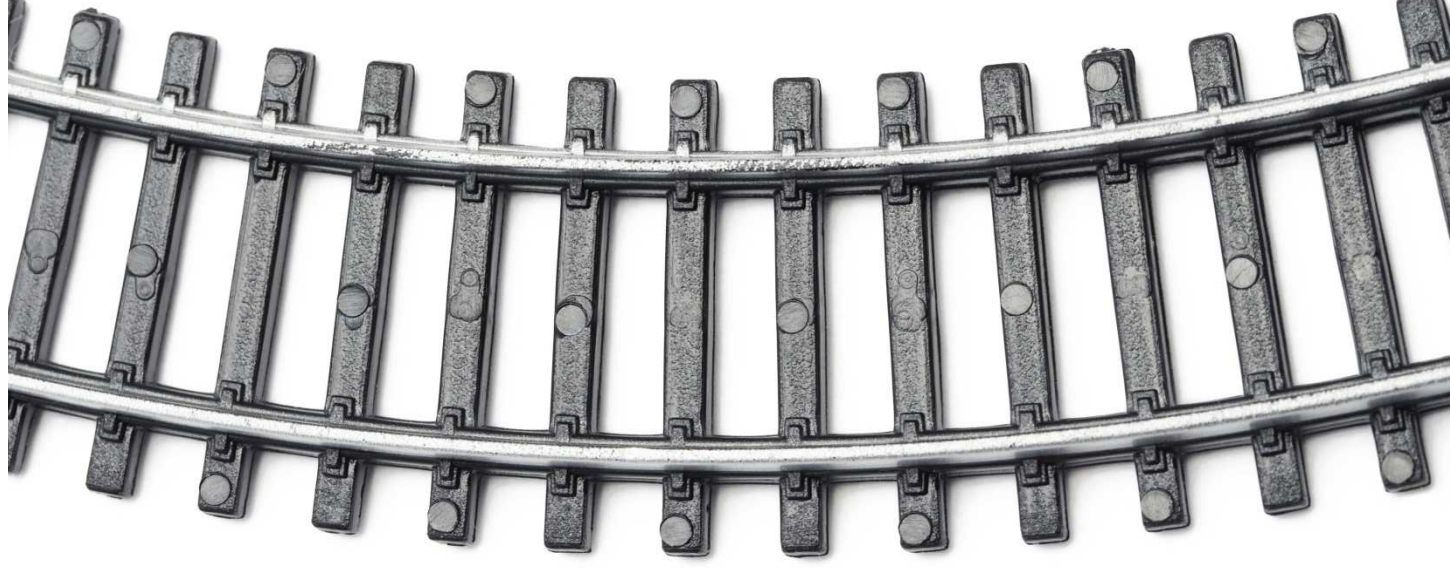


**Deloitte.**

Auckland Transport

Growing Public Transport  
Patronage by 2022

November 2013



# Contents



## Executive Summary

Background behind patronage 'goals'	Slide 4
Executive summary	Slide 5
Our approach	Slide 6
Public transport "patronage" defined	Slide 7
Patronage and cost projections	Slide 8
Key modelling insights	Slide 9
Patronage projections from comparable jurisdiction analysis	Slide 10
Key research insights	Slide 11
Options for Phase Three	Slide 12
Bridging the gap	Slide 13



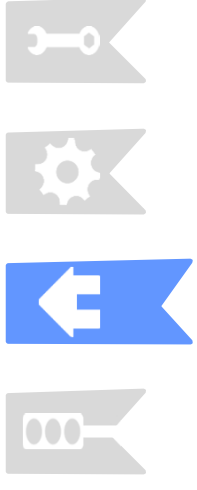
## Detailed Report

Phase Two approach	Slide 15
Initiatives baseline	Slide 17
Empirical research	Slide 21
Patronage modelling	Slide 30
Financial modelling	Slide 37
Gap analysis	Slide 42



## Appendix

Empirical research by jurisdiction	Slide 47
Patronage modelling assumptions	Slide 59
Patronage modelling scenarios	Slide 73
Financial modelling detail	Slide 82
Sources	Slide 85



# Executive Summary



## Background behind patronage 'goals'



**“We want to see transit movements go from 63 million a year, as it stands this year, to 150 million a year in 10 years time.”**

**Len Brown, 17 January 2011**

**“The target is to double public transport boardings  
(from 70 million to 140 million) by 2022.”**

**2012 – 2041 Integrated Transport Programme, March 2013**

# Executive summary



Early in 2011 the Mayor of Auckland set an aspirational target to double transit movements on public transport in Auckland by 2022. Auckland Transport measures public transport patronage by boardings and is considering how these can be doubled within the timeframe outlined by the Mayor, Len Brown.

Initial patronage modelling performed by Auckland Transport (AT) looked at the implied land use changes and other economic factors, together with other transport investments which would need to occur in order for 140m passenger boardings to be achieved in 2022.

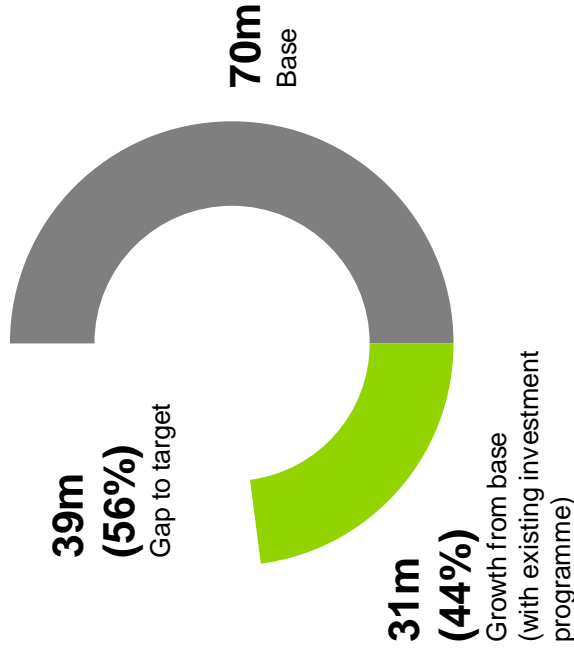
This report considers the patronage growth that is expected from the current planned projects (both funded and unfunded) within the 10 year horizon. It has been based on an updated view of macroeconomic factors based on past experience in the Auckland region, which will drive public transport patronage. The patronage forecasts have been generated using Auckland Transport and Auckland Council's existing transport and land use models and comparing the results produced with actual patronage growth achieved in cities similar to Auckland that have undertaken similar transport investment programmes.

This analysis indicates that Auckland Transport's current planned and prospective investment programme, even if all planned initiatives were fully funded, may result in around 101m boardings in 2022. This represents a growth rate of approximately 44% on current patronage levels if all AT's current planned projects are implemented within a 10 year window.

This maximum patronage forecast is broadly in line with ~103m boardings projected in the 2012 -2022 Auckland LTP.

What does this mean?

- In order to reach the maximum forecast patronage, with the current investment portfolio, Auckland Transport would need all proposed projects to be implemented on time and to requirements.
- A maximum patronage level of ~92m boardings would be in line with the growth from similar initiatives implemented in comparable jurisdictions. upper end of what we consider achievable with the current investment programme.
- Additional investments would be required for Auckland Transport to increase patronage above ~100m boardings. This is the upper end of what we consider achievable with the current investment programme.



5 Note that 44% growth is relative to a 70m base, anticipated growth is 54% relative to 2011 boardings. Note: the gap has been calculated using AT's full investment programme (both funded and unfunded).

# Our approach



Our approach to the patronage analysis has been to build on work already completed by Auckland Transport, using supporting evidence from other cities similar to Auckland.

Our patronage analysis has five main elements:

1. **Initiatives baseline** – developed a single comprehensive baseline list of transport projects and initiatives from various sources within Auckland Transport
2. **Empirical research** – similar cities to Auckland have been analysed to understand the patronage impacts including features of project programmes similar to Auckland Transport's baseline initiatives
3. **Patronage modelling** – Auckland Council and Auckland Transport's existing transport models have been updated with revised assumptions and separate initiative runs to enable more robust forecasts of the patronage impact of individual projects to be identified. An overall forecast of patronage by 2022 has been developed based on updated land use and economic data
4. **Financial modelling** – the financial impacts of initiatives have been considered at a high level
5. **Gap analysis** – an assessment of the shortfall against the aspirational goal of doubling patronage by 2022, as stated by the Mayor, has been calculated.

The patronage projections from the current transport programme fall short of the Mayor's aspirational goal of 140m boardings. A very high level summary of potential additional measures that could be taken has been included in this report for completeness. However, the scope of this analysis did not include any further development of these additional measures.

To address this gap and accelerate patronage growth at a higher rate, a third phase of work is proposed that will consider a variety of improvements (to existing and alternative initiatives), including:

- **Operational, network and service initiatives**
- **Modification of existing planned projects**
- **New capital investments**
- **Regulatory reform**

It is recommended that the patronage impact and feasibility of these options are assessed in more detail to evaluate patronage impacts, high level costs and the potential to close the gap between 101m boardings and the 140m aspirational goal.

# Public transport “patronage” defined



**Patronage:** or ridership, measures the number of passengers who use a given public transport system. Patronage is typically measured using Boardings, but can also be measured by Trips.

**Auckland Transport uses Public Transport Boardings as its primary method of measuring public transport patronage**

## Public Transport Boarding

‘An entry to railway station or vehicle (ferry/bus) by a passenger. Passengers may make multiple boardings to complete one trip.’

Metropolitan Public Transport Demand Forecast Report  
August 2012  
Public Transport Victoria

## Public Transport Trip

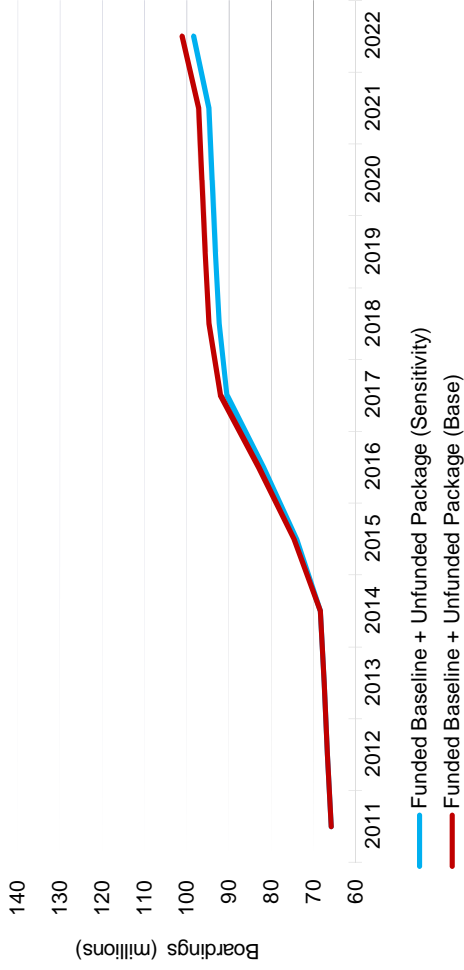
‘A public transport trip is a journey from one place (origin) to another place (destination) that is for one purpose, using public transport as the primary mode. People may make multiple public transport trips within a time period and across the day. A change of mode does not generate a new public transport trip, but generates a new public transport boarding.’

Metropolitan Public Transport Demand Forecast Report  
August 2012  
Public Transport Victoria

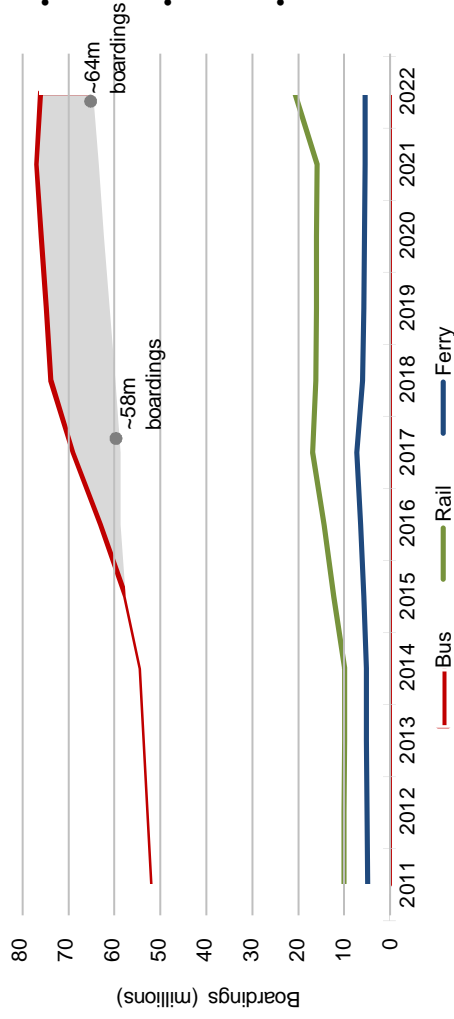
# Patronage and cost projections



Revised patronage forecasts through to 2022 indicate a maximum of ~101m boardings.



Bus patronage may be constrained up to ~15% by 2022.



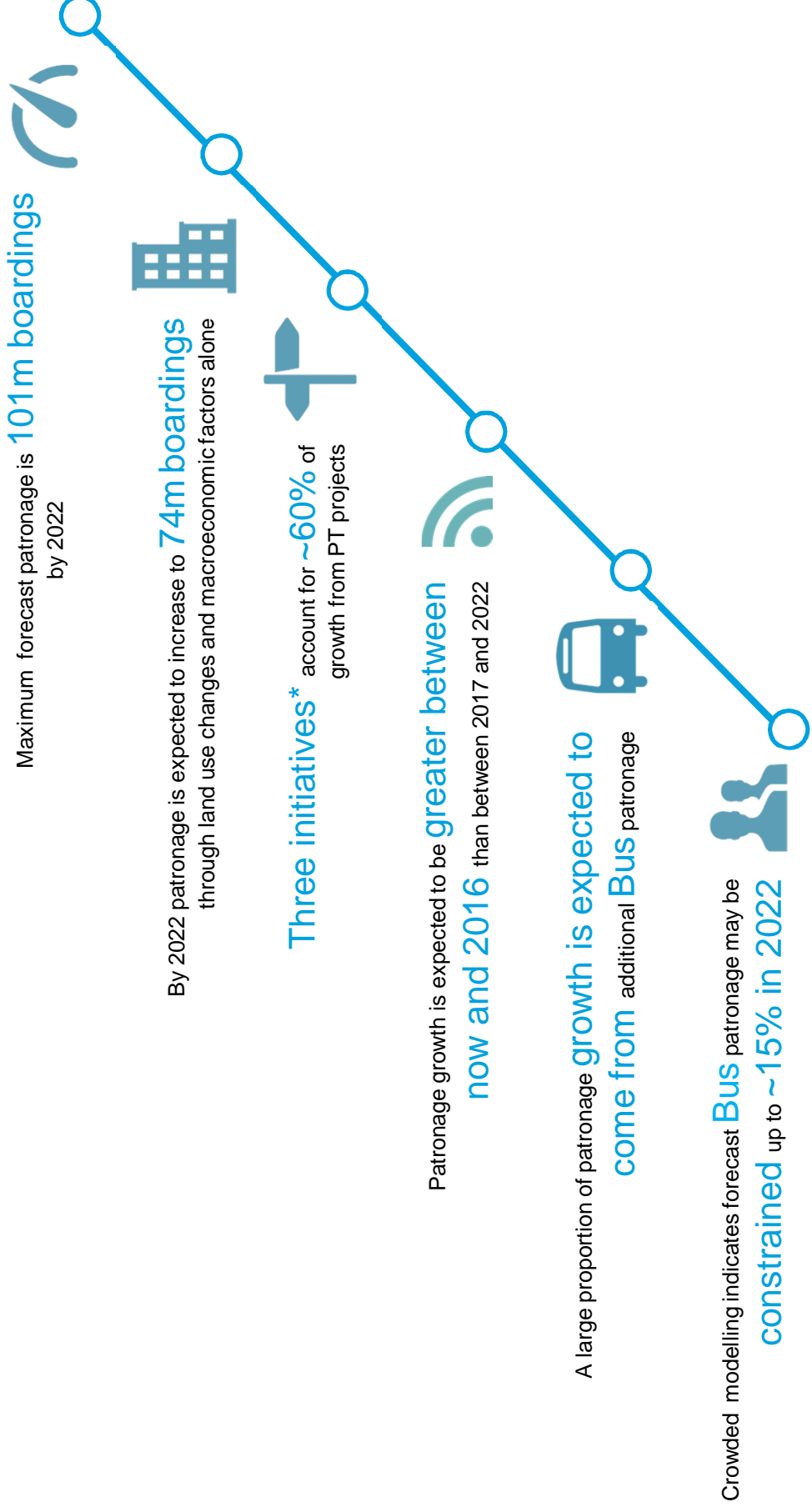
## Key observations:

- Patronage is forecast to grow to ~101 m\* by 2022 if all planned projects are delivered
- Revised ART3 Model runs were used to produce traffic matrix to populate Auckland Transports **APT Model**. APT Model was used to model public transport outcomes by mode
- Patronage profile has been interpolated from results for 2016/17 and 2021/22. Existing transport models have some significant limitations
- Macroeconomic and land use factors (e.g. population and employment growth) alone will increase patronage to ~74m by 2022
- **Assumptions have been amended** in the ART3 Model for CBD employment and forecast petrol prices. Revised assumptions will limit maximum patronage to ~98m
- Using the original ART3 assumptions (based off Auckland Council's land use scenario), forecast patronage is highest at 101m
- Indicative **gap of ~39m boardings** between the highest forecast figure and the target (using a 70m base and a 140m aspirational goal)
- Total public transport capital costs of ~\$4 billion to 2022

8 \* Figure comes from using base ART3 assumptions and a scenario where all planned projects are fully implemented (both funded and unfunded).



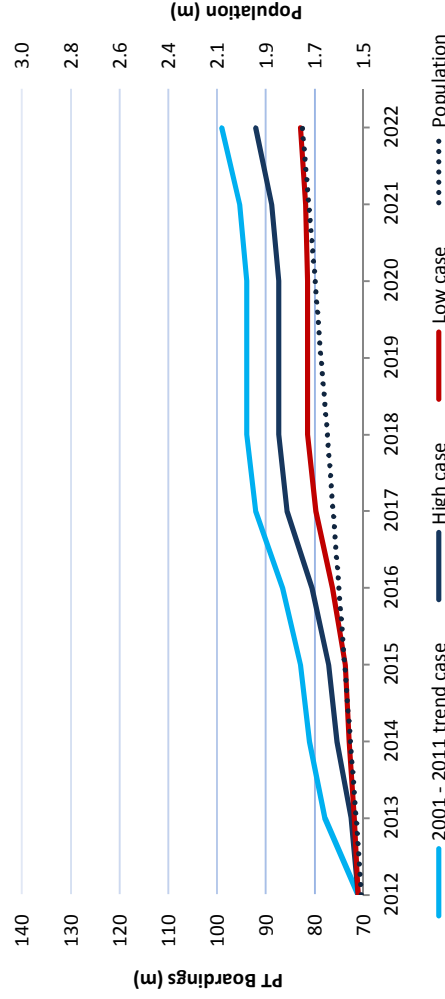
# Key modelling insights



# Patronage projections from comparable jurisdiction analysis



Analysis of comparable cities indicates a target range of 83m to 92m boardings by 2022 is likely.



## Key observations:

- Auckland patronage growth of 44% by 2022 is **slightly lower than** that achieved by **similar cities** over previous 10 year periods
- Forecast figures include only two thirds of the expected impact of CRL in 2021 and 2022
- The 2001 – 2011 trend case takes Auckland's historic growth rate and extends it out for a further ten years
- The modelled 101m patronage projection is broadly **in line with Auckland's historic growth** trend (over the past 10 years), though this period included substantial projects such as Britomart and the Northern Busway
- Typically it has taken **~20 years** for similar cities to double public transport patronage
- Cities that have achieved patronage growth significantly above background population growth, have **also made major and sustained investments to improve service coverage**, expand networks, or reduce the relative price of travel
- Auckland Transport's project programme to 2022 includes **relatively limited measures** to substantially increase service coverage.

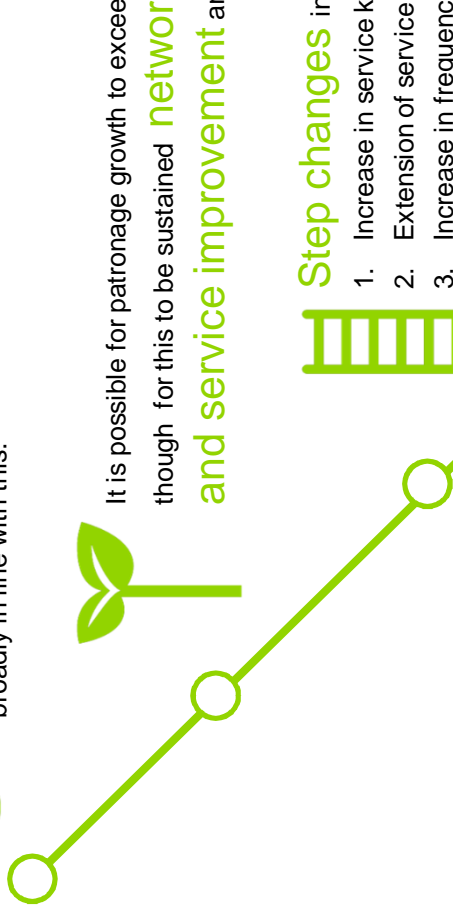
## Comparable cities include:..



# Key research insights



Comparable cities show it is more common to see **patronage double over a 20 year horizon**. Auckland's patronage growth over the last decade and extended out to 2022 is broadly in line with this.



It is possible for patronage growth to exceed population growth, though for this to be sustained **network investment and service improvement** are required.



**Step changes** in patronage have required:

1. Increase in service kms
2. Extension of service coverage
3. Increase in frequency, and/or
4. Reduction to the relative price of travel.



**Service quality is important.**

**Removing barriers** to enable a good customer experience can shift patronage growth to the upper end of the spectrum.



There is **no silver bullet**. Patronage is driven by a complex range of factors (capacity, experience, network, and price), which need to be considered together. No similar city appears to have found a magic formula for growing patronage.

# Options for Phase Three

The maximum projected patronage in 2022 falls approximately 39m short of the aspirational goal of 140m boardings. Growth in population and employment, and changes in land use will likely drive increases in patronage beyond 2022 to reach the target. However, significant additional measures are required to achieve it within the 10 year timeframe.

**Auckland Transport is faced with two primary options:**

## Option 1: Reset expectations

Given the funding profile for the next ten years is relatively defined and committed, it is a realistic option for Auckland Transport to confirm that the current planned investments and activities are unable to meet expected demand and that the timeframe for reaching the 140m aspirational goal should be extended to a point that is affordable given current constraints.

## Option 2: Refine and extend the network re-development strategy

If the aspirational goal of 140m boardings by 2022 is not negotiable, Auckland Transport will require additional analysis to generate and assess potential initiatives across customer, patronage and financial aspects. Potential areas for further consideration are proposed as a thought prompter for potential avenues open to Auckland Transport.

## Way forward

The proposed third phase of work will consider the options above and the most appropriate way forward for Auckland Transport to meet stakeholder and ratepayer expectations.

