



Auckland
LIGHT RAIL
Bringing us closer

City Centre to Māngere Rapid Transit

Indicative Business Case

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MIHI

Ki ngā Mana Whenua, ngā mātāwaka, ngā rau rangatira mā o Tāmaki nui, o Tāmaki roa, Tāmaki Makaurau, Tēnā koutou katoa.

Ko te tuatahi e tika ana kia mihi ki te wāhi ngaro, ki ngā Atua, ki ngā mana kei tua o te pae maumahara.

Ki te Kīngi Māori a Tūheitia me tōna Whare Ariki, ngā rangatira katoa o Tāmaki herehere o ngā waka e, Paimārire ki a kātou katoa.

Ki ngā mate huhua kua hinga atu, kua hinga mai, haere atu koutou ki te mūrau o te tini, ki te wenerau o te mano. Nō reira, Moe mai rā.

Ki a tātou ngā mahuetanga o rātou mā, Tēnā koutou, Tēnā koutou katoa.

Ka tirohia e tātou te pae tawhiti, he whakairinga tūmanako mō ngā uri whakaheke,

Anei te pūrongo ‘Te Terewhiti ki Tāmaki’. Ehara tēnei i te kaupapa mō te Terewhiti anake he kaupapa ka whakarato ai ngā āheinga me ngā whiwhinga ki ngā tāngata o Tāmaki, ka mōhio whānuitia ‘He tāone taiooreore nui o te ao, ka manakohia e te iwi pūmanawa ka noho ai’

Nō reira i roto i ngā kupu tuku iho; “Ki te kāhore he whakakitenga ka ngaro te iwi.” Na Kingi Tāwhiao

Kei ngā huia kaimanawa o Tāmaki Makaurau,

Tēnā koutou, tēnā tātou katoa

To the people of the land, to the many ethnic groups, to the leaders of the vast Auckland, the far-reaching Auckland, Auckland of the multitudes - salutations to you all.

Firstly, it is right that we acknowledge the unseen world, the Gods and the powers from beyond our experience.

To the Māori King Tūheitia and his Royal household, including all the leaders of Auckland that bind the many canoes, goodwill to them all.

To the multitudes who have passed on, we farewell you, the dread of the multitude, the envy of thousands. Forever rest in peace.

To all of us left behind - greetings and salutations to you all.

We look to the future, the repository of our hopes for generations to come.

Please find that this light rail report reflects this is not just a transport project but an initiative that will provide opportunities for the people of Auckland, so Auckland will be known by all as ‘a world-class city where talent wants to be’

In conclusion, in the words handed down; “Without foresight or vision, the people will be lost.”

To all the treasured people of Auckland, greetings and salutations to you all.

INTRODUCTION

Well-functioning cities and urban areas matter a great deal to the wellbeing of New Zealanders. When cities function well, they provide greater access to and choices of housing, better protection of our natural environment and cultural values, and the provision of quality infrastructure at the right time in the right place. Well-functioning cities also provide greater choices of employment and higher wages, a wider pool of labour for firms, and more opportunities for specialisation, innovation and easier transfer of ideas – the engine of economic prosperity. Successful cities are not only places where people work; they are also attractive urban areas where people consume goods and services, play, and are creative. Such cities have areas with atmosphere and amenity. Successful New Zealand cities should also acknowledge the special relationship that Māori have with the land on which cities are built.

Productivity Commission Report into Better Urban planning – February 2017

Auckland is at a crossroads. As Auckland's population continues to grow it can continue to evolve as a well-functioning and prosperous city. But to do that more people need to live in urban areas and growth needs to be supported by fit for purpose transport infrastructure.

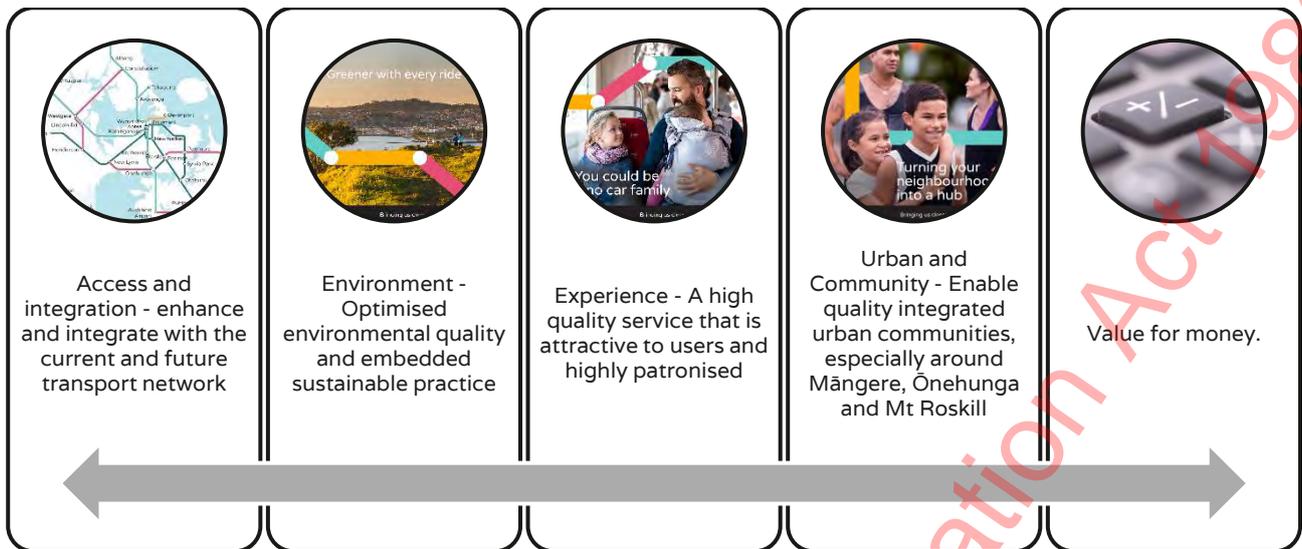
Unsupported growth will reduce quality of life, disproportionately impact disadvantaged communities, impact the economy, and threaten New Zealand's ability to reduce its carbon footprint and reduce carbon emission to meet climate change commitments.

To address these issues, Auckland must create quality compact and attractive urban places where people have less reliance on private vehicles and where a wider range of activities are able to be found close to where they live. This will build stronger communities, greater vitality, and quality compact urban form. Rapid transit (high capacity, high quality public transport) is a key enabler of that urban development.

In March 2021, the Government reaffirmed that the delivery of rapid transit investment in the city centre to Māngere (CC2M) corridor as an "important city-shaping project" was a priority.

The Government has identified the need to investigate strategic choices and trade-offs to confirm the best way forward. To do that work an Establishment unit was created to look at the case for a rapid transit solution along the CC2M corridor as *an enabler of higher density and better-quality urban development, leading to stronger communities, greater vitality, and attractive compact urban form.*

The Unit was asked to develop an Indicative Business Case (IBC) to identify a solution that would deliver the following outcomes.



This IBC:

- sets out the case for investment in rapid transit along the CC2M corridor to support sustainable, compact urban development
- explores the extent to which integrating urban interventions with rapid transit will enable better urban outcomes, which will enable further benefits from the rapid transit solution to be realised
- assesses a range of mode and route options and outlines a preferred rapid transit solution, its costs and benefits
- discusses how the Project can be delivered – by what entity (the ‘Delivery Entity’) and how strong partnerships will be key to the success of the Project. The key partners are:
 - Māori and the obligations and responsibilities of partnership, protection and participation, as well as an article-based approach under Te Tiriti o Waitangi (the Treaty of Waitangi) will guide decision-making and the way the Project works
 - partner agencies
- discusses potential funding arrangements.

A critical success factor of this investment will be achieving positive outcomes for Māori.

EXECUTIVE SUMMARY

THE CASE FOR CHANGE

Infrastructure, especially transport infrastructure, shapes cities. Auckland's existing transport arrangements along the CC2M corridor do not have the capacity and quality of service (including speed and reliability) needed to support future transport needs and support quality compact urban growth, to attract significant mode shift, and to reduce greenhouse gas (GHG) emissions.

Context

Auckland is growing rapidly and struggling to keep pace with growth in a sustainable way

Auckland is projected to account for about half of New Zealand's population growth. By 2050 Auckland could grow by another 720,000 people to be a city of 2.4 million. The scale of Auckland's growth is putting significant pressure on housing and infrastructure. By 2050, approximately 320,000 new homes will be needed across Auckland.

Auckland must decide how to accommodate that growth and in doing so how to shape the city's growth to support future growth. Rapid transit will be instrumental in shaping Auckland's future urban form. It will be a catalyst for urban transformation, influencing how the city grows to create quality, compact and highly accessible centres and communities.

Most of the future growth will happen in urban areas

A key opportunity to unlock this growth is through quality compact urban development along the CC2M corridor. With its access to significant employment and education hubs, it offers a unique opportunity to create well-functioning communities. Investing in the CC2M corridor also offers disadvantaged communities more choice and more affordable transport options.

What could growth look like along the CC2M corridor

Decision makers are being asked to choose between three futures:

- Future one: Bus-based public transport
- Future two: Investment in rapid transit
- Future three: Investment in rapid transit integrated with urban interventions.

At 2021, the corridor contains 60,000 homes and 169,000 jobs.

Future one: Bus based public transport

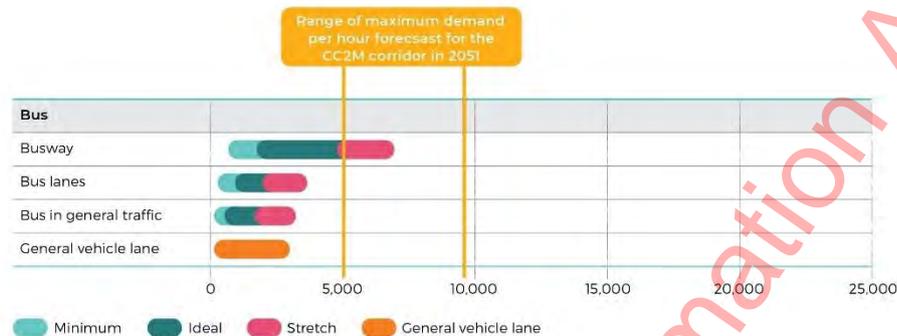
In this future, by 2051 there will be potentially 30,000 additional households along the CC2M corridor, which equates to 91,000¹ households or 10.5 percent of Auckland's growth. Currently there are 60,000 households along the corridor.

¹ Currently there are 60,000 households in the CC2M corridor

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The new growth would be supported by bus-based public transport service, based on the funded programme within the 2021-31 Regional Land Transport plan (RLTP) up to 2031, with similar incremental funding to 2051.

The ability of buses to operate effectively at higher volumes is constrained by the corridor's spatial configuration and traffic density, so well before 2051 they will not meet forecast travel demand (see next figure).



This means bus services would become increasingly unreliable and travel times longer. To get to where they need to go, people would need to use their vehicles. This would cause additional congestion, especially in the city centre.

Lack of access to adequate public transport would result in more vehicles on the road, more vehicle kilometres being travelled (VKT) and more idling in traffic congestion, which would:

- have adverse impacts on the environment, with more emissions, impacting on both climate change and air quality
- mean that New Zealand could not meet its net zero carbon target by 2050 (which is based on tripling Auckland public transport trips)
- reduce Auckland's liveability, especially for those living along the corridor
- have adverse impacts on people who already have limited travel options, especially south of the Manukau harbour, and flow-on effects to social cohesion
- reduce benefits from the Kāinga Ora developments in Mt Roskill and Māngere
- impact on Auckland's economic performance.

People who live in the corridor would experience low quality urban environment with inadequate public transport and highly congested roads. Increasingly, city centre streets would become 'a wall of buses'.

Urban expansion is more likely.

Future two: Investment in rapid transit

In this future, by 2051 35,000 new households will be added to the CC2M corridor. This equates to 96,000 households or 12.7 percent of Auckland's growth.

This is facilitated by investment in a new rapid transit solution. This service would have enough capacity and reliability for people to choose not to rely on private vehicles for the bulk of their travel. This option would avoid the negative social and economic outcomes listed in future one.

The remaining 87 percent of Auckland's growth would be accommodated elsewhere. Inevitably some of that growth would be through urban expansion, which would require expensive additional investment in transport for these new areas. There would be more work to be done elsewhere in

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Auckland to achieve the Government's target to triple public transport use in Auckland to achieve net zero carbon emissions by 2050.

In the short term there would be significant construction disruption whilst the infrastructure is built, though this would depend on the extent to which a rapid transit solution travels underground or on the surface.

Future three: Investment in rapid transit plus urban interventions

In this future, by 2051 there would be 66,000 additional households - 126,000 households along the CC2M corridor. That equates to a quarter of Auckland's growth inside the Rural Urban Boundary is accommodated in the corridor.

This is facilitated by a new rapid transit solution with sufficient capacity to meet future demand, plus a range of supporting urban interventions to enable additional housing and development in the CC2M catchment. This would lead to:

- more positive social outcomes for **more** people, who would live closer to employment, education and places important to them
- better environmental outcomes and lower emissions because there would be fewer private vehicles on the road than in future two and fewer vehicle kilometres travelled (VKT)
- better economic outcomes through sustainable quality urban development.

THE PROBLEMS

The following sets out the problems that the proposed investment in rapid transit will address:

- A high reliance on cars is adversely affecting the climate as well as increasing harm from injury and pollution
- Increasing congestion will further disrupt and lengthen travel times, threatening investment and quality of life
- Some communities have worse access to public transport connections, creating inequity and reducing social cohesion.

Problem 2: Environmental impacts

A high reliance on private vehicles is adversely affecting the climate as well as increasing harm from injury and pollution

The environment

Climate change means New Zealand will become a land divided by weather extremes – rain will batter the west and south leading to more floods, while high temperatures will bring drought and more risk of fires to the east and north. Over the last decade, Auckland has felt the impacts of heavy rain events, storm surges and coastal inundation, extreme heat events, and droughts. Erosion and storm surges have impacted on Māori coastal communities particularly marae.

With its high reliance on vehicles, the transport sector is responsible for 44 percent of Auckland's GHG emissions. This is threatening Government and Auckland Council's ability to achieve their commitment of net zero GHG emissions by 2050.

Motor vehicles adversely affect air quality by emitting air pollutants such as particulate matter, carbon monoxide, volatile organic compounds (as unburned hydrocarbons), and oxides of nitrogen

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(NOx). Urban expansion has adverse impacts on natural environments e.g. reduced biodiversity, polluted waterways.

Harm from injury

People with mobility issues (disabled people, young adults, children, and the elderly) living in disadvantaged communities along the CC2M corridor have a significantly higher risk of experiencing road traffic injuries. People living around the CC2M corridor also experience a disproportionate number of deaths and serious injuries by distance travelled.

Research has shown that children living in the most deprived areas have a three times higher injury rate from private vehicles than children living in the least deprived areas. This is higher for Māori and Pasifika children in these communities. People aged 70 years and over have the highest rate of walking-related deaths and serious injuries per capita, because they are often physically vulnerable and have limited transport choices. Māori have the highest death and serious injury rate in Auckland.

Problems 1 and 3: Traffic congestion and community inequity

People from across Auckland use the CC2M corridor to go to work, access education and undertake a range of other activities. The transport challenges differ along the corridor. North of the Manukau harbour, the story is largely one of congestion, whilst south of the harbour the story is predominantly one of 'transport poverty' and its impacts on the community.

North of the Manukau harbour – a congestion story

While most travel in this area is dominated by private vehicles, it also contains several major bus routes which carry significant volumes of people. Four of Auckland's six busiest bus corridors are located within the central isthmus, including high frequency services along Dominion Rd and Sandringham Rd. These buses are close to capacity, the roads upon which they operate are congested and travel times are unreliable. With the projected population growth, the current public transport system will not meet peak demand and become increasingly unreliable throughout the day.

Congestion, for both buses and general traffic, with the associated effects, reduces liveability for people living, working and studying in the city centre where most of the traffic converges.

South of the Manukau harbour – an equity story

Public transport journey times from southern parts of the CC2M corridor are lengthy and often unreliable. Using public transport to travel from Māngere to the city centre takes more than twice as long than using a private vehicle. As a result, private vehicles account for 85 percent of all journeys to work by Māngere residents. A 2018 survey found public transport does not provide an attractive and realistic service for residents of Māngere-Ōtāhuhu and other areas with high levels of deprivation in the corridor including Puketāpapa and Maungakiekie-Tamaki. Poor public transport services and the resulting private vehicle dependency also affect deprived communities more for financial reasons, as travel costs make up a greater proportion the household spend.

If owning and maintaining a private vehicle is not an available option, people may be confined to their local area. A 2016 report on closing income gaps in South Auckland identified that long commutes are a key constraint to finding work.

THE BENEFITS OF ADDRESSING THESE PROBLEMS

Solving these problems would facilitate Auckland to be a well-functioning successful city.

It would enable increased urban density and economic growth

The location of the CC2M corridor means it is uniquely placed to support quality urban growth and provide access to significant areas of housing growth.

Investment in reliable and frequent rapid transit along the CC2M corridor can support increased quality urban density, as well as major intensification of commercial and other land uses in the corridor and the critical employment hubs at either end. The combination of investment in more intensive housing and employment opportunities, planned around new rapid transit, will ensure the significant economic benefits are unlocked, whilst minimising the costs and negative consequences that sprawling growth can introduce. Without reliable and frequent high-capacity public transport (i.e. rapid transit), densification will lead to unpleasant places to live because of the increasingly high concentration of private vehicles.

It would increase community wellbeing

Rapid transit can greatly benefit communities that are disadvantaged in terms of transport choices. This is particularly true in areas with proportionately lower vehicle ownership, higher household travel costs and currently limited transport options, such as Māngere. Even if each household was unable to afford to travel by private vehicle, the road networks simply could not accommodate so many vehicles, resulting in increasing congestion and worsening environmental outcomes.

Rapid transit can also help groups that don't have, or who have limited, access to private vehicles, such as the young, older people and people with mobility issues. Rapid transit is highly accessible for all levels of mobility (including mobility impaired persons, people with push chairs, travellers with luggage, etc.) as passengers can easily enter the vehicles from comfortable, level-access platforms.

Investment in rapid transit along this corridor will contribute to people's economic wellbeing by increasing employment choice and security, ensuring reliable access to jobs and education. It will also provide access to marae, Kura Kaupapa Māori and Kōhanga Reo and Te Whare Wānanga o Aotearoa in Māngere, and along the route. It will support Māori communities by improving access to Māori education.

Journey times will decrease and the number of jobs accessible to residents within a particular journey time, will increase.

Investment in rapid transit can improve health by encouraging more walking and cycling, because more people will walk or cycle to and from stops/stations. Studies have shown there is a correlation between public transport use and physical activity. An Australian study found that public transport accessibility was positively correlated with walking at recommended levels (including for those people who were not actively exercising). These levels of physical activity reduce the likelihood of premature death and sickness.

It will improve the environment

A cleaner, greener, healthier, and more sustainable Auckland will bring benefits across the economy and to the whole of society, not just now but in the future. Mana Whenua have a special cultural and spiritual relationship with the Te Taiao environment as kaitiaki. Mana Whenua have a

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special cultural and spiritual relationship with the Te Taiao environment as kaitiaki. This includes their relationship with Waahi tapu (sacred sites), Taonga (treasures), Wai/Wai Māori (water/fresh water), Whenua (land) and Āngi (air), Moana(Sea) and Takutai Moana (foreshore).

A key feature of the environment for Māori is the Manukau Harbour.

Research shows that doubling urban density can reduce carbon pollution from household travel by nearly half and residential energy use by more than a third. Drawing more people into urban Auckland and reducing their reliance on private vehicles will help significantly reduce the country's overall GHG emissions.

Enabling growth in existing urban areas, rather than through urban expansion, will reduce people's impact on the natural environment.

It will improve public transport accessibility

Rapid transit for the CC2M corridor is an important part of Auckland's wider rapid transit network (RTN). As the RTN grows it will serve the whole city and drive and shape Auckland's future growth (see map). Expanding rapid transit capacity along the CC2M corridor will add to the network. At key locations it will connect with the existing heavy rail network, with buses and active modes of transport, and with proposed future rapid transit corridors. It will also capture additional value by ensuring effective interchanging with the current City Rail Link (CRL) investment. As the network expands it will allow people to connect to other rapid transit corridors outside the CC2M corridor, and link to jobs, homes, services, cultural opportunities, and education facilities across Auckland. Once the CC2M is connected to future extensions to the North Shore and Northwest, patronage is forecast to increase by around 20-30 percent.

This, combined with greater reliability and timeliness, will make rapid transit more attractive and accessible, further helping to people make the mode shift from private vehicles.



STRATEGIC ALIGNMENT

Both central and local government have numerous strategies to increase urban development, improve transport, reduce congestion, reduce GHG emissions, and support thriving communities.

PROPOSED SOLUTION - THE WAY FORWARD

Rapid Transit - building on a strong tūāpapa (foundation)

To identify what form of rapid transit would best meet the desired outcomes, 50 different options for modes and routes were assessed against the Project's three objectives. From these three short listed options were identified.

Light Rail

Light Rail consists of modern trams running on tracks embedded into the road but separated from traffic – surface running.

Light Metro

Light Metro is a rail-based mode which is grade-separated (it is elevated or underground). The Light Metro option would travel through tunnels built under densely populated urban areas and on the surface through non-urban areas, such as motorways.

Tunnelled Light Rail

The Tunnelled Light Rail option is Light Rail which travels on the surface from the airport to Mt Roskill, then goes underground for the section from Mt Roskill to the Wynyard Quarter (partly tunnelled). This option was considered because it could support higher levels of urban development with the benefits of grade separation in the more built-up areas of the corridor, whilst providing strong community integration in the surface running southern section.

The estimated completion date for all options is 2032. Each option's attributes are set out in the next table.

				
	Light Rail	Light Metro	Tunnelled Light Rail	
Description	Total boardings (Annually in 2051)	20,300,000	34,950,000	31,900,000
	Capacity Reached	2070+	2085+	2070+
	Number of Stations	22	17	18
Urban Development	Urban Uplift Potential by 2051			
	Household	20,000	35,000	35,000
	Jobs	12,000	16,000	16,000
	Accessibility (jobs within 45 minutes)			
	Māngere	247,000	452,800	346,200
	Onehunga	405,500	463,900	437,600
Mt Roskill	414,700	423,000	403,300	
Jobs within 45 minutes of Central City and Airport	475,600	569,600	515,900	
Travel Time	Travel Time	57	36	43
	To Airport Business Precinct			
	Māngere	7	5	7
	Onehunga	18	12	18
	Mt Roskill	27	20	30
	To City Centre (mid town)			
Māngere	37	27	32	
Onehunga	25	20	21	
Mt Roskill	17	12	12	
Impacts	Carbon (tonnes saved)	860,000	940,000	980,000
	Surface Properties Affected	489	168	167
Challenge Economics	Cost (p50)	\$9.0 Bn	\$16.3 Bn	\$14.6 Bn
	BCR	1.1	1.2	1.1
	Key Risks	Disruption Consentability	Affordability Market Capacity	Affordability Market Capacity

Analysis

The analysis considered which options best met the objectives.

Objective one



Objective 1: To implement a rapid transit service that:

- Is attractive, reliable, frequent, safe, and equitable
- Is integrated with the current and future active and public transport network
- Improves access to employment, education, and other opportunities.

The Light Metro option performed better on this objective than the Light Rail or Tunnelled Light Rail options. The Tunnelled Light Rail option was a close second. The following sets out the analysis against each part of the objective.

Is attractive, reliable, frequent, safe, and equitable

The Light Metro option, and to a lesser extent the Tunnelled Light Rail option, attract a higher patronage because:

- it is more accessible due to the faster travel time
- it serves the high growth Kāinga Ora development better than the Dominion Road Light Rail option
- it has better connections with other parts of the public transport network.

The higher patronage forecast for these options comes from some mode shift from private vehicles but mainly from people transferring between Light Metro and rest of the public transport network. For example, at Kingsland, by 2051 in the morning peak, of 1,000 people will transfer from the western line to CC2M (largely driven by better travel times and access to the universities precinct and the Wynyard Quarter).

Figure 1: Patronage profile (2051 peak hours)



The Light Metro and Tunnelled Light Rail options deliver better mode shift than the Light Rail option, but the difference is not significant. An important reason for this is most (55 percent) trips by residents in the CC2M corridor are to destinations outside the corridor. To improve the ability of

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the proposed rapid transit investment to deliver better mode shift outcomes, it is vital that there is excellent integration with other parts of the network (interchanges) and to active modes.

All options are safe by design for passengers. The Light Metro option does not run on the road so is safer for people using active modes, with the Tunnelled Light Rail option second because it runs underground for part of its journey.

All options mean passengers can easily enter the vehicles from raised, level-access platforms. However, with the Light Metro and the Tunnelled Light Rail options it would be harder for people with physical mobility issues to access the underground stops/stations. So the Light Rail option is more equitable for those people.

Is integrated with the current and future active and public transport network

The Light Metro and the Tunnelled Light Rail options show better integration potential because:

- They are tunnelled into the city centre, so they can connect with the future North Shore and Northwest lines which are also expected to be tunnelled
- They have significantly higher capacity than the Light Rail option. This is important because passenger demand on the CC2M corridor increases by around 20-30 percent when North Shore and Northwest lines are connected.

Improves access to employment, education, and other opportunities.

For people in Māngere / Favona, the Light Metro and Tunnelled Light Rail options will deliver better access to employment and education opportunities than the Light Rail option. By 2051, the Light Metro and Tunnelled Light Rail options will provide access to between 199,000 and 95,000 more jobs within 45 minutes peak travel time from Māngere Town Centre than the Light Rail option (an increase of 40-80 percent).

Being the fastest, the Light Metro option provides the timeliest access to education and employment opportunities – almost half the time to travel from Airport to Wynyard Quarter than Light Rail.

Objective two



Objective 2: A transport intervention that embeds sustainable practice and reduces Auckland's carbon footprint

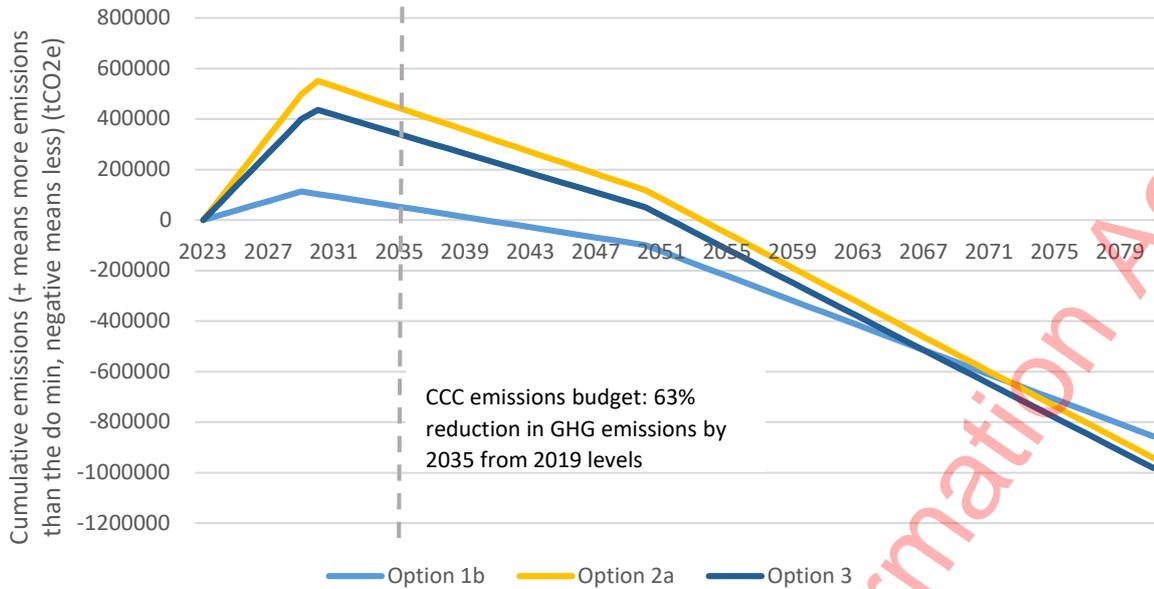
Carbon

All options result in net reductions in carbon over the 50-year assessment period, with ongoing benefits past that assessment period. This is mainly because of mode shift from private vehicles to public transport or active modes, and therefore a reduction in vehicle kilometres travelled (VKT).

Light Rail will reach carbon neutrality sooner than Tunnelled Light Rail or Light Metro, after about 25 years. But in the longer term Tunnelled Light Rail and Light Metro deliver overall greater carbon reduction. This is because these options lead to more mode shift and higher patronage.

Due to the scale of the Light Metro option tunnel construction the embedded carbon for this option (and the Tunnelled Light Rail) is significantly higher than for the Light Rail option.

Cumulative emissions for all options- compared to DO MIN (tCO2e)



However regardless of what decision is made, it is likely that a city centre tunnel will required at some stage in the future. This means at a network level some of the difference between the embedded carbon in the Light Rail and Tunnelled Light Rail options would disappear, and the time each option takes to achieve carbon neutrality would be reduced.

Environment

Rapid transit can improve air quality and have other environmental benefits as it is electrically powered and able to move a comparatively greater number of passengers (e.g. lower energy cost per km travelled) than fossil fuel powered vehicles.

There will be fewer polluting emissions with all options they all support mode shift from private vehicles to public transport or active modes.

All options will support keeping housing growth more confined to urban areas, rather than urban expansion into greenfield areas. This will also reduce people’s impacts on the natural environment. The Light Metro option and to, a lesser extent the Tunnelled Light Rail option, will support more people living along the corridor.

Objective three



Objective 3: To unlock significant urban development potential supporting a quality compact urban form and enabling integrated and healthy communities

The following table sets out the key findings for each option on the factors that affect the potential for quality compact urban development.

On balance the Light Metro option, and to a lesser extent the Tunnelled Light Rail option, delivers the most potential to create a higher quality, compact urban development that can support greater density. The Light Rail option’s lower capacity would result in comparatively lower urban growth.

Impacts	Light Rail	Light Metro	Tunnelled Light Rail	Commentary
Number of stops/stations	22	17	18	Light Rail allows growth to be spread out due to the number of stops/stations, but doesn't enable more growth because of capacity
Household uplift range	4,100 – 20,000	5,100 - 35,000	5,000 - 35,000	For all options the anticipated growth of 31,000 is more likely to happen with the rapid transit investment The Light Metro and Tunnelled Light Rail options deliver significantly higher capacity than the Light Rail option, which means they can support more people living along the CC2M. This uplift is on top of the expected 35,000 households that are forecasted to occur by 2051. Without urban intervention the upper range is unlikely to be achieved.
Jobs uplift range	3,700 – 12,000	5,300 – 16,000	5,100 – 16,000	This potential is linked to capacity. Without urban intervention the upper range is unlikely to be achieved.

All options increased active modes (e.g. walking and cycling) because they increase patronage and intensification along the corridor which means more people to walk to stops/stations .

The Light Metro option and Tunnelled Light Rail option are partially underground so theoretically there will be more space on the surface to provide for cycling (specific designs have not been undertaken). The Light Rail option will also have space for cycling facilities, albeit in a 'busier' surface corridor.

All options result in reduced pollutants mainly because of mode shift from private vehicles to public transport and because of reductions in vehicle kilometres travelled (VKT). The Light Metro and Tunnelled Light Rail option can carry more people so would perform better than the Light Rail option.

All options allow people with mobility issues to move around the community easily, which supports greater social inclusion. Light Rail is easier for people to access because they don't have to go down to underground stops/stations.

The trade-offs

In making the decision on which option is preferred for the CC2M corridor, a range of trade-offs were considered.

Level of transport opportunity

The Light Metro option (followed closely by the Tunnelled Light Rail option) provides the greatest increases in mode shift and has the highest levels of residual capacity at 2051.

Level of urban opportunity

All options generate benefits in terms of supporting urban development. However, unlocking and realising high levels of urban development will require the use of additional urban interventions. These include but are not limited to master planning, collaboration with Kāinga Ora and Auckland Council, site amalgamations, improved active mode connections, amenity and public space upgrades, and commercial partnerships. The Light Metro and Tunnelled Light Rail options enable more urban capacity but cost more than the Light Rail option.

Costs

There is a substantial difference in estimated costs.

Light Rail	Light Metro	Tunnelled Light Rail
\$9.0 Bn ² (NPV ³ \$7.1 Bn)	\$16.3 Bn (NPV \$11.2 Bn)	\$14.6 Bn NPV (\$10.3 Bn).

Notes on the costs:

- These figures are capital costs but do not include capital cost of enabling infrastructure etc for urban development.
- The costs are P50, and the cost estimate class (class 5; accuracy range of -50% to +100%, based on information produced and assessed against the AACE Criteria⁴. The level of accuracy for these schemes have been assessed around -50% to +60%.
- The key purpose of costs at this stage is to enable comparison between options for the economic analysis and should not be relied upon as the likely final outturn costs for the Project. The Base Estimate figures are likely to increase during the design development, these are contained within the current P50 estimate, with the outturn cost, likely to be contained within the P95.

Benefits

There is a substantial difference in forecast benefits.

	Light Rail	Light Metro	Tunnelled Light Rail
Benefits (NPV values over 60 years)	\$7.7 Bn	\$13.1 Bn	\$11.0 Bn
BCR	1.1	1.2	1.1

Given the benefits are broadly commensurate with costs, all three options have benefit cost ratios (BCRs) of above one, and so broadly equivalent economic outcomes.

Disruption

All options will generate some degree of disruption. The Light Rail option will create prolonged (multi-year) disruption in important areas like Queen St and Dominion Road.

All options require construction in heavily populated areas of Auckland, including the city centre, the central isthmus, Ōnehunga and Māngere town centre.

The Light Rail option requires surface construction for the entire length of the route and is likely to require partial and full road closures for periods of three to five years, depending on the location.

The Light Metro and Tunnelled Light Rail options tunnel under many areas, which reduces surface impacts to the locations of stops/stations and the landing areas for the tunnel boring machines. These locations are likely to experience significant disruption due to the depth and complexity of construction, but the spatial extent is less than for the Light Rail option.

² Note – the costs have been updated from what was presented to Sponsors in mid-September.

³ The discount rate is 4% for 60 years (consistent with Waka Kotahi guidance).

⁴ AACE is the Association for the Advancement of Cost Engineering - be <https://web.aacei.org/about-aace>

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The Light Metro and Tunnelled Light Rail options have less impact on properties⁵ than the Light Rail option because they are partially tunnelled. Light Rail option affects the:

- most surface properties
- most surface businesses - 219 businesses compared to 73 and 85 respectively.

Integrated network

To support future network integration requirements all the options might require a tunnel in the city centre.

Carbon reduction

All options result in net reductions in carbon over the 50-year assessment period, with ongoing benefits past that assessment period.

Preferred option

Considering the trade-offs **the Tunnelled Light Rail option is the preferred option** because:

- The Tunnelled Light Rail option provides a high-capacity service and the opportunity for the same quantum of intensification and high-quality urban form to be attracted to the corridor as the Light Metro option and a high-quality urban form to be attracted to the corridor. This will provide confidence that the intensification already anticipated in the corridor will take place, in a way that would deliver high quality transit supportive outcomes, also provides the opportunity for even greater growth and urban outcomes consistent with Auckland's quality compact urban form and sustainability benefits. Tunnelled Light Rail provides the opportunity to deliver the same level of urban outcomes, as the Light Metro option at a lower cost.
- The Tunnelled Light Rail option is segregated option in the denser areas of the route while supporting the communities south of the corridor through surface running along Bader Drive which maximises the urban outcomes and accessibility and avoids severance of communities.
- The Tunnelled Light Rail option provides a step change in accessibility in the corridor particularly to jobs and education, and delivers a carbon reduction, whilst minimising disruption, particularly in the city centre, during construction.
- The Tunnelled Light Rail option provides a high level of flexibility (and supports future investment) for how this corridor could interface with Auckland's future rapid transit network, in particular the North Shore and Northwest lines.
- The exact route of the Tunnelled Light Rail option remains flexible and so the final route through the central isthmus (including the length of tunnelling) can be explored with the community during the next project phase.
- Whilst the economic analysis favours the Light Metro option, there is a strong economic case for the Tunnelled Light Rail option which can be delivered for a lower cost (compared to the Light Metro option).

⁵ The number refers to the number of surface properties that will need to be acquired and the number in brackets is the number of subterranean properties that need to be acquired. This number refers to both residential and businesses.

- Light Rail is lowest cost and a credible investment; however it delivers fewer benefits than the other options and may restrict long term integration potential. It provides a step change in accessibility, urban uplift/form and is the first option to achieve carbon neutrality.

FUNDING REQUIREMENTS

Indicative cost of the preferred option

The next table summarises the indicative capital cost for Tunnelled Light Rail. The base cost is presented in July 2021 dollars, and the P50 risk allowance is included, along with the escalated P50 and P90 cost.

Table 1: Capital cost summary (NZ\$m)

Cost element	Tunnelled Light Rail
s 9(2)(i)	
P50 total escalated cost	14,601
s 9(2)(i)	

The estimated capital spend profile over the delivery phase for Tunnelled Light Rail is shown below Table 2.

Table 2: Capex profile (P50, escalated) (NZ\$m)

s 9(2)(i)

Operating and maintenance (O&M) costs will be incurred once services begin operating to cover the power to run the services, staff costs and maintenance of the tracks, systems and rolling stock. Also included is an estimate of the consequential operating costs from reconfiguring the bus network to better support the Project. The O&M costs at Day 1 of operation (for the first full year, being FY33) are summarised in Table 3 below.

Table 3: O&M costs at day 1 (annual, NZ\$m)

Cost element	Tunnelled Light Rail
s 9(2)(i)	
P50 total escalated total opex	119.3
s 9(2)(i)	

Funding options

Given the scale of capital and operating costs, a combination of different funding sources will be required. This will include a mixture of Crown, Council, and other sources, development and fees-based value capture, and cover the full range of project beneficiaries. The preferred funding solution will need to balance the trade-off between allocating costs to beneficiaries and the affordability of different tools for ratepayers. Additional funding could be generated by capturing value through development (e.g. development partnering), however this may require upfront capital to implement and the Crown, Delivery Entity or responsible partner organisation assuming additional risk.

An overview of the key principles, trade-offs and considerations identified are provided below.

- **A range of options with similar beneficiaries and magnitudes** – There are several funding tools that target the same beneficiaries and could generate similar amounts (e.g., the Infrastructure Funding and Financing Act 2020 (IFFA) mechanisms (referred to as ‘IFF’), Targeted Rate, Betterment Levy). The preferred funding solution will need to ensure that beneficiaries will not be targeted by multiple funding tools for the same benefits.
- **Affordability / acceptability**– Ratepayer affordability and acceptability is an important consideration in the implementation of different taxes, levies and rates, particularly in the lower socio-economic portions of the corridor. A high-level affordability assessment suggests that an additional \$1,000 annual levy or rate for properties within station catchments would remain within a 5 percent affordability threshold⁶ (total rates or levies to household income). This approach would need to be reviewed at a more granular level at the next phase.
- **Value capture and development potential** – Capturing value from landowners may have implications on incentivising development. This needs to be considered in the context of Auckland-wide patterns of intensification. The impact on development will depend on the proportion of value captured and how the market prices this in. To the extent the market prices the cost into land markets, the potential impact on Gross Floor Area (GFA) could be estimated through the land use change model that measures the correlation between land value uplift and GFA. However, prices achieved on the 2019 IFF Milldale transaction indicate that the levies were not priced into land markets and did not materially affect development. To ensure the

⁶ The 5% affordability threshold was identified in the 2007 Local Government Rate Enquiry Report and is considered by Auckland Council when determining the rate settings for its Long-Term Plans.

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development incentive is not unduly constrained, funding tools will not target the development margin for developers (i.e. will focus on super-profit through land value uplift).

- **Precedent setting impact** – The funding allocations and tools selected to deliver the Project may set a precedent for the delivery of future projects (i.e. equitable allocations to regional/local beneficiaries, investigation of alternative funding tools, capturing value from different beneficiary groups). Accordingly, the preferred funding solution should allocate an equitable portion of costs to regional/local beneficiaries, rather than relying on Crown funding. The preferred operating funding model may similarly set a precedent for how operating expenditures are funded for major rapid transit projects. This may have implications for the public transport operating model (PTOM) and current approach to National Land Transport Fund (NLTF) funding.
- **Behavioural impact** – Certain funding tools can be used to manage demand for public transport and private vehicle usage. For example, the application of a premium fare and any other increases to fares will need to be balanced against the objectives of achieving mode-shift/patronage. Other demand management tools (e.g. workplace parking levy, increasing parking charges) may be worth pursuing to incentivise public transport usage, even where the financial benefit is relatively low.
- **Crown/Delivery Entity role in capturing land value uplift** – There is a spectrum of ways the Delivery Entity and/or the Crown could capture land value uplift on both public and wider landholdings in the corridor. Land ownership and active development provides opportunities to better control urban outcomes and capture value. However, this comes with increased risk, the potential need for upfront investment and greater intervention and capability requirements.

Potential capital funding gap and affordability

s 9(2)(i)

s 9(2)(i)

Financial next steps

The Financial Case will be updated and refined at the next phase once there is clarity over the preferred technical option, procurement strategy, level of urban development interventions and Delivery Entity taking the Project forward

- Costs will continue to be refined as the preferred technical solution is further developed and defined.
- Funding and financing - refine the funding analysis and determine a preferred funding and financing solution.
 - Detailed beneficiary identification and allocation
 - Detailed affordability analysis
 - Further exploration of 'active' value capture opportunities
 - Detailed assessment of the Crown and Delivery Entity finance approaches.
 - Market engagement with financiers and credit rating agencies to inform the financing strategy and assessment of the Crown and Delivery Entity financed approaches.

ACHIEVING THE OUTCOME

The procurement approach

The procurement approach for the transport aspects will continue to be developed through the next phase, when there is greater certainty over the Project's technical solution, Delivery Entity, and governance framework, as well as market capability. The following sets out early thinking.

s 9(2)(i)

s 9(2)(i)



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s 9(2)(i)

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Delivering urban outcomes

To achieve the investment objective of “unlocking significant urban development potential”, an intentional Urban Development Programme is required. The extent of urban development to be delivered ‘on the ground’ by the Project is subject to further decision-making.

The range of urban interventions that support and/or inform the Urban Development Programme occur at three fundamental levels:

- **Enable urban change:** Creating an environment or platform for change (“light hand”). e.g., planning and zoning for appropriate densities and urban form outcomes, identifying and communicating opportunities, and integrating with existing and planned supportive initiatives.
- **Unlock urban change:** Selectively influencing change (“light to medium hand”). e.g., strategic property acquisitions to facilitate access and development opportunities, small scale catalytic investments e.g. land aggregation, critical transport connections and place-making initiatives.
- **Deliver urban change:** Directly procuring, contracting or delivering change (“directive”). e.g., development briefs or agreements for strategic sites, risk sharing or partnership arrangements and direct intervention.

The next steps for developing the urban development strategy include:

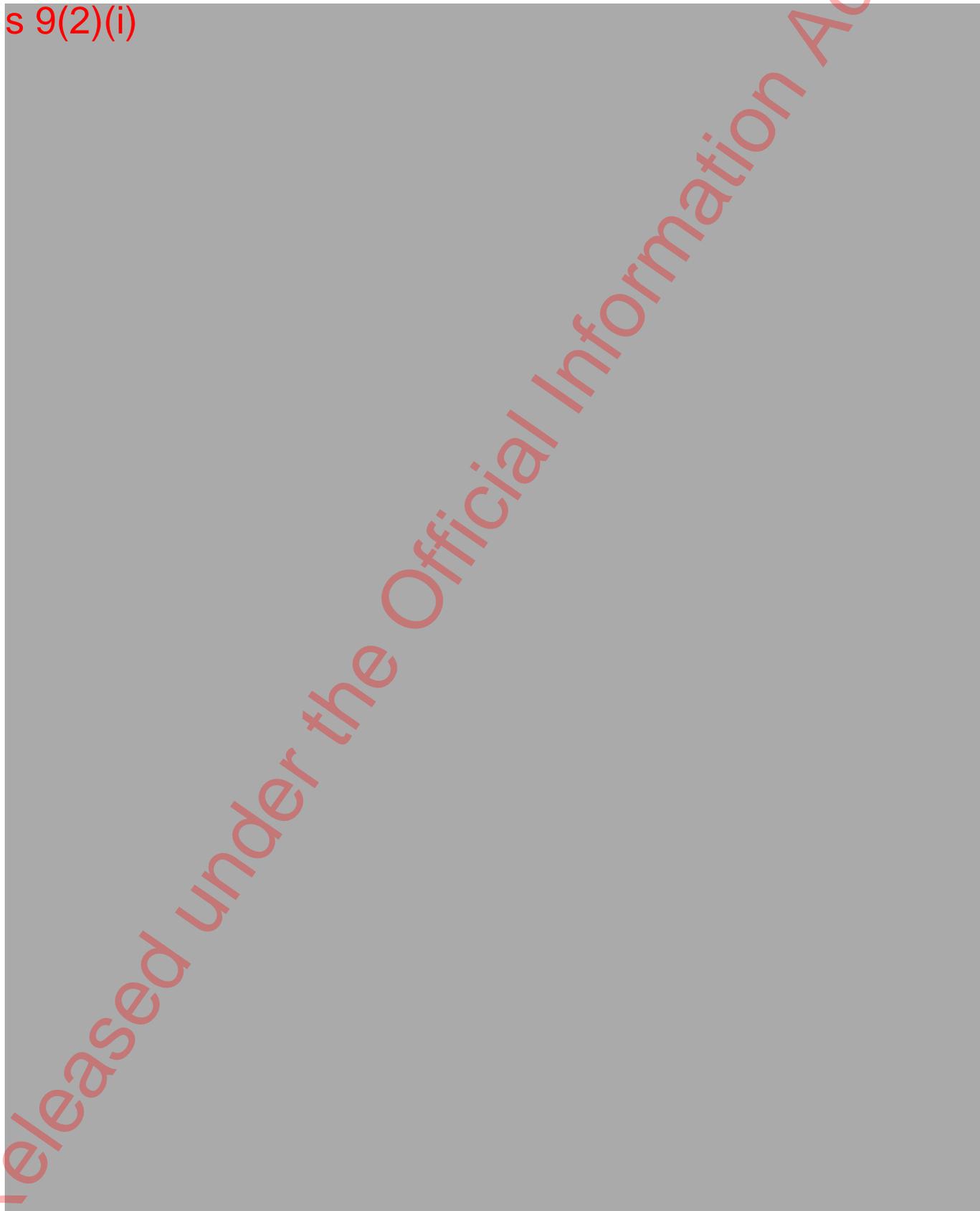
- Definition of the process and partnerships necessary to analyse and identify place-based interventions at specific nodes, noting this is likely to be different along each section of the Project’s alignment.
- Identifying the opportunities at each node in terms of landholdings, and the need for interventions.
- Gaining agreement on the organisation that will be accountable for securing urban outcomes.
- Providing necessary urban input to the location of stops/stations from an urban development perspective.
- Identification of appropriate levers and mechanisms to deliver the above interventions (e.g. a whole of government approach and optimising the respective skills, funding and operating requirements of each partner.
- Developing a robust urban development programme, including roles and responsibilities, funding and financing, interventions, partnership arrangements etc.

s 9(2)(i)

Property Acquisition Overview

A Property Overview has been prepared to consider the property requirements and consider the approach to acquire land required for the Project. The land requirements for all non-road parcels that need to be acquired have been identified (parts of the route within the existing road corridor have been excluded). This indicative property acquisition overview is based on the current scope and may need to be revised as the scope develops in the next phase.

s 9(2)(i)



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s 9(2)(i)

Delivery phase - Delivery Entity

Cabinet tasked the Establishment Unit with preparing advice on the form of the Delivery Entity and governance arrangements to deliver the Project.

