MINISTRY OF TRANSPORT
TE MANATŪ WAKA

OC250171

27 March 2025

[redacted]

I refer to your email dated 28 February 2025, requesting the following under the Official Information Act 1982 (the Act):

> *"The Ngāi Tahu Holdings research report on Shared Mobility".*

One document falls within the scope of your request and is enclosed:

- Evaluating potential for shared mobility in housing developments: Research Report.

Certain information has been withheld under the following sections of the Act:

9(2)(a) to protect the privacy of natural persons.

You have the right to seek an investigation and review of this response by the Ombudsman, in accordance with section 28(3) of the Act. The relevant details can be found on the Ombudsman's website **www.ombudsman.parliament.nz**

The Ministry publishes our Official Information Act responses and the information contained in our reply to you may be published on the Ministry's website. Before publishing we will remove any personal or identifiable information.

Nāku noa, nā

Genevieve Woodall
**Manager Urban Development and Public Transport**

ARUP

Ministry of Transport | Ngāi Tahu Holdings

# Evaluating potential for shared mobility in housing developments

*Research Report*

Arup

December 2022

# Contents

# Foreword

Mobility and the way it is provided and funded is changing, with new ways and models of travelling around our cities, towns, and rural areas. We need to think about how we provide transport choices and services to communities and our whānau and embed this into our urban fabric.

Shared mobility can help provide transport choices for groups who need it most, whilst reducing the number of cars on our roads and promoting more sustainable forms of transport. It's an industry that is fast growing, and is already changing how people move in countries around the world. New Zealand must continue to explore how opportunities for shared mobility can be harnessed, to promote better transport outcomes for all. This exciting research develops a model for incorporating a range of shared transport options into medium and high-density housing developments around New Zealand, to help us achieve these outcomes.

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# Executive summary

We developed a framework in partnership with the Ministry of Transport and Ngāi Tahu Holdings to investigate how property developers can incorporate shared mobility into their future developments.

The final framework outlines the steps that a developer can take to assess the potential of a development site and come up with different options for incorporating shared mobility, as well as assessing each to find a fit-for-purpose solution.

The development of the framework involved several steps to take a broad range of sources and experiences to understand what the critical opportunities and barriers are to shared mobility in New Zealand.

**Methodology**

We undertook a horizon scan which included literature review, stakeholder interviews, policy analysis and research into different funding models to build an evidence-based understanding of how to create successful shared mobility systems.

We took the information gathered through the horizon scan to a series of workshops to create the framework. This allowed different stakeholders to feed into the framework and to identify which key factors need to be considered to drive success.

**Horizon scan**

The results of the horizon scan showed that there are several key factors which influence the success of shared mobility. For instance, a strong sense of community was seen as fundamental to residents being 'willing to share' resources such as vehicles, bikes and scooters.

Another important theme was that shared mobility should be viewed in context with existing transport infrastructure and places. This includes access to high quality public transport, active transport networks, green space and proximity to local destinations such as a town centre.

**The decision making framework**

The final framework is a four-step process which developers can use to assess their project.

1. Project context assessment
2. Project options development
3. Options evaluation
4. Option refinement and preferred option

**Benefits and recommendations**

Benefits for developers include creating more space for dwellings, community spaces and facilities which lift the value of the development and make it more attractive to buyers. Recommendations include having a critical level of service that has vehicles tailored to the resident's needs as well as working with marketing and real estate agents to create positive messaging and overcome buyer hesitation toward low-car living.

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# Introduction

# Section 1
# Introduction

## Definition of shared mobility

Shared mobility is often defined in terms of services that replace private car trips and supplement traditional public transit services. It has become an umbrella term that is used in the literature to refer to "the shared use of a vehicle, motorcycle, scooter, bicycle, or other travel mode" (Shaheen et al., 2019). We define shared mobility as shared micromobility (bikes and scooters), ride-hailing services, rideshare, carshare and on-demand shuttle. Figure 1 shows the mobility continuum of where shared mobility relates to other transport modes.

The following shared mobility services are currently available in New Zealand.

### Carshare

There are currently 10 towns and cities that provide carsharing: Auckland, Wellington, Christchurch, Hamilton, Tauranga, Dunedin, Invercargill, Queenstown, Wānaka and Whangārei. The 5 commercial providers are Cityhop, Zilch, Yoogo, GoTo and Mevo. Peer-to-peer and informal carsharing is also present in New Zealand, including YourDrive and MyCarYourRental which operate nationwide.

### Bike and / or scooter-share

There are currently 11 towns and cities that provide bike and / or scooter-sharing: Auckland, Hamilton, Wellington, Christchurch, Dunedin, Palmerston North, New Plymouth, Waimakariri, Selwyn, Whanganui and Whangārei, with Napier and Queenstown planning to have future trials. The 4 providers are Flamingo, Beam, Lime and Neuron.

### Ondemand shuttles

There are currently 5 towns and cities that provide public ondemand shuttles: Auckland, Wellington, Hamilton, Timaru and Hastings, with planned extension to Napier in 2023.

Services are run by the public transport providers in each town, with the private company MyMobigo also operating in certain suburbs in Auckland.

### Ride-hailing and taxis

Ride-hailing services are available in 13 cities and towns including Auckland, Christchurch, Wellington, Tauranga, Dunedin, Queenstown, Rotorua, Taupō, Napier, Hastings, New Plymouth, Palmerston North and Nelson. Commercial providers include Uber, Ola, Didi and Zoomy as well as companion driving services such as Driving Miss Daisy.

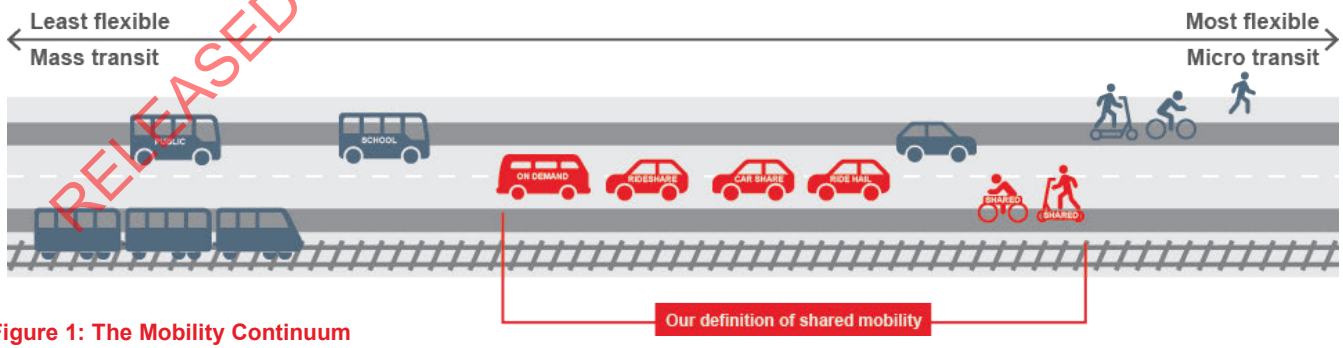


Figure 1: The Mobility Continuum

# Section 1.2
# Introduction

## Why developers should consider shared mobility

Shared mobility gives developers the opportunity to create more value for communities:

- Fewer carparks can be required and space can be reallocated to dwellings to increase the yield of a site
- Space can also be allocated to green space and/or shared facilities, increasing attractiveness to buyers
- Properties that do not come with a carpark can be offered at lower price compared to other developments, increasing attractiveness to buyers
- Shared mobility provision increases the sustainability of developments by reducing car dependency which can boost green credentials and attractiveness to buyers
- The best opportunity to change people's behaviour to make more sustainable choices is when they move home (Ramezani et al., 2021) which gives developers a unique opportunity to influence transport choice
- Provision of shared mobility increases transport choice for residents who value accessibility, increasing the attractiveness of the development

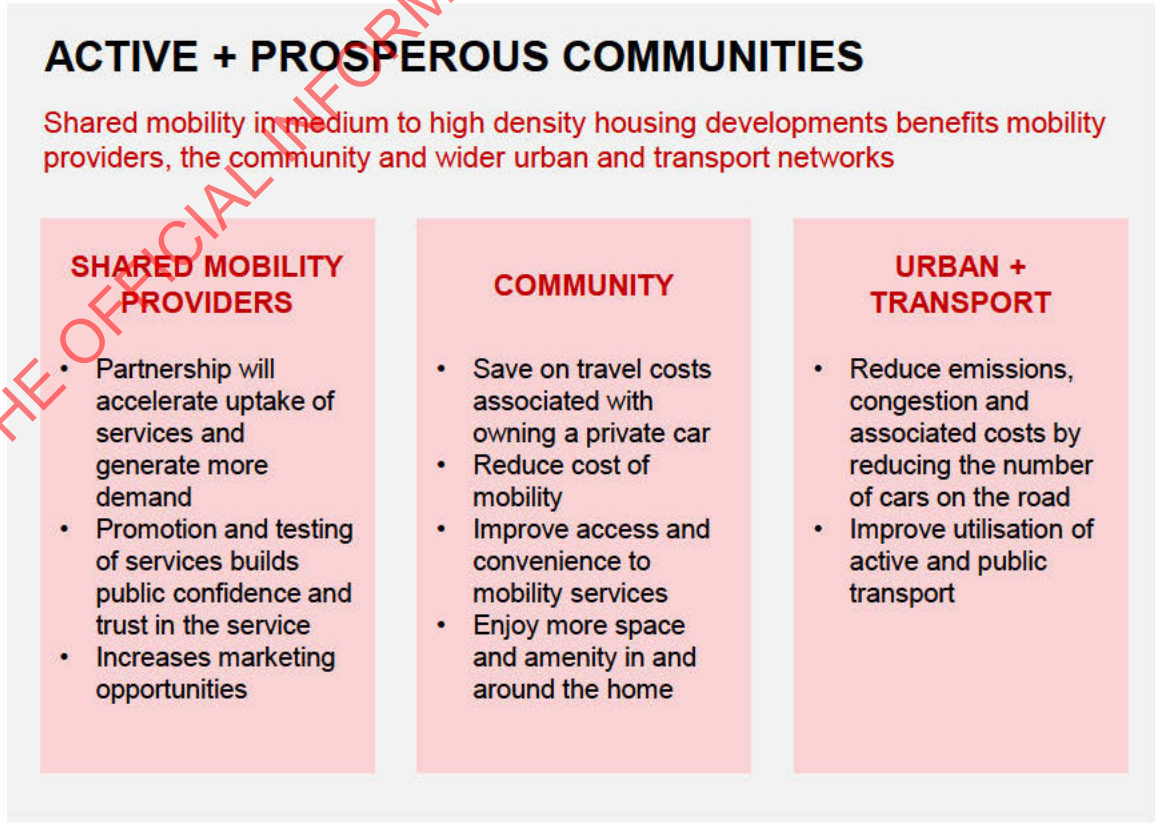


Figure 2: Benefits of shared mobility

# Section 1
# Introduction

## Purpose of this report

This report discusses how developers can implement shared mobility in new housing projects. New Zealand is among the most car-dependent countries in the world, with upwards of 90% of passenger kilometres travelled in a private car (Ministry of Transport, 2022).

The Government Policy Statement on Land Transport in 2021 recognises the need to increase public transport and other shared mobility options to improve equitable access and reduce environmental and economic externalities arising from car-dependence. New mobility options are growing to meet this need, with shared mobility and trials of on-demand public transport growing in several cities.

New Zealand is facing major challenges around housing affordability and transport emissions. Higher density housing will help with housing affordability, but developments where privately owned vehicles are the primary mode of transport will add pressure to already strained transport infrastructure.

There are increasing examples of micromobility and carshare services being offered by developers, but little is known about how developers can implement these services successfully.

Shared mobility makes sense for both property developers and communities. Developers can reduce costs of housing provision by reducing the number of carparks in developments while providing more amenity and transport choice through shared mobility services. Increasing transport choice can increase equitable access to transport for marginalised groups who do not drive their own vehicle (Litman, 2022).

There are also perceived disbenefits of shared mobility which need mitigated to ensure successful and equitable access to services. With a greater shift to shared mobility, there is the risk of a potential for increased vehicle kilometres travelled and reduced public transport use, as non-car-owners use the service (Becker, H., Ciari, F., Axhausen, K., 2015). There is also risk of social exclusion as it is difficult to establish profitable car clubs in low socio-economic areas as the costs for the provider result in unaffordable user fees (Bonsall, 2002).

Free-floating car share where users can pick up and drop off a car anywhere also result in clustering of vehicles in areas that are predominantly young, white, educated and employed (Tyndall, 2017).

The central government's transport objectives can be supported through uptake of shared mobility. The Ministry of Transport (MoT) and Waka Kotahi are focused on mode shift away from privately owned vehicles, to reduce the number of cars on the road and provide for other forms of mobility. The central government's commitment to net zero carbon emissions by 2050 will need to include shared mobility in the mix of strategies, alongside electrification of vehicles and provision of more public transport.

We offer a framework to help developers take action on shared transport options in medium and high-density housing developments. Our approach highlights the business opportunity for developers and amenity and affordability benefits for residents. The framework accounts for a broad range of communities around New Zealand and is scalable and transferable to future developments around the country.

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# Methodology

# Section 2
# Methodology

## Methods

Our methodology for developing the framework is as follows:

### 1. Horizon Scan

- Snapshot of current shared mobility in New Zealand and internationally
- Literature review of academic and industry publications
- Review of local and international policy
- Interviews with stakeholders
- Case studies of shared mobility in housing developments
- Exploration of Māori values in shared mobility

### 2. Funding Assessment

- Literature review on funding approaches relevant to shared mobility infrastructure and services
- Development of a quantitative guide for developers to evaluate costs and funding sources to understand the potential revenue sources for shared mobility systems. This is informed by examples both internationally and in New Zealand to see how users, providers and government can cooperate to cover costs.

### 3. Framework development

- Workshops to interpret the success factors and barriers identified in the horizon scan and create a scenario framework of how critical factors could shape shared mobility outcomes.
- Scenario development based on the identified New Zealand context to incorporate key factors that would have the most impact on shared mobility outcomes. These scenarios were used to refine the framework and test it in the New Zealand context.

### Limitations of the methodology

- The literature review encompasses shared mobility in housing developments and does not extend to mobility trends more broadly
- Engagement with stakeholders through interviews and workshops was limited by the availability of participants
- Residents surveys were proposed, however a lack of responses meant conclusions from this method of engagement couldn't be made

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# Horizon scan

# Section 3: Horizon Scan
## Horizon scan introduction

### What is a horizon scan?

The horizon scan is a method to identify future trends and issues that involves information from different sources. The purpose of the horizon scan is to understand the drivers of success and barriers to shared mobility and what the future trends are. These are then used to inform the workshops for developing the framework and recommendations.

In the horizon scan we looked at the six following areas:

1. Snapshot of current shared mobility in New Zealand and internationally
2. Literature review of academic and industry publications
3. Review of local and international policy
4. Interviews with stakeholders
5. Case studies of shared mobility in housing developments
6. Exploration of Māori values in shared mobility

Figure 3 shows the outcomes of each part of the horizon scan and how they feed into the framework development.

The outcome of the horizon scan is a summary of what the success factors, drivers and barriers to shared mobility are.

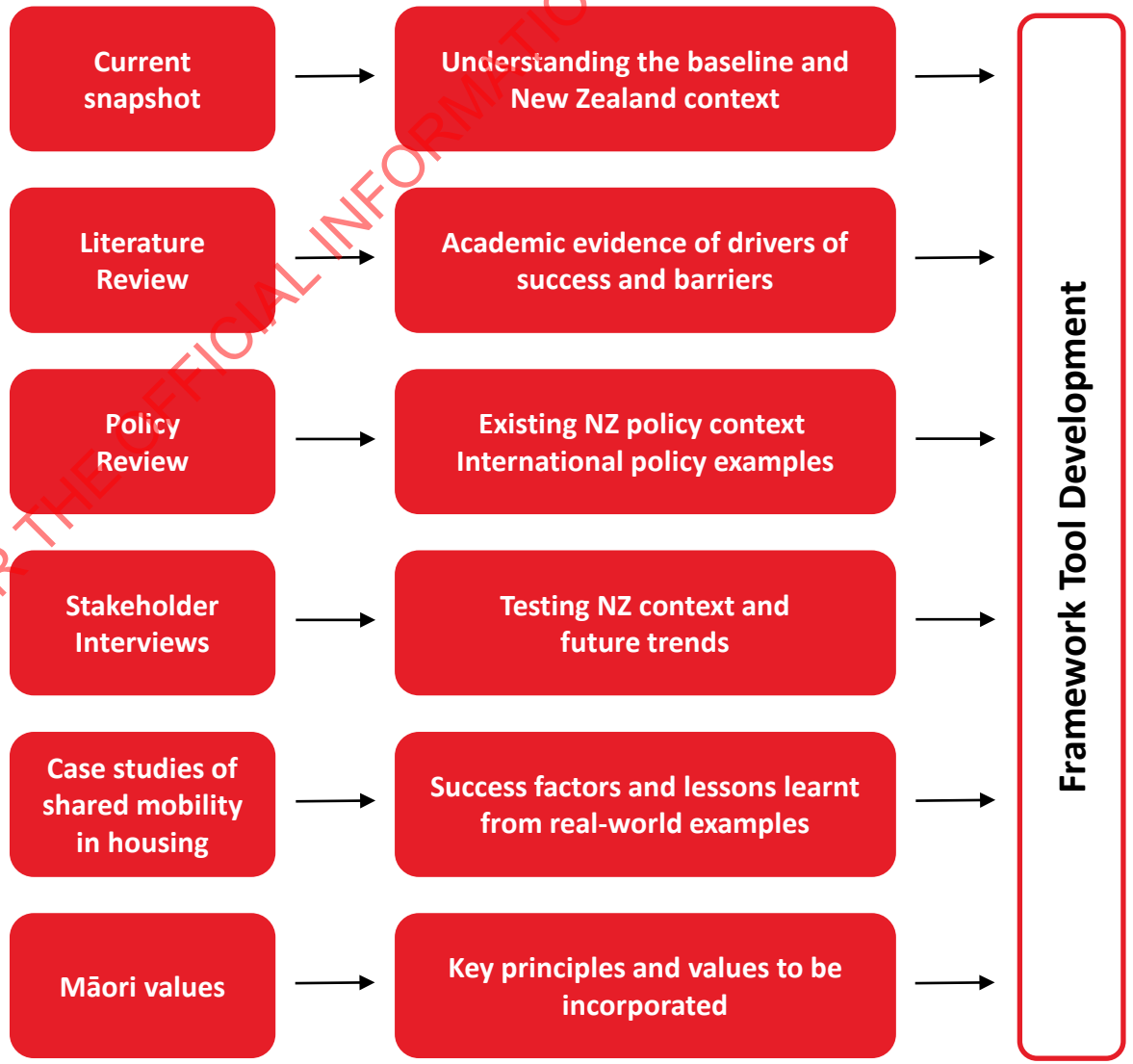



Figure 3: Outcomes of each section of the horizon scan

# Section 3: Horizon Scan
## Snapshot of current shared mobility

### Introduction of snapshot of shared mobility

Shared mobility is available globally, with a 2019 study estimating the value of the global market at $130-140 billion USD (Heineke et al., 2021). The market is growing rapidly, with Europe alone seeing a growth of 310,000 shared vehicles and 21% growth in the number of trips between 2021 and 2022 (Fluctuo, 2022).

In 2016, there were shared mobility services operating in over 2000 cities worldwide (Cohen, 2016). We have presented 3 case studies of systems in New Zealand and 3 overseas services that give a snapshot of the general lessons and trends of shared mobility worldwide. These show the breadth of opportunity for shared mobility and the potential for different services.

Figure 4 shows a snapshot of where shared mobility is available in New Zealand.

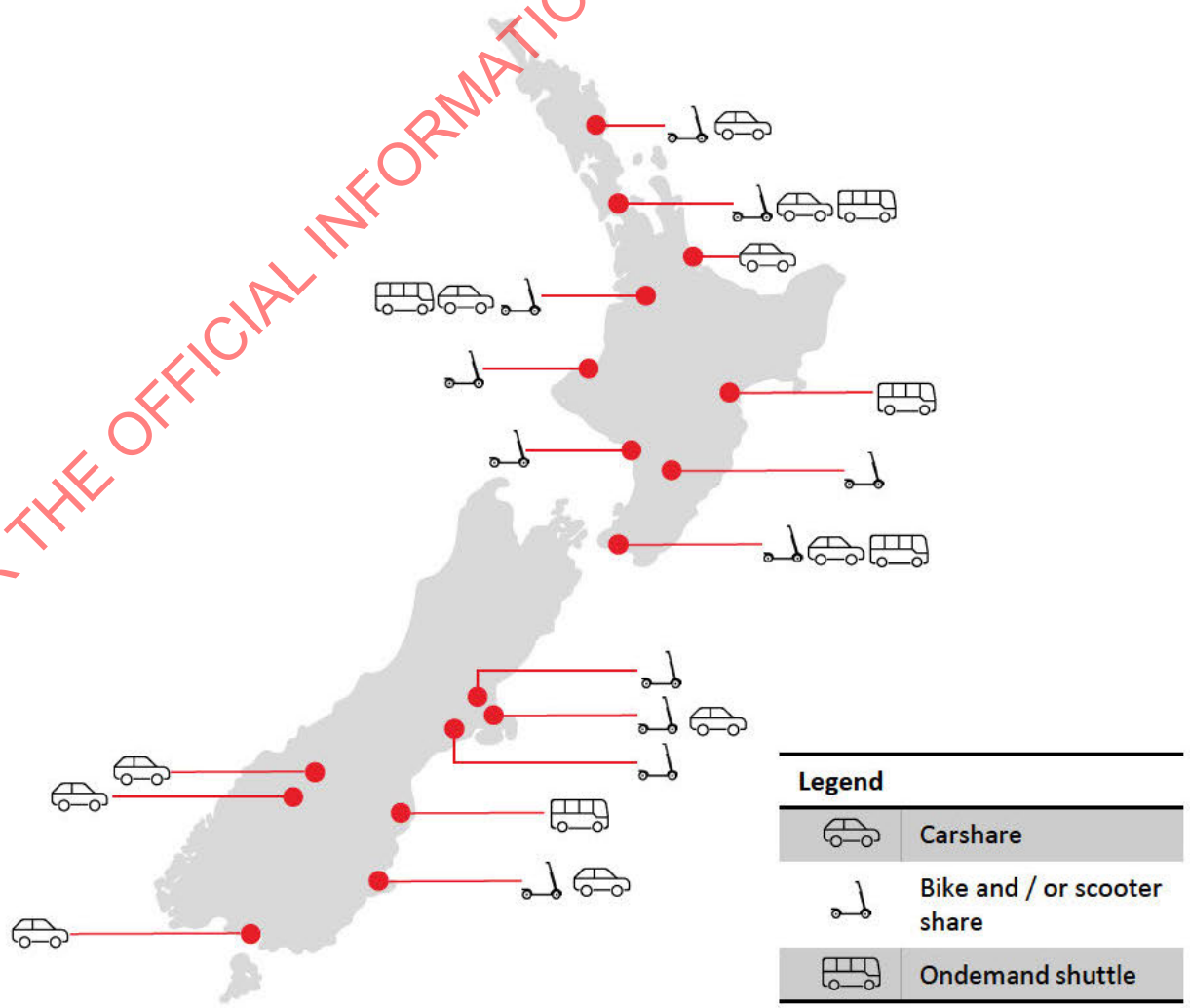



Figure 4: Shared mobility services in operation in New Zealand

# Section 3: Horizon Scan
## Snapshot of current shared mobility

### Examples of shared mobility in New Zealand

**Mevo, Wellington**

| | | |
|---|---|---|
| Carshare | 50 vehicles | 10,000 members |

Mevo operates 50 cars in a flex zone of Wellington city centre, meaning vehicles can be picked up and dropped off at any council-controlled parking space.