**Potential opportunities to increase patronage at an accelerated rate within the ten year horizon:**

- 1. Operational, network and service initiatives** – for example:
  - Fare reduction and restructuring
  - Increase frequency, coverage, or additional service kms
  - Focus on operational improvements including punctuality and reliability
- 2. Modification of existing planned projects** – for example:
  - Rescheduling capital projects (i.e. bring forward CRL and potentially other projects)
- 3. New capital investments** – for example:
  - Additional investment in busways
  - Bring forward the harbour crossing
- 4. Incentive management initiatives** – for example:
  - Creating a competitive process for operators
- 5. Structural reform** – for example:
  - Congestion/road user charges

These measures will all have implications for operating costs, capital costs and revenue generation potential. These will need to be carefully considered through an initial feasibility assessment and a detailed business case process. The process should focus on driving the best patronage outcomes for a given investment level.



# Bridging the gap

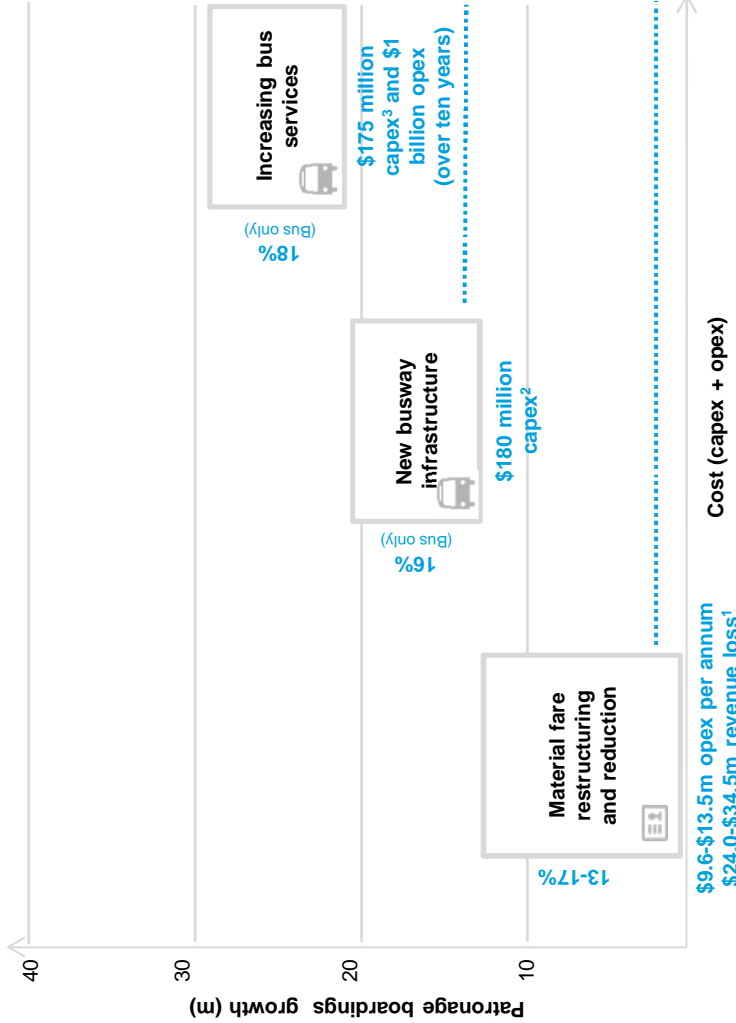


Given the 40 million shortcoming in boardings by 2022, increased investment will be required to help AT bridge the gap. Due to large scale rail investments already planned, the additional focus should be on improving bus services.

Auckland Transport could face an additional **\$355 million capex investment**, with a minimum of **\$1.5 billion additional opex** over ten years (averaging \$150 million per annum)<sup>5</sup> to achieve 130m boardings.

Examples of the kind of investments that could help to reduce the gap:

- Enablers:**
- Other activities can be considered to accelerate patronage growth, including:
    - 7am – 7pm clearway extensions
    - Bus priorities at traffic lights
    - Increased service frequency on existing routes
  - While revenue generation activities should be considered to help fund the additional investment:
    - Congestion charging (\$137m to \$143m annual revenue<sup>6</sup>)
    - Parking charge changes in the CBD



**Increasing bus services:**  
Based on Melbourne's SmartBus and DART bus service to reach more customers  
E.g., increasing the service kms and frequency of service to reach more customers  
Would alternatively need to increase park and ride capacity to improve accessibility

**New busway infrastructure:**  
Undertake another project equivalent to the Northern Busway. Cost and patronage growth figures have been derived from Northern Busway project.

**Aggressive fare reductions:**  
Using ring 1 and ring 3 pricing, which involves significant reduction in fares and no inner city ring

<sup>1</sup> Based on 1 ring and 3 ring scenarios. 6 November 2013, Subsidy cost per pax km, Strategic Fares Review, Auckland Transport  
<sup>2</sup> Based on Northern Busway, Auckland Transport Annual Report 2012 (patronage); Mark Lambert (Funding)  
<sup>3</sup> Based on SmartBus, Melbourne. Growing bus patronage and addressing transport disadvantage – The Melbourne experience, 2009 (patronage); SmartBus Budget History (Funding)  
<sup>4</sup> Based on Melbourne Metropolitan Bus Improvement Programme, Melbourne. Growing bus patronage and addressing transport disadvantage – The Melbourne experience, 2009 (patronage); MOTC Infrastructure scorecard, Property Council of Victoria (Funding)  
<sup>5</sup> Opex calculated from 40m additional passengers at \$2 average fare, with 44% farebox recovery  
<sup>6</sup> Year 1 Scheme Gross Revenue (nominal) for Double Cordon and Area scenarios, Auckland Road Pricing Evaluation Study (ARPES) in 2007



# Detailed Report



# Purpose and context of Phase Two



## The challenge for Auckland Transport is clear

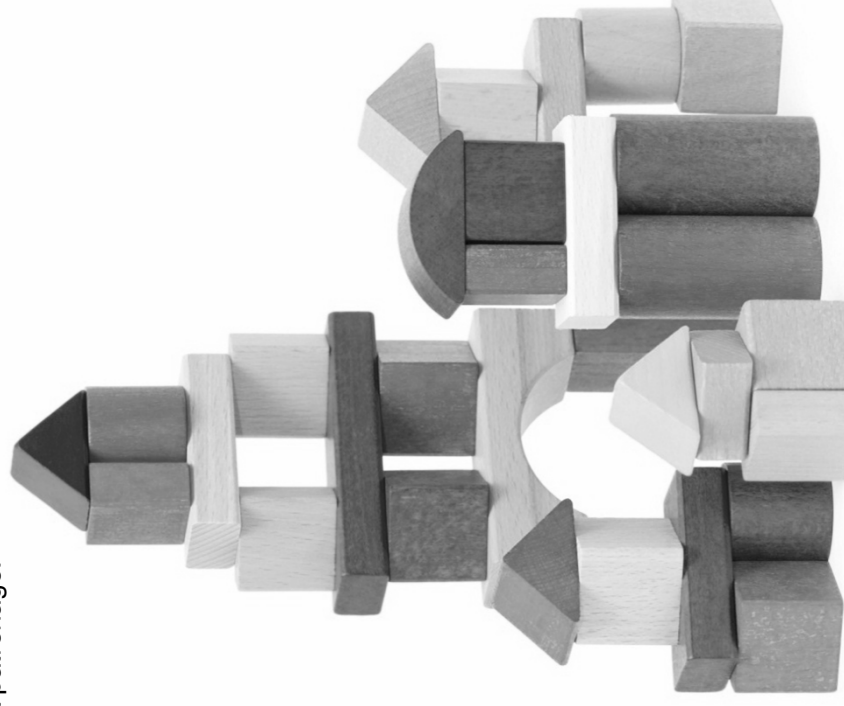
The Auckland Plan, developed by Auckland Council, has established a vision to become the world's most liveable city. A key foundation for this vision is the effectiveness of major transport systems including public transport networks and infrastructure. In support of this vision, the Mayor of Auckland has set an aspirational target to grow public transport patronage to ~140m boardings by 2022.

During **Phase One** of the project a review of the existing business cases for Auckland Transport's projects was carried out to identify the underlying assumptions in relation to drivers of patronage. A number of issues were identified with the analysis, documentation and modelling of public transport patronage with limited patronage forecasting information available at the project level. The investigation identified that further analysis was required to supplement the work to date and establish a baseline patronage projection, off which to monitor the impact of proposed projects and the growth in public transport patronage.

**Phase Two** of the public transport patronage review was established to:

- Provide confidence that patronage increases estimated as part of the current suite of initiatives are realistic and based on robust assumptions
- Compare initiatives with similar projects undertaken in similar cities to understand patronage impacts of actual projects that have been delivered
- Identify the extent of any resulting gap between the estimated patronage effect of the initiatives and the aspirational goal
- Establish a baseline against which the impact of initiatives on patronage can be monitored.

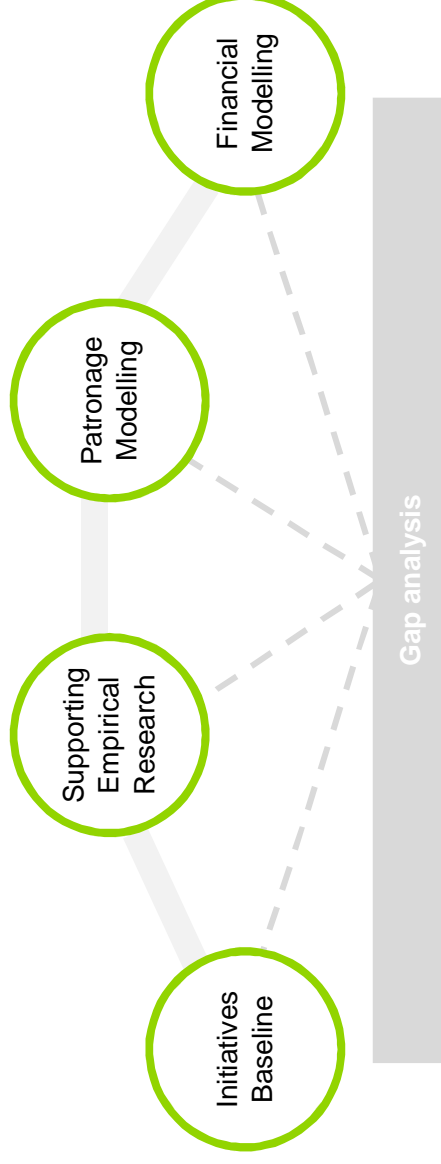
A **third phase** of work is proposed that will identify and consider a variety of improvements to address the gap identified during Phase Two and to accelerate the rate of patronage growth



# Approach



Our approach to Phase Two of the work has been structured as five elements to ensure a robust evaluation of patronage, and to provide a patronage forecast Auckland Transport can have confidence in.



- 1 **Initiatives baseline**  
Established a baseline set of initiatives from existing projects, which were analysed in the APT Model scenarios.
- 2 **Supporting empirical research**  
Analysed the patronage impacts of similar initiatives undertaken in similar cities, to cross check modelling outputs and to provide a more granular analysis of specific initiatives.
- 3 **Patronage modelling**  
Reviewed and refined assumptions within the APT Model and ART3 Model. Re-forecast patronage out to 2022 under a range of investment scenarios, including a new Do Nothing base from which the impacts of funded and unfunded initiatives and specific project packages were measured.
- 4 **Financial modelling**  
Estimated capital and operating expenditure impacts of each investment scenario. Compared patronage and cost impacts to determine the relative value for money of each specific project package.
- 5 **Gap analysis**  
Established the gap between forecast patronage and the aspirational goal of 140m boardings.

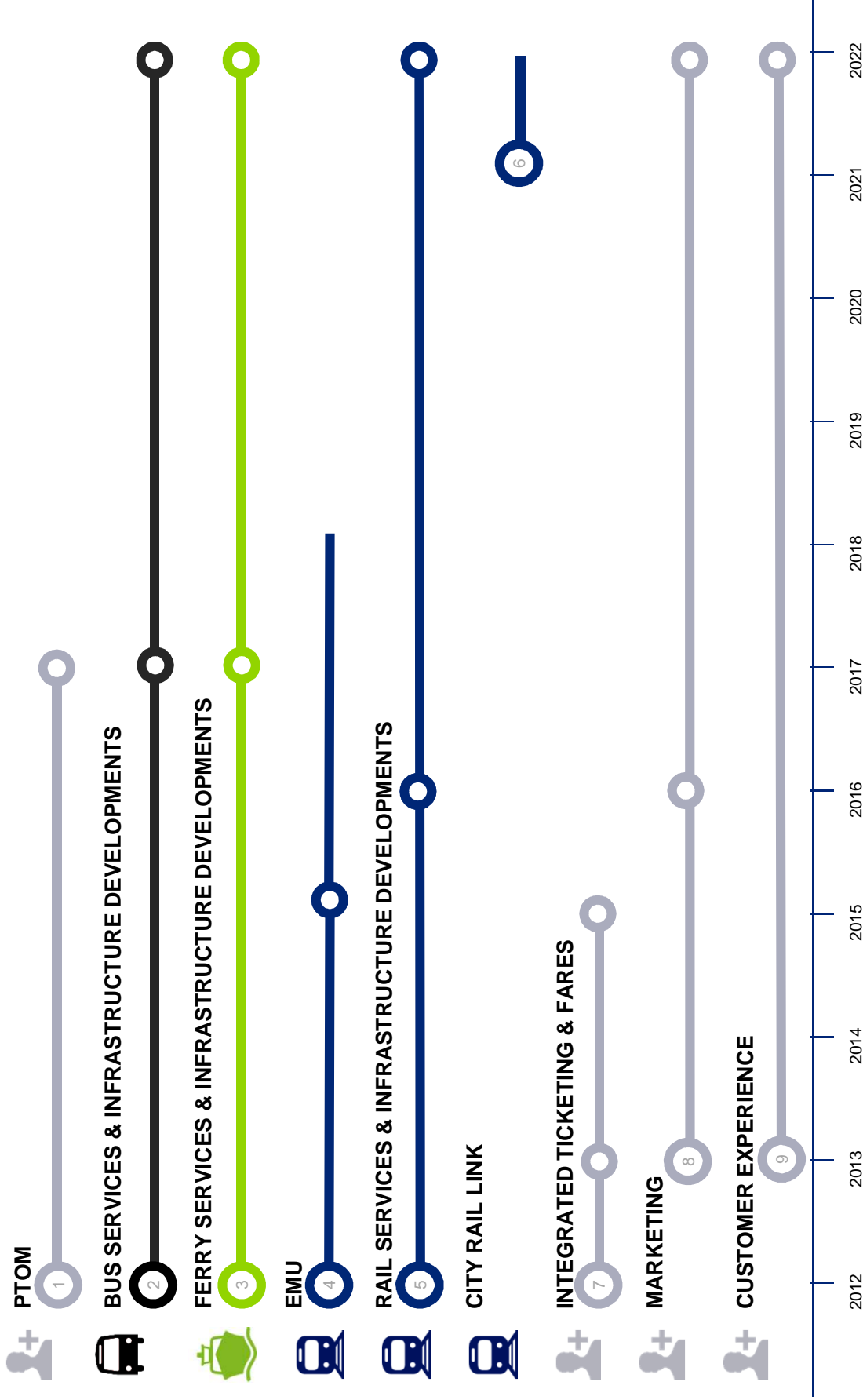


# ○ Initiatives baseline

# The initiatives summary



High level summary of the groupings applied to AT's planned projects over the ten year horizon to 2022:



# AT initiatives



AT Initiative	Sub-Grouping	Description	Est. Completion Date	Mode
1 PTOM	Phases One to Three	Operate, maintain and renew existing infrastructure optimally	2016 / 2022	Bus
	Stage 1 - South Auckland	Network and service improvements - South Auckland	2016 / 2022	Bus
	Stage 2 - North Shore & Isthmus	Network and service improvements - North Shore & Isthmus	2016 / 2022	Bus
	Northern Busway	Northern busway extension from Albany to Silverdale and associated service changes	2016 / 2022	Bus
	Stage 3 - Western, Eastern & Central	Network and service improvements - West, East & Central Auckland	2016 / 2022	Bus
2 Bus Services and Infrastructure Development	Continuous improvement of major and intermediate interchanges	Britomart, Akoranga, Henderson, New Lynn, Newmarket, Onehunga, Panmure, Manakau, Aotea, Inner West, Takapuna, Wynyard, University	2016 / 2022	Bus
	AMETI	Panmure bus / rail interchange (2015) and Panmure to Pakuranga busway (2021)	2016 / 2022	Multi
	At 2016 and 2021	Ferry service changes, terminal upgrades and developments occurring between 2012 and 2022	2016 / 2022	Ferry
3 Ferry Services and Infrastructure Development	Wiridepot	Develop physical depot for electric trains	2013	Rail
	Procurement & delivery	Procure and receive electric trains	2015	Rail
	Network electrification	Extend electrification of rail network	2015	Rail
	Station platform extensions	Extend any identified stations necessary to meet electric train requirement	2015	Rail
	Launch	Launch electric train solution & new service timetable	2015	Rail
4 EMU	Rolling stock	Rolling stock purchases of electric trains	2018	Rail
	2005-2014	Upgrades and developments occurring between 2005 and 2014 (e.g. Papakura)	2014	Rail
	2015-2022	Upgrades and developments occurring between 2015 and 2022	2022	Rail
5 Rail Services and Infrastructure Development	New rail services	New rail services (often resulting from new station development)	2016	Rail

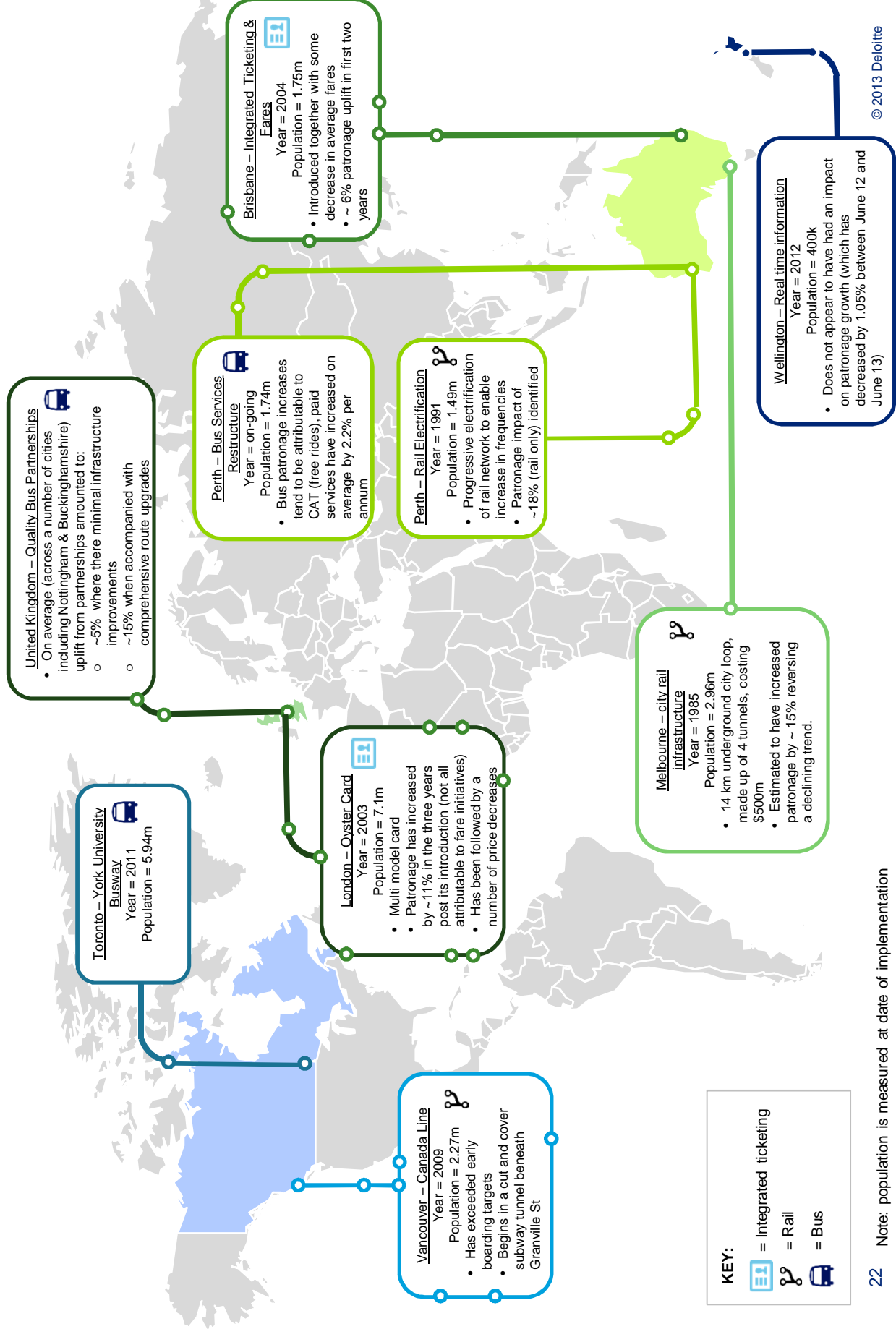
# AT initiatives (cont.)



AT Initiative	Sub-Grouping	Description	Est. Completion Date	Mode
6 City Rail Link	Land purchase & detailed design	Purchase land and develop detailed design of CRL	2016	Rail
	CRL construction (network changes)	Engage in construction of CRL	2021	Rail
	Frequency change (from 10 to 7.5 mins)	Change train frequencies from 10 mins to 7.5 mins	2021	Rail
7 Integrated Ticketing & Fares	Integrated ticketing	Provide integrated ticketing across all bus, rail and ferry services & additional ticketing machines	2013	Multi
	New zones and integrated fares	Implement a zone based fare structure with standard fares across bus and rail initiatives, and fares which allow passengers to transfer without penalty	2014	Multi
	Pricing strategy review	Strategic pricing and fare review	2015	Multi
	Overarching marketing strategy (principle)	Implement overarching marketing strategy to drive Aucklanders to public transport	2016	Multi
8 Marketing	Overarching marketing strategy (new direction)	Implement new overarching marketing strategy to drive Aucklanders to public transport	2022	Multi
	Targeted acquisition campaigns	As services and infrastructure initiatives are rolled out, AT intends to implement concurrent targeted customer acquisition campaign e.g., new route, new movers, Northern Busway	2022	Multi
	AT brand refresh (uniforms, consistent brand)	Brand refresh initiatives, and driving a consistent brand across Auckland	2016	Multi
9 Customer Experience Initiatives	Wayfinding	Work together with Auckland Council to develop improved and consistent wayfinding	2016	Multi
	Punctuality & reliability improvements	Implement initiatives to improve punctuality and reliability of existing services	2016	Multi
	Passenger information improvements	Use of GPS tracking to provide interactive and real time information to customers to enable network-wide way-finding	2016	Multi
	CE Blueprint initiatives	To be confirmed, programme for 2013-2015	2016	Multi
	Customer service continuous improvements	Identifying opportunities to improve service to customers	2016	Multi

# Empirical research

# Similar initiatives in comparable jurisdictions



# Forecast patronage trends following comparable initiatives

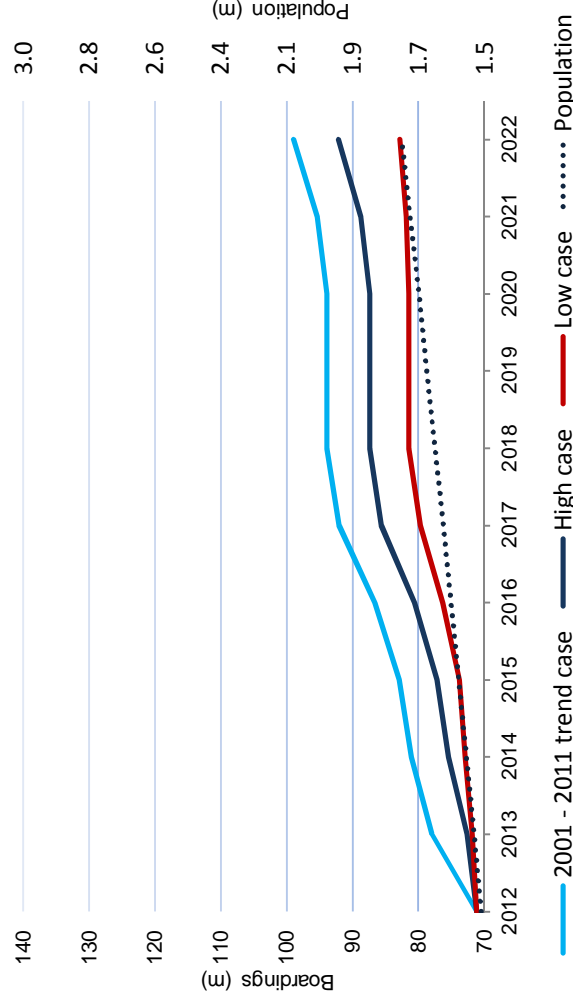


We have analysed the actual patronage impact of transport projects in other cities similar to those planned for Auckland. Analysis of these cities indicates a likely range of 83m to 92m boardings by 2022 in Auckland. Auckland's planned programme of work through to 2022 is more limited than that seen in comparable cities (where greater service extension and other investments have been made).

