



Airport to City Light Rail Transit Acceleration Strategy

1 October 2017

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Executive Summary

Auckland Transport (AT) was requested by Mayor Phil Goff at a meeting on 20 July 2017, to provide a feasibility assessment for an accelerated delivery programme for Light Rail Transit (LRT) to support an operational delivery date of December 2020. This date is driven by two major events in 2021 – the America's Cup event (Q1 of 2021) and the APEC summit (Q4 2021).

The request to investigate an accelerated delivery of LRT is also aligned with the Mayoral Intent for the 10 Year Budget (Long Term Plan) 2018-2028 document released on 22 August 2017. The document signals the investigation into LRT between the city and the airport to assist in alleviating congestion on the Isthmus and timeframe for which this could be done¹.

This report provides a high level investigation to understand the requirements, constraints and context for delivery of an accelerated programme for LRT should a decision be made to accelerate LRT in advance of the current Mass Transit Project programme. The report expands on a previous memo dated 25 July 2017 (Appendix 1).

The request was to look at an accelerated delivery of LRT, and while there are other feasible options that will be looked at as part of the strategic mass transit programme, the focus of this report is the acceleration of LRT. It is noted however there are alternative vehicle solutions of LRT capacity emerging in the market that warrant further investigation (currently underway) to determine their viability for acceleration. The report includes assumptions, requirements and timeframes for the acceleration of either Light Rail Vehicles (LRVs) or an alternate vehicle option should the investigation conclude it is viable. It is stressed that these assumptions and estimates are assessed at the time of writing and may be subject to change for a number of reasons that are outlined in this report such as funding availability, market fluctuations and market capacity.

Any accelerated programme would be a departure from the strategic direction of the current programme for mass transit, which is focused on the Airport to City Centre corridor (A2C) and includes a business case for route protection as outlined in the February and March 2017 AT and New Zealand Transport Agency Board resolutions. While the focus of the current Mass Transit Project is on the entire corridor and will investigate a transition solution through to a LRT type solution, this report only considers acceleration of LRT for the America's Cup event and focuses on accessibility between the Wynyard Quarter to the City Centre (alignment A and B and a main Depot at Stoddard Road refer to Appendix 2). The report also includes accelerating, along with the LRT for alignment A and B, a bus-based solution (alignment G) between Auckland Airport and Puhinui by December 2020. This will provide additional airport access in time for the two major events. It is not feasible to deliver LRT on the full Airport to City Centre corridor in time for the major events scheduled for 2021.

Key Risks

The accelerated programme outlined in this report is unprecedented in timescale and scope and involves considerable risks. There are no international examples of LRT being delivered within the proposed timescale that the AT and its advisers are aware of. However, there have been precedents set by Auckland Transport with regard to projects that have been implemented in restricted timeframes and have set international examples of best practice, including HOP card rollout, EMU programme and New Network. The key risks to this project include market capacity, complex structural engineering requirements, procurement timeframes and legislative decision making processes. Should a decision be made to progress an accelerated programme, the delivery of LRT and would require a number of conditions to be met (outlined in this report). Failure to achieve this in the timeframe will remove any chance of delivery.

The key risks are as follows:

1. Deliverability - All construction work including a depot facility at Wynyard Quarter for light maintenance (essential for the delivery of a city centre service) must be completed by Q3 2019 in order to allow for event preparations in the area. In addition, there are significant and complex structural design and construction requirements for priority sections of the route including;
 - an underpass at Karangahape Road, to manage the gradient and to provide for a stop in the vicinity

¹ Mayoral Intent for the 10 Year Budget (Long Term Plan) 2018-2028 document, page 4.

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- a new bridge in Upper Queen Street over the Central Motorway Junction to connect to Ian McKinnon Drive
 - at-grading of the Dominion Road flyover
 - a depot facility at the Stoddard Road end of the route for heavy maintenance and testing and commissioning, all of which bring considerable risk to the programme given the condensed timeframe.
2. Procurement Management –the Government and Council will need to support appropriate processes and controls to manage the governance and risk associated with an accelerated and bespoke procurement approach within the market.
 3. Market Capacity – present market conditions indicate significant constraints in capacity and capability within both the New Zealand and global market for LRT, which could impact on the accelerated programme assumptions. This could have an impact on the ability to deliver on time and within budget, (particularly in the construction and infrastructure sector relative to the various contract packages and timescales required).
 4. Cost/Funding - an overall indication for the entire system, taking account of design, construction, systems and rolling stock is between \$930m-\$1205m, which is dependent on the scale and scope of the programme. This estimate does not include any cost premium that may be associated with accelerated delivery. The figure excludes costs associated with the bus-based solution from Airport to Puhinui interchange (section G, Appendix 2) in accordance with the Airport Access Programme Business Case. These costs are yet to be confirmed. In addition, unilateral political and key stakeholder (NZTA, MoT, Treasury, Auckland Council) support and commitment is critical to ensure funding is available. Without unilateral support there may be risks to decisions and approval and a lack of clarity with regard to funding.
 5. Operational Requirements – this is linked to procurement as there is a required lead in time of approximately three months to allow for systems and fleet testing, safety auditing and quality assurance. This requires rolling stock procurement to be underway by December 2017 to ensure that units could be delivered prior to 2020.

Critical Success Factors

A critical success factor for any possible acceleration is the Government's agreement and approval of enabling legislative powers and shareholder/funder requirements by end of 2017. While any legislative acts would not be passed in this timeframe, there would need to be broad in principle agreement to passing them as soon as possible.

The critical success factors are as follows;

1. An accelerated LRT delivery would require special legislation to expedite the timing of its implementation. To ensure a service offering is in place within the timeframe, any enabling legislation would need to include among others, acquisition, consenting, design, operational considerations and potentially procurement considerations.
2. The procurement process for an LRT project typically takes a period of up to 2 to 3 years post business case approval with construction and manufacture of vehicles commencing thereafter, and an additional 2 – 3 years to be "in-service". Given the accelerated requirements, typical procurement timeframes do not appear possible to meet the required date of December 2020. Therefore, a bespoke procurement approach will need to be agreed with Government to meet the accelerated in service delivery requirements.
3. In addition, changes to legislation are required to enable the operation of LRT within the road corridor separate from a general traffic lane. Recommended legislative changes were provided in a briefing note to the Minister of Transport in March 2017 for consideration (refer Appendix 5).

Stages of Delivery

If there is a decision by the Government and Council to commence the LRT project, noting the identified risks and critical success factors required to be in place then the recommended stages for delivery are:

By December 2020:

- The delivery and operation of LRT from Wynyard Quarter to the Civic Stop (section A, Appendix 2).
- An operational solution that enables interim maintenance (likely through a facility at Wynyard Quarter), depot, testing and stabling arrangements prior to the solution that will be in place at full completion (including the permanent depot likely to be situated at Stoddard Road). Further work is currently being undertaken to assess suitable options and approaches to deliver these aspects.
- The delivery of a bus-based solution from Airport to Puhinui interchange (section G, Appendix 2) in accordance with the Airport Access Programme Business Case. Consideration has been given to the delivery (design, construction, operation and maintenance) of LRT for this section and it is feasible within the timeframe, however given the acceleration of the northern/city centre route, the investment currently proposed for a bus-based option is considered more prudent.

By November 2021:

- The delivery and operation of LRT from Civic Stop to Dominion Rd Junction (subject to risk resolution in detailed design and construction of significant structures) (section B, Appendix 2)

Next Steps

In order to achieve the December 2020 operational timeframe, the following next steps must be initiated immediately;

- Confirm governance structure, including roles, functions and decision forum for the project.
- Confirm cost budget and timetable.
- Progress detailed design process by October 2017 for Wynyard Quarter to Civic Stop (section A), Civic Stop to Dominion Rd Junction (section B), Stoddard Depot to Dominion Rd Extn (section H).
- Commence utility design by October 2017 and develop a plan to relocate utilities where possible (e.g. the Transpower 220K oil filled cable in Fanshawe Street) before LRT construction.
- Procure rolling stock, including systems/communications and maintenance requirements for in-service by Dec 2020. This would require commencing procurement by December 2017.
- Define scope and purpose of the required enabling legislation and progress a bill in consultation with the Crown to ensure it becomes an Act of Parliament by February 2018.
- Commence enabling works (utilities, earthworks, Karangahape Rd underpass box, temporary and permanent depot, substations, CMJ bridge, Dominion Rd flyover at-grading) and subsequent construction of Wynyard Quarter to the Civic Stop (section A), Civic Stop to Dominion Rd Junction (section B), Stoddard Depot to Dominion Rd (section H) no later than mid-2018.

Alternate Option – Airport Access Bus-Based Solution

If the decision were made not to progress with the accelerated LRT programme that is focussed primarily on the city centre and service to the central suburbs/isthmus, the opportunity would remain feasible to deliver the bus-based solution between Auckland Airport and Puhinui within the timeframe. This would provide airport access in time for the two major events.

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The key risks still include deliverability, market capacity and capability, procurement and funding however given buses and interchanges are part of our existing business model, these risk are reduced. As outlined above the costs for this option are yet to be confirmed.

Critical success factors for this project will also benefit from enabling legislation to include among others, acquisition, consenting, design, operational considerations and potentially procurement considerations for accelerated delivery.

In order to achieve this option, the scoping and progression of the detailed design would need to commence immediately. The next steps include;

- Progress design by October 2017 for the Airport to Puhinui interchange (section G) corridor identified in the Airport Access Programme Business Case.
- Agree the bus fleet procurement to take to the market by December 2017.
- Commence construction of Airport to Puhinui interchange (section G) bus-based option for in-service date of December 2020.

1 Purpose

The purpose of this report is to provide a preliminary assessment of the feasibility of accelerating LRT for the America's Cup (Q1 2021) and the APEC summit (Q4 2021) event between the Wynyard Quarter and City Centre (alignment A and B and a main Depot at Stoddard Road refer to Appendix 2). The delivery focus is for an LRT system except for Section G, which is recommended as a bus-based solution. Consideration has been given to the risks and success factors for delivery including staging and timing for design, construction, operation and maintenance. Consideration has also been given to the legislation and procurement requirements to support an accelerated delivery.

The report identifies a range of delivery sequence options, however is not a detailed analysis of all possible options available. If an investment decision on LRT is not made in time to support accelerated delivery, the focus will remain on the Airport to City Centre corridor (A2C) Business Case for Route Protection as outlined in the February and March 2017 AT and New Zealand Transport Agency Board resolutions.