Delivery Entity function (scope)

It is proposed that the Delivery Entity, and any pre-establishment transition entity, will:

- Be responsible for project planning (DBC, consenting, land acquisition etc), noting that these activities will be undertaken by the shadow entity before the final Delivery Entity is established.
- Be directly responsible for core transport delivery (procure and deliver the chosen form of rail and stops/stations and associated accessibility improvements within the corridor (e.g. connections to stops/stations).
- Be responsible for facilitating narrow transit-oriented
- development (TOD) - over or adjacent to station infrastructure. It could choose to engage developers directly or partner with others (Kāinga Ora, Panuku or Auckland Council) to do this. Some specialist development capability will be required within the Delivery Entity.
- The expectation is that this is not looking to duplicate or replicate expertise in other agencies but provide sufficient expertise for the Delivery Entity to hold robust and informed discussions with developers as needed. It could also partner to provide this development expertise (for example with the private sector). The scope and enablement of the Delivery Entity related to urban development is further summarised in Appendix 29 and will be validated in the next phase.
- not be responsible for ‘supporting infrastructure’ (e.g. intersection upgrades outside the corridor etc)
- not be responsible for facilitating wider ‘beyond-TOD urban development’. This would remain the responsibility of partner organisations. Clarity of roles and responsibilities, partnerships and the governance structure of the wider development landscape will be developed to minimise interface risk.

The Delivery Entity form

A range of options were considered on which organisation should be responsible for delivering the Project. The longlisted options are set out to the right. As requested by Cabinet, the options included expanding the mandate of City Rail Link Ltd (CRL) to accommodate the Project and a joint venture (JV) structure.



Based on the options analysis, the preferred options for the Delivery Entity are for a new purpose-designed Schedule 4A (S4A) company or Waka Kotahi (potentially through an internal business unit or subsidiary).

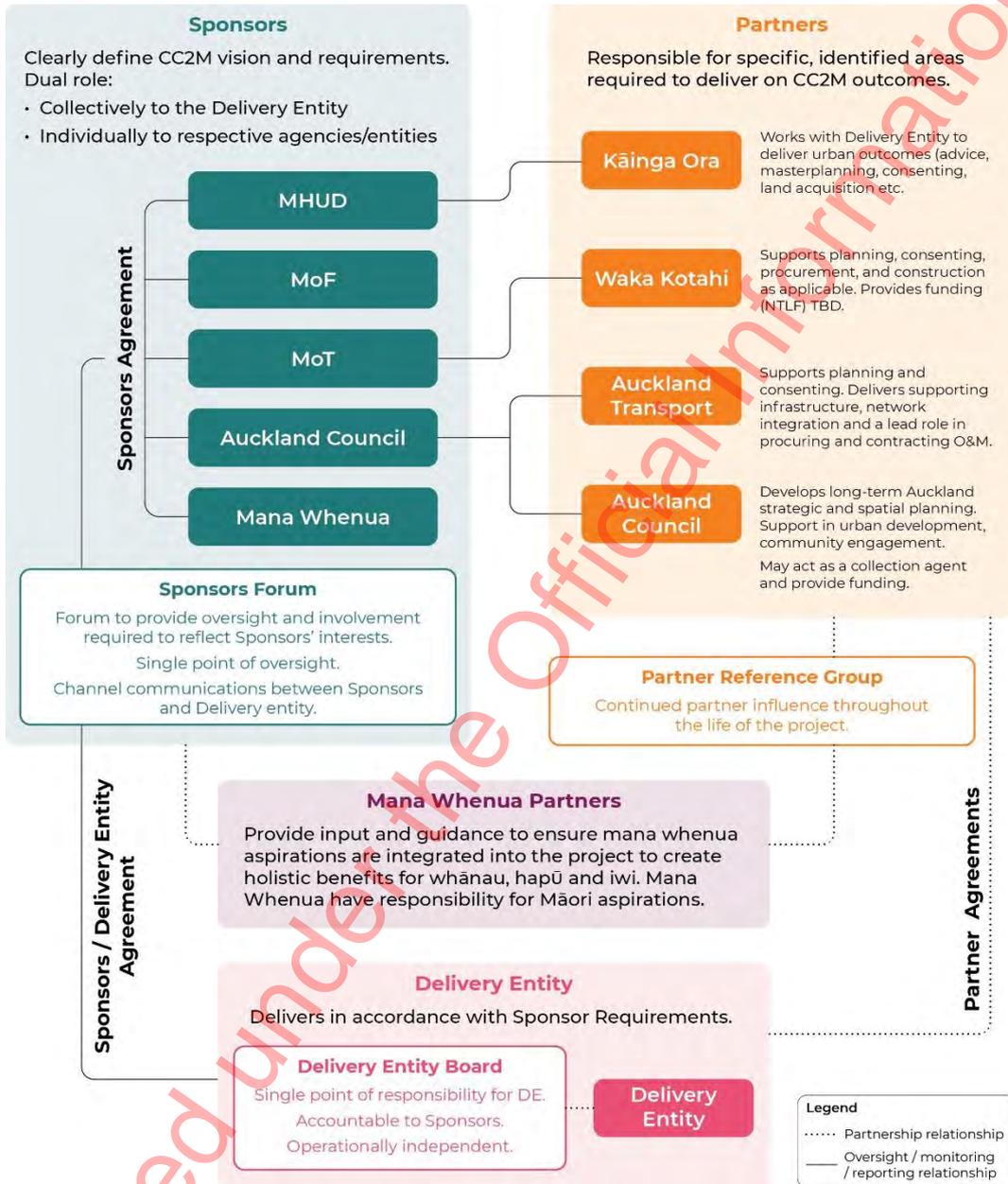
However, a delayed decision on the final Delivery Entity may mean that the Project loses momentum without a dedicated champion. Extended delays could also have an impact on wider

Sponsor agendas, the Project programme, and impact the ability of the Delivery Entity to build capability and attract skilled staff.

Governance, partnerships and Sponsors

Strong governance and partnerships will be key to the success of the Project. The key partnerships will be with our partner agencies and with Māori, especially with Mana Whenua and mataawaka. Te Tiriti o Waitangi and its articles and principles of partnership, protection, and participation will guide decision-making and the way the Project is run.

The proposed governance framework has been designed to reflect the importance, scale and complexity of the Project, and to mitigate identified risks in delivering the Project’s outcomes.



Roles

Role	Responsibility
Sponsors	The Sponsors' role is critical to provide the vision and requirements for the Project and to hold the Delivery Entity to account against performance measures. Ultimate decision-makers on the outcomes being sought (subject to any decisions retained by Cabinet) and the nature and scope of the Project. They should include a mix of local and national representation and provide transport and urban focus, and Mana Whenua representation. The proposed Sponsors are the Minister of Finance, the Minister of Housing, Minister of Transport, Auckland Council elected members and Mana Whenua representatives.
Sponsors Forum	Provides a single point of oversight and be the channel of communication between the Sponsors and the Delivery Entity. It will be made up of Sponsor representatives (officials) and will monitor and oversee Delivery Entity performance.
Independent Board	A skills-based operationally independent Board will be a single point of responsibility for the Delivery Entity.
Partner Reference Group	A strong partnership approach is needed. Therefore a forum for partners and the Delivery Entity to come together and provide timely advice and guidance to the Board. The Partner Reference Group will: <ul style="list-style-type: none"> • provide continued interaction and involvement of Partners throughout the lifecycle (critically from early planning stages) • Provide support and guidance (where relevant) to Delivery Entity • Help identify and resolve issues or seek political direction where needed.

Mana whenua representation will assist in guiding decision making, building on the approach adopted by the Establishment Unit, and ensure Mana Whenua aspirations are incorporated into the Project. Mana whenua will be involved across the depth and breadth of the Project, with representation at Sponsor and Partner level.

Project methodology

Risk Management

A project of this scale requires a comprehensive Risk Management approach, commensurate with the significant level of government investment, community disruption and broad interest in the Project. The Project will implement a risk management approach that is in line with International Risk Standard, AS/NZS ISO 31000, Waka Kotahi Risk Standard Z/44, and global best practice.

Benefits realisation approach

A Benefits Realisation Plan and related assessment process will be established during the next phase and be focussed on measuring the achievement of Project benefits described in this business case.

Engagement and stakeholders

The Establishment Unit has undertaken a range of engagement activities with the public and stakeholders throughout the IBC phase to grow awareness of the Project and gather people's views to understand what is important to communities along the route and Aucklanders in general.

Community engagement in relation to the DBC and consenting phase is to be implemented from early 2022. This phase of the Project will focus on opportunities to 'consult' and 'involve' communities and stakeholders. Engagement with the following cohorts will occur.

- Key stakeholders - awareness raising, relationship building and collaboration with key stakeholder
- Elected officials - gain local knowledge and align with policy goals related to the Project
- Māori - opportunities for involvement and engagement will be identified, such as in delivery of urban development outcomes where Māori investors and developers could play an important role
- Industry - market engagement, key industries can be informed about the Project and timing for potential procurement
- Affected property owners - identifying and managing property owner relationships and communications for property acquisition and impacts to landowners and tenants
- Detailed design and consenting consultation- community consultation programme will be developed and implemented to inform the detailed design
- Waka Kotahi Rail Regulatory Services Group through a Light Rail Licensing Group (LRLG) to promote an effective working relationship
- Rail safety and assurance will be required to engage with an Independent Safety Assessor, to support the Project and provide assurance to the rail regulator that risks are reduced so far as is reasonably practicable (SOFAIRP).

Approach to addressing business disruption

Disruption to business is a justifiable concern for many stakeholders in the corridor and is inevitable during construction. This issue is particularly topical in light of CRL and recent announcements with regards to a targeted hardship fund.

Proactively addressing this concern, minimising the level and duration of disruption will be an aim of the delivery strategies (e.g. procurement and consenting strategies). In the next stage of the Project a business support and targeted assistance scheme ('the Scheme') will be developed in consultation with the community to minimise any adverse impacts of the Project on businesses or individuals during construction, when impacts are most intense.

NEXT STEPS

The next stage of the Project will focus on:

- continued community and stakeholder engagement
- gaining greater certainty on scheme design, cost, and schedule
- continued integration with wider rapid transit network strategy (and integration implications)
- addressing funding and affordability issues

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- gaining greater clarity on urban development opportunities at each node and partner roles to develop this
- setting the Project up for long term success, including finalising governance and partnership arrangements and preferred final Delivery Entity form
- developing a Detailed Business Case (DBC).

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THE STRATEGIC CASE | MAKING THE CASE FOR CHANGE

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INTRODUCTION

The purpose of this strategic case is to make a compelling case for change for investing in rapid transit and urban interventions along the City Centre to Māngere (CC2M) corridor. This investment will facilitate a well-functioning urban environment that meets the changing needs of diverse communities, not just for today but for future generations.

It will show that an addition to the rapid transit network will move more people, faster and more reliably, to access to jobs and education. That will drive more urban development.

It will show that because of its location, the CC2M corridor presents a unique opportunity for that growth. It will also show that on its own, rapid transit will not be enough to unlock the significant urban development potential available along CC2M corridor. To achieve this an integrated transport investment and urban intervention approach will be required.

The strategic case will answer two questions:

- What is the case for investing in rapid transit, integrated with urban intervention, along the CC2M corridor to unlock quality compact urban development?
- Why that investment needed now?

What is rapid transit?

Rapid transit is the backbone of the public transport system. It:

- provides fast, frequent, and reliable travel
- can carry much more people than private vehicles or buses (high capacity)
- is fully separated (segregated) from other forms of transport (modes) so are not affected by congestion.

What is sustainable quality compact urban development?



Sustainable means that the urban development will lead to Auckland decreasing its environmental footprint through building practices, well designed urban areas and enabling a shift to more active and public transport modes⁷. This will maximise the economic, social, cultural, and environmental potential of Auckland.



Compact urban form is characterised by well-connected intensification within already urbanised areas of the city (see the section on *Auckland is growing rapidly* for a description of different types of density).



Quality refers to the liveability of urban environments where development enables accessibility to jobs, local services, homes, and education. Communities are well connected by public transport, walking and cycling. Development is coordinated with infrastructure to support growth in the right locations.

⁷ Transport “modes” include forms of transport such as trains, buses, private vehicles, active modes (such as walking or cycling).

BACKGROUND

Work on a rapid transit solution for the CC2M corridor has gone through many iterations in recent years, starting with an Auckland Transport proposal which sought to address increasing bus congestion in the city centre, and later versions led by Waka Kotahi.

In 2020, the Ministry of Transport, with the support of the Treasury led a collaborative exercise with Auckland Transport Alignment Project (ATAP) partners, Ministry of Housing and Urban Development (MHUD), Kāinga Ora and the Infrastructure Commission (Te Waihanga) to develop advice to the incoming government.

This work supported the CC2M corridor because:

- Even with the City Rail Link (under construction) and other planned transport improvements, bus services in the city centre will be increasingly congested, reducing the amenity, attractiveness, and efficiency of Auckland’s prime employment centre.
- There is significant potential to support housing and employment growth along CC2M corridor, including Kāinga Ora’s large-scale investments in Mt Roskill and Māngere.
- Improved transport access will enable more accessible housing and employment opportunities along the CC2M corridor to be unlocked.
- Providing rapid transit in the CC2M corridor can support key Auckland outcomes, particularly access to employment, as CC2M corridor widens the labour market accessibility for both the city centre and rapidly growing airport employment hubs. This will enable Auckland’s continued strong economic growth and improve productivity.

THE STRATEGIC CONTEXT

This section sets out the strategic context for this investment for both central and local government.

- the general supporting plans and strategies that the proposed investment is aligned to
- the Living Standards Framework (LSF) which guides all government investments and provides an overarching framework for wellbeing which guides many of those strategies and plans
- Te Tiriti o Waitangi (Treaty of Waitangi) – its articles and principles
- the Transport Outcome Framework that guides all long-term planning in the transport sector.

General plans and strategies

Both central and local government have numerous strategies to improve housing choices, improve transport, reduce congestion, reduce GHG emissions, and remove some barriers to communities thriving. These strategies are in turn supported by initiatives that complement the proposed investment. The main plans and strategies are set out in the table below. It differentiates between ones that have been developed specifically for Auckland, and national plans and strategies.

Areas	Auckland specific	New Zealand
Urban	Auckland Plan 2050 (includes the Development Strategy) Auckland Unitary Plan (AUP) Auckland Housing Programme Housing Action Plan	Urban Development Act 2020 National Policy Statement on Urban Development (NPS UD) Urban Growth Agenda Resource Management Reform

Areas	Auckland specific	New Zealand
Reducing Carbon footprint – particularly in transport	Te Tāruke-ā-Tāwhiri: Auckland's Climate Plan (ACP) Transport Emissions Reduction Plan (TERP) Auckland Transport Alignment Plan (ATAP)	Climate change response (Zero Carbon) Act 2019 The New Zealand Transport Strategy Transport Emissions Action Plan (TEAP) Hīkina te Kohupara – Kia mauri ora ai te iwi - Transport Emissions: Pathways to Net Zero by 2050 (in progress) Toitū Te Taiao Our Sustainability Action Plan Ināia tōna nei: a low emissions future for Aotearoa 2021
Transport	Auckland Rapid Transit Plan (ARTP) (in progress) Regional Land Transport Plan (RLTP) Regional Public Transport Plan (RPTP) Auckland Transport Alignment Project (ATAP) Better Travel Choices	The Transport Outcomes Framework Government Policy Statement (GPS) on Transport National Land Transport Programme (NLTP) Arataki To Tātou Mahere Mō Te Pūnaha Waka Whenua Keeping Cities Moving
Infrastructure	Auckland 30-year Infrastructure Strategy Auckland's 10-year Budget (LTP)	Infrastructure Funding and Financing Act 2020 (IFF) Draft New Zealand Infrastructure Strategy

The Living Standards Framework (LSF)

Government has prioritised the wellbeing of people living in New Zealand. The LSF is the overarching framework which sets out what matters for New Zealanders' wellbeing, now and into the future (see figure). The LSF is used to evaluate any major proposed investments.



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The proposal to invest in rapid transit along the CC2M corridor contributes to the LSF by enabling sustainable quality compact urban development.

The proposed investment will have a positive impact on all four capitals.

Natural capital

Natural capital is encompassed by the complex concept of kaitiakitanga which ensures that all natural resources and people are cared for. A cleaner, greener, healthier, and more sustainable Auckland will bring benefits across the economy and to the whole of society, not just now but in the future. A cleaner, greener, healthier, and more sustainable Auckland will bring benefits across the economy and to the whole of society, not just now but in the future.

It acknowledges the special relationship that Māori have with the whenua, awa and moana (land, water and sea). A key feature of the environment for Māori is the Manukau Harbour. In engagement with Mana Whenua protecting Te Taiao and providing environmental protections were considered vital.

Drawing more people into urban Auckland and reducing their reliance on private vehicles will help significantly shrink the country's overall GHG emissions. The most recent Climate Change Commission report has shown that road transport can be almost completely decarbonised by 2050 by increasing walking, cycling and public transport use, reducing travel by working from home, and by switching to low emissions vehicles. To achieve that they assumed that share of travel distance by public transport nearly triples in Auckland by 2030⁸.

Urban expansion has adverse impacts on natural environments e.g. reduced biodiversity, polluted waterways⁹. Enabling growth in existing urban areas, rather than through urban expansion, will reduce people's impact on the natural environment.

Social capital

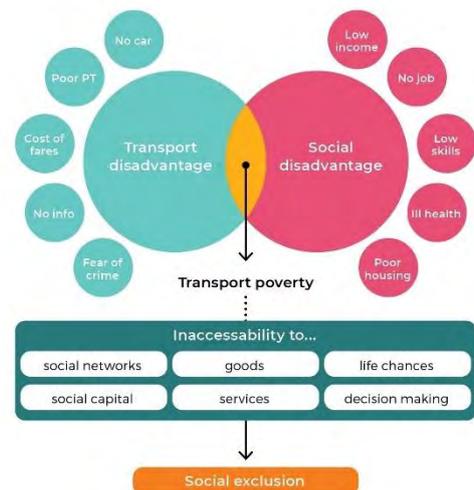
Social capital refers to people's sense of belonging and cohesion.

The figure to the right shows the role transport can play in creating cohesion and reducing social exclusion, particularly in the context of deprivation.¹⁰

The proposed investment will drive greater social cohesion by integrating and connecting communities and providing improved opportunities for social interaction. This would particularly be the case for people living in areas along CC2M corridor with high levels of deprivation and with less viable and equitable choices.

Human capital

Human capital refers to people's ability to participate in a range of activities and health. The proposed investment in rapid transit would enable people to engage more equitably in work, education, study, recreation, and social activities, by providing improved public transport to get to those activities safely reliably and in a timely way.



⁸ He Pou a Rangi the Climate Change Commission | Ināia tonu nei: a low emissions future for Aotearoa 2021

⁹ Environment Aotearoa 2019

¹⁰ Adapted from- Transport and social exclusion: Where are we now? Karen Lucas

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Rapid Transit will particularly help groups that don't have, or who have limited, access to reliable vehicles such as young people, older people, people who stay at home during workdays and people with mobility issues.

Compact urban development would mean more people would live closer to most of the places they need to be.

Rapid transit contributes to health by:

- encouraging more walking and cycling because more people will walk or cycle to and from stops/stations
- greater social interaction
- less air pollutants than there would otherwise be.

Financial and physical capital

The proposed investment would enable an urban environment that improves access to jobs and education, supports greater infrastructure efficiency, defers investment in less efficient infrastructure at the urban edge, enables increased housing supply and more affordable and accessible housing typologies and choices.

The Transport Outcomes Framework

The Transport Outcomes Framework is an overarching framework for transport which guides all long-term planning and investment in the transport sector (see diagram below). It sets out the range of outcomes sought by transport interventions. This strategic case will show how investment in rapid transport along the CC2M corridor is aligned to those outcomes .



AUCKLAND CONTEXT

This section sets the scene for the proposed investment in a rapidly growing Auckland.

About Auckland

The Māori name for Auckland is Tāmaki Makaurau, in reference to the desirability of its natural resources and geography. Māori have a long enduring relationship with Auckland through whakapapa, as well as its plentiful and abundant resources.

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Auckland lies between the Hauraki Gulf to the east, the Hunua Ranges to the south-east, the Manukau Harbour to the south-west, and the Waitākere Ranges and smaller ranges to the west and north-west. The surrounding hills are covered in rainforest and the landscape is dotted with 53 volcanic cones. These geographic features have shaped the nature of Auckland's urban form.

The main feature of human settlement in Auckland has been the development of a substantial urban area, the largest in New Zealand, in which approximately 90 percent of the population live. This metropolitan area is located on and around the central isthmus and occupies around 10 percent of the land mass.

Auckland is New Zealand's most populous region and has an estimated population of almost 1.7 million people - a figure that has nearly doubled in the last 30 years. Auckland's population is very diverse. It has a large proportion of young people especially in some parts of Auckland, such as South Auckland.

Auckland has a strong and productive economy. The city centre is the largest hub of economic activity in the country. In 2018, the city centre generated an estimated \$17.5 billion of economic activity, accounting for 19 percent of Auckland's GDP and 7.2 percent of New Zealand's GDP. This is approaching the GDP of the entire Waikato region (8.4 per cent of NZ GDP)¹¹.

Many major local and international companies have a commercial presence in Auckland, whether in the form of manufacturing facilities in industrial areas, or headquarters within the city centre. Ports of Auckland is the country's biggest port, handling almost a million containers per year, while prior to COVID-19, Auckland Airport processed over 21 million passengers per year. That number is expected to return to similar levels once New Zealand opens its borders again.¹²

Auckland is growing rapidly

Auckland is struggling to keep pace with growth in a sustainable way

Auckland is projected to account for about half of New Zealand's population growth by 2050 and it could grow by another 720,000 people to be a city of 2.4 million. Natural increase is projected to account for half of the growth, and net migration (arrivals less departures) the remainder.

The scale of Auckland's growth is putting significant pressure on housing and infrastructure. By 2050, approximately 320,000 new homes will be needed across Auckland.

Unsupported growth will reduce quality of life, disproportionately impact disadvantaged communities, and jeopardise the ability of New Zealand to reduce its carbon footprint and meet climate change commitments.

The transport sector is responsible for 44 percent of Auckland's GHG emissions. Unsupported growth will mean a higher reliance on private vehicles which increase Auckland's GHG emissions which results in harm to the environment. Government and Auckland Council would be unlikely be able to achieve their commitments to achieve net zero GHG emissions by 2050.

Most of the future growth will happen in urban areas

Historically, Auckland's population has been accommodated in suburbs and low-density developments.

¹¹ <https://www.aucklandccmp.co.nz/outcomes/outcome-10-prosperous-city-centre/economic-prosperity-in-aucklands-city-centre/>

¹² Back to the future? Airline sector poised for change post-COVID-19, McKinsey (2021)

Since the turn of the millennium there has been an increase in greenfields growth and inner-city development, including infill housing. The number of new medium-high density housing developments has increased as developers and residents have realised the benefits of more intensified development. This has particularly been in the city centre, but also in the city edges, as the urban limits are reached. Where zoning permits, more densification is happening around existing rapid transit nodes. This reflects market trends towards higher density living as well as recent changes in planning policies, to enable more density in locations with good access to public transport and amenities.

Greater population and employment densities around key transport corridors makes public transport more accessible and viable and more necessary.

The move to more intensive development is set to continue with some 60-70 percent of Auckland's future growth planned to occur in existing urban areas.¹³ As further and more intensive mixed-use development happens, the additional travel demand will in many cases exceed the capacity of current bus services.

There are a range of significant benefits from increasing housing and employment opportunities through compact and connected urban development, rather than urban expansion.

Urban areas give people more opportunities for social inclusiveness, better access to a range of amenities, less cost and shorter travel distances to where they need to go.

Drawing more people into urban Auckland will help significantly shrink the country's overall GHG emissions. Low-density developments produce nearly four times the GHG emissions of high-density alternatives¹⁴, with research finding that doubling urban density can reduce carbon pollution from household travel by nearly half and residential energy use by more than a third¹⁵. In addition it will lower the impacts on natural environments e.g. reduced biodiversity, polluted waterways¹⁶, polluted air.

However, to realise these benefits, growth needs to deliver quality housing outcomes - homes that people want to live in and to ensure that the rich diversity of communities remains. This means a pleasant environment, with good access to places people need to go.



Low density



Medium density



High density

Māori have diverse interests in urban development and a wide range of aspirations for how Auckland will contribute to their wellbeing

Māori are interested in improving a wide range of social and economic outcomes and what is good for Māori wellbeing will also provide benefits to the wider community. Māori have a particular focus on addressing inequities for Māori such as socio-economic issues including housing affordability and access to educational pathways and employment.

¹³ Auckland plan 2050

¹⁴ Density, Carbon Emissions, Transportation and Energy Efficiency ([link](#))

¹⁵ <https://css.umich.edu/factsheets/us-cities-factsheet>

¹⁶ Future Urban Land Supply Strategy – July 2017

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Mana Whenua as kaitiaki have a long and enduring relationship with their ancestral lands and natural resources including people, as expressed through the complex concept of kaitiakitanga.

Incorporating Mana Whenua history and culture into the urban design and planning process will help develop clear sense of space and a rich cultural identity.

Growing Te Ōhanga Māori the Māori economy will contribute to whānau intergenerational wealth. This will be enabled by increasing access to employment and job creation opportunities in all disciplines and at all levels of the workforce.

Investing in Māori outcomes and providing opportunities for a true partnership approach as envisaged under Te Tiriti o Waitangi Treaty of Waitangi will be critical in shaping urban growth to enable natural, social and economic outcomes.

A CITY SHAPING OPPORTUNITY - THE CITY CENTRE TO MĀNGERE CORRIDOR

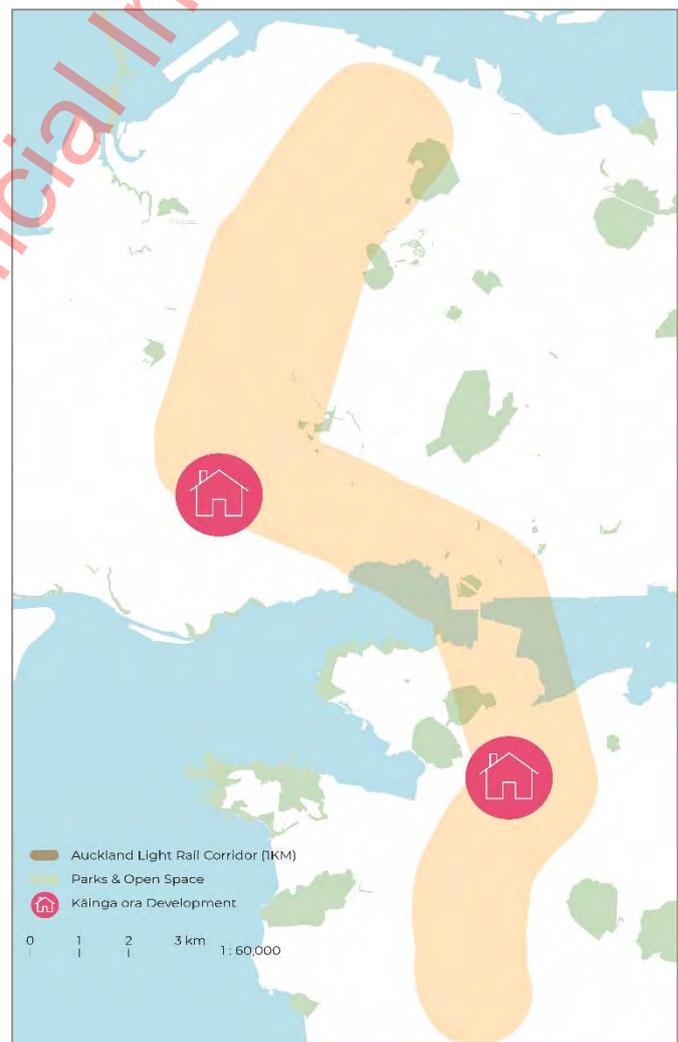
Auckland is making strategic choices about where and how this growth occurs. A key opportunity to unlock this growth is through quality compact urban development along the CC2M corridor.

The CC2M corridor stretches 28 kms from the densely populated city centre, through the well-established suburban and residential areas in the isthmus (Mt Roskill to Ōnehunga). It continues into Māngere and reaches its southern extent at airport business precinct (see map below).

The CC2M corridor is the location of significant employment hubs in Auckland – 24 percent of Auckland’s jobs lie down CC2M corridor. The city centre is a primary focal point for employment and the location for the highest value jobs, with the area around the airport another major and growing employment centre. It is expected that 33 percent of Auckland’s job growth will be along CC2M corridor.¹⁷

The CC2M corridor also has two of Auckland’s major tertiary institutions close to the route - University of Auckland (UoA) and Auckland University of Technology (AUT).

Intensifying development along the CC2M corridor will make it easier for people to access those jobs, education, and associated social opportunities. It will improve Māori access to educational institutions such as the



¹⁷ <https://at.govt.nz/projects-roadworks/auckland-light-rail-project/>

University of Auckland and Auckland University of Technology. It will also provide access to marae, Kura Kaupapa Māori and Kōhanga Reo and Te Whare Wānanga o Aotearoa in Māngere, and along the route, will support Māori communities by improving access to Māori education.

Places and sites of significance for Māori

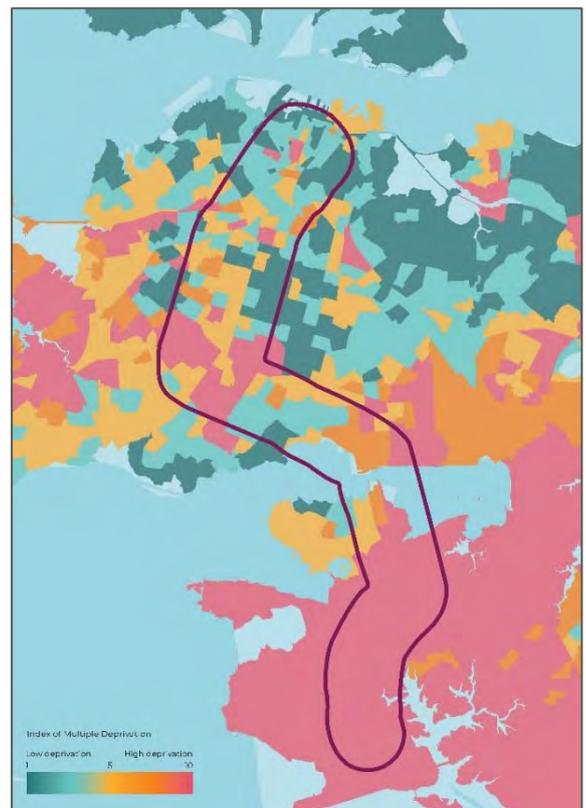
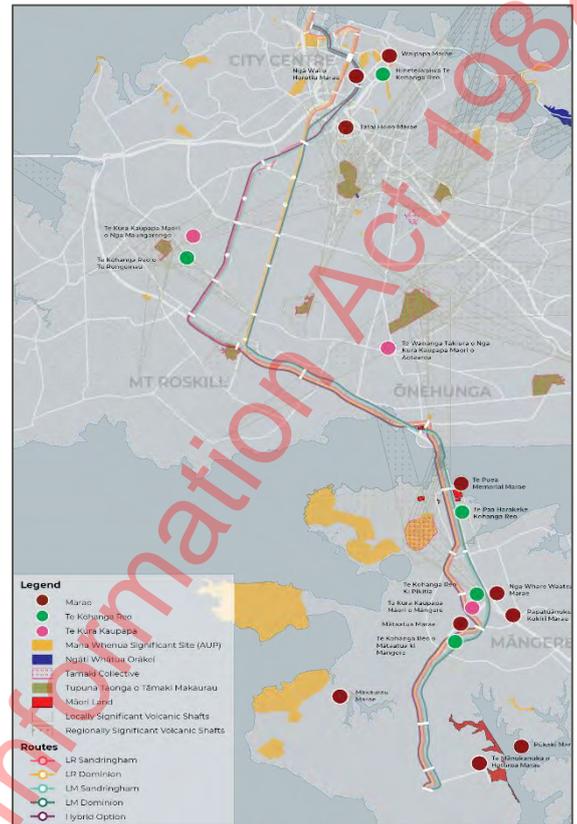
Māori have several places and sites of significance along the corridor. Manukau Harbour is of high significance to Māori. In engagement with Mana Whenua they stated that they wished to ensure that cultural values are protected, and any investment in rapid transit avoids, remedies and mitigates impact on the Manukau harbour and the values of Mana Whenua.

People living along the CC2M corridor

A diverse range of communities live in the suburbs along the CC2M corridor

185,000 people, or 11 percent of Auckland's population live within one kilometre of either side of the CC2M corridor. It is the location of some of Auckland's most deprived suburbs (see right).¹⁸ It is also home to Auckland's largest employment hub – the city centre. It accounts for 7.4 percent of New Zealand's GDP making it the single highest concentration of GDP generation in New Zealand and as such is an incredibly important economic resource of national significance.

The city centre is made up of high-density housing, mainly apartments. At the last Census, 33,222 people lived in the city centre in 17,742 households – a population about the size of Whanganui.¹⁹ This is an 11.8 percent increase since the 2013 Census. Over 90 percent of the population is NZ European and Asian. 120,000 employees are based in the city centre making it the biggest employment hub in New Zealand. It is the country's largest fastest growing residential area, and many new apartments are currently proposed, or under construction.



¹⁸ [deprivation map](#) from the Auckland plan supporting material [Auckland plan and supporting material](#)

¹⁹ All numbers in this section are based on the 2018 census using 2018 statistical areas.

Mt Roskill has 17,319 people living in this area in over 12,030 households (a 7.4 percent increase since the 2013 Census). The majority are NZ European and Asian (80 percent), with a median age of 38.3 years. Whilst overall its level of deprivation is lower than Auckland's average, it has pockets of high deprivation.

11,772 people live Ōnehunga in over 4,278 households. The majority are NZ European and Asian (83 percent) with 10.7 percent Māori, and 16.2 percent Pasifika peoples. Several areas of nationally significant industrial and light-industrial sites with high-value manufacturing are based in this area.

Over the Manukau harbour is Māngere and the airport business precinct. 21,363 people live here, in 4,317 households with a larger number of family households. It has a young and diverse population with 27 percent of its population under 15 and strong Pasifika (68 percent) and Māori (16.5 percent) communities. It is also one of the highest deprivation areas in Auckland²⁰. Income and employment levels in Māngere are far below the rest of Auckland. The unemployment rate in Māngere is 6.3 percent, compared to 4.1 percent for the rest of Auckland.²¹

The airport business precinct is also a major employment centre with 28,800 employees are based in the airport business precinct and the airport industrial corridor.²² It is one of several large employment areas in Auckland including areas such as the Wiri, Manukau, Penrose and Ōnehunga, and the East Tamaki Highbrook areas.

Considerable growth is expected along CC2M corridor

Population and jobs are forecast to grow along CC2M corridor - a 40 percent increase in population and 48 percent increase in jobs by 2051 (see below). Without any investment in rapid transit, this corridor is forecast to grow from 60,000 households in 2021, to 91,000 households by 2051. This equates to an increase of 30,000 households which is 10.5 percent of Auckland's total household growth.



However the current transport infrastructure will not enable that level of growth. There are already significant transport issues, including significant congestion and equity issues (see page 54). These will lead to people living in lower quality poorly connected urban environments with inadequate public transport, highly congested roads and perpetuate inequity for future generations. It will adversely affect anyone trying to travel into the city centre in peak hours regardless of where they live in Auckland.

²⁰ [deprivation map](#) from the Auckland plan supporting material [Auckland plan and supporting material](#)

²¹ Stats NZ Census 2018

²² <https://www.greaterauckland.org.nz/2019/11/26/city-centre-employment-keeps-growing/>

Urban development along the CC2M corridor

The CC2M corridor has significant potential to shape quality compact growth in Auckland, to create vibrant, thriving, and connected places where people can live affordably, work locally, and have access to more opportunities

Rapid transit and urban interventions will facilitate more of Auckland's growth to occur within the CC2M corridor, which will reduce pressure for greenfield development, with the liveability, financial and environmental impacts that entails. It will also make efficient use of current infrastructure and lessen the need for new infrastructure to serve greenfield areas and improve the performance and value for money of the proposed rapid transit investment.

Urban development has already started. Government has committed \$3.8 billion in investment to accelerate housing delivery to redevelop large area across Auckland, including in Mt Roskill, Ōnehunga and Māngere (see purple houses on the CC2M corridor map on page 46). This equates to 21,000 homes, although not all of these within the corridor.

Parts of the CC2M corridor have also been identified in the Auckland Unitary Plan (AUP) as areas for intensification over the next 30 years.

Urban growth and transport investments must be integrated to achieve both urban and transport outcomes in CC2M corridor.

Right-sized well-located transport is critical to the success of quality compact urban growth. Rapid transit presents an opportunity to enable medium to high density development in the CC2M corridor, particularly around stops/stations. It would provide sufficient capacity for large volumes of people to access work and amenities, benefiting from a good quality of service (including speed and reliability). It would encourage people out of their private vehicles and into public transport ('mode shift'), freeing up road space for those who need to drive, e.g. freight and deliveries.

International experience suggests that recognising what communities value in their neighbourhoods is key to urban development and enabling sustainable growth.

The following case study shows how the Vancouver SkyTrain has supported urban development in Canada.²³

²³ [Metro Vancouver Rapid Transit Presentation, Dan Doyle](#)

Case Study: Vancouver SkyTrain

The SkyTrain is a medium-capacity rapid transit system in Vancouver, serving the city-centre and surrounding municipalities. It has 79.6km of track and 53 stations served by three lines. The most recent expansion was the Canada line completed in 2010 to support the Winter Olympics.



SkyTrain has had a significant impact on the development of areas near stations and has helped to shape urban density in metropolitan Vancouver. Between 1991 and 2001, the population living within 500 m of SkyTrain increased by 37 percent, compared to the regional average of 24 percent.²² Since SkyTrain opened, the total population of the service area rose from 400,000 to 1.3 million people.²³ According to BC Transit reviews SkyTrain is: “A catalyst for development, more than \$5 billion of private money had been invested within a 10–15-minute walking distance of the SkyTrain”, including investments in commercial and residential high and medium density development.²⁴

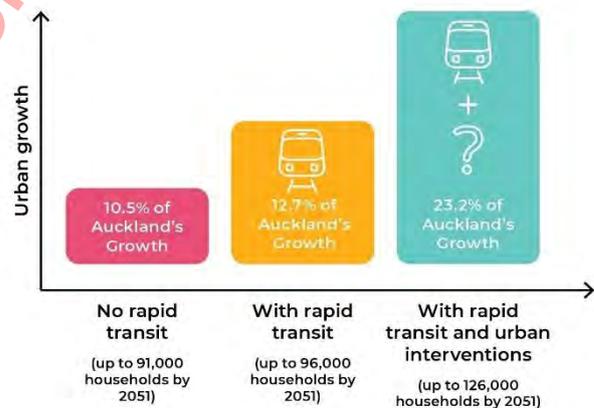
Much of Metro Vancouver’s future – where residents live, work, and play – will revolve around areas served by SkyTrain stations, where the region is already experiencing its greatest urban transformation projects. Already today, 90 percent of residents within Vancouver City are within a 10-minute walking or cycling distance from a frequent transit stop.

On its own rapid transit will not be enough to deliver the level quality compact urban development where people want to live.

There are currently 60,000 households along the CC2M corridor. By 2051 without any interventions it is forecasted that 30,000 additional households will be added – 10.5 percent of Auckland’s growth.

Investing in rapid transit is forecast to increase to 35,000 households over the next 30 years, that’s 5,000 more households than no transport intervention. This equates to 12.7 percent of Auckland’s household growth.

When the urban interventions are added to the investment in rapid transit the number of additional households is forecasted to potentially be 126,000 households. This equates to quarter That means a quarter of Auckland’s growth inside the Rural Urban Boundary is accommodated in the CC2M corridor.²⁴.



The distribution and form of this growth will be critical to realising the full benefits of the proposed investment.

Interventions are needed to catalyse the right level and quality of density uplift (see Appendix 1).

²⁴ The Rural Urban Boundary identifies land potentially suitable for urban development. It defines the extent of urban development over 30 years and areas likely to be kept rural.

TRANSPORT CONTEXT

This section looks at the current state of Auckland’s and the CC2M corridor’s transport networks. It also looks at the future role rapid transit along the CC2M corridor can play in addressing Auckland’s transport needs.

Auckland’s current transport networks

Historically, Auckland’s population has mostly been accommodated in low-density housing. This has made it difficult and expensive to serve with public transport and has led to a high dependency on private vehicles.

That reliance on private vehicles is having an adverse impact on the climate, congestion and health. As the population grows and the number of private vehicles increase these problems will continue to grow.

Private vehicles are a big source of GHG emissions which is impacting on climate change

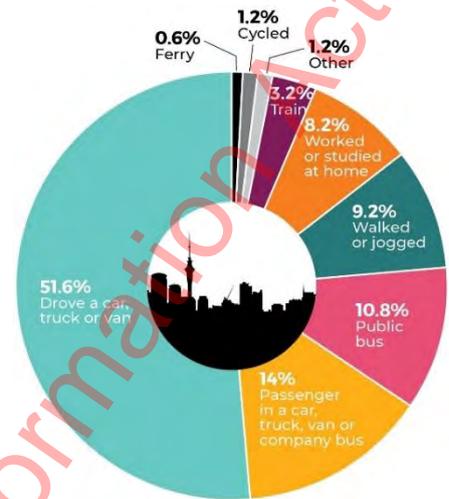
The recent Intergovernmental Panel on Climate Change IPCC report 2021²⁵ found that New Zealand land areas have warmed by 1.1C between 1910 and 2020 and that this warming will continue. New Zealand will become a land divided by weather extremes – rain will batter the west and south leading to floods, while high temperatures will bring drought and more risk of fires to the east and north.

Over the last decade, Auckland has felt the impacts of heavy rain events, storm surges and coastal inundation, extreme heat events, and droughts. Erosion and storm surges have impacted on Māori coastal communities particularly marae. These climate change impacts are expected to increase in frequency and severity.

Climate change is caused by GHG emissions. Transport is the second biggest source of GHG emissions in New Zealand. Across New Zealand the transport sector is responsible for 47 percent of all GHG emissions - 90 percent by road vehicles.²⁶ In Auckland 44 percent of Auckland’s GHG emissions comes from the transport sector.

Strong population growth has continued to put pressure on Auckland’s transport network

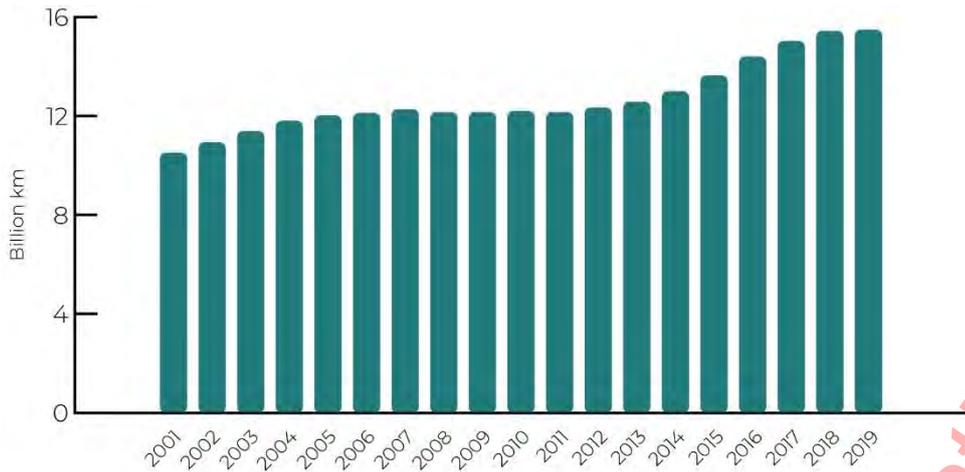
Rapid and ongoing population growth has seen continued growth in vehicle numbers and the distance travelled by Auckland’s vehicles. The next figure shows the growth in vehicle kilometres over the last 19 years.



²⁵ <https://www.ipcc.ch/report/ar6/wg1/>

²⁶ [New Zealand's greenhouse gas emissions, Stats NZ](#)

Figure 3: The rise in vehicle kilometres travelled in Auckland (2001 to 2019)



The result has been increased in congestion in both the peak and interpeak periods. The opening of the Waterview Connection and SH16 improvements in 2017 have held congestion levels relatively steady at a regional level, although there were indications pre-COVID-19 of a return to an upward trend. This growth, combined with the legacy of under-investment in public transport, means substantial parts of the strategic bus and road networks are heavily congested and performing inefficiently.