## Key insights:

- The impact of CRL is not seen till 2021 and only two thirds of the effect falls within the period to 2022
- Comparable cities have achieved substantial growth primarily by increasing coverage or network kms (e.g. rail extensions in Perth / Vancouver, and bus service improvements in Melbourne)
- Effects from customer experience / service improvements are difficult to decouple, as these are often run in parallel with infrastructure upgrades
- Patronage growth at a substantially higher rates than underlying population growth has been achieved with sustained and significant investment in network expansion
- Wellington has experienced relatively stagnant patronage growth over the last ten years, due largely to slow population growth and limited initiatives to extend the network

- Between 2001 and 2011 Auckland achieved a CAGR of patronage of 4.2% per annum, being 2.1x population growth. **The "trend case" shows** the patronage growth if this trend is continued
- The **2001-2011 trend case** is based on historic growth of 3.35% per annum (or 2.1x population growth of 1.6%). Applying this trend across the next decade, patronage could reach ~99m by 2022. Extending this trend out for 20 years to 2032 would increase to ~140m boardings.



- Auckland's higher historical growth rate has been supported by significant infrastructure investments that extended or enhanced the network (e.g. Britomart and the Northern Busway) as well as events such as the Rugby World Cup and Americas Cup. Investment will be needed in infrastructure, service quality and coverage to sustain this rate of growth going forward
- Sustaining Auckland's historic growth rate out to 2032 would likely require greater infrastructure investment in addition to CRL to extend the network.

# Forecast patronage trends following comparable initiatives (approach)



The forecasts are consistent with public transport growth achieved in similar cities that have been analysed. Comparable cities have implemented broadly similar project programmes to Auckland but have made greater investments in expanding service coverage, which has driven higher rates of patronage growth over time.

## Summary of results

- The analysis of comparable cities indicates an expected range of 83m to 92m boardings by 2022 in Auckland. Extrapolating Auckland's historic growth rate from 2001 to 2011 through to 2022 results in a patronage level of 99m boardings. This has been calculated using the average patronage growth / population growth ratio observed over the last decade.

## Summary of forecast approach

- Auckland's initiatives have been compared with similar projects overseas to assess the likely patronage impacts of actual delivered projects in similar environments. Where possible the figures have been adjusted in order to avoid double-counting and to correct for external effects (e.g., petrol price rises)
- Growth from comparable initiatives has been measured three years post implementation, as it can take a number of years for improvements to 'bed-in' and for passengers to change their existing travel behaviours
- Park and ride patronage impacts are incorporated within Rail / Bus services and infrastructure, where appropriate
- Ferry initiatives have not been considered. They are not considered material to this analysis, as Ferry services represent only a small portion of overall patronage.

## Assumptions

- Base patronage has been sourced from AT's 2012 annual report
- 2012 mode share proportions remain constant over time (77% Bus, 15.3% Rail and 7.7% Ferry)
- Patronage from the year an initiative is implemented has been used as the starting point for percentage growth
- Forecasting has assumed a three year ramp-up period, to reflect a conservative profile of patronage growth
- Growth from Customer Experience improvements occurs in year one only, as projects from comparable jurisdictions tend to have this "built in"
- Phased initiatives are modelled in the final year of the phase, with a ramp-up of three years following the final implementation
- Underlying growth (population and employment) has not been added to forecasts as underlying population growth is already incorporated within effects of projects in comparable cities (and population growth has been similar to that expected in Auckland)
- The "2001-2011 trend case" assumes historic growth rates will continue (in reality this would require substantial investments similar to what were seen during the 2001 to 2011 period).



# Comparable initiatives



Patronage growth for comparable projects is provided below. Given project effects tend to overlap it is difficult to consider the projects in isolation. Accordingly, forecast figures are adjusted for effects of double counting. Additionally, large scale increases in patronage growth (>10%) have generally been accompanied by a significant increase in service kilometres, which is not a feature of Auckland's current 10 year plan.

AT Initiative	Comparable City	Comparable Initiative	Mode	Date	Patronage Growth (%)*	Rationale	Forecast (%)
PTOM	UK (multiple cities)	Quality bus partnerships	Multi	In Progress	5 -15** (Bus only)	<ul style="list-style-type: none"> <li>Included investment in new roading infrastructure as well as operator committed higher frequencies</li> </ul>	PTOM does not contemplate material service km extension or new infrastructure <ul style="list-style-type: none"> <li><b>Low case: 2</b> Excludes impact of new roading infrastructure</li> <li><b>High case: 5</b></li> </ul>
	South East Queensland	Integrated public transport system	Multi	2005	9 (Corridor only)	<ul style="list-style-type: none"> <li>Significant capital expenditure on busways and increased frequencies</li> </ul>	Other cities made significant investments in new infrastructure and service km to increase frequency. AT's new bus system is a reallocation of the existing network rather than an extension <ul style="list-style-type: none"> <li><b>Low case: 5</b> Based on reallocation of service kms rather than increase</li> <li><b>High case: 15</b> Northern Busway saw ~17% corridor improvement and ~8% network improvement?</li> </ul>
Bus Services and Infrastructure Development	South East Queensland	SE busway & bus frequencies	Bus	2001	19 (Corridor only)	<ul style="list-style-type: none"> <li>Significant capital expenditure on busways and increased frequencies</li> </ul>	
	Melbourne	Doncaster SmartBus	Bus	2010/11	14 (Corridor only)	<ul style="list-style-type: none"> <li>Capital expenditure was \$450m for busways in an area not well serviced by rail</li> </ul>	
	Melbourne	Metropolitan Bus Improvement Program	Bus	2008/09	20 (Bus only)	<ul style="list-style-type: none"> <li>Significant capital expenditure on busways and increased frequencies</li> </ul>	
	Melbourne	SmartBus initiative begins	Bus	2005/06	16 (Bus only)	<ul style="list-style-type: none"> <li>Significant capital expenditure on busways and increased frequencies</li> </ul>	

1

2

\* Patronage has been calculated from either mode or city patronage data, over the three years following an initiative's implementation.  
 \*\* Combined with other key initiatives.

## Comparable initiatives (cont.)



AT Initiative	Comparable City	Comparable Initiative	Mode	Date	Patronage Growth (%)*	Rationale	Forecast (%)
3 Ferry Services and Infrastructure Development	Brisbane	Fare integration + ferry service upgrades	Ferry	2009	5 (Ferry only)	<ul style="list-style-type: none"> <li>Ferries are a small proportion of current patronage, and effects of changes are not considered material</li> </ul>	<ul style="list-style-type: none"> <li><b>Low case: 0</b></li> <li><b>High case: 0</b></li> </ul>
	Perth	Electrification extension	Rail	1992	18*** (Rail only)	<ul style="list-style-type: none"> <li>Electrification of three lines in Perth, excluding impacts of line extensions</li> </ul>	<p>EMU introduction in Auckland is combined with other measures to increase capacity. Wellington had minimal capacity increases</p> <p>Other cities combined electrification with service extensions</p>
4 EMU	Wellington	Replacement of existing EMUs	Rail	2011	1 (Rail only)	<ul style="list-style-type: none"> <li>EMU replacement in Wellington had minimal impact with minimal service extensions</li> </ul>	<ul style="list-style-type: none"> <li><b>Low case: 6</b> Includes capacity, frequency and new train benefits</li> <li><b>High case: 18</b> Based on Perth experience</li> </ul>
	Melbourne	Sunbury Electrification	Rail	2008	14 (Corridor only)	<ul style="list-style-type: none"> <li>Forecast data from Sunbury line. Incorporates service coverage extension</li> </ul>	<ul style="list-style-type: none"> <li><b>Low case: 3</b> Only includes station upgrades and new stations</li> <li><b>High case: 14</b> Potential for double counting with electrification</li> </ul>
5 Rail Services and Infrastructure Development	Melbourne	South Morang Rail Extension	Rail	2009	3 (Corridor only)	<ul style="list-style-type: none"> <li>Service coverage extension</li> </ul>	

# Comparable initiatives (cont.)



AT Initiative	Comparable City	Comparable Initiative	Mode	Date	Patronage Growth (%)*	Rationale	Forecast (%)
City Rail Link	Melbourne	City Loop	Rail	1985	10 (Rail only)	<ul style="list-style-type: none"> <li>Relatively old project, however still comparable</li> </ul>	Forecast period only includes two thirds of expected CRL benefits
	Vancouver	Canada Line	Rail	2009	34 (Rail only)	<ul style="list-style-type: none"> <li>Extended service coverage and linked airport with CBD via a direct routes</li> </ul>	<ul style="list-style-type: none"> <li><b>Low case: 10</b> Includes frequency improvements</li> <li><b>High case: 30</b> Would need to attract large new groups of users to train from car by significantly reducing travel times to the CBD</li> </ul>
	Perth	Mandurah line	Rail	2007	33 (Rail only)	<ul style="list-style-type: none"> <li>Opened access to a newly populated area and halved travel time to city</li> </ul>	
Integrated Ticketing & Fares	Perth	SmartRider ticketing systems	Multi	2007	16**	<ul style="list-style-type: none"> <li>Includes major effects generated with opening of the Mandurah line and service increases</li> </ul>	The introduction of integrated ticketing was combined with fare structure and zoning changes in QLD and network extensions in Perth. Auckland is not expanding the network and has undertaken a limited rationalisation of fares. This is aligned to pricing analysis and would only change if there is substantial increase in investment
	Melbourne	Myki rolled out	Multi	2008	8**	<ul style="list-style-type: none"> <li>Influenced by petrol price rises</li> <li>Occurred during time of high growth</li> <li>Includes abolishment of zone 3</li> </ul>	
	London	Oyster card	Multi	2003	11**	<ul style="list-style-type: none"> <li>Held up as successful implementation, also successfully migrated systems</li> <li>Run in parallel with congestion charging</li> <li>Run in parallel with fare decreases</li> </ul>	<ul style="list-style-type: none"> <li><b>Low case: 2.5</b> Conservative view sourced from AIFS Business Case!</li> <li><b>High case: 4</b> High case scenario sourced from the AIFS Business Case, this would need to include average fare changes</li> </ul>
	South East Queensland	Integrated public transport system	Multi	2004	~ 6 (attributed)	<ul style="list-style-type: none"> <li>Included the bundling of average fare changes</li> </ul>	

6

7

# Comparable initiatives (cont.)



AT Initiative	Comparable City	Comparable Initiative	Mode	Date	Patronage Growth (%)*	Rationale	Forecast (%)
Marketing	Perth, Scotland	Direct marketing campaign	Bus	2001	Not Available	<ul style="list-style-type: none"> <li>Reported uplift on use of the particular corridor targeted</li> </ul>	<p>Assumes initiatives include corridor specific marketing, therefore only includes network wide marketing campaigns</p> <ul style="list-style-type: none"> <li><b>Low case: 2</b></li> <li><b>High case: 2</b></li> </ul>
	London	Consistent bus branding	Bus	1997	5 (Bus only)	<ul style="list-style-type: none"> <li>London experience includes apps, real-time information and effective branding</li> </ul>	<p>Removal of customer experience barriers is assumed within all initiatives, especially to achieve the high case targets</p> <ul style="list-style-type: none"> <li><b>Low case: 1.5</b></li> <li><b>High case: 4</b></li> </ul>
Customer Experience Initiatives	Wellington	Real time information	Multi	2012	-1		

8

9

# Jurisdiction CAGR comparison



A 10 year CAGR is a useful comparator for assessing the performance of projects across cities where growth rates are similar.

Comparable City	Scenario	Forecast vs Actual	PT Boardings 10 year CAGR	Population Growth 10 year CAGR	Patronage Growth/ Population Growth
Auckland	High case: 2011/12 – 2021/22	Forecast	2.62%	1.60%	1.6 x
	Low case: 2011/12 – 2021/22	Forecast	1.54%	1.60%	1.0 x
Melbourne	2001/02 – 2011/12	Actual	4.17%	1.91%	2.1 x
	2001/02 – 2011/12	Actual	4.73%	1.49%	3.2 x
Vancouver	2001/02 – 2011/12	Actual	6.33%	1.41%	4.5 x
	2001/02 – 2011/12	Actual	5.29%	2.64%	2.0 x
Wellington	2001/02 – 2011/12	Actual	1.69%	0.98%	1.7 x

## Public transport boardings

- Vancouver has seen the highest increase in public transport boardings of the comparable cities
- Vancouver hosted the Winter Olympics within this timeframe, which temporarily boosted patronage
- Auckland's patronage growth has been slightly less than comparable cities over the past ten years.

## Population growth

- Perth had the highest population growth over the last ten years
- Auckland's forecast 1.6% annual growth rate appears reasonable compared with historical trends as well as other jurisdictions.

## Drivers of patronage growth

Patronage growth has been able to outstrip population growth at a higher rate where major investment has occurred to extend the network coverage or service kms, decrease the relative price of travel, or where special events have been hosted:

- Auckland to 2012 included Britomart, Northern Busway and the Rugby World Cup effects
- Vancouver included Winter Olympics and the opening of the Canada Line
- Vancouver decreased the price of travel for university students through the U-Pass initiative
- Perth included uplifts from the opening of the Mandurah line
- Wellington had minimal additional service coverage
- Melbourne includes a 25% increase in service kms as part of the SmartBus programme.

# Patronage modelling

# Modelling approach



The APT and ART3 models were used to re-forecast PT patronage out to 2022 under a range of investment scenarios.



# Modelling approach (cont.)



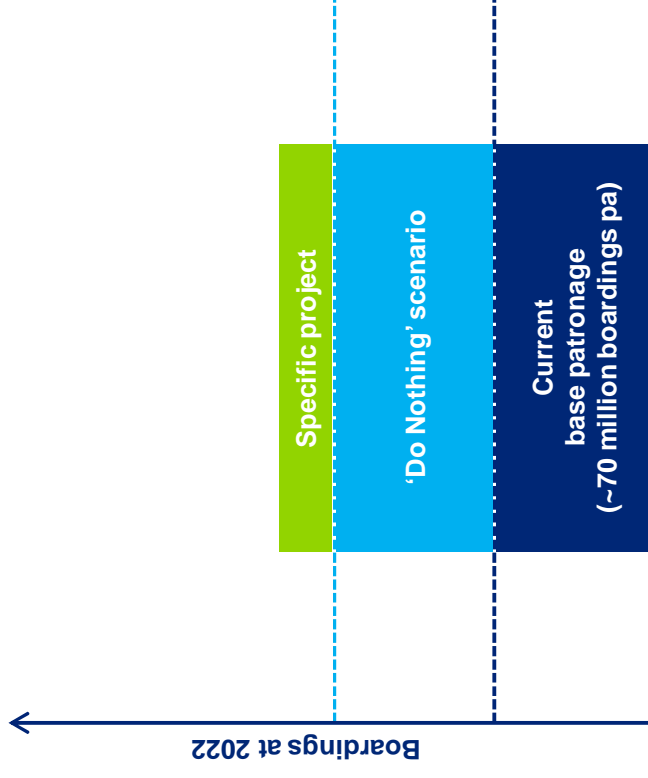
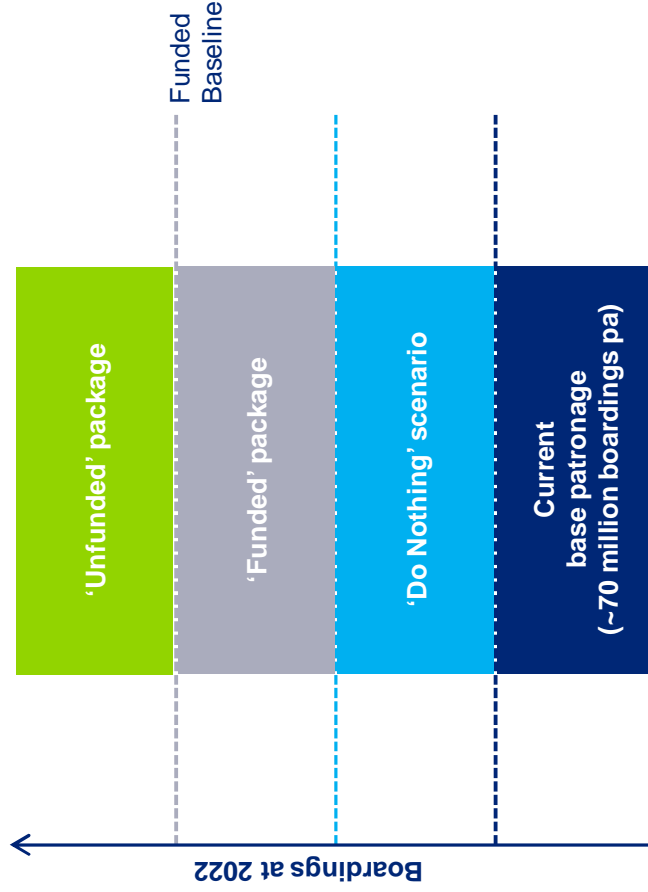
Modelling has been performed in two ways – one which builds up the patronage growth from packages of funded and unfunded projects, and one which estimates the patronage growth from specific project packages.

## Funded versus unfunded analysis

The diagram below illustrates the conceptual results for three model scenarios. This modelling exercise builds up the collective impact of all planned PT projects.

## Specific project packages

The diagram below illustrates the conceptual uplift in patronage from a specific project package. Specific project packages are modelled independently to estimate the contribution that each makes towards patronage growth.





# Modelling assumptions



## Principles

- In establishing base assumptions for this modelling exercise, the assumptions currently being used by Auckland Council and Auckland Transport were reviewed and adjusted where appropriate
- Key model inputs and details of the various model packages have been documented in an Appendix to this report.

## Model packages

- Projects were grouped into funded and unfunded packages based on definitions agreed with Auckland Transport
- Projects with similar characteristics were grouped into specific project packages
- AT projected PT patronage out to 2022 for each model scenario using the ART3 Model and APT Model.

## ART3 Model

- Key assumptions in the ART3 Model are centred around population and employment growth, land use assumptions and other economic variables
- The reasonableness of original input values were evaluated against historical and forecast information reported by third party organisations such as Statistics NZ, Ministry of Business, Innovation and Employment and NZ Treasury
- As a result of this review, employment was redistributed away from the Auckland CBD and assumptions around future fuel prices were refreshed. All other assumptions were unchanged in the model
- The 2013 Census data was not available at the time of this modelling exercise. Regional population data has since been released, indicating that the CAGR for Auckland was ~1.2% per annum between 2006 and 2013. This is materially lower than the forecast growth rate of 1.6% per annum used in our analysis.

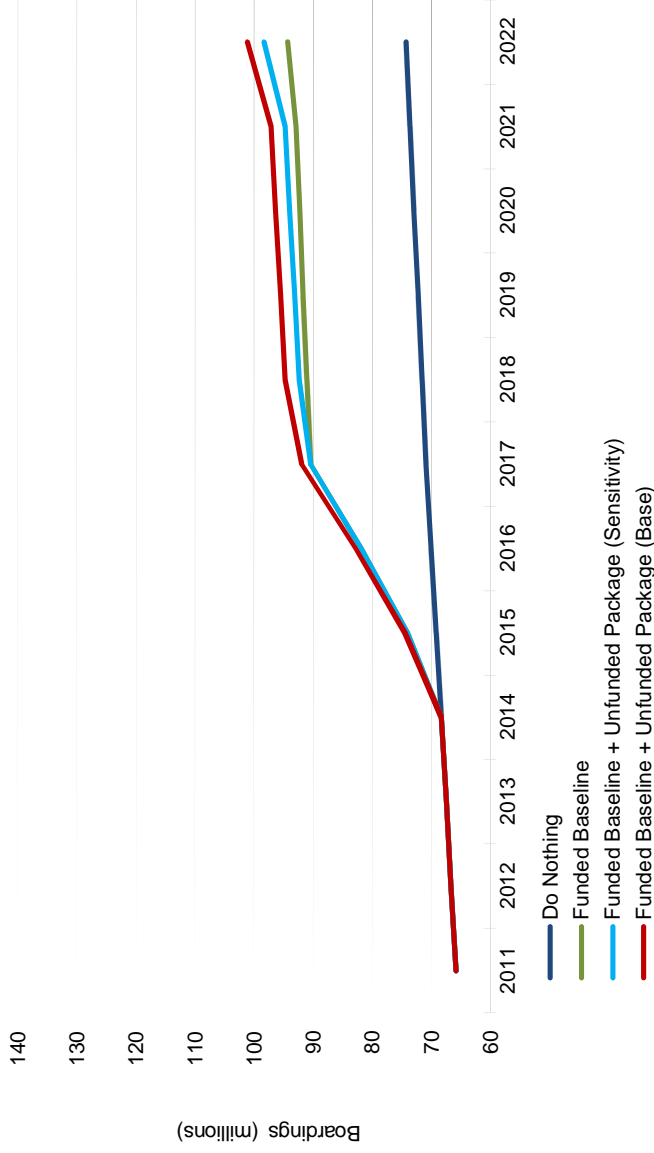
## APT Model

- Key assumptions in the APT Model are centred around parameters used in the generalised cost of travel calculation
- Auckland Transport is currently planning to recalibrate the APT Model once the 2013 Census data is made available. Accordingly, we considered it inappropriate to request input changes for this model.
- Once the APT Model outputs were received for the 2011, 2016 and 2021 years, Auckland Transport's expansion factors were applied to the AM peak numbers to annualise the results and adjust 2011 model results to match actual patronage
- Year-by-year patronage forecasts (2011 – 2022) were subsequently created based on expected project timings and then an uplift to the forecasts was manually applied to incorporate Marketing and Customer Experience initiatives.

# Revised model output



The maximum forecast patronage is ~101m boardings by 2022, without changed assumptions.



Cumulative patronage uplift by year (based on 101 maximum):



With amended assumptions, the maximum patronage forecast is approximately **98m** boardings by 2022.

By 2022 macroeconomic factors and land use changes alone grow patronage to **~74m** boardings (Do Nothing scenario).