A survey in 2020 showed that every share vehicle in Wellington replaces up to 11 private vehicles (Wellington City Council, 2021). 25% of members have sold or are planning to sell a vehicle as a result of joining Mevo and 40% say they use their private vehicles less.

**Lessons learned**

- Being able to park anywhere in the Flex Zone increases the attractiveness of the service (McKenna, 2021)

**Lime and Beam, Auckland**

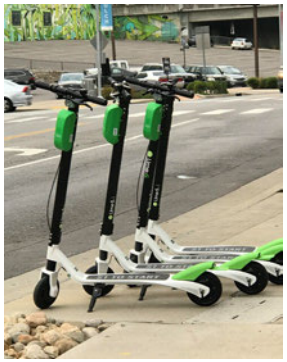
| | | |
|---|---|---|
| Scootershare | 1700 scooters | 140,000 monthly trips |

Lime and Beam are the two scootershare providers in Auckland. The most popular trip locations are in the city centre and along car-free routes such as shared paths and public spaces.

Lime benefits from being integrated into the Uber app, with members of either service having access to both.

**Lessons learned**

- Integration with other mobility apps increases the number of people who try the service
- A dense city increases the use of e-scooters (CIVITAS, 2020)



**MyWay, Timaru**

| | | |
|---|---|---|
| Ondemand shuttle | 4 vehicles | 6,000 registered |

The MyWay on-demand shuttle replaced three bus routes in Timaru in 2020 and saw an increase in patronage of 30% compared to the old bus routes. Due to this success, the service will be extended to replace the final fixed-route bus in Timaru in 2023 with investigations underway to expand the service to other small towns in Canterbury.

**Lessons learned**

- Accessibility for people with mobility issues was increased by reducing the need to walk to a bus stop or wait for a bus (Environment Canterbury, 2021)
- 90% of users said MyWay makes public transport easier, with 32% increasing their public transport use (Environment Canterbury, 2021)

# Section 3: Horizon Scan
## Snapshot of current shared mobility

### Examples of shared mobility overseas

**Mobility, Switzerland**

| | | |
|---|---|---|
| Carshare | 3000 vehicles | 240,000 members |

Mobility is the largest carshare service in Switzerland and has operated since 1997 with a highly successful offering, with each vehicle replacing an estimated 11 privately owned cars. It is a cooperative and reinvests all profits back into vehicles and the service. Users pay an entrance fee, cooperative fee and yearly membership fee for unlimited access.

**Lessons learned**

- The community buy-in to the service and normalisation of carshare increases uptake, use, loyalty and perception of the service (Suter, P., Gmür, M., 2014)


**Free2Move, Europe and the USA**

| | | |
|---|---|---|
| Carshare | 450,000 vehicles | 2 million members |

Free2Move is an all-inclusive service that offers both carshare and long-term car rental. Carshare is free-floating, with users able to pick up and drop-off a car anywhere in the city.

**Lessons learned**

- The range of different options for rental length means users can use the service for both short trips and long, intercity journeys (Vulog, 2022)
- The technology behind the service allows flexible pricing structures and different vehicle types to cater for different markets (Vulog, 2022)

**Santander Cycles, London**

| | | |
|---|---|---|
| Bikeshare | 12,000 bikes | 1 million users |

Santander cycles are located in 800 docks across the city, with users picking up and returning the bikes to one of these locations. The system has been successful with almost 11 million trips taken in 2021 and 49% of users saying that the service has prompted them to start cycling in London. 250 e-bikes were introduced in October 2022 which have seen on average 30% greater use than non-powered bikes.

**Lessons learned**

- Bikeshare success increases with the provision of high-quality cycling infrastructure (TfL, 2022)
- E-bikes are more popular than non-powered bikes (TfL, 2022)
- Offering the first 30 minutes free increased usage (TfL, 2022)

# Section 3: Horizon Scan
## Literature Review

### Purpose of the literature review

The literature review looks at how shared mobility relates to housing development. Little research has examined the role developers could play in implementing small-scale and flexible modes of shared mobility, which can be deployed early for first residents of a development.

We looked at academic literature and industry reports to identify the issues, trends and drivers impacting on shared mobility outcomes.

We categorised key drivers of success and barriers using the STEEPC framework (social, technological, environmental, economic, political, cultural). The drivers and barriers influence shared mobility through the actions of central government, local government, private developers and shared mobility providers (see Figure 5). Success of shared mobility hinges on the daily practices of end users and how well government and industry players coordinate to integrate these services into New Zealand's transport system.

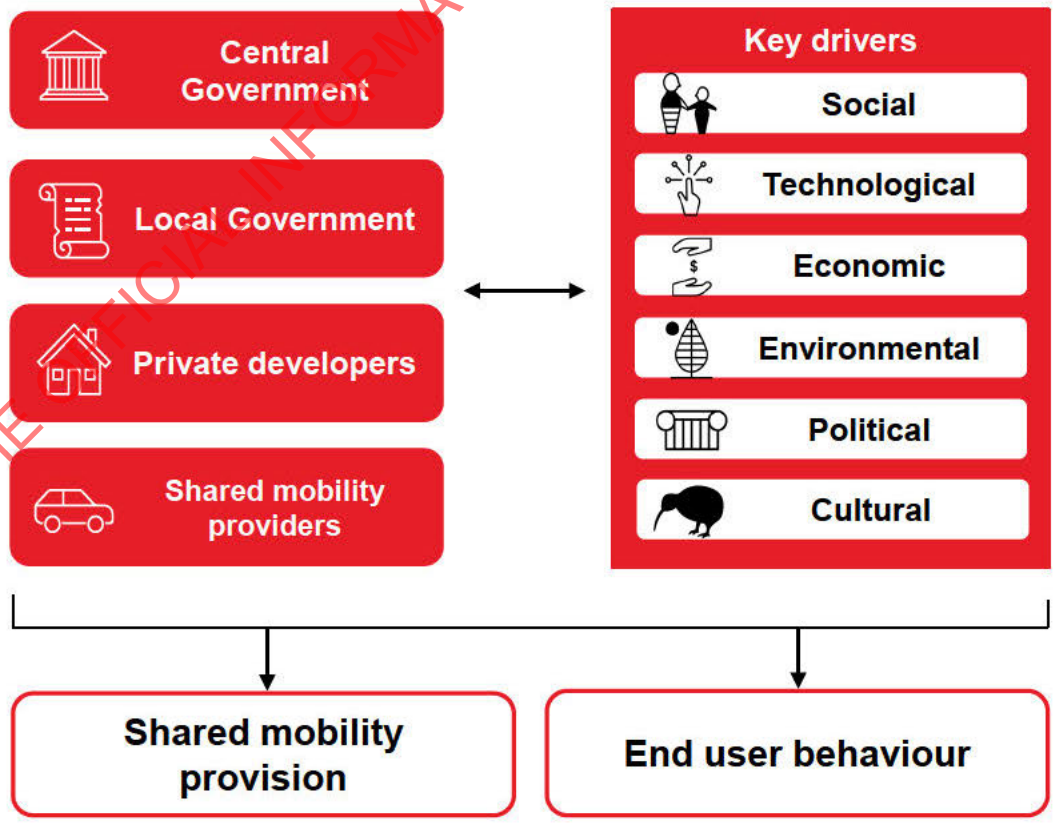



Figure 5: Shared mobility provision and use stem from key drivers and the action of government and industry players

# Section 3: Horizon Scan
# Literature Review

## Outcome of the literature review

A total of 83 drivers of success and barriers were identified and each was assigned to a different domain, with most relating to the social domain (37) (see Table 1). Most literature on shared mobility is situated in large, densely cities with high-quality public transport where providers can benefit from a large pool of users, many of which are frequent active and public transit users.

**Table 1. Number of drivers identified by domain**

| Domain | No. of drivers |
|---|---|
| Social | 37 |
| Technological | 7 |
| Economic | 20 |
| Environmental | 6 |
| Political | 8 |
| Cultural | 5 |

### Outline of key drivers

***Social***

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- "Personal connection" to a service, for example if friends use a service, if the service is run by and for a community and if it fosters a sense of connection within their community (Haerewa et al., 2018)
- Personal safety concerns around riding scooters/ bikes, particularly where there isn't dedicated infrastructure and at night or in poor weather (Tamer, 2020)
- A lack of trust or discomfort with the service prevents people from using it. People are more likely to have negative views towards shared mobility if they don't use it (Gray et al., 2006)
- Community engagement and communication over a long period of time are essential to attract people to using shared mobility (CIVITAS, 2020)

***Technological***

- Shared services are used more by those who have access to a smartphone, internet and have digital literacy (Karbaumer & Metz, 2021)
- Populations such as rural, older, lower socio-economic situations are less likely to have access to technology that allows them to use shared services (Tamer, 2020)

***Economic***

- Cost to the user was cited as one of the main reasons for choosing transport mode (ITF, 2017; Dill & McNeil, 2020). As cost-of-living increases, people are more likely to shift to cheaper modes of transport (ITF, 2017)
- Easily available and cheap parking results in people choosing to drive their personal vehicle over share mobility (ITS Australia, 2021)
- Providers will not create a service if there is insufficient demand to drive revenue (Tamer, 2020)
- Mobility bundles, compared to pay-as-you-go, are more popular with people preferring simpler bundles of two or three modes over a broad selection (Karbaumer & Metz, 2021)
- Mobility as a Service (MaaS) trials show that bundled service offerings of multiple modes through one platform result in mode shift to more active and public transport, and reduced car ownership and vehicle kilometres travelled (Strömberg et al., 2018; Butler et al., 2021)

# Section 3: Horizon Scan
# Literature Review

## Outcome of the literature review

***Environmental***

- More green space and street design to support shared mobility attracts people to use the services (Wang et al., 2021)
- Shared mobility is more likely to be used when located near to town centres and in mixed use neighbourhoods (Wang et al., 2016)
- Deploying micromobility to act as first/last mile connection to public transport increases uptake of both public transport and shared mobility (Ensor et al., 2021)
- Carshare schemes reduce greenhouse gas emissions and environmental impact by optimising the use of vehicles and driving modeshift (Amatuni et al., 2020)

***Political***

- Policy interventions such as reducing free car parks or lowering speed limits increase uptake of shared mobility (Rosenblum et al., 2020; Hosford et al., 2021)
- Reducing free carparks increases the uptake of carshare by making it more expensive to drive a personal car (Rosenblum et al., 2020)
- Lowering speed limits and low-speed zones increase the uptake of shared bikes and scooters by increasing safety and making driving a car less desirable (Hosford et al., 2021)
- Political intervention to include incentives for shared mobility users increases the provision and uptake of shared mobility services (Hosford et al., 2021)
- Policy requiring data sharing increases the use and success of mobility as a service (Hosford et al., 2021)

## Conclusions from the literature review

- There is inequitable access to shared mobility, with people requiring a high level of income that affords them digital access and literacy. People also need to live in cities where services are available.
- There needs to be a high level of trust and community buy-in for a service to be successful and treated with respect by users.
- Policy interventions are effective in increasing shared mobility use.
- The context and location of shared mobility services affects success, with proximity to green space and public transport increasing success.

# Section 3: Horizon Scan
# Literature Review

## Māori values in literature

For the New Zealand context, we expanded the STEEP categorisation to include cultural factors which shape end user behaviour and shared mobility provision. This focused on Māori values and how they could be considered in shared mobility.

Māori communities have long-established ways of sharing that are underpinned by and support cultural principles. A study in Te Whānau-ā-Apanui in Tairāwhiti found informal shared mobility was common, from lending vehicles and sharing car journeys to the provision of community-based communal transport such as vans for kaumātua and kōhanga reo (Haerewa et al., 2018).

Travelling together reflects whakakotahitanga (unity) by providing community members with an opportunity to spend time with each other while travelling. Travel by car provided a means of responding to whānau emergencies and necessities, was often consistent with historical cultural travel patterns, and importantly allowed whānau access to wisdom and cultural knowledge.

This study found a positive correlation between the drivers of shared mobility and the benefits across economic, social and cultural measures, which shows that sharing mobility is common in more traditional forms. It also recognises that there are more than just environmental and economic benefits to shared mobility.

Another study recognised the importance of access to transport in achieving Mauri ora (access to Māori cultural, economic and social resources) and wellbeing (Raerino et al., 2013). Limited transport access had a negative effect on mauri ora and potential for long term impacts on Māori cultural identity. The majority of the participants identified that car use was the only option in accessing sites important to their wellbeing and that public transport did not cater for these journeys. The presence of elders at hui and other events was highlighted as particularly critical; without their expertise, there was a risk of adverse impacts on the wellbeing of the whole family, including the loss of tikanga (procedures) and kawa (ceremonial etiquette) knowledge. These trips to pick up older whānau necessitate car use as they may otherwise be left out.

Choosing to live on papakāinga on Māori land rather than in more conventional suburban environments in turn also leads to increased car use due to the location often being on the edge of towns and cities.

Another factor identified in the study was the need to combine work commitments with whānau and community commitments, reflecting the complexity of transport needs. Participants in the study acknowledged that juggling public transport timetables to go to work, visit family and attend marae meetings was often very difficult which made car use seem more practical.

Involvement in decision-making and the ability to demonstrate leadership in design were both regarded as important in the development of transport services and infrastructure. This included decisions about public transport and community level urban planning. Exclusion from decision making is a major barrier to implementation and use of transport. Improved participation would increase the appropriateness of public transport services for Māori, and therefore Māori patronage of those services. The design of small-scale community-owned public transport services was considered particularly important for improving safety, security and accessibility.

### *Culture*

- Limited transport access has a negative effect on mauri ora
- Sharing and communal ownership is more widely adopted in Māori communities
- The need to take multiple trips in one journey means a private car is the most practical transport choice
- Māori are often excluded from decision-making by government and stakeholders and so outcomes do not accurately reflect the wants and needs of the community

# Section 3: Horizon Scan
## Policy Review

### National policy review

A national policy review was undertaken to examine how much prioritisation and direction shared mobility is given. The opportunities shared mobility can bring are mentioned in many plans and policies, and this review seeks to identify opportunities and gaps. Figure 6 shows how these policies relate to each other.

**Government Policy Statement on Land Transport (GPS) – MoT, 2021**

The GPS outlines the Government's priorities for land transport investment over the next 10 years. It identifies the opportunity for shared transport in improving accessibility in our cities and towns. It instructs land transport authorities to consider innovative transport solutions such as shared mobility when making investment decisions. The GPS instructs Waka Kotahi to partner with local Councils to encourage shared transport.

**Arataki Version 2 – Waka Kotahi, 2021**

The Arataki 10-year plan recognises the importance of shared mobility in meeting climate targets, providing accessibility to education and employment for areas of high social deprivation, and reducing transport network demand and subsequently long-term infrastructure costs. The role of technology in driving the viability of shared mobility is acknowledged.

**Toitū Te Taiao Sustainability Action Plan – Waka Kotahi, 2020**

Toitū Te Taiao outlines the importance of shifting to a sustainable transport network that supports shared mobility. No further direction is given for how this can be achieved.

**Keeping Cities Moving – Waka Kotahi, 2019**

This plans to increase the share of journeys taken by public transport, walking and cycling. It identifies that technological advancements are bringing new shared vehicles. New shared mobility services must be carefully navigated to ensure wider benefits are not undermined, such as by taking up more road space or detracting from active modes and public transport.

**Transport Emissions Reduction Plan – MfE, 2022**

Shared mobility is recognised for its role in a net zero future, promoting social equity by giving transport choice to those living in social housing, and in providing accessibility for the transport disadvantaged, particularly in rural areas.

MoT's Public Transport Operating Model (PTOM) is currently being replaced with the Sustainable Public Transport Framework, which will support on-demand public transport services to be more widely deployed and support existing public transport networks.

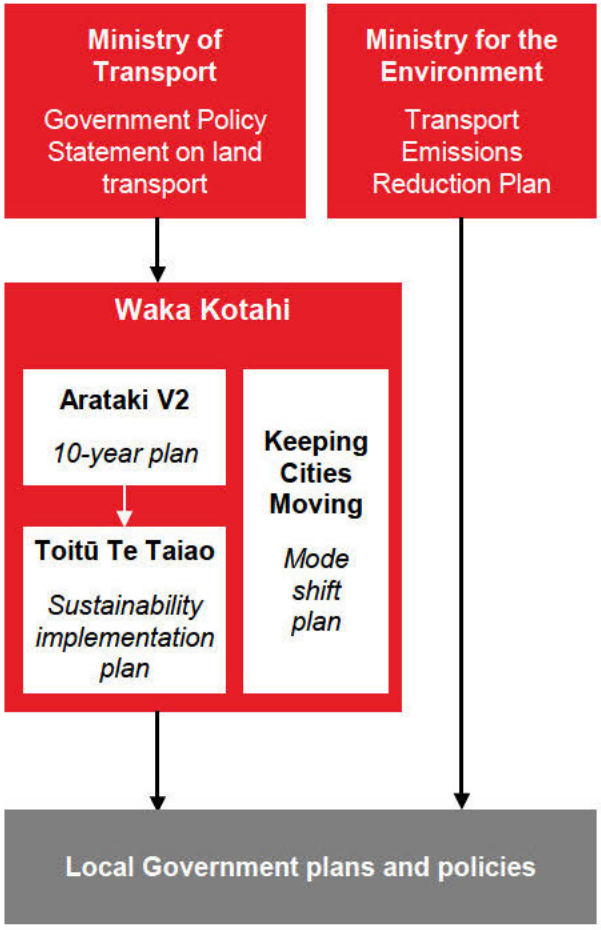



Figure 6: Policy context

# Section 3: Horizon Scan
## Policy Review

### National policy review

**Urban development and intensification**

The horizon scan identified density as a driving factor in provision and use of shared mobility services. With the National Policy Statement on Urban Development (NPS-UD) and the new Medium Density Residential Standards, there will be an increase in housing density across the country.

In 2022, central government required local councils to remove minimum parking requirements from district plans, thereby allowing developers more flexibility in reducing the number of car parks provided.

Shared mobility works best in dense cities (CIVITAS, 2020). Denser cities provide greater customer pools for shared mobility services and increase land constraints for parking provision which can drive demand for shared mobility services.

Figure 7 shows how the proportion of consents of apartments and townhouses relative to houses has grown since 2015 in four major centres. As New Zealand cities densify, there is an opportunity to better integrate shared mobility as traditional housing development is disrupted.

**Summary of common themes from policies**

- Reducing carbon emissions through modeshift towards active modes and public transport
- New technology and transport solutions will support the increase of modeshift
- Densification of cities supports modeshift
- General policy support for shared mobility

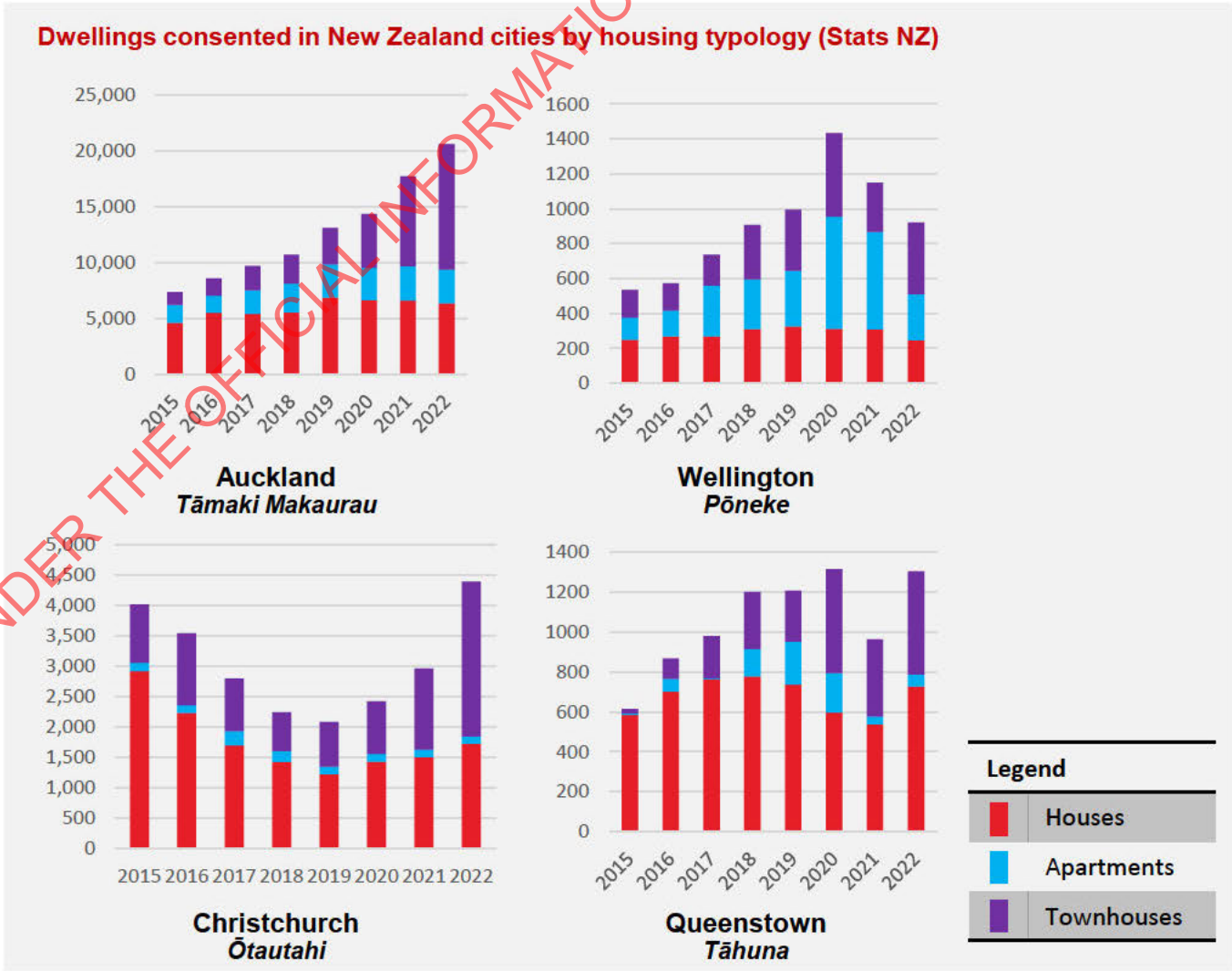



Figure 7: Density of housing consents in New Zealand

# Section 3: Horizon Scan
# Policy Review

## New Zealand policy review

Support from local government is an important factor in the feasibility of shared mobility provision and usage, which was examined across New Zealand.