On average, Aucklanders spend near 80 hours stuck in congestion each year²⁷, leading to lost income, lost time, and additional pollution. It is estimated that congestion costs the Auckland economy around \$1.3 billion per year – or \$65 billion over 50 years²⁸. Traffic congestion, lack of affordable housing within the city, and poor public transport service have all been cited among the top reasons why 23 percent of Aucklanders already feel their quality of life is declining.²⁹

Without intervention, the population growth will continue to result in increased road congestion for Auckland. It is expected that:

- the proportion of vehicle travel spent in severe congestion is expected to increase by 29 percent in the peaks and by 38 percent in the interpeak by 2045.³⁰
- vehicle kilometres travelled across Auckland is expected to increase by 48 percent by 2045.³¹
- public transport trips will grow from approximately 275,000 (pre-COVID-19) to over 700,000 per day by 2051.³²
- Road-based freight movements are also expected to increase by over 30 percent over the next 30 years.³³

²⁷ AA (2018). Auckland congestion report 2018.

²⁸ NZIER. (2017). Benefits from Auckland road decongestion.

²⁹ Auckland Council. 2020. Quality of Life Survey 2020. Topline Report

³⁰ The Congestion Question

³¹ MSM transport modelling outputs

³² MSM transport modelling outputs

³³ Auckland Transport 2020. Auckland [Freight Plan](#)

The ongoing impact of COVID-19

COVID-19 has led to more remote working for office workers and university students, which has temporarily reduced demand and congestion. It is unlikely that Aucklanders will completely return to pre-pandemic levels of working from home, but in the long term the effects will be minor and short lived with increases demand being delayed by about two years.

A recent review of the Australian productivity commission found while increased working from home may change how cities work to some extent, the economic benefits of people clustering together are expected to remain. They found that there will be a process of change and adaptation will mitigate the initial effects of an increase in working from home so:

- A decline in office rents will likely limit the overall exit of firms from the centre of cities, as well as attract new businesses to locate closer to the central business district (CBD).
- The benefits of businesses working in close proximity – sharing, matching and learning – remain strongest in high density areas like CBDs.
- Many firms will experiment with hybrid or work-from-anywhere models and will maintain their CBD offices because of their accessibility.

In any event, with between 30,000 to 66,000 additional households forecast along CC2M corridor and Auckland’s additional population growth, any decreases in congestion due to changes in working patterns will be short lived.

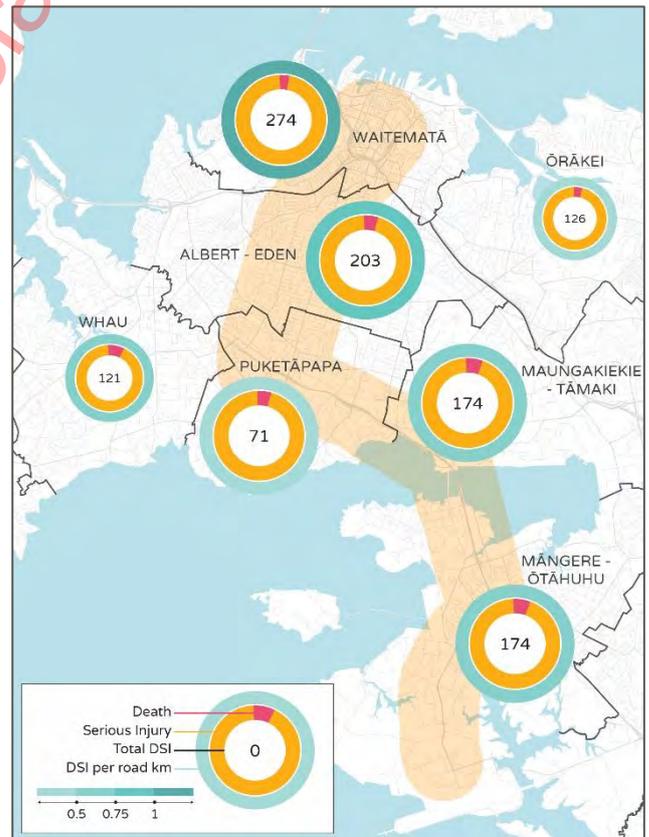
Private vehicles are having an adverse impact on health

The first way vehicles cause health issues is the air pollution they generate³⁴. Vehicle emissions contribute to poor air quality. Vehicles typically emit air pollutants such as particulate matter (PM), carbon monoxide, CO, volatile organic compounds (VOCs, as unburned hydrocarbons), and oxides of nitrogen (NOx).

The main health effects of PM are through causing breathing difficulties and exacerbating respiratory diseases, such as asthma, cardiovascular disease, and chronic obstructive pulmonary disease, with potential for premature death.

Since 2014, Auckland’s road safety performance has worsened at a faster rate than the national average

Most safety issues are on local roads as opposed to motorways. From 2014 to 2018, 92 percent of road deaths and 60 percent of serious injuries are on 50km/h roads.



³⁴ <https://www.cph.co.nz/your-health/air-quality/>

Commercially sensitive – Do not distribute

Research shows people living in lower income areas have a significantly higher risk of experiencing road traffic injuries, particularly young adults, children, and the elderly.

From 2014 to 2018 the Local Board areas that the CC2M corridor straddles have experienced a disproportionate number of deaths and serious injuries by distance travelled.³⁵ Māori have the highest death and serious injury rate in Auckland.

Children living in the most socio-deprived areas have a three times higher injury rate than children living in the least deprived areas. This is also higher for Māori and Pasifika children in these communities.

Senior citizens aged 70 years and over have the highest rate of walking-related deaths and serious injuries per capita, because they are often physically vulnerable and have limited transport choices.

Children, elderly people, and those with respiratory diseases are more vulnerable to air pollution and areas of high deprivation have greater excess mortality from air pollution. New Zealand research suggests that ambient air pollution is responsible for an estimated 970 premature deaths nationally each year in people over 30 years of age, approximately 400 of which are from vehicle emissions.

Transport along the CC2M corridor

The CC2M corridor is a busy commuting route and journey times along CC2M corridor are highly variable

North of the Manukau harbour – a congestion story

As an important employment hub, the city centre is a major destination for commuters across Auckland. This leads to significant congestion during commuting hours.

While most of the traffic consists of private vehicles³⁶, the city centre is also the destination of several major bus routes. Four of Auckland's six busiest bus corridors are located within the central isthmus, including services along Dominion Rd and Sandringham Rd. These four routes account for over 40,000 trips per weekday, around 20 percent of Auckland's total bus journeys.

Even as double-deckers are added to the bus fleet, both the buses and the streets themselves are getting increasingly crowded. This affects the amenity, attractiveness, and efficiency of the city centre. Due to the congestion, bus journey times are increasingly unreliable and significantly longer than private vehicle equivalents, due to lack of consistent priority measures along CC2M corridor and sufficient kerb space for stops/stations and layovers.

In the short term, the ongoing rollout of double-decker buses will deliver more capacity. But in the long-term the number of buses required to accommodate expected growth in passenger demand in the city centre would have to double over the next 30 years.³⁷ Whilst additional public transport capacity will be provided through City Rail Link, this will primarily benefit those other



³⁵ CAS and RAMM databases for 2014-2018 (June 2019) 5-year Total DSI per km on Auckland Transport roads.

³⁶ On average each private vehicle has 1.2 people in it.

³⁷ [Auckland Transport Bus Reference Case 2020](#)

corridors already served by rail, which excludes CC2M corridor south of the city centre through to Māngere and the Airport.

As urban growth increases just adding more buses to add capacity will not work

Continuing to add buses is not a viable solution to growing travel demand, because of spatial constraints, the additional congestion this would cause, especially in the city centre alongside the negative impacts on urban quality and liveability (see figure for ability to meet demand).



The ability of buses to operate effectively at higher volumes is constrained by CC2M corridor's spatial configuration and traffic density. These issues include:

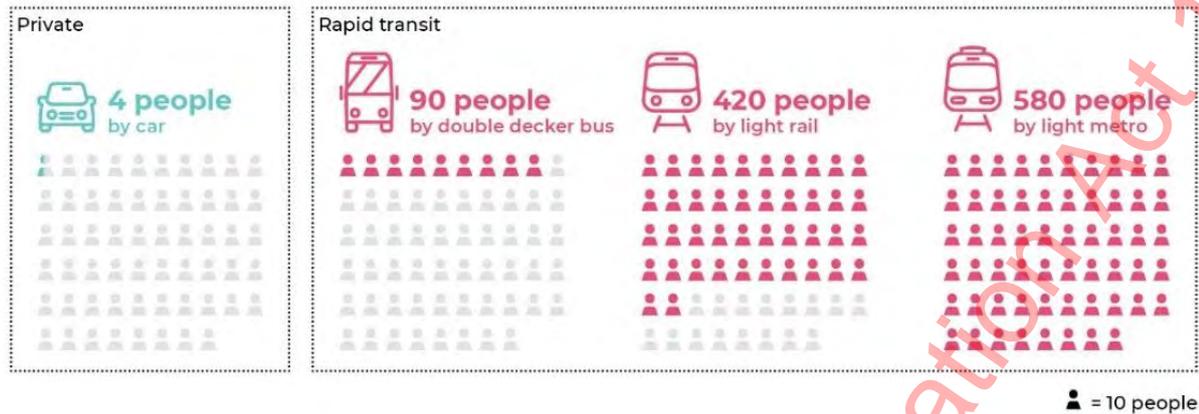
- increasingly limited movement and stopping space within the city centre and on key corridors like Symonds St and Wellesley St
- lack of alternate routes to spread demand to
- limited turnaround opportunities for terminating services
- frequent intersections that limit the number of buses able to travel along key corridors

Higher volumes of buses also increase the need to invest in major additional infrastructure e.g. substantial off-street termini, etc. There is limited space for this infrastructure, and property costs in the city centre are becoming prohibitively high.

Increased bus congestion leads to poor service quality and reliability, as well as over-crowding. This reduces the attractiveness of public transport as an alternative to private vehicles. The high volume of buses also reduces the liveability of the city centre. Although the bus fleet will in the longer-term transition to electric operation, the current diesel fleet contribute to poor air quality, and their visual impact ('walls of buses') has an impact on city centre amenity.

This means that supporting increased population and employment density by adding more buses is not a viable long term transport solution. Denser urban environments mean a rapid transit solution that has more capacity so more people can travel along the CC2M corridor at peak hours is needed, such as light rail.

Other forms of rapid transit carry more people per trip than private vehicles and buses



South of the Manukau harbour – an equity story

The airport business precinct is also a significant and rapidly growing employment hub. Transport needs are forecast to grow, with a significant increase in the number of people working in and around the airport and growth in air passengers (post-COVID-19). Even if air passenger growth is delayed, there is still expected to be strong employment growth in the surrounding airport business precinct, driving increased travel demand. Access to and from the airport business precinct by private vehicle is limited to two corridors (SH20A and SH20B), and around 86 percent of current trips to the area for work are made by single occupant vehicles.³⁸ There are around 83,000 daily vehicle trips to the area, and this is expected to more than double to 170,000 by 2046.³⁹

Public transport journey times from Māngere are lengthy and often unreliable. It takes more than twice the time using public transport than private vehicles to travel to key employment centres such as the city centre. It takes more than 50 minutes on average from the airport to the city centre by either private vehicle or public transport. At recent community engagement sessions the time and cost difficulty of getting to the city centre for education or work was a recurrent theme.

This means private vehicles account for 85 percent of all journeys to work by Māngere residents. A 2018 survey found public transport does not provide an attractive and realistic service for residents of Māngere-Ōtāhuhu and other areas with high levels of deprivation in CC2M corridor including Puketāpapa, Maungakiekie-Tāmaki (Table 5).

Table 5: "Over the past 12 months, how often did not you use public transport?" (Quality of Life Survey, 2018)

Did not use public transport over the past 12 months	Waitematā	Albert-Eden	Puketapapa	Maungakiekie-Tamaki	Māngere-Ōtāhuhu
	15 percent	16 percent	38 percent	31 percent	44 percent

Poor public transport services affect lower socio-economic communities more for financial reasons. People may be confined to their local area, particularly if owning and maintaining a vehicle is not an available option. A 2016 report on closing income gaps in South Auckland identified that long commutes are a key constraint to finding work.⁴⁰

³⁸ Census 2018

³⁹ Waka Kotahi (2017). Auckland Airport Access Supplementary Programme Business Case

⁴⁰ NZIER (2016). Resilient South, a strategy for closing income gaps in South Auckland

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Accommodating this travel growth on existing transport networks will be challenging, as current infrastructure and public transport services are already struggling to meet the travel needs of people accessing the airport business precinct. Without investment in rapid transit to allow more people can travel along the CC2M corridor at peak hours, significant roading investment and vehicle demand management restrictions will be needed. This will adversely impact the attractiveness and efficiency of business and employment in South Auckland and, to a lesser extent, the area around it.

The future of Auckland's Rapid Transit Network (RTN)

Aucklanders have shown that they will make the mode shift to quality public transport

The Britomart Train Station opened in 2003 and the Northern Busway opened in 2008. 40-50 percent of people who now come across the harbour bridge use the busway.

Use of these rapid transit facilities and networks has substantially increased. Annual train usage (patronage) increased 755 percent between 2003 to 2019 (2.5 million to 21.4 million) and annual bus patronage grew from 43.6 million in 2008 to 73.1 million in 2019.

In recent stakeholder engagement 73 percent of people said that they would use rapid transit.

One network - the CC2M investment will be part of the wider integrated Rapid Transit Network

The proposed investment would not be done in isolation – it is part of a current and future Rapid Transit Network (see diagram to the right).

One of the most important outcomes of the ATAP in 2016 was central and local government agreement that Auckland needed a regionwide rapid transit network and that a co-ordinated approach is needed. This is because only rapid transit can provide the step change in capacity and quality of service (including speed and reliability) needed to attract significant mode shift and drive improvements in access, urban growth and emission reductions goals.

ATAP found that rapid transit along the CC2M corridor will ideally be future proofed for integration with the future Northwest and North Shore rapid transit corridors. This will ensure the best value for money from what will be a significant investment in the CC2M corridor and enable benefits to be realised on those corridors in the future.

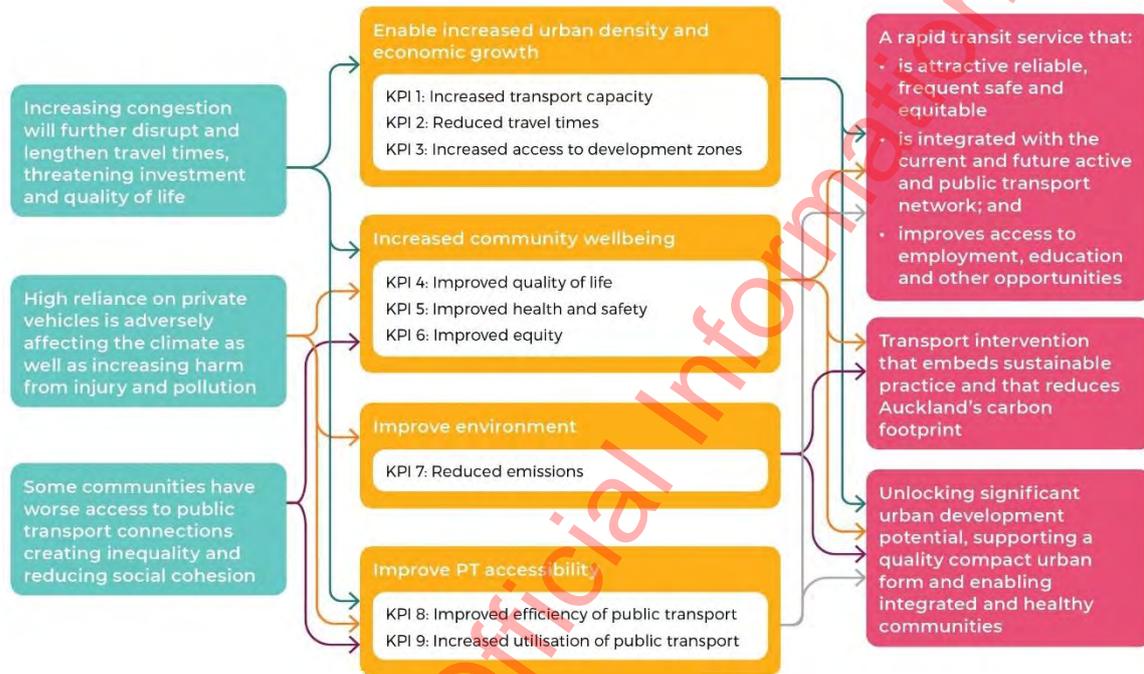
In recent stakeholder engagement people said that they want rapid transit to be well connected to existing transport networks, including trains, buses and active modes of transport (walking and cycling).



ADDRESSING THE PROBLEMS CAUSED BY RAPID GROWTH

The impact on the traveling public, communities and the environment caused by current and projected future growth were identified during a facilitated Investment Logic Map (ILM) workshop. The workshop identified three problems, the four benefits of addressing these problems and three investment objectives for a solution to address these problems. The complete investment logic map, including benefits key performance indicators, is shown below.

Figure 4: Auckland Rapid Transit Investment Logic Map



The problems

Problem 1: Increasing congestion will further disrupt and lengthen travel times, threatening investment, and quality of life (50 percent)

The transport context section has demonstrated that travel within the CC2M corridor is already being affected by congestion. Increasing bus services is not a long-term solution and does not facilitate the needed lift in density.

The potential impacts of increasing congestion are set out below:



Quality compact urban growth will be compromised

Growth the CC2M corridor will be:

- limited which would contribute to further urban sprawl and private vehicle based neighbourhoods will require new infrastructure and worsen congestion, or
- delivered in a sub-optimal way which comprises the people and place value of quality, compact areas less attractive places to live.



Quality of life will decline

- Increased travel time, especially commuting time, decreases time available for social activities, community engagement and recreation



Business investment and job growth will slow, and economic efficiency will reduce

Auckland's attractiveness as a place to do business will be reduced as:

- Employee's commute times to key job hubs, in the city centre and the airport business precinct, become longer, less attractive and less reliable
- The movement of goods and services is less efficient and more costly.

The proposed investment cannot and will not eliminate congestion along the CC2M corridor. But it does to allow more people to travel along the CC2M corridor at peak hours without experiencing that congestion. Congestion caused by increasing population density will be minimised. By its very nature rapid transit also bypasses congestion, which will encourage people out of their private vehicles to public transport, enabling more people to travel.

Problem 2: High reliance on private vehicles is adversely affecting the climate as well as increasing harm from injury and pollution (40 percent)

The previous sections have set out how Auckland's urban sprawl has led to a high reliance on private vehicles and is adversely impacting on the climate, health, and the wider environment.

Problem 3: Some communities have worse access to public transport connections creating inequity and reducing social cohesion (10 percent)

The transport section of the strategic case showed that access to fit for purpose public transport is a particular issue for Māngere, which is one of the most deprived areas of Auckland.

The graphic on page 42, shows that lack of access together with social disadvantage creates transport inequity which leads to exclusion and reduced social cohesion.

The following case study shows where rapid transit investment delivered positive equity outcomes.

Case Study: Yarra Trams, Melbourne

Melbourne has expanded over time to become the world's largest operational tram network with 250km of double track (75% of which is shared with other vehicles) supporting over 200 million trips annually across the city, resulting in it being one of the busiest light rail networks in the world.



The scale and use of the network have resulted in material, social, and environmental benefits for the local community. A report by Keolis Downer (2016) indicates that the tram network:

- Contributes between \$730 and \$870 million to Melbourne's social fabric every year.
- Saves \$75 – \$97 million in environmental damage and is 82% less greenhouse gas emissions intensive than driving.
- Increases connectivity, accessibility, independence, and improved well-being for Melbournians who utilise the network.

The benefits of delivering change

This section sets out the benefits of investing in rapid transit. All these benefits assume that quality urban densification will also occur supported by rapid transit and other interventions.

Benefit 1: Enable increased urban density and economic growth (30 percent)

As discussed earlier, investment in reliable and frequent rapid transit is a driver for increased quality urban density as well as major intensification of commercial and other uses in corridor and the critical employment hubs at either end. The combination of investment in more intense housing in housing and employment opportunities, planned around new rapid transit, will ensure that significant economic benefits are unlocked whilst minimising the costs and negative consequences that growth can introduce. Without reliable and frequent public transport, densification will lead to unpleasant places to live because of the increasingly high use of private vehicles.

The location of this corridor means it is uniquely placed to drive that quality urban growth.

The following KPIs will be used to measure the achievement of this benefit:

- KPI 1:** Increased transport capacity
- KPI 2:** Reduced travel time
- KPI 3:** Increased access to development zones

Benefit 2: Increase community wellbeing (35 percent)

Rapid transit will greatly benefit communities that are disadvantaged in terms of transport choices. This is particularly true in areas with proportionately lower vehicle ownership, higher household travel costs and currently limited transport options, such as Māngere.

Rapid transit will help groups that don't have, or who have limited, access to private vehicles such as young people, older people, and people with mobility issues. Rapid transit is highly accessible for all levels of mobility (including people with disability and mobility impaired persons, people with push chairs, travellers with luggage) as passengers can easily enter the vehicles from raised, level-access platforms. This was one of the themes that came out in stakeholder engagement.

Investing in public transport along this corridor will contribute to people's economic wellbeing by improving employment choice and security, ensuring reliable access to jobs and education, access to affordable goods and essential services. Journey times will decrease and the number of jobs accessible to residents within a particular journey time, will increase.

Rapid transit will contribute to positive health outcomes by encouraging more walking and cycling, because more people will walk or cycle to and from stops/stations. Studies have shown there is a correlation between public transport use and physical activity. An Australian study found that public transport accessibility was positively correlated with walking at recommended levels (including for those people who were not actively exercising).⁴¹ These levels of physical activity reduce the likelihood of premature death and sickness.

⁴¹ Barr, A., Rebecca B., Julie A. S., Jan S., Neville O., David D., Lukar T., Lauren K., and Anne K. (2016), Associations of public transport accessibility with walking, obesity, metabolic syndrome, and diabetes. Journal of Transport & Health, Volume 3, Issue 2,

The following KPIs will be used to measure the achievement of this benefit:

- KPI 4:** Improved quality of life
- KPI 5:** Improved health and safety
- KPI 6:** Improved equity

Benefit 3: Improve environment (15 percent)

Half of people engaged with said that reducing Auckland's carbon emissions is very important to them. During stakeholder engagement people told us that they are supportive of potential positive impacts that rapid transit could have by offering a mass transit option to Aucklanders that takes cars off the roads.

Investing in rapid transit along the CC2M corridor will contribute to mode shift and reduce Auckland's high reliance on private vehicles. This will:

- reduce the GHG emissions and their impact on the environment
- improve air quality
- reduce contamination of the physical environment.
- reduce the physical footprint of transport infrastructure by moving more people with proportionately less footprint

Urban expansion has adverse impacts on natural environments e.g. reduced biodiversity, polluted waterways⁴². Increased intensification will reduce pressure for that expansion to take place.

It can also have a detrimental effect on Mana Whenua Values which are tangible and intangible.

The following KPI will be used to measure the achievement of this benefit:

- KPI 7:** Reduced transport emissions

Benefit 4: Improve public transport accessibility (20 percent)

Expanding rapid transit capacity along the CC2M corridor will add to and further integrate Auckland's transport network. This will help to create a much larger and integrated rapid transit network that serves the whole of the city. By connecting with the existing heavy⁴³ rail network, with buses and active modes of transport at key locations, and with proposed future rapid transit corridors, accessibility will be extended to a much wider area than just along CC2M corridor and will capture additional value from the existing City Rail Link investment. This extends where people can travel by rapid transit. Without rapid transit along the CC2M corridor there will be a gap in the network.

This, combined with reliability and timeliness, will make public transport more attractive and accessible, further helping to attract people out of private vehicles. Increases in patronage, will lead to greater fare revenue to invest back into improving services.

The following KPIs will be used to measure the achievement of this benefit:

- KPI 8:** Improved efficiency of public transport
- KPI 9:** Increased utilisation of public transport

⁴² Environment Aotearoa 2019

⁴³ Heavy rail trains are used for freight as well as passengers

THE SCOPE AND OBJECTIVES FOR THE PROPOSED INVESTMENT

To address the problems and realise the benefits identified at the ILM, three investment objectives for a rapid transit solution along the CC2M corridor have been identified. These objectives will be used in the economic case to assess potential rapid transit options and identify the best solution for the CC2M corridor.

Investment objectives



Objective 1: Implement a rapid transit service that:

- Is attractive, reliable, frequent, safe, and equitable
 - Is integrated with the current and future active and public transport network
 - Improves access to employment, education, and other opportunities.
-



Objective 2

Devise a transport intervention that embeds sustainable practice and reduces Auckland's carbon footprint



Objective 3

Unlocking significant urban development potential, supporting a quality compact urban form, and enabling integrated and healthy communities.

Investment scope

The following sets out what is in-scope for this investment:

- capital investment in transport infrastructure to service the public transport needs of people along the CC2M corridor
- integration with other transport system operations that may be changed because of the proposed investment (e.g. connector buses, local roads, etc)
- development of an Urban Development Programme including a delivery action plan to achieve urban outcomes, supported by rapid transit.

The following are matters that may be impacted by the proposed investment, but are beyond the scope for investment for this business case for now:

- improvements to other infrastructure that may be required by central or local government to facilitate development unlocked through this investment
- specific transit-oriented land acquisitions and development at and around proposed station locations
- development of the wider rapid transit network for other areas of Auckland.

Some of these areas may come into scope in the detailed business case.

FACTORS THAT WILL AFFECT CERTAINTY

This section sets out the factors that will affect certainty in the investment.

Investment assumptions

The following table set out the **key** assumptions that have been made for this business case.

Assumptions	Description
Government enabled housing	Kāinga Ora will continue to build new homes along the CC2M corridor
Capable resources with capacity	The proposal assumes that sufficient skilled resource can be sourced/trained.
Growth assumptions	Population growth will continue in line with Statistics New Zealand’s medium projection.
COVID-19	There are minimal long-lasting impacts associated with COVID-19 regarding travel behaviour, and this will not require changes to construction or operational requirements.
Climate change	Legislation and policy changes will drive mode shift.
Legislation	No legislative change is required to deliver the Project (with the exception of any legislation required for any new value capture tools that the Government may choose to implement).
Funding	Funding will be committed for a multi-year period for detailed planning, design and consenting, before the final investment decision is made.

Investment constraints

A constraint is a limitation or a restriction on what can be achieved, how it can be achieved and when it can be achieved. The following table set out the **key** constraints for this IBC.

Constraints	Description
Available Funding	There are a significant number of competing priorities for infrastructure funding. Depending on the proposed solution, the availability of funding may be a constraint.
Existing environment – natural and built	The existing environment has a significant number of constraints on the proposed investment. This can come in the form of the natural environmental features such as water bodies, volcanic cones and tuff rings, and topography. The built environment also presents a substantial number of constraints, including existing buildings, private property, cultural property, parks and open spaces, and other features associated with the historic development of Auckland.
Existing and planned infrastructure	There has already been significant investment in infrastructure over the last 100+ years, e.g. underground water, gas, and other utilities. Therefore, the location and nature of this infrastructure is highly likely to place a constraint on future investment decisions. Care will need to be taken to ensure renewal plans for this investment are integrated where appropriate into the augmentation (growth) investments of the nature being proposed here.

Investment dependencies

An investment dependency is something that prevents the proposed investment being completed or impacts on its ability to be completed until one or more other conditions, events, or tasks have occurred. Dependencies can impact on the ultimate success of the investment proposal. As emphasised throughout the strategic case, the importance of the integrated delivery of rapid transit and urban development is essential to achieving the benefits identified. The table below sets

Commercially sensitive – Do not distribute

out the **key** dependencies to delivering this Project from both a rapid transit (RT) and an urban development (UD) perspective.

Dependencies	UD	RT	Description
Whole of government approach			The establishment of a governance and whole of government partnership framework which can secure urban development outcomes driven by the rapid transit investment, and which is capable of initiating urban change to deliver optimum urban development.
Planning			There are likely to be a range of changes required to planning policy to enable and unlock the desired urban development uplift, including but not limited to: <ul style="list-style-type: none"> • amendments to existing AUP requirements for affected and adjacent land e.g. such as minimum parking requirements, overlays, etc. • more directive planning and policy levers to drive intensification and urban quality
Developers			On the assumption that the success of any potential investment is closely associated with the ability to redevelop at pace and scale along the length of CC2M corridor, and the fact that a substantive component of development will be required to be delivered by the private sector at the right time and place, the investment is highly dependent on development feasibility, the capability and capacity of the development industry and private developers' ability to: <ul style="list-style-type: none"> • acquire and amalgamate property • secure financing • obtain the necessary approvals.

Key risks

A risk is something that could impact on the ability of the investment to deliver the desired outcomes. These are separate from project delivery risks, which are identified and described in the Management Case. The following table sets out the **key** risks to realising the desired outcomes.

Risk	Description
Patronage	Patronage is: <ul style="list-style-type: none"> • lower than projected, resulting in lower revenue being collected than assumed and impacting on the overall affordability with higher operating expenses than projected lower and not achieving sufficient mode shift • higher than projected which means it is inadequate for the future and additional investment in adjacent corridors is required.
Urban development	Quality urban development doesn't occur in the manner (scale, location, timing, form) as assumed in the business case, resulting in lower benefits being realised or benefits taking longer to be realised than projected.
Displacement through gentrification	The investment is so successful that those communities the proposal is intended to help, including local businesses and the communities of Mt Roskill and Māngere, are displaced by the regeneration associated with the proposal. This risk was highlighted during engagement with Mana Whenua.
Legislative change	The RMA is being replaced, which gives to uncertainty about the consenting path.
Social licence	The sheer scale of the Project means that construction and property disruption may undermine social licence.
Integration with RTN	Developing a rapid transit solution that does not optimally integrate with the rest of the RTN may lead to future cost in other RTN projects and inefficient sequencing.

CONCLUSIONS FROM THE STRATEGIC CASE

Two questions were asked in the introduction to this strategic case:

- What is the case for investing in rapid transit, integrated with urban intervention, along the CC2M corridor to unlock quality compact urban development?
- Why that investment needed now?

The case for investing in integrated rapid transit along the CC2M corridor

This strategic case has shown that existing transport arrangements do not have the capacity and quality of service (including speed and reliability) needed to deliver future transport needs and quality compact urban growth, attract significant mode shift, and reduce emissions. The Economic Case will show that rapid transit along the CC2M corridor can address those issues.



Auckland's growth can become more sustainable, with quality urban development supported by high-capacity public transport infrastructure. Urban development will reduce the distance people need to travel and the need to use private vehicles. This would provide better accessibility for more people to employment, economic and social opportunities, thereby supporting a more productive and liveable city. Auckland's carbon footprint would be reduced and there would be other positive environmental and health outcomes.

The alternative is:

- Additional housing primarily accommodated through urban sprawl, requiring expensive new infrastructure, and resulting in a high reliance on private vehicles
- Lower quality poorly connected urban development with inadequate public transport and highly congested roads.



Lack of access to suitable public transport would result in more vehicles which would:

- have adverse impacts on the environment including the climate
- reduce Auckland's liveability
- have adverse impacts on people who would have limited travel options with a flow on effects to social cohesion.
- reduce benefits from the Kāinga Ora developments in Mt Roskill and Māngere
- impact on economic performance.

With its access to significant employment and education hubs, the CC2M corridor offers a unique opportunity to create quality compact communities. It also offers deprived communities more housing choice and more affordable more transport options. The lack of rapid transit in the central isthmus and in Māngere is a key contributor to the issues in the area, particularly regarding travel choice.

This case has also shown that while investing in rapid transit will address current and projected transport needs, investment in infrastructure alone will not achieve the urban growth, urban quality and urban renewal required.

That investment is needed now

Decisions made now have a major impact on how people travel and live for years to come.

The strategic case has shown that several urgent issues facing Auckland:

- Rapid projected population growth in Auckland and along the CC2M corridor
- The need to reduce Auckland and New Zealand's carbon footprint to meet commitments and prevent further climate change
- A shortage of housing, including affordable and accessible housing
- Growing social inequity.

Putting in place rapid transit and associated urban development can have a long lead in time. To deal with decisions and to stop adverse outcomes, this transport investment must be made now.

Released under the Official Information Act 1982

THE ECONOMIC CASE | DETERMINING POTENTIAL VALUE FOR MONEY

Released under the Official Information Act 1982

INTRODUCTION

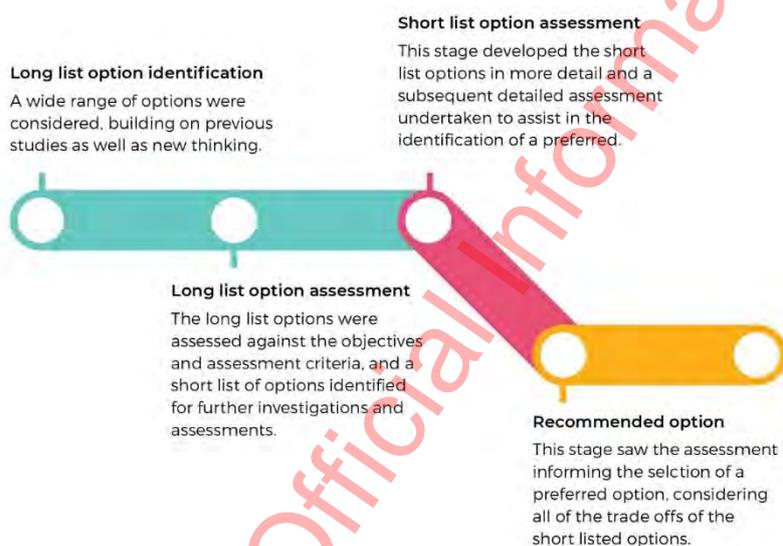
The purpose of the Economic Case is to identify the preferred investment option(s) for the rapid transit mode and its route along the CC2M corridor. This case builds upon earlier work undertaken on the CC2M corridor and other regional rapid transit investigations.

This case will look at how the investment aligns with the urban outcomes identified in the Strategic Case and set out in the Urban Story (Appendix 2 The Urban Story).

THE PROCESS USED

This section looks the process used to get to a preferred option. A four-step option development and assessment process was used (see Figure 5).

Figure 5: Assessment Process



Step 1: Long list identification

Cabinet directed the Establishment Unit to look at options that delivered a rapid transit intervention along the CC2M corridor, connecting with Mt Roskill, Ōnehunga and Māngere. It asked that options be initially considered from a mode perspective and then a route perspective.

Therefore a long list of options around modes and routes was developed.

Step 2: Long list assessment

A Multi Criteria Assessment (MCA) was undertaken to assess the long list and short list options against assessment criteria.

The assessment criteria

The assessment criteria were initially developed from Waka Kotahi guidelines for option evaluations for business cases and then refined. They included the investment objectives identified in the ILM and a set of criteria that looked at the option's wider impacts, and opportunities (see Table 6). The full assessment criteria framework is included in Appendix 3.

Table 6: High level MCA criteria

Headline Criteria	Description
Investment Objectives	<p>Objective 1: A rapid transit service that:</p> <ul style="list-style-type: none"> ○ Is attractive, reliable, frequent, safe and equitable ○ Is integrated with the current and future active and public transport network ○ Improves access to employment, education and other opportunities.
	<p>Objective 2: A transport intervention that embeds sustainable practice and reduces Auckland’s carbon footprint</p>
	<p>Objective 3: Unlocking significant urban development potential, supporting a quality compact urban form and enabling integrated and healthy communities⁴⁴.</p>
Impact criteria	
Achievability	Considers technical challenges, safety outcomes and consentability implications
Environmental Effects	Implications during construction and in the long term for environmental factors such as landscape, visual, water quality and wetlands, ecology, natural hazards and cultural and historic heritage
Social and community	Implications during construction and in the long term for environmental factors such as urban design, social cohesion and human health/well being
Impacts on Te Ao Māori ⁴⁵	What, if any, impacts are there on te ao Māori, including areas of significance for Māori, Māori Land and Kaitiakitanga. Māori Land and Mana Whenua cultural values
Property Impacts	Scale of public / private land (m ² / number of properties / special status of impacted property) required to deliver the option.

⁴⁴ The Cabinet paper identified the need to resolve the “city shaping function” of the CC2M, the “level of commitment to delivering urban development opportunities unlocked by the CC2M” and “what level of complexity are the Government and stakeholders prepared for?” Objective 3 is very important and options for varying levels of rapid transit service that enable different levels of urban development potential were considered in this context.

⁴⁵ The assessment of Te Ao Māori and environment criteria had no involvement from Mana Whenua groups, with the assessment primarily undertaken by the Māori team within Project based on their extensive knowledge. It is acknowledged that Mana Whenua have the special relationship with the natural environment and will be key assessors of Kaitiakitanga and be involved in the DBC assessment. From a Mana Whenua perspective, the potential negative impact on residential and business owners, is also a consideration in the at-grade options due to the consideration of Manaakitanga generosity and care for others.

Headline Criteria	Description
Value for Money	Value for money considerations, such as cost and benefit cost ratio

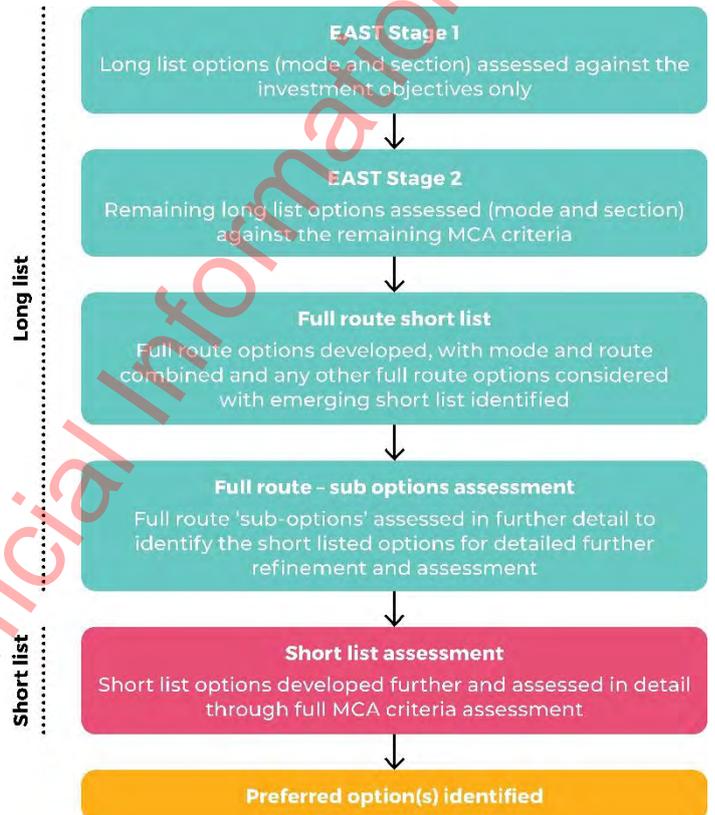
The assessment process

The long list options were assessed from a mode perspective, then from a route perspective and then complete options were put together.

Each option was assessed against the MCA criteria and each criterion was scored using a seven-point assessment system. The scores ranged from +3 for a strongly positive impact, to -3 for a strongly negative impact. The full scoring scale is included in the Assessment Criteria set out in Appendix 3 .

Options that did not meet the criteria were discarded. If the option did meet the criteria, they were retained for further consideration and development. This allowed the modal options to be ranked to inform the development of the route options.

A staggered approach to the application of the MCA, using an Early Assessment Sifting Tool (EAST) approach (consistent with Waka Kotahi guidance) as outlined in the figure below. This allowed non-performing options to be assessed against some MCA criteria only and discounted at an early stage, with more viable options going through for a more comprehensive MCA against all criteria.



Step 3: Shortlist assessment

The five short listed options underwent a more detailed assessment looking at the benefits, the impacts and against the MCA criteria. From this the final short list was identified and an even more detailed analysis was undertaken. The options were assessed against a base case (do minimum option). A do-nothing option was not developed because an agreed and funded list of transport options already exists in the Auckland Regional Land Transport Plan (RLTP).

THE BASE CASE - DO MINIMUM OPTION⁴⁶

The Do Minimum option (the base case) was the option that all the other options were assessed against. In developing the base case, both Treasury and Waka Kotahi guidance on how to treat the base case were considered.

Two planning horizons were used for the analysis – 2031 and 2051. This allowed the longlisted options to be assessed against the base case ‘at opening’ then two decades later. The planning horizons were based on:

- The approved and funded programme within the 2021-31 RLTP was the base case for the 2031 scenario.
- Modifications to the 2051 RLTP scenario were made which are summarised in subsequent sections.

Appendix 4 sets out the base case assumptions in more detail.

The base case includes increased growth and associated upgrades to the transport network (to accommodate this growth) in the CC2M corridor such as increased bus services along the corridor.

The following sets out the key assumptions that were made in the base case.

Land use assumptions

The latest Scenario I-11.6 reflects the latest regional land use forecasts used by Auckland Council for planning. It assumes some form of rapid transit (assumed as Light Rail) will run along the Dominion Road corridor, which is one of the potential routes along the CC2M corridor.

To allow the proposed investment impact to be understood, the base case land use assumption was reversed as follows:

- For 2031: no adjustments were made to Scenario I-11.6’s land use and distribution forecasts.
- For 2051: The following adjustments to Scenario I-11.6’s land use forecasts:
 - Households: The number of households was reduced within the zones listed in Appendix 4, without changing the overall regional household total for Auckland. This is the same as in Scenario I-11.6.
 - Households removed from zones within the Dominion Road corridor were re-distributed to other zones in Auckland – in line with original Scenario I-11.3 forecast.
 - The allocation of education rolls was adjusted to match the revised household totals per zone.
 - Employment: 4,000 jobs were redistributed away from the Dominion Road corridor (excluding city centre zones).

Even with these changes there is still considerable growth forecast along the CC2M corridor - a 36 percent increase in population and 47 percent increase in employment in the corridor by 2051.

The urban form of this future land use in this option takes account of changes in zoning and includes some intensification based on currently observed responses to similar zoning changes.

⁴⁶ A Do-nothing option was not developed because an agreed and funded list of transport interventions already exists in the Auckland Regional Land Transport Plan (RLTP).

Network assumptions

The 2031 and 2051 do minimum networks were based on the networks used in the most recent RLTP planning. Some refinements were made to networks in greenfield areas and to the bus networks. These changes are outlined in more detail in Appendix 4.

Other assumptions

The following sets out the other assumptions that were made in the base case:

- **Road Pricing:** Road pricing was excluded from the base case as it is not a committed nor a funded at this stage.
- **Fleet Emissions:** Auckland Transport has adopted a Low Emission Bus Roadmap (October 2020). Funding for this had not been committed at time of developing this IBC, so the base case retained the transition to zero emission fleet based on assumptions documented within the Vehicle Emissions Prediction Model VEPM 6.1. Emissions are projected to fall by 31 percent from 2015/16 to 2039/40, despite an increase in the size of the vehicle fleet and distance travelled.
- **Covid-19:** This option adjusted land use totals contained within Scenario I-11.6 which anticipates slightly lower growth rates to 2051 compared to previous forecast scenarios. This approach is consistent with analysis undertaken by University College of London advice to the Project that forecasts a return to previously forecast levels of public transport ridership after an initial reduction and subsequent build-up of demand over a few years. This COVID-19 assumption did not take into account the possible increased attractiveness of Auckland as a global destination as a result of COVID-19 and the resultant potential increase in housing demand
- **Transport concessions:** This option made no specific allowance for public transport fare concessions. Fares are assumed to reflect the fare structure as contained in the 2031 RLTP scenario.

LONG LIST DEVELOPMENT

This section sets out how the long list options were developed and what these options are.

General

A substantial amount of work has already been undertaken on rapid transit options for this corridor in previous studies. However to be robust, a comprehensive re-assessment of a full range of options was undertaken, based on the updated objectives and the latest information.

Some information, such as the typical capacity and characteristics of various modes, were taken from network-wide work contained in the Auckland Rapid Transit Plan (ARTP). The ARTP found that based on travel demands from previous work, Light Rail and Light Metro appear to perform best in the CC2M corridor. They concluded that further work is needed to test these findings. This work was done as part of developing this IBC.

To ensure that a comprehensive long list assessment was undertaken, the options development process drew on the ARTP analysis and findings, as well as identifying and considering additional options. This ensured that a comprehensive long list assessment was undertaken. The associated urban implications and outcomes were an important differentiator between the different modes.

Options were considered in three phases:

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- mode options consistent with the ARTP definitions
- route options which were considered in sections
- any other potential options or combination of options.

In total over 50 long list options were assessed.

None of the long list options had a confirmed or detailed design for the corridor, though some modes had been previously investigated. All long list options were assessed under an assumed design/layout typical for that mode. Specific design work was undertaken only for the short-listed options. Appendix 5 sets out the long list option development and assessment in more detail.

Modes

The purpose of the mode assessment was to determine what the mode best meets the MCA criteria. The ARTP main mode types are set out the following table.

Mode	Comment
	<p>Bus - Non-segregated bus lanes (same as present operation), driver required.</p> <p>Bus Rapid Transit– Segregated bus lanes, passing lanes provided at larger stops, urban (Eastern Busway) type stops, driver required.</p>
	<p>Trackless trams</p> <p>These are guided bus systems that are segregated from general traffic. They have a higher capacity than Bus Rapid Transit.</p>
	<p>Light Rail</p> <p>A Light Rail system is a surface running modern tram system, that requires drivers to operate and has street level stops more frequently along the route than a Light Metro system.</p>
	<p>Light Metro</p> <p>A Light Metro system is a fully segregated rail system than can be operated autonomously and therefore operates at a higher speed than Light Rail systems. Stations are generally underground and spaced further apart than the Light Rail options.</p>
	<p>Heavy rail</p> <p>Fully segregated rail (typically underground in urban areas), potentially autonomous operation. Ability to run rail freight.</p>

As well as these standard rapid transit modes, other modes, such as monorail and Hyperloop, were also considered. An assessment of demand management interventions as an alternative to infrastructure solutions was also undertaken.

