

Major Projects Canberra

City to Woden Light Rail: Stage 2A City to Commonwealth Park Business Case

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Document sign-off sheet

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- Chapter 5.0 (Design and Output Specifications); and
- Chapter 3.0 (Needs Analysis).

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I.0 Executive summary

I.1 Project description

The ACT Government is progressively developing the Canberra light rail network to improve transport accessibility by providing more convenient, reliable and high-quality public transport services that better connect Canberrans, while supporting opportunities for urban renewal across the Territory.

With the completion of the network's initial stage between Gungahlin and the City in 2019, the ACT Government is committed to constructing Stage 2, which will extend light rail south from the City to Woden, creating a north-south public transport spine for Canberra.

Stage 2 is planned to be delivered in two components as outlined in Figure 1-1 – Stage 2A between the City and Commonwealth Park on Commonwealth Avenue and Stage 2B between Commonwealth Park and Woden.

Stage 2A of City to Woden Light Rail to Commonwealth Park (the **Project**) as outlined in this Business Case entails:

1. The design and construction of light rail between the City and Commonwealth Park (on Commonwealth Avenue), with associated stops, track, structures, depot, road, signalling, preparatory and other works required for its completion; and
2. The ongoing operation and maintenance of that light rail system.

This Business Case has been developed on the basis that light rail is recommended to be delivered between the City and Woden as soon as possible. Recognising, however, that complex Commonwealth planning approval processes exist which will take some time to resolve, this Business Case recommends that the procurement and delivery of Stage 2A, the first component of the route from the City to Commonwealth Park (on Commonwealth Avenue) commence upon approval of this Business Case. It is expected that this first component, while still technically complex, and also subject to Commonwealth Government planning approvals, will be capable of procurement and the commencement of delivery ahead of Stage 2B (from Commonwealth Park to Woden) receiving relevant approvals.

Importantly, even in a worst-case scenario where Commonwealth approvals are not obtained for Stage 2B, the Project stands on its own merits and represents an important expansion of Canberra's light rail network.

In preparing this Business Case, Major Projects Canberra (and before that Transport Canberra and City Services) has taken account of the ACT Government's long-term plan to develop a city-wide light rail network that will shape the future development of the Territory and provide an integrated public transport network for Canberrans.

The Project will improve public transport accessibility and transport choice for Canberrans, encouraging new users and providing an attractive, reliable and frequent public transport option. Together with City to Gungahlin Light Rail and future network stages, including the completion of Stage 2B to Woden, the Project seeks to give greater

Figure 1-1: City to Woden Light Rail (Stage 2A and 2B)



choice for all Canberrans and to change how we move around Canberra to create a more sustainable, inclusive and competitive city.

The Project will also facilitate urban renewal and assist the ACT Government in achieving its land use and development objectives, in the first instance in the Acton Waterfront, City Hill and City West, and then to Woden, supporting revitalisation along the corridor and particularly in the Woden Town Centre.

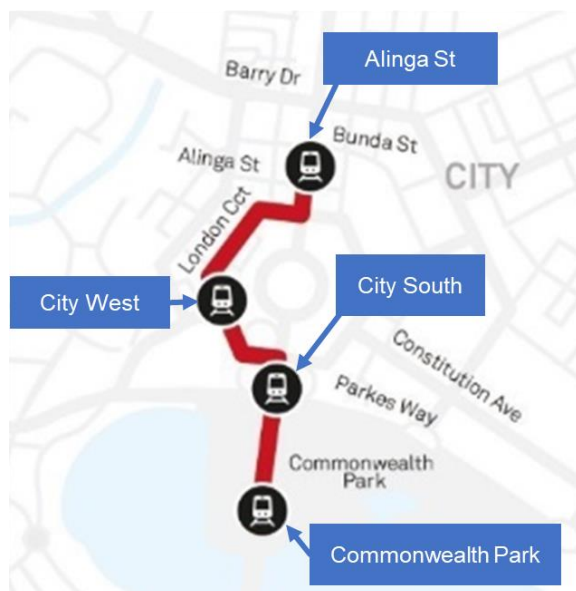
1.2 Purpose and recommendation

The purpose of this Business Case is to (i) seek approval to enter into a procurement process and undertake associated activities for the delivery of the Project, and (ii) provide an analysis of the options, benefits, risks and procurement approach for the Project. The findings will support Cabinet in its investment deliberations regarding the Project.

This Business Case recommends that the ACT Government:

1. Approve the Project – as depicted in Figure 1-2 – to extend light rail from the existing terminus at Alinga Street, south along Northbourne Avenue, around the western side of London Circuit to Commonwealth Avenue, terminating at Commonwealth Park, as the first component of light rail to be delivered between the City and Woden;
2. Continue with planning, design and other associated activities for the “State Circle East” alignment as the preferred route to connect light rail to Woden, with the alignment extending from the terminus at Commonwealth Park, across Lake Burley Griffin and onward to State Circle where it will travel around the eastern side of Parliament House until it reaches Adelaide Avenue, travelling south to Woden and terminating at Callam Street at a new bus/light rail interchange;
3. Proceed with procurement for the design, construction and operation of the Project on the basis of a sole source procurement with the Canberra Metro consortium.
and
4. Implement all other associated matters as outlined in this Business Case.

Figure 1-2: City to Commonwealth Park (Stage 2A) route alignment



1.3 Policy context

The Canberra light rail network represents a key infrastructure investment that will shape how Canberra moves and grows over the coming decades. It is essential that each stage is developed in accordance with the ACT Government's broader vision for the city. In this regard, this Business Case has been prepared in the context of

land use and transport policies developed by both the ACT and Commonwealth Governments, and in consultation with other ACT Government directorates.

Transport policy

The ACT Government is delivering a light rail network for Canberra that will contribute to the development of a modern, sustainable and integrated public transport system for the Territory. The Business Case reflects the goals and ambitions of various ACT Government directorates policy documents, including:

- Moving Canberra 2019-2045 (currently draft);
- Light Rail Network Plan; and
- Public Transport Improvement Plan.

Land use and city renewal policy

Light rail will play a key land use and planning role for Canberra, stimulating sustainable urban renewal and more efficient land use across the Territory. This Business Case has considered the following land use and city renewal policy documents:

- Territory Plan;
- City Plan;
- National Capital Plan (NCP);
- ACT Planning Strategy 2018;
- City Renewal Authority 2025 Strategic Plan; and
- *Canberra: A Statement of Ambition*.

1.4 Prior activities

This Business Case follows and considers previous activities, analyses and studies undertaken to progress the development of a light rail network for Canberra.

Since the ACT Government's 2016 announcement of City to Woden Light Rail as the preferred next corridor of the network, it has undertaken a series of activities to further define and develop the Project including planning, design, technical, financial and economic analysis and community and stakeholder consultation.

In 2017, the ACT Government undertook a range of scoping activities to understand the key considerations, risks, opportunities and objectives for the development of light rail to Woden. This work led to a range of options being explored and offered for community and stakeholder consultation.

This analysis allowed the ACT Government to identify the core alignment and engineering requirements, as well as the key challenges to delivering a solution that maximises the outcomes for the corridor, the network and the Territory. These activities informed the options analysis for the City to Woden Light Rail project (see Section 1.6).

In 2018 the Commonwealth Joint Standing Committee on the National Capital and External Territories (JSC) undertook an inquiry into light rail between the City and Woden (the 'JSC inquiry'), with the following terms of reference:

1. The relevant Parliamentary approval processes for works within the Parliamentary Zone;
2. The roles of the National Capital Authority (NCA) and the Commonwealth Government, and the associated approval processes;
3. Possible impacts on the Parliamentary Zone and Parliamentary precincts, including any impacts on the heritage values and national importance of the Parliamentary Zone and our national capital;
4. The identification of matters that may be of concern prior to formal Parliamentary or Commonwealth Government consideration of the project between the City and Woden; and

5. Any other relevant matter the Committee wishes to examine.

While the primary focus of the JSC inquiry was on the section of the route alignment that traverses the Parliamentary Zone (which is within the Stage 2B alignment), the JSC inquiry has informed the development of the Project in a number of ways, particularly the staged delivery strategy.

As previously outlined, this Business Case assesses the delivery of light rail to Commonwealth Park (on Commonwealth Avenue, on the north side of Lake Burley Griffin) as the initial component of a light rail line which is proposed to ultimately extend to Woden. The JSC inquiry highlighted the complexities of the Commonwealth approvals process and included a requirement for future JSC inquiries in relation to the section of the alignment that traverses the Parliamentary Zone. The proposed initial delivery of Stage 2A (as recommended in this Business Case) is in recognition of the likely time and complexity involved in achieving planning approval for Stage 2B.

The JSC recommendations, agreed to in principle by the Commonwealth Government, and NCA planning regime may have material consequential impacts, specifically in relation to wire-free requirements, visual amenity and urban design outcomes. These are outlined in Chapter 6.0 of this Business Case.

In 2019, consultation continued with the Commonwealth Government, including discussions with the Department of Environment and Energy and the NCA regarding route alignments and Environment Protection and Biodiversity Conservation (EPBC) Referrals were lodged on the basis of the staged approach outlined in this Business Case.

1.5 Need for Investment

Canberra is one of Australia's most liveable cities. For the Territory to remain competitive into the future and to continue to provide the high-quality lifestyle Canberrans enjoy, the Territory needs to make strategic policy decisions and investments *now* to address the current and future challenges that Canberra is experiencing and will continue to face. These investments will also contribute to achieving local and national policy priorities relating to employment, productivity, housing affordability and economic diversification.

The Project will deliver a host of benefits and addresses the following key challenges:

- The need to invest in Canberra's liveability and economic connections to attract and retain people and businesses. With significant infrastructure investments occurring in other Australian capital cities, the Territory should invest now to ensure Canberra remains one of Australia's and the world's most liveable cities;
- The need for a more efficient use of land and infrastructure in Canberra. Canberra is low density when compared to other Australian cities, which will lead to additional expenditure on power and utilities, roads and other public infrastructure such as schools and hospitals which may be reduced through increased densification. The Project will support and optimise planned investment and urban renewal in the city centre, Acton Waterfront and City Hill by providing improved public transport accessibility and enhancing urban amenity. Completion of Stage 2B to Woden will support the revitalisation of the Woden Town Centre, as well as planned developments in Curtin and elsewhere along the alignment;
- The need to continue improvements in the utilisation of Canberra's public transport system. There exists an opportunity to further enhance the utilisation of public transport in Canberra. A failure to continue to improve public transport utilisation is unsustainable for a growing city in the long term. Experience in other cities and the initial patronage of City to Gungahlin light rail are evidence that light rail is an attractive transport option, offering a different (but complementary) experience to bus networks with a commensurate increase in public transport patronage; and
- The need to reduce car dependency in Canberra. Car use in Canberra is high and this, combined with population growth, will lead to a congested road network with negative social, economic and environmental impacts, such as noise pollution and slower travel times.

Addressing these challenges will help achieve the ACT Government's vision for Canberra as a more connected, compact and competitive city. It is sensible for Canberra to make these investments *now* so as to avoid the acute congestion problems and increased construction costs that arise from delays to such investments (as has been experienced in other larger Australian cities).

1.6 Options Analysis

1.6.1 City to Woden Light Rail

This Business Case is consistent with priorities previously identified in the ACT Government's Light Rail Network Plan¹ to:

- Ensure the light rail network connects to other modes of transport and employment hubs;
- Invest in corridors where there is a future need; and
- Shape the growth of the city.

Stage 2 of Canberra light rail between the City to Woden was identified as a high priority due to its capacity to connect key residential, cultural, commercial and employment centres across the city using an integrated public transport network. While the City to Woden route alignment has technical and planning challenges, its strategic significance to the city in connecting north and south Canberra means that it is a crucial part of the network. It will contribute to Canberra's connected, integrated public transport network creating a north-south light rail spine and has the potential to support urban renewal, especially in Woden.

As the design and technical analysis for the City to Woden corridor has developed, various options for the full route have been considered and refined. Two route alignment options – City to Woden via Parkes and Barton and City to Woden via Capital Circle – were considered in early design and community consultation in 2017. One of these options – City to Woden via Parkes and Barton – was previously recommended by the ACT Government in its submission to the JSC inquiry based upon circumstances then existing.

Following the JSC inquiry and with further guidance having been provided by the Commonwealth Government, together with further technical analysis and deliberations by the ACT Government, three route alignment options between the City and Woden were considered:

1. **Option 1:** City to Woden via State Circle (East);
2. **Option 2:** City to Woden via Capital Circle; and
3. **Option 3:** City to Woden via Parkes/Barton.

A comparative assessment of the merits of these route alignments when evaluated against a series of criteria (connectivity and urban renewal, planning and technical and cost and risk contingency) has resulted in a recommendation that light rail be constructed in the corridor between the City and Woden via State Circle East as outlined in Figure 1-3.

Figure 1-3: City to Woden via State Circle East (Option 1)



¹ Transport Canberra, 'Light Rail Network', https://www.tccs.act.gov.au/data/assets/pdf_file/0011/984638/Transport-Canberra-Light-Rail-Network.PDF

This alignment is preferred as it provides a balanced solution that supports the achievement of ACT Government objectives and is likely to have the best chance of ultimately obtaining all necessary planning approvals, particularly in relation to Stage 2B.

1.6.2 Staged delivery

Given the complex planning approvals processes required to deliver light rail from the City to Woden – particularly in relation to light rail through the Parliamentary Zone – analysis was undertaken to determine the most appropriate manner to deliver light rail in the corridor. Two options have been considered:

- **Option 1:** a staged delivery approach, with the initial component to be delivered from the existing light rail terminus at Alinga Street to Commonwealth Park (on Commonwealth Avenue, on the northern side of Lake Burley Griffin). That 'Stage 2A' component is the subject of this Business Case. 'Stage 2B' from Commonwealth Park to Woden through the Parliamentary Zone would then be delivered as a future component of the City to Woden corridor once Commonwealth planning approvals are received and in accordance with a future business case.

The proposed initial component of the corridor to Commonwealth Park was delineated on the basis that it allows planning complexities associated with the Parliamentary Zone and the Commonwealth Avenue Bridge to be addressed as part of the ongoing Stage 2B planning processes; and

- **Option 2:** a single stage delivery approach such that City to Woden Light Rail is constructed in one continuous build.

A staged delivery approach (Option 1) is preferred as it:

- Provides improved transport connectivity between the City and those areas on the northern side of Lake Burley Griffin sooner than otherwise would be possible under a single stage approach. This is due to planning complexities and associated timeframes related to the construction of light rail in the Commonwealth Avenue Bridge area and the Parliamentary Zone;
- Supports the optimisation of urban renewal activities planned or underway in City Hill, City West and the Acton Waterfront by providing a frequent and high-quality public transport solution to Commonwealth Park. In this respect, the Project stands on its own merits even in a worst-case scenario in which Commonwealth planning approvals are not provided for Stage 2B;
- Enables valuable corporate knowledge garnered by both the ACT Government and Canberra Metro during the delivery of City to Gungahlin Light Rail to be maintained and applied to the City to Woden corridor. Both the ACT Government and Canberra Metro teams can productively progress the delivery of light rail while Stage 2B planning approvals are sought;
- Assists in retaining local skills and capabilities developed during the construction of City to Gungahlin Light Rail, supporting the economic diversification objectives outlined in *Canberra: A Statement of Ambition*; and
- Demonstrates the ACT Government's commitment to delivering light rail in full City to Woden corridor.

Although the staged delivery approach is recommended, it does have a number of potential disadvantages. These include:

- Potential construction inefficiencies from delivering light rail in the corridor over two stages. However, both Stage 2A and Stage 2B will be complex projects. Delivering light rail in separate components may assist the ACT Government in better managing Project risks with potential off-setting financial benefits;
- Potentially longer construction disruption than would otherwise be the case. The staged delivery approach will, however, limit disruption to each stage rather than across the entirety of the corridor. In addition,

combining the delivery of Stage 2A with the delivery of the London Circuit / Commonwealth Avenue project will minimise disruption from these two projects; and

- The risk that the Commonwealth Government does not ultimately approve Stage 2B or agree reasonable terms that would allow Stage 2B to proceed. Offsetting this, Stage 2A stands on its own merits even if there is a worst-case outcome in relation to Commonwealth approvals.

On balance, the benefits of a staged delivery approach are considered to outweigh its potential disadvantages and as such, this Business Case recommends that City to Woden Light Rail proceed in this manner. Consequently, this document assesses the benefits, risks, costs and delivery model options for City to Commonwealth Park Light Rail (Stage 2A) as the initial component of a light rail line to Woden.

Concurrently, it is proposed that the ACT Government will continue design, planning and approval activities for Stage 2B to Woden using the State Circle East alignment, noting the complexities that are associated with constructing light rail through the Parliamentary Zone.

I.7 Project Scope

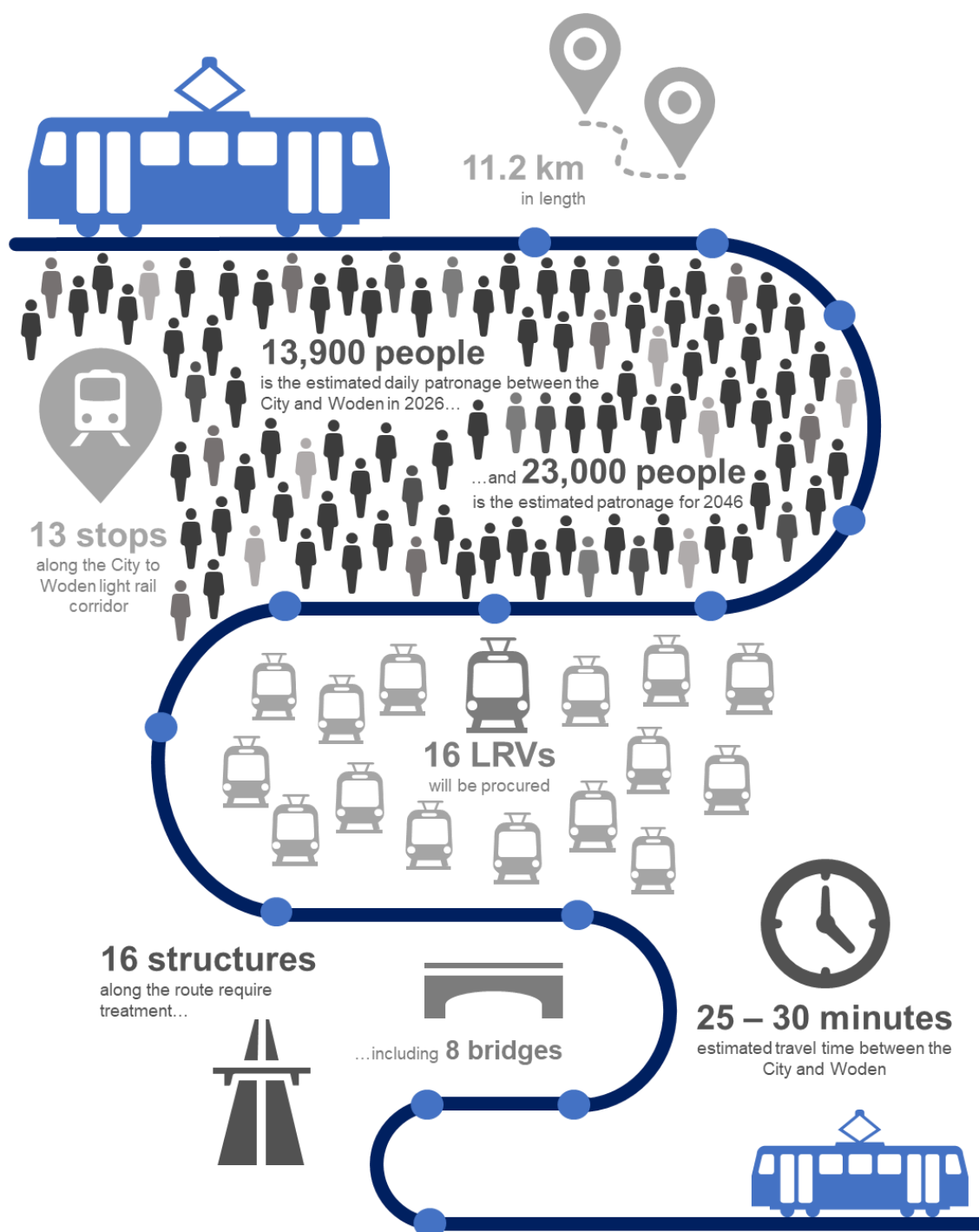
I.7.1 Light Rail Stage 2: City to Woden

As outlined in Section 1.6, City to Woden Light Rail will be delivered in two stages: Stage 2A to Commonwealth Park and Stage 2B to Woden (refer Figure 1-1 above). City to Woden Light Rail will provide improved public transport choice for Canberrans, while also supporting the revitalisation of suburbs along the corridor to create a more compact and connected City that promotes inclusivity, high quality spaces and more community-focused neighbourhoods.

Key features of City to Woden Light Rail are outlined in Figure 1-4. These are subject to further technical and operational analysis and design.

While the ACT Government is committed to completing the full City to Woden light rail alignment, the Project scope outlined in this Business Case focuses on Stage 2A.

Figure 1-4: Anticipated City to Woden Light Rail key features



1.7.2 Place making and customer experience

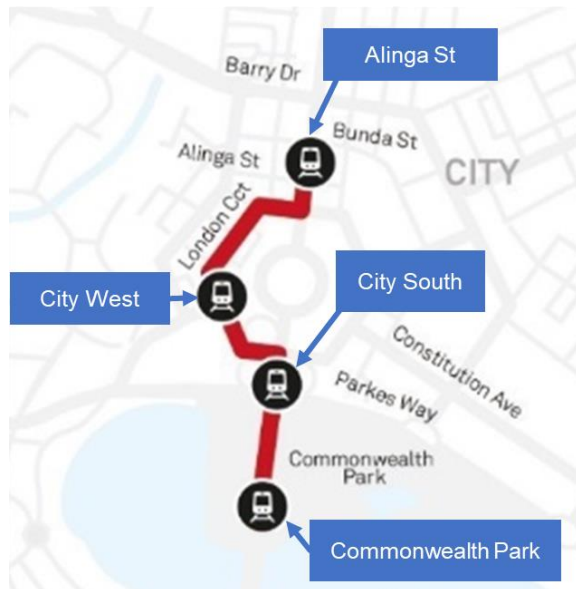
The Project will extend light rail from the current terminus at Alinga Street to Commonwealth Park, improving public transport connectivity between those areas on the northern side of Lake Burley Griffin and the City.

In doing so, the Project will support revitalisation activities planned or underway in City Hill, City West and the Acton Waterfront, with light rail carefully designed to improve urban amenity outcomes along the alignment. Investment in light rail has demonstrated its potential to contribute to the creation of vibrant activity centres, supporting urban renewal and creating attractive, people friendly places. It is anticipated that the Project will be no exception, complementing planned mixed use developments and supporting the achievement of the ACT

Government's vision for Canberra as a connected and compact City.² These benefits will grow as the ACT Government completes Stage 2B to Woden, supporting the revitalisation of the Woden Town Centre and connecting key employment, cultural, residential and commercial hubs with a high quality light rail network.

Figure 1-5 depicts the indicative stops on the proposed alignment, extending south from the existing Alinga Street terminus. It should be noted that stop locations may change through the Project's procurement phase as additional planning and engineering works are undertaken.

Figure 1-5: Potential Project stops



The Project's operations will be an extension of the City to Gungahlin Light Rail service and will therefore have the same frequency. Light rail services currently operate with a frequency of at least 10 minutes on weekdays between the core hours of 7am and 6pm, with 6 minute frequencies being provided in peak hours. Outside these hours on weekdays and all day on Saturdays, Sundays and public holidays, the frequency is anticipated to be at least every 15 minutes.

1.7.3 Patronage and travel times

Transport modelling has been used to estimate the anticipated daily patronage for the route in 2026 and 2046. The anticipated travel time and patronage numbers are outlined in Table 1-1. It should be noted that these patronage figures were generated for the purposes of the economic analysis and initial technical design and as such are only a forecast. Actual patronage figures may differ substantially from these estimates.

The early patronage of City to Gungahlin Light Rail, with more than one million boardings between the commencement of operations in mid-April and mid-July 2019, indicates Canberrans willingness to use light rail when it is available. The completion of the north-south spine between Gungahlin and Woden will connect more communities with an attractive, reliable and affordable public transport choice.

Travel times in the table below are indicative and subject to further operational analysis and design.

² ACT Government, 'Canberra: A Statement of Ambition', http://www.cmd.act.gov.au/_data/assets/pdf_file/0006/865482/Canberra-A-Statement-of-Ambition.pdf, 2016

Table 1-1: Estimated Project travel time and patronage

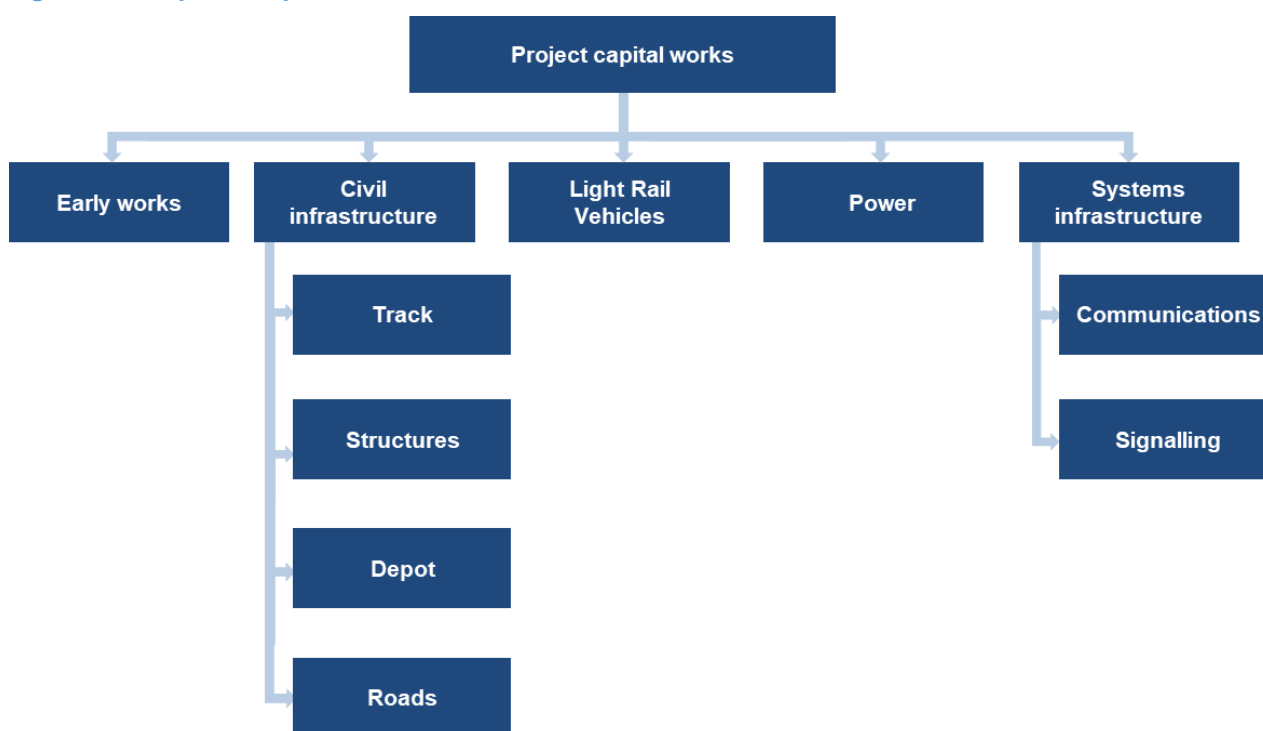
Assumption	City to Commonwealth Park	City to Woden
Estimated travel time (minutes) ³	6	25 – 30
Estimated additional daily patronage (2026) ⁴	2,500	13,900
Estimated additional daily patronage (2046) ⁵	4,300	23,000

1.7.4 Construction and operation of light rail

The Project includes the construction of stops, track, structures, roads, signalling and other works, as well as works to the existing Mitchell Depot, and the procurement of four additional Light Rail Vehicles (LRVs). The final design of the Project is expected to be largely consistent with existing City to Gungahlin Light Rail designs to ensure a high quality, coherent, customer-focused network.

The following figure provides a high-level overview of the capital works associated with the Project.

Figure 1-6: Proposed capital works



Key physical features of note for the Project include:

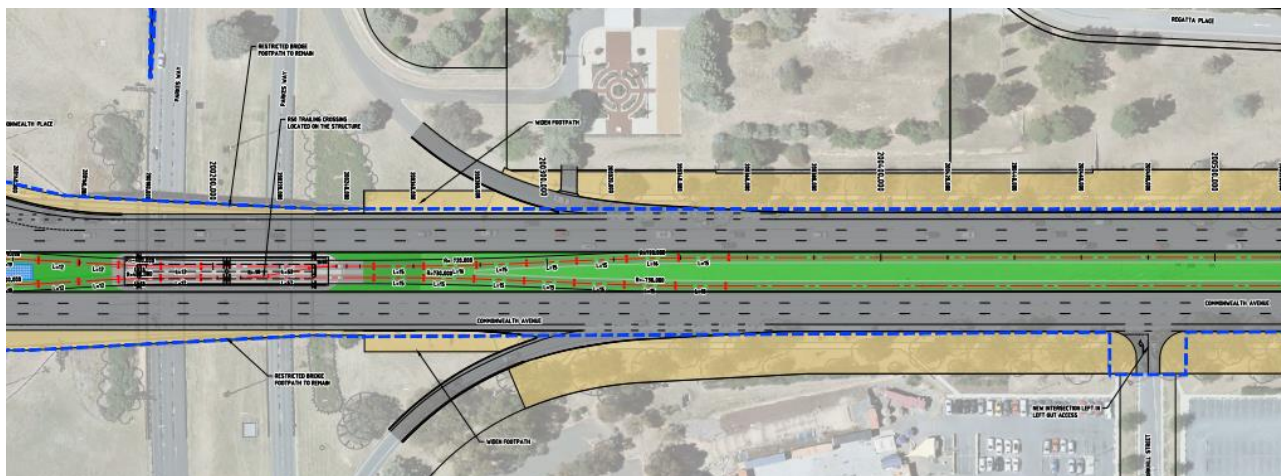
- Structures:** It is assumed for the purposes of this Business Case that London Circuit is raised to meet Commonwealth Avenue (with approval for those works being sought as part of a separate Business Case) and a signalised intersection is formed. Light rail will traverse the intersection to connect to Commonwealth Avenue. A new bridge for light rail will be constructed across Parkes Way in the Commonwealth Avenue median (see Figure 1-7);

³ Wire-free operations (if required) and the raising of London Circuit may impact on the travel times outlined in this Business Case. Wire-free operations from Commonwealth Avenue to Kent Street would add in the order of 2 to 2.5 minutes to the journey time from the City to Woden

⁴ The patronage figure refers to the increase in light rail boardings that occur following the commencement of operations. Figures are rounded to the nearest hundred boardings

⁵ The patronage figure refers to the increase in light rail boardings that occur following the commencement of operations. Figures are rounded to the nearest hundred boardings

Figure 1-7: Light rail bridge across Parkes Way (indicative)



- **Light Rail Vehicles:** The Project will require additional light rail vehicles (LRVs). LRVs are anticipated to be of a similar design to the existing fleet that operates between the City and Gungahlin. The preferred traction power system for the project is an overhead wire (OHW) system. LRVs will be procured on that basis, which will provide the following advantages:
 - A reduced travel time between the City and Woden in the order of 2 to 2.5 minutes;
 - Reduced cost;
 - Maintenance simplicity;
 - Greater certainty of reliability; and
 - A delay to the procurement of batteries / super capacitor technology. If wire-free operations are required for subsequent parts of the light rail network, battery technology acquired at that time will likely be further advanced.

However, JSC recommendations and NCA planning conditions may necessitate wire-free running for sections of the Stage 2A route alignment, requiring LRVs have an on-board energy storage system. This would also necessitate the 14 LRVs procured as part of the City to Gungahlin Light Rail project (which were specified to enable wire-free running) to be modified to allow the whole fleet to be capable of end-to-end running from Gungahlin to Commonwealth Park.

The exact number and type of LRVs to be procured will depend on:

- Negotiations with Canberra Metro and the cost of each LRV. The cost per LRV will vary depending upon the total size of the production run, so it may be appropriate to purchase LRVs in excess of the minimum needed for the Project (noting the intention to deliver Stage 2B in the future);
- The final operating parameters of the Project, including any requirement for wire-free running which could necessitate an additional two LRVs due to extended journey times; and
- Program implications, production run timing and service level implications on City to Gungahlin Light Rail should wire-free running (and therefore retrofitting of the existing fleet with battery technology) be required.

For the purposes of this Business Case, it is expected that a minimum of four LRVs will be required for the Project and on-board energy storage systems are not required. Section 1.8 provides an indication of the additional cost that could be expected if wire-free running is required, noting the JSC and NCA's previous position in this regard.

- **Mitchell Depot:** the City to Gungahlin Light Rail maintenance and stabling facility and depot in Sandford Street, Mitchell is of sufficient size to accommodate the additional four LRVs to operate a north-south light rail route from Gungahlin to Commonwealth Park. The existing facilities were designed with expansion of the network in mind. Minimal works are required within the existing depot site, including a new stabling road to accommodate the four additional LRVs. There may be benefit in expanding the depot as part of Stage 2A to cater for the fleet requirements for City to Woden Light Rail as outlined in Section 1.8 below.

1.8 Cost and Contingency

1.8.1 Capital costs

Estimated total Project Outturn Cost at a P75 level are shown in Table 1-2.

Table 1-2: Project Outturn Cost estimate (\$m, nominal, P75)

Cost area	Cost
Stops and Precincts	
Roads and Utilities Infrastructure	
Rail Alignment	
Signalling, Rail Systems and Power	
Depot and Stabling	
Preliminaries	
Traffic Management	
Design	
Insurance	
Security & Bonds	
Contractor's Overhead & Profit	
Total Capital Cost	
Rolling Stock ⁶	
Total Alignment Costs	
Escalation	
Subtotal	
Contingency	
Project Outturn Cost	

The Project Outturn Cost to construct Stage 2A is made up of:

- total alignment costs, of which the most significant contributors are preliminaries and signalling, rail systems and power which represent of the total alignment cost respectively;
- escalation; and

⁶ Before escalation and contingency

- contingency. This contingency figure is at a P75 level

These capital costs do not include Major Projects Canberra agency costs or Independent Certifier costs, cost associated with delivering Stage 2B, or costs associated with progressing design, planning and early contractor involvement for Stage 2B.

Other assumptions and key exclusions from these estimates and Project risks are described in this Business Case.

1.8.2 Additional scope elements

The Project Outturn Cost outlined above excludes a number of scope items, that either are (i) not strictly necessary for the operation of Stage 2A, (ii) attributable to the City to Gungahlin route alignment or (iii) may be required following further Project development or consultation. An overview of these elements and relevant considerations to potentially procuring them in conjunction with Stage 2A are outlined in the table below. Capital costs and contingency figures are indicative and subject to further refinement.

Table 1-3: Indicative cost of additional scope or separate projects (\$m, nominal, P75)

Scope element	Relevant considerations to procurement in Stage 2A	Estimated cost
Additional four LRVs	<ul style="list-style-type: none"> May provide opportunities for cost efficiencies and economies of scale in the production run, leading to a lower cost per vehicle; Assist in minimising impacts on City to Gungahlin Light Rail should wire-free running be required by the NCA to obtain planning approvals (see below); and May provide additional flexibility to ensure headways are met should Mitchell Stop be constructed (see below), or increased headways are proposed for City to Gungahlin Light Rail. 	
Depot expansion	<ul style="list-style-type: none"> Provide flexibility to accommodate any additional fleet purchased by the ACT Government (see above). 	
Wire-free running and urban design finishes	<ul style="list-style-type: none"> The JSC recommended, and the Commonwealth Government agreed, that any light rail on or crossing Commonwealth Avenue, Kings Avenue, State Circle, Brisbane Avenue, Sydney Avenue, Canberra Avenue (to Manuka Circle), Hobart Avenue, Melbourne Avenue, Adelaide Avenue (to Kent Street) and in the Parliamentary Zone be wire-free. This spans part of Stage 2A and 2B. As such it is likely that to obtain approval for City to Woden Light Rail sections of wire-free running will be required; As was the case with City to Gungahlin Light Rail, higher standard urban design finishes (when compared to light rail projects in other cities) are likely to be required to meet the NCA's standard to obtain Works Approval; Will support urban amenity outcomes; Cost includes batteries on new LRVs and retrofitting of the existing fleet; and The extent of any requirement for wire-free running may also increase journey times and necessitate the procurement of up to an additional two LRVs 	

⁷ Contingency has been included on a proportional basis. A bottom up risk assessment has not been undertaken

⁸ Contingency has been included on a proportional basis. A bottom up risk assessment has not been undertaken

⁹ This is a high level estimate that refers to costs associated with the fitting of on-board energy storage systems to LRVs. It does not include the purchase of any additional LRVs that may be required should wire-free running be necessary. It is likely that wire-free running requirements would result in other additional costs (e.g. charging stations) being incurred, but may also result in costs currently in the Project scope not being required (e.g. overhead catenary). Contingency has been included on a proportional basis. A bottom up risk assessment has not been undertaken

Scope element	Relevant considerations to procurement in Stage 2A	Estimated cost
Sandford Street Stop in Mitchell	<ul style="list-style-type: none"> May facilitate earlier delivery of the ACT Government commitment to construct a light rail stop at Sandford Street in Mitchell; Potential to minimise procurement and agency costs by procuring these works as part of a larger package; and Potential for construction and consequently cost efficiencies in delivering the works as part of a larger package. 	
Environmental offsets	<ul style="list-style-type: none"> Likely to be required to meet regulatory and planning approvals. 	
Total additional scope cost		

1.8.3 Operating costs

Operating expenditure (including ongoing operations, maintenance and lifecycle costs) associated with the Project is anticipated to amount, in nominal terms, to approximately in the first full year of operations (P75). This is shown in Table 1-4.

Table 1-4: Project Opex cost estimate – first year¹² of operations (\$m, nominal, P75)

Cost area	Cost
Salaries and wages	
Depot / Stabling Costs	
Operations and General Costs	
Electricity Supply	
Special Events	
Total Operating Costs	
Vehicle maintenance costs	
Infrastructure Maintenance	
Total Maintenance Costs	
Lifecycle Costs	
Subtotal	
Contingency	
Total Opex	

¹¹ This is a high level indicative estimate of the potential environmental offset required and is subject to further analysis

¹² This has been calculated as the first 12 months of operations (i.e. not financial year)

1.9 Economic Analysis

Major Projects Canberra has, independently of its economic advisor, derived a blended indicative BCR, inclusive of wider economic benefits, between Gungahlin and Woden and Gungahlin to Commonwealth Park of 1.2 each. This blended analysis utilises:

- Gungahlin to the City benefits as per the Light Rail Stage 1 Business Case;
- Actual Gungahlin to the City project costs as presented in the Project Delivery Report, adjusted to \$2019; and
- Stage 2A and Stage 2B analysis as set out in this Business Case.

An assessment of the economic merits of both Stage 2A (the Project) and City to Woden Light Rail (Stage 2A and Stage 2B), has been conducted using a Cost Benefit Analysis (CBA) to produce Benefit Cost Ratios (BCRs) and Net Present Values (NPVs) based on strategic transport modelling and expected land use changes.

The analysis includes an assessment of the impact of Stage 2A and City to Woden Light Rail (Stage 2A and 2B) on urban development and revitalisation along the corridor. It is anticipated that construction of the light rail routes will accelerate development at the Acton Waterfront, and the benefits of this acceleration are captured in the CBA. Additionally, it is expected that the construction of the City to Woden Light Rail (Stage 2A and 2B) will activate the land along the City to Woden corridor and increase population and employment growth in the area, which is included in the City to Woden CBA.

The approach used for the economic appraisal of Stage 2A and City to Woden Light Rail is consistent with the CBA methodology used for the City to Gungahlin Light Rail Business Case, with appropriate modifications to reflect updated industry appraisal guidelines and parameters. The results of the analysis are summarised below.

The approach used for the blended BCR has not been created using new analysis or under the same process as the Stage 2A or City to Woden Light Rail BCRs. Consequently, underlying assumptions from the City to Gungahlin BCR may not be relevant and not provide the same outcome when viewed on a City to Woden basis.

The City to Gungahlin results are based on assumptions, estimates, modelling and forecasts believed to be reasonable at the time of the 2014 Business Case. They do not reflect any changes in scope, costs or economic reality since then, and as such do not represent the realised costs and benefits from the project.

When considered in conjunction with the BCR for the City to Gungahlin (Stage 1), the benefits of light rail across the north-south corridor between Gungahlin and Woden via the City, inclusive of wider economic benefits, exceed the costs.

Results for the City to Gungahlin Project should be interpreted in conjunction with the assumptions and limitations set out in the Business Case for that Project.

Table 1-5: Results summary (\$2019m, real, PV at 7%)

Benefit Category	Gungahlin to Woden (Indicative Blended)	Gungahlin to Commonwealth Park (Indicative Blended)	City to Commonwealth Park	City to Woden	City to Gungahlin ¹³
Project benefits					
Transport benefits					569
City shaping benefits					534

¹³ Results for the City to Gungahlin Project escalated to 2019\$ at 7%

Benefit Category	Gungahlin to Woden (Indicative Blended)	Gungahlin to Commonwealth Park (Indicative Blended)	City to Commonwealth Park	City to Woden	City to Gungahlin ¹³
Wider economic benefits					278
Total Project benefits					1,380
Project costs					
Project capital costs					
Operating costs					
Development costs					-
Total Project costs					
Results					
NPV (<i>excluding WEBs</i>)					69
NPV (<i>including WEBs</i>)					346
BCR (<i>excluding WEBs</i>)	0.8	0.9	0.4	0.6	1.1
BCR (<i>including WEBs</i>)	1.2	1.2	0.6	1.0	1.3

The CBA has produced BCRs for City to Woden of 1.0 and City to Commonwealth Park of 0.6 (including WEBs). A separate CBA has not been conducted for the Commonwealth Park to Woden component of the alignment on the basis that it will form part of a future business case for Stage 2B.

However, on the basis of the City to Woden and City to Commonwealth Park BCRs calculated above, it is likely a BCR for this section would exceed 1.0. Indicatively, deducting the costs and benefits of the City to Commonwealth Park economic analysis from the costs and benefits of the City to Woden BCR would result in a residual indicative BCR of around 1.2.

While a CBA attempts to encompass all costs and benefits of a project to society, there are both elements that cannot be quantified/monetised, as well as wider project objectives that may not be well represented within the monetised benefits and costs. For example:

- The ACT Government has noted its plan to develop a city-wide light rail network over time. Key elements of that light rail network cannot be delivered without developing the section of the network from the City to Commonwealth Park;

¹⁴ Adjusted to reflect the actual cost of the City to Gungahlin Light Rail as presented in the Project Delivery Report

- Light rail can assist in enhancing the reputation of Canberra as a desirable city in which to live, visit and invest;
- Relative to other forms of travel, light rail can provide a significant improvement to the mobility and access to opportunities for disadvantaged groups, including easy access to stops and vehicles for the mobility impaired, the elderly and for families, in a network that is easy to use and understand;
- Given appropriate stop locations, light rail can also offer better quality access to community facilities and shopping opportunities, as well as improved personal safety relative to other forms of travel; and
- Light rail comfort is high when compared to other public transportation options.

In interpreting the results of the CBA, consideration should be paid to these potential costs and benefits that have not been fully captured. For this reason, the CBA should not be regarded as the only tool used by government in making an investment decision. It is appropriate for government to also have regard to a broad range of factors, such as stakeholders' views, long-term planning and transport objectives and the Territory's overarching vision for Canberra.

1.10 Key risks

The Project (Stage 2A) is a large and complex undertaking with a multitude of risks that should not be underestimated.

A non-exhaustive list of key Project risks is outlined in Table 1-6 below.

Table 1-6: Project key risks

Risks	
Procurement risks	
Value for money	<ul style="list-style-type: none"> • By undertaking a sole source procurement of the Project there is a heightened risk that value for money through the procurement process cannot be achieved and/or demonstrated.
Market capacity	<ul style="list-style-type: none"> • The procurement and delivery of the Project is expected to coincide with significant levels of transport infrastructure construction activity on the east coast of Australia. Consequently, there is a significant risk that there will be market capacity constraints impacting the budget, timing and potentially quality outcomes of the Project.
Project risks	
NCA approvals	<ul style="list-style-type: none"> • The alignment runs through 'Designated Areas' and as such will require the approval of the NCA. • This process increases the risk of delays and additional costs if deadlines are missed and/or additional unexpected conditions are imposed. This could include requirements for wire-free running (see wire-free risk below).
Environmental and other approvals	<ul style="list-style-type: none"> • Risk that the Project does not receive all other approvals required for the Project (e.g. EIS, EPBC, Territory planning approvals etc.). • There is a risk that Commonwealth environmental approvals processes may add longer than anticipated timeframes to the program, leading to a delay in delivering the Project. • There is also a risk that conditions of environmental approvals may require wire-free running (see wire-free risk below).

Risks	
Site access	<ul style="list-style-type: none"> Sections of the route alignment run on Commonwealth land. There is a risk that this may impact on site access due to changes in Commonwealth assets, lease or license agreements. There is a risk that the Commonwealth Government may seek lease or licence terms in respect of its land which are commercially unacceptable to the Territory. This would effectively inhibit progression of the Project, even if planning approvals are provided.
Traffic management	<ul style="list-style-type: none"> Risk that traffic is impacted more than expected during construction, particularly around the intersections at Commonwealth Avenue and Northbourne Avenue. The level of traffic disruption in and around the City will be impacted by the timing and approval of other projects in and around the route alignment, such as the raising of London Circuit at Commonwealth Avenue (see below).
Integration with City to Gungahlin Light Rail	<ul style="list-style-type: none"> Risks related to the addition of the Project to the network, such as: <ul style="list-style-type: none"> The interface with City to Gungahlin Light Rail causing issues during the delivery stage, or disruption in service once operational; and A discrepancy in the interface specification for the integration of City to Gungahlin Light Rail and the Project.
Interface with City to Woden Light Rail	<ul style="list-style-type: none"> The Project is the initial component in the extension of light rail from the City to Woden, resulting in interface and integration risks associated with the further extension. These risks include: <ul style="list-style-type: none"> Technical risks, including systems and design specifications; and Commercial and value for money risks associated with contracting arrangements and the renegotiation of the performance regime and payment mechanism.
Interface with third party and other developments	<ul style="list-style-type: none"> Risks arising due to the interface between the Project and other developments occurring in the area, such as works on Commonwealth Avenue Bridge and planned developments in City Hill and Acton Waterfront. Risk of consequential road investments being needed elsewhere in the network. Risk that the Edinburgh Avenue extension will not be completed in time, causing worsened traffic conditions.
London Circuit	<ul style="list-style-type: none"> Risks relating to complexities surrounding the structure between London Circuit and Commonwealth Avenue. Significant risks may also arise due to potential concurrent work related to the raising of London Circuit. Should the ACT Government decide to raise London circuit, it is recommended that it is appropriate to undertake that work as part of this Project (though separately accounted for). The program in this Business Case assumes that London Circuit is raised to be at-grade (with approval for these works being sought as part of a separate Business Case).
Utilities	<ul style="list-style-type: none"> Risk of delay due to the location of utilities and services, particularly around London Circuit and Commonwealth Avenue, such as:

Risks	
	<ul style="list-style-type: none"> ○ Insufficient resources or priority on the part of a utility provider for timely agreement; ○ Incorrectly identified utilities which result in a change in the level of works required; and ○ Unanticipated national or international events which impact on the Commonwealth Government's ability to address its infrastructure in the alignment.
Patronage	<ul style="list-style-type: none"> ● Risk of light rail patronage numbers differing from assumptions impacting transport revenue.
Site conditions	<ul style="list-style-type: none"> ● The risk of dealing with unexpected site issues, including contamination, geotechnical conditions, stormwater and flooding.
Safety	<ul style="list-style-type: none"> ● Overall safety risks to passengers and workers during construction and the ability to achieve a safe delivery and operational outcome, along with the risk of not obtaining accreditation from the Office of the National Rail Safety Regulator.
Wire-free	<ul style="list-style-type: none"> ● The JSC inquiry recommended (see Section 1.4) that any light rail on or crossing Commonwealth Avenue, Kings Avenue, State Circle, Brisbane Avenue, Sydney Avenue, Canberra Avenue (to Manuka Circle), Hobart Avenue, Melbourne Avenue, Adelaide Avenue (to Kent Street) and in the Parliamentary Zone be wire-free. The Commonwealth Government agreed with this recommendation. This spans part of Stage 2A and 2B. As such it is likely that to obtain approval sections of wire-free running will be required. ● Should wire-free running be required wire-free LRVs will be required to be purchased and the existing fleet would need to be retrofitted with battery technology to allow for an end-to-end service. As noted in Section 1.8, the cost of retrofitting is anticipated to have an additional capital cost of (nominal, P75). Additionally, there is a risk that City to Gungahlin Light Rail performance requirements will not be met during this process or that the process takes longer than anticipated and delays operational commencement for the Project. ● Additionally, should the NCA require wire-free running late in the Project's development, the lead time needed to retrofit LRVs will likely result in a delayed operational commencement. ● The extent of any requirement for wire-free running may also increase journey times and necessitate the procurement of up to an additional two LRVs.
Community	<ul style="list-style-type: none"> ● Risk that construction impacts on businesses.
Commissioning and start of service	<ul style="list-style-type: none"> ● Risk of late delivery and commencement of Project operations related to not successfully testing and commissioning (for reasons other than delays caused by the ACT Government).
Cost	<ul style="list-style-type: none"> ● Risk that the cost estimate supporting the Business Case is materially different to the final cost estimate due to the preliminary nature of the designs, incorrect assumptions, changed project timeframes, unsuccessful progression of the procurement process, unexpected planning conditions or the state of the national infrastructure delivery market.

Risks	
Scope creep	<ul style="list-style-type: none"> • Risk that incremental design demands increase Project costs.
Market price risk	<ul style="list-style-type: none"> • If relevant, interest rate risk – risk of higher interest rates when Project finance is rolled over beyond first financing periods; • Foreign Exchange risk – LRV procurement and other imported components of the Project will be subject to changes in foreign exchange rates; and • General labour price risk – while being a systematic risk, it should be noted that market capacity constraints on the east coast may drive up the cost of construction labour during the Project.

1.11 Delivery model analysis

The recommended delivery model to be pursued in the first instance for Stage 2A consists of two components:

- An 'Early Contractor Involvement' contract on a sole source basis with Canberra Metro in connection with Stage 2A. This will cover the period between this Business Case and the submission of a proposal for the main Stage 2A works by Canberra Metro. This 'Early Contractor Involvement' approach will enable development of Stage 2A to continue while Canberra Metro prepares its proposal. It will also establish a framework that will facilitate the achievement of a value for money outcome
- ; and
- Procurement of a contract for the Project's main works through a sole source negotiation with Canberra Metro. This will, at a minimum, include an integrated package consisting of the design, construction, operations and maintenance of the Project. The entry into a contract for the Stage 2A main works will come at the conclusion of the Stage 2A 'Early Contractor Involvement' process.

