



*Wellington Transport Research Series: Report 3*

# **Transport Technology Opportunities for the Wellington Region**

**Actions and Recommendations**



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# Transport Technology Opportunities for the Wellington Region

## Actions and Recommendations

Prepared By	..... Chris Bowie Senior Researcher	Opus International Consultants Ltd Opus Research 33 The Esplanade, Petone PO Box 30 845, Lower Hutt 5040 New Zealand
Reviewed By	..... Louise Baker Market Sector Lead - Smart Mobility and Advisory Services	Telephone: +64 4 587 0600 Facsimile: +64 4 587 0604  Date: 25/08/2017 Reference: 5-27841.00 Status: Draft 1
Approved for Release By	..... David Dunlop National Market Lead for Transportation	

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# Executive Summary

The purpose of this research series is to recommend practical, short, medium and long-term technology focused actions that could be implemented in the Wellington Region. This report provides background on each of these potential actions.

Technology investment and innovation will underpin most future mobility services and management of the transport system in Wellington. This report highlights some key areas where technology is a critical enabler of progress, community development, economic vitality, and a transport system that is accessible, provides choice, and enhances the city and region. These focus areas are:

- Innovation corridors – dedicated spaces where innovation is facilitated, supported and encouraged by local and central government.
- Electric vehicles – providing infrastructure to enable a large increase of EVs in the fleet, and speeding up moves toward an electric public transport fleet.
- Shared mobility – supporting and incentivising shared mobility services (car and bike) in Wellington and integrating these services into the wider transport system.
- Bus Rapid Transit ‘Integrated Mobility Hubs’ – modern public transport hubs that incorporate traditional transport services (public transport, taxis, etc.) with emerging services (carsharing, bikesharing, ride hailing, etc.).
- Mobility as a Service – integrating all the region’s mobility service providers into an integrated payment and journey planning platform.
- Inner City Parking – improving the provision, use and access to inner city parking through sensors, apps and novel pricing options.

Accompanying these focus areas are a long-list of recommendations for technology actions that could be implemented in Wellington and a timeline for their potential introduction.

**This document is not intended for public release.**

# 1 Introduction

This report is the final stage of a 3 part research series that comprises:

- Stage 1 – A review of local and national technology related strategy and policy documents; and scoping of relevant technology trends and innovation's that should be considered as part of the Wellington Region's investment and utilisation of transport technology enablers.
- Stage 2 – An in-depth review of 'inspirational case study' examples of cities who are undertaking similar initiatives.
- Stage 3 – Identification of practical, short, medium and long-term technology focused actions that could be implemented in the Wellington Region. This report provides background on each of these potential actions.

## 2 Policy and Strategy framework

Both central and local government (in particular local authorities in Wellington) recognise the potential that established and emerging technologies have to positively impact transport and mobility locally across a range of plans, strategies and policy documents. Likewise, both central and local government in New Zealand are consistent in the view that technology is an enabler of change, supplementing rather than replacing established solutions e.g. enhancing the efficacy of infrastructure like train lines. While not explicit in all cases, central government is generally positive and often supportive regarding the adoption and use of:

- Mobility as a service.
- Vehicle-to-everything communication.
- Technology enhanced network operations.
- Data as a service.
- Electric vehicles and associated infrastructure.
- Semi- and fully-autonomous vehicles.

### 2.1 Local Government

Wellington City Council's strategy *Wellington Towards 2040: Smart Capital* has set a clear strategic direction around the adoption of technology in support not only of Wellington becoming a smart city, but as an enabler of healthy and vibrant lifestyles for people<sup>1</sup>. This enables the transport system to be considered, not just from a utilitarian perspective, but from the point of view of people's enjoyment and satisfaction, recreation, health & activity, connecting people to the natural setting of their city and improving the traveler experience beyond just reducing delays, increasing efficiency and providing information.

In addition to *Wellington Towards 2040* both Greater Wellington Regional Council and Wellington City Council have recognised the significance of technology to delivering high-quality transport outcomes for the city, and set the scene for the use of these technologies in the following key documents:

- Greater Wellington Regional Council's Wellington Regional Land Transport Plan 2015
- Wellington City Council's Long-Term Plan 2015
- Wellington City Council's Wellington Urban Development and Transport Strategy 2014-2043

It is clear from both Wellington City Council and Greater Wellington Regional Council that, with regard to transport, technology should be applied to support the following outcomes:

- Reliable public transport and transport routes
- Improved safety across all modes
- A resilient and low impact transport network
- Integration between modes
- Increasing active transport
- Roads and public spaces (parks) as strategic transport assets.

Greater Wellington Regional Council comments specifically on the potential of EV, ridesharing, and fast broadband as tools to reduce the impact on the environment and demand on the transport network. Wellington City Council is less explicit, noting the supplementary role that technology plays alongside other tools available to local government<sup>5</sup>, WCC has shown leadership by already working in conjunction with NEC to test centralising data to enable collaboration between agencies, and to deploy new sensors to enhance civic operations.

Outside of Wellington and the region there has also been recognition of the potential benefits of technology with respect to transport systems. Christchurch City Council, note the benefits for the environment recommends that technology should be considered for integration on a case-by-case basis<sup>6</sup>. It should also be noted that post-earthquake Christchurch has been a leader in leveraging technology to engage the public<sup>8,9,10</sup>, quickly realising the potential of technology not only to reach a wider audience, but to aide people’s understanding of a transport system in a state of flux and to collect their thoughts and desires for the rebuild of their transport system. This enabled a wide range of people to get participate in a genuine way, technology was critical in equipping the public to take part.

