Mosgiel Park and Ride

Single Stage Business Case

Dunedin City Council

04 August 2023

→ The Power of Commitment

Appendices

Appendix A

Customer Insights report

Customer Insights

Mosgiel Park and Ride

Dunedin City Council

24 August 2022

→ The Power of Commitment

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Executive Summary

The Dunedin City Council is working with Otago Regional Council to investigate opportunities to make public transport more attractive for people traveling from areas south of the city. One of the options being investigated is a Park and Ride service located in Mosgiel that would enable users to catch an express bus into central Dunedin.

Dunedin City Council (DCC) engaged GHD to investigate options and develop a Single Stage Business Case (SSBC) for the provision of the Mosgiel Park and Ride. In order to inform the business case for the Park and Ride, a Customer Insights Study was undertaken with the community to understand level of demand for this facility.

This report presents the findings from the Customer Insights Study. The key objective of the Study is to understand the level of demand for the Park and Ride option and the factors that would contribute to members of the community utilising the potential service. The Study was undertaken between 20 June 2022 and 18 July 2022 through an online survey available through Council's website.

The Customer Insights Study received 476 responses to the online survey, as well as five email submissions and ten social media posts. Over half of the respondents commence their journey into Central Dunedin from Mosgiel (56%) with other respondents from the broader Dunedin Council area including Green Island (8%), Fairfield (7%) and Outram (5%).

476 respondents completed the Customer Insights Study with 56% travelling from Mosgiel

The Customer Insights Study asked about current travel behaviour. The majority of respondents (87%) stated that they use a private vehicle to travel into Central Dunedin either on their own, ride sharing or as a passenger. 10% of survey respondents currently use the public bus service on a regular basis. When asked what prevents respondents from using public transport more often, three main themes emerged:

- The travel time by public transport due to multiple stops, waiting times, additional walking required to bus stops and multiple bus transfers to get to destinations.
- Lack of bus frequency, especially around peak times resulting in overcrowded busses, and
- Accessibility of the bus service, particularly with bus stop locations. For respondents who identified as having a mobility disability, the current bus service was said to be inaccessible, and they are required to use their own vehicle.

The Study investigated level of interest in using a potential Park and Ride facility in Mosgiel to understand what factors would contribute to its successful implementation. The three features that were considered 'very important' for the Park and Ride facility included:

- The Park and Ride having sufficient and always available parking (71%)
- Free parking (68%),
- An express bus service direct from Mosgiel to the CBD (66%).

Overall, 64% of respondents indicated that they would use the Park and Ride with 35% of respondents stating that they would very likely use the Park and Ride. The two most preferred locations for the Park and Ride in Mosgiel were near State Highway 1 (32%) and central east Mosgiel (between Factory Rd and Gladstone Rd North) (21%). The most preferred drop-off locations in Central Dunedin included the bus hub (29%), the CBD (26%), and the university. (24%)

64% of respondents stated that they were likely or very likely to use a Park and Ride facility in Mosgiel

Overall, the insights survey indicates there is strong support for a Park and Ride facility from respondents, with many expressing their eagerness to see a Park and Ride facility. When asked to provide further feedback on the proposal, the survey received 130 comments from respondents expressing their support for the Park and Ride facility to be provided. According to one respondent *"I LOVE the idea of an express bus system from of the most common commuter routes, I think it's well overdue in Dunedin and should be well utilised. Thanks for looking into this."*

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1. Introduction

Dunedin City Council is working with Otago Regional Council to investigate opportunities to make public transport more attractive for people traveling from areas south of the city. One of the options being investigated is a Park and Ride service located in Mosgiel that would enable users to catch an express bus into central Dunedin.

Dunedin City Council (DCC) engaged GHD to investigate options and develop a Single Stage Business Case (SSBC) for the provision of the Mosgiel Park and Ride. The SSBC is focused on fostering safe travel choices for people who live south of Dunedin.

In order to inform the business case for the Park and Ride, a Customer Insights Study was undertaken with the community to understand level of demand for this facility. The survey was developed to understand how people currently travel, how often they travel, and to gauge opinion on how much a Park and Ride with suitable facilities would encourage them to travel by bus more frequently. The intent is that the results will provide greater confidence in the investment as well as inform the specific requirements for the facilities and services.

1.1 Purpose of this report

This report presents the findings from the Customer Insights Study for the Mosgiel Park and Ride. The key objective of the Study is to understand the level of demand for the Park and Ride option and the factors that would contribute to more members of the community utilising the potential service.

The survey comprised 18 questions focussing on people's travel behaviours, their views and experiences with current public transport, and whether a Park and Ride with suitable facilities would encourage them to travel by bus.

In total 476 responses were received from surveys completed both online and in person at the Mosgiel public library, Blend Espresso Cafe, Blackstone Cafe, and bus stops located in the Mosgiel town centre.

1.2 Scope and limitations

This report: has been prepared by GHD for Dunedin City Council and may only be used and relied on by Dunedin City Council for the purpose agreed between GHD and Dunedin City Council as set out in section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than Dunedin City Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect

2. Survey method and distribution

2.1 Customer Insights Study

The Customer Insights Study for the Mosgiel Park and Ride was undertaken between 20 June 2022 and 18 July 2022. The Study was undertaken through an online survey available through Council's website. In addition, stakeholders and members of the community were provided with the opportunity to provide feedback on a proposed Park and Ride through email submissions and online through social media. Meetings were also held with:

- Mosgiel Taieri Community Board
- Te Whatu Ora Health NZ Southern (former Southern District Health Board)
- Otago Regional Council

The Customer Insights Survey was comprised of 18 open-ended and closed-ended questions regarding people's travel behaviours, their views, and experiences with current public transport, and whether a Park and Ride with suitable facilities would encourage them to travel by bus. A copy of the survey is attached as **Appendix A.**

2.2 Survey distribution

Information outlining the background and the purpose of the Customer Insights Study and an online website link to the survey was posted on the Dunedin City Council website. The survey and its website link were also promoted and made available on the Dunedin City Council Facebook page.

Emails were circulated to key stakeholders to support the promotion of the Mosgiel Park and Ride Customer Insight Survey. Key Stakeholders contacted included the Southern District Health Board, The University of Otago, and ACC. These stakeholders were asked to support the distribution of the Customer Insights Study by promoting the website and displaying posters with a QR code in prominent locations.

Posters that included a QR code and website link to the survey were made available to businesses within Mosgiel and displayed on Mosgiel community noticeboards. A copy of the posters advertising the Customer Insight Study is provided in Appendix B.

To further encourage participation in the Customer Insights Study, members of the project team conducted intercept surveys in Mosgiel between 7am and 10:30am on Wednesday 29th June 2022 at the Mosgiel Public Library, Blend Espresso Cafe, Blackstone Cafe, and bus stops located in the Mosgiel town centre. The survey could be completed either on an iPad or using paper copies provided by GHD. A timetable outlining the time, and venue for the intercept surveys is provided in Table 1.

Table 1 Schedule of intercept surveys conducted on 29 June 2022

Time	Venue
7 am to 8am	Blackstone Café and Bar (134 Gordon Road)
8am to 9am	Blend Espresso (129 Gordon Road)
9am to 9:30am	Walk around of bus stops
9:30am to 10:30am	Mosgiel Library

3. Overview of findings

Overall, the Customer Insights Survey received 476 responses. The feedback provided has been analysed within the two sections of the Study. These comprise of:

1. Current travel behaviour – understanding existing travel behaviour including journey starting point, frequency and duration of travel and usual travel mode. The survey also asked about level of satisfaction with their commute and obstacles that prevent respondents from using public transport.
2. Park and ride services – understanding level of support for a proposed Park and Ride in Mosgiel and the factors that would contribute to its successful implementation

3.1 Travel behaviour

There were eight questions regarding the current travel behaviour of the survey respondents. The questions focussed on where the journey commenced, time of travel for both outbound and return, frequency of travel, reason for travelling to Dunedin and level of satisfaction. Respondents were asked to provide an explanation about the factors that contribute to their level of satisfaction with their commute as well as the obstacles that they perceive as preventing them from using public transport.

3.1.1 Current travel behaviour

Over half of the survey respondents commence their travel journey into Central Dunedin from Mosgiel (56%). Other common locations amongst survey respondents, as illustrated in Figure 1, include Green Island (8%), Fairfield (7%) and Outram (5%). 12% of respondents stated Other – with their journey commencing from other areas within the Dunedin Local Government Area.

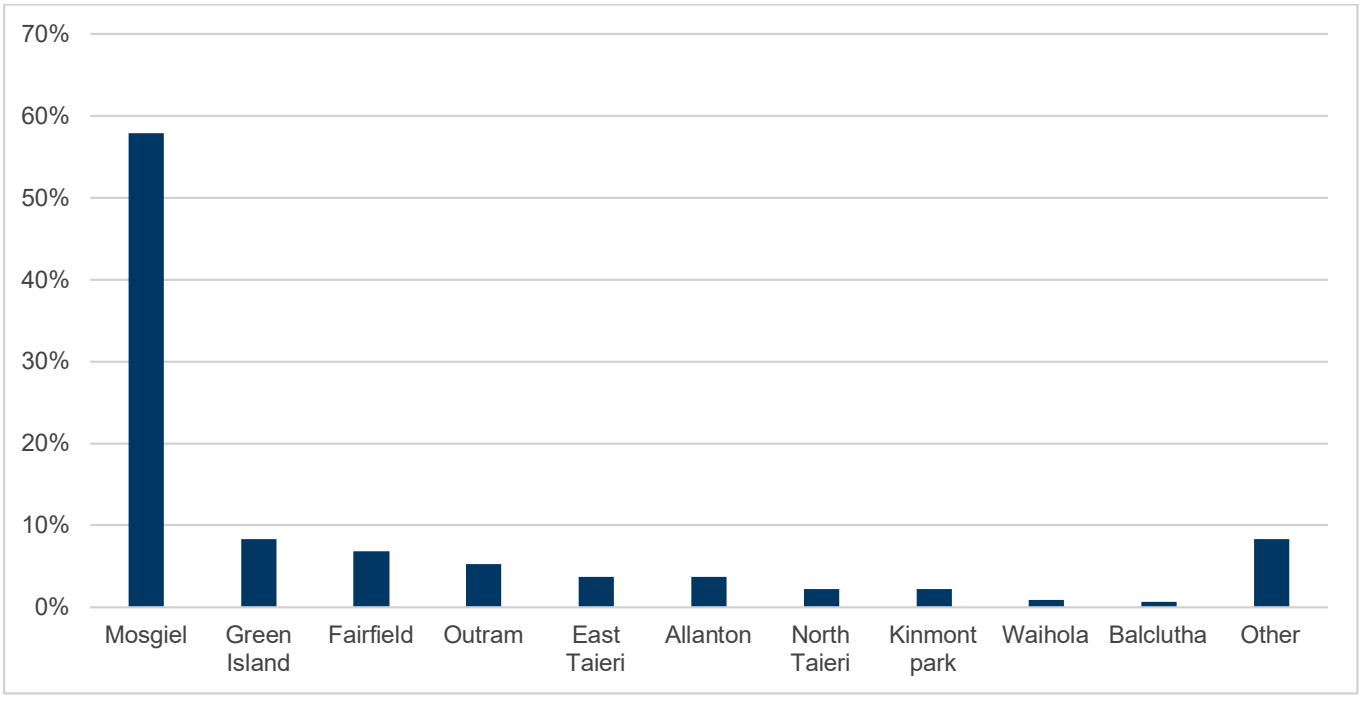


Figure 1 Locations that survey respondents commence their travel into central Dunedin

The majority of survey respondents travel to Central Dunedin more than three times a week, with 56% travelling 3-5 times per week and 31% travelling more than six times a week, as illustrated in Figure 2.

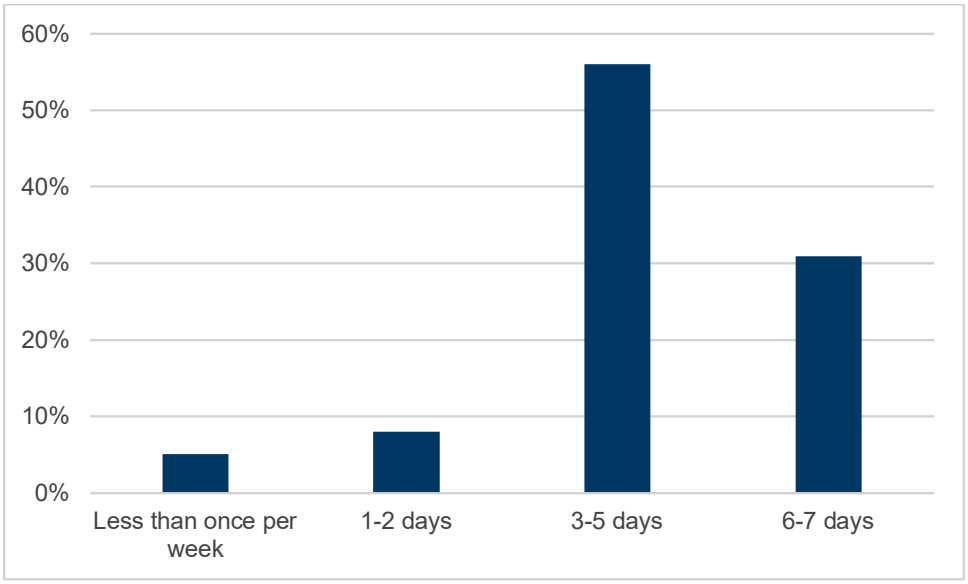


Figure 2 Number of days survey respondents travel to or from Central Dunedin

Travel times to and from Central Dunedin align to morning and afternoon peak periods. In the morning the most frequent travel time was between the times of 7 am and 8 am (44%), followed by 8 am to 9 am (30%), as illustrated in Figure 3.

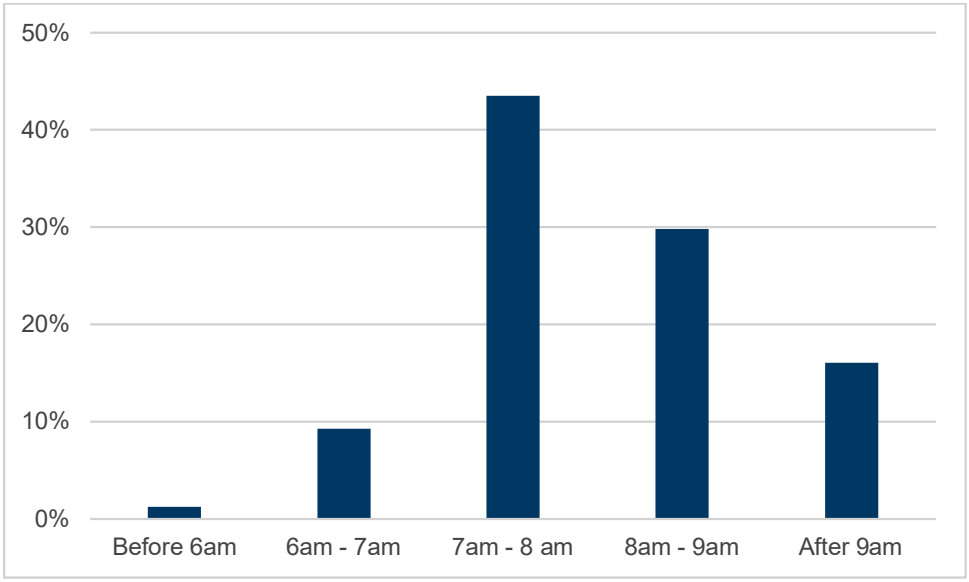


Figure 3 Time respondent typically travels to Central Dunedin

In the evening, the return home was most common between 5 pm and 6 pm (48%) as illustrated in Figure 4.

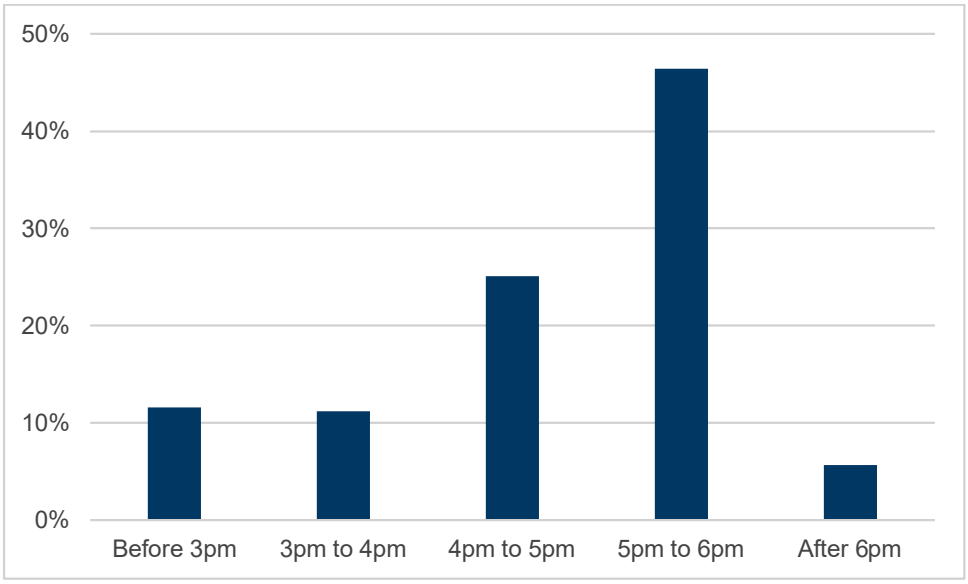


Figure 4 Time respondent typically travels from Central Dunedin

The majority of respondents are travelling to Central Dunedin for work (84%). Other reasons respondents travel to Dunedin include accessing services (6%) and education (4%). These responses are illustrated in Figure 5.

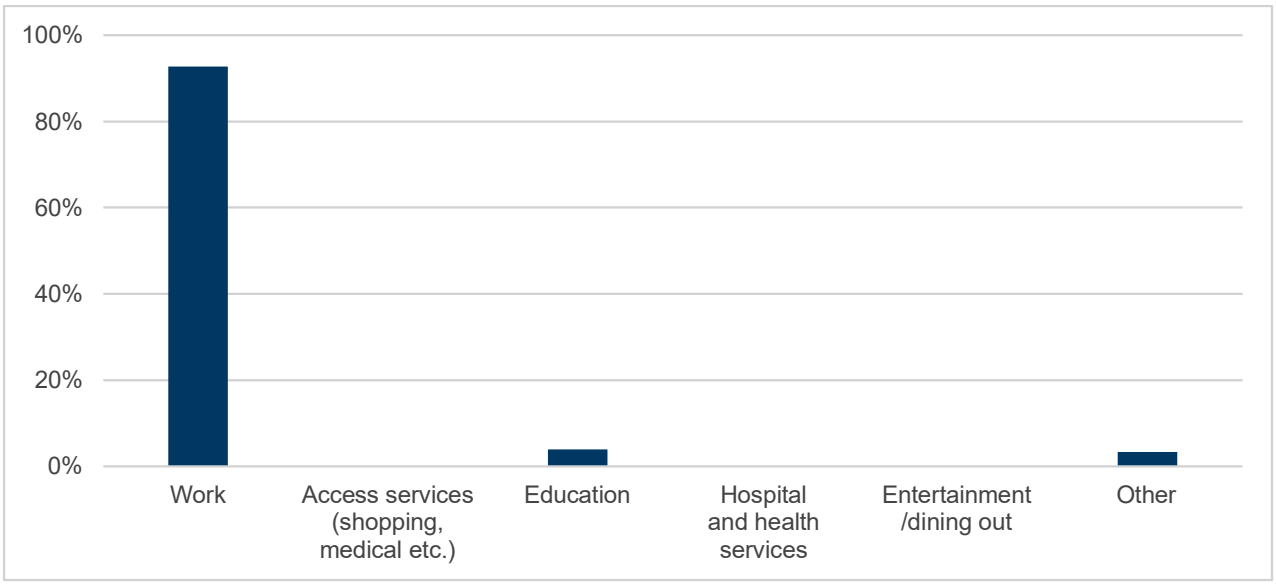


Figure 5 Reason for travelling to Central Dunedin

The majority of respondents use a car to travel to Central Dunedin (87%), as illustrated in Figure 6. This includes 81% who utilise a private vehicle as a driver as well as 3% using work owned vehicles, 3% who are passengers and 1% who rideshare or carpool. 10% of respondents currently use the bus to travel to Central Dunedin. Although these numbers are fairly consistent with NZ Census data, the survey received a higher response rate from bus users. According to Census data from the Mosgiel region, 4% of the population commute regularly by bus.

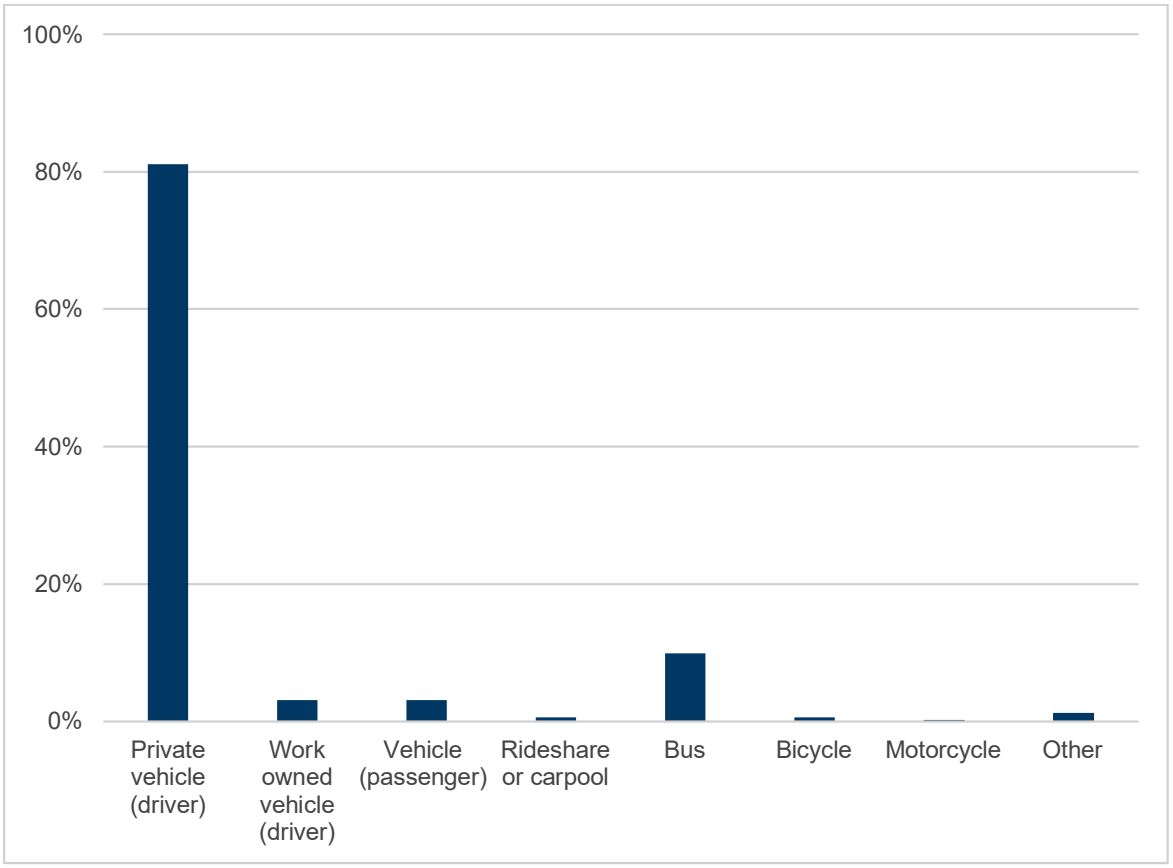


Figure 6 Mode of transport used by survey respondents to travel to Central Dunedin

When respondents were asked about how frequently they take the bus, the results were consistent with the feedback received on the current mode of transport. The majority of respondents indicated that they do not catch the bus during the week (81%) and instead rely on other modes of transport when travelling. Only small proportion of respondents (11%) indicated that they use the bus regularly ie more than three times per week, as illustrated in Figure 7.

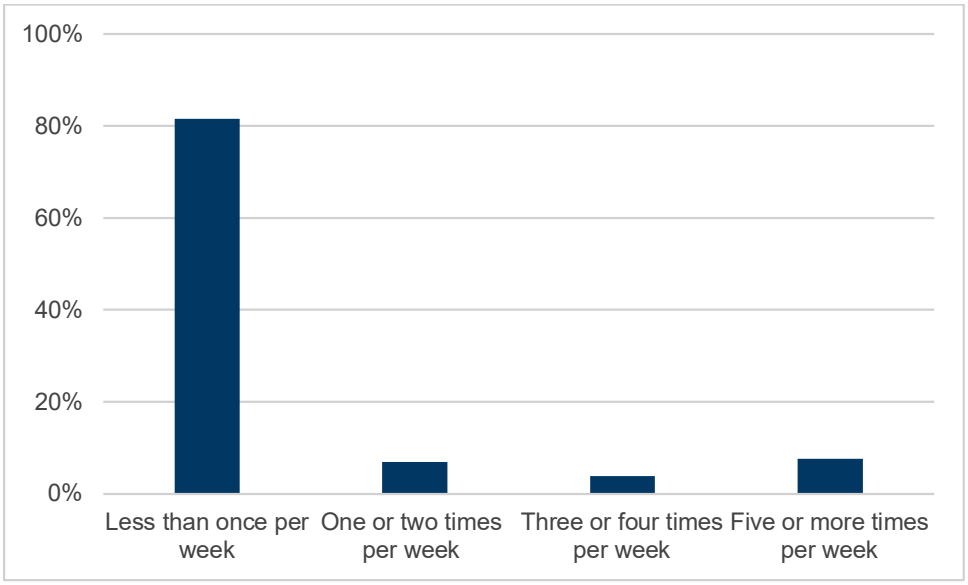


Figure 7 Level of frequency that survey respondents use the bus to travel to central Dunedin

3.1.2 Satisfaction with current commute

Respondents were asked to rate their level of satisfaction with their current commute. This was ranked on a scale of one to five, with one being very dissatisfied and five being highly satisfied. Most individuals ranked their satisfaction with their journey as a 3 - Neutral (38%) or a 4 - Satisfied (28%), as illustrated in Figure 8.

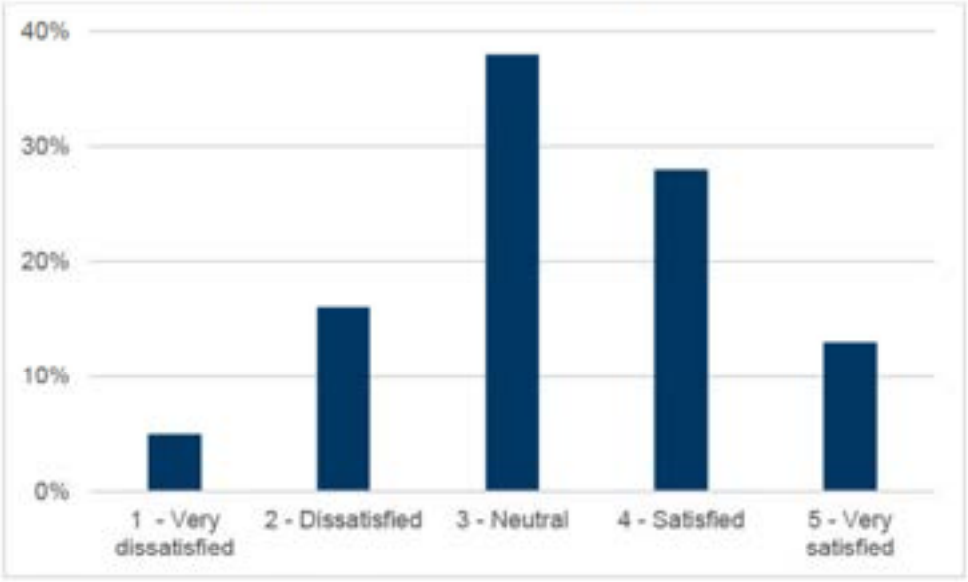


Figure 8 Level of satisfaction with the current commute

When the level of satisfaction is analysed by the transport mode used by survey respondents, as illustrated in Figure 9, respondents that commuted by private vehicle (either as a driver, work owned vehicle or ride share) had a higher level of satisfaction when compared to those respondents that commuted by bus or bicycle. Interestingly, the commute by bicycle had the highest level of dissatisfaction.

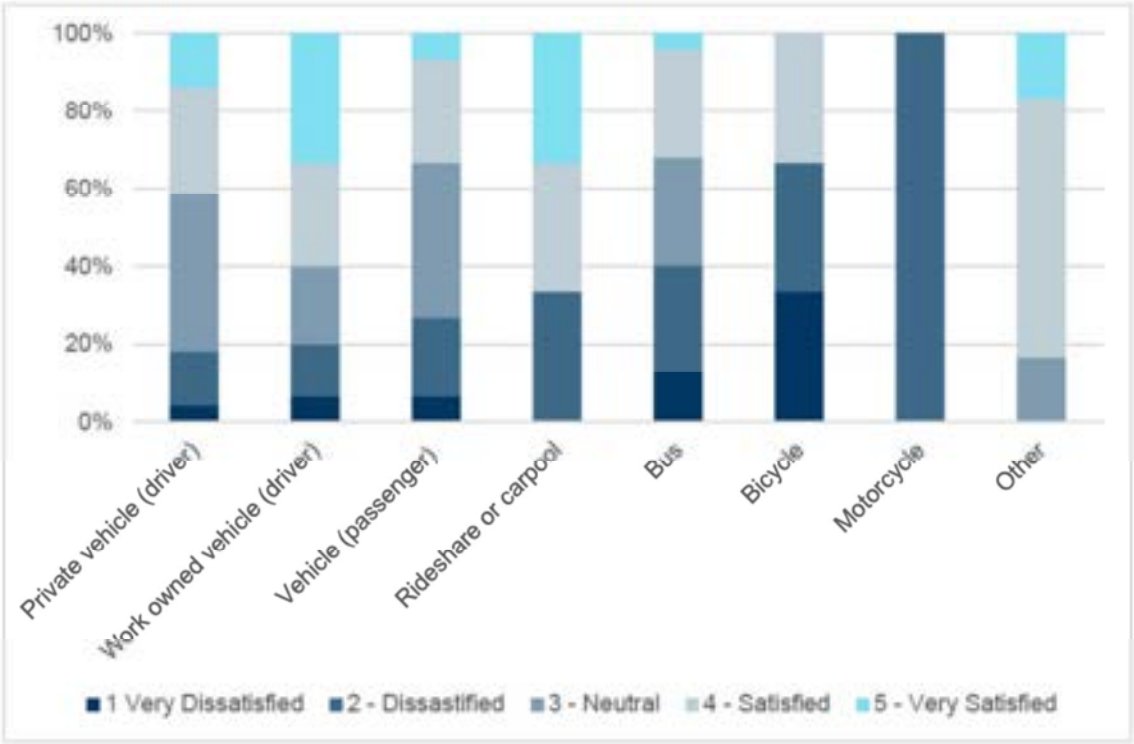


Figure 9 Level of satisfaction with commute by transport mode

To understand what factors influenced the respondent's satisfaction ratings, respondents were asked to explain their level of satisfaction with their current journey (whether bus public transport or private car). From the comments received, 11 key themes emerged. These themes summarised in Table 2 related to either private car journeys or public transport journeys.

The following section provides an overview of the comments that were received relating to satisfaction with the commute. The feedback on public transport was also supported by respondents with regard to the question about barriers to using public transport, as discussed in section 3.1.3.

Table 2 Themes influencing level of satisfaction with the daily commute

Theme	Number of Comments
Traffic congestion slowing vehicle travel time	104
Parking availability	88
Cost of petrol	67
Cost of parking	48
Convenience of using a private vehicle	45
Slow public transport travel times	37
Infrequent public transport	36
Unreliable public transport arrival/departure times	25
Health and safety concerns	23
Public transport accessibility issues	22
Negative effects on the environment	14
Other	46
Total	555

Traffic congestion slowing vehicle travel time – 104 comments

Most of the comments received for this theme discussed how traffic congestion during peak travel times can make travelling to and from Dunedin by private vehicle a slow and frustrating process. Respondents attributed traffic congestion to several factors including an increased number of vehicles on the road, road works, poorly synced traffic lights, and barn dance crossings in the Central Business District (CBD). To avoid congestion respondents commented on changes they make to their commute including, changing the time they travel to miss peak traffic times or travelling a different route, such as over Three Mile Hill. One respondent stated, "I try to leave home early to avoid the worst of the traffic." Respondents also indicated that they would be open to new transport options with one respondent explaining that they "would be interested in the possibility of a park and ride to and from Mosgiel".

Parking availability – 88 comments

These respondents discussed the difficulty in locating parking in Central Dunedin. A key cause of this was considered by respondents to be an insufficient number of car parks. Respondents within this theme, discussed the changes they have made to their commute to access parking. These changes include changing their travel time, parking some distance from their place of work, carpooling with other, or privately renting parking spaces. Two respondents discussed that difficulties finding parking have made dropping off and picking up elderly persons difficult. One respondent stated, "I bring my 93-year-old mother for appointments etc and busing is not an option for her, so I need better parking options".

Cost of petrol – 67 comments

These responses all related to the price of petrol and the impact it is having on their commute. One respondent commented "I don't like to drive my car in as the petrol prices are high". Whilst respondents would like to take alternative transport many indicated that this is not a viable option with one respondent stating, "Gas and parking are expensive but there isn't a bus that can get me to work on time, so I have no choice".

Cost of parking – 48 comments

The price of parking in central Dunedin was acknowledged to be a key issue when commuting. Due to the price of parking respondents have been required to either rent a parking space, park far from their place of work or travel to central Dunedin earlier than they would like to ensure they get free parking. One respondent stated, “I have to pay a lot for parking or park miles away.”

Convenience of a private vehicle- 45 comments

Some respondents discussed enjoying commuting using a private vehicle. When using a private vehicle respondents have the freedom to travel when and where they like. It was also said to make commuting around Dunedin quick and easy. One respondent summarised these sentiments stating, “I have no problem, happy with the commute, doesn't take long and with my car, I am free to come and go as I please, and take shopping home if required.”

Public transport travel times are too slow -37 comments

Responses regarding public transport travel times discussed that the current Mosgiel to Dunedin route is too long and makes too many stops. Due to this, it takes twice as long to travel by bus. One respondent stated, “I drive to work as the current bus takes double the time, if there was a direct bus I would definitely catch It.” This theme is discussed further in section 3.1.3.

