# Albany Street Cycleway

Single Stage Business Case Lite - addendum

19.09.2023

When the completed SSBC lite was handed to Waka Kotahi in June 2022, initial feedback was provided, and it was agreed that the BC would undergo investment assurance and recommendation for endorsement once a cost estimate based on detailed design was provided. That cost estimate was provided to Tim Mueller in August 2023. The feedback was that further and updated information is needed before the BC can be approved. This addendum provides that further information as outlined on the following pages.

## 1. Summary of changes since SSBC lite

This is a summary of what has changed since the Albany Street Cycleway business case lite was first submitted to Waka Kotahi in June 2022

- A new University of Otago residential college Te Rangihīroa was built at the intersection Forth/Albany St, providing for 450 students
- Waka Kotahi have decided to deliver an upgrade to the two SH1/Albany St intersections as part of this project. This upgrade delivers a raised table at the intersections
- A road stopping process for Walsh St is currently underway. The University of Otago wishes to purchase this road. The Albany/Walsh St intersection will be converted to a driveway.
- A 30 km/h speed limit change for the entire tertiary area has been approved by Council and is currently being implemented. More information is provided here: Interim Speed Management Plan - Dunedin City Council
- ORC is changing bus routes in the area and is implementing two bus super stops, one in Albany St and one in Union St. ORC received Transport Choices funding to implement the bus super stop in Union St.
- Two rounds of public consultation took place since the SSBC lite was first submitted. Consultation in May/June 2022 resulted in changes to the 2022 concept. These are:
    - Leith Street (from Albany Street to Frederick Street): Retain as a two-way street to support the Leith Street businesses and cyclists who use this route (less angle parking means it's safer for cyclists)
    - Clyde/Union Streets intersection: Make it easier and safer for pedestrians to cross with a raised zebra crossing and new kerb build outs.
    - Harbour Terrace zebra crossing: Raise existing zebra crossing to make it easier and safer for pedestrians to cross.
    - Trees along Albany Street: Keep most of the trees and still have the separated cycleway.
    - Albany Street between George Street and Great King Street: Continue the cycleway to link up with the retail area. This won't result in parking loss as the road is wide enough.
    - In-lane bus stop on Albany Street: The new super stop will only have one in-lane bus stop on Albany Street, not two.
    - Albany Street between Forth Street and Riego Street: Include an area where coaches can stop for the new University college.
    - Leith Street near Albany Street: New short-term parking to support businesses.

  The second consultation in June 2023 was to propose changes to the 2022 concept, following the road safety audit and an independent study undertaken by ViaStrada. These proposed changes are:
    - Albany/Clyde Streets intersection: Make Clyde Street between Albany Street and Trent Avenue one way south to reduce vehicle/cyclist conflicts at this intersection. More (angle) parking will be added into this part of Clyde Street.
    - Albany/Forth Streets intersection: No entry from Albany Street heading south into Forth Street. This is to reduce vehicle/cyclist and vehicle/pedestrian conflicts at this intersection.
    - Food trucks: Provide one or two new dedicated food truck spaces to support mobile traders in the area. These would be bookable (with a fee) and have power supply in the future. The space outside the Polytechnic Hub on Union Street (in red on map below) could alternatively be for motorcycle parking

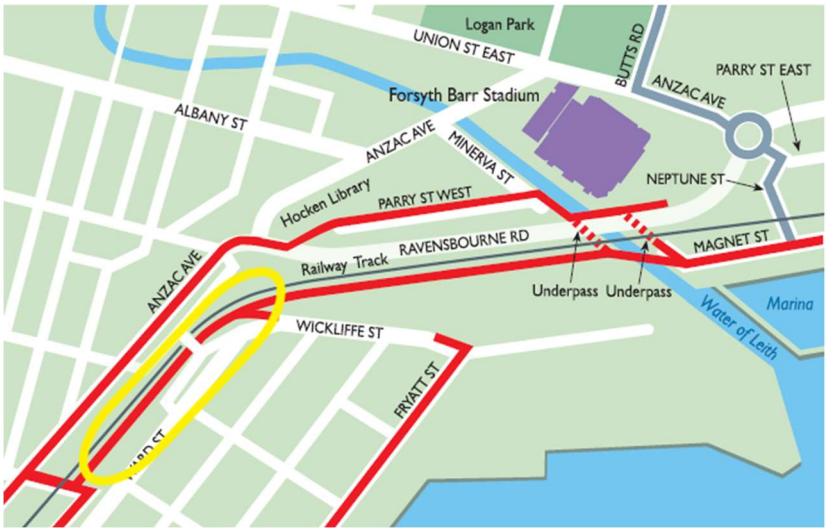

These changes were mostly supported and consequently the 2022 concept was amended accordingly.

- Detailed designs completed in 2022 estimated a delivery cost of approx. $10 million which is above the project budget. Following this DCC undertook a value engineering exercise that produced the current detail designs at a lower cost. This was achieved by adapting an interim approach at the eastern end of Albany St, Anzac Ave and Minerva St.
- Road Safety audits were undertaken for both detailed designs and a copy of the reports are attached.
- Peer review: An internal review and verification process of the SSBC lite was undertaken within AECOM. The verifier was Marcus Williams (Technical Director Transportation). Adam Ashford
- The governance arrangements have not changed since the SSBC lite was first submitted to Waka Kotahi. Governance continues to be in place through Connecting Dunedin governance structure that is in place for the Shaping Future Dunedin Transport programme.

## 2. Dependencies

Dependencies for the Albany St Cycleway project are:

- Area wide 30 km/h speed limit changes. These have been approved by Council and are currently being implemented
- A reseal of the entire length of Albany is scheduled to take place and is coordinated to be delivered in conjunction with this project
- Waka Kotahi upgrade of the two SH1/Albany St intersections is coordinated to be delivered in conjunction with this project.
- Bus route changes, bus stop rationalisation and implementation of two new super stops in Albany St and Union St are coordinated to be delivered as part of this project. The new bus super stop in Union St received Transport Choices funding and to support the new infrastructure and lower speed limits, DCC is extending pedestrian improvements to Union St
- Harbour Link (outlined in yellow on map below) will be completed by the end of this year. This will provide an important connection between the two sides of the harbour and to the central city.




3. **Local Share and TIO**
   Local share is confirmed as documented in Dunedins-Annual-Plan-2023-2024.pdf (page 52)
   We have updated TIO and split the Central City Cycle and Pedestrian Improvements project into 4 phase:
   - Albany St Cycleway phase: $3.5 million
   - George/Bank St Connection: $800.000
   - Slow Speed zone and walking/cycling improvements: $1.1 million
   - St Andrew St Connection: $14.1 million

4. **Status of related projects**
   - George/Bank St connection: received Transport Choices funding, public consultation closed 25.09.2023 and detailed design is being finalised in Sept/October. Procurement is underway and construction planned to be completed by June 2025
   - Slow Speed zone and walking/cycling improvements: the planning for this project is anticipated to start in 2024/25/26
   - St Andrew St Connection: Waka Kotahi has started a Business Case to consider the future of the SH88 part of St Andrew Street. DCC will start the planning of this project in 2023/24/25
   - Tertiary Precinct project: funding for this project has been moved to 2030/31
   - Strategic walking and cycling network review PBC: This work is underway and is anticipated to be completed in 2023/24

5. **National Policy Statement on Urban Design (NPSUD)**
   There are no influences or considerations for the Albany St Cycleway relevant to the NPS UD.

6. **Key milestones**

| Task | Description | Dependencies | Timeframe |
|---|---|---|---|
| **SSBC lite** | Completion of SSBC lite for submission to Waka Kotahi for funding approval | None | 03 June 2022 |
| **Public consultation** | Consultation on concept designs | Completion of Albany Street concept designs | May/June 2022 |
| **Detailed design** | Detailed design completed based on | Approval by Waka Kotahi and DCC to | September 2022 |

| | | | |
|---|---|---|---|
| | the scope of the preferred option outlined under the economic case | proceed. Procurement of professional services for detailed design through direct award | |
| **Safety audit** | Safety audit | Detailed design | October 2022 |
| **Tertiary Area Shared Space Investigation** | Technical advice following concerns raised through the safety audit and by key stakeholders | Detailed design | March 2023 |
| **Follow up consultation** | Follow up public consultation on proposed changes to the 2022 concepts | Detailed design | June 2023 |
| **Detailed re-design** | Detailed re-design due to infeasible cost of first detailed design | Approval by Waka Kotahi and DCC to proceed. Procurement of professional services for detailed design through direct award | August 2023 |
| **Safety audit** | Safety audit of detailed re-design | Detailed re-design | August 2023 |
| **Decision point** | Decision by DCC and Waka Kotahi to progress project | Completion of SSBC Lite and detailed design | September 2023 |
| **Procurement** | Commence procurement based on the complete detailed design | Completed detailed design | October 2023 |
| **Construction** | Construction of Albany St cycleway | Project delivery is coordinated with SH1 intersection upgrade and a reseal. Budgets are sitting in different FY's, therefore construction is stretched out. | Commence March 2024 and completion June 2025 |

**7. updated table 9: Summary of the preferred option for the Albany Street cycleway project**

| **In Scope of preferred option** |
|---|
| All infrastructure listed below is essential to achieve a safe, slow speed environment that encourages walking and cycling along Albany Street.<br>**Intersection - George Street/Albany Street**<br>• changes delivered through Central City Plan project<br>**Midblock – between George Street and Great King Street (SH1 northbound)**<br>• buffered cycle lane |

**Intersection – Great King St/Albany Street**

- Slight realignment of all traffic lanes
- North west corner: Consolidation of the straight and left turn traffic lanes for vehicles heading north
- North west corner: cycle lane leads onto kerb build out into shared space
- Raised intersection (Waka Kotahi project)

**Midblock – between Great King Street (SH1 northbound) and Cumberland Street (SH1 southbound)**

- Coloured surfacing of cycleway across Walsh St intersection
- Removal of on-street parking and any associated infrastructure such as parking meters
- Widening of path on southern side
- New shared path between Great King St and Walsh St
- Transformation of Walsh St into a driveway (due to road stopping process)
- Bus lane leading up to Cumberland/Albany St intersection

**Intersection – Cumberland Street/Gowland Street/Albany Street**

- Realignment of the south-west kerb and traffic signal pole to facilitate bi-directional cycleway
- Removal of central traffic island on Albany Street
- Bus priority at signals, for buses heading east

**Midblock – between Cumberland Street/Gowland Street and Anzac Avenue**

- Cycleway separator to accommodate bi-directional cycleway on the north side of Albany Street – mix of concrete separators at the western end and interim materials at the eastern end
- Coloured surfacing of cycleway across side-street intersections and accessways
- Removal of two trees that conflict with the cycleway alignment
- Removal of parking along the northern side of Albany Street
- One in-line bus stops with raised platform –
- Relocated mobility parks to appropriate locations
- Fife zebra crossings across Albany St at key locations
- No entry into Clyde St north
- No entry into Forth St south

**Riego Street**

- Conversion to one-way northbound
- Conversion of parallel parking on the western side of Regio Street to 60-degree angle parking
- Change the angle parking on the eastern side of Regio Street to match the one-way northbound

**Intersection - Anzac Ave and Minerva St**

- New zebra/cycle crossing
- Kerb build outs on three corners
- Polytechnic driveway converted to one way east – with coloured surfacing
- Speed cushons either side of crossing point

**Out of scope of preferred option**

- Changes to bus routes that use Albany Street and surrounding side streets. This work is coordinated but funded differently.
- Bus stop changes that are not on Albany St (e.g. on Union St). This work is coordinated but funded differently.
- Design, and funding for changes on Union St and other surrounding streets will be under the Low-Cost Low-Risk programme and is outside the scope of this SSBC Lite.

Construction of this work is likely to be completed at the same time to minimise disruption to the public.

- Waka Kothai raising the two SH1 intersections with Albany St. Design and delivery of this work is coordinated but funded differently
- Reseal of Albany St. This work is delivered at the same time but funded from a different source.
- Conversion of Walsh St / Albany St into a driveway. Delivery of this work is coordinated but funded differently.

## 8. Timebound nature of benefits and investment objectives

The benefits and investment objectives will be realised as soon as the infrastructure is constructed and open for the public to use. DCC is in the process of developing a Monitoring Framework for all its strategies, projects and programmes.