Auckland Transport’s plans are more comprehensive with the agency having adopted a technology strategy in June 2016. However, they also look at technology as supplementary rather than a standalone solution, commenting “a modern transport system requires technological “glue” to collect, process and utilise data to provide operational effectiveness, efficiency, safety and resilience across all transportation modes and services.”<sup>7</sup> The Auckland Transport Alignment Project (ATAP), which included a technology workstream, recognised the importance of technology as a tool to manage travel demand and to enable more efficient use of existing networks. ATAP identified “accelerating the uptake of new technologies” as a medium to long term focus and wanted to “maximise benefits” from new technologies.<sup>1</sup>

### 2.1.1 Towards 2040: Smart Capital

Wellington Towards 2040: Smart Capital Wellington’s 30-year strategy for future development is a vision supported by four city goals: a people centred city; an eco-city; a connected city; and a dynamic central city.<sup>2</sup> The scenarios developed by Get Welly Moving and the investment that will take place in prioritised transport and mobility projects will be a core enabler of all four Smart Capital goals.

Wellington’s transport network and central city spaces are competing for space and the city’s connections to the wider region experience heavy congestion with the worst spikes in travel times

<sup>1</sup> <http://www.transport.govt.nz/land/auckland/atap>

<sup>2</sup> <http://wellington.govt.nz/~media/your-council/plans-policies-and-bylaws/plans-and-policies/a-to-z/wellington2040/files/wgtn2040-brochure.pdf>

at peak commuter periods in out of any territorial authority in New Zealand. New infrastructure and better public transport services will help to alleviate some of this burden but, certainly in the medium to longer term, Wellington will not be able to build its way out of congestion and poor connectivity by investing in hard infrastructure alone.

Technology will play a key role in the future of mobility in Wellington by helping to get people out of their cars and using more efficient modes such as public transport (on a reliable and accessible network) and shared services. The impact of public and private mobility services will be ‘unlocked’ by technology as multi-modal trips are integrated into single online platforms that provide people with the ability to plan and pay for journeys on the fly.

The goals of Wellington’s Smart Capital vision will be drivers of smart transport infrastructure investment and strategy. This approach places social and economic development at the core of transport decision making and positions transport as an enabler of growth in these areas. Intelligent mobility is not just about solving current transportation issues but about creating liveable cities that attract talent and businesses and promote a high quality of life for residents.

While setting goals for Smart Wellington, the document itself does not mandate specific investments in technology, and there are a number of challenges and influences that will shape how these goals are achieved. Technologies implemented will be swayed by public opinion, openness (or resistance) to change, the availability and reliability of technology, and ‘game changing’ decisions made by central government and private companies who are also involved in this space.

Any future planning for investment in technology solutions to achieve Wellington’s Smart Capital goals will need to consider timing and the useful life of investments – when do you plan to implement and how long will the implementation last? There are quick wins to be made but these should not be at the expense of high ongoing costs, or technologies that meet Wellington’s goals now but not in ten years’ time.

## 2.2 Central Government

Where local government in Wellington has set the strategic direction for the application of technology, central government provides the framework to limit or enable to application of technology in general, and specific technologies in particular. The key central government documents that set the scene for transport and technology (more specifically Intelligent Transport Systems or ITS<sup>11</sup>) include:

- NZ Transport Agency Position Statement on Intelligent Transport Systems, 2014.
- Government Policy Statement on Land Transport, 2014.
- Intelligent Transport Systems Technology Action Plan 2014-18, 2014.
- Ministry of Transport Domain Plan, 2016.

More generally, central government has recognised the potential of technology to transform the way New Zealand works, and has developed a policy and regulatory framework with a focus on realising the economic benefits to the nation. This has involved an investment of \$1.35 billion in deploying future proofed high-speed broadband infrastructure and making sure that services over that infrastructure are affordable for households and small businesses<sup>12</sup>, as well as a regulatory review of pricing of services to ensure accessibility<sup>13</sup>.

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Central government is explicit in endorsing the use of new technologies to enhance transport in Aotearoa / New Zealand commenting that ITS is a tool that will aide in delivering an effective, efficient, resilient, and safe transport network in Aotearoa / New Zealand<sup>14</sup>, and that technology offers “*considerable scope for innovation in the way that the land transport system is delivered.*”<sup>15</sup> Specifically, central government notes that ITS presents opportunities to enhance<sup>16</sup>:

- “the way we gather and use data about traffic flows and the state of the network
- the amount and quality of data
- our ability to communicate with travelers
- our ability to resolve operational issues in the transport network
- our ability to protect people from their and others’ mistakes.”

The NZ Transport Agency has recognised three strategic advances that are important enablers of these opportunities<sup>17</sup>:

- The ubiquity of smartphones and related location information
- The potential positive impact of autonomous and sensor equipped vehicles
- Improved vehicle identification technologies including in-vehicle chips and road-side sensors.

As well as a general acknowledgement of the opportunities related to ITS / emerging technologies, central government has signaled its support for:

- Electric vehicles - in 2016 the Ministry of Transport launched the Electric Vehicle Programme to increase uptake of electric vehicles in Aotearoa / New Zealand<sup>18</sup>.
- Autonomous vehicles - the Ministry of Transport has published guidelines for trialing autonomous vehicles in Aotearoa / New Zealand<sup>19</sup>.
- Ride-sharing - the Land Transport Amendment Bill 2016 removes outdated provisions and caters for the use of new technologies that facilitate ride-hailing, carpooling, transportation network companies and other micro-transit services<sup>20</sup>.

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## 3 Potential for technology actions in the Wellington region

### 3.1 Innovation corridors

Over the last few years there has been a growing focus on pilots and trials for smart transport technology and many cities, including Wellington, are seeking to position themselves as test sites for innovation and development. This approach recognises the rate at which new internet enabled technologies are emerging and evolving. Pilots and trials are an effective way for local authorities to mitigate the risks associated with a high rate of change by partnering with a range of organisations or different sizes and types (large corporates to small local community innovators) to test and validate different ideas in a real-world context. Technologies that demonstrate their effectiveness can then be scaled up, either incrementally or acutely. Learnings from those that do not can be used to inform new approaches. The pilot / trial model has the added benefit that, by having third parties develop technical solutions, local government is freed up to focus on outcomes.