**~60%** of patronage growth from PT projects is attributable to three initiatives (CRL, Integrated Ticketing & Fares, and Bus Services & Infrastructure Developments).

Patronage growth is expected to be **greater** between now and 2016 than between 2017 and 2022.

A large proportion of patronage growth modelled is expected to come from bus patronage.

Note: Growth rates (above) are derived from the Funded Baseline + Unfunded Package (Base) scenario, relative to actual patronage of 65.8m boardings in 2011.

Note: Bus Services and Infrastructure Developments includes AMETT

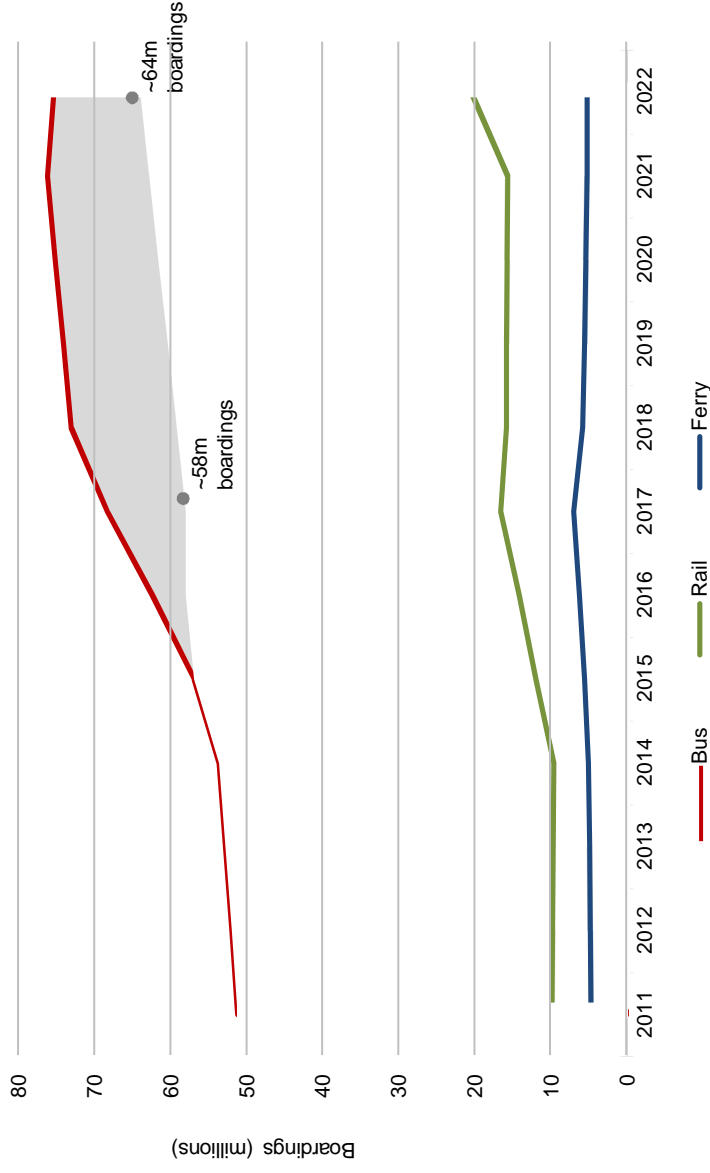
Note: Integrated Ticketing & Fares scenario includes a significant reduction in fares, which enhances forecast patronage growth.

Note: the full patronage uplift from CRL may not be realised by 2022.

# Capacity constraints



A crowding function has been used in the APT Model to limit patronage to forecast network capacity. The results show that only the bus network is expected to reach its capacity.



A large proportion of growth is expected to come from extra Bus patronage.

A comparison of the upper bound scenario and a comparable capacity-constrained model run suggests the bus network could reach capacity by as early as 2015. In 2022, Bus patronage may be constrained up to **~15%** as a result.

Capacity constraints in the bus network could be relatively easy to address by providing additional bus services.

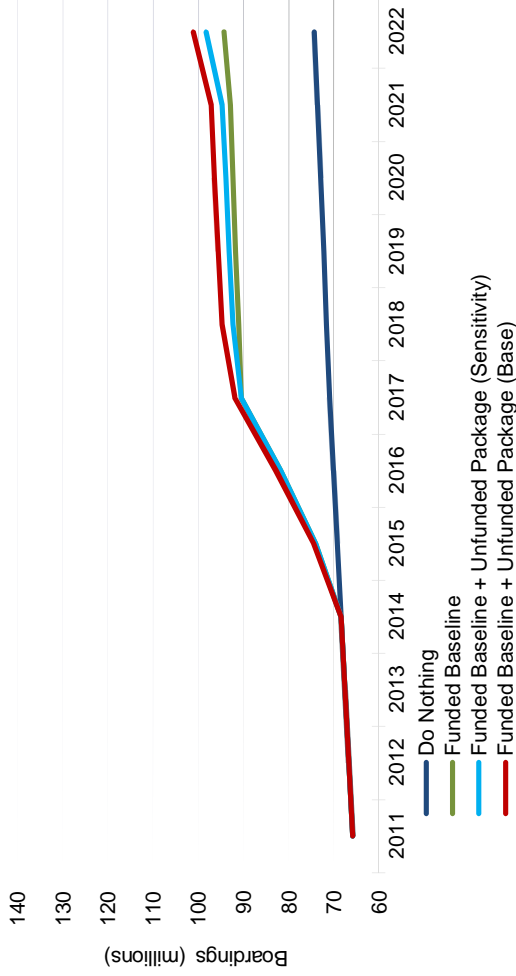
The model shows no apparent constraint to **Rail** patronage

The model shows no apparent constraint to **Ferry** patronage.

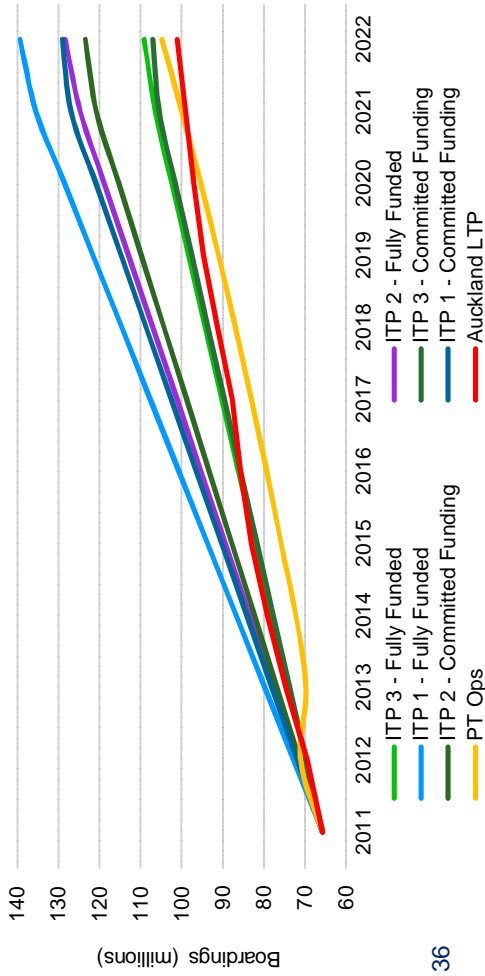
Note: Crowding was assessed at two data points (2016/17 and 2021/22). The magnitude of constraints has been estimated for adjacent years.

# Key difference between original and revised model outputs

Revised patronage forecasts through to 2022 indicate a range of between 74m and 101m boardings.



Original (included in the ITP) patronage forecasts through to 2022 indicated a range of between 101m and 139m boardings.



Revised model scenarios were not run in the same model (original PT modelling was performed in the ART3 Model, revised PT modelling was performed in the APT Model).

Over 100 projects have been consolidated into 9 major initiative groupings.

Revised land use assumptions and macroeconomic factors (CBD employment growth and petrol prices) have been applied.\*

Revised patronage trends were informed by comparable initiatives in other jurisdictions.

The fully funded patronage forecast changed from ~139m to ~101m boardings.

The APT Model is conservative regarding the base Do Nothing projections, but is relatively aggressive regarding the uplift from individual initiatives.

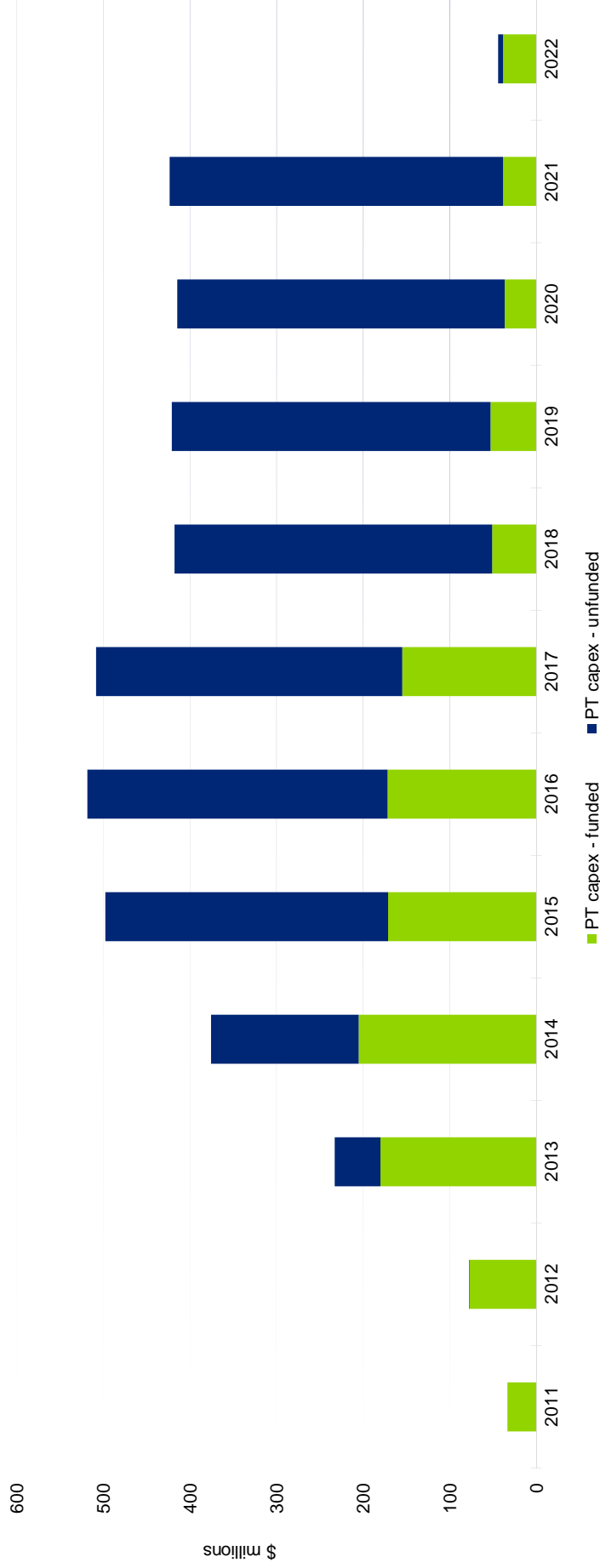
\* Amended assumptions were applied in all model scenarios except the Funded Baseline + Unfunded Package (Base) scenario, which projects ~101m boardings by 2022.

# Financial modelling

# PT capital expenditure



The graph below shows the capital expenditure profile for public transport projects, split between funded and unfunded investments.



Total capital expenditure peaks between 2015 and 2017. Funded investment peaks between 2013 and 2015.

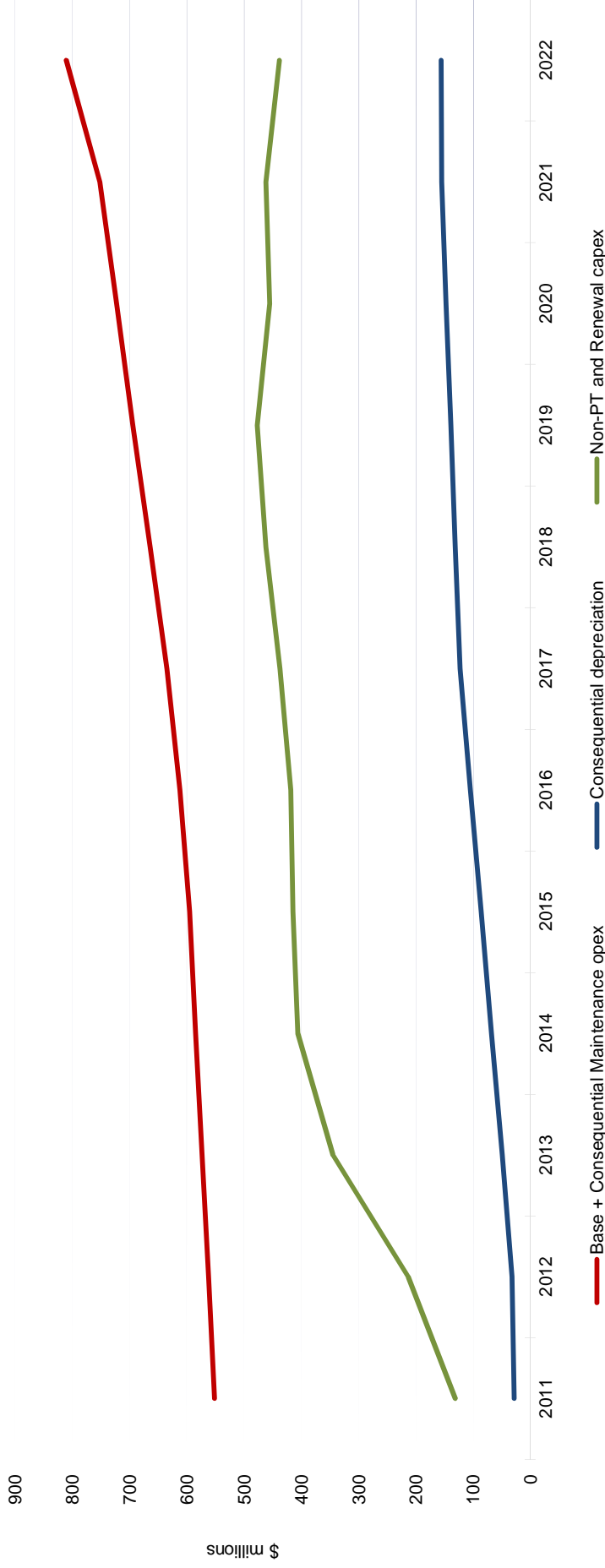
Funded capital expenditure totals ~\$1.2 billion and unfunded capital expenditure totals ~\$2.8 billion.

~\$2.7 billion of unfunded capital expenditure relates to CRL.

# Other expenditure



The graph below shows other capital and operating expenditure requirements facing Auckland Transport.



In addition to capital spend on PT projects, **other capital and operating expenditure is already very high.**

Consequential maintenance opex and depreciation **both grow with increased capital investment.**

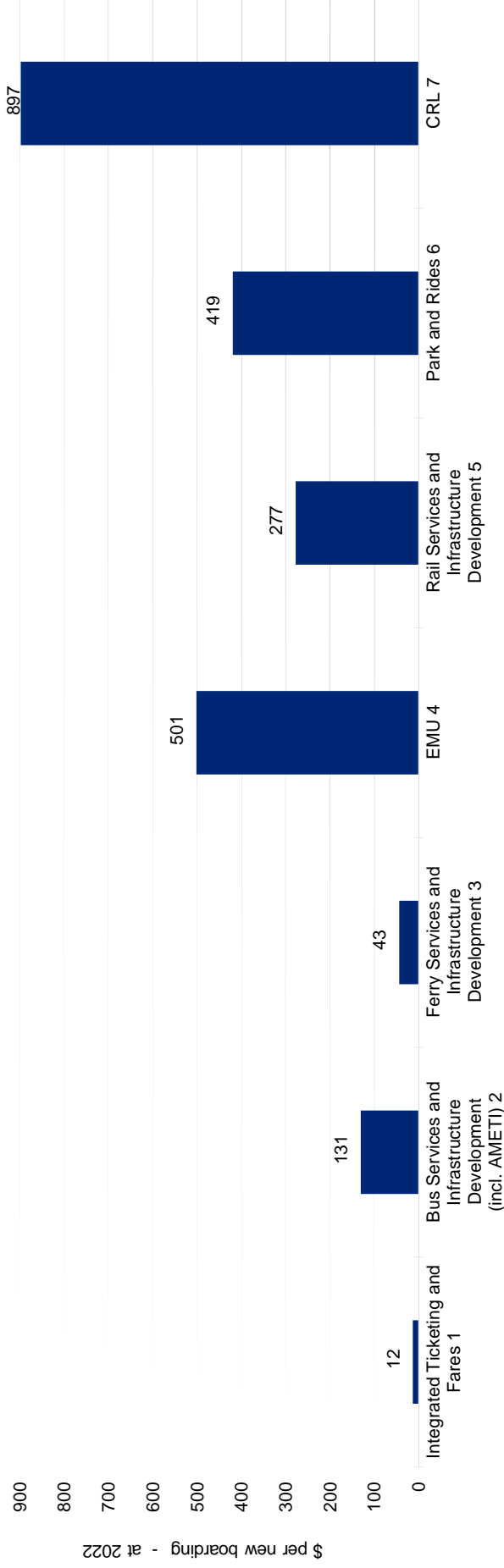
**Significant grant funding will be required** to meet capex and opex requirements.

Note: Operating expenditure analysis does not include the potential cost of additional services to accommodate growth.

# PT capex per new boarding



Value for money has been assessed based on the PT capex per new boarding attracted to public transport for each of the project packages.



The capital cost of all planned projects totals ~\$5.2 billion, with ~\$4 billion to be spent between 2011 and 2022.

Integrated Ticketing and Fares has the lowest capital cost per new boarding.

CRL has the highest capital cost per new boarding.

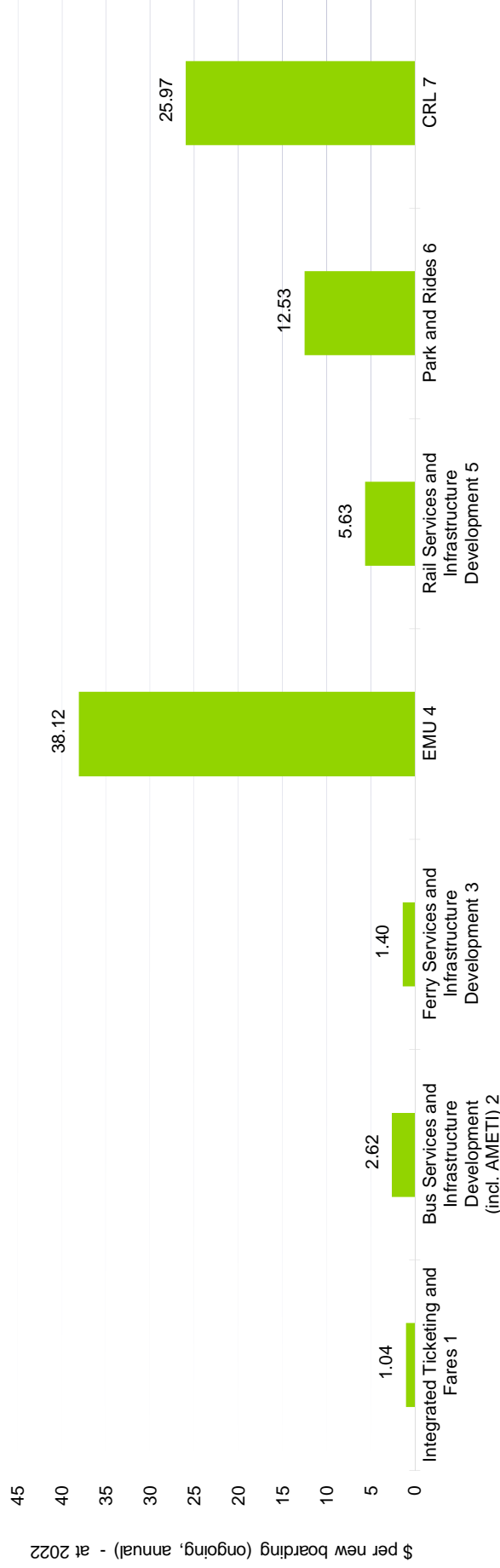
1. Integrated Ticketing and Fares modelling includes a significant reduction in fares, which enhances patronage growth but limits revenue growth. Capex per new boarding is calculated based on both historical and future project capex (\$100m in total).
2. Northern Busway capex is not included in the calculation of capex per new boarding for Bus Services and Infrastructure Development (incl. AMETI).
3. Historical capex is not considered for Ferry Services and Infrastructure Development.
4. Capex per new boarding is calculated based on both historical and future project capex (~\$1 billion in total covering rolling stock purchases and rail electrification).
5. Capex per new boarding is calculated based on both historical and future project capex (includes \$600m for DART).
6. Historical capex is not considered for Park and Rides.
7. The full patronage uplift from CRL may not be realised by 2022.



# Consequential maintenance opex and depreciation per new boarding



The following graph shows extra maintenance opex and depreciation per new boarding (ongoing, annual) for each of the project packages. No consideration has been given to potential costs of providing additional services to accommodate growth.



**Consequential maintenance opex from a new PT project is estimated as 0.85% of its capital cost.**

**Consequential depreciation is calculated based on various useful life estimates.**

**EMU has the highest extra maintenance opex and depreciation per new boarding.**

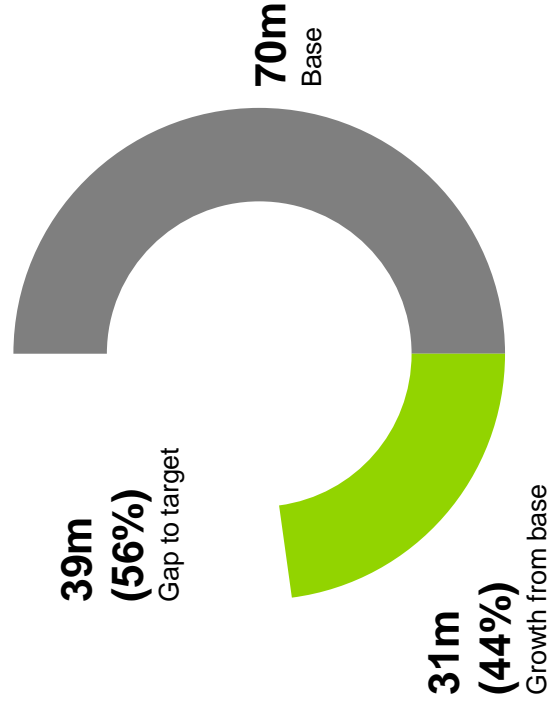
1. Consequential depreciation is calculated based on future and historical capex (~\$100m in total), using a useful life estimate of 12 years.
2. Consequential depreciation is calculated using a useful life estimate of 60 years. Northern Busway capex is not considered in the calculation of consequential depreciation.
3. Ferry Services and Infrastructure Development opex does not include the cost of running additional ferry services. Consequential depreciation is calculated using a useful life estimate of 45 years and historical capex is not considered.
4. Consequential depreciation is calculated based on future and historical capex (~\$1 billion in total covering rolling stock purchases and rail electrification), using a useful life estimate of 8 years for the rolling stock and 52 years for the infrastructure.
5. Consequential depreciation is calculated based on future and historical capex (includes \$600m for DART), using a useful life estimate of 52 years.
6. Consequential depreciation is calculated using a useful life estimate of 52 years. Historical Park and Ride capex is not considered in the calculation of consequential depreciation.
7. The full patronage uplift from CRL may not be realised by 2022. Consequential depreciation is calculated using a useful life estimate of 52 years.

