TE TUPU NGĀTAHI
SUPPORTING GROWTH

# North Network

## Assessment of Alternatives

15/09/2023

Version 1.0

WAKA KOTAHI NZ TRANSPORT AGENCY

New Zealand Government

## Document Status

| Responsibility | Name |
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## Acronyms and Terms Definitions

| Acronym/Term | Description |
|---|---|
| AEE | Assessment of Environmental Effects |
| AT | Auckland Transport |
| ATAP | Auckland Transport Alignment Project |
| AUP: OP | Auckland Unitary Plan – Operative in Part |
| BCR | Benefit-Cost Ratio |
| CFAF | Corridor Form and Function |
| DBC | Detailed Business Case |
| FUZ | Future Urban Zone |
| GHG | Greenhouse Gas |
| GIS | Geographic Information System |
| GPS | Government Policy Statement |
| IBC | Indicative Business Case |
| ISTN | Indicative Strategic Transport Network |
| LOS | Level of Service |
| MCA | Multi-criteria Assessment |
| NES-FW | National Environmental Standards for Freshwater 2020 |
| NOR | Notice of Requirement |
| NPS-FM | National Policy Statement for Freshwater Management 2020 |
| NPS-HPL | National Policy Statement for Highly Productive Land 2022 |
| NPS-UD | National Policy Statement on Urban Development 2020 |
| PBC | Programme Business Case |
| RASF | Roads and Streets Framework |
| RMA | Resource Management Act 1991 |
| RTC | Rapid Transit Corridor |
| SEA | Significant Ecological Areas |
| SG | Te Tupu Ngātahi Supporting Growth |
| SH1 | State Highway 1 |
| SH18 | State Highway 18 |

| Acronym/Term | Description |
|---|---|
| TFUG | Transport for Future Urban Growth (PBC) |
| Waka Kotahi | Waka Kotahi NZ Transport Agency |

# PART A

## Overview and Background

# 1. Introduction

## 1.1 Purpose of this report

The Te Tupu Ngātahi Supporting Growth is a collaboration between Auckland Transport (AT) and Waka Kotahi NZ Transport Agency (Waka Kotahi) to investigate, plan and identify the preferred transport network to support Auckland's future urban growth areas over the next 30 years.

This Assessment of Alternatives report has been prepared on behalf of AT and Waka Kotahi, as the requiring authorities for the North Projects (as described in main Assessment of Environmental Effects (AEE) report). This report will support the Notices of Requirement (NORs) for designations and has been prepared in accordance with:

a) Section 171(1)(b) of the Resource Management Act 1991 (RMA);
b) Policy tests under the relevant policy framework; and
c) Waka Kotahi's Business Case Approach guidance requirements to document the option development, assessment, and selection process.

Section 171(1)(b) of the RMA requires that when making a recommendation on an NOR, a territorial authority shall consider whether adequate regard has been given to alternative sites, routes or methods of undertaking the work in circumstances where the requiring authority:

a) Does not have an interest in the land sufficient for undertaking the work; or
b) Where it is likely that the work will have significant adverse effects on the environment.

There are several principles and key considerations for a requiring authority to apply and adhere to when undertaking an assessment of alternatives and identifying a preferred option. Of note are the following:

a) The process cannot be cursory or arbitrary;
b) The process should be adequately transparent and robust, and clearly recorded so that it can be understood by others;
c) An appropriate range of alternatives should be considered; and
d) The extent of options considered, and the assessment of these options, should be proportional to the potential effects of the options being considered.

AT and Waka Kotahi do not have sufficient interest in the land required for the Projects and as such are required to give adequate consideration to alternatives.

Accordingly, this report covers the following matters:

- Overview of the previous business case processes and methodology for the consideration of alternatives (refer to Part A)
- Consideration of alternative routes (refer to Parts B and C)
- Consideration of alternative methods (see Part D).

**Note:** This report covers the consideration of alternatives to the extent needed for designations. The detail required for resource consents (section 105 of the RMA etc.) is a forthcoming process and will build on the conclusions drawn in this report.

## 1.2 Report structure

This report is structured as follows:

| Section | Heading | Description |
|---|---|---|
| **PART A – OVERVIEW AND BACKGROUND** | | |
| 1 | Introduction | Purpose of the report and report structure |
| 2 | Assessment of Alternatives Methodology | Overview of the assessment of alternatives methodology used to develop and assess route options for the Network and ultimately determine the preferred option |
| 3 | Indicative Corridor Assessment (IBC Phase) | Summary of the previous Indicative Corridor Assessment in the IBC phase, leading to the identification of the Indicative Strategic Transport Network (IBC phase) |
| IBC Milestone | Indicative Strategic Transport Network | Identification of the Indicative Strategic Transport Network. |
| 4 | Projects Progressed in the North DBC/NORs | Summary of which ISTN corridors progressed to DBC and NOR phases |
| 5 | Detailed Corridor Assessment and Route Refinement Methodology (DBC and NOR Phase) | Overview of the methodology for alternatives assessment during the DBC and NOR phase, including the gap analysis between IBC and DBC |
| **PART B – ASSESSMENT OF ALTERNATIVES - NORTH STRATEGIC PROJECTS (WAKA KOTAHI)** | | |
| 6 | NOR1 – Rapid Transit Corridor (RTC) Project | Option development and assessment for the RTC with a preferred route selected. |
| 7 | NOR2 – New Milldale Station and Associated Facilities | Site refinement and assessment with a preferred site and indicative layout selected. |
| 8 | NOR3 – New Pine Valley East Station and Associated Facilities | Site assessment, option development and assessment with a preferred site and indicative layout selected. |
| 9 | NOR4 – State Highway 1 Improvements Package | Option development, assessment and preferred route selected for each improvement project. |
| DBC Milestone | | Identification of the Preferred Routes (for further option refinement) |
| **PART C – ASSESSMENT OF ALTERNATIVES - NORTH LOCAL PROJECTS (AT)** | | |
| 10 | NOR5 – New Crossing of SH1 at Dairy Stream | Option development and assessment for the new Dairy Stream Crossing with a preferred route selected. |
| 11 | NOR6 – New Connection between Milldale and Grand Drive | Option development and assessment for the new connection with a preferred route selected. |

| Section | Heading | Description |
|---|---|---|
| 12 | NOR7 – Upgrade to Pine Valley Road | Option development and assessment for the Pine Valley Road Upgrade with a preferred route selected. |
| 13 | NOR8 – Upgrade to Dairy Flat Highway between Silverdale and Dairy Flat | Option development and assessment for the Dairy Flat Highway Upgrade between Silverdale and Dairy Flat with a preferred route selected. |
| 14 | NOR9 – Upgrade to Dairy Flat Highway (Durey Road to Albany Village) | Option development and assessment for the Dairy Flat Highway Upgrade from Durey Road to Albany Village with a preferred route selected. |
| 15 | NOR10 – Upgrade to Wainui Road | Option development and assessment for the Wainui Road Upgrade with a preferred route selected. |
| 16 | NOR11 – New Connection from Dairy Flat Highway to Wilks Road | Option development and assessment for the new connection with a preferred route selected. |
| 17 | NOR12 – Upgrade and Extension to Bawden Road | Option development and assessment for the Bawden Road Upgrade and Extension with a preferred route selected. |
| 18 | NOR13 – Upgrade to East Coast Road between Silverdale and Ō Mahurangi Penlink | Option development and assessment for the East Coast Road Upgrade with a preferred route selected. |
| DBC Milestone | | Identification of the Preferred Routes (for further option refinement) |
| **PART D – CONSIDERATION OF ALTERNATIVE METHODS** | | |
| 19 | Consideration of Alternative Methods | Consideration of alternative route protection and future implementation methods. |

# 2. Assessment of Alternatives methodology

## 2.1 Overview

This section provides an overview of the assessment of alternatives methodology used to develop and assess route options for the North Projects and ultimately determine the preferred options through all phases of the projects.

An overview of the process is provided in **Figure 1**.

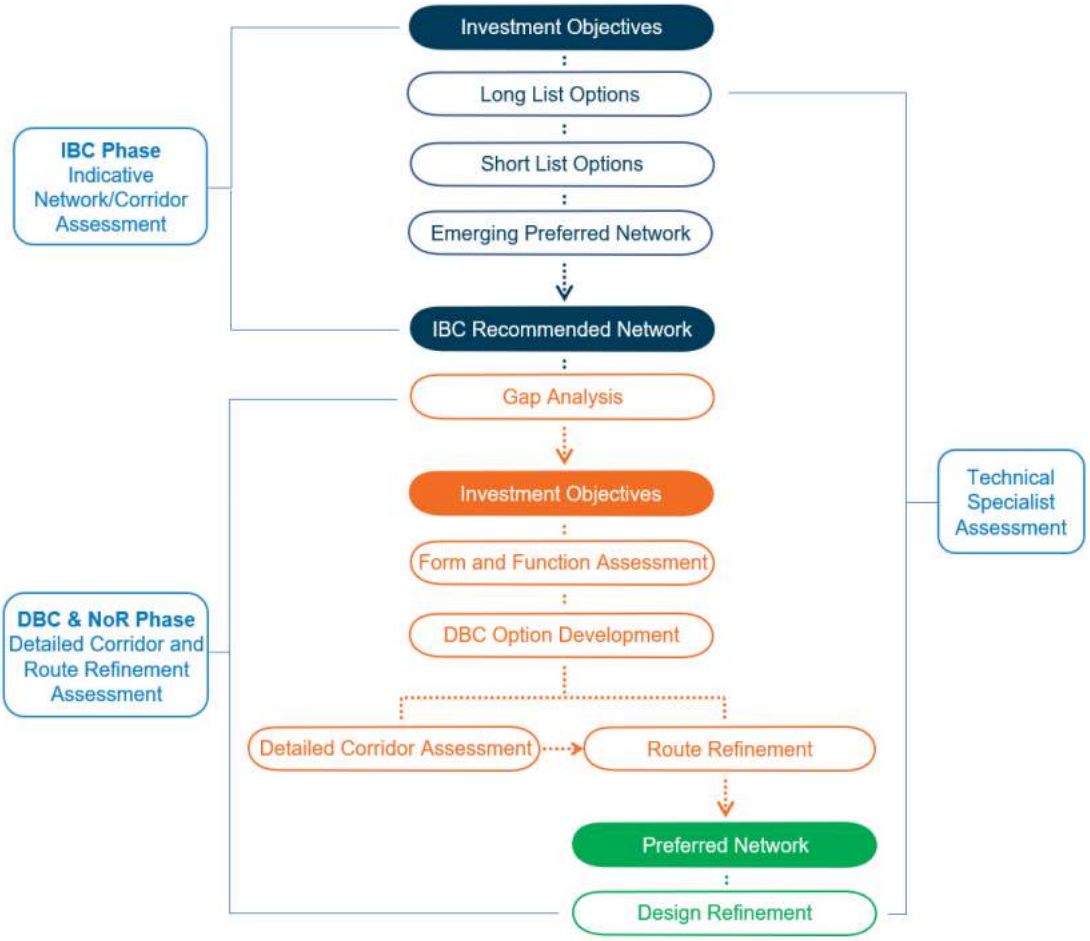



**Figure 1: Overview of assessment of alternatives methodology**

In summary the assessment of alternatives methodology included:

a) **The North Indicative Business Case (IBC) Phase (2018-2019)** – which focused on an 'Indicative Corridor Assessment' of alternatives for the northern growth area.

- **Indicative Corridor Assessment** comprised the identification and assessment of high level corridor (or site) options to define the North Indicative Strategic Transport Network (ISTN) required to support Auckland's Northern growth area through the IBC. Both a long list and short list were assessed through this process (refer Section 3).

b) **The North Detailed Business Case (DBC) Phase (2019-2024) and overlapping NOR phase (mid-2022 – 2024)** – which focused on more 'Detailed Corridor Assessments', 'Route Refinement Assessments' and 'Option Refinements' for individual North Network projects (refer Section 5). These terms are defined as follows:

- **Detailed Corridor Assessments** - identification and assessment of corridor options occupying different locations within a defined study area and potentially connecting to the network at different points.
- **Route Refinement Assessments** - identification and assessment of route options considering the effects, constraints and opportunities present (for road upgrades this included consideration of widening the corridor on either side, both sides, or a combination)
- **Option Refinements** – refinement of the preferred route option through option design development to determine the final route alignment and extent of designations necessary. This included changes in response to engagement, specialist assessments and more detailed engineering design assessment.

Detailed corridor assessments focused on larger-scale corridors; whereas route refinement assessments were used to refine and confirm the preferred route. These are described in detail in this report. Option refinement focused on confirming the final alignments and the proposed designation boundaries. This is described in the main AEE document.

At the start of the DBC Phase, a **gap analysis** was completed to check whether the recommended corridor option for each project (as per the ISTN) required reconsideration due to any relevant new information or assumptions that had changed since the IBC Indicative Corridor Assessment. Detailed **constraints mapping** and **form and function** assessments were also completed at the start of the DBC to inform the scope of the Projects, the associated assessment of alternatives, and to develop the options for assessment. These processes are described in more detail in Section 5.

Further to the consideration of alternatives within the IBC phase, the option development in the DBC considered integration with land use and use of existing corridors when developing options in accordance with Waka Kotahi's Business Case Approach guidance. This approach aligns with the **intervention hierarchy approach** of prioritising lower impact and cost-effective options first, see **Figure 2**.

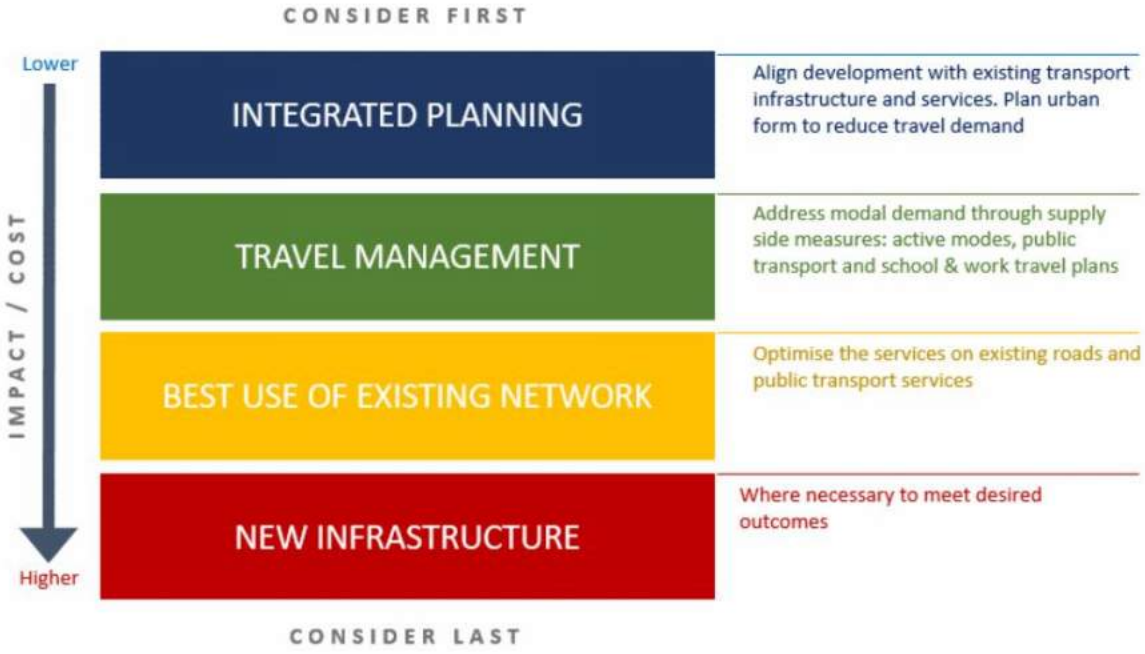



**Figure 2: Options development – intervention hierarchy approach**

In order to achieve the identified transport outcomes, new infrastructure was identified as being required for seven of the projects[1]. Upgrades to the existing network were considered to be viable for the remainder of the projects. For options where new infrastructure was required, corridor development and assessment was undertaken to identify a preferred route alignment, which was then refined in further detail (route refinement). Where an existing network was to be utilised and upgraded, route refinement considered where upgrades may be accommodated, generally widening to the left, right or both sides of the corridor.

## 2.2 Assessment framework

In order to evaluate and compare options, a programme wide assessment framework (including a Multi-Criteria Assessment (MCA)) was developed for the alternatives assessment in consultation with AT, Waka Kotahi and Manawhenua (refer **Table 1**).

The MCA was developed for use across the Te Tupu Ngātahi Programme and has been used in both the IBC and DBC option evaluation processes. At the DBC phase, the option evaluation process was tailored to make it specific to the requirements of each project.

The MCA framework is a common tool that is often used to assist in the alternatives assessment decision-making process and provides an opportunity to understand how different options compare against a set of standard and grouped criteria.

The MCA framework developed and adopted by the Project Team involved the following:

- Assessment criteria: Transport outcomes and the four well-beings: Cultural, Social, Environmental and Economic. Several sub-criteria were developed under each wellbeing grouping which were assessed by technical specialists.