2 Acceleration Requirements

The following requirements would need to be progressed for LRT and a bus-based solution for Puhinui to the Airport in order to achieve the December 2020 operational timeframe and to ensure the integrity of a decision to accelerate:

- Progress detailed design process by October 2017 for Wynyard Quarter to Civic Stop (section A), Civic Stop to Dominion Rd Junction (section B), Stoddard Depot to Dominion Rd Extn (section H).
- Commence utility design by October 2017 and develop a plan to relocate utilities where possible (e.g. the Transpower 220K oil filled cable in Fanshawe Street) before LRT construction.
- Procure rolling stock, including systems/communications and maintenance requirements for in-service by Dec 2020. This would require commencing procurement by December 2017.
- Progress design by October 2017 for the Airport to Puhinui interchange (section G) corridor identified in the Airport Access Programme Business Case.
- Define scope and purpose of the required enabling legislation and progress a bill in consultation with the Crown to ensure it becomes an Act of Parliament by February 2018.
- Commence enabling works (utilities, earthworks, Karangahape Rd underpass box, temporary and permanent depot, substations, CMJ bridge, Dominion Rd flyover at-grading) and subsequent construction of Wynyard Quarter to the Civic Stop (section A), Civic Stop to Dominion Rd Junction (section B), Stoddard Depot to Dominion Rd (section H) no later than mid-2018.

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- Commence construction of Airport to Puhinui interchange (section G) bus-based option for in-service date of December 2020.

In order to achieve the above, scoping and progression of the detailed design would need to commence immediately, and rolling stock procurement to the market by December 2017.

To allow for the construction of LRT within the accelerated timeframe, special legislation would be required to ensure timely consent and regulatory approvals and to expedite decision-making and implementation processes. The Mass Transit Project team has been working with Auckland Council's legal advisors on the scope and purpose of the enabling legislation. The team has also provided a list of requirements on what the legislation would need to include to enable delivery of the project in the accelerated timeframe. Failure to have a clear commitment by November 2017 to progress in the timeframes indicated above and all of the enabling legislation in place (at least in principle) would remove any ability to deliver an accelerated programme.

The depot requirements would include a major maintenance and testing facility in the Stoddard Rd area to ensure that off-street training and testing and commissioning could occur away from city centre development and traffic movements. A minor maintenance facility would be required in Wynyard Quarter that would service and store the rolling stock. Light Rail Vehicles (LRVs) bogies (wheel mechanisms) would need to be transported to the permanent depot for heavy maintenance until the rest of the LRT line is complete at a later date.

3 Background

In March 2017, the AT and NZ Transport Agency Boards passed a resolution confirming the progression of a business case for route protection for the A2C corridor, which was to include a study on the transition between the current bus service options to LRT, including consideration of a potential bus rapid transit solution in the interim.

Further work is required with the Transport Agency and Auckland Transport, together with Auckland Council to assess key operational elements, required trade-offs, flow on effects, transition impacts and network resilience issues in order to future proof for both LRT and advanced bus. The Mass Transit Project team has been progressing the scope of a business case for route protection, which is currently programmed to be completed by the end of 2018.

Should an acceleration occur, this discounts any other mode option for the city centre and isthmus as the mode will be LRT. The business case scope, timeframe and requirements would still progress for the Mt Roskill to Airport section and would include assessment of a range of mass transit mode options.

3.1 Drivers for Acceleration

The Mayor's request to provide a feasibility assessment for an accelerated delivery programme of LRT is driven by the two events in 2021. As part of this acceleration work, consideration has also been given to the need for specific enabling legislation.

The impact of these events requires a transport response to manage the operation of the transport system, which is already constrained in terms of congestion and accessibility. During the America's Cup event, accessibility to and around the city centre will be critical and Auckland's transport system will need to cater for the movement of high numbers of people, particularly between the Wynyard Quarter and the city centre due to the volume of people needing to travel in these areas. This demand will be affected by the decision on where on the waterfront the event and teams will be hosted – this is yet to be confirmed.

During the 2003 America's Cup regatta, 3.26 million people visited the Viaduct Harbour area, of which 32 per cent were international visitors. LRT would enable spectators, other syndicates, crews, sponsors, and media to travel to and from the waterfront, with a more extensive ability to travel required by the time of the APEC summit. APEC is expected to draw 22,000 international attendees with 12 significant events over a number of months before the main event in early November 2021 where 21 countries will be represented in Auckland.

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With the increased global focus on Auckland, the events provide an opportunity to showcase what Auckland has to offer, raising the city's profile and promoting Auckland as a place to invest and do business, as well as visit and enjoy.

Improvement works proposed by the wider Council family and private investment and development to be completed by 2021 in the city centre would mean that the visitor experience of Auckland would be enhanced, providing appropriate amenity and places for people. However, the city will require a public transport option that provides for day to day movement and can also cater for high demand events (such as APEC and Americas Cup). An LRT System is the type of system that will be able to respond to the demand.

More detail on some of the private development planned for the city centre that would interface with a LRT system is included in Appendix 3.

In addition to providing more capacity and improving the city's abilities to host such major events, Auckland's congestion problem is well documented. An acceleration of a transformational transport solution such as light rail is critical to addressing this rapidly growing social, economic and environmental issue.

4 Acceleration Considerations

In order to understand the feasibility of accelerating the delivery of LRT and a bus-based solution from Puhunui to the Airport to support events in 2021, the project team has undertaken further analysis on the staging and timing for the delivery and operation. This has included preliminary technical reports from the Mass Transit Project Technical Advisor, internal workshops in July-August 2017 with business unit leads and a constructability workshop with a wider group of international LRT specialists. Should the decision be reached to accelerate, more work will be required across a wider group of advisors and stakeholders.

The constructability workshop was held with the Mass Transit Project team and technical specialists experienced in the international market with respect to delivering LRT projects. The purpose was to understand the requirements and risks of delivering LRT on the A2C corridor in time for these major events. There are fundamental requirements that need to be considered and resolved to manage the successful delivery and operation of an LRT system.

The LRT route has been divided into sections A to H for consideration and is highlighted in the map in Appendix 2. Initially three potential scenarios were considered to be delivered over a 7-year period with Scenario 1 being the accelerated delivery programme over a 3-year period. Scenario 1 included sections A (Wynyard Quarter to Civic Stop), B (Civic Stop to Dominion Rd Junction) and G (Airport to Puhinui interchange). After further assessment, section B was subsequently considered to be deliverable by 2021 and section C (Dominion Road Junction to SH20) was considered as part of the feasibility assessment, but was not considered deliverable in the timeframe.

Scenario 1 addressed an accelerated programme and considered that under a fast-tracked timeline, any necessary business case would exclude the transition study currently programmed. This scenario involved fit for purpose procurement and delivery models that would potentially be enabled by special legislation, which would also cover fast-track decision making.

Constructability workshop attendees concluded that full delivery and operation of Wynyard Quarter to the Civic Stop (section A), Stoddard Depot to Dominion Rd Extn (section H) and Airport to Puhinui interchange (section G) are feasible by December 2020, subject to a number of constraints being resolved and risks managed. While initial thinking identified Civic Stop to Dominion Rd Junction (section B as deliverable, further analysis showed this section to be deliverable by 2021 due to the complex structures involved.

The conclusion reached by the workshop and preliminary reports was that while it was technically feasible to construct LRT from Airport to Puhinui interchange (section G), the recommendation is to accelerate the bus-based solution currently being investigated as part of the Airport Access Programme Business Case given the suitability of a bus-based option to meet demand for the foreseeable future.

This review has provided confidence that LRT operations from Wynyard Quarter to the Civic Stop (section A) could be achieved by December 2020 in time for the America's Cup event as long as all

conditions in this report are met, including the partial completion of a permanent depot planned for Stoddard Road, a maintenance facility in Wynyard Quarter, structural requirements, legislative requirements, and risk management.

5 Delivery

5.1 Delivery sections

In order to enable the proposed programme of works to be delivered, the project has been divided into delivery sections as set out in Table 2 below. The final approach to initial maintenance, depot and stabling arrangements could impact the final section configuration.

Table 2 – Delivery Sections

Section	Description	Approx. length	Notes
A	Wynyard Quarter to Civic Stop	2.8km	Inner city construction, impact of CRL construction, stabling and maintenance facility required in Wynyard Quarter
B	Civic Stop to Dominion Rd Junction	2.2km	Includes K' Rd underpass, new CMJ bridge and at-grading of Dominion/New North Road junction
H	Stoddard Depot to Denbigh Ave	1.4km	Depot site is required for testing and commissioning of new fleet to ensure early operations can be delivered into service. This would also provide for full fleet maintenance. It would require trucking bogies from Wynyard Quarter to the depot site for heavy maintenance and repairs A stabling and maintenance facility would also be required at Wynyard Quarter.
<i>Total Light Rail Length</i>		<i>6.4km</i>	<i>(includes test track)</i>
G	Airport to Puhinui interchange (bus-based option)	7.9km	Airport terminal, potential new Pukaki Creek crossing, property acquisition along SH20B and major upgrade to Puhinui Station
<i>Total length of network</i>		<i>14.3km</i>	

5.2 Project works components

Delivery of a new LRT network requires, at a high level, consideration of the following elements. The project delivery model must consider delivery of all / each component together with commissioning, operation and maintenance obligations (i.e. delivery of an operating network). Table 3 below sets out Project Works Components.

Table 3 – Project Works Components

Track and Civils	Stops	Systems & Power	Depot
<ul style="list-style-type: none"> • Earthworks • Road works • Slab and track bed 	<ul style="list-style-type: none"> • Platforms • Structures • Fitout / Furnishing 	<ul style="list-style-type: none"> • Signalling (road, rail) • Overhead lines 	<ul style="list-style-type: none"> • Civil works (shed) • Track and stabling • Site works / access

Track and Civils	Stops	Systems & Power	Depot
<ul style="list-style-type: none"> • HV Power supply • Drainage works • Service relocations 	<ul style="list-style-type: none"> • Urban design • Passenger info • Systems / Comms 	<ul style="list-style-type: none"> • Power supply / substations • Communications • Controls 	<p>Rolling Stock</p> <ul style="list-style-type: none"> • Vehicle supply • System fit-out • Commissioning

5.3 Design

In all cases, the production of scoping and tender documents for design and procurement should proceed immediately, with design being progressed in all sections where reference design has not previously been completed (e.g. Wynyard Quarter). Procurement activities would likely need to be progressed in parallel, rather than after, business case development and approvals.