# Gap analysis

# Gap to target



The gap between expected patronage in 2022 and the aspirational goal of 140m boardings is significant.



Auckland Transport has two options in order to address the gap highlighted above:

1. Revise the timeline over which the 140m aspirational goal is to be achieved, to be consistent with other cities
2. Identify new PT initiatives and encourage use at a greater rate than is possible with the current programme of projects and given restrictions

## Option 1: Reset expectations

Given the funding profile for the next ten years is relatively defined and committed, it is a realistic option for Auckland Transport to confirm that the current planned investments and activities are unable to meet expected demand and that the timeframe for reaching the 140m aspirational goal should be extended to a point that is affordable given current constraints.

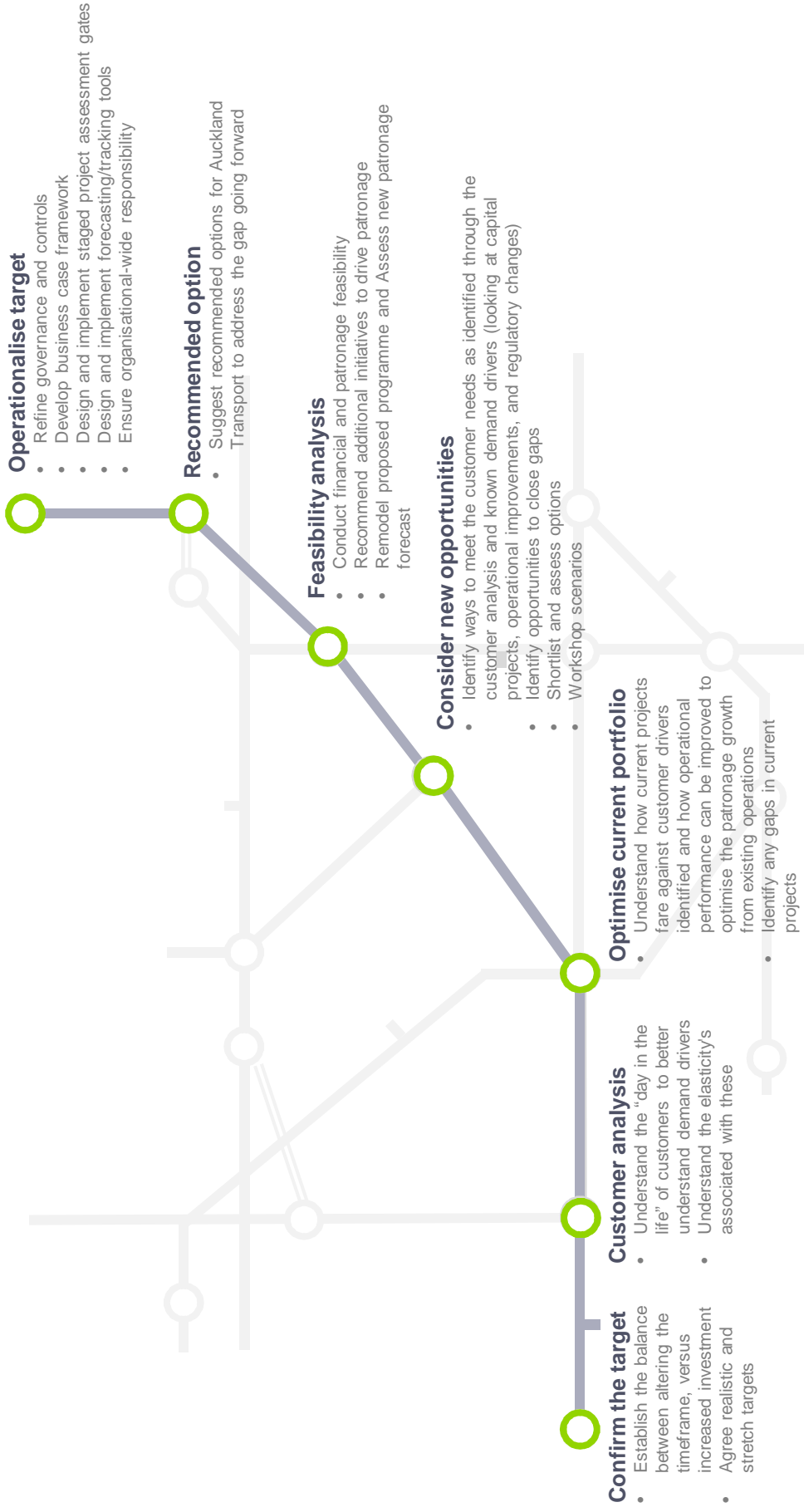
## Option 2: Refine and extend the network re-development strategy

If the aspirational goal of 140m boardings by 2022 is not negotiable, Auckland Transport will require additional analysis to generate and assess potential initiatives across customer, patronage and financial aspects. Potential areas for further consideration are proposed as a thought prompter for potential avenues open to Auckland Transport.

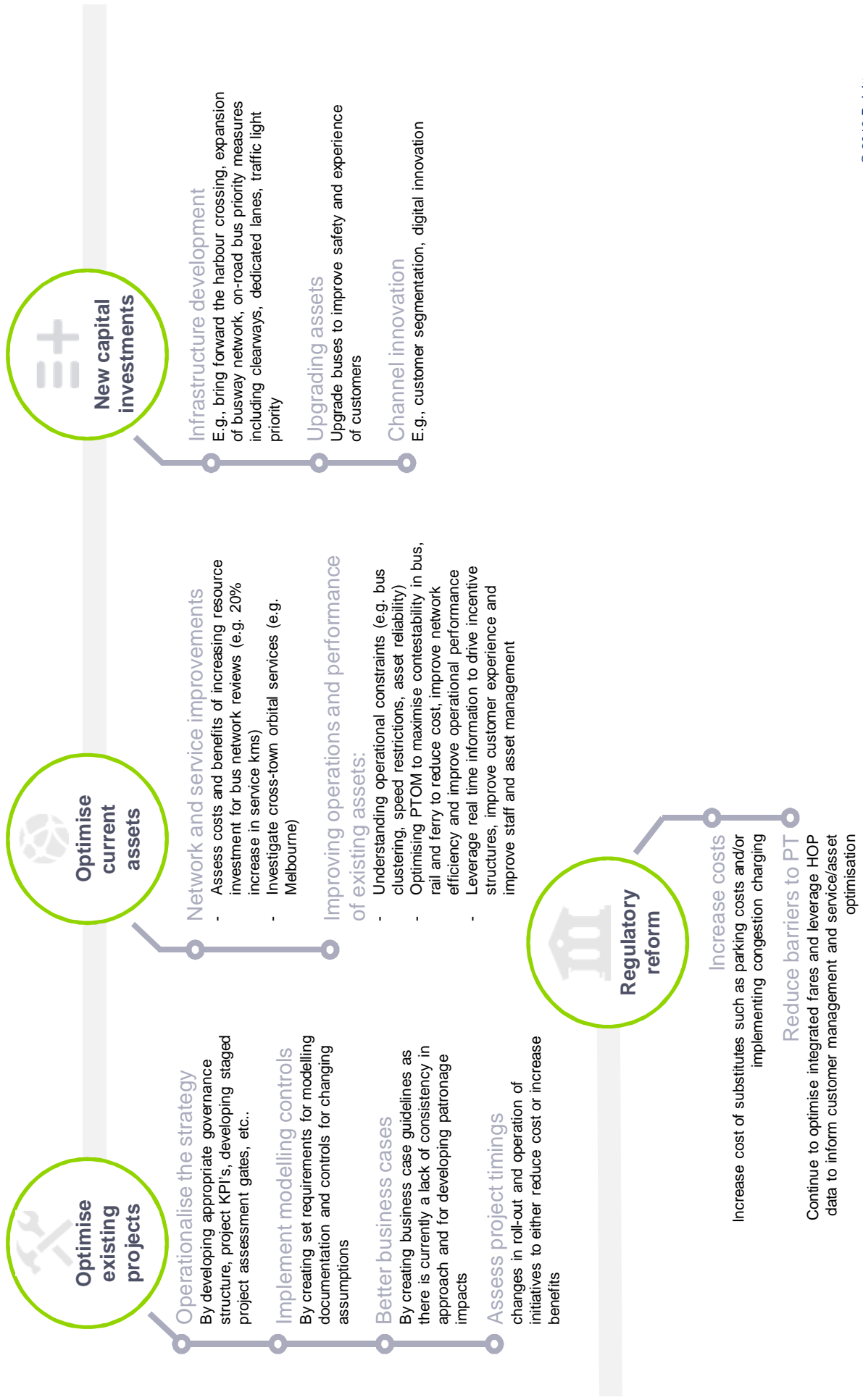
## Way forward

The proposed third phase of work will consider the options above and the most appropriate way forward for Auckland Transport to meet stakeholder and ratepayer expectations.

# Phase Three – approach and next steps



# Potential opportunities



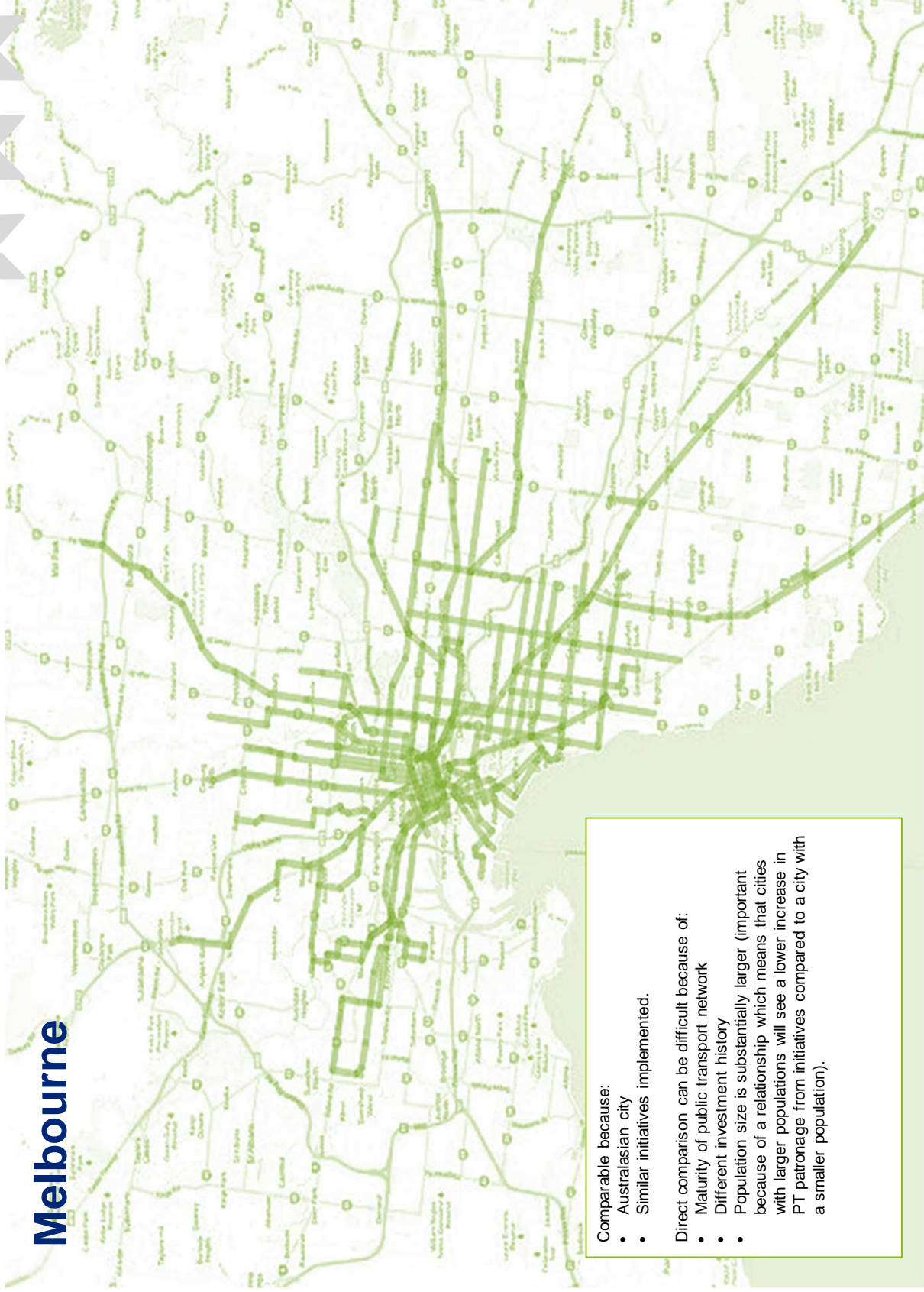
# Appendix





# Appendix: Empirical research by jurisdiction

# Melbourne



Comparable because:

- Australasian city
- Similar initiatives implemented.

Direct comparison can be difficult because of:

- Maturity of public transport network
- Different investment history
- Population size is substantially larger (important because of a relationship which means that cities with larger populations will see a lower increase in PT patronage from initiatives compared to a city with a smaller population).





# Melbourne's PT initiatives



Timeline of notable public transport initiatives and public transport patronage by mode (1990 to 2012)

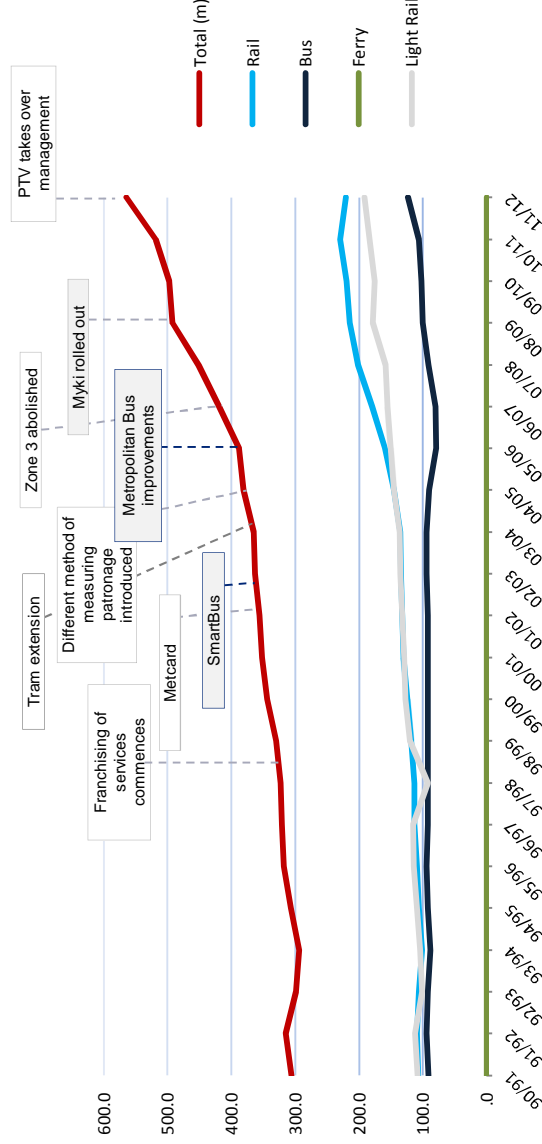
## SmartBus and Metropolitan Bus improvements

Melbourne's Bus patronage has recently grown following the introduction of new *SmartBus* services in 02/03 and a number of service and frequency improvements occurring from 05/06 as part of the Metropolitan Bus Improvement Program. The first four years of the programme sought to extend service kilometres by about a quarter, and bought bus services up to new minimum standards.

In the year to August 2007 bus patronage grew by 4.6% (historically high). Three quarters of the absolute growth in patronage has been attributed to routes that have been added, extended or upgraded in services. Routes without changed service levels grew on average at around 1.3% per annum during that same period.

Other parallel initiatives could have contributed to this patronage uplift in buses. Such initiatives include:

- Fare reductions for Sunday travel
- The elimination of fare zone 3
- The introduction of an integrated ticketing system



## Integrated ticketing (Myki)

Melbourne introduced an integrated ticketing platform in 2009 known as Myki. Myki fares are based on the same time and zone fares used under the previous Metcard system, which it replaced. Myki has been highly criticised due to delays in implementation, expense, faulty performance, and for not providing substantial benefits over the previous system. Following its introduction patronage growth appears to have flattened to 2% per annum, though this may be attributable to economic conditions. In the following years patronage has since recovered.

## Rail electrification & extension (Sunbury Line)

Recent initiatives in rail have extended the network. The most recent has been the Sunbury Extension. The Sunbury business case predicts that patronage on the line will increase by 4.7% per annum for the first 5 years and by 1.6% per annum thereafter.

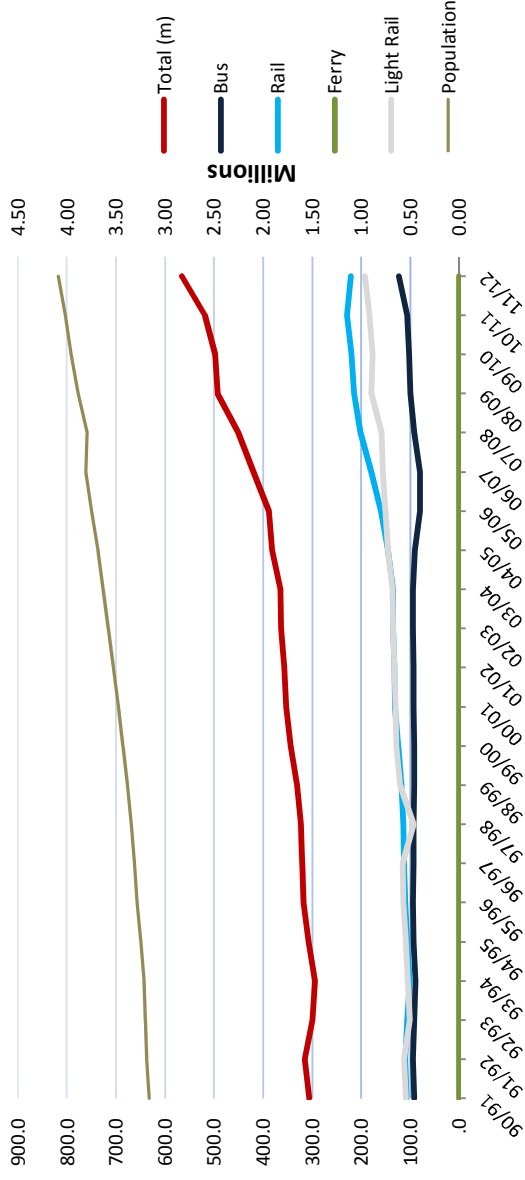
# Melbourne



## Patronage growth compared with population (1990 to 2012)

Population has followed a fairly consistent upwards trajectory over the last two decades.

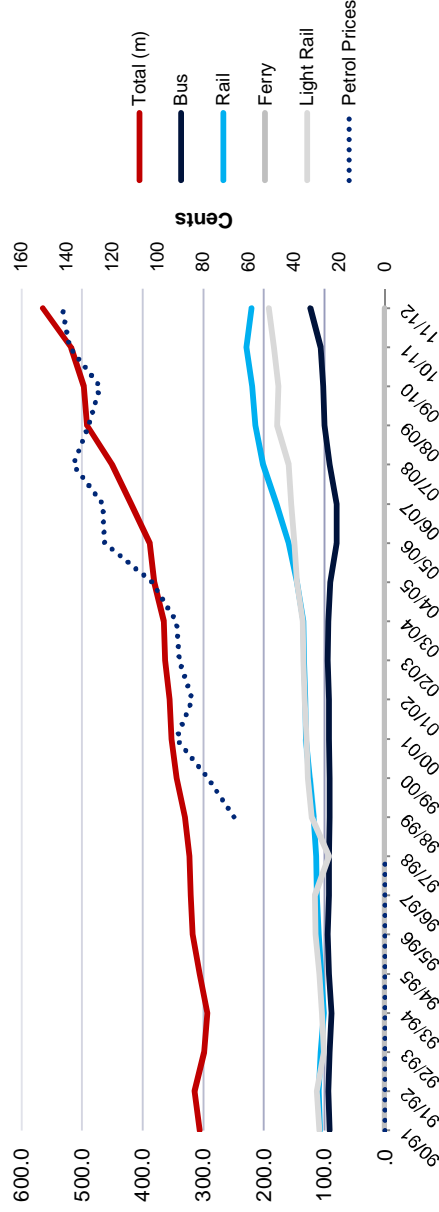
Melbourne's population is significantly higher than Auckland's and was last comparable in 1954. This is an important factor, as public transport patronage growth tends to have a lesser impact in cities with a larger population.



## Public transport patronage growth compared with petrol price fluctuations (1990 to 2012)

Patronage growth has increased together with the price of petrol. However, there appears to be a significant impact on patronage in 10/11 where petrol prices peaked, but a limited effect in 05/06 when petrol prices dipped.

Patronage growth on all modes has increased since 2003 (following limited growth during the 1990s).



# Vancouver



Comparable because:

- Western population
- Comparable demographic
- Closer in population size
- Predominately bus driven (though shifting to rail)
- Initiatives are generally perceived to be best practice.

Direct comparison can be difficult because of:

- Maturity of public transport network
- Different investment history
- Shifting focus to rail infrastructure developments.

# A substantial proportion of Vancouver's PT growth can be tracked to two key initiatives



Timeline of notable public transport initiatives and public transport patronage by mode (1990 to 2012)

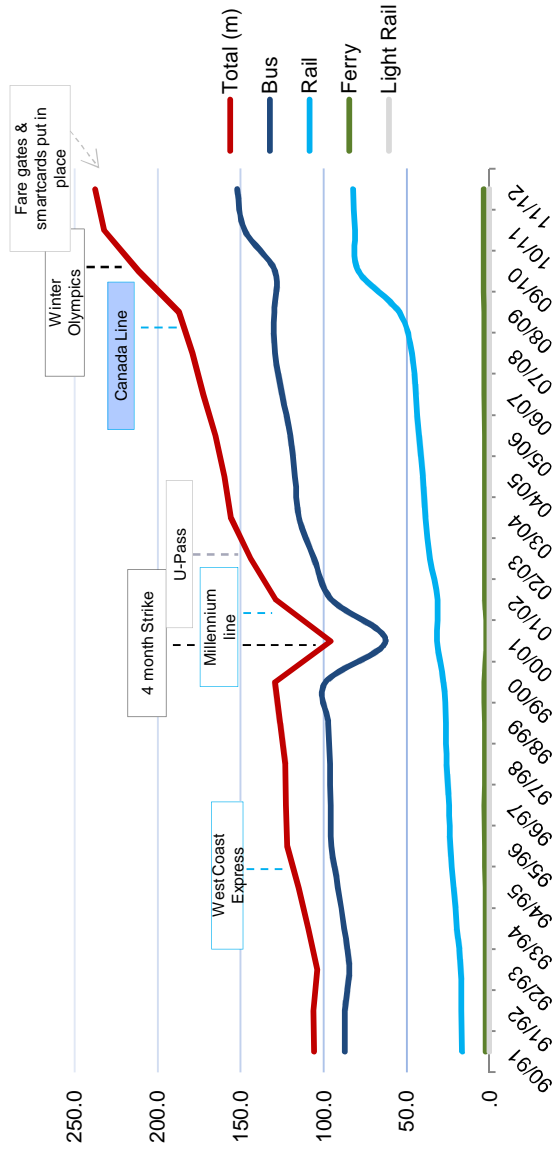
## Canada Line

Vancouver's train patronage has grown notably since the opening of the Canada Line in 2009. The initiative involved developing 19.2km of rail line with third rail electrification.