[1] NOR 1: New Rapid Transit Corridor between Albany and Milldale; NOR2: New Milldale Station; NOR 3: New Pine Valley East Station; NOR 5: New SH1 Crossing at Dairy Stream; part of NOR 6: New Connection between Milldale and Grand Drive; NOR 11 – New Connection from Dairy Flat Highway to Wilks Road; and part of NOR 12 – Bawden Road Upgrade and Extension (refer Figure 6 for map of these NORs)

- Opportunities: identifying opportunities that can be taken forward in developing the options. These were identified by the relevant technical specialist.
- Additional inputs: Manawhenua feedback/preferences; Partner, stakeholder, community and landowner feedback; policy analysis; value for money.

Options were assessed, and where appropriate, scored or assessed at each stage by a multi-disciplinary team, using the MCA framework set out in **Table 1**. Constraints mapping and existing evidence from desktop research were the main sources of information to assist with assessment. In assessing the criteria, guidance was provided by the policy direction of the AUP:OP (e.g., overlays), which could place constraints on the various options identified.

It should be noted that, while the MCA tool was typically used when undertaking options assessment, it was not the sole means of assessing options; instead, it was considered alongside other factors as part of the decision-making process. The process incorporated Manawhenua input, feedback from the consultation and engagement process and technical experts (engagement discussed in Section 5.4.7).

Criteria were developed for consideration by Manawhenua under the cultural wellbeing grouping. On review, Manawhenua stated a preference to rank options where possible or identify an overall preference (rather than score). In some cases, this comprised a collective Manawhenua response, and sometimes it was individual iwi preferences. Accordingly, Manawhenua representatives expressed their views and provided specialist cultural advice on key issues through the optioneering and assessment of alternatives process.

**Table 1: Te Tupu Ngātahi MCA Framework**

| Well being | MCA topic | # | Criteria | Measure |
|---|---|---|---|---|
| **Investment Objectives** | **Investment Objectives** | | Project specific | Project specific – *detailed in Parts B and C* |
| **Cultural** | **Heritage** | 1a | Heritage | Extent of effects on:<br>• Sites and places of valued heritage buildings, trees (with heritage value) and places.<br>• Sites and places of archaeological value.<br>• Sites and places of European cultural heritage value<br>• Sites and places of significance to Manawhenua |
| | | | | |
| **Social** | **Socio-economic impacts** | 2a | Land use futures | To what extent will the option impact on the future development of land (within the corridor, adjacent to it and impacted by it – i.e. consider all 3 scales), in relation to:<br>• Underlying existing urban structure (block and street pattern)<br>• Integration with the future landuse scenario (aligning housing delivery with infrastructure delivery)<br>• Size and shape of potential development parcels to enable appropriate building typologies<br>• Ability to consolidate residual land |

| Well being | MCA topic | # | Criteria | Measure |
|---|---|---|---|---|
| | | | | • Access that does not prevent neighbouring development |
| | | 2b | Urban design | To what extent does the option support a quality urban environment (both current and future planned state)? particularly relating to:<br>• Context and planned place making considerations<br>• An inviting, pleasant and *high amenity public realm*<br>• Open space integration<br>• Active interface between public and private realm<br>• Scale of long term impact on the amenity and character of the surrounding environment. |
| | | 2c | Land requirement | Scale of public / private land (m2 / number of properties / special status of impacted property) required to deliver the option. |
| | | 2d | Social cohesion | Impact on connectivity/accessibility for the existing urban areas including access to:<br>• Employment<br>• Other communities or within the same community<br>• Shops/services/other community and cultural facilities/'attractors'<br>• Severance of the existing community (including consented)<br>• Scale of effect on existing community facilities and open space<br>• Public access to the coast, rivers and lakes |
| | | 2e | Human Health and Wellbeing | Will the option potentially affect any sensitive land uses nearby or consented (adjacent residential, childcare centres, hospitals, rest homes, marae and schools)? particularly relating to:<br>• Air Quality<br>• Contaminated Land<br>• Noise and Vibration |
| | | | | |
| **Environmental** | **Natural Environment** | 3a | Landscape/visual | Will the option have visual effects?<br>Extent of effects on:<br>• The natural landscape and features such as streams, coastal edges, natural vegetation and underlying topography – acknowledging planned changes to area in light of urban land use/zoning<br>• Natural character and outstanding natural features/landscapes including geological features (mapped and protected features) |

| Well being | MCA topic | # | Criteria | Measure |
|---|---|---|---|---|
| | | 3b | Stormwater | Impact of operational stormwater (both quantity and quality) on the receiving environment, including:<br>• Potential flooding effects of the option within the catchment<br>• Extent and consequences of likely mitigation measures |
| | | 3c | Ecology | Extent of effects on:<br>• Significant indigenous flora;<br>• Significant habitats of indigenous fauna;<br>• Indigenous biodiversity;<br>• Stream/waterway ecology<br>• Coastal environment (e.g. CMA) |
| | | 3d | Natural Hazards | Extent of effect on adverse geology; steep slopes; seismic impacts; other resilience *risks* (low level infrastructure near coastlines, inundation areas) |
| | | | | |
| **Economic** | **Transport** | 4a | Transport system integration | The extent to which the option achieves the following:<br>• Integration with wider network and between modes<br>• Resilience to operational incidents or short term life-line access disruption<br>• Reduces the need to travel increase access to non-car choices |
| | | 4b | User Safety | Extent of safety effects on all transport users, including:<br>• People in public transport<br>• People walking or cycling<br>• People in private vehicles |
| | **Construction impacts** | 5a | Construction impacts on utilities/infrastructure | Requirements for relocation/design of existing infrastructure, including<br>• Consideration of safety impacts<br>• Risk of continuity of service over construction<br>• Engagement with utility providers<br>• Opportunities for integration with other bulk infrastructure |
| | | 5b | Construction Disruption | Construction impacts on people and businesses regarding:<br>• Traffic & noise<br>• Earthworks related effects including dust<br>• Quality of life and amenity<br>• Economic impacts on businesses/community/town centres |

| Well being | MCA topic | # | Criteria | Measure |
|---|---|---|---|---|
| | **Cost & Construction Risk** | 6a | Construction costs and risk | Assessed cost for construction of options including:<br>• Complexity and risk in construction (including consideration of constructability)<br>• Complexity in programme<br>• Cost and complexity of safely undertaking works (including works on contaminated land) |

The programme-wide criteria were 'localised' for each Project, whereby some criteria were not considered differentiators for certain projects.

Technical experts were appointed to undertake assessments of the options in their area of expertise. The experts were required to differentiate between anticipated effects experienced in the existing environment and effects that would be experienced in a realistic, future environment (as discussed further below). This differentiation is particularly relevant within the Future Urban Zone (FUZ), which is earmarked for urban development but currently functions, primarily, as a rural area.

The MCA used a graduated scoring scale, ranging from -5 for Very High Adverse Effect to +5 Very High Positive Impact (see **Table 2**) to score options against the MCA Framework. The varying shades of green represent what was identified in the MCA as a score above '0' and is associated with a positive impact, whereas shades of red represent what was identified in the MCA as a score below '0' and is associated with an adverse impact.

**Table 2: MCA scoring scale.**

| Effects criteria | Scoring |
|---|---|
| Very high adverse impact | -5 |
| High adverse impact | -4 |
| Moderate adverse impact | -3 |
| Low adverse impact | -2 |
| Very low adverse impact | -1 |
| Neutral impact | 0 |
| Very low positive impact | 1 |
| Low positive impact | 2 |
| Moderate positive impact | 3 |
| High positive impact | 4 |
| Very high positive impact | 5 |

Scoring was completed by technical experts (ecologists, stormwater experts, archaeologists, etc.) and the Project Team (including planners, designers, transport engineers). Scores were presented and challenged in an interdisciplinary workshop setting.

When considering the options and assigning scores, experts considered options and potential effects in the context of a future environment within which the transport corridor would likely be operating. It is considered that there are broadly two likely future environments that could apply:

a) Environments that are likely to experience material change as a result of urbanisation; and
b) Environments that are not likely to materially change in the future (i.e.: they are either already urbanised or are not zoned for future urban development).

When considering the future environment, there are four scenarios that are likely to eventuate through the Supporting Growth Programme, two of which have a high probability of change because of a signal of land use change by way of operative planning provisions. For example, there is a high likelihood of change in Future Urban Zone areas and rural areas that are currently zoned urban; urban growth is enabled and anticipated to occur in the short to medium term within these areas. These are outlined in the table below:

**Table 3: Overview of likely scenarios eventuating through the Supporting Growth Programme**

| Environment today | Zoning | Likelihood of change | Likely future state environment |
|---|---|---|---|
| Rural | Rural | Low | Rural |
| Rural | Urban | High | Urban |
| Rural | Future Urban | High | Urban |
| Urban | Urban | Low | Urban |

Unless circumstances suggested otherwise, when considering effects in areas where there was a high likelihood of change, the approach that was adopted was that construction effects were to be considered in the context of an un-urbanised environment and operational effects were to be considered within the context of an urbanised environment. This is on the basis that while construction is likely to occur prior to urbanisation, the relevant project is to operate in an urbanised environment.

# 3. Indicative Corridor Assessment (IBC phase)

This section summarises the Indicative Corridor Assessment optioneering process undertaken during the IBC phase of the projects. This process resulted in the identification of the North Indicative Strategic Transport Network (ISTN) that was approved for further investigation in the DBC.

A full description of the options assessment in the IBC phase is included in Appendix A – Options Assessment Report for the North IBC.

Steps involved in the option development and assessment process from the long list to the short list and short list to recommended network are illustrated in **Figure 3**. This figure was prepared in 2019 and summarised the process at that time. Further details of relevant options, assessments and recommendations are described below.

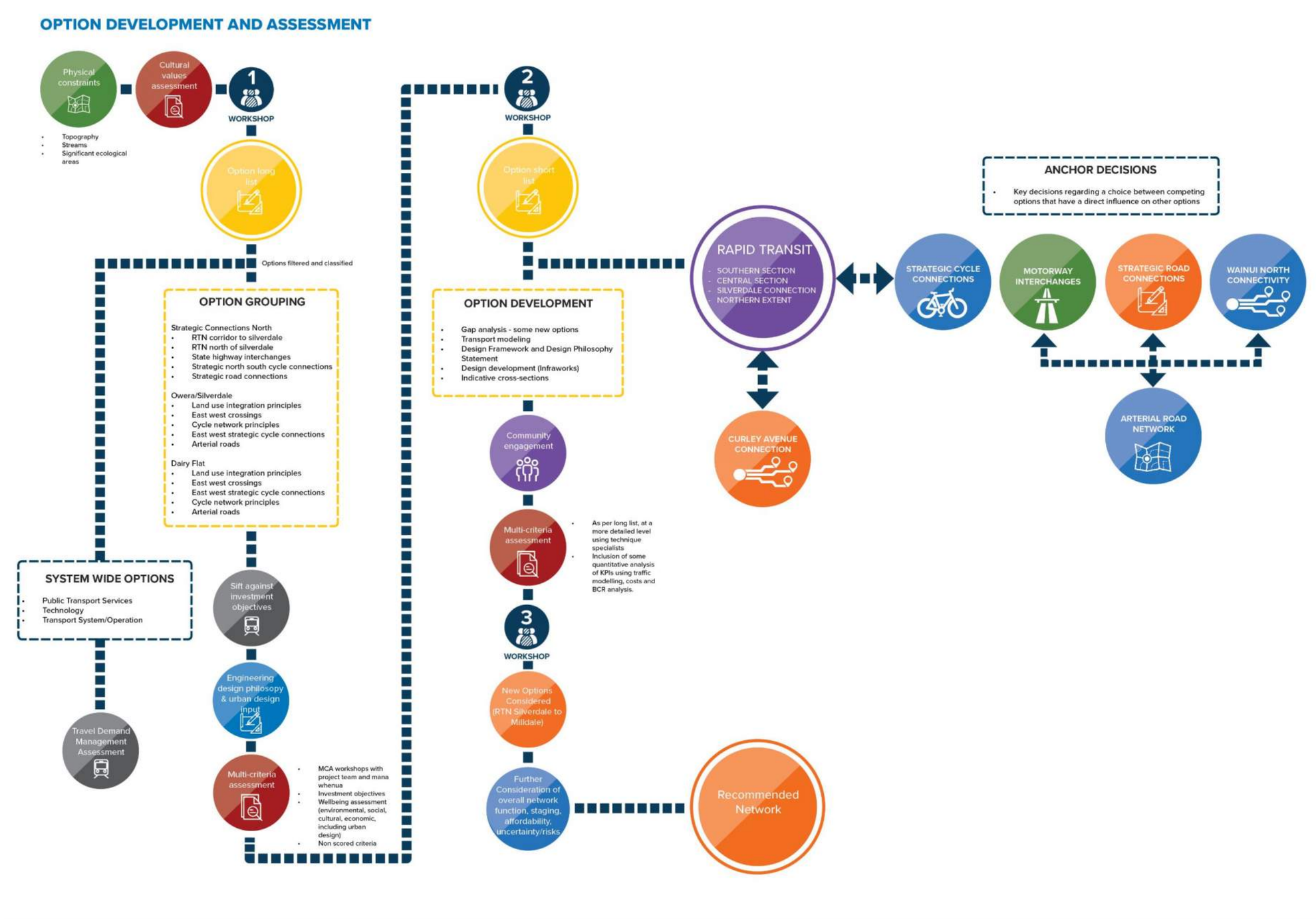



**Figure 3: IBC phase - Option development and assessment process**

## 3.1 Indicative Strategic Transport Network

Following the shortlist assessment (longlist and shortlist assessment processes outlined below), the North IBC recommended the ISTN. The indicative network was endorsed by the AT and Waka Kotahi boards in December 2018 to progress to the DBC phase (see **Figure 4**) below.

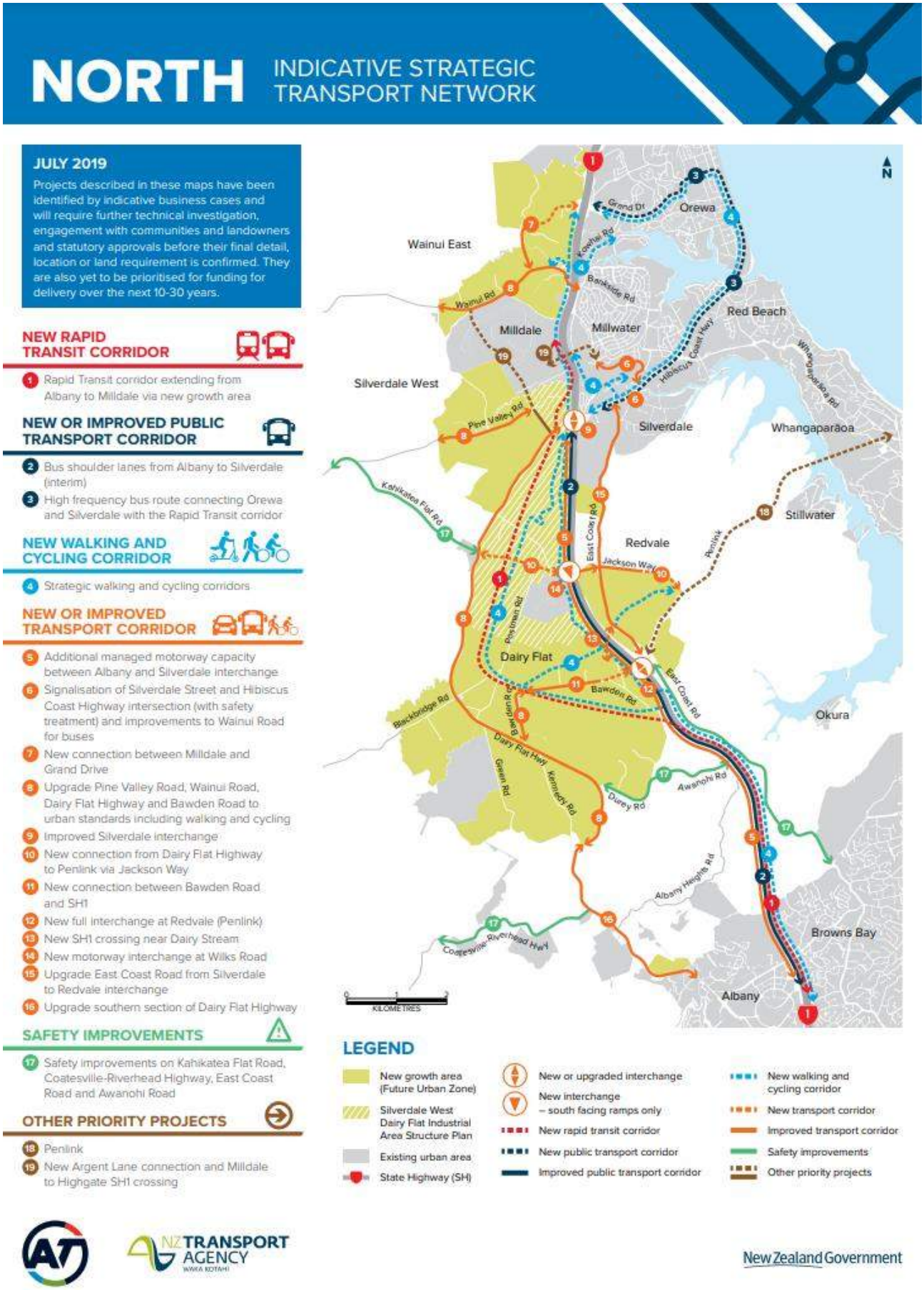



**Figure 4: North Indicative Strategic Transport Network recommended through the IBC**

## 3.2 Longlist Corridor Assessment

The longlist assessment phase included development and assessment of a wide range of indicative options, which were assessed against transport outcomes and the Te Tupu Ngātahi MCA framework (see Section 2.2). Key Project Partners (Auckland Council and Manawhenua) were involved in the development and evaluation of longlist options. Section 3.2.1 and 3.2.2 provide further details on longlist development and assessment.