**Across NZ**

Each city provides licencing to allow bike and e-scooter share companies to operate and leave vehicles on the street and footpaths, with some laying out areas where parking is not allowed or applying speed limits in specific areas. Carshare provisions are more varied across the country and are detailed further below.

**On-demand and shared mobility roadmap – Auckland Transport**

The Auckland on-demand and shared mobility roadmap calls for an expansion of shared mobility and identifies 12 principles that should be used to guide investment and decision making around on-demand and shared mobility.

1. Provide a great customer experience.
2. Everyone is kept safe from death, injury and serious harm.
3. Walking, cycling and active travel should be the most attractive choice for short trips.
4. Keep the frequent and rapid transit network at the heart of Auckland's transport system.
5. On-demand and shared services should support a transition to clean, green and space-efficient travel choices.
6. Co-design Auckland's on-demand and shared mobility services with communities, providers and other stakeholders.
7. Regulation and licensing can be guided by public benefit.
8. Engage with customers and develop marketing to support the shift to on-demand, shared and active modes.
9. Be transparent about data and insights, and protect customer privacy.
10. Be resilient and responsive to change and feedback.
11. Provide a transport system that offers good value for money, is inclusive and equitable.
12. Make use of on-demand and shared modes to support existing growth.

A number of scenarios of potential locations were also identified as being suitable for on-demand and shared mobility and are outlined below.

*Rural townships*

Reason for suitability of shared mobility: Low density, long distances and limited travel choices mean there is low use of existing bus routes or lack of bus services.

Benefit of shared mobility: Focus on first- and last-leg journeys to connect with the frequent transport network and implement community-led initiatives.

*Areas with socioeconomic deprivation*

Reason for suitability of shared mobility: Overreliance on private cars due to lower quality public transport access, lack of access to jobs and services and non-standard hours of work.

Benefit of shared mobility: Implement affordable or means-tested options for shared mobility. Create availability outside of standard work hours and provide connections to the frequent transport network.

*Areas underserved by public transport*

Reason for suitability of shared mobility: Opportunity to reduce social isolation, improve access to jobs and services and provide transport where traditional bus services may not be viable.

Benefit of shared mobility: Increases transport accessibility.

# Section 3: Horizon Scan
# Policy Review

## New Zealand policy review

**Auckland continued**

*Business parks/ employment centres*

Reason for suitability of shared mobility: High volume of car trips to one location, high congestion, often non-standard work hours, lower public transport access.

Benefit of shared mobility: Reduction in congestion and travel cost, flexibility of travel options, community-led solutions, improve public transport connections.

*Medium density housing areas*

Reason for suitability of shared mobility: Public transport lags behind housing, limited space for resident parking, local roads lack capacity for extra vehicles, opportunity to change travel habits when people move house.

Benefit of shared mobility: Reduce congestion, complement public transport services, reduce household travel costs.

The roadmap feeds into the Regional Public Transport Plan (RPTP) which has allocated funding to extend trials of shuttle services that compliment existing public transport services and continue granting licences for shared mobility.

Under the Auckland Transport carshare policy, the benefit to carshare developers is that council-controlled spaces can be dedicated to carshare providers at discount leases. The policy also outlines the steps for assessing provider applications

**Wellington**

Wellington carshare guidelines recognise that carshare parking spaces are a high priority in the city. It also recognises the benefits of supporting providers. Providers who require their cars to return to the same spot can permanently rent discounted council-controlled parks, while free-floating providers have access to any parking bay and will pay the value of the park. Providers have to provide quarterly usage data to the council which is used to review performance targets and allow for changes to parking provision.

**Christchurch**

The Christchurch carshare policy encourages carsharing and allows the council to grant the use of council-controlled parking spaces to carshare providers.

**Hamilton**

There is no set policy for carshare providers in Hamilton, however 14 council-controlled carparks are dedicated to carshare providers.

## Conclusion of local policy review

There are limited policies for shared mobility in New Zealand central or local government policies. The major centres support shared mobility through licencing of carshare and micromobility providers and offering car parks at reduced rent.

There is broad support to encourage shared mobility uptake but currently no policy actions have been undertaken to drive this.

Some carshare providers have partnered with private landowners to bypass the need for public parking spaces, for example Cityhop have partnered with Mitre10 stores in Dunedin, Whangārei, Invercargill and Central Otago.

## Lessons learned

- Parking policy supporting dedicated carshare spaces is important
- In the absence of local policy, it is recommended that there is national policy guidance on shared mobility
- Principles for shared mobility are important to guide investment and growth in these services

# Section 3: Horizon Scan
# Policy Review

## International policy review

The international policy review looks at examples where cities have adopted specific policies to enable shared mobility. Links to these policies are provided.

**EV Readiness – Tucson, USA**

The City of Tucson has introduced special ordinance to require residential developments to provide for electric vehicle charging. All new single-family or duplex homes need to have a regular outlet near a parking space for at-home EV charging, while larger multi-family developments are required to install EV-ready power outlets on 10% of spaces and make a further 15% EV ready with pre-wiring for future installation of charging equipment.

As an incentive to developers, for every extra EV space provided, developers can have one fewer than the minimum required by other regulations, thereby saving developers space and money.

*https://climateaction.tucsonaz.gov/pages/electricvehicles-roadmap*

**Bike Share for All – San Fransisco Bay Area, USA**

The Bay Area Transportation Authority subsidises access to four bike and scooter providers for those who receive certain social security payments, allowing them to access services for lower membership fees and user fees. Arrangements are also available for those how do not have a smartphone or credit card. This increases equitable access to mobility for people who could not otherwise afford or access these shared mobility services.

*https://www.sfmta.com/getting-around/bike/bike-share*

**Shared Mobility Principles – Oakland, USA**

The Department of Transportation have launched an outreach programme to increase access to shared mobility for disadvantaged communities. This includes outreach events, demonstrations and assistance with the sign-up process as well as offering credit to trial the service. This resulted in an increase in people signing up to the services.

*https://www.oaklandca.gov/resources/shared-mobility-principles*

**Roadmap for the Future of Transportation and Mobility in Chicago**

This roadmap places a large emphasis on the role of shared mobility in solving many of the city's challenges relating to environmental, social and economic wellbeing. It was informed by government, neighbourhood and civic organisations, research institutions, and not-for-profits.

The success of the roadmap comes from its specific and implementable actions. It provides clear direction for how to support shared mobility, such as through conducting a shared scooter pilot, evaluating the structure of transport-related taxes to promote the use of shared vehicles and establishing a Chief Mobility Officer with a specific mandate to lead engagement with mobility providers.

*https://www.chicago.gov/content/dam/city/depts/mayor/PDFs/21755_37_AF_MobilityReport.pdf*

**E-mobility strategy – Brisbane, Australia**

E-mobility is included as a key initiative of the Brisbane Transport Plan. In the city e-mobility strategy a number of policy directions were outlined to increase the shared mobility service. These included partnering with the state government and transport agency to provide facilities for first- and last-leg journeys on rapid transit routes, encouraging extension of services to areas with low car ownership or low public transport access and investment in infrastructure including charging spaces and dedicated parking spaces for shared mobility. Further incentives would encourage customers to park in those designated areas and the city is considering the potential for contributions from providers to support this infrastructure.

*https://www.brisbane.qld.gov.au/sites/default/files/documents/2021-06/20210623-Brisbanes-emobility-strategy_web-tagged.pdf*

# Section 3: Horizon Scan
# Policy Review

## International policy review

### Shared e-mobility introduction policy – ACT, Australia

Transport Canberra has introduced new policy allowing e-scooters and other e-mobility options in public spaces in the Australian Capital Territory (ACT). Partnerships with Beam and Neuron Mobility have seen the introduction of e-scooters and e-bikes onto the city streets for public use. The future strategy for e-mobility in the ACT includes plans for mixed use of curbside for shared mobility and stations to park e-scooters and e-bikes.

*https://www.transport.act.gov.au/travel-options/e-scooters/shared-e-scooters*

### Infrastructure Australia Mobility choice policy recommendations – Australia

Infrastructure Australia has proposed the introduction of policy to promote the ease of access and use of micromobility options to promote less car dependent lifestyles. The policy recommendations for implementation over a 5–10 year timeframe include improvements for speed, reliability, and ease of use for active, public and demand responsive transport to deliver on environmental, social and affordability outcomes that improve liveability.

*https://www.infrastructureaustralia.gov.au/2021-australian-infrastructure-plan-implementation-and-progress/recommendation-4.3*

### A car club strategy for London – London, UK

The strategy was developed by the Car Club Coalition, an organisation that brings together local councils, Transport for London and carshare providers. It created an action plan for 10 steps to drive uptake of carsharing which are summarised below:

1. Developing a monitoring framework to build the evidence on the impacts of car clubs
2. Working with key stakeholders to support car clubs
3. Transforming London's public sector fleets
4. Building capacity and creating a framework for supportive policy development
5. Helping more Londoners make the switch from private cars
6. Making parking management smarter and easier
7. Driving the uptake of low emission vehicles
8. Transforming the profile of car clubs in London
9. Driving the uptake of car clubs in London's commercial fleets
10. Car club integration

### Conclusion of international policy review

There are few policy examples internationally to consider shared mobility. Existing policies focus on increasing uptake of shared mobility or improving equitable access.

There are examples of roadmaps and strategies globally, but these do not extend to policy changes yet. Any major policy changes will be industry-leading and allow New Zealand to be at the forefront of a shared mobility future.

Some equity provisions are made in other countries, such as the Oakland outreach and trial programme and wider San Francisco Bay Area bikeshare subsidy. There is an opportunity to embed a similar provision in New Zealand.

Benefits could also be linked to the number of EV or shared spaces provided such as those in Tucson. Given there are no parking minimums in NZ, this could be in the form of reduced developer contributions or increase in the number of allowed dwellings for a site.

Collaboration between different stakeholders is effective to create a plan of action that all stakeholders agree with.

# Section 3: Horizon Scan
# Stakeholder Engagement

## Interviews

We interviewed several key stakeholders across the mobility spectrum to understand the opportunities and barriers they experienced on the ground (see Table 2).

Interviews based around the following questions:

- What do you see as the future trends of shared mobility?
- What role does your organisation play in shared mobility?
- What are the biggest challenges to shared mobility?
- What are you doing to future-proof?
- What sort of funding opportunities or incentives are available for developers or mobility providers?

The questions were tailored to each stakeholder organisation to maximise diversity of perspectives.

The lessons learned from the stakeholders are used to inform the development of the framework tool by being key factors to consider in the development of shared mobility systems. They are also incorporated in the recommendations.

**Table 2: List of stakeholders interviewed**

| Stakeholder organisation | Type |
|---|---|
| Zilch | Mobility provider |
| Ockham | Property Developer |
| Auckland Council | Local Government |
| Queenstown Lakes District Council | Local Government |
| EECA | Central Government |
| Human Nature Places | Property Developer/ Advocacy Group |
| CityHop | Mobility Provider |
| Christchurch City Council | Local Government |
| CoHaus | Property Developer/ Community Group |
| Ngāi Tahu | Property Developer |
| Fletcher Living | Property Developer |

# Section 3: Horizon Scan
# Stakeholder Engagement

## Outcomes from the interviews

### Future trends of shared mobility

- More supportive communities and development of infrastructure, such as public transport, cycle lanes and micromobility parking
- Consolidated platforms and creation of a new technology app that will become a "one stop shop" for all shared mobility services to make it easy for users to choose different modes
- Adjusted zoning in areas where shared mobility would be most suitable to encourage shared mobility developments

### Opportunities for shared mobility

Mobility Providers

- Need of an ecosystem or more collaboration between all stakeholders to have a coordinated approach to make the service attractive
- Introduction of minimum standards for mobility providers and accreditation to hold providers accountable. For example, data gathering and sharing

Property Developers

- Potential opportunities for shared EV fast chargers for both shared vehicles and private vehicles
- Improve financial literacy of the cost of owning a car and promote how using a shared service can be cheaper and lower emission

Government

- Restriction from central government to make it harder to own a car
- Shape policy to ensure developments support shared mobility, e.g. mandating bike parking or pre-wiring spaces for electric vehicles
- Councils/Government to require workplace and school travel plans so developments will demonstrate how they're reducing private vehicle use
- Strengthen relationships with charging manufacturers and distributors, developers and car share providers

### Barriers to shared mobility

Mobility Providers

- Cultural issues around desirability of car ownership and rhetoric of cars meaning freedom
- Low financial literacy around car ownership, leading to people only considering variable costs (petrol) and not fixed costs (vehicle purchase, depreciation, insurance etc) when considering travel mode
- Not commercially viable to provide services in low density or low socio-economic areas, challenging to create a model that works financially for everyone
- Regulatory restrictions on parking, providing charging infrastructure and insurance make it difficult to get a service up and running
- Not enough breadth of electric vehicles available to offer a full car-replacement service

Property Developers

- Different models need to be looked at because expense can put apartment residents off using shared cars. Residents who do not have a carpark may instead choose to park on-street
- Lack of cooperation from utilities providers to provide for electric vehicle charging and transparency about maintenance and state of the asset

# Section 3: Horizon Scan
# Stakeholder Engagement

## Outcomes from the interviews

**Barriers to shared mobility continued**

Property Developers

- High upfront cost associated with installing transformers and cabling to future proof for charging infrastructure can be prohibitive
- Gaps in regulation that allow private developers to choose commercial success over mobility
- Site selection, in terms of how close is it to public transport, town centres or is it too far away from where people want to go

Government

- Some communities are unsupportive of change
- Councils have limited budget and influence to support change. Central government needs to work with local councils to advocate for shared mobility
- Council and government policy still makes owning and driving a car the easiest, default option
- Requirements for cooperation on minimum standards and regulation

**Lessons learned**

Mobility Providers

- Each development will have a critical number of vehicles below which the residents will not have confidence in the service that there will always be a car available. One developer cited 1 car for 33 dwellings was enough, but it is highly dependent on the development and proximity to other transport choices
- There are different social considerations that the services needs to adapt to, particularly around trust, accessibility, maintenance and upkeep of the vehicles in lower socio-economic areas
- The types of vehicles in the system need to meet the communities needs

Property Developers

- There is a critical threshold of vehicles in a development to have a viable service
- Provision for bikes is important – part of the ethos is that most car trips can be done by bike and only some trips will be in the shared car
- Shared mobility can't be considered in isolation, it is most effective when it is a part of the wider transport system and compliments public transport and active modes

## Conclusion

Recommendations should be made to implement policy around shared mobility, particularly regarding making shared mobility more attractive and easier for providers and developers to implement services. This supports the literature review which found policy interventions that incentivise shared mobility and disincentivise private car use are effective to drive uptake.

There needs to be improvements to the social perception of shared mobility and education around the costs of car ownership and the benefits of shared mobility.

Shared mobility needs to be tailor-made for each development based on the context and community.

# Section 3: Horizon Scan
## Case studies



### Shared mobility in housing in New Zealand

**Daisy, Auckland**
*Ockham*

| | | |
|---|---|---|
| 2018 | 33 apartments | 1 shared car |

The apartment building is located off Dominion Road in close proximity to public transport routes. There are no car parks for residents, but provides secure parking for personal bikes and scooters.

Ockham provided the car park and charging infrastructure which is then leased to CityHop who own and maintain the shared vehicle. Residents book through the CityHop app and have exclusive use of the car on the premises, as well as access to the wider CityHop network.

The promotion of a low-car lifestyle and use of shared cars was used to market the building and as the first of its kind in the country there was increased interest among buyers. Residents were attracted by the sustainable nature of the building and chance to reduce travel costs.

For the developer, the provision of carshare contributed to the development being the first and so far only 10 Homestar rated building in New Zealand- the highest sustainability rating for residential buildings.

**Lessons**

- Proximity to public transport and active mode provisions increase success of the service
- Shared mobility builds a strong sustainable brand and contributes to sustainability accreditation

**Ōtautahi Community Housing Trust, Christchurch- Brougham Street**
*ŌCHT*

| | | |
|---|---|---|
| 2018 | 90 townhouses and apartments | 2 shared cars, five e-bikes |

ŌCHT has partnered with Zilch Car Sharing to provide a subsidised EV to ŌCHT tenants. The cars are based at charging stations located in Sydenham, but are available to tenants from any other ŌCHT properties to use.

Cost and convenience are the over-riding positives of the ŌCHT/Zilch Car Sharing subsidised EV scheme. As ŌCHT and Zilch supply the cars and subsidises the cost, residents who find cost as a significant barrier to travel are able to do so.

The barrier of this car share scheme is that it is difficult for the residents living in suburbs other than Sydenham to access the cars and Zilch have indicated that two cars are too few to build high confidence in the service always being available.

**Lessons**

- Subsidised service increases the popularity of the service in a low socio-economic environment
- Positive social outcomes by providing transport access to residents who otherwise have none
- 2 cars is not enough to build confidence that one will always be available among residents

# Section 3: Horizon Scan
## Case studies

### Case studies of shared mobility in New Zealand

**Cohaus, Auckland**
*Independent*

| | | |
|---|---|---|
| 2021 | 20 apartments | 6 shared cars |

Cohaus was developed by an independent residents group who had the goal of creating a low-car and sustainable community. The development features shared facilities including a guest bedroom, a common room, storage, laundry, bike parking, cars and car parking.

Most residents do not own a personal car and use the six shared cars which are owned and operated by the body corporate which residents can book through a website portal.

Two of the cars are electric and are the most popular of the vehicles. The electric chargers were funded by the EECA Low Emission Vehicles Contestable Fund (LEVCF).

**Lessons**
- The service is well-used as all residents believe in the community and bought in to the shared resources
- Electric vehicles are more popular than non-electric shared vehicles

**Sunfield, Auckland**
*Winton*

| | | |
|---|---|---|
| Future 2025 | 5000 dwellings | On-demand shuttle |

Sunfield is seeking to create a highly sustainable community encompassing the principles of a 15-minute neighbourhood where all needs, employment and education are accessible within 15 minutes of home. Sunfield will have two schools, a town centre, four retail hubs, healthcare, aged-care facilities, 28 hectares of open space, and an employment precinct providing up to 11,000 job opportunities.

There will be only 1 carpark per 10 homes to drive active mode use, shared car services and the use of the on-demand shuttle. Currently, no carshare, bikeshare or scootershare plans have been released.

The development will own and operate the Sunbus, an autonomous electric bus which stops at scheduled stops in the neighbourhood and can also be hailed on demand via an app. This will provide seamless and efficient transport to Papakura Train Station and town centre, ensuring easy connections with the Auckland public transport network.

**Lessons**
- Shared mobility features as a core part of the development marketing which increases the sustainability image of the development to attract buyers
- Shared mobility is attractive in mixed-use and compact neighbourhoods as people need to drive less

# Section 3: Horizon Scan
## Case studies

### Shared mobility in housing overseas

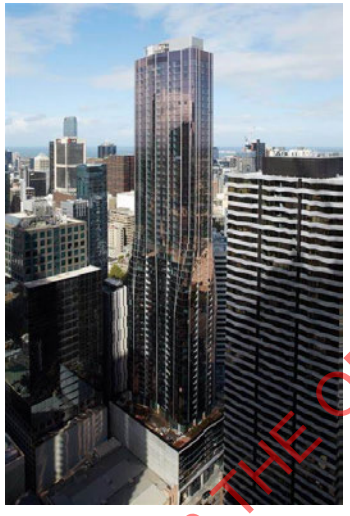
**EQ Tower, Melbourne**
*ICD Property and Sino-Ocean Land*

| | | |
|---|---|---|
| 2021 | 633 apartments | 2 shared cars |

The EQ Tower has shared cars provided by the Ohmie Go initiative: a partnership between Ohmie, a smart-home developer, car manufacturer Hyundai and Australia's leading EV charging company, JET Charge. They provide dedicated carshare services to large-scale apartment blocks and businesses, offering bespoke options of vehicles, charging infrastructure and options for bikes and scooters depending on the needs of the development.

The Ohmie Go partnership finds success among developers by providing a turn-key solution where all planning, design, installation, operations and maintenance and ownership of the infrastructure are provided by Ohmie Go. Ohmie Go manages, support, insurance and the digital tools to use the system.

These turn-key shared mobility solutions can be included in new developments or retrofitted to existing buildings.



**Lessons**
- Turn-key solutions are attractive to developers as an easy way to include shared mobility
- The shared mobility service can be tailored to the needs and wants of residents to create an attractive and useful service

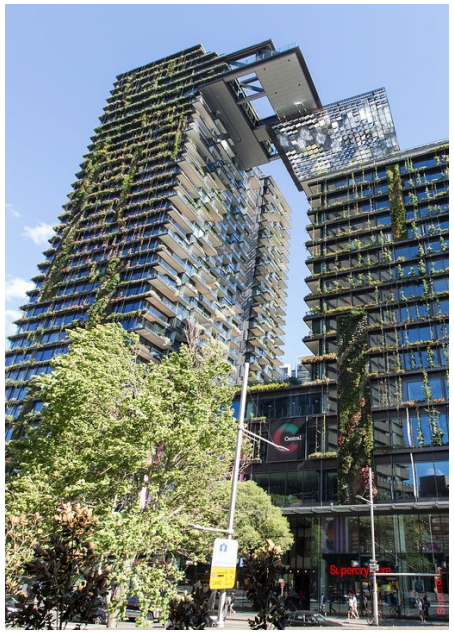
**Central Park, Sydney**
*Fraser's Property and Sekisui House*

| | | |
|---|---|---|
| 2013 | 3000 apartments | 50 shared cars |

Central Park does not offer carparks to every dwelling, instead, Australia's largest carshare hub is co-located in the development with service provided by GoGet. There are 50 vehicles provided, ranging from small hybrid cars to people carriers and larger vans. Residents pay a membership to GoGet and book through the app and have access to the nationwide GoGet network.

Over 700 residents actively use the carshare service and several have reported selling personal cars.

The sustainability credentials of the building were a key marketing point for the developer and attracted people to buy in the property. Success of the shared mobility service was also driven by the mixed-use neighbourhood with amenities and public transport close by, reducing the need for residents to travel by car.



