

Appendix H



SWGP Demand Management
& Local Access Assessment

Appendix H-1

Southwest Gateway Demand Management Approach

Technical Note

To	NZ Transport Agency Auckland Transport	From	20Connect Project Team
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Subject	Southwest Gateway Demand Management Approach		

1 Introduction

The NZ Transport Agency (Transport Agency) and Auckland Transport (AT), alongside investment partner Auckland International Airport Limited (AIAL) are investigating improvements to customer journey experiences and access as part of the Southwest Gateway suite of projects, which includes journeys to and from Auckland International Airport (Auckland Airport).

Travel demand management (TDM) was a key component considered as part of the Programme Business Case (PBC) with an emphasis on encouraging behaviour change and demand management. Continuous provision of infrastructure won't solve the pressures on the transport network from traffic congestion and can provide only temporary relief. TDM measures will provide a better way to manage traffic congestion through efficient usage of existing transport infrastructure in a growing urbanised environment.

This technical note outlines and recommends potential TDM initiatives and measures, especially those that can be implemented promptly and lead to quick-win results, but also measures that will support the development of the preferred option of the Single Stage Business Cases (SSBC) undertaken for the following projects:

- Short Term Airport Access Improvements (STAAI) SSBC led by AT
- SH20B Short Term Single Stage Business Case (20B SSBC) led by the Transport Agency
- Airport to Botany (A2B) Mass Rapid Transit (MRT) SSBC led by AT
- 20Connect (SH20, 20A and 20B) State Highway Upgrade Project SSBC led by the Transport Agency.

2 National TDM and Mode Shift Strategies

It is understood that the Transport Agency is currently developing a National TDM strategy and National and Regional mode shift strategies. Listed below are some of the emerging objectives of these initiatives which are to be applied to initiating and in-flight projects – such as Southwest Gateway/20Connect.

National TDM Strategy

- Reduce and redistribute Single Occupant Vehicle trips
- Reduce VKT
- Increased mode share of PT and active modes
 - Benefits include improved productivity, reduced emissions and improved health and well-being

Mode Shift Strategy

- Creating a more accessible, healthy, safe and sustainable Auckland by reducing reliance on private vehicles
- ATAP investing in RTN, public transport and active modes
- Strategic Direction
 - Shaping urban form
 - Make shared and active modes more attractive
 - Incentivising and encouraging people to change the way they travel
- Interventions for targeted locations
 - Credit on new hop cards
 - Pedestrian facilities by schools and bus stops
 - Walking school bus
 - Cycle parking at schools and PT stations
 - Interpeak fare reduction
 - Campaigning
 - Lighting at stations
 - More bus shelters
 - Wayfinding signage
- Recommendations
 - Targeted PT fare changes
 - Parking policy should support mode shift
 - Investigate road pricing

3 Purpose

The purpose of this technical note is to develop and form the TDM strategy that is a key part of the Single Stage Business Cases for the Southwest Gateway Programme. These TDM measures aim to maximise efficiency and reliability of the wider transport system by discouraging single-occupancy vehicles and promoting more effective and efficient methods of travel (or alternative modes of transport such as public or non-motorised transport). The recommended measures should also align with the national and regional TDM and mode shift strategies currently in development.

4 Southwest Gateway Projects

This section defines the purpose of the Southwest Gateway Projects and their respective preferred options, which includes the Short-term and longer-term 20Connect and A2B project. The short list assessments for each project identified the recommended options to be progressed in further detail.

The development and refinement of infrastructure options to determine a preferred 20Connect option was completed in parallel to the assessment of the A2B project. It is expected that the demands on the preferred solutions will affect the other as both projects are closely related in providing additional

transport choices and capacity along similar corridors. The following sections provide a summary of the preferred options progressed for both projects.

4.1 Strategic Interventions

The Southwest Gateway projects have developed and assessed a set of Strategic Intervention options at the early stages of the business case process. These interventions were defined from a review of the PBC recommended programme. The strategic interventions informed the development of the long list of options. Both infrastructure and non-infrastructure interventions were considered. The non-infrastructure interventions included potential mechanisms to change transport behaviours for travelling to and from Auckland airport and the airport precinct.

All of the interventions considered were evaluated through a high-level assessment process. This process 'sieved' out the interventions against three primary measures as follows:

- Feasibility – technical, implementation and construction considerations
- Risk, constraints and impacts – degree of social, environmental and economic impacts
- Effectiveness – achievement of ILM benefits and objectives.

As a result of this sieving process, all except one non-infrastructure intervention was retained for further considerations with the infrastructure interventions forming the basis of the 20Connect long list options. The non-infrastructure interventions provided some of the basis for the TDM initiatives proposed in this Technical Note.

4.2 In isolation, the non-infrastructure interventions were determined to be ineffective in catering for future demand through the lack of infrastructure-based provisions and would be more effective when complementing infrastructure to encourage behaviour change and improve transport choices. Short-Term Single Stage Business Cases

The Short-Term Airport Access Improvements (STAAI) SSBC led by AT and the Transport Agency led SH20B Short-Term SSBC were developed in parallel to provide short term improvements for access to the Airport and surrounding area. These business cases were developed to focus on “short term” interventions, while their “longer-term” counterparts are discussed in Section 4.3.

There is an urgency to develop short-term improvements to access the Airport, as:

- Available capacity on routes servicing the airport area are forecast to be exhausted within five years¹,
- Lack of alternative dedicated public transport corridor on SH20B in comparison to the future provision of the Light Rail (LRT) along SH20A².

Additionally, there is an underlying need to cope with the transport demands associated with two large international events in 2021: the APEC 2021 Leaders' Week and the 36th America's Cup. Both are expected to attract substantial patronage and economic benefits through the corridor and wider Auckland area, adding to the forecast strain on the network³⁴.

The following sections provide a brief summary of the preferred options as part of the respective short-term business cases. For more information, refer to each of the business cases listed.

¹ Short Term Airport Access Improvements – Single Stage Business Case Report. Issued 29 July 2019.

² Short Term Airport Access Improvements – Single Stage Business Case Report. Issued 29 July 2019.

³ Short Term Airport Access Improvements – Single Stage Business Case Report. Issued 29 July 2019.

⁴ 20Connect – SH20B Short Term Single Stage Business Case. Issued 19 September 2018.

4.2.1 Short Term Airport Access Improvements (STAAI)

The STAAI SSBC recommended early construction of a bus/rail interchange at Puhinui, along with revised public transport services and walking and cycling measures. The preferred options include the following:

- New Rapid Transit Bridge Puhinui Station Interchange:
 - Early deliverable of an enclosed station concourse above the railway line with an at-grade bus interchange accessible by lifts and escalators and ‘short-term meet and greet’ bays and ‘kiss-and-ride’ drop off.
- Recommended short-term bus network:
 - New pre-Rapid Transit shuttle route between Manukau, Puhinui and the Airport, supported by a reduced Route 380 route and improved crosstown bus links serving the town centres of the southwest
 - Two local Frequent Service buses to serve Airport from Botany-Otara-Papatoetoe and Sylvia Park-Otahuhu, and retainment of a third Frequent Service between Onehunga, Mangere Bridge and the Airport.
 - New express service between New Lynn-New Windsor and the Airport.
- Short-term cycle improvements.

4.2.2 20B Short Term Single Stage Business Case

The SH20B SSBC was developed in parallel with the STAAI SSBC to provide infrastructure for an enhanced interchange at Puhinui on the North Island Main Trunk and upgraded bus services to the Airport and surrounding area. There is an urgency to develop short-term improvements to access the Airport (particularly for an alternative public transport route via SH20B), as available capacity on routes serving the airport area are forecast to be exhausted within five years⁵.

The SH20B SSBC recommended option included the following treatments:

- Bus shoulder running lanes between the eastern end of Pukaki Creek Bridge and Manukau Memorial Garden intersection on the existing SH20B alignment
- New signalised intersection midblock between Campana Road and existing Prices Road
- Signalisation of Manukau Memorial Gardens intersection
- Shared use path (SUP) for cyclists and pedestrians.

4.3 Longer Term Business Cases

The following sections provide a summary of the scope of the longer term 20Connect and A2B business cases. For more information on these, please refer to their respective business cases.

4.3.1 20 Connect

The 20Connect SSBC is focused on the longer term SH20, SH20A and SH20B improvements. 20Connect investigates the performance of the state highway corridors accessing the Airport, covering all modes, and to understand the Transport network’s operation and management.

The preferred option for the 20Connect project includes the following treatments, highlighted in Figure 1:

⁵ 20Connect – SH20B Short Term Single Stage Business Case. Issued 19 September 2018.

- SH20A/SH20 interchange ramp connection
- Widening of SH20B to 4 lanes – online at-grade
- Extend 4 lane widening of SH20B over Pukaki Creek
- SH20B/SH20 interchange ramp connections – south facing
- Rapid transit corridor along SH20B (A2B project)
- Widening of SH20 North of SH20A to 4 lanes in each direction
- Widening of SH20 between SH20A and SH20B to 3 lanes in each direction.



Figure 1 Preferred Option of 20Connect

4.3.2 Airport to Botany (A2B)

The A2B project is focussed on the provision of a dedicated RTN public transport route between the Airport and Botany. The proposed network aims to address key issues in Auckland's Southern and Eastern areas, including:

- Providing a direct link between four of Auckland's current and future radial transit lines (see Figure 2)
- Addressing a significant access deficiency for a large, highly deprived population
- Addressing a forecast access deficiency to Auckland International Airport
- Aligning to a whole of Government investment agenda in the area.

The A2B preferred alignment for MRT has been selected and divided into three components:

- Airport to Puhinui Rapid Transit Network (RTN)
 - Via SH20B

- Puhinui through Manukau RTN
 - Via Manukau Centre along Ronwood Drive
- Manukau to Botany RTN
 - Via Te Irirangi Drive.

Figure 2 depicts Auckland's existing and planned RTN, including the proposed A2B study corridor (highlighted in blue).

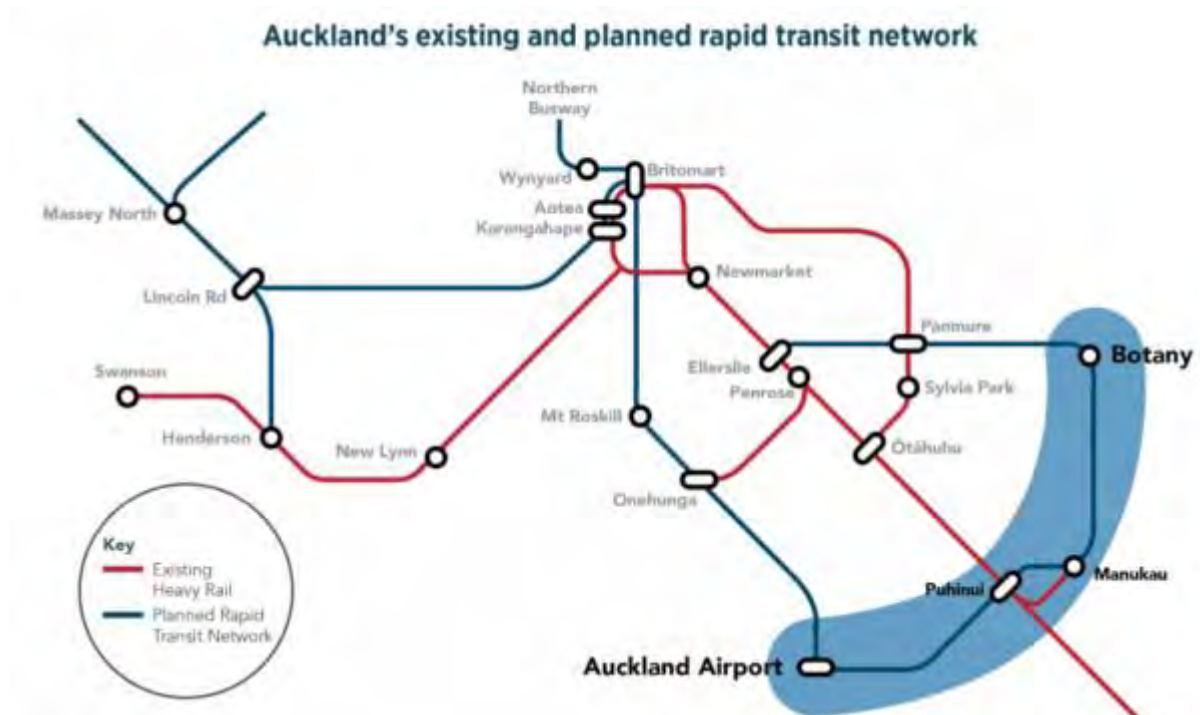


Figure 2 Preferred Option of A2B

5 City Centre to Mangere Light Rail

The Transport Agency and AT announced an agreement on the development of the City Centre to Mangere (CC2M) light rail transit (LRT). CC2M will provide a direct mass rapid transit option between the City Centre and the Airport.

The CC2M objective is to support sustainable growth in Auckland through the creation of a better integrated public transport system. CC2M will connect communities along its route, and improve access to jobs, education and recreation. Additionally, improved connections with Auckland Airport will also benefit from the CC2M LRT. The final LRT alignment has yet to be finalised and Figure 1 shows the indicative alignment.

6 Ministry of Transport – Government Policy Statement 2018/19 – 2027/28

The Government Policy Statement (GPS)⁶ outlines the government's priorities for the National Land Transport Fund (NLTF) and prioritises investment accordingly. The GPS sets the context and guides the investment in transport through a longer term strategic view, including the SWG SSBCs.

⁶ Government Policy Statement on Land Transport 2018/19 – 2027/28. Issued 1 July 2018.

The Transport Agency (and / or AT) should support investment activities that have an overall focus on the four key GPS priorities of safety, access, environment and value for money. Table 1 outlines the benefits of potential TDM measures align with the GPS priorities.

Table 1 Travel Demand Management alignment with the Government Policy Statement

Safety	Access	Environment	Value for Money
Infrastructure improvements to improve safety for all users.	Improves connections and access to social and economic opportunities.	Contribute to providing transport choices that will reduce adverse effects on the climate, local environment and public health.	Provides infrastructure to reduce overall network travel times and congestions.
	Provides improved network resilience with improved transport choices and network upgrades.		Contribute to delivering a "one transport system approach" with a focus on using Auckland's existing network and influencing travel demand

7 Evidence Base

Significant growth is projected at Auckland Airport - increasing airport activity and the growth of the surrounding area is leading to an increasingly poor journey experience with a range of customer-specific transport challenges⁷. As such, target groups (i.e. those most affected by the increasing pressure on transport at / in the vicinity of the Airport) were identified that will most likely benefit from TDM measures:

- Workers that require travel to Auckland Airport on a regular basis (including nine-to-five employees as well as shift employees)
- Leisure travellers
- Freight / trucks and passenger transport drivers.

Business travellers were disregarded as this customer group was assumed to be least responsive to choose alternative modes of transport other than private cars and taxis due to their time constraints⁸. Previous studies and data collection provided the evidence base for customers travelling to and from Auckland Airport, and are described in Sections 7.1 to 7.3 that follow. The evidence base consists of a Kantar customer insight survey, Qrious travel origin and destination (OD) data, and customer journey maps.

7.1 Kantar Auckland Airport Access Data

Kantar is a full-service market research consultancy providing in-depth insights for strategies. A report was commissioned in May 2018 by AT on the customer insights of traffic pressures and behaviours in the Auckland Airport and surrounding areas.

The researched concluded the most common mode of travel to the Airport and surrounding areas was by car due to the ease of travel, travel times and parking availability for workers and pick up or drop off for travellers. The mode share of cars dominates with 87% of employees travelling to / from work by

⁷ Auckland Airport Access Supplementary Programme Business Case Rev_3.0. Issued 26 September 2017.

⁸ Auckland Airport Access Supplementary Programme Business Case Rev_3.0. Issued 26 September 2017.

car of which 91% live in South Auckland. Only 4% travelling to / from work use public transport and another 4% are travelling by free buses / shuttles provided by their company⁹. Figure 3 below shows the proportion of mode share for employees working at the airport.