### 3.2.1 Longlist Option Development

Approximately 160 options were initially developed for the North Projects comprising approximately 70 non-infrastructure options and 90 infrastructure options. An initial assessment of those options excluded options that were considered outside the scope of the programme, already part of a designated /consented /funded project, considered business as usual, not feasible or at a level of detail beyond what is being considered at the stage of the corridor assessment process.

- **Strategic Connections infrastructure options**

The following strategic connection infrastructure options were identified for further assessment:

- RT corridor – Albany to Silverdale
- RT corridor – Silverdale to Grand Drive
- SH1 (Motorway) interchanges
- North-south strategic cycling connections
- Strategic road connections

- **Local area infrastructure options (Silverdale, Ōrewa, Wainui and Dairy Flat)**

The following ‘local area’ connection infrastructure options were identified for further assessment:

- East west motorway crossings
- East west strategic cycling connections
- North-south arterial roads
- East-west arterial roads

### 3.2.2 Longlist Option Assessment

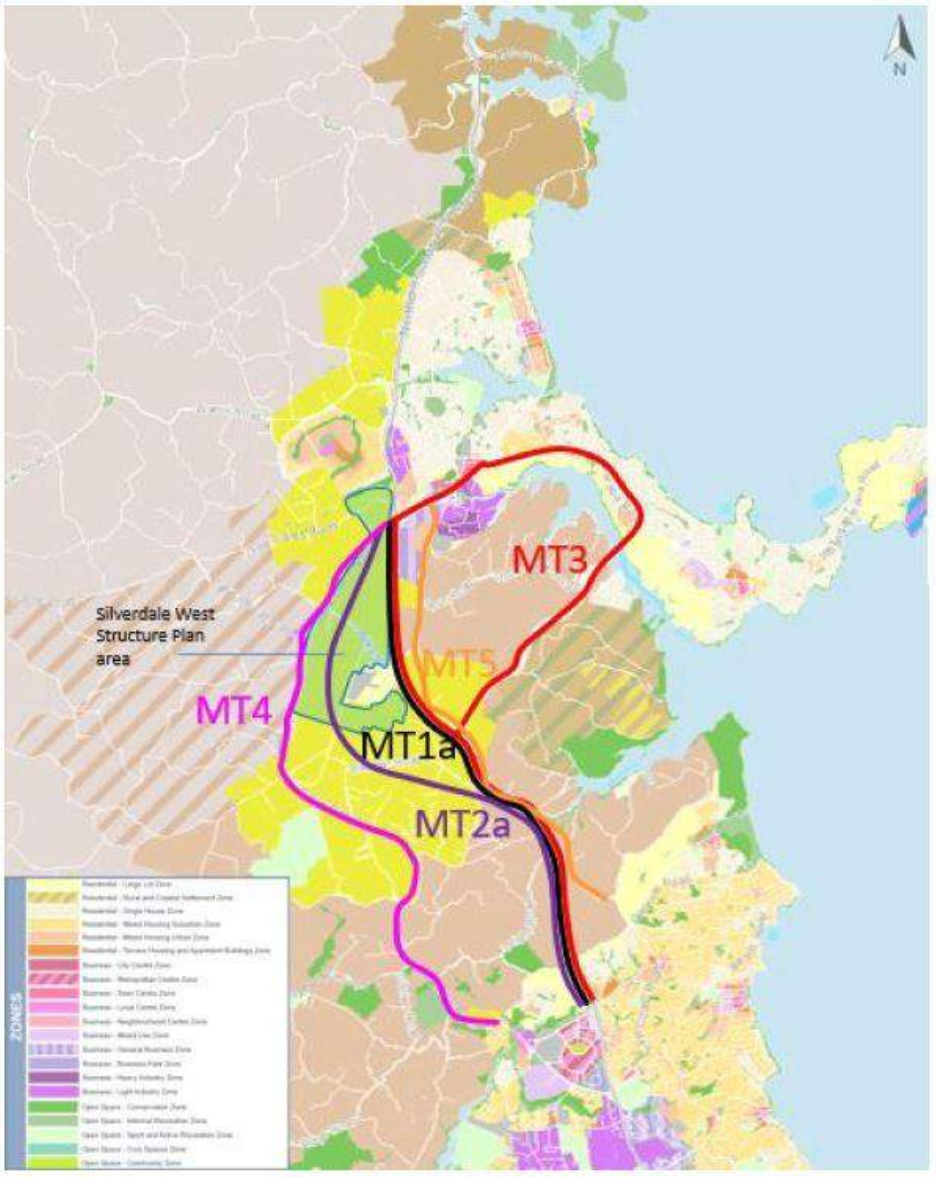
Each of the long list options within each option grouping identified above was assessed using two methods:

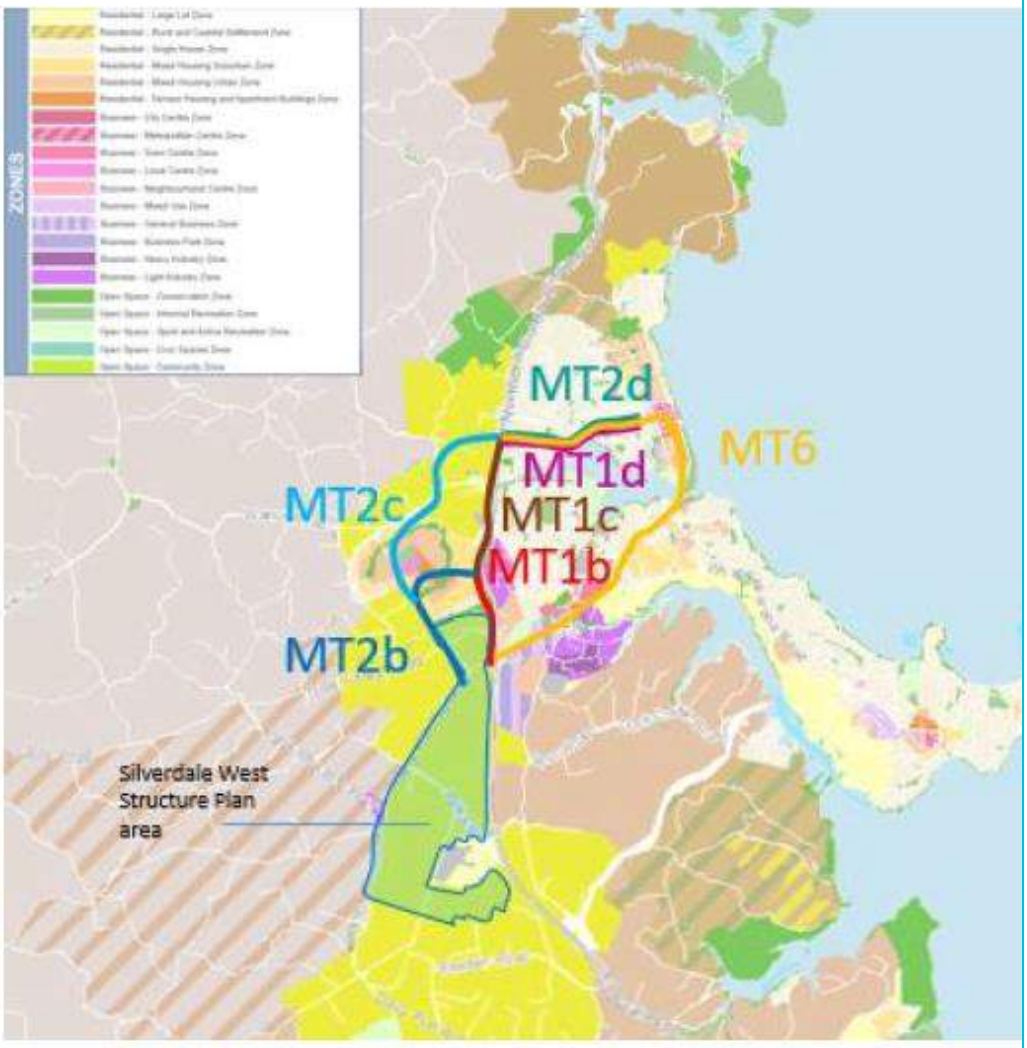
- A localised MCA framework was used to assess the majority of options focusing on projects which have a physical footprint and are likely to have effects on the surrounding communities and environment.
- Non-infrastructure or system-wide options (with no real footprint or need for route protection) were assessed via an effectiveness and value assessment to determine the best performing options. An assessment of the options’ effectiveness was carried out through assessment of the four investment objectives. In addition to the investment objectives assessment, the non-scored criteria were considered in relation to Stakeholder Feedback, Policy Analysis and Value for Money considerations.

### 3.2.3 Recommendations

**Table 4** provides an overview of the longlist options assessed, recommended options and reasoning for progressing options to the shortlist. The Option Guide in **Appendix A** shows how the options developed during the longlist phase led to the options developed in the shortlist phase (as well as the eventual recommended option for each project).

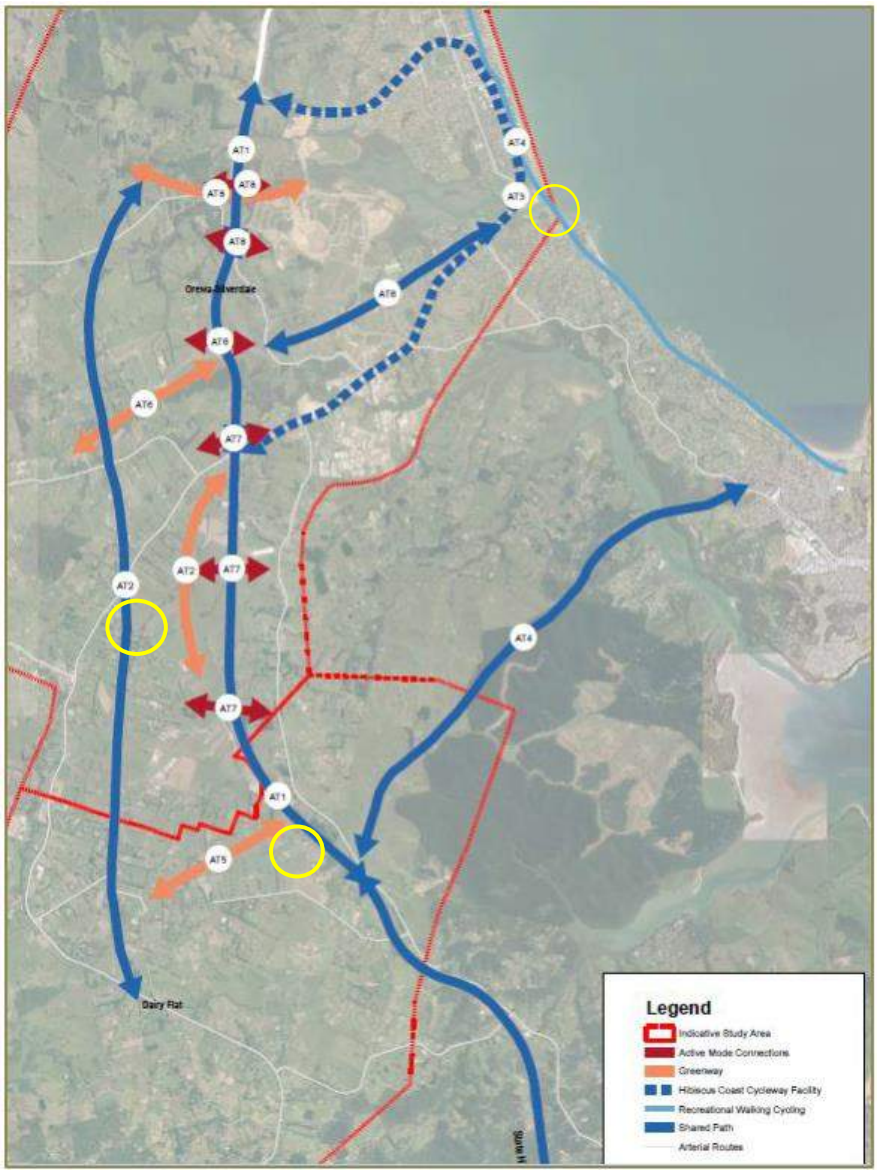
**Table 4: Longlist Corridor Assessment Recommendations**

| Options | Assessment Recommendations |
|---|---|
| **RT Corridor: Albany to Silverdale**<br>Options progressed to short list: MT1a and MT2a |  |
| | Reasons for selection for short list:<br>• MT1a (SH1 alignment) – performs highest overall (along with MT2a) across all investment objectives. MT1a is more accessible and attractive to the catchments from Silverdale north as it provides a more direct route. |

| Options | Assessment Recommendations |
|---|---|
| | • MT2a (FUZ alignment) – more accessible and attractive to the future Dairy Flat FUZ and has greater potential to integrate with new development, including proposed future business area in Silverdale West.<br>• The remaining options were not progressed to short list because:<br>  ○ MT3 had severance issues on existing communities and less resilience as it requires retro-fitting an existing corridor.<br>  ○ MT4 was too indirect and conflicted with East Coast Road's connectivity at Albany.<br>  ○ MT5 was not as accessible, was less direct and has reduced resilience from existing access points and constraints. |
| **RT Corridor: Silverdale to Grand Drive**<br>Option progressed to short list: MT1b-d (SH1 alignment) |  |
| | Reasons for selection for short list:<br>• MT1b-d[2] (SH1 alignment) – performed the highest overall (compared to option MT2b-d – FUZ alignment and MT6 -Grand Drive/Hibiscus Coast Highway) as it would provide the most direct and attractive route and is accessible to catchments on both sides of SH1. It is also more resilient. |

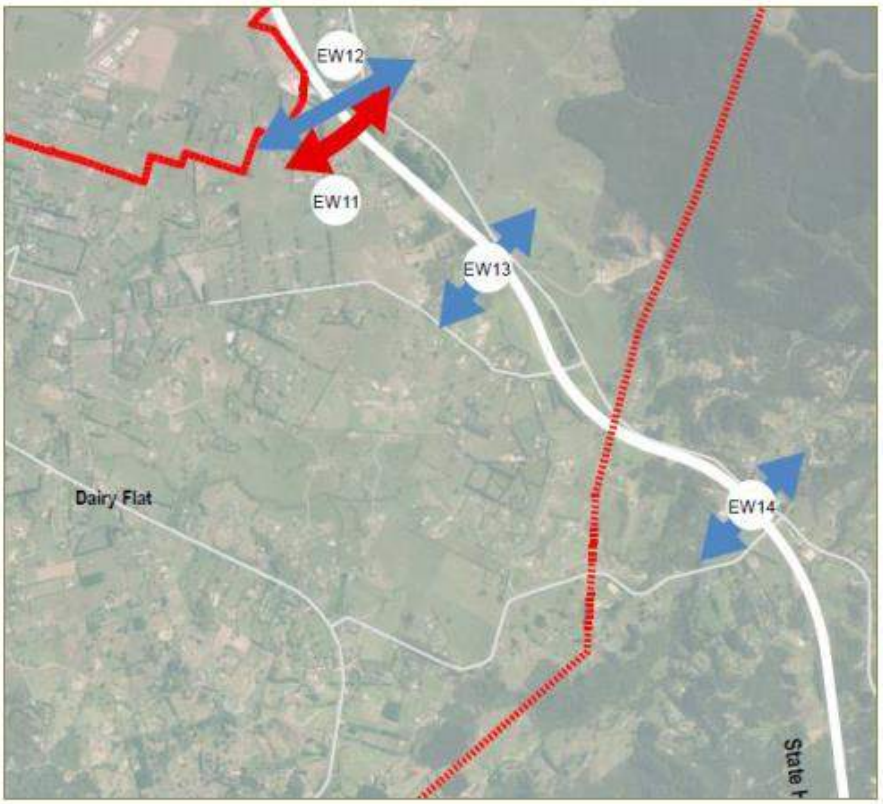
[2] MT1b runs from Silverdale Interchange to Milldale, MT1c from Milldale to Grand Drive and MT1d from Grand Drive to Ōrewa.