This recommended sole source approach provides the strongest basis to manage interface risks for the Design and Construct (D&C) and Operations and Maintenance (O&M) packages and maintains continuity of service quality and design between City to Gungahlin Light Rail and the Project under a single operator model that will provide a single seat journey between Gungahlin and Commonwealth Park. This approach is also likely to somewhat alleviate the risk of inadequate market participation caused by capacity constraints on the east coast of Australia, particularly given the Project's scale and Canberra Metro's strong position as the incumbent operator.

A robust value for money framework will be established (as described in this Business Case) to ensure value for money

I.12 Project governance

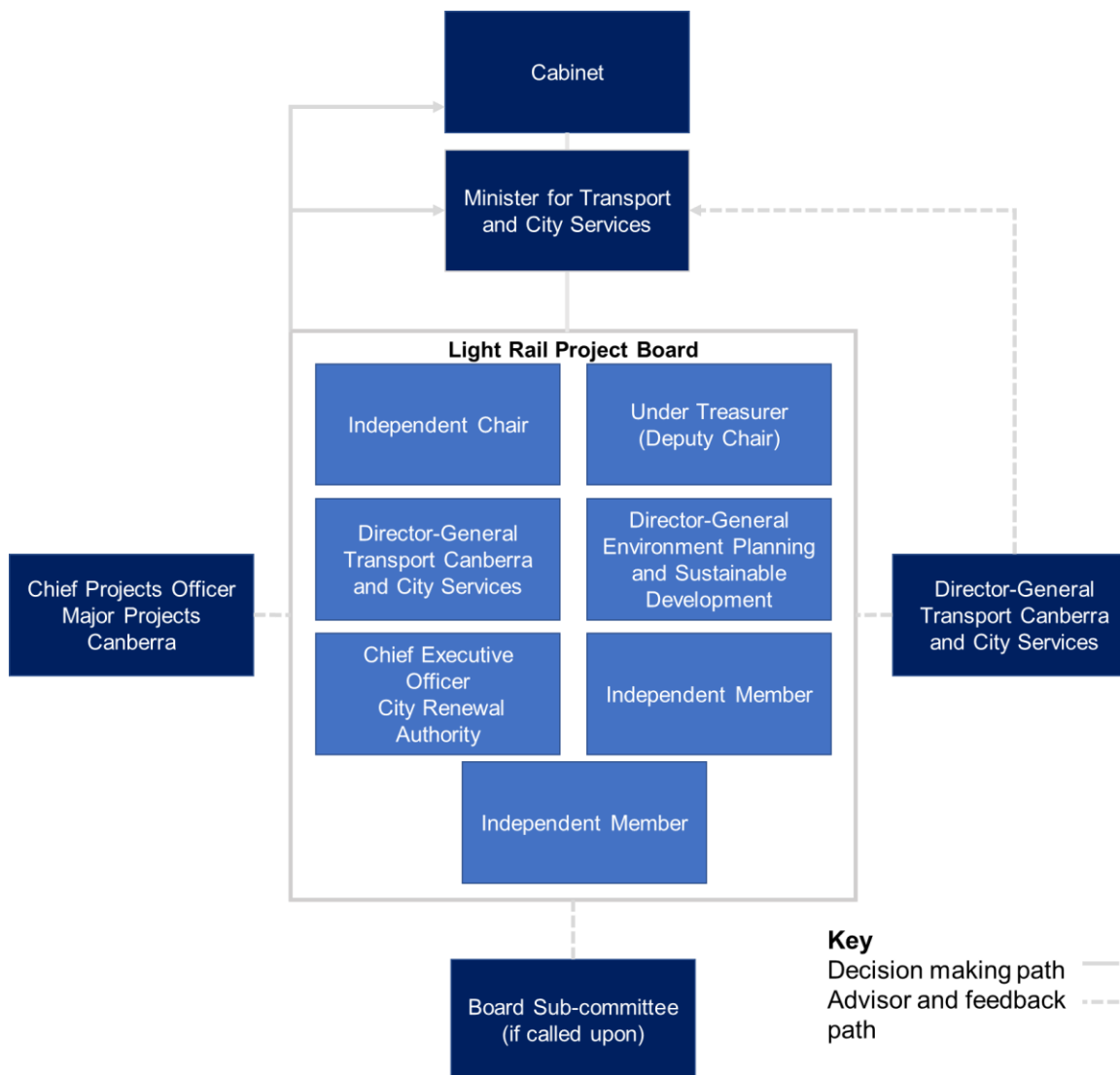
The Project will be procured and delivered by Major Projects Canberra in consultation with other relevant stakeholders, including the Transport Canberra and City Services Directorate, the Environment, Planning and Sustainable Development Directorate, and the City Renewal Authority. Once delivered, the management of the operations of the Project will revert to the Transport Canberra and City Services Directorate.

The Project will operate within a governance framework which includes a Light Rail Project Board with independent members, as well as representation from key ACT Government Directorates.

Within Major Projects Canberra, the Project team will report to the Project Director who will in turn report to the Chief Projects Officer. Ministerial responsibility for the Project will be with the Minister for Transport and City Services.

Figure 1-8 provides a high-level overview of the governance structure for the Project. However, these procurement governance arrangements are indicative and are subject to change following further consideration by Cabinet.

Figure 1-8: Governance structure



1.13 Stakeholder management

The Project will be delivered in a collaborative and consultative way. Given the Project will be co-delivered with the raising of London Circuit (if approved) and noting the range of other proximate projects in the city, coordination of engagement activities will occur with the Environmental, Planning and Sustainable Development Directorate and the City Renewal Authority.

Consultation has already occurred with the community and key stakeholders on the light rail network and the extension of light rail south to Woden, though substantial ongoing consultation will be required through the Project's procurement and delivery phase. Consultation will continue to consider the full alignment from the City to Woden (i.e. Stages 2A and 2B), but will focus on the implementation of the first component of the light rail route to Commonwealth Park.

The communications and consultation approach outlined in this Business Case is founded on the principle that regular engagement will deliver key Project benefits. Further, the approach supports the ACT Government's priorities for "enhancing liveability and social inclusion" and "suburban renewal and better transport".

The Project has a significant number of stakeholders ranging from the Canberra community, Commonwealth agencies and commercial organisations, through to small businesses, residents, unions and public transport

customers. A tailored communications and stakeholder engagement approach will be critical to the Project's success, adopting the right mix of engagement techniques across both the delivery and operations phases.

Given the large number of transport, land development and urban renewal projects in planning or delivery around the route alignment, coordination, collaboration and integration of all stakeholder and community engagement activities is critical to ensure consistent and clear messaging. It may also produce efficiencies for the ACT Government in the delivery of communications activities.

1.14 Advisor engagement plan

Given the scale and complexity of the Project a variety of external advisors may be appointed to assist in developing various elements of the Project. Major Projects Canberra (and before it Transport Canberra and City Services) has worked with Shared Services Procurement (SSP) on advisor engagement matters in accordance with relevant procurement guidelines.

Key external advisory mandates that may be required for the Project include:

- Strategic governance, project management and advisory support;
- Commercial and financial;
- Technical engineering, design and planning;
- Legal;
- Cost estimation;
- Communications, consultation and strategic relations; and
- Operations planning and management.

It is noted that this list of advisors is indicative and is likely to change as the Project progresses from the Business Case stage, through to procurement, construction and operations. If the ACT Government proceeds with the Project additional specialist advisory services may be required in addition to those outlined above.

1.15 Project timeline

Key indicative Project milestones (assuming London Circuit is raised) are outlined in Table 1-7. These indicative milestones are subject to substantial change; particularly if (i) complications arise in the raising of London Circuit (if approved), (ii) planning approvals necessitate wire-free running, or (iii) unexpected Commonwealth Government impediments arise.

Table 1-7: Key indicative Project milestones

Milestone	Anticipated Timeline
Approvals processes (Works Approval, Development Approval and environmental)	Mid-2019 – mid-2020
Early contractor involvement process	Mid-2019 – mid-2020
Main package contract award	Mid-2020
Design and construction	Mid-2020 – 2023 / 2024
Commissioning	Late 2023 / 2024
Operations commencement	2024
Stage 2B ongoing design and planning activities	2019 – until the time of Commonwealth approval

The timeline outlined above is indicative and may be impacted by the risk factors listed in Section 1.10 above.

2.0 Introduction

Key messages

- The ACT Government has selected the City to Woden corridor as the preferred next stage of its city-shaping light rail network, creating a north-south public transport spine for Canberra, which will continue to expand over the coming years, connecting Canberra's key employment, residential and commercial hubs, and stimulating urban renewal and economic diversification.
- The initial component of the City to Woden Light Rail corridor – Stage 2A – will involve the extension of light rail south from the current terminus at Alinga Street to Commonwealth Park. This will improve public transport connectivity between the City and those areas on the northern side of Lake Burley Griffin and will also support other revitalisation activities planned or underway in City Hill, City West and the Acton Waterfront.
- Concurrently, it is proposed that the ACT Government will continue design, planning and approval activities for Stage 2B from Commonwealth Park to Woden using the State Circle East alignment, noting the complexities that are associated with constructing light rail across the Lake at Commonwealth Avenue and through the Parliamentary Zone. This delivery approach will support the optimisation of urban renewal activities in the city precinct, providing a frequent and high quality public transport solution to Commonwealth Park, while necessary Commonwealth approvals are obtained to facilitate the delivery of the remainder of the light rail corridor to Woden.
- This Business Case has been developed in the context of existing land use and transport strategies adopted by the Territory and considers previous activities, analyses and studies undertaken to progress the development of the Canberra light rail network.
- The purpose of this Business Case is to (i) seek approval to enter into a procurement process and undertake associated activities for the delivery of the Project, and (ii) provide an analysis of the options, benefits, risks and procurement approach for the Project. This Business Case is designed to support Cabinet in its investment decision deliberations.
- This Business Case recommends that the ACT Government:
 1. Approve the Project to extend light rail from the existing terminus at Alinga Street, south along Northbourne Avenue, around the western side of London Circuit to Commonwealth Avenue, terminating at Commonwealth Park, as the first component of light rail to be delivered between the City and Woden;
 2. Continue with planning, design and other associated activities for the "State Circle East" alignment as the preferred route to connect light rail to Woden, with the alignment extending from the terminus at Commonwealth Park, across Lake Burley Griffin and onward to State Circle where it will travel around the eastern side of Parliament House until it reaches Adelaide Avenue, travelling south to Woden and terminating at Callam Street at a new bus/light rail interchange;
 3. Proceed with procurement for the design, construction and operation of the Project on the basis of a sole source procurement with the Canberra Metro consortium. [redacted] and [redacted]
 4. Implement all other associated matters as outlined in this Business Case.

2.1 Purpose and recommendation

The purpose of this Business Case is to (i) seek approval to enter into a procurement process and undertake associated activities for the delivery of the Project, and (ii) provide an analysis of the options, benefits, risks and procurement approach for the Project. In turn, this Business Case is designed to support Cabinet in its investment decision deliberations.

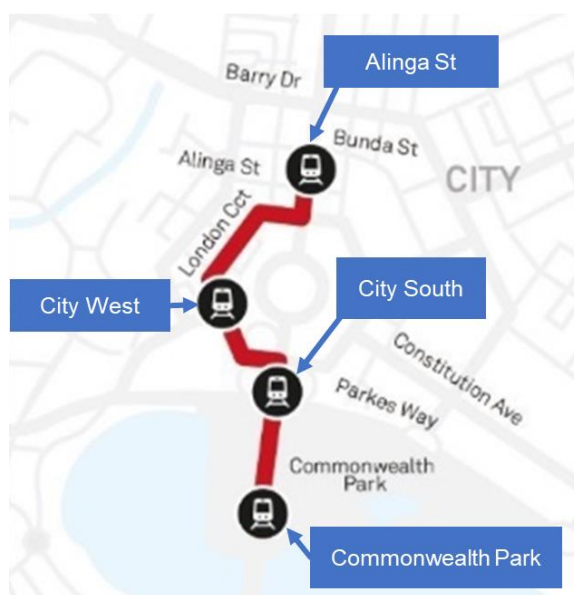
This Business Case recommends that the ACT Government:

1. Approve the Project – as depicted in Figure 2-1 – to extend light rail from the existing terminus at Alinga Street, south along Northbourne Avenue, around the western side of London Circuit to Commonwealth

Avenue, terminating at Commonwealth Park, as the first component of light rail to be delivered between the City and Woden;

2. Continue with planning, design and other associated activities for the “State Circle East” alignment as the preferred route to connect light rail to Woden, with the alignment extending from the terminus at Commonwealth Park, across Lake Burley Griffin and onward to State Circle where it will travel around the eastern side of Parliament House until it reaches Adelaide Avenue, travelling south to Woden and terminating at Callam Street at a new bus/light rail interchange;
 3. Proceed with procurement for the design, construction and operation of the Project on the basis of a sole source procurement with the Canberra Metro consortium.
- and
4. Implement all other associated matters as outlined in this Business Case.

Figure 2-1: City to Commonwealth Park (Stage 2A) route alignment



2.2 Project vision and objectives

The Project aligns with the ACT Government's ambition for Canberra as a 'compact and connected city'.¹⁶ The ACT Government's vision for the Project is:








“Ensuring Canberra is one of the world’s most liveable and competitive cities connected through smart public transport.”

The Project will improve public transport connectivity between the City and the Lake and support other revitalisation activities planned or underway in City Hill, City West and the Acton Waterfront.

Seven objectives (outlined in Figure 2-2) have been adopted for the Project based on guiding principles developed by the ACT Government and an Investment Logic Mapping Workshop undertaken in April 2017 for City to Woden Light Rail. These objectives are closely aligned with the objectives for the City to Woden corridor as illustrated in the figure below.

¹⁶ ACT Government, 'Canberra: A Statement of Ambition', http://www.cmd.act.gov.au/data/assets/pdf_file/0006/865482/Canberra-A-Statement-of-Ambition.pdf, 2016

Figure 2-2: Project objectives for Stage 2A and City to Woden Light Rail

City to Commonwealth Park		City to Woden
Continue the development of a north-south public transport spine that represents the next stage of a future city-wide light rail network that connects communities across Canberra	CONNECTIVITY 	Provide a north-south public transport spine that represents the next stage of a future city-wide light rail network that connects communities across Canberra
Frame the future shape of development along the corridor, supporting the activation of underutilised land around City West, City Hill and the Acton Waterfront and enabling the delivery of city wide initiatives for urban renewal and diversity of place	SHAPE AND PLACE 	Frame the future shape of development along the corridor while reinforcing the identity of existing communities and provide early delivery of city-wide initiatives for urban renewal and diversity of place
Provide Canberrans with an attractive, convenient, efficient and reliable integrated public transport system that facilitates choice, increases public transport patronage and reduces car dependency	TRANSPORT CHOICE 	Provide Canberrans with an attractive, convenient, efficient and reliable integrated public transport system that facilitates choice, increases public transport patronage and reduces car dependency
Deliver the Territory an affordable Project solution that drives innovation and provides a value for money outcome	VALUE AND INNOVATION 	Deliver the Territory an affordable Project solution that drives innovation and provides a value for money outcome
Reduce emissions and promote sustainable urban form for the benefit of current and future generations	ENVIRONMENT 	Reduce emissions and promote sustainable urban form for the benefit of current and future generations
Provide a connected, accessible public transport network that strengthens opportunities for social and economic participation	COMMUNITY 	Provide a connected, accessible public transport network that strengthens opportunities for social and economic participation
Build a productive, diversified and smart economy by making Canberra a more attractive place to live, work and invest	LIVEABLE AND PRODUCTIVE 	Build a productive, diversified and smart economy by making Canberra a more attractive place to live work and invest

2.3 Policy context

The development of the Project has been influenced by the ACT and Commonwealth Governments' existing strategic land use and transport policies in place in the Territory. Ensuring that the light rail network is planned and implemented cognisant of the ACT Government's broader vision for Canberra will maximise its benefits.

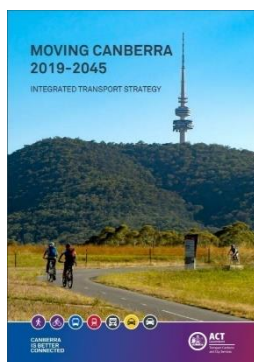
2.3.1 Transport policy

The ACT Government is delivering a light rail network for Canberra that will contribute to the development of a modern, sustainable and integrated public transport system for the Territory.

The light rail network will secure future transport capacity in the ACT, providing a high-quality public transport link that will facilitate Canberra's growth, assist in reducing the city's high level of car dependency and improve access to employment, education, retail centres and services. Light rail will also complement the ACT Government's recent rollout of additional rapid bus routes.

This Business Case has been prepared considering discussions across ACT Government directorates and the transport policy documents outlined below.

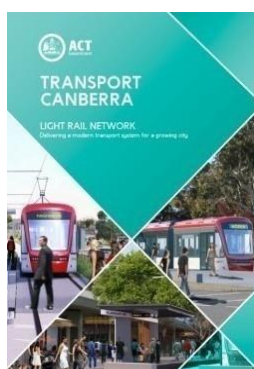
Figure 2-3: Guiding transport policy documents



Moving Canberra 2019 – 2045 (currently in draft)

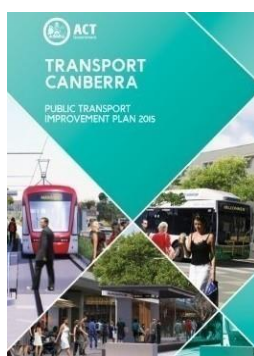
Moving Canberra, Canberra's updated transport strategy, provides a strategic direction that identifies the policies, infrastructure, programs and services necessary to meet Canberrans' needs and expectations. It identifies how Canberra will connect and integrate its transport modes.

The strategy highlights that the light rail network is a key transport priority in Canberra over the coming years and commits to building a city-wide light rail network based on a north-south and east-west spine. Extending light rail south to Commonwealth Park, and eventually on to Woden, will form the north-south spine.



Light Rail Network Plan

The Plan outlines how the light rail network will be developed over the coming years across seven corridors, with the objective of making Canberra 'an even more sustainable, modern and liveable city'. The Plan acknowledges the transformative, city-shaping potential of light rail for revitalising Canberra's urban centres, stimulating suburban renewal, increasing economic activity, reducing car dependency and providing environmentally responsible public transport. The Plan notes that investing in public transport will be pivotal to realising the full potential and benefits of the network, including the provision of better bus services, more walking and cycling paths and improved Park and Ride and Bike and Ride facilities. A coordinated well-planned approach to suburban renewal in centres along transport corridors will also be critical to providing housing, jobs and education choices for people wanting to live close to the integrated transport network.



Public Transport Improvement Plan

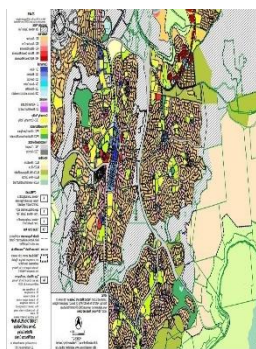
The Plan sets out how Transport Canberra and City Services will deliver the ACT Government's vision for a quality public transport system that is convenient and easy to use, efficient, affordable, reliable and integrated. The Plan recognises the importance of a smart, fully integrated public transport system in supporting social inclusion, driving economic development, maintaining liveability and reducing congestion. Improvements presented in the Plan include a one fare, one ticket, one network approach that will integrate bus and light rail services.

2.3.2 Land use and city renewal policy

The light rail network will play an important city-shaping role, helping to influence the way Canberra grows and supporting the creation of more compact, vibrant and highly accessible employment centres and communities. Extending light rail from the City to Commonwealth Park will support the achievement of urban revitalisation strategies for the city precinct, particularly in and around City West, City Hill and the Acton Waterfront.

This Business Case has been prepared considering discussions across ACT Government directorates and the land use and city renewal policy documents outlined below.

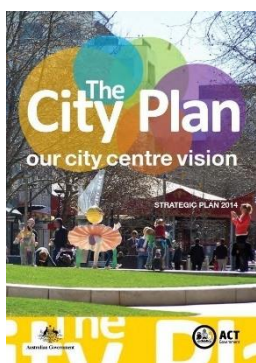
Figure 2-4: Guiding land use and city renewal policy documents



Territory Plan

The Territory Plan is a key statutory planning document in the ACT, providing the policy framework for the administration of planning. The purpose of the Territory Plan is to manage land use change and development in a manner consistent with the strategic direction set by the ACT Government. It establishes zones and precincts in the ACT, outlining the objectives and development requirements applying to each zone. The Territory Plan is also consistent with the NCA's National Capital Plan.

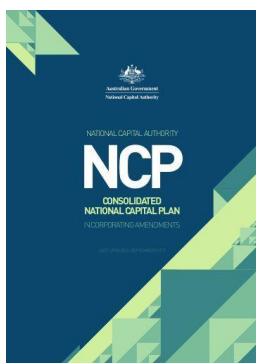
The Territory Plan will form an important reference document in the planning for the Project, with light rail being developed to complement and integrate with proposed land use changes.



City Plan

The City Plan sets a vision for the future development of the City centre, outlining a strategy to transform it into a more attractive, vibrant and dynamic destination. The six themes under the City Plan are growth, land use and development, transport and movement, public realm and design, community infrastructure and strengthening character.

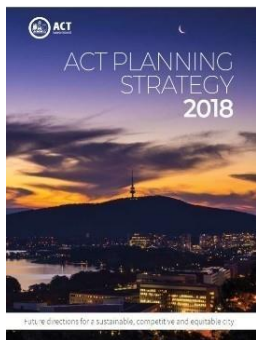
The Canberra light rail network is a key priority under the City Plan over the next 15 years and is consistent with these themes. Investment in the network will provide greater public transport choice for Canberrans and support mixed use urban renewal opportunities in the city.



National Capital Plan (NCP)

The NCP is the strategy and blueprint prepared by the NCA which gives effect to the Commonwealth's interests and intentions for planning, designing and developing Canberra and the Territory. The purpose of the Plan is to ensure that the Commonwealth's national capital interests in the Territory are protected, without otherwise involving the Commonwealth in matters that should be the prerogative of the Canberra community. At its broadest level the NCP prescribes land use controls across the whole of the Territory. At its most detailed level, it sets out conditions of planning, design and development for those areas identified as having special characteristics of the National Capital. The NCP includes a defined inter-town public transport system, which specifies the public transport corridors within the Territory.

The Project traverses NCA 'Designated Land' and as such will require careful consideration of the NCA's requirements as set out in the NCP.



ACT Planning Strategy

The ACT Planning Strategy recognises and incorporates the social, economic and environmental changes occurring in Canberra's growing and thriving city. It outlines a vision for a sustainable, competitive and equitable city that respects Canberra's place as a city in the landscape and as the National Capital, while being responsive to the future and resilient to change.

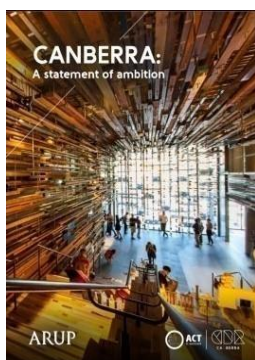
The Strategy notes the importance of developing a better integrated transport network to support Canberra's liveability and accessibility, aligning with the Project's vision.



City Renewal Authority 2025 Strategic Plan

The City Renewal Authority's 2025 Strategic Plan outlines five strategic goals along with objectives required to achieve them. The strategic goals include the curation of high-quality places and precinct development; facilitation of new and diverse investment; and the application of robust and innovative social and environmental sustainability principles and programs that will underpin precinct-wide renewal.

The Plan focuses on the renewal of areas in and around the city. Relevantly, this includes City Hill and the Acton Waterfront.



Canberra: A Statement of Ambition

The vision for Canberra is for a compact and competitive city of choice, talent and ambition: open to all. This ambition will be achieved by attracting and retaining talented people, continuing to open and diversify the local economy, delivering better metropolitan infrastructure and embracing the digital mindset.

Canberra: A Statement of Ambition acknowledges the potential transformative effects of light rail, noting that building a light rail network is fundamentally about changing settlement patterns and employment opportunities, and renewing the city's urban centres. The light rail network will be critical to developing a '30-minute city' of short commutes and journeys with 'a first-class public transport system at its heart'. The light rail network will play a key role in revitalising inner-city precincts and developing the compact, connected centres Canberra needs to attract the best people, while at the same time enhancing residents' lifestyles.

The Woden Town Centre Master Plan will also provide important guidance for the development of Stage 2B to Woden.

2.4 Prior activities and studies

In developing the light rail network, the Territory has already achieved a number of important milestones. City to Gungahlin Light Rail commenced operations in April 2019 and investigations have been undertaken indicating how light rail between the City and Woden could operate, its potential design features and proposed stop locations.

2.4.1 City to Gungahlin Light Rail

City to Gungahlin Light Rail is the initial stage of Canberra's light rail network and commenced operation on 20 April 2019. It was the Territory's largest infrastructure project and one of its first Public Private Partnership (PPP) contracts.

It forms the first stage of the north-south spine for the broader network and public transport system. It runs from the City to Gungahlin, along Northbourne Avenue and Flemington Road, delivering a high quality, reliable and frequent public transport service along one of Canberra's busiest corridors.

On 17 May 2016, the ACT Government entered into an agreement for the design, construction and financing of the project under an availability PPP. The agreement also includes the operations and maintenance of City to Gungahlin Light Rail over a 20-year period.

The Canberra Metro consortium that delivered the project comprises:

- Pacific Partnerships (equity investor);
- CPB Contractors (builder);
- John Holland (builder, operator and equity investor)

- UGL (operator);
- Mitsubishi Corporation (equity investor);
- Aberdeen Infrastructure (equity investor);
- Deutsche Bahn Engineering and Consulting (operations contractor); and
- CAF (light rail vehicle supplier).

Key elements of the route alignment, as well as its stops are outlined below.

Figure 2-5: City to Gungahlin Light Rail route map

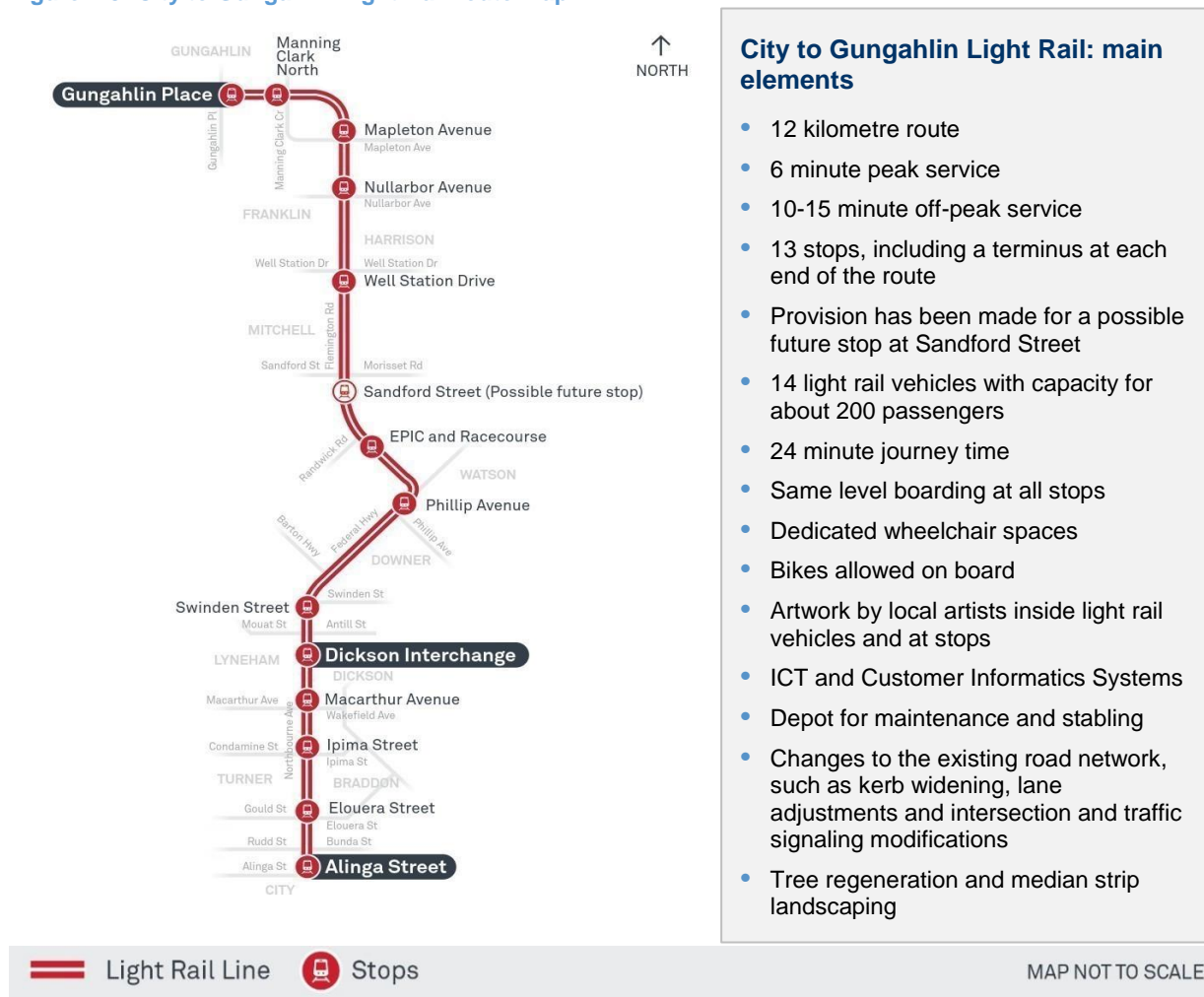
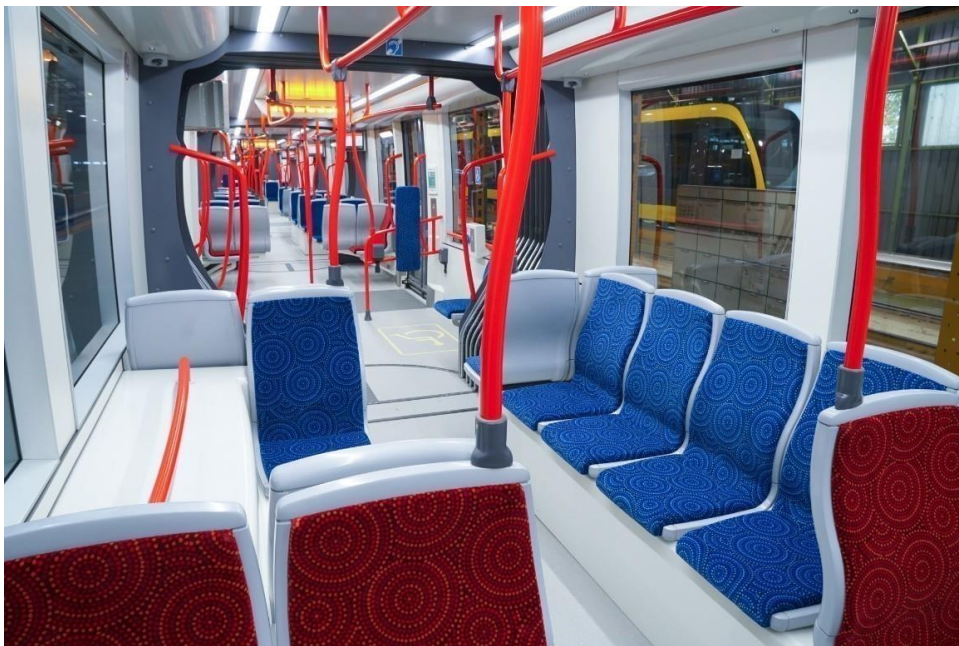


Figure 2-6 depicts a LRV running along the Federal Highway towards Alinga Street. Figure 2-7 shows the internal livery of Canberra's first LRV.

Figure 2-6: Light rail along the Federal Highway¹⁷



Figure 2-7: Internal livery of Canberra's first light rail vehicle¹⁸



2.4.2 Other activities and studies

This Business Case follows and considers previous activities, analyses and studies undertaken to progress the development of a light rail network for Canberra. Key activities are outlined below.

¹⁷ Transport Canberra and City Services, <https://www.flickr.com/photos/tamsmediaroom/>, 2019

¹⁸ CAF, 'Canberra Tram', <https://www.caf.net/en/productos-servicios/proyectos/proyecto-detalle.php?p=282>

Figure 2-8: Key prior light rail activities and studies

Planning for the delivery of City to Gungahlin light rail by the Capital Metro Agency (2012 to 2014)	This planning included the determination of design features and operational analysis, estimation of costs and benefits, and identification of the best way to proceed with the project's delivery.
Full Business Case for City to Gungahlin Light Rail (October 2014)	The Business Case confirmed the economic and other benefits of the City to Gungahlin Light Rail corridor and recommended that the Project proceed via an availability PPP.
Canberra Light Rail Plan (October 2015)	The Plan outlined a vision for the development of the Canberra light rail network across seven corridors.
Construction and operation of City to Gungahlin Light Rail (2016 to present)	Commencing operations in April 2019, City to Gungahlin Light Rail links the City with the growing town centre of Gungahlin, providing the backbone for future development of the city-wide light rail network.
Announcement of City to Woden Light Rail (September 2016)	The ACT Government announced that the preferred corridor for the second stage of the Canberra light rail network would be between the City and Woden to create a 'north south' spine.
JSC Inquiry (October 2018)	The JSC Inquiry focussed on Commonwealth and Parliamentary approvals for the proposed City to Woden Light Rail, and made a number of recommendations for the Project's design in order to obtain Commonwealth approvals.

In September 2016, the ACT Government announced that the preferred corridor for the second stage of the Canberra light rail network would be between the City and Woden to create a 'north-south public transport spine', with the final route to be developed thereafter.

The ACT Government has undertaken various design, technical, planning, economic and financial analysis, as well as community consultation to refine and optimise the scope and route alignment of City to Woden Light Rail and assess delivery approaches. In 2017, Transport Canberra and City Services undertook a range of activities to understand the key considerations, risks, opportunities and objectives for City to Woden Light Rail. These activities led to a range of options being explored and offered for community and stakeholder consultation.

In 2019, consultation continued with the Commonwealth Government. Additionally, discussions were conducted with the Department of Environment and Energy and the NCA regarding route alignments for City to Woden Light Rail and Environment Protection and Biodiversity Conservation (EPBC) Referrals were lodged on the basis of the staged approach outlined in this Business Case.

This Business Case assesses the proposed delivery of the initial component (Stage 2A) of the City to Woden corridor – the extension of light rail south from the current terminus at Alinga Street to Commonwealth Park.

Concurrently, it is proposed the ACT Government will continue design, planning and approval activities for the delivery of Stage 2B to Woden, noting the complexities that are associated with constructing light rail across the Lake at Commonwealth Avenue and through the Parliamentary Zone. This delivery approach will support the optimisation of urban renewal activities in the city precinct (see Section 2.5), providing a frequent and high quality public transport solution to Commonwealth Park, while necessary Commonwealth approvals are obtained to facilitate delivery of light rail in the remainder of the corridor to Woden.

2.4.3 Joint Standing Committee inquiry

On 10 May 2018, the JSC established an inquiry into Commonwealth and Parliamentary approvals for the City to Woden Light Rail Project.

The Terms of Reference for the JSC inquiry were to consider:

- The relevant Parliamentary approval processes for works within the Parliamentary Zone;
- The roles of the NCA and the Commonwealth Government, and the associated approval processes;
- Possible impacts on the Parliamentary Zone and Parliamentary Precincts, including any impacts on the heritage values and national importance of the Parliamentary Zone and our national capital;
- The identification of matters that may be of concern prior to formal Parliamentary or Commonwealth Government consideration of the Project; and
- Any other relevant matters.

The JSC released its report on 22 October 2018 which made six recommendations and outlined the process City to Woden Light Rail would need to go through to receive Commonwealth Approvals. The Commonwealth Government responded to the report in March 2019, agreeing or agreeing in principle to all of the recommendations.

While the primary focus of the JSC inquiry was on the section of the route alignment that traverses the Parliamentary Zone (which is within the Stage 2B alignment), the JSC inquiry has informed the development of the Project in a number of ways, particularly the staged delivery strategy:

- This Business Case assesses the delivery of light rail to Commonwealth Park (on Commonwealth Avenue, on the northern side of Lake Burley Griffin) as the initial component of a light rail line which is proposed to ultimately extend to Woden. The JSC inquiry highlighted the complexities of the Commonwealth approvals process and included a requirement for future JSC inquiries in relation to the section of the alignment that traverses the Parliamentary Zone. The proposed initial delivery of Stage 2A is in recognition of the likely time and complexity involved in achieving planning approval of Stage 2B; and
- The JSC recommendation, agreed to in principle by the Commonwealth Government, and NCA planning regime may have material consequential impacts on the Project, specifically in relation to wire-free requirements, visual amenity and urban design outcomes. These are outlined in Chapter 6.0 of this Business Case.

2.5 Related projects

The Project has been developed in the context of a series of transformational projects in and around the City Centre. It has been carefully designed to optimise and integrate with planned urban renewal activities and other projects in the precinct to provide a high quality urban realm that enhances accessibility and broader place making initiatives. These transformational developments are outlined in the sections below.

2.5.1 Acton Waterfront

Renewal of the City Centre is a key priority of the ACT Government coordinated by the City Renewal Authority and forms a key element of The City Plan, which outlines the overarching strategic and spatial framework for the City Centre. Several projects in planning will facilitate urban renewal opportunities around City Hill and the Acton Waterfront, supporting the creation of an extended waterfront precinct from the City Centre towards Lake Burley Griffin.

Planning and development is underway to revitalise currently unutilised and underutilised land around the Acton Waterfront, City Hill and Commonwealth Park and transform the area into a more vibrant, liveable and attractive destination. Future developments could potentially include a range of commercial, residential, recreational, entertainment and urban amenity projects.

The ACT Government is progressing the development of the Acton Waterfront, in line with the National Capital Plan (NCP), to bring the everyday life of the City to the foreshores of Lake Burley Griffin. Prior to planned mixed use development, this includes a multi-stage upgrade to the foreshore:

- Stage One of construction was the creation of Henry Rolland Park and the first 150 metres of a lakeside boardwalk. Construction started in November 2016 and is now open to the public. The area had been underused for many years and was primarily a car park. It is now a high-quality public space that will be a premium recreation destination for years to come;
- Stage Two of construction began in early 2019 and includes the:
 - completion of the final 500 metres of concrete boardwalk and lake wall;
 - reclamation of a part of the lake to provide for a generous waterfront urban park; and
 - construction of two public jetties.
- Stage Three of the development is anticipated to include the completion of the lakeside public space prior to starting work on mixed-use development precincts that will bring the City Centre across Parkes Way. It will see the creation of a generous waterfront urban park adjacent to the boardwalk that will separate the lake edge from any new buildings.

An artist impression of the Acton Waterfront is depicted in Figure 2-9.

Figure 2-9: Artist impression of the Acton Waterfront



Note: This representation is indicative only.

The Project will complement the Government's city renewal strategy, improving the public realm and providing an attractive, reliable and accessible form of public transport between the Lake and the City, and onward to Gungahlin, Dickson and other destinations.

2.5.2 London Circuit / Commonwealth Avenue Intersection and Section 63

London Circuit / Commonwealth Avenue intersection

The ACT Government has made a clear commitment to revitalise the City Centre and transform it into a more attractive, vibrant and dynamic destination that encompasses economic, residential, educational, culinary and entertainment activities, maintaining Canberra's reputation as one of the world's most liveable cities.¹⁹

¹⁹ See for example, 'Canberra: A Statement of Ambition' (2016) and 'The City Plan' (2014)

To this end, the City Renewal Authority has undertaken planning, design, economic and financial analysis on the raising of London Circuit to be at-grade with Commonwealth Avenue, with a signalised traffic intersection formed.

The London Circuit project is designed to improve active travel connectivity between the City and the Lake, provide a more attractive urban realm and align the road network with the future land release program. Over time, the City Renewal Authority plans to develop a series of sites surrounding the intersection, with the south-west and south-east cloverleaves that connect Parkes Way, London Circuit and Commonwealth Avenue closed to traffic to allow for mixed use development.

This Business Case assumes that London Circuit is raised to meet Commonwealth Avenue at a newly formed signalised intersection, with approval for those works being sought as part of a separate Business Case. As such, the program implications of raising London Circuit have been considered in Chapter 12.0 and the Project scope has assumed that light rail will traverse the newly formed intersection. Further information on this project, and its interfaces with light rail, are outlined in Section 5.7.4.1.

Section 63

The City Renewal Authority is pursuing the development of Section 63 near City Hill (see Figure 2-10), which is currently occupied by a surface carpark and the north-west cloverleaf that facilitates the movement of traffic from Commonwealth Avenue northbound to London Circuit eastbound. In line with the Indicative Land Release Program, this site is intended to be developed in the short term.

With the potential City West Stop in close proximity to the development, the Project will provide convenient and reliable public transport access to the site.

Figure 2-10: Section 63 site



2.5.3 Parkes Way works

There are a number of potential upgrades to the road and active transport network in and around Parkes Way to cater for increased traffic demand. These works may include capacity improvements to the Parkes Way between Kings Avenue and Commonwealth Avenue in the vicinity of Stage 2A.

2.5.4 NCA plans for Kings and Commonwealth Avenues

In May 2017, the NCA commenced community consultation on the reconfiguring of Kings and Commonwealth Avenues as grand boulevards for easy cycling and walking. The community consultation process sought feedback on the Kings and Commonwealth Avenues Draft Design Strategy. Key proposals in the design strategy include:

- Renewing the streetscape character of the avenues to highlight them as destinations and unifying the symbolic points of the Parliamentary Triangle;
- Enforcing high-quality design and a consistent palette of materials including lighting, signage and street furniture;

- Revitalising the avenues with unified street trees, shrubs and ground cover that ensure the character and sustainability of the landscape;
- Widening and enhancing pedestrian and cycle connections along the full length of the avenues; and
- Reconfiguring the roadways to better integrate existing and future public transport systems, while giving priority to pedestrians and cyclists.

More recently, the NCA has begun considering options in relation to upgrading or replacing the Commonwealth Avenue road bridges over Lake Burley Griffin.

The NCA's plans for Commonwealth Avenue Bridge will influence the development of the Project, as well as the extension further south to Woden, with design integration and close cooperation vital. The NCA's role as an approver, asset owner and stakeholder are further described in Chapter 10.0.

2.5.5 Integrated transport network

The ACT Government introduced a new integrated transport network in April 2019.

The network moved away from a point-to-point system, to a more frequent 7-day network (refer figure to the right), where passengers are directed along key transport corridors to connect to larger centres.

The core network is comprised of ten rapid routes: the City to Gungahlin Light Rail service and nine rapid bus routes. The rapid routes form a crucial piece of Canberra's future integrated transport network of buses and light rail, with services at least every 15 minutes along core transport corridors from 7am to 7pm Monday to Friday, continuing into the evening with less frequency. These routes provide improved connectivity between town centres, suburbs and the City – getting Canberrans where they need to be on a faster, more convenient network.²⁰

As well as new rapid routes, the new bus network involves a reconfiguration of existing feeder bus routes. These will be designed to connect suburbs to their town centre, and to connect passengers with rapid routes.

The transition to the new network was supported by a number of principles:

- Reallocation of resources to increase the frequency of the core network;
- Removal of parallel services to improve efficiency; and
- Facilitating interchange and transfer between different modes of transport.

In the future, an expanded light rail network will form north-south (Gungahlin to Woden) and east-west (Belconnen to Airport) links across Canberra. The Project is the initial stage in the southern section of the north-south link.

2.6 Summary of consultation undertaken to-date

The ACT Government recognises that community consultation and engagement with the Commonwealth Government and its agencies are critical to the successful design, development and delivery of major city-shaping projects.

This Business Case has been prepared following consultation with:

- The Project Board, comprising senior executives from the ACT Government and independent members;
- Relevant Directors General and other senior executives within the ACT Public Service;
- Major Projects Canberra and Transport Canberra and City Services Executives; and
- Major Projects Canberra (and previously Transport Canberra and City Services) advisors, including technical, commercial, legal, cost and other advisors.

Figure 2-11 Rapid routes network map



²⁰ Transport Canberra, 'New Network', <https://www.transport.act.gov.au/about-us/public-transport-options/bus/new-network>, 2019

Across 2017 and 2018, the ACT Government undertook community consultation to solicit feedback on its proposed changes to Canberra's transport network, particularly in relation to the introduction of the new bus network. This process considered the wider transport network, including light rail, to shape the design of a transport system best suited to the needs of the community.

Consultation undertaken by Canberra Metro during construction of City to Gungahlin Light Rail included hosting construction drop-in sessions, information pop-up sessions, construction tours and information sessions for particular stakeholders such as retired communities.²¹

Community and stakeholder management activities undertaken to date, as well as the proposed future consultation program for the Project are described in greater detail in Chapter 10.0.

2.7 Other important notes

2.7.1 The Capital Framework

This Business Case has been prepared with reference to The Capital Framework adopted by the ACT Government for assessing capital works funding proposals. Adherence to The Capital Framework is designed to enhance the rigour of the needs analysis, the identification of risks and the assessment of potential delivery models, delivering improved value for money outcomes for the Territory.

The level of analysis undertaken for this Business Case is in accordance with the Single Assessment Framework Business Case Tier 1 Template and associated guidance materials.

This Business Case has also considered the requirements of Infrastructure Australia to allow the Project to be considered for potential Commonwealth Government funding in the future.

The Capital Framework

The Capital Framework is used by Territory Directorates to assess funding proposals for medium to large infrastructure projects. The Framework helps to ensure that ACT Government investments provide maximum benefits to the Territory by addressing the right problems, choosing the best value for money investments, delivering investments as planned and realising the benefits the investment sets out to achieve.

The seven-stage Framework includes a 'conceptualise' stage (represented by the Investment Logic Mapping Workshop) and a 'prove' stage (represented by this Business Case). Other stages relate to the 'procurement', 'implementation' and 'measurement' phases of a Project.

As the Project is a Tier 1 Project (greater than \$50 million), the level of analysis undertaken for the Business Case is in accordance with the Single Assessment Framework Business Case Tier 1 Template. In accordance with this template and The Capital Framework, this Business Case conducts a thorough and rigorous assessment of the Project to enable the Government to make an informed decision. Reviews of the needs analysis (Chapter 3), financial analysis (Chapter 7) and selection of delivery model (Chapter 8) were conducted in accordance with the Tier 1 assessment requirements.

²¹ Canberra Metro Construction, 'News', <https://www.canberra-metro.com.au/news>, 2017 and 2018

3.0 Need for investment

Key messages

- City to Woden Light Rail is a city-shaping Project that will build on the successes of City to Gungahlin Light Rail, extending light rail south, initially to Commonwealth Park (Stage 2A) and then onward to Woden (Stage 2B). The Project will support the broader vision for Canberra outlined in *Canberra: A Statement of Ambition* to promote urban renewal and stimulate economic diversification in a city that is compact, competitive, welcoming and inclusive.
- The Project seeks to address four challenges to achieving this vision and the ACT Government's broader policy objectives and aspirations for Canberra:
 - Challenge 1:** Failure to invest in Canberra's liveability and economic connections will result in an inability to attract and retain people and businesses;
 - Challenge 2:** Inefficient use of existing land and infrastructure will lead to an unproductive and socially dislocated city;
 - Challenge 3:** There exists opportunity for public transport to be better utilised, to better meet customer expectations and to meet the needs of a growing population; and
 - Challenge 4:** Population growth, combined with high car dependency, will lead to a congested road network creating negative social, economic and environmental impacts.
- Addressing these challenges will deliver significant benefits for the Territory: creating a more connected and compact city, with reduced congestion, improved access to employment and services, and increased economic growth and diversification.
- The Project will provide better connectivity between the City and those areas on the northern side of Lake Burley Griffin, activate land currently underutilised around the City Centre, maintain Canberra's competitiveness, and lift levels of productivity with better intra-city movement of Canberrans.

3.1 Vision for Canberra

Canberra is a vibrant, dynamic and modern city, the heart of our national government, home to places of national and cultural significance, with world-class educational institutions and research facilities and an enviable lifestyle. As Australia's Capital, Canberra has an important role to play in showcasing Australia's forward-thinking, collaborative and inclusive nature.²²

²² Transport Canberra and City Services, 'Moving Canberra 2019-2045: Integrated Transport Strategy', <https://www.yoursay.act.gov.au/moving-canberra>, 2018

The ACT Government is focused on capitalising on Canberra's strengths to ensure that the Territory remains one of the world's most liveable cities – a destination of choice to live, work, visit and invest.

The ACT Government's *Canberra: A Statement of Ambition* charts the Territory's course for Canberra as a progressive city that can continue to attract and retain talented people, with a more diversified economy, high quality infrastructure and a city that embraces the digital mindset. Realising this vision will require a focus on ensuring Canberra is a connected, compact, competitive and sustainable city, both now and into the future.

Canberra has high-quality (though increasingly congested) transport infrastructure, an international airport that provides an excellent gateway into the nation's capital and the beginnings of a high-quality light rail network that provides frequent, reliable and sustainable public transport services and seamlessly integrates with the revised bus network implemented in April 2019.

The world's best and most liveable cities all have excellent transport networks, designed in conjunction with land use planning to create active, people friendly communities that provide reliable and convenient transport choice.

Canberra's light rail network will not only improve access and opportunity for all Canberrans, as truly city-shaping infrastructure, it will help transform our suburbs, creating stable corridors for investment and stimulating urban renewal across Canberra as the network is progressively built over the coming years.

The Light Rail Plan envisages light rail as transformative, demand-driving infrastructure that will shape Canberra's growth to reduce future congestion and revitalise Canberra's satellite centres.

"The path to the Canberra of the future is marked out by transformational urban renewal and innovation, underpinned by the light rail network and the city to the lake vision, all founded on design excellence. This cannot be an exercise in the bland and boring building of 'boxes'; it has to be about creating buildings that make statements about this city and excite interest in those living and working in them or just walking past them. They should be destinations as well as useful and modern spaces. They should be able to stand the test of time and have people still talking about them in 50 years."

Canberra's International Engagement Strategy, 2016

Canberra: Lonely Planet's top Australian city to visit in 2018

Canberra was named as Australia's top ranked city in Lonely Planet's 'Best in Travel – Top Cities' list for 2018.

Canberra was the only Australian city in the top 10 and placed third overall, the highest ranking an Australian city has ever received.

Highlighting Canberra's national treasures, gastronomic experiences and the atmosphere in revitalised precincts like New Acton and Braddon, Lonely Planet notes Canberra has been "criminally overlooked... pack[ing] a big punch for such a small city."

3.1.1 Challenges to achieving Canberra's vision

While Canberra is already one of Australia's and the world's most liveable cities, for the city to remain competitive into the future and continue the high-quality lifestyle Canberrans enjoy, the Territory needs to make strategic policy decisions and investments now to address the future challenges facing Canberra.