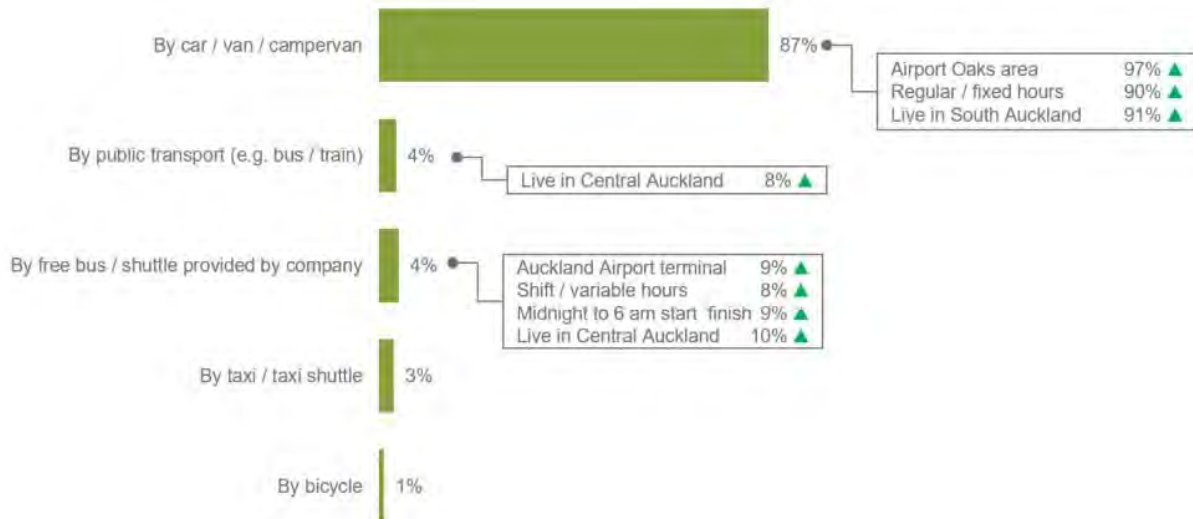


Figure 3 Transport Mode Share of Employees

Common reasons behind preferring cars as the main mode is due to time of day / night when work begins / ends, coupled with the availability of free parking. Buses not being available, or “not knowing about the services” was also a predominant reason for choosing a private vehicle for travel. Among workers, other barriers to using public transport included unreliable journey times and unavailability of the service. Cost savings and being more relaxed, in comparison to driving in traffic, are common reasons some workers choose to travel by public transport. Figure 4 below highlights the reasoning behind customer travel choices.

The statistics are similar for Auckland residents and domestic visitors when travelling to and from the Auckland Airport with approximately only 9% and 10% of travellers using public transport respectively¹⁰.

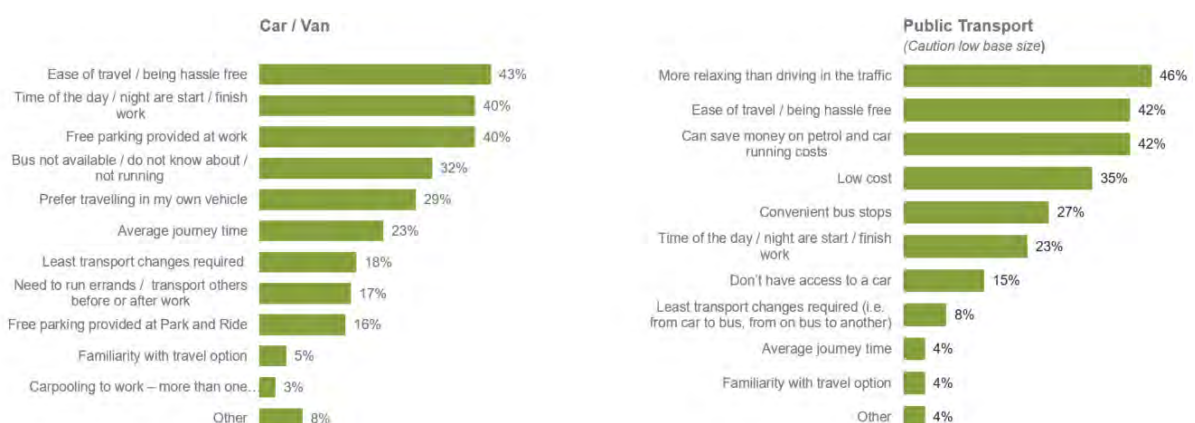


Figure 4 Reasons for Transport Mode Choice

The common theme derived from the Kantar study is that private vehicles dominate as the main mode of transport to and from the Auckland airport. Although Auckland residents and domestic visitors are

⁹ Kantar TNS Auckland Transport Auckland Airport Access Project Research Report Presentation, Slide 45. May 2018,

¹⁰ Kantar TNS Auckland Transport Auckland Airport Access Project Research Report Presentation, Slide 41. May 2018,

not particularly dissatisfied with their overall journey to and from the airport, it is important to recognise the level of dissatisfaction experienced by employees of the airport and surrounding area. Around two in ten Auckland residents / domestic travellers are dissatisfied with their journey while dissatisfaction is high among employees at 65%.

The highest level of dissatisfaction is observed by employees travelling via “car / van / campervan”, with only 17% satisfied with their journey (see Figure 5). Common contributing factors to this frustration are congestion and constant traffic delays / jams.

In contrast, two out of three employees travelling by public transport are satisfied with their journey. Common factors contributing to the dissatisfaction of public transport includes: the service being unavailable, erratic bus schedules and buses not keeping to the timetable.

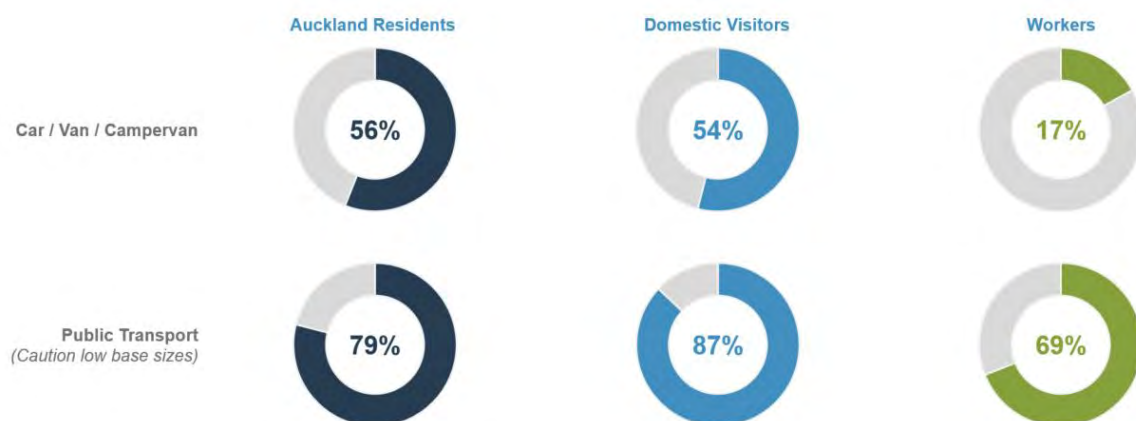


Figure 5 Total Satisfaction with travelling to and from Auckland Airport by mode of travel

The evidence presented in this section identifies significant room for improvement on how employees travel to and from Auckland Airport. There are opportunities to build upon TDM initiatives to help moderate the mode share currently seen by employee journeys, including:

- Public transport services to operate in line with working hours of employees (i.e. shift workers). The number of shift workers will continually increase at / in the airport precinct and will favour this market
- Enhanced frequency of bus routes for all other employees and customers for improved reliability and better estimated time of departure / arrival
- Incentivisation of ride-sharing or carpooling to reduce the number of single-occupancy vehicles on the network. This will assist in alleviating congestion, which is the leading cause of frustration/ dissatisfaction for airport employees travelling to work.

The above initiatives are expected to increase overall satisfaction for both private vehicle and public transport users, by focussing on high occupancy methods of travel (that effectively reduce congestion). While this data is airport focussed, the initiatives are forecast to improve journey experiences for all travellers on the network (not just airport travellers). These initiatives are explored in more detail in Section 8.2.

7.2 Qrious Data

Qrious data is used to gain an understanding of the origins and destinations of visitors to and from the Auckland Airport. Qrious Cell-Phone Movement Data (location-based services data) provides a record of movements for Spark mobile customers¹¹.

¹¹ Spark holds approximately 30% of the current mobile market share, which is assumed to provide a representative sample of customers.

Qrious data collected from the period of December 2017 was used to support the identification of three customer groups based on their travel characteristics: full-time employees, part-time employees and remaining visitors.

A full-time worker was deemed as someone who was observed to travel at least 18 days out of a month, and a part-time worker was someone who would travel between 9 to 18 days out of a month.

Figure 6 to Figure 8 shows the origins, destinations and number of visitors for each of the identified customer groups travelling to and from the Auckland Airport area during the month of December 2017. The area zones are colour coded based on the number of people visiting the Airport, with blue being the lowest and red the highest.

As this is location-based data from mobile phones, there are few minor anomalies in the data processed. For example, the Kingseat and Awhitu areas may include people on aircraft who did not turn off their mobile phone coverage therefore these areas, as shown, are not representative.

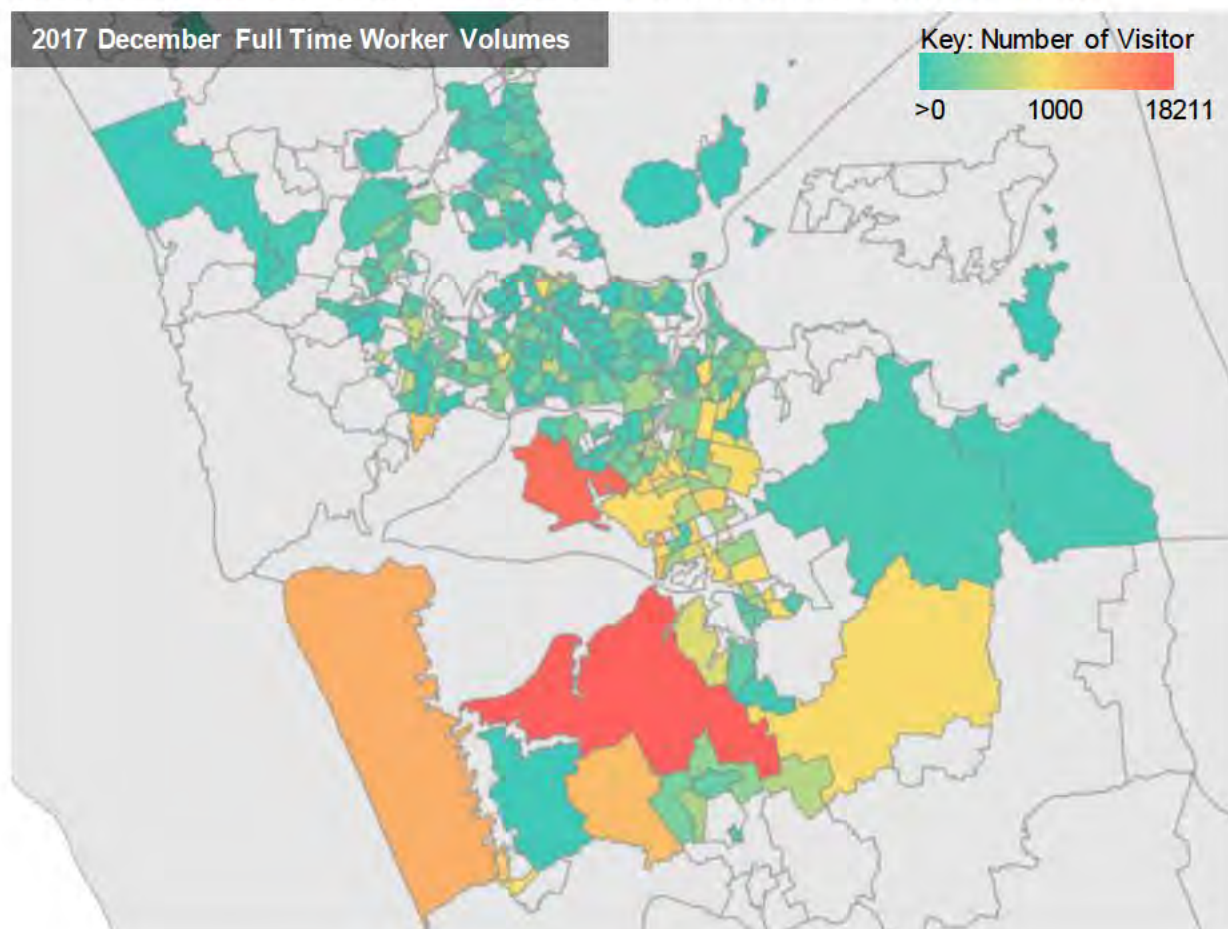


Figure 6 Origin – Final Destination Map for Full Time Employees at Auckland Airport

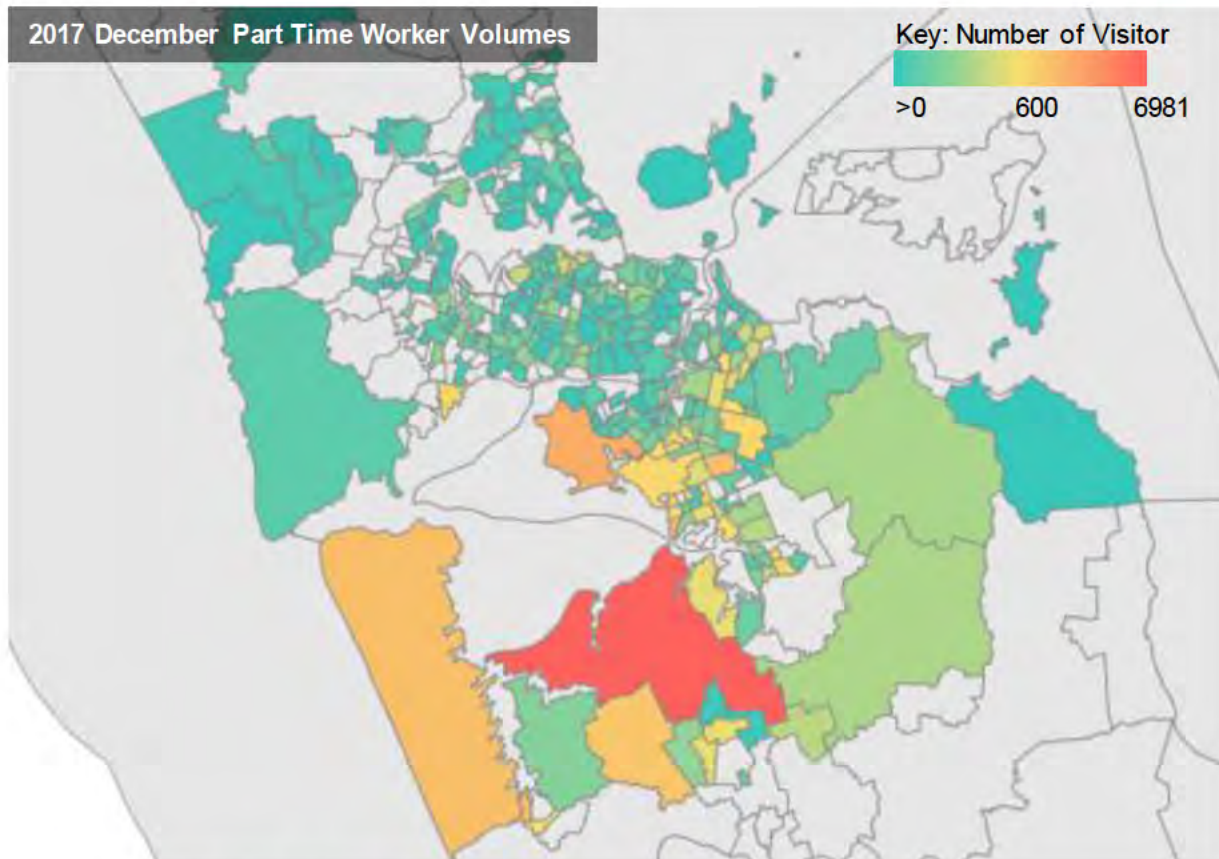


Figure 7 Origin – Final Destination Map for Part Time Employees at Auckland Airport