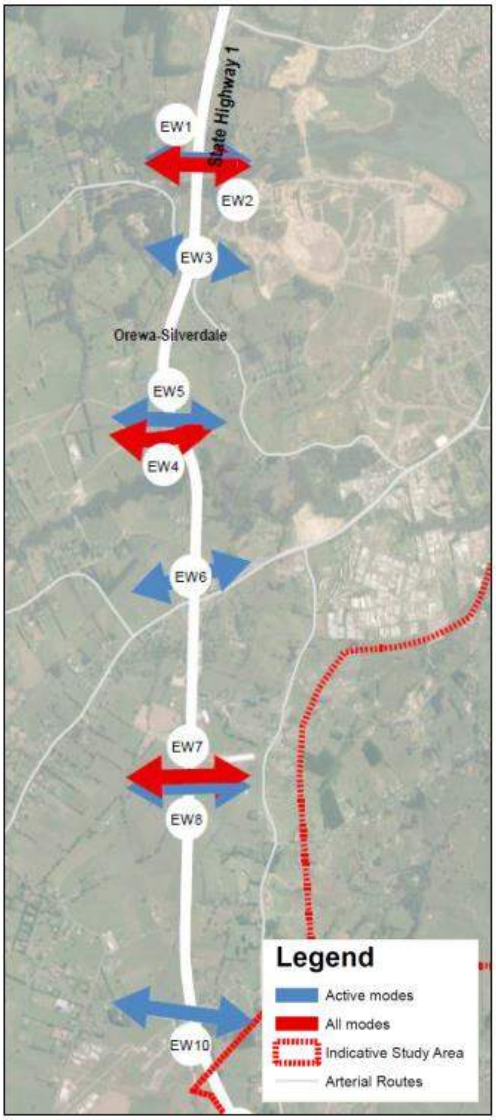
| Options | Assessment Recommendations |
|---|---|
| | • The remaining options were not selected because MT2b-d is less direct and less accessible to the catchment on the eastern side of SH1. MT6 is less direct and less resilient, involving retrofitting of an existing corridor. |
| **State Highway Interchanges**<br><br>Options progressed to shortlist:<br><br>IC3, IC4, IC5b, IC7 |  <br><br>Reason for selection for shortlist:<br><br>• IC3 (Wilks Road full interchange)- Scored well against investment objectives. Option needed to be investigated in more detail. There was a noted interdependency with the industrial land that the proposed Wilks Road interchange would serve. |

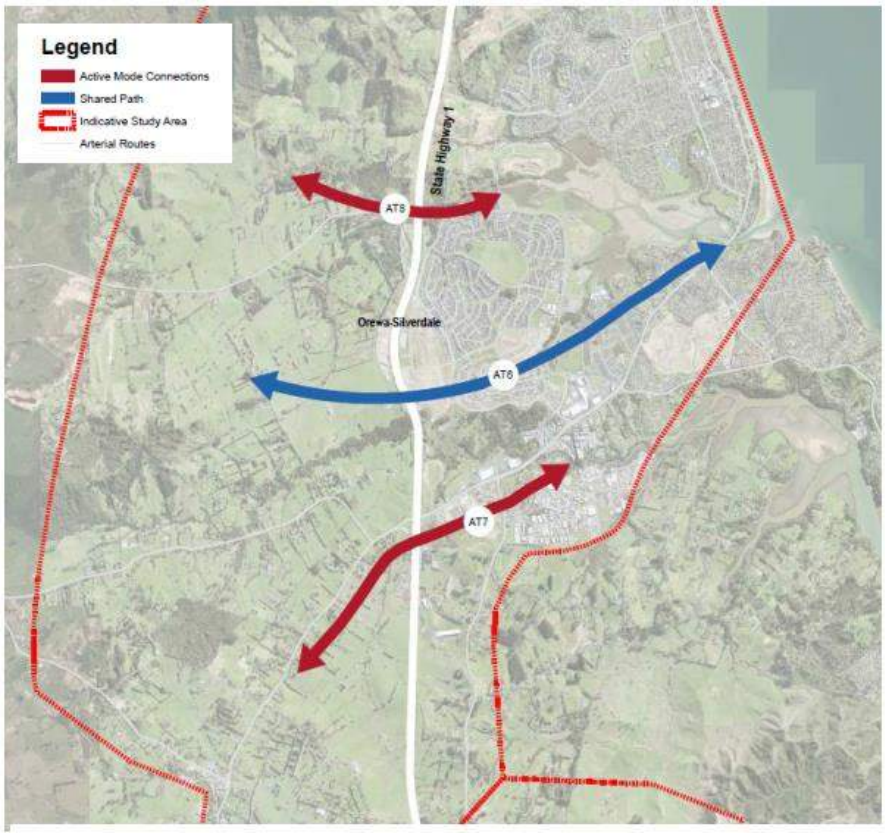
| Options | Assessment Recommendations |
|---|---|
| | • IC4 (Wilks Road south-facing ramps only) – Scored well against investment objectives. It would provide key access to SH1 for Silverdale West business areas and needed to be investigated in more detail.<br>• IC5b (Ō Mahurangi Penlink north-facing ramps and Wilks Road SH1 interchange moved north) –Scored well against investment objectives. Provides access further south than Silverdale SH1 interchanges for the Dairy Flat residential area.<br>• IC7 (Silverdale upgrade) This option scored lower than IC3, IC4, and IC5b against investment objectives, but supports proposed business land by improving access to the SH1 network for freight trips. It will also provide opportunities for housing and future development.<br>• Options that did not proceed to short list were IC1, IC2, IC5 and IC6. This was because they either did not perform well against investment objectives, did not provide adequate levels of accessibility or they undermined mode shift objectives. |
| **North South Strategic cycle connections**<br><br>Options progressed to shortlist: All (AT1, AT2 and AT3) |  <br>Reasons for selection for shortlist: |

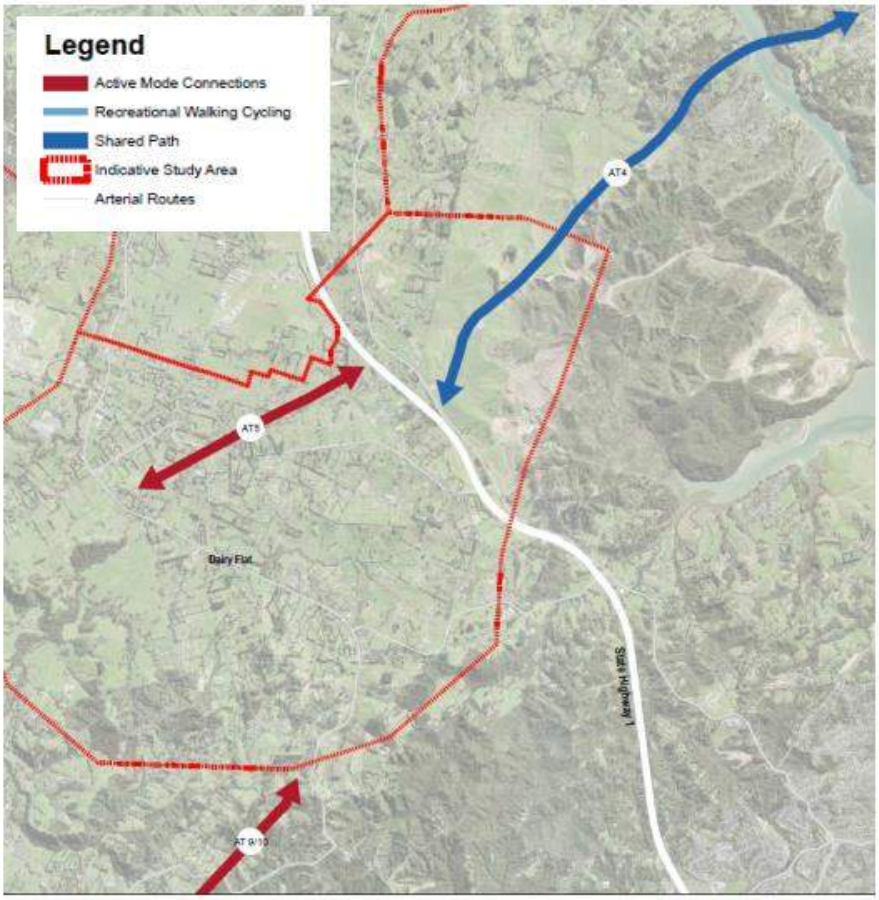
| Options | Assessment Recommendations |
|---|---|
| | All options (AT1- Albany and Grand Drive interchange, AT2- shared path through FUZ from Albany to Silverdale and AT3-Hibiscus Coast Highway and Grand Drive active mode facility) performed well against the investment objectives and scored well for value for money. No high or significant adverse effects were recorded in the MCA. Further investigation and testing was needed to be undertaken before any option could be dropped (if necessary). |
| **Strategic Road Connections**<br><br>Options progressed to shortlist:<br><br>SR1-SR4, SR6, SR6a, SR7, SR7a, SR8a, SR9a, SR11, SR12, SR13, SR14, SR16 |  |
| | Reasons and recommendations for selection for shortlist:<br><br>• SR1-SR4 (SH1 bus shoulder lanes) – all options were identified under Auckland Transport Alignment Project (ATAP) as interim solutions and needed further analysis. |

| Options | Assessment Recommendations |
|---|---|
| | • SR6 (SH1 additional capacity Albany to Ō Mahurangi Penlink) – progressed as it would increase vehicle throughput and resilience of SH1.<br>• SR6a (SH1 additional capacity as managed lane Albany to Ō Mahurangi Penlink) – this option performed better than additional capacity for general traffic but needed investigation into how it would operate effectively.<br>• SR7 (SH1 additional capacity Albany to Silverdale) – this option would increase access and resilience of SH1 but would depend on additional capacity being provided elsewhere in the network (e.g. Dairy Flat Highway, East Coast Road) and had inter-dependencies with the Ō Mahurangi Penlink project, which required further analysis.<br>• SR7a (SH1 additional capacity as managed lane Albany to Silverdale) – performed better than additional capacity for general traffic but needed further investigation into how it would operate effectively.<br>• SR8a (additional managed lane SH1 Albany to Wainui Road interchange) – performed better than additional capacity for general traffic but needed investigation into how it would operate effectively and its need.<br>• SR9a (SH1 additional capacity as managed lane Albany to Grand Drive) – performed better than additional capacity for general traffic but needed investigation into how it would operate effectively.<br>• SR11 (Dairy Flat Highway upgrade), SR12 (East Coast Road upgrade) – both performed well against the objective of providing resilience to the strategic network.<br>• SR13 (SH1 safety upgrade) –Will improve SH1 resilience. Safety upgrades may be implemented across all projects in the programme.<br>• SR14 (Coatesville-Riverhead Highway) and SR16 (Kahikatea Flat Road) – the form for these options needed to be confirmed. The assessment confirmed a lower level upgrade was likely.<br>• Reasons other options were discounted are as follows:<br>  ○ SR5 - because this option could be accommodated within the existing Ō Mahurangi Penlink designation if required and therefore there was no need to progress this option to the short list.<br>  ○ SR8 - performed poorly against investment objectives.<br>  ○ SR9 - performed poorly against the mode share objective.<br>  ○ SR10 - would have significant impacts and does not align well against strategic policy direction.<br>  ○ SR15 (Green Road)- would have required a significant amount of work to resolve the tight road geometry which would result in additional adverse effects and the option running through an SEA. |

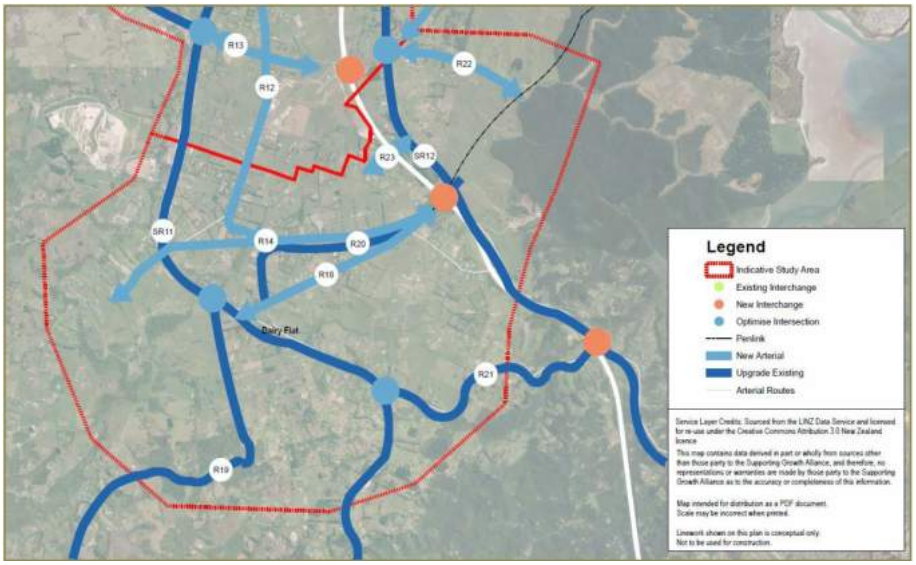
| Options | Assessment Recommendations |
|---|---|
| **East West Motorway crossings (Dairy Flat)**<br>Options progressed to shortlist:<br>EW11, EW13 |  |
| | Reasons for selection for short list:<br>• EW11 (Dairy Stream) – an all-mode crossing was preferred over an active mode (EW12) crossing. Provides an important connection between the eastern and western FUZ areas in Dairy Flat for all modes.<br>• EW13 (Redvale Ō Mahurangi Penlink) – provides access benefits through provision of a connection with active mode facilities provided through Ō Mahurangi Penlink.<br>• EW12 was not progressed to short list as an all modes crossing was preferred over an active mode crossing. EW14 active mode crossing was not progressed as the demand is unlikely to warrant the project and it is located outside of the urban boundary. |

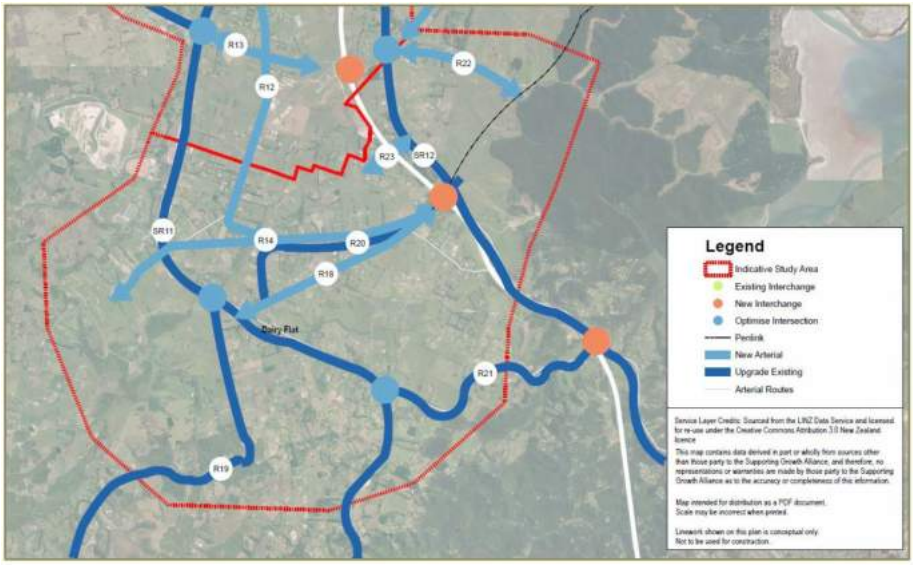
| Options | Assessment Recommendations |
|---|---|
| **East West Motorway crossings (Ōrewa / Silverdale)**<br><br>Options progressed to shortlist:<br><br>EW1 & EW2, EW3, EW4, EW6, EW7, EW10 |  <br><br>Reasons for selection for shortlist:<br><br>• EW1 & EW2 (Kōwhai Road crossing) – while an all-mode crossing had a higher impact, it provided increased benefits. Required further investigation in shortlist phase.<br>• EW3 (Wainui) – no significant adverse effects were identified and performance against investment objectives was positive.<br>• EW4 (Milldale to Highgate crossing) – an all-mode crossing was preferred as it was considered to support Auckland Council's land use aspirations.<br>• EW6 (Silverdale crossing) – no significant adverse effects were identified and performance against the investment objectives was positive.<br>• EW7 (Spur Road crossing) – an all-mode crossing was preferred. Due to land use in this location an all-mode crossing will better meet demand.<br>• EW10 (Wilks Road crossing) – no significant adverse effects were identified and performance against the investment objectives was positive.<br>• EW5 and EW8 did not proceed to the short list because they were not considered to be aligned with Auckland Council's land use aspirations. |

| Options | Assessment Recommendations |
|---|---|
| **East West strategic cycle connection (Ōrewa / Silverdale)**<br><br>Options progressed to shortlist: all (AT6, AT7 and AT8) |  |
| | Reasons and recommendations for selection for shortlist:<br>• AT6 provides a key connection between Milldale and the existing Silverdale town centre.<br>• AT7 will bring localised access improvements including a key connection between the existing Silverdale Town Centre and employment in Silverdale West. Consideration should be given to whether AT7 could be provided on an arterial road via separated cycle facilities.<br>• AT8 would provide a key connection between Milldale and the existing Ōrewa area. |

| Options | Assessment Recommendations |
|---|---|
| **East West strategic cycle connections (Dairy Flat)**<br>Options progressed to shortlist:<br>AT4 and AT5 |  |
| | Reasons for selection for short list:<br>• AT4 (Ō Mahurangi Penlink cycle facility) – Performed well against investment objectives. It provides a high quality strategic access for residents of Whangaparāoa by connecting to the industrial employment area.<br>• AT5 (east-west connection at Dairy Flat) – Performed highest against investment objectives. Will provide an important facility to encourage active modes in the Dairy Flat area. AT5 will provide a key connection between Dairy Flat town centre and strategic corridors (including RT).<br>• The remaining options AT9 and AT10 did not progress to the short list due to their lack of contribution to the investment objectives for the study area. |