Routes

The purpose of the route assessment is to determine preferences for the alignment in several key locations, including:

- City Centre: Queen Street alignment vs an alignment directly serving the University precinct
- Isthmus: Sandringham Road vs Dominion Road
- Māngere: Motorway alignment vs alignment directly serving the town centre

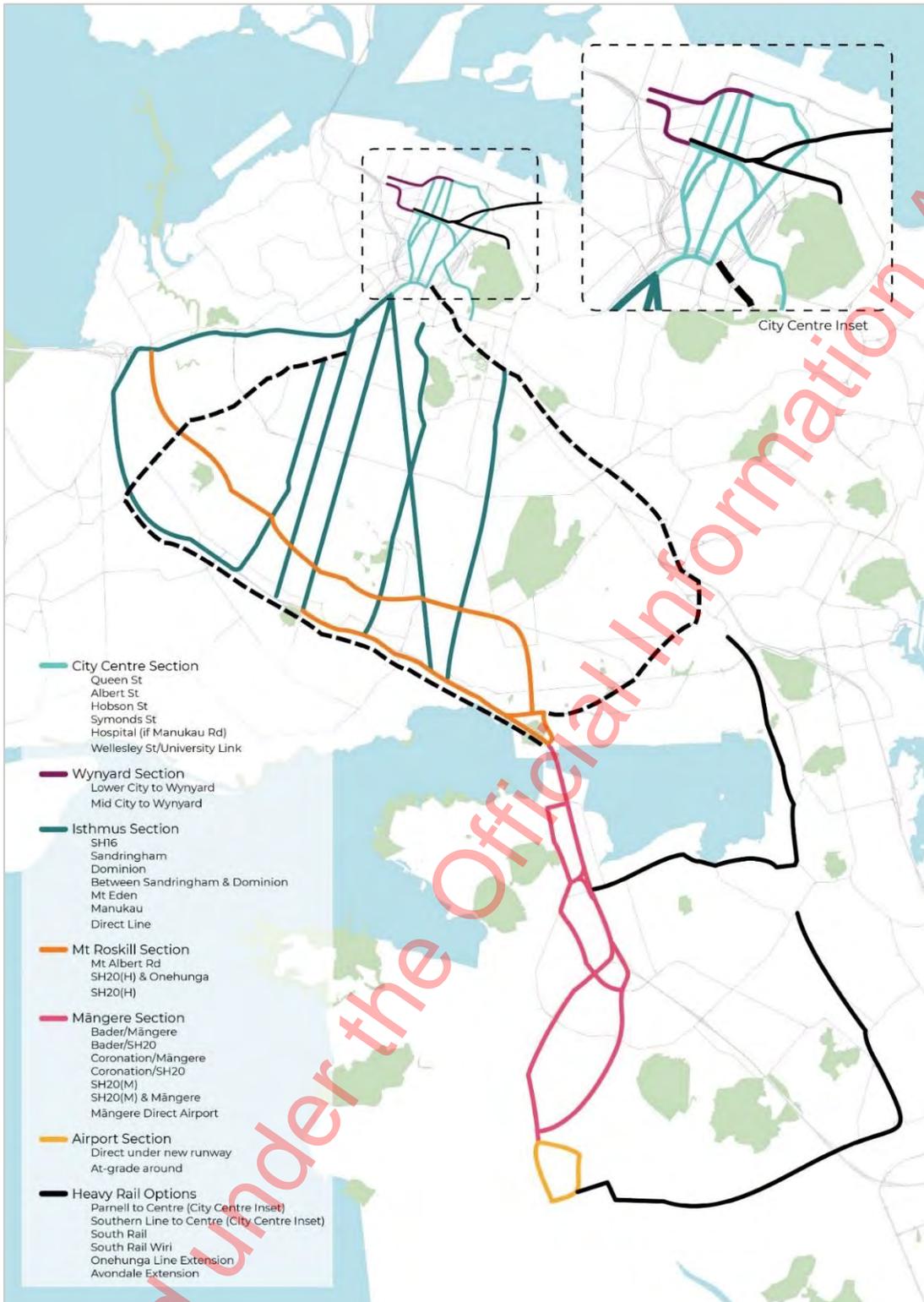
Given the length and variability of the characteristics of the CC2M corridor, such as variations in density of development and town centres vs industrial and residential uses, the route options were assessed initially in standalone sections:

- **Section A:** Airport to Ōnehunga
- **Section B:** Ōnehunga to Mt Roskill
- **Section C:** Mt Roskill to New North Road
- **Section D:** New North Road to Wynyard Quarter,

Options for each of these sections were considered separately and these are outlined in Figure 6.

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Figure 6: Long List route options



LONG LIST ASSESSMENT

This section summarises the long list assessment and which options were shortlisted.

Mode

Unlocking urban potential is an important objective for the Project. From an urban perspective the more capacity the rapid transit system has, the more likelihood there is to unlock the urban potential to deliver better urban and transport outcomes. The capacity of each rapid transit system is also a key driver of the transport outcomes sought for the Project.

Therefore the initial review of the modal options considered the capacity of each mode to meet expected CC2M corridor demands over time and the likely urban response, in terms of scale and form.

Indicative transport capacities for each mode were taken from the ARTP. These capacities were based on the service frequency and mode type as defined in the ARTP. Given ARTP had a wider regional focus, these capacities were re-tested for applicability to CC2M. That analysis showed they are appropriate for this corridor.

Forecast future capacity demands⁴⁷ were overlaid over the modal capacities. The capacity demands with and without additional future rapid transit lines coming into the city were considered. Figure 7 shows the outcome of that analysis.

Figure 7: Modal capacity analysis



The assessment showed that all the rail options have sufficient capacity to meet the forecasted demand up to and beyond 2051. The following sets out the key findings.

Busway options

The analysis found that a segregated bus system theoretically has sufficient capacity to meet the forecast demand up to 2048, but with a stretched operation⁴⁸. However there would be insufficient road space for increased bus volumes in the city centre.

Buses would not have enough capacity to meet the demand generated by the future North Shore and Northwest rapid transit lines (as identified in the ARTP).

⁴⁷ 2048 future demands were used based on the available modelling at the time.

⁴⁸ Stretched operation means the mode is operating at maximum frequency and are increasingly overcrowded.

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This analysis indicated that bus options would not unlock urban development, so are not a long-term solution.

Trackless trams

Like the Busway option the analysis found that the trackless tram system would only have sufficient capacity with a stretched operation. Providing a system that would be 'stretched' relatively early on in its life cycle when there are other options that provide for future growth capacity was not considered appropriate.

The assessment also noted that trackless tram systems have not been in commercial operation anywhere globally for long enough to understand their commercial and operational viability. This is compared to other modes with decades of performance, mature markets for vehicles and equipment, and good competition between suppliers. This finding reduces confidence in that this mode will deliver the required capacity to meet demand along the CC2M corridor and unlock growth.

However this mode may well be appropriate for lower demand corridors elsewhere in the network.

Three rail modes

The analysis showed that all three rail modes - Light Rail, Light Metro and Heavy Rail - provided corridor capacity beyond 2048 and will meet the forecast demand from the future changes to the ARTP network from the North Shore and Northwest corridors (with varying levels of performance). Based on this assessment all three rail options were taken through for further consideration.

Light Rail and Light Metro

Both modes enable urban development which can be further optimised by identifying, unlocking, and securing urban development. Light Metro has the greater capacity meaning it can support more urban development. This places additional emphasis on the requirement to secure this potential through more aggressive land use interventions. The permanence of rail provides increased confidence in urban outcomes being realised.

There was a difference between the Light Rail and Light Metro on some assessment criteria, but those changes were not substantial enough to immediately identify a preference. Therefore a more detailed analysis of Light Rail and Light Metro was required to understand potential differences, and so both modes were shortlisted.

Heavy Rail

Due to its specific characteristics, the Heavy Rail mode did not meet the objectives as well as the Light Metro option (particularly the urban objective) and its impacts were found to be greater in implementation. So it was not preferred as the solution for a new standalone corridor.

However Heavy Rail has more carrying capacity than Light Rail and Light Metro so it was taken to the next assessment stage due to the potential transport benefits.

Other modes

The other mode options were also assessed and for reasons outlined in Appendix 5 did not sufficiently meet the Project's investment objectives and therefore they were not shortlisted.

Route

As the mode assessment was alignment-agnostic, the next step was to assess route options for each of the three rail modes. These route options were assessed to get to the final short list. This

assessment is set out in detail in Appendix 5 with the summarised findings set out below. The routes considered are set out in Figure 8.

Figure 8: Route options assessed by mode



Light Rail options

To identify the best Light Rail option, different routes through different locations along the CC2M corridor were assessed. The Light Rail route assessment determined the following preferences for alignment in the key locations.

Location	Analysis
City Centre	The Queen Street alignment is preferred over a Symonds Street alignment that directly serves the Auckland university precinct because, from a demand perspective, it was found to have significant adverse impacts on the operation of the bus network (which has no alternative route to use) and there are also strong bus connections between Queen Street and the Auckland university precinct (meaning Auckland university access is still improved by this alignment, which is also within easy walking distance).
Isthmus	Both Sandringham Road and the Dominion Road route alignments achieved the Project’s objectives, for a similar impact. The fundamental difference is a trade-off between the longer travel time of the Sandringham Road route (and consequential delays to users of the service from further away) and the increased development potential of the southern Sandringham Road corridor, especially the Kāinga Ora land in Mt Roskill. Initial modelling indicates that these two issues somewhat balance each other out. This was such a critical issue that this alignment would benefit from a more detailed assessment. Therefore both alignment options were short listed for the Light Rail mode.
Māngere	For the Māngere section, the initial assessment identified:

Location	Analysis
	<ul style="list-style-type: none"> All the route options have merit. The SH20-only option provides lesser outcomes compared to the other two route options; however it has lesser impacts and is simpler to implement. The route options that go through Bader Drive and the Māngere town centre penetrate the catchments better and provide improved accessibility for these areas. However the trade-off is that the Māngere town centre options also come with impacts to the local communities and longer travel times. Given that the trade-off between outcomes and impacts on the local community is at the heart of the decision in these areas, it is critical that feedback from the local community be included in the route decision-making (which is best undertaken in the next phase). That route option selection should take place after engagement with the local community in the next phase. To allow a complete assessment of the outcomes, benefits, and costs to be undertaken in the short list phase, one route option is needed to be included for the Light Rail option. And whilst this will be an area of focus in the DBC, the Light Rail route that best serves the local communities is included at this point, which is the Bader Drive and Māngere town centre alignment.

Based on the above assessment two Light Rail options were short listed for detailed assessment:

- Option 1A: Light Rail Sandringham
- Option 1B: Light Rail Dominion.

Light Metro options

To identify the best Light Metro option, different routes through different locations along the CC2M corridor were assessed. The Light Metro route assessment determined the following preferences for alignment in the key locations.

Location	Analysis
<p>City Centre</p>	<p>The Wellesley Street route option is preferred for the following reasons:</p> <ul style="list-style-type: none"> It provides direct access to the University precinct, which is highly valued as an educational hub providing opportunities for the communities along the CC2M corridor. This option also links with the CRL Aotea station area, providing accessibility to another important destination in the city centre. This additional accessibility is obtained for a similar cost and impact as other alignments within the city centre. <p>This is a different route selection than the Light Rail assessment. This is because the route cost comparisons are similar, and an underground Light Metro option does not have bus impacts for using a Symonds Street alignment.</p>
<p>Isthmus</p>	<p>In the isthmus section, the Sandringham Road and Dominion Road alignments are similar in terms of impacts. They are similar in cost, length and number of stops/stations. However the additional station on the Sandringham Road</p>

Location	Analysis
	alignment enhances accessibility to Kāinga Ora’s significant Mt Roskill development sites. This additional station results in a 7 percent increase in forecast patronage on the Sandringham Road alignment. Whilst the Sandringham Road alignment appears to attract more patronage, a more detailed land use analysis could identify greater urban development opportunities on Dominion Road. Therefore both alignments were shortlisted to allow a more detailed assessment to be undertaken.
Māngere	To allow a complete assessment of outcomes, benefits, and costs to be undertaken in the short list phase one Light Metro option is needed. And whilst this will be an area of focus in the DBC, the Light Metro route option that best serves the local communities is the Māngere town centre option. This route differs to the Light Rail route option, as there is a high cost for the Light Metro option to veer off SH20 and serve the Bader Dr area compared to the catchment served.

Based on the above assessment two Light Metro options were short listed for detailed assessment:

- Option 2A: Light Metro Sandringham
- Option 2B: Light Metro Dominion.

Heavy Rail options

The mode assessment showed that Heavy Rail has sufficient capacity but too much impact and lesser urban outcomes to be preferred as the solution for a new standalone corridor. However it was taken to this step as an option that would extend the existing Heavy Rail network. Two Heavy Rail options were identified for consideration:

- Ōnehunga Rail Line extension to the Airport and a bus-based solution north of Mt Roskill to the city centre
- Western Rail Line extension to the Airport (using the Avondale-Southdown corridor) and a bus-based solution from Mt Roskill to the city centre.

The detailed analysis of these two options is set out in Appendix 5 . The assessment found that the Western Rail option outperformed the Ōnehunga Rail option for the following reasons:

- The Western Rail option provided a higher quality more frequent rapid transit connection to the development area of Mt Roskill.
- The Western Rail option provided an additional rail connection, creating an increase network resilience and the ability to run freight on an alternative route.
- The Western Rail option also provided the ability to connect with the Ōnehunga Line, giving greater travel choice and accessibility to customers south of Ōnehunga.
- The Ōnehunga line option would still require a dedicated busway-style corridor through the central isthmus section of the route, as well as double-tracking and level crossing removal along the Ōnehunga line.

The Ōnehunga Rail Line option was therefore not short listed, given the Western line Option outperformed it.

The Heavy Rail option assessment showed several benefits, including some improved accessibility and urban uplift potential. However, compared to the Light Rail and the Light Metro options, the

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scale of those benefits is substantively smaller. A significant amount of the Project's urban uplift benefits are through the central isthmus section of the corridor, which Heavy Rail would not travel through.

The Heavy Rail option was found to:

- deliver a lower accessibility improvement
- increase constraint on the operation of the Heavy Rail network.
- deliver a smaller urban uplift in the entire CC2M corridor, resulting in an urban outcome which fails to achieve its full potential to unlock the corridor's significant urban uplift development potential, and contributes less to achieving a quality compact urban form and integrated, healthy communities.

So whilst this option has several positive attributes, when compared to the Light Rail and Light Metro options, it does not perform as well so **this option was not investigated further.**

SHORT LIST OPTIONS

This section sets out the short-listed options that were investigated and assessment in further detail.

General

Based on the above assessment four options were short listed for detailed assessment:

- Option 1A: Light Rail Sandringham
- Option 1B: Light Rail Dominion
- Option 2A: Light Metro Sandringham
- Option 2B: Light Metro Dominion.

In addition, a segregated Light Rail option was considered that essentially used Light Rail technology by fully segregated the service (like the Light Metro option) from Mt Roskill (to make best use of the depot location and the ability to run additional services from this location to increase the capacity of the option). This combination option was considered because:

- the demand profile for the CC2M corridor increases the closer to the city centre
- providing segregation for a rail (light or metro) system in the city centre is more important because of the level of interaction with rest of the public transport system, compared to the significant amount of motorway corridor-running in southern portions of the corridor.
- it provides higher capacity and full segregation north of Mt Roskill (effectively a Light Metro option)
- high community accessibility south of this point.

For the purposes of this assessment the Sandringham Road alignment (as used for Light Metro) was used because it has the higher patronage.

Including this Tunnelled Light Rail option resulted in five short listed options as set out in Table 7.

For all options, the alignment within the airport business precinct is consistent. Further analysis on the exact alignment and connections at the airport are required in the next phase. This connection is not considered a differentiator for the options, so this approach is considered appropriate.

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Appendix 6 provides more detail on the design elements of these options and Appendix 7 includes information on the concept of operations for each of the short list options.

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Table 7: Short List options

Option	Option 1A: Light Rail Sandringham	Option 1B: Light Rail Dominion	Option 2A: Light Metro Sandringham	Option 2B: Light Metro Dominion	Option 3: Tunnelled Light Rail
Alignment	s 9(2)(i)	s 9(2)(i)	s 9(2)(i)	s 9(2)(i)	s 9(2)(i)
Urban Outline	<p>A Sandringham Road alignment connects with the Kāinga Ora developments in Wesley and connects with the Kāinga Ora development opportunities around Bader Drive.</p> <p>Drives a greater level of public realm upgrade, accessibility and connectivity across the whole corridor through having more stops/stations</p>	<p>A Dominion Road alignment provides an opportunity to leverage off the established community including centres and connects with the Kāinga Ora development opportunities around Bader Drive</p> <p>Drives a greater level of public realm upgrade, accessibility and connectivity across the whole corridor through having more stops/stations</p>	<p>A Sandringham Road alignment connects with the Kāinga Ora developments in Wesley and realises the opportunity of the University connection.</p> <p>Drives some level of public realm upgrade, accessibility and connectivity particularly around stops/stations</p>	<p>A Dominion Road alignment provides an opportunity to leverage off the established community including centres and realises the opportunity of the University connection.</p> <p>Drives some level of public realm upgrade, accessibility and connectivity particularly around stops/stations</p>	<p>A Sandringham Road alignment connects with the Kāinga Ora developments in Wesley and connects with the Kāinga Ora development opportunities around Bader Drive.</p> <p>Receives the majority of the benefits of each mode</p>
Cross Section	Street running		Tunnel through urban areas, fully segregated in other areas		2A cross section from north of Mt Roskill and Light Rail cross section south
Service Pattern	15tph Driver operated		20 tph Driverless operation		20 tph Driver operated
Capacity (people per peak hour)	<p>Light Rail: Assumed 6,300, Maximum 8,400</p> <p>Street: Some reduction in capacity through town centres and movement restrictions along the route</p>		<p>Light Metro: Assumed 11,600, Maximum 23,200</p> <p>Street: No change, enhanced space for pedestrian and cyclists</p>		<p>Tunnelled Light Rail: Assumed 12,600, Maximum 12,600</p> <p>Street: Varies between section, where tunnelled, no change, where surface running some reductions in capacity through town centres and movement restrictions</p>
Stations	23 Stations	22 Stations	17 Stations	16 Stations	18 Stations
Travel time (Airport to Wynyard)	58min	57min	36min	34min	44min
Indicative (un-escalated)	\$7.8Bn	\$7.3Bn	\$12.8Bn	\$15.0Bn	\$11.4Bn

Option	Option 1A: Light Rail Sandringham	Option 1B: Light Rail Dominion	Option 2A: Light Metro Sandringham	Option 2B: Light Metro Dominion	Option 3: Tunnelled Light Rail
CAPEX Cost (P50)					

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Key design elements

An important element of each of the options is the interface with the existing transport network. For both the short-listed modes, Light Rail and Light Metro, this means different things.

Light Rail options

Different cross sections for the surface running Light Rail options were considered (for more detail see Appendix 6).

This included cross sections that were fully compliant with the current Transport Design Manual (TDM) from Auckland Transport, through to reduced widths for elements such as footpaths and cycle lanes⁴⁹.

The two cross sections considered in detail (see Figure 9), were a fully compliant cross section and a reduced width cross section (that still provided continuous active mode facilities). It was found that the higher the level of compliance with the optimal design standards, the better the outcome for users. However there was more property impact because the required width was beyond the typical road reserve along the corridor and the wider TDM corridor may not be practical in some parts of the CC2M corridor.

For the purposes of costing and consideration of outcomes, the use of the wider cross section has been assumed.

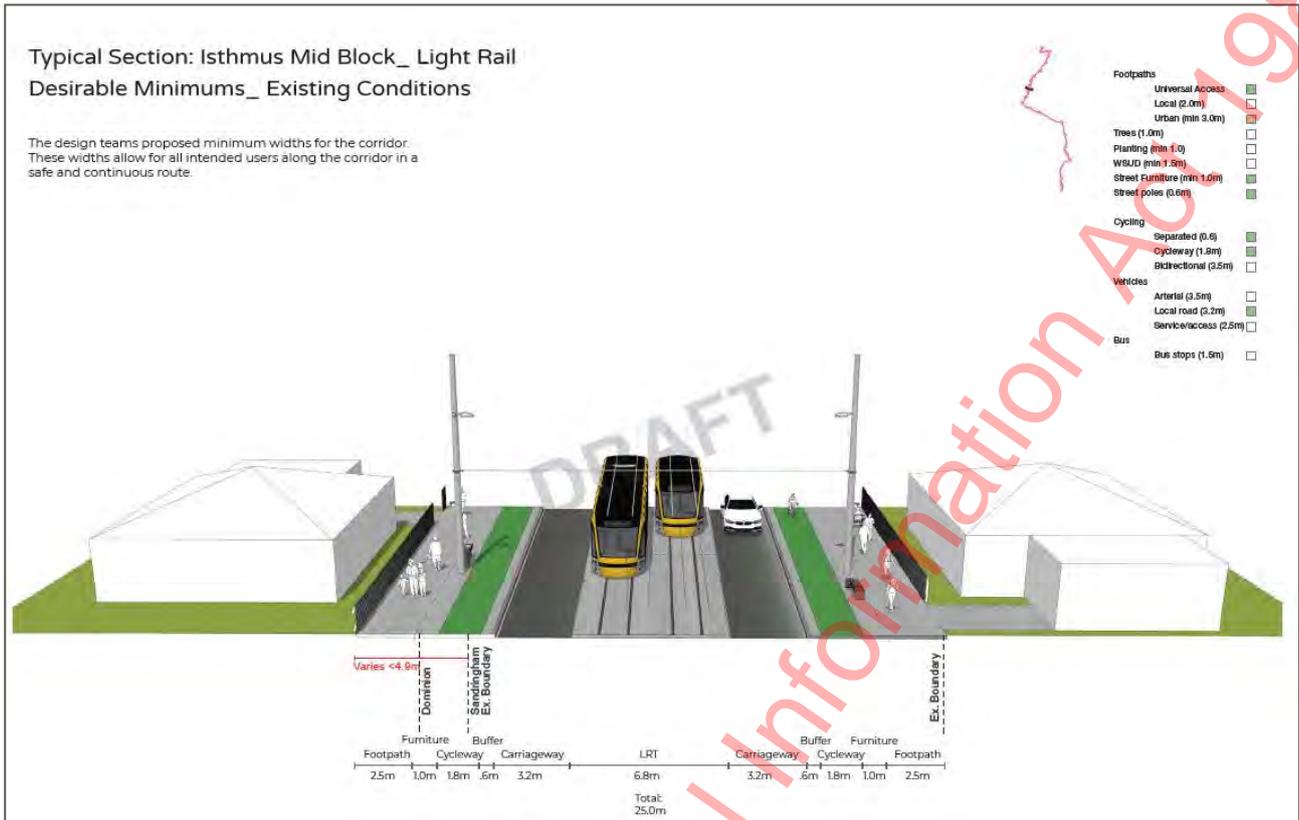
Given the scale of the implications of either cross section, if the Light Rail option (Option 1B) is preferred, this issue will need to be explored further in the DBC before a final decision is made. Whilst there are areas where neither cross section would be applied, for example through constrained town centres in the central isthmus, where customised layouts would be required, these cross sections would be generally sought along as much of the corridor as possible.

Figure 9: Typical Wider Light Rail cross section



⁴⁹ Note that much of Auckland's existing street network is noncompliant in one way or another, having been built prior to the TDM adoption

Figure 10: Typical narrower Light Rail cross section



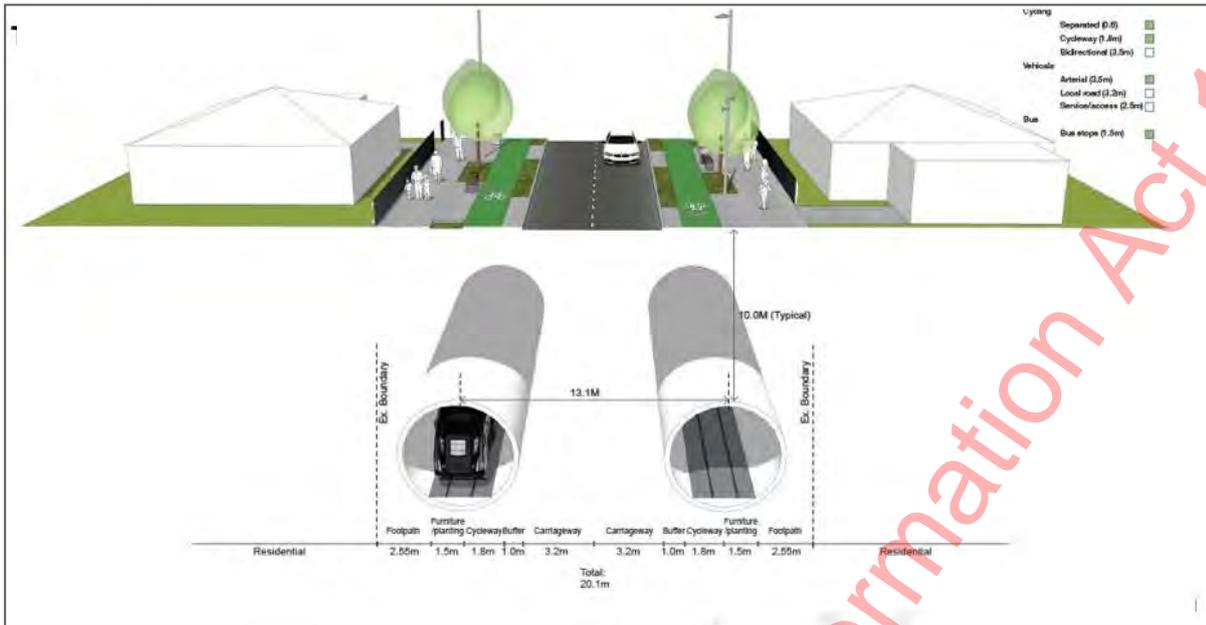
Light Metro options

For the Light Metro options different forms of segregation were investigated, including open trenches and bored tunnels. Elevated options had previously been discounted due to adverse visual, shading and amenity impacts. Based on this assessment, it was determined that all the Light Metro options should be tunnelled through the more densely populated areas, such as the city centre, central isthmus, Ōnehunga and Māngere town centre, and generally follow the motorway corridor on the surface in other areas. This approach was preferred for the following reasons:

- it minimises impacts upon the greatest population densities during construction
- it provides highest level of amenity in the final form of the street above the tunnels
- it removes any operational impacts at the surface, except at stops/stations
- tunnels could be built at a similar cost to a trenched option, once the full construction requirements of both options were known

Figure 11 shows the typical cross section that was adopted for Light Metro and, where appropriate, the Tunnelled Light Rail option.

Figure 11: Typical Light Metro cross section



INITIAL SHORT LIST ASSESSMENT

This section sets out the outcome of the assessment of the five short listed options and the identifies the best performing Light Rail and Light Metro option for further assessment.

General

Following the above assessment, more detailed assessments of the benefits, impacts and issues of the five short list options were undertaken against the MCA criteria.

Table 8 summarises the outcome of the assessment and Appendix 8 sets out this assessment in more detail. The key conclusions from this assessment are set out below.

All short-listed options deliver well against the investment objectives, increasing accessibility, mode shift to public transport, unlocking urban potential and reducing carbon emissions.

- Patronage on the options ranged from 15M to 28M boardings per annum by 2051
- Carbon reduction (enabled) is in the order of 350,000 to 700,000 tonnes
- Urban uplift is in the order of 10-12 percent, with associated place, people and spatial economy gains.

All options have a BCR of over 1, meaning they deliver more financial benefits than cost.

The Light Metro options deliver greater benefits and lesser impacts generally. However they have the highest cost, at approximately \$16,291m⁵⁰.

The Light Rail options deliver fewer benefits and has greater impacts predominantly due to the scale of surface disruption during construction along the routes. But the costs are lower - approximately \$9,047m.

⁵⁰ Escalated (P50) Capital Cost (M) estimate

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The Tunnelled Light Rail option's performance is between the Light Metro and Light Rail options, closer in performance to the Light Metro option \$14,601m.

Light Rail route assessment

Of the two Light Rail options, the Dominion Road alignment performs better for the following reasons:

- There is a major power cable beneath the Sandringham Road corridor that would need to be relocated (potentially to Dominion Road) if Sandringham Road was chosen, resulting in an additional period of disruption for two years whilst this cable is relocated.
- The Dominion Road corridor travel time is marginally shorter and would attract a slightly greater overall patronage as a result
- The capital cost is slightly lower
- Most other assessment criteria are similar.

However, as it is slightly further away, this option does not capitalise as well on the urban development opportunities presented by the Crown housing initiative undertaken by Kāinga Ora in Mt Roskill.

Light Metro route assessment

Of the two Light Metro options, the Sandringham Road alignment performs better for the following reasons:

- Both route options have similar patronage, carbon, urban uplift and accessibility outcomes. There is also little differentiation between the options from a travel time perspective.
- Unlike Light Rail, there are no significant differentiators between the two Light Metro routes. This is less of a concern for Light Metro given the option is assumed to be in a tunnel, so the alignment does not necessarily need to follow a road corridor. At the next phase, a bespoke alignment which serves key locations in both Dominion and Sandringham Roads could be considered.
- However, one Light Metro alignment option needed to be selected to allow a complete assessment of the Project outcomes, and for benefits and costs to be undertaken. Based on the assessment of investment objectives, the Sandringham Road alignment achieved slightly better patronage and urban uplift, primarily based on being closer to the Kāinga Ora developments in Mt Roskill, so was chosen as the preferred alignment.

Note on community engagement

Whilst community feedback on specific options has not been undertaken during this phase, through the broader engagement undertaken (that sought general feedback on the concept of Light Rail in the corridor and what it would mean for communities) there has been feedback provided which aligns well with the areas of investigation, including:

- Construction disruption is a key concern of businesses and communities along the route
- A Auckland university precinct connection was highly valued
- A stop within Māngere town centre is highly valued by the local community
- Maximisation of community interface (e.g. Bader Drive) in southern sections of the corridor was considered important

- Protecting and enhancing heritage value along the corridor was seen as important. The civic and heritage value of places like Queen Street, and homes and other buildings along the corridor (including on Dominion and Sandringham Roads), is perceived to be at risk with this Project.

The overall community feedback will be a key contribution to the scoping of the next phase, where further (more detailed) community engagement and consultation will occur.

The next stage of the assessment was considering the trade-offs of the best performing Light Rail and Light Metro options, as well as the Tunnelled Light Rail option.

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Table 8: Short List option assessment summary

	Option 1A: Light Rail Sandringham	Option 1B: Light Rail Dominion	Option 2A: Light Metro Sandringham	Option 2B: Light Metro Dominion	Option 3: Tunnelled Light Rail
Investment Objectives					
Transport Accessibility	<ul style="list-style-type: none"> Minor improvement in accessibility (sample measures) 15M annual boardings Number of additional employment opportunities accessible within 45mins by PT: <ul style="list-style-type: none"> Māngere 114,000 Mt Roskill 59,000 	<ul style="list-style-type: none"> Minor improvement in accessibility (sample measures) 15M annual boardings Number of additional employment opportunities accessible within 45mins by PT: <ul style="list-style-type: none"> Māngere 115,000 Mt Roskill 109,000 	<ul style="list-style-type: none"> Significant improvement in accessibility (sample measures) 28M annual boardings Number of additional employment opportunities accessible within 45mins by PT: <ul style="list-style-type: none"> Māngere 353,000 Mt Roskill 159,000 	<ul style="list-style-type: none"> Moderate improvement in accessibility (sample measures) 27M annual boardings Number of additional employment opportunities accessible within 45mins by PT: <ul style="list-style-type: none"> Māngere 335,000 Mt Roskill 123,000 	<ul style="list-style-type: none"> Moderate improvement in accessibility (sample measures) 25M annual boardings A number of additional employment opportunities accessible within 45mins by PT: <ul style="list-style-type: none"> Māngere 197,000 Mt Roskill 103,000
Carbon	204,000 tonnes of carbon reduced due to the option	157,000 tonnes of carbon reduced due to the option	321,000 tonnes of carbon reduced due to the option	314,000 tonnes of carbon reduced due to the option	249,000 tonnes of carbon reduced due to the option
Urban Value	<ul style="list-style-type: none"> Medium Urban Development opportunity with a reasonable certainty of delivery Connects to Kāinga Ora development in Mt Roskill and Bader Drive 4,400 additional households and 4,100 additional jobs 	<ul style="list-style-type: none"> Medium Urban Development opportunity with some certainty of delivery Connects to Kāinga Ora development in Bader Drive Dominion corridor provides an opportunity to leverage off the established community including centres 4,100 additional households and 3,700 additional jobs 	<ul style="list-style-type: none"> High Urban Development opportunity with a reasonable certainty of delivery Connects to Kāinga Ora development in Mt Roskill but misses Bader Drive Realises the opportunity of the University connection 5100 additional households and 5,300 additional jobs 	<ul style="list-style-type: none"> Medium Urban Development opportunity with some certainty of delivery Connects to some of the Kāinga Ora development in Mt Roskill but misses Bader Drive Realises the opportunity of the University connection 5000 additional households and 5,000 additional jobs 	<ul style="list-style-type: none"> High Urban Development opportunity with a reasonable certainty of delivery Tunnelled Light Rail option receives most of the benefits of each mode 5000 additional households and 5,100 additional jobs
Impacts and Opportunities					
Achievability	<ul style="list-style-type: none"> Carries significant consenting risk due to duration and impact of construction on Fanshawe Street, Queens Street (up to 5 years) and Sandringham and Dominion (due to relocation of power cable from Sandringham Road) Balanced by safety benefits 	<ul style="list-style-type: none"> Carries significant consenting risk due to duration and impact of construction on Fanshawe Street, Queens Street and Dominion Road (up to 5 years) Balanced by safety benefits 	<ul style="list-style-type: none"> Has some consenting challenges around tunnel portals Balanced by safety benefits 	<ul style="list-style-type: none"> Has some consenting challenges around tunnel portals Balanced by safety benefits 	<ul style="list-style-type: none"> The Tunnelled Light Rail solution combines the best of the underground section in the city centre and Isthmus, whilst removing the need to trench in Onehunga. Construction impacts through Māngere
Environmental Effects	Long project through built up area, will have environmental impacts that can be managed	Long project through built up area, will have localised environmental impacts that can be managed	<ul style="list-style-type: none"> Localised impacts at the tunnel portal locations Significant embodied carbon from tunnel construction 	<ul style="list-style-type: none"> Localised impacts at the tunnel portal locations Significant embodied carbon from tunnel construction 	Closer to Option 2A (than 1A), however overall impacts considered minor.
Social and community	<ul style="list-style-type: none"> Impacts during construction considerable as there are two corridors Accessibility benefits Long term impacts also considered negative overall given severance and right turn restrictions along route and construction impacts on two corridors 	<ul style="list-style-type: none"> Impacts during construction Long term impacts also considered negative overall given severance and right turn restrictions along route and construction impacts on two corridors Accessibility benefits Overall these issues balance themselves 	<ul style="list-style-type: none"> Impacts during construction, but lesser north of Mt Roskill Little segregation Considerable accessibility benefits, particularly to education and social for the southern section 	<ul style="list-style-type: none"> Impacts during construction, but lesser north of Mt Roskill Little segregation Considerable accessibility benefits, particularly to education and social for the southern section 	Closer aligned to Option 2A, but still impacts of construction and severance through Māngere without significant accessibility improvement
Impacts on Te Ao Maori	<ul style="list-style-type: none"> The Māori land parcel at Princess Street – which would require land take Wai o horotiu runs in queen street and there is an associated Pā around the town hall 	<ul style="list-style-type: none"> The Māori land parcel at Princess Street – which would require land take Wai o horotiu runs in queen street and there is an associated Pā around the town hall 	<ul style="list-style-type: none"> Mana Whenua been engaged with CRL so understand the technology and the positives and negatives of boring two main concerns are around Aquafer and potential lava caves when boring close to Māngere bridge or when close to Puketapapa 	<ul style="list-style-type: none"> Most Mana Whenua have been engaged with CRL so understand the technology and the positives and negatives of tunnel boring Two main concerns are around Aquafer and potential lava caves when tunnel boring close to Māngere bridge or when close to Puketapapa 	Closer to Option 2A, but there is still Māngere disruption

	Option 1A: Light Rail Sandringham	Option 1B: Light Rail Dominion	Option 2A: Light Metro Sandringham	Option 2B: Light Metro Dominion	Option 3: Tunnelled Light Rail
Property Impacts	<ul style="list-style-type: none"> • Very significant number of businesses affected in terms of partial acquisitions and temporary occupation ranging through the Viaduct Harbour, Queen Street, Sandringham Road, Onehunga and Māngere Town Centre Areas. • Very significant disturbance to commercial properties in the above areas for lengthy periods of time. The potential cost is difficult to estimate and is like the issues being experienced by the CRL project. • Moderate potential for businesses to require relocation with this option. • Significant number of property interests to be acquired to facilitate this option. 	<ul style="list-style-type: none"> • Significant number of businesses affected in terms of partial acquisitions and temporary occupation ranging through the Viaduct Harbour, Queen Street, Sandringham Road, Onehunga and Māngere Town Centre Areas. • Very significant disturbance to commercial properties in the above areas for lengthy periods of time. The potential cost is difficult to estimate and is like the issues being experienced by the CRL project. • Moderate potential for businesses to require relocation with this option. • Significant number of property interests to be acquired to facilitate this option. 	<ul style="list-style-type: none"> • Localises the impact upon property owners for both residential and commercial property substantially to the locations surrounding the stations. • Significantly reduces the potential disturbance to residential and commercial property owners during construction. • Property acquisitions are significantly less onerous as the surface-based acquisitions predominantly occur around the stations and the other acquisitions are subterranean or are acquired from other requiring authorities. 	<ul style="list-style-type: none"> • Localises the impact upon property owners for both residential and commercial property substantially to the locations surrounding the stations. • Significantly reduces the potential disturbance to residential and commercial property owners during construction. • Property acquisitions are significantly less onerous as the surface-based acquisitions predominantly occur around the stations and the other acquisitions are subterranean or are acquired from other requiring authorities. 	<ul style="list-style-type: none"> • Localises the impact upon property owners for both residential and commercial property substantially to the locations surrounding the stations. • Significantly reduces the potential disturbance to residential and commercial property owners during construction. • Property acquisitions are significantly less onerous as the surface-based acquisitions predominantly occur around the stations and the other acquisitions are subterranean or are acquired from other requiring authorities.

Key

	Significant adverse impacts
	Moderate adverse impacts
	Minor adverse impacts
	Minor positive benefits
	Moderate positive benefits
	Significant positive benefits

FINAL SHORTLISTING OPTIONS TRADE OFFS

This section sets out the key outcomes by Project investment objectives and impacts of each of the final three (best performing Light Rail, Light Metro and Tunnelled Light Rail) short-listed options:

- Option 1B: Light Rail (Light Rail)
- Option 2A: Light Metro (Light Metro)
- Option 3: Tunnelled Light Rail (Tunnelled Light Rail).

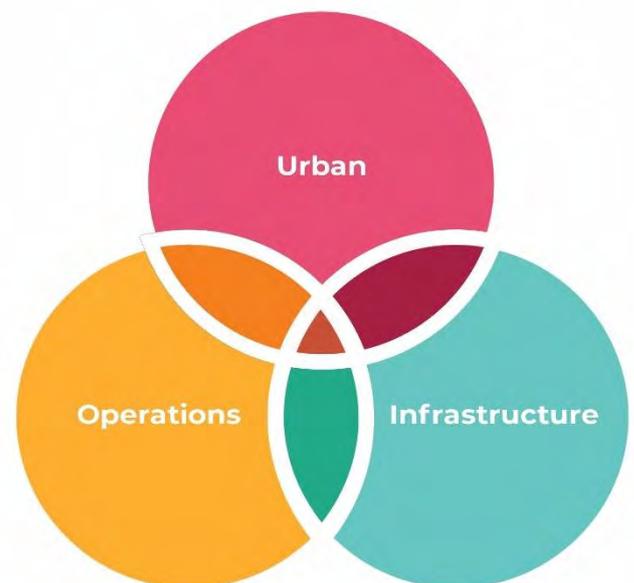
This will allow the relevant high-level trade-offs to be considered.

Securing urban outcomes

Urban change, defined as more intense urban form, more diverse uses, more legible and connected neighbourhoods and improved urban quality, is critical to achieving both urban and transport outcomes in the corridor.

Land use change is driven by several factors notably, zoning, market/commercial perspectives, social and physical character, accessibility and specific land attributes therefore a comprehensive suite of interventions is necessary beyond the improvements in accessibility. A one-dimensional approach e.g., zoning changes (enabling) alone won't get us there. To ensure the urban outcomes are delivered, the following key concepts have been assumed:

- The full integration of urban and transport (infrastructure and operations) is critical to the success of the Project.
- The current urban conditions and the desired urban future of the corridor will help inform the preferred route and mode.
- The needs of current and future communities and places are different across the corridor and will experience different levels of change and require different forms of interventions to optimise the outcomes.
- Multiple intervention instruments, across all agencies, will be required to enable, unlock and realise the required transformation from both an urban and transport perspective.
- These interventions will, of necessity, need to drive market attractiveness/private sector involvement and require an intentional urban programme, governance oversight and a scoped and urban resources in the entity to take the Project forward.



A fully integrated system ensures that infrastructure and operations are in harmony with key urban drivers and outcomes is required.

Investment options and urban outcomes

The investment options enable different degrees of capacity and accessibility and therefore provide for a different urban outcome and response.

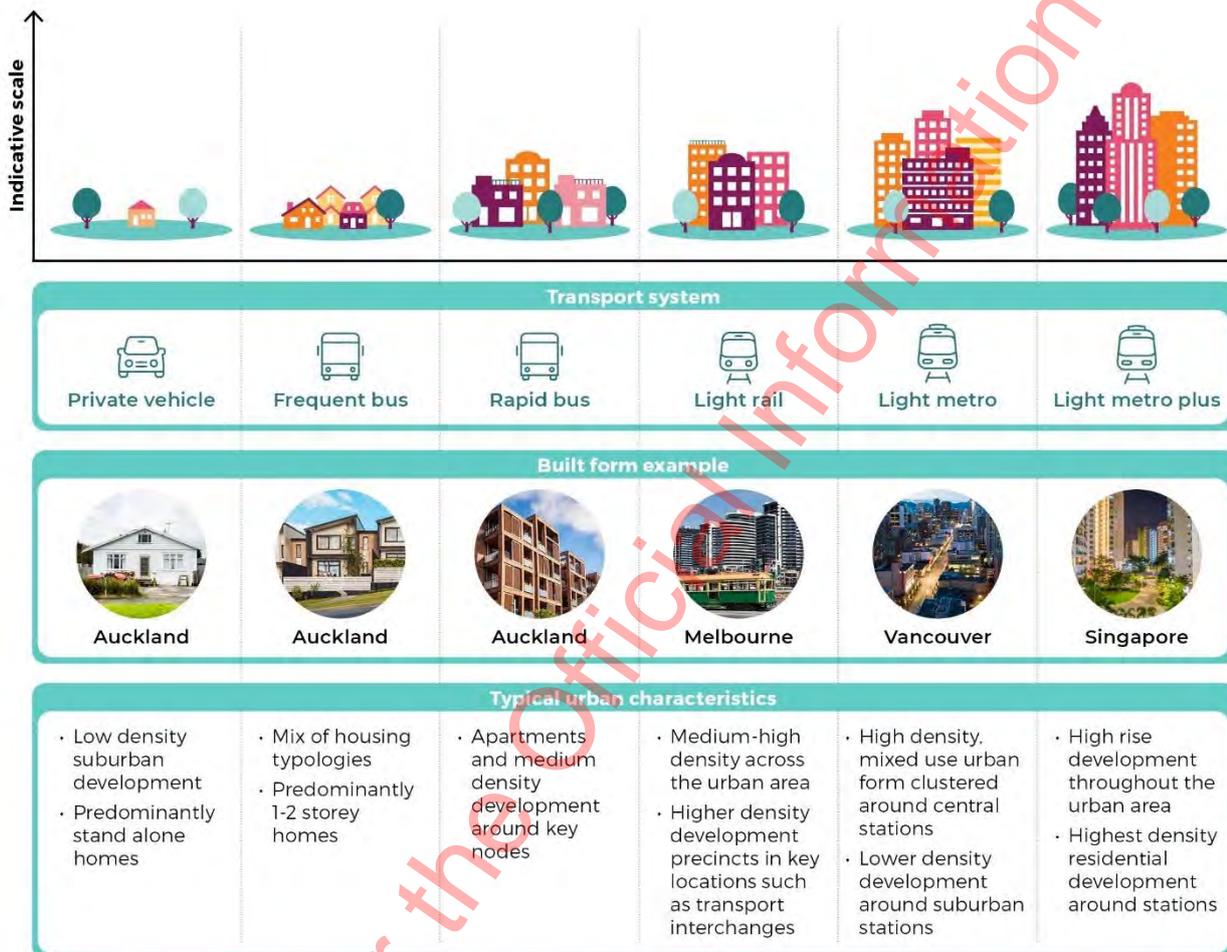
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The Light Rail option, with more and closer stops enabled a more even urban form with increased density likely along the entire length of the route.

The Light Metro and Tunnelled Light Rail options, with greater capacity and accessibility and less stops/stations will concentrate density (and height) largely at the station locations with likely lower density in between.

Figure 12 shows the different urban outcomes associated with the different options (and modes).

Figure 12: Urban development options



The greater the level of intensification, i.e., to the right of the table above, associated with a commitment to maintain urban quality, the more significant the urban plus transport benefits, and the more the requirement to intervene in the urban conditions via manage interventions.

Urban uplift opportunity

Each option has wide range of possible urban outcomes, depending on the level of ambition and the supporting measures used to drive greater urban uplift.