Investment objectives, KPI's measures and baseline for this project are as following:

| INVESTMENT OBJECTIVE | KEY PERFORMANCE INDICATORS | MEASURES | BASELINE | 2031 TARGET | 2050 TARGET |
|---|---|---|---|---|---|
| Improve safety for active modes along Albany Street | KPI 1: Decrease in deaths and serious injuries on Albany Street | Number of deaths and serious injuries over 5 years in Dunedin | 2 deaths and serious injuries in 2018-2022 | 0 deaths and serious injuries in 2024 - 2028 | 0 deaths and serious injuries in 2024 - 2028 |
| | KPI 2: Decrease travel speed gap | Travel speed gap | The safe and appropriate speed is 30km/h. The 85% speed outside 97 Albany Street is 54 km/hr (March 2021, Covid alert level 1). Late 2023 the posted speed changed from 50km/h to 30km/h. | 0 km/h travel speed gap<br><br>(85% speed of 30 km/h) | 0 km/h travel speed gap<br><br>(85% speed of 30 km/h) |
| | KPI 3: Improved perception of safety and ease of walking and cycling | Perception of safety of walking and cycling in Dunedin | TBC: Baseline to be determined from surveys. | | |
| | KPI 4: Increase in number of people cycling along Albany St | Number of people cycling along Albany St | Cycling aadt: 317 (2019) | cycling aadt: 528 | cycling aadt: 600 |
| Improve multi-modal access to and within the central city | KPI 1: Increase in active modes share | Percentage of active modes along Albany St | Cycling aadt: 317<br>Pedestrian aadt: 6,359 (2019) | cycling aadt: 528<br><br>pedestrian addt:6,400 | cycling aadt: 600<br><br>pedestrian addt: 7,000 |
| | KPI 2: Increase in cycle network connectivity and coverage | kilometres of cycle network classified as catering for the interested but concerned cyclists | Baseline year 2022 | One additional kilometre | One additional kilometre |
| | KPI 3: Increase in level of service for walking and cycling | LoS ratings of pedestrian and cycling provisions using Austroads Level of Service Metrics Research Report AP-R475-15 | Baseline year 2022 | | |

| | | | | | |
|---|---|---|---|---|---|
| | | (2015) along Albany St | | | |
| Improve place quality and the walking environment within the central city | KPI 1: Reduce Co2 emissions | Tonnes of CO2 emitted (as a function of motor vehicle fuel consumption) in Dunedin | Calculated from traffic model (baseline) | | |
| | KPI 2: Increase in community satisfaction with street environment | Percentage of population with a positive experience of Albany Street | TBC: Baseline to be determined from surveys | | |
| Enhance connectivity between key destinations for active modes | KPI 1: Reduced walking journey time between key destinations | Time it takes to travel the length of Albany St on foot | TBC: Baseline to be determined from tests | | |
| | KPI 2: Reduced cycling journey time between key destinations | Time it takes to travel the length of Albany St by bike | TBC: Baseline to be determined from tests | | |

## 9. Lessons learned pathway

Risks and Issues are recorded monthly and reported to management through DCC's Project and Portfolios Support Office (PPSO). Project Control Meetings are held monthly.

## 10. Economics

Updated economics are being presented are

**Table 8: Net present value benefits and costs of Albany Street cycleway preferred option**

| Benefits and Costs | Preferred option |
|---|---|
| Travel Time Cost Savings | $1,535,347 |
| Health and Environment Savings | $4,082,935 |
| Crash Cost Savings | $813,369 |
| Net present value<br>**Total benefits** | **$6,431,651** |
| Present value - P50 Capital & Maintenance Costs | **$2,825,234** |
| BCR | **2.3** |

**Table 11 Summary cost estimate breakdown**

| Component costs | | | |
|---|---|---|---|
| | Item | Albany Street Preferred Option (Incl Leith, Clyde, Regio Minor works) | Project cost (nearest thousand) |
| A1 | Pre-implementation consultancy (Design & Consents) @ 10% | $278,325 | $278,000 |
| A2 | Pre-implementation DCC costs @ 1.5% | $0 | $0 |
| B1 | Implementation consultancy (MSQA) @ 6% | $150,180 | $150,000 |
| B2 | Implementation DCC costs @ 1% | $25,030 | $25,000 |
| C | Physical works estimate | $2,503,000 | $2,503,000 |

| | | | |
|---|---|---|---|
| **D** | **Base Estimate** | **$2,956,535** | **$2,957,000** |
| E | P50 contingency @ 10% | $251,000 | $251,000 |
| **F** | **P50 Expected Estimate** | **$3,207,535** | **$3,208,000** |
| G | P95 Funding Risk @ 15% | $413,100 | $413,000 |
| **H** | **P95 Project Estimate** | **$3,620,635** | **$3,621,000** |

- Appendix C: Appraisal Summary Table (attachment)
- Appendix D – cost estimate. (attachment)

**11. Attachments**

- Appendix C: Appraisal Summary Table
- Appendix D – cost estimate
- Benefits realisation management plan
- ViaStrada Report
- Detailed Design #1 (2022)
- Detailed Design #2 (2023)
- Road Safety Audit Report #1 (2022)
- Road Safety Audit Report #2 (2023

# Appraisal Summary Table

| Date: | 12/10/2023 | Evaluation Period: (baseline and forecast year) e.g 2020 - 2060 | 2023-2063 | Option Name: | Option 4 - Separated contra-flow cycle path on north side of Albany Street and speed reduction | This is the preferred option | ☑ |
|---|---|---|---|---|---|---|---|

| Problem/opportunity statement: | Investment objectives: | How project gives effect to GPS: | How project gives effect to local community outcomes: |
|---|---|---|---|
| The inappropriate design, use and and management of the corridor does not support the adjacent land-use. A lack of safe active mode facilities between the Harbour Cycleway and the CBD/Tertiary Precinct results in poor accessibility, level of service, and safety for active modes, preventing mode shift. | Improve safety for active modes along Albany Street<br>Improve multi-modal access to and within the central city<br>Improve place quality and the walking environment within the central city<br>Enhance connectivity between key destinations for active modes | Very strong alignment with GPS strategic priorities - Safety, Better Travel Options, Climate Change.<br>**Safety** - Reduced risk of DSIs through dedicated cycling infrastructure. Improved comfort and accessibility for cyclists on Albany Street, ensuring people feel safe to cycle.<br>**Better Travel Options** - Improved cycle connections on Albany Street will address actual and perceived safety risks, making cycling a more appealing option. Severance issues also addressed through the provision of a continuous cycle connection from the harbour to the CBD.<br>**Climate Change** - A highly attractive largely off-street facility will attract new cyclists, reducing vehicle kilometres travelled and associated emmissions. | Project is a component of the Dunedin Central City walking and cycling improvements project, as outlined in the Shaping Future Dunedin Transport (SFDT) Programme. The SFDT programme aims to change the transport network to support the development of the new Dunedin hospital as well as provide a future-focussed, accessible transport system.<br>The walking and cycling improvements project will support mode shift to public transport, walking and cycling for people travelling to and within the CBD. Albany Street is a critical link in establishing a complete cycle connection from the harbour,<br>through the tertiary precinct and on to the central city. This provides improved travel options and supports a sustainable, safer, and healthier cycling network. |

| 1. Summary of Non-Monetised Impacts (Description) | 2. Summary of Financial Impacts (nominal, non-discounted) | | 3. Summary of Monetised Option Impacts (present value, discounted) | |
|---|---|---|---|---|
| The option provides significant improvement in cycle facilities for Albany Street in the form of an off-street bi-directional cycle path on Albany Street between Great King Street and Anzac Avenue, and on-street cycle lanes between Great King Street and George Street. This provides a transformational improvement in cycling level of service compared to the current corridor, which has no cycle facilities.<br>A reduction in operating speed will also support the uptake of walking and cycling as well as reduce the severity of accidents. This option is likely to significantly impact mode shift and address cycle severence. Consequently the benefits/outcomes for safey, air quality, CO2 emissions and people throughput are likely to be very positive. | Capital Costs | $3,208,000 | Total Monetised Benefits, excluding Wider Economic Benefits (WEBs) | $6,431,651 |
| | | | Total Monetised Benefits, including Wider Economic Benefits (WEBs) | $6,431,651 |
| | Operating Costs | $1,020,000 | Total Economic Costs | $2,825,234 |
| | | | BCR (excluding WEBs) | 2.3 |
| | Total Financial Costs | $4,228,000 | BCR (including WEBs) | 2.3 |

| Transport Outcomes | | Non-Monetised Impact: (description in numerical or narrative terms) | | | Monetised Impact: (description in dollar terms in real terms, non-discounted) | |
|---|---|---|---|---|---|---|
| Name of Benefit | Name of Measure: | Baseline: | Do Minimum Impact: | Option Impact: | Do Minimum Impact: | Option Impact: |
| **Healthy and safe people** *(Please copy the row below to add an additional benefit or measure, and delete rows as appropriate)* | | | | | | |
| 1.1 Impact on social cost and incidents of crashes | 1.1.3 Deaths and serious injuries | Two serious injury incidents were reported on Albany Street between 2018 and 2022 | A speed review may decrease the risk of DSIs. However, safety impacts are likely to be minimal | Cyclists are entirely removed from the traffic mix except for one section at the west end. This is likely to have a significant impact on safety. | $19,849,410 | $19,036,041 |
| 1.1 Impact on social cost and incidents of crashes | 1.1.2 Crashes by severity | 28 crashes occurred on Albany Street between 2018 and 2022 - 2 serious, 7 minor and 19 non-injury | A speed review may result in a reduction in crash severity. However, safety impacts are likely to be minimal | Cyclists are entirely removed from the traffic mix except for one section at the west end. This is likely to have a significant impact on the severity of cycle crashes. The reduction in speed will also reduce the severity of vehicle crashes. | As above | As above |
| 1.2 impact on a safe system | 1.2.3 Travel speed gap | The operational vehicle speed on Albany Street is currently 54 km/hr. The posted speed is 50km. This is unsuitable for an environment with high levels of activity and vulnerable users | A speed review will reduce the posted speed. This will reduce the incidence and severity of crashes. | Operational speed will reduce through traffic calming measures and reduction of the posted speed. | Not applicable | Not applicable |
| 2.1 Impact on perception of safety and security | 2.1.1 Access - perception | Perception of access for cyclists on Albany Street is poor due to the complete absence of dedicated cycle infrastructure | Cycle infrastructure absent. No change in perception of cycle access | Improved access perception for all cycling abilities. | Not applicable | Not applicable |
| 3.1 Impact of mode on physical and mental health | 3.1.1 Physical health benefits from actice modes | Cycle counts along Albany Street are low with an average of 335 per day, compared with 9,835 vehicles. Health benefits from cycling are therefore low in the current environment | Cycle infrastructure absent. No change in health benefits from additional uptake of active modes | Significant increase in cycle numbers as a result of off-road facility that appeals to all cycling abilities. Significant change in health benefits from uptake of active modes. | $13,036,163 | $17,119,098 |
| 3.2 Impact of air emmissions on health | 3.2.1 Ambient air quality - NO2 | With low cycle counts, high traffic volumes and car-centric infrastructure, ambient air quality improvements are not currently supported | Limited mode shift encouragement. Improvements in ambient air quality not supported | Significant increase in cycle numbers as a result of off-road facility. A proportion of these will be existing vehicle drivers, reducing emmissions and improving air quality. A further proportion will be future users cycling instead of driving, offsetting what would be poorer air quality. | This measure's monetised benefits have not been calculated. Economic assessment has followed SP-11 which does not factor in ambient air quality benefits | This measure's monetised benefits have not been calculated. Economic assessment has followed SP-11 which does not factor in ambient air quality benefits |
| **Environmental sustainability** | | | | | | |
| 8.1 Impact on greenhouse gas emissions | 8.1.1 CO2 emissions | With the lack of dedicated cycle infrastructure on Albany Street, mode shift and a corresponding reduction in CO2 emissions are not supported | Limited mode shift encouragement. No significant change to CO2 emissions | Significant mode shift likely as facility will apeal to a range if prospective cyclists. Reduction in CO2 emissions likely. | This measure's monetised benefits have not been calculated. Economicassessment has followed SP-11 which does not factor in vehicle emission reduction benefits | This measure's monetised benefits have not been calculated. Economic assessment has followed SP-11 whichdoes not factor in vehicle emissionreduction benefits |
| **Inclusive access** | | | | | | |
| 10.1 Impact on user experience of the transport system | 10.1.7 People - throughput (UCP) | Pedestrian activity is high along Albany Street and estimated at 6,359 pedestrians per day. Existing cyclist volumes is estimated at 335. Annual average daily traffic of vehicles is 10,500. | Limited change (+8) to cycle throughput | Significant increase (+193) in new users | Health benefits of $13,036,163 as above. | Health benefits of $17,119,098 as above. |
| 10.1 Impact on user experience of the transport system | 10.1.8 Traffic throughput | Pedestrian activity is high along Albany Street and estimated at 6,359 pedestrians per day. Existing cyclist volumes is estimated at 335. Annual average daily traffic of vehicles is 10,500. | Limited change to traffic throughput | Limited change to traffic throughput as significant mode shift unlikely as a direct result of this investment, however contributes to the broader citywide mode shift strategy. | The number of new cyclists anticipated from the Do Minimum is 8. | The number of new cyclists anticipated from the preferred option is 193. |
| 10.2 impact on mode choice | 10.2.3 Spatial coverage - cycle lanes and paths | Cycle lanes are currently absent from Albany Street | No change to spatial coverage of cycle lanes | Full coverage of Albany Street with cycle facilities in both directions | Not applicable | Not applicable |
| 10.4 Impact on community cohesion | 10.4.3 Severance | The Dunedin cycle network between the harbour and CBD is currently severed due to the lack of cycle infrastructure along Albany Street | No change to severence of the Dunedin cycle network | Full connection of the cycle network from the harbour to the CBD for cyclists of all abilities. | Not applicable | Not applicable |
| 12.1 Impact on Te Ao Māori | 12.1.1 Te Ao Māori | The street environment on Albany Street completely lacks recognition of Te Ao Māori values or concepts | No further incorporation of Te Ao Māori values or concepts | Te Ao Māori values and concepts can be incorporated during the detailed design of the project. | Not applicable | Not applicable |

**Rationale for option selection decision**

Option 4 performed equally well as Option 5 during the multi-criteria analysis
Targeted consultation with key stakeholders was conducted to help capture opportunites outside of the benefits framework.
All stakeholders preferred option 4 unanimously. It was subsequently selected as the preferred option.