| Options | Assessment Recommendations |
|---|---|
| **Arterial Roads (Ōrewa / Silverdale)**<br>Options progressed: R6, R7, R8 R9, R10, R11, R12, R13, R16, R17, R24, R26 |  |
| | Reason for selection for shortlist:<br>• R6 (Wainui Road to Grand Drive Interchange) – this option brings improvements around the Milldale area. The need for this link to be an arterial road needed further investigation at shortlist.<br>• R7 (Pine Valley Road (PVR) to Wainui Road)- While stakeholders suggested removal of this option as it is to be delivered by developers, it was decided to test the proposed alignment within the shortlist to ensure it meets the long-term transport functional need.<br>• R10 (widening PVR within FUZ) and R11 (Dairy Flat Highway (DFH)/PVR intersection to PVR) – the options are likely to improve access at a smaller scale; it enhances access to the west of the FUZ area.<br>• R12 (North-South Postman Road)- Provides key roading connections/upgrades within the growth area.<br>• R13 (DFH/Kahikatea Road) – Stakeholders questioned the need for R13 as it could be delivered through the structure planning process; however, it was considered that R13 is an important potential element in the transport network that required testing in the shortlist. |

| Options | Assessment Recommendations |
|---|---|
| | • R16 (Curley Avenue extension to the proposed Milldale/Highgate motorway crossing) – Although this option was identified as having relatively high adverse environmental impacts and potential construction costs/risks, it scored well in relation to the investment objectives and some stakeholders were strongly in support of the option, so it was taken through to shortlist to investigate these outcomes in more detail.<br>• R17 (Wēiti River connection: Curley Avenue extension to Brian Smith Drive) – has good benefits (performance against objectives) but had potentially high impacts in relation to environmental values. The option was taken through to the shortlist to investigate these outcomes further.<br>• R24 (Widening DFH between Silverdale and the end of FUZ area) and R26 (Widening East Coast Road – Hibiscus Coast Highway to end of FUZ area) – shortlisted as it would provide key roading connections/upgrades within the growth area.<br>• Options that did not proceed to the short list include R15, R8a and R10a. This was because R15 extended outside the rural urban boundary, it did not integrate with Council's land use aspirations, and therefore performed negatively against Investment Objectives and scored poorly against the wellbeing criteria. R8a and R10a did not proceed as the upgrading of rural roads is to be taken through as a programme-wide design principle. |
| **Arterial North South connections (Dairy Flat)**<br><br>Options progressed to shortlist:<br><br>R12, R21, R23, R24, R26 |  <br><br>Reasons for selection for shortlist:<br><br>• R12 (Postman Road) – this is a key north-south route through the future urban area. No significant adverse effects were identified and performance against the investment objectives was positive.<br>• R21 (Upgrade of Awanohi Road) –the road may need some level of upgrading in terms of safety improvements but may not need to be a full arterial. Safety options therefore needed to be considered at the next stage. Also, if no motorway interchange were provided in this location, the option could be required.<br>• R23 (New north-south arterial between Redvale (Ō Mahurangi Penlink) and Coatesville Riverhead Highway)- was selected to be further tested at the shortlist stage as there was a remaining question as to whether there would be demanded to warrant an arterial road.<br>• R24 (Upgrade of existing Dairy Flat Highway) – widening of the existing road (R24) was preferred to an offline version (R25) due to reduced cost and reduced impacts. |

| Options | Assessment Recommendations |
|---|---|
| | • R26 (Upgrade of East Coast Road) – Scored high in terms of performance in promoting strategic transport links across future urban areas, but the form of this upgrade needed confirming in the shortlist assessment.<br>• R25 was not progressed to the short list due to increased cost and impacts over option R24 for the Upgrade of the existing Dairy Flat Highway. |
| **Arterial East West connections (Dairy Flat)**<br>Options progressed to shortlist: all (R14, R18, R20, R22) |  |
| | Reasons for selection for short list:<br>• R14, R18 and R20 (East West arterials in Dairy Flat)- would promote a strategic link between SH1 and the future urban area of Dairy Flat, therefore positively providing the opportunity to support future housing and urban development in this area.<br>• R22 (arterial route between Wilks Road and Ō Mahurangi Penlink) –the option had strong access benefits but there were some noted interdependencies on the decision about a motorway interchange at Wilks Road (which may affect whether this road is required as an arterial. In addition, there it was a noted interdependency with the alignment/location of the RTN options and their form that needed further testing. |

## 3.3 Shortlist Corridor Assessment

At the shortlist stage, options underwent a refinement and grouping process. Public consultation was undertaken, and feedback considered in the assessment. Key Project Partners (Auckland Council and Manawhenua) were involved in the shortlist evaluation and an initial shortlist was developed. Sections 3.3.1 and 3.3.2 below, and the Options Guide in **Appendix A**, provide more detail on shortlist development and assessment.

### 3.3.1 Shortlist Option Development

Following the recommendations on the initial shortlist, the project team refined the shortlist of options to enable further testing and evaluation of the options. Development of the shortlist of options followed the process in **Figure 5** below. The results of the shortlist refinement are summarised in **Table 5**.

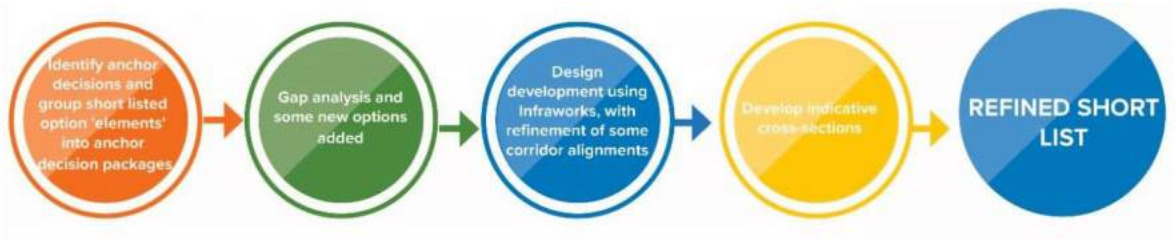



**Figure 5: Shortlist development process**[3]

**Table 5: Refined shortlist**

| Option groupings/ Key decision | Shortlist Option |
|---|---|
| Mass transit corridor – southern section (Albany to south of Bawden Road) | MTS-1, MTS-2, MTS-3, MTS-4 |
| Mass transit corridor – middle section (south of Bawden Road to south of Silverdale SH1 interchange) | MT1-1, MT1-2, MT2-1, MT2-2, MT2-3; and<br>MT1-3, MT1-4, MT1-5 (these were new options added that were not originally in the longlist) |
| Mass transit - northern section (south of Silverdale SH1 interchange to Milldale station) | MTN-1, MTN-2, MTN-3; and<br>MTN-4, MTN-5, MTN-6, MTN-7, MTN-8 (these were new options added that were not originally in the longlist) |
| Mass transit – Grand Drive Extension | MTG-1, MTG-2; and<br>MTG-3 (this was a new option added that was not originally in the longlist) |
| Mass transit – Hibiscus Coast connection | MTH-1, MTH-2, MTH-3 |
| Motorway interchanges | IC7-1, IC4-1, IC3-1, IC3-2, IC5-1, IC5-2, IC5-3 |
| Strategic north-south cycle routes | AT1-1, AT1-2, AT1-3 |
| Strategic road connections | SR1-1, SR2-1, SR3-1, SR4-1, SR11-1, SR12-1, SR6-1, SR7-1, SR8-1, SR9-1, SR14-1, SR16-1 |
| Curley Avenue connection | R16-4, R16-5; and<br>R16-2, R16-3 (these were new options added that were not originally in the longlist) |
| Wainui North connectivity | EW1-1, EW1-2, EW1-3, EW2-1, EW2-2, EW2-3 |
| East West strategic cycle connections | AT4-1, AT5-1, AT7-1 |
| East West motorway crossings | EW3-1, EW4-1, EW6-1, EW7-1, EW10-1, EW11-1, EW13-1 |

[3] Infraworks is a software tool that presents a visualisation of designs and enables visual evaluation of design concepts.

| Option groupings/ Key decision | Shortlist Option |
|---|---|
| Arterial road connections | R6-1, R6-2, R7-1, R7-2, R8-1, R10-1, R12-1, R12-2, R13-1, R20-1, R20-2, R20-3, R20-4, R21-1, R22-1, R23-1, R24-1, R26-1 |

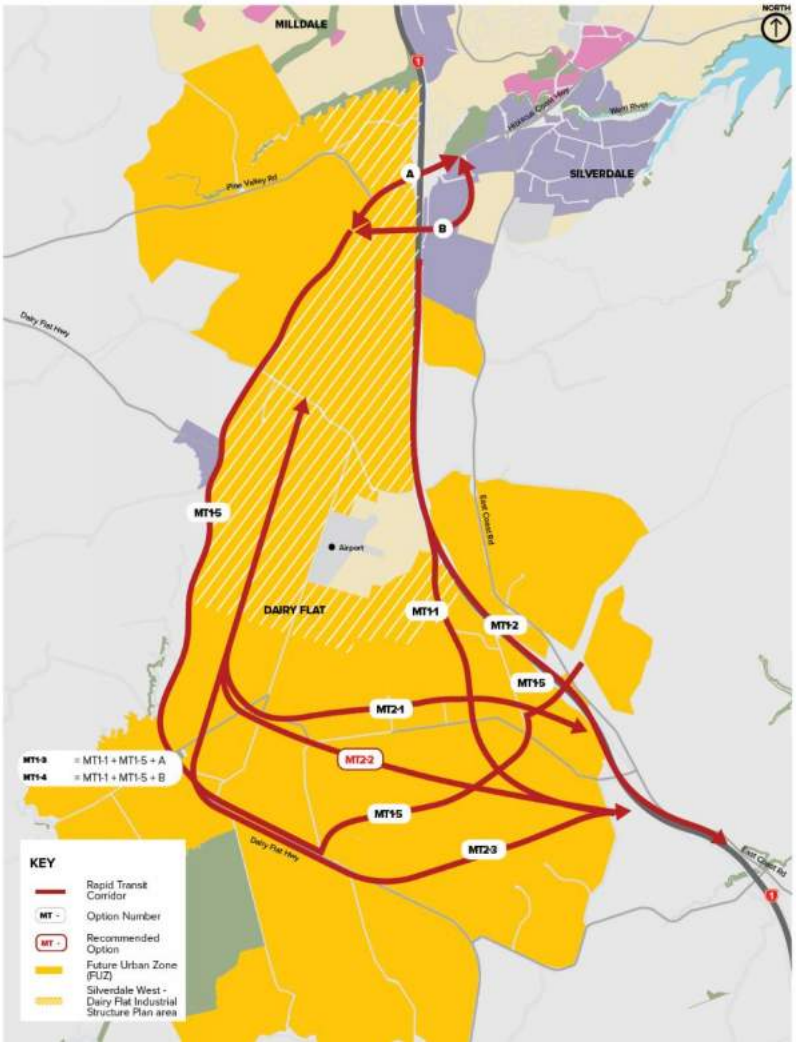
### 3.3.2 Shortlist Option Assessment

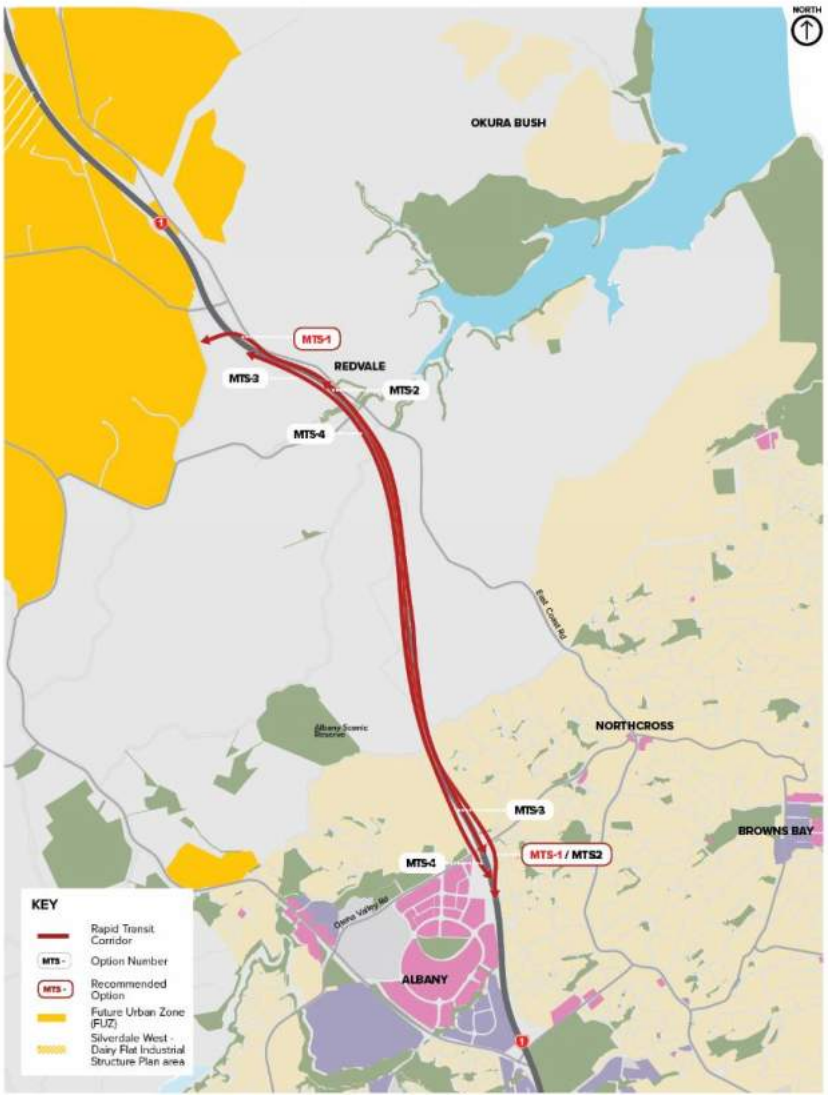
During the shortlist phase, the MCA Framework outlined in section 2.2 above was applied to assist to provide information and assess the options. The assessment of the criteria was at a more detailed level than the longlist evaluation and included qualitative analysis of investment objectives, costs, cultural, social, environmental, economic and value for money criteria. Auckland Council and Manawhenua, as project partners, were also involved in the assessment and decision-making process. Additional input was also considered from the IBC engagement phase which was undertaken between 16 August and 7 September 2018.