Patronage has increased on the line from 83,000 per day in 2009 (opening year) to 105,000 per day in 2010, and 136,000 per day in 2011. During the Winter Olympics the line carried 228,190 passengers per day (on average). The Canada Line reached its break even patronage goal in late 2010, three years early.

In addition to improving the network the Canada Line development provided:

- The opening of 16 new stations
- Increased frequencies and travel times (trains run approximately every 7 mins)
- Most bus routes in Richmond, as well as connecting services doubled their service frequency
- Real time information is provided in every station
- Each train has electronic displays on the exterior and interior to indicate the terminus and next station.



## Integrated ticketing & fares (U-Pass)

U-Pass is a discounted set fare system for university students and was first introduced at UBC in 2003. The following results have been reported:

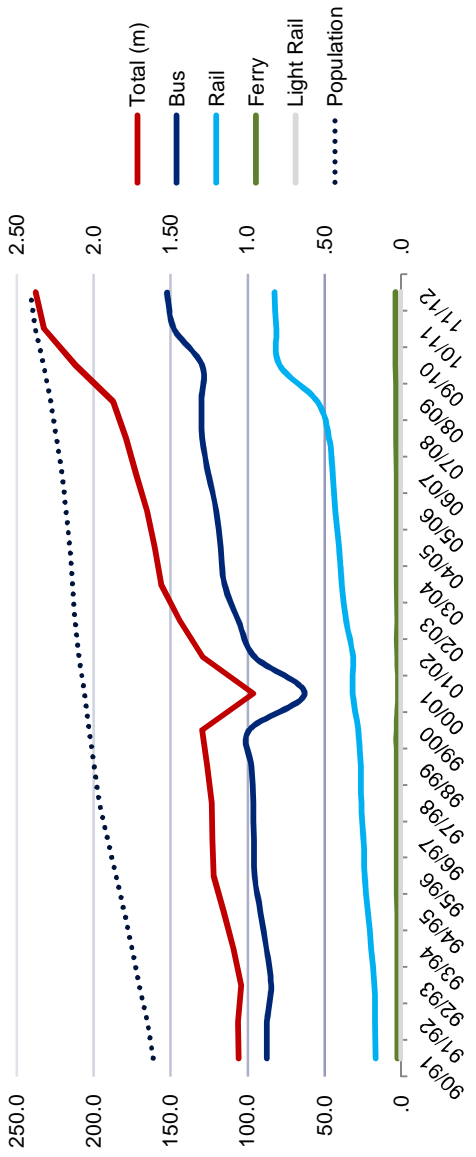
- Transit ridership at UBC has increased by 63% since its implementation
- Transit ridership now accounts for 42% of all trips to UBC, a figure expected to grow by 10% per year
- 37% of UBC students reported that they have been able to avoid buying a car as a result of the initiative.

The initiative's success has also been demonstrated at other universities in Vancouver.

# Vancouver's patronage numbers have doubled over the last decade



Patronage growth compared with population (1990 to 2012)

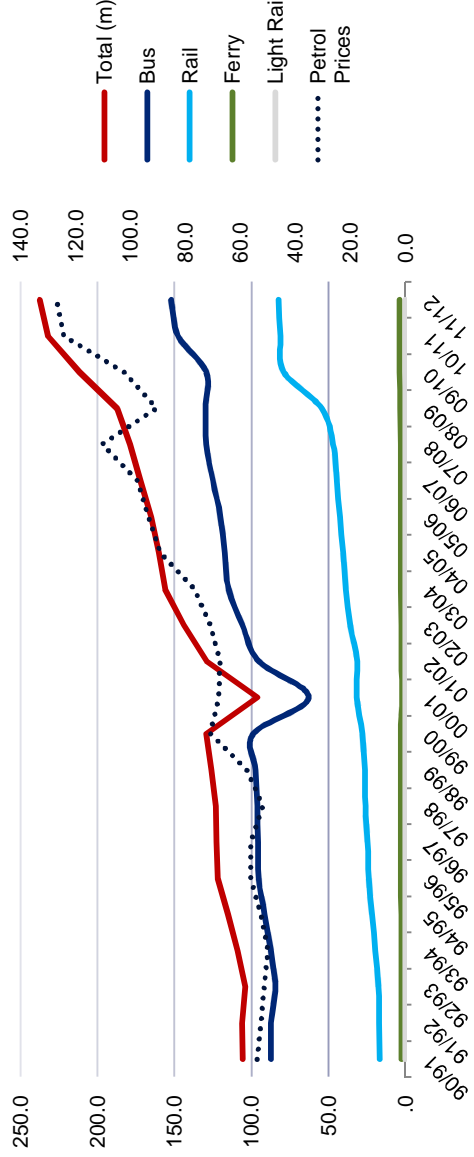


The population of Vancouver is comparatively closer to Auckland's. It too has seen consistent growth over the last two decades.

However, patronage numbers are substantially higher in Vancouver than in Auckland. With 41.3% of workers in the City of Vancouver reported as using public transport.

Patronage has doubled in Vancouver over the course of 15 years (between 92/93 and 09/10).

Public transport patronage growth compared with petrol price fluctuations (1990 to 2012)



Patronage growth has generally followed a similar trend to the price of petrol in Vancouver. In relative terms, petrol is cheaper in Vancouver than in New Zealand.

The noteworthy drop in patronage occurring in 00/01 was due to a four month long staff strike, which prevented the operation of some PT services.

# Perth



Comparable because:

- Australasian city
- Comparable population

Direct comparison can be difficult because of:

- Maturity of public transport network
- Different investment history
- Shifting mode focus from bus to rail..

**Visitor information**

- Blue C&T Bus Stop
- Red C&T Bus Stop
- Yellow C&T Bus Stop
- Railway station
- Lightning Bolt (Bike Stop)
- Cycling path

**Accommodation**

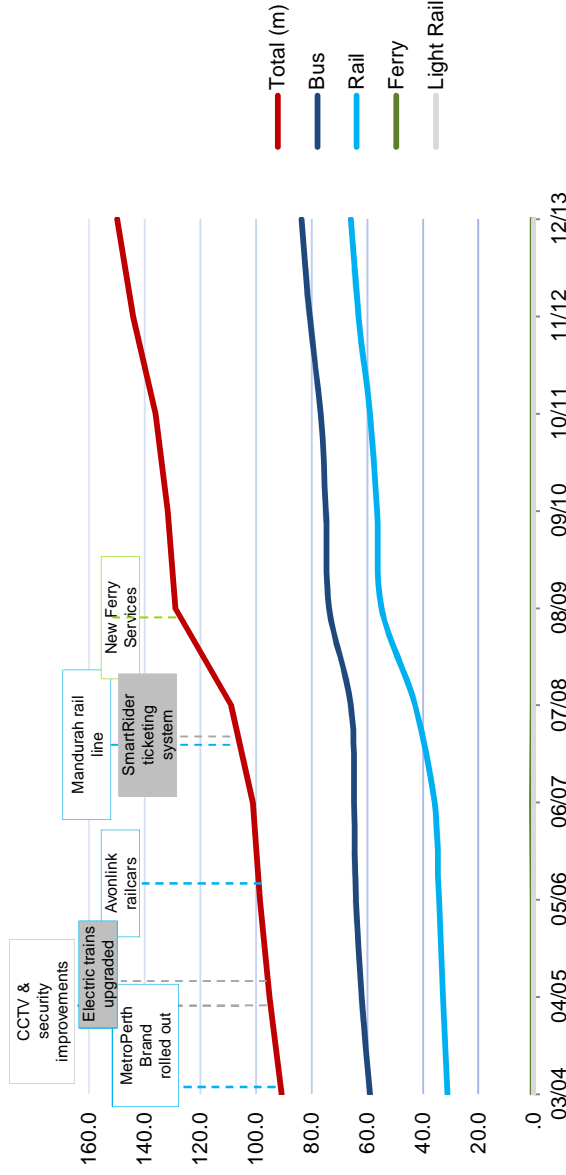
- Place of interest
- Ferry route
- Cycling path

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# Perth's PT initiatives



Timeline of notable public transport initiatives and public transport patronage by mode (2003 to 2013)



## Mandurah rail line

Perth's patronage figures have grown noticeably since the opening of the Mandurah line in December 2007. The 72km the line (which carries ~50,000 passengers per day) replaced an existing busway (which carried ~16,000 passengers per day) and connects Perth with Western Australia's second largest city, Mandurah. Construction extended into Perth's CBD and connects into Perth's underground.

The implementation of the railway line has been seen as a success, with patronage targets being reported as met after only six months. Rail patronage has grown by 36% in the three years following its opening. Patronage on the Mandurah line has accounted for ~30% of all of Perth's rail patronage in the last three years.

In addition to improving the network the Mandurah line development provided:

- 8 new stations
- Additional park and rides
- Improved feeder bus services and frequencies
- Decreased travel times.

## Electric trains

Electric lines were introduced on the Armadale, Fremantle and Midland lines in April 1992, with a 18% uplift in rail patronage on the previous year with limited change in service kilometres. Further electrification on the Joondalup (1993) and Mandurah lines (see left) introduced big shifts in rail patronage across Perth. However, these were combined with numerous other initiatives including major increases in service kilometres.

## Integrated ticketing (SmartRider)

The implementation Perth's integrated ticketing system (*SmartRider*) was originally planned for January 2005, but due to problems with implementation of reader technology, the key dates changed a number of times. *SmartRider* became available to members of the public from January 2007. The *SmartRider* card has been criticised due to increased costs to passengers and delays in implementation.

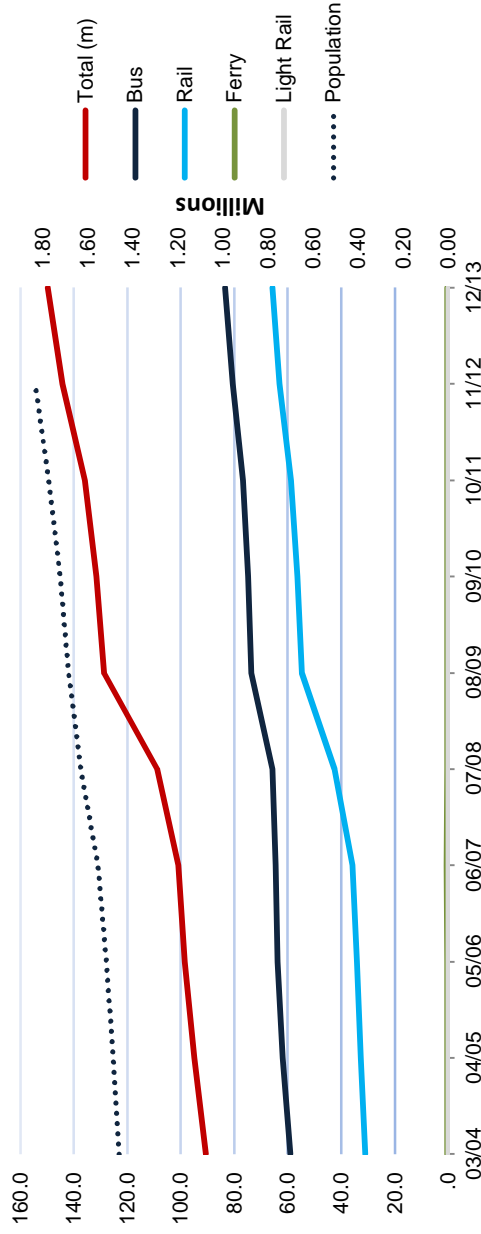
# Perth



## Patronage growth compared with population (2003 to 2013)

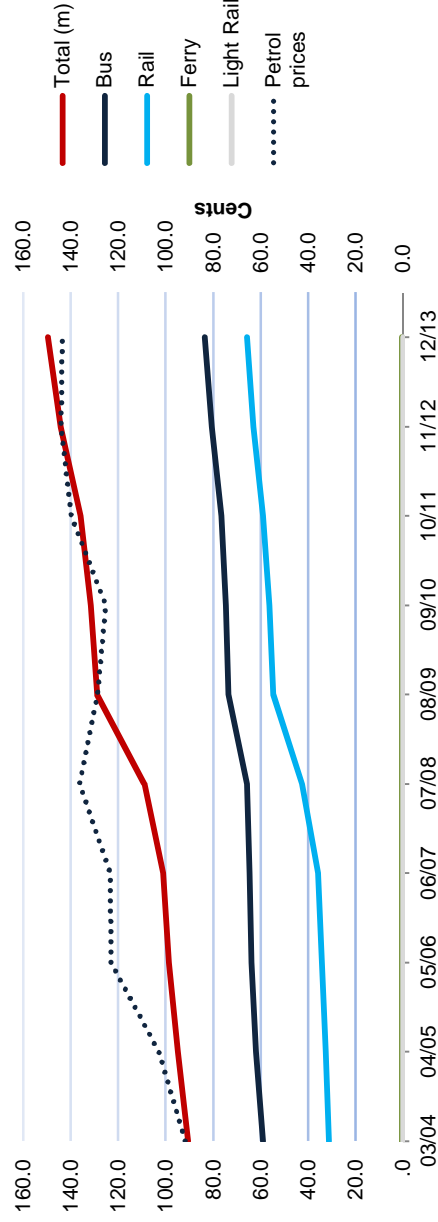
Perth's population at the beginning of the ten year period investigated is comparable to Auckland's. Perth's population has grown on average at 2% per annum over that period, higher than the rate estimated for Auckland.

Public transport has also shown substantial growth over the last ten years. A significant proportion of this jump correlates with the opening of the Mandurah rail line (in 2007).



## Public transport patronage growth compared with petrol price fluctuations (2003 to 2013)

Petrol prices in Perth have been relatively more stable. While there have been price fluctuations, the range has been between 90 cents and 145 cents. Comparatively in New Zealand petrol prices have ranged between 115 cents and 210 cents over that same period.







# Wellington



Comparable because:

- New Zealand city
- Comparable demographics
- Higher PT use per capita.

Direct comparison can be difficult because of:

- Patronage growth is not particularly strong
- No patronage impact can be inferred to be attributed to initiatives
- Different investment history
- Population size is about a quarter of the size.

# Wellington's PT initiatives



## Timeline of notable public transport initiatives and public transport patronage by mode (2002 to 2013)

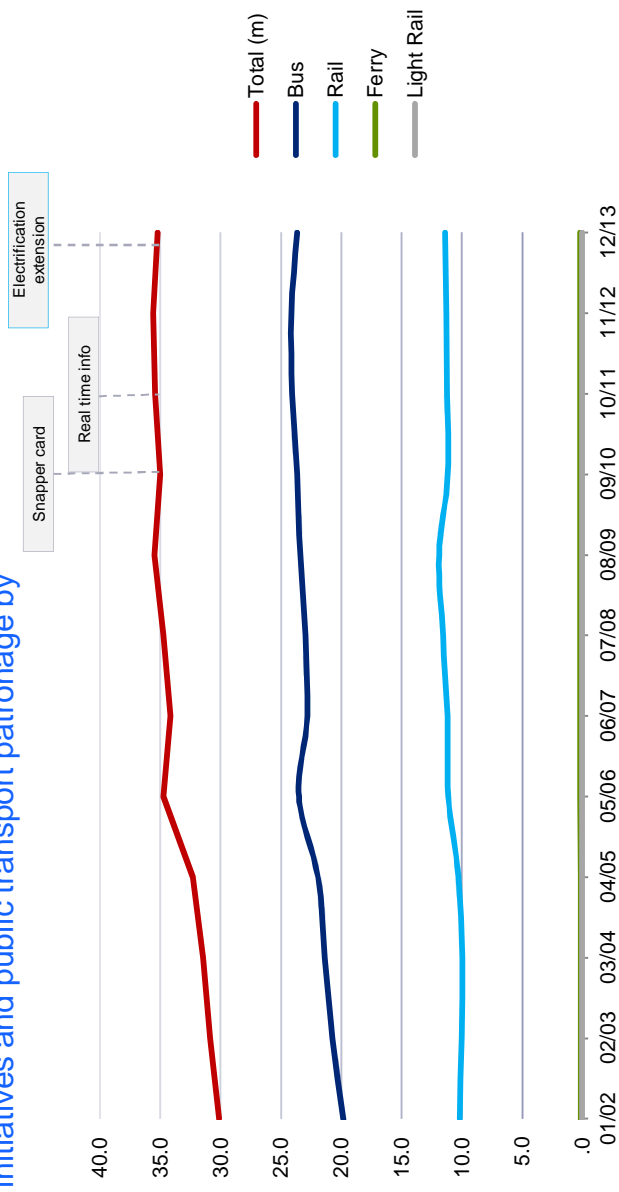
While per capita patronage is higher in Wellington than Auckland, there has been very little growth in patronage over the last six years.

Wellington has a higher proportion of non-car owners.

### Rail

Between 2008 and 2011 KiwiRail and the GRWC undertook an upgrade to Wellington's rail network, under the name Wellington Regional Rail Programme. The programme included upgrading and extending the existing electrified network, upgrading the trains and double-tracking lines to improve capacity, and installing a third, bi-directional, line into Wellington Station.

Despite these efforts, patronage has remained flat. Since 06/07.



### Real time information

Wellington introduced real time information to passengers in 2011. Real time information tells passengers exactly when their bus or train will arrive through Global Position System (GPS) vehicle tracking. Real time information was anticipated to improve people's perceptions of bus and train reliability. However, no corresponding growth in patronage can be seen (in fact patronage has decreased by 1% since its introduction).



# Appendix: Patronage modelling assumptions

# ART3 model assumptions



Key Variable	Original Input Value	Revised Input Value	Rationale
Land use scenario	60%/40% development capacity inside/outside the 2010 MUL	Same as original assumption	No comment
Population growth	Scenario I (Modified) Version 5 B 2011: 1,455,226 2016: 1,579,213 (CAGR = 1.6% pa) 2021: 1,697,718 (CAGR = 1.6% pa) 2026: 1,812,710 (CAGR = 1.5% pa)	Same as original assumption	The average population growth rate for Auckland was around 1.6% pa over the last 5 years (according to Stats NZ data). Furthermore, population growth for Auckland is projected to be between 1.1% and 1.8% pa on average for the next 20 years (according to Stats NZ data).
Household growth	Scenario I (Modified) Version 5 B 2011: 493,418 2016: 555,730 (CAGR = 2.4% pa) 2021: 610,092 (CAGR = 2.1% pa) 2026: 662,431 (CAGR = 2.0% pa)	Same as original assumption	The household growth assumption supports the trend towards smaller household sizes. Household projections have a less significant impact on patronage forecasts than population and employment projections.
Employment growth	Scenario I (Modified) Version 5 B 2011: 548,780 2016: 632,641 (CAGR = 1.6% pa) 2021: 677,831 (CAGR = 1.5% pa) 2026: 720,969 (CAGR = 1.4% pa)	Same as original assumption	The average employment growth rate for Auckland was around 1.8% pa over the period 2000 to 2012, although only 0.4% pa over the last 5 years (according to Stats NZ data). The original assumption represents a return to economic growth and appears reasonable.
CBD employment growth	Scenario I (Modified) Version 5 B 2011: 78,557 2016: 90,150 (CAGR = 2.8% pa) 2021: 101,550 (CAGR = 2.6% pa) 2026: 112,854 (CAGR = 2.4% pa)	2011: 78,557 2016: 85,886 (CAGR = 1.8% pa) 2021: 93,899 (CAGR = 1.8% pa) 2026: 102,660 (CAGR = 1.8% pa)	We considered the original CBD employment growth assumption to be aggressive. We revised the forecast growth rate to 1.8% pa to align with the observed average growth rate for Auckland CBD employment over the period 2000 to 2012 (according to Stats NZ data).
Car ownership (% of households with 0, 1, 2 and 3+ cars)	0 cars: 1.2% 1 car: 31.8% 2 cars: 51.3% 3 cars: 15.7%	Same as original assumption	Not applicable

# ART3 model assumptions (cont.)



Key Variable	Original Input Value	Revised Input Value	Rationale
Fuel prices	Average petrol price (real 2006\$) 2011: \$2.50 2016: \$2.38 2021: \$2.42 2022: \$2.44	Average petrol price (real 2006\$) 2011: \$1.72 2016: \$1.99 2021: \$2.15 2022: \$2.17	We considered the original petrol prices to be too high and disagreed with the expectation that 2011 prices would be higher than 2016, 2021 and 2022 prices. Our revised petrol price forecast represents a median scenario, which was derived from petrol price forecasts produced by the Ministry of Business, Innovation and Employment in 2011.
Toll and road pricing	ALPURT toll = \$2 per trip	Same as original assumption	No comment
Parking charges (real 2006\$)	<p><b>Home based work trips 2011</b> CBD zones: ~\$10.50 per day Other charged zones: ~\$8 per day Assume 50% of travellers paying</p> <p><b>Other parking charges 2011</b> CBD zones: ~\$2.55 Other charged zones: ~\$1.55</p> <p><b>Home based work trips 2016</b> CBD zones: ~\$11.70 per day Other charged zones: ~\$7.80 per day Assume 50% of travellers paying</p> <p><b>Other parking charges 2016</b> CBD zones: ~\$2.80 Other charged zones: ~\$1.35</p> <p><b>Home based work trips 2021</b> CBD zones: ~\$13.00 per day Other charged zones: ~\$8 per day Assume 50% of travellers paying</p> <p><b>Other parking charges 2021</b> CBD zones: ~\$3.05 Other charged zones: ~\$1.70</p>	Same as original assumption	We researched current parking charges set by AT, Wilson Parking and Tournament Parking, and measured these charges in 2006 dollars. After making this adjustment, we observed that original input values sit within current parking charge ranges.

# ART3 model assumptions (cont.)



Key Variable	Original Input Value	Revised Input Value	Rationale
Real GDP / capita growth	1.8% pa based on historical data	Same as original assumption	NZ Treasury is forecasting real GDP per capita growth for New Zealand to be between 1.3% pa and 2.0% pa over the next 5 years. The original assumption appears reasonable.
TDM assumptions	<p><b>Working from home</b> 16.9% of people in 2006, 19.9% of people in 2021, 22.9% of people in 2041 (60% of RLTS 2010 assumptions)</p> <p><b>Reduction in car trips to work - CBD</b> 18% reduction on 2006 car trips by 2021, no further reductions thereafter (60% of RLTS 2010 assumptions)</p> <p><b>Reduction in car trips to work - RGS centres</b> 7.5% reduction on 2006 car trips, moved to PT modes and active modes (walking and cycling) (50% of RLTS 2010 assumptions)</p> <p><b>Reduction in car trips to work - Non-RGS centres</b> 3% reduction on 2006 car trips in 50% of workplaces (1.5% of trips), moved to PT modes and active modes (walking and cycling) by 2026 (60% of RLTS 2010 assumptions)</p> <p><b>Reduction in car trips to school and tertiary (Education TDM initiatives)</b> 5.1% reduction on 2006 car trips by 2016, 9% by 2026 and 20% by 2051 (100% of RLTS 2010 assumptions)</p> <p><b>Reduction in shopping and other car trips (Community TDM initiatives)</b> 0.75% reduction on 2006 car trips by 2016, 1.5% by 2026 and 3.75% by 2051 (25% of RLTS 2010 assumptions)</p>	Same as original assumption	No comment

# APT model assumptions



Key Variable	Original Input Value	Revised Input Value	Rationale
Generalised cost – access time to / from mode	<p>Walk times in the APT model have been based on an assumed walking speed of 4.8 km/hr</p> <p>In the Auckland CBD, this has been reduced to 3 km/hr to allow for delays in crossing roads</p> <p>APT model calibration 2001-03</p> <p>Walk generalised cost weight = 2.0 (relative to in-vehicle time)</p>	Same as original assumption	AT is currently planning to update the APT Model once the 2013 Census data is made available. Therefore, we considered it inappropriate to request input changes.
Generalised cost – waiting time penalty	<p>Unplanned transfer = 3 mins + [0.22 x frequency of service (mins)]</p> <p>Planned transfer = 3 mins + [0.01 x frequency of service (mins)]</p> <p>Wait generalised cost weight = 2.0</p>	Same as original assumption	AT is currently planning to update the APT Model once the 2013 Census data is made available. Therefore, we considered it inappropriate to request input changes.
Generalised cost – boarding penalty	<p>High quality interchange = 5 min penalty</p> <p>Purpose interchange = 8 min penalty</p> <p>Normal interchange = 10 min penalty</p>	Same as original assumption	AT is currently planning to update the APT Model once the 2013 Census data is made available. Therefore, we considered it inappropriate to request input changes.
Generalised cost – in-vehicle time	In-vehicle time generalised cost weight = 1.0	Same as original assumption	AT is currently planning to update the APT Model once the 2013 Census data is made available. Therefore, we considered it inappropriate to request input changes.
Generalised cost – mode-specific factors	<p>There are perceived adjustments to the Rail and Ferry in-vehicle time used in the generalised cost of travel calculations (0.9 and 0.8 respectively)</p> <p>Bus = 1.0</p>	Same as original assumption	AT is currently planning to update the APT Model once the 2013 Census data is made available. Therefore, we considered it inappropriate to request input changes.