# Project Estimate - Form B

**Project Name: Albany Street Cycleway Preferred Option (incl Leith Street, Clyde Street and Regio Street minor works)**

**SSBE**

**Single Stage Business Case Lite Estimate**

| Item | Description | Base Estimate | Contingency | Funding Risk Contingency |
|---|---|---|---|---|
| A | **Total Property Cost** | | | |
| | **Project Development Phase** | | | |
| | **- Consultancy Fees** | - | - | - |
| | **- Waka Kotahi Managed Costs (Form G)** | - | - | - |
| B | **Total Project Development** | **0** | **0** | **0** |
| | **Pre-Implementation Phase** | | | |
| | **- Consultancy Fees** | 278,325 | - | - |
| | **- Waka Kotahi Managed Costs (Form G)** | - | - | - |
| C | **Total Pre-implementation** | **278,325** | **0** | **0** |
| | **Implementation Phase** | | | |
| | **Implementation Fees** | | | |
| | **- Consultancy Fees** | 150,180 | | |
| | **- Waka Kotahi Managed Costs (Form G)** | 25,030 | | |
| | **Sub Total Base Implementation Fees** | **175,210** | | |
| | **Physical Works** | | | |
| 1 | Environmental Compliance | 25,000 | | |
| 2 | Earthworks | 110,505 | | |
| 3 | Ground Improvements | 0 | | |
| 4 | Drainage | 169,000 | | |
| 5 | Pavement and Surfacing | 794,877 | | |
| 6 | Bridges | 0 | | |
| 7 | Retaining Walls | 0 | | |
| 8 | Traffic Services | 677,309 | | |
| 9 | Utility Services | 181,450 | | |
| 10 | Landscaping | 114,399 | | |
| 11 | Traffic Management | 103,650 | | |
| 12 | Preliminary and General | 326,550 | | |
| 13 | Extraordinary Construction Costs | 261 | | |
| | **Sub Total Base Physical Works** | **2,503,000** | 251,000 | 413,100 |
| D | **Total for Implementation Phase** | **2,678,210** | **251,000** | **413,100** |
| E | **Project Base Estimate** (A+B+C+D) | **2,956,535** | | |
| | **Project Base Estimate (rounded)** | 2,957,000 | | |

| | | | |
|---|---|---|---|
| F | **Contingency** (Assessed/Analysed) | (A+B+C+D) | **251,000** |
| G | **Project Expected Estimate** | (E+F) | **3,207,535** |
| | **Project Expected Estimate (rounded)** | | 3,208,000 |
| Total Property Cost Expected Estimate | | | **0** |
| Project Development Phase Expected Estimate | | | **0** |
| Pre-implementation phase Expected Estimate | | | **0** |
| Implementation Phase Expected Estimate | | | **2,929,210** |

| | | | |
|---|---|---|---|
| H | **Funding Risk Contingency** (Assessed/Analysed) | (A+B+C+D) | **413,100** |
| I | **95th percentile Project Estimate** | (G+H) | **3,620,635** |
| | **95th percentile Project Estimate (rounded)** | | 3,621,000 |
| Total Property Cost 95th percentile Estimate | | | **0** |
| Project Development Phase 95th percentile Estimate | | | **0** |
| Pre-implementation Phase 95th percentile Estimate | | | **0** |
| Implementation Phase 95th percentile Estimate | | | **3,342,310** |

| | |
|---|---|
| **Date estimate prepared 09/10/2023** | **Base Date (Quarter One/2023)** |
| **Estimate prepared by Seth Goldsworthy** | **Signed** S Goldsworthy |
| **Estimate internal peer review by Russell Wark** | **Signed** |
| **Estimate external peer review by** | **Signed** |
| **Estimate accepted by Waka Kotahi project manager** | **Signed** |

*Note:* (1) These estimates are exclusive of escalation and GST.
(2) Refer to Section 6.6 for guidance on rounding.

Albany Street Cycleway project

Benefit realisation management plan - October 2023

| | KPI | Measure | Baseline | 2031 Target | 2050 Target | comment |
|---|---|---|---|---|---|---|
| **Health and safe people** | | | | | | |
| 1.1 Impact on social cost and incidents of crashes | Decrease in deaths and serious injuries on Albany Street | 1.1.3 Deaths and serious injuries | Two serious injury incidents were reported on Albany Street between 2018 and 2022 | 0 DSI's per annum | 0 DSI's per annum | based on R2Z interim target of 40% reduction of DSI's by 2030 |
| 1.1 Impact on social cost and incidents of crashes | Decrease in crash severity | 1.1.2 Crashes by severity | 28 crashes occurred on Albany Street between 2016 and 2021 - 2 serious, 9 minor and 17 non-injury | 0 DSI's, 1 minor, 1 non injury per annum | 0 DSI's, 0 minor, 0 non injury per annum | based on R2Z interim target of 40% reduction of DSI's by 2030 |
| 1.2 impact on a safe system | Decreased travel speed gap (Difference between safe and appropriate speed, and current 85% speed) | 1.2.3 Travel speed gap | The safe and appropriate speed is 30km/h. The 85% speed outside 97 Albany Street is 54 km/hr (March 2021, Covid alert level 1). Late 2023 the posted speed changed from 50km/h to 30km/h. | 0 km/h travel speed gap | 0 km/h travel speed gap | |
| 2.1 Impact on perception of safety and security | increase of dedicated cycle infrastructure | 2.1.1 Access - perception | Perception of access for cyclists on Albany Street is poor due to the complete absence of dedicated cycle infrastructure | dedicated cycle infrastructure on Albany St | dedicated cycle infrastructure on Albany St | |
| 3.1 Impact of mode on physical and mental health | Increased cycling mode share | 3.1.1 Physical health benefits from active modes | Pedestrian activity is high along Albany Street and estimated at 6,359 pedestrians per day. Existing cyclist volumes is estimated at 317. Annual average daily traffic of vehicles is 10,500. | cycling aadt: 528 pedestrian addt: 6,400 | cycling aadt: 600 pedestrian addt: 7,000 | Cycle numbers are taken from the AST. Pedestrian numbers are already high but could grow slightly due to improved PT infrastructure |
| 3.2 Impact of air emmissions on health | Reduction in airborne particles/particulate matter (PM) | 3.2.1 Ambient air quality - NO2 - PM per micrograms per metre cubed (µg/m3) | The 2022 annual avarage air quality on Albany St is 23 µg/m3 | no target developed | no target developed | Air quality: https://www.lawa.org.nz/explore-data/otago-region/air-quality/dunedin/central-dunedin/ |
| **Environmental sustainability** | | | | | | |
| 8.1 Impact on greenhouse gas emissions | increase in cycle mode share | 8.1.1 CO2 emissions | With the lack dedicated cycle infrastructure on Albany Street, mode shift and a corresponding reduction in CO2 emissions are not supported | cycling aadt: 528 pedestrian addt:6,400 | cycling aadt: 600 pedestrian addt:7,000 | Cycle numbers are taken from the AST. Pedestrian numbers are already high but could grow slightly due to improved PT infrastructure |
| **Inclusive access** | | | | | | |
| 10.1 Impact on user experience of the transport system | increase in walking and cycle mode share | 10.1.7 People - throughput (UCP) | Pedestrian activity is high along Albany Street and estimated at 6,359 pedestrians per day. Existing cyclist volumes is estimated at 317. Annual average daily traffic of vehicles is 10,500. | cycling aadt: 528 pedestrian addt:6,400 | cycling aadt: 600 pedestrian addt:7,000 | Cycle numbers are taken from the AST. Pedestrian numbers are already high but could grow slightly due to improved PT infrastructure |
| 10.1 Impact on user experience of the transport system | increase in walking and cycle mode share | 10.1.8 Traffic throughput | Pedestrian activity is high along Albany Street and estimated at 6,359 pedestrians per day. Existing cyclist volumes is estimated at 317. Annual average daily traffic of vehicles is 10,500. | cycling aadt: 528 pedestrian addt:6,400 | cycling aadt: 600 pedestrian addt:7,000 | Cycle numbers are taken from the AST. Pedestrian numbers are already high but could grow slightly due to improved PT infrastructure |
| 10.2 impact on mode choice | increase of dedicated cycle infrastructure | 10.2.3 Spatial coverage - cycle lanes and paths | Cycle lanes are currently absent from Albany Street | separated cycle lanes on Albany St | separated cycle lanes on Albany St | |
| 10.4 Impact on community cohesion | increase of dedicated cycle infrastructure | 10.4.3 Severance | The Dunedin cycle network between the harbour and CBD is currently severed due to the lack of cycle infrastructure along Albany Street | separated cycle lanes on Albany St | separated cycle lanes on Albany St | |
| 12.1 Impact on Te Ao Māori | Increase in recognition of Te Ao Māori values or concepts | 12.1.1 Te Ao Māori | The street environment on Albany Street completely lacks recognition of Te Ao Māori values or concepts | no change | no change | This project won't increase recognition of Te Ao Māori values or concepts |

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# Tertiary Area Shared Space Investigation

Report prepared for

Dunedin City Council

March 2023

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| Quality Assurance Statement | | |
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| V5 – final | 10/03/2023 |
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| V2 – updated to include staged delivery assessment and implications on other users and rest of Tertiary Precinct | 30/01/2023 |
| V1 draft – excludes staged delivery assessment and PowerPoint summary. | 20/01/2023 |

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# 1 Introduction

## 1.1 Project background

A cycleway on Albany Street has been prioritised in the Dunedin City Council 10 Year plan 2021-31 and in the Shaping Future Dunedin Transport (SFDT) PBC (Stantec 2021) as an east-west route linking through the tertiary area. On this basis, DCC commissioned AECOM for the Albany Street Cycleway Single Stage Business Case Lite (SSBC Lite) completed in June 2022.

The SSBC-Lite developed a range of options, and after multi-criteria analysis selected a bi-directional separated cycle path on the northern side of Albany Street, plus reducing the speed limit to 30 km/h as the preferred option.

The (paused, partially complete) Tertiary Precinct SSBC identified safety, poor level of service and accessibility for active mode users as a key problem. The thinking from that business case process has been considered in the SSBC-Lite and will be considered in the walking and cycling networks review (generally but also of specific relevance to Albany Street). This is to ensure street characteristics throughout the precinct suit people on bikes, micro-mobility devices and foot.

The 2023 draft Dunedin interim speed management plan suggests that all roads in the Tertiary will be 30km/h as indicated in Figure 1-1.

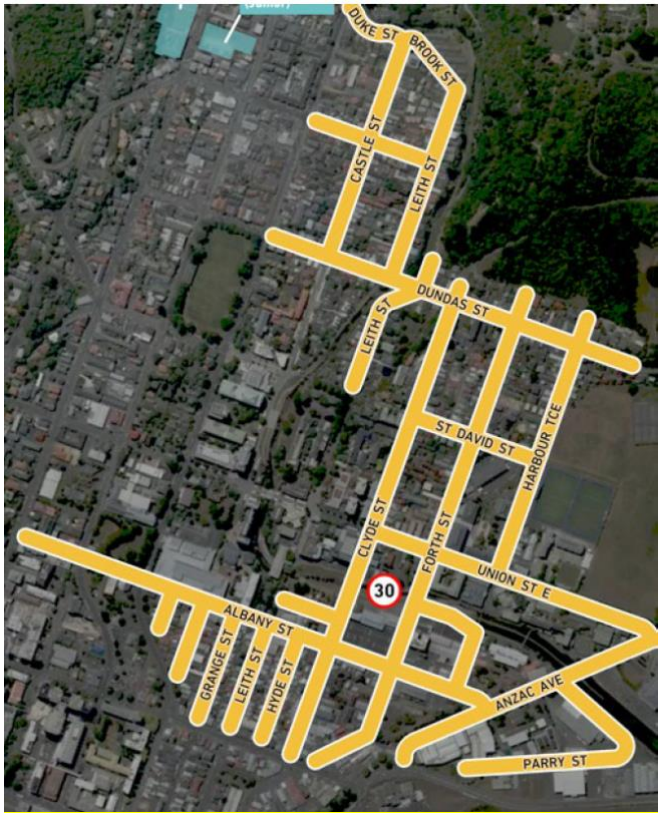


***Figure 1-1: Albany Street is part of the proposed 30 km/h Tertiary Precinct street network (source: draft interim speed management plan***

## 1.2 Technical advice requirements

Council staff need to complete a report for presentation of the SSBC-Lite preferred option and design to elected members in the first half of 2023.