Infrequent public transport – 36 comments

Responses discussed that the bus service needs to operate more frequently as the bus is often overcrowded and that current times are not suited to peoples travel behaviours. Due to this, respondents acknowledged that they were less willing to catch the bus with one respondent stating, “I would use the bus more often if the times available suited.” This theme is discussed further in section 3.1.3.

Public transport is too unreliable – 25 comments

The comments received within this theme focused on how public transport was considered too unreliable. These respondents provided examples such as buses not running in accordance with the advertised schedule and arriving either too early or too late or is canceled due to drivers being sick. Because the service is perceived as being unreliable, these respondents stated that they preferred using their own vehicle or ride-share into Central Dunedin. According to one respondent “I wish to take public transport but it is too unreliable. As I have kids to get home to and can’t afford to be waiting 40mins for a bus.”

Health and Safety concerns – 23 comments

Responses within this theme related to safety concerns regarding the commute to and from central Dunedin. These safety concerns related predominantly to unsafe winter driving conditions on icy roads. One respondent acknowledged this stating “I’m usually satisfied except in winter when the roads are not maintained for winter conditions”. Other safety concerns identified by respondents included, traffic congestion increasing near misses, unsafe cycling conditions, safety concerns walking to and from work and bus stops in the dark as well as the potential spread of COVID on public transport.

Public transport accessibility issues – 22 comments

Respondents discussed that current public transport is not easily accessible. These respondents commented about how there were no bus routes close to their homes or no bus stop close to their intended destination. According to these respondents, they would have to catch multiple buses to get to their destination and that is not practical. Respondents commenting on access to public transport acknowledged that they would like to see it become accessible and user-friendly in the future. One respondent stated, “I’d like to take the bus, but as the service isn’t accessible, reliable, or close by, I cannot” This theme is discussed further in section 3.1.3.

Three respondents who identified as having a mobility impairment commented within this theme of accessibility, stating that because the bus system is inaccessible for them, they have no choice but to use their private vehicle.

Negative environmental effects – 14 comments

These respondents expressed concern about how their current travel behaviour adversely impacts the environment. Examples provided by the respondents included burning fossil fuels, driving vehicles containing just one person, and driving short distances. One respondent stated, “I do feel guilty that I am driving in by myself in a

private car and that to travel to my work in North Dunedin I have to drive through the city, a detour over 3-Mile Hill would extend my trip by 15-20mins, so would love an alternative that was better for the environment".

Other – 46 comments

Other less common factors also impacted respondents' journey satisfaction. These factors included individuals enjoying cycling, that public transport and the motorway being stressful, roadworks, the quality of roads, the current unsatisfactory bus service, and ride-sharing. Additional comments such as "good" and "fine" were also made to describe respondents' journey satisfaction

3.1.3 Barriers to using public transport

Respondents were asked to explain what factors were preventing them from using public transport. The feedback provided in response to this question, is consistent with the key themes that emerged when asked about satisfaction with their current commute. An overview of the key themes is presented in Table 3.

Table 3 Emerging themes regarding the barriers to using public transport

Theme	Number of comments
Amount of time and reliability of the bus service	228
Infrequent bus service	107
Accessibility of bus services	90
Required use of private vehicle	35
Traveling with children	31
Health and wellbeing on public transport	19
Other	63
Total	573

Amount of time and reliability of the bus service – 228 comments

These comments discussed the poor functioning of the current bus service. Respondents noted that currently, the bus is an inconvenient mode of transport which prompts them to use private vehicles regardless of the increasing expenses (also discussed regarding satisfaction of commute in 3.1.2). One of the key issues raised with the current bus service is that it takes too long, according to respondents this time can be up to twice as long as commuting by private vehicle. Factors identified by respondents that contribute to this increased travel time include; multiple stops on the bus route, waiting times, additional walking time required to get to and from the bus stop, and having to catch multiple buses. One respondent stated that the frequent cancellations of the bus service would make them anxious as they would never know if they were going to have a ride home.

Infrequent bus service – 107 comments

The frequency of the bus service was also discussed as a key operational factor preventing bus use. These respondents discussed that the lack of frequency of buses particularly around peak travel times meant that the buses were overcrowded with workers and children trying to get to and from work and school. Consequently, the experience is uncomfortable due to overcrowding. The lack of frequency of the bus service also makes using it impracticable for those traveling outside peak times such as shift workers. Many of these workers are starting work either before the bus service commences or after the bus service has finished. One respondent acknowledged this stating "the timetable for nurses starting at 06:45 and finishing 23:00 add a barrier to me using the bus, as I can only use it typically one way due to my roster."

Accessibility of bus services – 90 comments

Accessibility of the bus service, particularly with regard to location of bus stops was discussed by these respondents. Examples were provided about how respondents did not have access to a bus stop within a 10-minute walk of their home. This was acknowledged as a barrier for respondents living in Outram, Allenton, Waihola, North Taieri, and Wingatui and resulted in them using their private vehicles.

Required use of private vehicle – 35 comments

Respondents in this theme discussed the need to use a private vehicle when commuting. Multiple factors contributed to this requirement including running multiple errands a day, shopping, transporting elderly relatives, living rurally, having a company vehicle, driving frequently for work, transporting equipment and tools, and commuting flexibility. One respondent stated that they, "live very rural and often have a large number of purchases to transport." Another respondent stated that they just "simply enjoy driving their own vehicle".

Travelling with children – 31 comments

Responses received discussed that traveling with children was a barrier to using public transport. Respondents discussed how they were responsible for picking up and dropping off children at school and other activities. Due to time restrictions using a private car is the most convenient way to do this. One respondent acknowledges this stating "I am responsible for the primary school drop off and pick up for my family - my workday would be too short if I took the bus as I wouldn't get to work until 10 am and would have to leave around 1:30 pm to make it viable (15 min walk to the bus hub from work)." One respondent also noted having a vehicle is convenient in case they unexpectedly have to pick up a sick child from school.

Health and wellbeing concerns on public transport – 19 comments

Multiple respondents discussed their concerns regarding the transmission of COVID. As buses can be overcrowded respondents expressed that they did not feel safe traveling in a confined space with others particularly when others do not wear masks. This sentiment is summarised by one respondent who stated "I was using the bus every day, but I was uncomfortable during COVID with the number of people who do not wear a mask. Also, the buses are often crowded and only leave every 30 minutes".

Other comments

Several other less common factors prevented individuals from using public transport. These included people being uncomfortable on the bus as they are cold, can be unclean, and are full of strangers, individuals already ridesharing, being retired and not traveling into central Dunedin frequently, mobility issues, and the habit of catching public transport not being ingrained.

3.2 Interest in using Park and Ride Services

The Study investigated level of interest in using a potential Park and Ride facility in Mosgiel to understand what factors would contribute to its successful implementation. Respondents were provided with multiple desirable features and asked to rank their importance on a scale from very important to not important. The three features that were ranked as very important included;

– the Park and Ride having sufficient and always available parking (71% of respondents stated very important),
– free parking (68%), and
– an express bus service direct from Mosgiel to the CBD (66%).

The key findings are illustrated in Figure 10.

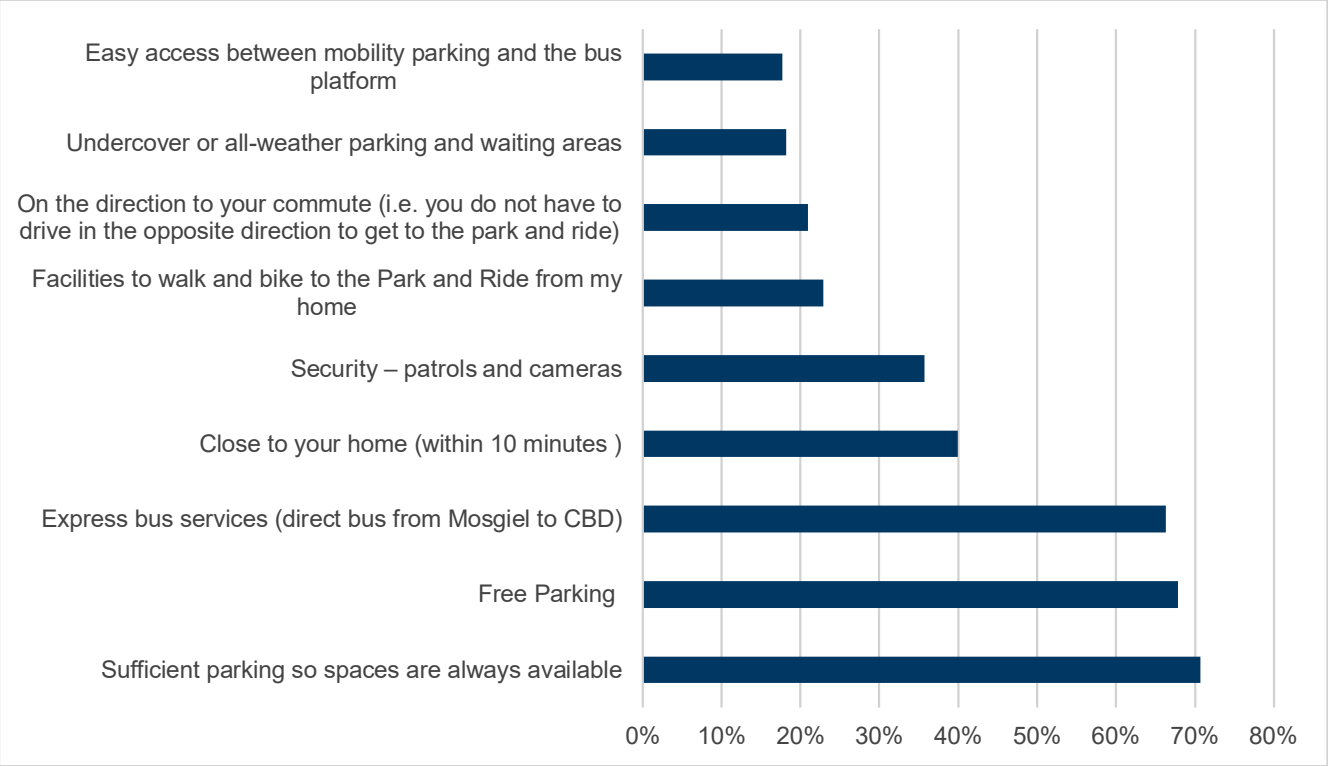


Figure 10 Features of the Park and Ride that were considered Very Important by Survey Respondents

Participants were asked where they would prefer the Park and Ride to be located within Mosgiel. The two most preferred locations were near State Highway 1 (32%) and central east Mosgiel (between Factory Rd and Gladstone Rd North) (21%), as illustrated in Figure 11. 14% of respondents suggested other locations, these included Green Island, the old railway station, and Gordon Road.

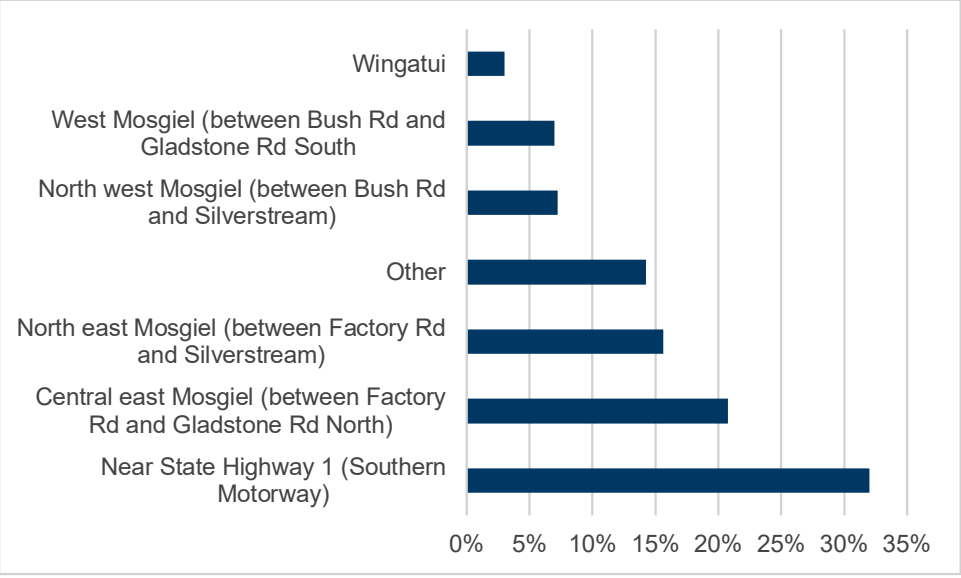


Figure 11 Preferred location for a park and ride in Mosgiel

Respondents were also asked about their preferred location in Central Dunedin for the Park and Ride Bus to drop-off passengers. The most popular locations in the City were the bus hub (29%), the CBD (26%), and the university (24%) as shown in Figure 12. In some cases, respondents discussed that there should be multiple stops in the central Dunedin area. Less frequent responses also included the hospital (10%) and South Dunedin (1%).

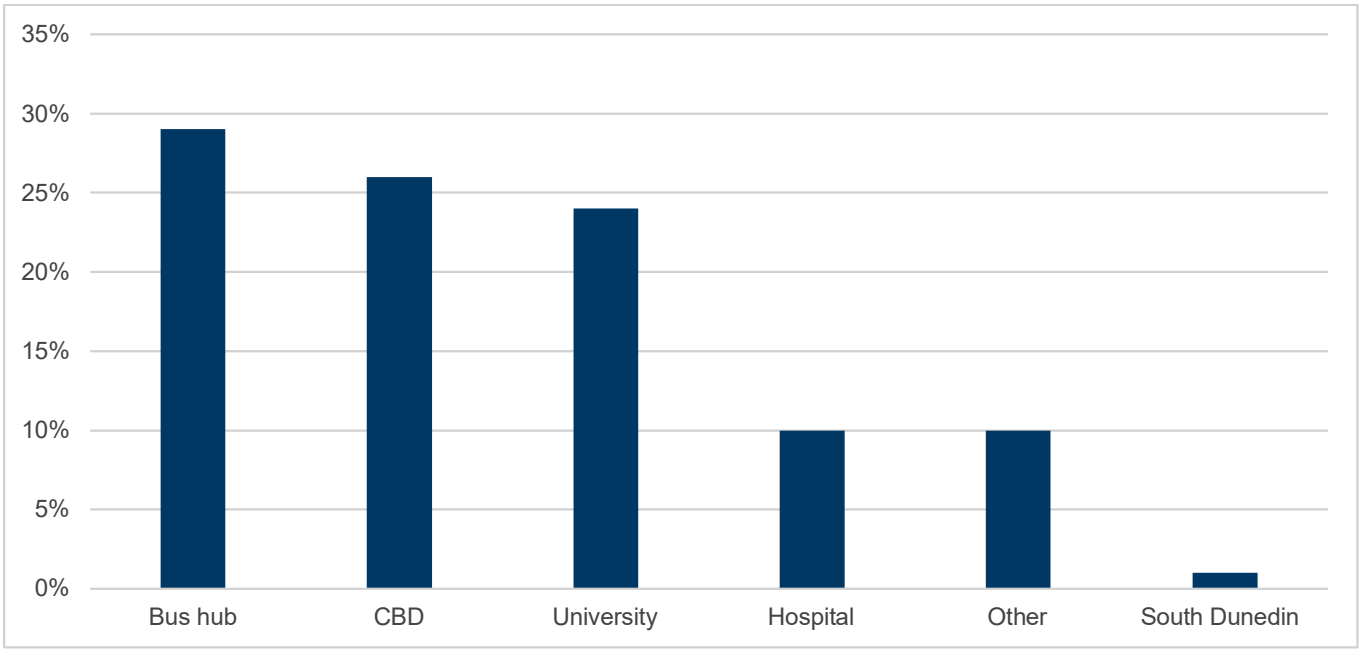


Figure 12 Preferred bus stop destination in Central Dunedin

Respondents were asked to rate on a scale of 1- 5 how likely they would be to use the Park and Ride, 1 being very unlikely and 5 being very likely. Overall, 296 respondents (64%) indicated that they would use the Park and Ride with 162 respondents 35% stating that they would very likely use the Park and Ride, as illustrated in Figure 13. 13% of respondents stated that it was very unlikely that they would use the Park and Ride. This shows that there is a clear willingness and support for the development of a Park and Ride in Mosgiel.

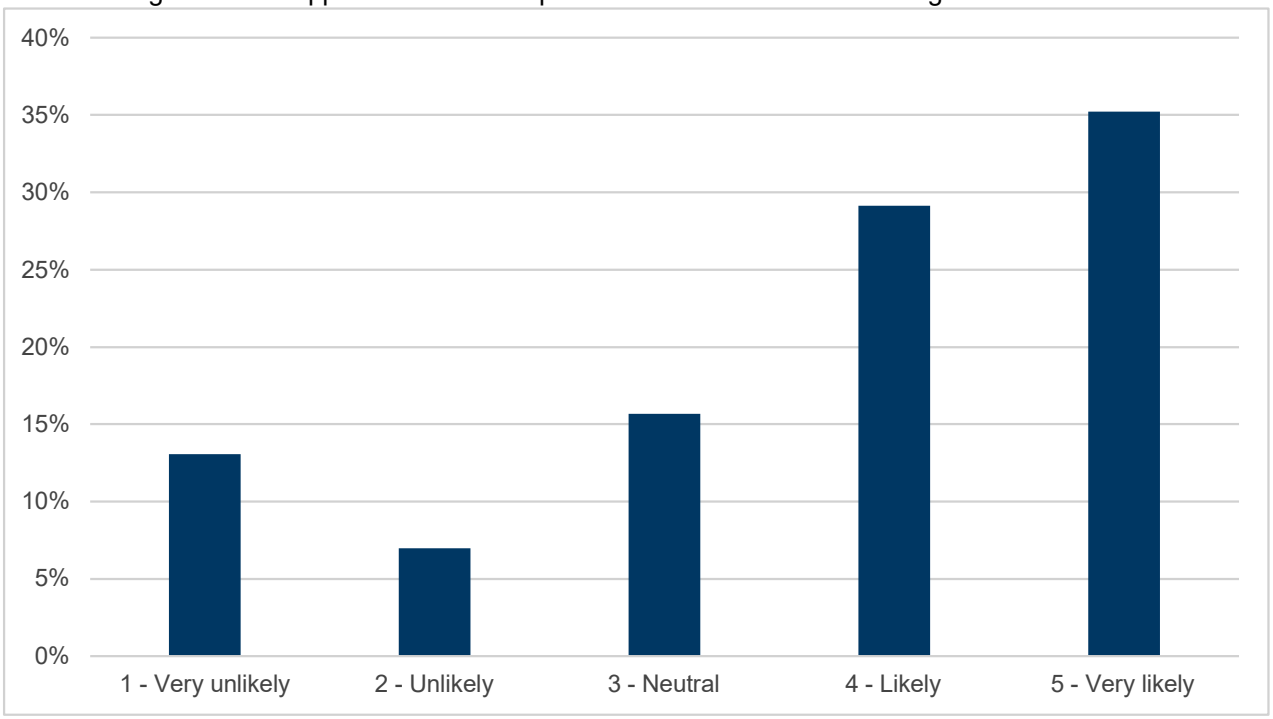


Figure 13 Respondent level of likelihood for using the proposed Park and Ride

3.2.1 Feedback on the proposed Park and Ride

The final section of the survey asked respondents if they had any final comments on the potential introduction of the Park and Ride. A key theme to emerge from this question was the level of support for the Park and Ride facility, as well as suggestions as to what would need to be considered for the Park and Ride to be successfully implemented. The themes are summarised in Table 4.

Table 4 Emerging themes regarding final feedback provided by survey respondents

Theme	Number of Comments
Support for a Park and Ride	130
New bus schedule to support a Park and Ride	31
Recommendations for additional bus stops	22
Development of a train service	22
Further suggestions on Park and Ride location	16
Opposition to the Park and Ride	14
Park and ride should be inexpensive	13
Other feedback	24

Support for a Park and Ride facility – 130 comments

These comments demonstrated a high level of support for the Park and Ride. Respondents discussed how the service would "make life so much easier", would encourage people to use the bus, and would help create a greener environment. Many respondents also expressed their eagerness to get the Park and Ride up and running with one respondent stating, "Great idea, the sooner the better". Some respondents who would not be able to use the park and ride also offered support for the initiative acknowledging that although it may not help them it is a "great idea" and "would get a lot of use".

New bus schedule to support a Park and Ride – 31 comments

Respondents commented that the Park and Ride would need to be supported by a frequent bus service that better accommodates different work schedules. Some respondents suggested that the service would need to be operational before 7 am and have a late-night service (around 9 pm-10 pm). It is also suggested that the bus service run approximately every 10-15 minutes so that it is easy to use and provides users greater flexibility in terms of travel times.

Recommendations for additional bus stops – 22 comments

As well as additional Park and Ride locations respondents also suggested additional bus stops needed on the express bus route. These include Green Island, Outram, Three Mile Hill, and South Dunedin.

Development of a train service – 22 comments

Respondents discussed the potential of a passenger train service. This train service would avoid traffic on the motorway, better cater to parents and children as it has a greater ability to take prams, and will be an attractive transport option as it will be a novelty.

Park and Ride location – 16 comments

Respondents acknowledge that the Park and Ride would have to be easily accessible. As a result, several additional locations for the Park and Ride were suggested. These include the corner of Tay Street and Gordon Road, opposite Hotel Taieri, Burnside, Hagart Alexander Drive, and Neil Street. Respondents also discussed the potential of establishing an additional Park and Ride in Green Island.

Opposition to the Park and Ride – 14 comments

These respondents were not supportive of the Park and Ride and referred to the initiative as a waste of time, unhelpful, and a waste of money. One respondent stated, “I think it's a waste of 5 million dollars that could be better spent elsewhere.”

Park and ride should be inexpensive – 13 comments

Ensuring that the use of the Park and Ride is inexpensive was suggested to be important to its successful utilisation. It was suggested the bus fare is kept to a minimum and parking is either free or inexpensive to ensure the service is more cost-effective than using a car. One respondent summarised this sentiment by stating that the “success of a Park and Ride system is that it needs to be more convenient and no more expensive than taking a private car.”

Other feedback – 24 comments

Other feedback received from respondents focused on improving the reliability of the service so travel times are not so variable and including covered waiting areas, toilets, security cameras monitoring parked bikes and vehicles and suitable lighting. It was also suggested by a respondent that an express bus from the airport to central Dunedin be investigated.

3.3 Summary of written submissions

Key stakeholders and members of the public also contributed written submissions outlining their views on the potential Park and Ride. Written submissions were received from:

– The University of Otago
– Te Whatu Ora Health NZ Southern (former Southern District Health Board)
– AA Otago
– Disabled Persons Assembly NZ.

All of these stakeholders supported the implementation of the Park and Ride facility and suggested design features that need to be included in the Park and Rides design. These features are summarised as follows:

– Secure bike parking facilities and a potential supporting cycleway network.
– Shelter for commuters waiting (with enough space to social distance)
– Security for the Park and Ride
– Initial free parking to encourage people to use the Park and Ride
– Sufficient mobility parking adjacent to the facility
– Fully accessible toilets
– Tactile strips to enable safe navigation by blind/low vision people
– Space available to enable people using all kinds of modes including bicycles, skateboards, wheelchairs, and mobility scooters to do so safely while using the facility
– Wayfinding signage and available information about the facility

The AA support the Park and Ride, however they made recommendations regarding improvements to operation of the bus service. Similar to feedback provided through the survey, the AA expressed concern that the current bus service is frequently disrupted or cancelled. It was recommended that this be addressed so that members of the community have confidence in the service.

Members of the public also submitted written submissions. There were two email submissions and nine comments on the Dunedin City Council post. Written submissions from the public indicated that there is support for a functioning train service. A train service is viewed to be a more effective solution to reducing private vehicle use and moving a higher volume of passengers in fewer trips. Submitters noted that the initial infrastructure is existing. It is suggested that this train service could run from Mosgiel to Port Chalmers. An additional tram line from the university to St Clair is also suggested.

One respondent stated that a Park and Ride was “not suitable” for Dunedin as it causes double the amount of vehicles on the road and suggested small business hubs with parks were developed instead.

Finally, one member of the public suggested a Park and Ride service be established in Macandrew Bay or Broad Bay to assist those commuting into central Dunedin from the Peninsula.

3.4 Demographics

The online survey received 476 responses. Figure 14 and Figure 15 present the gender and age demographics of the survey respondents. 63% of the respondents stated that they were female. The age groups were relatively evenly distributed between the ages of 25 years and 55 years.

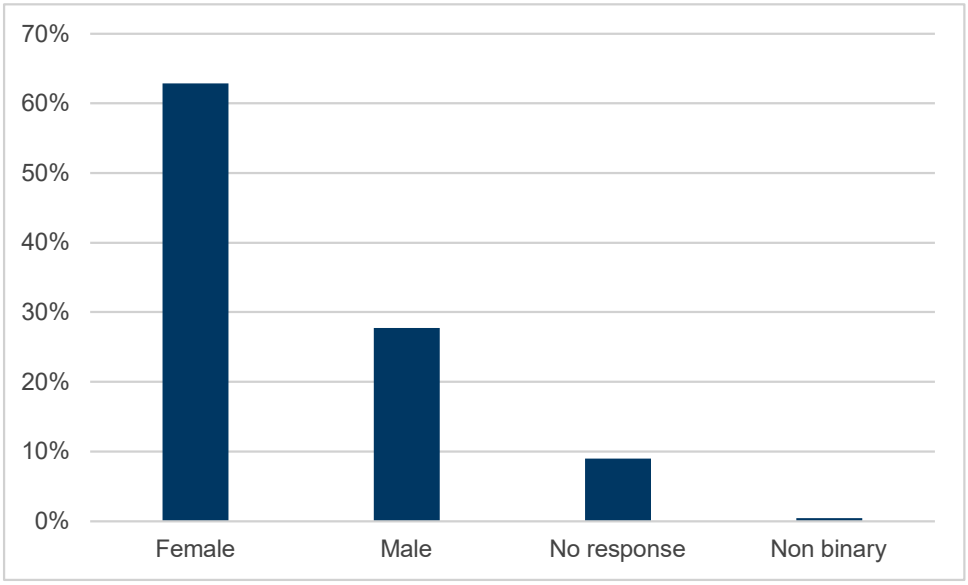


Figure 14 Gender of survey respondents

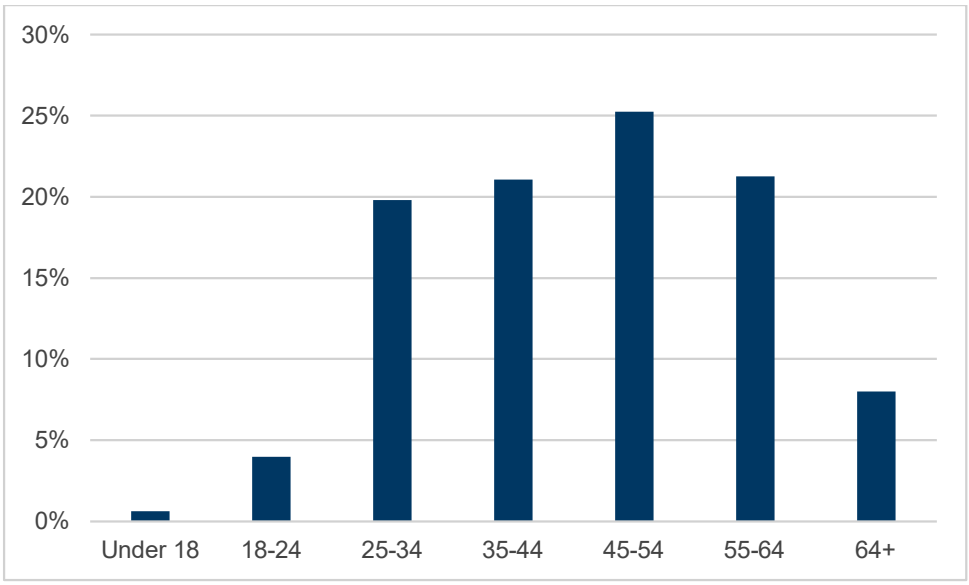


Figure 15 Age of survey respondents

The majority of respondents did not identify as a disabled person (91%), as illustrated in Figure 16.

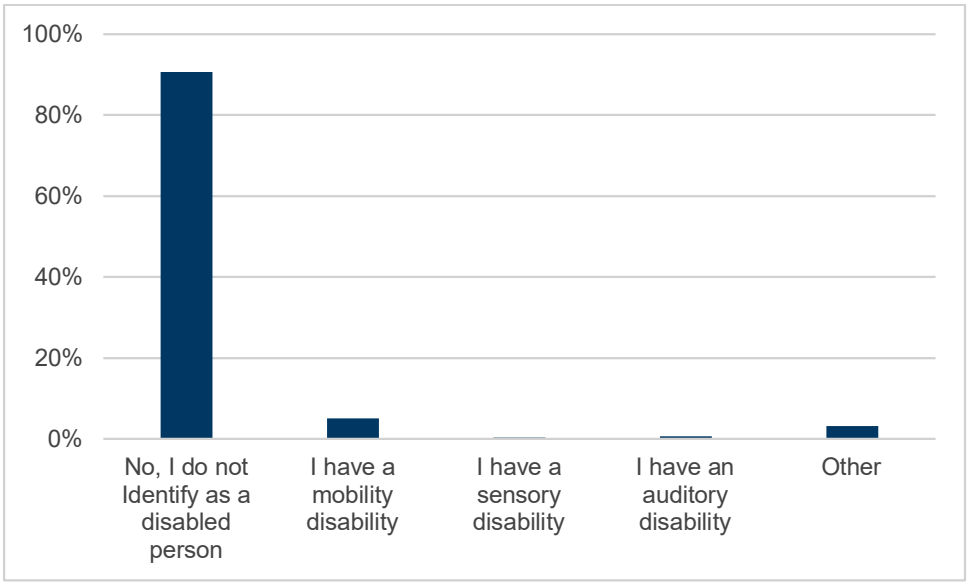


Figure 16 Respondents who identify as a disabled person

Park and Ride Transport

Please complete our five minute survey so we can understand how people travel to central Dunedin, how often, by what means, for what purpose and what, if any, services and facilities they would like to see at a Park and Ride in Mosgiel.

Travel Behaviour

Help us understand how you are currently commuting

1.Which of the following areas are closest to your usual starting point for your travel into central Dunedin? [Single Choice]

- Mosgiel
- Outram
- East Taieri
- North Taieri
- Allanton
- Fairfield
- Green Island
- Waihola
- Balclutha
- Kinmont Park
- Broader Dunedin City Council area
- Other (please specify)

[Proceed to next question]

2. How many days of the week do you usually travel to or from central Dunedin? [Single Choice]

- Less than once per week
- 1-2 days
- 3-5 days
- 6-7 days

[Proceed to next question]

3. During a typical week, what time do you most often travel to central Dunedin? [Single Choice]

- Before 6am
- 6am - 7am
- 7am – 8am
- 8am - 9am
- 10am - 11am
- After 11am

[Proceed to next question]

4. During a typical week, what time do you most often travel from central Dunedin? [Single Choice]

- Before 3pm
- 3pm to 4pm
- 4pm to 5pm
- 5pm to 6pm
- 6pm to 7pm

[Proceed to next question]

5. What is the main purpose for your most common journey into central Dunedin? [Single Choice]

- Work
- Hospital and health services
- Education
- Access services (shopping, medical etc.)
- Entertainment/dining out
- Other (please specify)

[Proceed to next question]

6. What is the main way you usually travel to central Dunedin? [Single Choice]

1. Private vehicle (driver)
2. Work owned vehicle (driver)
3. Vehicle (passenger)
4. Rideshare or carpool
5. Bus
6. Bicycle
7. Motorcycle
8. Other (please specify)

7 In general, how satisfied are you with your travel into Dunedin?

1 being extremely dissatisfied and 5 being highly satisfied

[Single Choice]

- 1 Extremely dissatisfied
- 2
- 3
- 4
- 5 Highly satisfied

[Proceed to next question]

8. Please explain your level of satisfaction

(Short answer text)

[Proceed to next question]

Public transport

9. How many times do you use buses for your travel in a typical week? [Single Choice]

- Five or more times per week
- Three or four times per week
- One or two times per week
- Less than once per week

[Proceed to next question]

10. Tell us what prevents you from using buses or public transport more often?

[Short answer text]

[Proceed to next question]

Interest in using Park and Ride services

A Park and Ride system will involve the provision of parking facilities in which residents can park their car and travel into the city using public transport. Users will be able to park their car in Mosgiel without cost and then catch an express bus which will follow a direct route into central Dunedin.

11. Thinking specifically about Park and Ride facilities, which of the following are most important in encouraging you to use them? Please rank the options from most to least important to you. [Ranking]

- Close to your home (within 10 minutes)
- Express bus services (direct bus from Mosgiel to CBD)
- On the direction to your commute (i.e. you do not have to drive in the opposite direction to get to the park and ride)
- Free parking
- Sufficient parking so spaces are always available
- Security – patrols and cameras
- Undercover or all-weather parking and waiting areas
- Facilities to walk and bike to the Park and Ride from my home
- Easy access between mobility parking and the bus platform
- Other (please specify)

[Proceed to next question]

12. If a Park and Ride facility were to be located in Mosgiel, where would be your preferred location? [Single Choice]

- North east Mosgiel (between Factory Rd and Silverstream)
- North west Mosgiel (between Bush Rd and Silverstream)
- Central Mosgiel East Mosgiel (between Factory Rd and Gladstone Rd North)
- West Mosgiel (between Bush Rd and Gladstone Rd South
- Wingatui
- Near State Highway 1 (Southern Motorway)
- Other (please specify)

13. "Please tell us your preferred location for where the Park and Ride Bus should STOP in Central Dunedin?"

(Short answer text)

[Proceed to next question]

14. If there were good facilities at a well-located Park and Ride what is the likelihood that you would increase the number of times you would travel by bus? [Single Choice]

- 1 – Extremely unlikely
- 2
- 3
- 4
- 5- Extremely likely

[Proceed to next question]

Demographic

15. How old are you?

[Single Choice]

- Under 18
- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65+

[Proceed to next question]

16. What is your gender?

[Short text answer]

[Proceed to next question]

17. Do you identify as a disabled person? [Single Choice with option to add comment]

- No I do not identify as a disabled person
- I have a mobility disability
- I have a sensory disability
- I have an auditory disability
- Other (please specify)

[Proceed to next question]

18. Do you have any final comments about the potential introduction of a Park and Ride system?

[Short text answer]

Thank you

Thank you for your responses today, we really appreciate the time you have taken to answer our questions. The feedback obtained from this survey will inform our Business Case.