**Lessons**
- Providing a variety of vehicles increases the attractiveness for users
- Incorporating mixed-uses in the precinct increases success of the service

# Section 3: Horizon Scan
## Case studies



### Shared mobility in housing overseas

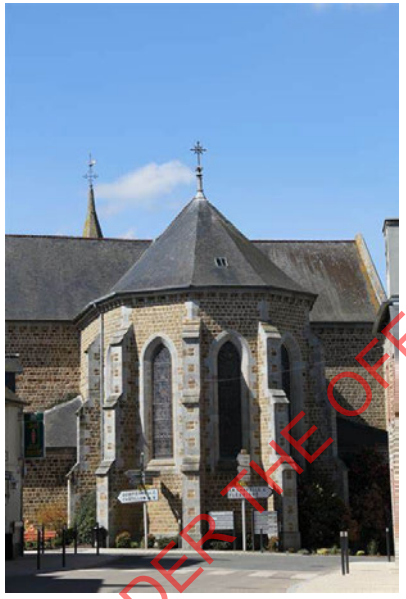
**Luitré-Dompierre, France**
*Local Council*

| | | |
|---|---|---|
| 2021 | 1900 residents | E-bikes and 2 shared cars |

Luitré-Dompierre is a village in Brittany, France, home to 1900 people. In 2021, the local council created a carshare hub for the village through Mobilize Share with two Renault Zoe EVs available. The hub was designed and installed on the village outskirts which includes a caravan park, a car-pooling meeting point, bus stop and a fleet of electric bikes.

The introduction of this service aimed at ensuring people can travel when they need without needing a personal car which rural communities rely on due to the lower public transport service offering and longer distances.

The project was supported by the European Commission as part of the Leader initiative developed by the European Agricultural Fund for Rural Development (EAFRD) that aims to support rural communities in meeting their local development objectives.



**Lessons**

- The service was designed by the community and for the community so is used by all
- The hub brings together multiple transport modes, increasing the use of all of them

**Merwede, The Netherlands**
*Local Council*

| | | |
|---|---|---|
| Future 2025 | 6000 apartments | E-bikes and 300 shared cars |

Merwede is a planned car-free neighbourhood on former industrial land in Utrecht. The area will be car-free, with no through-road access and limited road space reserved for logistical uses.

There will be 0.3 spaces per dwelling that are available for a high cost in parking on the edges of the neighbourhood to discourage use.

300 shared cars will be available for residents to use in the mobility hubs. This will be complimented by shared bicycles, ridehailing and high frequency public transport. The mobility hubs will be supported with amenities such as coffee shops and dry cleaning services.

The neighbourhood is expected to be successful as the town centre, including the Utrecht Central Station will be walking or cycling distance and regular amenities such as public spaces, shops, schools and sports facilities will be all located within the neighbourhood.

**Lessons**

- Proximity to the town centre and mixed-use reduce the need to drive a car which increase the attractiveness of shared mobility
- Limited ability to drive cars result in more people choosing shared mobility

# Section 3: Horizon Scan
# Māori values

## Values workshop

A Māori values workshop was held to understand the values that Ngāi Tahu wish to embed in the framework model for developments.

The workshop discussed the barriers and opportunities to shared mobility from a Māori perspective to ensure that the framework is inclusive of the specific needs of their communities. We took the six Ngāi Tahu values (whanaungatanga, manaakitanga, tohungatanga, kaitiakitanga, tikanga and rangatiratanga) and picked three to focus on and delve deep into what each means for shared mobility in housing.

### Whanaungatanga

The sense of community and creating a sense of belonging to the place where you live. The development should uplift people and create an environment where people can be brought together and reinforce relationships between people. We need to strongly communicate what the product is and the service that is available. In particular, we need to reinforce that the service is by residents and for residents.

### Manaakitanga

Everyone has a sense of dignity that needs to be upheld and we need to design a service that works for everyone and is not solely focused on commercial outcomes. We need to consider the wider uplift in mana that is brought from intangible benefits such as lowered congestion, more access to green space and more sustainable living.

### Rangatiratanga

The individuals within a community can be brought together through shared mobility to build a sense of responsibility and respect for shared assets and others. There are opportunities for communities to own the asset and take pride in the system. All different stakeholders such as residents, council and mobility providers need to be brought together as part of the conversation to ensure that the outcome works for everyone. Community voices and involvement will result in a more successful shared mobility system and building in flexibility allows the service to adapt to the needs of the residents.

### Outcomes

The outcome of the workshop showed that accessibility to shared mobility and community trust in the service are the two key factors that need to be established to ensure that a shared mobility service is successful.

We incorporated cultural considerations as a new pillar of analysis for the horizon scan and to be considered into the development of the model to ensure that the social and cultural needs of people are considered in the framework.

# Section 3: Horizon Scan

## Summary of horizon scan findings

The findings of the horizon scan are summarised in Table 3 below as they apply to the context of shared mobility in New Zealand. Drivers are the key success factors that improve the quality and uptake of shared mobility services, while barriers are negative impacts that hinder shared mobility. Considerations are also recognised as these can have a negative impact if not managed or a positive effect if incorporated. The drivers and barriers are used to feed into the decision making framework and recommendations by identifying which are the most influential factors for shared mobility.

| | Social | Technological | Economic | Environmental | Political |
|---|---|---|---|---|---|
| **Users** | • Knowing others who use shared mobility services<br>• Feel safe and connected within their community<br>• More people with a sustainability ethos willing to get rid of their car<br>• Lack of trust or discomfort with the service<br>• Haven't used it before<br>• Culture around desirability of car ownership, including for businesses providing fleets<br>• Rhetoric that car = freedom | • Access to a smartphone, internet, and credit card<br>• Lack of technological literacy can present a barrier to use, particularly when services are linked to apps or websites | • Growing tourism industries, increasing demand<br>• Low financial literacy meaning people don't consider fixed cost of vehicle ownership when making travel choices<br>• Services being too expensive<br>• Greater uptake in higher socio-economic areas<br>• Cost of travel is cited as the most important factor that influences transport choice. Increasing living costs will exacerbate this driver's influence | • Personal safety and security in the surrounding environment<br>• Providing facilities that make it convenient to walk & cycle<br>• Lack of personal safety when cycling or using micromobility<br>• Communities are very unsupportive of change<br>• Urban vs rural environment, influencing proximity to services | |
| **Providers** | • Distrust in services lead to vandalism and hence higher costs | • Market growth is attracting innovators, making services more attractive through technological advancement<br>• New technology with IoT | • Sufficient demand in an area<br>• Market growth is currently being experienced, which will attract more providers<br>• Credit cards as a payment system means providers must chase debts | • Drivers around contributing to reduced emissions<br>• More dispersed areas have higher costs for vehicle relocation and maintenance for free-floating services<br>• Only financially viable in dense areas | |

**Key**
Driver Barrier Considerations

Table 3: Summary of the drivers, barriers and considerations identified in the horizon scan.

# Section 3: Horizon Scan
## Summary of horizon scan findings

| | Social | Technological | Economic | Environmental | Political |
|---|---|---|---|---|---|
| **Developers** | | • New charging technologies can make providing shared electric vehicles more feasible | • Significant cost of providing parking, with a high opportunity cost of green or leasable space<br>• Focus on affordable units can make services unviable | • Density of development is the primary driver of success, as more customers are located in a walkable catchment of services<br>• Higher green space density, street design that incorporates safe zones and parking<br>• Developers who strive to foster sustainable developments may provide shared vehicles over parking | • Strong body corporates in developments to oversee services<br>• Removal of minimum parking requirements allows developers to choose to provide a few shared vehicles over carparking for every unit<br>• Lack of cooperation/will from utility providers to provide for electric vehicle charging |
| **Government** | • Shared mobility can help achieve Government agendas around transport equity and reducing social deprivation of rural and low-income groups | • Government acknowledges the opportunity technology brings to make shared mobility more attractive, and are investing in it | • On-demand PT services can be more cost effective than traditional PT<br>• Lack of funding in local government to support change<br>• Availability of funding to support pilot / nascent stages of shared mobility services | • Location near town centres, green space, dedicated paths and infrastructure<br>• Well used public transport where shared mobility can be used as a first/last mile solution | • NPS-UD requirements to allow for greater density and no carparking<br>• Aspirations around mobility, climate, health, quality of life<br>• Interventions that make driving less attractive, e.g. congestion pricing for reducing parking<br>• Resistance from Waka Kotahi to change |

**Key**
Driver Barrier Considerations

Table 3: Summary of the drivers, barriers and considerations identified in the horizon scan.

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# Funding assessment

# Section 4: Funding assessment

## How can shared mobility projects be funded?

This section focuses on how shared mobility projects are funded around the world and offers insights into how funding models could be applied in the New Zealand context.

There are two areas of analysis in this section:

1. Key considerations when securing funding for shared mobility projects.

2. Sources of transportation funding with relevant examples observed in other cities and countries, mainly:

- General government budgets
- User charges and revenue models
- Value capture mechanisms

It is important to understand the project goals, nature of costs and revenue potential when assessing the project opportunities and decisions related to funding.

### Understanding the goals

The mechanisms used to secure funding need to align with the project's goals. For instance, placing a shared mobility service in an area likely to generate higher levels of ridership can produce higher revenue, however this would not be a viable revenue strategy for a project with a goal of mobility equity.

Mobility equity often requires that service is provided in lower density, harder to reach locations, where the revenue generated may be insufficient to operate a project. Action to increase affordability and access of services such as subsidies is a key opportunity to increase equity in these situations.

### Understanding the costs

In general, projects have high upfront capital costs for the implementation, construction and purchase of equipment. Subsequently, there will be recurring operational / maintenance costs incurred.

The last component and often most overlooked in practice is lifecycle/refurbishment costs for asset refreshing. These are high and periodic (once every few years) costs. If overlooked, the assets could degrade significantly, which in turn would affect user experience. A lack of forward planning for lifecycle costs can result in a circular problem whereby revenues drop with a user base decline resulting from asset quality degradation, and there is insufficient income for continuous lifecycle replacement.

Financial reserves (known as maintenance reserve accounts, or MRAs) are utilized in transport projects and function like sinking funds in real estate projects. A sum is set aside periodically in a reserve account and released to pay for lifecycle costs.

### Understanding the potential to leverage private capital

Putting together the costs and revenue potential of the project, the estimated net cash flow indicates if private investors can attain an attractive return and if the project is viable.

Should a project be financially unviable on a standalone basis, governments can explore ways to bridge the gap through a partnership. There are no public private partnerships (PPPs) for housing in New Zealand, however there are examples overseas such as a 2332 house development in Bonnyrigg, Sydney where there the state government contracted to a private developer to build both public and private housing, with fixed yearly payments over the life of the housing asset.

Understanding partnership dynamics and developing effective partnership models are critical to leveraging innovative funding solutions and lasting shared mobility programs.

Equitable partnerships can help to share the risk and reward between a public agency and its private partner. These partnership models balance ownership, governance, management, operations and funding. The way these partnerships are structured will dictate how the funding is shared or distributed.

# Section 4: Funding assessment
# Funding

## How can shared mobility projects be funded?

**User fees**

User fees are collected from those who utilise a certain service or facility. They are applicable for infrastructure or services where costs can be attributed to specific users and where it is possible to exclude non-payers from the infrastructure/service.

Where user fees are collected, it is a critical and direct contributor to the recovery of costs as it matches the timing of costs of providing such services to the direct users of the service.

One key downside on user fees is unpredictability – costs to provide shared mobility can be forecast with reasonable certainty but user fee revenue is dependent on user take-up, which fluctuates over time based on many external factors. Actual fee revenue may be insufficient to cover costs and threaten the financial viability of the project.

In the context of shared mobility, three types of user payment models have been analysed, including subscriptions, cooperatives and pay-as-you-go (see box inserts).

These are examples of how services are funded and are not an exhaustive list of all options. These have been selected as the most relevant to the New Zealand context due to their current existence in New Zealand.

**Recurring subscription - Swapfiets**
Under a recurring subscription model, users pay a fixed recurring fee for the provision of a service. No upfront deposit is collected, though there may be minimum subscription periods imposed. Swapfiets offers a bike subscription-based membership service or 'bike-as-a-service'. Founded in 2014 in the Netherlands, Swapfiets grew quickly to become one of Europe's leading micromobility providers with over 270,000 members in more than 70 European cities.

From EUR19 (NZ$30) a month, customers get a bicycle and need not worry about the maintenance, repair or end-of-life arrangements. Users are attracted to the fact that no upfront deposit is collected, which is made possible by the fact that bicycles have a relatively low upfront cost compared with cars.

**Cooperatives – CoHaus**
CoHaus in Auckland have a fleet of shared vehicles that are owned and operated by the residents. Upfront costs for the vehicles were included in the apartment construction cost, with some funding also provided by EECA for two EV chargers.

The residents of the building pay a flat yearly fee that is included in the body corporate fees for the building. Residents then pay-per-use with both a time-based and kilometre-based charge. These revenue sources cover the yearly running cost and depreciation of the vehicles which are managed by a group of residents. Key success factors are that residents felt a sense of ownership and responsibility in the service that they bought into and so use and respect the vehicles. Costs are also kept low by operating the service as not-for-profit.

# Section 4: Funding assessment
# Funding

## How can shared mobility projects be funded?

**Pay-as-you-use – BlueSG carsharing**
Pay-as-you schemes charge users according to their use of a facility / service. This is typically linked to metrics such as time-based or distance-based charging.

This model has relatively higher revenue volatility and can be more difficult to implement due the need to measure usage and apply charges in real time. However, it is more just, whereby users pay proportionately to their consumption. Cross subsidy of overconsumption, where frequent users are subsidized by other users, is minimized.

BlueSG operates as a point-to-point carsharing program in Singapore, with related companies operating the same vehicles under different names in other countries.


A 100% electric fleet is available across Singapore for rental 24/7, with users paying based on duration of use. Users have the convenience of returning the car at a different charging station from the one they picked it up from. As of December 2020, the company had 374 charging stations located across Singapore and a fleet of 667 cars.

Without memberships fees or deposits to pay for upfront costs, owners' funds and leasing options had to be used for capital purchases. Additionally, the Singapore government supported the roll-out of charging infrastructure, with agreement that this infrastructure would be handed over to the government after 10 years.

The model is attractive to users with irregular and infrequent usage patterns, and who wish to drive without the hassle of maintenance, parking, petrol, etc. The absence of an initial deposit requirement also lowers the barrier to sign up for such a service. The cars achieve higher utilization rates and more targeted user charging.

**Ancillary revenue**

Ancillary revenue sources are utilised to supplement direct user charges in many transport cases. In the context of shared mobility, these can include advertising, leasing of space for lockers, kiosks, vending machines, etc., to operating activities such as helmet rental.

When planned thoughtfully and executed strategically, ancillary revenue can make a difference to the bottom lines of projects and turn a previously unviable project to being financially viable.

It is important to look beyond the transport product and focus on the customer and their broader needs.

Advertising has been particularly effective in mobility hubs and transport nodes, due to the higher levels of footfall concentrated in these spots. Typically, asset owners will bring in an advertising specialist company to manage advertisement space and pay them a management fee or profit share amount.

Where user fees are incapable of cost recovery, the public sector often contributes to transport infrastructure to bridge the funding gap.

# Section 4: Funding assessment
# Funding

## How can shared mobility projects be funded?

**Government budgets**

Transportation infrastructure with 'public-good' characteristics is typically funded from this source, largely due to it having benefit to society as a whole while being difficult or not desirable to charge users directly.

**Value capture**

Value capture mechanisms have been applied in varying ways to raise funding for transport projects.

Based on a principle of beneficiary-pays, value capture mechanisms seek to 'capture the value' from transportation improvement from non-users of transport who indirectly benefit from such improvements. Such value creation has been observed in real estate price increases in developments close to new transport nodes.

Quantifying the value uplift effect from transport projects and attributing it to various developments/beneficiaries is a complex and subjective task, as the specific impact of infrastructure investments on property values can be difficult to separate from the many other variables influencing market prices.

Nonetheless, it can be an important contributor to promoting efficient investment in and development of transport infrastructure. It can reduce the burden on users, whose willingness to pay does not reflect the positive externalities generated by transport infrastructure, as well as reducing the need to rely on general tax revenues which could be more effectively used on public good infrastructure.

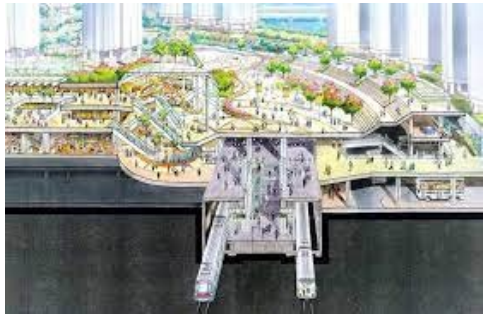
**Transit-oriented development in Hong Kong**

Transit-oriented development (TOD) seeks to fund the development of transport infrastructure through giving the transport developer the financial rights and benefit to the value appreciation from surrounding catchment areas. TOD relies more on private capital to fund transport development, instead of government direction. This is typically done through creating higher density, mixed developments immediately around or above transport nodes.

Transport infrastructure is financed via the redevelopment rights and land grants along the transport alignment given to MTR Corporation. These rights appreciated from value created by transport connectivity and were realized via co-development profits and leasing income.

MTR was able to capture the profit upside as land was transferred at pre-development cost. Further, the legal setup and regulatory environment for transfer of air rights was established, so MTR could use air rights to intensify the land use.

While more commonly applied to rail transport projects, smaller scale TOD features could be applied to 'shared mobility hubs' (e.g., mixed-uses and higher density).



# Section 4: Funding assessment
# Funding

## How can shared mobility projects be funded?

### Development contributions in New Zealand

Development contributions are charged for new developments to be approved and contribute to the costs of building and upgrading of community and transport infrastructure that supports the new developments.

In New Zealand, local councils levy development contributions as a one-off charge, which in principle aims to pay for the capital costs of community and transport infrastructure. Recurring costs are then covered via other collection mechanisms like council rates.

It is an effective mechanism as new and upgraded infrastructure is driven by demand created from new residential and commercial real estate development.

Current policies in New Zealand for developer contributions do not consider shared mobility in their calculations. A future consideration is that development contributions could be reduced for developments that provide shared mobility. This is both as an incentive to developers and is justified by the expected lower impact on roading infrastructure from reduced private vehicle movements.

### Betterment levies in Australia

Betterment levies are a form of tax or fee levied on land that gains value because of public infrastructure investments. This levy is typically ad-hoc in nature and levied on top of existing property and land taxes.

For the Gold Coast Light Rail (GCLR) project, the Gold Coast City Council levied a separate transport improvement charge to ratepayers in addition to existing rates and charges to help pay for the council's A$120 million share of the A$1.2 billion total capital cost of the project.

Betterment levies are effective in raising targeted funding for specific large projects as well as raising significant revenue on an ad-hoc basis.

However, it is a relatively blunt tool, as the levy is applied equally on all properties in the catchment area, and not specifically linked to received land value uplift from the project. A catchment area needs to be well defined, based on the impact of improvement on surrounding areas.

Another point to note is that the City Council has been reducing minimum car parking requirements for developments along the GCLR transit corridor, further contributing to gains by landowners.

## What mechanisms are most applicable in New Zealand?

- The provision of shared mobility or community facilities could be tied to lower development contributions by linking the use of these services to reduced pressure on council infrastructure such as roads. While not directly funding shared mobility, it acts as an incentive to developers and offsets costs.
- Small-scale government funding is available from EECA which can be used for some of the upfront costs to developers, such as installing EV chargers.
- Large-scale funding for providers is available through the Low Emission Vehicles Contestable Fund to allow them to purchase vehicles and set up the service.
- Funding partnerships between developers and providers result in the most successful implementation. Developers fund infrastructure while providers fund the service through user fees.

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# Framework development

# Section 5: Framework Development
## Scenario development

### Summary of methodology

Development of the shared mobility framework was undertaken through a series of four workshops, which featured scenario thinking and testing. Key findings from the horizon scan became stimulus material and informed stakeholder deliberations.

Property developers, councils, shared mobility providers, central government agencies and Ngāi Tahu were invited to participate in the workshops. The attendees of each are shown in Table 4.

Participants explored different situations in which property developers might consider delivering shared mobility solutions. As an immature market, there is uncertainty about how shared mobility will evolve and be nurtured by developers.

Scenarios were constructed across a series of workshops and addressed two timeframes:

1. Near-term (or <5 years) to capture the known diversity of project contexts. Key factors in this timeframe highlight what drivers property developers expect will immediately impact on the success of shared mobility services.
2. Long-term scenarios (or 20-30 years) to assess critical uncertainties that a likely to influence shared mobility in the future.

**Table 4. List of participants for each workshop**

| Values workshop | Workshop 1 | Workshop 2 | Workshop 3 | Workshop 4 |
|---|---|---|---|---|
| Arup (5) | Arup (5) | Arup (5) | Arup (4) | Arup (4) |
| Ministry of Transport (4) | Ministry of Transport (2) | Ministry of Transport (2) | Ministry of Transport (2) | Ministry of Transport (2) |
| Mana whenua engagement advisor (1) | QLDC (2) | Waka Kotahi (2) | Waka Kotahi (2) | |
| Kāinga Ora (1) | Waka Kotahi (3) | | QLDC (1) | |
| Ngāi Tahu (2) | | | Ngāi Tahu (1) | |

# Section 5: Framework Development
## Scenario development

### Near-term scenarios (< 5 years)

During the first and second workshops, participants brainstormed what key contextual factors across social, technological, environmental, economic, political and cultural (STEEPC) categories they would expect to shape shared mobility outcomes in today's market (see Figure 8). Factors from the horizon scan were offered as a starting point for this discussion.

Brainstormed factors were then split into high versus low impact factors as decided by workshop participants. High impact factors were translated into concise factor descriptions (see Figure 9).

The final set of key factors were discussed and refined for input into the project context matrix (see Figure 10). In all, 12 key factors were included in the project context framework, two from each STEEPC domain. Full definitions of each key factor, including their measurement are provided in Appendix A.

Large scale versions of Figures 8, 9 and 10 are included in Appendix B.