Detailed design is required in order to fully understand the risk in design and construction of structures at Karangahape Road and Upper Queen Street/CMJ, including how they could be adequately managed and mitigated to support implementation. Analysis to date shows that operations could be implemented in Wynyard Quarter to Civic Stop (section A) in time for the America’s Cup event (Q1 2021), and Civic Stop to Dominion Road Junction (section B) in time for the APEC summit (late 2021). See Next Steps for more detail.

The current review indicates that construction of Dominion Road Junction to SH20 (section C) could not be achieved in the required timeframe for the APEC summit in November 2021 on account of the significant risks and construction constraints due to timeframe (see risk table in Appendix 4). The design for this section is therefore lower priority than other sections.

5.4 Facilities

In order for Wynyard Quarter to the Civic Stop (section A) to be operational by December 2020 and Civic Stop to Dominion Rd Junction (section B) by 2021, it is essential that appropriate support is provided to operations from a maintenance facility at Wynyard Quarter and that appropriate depot, stabling and testing arrangements are established prior to this date. Approximately 10,000m² is required for any stabling and maintenance facility to store a fleet of 10 33m LRVs (enough for A and B at a 4min headway).

It would be preferable if the full depot facility and connecting track were available for December 2020. Work is currently underway to secure the Stoddard Road depot site and is programmed for acquisition this financial year. At this stage, the connection from Stoddard Rd depot (section H) to Dominion Rd Junction (section C) is considered very high risk for delivery of an operational service. Therefore, an interim solution is required for the transportation of bogies for heavy maintenance and repair between the Wynyard Quarter facility and Stoddard Rd facility until the completion of section C at a later date.

The following interim arrangement options have been identified and will be further assessed. Initial considerations point to Option 1 as the preferred least risk and most cost effective approach.

Table 4 Facilities Options

Option	Solution	Comments
1	<ul style="list-style-type: none"> - Stabling, testing and maintenance at Wynyard Quarter on temporary basis - Depot Stoddard/Section H 	<ul style="list-style-type: none"> - Bogies transported on trucks as required from Wynyard maintenance facility to Stoddard depot for heavy maintenance - Testing and commissioning on Section H (Stoddard)
2	<ul style="list-style-type: none"> - Stabling, testing and maintenance at Wynyard Quarter 	<ul style="list-style-type: none"> - Higher investment to cater for maintenance requirements - Testing and commissioning on road network

3	<ul style="list-style-type: none"> - Stabling, testing and maintenance at Ian McKinnon Drive or Dominion Road Junction 	<ul style="list-style-type: none"> - Testing and commissioning on road network - Must complete section B for this to be viable
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5.5 Operational considerations

America's Cup Event (Quarter 1 2021)

It is proposed that for the America's Cup (operational date December 2020) the full fleet of ten Light Rail Vehicles (LRVs) - seven for Wynyard to Civic and a further three for Civic to Dominion Junction) are procured, tested and commissioned). LRVs would be tested and commissioned at the Stoddard Road depot facility and testing track (section H), which would need to be constructed before delivery.

It is proposed that bogies are transported by road from the Wynyard Quarter maintenance facility to the depot at Stoddard Road for heavy maintenance. Light maintenance activities will be undertaken at the Wynyard facility.

Prior to all operations, it would be critical to assess, document, prepare, train staff and practice responses to emergencies, accidents and incidents on the full and partial LRT system. It is important that adequate time and facility for training drivers and supervisory staff is planned and implemented.

It would be critical to operations to secure the Stoddard Road Depot connecting track for testing, commissioning and staff training. Construction of the track and infrastructure from the depot alongside SH20 to the end of Dominion Road would be critical in providing a controlled operational training area that is separated from the city centre network and does not disrupt activities around the facility in Wynyard Quarter.

APEC Summit

As outlined above, sufficient LRVs should be procured, tested and commissioned for the proposed sections (Wynyard Quarter to the Civic Stop (A), Civic Stop to Dominion Rd Junction (section B), Stoddard Depot to Dominion Rd Extn (section H) in time for the APEC summit (late 2021). Ten LRVs are required for this service.

It is recommended that procurement commence by December 2017 for the entire 2021 fleet (10) in order to provide a viable order to the manufacturer and to save on unit costs. Alternatively, it may be prudent to order the full isthmus fleet of 18 LRVs with the balance delivered once section C timing is confirmed.

5.6 Legislative Requirements

An accelerated LRT delivery would require special legislation to expedite the timing of its implementation. To ensure a service offering is in place within the timeframe, any enabling legislation would need to include among others, acquisition, consenting, design, operational considerations and potentially procurement considerations.

The procurement process for an LRT project typically takes a period of up to 2 to 3 years post business case approval with construction and manufacture of vehicles commencing thereafter, and an additional 2 – 3 years to be "in-service". Given the accelerated requirements, typical procurement timeframes do not appear possible to meet the required date of December 2020. Therefore, a bespoke procurement approach will need to be agreed with Government to meet the accelerated in service delivery requirements. Further detail is outlined under paragraph 5.8.

In addition, changes to legislation are required to enable the operation of LRT within the road corridor separate from a general traffic lane. Recommended legislative changes were provided in a briefing note to the Minister of Transport in March 2017 for consideration (refer Appendix 5).

Due to the nature of LRT running in streets, it would be necessary to obtain interim certification and possibly licencing prior to testing and commissioning. Tables 5 and 6 below assess constraints and benefits in respect to Enabling Legislation for acquisition and consenting.

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Table 5 Enabling legislation and acquisition

Constraints to acquisition	Benefits to acquisition
The statutory timeframes required to secure ownership of land	Streamlining processes and timeframes.
The ability to make statutory decisions	<ul style="list-style-type: none"> • Have the ability to make statutory decisions within a timely manner. Provision for the following powers would be beneficial: designate, acquire, dispose, manage and control land, stop and close roads, vest land in Council, subdivide and amalgamate land • Dedicated panel to assess compensation, noting that specific expertise would be required i.e. valuation, Public Works Act 1981 & Resource Management Act 1991 • Control over budget and milestones
Appeals to the Environment Court with no clear timeframes for resolution	<ul style="list-style-type: none"> • Limiting objections on points of law only– Judicial Review
Availability of funding within required timeframes	Control over budget and milestones

Table 6 - Enabling legislation and consenting

Constraints to consents	Benefits to consents
Statutory timeframes for notification and decision making (preparation of reports, hearings including pre-hearing timeframes, preparation of decision)	Facilitating a multi-agency approach to delivering infrastructure required to achieve the purpose of the legislation (i.e one piece of legislation that can be used by Council, AT, Watercare, Auckland International Airport Limited (AIAL))
Appeals to the Environment Court with no clear timeframes for resolution	Providing streamlined and defined timeframes for consenting processes
Auckland Unitary Plan (operative in part) provisions and consent requirements	Limiting appeals to points of law only
Adequate resourcing to process consent applications within an accelerated timeframe	<ul style="list-style-type: none"> • Providing more permissive activities if they meet the purpose of the legislation • Requiring a dedicated specialist team to manage the consenting process including a dedicated panel of Commissioners to hear and decide on the applications

5.7 Programme and Construction Sequencing

A high level programme has been developed for undertaking and finalising the detailed design and consenting requirements (Appendix 6).

This programme assumes that construction would be complete for Wynyard Quarter to the Civic Stop (section A) together with construction (temporary or permanent) of two depots by December 2020 to stable LRVs and allow suitable maintenance to service an operational LRT system by this date. Operational requirements and mitigation works for the rest of the route have assumed to be ongoing

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until later in 2021. It is anticipated that at final completion a full and complete servicing depot would be established at Stoddard Road on a permanent basis.

A comprehensive list of programme assumptions that formed the basis for these recommendations can be found in Appendix 7.

Rolling stock procurement would need to be underway by December 2017 to ensure that units could be delivered prior to 2020 and allow suitable testing, commissioning, safety certification and regulatory approvals. This 2.5-year lead time should be satisfactory for a selected supplier based upon current lead times for other projects worldwide.

Construction Sequencing

It is proposed that the construction activity sequence would be as follows:

1. Enabling works, service relocation, then construction of:
 - a. Wynyard Quarter to the Civic Stop (section A)
 - b. Maintenance facility (Wynyard Quarter)
 - c. Stoddard Depot to Dominion Rd Extn (section H).
2. Critical aspects of Civic Stop to Dominion Rd Junction (section B) - enabling works and then construction of:
 - a. Karangahape Road underpass box
 - b. New Upper Queen Street Bridge across Central Motorway Junction
 - c. Structures at Dominion Rd Junction.
3. Civic Stop to Dominion Rd Junction (section B) services relocation, enabling works then construction of non-structural components ie track and power.

It is recommended that the Airport Access Programme Business Case bus options are advanced in parallel to the detailed design of the Mass Transit Project for Airport to Puhinui interchange (section G).

It is noted that these works would occur concurrently with other projects, such as the City Rail Link (CRL) and bus projects in the city centre and therefore presents an opportunity to combine resources, planning and construction sequencing. Initial discussions have taken place with the CRL project team to identify what the opportunities and constraints for dual construction programmes might entail. A full understanding of project and construction interfaces is required in advance of any construction works commencing.

5.8 Delivery models and procurement

The project team has received preliminary advice by Price Waterhouse Cooper (PwC) on potential delivery models and various procurement options for LRT under an accelerated programme, including contract packaging and contracting models.

This advice discusses a range of work packages and contract models for project delivery under normal project timeframes, however, given there are practical limitations to support an accelerated timeframe, only some options will be applicable.

Given the number of project elements (i.e. utilities, infrastructure, systems / communications, stabling facilities and vehicles) and project scale in terms of cost and multiple interface complexity; the procurement and delivery approach needs careful planning and strategic advice from the market experienced in LRT procurement processes and contract packaging to match international LRT procurements.

A bespoke procurement approach is required and will need to run in parallel with the construction elements to enable in service delivery requirements to be met. This will create a number of significant risks that would require management, including the following:

1. Attractiveness to the international market: there is a significant cost to bidding a project and bidders will consider the Auckland opportunity in the context of other international projects. A non-standard approach, which will be required for Acceleration, could significantly impact bidding interest.