During engagement, cycling groups raised concerns about the route selection, the facility type, parking loss and legibility of respective transport networks. A review at this stage gives council staff assurance about the way forward for Albany St, which needs to be expressed in the upcoming report to council. The findings will also feed into the citywide walking and cycling networks review.

This report presents the key questions to be answered, the methods undertaken in completing this investigation and the findings.

# 2 Route review

| No. | Question/issue | Task and methods |
|---|---|---|
| 1 | Considering the planned walking and cycling networks review, is Albany Street likely to remain the preferred route for a dedicated cycleway (SSBC lite preferred option)? | **Route review:** consider previous planning documents and discuss routing rationales and the general approach to providing for cycling in the central city/Tertiary Precinct. Discuss the relative effectiveness of individual elements of the preferred option (lower speeds and a separated cycleway). |

ViaStrada reviewed the appropriateness of identifying Albany Street as the primary cycling route by considering synergies or conflicts with previous and parallel plans.

ViaStrada also conducted a high-level assessment of the effectiveness of the midblock and intersection elements of AECOM's preferred option for Albany Street (Table 2-1).

## 2.1 Synergies and relationship to other plans

### 2.1.1 Strategic cycling network in the Integrated Transport Strategy (2013)

The 2013 strategic cycling network identified Union Street and Hanover Street as the key east-west cycling routes near the tertiary area.

### 2.1.2 Shaping Future Dunedin Transport

Dunedin's road hierarchy was reviewed during 2016-2019 for the Second-Generation District Plan (2GP). The Shaping Future Dunedin Transport (SFDT) PBC (Stantec 2021) figures 7-7 and 7-8 illustrate the roading hierarchy change and change in thinking about these east-west routes around 2018:

- Before 2018 and as shown in the Integrated Transport Strategy, Hanover Street was unclassified (i.e., local) and Albany Street was a Collector Road (the lowest level before local streets)
- After 2018 and as shown in the Dunedin 2GP network, Albany Street west of Clyde Street was reclassified as "commercial centre" – reflecting the place and access function of this central city street. The eastern section of Albany Street remained as "collector". A shorter section of Hanover Street, west of the SH1 pair, was also reclassified as "commercial centre", with the rest remaining unclassified.

The SFDT PBC identifies a Albany St cycleway in the 'Cycle and Pedestrian Networks: Complete gaps and address safety issues through' package which is part of all short-listed programmes (page 80):

*"Albany Street North/South Extensions: A complete cycle route from the Harbour/SH88 cycleway to George Street via the Tertiary area, and pedestrian improvements including additional crossing points and intersection changes."*

### 2.1.3 Tertiary Precinct Single Stage Business Case – DRAFT (AECOM, 2021)

The Tertiary Precinct project extended from the intersection of Albany St with the State Highway, which results in a gap of a block on Albany Street between this project and the Retail Quarter project. (p41)

The draft Tertiary Precinct SSBC found that:

> *There are no designated cycling facilities within the Tertiary Precinct area as outlined below ... The University of Otago also have a 'Walk your Wheels' policy which bans riding bikes, scooters*

> *and skateboards in the university grounds. There is also a lack of bike parking, wayfinding and end of trip facilities within the Tertiary Precinct for active mode users.* (p23)

One of the seven objectives for the Tertiary Precinct project (draft SSBC) is:

> ***Destination and use*** *– Establish the Tertiary Precinct as a destination by creating a vibrant, environmentally enhanced and unique streetscape with amenities to support and encourage travel behaviour change and enhance accessibility (i.e. cycling, public transport, prioritise pedestrians and other "soft" forms of transport) as well as providing opportunities for community use and interaction with the public space.* (p42)

The authors cite the Dunedin Tertiary Streets Improvement Options Report which classifies Albany Street as a "movement street" – repeating elements and a spatial arrangement that supports movement and flow for pedestrians, cyclists and motor vehicles. (p47).

Albany Street is classified as medium-high risk in KiwiRap (p57) suggesting a need for safety improvements.

Cycling Level of Service (LOS) and accessibility are cited as a sub-problem under access:

> *…no dedicated cycling infrastructure exists in The Tertiary Precinct, therefore significantly limiting access throughout the area by bicycle. While this does not entirely prevent cyclist movement in the precinct, it does force cyclists to share the road with general traffic, reducing the level of service afforded to this mode, increasing risk and decreasing user enjoyment, particularly given the higher-speed environment. It is likely this perceived risk and unpleasantness of navigating the Tertiary Precinct by bike is contributing to the near non-existent cyclist numbers... There is therefore a significant opportunity to provide more comprehensive cycle connections and end of trip facilities throughout the Tertiary Precinct, increasing access and supporting a shift to active sustainable modes.* (p75)

One particular opportunity identified is:

> *"Support wider city goals for increased active mode use, connectivity and safety"* by: "*providing safer, better connected pedestrian and cycle network both within the precinct and connecting to the wider city network".* (p87)

The business case authors propose:

- Albany Street west of Clyde Street to be "**social activity character**" – *providing social gathering spaces and supporting high on-street activity – includes areas around key tertiary facilities on Albany Street, Union Street East, Forth Street and Harbour Terrace*. (p101)
- And Albany Street east of Clyde Street to be "**mixed activity character**" – *improved amenity while accommodating existing activities – includes southern sections of the Tertiary Precinct on Albany Street, Forth Street and Riego Street, as well as Dundas Street.* (p101)

The SSBC proposed four precinct options, for which the cycle provision on Albany Street would be (pp104-107):

A. Buffered on-street cycle lanes
B. Shared path (SH1 to Clyde) and buffered on-street cycle lanes (Clyde to Anzac)
C. Shared path (SH1 to Clyde) and buffered on-street cycle lanes (Clyde to Anzac)
D. On-street with sharrows

No preferred option has been identified in the TPP SSBC because the work was deferred in the DCC 10 Y Plan 2021-31.

### 2.1.4 Conclusion

Implementing a cycle route on Albany Street accords well with previous and parallel plans. It fulfils a recommendation in the Shaping Future Dunedin Transport business case to give a complete east-west link for cycling. It is also consistent with the Tertiary Precinct business case goals of encouraging travel behaviour change and enhancing accessibility for cycling by providing for cycling to/from the edge of the precinct, whilst still adhering to the University's 'walk your wheels' policy within university grounds.

## 2.2 Albany Street SSBC Lite – preferred option (option 4)

This section provides a high-level assessment of the effectiveness of the midblock sections and intersection elements of AECOM's preferred option for Albany Street (option 4).

Table 2-1 assesses the 4 different midblock sections and their facility type options, plus the three types of intersection in terms of the range of cyclist they will attract and the level of safety. All treatments offer an improvement over the current conditions. The ratings used (low, medium, high etc) are relative between options and based on professional experience. For cycling audience the ratings refer to the range of cyclists in terms of experience and confidence, for safety the ratings refer to *actual* safety i.e. crash outcomes (as opposed to *perceived* safety, which will influence the cycling audience).

***Table 2-1: Relative effectiveness option 4 – by sections / different facility types***

| Facility type | Cycling audience | Safety |
|---|---|---|
| **Midblock** | | |
| 1-way buffered cycle lanes with 30 km/h speed limit (George Street to SH1 northbound) | **Medium**<br>Less confident cyclists may appreciate the buffer from adjacent moving traffic but will notice the lack of physical separation and interaction with parked vehicles or vehicles moving in and out of parking spaces.<br>Faster-travelling commuters or sports cyclists will likely feel comfortable and appreciate the ability to move into the general traffic lane if they need to pass slower cyclists. | **Low-Medium**<br>Speed limit is at the safe system upper threshold for cyclists – speeding motorists would likely cause serious injury to any cyclists they hit.<br>Biggest threat will be opening doors of parked vehicles, which may knock cyclists off their bikes and into the path of live traffic. |
| 2-way separated cycleway[1]<br>(SH1 northbound to Anzac Ave) | Medium-High<br>People with less experience and / or less confidence will feel safer due to the separation from motor traffic. Faster-travelling commuters or sports cyclists who might normally be comfortable mixing with motor traffic may appreciate aspects such as the | Medium-High<br>The biggest threat will be at driveways, especially for cyclists traveling contra-flow to adjacent traffic lane and for non-residential driveways with high turnover (e.g. University carpark – although this is |

[1] assumed designed according to best practice - e.g. sufficient width, good physical and horizontal separation from motor traffic, level surface over driveways and side roads with clear precedence over turning traffic, high level of service at intersections

| Facility type | Cycling audience | Safety |
|---|---|---|
| | surface quality and level of service, although some riders may still prefer to mix with motor traffic where they are less likely to be delayed. | tempered somewhat by the fact that users are likely to be regular). |
| Shared path crossed by driveways<br>(Anzac Avenue) | Medium-High<br>Suitable for less confident and slower cyclists. Faster cyclists may get frustrated mixing with pedestrians.<br>Note that this assessment is for people on bikes; however shared paths are not desirable for many pedestrian groups (PNG link) | Medium-High<br>The biggest threat to shared paths is at driveways, especially for cyclists traveling contra-flow to adjacent traffic lane and for non-residential driveways with high turnover (e.g. University carpark). In this case, there are few driveways, motorists are likely to be regular, and the grass berm between the shared path and roadway means drivers are more likely to recognise it as a 2-way path. |
| Shared path with no intersecting driveways<br>(Minerva Street) | Medium-High<br>Suitable for less confident and slower cyclists. Faster cyclists may get frustrated mixing with pedestrians. | High<br>No driveways so no interaction with motor vehicles. |
| **Intersections** | | |
| Signalised intersection with fully protected cycle movement<br>(SH1 northbound, SH1 southbound) | Medium<br>Less-confident cyclists will feel safer not having to worry about the potential for conflict with motor vehicles.<br>More-confident cyclists are likely to get frustrated at the delay involved with two diagonal crossings. Eastbound cyclists may choose to transfer to the eastbound general traffic lane, thus running a red cycle light at SH1 northbound plus risk conflict with left turning traffic). | Medium-High<br>The main concern preventing a "high" ranking is that more confident cyclists may run a red signal if the dedicated cycle crossing movement has a lower proportion of the total intersection time than the adjacent motor traffic lane. |
| Priority-controlled intersection on raised platform, cyclists parallel to main road<br>(Clyde Street, Forth Street) | High<br>Less-confident cyclists perceive they have precedence over turning traffic, and raised platform helps to slow vehicles. More-confident cyclists appreciate direct, no delay treatment. | Medium<br>More dangerous for cyclists travelling in the contra-flow direction relative to the adjacent traffic lane, as motorists may not expect them. |

| Facility type | Cycling audience | Safety |
|---|---|---|
| Dual cycle-zebra crossing on raised platform, cyclists cross main road<br><br>(Anzac Avenue) | Medium-High<br><br>Cyclists and motorists are perpendicular so have good inter-visibility. Raised platforms slow motorists. | Medium-High<br><br>Raised platform improves visibility / driver awareness of crossing point and slows motor vehicles. |

Table 2-1 suggests that the Albany Street design east of SH1 northbound should appeal to a wide range of people on bikes including those in the "interested but concerned" and "enthused and confident" categories and should offer a reasonable level of safety. However, the mixed traffic block between George Street and SH1 northbound is likely to be less ideal (in terms of traffic volumes and comfort for people on bikes) than Albany Street east of SH1 northbound. There is concern that cyclists will not appreciate the geometric and temporal delays imposed at the SH1 signalised intersections. However, it is noted that there are expected to be fewer cyclists using the section between George Street and Great King Street, as these cyclists would at some point be linking with north-south routes, most likely along the State Highway pair cycleways (i.e. without having to travel all the way to George St).

Overall, ViaStrada considers that the choice of the Albany Street as a cycling route is appropriate, and that a suitable provision for cycling can be achieved along this route[2].

[2] Note that this section was focused on the route choice, not the proposed AECOM detailed design for Option 4. Furthermore, ViaStrada have not been commissioned to conduct a full review on AECOM's design, but have offered some feedback on certain aspects in section 5.