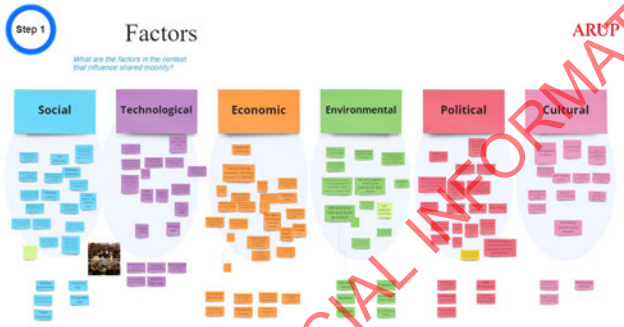


Figure 8. Miro board output of brainstormed factors impacting shared mobility in new housing developments

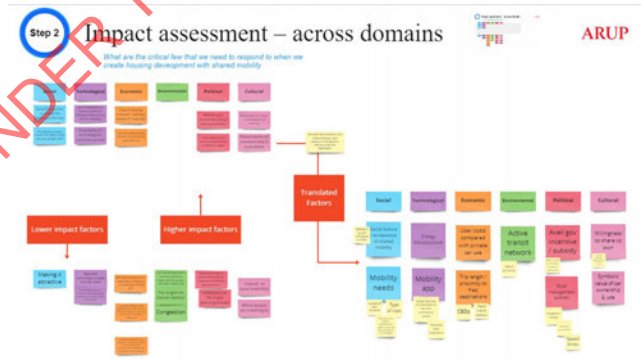


Figure 9. Prioritised factors

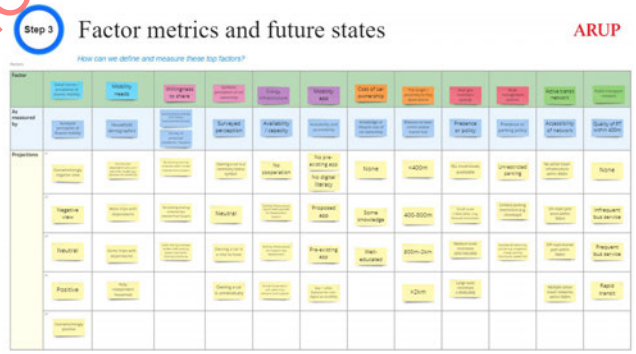


Figure 10. Project context matrix

# Section 5: Framework Development
## Scenario development

### Near-term scenarios (< 5 years)

Participants were asked to develop scenarios that contrasted low, medium and high potential for shared mobility services. The discussion aimed to assess the validity of the factors and how solutions should be designed and delivered for different contexts.

**Scenario 1. Low potential – Small farming community**

The small community lacks basic public transport services and active mobility infrastructure and is located more than 10 kilometers from essential services. Apart from a few enthusiasts, the community and potential new residents view shared mobility services with skepticism and would question investments in shared mobility infrastructure, expressing concern about possible cost implications of these services. Car restrictive policies are inappropriate as most people need their car for agriculture-based work or to access services in other towns.

**Scenario 2. High potential – high density city centre**

The area is walkable with access to rapid transit and most essential services, including major employment and entertainment precincts. Car ownership is genuinely optional and significant portions of the community are digital natives, young, highly educated and use ride-hailing and micromobility on a frequent basis. Journey planning apps are available and there is demand for integrated payments and service bundling to make multi-modal trips more convenient and cost effective. New buyers are looking to downsize or simplify their life in a high amenity community that delivers smart, green and modern living.

**Scenario 3. Medium potential – medium to large provincial town**

This community has grown rapidly with tourism and an influx of people seeking more affordable housing or lifestyle changes. The demand for new mobility modes is high but lacks support from council and public transport and active mode infrastructure is lagging behind growth. Nevertheless, people can be seen riding ebikes and scooters around town and local businesses are offering bike racks and free charging to attract bike users.

**Scenario 4. Medium potential – outer suburb of a major city**

This urban fringe zone has grown dramatically with demand for more affordable homes. Most households require a car for work or commuting purposes as the community is far from the city centre, jobs and education. Public transport provision is poor and improvements are expected to be years away as the current density does not support higher quality services.

### Key considerations for property developers

Participants identified several implications from this scenario thinking, including:

- Transport guarantee: In most scenarios, users would need to know they can get a carshare or ride-hailing service when needed
- Funding: There is possibility to arrange a funding mechanism within the body corporate, which can enable reinvestment in expanded facilities for residents
- Affordability: Pricing will shape behaviour, especially as the cost-of-living crisis continues
- Decoupling parking from home/unit ownership: Housing can be sold independent of car parking provisions to reduce housing cost.
- Street space: Shared mobility requires a rethink of space allocation – from moving cars to moving multiple shared mobility modes
- Target locations for shared mobility: Where are the opportunities to offer shared mobility and transition current car parking stock to higher value uses?

# Section 5: Framework Development
## Scenario development

### Long-term scenarios (20-30 years)

The third and fourth workshops focussed on developing the long-term scenarios.

We considered what the drivers are of shared mobility over the next 20-30 years and how they could influence a developer-led approach to delivering shared mobility.

Developing long-term scenarios combines facts with imagination to determine how trends might interact and influence the property sector and mobility. The aim of the exercise is to think outside the box and challenge expectations about how the future might turn out rather than accurately predict what will happen.

In this context, analysing long-term scenarios can help identify strategic risks and opportunities for developer-led shared mobility provision. In contrast to the near-term scenarios, participants were asked to brainstorm what factors could shape shared mobility to 2050.

### Key issues raised in the discussion:

- Population may peak and then begin to decline which may limit economic growth or change the property model
- Climate refugees from Pacific Islands and Southeast Asia could drive population growth to 2050 and beyond
- Travel patterns will change with a drive to reduce distance and frequency of travel to reduce emissions and congestion
- Households are getting smaller and couples are delaying having kids which could trigger the rise of multi-family living
- Cost of living and mortgage stress could shift household structure and promote resource sharing, including mobility
- Transport technology is going to change mobility, especially autonomous vehicles or flying taxis
- Uncertainty around level of competition versus cooperation between private mobility providers and public transport providers
- Higher housing density is expected to form a large portion of new developments in New Zealand
    - Developers will focus on areas where there is higher amenity and certainty about public investment to support medium-high density living.
    - If paying higher rent in these locations, people will be open to forgoing car ownership to manage overall cost of living.

# Section 5: Framework Development
## Scenario development

### Long-term scenarios (20-30 years)

Participants voted on which issues were more important for developers to address when evaluating their projects against strategic issues and risks. This process produced a set of eight key factors as shown in Figure 11 (large version attached in Appendix B) . Appendix A defines these factors in more detail.

Three scenarios were drafted from a combination of projections within each of these factors. These scenarios aim to be plausible yet challenging narratives of the future.


**Figure 11. Long-term project context matrix with key factors and their projections**

**2050 Scenario 1. Green suburban dream**

*Shared mobility stalls with the rise of wealth gaps and green suburbs for the rich.*

This scenario is driven by an influx of wealthy migrants fleeing climate change-affected regions of the world. New Zealand is 'Plan B' for these migrants and what they seek most is a green utopia close to New Zealand's natural wonders. With growing severity and frequency of damaging climate events, public confidence and trust in governments globally slumped. This stifled attempts of policy makers to manage population growth with compact new-urbanist policies. Plans for rapid transit development and densification across cities lacked public support. Governments were also suffering fiscal strain with a faltering economy and high unemployment post-COVID, and the costs of maintaining legacy assets. Developers focused on the luxury market delivering detached low-density housing in exclusive eco-villages and towns.

Some densification of existing urban areas occurred but was haphazard and lacked well-integrated public transport systems. Car-dominated ghettos formed. To make things worse, multi-family dwellings became notorious for high conflict and bitter legal battles between residents or with developers.

This limited the appeal of shared mobility and resource sharing more broadly. As a result, developers ran out of ideas to deliver more affordable housing and mobility solutions

**2050 Scenario 2. A tale of two cities**

*Shared mobility thrives only in Auckland and Wellington. The rest get left behind.*

In this scenario, the global digital economy favours the country's biggest cities. Both Auckland and Wellington attracted the lion's share of migrant and capital inflows to the country, and both local and central governments took proactive action to manage growth. The central government issued clear directives and catalysed investment for smart growth along rapid transit corridors. Property developers responded to the certainty by providing high quality medium to high density housing and mixed used precincts that became benchmarks for smart living in the region. Driven by the volume and availability of transport data, tech companies also focused their autonomous vehicle trials in these cities.

# Section 5: Framework Development
## Scenario development

### Long-term scenarios (20-30 years)

With plenty of human and financial capital, developers operating in Auckland and Wellington built up a strong capacity to innovate, creating 'packaged living' solutions (house, energy, mobility, meal etc.) for busy professionals. While these cities emerged as innovation hubs in the region, the rest of the country got left behind. A giant city-region gap opened in terms of economic development, health and well-being and happiness.

**2050 Scenario 3. Great islands of opportunity**

*Shared mobility and sharing takes-off following 'The Great Reset'*

This scenario was triggered by a global financial meltdown, which crippled the economy and halted global trade. Following global crisis talks, the central government responded with a range of smart growth and resource sharing policies that promised to deliver a fair and 'self-sufficient New Zealand'. Dubbed 'The Great Reset', the radical economic plan involved a new digital currency, universal basic income, and targeted urban densification around major activity centres and along transit corridors. National public transport policies were uniformly implemented across all towns and cities. Urban areas were shaped by public transport corridors and walkability. On-demand public transport expanded and included traditional ride-hailing services.

The policy certainty helped developers unlock opportunities for new medium to high density housing and create shared mobility services that harmonised with public transport modes. Mobility-as-a-service was mandated to every town over 10 000 people, helping most New Zealanders access essential services without much need for a car. To ensure national housing and mobility policies were implemented efficiently, developer revenue was regulated, and new housing stock was partially nationalised.

Rollout of new connected autonomous vehicles – both autonomous taxis and flying taxis– was also part of the The Great Reset, which paved the way for efficient access to remote towns and regions across the country. Along with advancements in virtual reality that touched every aspect of society, New Zealanders could choose to live wherever they wanted. Many countries in the region did not fare so well, which created mass migration of people looking to New Zealand for a better life.

# Section 5: Framework Development
## Scenario development

### Implications for developers

These scenarios paint diverse pictures of the future and envision very different outcomes for shared mobility and the role of property developers. While the scenarios seem extreme, they are plausible based on global trends and risks surrounding climate change, economic factors and new technology.

Each scenario emphasises a particular set of risks and opportunities for property developers and shared mobility. The best way to use scenarios is to take stock of each set of risks and opportunities and consider how shared mobility in housing development could be more resilient to change and successful in shifting mobility behaviours.

In reality, the future is likely to be a mix of all three scenarios, and there are many other possible scenarios that we have not considered. Nevertheless, these scenarios highlight key challenges and opportunities that were central to workshop discussions, such as:

- What will be the nature of public transport in the future? Can shared mobility solutions evolve and adapt with changes to public transport provision?
- Developers require policy and market certainty in order to participate in major changes to housing and mobility. Yet certainty is unlikely during times of transformational and disruptive change. What can developers do to manage higher perceived risk with shared mobility projects?
- How can road infrastructure and urban design be flexible to evolving transport technologies and markets?
- Does shared mobility offer an alternative revenue stream for developers? (And therefore, enable developers to invest in more mobility services and/or other shared amenities (e.g. community garden).
- How can Māori values be supported in the process of expanding shared mobility solutions? What aspects of current and emerging transport modes and infrastructure are in/consistent with key values?
- Is there uncertainty about whether New Zealand society will be more sharing in the future? What aspects of new residential areas are important to nudge New Zealanders to a more sharing-oriented lifestyle?

### Developer tool

An industry-facing document has been developed to introduce developers to shared mobility, show case studies of how it works overseas and outline how the tool is used. This is found in Appendix C. This is accompanied by an excel model costing tool in Appendix D.

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# The decision-making framework

# Section 6
# The decision-making framework

## Purpose of the framework

The framework aims to inform early concept stage of a development, prior to land acquisition or at the design and costing stage.

The framework promotes a rigorous assessment of options and local context with the aim of achieving 'project-context fit' and a firm basis for collaboration with partners and local communities. The framework process will promote successful implementation by acting as a basis for coordination between stakeholders, including policy makers, infrastructure, and mobility service providers. The framework also promotes options development and evaluation based on current and future risks. This coordination and risk management challenge is addressed through a series of structured decision-making step (Figure 12).

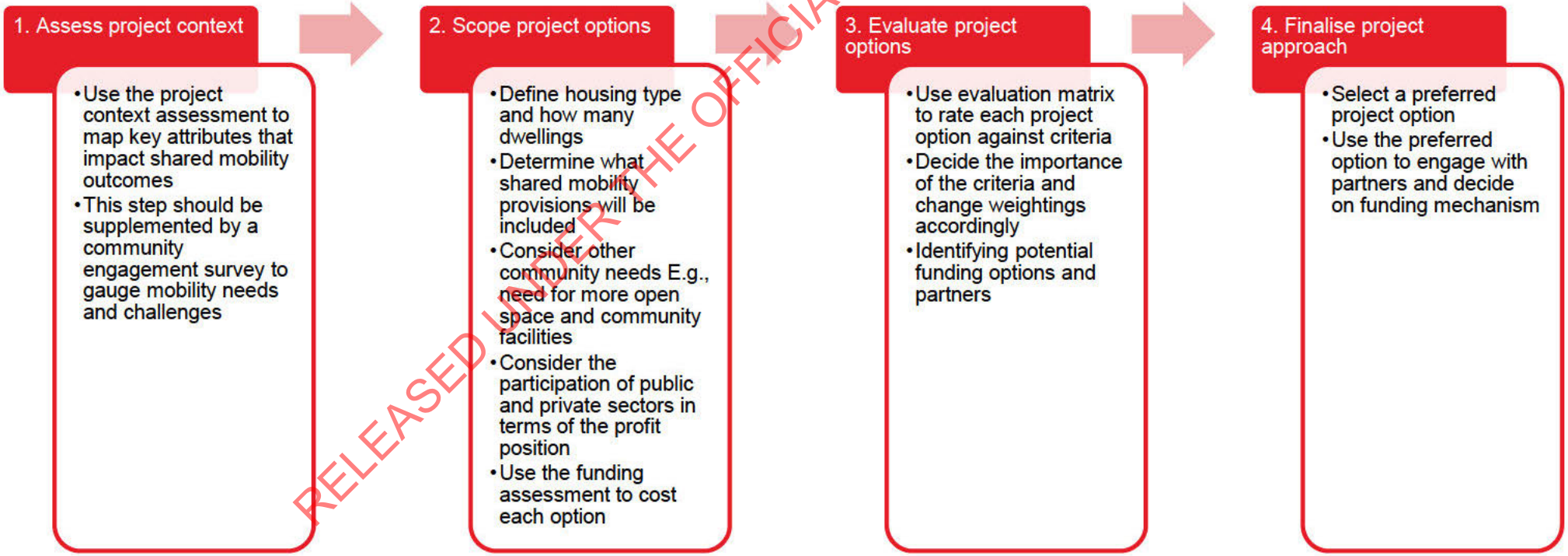


Figure 12: The steps of the framework tool

# Section 6
# The decision-making framework

## 1. Assess project context

Project context is assessed using the project context matrix in Table 5 which was developed in the workshops. This would be combined with a community survey to identify the key local characteristics that can influence shared mobility outcomes. While the project needs to be tailored to the immediate needs and constraints of the community, there should also be consideration about how this context might change over time.

**Table 5: Project context matrix**

| Key Attribute | Willingness to Share | Symbolic Perception of Car Ownership | Social Acceptance | Mobility Needs | Energy Infrastructure | Mobility App | Cost of Car Ownership | Proximity to Frequent Destinations | Available Government Incentives | Road Management Policies | Active Transport Network | Public Transport (PT) Network |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Measured by** | Existing share schemes Survey of potential residents / buyers | Surveyed perception | Surveyed perceptions of shared mobility | Household demographics | Availability / capacity | Availability and accessibility | Knowledge of lifecycle cost of car ownership (survey) | Distance to town centre and/or transit hub | Presence of policy | Presence of car restrictive policies | Accessibility of network within 400m of community | Quality of PT within 400m |
| **Projections** | No existing sharing schemes AND limited interest from buyers | Owning a car is necessary status symbol | Negative view | Single or couple without dependants, daily car use | Existing infrastructure would need upgrades for development support | No pre-existing app No digital literacy | None | <400m | No incentives available | No restrictions | No infrastructure | None |
| | No existing sharing schemes but interest from buyers | Neutral / practical use value | Neutral | One family with dependants, daily car use | Existing infrastructure can support new development | Proposed app | Some knowledge | 400-800m | Small scale (<$50,000), ring fenced incentives | Limited parking restrictions (e.g. clearways) | Footpath and on-road bikeways | Infrequent bus service |
| | Local sharing schemes evident AND existing buyers looking for sharing community | Owning a car is a nice to have | Positive | Multi-family household, with 3 or more cars used daily | | Pre-existing app | Well-educated | 800m-2km | Medium scale incentives ($50-500,000) | Multiple car-restricting policies e.g. congestion charge, parking maximums, low speed limits | Off-road shared path | Frequent bus service |
| | | Owning a car is unnecessary | | | | App + other features for non-digital accessibility | | >2km | Large scale incentives (>$500,000) | | Dedicated footpath and bikeway | Rapid transit |

# Section 6
# The decision-making framework

## 2. Scope project options

Project scoping at the concept stage is a description of what the project would involve from a high-level design and delivery perspective, including a quick assessment of cost and funding arrangement.

Scoping the project involves choosing which shared mobility services a developer wants to make available and how many. This could include:

- E-bike or e-scooter share
- EV share
- Dedicated drop-off/ pick up bays for ride-hailing or on-demand shuttles

This step also includes consideration of what other facilities can be provided in the development:

- Secure bike/ scooter storage
- Bike repair facilities
- End-of-trip facilities
- Green space
- Community gardens or playgrounds
- Co-working spaces
- Commercial space

We have created a scale of different levels of shared mobility integration as a guide to developing project options, shown in Table 6.

**Table 6: Different levels of shared mobility integration**

| Type of shared mobility | Basic | Basic + | Basic + public transport | Basic + public transport + community facilities | Fully optioned with commercial space |
|---|---|---|---|---|---|
| Guide of number of different components | 1 | 2 | 3 | 4 | 5+ |
| Example | • EV share | • Bike share<br>• End of trip facilities | • EV share<br>• Bike share<br>• On-demand shuttle bay | • EV share<br>• Bike share<br>• End-of-trip facilities<br>• Green space Gardens<br>• Public transport nearby | • EV share<br>• Bike share<br>• End-of-trip facilities<br>• Green space<br>• Ground-floor commercial<br>• Rapid transit nearby |

# Section 6
# The decision-making framework

## 2. Scope project options (cont.)

Depending on scale and complexity of the project, multiple options might be identified during the project scoping step. The alternative options might capture key uncertainties about the project.

**Using the funding assessment to cost each option**

We have developed a costing guide for the user to develop a financial profile of their project, which consists of the following key steps:

1. Develop estimates around key financial inputs of costs and revenues.
2. Understand the overall profitability of the project and its various components.

The costing guide has been designed to be flexible to reflect a variety of housing project types and shared mobility components.

The project context and scope are used to inform the development of inputs that feed into the costing guide. The project characteristics are determined by the project context and the choice of project options. The inputs for the model are drawn from these choices. Figure 13 illustrates how each of the characteristics then influence the input field in the costing guide. For instance, housing type affects land cost, availability of community facilities, and housing revenue uplift.

The output is a financial profile of each option including the upfront costs, recurring costs, revenue potential and profitability position. The various financial profiles encourage additional thinking such as the desired delivery/business model among the options and explore potential opportunities in bundling various components for more value creation.

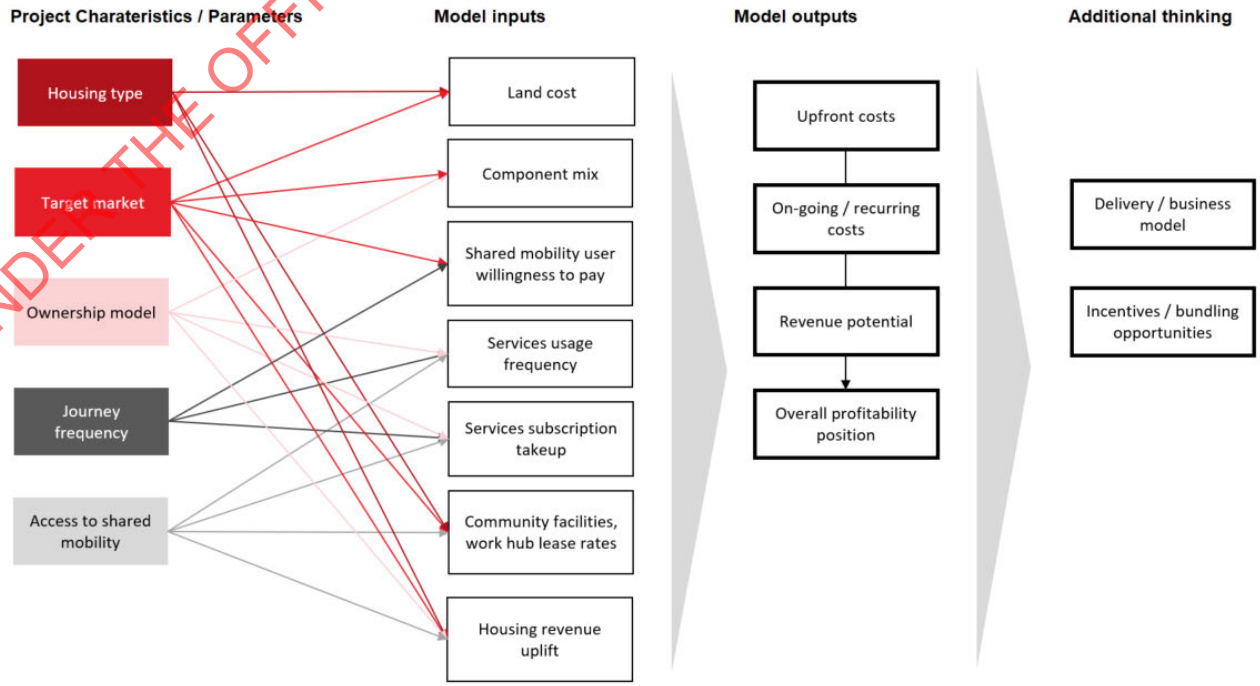


Figure 13: Costing guide methodology

# Section 6
# The decision-making framework

## 2. Scope project options (cont.)

**Types of model input and output**

The inputs in the funding assessment are grouped in three categories: physical space inputs, cost inputs and revenue inputs. Physical space inputs define size of space allocated for shared mobility components and allocate it for the use of various components. This ensures an optimal balance, whereby valuable real estate is not underutilised and, that the guide is realistic in the quantity of shared mobility components to be delivered under space constraints.

The intermediate outputs are the revenue potential of the project and the costs of the project. Costs are further split into upfront costs and on-going costs. Upfront costs are typically associated with the purchase or construction cost of assets and infrastructure. On-going costs are associated with the delivery of services and maintenance of assets and infrastructure.

**Profit position and project options**

The difference between the revenue and cost profile is the profit position, which feeds back into the project design and delivery options.