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2. Market Capacity and Timescales: anticipated Acceleration procurement and construction / manufacture and testing timeframes will be difficult to resource across all supply chain areas for both AT and the bidding market, particularly given other forward work programmes locally (esp CRL) nationally and internationally. Short lead in timeframes also severely impact ability to deliver requirements.
3. Delivery Risk: the short timescales, unique approach, resource limitations and inability to complete the full Reference Design / Route Protection (before project commencement) creates a risk that there will be significant gaps in project understanding and detail that will ultimately impact delivery, timescales, cost and project and operational outcomes.
4. Sole Sourcing (from existing or known supplier): whilst this could assist meeting required timescales, it removes the benefit of competition in such areas such as innovation, financial incentive, contestability etc. It would also likely be challenged by other suppliers who would ordinary bid the project.

Whilst a project risk management framework is now being established, given the combination of timescales, complexity and the risks noted above; it is likely that it could be ineffective in managing and mitigating the risks of an accelerated project.

The procurement options are currently being further in consultation with AT's Commercial Manager and the project team, AT Procurement and PWC in regards to suitable models and approaches.

6 Financials

The tables below outline the indicative costs for construction and rolling stock.

Costs do not include the potential cost premium that may be associated with accelerated delivery and adjustments are likely once design development, construction methodology and rolling stock requirements are finalised. LRV costs are calculated at \$10m per unit. Cost ranges are indicative at this stage based on design to date. They reflect P50 Estimates and include a contingency of 30%.

Table 7 – Indicative Cost Envelope (in millions)

Section	Length	Indicative Construction Cost (range)	Number of LRVs at 4 min frequency	Rolling stock costs (estimated)	Total
A – Wynyard Quarter to Civic Stop	2.8km	\$350-\$470m	7	\$60m	\$410-530m
B - Civic Stop to Dominion Rd Junction	2.2km	\$200-\$265m	3	\$40m	\$240-305m
H – Stoddard Depot to Dominion Rd Extn (<i>note subject to adjustment for interim facility approach</i>)	1.4km	\$280-370m	N/A	N/A	\$280-370m
TOTAL LRT		\$ 830 – 1105m	10	\$100m	\$ 930 – 1205m
BRT Solution G – Airport to Puhinui	7.9km	TBC	Bus Numbers TBC	TBC	TBC

7 Constraints and Risks

The key risks associated with accelerated delivery have been identified as:

- Unilateral political and key stakeholder (NZTA, MoT, Treasury, Auckland Council) support and commitment is critical – without unilateral support there may be risks to decision approval and funding limitations.
- Decision making and approval processes – delays in accelerated decision making and approval processes leads to a delay in delivery of programme. Given the required in service dates decisions must be streamlined and made on time. There is no float available in the programme for any delay.
- Procurement & delivery – delivery within an accelerated timeframe constrains procurement and delivery options.
- Capacity and capability – the lack of capacity and capability, both internally and market resource, may result in the inability to deliver on time and within budget, (particularly in the construction and infrastructure sector relative to the various contract packages and timescales required).
- Delivery - an accelerated programme requires trade-offs within the project which may impact overall design and project outcomes.
- Governance and Risk Management – appropriate processes and controls are not established or cannot be created to fit with and oversee accelerated procurement

The top four Risks identified at initial risk workshops are:

- Consenting - inability to achieve legislation
- Operational - LRV fleet does not meet performance requirements due to need to fast track procurement
- Network Planning - Impact of LRT on traffic capacity on existing corridors and ongoing operation of the network
- Programme - Procurement timeframe for rolling stock

The key constraints that have been identified to date are:

System-wide

- Funding available in time for each phase of work
- Utilities diversions, including unknown utilities and agreements
- Procurement and delivery of LRV fleet
- Resolution of interface with other projects, including CRL
- Resolution of private property issues
- Resolution of regulatory issues through legislation for LRT operation
- Market capacity
- Streamlined decisions process
- Appropriate and cost effective interim arrangements for depot, testing and stabling that enable operations to commence

Wynyard Quarter to Civic Stop (section A)

- 220KV Transpower Cable on Fanshawe Street
- Maintaining traffic flow on Fanshawe Street, especially buses
- Mitigating the cumulative (CRL, LRT, other private developments) traffic effects during construction
- Interface with other works in Wynyard Quarter and in the city centre

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- Restrictions to private vehicle access in Queen Street and Wynyard Quarter
- Removal of private vehicles from Queen Street and Daldy Street
- Location of a terminal in Wynyard Quarter
- Location of a temporary maintenance facility in Wynyard Quarter

Civic Stop to Dominion Rd Junction (section B)

- Construction of Upper Queen Street bridge over Central Motorway Junction
- Construction of Karangahape Road underpass box
- Construction of Dominion Rd Junction and removal of flyover
- Proximity to heritage buildings and potential impacts from vibration and groundwater

Stoddard Depot to Dominion Rd Extn (section H)

- Land acquisition for depot site – other parties have advised their interest in the site
- Construction of Depot at Stoddard Road

More detail on constraints and risks can be found in the risk register in Appendix 4, which is being further developed and monitored with mitigation plans being developed in conjunction with the risk register.

8 Airport Access Option

The LRT option discussed in this report focuses on serving the city centre and Wynyard Quarter, with emphasis on providing a transport option by December 2020 for the America's Cup event. If the risks and constraints identified for the LRT option are considered insurmountable, the option still remains for the provision of airport access in time for the major events by implementing section G.

The current Airport Access Programme Business Case shows:

- 2017: SH20b/SH20 Puhinui Interchange capacity improvements - \$5M
- 2020: Improved links with rail network (inc Puhinui Interchange) - \$20-\$40M

Constraints and risks for this section are identified below with more detail in Appendix 4.

Airport to Puhinui (section G as BRT)

- Only high level route identification is available
- Land acquisition may be required
- Construction of Puhinui Interchange, including Kiwi Rail interface
- Construction of depot required
- New bridge required over the Pukaki Creek, note this also has significant consenting risk
- Resolution of Bus interchange with AIAL road network and terminal that future-proofs for LRT
- Mana whenua agreement required

Puhinui bus interchange capacity improvements will commence in 2017 as part of the Airport Access Programme Business Case, which will support public transport improvements between Puhinui and the airport. The works will be funded by the Transport Agency at a cost of \$5m. Total costs for acceleration are yet to be confirmed.

9 Next Steps

To progress with an accelerated plan that delivers the initial stage of the LRT system – Wynyard Quarter to Civic Stop (section A) and Civic Stop to Dominion Rd Junction (section B) by 2021 and appropriate depot, testing and stabling arrangements – the following steps need to be progressed with urgency:

Governance

- Confirm governance structure, including roles, functions and decision forum for the project

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- Confirm cost budget and timetable

Delivery Model and Procurement

- Identify, test and confirm project delivery model, including potential PPP procurement and contracting approaches, process and timeframes and interface with operations and asset ownership implications
- LRV Procurement – specification definition, vehicle manufacturer and fleet numbers for ordering
- Design Procurement – AT/AC to confirm in principle funding agreement/budget provision for detailed design for \$120m - \$150m (design and project team costs through to 2021 and including design for section C)
- Construction procurement – progress procurement of construction parties to have immediate design involvement in 2017 with Wynyard Quarter to Civic Stop (section A) and (subject to interim facility approach) the Stoddard Depot to Dominion Rd Extn (section H). Consider separate construction party for Civic Stop to Dominion Rd Junction (section B) for delivery by 2021.
- Undertake a market sounding exercise with selected manufacturers (rolling stock and systems) and constructors to determine resource capacity to deliver an LRT scheme.

Project Costs and Funding Implications

- Further define and confirm likely project costs (capital, whole of life and operational)

Detailed Design and Construction

It is proposed that scoping and progression of detailed design commence as soon as possible (and no later than October 2017) for operations commencing before and during the America's Cup (summer 2021), for the following priorities:

- Wynyard Quarter to the Civic Stop (section A).
- Civic Stop to Dominion Rd Junction (section B) and in particular the structures at Karangahape Road, Upper Queen Street and Dominion Rd Junction.
- Airport to Puhinui interchange (section G) and its maintenance facility, proposed as a bus-based solution.
- All services relocations in Wynyard Quarter to the Civic Stop (section A), Civic Stop to Dominion Rd Junction (section B) and Airport to Puhinui interchange (section G).
- Systems design (rolling stock, track, power, communications, etc) for Wynyard Quarter to the Civic Stop (section A), Civic Stop to Dominion Rd Junction (section B)
- Appropriate depot, testing and stabling facilities that ensure interim operations (including fleet maintenance) can be delivered. This could include a stabling and maintenance facility at Wynyard Quarter and depot facilities at Stoddard Road
- Progress detailed design for Dominion Rd Junction to SH20 (section C) with lower level of priority
- Confirm infrastructure construction strategy

Consenting and Acquisition

- Confirm consenting pathway
- Confirm property impacts and budget required for acquisition

Confirm Operations and Systems Requirements

- Stop location, service demand and frequency, hours of operation, journey time, traffic signal prioritisation, LRV specification and fleet size

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Resourcing and Related Budget

- Confirm resource plan and related budget

Enabling Legislation

- Enabling legislation – clearly defining the functions, roles and responsibilities for the entities involved and clear directives for decision-making
- Liaise with and seek support from Council to achieve the necessary regulatory approvals for design and construction

Stakeholder Engagement and Communications

- Communications and stakeholder management strategies

Appendix Number	Description
1	Confidential Memo for Accelerated Mass Transit Requirements by December 2020
2	Map of route and sections for proposed A2C LRT network
3	Developments along the route
4	Risks table
5	Mass Transit memo to Minister of Transport
6	Accelerated Programme
7	Project Assumptions

Appendix 1: Confidential Memo for Accelerated Mass Transit Requirements by December 2020

Memorandum

To: The Mayor of Auckland
CC: AC Chief Executive – Stephen Town
ATEED Chief Executive – Brett
From: AT Chief Executive – David Warburton
Group Manager Investment and Development – Aimee Barwick
Date: 25 July 2017
Subject: **CONFIDENTIAL MEMO FOR ACCELERATED MASS TRANSIT REQUIREMENTS BY DECEMBER 2020.**

Executive Summary

This memo provides high-level thinking that outlines options for the development of the mass transit network for the airport to city centre (A2C) corridor, including a potential fast-track option that would see a mass transit solution operational by December 2020 should there be an opportunity to progress earlier than the current programme.

Three potential scenarios have been developed as part of this preliminary exercise of evaluating delivery options. If the timeframe were to be fast-tracked, AT considers the optimal mode for this corridor to be light rail (LRT) and is looking at a staged programme and delivery approach for LRT as the preferred mass transit solution.