Internationally, smart city projects often begin by selecting a community or a corridor from which to begin their city's smart mobility transformation. In general strategy and policy, as well as pilot projects that are already underway, suggest that Wellington is well placed to develop innovation corridors. These will offer business opportunities for WCC, GWRC and NZ Transport Agency in the region, and help bring an 'innovation buzz' to the city. Overseas experience suggests that scalability and ongoing funding requirements are two key features of successful pilot projects. Considering these from the outset can help avoid development stopping at the pilot phase.

#### 3.1.1 Ngauranga to Wellington Airport

This is the focus area of 'Let's Get Wellington Moving' and includes the Wellington Urban Motorway and connections to the Wellington Regional Hospital and the eastern and southern suburbs. This corridor is primarily a thoroughfare, carrying large volumes of vehicle traffic into and through the city. As such, the 'Let's Get Wellington Moving' Travel Demand Management (TDM) Study is expected to recommend a range of soft and hard TDM measures, many of which will be supported by technology solutions.

These include, but are not limited to:

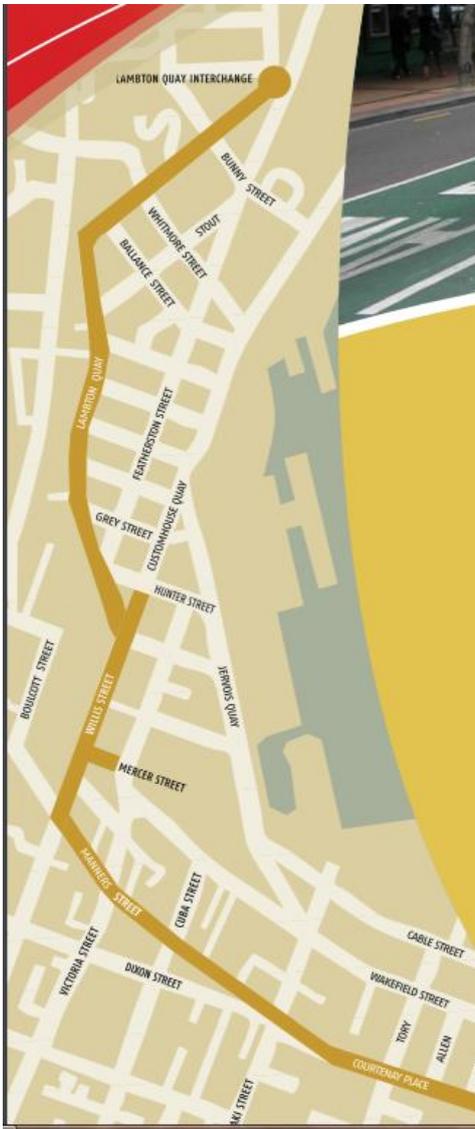
- WiFi provision on public transport.
- Shared mobility services on web-enabled platforms.
- Autonomous and connected vehicle infrastructure.
- Electronic congestion charging, distance based charging, and road tolling.
- Smart parking sensors and parking management systems.

This report recommends technology solutions specific to managing congestion and trips along the Ngauranga to Wellington Airport corridor are developed in conjunction with the TDM Study outcomes to ensure alignment in vision and goals.

#### 3.1.2 The 'Golden Mile'

Wellington's 'Golden Mile' (Courtenay Place – Manners Street – Willis Street – Lambton Quay) is the central spine of the inner city public transport system, it is a place that has been designed to

attract pedestrians visiting the retail and commercial centre of Wellington and, because it is home to a diverse range of commercial premises (ranging from retail shops and cafes to supermarkets, hotels and office buildings), it is also a key corridor for freight.



**Figure 3-1: The 'Golden Mile'** (source <http://wellington.govt.nz/~media/your-council/projects/files/brochure.pdf>)

The Golden Mile already has some smart infrastructure in place. Electric trolley buses have carried passengers along this corridor for many years, while more recently NEC has trialled automated video capture and data processing of pedestrian, cyclist, and vehicle (by type) movements through the Taranaki and Courtenay Place intersection. This corridor of road network is an attractive space to continue to develop technology, innovation and development because it caters for a wide range of people and goods movements across many different modes throughout the day.

This report recommends the 'Golden Mile' corridor be used to explore technology opportunities that can help balance the needs of freight, people and vehicles travelling on this corridor and reconcile conflicts, such as between public transport and private vehicles, and pedestrians and other modes. Technology solutions will also be enablers of creating an urban environment that supports safe and efficient movements of people and goods, and helps to create a safe and pleasant environment for pedestrians. A technology-enhanced Golden Mile would be a network corridor where local authorities and government would actively support and enable the testing of new technologies (be they sensors, ITS infrastructure, or autonomous vehicles) by non-government third parties. This would help WCC, GWRC and NZ Transport Agency to develop protocols for public (local + central) and private organisations working together and sourcing data from the same network – in essence, developing protocols for an aligned multi-stakeholder approach that delivers transport outcomes and commercial interests.

Potential technologies/learnings that could be encouraged/trialled that align with the existing vision for the Golden Mile innovation corridor, and that could help balance the interests of local freight with active transport modes (walking and cycling), include:

- Smart intersections that prioritise public transport and pedestrian movements and improve safety for pedestrians and cyclists.
- An 'integrated mobility hub' which provides infrastructure to facilitate interchange between technology-enabled transportation services and the bus rapid transit system e.g. carshare, Uber or bikeshare to bus.
- A smart freight corridor that allows delivery drivers to see when loading bays are available in real time and potentially ties in to a 'hub and spoke' style programme to enable efficient delivery of goods and supports a freight demand management plan that balances delivery schedules outside of the busiest times for moving people.