The profit position also informs the potential delivery model to be applied. Where a service may be more profitable, private player(s) will be encouraged to partner in the development of the project.

The position can also inform the delivery model in terms of public sector involvement such as having local council and central government funding for the project. In some cases, government might explore opportunities to subsidise the project to close the funding gap if the profit position is less favourable.

The project can explore a hybrid model among the private and public players based on the analysis of the profit position such as a developer providing upfront cost for infrastructure investment while leasing the infrastructure to a mobility provider. The project likewise can explore the option of upfront cost being partially borne by the developer given the additional benefits that they will receive through enhanced amenity and uplift in value.

By comparing the financial profile of the different options, users will gain an appreciation of how project context affects optimal option selection, and that there is no ‘one-size fits all’ solution for all project contexts.

# Section 6
# The decision-making framework

## 3. Evaluate project options

Multiple project options can be evaluated against key success criteria, using a multi-criteria assessment (MCA), which asks developers to score each option against weighted criteria. An example of the MCA is shown in Table 7. The MCA can be adapted by changing or adding criteria and altering the weightings to suit the corporate goals or ethos of the property developer.

The scoring of each success criterion can be done on a 5-point scale. The rows of each success criterion indicate the weightings in sequence with the heaviest weighting being first on the list, which in this case is the investment cost.

## 4. Finalise project approach

The preferred option can be selected or characteristics of different options can be combined to further refine the project. Final evaluation of project options would ideally involve potential delivery partners, such as a public transport agency and/or shared mobility provider. This step of finalising the approach is designed to share expectations and assumptions about what it will take to deliver shared mobility outcomes at that project location.

The final guidance can be used to justify further investigation into shared mobility in developments and give a developer confidence in pursuing a shared mobility solution for their project.

**Table 7: Example MCA with weightings and options assessment**

| Success Criteria | Weighting | Option 1 | Option 2 | Option 3 |
|---|---|---|---|---|
| Investment cost | 20% | 4 | 3 | 2 |
| Speedy implementation period | 10% | 5 | 3 | 2 |
| Supports local sharing economy and platforms | 10% | 3 | 4 | 4 |
| Unlocks land for enhanced amenity and project value | 10% | 1 | 4 | 5 |
| Responds to community needs | 10% | 2 | 3 | 5 |
| Attracts government incentives and funding | 10% | 1 | 4 | 4 |
| Links with public transport and/or services | 10% | 2 | 4 | 5 |
| Potential to adapt to changing requirements by the community | 10% | 1 | 4 | 4 |
| Profit potential of shared mobility service | 10% | 1 | 5 | 4 |
| Total score | 100% | 2.4 | 3.7 | 3.7 |

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# Worked examples

# Section 7
# Worked examples

## Queenstown

We have developed an example of how the framework can be applied to a hypothetical development in Queenstown.

A developer is looking to create a 30-unit complex, a mix of townhouses and apartments on a site close to downtown Queenstown. The target market is a mix of families, young first home buyers and older people who want to embrace the Queenstown lifestyle. The business-as-usual comparison would be providing 1 carpark for each unit but the developer wants to test the options for implementing shared mobility. Stepping through the framework produces the following results:

### 1. Assess Project Context

| Factor | Projection based on context of the development |
|---|---|
| Social acceptance of shared mobility | Positive |
| Mobility needs | Some trips with dependants |
| Willingness to share | No existing sharing, but willingness from residents |
| Symbolic perception of car ownership | Owning a car is necessary |
| Energy infrastructure | Existing infrastructure can support a new development |
| Presence of a mobility app | Pre-existing app (Uber) |
| Cost of car ownership | Some knowledge |
| Trip length / proximity to frequent destinations | < 400m. |
| Available government incentives/ subsidies | No incentives available |
| Road management policies | Unrestricted parking |
| Active transport network | No active travel infrastructure within 400m |
| Public transport network | Infrequent bus service |

**Table 8: Queenstown worked example project context matrix**

### 2. Scope Project Options

Based on the project context, a couple of options for building in shared mobility can be considered. Given the short distances to frequent destinations there is greater opportunity for shared bikes and active modes and the presence of a ride-hailing service (Uber) can be catered for:

*Option 1: Basic +*

Five carparks are removed, and two shared mobility vehicles are provided.

This frees up 56m$^2$ for other uses such as increased dwellings or community spaces.

*Option 2: Basic + community facilities*

Ten carparks are removed and four shared mobility vehicles are provided, as well as 10 shared bikes and a dedicated bay for ride-hailing vehicle pickups and drop-offs.

This frees up 65m$^2$ of space for other uses such as increased dwelling or community spaces.

*Option 3: Fully optioned with commercial space*

25 carparks are removed, and six shared mobility vehicles are provided, as well as 15 shared bikes, end of trip shower facilities, ride hailing bay and 25m$^2$ of shared community space.

This frees up 255m$^2$ for other uses such as increased dwellings or community spaces.

# Section 7
# Worked examples

## Queenstown (cont.)

Using the costing model for the three scenarios developed we can approximate the annualised cost of infrastructure and operations for the shared mobility system.

**Table 9: Project options for Queenstown worked example**

| Project option | Cost per year (thousand $NZD) |
|---|---|
| Option 1: Basic + | 14 – 27 |
| Option 1: Basic + community facilities | 34 – 66 |
| Option 3: Fully optioned with commercial space | 56 – 105 |

### 3. Evaluate Project Options

The three project options can now be assessed against the multi-criteria analysis. Each of the success criteria is weighted based on the developer's priorities and then used to assess each of the options from 1-5.

**Table 10: Multi-criteria analysis for Queenstown worked example**

| Success Criteria | Weighting | Option 1 | Option 2 | Option 3 |
|---|---|---|---|---|
| Investment cost | 20% | 4 | 3 | 2 |
| Speedy implementation period | 10% | 5 | 3 | 2 |
| Supports local sharing economy and platforms | 10% | 3 | 3 | 4 |
| Unlocks land for enhanced amenity and project value | 10% | 1 | 4 | 5 |
| Responds to community needs | 10% | 2 | 3 | 5 |
| Attracts government incentives and funding | 10% | 1 | 4 | 4 |
| Links with public transport and/or services | 10% | 2 | 4 | 5 |
| Potential to adapt to changing requirements by the community | 10% | 1 | 4 | 5 |
| Profit potential of shared mobility service | 10% | 1 | 2 | 5 |
| Total | 100% | 2.4 | 3.3 | 3.9 |

### 4. Finalise Project Approach

Based on the multi-criteria analysis of project options and results of the costing model, the developer might choose option 2 (Basic + community facilities) for their development as it delivers the benefits that are most important while not being as expensive as option 3.

The developer can then use this information to seek out funding, reach out to shared mobility partners and inform design of the development.

# Section 7
# Worked examples

## Christchurch

This example uses the framework for a development located in Christchurch to illustrate how the shared mobility solution can vary for a comparatively large and urbanised setting.

A developer is looking to create a 60-unit apartment building in a local town centre with good bus connections. The target market is a mix of families and young first home buyers. The business-as-usual comparison would be providing 1 carpark for each unit but the developer wants to test the options for implementing shared mobility. Stepping through the framework produces the following results:

### 1. Assess Project Context

**Table 11: Christchurch worked example project context matrix**

| Factor | Projection based on context of the development |
|---|---|
| Social acceptance of shared mobility | Positive |
| Mobility needs | Some trips with dependants |
| Willingness to share | No existing, but interest from buyers |
| Symbolic perception of car ownership | Owning a car is a nice to have |
| Energy infrastructure | Existing infrastructure can support new development |
| Presence of a mobility app | Pre-existing app |
| Cost of car ownership | Some knowledge |
| Trip length / proximity to frequent destinations | <400m |
| Available government incentives/ subsidies | No incentives available |
| Road management policies | Limited parking restrictions |
| Active transport network | On-road cycle lanes within 500m |
| Public transport network | Frequent bus service |

### 2. Scope project options

Based on the project context, a couple of options for building in shared mobility can be considered. Given the presence of active mode infrastructure and bus services, there is more confidence for people to choose other travel modes and use shared mobility instead of private vehicles for their travel needs.

*Option 1: Basic +*

20 carparks are removed, and four shared mobility vehicles are provided and 15 shared bikes.

This frees up 252$^2$ for other uses such as increased dwellings or community spaces.

*Option 2: Basic + community facilities*

40 carparks are removed and six shared mobility vehicles are provided, as well as 25 shared bikes and a dedicated bay for ride-hailing vehicle pickups and drop-offs.

This frees up 510m$^2$ of space for other uses such as increased dwelling or community spaces.

*Option 3: Fully optioned with commercial space*

60 carparks are removed, and six shared mobility vehicles are provided, as well as 40 shared bikes, end of trip shower facilities, ride hailing bay and 100m$^2$ of shared community space.

This frees up 586m$^2$ for other uses such as increased dwellings or community spaces.

# Section 7
# Worked examples

## Christchurch (cont.)

Using the costing model for the three scenarios developed we can approximate the annualised cost of infrastructure and operations for the shared mobility system.

**Table 12: Project options for Queenstown worked example**

| Project option | Cost per year (thousand $NZD) |
|---|---|
| Option 1: Basic + | 16 – 30 |
| Option 2: Basic + community facilities | 37 – 70 |
| Option 3: Fully optioned with commercial space | 128 – 224 |

### 3. Evaluate Project Options

The three project options can now be assessed against the multi-criteria analysis. Each of the success criteria is weighted based on the developer's priorities and then used to assess each of the options from 1-5.

**Table 13: MCA for Christchurch worked example**

| Success Criteria | Weighting | Option 1 | Option 2 | Option 3 |
|---|---|---|---|---|
| Investment cost | 20% | 4 | 3 | 2 |
| Speedy implementation period | 10% | 5 | 3 | 2 |
| Supports local sharing economy and platforms | 10% | 3 | 4 | 4 |
| Unlocks land for enhanced amenity and project value | 10% | 1 | 4 | 5 |
| Responds to community needs | 10% | 2 | 3 | 5 |
| Attracts government incentives and funding | 10% | 1 | 4 | 4 |
| Links with public tranpsort and/or services | 10% | 2 | 4 | 5 |
| Potential to adapt to changing requirements by the community | 10% | 1 | 4 | 4 |
| Profit potential of shared mobility service | 10% | 1 | 5 | 4 |
| Total score | 100% | 2.4 | 3.7 | 3.7 |

### 4. Finalise Project Approach

Based on the MCA of project options and results of the costing model, the developer might choose option 3 because even though it is the most expensive option, it opens up a large amount of space for complementary services and additional revenue streams for developers (e.g., leasing commercial space). Extra amenities also makes the shared mobility assets more visible, which may therefore improve utilisation.

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# Recommendations

# Section 8
# Recommendations

The following recommendations have been identified for different stakeholders to drive shared mobility. These have been identified through the literature review, interviews with key stakeholders and workshops to develop the framework.

## All stakeholders

1. Gather and share data to understand how people use existing shared mobility services
2. Form and participate in a working group led by central government for knowledge and data sharing and coordination of service provision

## Developers

1. Identify projects and plan for implementation in new or existing developments. This should involve identifying funding requirements and sources, analysis of business models and revenue streams, and also partnerships with shared mobility providers
2. Deploy community engagement surveys in potential trial sites to assess mobility needs and sentiment toward shared mobility services
3. Develop education, awareness raising and marketing campaigns to communicate with new buyers about the future of living a low-car lifestyle and to address the lack of knowledge on cost of car ownership
4. Future proof for electric vehicle charging infrastructure and allocating priority dedicated spaces for shared mobility
5. Engage with shared mobility providers early in the planning process to ensure the best design for specific sites
6. Develop a business case template for justifying shared mobility in housing developments

## Shared mobility providers

1. Invest in marketing to promote the benefits of shared mobility and build public trust and awareness
2. Build partnerships with developers to establish a shared approach to critical issues, such as infrastructure and user experience design
3. Explore different revenue gathering mechanisms from users – subscription, pay-as-you-go, cooperatives and ancillary revenue options to increase commercial viability
4. Participate in a shared mobility accreditation scheme with government
5. Provide a range of shared mobility options, e.g. vans, people movers and larger vehicles when they become available

# Section 8
# Recommendations

## Local government

1. Increase education on the cost of car ownership and mobility through home mover information packs and transport agency communications
2. Require shared mobility providers to share data on usage with the local transport agency
3. Survey community to determine demand for shared mobility to inform target locations for implementation
4. Provide incentives to developers implementing shared mobility in developments, including reduced developer contributions
5. Require travel plans for developments that include shared mobility provision
6. Prioritise shared mobility in district and spatial plans (e.g. include shared mobility in zoning rules, dedicate spaces for shared mobility hubs)
7. Prioritise shared mobility in parking provisions, such as increasing the number of public parks provided for shared mobility and prioritised parking
8. Integration of shared mobility services into public transport apps and other mobility apps
9. Provide guidance to developers and shared mobility providers on how to implement schemes locally
10. Introduce measures to increase equitable access to shared mobility, such as outreach programmes, credit for trials or subsidies for low-income people

## Central government

1. Assign a shared mobility champion at the Ministry of Transport (MoT) or Waka Kotahi to own the framework and assemble the working group including mobility providers, transport agencies and developers
2. Promote the use of the framework through a programme of engagement with developers
3. MoT to work with Ministry of Housing and Urban Development (HUD), Ministry of Environment (MfE), Kāinga Ora, Waka Kotahi, EECA and the Green Building Council to develop a national strategy for shared mobility provision
4. Create a standard accreditation process for shared mobility providers - in conjunction with key partners including Waka Kotahi
5. Kāinga Ora to roll out shared mobility in developments
6. MoT to engage with government agencies to deliver policy levers to accelerate shared mobility rollout and reduce emissions such as subsidies, funding to transport agencies for on-demand mobility or regulations requiring shared mobility in developments
7. Engage with MfE to include shared mobility in the RMA reforms and the Transport Emissions Reduction Plan targets
8. Gather representatives from HUD, EECA, Waka Kotahi and MfE to be part of the working group alongside MoT, shared mobility providers and developers

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# Appendix A

## Key factor definitions for the short- and long-range scenarios

# Appendix A
# Short-range scenario factors

We categorised key drivers and barriers using the STEEP framework (social, technological, environmental, economic, political). For the New Zealand context, we expanded the STEEP categorisation to include cultural factors which shape end user behaviour and shared mobility provision (STEEPC).

| Key factor (STEEPC) | Definition |
|---|---|
| **Social acceptance of shared mobility (Social)** | The extent to which the existing local community and/or potential residents of the new development agree that shared mobility for that area is worth pursuing.<br><br>Measurement: Surveyed perceptions |
| **Mobility needs (Social)** | The predominant household size and structure of existing and potential new residents and extent of independent mobility requirements.<br><br>Measurement: Survey / statistics office on household demographics |
| **Energy infrastructure (Technological)** | The availability and capacity of existing energy infrastructure to support EV charging infrastructure for the given housing development.<br><br>Measurement: Capacity gap (based on projected demand and existing capacity) and support from utility |
| **Mobility app (Technological)** | The extent to which mobility modes are integrated into one planning and payment platform (or app) and accessed by the community<br><br>Measurement: Availability and accessibility |
| **Cost of car ownership (Economic)** | The extent to which the existing and potential new community is aware of the true cost of car ownership and use versus other modes.<br><br>Measurement: Surveyed self-ratings on knowledge regarding the costs of ownership |
| **Mobility app (Technological)** | The extent to which mobility modes are integrated into one planning and payment platform (or app) and accessed by the community<br><br>Measurement: Availability and accessibility |

# Appendix A
# Short-range scenario factors

| Key factor (STEEPC) | Definition |
|---|---|
| **Cost of car ownership (Economic)** | The extent to which the existing and potential new community is aware of the true cost of car ownership and use versus other modes.<br>Measurement: Surveyed self-ratings on knowledge regarding the costs of ownership. |
| **Proximity to frequent destinations (Economic)** | The distance of essential services (shops, schools, employment etc.) from the new development<br>Measurement: Distance (m and km) to town centre and/or transit hub |
| **Available government incentive (Political)** | The availability and scale of financial incentives for shared mobility infrastructure.<br>Measurement: presence and size of funding |
| **Road management policies (Political)** | The extent of car restrictive policies in the locality.<br>Measurement: policy settings |
| **Active transit network (Environmental)** | The presence and accessibility of a network of footpaths and bikeways that connect to important destinations (shops, schools, employment etc.)<br>Measurement: availability and accessibility within 400m of community |

# Appendix A
# Short-range scenario factors

| Key factor (STEEPC) | Definition |
|---|---|
| **Public transport (Environmental)** | The availability and frequency of public transport near the development.<br>Measurement: Quality of PT within 400m |
| **Willingness to share (Culture)** | The extent to which the community is sharing and potential new residents are looking for a community with resource sharing schemes.<br>Measurement: Presence of existing schemes; survey responses |
| **Symbolic perception of car ownership (Culture)** | The extent to which car ownership holds a symbolic versus practical value to the community.<br>Measurement: Surveyed responses |
| **Public transport (Environmental)** | The availability and frequency of public transport near the development.<br>Measurement: Quality of PT within 400m |
| **Willingness to share (Culture)** | The extent to which the community is sharing and potential new residents are looking for a community with resource sharing schemes.<br>Measurement: Presence of existing schemes; survey responses |

# Appendix A
# Long-range scenario factors

| Key factor (STEEPC) | Definition |
|---|---|
| **Mobility demand (Social)** | The extent to which people will seek in-person versus virtual experiences (working, socialising and recreating), compared to pre-COVID.<br>Measurement: percent change from pre-COVID |
| **Private car ownership (Social)** | The extend of ownership compared to 2022.<br>Measurement: No of private vehicles per 1000 population |
| **Multi-household living (Social)** | The market adoption of co-housing with shared facilities (e.g., kitchen, living areas, laundry, mobility etc.)<br>Measurement: % of households |
| **Connected autonomous vehicles (Technological)** | The extent of geographic deployment of driverless cars and robotaxis.<br>Measurement: Diffusion by autonomy level (L1-5) |
| **Mobility market management (MaaS maturity) (Economic)** | The extent of competition between shared mobility and public mobility providers<br>Measurement: Predominant level of cooperation |

# Appendix A
# Long-range scenario factors

| Key factor (STEEPC) | Definition |
|---|---|
| **Developer value capture (Economic)** | The dominant business model and profitability rate.<br>Measurement: Sell vs rent, and % profit |
| **Road demand management (Political)** | Extent to which roads enable movement of cars versus people.<br>Measurement: Qualitative / quantitative assessment of predominance of car vs people oriented streets, including available footpaths, bikepaths, road space for cars and parking etc. |
| **Urban & transport policy (Political)** | Direction of policy settings regarding mobility, land use and urban growth management<br>Measurement: Extent of densification, rapid transit corridors and 15-min city nodes |

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# Appendix B

Figures 8, 9, 10 and 11

Step 1

Figure 8: Miro board output of brainstormed factors impacting shared mobility in new housing developments

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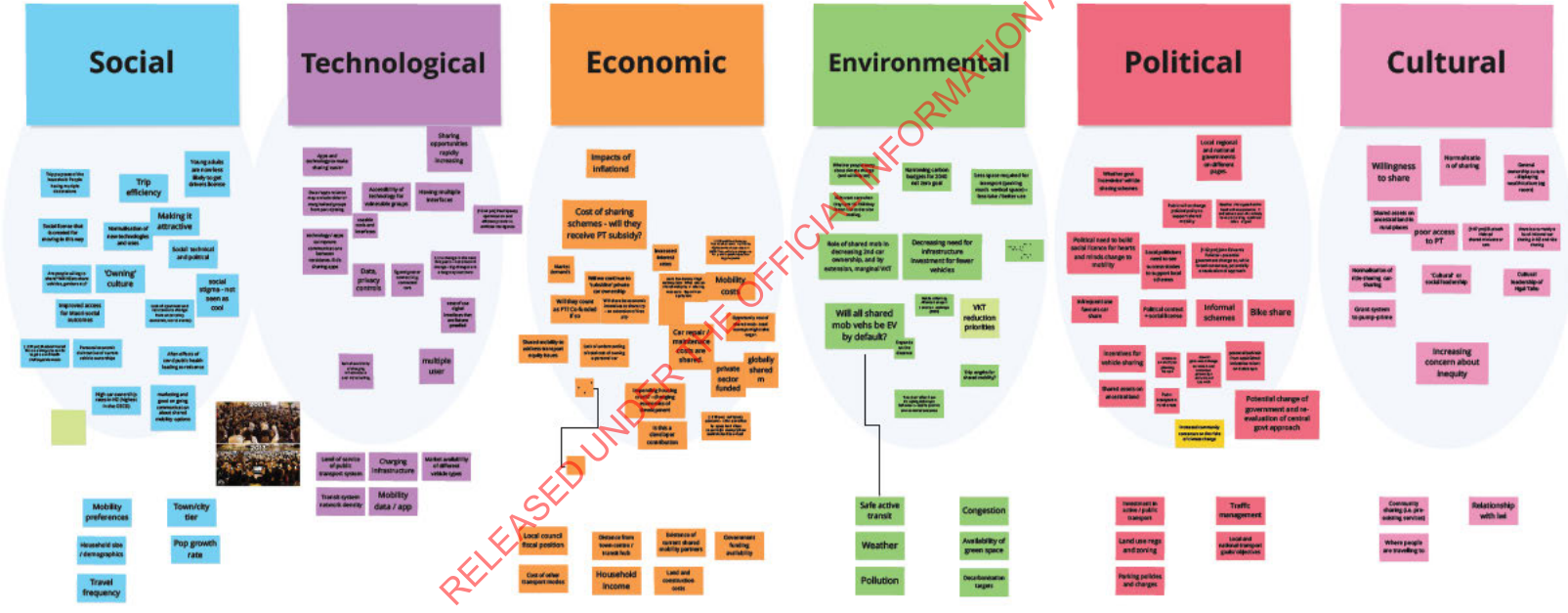
# Factors

*What are the factors in the context that influence shared mobility?*



Step 2

Figure 9: Prioritised factors

# Impact assessment – across domains

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*What are the critical few that we need to respond to when we create housing deveopment with shared mobility*



**Social**
- Social license that is created for moving in this way
- Are people willing to share? Will NZers share vehicles, gardens etc?

**Technological**
- lack of availability or future proofing of charging infrastructure and H2 refuelling
- Accessibility of technology for vulnerable groups

**Economic**
- Cost of sharing schemes - will they receive PT subsidy?
- Lack of understanding of total cost of owning a personal car

**Environmental**

**Political**
- Whether govt 'incentivise' vehicle sharing schemes
- Local, regional and national governments on different pages

**Cultural**
- Willingness to share/ normalisation of sharing
- Shared assets on ancestral land in rural places

Aim with the translation is to make the factor most relevant to the decision-making context for developers

**Translated Factors**

**Lower impact factors**

- Making it attractive
- Apps and technology to make 'sharing' easier
  - technology / apps to improve communications between residents. Ride sharing apps
- Will there be economic incentives to share trip - an extension of free PT?
- Low Urban density - high mobility costs. What scale can shared mob. play in reducing mob costs? Esp with an equity lens
- [12 Bhplot] Pool Speedy assessment - is there an offset for space/land. If less carparks (for example) how could the land be utilised?