The Territory held an Investment Logic Mapping Workshop in April 2017 for City to Woden Light Rail and identified four challenges outlined below:

- **Challenge 1:** Failure to invest in Canberra's liveability and economic connections will result in an inability to attract and retain people and businesses;
- **Challenge 2:** Inefficient use of existing land and infrastructure will lead to an unproductive and socially dislocated city;
- **Challenge 3:** There exists opportunity for public transport to be better utilised, to better meet customer expectations and to meet the needs of a growing population; and

- **Challenge 4:** Population growth, combined with high car dependency, will lead to a congested road network, creating negative social, economic and environmental impacts.

The completion of Stage 2A as the initial component of the north-south spine will help address these challenges, which will be complemented by the construction of Stage 2B from Commonwealth Park to Woden.

Tackling these challenges by delivering the Project and ultimately the entire City to Woden Light Rail corridor will not only fulfil the Project objectives (see Section 2.2) but will also help to achieve the ACT Government's vision for Canberra as a connected, compact and competitive city.

3.2 Challenge 1 – failure to invest in Canberra's liveability and economic connections will result in an inability to attract and retain people and businesses

High levels of accessibility and connectivity are features of liveable, successful cities across the globe. As Canberra grows, well-connected employment hubs, service centres and suburbs will be important in attracting and retaining new residents, businesses and investors. As part of an integrated public transport system, light rail will improve access to jobs and services. It will also provide a stable corridor for private investment, driving greater diversification of the Canberra economy.

Why now?

The lead times in developing and delivering major infrastructure projects mean that forward planning is essential. To maintain the Territory as an attractive place to live, work, visit and invest, transport infrastructure needs to keep up with and anticipate growth and changes in population and employment.

An improved public transport system will boost Canberra's accessibility and connectivity, enhancing quality of life, maintaining the city's reputation for liveability and helping to attract new residents and tourists.

With Canberra Airport receiving direct international flights since September 2016, additional supporting investments in accessibility around the city are required to provide the standard of service expected by domestic and international tourists, visiting the nation's capital.

Continuous improvements in infrastructure are also important to fully realise the economic and employment potential of large cities, particularly investments that enable businesses and their workers, suppliers and customers to interact more efficiently. A modern, efficient transport system is a critical element in sustaining strong business growth in Canberra, stimulating diversification of the Territory's economy and encouraging a greater spread of employment centres.

Light rail is an integral component of Canberra's future public transport system. By commencing the Project now, its construction can be designed and carried out concurrently with other key proposed projects occurring in the same corridor, supporting the optimisation of urban renewal activities in the city precinct and providing a frequent and high quality transport solution to Commonwealth Park. As described elsewhere in this Business Case, planning and design activities in relation to Stage 2B are proposed to continue in parallel with the Project.

Relevant separate projects are outlined in Section 2.5 and include land developments in City Hill and City West, the raising of London Circuit to be at-grade with Commonwealth Avenue, as well as the Acton Waterfront development which will see a vibrant waterfront precinct constructed on the shores of Lake Burley Griffin.

Furthermore, construction has recently been completed on the first stage of Canberra's light rail network, with City to Gungahlin Light Rail commencing operations in April 2019. That project supported the development of a range of skills in Canberra. Data from February 2019 indicates that the City to Gungahlin Project had supported 4,753 workers and contractors, with the Project exceeding expectations in job creation and skills development.²³ Continuing the construction of the light rail network, rather than delaying construction until Commonwealth planning approvals are obtained for Stage 2B, may allow for this experience to be leveraged and skills to be

²³ TCCS analysis, 2019

retained in the Territory, aligning with the economic diversification objectives of *Canberra: A Statement of Ambition*.

Light rail as an attractive transport alternative for Canberra

A study undertaken by the International Association of Public Transport (UITP) has found that light rail services can offer a range of benefits to communities:

- **Speed, reliability and regularity** of services where segregated tracks and priority signaling are in place;
- **Improved public transport capacity**, with light rail able to carry greater loads than traditional bus networks;
- **Accessibility and ease of use**, offering a smoother and more comfortable ride for passengers;
- **A safer means of transport** as light rail has been found to be six times safer than car travel; and
- **City-shaping impact** supporting investment in urban renewal projects.

Canberra's light rail network will be modern, sustainable and accessible. Wi-Fi connectivity will be available on light rail vehicles and at stops. There will be provision for bikes on board to encourage active travel and regular services will be offered in peak (at least every 6 minutes) and off peak (every 10-15 minutes), with regular services running until 1am on Friday and Saturday nights.

Source: UITP, *Light Rail: A tool to serve customers and cities* (2016)

Canberra's liveability relies on connectivity to centres

Canberra generally ranks highly in the various global ratings systems and indices used to rank cities around the world for their liveability and the wellbeing of residents.

For example, Canberra is Australia's highest scoring city according to the OECD Better Life Index, which ranks cities against eleven criteria related to regional wellbeing. As shown in Figure 3-1, Canberra's lowest scoring categories are education, suitability of housing and access to services.

Figure 3-1: OECD Regional Well-Being Index: ACT²⁴



In the 2019 MERCER Liveability Ratings (used to determine recommended compensation for expatriates), Canberra ranked thirtieth. While this is a high rating on a global scale, it is behind Sydney, Melbourne, Perth and Adelaide (as shown in Table 3-1). This survey ranks cities against a range of criteria including political, economic, environmental, social, safety and public service. A key gap identified for Canberra was connectivity.

²⁴ OECD Regional Well-Being, 'Canberra Capital Region', <https://www.oecdregionalwellbeing.org/AU8.html>, 2018

Table 3-1: MERCER Liveability Ratings: Australian cities²⁵

Mercer Liveability Ratings	
Rank	City
11	Sydney
17	Melbourne
21	Perth
29	Adelaide
30	Canberra
35	Brisbane

Connectivity, including the ease of commuting to work, services, and places of interest, are important factors in maintaining Canberra's reputation for liveability as the population increases and employment intensifies in key hubs. Improvements will enhance Canberra's reputation for liveability, making the city a more attractive destination for prospective residents, businesses and tourists.

With cultural, residential, education and retail precincts in close proximity to the Project, Stage 2A will improve connectivity between the City and the Acton Waterfront and ultimately beyond to the Parliamentary Triangle and Woden with the delivery of Stage 2B.

Public transport is essential for tourism and special events

As Australia's capital city, Canberra is home to national monuments, galleries and museums. These sites of national and cultural significance are predominantly clustered north and south of the Lake, but are isolated in terms of easy access between them. For the year ending December 2018, 5.21 million visitors came to Canberra, spending \$2.84 billion and supporting around 16,800 jobs in Canberra's tourism industry.²⁶

Canberra is in a tourism boom

According to Tourism Research Australia data, one in seven new jobs created in the ACT is in the tourism sector. Around 17,000 people in the Territory now work in tourism industries.

Supported by unprecedented growth in visitor numbers, the sector contributed \$2.3 billion to the ACT economy in 2016-17.

Source: <https://canberra.com.au/the-numbers-say-it-all-canberra-in-a-tourism-boom/> (May 2018)

Table 3-2: Tourism numbers in the ACT for the year ending December 2018²⁷

Tourism numbers	Past year growth	Australia wide growth
252 thousand international visitors	Increase by 2.9%	Increase by 4.8%
2.7 million domestic overnight visitors	Decrease -0.3%	Increase by 8.6%
2.2 million domestic day visitors	Increase by 13.8%	Increase by 7.4%

Table 3-2 above shows that tourism numbers in Canberra are highly competitive with the Australia-wide growth in tourism. There has also been strong growth in international tourism; international visitor nights have increased steadily over recent years.²⁸ Opportunities for enhancing our visitor economy exist due to the significant landmarks and cultural attractions in the Territory. Improvements in accessibility and urban amenity will help to increase Canberra's attractiveness as a tourism destination.

²⁵ MERCER, 'Quality of Living City Ranking', <https://mobilityexchange.mercer.com/Insights/quality-of-living-rankings>, 2019

²⁶ Visit Canberra, 'Latest Visitor Numbers', <http://tourism.act.gov.au/insights/research/>, 2018

²⁷ Visit Canberra, 'Latest Visitor Numbers', <http://tourism.act.gov.au/insights/research/>, 2018

²⁸ Tourism Research Australia: 'Australian Capital Territory Tourism Audit', https://www.tra.gov.au/ArticleDocuments/258/ACT_DVS_Tourism_Audit_FINAL_NOV_2017.pdf.aspx?Embed=Y, 2017

Additionally, due to the heavy reliance on private car travel, Canberra's transport network experiences periods of peak pressure during special events. Canberra is home to various significant sporting, cultural and social events centred in the inner north and south of the City. Extending light rail to Commonwealth Park, through the Parliamentary Zone to Woden will provide improved accessibility to the following events:

- Floriade (480,000 attendees in 2018);
- The Multicultural Festival (280,000 visitors in 2017 across three days);
- Cricket and AFL at Manuka Oval (capacity 13,550);
- Exhibition Park (Epic);
- Colour Run (around 7,000 participants) and other sporting events held at or near Commonwealth Park;
- The Commons Street Feast (Commonwealth Park, attracted over 50,000 Canberrans across 10 days);²⁹
- Llewellyn hall hosts Canberra Symphony Orchestra, Australian Chamber Orchestra, Australian Youth Orchestra, Musica Viva and many local and international touring ensembles (capacity 1,335);³⁰
- Million Paws Walk (held every year in May); and
- Stage 88 events at Commonwealth Park.

The completion of Stage 2B will also provide improved connectivity to the range of artistic and cultural institutions on the southern side of the Lake, such as the National Portrait Gallery, Museum of Australian Democracy (Old Parliament House) and Questacon.

An attractive, reliable and frequent mass transit alternative that connects key cultural, sporting and entertainment precincts will help take pressure off the road network during these periods, encourage public transport usage and active travel. Parking near Commonwealth Park is limited³¹ and thus the Project will offer a frequent, convenient and reliable mode of public transport to these events from the City, further north from Gungahlin, and ultimately, from Woden.

3.3 Challenge 2 – inefficient use of land and infrastructure will lead to an unproductive and socially dislocated city

Canberra is a low-density city compared to other Australian cities. Planning Canberra around a number of 'satellite centres' was designed to provide greater accessibility, reduce the need for longer trips and reduce congestion in the city centre. However, these benefits have not been fully realised and the spread of satellite centres has led to an inefficient use of land and infrastructure and in some cases suboptimal amenity outcomes.

Canberra's low density also means fewer agglomeration economies and lower economic benefits associated with density, such as economies of scale, more accessible labour markets, better matching of firms and workers and knowledge spill overs.

Without action, projected population growth will exacerbate these problems, leading to greater urban sprawl, avoidable land use inefficiencies and high costs of infrastructure provision. As demonstrated in other cities – and already apparent along the City to Gungahlin Light Rail corridor – light rail's transformative potential includes encouraging higher density development, improving local amenity and generating new economic opportunities in better connected centres.

²⁹ The Commons Street Feast, 'About', <https://thecommonsstreetfeast.com.au/about/>, 2016

³⁰ Australian National University, 'Venues', <http://music.cass.anu.edu.au/services/bookings/venues>, 2019

³¹ ACT Government, 'Your guide to getting to Floriade 2018', <https://www.act.gov.au/our-canberra/latest-news/2018/september/your-guide-to-getting-to-floriade-2018>, 2018

The ACT Government's Planning Strategy acknowledges the importance of addressing this challenge and emphasises the need to focus on infill development and urban renewal to avoid the consequences of urban sprawl and land use inefficiencies. The Strategy identifies a target of delivering up to 70% of new housing within Canberra's existing urban footprint.³²

Why now?

City to Gungahlin Light Rail has already had a positive impact on development along the Northbourne Avenue and Flemington Road corridors with the construction of new residential and commercial precincts underway. Many developers have emphasised the City to Gungahlin Light Rail project as a reason for investment (see box below).

The Project is similarly expected to activate and enhance developments within City West and the Acton Waterfront. Stage 2B is anticipated to have a transformational impact on the Woden Town Centre and support urban revitalisation and place making activities along the corridor.

The Light Rail Effect – Urban Revitalisation

According to data from the Domain Group, property prices in Canberra's Inner North and in Gungahlin have outperformed the Canberra average rate of growth since December 2015.

The introduction of a "durable transport network" is linked to urban renewal and commercial and residential development.

The image below shows a new development that has been constructed in Dickson since the announcement of City to Gungahlin Light Rail.



Source: Powell, Nicola: Short-term plan for long-term gain: Will home owners benefit from the Canberra light rail?

Source (image): Nova, Morris Property Group, <http://morrispropertygroup.com.au/projects/nova/>

As experienced by other cities, light rail reinforces major corridors and centres, providing a stable corridor for development and acting as a support, or catalyst in some cases, for urban renewal. These outcomes will support the ACT Government's vision for Canberra outlined in *Canberra: A Statement of Ambition*.

City to Woden Light Rail, integrated with City to Gungahlin Light Rail, will provide a single seat journey option for passengers travelling between north and south Canberra. Delivery of the north-south light rail spine closely aligns with the ACT Government's urban renewal plans, particularly for City Hill, City West and the Acton Waterfront (Stage 2A), and Barton, Curtin and Woden (Stage 2B). More efficient use of existing land and infrastructure will lead to increased productivity and improved social outcomes, supporting Canberra as it continues to grow.

City to Woden Light Rail has the potential to:

- Activate and enhance planned developments in City Hill, City West and the Acton Waterfront;

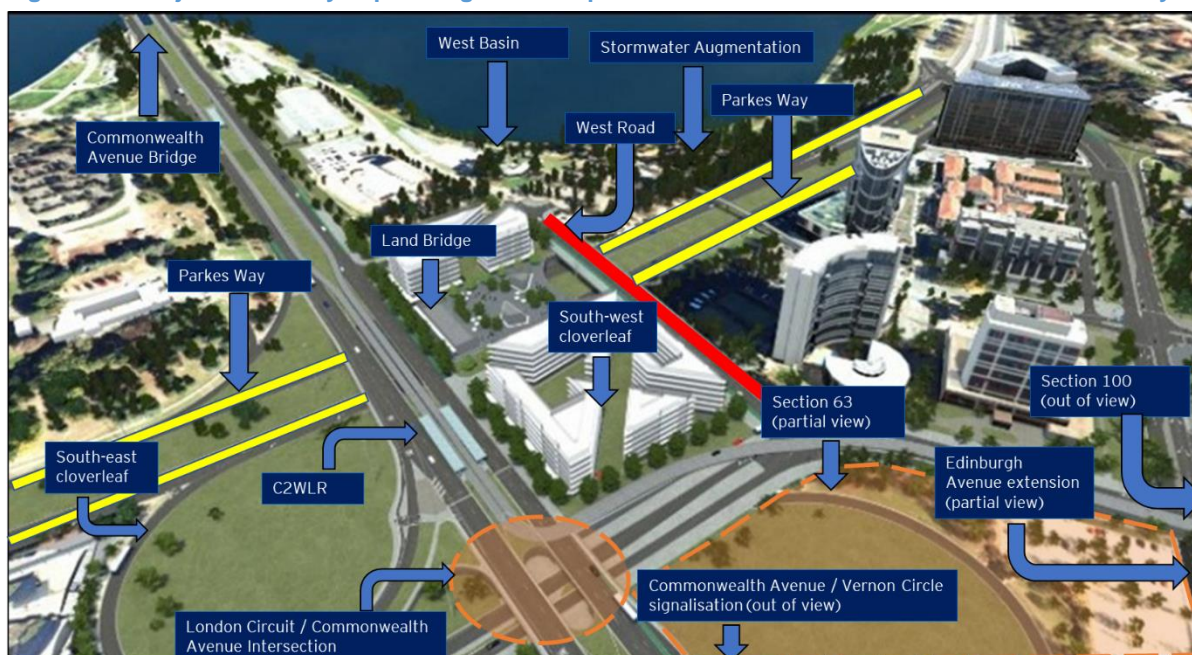
³² ACT Government, 'ACT Planning Strategy 2018', https://www.planning.act.gov.au/_data/assets/pdf_file/0007/1285972/2018-ACT-Planning-Strategy.pdf, 2018

- Contribute to Woden’s revitalisation by enhancing amenity and safety, improving public access to the shopping district and employment hubs and increasing property values;
- Support ongoing urban renewal in the City, Braddon and New Acton, including improved accessibility for staff and students at the ANU, especially noting the significant investment by ANU to link its campus into City West;
- Support planned developments in the Parliamentary Triangle and improve public transport access to the area for employees, as well as to tourist destinations;
- Encourage development along the relatively low density corridor between the City and Woden Town Centre;
- Act as a catalyst for the medium to longer term development and densification of North Curtin and Deakin; and
- Enhance the anticipated benefits from proposed City renewal opportunities by improving access between the north and the south of Canberra.

Supporting urban renewal and development in the Acton Waterfront and City Hill

A large number of developments are in planning or under construction around the Acton Waterfront and City Hill as outlined in Figure 3-2. Relevant land development projects proposed by the City Renewal Authority are outlined in Table 3-3. The delivery of Stage 2A will provide reliable and convenient public transport connectivity to the Acton Waterfront, City Hill and Commonwealth Park, optimising planned development activities and improving place making outcomes.

Figure 3-2: Projects currently in planning or development in and around the Acton Waterfront and City Hill



Note: these projects are in various stages of planning and development and as such should be viewed as indicative and subject to further consideration by the ACT Government.

Table 3-3: Projects in planning or development in and around the Acton Waterfront and City Hill

Project	Description
South-east cloverleaf site	The south-east cloverleaf site will unlock approximately 57,000m ² of land for development for residential and commercial use. The proposed development will result in the closure of the south-east cloverleaf. It will complement other developments in the City Centre area, support improved access between the City and Lake, create more active street frontages and improve urban amenity

South-west cloverleaf site	The proposed south-west cloverleaf development will close the south-west cloverleaf to traffic and release over 57,000m ² of land to be used for mixed-use development. The development will complement other developments in the City Centre area, support improved access between the City and Lake, create more active street frontages and improve urban amenity
Section 63	The City Renewal Authority is planning develop Section 63 near City Hill, which is currently occupied by a surface carpark and the north-west cloverleaf that facilitates the movement of traffic from Commonwealth Avenue northbound to London Circuit eastbound
Acton Waterfront	<p>New development on the Acton Waterfront is anticipated to create homes for approximately 15,000 new residents and includes plans for open space improvements on the waterfront and other public infrastructure. The development will also improve accessibility between the City and the waterfront.</p> <p>The feasibility and final development yield/design for the master plan in this area is under consideration</p>

Connecting New Acton and ANU to the City and beyond

A popular, cosmopolitan suburb with thriving new businesses that is also home to the ANU, New Acton is a cultural precinct that has put Canberra on the map for design and originality. It has numerous offerings such as the Nishi Gallery, Palace Electric Cinemas and popular restaurants. Keep Collective, a program of weekly creative workshops, has also established itself in the New Acton area.³³

The City West Precinct Deed signed between the ACT Government and ANU, now known as the ANU Exchange, is designed to establish a creative convergence between the commercial centre of Canberra and the ANU campus. It will bring the ANU campus into the City and create a vibrant zone of leading research partnerships based around science, arts, education and on campus university living.³⁴

Stage 2A will connect north Canberra and Commonwealth Park to the popular New Acton suburb and to Australia's premier research university.

Parliamentary Triangle – a growing employment and visitor hub

The Parliamentary Triangle hosts a number of nationally significant sites including Parliament House, the National Gallery, Questacon and the Museum of Australian Democracy (Old Parliament House), attracting approximately four million visitors each year.³⁵ The area is home to businesses, organisations and government departments including the Department of Prime Minister and Cabinet, the Department of Foreign Affairs and Trade, Treasury and the Attorney-General's Department.

The Parliamentary Triangle's importance as an employment hub is expected to grow, with employment in the Parliamentary Zone set to increase by 50% between 2015 and 2041.³⁶ Residential population in the Parliamentary Triangle is also anticipated to increase. This growth will intensify transport demand to, from and through the area.

Potential developments planned for this area include:

- 'Place-making' initiatives along Commonwealth Avenue, including increasing access for pedestrians and cyclists;

³³ City Renewal Authority, 'Keep Collective', <https://www.act.gov.au/cityrenewal/whats-on/past-events/keep-collective>, 2018

³⁴ The Australian National University Exchange, 'Master Plan and Implementation Plan', https://www.planning.act.gov.au/_data/assets/pdf_file/0007/890611/anuex-masterplan2.pdf, 2006

³⁵ Tourism Research Association and visitor figures obtained by ACT Government from relevant national institutions

³⁶ Transport Canberra, 'Light Rail Network', https://www.tccs.act.gov.au/_data/assets/pdf_file/0011/984638/Transport-Canberra-Light-Rail-Network.PDF

- Enhancing the prominence of Kings and Commonwealth Avenues as grand boulevards with reduced travel speeds that encourage public transport use. The Commonwealth Government has committed to investing \$14 million over the next three years to help the National Capital Authority deliver upgrades to key infrastructure. The funding provides for a business case to be prepared to consider strengthening, widening and safety barrier replacement works on Commonwealth Avenue Bridge to ensure the continued safety of the bridge for the next 50 years. The ACT Government and the NCA are currently engaged in preliminary discussions around other potential options for the Commonwealth Avenue bridges over Lake Burley Griffin;
- Revitalising York Park and redeveloping neighbouring surface carparks for future office accommodation. Windsor Walk will be retained and redeveloped as a central linear park and continuous pedestrian spine connecting car parks, offices, a proposed retail plaza and landscaped recreational areas;
- The Department of Finance plan to sell the 11,560m² site at the corner of Sydney Avenue and National Circuit. The land could be redeveloped to host up to 425 apartments, or a mix of housing, offices, a hotel and cafes, according to preliminary concept plans.

These developments aim to support Canberra's growing tourism and education sectors and capitalise on the potential for agglomeration benefits within inner Canberra. With the delivery of Stage 2B, connecting the Parliamentary Triangle with employment and residential hubs to its north and south, light rail will improve accessibility, providing easy access to other key destinations and acting as a substantial public transport hub that can support future connections to town centres to the south.

North Curtin and Deakin – underutilised and under-developed

North Curtin's Horse Paddocks is an underutilised parcel of land close to the City, adjacent to large playing fields in West Deakin. The area is a potential location for future urban renewal, density uplift and open space improvement. A strategic integrated approach to transport and land use will be essential to the future development of these spaces.

The already established health precinct in West Deakin could form the core of an expanded specialised medical precinct in Canberra's south, supporting additional mixed-use development. Again, improved access to this area will provide the foundation for further expansion and residential growth.

Land use surrounding Adelaide Avenue is constrained, with the road a major arterial link, presenting a physical barrier between the City to Woden light rail corridor and the surrounding catchment area. Improving connectivity will unlock potential urban renewal sites and improve integration. In considering future land developments along the corridor, such as the Horse Paddocks in North Curtin, it will be necessary to consider how future residents and businesses will connect with light rail in the planning stages for Stage 2B.

Woden – suboptimal amenity and relatively high commercial vacancy rates

Woden is a key urban renewal site in Canberra where suboptimal urban amenity is undermining the district's liveability and productivity potential.

Several areas in Woden have been identified as places where women feel the least safe in the ACT, including the bus interchange, car parks and connecting footpaths.³⁷ In 2017, Woden had an overall commercial vacancy rate of 16.5% compared to Canberra's overall vacancy rate of 12.6%,³⁸ suggesting that businesses found the district a less attractive location than other parts of the City. The Woden Town Centre Master Plan identified strong community support for upgrades to the town square, streets, and public spaces, as well as concerns about declining employment in Woden.³⁹

³⁷ Women's Centre for Health Matters presentation to Woden Valley Community Council, 2017

³⁸ The Canberra Times, 'Numbers reveal the story isn't as bleak as some Woden Town Centre facades', <https://www.canberratimes.com.au/story/6036510/numbers-reveal-the-story-isnt-as-bleak-as-some-woden-town-centre-facades/>, 2017

³⁹ ACT Government, 'Woden Town Centre: Master Plan', https://www.planning.act.gov.au/_data/assets/pdf_file/0009/898272/Woden_Master_Plan-web.pdf, 2015

Projects such as the ACT Government funded #WodenExperiment have acknowledged the need for investment in Woden. The Project involves a temporary installation of new facilities in the Woden Town Square, including new furniture and a stage for community performances.⁴⁰

The ACT Government has relocated approximately 1,000 public servants to Woden and other developments are planned or underway to improve amenity, enhance open spaces and recreational facilities, and create new employment opportunities, including:

- Expansion of Canberra Hospital;
- Pedestrian and cycling accessibility improvements at Woden Town Centre, and urban upgrades to implement some of the priorities of the Woden Town Centre Master Plan;
- Revitalising Woden Library;
- Woden bus interchange improvements and a new bus depot at Woden;
- Design and planning for a new Woden Community Centre
- A new health and wellness centre on the site of Woden's old pitch-and-putt golf course (completed);
- Potential upgrades to Westfield Woden; and
- Residential land release.

Improved access to the Woden retail district and employment hubs with the delivery of Stage 2B of City to Woden Light Rail will be critical to the success of these developments, and to making Woden a safer, more attractive place to live, work and visit.

Additionally, the development of City to Woden Light Rail has the potential to lead to urban renewal benefits in and around the Yarra Glen roundabout, including:

- Release of land in and around the roundabout due to the rationalisation of infrastructure;
- Increased development potential of adjacent sites; and
- Improvements in cyclist accessibility into Woden via the main trunk cycle path from the north.

⁴⁰ "ACT Government, 'Woden Experiment begins next week', https://www.cmtedd.act.gov.au/open_government/inform/act_government_media_releases/chris-steel-mla-media-releases/2019/woden-experiment-begins-next-week, 2019

Woden Town Centre: Before and After Light Rail

Woden Town Centre is the major retail precinct in the Woden Valley. Its landscape is currently dominated by a number of surface carparks. It has the opportunity to better improve pedestrian amenity and to better utilise land and community assets.

The Territory's vision to deliver a high capacity transport interchange is intended to introduce generous active travel paths alongside the light rail alignment; a barrier free shared zone that ensures pedestrian and cyclist easy access across the track; and new street tree planting to reflect the nature and pedestrian scale of surrounding streets. The following two images show the Town Centre in its current form; and a visualisation of how the space could potentially look after the introduction of light rail.



Source: Gungahlin to Woden Light Rail: Submission by the ACT Government to the Joint Standing Committee on the National Capital and External Territories

3.4 Challenge 3 – There exists opportunity for public transport to be better utilised, to better meet customer expectations and to meet the needs of a growing population

Public transport is relatively underutilised in Canberra and car use is high. This is in part due to the low barriers to car use, the historic nature of land development in Canberra, community habits and, until recently, the low-frequency nature of Canberra's bus network. As Canberra's population grows, these patterns of travel will increasingly become unsustainable. If public transport is not improved, congestion will worsen and journeys around the city will be longer and less reliable.

Why now?

There is a significant opportunity to enhance the attractiveness of the current public transport system to encourage new users. Australian Bureau of Statistics (ABS) data shows that 74.9% of Canberra's working population travel by car.⁴¹ A continued reliance on car travel in Canberra is unsustainable for a growing city in the long-term.

Investment is required now to further stimulate public transport uptake and reduce car dependency and congestion. Experience in other cities shows that light rail is an attractive transport option that can increase public transport usage when compared to bus transit alone. Around the world, newly built light rail lines have increased the overall number of public transport passengers considerably. For instance, Montpellier in France experienced an increase in public transport use of more than 50% between 1997 and 2001.⁴² Similar impressive gains occurred in Strasbourg in France (over 40% between 1992 and 1999) and Freiburg in Germany.

Closer to home, the implementation of light rail networks in Sydney and Adelaide has seen increased public transport patronage. For example, the journey to work share of total travel for light rail in Adelaide and Sydney grew at 127% and 108% respectively between 2001 and 2011.⁴³ In Sydney between 2015 and 2018, there has been a 12% reduction in the number of vehicles coming into the Sydney CBD in the morning peak, and an increase of 11% in public transport trips into the Sydney CBD in the morning peak.⁴⁴ The Sydney Inner West Light Rail extension between Lilyfield and Dulwich Hill, which opened in 2014, has led to a 30% increase in the number of trips across the network. The Glenelg Tram Extension in Adelaide, which commenced operations in 2008, led to a patronage rise during peak hours to and from Glenelg by 40% and an overall patronage rise of 70% within the City.⁴⁵

Significant investment in light rail is also occurring across Australia. Projects currently under construction, or recently completed, include Sydney's CBD and South East Light Rail, Gold Coast Light Rail Stage 3A, Paramatta Light Rail, Adelaide's City Tram Extension, and the Toorak Road West Tram Diversion in Melbourne.⁴⁶ Other light rail systems and extensions are in planning across Australia.

As other cities continue to improve their public transport services, Canberra needs to offer comparable travel options to cater for its growing population and meet community expectations.

As well as investing in light rail, the ACT Government has also recently implemented significant changes to the bus network in the Territory, as part of the delivery of an integrated transport network to get Canberrans and visitors where they want to go (see Section 2.5.5). The network features ten Rapid routes (including light rail from

⁴¹ Australian Bureau of Statistics, 'More than two in three drive to work, Census reveals', <https://www.abs.gov.au/AUSSTATS/abs@.nsf/mediareleasesbyReleaseDate/7DD5DC715B608612CA2581BF001F8404?OpenDocument>, 2017

⁴² Crampton, G., 'Economic Development Impacts of Urban Rail Transport', <http://www.sre.wu-wien.ac.at/ersa/ersaconfs/ersa03/cdrom/papers/295.pdf>, 2003

⁴³ Currie, G, Burke, M., 'Light Rail in Australia – Performance and Prospects', https://www.atrf.info/papers/2013/2013_currie_burke.pdf, 2013

⁴⁴ NSW Government, 'Sydney City Centre Access 2018', <https://access2018.mysydneycbd.nsw.gov.au/>, 2018

⁴⁵ Elaurant, S., Evans, G., Buchanan, P., Tisato, P., 'Measuring Wider Economic Benefits of the Glenelg Tram Extension', 2014

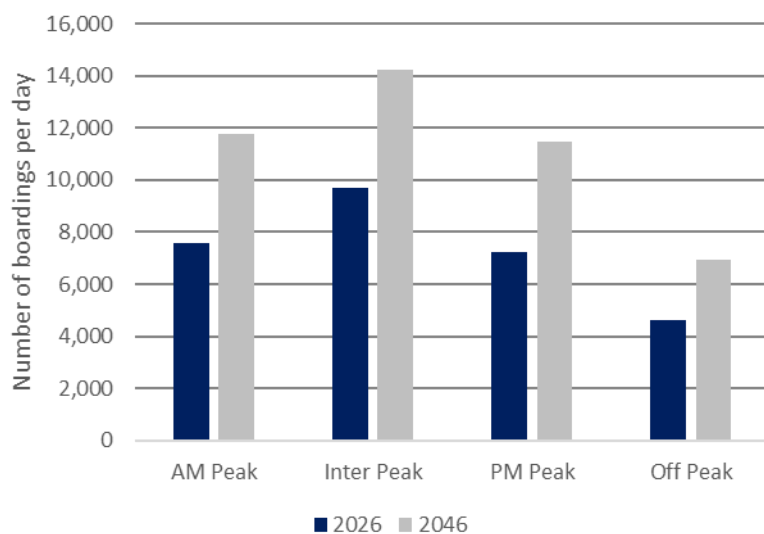
⁴⁶ Bureau of Infrastructure, Transport and Regional Economics and Australasian Railway Association, 'Trainline 5: Statistical Report' https://www.bitre.gov.au/publications/2017/files/train_005.pdf, 2017

the City to Gungahlin) providing frequent services between town centres and other key destinations, seven days a week. Local services have also been re-designed to better connect suburbs to their town centres, and to connect travellers to Rapid services.⁴⁷ Together, light rail and the new bus network will provide more convenient, reliable and accessible public transport for Canberrans.

With the delivery of City to Woden Light Rail, between 2026 and 2046, the number of public transport trips is expected to increase by over 50% to more than 141,000 trips per day.⁴⁸

Light rail between Gungahlin and Woden via the City will also provide an attractive option for non-commuter passengers, with inter peak and off-peak light rail trips expected to represent nearly 50% of all trips in 2026 and 2046 as depicted below.

Figure 3-3: Light rail network boardings (time of day, 2026 and 2046)⁴⁹



Public transport accessibility for an increasing number of ANU students

A 2014 report found Canberra has the highest percentage of its population studying full time or part time, compared to any other Australian city.⁵⁰ In 2018 the ANU, one of the largest universities in Australia, had around 25,500 students. Approximately 5,000, or approximately 20%, of those lived on campus, with the remaining living off-campus and commuting to class.⁵¹ Many students rely on, or opt for, sustainable and affordable transport options, requiring convenient transport access in both peak and off-peak periods.⁵² Extending light rail south to Commonwealth Park will provide improved connectivity for the increasing number of students at ANU, with the City West and City South stops in close proximity to campus.

Public transport share from Woden to the City is relatively low

The Woden to City public transport connection is currently serviced by the R4 Rapid bus with other Rapid services operating via Constitution Avenue and Barton (R5), and via Narrabundah (R6). Despite offering highly competitive

⁴⁷ Transport Canberra, 'New Network', <https://www.transport.act.gov.au/about-us/public-transport-options/bus/new-network>, 2019

⁴⁸ Strategic transport modelling based on a State Circle (east) route alignment between the City and Woden

⁴⁹ Strategic transport modelling based on a State Circle (east) route alignment between the City and Woden

⁵⁰ Study Canberra, 'Canberra: Australia's University Town', <https://web.aiu.ac.jp/en/wp-content/uploads/2012/12/Study-Canberra.pdf>

⁵¹ Australian National University, 'Quick Statistics', <https://www.anu.edu.au/about/quick-statistics>, 2019

⁵² ACT Government, 'Transport for Canberra: Transport for a sustainable city 2012-2031', https://www.transport.act.gov.au/data/assets/pdf_file/0017/1237013/TransportForCanberra_Policy.pdf, 2012

travel times, every 10 minutes or better between the hours 7am and 7pm on weekdays, car travel continues to dominate travel on the corridor, accounting for 74% of all commuter trips between the City and Woden.⁵³

It should also be noted that the current R4 bus service operates as express service, with no stops in or around the Parliamentary Triangle aside from Albert Hall. The R5 and R6 services take less direct routes via Constitution Avenue and Narrabundah respectively. Furthermore, the reliability of this service is subject to traffic congestion along the route or at any point on the journey, including in the City or in and around Woden.

Travel between Woden and the City in the weekday morning peak hour (8am to 9am) indicates that of the 14,400 total trips only 1,150, or 8% were by bus, with more than half by car.⁵⁴

City to Woden Light Rail will increase public transport choice, providing a convenient, frequent and reliable option for Canberrans.

3.5 Challenge 4 – population growth and high car dependency, will lead to congested roads and negative social and environmental impacts

Car use in Canberra is high and – without action being taken – is forecast to increase alongside population growth. Continuing high levels of car dependency will lead to increased traffic congestion, air and noise pollution, higher crash costs and slower travel times. These impacts will have negative economic, social and environmental consequences, eroding Canberra's liveability, productivity and competitiveness.

Why now?

Light rail will provide an alternative mode of transport that is expected to decrease the number of car trips around and through the city. It will assist in reducing congestion on the city's road network and alleviate pressure on key Canberra roads. Undertaking the Project now will also enable Canberra to start realising productivity gains and reduce transport emissions before the problems become more severe.

Light rail aligns with Transport Canberra and City Service's vision to implement an integrated public transport network for Canberra. As the next stage in completing the north-south public transport spine, the Project will provide improved connectivity between Gungahlin, the City and Commonwealth Park, and ultimately south to Woden with the delivery of Stage 2B. The initial stage will help overcome the barriers that restrict movement between the City and those areas on the northern side of the Lake and support increased public transport usage and visitation.

The introduction of light rail will also support contemporary planning activities included in the ACT Planning Strategy and the Moving Canberra Strategy (currently in draft). It will assist moves toward developing a more compact city that combines a sensitive and accessible mix of residential, commercial, retail and recreational land uses.

More people mean more cars, more congestion and more delays

The city's population is expected to reach 620,000 by the mid-2040s.⁵⁵ As illustrated in Figure 3-4, without additional investment this will lead to an increase in the cost of road congestion in the ACT, rising from \$208 million per annum in 2011 to \$703 million per annum in 2031.⁵⁶

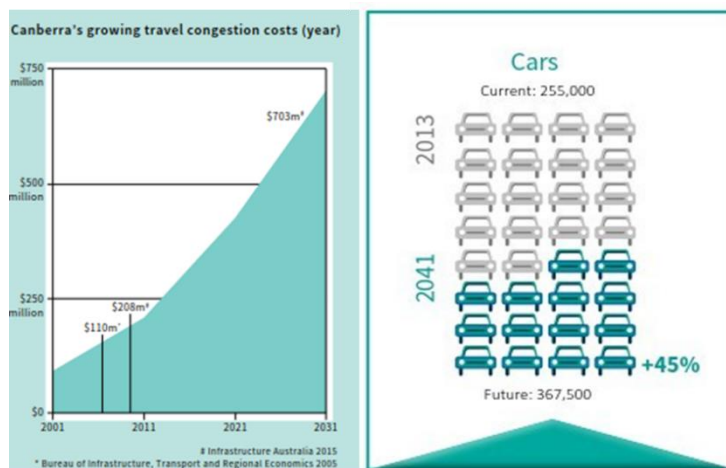
⁵³ Australian Bureau of Statistics, *Census of Population and Housing*, 2016

⁵⁴ ACT and Queanbeyan-Palerang Regional Council, 'Household Travel Survey', <https://www.transport.act.gov.au/about-us/planning-for-the-future/household-travel-survey>, 2017

⁵⁵ ACT Treasury, 'Projections of the resident population 2019', <https://apps.treasury.act.gov.au/snapshot/demography/act>, 2019

⁵⁶ Infrastructure Australia, 'Australian Infrastructure Audit', <https://www.infrastructureaustralia.gov.au/sites/default/files/2019-06/australian-infrastructure-audit-volume-1.pdf>, 2015

Figure 3-4: Canberra's growing travel congestion costs (year)⁵⁷



Car dependency in Canberra is high and the number of car trips are growing. Between 2026 and 2046 the number of car trips in Canberra is expected to grow by over 400,000 trips per day.⁵⁸ Travel delays are also predicted to increase with more cars on the road. In 2026, delay hours in Canberra were on average almost 34,000 per day; by 2046, this is expected to more than double to 85,000 hours per day.⁵⁹

The City Plan estimated that in 2004 people driving cars represent 55% of all people travelling into the city centre, with an additional 15.8% arriving as car passengers.⁶⁰

As outlined in below, loads on key arterial roads are set to increase into the future. The increasing traffic on key city roads is unsustainable into the future and hinders the realisation of the ACT Government's vision for the city centre as an active, people friendly place. According to transport modelling completed for the Project, the total load on key roads is expected to increase by up to 165% (Clunies Ross Street) between 2026 and 2046.

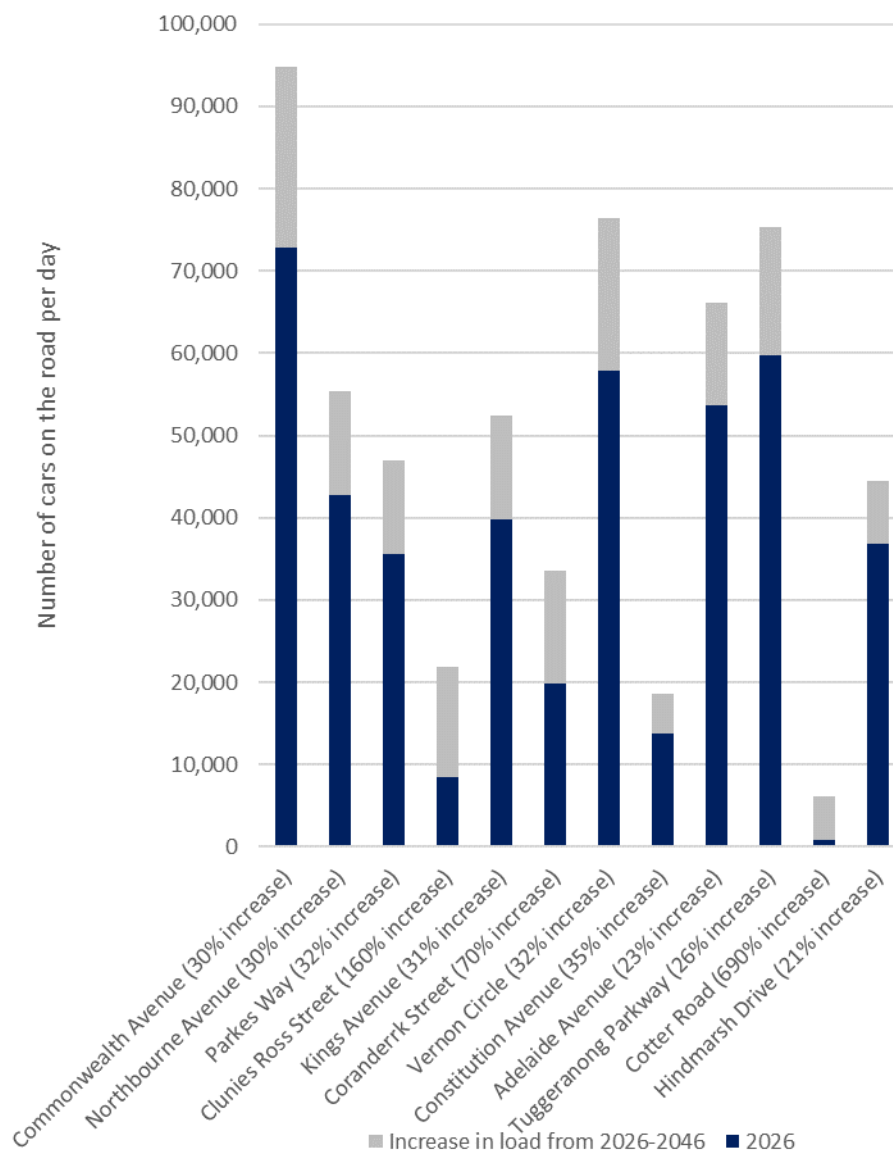
⁵⁷ Infrastructure Australia, 'Australian Infrastructure Audit', <https://www.infrastructureaustralia.gov.au/sites/default/files/2019-06/australian-infrastructure-audit-volume-1.pdf>, 2015

⁵⁸ Strategic transport modelling

⁵⁹ Strategic transport modelling

⁶⁰ ACT Government, 'The City Plan', <https://www.cityplan.act.gov.au/>, 2014, p43

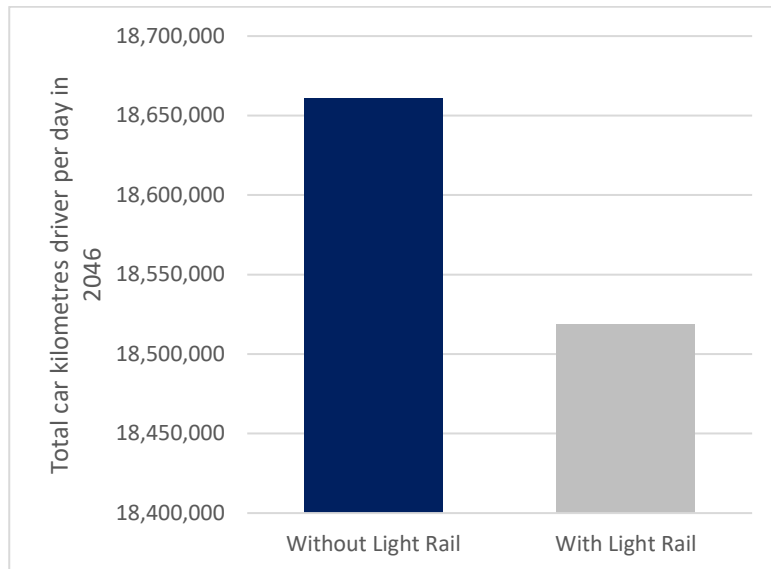
Figure 3-6: Sum of loads on key roads, 2026 and 2046 (without the Project)



In the absence of City to Woden Light Rail (i.e. Stages 2A and 2B), the number of car trips is expected to grow by approximately 400,000 trips per day between 2026 and 2046.⁶¹ Additionally, with light rail, car kilometres are expected to be lower than they would otherwise be, as shown in the figure below.

⁶¹ Strategic transport modelling based on a State Circle (east) route alignment between the City and Woden

Figure 3-5: Car kilometres travelled with and without City to Woden Light Rail in 2046⁶²



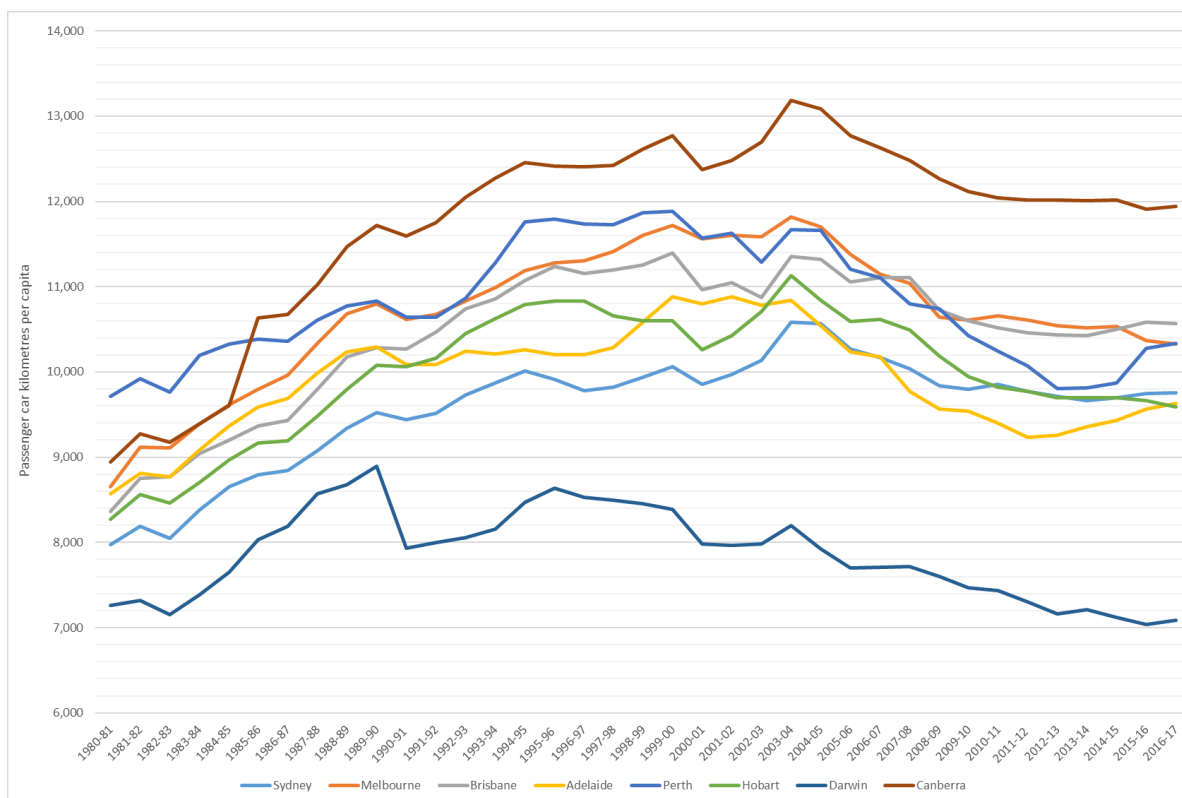
Canberra's per capita kilometres driven are higher than any other city in Australia

Canberra's low population is dispersed over a large area resulting in more kilometres driven than other capital cities in Australia. While the planning of Canberra's satellite Town Centres envisaged a high level of self-containment, travel and employment data indicate a greater spread of workers, with households often having several workers employed in different locations.

Figure 3-6 shows that Canberra's kilometres driven per capita (to 2016-17) have been consistently higher than in other Australian capital cities since 1985. The gap in kilometres driven per capita between Canberra and the next highest city has been growing. While Canberra's total kilometres driven have been declining since the early 2000s, this is not occurring at the same rate as the other capital cities.

⁶² Strategic transport modelling based on a State Circle (east) route alignment between the City and Woden

Figure 3-6: Total car passenger kilometres driven per capita⁶³



Car ownership is high compared to other cities

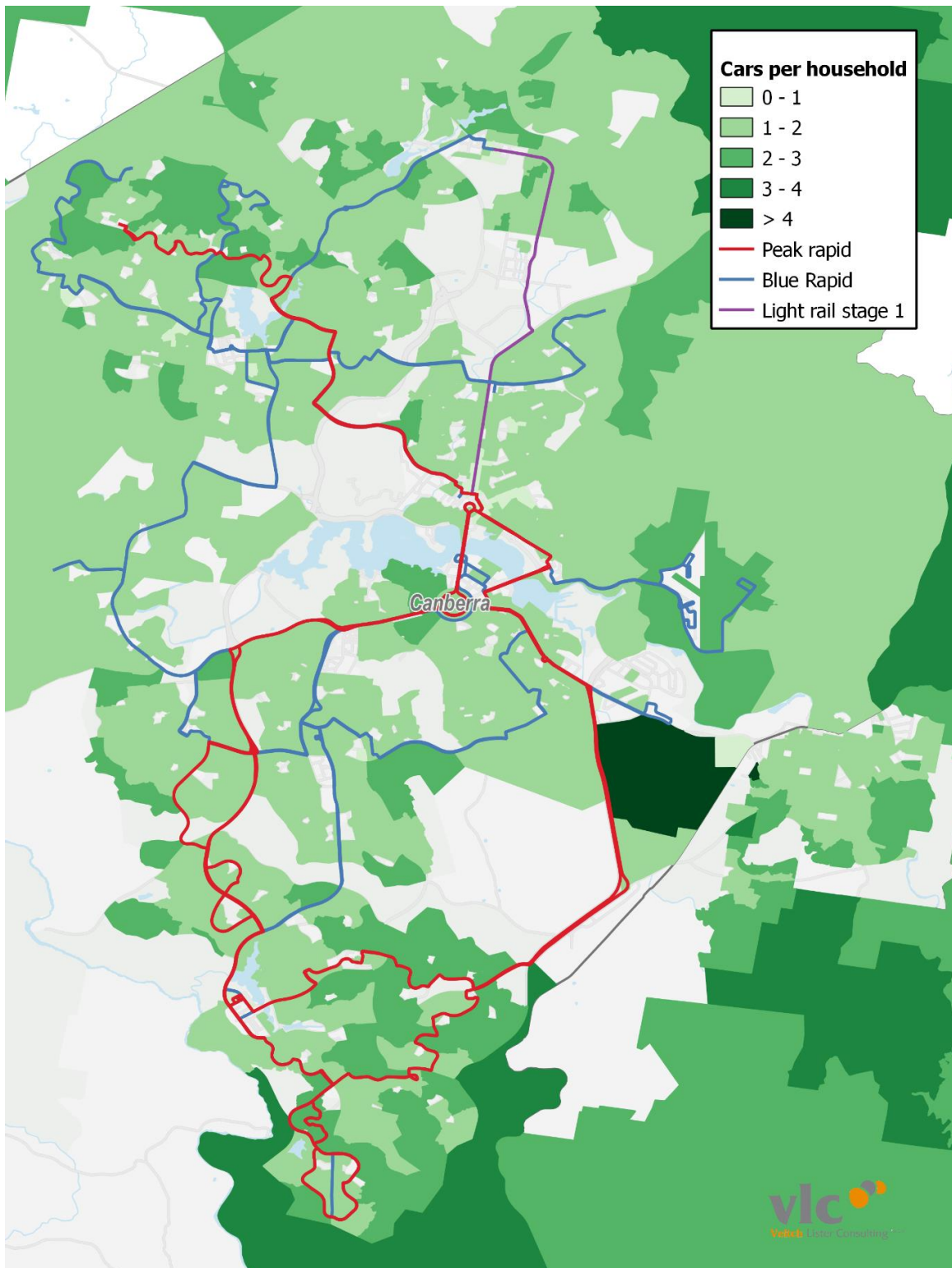
Generally, as the use of public transport increases, car ownership decreases. The ABS 2016 census indicated that 10.7% of households in the City of Sydney did not have access to a motor vehicle, compared to 5.6% in Canberra. This compares to Sydney's high rate of public transport use to get to work (20%) and Canberra's relatively low rate of public transport use to get to work (7%).⁶⁴ Car ownership is high in Canberra, with an average of 1.8 vehicles per household and 0.9 vehicles per person, as depicted in Figure 3-7.⁶⁵ Offering greater choice in housing, transport, access and supporting infrastructure is essential to realising the Territory's vision of a compact and competitive City.