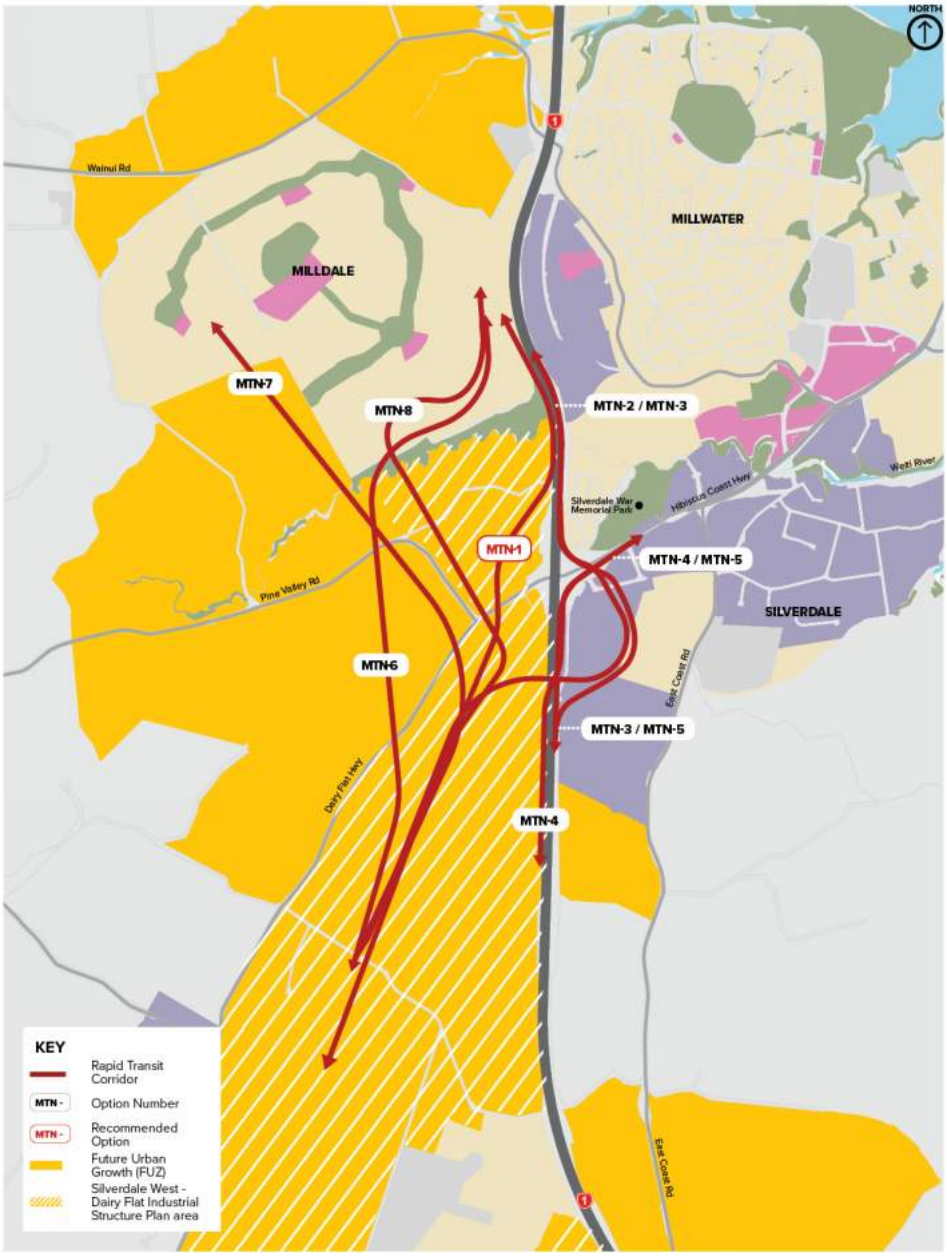
### 3.3.3 Recommendations

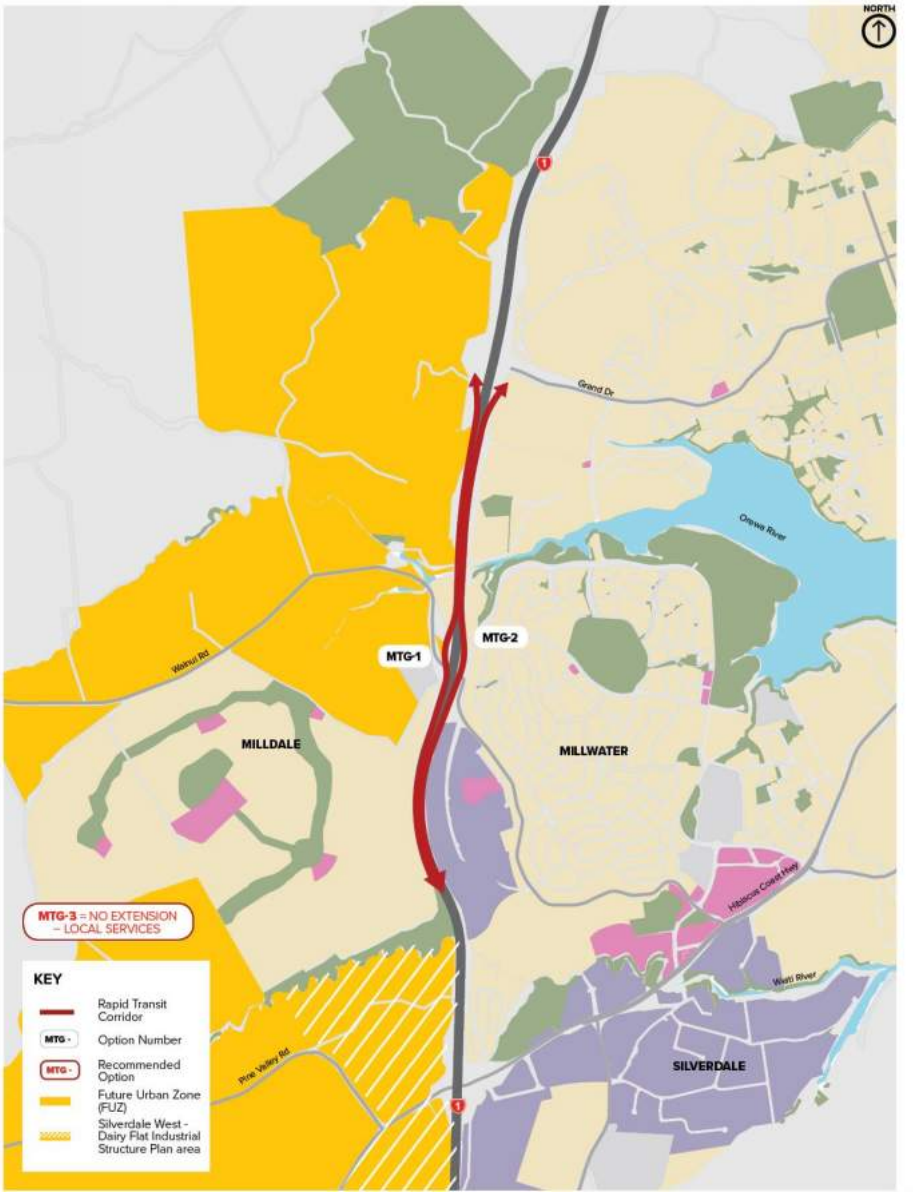
**Table 6** provides an overview of the options and recommended options along with reasoning for identifying the preferred corridors. The Options Guide in **Appendix A** shows how the options developed during the shortlist phase led to the recommended option for each project to be taken through to the DBC phase.

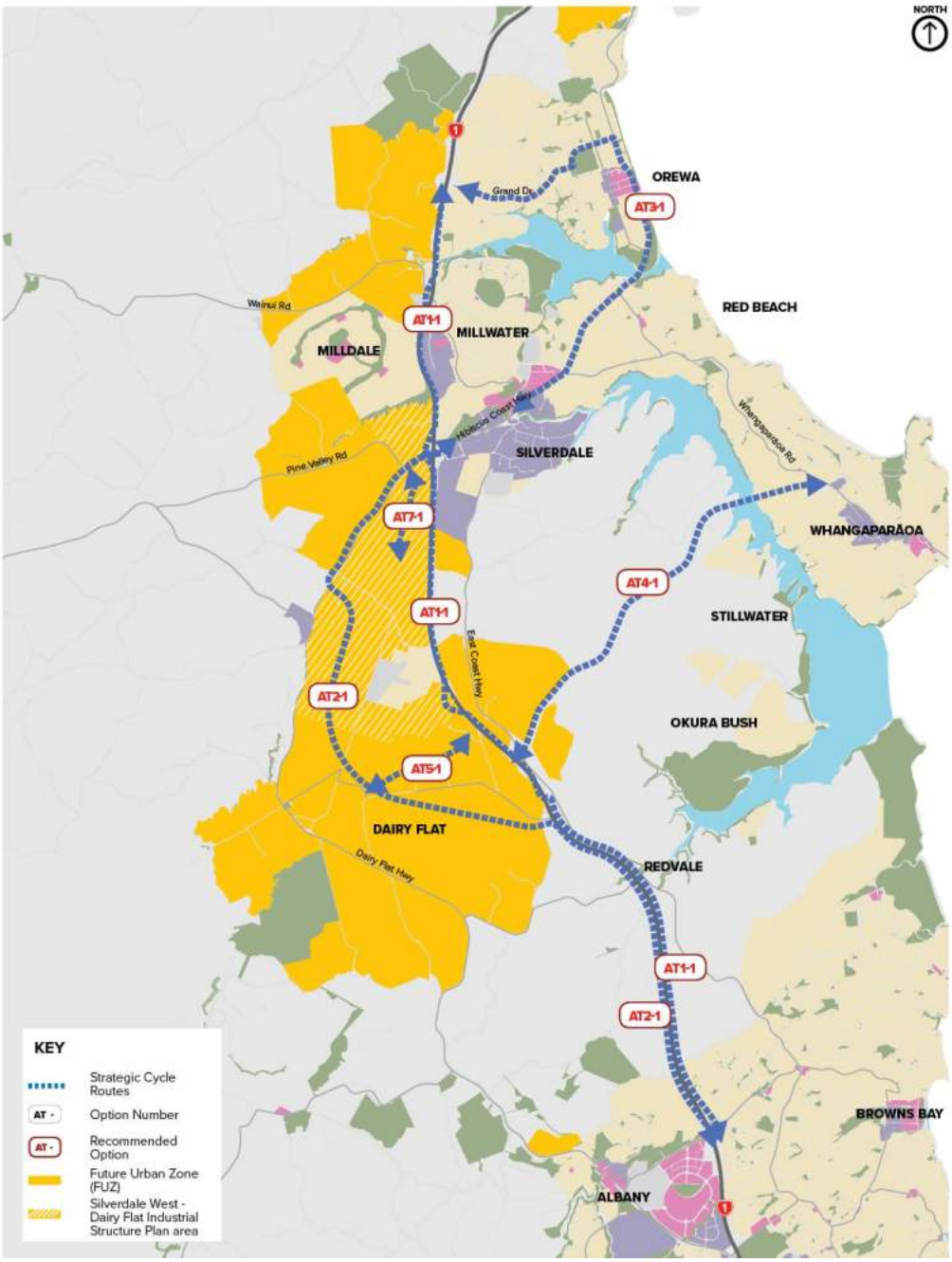
### Table 6: Shortlist Corridor Assessment Recommendations

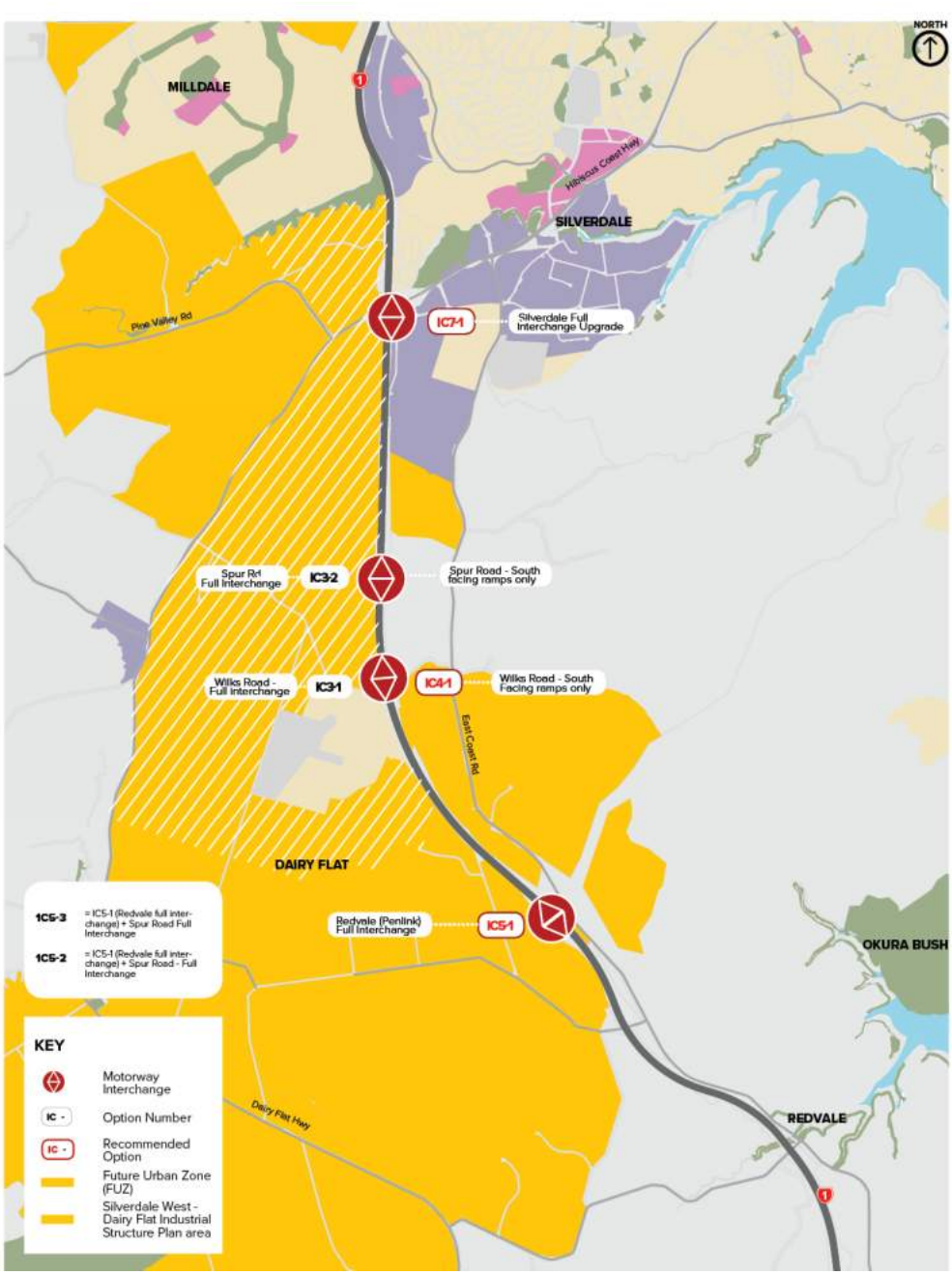
| Options | Assessment Recommendations |
|---|---|
| **RT corridor – middle section (south of Bawden Road to south of Silverdale SH1 interchange) – 8 options**<br><br>Option progressed: MT2-2 – High speed FUZ corridor – central town centre |  <br><br>MT2-2 was recommended. This option assumed a high-speed RT alignment through the FUZ, enabling growth of the Silverdale West and Dairy Flat growth areas, including:<br>• Higher speed/lower access through the proposed industrial area<br>• Grade separated crossings with arterial and collector roads.<br><br>Opportunity for a high quality/separated facility with improved accessibility and lower speed around a Dairy Flat town centre in the middle portion of the FUZ. The option scored very well against the investment objectives, reflecting a high level of accessibility to jobs; very good integration with the pace, scale and form of Council's land use aspirations; and very good patronage and mode shift outcomes.<br><br>No high or significant adverse effects were identified against the environmental, social, cultural and economic wellbeing criteria, with positive urban design and social opportunity scores for the MT2-2 FUZ corridor.<br><br>Overall, the option best enables and supports growth in the Northern growth area and strikes the best balance between the key differentiating attributes, as follows:<br>• Transport benefits, including ridership/patronage and travel time benefits. |

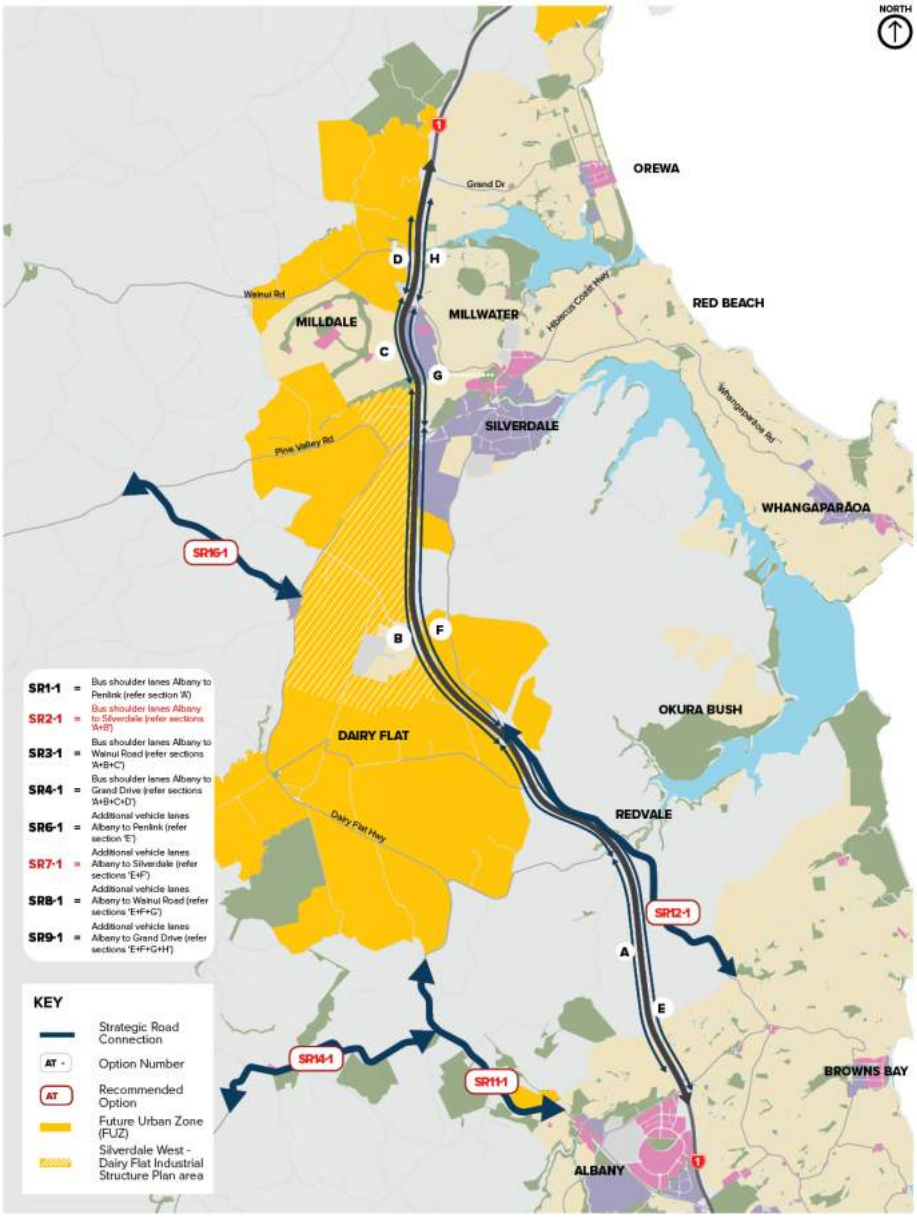
| Options | Assessment Recommendations |
|---|---|
| | • Land use opportunity, including opportunity for transit-oriented development and good urban design outcomes.<br>• Flexibility, including stage ability, ability to integrate with the North Shore RT, and flexibility to respond to changes in land use assumptions.<br>• Cost and benefit cost ratio (BCR) – although not the lowest cost option, this option shows good economic benefits considering the ratio of costs to benefits.<br><br>Alternative options were not recommended because:<br><br>• MT1-1 and MT1-2 (SH1 options) would attract fewer people to use the service and do not provide the same level of land use integration opportunity as the FUZ options.<br>• MT1-5 would not serve existing communities well with a noticeable increase in travel time over alternate, higher speed options.<br>• The high-speed FUZ options (MT2-1, MT2-2 and MT2-3) had limitations as to their urban design outcomes; however this could be most effectively mitigated for MT2-2 resulting in it being the recommended option over MT2-1 and MT2-3. |
| **RT corridor – southern section (Albany to south of Bawden Road)**<br><br>Option progressed: MTS-1 – Motorway corridor east (with crossing). |  |

| Options | Assessment Recommendations |
|---|---|
| | MTS-1 was recommended as it avoids some potentially significant adverse effects on SEAs and associated environmental and cultural values. This option will connect the Northern growth area to the existing RT at Albany.<br><br>The option ties-in well with the recommended option for the RT middle section (MT2-2 above).<br><br>The other options (MTS-2, MTS-3 and MTS-4) were not recommended principally because of their impacts on the SEA to the west while also not performing as well as MTS-1 for in relation to effects and contributions towards the investment objectives. |
| **RT Corridor – northern section (south of Silverdale SH1 interchange to Milldale Station)**<br><br>Option progressed: MTN-1-Pine Valley Station and motorway corridor west |  <br><br>Option MTN-1 was recommended as it scored very well against the investment objectives, recognising that it: provides additional catchment for a new Milldale Station including Milldale and Millwater (serving both sides of the Motorway); provides good resilience by increasing the availability of strategic corridors; integrates well with the proposed development at Milldale; and |