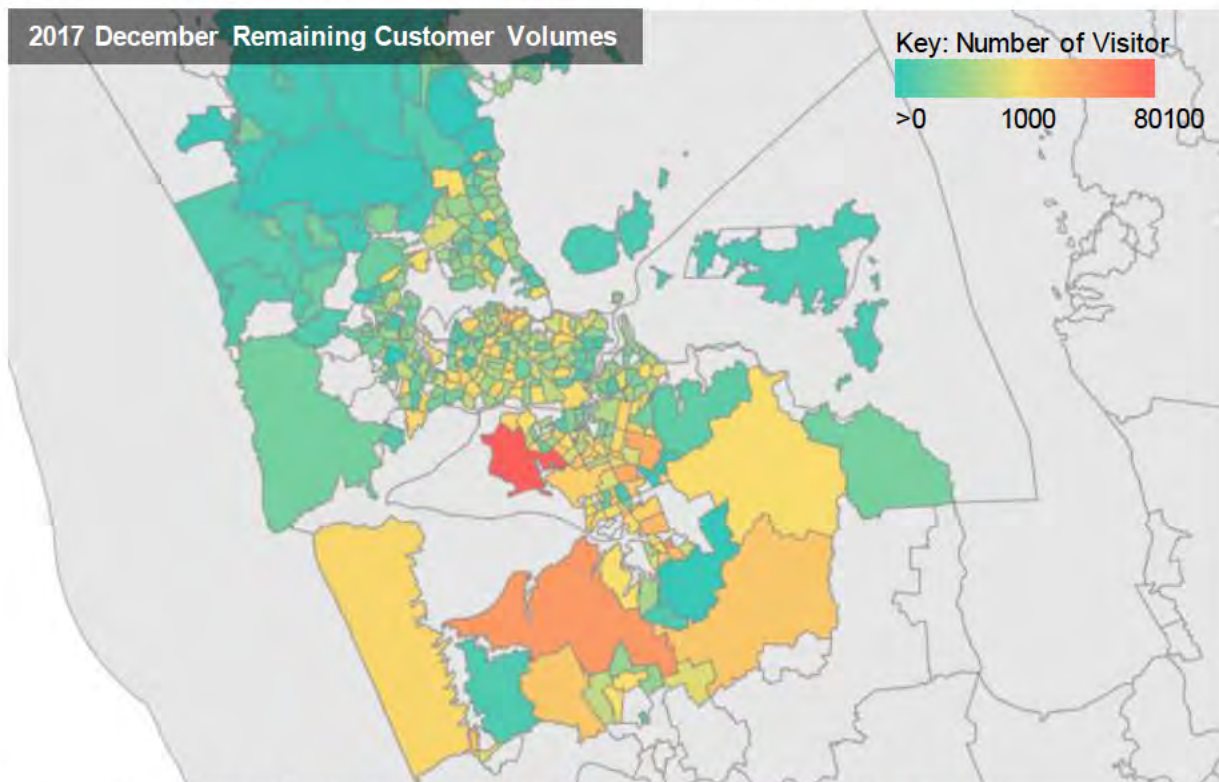


Figure 8 Origin – Final Destination Map for Remaining Customers to Auckland Airport

Data analysis confirmed that many full time and part time employees travel from the south and south-east zones of Auckland to the airport. In particular, the Mangere South, Clendon North, Papatoetoe,

Takanini, Manurewa, Ormiston and other neighbouring zones account for approximately 36% of all full-time employees and 30% of all part time employees, see Appendix A. While these are the most prominent zones, many other south, south-eastern and western suburbs contribute to employment at Auckland Airport. The number of employees travelling from these zones are expected to grow and will result in significant pressures on the existing transport network¹². These areas will likely be served in the future by a reliable MRT system, as part of the preferred options for the SWGP. However, with workers being the major customer groups who make the most frequent trips to and from the airport from the aforementioned zones, there are opportunities to build upon the SWG project recommendations to provide additional quick-win TDM initiatives.

Figure 8 shows the remaining journeys made outside of employment trips, which includes 23.79% of trips generated from the rest of New Zealand and internationally, outlined in Appendix A. Within Auckland, Mangere South had the highest number of travellers making trips to and from the Airport at approximately 2.26%. This is closely followed by other southern, western and some central suburbs.

Therefore, it is evident that the largest beneficiary of TDM measures will primarily be employees to the airport in the south and south-eastern zones of Auckland. This area will be served by a new MRT as part of the A2B project, however there are opportunities to provide additional or link further TDM initiatives together. While this data is airport focussed, these initiatives are also expected to provide significant improvements to the communities of south and east Auckland that utilise these corridors for non-airport related travel (for example travel from Botany to Manukau, or Manukau to Puhinui etc.).

7.3 Customer Journey Mapping

Customer insight surveys, as mentioned in Section 7, have played an important role in the overall development of the business case. These insights provided the overarching guidance to the development of the options in the various SWG business cases, as well as helping identify potential additional TDM initiatives that will assist in creating additional benefits to the preferred options identified in the SWG projects.

At the Short List to Preferred Option Workshop (The Workshop) held on the 13th December 2018, several perceived customer personas were constructed to understand the preferred options alignments from the perspective of the end user. The personas were identified as follow:

1. Sam is a tourist visiting NZ for the Rugby World Cup. Sam has enough money for the flight but not much left to travel to the city.
2. Roimata lives in Botany and is a shift worker at the airport. This includes night and weekend work.
3. Kim lives in Manurewa and works Tuesday to Saturday between 2pm – 10pm in the airport area where being late isn't an option
4. The Young Family are going on holiday to the Gold Coast, their flight leaves at 8pm on a Friday. The family of 5 (children aged 9months – 5 years) live in Botany and have lots of luggage.

Figure 9 below highlights the journeys across Auckland taken by the four different personas identified in The Workshop. The journeys identified are shown above the preferred options of the Southwest Gateway Projects and how they interact and effects the trips to and from the airport.

¹² Auckland Airport Access Supplementary Programme Business Case Rev_3.0. Issued 26 September 2017.

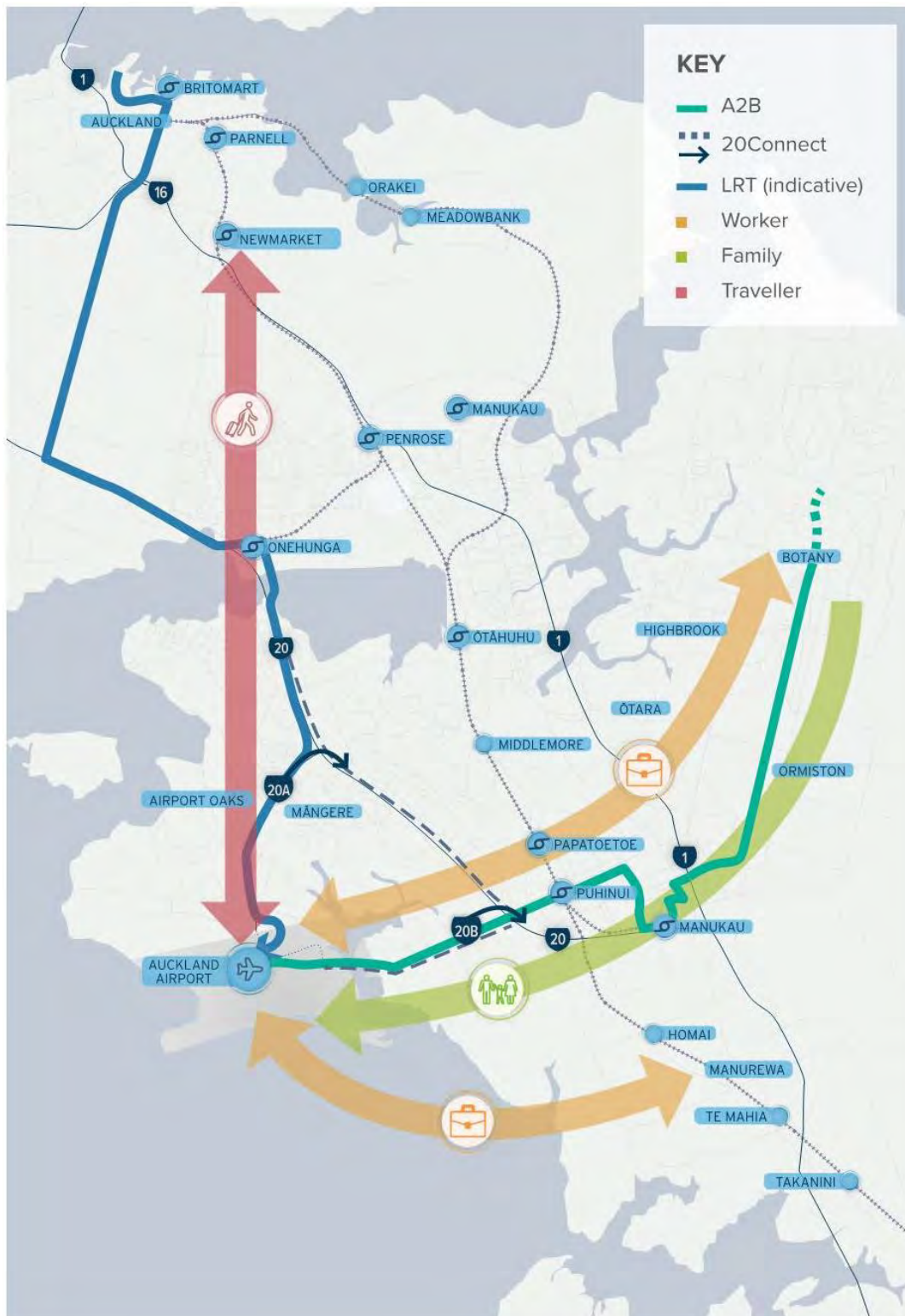


Figure 9 Personas and their needs to travel to the airport

Using the customer personas, an understanding of how the preferred option affects different users was gained. Key takeaways from The Workshop are summarised below:

- Rapid Transit Corridor (RTC) needs to be efficient and reliable with frequent services that support the travel patterns of users, including shift workers
- Services would need to be affordable and safe

- Provide facilities that are easy to use and accessible at both ends of the journey
- Provide excellent wayfinding to simplify and ensure destination signage is clear for visitors unfamiliar with Auckland.

Based on the key takeaways from the customer personas created for the preferred options, additional TDM initiatives can be developed to improve the overall journey experience for the customer. However, the initiatives will benefit a broader range of customer persona not including those mentioned in this section, however these have not been captured as part of the Airport study.

8 TDM Developments

TDM initiatives have the potential to provide transport benefits for a wide range people. However, provision of TDM measures will not solve transport issues overnight, and will require significant behavioural change to realise success. The SSBCs have taken this behavioural change into consideration and developed measures and interventions that are staged to encourage the required changes over time.

8.1 Target Customer Groups

As mentioned in Section 7.3, the customer target groups for which these initiatives will be aimed at will consist primarily of Auckland Airport area employees and leisure travellers. Business travellers were omitted as they were time sensitive and potentially need to work during their journey to airport, therefore less likely to take up TDM measures.

The customer personas considered at The Workshop identified the need to consider the start and end of the customer journeys, as the preferred option looks primarily at the longer strategic journey. In general, all customers travelling from the south and south east of Auckland will benefit from improved strategic public transport and integrated transport measures. The TDM initiatives to be considered can be tailored to influence the way customers travel to and from larger TDM developments.

8.2 Proposed Initiatives

A long list of potential TDM initiatives have been proposed to align with the needs for the target customer group: employees and leisure travellers to Auckland Airport. Proposed initiatives have been differentiated dependent on being a part of the Southwest Gateway projects, or as a new additional initiative.

The end goal of all proposed TDM initiatives is to provide feasible potential alternatives for private vehicle users to reduce the congestion on the transport network. Initiatives proposed should also investigate the potential for means to get people from their start and end of journeys on public transport:

- Ridesharing incentives such as dynamic capacity lanes, carpooling or transit lanes
- Incentives for employees to encourage alternative modes of transport other than private vehicles, such as public transport, cycling, e-bikes
- Identification of new bus routes / shuttle services specific for areas with a high number of employees travelling to the airport
- Improved first km-last km experience
- Improved legibility, wayfinding, certainty of travel times and ease of connections to / from Auckland Airport
- Improved safety and comfort of interchanges
- High Occupancy Vehicle (HOV) priority lanes and bus priority measures

- Cycle and shared path infrastructure
- Meet and greet / farewell locations shifted from Auckland Airport to train stations and interchanges
- Pre-departure info
- Variable Message Signs (VMS) at key decision-making points
- Road pricing or congestion charging
- Land use changes through up-zoning
- Prince strategies on parking and public transport fares.

The proposed TDM initiatives have been aligned and developed to seamlessly integrate with the Network Operating Plan (NOP) and Concept of Operations (ConOP) developed for the Southwest Gateway. Table 2 and Table 3 below provide an overview of the proposed TDM initiatives and a brief description on the effectiveness and implementation strategy to take into consideration.

8.2.1 Southwest Gateway TDM initiatives

This section outlines TDM initiatives proposed as part of the preferred options for the Southwest Gateway suit of projects. The short-term SSBC's TDM measures prepare and initiate travel behavioural change in the study area in preparation for the long-term RTN and SSBC TDM measures.

Table 2 highlights the different TDM measures proposed in the short-term SSBCs and the separate measures under the long-term 20Connect and A2B projects.

Table 2 Table of TDM initiatives within Southwest Gateway projects

TDM Initiative	Evidence and effectiveness	Implementation strategy
Provide and improve walking and cycling options	Providing high quality facilities and better connections between points of interest to increase demand on the walking and cycling network that helps encourage new users in the area. This has the potential to reduce the demand and reliance on general vehicles for shorter distance trips on the network and provide greater people throughput. Qrious location data gathered as part of the 2017 Airport Access PBC. Providing an improved walking and cycling network will provide potential for airport employees to take up alternative forms of transport. Short-term SSBCs: Both short-term SSBCs will provide walking and cycling facilities in the area. These include new local road connections and a SUP along SH20B. 20Connect: Provision and development strategic cycle network along SH20 to connect into existing facilities. A2B:	■ Opportunities to combine infrastructure provision with incentivised scheme with employers /workers. ■ Integration with Puhinui Station redevelopment and cycle network improvements from Mangere. ■ Fully separated cycling and walking facilities that are safe will attract employees within the airport precinct and closer residential zones where people are travelling to and from the airport. ■ Provision of bike-sharing opportunities in area to promote active transport. ■ Incentives for people to use walking and cycling network such as secure bicycle storage, changing and shower facilities in workplaces.

TDM Initiative	Evidence and effectiveness	Implementation strategy
Bus reliability and more frequent services	Improved facilities along A2B corridor and surrounding local roads to provide an improved walking and cycling network. More frequent bus services and a dedicated strategic corridor for public transport. This will remove the perception of public transport being a low-frequency service and will give better time flexibility for customer travel needs. Short-term SSBCs: Provision of bus / HOV lanes along SH20B and Puhinui Road to support the redevelopment of the Puhinui Station. Changes and more frequent bus services to and from the Airport for the south and south east of Auckland. 20Connect: Provision of rapid transit corridor along SH20B for the A2B project. Will provide more efficient and reliable public transport options servicing Auckland Airport. A2B: Rapid transit corridor for buses between Auckland Airport and Botany will provide choice of an efficient and reliable transport choice over the use of general vehicles.	■ Integrated airport bus terminal and precinct improvements that makes an easy and reliable connection using public transport. ■ Improvements to customer experience through more frequent services during peak hours, competing against private cars / taxis, reducing wait times. ■ General improvements to how bus service information reaches customers (e.g. through mobile apps). Legibility and wayfinding should be simplified.
Increase number of High-Occupancy Vehicle (HOV) lanes.	Increase occupancy through high occupancy vehicle (HOVs) provision to take advantage of priority along corridors and bypass queues. Increased HOV lanes will result in an increase the throughput of both people and goods (i.e. freight) in a more efficient manner. Short-term SSBCs: Provision of bus / HOV lanes along SH20B shoulders. 20Connect: Potential provision of new HOV lanes at select SH20 on-ramps as part of 20Connect.	■ Further investigations to be carried out on SH20 ramp HOV lanes before being confirmed.
'Meet and Greet' terminal and 'Kiss-and-Ride' facilities	Facilities to offer a 'Meet and Greet' for dropping off or picking up travellers / commuters at public transport interchanges away from Auckland Airport. These facilities can also serve a purpose as a public transport 'Kiss-and-Ride' stop for daily commuters. Dropping off / picking up is a common occurrence across all of Auckland. 3 in 4 Aucklanders are dropping off / picking up or being dropped off / picked up at least once	■ Provide safe and accessible infrastructure at locations of high interest e.g. add-on to an existing interchange or town centre, easily accessible by cars e.g. drop off / pick up zones. ■ Single direct bus routes to improve travel time reliability.