⁶³ Analysis of Bureau of Infrastructure, Transport and Regional Economics, 'Yearbook 2018: Australian infrastructure statistics', <https://www.bitre.gov.au/publications/2018/files/infrastructure-statistics-yearbook-2018.pdf>, 2018

⁶⁴ Analysis of Australian Bureau of Statistics, Census of Population and Housing, 2016

⁶⁵ Transport Canberra and City Services, 'Moving Canberra 2019-2045: Integrated Transport Strategy', <https://www.yoursay.act.gov.au/moving-canberra>, 2018

Figure 3-7: Household car ownership rates in Canberra overlaid with selected existing Rapid bus services (2026, without Project)

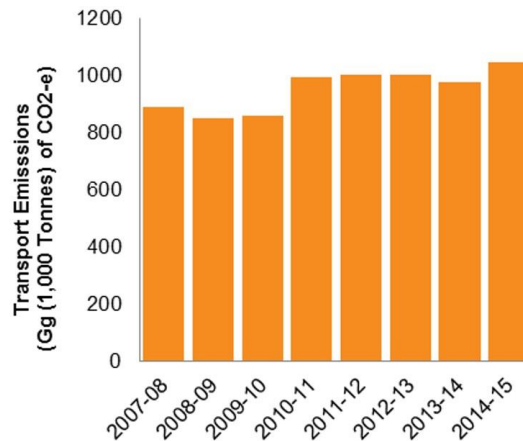


Emissions from transport are increasing

In 2015, transport emissions accounted for more than 26% of total ACT emissions (the second largest emitter of greenhouse gases in the Territory), compared to 18% of Australian emissions. By 2020, emissions from transport

will represent more than 60% of ACT emissions.⁶⁶ ACT transport emissions grew by 29.5% between 1990 and 2011⁶⁷ and the long-term trend has been one of steady growth, with a 7.4% increase recorded between 2013-2014 and 2014-2015 – higher than the Territory's population growth over that period. Between 2012 and 2017, emissions from transport increased by 11% across the Territory.⁶⁸ Passenger vehicles comprise approximately 73.5% of the direct emissions produced in the ACT.⁶⁹

Figure 3-8: Transport emissions in the ACT, 2007-08 to 2014-15⁷⁰



The ACT Government's emissions reduction targets are established through the Climate Change and Greenhouse Gas Reduction Act 2010. The Act seeks to achieve a 40% reduction in greenhouse gas emissions on 1990 levels by 2020 and zero net emissions by 2050.

A more ambitious target of zero net carbon emissions in the ACT by 2045 is outlined in the Government's Moving Canberra 2019-2045 Integrated Transport Strategy. The Strategy also sets a goal of a reduction in emissions from transport by 25% from 2020 to 2025.⁷¹ AP2 – the climate change strategy and action plan for the ACT released in 2012 – outlines a core focus for Transport Canberra and City Services in reducing transport emissions and encouraging more people to shift to more sustainable modes of transport: public transport, cycling and walking.

In the ACT, a reduction of emissions from car transport by a minimum of 30% would be necessary, to achieve the Government's transport sector goals.⁷²

3.6 Key benefits to be realised from this Project

The Investment Logic Map identified four main benefits that are expected to be realised by City to Woden Light Rail. These benefits are equally applicable to the Project, as the initial stage in extending light rail south to Woden. The benefits are as listed below:

⁶⁶ Transport Canberra and City Services, 'Moving Canberra 2019-2045: Integrated Transport Strategy', <https://www.yoursay.act.gov.au/moving-canberra>, 2018

⁶⁷ ACT Government, 'Transport for Canberra Report Card', https://www.transport.act.gov.au/data/assets/pdf_file/0007/887362/Transport-for-Canberra-Report-Card.pdf, 2014

⁶⁸ Transport Canberra and City Services, 'Moving Canberra 2019-2045: Integrated Transport Strategy', <https://www.yoursay.act.gov.au/moving-canberra>, 2018

⁶⁹ ACT Government, 'Low Emission Vehicle Strategy: Discussion Paper', https://www.transport.act.gov.au/data/assets/pdf_file/0008/1229057/Low-Emission-Vehicle-Strategy-Discussion-paper_ACCESS.pdf, 2014

⁷⁰ AECOM, 'Strategic Options for Reducing Emissions in 2030, 2040 and 2050', https://s3.ap-southeast-2.amazonaws.com/hdp.au.prod.app.act-yoursay/files/2115/1252/3391/60507826_Reducing_ACT_Transport_Emissions_Final_Report_Rev_5.pdf, 2017

⁷¹ Transport Canberra and City Services, 'Moving Canberra 2019-2045: Integrated Transport Strategy', <https://www.yoursay.act.gov.au/moving-canberra>, 2018

⁷² Transport Canberra and City Services, 'Moving Canberra 2019-2045: Integrated Transport Strategy', <https://www.yoursay.act.gov.au/moving-canberra>, 2018

1. Reduced congestion;
2. Connected and compact city;
3. Improved access to employment and services; and
4. Increased economic growth and diversification.

These benefits and their values are summarised below. As with the City to Gungahlin Light Rail project, it is expected that a Benefits Realisation Plan will subsequently be developed by the ACT Government in consultation with relevant directorates. That Benefits Realisation Plan will measure Project outcomes against a series of Key Performance Indicators which are to be agreed.

Figure 3-9: Key Project benefits

Expected benefit	Value of benefit
Increased economic growth and diversification of employment	<ul style="list-style-type: none"> • Job creation along the light rail corridor • Agglomeration benefits (as discussed in the economic appraisal – see Chapter 7.0) • Diversification of jobs in Canberra, reducing reliance on Commonwealth Government employment and expenditure (which will also have positive implications for ACT tax revenues) • As light rail generates revenue and unlocks value along the corridor, this benefit can be realised in the form of increased tax revenue on land (including both higher value land and better utilised land)
A connected and compact city	<ul style="list-style-type: none"> • Infrastructure cost savings associated with infill development (relative to development along the urban fringe) • Wider economic benefits achieved due to land use change (see Chapter 7.0) • Higher levels of productivity due to an increase in density and agglomeration • Reduced urban sprawl • In addition to planned urban renewal, light rail will be a catalyst for further private development in the area – providing ongoing revenues to the ACT Government
Improved access to employment and services	<ul style="list-style-type: none"> • Supporting the unlocking of commercial and retail space will increase the number of accessible jobs in Canberra • Better access to employment will increase productivity and ultimately the economic output of the City
Reduced congestion	<ul style="list-style-type: none"> • Increased public transport use, leading to a reduction in car use and associated congestion and pollution • Travel time savings equivalent to _____ over the first 30 years of operations (see Chapter 7.0) • Estimated net externality benefits at _____ over a 30-year appraisal period (see Chapter 7.0). This estimate includes reductions in emissions, noise, water pollution and impacts on nature and landscape

The relationship between the challenges and benefits outlined in this Section and the economic benefits quantified in the cost benefit analysis (CBA) are outlined in Table 3-4 below.

Further detail on the CBA is outlined in Chapter 7.0.

Table 3-4: Relationship between needs analysis and economic appraisal

Economic Benefits		Need for Investment			
		Economic diversification	Competitive and compact city	Accessibility	Reduced congestion
Transport Benefits	Travel time savings	✓		✓	✓
	Reliability benefits	✓		✓	✓
	Vehicle operating costs	✓		✓	✓
	Net externalities	✓		✓	✓
	Accident costs	✓		✓	✓
	PT Revenue	✓		✓	
	Bus operation cost savings			✓	
	Health benefits	✓		✓	
	Light rail amenity benefits			✓	
	Residual Value			✓	
	Second round transport benefits ⁷³		✓	✓	✓
City-Shaping Benefits	Land value uplift		✓		
	Infrastructure cost savings		✓		
Wider Economic Benefits	Transport agglomeration	✓			
	Land use agglomeration		✓		

The benefits identified in this Business Case are of high importance to the ACT Government. They will keep Canberra competitive and contribute to making the city more productive, liveable and sustainable.

⁷³ Transport benefits that accrue as a result of changes in land use

Treasury directorate to sign off that a case for the Project is present in the Business Case.

Review 2 (Treasury) Officer Name: _____

Signature: _____

Date: _____

4.0 Options analysis

Key messages

- The ACT Government has determined to proceed with City to Woden Light Rail as the next stage of Canberra's light rail network. It is proposed to be delivered in accordance with the priorities identified in the Light Rail Network Plan to:
 - Ensure the light rail network connects to other modes of transport and employment hubs;
 - Invest in corridors where there is a future need; and
 - Shape the growth of the city.
- The City to Woden corridor was identified as a high priority due to its capacity to connect key residential, cultural, commercial and employment centres across the city using an integrated public transport network.
- In 2017, the ACT Government undertook a range of scoping activities to understand the key considerations, risks, opportunities and objectives for City to Woden Light Rail. These activities led to the selection of several options for further analysis and community and stakeholder consultation. In 2018 options were presented to the JSC inquiry in order to gain certainty around the approval process for traversing the Parliamentary Zone.
- Following the JSC inquiry, additional guidance provided by the NCA, further technical analysis and deliberations by the ACT Government, three final route alignment options to Woden have been considered. Following a comparative analysis of each route alignment's benefits and costs, technical feasibility, ability to obtain approvals and performance against the Project's objectives, it is recommended that the ACT Government continue with planning, design and other associated activities on the basis of a "State Circle East" alignment as the preferred route to connect light rail to Woden.
- Delivery options were also considered to determine the preferred delivery approach for light rail in the City to Woden corridor. A staged delivery approach is recommended, with the first component of the City to Woden corridor, Stage 2A, to be delivered being from the existing light rail terminus at Alinga Street to Commonwealth Park (on Commonwealth Avenue, on the northern side of Lake Burley Griffin).
- Delivery of Stage 2B will be the subject of a separate, future recommendation to Cabinet once Commonwealth planning approval processes are further resolved.

4.1 Overview

This Chapter outlines the strategic, project and delivery options analysis that has been undertaken for the Project. It is divided into:

- **Strategic options analysis:** outlining the potential light rail options identified in the Light Rail Plan and the process undertaken to select the City to Woden corridor;
- **Project options analysis:** outlining the process used to shortlist route alignments to Woden and the analysis undertaken to support the preferred route alignment; and
- **Delivery options analysis:** outlining the process used to determine the preferred delivery approach for the Project.

The strategic options analysis concludes that the City to Woden corridor is a high priority due to its capacity to connect key residential, cultural, commercial and employment centres across the City using an integrated public transport network. While the City to Woden route alignment has technical and planning challenges, it is a crucial part of the integrated transport network, connecting north and south Canberra and forming the backbone of an integrated and accessible public transport network.

The Project options analysis shortlists three route alignment options:

- **Option 1:** City to Woden via State Circle (East)
- **Option 2:** City to Woden via Capital Circle
- **Option 3:** City to Woden via Parkes/Barton

A comparative assessment of the merits of these route alignments when evaluated against a series of criteria (connectivity and urban renewal, planning and technical, cost and risk contingency, and community and governmental consultation) has resulted in this Business Case's recommendation that the Project be constructed between the City and Woden via State Circle East (Option 1). This alignment is preferred as it provides a balanced option that supports the achievement of the Project objectives and is likely to have the best chance of obtaining necessary planning and approvals.

The delivery options analysis considers two options:

- **Option 1:** staged delivery approach
- **Option 2:** non-staged delivery approach

A staged delivery approach (Option 1) is preferred for reasons described below.

4.2 Strategic options analysis

The ACT Government has made a clear commitment to construct the light rail network over the coming years to help achieve its vision for Canberra and to:

- Deliver an attractive public transport choice for the City;
- Support and generate urban renewal; and
- Diversify the Canberra economy.

The Light Rail Network Plan identified seven different potential light rail corridors. These corridors are depicted in Figure 4-1.⁷⁴ Light rail plans and further analysis have set out the priorities for the development and delivery of a light rail network that facilitates easy access between communities, major educational institutions, retail and entertainment precincts, major events and employment hubs through an integrated public transport network.

Light rail will be demand driving infrastructure that will help shape the way the City grows with higher density and more compact urban form along light rail corridors.

In light of these considerations and following consultation with the community, the ACT Government announced in September 2016 that City to Woden via the Parliamentary Triangle would be the next stage of the light rail network to be developed.

4.2.1 Recommended strategic option

The strategic options analysis conducted in the lead up to ACT Government's decision to proceed with City to Woden Light Rail as the next stage of the network concluded that it aligned with the priorities identified in the Light Rail Network Plan to:

- Ensure the light rail network that connects to other modes of transport and employment hubs;
- Invest in corridors where there is a future need; and
- Shape the growth of the City.

While the City to Woden route alignment has technical and planning challenges, it has strategic significance and is a high priority due to its:

Figure 4-1: Canberra's future light rail network



⁷⁴ This map has been updated since the ACT Government released the Light Rail Network Plan document

- Capacity to connect key residential, cultural, commercial and employment centres across the City using an integrated public transport network;
- Ability to connect north and south Canberra, creating a north-south public transport spine; and
- Potential to stimulate urban renewal along the route alignment but particularly in Woden.

The City to Woden corridor also gives the ACT Government an opportunity to consider supporting infrastructure and other policy approaches to enhance Project outcomes and achieve broader Territory objectives with respect to inclusivity, employment, accessibility and land utilisation.

Light rail or bus rapid transit?

When comparing the relative merits of on-street bus, bus rapid transit and light rail there is empirical evidence around the world that suggests that customers perceive light rail more favourably than on-street bus services and bus ways. Key factors include customer perception, awareness, well designed permanent stops, quality and accessible stations, quality of ride, comfort and reliability.

Light rail can be used as demand driving infrastructure to help shape the way the city grows and stimulate higher density and more compact urban form along its corridors due to its permanency compared to bus routes.

Light rail will provide an attractive public transport choice, integrating with the urban form of precincts along the corridor and providing greater public transport capacity – with one light rail vehicle providing three times the capacity of a bus.

It is incorrect, however, to consider public transport simply in terms of “bus versus light rail”. The objective of the ACT Government is to build a public transport network that provides customer choice and integrates multiple forms of travel, including buses, light rail, on-demand services, and active travel options.

4.3 Project options analysis

Based on the recommended strategic option outlined above which identified the City to Woden corridor a high priority, Major Projects Canberra, and before it Transport Canberra and City Services, has undertaken project options analysis to shortlist the most appropriate route alignment options from the City to Woden. Options were subject to community consultation and further technical analysis.

Although the route alignment options discussed in this section relate to Stage 2B, it is necessary to determine the Stage 2B alignment now so that continued planning and design works for Stage 2B can take place in relation to the ultimate alignment to Woden.

The Project options analysis initially sought to define the need and objectives of the route alignment shortlisting processes, establishing key shortlisting considerations based on the Project’s guiding principles and undertaking a high-level corridor analysis. The high-level corridor analysis assessed the corridor’s profile and function, land uses, travel patterns and employment, growth potential, and connectivity against a long list of route alignment options.

The process undertaken and results are outlined in Figure 4-3.

Figure 4-2: City to Woden route alignment options

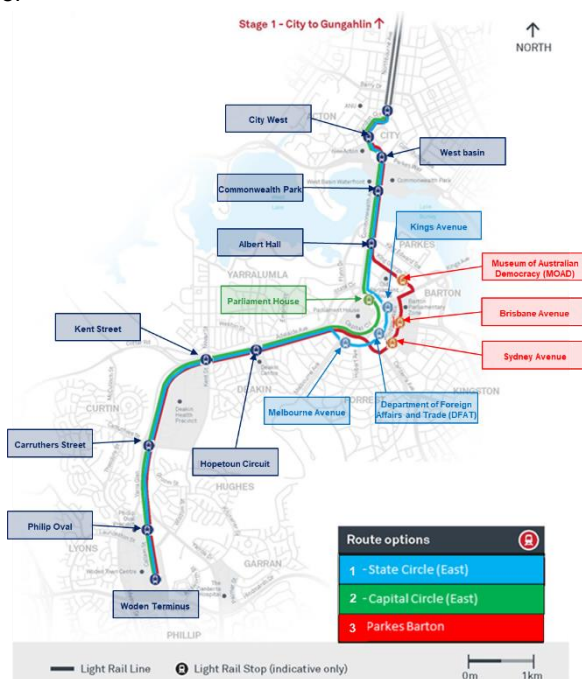
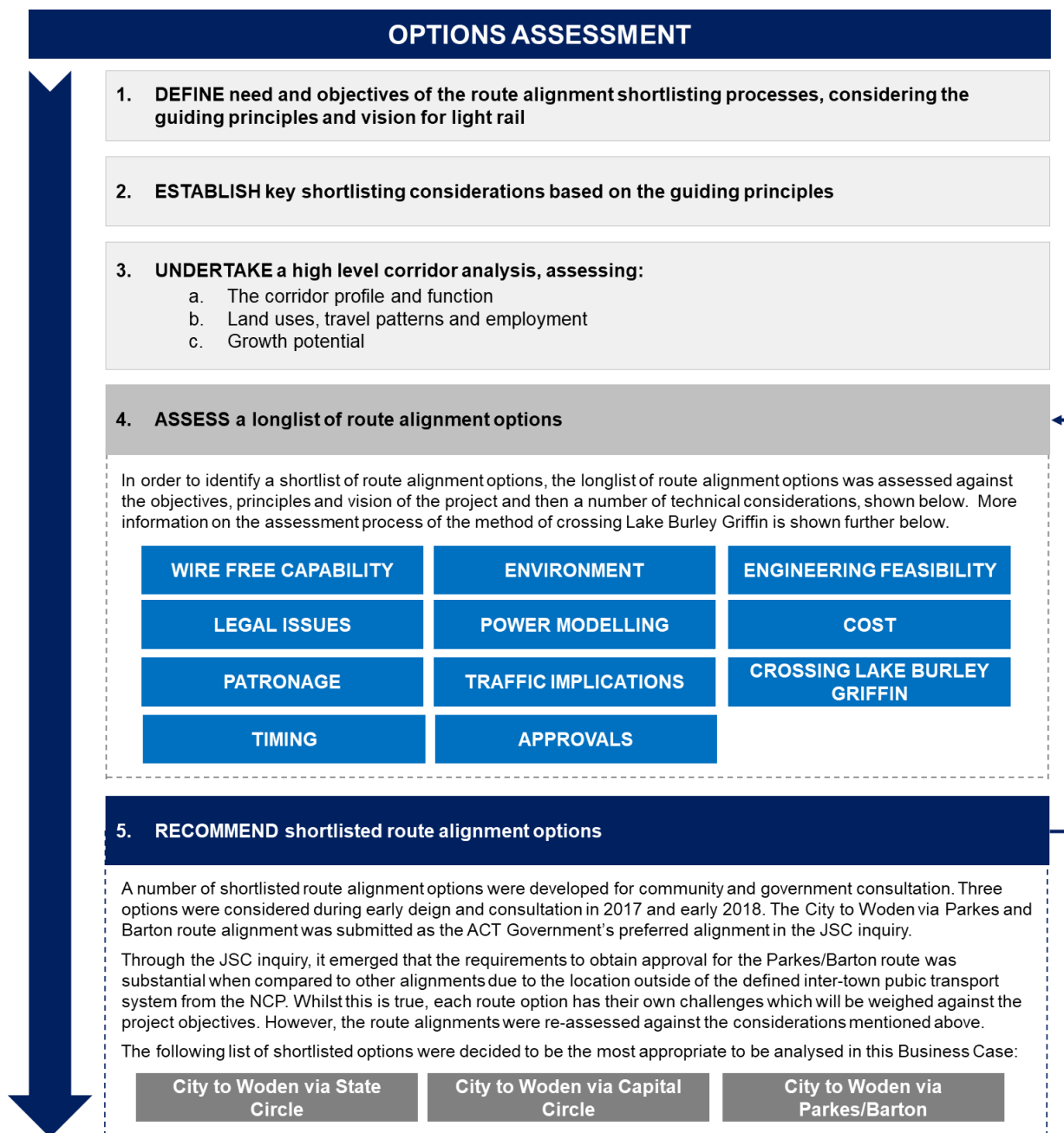


Figure 4-3: Project options analysis



4.3.1 Prior Analysis

As part of the design development process to determine the shortlisted route alignment options, a number of different technical sub-options were assessed for different sections of the alignment, including tunnel options and various alignments for how light rail should cross Lake Burley Griffin.

Tunnelling options were considered, but ultimately discounted due to the significant additional costs and technical complexities associated which would impact on overall Project affordability and delivery timing. Tunnel options would also likely need to traverse under embassy and Parliamentary land with additional attendant planning complications.

With respect to crossing Lake Burley Griffin, it is a technically complex issue, with Major Projects Canberra (and Transport Canberra and City Services before it) and its technical advisors carefully considering several design options, including:

- Central Alignment (new or existing Commonwealth Bridge)
- Eastern Alignment (Kings Avenue Bridge)
- Western Alignment (New Acton Bridge)

The ACT Government selected Commonwealth Avenue as the preferred method to cross the Lake because it is the most direct north-south alignment from the city, providing a better journey time to Woden than other options. It is consistent with the National Capital Plan (NCP) and the Kings and Commonwealth Avenues Draft Design Strategy and also provides an opportunity to revitalise the urban design of Commonwealth Avenue in line with the values and vision of the NCP and the NCA.

Importantly, a Kings Avenue Bridge alignment would mean that in the future both the north-south route and an east-west route would share running on a material segment of Constitution Avenue. This would limit frequency on both routes. It would also increase network risks as an incident on that segment would disrupt services on both routes.

Two options for light rail crossing Lake Burley Griffin at Commonwealth Avenue were considered:

- Repairing and strengthening the existing bridge
- Construction of a separate bridge between the two existing bridges and dedicated to the light rail.

Initial technical and costing analysis found that the bridge strengthening option may be more costly and, based on current information, has greater design and delivery risks.

Therefore, the assumption outlined in this Business Case for Stage 2B (although subject to finalisation with the NCA) is for light rail alignment to cross Lake Burley Griffin using a new bridge between the existing Commonwealth Avenue Bridges. This approach also carries risks, particularly around the construction of the structure within a relatively confined area. This light rail alignment means that the existing road traffic capacity will be retained, and traffic capacity will not be affected by the introduction of light rail. The Commonwealth Government is continuing discussions with the ACT Government on the basis of the City to Woden light rail alignment crossing a new Commonwealth Avenue Bridge, provided it meets certain design requirements (see Chapter 2.0).

Figure 4-4: Median alignment on Commonwealth Avenue, south of the bridge



4.3.2 Project options assessment

Following the JSC inquiry, further technical analysis and deliberations by the ACT Government, three final route alignment options were identified for consideration in this Business Case:

- **Option 1:** City to Woden via State Circle (East);
- **Option 2:** City to Woden via Capital Circuit; and
- **Option 3:** City to Woden via Parkes/Barton.

The three proposed route alignments as depicted in Figure 4-5, have been assessed in this Business Case to determine a preferred route alignment with indicative stop locations for the light rail corridor to Woden.

Figure 4-5: Route alignment options



Table 4-1 provides a high-level summary of the assessment that was undertaken.

Table 4-1: High level assessment of route alignment options

	Option 1 (State Circle)	Option 2 (Capital Circle)	Option 3 (Parkes Barton)
Characteristics			
Length of route	11.2km	10.8km	11.8km
Number of intermediate stops (excluding termini)	11	9	11
Indicative number of LRVs required	16	16	16
Anticipated travel time	25 to 30	23 to 28	28 to 33

	Option 1 (State Circle)	Option 2 (Capital Circle)	Option 3 (Parkes Barton)
Patronage⁷⁵			
Estimated daily patronage (2026) ⁷⁶	13,900	13,000	14,000
Estimated daily patronage (2036) ⁷⁷	19,000	18,000	19,000
Estimated daily patronage (2046) ⁷⁸	23,000	21,000	23,000

Options 1 (State Circle) and Option 3 (Parkes Barton) are anticipated to have very similar patronage numbers, while Option 2 (Capital Circle) is anticipated to be slightly lower.

Table 4-3 provides a more detailed qualitative assessment of the route alignments, depicting the comparative merits of each when evaluated against a series of criteria. The three key criteria are set out below and were developed to align closely with the seven Project objectives that have guided the development of the Project, which are set out in Section 2.2.

When reflecting on Table 4-3 it should be noted that the analysis was completed under current expectations and assumptions. As the Project progresses to detailed design, some of these expectations may change, such as estimated travel times and light rail stops.

Table 4-2: Qualitative criteria

Criteria	Alignment with Project Objective
1. Connectivity and urban renewal	<p>CONNECTIVITY Provide a north-south public transport spine that represents the next stage of a future city-wide light rail network that connects communities across Canberra</p> <p>TRANSPORT CHOICE Provide Canberrans with an attractive, convenient, efficient and reliable integrated public transport system that facilitates choice, increases public transport patronage and reduces car dependency</p> <p>LIVEABLE AND PRODUCTIVE Build a productive, diversified and smart economy by making Canberra a more attractive place to live work and invest</p> <p>ENVIRONMENT Reduce emissions and promote sustainable urban form for the benefit of current and future generations</p>
2. Planning and technical ⁷⁹	<p>SHAPE AND PLACE Frame the future shape of development along the corridor while reinforcing the identity of existing communities and provide early delivery of city-wide initiatives for urban renewal and diversity of place</p>
3. Cost and risk contingency	<p>VALUE AND INNOVATION Deliver the Territory an affordable Project solution that drives innovation and provides a value for money outcome</p>

⁷⁵ It should be noted that these patronage figures were generated for the purposes of the economic analysis and initial technical design and are only a forecast. Actual patronage figures may differ substantially from these estimates. There have been instances where transport modelling patronage estimates have been understated compared to actual usage.

⁷⁶ The patronage figure refers to the increase in light rail boardings that occur following the Project's commencement of operations. Figures are rounded to the nearest hundred boardings

⁷⁷ The patronage figure refers to the increase in light rail boardings that occur following the Project's commencement of operations. Figures are rounded to the nearest hundred boardings

⁷⁸ The patronage figure refers to the increase in light rail boardings that occur following the Project's commencement of operations. Figures are rounded to the nearest hundred boardings

⁷⁹ The Parliamentary Zone is an area of national significance subject to special planning rules requirements. A clear path to identify and navigate the requisite approvals and restrictions in this area is necessary to provide certainty in determining the optimal project solution

Table 4-3: Detailed assessment of route alignment options

	Option 1 (State Circle)		Option 2 (Capital Circle)		Option 3 (Parkes Barton)	
	Pro(s)	Con(s)	Pro(s)	Con(s)	Pro(s)	Con(s)
1. Connectivity and Urban Renewal	<ul style="list-style-type: none"> Option 1 provides connectivity to employment, residential and cultural centres in Parkes and Barton. There will be three stops along State Circle for access to Barton and Parkes. Option 1 will enhance access to sporting and special events at Manuka Oval, with the proposed stop at Sydney Avenue a 10-minute walk away. Option 1 provides connectivity with the bus network, with a potential interchange on Brisbane Avenue. Option 1 will provide an opportunity for future light rail connection to Kingston, via Brisbane Avenue. Relative to Option 3, the travel time is on average 3 minutes faster. Option 1 has greater access to Parliament House, a key employment and tourism hub in Canberra. 	<ul style="list-style-type: none"> Relative to Option 3, Option 1 provides more limited accessibility to Parkes and Barton. However, it provides greater accessibility than Option 2. 	<ul style="list-style-type: none"> Option 2 has the fastest estimated travel time. 	<ul style="list-style-type: none"> Relative to Option 3, Option 2 provides more limited accessibility to Parkes and Barton. Option 2 presents challenges for future network expansion, as connections to Kingston will require either traversing the Parliamentary Zone (and associated approvals challenges) or new arrangements in the vicinity of Brisbane Avenue. Option 2 presents limited opportunity for integration with existing bus interchanges. 	<ul style="list-style-type: none"> Option 3 provides a greater level of connectivity into employment, residential and cultural centres in Parkes and Barton when compared to Options 1 and 2. Option 3 will enhance access to sporting and special events at Manuka Oval. Option 3 will provide an opportunity for a bus interchange on Brisbane Avenue. Option 3 will provide an opportunity for future light rail connection to Kingston, via Brisbane Avenue. 	<ul style="list-style-type: none"> Option 3 has the longest travel time between Woden and the City.

<ul style="list-style-type: none"> For Option 1, planning approval from the NCA and the Commonwealth Government, while required, is expected to carry a lower risk than Option 2 and significantly lower than Option 3. Expected to be consistent with the NCP The NCA noted that extending the route along Commonwealth Avenue to State Circle, rather than crossing the Parliamentary Zone (Option 3), 'approximates Griffin's design and may result in improved trip times'. However, it noted that 'there are challenges in navigating beneath the Australian Parliament House ramp'. 	<ul style="list-style-type: none"> Option 1 will require planning approval from the NCA and the Commonwealth Government. Although Option 1 is more likely to be consistent with the NCP, its acceptability or otherwise to the Commonwealth ultimately remains subject to future Commonwealth planning approval processes. Option 1's design will involve significant structures on State Circle to accommodate light rail. Option 1 would impact at least 20m of native plantings on the inside of State Circle, and require the removal of all Weston plantings on Commonwealth Avenue. The ACT Government would implement mitigations in this respect. Option 1 is anticipated to affect seven signalised intersections between Albert Hall and Hopetoun Circuit (two new and five augmented), though this is subject to detailed design. 	<ul style="list-style-type: none"> Expected to be consistent with the NCP 	<ul style="list-style-type: none"> Option 2 has a higher planning risk than Option 1 (although lower than Option 3) given the extent of the civil works required for Federation Mall near Parliament House. The extent and location of these works may mean the NCA is less likely to approve Option 2, or will impose additional planning approval requirements. Option 2 requires additional approval under the Parliamentary Precincts Act (1988). Option 2 would require the removal of all Weston plantings on Commonwealth Avenue, as well as removal of additional vegetation within Capital Circle to facilitate traffic sight lines. The ACT Government would implement mitigations in this respect. 	<ul style="list-style-type: none"> Option 3 has simpler structures than Options 1 and 2 as it does not impact Federation Mall. 	<ul style="list-style-type: none"> Option 3 is not supported by the NCA, which has noted an amendment to the NCP would be required, elevating the planning risk associated with the route. Option 3 would require nine new signalised intersections between Albert Hall and Hopetoun Circuit. Option 3 would impact most Weston plantings with the expected retention of 6.
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	Option 1 (State Circle)		Option 2 (Capital Circle)		Option 3 (Parkes Barton)	
	Pro(s)	Con(s)	Pro(s)	Con(s)	Pro(s)	Con(s)
3. Cost and Risk Contingency	<ul style="list-style-type: none"> Contingency with respect to planning (which is likely to be a Territory retained risk) is the lowest of the three options. Option 1 has the lowest Project Outturn Cost of the three options. 	<ul style="list-style-type: none"> Risks associated with structures are the highest for Option 1, when compared to the other two options due to the uncertainty surrounding significant structures that are anticipated to be required on State Circle. 		<ul style="list-style-type: none"> Option 2 has the highest Project Outturn Cost of the three options and the highest cost per kilometre Risk contingency with respect to planning (which is likely to be a Territory retained risk) is substantial. 	<ul style="list-style-type: none"> Option 3 has the lowest cost per kilometre of the three options due to its longer length and the lack of structures on the route alignment 	<ul style="list-style-type: none"> Option 3 has the second highest Project Outturn Cost of the three options Risk contingency with respect to planning (which is likely to be a Territory retained risk) is the highest of the three options.

4.3.3 Recommended Project option

Based on the qualitative analysis above and the consideration of connectivity, urban renewal, planning processes, technical complexities, cost and risk analysis, the State Circle East alignment (Option 1) as outlined in Figure 4-6 is the preferred route alignment option to Woden.

It is therefore recommended that the ACT Government proceed with planning, design and other associated activities for the “State Circle East” alignment as the preferred route to connect light rail to Woden, with the alignment extending from the terminus at Commonwealth Park, across Lake Burley Griffin and onward to State Circle where it will travel around the eastern side of Parliament House until it reaches Adelaide Avenue, travelling south to Woden and terminating at Callam Street at a new bus/light rail interchange.

The route alignment is assumed to be on the inside of the road alignment (i.e. Parliament House side of State Circle) to avoid direct impacts to listed heritage items (State Circle cutting, York Park and St Andrews Church), while still providing good connectivity and journey time with limited impacts on the environment. The alignment on the inside of State Circle will have comparatively less impacts to traffic than an alignment on the outside or median, with less implications on key intersections on State Circle. It also provides a faster route as well as a faster approvals process than the Parkes / Barton route, as it has “in-principle approval” via the National Capital Plan.

The exact alignment in the State Circle (East) corridor and the number and location of stops will be subject to the Project’s detailed design and planning approval processes. Delivery of Stage 2B will be the subject of a separate, future recommendation to Cabinet once Commonwealth planning approval processes are further resolved.

4.4 Delivery options analysis

The delivery of City to Woden Light Rail was considered under two approaches:

- **Option 1:** staged delivery approach (i.e. City to Woden Light Rail constructed in stages, with an initial stage extending south and terminating prior to the Parliamentary Zone, and a second stage from the terminus to Woden); and
- **Option 2:** single stage delivery approach such that City to Woden Light Rail is constructed in one continuous build.

Key advantages and disadvantages for each option are outlined in the table below.

Table 4-4: Delivery options assessment

Staged delivery approach	Non-staged delivery approach
Advantages	Advantages
<ul style="list-style-type: none"> • Allows for construction to commence while complex planning requirements in the Parliamentary Zone are resolved. The timing of planning approvals, 	<ul style="list-style-type: none"> • Noting uncertainties around planning approval timings, a non-staged approach potentially provides greater certainty on the timing for the delivery of the

Figure 4-6: City to Woden Light Rail – State Circle East route alignment (Option 1)



Staged delivery approach	Non-staged delivery approach
<p>particularly given the need for JSC and Parliamentary approvals, are a significant risk for the delivery of the City to Woden Light Rail project</p> <ul style="list-style-type: none"> Aligns the timing for the delivery of light rail in the city precinct with planned urban revitalisation activities in and around City Hill, the Acton Waterfront and City West, optimising benefits for the community while minimising impacts during construction Provides for the earlier delivery of improved connectivity to the Acton Waterfront and Commonwealth Park May support the retention of local skills and capability developed as part of the City to Gungahlin Light Rail project, supporting economic diversification, due to the earlier delivery timeframe 	<p>whole north-south spine between Gungahlin and Woden</p> <ul style="list-style-type: none"> Reduces technical interfaces, with only one interface when the route alignment is extended from the City to Woden If a sole source approach is adopted for the procurement, it would require one negotiation with Canberra Metro with regard to the Project Agreement, performance regime and payment mechanism
Disadvantages	Disadvantages
<ul style="list-style-type: none"> Potential construction inefficiencies from delivering light rail in the corridor over two stages, noting both Stage 2A and Stage 2B will be complex projects and therefore staging could assist in managing Project risks Potentially longer construction disruption than would otherwise be the case. However, the earlier commencement of Stage 2A and its potential concurrent delivery with the London Circuit / Commonwealth Avenue project may limit disruption in certain parts of the alignment Will create additional technical interface risks due to the need to integrate City to Gungahlin light rail with the extension to Commonwealth Park, and then again when light rail is extended to Woden If a sole source approach is adopted for the procurement of both stages, it would require two separate negotiations and amendments to the Project Agreement, performance regime and payment mechanism. However, this could be mitigated by including an augmentation framework in the commercial arrangements for the initial extension There is a risk that the Commonwealth Government does not ultimately approve Stage 2B or agree reasonable terms that would allow Stage 2B to proceed 	<ul style="list-style-type: none"> A later construction commencement date 'Stretching' of available resources (both ACT Government and the delivery partner) across a larger, more complex project with attendant risks If the project contract were to be signed ahead of planning approvals having been obtained, a substantial degree of planning risk might be borne by the ACT Government No opportunity to gain efficiencies with the London Circuit / Commonwealth Avenue intersection project The later commencement may result in skills being lost to interstate, particularly given the demand for skilled labour and the constrained east coast construction market Connectivity between the City and Commonwealth Park is provided later and is potentially misaligned with urban renewal and development activities in the area

4.4.1 Recommended delivery option

Balancing the advantages and disadvantages listed above, the benefits of a staged delivery approach (Option 1) are assessed to outweigh potential disadvantages. This Business Case ultimately recommends that City to Woden Light Rail proceed under a staged delivery approach, with this Business Case assessing the benefits, risks, costs and delivery model options for City to Commonwealth Park Light Rail (Stage 2A) as the initial component of a light rail line to Woden. Concurrently, it is proposed that the ACT Government continue design, planning and approval activities for Stage 2B to Woden using the State Circle East alignment, noting the complexities that are associated with constructing light rail through Parliamentary Zone.

Base Case for the Project's Business Case

The 'base case' scenario represents the likely situation if the Project does not proceed under any option. This is effectively a 'business as usual' scenario under which the problems identified in the Investment Logic Map will worsen and become further entrenched and more difficult to resolve. In particular:

- Canberra's population and car dependency will continue to grow, leading to an increasingly congested road network and growing pressures on key roads;
- Land and infrastructure will continue to be inefficiently utilised;
- The opportunity to further enhance the attractiveness of the current public transport system will go unrealised;
- Existing public transport which relies on road capacity will suffer increased travel times; and
- Canberra's liveability and economic connections will be impacted adversely, making it more difficult to attract and retain residents, businesses, visitors and investors.

Ultimately, the 'business as usual' scenario will delay and potentially threaten the achievement of the ACT Government's vision for Canberra and its objectives of encouraging urban renewal and stimulating economic diversification. Further detail on the base case assumptions used for the purposes of the economic analysis are outlined in Chapter 7.0.

5.0 Project Scope

Key messages

- The Project (Stage 2A) will extend light rail from the current terminus at Alinga Street to Commonwealth Park, improving public transport connectivity between the Lake and the City and onward to other destinations as the initial stage in constructing light rail to Woden.
- The Project will also support other revitalisation activities planned or underway in City Hill, City West and the Acton Waterfront, with light rail carefully designed to improve urban amenity outcomes along the alignment.
- The Project includes the construction of structures, stops, track, road, signalling and other works, and the procurement of additional light rail vehicles (LRVs).
- Where relevant, the design of the Project will be consistent with existing City to Gungahlin Light Rail designs to ensure a high quality, consistent, customer-focused network. Stops will be highly accessible and integrated into their surroundings.
- The Project's operations and maintenance activities will include the operation of light rail services, power supply, communications and control systems, LRV maintenance and infrastructure maintenance.
- LRVs will be consistent with, but not necessarily identical to, the LRVs procured for City to Gungahlin Light Rail and will have Wi-Fi, priority seats for mobility impaired passengers and internal space for four bicycles.
- The precise scope of the Project will continue to be developed during the Project's procurement phase and future planning and approvals processes.

5.1 Overview

City to Woden Light Rail will provide improved public transport choice for Canberrans, while supporting the revitalisation of suburbs along the corridor to create a more compact and connected City that promotes inclusivity, high quality spaces and more community-focused neighbourhoods.

As outlined in Chapter 4.0, City to Woden Light Rail will be delivered in two stages: Stage 2A to Commonwealth Park and Stage 2B to Woden as depicted in Figure 5-1.

Key features of City to Woden Light Rail are outlined in Figure 5-2. These are subject to further technical and operational analysis and design.

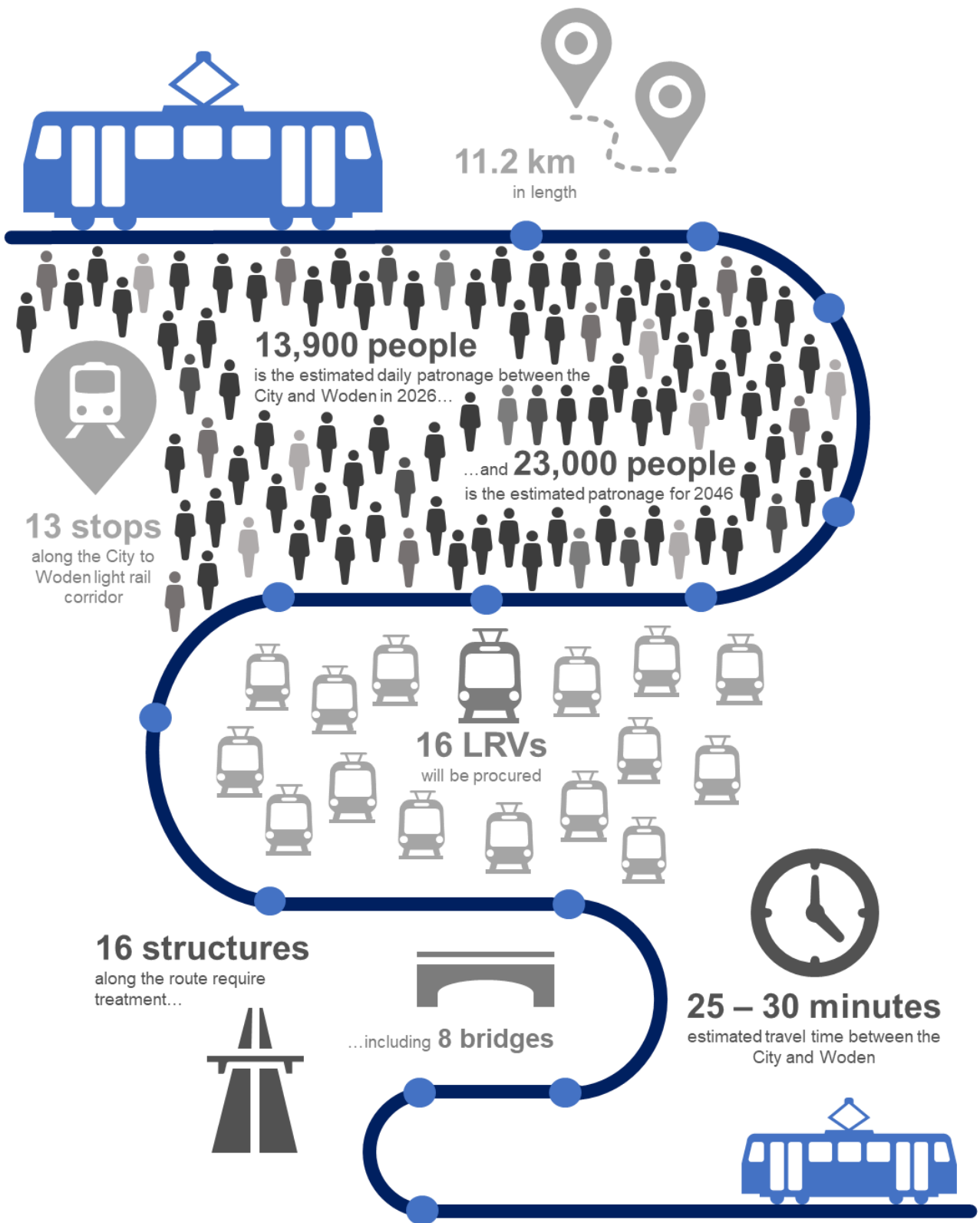
Stage 2A will extend light rail from the current terminus at Alinga Street to Commonwealth Park, improving public transport connectivity between those areas on the northern side of Lake Burley Griffin and the City (and onward to other destinations), with Stage 2B extending light rail further south to Woden through the Parliamentary Zone.

While the ACT Government is committed to completing the full City to Woden light rail alignment, this Chapter largely focuses on Stage 2A. A high level overview of the scope of Stage 2B is outlined in Section 5.11.

Figure 5-1: City to Woden Light Rail corridor (Stage 2A and 2B)



Figure 5-2: Anticipated City to Woden Light Rail key features



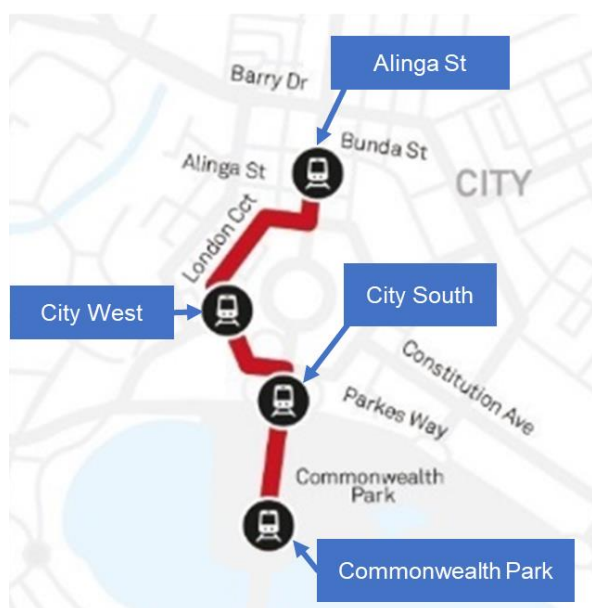
5.1.1 Place making and customer experience

The Project will support revitalisation activities planned or underway in City Hill, City West and the Acton Waterfront, with light rail carefully designed to improve urban amenity outcomes along the alignment. Investment in light rail has demonstrated its potential to contribute to the creation of vibrant activity centres, supporting urban renewal and creating attractive, people friendly places. It is anticipated that the Project will be no exception, complementing planned mixed use developments and supporting the achievement of the ACT Government's vision for Canberra as a connected and compact City.⁸⁰ These benefits will grow as the ACT Government completes Stage 2B to Woden, supporting the revitalisation of the Woden Town Centre and connecting key employment, residential and commercial hubs with a high quality light rail network.

Figure 5-3 depicts the stops on the proposed alignment, extending south from the existing Alinga Street terminus.

It should be noted that stop locations may change through the Project's procurement phase as additional planning and engineering works are undertaken.

Figure 5-3: Potential Project stops



5.1.2 Capital works and services

A high-level overview of the capital works and services to be undertaken for the Project are outlined in Figure 5-4 and Figure 5-5.

⁸⁰ ACT Government, 'Canberra: A Statement of Ambition', http://www.cmd.act.gov.au/data/assets/pdf_file/0006/865482/Canberra-A-Statement-of-Ambition.pdf, 2016

Figure 5-4: Proposed capital works

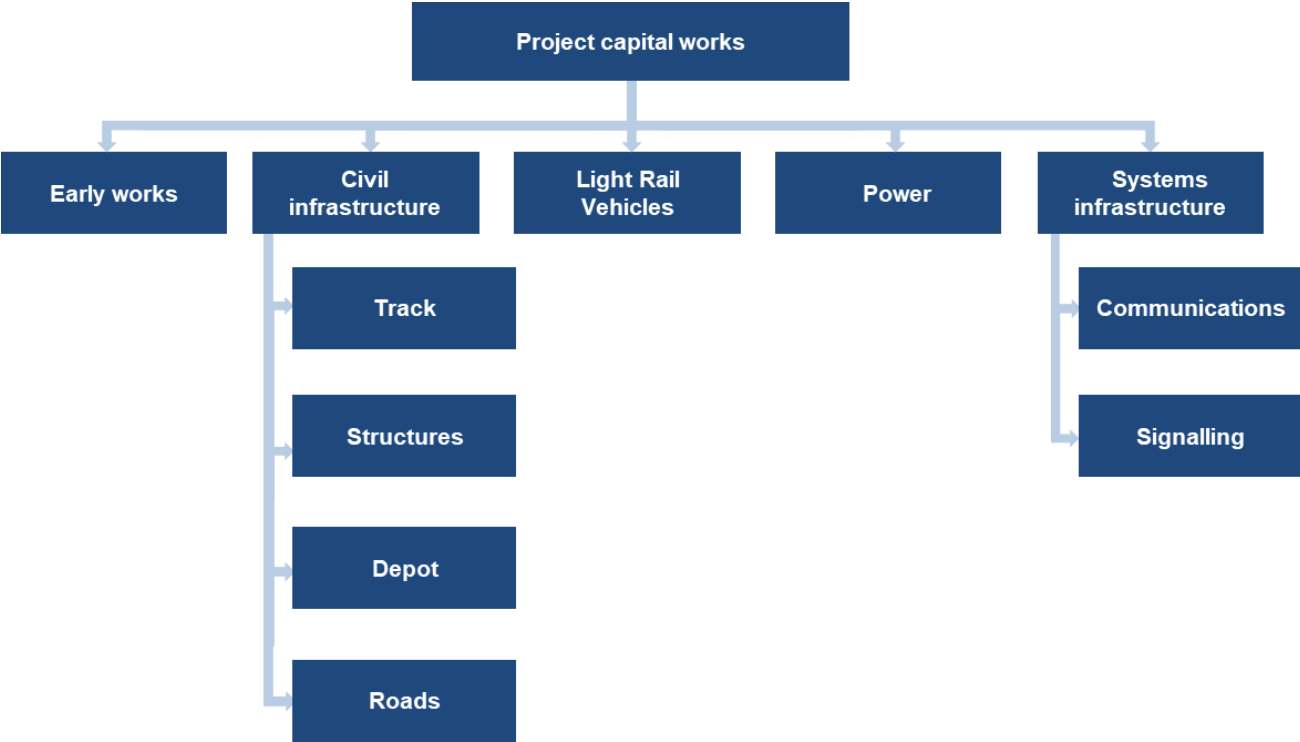
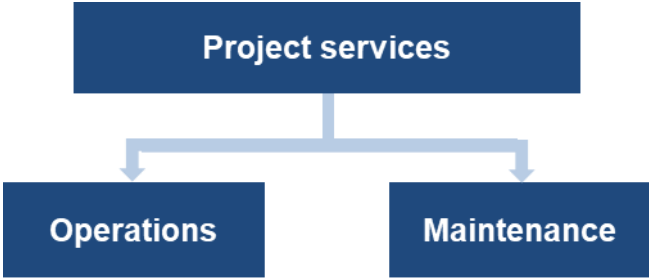


Figure 5-5: Proposed services



The final scope of the Project’s capital works and services will be further developed and refined during more detailed design and procurement processes.