An assessment of the potential urban uplift for each option was undertaken. Two scenarios were used to undertake the analysis– the ‘Accessibility based scenario’ and ‘Higher intensification scenario’. The ‘Accessibility based scenario’ is the forecast uplift response with limited intervention, whereas the ‘Higher intensification scenario’ considers the potential uplift if more urban levers were pulled to facilitate increased development along the corridor.

Table 9 shows the range of uplift forecast for each option (detail on the approach and basis of these assumptions is provided in Appendix 9).

Table 9: Forecast urban uplift potential

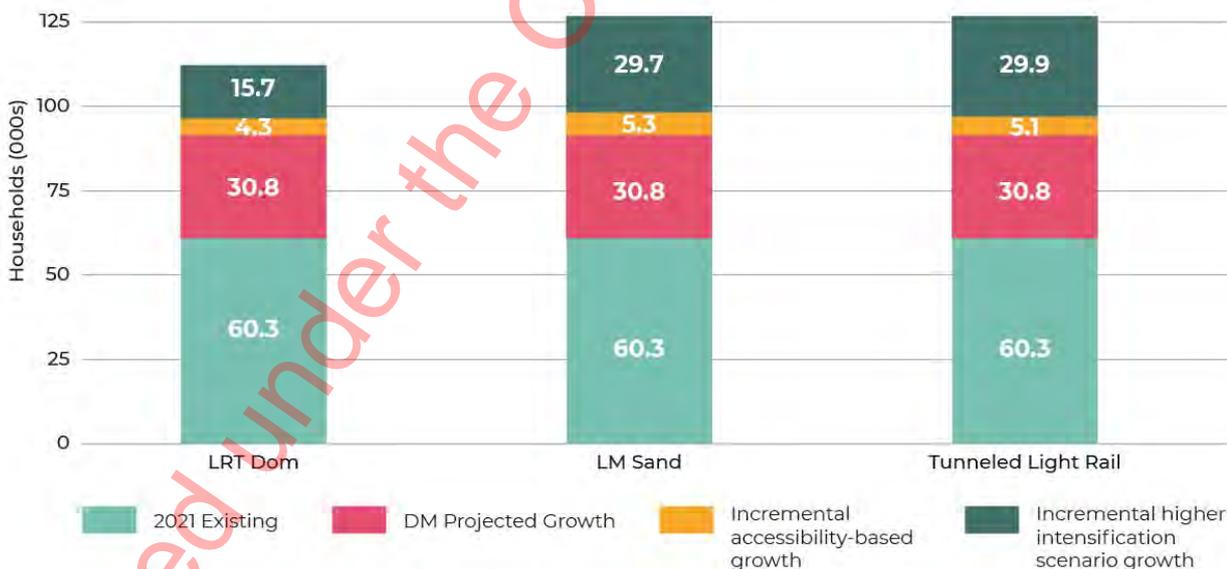
	Light Rail		Light Metro		Tunnelled Light Rail	
	Households	Jobs	Households	Jobs	Households	Jobs
Accessibility based scenario	4,100	3,700	5,100	5,300	5,000	5,100
Higher intensification scenario	20,000	12,000	35,000	16,000	35,000	16,000

It shows that the Light Metro option, and to a lesser extent the Tunnelled Light Rail option, can enable the greatest level uplift along the corridor due to the increased capacity and accessibility provided. This additional uplift would be provided around the stops/stations and in particular the Dominion Junction station, where there is significant development potential.

The Light Rail option would also provide uplift opportunities, albeit to a lesser scale than the Light Metro and Tunnelled Light Rail options. This uplift would be focussed in the town centres but given the greater number of stops/stations with this option uplift can be spread along the route.

Figure 13 shows that regardless of the additional growth driven by improved accessibility associated with the transit investment, there is still significant growth potential projected for the corridor without this Project. However, the Project investment will create additional certainty and security that this level of growth will be delivered.

Figure 13: Existing and forecast households in 2051



Whilst both scenarios are within the theoretical capacity of the Auckland Unitary Plan land use allowance for the corridor, there are significant challenges to achieve this higher uplift and the Commercial Case below provides further detail of the urban interventions that could be used to secure this uplift.

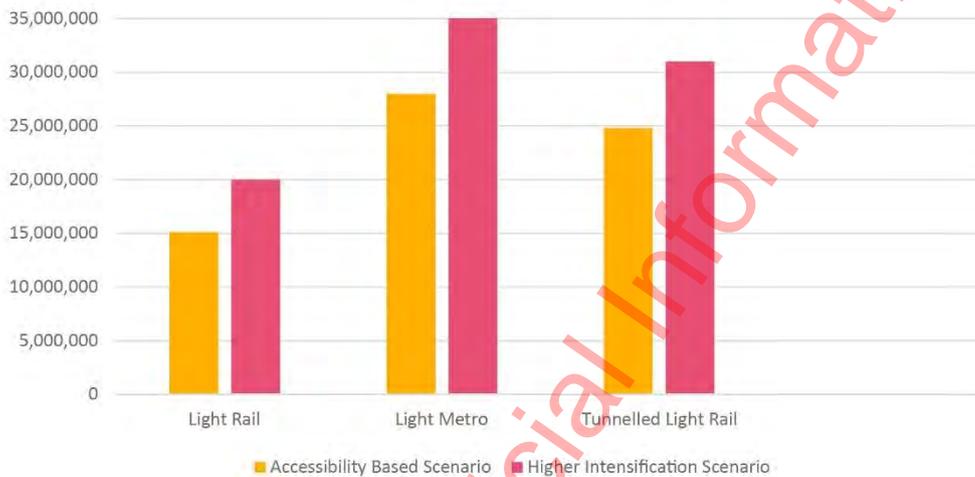
Transport outcomes

The assessment of the three shortlisted options has considered both potential land use futures, Accessibility based scenario and the Higher intensification scenario, to understand the impact on patronage and the Project economics, with the Accessibility based scenario used as the 'base scenario'.

Patronage and accessibility

Appendix 10 sets out the transport assessment details for each option. All three options are forecast to carry a substantial number of passengers and provide a step change in accessibility for many users. The forecast patronage is shown in Figure 14.

Figure 14: Annual patronage (2051) for short listed options



The Light Metro option attracts higher patronage because:

- it provides more accessibility due to the faster travel time
- it serves the high growth Kāinga Ora development more directly than the Dominion Road Light Rail option
- it has better connections with other parts of the public transport network (e.g. Kingsland rail station).

Figure 15 shows patronage is higher closer to the city centre.

Figure 15: Patronage profile (2015 peak hours)



The five busiest stops/stations for each option are:

- s 9(2)(i)
- [Redacted]
- [Redacted]
- [Redacted]

Table 10 summarises the key transport outcomes forecast. Māngere

Table 10: Transport outcomes summary 2051 (Higher intervention)

Indicators	2018	2051 Do Minimum	Light Rail	Light Metro	Tunnelled Light Rail
Number of Jobs within 45min by public transport from origins in the AM Peak from					
Māngere Town Centre	79,780	82,065	247,207	452,773	346,183
Ōnehunga	165,136	194,045	405,544	463,881	437,561
Mt Roskill	208,209	297,096	414,691	423,047	403,296
Number of Households within 45min by PT to destinations in the AM Peak from					
City Centre	202,704	354,075	378,545	405,418	399,246
Airport	3,840	19,838	97,008	164,245	116,737
Number of Tertiary Education Opportunities within 45min by PT from origins in the AM Peak					
Māngere Town Centre	9,081	4,828	22,541	131,990	114,614
Ōnehunga	4,323	5,787	112,025	116,251	111,702
Mount Roskill	77,097	111,005	112,027	112,139	112,103
CC2M Travel times to Airport business from					
Māngere			6.9	4.5	7.0
Ōnehunga			18.3	12.1	18.4
Mount Roskill			26.6	20.1	29.9
CC2M Travel times to Mid-Town from					
Māngere			36.6	27.3	32.0
Ōnehunga			25.2	19.7	20.6
Mount Roskill			17.0	11.8	11.8
CC2M Boardings					
AM Peak			16,505	28,822	26,411
Daily			72,605	125,252	111,724
Annual			20,256,851	34,945,169	31,170,996
PT Mode share					
CC2M corridor	12%	21%	26%	26%	26%

All options provide sufficient capacity to meet the demand modelled on their corridors by 2051. However, Light Metro and the Tunnelled Light Rail options have higher potential total service passenger capacity.

Light Metro has the highest at absolute maximum capacity potential of over 23,000 passengers/hour/per direction compared to Tunnelled Light Rail at 16,800 and Light Rail at 8,400 respectively.

This difference arises because Light Rail capacity is limited by surface running constraints, as is the Tunnelled Light Rail to a lesser extent, through Māngere town centre, Bader Drive and Ōnehunga sections.

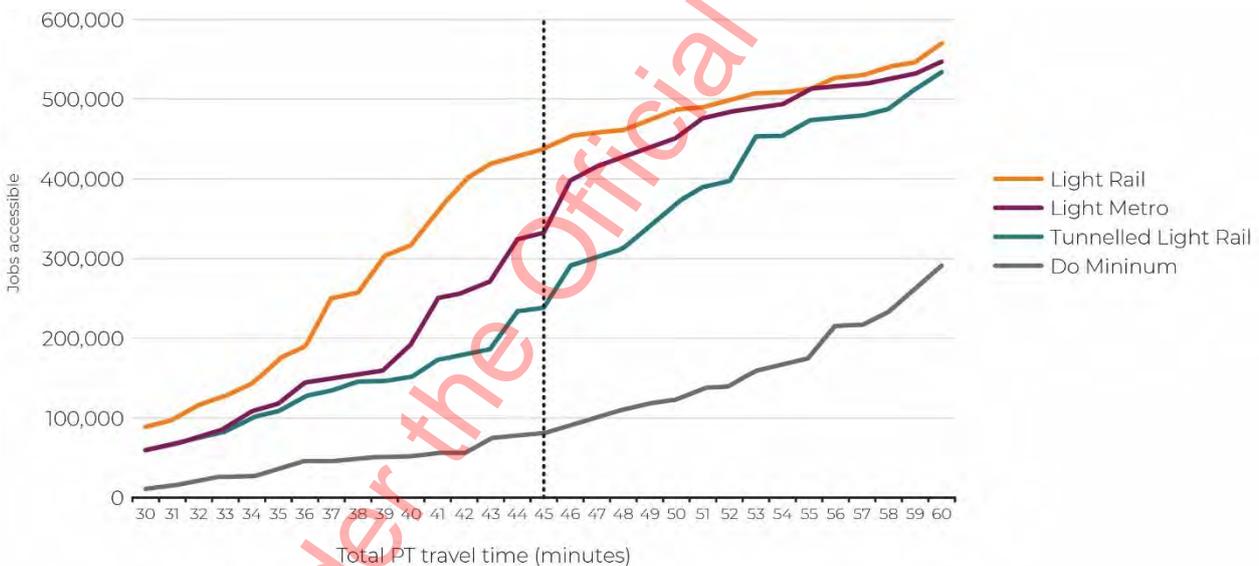
All options deliver improved accessibility to employment and education opportunities for the CC2M corridor compared to the base case. Regardless of the option chosen, the proposed investment significantly increases access to employment and education opportunities for communities in the corridor.

Without the proposed investment, accessibility to employment and education from Māngere / Favona will worsen between 2031 and 2051 (under the currently funded transport programme).

All options deliver the biggest employment and education accessibility improvements to the Māngere / Favona catchment. Other catchments in the corridor have better existing travel choices, so the increase is not as significant.

For Māngere / Favona, the Light Metro and Tunnelled Light Rail options faster travel times, will deliver better access to employment and education opportunities than the Light Rail option (Figure 16). By 2051 the Light Metro and Tunnelled Light Rail options provide access to between 250,000 and 350,000 more jobs in the morning peak than the base case within 45 minutes travel time from Māngere town centre than the Light Rail option (an increase of in the order of 300 percent).

Figure 16: Employment opportunities available from Māngere town centre along the CC2M by 2051 morning peak



The three options patronage forecasts were benchmarked against international cities comparing patronage forecasts against city densities (Figure 17). This gives confidence that the forecasts are within an expected range with cities with both lower and high densities achieving patronage forecasts like what is being forecast for this Project.

Figure 17: International patronage comparison⁵¹



Mode shift

All options deliver an increase in mode shift to public transport within the corridor compared to the base case.

The Light Metro and Tunnelled Light Rail options deliver better mode shift than the Light Rail option, but the difference is not significant. An important reason for this is that most (55 percent) of trips by residents within the CC2M corridor are to destinations outside the corridor not directly served by the proposed investment. To improve the ability of CC2M to deliver better mode shift, it is vital that effective integration is provided to the wider public transport network at interchanges.

The higher Light Metro and Tunnelled Light Rail patronage comes from some mode shift from private vehicle but mainly from increased interchanging between the Light Metro and rest of the public transport network. For example, at Kingsland by 2051 in the morning peak, there will be 1,000 people interchanging between the Western line to the CC2M service (largely driven by better travel times and access to the University precinct and Wynyard Quarter).

In each option 30-40 percent of trips have transferred from feeder bus services. It is therefore critical that there are high-quality interchanges provided at the key locations identified and outlined in Appendix 10 Transport Assessment. An underlying assumption was that changes to the current bus services will be maximised for the benefit to existing public transport users in the wider catchment (e.g. well-co-ordinated service integration and well-located interchange opportunities). These changes will need to be implemented alongside the preferred option.

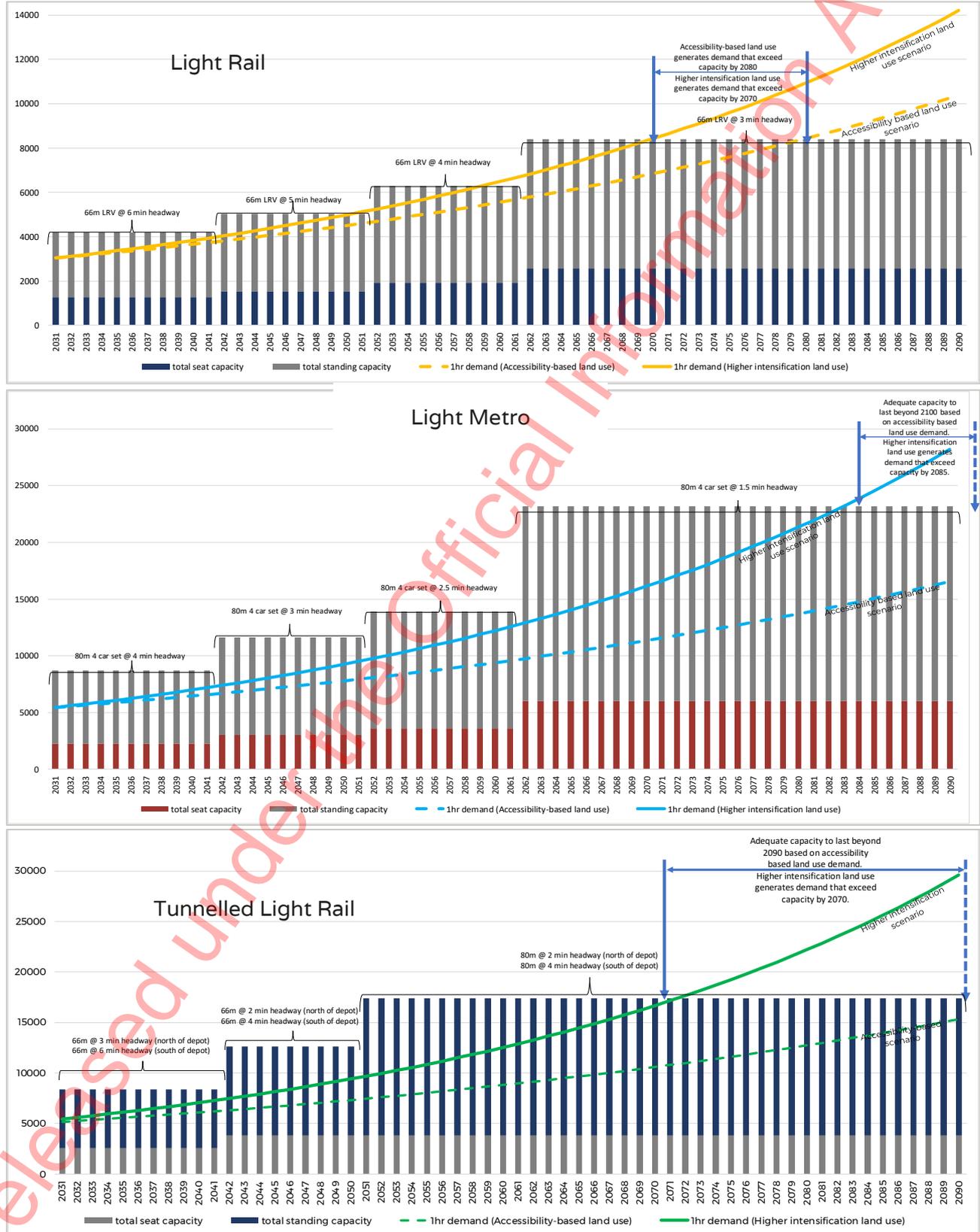
⁵¹ Exploring the benefits of Rapid Transit - 30 September 2021, ALR project

Future proofing

Patronage profiles and capacity determine how future proofed an option is in terms of demand. The three options have different patronage profiles and capacities.

Figure 18 shows the current forecast for the options and when the option reaches capacity under a range of demand scenarios, including the lower and higher land use scenarios.

Figure 18: Options long term AM city bound peak hour forecasts vs capacity



The above graphs show that the Light Rail option is forecast to reach the maximum capacity as early as 2070. The Light Metro option could reach maximum capacity as early as 2085 and the Tunnelled Light Rail option by 2070. These dates assume higher land use densities and an increase in use of the service. If less 'optimistic' urban growth assumptions are made, the options reach capacity later. It is however important to note that the Tunnelled Light Rail option capacity could be increased to be closer to that of the Light Metro option through extending the length of trains, significantly increasing the capacity of this option. If this option was selected, this additional capacity would be optimised in the next phase.

Interface with the future rapid transit system

Work done as part of the ARTP helps to inform work on the Project. This work looked at how the CC2M, North Shore and Northwest lines could be integrated in future.

The ARTP work has identified a shortlist of network options for how these corridors could integrate. This includes all three corridors as the Light Rail option, all three corridors as the Light Metro option, and a combined option with Light Metro operating on the North Shore and Northwest corridors, and with CC2M operating as Light Rail (option 8 of the ARTP). These options are shown in Figure 19.

Figure 19: Future Rapid Transit Network integration



All three shortlisted options for the CC2M corridor can integrate with Northwest and North Shore corridors.

Anticipated future demand from these three corridors in the longer term (i.e. from the mid-2040s) will be difficult to accommodate on a single surface-level corridor like Queen Street, due to the volume of vehicles that can operate on the surface and the desirability of doing so especially given the 'place value' of this street. The ARTP highlighted that there are a variety of ways this issue could be addressed, including a second surface-level corridor or a city centre tunnel. Work undertaken by ALR has identified some significant challenges in delivering a second city centre surface corridor, while a tunnel obviously has a very significant cost.

Whatever one of the three options is chosen for the CC2M options that include a city centre tunnel create a more enduring solution for all three corridors, whereas surface-level options are likely to require significant additional investment in 20-30 years' time (10-20 years after CC2M is expected to be fully operational).

If the Light Rail option was selected for the CC2M corridor it could remain at surface in the short term, move to a tunnel in the city centre in the long term (when required) or a future proofing tunnel could be considered now as part of the option. These issues would be investigated in the next phase (if the option was selected).

Should either the Tunnelled Light Rail or Light Metro option be chosen for the CC2M then:

- 100 percent of the costs of the city centre tunnel would be borne by the CC2M but would deliver significant future benefits to the future Northwest and North Shore rapid transit

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connections. Based on the demands from the initial modelling assessment, up to 70 percent of the benefits from the tunnel would be attributable to the North Shore and Northwest corridors.

- A portion of the cost of the Light Metro/Tunnelled Light Rail options can be regarded as an investment for the future. It will deliver some benefits in the short term, but much more once the other schemes are constructed.

It is also important to acknowledge that the mode decision for CC2M will have implications for the wider Auckland Rapid Transit Network as follows:

- With the surface light-rail option for CC2M, the North Shore and Northwest could be light-metro (ARTP option 8) or also light-rail (ARTP option 1).
- With the light-metro option for CC2M, this probably means the other corridors are light-metro (ARTP option 3), but potentially the Northwest could still be Light Rail.
- With the Tunnelled Light Rail option for CC2M, Light Rail (same vehicles as Tunnelled Light Rail option) would be required on the other lines, however the tunnel in the city centre would potentially allow higher frequency services.

Regardless of the option selected further detailed planning and analysis on what the exact integration with the future Rapid Transit Network will be required to maximise the flexibility of the future Rapid Transit Network.

Active modes

All the options increase active mode use, both walking and cycling. This is because greater population density and more land use intensification along the corridor and encourages and enables more people to walk to stops/stations. Enhanced bus and cycling facilities will be provided along and around the alignment of each option. This will provide a high-quality environment supporting more active users.

Being tunnelled, the Light Metro and Tunnelled Light Rail options offer more potential for a better cycling environment, due to the availability of more space on the surface areas along the corridor. The Light Rail option will also provide quality cycling facilities, albeit in a 'busier' surface corridor.

Sensitivity tests

To understand the implication on the options of some key possible futures the following sensitivity tests were undertaken:

- Impact of road pricing (The Congestion Question pricing scenario)
- Impact of road pricing and expansion of the Auckland RTN

Appendix 11 outlines the results of these tests for the three short listed options in detail. By way of a summary, these sensitivity tests showed that:

- **Road pricing** - road pricing will have a minimal impact on the CC2M demand, increasing demand on the options between 1 and 2 percent
- **Road pricing and RTN expansion**
 - expanding the CC2M network to the North Shore and Northwest, together with road pricing will increase daily demands on the options by between 5 and 9 percent (5 percent for Light Rail, 9 percent for Light Metro and Tunnelled Light Rail)
 - By 2051 the options will experience similar increases during the morning peak (approximately an additional 6 percent).

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- The Light Metro and Tunnelled Light Rail options will experience approximately 9 percent increase in daily and annual boarding's, suggesting the higher inter-peak use for these options

Carbon outcomes

Existing policies and transport interventions (the Do Minimum base case scenario) are expected to reduce carbon emissions across Auckland's transport network by 50 percent by 2051. While these represent significant emissions savings, there remains a large gap between Auckland's transport emissions and the goal of achieving net zero carbon emissions by 2050, enshrined in the Climate Change Response (Zero Carbon) Amendment Act. Therefore, new transport interventions are essential to bridging this gap.

An assessment of the carbon emissions of each of the refined shortlisted options was undertaken, as set out in Appendix 12. The Whole of Life Carbon Profile 3 compares the carbon impact of the five emission sources and emission saving factors of the three shortlisted options against the Do Minimum base case scenario.

The five sources of carbon emission contribution and emission savings include:

- Source 1 - Emissions from asset construction activities.
- Source 2 - Emissions from asset operational activities.
- Source 3 - Emissions from transport users across Auckland due to the impact of the Project.
- Source 4 - Emission savings from reduced road construction and car parking spaces across Auckland.
- Source 5 - Emissions savings due to lower energy requirements of denser housing typologies along the CC2M corridor.

Carbon emissions increase from the construction of the schemes but reduce because of mode shift from private vehicles to public transport and active modes, as well as reduced VKT. Due to the scale of construction of the underground Light Metro stations, the embodied carbon for the Light Metro and Tunnelled Light Rail options are significantly higher than for the Light Rail option. However, the Light Metro and Tunnelled Light Rail options induces greater urban uplift which results in greater mode shift.

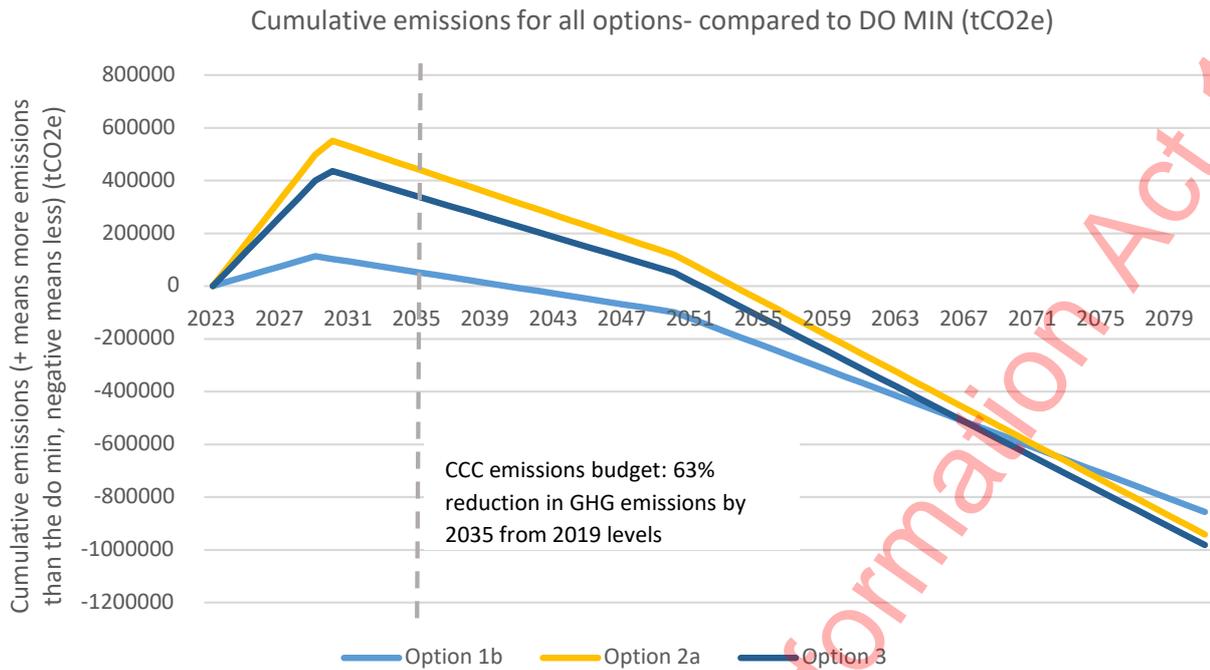
Over a 50-year period, the assessment (of the higher intensification urban scenario) shows that all the shortlisted options reduce carbon emissions, with the Tunnelled Light Rail option having the greatest carbon emissions reduction impact.

Compared to the Do Minimum base case scenario by year 2081:

- The Light Rail option reduces carbon emissions by around 860,000 tCO₂e,
- The Light Metro option reduces carbon emissions by around 940,000 tCO₂e
- The Tunnelled Light Rail option reduces carbon emissions by around 980,000 tCO₂e

As shown in Figure 9, parity of carbon emissions, when compared to the Do Minimum, from constructing the Light Rail option is achieved after approximately 10 years of operation, whereas the Light Metro and Tunnelled Light Rail options takes approximately 20-25 years.

Figure 9: Whole of Life carbon impact from ALR IBC – Profile 3



Regardless of what decision is made on the Project, it is likely that a city centre tunnel will be required at some stage in the future. This means at a network level some of the difference between the embedded carbon in the Light Rail and Tunnelled Light Rail options would disappear, and the time each option takes to achieve carbon neutrality would be reduced.

IMPACTS

An assessment of the impacts of each short-listed option, during construction and operation, was undertaken. The details of this assessment are provided in the short-list Assessment Report in Appendix 8.

While not a differentiator, Te Ao Māori considerations were an important part of the options assessment with the following findings:

- Negative marks were given for the impact or land take on Māori land parcels including the effects at Princess Street which is on route.
- Te Awa Te Wai o Horotiu runs in Queen Street and could be negatively affected there is an associated Pā close to the town hall which could have potential cultural effects.
- Most Mana Whenua been engaged with CRL therefore understand the technology and the positives and negatives of boring,
- There are two main concerns and considerations for these options are around Aquifer and potential lava caves when boring close to Māngere bridge or when close to Puketāpapa.

The impacts that were the key differentiators between options include⁵²:

- Constructability / Disruption
- Consentability

⁵² This excludes cost which is discussed in a separate section

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- Property
- Community

The following sections summarise these impacts.

Constructability / Disruption

This Project will require construction in heavily populated areas of Auckland, including the city centre, the central isthmus, Ōnehunga and Māngere town centre.

The three options have very different impacts during construction due to the specific form of the options (surface versus tunnel). The Light Rail option would be constructed at surface level along the entire length of the route, whilst the Light Metro and Tunnelled Light Rail options are tunnelled through some of these areas, reducing surface impacts to station locations and the landing areas for the tunnel boring machines.

The Light Rail option would result in surface disruption in several areas for lengthy periods, including Queen St, Dominion Road, and Ōnehunga and Māngere town centres. Although construction would be broken up into sections, lasting up to 18 months in any one location, this may require partial or full closure to traffic for between three to five years.⁵³

Conversely the impacts of the Light Metro and Tunnelled Light Rail options will be largely limited to the underground station locations and at the tunnel portal areas, although these are likely to be more intensive in their nature than the Light Rail impacts. The possible locations of the underground stations are:

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These will be further investigated in the next phase. None of the options can avoid construction impacts, although these can be reduced through staging of works to limit the impacts on specific areas and through management plans to assist impacted residents and businesses as much as possible. Acknowledging those construction impacts upfront and working with communities on ways to address them through design, consenting, management, support, and other mitigation measures, will be part of the Project going forward.

Consentability

Achieving statutory approvals for a project of this scale is a significant task. The impacts of each of the options are different and will present different consenting challenges.

The consenting challenges for the Light Rail option relate to the extent and duration of construction disruption through town centres and the city centre, and in particular impacts along Queen Street and Fanshawe Street in the order of three to five years. This is particularly relevant given the heightened concerns surrounding impacts from the current CRL works.

Construction disruption is considered a significant challenge for the Light Rail option and would require careful development of mitigations and designs to minimise impacts in the delivery of this option if it was progressed further.

⁵³ Detailed traffic management plans have not been developed at this stage

The Light Metro and Tunnelled Light Rail options also have consenting challenges, but these are predominantly focussed at underground stations and the tunnel portals, in particular the scale of transport movements and materials handling for the management of spoil. Managing these impacts would be a focus of the next phase.

The Manukau Harbour is highly significant to Mana Whenua as well as the nearby Māori community. All options have a specific consenting challenge where they pass near the lagoon to the west of Ōnehunga and cross the Manukau Harbour. The next phase will need to undertake careful design development and work with partners and stakeholders, to aim to avoid or minimise the impact on these areas and the Māori Values associated with them.

Property

The impacts to property for each option are different. These are largely related to the use of tunnels versus surface construction. Table 11 sets out a summary of the number of properties likely to be impacted for each option. For the Light Metro and Tunnelled Light Rail options, this includes the number of properties by surface and subterranean interests.

Table 11: Short list property requiring acquisition

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The assessment has shown that the Light Rail option requires the greatest number of surface properties to be acquired. Once the subterranean interests are included, the Light Metro and Tunnelled Light Rail options have the highest total number of properties affected, at approximately 600 properties. Whilst the Light Metro and Tunnelled Light Rail options have the highest number of properties, their impacts are considered significantly less than the Light Rail option, as the number of properties affected at surface level is approximately a third of that required for the Light Rail option. These surface properties will require acquisition, either partial or full acquisitions, and the subterranean interest in some properties will require compensation.

s 9(2)(i)

Another important property impact difference is the number of business properties impacted, with the Light Rail option affecting approximately three times the number as the Light Metro and Tunnelled Light Rail options, mainly due to its surface running operation in the city centre and town centres.

Property acquisition poses several risks, including the timing of acquisitions as well as cost escalation challenges currently in the market. The Property Overview as discussed in the Commercial Case sets out how these impacts will be managed, including how the Public Works Act would be used to acquire these properties.

Community impacts

During construction there will be multiple adverse impacts on communities and urban spaces/places along the route. This includes noise, dust, vibration, access restrictions and other construction impacts.

The Light Rail option impacts occur at surface for the entire route, whereas the Light Metro and Tunnelled Light Rail options have impacts focussed at tunnel portals and stops/stations, where these may be quite intensive.

These construction impacts on communities must be balanced with the long-term accessibility improvements and other urban benefits for these communities from the Project and associated urban development/renewal.

The Light Metro and Tunnelled Light Rail options provide a significant increase in accessibility to social, education and employment destinations, particularly for the communities in the south of the corridor, such as Ōnehunga and Māngere. There are similar enduring impacts for the Light Rail option, albeit to a smaller scale.

With the Light Rail option being surface running, there will also be a level of corridor severance, with some side streets and properties along the route likely being limited to left in-left out vehicular access only.

Balancing the long terms benefits (and impacts) with the construction impacts on communities, the Light Rail option is considered neutral and overall positive for the Light Metro and the Tunnelled Light Rail options.

ECONOMIC ANALYSIS

This section sets out the monetisation of the benefits of the options, compares these to the cost to then give an indication of the value for money of each option.

Methodology

Each of the short-listed options had a full Cost Benefit Analysis (CBA) undertaken.

The CBA was largely based on the Waka Kotahi Monetised Cost and Benefits Manual (MCBM). Appendix 11 sets out the approach in more detail.

Key aspects of the economic assessment include:

- A 60-year economic evaluation period, with a 4 percent discount rate has been used
- Year zero of 2021, opening year is 2032 assumed
- The following benefit streams have been quantified:
 - **Public transport user benefits** - new public transport users who have either transferred from another mode or are a new generated trip. Benefits are based on the difference between the proposed and the maximum user charge (at which no one would use the service). The result is then divided in half, based on the 'rule of half'. The Project is expected to reduce congestion for existing services and reduce crowding on existing services.
 - **Public transport user experience benefits** - public transport users experience an improved quality of facility and service.

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- **Road traffic benefits** - The Project will reduce vehicle travel, providing benefits in vehicle travel time, congestion, and vehicle operating costs for those who continue to drive.
- **Reliability benefits** - The Project provides public transport users with a more reliable service than the existing bus services. A reduction in traffic on the remaining network will result in some reliability benefits for vehicles.
- **Safety benefits** - The Project will reduce VKT on the road network, due to a transfer of users to the Project. High quality public transport services are inherently better performing from a road safety perspective.
- **Impact of mode on physical and mental health** - Users of a public transport corridor typically walk more than a comparative vehicle journey. The physical and mental health benefits of this increased walking will be considered using MBCM.
- **Emissions benefits** - The Project is expected to lead to a reduction in vehicle emissions.
- Wider Economic benefits, include:
 - **Agglomeration benefits** which measure the productivity gains that arise when increased spatial concentration results in higher efficiency of activities
 - **Imperfect competition benefits** which measure the impact of transport infrastructure-induced increases in output in sectors with price cost margins
 - **Increased labour supply benefits** which measure the additional tax take that results in when improved transport infrastructure increases the labour supply
- Dynamic land use has been used in the economic analysis⁵⁴.

Sensitivity testing of several key assumptions has also been undertaken to understand the responsiveness of the CBA to different assumptions.

Costs

The costs of the short-listed options are set out in detail in the Financial Case. The economic analysis has included both the CAPEX and OPEX costs of the options. The escalated expected estimate (P50) costs have been used and converted to a Net Present Value (NPV). The costs are summarised in Table 12.

Table 12: Economic Costs

	Light Rail	Light Metro	Tunnelled Light Rail
Unescalated (P50) Capital Cost (M)	\$7,312	\$12,773	\$11,410
Escalated (P50) Capital Cost (M)	\$9,047	\$16,291	\$14,601
Unescalated OPEX (M pa⁵⁵)	\$105	\$115	\$120
Economic NPV (M)	\$7,141	\$11,196	\$10,362

⁵⁴ Dynamic Land Use, meaning the option scenario has a higher land use in the CC2M corridor than the Do Minimum scenario

⁵⁵ Average value

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The costs of other investment that will not be required, or delayed, because of this Project were considered, particularly related to the 'relocation' of development from currently identified greenfields areas to the CC2M corridor.

A sensitivity test is undertaken to consider the implications of delayed investment in greenfields areas and what this could do the BCR if the savings were attributed to this Project.

Benefits

The benefits of the short list options are set out in detail in Appendix 11. The benefits are summarised in Table 13.

Table 13: Economic Benefits

	Light Rail	Light Metro	Tunnelled Light Rail
Traditional transport benefits (NPV) (M)	\$3,747	\$6,063	\$5,278
Wider economic benefits (NPV) (M)	\$3,989	\$6,988	\$5,760
Total benefits (NPV) (M)	\$7,736	\$13,051	\$11,038

This shows that:

- Significant economic benefit is generated by all the options.
- Light Metro has highest benefits, followed by the Tunnelled Light Rail and then Light Rail option.
- Wider economic benefits (WEBs) are high as a proportion (outside typical guidelines), but this makes sense given the CC2M corridor links two of the largest employment areas in New Zealand.
- Most of the transport benefits (over 50 percent) relate to improvements in public transport travel time, reliability, and amenity, particularly in the peak commuter periods. There are also safety and active mode benefits associated with all options. There are private vehicle travel time benefits, predominantly associated with interpeak travel benefits to those greenfields areas where growth has been relocated.

These benefits are considered conservative at this time as this analysis assumes that the full scheme will open in 2032 when it is likely that there would be an initial opening of stages, delivering benefits earlier than currently modelled in the economic analysis. The DBC will look to optimise these benefits.

Benefit Cost Ratio (BCR)

Each of the options deliver positive development and transport outcomes. The transport outcomes include a high-quality modern and rapid public transport service, excellent levels of reliability, reductions in harmful emissions, safety improvements through a reduction in private vehicle travel, lower vehicle operating costs and improvements in public transport travel times through the corridor, that deliver considerable accessibility gains.

The BCR ranges from 1.1 to 1.2 for the three options as outlined in Table 14.

Table 14: BCR summary

	Light Rail	Light Metro	Tunnelled Light Rail
Traditional transport benefits (NPV) (M)	\$3,747	\$6,063	\$5,278
Wider economic benefits (NPV) (M)	\$3,989	\$6,988	\$5,760
Total Benefits (NPV) (M)	\$7,736	\$13,051	\$11,038
Total Cost (NPV) (M)	\$7,141	\$11,196	\$10,362
BCR (Transport benefits only)	0.5	0.5	0.5
BCR (TOTAL benefits)	1.1	1.2	1.1
Project NPV (M) (with WEBS)	\$595	\$1,855	\$676

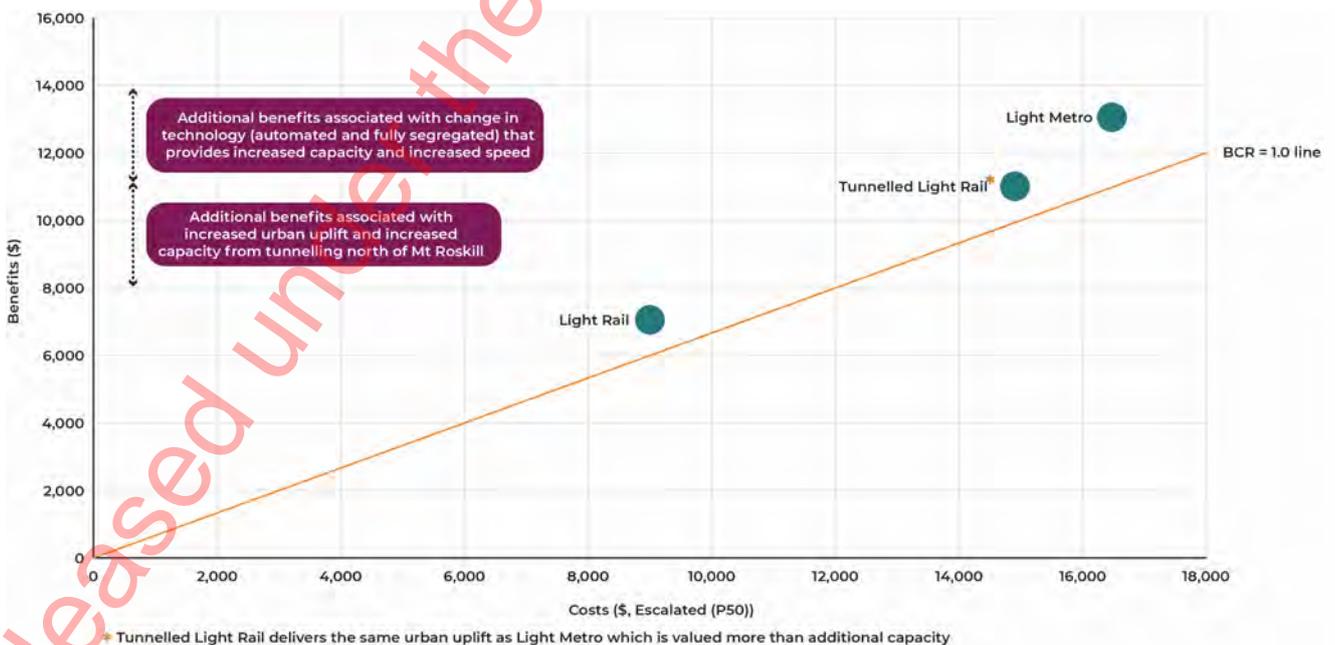
This shows that all options provide value for money relative to the cost of the option, with positive NPV's of greater than a billion dollars.

Incremental analysis (of the total benefits with WEBS) of the options was undertaken. It shows that:

- Incremental BCR from Light Rail to Tunnelled Light Rail of 1.0
- Incremental BCR from Light Rail to Light Metro of 1.3 (undertaken due to above figure being close to 1.0)
- Incremental BCR from Tunnelled Light Rail to Light Metro of 2.4

From a pure economic perspective the more expensive option (Light Metro) delivers greater benefits, and these are worth the additional investment. This is shown visually in Figure 20.

Figure 20 Short list option economic performance



It will be important that the economic analysis is refined further in the next phase to capture the benefits specific to a particular option in more detail. Consideration could also be given to the

economic benefit of unconstrained regional growth totals and what impact this Project might have on increasing Auckland relative attractiveness for growth compared to other cities, which could increase the benefits of this Project.

KEY TRADE OFFS

This section considers the key trade-offs between the options to allow a preferred option to be recommended.

General

All three short listed options deliver well against the Project objectives, improving accessibility, reducing Auckland's carbon footprint, and enabling urban benefits in the corridor.

Each of the options deliver different levels of benefits, have varying scales of implementation impacts and have different cost and economic responses. To determine a recommended option, it is important to also consider the key trade-offs between the options. Key aspects of these trade-offs are provided in Figure 21.

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Figure 21: Trade off summary (high land use)

		 Light Rail	 Light Metro	 Tunnelled Light Rail
Description	Total boardings (Annually in 2051)	20,300,000	34,950,000	31,900,000
	Capacity Reached	2070+	2085+	2070+
	Number of Stations	22	17	18
Urban Development	Urban Uplift Potential by 2051			
	Household	20,000	35,000	35,000
	Jobs	12,000	16,000	16,000
	Accessibility (jobs within 45 minutes)			
	Māngere	247,000	452,800	346,200
	Onehunga	405,500	463,900	437,600
Mt Roskill	414,700	423,000	403,300	
	Jobs within 45 minutes of Central City and Airport	475,600	569,600	515,900
Travel Time	Travel Time	57	36	43
	To Airport Business Precinct			
	Māngere	7	5	7
	Onehunga	18	12	18
	Mt Roskill	27	20	30
	To City Centre (mid town)			
	Māngere	37	27	32
	Onehunga	25	20	21
Mt Roskill	17	12	12	
Impacts	Carbon (tonnes saved)	860,000	940,000	980,000
	Surface Properties Affected	489	168	167
Economics	Cost (p50)	\$9.0 Bn	\$16.3 Bn	\$14.6 Bn
	BCR	1.1	1.2	1.1
Challenge	Key Risks	Disruption Consentability	Affordability Market Capacity	Affordability Market Capacity

Key considerations

When considering the trade-offs between options to inform a decision on a preferred option, the following key considerations were posed.

Level of ambition

The Auckland region is a substantial and dominant national economic force, with above average productivity. While the likely footprint of the Project investment represents only around 5.5 percent of the Auckland economy, it is a substantial economy, generating \$5.2Bn of GDP, with

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nearly 13,000 businesses employing 48,600 people, and near the centre of the Auckland spatial economy. Therefore small changes in performance can have large effects.

There is substantial statutorily enabled capacity in the central isthmus to accommodate a significant increase in residential and business activity which is “city shaping” in effect and will drive superior economies of scale, agglomeration and density, alongside community and place benefits.

All options can achieve urban benefits and accessibility alongside forecast carbon reductions.

The Light Metro option delivers the most benefits against the investment objectives, it has the potential to enable the highest number of additional households in the corridor (an additional 35,000 households and 16,000 additional jobs), whilst also providing the greatest increase in accessibility and the annual savings in carbon once the option is operational. The Tunnelled Light Rail option has similar benefits as the Light Metro option.

The Light Rail option has the potential to enable for an additional 20,000 households and 12,000 jobs and provides a step change in accessibility and carbon reductions (including reaching carbon neutral many years earlier than the other two options if embodied carbon is considered), albeit to a lesser level than the Light Metro and Tunnelled Light Rail option (for instance patronage is 40 percent less than the Light Metro option)

The Light Metro option also has the highest level of residual capacity beyond the modelling horizon of 2051, futureproofing for further patronage growth beyond the core assessment period.

The forecast level uplift and patronage are less for Light Rail with this option being forecast to reach its capacity within 35-45 years after opening.

The Tunnelled Light Rail option sits between these two options from a future-proofing perspective.

The more benefits required for the corridor, the more the Light Metro would be the preferred option, very closely followed by the Tunnelled Light Rail option which also provides a similar level of benefit.

Level of urban intervention

There is direct correlation between the level of intensification, households and employment and the flow-on effects to the transport and urban benefits/outcomes. However the level of growth enabled by the proposed investment on its own is not enough to unlock the significant urban potential in the central isthmus. Therefore other interventions are needed to maximise that potential.

The minimum commitment, to optimise the transport and urban benefits, is the establishment of a ‘whole of government’ collaborative accountability, responsibility and a governance structure and Delivery Entity which is charged with securing optimum urban outcomes alongside delivering the transport infrastructure.