- Testing for deployment of emerging technologies – how can sensors be deployed along the same corridor by different providers without the need for multiple poles, fixtures and wiring? To collect information about people in motion, things in motion and vehicles in motion.
- Link to the Smart Motorway and seek opportunities to integrate information across the existing Bluetooth sensor network with new sensors and data collected on the innovation corridor.
- Ready infrastructure for future developments e.g. this corridor would be capable of supporting Vehicle to Infrastructure (V2I) communication and data sharing, and become a test corridor for automated vehicles – perhaps an automated public transport shuttle running the length of the Golden Mile.

### **3.2 Electric vehicles**

When we discuss electric vehicles, we are generally talking about how we power the modes of transport we use today (specifically those that are currently powered using fossil fuels) as well as the vehicles/modes of the future. With clear signals from central government and the private sector, electricity will be the fuel that will power New Zealand's vehicle fleet in the near future. Thus, action must be taken at a local level to ensure that the appropriate enabling infrastructure is in place at the right time.

The transition from fossil fuels to electric vehicles is often discussed in conjunction with a shift in transport modes and how we use them (e.g. ridesharing). This is because both are significant changes that are occurring almost simultaneously. To ensure the benefits of both are maximised the disruption that the transition to electric is creating should be leveraged in support of changing transport modes and uses (e.g. ridesharing) and vice-versa.

Wellington Region's electric vehicle (EV) policy and goals are already ambitious with GWRC aiming to be the first NZ city to have an all-electric bus fleet, and WCC adopting an electric-first policy for their vehicle fleet. The PLUGSHARE website helps EV drivers find local charging stations, including public stations provided by business/government, and residential charges that are shared by PLUGSHARE's members.

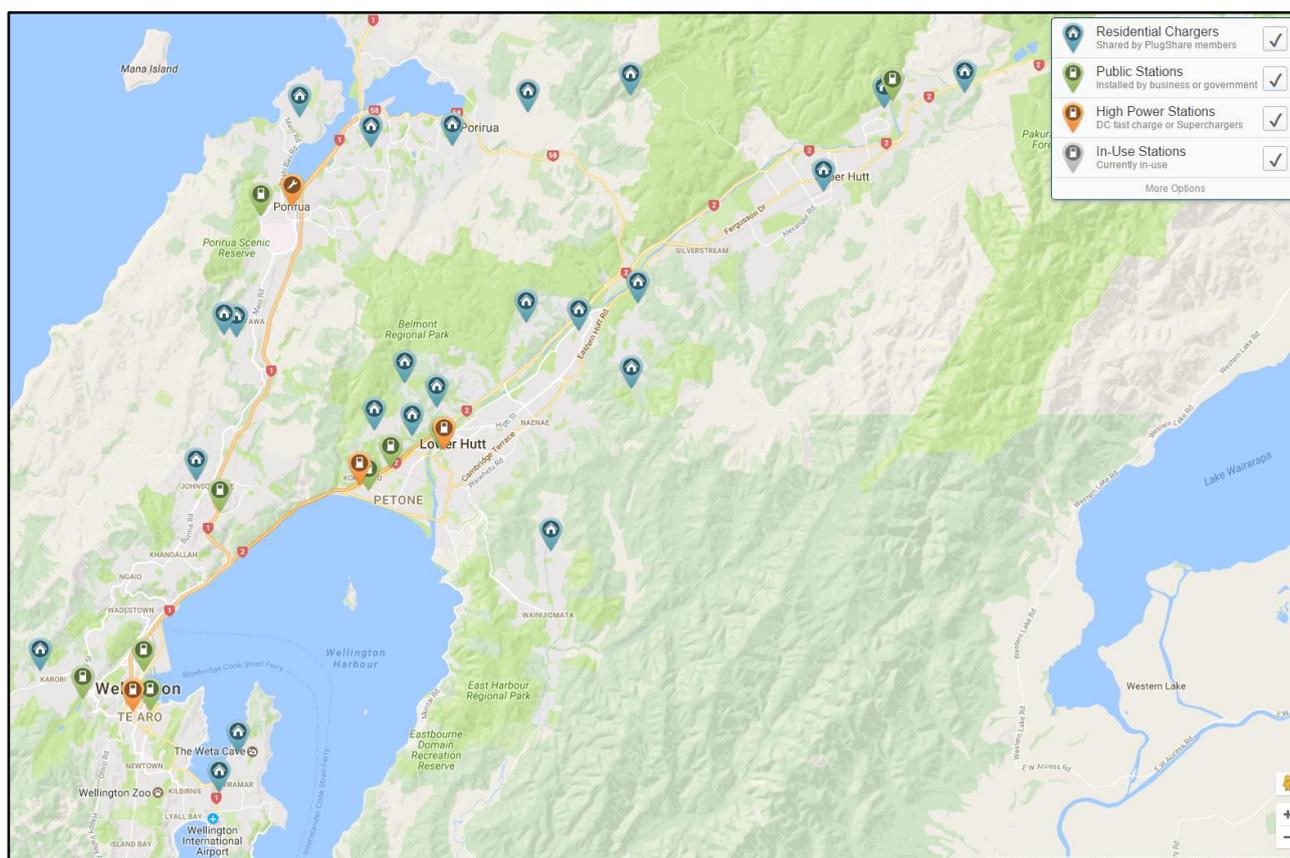


Figure 3-2: EV charging stations in the Wellington Region (source: [www.plugshare.com](http://www.plugshare.com))

The publicly provided charging network across the region is in its infancy with a handful of sites in each of the major centres. These charging units are largely provided on commercial premises such as petrol stations, shopping centres and major attractions.