All works will be compliant with relevant legislative and regulatory requirements, standards and statutory approvals processes.

5.1.3 Overview of physical features

Table 5-1 summarises the main physical features of the Project. These features are described in further detail in subsequent sections.

While these features provide the basis for the cost estimates in this Business Case (see Chapter 6.0), their scope may change during the more detailed design and procurement processes. The Project scope is also subject to Cabinet and other required planning approvals, such as NCA requirements.

While the ACT Government proposes to seek private sector innovation and guidance in respect of the Project’s physical features, a consistent design approach with City to Gungahlin Light Rail will be adopted to deliver an easily navigable network and a quality, consistent customer experience across the length of the route alignment from Gungahlin to Commonwealth Park and onward to Woden when constructed. While it is anticipated that infrastructure and systems will be similar to those adopted for City to Gungahlin Light Rail, improvements will be implemented where possible.

Table 5-1: Summary of the Project's physical features

Physical feature	Description
Route	<p>The proposed light rail route commences in the City's central business district from the existing Alinga Street terminus and travels south along Northbourne Avenue, around the west side of London Circuit and onto Commonwealth Avenue. The Commonwealth Park terminus stop is located on Commonwealth Avenue, north of the intersection between Commonwealth Avenue and Albert Street.</p> <p>Approximately 150m of track may be constructed south of the Commonwealth Avenue stop, including a double-scissor turn back to facilitate LRVs changing direction at the terminus.</p> <p>The approximate length of the route is 1.7 kilometres.</p>
Stops	<p>Light rail stops will predominately have the same design as stops on City to Gungahlin Light Rail. The route extension has two intermediate stops at City West and City South, as well as the initial terminus at Commonwealth Park (noting that it will be a regular stop once Stage 2B is delivered).</p>
Track	<p>Track appearance: In general, the Project will have the same track appearance as City to Gungahlin Light Rail: a standard gauge, double track light rail route that is largely at grade. Track finishing will be determined during the procurement and more detailed design processes.</p> <p>Track location: While the City to Gungahlin Light Rail track primarily occupies road medians and verges, some of the Project's track will occupy road traffic lanes currently used by general traffic.</p>
Power transmission and supply	<p>A wired power delivery to LRVs will provide the most operationally flexible solution.</p> <p>LRVs are anticipated to be of a similar design to the existing fleet that operates between the City and Gungahlin.</p> <p>It should be noted that while this Business Case is based on an assumption of an overhead wired system, NCA planning conditions may necessitate wire-free running for sections of the Stage 2A route alignment, requiring the LRVs to have an on-board energy storage system.</p> <p>This would also necessitate the 14 LRVs procured as part of the City to Gungahlin Light Rail project (which were specified to enable wire-free running) to be modified to allow the whole LRV fleet to be capable of end-to-end running from Gungahlin to Commonwealth Park.</p>
Signalling	<p>As a line-of-sight system, the light rail network does not require a signalling system to maintain separation between LRVs proceeding in the same direction. However, traffic signalling will be required to manage potential conflicts between LRVs and road vehicles at intersections, give pedestrians safe access to stops, and achieve travel time targets. Light rail will be given signal priority at intersections.</p>
Bus/light rail interchanges	<p>The current bus interchange in the City will serve as a major multi-modal transport interchange hub. As a high-quality bus/light rail interchange, the City Interchange will improve the efficiency and ease of journeys around Canberra.</p>
LRVs	<p>LRVs will be similar, but not necessarily identical, to those used in City to Gungahlin Light Rail to ensure a consistent customer experience and to reduce integration risks. For the purposes of this Business Case, it is expected that four LRVs will be required for the Project and on-board energy storage systems are not required. Chapter 6.0 provides an indication of the additional cost that could be expected should wire-free running be stipulated by the NCA. LRVs will be approximately 33 metres in length with a maximum speed of 70 km/h.</p>
Depot	<p>The existing City to Gungahlin Light Rail depot in Mitchell will continue as the base for operations and maintenance of the light rail network and is of sufficient size to accommodate the additional four LRVs to operate a north-south light rail route from Gungahlin to Commonwealth Park. Minor works will be undertaken to provide appropriate stabling facilities for the additional LRVs purchased for Stage 2A.</p>

5.2 Place making

The Project will extend light rail from the current terminus at Alinga Street to Commonwealth Park, improving public transport connectivity between those areas on the northern side of Lake Burley Griffin and the City. It will represent the first component of light rail in the City to Woden corridor and provide a single seat journey from the growing population centre of Gungahlin via key hubs in Dickson, along Northbourne Avenue and the City to existing and planned commercial, residential, cultural and entertainment precincts in and around City West and the Acton Waterfront.

The Project will improve connectivity between employment hubs and residential areas, promoting greater diversification of the Canberra economy and supporting revitalisation activities planned or underway in City Hill, City West and the Acton Waterfront.

While decisions on development will be subject to separate government decision making processes, urban development plans and strategies could promote concentrations of activity aligned with public transport services, with the aim of creating communities that are more environmentally, socially and economically sustainable. The construction of the Project will assist with achieving these outcomes between the Lake and the City. It will also lay the foundation for the realisation of benefits along the City to Woden Light Rail corridor when Stage 2B from Commonwealth Park to Woden is constructed.

The landscape along the corridor is designed to respond to the unique characteristics of the surrounding environment, while recognising and supporting the broader vision for the city outlined in Griffin's Legacy and the NCA's design strategy for Kings and Commonwealth Avenues. Canberra is made up of many world class avenues and boulevards, and the Project's urban design seeks to support and enhance the quality of these spaces.

5.2.1 Key attractors and activity centres

The Project will be designed to ensure close integration between transport modes, connecting key attractors with light rail stops using feeder bus services, pedestrian walkways and cycle paths. The stops have been chosen to optimise the connectivity between precincts, employment hubs and residential areas. Each stop has a number of key attractors nearby – existing activity hubs in the community, as well as tourist, education or shopping and retail centres. Key attractors fall broadly into the following categories:

- **Employment and residential hubs:** with a mix of residential and commercial development planned for City Hill and the Acton Waterfront, the Project will provide a high-quality transport link to supplement the growth in employment and residency in these areas;
- **Education facilities:** ANU in Acton has over 25,500 student enrolments,⁸¹ and is approximately 900m from the City West stop on London Circuit;
- **Tourism and visitor attractors:** the Project will connect the City with key visitor sites at Lake Burley Griffin – such as Commonwealth Park, Canberra Theatre and other nearby entertainment venues, the National Museum of Australia, and lakeside walking and cycling paths – supporting future development in the Acton Waterfront area; and
- **Shopping and retail:** as well as servicing existing shopping precincts in the City, the Project will enable the growth of retail development in the City Hill and Acton Waterfront.

5.2.2 Realising precinct opportunities

The key urban renewal zones for the Project are City Hill, City West and the Acton Waterfront. The Project will support the realisation of the Territory's vision for the city centre outlined in The City Plan. Stops have been located to integrate with existing and future activity centres, taking into account developments around the Acton Waterfront, City Hill and City West.

By 2046, it is anticipated that mixed use development in the Acton Waterfront precinct could total 195,305 m² of gross floor area, consisting primarily of residential uses (178,261 m²), as well as commercial space (17,044 m²).

As outlined in Section 2.5, other development opportunities include Section 63 and surrounding development sites in City Hill.

⁸¹ Australian National University, 'Quick Stats', <https://services.anu.edu.au/planning-governance/performance-measurement/quick-stats>, 2018

5.3 Light rail stops and walkability

5.3.1 Stop locations

The seamless integration of light rail and its stops into surrounding precincts is a priority outcome for Canberra's light rail network, but is particularly relevant for the sections of the Project that traverse nationally significant areas, such as Commonwealth Avenue. The location of light rail stops has been carefully identified, accounting for the characteristics of the corridor, the potential for place making opportunities, the location of key attractors and the need to ensure that connectivity is maximised along the corridor.

The landscape surrounding each stop has been considered to allow for tailored design solutions that respect the local environment. These areas will be designed to be urban spaces that are liveable, safe, active and attractive. The figure below depicts an artist impression of the proposed stop at City West.

Figure 5-6: Artist impression of proposed stop at City West



Note: This representation is indicative only. The final appearance of stops is subject to future design development and the Project's procurement process.

5.3.2 Stop features

Core stop and platform elements developed for City to Gungahlin Light Rail will be used for the Project to create a comfortable, consistent network-wide customer experience between Gungahlin and Commonwealth Park. This includes the canopy design that provides a signature and recognisable element for the stops.

Stops will be accessible for passengers with restricted movement (that is, compliant with the requirements of the *Disability Discrimination Act (1992)*), with features including:

- Parking at designated locations that meet the needs of people with impaired mobility;
- Safe and convenient access to entrances and public spaces;
- Accessible supporting infrastructure, including passenger ramps, handrails and grab rails; and
- Facilities, such as street furniture (seating, drinking fountains and litter bins) and ticket machines, designed and provided in accordance with appropriate Australian Standards.

5.3.3 Proposed stops and walking catchments

The location of proposed stops along the Project route alignment is listed north to south in Table 5-2, together with the type and access arrangements. The route alignment will extend south from the existing terminus at Alinga Street, which has been excluded from the table as it has been constructed as part of the City to Gungahlin Light Rail Project. Figure 5-7 provides an overview of areas within the walking catchment of proposed stop locations.

The precise location and design of stops may continue to evolve through the Project's procurement and planning processes.

Table 5-2: Proposed stop locations, type and access arrangements





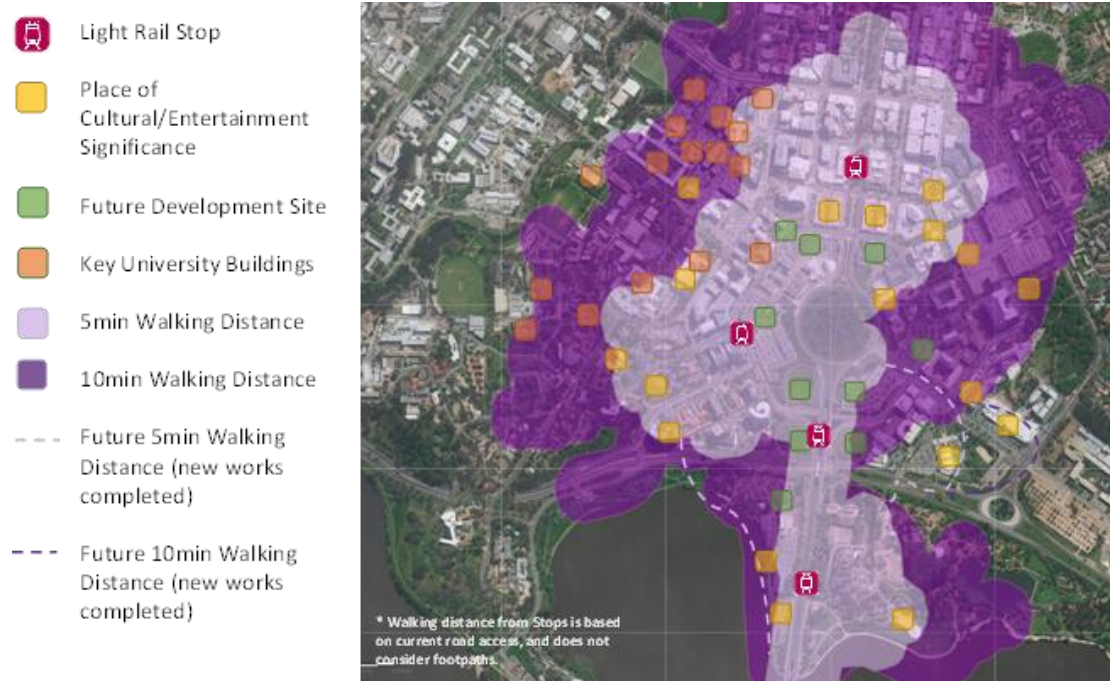
	Stop	Location	Type	Access
	City West 	This stop is located at London Circuit, south of Gordon Street.	<i>Side platform</i>	<p>Patronage modelling identified this area as the third busiest stop in the network after Alinga Street and Gungahlin Place, and therefore accessibility will be critical. The platforms will be accessed by signalised crossings with modifications to existing footpaths to achieve integration and access.</p> <p>Currently, possible designs involve the pedestrianisation of this section of London Circuit to further enhance access around the area.</p> <p>Figure 5-7 depicts the key sites within a 5 and 10 minute walk of the stop, including the National Film and Sound Archive, Llewellyn Hall and ANU buildings such as the School of Music.</p>
	City South 	This stop will be located at Commonwealth Avenue, north of Parkes Way, as the light rail route turns from London Circuit (southbound).	<i>Island platform</i>	<p>The platforms will be accessed from a signalised road crossing on Commonwealth Avenue.</p> <p>Figure 5-7 depicts the key sites within a 5 and 10 minute walk of the stop, including future development sites in City Hill and the Acton Waterfront.</p>
	Commonwealth Park 	The stop will be located at Commonwealth Avenue, near Albert Street, Commonwealth Park (500m to the east) and the planned Acton Waterfront precinct to the west.	<i>Island platform</i>	<p>The stop will be accessed from the existing signalised road crossing on Commonwealth Avenue, the primary crossing for Floriade and will act as the terminus the stop for Stage 2A.</p> <p>Figure 5-7 depicts the key sites within a 5 and 10 minute walk of the stop, including future development sites in the Acton Waterfront and Stage 88 in Commonwealth Park.</p> <p>The stop is a short walk (250m) from the existing Lake Burley Griffin recreational pathways.</p>

Figure 5-7: Walking catchment surrounding proposed stops



5.4 Operating hours and scheduling

Light rail offers an attractive alternative to cars as it provides a convenient, reliable and regular service that connects customers to where they want to go, when they need to travel. The Project aims to deliver the following service outcomes:

- **Travel time⁸²** – The journey time between the Commonwealth Park and Alinga Street Termini is approximately 6 minutes.
- **Periods of service** – A combined Gungahlin to Commonwealth Park service will have the operating hours outlined in Table 5-3. The existing hours of operation have been extended to provide the same level of service for existing City to Gungahlin Light Rail customers.

Table 5-3: Gungahlin to Commonwealth Park proposed hours of operation

Service	Hours of Operation
First Services	
The first service southbound from Gungahlin to Commonwealth Park	Leave Gungahlin at or before 0600 on weekdays and Saturdays, and at or before 0800 on Sundays
The first service southbound from Alinga Street to Commonwealth Park	Leave Alinga Street at or before 0600 on weekdays and Saturdays, and at or before 0800 on Sundays
The first service northbound from Commonwealth Park to Gungahlin	Leave Commonwealth Park at or before 0600 on weekdays and Saturdays, and at or before 0830 on Sundays
The first service northbound from Alinga Street to Gungahlin	Leave Alinga Street at or before 0600 on weekdays and Saturdays, and at or before 0830 on Sundays
Last Services	

⁸² Wire-free operations (if required) and the raising of London Circuit may impact on the travel times outlined in this Business Case. Wire-free operations from Commonwealth Avenue to Kent Street would add in the order of 2 to 2.5 minutes to the journey time from the City to Woden.

Service	Hours of Operation
The last service southbound from Gungahlin to Commonwealth Park	Leave Gungahlin at or after 2300 on Sundays through to Thursdays, and at or after 0030 on Friday and Saturday nights (i.e. 0030 Saturday and Sunday)
The last service northbound from Commonwealth Park to Gungahlin	Leave Commonwealth Park at or after 2330 on Sundays through to Thursdays, and at or after 0100 on Friday and Saturday nights (i.e. 0100 Saturday and Sunday)

- **Frequency** – the Project will be an extension of the City to Gungahlin Light Rail service and will therefore have the same frequency. Light rail operations are expected to achieve a frequency of at least 10 minutes on weekdays between the core hours of 7am and 6pm with 6 minute frequencies in peak periods. Outside these hours on weekdays and all day on Saturdays, Sundays and public holidays, the frequency is anticipated to be at least every 15 minutes.

These service targets may be subject to further development during the Project's procurement phase. For example, proposed service frequencies may be improved over the course of the concession term for light rail operations by agreement between the ACT Government and the operator.

5.5 Light rail vehicles

The minimum LRV fleet size for both the City to Gungahlin and City to Commonwealth Park light rail network in total is estimated to be 18, though this is subject to ongoing design development. For the purposes of this Business Case, it is expected that a minimum of four LRVs will be required for the Project. The preferred traction power system for the project is an overhead wire (OHW) system. LRVs will be procured on that basis, which will provide the following advantages:

- A reduced travel time between the City and Woden in the order of 2 to 2.5 minutes;
- Reduced cost;
- Maintenance simplicity;
- Greater certainty of reliability; and
- A delay to the procurement of batteries /super capacitor technology. If wire-free operations are required for subsequent parts of the light rail network, battery technology acquired at that time will be further advanced.

The exact number of LRVs to be procured will depend upon:

- Negotiations with Canberra Metro and the cost of each LRV. The cost per LRV will vary depending upon the total size of the production run, so it may be appropriate to purchase LRVs in excess of the minimum needed for the Project (noting the intention to deliver Stage 2B in the future);
- The final operating parameters of the Project, including any wire-free requirements which could necessitate an additional two LRVs due to extended journey times; and
- Program implications, production run timing and service level implications on City to Gungahlin Light Rail should wire-free running (and therefore retrofitting of the existing fleet with battery technology) be required.

All new LRVs will be similar in size and performance to City to Gungahlin Light Rail LRVs but not necessarily identical, to achieve any improvements in technology. These LRVs will have:

- Capacity to carry at least 200 people;⁸³
- Level boarding at all doors, priority seats for mobility impaired passengers and designated areas for wheelchairs and pushchairs;
- Internal spaces for four bicycles;
- A Wi-Fi service, free for the use of passengers; and
- A PA system for announcements.

The LRVs can also have an additional module added that would increase the length of the vehicle to 45 metres, and increase the capacity to more than 300 people. Development of new stops on the alignment will need to be mindful of provisioning for this potential addition in the future. Figure 5-8 illustrates the City to Gungahlin Light Rail LRVs, with the Project's LRVs likely to be similar in appearance and design.

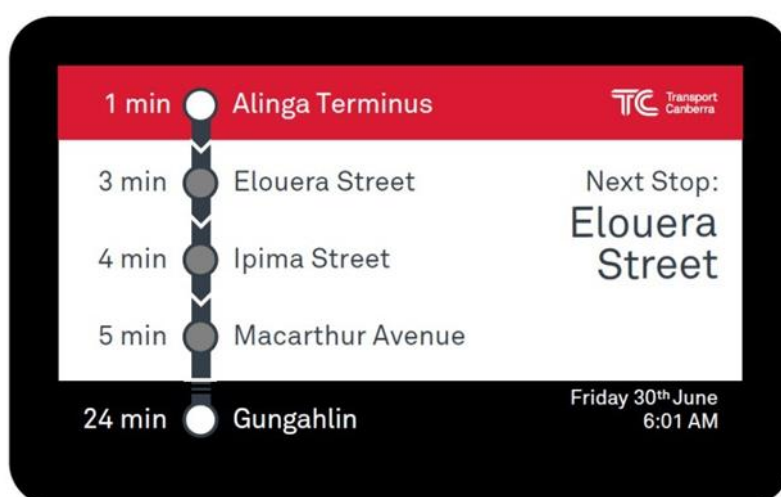
Figure 5-8: City to Gungahlin Light Rail light rail vehicle



Each LRV will have real-time Passenger Information Displays (PIDs), which will display the next few stops, the expected journey time, an accurate clock, the connecting services available from the next stop and a space for any messages required as shown in Figure 5-9.

⁸³ At Added Weight 3 loading – 4 per m²

Figure 5-9: Indicative real-time PID



Note: the image above is indicative only and is subject to change.

5.6 Transport system integration

A key vision for ACT's transport network, which has recently undergone significant transformation, is for it to be an integrated network based on a seven day frequent network (see Section 2.5.5), which enables Canberrans to plan and enjoy seamless, multi-modal travel.

An integrated transport and land use network will consider the services and facilities needed for successful whole-of journey and interchange experiences. Journeys will be seamless, with improved physical infrastructure for Bike & Ride, Park & Ride and public transport interchange. Active modes should be prioritised highly by establishing a permeable footpath and bicycle network that provides a direct connection to light rail stops from surrounding destinations and suburbs.

City to Gungahlin Light Rail and the Project will operate as a single line offering a single seat journey for passengers from Gungahlin to Commonwealth Park, with no transfer required at the Alinga Street Stop in the City.

5.6.1 Bus network integration

This Business Case does *not* seek approval for changes to the bus network with the introduction of the Project. It is recommended that the ACT Government consider changes to the bus network to complement the Project prior to the commencement of operations. This will enable the ACT Government to take into account:

- Experiences from the introduction of City to Gungahlin Light Rail into service;
- Community consultation feedback closer to the date of the project operational commencement; and
- Experiences from the introduction of the new bus network in 2019.

However, any changes to the network would be subject to the principles outlined in the Integrated Transport Strategy,⁸⁴ as set out below:

- Maintaining an all-day, seven-day network;
- Having a legible 'grid' of frequent service routes;

⁸⁴ Transport Canberra and City Services, 'Moving Canberra 2019-2045: Integrated Transport Strategy', <https://www.yoursay.act.gov.au/moving-canberra>, 2018

- Reallocation of resources into improved frequency of the core network; and
- A simple, future-ready, more legible overall network.

The City Interchange, an on-street facility located on Alinga Street, East Row and Mort Street, will serve as a focal point of the Canberra light rail network and will allow customers to interchange between light rail and all buses that enter the city centre. It will also provide easy access to the nearby coach station, allowing intercity passengers to transfer easily to light rail services. The Alinga Street Stop is located adjacent to the City Interchange.

5.7 Civil infrastructure

5.7.1 Track

The track for the Project will run on either road medians or existing road lanes.

Extending from the existing southern terminus on Alinga Street, the route alignment will run down the central median of Northbourne Avenue through the intersection at London Circuit. It will continue along the west side of London Circuit between Northbourne Avenue and Commonwealth Avenue, travelling in the centre of the road.

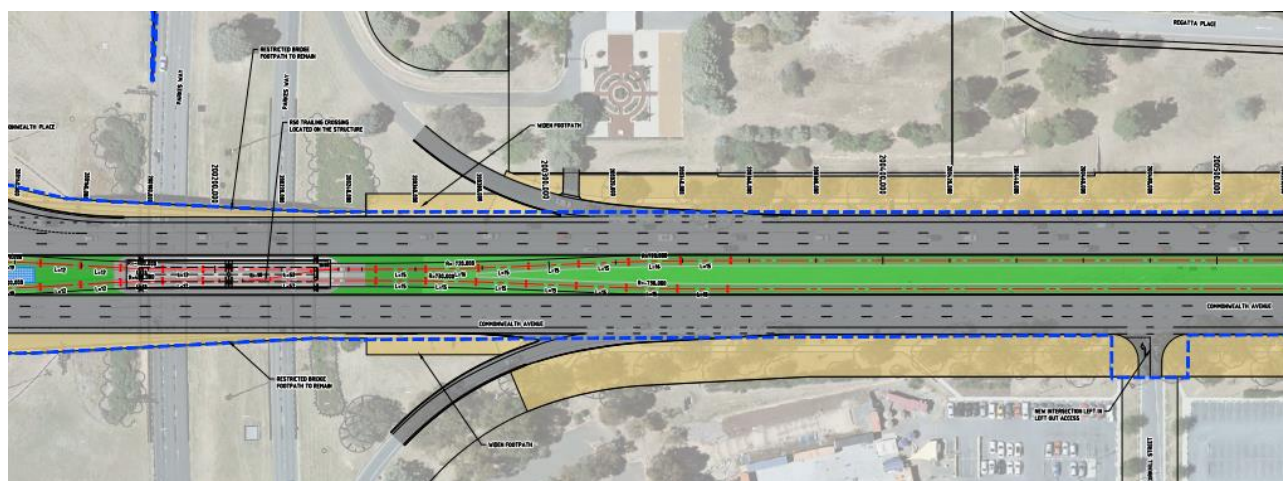
This Business Case assumes that London Circuit is raised to meet Commonwealth Avenue at a newly formed signalised intersection, with approval for those works being sought as part of a separate Business Case. Light rail will traverse the intersection, turning right onto Commonwealth Avenue.

Track will run along the median of Commonwealth Avenue to the terminus stop at Commonwealth Park, expending approximately 150m further to facilitate a turn back for LRVs to reverse direction.

5.7.2 Structures

The key structure on the Project route is the Commonwealth Avenue bridge over Parkes Way as depicted in the figure below. It is anticipated that light rail will cross Parkes Way on a new bridge structure to be built in the median between the two existing Commonwealth Avenue bridges over Parkes Way.

Figure 5-10: Light rail bridge across Parkes Way (indicative)



5.7.3 Depot

The City to Gungahlin Light Rail maintenance and stabling facility and depot in Sandford Street, Mitchell is of sufficient size to accommodate the additional four LRVs to operate a north-south light rail route from Gungahlin to Commonwealth Park. The existing facilities were designed with expansion of the network in mind.

Minimal works are required within the existing depot site, including a new stabling road to accommodate the four additional LRVs. There may be benefit in expanding the depot as part of Stage 2A to cater for the fleet requirements for City to Woden Light Rail as outlined in Chapter 6.0.

5.7.4 Roads

Integrating light rail into Canberra's existing road network will necessitate changes to the road network, particularly at intersections along the route alignment. Kerb widening, lane adjustments and modifications to existing intersections and new intersections will be required. Changes will generally comprise:

- Modifications to intersection layouts, such as at London Circuit and Northbourne Avenue;
- Removal of non-signalised right-turns across the light rail tracks;
- Changes to property access;
- Removal of parking areas;
- Removal of vehicle access, such as between Gordon Street and Edinburgh Avenue on London Circuit; and
- Introduction of signalling.

Significant changes to road layout, signalling and pedestrian walkways are described in greater detail in the following table.

Table 5-4: Significant road upgrades required for the project

Location	Existing arrangement	Proposed arrangement
Northbourne Avenue and London Circuit	Signalised intersection	Installation of turning lanes for northbound and southbound traffic on Northbourne Avenue. This requires an adjustment to signal phasing and road widening works.
London Circuit between Gordon Street and Edinburgh Avenue	Open Road	This portion of the road is proposed to be a shared zone.
London Circuit	Right turns permitted	The ability to turn right on London Circuit to side roads will be removed for most roads, apart from onto Gordon Street westbound and Edinburgh Avenue eastbound.
Access between Commonwealth Avenue and London Circuit	Signalised intersection (proposed)	As outlined in Section 5.7.4.1, this Business Case assumes that London Circuit will be raised to be at-grade with Commonwealth Avenue intersection (with approval for those works being sought as a separate Business Case). The ability to turn right from Commonwealth Avenue northbound to London Circuit eastbound will not be permitted.

5.7.4.1 London Circuit / Commonwealth Avenue Intersection

Consistent with the National Capital Plan (NCP), the ACT Government has made a clear commitment to the urban renewal of its city centre as outlined in *Canberra: A Statement of Ambition* and The City Plan.

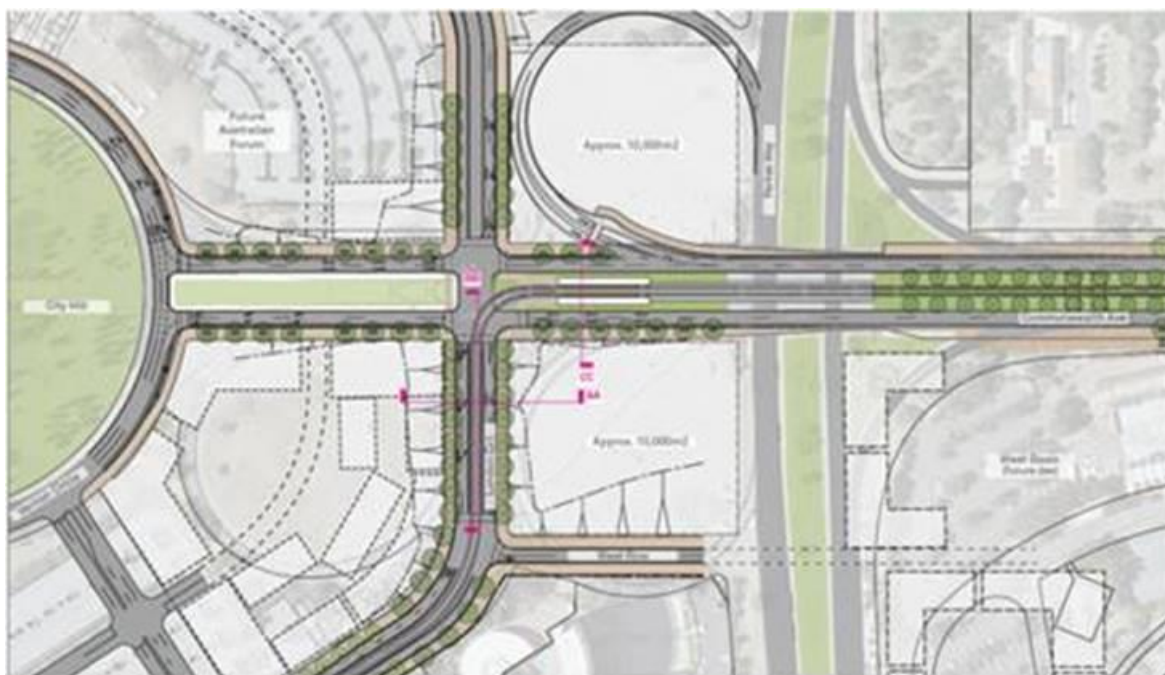
The City Plan outlines the overarching strategic and spatial framework for the city centre and imagines London Circuit as the city's high street with generous verges, street trees and activated street frontages underpinned by a mix of residential, commercial and retail activity.

The City Renewal Authority has undertaken planning, design, economic and financial analysis into the modification of the London Circuit / Commonwealth Avenue intersection to raise the southern portion of London Circuit so it and Commonwealth Avenue are at-grade. The at-grade configuration would allow for street grade development of the adjacent sites, including the eventual removal of the south-west and south-east cloverleaves that connect Parkes Way, London Circuit and Commonwealth Avenue to allow for mixed use development.

The City Renewal Authority's proposed scope of works includes planning and design, traffic management, landscaping, street lighting, utilities and civil works (though separate costings developed by the City Renewal Authority do not include light rail associated costs).

A concept plan for the intersection is outlined in Figure 5-11 below.

Figure 5-11: London Circuit / Commonwealth Avenue at-grade concept plan⁸⁵



It is assumed for the purposes of this Business Case that London Circuit is raised to meet Commonwealth Avenue (with approval for those works being sought as part of a separate Business Case) and a signalised intersection is formed. Consequently, the Project's route alignment travels along the median of London Circuit, to the median of Commonwealth Avenue through the at-grade intersection.

5.8 Power transmission and substations

The preferred traction power system for the project is an overhead wire (OHW) system. This Business Case – and importantly the Project Outturn Cost in Chapter 6.0 – are based on an OHW system for all of Stage 2A.

However, it should be noted that NCA planning conditions may necessitate wire-free running in certain visually sensitive areas within the NCA Designated Areas. The JSC recommended, and the

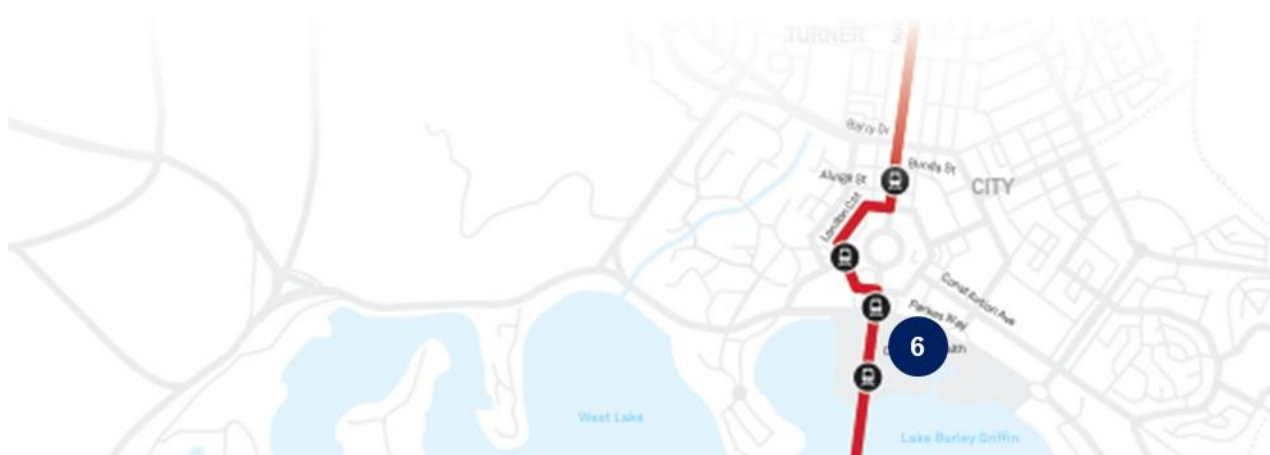
⁸⁵ This diagram represents a long term City Renewal Authority plan. It should be noted that the removal of the cloverleaf on the west side of Commonwealth avenue between London Circuit and Parkes Way is not a requirement for this Project

Commonwealth Government agreed, that any light rail on or crossing Commonwealth Avenue, Kings Avenue, State Circle, Brisbane Avenue, Sydney Avenue, Canberra Avenue (to Manuka Circle), Hobart Avenue, Melbourne Avenue, Adelaide Avenue (to Kent Street) and in the Parliamentary Zone to be wire-free. This spans part of Stage 2A and 2B and as such it is likely that to obtain approval for the Project sections of wire-free running will be required.

The Project will use an overhead 750V DC power supply in the OHW areas. One new traction power substation will be required for the Project. The substation (substation 6 taking into account substations already used by the existing network) is proposed to be located in Commonwealth Park and is not on Territory land. This will require negotiations with, and an arrangement to be agreed with, the Commonwealth Government. The substation will be clear of existing civil infrastructure such as public access ways and cycle routes.

The supply of a reliable, high quality power supply to this proposed substation is a technical requirement that will be developed in liaison with Canberra's electricity distribution service provider.

Figure 5-12: Proposed location of Commonwealth Park traction power substation



5.9 Systems infrastructure

The existing systems for City to Gungahlin Light Rail will be extended to maximise safety outcomes and minimise cost impacts on the project's operations and maintenance activities. Known and/or likely elements of systems infrastructure works associated with the Project are outlined below.

5.9.1 Communications and passenger systems

To the extent possible, communications and passenger systems will have the same 'look and feel' to those of City to Gungahlin Light Rail to ensure a consistent customer experience across the light rail network. The objective of these systems will be to provide timely, safe and reliable transmission of voice, data and video traffic from key operational locations throughout the light rail network. Systems will include:

- **CCTV:** There will be CCTV at light rail stops and on LRVs to support a high level of security and ensure a safe environment for customers;
- **Ticketing:** The smartcard ticketing system on ACT Government buses will also cover the light rail network. It will be a tap on, tap off system at each stop, as opposed to buses, where it is on board the vehicle. Other forms of ticketing, such as use of smartphones and credit cards, are being considered by the ACT Government;
- **Passenger Information Displays (PIDs):** Every stop will be provided with PIDs that are visible and legible from anywhere on the platform. These PIDs will display the destination and expected

departure time of at least the next two services, an accurate clock, and will have space for a free-form text information message (see Figure 5-9);

- **Website:** Transport Canberra and City Services will provide a website incorporating a real-time journey planner and timetable information. Printed timetable and fare information will be available and displayed on every platform; and
- **Wi-Fi:** Stops and LRVs in service will be equipped with a Wi-Fi service, free for the use of passengers.

5.9.2 Signalling

The Canberra light rail system will operate on a line-of-sight basis. As with a road vehicle, it will be the light rail driver's responsibility to observe the route ahead and stop before any obstruction. Accordingly, no signalling system is required to maintain separation between LRVs proceeding in the same direction. At certain locations signalling will be required to manage potential conflicts between LRVs and road vehicles at intersections, provide safe pedestrian access to stops and enable light rail operations to achieve the required journey times.

Modelling of the optimum configuration of signals has been undertaken to minimise LRV waiting times and, where possible, minimise the impact on users of other modes of transport and pedestrians. New traffic signals are proposed at several locations (subject to the procurement process). Light rail will be given signal priority at intersections.

The table below provides an overview of the intersections that will be impacted by the Project, highlighting where existing signals will be modified and new signals are proposed.

Table 5.9: Proposed signalised intersection

Proposed signalised intersection	Currently Signalised (Y/N)
Northbourne Avenue / Alinga Street	Y
Northbourne Avenue / London Circuit	Y
London Circuit / West Row	N
London Circuit / Hobart Place	N
London Circuit / Knowles Place (N)	N
London Circuit / University Avenue	N
London Circuit / Knowles Place (S)	N
London Circuit / Farrell Place	N
London Circuit / Gordon Street	Y
London Circuit / Edinburgh Avenue	Y
London Circuit / Commonwealth Avenue	N
Commonwealth Avenue (City South Stop)	N
Commonwealth Avenue (Albert St north pedestrian crossing)	Y
Commonwealth Avenue / Corkhill Street	N

5.10 Scope of services

Table 5-5 summarises the main services that will be required post-commissioning of the Project. The scope of some features may change once the Project capital works components are finalised.

Further information on the operational requirements for the Project are contained in Section 5.5.

Table 5-5: Post-commissioning services to be procured

Service	Description
Light rail operations	<p>All aspects of light rail operations for the operating term including:</p> <ul style="list-style-type: none"> • Passenger services including driver operations, safety management, customer services and revenue protection; • Security services (including CCTV surveillance); • Signalling / control centre operations; • Passenger and operational signage; • Communications and rail control systems including rail systems, stop systems, phone systems, passenger information displays (PIDs), public address and Emergency Help Point systems, supervisory control and data acquisition, signalling, control centre and LRV systems; • HV and LV power supplies; • Substations and traction power reticulation; • Central storage of all required data and data interfaces with the Territory; and • Other associated light rail operational services. <p>The ACT Government will maintain responsibility for ticketing systems, including revenue collection, but the operator will be required to provide necessary supporting infrastructure (including power, data and equipment space provision).</p> <p>It is anticipated that the operating term will be aligned to end with the conclusion of the City to Gungahlin Light Rail PPP operating term (in 2038).</p>
Light rail maintenance	<p>All aspects of light rail maintenance for the operating term, including:</p> <ul style="list-style-type: none"> • Maintenance of LRVs; • Depot maintenance; • Track, communications, signalling (except at intersections), stops and associated infrastructure (e.g. any rail pedestrian crossing infrastructure) maintenance; • Substation and overhead line equipment; • All rail infrastructure on bridges but not the structures themselves. Noting that the responsibility for maintenance is likely to be split between the O&M provider, the Commonwealth and the Territory depending on the asset owner, proximity to the corridor and maintenance requirements; • Landscape maintenance; and • Stop and vehicle cleaning.
Finance	<p>Subject to future decisions of Cabinet, private sector financing may be in place for the duration of the concession term, subject to capital contributions made by ACT Government (see Chapter 8.0).</p>
Other services	<p>As the ACT Government will seek innovative solutions to reduce cost and risk, enhance design or improve customer service outcomes, other services may fall within the final procurement scope to the extent that such services provide added value to the Project. An example may be the management of retail services at stop locations.</p>

5.1.1 Stage 2B: Commonwealth Park to Woden

As noted above, the Project is the first component (Stage 2A) of City to Woden Light Rail, with the ACT Government committed to deliver Stage 2B to Woden as soon as practicable.

Stage 2B will enhance the urban renewal benefits of Stage 2A, particularly in and around the Woden Town Centre, improving connectivity between north and south Canberra and connecting key employment, residential and commercial hubs with a convenient and high quality light rail network.

This section provides an overview of the key features of Stage 2B.

5.11.1 Patronage and travel times

Transport modelling has been used to estimate the anticipated daily patronage for the full City to Woden Light Rail (Stage 2A and 2B) corridor in 2026 and 2046. The anticipated travel times and patronage numbers are outlined in Table 5-6. It should be noted that these patronage figures are only a forecast, and actual patronage may differ substantially from these estimates.

Table 5-6: Proposed stop locations, type and access arrangements

	City to Woden corridor (Stage 2A and Stage 2B)
Estimated travel time (minutes)	25 to 30
Estimated daily patronage (2026) ⁸⁶	13,900
Estimated daily patronage (2046) ⁸⁷	23,000



⁸⁶ The patronage figure refers to the increase in light rail boardings that occur following the commencement of operations after the completion of Stage 2B. Figures are rounded to the nearest hundred boardings

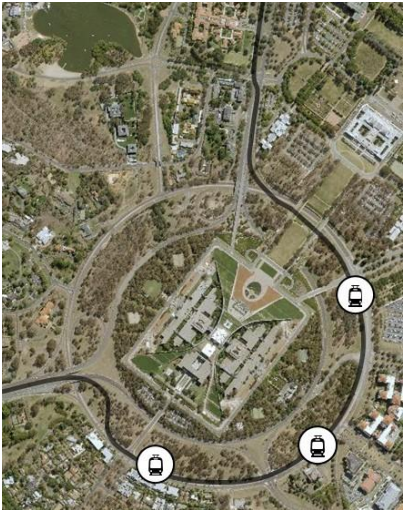



⁸⁷ The patronage figure refers to the increase in light rail boardings that occur following the commencement of operations after the completion of Stage 2B. Figures are rounded to the nearest hundred boardings





5.11.2 Light rail stops

The stops for Stage 2B will have similar design and accessibility features to those of 2A and City to Gungahlin, and have been chosen based on proximity to activity centres and precincts, transport connectivity, place making opportunities and key attractors. The location of each stop along the proposed 2B route alignment is detailed in Table 5-7. Stop locations are indicative and subject to change due to design and operating requirements, approvals and further technical analysis. The stop at Commonwealth Park is not included as it is constructed as part of Stage 2A. Figure 5-13 provides an overview of areas within the walking catchment of proposed stop locations.

Table 5-7: Proposed stop locations, type and access arrangements

	Stop	Location	Type	Access
	Albert Hall 	The stop will be at the southern end of Commonwealth Avenue adjacent to Albert Hall.	<i>Island</i>	<p>The stop will be accessed from a new signalised pedestrian crossing adjacent to Kaye Street. The two side platforms will be boarded from one end only.</p> <p>Figure 5-7 depicts the key sites within a 5 and 10 minute walk of the stop, including Albert Hall, the National Library and the Treasury.</p> <p>Depending on the route option, the stop will function as the primary stop servicing Questacon and the National Library.</p> <p>In the future a (potentially autonomous) shuttle could run between Albert Hall and Kings Ave to provide enhanced connectivity to key features within the Triangle that are beyond a 5-minute walk (for example, the National Gallery of Australia).</p>

	Stop	Location	Type	Access
	Kings Avenue 	This stop is located on the inside of State Circle, south of Kings Avenue.	<i>To be confirmed following further technical analysis and design</i>	The stop will be accessed from the existing signalised road crossing at Kings Avenue. This stop is a short walk to both Parliament House, and part of the Barton employment precinct (within 5-10 minutes). Figure 5-13 depicts the key sites within a 5 and 10 minute walk of the stop.
	Sydney Avenue 	This stop is located on the inside of State Circle, opposite Sydney Avenue.	<i>To be confirmed following further technical analysis and design</i>	The stop will be accessed from the existing signalised road crossing. This stop is a short walk to the Barton employment (for example, 5,000 people work in the DFAT building) and residential precinct and a large portion of the Parliamentary Triangle (within 5-10 minutes). Figure 5-13 depicts the key sites within a 5 and 10 minute walk of the stop.
	Melbourne Avenue 	This stop is located on the inside of State Circle, east of Melbourne Avenue.	<i>To be confirmed following further technical analysis and design</i>	<p>The stop will be accessed from the existing signalised road crossing at Melbourne Avenue. This stop is a 5-10 minute walk to the Deakin and Forrest residential area.</p> <p>The stop would provide an effective access point for Parliament House, but could only be accessed via staff due to pass card requirements. Figure 5-13 depicts the key sites within a 5 and 10 minute walk of the stop.</p>

	Stop	Location	Type	Access
	Hopetoun Circuit 	<p>The stop will be located at Adelaide Avenue, adjacent to the Hopetoun Circuit overbridge.</p> <p>The stop will function as the primary stop for Deakin and south Yarralumla.</p>	<i>Island platform</i>	<p>The stop will be incorporated into the Hopetoun Circuit overbridge and intersection. It will be accessed via a stair and elevator from Hopetoun Circuit to the centre island platform.</p> <p>The Deakin shops are a 400m, 5 minute walk away. Kiss and ride and bicycle parking opportunities will be provided.</p> <p>Pedestrian and cycle integration with the stop will be a key part of ensuring that the stops are well used by the local community. This may include the provision of bike storage facilities.</p>
	Kent Street 	<p>The stop will be at Adelaide Avenue adjacent to the Kent Street overbridge.</p> <p>The stop will function as the primary stop for areas of West Deakin.</p>	<i>Island platform</i>	<p>The stop will be incorporated into the Kent Street road bridge and intersection. It will be accessed via a stair and elevator from Kent Street to the centre island platform.</p> <p>Kiss and ride and bicycle parking opportunities will be provided.</p> <p>Pedestrian and cycle integration with the stop will be a key part of ensuring that the stops are well used by the local community. This may include the provision of bike storage facilities.</p>
	Carruthers Street 	<p>The stop will be located at Yarra Glen, adjacent to the Carruthers Street overbridge.</p> <p>It will function as the primary stop for Curtin, north Hughes and south Deakin.</p>	<i>Island platform</i>	<p>The stop will be incorporated into the Carruthers Street road bridge and intersection. It will be accessed via new pedestrian overpass. The location of the overpass on the northern side of Hopetoun Circuit will provide better east west connections than the current thin path on the bridge. The existing path on the southern side of the bridge is wider, therefore balancing pedestrian accessibility on either side of the road.</p> <p>The Curtin shops are a 400m, 5 minute walk away. Kiss and ride and bicycle parking opportunities will be provided.</p> <p>Pedestrian and cycle integration with the stop will be a key part of ensuring that the stops are well used by the local community. This may include the provision of bike storage facilities.</p>

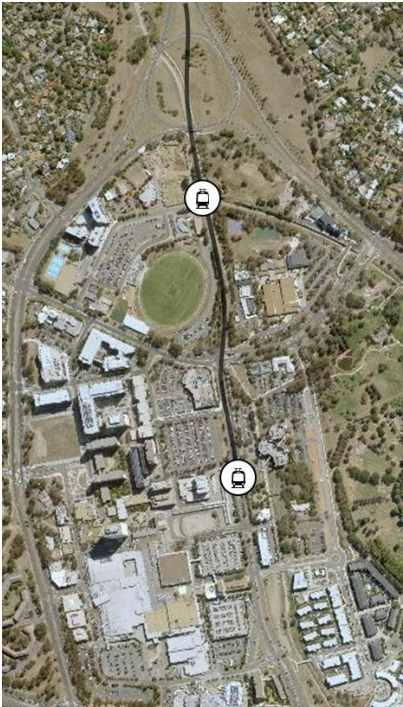


	Stop	Location	Type	Access
	Philip Oval 	<p>The stop will be located in an existing road easement south of Melrose Drive, adjacent to the existing drainage channel.</p>	<p><i>Side platform, off-road</i></p>	<p>The stop will be accessed via a shared path from Melrose Drive and Launceston Street, with future connections across the culvert to be further assessed.</p> <p>The catchment for the stop includes Philip Oval and the Sports Centre, Canberra College and several residential developments that are planned or likely in the immediate vicinity.</p> <p>A Park and Ride will be provided at Philip Oval.</p> <p>Yarra Glen roundabout works could enable an effective connection to the Hughes Shops located less than 800m away from this stop</p>
	Woden Terminus 	<p>The stop will be located at Callam Street opposite Bowes Street.</p> <p>The stop will function as the primary stop for the Woden Town Centre and will be integrated with the bus interchange.</p>	<p><i>Side platform / Bus interchange</i></p>	<p>The stop will be highly visible on Callam Street opposite Bowes Street. It will be accessed by a signalised pedestrian crossing on Callam Street at one end of the stop only.</p> <p>Callam Street will be closed to general road traffic (except buses, LRVs and emergency vehicles) between Bowes Street and Bradley Street. This will consolidate bus and light rail infrastructure onto Callam Street, providing a 'transit mall' that allows for public transport transfers and frees up space elsewhere for development and activation.</p> <p>Connectivity to the Woden Town Centre will be via new footpaths.</p>

Figure 5-13: Walking catchment surrounding proposed stops



5.1.1.3 Operating hours and scheduling

The operating hours for Stage 2B will be similar to Stage 2A, with:

- The first service northbound from Woden to Gungahlin proposed to leave at or before 0600 on weekdays and Saturdays, and at or before 0800 on Sundays; and
- The last service northbound from Woden to Gungahlin proposed to leave at or after 2330 on Sundays to Thursdays, and at or after 0100 on Friday and Saturday nights (i.e. 0100 Saturday and Sunday).

The frequency of the service will be identical to Stage 2A and City to Gungahlin, mentioned above.

5.1.1.4 Light rail vehicles

The proposed LRV fleet size for the City to Gungahlin and City to Woden network in total will be 30, though this is subject to ongoing design development. This will require the purchase of 12 additional LRVs (if 4 are purchased for Stage 2A). Similar to Stage 2A, all new LRVs will be similar in size and performance to the City to Gungahlin Light Rail LRVs but not necessarily identical, to achieve any improvements in technology.

5.11.5 Bus network integration

The Woden Bus Interchange will be a major facility located on Callam Street in the Woden Town Centre to complement and support light rail, providing convenient and seamless transfers for public transport passengers. Callam Street is to be reimagined as a transit boulevard between Bowes Street and Bradley Street, prioritising pedestrian and public transport movements and removing the role of private vehicle traffic on the street (i.e. Callam Street between Bowes Street and Bradley Street will be closed to private vehicles).

The light rail terminus is currently proposed to be either in the median or western verge of Callam Street, with bus stops along each side of the street. The design of the terminus will be mindful of the extension opportunities south of Woden Terminus, such as to Mawson. Retaining the potential for extensions may leverage significant development opportunities and provide for better integrations with the bus network and the planned new bus depot in Woden.