TDM Initiative	Evidence and effectiveness	Implementation strategy
	every year directly at Auckland Airport. Kanter's Auckland Airport Access data suggest approximately 32% of Aucklanders show interest in a 'Meet and Greet' terminal. Short-term SSBCs: Proposed Puhinui Interchange will incorporate a 'Meet and Greet' and a 'Kiss and Ride' drop off zone for users of the public transport services. A2B: Proposed Puhinui Interchange will incorporate a 'Meet and Greet' and a 'Kiss and Ride' drop off zone for users of the public transport services.	■ Buses to have large storages spaces / accessible by people with lots of luggage. ■ Live departure / arrival information of flights at the terminal. ■ Strong CPTED design with comfortable areas to sit / wait / eat.
Give priority to public transport as part of proposed option of A2B/20Connect	Prioritises public transport over general traffic to improve trip reliability along the route. Priority lanes (such as the Northern Busway on the North Shore) improves and attracts customers and will influence the demand of private vehicle usage. Over time, this may influence private vehicles to switch to public transport when realising benefits of an improved, priority controlled public transport network that provides reliable and efficient travel times. Both 20Connect and A2B promote providing a strategic public transport route with the provision of a dedicated busway corridor along SH20B and arterial roads between the Airport and Botany. Increased public transport usage will increase the throughput of people and productivity of the road asset. Short-term SSBCs: Proposed initiatives provide increased priority for public transport and initiates behavioural change for future public transport infrastructure proposed as part of the A2B and 20Connect.	■ Futureproof the proposed option of A2B/20Connect by providing priority infrastructure for public transport. ■ Optimise traffic operations to provide priority for public transport. ■ Provide high quality public transport facilities to improve customer journey experiences.

8.2.2 Proposed additional TDM initiatives

This section provides a brief overview of potential additional TDM initiatives that can be implemented promptly as quick-win solutions. Immediate TDM measures will help in the period between now and completion of the projects and are mainly focused on changes in behaviour through incentivisation or minor improvements on the existing transport network. These measures are outlined in Table 3.

Table 3 Table of proposed TDM initiatives

TDM Initiative	Evidence and effectiveness	Implementation strategy
Bus reliability and more frequent services	More frequent bus services coupled with improved reliability of public transport will encourage and show public transport as a viable transport option. Provision of an integrated network and interchanges with the wider transport network can make using public transport easier and more efficient.	■ Integrated airport bus terminal and precinct improvements that makes an easy and reliable connection using public transport. ■ Improvements to customer experience through more frequent services during peak hours, competing against private cars / taxis, reducing wait times. ■ General improvements to how bus service information reaches customers (e.g. through mobile apps). Legibility and wayfinding should be simplified.
Increase number of High-Occupancy Vehicle (HOV) lanes.	Increase occupancy and high occupancy vehicles (HOVs) to take advantage of priority along arterial road corridors and / or SH20. Increased HOV lanes will result in an increase in throughput of both people and goods (i.e. freight) along the corridor. It will help promote ride while reducing single occupancy vehicles. Leeds case study on HOV lanes between 1997 to 2002 found the vehicle occupancy rate increased from 1.35 in 1997 to 1.51 in 2002	■ Provide infrastructure to change lane allocation on the corridor. ■ Combine and incentivise with potential carpooling opportunities at start and end of journey. ■ Implement a network strategy for additions of HOV on state highway networks.
Employee benefits of public transport services or ride-sharing incentives. Off-peak hour services	Lack of services during off-peak hours that do not suit employees, especially those working shifts. With increasing business growth of Auckland Airport, the number of (shift) employees are projected to increase however will be inclined to use private vehicles if there are a lack of alternative transport solutions outside of normal working hours. Qrious data and customer surveys can identify locations of highest travel demand during off-peak periods to introduce optimised public transport routes during these off-peak periods. The main motivation to use private vehicles is due to the lack of available transport options during off-peak hours. Boston Logan Airport developed initiatives for their employees to make the use of public transport attractive by providing discounts to certain bus services and free shuttle services serving employees, prior to the start of public transport services. Other airports help by assisting with a transit	■ Incentivisation for employers to use alternative modes of transport or help with trip planning such as rideshare matching / carpooling. Implementation through existing ride-sharing apps such as 'Liftango' and 'Faxi' that provide intuitive ride-sharing experiences. The apps verify and connect employees and employers too where incentivisation programmes can be easily loaded into the app. ■ Employer to operate off-peak shuttles will be a considerable employee benefit and may potentially help when recruiting for hard-to-fill shift positions. ■ Further demand investigation for off-peak public transport services to meet needs of shift workers or those travelling during off-peak periods.

TDM Initiative	Evidence and effectiveness	Implementation strategy
	subsidy if public transport is used as a mode or helps with trip planning or rideshare matching for all employees.	
Improved first km-last km experience for customers.	Often, the gap between the origin to the public transport service restricts and discourages usage. The New Network bus routes rolled out in Auckland help with providing more frequent and better-connected journeys. As major transport infrastructure investment is implemented in Auckland, such as the proposed A2B and 20Connect projects, it is important that the New Network is adapted to improve the catchment area and in turn provide a more efficient first and last km journey experience. Providing tailored shuttle services to serve strategic public transport corridors, similar to trial service on the North Shore between Devonport and the Ferry terminal. Possible locations for terminus include Botany Town Centre, Manukau Station and Puhinui Station. Localised travel can be served with the introduction of increased micro-mobility transport options. These could include shared electric scooters and bicycles that can be ridden for shorter journeys, primarily to public transport interchanges.	■ Investment and research into re-distribution of bus services to improve first km-last km experience with changing dynamics of Auckland. ■ Expansion of alternative short distance modes of transport into the southern areas. ■ Link to A2B preferred option and provide facilities and incentives to use public transport. ■ Localised shuttle services to serve major public transport interchanges such as Manukau Station, Otahuhu Station and Puhinui Station, etc. (e.g. Devonport ferry shuttle service trial). ■ Opportunity to conduct trial on different TDM measures to tailor journeys to public transport hubs. ■ Secure storage for possible private electric scooters and bicycles at public transport interchanges.
Increase number of bus and T2 / T3 lanes on existing transport network.	Reallocation of existing road space to provide greater emphasis on higher occupancy vehicles can influence the travel demand and options available. This initiative can influence the way road design and management of the available corridors that favour higher throughput modes. Increased capacity will be beneficial to the public transport journey with reduced points of conflict with general traffic. Transit lanes (T3) lanes installed on Onewa Road were found to greatly increase the carrying capacity of the road when compared with the general traffic lane. Increased usage by HOV and public transport resulted in the transit lane containing 68% of all commuters in 27% of all vehicles on Onewa Road. (Murray 2003)¹³ Potential to provide bus shoulder lanes along sections of the state highway	■ Provide infrastructure to provide greater priority for HOV and public transport vehicles along the network. ■ Locations of proposed HOV lanes as part of SH20 and SH20B options ■ Provide bus shoulder lanes on SH20, SH20A to improve bus reliability. Combine with Transport Agency work to be done on SH16 and SH1 northern motorway.

¹³ <https://www.nzta.govt.nz/assets/projects/ramp-signals/Priority-Lanes.pdf>

TDM Initiative	Evidence and effectiveness	Implementation strategy
	network on SH20 and SH20A to improve bus reliability. Opportunity to tie into the proposed bus shoulder running by the Transport Agency along SH16 and SH1 northern motorway.	
'Meet and Greet' terminal and 'Kiss-and-ride' facilities	Potential of a 'meet and greet' facility to provide an alternative option to dropping off or picking up travellers at public transport interchanges away from Auckland Airport. These facilities can also serve a purpose as a public transport 'Kiss-and-Ride' stop for daily commuters. 'Meet and Greet' services / terminals would be located in areas of high population density e.g. locations such as Sylvia Park, New Lynn and Botany where there is a comfortable environment for travellers and people to drop off or pick up travellers. Travellers would use a single direct bus service to get from the 'Meet and Greet' terminal and the airport. Current 'Kiss-and-Ride' facilities are present at Otahuhu Station and Akoranga Station. General vehicles are unable to remain for long periods of time and are solely for drop off and pick up only. Puhinui Station is also proposed to include a 'Kiss and Ride'.	■ Provide safe and accessible infrastructure at locations of high interest e.g. add-on to an existing interchange or town centre, easily accessible by cars e.g. drop off / pick up zones. ■ Single direct bus routes to improve travel time reliability. ■ Buses to have large storages spaces / accessible by people with lots of luggage. ■ Live departure / arrival information of flights at the terminal. ■ Strong CPTED design with comfortable areas to sit / wait / eat. ■ Futureproof stations and interchanges to consider providing 'Meet and Greet' services as standard. ■ Liaise with Botany Town Centre and Sylvia Park for potential 'Meet and Greet' locations within premises.
Pre-departure info	Customers can choose their choice of travel prior to their journey to determine the fastest route to the Airport or their desired destination. Allows key travel decisions on transport mode choice to be made earlier and therefore influence the demand on the transport network by freeing capacity on the road.	■ Installation of airport information across a number of key locations across the south. ■ Installation of electronic signs of journey times to the airport at key public transport interchanges and stations, particularly along A2B corridor.
VMS at key decision making points	Customers can be informed and make choices on travel and journey times on arterial roads from the south and south east to the Airport. Customers can determine their choice of travel during their journey and have the option to divert and use alternative forms of travel. Potential to reduce demand on certain corridors through corridor demand changes. Improve journey decisions and influence demand on particular modes of travel through provision of information to	■ Installation of VMS boards across SH20, SH20A and SH20B networks to provide information. ■ Possible combination together with pre-departure information or airport traffic information.

TDM Initiative	Evidence and effectiveness	Implementation strategy
	customers to help with decisions on their journey. Provisions currently provided on SH20, SH20A and SH20B. Potential to provide additional VMS on arterial roads such as Te Irirangi Drive, Ti Rakau Drive, Highbrook Drive, Redoubt Road, etc.	
Park and Ride facilities at key station locations	Park and ride is an integral part of the public transport network and plays a strategic role in providing access to the RTN stations. The purpose is to expand access opportunities for commuters beyond the existing services. AT has recently conducted a Park and Ride Programme Business Case (PBC) to identify and confirm priority locations for Park and Ride expansions. From this piece of work, AT decided to develop or expand Takanini, Papakura and further south in Drury, Drury West and Paerata Stations. Auckland Airport are also providing Park and Ride facilities for staff and travellers on the fringes of the Airport area.	- Propose re-investigation of park and ride sites along A2B corridor for potential catchment of south eastern area - Future proof potential expansions for Park and Ride facilities along the A2B route
Road pricing or congestion charging	Road pricing initiatives to charge vehicles using the road to reduce traffic congestion. Primarily used during the peaks to discourage single use occupancy vehicles using the network during the heaviest congested periods and where there are suitable alternatives for travel. Improve network performance and road capacity through discouragement of driving. Revenue from road pricing will be invested back into the greater transport network to encourage behavioural through improved alternative modes of transport, e.g. public transport.	- Implemented on a region wide basis or zonal basis. - Implement for SH20A and SH20B for specific periods of the day. - Toll booths / cameras at on-ramps and off-ramps.
Land use changes – up zoning	Land use changes through up zoning will alter the travel dynamics of the transport network. Increasing Future Urban Zone land and light industry land in the study area through a change process to the Auckland Unitary Plan. Effective benefits will arise with mass rapid transport projects and increased frequency capacities on public transport services.	- Up zoning near important transport nodes such as Puhinui Interchange. - Up zoning at Future Urban Zone land and light industry.
Pricing led initiatives for parking and public transport	Changes to pricing on parking within the Auckland Airport area and on public transport fares to encourage behavioural shift away from usage of vehicles.	Agreement with Auckland Airport on changes to parking pricing changes.

TDM Initiative	Evidence and effectiveness	Implementation strategy
	Potential to increase parking pricing with Auckland Airport and lowering fares on AT public transport to make it a more affordable form of transport option. The two initiatives should be combined together to capture the benefits and reduce the backlash expected from customers and stakeholders.	■ Educational programme to inform customers of low cost transport options to and from the airport. ■ Reduction of public transport fares to increase overall patronage.

9 Recommendations

The proposed TDM initiatives proposed as part of this Technical Note should be investigated further to evaluate the effectiveness and possibility of implementing them together with the Southwest Gateway suite of projects. A number of initiatives have already been considered, however additional measures should be included to provide the full range of associated benefits.

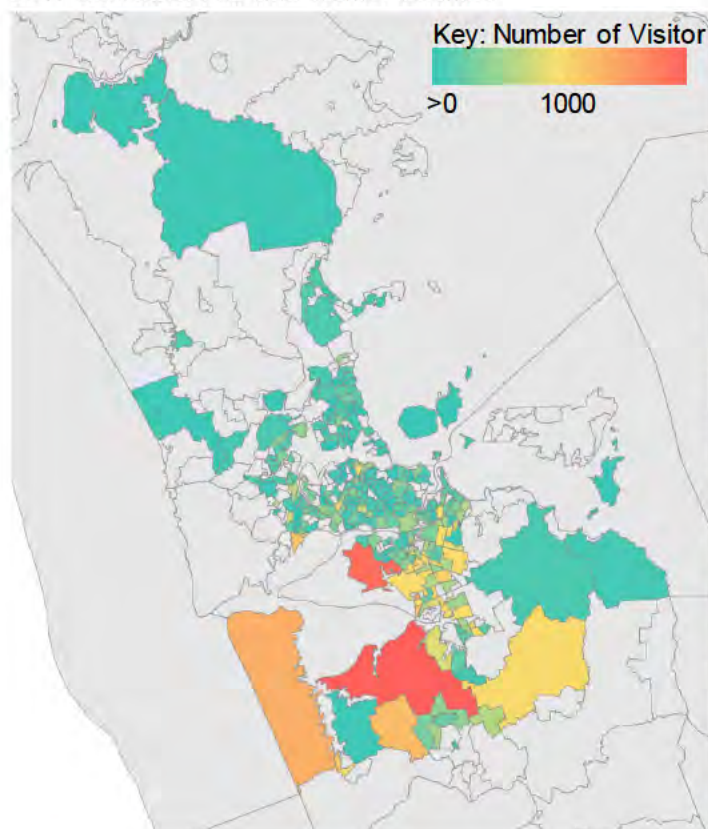
A number of initiatives can be packaged together with potential elements of the business case, for example, first and last mile travel to public transport hubs through the design of stations accesses.