Under the current mass transit programme a joint business case is being developed in collaboration with AC, AT, and NZ Transport Agency (NZTA). The business case is programmed to be completed end of 2018 and includes a transition study to further understand how to progress from current bus services to light rail.

In addition, the Auckland Transport Alignment Project (ATAP) is being reviewed in coming weeks under the new growth Scenario I11, which has highlighted that growth is occurring faster than previously modelled and may identify the need for earlier investment in infrastructure. A revised indicative package of first decade projects and the associated funding gap is currently being worked through.

This memo outlines at a high level the decisions, requirements and works that would need to commence in the 2017 calendar year to enable an accelerated delivery programme should a fast-tracked solution be progressed. A more detailed report will be available within the next two weeks.

Background

In 2017, the AT and NZTA boards passed a resolution confirming the progression of a business case for route protection for the A2C corridor, which was to include a study on the transition between the current bus service options to light rail, with a potential bus rapid transit solution in the interim. The mass transit project team has been progressing the scope of the business case and it is currently programmed to be completed by the end of 2018.

In 2021 Auckland will be hosting APEC. As part of ATAP and AT's requirements to manage the transport system for large scale events AT has looked at which mass transit solutions could be advanced to respond to any proposed early investment from this opportunity. In addition, with the recent success of Team NZ winning the America's Cup, AT is also considering which transport requirements are necessary for Auckland to host such an event coupled with APEC. The project team has prepared some scenario options based on the assumptions that if Auckland were to host the America's Cup, the regatta would occur in February/March 2021, signalling that the city centre component of a LRT system would need to be operational before December 2020 to ensure adequate time for systems and fleet testing, safety auditing and quality assurance.

Memorandum

Context

Figure 1: Potential project scenarios

Scenario	Programme for operational system	Business Case	Commencement	Procurement	Staging	Requirements
Scenario 1 Accelerated programme is to deliver key stages by Dec 2020. Stages are still being worked through however thinking is currently routes A, B and G. (see map below)	3 years	Fast-tracked	Early works 2017	Fit for purpose	Determined by condensed timeframe	Enabling legislation to fast track decision making, procurement and delivery
		No bus to LRT transition study		Determined by enabling legislation		
Scenario 2 Continued extension of scenario 1 to complete rest of A2C post Dec 2020. Route C, D, E and F (see map below)	5 years	Streamlined as determined by key Crown decisions	Early works 2017	Standard procurement model with exceptions for early works	Determined by Crown directive	Crown directive
					Expected to be one stage - A2C	
Scenario 3 Current programme and business case to be delivered by 2024/25. Complete route from Airport to City.	7 years	Route protection A2C	Once business case is signed off	As determined in business case	Construction methodology and staging determined by business case	Crown and Council sign off of business case
		Includes bus to light rail transition study				
		Complete by end 2018				

Summary of Scenario 1 Accelerated Programme

Delivery and staging options under examination (Figure 2 on following page)

The mass transit project team is currently examining staging options in order to understand the extent to which a system is deliverable in the timeframe and to establish the construction impacts and effects. The options have been developed to minimise land take, including at the depot sites, in order for the operational delivery to be feasible.

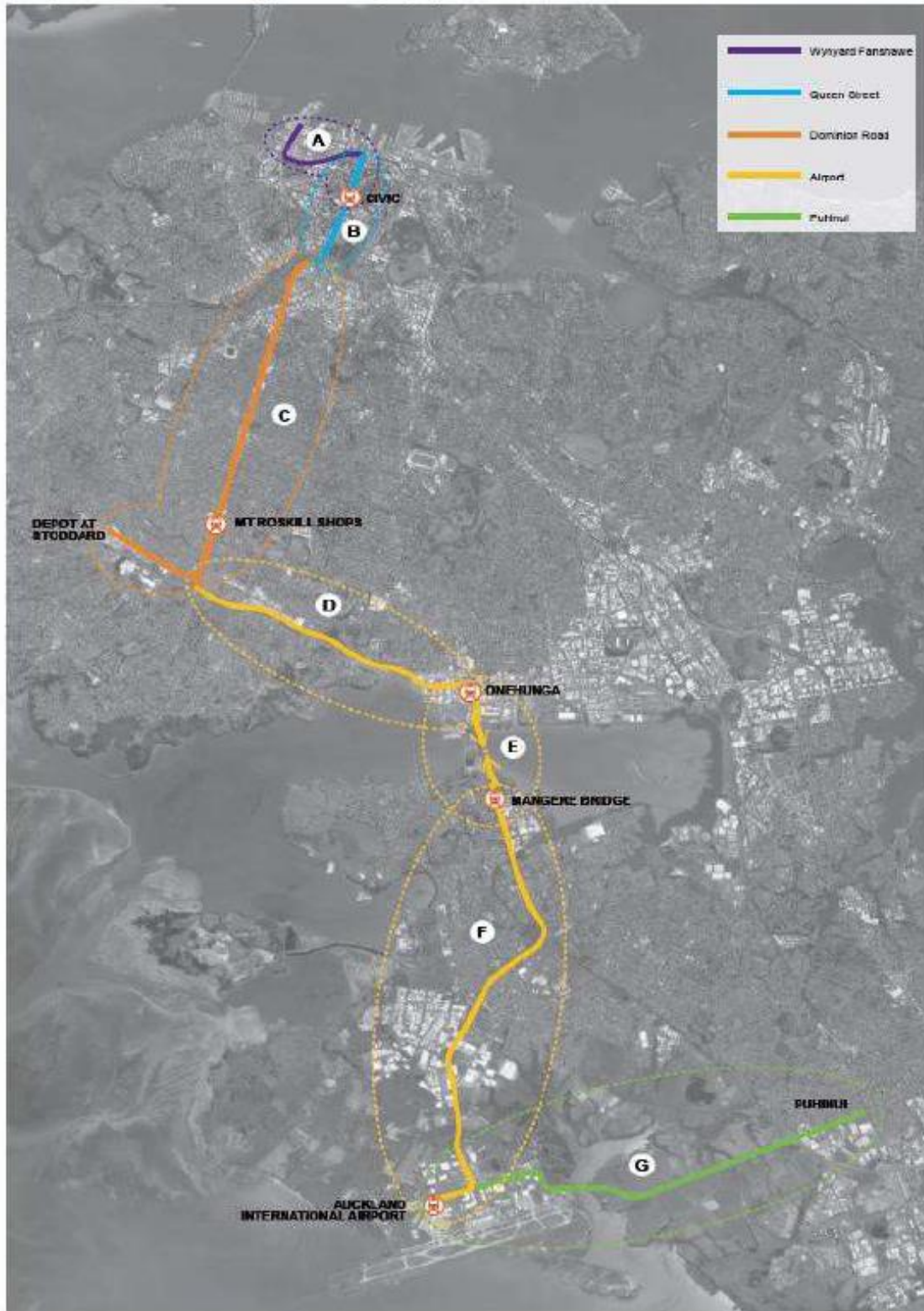
More detail will be available in coming weeks, however it is considered that only sections of A and B could be constructed in the timeframe and a depot built at the Dominion Road interface sections of A and B.

The route has been divided into sections for this purpose and is highlighted in Figure 2.

There are a number of underlying assumptions that underpin these options, in addition to those outlined below.

Memorandum

Figure 2 – LRT route and potential staging options



Memorandum

Enabling legislation

In order to have a light rail system operational by December 2020 the project would require special legislation in order to expedite the timing of its implementation. Previous examples of legislation that has fast-tracked projects for major events include the previous America's Cup and the Rugby World Cup legislation, and the establishment of CERA in response to the Christchurch earthquake.

The objective of the legislation would be to allow timely acquisition, procurement, consent and regulatory approvals necessary for the America's Cup, which will ensure implementation of infrastructure, including light rail, could take place at short notice. The legislation would be temporary and not look to alter the criteria for consenting decisions, but to accelerate the decision-making and approval processes.

Broadly, the requirements considered essential for enabling legislation include the need to be project specific with clear objectives and timeframes for delivery. It should be drafted to accelerate delivery and use the basis of existing legislation related to consenting, Public Works Act (land acquisition) and procurement with key amendments to streamline the process and accelerate timeframes under a fit for purpose legalisation. The legislation will also need to clearly define the functions, roles and responsibilities for the entities involved and clear directives for decision-making.

It is noted that operational legislation for an LRT system would need to be a fit for purpose enduring legislation as previously discussed with the Minister of Transport, however would need to be progressed with urgency.

The project team is working on more detail regarding potential requirements for enabling legislation, which includes, among others, acquisition, consenting, design, operational and procurement considerations.

Business case

The current programme for the mass transit project is currently progressing the business case for route protection, which includes the transition study. Any fast-tracked LRT solution would need to be advanced without a business case completed. However, the consenting requirements would justify the options and provide a robust evaluation to meet the threshold tests for the project. In essence, the fast-track solution would be underpinned by a feasibility study, scheme assessment, assessment of effects and a robust procurement method. This would be in line with how infrastructure was delivered pre the business case approach that is required today.

Land Use and Development Opportunities

There are land use and development opportunities that an expedited LRT timeframe might enable for urban development across a number of sites such as Wynyard Quarter, Silo Park, and Dominion Road.

Early investigations have looked into at-grading the Dominion Road flyover, which is in the immediate vicinity of the redevelopment of the Mount Eden train station planned as part of the City Rail Link project. This redevelopment is expected to be carried out within the next three-year time period and provides potential value capture opportunities for the mass transit project and any other projects carried out by the Auckland Council family. The Plans and Places team (AC) is progressing their programme and working together with the project team to ensure the two organisations are taking a joint approach to this area.

A fast-track solution would provide the opportunity to advance all of these construction and development outcomes simultaneously with CRL. This could provide for a significant regeneration opportunity in this area of the city. The potential Urban Development Authority legislation could provide for this fast-track approach in the urban development space.

Procurement

Any procurement methodology adopted by the project will require involvement and cooperation with NZTA and would potentially need to be an alternative method to the traditional procurement methods used by the agencies. In order to successfully carry out the procurement process in the timeframe, the project would require allowances under enabling legislation.

Memorandum

Under the current mass transit programme AT has considered the use of a Public Private Partnership (PPP) delivery mechanism. In consideration of the fast-track solution a PPP procurement method is unlikely to be achievable due to the timeframes required for this procurement option.