MOSGIEL PARK AND RIDE
CONNECTING MOSGIEL TO CENTRAL DUNEDIN
Take our survey and help us understand how people travel to central Dunedin.
www.dunedin.govt.nz/mosgiel-park-and-ride
transport@dcc.govt.nz
03 477 4000
DUNEDIN CITY COUNCIL
kaunihera a-rohe o Ōtepoti
CONNECTING dunedin

Appendix B

Investment Logic Map workshop summary

Mosgiel Park and Ride

Investment Logic Mapping Workshop 19 May 2022

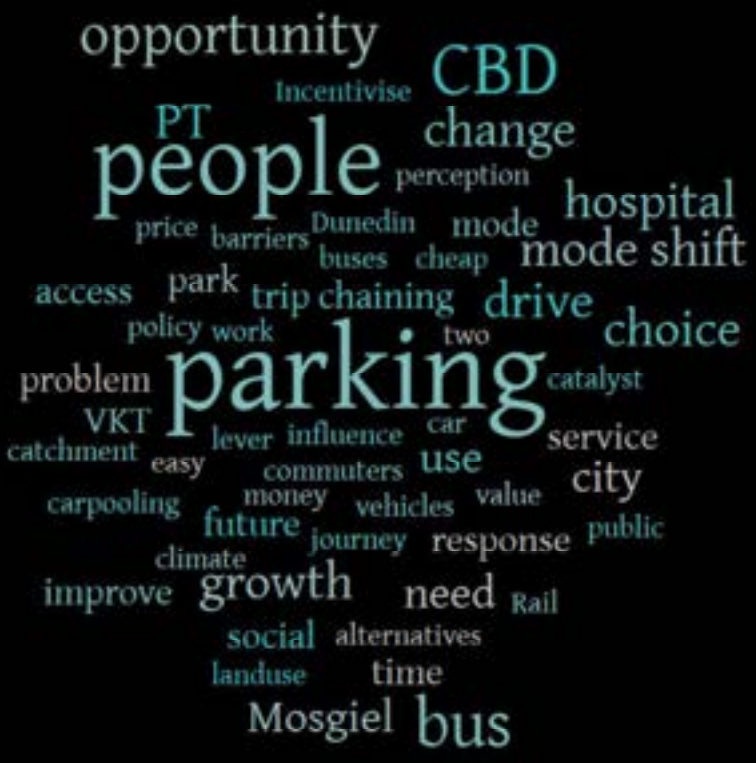
Issued 31 May 2022

Post-Workshop Pack

Purpose and Outcomes

- To present a summary of the Investment Logic Mapping (ILM) workshop and evidence base

→ Collated from our notes of what we heard



Key themes we heard

→ You told us your views about what this project means

"Park and Ride is a lever to make sustainable change"

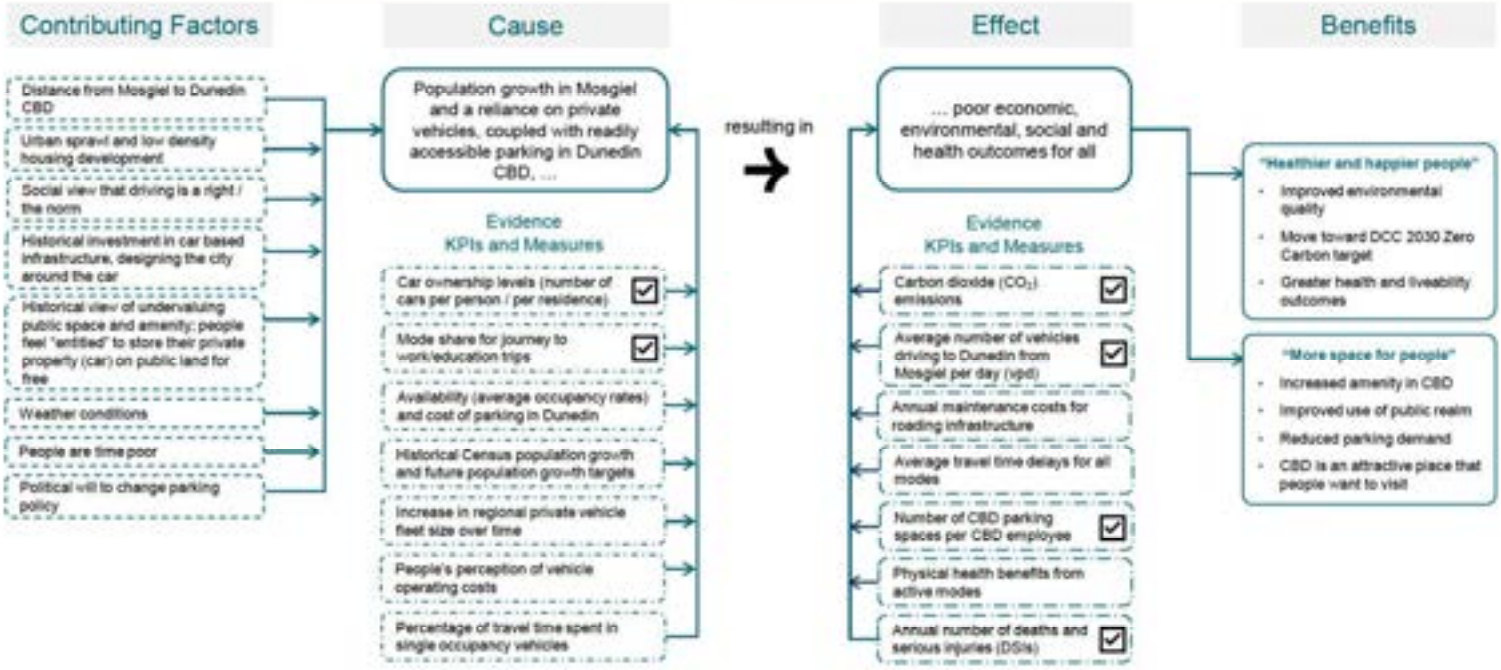
"It is an opportunity to balance transport system outcomes... the challenge is the attitudes to PT... and the supplementary tools to attract people with higher barriers to mode shift"

"It is about helping people move about the city better"

"An opportunity to increase mode choice for the people who live to the south of Dunedin"

Workshop Mapping

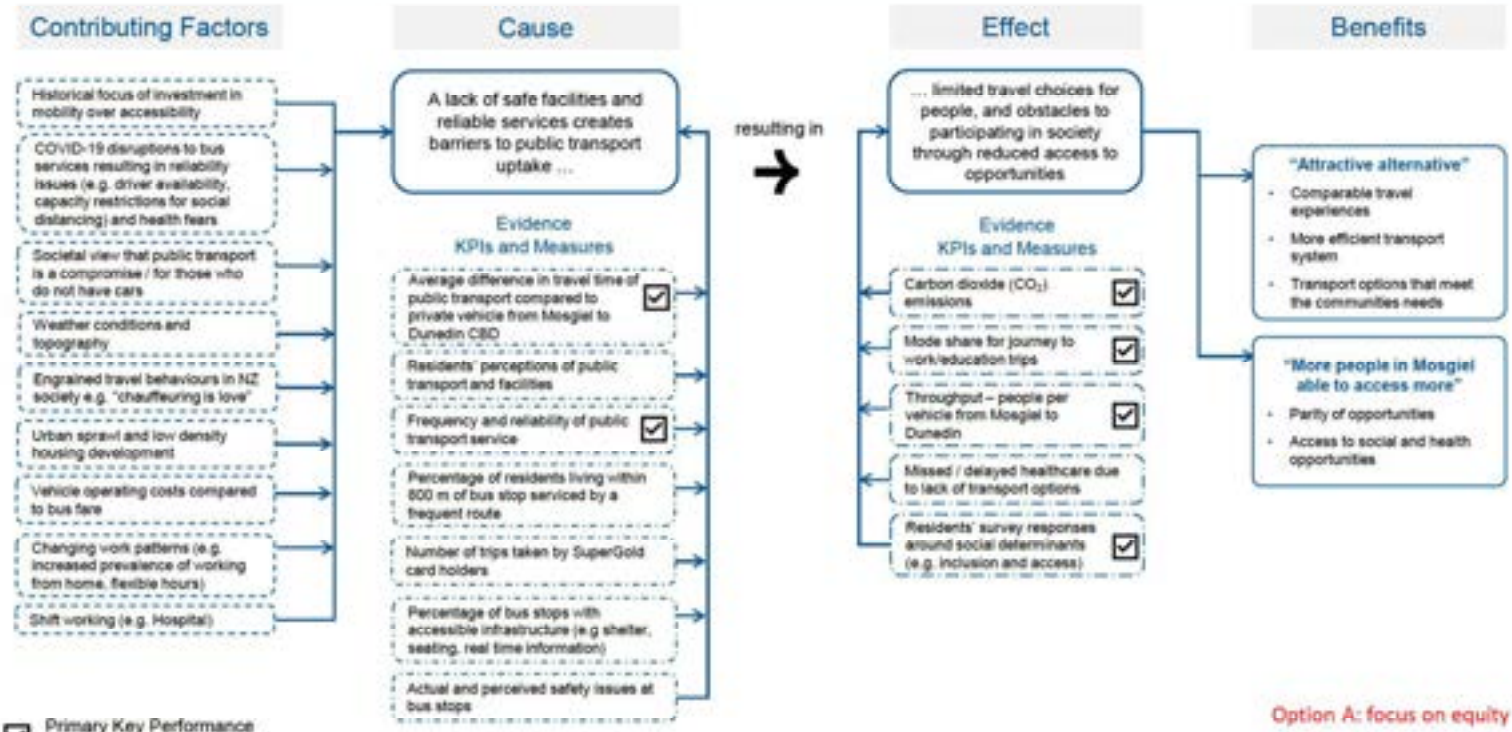
Draft Problem Statement 1: Mosgiel Park and Ride SSBC



☑ Primary Key Performance Indicators (KPIs) to measure

DRAFT FOR COMMENT

Draft Problem Statement 2A: Mosgiel Park and Ride SSBC



☑ Primary Key Performance Indicators (KPIs) to measure

Option A: focus on equity

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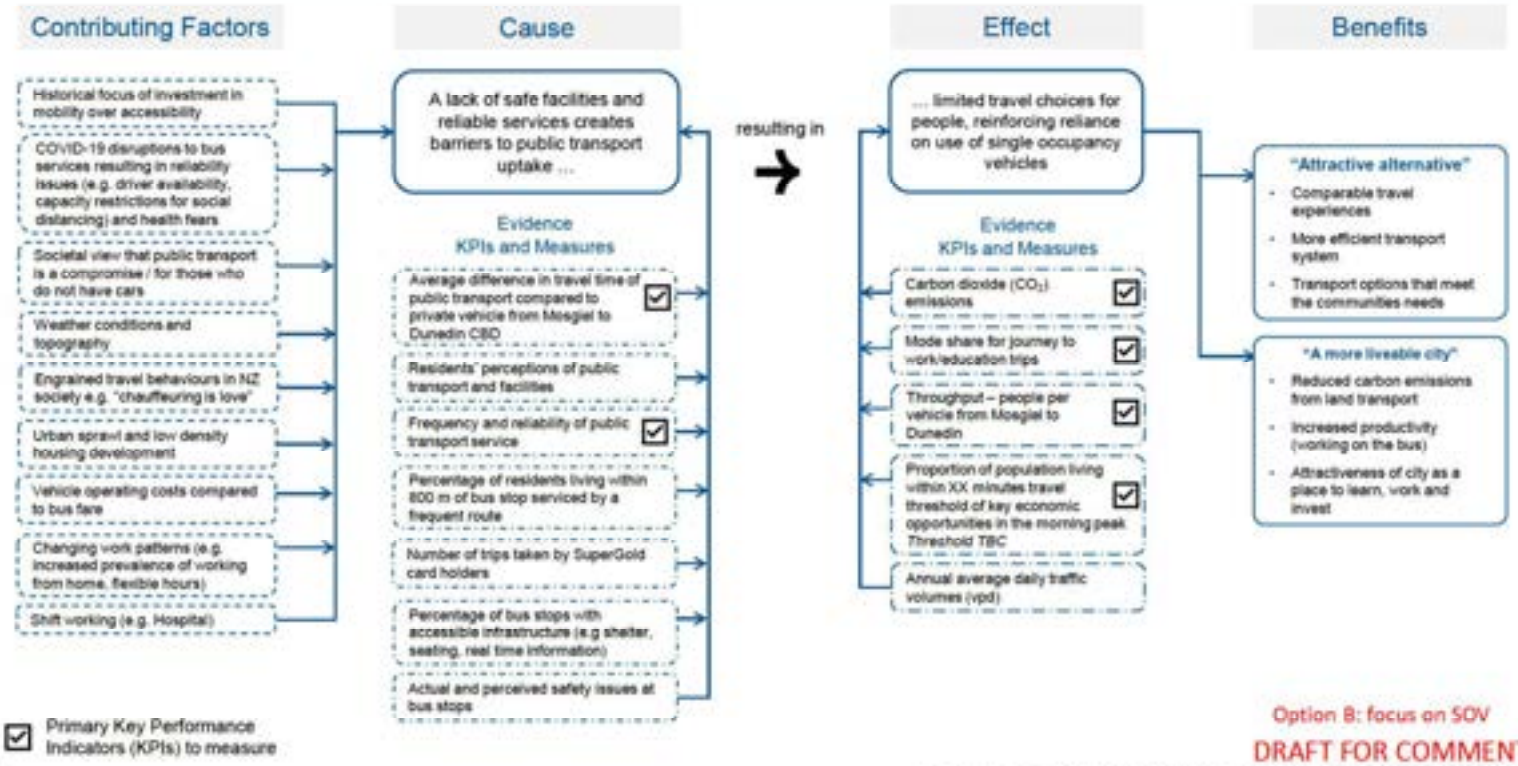
Draft Problem Statement 2B: Mosgiel Park and Ride SSBC



Option B: focus on SOV

DRAFT FOR COMMENT

Next Steps

- GHD to use evidence and feedback gathered to draft the Strategic Case
- Long list workshop 23 June 2022 (TBC)

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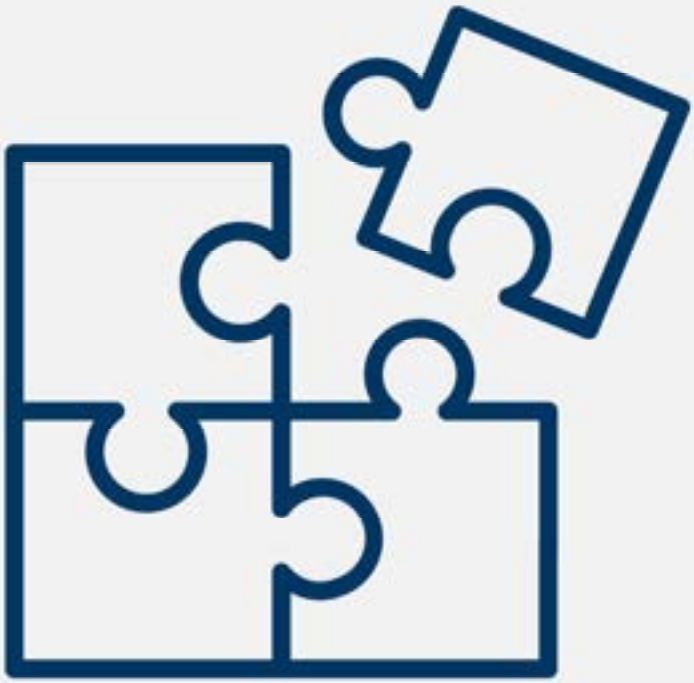
Background and Context

→ Mosgiel Park and Ride



Context

The Park and Ride Facilities at Mosgiel project is one of seven Dunedin City Council projects of the Shaping Future Dunedin Transport Programme:

→ Change the Dunedin transport network to support the location of the New Dunedin Hospital

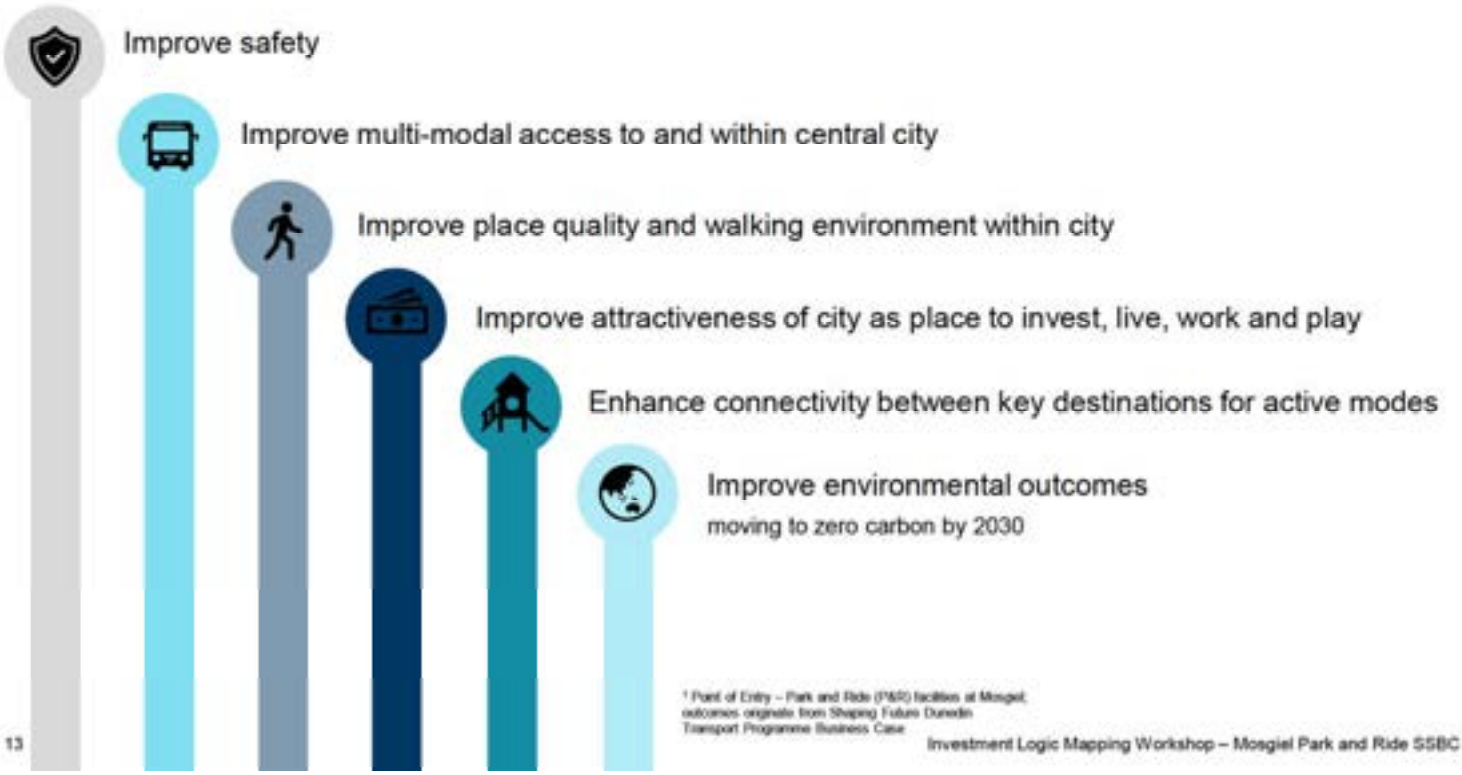
→ Provide a future focused, accessible transport system enabling placemaking and liveability outcomes for the city

Mosgiel Park and Ride

Objective:

Develop Park and Ride facilities to provide an attractive alternative to driving, and reduce parking demand and traffic in the central city

Outcomes Sought[1]



[1] Point of Entry – Park and Ride (P&R) facilities at Mosgiel; outcomes originate from Shaping Future Dunedin Transport Programme Business Case

Quick Stats

13,638

Mosgiel population (2018 Census[1])

3,834

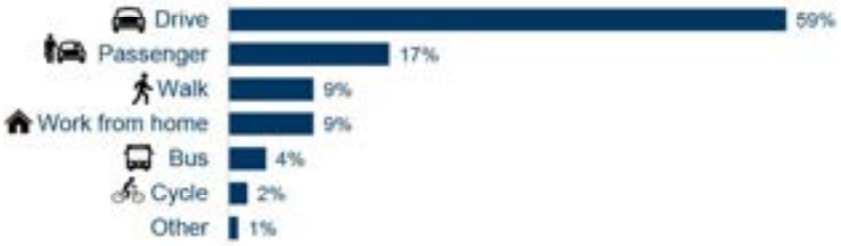
Outer hinterland population (2018 Census[2])

90%

Mosgiel households with at least one car (2018 Census[3])

154

Route 77 bus patronage 07:30 to 09:30[4]



Mosgiel Travel to Work and Education (2018 Census[5])

8-10%

SFDT predictions for Dunedin public transport mode share post SFDT[6]

[1] Statistics NZ, Statistical areas: Bush Road (2,361), East Taieri (2,184), Mosgiel Central (2,604), Mosgiel East (2,604), Seddon Park (2,871), Wingatui (891)

[2] Statistics NZ, Statistical areas: Momona (2,325), Taieri (1,509)

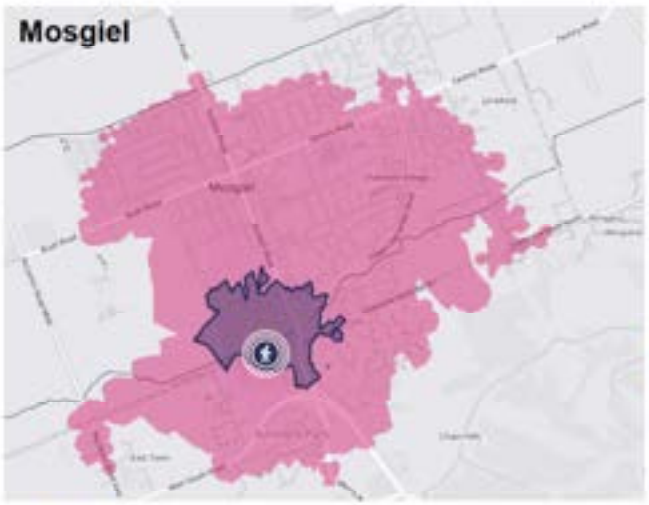
[3] Statistics NZ, Statistical areas: Mosgiel Central

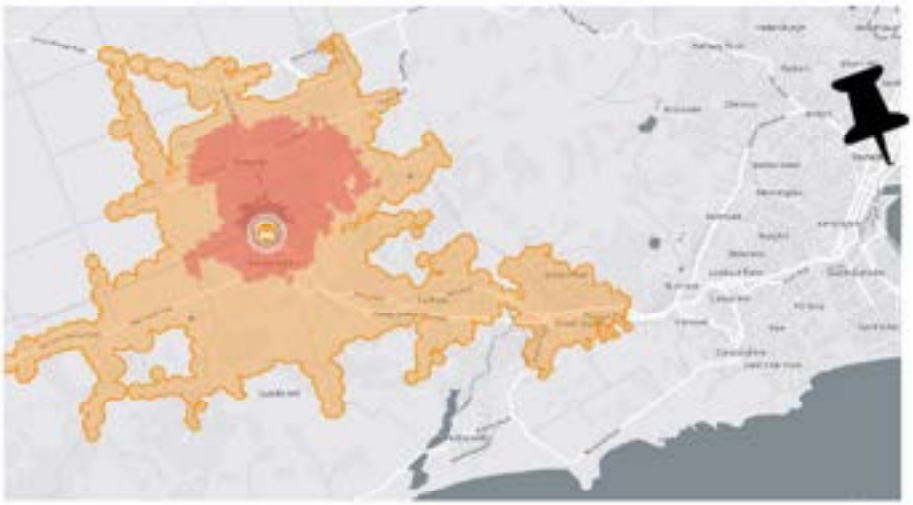
[4] Stantec, Cordon Travel Survey 2021, counted at Market Reserve bus stop on Wednesday 17th March 2021

[5] Statistics NZ Commuter Waka Departures from Statistical areas: Bush Road (2,361), East Taieri (2,184), Mosgiel Central (2,604), Mosgiel East (2,604), Seddon Park (2,871), Wingatui (891)

[6] Waka Kotahi NZ Transport Agency, Shaping Future Dunedin Transport Programme Business Case (2021), Appendix M

Isochrones[1]





10 min

10 min

10 min

[1] Travel Time Map | Drive Time Radius & Other Modes

Feedback Summary

→ Previous discussions and questionnaire responses

SFDT Survey Themes

62% **Supported proposed Park and Ride facilities at Mosgiel and Burnside**

▲ **86%** ▲ **71%**

Social media support for proposed Park and Ride facilities at Mosgiel and Burnside

Cost

"Sounds like a good plan but could potentially bite back if not strongly incentivised. Reducing cost would be key to motivate individuals to use this system i.e. it should be cheaper if they park and ride than drive to the city."

Bus Services

"The park and ride bus would have to be regular enough to make it worthwhile using and the parking facility needs to be well lit and have security."

Existing demand

"I do "park and Ride" now on the #77 bus from Mosgiel as we live 3kms from nearest stop (corner of Bush and Factory Road)."

Rail

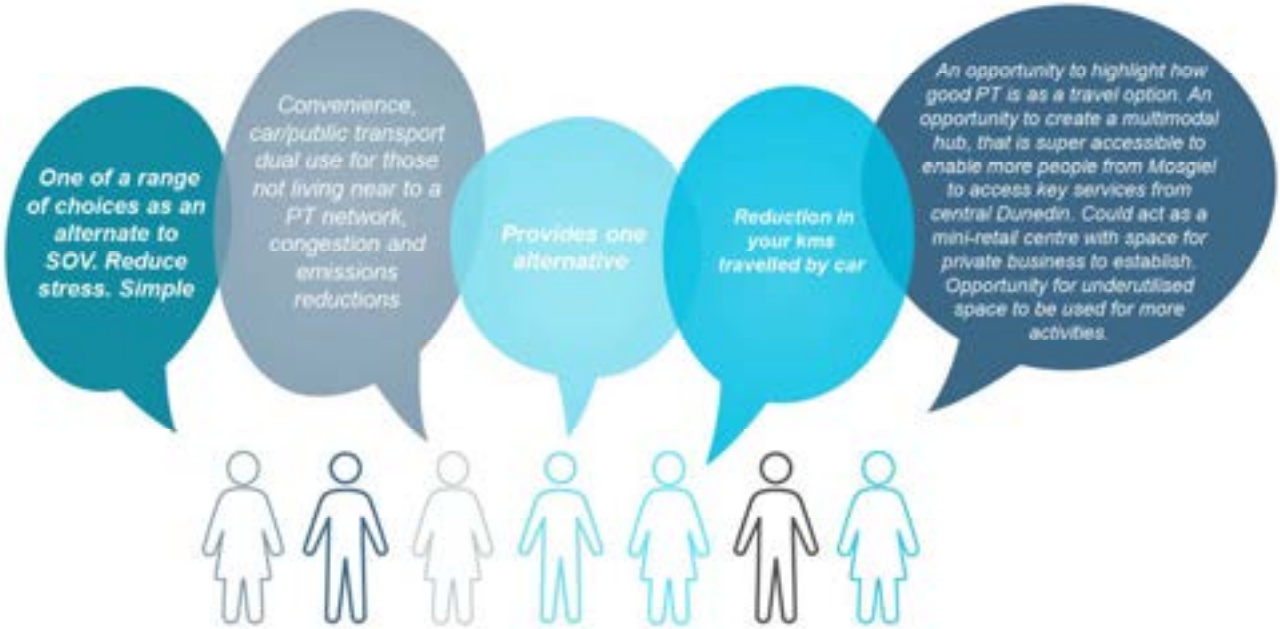
"I support the park n ride from Mosgiel/Burnside but would prefer the ride to be on the train."

Demand

"I'm not sure the Mosgiel option would be well used? Is there a way to trial that first?"

What do you believe are the three main historical and contributing factors to the transport challenges for movement / commuting between Mosgiel and Dunedin?

What do you think are the three current and future challenges for meeting a reduction in car trips between Mosgiel and Dunedin?



Explain the opportunities that a Mosgiel Park and Ride represents to the community.

What would a successful park and ride outcome look like to you in two years time?

How would you measure success or failure from the implementation of park and ride facilities in Mosgiel?

* Thank You

→ ghd.com

Appendix C

Project risk register

Risk description	Likelihood	Consequence	Mitigation	Risk owner
Stakeholder – KiwiRail relationship Risk that KiwiRail do not agree to the lease and development of their yard. Alternate site may then have to be explored which will have potential programme and cost risks, as well as being a less favoured site.	Possible	Moderate	Discussions with KiwiRail started in July 2022 to understand constraints on using the site. Maintain frequent and transparent communication.	DCC
Stakeholder – ORC relationship Risk that current working relationship with ORC is not maintained, resulting in risk that Park and Ride project is not delivered in parallel with express service.	Unlikely	Moderate	Maintain frequent and transparent communication. DCC and ORC are both partners in the Connecting Dunedin programme which this project falls under. Oversight of this partnership is provided by the Connecting Dunedin Governance Group which acts to ensure well-aligned delivery of the Shaping Future Dunedin Transport programme.	DCC
Stakeholder – Political support Local elections in 2022, followed by the national election in 2023, may result in changed funding priorities and level of political support for the project.	Possible	Moderate	Demonstrate a strong case for investment, both economical and community support. Dunedin City Council to keep Councillors informed about the project and the expected benefits.	DCC
Financial Funding not obtained from Waka Kotahi leading to project costing the Council more than budgeted. Risk that available funds in the NLTF are allocated to other projects within the 561 activity class (passenger facilities and infrastructure improvements – bus). This project has a "N" funding source meaning it will compete with other projects nationally for funding.	Unlikely	Moderate	Early and regular conversations about project with Waka Kotahi. Project intentions signalled through SFDT PBC and included in 2021-24 NLTP. Demonstrate a strong investment case with regular reviews by Waka Kotahi so there are no surprises.	DCC
Financial The preferred option is located on a KiwiRail yard and will require agreement with KiwiRail to use the site. Risk that the costs associated with the lease agreement and access rights are higher than anticipated and are unaffordable.	Unlikely	Moderate	Lease agreement to be signed between DCC and KiwiRail prior to pre-implementation to reduce risk of sunk costs.	DCC
Financial It is assumed that maintenance of the site will be the responsibility of DCC. Maintenance costs are likely to increase with time as the asset ages, requiring greater investment to retain acceptable level of service. Risk of maintenance costs increasing over time.	Likely	Minor	Maintenance in Design review to be completed during detailed design stage to mitigate maintenance costs where possible. Potential to charge users to offset some of the maintenance costs, however this have been discounted in the short term by DCC.	DCC

Risk description	Likelihood	Consequence	Mitigation	Risk owner
Economic appraisal The future use of the site as a Park and Ride site is not confirmed as DCC do not have ownership of the site, resulting in sunk infrastructure costs on a site with unguaranteed future. Risk of capital investment on a site not owned by DCC.	Possible	Moderate	Lease agreement to be signed between DCC and KiwiRail, anticipated to be similar to the lease agreement between DCC and KiwiRail for the St Andrews Street carpark. It has been indicated that a nine year lease term with a right to renew is likely.	DCC
Economic appraisal Value for money not obtained through either construction cost increases over the cost estimate, or reduced benefits realisation from completed project.	Possible	Moderate	The cost estimate was undertaken by a QS with contingencies applied to account for forecast cost escalation. Construction is anticipated to being within 12 months of the cost estimate. Benefits have been estimated in-line with the Waka Kotahi Monetised cost and benefit manual with a conversative approach to population increase in Mosgiel. Monitoring and reporting of costs will be undertaken throughout the project life cycle.	DCC
Technical risk - Consenting The new stream crossing to access the site (a KiwiRail requirement) requires consent. If this consent is not granted, alternative access to the site will need to be determined which may have re-design implications or make the site unfeasible. Other anticipated consents requirements include land use, earthworks outside of road reserve, building consent, stormwater.	Unlikely	Significant	Discussions with ORC in July 2022, followed by a pre-application meeting in August 2022 to understand the likely consent requirements.	DCC
Technical risk - Ground conditions Unknown ground conditions on KiwiRail site could cause delay to programme / significant design changes / cost increases.	Likely	Significant	Site has been assumed HAIL for the purposes of preparing the programme and cost estimate. Detailed site investigation to be undertaken to assess the contaminated land status including identification of potential contaminants of concern. A 40% contingency was included in the cost estimate to allow for poor ground conditions.	DCC

Appendix D

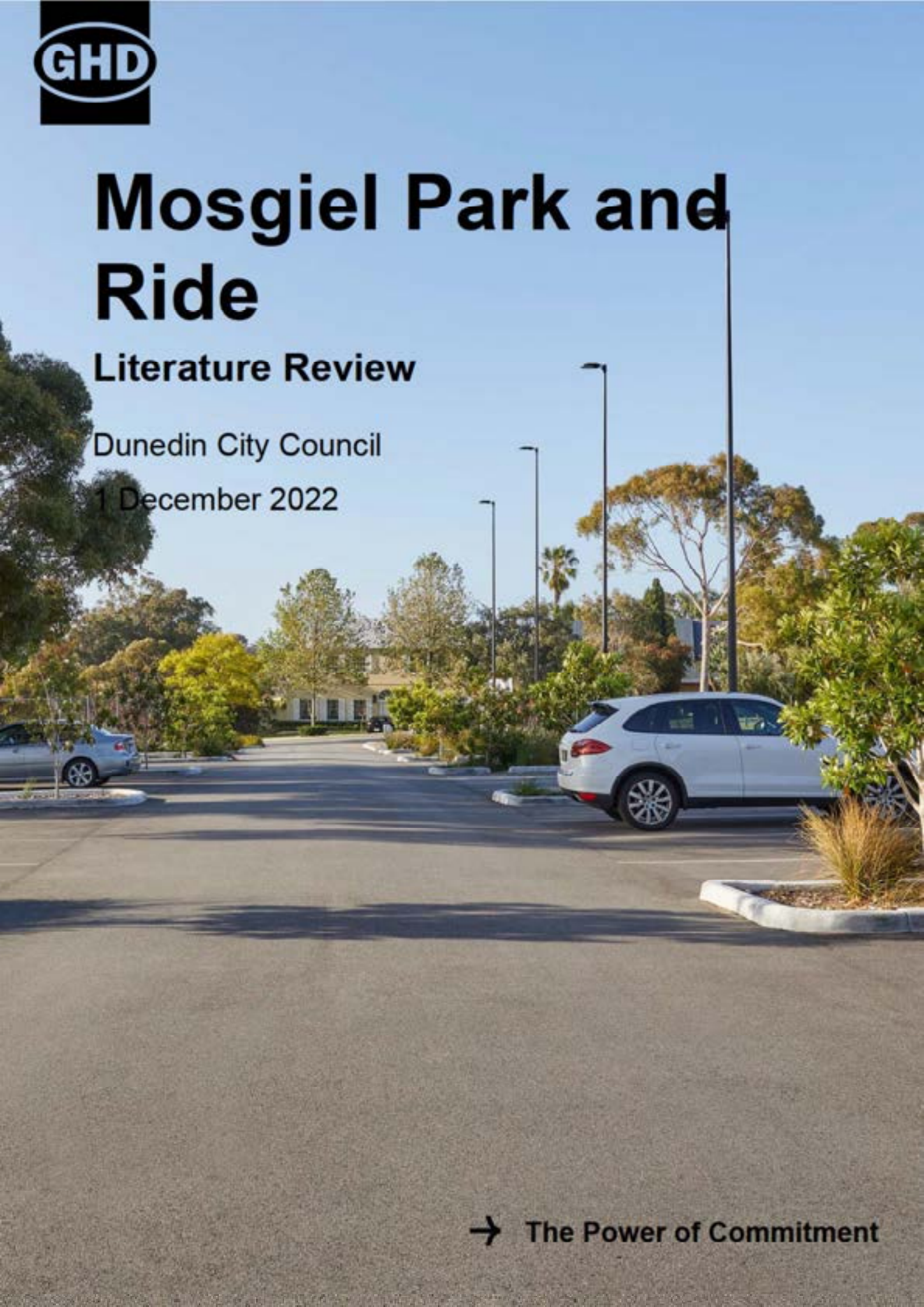
Literature review

Mosgiel Park and Ride

Literature Review

Dunedin City Council

1 December 2022



→ The Power of Commitment

Scope and Limitations

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The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section(s) 1 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

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If this report is required to be accessible in any other format, this can be provided by GHD upon request and at an additional cost if necessary.