There are currently no charging units provided on-street at dedicated parking spaces, a common trend overseas that both increases the visibility of this infrastructure and provides a practical charging option for vehicles to be charging while passengers go about their activities.

### 3.2.1 Electric vehicle actions

- The project's priority should be to provide charging for shared-use vehicles as opposed to private solo car drivers and there should be strong ties to the TDM workstream to encourage uptake that will have a positive impact on the transport system
- Work with shared-use EV schemes (carshare and rideshare) to understand infrastructure needs to increase network coverage and ensure this sector is supported as part of the region's mobility service network and in a way that compliments the public bus and rail network. Provision of infrastructure and working with EV car share providers is already taking shape in Wellington, most recently with the introduction of Mevo.
- Continue to expand public provision of EV charging units across Wellington Region and drive the shift to electric public transport. Identify opportunities for public-private partnerships, or to facilitate private investment, in new EV charging units in urban areas or at 'integrated mobility hubs'. Strong targets for geographic coverage and number of units should be set in this space.

- 2016 saw the release of the first international standard for “Wireless Power Transfer for Light-Duty Plug-In/ Electric Vehicles and Alignment Methodology”. This opens the door for deploying wireless charging stations on street in the short to medium term, and as electric buses are deployed on the Golden Mile, roadway wireless charging could be implemented (medium to long term)<sup>3</sup>

### 3.3 Shared Mobility

At the heart of any smart mobility plan lies a shift away from single occupancy car driving towards shared mobility. In addition to growing bus and rail patronage, which will continue to form the spine of Wellington’s mobility system, Wellington will also need to harness the potential for the new technology-enabled transport services to augment these services, both to plug low-patronage last-mile gaps in the network, and to supplement services during lower-frequency periods of the day / week. Presently, providers of shared mobility services are mostly developing their systems in isolation from any central or regional planning. A more collaborative approach will ultimately provide a more integrated system that will better meet the needs of the public and business. The onus is on local and regional authorities to form relationships with shared mobility service providers, to understand their business and include them in the wider mobility system.

The other reason to focus on growing shared-use mobility in the short to medium term is to leverage the disruption that the transition from fossil fuels to electric vehicles is and will create. There is the opportunity to piggyback on this transition to form the foundation for a shared, autonomous, connected, electric future for small passenger vehicles. Without achieving this transition, there is a risk that people will simply shift from solo car driving to solo travel by electric-autonomous vehicle, which does nothing to solve congestion and could potentially make it worse if, for example, it is cheaper to send a car home after you have arrived at work or school, than to park it for the day. This might reduce demand on inner city parking but could increase peak time trips.

The new technology-enabled services include:

- Bikeshare, particularly point-to-point bikeshare systems
- Carshare (community carshare, peer-to-peer and city-wide schemes)
- Microtransit services (e.g. Bridj and Ride Chariot)
- Ridesharing or shared ridehailing (e.g. UberPool or Lyft Line)
- Carpool, particularly dynamic carpool system e.g. Scoop

Other trends include services that are combining freight and passenger transport, so that, effectively, they are co-subsidising each other’s trips e.g. BridjBox and these sorts of efficiencies should be encouraged, particularly on a corridor with multiple uses.

#### 3.3.1 Shared Mobility Actions

- Set targets for change (passengers/ users/ trips) and relate these to services required (i.e. as LA has done- increased trips on bikeshare have been translated into number of bikes required in the system)
- Identify opportunities for first/ last mile partnerships to extend the reach of rapid transport networks (also see ‘integrated mobility hubs’)

<sup>3</sup> Source: <http://standards.sae.org/wip/j2954/> last accessed 22/2/17

- Support policy change to enable ridesharing, following the approach taken by Wellington’s partner city, Sydney, New South Wales and consider inviting ‘expressions of innovation’ as New South Wales has done, for mobility on demand
- Identify communities suitable and potentially willing to transition to a ‘shared fleet’ model (as San Francisco proposed in their Smart City Vision)
- Develop an approach to attracting more rideshare, ridehailing and micro-transit providers into the New Zealand and Wellington marketplace (through incentives, procurement models and international outreach) or to grow this technology at home (incubators and needs-based innovation challenges/ competitions)
- Place emphasis on the inclusion of bikeshare and carshare as part of TDM programmes for example at Victoria University
- Initiate a business co-operative carshare scheme which enables a group of local businesses to transition from pool or company cars to a shared pool of cars (short term); once this has been established, facilitate the transition/ encourage uptake of a MaaS scheme to encourage multi-modal trips
- Change travel surveys or other data gathering approaches to capture multi-modal journeys and use of new modes of transport
- Target TDM outreach efforts to educate citizens and visitors about how to use the new shared services, including both online and real-world communication platforms.

### 3.4 Bus rapid transit ‘integrated mobility hub’

Los Angeles’ ‘Shared-use Mobility Action Plan’ includes a number of ‘Integrated Mobility Hubs’ at its mass transit stations. These are, in essence, this decade’s public transport interchanges but unlike these traditional interchanges which usually only cater for bus-rail interchange, commuter cycle parking, taxis and perhaps some park-and-ride the new ‘Integrated Mobility Hubs’ will accommodate seamless transfers between technology-enabled shared-use modes and rapid/ mass transit routes, while still focusing on keeping all travellers safe and informed as they travel through the interchange. The new ‘integrated mobility hubs’ are also supporting activities that are not traditionally the domain of passenger transport e.g. providing refrigerated lockers to allow travellers to pick up groceries on their way home or received other items, adding to the convenience of using shared modes for their journey. This integration of different activities represents a major opportunity to optimise the functionality of trips. LA’s Action Plan describes the Integrated Mobility Hubs as being particularly attractive to their “super sharers” i.e. travellers who embrace shared modes and often don’t own a private car.