Approvals:

	Name	Title	Date
Authored by:		Transport Engineer	08/05/2020
		Associate	
Reviewed by:		Senior Consultant	08/05/2020

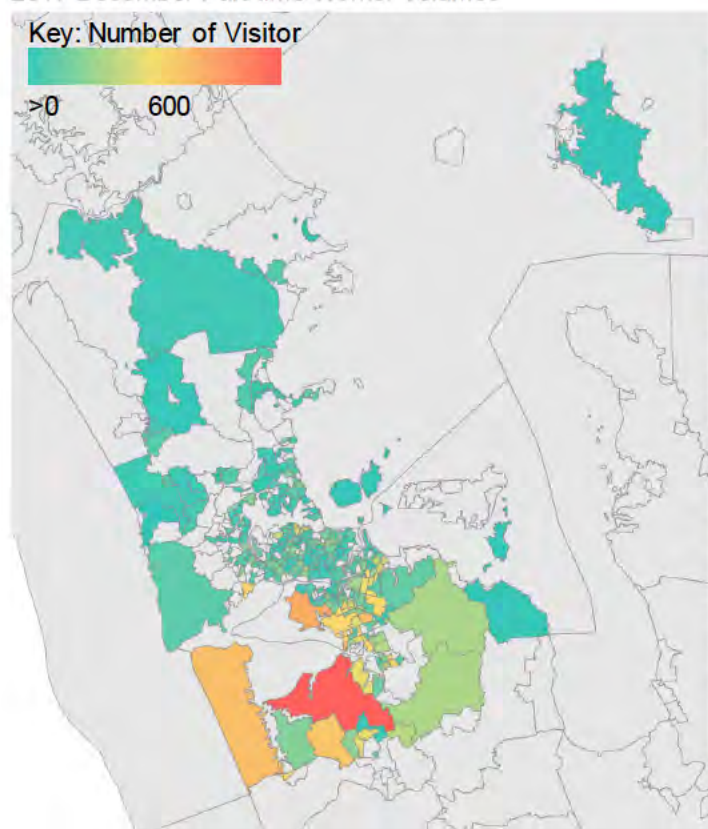
Appendix A

2017 December Full-time Worker Volumes



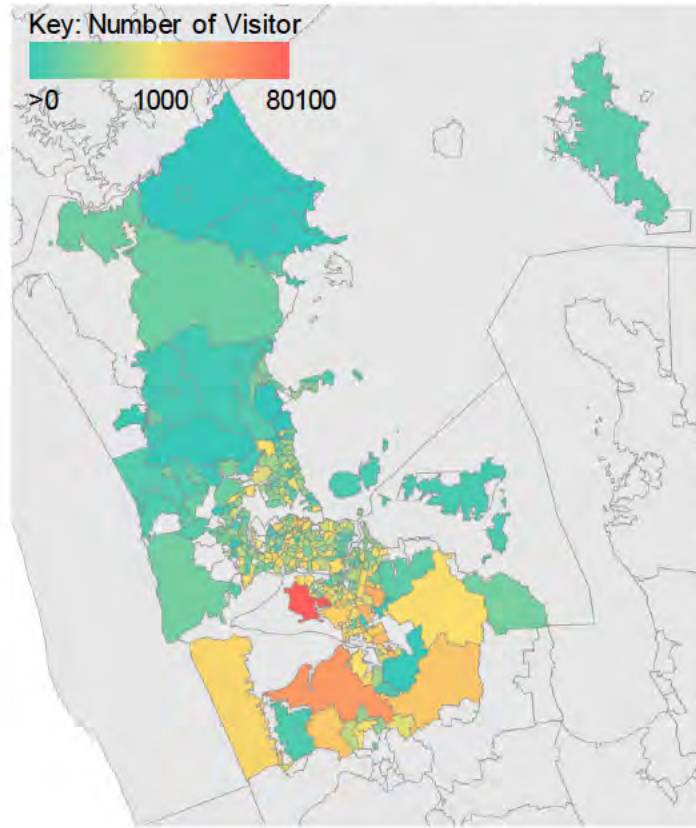
Area Unit Name	Number of Visitor	% Number of Visitor	Daily Average Number of Visitors
Kingseat	18211	10.90%	587
Mangere South	16238	9.72%	524
Awhitu	7552	4.52%	244
Clendon North	7286	4.36%	235
Patumahoe	5784	3.46%	187
Weymouth West	4802	2.75%	148
Titirangi South	4533	2.71%	146
Waiuku West	4050	2.42%	131
Redoubt South	2950	1.77%	95
Papatoetoe Central	2247	1.34%	72
Papatoetoe West	2113	1.26%	68
Clover Park	1754	1.05%	57
Takanini West	1663	1.00%	54
Manurewa Central	1659	0.99%	54
Ormiston	1558	0.93%	50
Puhinui North	1544	0.92%	50
Hunua	1495	0.89%	48
Greenmount	1380	0.83%	45
Manukau Central	1353	0.81%	44
Hyperion	1341	0.80%	43
Beaumont	1278	0.76%	41
Massey Park	1277	0.76%	41
Homai West	1267	0.76%	41
Clendon South	1229	0.74%	40
Auckland Central West	1200	0.72%	40
South Waiuku	1069	0.64%	34
Takanini South	1061	0.64%	34
Papakura South	1014	0.61%	33
Papatoetoe East	1010	0.60%	34
Elsmore Park	999	0.60%	32
Baverstock Oaks	949	0.57%	32
Dannemora	928	0.56%	30
Walmsley	919	0.55%	31
Whangapouri Creek	869	0.52%	28
Mission Heights	846	0.51%	28
Total	167082	100.00%	5390

2017 December Part-time Worker Volumes



Area Unit Name	Number of Visitor	% Number of Visitor	Daily Average Number of Visitors
Kingseat	6981	9.08%	225
Mangere South	3098	4.03%	100
Weymouth West	2565	3.34%	83
Waiuku West	2425	3.15%	78
Redoubt South	2218	2.89%	72
Awhitu	2188	2.85%	71
Patumahoe	1819	2.37%	59
Clendon North	1304	1.70%	42
Manurewa Central	1284	1.67%	41
Massey Park	1201	1.56%	40
Papatoetoe Central	1125	1.46%	38
Ormiston	1018	1.32%	35
Titirangi South	1012	1.32%	33
Papakura South	947	1.23%	32
Manukau Central	935	1.22%	32
Clendon South	750	0.98%	28
Baverstock Oaks	719	0.94%	23
Homai West	711	0.92%	25
Takanini West	678	0.88%	22
South Waiuku	639	0.83%	23
Golfland	636	0.83%	28
Puhinui North	616	0.80%	22
Papatoetoe West	584	0.76%	19
Leabank	568	0.74%	24
Pukekohe North	567	0.74%	20
Pukekohe West	558	0.73%	21
Greenmount	552	0.72%	20
Whangapouri Creek	550	0.72%	20
Kilkenny	543	0.71%	21
Beaumont	527	0.69%	22
Dannemora	526	0.68%	19
Wiri	519	0.68%	17
Papatoetoe East	511	0.66%	20
Auckland Harbourside	504	0.66%	17
Auckland Central West	495	0.64%	18
Total	76875	100.00%	2480

2017 December Remaining Customer Volumes



Area Unit Name	Number of Visitor	% Number of Visitor	Daily Average Number of Visitors
Mangere South	841821	23.79%	27149
Massey Park	80100	2.26%	2584
Kingseat	48619	1.37%	1568
Redoubt South	48191	1.38%	1555
Ormiston	36884	1.04%	1190
Auckland Central West	36045	1.02%	1163
Papakura South	34586	0.98%	1116
Takanini South	29473	0.83%	951
Auckland Harbourside	29367	0.83%	947
Waiuku West	28056	0.79%	905
Manurewa Central	27453	0.78%	886
Clover Park	24283	0.69%	783
Beaumont	24029	0.68%	775
Totara Heights	23507	0.66%	758
Papatoetoe West	23438	0.66%	756
Patumahoe	23347	0.65%	753
Aorere	23175	0.66%	748
Hunua	23159	0.65%	747
Hyperion	23076	0.65%	744
Baverstock Oaks	21626	0.61%	698
Auckland Central East	21362	0.60%	689
Weymouth West	21186	0.60%	683
Takanini North	20571	0.58%	664
Manukau Central	19161	0.54%	618
Harania East	18813	0.53%	607
Papatoetoe Central	17816	0.50%	575
Puhinui North	17589	0.50%	567
Greenmount	17339	0.49%	559
Hillsborough West	16568	0.47%	534
Epsom South	16325	0.46%	527
Westmere	15756	0.45%	508
Homai West	15678	0.44%	506
Lynfield North	15478	0.44%	499
Kilkenny	15337	0.43%	495
Kilkenny	14865	0.42%	480
Total	3537023	100.00%	114098

Appendix H-2

Local Road Assessment Technical Note

Technical Note

To	Waka Kotahi NZ Transport Agency	From	20Connect Project Team
Copy		Reference	501094
Date	08/05/2020	Pages (including this page)	30
Subject	Local Road Assessment Technical Note		

1 Introduction

The Transport Agency, alongside investment partners Auckland Transport (AT) and Auckland International Airport Limited (AIAL) are investigating improvements to customer journey experiences and access to and from Auckland International Airport (Auckland Airport) and the surrounding area. The Transport Agency are seeking to address the gaps between the expected and present performance of the State Highway (SH) network around the airport, consisting of SH20, SH20A and SH20B.

Access to the airport precinct and surrounding industrial development zones is mainly provided through the state highway network. There is a limited arterial and collector road network north of the airport precinct, which provide access to the nearby industrial developments (Airport Oaks). Access to the east is only provided through SH20B, without a supporting arterial and collector road network.

1.1 Study Area

The study area consists of the local road network surrounding SH20A and SH20B (Puhinui Road) development corridors. The existing road network and surrounding key land uses are shown in **Figure 1**.

1.2 Purpose of this technical note

This technical note reviews opportunities for local road improvements adjacent to the immediate 20Connect study area that could compliment the proposed improvements and facilitate traffic and public transport access.

A qualitative and quantitative assessment of local road improvement opportunities in order to:

- identify local road improvements necessary to mitigate effects of the recommended option
- identify opportunities to improve local roads within the wider transport network.

2 Strategic access interventions for the study area

Strategic access options to the airport and surrounding developments have been considered as part of the 20Connect and Airport to Botany Single Stage Business Case (SSBC) process. These options are aimed at providing more travel choices, improving transport system resilience, reliability and journey experiences to airport and surrounding developments' employees, customers and visitors. The improvements include both public transport and road network improvements.

The public transport improvements being considered as part of the 20Connect shortlist stage, includes a Rapid Transit Network (RTN) along SH20B, Airport to Botany (A2B), as well as Light Rail Transit (LRT) from the City Centre to Mangere and the Airport via the SH20 and SH20A corridors.

The road improvements being considered as part of the shortlist stage of the 20Connect SSBC include:

- Option 1 – SH20B to be upgraded to a four-lane freeway, with grade separation at Campana Road, south-facing ramps at SH20B / SH20 interchange and restricting local access along SH20B.
- Option 2 – SH20B to be upgraded to a four-lane urban expressway with at-grade (signalised) SH20B / Campana Road intersection, signalised intersection at Memorial Garden access, limited local access along SH20B, and a southbound ramp from SH20A joining SH20 southbound carriageway.
- Option 3 – SH20B to be upgraded to a four-lane expressway, but without widening of the Pukaki Creek crossing, at-grade SH20B / Campana Road intersection, signalised intersection at Memorial Garden access, limited local access along SH20B, and a southbound ramp from SH20A joining SH20 southbound carriageway.

The shortlist options, as described above, are expected to improve the regional accessibility and catchment areas of the Airport Precinct and surrounding industrial developments, increasing network resilience, providing additional travel choices and improving network reliability for all users. Option 2 has also been identified as the emerging preferred option, based on latest modelling results and other key performance indicators, as well as alignment with the A2B RTN, that are part of the multi-criteria analysis (MCA) process. Some elements of Option 1 have been incorporated in emerging preferred option (Option 2V) and tested further as part of the selection process.

The future reference case includes rapid transit between the Auckland CBD, Mangere town centre and the airport (CC2M), and between Botany and the airport (A2B). It also includes the transport investment proposed in Option 2V of the 20Connect shortlist options, including:

- 4-Laning along SH20B
- SH20 widening between Mangere Bridge and Lambie Drive
- SH20 / SH20B Puhinui south-facing ramps
- A new southbound SH20A to SH20 ramp, and
- Changes to road connections within the airport precinct, between SH20A, SH20B and the main car parks along the road.

Despite the many benefits of the strategic transport interventions, there are potentially additional benefits in improving local access within the study area. The local access improvements could enhance the quality of access for surrounding developments, improve local area traffic circulation and provide improved access to the strategic transport network. There are also opportunities for improvements that arise from the strategic highway network investment options, such as requirements for overbridge replacement across some sections of the highway network. The local access

improvements that were considered in this assessment are listed below and discussed further in the remainder of this technical note:

1. Ascot Road
2. New Montgomerie Road link across SH20A
3. Noel Burnside Road link
4. Walmsley Road / SH20 interchange improvements
5. Bader Drive bridge replacement
6. Portage Road bridge replacement

See **Figure 1** for location of local roads.

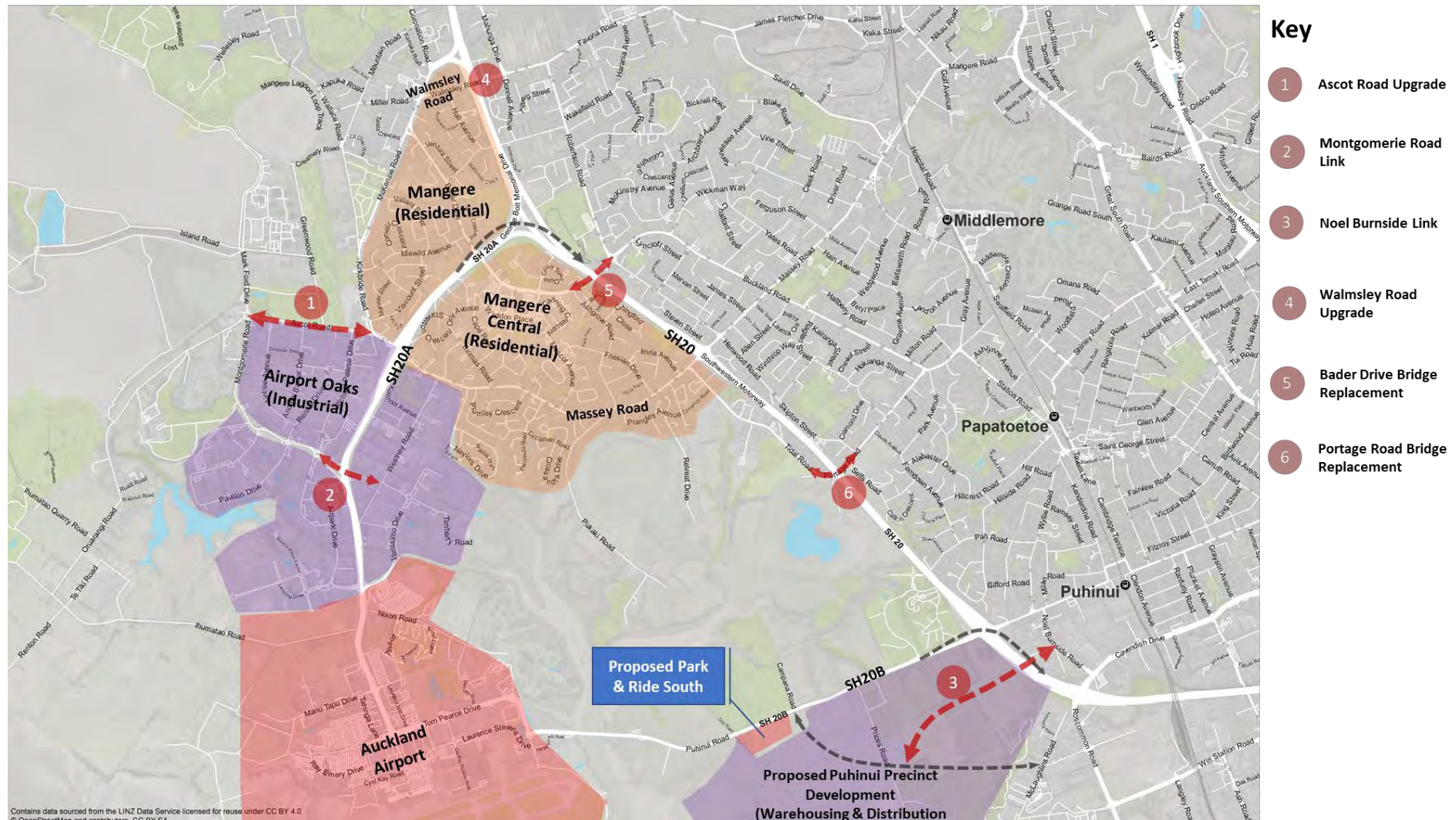


Figure 1 Location map

3 Ascot Road

Ascot Road forms part of the Airport Oaks local road network, west of SH20A as shown in **Figure 2**.



Figure 2 Access roads to Airport Oaks (Average Daily Traffic 2019)

3.1 Existing traffic environment

Ascot Road is a primary collector, providing an important link between SH20A and the Airport Oaks access road network in the north. Ascot Road starts at the intersection with Kirkbride Road and ends at Montgomery Road roundabout as shown in **Figure 2**. It is a two-lane road with a one lane per direction. Except for a short section near SH20A interchange, Ascot Road generally does not have a median between the opposing traffic streams. On-street parking facilities are provided on either side of the carriageway and the road has a posted speed limit of 70 kph.

Traffic demands on Ascot Road range between 10,000 and 21,000 vehicles per day (2019). Traffic volumes along Ascot Road have increased due to increased development intensity in the area and following recent upgrades along SH20A (Montgomery Road intersection closure and Kirkbride Road interchange grade separation).

3.2 Proposed interventions

As mentioned above, Ascot Road only has two lanes west of Richard Pearce Drive and does not have a dividing median between the opposing traffic streams. The short list assessment modelling has indicated possible capacity constraints along Ascot Road in the future, resulting in high degree of saturation and long vehicle delays at intersections. A need for capacity upgrades and provision of a flush median to improve safety has therefore been identified for Ascot Road.

Given the nature and function of Ascot Road, with turning vehicles and active mode users, the current posted speed limit of 70 kph along the road seems too high for the local context. Other roads with similar nature and function have posted speed limits down to 50kph. It is recommended that functional classification of the road, along with posted speed limits, be reviewed as per the provisions of the NZ

Transport Agency One Network Road Classification (ONRC), the Auckland Council Roads and Streets Framework (RASf) and the Speed Management Guideline documents.