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Contents

1. Introduction

Dunedin City Council (DCC) has tasked GHD to investigate options and develop a Single Stage Business Case (SSBC) for the provision of Park and Ride facilities in Mosgiel, Dunedin. The SSBC is part of the Connecting Dunedin programme that looks to achieve a future focused, accessible transport system that delivers placemaking and improved liveability outcomes for Dunedin.

Park and Ride services typically comprise of a car park, usually located on the outskirts of an urban area, with access to a public transport service and/or active mode network to provide connections between the Park and Ride facility and the central city.

This report has been prepared to provide a desktop literature review of comparable cities that have Park and Ride facilities, assess existing policies and strategies, and provide recommendations for Mosgiel with respect to location and design.

The findings of this report will be a key input into the optioneering phase of the SSBC through informing critical success factors of the multi-criteria analysis framework at the long list stage. The findings of this report will also influence the short list stage with regard to identification of key design elements for a successful Park and Ride design.

The remainder of this report is structured as follows:

- **Section 2:** Presents an overview of Park and Ride facilities;
- **Section 3:** Summarises New Zealand territorial local authority parking policies;
- **Section 4:** Provides an analysis of best practice for Park and Ride facilities based on a review of national and international guidelines and literature;
- **Section 5:** Presents a Wellington case study; and
- **Section 6:** Summarises the findings of this report and provides recommendations for Mosgiel.

It is important to note that at the time of preparing this report, a Park and Ride site in Mosgiel has not been selected and this report does not seek to identify specific locations.

Glossary

Acronym	Definition
2GP	Second Generation District Plan
CBD	Central business district
DCC	Dunedin City Council
ONF	One Network Framework
SSBC	Single Stage Business Case
VKT	Vehicle kilometres travelled

2. Park and Ride overview

In its simplest form, Park and Ride is the provision of:

- Car parking facilities, typically located outside of the central city / major destination[1]; and
- Public transport services to link the facility with the central city / major destination.

Park and Ride is designed to give people a better alternative to their current form of travel by reducing the generalised cost of travel, e.g. reducing journey times or costs, and increasing travel choices through improving access to public transport. In doing so, there may be additional benefits such as a reduction in stress (not having to drive or find central city parking), increasing productivity (can read or work on public transport) and improved individual health through physical activity (walking and cycling).[2]

The primary reasons for considering the introduction of Park and Ride are typically to:

+ Encourage public transport patronage;
+ Extend the reach of public transport;
+ Provide improved access to public transport for people with mobility restrictions;
+ Reduce traffic volumes and congestion along roads leading into the central city;
+ Reduce congestion within the central city;
+ Reduce parking demand within the central city;
+ Reduce environmental externalities along roads leading to and within the central city; and
+ Utilise existing car parks that are considered underutilised during the weekday e.g. sports clubs.

Conversely, the primary disbenefits of the introduction of Park and Ride facilities could include:

- Financial cost of providing parking;
- Opportunity cost of the land used for parking;
- Increased localised congestion and noise pollution around the Park and Ride site;
- Inequity effects through disadvantaging those who cannot afford to drive to the Park and Ride site;
- Encouraging those who do not usually drive to a transport hub to do so because it is easier to find parking;
- Encouraging urban sprawl rather than higher density development around transport hubs;
- Undermining the viability of feeder bus services, therefore potentially reducing access for the transport disadvantaged (people who do not or cannot drive);
- Conflicts with existing amenity and creating overflow parking on streets;
- Use of the facility for free (or discounted) parking for nearby shopping and employment centres, rather than for those travelling to the central city; and
- Disadvantaging those who travel toward the end of peaks, or throughout the day.

[1] Such as a hospital / tertiary education campus / sporting arena / entertainment facility / airport etc.
[2] Institute for Transport Studies, University of Leeds, n.d. *Park and Ride.* Retrieved 13 June 2022 from **http://www.its.leeds.ac.uk/projects/konsult/private/level2/instruments/instrument035/l2_035b.htm**

3. New Zealand parking policies

Parking policies for Auckland, Wellington and Christchurch were examined and sections on Park and Ride facilities were noted.

3.1 Auckland Council

The Park and Ride Management policy statement from the Auckland Council and Auckland Transport Draft Auckland Parking Strategy is that:

"…Park and Ride facilities will be provided and managed in locations where they improve access to the PT network and make a meaningful contribution to congestion reduction. They will be priced and managed in recognition of their role as a premium product and to ensure utilisation is targeted to those without travel choices."[3]

Relevant policy detail for the implementation and use of Park and Ride facilities include:

- Facilities will be provided to support growth by improving access to the public transport network;
- Facilities will be priced and time regulated. This recognises the cost incurred to provide facilities and assists to encourage access to public transport infrastructure by modes other than the private vehicle;
- Space at the facilities will be allocated to each mode, tailored in accordance with the Parking Diversity Policy;
- Investment in additional facilities must be first justified through a business case; and
- Cycle and micro-mobility parking will be provided at all off street parking facilities (unless impractical) including park and rides.

3.2 Wellington City Council

The Wellington City Council Parking Policy considers Park and Ride facilities as a "*parking management tool for outer residential areas".*[4]

The Policy recognises that there is increasing pressure on existing Park and Ride facilities due to population growth and increased use of public transport, which is in turn resulting in parking overspill onto surrounding residential streets. Equally, where formal Park and Ride facilities are not provided, people create informal parking sites where they access public transport. This can lead to conflict, restricted access, and compromised safety.

An intervention hierarchy has been specified based on the severity of these issues that include increased monitoring, enforcement, time restrictions, and charging regime to manage demand.

[3] Auckland Council, 2022. *Draft Auckland Parking Strategy*. Pp 47. Retrieved 13 June 2022 from **at-draft-auckland-parking-strategy.pdf**
[4] Wellington City Council, 2020. *Parking Policy*. Pp 31. Retrieved 13 June 2022 from **Plans, policies and bylaws - Parking Policy - Wellington City Council**

3.3 Greater Wellington Regional Council

Greater Wellington Regional Council currently have approximately 6,000 park and ride spaces located at key train stations throughout the region.[5] The Wellington Regional Public Transport Plan 2021-2031 signalled the introduction of paid parking for Park and Ride facilities in the region as part of the Smarter Connections Strategy.

This strategy is guided by three principles:

*"…**Strategic location:** Located in the right places, Park and Ride facilities can effectively extend the coverage of the public transport network. It is important that new or extended facilities are strategically located where they will result in an overall increase in public transport patronage, rather than just where there is demand for Park and Ride.*

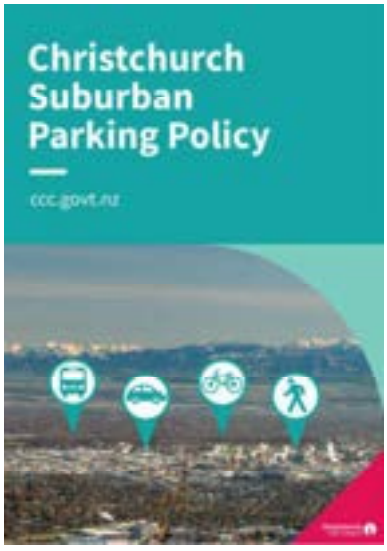
***Managing demand:** Managing demand within existing Park and Ride facilities is an important part of our strategic approach. We will look to put in place pricing, enforcement and other mechanisms such as priority parking to influence behaviours and to get the best use out of our facilities.*

***Effective design"**[5]*

This strategy represents a shift in approach by Greater Wellington Regional Council, recognising that continuing to expand park and ride facilities is not financially or environmentally sustainable due to:

- Growing demand;
- Cost of land increasing;
- Stormwater runoff associated with parking;
- Use of parking by other long stay users (i.e. not train passengers); and
- Prioritisation of user convenience impacting uptake of lower carbon modes such as walking, cycling, and feeder services.

3.4 Christchurch City Council



The Christchurch City Council Christchurch Suburban Parking Policy states that the Council will:

".. support the provision of all types of parking, including motorcycle, electric, coaches and bicycles, in additional to vehicle parking, to encourage greater use of alternatives to the single occupant car."[6]

Specifically, support will be given to Park and Ride/bike facilities that are considered to be well integrated with the existing/planned public transport network and the major cycleways.

[5] Greater Wellington Regional Council, 2021. *Te Mahere Waka Whenua Tūmatanui o te Rohe o Pōneke Wellington Regional Public Transport Plan 2021-2031*. Pp 57. Retrieved 15 July 2022 from **Greater Wellington Regional Council Annual Report 2018/2019 (gw.govt.nz)**
[6] Christchurch City Council, 2019. *Christchurch Suburban Parking Policy*. Pp 10. Retrieved 13 June 2022 from **Suburban-Parking-Policy.pdf (ccc.govt.nz)**

4. Analysis of best practice

This section summarises the key objectives, challenges and considerations to illustrate best practice with regard to Park and Ride facilities in both New Zealand and overseas.

4.1 Target audience

In developing a Park and Ride scheme the target market has to be identified to enable the service and facilities to be designed appropriately. The target market typically comprises of existing car drivers and passengers who would otherwise use a private car to access the central city / major destination.

It is accepted that those people who have access to free parking at their destination are less likely to use such a facility, as are those who require their vehicles throughout the day. However, commuters in particular who have to pay for long stay parking at their destination could be persuaded to shift to Park and Ride. Commuters travelling at peak periods could also be convinced to make the switch to avoid the peak period congestion and delays if public transport has time savings due to priority measures (e.g. rail, bus lanes etc).

Another lever to convince people to change travel behaviour is cost. Commuters have historically been relatively insensitive to cost while being more sensitive to journey time.[7] This is because commuting is considered a high value trip (refer to Figure 1) meaning people will make this trip even if the cost is high. However, with travel by private vehicle becoming increasingly more expensive (e.g. fuel costs, parking charges), people start to make decisions about their mode of travel.

Price sensitivity is typically measured using *cross-elasticities,* which is a measure of the responsiveness of the demand for a good to a change in the price of another good. Macbeth et al. (2010) found a 26% increase in fuel prices over four months resulted in a 7% decrease in motor vehicle traffic volumes across the Auckland Harbour Bridge. [8] Travel elasticities in New Zealand are, however, generally considered to be low compared to other developed countries. This is likely due to limited alternative travel modes that are deemed competitive for commuters.[8]

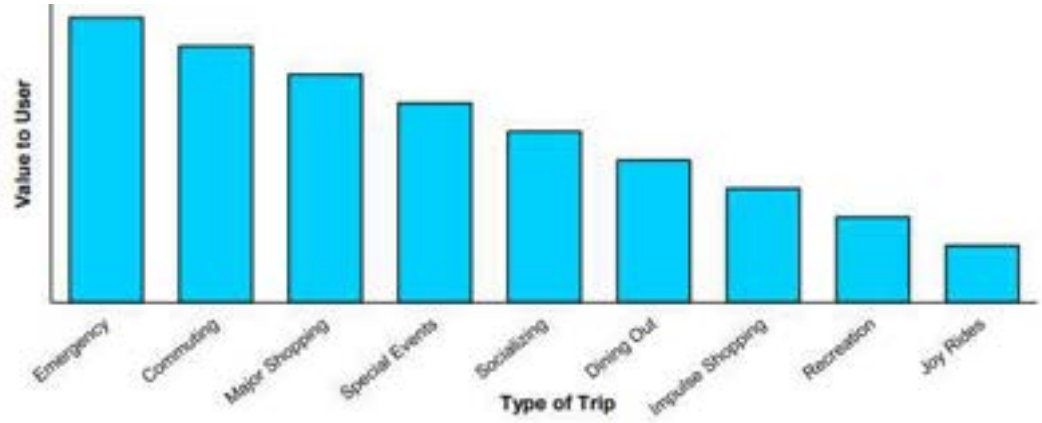


Figure 1 Travel purpose ranked by user value[9]

Dunedin Central is a key employment hub for the region, and is the destination for 17% of residents who leave Mosgiel, Wingatui and East Taieri for work or education purposes. The majority of these commuters (76%) currently use private vehicle to access the central city. [10]

[7] Transfund New Zealand, 1999. *Park and Ride Policies and Criteria, Research Report No. 136*. Retrieved 13 June 2022 from **136 - Park and ride policies and criteria (nzta.govt.nz)**

[8] Macbeth, A. G., Horspool, B., & Lieswyn, J., 2010. *What happens when petrol goes up or buses go down?* Pp. 1. Retrieved 15 July 2022 from **Modal_elasticity_paper.pdf (viastrada.nz)**

[9] Litman, T., 2022. *Understanding Transport Demands and Elasticities; How Prices and Other Factors Affect Travel Behaviour.* Pp 7. Retrieved 15 July 2022 from **Transportation Elasticities (vtpi.org)**

[10] Statistics NZ, n.d. *2018 Census Commuter Waka Departures from Statistical areas: Bush Road, East Taieri, Mosgiel Central, Mosgiel East, Seddon Park and Wingatui*. Retrieved 17 May 2022 from **Bush Road & 5 other areas - Commuter - Waka**

4.2 Site location

Proximity to the central city

The location of Park and Ride facilities should be away from the central city. The reason for this is to relocate parking to outside the central city, reducing traffic congestion and releasing land allocated in the central city to parking for other uses.[11] One United States report recommends that Park and Ride lots should generally "*be at least 16 km from the job locations where parking charges are substantial*".[12]

Park and Ride sites should also be located before the main congestion points (or pinch points), as one of the main incentives for car drivers to switch to Park and Ride facilities is to avoid congestion.[13] This is particularly effective if there is bus priority or rail public transport at the point of congestion. Wellington research shows that Park and Ride usage in Paraparaumu has increased greatly as road congestion between Paraparaumu and Wellington gradually worsened.[14]

Park and Ride sites should also be located to intercept commuters early in their overall trip, otherwise commuters will be reluctant to change mode if the public transport, active mode or micro-mobility leg of the trip is short relative to the car leg.

Mosgiel is located approximately 14 km travel from the Dunedin Octagon / bus hub (refer to Figure 2). This distance is considered in line with international best practice for the location of a Park and Ride facility relative to the central city.

There are currently no bus priority measures in Dunedin but they are being considered as part of the broader Shaping Future Dunedin Transport programme, e.g. Princes Street.[15]

Figure 2 Mosgiel, Dunedin[16]

[11] Steer Davies Gleave, 2017. *Park and Ride – Best Practice Review*. Steer Davies Gleave, Vancouver, Canada
[12] Transfund New Zealand, 1999. *Park and Ride Policies and Criteria, Research Report No. 136*. Pp 17. Retrieved 13 June 2022 from **136 - Park and ride policies and criteria (nzta.govt.nz)**
[13] Greater Wellington Regional Council, 2019. *Park and Ride – Technical Notes.* Retrieved 13 June 2022 from **Regional Transport Analysis | Greater Wellington Regional Council (gw.govt.nz)**
[14] Land Transport New Zealand, 2007. *Park and Ride: Characteristics and demand forecasting, Research Report 328*. Retrieved 13 June 2022 from **Research 328 - Park and ride: characteristics and demand forecasting (nzta.govt.nz)**
[15] Dunedin City Council, 2022. *Princes Street Connections.* Retrieved 17 November 2022 from **Princes Street Connections - Dunedin City Council**
[16] Source **https://snazzymaps.com/editor/customize/8381**

Catchment area

Best practice is to locate sites where they can intercept commuter trips by being 'on the way' from areas of high potential population catchment, so users do not need to backtrack to reach the site.[17]

Studies undertaken in Seattle and Texas estimated the catchment area of a Park and Ride to be of a parabola shape as shown in Figure 3. The parabola was estimated to be of around 2 - 2.5 miles (3.2 – 4 km) towards the CBD and around 10 miles (16 km) 'upstream'. Around 85% of the catchment was located in this area, and then 50% of demand was situated within a circle radius of 2.5 miles (4 km).

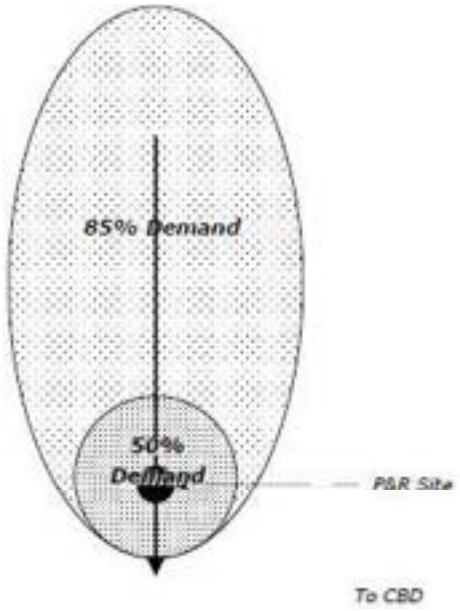


Figure 3 Catchment area estimate from study in Seattle, Washington and Texas[18]

Further analysis on catchment areas and intercepts rates will be undertaken for Mosgiel when the long-list of potential sites is determined.

Land use considerations

There are financial costs of providing Park and Ride facilities, especially if land values are high, and there are also opportunity costs if the land can be better utilised for other higher value purposes.[19] Some cases suggest having Park and Ride facilities in reasonable proximity to the town centre may encourage use and help deter vandalism, however this typically results in higher land costs and reduced amenity in the town centre.[20]

The Park and Ride Strategy for the City of Edmonton, Canada suggests location for Park and Rides should focus primarily on sites where intensive development is either not possible, or feasible in short and medium term. Ideal sites are areas zoned for transport or utility purpose.[21]

Park and Ride facilities should be located where they can service low to medium density residential development catchments which have limited access to the site by walking, cycling and connector bus services. This is important because Park and Ride provisions can undermine / cannibalise other modes of access to public transport such as walking, drop-offs or cycling. It may reinforce car ownership and absence of pricing can lead to inefficient travel choices.[22]

[17] Greater Wellington Regional Council, 2019. *Park and Ride – Technical Notes.* Retrieved 13 June 2022 from **Regional Transport Analysis | Greater Wellington Regional Council (gw.govt.nz)**
[18] Land Transport New Zealand, 2007. *Park and Ride: Characteristics and demand forecasting, Research Report 328*. Pp 29. Retrieved 13 June 2022 from **Research 328 - Park and ride: characteristics and demand forecasting (nzta.govt.nz)**
[19] Steer Davies Gleave, 2017. *Park and Ride – Best Practice Review*. Steer Davies Gleave, Vancouver, Canada
[20] Land Transport New Zealand, 2007. *Park and Ride: Characteristics and demand forecasting, Research Report 328*. Retrieved 13 June 2022 from **Research 328 - Park and ride: characteristics and demand forecasting (nzta.govt.nz)**
[21] The City of Edmonton, 2018. *Park & Ride Guidelines.* Retrieved 13 June 2022 from **City of Edmonton Park & Ride Guidelines**
[22] Greater Wellington Regional Council, 2019. *Park and Ride – Technical Notes.* Retrieved 13 June 2022 from **Regional Transport Analysis | Greater Wellington Regional Council (gw.govt.nz)**

It is often recommended to avoid proposing Park and Ride where there is potential for dense mixed-use development, as this type of development can deliver significant patronage, economic value, and improve walkability to the station, thus negating the efficiency of the Park and Ride.[23] It is however recognised that a Park and Ride facility could act as a catalyst for development in the short term and secure the site for development into a long-term transit hub. Notwithstanding, Waka Kotahi NZ Transport Agency Public transport design guidance (2022) notes that it may be challenging to remove parking and transition to a transport station (without parking provision) as development occurs.[24] This could lead to adverse outcomes, such as ongoing reliance on private vehicle use to access the site without facilities to cater to this demand. This would particularly impact people living further away from the Park and Ride site (e.g. the outer hinterland).

Another factor to consider apart from where users live, is the community needs. Users may find convenience in having the Park and Ride near where they drop a child off to school, for example.

The Dunedin 2nd Generation District Plan (2GP) is shown in Figure 4. Land use in Mosgiel is predominantly:

- General Residential 1 (beige)
- General Residential 2 (dark beige)
- Major Facility - School (mauve);
- Recreation (light green);
- Commercial/Mixed Use (light purple); and
- Rural Residential (dark green).

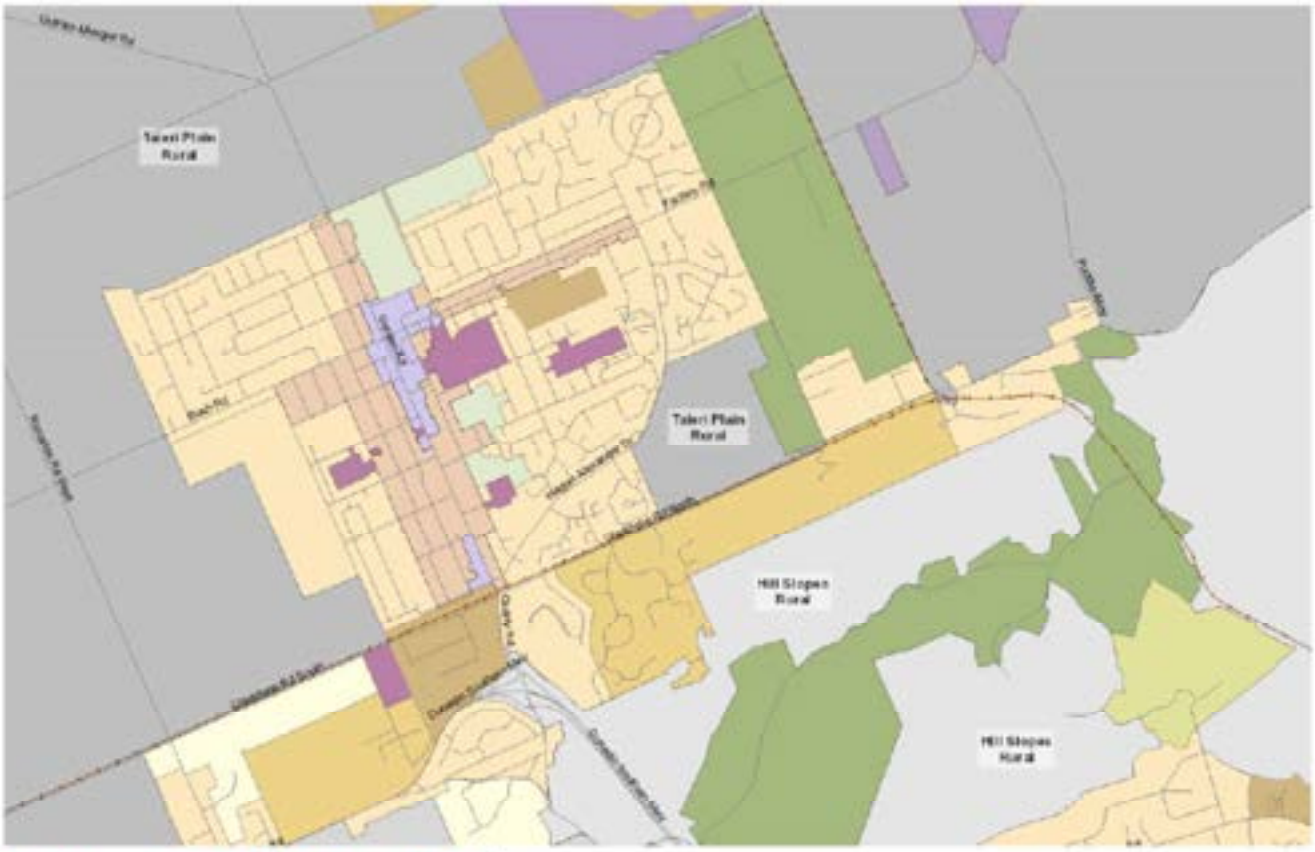


Figure 4 Mosgiel land use zoning (2GP)[25]

Future residential development is anticipated in Mosgiel as it is a key growth area for Dunedin. This could impact the best suitability of a site for Park and Ride and deliver significant patronage for a new or existing bus service.

[23] Department of Transport and Main Roads, 2020. *Public Transport Infrastructure Manual, Chapter 10 – Park 'n' ride infrastructure*. Retrieved 13 June 2022 from Chapter 10 (publications.qld.gov.au)
[24] Waka Kotahi NZ Transport Agency, 2022. *Public transport design guidance*. Retrieved 18 November 2022 from Car connections | Waka Kotahi NZ Transport Agency (nzta.govt.nz)
[25] Dunedin City Council, 2022. *2nd Generation District Plan, Planning Map (Appeals Version)*. Retrieved 14 July 2022 from Planning Map (Appeals Version) (arcgis.com)

Roading / local network considerations

Best practice documents suggest that Park and Ride sites should be located on or close to a major radial route (with the Park and Ride site preferably visible from such a route).

Park and Ride facilities should be located as to not cause localised congestion issues and adverse impacts on network users. Providing multiple access points can ease congestion, however, may reduce parking capacity and increases the number of vehicles crossings which can have negative safety outcomes, particularly for pedestrians.

The Dunedin One Network Framework (ONF) road classification for Mosgiel is shown as Figure 5. Urban Connectors are shown in light blue, Main Streets orange, and Activity Streets purple.

Figure 5 One Network Framework Mosgiel[26]

Public transport

Park and Ride sites should be located in close proximity to high quality public transport routes to help realise increased patronage. Park and Ride facilities need to be located where they can:

- Extend the coverage of public transport services beyond current terminal stations;
- Provide residents with access to public transport in areas where pedestrian access is difficult and/or feeder bus services are not available or limited; and
- Intercept motorists on their usual journey (so they do not see the Park and Ride as being out of their way) and remove them from congested motorways.[27]

For best return on investment, Park and Ride facilities should be positioned to enable a net increase in patronage, rather than just where there is demand for Park and Ride.

[26] [redacted] (DCC). Email to GHD. 28 July 2022

[27] Transportation Research Board of the National Academies, 2012. *Guidelines for Providing Access to Public Transportation Stations, Transit Cooperative Research Program Report 153*. Retrieved 13 June 2022 from **TCRP Report 153 – Guidelines for Providing Access to Public Transportation Stations (nacto.org)**

As mentioned in section 4.1, travel time is an important consideration for commuters. Bus frequency is a key component of travel time with Figure 6 showing the effect of public transport frequency on Park and Ride site utilisation. As the time between services increases, the demand for Park and Ride decreases. Typically, 15 minutes is considered the maximum time between services to realise high Park and Ride demand.

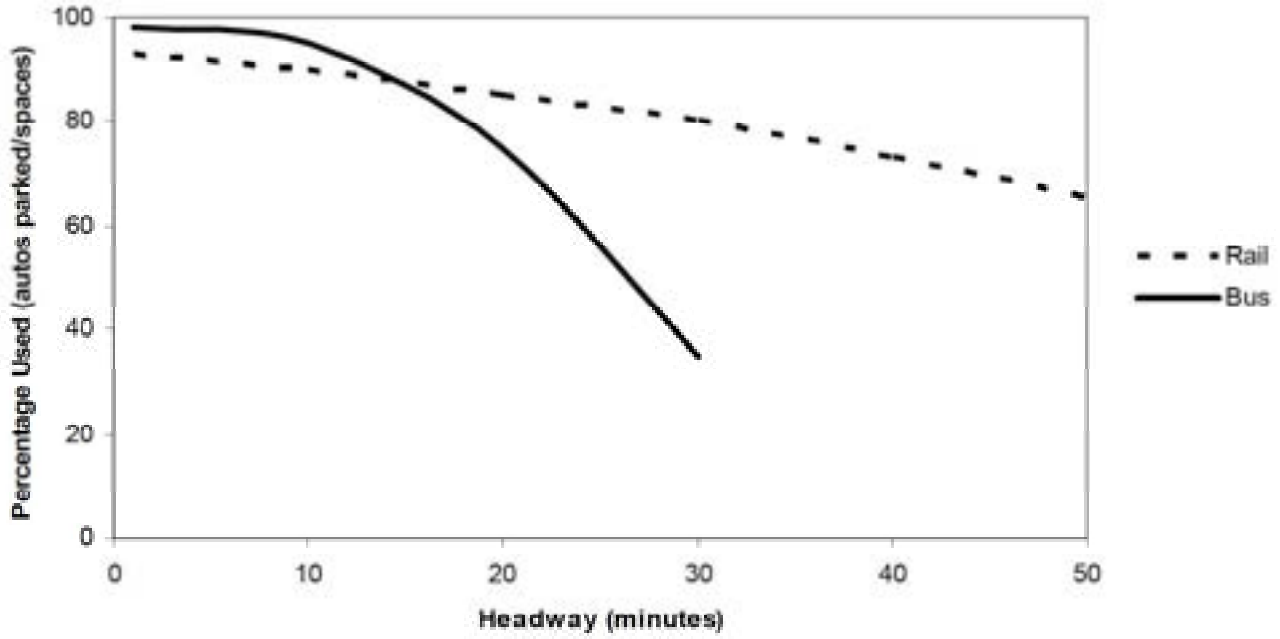


Figure 6 Effect of public transport frequency on Park and Ride utilisation[28]

A review of public transport in Auckland, Wellington and Christchurch in NZ Transport Agency Research Report 396 reported the following changes to network operations, in association with Park and Ride facilities, improve relative attractiveness and uptake:[29]

- **Directness**
  - Avoid physical deviations in bus routes
- **Speed and reliability**
  - Door-to-door travel times that are faster than can be achieved by car
  - Bus lane and traffic signal priorities to enable reliable bus journey times
- **Frequency**
  - 'Forget-the-timetable' headways, i.e. ten minutes or less
- **Access to services**
  - Create competitive advantage by allowing buses to stop in car-free precincts close to key destinations
  - Short walking distances
- **Marketing for occasional and first time users**
  - Maps, real time information, vehicle livery and on-board displays

There is an existing bus service (Route 77) with a half-hourly frequency that caters for trips between Mosgiel and Dunedin. Residents report that it is usually quicker to drive to Dunedin as Route 77 is an "all-stops" service and travels via Fairfield and Green Island.

It is understood Otago Regional Council are investigating providing an express bus service between Mosgiel and Dunedin, as well as increasing the frequency of Route 77.[30]

[28] Land Transport New Zealand, 2007. *Park and Ride: Characteristics and demand forecasting, Research Report 328*. Pp 27. Retrieved 13 June 2022 from **Research 328 - Park and ride: characteristics and demand forecasting (nzta.govt.nz)**
[29] New Zealand Transport Agency, 2010. *Public transport network planning: a guide to best practice in NZ cities, Research Report 396.* Pp 8. Retrieved 15 July 2022 from **Research Report 396: Public transport network planning (nzta.govt.nz)**
[30] Phillips, J. (ORC). Email to [redacted] (DCC). 1 November 2022

4.3 Generated demand

In some circumstances Park and Ride schemes can generate additional vehicle demand:

- Some road users may travel a greater distance to reach a Park and Ride site rather than driving directly into the central city (although this does not necessarily mean extra congestion and pollution, given that a short journey in a congested network may have a greater adverse impact).
- Park and Ride may encourage additional journeys by private car for people who currently walk/cycle to access public transport.
- Cars left at a Park and Ride site that were previously driven into the central city may be replaced by other vehicles in the central city that were previously using alternative modes.
- Some people who previously travelled all the way by bus now switch to driving to the Park and Ride site, then continuing by bus.
- Any additional bus services as a result of the Park and Ride facility will contribute to overall road traffic.

Dunedin City Council have a 2030 target of being a net zero carbon city and the challenge to reduce vehicle kilometres travelled (VKT) by light vehicles by 20% by 2035. Generated demand associated with any Park and Ride facility will need to be assessed and mitigated appropriately.

4.4 Site facilities and design elements

The Park and Ride facilities and design elements are an important consideration to a successful Park and Ride. It is shown that usage is increased when quality service is provided. A review of best practice examples and literature has been undertaken, the key findings are summarised as follows.

Accommodating a range of modes

The Draft Auckland Parking Strategy[31] states that, at Park and Ride sites, **space and facilities will be allocated for a range of modes** in accordance with the Parking Diversity Policy. Similarly, Wellington have a station access hierarchy (shown in Figure 7) to guide Park and Ride design to reflects the priorities and needs of users.

Figure 7 Wellington station access hierarchy[32]

[31] Auckland Council, 2022. *Draft Auckland Parking Strategy*. Pp 47. Retrieved 13 June 2022 from **at-draft-auckland-parking-strategy.pdf**
[32] Greater Wellington Regional Council, 2021. *Te Mahere Waka Whenua Tūmatanui o te Rohe o PōnekeWellington Regional Public Transport Plan 2021-2031*. Pp 59. Retrieved 13 June 2022 from **Greater Wellington Regional Council Annual Report 2018/2019 (gw.govt.nz)**

In addition, to accommodate for emerging technologies and travel behaviours, it is suggested to include electric vehicle charging facilities, ride share drop-off / parking, and electric scooter / micro-mobility parking. The Waka Kotahi NZ Transport Agency National parking management guidance (2021) identifies electric vehicle parking as a high priority user to allocate parking space as a 'carrot' measure to encourage use of vehicles with a lower carbon footprint.[33] Similarly, Wellington City Council as part of their climate response package are trialling installing EV chargers in off-street parking facilities owned by council.[34]

Personal safety and security

One of repeated considerations throughout all successful cases was **good personal safety and security** (for both users and vehicles). Personal safety concerns are considered to be most serious during hours of darkness and during off-peak times. The physical characteristics of Park and Ride sites also increase safety concerns:

- Sites are often geographically isolated;
- Sites often have limited predetermined exit routes should people feel threatened (note this is more prominent at rail station sites where people are waiting on the platform); and
- Passengers having to walk a long distance to their car (particularly if they park at the end of the morning peak and are one of the last to return to their car in the evening).