This report recommends that Wellington develop at least two integrated mobility hubs over the short to medium term, one of these could be at the end of the Golden Mile and the other should be in a suburban location with the site could be selected either to improve access to rapid transit by solving the first-last mile problem at a site that is presently under pressure (e.g. a park and ride with parking pressure), or implemented in a location to stimulate transit/ mobility oriented development in an area earmarked for residential growth.

#### 3.4.1 Integrated Mobility Hub Actions

- Develop an Urban Integrated Mobility Hub e.g. Lambton Key: focusing on providing the onward connection via bikeshare and rideshare options and technology enabled taxi services (i.e. that can arrive on demand as opposed to waiting at ranks in large numbers)

- Develop a Suburban Integrated Mobility Hub: focusing on providing supporting infrastructure and technology to facilitate first/last mile trips via carshare, carpool and rideshare, micro-transit and bikeshare
- Develop a Wellington design guide for ‘Integrated Mobility Hubs’ to support the development or upgrade of rapid public transport stations and to support mobility-oriented development as the city’s population grows.

### 3.5 Mobility as a Service

Current public transport services are designed to enable users to plan trips based on where and when they want to go, not having to concern themselves with the mode of travel or the service provider of that mode. In that respect, public transport can be considered agnostic. However, the integration between different modes is usually limited to e.g. synchronised timetabling that does not adapt to reflect changing circumstances (such as the needs of individual users from different demographics). Mobility as a Service (MaaS) is a natural extension of the outcome focused approach taken by public transport services, enabling people (and goods and services) to more effectively meet their transport needs by integrating services offered by different modes and service providers on a unified platform, coordinating those different services, and streamlining the transaction process.

MaaS also complements shared services as it also supports the shift away from personally owned modes of transport that will be critical to reducing congestion, as well as the adverse effects of the transport network on amenity, health and safety, and the natural environment.

A key limiting factor for MaaS solutions is access to real-time information about transport services and user demand / needs. Related to this is scale i.e. the number of people using the MaaS solution. Where real time information is available it becomes possible to deliver more reliable services for users. As real time information becomes more comprehensive and demand for MaaS increases then demand responsive transport becomes possible i.e. services that adapt (routes, timetables etc.) to meet the needs of transport users.

As with shared mobility services it is important that MaaS is supported and guided by local authorities to ensure interoperability of technology platforms. Future models such as Mobility as a Service will require both public and private transport services to have integrated ticketing and journey planning systems available to customers. At present Wellington’s public transport service is well catered for through Metlink and the Metlink Commuter app, both of which support journey planning. This forms a robust foundation for the shift to MaaS where such a platform will be needed to act as a neutral interface, coordinating private and public service providers. However, it may be that as the functionality required of the platform increases, that government is not the entity best placed to develop the platform itself. Based on the experience of international cities including Portland, Oregon and Helsinki, Finland this report recommends that Wellington works with an experienced vendor to develop a MaaS platform, freeing local authorities up to focus on coordinating local transport service providers.

#### 3.5.1 MaaS Actions

- Leverage Wellington’s position as a fast-follower by partnering with a city more experienced in delivering MaaS to expedite implementation in Wellington e.g. Portland, Oregon

- Understand delivery model that works for Wellington’s travellers, such as monthly subscription based services and what these would include (public transport, taxi/ride hailing trips, shared rides, shared vehicle access) and/or pay-as-you-go services. Also, how people in different parts of the Wellington Region might have different needs for MaaS – those who commute into and out of the central city each day will have different needs/wants to those who walk to work in the central city but travel out for recreation at the weekend. What would be the likely cost of these offerings?
- Explore key success factors that have been identified internationally, for example, how well is Wellington able to provide for such things as: guaranteed services (people must know that they will be able to get home), ease and speed of use should allow for freedom of movement. What actions need to be taken to ensure these things
- Access to real-time information should be accessible to all. For many people this may be via smartphone, but access should also be provided by other methods (for example by way of a kiosk) for people who don’t have access to a smartphone.
- Need to develop public education campaigns that include comparing offerings to the true cost of car ownership/use so that people can fully evaluate their transport options
- Establish partnerships with transport service providers (including public and private, and large and small scale providers) and develop a business model that enables all service providers to participate in a MaaS solution, including sharing data and information
- Explore procuring and testing a next generation MaaS platform from experienced vendors (e.g. Moovel in the USA, Whim app in Helsinki) and engage with the NZ Transport Agency to work toward a model that can be applied across NZ and not just Wellington.
- Explore how pricing could be used to control/flatten the demand for public transport. For example, Singapore provides free trips in the morning pre-peak to encourage people to travel earlier. Such measures allow for more people to be moved with the existing infrastructure.

### 3.6 Inner-city parking

Wellington has already started the installation of smart parking sensors and web/mobile enabled payment platforms for public parking in the city centre. Apps like PayMyPark and phone2park let users pay for parking time remotely, and in-vehicle units can also be installed to do the same.

This report recommends a continuation, and geographic expansion, of current approaches to parking management technologies in Wellington CBD, and an investigation of where coverage could be expanded to. Key functions or outcomes that will be a focus of any investment in parking technology are:

- Payment platforms, including pre-booking of parking spaces.
- Real-time mapping/communication of parking availability and prices.
- Demand responsive pricing for parking to manage availability.
- Detailed understanding of parking use by space and zone, ties into automation of responsive pricing.
- Better overall management of parking stock, including where parking can be reduced to return valuable inner-city land to more productive social and economic uses.

This system is currently disconnected from off-street parking facilities which generally have private operators. If demand responsive parking prices is a potential future TDM measure for Wellington, then some level of collaboration between public and private providers of parking will be necessary to provide benefit for the transport system.