5.11.6 Depot

The depot will be expanded as part of Stage 2B to cater for the predicted 16 vehicles⁸⁸ that will be required to service the full City to Woden route, with a total fleet size of 30 for the Gungahlin to Woden alignment.

The stabling area will be expanded and further turnouts and crossovers will be required to facilitate extra connectivity and the maintenance building will be expanded to incorporate a third inspection bay and more stabling tracks.

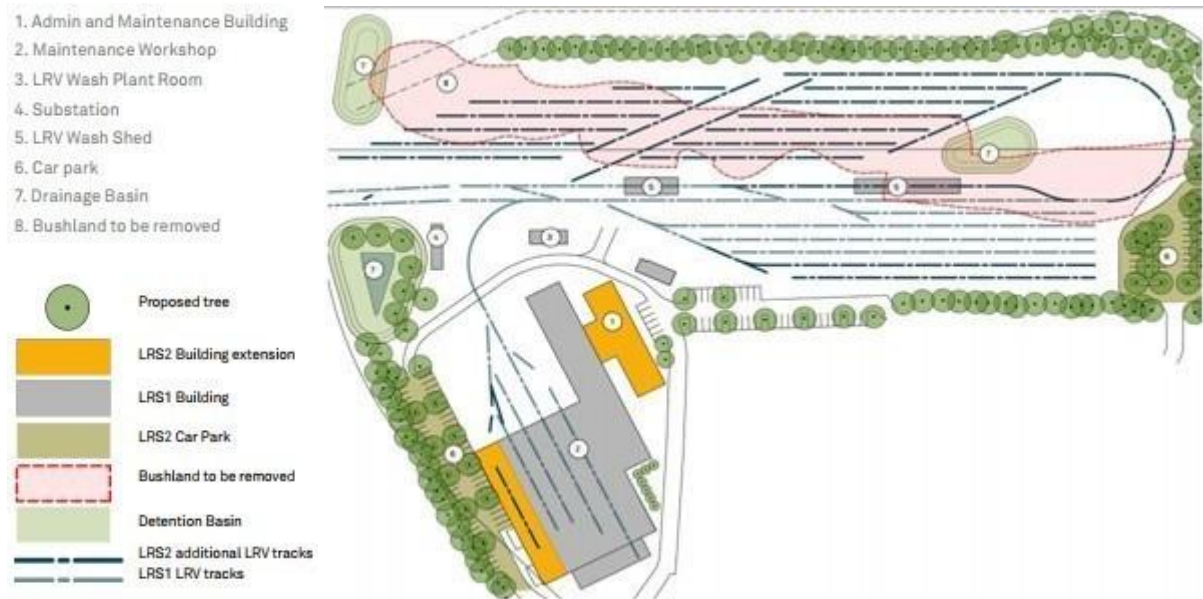
More staff will be required to operate and maintain light rail, including LRV drivers and customer service, rolling stock maintenance, infrastructure maintenance and supervisory and administrative staff.

A new office building parallel to the existing building is considered the most feasible option to accommodate additional staff facilities and working space as it will allow for almost all of the existing building to be used throughout construction. Increased car parking will also be required to accommodate additional staff who drive to work at the depot.

The extra office administration building, stores building, car park extensions and road layout changes are intended to be constructed contemporaneously (as opposed to commencing and completing each component sequentially). This is likely to be more efficient and less disruptive to ongoing operations. The plan for the updated depot is shown in Figure 5-14.

⁸⁸ Four LRVs purchased as part of Stage 2A, plus an additional 12 LRVs anticipated to be procured as part of Stage 2B

Figure 5-14: Updated depot for City to Gungahlin Light Rail and Stage 2B



Sign off that the functional brief/output specifications are sufficiently progressed in order to go to market under the delivery model selected and within the procurement timeline outlined in the Business Case.

Review 1 (Major Projects Canberra) Officer Name: _____

Signature: _____

Date: _____

6.0 Cost, Contingency and Financial Analysis

Key messages

- Estimated total Project outturn costs (nominal, P75) are [redacted] including [redacted] contingency but excluding:
 - Potential additional Project scope elements, such as additional light rail vehicles, costs associated with wire-free running and additional works at the Mitchell depot; and
 - Separate projects, including the raising of London Circuit (if approved) and the construction of the Sandford Street Stop in Mitchell.
- Agency costs to support the delivery of the Project are not included in the abovementioned Project outturn cost. Agency costs will be subject to ordinary budget approval processes.
- Operating expenditure (including ongoing operations, maintenance and lifecycle costs) associated with the first full financial year of operations is anticipated to amount to approximately [redacted], (including [redacted] contingency) (nominal, P75).
- The cost estimations in this Chapter do not represent a Project budget.

6.1 Cost estimate

6.1.1 Overview notes

The cost estimate contained within this Business Case is an *estimate only* and is not based upon final Project design (which will only occur following the Project's procurement process if the Project proceeds). The ultimate cost associated with the Project will be a function of many factors, including:

- Final Project scope and the ACT Government's Project requirements during the procurement process;
- Market capacity and other infrastructure projects underway; and
- The allocation of risk between parties and the realisation (or otherwise) of such risks.

The following Chapter outlines the cost estimate for the Project considered in this Business Case and outlined in Chapter 5.0.

Assumptions underlying the cost estimate are detailed in the Assumptions Book at the end of this document.

6.2 Project Outturn Cost estimate

The estimated Project Outturn Cost to deliver the Project has been calculated in two stages:

- The ACT Government engaged an expert and well-regarded cost estimation firm with deep, recent Australian light rail experience to calculate a non-risk adjusted base cost estimate. This firm also produced the opex / whole of life costs noted in this Business Case. That cost estimation firm calculated its estimate based upon:
 - A definition design generated by technical advisors;
 - Discussions with Major Projects Canberra and its technical advisors regarding proposed features of the light rail system; and
 - Its market knowledge regarding rates and other costs.
- A risk (contingency) figure was estimated by the ACT Government's commercial advisors following:

- The receipt of inherent risk percentages to reflect cost estimation risk supplied by the cost estimator;
- Contingent risk identification, allocation and quantification workshops conducted in conjunction with Major Projects Canberra and its advisors; and
- Monte Carlo analysis conducted on risk figures (contingent and inherent) generated during the foregoing workshops.

Based upon those cost and risk estimation processes, the anticipated Project outturn cost for the Project is outlined in Table 6-1 below.

Table 6-1: Project Outturn Cost estimate (\$m, nominal, P75)

Cost area	Cost
Stops and Precincts	
Roads and Utilities Infrastructure	
Rail Alignment	
Signalling, Rail Systems and Power	
Depot and Stabling	
Preliminaries	
Traffic Management	
Design	
Insurance	
Security & Bonds	
Contractor's Overhead & Profit	
Total Capital Cost	
Rolling Stock ⁸⁹	
Total Alignment Costs	
Escalation	
Subtotal	
Contingency	
Project Outturn Cost	

The Project outturn cost to construct Stage 2A is made up of:

- total alignment costs, of which the most significant contributors are preliminaries and signalling, rail systems and power which represent and of the total alignment cost respectively;
- escalation; and
- contingency. This contingency figure is at a P75 level (discussed in further detail in Section 6.4).

⁸⁹ Before escalation and contingency

6.2.1 Profile of capital cost

The following figure shows the anticipated profile of Project outturn costs as per the breakdown of the capital cost provided by the cost estimator. The primary axis represents the expenditure for each category and the secondary axis represents the cumulative Project Outturn Cost over the period.

The figure highlights that construction activity peaks in 2022 Q3.

6.2.2 Cost exclusions

Excluded from the cost estimate are:

- Scope exclusions:
 - Items outside the project scope, such as expansion of Mitchell Depot, the cost of retrofitting the existing fleet with wire-free technology, a Sandford Street stop in Mitchell and environmental offsets. These cost components can be found in Section 6.2.3;
 - Stage 2B costs, including 'early contractor involvement' costs associated with progressing planning and design for Stage 2B to Woden;
 - Any costs associated with raising London Circuit at Commonwealth Avenue;

- The construction of the ramp from London Circuit to Commonwealth Avenue, which is not required assuming the reconfiguration of the intersection to be at-grade; and
- Other road works which may be beneficial to the Project.
- Internal and procurement cost exclusions:
 - Internal ACT Government and advisory costs (including legal costs, independent certifier and Major Projects Canberra or Transport Canberra and City Services agency costs);
 - Costs associated with renegotiating City to Gungahlin Light Rail contract arrangements or costs associated with a revised City to Gungahlin Light Rail payment mechanism;
 - Costs associated with a delayed start to the Project due to longer than anticipated Commonwealth Government approval processes; and
 - Any costs associated with amending the procurement approach during the Project's procurement phase, bid costs and costs associated with alternative procurement approaches should the recommended approach prove unsuccessful.

6.2.3 Additional scope elements

The Project Outturn Cost outlined above excludes a number of scope items, that either are (i) not strictly necessary for the operation of Stage 2A, (ii) attributable to the City to Gungahlin route alignment or (iii) may be required following further Project development or consultation. An overview of these elements and the relevant considerations of potentially procuring them in conjunction with Stage 2A are outlined in the table below. Capital costs and contingency figures are indicative and subject to further refinement.

Table 6-2: Indicative cost of additional scope or separate projects (\$m, nominal, P75)

Scope element	Relevant considerations of procurement in Stage 2A	Estimated cost
Additional four LRVs	<ul style="list-style-type: none"> May provide opportunities for cost efficiencies and economies of scale in the production run, leading to a lower cost per vehicle; Assist in minimising impacts on City to Gungahlin Light Rail should wire-free running be required by the NCA to obtain planning approvals (see below); and May provide additional flexibility to ensure headways are met should Mitchell Stop be constructed (see below), or increased headways are proposed for City to Gungahlin Light Rail. 	
Depot expansion	<ul style="list-style-type: none"> Provide flexibility to accommodate any additional fleet purchased by the ACT Government (see above) 	
Wire-free running and urban design finishes	<ul style="list-style-type: none"> The JSC recommended, and the Commonwealth Government agreed, that any light rail on or crossing Commonwealth Avenue, Kings Avenue, State Circle, Brisbane Avenue, Sydney Avenue, Canberra Avenue (to Manuka Circle), Hobart Avenue, Melbourne Avenue, Adelaide Avenue (to Kent Street) and in the Parliamentary Zone be wire-free. This spans part of Stage 2A and 2B. As such it is likely that to obtain approval for City to Woden Light Rail sections of wire-free running will be required; 	

⁹⁰ Contingency has been included on a proportional basis. A bottom up risk assessment has not been undertaken

⁹¹ Contingency has been included on a proportional basis. A bottom up risk assessment has not been undertaken

⁹² This is a high level estimate that refers to costs associated with the fitting of on-board energy storage systems to LRVs. It does not include the purchase of any additional LRVs that may be required should wire-free running be necessary. It is likely that wire-free running requirements would result in other additional costs (e.g. charging stations) being incurred, but may also result in costs currently in the Project scope not being required (e.g. overhead catenary). Contingency has been included on a proportional basis. A bottom up risk assessment has not been undertaken

Scope element	Relevant considerations of procurement in Stage 2A	Estimated cost
	<ul style="list-style-type: none"> As was the case with City to Gungahlin Light Rail, higher standard urban design finishes (when compared to light rail projects in other cities) are likely to be required to meet the NCA's standard to obtain Works Approval; Will support urban amenity outcomes; Cost includes batteries on new LRVs and retrofitting of the existing fleet; and The extent of any requirement for wire-free running may also increase journey times and necessitate the procurement of up to an additional two LRVs. 	
Sandford Street Stop in Mitchell	<ul style="list-style-type: none"> May facilitate earlier delivery of the ACT Government commitment to construct a light rail stop at Sandford Street in Mitchell; Potential to minimise procurement and agency costs by procuring these works as part of a larger package; and Potential for construction and consequently cost efficiencies in delivering the works as part of a larger package. 	
Environmental offsets	<ul style="list-style-type: none"> Likely to be required to meet regulatory and planning approvals. 	
Total additional scope cost		

6.2.4 Project Outturn Cost estimate notes

The following is noted regarding the Project Outturn Cost estimate:

- The Project Outturn Cost does not represent a Project budget. It represents an estimate of Project outturn costs only. A Project budget shall only be finalised following completion of the Project's procurement process;
- The estimate is based upon the Project's Definition Design;
- Any apparent errors in summation are due to rounding;
- There exist several risks and mitigation strategies associated with the Project which may impact upon the ultimate Project cost;
- Escalation allowance has been calculated by the cost estimator, based on a mix of materials' indices; and
- The expected Project outturn cost incorporates a P75 risk adjustment. This has regard to the extent of work undertaken on the Project to date, including various concept and definition design iterations. The full anticipated risk profile associated with the Project is summarised below in Section 6.4.

6.2.5 Benchmarking

Capital cost benchmarking of light rail projects is an especially challenging task, as:

- There is comparatively little cost information publicly available at a detailed level. This makes it difficult to determine whether projects are being compared on a like-for-like basis. For example, it is not always

⁹⁴ This is a high level indicative estimate of the potential environmental offset required and is subject to further analysis

apparent whether items such as rolling stock, depots and utilities relocation have been included in publicly available figures;

- Projects may have very different physical characteristics (e.g. bridges, tunnelling) which substantially impact the cost per kilometre of the system;
- Some costs may be included in other light rail projects which are not strictly a direct component of the light rail Project; and
- Light rail projects may involve route extensions or conversion of heavy rail lines, further complicating the ability to make like-for-like cost comparisons.

Nevertheless, in determining the cost estimate contained above, the Project's cost estimator has had regard to confidential benchmarking data.

6.2.6 Comparison to City to Gungahlin cost estimate

Care should be taken when comparing the cost per kilometre for the Project to that of the City to Gungahlin project. While the Project has a higher cost per kilometre when compared to City to Gungahlin Light Rail, this comparison does not account for a number of important factors, including:

- Passage of time: due to the passage of time, costs have been subject to escalation since City to Gungahlin Light Rail's cost was agreed. On top of this, the large number of projects in planning or delivery on the east coast (see Figure 8-3) has impacted on demand for key inputs and anticipated escalation rates;
- Complexity: the Project requires the construction of a large structure, the bridge over Parkes Way (detailed above). City to Gungahlin Light Rail did not require any large structures. Furthermore, Stage 2A reflects predominantly running along what is currently a street (as opposed to median) environment;
- Scale: the smaller scale of the Project at 1.7km, when compared to City to Gungahlin Light Rail at 12km, may impact on the achievement of economies of scale; and
- Contingency: to account for the increasing complexity of the Project, particularly in relation to planning and approvals and interfaces with surrounding Projects in and around the route alignment (see Section 8.2.3), the Project has a larger proportional contingency when compared to City to Gungahlin Light Rail.

6.3 Operating cost and whole of life expenditure estimate

The operation and mobilisation periods assumed for the purposes of this Business Case are outlined in Table 6-3.

Table 6-3: Indicative operating period assumptions for analysis only⁹⁵

Assumption	Value
Operator mobilisation period	Four months prior to the commencement of operations
Operations start date	2024
Operations end date ⁹⁶	August 2038

⁹⁵ It should be noted that changes to these timing assumptions will impact on the nominal figures reported in this Chapter

⁹⁶ The operations end date for the Project will coincide with the conclusion of the existing City Gungahlin Light Rail concession period for the purposes of the cost and financial analysis

6.3.1 First year of operations opex estimate

Operations, maintenance and lifecycle costs relating for the first year of operations for the Project are shown in Table 6-4.

Table 6-4: Project Opex cost estimates – first year⁹⁷ of operations (\$m, nominal, P75)

Cost area	Cost
Salaries and wages	
Depot / Stabling Costs	
Operations and General Costs	
Electricity Supply	
Special Events	
Total Operating Costs	
Vehicle maintenance costs	
Infrastructure Maintenance	
Total Maintenance Costs	
Lifecycle Costs	
Subtotal	
Contingency	
Total Opex	

Salaries and wages are the most significant component of opex in the first year of operations, at 30%. As operator mobilisation occurs in the four months prior to the commencement of operations it is not included in this table.

⁹⁷ This has been calculated as the first 12 months of operations (i.e. not financial year)

6.3.2 Whole of life opex cost estimate

The table and figure below outlines the operating, maintenance and lifecycle costs over the operational period for the Project.

Table 6-5: Operating, maintenance and lifecycle costs (\$m, nominal, P75)

Cost area	FY2024 ⁹⁸	FY2025 ⁹⁹	FY2030	FY2035	FY2038 ¹⁰⁰	Whole of Life
Operating Costs						
Operator Mobilisation						
Maintenance Costs						
Lifecycle Costs						
Total Operating Cost						
Contingency						

⁹⁸ Operator mobilisation occurs four months prior to the commencement of operations

⁹⁹ First full financial year

¹⁰⁰ Final full year of the O&M contracted term

Cost area	FY2024 ⁹⁸	FY2025 ⁹⁹	FY2030	FY2035	FY2038 ¹⁰⁰	Whole of Life
Total risk adjusted cost						

The table and figure above highlight the growth in operating, maintenance and risk over the period in accordance with escalation and the variable profile of lifecycle costs in accordance with the assets' expected useful lives.

Significant lifecycle costs occur periodically, with peaks in . As the operating period is assumed to conclude in August 2038, there is only two months of operational cost in the final year of operations assumed for this analysis, resulting in the lower expenditure in that year.

6.4 Project contingency

Contingency was calculated in line with the approach outlined in Section 6.2 on a different (and larger Project scope). The contingency, as a proportion of capital cost, that was estimated has been used to determine the Project contingency for the Project scope outlined in this Business Case. As such this figure is an indicative estimate only. The current Project scope should be subject to a bottom up risk assessment.

The process for determining contingency for the larger project scope is outlined below.

The ACT Government hosted a series of risk allocation and quantification meetings to inform the Project's development.

Those meetings sought attendee input into:

- The likelihood of a risk event occurring;
- The likely cost and programme impact of a risk event occurring; and
- The likely distribution around anticipated cost and programme impacts.

Monte Carlo simulations were then applied to estimate the uncertainty levels and probability distributions associated with the Project. This risk analysis will also help inform future procurement activities.

The process resulted in the determination of the Project's P50, P75 and P90 construction and operation risk estimates. This was then applied proportionally to the Project scope outlined in this Business Case.

The results are outlined in Table 6-6 and Table 6-7 respectively.

Table 6-6: P50, P75 and P90 Project outturn cost estimates (LHS, \$m, nominal) and contingency as a proportion of capital cost (RHS, %)

Cost area	P50	P75	P90
Capital Cost			
Contingency			
Contingency % of Capital Cost			
Total Project outturn cost			

Table 6-7: P50, P75 and P90 opex cost estimates (LHS, \$m, nominal) and contingency as a proportion of operating cost (RHS, %)

Cost area	P50	P75	P90
Operating Cost			
Contingency			
Contingency % of Operating Cost			
Total Opex			

The Project contingency is predominantly driven by the following risks:

- Risks associated with Commonwealth planning approvals and environmental approvals for the Project; and
- Risks associated with third party developments that may impact on the Project, including the raising of London Circuit, land developments such as Section 63 and the Acton Waterfront, as well as road and other infrastructure upgrades.

More information on the Project's risks is outlined in Section 8.2.3.

The presentation of the P75 figure for the Project outturn cost in Section 6.1 (as opposed to a P50, P75 or another figure) followed consideration of a range of factors, including works performed to date in developing this Business Case, an assessment of the anticipated approach of bidders to the procurement process and planning approval complexities.

The overall risk adjusted capital expenditure distribution profile is shown below. This histogram represents the distribution of potential risk outcomes (from a capital expenditure point of view) which may impact on the Project. In this regard:

- P50 is a mid-point estimate. It represents the Project cost with sufficient risk provision to provide a 50% level of confidence in the outcome i.e. that there is a 50% likelihood that the Project cost will not be exceeded;
- P75 represents the Project cost with sufficient risk provision to provide a 75% level of confidence in the outcome i.e. that there is a 75% likelihood that the Project cost will not be exceeded. In other words, it represents an estimate that has a 25% chance of being exceeded; and
- P90 represents the Project cost with sufficient risk provision to provide a 90% level of confidence in the outcome i.e. that there is a 90% likelihood that the Project cost will not be exceeded. In other words, it represents a conservative position, one that has an anticipated 10% chance of being exceeded.

The Monte Carlo simulation of P50, P75 and P90 construction risks is outlined below, depicting a relatively normal distribution.

Figure 6-3: Monte Carlo simulation of P50, P75 and P90 construction risks (\$m, real)

6.5.2 Revenue from operations (Farebox)

Under the contract, farebox revenue will be collected by the ACT Government. The operations phase will therefore result in revenues from operations through ticket sales to customers which will form part of the funding envelope. The following table outlines indicative potential revenues.

Table 6-8: Estimated farebox revenue (nominal)

Assumption	Value
Estimated daily patronage (2026)	2,709
Estimated daily patronage (2036)	3,506
Inferred compound growth in patronage based on 2026 and 2036 patronage figures (Note 1)	2.61%
Estimated average fare per trip (\$2019) (Note 2)	\$1.27
Daily/annual multiplier (to convert average daily patronage to annual)	315
Estimated annual patronage revenues in first full year of operations (Nominal, \$m in FY25)	\$1.0
Estimated net present value of revenues from FY25 to FY39 (\$m)¹⁰¹ (Note 3)	\$16.8

Source: Major Projects Canberra and Transport Canberra and City Services assumptions on estimated daily fare, considering an escalation rate of 2.5%.

Note 1: Based on a FY19 model commencement point. These are light rail revenues based on estimated light rail patronage in 2026 and 2036. This does not consider fare sharing arrangements between bus and

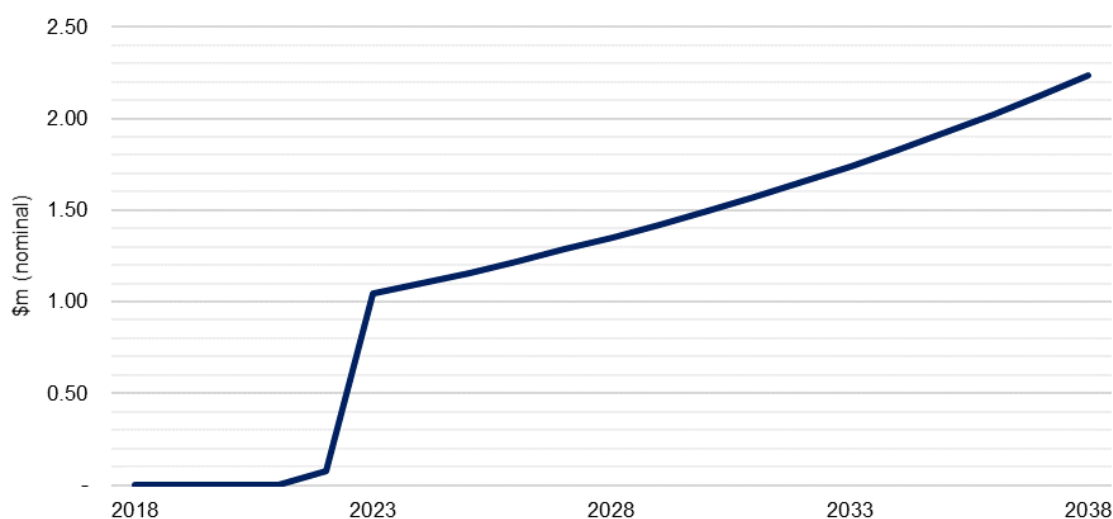
¹⁰¹ Totals represent additional patronage expected following the commencement of Stage 2A operations

light rail trips and does not consider offsetting changes in bus patronage over the period as this will be considered separately.

Note 2: Estimated fare per trip in \$2019 of \$1.69 based on the Transport Canberra and City Services average fare for a MyWay journey between April 2019 and March 2019. This figure was reduced by 25% as proxy for potentially free interchanges between bus and light rail, resulting in a reduced figure of \$1.27 noted in the table above.

Note 3: Discounted at 3.2%. The discount rate has been calculated as per the Infrastructure Australia Discount Rate Methodology guidelines, and updated as per the new Treasury guidance that requires usage of the Commonwealth bond rate with appropriately matching maturity and premium as the base for the Treasury risk-free rate. ACT Treasury guidelines have been developed based on the precedent discount rate methodologies and common practice in other jurisdictions.

Figure 6-4: Estimated nominal cash flow generated from patronage (years are FY ending 30 June)¹⁰²



6.5.3 Other costs

The ACT Government may incur Project related costs which will not be included in the contracted amounts. In this regard:

- The ACT Government may, at its discretion, consider the provision of partial bid cost reimbursements if the Project does not proceed or for intellectual property; and
- The ACT Government will incur costs during the procurement, construction and operational phases of the Project which are not passed to third parties (for example, costs associated with independently certifying construction works). These costs will be:
 - In part influenced by commercial principles adopted during the procurement process;
 - Subject to the realisation or otherwise of risk events during the procurement and delivery process; and
 - A function of ordinary budget discussions from year to year. The apportionment of costs as either capital or operating expenditure is subject to future assessment.

¹⁰² The graph only includes to the end of 2038 as this is the last expected full financial year of the operating term

6.6 Indicative Stage 2B and Delay Costs

Delivery of Stage 2B will be the subject of a separate business case with future recommendations to Cabinet once Commonwealth planning approval processes are further resolved.

Cost estimates for Stage 2B will be included in a future Business Case to Cabinet.

Indicatively however, inclusive of contingency and assuming delivery in the period FY2022 to FY2025, the estimated Project outturn cost of Stage 2B may be in the region of (nominal, P75). Therefore, the cost of the staged delivery of City to Woden Light Rail may be (nominal P75).

Both Stage 2A and Stage 2B may be delayed due to longer than anticipated Commonwealth Government approvals processes or due to longer than anticipated timeframes to resolve commercial matters with the Commonwealth. The table below provides an indication of additional project costs *through escalation alone* that may be realised by Project delays (and assuming delays are incurred prior to a contract for the main works being signed).

Table 6-9: Indicative Delay Costs (\$m, nominal, P75)

Delay to commencement (Years)	Stage 2A (Assume 2020 Contract)	Stage 2B (Assume 2023 Contract)
1		
2		
3		

7.0 Economic Analysis

Key messages

- The Project is the next phase of development of a north-south light rail spine between Gungahlin and Woden via the City.
- Major Projects Canberra has derived an indicative blended Benefit Cost Ratio, inclusive of wider economic benefits, between Gungahlin and Woden of 1.2.
- An indicative blended Benefit Cost Ratio, inclusive of wider economic benefits, between Gungahlin and Commonwealth Park is also expected to be 1.2.
- The full City to Woden Light Rail route (Stage 2A and 2B) is expected to deliver \$ [redacted] m (\$2019, PV at 7%) in benefits over the 30-year appraisal period, comprising:
 - \$ [redacted] m in transport benefits;
 - \$ [redacted] m in city-shaping benefits; and
 - \$ [redacted] m in wider economic benefits.
- Costs for the City to Woden Light Rail (Stage 2A and 2B), including a P50 contingency, amount to \$ [redacted] m (\$2019, real, PV at 7%), consisting of capital, operating and development costs.
- As a result, the full City to Woden (Stage 2A and 2B) Light Rail has a BCR of 1.0 and an NPV of \$ [redacted] m.
- A separate CBA has not been conducted for the Commonwealth Park to Woden component of the alignment on the basis that it will form part of a future business case for Stage 2B. However, on the basis of the City to Woden and City to Commonwealth Park BCRs calculated above, it is likely a BCR for this section would exceed 1.0.

7.1 Introduction

This Chapter outlines the results of the Cost Benefits Analysis undertaken to support the ACT Government's consideration of City to Commonwealth Park Light Rail (Stage 2A) as the initial component in extending light rail south from the current terminus at Alinga Street to Woden.

In recognition of the ACT Government's commitment to extend light rail to Woden and provide a north-south public transport spine between Gungahlin and Woden, Major Projects Canberra has derived an indicative blended benefit cost ratio (BCR) for:

- Gungahlin to Woden; and
- Gungahlin to Commonwealth Park.

Additionally, the economic appraisal outlined in this Business Case considers:

- City to Woden Light Rail via State Circle (Stages 2A and 2B); and
- City to Commonwealth Park Light Rail (Stage 2A).

An outline of the proposed timeline for the construction and operational commencement for Stage 2A and Stage 2B and other important assumptions are outlined in subsequent sections of this Chapter.

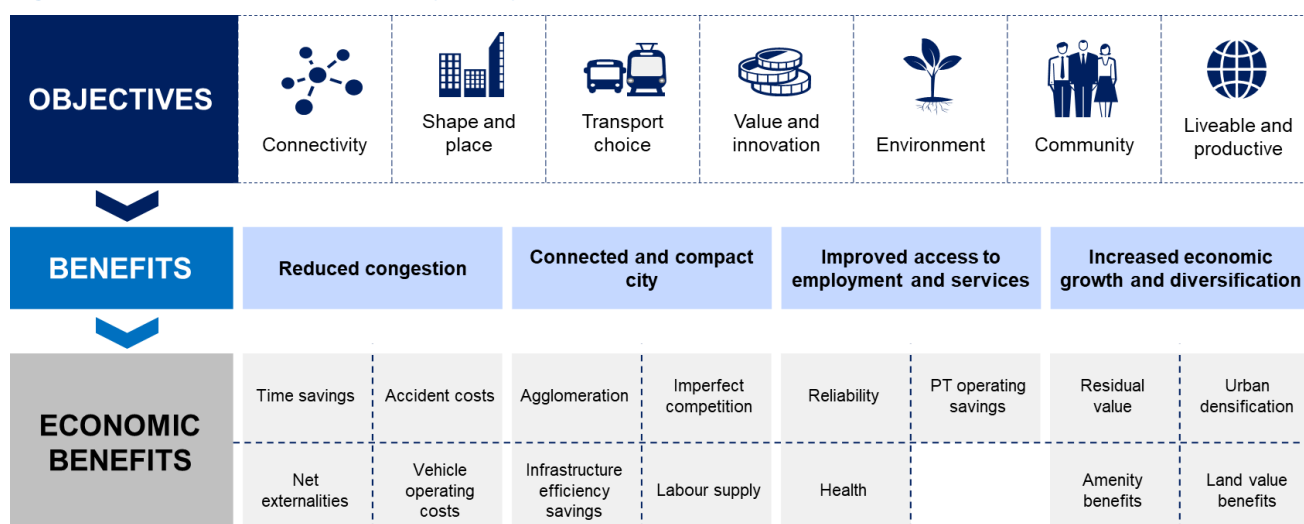
The CBA assesses the range of costs and benefits accruing to transport users, operators, the Government and the general community as a result of the two options. The benefits presented in this Chapter are split into three categories:

- Transport;

- City-shaping; and
- Wider economic benefits.

These three categories align to the benefits identified in the Investment Logic Map (ILM). The figure below illustrates the relationship between the Project objectives, the benefits identified in the ILM and the economic benefits identified in the economic appraisal. This relationship – and the ‘unlocking’ of the Project’s potential benefits – has been a critical consideration in the assessment and analysis of the Project undertaken for the Business Case.

Figure 7-1: Relationship between Project objectives and benefits



7.1.1 Route alignment

Analysis has been performed for four different route alignment segments on the north-south public transport spine as outlined in this section.

The indicative blended BCR derived by Major Projects Canberra encompasses the north-south public transport spine from Gungahlin to Woden and the staged development from Gungahlin to Commonwealth Park. These have not been developed on the basis of a single Cost Benefit Analysis, but are a ‘blend’ of results from the Stage 1 Business Case cost-benefit analysis (escalated to 2019) and the Stage 2A and Stage 2A / 2B cost-benefit analysis results contained herein.

As a consequence, differing assumptions underpin the indicative ‘blended’ BCRs in respect of light rail between Gungahlin and Woden and Gungahlin to Commonwealth Park. They are presented, however, to provide an indication of the economic benefit and cost outcomes across the entirety of the Gungahlin to Woden corridor.

7.1.1.1 Gungahlin to Woden

This analysis utilises:

- Gungahlin to the City benefits as per the Light Rail Stage 1 Business Case;
- Actual Gungahlin to the City project costs as presented in the Project Delivery Report; and
- Stage 2A and Stage 2B analysis as set out below.

7.1.1.2 Gungahlin to Commonwealth Park

This analysis utilises:

- Gungahlin to the City benefits as per the Light Rail Stage 1 Business Case;
- Actual Gungahlin to the City project costs as presented in the Project Delivery Report; and
- Stage 2A analysis as set out below.

7.1.1.3 City to Commonwealth Park (Stage 2A)

The proposed light rail route commences in the City's central business district from the City to Gungahlin Light Rail terminus at Alinga Street and travels south along Northbourne Avenue, around the west side of London Circuit and onto Commonwealth Avenue. The Commonwealth Park terminus stop is located on Commonwealth Avenue, north of the intersection between Commonwealth Avenue and Albert Street.

7.1.1.4 City to Woden (Stage 2A and 2B)

The proposed light rail route alignment commences in the City from the existing terminus of the City to Gungahlin Light Rail service and travels south along Northbourne Avenue before crossing Lake Burley Griffin via Commonwealth Avenue Bridge. From the Bridge it travels through the Parliamentary Triangle via State Circle (East) and continues to the Woden Town Centre via Adelaide Avenue, terminating at Callam Street.

7.1.2 Base Case

The base case represents a 'business as usual' scenario under which each respective light rail option is not constructed. The base case includes the continuation of existing programmes, such as proposed upgrades to the road network and proposed city shaping developments, such as those within the Acton Waterfront precinct, which are assumed to occur from 2024.

All options and sensitivities are presented relative to this base case. Key assumptions for the base case, including those related to the Acton Waterfront development, are outlined in Table 7-1.

Table 7-1: Base case overview

Assumption	Description
General	
Transport network	<ul style="list-style-type: none"> • Planned road upgrades across the Territory including a series of road upgrades on and around Parkes Way • London Circuit/Commonwealth Avenue Intersection assumed to be grade separated¹⁰³ • Several park and rides implemented in future years
Public transport	<ul style="list-style-type: none"> • City to Gungahlin Light Rail in operation • Stage 2A route economic appraisal: Canberra's 2019 bus network, with future updates in line with greenfield developments • City to Woden Light Rail (Stage 2A and 2B) economic appraisal: Bus network as outlined in the Public Transport Service Plan, with future updates in line with greenfield developments • The difference between the two bus networks highlighted above include changes to the R7 and R10 rapid bus routes, the addition of peak express routes 180, 181 and 182 between Tuggeranong and the City, and the removal of other peak express services. • Public transport fares remain constant at \$2.67 in real terms

¹⁰³ Approval for works to raise London Circuit to meet Commonwealth Avenue at a newly formed signalised intersection is being sought as part of a separate Business Case. In this economic analysis, light rail will travel up a ramp between London Circuit and Commonwealth Avenue. However, under an at-grade configuration, light rail would traverse along the median through the intersection, turning right onto Commonwealth Avenue.

Assumption	Description
Land use	Land use in the base case is consistent with the Canberra Strategic Transport Model (CSTM), with the development of the Acton Waterfront precinct occurring between 2025 and 2030 as per land use strategies, which is detailed further below.
Parking	Parking costs are assumed to increase throughout the Territory at varying rates depending on the location.
Fuel	The fuel price is assumed to be 140c per litre in 2011 and grow every year

Land development costs	Land development costs include professional fees, site preparation costs, infrastructure works, statutory fees, marketing costs, legal fees, council rates, sales commission and a valuation fee.
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7.1.3 City to Commonwealth Park (Stage 2A) Project case

The Project case includes the construction and operation of Stage 2A and the acceleration of the Acton Waterfront development. The assumptions underlying the Project case are shown in Table 7-2.

Table 7-2: Project case overview

Assumption	Description
Transport network	<p>Everything included in the base case with road modifications necessary to accommodate the Stage 2A route including:</p> <ul style="list-style-type: none"> Removal of the slip lane from London Circuit (westbound) to Commonwealth Avenue (southbound) A new bridge is built to accommodate light rail travelling over Parkes Way The London Circuit/Commonwealth Avenue Intersection is assumed to be grade separated¹⁰⁴ <p><i>Note: these assumptions are made for economic modelling purposes only and are subject to separate consideration by Cabinet.</i></p>
Public transport	<ul style="list-style-type: none"> City to Commonwealth Park Light Rail is constructed Base case bus network. A decision on how the bus network will integrate with the Project once operations commence will be taken in due course <p><i>Note: these assumptions are made for economic modelling purposes only and are subject to separate consideration by Cabinet.</i></p>
Land use	<p>Land use in the Project case is consistent with the base case, except for the development of the Acton Waterfront precinct which is assumed to be accelerated i.e. construction is brought forward and have a more compressed period, as detailed in Section 7.1.3.1.</p>
Parking	<p>Assumptions are as per base case</p>
Fuel	<p>Assumptions are as per base case</p>

7.1.3.1 Land use assumptions

The ACT Government has stated that, although the Acton Waterfront development may proceed irrespective of the Project, construction of the Stage 2A light rail will accelerate the completion of commercial and residential developments in the precinct. As such, this CBA captures the incremental benefits that flow from the accelerated development of the Acton Waterfront.

Figure 7-2 compares the development profile assumed in the base case (which aligns with City Renewal Authority plans and the Territory land release program) with the accelerated development profile assumed in the Project case.

¹⁰⁴ Approval for works to raise London Circuit to meet Commonwealth Avenue at a newly formed signalised intersection is being sought as part of a separate Business Case. In this economic analysis, light rail will travel up a ramp between London Circuit and Commonwealth Avenue. However, under an at-grade configuration, light rail would traverse along the median through the intersection, turning right onto Commonwealth Avenue.

Figure 7-2: Cumulative GFA (residential and commercial) released at the Acton Waterfront in the project and base cases

A change to any assumptions made for either the base or Project case would have a material impact on the economic appraisal and the results presented in this Chapter.

7.1.4 City to Woden (Stage 2A and 2B) project case

The project case includes construction and operation of the City to Woden (Stage 2A and 2B) Light Rail. The assumptions underlying the project case are shown in Table 7-3.

Table 7-3: Project case overview

Assumption	Description
Transport network	<p>As base plus road modifications necessary to accommodate the full route including:</p> <ul style="list-style-type: none"> Removal of the slip lane from London Circuit (westbound) to Commonwealth Avenue (southbound) Intersection upgrades on Parkes Way between Kings Avenue and Coranderrk Street A new infill bridge is built to accommodate light rail travelling over Lake Burley Griffin, noting that further consultation with the NCA will be required on the crossing The London Circuit/Commonwealth Avenue Intersection is assumed to be grade separated¹⁰⁵ <p><i>Note: these assumptions are made for economic modelling purposes only and are subject to separate consideration by Cabinet.</i></p>

¹⁰⁵ Approval for works to raise London Circuit to meet Commonwealth Avenue at a newly formed signalised intersection is being sought as part of a separate Business Case. In this economic analysis, light rail will travel up a ramp between London Circuit and Commonwealth Avenue. However, under an at-grade configuration, light rail would travel through the intersection, turning right onto Commonwealth Avenue.

Assumption	Description
Public transport	<p>Base case bus network with adaptations to accommodate light rail. These changes to the bus network have been adopted for the purposes of transport modelling only. A decision on how the bus network will integrate with the full route once operations commence will be taken in due course. Bus changes include:</p> <ul style="list-style-type: none"> • R4 altered to operate between Lanyon and Woden via Greenway as a local service • R5 altered to terminate at Russell • Routes 170 and 171 were extended from Erindale to Woden, operating between Calwell and Woden as a rapid service • Other parallel bus-light rail services have been removed from the network to be redeployed as feeder buses to the full route, such as buses from surrounding suburbs to Woden • Other associated bus network assumptions have also been made <p><i>Note: these assumptions are made for economic modelling purposes only and are subject to separate consideration by Cabinet.</i></p>
Land use	<ul style="list-style-type: none"> • The Project case assumes that the light rail investment will unlock accelerated growth of population and employment in the light rail corridor at the expense of growth elsewhere in the ACT • The Acton Waterfront development is assumed to be accelerated; i.e. constructed is brought forward with a more compressed construction period • Land use is further outlined below
Parking	Assumptions are as per base case
Fuel	Assumptions are as per base case

7.1.4.1 Land use assumptions

An assessment of potential land use changes that will accompany the development of the full route has been developed, resulting in changed employment and population forecasts across the Territory due to an intensification of activity in the City to Woden Light Rail's area of influence.¹⁰⁶ It should be noted that the Territory-wide population and employment forecast and demographics remain constant between the base and project cases; only the distribution of future growth is assumed to change reflecting the City to Woden Light Rail's city-shaping potential.

The area of influence is split into seven precincts as shown in Figure 7-3. These are described in further detail in Section 5.2. Notable developments in the Project case include the Acton Waterfront, North Curtin and a more compact and efficient urban form in Woden.

¹⁰⁶ The area of influence for the Project was determined using spatial analysis of the route alignment. The area of influence was initially determined using a linear catchment of 1,200m either side of the route alignment in activity centres and 800m in areas outside of activity centres. To refine the area of influence local conditions were considered – constraining factors such as land uses that were unlikely to change (for example, conservation areas) resulted in a contraction of the area of influence, whereas major employment zones or existing active travel infrastructure could expand the area of influence.

Figure 7-3: Route alignment and precincts

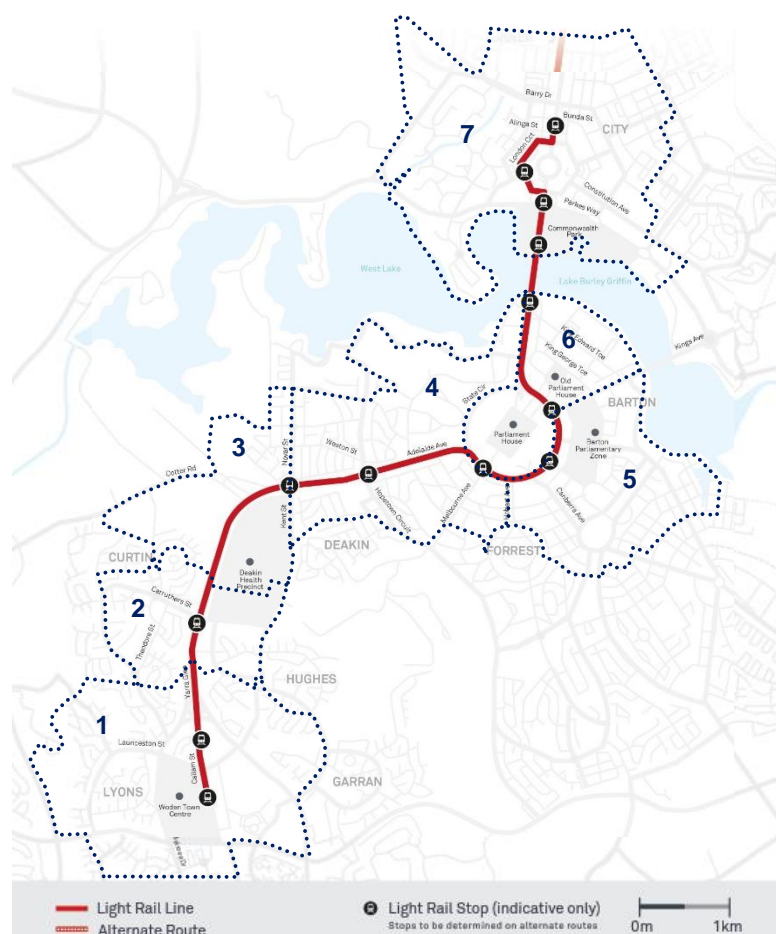


Table 7-4 below shows population and employment in the urban renewal precincts in the business as usual scenario in the base case and in the full route land use scenario in the project case.

Table 7-4: Precinct demographic changes

Precinct	Base case – BAU		Project case – City to Woden	
	Population	Employment	Population	Employment
	2046	2046	2046	2046
1	12,049	25,211	23,256	31,265
2	2,414	1,910	4,977	2,798
3	2,249	5,666	7,181	9,033
4	4,777	2,088	6,036	3,124
5	10,562	24,613	13,393	28,354
6	16	7,238	13	8,641
7	40,428	83,832	46,353	81,571
Total	72,495	150,558	101,209	164,786

7.1.5 Limitations

When interpreting the results presented in this Chapter, there are several limitations that should be kept in mind.

Firstly, while a CBA attempts to encompass all costs and benefits of a project to society, there are both elements that cannot be quantified/monetised as well as wider Project objectives that may not be well represented within the monetised benefits and costs. For example, improvement in connectivity and urban fabric are difficult to quantify in a CBA, but do provide a social benefit to the Canberra community.

Noting this, a BCR greater than 1 is not a guarantee of project success. Similarly, a BCR less than 1 does not necessarily mean the project should not go ahead. Consideration should be paid to these potential costs and benefits that have not been captured, as well as the project's strategic fit with broader Territory strategies and policies.

Light rail has specifications that make it a more attractive and convenient form of public transport. While some of these benefits are captured in the CBA (e.g. as light rail amenity benefits), this may not capture all impacts, such as:

- Relative to bus travel, light rail can provide a significant improvement to the mobility and access to opportunities for disadvantaged groups, including easy access to stops and vehicles for the mobility impaired, the elderly and for families, in a network that is easy to use and understand;
- Light rail tends to have lower physical barriers than other public transport options and requires fewer level changes;
- Light rail can assist in enhancing the reputation of Canberra as a desirable city in which to live, visit and invest;
- Given appropriate stop locations, light rail can also offer better quality access to community facilities and shopping opportunities, as well as improved personal safety relative to bus travel; and
- Light rail comfort is high when compared to other public transportation options.

Finally, there are several benefits derived by potential future projects that are dependent on both the Stage 2A and City to Woden (Stage 2A and 2B) routes (see Section 7.1.6). For example, future light rail extensions further south to Mawson or Tuggeranong, or east to Fyshwick or Kingston will have a lower capital expenditure due to the sunk costs in the constructed route. Additionally, the Project will support complementary land development projects, such as the urban renewal of the Acton Waterfront and City Hill.

In addition to the benefits that may not be captured, the following limitations should also be considered when interpreting a Project's CBA:

- The economic appraisal assumes that the London Circuit/Commonwealth Avenue Intersection is grade separated. However, other sections of this Business Case assume that London Circuit is raised to meet Commonwealth Avenue at a newly formed signalised intersection, with approval for those works being sought as part of a separate Business Case. Under this road configuration, light rail will traverse the intersection, turning right onto Commonwealth Avenue. While this is not expected to have a material impact on the results, the economic appraisal does not directly align to the Project scope detailed in Chapter 5.0;
- As described in Section 7.4, the estimate of economic resource costs used for the CBA are not directly comparable to the costs presented in Chapter 6.0. This is caused by the following factors:
 - Economic costs are presented in real present value (discounted at 7%) terms, whereas costs in the Chapter 6.0 are presented in real and nominal terms; and

- Economic costs are presented with P50 contingency. The financial appraisal presents costs with P75 contingency.
- The cost component of the CBA represents an estimate of the economic resource costs. Ultimately the Project outturn cost will be determined in large part by the private sector during the procurement process; and the occurrence (or otherwise) and severity of risk events during the life of the Project;
- The benefits component of the CBA may be influenced, both positively and negatively, by actions taken by the ACT Government subsequent to this Business Case;
- The benefits described in this Chapter are estimated using industry accepted methodologies, but they do not always reflect all impacts that one may perceive in practice. For example, a value that is attached to time travel savings from light rail may end up being reflected in higher property values along the rail corridor, as people value living near the light rail network. To avoid double counting of benefits, such impacts are only counted as a benefit once (in the above example they are captured as a travel time saving); and
- A CBA should not be regarded as the only tool which may appropriately be used by government in making an investment decision. It is appropriate for government to also have regard to a broad range of other factors, such as stakeholders' views, planning considerations and the Territory's overarching vision for Canberra.

It should be noted that values presented in this document have been subject to rounding. This can cause the appearance of arithmetic errors.

7.1.6 Future projects

The Stage 2A and Stage 2B route will enable future extensions of light rail from the north-south spine, which could deliver further economic benefits to Canberra. The ACT Government acknowledges that the City to Woden Stage of Canberra's Light Rail Network is a difficult stage due to constructability and planning challenges along the route but recognises the importance of the stage as a critical element of the network.

Building the Stage 2A, and then Stage 2B, route now can therefore enable further benefits to be unlocked in the future. These benefits, which have not been included in this economic appraisal, can include:

- The reduction in the need to interchange between modes and lines;
- Better interchange between modes; and
- The potential to connect to new locations.

7.2 Methodology

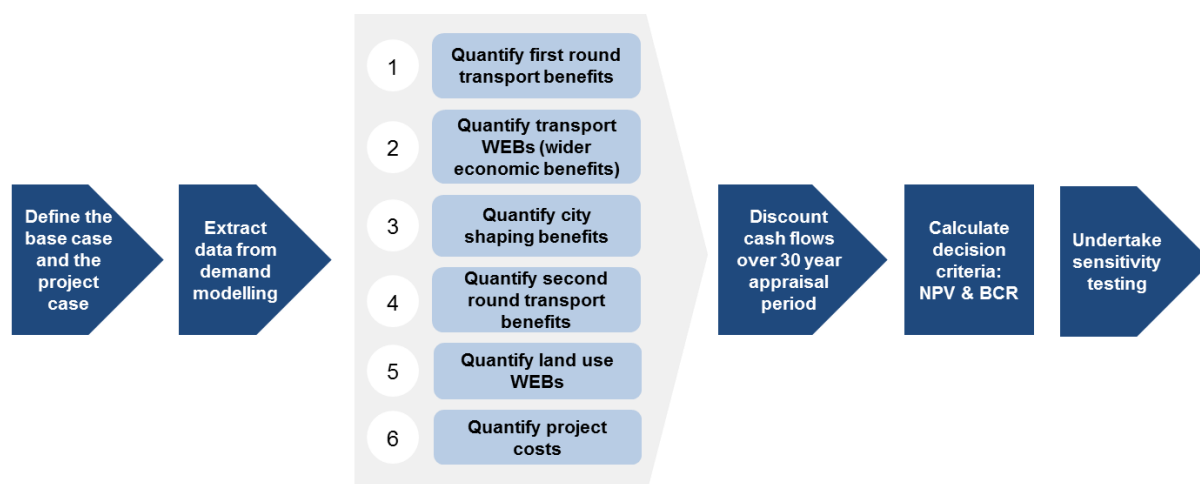
7.2.1 Overview of method

The assessment of the economic merits of Stage 2A and City to Woden Light Rail (Stage 2A and 2B), including the consequential urban development, has been conducted using a CBA. The approach is consistent with the CBA used for the City to Gungahlin Light Rail Project, with appropriate modifications to reflect updated industry appraisal guidelines and parameters.

As noted in other sections of this Chapter, a different approach has been adopted for the development of the indicative blended BCRs.

A high-level approach to the Stage 2A and City to Woden Light Rail (Stage 2A and 2B) CBA is shown in Figure 7-4.