Key security measures may include:[35]

- Periodic / random security guard patrols during less busy times;
- Good lighting;
- Fencing to prevent through-traffic;
- Emergency alarms or 'panic buttons';
- Security cameras;
- Attendant at coffee shop / ticketing kiosk; and
- Having the site visible from the road to provide natural passive surveillance (refer to Figure 8).

Installation of a surveillance system and working with NZ Police to respond to reports of anti-social behaviours was seen to increased use of Park and Ride sites in Wellington, as well as improved the perception of security at the Park and Ride. However, it is noted in literature that there is a preference for a personal presence (e.g. security guard, attendant at coffee shop) over passive surveillance such as security cameras.

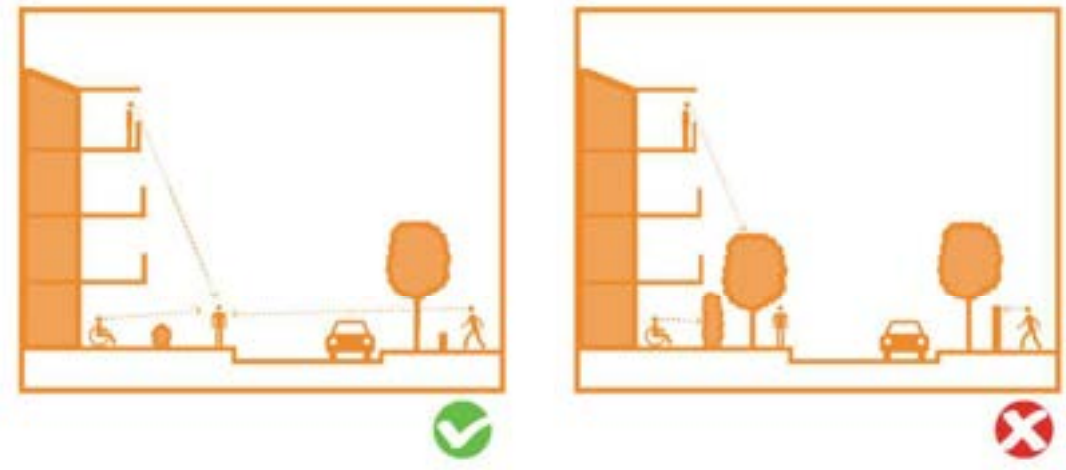


Figure 8 Passive surveillance example[36]

[33] Waka Kotahi NZ Transport Agency, 2021. *National parking management guidance.* Pp. 36. Retrieved 17 November 2022 from **National parking management guidance (nzta.govt.nz)**
[34] Greater Wellington Regional Council, 2021. *Te Mahere Waka Whenua Tūmatanui o te Rohe o PōnekeWellington Regional Public Transport Plan 2021-2031.* Retrieved 13 June 2022 from **Greater Wellington Regional Council Annual Report 2018/2019 (gw.govt.nz)**
[35] Land Transport New Zealand, 2008. *Personal security in public transport travel in New Zealand: problems, issues & solutions, Research Report 344.* Retrieved 13 June 2022 from **Research 344 - Personal security in public transport travel in NZ (nzta.govt.nz)**
[36] Department of Transport and Main Roads, 2020. *Public Transport Infrastructure Manual, Chapter 10 – Park 'n' ride infrastructure.* Pp 17. Retrieved 13 June 2022 from **Chapter 10 (publications.qld.gov.au)**

Amenity

Amenity for the user should be considered with waiting areas made generally attractive to users through providing:[37]

- Weather protection and seating for waiting passengers;
- Real time route information on public transport services;
- Adequate passenger hard stand area with a sealed smooth surface connected to the kerb edge;
- Proper drainage to avoid waiting passengers being splashed by the bus;
- Secure bike storage facilities; and
- Toilets and retail amenities (e.g. coffee shop and ticketing) are optional but preferrable at sites with high patronage.

Ease of access

To encourage people who live near the Park and Ride to walk or cycle to the facility, and in turn free up parking spaces for people who have to drive, the site network needs to be **accessible** for all users:[38]

- Connectivity with footpaths and wider cycle network;
- Short and direct paths to stops;
- Minimised need to cross roads / vehicle paths;
- Minimal physical barriers to reach stop;
- Accessible parking;
- Clear and legible wayfinding and information;
- Tactile pavers;
- Appropriate kerb height to reduce the vertical distance to the bus and accommodate safe ramp gradients for users accessing the bus whilst taking into account ground clearance of buses; and
- Integrated with feeder services.

Ultimately, passengers are able to have confidence that the infrastructure and service will provide what they need for a seamless, continuous journey with no barriers.

Internal layout

Internal layout should be:[39]

- An open and level site, that is well sealed and drained;
- Sized to accommodate projected parking demand to prevent overflow onto the surrounding street network but should not be oversized noting the overall desire to reduce VKT by, in part, encouraging travel by non-car modes (refer to section 3.3)[40];
- A balance between having enough space for vehicle manoeuvring, and the need for more parks;
- Designed with good access to ease congestion; and
- Low, light foliage is recommended to be used to subdivide the parking area, but it must not interfere with site distance or affect security perceptions.

[37] Tauranga City Council, 2010. *Bus Stop Guidelines*. Retrieved 13 June 2022 from **Microsoft Word - Bus Stop Guidelines April 2010.doc (tauranga.govt.nz)**
[38] Department of Transport and Main Roads, 2020. *Public Transport Infrastructure Manual, Chapter 10 – Park 'n' ride infrastructure*. Retrieved 13 June 2022 from **Chapter 10 (publications.qld.gov.au)**
[39] The City of Edmonton, 2018. *Park & Ride Guidelines*. Retrieved 13 June 2022 from **City of Edmonton Park & Ride Guidelines**
[40] Waka Kotahi NZ Transport Agency Public transport design guidance (2022) recommends a target parking utilisation of 95% with parking management tools to mitigate effects on street parking from spillover, such as time restrictions, charges, and incentives (e.g. around active modes and car share).

It is important to recognise that Park and Ride sites are not the same as car parks in that they are intermodal transfer points. As all trips will involve a pedestrian element, the design must consider, provide for, and promote safe pedestrian flow. Close vehicle to service proximity is an important factor to usage for Park and Rides. When asked about the impact of having an extra 200 m walk to the station platform, 31% of users surveyed at a Wellington Park and Ride said they would no longer use that Park and Ride facility.[41] It is recommended that the walking distance to the bus stop does not exceed 100 m or is preferably considerably less.

Similarly, the interaction of the bus cannot be understated and the design must consider:[42]

- How the bus will access and egress the site;
- Where the bus will wait for passengers to board and disembark;
- Frequency of buses and dwell time; and
- Facilities for bus drivers.

[41] Land Transport New Zealand, 2007. *Park and Ride: Characteristics and demand forecasting, Research Report 328*. Retrieved 13 June 2022 from **Research 328 - Park and ride: characteristics and demand forecasting (nzta.govt.nz)**
[42] Spillar, R.J., 1997. *Park-and-Ride Planning and Design Guidelines*. Retrieved 13 June 2022 from **cv.pdf (wspgroup.com)**

5. Case study

This section provides a case study that considers how factors affected the demand for Park and Ride facilities in Wellington. Wellington was selected as a comparative city to Dunedin for the following reasons:

- A harbour city with a compact, hilly city centre;
- Has satellite contributor commuter populations (e.g. Porirua and Lower Hutt compared to Mosgiel);
- A city with rail infrastructure; and
- Wellington represents a potential future state for Dunedin with comparatively high public transport mode share.

5.1 Wellington

Wellington has a considerably mature approach to public transport and in 2019 had Park and Ride facilities at 33 rail stations.[44] Nearly all of the Park and Ride sites in Wellington have high utilisation rates, and Greater Wellington Regional Council is increasingly under pressure to increase supply.[45] [44]

A map of the Wellington rail network and the location of park and ride facilities is shown in Figure 9.

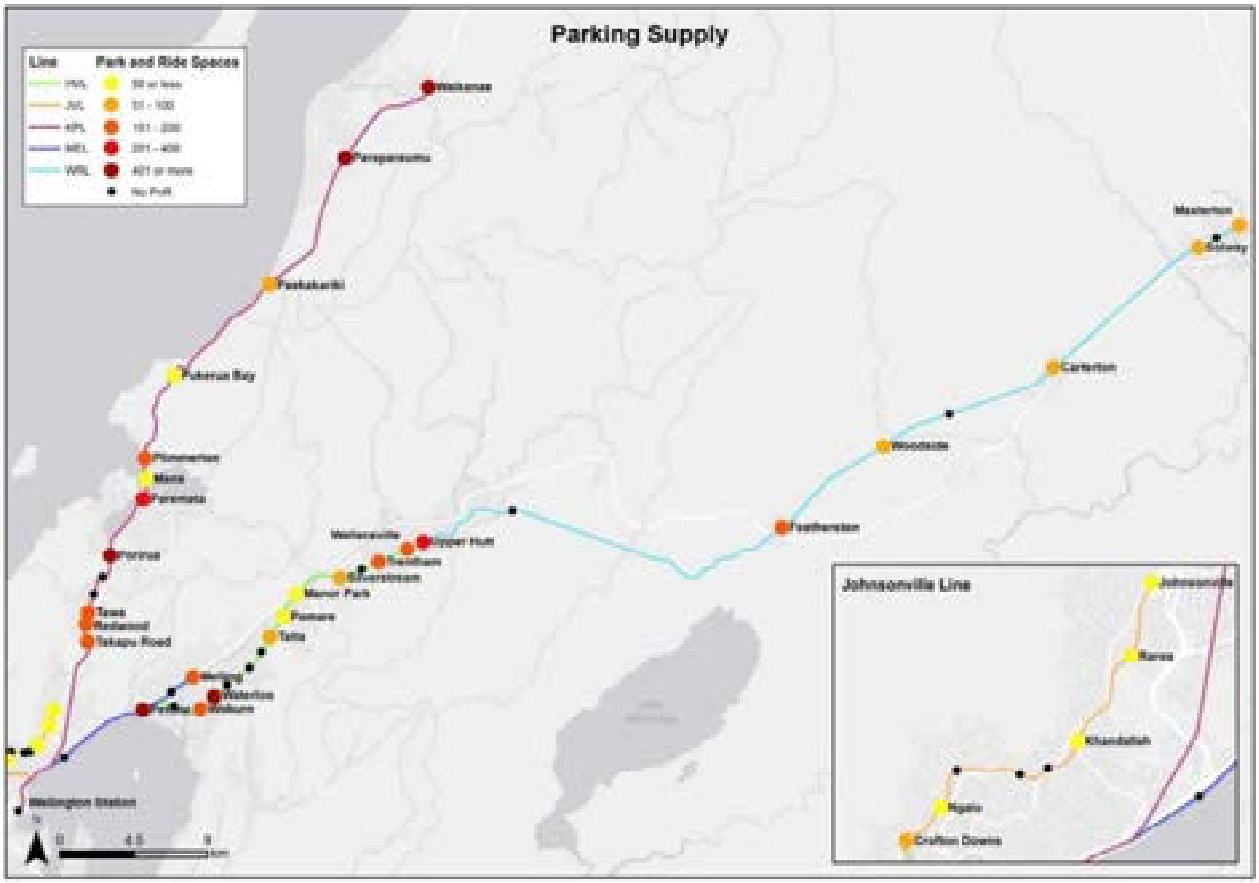


Figure 9 Wellington rail network and park and ride facilities[46]

[44] Macbeth, A., 2019. *Public Transport Park and Ride Strategy.* Retrieved 13 June 2022 from **(PDF) Public Transport Park and Ride Strategy (researchgate.net)**
[45] Land Transport New Zealand, 2007. *Park and Ride: Characteristics and demand forecasting, Research Report 328*. Retrieved 13 June 2022 from **Research 328 - Park and ride: characteristics and demand forecasting (nzta.govt.nz)**
[46] Macbeth, A., 2019. *Public Transport Park and Ride Strategy.* Pp 2. Retrieved 13 June 2022 from **(PDF) Public Transport Park and Ride Strategy (researchgate.net)**

It was found that several factors have affected the demand for Wellington Park and Ride sites, including.[47] [48]

Availability and price of CBD car parking and at the Park and Ride

As parking prices in the Wellington CBD have increased yet Park and Ride parking remained free, usage of the Park and Ride sites have increased.

Users of Waterloo station Park and Ride (788 spaces[49]) were surveyed and asked how they would respond if a parking fee was introduced at the Park and Ride:

- 16% would continue parking at Waterloo station;
- 31% would park at another station;
- 18% would walk/cycle;
- 15% would drive to Wellington; and
- 20% were unsure.

Level of Service – especially trip frequency

When an express service was introduced from Upper Hutt through to Wellington, stopping at Waterloo station but not Woburn station (Woburn being 1.3 km closer to Wellington than Waterloo), this approximately doubled the frequency of services at Waterloo station and saw the majority of users at Woburn relocate 'upline' to Waterloo Station.

Fares

When a fare boundary was introduced between Mana and Paremata (294 spaces[49]), anecdotally the majority of users who used to park and board the train at Mana relocated to using Paremata station (1.5 km closer to Wellington), to save 50c per journey (cash fare).[50]

Traffic congestion

As travel time delay and road congestion worsened between Paraparaumu and Wellington, Park and Ride usage increased at Paraparaumu station (527 spaces[49]). For comparison, a train trip scheduled to arrive at Wellington Station at 8:15 am would leave Paraparaumu Station at 7:24 am (50 minutes duration).[51] Driving this route at this time can typically take 50% longer with a duration of 75 minutes.[52]

Note this assessment was made prior to the opening of Transmission Gully.

Security

Following reports of several car break ins at Porirua station (1,000 spaces[49]), surveillance cameras were installed. This improved public perception of safety at the station and Park and Ride usage increased.

Distance from station platform

31% of users at Waterloo station responded they would consider parking at a different station if the walk from their car to the Waterloo stationed increased by 200 m.

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[47] Land Transport New Zealand, 2007. *Park and Ride: Characteristics and demand forecasting, Research Report 328*. Retrieved 13 June 2022 from **Research 328 - Park and ride: characteristics and demand forecasting (nzta.govt.nz)**

[48] Greater Wellington Regional Council, 2021. *Te Mahere Waka Whenua Tūmatanui o te Rohe o Pōneke Wellington Regional Public Transport Plan 2021-2031*. Pp 59. Retrieved 13 June 2022 from **Greater Wellington Regional Council Annual Report 2018/2019 (gw.govt.nz)**

[49] Metlink, 2022. *Park & Ride*. Retrieved 14 July 2022 from **Park & Ride » Metlink**

[50] Metlink, 2022. *Train tickets & fares*. Retrieved 13 June 2022 from **Train tickets & fares » Metlink**

[51] Metlink, 2022. *Timetable KPL*. Retrieved 15 July 2022 from **Metlink - Timetable KPL Kapiti Line (Waikanae - Wellington)**

[52] Map data, 2022. **Paraparaumu Station, Paraparaumu to Wellington Station - Google Maps**

This case study analysis has primarily focused on the Park and Ride sites in Wellington with the largest capacity. For comparison to Mosgiel, Table 1 provides the 2018 Census population data for the surrounding suburbs. Note this does not account for people who choose to catch the train at the station that is not closest to their house (e.g. a resident of Plimmerton who drives their child to college in Porirua and then catches the train at Porirua Station).

Table 1 2018 Census populations of select Park and Ride sites in Greater Wellington [53] [54]

Station	Census population	Park and Ride spaces	Journey time[55]
Mosgiel *Statistical areas: Bush Road; Mosgiel East, Mosgiel Central, Seddon Park*	10,563	N/A	37 minutes[56]
Waterloo *Statistical areas: Waterloo West, Waterloo East, Waiwhetu, Gracefield, Arakura, Glendale, Wainuiomata West, Wainuiomata Central, Homedale West, Homedale East*	27,735	788	16 minutes (express) 20 minutes (all stops)[57]
Paremata *Statistical areas: Endeavour, Whitby, Postgate, Paremata, Papakōwhai*	10,527	294	22 minutes (express) 25 minutes (all stops)[58]
Porirua *Statistical areas: Onepoto, Titahi Bay North, Titahi Bay South, Elsdon-Takapuwahia, Ascot Park, Waitangirua, Aotea, Cannons Creek East, Cannons Creek North, Cannons Creek South, Ranui Heights, Porirua East, Porirua Central*	33,960	1,000	18 minutes (express) 21 minutes (all stops)[58]
Paraparaumu *Statistical areas: Paraparaumu North, Paraparaumu Beach North, Paraparaumu Beach East, Paraparaumu Beach West, Paraparaumu Central, Paraparaumu East, Raumati Beach East, Raumati Beach West, Raumati South*	27,897	527	51 minutes[58]

[53] Statistics NZ, 2022. *2018 Census Place Summaries*. Retrieved 14 July 2022, from **https://www.stats.govt.nz/tools/2018-census-place-summaries**
[54] Metlink, 2022. *Park & Ride*. Retrieved 14 July 2022 from **Park & Ride » Metlink**
[55] Scheduled journey time in AM peak by public transport as per timetable to key destination (i.e. Dunedin bus hub, Wellington train station)
[56] Otago Regional Council, 2022. *77 Mosgiel, Fairfield, Green Island – City*. Retrieved 17 November 2022 from **77 - Mosgiel, Fairfield, Green Island - City (orc.govt.nz)**
[57] Metlink, 2022. *HVL timetable*. Retrieved 17 November 2022 from **Metlink - Timetable HVL Hutt Valley Line (Upper Hutt - Wellington)**
[58] Metlink, 2022. *KPL timetable*. Retrieved 17 November 2022 from **Metlink - Timetable KPL Kapiti Line (Waikanae - Wellington)**

6. Recommendations for Mosgiel

Table 2 provides recommended assessment criteria to consider the suitability of potential Park and Ride sites in Mosgiel. These recommendations will be further explored through the optioneering phase of the SSBC.

Table 2 Recommended criteria to assess the suitability of potential Park and Ride sites in Mosgiel

Objective	Criteria/Principle	Reason for Criteria/Principle	How and where has this been incorporated into the SSBC
Site is located to attract potential passengers	Locate sites where it will intercept commuter trips by 'being on the way'	– Making the Park and Ride visible and convenient, rather than "out of sight, out of mind", will increase usage – Reduces the impact of localised generated demand as vehicles are not rerouted to new areas	Considered in assessment criteria within for multi-criteria analysis framework applied during long-list stage
	Locate site near to the start of users' trips	– Commuters are more likely to change mode to public transport if the public transport mode leg of the trip is short relative to the car leg – Reduces travel by private vehicle	Considered in assessment criteria within for multi-criteria analysis framework applied during long-list stage
	Located site where there is potential demand for Park and Ride services	– Reduces risk of creating a 'white elephant' – Important to focus investment that is likely to result in the greatest increase in patronage	Considered in assessment criteria within for multi-criteria analysis framework applied during long-list stage
	Locate close to existing or planned rapid public transport service, where access by active modes is less feasible	– High quality / high frequency public transport will make the Park and Ride more appealing – Increases customer catchment size for public transport – Park and Ride provisions can undermine other modes of access to public transport such as walking, drop-offs or cycling. If poorly located, the site may reinforce car ownership, and absence of pricing, can lead to inefficient travel choices.	Considered in assessment criteria within for multi-criteria analysis framework applied during long-list stage Discussions with Otago Regional Council to determine proposed route of express service between Mosgiel and Dunedin
Site is aligned with transport networks and land use	Locate site where it will not cause localised congestion issues to unacceptable levels	– Decreases attractiveness of Park and Ride and discourages potential users – May create adverse safety impacts for other road users	Considered in assessment criteria within for multi-criteria analysis framework applied during long-list stage
	Do not locate site where there is potential for medium to high density mixed-use development	– This type of development can deliver significant patronage, economic value. These areas would deliver a significant number of potential passengers within walking distance of PT services and improve walkability to the station negating the efficiency of a Park and Ride	Considered in assessment criteria within for multi-criteria analysis framework applied during long-list stage

Objective	Criteria/Principle	Reason for Criteria/Principle	How and where has this been incorporated into the SSBC
	Locate site where it will support future land use development (both on site and wider vicinity)	– Caters to growth and economic development	Considered in assessment criteria within for multi-criteria analysis framework applied during long-list stage
	Locate site where there can be multiple access points (from separate roads)	– Can ease congestion on existing network – Provides access resiliency if there is a road closure	Considered in assessment criteria within for multi-criteria analysis framework applied during long-list stage Access design considered at concept design stage
	Locate parking away from town centre and areas with high pedestrian activity	– Town centre will tend to have higher land values that may mean the cost of providing the site outweighs the benefits – Town centre will typically have higher levels of congestion which may make accessing the Park and Ride unattractive – Parking is a low amenity activity and will detract from amenity values in the town centre – Visitors to the town centre may use the Park and Ride facility because of ease rather than using parking in the town centre. This is particularly true if the Park and Ride is unpaid / unrestricted and town centre parking is paid / time restricted	Considered in assessment criteria within for multi-criteria analysis framework applied during long-list stage
	Locate site where it will not cause disruption to regular users of the public transport service or transport network	– Generated traffic to access the site can negatively impact on active modes by increasing traffic on previously quite roads – May create adverse safety impacts on transport network – Existing public transport users may be discouraged if they find the experience less appealing	Considered in assessment criteria within for multi-criteria analysis framework applied during long-list stage
	Locate site where overflow of parking can be managed if it occurs.	– Enables demand to be realised without significantly adversely impacting existing users	Considered in assessment criteria within for multi-criteria analysis framework applied during long-list stage Design of overflow parking area considered at concept design stage
Site facilities and design elements improve passenger level of service	Site feels safe and secure with key security measures discussed in Section 4.4	– Security and perception of security has great impact on Park and Ride usage	Design consideration during short-list stage and concept design
	Providing facilities for all modes as discussed in Section 4.4	– To prioritise space and investment appropriately to encourage uptake of non-car dependant modes – To accommodate for emerging technologies and future uptake of other modes	Design consideration during short-list stage and concept design

Objective	Criteria/Principle	Reason for Criteria/Principle	How and where has this been incorporated into the SSBC
	Site is accessible with key infrastructure as discussed in Section 4.4	– Uptake will increase if passengers are able to have confidence that the infrastructure and service will provide what they need for a seamless, continuous journey with no barriers – Removing barriers to travel for users with accessibility requirements will result in facilities that are accessible for all users.	Design consideration during short-list stage and concept design
	Site considers amenity with high standard waiting areas and components discussed in Section 4.4	– Comfort of users has great impact on Park and Ride usage	Design consideration during short-list stage and concept design
	Site layout is safe and operational with key design features discussed in Section 4.4	– New facilities need to be designed and delivered to current standards.	Design consideration during short-list stage and concept design

Appendix E

Demand estimation memorandum

Technical Memorandum

December 19, 2022

To	Dunedin City Council	**Contact No.**	027 321 1116
Copy to	[redacted]	**Email**	Tim.Eldridge@ghd.com
From	Tim Eldridge	**Project No.**	12579672
Project Name	Mosgiel Park and Ride Single Stage Business Case		
Subject	Preferred Option – Demand Estimation v0.3		

1. Introduction

Dunedin City Council (DCC) engaged GHD to investigate options and develop a Single Stage Business Case (SSBC) for the provision of Park and Ride facilities in Mosgiel, Dunedin. The SSBC has been prepared in accordance with Waka Kotahi NZ Transport Agency (Waka Kotahi) guidelines and identified a preferred Park and Ride site option at a KiwiRail yard at 2 Burns Street, Mosgiel.

The purpose of this Technical Memorandum is to estimate the potential public transport demand (i.e. number of new users) as a result of implementing a Park and Ride facility at 2 Burns Road, Mosgiel (the preferred option). This Technical Memorandum documents the methodology and assumptions used to inform the demand calculations and estimates.

The remainder of this Technical Memorandum is structured as follows:

- **Do Minimum option description:** describes the Do Minimum option bus patronage numbers and assumptions used as inputs into the preferred option demand estimation methodology.
- **Preferred option demand estimation methodology and assumptions:** describes the GIS residential catchment approach and assumptions made to estimate the new public transport users generated by a Park and Ride facility at 2 Burns Street, Mosgiel.
- **Demand estimate summary:** summarises the results.
- **Considerations for the economic assessment:** describes the factors that may influence the demand estimate results, to be considered as sensitivities as part of the economic assessment.
- **Next steps:** outlines next steps for the preferred option demand estimates.

1.1 Scope and Limitations

This technical memorandum has been prepared by GHD for DCC. It is not prepared as, and is not represented to be, a deliverable suitable for reliance by any person for any purpose. It is not intended for circulation or incorporation into other documents. The matters discussed in this memorandum are limited to those specifically detailed in the memorandum and are subject to any limitations or assumptions specially set out.

Glossary

Acronym	Definition
JTW/JTS	Journey to Work/Journey to School

This Technical Memorandum is provided as an interim output under our agreement with DCC. It is provided to foster discussion in relation to technical matters associated with the project and should not be relied upon in any way.

2. Do Minimum

2.1 Description

The Do Minimum for the Mosgiel Park and Ride SSBC consists of:

- The existing bus route 77 services and,
- The planned peak period express bus services between Mosgiel and Dunedin that are to commence operation in 2023.

All bus route 77 and express service information and assumptions outlined below were confirmed with Otago Regional Council (ORC) via email 1 November 2022.

The Do Minimum option for the Mosgiel Park and Ride SSBC consists of the existing bus route 77 services and the planned peak period express bus services between Mosgiel and Dunedin that are to commence operation in 2023. All bus route 77 and express service information and assumptions outlined above were confirmed with Otago Regional Council (ORC) via email 1 November 2022.

Bus route 77 description:

The existing bus route 77 characteristics that form the Do Minimum are:

- On weekdays, ORC operates 28 services from Mosgiel to Dunedin, and 27 services from Dunedin to Mosgiel for bus route 77. The services from Mosgiel to Dunedin operate half hourly between 6.00 am and 6.30 pm and two evening services at 7.30 pm and 8.00 pm. The services from Dunedin to Mosgiel operate half hourly between 7.12 am and 7.12 pm and two evening services at 8.42 pm and 11.42 pm (Friday only).
- On weekends, ORC operates 22 services from Mosgiel to Dunedin, and 20 services from Dunedin to Mosgiel for bus route 77. The services from Mosgiel to Dunedin operate half hourly between 8.00 am and 4.30 pm and four evening services at 5.30 pm, 7.30 pm, 9.00 pm and 10.30 pm (Saturday only). The services from Dunedin to Mosgiel operate half hourly between 8.42 am and 3.42 pm and five afternoon / evening services at 4.42 pm, 6.12 pm, 8.12 pm, 9.42 pm and 11.42 pm (Saturday only)[1].

ORC have also confirmed that on weekdays from 2023, they plan to increase the number of bus route 77 services to 34 services from Mosgiel to Dunedin, and 32 services from Dunedin to Mosgiel. Weekend service numbers will remain the same as existing.

Future Express Service description:

The planned future express service characteristics that form the Do Minimum are:

- On weekdays, ORC plan to operate three morning peak express services departing from Mosgiel to Dunedin at 7.15 am, 7.45 am, and 8.15 am. They plan to operate six afternoon peak express services from Dunedin to Mosgiel at 3.30 pm, 4.00 pm, 4.30 pm, 5.00 pm, 5.30 pm, and 6.00 pm.
- Express service stops are unconfirmed at this time but will likely stop at three to four stops in the central Mosgiel area. The bus will then travel along State Highway 1 (SH1), exiting at South Road via Caversham to Princes Street and onto the Dunedin Bus Hub.
- Express service bus capacity assumed to be 60 passengers, including those standing.

[1] Sourced from ORC: Route 77 Timetables and Stops excel spreadsheet. Received via email 1 November 2022 from ORC.

2.2 Demand

The estimated demand (i.e. number of users) associated with the Do Minimum is displayed in Table 1. Note, 2024 estimates are based on a bus patronage annual growth rate of 4% per annum[2]. As part of the development of the SSBC an initial Travel Demand Management initiative for promoting the Park and Ride has been allocated $15,000 at the lead up to and commencement of the new facility as well as $5,000 per annum to continue promoting its use. These costs have been included in the economic assessment and financial case.

Table 1 Do Minimum – estimated daily users

Do Minimum	2022	2024
Existing users of route 77 – average number of users boarding in Mosgiel daily[3]	213	230
Estimated peak period express service Mosgiel to Dunedin users (JTW/JTS[4])	109	117
Total estimated passengers (Do Minimum)	**322**	**347**

Data for the existing number of users on route 77 was provided by ORC via email dated 12 May 2022, sourced from Bee Card boarding data.

Patronage forecast estimates for the express service were not available at the time of undertaking the demand assessment for the Mosgiel Park and Ride SSBC. As a result, the. express service (JTW/JTS) users were estimated using the Waka Kotahi Monetised benefits and cost manual (2021) direct demand elasticity ranges for public transport service improvements. This guidance states that any public transport service level improvements can result in overall (short run) direct demand elasticity increases (at 12 months after service, etc change) of between 20 and 70 percent on existing service demand[5]. In this instance a demand increase of 117 new users (55 percent) has been assumed as an estimated proportion within this range.

3. Preferred option demand estimation methodology and assumptions

GHD has used the following data sources to estimate the public transport user demands of the preferred option Park and Ride facility:

- GIS residential catchment mapping (LINZ).
- Statistics NZ dwelling data.
- Statistics NZ Journey to Work / Journey to School data (2018 Census).
- Australian public transport access data for a similar project for comparison.

A high-level flow diagram summarising the demand estimation process is shown in Figure 1.

[2] Sourced from ORC: Route 77 Historical Patronage Data – January 2019 to September 2022. Received via email 1 November 2022 from ORC.
Note: Jan 2019 to Sept 2022 historical bus patronage data shows 6% average growth per annum. 4% bus patronage growth per annum selected and used as a longer term, conservative estimate.
[3] Sourced from ORC: Route 77 stop data average daily user numbers for March 2022. Received via email 12 May 2022 from ORC.
[4] JTW / JTS = Journey to Work / Journey to School
[5] Waka Kotahi NZ Transport Agency, 2021. *Monetised Benefits and Cost Manual, 4.4 Evaluation of Public Transport Service Activities, Table 81: Overall (short run) direct elasticity estimates (at 12 months after service etc change).*

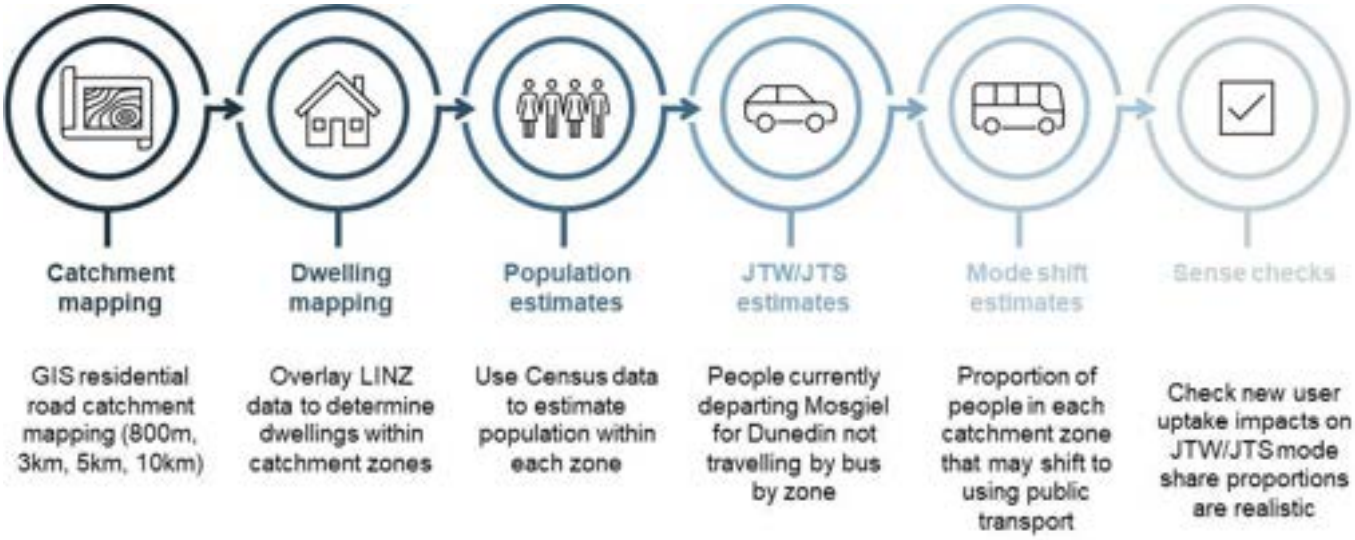

Figure 1 Preferred option demand estimation process

The analysis was completed using the following software and resources:

- ArcGIS Pro for the network analysis and investigation.
- FME for all data processing, calculations and extraction of data from Feature Services.

GIS Catchment mapping

Catchment mapping was undertaken in GIS to determine the land areas located within 800 m, 3 km, 5 km and 10 km of the preferred Park and Ride site via the road network:

1. The *Road Catchment Zones* were generated using the ArcGIS Online tools for Network Analysis and the *Service Area – Driving* scenario.

   Note: A road network data set was available through AGOL for these calculations. The Waka Kotahi Road Centreline Data would have been more accurate but was not available for use due to commercial purposes.

2. The preferred option Park and Ride site point was digitised and distance buffer polygons generated for 800 m, 3 km, 5 km and 10 km as rings following the road network.
3. These rings are separated at this stage, to form catchment donuts expanding out from the centre catchment ring (refer Figure 2).

Figure 2 Road Catchment Zones (800 m, 3 km, 5 km and 10 km) for Park and Ride Facility at 2 Burns Street, Mosgiel (GHD)

Dwelling mapping

The number of residential dwellings within each *Road Catchment Zone* was calculated as follows.