A more conventional contractual mechanism is considered appropriate to deliver the major works packages proposed for the project. These include:

- **Alliance** – this contract form gives both parties an incentive to achieve an early completion. Potentially also requires less tender documentation compared to PPP and other forms of agreement
- **Design and Construct (D&C)** – this contract generally gives the most competitive bidding and price control. In this case an immediate commitment to preparing detailed tender documents would be essential.

Indicative Costs

The cost estimates in the table below are based on existing project estimates.

Sections	Indicative Cost
A (including Civic Stop)	\$360m - \$400m
A + B (including New North/Dominion Stop)	\$620m - \$680m
G	\$TBC

Please note, these costs do not include paying a premium for acceleration and other cost adjustments pending further design development, construction methodology and final numbers associated with rolling stock requirements. Revised costs will be included in the detailed report in next few weeks.

Procurement of rolling stock

It would be necessary to commence tendering for light rail vehicles (LRVs) by October 2017 to ensure that the sufficient number of vehicles were ready in time for 2020. The procurement of rolling stock is part of the critical path for an accelerated delivery.

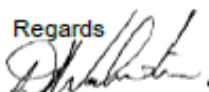
Decisions required by year end 2017 for 2020 delivery:

- Enabling legislation - clearly defined the functions, roles and responsibilities for the entities involved and clear directives for decision-making.
- Procurement – vehicle manufacturer and fleet numbers for ordering, procurement model and coordination, separate procurement opportunities for different sections of route
- Preferred staging option
- Airport agreement re alignment and terminus design
- Operational requirements – stop location, service demand and frequency, hours of operation, journey time, traffic signal prioritisation, fleet size
- Design requirements – stop design, road design, corridor allocation.

Conclusion

An updated report will be provided as more information is obtained.

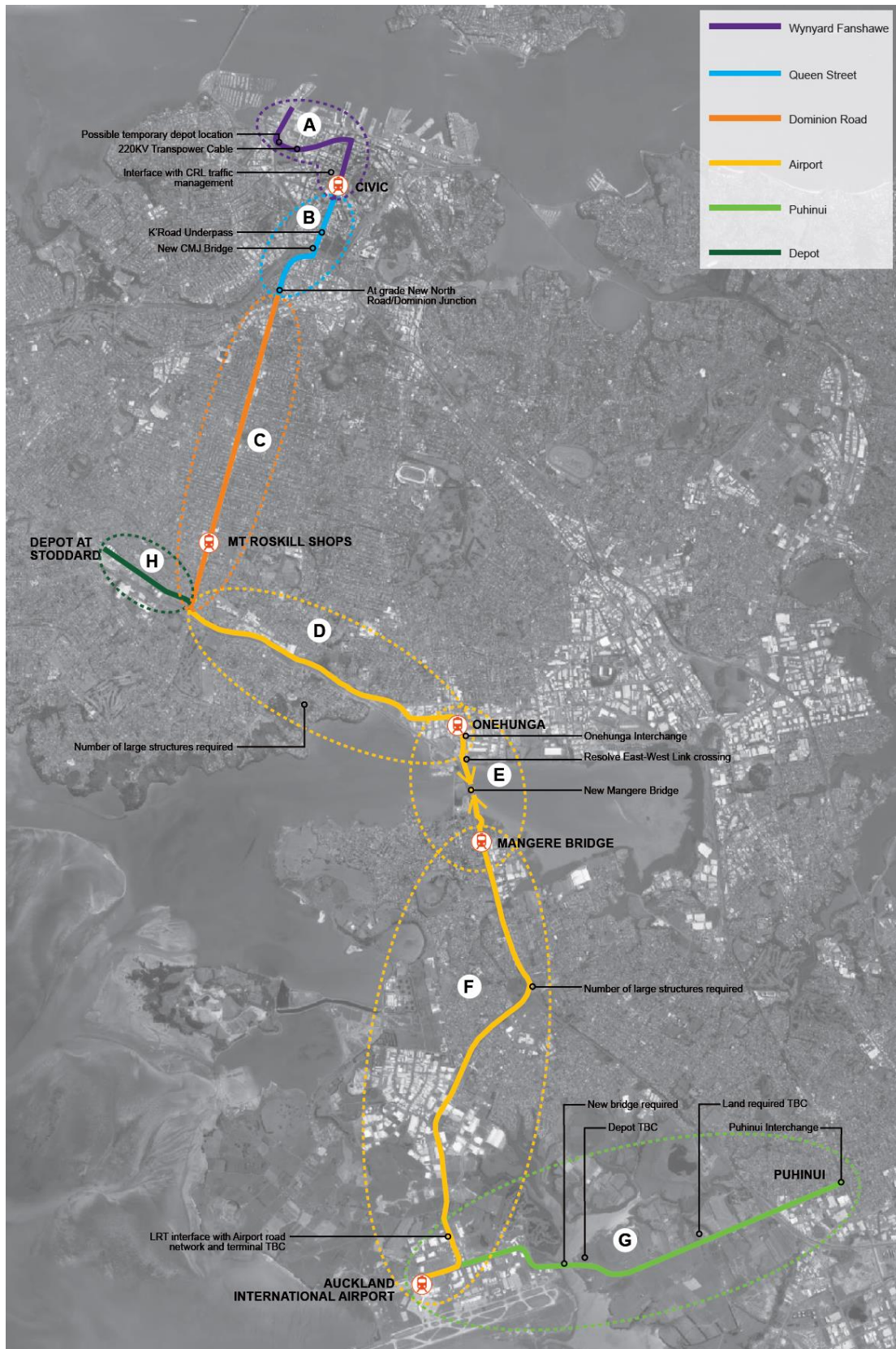
Regards



David Warburton
CHIEF EXECUTIVE

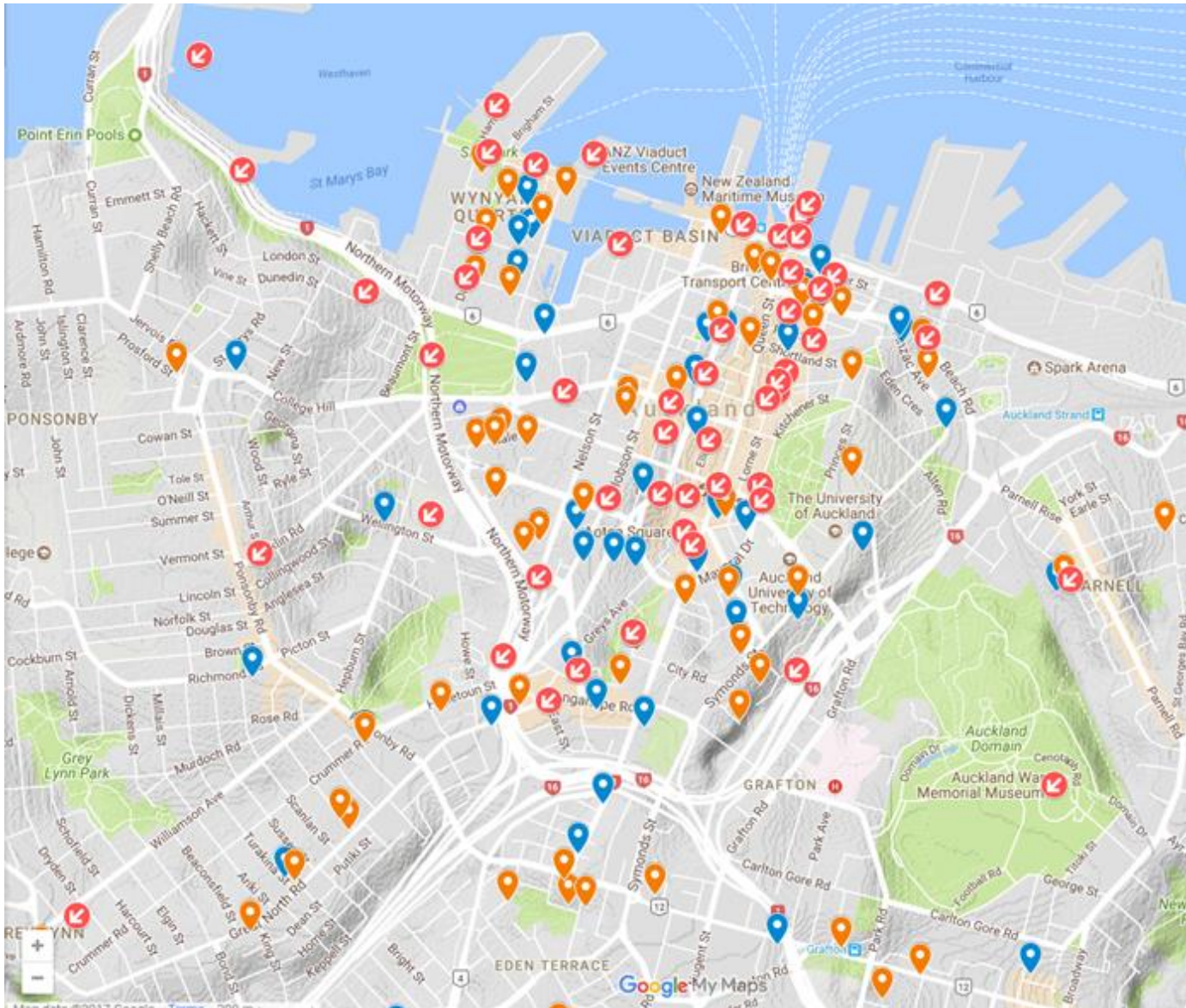
Appendix

Appendix 2: Map A2C



Appendix 3: Developments along the route

1. There are 75 private developments under construction in the city centre and fringe and 51 developments proposed.
2. Over the next 10 years \$10 billion of private sector investment in infrastructure and \$4 billion of public sector investment is committed to developments in Auckland. All of these developments would greatly benefit from improved public transport.