**Higher impact factors**

- Less space required for transport (parking, roads, vertical spaces) – less take / better use
- Trip lengths for shared mobility?
- Congestion
- Potential change of government and re-evaluation of central govt approach
- Limitations on the 3 year planning horizon
- 'Cultural' or social leadership
- Where people are travelling to

**Social**
- Overlaps a bit with 'willingness to share'
- Social licence / acceptance of shared mobility
- Mobility needs
  - Household size / structure
  - Type of trips
  - This factor can address prevalence of multicar hh. and thus possibility of 'car shedding'

**Technological**
- Energy infrastructure
- Mobility app
  - Access services via data/apps vs low tech community board
  - Assumes data integration

**Economic**
- User costs compared with private car use
- Trip length / proximity to freq destinations
  - CBDs
  - Rapid transit stations

**Environmental**
- Active transit network
  - Safe & attractive

**Political**
- Avail gov incentive / subsidy
  - Will it count as PT? Does it address emissions
- Road management policies
  - Congestion charge
  - Parking restrictions
  - Speed limits

**Cultural**
- Willingness to share vs own
- Symbolic value of car ownership & use

Step 3

Figure 10: Project context matrix

# Factor metrics and future states

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*How can we define and measure these top factors?*

Factors

| Factor | Social licence / acceptance of shared mobility | Mobility needs | Willingness to share | Symbolic perception of car ownership | Energy infrastructure | Mobility app | Cost of car ownership | Trip length / proximity to freq destinations | Avail gov incentive / subsidy | Road management policies | Active transit network | Public transport network |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| As measured by | Surveyed perception of Shared mobility | Household demographics | Existing share schemes (tool library, buy/swap/sell groups)<br>Survey of potential residents / buyers | Surveyed perception | Availability / capacity | Availability and accessibility | Knowledge of lifecycle cost of car ownership | Distance to town centre and/or transit hub | Presence or policy | Presence or parking policy | Accessibility of network | Quality of PT within 400m |
| Projections p1 | Overwhelmingly negative view | All trips with dependents who can't use other modes (e.g. because of a disability) | No existing sharing schemes AND limited interest from buyers | Owning a car is a necessary status symbol | No cooperation | No pre-existing app<br>No digital literacy | None | <400m | No incentives available | Unrestricted parking | No active travel infrastructure within 400m | None |
| p2 | Negative view | Most trips with dependants | No existing sharing schemes but interest from buyers | Neutral | Existing infrastructure would need upgrades for development supply | Proposed app | Some knowledge | 400-800m | Small scale (<$50,000), ring fenced incentives | Limited parking restrictions (e.g. clearways) | On-road cycle lanes within 500m | Infrequent bus service |
| p3 | Neutral | Some trips with dependants | Local sharing schemes evident AND existing buyers looking for sharing community | Owning a car is a nice to have | Existing infrastructure can support new development | Pre-existing app | Well-educated | 800m-2km | Medium scale incentives ($50-500,000) | Multiple car-restricting policies e.g. congestion charge, parking maximums, speed limit | Off-road shared path within 500m | Frequent bus service |
| p4 | Positive | Fully independent household | | Owning a car is unnessecary | Active Cooperation with electricity network and supplier | App + other features for non-digital accessibility | | >2km | Large scale incentives (>$500,000) | | Multiple active travel networks within 500m | Rapid transit |
| p5 | Overwhelmingly positive | | | | | | | | | | | |

Figure 11: Long-term proejct context matrix with key factors and their projections

# 2050 morphological box

Factors

| Factor | Lifestyle and mobility demand | Private car ownership | Multi-family living (co-housing) | Connected autonomous vehicles | Mobility market management (MaaS maturity) | Developer value capture | Road management | Urban & transport policy |
|---|---|---|---|---|---|---|---|---|
| As measured by | Change from pre-COVID (2019) | No. / 1000 pp | Diffusion (% of families) | Diffusion by autonomy level (0-5) | Competitive tension between PT and shared mobility providers | Dominant business model and profit margin | Extent to which roads enable movement of cars vs people | Direction of policy settings re mobility, land use and urban growth |
| Projections p1 | Similar to pre-COVID (back to in-person contact) | Slight decrease (<800) | < 10% | Mostly L3 (still need driver) | Limited partnership between shared mobility and PT (immature MaaS) | Build to sell, high margin (circa 20-25%) | Streets favour car movement | Persistent emphasis on urban sprawl and car use for most NZ'ers |
| p2 | Hybrid live-work-play (40-50% reduction) | 25-50% less (~400-600) | 25% | Niche L4 in 1 or 2 cities | Partnership between shared mobility and PT in a few cities (local MaaS) | Build to sell, low margin (circa <10%) | Streets cater to both cars and other modes | Limited shift to rapid transit corridors and 15-min cities (% pop?) |
| p3 | Virtual live-work-play (>80% reduction) | >75% less (<200) | 50% | Substantial L4 in most cities and major highways | Nation-wide partnership between shared mobility and PT (national MaaS) | Build to rent, high margin (circa 20-25%) | Streets favour people movement (walking, micromobility, PT) | Substantial shift to rapid transit corridors and 15-min cities (% pop?) |
| p4 | | | 75% | Ubiquitous L5 | | Build to rent, low margin (circa <10%) | | |
| p5 | | | | | | | | |

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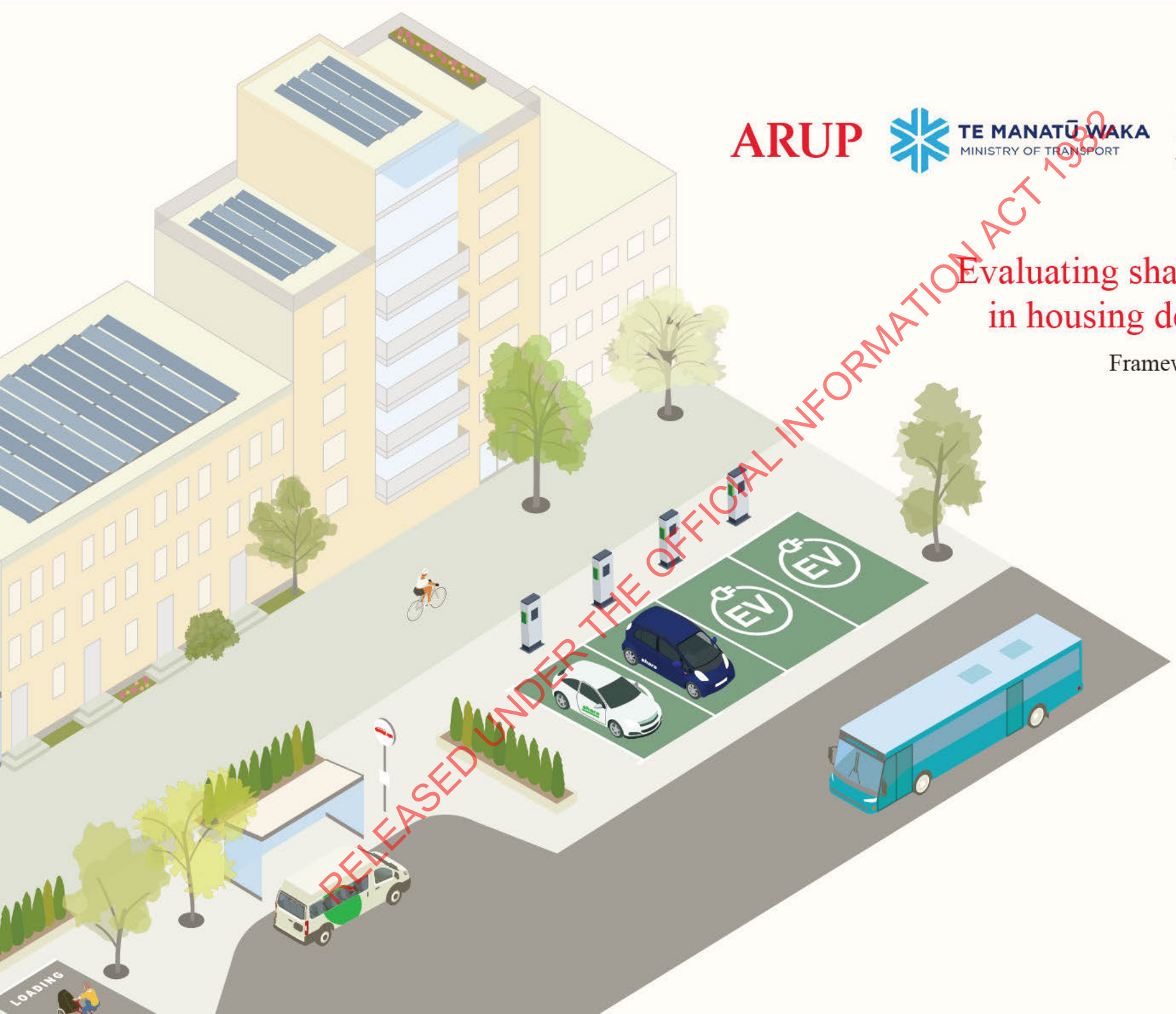
# Appendix C

## Industry facing document

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TE MANATŪ WAKA
MINISTRY OF TRANSPORT

Te Rūnanga o NGĀI TAHU

# Evaluating shared mobility in housing developments

Framework for developers

## Contents

# What is the opportunity?

Land use drives transport choice and developers have unique and unrealised potential to influence and benefit from the transport choices of their residents.

Incorporating shared mobility into developments can benefit both residents and developers by creating a more sustainable and affordable lifestyle for residents and increasing the value and attractiveness of developments.

Shared mobility is designed to replace the need to own a private car by providing residents with a car when they need it through an on-demand service that can maximise use of the vehicles by sharing among all residents.

Developers can realise greater commercial benefits through freeing up space and saving money that would otherwise go toward providing parking for residents.

This framework provides information and guidance for developers around implementing shared mobility in their developments, focussing on;

- Benefits for developers
- Real world case studies
- Critical success factors
- Recommendations
- How can developers realise the opportunity?
- Decision-making framework
- Worked examples

## What is shared mobility?

**For the purpose of this framework, shared mobility captures micromobility (bikes and scooters), ride-hailing services, rideshare, carshare and on-demand shuttles that community members can book for casual use.**

# Benefits for developers

Shared mobility gives developers the opportunity to create more value for communities:

- Less space can be dedicated to carparks and reallocated to dwellings to increase the yield of a site.
- Unlocked space can also be allocated to green space and/or shared facilities, increasing attractiveness to buyers
- Properties that do not come with a carpark can be offered at lower price compared to other developments, increasing attractiveness to buyers
- Increased sustainability of developments can boost green credentials and attractiveness to buyers
- Opportunity to change people's behaviour to make more sustainable choices is when they move home.
- Provision of shared mobility increases transport choice for residents who value accessibility, increasing the attractiveness of the development.


## Shared mobility providers

Partnership will accelerate uptake of services and generate more demand

Promotion and testing of services builds public confidence and trust in the service

Increases marketing opportunities

## Urban & Transport

Reduce emissions, congestion and associated costs by reducing the number of cars on the road

Improve utilisation of active and public transport

## Community

Save on travel costs associated with owning a private car

Reduce cost of mobility

Improve access and convenience to mobility services

Enjoy more space and amenity in and around the home

# Real world case studies

## Daisy, Auckland, New Zealand

### Ockham

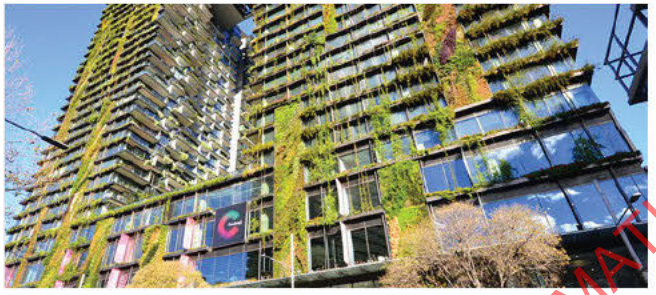
Daisy is a 33 unit apartment building in central Auckland, within close proximity to public transport routes and secure parking for personal bikes and scooters. The building has no car parks for residents and instead provides a shared car through CityHop.

The promotion of a low-car lifestyle and use of share cars was used to market the building and as the first of its kind in the country there was increased interest among buyers. Residents were attracted by the sustainable nature of the building and chance to reduce travel costs.

For the developer, the provision of carshare contributed to the development being the first and so far only 10 Homestar rated building in New Zealand- the highest sustainability rating for residential buildings.

#### Lessons

- Proximity to public transport increases success of the service
- Shared mobility builds a strong sustainable brand and contributes to sustainability accreditation



## Central Park, Sydney, Australia

### Fraser's Property and Sekisui House

Central Park is a major mixed use development in central Sydney.

There are 0.6 carparks per dwelling and Australia's largest carshare hub is co-located in the development with service provided by GoGet. There are 50 vehicles provided, ranging from small hybrid cars to people carriers and larger vans. Over 700 residents actively use the car share service and several have reported selling personal cars.

The sustainability credentials of the building were a key marketing point for the developer and attracted people to buy in the property. Success of the shared mobility service was also driven by the mixed-use neighbourhood with amenities close by, reducing the need for residents to travel by car.

#### Lessons

- Providing a variety of vehicles increases the attractiveness for users
- Incorporating mixed-uses in the precinct increases success of the service

## Leodis Square, Leeds, UK

### Dandara Living

Leeds City Council have introduced Supplementary Parking Guidance, establishing rules for new developments to dedicate 1 in 20 car park spaces for shared mobility cars.

The Leodis development leveraged this guidance by supplementing 0.3 private parks per dwelling with two car club bays. The developer makes a contribution to attract a car share provider and residents are offered 1 year free membership and £150 GBP ($300 NZD) credit to use the service.

The incentives from the city council and the developer allowed for successful implementation of the carshare scheme. Flexible travel arrangements are a key marketing point to attract buyers and over 60 residents have joined the carshare service.

#### Lessons

- Incentives for residents increase success of the service
- Local policy regulations increase the provision of shared mobility by reducing barriers for developers

# Critical success factors

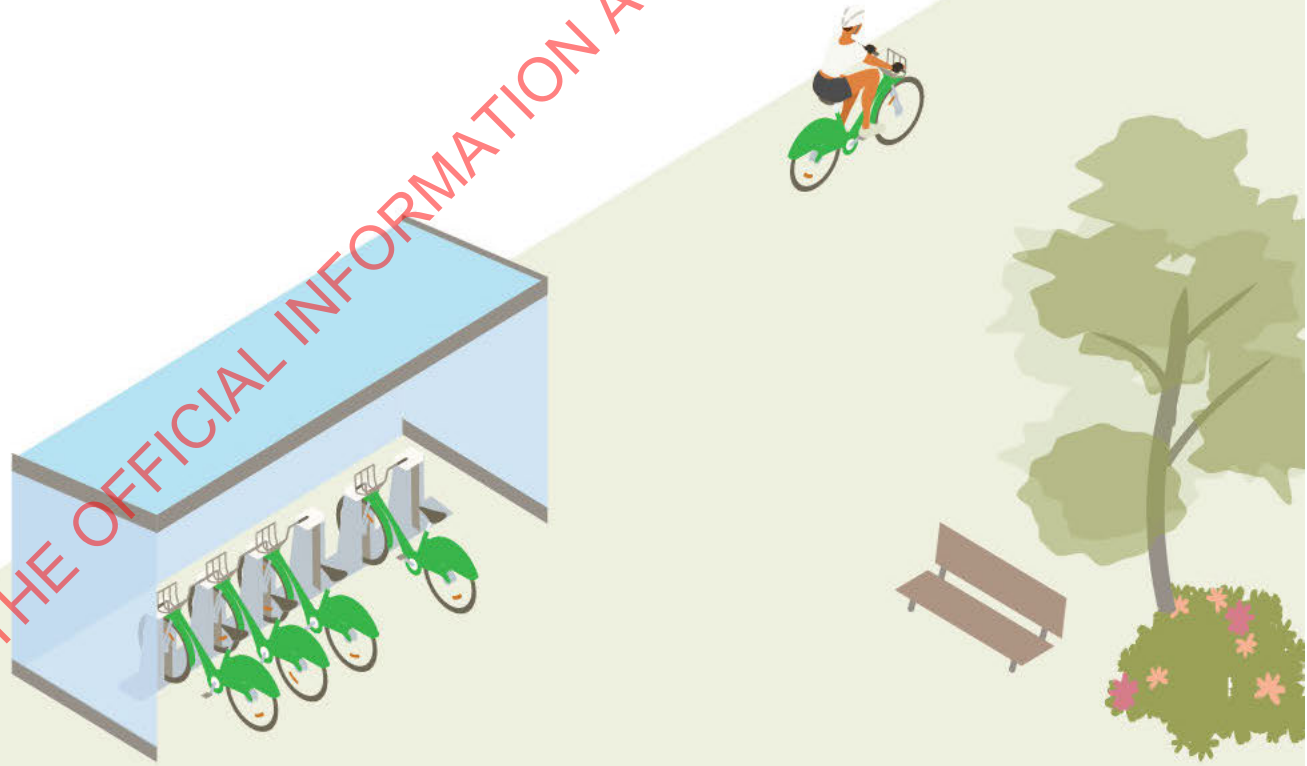
When developments have access to high quality public transport, people are more confident to reduce their personal car use or get rid of a car and use shared mobility as there are multiple travel options available.

A high sense of community and cohesion between residents in a neighbourhood setting had a positive impact on the success of share mobility, with residents more likely to use and treat the service well.

Access to high quality green space and active mode corridors results in people choosing active modes.

Proximity to amenities such as town centres, schools, shops, medical facilities, community services and recreation.

Critical mass of vehicles is required to build trust that a vehicle will always be available to residents.



# Recommendations

We recommend individual developers incorporate shared mobility into their corporate strategy. Innovative developers have the opportunity to create more value in their projects and promote mobility choice, among other co-benefits such as enhanced sense of community.

## All stakeholders

Gather and share data to understand how people use existing services and what works best.

Form and participate in a working group led by central government. The working group should consist of a range of stakeholders to help share data, knowledge and help create a more enabling shared mobility ecosystem.

## Developers

Identify projects and plan for implementation in new or existing developments. This should involve identifying funding requirements and sources, analysis of business models and revenue streams, and also partnerships with shared mobility providers.

Deploy community engagement surveys in potential trial sites to assess mobility needs and sentiment toward shared mobility services.

Develop education, awareness raising and marketing campaigns to new buyers about the future of living a low-car lifestyle. This should be done in partnership with shared mobility providers and local authorities.

Future proof for shared mobility and electrification with electricity infrastructure and dedicated space.

Engage with shared transport operators early in the planning process to ensure the best design for specific sites.

# How can developers realise the opportunity?

The scope of work in developing the framework included:

1

Review of local and international literature to understand the success factors, barriers and opportunities in different contexts

2

Review of New Zealand policies at a local and central government level to establish the context that this framework will operate

3

Review local and international case studies of implementing shared mobility

4

Interviews with 11 stakeholders including developers, central government, local government and transport agencies, and shared mobility providers

5

Developing the framework model through workshops with key stakeholders

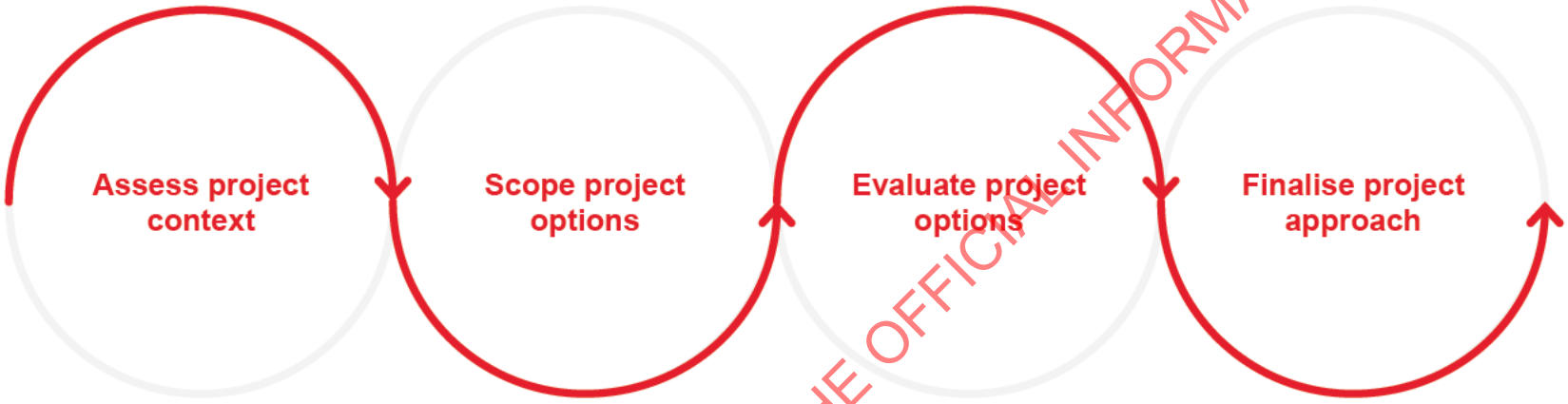
6

Creating recommendations for stakeholders

# Decision-making framework

The decision-making framework aims to promote a rigorous assessment of options and local context with the aim of achieving 'project-context fit' and a firm basis for collaboration with partners and local communities. The outcomes of the framework process will promote successful implementation by acting as a basis for coordination between stakeholders from policy makers, infrastructure, and mobility service providers.