3.3 Evaluation

The impact of the Ascot Road upgrades was tested in a SATURN traffic model, both independently and in combination with the proposed local intervention elsewhere in the network. For option modelling purposes the following improvements were tested all together in the model:

- Widening Ascot to a four-lane road (i.e. two lanes per direction).
- Converting the Ascot Road / Greenwood Road intersection to a signalised intersection.
- Adding a right turn lane to the northbound approach and the Ascot Road / Richard Pearce Drive intersection.
- Provision of a flush-median (modelled as additional 50m right turn lanes on Ascot Road eastbound approach to local intersections)

The impacts and benefits of Ascot Road upgrade test are summarised **Figure 3** and **Figure 4**. The blue bands represent where traffic reduces with the test and the green shows an increase in volumes. The traffic has reduced on Coronation Rd, McKenzie Rd, Kirkbride Rd and Richard Pearce Dr whereas traffic has increased on Mountain Rd, Creamery Rd, Greenwood Rd and Andrew Baxter Rd during the AM Peak. Significant reduction of traffic is observed during the PM peak.

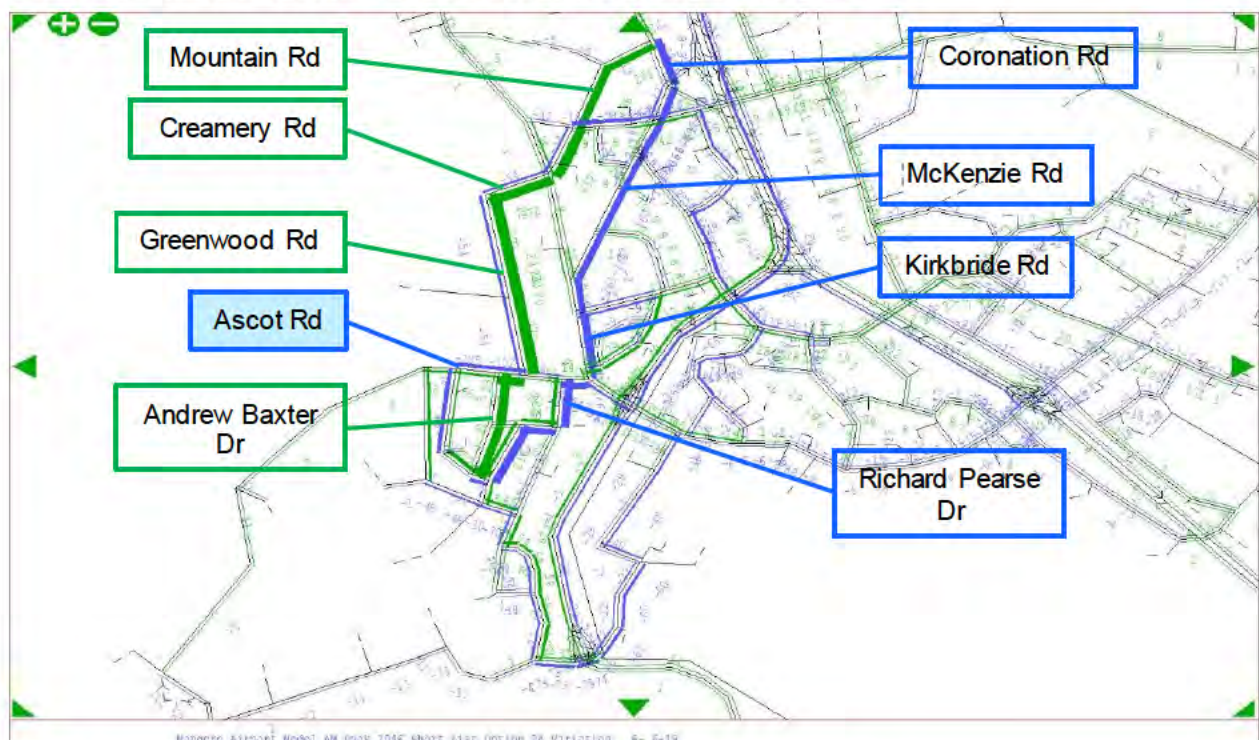


Figure 3: Ascot Road - AM Peak flow difference (test minus reference case)

Figure 4: Ascot Road - PM Peak flow difference (test minus reference case)

A map showing the proposed layout of Ascot Rd. The road is highlighted in green, following a path through a field with various boundaries. A green box with the text "Ascot Rd" is placed near the start of the road.

The analysis results shown above indicate that:

- The upgrades will improve V/C ratios from over 100% along Ascot Road in the future reference case to below 80% in the PM peak.
- Intersection delays are also expected to reduce significantly along Ascot Road.
- In the PM peak, the Ascot Road upgrades will result in some reduction in northbound traffic along SH20A. This is considered a benefit since opportunities for widening SH20A are limited.

3.4 Evaluation conclusion

The proposed improvements will benefit the local area, through additional road capacity, providing north-south routing to SH20A, and improve traffic safety along Ascot Road. While this is a good opportunity to improve the local network, it is not directly required to mitigate effects of the preferred option. It is recommended that the proposed improvements be assessed further as part of future access strategy for the Airport Oaks industrial zone and future land use development in the area.

4 **Montgomery Road east-west link**

4.1 **Existing traffic environment**

Montgomery Road previously served as an alternative primary collector road for Airport Oaks between Kirkbride Road and Landing Drive. But it has now been reduced to a secondary collector function following the recent closure of SH20A / Montgomery Road intersection. Montgomery Road starts from the roundabout at Ascot Road and terminates at a cul-de-sac a few meters west of George Bolt Memorial Drive (SH20A). It is a two-way road with a single lane per direction but without a median. On-street parking facilities are provided on both sides of the road and has a posted speed limit of 70 kph.

There is a lack of connectivity between the east and west part of the Airport Oaks industrial zone across SH20A as shown in **Figure 2**. Due to the missing connectivity, the east-west traffic is routed through the busy intersection at Kirkbride Road and Landing Drive. The landing Drive traffic re-distribution causes congestion close to the airport terminal area and could potentially interfere with airport operations, leading to delays.

The traffic on Montgomery Road, east of Richard Pearce Drive, has decreased from 12,700 vehicles per day in 2017 to 1,300 post the closure of the Montgomery Road intersection with SH20A. This translates to over 11,000 vehicles per day being diverted to the already constrained corridors.

4.2 **Proposed intervention**

As discussed above, there is currently a missing east-west link along Montgomery Road, limiting access options to Airport Oaks and between the surrounding commercial developments. It is proposed that a grade-separated east-west link be considered, which can connect the two parts of Montgomery Road on either side of SH20A. The proposed east-west link could help ease the traffic congestion on Kirkbride Road and Landing Drive, therefore providing for a flow of traffic on Montgomery road to serve the industrial zones on either side of SH20A. This proposed link is illustrated in **Figure 7**.

Given the nature and function of Montgomery Road, with turning vehicles and active mode users, the current posted speed limit of 70 kph along the road seems too high for the local context. Other roads with similar nature and function have posted speed limits down to 50kph. It is recommended that functional classification of the road, along with posted speed limits, be reviewed as per the provisions of the NZ Transport Agency One Network Road Classification (ONRC), the Auckland Council Roads and Streets Framework (RASf) and the Speed Management Guideline documents. The re-established link could also provide for active modes and avoid the busy intersection at Kirkbride Road and Landing Drive.



Figure 7 East – Montgomery Road (West Missing Link)

4.3 Evaluation

The impact of the link was tested in a SATURN traffic model, both independently and in combination with the proposed local intervention elsewhere in the network.

The Montgomery Road link was modelled with a single lane per direction, connecting sections of Montgomery Road that terminates on either side of SH20A in the Airport Oaks industrial / logistics zone. The benefits and impacts of the Montgomery Road link are illustrated in **Figure 8** and **Figure 9**.

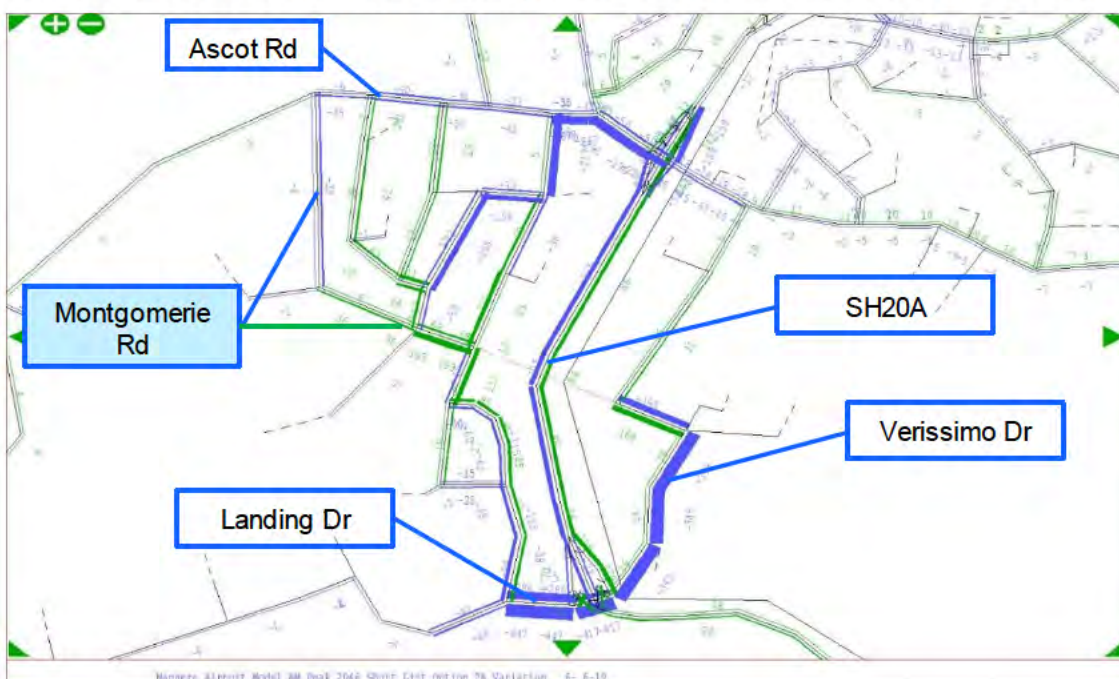


Figure 8 Montgomery Road link - AM traffic flow difference (test minus reference case)

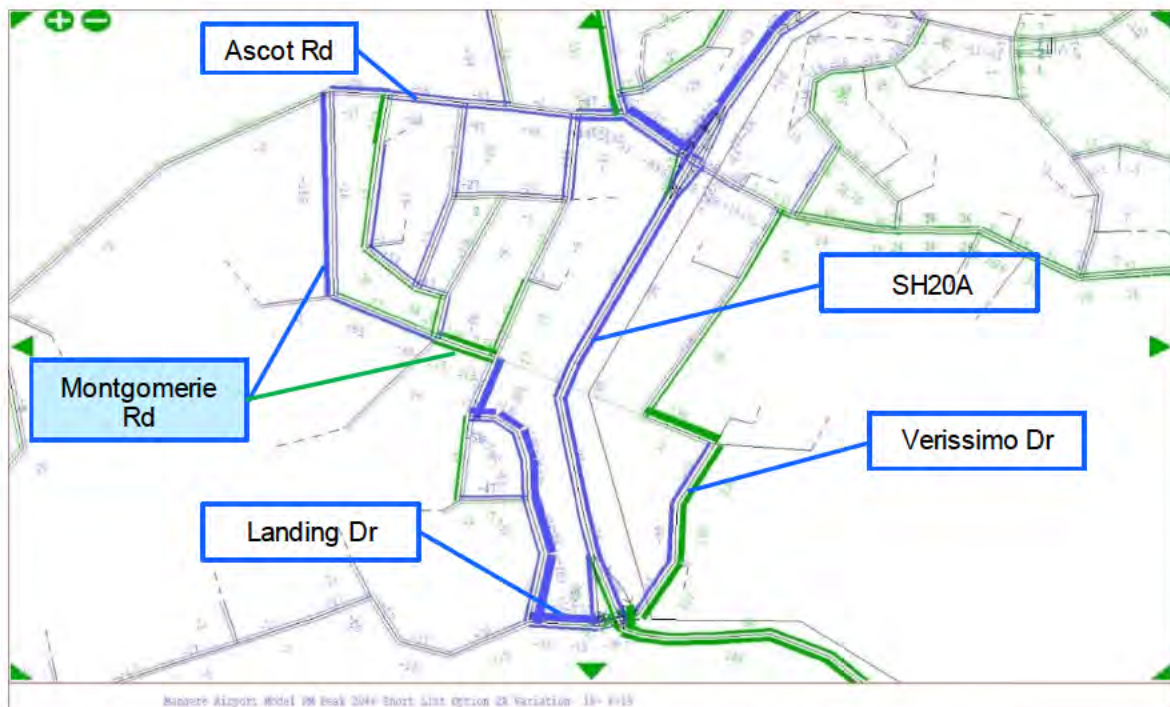


Figure 9: Montgomery Road link - PM traffic flow difference (test minus reference case)

The analysis results indicate that:

- The Montgomery Road link will reduce traffic volumes on Kirkbride Road and Landing Drive, leading to a decrease in link delays along the two roads.
- There will be a minor increase in traffic along Massey Road due to the new link.
- During the PM peak, there will be an increase in traffic on Verissimo Drive, east of SH20A, which will result in increased delays through the Verissimo Drive / SH20A Southbound off-ramp intersection.
- Considering the combined tests, it is evident that there are inter-dependencies between the Ascot Road upgrades and Montgomery Road link. There is therefore an opportunity to integrate the two options into one.

4.4 Evaluation conclusion

The proposed east-west link for Montgomery road will likely be expensive but will benefit the local area as discussed above. This improvement is an opportunity for the local network, however, is not considered to be required to mitigate effects of the preferred option. It is recommended that the proposed improvements be assessed further as part of future access strategy for the area.

5 Noel Burnside Road Link

5.1 Proposed intervention

A test was carried out, where a link was added to connect the new South-West Gateway (SWG) development link road directly with Noel Burnside Road. The purpose of this link was to provide additional options for traffic accessing and circulating around the Puhinui Precinct development.



Figure 10: Proposed new Noel Burnside Road Link (Average Daily Traffic 2019)

5.2 Evaluation

The link was tested in the SATURN model, both independently and as part of the combined local improvements test. For modelling purposes, the western intersection of the link with the SWG link was assumed to be traffic signal controlled and the eastern intersection (with Noel Burnside Road) was assumed to be a roundabout. The link was tested as a two-lane road, but also comprising of short right turning lanes at either end.

The traffic modelling results for the test are illustrated in **Figure 11** and **Figure 12**.