City centre developments – source Emerging Auckland

3. The vision for the Wynyard Quarter area is a mix of residential, retail and commercial development. When the area is fully developed in 2030, it will be home to around 3000 residents and 25,000 workers. Some of New Zealand's biggest companies have already moved to the Wynyard Quarter area: Air New Zealand, Fonterra, Datacom and ASB Bank.
4. Thirteen sites are live, with two office buildings and two new apartment blocks under construction. The following developments are either planned, or recently completed:

- 500 – 600 new apartments, town houses and duplexes in the central area of Wynyard Quarter, with the first homes to be completed by early 2018
- 48,000m² of commercial space in the centre of Wynyard Quarter, including GridAKL – a new innovation precinct
- A flexible co-working space for startups, SME's and corporate incubators in Madden Street
- ASB Waterfront Theatre, a 650-seat theatre that opened in September 2016
- Park Hyatt on the western edge of the Viaduct harbour. The Park Hyatt is expected to be completed by 2018. Close by the Fu Wah hotel is also being planned
- Wynyard Point (the “tank farm”) is to become a large public space including parkland, plazas and a signature public building
- The Wynyard Marine site is earmarked as a superyacht refit facility
- Westhaven Marine Centre.

Other city centre developments

- The Civic Administration Building is being refurbished and will include residential apartments and food and beverage facilities. There will also be a new apartment building on the Greys Ave-Mayoral Drive corner, a new boutique hotel on Mayoral Drive and a performance space fronting Aotea Square. The refurbishment of the CAB building is expected to start in early 2018 and take up to three years
- Restoration of St James Theatre, 57 Lorne Street
- The NZ International Convention Centre, 66 Wyndham Street, scheduled to open in 2019, which is designed to accommodate up to 4,000 people
- The NDG Tower, Elliot and Albert Streets, a 209 metre 52-storey tower which will house a mix of apartments, a hotel and shops
- 1 Mills Lane, a 30-level tower capable of housing over 4000 workers, with shops and a hotel. Due to be completed at the end of 2018
- Commercial Bay, a 36-level glass tower with 37,000 square metres of office space on Queen Elizabeth Square at the bottom of Queen Street
- Britomart is scheduled to get a \$100m investment in a new office tower
- 1 market Square, a new 165 room hotel
- Downtown centre, 11–19 Customs Street West, a 36-level retail and office space
- The Pacifica, 10 Commerce Street, a 57 story luxury residential building due to finish by September 2020. The building will be New Zealand's highest residential tower
- Union Green, 39 Union Street, a 150-unit apartment complex.

Dominion Road

The development of a Council-owned site at 198-222 Dominion Road and 113-117 Valley Road, Mt Eden. The construction of four buildings, including 102 apartments, ground-level retail space and more than 100 basement car parks.

Appendix 4: Risks

IDENTIFY					ANALYSE		
Row Ref	Risk ID	Risk Category	Filter	Risk Title	Effect/Impact	Risk Score	Risk Level (Rating)
1	4	Consenting	A2C Global	Inability to achieve special legislation for acceleration	Leads to inability to deliver programme of works; unintended consequences; inappropriate / ineffectual scope.	25	Very Large Threat
2	27	Operational	ABC+H	LRV fleet does not meet performance requirements due to need to fast track procurement	Poor performance of rolling stock. Reputation damaged (AT & Govt); LRV doesn't deliver; LRV not suitable for future stages. Late arrival of rolling stock. Stage 2 A2C cancelled.	25	Very Large Threat
3	39	Planning (Transport, etc)	ABC+H	Impact of LRT on traffic capacity on existing corridors	Reduced traffic capacity, negative stakeholder/public feedback. Impact on bus transport.	25	Very Large Threat
4	44	Strategic	A2C Global	Procurement timeframe for rolling stock too short	Critical delay to achieving project commissioning and operating objective.	25	Very Large Threat
5	10	Utilities	A2C Global	Unknown scope and scale to divert existing utilities in time for accelerated programme	Impact on programme delivery and significant costs.	20	Large Threat
6	12	Stakeholder & Comms	ABC+H	Impact of LRT to amenities - stakeholder and community dissatisfaction	Program; Reputation; Quality; Cost.	20	Large Threat
7	20	Consenting	ABC+H	More than anticipated mitigation requirements on surrounding network	Traffic mitigation requirements temporary or permanent. Programme and cost impact to implement mitigations. Reputational impact. Potential for other project consent condition amendments.	20	Large Threat

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8	1	Approvals / Governance	A2C Global	Lack of appropriate governance to make effective decisions for acceleration programme	Lack of/delay in funding and delay in decision making. Delay in hitting milestones. Inability to deliver project (accelerated).	16	Large Threat
9	9	Interface	ABC+H	Interface and impact of other construction projects (e.g. CRL, major construction projects locally/regionally)	Conflict/clash/lack of alignment – catastrophic PT operations. Missed opportunities.	16	Large Threat
10	2	Strategic	ABC+H	Procurement model trade-offs. An ability to accelerate programme requires different risk allocation considerations	Cost/time interface risk. Outcome. Unintended consequences loss of flexibility especially future extensions. Funding (options). Quality. Reputation. Need for rework/redo. Poor integration of packages.	15	Large Threat
11	6	Property	ABC+H	Inability to acquire required land (temporary and permanent) to deliver the project which impacts on acceleration programme	Inability to secure land – in time to meet programme requirements; flow on -> project compromises. Project compromises – short term; long term. Cost.	15	Large Threat
12	16	Strategic	A2C Global	Insufficient market capacity and capability of designers and constructors to deliver the accelerated programme	Programme delay, unable to achieve desired quality and disbenefits with the lack of healthy competition. Increased project cost.	15	Large Threat
13	36	Operational	ABC+H	Compressed timeframes for testing and commissioning to meet accelerated programme - poor or unsafe functionality	Additional delays, cost and reputation. (e.g. Waterview)	15	Large Threat
14	35	Design/Construction	B: Queen Street	Challenges with existing structures such as the NZTA bridge on upper Queen street over the CMJ or underpass under K-Road	New dedicated LRT bridges are required on a separate alignment. Location of the CRL tunnels may impact pier locations. Mitigation works may be required on NZTA state highway 1 and 16.	15	Large Threat

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15	41	Design/ Construction	B: Queen Street	Construction of New North/Dominion junction and removal of flyover	Approval, removal and construction take longer to complete than expected and cause greater impacts on customers during removal/construction.	15	Large Threat
16	3	Finance	G: Puhinui	Inconsistent strategic approach for Airport to Puhinui and Botany if route delivered for accelerated programme	Reputation. Cost including sunk cost. White elephant. Compromised long term – including cost commitment.	12	Moderate Threat
17	15	Design	A2C Global	Insufficient value engineering if accelerated programme drives other outcomes	Cost increases above budget	12	Moderate Threat
18	24	Operational	ABC+H	The transition of existing bus services to LRT is poorly managed within an accelerated programme	Unhappy customers, damaged reputation.	12	Moderate Threat
19	29	Design	ABC+H	Failing to achieve required priority service levels of max 4% max delay at signals as stated in OTOR	Light rail operational service does not achieve journey time of 25 minutes for Stage 1, or 45 minutes for Stage 2 (A2C). Reputational risk.	12	Moderate Threat
20	37	Operational	ABC+H	Poor control centre integration of LRT functionality	Inefficient LRT Operations. Additional delays, cost and reputation.	12	Moderate Threat
21	32	Design	H: Depot	Proposed depot site may not be suitable and/or cause ongoing operational issues to meet an accelerated programme	Delays, additional costs, rework, the system cannot operate effectively.	12	Moderate Threat
22	13	Design	A2C Global	Standards and specifications adopted do not meet project objectives. An accelerated programme may require greater departure approvals	Significant cost for land take, reputational damage, resistance from internal and external stakeholders.	10	Moderate Threat
23	14	Design	ABC+H	Poor urban design outcomes if accelerated programme becomes the priority	Poor urban design outcomes lead to reputation and quality legacy issues. Rework required. Project objectives not achieved.	10	Moderate Threat

Appendix

24	17	Funding	ABC+H	Inability to secure funding for project	Delay in programme, project unable to proceed.	10	Moderate Threat
25	21	Design	A2C Global	Inability to finalise the design due to ongoing technical and performance issues that aren't able to be resolved in the NZ context	Cost increases due to rework and substantive changes to the design and quality is reduced due to a lack of consistency	10	Moderate Threat
26	19	Approvals / Governance	ABC+H	Delays with Approvals - particular for the accelerated programme	Programme impact, timeliness of decision.	9	Moderate Threat
27	7	Consenting	ABC+H	Inability to obtain required consents to start construction	Project delivery is compromised – time; cost; suboptimal outcomes e.g. design.	8	Moderate Threat
28	8	Stakeholder	ABC+H	Lack of stakeholder (exclude public) support/buy in	Reputation. Public opposition. Compromised long term outcomes. Burn political capital. Could scupper the project if support is critical.	8	Moderate Threat
29	18	Strategic	A2C Global	Political uncertainty around the scope and extent of a system under an accelerated programme	Project delay, scope change, project stopped.	8	Moderate Threat
30	26	Operational	ABC+H	Unable to obtain license in an accelerated programme to operate LRVs on road network.	LRT operator is refused a license; unacceptable caveats make operations untenable.	8	Moderate Threat
31	28	Operational	ABC+H	Standard Operating Procedures late or inadequate	SOP late or inadequate; poor operational outcome with inadequate responses to operational requirements.	8	Moderate Threat

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32	5	Strategic	A2C Global	Accelerated project compromises long term outcomes - legacy / white elephant	Sub- optimal outcomes – short term; long term. Lost opportunities 'white elephant'. Need to go back to redo (cost time). Reputation risk. Abandoned infrastructure (sunk cost).	6	Moderate Threat
33	43	Design	B: Queen Street	Stormwater and flooding issues in Lower Queen St which cannot be resolved adequately under an accelerated programme	Impacts to properties.	6	Moderate Threat
38	34	Utilities	A: Wynyard Fanshawe	Transpower cable on Fanshawe Street to be protected/relocated quickly	Traffic impact delays to PT corridor	12	Moderate Threat
34	42	Consenting	A2C Global	Construction and operations noise and ground borne vibration impact	This will require mitigation measures to be implemented at specific locations. Specific design or construction methodology will need to be considered. These all lead to increased project costs.	4	Low Threat
35	30	Strategic	A2C Global	The uncertainties about the effect of emerging or unproven technology in an accelerated programme versus future technologies	Project delays and approvals. Redesign effort.	3	Low Threat
36	33	Planning (Transport, etc)	A2C Global	Risk that design decisions are made which inhibit the opportunity to achieve land use integration/ TOD opportunities	Delays and additional costs	3	Low Threat

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37	33	Planning (Transport, etc)	A2B Botany	Patronage either exceeds or is less than forecast - assumptions either too optimistic or conservative which means LRT to be delivered on the A2C corridor to relieve demand or look for alternative route	Loss of reputation due to perceived or actual poor investment decision. Infrastructure is under or over sized for actual demand	2	Low Threat
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Appendix 5: Confidential Mass Transit ministerial discussion memo

2 March 2017

Mass rapid transit – scope of Ministerial discussion

Background:

In summary, the proposed mass rapid transit (MT) system involves [the development of high-capacity public transport system, primarily connecting Auckland Airport and areas of south-central Auckland with the central city, that complements the rail and bus public transport systems]. The available options for the proposed MT system are light rail transit (LRT) and bus rapid transit (BRT). Both LRT and BRT involve a physically-separated dedicated public transport corridor within or alongside either local roads or state highway.