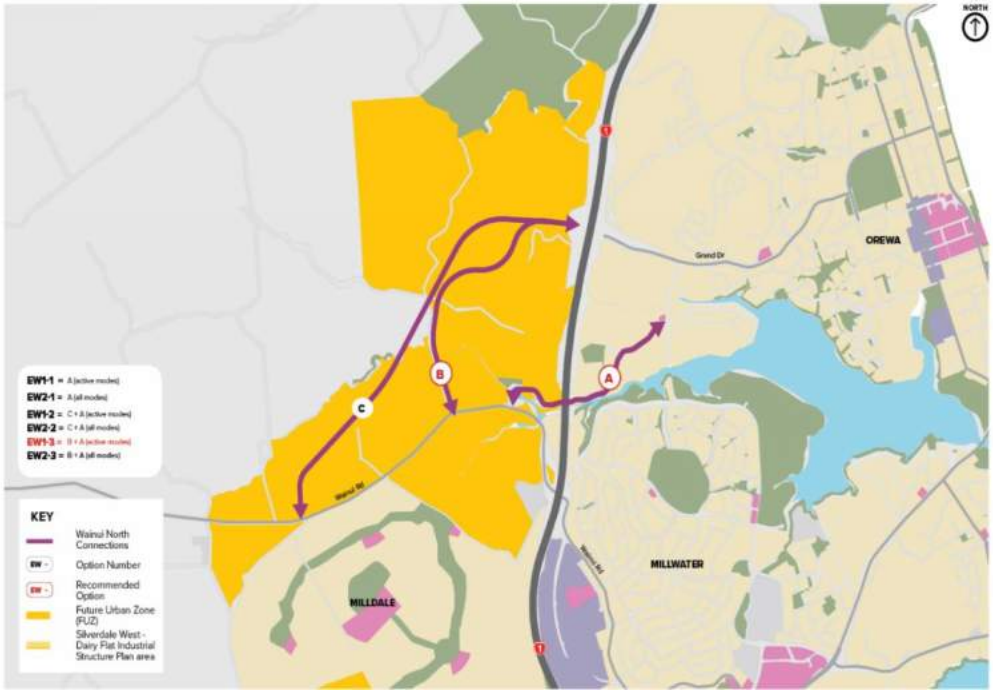
| Options | Assessment Recommendations |
|---|---|
| | provides additional travel choice for the local catchment. The option also ties in well with the decisions on other parts of the RTC.<br><br>The option scored most positively overall, particularly in relation to social wellbeing, transport and urban design benefits.<br><br>The remaining options were not recommended principally because they either did not align well with the Rapid Transit Corridor at Albany and the Rapid Transit Corridor to the west of the State Highway north of Awanohi Road, or because of their impacts on the SEA to the west and associated environmental and cultural values. |
| **RT corridor – Grand Drive extension**<br><br>Option progressed: MTG-3 (no extension – local services) |  <br><br>Option MTG-3 was recommended, which assumes a new Milldale Station is the terminus of the RT corridor. Connectivity to the north of Milldale would be provided via local bus services.<br><br>Option MTG-3 was recommended as local services to Grand Drive can achieve a good level of accessibility and connectivity for the areas. The local bus network remains relatively similar |

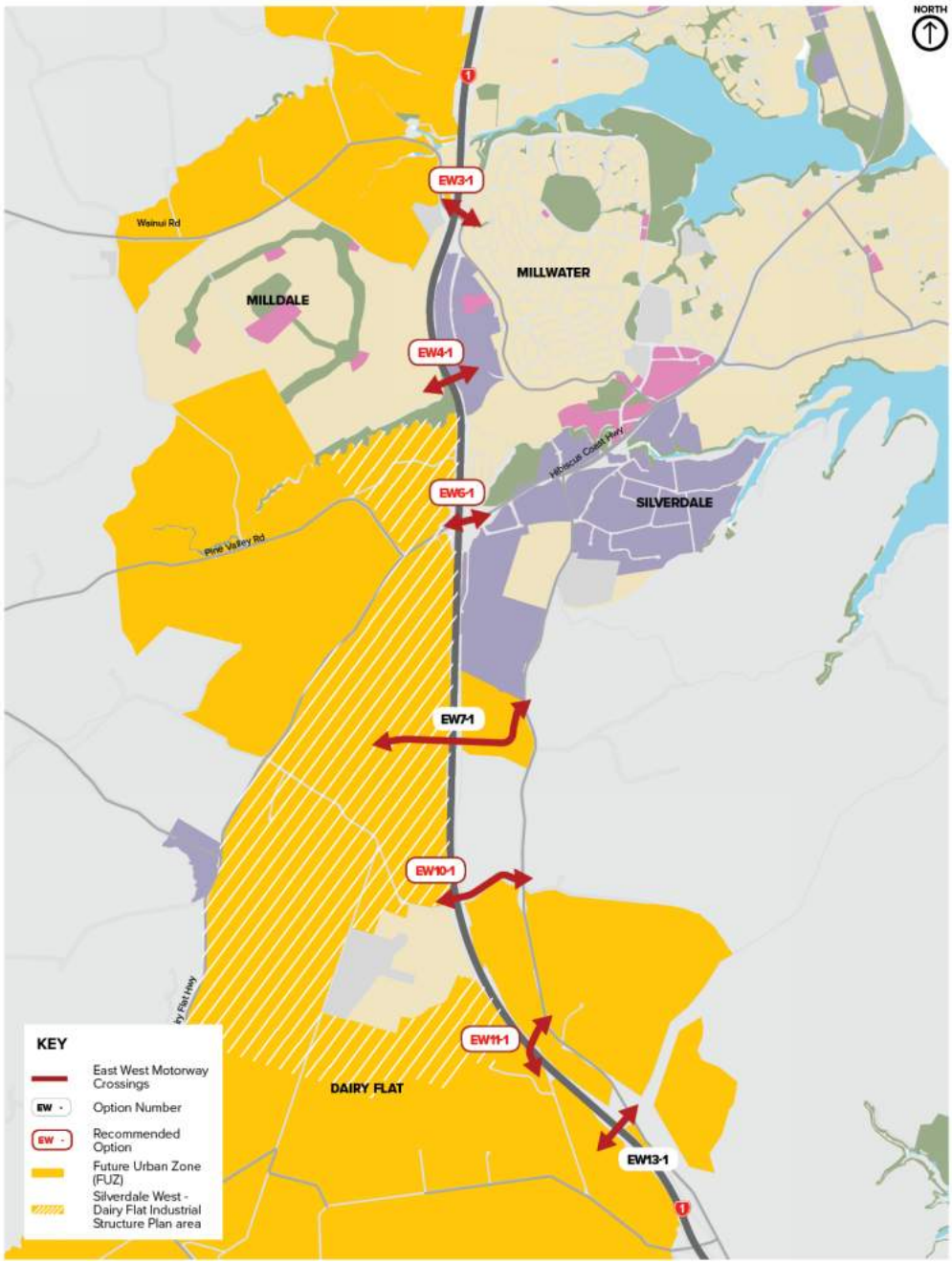
| Options | Assessment Recommendations |
|---|---|
| | whether the RT extends to Grand Drive or not and provides a good level of accessibility to an RT station at Milldale.<br><br>The remaining two options MTG-1 and MTG-2 did not show sufficient transport benefits for their relative costs of implementation. They would also need to traverse challenging topography and would have high environmental impacts (crossing Ōrewa River and impacting SEAs). Therefore these options were not recommended. |
| **Strategic cycling connections**<br><br>Options progressed: all 9 options |  <br><br>The recommended options include all three north-south option elements AT1-1 (shared parth along SH1), AT2-1 (shared path north-south route through FUZ from Albany to Silverdale), AT3-1 (Hibiscus Coast Highway/Grand Drive Cycle Facility, plus all three east-west option elements: AT7-1 John Creek riparian facility with tie-in North of Silverdale interchange, AT5-1: |

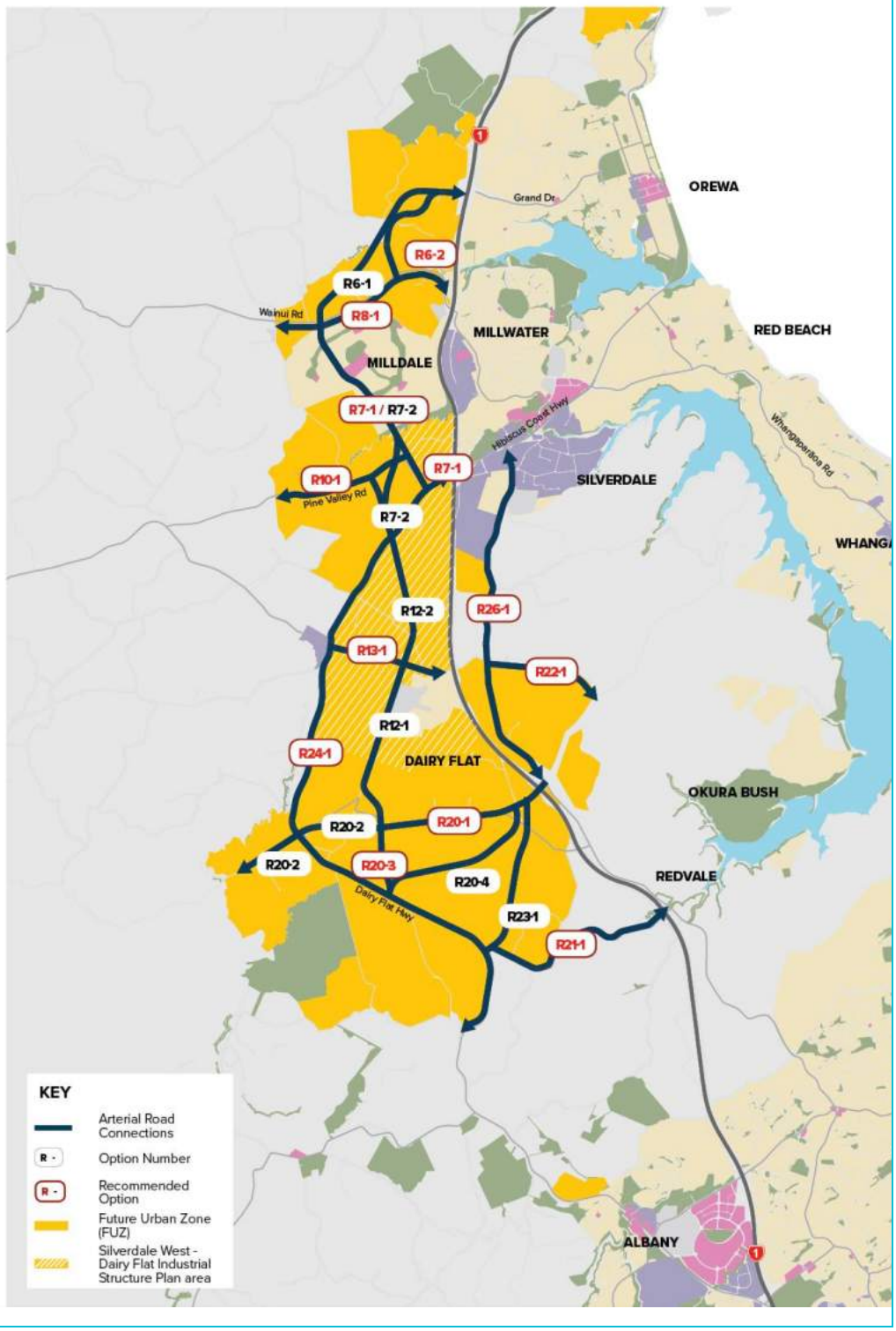
| Options | Assessment Recommendations |
|---|---|
| | East west - Dairy Stream (Dairy Flat to Redvale via riparian corridor), and AT4-1: Ō Mahurangi Penlink corridor cycleway.<br><br>These options were recommended as the connections perform positively in achieving the investment objectives and are considered necessary to achieve a significant shift away from private vehicles and towards active modes. All options would provide highly attractive and safe facilities with physical separation from arterial vehicle traffic. They would also provide significant benefits as they will connect between RT stations, employment sites and town centres. These connections are also critical for providing a complete strategic cycling network. |
| **Motorway interchanges**<br><br>Options progressed: 3 (IC7-1: Silverdale interchange capacity upgrade, IC4-1: Wilks Road south facing ramps only, IC5-1: Redvale (Ō Mahurangi Penlink) full interchange) |  <br><br><br>Reasons for selection of these options included: |

| Options | Assessment Recommendations |
|---|---|
| | • A Silverdale interchange upgrade was seen to have good benefits in enabling development in the short term (pre-Ō Mahurangi Penlink) and catering for cross connectivity in the longer term.<br>• Traffic modelling and investigations demonstrated improved levels of access when two sets of south-facing ramps are provided (i.e. Redvale/Ō Mahurangi Penlink and an additional site).<br>• South-facing only ramps at Wilks Road and a full interchange at Redvale (Ō Mahurangi Penlink) will provide good benefits to the wider and allow more local communities access to the SH1 strategic network.<br><br>The remaining options were not recommended because they either resulted in an increase in cost with only nominal benefits (such as the Wilks Road north facing ramps option) or, in the case of the Spur Road options, high impacts on land outside the RUB including visual and landscape effects and poor performance from a transport network perspective. |
| **Strategic road connections**<br><br>Options progressed: SR2-1,SR7-1, SR11-1, SR12-1, SR14-1, SR16-1 |  |

| Options | Assessment Recommendations |
|---|---|
| | The recommended options include SR2-1 (bus shoulder lanes Albany to Silverdale), SR7-1 (additional vehicle lanes Albany to Silverdale), SR11-1 (upgrade to Dairy Flat Highway (DFH)), SR12-1 East Coast Road (ECR) upgrade and SR14-1 (safety upgrade to Coatesville Riverhead Highway (CRH)) and SR16-1 Safety upgrade to Kahikatea Flat Road (KFR). Reasons for selection of these options include:<br>• The bus shoulder lanes on SH1 up to Silverdale provide a short- to medium-term staging option for improving reliability and travel time for public transport in the area. They will provide the function of connecting the study area with key destinations within and outside the study area.<br>• The additional motorway capacity between Albany and Silverdale will help retain the strategic function of SH1 in light of higher local demand from the communities in the study area. This option was selected over the other capacity options, as traffic modelling indicates that future demands north of Silverdale do not warrant extension further north.<br>• Upgrading Dairy Flat Highway and East Coast Road will provide strategic alternatives to SH1, linking the study area to the south.<br>• The Coatesville Riverhead Highway and Kahikatea Flat Road upgrades will have minimal impacts and are necessary to improve the safety of the roads as the population in the Northern growth area expands.<br>The remaining options were not recommended because either traffic modelling indicated future travel demands north of Silverdale do not warrant extension of SH1 capacity further north or because there are higher adverse impacts than other options. |
| **Curley Avenue connections**<br>Option progressed: R16-3 (use of existing roads with active mode only connection on Curley Avenue and Brian Smith Drive) |  <br>Option R16-3 was recommended as the option enhances permeability of the transport network, promoting a mode shift to walking and cycling by providing connection to the Hibiscus Coast Bus Station in the short/medium-term. The connection was recommended as it would support the recommended RT option in the short to medium-term, by unlocking benefits from early investment in the RT corridor through increased accessibility to the Hibiscus Coast Bus Station. The environmental impacts of a walking and cycling connection are also more likely to be able to be mitigated than an all modes connection. |