4. The *NZ building* outlines from LINZ LDS were used to estimate the total dwellings in each *Road Catchment Zone*. Note: This data had no attribution on building type, and every structure was mapped.
5. To remove non-residential structures from this dataset, all polygons with an area < 95 m² were removed as they were assumed to be non-residential dwellings such as garages and generated centroids. Once these structures were removed, the number of remaining structures was compared to the *NZ Census 2018 Statistical Area 2* data to check and confirm the number of dwellings were similar.
6. The zonal information feature services were located from Dunedin City Council and a spatial related analysis was applied to the centroids to transfer across the District Plan zonal attribution classifications.
7. A filter was applied on the centroids where zones were equal to: Residential, Rural and Rural Residential.
8. A spatial relate of the Road Catchment Zones (800m, 3km, 5km, 10km) from the preferred option site to the centroids was performed to count the numbers of centroids in each Road Catchment Zone. This provided the estimated number of residential dwellings in each distance band.

Road Catchment Zones population estimates

The estimated number of residents living in each *Road Catchment Zone* as shown in Table 2 was found by:

9. The estimated number of dwellings was multiplied by the average number of people per dwelling reported at the 2018 Census at *Statistical Area 2* level for Mosgiel. For the project area, 2022 populations per dwelling proportions were assumed to be the same as 2018 which was determined to be 2.5 people per dwelling.

Table 2 *Estimated number of residents living within Park and Ride Road Catchment Zones*

2 Burns Street, Mosgiel	800 m	3 km	5 km	10 km	Total
Estimated residents living within radius (2018 Census)	1,965	11,245	1,378	2,103	**16,691**

Note, the estimated residents living within each Park and Ride road catchment zone shown in Table 2 are not cumulative totals, i.e. 11,245 residents live between 800 m and 3 km from the Park and Ride site.

JTW/JTS departures estimation

Statistics NZ Census data for population and JTW/JTS departures was extracted and used to estimate the potential new bus and Park and Ride users within each *Road Catchment Zone*.

As part of a measured approach, it was assumed that any potential new users generated by the Park and Ride will be unlikely to transfer onto other services to continue trips to destinations beyond the Dunedin Central statistical area. Therefore, locations within Dunedin Central were assumed as the final destinations for potential new public transport user trips from Mosgiel.

10. Statistics NZ Census 2018 total population data and JTW/JTS data (specifically the number of people who travel/depart from Mosgiel area to Dunedin) was used to determine the proportion of people who travel from Mosgiel to Dunedin each day relative to total resident population. Mosgiel was assumed to be the Statistical Areas for Bush Road, Mosgiel Central, Seddon Park, Mosgiel East, Wingatui, Taieri and East Taieri.

    It was found that the proportion of the study area population who travelled to Dunedin Central on Census Day 2018 for work or schooling was 8.28%. It is assumed this proportion (8.28%) was the same in 2022.

11. This proportion factor (8.28%) was applied to the catchment buffer zone populations (shown in Table 2) for the preferred option site to estimate/isolate the number of people within each catchment that regularly travel to Dunedin Central for school and work each day (refer Table 3).

Table 3 *Estimated number of residents living within Park and Ride Catchment Zones who travel to Dunedin Central for work or school*

2 Burns Street, Mosgiel	800 m	3 km	5 km	10 km	Total
Estimated residents living within radius (2018 Census)	1,965	11,245	1,378	2,103	**16,691**
Residents living within Catchment Zones assumed to depart Mosgiel daily to Dunedin Central **(8.28%)**	163	931	114	174	**1,382**

12. For the purpose of calculating the demand associated with the Park and Ride facility, the Do Minimum passengers shown in Table 1 (Section 2) are assumed to continue using public transport regardless of whether the Park and Ride is provided or not.

    Therefore, the number of Do Minimum passengers needed to be subtracted from the *Estimated number of residents living within Park and Ride Catchment Zones who travel to Dunedin Central for work or school* numbers shown in Table 3. This is because they are not potential new users who may be attracted to the Park and Ride, as they are already assumed users of public transport (i.e. the Park and Ride site won't influence their decision as to whether to travel by bus).

13. The existing public transport bus route 77 users (213 daily users in 2022[6]) were assumed to be residing across the four catchment zones of the preferred Park and Ride site and removed from Table 3 as follows:

    a. 21.3 people (10 percent of existing bus route 77 users) removed from 800 m residential catchment zone

[6] Sourced from ORC: Route 77 Stop Data – March 2022. Received via email 12 May 2022 from ORC.

b. 149.1 people (70 percent of existing bus route 77 users) removed from 3 km residential catchment zone

c. 21.3 people (10 percent of existing bus route 77 users) removed from 5 km residential catchment zone

d. 21.3 people (10 percent of existing bus route 77 users) removed from 10 km residential catchment zone.

The remaining 45 users of public transport for JTW/JTS trips identified by the Mosgiel All Departures Mode Share statistics (refer Table 7 in Section 4) were assumed to depart Mosgiel using school bus services. They have been kept in these demand calculations as these users may choose to shift to using the Park and Ride and public bus services.

14. The future express service users (117 daily users, refer Section 2.2) were also assumed to be residing across the four catchment zones of the preferred Park and Ride site and were removed from Table 3 as follows:

a) 11.7 people (10 percent of forecast express service users) removed from 800 m residential catchment zone

b) 81.9 people (70 percent of forecast express service users) removed from 3 km residential catchment zone

c) 11.7 people (10 percent of forecast express service users) removed from 5 km residential catchment zone

d) 11.7 people (10 percent of forecast express service users) removed from 10 km residential catchment zone.

15. The remaining residents living within the Park and Ride catchment zones who depart Mosgiel daily to Dunedin Central were assumed to be users of other modes of transport (other than public bus) for JTW/JTS. They are therefore assumed to be the target audience who could be attracted to shift modes as a result of the new Park and Ride facility (refer to Table 4).

Table 4 Estimated target audience for Park and Ride [7]

2 Burns Street, Mosgiel	800 m	3 km	5 km	10 km	Total
Residents living within Road Catchment Zones assumed to depart Mosgiel daily to Dunedin Central	163	931	114	174	1,382
Existing users of route 77 (part of Do Minimum)	(21)	(149)	(21)	(21)	(213)
Estimate users of new express service (part of Do Minimum)	(12)	(81)	(12)	(12)	(117)
Total	**130**	**700**	**81**	**141**	**1,052**

Catchment Zone mode shift percentage estimates

The number of people in each *Road Catchment Zone* who may be attracted to the new Park and Ride (i.e. shift mode from their current means of travel to Dunedin) was determined through:

16. It was assumed that the proportion of residents (whom already travel to Dunedin by means other than bus) who would transfer to public transport use as a result of the new Park and Ride facility would be:

a) 15 percent for residents within 800 m of the Park and Ride facility

b) 10 percent between 800 m and 3 km

c) 5 percent between 3 km and 5 km

d) 3 percent between 5 km and 10 km.

[7] Note: The numbers shown in Table 4 are rounded to one significant figure.

These estimated mode shift factors of 15 percent, 10 percent, 5 percent and 3 percent were based on previous and recently completed Park and Ride facility access demand estimates calculated for Park and Ride projects in Perth, Australia.

Note, the mode shift factor for people living within the 800 m catchment was assumed to be higher than the between 800 m and 3 km catchment due to the improved facilities attracting both residents who walk up and drive to the Park and Ride.

17. The mode shift factors were then applied to all other mode users who travel to Dunedin Central for school or work to determine estimated new user demand generated through the Park and Ride services as shown in Table 5.
18. The estimated total new public transport users generated due to new the Park and Ride facility (in 2022 values) shown in Table 5 were uplifted to 2024 values of **104 users** based on 4% per annum bus patronage growth, consistent with economic evaluation assumptions.

Table 5 *Estimated number of new / additional PT users generated due to Park & Ride facilities within each catchment (2022)*

2 Burns Street, Mosgiel	800 m	3 km	5 km	10 km	Total
Estimated target audience for Park and Ride	130	702	81	141	1,054
Mode shift percentage	15%	10%	5%	3%	-
Estimated new PT users within Road Catchment Zones generated due to new Park and Ride facility (in 2022 values)	**19**	**70**	**4**	**4**	**97**
Estimated new PT user growth between 2022 and 2024 – 4% growth rate	2	5	0	0	5
Estimated new PT users within Road Catchment Zones generated due to new Park and Ride facility (in 2024 values)	**21**	**75**	**4**	**4**	**104**

Note: The new users of the preferred option shown in Table 5 above are those attributed to the Park and Ride facility only. The preferred option of the Mosgiel Park and Ride SSBC also includes provisions for seven additional express services between Mosgiel and Dunedin from 2024 (to support the Park and Ride facility). The operational cost of these additional express services are included in the preferred option economic evaluation and in the financial case. However, at this time we have not estimated the new users or benefits that may be generated from the additional services as further demand assessments would be required to estimate this patronage uplift.

New user demand estimate checks:

To confirm the validity of the preferred option new user demand estimate results shown in Table 5, a series of demand elasticity and mode shift impact checks were completed.

19. The total number of new public transport users generated from the Park and Ride facility was compared against the Waka Kotahi Monetised benefits and cost manual (2021) direct demand elasticity ranges expected for public transport service improvements.

    This guidance states that any public transport service level improvements can result in overall (short run) direct demand elasticity increases (at 12 months after service, etc change) of between 20 and 70 percent. In this instance, the estimated number of new users from the Park and Ride facility equates to a demand increase of 45 percent on current bus route 77 user numbers, which is within this range.
20. The impacts on total JTW/JTS mode share proportions were also checked to confirm the resulting total mode share proportions from these new users appeared reasonable.

    The 2018 Census JTW/JTS mode user numbers were uplifted to 2022 numbers based on historical population growth rates between 2013 and 2018 (2.16 percent). Mode share proportions for 2022 were assumed to remain consistent with 2018 mode share proportions in the absence of more recent Census data, apart from private vehicle trips which were subtracted by the number of new public transport trips generated by the Do Minimum and the preferred option. It was assumed all new users

generated by these improvements shifted from JTW/JTS private vehicle trips to Dunedin Central to bus trips due to the 14.7 km distance between Mosgiel and Dunedin.

This generated an estimated public transport mode share of all people who depart from the study area of 7.49 percent (2024). This estimated mode share proportion following increased public transport user uptake due to the Park and Ride and new Express Bus Service improvements was considered realistic based on previous project experience and other urban centre mode share proportions witnessed nationally and in Australia.

4. Demand estimate summary

Table 6 provides a breakdown of the estimated new public transport users generated by the preferred option Park and Ride facility by catchment calculated using the methodology in Section 3. These new public transport users are presented relative to the estimated resident populations living within each Catchment Zone and those who depart Mosgiel to Dunedin Central for JTW/JTS purposes.

The estimated existing bus service 77 users and forecast express service new users (Do Minimum) that were subtracted from the estimated residents who travel to Dunedin Central (JTW/JTS) as part of this catchment demand analysis are also shown in the table. These users were subtracted from the Park and Ride catchment demand analysis as they are assumed to continue using public transport regardless of whether the Park and Ride is provided or not.

Table 6 Preferred option – estimated new public transport users by catchment

Description	800 m	3 km	5 km	10 km	Total
Estimated residents living within radius	1,965	11,245	1,378	2,103	16,691
Estimated residents travelling to Dunedin Central (JTW/JTS)	163	931	114	174	1,382
Do Minimum users	(33)	(229)	(33)	(33)	(328)
Potential new users – estimated residents travelling to Dunedin Central (JTW/JTS) not including existing Do Minimum bus users	130	702	81	141	1,054
Estimated public transport mode shift percentage following Park and Ride opening	15%	10%	5%	3%	-
Estimated new users from Park and Ride (JTW/JTS) – 2022	19	70	4	4	97
Estimated new users from Park and Ride (JTW/JTS) – uplifted to 2024	**21**	**75**	**4**	**4**	**104**

Note, the mode shift percentages applied to each catchment radius align with the overall public transport access mode share proportions of similar and recent Park and Ride projects completed in Perth, Australia[8].

Impact on Mosgiel public transport mode share

Table 7 displays the indicative combined impacts of the Do Minimum option and the preferred option on overall Mosgiel mode share proportions for public transport for future year scenarios:

- **2024** – the first full year following construction of the Park and Ride
- **2034** – year ten of the Park and Ride facility being in operation.

[8] PTA, March 2021. *High Wycombe Station Access Strategy, Opening (2021), 2031, and 2051 target mode split and patronage, Figure 0-1, Pp. 5.* Public Transport Authority.
Note: High Wycombe Park and Ride facility public transport access mode share estimates used as a reference (e.g., walking mode share station access proportions between an estimated 15% and 20% and vehicular mode share station access making up remainder) as catchment characteristics were deemed similar to Mosgiel.

This shows an estimated 258 users of public transport for JTW/JTS departures in 2022. This is predicted to increase to 279 of do minimum users by 2024 opening year based on a bus patronage annual growth rate of 4 percent per annum[9].

The planned express service is estimated to increase the 2024 demand by 117 users, and a further 104 new users are estimated due to the introduction of the Park and Ride. This results in a total estimated demand in 2024 of 500 users.

By 2034, this increases to an estimated 741 users based on a continued bus patronage growth rate of 4 percent per annum and 2.16 percent population growth[10].

Table 7 Indicative JTW/JTS departures and estimated Mosgiel public transport mode share[11]

Description	2022	2024	2034
Estimated Mosgiel population (2018 Census)	16,489	17,208	21,298
All Mosgiel departures JTW/JTS	6,391	6,781	8,290
Mosgiel base demand public transport passenger departures for JTW/JTS (includes 213 users for existing bus service 77 as part of Do Minimum (Mar 2022))	258	279	413
Estimated new users induced by express service (JTW/JTS) (part of Do Minimum)	N/A	117	173
Estimated new users induced by Park and Ride facility (JTW/JTS)	N/A	104	154
Total estimated public transport users (all departures for JTW/JTS)	**258**	**500**	**741[12]**
Estimated public transport mode share	**4%**	**7.49%**	**8.9%**

The new user estimates by catchment (shown in Table 7) equate to less than 0.6 percent of all residents within a 10 km radius of the Park and Ride taking up travel by public transport.

The public transport journey to work and school mode share proportions shown for 2024 and 2034 assume a bus patronage annual growth rate of 4% based on an annual average 3-year existing bus service (route 77) growth rate of 6% provided by ORC, and a population growth rate of 2.16 percent per annum for all other modes in line with historical five-year population growth rates. It is acknowledged that these population and bus patronage growth rates may not be representative of the significant residential growth and approved/ under construction subdivisions planned for the Mosgiel area over the next ten years.

5. Sensitivity Tests

An additional sensitivity test was undertaken to demonstrate the potential demand impacts of extending the route 77 service end point to Union Street in Dunedin North, to service the University of Otago Campus. It involved extending the potential public transport user base for those travelling to the Campus South statistical area for JTW/JTS, in addition to Dunedin Central (refer step 10 of section 3). This resulted in an (upper bound) estimated increase of an additional 48 new public transport users (total of 145) using the Park and Ride facility on opening. This assumes there are no existing users currently travelling to Dunedin Central by bus and transferring or walking to Campus South and all travellers to Campus South are able to change to complete their trip by public transport.

[9] Sourced from ORC: Route 77 Historical Patronage Data – January 2019 to September 2022. Received via email 1 November 2022 from ORC.
Note: Jan 2019 to Sept 2022 historical bus patronage data shows 6% average growth per annum. 4% bus patronage growth per annum selected and used as a long-term, conservative estimate.
[10] Statistics NZ, 2022. Place Summaries, Population count data for Bush Road, Mosgiel Central, Seddon Park, Mosgiel East, Wingatui, Taieri and Taieri East Statistical Areas. Historical average annual growth between 2013 and 2018 Censuses.
[11] Note: Estimated Mosgiel Populations and Departures for Journey to Work and Journey to School purposes utilise Bush Road, Mosgiel Central, Seddon Park, Mosgiel East, Wingatui, Taieri and Taieri East Statistical Areas data from Statistic NZ, Census 2018 uplifted to 2022, 2024 values using the growth rates noted below Table 6.
[12] Note: Estimate based on bus patronage annual growth rate of 4% per annum.

6. Considerations for the economic assessment

It is important to note there are other factors not incorporated into these demand estimations that may impact forecast bus user uptake and growth rates documented in this Technical Memorandum. These factors include, but are not limited to:

- The price of petrol and other fuels.
- Road user charges.
- The implementation of vehicle toll charges.
- The implementation of new supporting Park and Ride travel demand management (TDM) measures.
- Changes in parking charges and policy in Dunedin City.
- Charging customers for using of the Park and Ride facility.
- The uptake rates of electric vehicles and electric bikes, which have lower vehicle operating costs than petrol vehicles.
- In-vehicle travel time changes (levels of congestion).
- Improvements to active mode facilities and infrastructure between Mosgiel and Dunedin Central.
- Local development growth.
- The prevalence of work from home behaviours.
- The introduction of passenger rail commuter services between Mosgiel Station and Dunedin.

A higher growth outcome for the Park and Ride facility at 2 Burns Street may result from:

- Increased employment and services within Dunedin City.
- Increased parking charges in Dunedin City.
- Improved bus service reliability and frequency.
- Improved bus infrastructure such as electric buses and the provision of on-board wi-fi.

The factors outlined above that could result in higher (or lower) public transport uptake and use of the Park and Ride. They will be considered as sensitivity tests as part of the next phase SSBC economic evaluation.

7. Next steps

The Mosgiel Park and Ride preferred option new user demand estimates for 2022 and 2024 identified in this Technical Memorandum will become key inputs into the SSBC economic evaluation and implementation strategy.

Regards

Tim Eldridge
Executive Advisor

Appendix F

Long list MCA scoring rationale

Category	Criteria	Option 1 Peter Johnstone Park		Option 2 Memorial Park		Option 3 Glasgow Street		Option 4 Wingatui Hall / Racecourse		Option 5 Do Min + Mosgiel Station		Option 6 Privately owned vacant site	
Investment Objectives	Mode share	✓✓	Moderate ability to influence mode shift based on population catchment and anticipated uptake	✓✓	Moderate ability to influence mode shift based on population catchment and anticipated uptake	✓	Low ability to increase mode shift as does not cater to people who need to travel by car to the bus	✓	Low ability to increase mode shift based on population catchment and anticipated uptake	✓✓✓	High ability to influence mode shift based on population catchment and anticipated uptake due to capturing bypass trips (majority of trips from Mosgiel to Dunedin will pass site)	✓	Low ability to influence mode shift based on estimated capacity of site (approx. 40 spaces max)
	Travel time	x	Existing bus route would have to divert approximately 1 km resulting in increased journey time with additional delay due to intersections	xx	Existing bus route would have to divert approximately 1.5 km resulting in increased journey time with additional delay due to intersections	-	No noticeable difference to Do Minimum which includes a stop in Central Mosgiel	xxx	Increases bus journey travel time significantly (~20% increase) due to travelling to Wingatui (5 km round trip from SH87 via Gladstone Road North)	x	Existing bus route would have to divert approximately 0.5 km resulting in increased journey time with additional delay due to intersections	x	Existing bus route would have to divert approximately 0.9 km resulting in increased journey time with additional delay due to intersections
	Frequency and reliability of public transport	Not scored at long list stage, as not considered a differentiator between options											
	Number of single occupancy vehicles	✓✓	Moderate ability to impact based on population catchment and anticipated uptake	✓✓	Moderate ability to impact based on population catchment and anticipated uptake	✓	Low ability to impact based on only catering to active modes	✓	Low ability to impact based on population catchment and anticipated uptake	✓✓✓	High ability to impact based on population catchment and anticipated uptake	✓	Low ability to influence mode shift based on estimated capacity of site (approx. 40 spaces max)
	Deaths and serious injuries	✓✓		✓✓		✓		✓		✓✓✓		✓	
	People per vehicle (throughput)	✓✓		✓✓		✓		✓		✓✓✓		✓	
	CO_2 emissions	✓✓		✓✓		✓		✓		✓✓✓		✓	
	Residents' survey	Not scored at long list stage (awaiting Customer Insights results)											
	Access threshold	✓✓	Identified as a good option for people coming from Outram and then taking the bus to the hospital etc.	✓✓	Identified as a good option for people coming from Outram and then taking the bus to the hospital etc.	✓	Low ability to impact due to not catering to car parking and therefore reduced likelihood of attracting trips from the hinterland	✓	Low ability to impact based on population catchment and anticipated uptake and journey time; therefore, reduced likelihood of attracting trips from the hinterland	✓✓	Identified as a good option for people coming from Allanton/Clutha and then taking the bus to the hospital etc.	✓	Identified as a good option for people coming from Outram and then taking the bus to the hospital etc; however limited capacity so will restrict availability
Mana whenua	Mana whenua	Not scored at long list stage											
Social and Environmental Impacts	Climate change mitigation / adaptation	✓✓	Moderate ability to impact based on population catchment and anticipated uptake; ability to include emerging technologies to reduce impact (e.g. EV charging)	✓✓	Moderate ability to impact based on population catchment and anticipated uptake; ability to include emerging technologies to reduce impact (e.g. EV charging)	✓✓	Will encourage people to use active modes to access bus, hence not requiring a car at all for their journey; limited catchment however	✓	Low ability to impact based on population catchment and anticipated uptake and increased travel; ability to include emerging technologies to reduce impact (e.g. EV charging)	✓✓✓	High ability to impact based on population catchment and anticipated uptake; ability to include emerging technologies to reduce impact (e.g. EV charging)	✓✓	Will encourage people to use active modes to access bus, hence not requiring a car at all for their journey; limited catchment however
	Heritage[1] and archaeology[2]	-	No identified heritage / archaeology sites impacted	-	No identified heritage / archaeology sites impacted	x	Located within Archaeological Alert Layer on 2GP	-	No identified heritage / archaeology sites impacted	-	No identified heritage / archaeology sites impacted	-	No identified heritage / archaeology sites impacted
	Noise and vibration	xx	Increases traffic on surrounding residential streets particularly early morning and late afternoon/early evening	xx	Increases traffic to site, impact mostly restricted to houses either side of access (compared to existing SH87 impacts) however may have network rerouting effects depending on ease of access	x	Potentially encourages ad hoc parking in residential streets which will create noise / v bration; bus will spend longer in town centre as it picks up and drops off	xx	Increases traffic on surrounding residential streets particularly early morning and late afternoon/early evening	xx	Increases traffic on surrounding residential streets particularly early morning and late afternoon/early evening	xx	Increases traffic on surrounding residential streets particularly early morning and late afternoon/early evening
	Contaminated land[3]	-	Site not identified on HAIL register	-	Site not identified on HAIL register	-	Site not identified on HAIL register	-	Site not identified on HAIL register	xx	Site identified on HAIL register	xx	Site identified on HAIL register

Category	Criteria	Option 1 Peter Johnstone Park		Option 2 Memorial Park		Option 3 Glasgow Street		Option 4 Wingatui Hall / Racecourse		Option 5 Do Min + Mosgiel Station		Option 6 Privately owned vacant site	
	Social and economic	x	Potentially impacts rugby club who are existing users. Overflow parking for pool	xx	Potentially impacts football club who are existing users (longer season than rugby). Primary overflow parking for pool	x	Potential positive effect for businesses (e.g. cafes); however parking in town centre and on residential streets would have negative impact on amenity	x	Potentially impacts hall users for events in early evening	✓	Impact on nearby residents during construction; no existing users that will be impacted; positive business impacts through creating a transport hub (if coffee shop for example is situated on site)	x	No existing users to impact; encouraging parking in town centre would have a negative impact on amenity
	Landscape and visual	✓✓	Parking is already an established activity here; upgrade elements could improve site visually and add planting	✓✓	Parking is already an established activity here; upgrade elements could improve site visually and add planting	✓✓	Upgrade elements could improve site visually and add planting	✓✓	Parking is already an established activity here; upgrade elements could improve site visually and add planting	✓✓✓	Upgrade elements could improve site visually (entrance to Mosgiel) and add planting	✓✓	Upgrade elements could improve site visually and add planting; makes use of a vacant site
Design, Delivery and Operation	Engineering (technical) difficulty	x	Lighting and intersection improvements required	x	Lighting and intersection improvements required	-	Limited work required to upgrade site to be useable	x	Sealing, lighting and intersection improvements required	xx	Requires culvert crossing to be constructed, potential intersection upgrades, site sealing and site lighting	x	Sealing, lighting and intersection improvements required
	Safety and design	✓✓	Upgrades and increased use likely to increase personal security; has footpath access; road width sufficient to add cycleways	✓	Upgrades and increased use likely to increase personal security; has footpath access; would need to remove parking to provide cycle lanes; turning movements at access may be difficult and result in conflict	✓✓	Good perceived personal security; good active mode facilities	xx	Access to site involves crossing a level crossing, no footpaths or cycleways in place. Has poor perceived personal safety	✓	Upgrades and increased use likely to increase personal security; has footpath access; would need to remove parking to provide cycle lanes; turning movements at access may be difficult and result in conflict	✓	Upgrades and increased use likely to increase personal security; has footpath access; would need to remove parking to provide cycle lanes; turning movements at access may be difficult and result in conflict
	Network impacts	x	Bus will need to re-route; negative direction to Dunedin so will generate demand from people back tracking	x	Bus will need to re-route; negative direction to Dunedin so will generate demand from people back tracking	xx	Increased conflict in town centre and local residential streets due to increased cars	xx	Bus will need to re-route; negative direction to Dunedin so will generate demand from people back tracking; additional traffic turning movements at SH87/Gladstone Road North by level crossing	xx	Additional traffic turning movements at SH87/Burns Street could cause delay / require upgrades to intersection	x	Bus will need to re-route; negative direction to Dunedin so will generate demand from people back tracking
	Property impacts	x	Requires Parks approval	x	Requires Parks approval	-	Site is DCC owned	x	Requires Community Board acceptance	xx	Requires KiwiRail agreement; land is not DCC owned so would be on a lease agreement; risk of sunk infrastructure cost	xx	Requires private landowner agreement; land is not DCC owned so would be on a lease agreement; risk of sunk infrastructure cost
	Scalability of facility and services	xx	Reasonable estimated capacity at site however cannot expand without taking land from Parks and Reserves	xx	Reasonable estimated capacity at site however cannot expand without taking land from Parks and Reserves	xx	Unable to expand without purchasing / leasing land	x	Limited space available, however potential to discuss longer term options with Racecourse; supports future rail expansion	✓✓✓	Considerable space available for lease; supports future rail expansion	xx	Unable to expand without purchasing / leasing additional land
	Timing (programming)	✓✓✓	Trial can be implemented relatively quickly with limited additional works required	✓✓✓	Trial can be implemented relatively quickly with limited additional works required	✓✓✓	Trial can be implemented relatively quickly with limited additional works required	✓✓	Site requires upgrades to be an attractive Park and Ride, but a trial site could be made operational in a short time frame	xx	Site not able to be used short term due to upgrades required	x	Trial timing will be dependent on private owners; uncertainty about long term viability as site not DCC owned

[1] Data sourced from Heritage New Zealand Pouhere Taonga, 2022. *Search the List Rārangi Kōrero*. Retrieved 5 July 2022 from **Search the List | Heritage New Zealand**

[2] Data sourced from New Zealand Archaeological Association, n.d. *ArchSite, Archaeological site recording scheme*. Retrieved 5 July from **NZAA Site Viewer (eaglegis.co.nz)**

[3] Data sourced from Otago Regional Council, n.d. *Otago Regional Council – Mapping Resource: Hazardous Activities, Industries and Bores Search*. Retrieved 5 July 2022 from **https://maps.orc.govt.nz/portal/apps/MapSeries/index.html?appid=052ba04547d74dc4bf070e8d97fd6819**

Appendix G

Economic assessment and assumptions memorandum

Memorandum

8 February 2023

To	Dunedin City Council		
Copy to	[redacted]		
From	Tim Eldridge	**Tel**	027 321 1116
Subject	Mosgiel Park and Ride SSBC – Economic Evaluation Assumptions	**Project no.**	12579672

1. Introduction

This memorandum is to note the assumptions and methodology used in the economic evaluation of the Preferred Option of the Mosgiel Park and Ride Single Stage Business Case (SSBC) completed on the behalf of Dunedin City Council (DCC). This assessment utilises Simplified Procedures for Public transport existing services (SP-10) and follows the guidance provided in the 2021 edition of the Waka Kotahi Monetised Benefits and Cost Manual (MBCM). This memorandum will be appended to the Mosgiel Park and Ride SSBC as Appendix G.

2. Business Case Scope

This SSBC presents the case for investing in safe travel choices for people who live south of Dunedin through the introduction of the Mosgiel Park and Ride and support an increase in public transport use. A key outcome of the project is to "*…change the transport network to support the new hospital, whilst also providing a future focussed, accessible transport system enabling placemaking and liveability outcomes for the city.*"[1]

The Mosgiel Park and Ride SSBC looks at locations within Mosgiel suitable for a Park and Ride service between Mosgiel and Dunedin via State Highway 1. This economic evaluation assessed the economic efficiency of the Mosgiel Park and Ride SSBC Preferred Option (determined through the business case process), a Park and Ride facility at 2 Burns Street, Mosgiel.

[1] Dunedin City Council, 2021. *Park and Ride facilities at Mosgiel Point of Entry*. Pp 2

3. Summary Results

A summary of the economic evaluation results for the Mosgiel Park and Ride preferred option are shown in Table 1.

Table 1 Economic Results Summary Table

Timing	
Earliest Implementation Start Date	Construction start July 2023
Expected Duration of Implementation	12 months
Economic efficiency	
Time Zero	1 July 2023
Base date for Costs and Benefits	1 July 2022
Present Value of Funding Assistance	$17.7m
Present Value net Total Project Cost of Recommended Option	$23.3m
Present Value net Benefit of Recommended Option (exc. WEBs)	$38.4m
BCR national	1.6
BCR government	2.2
First Year Rate of Return (FYRR)	5.4%
Sensitivity results	
Discount Rate of 3%	1.9
Discount Rate of 6%	1.3
Patronage +20%	1.7
Patronage -20%	1.6

4. Assumptions

4.1 Assessment Details

4.1.1 General Economic Assumptions

The general economic assumptions used in the evaluation are:

1. Discount Rate is 4%.
2. Evaluation period is 40 years.
3. Sensitivity testing:
   a. Discount rate of 3%.
   b. Discount rate of 6%.
4. Time Zero is 1 July 2023.
5. Construction to commence in 2023 and take 12 months (for evaluation purposes, construction may be shorter than 12 months).
6. Each year is defined as having 365 days comprising 245 weekdays, 52 Saturdays, 68 Sundays and public holidays (MBCM p.304).
7. General update factor of 1.28 (for passenger transport user benefits) used to uplift benefits between July 2008 and July 2021 per MBCM Appendix 12.3 *Update factors for benefits*.

4.1.2 Transport Input Assumptions

The transport input assumptions make up the general data used for the evaluation and analysis of the proposed preferred option. These include:

8. Distance of 14.70 kms from Burns Street/SH87 intersection to Bus Hub in Dunedin[2].
9. Peak periods of 6am to 9am and 3pm to 6:30pm[3].
10. Peak period traffic flows of 1,078 vehicles per hour[4].
11. Rate of traffic growth of 2.16% over the length of the economic appraisal period[5]. Population growth forecasts and changes for Mosgiel have not been included in the economic evaluation other than this traffic growth rate based on historical annual population growth between 2013 and 2018.
12. Existing public transport service passengers per annum of 263,190 passenger trips in year 2022[6].
13. Existing peak period PT passenger numbers of 75% of total patronage in 2022 for Route 77.
    a. This peak period to off-peak period patronage split was calculated using existing route 77 hourly patronage data for March 2022[7].
14. Historic growth rate in passenger numbers of 6%[8].
15. Future growth rate in passenger numbers of 4% per annum[9].
16. Existing operating costs of $0.
    a. Note: these existing service operating costs were not required for the simplified procedures economic evaluation that only evaluates incremental impact of the preferred option over the Do Minimum.
17. New users per weekday in peak times of 104 at the opening year of the park and ride facility in 2024.
    a. This is based on the assumption that all new users make a return bus trip to and from the Park and Ride facility - totalling 208 passenger trips per day)[10].
    b. It also assumes that 20% of the weekday peak time ridership will travel on the weekend and in off peak periods as per actual patronage numbers for route 77[11] which display an estimated 25% of users using the services in off-peak times.
18. Based on the new users per weekday in peak times of 104 and future growth rate in passenger numbers of 4% per annum, the Preferred Option Park and Ride facility (235 motor vehicle capacity) would reach vehicle capacity in 2050. It is assumed the 4% per annum growth track for new public transport users is maintained from 2050 through to the end of the economic appraisal period in 2062.
    a. This is based on increased vehicle occupancy for Park and Ride users >1.1 people per car, kiss and ride drop offs and increased walk ups to the facility which provides increased levels of service compared to other bus stops.
19. Estimated diversion rate of 50% of new users shift from trips by private vehicle to bus due to the Park and Ride facility.[12]
20. Proposed user charge $2 average fare based on bee card cost per trip as per ORC information[13].

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[2]Used Google Maps roading networks distance by road for PT Route 77
[3]Otago Regional Council (ORC), Nov 2022. *Park n Ride data*. Received via email dated 01/11/2022 12:05pm
[4]Note: Calculated using TMS data for peak period average hourly traffic flow between 3pm and 6pm for SH1 at Saddle Hill (northbound lanes only) obtained through the Waka Kotahi TMS Portal
[5]Note: Based on Mosgiel area historical annual population growth between 2013 and 2018 for Bush Road, Mosgiel Central, Seddon Park, Mosgiel East, Wingatui, Taieri and Taieri East statistical areas Stats NZ, Annual Average Population Growth between 2013-2018 Census populations
[6]Otago Regional Council (ORC), Nov 2022. *Route 77 Mosgiel Patronage 2019 – 2022 spreadsheet*. Received via email dated 01/11/2022 12:05pm
[7]Otago Regional Council (ORC), Nov 2022. Route 77 Mosgiel Patronage 2019 – 2022 spreadsheet. Received via email dated 01/11/2022 12:05pm
[8]Otago Regional Council (ORC), Nov 2022. *Route 77 Mosgiel Patronage 2019 – 2022 spreadsheet*. Received via email dated 01/11/2022 12:05pm
[9]GHD Technical memorandum titled "Preferred Option – Demand Estimation" dated 25 November 2022
[10]GHD, Nov 2022. *Preferred Option – Demand Estimation Technical Memorandum*. DCC .
[11]Otago Regional Council (ORC), Nov 2022. *Route 77 Mosgiel Patronage 2019 – 2022 spreadsheet*. Received via email dated 01/11/2022 12:05pm
[12]Note: As per Waka Kotahi monetised benefits and costs manual (MBCM) Table 85: Prior modes of new public transport passengers resulting from urban public transport initiatives (p.161)
[13]Otago Regional Council (ORC), Nov 2022. *Park n Ride data*. Received via email dated 01/11/2022 12:05pm

4.1.3 Service Provider Costs

The service provider costs of the preferred option are the P50 capital cost estimate, and 40-year expected operational and maintenance expenditure. These service provider costs were estimated or sourced as follows:

21. Preferred option Park and Ride facility capital cost of $14,910,000 (P50) provided by Alta[14] and included as Appendix H of the Mosgiel Park and Ride SSBC.
22. An additional capital cost of $30k for additional PT infrastructure on Glasgow Street – includes bus shelter, bike stands, and signage.
23. Preferred option Park and Ride facility annual operating and maintenance costs assumed to be 0.5% of total P50 capital cost, including costs for additional PT infrastructure on Glasgow Street.
24. DCC travel demand management (mode shift campaign) additional operational costs of $30,000 total. $15,000 in year 1, and $5,000 each in years 2-4[15]. The $15,000 in year 1 is for promotion of the new Park and Ride facility in the lead up to and commencement of its operation. The $5,000 each in years 2 – 4 are for TDM measures to continue promoting its use.
25. Annual operating costs for seven additional express services between Mosgiel and Dunedin from 2024 (to support the new user uplift estimated from the Park and Ride facility) at $264,444 per annum (pro-rata costs for 7 additional services based on ORC provided estimate costs for 9 services at $340,000 per annum) as per ORC information[16].
26. Lease costs for Park and Ride site from KiwiRail at $129,250 +GST[17] per annum. Lease costs for the first nine years assumed to be the same for the remainder of the economic evaluation period.