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### 3.7 Mapping Wellington's pedestrian thoroughfares

Within Wellington's central city are a vast number thoroughfares and passageways through buildings and laneways that are legal thoroughfares for pedestrians. Dubbed 'Twittens' these routes are sometimes mapped in online maps, but a number are missing and tucked away in documents like consent conditions for new buildings. Publishing these in open source maps for journey planning and incorporating them into Google Maps and Open Street Map would make them more accessible and increase pedestrian mobility around the city, along with the experience of people who would otherwise see these as private closed off space.

This project will contribute to the principles of an 'accessible, healthy and safe', a 'compact city' and ensuring 'past, present and future' infrastructure developments are integrated within their built environment. This is achieved by providing pedestrians with a range of safe routes through the central city and increasing the liveability of the city centre by promoting it as a pedestrian-centric urban space.

### 3.8 Counting Wellington's Cyclists

Many major cycle ways are established across the Wellington Region, and these routes attract large numbers of commuter and recreational cyclists to them daily. Installation of electronic bike counters on major cycleway routes to highlight usage of these both to users and to drivers passing by.

While not directly incentivising cycle trips themselves, this infrastructure would help celebrate the principles of 'travel choice', demand and supply' and 'clean and green' mobility in Wellington.

## 4 Key enablers

**Note: this section contains recommendations at a higher level than technology focused enablers of mobility in Wellington, but are relevant as guiding approaches and large-scale investment to improve the technology underpinning the region's transport network.**

A partnership approach and the use of data are common themes across many of the recommendations and actions included in this report. Expanding on these, we consider it valuable to discuss the more general benefits of public-private partnerships and a data-focused approach to technology investment and innovation.

### 4.1 Partnerships

One common trend internationally has been the increasing emphasis on partnerships between government and smart mobility service or equipment providers. The US DOT Smart City competition required applicants to have partnerships in place with a value of US\$40m or greater. This is a change to current procurement models and would require the establishment of an alliance/ coalition or similar to foster these relationships within Wellington. Changes to procurement models are needed to ensure that, for example, where a private enterprise has secured a premium market position through government support or endorsement, this should take place through a fair and open selection process that allows all interested parties to compete for the work.

- Wellington 'Smart Mobility' alliance – group that works with private providers of technology and mobility services to ensure all groups are working toward a shared vision, and are complementing, or at least aware of, each other where possible.
- Engage with private organisations (NZ and overseas) and establish working relationships to encourage new entrants into the sector to work with a shared vision for future mobility and community outcomes in the Wellington region.
- Develop strategic business models for Public Private Partnerships in the technology space.
- Establish a partner city who is embarking on a similar journey – (e.g. Portland or Columbus).
- Understand what are the barriers for private organisations innovating and implementing new things and what local/central government can do to remove these.

### 4.2 Data

Data collected from and associated with transport activities across investor, asset manager and customer perspectives is becoming an increasingly valuable resource for public transport authorities.

Data in itself does not answer anything, but is vital to the design and supply of information. The information that can be created from data, particularly trends, is important for evidence decision making, business cases and for improving transport service provision – leading to better value outcomes for all stakeholders.

Data investment in New Zealand Transport is bespoke, and typically project driven, which results in many suppliers supplying many datasets, in many formats across many data platforms. While this happens, realisation of value return from IT occurring in “siloes” isolation, and is materially

hard to scale because of the predefined project parameters. At national level, this equates to much less value for New Zealand at much higher bespoke costs.

These perspectives are important to understand before considering an appropriate data solution for Wellington City Council, which will help contain costs whilst maximising benefits.

Transport providers, operators and managers in the Wellington Region should:

- Aim to use or reuse existing datasets and data contracts to reduce procurement costs.
- Collaborate closely with other Smart Cities globally and locally to determine low cost – high value data investment initiatives.
- Leverage existing transport and supplier partnership arrangements.
- Make best use of existing data and data collection infrastructure.
- Utilise internal and open source IT analytics capability.

There are broader actions that can be undertaken by WCC and GWRC to increase the value of their data, help translate data into knowledge, and ensure data is available to meet the city and region's transport vision and needs:

- Understand what the quality and nature of data/information is that different groups need:
  - Public.
  - Network operators/managers.
  - Private groups.
  - Decision makers.
- Identify data gaps in the context of specific projects/goals (e.g. MaaS) and undertake a tiered approach to plugging data gaps that includes the private sector – local and central government should not expect to capture and manage all relevant information but rather identify opportunities to collaborate with external organisations for co-benefit.
- Development of an integrated data platform (such as an API) that is built on data standards to ensure vendors are providing information to WCC and the NZ Transport Agency in a consistent manner. Looking at opportunities for developing a Wellington Transport API that is accessible for uploading and downloading of information by both public and private organisations, while protecting the privacy of individuals – look to what is taking place in Auckland and Christchurch with their APIs and play a role in centralising NZ transport data in a single API, or network of APIs that can talk to each other).
- Recognise tipping points for data sharing – when does an integrated system/shared data become so valuable that everyone starts getting on board?