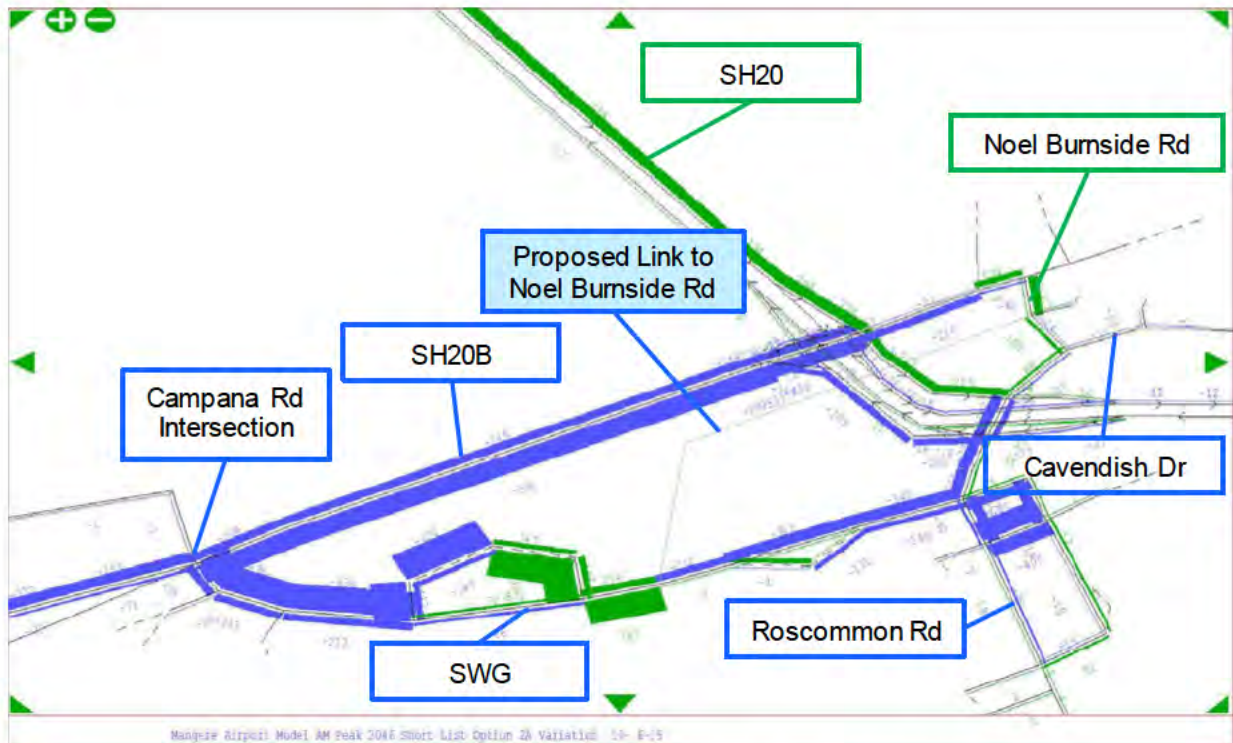


Figure 11: Noel Burnside Road link - AM traffic flow difference (test minus reference case)

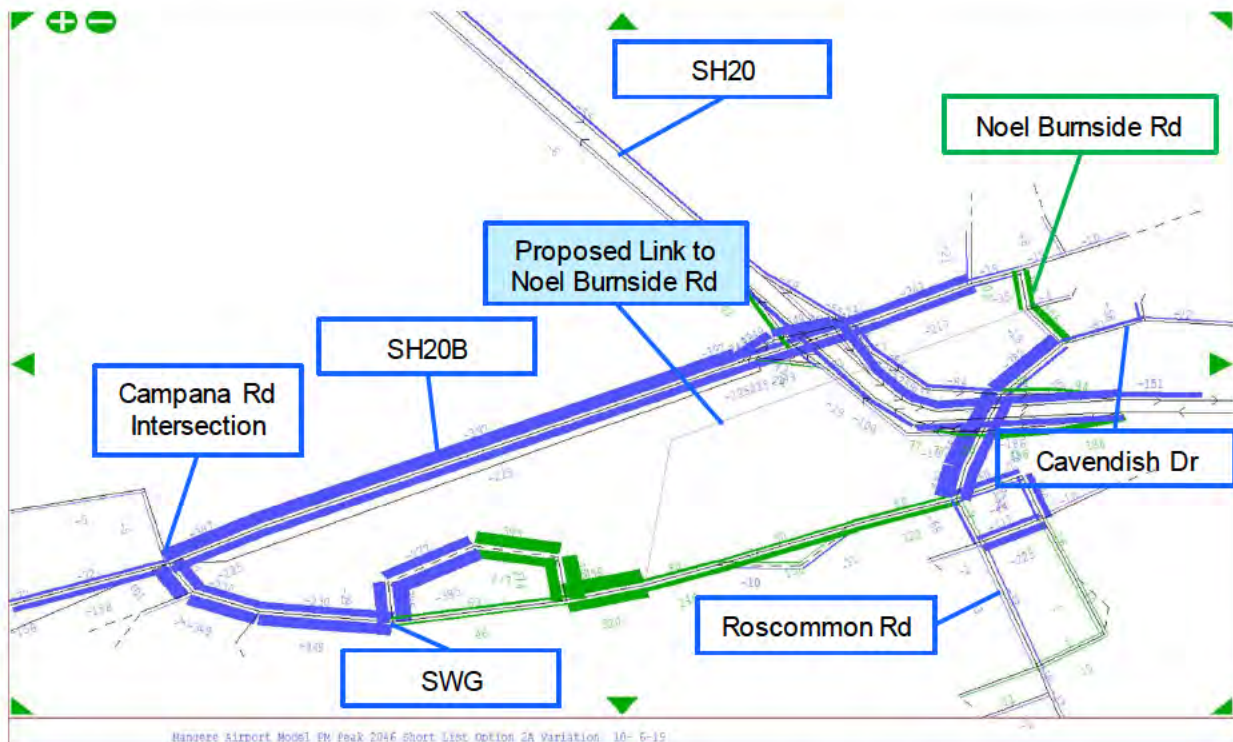


Figure 12: Noel Burnside Road link - PM traffic flow difference (test minus reference case)

The analysis results shown above indicate that:

- The Noel Burnside Road Link would result in significant reduction in traffic volumes along SH20B and Roscommon Road as seen by the blue bands in **Figure 11** and **Figure 12**.
- Consequently, significant improvements in traffic operational performance are expected at SH20B / Campana Road intersection and intersections along Roscommon Road.
- Some sections of Puhinui Road, east of SH20 interchange, will have longer delays than the reference case as a result of traffic re-distribution in this area.
- From the Select link analysis, it is evident that the Noel Burnside Road link will mainly serve the Puhinui Precinct (SWG) development.

5.3 Evaluation conclusion

The link is considered to primarily provide alternative access for the Puhinui Precinct development. This is an opportunity to improve the local network, however, it is not considered required to mitigate the effects of the preferred option. Further studies should also investigate whether developer contributions could apply to support the provision of this link road.

6 SH20 - Walmsley Road Ramp Upgrades

Some of the shortlist options include widening of SH20, as a long-term capacity improvement measure. With SH20 widening, there will be a need to replace some of the highway overbridges and upgrade some ramps. This will provide an opportunity to improve local accessibility through a combination of the following options:

- Widening footpaths and improving the quality of pedestrian crossings.
- Increasing level of protection for cyclists.
- Providing bus priority or high occupancy vehicle (HOV) lanes.
- Increasing general traffic lane capacity.

Walmsley Road is one of the locations where SH20 ramp upgrades will mitigate congestion and provide travel time benefits within the study area.

6.1 Existing traffic environment

Walmsley Road is generally a four-lane east-west arterial road without a dividing median, except near SH20 southbound ramp intersection, where it has three lanes with short sections of raised and flush medians to improve traffic safety. Walmsley Road connects Māngere and Otahuhu Town Centre, via Favona, therefore providing a critical east-west access for the residents, businesses and community facilities in the area. Walmsley Road carries between 18,600 and 26,000 ADTs (2019) between Coronation Road and Robertson Road, with HCVs composition of about 10%.



Figure 13: Walmsley Road (Average Daily Traffic 2019)

6.2 Propose interventions

The interventions at Walmsley Road / SH20 southbound off-ramp were considered due to the opportunities presented by SH20 widening, as a ramp upgrade is required to improve motorway traffic safety. The improvements would also improve intersection traffic performance during the AM peak, as the SH20 southbound off-ramp experiences long delays in the reference case model scenario. There would also be an opportunity to prioritise public transport and high occupancy vehicles joining SH20 southbound from this intersection.

The following interventions are proposed at the Walmsley Road / SH20 Southbound Ramp intersection:

- Additional right turning lane on Walmsley from the southbound off-ramp;
- New special purpose lane on the southbound on-ramp. This would accommodate high-occupancy vehicles and public transport

6.3 Evaluation

The impact of the link was tested in a SATURN traffic model, in a combined local improvements test scenario.

The traffic modelling results for the test are illustrated in figures below and briefly discussed.

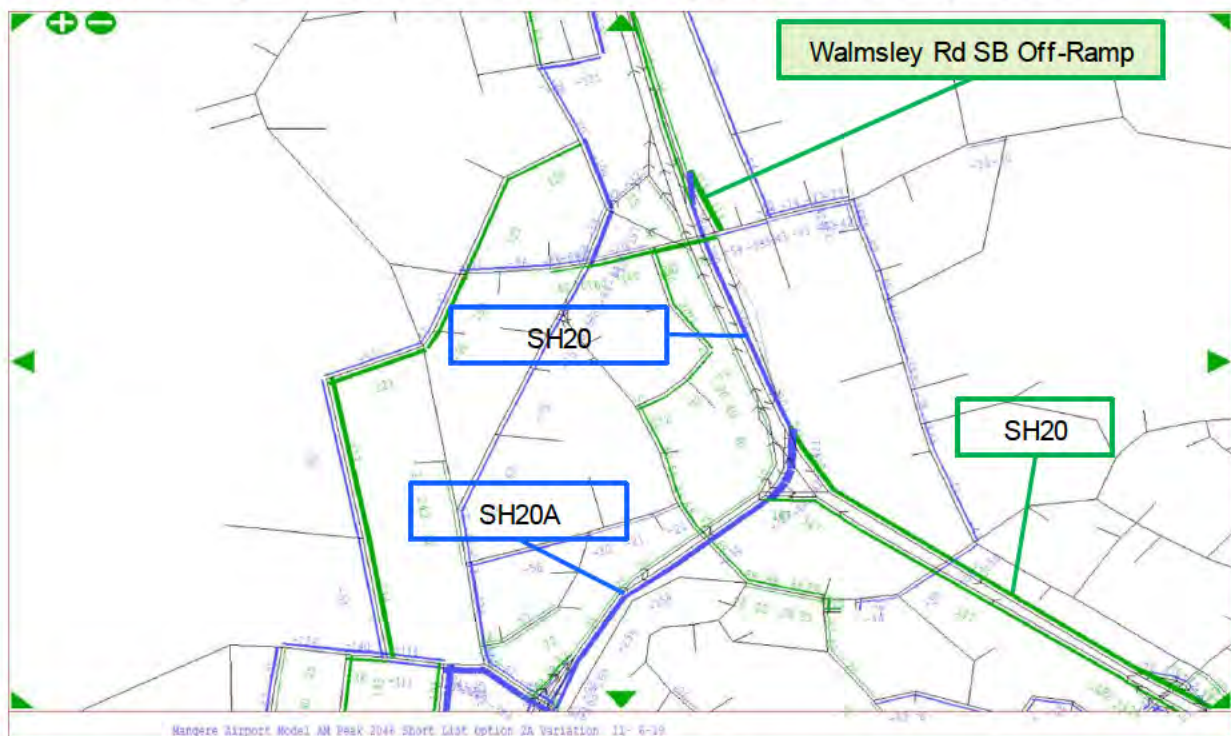


Figure 14: Walmsley Road upgrades - AM traffic flow difference (Combined test minus reference case)

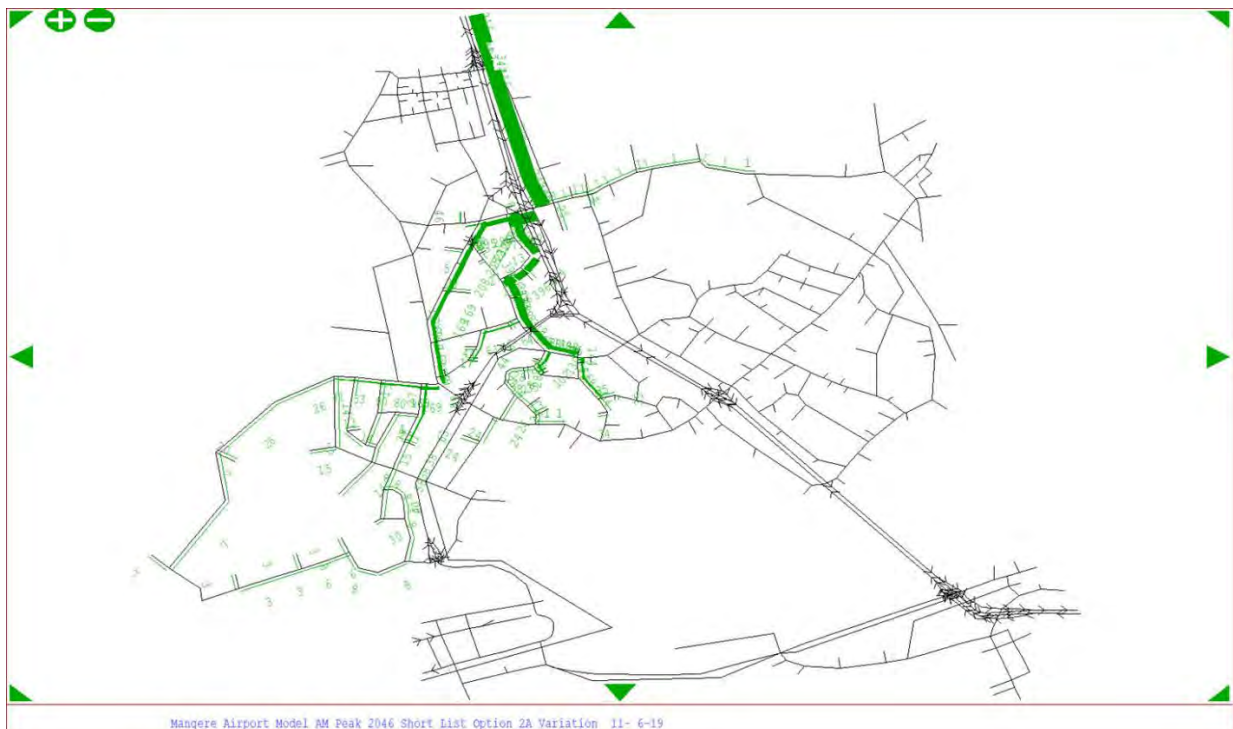


Figure 15: Walmsley Road upgrades - AM select link analysis (SH20 SB offramp)

The analysis results shown above indicate that:

- The additional capacity will attract more traffic on the SH20 southbound off-ramp at Walmsley Road during the AM Peak;
- V/C and delay levels would improve at the intersection because additional turning capacity would be added.
- Most of the traffic using the off-ramp has destinations in Māngere, Māngere Town Centre and Airport Oaks.
- The upgrades would have negligible impact on traffic volumes during the PM peak.
- The special purpose lanes would improve travel time and reliability for public transport and high-occupancy vehicles therefore improving mode split.

6.4 Evaluation conclusion

The proposed improvements of additional right turning lane at southbound off-ramp and special purpose lane at the southbound on-ramp demonstrate benefits to the local area as discussed above, however, it is not considered to be necessary to mitigate effects of the preferred option. Therefore, it is recommended that the Walmsley Road improvements be considered further as part of a comprehensive arterial improvement scheme for Walmsley Road.

7 Bader Drive Bridge Replacement

7.1 Existing traffic environment

Bader Drive is an east-west local collector road. Bader Drive is generally a four-lane road with either raised or painted median across most of its length. It narrows to two lanes, with no median, at both SH20A and SH20 overbridges. Bader Drive intersections are mostly roundabouts through Māngere Town Centre and Robertson Street. Bader Drive carries between 13,000 and 24,900 ADTs (2019) between SH20A and SH20, with HCV composition of 3%. It is also a key public transport corridor, serving routes to the Māngere Town Centre, such as Bus Routes 31, 32, 309, 313, 325 and 380. It is also expected to accommodate a proposed new Route 36 (between Manukau and Onehunga via Māngere) as part of the A to B early deliverable single stage business case project proposals.



Figure 16: Bader Drive (Average Daily Traffic 2019)

7.2 Proposed intervention

Currently the section of Bader Drive across SH20 has a single lane per direction. However, adjacent sections east and west of the bridge have two general traffic lanes per direction. Short sections of bus priority lanes are included in one section of Bader Drive in the westbound direction, near the Māngere Town Centre. There are therefore opportunities to increase the number of lanes across the bridge, either as general traffic lanes or special purpose lanes for public transport and high occupancy vehicles. The additional lanes along the Bader Drive overbridge would result in a consistent cross section along the road, between SH20A overbridge and Robertson Road.

For traffic modelling purposes, it was assumed that an additional general traffic lane would be provided in each direction on the bridge.

7.3 Evaluation

The proposed Bader Drive upgrade was assessed in the combined test in the SATURN model. The traffic modelling results for the test are illustrated in **Figure 17** and **Figure 18**.



Figure 17: Bader Drive upgrades - AM traffic flow difference (combined test minus reference case)



Figure 18: Bader Drive upgrades - PM traffic flow difference (combined test minus reference case)

From the modelling results, it is evident that an additional general traffic lane would not have material impact on traffic volumes and operational performance on the local road network.

7.4 Evaluation conclusion

The Bader Drive overbridge will need to be replaced to enable SH20 widening. Bader Drive currently has four lanes in the adjacent sections of the two-lane bridge. There could be benefits in providing additional lanes on the bridge from network consistency, network resilience and future-proofing perspective. This is an opportunity to improve the local network during the pre-implementation design stage, however, it is not considered necessary to mitigate effects of the recommended option. It is recommended that the feasibility, costs and benefits of providing additional lanes for public transport and high occupancy vehicles is investigated at the pre-implementation design stage.