This framework breaks down this complexity into a series of structured decision-making processes, consisting of four steps:




| Assess project context | Scope project options | Evaluate project options | Finalise project approach |
|---|---|---|---|
| Use the project context assessment to map key attributes that impact shared mobility outcomes | Using funding assessment to create options | Use evaluation matrix to rate each project option against criteria | Select a preferred project option |
| This step should be supplemented by a community engagement survey to gauge mobility needs and challenges | Define housing type and how many dwellings | Decide the importance of the criteria and change weightings accordingly | Use the preferred option to engage with partners and decide on funding mechanism |
| | Consider other community needs e.g., need for more open space and community facilities | Identifying potential funding options and partners | |
| | Consider the participation of public and private sectors in terms of the profit position | | |

## Different options for shared mobility

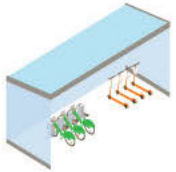
Scoping the project involves choosing which shared mobility services a developer wants to make available and how many. This could include:

E-bike or e-scooter share

EV share

Dedicated drop-off / pick up bays for ridehailing or paratransit shuttles

Other considerations of what other facilities can be provided in the development:



Secured bike/ scooter storage

Bike repair facilities

End-of-trip facilities

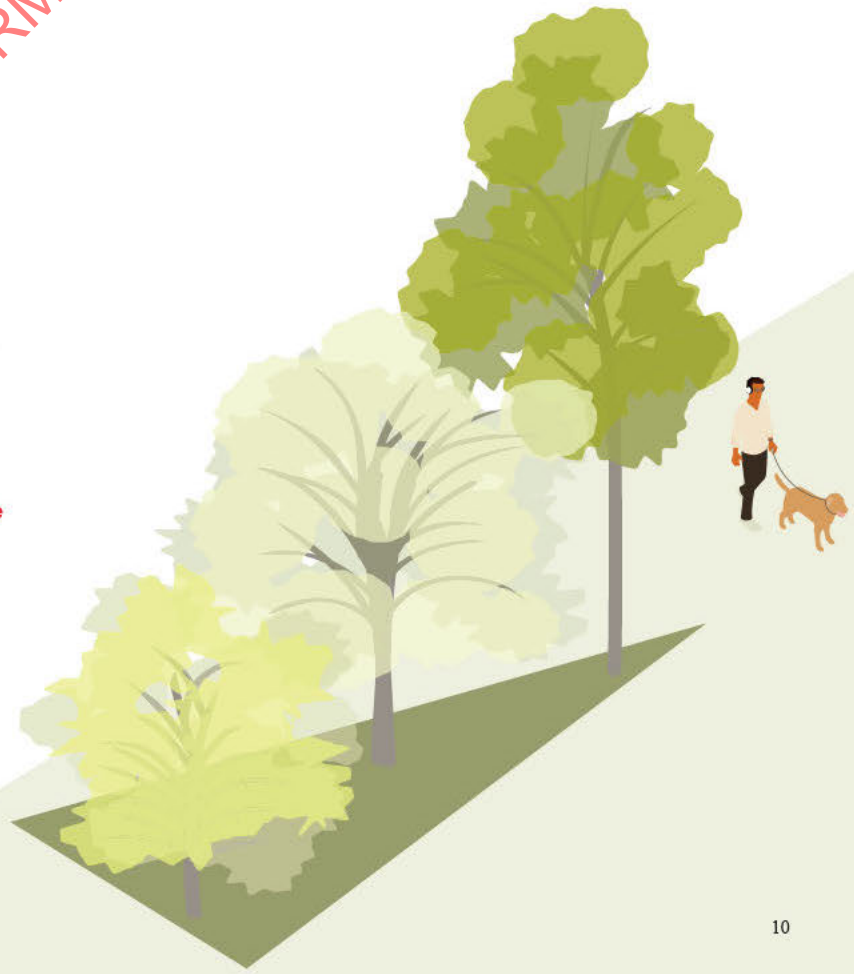
Commercial space

Green space

Community gardens or playgrounds

Co-working space





We have created a scale of different levels of shared mobility integration as a guide to developing project options.

| Type of shared mobility | Guide of number of different components | Example |
|---|---|---|
| Basic | 1 | EV share |
| Basic + | 2 | Bike share and end of trip facilities |
| Basic + transit | 3 | EV share, bike share and on-demand shuttle bay |
| Basic + transit + community facilities | 4 | EV share, bike share, end-of-trip facilities, green space and gardens with public transport nearby |
| Fully optioned with commerical space | 5+ | EV share, bike share, end-of-trip facilities, green space and ground floor commercial with rapid transit nearby |



Developers can assess the context of the project to identify which local characteristics will influence the success of shared mobility.

| Key attribute | Willingness to share | Symbolic perception of car ownership | Social acceptance | Mobility needs | Energy infrastructure | Mobility app | Cost of car ownership | Proximity to frequent destinations | Available government incentives | Road management policies | Active transport network | Public Transport (PT) network |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Measured by | Existing share schemes<br>Survey of potential residents / buyers | Surveyed perception | Surveyed perceptions of shared mobility | Household demographics | Availability / capacity | Availability and accessibility | Knowledge of lifecycle cost of car ownership (survey) | Distance to town centre and/or transit hub | Presence of policy | Presence of car restrictive policies | Accessibility of network within 400m of community | Quality of PT within 400m |
| Projections<br>↓<br>Increases success of shared mobility | No existing sharing schemes AND limited interest from buyers<br>No existing sharing schemes but interest from buyers<br>Local sharing schemes evident AND existing buyers looking for sharing community | Owning a car is necessary status symbol<br>Neutral / practical use value<br>Owning a car is a nice to have<br>Owning a car is unnecessary | Negative view<br>Neutral view<br>Positive view | Single or couple without dependents, daily car use<br>One family with dependents, daily car use<br>Multi-family household, with 3 or more cars used daily | Existing infrastructure would need upgrades for development support<br>Existing infrastructure can support new development | No pre-existing app<br>No digital literacy<br>Proposed app<br>Pre-existing app<br>App + other features for non-digital | None<br>Some knowledge<br>Well-educated | >2km<br>800m-2km<br>400-800m<br><400m | No incentives available<br>Small scale (<$50,000), ring fenced incentives<br>Medium scale incentives ($50-500,000)<br>Large scale incentives (>$500,000) | No restrictions<br>Limited parking restrictions (e.g. clearways)<br>Multiple car-restricting policies e.g. congestion charge, parking maximums, low speed limits | No<br>Footpath and on-road bikeways<br>Off-road shared path<br>Dedicated footpath and cycle infrastructure | None<br>Infrequent bus service<br>Frequent bus service<br>Rapid transit |

## Scope project

Having established an understanding of the context, the project scope can be defined.

Depending on scale and complexity of the project, multiple options might be identified during the project scoping step. The alternative options might capture key uncertainties about the project.

### Funding Assessment

The costing guide allows the user to develop a financial profile of their project, which consists of the following key steps:

1. Define the project under assessment using the framework.
2. Develop estimates around key financial inputs of costs and revenues.
3. Understand the overall profitability of the project and its various components.

The costing guide allows various scenarios and options to be tested simultaneously for the project, to better understand the financial profile on an option relative to others.

## Evaluate project options

Multiple project options can be evaluated against key success criteria, using a multi-criteria assessment (MCA), which asks developers to score each option against weighted criteria as shown below. The MCA can be adapted by changing or adding criteria and altering the weightings to suit the corporate goals or ethos of the property developer.

The scoring of each success criterion can be done on a 5-point scale. The rows of each success criterion indicate the weightings in sequence with the heaviest weighting being first on the list, which in this case is the investment cost.

## Finalise project approach

This step is designed to share expectations and assumptions about what it will take to deliver shared mobility outcomes at that project location. The final guidance can be used to justify further investigation into shared mobility in developments and give a developer confidence in pursuing a shared mobility solution for their development.

| Success criteria | Weighting | Option 1 | Option 2 | Option 3 |
|---|---|---|---|---|
| Investment cost | 20% | 4 | 3 | 2 |
| Speedy implementation period | 10% | 5 | 3 | 2 |
| Supports local sharing economy and platforms | 10% | 3 | 4 | 4 |
| Unlocks land for enhanced amenity and project value | 10% | 1 | 4 | 5 |
| Responds to community needs | 10% | 2 | 3 | 5 |
| Attracts government incentives and funding | 10% | 1 | 4 | 4 |
| Links with transit and/or services hub | 10% | 2 | 4 | 5 |
| Potential to adapt to changing requirements by the community | 10% | 1 | 4 | 4 |
| Profit potential of shared mobility service | 10% | 1 | 5 | 4 |
| Total score | 100% | 2.4 | 3.7 | 3.7 |

# Worked example:
# Queenstown


We have developed an example of the use of the framework to illustrate how the framework can be applied to a hypothetical development in Queenstown.

## Queenstown

A developer is looking to create a 30-unit complex, a mix of townhouses and apartments on a site close to downtown Queenstown. The target market is a mix of families, young first home buyers and older people who want to embrace the Queenstown lifestyle.
The business-as-usual comparison would be providing 1 carpark for each unit but the developer wants to test the options for implementing shared mobility.
Stepping through the framework produces the following results:

### 1. Assess project context

| Factor | Projection based on context of the development |
|---|---|
| Social acceptance of shared mobility | Positive |
| Mobility needs | Some trips with dependents |
| Willingness to share | No existing sharing, but willingness from residents |
| Symbolic perception of car ownership | Owning a car is necessary |
| Energy infrastructure | Existing infrastructure can support a new development |
| Presence of a mobility app | Pre-existing app (Uber) |
| Cost of car ownership | Some knowledge |
| Trip length / proximity to frequent destinations | < 400m |
| Available government incentives/ subsidies | No incentives available |
| Road management policies | Unrestricted parking |
| Active transport network | No active travel infrastructure within 400m |
| Public transport network | Infrequent bus service |

## 2. Scope project options

Based on the project context, a couple of options for building in shared mobility can be considered. Given the short distances to frequent destinations there is greater opportunity for shared bikes and active modes and the presence of a ride-hailing service (Uber) can be catered for.

Using the costing model for the three scenarios developed we can approximate the annualised cost of infrastructure and operations for the shared mobility system.

| Project option | Space free up for other uses ($m^2$)<br>ie. increased dwelling or community spaces | Cost per year (thousand $NZD) |
|---|---|---|
| 1. Basic +<br>Five carparks are removed, and two shared mobility vehicles are provided. | 56 | 14-27 |
| 2. Basic + community facilities<br>Ten carparks are removed and four shared mobility vehicles are provided, as well as 10 shared bikes and a dedicated bay for ride-hailing vehicle pickups and drop-offs. | 65 | 34-66 |
| 3. Fully optioned with commercial space<br>25 carparks are removed, and six shared mobility vehicles are provided, as well as 15 shared bikes, end of trip shower facilities, ride hailing bay and 25$m^2$ of shared community space. | 255 | 56-105 |

## 3. Evaluate project options

The three project options can now be assessed against the multi-criteria analysis. Each of the success criteria is weighted based on the developer's priorities and then used to assess each of the options from 1-5.

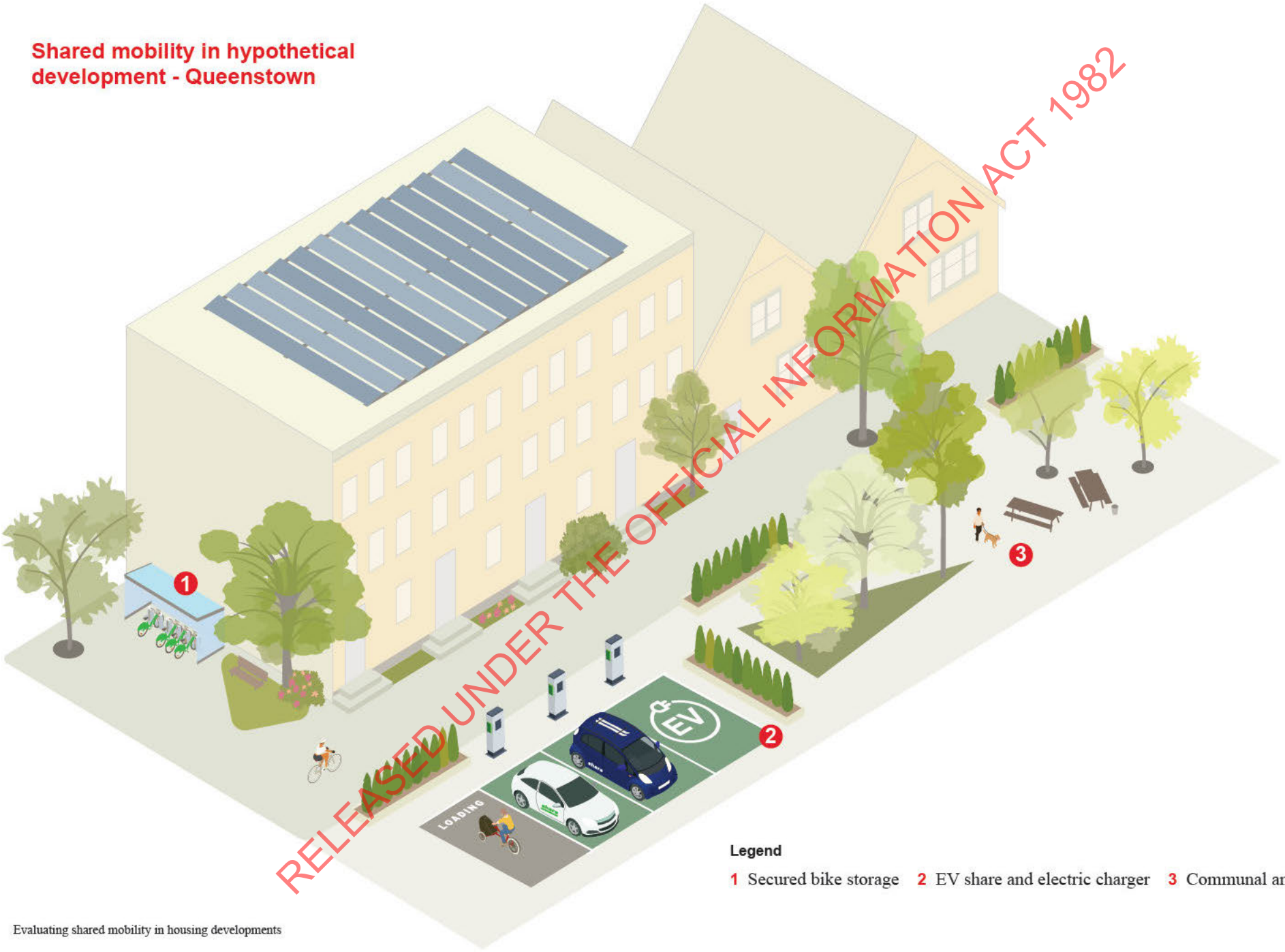
| Success criteria | Weighting | Option 1 | Option 2 | Option 3 |
|---|---|---|---|---|
| Investment cost | 20% | 4 | 3 | 2 |
| Speedy implementation period | 10% | 5 | 3 | 2 |
| Supports local sharing economy and platforms | 10% | 3 | 3 | 4 |
| Unlocks land for enhanced amenity and project value | 10% | 1 | 4 | 5 |
| Responds to community needs | 10% | 2 | 3 | 5 |
| Attracts government incentives and funding | 10% | 1 | 4 | 4 |
| Links with transit and/or services hub | 10% | 2 | 4 | 5 |
| Potential to adapt to changing requirements by the community | 10% | 1 | 4 | 5 |
| Profit potential of shared mobility service | 10% | 1 | 2 | 5 |
| Total score | 100% | 2.4 | 3.3 | 3.9 |

## 4. Finalise project approach

Based on the MCA of project options and results of the costing model, the developer might choose option 2 (Basic + community facilities) for their development as it delivers the benefits that are most important while not being as expensive as option 3.

The developer can then use this information to seek out funding from sources, reach out to shared mobility partners and inform design of the development.

## Shared mobility in hypothetical development - Queenstown




**Legend**

**1** Secured bike storage **2** EV share and electric charger **3** Communal and green space

# Worked example: Christchurch

This example uses the framework for a development located in Christchurch to illustrate how the shared mobility solution can vary for a comparatively large and urbanised setting.

## Christchurch

A developer is looking to create a 60-unit apartment building in a local town centre with good bus connections. The target market is a mix of families and young first home buyers. The business-as-usual comparison would be providing 1 carpark for each unit but the developer wants to test the options for implementing shared mobility. Stepping through the framework produces the following results:

### 1. Assess project context

| Factor | Projection based on context of the development |
|---|---|
| Social acceptance of shared mobility | Positive |
| Mobility needs | Some trips with dependents |
| Willingness to share | No existing sharing, but interest from buyers |
| Symbolic perception of car ownership | Owning a car is a nice to have |
| Energy infrastructure | Existing infrastructure can support a new development |
| Presence of a mobility app | Pre-existing app |
| Cost of car ownership | Some knowledge |
| Trip length / proximity to frequent destinations | < 400m |
| Available government incentives/ subsidies | No incentives available |
| Road management policies | Limited parking restrictions |
| Active transport network | On-road cycle lanes within 500m |
| Public transport network | Frequent bus service |

## 2. Scope project options

Based on the project context, a couple of options for building in shared mobility can be considered. Given the presence of active mode infrastructure and bus services, there is more confidence for people to choose other travel modes and use shared mobility instead of private vehicles for their travel needs.

Using the costing model for the three scenarios developed we can approximate the annualised cost of infrastructure and operations for the shared mobility system.

| Project option | Space free up for other uses ($m^2$)<br>ie. increased dwelling or community spaces | Cost per year (thousand $NZD) |
|---|---|---|
| 1. Basic +<br>20 carparks are removed, and four shared mobility vehicles are provided and 15 shared bikes. | 252 | 16-30 |
| 2. Basic + community facilities<br>40 carparks are removed and six shared mobility vehicles are provided, as well as 25 shared bikes and a dedicated bay for ride-hailing vehicle pickups and drop-offs. | 510 | 37-70 |
| 3. Fully optioned with commercial space<br>60 carparks are removed, and six shared mobility vehicles are provided, as well as 40 shared bikes, end of trip shower facilities, ride hailing bay and 100$m^2$ of shared community space. | 586 | 128-224 |

## 3. Evaluate project options

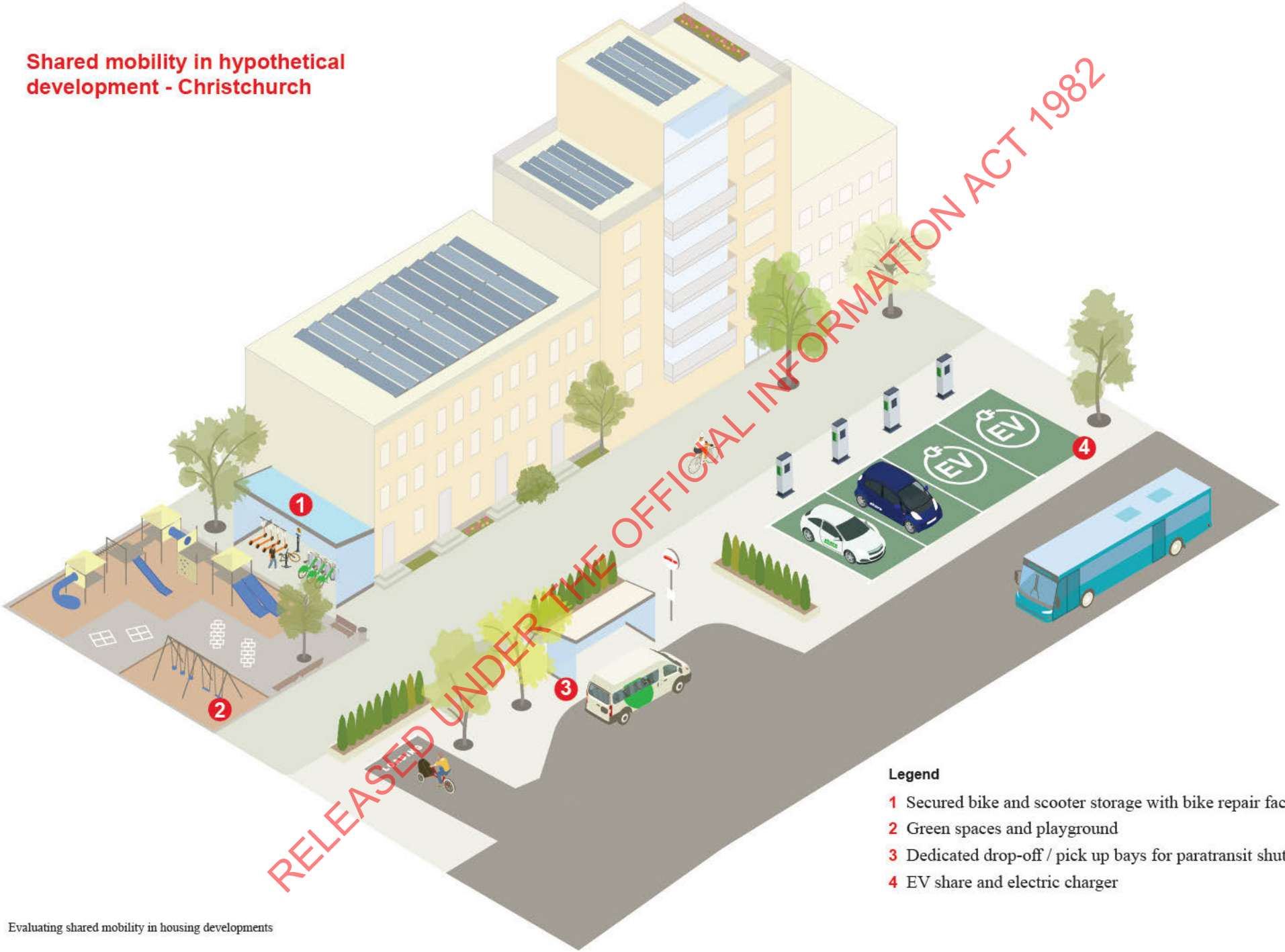
The three project options can now be assessed against the multi-criteria analysis. Each of the success criteria is weighted based on the developer's priorities and then used to assess each of the options from 1-5.

| Success criteria | Weighting | Option 1 | Option 2 | Option 3 |
|---|---|---|---|---|
| Investment cost | 20% | 4 | 3 | 2 |
| Speedy implementation period | 10% | 5 | 3 | 2 |
| Supports local sharing economy and platforms | 10% | 3 | 4 | 4 |
| Unlocks land for enhanced amenity and project value | 10% | 1 | 4 | 5 |
| Responds to community needs | 10% | 2 | 3 | 5 |
| Attracts government incentives and funding | 10% | 1 | 4 | 4 |
| Links with transit and/or services hub | 10% | 2 | 4 | 5 |
| Potential to adapt to changing requirements by the community | 10% | 1 | 4 | 4 |
| Profit potential of shared mobility service | 10% | 1 | 5 | 4 |
| Total score | 100% | 2.4 | 3.7 | 3.7 |

## 4. Finalise project approach

Based on the MCA of project options and results of the costing model, the developer might choose option 3 because even though it is the most expensive option, it opens up a large amount of space for complementary services and additional revenue streams for developers (e.g., leasing commercial space). Extra amenities also makes the shared mobility assets more visible, which may therefore improve utilisation.

## Shared mobility in hypothetical development - Christchurch




**Legend**

1 Secured bike and scooter storage with bike repair facilities
2 Green spaces and playground
3 Dedicated drop-off / pick up bays for paratransit shuttles
4 EV share and electric charger

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# Appendix D

## Costing model Excel document