## 5 Summary of key technology-related actions

Category	Action	Benefits	Time Frame*
Innovation corridors	Smart intersections.	Prioritise public transport and pedestrian movements, improve safety for pedestrians and cyclists. Provides a safe and accessible city for all modes, and improves efficiency for priority vehicles/travellers.	Short term (2-5 years)
	Smart freight corridor.	Delivery drivers can see available loading bays in real-time, support real-time freight demand management that balances schedules around network demand from other modes. Facilitates efficient business activity and balances the needs of the transport system across modes.	Short term (2-5 years)
	Testing deployment of emerging technologies.	An enabler of innovation and learning, test how sensors can be deployed in the same space by multiple providers without developing many unique systems, understand physical requirements of these sensor networks, collect information about people in motion, things in motion and vehicles in motion. Ensures that the transport system is future-proofed and responsive to new technology.	Immediately and ongoing (1+ years)
	Link to existing 'smart' technologies.	Link central city smart corridors to the Smart Motorway and Wellington's Bluetooth sensor network, develop integrated data and decision making platforms that can be scaled. Leverages off lessons already learned and ensures a cohesive approach to investment in technology, systems and capability.	Short term (2-5 years)
	Ready infrastructure for emerging vehicle technologies.	Develop a test corridor capable of supporting V2I communication, and a test corridor for automated vehicles (including on-road trials). Learning is relevant for both Wellington, New Zealand and internationally. Future-proofs the local system to well signalled changes in technology, contributes to international learning of new technology testing.	Short-medium term (2-10 years)
Electric vehicles	WCC and GWRC to prioritise actions in developing charging network, and supporting shared-use models for EVs.	Provide required infrastructure to support significant change in fleet to EVs, encourage uptake of EVs that is not just a continuation of current 'single occupancy' trip model. Strengthens public-private partnerships and the delivery of a cohesive transport system where all service providers are working to a common goal(s).	Immediately (1 year)
	Set aspirational targets for geographic and number of publicly available EV charging units in the region.	Develops a timeline by which to benchmark investment (public and private) in EV infrastructure and uptake.	Immediately (1 year)

Category	Action	Benefits	Time Frame*
		Strong metrics for investment increase likelihood of delivery and set a vision for priority areas, EV is a significant step-change for a sustainable fleet.	
	Keep up with emerging technologies, e.g. wireless charging infrastructure, and identify opportunities to introduce these.	The system is future-proofed and resilient to emerging technologies and change.	Immediately and ongoing (1+ years)
	Speed up shift to electric public transport fleet.	GWRC leading from the front in terms of a sustainable public transport fleet.	Short to medium term (2-10 years)
Shared Mobility	Set targets for shared mobility uptake.	Services are likely to be provided privately but Council has a significant interest in uptake of shared mobility services due to the benefits for overall transport demand and congestion. Providing shared mobility increases travel options for all users, makes the system more accessible by alleviating 'last mile' challenges, and improves the sustainability of the fleet through less vehicles being required to move people around.	Immediately (1 year)
	Support policy which enables ridesharing.	Break down barriers to new mobility models, including ride sharing, to encourage innovative services and a re-think on how people and goods can be moved around out city. Leverage off overseas examples to increase transport choice in Wellington.	Immediately (1 year)
	Provide incentives for new entrants into the ridesharing and ridehailing marketplace.	Currently there are a small number of providers offering services. Competition in this space is important to increase the coverage, quality and price of services. Major barrier at present is uptake so other incentives are necessary to encourage new entrants.	Short term (2-5 years)
	Emphasise bikeshare and carshare as part of TDM programmes for local education providers and businesses. Target TDM outreach efforts to educate the community about shared services.	Helps to embed shared modes of travel or vehicle ownership in Wellington's travel culture and promotes a shift away from single occupancy trips. Helps to create a more sustainable transport network with improved travel times if congestion is reduced.	Immediately (1 year)
	Initiate a business co-op carshare scheme.	Businesses are a good starting point for behaviour change and to champion the benefits of alternative approaches to mobility. Once engaged these businesses become more inclined to continue to push the boundaries and seek new ways of operating.	Short-term (2-5 years)
	Include measures of shared trips in travel surveys and other data gathering approaches.	Allows for the evaluation of culture change and uptake of new travel modes over time.	Short-term (2-5 years)

Category	Action	Benefits	Time Frame*
Bus Rapid Transit 'Integrated Mobility Hub'	Develop urban (central city) mobility hub.	Greater integration of mobility services and improves the functionality and experience of trips made in the region.	Medium-term (5-10 years)
	Develop suburban mobility hub.	Greater integration of mobility services and improves the functionality and experience of trips made in the region.	Medium term (5-10 years)
	Develop a design guide for integrated mobility hubs.		Short term (2-5 years)
Mobility as a Service	Understand and develop a delivery model that works for Wellington's transport and people's needs.	Provide attractive options for non-car based travel that are practical for all people to use, and easy to access.	Immediately and ongoing (1+ years)
	Explore key success factors of MaaS offerings overseas.	Benefit from other cities work to date and apply this experience locally to improve the viability of MaaS.	Immediately (1 year)
	Establish partnerships with transport service providers.		Immediate to short-term and ongoing (1-5+ years)
	Explore procurement and testing of a MaaS platform from experienced vendors.		Short-term (2-5 years)
Inner-city parking	Continue to invest in smart parking infrastructure and expand coverage.		Immediately and ongoing (1+ years)
	Invest in and promote online payment, booking, and mapping platforms.		Immediate and ongoing (1+ years)
	Evaluate demand-responsive pricing systems in the context of wider network pricing/tolling.		Short-term (2-5 years)
	'Project Twitten' – mapping all pedestrian thoroughfares in Wellington.	Directly contributes to an accessible and compact city, providing pedestrians with a detailed network of safe and convenient routes to navigate their way through the city. Creates a sense of place as people get to know the inside of major buildings and laneways that would otherwise have appeared to be private space.	Immediately (1 year)
	Electronic bike counters on major cycleways.	Increases the visibility of demand for cycle infrastructure and provides a direct metric of use that can be used for decision making around new infrastructure. Also creates a sense of place/ownership for users of the infrastructure who become one of the many citizens who value this investment.	Immediately (1 year)

\*The timeframes presented here are an estimate only and are considered independently of each other, they do not consider cost and time to secure funding or the potential interdependencies of specific actions on others listed here or in external policy and strategy documents.



**Opus International Consultants Ltd**

33 The Esplanade, Petone  
PO Box 30 845, Lower Hutt 5040  
New Zealand

t: +64 4 587 0600

f: +64 4 587 0604

w: [www.opus.co.nz](http://www.opus.co.nz)