While a collaborative structure, including the role of delivery agencies such as Kāinga Ora and Eke Panuku, can go some way towards enabling more urban outcomes by optimising the skills and resources of the partners, it will fall short of unlocking and delivering these outcomes, which in turn will fail to fully optimise the benefits. Therefore, a greater level of active involvement is required to unlock and deliver benefits.

At this IBC phase, the intervention instruments, and the urban intervention levers available to drive transit-supportive land use change to unlock and deliver urban development potential are well understood. The current market considerations and generic risks, barriers and opportunities

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associated with undertaking such activity are also understood, as well as multiple international examples of approaches to deliver urban development.

However, what is not understood, is a specific place-based understanding of how these instruments and levers will be applied in each specific location and what level of resources, risks, costs, and commitment of the parties is required to fund and deliver the development outcomes.

These matters will be explored further in the DBC.

Level of investment in the CC2M corridor

There is a substantial difference in costs of the options, with the Light Rail forecast to cost in the order of \$9,047M⁵⁶, the Light Metro \$16,291M and the Tunnelled Light Rail option \$14,601M.

However, all options provide value for money, with a BCR of above one and all three options having a similar level of economic efficiency with the more expensive options generating more benefits. So it is cost rather than economic efficiency that is the key trade-off between these options.

From an incremental economic perspective the analysis shows the Light Metro option performs best.

The Light Metro option, which has the highest cost, also delivers the greatest level of benefit and future proofing. This option is forecast to deliver the greatest level of economic benefit to Auckland and ultimately the country.

The Tunnelled Light Rail option delivers many of the Light Metro option benefits (including the higher urban uplift) for a lesser cost - in the order of \$2Bn less.

The Light Rail option is more than half the cost of the Light Metro option, which is in the order of a \$5-7Bn lower than the other two options. The higher the short-term affordability challenge for the corridor, the more the Light Rail option would be the preferred. The Light Rail option also delivers substantial benefits in meeting the Project objectives.

Level of disruption

All options will be disruptive during implementation. However, the form and location of the disruption is different between the options.

The Light Rail option will result in disruption along the entire route as the surface running tracks and facilities are put in place. This will result in disruption for long periods of time, perhaps 3-5 years, in important areas such as Queen Street, Fanshawe Street and Dominion Road. There would also be similar impacts through the town centres of Ōnehunga and Māngere. The Light Rail option will also likely result in ongoing restricted access (left in left out access only) to properties and streets along the route.

There will also be disruption during the Light Metro and Tunnelled Light Rail implementation. Due to the tunnelling of these options through the city centre, central isthmus and Ōnehunga and Māngere town centres, the level of disruption for these areas is significantly reduced. There will however be considerable disruption at the station locations and at the tunnel portal locations.

⁵⁶ Estimated escalated P50 capital costs

Regardless of the option, the Project will seek to minimise these impacts during implementation as much as possible, but disruption will occur. The lower the appetite for disruption, the more the Light Metro would be the preferred option.

Preferred option

All three options meet the investment objectives and have a BCR greater than 1.0, justifying investment. Table 15 outlines why an investor would invest in each of the short-listed option, what outcomes would be expected and what are the key issues the investor should be aware of for each option.

Table 15: Option selection summary

	Light Rail	Light Metro	Tunnelled Light Rail
	Why you would choose this option		
Objectives	<ul style="list-style-type: none"> Delivers step change in accessibility in the corridor Delivers reduced carbon reliance in the corridor Enables high quality urban form and capacity in the corridor 	<ul style="list-style-type: none"> Delivers step change in accessibility in corridor and highest level of capacity in the corridor through full segregation of system Delivers reduced carbon reliance in the corridor Enables high quality urban form and highest urban capacity in the corridor 	<ul style="list-style-type: none"> Delivers step change in accessibility in corridor through full segregation in the city centre and central isthmus and high level of capacity in the corridor Delivers reduced carbon reliance in the corridor Enables high quality urban form and capacity in the corridor
Value	<ul style="list-style-type: none"> Is economically justifiable At \$9Bn (\$7.1Bn NPV) is the least costly of the options, providing opportunity for investment elsewhere in the Rapid Transit Network in Auckland Delivers the lowest total benefits at \$7.7Bn (NPV) 	<ul style="list-style-type: none"> Is economically justifiable Focusses investment to maximise long term outcomes in this corridor and provides future proofing in city centre for wider Auckland Rapid Transit Network at a cost of \$16.3Bn (\$11.1Bn NPV). Delivers the highest level of benefits at \$13.1Bn (NPV) 	<ul style="list-style-type: none"> Is economically justifiable Provides opportunity for high levels of urban uplift and future proofing in city centre for wider Auckland Rapid Transit Network for a cost of \$14.6Bn (\$10.4Bn NPV), which is approximately \$2Bn (\$0.7Bn NPV) less than the Light Metro option Delivers \$11.0Bn (NPV) of benefits, approximately \$2.1Bn(NPV) less than the Light Metro option.
	Things to be aware of with this option		
	<ul style="list-style-type: none"> Level of disruption during implementation along the entire route and at town centres Potential for further longer-term investment in the corridor to meet demand 	<ul style="list-style-type: none"> Level of disruption during implementation at station locations and tunnel portals Very high level of investment in a single corridor Suggests that further investment in the Auckland Rapid Transit Network will be Light Metro to maximise the benefits of this investment 	<ul style="list-style-type: none"> Level of disruption during implementation at station locations and tunnel portals High level of investment in a single corridor, that has lesser capacity than Light Metro option

Any of options could be selected and deliver the outcomes sought by the Project objectives and can be justified economically.

Given the trade-offs **the Tunnelled Light Rail option is the preferred option** because:

- The Tunnelled Light Rail option provides a high-capacity service and the opportunity for the same quantum of intensification and high-quality urban form to be attracted to the corridor as the Light Metro option and a high-quality urban form to be attracted to the corridor. This will provide confidence that the intensification already anticipated in the corridor will take place, in a way that would deliver high quality transit supportive outcomes, also provides the opportunity for even greater growth and urban outcomes consistent with Auckland's quality compact urban form and sustainability benefits. Tunnelled Light Rail provides the opportunity to deliver the same level of urban outcomes, as the Light Metro option at a lower cost.
- The Tunnelled Light Rail option is segregated option in the denser areas of the route while supporting the communities south of the corridor through surface running along Bader Drive which maximises the urban outcomes and accessibility and avoids severance of communities.
- The Tunnelled Light Rail option provides a step change in accessibility in the corridor particularly to jobs and education, and delivers a carbon reduction, whilst minimising disruption, particularly in the city centre, during construction.
- The Tunnelled Light Rail option provides a high level of flexibility (and supports future investment) for how this corridor could interface with Auckland's future rapid transit network, in particular the North Shore and Northwest lines.
- The exact route of the Tunnelled Light Rail option remains flexible and so the final route through the central isthmus (including the length of tunnelling) can be explored with the community during the next phase.
- Whilst the economic analysis favours the Light Metro option, there is a strong economic case for the Tunnelled Light Rail option which can be delivered for a lower cost (compared to the Light Metro option).
- Light Rail is lowest cost and a credible investment; however it delivers fewer benefits than the other options and may restrict long term integration potential. It provides a step change in accessibility, urban uplift/form and is the first option to achieve carbon neutrality.

PREFERRED OPTION

This section sets out the performance of the recommended option – the Tunnelled Light Rail option.

Objectives delivered

The Tunnelled Light Rail option meets the Project investment objectives, delivering a step change in outcomes for this corridor as summarised in Table 16.

Table 16: Recommended option summary

Investment Objective	Outcome (in 2051)
<p>Objective 1: A rapid transit service that:</p> <ul style="list-style-type: none"> • Is attractive, reliable, frequent, safe and equitable • Is integrated with the current and future active and public transport network • Improves access to employment, education and other opportunities. 	<p>The Tunnelled Light Rail option will provide a rapid (43mins Airport to Wynyard Quarter travel time) service that is highly segregated (and particularly in the most built-up areas) that is attractive for users, attracting over 31,200,000 passengers a year, increasing the public transport mode share in the corridor but across the region.</p> <p>The Tunnelled Light Rail options would integrate well with the current rapid transit network and importantly is of a form that would provide maximum flexibility for the future network. The Tunnelled Light Rail option has sufficient capacity to provide for forecast demands and further demand likely with the continued development and integration of the corridor with the wider network.</p> <p>The Tunnelled Light Rail option would provide a step change in accessibility to the communities along the corridor, giving access to over 50,000 more households within 45mins by public transport of the city centre.</p> <p>The communities of Māngere and Ōnehunga will each have over 100,000 additional tertiary education opportunities within 45mins by public transport.</p>
<p>Objective 2: A transport intervention that embeds sustainable practice and reduces Auckland’s carbon footprint</p>	<p>The Tunnelled Light Rail option will increase the mode share of public transport in the corridor and in the Auckland region. There will be in the order of 5,000 fewer vehicle movements in the peak commute period (AM) which equates to in the order of 550,000 tonnes of carbon over the first 50 years of the scheme’s implementation.</p>
<p>Objective 3: Unlocking significant urban development potential, supporting a quality compact urban form and enabling integrated and healthy communities.</p>	<p>The Tunnelled Light Rail option provides the opportunity to realise an additional 35,000 households and 16,000 jobs in the corridor in addition to the growth already enabled in the corridor.</p> <p>The Tunnelled Light Rail option allows for a high quality compact urban form in the corridor around the high-quality stops/stations in the northern end of corridor, whilst also allowing for more community-integrated stops/stations in the southern portion of the corridor, where capacity is less critical.</p> <p>Importantly the Tunnelled Light Rail option provides a step change in accessibility and integration for all the communities along the corridor.</p>

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These outcomes are delivered from an estimated operational date of 2032 (for an estimated cost⁵⁷ of \$14.8Bn) after the required design, consenting, procurement and then implementation phases.

There is the potential for some of these outcomes to be delivered earlier through staging – delivering different sections at different times. This possible staging should be investigated in the next phase. The DBC will also look to optimise the option further, including the exact alignment and station location through the central isthmus section, where the tunnel form provides flexibility of alignment from a transport and urban outcomes perspective.

Key risks

The key risks associated with the delivery of the outcomes outlined above include:

- This is a Project of significant scale and carries the normal risks associated with obtaining the required statutory approvals to allow construction to commence.
- With over 600 property interests to be secured, the scale and likely duration of this property acquisition carries risk.
- There is a need for specialist tunnelling capability which will be required from overseas. This capability and the scale of the Project will likely put pressure on the capacity of the local construction industry.
- To maximise the urban outcomes, from a scale and form perspective, policy and market interventions will be needed. There is a risk that these are not delivered.

The remaining cases outline how these risks can be appropriately managed.

Economic sensitivity tests

For a project of this size there is uncertainty with the forecast costs and benefits. Estimates in this IBC phase are made with the best information available at that time. To understand the sensitivity to the economic performance of the preferred option to some of the key assumptions, a series of sensitivity tests has been undertaken, including:

- Low land use test – assumed uplift in density does not occur
- Test different Do Minimum – assumed higher land use
- Different base case – assumed land use change occurs regardless of the Project
- 3 percent discount rate – both benefits and costs are discounted with a 3 percent discount rate
- 5 percent discount rate - both benefits and costs are discounted with a 5 percent discount rate
- Increased cost by 20 percent - capital cost and opex increases by 20 percent
- Benefits increase by 20 percent
- Slower benefits ramp up – opening year benefits are achieved over a 5 year ramp up period instead of 2 years as assumed in the base

⁵⁷ Including escalation

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- Reduced cost of urban development – savings are achieved through deferral of greenfield growth costs because of the Project.

The results of sensitivity testing are set out in Table 17. The sensitivity testing shows a variance in BCR between 0.9 - 1.2 (including WEBS).

These sensitivity tests have been undertaken on the preferred option only, however a similar range of impact would be anticipated if one of the other short-listed options was identified as being preferred given the relative similarity of the BCR for the three short listed options.

Table 17: Economic sensitivity testing

Option	Traditional Benefits total	Wider Economic Total	Benefits TOTAL	NPV costs	BCR without WEBS	BCR with WEBS
Preferred option – Tunnelled Light Rail	\$5,278M	\$5,760M	\$11,038M	\$10,362M	0.5	1.1
Test - Low land use	\$4,025M	\$5,760M	\$9,785M	\$10,362M	0.4	0.9
Test - Different Do minimum	\$4,856M	\$5,760M	\$10,616M	\$10,362M	0.5	1.0
Test - 3 % discount rate	\$6,907M	\$5,760M	\$12,667M	\$11,429M	0.6	1.1
Test - 5 % discount rate	\$3,586M	\$5,760M	\$9,346M	\$9,488M	0.4	1.0
Test - increased cost by 20%	\$5,278M	\$5,760M	\$11,038M	\$12,434M	0.4	0.9
Test - increase benefits by 20%	\$6,333M	\$5,760M	\$12,093M	\$10,362M	0.6	1.2
Slower benefits ramp up (5 years instead of 2)	\$4,780M	\$5,760M	\$10,540M	\$10,362M	0.5	1.0
Reduction in wider costs	\$5,278M	\$5,760M	\$11,038M	\$9,826M	0.2	1.2
Increase in Value of CO2 reductions	\$5,343M	\$5,760M	\$10,952M	\$10,362M	0.5	1.1
Rule of a half on all PT / Traffic benefits	\$4,926M	\$5,760M	\$10,687M	\$10,362M	0.5	1.0

Supporting measures

There are several supporting measures to deliver and optimise the outcomes forecast for the preferred option. These include:

- Optimised investment opportunities and commitment to funding where land is already owned by project partners
 - Spatial identification of key opportunities and constraints as well as urban response
 - Programme and timing of enabling infrastructure to support early delivery of key projects
 - Regulatory progression to enable early delivery

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- Amalgamation of partner owned land to deliver on the outcomes and opportunities identified in the masterplan
- Key project partner investment in location where government can enhance market attractiveness and lead urban transformation
- Procure private sector investment with supporting agreements which ensure the delivery of key outcomes
- Development profits shared between key project partners and market
- Travel demand management initiatives to encourage and maintain mode shift
- Active mode supporting facilities, e.g. improved cycle lanes and pedestrian facilities
- High quality urban realm in and around stops/stations
- Bus service refinements to better integrate with the new service.

Next Steps

In the next phase work will be undertaken to optimise the preferred solution. That work will include:

- confirming the exact route and station locations of tunnelled alignment to maximise urban outcomes
- maximise the capacity of the route
- confirming the alignment through Ōnehunga and Mangere town centres
- confirming the alignment of Manukau Harbour crossing
- looking at the potential for staging
- the exact alignment and station location through the central isthmus section, where the tunnel form of the option
- undertake public consultation and include feedback in the evolution of the design development
- confirming implementation staging
- updating the economic assessment to include staging, early benefit release and consideration of further land use benefits.

The Project will engage regularly and early with Mana Whenua during the design, construction, and operations phase of the Project to incorporate their aspirations for their taiao (environment/natural world).

Design involvement in design phase will include avoiding, remedying, and mitigating harmful impacts on Te Taiao, the environment and ensuring the preservation of taonga and waahi tapu.

OUTLINING THE COMMERCIAL CASE | ACHIEVING THE OUTCOME

Providing decision-makers with appropriate assurance on the likely viability and deliverability of the commercial components of the Project.

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INTRODUCTION

Purpose

The purpose of this Commercial Case is to provide decision-makers with appropriate assurance at this stage in respect of the likely viability and deliverability of the commercial components of the Project.

This Commercial Case is presented in four parts, as follows:

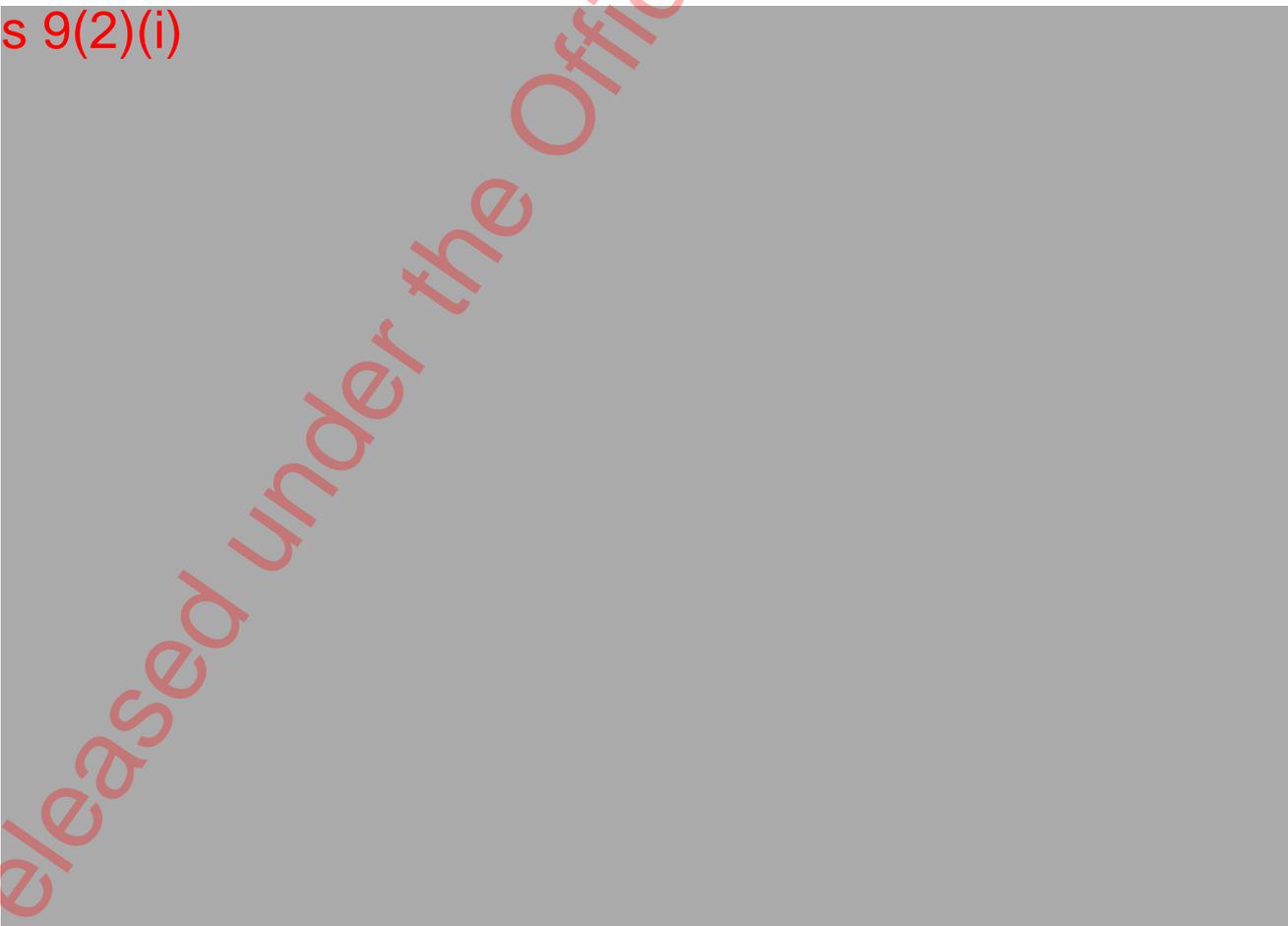
- Transport procurement approach
- Securing urban outcomes
- Consenting strategy
- Property acquisition overview

The analysis presented in this Commercial Case is based on the preferred technical option of Tunnelled Light Rail. In undertaking the analysis, procurement scope implications relating to the other two shortlisted options (Light Rail and Light Metro) were also incorporated to ensure that they would not be precluded if future decisions changed the option that was to be taken forward.

Commensurate with the approach taken in the Economic Case, Project staging will be assessed at the next phase. The market capability to deliver according to the proposed staging arrangement will be confirmed through detailed market engagement.

Approach

s 9(2)(i)



s 9(2)(i)

Procurement context

Procuring organisation

s 9(2)(i)

Governing rules and procurement strategies

The expectation is that all procurement associated with the Project will be conducted according to the Government Procurement Rules (4th edition), regardless of the procuring organisation.

The assumption is that the procurement activities will be consistent with the procuring organisation's overarching procurement strategies. A procurement strategy will be developed and adopted by the Delivery Entity to govern the elements it is responsible for delivering.

Sustainability and broader outcomes

There is a shared commitment from Partner Organisations to follow a sustainable procurement approach for all elements of the Project. Commensurate with the Priority Outcomes⁵⁸, the procurement approach will seek to:

- increase New Zealand businesses' access to commercial opportunities associated with the transport solution or the urban development activities, in particular, pakihi Māori Māori businesses including Māori and Pasifika businesses
- increase the size and skill level of the domestic construction sector workforce
- improve conditions for workers and future-proof the ability of New Zealand businesses to trade
- support the transition to a net zero emissions economy and assist the Government to meet its goal of significant reduction in waste

The procurement approach will seek to drive Broader Outcomes through each phase of the procurement lifecycle, including:

- adoption of a sustainable procurement framework
- optimising the packaging and contracting approaches to drive sustainable outcomes and opportunities
- engaging proactively with the contractor market
- incorporating Broader Outcomes into the performance and payment mechanisms for the different contracts
- committing to ongoing monitoring, measurement, and reporting
- Māori outcomes across the whole project lifecycle
- Working in partnership with Māori to ensure positive outcomes, including in decision-making.

Further information on how the Broader Outcomes will be delivered is provided in Appendix 19.

The procurement approach will also investigate opportunities to support the Te Terewhiti ki Tāmaki Makaurau Auckland Light Rail Te Rautaki Huanga Māori (Māori outcomes strategy) by enabling social procurement to achieve job creation (through all phases of the Project, including post-construction), skill development and support for innovation, which are considered important for Mana Whenua and Mataawaka to grow the Māori economy. Commercial partnership, investment and ownership opportunities for Māori will also be explored as noted above.

TRANSPORT PROCUREMENT APPROACH

Introduction

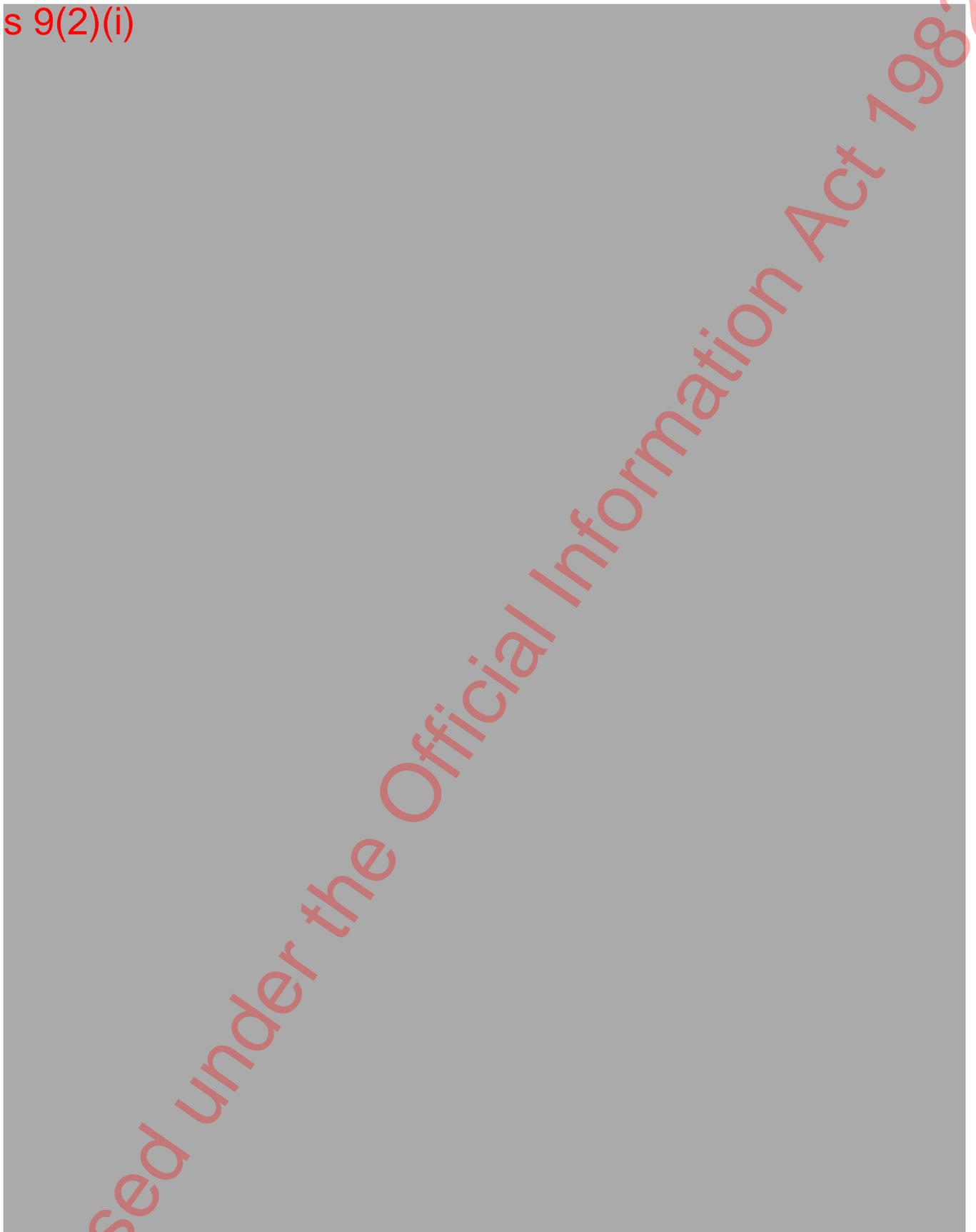
s 9(2)(i)

⁵⁸ As defined in the Government Procurement Rules 4th Edition

s 9(2)(i)

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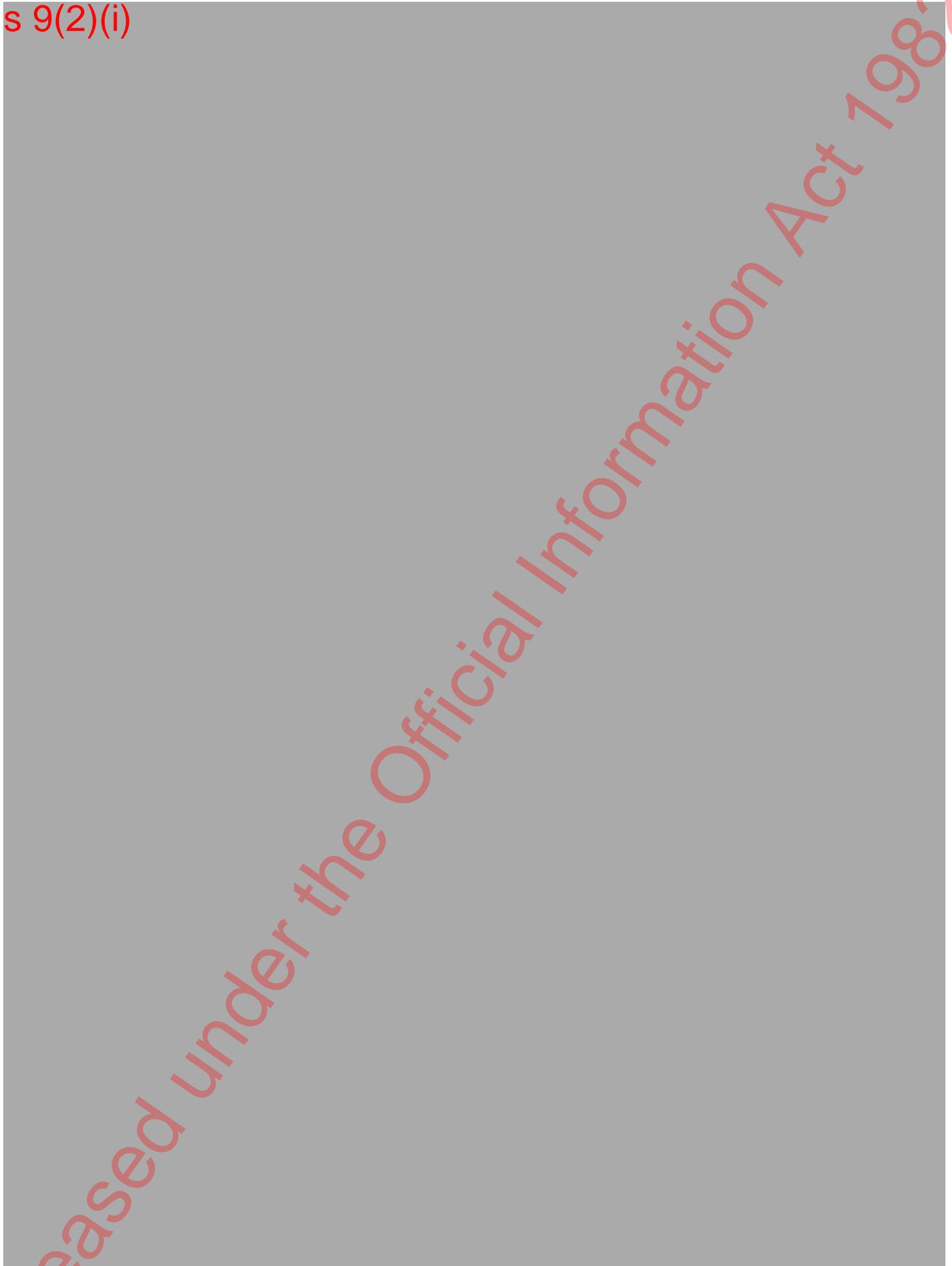
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Released under the Official Information Act 1982

⁵⁹ However, these aspects should be integrated from planning and design perspectives.

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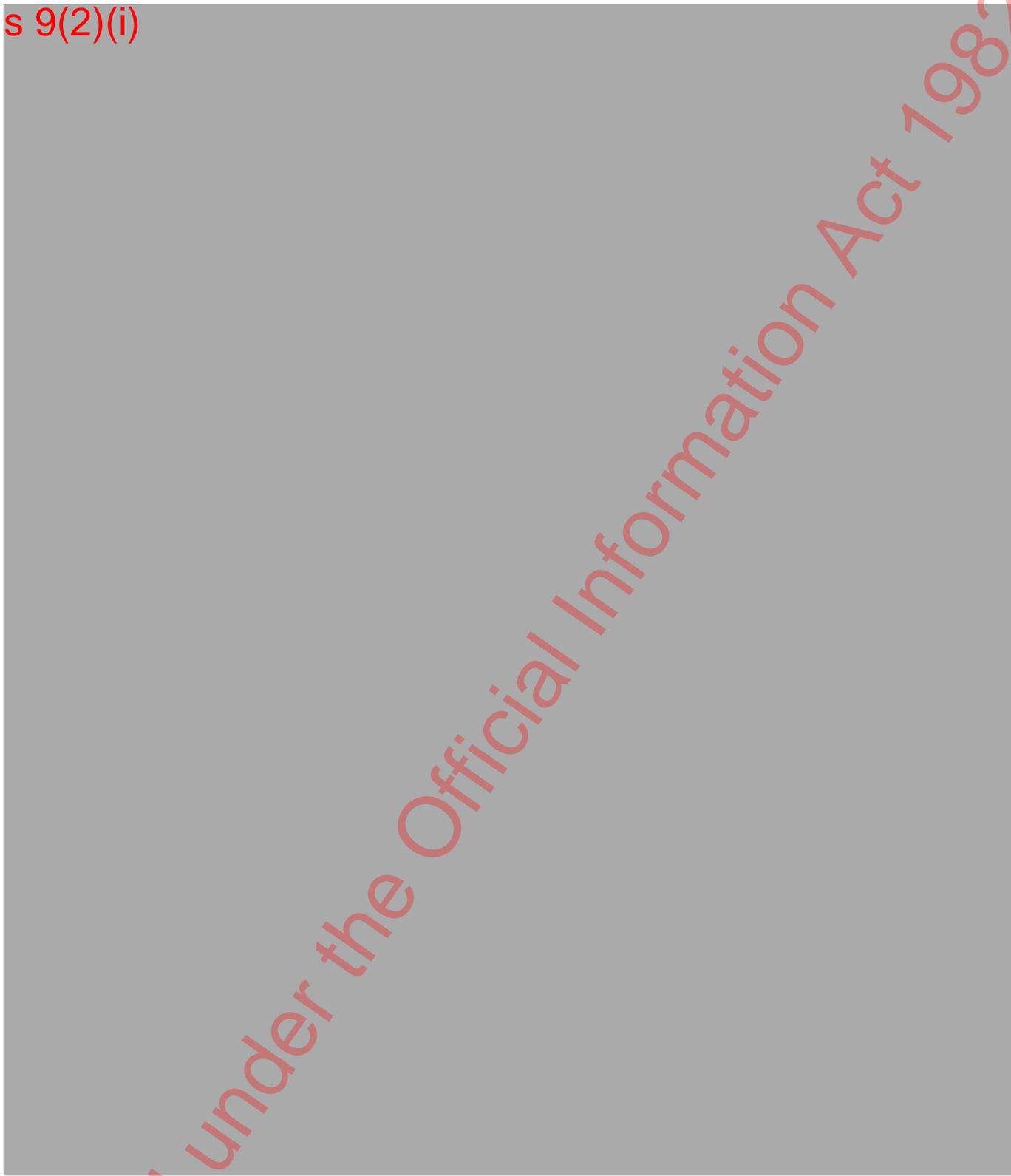
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SECURING URBAN OUTCOMES

Urban development delivery

As noted at the start of this Commercial Case, the extent of urban development to be delivered ‘on the ground’ by the Project is subject to further decision-making. However, as discussed in the Strategic Case, to achieve the investment objective of “unlocking significant urban development potential”, an Urban Development Programme (UDP) is clearly required.

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To unlock development and to address barriers identified below, two key issues must be addressed:

- A “whole of government” approach to governance will drive and promote clear accountability. This will take advantage of the urban development-related skills and resources across government and drive integrated urban/transport decision-making to unlock urban development potential. This includes capitalising on Project value from related Crown initiatives (e.g. City Rail Link).
- The Delivery Entity or responsible partner organisation must be clearly scoped, resourced and sufficiently agile to an UDP. Urban outcomes could be achieved either via independent means through the Project, and/or via partnerships, including limited commercially procured delivery arrangements.

These issues are incorporated into the development of the Delivery Entity recommendations outlined in the Management Case.

It is acknowledged that delivering urban development will continue beyond the completion of the rapid transit construction. As such, the Project’s governance structure will need to the wider and longer-term outcomes sought.

Land use change is essential to unlocking Project benefits and will depend upon accessibility, local physical and social character and market or commercial factors. An UDP must be place-based and comprehensively address all these factors, as generally multiple interventions are likely to be required to optimise potential.

Critical success factors

There are a number of success factors to achieving urban development outcomes, which include:

- development programme ownership and intentional delivery
- a “whole of government” collaborative approach to securing urban outcomes
- contextual and place-based application (“Inside out”)
- strategically and spatially informed transport - urban investment options (“Outside in”)
- giving regard to the respective competencies, risk profiles and frameworks which govern the activities of the Delivery Entity or responsible partner organisation
- enabling market attractiveness to secure private sector involvement
- coordinated rollout of intensification opportunities
- utilising a suite of intervention instruments
- clear programme, accountabilities, budget, performance monitoring and reporting requirements.

Current urban development market context

While the Auckland housing market is seeing high levels of activity, with residential building consents at an all-time high, this demand has not yet translated into an increased supply of mid-rise apartments i.e., six levels and above. Building consents over the last three years have shown no increase in the proportion of apartments being planned. However, there has been a substantial increase in the three-level townhouse market (from 16 to 25 percent of building

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consents), largely because of the enabling Auckland Unitary Plan and the market's product pricing.

In addition, there is little or no suburban office demand, which also places a constraint on any future mixed-use development propositions.

Along with the demand side considerations there is currently also only a very small pool of mid-rise residential developers who have the skills, capital and risk appetite to deliver apartments (e.g. over the past ten years, only nine developers have undertaken projects of >150 units). Further, there is a low proportion of apartment developers completing multiple projects.

This market context will be a key driver of the UDP and determining the appropriate urban interventions and market attractiveness initiatives at different locations along the corridor.

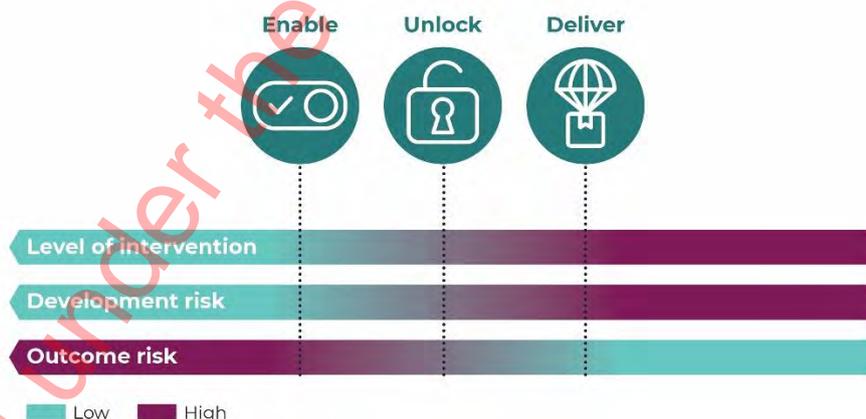
Urban interventions

Urban interventions that support and/or inform the UDP occur at three fundamental levels:

- **Enable urban change:** Creating an environment or platform for change (“light hand”). e.g., planning and zoning for appropriate densities and urban form outcomes, identifying and communicating opportunities, and integrating with existing and planned supportive initiatives.
- **Unlock urban change:** Selectively influencing change (“light to medium hand”). e.g., strategic property acquisitions to facilitate access and development opportunities, small scale catalytic investments and aggregation, critical transport connections and place-making initiatives.
- **Deliver urban change:** Directly procuring, contracting or delivering change (“directive”). e.g., development briefs or agreements for strategic sites, risk sharing or partnership arrangements and direct intervention.

The above continuum of interventions is reflected in Figure 26 below.

Figure 26: Urban intervention continuum



Balancing development and delivery risk with outcome risk, and particularly the need for the Delivery Entity to offset any market risks without undue compromise to outcomes, will be critical to achieving urban development outcomes. The Delivery Entity will also need to manage the capital funding needs, as the more directive the intervention, the higher the requirement for development funds, unless these are secured via partnerships.

Finally, the UDP will consider a range of intervention instruments, shown in Figure 27 to address the specific place-based requirements to secure urban change.

Figure 27: Intervention instruments



The requirements outlined above have informed the scope of activities to be progressed as part of the subsequent next phase by the Delivery Entity, which is discussed further in the Management Case.

Risks

“Unlocking significant urban development potential” is a critical investment objective that will impact city shaping and urban outcomes, investment value for money and operational system performance.

Analysis indicates that simply enabling land use change, which might be induced by improved accessibility, will not on its own unlock the significant urban development potential available, due to a range of risks that include:

- Attractiveness critical to drive essential private sector involvement - there are significant market challenges to achieving potential on both the demand and supply sides.
- Local, place-based constraints such as poor connectivity to the system, local physical and social character, statutory limitations, and land attributes (e.g. fragmentation limits land use change and potential).
- It is necessary to apply multiple levers or interventions, across a range of land use change factors, to unlock potential and there are significant risks to the efficacy of these levers without a coordinated, “whole of government” approach necessary to secure urban change.
- The Delivery Entity or responsible partner organisation not being mandated and resourced to secure urban potential through a clearly defined and agreed UDP and intentional implementation programme.
- Opportunities to deliver intensification that is consistent with the requirements of the Project will be lost, both within the Crown Estate and within private sector holdings, over the next ~10 years, as housing options are delivered in this period by the market (e.g. low-rise redevelopment will preclude higher levels of intensification in the short-medium term due to higher capitalisation to land ratios).
- Unconstrained or uncoordinated roll out of intensification along the corridor will likely result in outcomes overall as development projects compete for market share, eroding their potential for successful delivery.

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The UDP will actively consider and respond to these risks as it developed and agreed by the Project sponsors moving forward.

Next steps

The next steps for developing the UDP include:

- Definition of the process and partnerships necessary to analyse and identify place-based interventions at specific nodes, noting this is likely to be different along each section of the Project's alignment.
- Identifying the opportunities at each node in terms of landholdings, and the need for interventions.
- Gaining agreement on the organisation that will be accountable for securing urban outcomes.
- Providing necessary urban input to the location of stops/stations from an urban development perspective.
- Identification of appropriate levers and mechanisms to deliver the above interventions (e.g. a whole of government approach and optimising the respective skills, funding and operating requirements of each partner.
- Developing a robust urban development programme, including roles and responsibilities, funding and financing, interventions, partnership arrangements etc.

INDICATIVE CONSENTING STRATEGY OVERVIEW

The Indicative Consenting Strategy for the Project identifies opportunities available to secure statutory approvals under the relevant resource management provisions to deliver the Project. The indicative strategy is based on the current Project scope and may need to be revised as the scope develops in the next phase. The full Indicative Consenting Strategy is attached in Appendix 25.

The recommended consenting strategy is to obtain resource consents and designations required to authorise the construction and operation of the Project through a Board of Inquiry (BOI) process under either the Resource Management Act 1991 (RMA) or the future Natural and Built Environments Act (NBA). The BOI process is recommended as it has concise timeframes that will help to manage the consenting programme. This recommendation is based on the assumption that the timeframe for consenting should be minimised as much as practicable.

The potential to use the Urban Development Act 2020 (UDA) was considered. However, early advice is that the Project alone, as a linear transport intervention, is outside the scope of the UDA. The UDA could be used to deliver urban development (e.g. development nodes along the corridor), in parallel with the consenting of the Project. Alternatively, if the Project scope were to change to include greater urban development intervention, the UDA may be able to be used, in conjunction with Kāinga Ora, for the full package of works, i.e., the transport infrastructure and the urban development.

Key consenting risks

The Government is currently drafting new legislation, which will repeal and replace the RMA. As the core piece of replacement legislation, the Government has indicated the NBA will be the first Act (of three) to be operative and expects it to be passed in early 2023. For the purposes of the

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Indicative Consenting Strategy, it is assumed that the Project will be authorised either under the RMA or the NBA and that in either case:

- the Project will be considered a proposal of national significance or equivalent
- the Project will be able to be processed through a BOI type streamlined process with set timeframes and limited appeal rights
- the Project will be authorised through resource consents and designations, or equivalent
- the Delivery Entity will have requiring authority status for Light Rail, or equivalent.

As “new” legislation there is likely to be uncertainty once the NBA is in force due to potentially untested terms and concepts, which is highly likely to result in legal challenge, litigation and delay.

The uncertainty around the nature of the NBA and what will be required for the Project, together with the high likelihood of litigation, is a significant consenting risk to the Project. At this stage the status quo RMA process is preferred.

Another significant consenting risk is the anticipated effects of disruption on businesses and the residential community along the route during construction. The extent and scale of these effects will vary depending on the chosen technical solution (e.g. Light Metro versus Light Rail). These effects are likely to require specific, robust mitigation. There is the potential for onerous conditions to be imposed during consenting to mitigate these effects depending on the level of disruption.

What is needed

Continued application of the RMA: It is strongly recommended that the Project be consented under the RMA. The current programme assumes that the application for statutory approvals will be lodged in early 2023 and would therefore be processed under the RMA. To meet this timeframe, the documentation to support the NORs and resource consents should be progressed with urgency. Therefore, it is recommended that the programme allow for statutory approvals to be lodged prior to enactment of the NBA.

At the time of writing, recent updates to the indicative programme suggest lodgement may be later than that, in which case the Project may need to be consented under the NBA. We will revise the programme and consenting strategy in the next phase.

Requiring authority status: The Project sponsors need to ensure that any transitional unit, as well as the ultimate Delivery Entity has requiring authority status to allow for designation of the Project.

Surveys: Specific experts have been identified who should commence data collection as soon as possible to inform assessments for statutory approvals. These include avifauna ecological and ground water surveys.

Next steps

Next steps for the Indicative Consenting Strategy may require Government involvement on the matters raised above, as well as confirmation of sufficient resourcing and technical expertise to successfully lodge and deliver the consents for the Project.

PROPERTY ACQUISITION OVERVIEW

A Property Overview (attached in Appendix 26) has been prepared to consider the property requirements from the indicative options and consider the approach to acquire land required for the Project. The land requirements for all non-road parcels that need to be acquired for each of the options have been identified (parts of the route within the existing road corridor have been excluded). This indicative property acquisition overview is based on the current scope and may need to be revised as the scope develops in the next phase.

Property requirements

A mixture of partial and full land acquisitions is required for all the options, and for two of the options subterranean property interests would also be required. The surface property requirements for all the options impact a large number of properties, which will require demolition or removal of residential and commercial buildings. For the Dominion Road Light Rail option, there is the potential to reduce the width of the corridor in places to reduce the property requirements by approximately half, which could be pursued if this option progresses.

The property requirements are greatly reduced if a subterranean route is pursued, which would leave the above ground improvements largely untouched other than where proposed stops/stations are located.

Recommended acquisition approach

Section 224 of the Public Works Act 1981 (PWA) provides for Government and the relevant local authority to enter into an agreement to combine works of national and local importance.

Using the powers within section 224 provides advantages and flexibility for the Project that could otherwise be constrained if undertaken by the Crown or local authority independently. This includes broader compulsory acquisition powers (i.e., even if the nature of the relevant works does not fall neatly within the PWA definition of “public work” - which has traditionally been a limitation - although the need for the acquisition will still need to be evidenced). The process further provides for the ability to transact with the land without the restriction of offer back obligations - allowing the Project to capture value uplift and pursue commercial development.

Therefore, if the Project is to include the delivery of wider urban development, it is recommended that a section 224 process be adopted, to allow for the delivery of a combined, intertwined transport and urban regeneration project avoiding the complications of statutory authority and jurisdiction otherwise existing if the two had to be addressed separately.

Should the Project be solely a transport project, conventional PWA process only would be required, without the need for a section 224 approach.

Risks

An overview of the key property acquisition risks is provided below.

- Property cost escalation caused by ongoing development within identified land requirement footprint and delays in acquiring land.
- Resolving objections to compulsory acquisitions within project timeframes.
- A requirement for Māori Freehold Land in Ōnehunga for all options.

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- Industry resourcing and capacity to provide the property professional services for a project of this scale.