# 3 Shared space (mixed traffic) assessment

| No. | Question/issue | Task and methods |
|---|---|---|
| 2 | If a cycleway was not delivered on Albany Street but rather a slow & low traffic shared environment (AECOM option 1), what would be required to achieve a traffic environment that would enable people of all ages and abilities to feel comfortable cycling along it – and at a high level what routes would likely see an increase in vehicle traffic as a result? | **Shared space assessment**: describe and illustrate what would be required to achieve a shared space as defined in option 1 of the Albany Street SSBC-lite. Describe the network impacts, the potential increase in traffic volumes and conflicts with other users if motorists re-route to other streets.<br>Review the WSP modelling reports and consider the impacts of a Tertiary Precinct-wide 30 km/h low traffic / slow speed zone.<br>This excludes new network traffic modelling. |

## 3.1 Overview of issue – mixed traffic vs shared space

Option 1 in the Albany Street SSBC lite (AECOM, 2022) is to *reduce the speed limit to 30 km/h, provision of on street cycling using 'sharrow' markings and traffic calming*. The analysis of this option states: *Cycle sharrow markings help to raise the awareness of cyclists. Traffic calming treatments will also help to reinforce the reduced speed limit.*

ViaStrada's interpretation of Option 1 is that it would still have similar traffic volumes to the current situation, with only a small proportion of drivers being deterred by the speed change and traffic calming. This scenario would generally be referred to as "*mixed traffic*" and may not be appealing to less-confident cyclists, due to the vehicle volumes involved and factors such as interaction with on-street parking. Appendix A shows that Option 1 is a feasible option in that it adheres to the best practice guidance for sharrows (a proxy for mixed traffic), provided traffic calming is included. Section 3.2 compares Option 1 (mixed traffic) to Option 4 (preferred option: separated cycleways).

To achieve a "shared environment that would enable people of all ages and abilities to feel comfortable cycling along it" would require significant access management, i.e. restricting the number of vehicles on Albany Street, as well as speed management to ensure similar speeds between motor vehicles and cyclists.

Hence, a new option – **Option 1B** – has been developed as a "shared space" scenario suitable for all ages and abilities cycling (described in section 3.3 with the evaluation in section 3.4).

While some people could interpret "shared space" as being fully open to pedestrians (e.g. no kerbs, pedestrians are able to walk anywhere and cyclists and motorists expected to give way to them), Option 1B is only shared between cyclists and motorists. Option 1B would still have footpaths distinct from the carriageway, plus dedicated pedestrian crossing facilities. Option 1B would allow slow-moving buses, delivery vehicles at limited hours and some private vehicles.

Note that Albany St is a main bus route, so slow-moving buses could cause issues for the public transport network and may not be desirable. This assessment does not consider what the appropriate or acceptable route travel time for buses along Albany Street, or whether there is another possible public transport route.

Note that the economic case developed for Option 1 in the SSBC-Lite would not apply to Option 1B, as the latter is likely to involve much more extensive physical works.

## 3.2 Quality of Service for Options 1 and 4

The Auckland Transport Quality of Service (AT QoS) tool has been used to compare options 1 and 4 and estimate their respective cycling target audiences to give an indication of how different they are.

The AT QoS tool evaluates the safety, directness, comfort, coherence and attractiveness of intersections and midblock segments along a route depending on the facility type and other key criteria. QoS is scored from 1 to 4 and relates to the type(s) of users expected to find it appropriate (Table 3-1).

***Table 3-1: AT QoS score definitions***

| AT QoS score | Design | Anticipated users |
|---|---|---|
| 1 | Consistent with or exceeds best practice design guidance. | Suitable for a very wide range of users. |
| 2 | Meets best practice design guidance. | Suitable for a wide range of users, including the 'interested but concerned'. |
| 3 | Does not meet best practice design guidance and may introduce safety concerns for users. | Likely to only be attractive for confident cyclists. |
| 4 | Presents shortcomings in design that are likely to introduce major safety concerns for most users, or other quality problems. | Will detract many potential users. |

In applying the QoS tool, **traffic volumes have been held at the current levels** (based on Waka Kotahi ONRC database). While the Albany Street modelling report (WSP & Abley, 2022) suggested that volumes are likely to increase, it is not certain which options for the surrounding network will be chosen and therefore how high the increases will be. In any case, this is unlikely to affect the QoS scores as the tool uses bands of volume.

The values used in the inputs to the tool are listed in Appendix B.

Figure 3-1 presents the Quality of Service scores (lower numbers are better) for option 1 (as per the description in the SSBC lite) and option 4 (as per the detailed designs) applied along the various sections along Albany Street, according to the Auckland Transport Quality of Service tool.

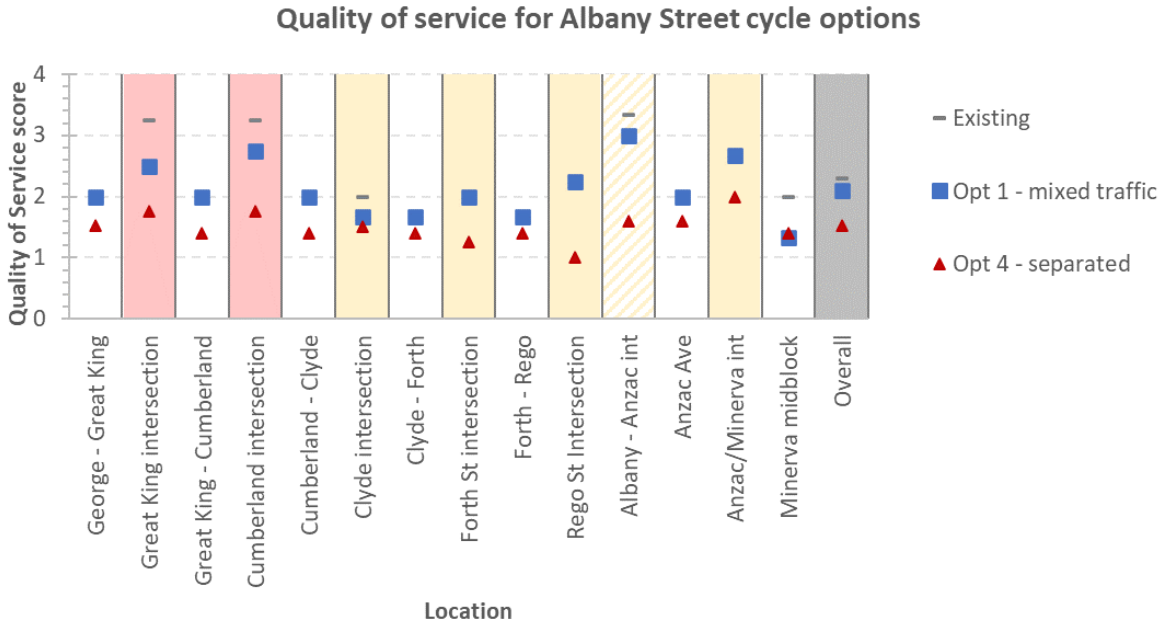


***Figure 3-1: Quality of service scores for Albany Street options 1 and 4 (lower numbers are better)***

Figure 3-1 shows that Option 4 (cyclists predominantly physically separated from motor traffic) performs better than Option 1 (cyclists mix with motor traffic in the general traffic lane) in all locations.

Option 4 has its worst score (2.0) at the Anzac / Minerva intersection due to the current volume on Anzac Avenue. This could be mitigated by applying some of the measures identified in section 3.3.6 (which were identified for Option 1B, but could also be applied for Option 4).

Option 4's second highest score (1.8) is at the Great King Street (SH1 northbound) and Cumberland Street (SH1 southbound) intersections due to the State Highway traffic being allocated the bulk of the operation time. The use of diagonal crossings also has an effect as these require an exclusive cycle phase (i.e. when no motor vehicle movements are operated, but in conjunction with the pedestrian Barnes Dance phase) which receives less time than Albany Street. Eastbound cyclists in particular also experience geometric delay due to having to cross from the left side of the road, to the right side, then back to the left side within one short block. For westbound cyclists this is not as bad as they only have to switch from the right side to the left side, which will probably feel like a return to normal positioning.

The very small difference between the two options at the George Street to Great King Street section is in part due to the AT QoS tool not having an option for buffered cycle lanes – hence the standard cycle lane setting was used for Option 4. In general, it is believed that buffered cycle lanes offer some improvement over standard cycle lanes as less confident cyclist in particular prefer to feel some separation from moving traffic. However, cyclists will still be exposed to vehicles moving across the cycle lane to and from the parking spaces, and furthermore, the buffered cycle lanes in the Option 4 design do not include a buffer to the adjacent parked cars, thus not providing any guide to stay away from opening car doors.

AT does not use the term "all ages and abilities". Based on the definitions in Table 3-1, QoS = 1 ("a very wide range of users") seems most analogous, but QoS = 2 ("a wide range of users, including the 'interested but concerned'") could be considered acceptable. Option 4 achieves a QoS less than or equal to 2 in all locations. Option 1 involves several locations with QoS greater than 2 and does not appear to be suitable for all ages and abilities.

## 3.3 Option 1B development

Option 1B has been developed as a "shared space" option with the aim of achieving a QoS as close to that of Option 4 as possible. To achieve this, the following modifications are proposed.

### 3.3.1 Reduce midblock traffic volumes on Albany Street

Current traffic volumes along the route are as follows:

***Table 3-2: Route traffic volumes***

| Location | AADT[3] |
|---|---|
| Albany Street (George to SH1 northbound) | 4,400 |
| Albany Street (between SH1 pair) | 6,600 |
| Albany Street (SH1 southbound to Leith St) | 6,300 |
| Albany Street (Leith St to Clyde St) | 6,000 |
| Albany Street (Clyde St to Forth St) | 3,500 |
| Albany Street (Forth St to Anzac Ave) | 3,300 |
| Anzac Ave (Albany St to Minerva St) | 5,500 |
| Minerva St (Anzac Ave to path) | 670 |

Albany Street traffic volumes must be reduced to less than 2,000 vehicles per day (approximately 200 vehicles in the peak hour) to achieve QoS score of 2 for traffic volume (one of three applicable criteria towards the "safe – infrastructure type suitable for street conditions" principle). As per Table 3-1, QoS 2 is considered the threshold to suit interested but concerned cyclists. Motor traffic must include slow moving buses, delivery vehicles (at limited hours) and some private vehicles. Note this would put the volumes well below the upper limit for sharrows as discussed in Appendix A.

The exact means of achieving the traffic volume reduction have not been determined. Some would require modelling and public engagement. Options for achieving midblock traffic reductions include:

- Modal filters – good examples of the treatment types are given in section 3.2 of the Local Path Design Guide rev 1.2 (Auckland Transport & Auckland Council, 2017). Exact locations would need to be confirmed via modelling, but candidates could include:
    - Cul-de-sac(s) on Clyde Street and / or Forth Street northern or southern legs – Options A and B discussed in section 5.1.
    - Restrictions to or from Clyde Street and / or Forth Street – Options C and D discussed in section 5.1.
- Turn restrictions – i.e. banning certain movements at an intersection. Exact locations would need to be confirmed via modelling, but candidates could include:
    - Conversion of Leith Street and Clyde Street between Albany Street and Frederick Street to one-way operation (Test 2 from the modelling report).
    - One-way operation of Albany Street between Great King Street and Cumberland Street (Test 3 from the modelling report, although results not included in Appendix H of the Albany Street SSBC).
    - Banning left and / or right turns from the SH1 pair to Albany Street
    - Modifications at Forth Street (also covered in point 3.3.3)
- Aggressive traffic calming – to deter drivers from using Albany Street and make other routes relatively more attractive.

[3] Average Annual Daily Traffic, as per Waka Kotahi's One Network Road Classification database

- Parking management strategies – as discussed in section 5.1, to reduce the amount of traffic circulating in search of a parking space.

### 3.3.2 Physical roundabout at Clyde Street

The Albany Street / Clyde Street intersection has a temporary roundabout treatment using a painted circle plus speed humps. The QoS tool allows higher side street traffic volumes at a roundabout than at a priority-controlled side / cross street and thus the intersection currently achieves a suitable QoS. However, it would be preferable to replace the temporary treatment with a standard physical roundabout, to improve its conspicuity and ensure light vehicles can't drive over it.

An alternative for Clyde Street would be to remove the roundabout and design it as per Forth Street (see section 3.3.3) – this would require measures to reduce the traffic volume on Clyde Street.

### 3.3.3 Reduce Forth Street traffic that crosses the cycleway

To improve Option 1B's QoS at the Forth Street intersection it would be necessary to reduce Forth Street traffic to below 1,000 vehicles per day[4].

- Option A from section 5.1 would be sure to achieve this; Options B-D may well achieve it.

### 3.3.4 Kerb build-outs at Forth Street and Riego Street

Adding kerb buildouts on the Forth Street and Riego Street approaches to Albany Street such that the crossing distance is reduced to less than 10 m will reduce the zone of exposure / potential conflict and thus achieve QoS 1 for the criterion of intersection crossing distance under the principle of "safe – infrastructure type suitable for street conditions" in the AT QoS tool. These buildouts should be designed with tighter corner radii (≤ 3 m) to reduce vehicle turning speeds and achieve QoS 1 under the principle of "Safe – appropriate facility dimensions" however, vehicle tracking checks of the design would be required to ensure the bus turning left from Albany Street to Forth St north could still be accommodated. Note that a turning bus could cross a "virtual" centreline (i.e., use the full carriageway) if the opposing traffic limit line was moved upstream.