The resulting discounted present value of service provider costs was $23,294,410.

4.1.4 Funding Gap Analysis - Methodology

This analysis compares the net present value of expected service provider revenues and expected rate of return with the service provider costs[18]. The funding gap is the amount that local and central government need to fund to make up any deficit in cash flow if the activity is to be financially viable from the public transport service provider's point of view.

The funding gap was calculated as follows:

27. Used service provider rate of return per annum at 12% as per the Waka Kotahi industry standard noted in the SP10 worksheet.
28. Estimated total passenger trips per annum calculated as the total of existing passengers and expected new passengers at 318,476.
29. Estimated patronage growth rate percent per annum assumed to be the slightly less than the historical patronage growth rate at 4%[19].
30. Used existing user charge of $2[20].
31. Calculated that net present value of 40-year annual total revenues and funding equals zero when the funding gap is $3,404,647 [21].

The result of this analysis is that the activity (including increased express services to support the Park and Ride) requires central and local government funding of 3,404,647 per year in the years 2024-2031.

[14]Alta, Oct 2022. *Mosgiel Park and Ride - Cost estimate.* Received via email dated 28 October 2022.
[15]Dunedin City Council, Nov 2022. *Mosgiel Park and Ride - approach for economic analysis.* Received via email dated 14/11/2022 2:28pm
[16]Otago Regional Council (ORC), Nov 2022. *Park n Ride data.* Received via email dated 21/11/2022 11:34am
[17] As per email Subject: Mosgiel Park N Ride - Rental Estimate received Friday, 16 December 2022 10:52 am. Note 30% discounted leasing scenario assumed as per email.
[18]Waka Kotahi, 2021. *Monetised Benefits and Costs Manual v1.5 August 2021, p.23.* Waka Kotahi.
[19] Otago Regional Council (ORC), Nov 2022. *Route 77 Mosgiel Patronage 2019 – 2022 spreadsheet.* Received via email dated 01/11/2022 12:05pm
[20]Otago Regional Council (ORC), Nov 2022. *Park n Ride data.* Received via email dated 01/11/2022 12:05pm
[21]Note: Calculated as per MBCM Funding gap analysis (p.420)

4.1.5 Economic Benefit Streams

The economic benefit streams quantified as part of this analysis include public transport road traffic reduction benefit, public transport user benefit, public transport reliability benefit, reduction in average minutes late and public transport infrastructure benefit.

4.1.5.1 Road traffic reduction benefit and public transport user benefit

The road traffic reduction benefit and public transport user benefit of the proposed park and ride were derived using the following assumptions:

30. Benefits to road traffic users in peak periods of $2.06 per additional passenger boarding[22].
31. Benefits to public transport users in peak periods of $11.00 per additional passenger boarding[23].

4.1.5.2 Public transport reliability benefit

Public transport reliability benefits are realised when there is an increase in certainty in the time it takes to travel from the start to the end of a person's journey and calculated using time to a minute late ratios and the reduction in average minutes late as follows:

32. The equivalent time to a minute late ratio was derived from the combined equivalent minutes to late ratios in Table SP10.2 of 3.9 as both in vehicle and departure ratios would be improved by the new facilities provided.
33. Reduction in average minutes late was determined by a capacity assessment and travel time delay assessment for SH87 entering Mosgiel (south of the Burns Street Park and Ride facility).
    a. The capacity for SH87 (the bus service 77 and express service route entering Mosgiel) in PM Peak was estimated at 600 users[24].
        i. This threshold is also expected to be met for select urban corridors into Dunedin in AM Peak, however these impacts have not been calculated or included in this economic evaluation.
    b. The capacity assessment for SH87 resulted in a public transport reliability benefit reduction of 0.58 minutes in average minutes late for the preferred option compared to the do minimum. This was based on:
        i. SH87 South of Burns Street and South of Bruce Street being a Class III Urban Principal route[25].
        ii. Determined capacity for this section of road at 600 vehicles per lane per hour[26].
        iii. Determined peak interval traffic intensity to be 636 between 3:00pm and 6:30pm using TMS data for vehicle counts per hour[27].
        iv. Determined the time period average delay per vehicle for the "Do minimum" option to be 6.58 minutes[28].
        v. Determined the time period average delay per vehicle for the preferred option to be 5.03 minutes[29] by reducing the traffic volume between 17:00-18:00 by 52 vehicles.
            A. refer to diversion rate assumption for new users generated by the Park and Ride in (18).
            B. Derived the reduction in average minutes late by obtaining the difference between (iv) and (v) resulting in a reduction of 1.44 minutes late.
        vi. Applied this time saving at 75% to account only for traffic allocated to peak periods and halved to reflect that this analysis was conducted on one peak period of traffic (PM) only.
34. This resulted in a final value for reduction of average minutes late of 0.58.

[22] Note: Derived from SP10 Table SP10.1 using the value for other urban area
[23]Note: Derived from SP10 Table SP10.1 using the value for other urban area
[24]Table A66 of the MBCM.
[25]Table A56 of the MBCM.
[26]Table A57 of the MBCM
[27]Table A63 of the MBCM
[28]Table A66 of the MBCM.
[29] Table A66 of the MBCM

4.1.5.3 Public Transport Infrastructure Benefit

Public transport user experience improves given certain infrastructure conditions. These have been monetised in the MBCM and expressed as in vehicle time (IVT) minutes to provide comparative measures for user preference. The preferred option infrastructure benefits quantified in this economic evaluation were derived using the MBCM[30] and the preferred option concept design[31] and include:

35. Stop and shelter benefits of 0.9 IVT minutes based on the following preferred option attributes:
    a. Excellent condition – looks like new
    b. Double-sized shelters
    c. Seats in the shelter
    d. Spotlessly clean
    e. No litter
    f. No graffiti
    g. Glass cubicle giving good all-round protection
36. Ticketing benefits of 0.3 IVT minutes based on:
    a. Pay by cash (change given), credit/debit card
    b. Machines available at busiest stops
37. Security benefits of 0.6 IVT minutes based on the following attributes:
    a. CCTV recorded and monitored by staff if alarm raised
    b. Adequate lighting provided
    c. Security point with two-way communication with staff
38. Information benefits of 0.8 IVT minutes based on the following attributes:
    a. Digital clock telling correct time
    b. Free-phone number shown at stop
    c. Simple timetable
    d. Small map showing local streets and key locations
39. Station benefits of 0.6 IVT minutes based on the following attributes:
    a. Bright lighting, CCTV, cleaned frequently, landscaping, block paving.

4.2 Preferred Option Demand

40. Refer to the GHD Technical memorandum titled *Preferred Option – Demand Estimation* dated 25 November 2022 for the complete methodology and assumptions/ sources used to estimate the new user demand for the Preferred Option Park and Ride facility.

Regards,

Tim Eldridge
Executive Advisor

[30] Waka Kotahi, 2021. *MBCM, Table 34: Infrastructure features value for public transport – bus (p.88).* Waka Kotahi.
[31] GHD, Sep 2022, *Dunedin City Council Mosgiel Park and Ride Concept Layout 12579672.* DCC.

Worksheet 1 - Evaluation Summary and TIO Upload Effective from 31 August 2020

This spreadsheet can be automatically uploaded into Transport Investment Online. To enable automatic upload please do not adjust the columns or rows.

Activity name		Mosgiel Park and Ride Single Stage Business Case
Reference		Mosgiel Park and Ride
Evaluator(s)	- name, organisation	Logan Peck
Reviewer(s)	- name, organisation	Thomas Hankinson
Date of evaluation	mm/yyyy	11-2022
Time zero / implementation start date	1 July yyyy	2023
Construction duration	Months	12
Base date of costs and benefits	1 July yyyy	2022
Location		Mosgiel, Dunedin.
Problem definition		Mode shift away from single occupancy vehicle user to public transport
Do minimum description		Bus route 77 services and planned Mosgiel- Dunedin express bus route services in peak times.
Alternatives considered (or page references to relevant)		
Options considered (or page references to relevant)		A new Park and Ride facility at 2 Burns Street, Mosgiel (KiwiRail yard)
Preferred option description		Mosgiel Park and Ride

Statistics		Base rate	Growth rate (%)	New users/transfer
Road traffic - Annual Average Daily Traffic (AADT)	AADT	0	2.16	
Pedestrians - Annual Average Daily	Count	0	0.00	0
Cyclists - Annual Average Daily	Count	0	0.00	0
Annual Patronage - Total	Count	197,393	4.00	55,286
Annual Patronage - Peak Period	Count	197 393		
Freight volume	tonnes	0	0.00	0
Heavy Vehicles Volume	AADT	0	0.00	
Heavy Vehicles Volume	%	0.00		
Road Category				

		Before	After
Roughness	IRI/NAASRA	0	0
Posted speed	km/h	0	0
Average traffic speed	km/h	0	0
Length of road / route	km	14.70	0.00
Road width	metres	0.00	0.00
Travel time on route	minutes	0	0

		Period start am	Period stop am	Period start pm	Period stop pm
Peak Period		0	0	0	0
Peak Period Traffic flow	Vehicles/hr	1078			
Period of crash analysis	yyyy - yyyy				

	Fatal	Serious	Minor	Non Injury
Recorded crashes in period (row 4 crash analysis)	0.0	0.0	0.0	0.0
Total estimated crashes per year - do minimum (row 11)	0.0	0.0	0.0	0.0
Predicted crashes per year - preferred option (row 20)	0.0	0.0	0.0	0.0

Heavy Vehicle Trips Saved (average per year)	count	0	Total DSI saved	
Vehicle Operating Cost Savings (per annum)	$/vehicle	0	VOC saving	
Travel time savings (per day)	minutes	0	Total hours saved	

Costs		Do minimum	Preferred option
Construction / implementation	$	0	0
Present Value Construction / implementation	$	0	23,294,410
Present Value Maintenance, renewal and operating costs	$	0	0
Present Value Total costs (whole of life)	$	0	23,294,410
Present Value Cost savings	$	0	
Present Value Funding assistance	$	17,657,372	

Benefits		Present Value	Total Value (undiscounted)
Travel time cost savings	$	0	
Vehicle operating cost savings	$	0	
Crash cost savings	$	0	
Seal extension benefits	$	0	
Driver frustration reduction benefits	$	0	
Risk reduction benefits	$	0	
Vehicle emission reduction benefits	$	0	
Other external benefits (noise, visual, impact etc)	$	0	
Mode change benefits	$	38,400,904	
Walking and cycling health benefits	$	0	
Service or facility user benefits	$	2,375,677,285	75,958,637
Parking user cost savings	$	0	
Dis-benefits during implementation/construction	$	0	
Road Traffic reduction benefits	$	0	10,233,624
National strategic benefits	$	0	
Agglomeration benefits (WEB)	$	0	
Increased Labour Supply (WEB)	$	0	
Imperfect Competition (WEB)	$	0	
Total Benefits Present Value	$	2414078188	86,192,262

Non monetised benefits or national strategic factors		
Benefit Cost Ratio (BCRn) National	1.65	
Benefit Cost Ratio (BCRg) Government	2.17	
First Year Rate of Return (FYRR)	0.05	
Sensitivity Analysis - BCR range	2.52	1.68

Appendix H

Cost estimate

Memorandum

To	Riaan Steenkamp - GHD
From	Kyle Gounden
Date	28 October 2022
Reference	J000422
Subject	Mosgiel Park and Ride - Cost estimate

Dear Riaan,

Alta has been engaged to provide an estimate based on the concept drawings from GHD of the Mosgiel Park and Ride for Dunedin City Council. This project involves the construction of a new park and ride facility on a site previously occupied by Kiwirail, used for stockpiling materials and storage of containers.

In Brief

This memorandum outlines the estimates value, the information provided, the estimate process we have undertaken and some of the main assumptions we have made in developing this estimate. Attached to this memorandum is the estimate summary and schedule of prices.

The site is located off Burns Street and adjacent to the existing rail lines, as shown below in figure 1.

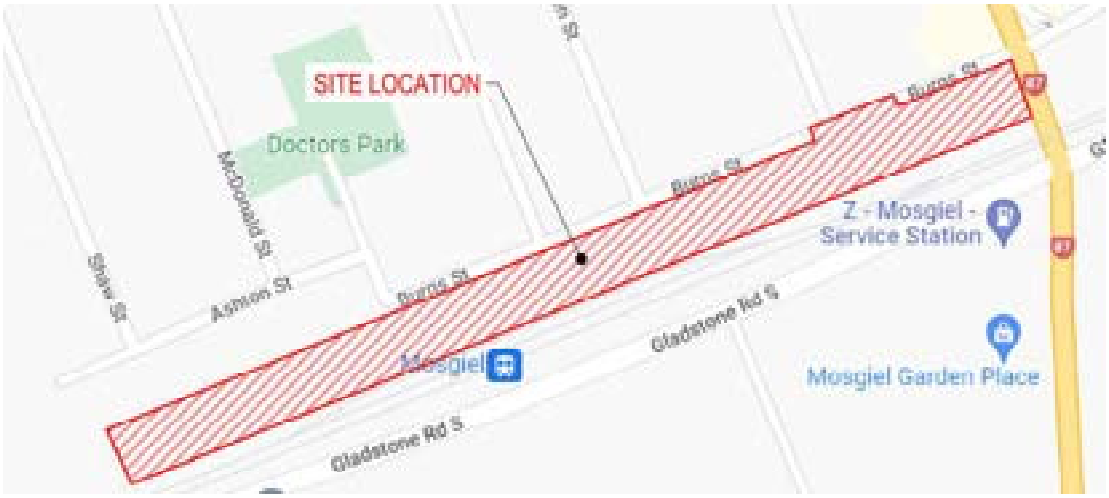

Figure 1 - Site area of work

Based on the site layout drawings provided we have undertaken a site measure and have developed a schedule of quantities based on what we have assumed to be the required scope. Pricing is a mix of first principles and from rates used on similar projects.

The estimate has a base date of October 2022 and no allowance has been made for future escalation.

The values below are the project base, expected and 95th percentile estimates.

Information Provided

To undertake our estimate we have been provided with the following information;

- Concept layout plans (3 pages)
- Site photos (2x)

Estimates Assumptions

The following items include the main assumptions used to develop our estimate.

Project Development Phase

- Consultancy fees have been included at 3% of physical works.
- DCC managed costs have been included at 2% of physical works.

Pre-Implementation Phase

- Consultancy fees have been included at 6% of physical works.
- DCC managed costs have been included at 2% of physical works.

Implementation Phase

- Consultancy fees have been included at 1% of physical works.
- DCC managed costs have been included at 2% of physical works.
- Construction Monitoring fees have been included at 5% of physical works.

Preliminary and General

- The preliminary and general costs equate to around 20% of the direct costs.

- Offsite overheads and profit percentage have been calculated at 13% of the base physical works cost.

Traffic Management and Temporary Works

- Temporary traffic management includes all traffic management crew, barriers and signs. These have been priced based on activities. Most of this cost is for the Burns Street raised intersection works.

Earthworks

- Assumed there is no requirement for an extensive cut or fill as the site is relatively flat.
- An allowance for 20% of the excavation to be contaminated material.
- Assumed the only existing structure to be removed is the train shed.
- No allowance made for asbestos removal.
- Assumed 20% of the existing site to be concrete or asphalt to be removed.
- We have allowed for general site clearance, although have assumed any stockpiles of materials will not be removed by Kiwirail.

Drainage

- We have allowed 300mm diameter pipes for new drainage.
- Assumed the number of single and double catch pits based on the site area.
- Allowance for a SW360 treatment device, assumed 20 cartridges would be required.
- We have also allowed for a stormwater detention tank.
- We have allowed for Kassel kerbs to be installed for the bus stops.
- Assumed the culvert required would be 20m long, 5m wide and 4m high.
- There has been an allowance for one outlet that connects to the existing culvert.
- No allowance has been made to upgrade the remainder of the existing culvert.

Utilities

- An allowance has been made for existing overhead power lines to be undergrounded.
- A sum has been allowed for a power connection to the site.
- Existing utility covers have been allowed to be raised for the Burns Street raised intersection.
- A sum has been allowed for existing services investigation.
- Assumed there is no need for power upgrades.

Pavement and Surfacing

- We have allowed for a light-duty pavement where buses will not traffic. This consists of;
    - GAP65 250mm
    - GAP 40 150mm
    - Two coat chip seal
- Based on the previous park and ride projects, in areas where buses will traffic, we have allowed for a pavement consisting of;
    - GAP65 250mm
    - GAP 40 150mm
    - SMA 40mm
    - Grade 5 membrane
    - AC20 160mm

    - AC14 50mm
- The raised intersection is assumed to be constructed of asphalt.

Traffic services

- An allowance of one VPID per bus stop
- Assumed transport card vending machines to be installed.
- W-Barriers installed on the box culvert entranceway of the park and ride.
- We have assumed that lighting will be installed for the length of the car park, standard lighting column which has a dual outreach and two luminaires.
- Allowance for large bus shelters to be installed.
- Assumed CCTV will be required.

Landscaping

- Low-level planting to landscaping islands.
- We have allowed for a 50mm thick asphalt footpath to be installed on GAP40.
- Allowance of bins and seats priced for each bus stop.
- Small trees allowed for landscaping islands
- Footpath handrails allowed for the entrance of the entrance to the park and ride.
- Allowance for a bicycle shelter to be installed.
- Assumed that the boundary fence will be 1.8m high
- No allowance for transplanting of trees.
- Assumed the hardstand area to be concrete.

Extraordinary Costs

- Allowance for electric vehicle charger to be installed.
- The Exeloo has been based on the specification that was previously installed in the Otago city centre. This includes LED panels on the front side of the unit.
- Assumed no railway protection was required.

Risk

For all works, we have applied a contingency of 30% (earthworks 40%) to the base estimate to derive the expected estimate (P50). A further 20% has been added to the expected estimate to derive the P95 funding risk contingency estimate. A detailed risk assessment has not been undertaken.

Yours sincerely,

Kyle Gounden

Alta Consulting Ltd
022 366 4780

Reviewed by: Tim Lancaster

Project Estimate - Form C

Project Name: Mosgiel Park and Ride

DBE

Detailed Business Case Estimate

Item	Description	Base Estimate	Contingency	Funding Risk Contingency
	Property Purchase and Compensation Costs			
	Property Owner Accommodation Works			
	Property Consultancy Fees			
A	**Total Property Cost**			
	Project Development Phase			
	- Consultancy Fees	Nil	Nil	Nil
	- Dunedin City Council Fees	Nil	Nil	Nil
B	**Total Project Development**	**Nil**	**Nil**	**Nil**
	Pre-Implementation Phase			
	- Consultancy Fees	849,261	254,778	220,808
	- Dunedin City Council Fees	377,449	113,235	98,137
C	**Total Pre-Implementation**	**1,226,710**	**368,013**	**318,945**
	Implementation Phase			
	Implementation Fees			
	- Consultancy Fees	566,174	169,852	147,205
	- Dunedin City Council Fees	188,725	56,617	49,068
		-		
	Sub Total Base Implementation Fees	**754,898**	**226,470**	**196,274**
	Physical Works			
1	Environmental Compliance	143,800	43,140	37,388
2	Earthworks	655,279	262,112	183,478
3	Ground Improvements	-	-	-
4	Drainage	1,736,454	520,936	451,478
5	Pavement and Surfacing	1,809,814	542,944	470,552
6	Bridges		-	-
7	Retaining Walls		-	-
8	Traffic Services	419,000	125,700	108,940
9	Utility Services	335,750	100,725	87,295
10	Landscaping	1,004,790	301,437	261,245
11	Traffic Management	339,905	101,972	88,375
12	Preliminary and General	1,505,854	451,756	391,522
12A	Off Site Overheads	1,085,584	325,675	282,252
13	Extraordinary Construction Costs	400,000	120,000	104,000
	Sub Total Base Physical works	**9,436,231**	**2,896,397**	**2,466,526**
D	**Total for Implementation Phase**	**10,191,129**	**3,122,867**	**2,662,799**
E	**Project Base Estimate** (A+C+D)	**11,417,839**		
	Project Base Estimate (rounded)	11,417,839		

F	**Contingency** (Assessed/Analysed) (A+C+D)	**3,490,880**	
G	**Project Expected Estimate** (E+F)	**14,908,719**	
	Project Expected Estimate (rounded)	14,908,719	
Total Property Cost Expected Estimate			
Project Development Phase Expected Estimate		**Nil**	
Pre-implementation Phase Expected Estimate		**1,594,723**	
Implementation Phase Expected Estimate		**13,313,996**	

H	**Funding Risk Contingency** (Assessed/Analysed) (A+C+D)		**2,981,744**
I	**95th percentile Project Estimate** (G+H)		**17,890,463**
	95th percentile Project Estimate (rounded)		17,890,463
Total Property Cost 95th percentile Estimate			
Project Development Phase 95th percentile Estimate			**Nil**
Pre-implementation Phase 95th percentile Estimate			**1,913,668**
Implementation Phase 95th percentile Estimate			**15,976,795**

Date of Estimate: 1 October 2022	**Cost Index (Qtr/Year)**	**Oct 2022**
Estimate prepared by: Kylie Gounden	**Signed** KG	
Estimate internal peer review by: Tim Lancaster	**Signed** TL	
Estimate external peer review by	**Signed**	
Estimate accepted by DCC	**Signed**	

Note: (1) These estimates are exclusive of escalation and GST.
(2) Project Development Phase Estimates are set to Nil as these are now sunk costs.
(3) These estimates are exclusive of escalation and GST.

Appendix I

Economic assessment sensitivity testing memorandum

Memorandum

Internal use only

20 April 2023

To	Dunedin City Council		
Copy to	[redacted]		
From	Tim Eldridge	**Tel**	027 321 1116
Subject	Mosgiel Park and Ride SSBC Variation – Economic Evaluation Assumptions	**Project no.**	12579672

1. Introduction

This memorandum is to note the assumptions and methodology used to evaluate a staged implementation scenario of the Mosgiel Park and Ride SSBC Preferred Option, as requested by Dunedin City Council (DCC). This assessment builds on the core Mosgiel Park and Ride Preferred Option economic evaluation results documented in the Mosgiel Park and Ride SSBC – Economic Evaluation Assumptions memorandum dated 8 February 2023, and the Mosgiel Park and Ride SSBC. It is intended to be read in conjunction with these reports.

The economic assessment utilises Simplified Procedures for Public transport existing services (SP-10) and follows the guidance provided in the 2021 edition of the Waka Kotahi Monetised Benefits and Cost Manual (MBCM). A new edition of the MBCM was published after the assessment had been completed and contains significant increases to benefits for safety and active modes that will not be reflected in this evaluation. We would expect that the BCR would increase further with the application of these new benefit values. Any deviations or alterations made to (or outside of) the SP-10 standardised spreadsheet required to evaluate the value for money performance of a staged Mosgiel Park and Ride Preferred Option have been captured in Section 4 of this memorandum. This memorandum will be appended to the Mosgiel Park and Ride SSBC as Appendix G.

2. Preferred Option staged scenario description

This analysis builds on the scenario in Economic Evaluation Assumptions memorandum and analyses the impacts of a scenario in which the number of Preferred Option parking spaces is staged to meet short term affordability thresholds. The scenario analysed consists of reduced parking spaces from 240 to approximately 100 (a 57% reduction) in years 1 to 10, with the capital costs to the service provider split, putting half in the first year and the other half in year 10, bringing the total number of parking spaces up to 240 in year 11.

3. Summary results

A summary of the economic evaluation results for the Mosgiel Park and Ride preferred option are shown in **Table 1**. This assessment is based on a reduced capital cost of $7,470,000 in year 1. This is an estimate for the purposes of this economic assessment and has not been updated by the cost estimator. This is an indicative estimate of 50% of the total capital cost.

The Recommended Option in the SSBC has identified a site which is capable of being developed to approximately 240 car bays for the park and ride in the longer-term including mobility bays, bicycle parking, bus circulation and drop off facilities.

The demand for Park and Ride will be accommodated in the first 10 years through the provision of approximately 100 car bays. This is due to there being an estimated approximately 104 new passengers from the first year with an annual increase through to 10 years. Of these passengers some will walk or ride a bike, be dropped off or be a passenger in a car. There are also approximately 50 car bays on Burns Street next to the park and ride which are not in front of residential or other properties and these can be used if demand exceeds the available bays.

The BCR for the full development of the park and ride investment was 1.5. It is proposed that the development of the park and ride facilities be staged and that the initial development be approximately 100 car bays. Capacity would need to be reduced significantly lower than 100 car bays to have an impact or reduction on the BCR (lower to 1) due to the availability of adjacent car bays on Burns Street.

Table 1 Economic results summary table for staged Preferred Option implementation

Timing	
Earliest Implementation Start Date	Construction start July 2023
Expected Duration of Implementation	12 months
Economic efficiency	
Time Zero	1 July 2023
Base date for Costs and Benefits	1 July 2022
Present Value of Funding Assistance	$12.5m
Present Value net Total Project Cost of Recommended Option	$20.9m
Present Value net Benefit of Recommended Option (exc. WEBs)	$38.4m
BCR national	1.8
BCR government	3.1
First Year Rate of Return (FYRR)	7.7%

4. Assumptions

This memorandum builds on the work done in the previous assessment. All economic assumptions used in this evaluation are found in section 4 of the Mosgiel Park and Ride SSBC – Economic Evaluation Assumptions memorandum dated 8 February 2023. Only changes to these assumptions used to produce the economic results of the Preferred Park and Ride Option staged scenario are listed below.

4.1 Assessment Details

4.1.1 General Economic Assumptions

1. Parking spaces reduced from 240 to approximately 100 for years 1 to 10 – a reduction of 57%.
2. Parking spaces increased to 240, starting in year 10.

4.1.2 Transport Input Assumptions

No change

4.1.3 Service Provider Costs

1. Of the total Preferred Option capital cost for year 1 ($14,940,000) in the core SP10-2 spreadsheet, assume 50% ($7,470,000) in year 1 and 50% in year 10.
2. No change to operational and maintenance costs from the Mosgiel Park and Ride SSBC – Economic Evaluation Assumptions memorandum of:
    a. $264,444 per annum for seven additional express services between Mosgiel and Dunedin from 2024
    b. Lease costs for Park and Ride site from KiwiRail at $129,250 +GST
    c. DCC travel demand management (mode shift campaign) additional operational costs of $15,000 in year 1, and $5,000 each in years 2-4
3. Up to and including year 10, the per-annum operational and maintenance costs starting in year 2 were reduced from $473,394 to $436,044 based on a reduction in the assumed 0.5% of capital costs per annum ($37,350) in years 1 to 10.
4. Starting in year 11, the per-annum operational and maintenance costs increase to $473,394 based on the full 240 Preferred Option parking bay facility being in operation.
5. Present value (PV) of service provider costs reduces from $23,294,410 to $20,891,153 due to the cost timing changes outlined above.

4.1.4 Funding Gap Analysis – Methodology

1. Adjust the funding gap per annum in SP10-3 from $3,404,648 to $2,403,115 balance with revised year 1 to year 9 service provider costs.
    a. This changes the PV of funding assistance down from $17,657,372 to $12,463,168.

4.1.5 Economic Benefit Streams

No change.

Tim Eldridge
Executive Advisor

Worksheet 1 - Evaluation Summary and TIO Upload Effective from 31 August 2020

This spreadsheet can be automatically uploaded into Transport Investment Online. To enable automatic upload please do not adjust the columns or rows.

Activity name		Mosgiel Park and Ride Single Stage Business Case
Reference		Mosgiel Park and Ride
Evaluator(s)	- name, organisation	Logan Peck
Reviewer(s)	- name, organisation	Thomas Hankinson
Date of evaluation	mm/yyyy	11-2022
Time zero / implementation start date	1 July yyyy	2023
Construction duration	Months	12
Base date of costs and benefits	1 July yyyy	2022
Location		Mosgiel, Dunedin.
Problem definition		Mode shift away from single occupancy vehicle user to public transport
Do minimum description		Bus route 77 services and planned Mosgiel- Dunedin express bus route services in peak times.
Alternatives considered (or page references to relevant)		
Options considered (or page references to relevant)		A new Park and Ride facility at 2 Burns Street, Mosgiel (KiwiRail yard)
Preferred option description		Mosgiel Park and Ride

Statistics		Base rate	Growth rate (%)	New users/transfer
Road traffic - Annual Average Daily Traffic (AADT)	AADT	0	2.16	
Pedestrians - Annual Average Daily	Count	0	0.00	0
Cyclists - Annual Average Daily	Count	0	0.00	0
Annual Patronage - Total	Count	197,393	4.00	55,286
Annual Patronage - Peak Period	Count	197 393		
Freight volume	tonnes	0	0.00	0
Heavy Vehicles Volume	AADT	0	0.00	
Heavy Vehicles Volume	%	0.00		
Road Category				

		Before	After
Roughness	IRI/NAASRA	0	0
Posted speed	km/h	0	0
Average traffic speed	km/h	0	0
Length of road / route	km	14.70	0.00
Road width	metres	0.00	0.00
Travel time on route	minutes	0	0

		Period start am	Period stop am	Period start pm	Period stop pm
Peak Period		0	0	0	0
Peak Period Traffic flow	Vehicles/hr	1078			
Period of crash analysis	yyyy - yyyy				

	Fatal	Serious	Minor	Non Injury
Recorded crashes in period (row 4 crash analysis)	0.0	0.0	0.0	0.0
Total estimated crashes per year - do minimum (row 11)	0.0	0.0	0.0	0.0
Predicted crashes per year - preferred option (row 20)	0.0	0.0	0.0	0.0

Heavy Vehicle Trips Saved (average per year)	count	0	Total DSI saved	
Vehicle Operating Cost Savings (per annum)	$/vehicle	0	VOC saving	
Travel time savings (per day)	minutes	0	Total hours saved	

Costs		Do minimum	Preferred option
Construction / implementation	$	0	0
Present Value Construction / implementation	$	0	20,891,153
Present Value Maintenance, renewal and operating costs	$	0	0
Present Value Total costs (whole of life)	$	0	20 891 153
Present Value Cost savings	$	0	
Present Value Funding assistance	$	12,465,168	

Benefits		Present Value	Total Value (undiscounted)
Travel time cost savings	$	0	
Vehicle operating cost savings	$	0	
Crash cost savings	$	0	
Seal extension benefits	$	0	
Driver frustration reduction benefits	$	0	
Risk reduction benefits	$	0	
Vehicle emission reduction benefits	$	0	
Other external benefits (noise, visual, impact etc)	$	0	
Mode change benefits	$	58,400,904	
Walking and cycling health benefits	$	0	
Service or facility user benefits	$	2 375 677 285	75 958 637
Parking user cost savings	$	0	
Dis-benefits during implementation/construction	$	0	
Road Traffic reduction benefits	$	0	10 233 624
National strategic benefits	$	0	
Agglomeration benefits (WEB)	$	0	
Increased Labour Supply (WEB)	$	0	
Imperfect Competition (WEB)	$	0	
Total Benefits Present Value	$	2414078188	86,192,262

Non monetised benefits or national strategic factors		
Benefit Cost Ratio (BCRn) National	1.84	
Benefit Cost Ratio (BCRg) Government	3.08	
First Year Rate of Return (FYRR)	0.08	
Sensitivity Analysis - BCR range	3.57	2.38

Appendix J

Burnside Park and Ride Public Transport Demand Assessment

Technical Memorandum

01 February 2023

To	Dunedin City Council	**Contact No.**	027 321 1116
Copy to	[redacted]	**Email**	tim.eldridge@ghd.com
From	Tim Eldridge	**Project No.**	12579672
Project Name	Burnside Public Transport Demand Assessment		
Subject	Indicative Demand Estimation		

1. Introduction

Dunedin City Council (DCC) engaged GHD to estimate the potential uptake in public transport demand (i.e. the number of new users) as a result of implementing a Park and Ride facility in Burnside, Dunedin ('the site'). The purpose of this Technical Memorandum is to present the estimate and document the methodology and assumptions used to inform the public transport demand estimate.

The methodology used to estimate the demand for a potential Park and Ride site in Mosgiel was replicated for this site as agreed with DCC. For this reason, this Technical Memorandum should be read in conjunction with *GHD (2022), Mosgiel Park and Ride Single Stage Business Case: Preferred Option – Demand Estimation Technical Memorandum.*

1.1 Scope and limitations

This technical memorandum has been prepared by GHD for Dunedin City Council. It is provided as an interim communication under our agreement with Dunedin City Council. It is provided to foster discussion in relation to technical matters associated with the project and should not be relied upon in any way or for any purpose. It is not prepared as, and is not represented to be, a deliverable suitable for reliance by any person for any purpose. It is not intended for circulation or incorporation into other documents. The matters discussed in this memorandum are limited to those specifically detailed in the memorandum and are subject to any limitations or assumptions specially set out.