Figure 7-4: CBA methodology overview



There are three overarching benefit categories captured in the analysis:

- **Transport benefits** – benefits delivered due to the improvement of the transport system. It includes direct journey experience benefits such as travel time savings (to both public transport and highway users), reliability improvements and light rail amenity improvements. In addition, it captures external benefits such as reduced congestion and health benefits, and finally benefits accruing to government such as an increase in public transport fare revenue and bus operating cost savings.
- **City-shaping benefits** – benefits resulting from the land use change generated by the development of the respective Projects, and acceleration of development at Acton Waterfront as detailed in Section 7.1.3.1. The benefits include land value uplift resulting from an increase in densification and infrastructure cost savings resulting from economies of scale in infrastructure provision.
- **Wider economic benefits (WEBs)** – productivity benefits that result from improved business-business and business-workforce connectivity, consisting of transport and land use agglomeration benefits.

All benefits captured under each category are shown in below. The results for all benefits and costs are discussed further in this Chapter.

7.2.2 Economic guidelines

This economic appraisal has been conducted in line with current guidelines, including the Australian Transport Assessment and Planning (ATAP 2018) and TfNSW Principles and Guidelines for Economic Appraisal of Transport Investment and Initiatives (released in March 2013, with updated parameters in Appendix 4 in March 2018). These guidelines, in addition to the National Guidelines for Transport System Management in Australia, provide the framework for this CBA and the relevant parameter values.

7.2.3 Economic assumptions

The economic analysis is underpinned by several parameters and assumptions. Table 7-5 identifies the key CBA parameters. Further detail on methodology and detailed parameters and assumptions is provided in the Assumptions Book at the end of this document.

Table 7-5: Key CBA assumptions

Assumption	Detail
Appraisal horizon	<p>City to Commonwealth Park (Stage 2A): The economic appraisal period includes the period of implementation (FY2022 – FY2024), and 30 years of operation. A residual value benefit is accounted for in the last year of operations</p> <p>City to Woden (Stage 2A and 2B): The economic appraisal period includes:</p> <ul style="list-style-type: none"> The period of implementation for Stage 2A (FY2022 – FY2024), and 30 years of operation for the City to Commonwealth Park section The period of implementation for Stage 2B (FY2022 – FY2025), and 30 years of operation for the Commonwealth Park to Woden section
Constant prices	All costs and benefits are estimated in constant FY2019 prices
Discount rate	All benefits and costs are discounted to their present value as at the start of the appraisal period. The analysis uses a 7% real discount rate as prescribed in ATAP and TfNSW evaluation guidelines and The Capital Framework. Sensitivity tests have been undertaken based on a 4% and 10% rate
Base case	Includes approved and planned road improvements and current bus network

7.2.4 Source of inputs

The table below shows the various sources for the cost and benefit inputs used in the economic appraisal.

Table 7-6: Sources of inputs to the CBA

Benefit	Input data	Source
Cost inputs	Project capital costs	Cost estimator
	Project operating costs	Cost estimator
	Development costs	Commercial advisor
Benefit inputs	Transport patronage and journey times in the base and Project cases (in 2026, 2036 and 2046)	Transport modeller
	Acton Waterfront land development timeline	Major Projects Canberra / City Renewal Authority
	Land use	Land use advisor
	Economic transport model outputs	Transport modeller

7.3 Transport model results

High-level results of the transport modelling undertaken by the ACT Government's transport modeller are presented for light rail, bus and car below.¹⁰⁷

¹⁰⁷ Results presented in this section represent first round benefits only – that is, they show the direct impact of construction of each Project on the transport network. Second round transport impacts caused by land use changes resulting from the construction of each Project are not shown but remain a significant aspect of the Stage 2A and City to Woden (Stage 2A and 2B) Light Rail.

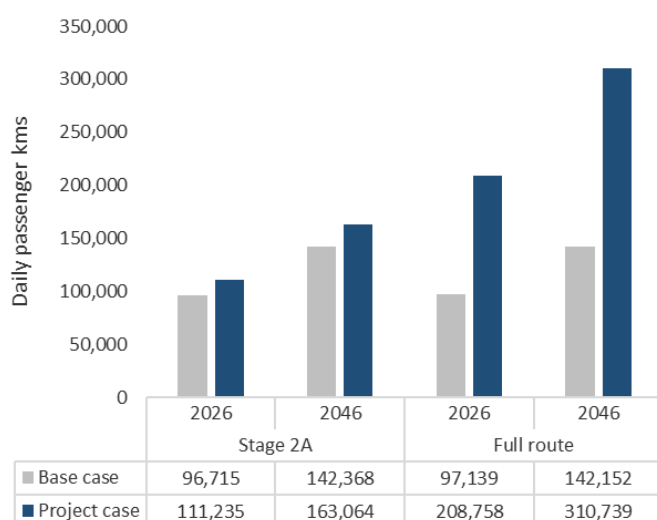
7.3.1 Light rail

The construction of the Stage 2A and City to Woden (Stage 2A and 2B) Light Rail directly increases the number of service and passenger kilometres on the light rail network in Canberra from the services provided by the City to Gungahlin corridor in the base case.

Light rail service kilometres are expected to directly increase by 14% with the introduction of Stage 2A and double with the introduction of City to Woden Light Rail (Stage 2A and 2B). Light rail passenger kilometres are expected to directly increase over and above the relative increase in service kilometres.

Figure 7-5 shows the changes in daily light rail passenger kilometres between the base and Project cases, with a significant direct increase in patronage seen in each of the model years.

Figure 7-5: Light rail passenger kilometres (daily, 2026 and 2046)



7.3.2 Bus

Figure 7-6 shows both the change in bus service and passenger kilometres between the base and project cases for the Stage 2A and City to Woden (Stage 2A and 2B) Light Rail. Figure 7-7 outlines the change in overall public transport service and passenger kilometres between the base and Project case.

Daily bus passenger kilometres are anticipated to decline slightly in the Stage 2A Project case when compared to the base case, while overall public transport passenger kilometres remain fairly constant over the appraisal period. Bus service kilometres, however, are also expected to decrease slightly for the City to Woden Light Rail (Stage 2A and Stage 2B) project case.

For the City to Woden (Stage 2A and 2B) Light Rail, daily bus passenger kilometres decline with the introduction of light rail, but the overall impact on public transport passenger kilometres is small, with the decrease in bus travel offset by an increase in light rail passenger kilometres.

It should be noted that a decision on how the bus network will integrate with Stage 2A and City to Woden (Stage 2A and 2B) Light Rail once operations commence will appropriately be taken closer to the date of operations commencement (see Section 5.6.2).

Figure 7-6: Network wide bus passenger kilometres (daily, 2026 and 2046)

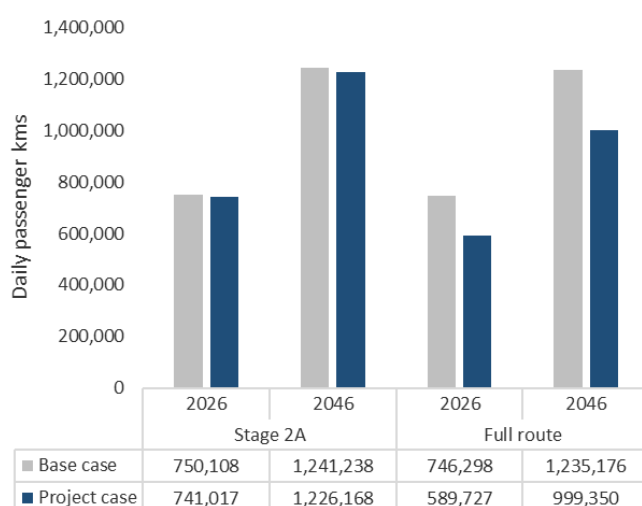
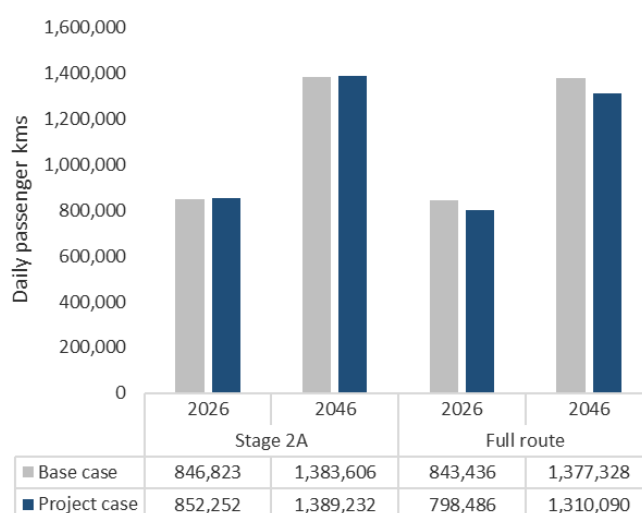


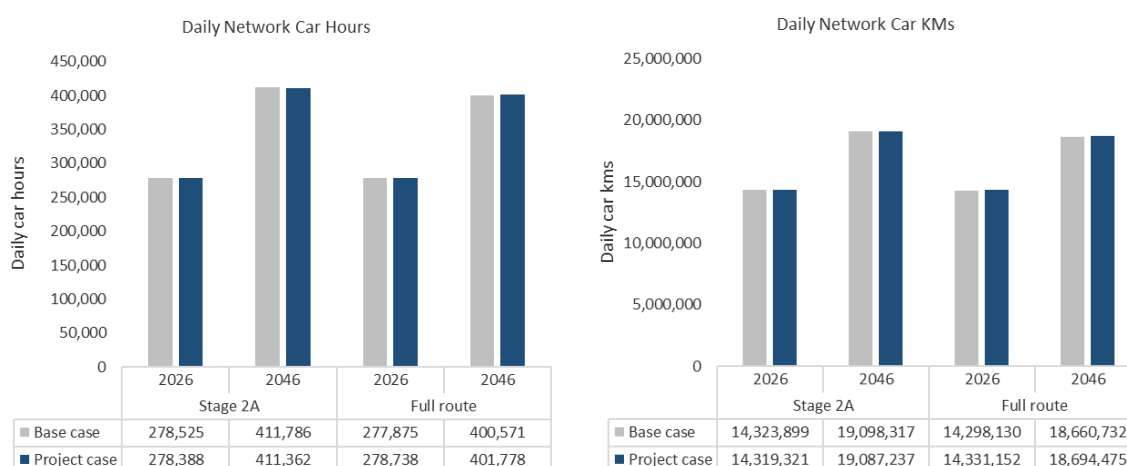
Figure 7-7: Network wide public transport passenger kilometres (daily, 2026 and 2046)



7.3.3 Highway

Figure 7-8 shows the change in car network kilometres and car hours between the base and project case for Stage 2A and City to Woden (Stage 2A and 2B) Light Rail. Under both Stage 2A and City to Woden (Stage 2A and 2B) Light Rail, no significant change is expected in the first round in car network kilometres and car hours.

Figure 7-8: Network wide car kilometres and hours (daily, 2026 and 2046)



7.4 Project costs

Project costs have been provided by the cost estimator (with development costs sourced from the commercial advisor). Costs presented as part of the financial analysis have been adjusted for use in the economic appraisal for Stage 2A and City to Woden (Stage 2A and 2B) Light Rail CBA. The cost figures used in the economic appraisal are:

- In real terms – \$FY2019 (with real escalation);
- Subject to P50 contingencies; and
- Operating costs are over a 30-year appraisal period as opposed to the shorter financial appraisal period.

7.4.1 Capital costs

Capital costs for the Stage 2A route are assumed to be (\$2019¹⁰⁸, real, P50).

Capital costs for the City to Woden (Stage 2A and 2B) Light Rail route are assumed to be (\$2019, real, P50).

Capital costs for the Gungahlin to City component of the network are assumed to be actual project costs incurred by the Territory, as presented in the Project Delivery Report and escalated to \$2019 for like-for like utilisation in the blended BCR analysis.

7.4.2 Operating costs

Operating and maintenance costs captured include those from operating the light rail routes, as well as required vehicle and infrastructure maintenance works. It does not include costs associated with operating the City to Gungahlin route. Any additional or avoided cost of services (such as bus routes that are no longer required) have been included as a benefit.

Operating and maintenance costs are expected to amount to over the 30-year appraisal period for the Stage 2A route (\$2019 real, P50); and to over the 30-year appraisal period for the City to Woden (Stage 2A and 2B) Light Rail (\$2019 real, P50). This is inclusive of life-cycle costs (renewals) required to maintain a sufficient level of operational performance.

¹⁰⁸ All economic costs include real escalation to account for real changes in costs over time. In other words, the costs include escalated costs with inflation stripped out. Escalation over time that are caused by other factors (for example, technical changes, supply/demand and other effects) are accounted for when costs are escalated but not inflated.

7.4.3 Development costs

Development costs associated with the Acton Waterfront development total (\$2019, real, discounted at 7%). These are costs associated with preparing Acton Waterfront for development, such as road and services connections. It represents the additional upfront cost of accelerating the development and construction of the Acton Waterfront (i.e. they are incremental to the development costs incurred in the base case).

7.4.4 Summary of Project costs

The table below shows a breakdown of the total cost for each option *for economic purposes only*.

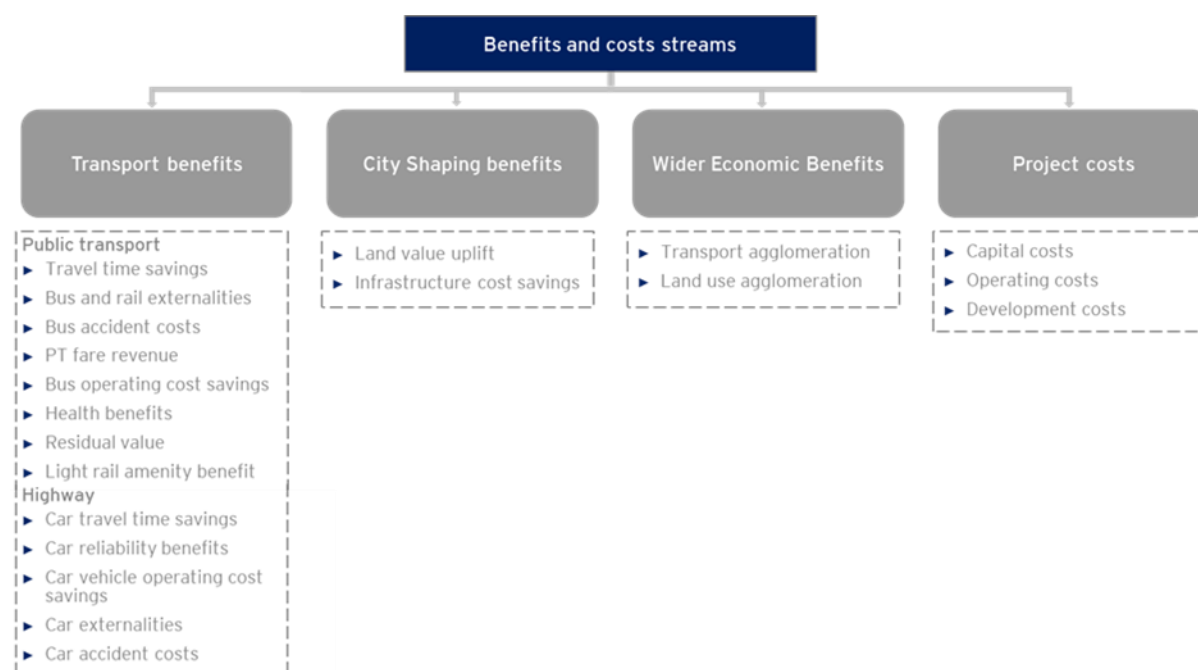
Table 7-7: Present value Project cost summary (\$2019m, real, PV at 7%)

Cost Item	City to Commonwealth Park	City to Woden
Capital cost		
Operation and maintenance costs		
Development costs		
Total Project cost		

7.5 Project benefits

This section explores the benefits captured by the CBA. Figure 7-9 shows the benefit and cost streams captured by the CBA.

Figure 7-9: Benefit and cost streams



7.5.1 Transport benefits

The transport benefits discussed in this section arise from both the change in transport provision and change in land use.

Stage 2A and City to Woden (Stage 2A and 2B) Light Rail will have the following direct benefits on users of the transport system.

- **Travel time savings** – reduction of travel time by light rail, bus and road;
- **Reliability** – reduction in road travel time variability;
- **Vehicle operating costs** – reduction in fuel consumption and other vehicle costs;
- **Health benefits** – increases in walking and cycling leading to improved health outcomes; and
- **Light Rail amenity benefits** – perceived amenity benefits from travel on light rail versus by bus.

In addition, the wider Canberra community will also benefit from Stage 2A and City to Woden (Stage 2A and 2B) Light Rail through the following external benefits:

- **Externality impacts** – reduction in negative externalities associated with car and bus travel;
- **Road accidents** – reduction in accident rates and hence costs, due to modal shifts;
- **Increased public transport revenue** – revenue from new public transport users;
- **Bus operation savings** – change in bus operating costs due to changes in bus service kilometres; and
- **Residual asset value** – remaining asset value at the end of the 30-year appraisal period.

7.5.1.1 Transport user benefits

A description of the transport user benefits captured by the CBA are outlined below.

Travel time savings – Public transport

Perceived travel time savings for public transport users, including time to access transport, wait time, in-vehicle time and transfer time, because of improved public transport services. The reduced travel time costs include costs to businesses of the time their employees and vehicles spend on travel, and costs to consumers of personal time spent on travel.

Travel time savings – Highway

Perceived travel time savings for road users based on changes to in-vehicle time, because of reduced congestion and improved on-road infrastructure. The reduced travel time costs include costs to businesses of the time their employees and vehicles spend on travel, and costs to consumers of personal time spent on travel.

Reliability – Highway

Perceived travel time savings from reductions in travel time variability on road travel because of reduced congestion and improved on-road infrastructure.

Vehicle operating costs (VOC)

A change in the vehicle speeds on the network will affect vehicle operating costs, as fuel consumption and other variable vehicle costs are higher in congested than in free-flowing networks. Total vehicle operating costs comprise basic variable running costs of the vehicle (depreciation, fuel, repairs and maintenance) in resource cost terms (i.e. excluding taxes and duties).

Light rail amenity benefit

Public transport users place value on other journey characteristics than what is counted by time and cost savings. These include elements that are particularly relevant to light rail (e.g. as compared to bus), such as network legibility, reliability, comfort, permanency and physical accessibility. These 'amenity' benefits are captured as a 'discount' to the perceived incremental travel time on light rail.

7.5.1.2 Transport externality benefits

A description of the transport externality benefits captured by the CBA are outlined below.

Externality impacts

Since different transport modes result in the production of different externality costs, such as air pollution, noise, urban separation and greenhouse gas emissions, changes in travel patterns will cause changes in network-wide externalities. Externality impacts have been measured using changes in vehicle kilometres travelled, together with evidence on damage cost per vehicle kilometre travelled.

Accident costs and health

The human and physical costs of accidents on the road network have been estimated for road vehicles (car and bus) as an average cost saving per reduction in vehicle km travelled. For road users this is applied as a cost per vehicle kilometre by road type and for bus as an average cost per service kilometre.

Stage 2A and City to Woden (Stage 2A and 2B) Light Rail have the potential to influence health outcomes for people who change their travel behaviour to more active forms (walking and cycling) because of light rail. This change in active transport movements is likely to be achieved through an increase in the number of people living in accessible locations (i.e. being able to walk to more destinations) and to access/egress from public transport modes. Greater levels of walking and cycling in turn can influence an individual's health outcomes and the wider cost burden this outcome places on the health system.

Health benefits can also be generated due to the reliability and preference of the light rail over driving. This will lead more people to walk or cycle to the nearest light rail stop as opposed to driving.

Public transport fare revenue

Additional fare revenue across the public transport network because of Stage 2A and City to Woden (Stage 2A and 2B) Light Rail being implemented. Public transport fares are transfers (as opposed to true costs or savings). However, since the fares that new public transport users pay are captured as negative user benefits, the incremental revenues from fares received by the operator must be counted as an 'offsetting' benefit.

Avoided bus operating costs

The introduction of the proposed light rail system will result in the reduction of costs for the provision of alternative public transport services, resulting in a reduction in bus kilometres travelled. Such savings have been captured using modelled changes in bus vehicle kilometres travelled and per kilometre values on operating and maintenance costs. Assumptions regarding bus operating costs are contained in the Appendix. Note that this economic analysis has not considered savings from avoided spend on alternative (not yet approved) transport infrastructure projects.

Residual value

Additional value that Stage 2A and City to Woden (Stage 2A and 2B) Light Rail will generate beyond the 30-year operational period in the analysis. Some components of the investment in the projects have significant life remaining at the end of the appraisal period, meaning that the asset still has the capacity to accrue benefits. Residual values are a way of capturing this remaining capacity.

7.5.1.3 Summary of transport benefits

The first and second round transport benefits, i.e. the benefits arising from each project including the land use changes are shown in Table 7-8 for Stage 2A and City to Woden Light Rail (Stage 2A and 2B).

Table 7-8: First and second round transport benefit summary (\$2019m, real, PV at 7%)

The transport benefits above include both first and second round transport impacts. For the Stage 2A route, second round transport benefits refer to those that accrue due to the accelerated development at the Acton Waterfront, and represent the benefit of demographic changes that affect travel patterns and lead to improved network efficiencies.

For City to Woden (Stage 2A and 2B) Light Rail, second round transport benefits are also generated by land use changes along the light rail corridor, as described in Section 7.1.4.1.

7.5.2 City shaping benefits

In combination with supportive government policies, light rail has the potential to drive land use changes. These will lead to additional benefits over and above those captured within transport benefits, both by realising higher and better use of existing land, reducing the cost of providing public services and delivering densification benefits such as agglomeration. Note that changes in the value of existing property stock are not captured as benefits, as these are merely manifestations of gains captured elsewhere in this economic assessment.

The land use benefits captured in the City to Commonwealth Park (Stage 2A) economic appraisal relate to the acceleration of the development timeline for the Acton Waterfront.

For the City to Woden (Stage 2A and 2B) Light Rail, city shaping benefits are also driven by land use changes in the light rail corridor between the City and Woden as outlined in Section 7.1.4.1.

The land use benefits captured by the CBA are outlined below.

Land use benefits

A change in land use will generate a net economic benefit if the value of the new use is higher than the value of current use, plus the cost of achieving the change. In an unfettered market, such benefits would be exhausted by developers and land owners. However, property markets face many constraints, including planning regulations and transactional taxes and levies. If the introduction of Stage 2A and City to Woden (Stage 2A and 2B) Light Rail unlocks, enables or attracts additional development into the corridor, away from other parts of ACT, the balance of these constraints may add up to a net benefit. These may consist of:

- **Highest and best use**¹⁰⁹ – where an increase in density is only permitted if a mass transport solution like light rail is introduced, the increase in land value from the higher permitted density can be attributed to the transport solution; and
- **Transactional taxes** – where a transport improvement attracts development into a corridor that already has higher valued property, the balance of incremental transactional taxes in the corridor and foregone taxes elsewhere will be positive. This should then be attributed as a benefit to the transport improvement.

Accordingly, the benefit attributed to light rail from land use uplift, as well as the net incremental increase in GST on residential sales and stamp duty paid, are captured as a benefit.

Light rail projects are city-shaping developments, providing a stable corridor for investment and higher value land use. As a city-shaping initiative for Canberra, light rail is expected to support changes in population and employment, stimulating urban renewal and economic diversification and helping to create a more connected, compact and competitive Canberra.

Infrastructure cost savings

Future population growth will require the provision of additional public services and physical infrastructure to ensure that existing service standards are maintained.

The future spatial location of population and jobs can impact the future government costs of providing physical infrastructure such as roads, rail and other transport, water and sewerage, electricity, gas and telecommunications. The cost to provide these services to “greenfield” (i.e. outer suburban or fringe development) locations is typically much higher per dwelling than to already well serviced “brownfield” (i.e. inner City) locations. Encouraging more of the future growth in population within built-up areas will generate an infrastructure cost saving.

7.5.2.1 Summary of city shaping benefits

The city shaping impacts resulting from light rail are shown below.

Table 7-9: Land use benefit summary (\$2019m, real, PV at 7%)

¹⁰⁹ For example, mixed use medium and high-density apartments

7.5.3 Wider Economic Benefits

The analysis of WEBs attempts to capture the productivity impacts of a project that accrue outside the transport sector, including from the effects of improved connectivity, land development, and business logistics improvement. The impacts result from both transport improvements and land use changes.

Agglomeration benefits are the result of business and commute travel time reduction which brings firms closer to each other, to workers, to their suppliers and consumers, and facilitates the knowledge and information exchanges. As WEBs are driven by accessibility, the improved connectivity delivered by the Project and the land use densification along the corridor both support increased agglomeration benefits.

Table 7-10 below summarises the transport and city shaping wider economic benefits that result from each Project.

Table 7-10: Wider economic benefit summary (\$2019m, PV at 7%)

7.5.4 Summary Results and north-south corridor indicative blended BCR

The results presented throughout this section are summarised in Table 7-11 below. All results are presented in \$million, discounted at a rate of 7%.

Major Projects Canberra has, independently of its economic advisor, derived a blended indicative BCR, inclusive of wider economic benefits, between Gungahlin and Woden and Gungahlin to Commonwealth Park of 1.2. This blended analysis utilises:

- Gungahlin to the City benefits as per the Light Rail Stage 1 Business Case;
- Actual Gungahlin to the City project costs as presented in the Project Delivery Report, adjusted to \$2019; and
- Stage 2A and Stage 2B analysis as set out in this Chapter.

The approach used for the blended BCR has not been created using new analysis or under the same process as the Stage 2A or City to Woden Light Rail BCRs. Consequently, underlying assumptions from the City to Gungahlin BCR may not be relevant and not provide the same outcome when viewed on a City to Woden basis.

The City to Gungahlin results are based on assumptions, estimates, modelling and forecasts believed to be reasonable at the time of the 2014 Business Case. They do not reflect any changes in scope, costs or economic reality since then, and as such do not represent the realised costs and benefits from the project.

When considered in conjunction with the BCR for the City to Gungahlin (Stage 1), the benefits of light rail across the north-south corridor between Gungahlin and Woden via the City, inclusive of wider economic benefits, exceed the costs.

Results for the City to Gungahlin Project should be interpreted in conjunction with the assumptions and limitations set out in the Business Case for that Project.

Table 7-11: Results summary (\$2019m, real, PV at 7%)

Benefit Category	Gungahlin to Woden (Indicative Blended)	Gungahlin to Commonwealth Park (Indicative Blended)	City to Commonwealth Park	City to Woden	City to Gungahlin ¹¹⁰
Project benefits					
Transport benefits					569
City shaping benefits					534
Wider economic benefits					278
Total Project benefits					1,380
Project costs					
Project capital costs					748 ¹¹¹
Operating costs					286
Development costs ¹					-
Total Project costs					1,035
Results					
NPV (excluding WEBs)					69
NPV (including WEBs)					346

¹¹⁰ Results for the City to Gungahlin Project escalated to 2019\$ at 7%

¹¹¹ Adjusted to reflect the actual cost of the City to Gungahlin Light Rail as presented in the Project Delivery Report

Benefit Category	Gungahlin to Woden (Indicative Blended)	Gungahlin to Commonwealth Park (Indicative Blended)	City to Commonwealth Park	City to Woden	City to Gungahlin ¹¹⁰
BCR (excluding WEBs)	0.8	0.9	0.4	0.6	1.1
BCR (including WEBs)	1.2	1.2	0.6	1.0	1.3

The Cost Benefit Analysis has produced BCRs for City to Woden Light Rail (Stage 2A and 2B) of 1.0 and City to Commonwealth Park (Stage 2A) of 0.6 (including WEBs). A separate CBA has not been conducted for the Commonwealth Park to Woden component of the alignment on the basis it will form part of a future business case for Stage 2B.

However, on the basis of the City to Woden and City to Commonwealth Park BCRs calculated above, it is likely a BCR for this section would exceed 1.0. Indicatively, deducting the costs and benefits of the City to Commonwealth Park economic analysis from the costs and benefits of the City to Woden BCR would result in a residual indicative BCR of around 1.2.

7.5.5 Sensitivity analysis

The following table shows the results of sensitivity analysis that tests the robustness of the appraisal results to changes in key assumptions and results.

Table 7-12: Sensitivities (\$2019m, PV at 7%)

Benefit Category	City to Woden	
	NPV	BCR
Economic Results		
Economic results		1.0
Sensitivities – Discount rate		
4% Discount rate		1.5
10% Discount rate		0.8
Sensitivities – Benefits		
Benefits + 20%		1.2
Benefits - 20%		0.8
Sensitivities – Costs		
Costs + 20%		0.9
Costs – 20%		1.3

The sensitivities that have the largest impact on the economic results are a change in the discount rate to 4%, an increase in benefits by 20% and a decrease in costs by 20%.

8.0 Delivery model analysis

Key messages

- The recommended delivery model to be pursued in the first instance consists of two components:
 - An 'Early Contractor Involvement' contract on a sole source basis with Canberra Metro in connection with Stage 2A. This will cover the period between this Business Case and the submission of a proposal for the main Stage 2A works by Canberra Metro. This 'Early Contractor Involvement' approach will enable development of Stage 2A to continue while Canberra Metro prepares its proposal. It will also establish a framework which will facilitate the achievement of a value for money outcome [REDACTED]; and
 - Procurement of a contract for the Project's main works through a sole source negotiation with Canberra Metro. This will, at a minimum, include an integrated package consisting of the design, construction, operations and maintenance of the Project. The entry into a contract for the Stage 2A main works will come at the conclusion of the Stage 2A 'Early Contractor Involvement' process.

8.1 Background and approach

The methodology employed to develop the delivery model for the Project has taken into account the following considerations:

- The requirements of The Capital Framework with reference to Infrastructure Australia Guidelines;
- The interface challenges that arise due to the Project being an augmentation of the existing light rail network; and
- The contractual relationship between the ACT Government and Canberra Metro.

While the existence of an incumbent increases the complexity of the delivery model selection process, the same fundamental approach has been applied to the assessment:

- Assessing on a 'best for Project' basis with no preconceived bias in favour of one model over another;
- Undertaking a bottom up analysis based on the needs of the Project; and
- Being cognisant of the nature of the inherent Project risks.

A consultative and iterative process has been adopted to develop the delivery model, including workshops and discussions with relevant ACT Government stakeholders and advisors, such as:

- Major Projects Canberra;
- Transport Canberra and City Services;
- ACT Treasury;
- Commercial advisors;
- Technical and operational advisors;
- Legal advisors; and
- Market soundings with industry participants, including Canberra Metro.

This was supported by a range of technical briefings, benchmarking analysis of similar procurements and functioning light rail systems and risk assessments.

8.1.1 Important note

At the outset, it is important to note the following:

- **Balanced assessment:** no single delivery model option perfectly addresses all aspects of the Project. The delivery model recommendation in this Chapter is based upon a balancing of the advantages and disadvantages of potential delivery models for the Project;
- **Differing opinions:** some stakeholders and market participants may have differing opinions as to the optimal delivery model to be utilised for the Project, and as to the numerous ways in which a particular delivery model may be structured and implemented. This is particularly relevant as the Project will be procured early in Canberra Metro's operating period for City to Gungahlin Light Rail; and
- **Maintaining the option to change delivery model:** the delivery model recommended in this Business Case is based on the Territory being able to meet its objectives for the Project and drive a value for money outcome in a sole source procurement. Consequently, the recommended option is supported by a secondary delivery model option that could be implemented later in the process if necessary.

8.2 Delivery model assessment

8.2.1 General principles

Seven general principles – based on the requirements of The Capital Framework – have guided the ACT Government's assessment of potential delivery models. They are:

- Risk transfer and price certainty;
- Quality;
- Value for money;
- Time;
- Flexibility and control;
- Market capacity and interest; and
- Innovation.

The table below provides key Project considerations in relation to each of the aforementioned Capital Framework principles. The principles listed above have been given levels of priority that assisted in informing the evaluation of options.

Table 8-1: Evaluation criteria

Criteria	Key issues	Relative importance to Project
Risk transfer and price certainty	<ul style="list-style-type: none">• Ensuring effective risk transfer and appropriate risk allocation to the party best able to manage each risk• Operational interface risk with the existing network, as well as the planned further extension south to Woden• Planning risks associated with NCA approvals that are required in 'Designated Areas'• Interface risk between components/packages• Importance of maintaining the existing City to Gungahlin performance regime	Very high

Criteria	Key issues	Relative importance to Project
Quality	<ul style="list-style-type: none"> Provides a service of a standard equal to or greater than the existing network Maintaining the KPIs and service level arrangements contained in the existing network's performance regime Continuous north-south spine that provides a single-seat journey option for customers between Gungahlin and Commonwealth Park, and eventually to Woden The Project is fit for purpose, achieving urban amenity and customer experience outcomes 	Very high
Value for money	<ul style="list-style-type: none"> Achieving value for money in a potentially non-competitive procurement process Certainty of construction costs and whole of life costs (future maintenance and operational costs) Costs incurred by the Territory in undertaking the procurement Taking advantage of economies of scale with City to Gungahlin Light Rail where appropriate 	Very high
Time	<ul style="list-style-type: none"> Time to market – Parliamentary Agreement commitment to progress light rail to Woden to the procurement stage and contract signing in the current Parliamentary term Time to completion 	High
Flexibility and control	<ul style="list-style-type: none"> Not preclude the future expansion of the Project (both contractually and physically), noting it is the initial stage of extending light rail to Woden Allow for technology advances, noting the possibility of requirement for wire-free running on sections of Stage 2A and Stage 2B as a consequence of NCA or Commonwealth Government requirements Management of operations as the network expands 	Medium
Market capacity and interest	<ul style="list-style-type: none"> Market capacity – extensive pipeline of large rail and civil projects Market interest in the Project given the existing City to Gungahlin Light Rail Project Agreement with the incumbent and the need for integration between stages 	Medium
Innovation	<ul style="list-style-type: none"> Create an incentive for an innovative solution to drive cost efficiencies Requirement to incorporate existing network design and systems may impact level of innovation on the Project 	Medium

8.2.2 Data gathering

Significant data has been collated for the purposes of assessing delivery model alternatives. This includes:

- Project objectives;
- Project requirements (scope of works and services);

- Project constraints;
- Project risk assessment;
- Project cost estimates;
- Benchmarking and case study review; and
- Other information as contained throughout this Business Case.

8.2.3 Key risks

Key risks are outlined in Table 8-2 below.

Table 8-2: Key Project risks

Risks	
Procurement risks	
Value for money	<ul style="list-style-type: none"> • By undertaking a sole source procurement of the Project there is a heightened risk that value for money through the procurement process cannot be achieved and/or demonstrated.
Market capacity	<ul style="list-style-type: none"> • The procurement and delivery of the Project is expected to coincide with significant levels of transport infrastructure construction activity on the east coast of Australia. Consequently, there is a significant risk that there will be market capacity constraints impacting the budget, timing and potentially quality outcomes of the Project.
Project risks	
NCA approvals	<ul style="list-style-type: none"> • The alignment runs through 'Designated Areas' and as such will require the approval of the NCA. • This process increases the risk of delays and additional costs if deadlines are missed and/or additional unexpected conditions are imposed. This could include requirements for wire-free running (see wire-free risk below).
Environmental and other approvals	<ul style="list-style-type: none"> • Risk that the Project does not receive all other approvals required for the Project (e.g. EIS, EPBC, Territory planning approvals etc.). • There is a risk that Commonwealth environmental approvals processes may add longer than anticipated timeframes to the program, leading to delay in delivering the Project. • There is also a risk that conditions of environmental approvals may require wire-free running (see wire-free risk below).
Site access	<ul style="list-style-type: none"> • Sections of the route alignment run on Commonwealth land. There is a risk that this may impact on site access due to changes in Commonwealth assets, lease or license agreements. There is a risk that the Commonwealth Government may seek lease or licence terms in respect of its land which are commercially unacceptable to the Territory. This would effectively inhibit progression of the Project, even if planning approvals are provided.
Traffic management	<ul style="list-style-type: none"> • Risk that traffic is impacted more than expected during construction, particularly around the intersections at Commonwealth Avenue and Northbourne Avenue.

Risks	
	<ul style="list-style-type: none"> The level of traffic disruption in and around the City will be impacted by the timing and approval of other projects in and around the route alignment, such as the raising of London Circuit at Commonwealth Avenue (see below).
Integration with City to Gungahlin Light Rail	<ul style="list-style-type: none"> Risks related to the addition of the Project to the network, such as: <ul style="list-style-type: none"> The interface with City to Gungahlin Light Rail causing issues during the delivery stage, or disruption in service once operational; and A discrepancy in the interface specification for the integration of City to Gungahlin Light Rail and the Project.
Interface with City to Woden Light Rail	<ul style="list-style-type: none"> The Project is the initial component in the extension of light rail from the City to Woden, resulting in interface and integration risks associated with the further extension. These risks include: <ul style="list-style-type: none"> Technical risks, including systems and design specifications; and Commercial and value for money risks associated with contracting arrangements and the renegotiation of the performance regime and payment mechanism.
Interface with third party and other developments	<ul style="list-style-type: none"> Risks arising due to the interface between the Project and other developments occurring in the area, such as works on Commonwealth Avenue Bridge and planned developments in City Hill and Acton Waterfront. Risk of consequential road investments being needed elsewhere in the network. Risk that the Edinburgh Avenue extension will not be completed in time, causing worsened traffic conditions.
London Circuit	<ul style="list-style-type: none"> Risks relating to complexities surrounding the structure between London Circuit and Commonwealth Avenue. Significant risks may also arise due to potential concurrent work related to the raising of London Circuit. Should the ACT Government decide to raise London circuit, it is recommended that it is appropriate to undertake that work as part of this Project (though separately accounted for). The program in this Business Case assumes that London Circuit is raised to be at-grade (with approval for these works being sought as part of a separate Business Case).
Utilities	<ul style="list-style-type: none"> Risk of delay due to the location of utilities and services, particularly around London Circuit and Commonwealth Avenue, such as: <ul style="list-style-type: none"> Insufficient resources or priority on the part of a utility provider for timely agreement; Incorrectly identified utilities which result in a change in the level of works required; and Unanticipated national or international events which impact on the Commonwealth Government's ability to address its infrastructure in the alignment.

Risks	
Patronage	<ul style="list-style-type: none"> • Risk of light rail patronage numbers differing from assumptions impacting transport revenue.
Site conditions	<ul style="list-style-type: none"> • The risk of dealing with unexpected site issues, including contamination, geotechnical conditions, stormwater and flooding.
Safety	<ul style="list-style-type: none"> • Overall safety risks to passengers and workers during construction and the ability to achieve a safe delivery and operational outcome, along with the risk of not obtaining accreditation from the Office of the National Rail Safety Regulator.
Wire-free	<ul style="list-style-type: none"> • The JSC recommended (see Section 2.4) that any light rail on or crossing Commonwealth Avenue, Kings Avenue, State Circle, Brisbane Avenue, Sydney Avenue, Canberra Avenue (to Manuka Circle), Hobart Avenue, Melbourne Avenue, Adelaide Avenue (to Kent Street) and in the Parliamentary Zone be wire-free. The Commonwealth Government agreed with this recommendation. This spans part of Stage 2A and 2B. As such it is likely that to obtain approval for City to Woden Light Rail sections of wire-free running will be required. • Should wire-free running be required the existing fleet would need to be retrofitted with battery technology to allow for an end-to-end service, as well as new vehicles having to be purchased with this technology. As noted in Section 6.2.3, this is anticipated to have an additional estimated capital cost of (nominal, P75). Additionally, there is a risk that City to Gungahlin Light Rail performance requirements will not be met during this process or that the process takes longer than anticipated and delays operational commencement for the Project. • Additionally, should the NCA require wire-free running late in the Project's development, the lead time needed to retrofit LRVs will likely result in a delayed operational commencement. • The extent of any requirement for wire-free running may also increase journey times and necessitate the procurement of up to an additional two LRVs.
Community	<ul style="list-style-type: none"> • Risk that construction impacts on businesses.
Commissioning and start of service	<ul style="list-style-type: none"> • Risk of late delivery and commencement of Project operations related to not successfully testing and commissioning (for reasons other than delays caused by the ACT Government).
Cost	<ul style="list-style-type: none"> • Risk that the cost estimate supporting the Business Case is materially different to the final cost estimate due to the preliminary nature of the designs, incorrect assumptions, changed project timeframes, unsuccessful progression of the procurement process, unexpected planning conditions or the state of the national infrastructure delivery market.
Scope creep	<ul style="list-style-type: none"> • Risk that incremental design demands increase Project costs.
Market price risk	<ul style="list-style-type: none"> • If relevant, interest rate risk – risk of higher interest rates when Project finance is rolled over beyond first financing periods;

Risks	
	<ul style="list-style-type: none"> • Foreign Exchange risk – LRV procurement and other imported components of the Project will be subject to changes in foreign exchange rates; and • General labour price risk – while being a systematic risk, it should be noted that market capacity constraints on the east coast may drive up the cost of construction labour during the Project.

8.2.4 Preliminary Packaging Assessment

Prior to shortlisting a set of potential delivery models for the Project, an initial assessment of the packaging options available was undertaken taking into account the existing Project Agreement between the Territory and Canberra Metro.

The initial packaging assessment outlined in the below table has bundled Project components into groups based on an assessment of the Project objectives, risks and technical characteristics. The packages have informed the delivery model assessment.

Table 8-3: Initial packaging assessment

Package	Components	Rationale
Operations and maintenance	Operations Maintenance (Hard and Soft FM) LRV maintenance Streetscape, furniture and landscaping maintenance	Structure allows for the provision of continuous end-to-end operations between Gungahlin and Commonwealth Park; supports integrated operations and maintenance activities across both stages; reduces interface risk; and may potentially allow for the requirements of the existing performance regime to be extended to the Project.
Alignment and civils (D&C)	Civil infrastructure Streetscape, furniture and landscaping Utilities	Components of civil infrastructure, utilities and streetscaping that have significant interface during construction are packaged together to minimise physical and timing interface risks and provide opportunities to obtain delivery efficiencies. Components of the D&C with complex interfaces with the existing light rail network have been excluded from this package and considered separately. Should the raising of London Circuit at Commonwealth Avenue project be approved by the ACT Government, these works would likely form part of this package due to their significant interface with light rail.
Systems infrastructure and depot works	Systems infrastructure Minor depot works	Software components of systems infrastructure have a high interface with the O&M provider and therefore should be procured together. In addition, the systems software utilised for the Project should be the same as City to Gungahlin Light Rail to ensure consistency, reduce systems interfaces that could create safety issues and to avoid duplication of upfront costs. Hardware components can generally be specified and procured as part of the wider D&C package to avoid

Package	Components	Rationale
		construction interfaces; however high interface hardware components could also be procured as part of the O&M scope.

8.2.5 High level delivery model assessment

In light of the preliminary packaging analysis outlined in Section 8.2.4, a high level delivery model assessment has been undertaken to establish a shortlist of delivery model options.

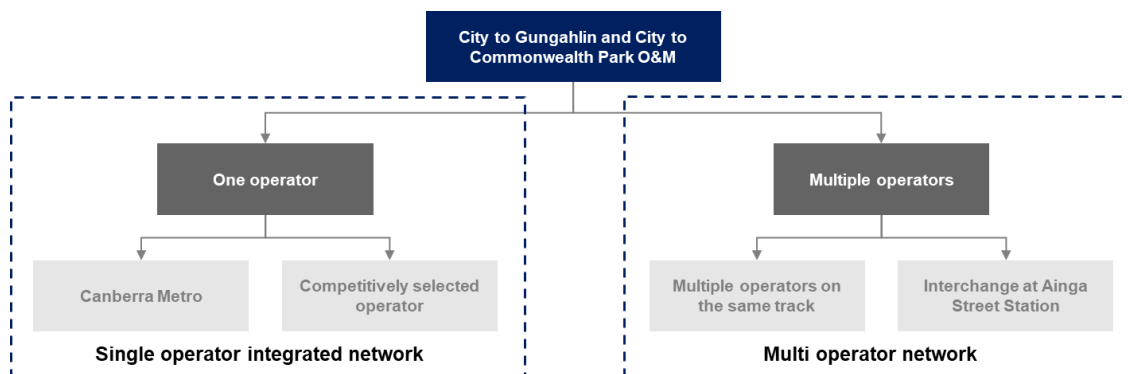
To establish the shortlist, three key structuring questions were answered to eliminate less preferred delivery model options:

- **Single or multiple operator network** – would the Territory pursue a multiple operator network either split between the existing light rail network and the Project or with multiple operators providing services on the one alignment;
- **The preferred O&M procurement approach** – would the Territory consider pursuing a sole source procurement with Canberra Metro for all or part of the O&M components of the Project; and
- **The preferred D&C procurement approach** – what Project components should be bundled into a larger D&C package to be procured under one contract and should the D&C procurement be pursued using a sole source or competitive tender.

8.2.5.1 Single or multiple operator north-south alignment

There are a number of possible structures under which either a single or multiple operator network could be implemented as outlined in Figure 8-1.

Figure 8-1: Operator options



The findings from the assessment of multiple north-south operator models include:

- A multi operator north-south alignment would likely miss the economies of scale presented by a growing single operator network due to some duplication of infrastructure and operating costs, particularly in light of the small scale of the extension (1.7 km);
- A multi operator north-south alignment does not eliminate the need for a sole source negotiation with Canberra Metro and may increase the risk of an inferior performance regime for the Territory;
- A split multi operator north-south alignment – with an interchange at the Alinga Street Stop – is likely to provide a lower quality customer experience due to the requirement for customers to change LRVs; and

- The continuous service – without interchange – multi operator model may also have challenges achieving consistent levels of service through the network with different staff and procedures in place, in addition to the need to manage the interface requirements between operators.

Conversely, a single operator north-south alignment option would provide:

- A consistent, high quality, network-wide customer experience outcome for passengers;
- A 'one network / one system' approach that ensures fully integrated systems in operations, power control, communications, CCTV and PIDs;
- Best use of economies of scale from the existing light rail network by making the most efficient use of infrastructure, such as LRVs, depot and maintenance equipment, and support staff in customer service and corporate/administrative personnel;
- Substantially reduced interface risk between City to Gungahlin Light Rail and the Project's O&M components; and
- The potential for a consistent performance regime for City to Gungahlin Light Rail and the Project.

Based on this analysis, the Territory's preferred option is to pursue a single operator north-south alignment.

8.2.5.2 The preferred O&M procurement approach

As Figure 8-1 highlights, the single operator scenario can be achieved through:

- Engaging the existing operator, Canberra Metro, to operate the full alignment (sole source), with or without the D&C also procured on a sole source basis;
- A concession buy-out (termination) of the City to Gungahlin Project Agreement and retendering of the O&M as a separate or integrated package with other scope components of the Project, such as the D&C. This option is proposed to involve the complete buyout of the City to Gungahlin Light Rail contract which is then combined with the Project's D&C and O&M to create a new PPP taken to market as one package.

An assessment of the sole source approach versus the competitively tendered approach highlights the key considerations outlined below.

Sole source O&M approach

- Canberra Metro should bring learnings from the existing light rail network that will improve the overall offering;
- Leaves the existing D&C and O&M consortia intact, maintaining whole of life benefits and the intra consortia defects and fit for purpose protections;
- Is likely to be the more expedient procurement approach; and
- Will be more challenging to achieve a value for money outcome when compared to a full competitive tender process.

Competitive tender through a concession buy-out (termination) of City to Gungahlin Light Rail approach

- May not attract sufficient market interest due to the perception of Canberra Metro being unfairly advantaged and the small scale of the Project;
- If sufficient market interest is achieved, then a competitive process should drive more robust pricing;
- The termination process may be expensive and extend the time required to undertake the procurement; and
- Presents some timing issues as Canberra Metro will need to continue O&M activities while the procurement is occurring. It may be challenging to drive Canberra Metro's performance effectively during this period.

Both of these options have been included in the shortlisted selection with these key considerations taken into account in the ratings in Table 8-6.

The options for procuring O&M services are influenced by other Project packages, including the interface with (or sole sourcing of) the D&C works for the Project and other key package items such as systems infrastructure. The relevant interface risks, value for money and timing considerations are considered in the following sub-section.

8.2.5.3 The preferred D&C Procurement approach

Consideration has been given to the procurement of the D&C under a combined O&M (City to Gungahlin Light Rail and the Project) approach as outlined in Section 8.2.5.2. The D&C procurement has been further considered under the following scenarios:

1. **D&C packaging structure:** should the D&C be procured as a single integrated package with the O&M (or O&M plus high interface D&C components) or separately; and if so
2. **D&C procurement approach:** should the integrated packages be procured with Canberra Metro under a sole source arrangement.

D&C packaging structure

As highlighted in the City to Gungahlin Light rail procurement model, there is benefit to integrating the D&C and O&M components – regardless of the contractor – due to the potential to:

- Minimise interface risks;
- Maximise value for money through economies of scale and efficiencies in design and overall customer experience; and
- Enhance whole of life benefits through the O&M contractor being closely involved in the D&C procurement.

These benefits are usually offset by the drawback of not being able to select the best in class contractors for each component of works and the fact that it can put restrictions on the level of input the Territory can have into the operations phase.

While these drawbacks need to be considered and managed, the benefits of this approach warrant the further examination of this option in the shortlisted delivery model evaluation outlined in Table 8-6.

D&C procurement approach

Should D&C components be bundled with O&M activities, the D&C procurement could be achieved either through:

- A concession buy-out of the existing light rail network and a full procurement of City to Gungahlin Light Rail O&M and the Project's D&C and O&M under a competitive process;
- A process whereby the D&C component is the subject of a competitive process run by the Canberra Metro SPV; or
- Canberra Metro for combined City to Gungahlin Light Rail and the Project on a sole source basis.

Key considerations in this respect – either if D&C were bundled with O&M or if it were a standalone procurement – are outlined below.

Risk

- Procuring both City to Gungahlin Light Rail and the Project with Canberra Metro under an integrated procurement model would assist in reducing the interface risk between components, while also improving whole of life outcomes; and
- Consideration should also be given to reducing the interface between the Project and the future stages across the Lake to Woden. This could include some allowance in the Project design for future

proofing for an extension to Woden and provision in the commercial framework to facilitate procurement of those works on a value for money basis.

Value for money

- Canberra Metro may be able to bring economies of scale from their work on City to Gungahlin. Specifically, there may be efficiencies in design, planning and mobilisation costs;
- A competitive procurement process that results in a different D&C provider may lead to increased costs due to the interface between City to Gungahlin Light Rail and the Project's D&C contractor in the design and planning phases. This may result in different approaches to key components of the construction, leading to inconsistent customer outcomes and operational inefficiencies;
- While an open market D&C process may yield a more competitive process, there is also a risk that a failure to attract other bidders (given Canberra Metro's incumbency and the length of the augmentation) may result in higher pricing to the Territory. Additionally, a concession buy-out may be expensive adding material costs to the overall procurement process;
- A D&C process run by the Canberra Metro SPV is unlikely to attract other Tier 1 constructors, both due to the current state of the infrastructure delivery market and because of the ownership structure of the Canberra Metro SPV;
- A Canberra Metro procurement may result in a streamlined contract management process as it will be an established governance structure which may minimise Territory resourcing requirements; and
- Canberra Metro may be able to bring economies of scale and minimise interface risks for the future extension of Commonwealth Park to Woden.