### 3.3.5 Traffic calming on Albany Street and Minerva Street

Traffic calming will be necessary to ensure drivers adhere to the 30 km/h speed limit[5]. As mentioned above, it may also have a secondary effect of reducing traffic volumes, if other routes become relatively more attractive to drivers.

### 3.3.6 Reduce midblock traffic volumes on Anzac Avenue

Anzac Avenue is home to key destinations such as the Forsyth Barr Stadium and University facilities and between Albany Street and Minerva Street currently carries 5,500 vehicles per day. It would be necessary to reduce this to 2,700 vehicles per day (and ideally less than that) to be suitable for cyclists to mix with general traffic, as detailed in Appendix A. Anzac Ave used to be part of SH88 before it was shifted to Ravensbourne Rd (behind the stadium). Many people still haven't changed their behaviour and continue to use Anzac Ave. DCC would like to change that.

The treatments outlined for Albany Street (see section 3.3.1) could also be applied to Anzac Avenue.

[4] The 1,000 vehicles per day figure is a threshold in the AT QoS Tool. Appendix A provides guidance on the traffic volume thresholds suitable for mixed traffic more generally.

[5] There is a narrow separated facility on Minerva Street however some riders will prefer to ride in mixed traffic, so a 30 km/h operating speed is desirable on that basis; it is also important for pedestrian safety and for discouraging unnecessary traffic.

## 3.4 Quality of Service for Option 1B

This section assesses the quality of service for option 1B.

Figure 3-2 shows the QoS scores including Option 1B (as described in section 3.3) and Table 3-3 presents the values of QoS for the overall route and worst segment of each of the options.

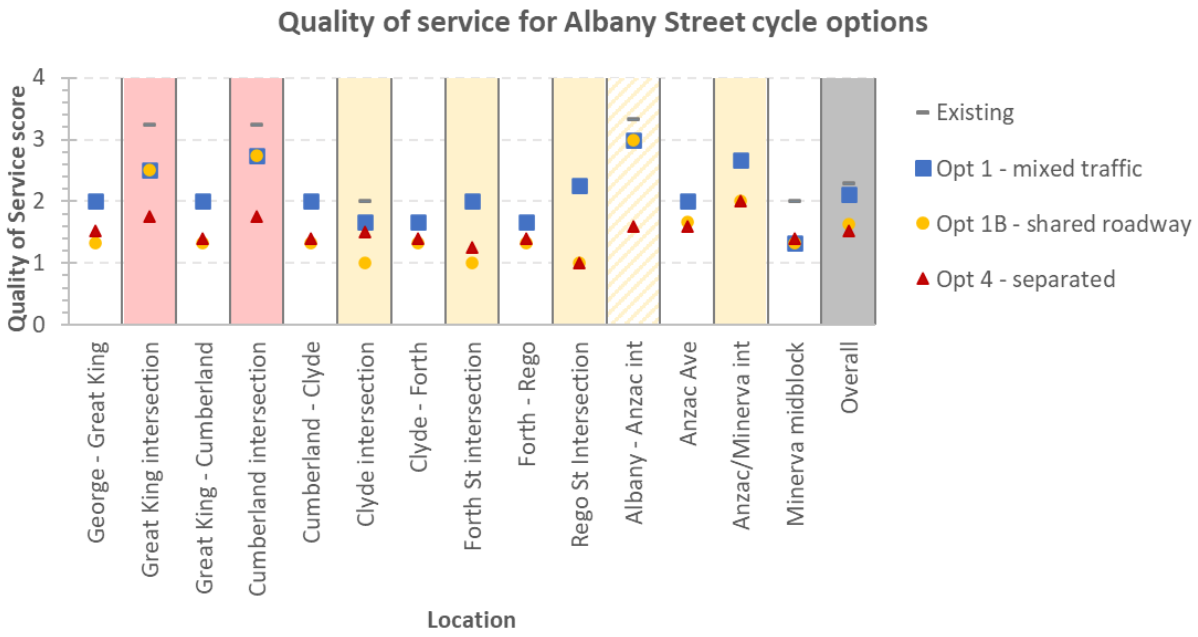


***Figure 3-2: Quality of service scores for Albany Street options including Option 1B – improved mixed traffic***

***Table 3-3: Overall route and worst segment QoS scores for Albany Street options***

| | **Existing** | **Option 1** Mixed traffic | **Option 1B** Shared space | **Option 4** Separated cycleway |
|---|---|---|---|---|
| Overall | 2.29 | 2.11 | 1.64 | 1.52 |
| Worst segment | 3.33 | 3.00 | 3.00 | 2.00 |

Figure 3-2 shows it would be possible to develop a shared space provision with similar overall QoS to separated cycleways. However, Option 1B is worse than Option 4 at the major intersections, as:

- It would not be feasible to decrease the traffic volumes on the SH1 pair (which affects exposure and delay).
- The AT QoS tool favours dedicated cycle phases at signalised intersections to minimise potential conflicts. These cannot be provided where cyclists share the general traffic lanes, unless a short cycleway is installed on approach and departure. Should this be done, the result would be a hybrid option based on Option 1B but with scores as for Option 4 at the two signalised intersections and an overall QoS of 1.52, i.e. equal to that of Option 4. The transitions between shared (midblock) and separated (signalised intersections) would have to be carefully designed, and the AT QoS tool is not sensitive enough to capture any tensions that could arise from such transitions.
- In most locations, it would not be possible to reduce the corner kerb radii (in aim of reducing the speeds of turning vehicles) as these are dictated by heavy vehicle tracking requirements.

Therefore, as Option 1B involves several locations with QoS greater than 2, the route would not be acceptable for all ages and abilities and is ultimately less appropriate than Option 4.

# 4 Users and demand assessment

| No. | Question/issue | Task and methods |
|---|---|---|
| 3 | How do options 1 and 4 compare in terms of what types of people who cycle they would attract and what mode shift potential sits with each option? | **Users and demand assessment:** using the AT Quality of Service for cycling tool and the ViaStrada cycling demand model, compare options 1 and 4 in terms of the types of riders who will likely use the route and how this will affect ridership. |

## 4.1 Cycle audience

Section 3 outlines how the Auckland Transport Quality of Service tool has been applied to options 1 and 4 from the Albany Street SSBC-Lite, plus the developed Option 1B to estimate the cycling audience. In particular, see the QoS scores presented in Figure 3-2 and the corresponding cycling audience definitions in Table 3-1.

## 4.2 Demand estimation

The average annual daily traffic (AADT) for cyclists has been calculated using the ViaStrada cycling demand model[6]. The model inputs include number of jobs in the area and the AT QoS scores. There is some uncertainty involved in averaging QoS scores for a number of segments along a route, because if a particular location does not meet a particular cyclist's threshold of acceptability, they may change their trajectory and potentially avoid the route altogether. Therefore, an additional AADT has been calculated based on the worst segment QoS for each scenario.

The estimated demands are presented in Figure 4-1. There is a substantial difference between the demands based on the route average QoS and the worst segment QoS for all four scenarios. The actual demand is likely to fall somewhere between the two.

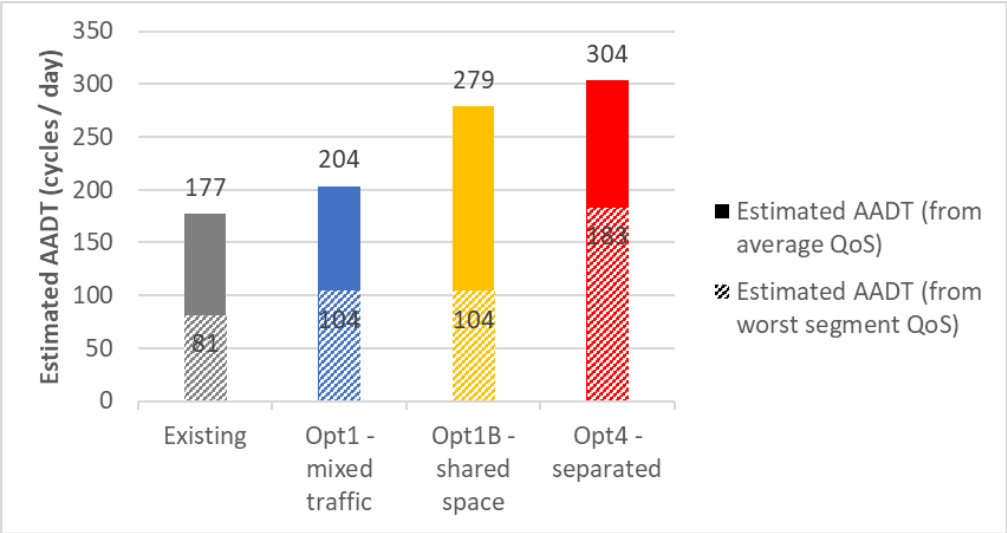


***Figure 4-1: Estimated cycle AADT for three Albany Street scenarios[7]***

[6] The ViaStrada cycling demand model was created for Waka Kotahi to update the current version of SP11 and will be published this year in the Monetised Costs and Benefits Manual (MCBM).

[7] Results differ from those used in the Dunedin Bike Hubs SSBC as the detailed designs made available for this investigation provide a slightly better LOS than previously assessed.

Figure 4-1 shows that Option 4 (cyclists predominantly physically separated from motor traffic) is expected to result in almost double the number of cyclists using Albany Street compared to the existing situation.

Option 1 (cyclists mix with motor traffic in the general traffic lane) would have very little effect, as its main change is to address motor vehicle speeds but not necessarily volumes.

Option 1B appears to be similar to Option 4 when bases on the route average QoS. However, this likely highlights a limitation of the method of aggregating QoS scores of multiple segments along a route. As discussed in previous sections, Option 1B is not expected to be suitable for all ages and abilities and the major intersections are likely to be interpreted as gaps in the network for less confident cyclists. Therefore, it is expected that the actual demand for Option 1B would be closer to that of Option 1, as represented by the worst segment QoS.

# 5 Intersection design review

| No. | Question/issue | Task and methods |
|---|---|---|
| 4 | Noting that the detailed designs for the street have gone through a standard RSA process; are there alternatives that would address safety concerns at the Clyde and Forth intersections? | **Intersection design review** to assess whether an alternative intersection design (including but not limited to shared traffic lanes, option 1) mitigates the risks. |

## 5.1 Clyde and Forth intersections

The current design plans show a bi-directional cycleway at a cross intersection, as is the case with Albany / Clyde (Figure 5-1) and Albany / Forth.

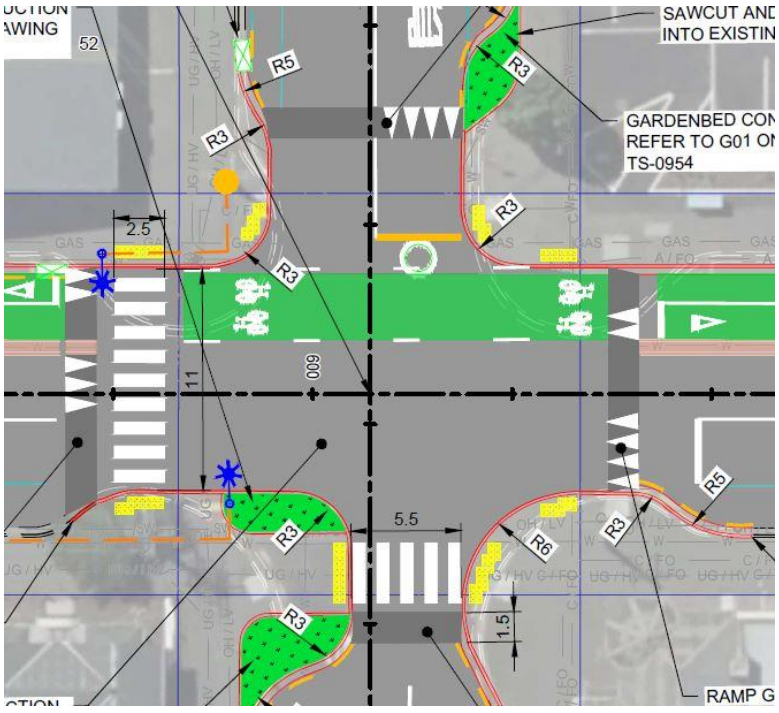


***Figure 5-1: Albany / Clyde intersection***

There are several problems[8] with such a configuration:

- The Separated cycleways at side roads and driveways technical note (Waka Kotahi, 2020) states that if such a configuration occurs, cycleway users must be subject to Stop or Give Way control[9]. This is because drivers negotiating the intersection might not expect people cycling from more than one direction, i.e., the assumption is that it is too difficult for drivers to always make the right decision.
- What this means, though, is that the burden of finding a safe gap in traffic (i.e., checking there are no drivers turning from Albany Street to a side street) is placed on people cycling, and they may have to scan nearly 360 degrees to survey all possible directions from which drivers may come who they must give way to. Some people cycling will struggle with this, either because they are too young, are cognitively impaired (and for that reason, they may not be allowed to drive but they are allowed to move by bicycle) or are temporarily impaired (as sometimes happens to students). That is, the burden of giving way is placed on a group of people some of whom are less capable of this task than drivers are.
- While a Give Way control has been applied against the cycleway[10], it may not be clear to cyclists who they are required to give way to. Some cyclists may assume this refers to having to give way to pedestrians on the zebra crossing, but not think about motor vehicles. It may not be clear that under existing law and the design as shown, cyclists are expected to give way to vehicles turning from Albany Street (the green coloured surfacing across the intersection further adds to this confusion). Furthermore, the side streets have Stop controls, so it may be assumed that cyclists have precedence over side street traffic, but users may not be aware of other users' controls.