1.2 Site description

The site is located in Burnside, Dunedin. It is proposed that the site will be developed into a carpark with an indicative layout showing approximately 80 parking spaces for light vehicles. The site has the following characteristics:

- The site is zoned Industrial under the Dunedin District Plan.
- The site is currently undeveloped.
- One public transport service currently passes the site, this is Route 37/38 and is currently operating on a reduced timetable with hourly weekday (from 8:20 am to 10:20 pm) services between Concord – City – University. It has been assumed that there will be no changes to the public transport services. It has also been assumed that the bus will pick up / drop off passengers using infrastructure on Kaikorai Valley Road rather than detouring the bus to the Park and Ride site.
- Existing active modes infrastructure in the vicinity of the site is limited. It is understood that improvements are planned by DCC to align with the proposed Tunnels Trail.

2. Demand estimation methodology and assumptions

A summary of the demand estimation process and key assumptions is in three broad steps and provided below.

Step one:

Analysis was undertaken using GIS and Statistics NZ Census 2018 data[1] to estimate the number of residents normally residing within 800 m, 3 km, 5 km and 10 km of the site via the road network. In doing so, the following assumptions were made (refer to Figure 1):

- The proposed Mosgiel Park and Ride site would be in operation. For all properties that were within catchments for both sites (i.e. Mosgiel and Burnside), it was assumed that people would use the Mosgiel site.
- Behaviour shift will only occur when it provides benefit to the user, this is often in the form of decreased travel time cost. For this reason, it was assumed that no one would travel west on State Highway 1 to access the site as this would require driving 'away' from Dunedin and would require a reasonably convoluted detour.
- Similarly, no one residing north of #687 Kaikorai Valley Road would travel south on Kaikorai Valley Road to access the Park and Ride site.
- People residing in statistical areas east of Concord (i.e. Calton Hill and Corstorphine) would travel to Dunedin through South Dunedin and therefore would not feel motivated to use the Park and Ride.

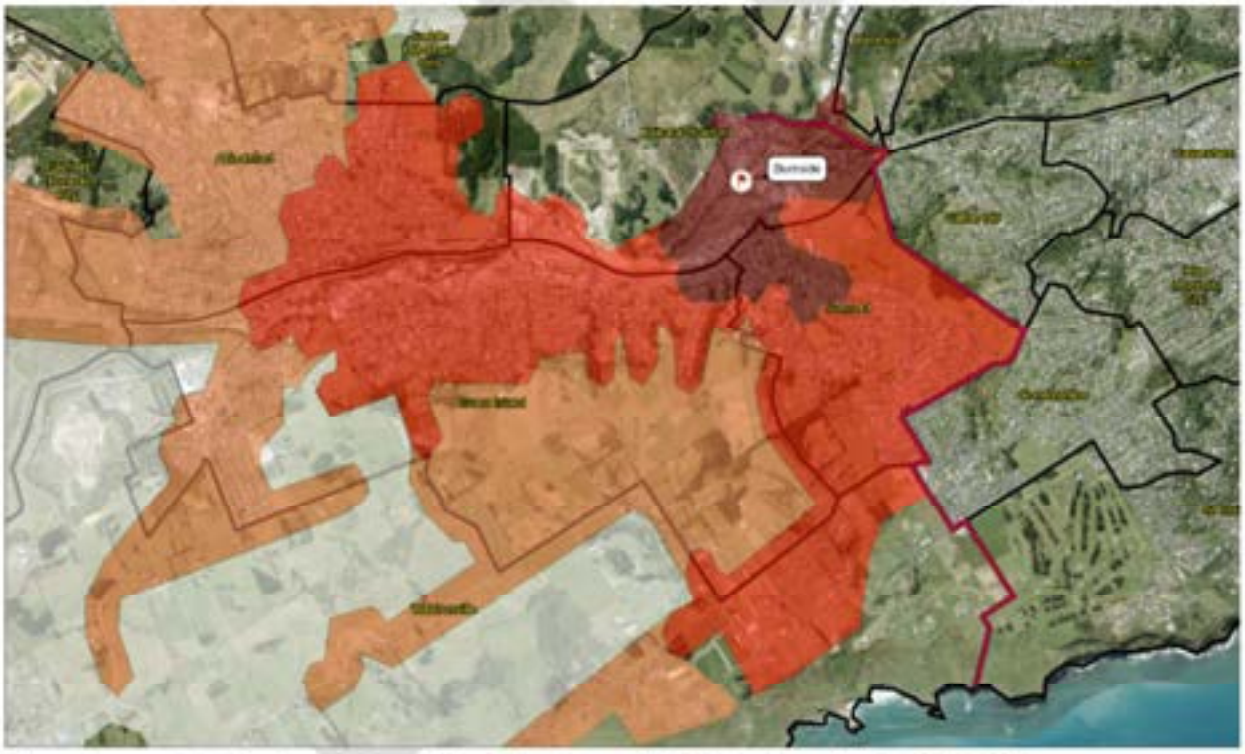

Figure 1 Road Catchment Zones (800 m, 3 km, 5 km and 10 km) for Burnside site (GHD, 2022)

[1] Statistical Areas 2: Saddle Hill-Chain Hills, Fairfield (Dunedin City), Abbotsford, Green Island, Kaikorai-Bradford, Concord, Waldronville and Brighton (or part of).

Step two:

Statistics NZ Census 2018 population data and Journey to Work / Journey to School (JTW/JTS) was extracted to estimate the number of people in each catchment zone that currently travel to Dunedin each day by means other than public transport. These people are considered the target audience for a Park and Ride.

Step three:

Mode shift factors were applied to estimate the number of residents (whom already travel to Dunedin by means other than public transport) who may transfer to public transport as a result of a Park and Ride facility. The mode shift factors applied were the same as those applied for the Mosgiel Park and Ride site of 15 percent for target audience residents living with 800 m, 10 percent for those living within 3 km, 5 percent for those living within 5 km, and 3 percent for those living within 10 km of the Park and Ride site. These numbers were then revised based on the following observations:

- People residing within walking distance (800 m) of the site (either on Ensor Street / Short Street, or in Concord) would have to pass an existing bus stop to get to the Park and Ride site. Combined with the limited active mode infrastructure, it is unlikely that a Park and Ride would create a change in behaviour for these people. Therefore this estimate is zero.
- People residing within cycling distance (3 km) of the site are either located near Green Island, in which case they would be likely to use the bus infrastructure at Green Island, or they are located in Concord. Similar to the point above, people residing in Concord are unlikely to cycle to the site which would involve passing the bus stop near Morton Street and then cycling up Kaikorai Valley Road – noting there are no provisions for cyclists under the motorway. Therefore this estimate is also zero.
- The estimates for people residing in the 5 km and 10 km catchments were not adjusted. It is however noted that the 5 km catchment population includes Abbotsford and Fairfield who may be more likely to travel to Green Island instead of the site due to the higher frequency of services from Green Island (this assumes that parking is available in Green Island).
- Numbers were not adjusted for population growth. Review of the Statistics NZ Census 2013 and 2018 population data showed only 1.16 percent average annual growth in this part of Dunedin. Burnside is not understood to be a planned residential growth area for Dunedin, with the immediate surrounds to the site remaining an industrial zoning in Variation 2 of the 2GP.

Results

The results are shown in Table 1. The potential uptake in public transport demand (i.e. the number of new users) as a result of implementing a Park and Ride facility in Burnside, Dunedin, is estimated to be approximately 32 users.

When the site is compared to the preferred site for a Park and Ride in Mosgiel, the Burnside site most notably lacks the local walking catchment. An estimated 1,965 people live within 800 m of the Mosgiel site compared to only 403 people in Burnside. It should also be noted that the walking access for Burnside has other detractions such as safety and amenity shortcomings which are expected to further reduce uptake potential.

Table 1 Estimated uptake of public transport by catchment – Burnside

Ref.	Calculation	800 m	3 km	5 km	10 km	Total
1.	Estimated residents living within radius (2018 Census)	403	3,690	3,430	3,440	10,963
2.	Estimated target audience	49	450	418	420	1,337
3	Estimated new users (opening year)	0	0	20	12	32

Demand estimate checks

Check one:

The total number of estimated new users was compared against the Waka Kotahi Monetised benefits and cost manual (2021) direct demand elasticity ranges expected for public transport service improvements. This guidance states that any public transport service level improvements can result in overall (short run) direct demand elasticity increases (at 12 months after service, etc change) of between 20 and 70 percent.

Based on the current number of people estimated to be travelling to Central Dunedin from Burnside (and surrounding statistical areas) being approximately **37**, this gives a range of new users of **7 to 26**. The above analysis sits slightly higher than the upper end of this range.

Check two:

The total number of estimated new users was compared against the existing number of public transport users in this catchment. An increase of 32 new users represents an 86% increase on the existing number which may be unlikely.

3. Summary

The potential uptake in public transport demand (i.e. the number of new users) as a result of implementing a Park and Ride facility in Burnside, Dunedin is estimated to be approximately 32 users. The demand estimate checks undertaken show that this estimate is likely to be optimistic when compared to existing travel behaviour.

There are several other factors in addition to the catchment demand analysis that may need to be considered in any future investment process. These include but are not limited to:

- The site presents with CPTED issues that will deter some people from using the park and ride facilities and service.
- Uptake in the walking and cycling catchments are likely to be severely limited due to the active mode infrastructure including no safe crossing facilities on Kaikorai Valley Road.
- There is potential for the site to be dual use through also providing parking for cyclists using the Dunedin Tunnel Trail.
- Changes in central city parking policy may incentivise people to consider changes to their travel behaviour.
- Changes to the public transport network (currently under review by Otago Regional Council Fare and Frequency business case) may change the number and frequency of services past the site.
- Potential future capital investment into intersection layouts on Kaikorai Valley Road may improve access to the site.

Regards

Tim Eldridge
Executive Advisor

Appendix K

Mosgiel Park and Ride Single Stage Business Case Peer Review

Jacobs

Mosgiel Park and Ride Single Stage Business Case peer review

Document no: IA233100
Revision no: 3

Dunedin City Council

3 August 2023

Jacobs

Mosgiel Park and Ride Single Stage Business Case peer review

Client name:	Dunedin City Council		
Project name:	Mosgiel Park and Ride SSBC Peer Review		
Document no:	IA233100	**Project manager:**	Tom Williams
Revision no:	3	**Prepared by:**	Tom Williams
Date:	3 August 2023	**File name:**	DCC Mosgiel Park and Ride SSBC peer review v0.3 08.03.2023 FINAL for DCC approval

Document history and status

Revision	Date	Description	Author	Reviewed
0	28/02/23	Draft	T. Williams	J. Hosking
1	03/03/23	Draft for client issue	T. Williams/K. Rupp	J. Hosking
2	15/03/23	Final for client issue	T. Williams/K. Rupp	J. Hosking
3	03/08/2023	Final	T. Williams/K. Rupp	J. Hosking

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Contents

1. Introduction

Jacobs has been appointed by Dunedin City Council (DCC) to undertake a peer review of the Mosgiel Park and Ride Single Stage Business Case (SSBC). This report presents the conclusions and recommendations from the peer review that has been undertaken in accordance with Waka Kotahi peer review guidelines. The intent of a peer review is to confirm the robustness of the SSBC and Preferred Option and to provide a format for the SSBC developers to respond to the recommendations of the peer review.

1.1 Project overview

The SSBC is focused on the identification of a Preferred Option for the development of a Park and Ride facility in Mosgiel, approximately 16km west of Dunedin. The case for the project is based around the need to provide alternative travel choices between Mosgiel and Dunedin. The SSBC also identifies that the redevelopment of the Dunedin Hospital and loss of parking acts as a catalyst to encourage the use of low carbon travel choices.

Mosgiel is currently connected to Dunedin by the Route 77 bus service and two circulator services (Routes 80 and 81), which act as feeder services for the 77. An additional express bus service between Mosgiel and Dunedin is expected to be operational in 2023, as part of the Do Minimum scenario considered in the SSBC.

The SSBC is informed by a customer insights survey which was undertaken to understand the community's viewpoint on the development of the project and to gauge potential demand for the facility. This survey features in problem statements, evidence and assessment of alternatives and options presented in the SSBC.

1.2 Peer review requirements and reviewers

Peer review of businesses cases is a Waka Kotahi requirement if the whole of life cost of the project is predicted to be over $15 million or involves significant levels of risk. When considering both the physical works cost of $14.9 million (P50) and operational costs of the project, the requirement for a peer review is triggered.

Waka Kotahi states that the purpose of a peer review is to reduce the risk that a project does not deliver on the identified project outcomes or at the level stated in the business case.

The Jacobs peer reviewers for the project are:

- Kerstin Rupp (Principal Transport Planner),
- James Channel (Senior Quantity Surveyor), and
- Tom Williams (Senior Transport Planner)

As Jacobs is independent from the parties developing the SSBC, the findings and opinions identified in this peer review are:

- Independent from those identified in the SSBC,
- Present an objective and professional viewpoint that reflects the purpose of the peer review process, and
- That the peer reviewers are competent with respect to the complexity of the SSBC and the tasks required to undertake its peer review.

1.3 Reviewed documents

The following documents were provided for this peer review:

- The Mosgiel Park and Ride Single Stage Business Case prepared by GHD for DCC (including appendices)

1.4 Peer review limitations

The peer review has been undertaken by Jacobs at the request of DCC for the purposes agreed to between Jacobs and DCC identified in the Statement of Works.

The opinions, conclusions and any recommendations in this peer review are based on conditions encountered and information reviewed at the date of preparation of the report. Jacobs has no responsibility or obligation (beyond what has been agreed) to update this report to account for events or changes occurring after the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by Jacobs and described in this report. Jacobs disclaims liability arising from any of the assumptions being incorrect.

2. Scope of the peer review

The purpose of the peer review is to confirm that the SSBC fulfils the Waka Kotahi SSBC requirements as set out in the Waka Kotahi Planning and Investment Knowledge Base.

The prescribed peer review process identified in the knowledge bank is as follows:

- Conformity,
- Credibility,
- Selection of the Do Minimum,
- Selection and assessment of the Alternatives and Options,
- Results alignment ratings,
- Cost estimate and economics review, and
- Risk identification, assessment, and proposed mitigation measures

The main requirement of a peer review is to document any concerns identified during the peer review process and provide the SSBC authors with an opportunity to respond to these comments.

3. Review

The remainder of this document identifies the observations made during the review of the SSBC.

3.1 Conformity

3.1.1 GPS activity classes

The project aligns with the 'Public Transport Infrastructure' and 'Public Transport Services' activity classes identified in the 2021-2024 National Land Transport Programme (NLTP).

The project conforms to the guidelines identified in the Waka Kotahi Planning and Investment Knowledge Base and has been assessed to align with the Waka Kotahi Investment Assessment Framework.

3.1.2 Investment Prioritisation Method

The project meets the requirements of the Investment Prioritisation Method for the 2021 – 2024 NLTP.

Based on the above, the peer reviewers are of the opinion that the Preferred Option identified in the SSBC aligns with Waka Kotahi funding requirements due to alignment with the Government Policy Statement (GPS) on Land Transport (2021-2024) and relevant activity classes.

This is subject to investment prioritisation and funding being available.

3.2 Credibility

3.2.1 Transport issues and opportunities

The project's Investment Logic Map (ILM) is shown in Figure 3-1 and clearly defines the problems that the project seeks to resolve and the benefits of addressing these problems.

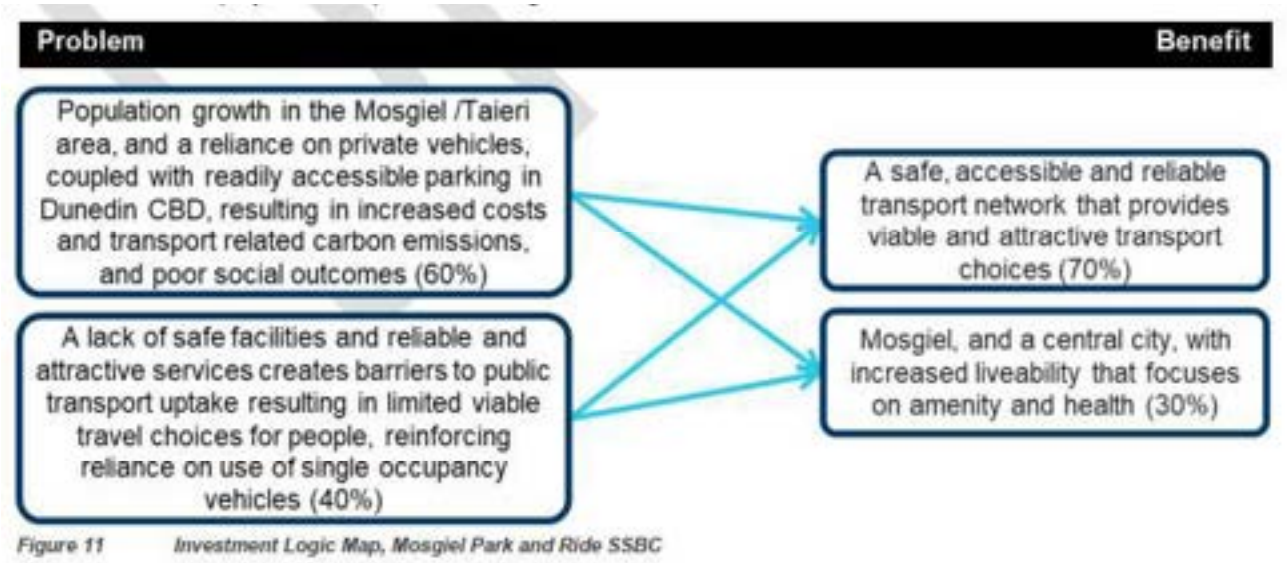

Figure 3-1: Mosgiel Park and Ride SSBC ILM

The first problem statement focuses on developing the link between high car use and poor social and environmental outcomes. As the population increases, the dependence on car use will also increase due to limited travel choices. The evidence to support this problem statement relates to: population growth (census data), journey to work information (census data), parking costs, collective crash risk for the State Highway Corridor between Mosgiel and Dunedin, death, and serious injury crashes involving vulnerable road users in Mosgiel.

The second problem statement relates to the identification of barriers that prevent people from using public transport. The evidence to support this problem statement relates to: a review of existing bus facilities in Mosgiel, the Customer Insights Survey, public perception of transport services, and bus stop catchments.

Recommendation: The evidence provided in the Strategic Case presents a broad approach to why investment is required. However, the broadness of this evidence detracts from the specific purpose of the project. As such it is recommended that this evidence base be refined to focus on this project intent, specifically:

- The safety evidence provided identifies a safety risk along the SH1 corridor and that there is also an increased probability of crashes involving vulnerable road user in Mosgiel. It is unclear how this information supports the project's scope; consideration should be given to its removal, as this would provide a more succinct evidence based linked to the intent of the project.

3.2.2 Economics evaluation

Generally the economics evaluation using SP10 seems sound. Some queries are mentioned below and are more around finer details.

3.2.3 Costs

A cost estimate of the Preferred Option has been undertaken by Alta and conforms with the Cost Estimation Manual (SM014) requirements for Detailed Business Case cost estimates. This cost estimate is included as Appendix H of the SSBC with the Concept Design plans which formed the basis of the cost estimate included as figure 56 in the SSBC.

Whilst this cost estimate conforms with SM014 requirements, the P50 and P95 estimates contain larger contingencies, which reflect assumptions made around ground conditions, consenting requirements and the requirement for a bridge/culvert over Owhiro Stream. Unless properly managed, the risk associated with these contingencies can result in price fluctuations for the project.

The peer review includes a review of this cost estimate; however, this review has been limited due to the information provided. Based on the information, it appears that the base estimate has been developed based on a range of assumptions rather than a build-up of rates/quantities.

Whilst this may be appropriate given the scale and complexity of the project, it is still unclear how the contingency was calculated, Moreover, it is unclear if cost escalation has been allowed for.

3.2.4 The full cost audit report is attached to this peer review. Benefits

The benefits delivered by the Preferred Option have been calculated using the simplified procedure for public transport (SP-10) in the Monetised Benefits and Costs Manual. Benefits relate to the following:

- Mode shift benefits, and
- Service or facility user benefits.

Whilst the benefit streams are identified in Appendix G, it is difficult to easily find this information in the business case. Therefore, it is suggested that the benefit streams (and value of the benefit) are included in Table 18.

The use of the simplified procedure is appropriate given the project's cost and complexity. Due to the limited interaction with the surrounding road network, modelling has not been undertaken in the development of the SSBC.

3.2.5 Forecast demand

Forecast demand is described in Section 6.1.1 of the SSBC. It stated that the development of the Park and Ride facility will result in 104 new users. As the success of the project is dependent on the implementation of the express bus service, it would be beneficial for this section to have a comparison between the Do Minimum (which includes the express bus) and the alternatives and options.

3.2.6 Risks associated with the forecasted costs and benefits

A project cost estimate has been prepared by Alta based on the concept design plans provided in the Preferred Option section of the document, this cost estimate contains a significant contingency for the P50 and P95 estimates. Whilst this estimate conforms with Waka Kotahi SMO14 requirements there is potential for a high-cost fluctuation that has the potential to impact on the benefits delivered by the project.

The cost of this lease agreement is identified at $130, 000 per annum. However, it is not clear if this has been factored into the project's financial case.

3.3 Do Minimum

The Do Minimum is stated in Section 4.3.1 and presents a credible base for the development of the project. The Do Minimum consists of the implementation of the express bus between Mosgiel and Dunedin. No other service or infrastructure changes are identified in the Do Minimum.

3.4 Alternatives and Options considered

3.4.1 Consideration of alternatives

Section 3.1.2 of the SSBC provides an overview of the Waka Kotahi and Dunedin City Council intervention hierarchy. Table 6 provides an overview of the alternative interventions considered in the development of the SSBC along with linkages to complementary projects being undertaken by DCC and the Otago Regional Council (ORC). This consideration of alternatives meets Waka Kotahi Requirements.

3.4.2 Option development and assessment

Within the SSBC, the problems and evidence presented in the strategic case are described on a broad scale, reflecting the project's investment Objectives and Key Performance Indicators (KPIs). These KPIs relate to:

- Increase in public transport mode share,
- Frequency, reliability and competitiveness of public transport,
- Safety and access,
- Social outcomes and a reduction in carbon dioxide emissions, and
- Proportion of the Mosgiel population living within 30 minutes of economic opportunities within the morning peak (if travelling by public transport)

In contrast to this, the options developed are of a much smaller scale and focus on the identification of sites that could be developed for a Park and Ride facility. As such, the link between the broad context presented in the Strategic Case and the specific response proposed could be strengthened to prevent misinterpretation.

It is assumed that intent behind the development of the options is to increase the patronage of the proposed express bus through the development of a Park and Ride facility thus making public transport a more attractive choice.

3.4.2.1 Assessment framework

The assessment framework used in the SSBC has been developed based on the projects Investment Objectives, KPIs, and the additional considerations listed in Table 8, as such the MCA framework used is clearly linked to the project's intent.

3.4.2.2 Longlist Option Development and Assessment

Six longlist options have been considered in the SSBC with the features of each option listed in Table 10. Whilst the description and assessment of these longlist options is brief, it reflects the size and complexity of the problems that the business case seeks to address and scale of investment required.

The longlist MCA assessment is summarised in Section 4.3.2, with the full assessment located in Appendix E.

Longlist Option Development and Assessment

Based on the information provided in the description and assessment of the options, it is not clear how the options have been assessed against these KPIs, as the KPIs reflect a broader context than the proposed options seek to address.

For example, how does the development of a park and ride facility deliver on the KPIs relating to:

- Frequency, reliability, and competitiveness of public transport,
- Safety and access, and
- Proportion of the Mosgiel population living within 30mins of economic opportunities within the morning peak (travel by public transport).

Recommendation: The MCA provides limited justification as to how the options considered have been assessed against the project's investment objectives and KPIs. Strengthening this connection and including a discussion around the cause and effect would help step the reader through the decision-making process. For example, based on the investment objectives what facilities are required for the development of a Park and Ride facility, and how does each option deliver against these requirements?

Shortlist Option Development and Assessment

The shortlist consists of two options (Options 1 and 5). A common feature of both options is the addition of a bus stop at the Glasgow Street Pocket Park; funding for the development of this bus stop is not requested as part of this SSBC.

The level of detail provided is appropriate to inform the feasibility of each option. However, the MCA assessment has limited depth and no Appraisal Summary Tables were included in the reviewed SSBC. The use of ASTs is a Waka Kotahi Requirement, and their omission will likely hold the SSBC up during IQA.

Moreover, based on the project risk register, Option 5 appears to be associated with increased risk compared to Option 3 due to:

- Requiring a lease from KiwiRail to occupy/develop the site,
- Identification as a HAIL site, and
- Requires resource consent due to the interaction with Owhiro Stream.

Recommendation:

Like the long list assessment, the MCA provides limited justification as to how the options considered have been assessed against the project's investment objectives and KPIs. Strengthening this connection and the inclusion of ASTs would help step the reader through the decision-making process.

Preferred Option Development and Assessment

The Preferred Option has been based on Option 5. As such, the description of the Preferred Option is succinct as no fundamental changes have occurred between the development of the Shortlist and the Preferred Option. Due to this addressing the recommendations in relation to the longlist and shortlist options, it would also strengthen the description of the Preferred Option, enabling the reader to conclude that it is the best way forward for the development of the project.

Recommendation: Addressing the recommendations in relation to the longlist and shortlist would also strengthen the description of the Preferred Option.

Moreover, in the assessment of the Preferred Option, it may be beneficial to loop back to how this option delivers on the project's requirements and how meeting these requirements also aligns with the Investment objectives and KPIs.

3.5 Results alignment rating

3.5.1 Conformity with the Investment Prioritisation Method

The project conforms to the requirements of the Investment Prioritisation Method used for the 2021-2024 NLTP.

GPS ALIGNMENT: The SSBC identifies a *Very High* alignment with the GPS. This is appropriate given that the benefits of the project relate to the development of public transport infrastructure to increase transport choices. This has an associated benefit of contributing to the development of a low carbon transport system.

SCHEDULING: The development of the park and ride in Mosgiel is part of the Connecting Dunedin programme of works. Therefore, the development of this project is linked to being able to unlock the wider programme benefits. Moreover, funding has been allocated in the 2021 – 2024 NLTP for the development of the project. This results in a *High* scheduling rating.

COST BENEFIT ANALYSIS: Project benefits have been calculated using the simplified procedures (SP10) of the Monetised Benefits and Costs Manual (MBCM). At 2.2 the projects BCR fits within the *Low* efficiency band

The projects assessment profile of VHHL as identified in the SSBC is correct returning an investment priority score of 2.

3.6 Project risks, Analysis and Mitigation

An assessment of project risks and mitigation measures is provided in Section 9.5. The development of Preferred Option is reliant upon third parties agreeing to a number of assumptions made in the SSBC such as:

- ORC running an express bus between Dunedin and Mosgiel,
- KiwiRail agreeing to a lease at the price assumed in the SSBC, and
- Obtaining resource consent for the planned site modifications.

Whilst these risks are identified in the SSBC, a delay in making these decisions is likely to impact on the projects programme and benefit realisation in relation to the proposed construction start date (July 2023).

3.7 Sensitivity analysis

The sensitivity tests undertaken in the Economic Assessment of the Preferred Option related to a +/-20% increase/decrease in patronage and discount rates of 3% and 6%. The results from these tests indicated that the BCR may have some variability, however under all scenarios the BCR remains above 1 and this will not impact the project's scheduling based on the IPM.

4. Conclusion

Overall, this business case follows a logical sequence and articulates the need for the development of the project.

The table below summarises the main points identified in the body of the report and providers the business case authors with an opportunity to respond to these points. The table also contains other recommendations that could be considered to strengthen specific sections of the business case.

It may be possible that in undertaking the review, some of the information contained in the business case has been misinterpreted. If so, please provide clarification and we will amend before finalising the peer review report.

5. Recommendation table

	Issue	SSBC author's response	DCC comment	Peer reviewers' response	Decision
1	Page 23 – 24 effects evidence – safety. The evidence provides over all context, however it could be strengthened by elaborating on the specific barriers limiting access to public transport.	Text added on page 25.	Accept text added.	No further comments	No further actions
2	Page 31 – The Ministry of Transports Decarbonising Transport Action Plan (Dec 2022) should be used to strengthen this problem	The strategic case was developed prior to the release of the Action Plan. No change is proposed so as to reflect the information available at the point in time when the strategic case was developed.	Agree no change required.	No further comments	No further actions
3	Page 32 – placeholder text: insert comment from ORC regarding implementation timeframes"	Text received from ORC and added on page 33.	Accept text added	No further comments	No further actions
4	Page 33 – place holder text - for express bus route map	Figure received from ORC and added on page 34.	Accept change	No further comments	No further actions
5	Page 37 – investment objectives. It would improve traceability if the benefit clusters/benefits were included in table 4 along with the measures (as per the Land Transport Benefit Framework)	Added to table 4.	Accept change	No further comments	No further actions
6	Page 39 – Strategic alignment – include The Ministry of Transports Decarbonising Transport Action Plan (Dec 2022)	The strategic case was developed prior to the release of the Action Plan. No change is proposed so as to reflect the information available at the point in time when the strategic case was developed.	Agree no change required.	No further comments	No further actions
7	Page 60 – Do Minimum. With the express bus service being identified as part of the Do Minimum it would be beneficial to state the impact that this will have on patronage. The benefit of this project is the development of the park and ride and how this increases bus patronage, as such comparing the increase in uptake of each option compared to the do mim (which includes any increased uptake due to the express bus service) would strengthen the case for the project .	Added into Do Min assumptions.	Accept change	No further comments	No further actions
8	Shortlist options – Option 5 appears to be associated with a higher level of risk compared to Option 1. As these risks are specific to the development of Option 5 they should be articulated in the description of the option along with the potential impact this may have on the development of the project.	Added into Option 5 description that the land is owned by KiwiRail. Description already included implications of this.	Accept changes made	No further comments	No further actions

	Issue	SSBC author's response	DCC comment	Peer reviewers' response	Decision
9	Page 68 – Waka Kotahi requires that Appraisal Summary Tables (ASTs) are completed for each shortlisted Option. Table 15 identifies a range of criteria that have been used for the MCA scoring however the actual MCA does not provide a summary of this information or how it has been used to score the shortlist options.	No change - as discussed, have used principles based approach as per Waka Kotahi guidance. Waka Kotahi has requested a SSBC that assesses the project at a level appropriate to the complexity and risks. It was considered that the MCA was the appropriate level. A shortlist AST can be added if Waka Kotahi IQA request this (note has not been requested at interim reviews to date), however at this stage it is considered to be academic.	Agree no change required	No further comments	No further actions
10	Page 72 – Parking – include a statement around if this will be free or paid parking	Text added.	Accept text added	No further comments	No further actions
11	Page 87 – P50 cost – the cost estimate has been developed based on using contingencies, however it is not clear how these have been calculated.	No change – contingencies were determined by a QS (Alta Consulting) and their experience in the local market. This is documented in the capital cost memorandum provided as an appendix and also in the Financial Case.	Agree no change required	No further comments	No further actions
12	Page 88 – Table 20 – highlighted text to be corrected 'xx percent – DCC to advise'. This also includes missing Appendix I regarding Cube modelling.	As discussed, this modelling is no longer going to be included in the SSBC as the DTM is not calibrated to be used for this purpose.	Agree no change required. Reference to modelling removed.	No further comments	No further actions
13	Page 97 – Rental costs – Has the cost of the rent agreement been factored into the financial case?	No change – the expected costs for the lease agreement are shown in Table 22 (and have been factored into the economic analysis as an operational expense).	Agree no change required	No further comments	No further actions
14	Page 99 – The last paragraph under funding sources identifies that the project has a potential funding gap. To manage this, it is proposed to stage the development of the project. This should be noted in both the description of the Preferred Option and the risk register as it has potential to impact on benefit realisation unless the project staging is aligned with assumptions around forecast demand.	No change – this is already included in section 6.2.3.	Agree no change required	No further comments	No further actions
15	Page 101 – Risks ' Place holder text-awaiting input from ORC	Text received from ORC and added on page 33.	Accept text added	No further comments	No further actions
16	Appendix F – demand estimation done on a GIS basis. Just wondering if the information was not available from the Strategic Transport Model. Or how this correlates with the information used in the model.	As discussed, the DTM is not calibrated to be used for this purpose.	Agree no change required	No further comments	No further actions

	Issue	SSBC author's response	DCC comment	Peer reviewers' response	Decision
17	Appendix F – appreciate that significant residential growth is forecast for subdivisions planned for Mosgiel over the next 10 years. Sensitivity test undertaken with +20% patronage increase. How does this correlate to the expected growth forecasts? Should the growth rate be higher? I note that the impact of the sensitivity test was minimal.	No change – sensitivity test showed BCR not significantly impacted by growth.	Agree no change required	No further comments	No further actions
18	Appendix G – point 4. Please clarify time zero, currently stated as 2023. If put in for funding before 1 June 2023 this would be time zero 2022. Minor impact expected.	No change – as noted the change will be minor.	Agree no change required	No further comments	No further actions
19	Appendix G – point 11: rate of traffic growth determined over 5 years (2013-2018). Has there been any subdivisions or growth in the area that is not likely to be repeated However rate of 2.16% does sound reasonable.	No change, growth rate is conservative and uses historical Census data available.	Agree no change required	No further comments	No further actions
20	Appendix G – point 18 – appreciate the check that the capacity of the P&R would be exceeded by 2050. Agree that increases in Kiss and Ride, car occupancy and walk ups are likely. Would be good to make this point stronger in the main body of the report. This is based on 235 car parking spaces. In the P50 cost estimate approximately 200 car parks are mentioned that includes 100 car parks that are informal. Can this be clarified please.	Have removed the reference to 200 car parks as the point of the confusion. For clarity, the economic analysis was undertaken for the long term intention which is a fully developed Park and Ride site. Due to funding constraints this has been revised to a staged approach, the exact number of parking spaces to be constructed in stage one will be confirmed in detailed design. (Footnote added to this effect in section 6.3)	Accept changes	No further comments	No further actions
21	Appendix G – points 21-26 -from year 2 yearly O&M of ~473k used, figure well explained in reporting. Usually there are annual maintenance costs as well as costs that occur periodically, like pavement rehab etc. Consideration should be given if the O&M should be refined to include larger potential spend.	No change. Assumed 0.5% of CAPEX to cover average annual O&M costs, we expect actual O&M to fluctuate over the life of the asset (appraisal period). We consider this a reasonable approach.	Agree no change required	No further comments	No further actions
22	Appendix G - W1 – Summary Upload – minor differences between the spreadsheet received and the attachment in the reporting. Check for consistency please.	Amended.	Accept changes	No further comments	No further actions
23	Appendix I – will the transport model be used to justify some of the demand forecasts?	As discussed, this modelling is no longer going to be included in the SSBC as the DTM is not calibrated to be used for this purpose.	Accept reference to model removed.	No further comments	No further actions

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