Time

- Canberra Metro's knowledge of the light rail network and Territory planning requirements, may support quicker delivery; and
- Sole sourcing through Canberra Metro may obviate the need for a full procurement process, potentially saving time and assisting to minimise undue delays.

On balance, procuring the Project's D&C on a sole source basis through Canberra Metro is likely to yield some time and cost efficiencies and has the potential to reduce interface risks between City to Gungahlin and any future stages to Woden.

Procurement of an integrated D&C and O&M package under a Canberra Metro and an open market process have been shortlisted and further considered in the shortlisting analysis and scoring in Section 8.2.6.

8.2.6 Shortlisted delivery model options

The initial packaging assessment and high level delivery model analysis led to a shortlisted set of delivery model options for evaluation against the criteria outlined in Table 8-1. These options are outlined below.

Table 8-4: Shortlisted delivery model options

Delivery Model	Description
Option 1: Sole source procurement with Canberra Metro for the Project's D&C and O&M as an integrated package	<ul style="list-style-type: none"> • Includes procurement of all major components of the Project's D&C • Includes procurement of the Project's O&M to be combined with City to Gungahlin Light Rail for an end-to-end service for the remainder of the 20 year operating period under the City to Gungahlin Light Rail contract

Delivery Model	Description
	<ul style="list-style-type: none"> Private financing of the Project could be considered for this option. A final determination on the applicability of private finance to the deal could be considered in the initial negotiations with Canberra Metro
Option 2: Concession buy-out – integrated package for procurement of the City to Gungahlin Light Rail O&M plus the Project's D&C and O&M under a PPP	<ul style="list-style-type: none"> Includes a buy-out of City to Gungahlin Light Rail by the Territory based on a termination for convenience scenario Includes procurement of all major components of the Project's D&C Includes procurement of the Project's O&M combined with City to Gungahlin Light Rail for end to end services for the remainder of the City to Gungahlin Light Rail 20 year operating period Private financing of the Project may be considered for this option. Private finance may be used to buy out City to Gungahlin Light Rail debt
Option 3: a split O&M (sole source) and D&C (competitive tender)	<ul style="list-style-type: none"> Includes procurement of all major components of the Project's D&C in a single package through the open market Includes procurement of the Project's O&M and high interface D&C components, such systems software, to be combined with City to Gungahlin Light Rail and procured with Canberra Metro allowing for an end-to end-service for the remainder of the City to Gungahlin Light Rail 20 year operating period Private financing of the D&C component of the Project are not considered appropriate under this option. Private finance of the City to Gungahlin project would remain in place

These shortlisted options were then taken forward for a qualitative evaluation against the criteria outlined in Table 8-1. Table 8-6 outlines the result of that evaluation and the associated drivers for each rating.

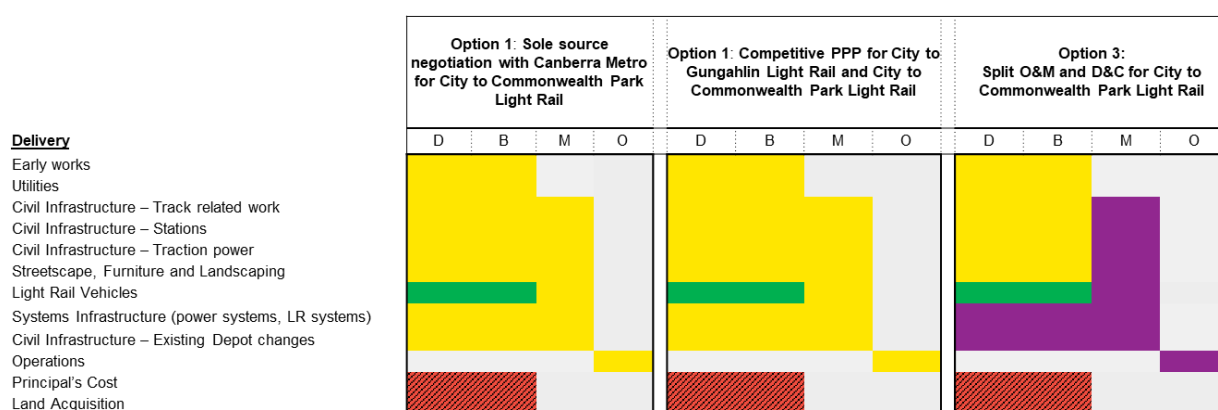
The ratings system utilised for the evaluation is outlined in Table 8-5.

Table 8-5: Qualitative rating scale

Scale	Description of scale
✓✓✓	Extremely effective in satisfying the requirements of the criterion
✓✓	Effective in satisfying the requirements of the criterion
✓	Just satisfies the requirements of the criterion
✗	Ineffective in satisfying the requirements of the criterion
✗✗	Extremely ineffective in satisfying the requirements of the criterion

The shortlisted options are diagrammatically presented below – with colours representing the different packages – followed by an assessment of the delivery models against the evaluation criteria.

Figure 8-2: Delivery model packaging options



The assessment of the shortlisted delivery models against the evaluation criteria is set out below:

Table 8-6: Qualitative evaluation of the shortlisted delivery models

Evaluation criteria	Relative importance	Option 1	Option 2	Option 3
Overall assessment		Ranking – 1 Option 1 is the preferred option on the basis of risk allocation, time to market and market capacity as compared with Options 2 and 3	Ranking – 2 Option 2, while providing relatively more flexibility to the Territory and a degree of risk transfer, will include termination costs and a lengthier procurement process	Ranking – 3 Options 3 allows greater synergy with City to Gungahlin Light Rail than Option 2 but the D&C is likely to be relatively less attractive to the market and reduces the Territory's control over the process
Flexibility and control	Medium	✓✓ - Currently limited flexibility in the Project Agreement but could seek to enhance this through the inclusion of robust termination provisions	✓✓✓ - Ability to re-write the Project Agreement to increase flexibility for the Territory through procurement and contract negotiations	✓ - Currently limited flexibility in the Project Agreement but could seek to enhance this through an augmentation framework to increase future flexibility
Optimal risk transfer	Very High	✓✓✓ - Sole source will provide for a fully integrated package with risk transfer. The incumbent's familiarity with City to Gungahlin Light Rail may also enhance risk transfer for the Project	✓✓ - Single PPP structure to govern both stages and for interface risks between packages to be managed intra-consortium	✓ - Risk is taken on the D&C through a competitive process. Fitness for purpose risks between Canberra Metro and the D&C contractor likely to be significant and borne by the Territory
Quality	Very High	✓✓ - Option will provide continuity for the customer through one head contractor as well as tension between quality and cost	✓ - While a fully competitive process provides a basis to select the best technical solution, a termination event may impact on City to Gungahlin Light Rail and the Project and the ability to meet timetables and retain learnings	✓✓ - Potential for the Territory to retain the benefits of a single operator for City to Gungahlin Light Rail and the Project provided that the operator has sufficient input into the D&C and into the resolution of interface issues
Value for money	Very High	✓ - Procurement process will not be competitive;	✓ - Competitive procurement process	✓ - Competitive procurement (and

Evaluation criteria	Relative importance	Option 1	Option 2	Option 3
		however, there is potential for reduced procurement costs, economies of scale and reduced cost pressures for interface risks	provides basis for a better price noting that termination costs and the procurement process requirements will result in additional costs	associated price competition) limited to the D&C package. Additional interface risks will need to be factored into the O&M price
Time	High	✓✓ - Procurement process has the potential to be quicker than a competitive tender (if successful)	✓ - A concession buyout followed by a PPP would be the most time intensive option and could therefore impact on the timeliness of the Project	✓✓✓ - Potentially advantageous noting that sole source may take time to draft
Market capacity and interest	Medium	✓✓✓ - Direct negotiation with Canberra Metro for the Project allows the Territory to secure a contractor for all aspects of the procurement	✓✓ - Current market capacity issues on the east coast exist that may impact interest on the D&C but the large size and more open (without the incumbent) field may be attractive to the market	✓ - Current market capacity issues on the east coast may impact interest for the D&C, while the interface risk between the D&C and O&M may also dampen market interest.
Innovation	Medium	✓ - Continuity of design and service provision should counteract the lack of substantive competition from the market under a sole source approach	✓✓ - A competitive PPP could encourage innovative solutions however there is a risk that service continuity is compromised	✓ - Competition for D&C could encourage innovative solutions however there is a risk that service continuity is compromised

While the final structure (including any private finance and commercial arrangements with the City to Gungahlin package of works) will be decided and confirmed following consideration of this Business Case, the Territory's preferred approach is Option 1 with procurement of the D&C and O&M components for the Project with Canberra Metro.

8.2.7 Consideration of delivery model under sole source

The following section outlines some key issues that have been identified and will have an impact on the Project's procurement. These issues will be considered post this Business Case and will inform the preferred delivery model, commercial structure and financing arrangements (if relevant) to be pursued with Canberra Metro under the sole source model.

8.2.7.1 Planning issues

While the route for Stage 2A does not enter the Parliamentary Zone and therefore is not subject to the same breadth of planning processes as Stage 2B to Woden, there remains substantial planning risks that must be negotiated before contracting with Canberra Metro.

The following is an outline of the planning risks associated with the route that may drive selection of a specified delivery model:

- The Project travels through 'Designated Land' and as such it requires an NCA Works Approval. As the City to Gungahlin project was subject to the same planning approval regime, Canberra Metro and the Territory have a good understanding of the requirements which provides greater certainty around timing and the scope of effort required. However, there remains uncertainty about the NCA's ultimate requirements until Works Approval is granted. There is a risk that the NCA may require more extensive designs than anticipated for Works Approval which could delay, add cost and increase uncertainty for the Project. The ACT Government will seek to determine the NCA's requirements before entering into agreements with Canberra Metro.

- The raising of London Circuit at Commonwealth Avenue project (if approved) presents planning issues for the Project:
 1. Should the London Circuit project be approved, it is anticipated that it may delay the final design and construction timeline of the Project as the projects have a direct physical interface and therefore construction requires sequencing. This Business Case assumes London Circuit is raised (although approval is sought as part of a separate Business Case);
 2. The complexity of the Project's design could increase; and
 3. The NCA has an interest in the outcomes of the London Circuit project as it interacts with their long term plans for the area and therefore may add conditions to Project approvals accordingly.

The risk associated with planning approvals for the Project is significant. Based on current market circumstances and market sounding feedback, it is desirable that contracts be entered into for the Project once greater certainty around the likely outcome of the Commonwealth approvals process has been obtained. Major Projects Canberra does not currently recommend entering into a project for the main works until greater certainty is achieved around likely Commonwealth planning process outcomes.

It is almost certain that the private sector would not bear substantial planning risk under any contracting arrangement. Consequently, while planning risks are generally not perceived to be as severe for the Project when compared to the Stage 2B route alignment, the ACT Government will need to gain greater certainty on these matters before finalising a proposed delivery model.

The ACT Government proposes to continue discussions with the NCA to understand the planning requirements for the Project and to determine the level of design required to achieve approval. The outcome of this process will drive the level of input required from Canberra Metro in the planning process. If more detailed or broader (outside of the construction area) designs are required there may be a need to engage Canberra Metro earlier and more extensively in the design process.

In any event, the recommended delivery model to be pursued includes an 'Early Contractor Involvement' contract on a sole source basis with Canberra Metro in connection with Stage 2A. This will cover the period between this Business Case and the submission of a proposal for the main Stage 2A works by Canberra Metro.

This 'Early Contractor Involvement' approach will enable development of Stage 2A to continue while Canberra Metro prepares its proposal, including the progression of planning approvals. It will also establish a framework which will facilitate the achievement of a value for money outcome

8.2.8 Market sounding validation

Market sounding was undertaken for the City to Woden Light Rail project with light rail operators, constructors and LRV suppliers. While this focused on the entire City to Woden Light Rail alignment, the key areas considered around augmentation and market capacity remain relevant and can help guide the commercial structuring for the Project.

The purpose of the market sounding was to:

- Test the market appetite for participating in a tender process for different components of the City to Woden Light Rail and directly discuss the potential impact that the incumbent consortium may have on the procurement;
- Understand how the relationship with the incumbent could be managed during a competitive tender process;
- Receive initial market advice on the technical aspects of City to Woden Light Rail and how the interface risks with the existing network could be mitigated;
- Inform the development of commercial principles for City to Woden Light Rail; and
- Receive initial industry input on potential packaging and procurement options.

Key discussion points with respect to the delivery model, risks, costs, commercial principles and procurement process are summarised below.

8.2.8.1 Delivery model

- An important consideration in selecting the appropriate delivery model was the management of the interface with Canberra Metro who will operate and maintain City to Gungahlin Light Rail for 20 years under the existing Project Agreement;
- In general, a standalone PPP for an extension, while possible, was not the preferred delivery model approach for parties other than Canberra Metro, given the significant interface with City to Gungahlin Light Rail and likely impact on customer experience;

- Market participants believed that the interface between Canberra Metro and a different O&M provider for an extension would have significant challenges and multiple operators was not recommended given the increased network costs caused by duplication of functions (e.g. depots, control systems and associated overheads); and
- An integrated D&C package was preferred over separate civil works packages to minimise interface and timing risks.

8.2.8.2 Key risks, costs and commercial principles

- In the event of a separate D&C package, a detailed interface agreement between the O&M and D&C contractors would be required to ensure that the obligations of both parties are clearly articulated and agreed;
- To ensure seamless network integration and a consistent customer experience between City to Gungahlin Light Rail and the extension, design specifications would be required for a number of design elements, such as systems infrastructure and stops; and
- The JSC inquiry recommended that light rail be wire-free along certain sections of the Stage 2A and Stage 2B alignment, and the Commonwealth Government agreed with this recommendation. As such, there is a risk that wire-free running will be a planning condition of the Project. If wire-free running is required, it may be a constraining factor as there is currently limited local and international wire-free running experience. All LRV operators included in the market sounding have existing wire-free capabilities or are in the final stages of developing and deploying these technologies – but not all have hybrid technology that could run both wire-free and wired technology on the one alignment. Battery and super capacitor LRV technologies are expected to continue to develop over time. Note: technology is likely to have advanced materially in the period since this market sounding was undertaken so this view should be retested with the market if an investment decision is made.

8.2.8.3 Procurement

- Industry participants expressed some interest in possibly bidding for packages in an extension to the network. However, the industry noted that the level of competitive advantage held by Canberra Metro for both the D&C and O&M packages is a significant constraint on industry participation and as a result, a competitive procurement process would need to encourage participation through a range of means including a transparent shortlisting process and open interaction with the Territory throughout the procurement process. Informally, certain potential participants have indicated they would not participate in a procurement process given the competitive advantage held by Canberra Metro and the glut of infrastructure work in the Australian market at present;
- Regarding the O&M package, there was limited interest from light rail operators noting that an incumbent exists for City to Gungahlin Light Rail and it was unlikely that a dual operator network would be feasible;
- D&C market participants indicated a possible interest in considering participation in a competitive D&C tender. However, this was caveated on the basis that the process was communicated to the market in a transparent manner and there were adequate controls in place should John Holland and CPB be participating as part of the procurement team (as members of the Canberra Metro consortium);
- Furthermore, market capacity may be constrained by other significant infrastructure projects which are expected to be in procurement and construction at the same time as the expansion. Participants indicated that there are capacity constraints on the east coast and competition for similar projects whose procurement processes will occur simultaneously with expansion's development. The massive number of transport infrastructure projects currently active in Australia is shown in Figure 8-3.

- ### 8.3 Recommended delivery model

- An 'Early Contractor Involvement' contract on a sole source basis with Canberra Metro in connection with Stage 2A. This will cover the period between this Business Case and the submission of a proposal for the main Stage 2A works by Canberra Metro. This 'Early Contractor Involvement' approach will enable development of Stage 2A to continue while Canberra Metro prepares its proposal. It will also establish a framework which will facilitate the achievement of a value for money outcome

- Procurement of a contract for the Project's main works through a sole source negotiation with Canberra Metro. This will, at a minimum, include an integrated package consisting of the design, construction, operations and maintenance of the Project. The entry into a contract for the Stage 2A main works will come at the conclusion of the Stage 2A 'Early Contractor Involvement' process.

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This recommended sole source approach provides the most sound basis to manage interface risks for the D&C and O&M packages and maintains continuity of service quality and design between City to Gungahlin Light Rail and the Project under a single operator model that will provide a single seat journey between Gungahlin and Commonwealth Park. This approach is also likely to somewhat alleviate the risk of inadequate market participation caused by capacity constraints on the east coast of Australia, particularly given the Project's scale and Canberra Metro's strong position as the incumbent operator.

A robust framework will be established (as described below) to ensure value for money,

8.4 Commercial principles

A preliminary set of commercial principles has been formulated to support the Business Case and the initial commercial framework for the procurement phase of the Project. These the Project commercial principles have been prepared based on an integrated delivery model for DCMO and where possible, are based on City to Gungahlin Light Rail principles. An overriding commercial principle of the Project has been to maintain positions from City to Gungahlin Light Rail.

Table 8-7: Commercial principles for discussions with Canberra Metro

Commercial Principle	Approach
City to Woden Light Rail PPP Principles	
Performance regime between City to Gungahlin Light Rail and the Project	<ul style="list-style-type: none"> As outlined in Section 8.2.5, the Territory's customer experience objectives support a single operator for the whole City to Gungahlin Light Rail and City to Commonwealth Park alignment; The single operator should be subject to a consistent performance regime between City to Gungahlin Light Rail and City to Commonwealth Park; and This position will be subject to negotiation with Canberra Metro.
O&M risk profile and structure of the overall performance regime	<ul style="list-style-type: none"> Canberra Metro is required to take O&M risk for City to Commonwealth Park with the overall position for the combined City to

Commercial Principle	Approach
	<p>Gungahlin Light Rail and City to Commonwealth Park to be no worse than City to Gungahlin Light Rail;</p> <ul style="list-style-type: none"> City to Gungahlin Light Rail performance regime principles include: <ul style="list-style-type: none"> A base service payment for O&M, debt payments (if relevant), equity distributions (if relevant), energy, additional and special event services; and An abatement regime comprising an availability and on-time running adjustment and a service quality regime supported by KPIs. This regime is to be maintained for City to Commonwealth Park; and This position will be subject to negotiation with Canberra Metro.
Interface between City to Gungahlin Light Rail and City to Commonwealth Park – physical, operational and maintenance related	<ul style="list-style-type: none"> All operating period interfaces between City to Gungahlin Light Rail and City to Commonwealth Park are to be managed by Canberra Metro with minimal input with the Territory.
Accreditation	<ul style="list-style-type: none"> Canberra Metro will be an accredited Rail Transport Operator for commissioning, maintenance & operation.
Term	<ul style="list-style-type: none"> City to Commonwealth Park operating term concludes at the end of the existing City to Gungahlin Light Rail term; Concurrency of the conclusion of City to Gungahlin Light Rail and City to Commonwealth Park terms and lifecycle costs is considered to be the most important consideration for the Commonwealth Park term; No compelling reason to shorten the overall term for City to Gungahlin Light Rail has been identified, due to the significant impact of renegotiating the City to Gungahlin Light Rail Project Agreement and lifecycle risk implications; The proposed operations term is based on satisfying the midlife refurbishments to the City to Commonwealth Park rolling stock. All other considerations are similar to that of City to Gungahlin Light Rail (flexibility, useful asset life etc.); and There is a trade-off between the transfer of risk (increases with a longer operations period), affordability (annual availability payment decreases with a longer operations period), whole of life costs (increases with a longer operations period) and Territory flexibility for current and future stages (decreases with a longer operations period).
Performance relief for City to Gungahlin Light Rail due to the Project D&C	<ul style="list-style-type: none"> Canberra Metro to manage the interface between City to Gungahlin Light Rail operations and City to Commonwealth Park during construction and into the operations phase so as to minimise impact on the City to Gungahlin Light Rail performance; and Relief will only be allowed in limited circumstances.
O&M requirements and interface agreement	<ul style="list-style-type: none"> O&M requirements to be included in any competitively tendered D&C Briefs for the RFT.
Canberra Metro required to demonstrate Value for Money to the Territory	

Commercial Principle	Approach
Integration with a future Commonwealth Park to Woden stage	<ul style="list-style-type: none"> • Canberra Metro to be responsible for whole of corridor integration and risk – this could be captured in the commercial framework for the City to Commonwealth Park project; • Technical future proofing should be accompanied by commercial future proofing through a robust augmentation regime contemplating the extension to Woden; and • Consideration of a process for design integration between City to Commonwealth Park and the extension to Woden.

8.5 Value for money framework

The Territory intends that a robust and documented framework will govern the procurement process for the Project to ensure that value for money is achieved.

The value for money framework will contain the following elements:

9.0 Project governance

Key messages

- The Project will be procured and delivered by Major Projects Canberra in consultation with other relevant stakeholders, including the Transport Canberra and City Services Directorate, the Environmental Planning and Sustainable Development Directorate, and the City Renewal Authority.
- Once delivered, the management of the operations of the Project will revert to Transport Canberra and City Services.
- It is anticipated that a consistent governance framework will be used to oversee the delivery of Stage 2B to Woden.
- Governance arrangements are indicative and subject to change following further consideration by Cabinet.

9.1 Governance structure

The Project will be procured and delivered by Major Projects Canberra in consultation with other relevant stakeholders, including the Transport Canberra and City Services Directorate, the Environment, Planning and Sustainable Development Directorate, and the City Renewal Authority. Once delivered, the management of the operations of the Project will revert to the Transport Canberra and City Services Directorate.

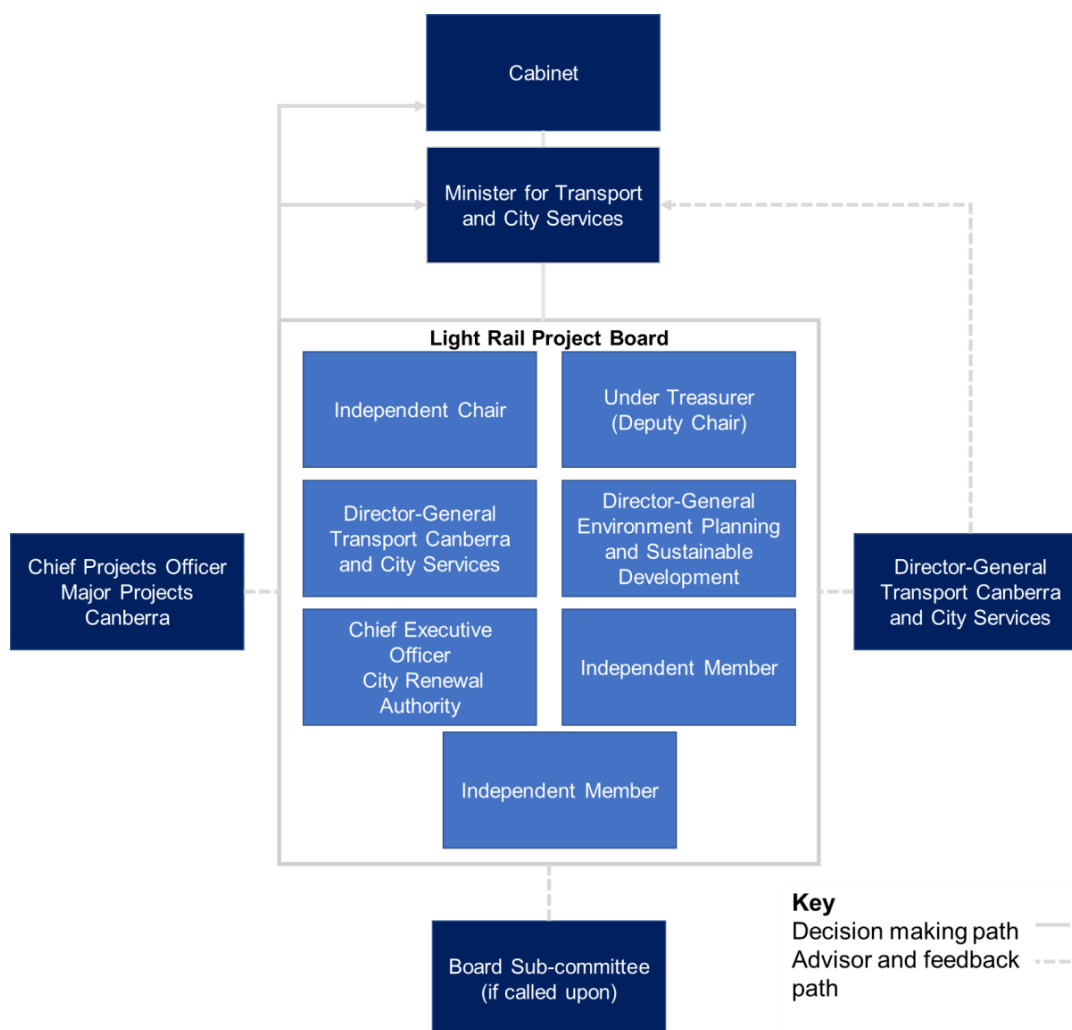
It is anticipated that a consistent governance framework will be used to oversee the delivery of Stage 2B to Woden.

The Project will operate within a governance framework which includes a Light Rail Project Board with independent members, as well as representation from key ACT Government Directorates.

Within Major Projects Canberra, the Project team will report to the Project Director who will in turn report to the Chief Projects Officer. Ministerial responsibility for the Project will be with the Minister for Transport and City Services.

Figure 9-1 provides a high-level overview of the governance structure for the Project. However, these governance arrangements are subject to future decisions of Cabinet.

Figure 9-1: The Project's governance structure



9.2 Key roles and responsibilities

9.2.1 Organisational representation

The governance structure developed ensures adequate ACT Government directorate representation through the Light Rail Project Board which will include independent members. The Project Board will consist of members from relevant ACT Government directorates including:

1. Chief Minister, Treasury and Economic Development Directorate
2. Transport Canberra and City Services
3. City Renewal Authority
4. Environment, Planning and Sustainable Development Directorate
5. Justice and Community Safety Directorate

In addition to this, the Project Team may also include individuals from the above noted directorates.

9.2.2 Key groups

Each of the key groups involved in the Project have different responsibilities as outlined below.

Cabinet

Cabinet, or any established Cabinet Subcommittee, is the peak decision-making body for the Project, including the decision (or otherwise) to proceed with the Project.

Generally, matters to be escalated to this group for approval include:

- Global capital and operational expenditure cost estimates;
- Design, delivery strategy and Business Case;
- Funding and value capture strategy;
- Project objectives and plan;
- Governance Framework;
- Cross-government coordination issues (in circumstances of unresolved issues at the Project Board level); and
- Risk oversight.

Project Board

The Project Board provides strategic direction and advice to key Project personnel, including the Chief Projects Officer, Project Director and project team.

Major responsibilities of the Project Board include:

- Strategy formulation;
- Endorsements of approvals to be referred to Cabinet;
- Monitoring the Project Team's performance;
- Risk oversight;
- Compliance with relevant legislation and the Territory's policies; and
- Communicating with key strategic stakeholder groups.

Chief Projects Officer

The Chief Projects Officer is accountable for all activities of the Major Projects Canberra Project Team. The Chief Projects Officer is a key interface point between all key decision makers (including the Project Board and Minister), and a key interface between the directorate, and community stakeholders.

Project Director

The Project Director, reporting to the Chief Projects Officer, leads the project team and directs and manages the delivery of the Project to meet the ACT Government's objectives. The Project Director represents the project team and is a common link between the Project, the City to Woden Light Rail project and the existing light rail network. The Project Director's responsibilities are to:

- Direct and manage the delivery of the Project in accordance with the Project plan to meet the Project objectives;
- Attend and participate in Project Board meetings;
- Establish Working Group(s);
- Keep the Chief Projects Officer and Project Board informed of key issues and risks;
- Take accountability for the Project's Business Case and all other key documents; and
- Oversee the Project budget.

Project Team

The Project Team focuses primarily on the day-to-day management and operations of the Project. Members are responsible for delivering the Project according to its vision under the direction of the Project Director. They are involved in the detailed outcomes of the Project. A Probity Advisor will also be appointed to assist during the procurement process as needed. The project team's major responsibilities include:

- Implementing the Project Plan;
- Identifying, discussing and escalating strategically important issues and risks to the Project Director, Chief Projects Officer and Project Board;
- Managing the preparation of Project Board papers and material; and
- Endorsing the Monthly Report for escalation to the Project Board for approval.

9.3 Benefits Realisation Plan

Noting the findings and recommendations of the Auditor-General's performance audit into Light Rail Stage 1,¹¹⁴ a Benefits Realisation Plan is proposed to be developed for the Project. The Benefits Realisation Plan will be managed by ACT Treasury in consideration of the existing City to Gungahlin Light Rail Benefits Realisation Plan to ensure that a coordinated and consistent approach is adopted.

The Project Benefits Realisation Plan will include the following activities:

- The Project Board will monitor and consider progress throughout the Project lifecycle, or as requested by the Board or Cabinet;
- ACT Treasury will be responsible for collating reports on benefits realisation for the Project Board and providing feedback to responsible agencies on the outcomes of the Project Board's consideration of reports;
- Responsible agencies will provide the following information on both business changes and performance metrics:
 - Progress on business changes;
 - Progress on benefits realisation; and
 - Any updates or revisions required to the Benefits Realisation Plan; and
- Updates or revisions to the Benefits Realisation Plan can be made at any time with agreement of the Project Board.

¹¹⁴ ACT Audit Office, 'Initiation of the Light Rail Project: Report No. 5 / 2016', https://www.audit.act.gov.au/_data/assets/pdf_file/0007/1179943/Report-No.-5-of-2016-Initiation-of-the-Light-Rail-Project.pdf, 2016

10.0 Stakeholder management

Key messages

- The Project will be delivered in a collaborative and consultative way. Given the Project will be co-delivered with the raising of London Circuit (if approved) and noting the range of other proximate projects in the city, coordination of engagement activities will occur with the Environmental, Planning and Sustainable Development Directorate and the City Renewal Authority.
- Consultation has already occurred with the community and key stakeholders on the light rail network and the extension of light rail south to Woden, though substantial ongoing consultation will be required through the Project's procurement and delivery phase. Consultation will focus on the extension to Commonwealth Park as the first component of light rail to be delivered between the City and Woden.
- The communications and consultation approach outlined in this Chapter is founded on the principle that regular engagement will deliver key Project benefits. Further, the approach supports the ACT Government priorities for "enhancing liveability and social inclusion" and "suburban renewal and better transport".
- The Project has a significant number of stakeholders ranging from the Canberra community, Commonwealth agencies and commercial organisations, through to small businesses, residents, unions and public transport customers. A tailored communications and stakeholder engagement approach will be critical to the Project's success, adopting the right mix of engagement techniques across both the delivery and operations phases.
- Given the large number of transport, land development and urban renewal projects in planning or delivery around the route alignment, coordination, collaboration and integration of all stakeholder and community engagement activities is critical to ensure consistent and clear messaging. It may also produce efficiencies for the ACT Government in the delivery of communications activities.

10.1 Our Stakeholders

10.1.1 Our customers

As a city-shaping project for Canberra, the Project will be of interest to all Canberrans – whether they use the light rail network every day, or only occasionally to attend and/or organise special events, such as at Canberra Theatre or in Commonwealth Park. The ACT Government will actively engage with all Canberrans to ensure that the community's views are taken into consideration during the Project's phases, including design development, construction and operations.

A wide range of customers will use the Canberra light rail network from the City to Commonwealth Park including shoppers, young travellers, tertiary students, the elderly, night-time travellers, peak commuters, tourists, business travellers and event attendees.

The ACT Government has adopted a 'customer centric approach' to provide Canberrans with an attractive, convenient, efficient and reliable integrated public transport system.

Key issues for stakeholder engagement

Addressing the following key issues will be vital to the ACT Government's stakeholder engagement strategy:

- Close consultation with Canberrans, particularly those that live, work or study along the corridor in New Acton and City West. Examples include local business patrons, public sector and private employees, and ANU students.
- Internal consultation within ACT Government to maximise synergies with other projects, such as the Acton Waterfront and City Hill development plans;
- Collaboration with Government stakeholders to manage traffic impacts during the Project's development, particularly in light of the large number of projects planned along the route alignment, and ensuring the community is advised of any proposed road closures or diversions;
- Keeping Canberrans informed of progress towards the further extension from Commonwealth Park to Woden;
- Ongoing engagement with Canberra Metro to ensure that the ACT Government's customer objectives are met for the light rail network; and
- Maintaining a dialogue with the NCA, particularly given Works Approvals will be required as the route traverses NCA 'Designated Area'.

Accordingly, the Project is guided by the same customer principles as those of the City to Gungahlin Light Rail:

- **Simplicity:** a simple to understand, use, find and interpret service;
- **Convenience:** a convenient service that offers suitable hours of operation, destinations that make sense, links to other modes of transport, accessibility and bike transport;
- **Smart:** smart access to information about my journey time and service, that is intuitive and easy to stay connected;
- **Seamless:** a seamless experience between the start of my journey through my destination and across the whole light rail network; and
- **Modern:** a service that is modern, professional and contributes to Canberra's positive image.

These customer principles will underpin the operation of the light rail network, supporting broader public transport customer objectives such as reliability, safety, personal security, frequency and efficient journey time.

Establishing good relationships with stakeholders, customers and the community will provide opportunities for Canberrans to have input into shaping key aspects of the Project and to understand its benefits, both in terms of improved public transport accessibility and its contribution to urban revitalisation.

10.1.2 External stakeholders

The external stakeholder landscape is diverse and broad. For instance, between 8,000 and 14,000 stakeholders are estimated to be directly impacted during the construction phases of Stages 2A and 2B – inclusive of businesses, residents and commuters. In addition to the local community, key external stakeholder groups for the Project include:

- Community councils and resident associations;
- Local businesses;
- Unions;
- Community groups and peak organisations;
- Event organisers and tourist groups;
- Regulatory and approval authorities;
- Educational institutions, including the Australian National University; and
- The Commonwealth Government and its agencies, including the NCA. The importance of collaboration with the Commonwealth Government, including the NCA, cannot be overstated.

To address the views of the external stakeholder audience, a Community Engagement Strategy will be developed for the Project to ensure that the Territory's consultation objectives are achieved.

Given the broad range of stakeholders likely to be interested and / or impacted by the Project, an assessment of the appropriate engagement strategy for each phase of consultation will be undertaken. It is recognised that stakeholders and their interests will vary at different phases of the Project's development. Some of the stakeholders will maintain an interest throughout all phases of planning, construction and operation, while others may only have an interest at specific times.

Importantly, the Community Engagement Strategy will set out a detailed account of the proposed engagement and reporting methods for all external stakeholders – arranged by demographic group.

10.1.3 Internal stakeholders

There are a wide range of internal stakeholders for the Project, including Cabinet and many other ACT Government Directorates and agencies such as:

- Chief Minister, Treasury and Economic Development Directorate;
- Major Projects Canberra;
- Transport Canberra and City Services;
- City Renewal Authority;
- Environment, Planning and Sustainable Development Directorate; and
- Education and Training Directorate

Internally within the ACT Government, the Project either impacts or interests every ACT Government Directorate. Accordingly, Cabinet and all ACT Government Directorates have been consulted in the development of this Business Case, and in relation to the Project more generally.

The ACT Government has ongoing forums through which it will maintain a continuous dialogue between internal stakeholders throughout the Project's development, including the Project Board and other formal and informal arrangements.

10.2 Communication and consultation

10.2.1 Communication objectives

The communications approach applied will be multifaceted, open and inclusive. Major Projects Canberra will be responsible for delivering all communications and engagement activities during the procurement and delivery phase. Transport Canberra and City Services will have responsibility for communications activities during the ongoing operational phase.

The overarching communications and engagement objective is:

"To effectively gather, acknowledge, analyse and mitigate community and stakeholder insights, views, experiences and opinions related to the Project"

The communication objectives for the Project are as follows:

- To effectively engage with ACT Government stakeholders, ensuring that they are informed and involved as the Project develops;
- To develop the ACT Government's capacity and capability to undertake effective communication and engagement activities for major transport infrastructure projects;
- To actively create momentum for the Project with key stakeholders and the broader Canberra community through accessible, informative, innovative and clear communications and engagement activities; and
- To provide effective communications and engagement support that strongly positions the Project at key decision-making points and during the formal approval process period.

10.2.2 Communications approach

The communications approach has been informed through extensive internal consultation and through the experiences from the delivery of City to Gungahlin Light Rail, consultation on the new bus network, internal

precinct review processes, piloting of engagement methods in 2018, research by the Next Engagement Project¹¹⁵ and learnings from other jurisdictions where major infrastructure projects are being delivered.

The objectives outlined in Section 10.2.1 align with the ACT Government's commitment to engaging effectively with its citizens as outlined in *Engaging Canberrans: A guide to community engagement*. The Guide identifies five key principles to inform engagement practice:

1. **Careful Planning and Preparation** – through adequate and inclusive planning, ensure that the design, organisation and convening of the process serve both a clearly designed purpose and the needs of participants. Tailor the approach to fit the target group. Integrate online engagement and other social media with traditional methods;
2. **Inclusion and Demographic Diversity** – equitably incorporate a diversity of people, voices, ideas and information to lay the groundwork for quality outcomes and demographic legitimacy;
3. **Collaboration and Shared Purpose** – support and encourage participants, government and community groups, and others to work together to advance engagement goals;
4. **Openness and Learning** – help all involved to listen to each other, explore new ideas unconstrained by predetermined outcomes, learn and apply information in ways that generate new options, and rigorously evaluate community engagement activities for effectiveness; and
5. **Transparency and Trust** – be clear and open about the process and its objectives, and how it will feed into decisions or government actions, provide a community record of the organisers, sponsors, outcomes and a range of views and ideas expressed, and feedback to participants.

Given the large number of transport, land development and urban renewal projects in planning or delivery around the route alignment, coordination, collaboration and integration of all stakeholder and community engagement activities is critical to ensure consistent and clear messaging. It may also produce efficiencies for the ACT Government in the delivery of communications activities.

A Communications and Engagement Team will oversee the implementation of the Community Engagement Strategy. This team will be responsible for the overall management and coordination of community information, involvement and face-to-face interaction.

10.2.3 Consultation methods

The community will be able to provide ongoing feedback throughout the Project's development. A variety of different consultation methods will be used, including:

- **Face-to-face engagement activities** – shopfront walks, drop in sessions, market stalls, roundtable meetings and community presentations;
- **Market research, advertising and mass communications activities** – brochures and newsletters distributed at market stalls and the Your Say website;
- **Social media** – Twitter and Facebook;
- **Website and collateral development** – Your Say website and surveys; and
- **Media and public relations activities described.**

A wide range of internal consultation methods will also be utilised for the Project. Methods include Ministerial and Executive briefings; staff awareness tours; working groups; workshops; intranet articles and whole-of-government messages.

¹¹⁵ The Next Engagement Project was undertaken by the Australian National University

10.2.4 Consultation undertaken to date

In October 2015, the ACT Government released its Light Rail Plan in which it outlined seven new route alignments to be built over a 25 year period, including the City to Woden corridor. The Project, from Alinga Street to Commonwealth Park, represents the northern portion of the corridor and the initial stage in extending light rail to Woden. The public were invited to submit comments on the plan by December 2015, helping to select the City to Woden route as the next stage of the network to be developed.

Initial consultation on City to Woden Light Rail's design principles, landscape strategy, route alignment, stop locations and items of community or environmental interest occurred in May and June 2017. The community consultation resulted in more than 10,000 individual interactions, ranging from seeking information from the website to in-depth stakeholder discussions. The potential stops in the Project, as part of the full route alignment, were considered during these consultations and have informed the Project's ongoing development.

A summary of the activity after the six-week public consultation period is provided in the table below.

Table 10-1: Summary of six-week consultation activity

Consultation activity	Interactions
Face-to-face consultation	Spoke to 587 individuals
Shopfront walks	7 completed
Roundtable meetings (Community and Business)	3 held with 33 attendees
Presentations to Community Councils/Events	4 held with 146 attendees
Drop in sessions	4 held with 24 attendees
Market stalls	7 held with 384 individual consultations
Brochures and Newsletters distributed	2,990 distributed
Visits to the Your Say website	4,772 visits
Online surveys	1,364 completed
E-mails	150 e-mails sent to organisations and schools
Verbate	1 video contribution
Online interaction map	1,704 visits and 339 contributions
Visioner questionnaire	71 contributions
Twitter	21 tweets with 17,016 impressions
Facebook posts	5 with 22 shares and a reach of 22,381
Media mentions (print, online, radio and television)	63
Written feedback submissions	Received 1,796 items of written feedback

On 10 May 2018, the JSC agreed to inquire and report on Commonwealth and Parliamentary approvals for the City to Woden Light Rail. The JSC accepted written submissions, addressing one or more of the Terms of Reference, which are outlined in Section 2.4.3. The JSC also conducted public hearings on 21 June 2018, 28 June 2018 and 16 August 2018, which heard from 25 witnesses, to gather evidence from stakeholders on one or more of the Terms of Reference.

The JSC received 43 submissions, 11 supplementary submissions and two exhibits. The submissions made included those from:

- Members of the public;

- Commonwealth Government (Department of Infrastructure, Regional Development and Cities, Department of Parliamentary Services, Department of Environment and Energy, NCA, Productivity Commission);
- Local Community Councils and resident's groups (Inner South Canberra Community Council, Kingston and Barton Residents' Group);
- Other organisations (Australasian Railway Association, Canberra Business Chamber, University of Canberra, Australian Institute of Architects, Smart Canberra Transport, Lake Burley Griffin Guardians, Public Transport Association of Canberra, Property Council of Australia, Planning Institute of Australia); and
- ACT Government

The JSC's report presented several recommendations for City to Woden Light Rail which were agreed, or agreed in principle by the Commonwealth Government. Where relevant, these have informed the development of the Project as outlined in Section 2.4.3.

11.0 Advisor engagement plan

Key messages

- A variety of external advisors have been appointed in accordance with ACT Government processes to assist the Territory to develop the Project.
- The expertise and support required from advisors will change as the Project progresses and the Territory's needs change.

11.1 Proposed advisor roles

A variety of external advisors are anticipated to be appointed to assist in the development of various elements of the Project. Transport Canberra and City Services has previously worked with Shared Services Procurement (SSP) on advisor engagement matters in accordance with relevant procurement guidelines.

Transport Canberra and City Services appointed a series of advisors to assist in the preparation of this Business Case and provide advice to support Cabinet's deliberations on whether to proceed with the Project. These advisors include:

- Commercial and economics;
- Legal and probity;
- Technical;
- Cost estimation;
- Communications;
- Strategic, meso and micro transport modelling; and
- Public transport integration.

Ongoing engagement of advisors will be dependent upon future ACT Government decisions regarding the progression (or otherwise) of the Project.

A list of key external advisory mandates that may be required for the Project are outlined in Table 11-1. It is noted that this list of advisors is indicative and is likely to change as the Project progresses from the Business Case stage, through to procurement, construction and operations.

11.1.1 Key external advisors

Table 11-1: Key external advisors

Key advisory mandates	Potential scope of engagement
Strategic governance, Project management and advisory support	<p>Project management services may include:</p> <ul style="list-style-type: none">• Planning and scheduling for major infrastructure and complex engineering procurements;• Provision of expert assistance on Project risk assessment, Project controls and assurance;• Advice on the preparation of documentation and / or review and clearance processes; and

Key advisory mandates	Potential scope of engagement
	<ul style="list-style-type: none"> Governance and construction surveillance services, including bid transactions processes and ICT security and data room management.
Commercial and financial	<p>Commercial and financial services may include:</p> <ul style="list-style-type: none"> Commercial advice; and Project procurement and negotiation assistance.
Technical engineering, design and planning	<p>Technical engineering, design and planning advisory services may include:</p> <ul style="list-style-type: none"> Detailed technical design of infrastructure and operating requirements; Urban design, planning, architecture and landscaping; Utilities location and geotechnical surveys; and Environmental investigations and studies and arboriculture.
Legal	<p>Legal advisory services may include:</p> <ul style="list-style-type: none"> Project procurement assistance, including drafting and negotiation of Project documentation; Legislative requirements such as planning and environmental approvals; and Probity advice.
Cost estimating	<p>Cost estimation advice may include the provision of cost estimation works for the Project's capital and operating costs.</p>
Communications, consultation and strategic relations	<p>Communications, consultation and strategic relations services may include:</p> <ul style="list-style-type: none"> Community engagement planning and ongoing consultation on various Project aspects; Preparation of Project communications materials and reports; and Advice, coordination and advocacy with respect to the Commonwealth Government, its departments, agencies and authorities.
Operations planning and management	<p>Operations planning and management advisory services may include:</p> <ul style="list-style-type: none"> Rail systems requirements; Systems implementation and integration; Rolling stock and systems procurement and maintenance; Network operations, planning and crewing; and Stop and depot management.

If the ACT Government proceeds with the Project, additional specialist advisory services may be required in addition to those outlined in the table above.

12.0 Timeline

Key messages

- All dates listed in this Business Case are indicative and subject to a number of factors, including Cabinet decisions regarding this Business Case.
- Contract award for the main works design and construction activities anticipated to occur in mid 2020.
- The Project is currently expected be operational in 2024.
- Indicative timing described herein is based upon the definition design and assumptions on construction methodology.
- Actual timing shall be subject to the length of the approvals process, completion of the procurement process and the realisation (or otherwise) of planning and other risks, and Government decisions on related projects.

12.1 Project timeline

12.1.1 Overview

Key indicative Project milestones (assuming London Circuit is raised) are outlined in Table 12-1. These indicative milestones are subject to substantial change, particularly if (i) complications arise in raising London Circuit (if approved) (ii) planning approvals necessitate wire-free running, or (iii) unexpected Commonwealth Government impediments arise.

Table 12-1: Key indicative Project milestones (assuming London Circuit is raised)

Milestone	Anticipated Timeline
Approvals processes (Works Approval, Development Approval and environmental)	Mid-2019 – mid-2020
Early contractor involvement process	Mid-2019 – mid-2020
Main package contract award	Mid-2020
Design and construction	Mid-2020 – 2023 / 2024
Commissioning	Late 2023 / 2024
Operations commencement	2024
Stage 2B ongoing design and planning activities	2019 – until the time of Commonwealth approval

12.1.2 Approvals

The Project will require a series of approvals in order to proceed to the construction phase. These include:

- **Environmental approval:** a draft Environmental Impact Statement (EIS) will be required;
- **Works Approval:** similar to City to Gungahlin Light Rail, the route alignment traverses 'Designated Areas' and as such will require Works Approval from the NCA; and
- **Development Approval:** in line with legislative requirements, Development Approval will be required from EPSDD

These approvals will be progressed in line with the timeline outlined above.

12.1.3 Procurement Phase

The procurement phase timelines outlined above are based on the delivery of the Project through a sole source negotiation with Canberra Metro.

12.1.4 Delivery phase

The overall duration of the construction phase is indicatively expected to be approximately three and a half to four years in duration for the main works package from contract award to the commencement of operations. This leads to an expected start date for operations in 2024.

This estimate is based on the assumption that the London Circuit and Commonwealth Avenue Project proceeds (although approval for that project is sought as part of a separate Business Case).

12.1.5 Timeline flexibility and constraints

The timeline outlined above may be impacted by a number of factors, including:

- Government decisions regarding this Business Case and the delivery of the Project more generally;
- Delays in planning and environmental approvals;
- Government decisions and construction timing on other related projects, such as the raising of London Circuit at Commonwealth Avenue; and
- All other risk factors identified elsewhere in this Business Case.

Assumptions book

Economic values

Valuation year and discount rate

Table 2 Discount and inflation rates

Parameter	Value
Discount rate	7.0%
Inflation	2.5%

Table 3 Appraisal parameters

Parameter	Year
First year of the appraisal period	2019 financial year
Dollar terms	2019 financial year
Operation	2024 financial year as per construction profile
Appraisal period	30 years
Appraisal end year	2054 financial year for Stage 2A analysis and 2055 financial year for City to Woden analysis
Annualisation factor volume – roads	345 days per year
Annualisation factor volume – public transport	300 days per year
Annualisation factor cost – car	336 per year
Annualisation factor cost – public transport	292 per year

Escalation year

Table 4 Escalation years

Parameter	Year
Travel time savings – public transport	2018
Travel time savings – cars	2018
Travel time savings – light commercial vehicles	2018
Travel time savings – heavy commercial vehicles	2018
Reliability benefits – all types	2018
Vehicle operating costs – resource	2007
Vehicle operating costs – fuel	2008
Health benefits	2018
Accident – car	2018

Parameter	Year
Accident – bus	2018
Public transport revenue	2008
Externalities – cars	2018
Externalities – public transport	2018
Wider economic impacts	2017
Infrastructure cost savings	2015
Bus operating cost savings	2018

Travel time

Table 5 Travel modes (assumed occupancy per vehicle of 1)

Main mode	2018 value (\$)
Car	16.89 per person
Light commercial vehicle	29.21 per person
Heavy commercial vehicle	58.17 per person

Table 6 Value of time per person hour

Parameter	2018 value (\$)
Business value of time	54.78
Private value of time	16.89

Vehicle operating costs

Table 7 Public transport operating costs

Bus	2018
Cost per bus km	\$1.65
Cost per bus hour	\$53.32
Assumed average speed	30 km/h

Externality impacts

Table 8 Externality benefits (2018 value, cents per km)

Main mode	Car	Light commercial vehicles	Heavy commercial vehicles	Bus	Light rail
Air pollution	3.30	8.02	28.41	37.15	40.63

Main mode	Car	Light commercial vehicles	Heavy commercial vehicles	Bus	Light rail
Greenhouse emissions	2.60	2.50	6.33	15.31	32.07
Noise	1.08	1.37	4.74	2.60	-
Water	0.50	1.20	4.26	5.57	-
Nature and landscape	0.06	0.89	0.46	0.17	-
Urban separation	0.76	1.31	3.16	2.46	-
Total	8.30	15.28	47.37	63.26	72.70

Accident

Table 9 Accident cost (\$/vehicle km travelled)

Accident cost	2018 value
Bus	0.01

Health benefits

Table 10 Health benefit of active transport per km

Main mode	2018 value
Walking	1.79
Cycling	1.19

Table 11 Average km per trip

Main mode	2016 value
Walk access to walk egress	1.00
Car access to walk egress	0.50
Walk access to car egress	0.50

Light rail amenity benefit

Table 12 Light rail amenity improvement

Improvement value	Value
Improvement value	10%

Infrastructure efficiency benefits

Table 13 Infrastructure efficiency benefits

Density	\$/dwelling
Low density	110,578.00
Medium density	82,631.00
High density	54,684.00

Financial analysis cost assumptions

Key assumptions

Table 15 Key assumptions

Cashflow component	Source and notes
Model period	Approximately 18 years, with an approximate 3 year and a half year design and construction period, and an approximate 14 and a half year operating period
Other assumptions	<ul style="list-style-type: none">• Consumer Price Index (CPI) at 2.50%• Wage Price Index (WPI) at 3.50%