This is a problem that cannot easily be addressed other than looking at significant changes in design. We offer some high-level thoughts:

A. Ideally, the intersections would be changed to T-intersections, with the leg to be closed on that side of Albany Street where the proposed bi-directional cycleway is located (Figure 5-2). That would remove all turning motor vehicle risk.

B. Alternatively, the opposite approach leg would be closed (Figure 5-3). A T-intersection is much simpler to navigate for all users and with such a layout, it would no longer be necessary to have the cycleway under give way control. This means that drivers, all of whom should be capable of choosing a safe gap, are the ones who need to give way. From the perspective of young or impaired people on bikes, that is a more appropriate solution.

C. The traffic movement across the cycleway could be restricted to a one-way movement towards Albany Street (Figure 5-4) from the side streets (i.e., no turning from Albany Street to the side streets). That would be a simple layout to use for all intersection users and it would no longer be necessary to have the cycleway under give way control. This means that drivers, all of whom should be capable of choosing a safe gap, are the ones who need to give way. From the perspective of young or impaired people on bikes, this is also a more appropriate solution.

D. The traffic movement across the cycleway could be restricted to a one-way movement away from Albany Street (Figure 5-5) – i.e., no movements from the side streets. This is a more complex layout, especially for those drivers coming from the side street wanting to cross Albany Street. We think such a layout would still require give way controls on the cycleway.

[8] Some smaller issues include connection between proposed shared path and bi-directional cycle lanes. As seen in Figure 5-1 cyclists would need to use the pedestrian crossing to access the shared path on Forth Street which is against current legislation. The pedestrian crossing could be replaced with a dual crossing to mitigate this.

[9] See section 1.2 of the Separated cycleways at side roads and driveways technical note.

[10] Note that limit lines for the cycleway are applied at three points between the two intersections, perhaps for the zebra crossings, but only once for motorists

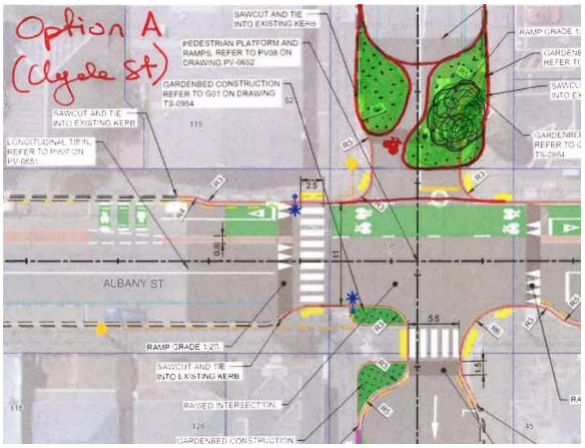


*Figure 5-2: concept option A on Clyde Street*

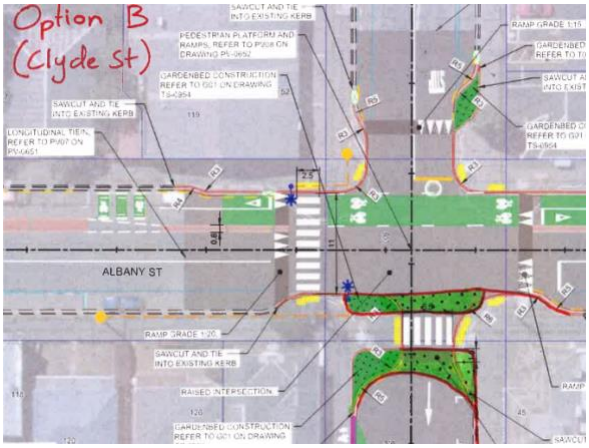


*Figure 5-3: concept option B on Clyde Street*

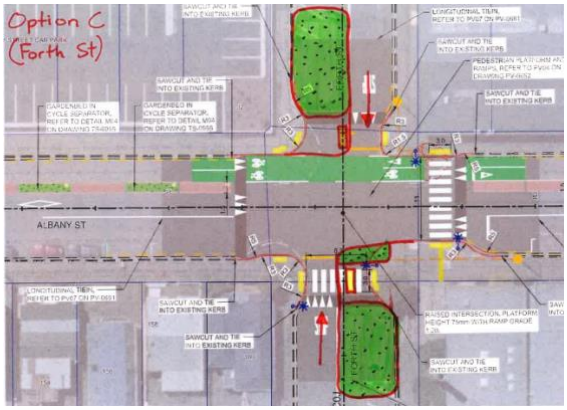


*Figure 5-4: concept option C on Forth Street*

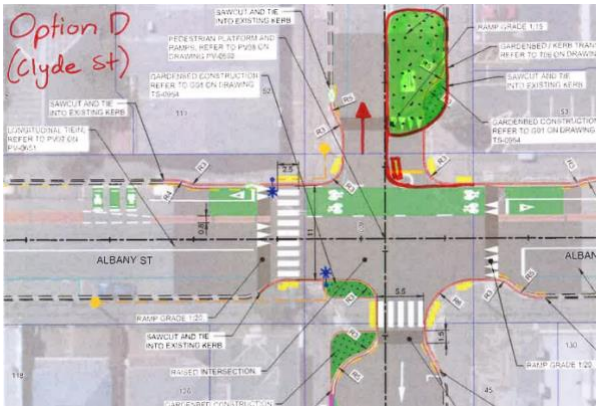


*Figure 5-5: concept option D on Clyde Street*

That said, we can think of one cross intersection with a separated cycleway without controls facing cycleway users – this was built in 2005 in Christchurch. The Harakeke / Matai intersection concept utilises a four-way stop control combined with a raised safety platform and it seems that this operates without too many concerns (based on ViaStrada staff using this corridor; see Figure 5-6). Note that Harakeke Street and Matai Street have low volumes – approximately 1,000 vehicles per day on each. This concept would probably not work given the *existing* traffic volumes on Albany Street (3,300-6,000 in the vicinity of Clyde and Forth streets, with 1,500 – 3,700 vehicles per day on the side streets).


***Figure 5-6: Harakeke / Matai intersection in Christchurch***

Apart from those potential intersection modifications, a broader look at the concept for Albany Street is justified:

- If Option 1 (shared street with sharrows) could be designed in a way that provides a good cycling environment, neither of these two side streets would pose a problem.
- If Option 2 (painted cycle lanes) could be designed in a way that provides a good cycling environment, neither of these two side streets would pose a problem.
- If Option 5 (separated cycle lanes of both sides) was found to be affordable, the risk would be reduced substantially at these two side streets.

Figure 5-7 shows parking controls, with blue indicating paid parking. Clyde and Forth streets are just outside the area where paid parking applies, and some of the kerbside space is unrestricted. This will attract some drivers who circulate through this area in search for a free park. If Clyde and Forth streets north of Albany Street were to be included in the area where on-street parking is paid for, traffic volumes would drop. We don't know whether such a change in parking management would have resulted in different outcomes for the transport modelling. What we do know is that where turning traffic volumes across a cycleway drop, the safety of cycleway users will improve.


***Figure 5-7: Parking controls***

*(blue = paid | red = no stopping | orange = time restriction | light green = unrestricted)*

## 5.2 Anzac Avenue dual crossing

We understand the Anzac Avenue crossing has been designed without vertical deflection because it is partly placed on a 97 year old bridge that has a limited load capacity. A 2022 bridge assessment by WSP found that DCC needs to be cautious with a raised crossing as it would result in a significant increase in dead load on this bridge.

We advise against implementation of the dual crossing design on Anzac Avenue at the Water of Leith as shown in Figure 5-8. The substantial concern is the lack of vertical deflection. We are aware of one case not within DCC where speed humps were retrofitted either side of a dual crossing (after our safety audit advice that a vertical element was required had been discounted) following a significant injury crash. Speed humps can be placed either side of the dual crossing clear of the bridge.

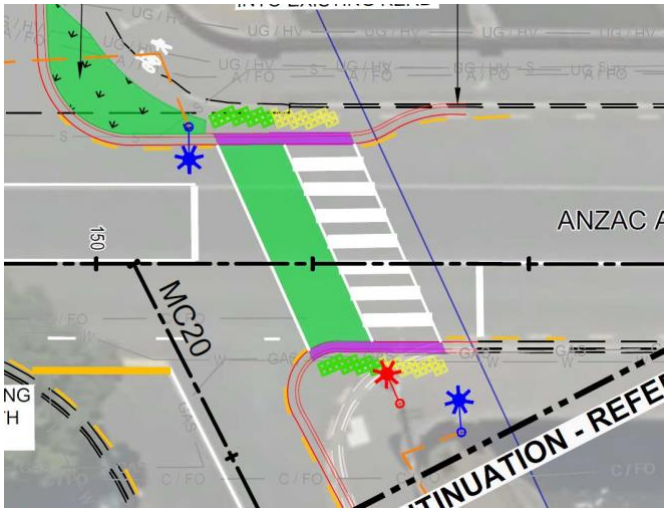


***Figure 5-8: Dual crossing design***

# 6 Staged delivery assessment

| No. | Question/issue | Task and methods |
|---|---|---|
| 5 | Considering the detailed design plans being produced now, what are the pros/cons and risks of a staged or transitional approach to delivery? Given the George Street project's ambition for a great urban design "people space", how can Albany Street complement that with a staged approach? | **Staged delivery assessment**: based upon previous and ongoing work ViaStrada has done with Waka Kotahi on transitional materials and techniques for Innovating Streets, Streets for People, and the Wellington Transitional Cycle Network, assess the safety and effectiveness of a staged delivery approach. This may include the use of lower cost yet attractive materials that would serve to meet some or all project objectives and a pathway to permanence. |

Council might consider a staged delivery approach with some initial interventions that will be built on over time. It will be necessary to change the environment at the right speed that people will accept. Table 6-1 outlines how this might be achieved for Options 1B and 4.

***Table 6-1: Outline of staged delivery approach***

<table>
<tr><th>Timeframe, funding</th><th>Focus</th><th>Treatments – Option 1B</th><th>Treatments – Option 4</th><th>Access management for any option</th></tr>
<tr><td>Stage 1:<br>1-4 years<br><br>$2 funding currently allocated (this NLTP)</td><td>Influence environment, within political and financial constraints</td><td>Speed cushions or raised safety platforms<br>Painted markings (sharrows, green surfacing)<br>On-street parking management</td><td>Lower cost cycleway separators that look permanent[11]; shared paths[12]<br>Physical treatments at intersections (including signal hardware and kerb transitions at signalised intersections)</td><td>Limited access management using low-cost materials e.g., tasteful large and heavy planter boxes, paint</td></tr>
<tr><td rowspan="2">Stage 2:<br>5-15 years<br><br>Standard RLTP funding</td><td rowspan="2">Major network and behavioural changes<br>Add more to street as residential and other buildings replace car parking</td><td>Modal filters e.g., retractable bus bollards.</td><td>Poured concrete cycleway separators; retain existing kerb and channel<br>Path widening for shared paths.</td><td>Additional access management using kerb and channel, in-ground landscaping; possible one-way traffic operation</td></tr>
<tr><td colspan="3">Raised safety platforms with dual pedestrian and cycle crossings</td></tr>
<tr><td>10-50 years</td><td>Fully shared space (no kerbs, pedestrians can</td><td></td><td>Retain physically separated cycleway</td><td>Access management now limits private vehicle access (no</td></tr>
</table>

[11] The Infrastructure for Quick Build Cycleways design note gives some useful examples of cycleway separator options

[12] Consider converting suitable footpaths on Anzac Ave, Minerva Street to shared use with markings and limited widenings

| | | | | |
|---|---|---|---|---|
| | walk anywhere) with limited private vehicle access. | | for pedestrian safety and cyclist LoS. | through traffic); delivery; vehicles have limited hours; buses **may** be re-routed |
| | | Extensive physical works including replacement of existing road / footpath surface, kerb and channel etc. | | |

# 7 Implications on other users and rest of Tertiary Precinct

## 7.1 Implications on other users

This section seeks to understand what implications options have for other users. Table 7-1 presents a multi-criteria analysis for the various user types along Albany Street. The criteria and rankings used are explained in Table 7-2 and Table 7-3. Note that these ratings are relative, not quantitative.