# APT model assumptions (cont.)



Key Variable	Original Input Value	Revised Input Value	Rationale																																						
<p><b>Bus</b>                      Fare structure = boarding charge + price per km                      Boarding charge = \$0.45                      Price per km = \$0.12                      Value of time = \$6.00 per hour                      Bus fare = 4.5 mins + 1.2 mins per km</p> <p><b>Rail</b>                      Fare structure = boarding charge + price per fare stage                      Boarding charge = \$0.82                      Price per km = \$0.58                      Value of time = \$6.00 per hour                      Fare = 8.2 mins + 5.8 mins per stage</p> <p><b>Ferry</b></p> <table border="1" data-bbox="718 1041 1053 1713"> <thead> <tr> <th>Ferry Service</th> <th>Average Fare (\$)</th> <th>Ferry Fare (minutes)</th> </tr> </thead> <tbody> <tr><td>Bayswater</td><td>\$3.61</td><td>29.49</td></tr> <tr><td>Birkenhead</td><td>\$3.61</td><td>29.49</td></tr> <tr><td>Devonport</td><td>\$3.93</td><td>32.11</td></tr> <tr><td>Half-Moon Bay</td><td>\$5.14</td><td>42.04</td></tr> <tr><td>Northcote Point</td><td>\$3.61</td><td>29.49</td></tr> <tr><td>Stanley Bay</td><td>\$3.93</td><td>32.11</td></tr> <tr><td>Waiheke</td><td>\$12.68</td><td>103.64</td></tr> <tr><td>Hosonville</td><td>\$7.86</td><td>64.23</td></tr> <tr><td>Beach Haven</td><td>\$5.71</td><td>46.71</td></tr> <tr><td>Gulf Harbour</td><td>\$8.93</td><td>72.99</td></tr> <tr><td>Pine Harbour</td><td>\$7.86</td><td>64.23</td></tr> <tr><td>West Harbour</td><td>\$7.14</td><td>58.39</td></tr> </tbody> </table>	Ferry Service	Average Fare (\$)	Ferry Fare (minutes)	Bayswater	\$3.61	29.49	Birkenhead	\$3.61	29.49	Devonport	\$3.93	32.11	Half-Moon Bay	\$5.14	42.04	Northcote Point	\$3.61	29.49	Stanley Bay	\$3.93	32.11	Waiheke	\$12.68	103.64	Hosonville	\$7.86	64.23	Beach Haven	\$5.71	46.71	Gulf Harbour	\$8.93	72.99	Pine Harbour	\$7.86	64.23	West Harbour	\$7.14	58.39	<p>Same as original assumption</p>	<p>AT is currently planning to update the APT Model once the 2013 Census data is made available. Therefore, we considered it inappropriate to request input changes.</p>
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<p>Generalised cost – fare paid</p>																																									



# Funded package



- The **'Funded' package** comprises the following fully funded PT projects:
  - Manukau City Rail Link (Manukau Transport Interchange)
  - AMETI - Sylvia Park Bus Lanes Package 2
  - EMU - Rolling Stock Purchase
  - EMU Project
  - AMETI - Panmure Corridor Package 1 / Panmure-Pakuranga Busway
  - Botany to Manukau RTN
  - Botany to Manukau RTN - Botany Interchange
  - Parnell Station (SUP)
  - Papakura Station (SUP)
  - Puhinui Station (SUP)
  - Downtown Ferry Terminal Pier 2
  - Downtown Ferry Terminal Pier 3 and 4
  - Otahuhu Bus Interchange
  - Dominion Road Corridor Upgrade
  - Mt Albert Station (SUP)
  - Newmarket Station
  - Swanson Station
  - Stanley Bay Ferry Terminal
  - East Coast Rd Bus Priority
  - Sylvia Park Station
  - Puhinui Park and Ride
  - Takanini Park and Ride
  - Manukau City Centre Car park #2 - Hayman Park
  - IT HOP Phase 2

## Funded package (cont.)



- The **'Funded' package** also comprises the following fully funded PT projects:
  - PTNP Bus Frequent Network Infrastructure and Facilities Gen Investigation
  - CBD Bus Infrastructure Requirements – Investigation
  - Albany Busway Station Platform Extension
  - Triangle Road/Lincoln Road Bus Interchange
  - CBD Bus Infrastructure Requirements Wellesley Street
  - CBD Bus Infrastructure Requirements Fanshawe Street
  - Te Atatu Motorway Bus Interchange
  - Pukekohe Bus and Rail Interchange
  - Papakura Bus and Rail Interchange
  - CBD Bus Infrastructure Requirements Albert Street
  - Downtown Ferry Terminal P-1 Integrated Ticketing Gates (AIFS)
  - Pukekohe Rail Electrification Investigation
  - Swanson Park and Ride
  - Tamaki Rail Station (re-established as new high quality station)
  - Panmure Bus-Rail Interchange (AMETI) and associated service changes
  - Increased Services on the QTN Ferry Service from Devonport to the Auckland CBD
  - Service Improvements to Waiheke Island (Matiatia)
  - Service Improvements to the West Harbour Terminal
  - Service Improvements to Half Moon Bay
  - Service Improvements to Pine Harbour
  - New Services to the Hobsonville Terminal (to include Beach Haven)
  - Increased Services on the QTN Ferry Service from Birkenhead to the Auckland CBD
  - Increased Services on the QTN Ferry Service from Bayswater to the Auckland CBD

# Unfunded package



- The ‘**Unfunded**’ package comprises the following fully funded PT projects:
  - Hibiscus Coast Busway Station
  - Davies Ave Carpark Building Upgrade
  - CRL Construction
  - CRL - Frequency Change (from 10 to 7.5 mins)
  - Te Mahia Station (SUP)
  - Takanini Station (SUP)
  - Downtown Ferry Terminal Queens Wharf Extension
  - Glen Innes Station
  - Westfield Station (SUP)
  - Northern Busway Extension – Stations
  - Te Atatu Ferry Terminal
  - Glen Eden Park and Ride
  - Rosedale / Greville Busway Station
  - Sunnyvale Station
  - Devonport Ferry Terminal
  - Bayswater Ferry Terminal
  - Northcote Point Ferry Terminal
  - Beachaven Ferry Terminal
  - Sylvia Park Station Park and Ride
  - Avondale Station Park and Ride
  - Huapai Station (SUP)
  - Half Moon Bay Ferry Terminal & Vehicular Ferries
  - Drury Station (SUP)
  - Waitakere Station (SUP)

## Unfunded package (cont.)



- The ‘**Unfunded**’ package also comprises the following fully funded PT projects:
  - Devonport Stanley Bay Wharf Access Upgrade
  - Rail Service Extension to Kumeu & Waimauku
  - New Zones and Integrated Fares
  - Albany to Silverdale (Northern Busway Extension)
  - Constellation to Albany (Northern Busway Extension)

# Specific project packages



- The **'Integrated Ticketing and Fares' package** comprises the following PT projects:
  - IT HOP Phase 2
  - Downtown Ferry Terminal P-1 Integrated Ticketing Gates (AIFS)
  - New Zones and Integrated Fares
- The **'Ferry Services and Infrastructure Development' package** comprises the following PT projects:
  - Downtown Ferry Terminal Pier 2
  - Downtown Ferry Terminal Pier 3 and 4
  - Stanley Bay Ferry Terminal
  - Downtown Ferry Terminal Queens Wharf Extension
  - Te Atatu Ferry Terminal
  - Devonport Ferry Terminal
  - Bayswater Ferry Terminal
  - Northcote Point Ferry Terminal
  - Beachaven Ferry Terminal
  - Half Moon Bay Ferry Terminal & Vehicular Ferries
  - Devonport Stanley Bay Wharf Access Upgrade
  - Increased Services on the QTN Ferry Service from Devonport to the Auckland CBD
  - Service Improvements to Waiheke Island (Matiatia)
  - Service Improvements to the West Harbour Terminal
  - Service Improvements to Half Moon Bay
  - Service Improvements to Pine Harbour
  - New Services to the Hobsonville Terminal (to include Beach Haven)
  - Increased Services on the QTN Ferry Service from Birkenhead to the Auckland CBD
  - Increased Services on the QTN Ferry Service from Bayswater to the Auckland CBD

## Specific project packages (cont.)



- The ‘**Bus Services and Infrastructure Development (including AMETI)**’ package comprises the following PT projects:
  - AMETI - Sylvia Park Bus Lanes Package 2
  - AMETI - Panmure Corridor Package 1 / Panmure-Pakuranga Busway Botany to Manukau RTN
  - Botany to Manukau RTN - Botany Interchange
  - Otahuhu Bus Interchange
  - Dominion Road Corridor Upgrade
  - East Coast Rd Bus Priority
  - PTNP Bus Frequent Network Infrastructure and Facilities Gen Investigation
  - CBD Bus Infrastructure Requirements – Investigation
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  - CBD Bus Infrastructure Requirements Wellesley Street
  - CBD Bus Infrastructure Requirements Fanshawe Street
  - Te Atatu Motorway Bus Interchange
  - Pukekohe Bus and Rail Interchange
  - Papakura Bus and Rail Interchange
  - CBD Bus Infrastructure Requirements Albert Street
  - Panmure Bus-Rail Interchange (AMETI) and associated service changes
  - Hibiscus Coast Busway Station
  - Northern Busway Extension – Stations
  - Rosedale / Greville Busway Station
  - Albany to Silverdale (Northern Busway Extension)
  - Constellation to Albany (Northern Busway Extension)

## Specific project packages (cont.)



- The **'Rail Services and Infrastructure Development' package** comprises the following PT projects:
  - Manukau City Rail Link (Manukau Transport Interchange)
  - Parnell Station (SUP)
  - Papakura Station (SUP)
  - Puhinui Station (SUP)
  - Mt Albert Station (SUP)
  - Newmarket Station
  - Swanson Station
  - Tamaki Rail Station (re-established as new high quality station)
  - Te Mahia Station (SUP)
  - Takanini Station (SUP)
  - Glen Innes Station
  - Westfield Station (SUP)
  - Sunnyvale Station
  - Huapai Station (SUP)
  - Drury Station (SUP)
  - Waitakere Station (SUP)
  - Rail Service Extension to Kumeu & Waimauku
  - EMU - Rolling Stock Purchase
  - EMU Project
- The **'EMU' package** comprises the following PT projects:
  - EMU - Rolling Stock Purchase
  - EMU Project
  - Pukekohe Rail Electrification Investigation

## Specific project packages (cont.)



- The **'Park and Rides' package** comprises the following PT projects:
  - Puhinui Park and Ride
  - Takanini Park and Ride
  - Manukau City Centre Car park #2 - Hayman Park
  - Swanson Park and Ride
  - Davies Ave Carpark Building Upgrade
  - Glen Eden Park and Ride
  - Sylvia Park Station Park and Ride
  - Avondale Station Park and Ride
- The **'CRL' package** comprises the following PT projects:
  - CRL Construction
  - CRL - frequency change (from 10 to 7.5 mins)
  - EMU - Rolling Stock Purchase
  - EMU Project
  - Tamaki Rail Station (re-established as new high quality station)



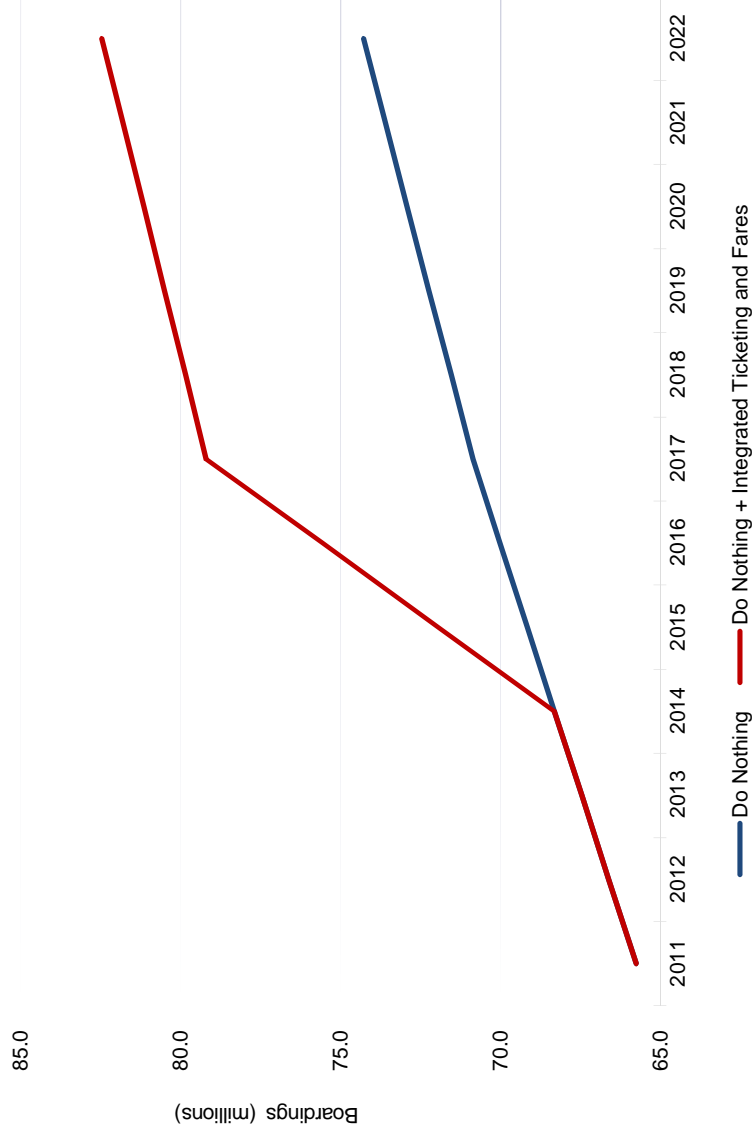


# Appendix: Patronage modelling scenarios

# Specific project packages



Patronage forecast – Integrated Ticketing and Fares



**Patronage benefits** from Integrated Ticketing and Fares are expected to **ramp up in 2015**

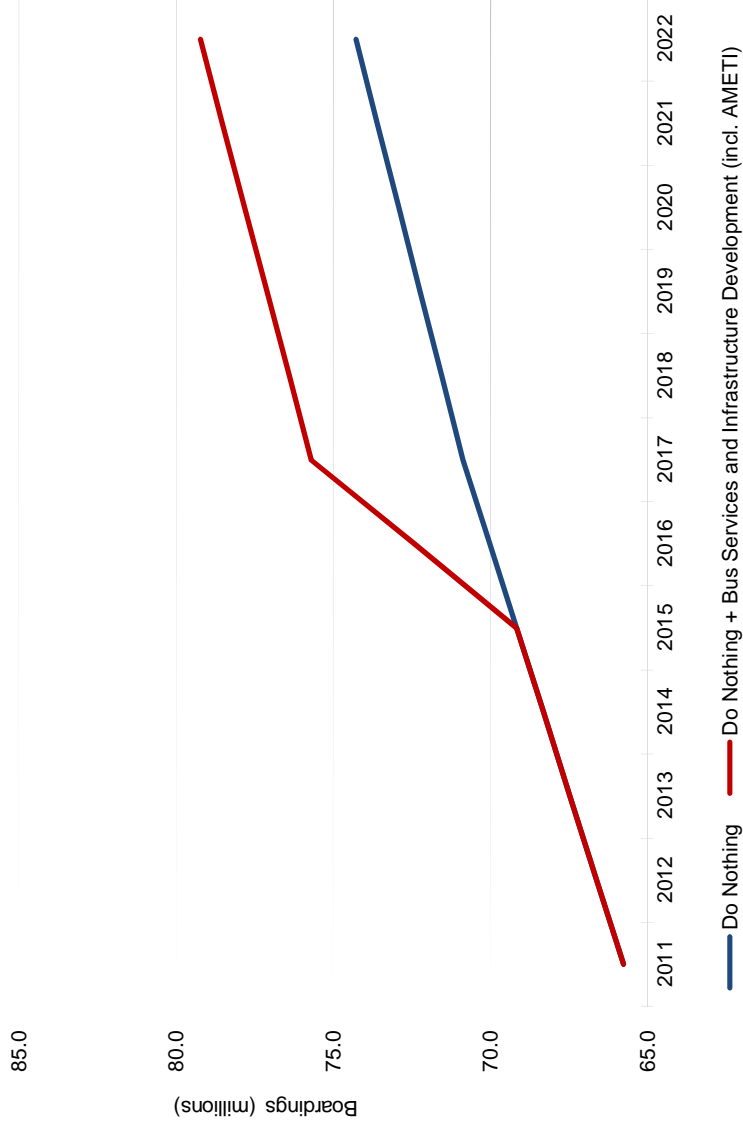
According to the APT Model forecasts, Integrated Ticketing and Fares is projected to increase patronage by **~8m boardings by 2022** (on top of the Do Nothing forecast)

Integrated Ticketing and Fares modelling includes a **significant reduction in fares**, which **enhances patronage growth**

# Specific project packages (cont.)



Patronage forecast – Bus Services and Infrastructure Development (incl. AMETI)



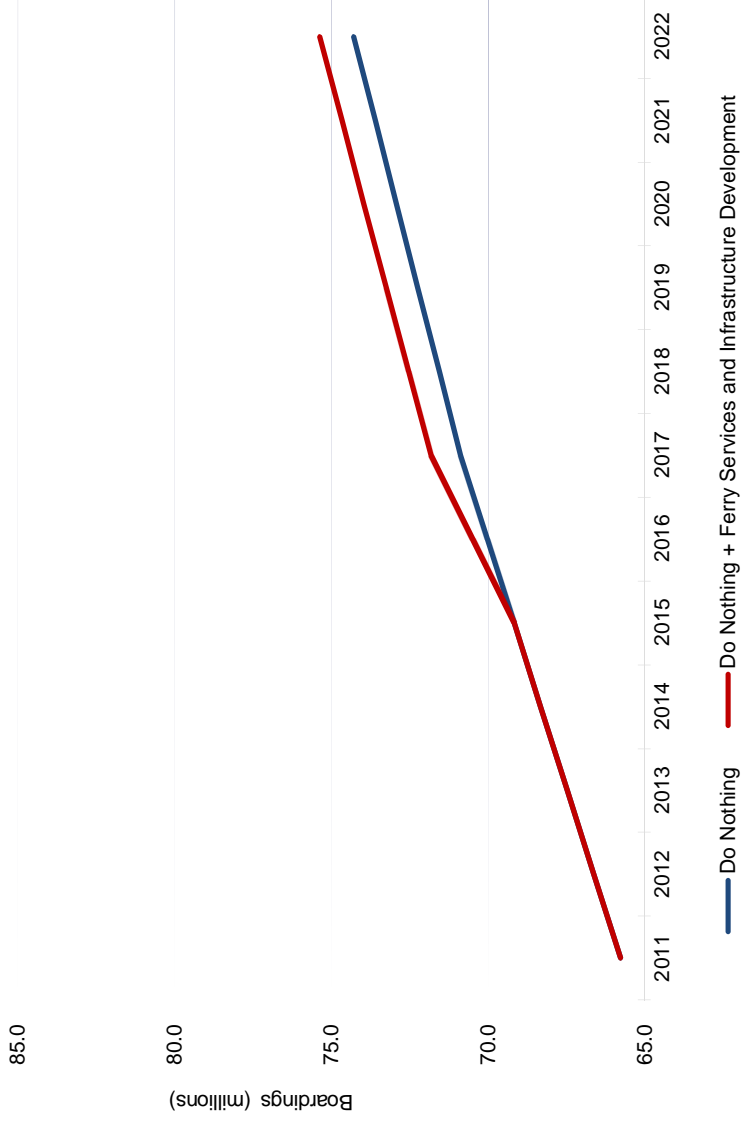
**Patronage benefits** from the Bus Services and Infrastructure Development (incl. AMETI) package are expected to **ramp up in 2016**

According to the APT Model forecasts, the Bus Services and Infrastructure Development (incl. AMETI) package is projected to increase patronage by **~5m boardings by 2022** (on top of the Do Nothing forecast)

# Specific project packages (cont.)



Patronage forecast – Ferry Services and Infrastructure Development



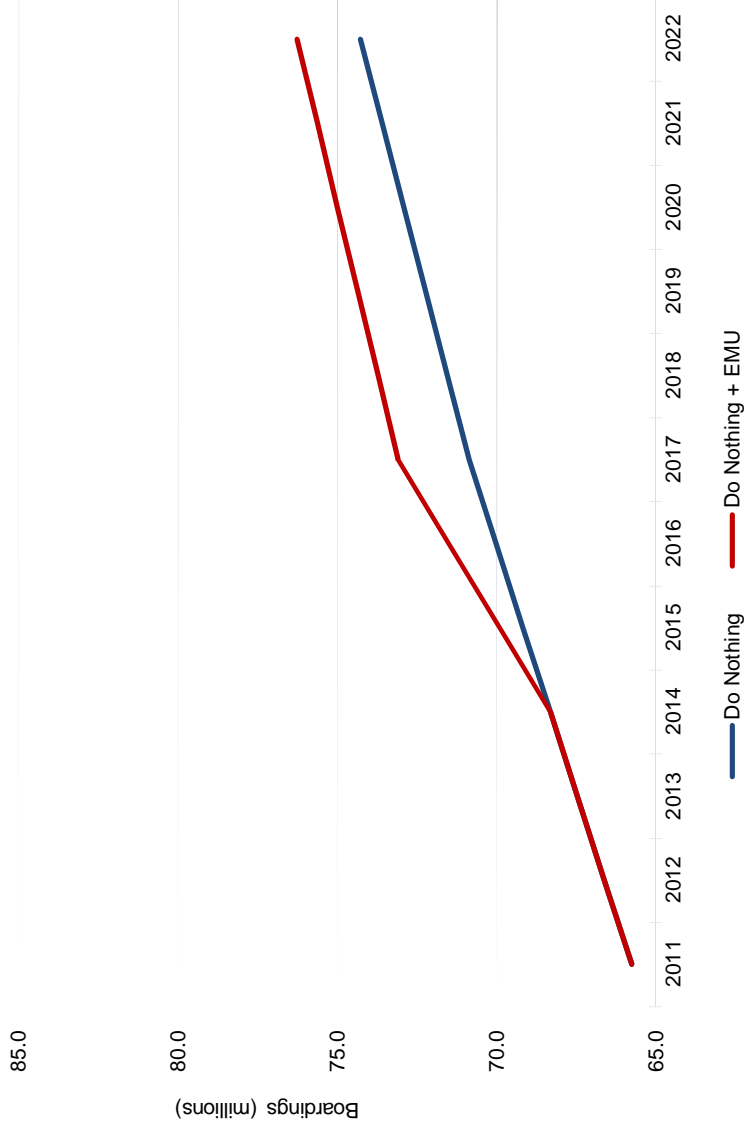
**Patronage benefits** from the Ferry Services and Infrastructure Development package are expected to **ramp up in 2016**