The Boards of Auckland Transport and New Zealand Transport Authority support the progression-through-mode approach (ie, the [staged, integrated] transition from BRT to LRT [along the preferred "Airport to City" route] to accommodate increased patronage) rather than a simple dichotomy of either LRT or BRT.

The issue:

1. AT may establish bus lines using road markings only. However, the statutory powers of Auckland Transport do not provide an effective mechanism for the development and operation of the proposed MT system, whether LRT or BRT. It appears that NZTA may have a similar difficulty in relation to the section of the MT system for the Airport link along SH20.
2. The only available mechanism for Auckland Transport for the development of the MT system is the road stopping procedure under the Local Government Act 1974 (LGA 1974). This is because:
 - (a) the MT system involves a physically separated dedicated corridor within the road that is available only to light rail vehicles/buses;
 - (b) the road stopping procedure under the Public Works Act 1981 is unlikely to be used by LINZ because of the wider public interest. This alternative procedure does not involve public consultation or objection rights.
3. Although the Land Transport Rule – Traffic Control Devices 2004, the Land Transport (Road Users) Rule 2004 and the Auckland Transport Traffic Bylaws 2012 each contemplate special vehicle lanes (for LRT vehicles and buses), there is no statutory authority (in the Land Transport Act 1998 or other legislation) for Auckland Transport to regulate the operation of a MT system, other than using bus lanes identified by road markings only.
4. If the [longer-term] preferred option for the MT system is LRT, and the mechanism used for establishing the dedicated vehicle lanes is a road stopping, then:
 - (a) the light rail vehicles will not be "light rail vehicles" for the purposes of the Railways Act 2005 or the Land Transport Act 1998. Instead, the vehicles (and the system) will be ordinary heavy rail, as a "light rail vehicle" does not include such a vehicle while it is on a railway line that is not a road;
 - (b) the light rail vehicles will not be "vehicles" for the purposes of the Land Transport Act 1998, because the vehicles will be "rail vehicles" under that Act;
 - (c) Auckland Transport's bylaw-making power under the Land Transport Act 1998, which would otherwise be used to establish special vehicle lanes, does not apply to any railway over or on a road. NZTA used its bylaw-making powers to establish the Northern Busway. However, it appears that this was possible because the Northern Busway was not existing State highway or road.
5. Similar to Sydney, Auckland Transport would require specific authority to develop and operate a separated dedicated MT system, whether light rail or buses, without the requirement to stop roads

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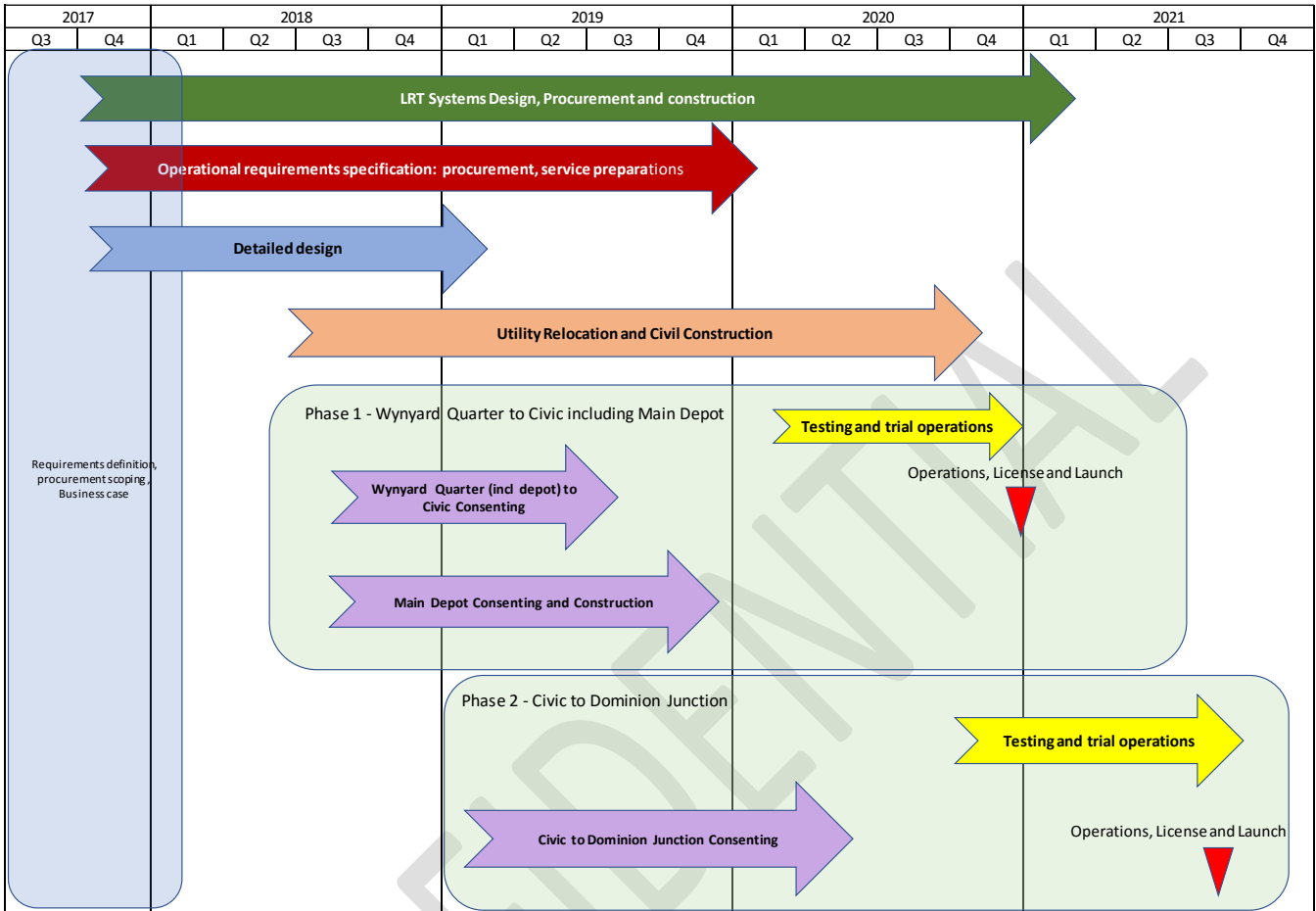
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using the ordinarily available LGA 1974 process. NZTA does not have the statutory authority to stop a State highway.

Principal areas for law reform:

1. Specific authority for Auckland Transport for the development and operation of the MT system, including financing and the use of a PPP/concession model, without the requirement for road stopping under the LGA 1974 or the Public Works Act 1981.
2. Modification of the Railways Act and the Land Transport Act to deal with the interface between road and a dedicated MT corridor (whether light rail or bus) and to enable licensing and regulation of light rail systems and operations.

Appendix 6: Accelerated Programme



Appendix 7: Project Assumptions

<p>System-wide</p>	<ul style="list-style-type: none"> The market will have capacity to deliver on this programme, including for design, construction and systems/rolling stock Legislation will be implemented by Feb 2018 that allows licencing/legalisation of LRT and fast track consenting and acquisition powers.
<p>Assumptions for: Wynyard Quarter to the Civic Stop (section A)</p> <p>Civic Stop to Dominion Rd Junction (section B)</p> <p>Stoddard Depot to Dominion Rd Extn (section H)</p>	<ul style="list-style-type: none"> Funding is confirmed concurrently for sections A, B and H, appropriate maintenance requirements are in place, and systems/rolling stock for A, B and H are done as one contract/order Section A and B will only operate as a standalone network for 9-18 months, after which time section C will be completed and operational, removing the need to transport bogies between the depots. An appropriate temporary maintenance facility site will be found and acquired in Wynyard Quarter. Confirmation of construction and rolling-stock funding will be made by February 2018, including section B, as per timeframe outlined in the attached programme Dominion Road Junction flyover is at-graded, and the site will be used as a construction yard NZTA will agree to having a new bridge over Central Motorway Junction and agree to a basis of design for LRT structures KiwiRail and NZTA will provide the necessary land alongside the SH20 corridor to enable section H to be constructed General traffic will be removed from Queen Street north of Mayoral Drive The cumulative traffic impact (including bus network impacts) in the city centre will be manageable, including the effects expected from CRL's ongoing construction The depot is confirmed to be located at Stoddard Road, although other sites may have been preferred if time constraints were removed.
<p>Assumptions for: Dominion Rd Junction to SH20 (section C)</p>	<ul style="list-style-type: none"> Section C is considered unfeasible in the required timeframe as there is high delivery and stakeholder risk
<p>Assumptions for: Denbigh Ave to Onehunga (section D)</p> <p>Onehunga to Mangere Bridge (section E)</p>	<ul style="list-style-type: none"> Consenting a new bridge over the Manukau Harbour will not be achievable in the necessary timeframe – ruling out section E and F In order for section D to be constructed, Onehunga would need a Train/Bus/LRT interchange requiring acquisition,

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<p>Mangere Bridge to Auckland Airport (section F)</p>	<p>realignment of the existing rail station and relocation of bus stops</p> <ul style="list-style-type: none"> • Constructing section D at the same time as section A, B, C and H is possible, however it may impact on the market's capacity to deliver on those other sections.
<p>Assumptions for: Airport to Puhinui (section G)</p>	<ul style="list-style-type: none"> • Section G will be progressed as a bus-based option • Bus/LRT interchange at the Airport agreed and designed • New bridge over Pukaki Creek will be consented and mana whenua approval provided. • AT must reach agreement with AIAL regarding road/LRT/stop/terminal design by Q1 2018 • Appropriate depot site will be found and acquired • The design/investigations for this section will not identify any further critical constraints not yet identified • Crossing SH20 is achievable without major structural modifications/works • Constructing Puhinui Interchange is achievable within the available 'block of line' periods between Q3 2018 and Q1 2021.

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