Next steps

Next steps for the property acquisition strategy include:

- a more detailed review to refine land requirements and potential property impacts
- assessment of mitigation measures for the risks listed above
- endeavouring to have objections heard in parallel with, rather than subsequent to, the RMA approvals process
- access to funding to enable advanced purchase of affected transport properties as they come to market.

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OUTLINING THE FINANCIAL CASE | ASCERTAINING FUNDING REQUIREMENTS

Providing decision-makers with an understanding of the proposal's funding requirements to assist in determining affordability

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INTRODUCTION

Purpose

The purpose of the Financial Case is to:

- set out the indicative capital (delivery), operating and lifecycle costs for the core transport elements of the Project
- identify and evaluate the potential sources of funding for the Project
- identify and evaluate the potential financing options for the Project.

This analysis will need to be updated and refined at the Detailed Business Case (DBC) phase, once there is confirmation of the preferred technical option, scope of urban development activities to be undertaken as part of the Project, and the Delivery Entity form, structure and governance framework.

FINANCIAL ESTIMATES

This section sets out the estimated delivery and operating costs and revenues associated with the shortlisted technical options. Based on the conclusions reached in the Economic Case, the cost discussion relates to Tunnelled Light Rail, though the information for Light Rail, Light Metro is also included in Appendix 14, alongside the Tunnelled Light Rail costs for completeness.

These costs are based on the scope of activities included in Appendix 13, and a number of assumptions outlined in the Economic Case (e.g. construction programme, service opening date and operational specifications), and Cost Report (e.g. escalation allowance, geotechnical specifications and resource availability), which is included in Appendix 15. The costs will continue to be refined through the next phase and ahead of procurement phases, as the scope of the Project is further refined, and additional design and risk mitigation activities are undertaken.

The budget estimates are in nominal July 2021 NZ dollars unless otherwise noted.

The costs considered exclude any allowance for the following:

- GST
- holding costs
- costs associated with delivery of Transport Orientated Developments (TOD) or Over Station Developments (OSD) costs
- potential realisable value for land acquired (i.e. residual land value), potential residential development, TOD or OSD (e.g. sales).

The cost estimates have been subject to peer review, which concluded that the estimate was within expected parameters for the current design stage. The peer review report is attached within Appendix 15.

Capital costs

Capital costs have been developed to a Class 5 estimate (reflecting an estimated accuracy range of -40% to +70%). The capital cost estimates consider the delivery of all aspects of the infrastructure, stops/stations, and facilities required during the delivery phase of the Project. The costs have been disaggregated into “Core” (relating to the core transport solution in the

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corridor) and “Peripheral” (ancillary to the core transport solution, including any complementary changes to the surrounding networks and have flexibility in their implementation timeframe).

The capital costs are summarised into the following areas:

- Client and Delivery Entity – Waka Kotahi’s standard 2 percent allowance to cover client-side costs has been applied, given the shape and scope of the final Delivery Entity remains uncertain at this stage. All ‘client-related’ professional services, which are often included in client costs, are captured in the professional services line item. The Client and Delivery Entity cost line also includes allowance for:
 - Delivery Entity establishment
 - Travel Demand Management activities during construction
 - bus disruption costs during construction
 - operational readiness
 - insurance
 - contingency for small business disruption during construction.
- Professional services – costs to cover design and support services to progress the Project and secure the necessary approvals (e.g. consenting and design), including design and project management. Based on benchmarking, it is assumed that 60 percent of the professional services costs are incurred pre-construction, with the balance during construction.
- Property – acquisition and associated costs for acquiring property requirements for the main alignment (including stops/stations), additional bus infrastructure and for enabling ‘quiet streets’ (see below). There is no land take requirement for enabling works on the parallel routes.
- Construction – the bulk of the costs to cover:
 - Enabling works such as utilities diversion, site clearance
 - ‘Peripheral’ or supporting works such as active mode and station accessibility improvements, ‘quiet streets’ (parallel and connecting corridor treatments to reduce speed and improve active mode movements), bus integration costs (interchanges near stops/stations) and urban design improvements.
 - Main works
 - Indirect costs to cover contractor’s design, preliminary, overhead and profit (based on benchmarking).
- Rolling stock - acquisition and cost associated with the supplier delivery phase support and mobilisation costs, initial rolling stock fleet, spares, and special tools and equipment.

Table 21 summarises the capital cost for Tunnelled Light Rail, using the breakdown outlined above.⁶⁰ The base cost is presented in July 2021 dollars, and the P50 risk allowance is included, along with the escalated P50 cost. Refer to Appendix 15 for the more detailed breakdown of the

⁶⁰ Note that subtotals and totals in all tables have been rounded (i.e. to the nearest million) from the more granular breakdown in the Cost Report at Appendix 15. This means that there may be some minor discrepancies between the sum of the line items and the presented total.

capital cost components. Note that the P90 cost is not shown in Table 21, but is included in the risk analysis section that follows.

Table 21: Capital cost summary (NZ\$m)

Core costs	Tunnelled Light Rail
s 9(2)(i)	
P50 total escalated core and peripheral costs [C + F]	14,601

The estimated capital spend profile over the delivery phase for Tunnelled Light Rail is shown below in Table 22.

Table 22: Capex profile (P50, escalated) (NZ\$m)

s 9(2)(i)	
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Significant cost items

The most significant items within this cost estimate for Tunnelled light rail, making up over 80 percent of the total, are as follows:

- 43 percent tunnels

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- 12 percent retaining wall structures to stops/stations and cuttings etc
- 10 percent rail systems and trackwork
- 10 percent stations and stops
- 5 percent bridges / viaducts

Risk analysis

Quantitative Risk Analysis (QRA) has been used as part of the Project to enable risks to be quantified and applied to costed items. The key objectives of the QRA are to:

- Integrate the capital cost estimates, risk events and opportunities into a single output
- Understand the key items that contribute significantly to the risk of the Project development
- Appreciate the overall risk to assist with identifying those areas of scope and design that would most benefit from further development
- Assess the cost impact of the inherent uncertainty and contingent event risks on the capital cost estimate and advise on probabilistic outcomes
- Determine and recommend the appropriate amount of contingency required to deliver the Project.

A review of risks has been carried out by the Establishment Unit, captured in the risk register included in and analysed in the attached risk report, which is included in Appendix 15. Every risk and opportunity was allocated to the corresponding option(s), and assigned a value derived from the capital cost estimate and a likelihood of occurrence. This process results in a specific risk factor being developed for each option, increasing the reliability of the budget estimate outcomes

The risk allowance at P50 and P90 is shown Table 23.

Table 23: Risk allowance summary

Cost element	Tunnelled Light Rail
P50	42%

s 9(2)(i)

The Budget Estimates (shown earlier in Table 21) have been calculated using the P50 allowance. A P90 cost estimate has also been calculated but should be treated as 'for information only' at this stage. The P50 and P90 capital cost summaries are shown in Table 24 and Table 25 below.

Table 24: P50 cost summary

	Tunnelled Light Rail
Base estimate (excl risk)	8,437
P50 risks	2,973
P50 total (un-escalated)	11,410
P50 total (escalated)	14,601

Table 25 P90 cost summary (for information)

s 9(2)(i)

Ongoing costs

A summary of the ongoing costs is presented below, with the detailed operating and maintenance (O&M) cost plan report included in Appendix 15. While a number of inputs and assumptions have been made (detailed in Appendix 15), the two main assumptions in relation to ongoing costs are:

- the Delivery Entity oversees the Project in its entirety, including post service commencement
- service delivery is outsourced to a private provider that has O&M responsibilities for a fully vertically integrated rail line.

Operating and maintenance estimates

O&M costs will be incurred once services begin operating. These costs cover the power to run the services, staff costs and maintenance of the tracks, systems and rolling stock. Also included is an estimate of the consequential operating costs from reconfiguring the bus network to better support the Project. The bus service operating costs (both for the new service and revised bus services) reflect the specified service levels outlined in the Economic Case. The O&M costs at Day 1 of operation (for the first full year, being FY33) are summarised in Table 26 below.

Table 26: O&M costs at day 1 (annual, NZ\$m)

Cost element	Tunnelled Light Rail
s 9(2)(i)	
P50 total escalated total opex	119.3
s 9(2)(i)	

Lifecycle costs

Infrastructure and rolling stock assets are subject to periodical replacement (at life expiry) or refurbishment in the case of repairable or rotatable parts. These costs are referred to as lifecycle costs.

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A high-level allowance has been provided to cover the lifecycle costs associated with rolling stock and infrastructure over the forecast period. These costs were modelled using an itemised list of assets describing asset life and the replacement/refurbishment cost adopted. It is expected that this high-level estimate will be further refined at a later stage of project development as the design matures.

The most significant replacement cost is that of the rolling stock, which is assumed to have a design life of 35 years.

Ongoing cost summary

The ongoing costs over a 60-year period for the three shortlisted Tunnelled Light Rail is presented below in Table 27. Also included is an allowance for costs attributable to the Delivery Entity post operational commencement, which are categorised as:

- constant (e.g. costs relating to the board, executives, administration, and compliance)
- contract management (e.g. costs relating to professional services, temporary resources or other ad-hoc costs like emergency bus replacements)
- periodic (\$5m per operations contract renegotiation, applied every 10 years).

Risk associated with the ongoing costs (covering both inherent and contingent risks) was calculated at P.50 and P.90 for the real and nominal totals over each forecast period using Monte Carlo analysis. These results have been spread pro rata across the operating quarters using the raw cost estimate in each respective quarter relative to the total raw cost estimate over the forecast period.

Table 27: Ongoing cost summary (60 years, NZ\$m) (nominal)

Cost element	Tunnelled Light Rail
s 9(2)(i)	
Total (P50)	16,745
s 9(2)(i)	

Cost summary

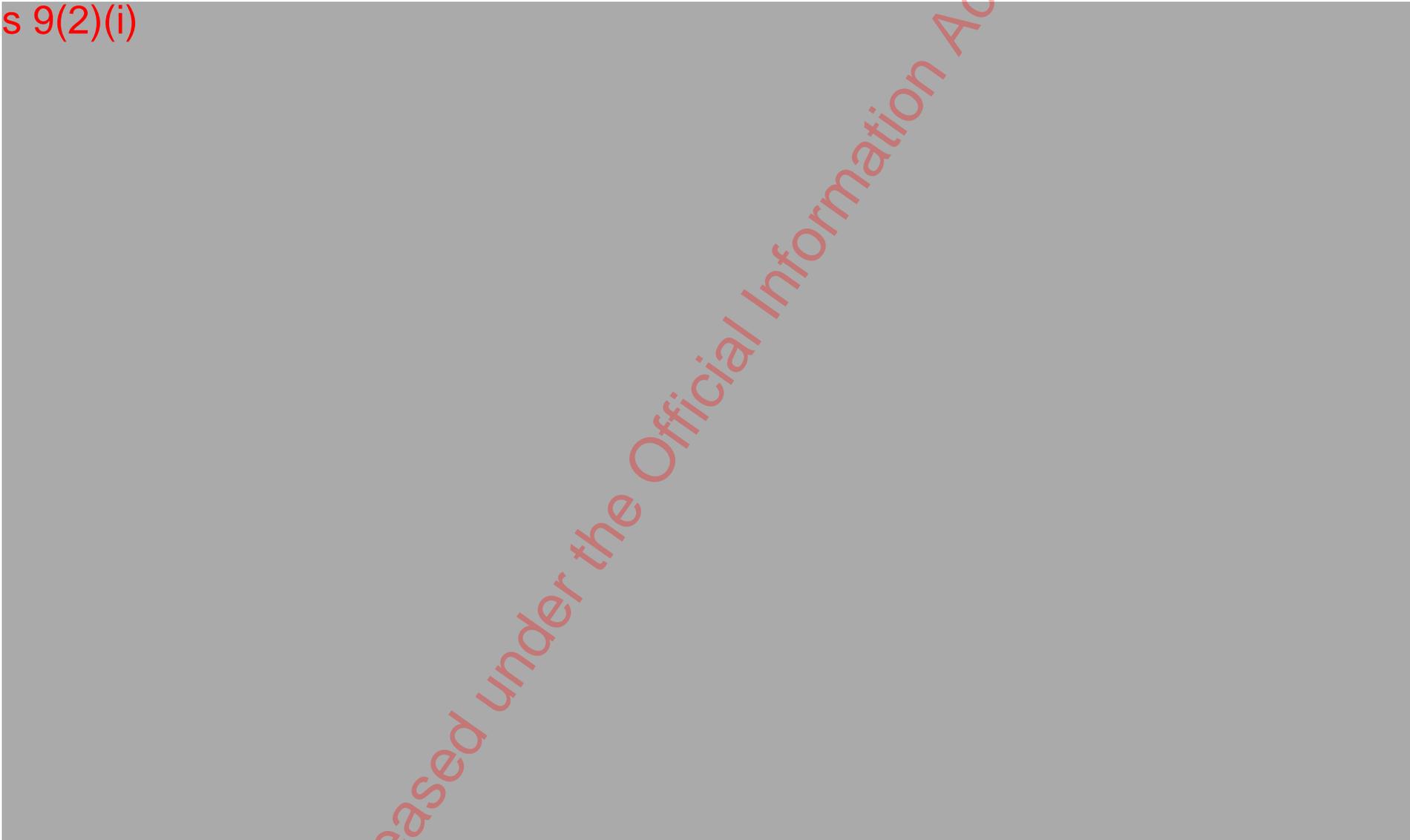
A summary of the Project’s P50 real and nominal cost profiles (covering delivery, operations, and lifecycle costs) is presented for Tunnelled Light Rail in Figure 28.

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Figure 28: Cost profile of Tunnelled Light Rail (NZ\$m)

Cost profile of Option 3 (Real, P50, NZ\$m)

s 9(2)(i)



Cost refinement and contingency

The cost estimates outlined above will need to be updated and tested in the next phase of the Project once there is more certainty, to allow technical design packages to be progressed, which in turn will allow more accurate costs to be developed. Areas for confirmation that will reduce uncertainty include the timing for confirming Project scope, staging of the core transport solution and design assumptions driving a number of cost items (e.g. property requirements). As is expected for major infrastructure projects in the early part of their lifecycle, a high level of contingency is included to reflect the high degree of uncertainty. Contingencies across the Project components will therefore reduce as the Project progresses and the level of risk and uncertainty decreases.

As noted in the Project cost scope (Appendix 13), whether any level of delivery of urban development will be part of the Project is currently uncertain, and as such, any costs relating to urban development or securing urban outcomes are currently excluded. As discussed in the Economic Case, the benefits associated with a high level of intensification are considerable, and the costs associated with securing these outcomes, or directly funding this type of investment (e.g. redevelopment of existing properties into higher density units, land aggregation etc) will be explored and dimensioned further in the DBC once decisions on the scope and scale of these interventions have been made.

Fare revenue

Fares have been assumed to be set by Auckland Transport as part of the overall Auckland public transport network, and to be consistent with Auckland Transport’s current (and planned) fare structures. The assumption is that Auckland Transport would collect fares through its public transport ticketing system (currently AT HOP).

The farebox estimates presented in Table 28 below were derived from the Auckland Forecasting Centre transport model outputs for 2031 and 2051 and represent the overall increase to fare revenue across the public transport network compared to the Do Minimum. The expansion from model period outputs to annual figures is consistent with the approach adopted for the economic appraisal. Linear interpolation was used to determine the forecast for 2041. The current assumption is that additional farebox revenue would be used to offset the increase in public transport operating costs.

Table 28: Annual additional farebox revenue estimate (nominal, NZ\$m)

Year	Tunnelled Light Rail
2033	19.3
2041	32.4
2051	55.0

The potential application of a ‘premium farebox’ was considered alongside other operating revenues (e.g. advertising, leasing opportunities) as part of the operational funding sources analysis in Table 30 below, but excluded from the estimates presented above.

FUNDING AND AFFORDABILITY

This section sets out the evaluation of initial funding and financing options. Due to the size and scale of the Project, there will be a significant funding requirement throughout both the delivery and operating phases. Accordingly, a combination of different capital and operating funding tools will be required to deliver the Project. Financing may be considered to smooth the financial impact of the delivery phase funding requirement, and detailed analysis and recommendations on the relative funding and financing strategies will be the subject of the DBC.

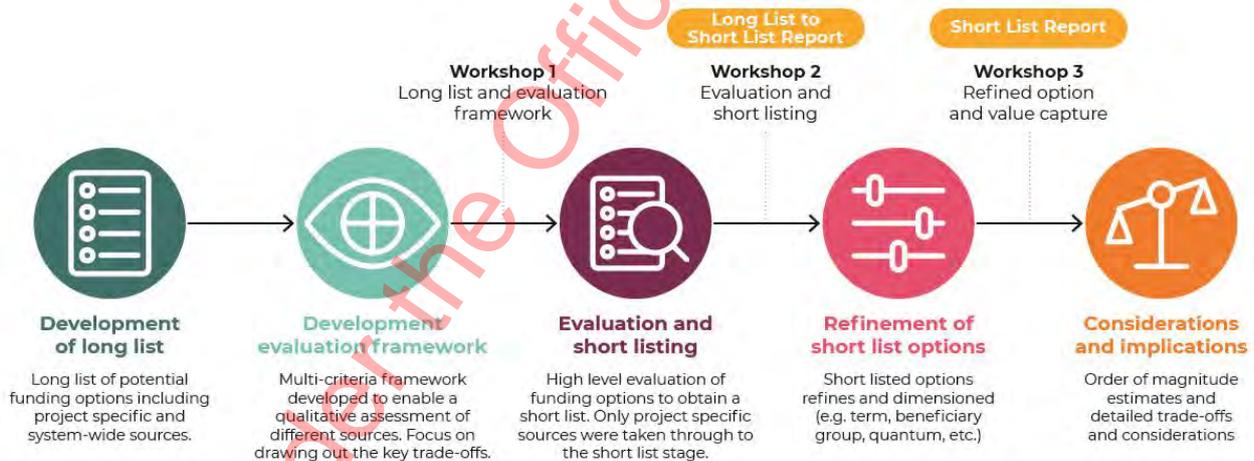
Funding options

Option development and assessment approach

The framework for identifying and assessing funding options was developed utilising a longlist to shortlist process, which is outlined in Figure 29 below. Commensurate with best practice and principles of equity, the framework considered the allocation of costs and benefits between national, regional, and local beneficiaries.

Given the level of uncertainty over the technical solution, the scope of urban development to be delivered ‘on the ground’ as part of the Project, and the Delivery Entity and governance framework, a preferred funding solution has not been identified at this stage. Instead, a set of shortlisted funding options has been identified and the potential trade-offs of different options are outlined. This set of options will be considered in greater detail at the next phase when a funding solution will be proposed. Further practical advice will be provided to decision-makers through detailed funding advice and value capture reports, independently of this business case.

Figure 29: Framework for evaluating funding options



Appendix 16 includes the Longlist to Shortlist Funding Options Report, which discusses the wide range of longlist options developed and tested and provides an overview of the indicative evaluation that was used to exclude those funding options that were not shortlisted.

The evaluation criteria, listed below and discussed further in Appendix 16, were developed to enable a high-level assessment of longlisted funding options with reference to international and domestic precedent, key funding implications, Project outcomes, potential system-wide impacts, and wider considerations e.g. development impacts and behavioural incentives. The assessment criteria are summarised as:

- Magnitude of funding
- Certainty of revenue

- Implementation and deliverability
- Equity of option
- Flexibility
- Wider considerations and impact.

Funding options shortlist

Options were shortlisted based on overall relative performance against the criteria.

The funding solution will ultimately seek to allocate costs of the Project to specific national, regional and local beneficiary groups (i.e. those different groups of people who are benefitting from the implementation of the Project). The funding tools available for each beneficiary group are set out in **Table 29** and Table 30 below for capital and operating funding respectively.

The shading in the following tables reflect the assessed red, amber, or green (RAG) rating based on relative performance against the criterion on a high (green), medium (yellow), and low (red) basis. For the magnitude criterion, the RAG rating reflects the potential magnitude of funding from each funding tool, defined as follows:

- Red **s 9(2)(b)(ii)**
- Amber **s 9(2)(b)(ii)**
- Green **s 9(2)(b)(ii)**

Further detail on the qualitative assessment of the options is detailed in the Funding Short List Report in Appendix 17.

Table 29: Evaluation of capital funding options

		Indicative assessment					
Beneficiary	Funding tool	Magnitude	Certainty of revenue	Implementation & delivery	Equitability of option	Flexibility	Wider considerations and impacts
Crown funding sources							
Crown and New Zealand taxpayers	Crown appropriation						
	City Deal						
	NLTF						
Council funding sources							
Crown	Increase in value of public land holdings						
	Auckland Council contribution						
Auckland Council	Tax increment financing						
	Increase in value of public land holdings						
Public transport users	Targeted rate (Auckland-wide)						
Motor vehicle users	Workplace parking levy						
	Increase in parking charges						
Auckland ratepayers	General rate						
	Targeted rate (Auckland-wide)						

		Indicative assessment					
Landowners within station catchments	Targeted rate						
	IFF levy						
	Vacant land rate (within corridor)						
	Betterment levy						
Business owners in station catchments	Business rates supplement						
Development sources							
Private sector or iwi Māori investors or developers	Development contribution						
	Negotiated contribution						
	Increase in value of public land						
	Sale of existing land						
	Development partnering						
	Sale of development rights						
	Strategic purchase of land						
Direct users of ALR	Targeted rate						

Table 30: Evaluation of operational funding options

		Indicative assessment					
Beneficiary	Funding tool	Magnitude	Certainty of revenue	Implementation & delivery	Equitability of option	Flexibility	Wider considerations and impacts
Crown funding sources							
Crown and New Zealand taxpayers	Crown appropriation						
	City Deal						
	NLTF						
Council funding sources							
Auckland Council	Auckland Council contribution						
	Increase in public land holdings						
Public transport users	Targeted rate (Auckland-wide)						
Motor vehicle users	Workplace parking levy						
	Increase in parking charges						
Auckland ratepayers	General rate						
	Targeted rate (Auckland-wide)						
Crown	Increase in public land holdings						
Landowners within station catchments	Targeted rate						
	Vacant land tax						

		Indicative assessment					
Business owners in station catchments	Business rates supplement						
	Negotiated contribution						
Private sector or iwi Māori investors or developers	Increase in value of public land						
	Sale of existing land						
	Development partnering						
	Sale of development rights						
Direct users of ALR	Strategic purchase of land						
	Targeted rate						
Fares							
Public transport user	Farebox						
	Premium farebox						
Other sources							
Local - commercial user	Advertising						
	Retail / commercial						

Discussion

Given the scale of capital and operating costs, a combination of different funding sources will be required to fund the Project. This will include a mixture of Crown, Council, and other sources, development and fees-based value capture, and cover the full range of project beneficiaries. The preferred funding solution will need to balance the trade-off between allocating costs to beneficiaries and the affordability of different tools for ratepayers. Additional funding could be generated by capturing value through development (e.g. development partnering), however this may require upfront capital to implement and the Crown, Delivery Entity or responsible partner organisation assuming additional risk.

An overview of the key principles, trade-offs and considerations identified are provided below.

- **A range of options with similar beneficiaries and magnitudes** – There are a number of available tools that target the same beneficiaries and could generate similar amounts (e.g., the Infrastructure Funding and Financing Act 2020 (IFFA) mechanisms (referred to as ‘IFF’), Targeted Rate, Betterment Levy). The preferred funding solution will need to ensure that beneficiaries will not be targeted by multiple funding tools for the same benefits.
- **Affordability / acceptability**– Ratepayer affordability and acceptability is an important consideration in the implementation of different taxes, levies and rates, particularly in the lower socio-economic portions of the corridor. A high-level affordability assessment suggests that an additional \$1,000 annual levy or rate for properties within station catchments would remain within a 5 percent affordability threshold⁶¹ (total rates or levies to household income). This approach would need to be reviewed at a more granular level at the next phase. One of the levers available to mitigate affordability constraints is to implement a comprehensive postponement scheme, which would enable landowners to defer levy

⁶¹ The 5% affordability threshold was identified in the 2007 Local Government Rate Enquiry Report and is considered by Auckland Council when determining the rate settings for its Long Term Plans.

payments (i.e. until after the sale of that property). The implications of such a scheme (i.e. impact on Project financing) will need to be considered at the next phase.

- **Value capture and development potential** – Capturing value from landowners may have implications on incentivising or securing the desired level of development. This needs to be considered in the context of Auckland-wide patterns of intensification. The impact on development will depend on the proportion of value captured and how the market prices this in. To the extent the market prices the cost into land markets, the potential impact on Gross Floor Area (GFA) could be estimated through the land use change model that measures the correlation between land value uplift and GFA. However, prices achieved on the 2019 IFF Milldale transaction indicate that the levies were not priced into land markets and did not materially affect development. To ensure the development incentive is not unduly constrained, funding tools will not target the development margin for developers (i.e. will focus on super-profit through land value uplift).
- **Precedent setting impact** – The funding allocations and tools selected to deliver the Project may set a precedent for the delivery of future projects (i.e. equitable allocations to regional/local beneficiaries, investigation of alternative funding tools, capturing value from different beneficiary groups). Accordingly, the preferred funding solution should allocate an equitable portion of costs to regional/local beneficiaries, rather than relying on Crown funding. The preferred operating funding model may similarly set a precedent for how operating expenditures are funded for major rapid transit projects. This may have implications for the public transport operating model (PTOM) and current approach to National Land Transport Fund (NLTF) funding.
- **Behavioural impact** – Certain funding tools can be used to manage demand for public transport and private vehicle usage. For example, the application of a premium fare and any other increases to fares will need to be balanced against the objectives of achieving mode-shift/patronage. Other demand management tools (e.g. workplace parking levy, increasing parking charges) may be worth pursuing to incentivise public transport usage, even where the financial benefit is relatively low.
- **Crown/Delivery Entity role in capturing land value uplift** – There is a spectrum of ways the Delivery Entity and/or the Crown could capture land value uplift on both public and wider landholdings in the corridor. Land ownership and active development provides opportunities to better control urban outcomes and capture value. However, this comes with increased risk, the potential need for upfront investment and greater intervention and capability requirements.

Value capture mechanisms

The Project will generate a wide range of economic, social, and environmental benefits across the Auckland region. Commensurate with accepted principles of equity, the funding solution should allocate the costs of the Project to different beneficiary groups, according to the quantum, timing, and nature of the benefits derived by each group.

Cost allocation will be achieved through implementing a combination of fee-based tools (e.g. IFF levy, betterment levy) and different development structures (e.g. development partnering). The Delivery Entity could also look to capture value through strategically acquiring land along the corridor and moving up the development risk curve. The specific combination and settings of the different tools will be determined at the next phase, once there is greater certainty over the preferred transport solution, the urban development strategy, project costs, and the timing and quantum of benefits.

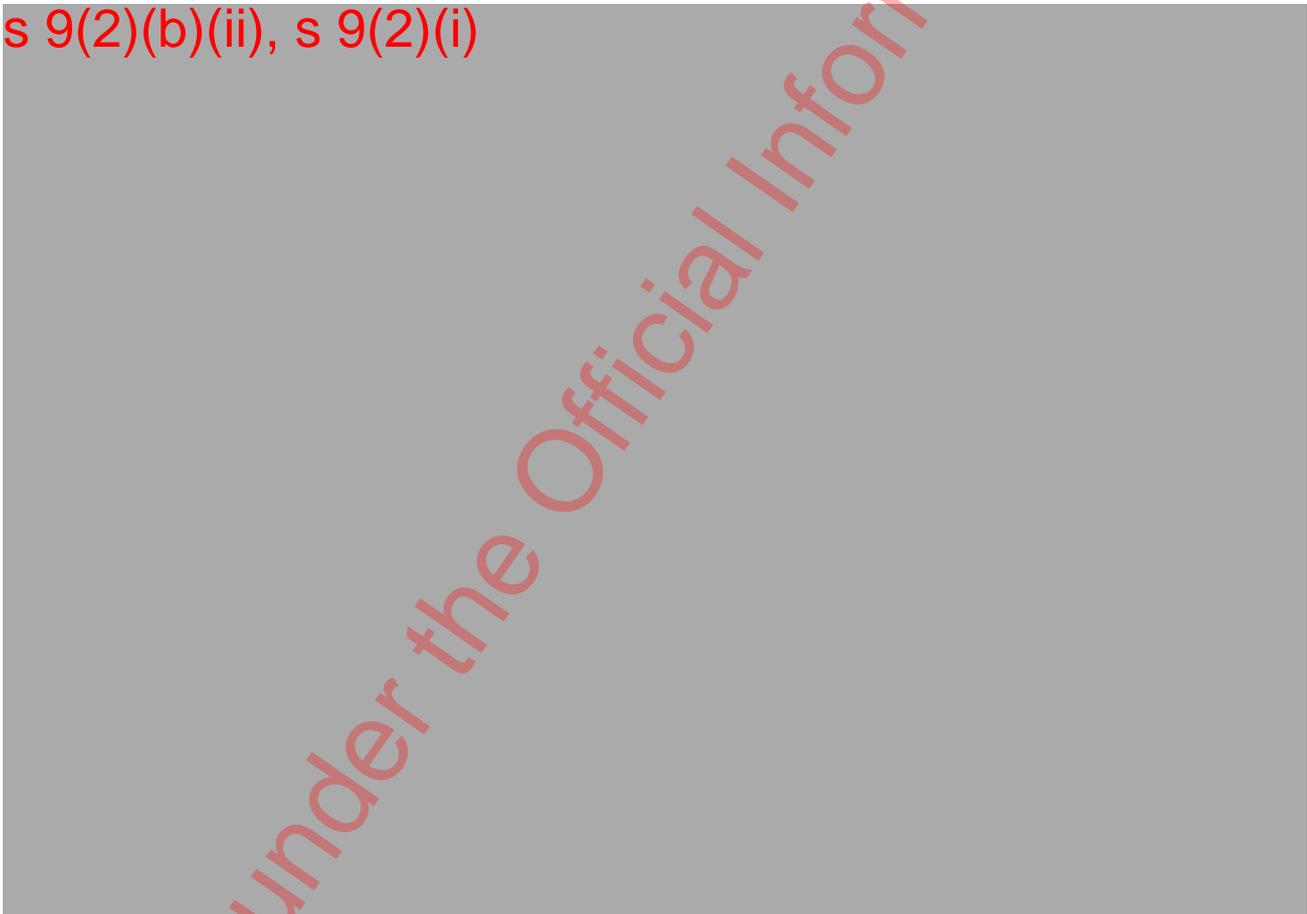
Potential capital funding gap and affordability

A large Crown contribution is likely to be required to fund the Project, given its significant size and scale, and the affordability constraints for ratepayers and Auckland Council. A high-level order of magnitude estimate for the Crown contribution has been calculated based upon the indicative magnitudes assessed for each of the funding tools. Commensurate with principles of equity, the estimates provided assume the delivery phase costs would be shared across the full range of project beneficiaries and only a single funding tool was applied to each beneficiary group to avoid double charging.

To estimate the potential impact of different funding settings on final beneficiaries (e.g. ratepayers), the Crown, the NLTF and Auckland Council, high-level affordability analysis was completed on a hypothetical funding scenario. This scenario is not intended to presuppose the preferred funding solution or any associated funding scenarios. The revenues outlined in Table 31: Indicative delivery phase funding tools and magnitudes are indicative only and based on a series of high-level assumptions. An overview of the scenario is provided below.

Table 31: Indicative delivery phase funding tools and magnitudes

s 9(2)(b)(ii), s 9(2)(i)



An overview of the estimated cashflows for the delivery phase funding tools is provided in Figure 30 below. This profile excludes Crown funding.

⁶² Based on a 5% discount rate.

⁶³ The magnitude of the IFF levy will need to be tested further against the expected value uplift of properties in the catchment to determine overall affordability and fairness in the next phase.

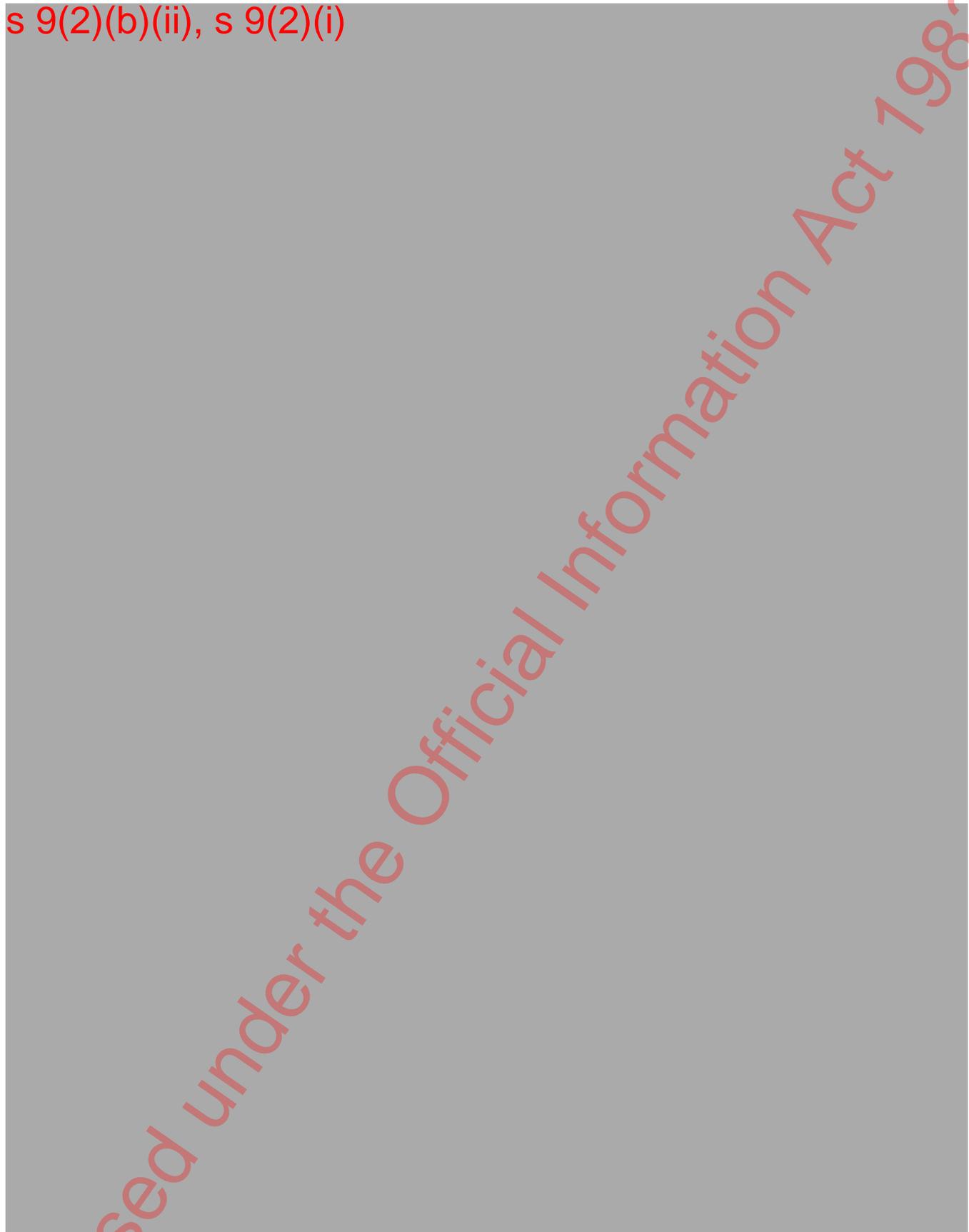
Figure 30: Indicative delivery phase funding cashflows

s 9(2)(b)(ii), s 9(2)(i)

s 9(2)(b)(ii), s 9(2)(i)

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s 9(2)(b)(ii), s 9(2)(i)



Potential operating funding tools

An overview of the operations phase funding tools considered in the indicative base case is outlined in the table below. As above, this base case is designed to draw out the potential affordability constraints and does not presuppose the preferred funding solution.

s 9(2)(b)(ii), s 9(2)(i)

Overall affordability

Overall affordability will be driven by the following factors:

- cost of the preferred technical option
- scope of urban development works being delivered and supporting investment
- capacity of the relevant organisations to fund and finance the Project (both upfront and ongoing costs)
- individual ratepayer affordability (to the extent funding is generated through rating base tools).

High level affordability analysis was undertaken to understand the potential affordability constraints for this Project. However, there is insufficient certainty over the preferred technical option and scope of urban development to be delivered to confirm the affordability of the Project at this stage. Accordingly, detailed affordability analysis will be undertaken at the next phase, once there is a greater level of certainty on these items. This will cover both the upfront and ongoing funding requirements (which could differ by funding sources). Staging of delivery also plays a part in assessing overall affordability over time, and this will be explored in the DBC to reach an agreed staging plan.

Ratepayer affordability

s 9(2)(b)(ii), s 9(2)(i)

s 9(2)(b)(ii), s 9(2)(i)

Auckland Council capacity

s 9(2)(b)(ii), s 9(2)(i)

NLTF capacity

s 9(2)(b)(ii), s 9(2)(i)

FINANCING

s 9(2)(i)

s 9(2)(i)

FINANCIAL RISKS

The Project is complex, and the scale of investment carries several inherent risks. A project risk register has been developed, which details all the identified design, construction, and operating risks. The potential impact of these risks has been assessed and quantified and was used as an input into the risk pricing for the Project. The key financial risks include:

- **Cost estimation risks:** The size, scale, and uncertainty over final scope of the Project means that there are several inherent risks associated with the cost estimates that have been prepared. This includes estimates for indexation (e.g. base interest rate, construction escalation, foreign exchange for various scope components (e.g. rolling stock)). Appropriate levels of risk and contingency have been included at this stage of the Project, commensurate with the level of information and detail available.

- **Unknown utility and geotechnical risks:** These unknown risks are not currently sufficiently understood to appropriately quantify and price. Leveraging partner, including Mana Whenua matauranga and experience, information and recent experience and completing geotechnical surveys and utility identification works as part of an early works package (or even during the DBC) will be used to better understand these risks.
- **Funding revenue estimates:** The revenue expected from the different funding sources will be estimated at the next phase. Estimates will be predicated on a number of underlying assumptions. There is a risk that these assumptions are optimistic, reducing actual revenue potential from each source.
- **Implementation risks:** There is a risk that some of the potential funding tools will be challenging to implement and/or may require legislative change (e.g. utilising the rating powers under the Urban Development Act 2020). This will be explored in more detail in the DBC.
- **Announcement risk:** There is a risk that the ability to utilise some of the funding tools to their potential is undermined by the timing of certain announcements. This is particularly relevant in relation to some value uplift capture tools, where announcements of route or station location, for example, can lock in uplift at the time of that announcement. This means that the portion of uplift cannot be captured in the future unless the funding strategy is confirmed in advance.
- **Farebox revenue:** Operating costs for the Project are likely to be predominantly fixed in relation to the timetabled services. If patronage is lower than forecast, then there is a risk that farebox revenue is therefore lower than expected, which would increase the operating funding gap.
- **Refinancing risk:** if the financing structure includes debt raised from the capital markets that is not raised via the DMO, the borrowing terms for the Project are likely to be shorter than the amortisation period for the Project, exposing the structure to risks associated with refinancing. This presents a risk that the same price and/or borrowing terms cannot be achieved when refinancing, which can be factored into the financial modelling in the DBC through appropriate risk considerations.
- **Finance market constraints:** finance market issues such as market liquidity, appetite for risk, or the amount of debt required for the Project can impact on Project financing efficiency. These risks will be higher for financing arranged by the Delivery Entity in the capital markets or where private finance procurement options are utilised, than where Crown financing through the DMO is utilised.

NEXT STEPS

The Financial Case will be updated and refined at the next phase once there is clarity over the preferred technical option, procurement strategy, level of urban development interventions and Delivery Entity taking the Project forward. An overview of the proposed next steps is set out below.

Cost development

The costs will continue to be refined through the DBC as the preferred technical solution is further developed and defined. This will enable additional layers of detail to be developed in the design from the concept design stage to feasibility design and move the cost estimate from a Class 5 (maturity of ~2% and the current level of accuracy of between -30%/-40% to

Commercially sensitive – Do not distribute

+50%/+70%) to Class 4 or Class 3 (up to 40% maturity and a level of accuracy of between -10%/-20% to +10%/+30%).

The QRA outlined earlier will be revised at intervals in the design refinement process, to improve estimations of likelihood and consequence associated with the cost risk areas. Along with an improved level of accuracy in the base estimate, the assumptions informing the QRA will be better informed and result in the level of risk and uncertainty reducing.

Once decisions are made in relation to the Delivery Entity's role in delivering on urban outcome interventions, the costs associated with those activities and investments will be explored and dimensioned further in the DBC.

Funding and financing

The following activities will be undertaken at the next phase to refine the funding analysis and determine a preferred funding and financing solution.

- Detailed beneficiary identification and allocation - The assumptions underlying this analysis will be to a more granular level (e.g. using separately used or inhabited places or housing unit equivalents etc. rather than the current land parcel proxy).
- Detailed affordability analysis - The analysis will utilise refined costs and the detailed beneficiary allocation analysis and may assess a postponement scheme to address ratepayer affordability concerns.
- Further exploration of 'active' value capture opportunities - Once the preferred technical solution and urban development scope and strategy have been determined, potential development opportunities will be explored in greater detail. This will include identifying options for strategic land acquisition.
- Development of a detailed financial model to assist in assessing overall affordability. It will also enable a more detailed understanding of the financing requirements to support the detailed financing assessment.

s 9(2)(i), s 9(2)(f)(iv)

OUTLINING THE MANAGEMENT CASE | PLANNING FOR A SUCCESSFUL DELIVERY

Addressing the achievability of the proposal and planning arrangements required for successful delivery of the preferred option and risk management

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INTRODUCTION

Purpose

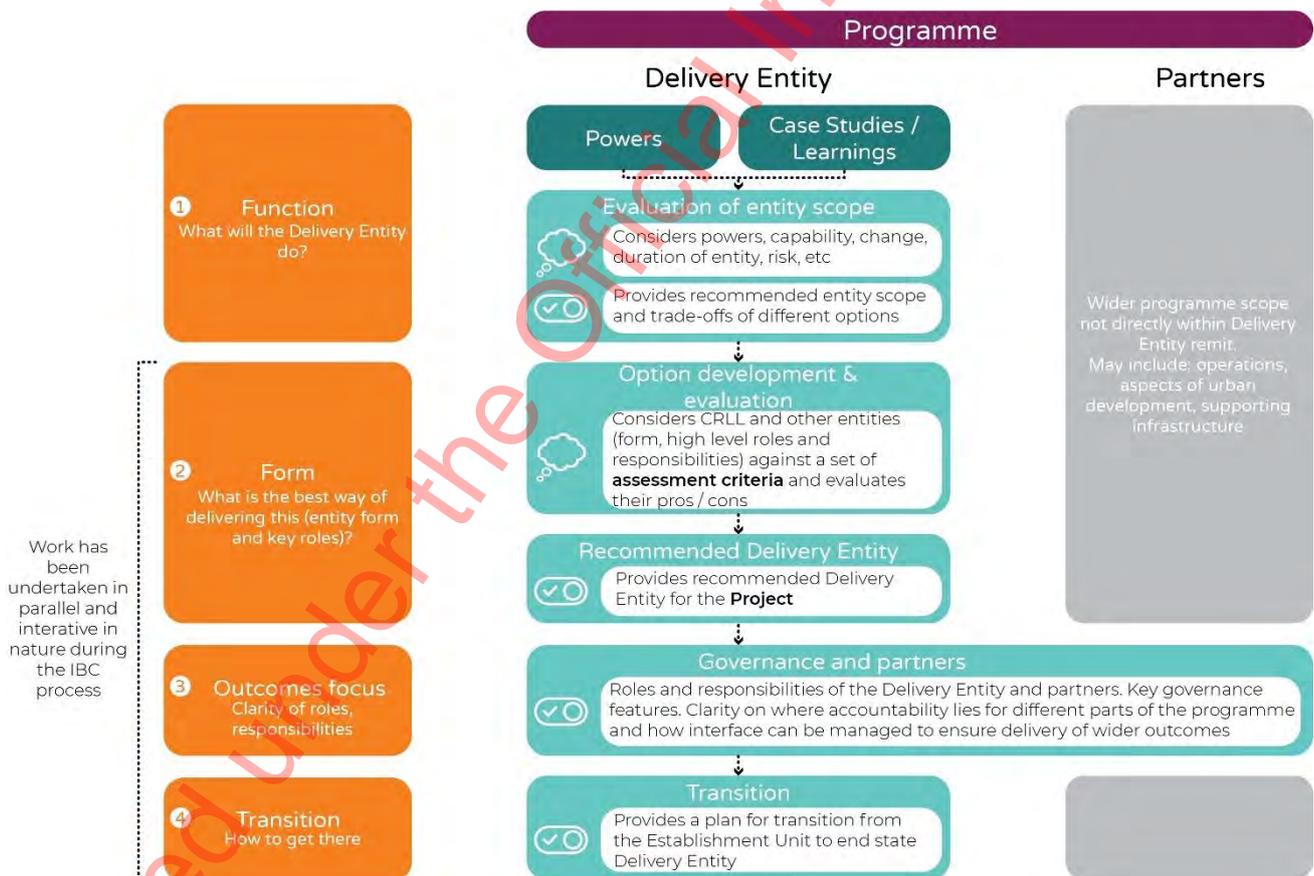
The purpose of the Management Case is to describe the arrangements that will be put in place for the successful progression, and ultimately delivery, of the Project. This includes Delivery Entity establishment and transition, governance and partnering structure, risk management, stakeholder engagement, benefits realisation, timing and assurance processes.

DEVELOPING A DELIVERY ENTITY

International experience and best practice show that the creation of a discrete entity, with the right expertise, authority, processes and controls is best placed to provide the level of focus and autonomy required to deliver the key outcomes for a complex project of this scale.

The process to recommend a Delivery Entity adopted a ‘form follows function’ approach, as set out in Figure 33 below. In relation to the urban aspects of the Project, the working assumption is that the Delivery Entity would be responsible for securing the urban outcomes, but not necessarily delivery of development projects on the ground.