8 Portage Road

8.1 Existing traffic environment

Portage Road is an east-west local collector road, facilitating access between Māngere Town Centre and Papatoetoe Station. It is predominately a two-lane road, without a dividing median between the opposing traffic streams, provides direct access for residents and businesses. Portage Road carries between 6,700 and 9,400 vehicles per day, comprising of 3% HCVs. Portage Road is also a public transport corridor, serving the Route 326 (Māngere Town Centre to Otahuhu Town Centre via Middlemore).

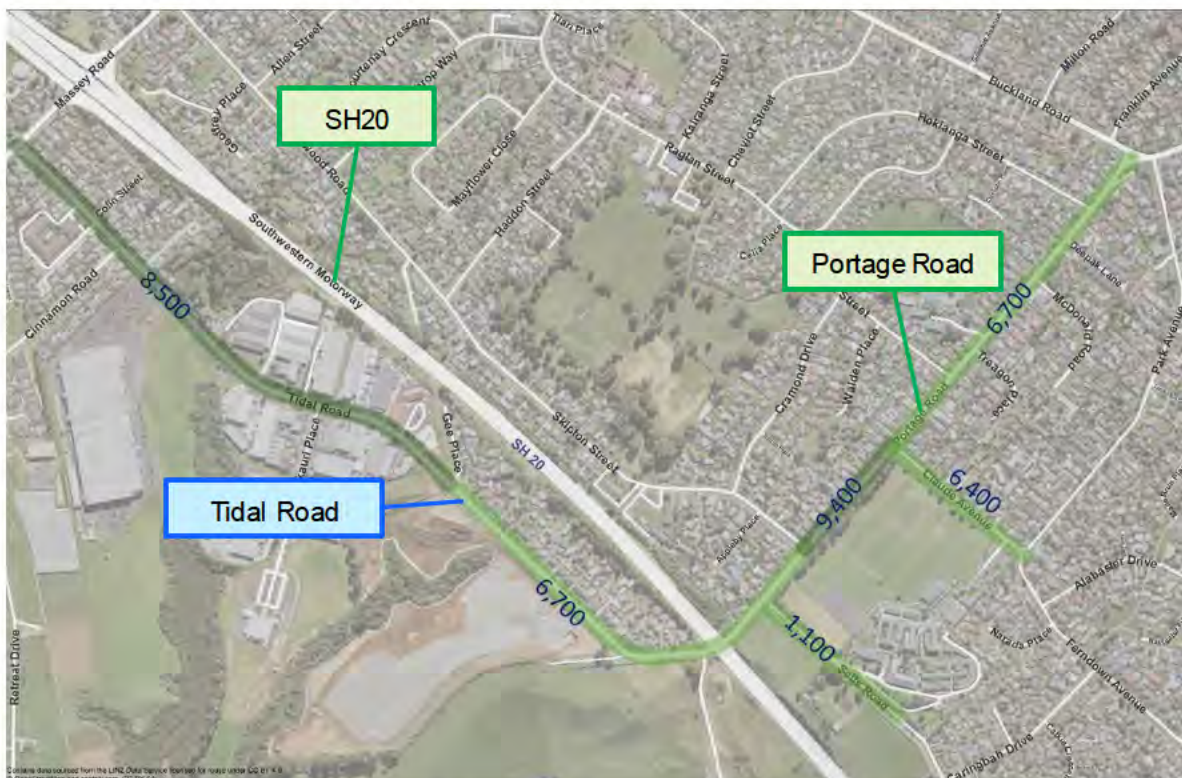


Figure 19: Portage Road (Average Daily Traffic 2019)

8.2 Proposed intervention

An improvement on Portage Road was considered due to opportunities that will be provided by SH20 widening. Initial options for bridge replacement included widening the road for either general traffic or special purpose vehicle lanes.

8.3 Evaluation

The initial qualitative assessment found that there would be little benefit expected from increasing general traffic capacity on the Portage Road overbridge, as the road is mainly a single lane per direction and largely functions as a local collector / access road. Therefore, capacity improvements on this bridge were not tested in the SATURN model. With the road currently serving only one bus route, with no known plans to increase bus routes or frequencies along this road, public transport priority is also not expected to get significant benefits on overbridge widening.

8.4 Evaluation conclusion

It is recommended that better quality walking and cycling facilities be considered, across the bridge and along the adjacent road sections, when the bridge replacement designs are further progressed at the pre-implementation design stage. The proposed intervention presents an opportunity to improve the local network at the pre-implementation stage, however, are not considered necessary to mitigate effects of the recommended option.

9 Overall SATURN model results

The overall model results, for the options that were tested, are presented below. The metrics relate to the overall model extent. Although these are useful for comparing the impact of the options at a more strategic level, the metrics alone do not explain the local benefits and the impact of the interventions, which are more important for this assessment. The local impacts have already been discussed in the individual intervention evaluation section 3.3, 4.3, 5.2, 6.3, 7.3 and 8.3.

Table 1: High-level model metrics - local access improvement tests

	AM Peak			PM Peak		
	Total travel time (Veh.Hr)	Total travel distance (Veh.km)	Average speed (km/hr)	Total travel time (Veh.Hr)	Total travel distance (Veh.km)	Average speed (km/hr)
Reference case	6,150	257,400	41.8	7,500	268,700	35.9
Test 1 (Ascot Road upgrades)	6,050	257,400	42.6	7,100	266,200	37.5
Test 2 (Montgomerie Rd link)	6,100	257,200	42.2	7,300	266,700	36.5
Test 3 (Noel Burnside Road link)	5,750	256,100	44.4	6,800	264,800	39.0
Combined Test (Test1 to 3 Plus Walmsley Road and Bader Drive improvements)	5,600	256,100	45.6	6,350	261,600	41.2

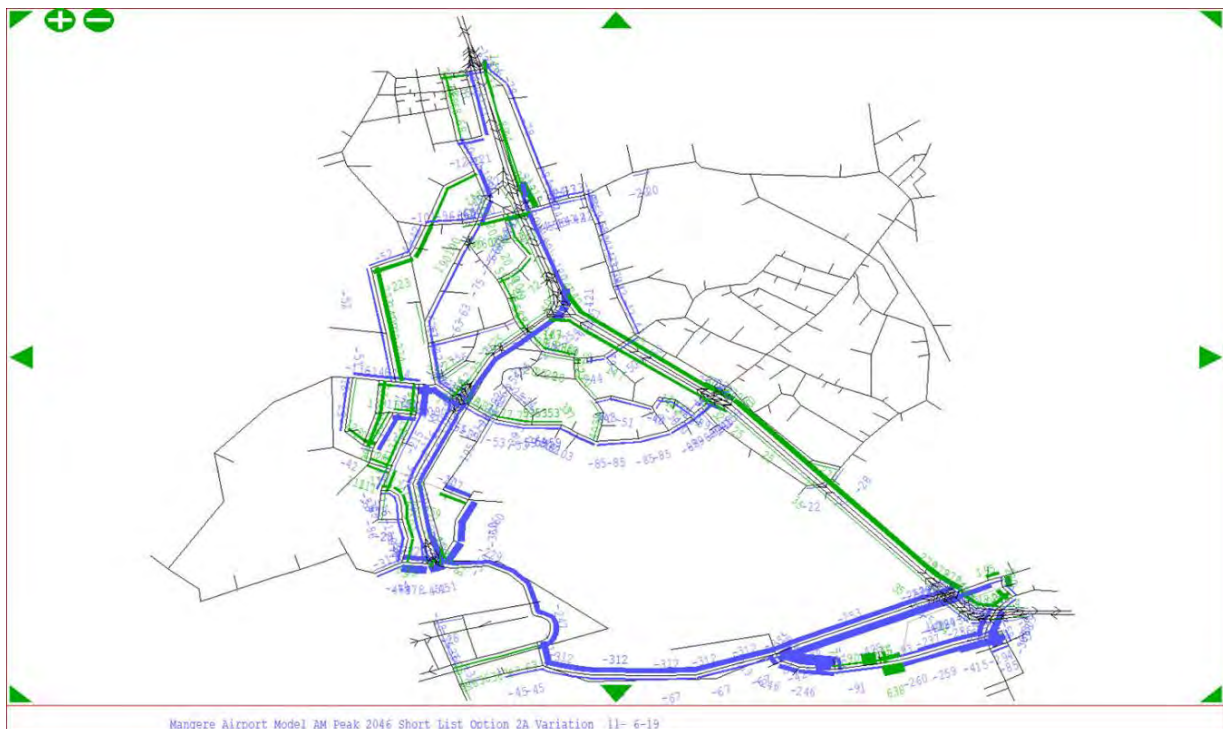


Figure 20: AM peak flow difference (Combined test minus reference case)



Figure 21: PM peak flow difference (Combined test minus reference case)

From the high-level model metrics results, the following observations can be made:

- The Noel Burnside Road link could achieve the most travel time savings out of all individual tests considered (i.e. 6.3%).

- However, as has been illustrated earlier, most of the benefits for Noel Burnside Link can be attributed to the Puhinui Precinct (SWG) development.
- Ascot Road upgrades could achieve 1.6% travel time savings and Montgomerie Link could achieve 0.8% travel time savings.
- In percentage terms the travel distance savings in all the options are minimal, with the best case being the Noel Burnside Link, which could achieve about 0.5% travel distance savings on the network.
- The flow difference plots demonstrate that the local improvements assessed, could relieve traffic volumes from the busier SH20A and SH20B corridors.

10 Multi-criteria assessment (MCA)

A high-level multi-criteria assessment (MCA) was carried out to assess the potential impact of the proposed local improvements. The assessment uses both quantitative and qualitative measures to inform the ranking.

The Key performance measures (KPIs) adopted for this local access improvement analyses are aligned to the 20Connect SSBC project objectives. The KPIs relevant for the local access improvements are summarised in Table 2. The MCA assessment is summarised in Table 3.

Table 2: 20Connect project objectives and KPIs relevant to the local improvement assessment.

Benefit	Investment Objectives	Investment KPI	Measure
A more reliable and resilient transport system	Reliable and resilient transport system in south and east Auckland that is easy to use	Capacity and resilience of the option to meet demand	Total demand serviced on 20Connect corridors
			Degree of saturation of key links and intersections
		Travel time reliability, including separation of road space	Performance of grade separations and at-grade junctions and intersections
			Assessment of travel time reliability for key journeys
		Ability for high priority trips to have reliable journeys	Length of separated rights of way for freight, PT, HOVs and special uses
			Volume/capacity of key routes and special purpose lanes
Travel time for key journeys	Vehicle travel time for key journeys: City-Airport, Papakura-Airport, Botany-Airport, Albany-Airport, Westgate-Airport		
Healthier and safer people	Safe and secure transport facilities in south and east Auckland.	Amenity function of activity areas and town centres	Reduction in through traffic and freight
		Safe walking and cycling conditions	Volume and speed appropriateness along walking and cycling corridors

Table 3: MCA assessment - local access improvements

Section	Necessary to mitigate the effects of 20Connect ?	Capacity Increase	Traffic performance	PT / HOV prioritisation	Through traffic reduction on local roads	Walking and cycling facilities	Notes
Ascot Road upgrade	No	Increased capacity along Ascot Road	Decrease in V/Cs in the PM peak	Multiple lanes. One of the lanes can be repurposed in the future if required.	Greenwood Road traffic volumes increase in the AM, but reduces in the PM	Opportunities for crossings to be improved with the upgrades	Recommended for further investigation as part of the Airport Oaks access improvement options.
New Montgomerie Road link across SH20A.	No	Localised capacity increase	- Improve traffic performance along Kirkbride Road and Landing Drive. - However, delays could increase on Verissimo Drive, east of SH20A.	Single lane per direction. Limited opportunities for SPV lanes.	Low impact on local road traffic volumes	Opportunities to reduce walking and cycle travel time and distance by providing more direct connection between industrial zones.	Recommended for further investigation as part of the Airport Oaks access improvement options.
Noel Burnside Road link	No	- Provide alternative access to the Puhinui Precinct development - Reduce traffic volumes on SH20B and Roscommon Road	- Reduces delay and SH20B / Campana intersection; - Highest reduction in overall network travel distance and times	Limited opportunities for SPV lanes.	- Primarily a local access alternative - Not expected to induce rat-running	Opportunities to reduce walking and cycle travel time and distance by providing more direct connection between across SH20.	Recommended for further investigation as part of the Puhinui Precinct (SWG) development access options.
Walmsley Road / SH20 interchange improvements	No	Increased right turn capacity.	Improved intersection performance.	Exit ramp to SH20 SB traffic to have an SPV lane.	Negligible increase in traffic volumes on local access roads.	Opportunities to improve walking and cycling crossing along Walmsley Rd with the upgrades	Recommended for further consideration as part of a comprehensive arterial study for Walmsley Road.

Section	Necessary to mitigate the effects of 20Connect ?	Capacity Increase	Traffic performance	PT / HOV prioritisation	Through traffic reduction on local roads	Walking and cycling facilities	Notes
Bader Drive bridge replacement	No	Additional capacity under-utilised	No significant change in traffic performance	Opportunity for new bridge to be provided with SPV lanes	Low impact on local road traffic volumes	Opportunities to improve walking and cycling facilities.	Possible improvements to be investigated at pre-implementation design stage.
Portage Road bridge replacement	No	The rest of the road is a two-lane road. localised upgrades will not have meaningful benefit for the remainder of the corridor.	No significant impact expected.	Limited opportunities for priority lanes beyond the location of the bridge.	Link not expected to displace traffic to surrounding access roads.	Opportunities to improve walking and cycling facilities	Possible active mode improvements to be investigated at pre-implementation design stage.

11 Conclusions

Strategic access options to the Auckland Airport precinct and surrounding residential and industrial / logistical hub have been considered as part of the Single Stage Business Case (SSBC) that is being prepared on behalf of the NZ Transport Agency and its investment partners, Auckland Transport and Auckland International Airport Limited.

In addressing the strategic access options, gaps have been identified for local access within the Airport Precinct. The purpose of this technical note was to summarise the assessment of the identified possible local access improvement options. A quantitative and qualitative assessment of the options was carried out. Local access improvement options were identified at the following locations:

- Ascot Road upgrades
- New Montgomerie Road link across SH20A.
- Noel Burnside Road link
- Walmsley Road / SH20 interchange improvements
- Bader Drive bridge replacement
- Portage Road bridge replacement

SATURN traffic model tests were developed to assess the impact of the identified local access improvement options. A qualitative assessment was also carried out. The analysis also included a multi-criteria evaluation.

A summary of the assessment conclusions is provided in **Table 4**.

Table 4: Summary of the local access improvement assessment

Section	Interventions proposed	Necessary to mitigate the effects of 20Connect?	Conclusion
Ascot Road upgrade	■ Widening Ascot Road from two lanes to four lanes. ■ Providing a flush median ■ Signalising Ascot Road / Greenwood Road intersection	No	• Recommended for further investigation as part of the <u>Airport Oaks</u> access improvement options.
New Montgomerie Road link across SH20A.	■ New two-lane grade-separated link across SH20A.	No	• Recommended for further investigation as part of the <u>Airport Oaks</u> access improvement options.
Noel Burnside Road link	■ New link between the SWG link and Noel Burnside Road to provide alternative access options for the Puhinui Precinct (SWG) development.	No	• Recommended for further investigation as part of the <u>Puhinui Precinct (SWG)</u> development access options.

Section	Interventions proposed	Necessary to mitigate the effects of 20Connect?	Conclusion
Walmsley Road / SH20 interchange improvements	- Widening of the SH20 southbound off-ramp to provide an additional right turning lane. - Providing an additional lane on the southbound onramp for public transport and high-occupancy vehicle prioritisation.	No	Recommended for further consideration as part of a comprehensive arterial study for Walmsley Road.
Bader Drive bridge replacement	- Widening the two-lane bridge to four lanes when the bridge is replaced for SH20 widening works. - Additional lanes to be SPV lanes for public transport and possibly high-occupancy vehicle lane prioritisation.	No	Possible improvements to be investigated at pre-implementation design stage.
Portage Road bridge replacement	- Maintaining existing general traffic lane capacity with the bridge replacement as would be required for SH20 widening. - Improving walking and cycling facility with the bridge replacement.	No	Possible active mode improvements to be investigated at pre-implementation design stage.

Approvals:

	Author	Reviewer	Verifier
Name			
Signature			
Designation	Traffic Signal Engineer	Associate	Technical Director