***Table 7-1: Multi-criteria analysis for different user types***

| **User type** | **Option 1B** | | | **Option 4** | | |
|---|---|---|---|---|---|---|
| | Safety | Convenience | Desirability | Safety | Convenience | Desirability |
| Cyclists |  |  |  |  |  |  |
| Pedestrians |  |  |  |  |  |  |
| Public transport users |  |  |  |  |  |  |
| Private vehicle users – accessing Albany Street |  |  |  |  |  |  |
| Private vehicle users – travelling through Albany Street |  |  |  |  |  |  |

***Table 7-2: Description of criteria used in multi-criteria analysis***

| **Criteria** | **Description** |
|---|---|
| Safety | To what level are users are protected from physical conflict? |
| Convenience | How easy is it to travel through the route and access destinations along the route? |
| Desirability | What proportion of user type will be willing to use this route / how appreciative of it will they be? |

***Table 7-3: Description of symbols used in multi-criteria analysis***

| | | | | |
|---|---|---|---|---|
|  |  |  |  |  |
| Adverse | Poor | Neutral | Good | Excellent |

Option 4 is slightly better than Option 1B for cyclists on the desirability level, because less-confident cyclists are expected to prefer the separated option (assertive cyclists may not prefer the separated cycleway, but would still have the option of travelling on-road under Option 4). Option 4 is also slightly preferable for pedestrians, largely due to the increased number of designated pedestrian crossing points. While the Option 4 cycleway treatments at bus stops have been well-designed, there will still be more interaction between cyclists and bus patrons compared with Option 1B, hence the slight decrease in safety for bus patrons in Option 4. Note that it is assumed that both options would be designed to accommodate the necessary bus route turning movements and therefore would not reduce convenience to bus users.

Private vehicle users accessing Albany Street will have a slightly worse level of convenience under Option 4, due to the reductions in on-street parking (especially on the north side of the road) to accommodate the separated cycleway. Both options aim to limit the desirability of private vehicle users to travel through Albany Street, with Option 4 being even less desirable due to having to turn across the separated cycleway in some locations. Drivers who would have previously travelled through Albany Street may find more convenient options elsewhere in the road network (e.g., Frederick Street). Given the need to reduce traffic volumes and speeds in both options, it is considered that a reduction in convenience and desirability for private vehicle users on Albany Street should be seen as a positive outcome for the project.

Overall, apart from the increased interaction between cyclists and bus patrons on the north side of Albany Street, Option 4 represents a slightly better outcome than Option 1B when considering **all users** in light of the project objectives.

## 7.2 Implications on future Tertiary Precinct development

Albany Street is the first street of the Tertiary Precinct to be designed. Subsequent streets should follow the same design process and criteria, unless best practice is updated in the meantime. This does not necessarily mean that all other streets will involve the same treatment.

The key criterion that affects Quality of Service is traffic volumes, and particularly volumes of traffic turning across the path of people on bikes. Albany Street has the highest traffic volumes within the Tertiary Precinct, with Dundas Street being second. It is likely that the treatment(s) selected for Albany Street will be appropriate for Dundas Street also, but other streets may not require the same intensity of treatment.

It would be advantageous to take an “all of the above” approach to streets throughout the precinct. Reduced traffic volumes throughout the precinct can be paired with separated cycleways where traffic remains. The two interventions (traffic calming and cycleways) can be implemented at the same time and in a context-sensitive manner, aligned with land use changes.

If the volumes of traffic can be reduced without adversely impacting other streets (i.e., through mode shift, increased vehicle occupancy, etc) then there will be multiple benefits:

- Pedestrians and people on bikes (regardless of skill/confidence) are exposed to less potential harm;
- Vehicular noise is reduced, contributing to places where it is more pleasant to walk and stay, improved sleep for nearby residents, and mental health benefits;
- Air quality is improved, with physical health and environmental benefits.

# Appendix A Appropriateness of sharrows and mixed traffic

The proposed 30 km/h slow speed zone is included in the refined base model ("test 1") considered in the modelling report (WSP & Abley, 2022); the report states that this would result in *two-way volumes along Albany St … generally between 100 vph and 300 vph in the three modelled periods*, with the PM peak period reproduced as follows.

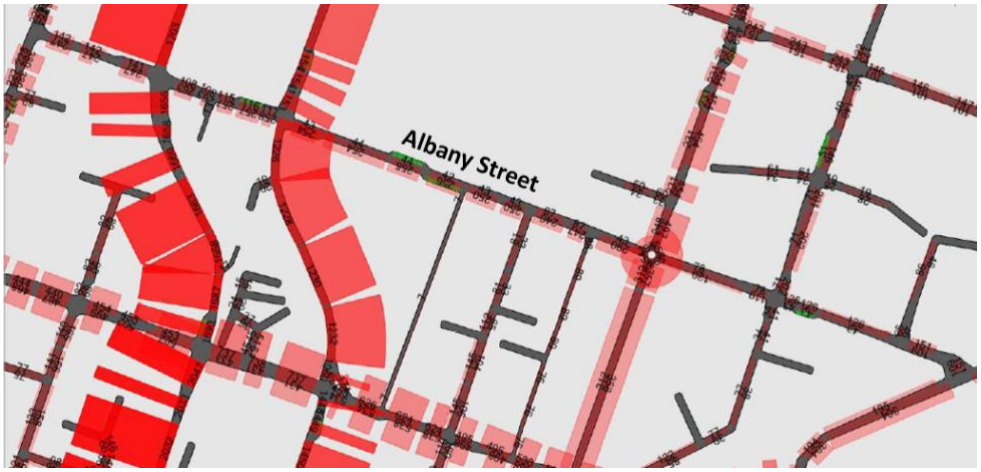


***Figure 7-1: PM peak traffic volumes (vehicles / hour) for refined base model (WSP & Abley, 2022)***

The Waka Kotahi CNG provides guidance on the traffic volumes and speeds suitable for mixed traffic:

> *Ideally, neighbourhood greenways should have motor vehicle volumes of no higher than 1,500-2,000 vehicles/day (and 150-200 vehicles in the peak hour), and vehicle speeds no higher than 30 km/h.*

The *Sharrow Markings: Best practice guidance note* (NZ Transport Agency, 2016) gives an envelope of traffic volume vs speed differential combination where it is appropriate to apply sharrows, as used in Figure 7-2. This should also be taken as the guidance for where to consider cycling in mixed traffic an appropriate form of provision for cycling.

The note does not give guidance on what cycling speeds to apply when calculating the speed differential. ViaStrada recommends that the 15$^{th}$ percentile cycling speed should be used, to ensure the situation is appropriate for a suitable majority of cyclists. ViaStrada speed survey data for a bus-cycle lane (the only on-road facility surveyed) on flat road (i.e. minimal gradient) suggests a 15$^{th}$ percentile cycling speed of 19 km/h[13], which gives a speed differential of 11 km/h with motor vehicles travelling at the 30 km/h speed limit.

[13] From "Speed surveys of powered transport devices" report, March 2022 undertaken by ViaStrada for Waka Kotahi. Site was Colombo Street bus lane.

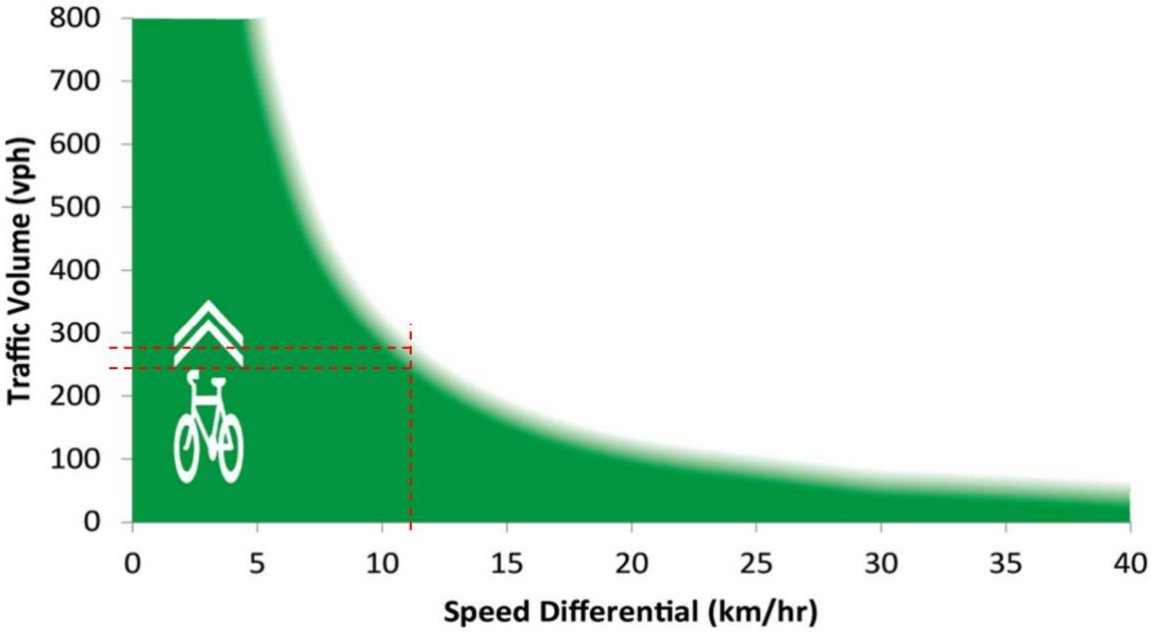


***Figure 7-2: Appropriate sharrow application (NZTA, 2016)***

Figure 7-2 indicates that, for a 11 km/h speed differential, the desirable upper threshold of motor vehicle volume would be 240 vehicles per hour per direction, with a tolerable threshold of 270 vehicles per hour per direction (i.e. the faded portion on the envelope).

The modelling report (WSP & Abley, 2022) shows the PM peak hour has the greatest two-way volume, but does not give the directional split. The only part of the modelling report showing the directional split shows a tidal PM peak flow in the westbound direction, with the heaviest location being just west of Clyde Street where there are 290 vehicles per hour, whereas all other sections have a flow less than 270 vehicles per hour.

Therefore, it appears that mixed traffic with sharrows on Albany Street would be at the limit of what is considered acceptable if lowering the speed limit were the only change. Additional traffic calming measures (e.g. speed cushions / raised platforms at frequent intervals) should be sufficient to achieve a small reduction in traffic volumes and ensure the posted speed limit is adhered to.

According to Waka Kotahi's Cycling Network Guidance (CNG), the current corridor width on Albany Street is sufficient to provide two "wide" mixed traffic lanes, i.e. where it is safe and appropriate for motorists and cyclists to travel side by side. This is the preferable form of mixed traffic, as it accommodates passing. However, where there is high on-street parking turnover, cyclists will be at risk of being hit by vehicles entering or exiting parking spaces, or by opening car doors, which could cause them to fall in the path of live traffic. Therefore, it would be advisable to repeat the sharrow markings more frequently, as a way of increasing motorist awareness of the likely presence of cyclists.

Hence, Option 1 is achievable but, as noted previously, will not appeal to all ages and abilities due to the vehicle volumes involved.

# Appendix B Quality of Service estimation

Table 7-4 outlines the treatments for Options 1 and 4 from the Albany Street SSBC-Lite:

***Table 7-4: Treatments for Option 1 and Option 4***

| Section | Option 1 (as per SSBC) | Option 4 (as per design plans) |
|---|---|---|
| Albany St (George St – SH1 northbound) | Mixed traffic cycling<br>30 km/h speed limit<br>Sharrows | 1-way buffered cycle lanes on each side of road<br>30 km/h speed limit |
| Albany St / SH1 northbound intersection) | No specific cycle phasing<br>Provision of advanced stop boxes where appropriate. | Fully protected cycle movements through intersection |
| Albany St (SH1 northbound – SH1 southbound) | Mixed traffic cycling<br>30 km/h speed limit<br>Sharrows | 2-way separated cycleway on south side of road<br>30 km/h speed limit |
| Albany St / SH1 southbound intersection) | No specific cycle phasing<br>Provision of advanced stop boxes where appropriate. | Fully protected cycle movements through intersection |
| Albany St (SH1 southbound – Anzac Ave) | Mixed traffic cycling<br>30 km/h speed limit<br>Sharrows | 2-way separated cycleway on north side of road<br>30 km/h speed limit<br>Side street traffic to give way to cycleway users |
| Anzac Ave (Albany St – Minerva) | Mixed traffic cycling<br>30 km/h speed limit<br>Sharrows | Shared pathway |
| Anzac Ave / Minerva St crossing | No specific provision for crossing cyclists | Dual cycle-zebra crossing |
| Minerva St | Mixed traffic cycling<br>30 km/h speed limit<br>Sharrows | Shared pathway |

The limitations of AT QoS tool include:

- Does not provide a suitable method of combing the QoS of various elements to give an overall segment or route score. The premise of this is that every category needs to be suitable to a particular cycling audience, and the audience will work to the lowest common denominator. However, in practice most people will be willing to accept a few undesirable features if they perceive most other aspects to be of a suitable standard.
- Several categories are noted as “N/A for mixed traffic”, which means mixed traffic locations (including at intersections) are scored on fewer categories and can ultimately appear better than other treatments.