According to the APT Model forecasts, the Ferry Services and Infrastructure Development package is projected to increase patronage by **~1m boardings by 2022** (on top of the Do Nothing forecast)

# Specific project packages (cont.)



Patronage forecast – EMU



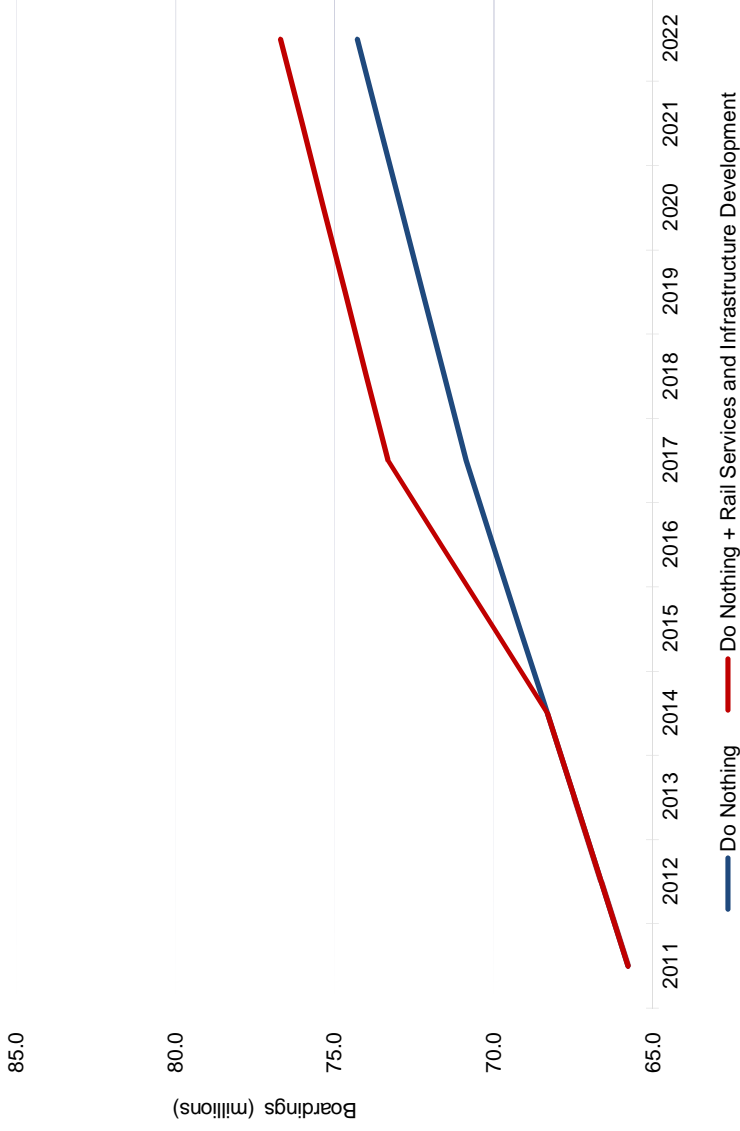
**Patronage benefits** from the EMU package are expected to **ramp up in 2015**

According to the APT Model forecasts, the EMU package is projected to increase patronage by **~2m boardings by 2022** (on top of the Do Nothing forecast)

# Specific project packages (cont.)



Patronage forecast – Rail Services and Infrastructure Development



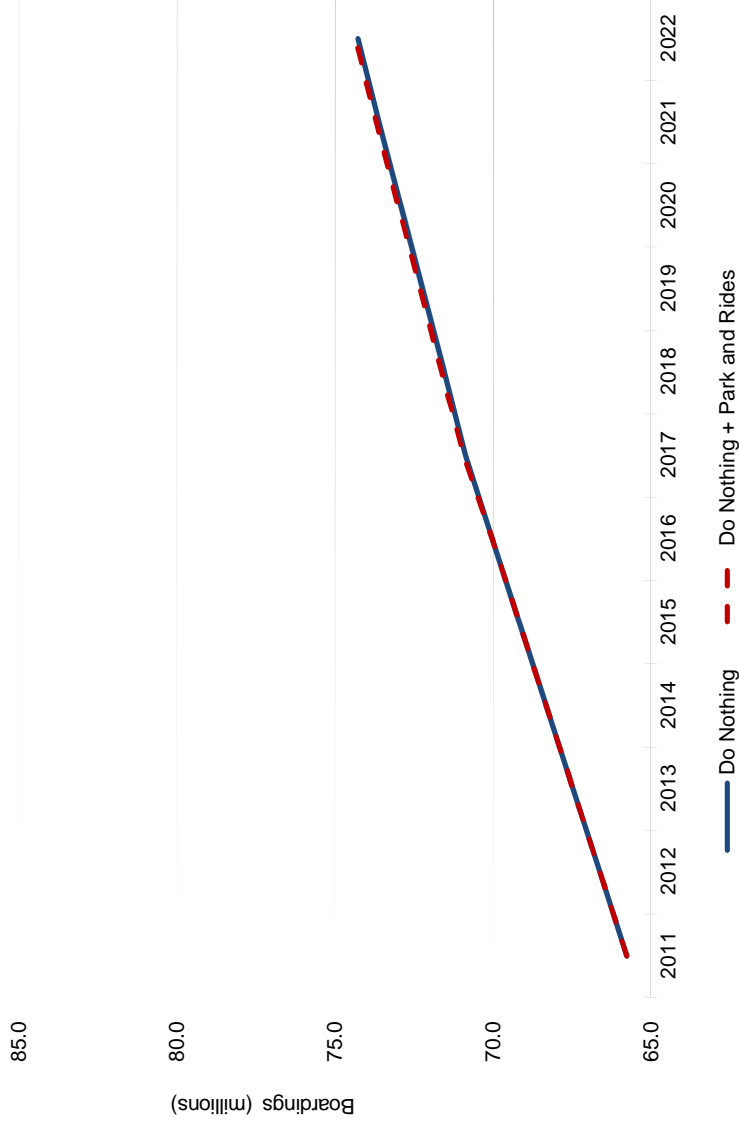
**Patronage benefits** from the Rail Services and Infrastructure Development package are expected to **ramp up in 2015**

According to the APT Model forecasts, the Rail Services and Infrastructure Development package is projected to increase patronage by **~2.5m boardings by 2022** (on top of the Do Nothing forecast)

# Specific project packages (cont.)



Patronage forecast – Park and Rides



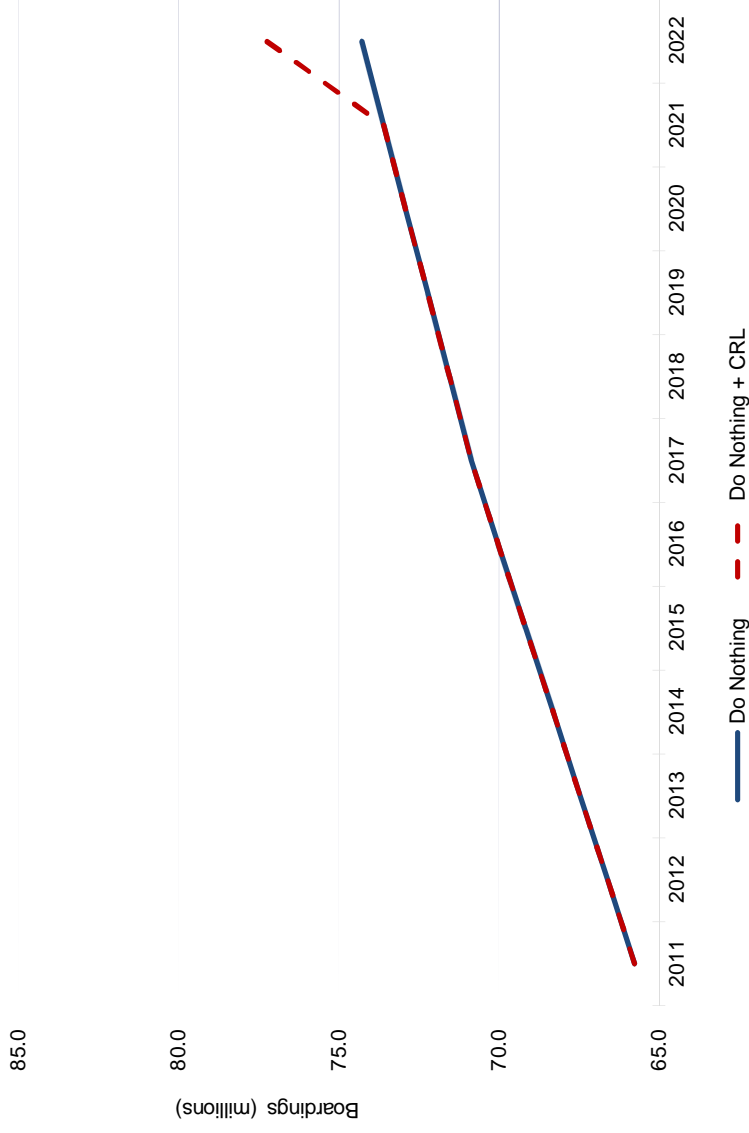
**Patronage benefits** from the Park and Rides package are expected to **begin in 2017**

According to the APT Model forecasts, the Park and Rides package is expected to have a **minimal impact on PT patronage (in isolation)**

# Specific project packages (cont.)



Patronage forecast – CRL



**Patronage benefits**  
from CRL are expected to  
**begin in 2022**

According to the APT Model  
forecasts, CRL is projected to  
increase patronage by **~3m**  
**boardings by 2022**  
(on top of the Do Nothing forecast)

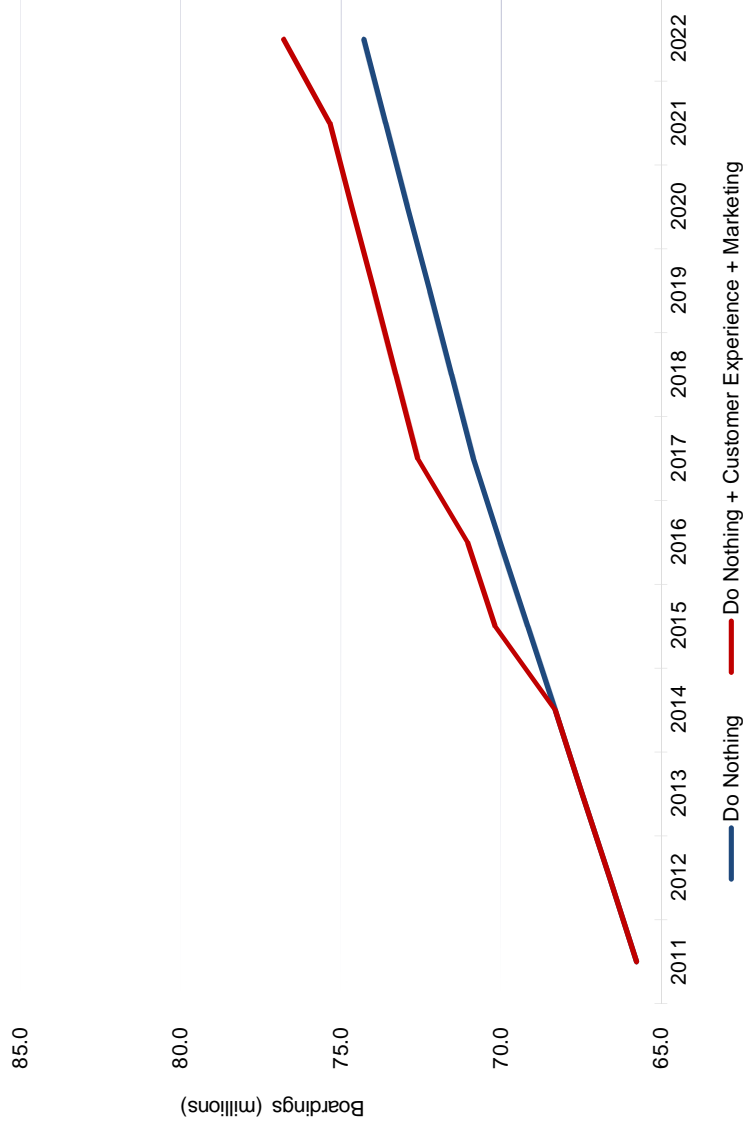
The **full patronage**  
**uplift** from CRL **may not**  
**be realised by 2022**



# Specific project packages (cont.)



Patronage forecast – Customer Experience and Marketing



The **combined patronage benefit** of the Customer Experience and Marketing initiatives is expected to be **3.5%**

The **Customer Experience** initiative is projected to **grow patronage by 1.5% in 2015**

**Marketing** initiatives are expected to **grow patronage in 2017 and 2022** and contribute a **2% uplift**



# Appendix: Financial modelling detail

# Financial tables



Model Scenario	Financial Metric (\$m)	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Funded Baseline + Unfunded Package (Sensitivity + Base)	Base opex	551	562	574	585	594	611	633	656	687	715	744	776
	Consequential maintenance	-	-	-	-	1	2	2	7	8	8	8	34
	<b>Total</b>	<b>551</b>	<b>562</b>	<b>574</b>	<b>585</b>	<b>595</b>	<b>612</b>	<b>635</b>	<b>664</b>	<b>694</b>	<b>723</b>	<b>752</b>	<b>810</b>
Consequential depreciation	PT capex	29	33	49	69	87	105	123	131	139	147	155	156
	Other capex	34	78	233	377	498	519	509	418	421	415	424	45
	<b>Total</b>	<b>131</b>	<b>214</b>	<b>345</b>	<b>407</b>	<b>414</b>	<b>419</b>	<b>438</b>	<b>462</b>	<b>477</b>	<b>455</b>	<b>462</b>	<b>439</b>
Do Nothing + Integrated Ticketing and Fares <sup>1</sup>	Base opex	551	562	574	585	594	611	633	656	687	715	744	776
	Consequential maintenance	-	-	-	-	0	0	0	0	0	0	0	0
	<b>Total</b>	<b>551</b>	<b>562</b>	<b>574</b>	<b>585</b>	<b>594</b>	<b>611</b>	<b>633</b>	<b>657</b>	<b>687</b>	<b>715</b>	<b>744</b>	<b>776</b>
Do Nothing + Bus Services and Infrastructure Development (incl. AMETI) <sup>2</sup>	Base opex	7	7	7	8	8	8	8	8	8	8	8	8
	Consequential depreciation	-	0	6	3	1	3	4	-	-	-	-	-
	<b>Total</b>	<b>131</b>	<b>214</b>	<b>345</b>	<b>407</b>	<b>414</b>	<b>419</b>	<b>438</b>	<b>462</b>	<b>477</b>	<b>455</b>	<b>462</b>	<b>439</b>
Do Nothing + Ferry Services and Infrastructure Development <sup>3</sup>	Base opex	551	562	574	585	594	611	633	656	687	715	744	776
	Consequential maintenance	-	-	-	-	0	1	1	2	2	2	2	2
	<b>Total</b>	<b>551</b>	<b>562</b>	<b>574</b>	<b>585</b>	<b>594</b>	<b>611</b>	<b>633</b>	<b>658</b>	<b>689</b>	<b>717</b>	<b>746</b>	<b>778</b>
Do Nothing + Ferry Services and Infrastructure Development <sup>3</sup>	Base opex	1	1	2	3	5	6	7	8	9	9	10	11
	Consequential depreciation	34	51	43	70	77	71	74	53	55	39	39	40
	<b>Total</b>	<b>131</b>	<b>214</b>	<b>345</b>	<b>407</b>	<b>414</b>	<b>419</b>	<b>438</b>	<b>462</b>	<b>477</b>	<b>455</b>	<b>462</b>	<b>439</b>
Do Nothing + Ferry Services and Infrastructure Development <sup>3</sup>	Base opex	165	265	388	477	492	489	512	514	532	494	501	478
	Consequential maintenance	551	562	574	585	594	611	633	656	687	715	744	776
	<b>Total</b>	<b>551</b>	<b>562</b>	<b>574</b>	<b>585</b>	<b>594</b>	<b>611</b>	<b>633</b>	<b>657</b>	<b>687</b>	<b>715</b>	<b>744</b>	<b>776</b>
Do Nothing + Ferry Services and Infrastructure Development <sup>3</sup>	Base opex	-	-	0	0	0	0	0	0	0	0	0	0
	Consequential depreciation	-	-	0	0	0	0	1	1	1	1	1	1
	<b>Total</b>	<b>131</b>	<b>214</b>	<b>345</b>	<b>407</b>	<b>414</b>	<b>419</b>	<b>438</b>	<b>462</b>	<b>477</b>	<b>455</b>	<b>462</b>	<b>439</b>
Do Nothing + Ferry Services and Infrastructure Development <sup>3</sup>	Base opex	131	214	346	413	418	429	445	470	481	459	462	440
	Consequential maintenance	551	562	574	585	594	611	633	657	687	715	744	776
	<b>Total</b>	<b>551</b>	<b>562</b>	<b>574</b>	<b>585</b>	<b>594</b>	<b>611</b>	<b>633</b>	<b>657</b>	<b>687</b>	<b>715</b>	<b>744</b>	<b>776</b>

Note: 2011-2013 figures are estimates only

1. Integrated Ticketing and Fares modelling includes a significant reduction in fares, which enhance patronage growth but limits revenue growth. Consequential depreciation is calculated based on future and historical capex (~\$100m in total), using a useful life estimate of 12 years.
2. Consequential depreciation is calculated using a useful life estimate of 60 years, to match the useful life of roads. Northern Busway capex is not considered in the calculation of consequential depreciation.
3. Ferry Services and Infrastructure Development opex does not include the cost of running additional ferry services. Consequential depreciation is calculated using a useful life estimate of 45 years and historical capex is not considered.

# Financial tables (cont.)



Model Scenario	Financial Metric (\$m)	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Do Nothing + EMU <sup>4</sup>	Base opex	551	562	574	585	594	611	633	656	687	715	744	776
	Consequential maintenance	-	-	-	-	1	1	1	4	4	4	4	4
	<b>Total</b>	<b>551</b>	<b>562</b>	<b>574</b>	<b>585</b>	<b>595</b>	<b>611</b>	<b>633</b>	<b>661</b>	<b>691</b>	<b>719</b>	<b>748</b>	<b>780</b>
Do Nothing + Rail Services and Infrastructure Development <sup>5</sup>	Consequential depreciation	10	13	27	41	51	61	71	71	71	71	71	71
	PT capex	-	25	114	114	80	80	80	-	-	-	-	-
	Other capex	131	214	345	407	414	419	438	462	477	455	462	439
<b>Total</b>	<b>131</b>	<b>239</b>	<b>459</b>	<b>520</b>	<b>494</b>	<b>499</b>	<b>517</b>	<b>462</b>	<b>477</b>	<b>455</b>	<b>462</b>	<b>462</b>	<b>439</b>
Do Nothing + Park and Rides <sup>6</sup>	Base opex	551	562	574	585	594	611	633	656	687	715	744	776
	Consequential maintenance	-	-	-	-	0	0	1	1	1	1	1	1
	<b>Total</b>	<b>551</b>	<b>562</b>	<b>574</b>	<b>585</b>	<b>595</b>	<b>611</b>	<b>633</b>	<b>657</b>	<b>687</b>	<b>716</b>	<b>745</b>	<b>777</b>
Do Nothing + CRL <sup>7</sup>	Consequential depreciation	12	12	12	12	13	13	13	13	13	13	13	13
	PT capex	-	2	23	20	9	3	3	6	-	-	0	3
	Other capex	131	214	345	407	414	419	438	462	477	455	462	439
<b>Total</b>	<b>131</b>	<b>216</b>	<b>368</b>	<b>427</b>	<b>423</b>	<b>421</b>	<b>440</b>	<b>468</b>	<b>477</b>	<b>455</b>	<b>462</b>	<b>462</b>	<b>442</b>
Do Nothing + EMU <sup>4</sup>	Base opex	551	562	574	585	594	611	633	656	687	715	744	776
	Consequential maintenance	-	-	-	-	-	0	0	0	0	0	0	0
	<b>Total</b>	<b>551</b>	<b>562</b>	<b>574</b>	<b>585</b>	<b>594</b>	<b>611</b>	<b>633</b>	<b>657</b>	<b>687</b>	<b>715</b>	<b>744</b>	<b>776</b>
Do Nothing + Park and Rides <sup>6</sup>	Consequential depreciation	-	-	0	0	0	1	1	1	1	1	1	1
	PT capex	-	-	0	1	6	22	2	1	1	-	-	-
	Other capex	131	214	345	407	414	419	438	462	477	455	462	439
<b>Total</b>	<b>131</b>	<b>214</b>	<b>345</b>	<b>407</b>	<b>421</b>	<b>441</b>	<b>439</b>	<b>463</b>	<b>478</b>	<b>455</b>	<b>462</b>	<b>462</b>	<b>439</b>
Do Nothing + CRL <sup>7</sup>	Base opex	551	562	574	585	594	611	633	656	687	715	744	776
	Consequential maintenance	-	-	-	-	-	-	-	-	-	-	-	26
	<b>Total</b>	<b>551</b>	<b>562</b>	<b>574</b>	<b>585</b>	<b>594</b>	<b>611</b>	<b>633</b>	<b>656</b>	<b>687</b>	<b>715</b>	<b>744</b>	<b>802</b>
Do Nothing + EMU <sup>4</sup>	Consequential depreciation	-	-	1	4	10	17	23	30	37	44	51	51
	PT capex	-	-	47	162	321	330	339	350	361	372	384	-
	Other capex	131	214	345	407	414	419	438	462	477	455	462	439
<b>Total</b>	<b>131</b>	<b>214</b>	<b>392</b>	<b>569</b>	<b>735</b>	<b>748</b>	<b>776</b>	<b>811</b>	<b>838</b>	<b>828</b>	<b>846</b>	<b>846</b>	<b>439</b>

Note: 2011-2013 figures are estimates only

- Consequential depreciation is calculated based on future and historical capex (~\$1 billion in total covering rolling stock purchases and rail electrification), using a useful life estimate of 8 years for the rolling stock and 52 years for the infrastructure.
- Consequential depreciation is calculated based on future and historical capex (includes \$600m for DART), using a useful life estimate of 52 years.
- Consequential depreciation is calculated using a useful life estimate of 52 years. Historical Park and Ride capex is not considered in the calculation of consequential depreciation.
- The full patronage uplift from CRL may not be realised by 2022. Consequential depreciation is calculated using a useful life estimate of 52 years.

# Appendix: Sources

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