Figure 33: Framework used to recommend a Delivery Entity



Consultation with key partners

As part of the Delivery Entity workstream, the Establishment Unit and partner agencies have worked collaboratively through a series of workshops that have covered the Delivery Entity scope, defining assessment criteria, commencing an assessment of options, governance and partnership principles, and transition considerations. Recommendations have been discussed and validated by the Establishment Unit Board.

Powers and institutional framework

Cabinet tasked the Establishment Unit with preparing advice on the form of the Delivery Entity and governance arrangements to deliver the Project. To recommend an appropriate form of Delivery Entity and determine how partners will work together, there needs to be a clear understanding of the powers required to support the Project. Preliminary analysis of existing legal powers suggests that the Delivery Entity can deliver the Project within the existing legislative framework through agencies, partnerships and commercial arrangements. The key exception to this is the potential need for legislative change for funding tools (refer Funding Short List Report (Appendix 16)).

As noted earlier, the working assumption is that there is separation in terms of delivering the Project’s transport and urban outcomes. The assumption is that the Delivery Entity would have a mandate to focus on delivery of the transport project, and be responsible for securing the urban outcomes, but would likely partner with other agencies, e.g. Kāinga Ora, for the actual delivery of urban development.

The key powers or regulatory enablers within the existing framework as they will relate to any Delivery Entity are set out in Table 34 and detailed further in Appendix 27.

Table 34: Summary of Delivery Entity powers

Area	Key powers considerations for Delivery Entity form evaluation
Planning	Auckland Transport and Waka Kotahi have existing statutory roles in planning for the Auckland region, with Waka Kotahi’s also extending across New Zealand.
Consenting	A Delivery Entity could apply to become a Requiring Authority (as recommended in the indicative consenting strategy in the Commercial Case) or partner with existing agencies such as Auckland Transport (statutory decision-maker responsible for planning and consulting on public transport services in Auckland) or Waka Kotahi (statutory whole-of system role). Note: the indicative consenting strategy in the Commercial Case recommends that the Project is consented through a Board of Inquiry (BOI) process under either the Resource Management Act 1991 (RMA) or the future Natural and Built Environments Act (NBA).
Land acquisition	A Delivery Entity could apply to compulsorily acquire lands for public works under the Public Works Act (PWA). Acquisition of land using PWA for transit-oriented development (TOD) is likely to raise several risks.
Land access and roading powers	Auckland Transport is the Road Controlling Authority for the local road network and has power to make and enforce bylaws

Area	Key powers considerations for Delivery Entity form evaluation
Urban Development	Kāinga Ora is the logical agency to lead urban development activities as it will be difficult for a Delivery Entity to acquire capability and similar powers to Kāinga Ora under the Urban Development Act 2020 (UDA).
Operations	Auckland Transport is the statutory decision-maker responsible for procuring and contracting public transport services in the Auckland region.
Ownership	Ownership of rapid transit infrastructure can be held by any entity, noting a substantial portion of assets will be located on Auckland Council land, i.e. the road reserve. Ownership of rolling stock can be held by any entity.

Delivery Entity scope

Potential areas of scope for the Delivery Entity were identified and then evaluated against a range of considerations (detailed in Appendix 28) through a series of workshops with partner agencies. The result of that evaluation was agreement on the following working assumptions, which inform analysis around governance and partner roles and entity form considerations. The Delivery Entity, and any pre-establishment transition entity, will:

- Be responsible for project planning (DBC, consenting, land acquisition etc), noting that these activities will be undertaken by the shadow entity before the final Delivery Entity is established.
- Be directly responsible for core transport delivery (procure and deliver the chosen form of rail and stops/stations and associated accessibility improvements within the corridor (e.g. connections to stops/stations).
- Be responsible for facilitating narrow transit-oriented development (TOD) - over or adjacent to station infrastructure. It could choose to engage developers directly or partner with others (Kāinga Ora, Panuku or Auckland Council) to do this. Some specialist development capability will be required within the Delivery Entity. The expectation is that this is not looking to duplicate or replicate expertise in other agencies but provide sufficient expertise for the Delivery Entity to hold robust and informed discussions with developers as needed. It could also partner to provide this development expertise (for example with the private sector). The scope and enablement of the Delivery Entity related to urban development is further summarised in Appendix 29 and will be validated in the next phase.
- Not be responsible for ‘supporting infrastructure’ (e.g. intersection upgrades outside the corridor etc).
- Not be responsible for facilitating wider ‘beyond-TOD urban development’. This would remain the responsibility of partner organisations. Clarity of roles and responsibilities, partnerships and the governance structure of the wider development landscape will be developed to minimise interface risk.

The agreed assumption is that Auckland Transport will have a lead role in procuring, contracting and integrating operational and maintenance services for the transport components of the Project, and will own the assets following completion. This will need to be confirmed at the appropriate point in time by Sponsors (assumed to occur within the next phase).

Several different funding tools will also likely be required to fund the Project, which may require the Delivery Entity and/or partners to have a role in implementation and/or revenue collection. As discussed in the Financial Case, a financing structure that utilises Crown financing through the debt management office (DMO) is likely to be preferred over a structure whereby the

Delivery Entity raises financing from the capital markets, however this will be confirmed at next phase.

The Delivery Entity

The Project is large, complex and the ‘first of its kind’ in NZ. The Project has a broad set of outcomes and high expectations of what it will deliver and how it will work with key stakeholders to deliver on these outcomes. Getting the structure right for planning and delivering the Project is critically important to its success.

Evaluation of entity forms

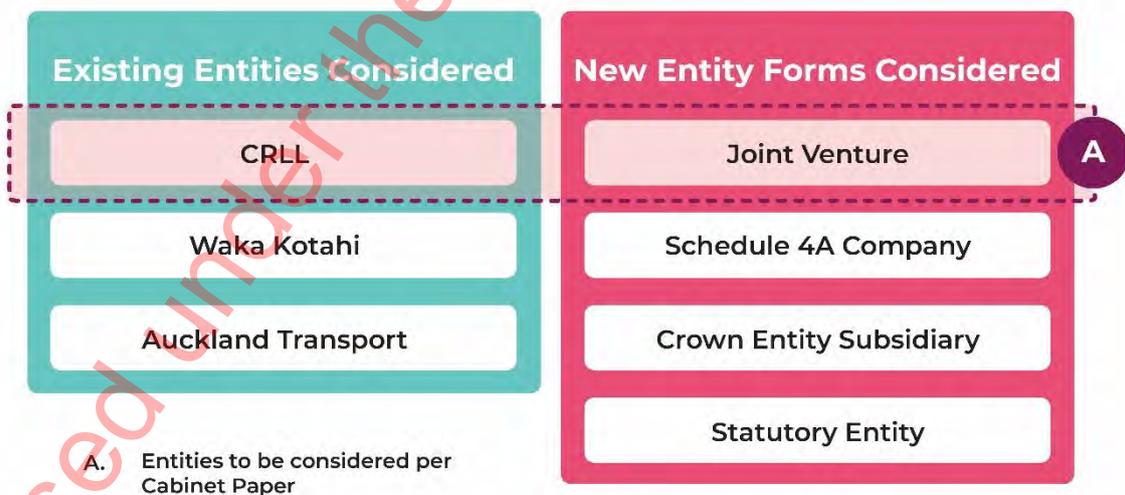
The Project could be delivered by either existing entities or a new entity. An existing entity would be more straightforward because systems, processes, and some capabilities are already in place and can be leveraged. However, it would require some changes to the existing entities to better enable them to deliver on the Project’s outcomes. Risks would remain around the ability of these entities to manage and govern the Project alongside other activities given its scale and complexity.

A new entity would require time and resources to establish. However, it could be set up to be solely focused on meeting the Project’s needs, functions and provide the required balance between operational autonomy and Ministerial or Sponsor oversight. It can also adapt as the Project evolves.

Whatever type of entity is used, there will be challenges in securing the requisite capability and capacity.

As requested by Cabinet, a range of different options were considered to deliver the Project. The evaluation includes expanding the mandate of City Rail Link Ltd (CRL) to accommodate the Project, a joint venture (JV) structure, existing transport agencies, and new entities. Figure 34 categorises the longlist of options into existing and new entities considered.

Figure 34: Delivery Entity options longlist



To consider each option, assessment criteria (listed in Table 35 below) were developed to reflect key desirable features for the Delivery Entity. Each option was assessed against these criteria and a full options assessment is set out in Appendix 30.

Table 35: Desirable criteria for the Delivery Entity



Recommended Delivery Entity form

Based on the options analysis, the preferred options for the Delivery Entity are for a new purpose-designed Schedule 4A (S4A) company or Waka Kotahi (potentially through an internal business unit or subsidiary). Each of the options has benefits and limitations. This means that Sponsors have alternative options differentiated by the desired levels of oversight, appetite for institutional change, costs, and long-term flexibility around scope and projects. Noting there will be substantial challenges relating to capability and capacity under any of the options considered.

The preferred options were stress-tested against the CRL and JV options put forward by Cabinet, using the assessment criteria referenced above, as summarised in Table 36. The light green shading reflects relatively better performance of the option against the evaluation criteria.

Table 36: Delivery Entity options evaluation

Criteria	CRL*	JV** (incorporated JV)	New S4A	Waka Kotahi (Subsidiary or Business unit)
Clear accountability	Existing Crown / Council structure. Complexity and risk to managing and governing 'dual' projects. Risk to CRL delivery.	Designed to provide clarity of roles & responsibilities. Potential complexity and ambiguity in accountability given parental legislative requirements.	Purpose-designed governing documentation and framework to ensure clear roles & responsibilities. Line of sight and accountability to Crown and Sponsors provided through Board of directors.	Provides for a direct line of sight and accountability to the Crown, recognising that the Waka Kotahi board has a wide mandate. Significant scale of the Project may, however, detract Waka Kotahi Board from its core activities and responsibilities. Could be addressed by the establishment of a skills-based subsidiary or project board to oversee the Project.

Criteria	CRL* CRL	JV** (incorporated JV)	New S4A	Waka Kotahi (Subsidiary or Business unit)
Independent and autonomous decision-making	Operationally independent Board with clear Ministerial / Sponsor oversight.	Unlikely to be able to be fully operationally independent given parental oversight requirements.	Operationally independent and has the advantage of clarity of purpose as solely project focused.	Will be ultimately accountable to Waka Kotahi Board, but considerable discretion and flexibility can be built into reporting lines and structure.
Outcomes led approach	Changes required to broaden remit and beyond pure transport outcomes.	May be limited by parental 'functions'. Would require greater reliance on partners to deliver outcomes.	"Blank sheet of paper" to create a fit-for-purpose entity with a focus on CC2M outcomes.	Will need to be guided by Waka Kotahi functions, but considerable flexibility is provided for within governing legislation.
Effective partnerships	Changes needed to clarify roles of partners for CC2M and how these may differ for CRL.	May require additional reliance on partners to deliver urban outcomes.	Could support wider governance obligations and build partnerships but will need to develop core competencies and relationships. May rely on Sponsors to support efforts to build partnerships.	Waka Kotahi has a history of partnering and close stakeholder relationships but lacks specific Auckland mandate and may have limited awareness amongst local communities.
Adaptable / flexible	<p>Changes required to current scope and functions.</p> <p>Complexity of balancing different scope for different projects.</p> <p>Can adapt to different commercial models, scopes and over time.</p> <p>Project focus may limit ability for Delivery Entity to support a wider perspective around rapid transit network integration.</p>	<p>Limited by parental legislative framework.</p> <p>Project focus may limit ability for Delivery Entity to support a wider perspective around rapid transit network integration.</p>	<p>Commercial and flexible entity. Can adapt to different commercial models, scopes and over time.</p> <p>Potential complications could arise from governance and funding arrangements, plus perceived Auckland orientation.</p> <p>Project focus may limit ability for Delivery Entity to support a wider perspective around rapid transit network integration.</p>	<p>Has national coverage, extensive transport network related relationships and experience working with local authorities and communities across the country.</p> <p>However, potential lack of recognised rapid transit brand could undermine social licence to develop and execute regional projects.</p> <p>Able to support integrated rapid transit network.</p>
Appropriately resourced	Ability to leverage existing Board, management team and corporate services.	Independence / flexibility limitations may impact ability to attract capability.	Will require the entity to build capability from the 'ground-up', but single delivery and commercial focus,	Provides the opportunity to build upon Waka Kotahi core competencies around planning,

Criteria	CRL* [*]	JV** (incorporated JV)	New S4A	Waka Kotahi (Subsidiary or Business unit)
	<p>A company delivering two large projects may assist with attracting capability.</p> <p>Nevertheless, additional resource needed to manage both projects.</p>		<p>plus the scale of project, would likely attract suitable resources.</p> <p>New entity provides chance to build bespoke project culture.</p>	<p>consenting, design, procurement and delivery.</p> <p>Subsidiary option offers opportunity to build bespoke project culture.</p>
Deliverability	<p>Entity already established, with some existing capability, systems and processes resulting in efficiencies.</p> <p>Complexity in unravelling and amending governing documentation (to address two different projects).</p> <p>Complexity with 'merging' CRL Board and teams to shadow Delivery Entity Board and teams.</p> <p>Compromised CRL social licence.</p>	<p>Could be relatively straightforward to establish, though would still require a commitment of resources.</p>	<p>Would require a commitment of resources to establish.</p> <p>Potentially presents future risks if the structure needed to be amended or unwound</p> <p>Straightforward Order in Council process and no legislative change required.</p>	<p>Entity already established, with some existing capability, systems and processes resulting in efficiencies.</p> <p>Smooth transition and continuity, and largely preserves the option to move to another entity once further work has been undertaken.</p>

* The CRL option above assumes that the Project and CRL are undertaken as side-by-side projects with separate management teams but under one Board and shared corporate functions.

**The JV option above considers an incorporated JV. An unincorporated JV was also considered but discarded as it is a relatively complex structure that drives decision-making and accountability upwards to JV participants (Sponsors) rather than down to the Delivery Entity. Given the scale and complexity of the Project, there is merit in driving more operational autonomy to the Delivery Entity. Key features of a JV have been leveraged and reflected in the proposed governance arrangements. These include clarity and delineation of roles, responsibilities, decision-making and funding between sponsors and the role of the various Partners in delivering the Project outcomes.

As set out above, the expansion of CRL's mandate, while possible, risks the entity being unable to govern two large and complex projects simultaneously under one Board, with flow-on implications for time and budget. There is also complexity and distraction from Project progress as a result of unravelling, adapting and implementing fit-for-purpose dual governing documents, shareholding and funding arrangements. An incorporated JV is unlikely to provide sufficient flexibility, adaptability and operational autonomy to the Delivery Entity Board to undertake the delivery of the Project. Appendix 30 provides further detail on the CRL evaluation (including changes that could be used to optimise this structure) and other entity forms considered.

By comparison to CRL and a JV, both the other options, a Schedule 4A (S4A) company and Waka Kotahi, perform better in the Delivery Entity evaluation. Each of the options is capable of delivering the Project outcomes, noting that both have their own advantages and limitations.

The evaluation therefore supports a position that keeps open the choice of final Delivery Entity at this point. However, a delayed decision on the final Delivery Entity may mean that the Project loses momentum without a dedicated champion. Extended delays could also have an impact on wider Sponsor agendas, the Project programme, and impact the ability of the Delivery Entity to build capability and attract skilled staff.

Governance, partnerships and sponsors

Strong governance and partnerships will be key to the success of the Project. The key partnerships will be with partner agencies and with Māori, especially with Mana Whenua and mataawaka. Te Tiriti o Waitangi, its articles and its principles of partnership, protection, and participation will guide decision-making and the way the Project is run.

The proposed governance framework has been designed to reflect the importance, scale and complexity of the Project, and to mitigate identified risks in delivering the Project's outcomes. Further detail is provided in Appendix 31. The Urban Development Delivery Action Plan (Appendix 29) provides further considerations around governance and partnerships from an urban development delivery perspective.

Governance framework

Sponsors, the Delivery Entity and partners all have a role to play in delivering the Project outcomes. Key principles in relation to governance and arrangements are summarised below and can be adapted to different Delivery Entity forms. These are summarised further in Figure 35 below.

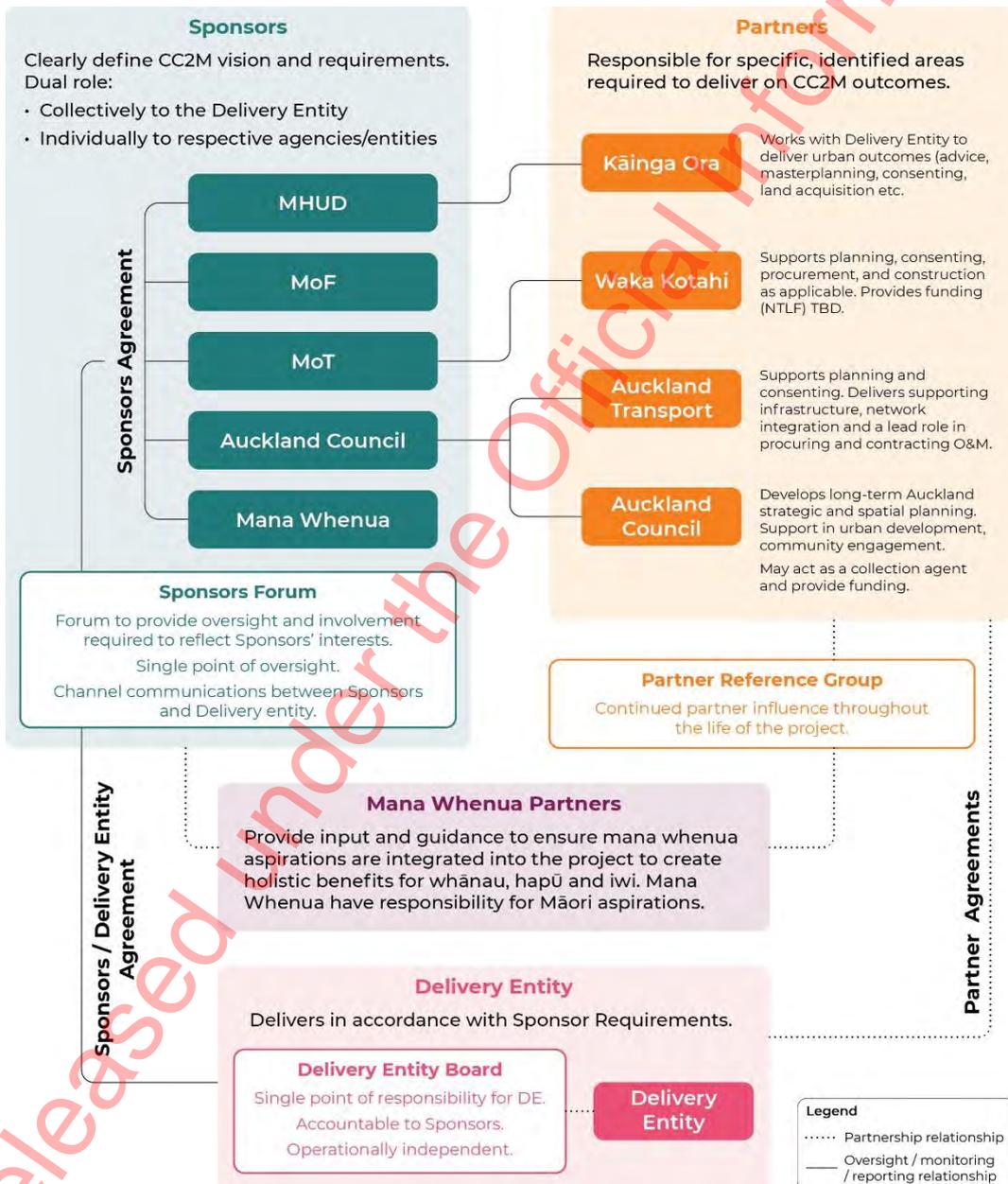
- **The Sponsors** are the ultimate decision-makers on the outcomes being sought (subject to any decisions retained by Cabinet) and the nature and scope of the Project. They should include a mix of local and national representation and provide transport and urban focus, and Mana Whenua representation. The proposed Sponsors are the Minister of Finance, the Minister of Housing, Minister of Transport, Auckland Council elected members and Mana Whenua representatives.
- **A Sponsors Forum** will provide a single point of oversight and be the channel of communication between the Sponsors and the Delivery Entity. It will be made up of Sponsor representatives (officials) and will monitor and oversee Delivery Entity performance.
- **A Partner Reference Group** will be a forum for partners and the Delivery Entity to come together and provide timely advice and guidance to the Board (see next point). The Partner Reference Group will:
 - provide continued interaction and involvement of Partners throughout the lifecycle (critically from early planning stages);
 - Provide support and guidance (where relevant) to Delivery Entity; and
 - Help identify and resolve issues or seek political direction where needed.
- **A skills-based operationally independent Board** will be a single point of responsibility for the Delivery Entity.
- **Mana Whenua** representation will assist in guiding decision making, building on the approach adopted by the Establishment Unit, and ensure Mana Whenua aspirations are incorporated into the Project. Mana Whenua and Māori will be involved across the depth and breadth of the Project, with representation at Sponsor and Partner level. A preliminary Māori outcomes strategy (Te Terewhiti ki Tāmaki Makaurau Auckland Light Rail Te Rautaki Huanga Māori) to inform this engagement is attached at Appendix 32.

Formalised agreements would be in place between the Sponsors, the Delivery Entity and partners to ensure clarity of roles and responsibilities, outcomes being sought and critical requirements. Terms of reference (detailed roles and responsibilities, membership, delegations, meeting frequency etc) will be developed during the next phase.

The detailed Project assurance framework will be developed in the next stage and refined as further clarity is gained on the exact role of the Delivery Entity along the corridor and how it will work with partners to deliver the outcomes. Best practice suggests different levels of assurance are appropriate for projects of this scale:

- Sponsors independent assurance for top level assurance of the Project.
- Board management and compliance assurance to oversee Delivery Entity operations, functions, policy, processes, and controls.
- Day-to-day operational assurance by Delivery Entity management, including peer and manager reviews, reports, and / or system controls.

Figure 35: Summary of governance framework - roles and responsibilities



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Partnership approach

The Delivery Entity would adopt a partnership approach to ensure it:

- leverages rather than replicates existing capabilities
- provides for a dedicated focus on outcomes
- has particular relevance given the scale and complexity of the Project and potential requirements needed to deliver urban outcomes
- meaningfully involves Mana Whenua and matawaka across the depth and breadth of the Project
- supports differing outcome realisation timelines (i.e. urban outcomes are likely to take longer to realise than transport infrastructure delivery outcomes).

Sponsors' role

The challenges to this partnership approach include misaligned incentives, inadequate funding and lack of capability or capacity. This means the Sponsors' role is critical to provide the vision and requirements for the Project and to hold the Delivery Entity to account against performance measures.

Sponsors have a dual role to collectively provide direction, oversight and monitoring to the Delivery Entity; and individually to provide strategic direction and funding to their relevant agencies/subsidiaries to partner with the Delivery Entity in achieving the objectives (e.g. to Waka Kotahi, Kāinga Ora, AT, Panuku, etc.).

There are a series of underpinning assumptions for the Sponsors' role and partnership approach summarised above, which are set out in Appendix 31.

THE PATH FORWARD

Maintaining momentum

The next phase of the Project is critical to ensure there is clarity on the Project, on the programme, and on the roles and responsibilities of Agencies, Delivery Entity, and Partners in delivering the Project and its broader outcomes. It is important that the collaboration between Partners experienced within the Establishment Unit continues to ensure whole-of-network, whole-of-life, and urban outcomes are considered.

Shadow Delivery Entity

Continuing to house the Project under the Waka Kotahi umbrella over the period following submission of this IBC has benefits in terms of maintaining momentum and continuity, including access to systems and capability already established in Waka Kotahi. In determining potential transitional arrangements, a range of underpinning principles have been used to guide the process, and these are summarised in Appendix 33.

At this stage, preliminary work has been undertaken to understand what this interim operational unit or 'Shadow Delivery Entity' would look like housed within Waka Kotahi. The Project could be progressed by either a dedicated entity (e.g. subsidiary of Waka Kotahi) or a dedicated business unit within Waka Kotahi.

Under both options, bespoke contractual arrangements will need to be made to ensure the Crown's desired level of oversight and direction can be provided for (this could be via a funding

agreement or terms of reference for governance arrangements). This will also need to recognise the Waka Kotahi Board’s statutory obligations in relation to a project it is delivering and/or as the parent of the subsidiary delivering the Project.

Governance, oversight and decision making

The next phase of the Project is when a number of foundational decisions are made that will determine the success of the Project in the long-term and the impact it has on shaping Auckland and driving desired social, cultural, environmental (including mode-shift) and economic outcomes.

The nature of these decisions and who makes them is critically important. This will ultimately guide what form of governance arrangements are needed to take the Project through this next phase.

Table 37 maps the key decisions and funding commitments per stage identified in Appendix 28.

Table 37: Summary of transition progress, decisions, and funding commitments

Advancing the project	Option Refinement	Prepare for consultation & consenting	Consultation & consenting / scheme approval	Delivery Strategy	Procurement
Identification of a long list of options Agree funding through to Investment Decision Agree structure to progress the project Stop-Go point	Appoint DE Board Board to appoint Project Director Agree preferred scheme Agree extent of DE and partner involvement in urban development Confirm asset owner and operator	Approve DBC Agree national funding envelope and funding mix (both opex and capex) Agree early land acquisition Agree to progress to transition to a final DE Stop-Go point	Funding and financing strategy agreed	Agree procurement strategy	Agree to award main works
Funding for option refinement stage and preparation for consultation and consenting No firm project spend commitment required	Funding for activities to support design, public consultation and consenting Potential for some land acquisition funding No firm project spend commitment required	Funding for next phase Ongoing funding for activities to support design, public consultation and consenting No firm project spend commitment required	Investment decision (subject to parameters) <i>At this point there will be a sufficient level of certainty to make an informed investment decision. This decision will be needed to ensure the market will participate in the procurement process.</i>	Confirm funding arrangements for scheme as contracted BaU project delivery commences	

At this stage, it is envisaged that transition stage governance will seek to mirror elements of the eventual governance framework that is envisaged for the final Delivery Entity (refer Figure 36). This involves Sponsor oversight and clarity of Sponsor requirements, the creation of the Sponsors Forum and a forum for Partner involvement.

It is expected that the nature and level of Crown oversight and decision making will evolve from more strategic and involved at the planning/transition stage to more of a monitoring and oversight role as the Project nears delivery.

The Establishment Unit is working closely with the Ministry of Transport and Treasury on the critical decisions that will need to be made by Cabinet at the end of 2021 to enable the Project to move forward, as well as signposting future decisions and where responsibilities for those should sit. The decision making and oversight framework adopted will reflect these decisions.

Building the team to progress the Project

Resourcing for the Shadow Delivery Entity is proposed to be drawn primarily from the existing Establishment Unit⁶⁴ supplemented by specialist external advisors. Funding and back-office

⁶⁴ The Establishment Unit Board is currently only in place until early 2022.

services would continue to be provided by Waka Kotahi. Figure 36 summarises the indicative functions that are envisaged through to the end of 2022. In particular, key lead roles in Construction and People are proposed to be established in early 2023.

An overriding principle in Project resourcing is to ensure a legacy of capability that is enduring and can be leveraged for future transport and infrastructure projects.

As it will be NZ's largest infrastructure project to date, with unprecedented scale and complexity, and a new mode to Auckland's rapid transit system, it will need to attract highly capable resources from the domestic and international markets. With closed borders (currently), the approach to international recruitment will form part of an overall Project sourcing and recruitment strategies.

The approach will be to engage external resources to supplement and complement high calibre local expertise. This will encourage knowledge to be built and retained in New Zealand as part of a deliberate upskill strategy to minimise risk and support long term delivery of rapid transit projects in New Zealand, building on broader current government, cross agency and private sector strategies.

As part of this the resourcing strategy, the Project will look to work with an integrated delivery partner with large scale project expertise to enable the rapid assembly of expertise, accelerate programme delivery and to assist with managing interface risk.

Subject to direction from Ministers, roles and responsibilities will be structured to encourage integrated decision making and continue the highly collaborative culture established through the Establishment Unit phase. Retention of key Establishment Unit personnel will assist in providing this continuity and positive momentum.

The structure will be flexible and evolve over time to match the activities during each phase of the Project. This may result in a relatively slim organisational structure, leveraging subject matter experts from the private sector. The ability to scale the Project resourcing at different phases, will be key and ensure an efficient core cost base.

Figure 36: Potential Shadow Delivery Entity functions



*Development response, asset management, testing and commissioning functions to be added late 2022.

Moving to the final Delivery Entity

As key decisions are made through transition and as work progresses, the final Delivery Entity form should continue to be assessed to determine whether a move to a dedicated entity is required, and when, or if it should remain within the Waka Kotahi umbrella for delivery.

The preferred final Delivery Entity form will be determined as decisions are made and will be impacted by:

- Node-by-node urban development scope and the role of the Delivery Entity in delivering this
- Clarity of roles and responsibilities of the Delivery Entity and partners, plus partnering arrangements
- Extent of Crown/Sponsor oversight and key decisions required
- System-wide considerations (taking into account other projects being considered in Auckland and beyond).

The requirement for and timing of a move to a final Delivery Entity structure will need to consider and trade-off:

- Whether the Shadow Delivery Entity structure provides a suitable level of oversight for the Crown
- Whether the Shadow Delivery Entity provides the right level of 'Project focus' to deliver a project of this scale
- The impact on system-wide capability and resources of moving to a new structure
- Project maturity - further progress and certainty around the technical solution, costings and move to delivery

- Clarity and confirmation of Partner roles and Delivery Entity scope in relation to TOD urban development
- Clarity on governance and assurance processes to provide Sponsors with comfort around project and risk management
- Ability of the Board and management to take ownership of major contractual, procurement and funding decisions.

RISK MANAGEMENT

The Establishment Unit has established a Project-wide risk register detailing both operational risks through this IBC phase and a range of key risks relating to the Project going forward. Project delivery risk have been through a quantitative risk assessment (QRA) process to inform the cost estimates discussed in the Financial Case. This combined risk register will be used as a starting point for the overarching risk management approach discussed below that will be implemented as the Project progresses beyond this IBC.

Summary of risk management framework

A project of this scale requires a comprehensive Risk Management approach, commensurate with the significant level of government investment, community disruption and broad interest in the Project. The Project will implement a risk management approach that is in line with International Risk Standard, AS/NZS ISO 31000, Waka Kotahi Risk Standard Z/44, and global best practice. This will include, but not be confined to:

- **A risk-led approach to understanding the scope and needs of the scheme**, recognising the context of the environment in which the Project will be delivered. Examples of this include the risks to communities with poor transport connections to opportunities, the risk of highly congested roads, and the risk of increasing carbon emissions.
- **Identification and management of risks associated with the delivery of the Project**, covering the political, financial/economic, social and reputational, partnering and environmental issues that may impact the Project. Focussing on these risks enables the Project to progress far more smoothly, forming a broad understanding and set of controls or actions around issues.
- **Ensuring a strong understanding of risk and assurance processes** so it can inform the Procurement Strategy and the Delivery Strategy, allocating risk fairly from a contractual perspective and to optimise Project delivery outcomes. A Project of this scale will require delicate handling and sharing of risk to ensure a mutually beneficial outcome for the Sponsors, partners and contractors.
- **An investment in Quantified Risk Assessments, Quantified Schedule Risk Assessments, best practice uncertainty guidelines and Contingency Management**. This approach ensures the Project's exposure to cost and schedule risk is understood in detailed, scientific terms, providing guidelines to funding and contracting agencies over the appropriate levels of cost and time contingency necessary, and the levels at which this contingency should be owned and managed. This is supported by robust processes around Contingency Management, linking the allocation of contingency to risk outcomes with controlled movement of budget to focus areas, when necessary.
- **Both the Delivery Entity and the team managing the transition will have appointed staff to facilitate the risk process**, with specific responsibilities defined as those organisations are established and governance arrangements are finalised.

- **These staff will facilitate a reporting approach that will ensure all parties at all levels (Government right through to small contractors) are informed** and able to be effective managers of risk, regularly supplied with information that tracks risk progress and informs responsible stakeholders of the anticipated final cost and anticipated completion dates of the individual contracts and the overall scheme.

ENGAGEMENT AND STAKEHOLDERS

Since June 2021, the Project has carried out a community and stakeholder engagement programme to raise public awareness and gather views from a diverse cross section of people on what the Project could mean for the city. A multi-faceted engagement approach was implemented to ensure touch points for stakeholders, with a particular focus on corridor communities. Over three months the team held 14 community events, 21 community and stakeholder workshops, 15 stakeholder presentations and 33 stakeholder meetings - reaching over 115 stakeholder groups. More than 2,800 feedback responses were also received via an online public survey. The programme has helped to build support from stakeholders to advocate for the Project and to establish overall social licence to progress to the next phase. A summary of the public engagement undertaken is included Appendix 34.

Community engagement in relation to the DBC and consenting phase is to be implemented from early 2022. The objectives underpinning this engagement are set out below and form the basis of a detailed engagement and stakeholder plan that would be developed in the early part of the next phase.

- Enabling social licence to operate in the corridor communities and greater Auckland.
- Building a diverse coalition of supporters who play an active role in advocating for the Project.
- Providing opportunities for communities and stakeholders to influence and shape the Project.
- Mitigating any information gap or misinformation that can have an adverse impact on the Project.

This phase of the Project will focus on opportunities to 'consult' and 'involve' communities and stakeholders, as defined in levels by the International Association of Public Participation's (IAP2) Spectrum. Engagement with the following cohorts will occur.

- **Key stakeholders:** Building on the engagement programme implemented during the Indicative Business Case phase, a focus will be placed on the continuation of awareness raising, relationship building and collaboration with key stakeholders (as identified via stakeholder mapping). This includes corridor-based engagement campaigns, creation of Community Advisory Groups along the route, and dedicated liaison with business, schools, interest and community groups.
- **Elected officials:** Continued engagement and relationship building with central and local elected officials (Councillors, Local Boards, MPs) will take place to gain local knowledge and align with policy goals related to the Project.
- **Māori:** Building on the initial engagement with Mana whenua leadership an in-depth Mana Whenua and Mataawaka Outcomes and Engagement Plan is to be developed, that focuses on opportunities for involvement and engagement in all aspects of the project, taking a long-term perspective.

- **Industry:** Through market engagement, key industries can be informed about the Project and timing for potential procurement. Building and strengthening these relationships will help to facilitate the delivery of Auckland Light Rail.
- **Affected property owners:** Working with the Project, a dedicated engagement team will be tasked with identifying and managing property owner relationships and communications for property acquisition and impacts to landowners and tenants.
- **Detailed design and consenting consultation:** As part of ongoing corridor-based engagement, a comprehensive community consultation programme will be developed and implemented to inform the detailed design. At least two rounds of public consultation will take place during this period. This includes seeking community input on community outcomes, design and location of stops/stations, to help shape these decisions and to optimise user experience, community sensitivities and project outcomes. Consultation will include gathering information to inform the construction and operational phases of the Project, ensuring that these are planned and implemented to reflect the interests and concerns of the community, residents and businesses. This will help address potential and perceived concerns about business disruption and identify community or area specific strategies.

Approach to addressing business disruption

Disruption to business is a justifiable concern for many stakeholders in the corridor but is inevitable during construction. This issue is particularly topical in light of CRL and recent announcements with regards to a targeted hardship fund.

As noted in the Commercial Case, to proactively address this concern, minimising the level and duration of disruption will be an aim of the delivery strategies (eg procurement and consenting strategies). The Establishment Unit has developed further mitigation strategies to give confidence to Sponsors that the issue is being given appropriate priority.

A business support and targeted assistance scheme ('the Scheme') will be developed in consultation with the community to minimise any adverse impacts of the Project on businesses or individuals during construction, when impacts are most intense. This Scheme will have two layers, with further detail set out in Appendix 35.

- Providing businesses with the tools to avoid or adapt to any disruption during the construction period.
- Providing targeted assistance schemes to mitigate any disproportionate construction impacts on individuals, and whanau as a result of the Project.

Key design principles to inform the establishment and implementation of the Scheme include simplicity, flexibility, cohesiveness, universality, fairness and timeliness, and voluntary and proactive. In order to implement the Scheme, engagement staff will be empowered to make timely and practical decisions to support businesses, and a cost contingency to cover the targeted assistance will be included in the costs of surface works and station works, to be refined further at the next phase.

Rail regulatory engagement

Following a decision to proceed beyond this IBC, it is proposed to start early engagement with Waka Kotahi Rail Regulatory Services Group through a Light Rail Licensing Group (LRLG) to promote an effective working relationship. This will help with early and informal dialogue and

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guidance before an application is made. This will be valuable to achieve the best rail safety outcomes and can help identify issues, timescales and reduce Project risk.

This workstream will be required to identify Railways Act 2005 and rail licence requirements, identify legislation that supports or does not support operation of Light Rail within the road environment including interfaces and key contacts.

There will be a need to develop the Project's rail licence scope of work and duration to satisfy requirements and milestones. An efficient consented pathway towards an application for approval of the rail licence for the Project's operation will be developed as part of this work. That will include the construction process, allow for testing and commissioning and entry into commercial service.

Rail safety and assurance will be required to engage with an Independent Safety Assessor, to support the Project and provide assurance to the rail regulator that risks are reduced so far as is reasonably practicable (SOFAIRP). This process will strive for continuous safety and risk improvement for Light Rail and road safety objectives towards a rail licence approval that include Auckland Transport's Vision Zero objectives.

BENEFITS REALISATION APPROACH

A Benefits Realisation Plan and related assessment process will be established during the next phase and be focussed on measuring the achievement of Project benefits described in this business case.

The benefits of the Project can be split into those that are more tangible and straightforward to measure, such as travel times, service patronage and level of urban development, and those that are more complex, such as improved quality of life and equity outcomes. The approach to monitoring the realisation of the suite of benefits therefore needs to differ by benefit area. It also needs to incorporate the different responsibilities that the various partner organisations have in relation to delivering on the outcomes sought through the Project, and therefore who and how they will be measured.

Monitoring of some areas can readily be implemented through existing (or slightly modified) regimes. For example:

- Auckland Transport has several performance monitoring processes that it undertakes as part of its business-as-usual activities that can be utilised or adopted to measure some of the key transport benefits such as:
 - service performance (e.g. travel times, reliability, capacity and utilisation)
 - patronage levels (e.g. network patronage, service patronage, number of transfers)
 - customer satisfaction surveys (adapted or rolled out specifically along the Project corridor)
- Auckland Council could define a 'corridor boundary' and monitor the level of development through building and/or resource consents occurring within it. While it will be difficult to control for development occurring as a direct result of the Project (unless modifications to the data gathered through the consenting process are implemented), this will provide an appropriate proxy for measuring some of the urban development outcome areas.

For the benefits that are seeking to use a degree of improvement as the measure of success, it will be important to establish a pre-Project baseline. This will require survey and data collection and analysis techniques to be developed for the benefit areas of interest. The scale and long-term nature of the Project likely warrants investment through the next phase to establish

methodologies that sufficiently cover some of those more complex benefit areas mentioned above. As discussed in the other parts of this business case, the urban development outcomes will occur over a long period. Establishing monitoring procedures for the benefits linked to urban outcomes at the outset will not only enable progress to be tracked, but also guide further interventions and adjustments over time to improve the long-run benefit realisation.

NEXT STEPS

The current Establishment Unit Board comprises representatives from Auckland Council, Auckland Transport, Kāinga Ora, Mana Whenua, the Ministry of Transport and Waka Kotahi (as well as observers from the Treasury and Te Waihangā). It has played a key role in providing insights, understanding of local and central government needs and providing challenge to the Establishment Unit as the Project has developed to date.

Until decisions are made on the Delivery Entity, and transitional arrangements are in place, the intention is to continue work on transition planning, acknowledging that there are many possible paths forward, and leverage existing capability in the Establishment Unit into the Shadow Delivery Entity, outlined above. This will allow the Project's momentum to be maintained and ensure that the progress to date is not compromised. The Establishment Unit is well placed to continue in this intervening period given its Board is in place until early 2022.

The transition to the final Delivery Entity will likely occur at a point in time when there is sufficient certainty around the Project, roles and responsibilities, governance required for key decisions and potential contracts to be entered into. At this stage there is no absolute target date for the Delivery Entity to be established.

In the next phase over ~12-15 months, decision-makers will need to decide:

- a **future work programme** for the next phase of the Project, the key activities involved, and the associated decisions needed during that programme
- the optimal **governance and partnership arrangements**, recognising that many decisions in the next phase will sit with and appropriately reflect the Crown's interests in the next phase. These interests may evolve over time as the Project transitions from detailed planning, through funding decisions to delivery and construction
- the **mandate** that is given to the Shadow Delivery Entity that is responsible for taking forward a programme of work in the immediate next phase
- the **funding** that is needed to deliver this next phase, and the source of that funding (note this will not include funding decisions for the delivery of the Project, which will come at a future stage)
- the best **form** for the Shadow Delivery Entity to take in the next phase.

It is proposed that governance of the Shadow Delivery Entity Board will be led by the Crown, as will any legal agreements to which the Crown / Sponsors are partners.

There will also need to be procurement strategies developed for expected advisors and specialists that will be required to assist with informing decision-making on the technical aspects of the Project through the next phase. These advisors are expected to include:

- Planning and engineering support
- Shadow operator
- Legal (RMA and transaction advisory)

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- Commercial and financial advisory
- Māori specialists.

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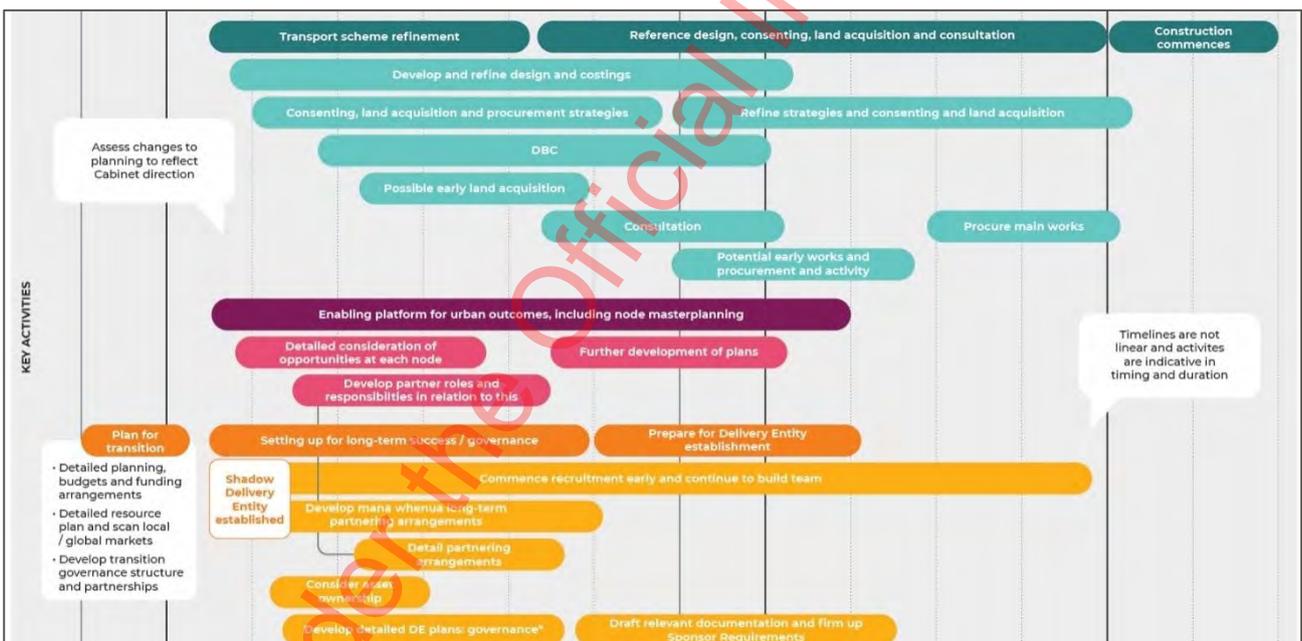
NEXT STEPS

The next phase of the Project will focus on:

- continued community and stakeholder engagement
- gaining greater certainty on scheme design, cost, and schedule
- continued integration with wider rapid transit network strategy (and integration implications)
- addressing funding and affordability issues
- gaining greater clarity on urban development opportunities at each node and partner roles to develop this
- setting the Project up for long term success, including finalising governance and partnership arrangements and preferred final Delivery Entity form
- developing a Detailed Business Case (DBC).

Figure 37 sets out a high-level view of the phases and activities that will need to be undertaken during this period from submission of this IBC through to construction commencing.

Figure 37: Summary of indicative progression activities



STRATEGIC CASE APPENDICES

Appendix 1 Urban Summary Technical Report

ECONOMIC CASE APPENDICES

Appendix 2 The Urban Story

Appendix 3 Assessment Criteria

Appendix 4 Do Minimum

Appendix 5 Long List Options

Appendix 6 Design Report

Appendix 7 Concept of Operations

Appendix 8 Short List Options

Appendix 9 Land use Change and Development Capacity

Appendix 10 Transport Assessment

Appendix 11 Project Benefits

Appendix 12 Carbon Assessment

FINANCIAL CASE APPENDICES

Appendix 13 Cost scope

Appendix 14 Shortlisted cost estimates

Appendix 15 Cost report

Appendix 16 Funding longlist to shortlist report

Appendix 17 Funding shortlist report

Appendix 18 Financing options report

COMMERCIAL CASE APPENDICES

Appendix 19 Delivering broader outcomes

Appendix 20 Procurement methodology

Appendix 21 Market trends

Appendix 22 Options assessment

Appendix 23 Accounting considerations

Appendix 24 Market engagement strategy

Appendix 25 Indicative consenting strategy

Appendix 26 Property overview

MANAGEMENT CASE APPENDICES

Appendix 27 Powers and institutional framework paper

Appendix 28 Delivery Entity scope considerations

Appendix 29 Urban Development Delivery Report

Appendix 30 Delivery Entity report

Appendix 31 Delivery Entity governance and partner roles

Appendix 32 Te Terewhiti ki Tāmaki Makaurau Auckland Light Rail Te Rautaki Huanga Māori (Māori outcomes strategy)

Appendix 33 Transition paper

Appendix 34 Public engagement summary

Appendix 35 Business support and targeted assistance scheme