| Options | Assessment Recommendations |
|---|---|
| | The remaining options were not recommended because their benefits were considered to be outweighed by the high to very high environmental, cultural and costs of the project. |
| **Wainui North connectivity**<br>This analysed how connectivity of buses and active modes would work –i.e.: use of roads or another route.<br><br>Option progressed: EW1-3: Kōwhai Road active mode only crossing and strategic connection for buses between Wainui Road and Grand Drive |  <br>EW1-3 was recommended as it provides a high-quality walking and cycling route connecting into existing facilities around the Ōrewa River. The active mode only crossing at Kōwhai Road has high amenity, safety and access benefits for the adjacent residential catchments, and minimises effects on the Ōrewa River and adjacent properties.<br><br>An all-modes crossing was not recommended because it would have limited benefit and significant environmental impact. |

| Options | Assessment Recommendations |
|---|---|
| **East West Motorway crossings**<br><br>Options progressed: EW3-1, EW4-1, EW6-1, EW10-1, EW11-1 |  <br><br>Options progressed include: EW3-1: Wainui active mode only crossing; EW4-1: Milldale-Highgate all modes crossing; EW6-1: Silverdale active mode only crossing; EW10-1: Wilks Road active mode improvement; and EW11-1: Dairy Stream all modes crossing.<br><br>The reasons for selection of these options include:<br><br>• These crossings are important to service connectivity between communities and access to social and economic opportunities between and on both sides of the existing SH1.<br>• None of the recommended crossings have high environmental, social, cultural or economic impacts and, in combination, they provide a good level of mode shift encouragement, accessibility to and between communities, and suitably cater for expected travel demand. |

| Options | Assessment Recommendations |
|---|---|
| | Option EW7-1 was not recommended because it would provide the lowest overall contribution to investment objectives, has the highest environment impacts and scored lowest against the economic criteria. EW13-1 was not recommended because this crossing would be provided by both the Ō Mahurangi Penlink project and the interchange option IC5-1 (these providing a full interchange with all modes provided for). |
| **Arterial roads**<br><br>Options progressed:<br><br>R6-2, R7-1, R24-1, R26-1, R8-1, R10-1 R13-1, R21-1, R20-1, R20-3, R22-1 |  |

| Options | Assessment Recommendations |
|---|---|
| | Recommended options included R6-2: New collector - North-South Milldale to Grand Drive; R7-1: New arterial - North-South Pine Valley Road to Wainui Road; R24-1: Dairy Flat Highway between Silverdale to end of FUZ area; R26-1: East Coast Road Hibiscus Coast Highway to end of FUZ area; R8-1: Upgrade Wainui Road (within the FUZ area); R10-1: Upgrade to Pine Valley Road (within the FUZ area); R13-1: New arterial - East-West through industrial area; R21-1: Upgrade Awanohi Road (safety upgrade); R20-1: Bawden Road new arterial; R20-3: Bawden Road to Dairy Flat Highway; and R22-1: New arterial - Wilks Road Interchange to Ō Mahurangi Penlink via Jackson Way.<br><br>Reasons for selection of these options include:<br>• These arterial routes are necessary to allow the movement of people within and between the future growth areas, providing access to jobs and homes.<br>• Many of the arterial routes have interdependencies with the RT route and its form; therefore, the recommended RT corridor options were considered in this recommendation.<br>• All the recommended connections provide safe routes that cater for significant movement of people (all modes) between key points on the network.<br>• Less significant adverse environmental impacts than other options. Some other options have greater potential impacts on SEAs.<br>• Less stormwater implications to manage, minimise and mitigate the effects of runoff.<br>• Less significant adverse impacts on natural landscape character with less adverse visual impacts from nearby rural residential properties. |

# 4. Projects Progressed in the North DBC/NORs

Following the identification of the North ISTN and consideration of potential NOR packages as part of the IBC, the scope of the North Network for the DBC was confirmed, commencing with the North strategic projects in 2019 and North local projects in 2021. NOR packaging was confirmed once the NOR phase commenced in late 2022.

The North Projects that is the subject of this alternatives report comprises 14 projects as summarised in **Table 7** below. A small number of projects from the North ISTN were removed from the North Projects for the DBC as they have/will be delivered outside Te Tupu Ngātahi. Furthermore not all DBC projects are proposed to be route protected with NORs, as outlined in the table below.

**Table 7: Projects Progressed in North DBC/NoRs**

| Project | In scope for DBC | In scope for NORs (proposed for route protection) |
|---|---|---|
| Rapid Transit Corridor – Albany to Milldale (including new walking and cycling path along RTC) | Yes | Yes - NOR 1 including two new stations at Milldale and Pine Valley Road (NORs 2 and 3) |
| Upgrades to SH1 (3-laning, new Wilks Interchange, Upgrade to Ō Mahurangi Penlink (Redvale) Interchange, Upgrade to Silverdale Interchange) | Yes | Yes - packaged as part of SH1 improvements NOR 4 |
| New Walking and Cycling Path along SH1 | Yes | Yes - packaged as part of SH1 improvements NOR 4 |
| Silverdale to Highgate Active Mode Connection (previously Curley Avenue active mode connections) | Yes | Yes - packaged as part of SH1 improvements NOR 4 |
| Wainui Interchange Active Mode Upgrade | Yes | Yes - packaged as part of SH1 improvements NOR 4 |
| New Crossing of SH1 at Dairy Stream | Yes | Yes – NOR 5 |
| New Connection between Milldale and Grand Drive | Yes | Yes – NOR 6 |
| Upgrade to Pine Valley Road | Yes | Yes - NOR 7 |
| Upgrade to Dairy Flat Highway between Silverdale and Dairy Flat | Yes | Yes – NOR 8 |
| Upgrade to Dairy Flat Highway between Durey Road and Albany Village | Yes | Yes – NOR 9 |
| Upgrade to Wainui Road | Yes | Yes – NOR 10; although only section east of Lysnar Road is in scope as road upgrade to west is proposed to be route protected through a developer agreement |
| New Connection between Dairy Flat Highway and Wilks Road | Yes | Yes- NOR 11 |
| Upgrade and Extension to Bawden Road | Yes | Yes – NOR 12 |
| Upgrade to East Coast Road | Yes | Yes -NOR 13 |

| Project | In scope for DBC | In scope for NORs (proposed for route protection) |
|---|---|---|
| Hibiscus Coast Highway-Grand Drive Active Mode and bus priority | Yes | No – route protection not required |
| Dairy Stream Active Mode connection | Yes | No – route protection not required |
| New Pine Valley Road and Argent Lane Extension | Yes | No – route protection not required (already route protected) |
| Kowhai Road Active Mode Connection | No | No |
| Jackson Way Extension | No | No |
| John Creek active mode connection | No | No |

This report focuses on the development and assessment of options for the North Projects which have been identified for route protection in the DBC.

The DBC recommended the projects were packaged into 13 NORs as outlined in **Figure 6** and **Table 7** above. NOR 4 comprises a major alteration to the existing SH1 Motorway designations, and packages several projects as shown in **Table 7**. The remainder of the NORs are new designations.

The projects that make up these 13 NORs are the subject of this alternatives report. These have been categorised into:

- North Strategic projects, which have Waka Kotahi as the Requiring Authority and include NORs 1 to 4 (covered in Part B); and
- North Local projects which have AT as the Requiring Authority and include NORs 5 to 13 (covered in Part C).

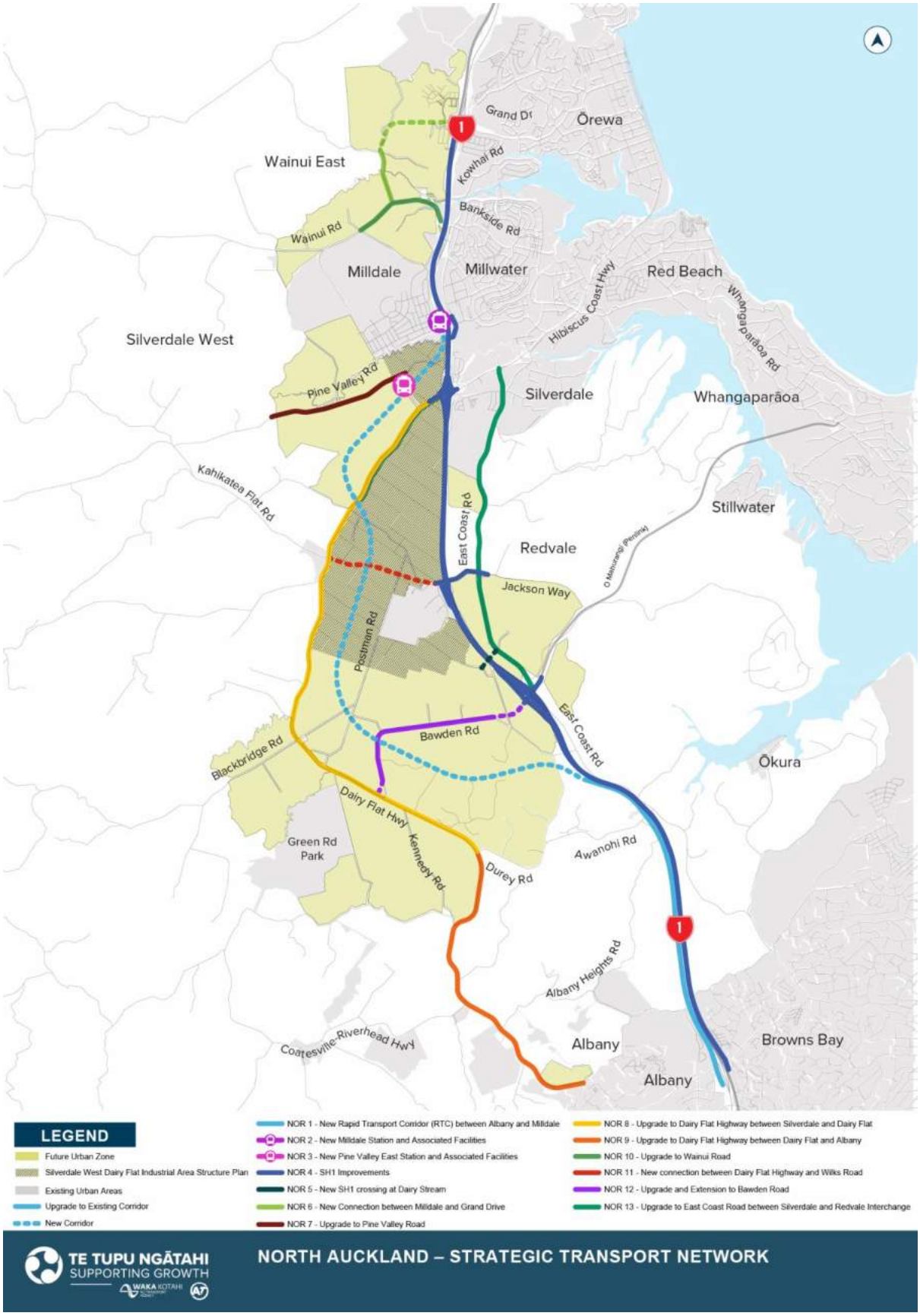



**Figure 6: NOR packages**

# 5. Detailed Corridor Assessment and Route Refinement Methodology (DBC and NOR Phase)

This section summarises the alternatives assessment process and methodology applied during the DBC/NOR phases. The general process is summarised in **Figure 7** and the key steps are described in more detail in the following sections.

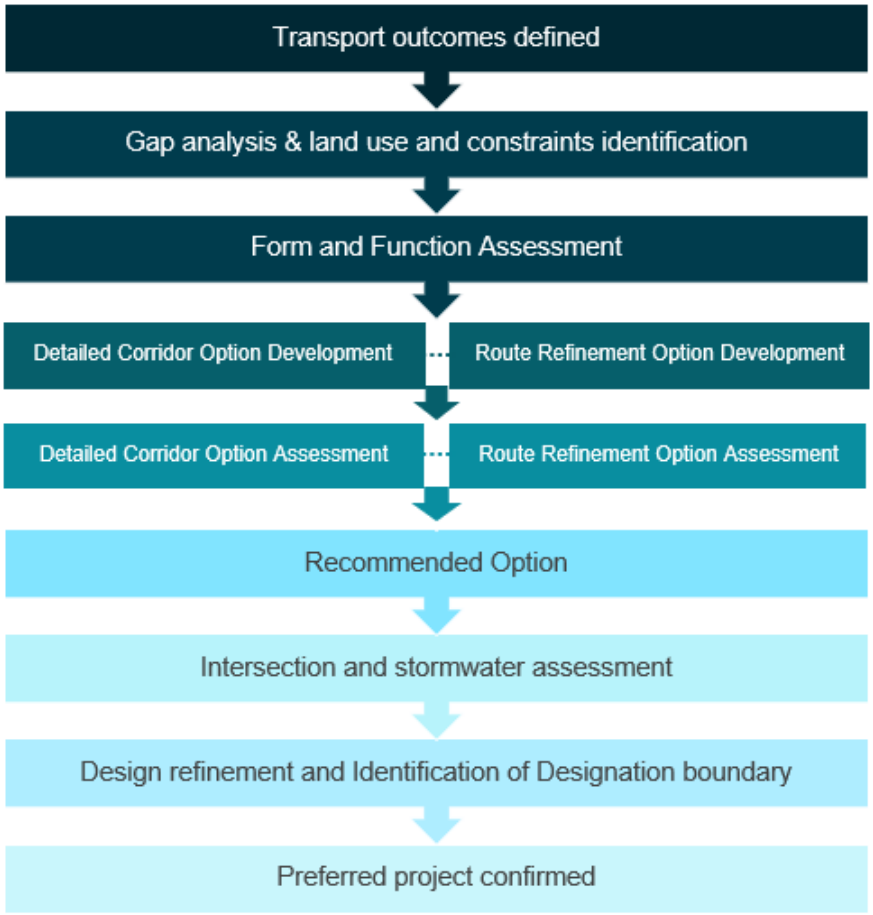



**Figure 7: Alternatives assessment process during DBC and NOR phases**

## 5.1 IBC to DBC gap analysis

Prior to commencing the DBC/NOR assessment of alternatives process, the Project Team undertook a gap analysis for the North ISTN recommended through the IBC Indicative Corridor Assessment process. This was to form a view as to whether any of the North ISTN components should be reconsidered at an indicative corridor level or whether the components could go straight to a more detailed corridor assessment or route refinement process.

The following documents and information were reviewed as part of this gap analysis:

- North Indicative Business Case - Options Assessment Report (2019)
- Feedback received on Council's Draft (now Final) Silverdale West Dairy Flat Industrial Area Structure Plan
- Recent changes in policy (as identified below), land use/developments, proposed plan changes, notices of requirement and relevant resource consents in the study area.

The gap analysis was done in two tranches – strategic projects (2019), followed by local projects (2021). In some cases, the contextual changes that have been identified have continued to evolve over the course of the alternatives assessment process. Where this has occurred, this has been discussed throughout this report in the relevant project-specific sections in Parts B and C.

Another indicative corridor assessment would be deemed necessary where the gap analysis determined that:

a) New information, for example, land use changes, new growth projections and any issues and opportunities identified through engagement with stakeholders and landowners since the completion of the IBC, had the potential to influence that option; and/or
b) Assessment undertaken at the IBC phase was not considered to be proportional to the scale of potential effects.

Detailed Corridor Assessment and/or Route Refinement was deemed appropriate (and so indicative corridor reassessment was not necessary) where the gap analysis determined that:

a) The option had adequately taken into account all known information (including land use changes, engagement etc.) relating to that option; and
b) Options considered at the IBC phase had sufficiently considered alternatives proportional to the scale of potential effects.

All the North Projects components listed in **Table 7** above were considered in the gap analysis.

### 5.1.1 Key changes between IBC and DBC

As part of the gap analysis, an assessment was undertaken to identify if there were any changes to the land use and policy framework relevant to the North. The purpose of the assessment was to ascertain whether any of the underlying assumptions about land use, policy or growth that were relied upon in identifying the North ISTN had changed since the IBC, and what influence this would have on upcoming assessments. In summary these changes were:

a) **Land use assumptions and development pressures:**
    a. Finalisation of the Silverdale West – Dairy Flat Industrial Structure Plan.
    b. Increasing development pressure in the northern parts of the study area including at/around Milldale, Ara Hills and the industrial structure plan area. At the time of the gap analysis, no new public or private plan changes had been lodged for the Northern growth area.
b) **Planning Policy Context**– release of several national policy statements (NPSs) – the NPS: Freshwater and associated NES (2020); Proposed NPS for Indigenous Biodiversity; and the NPS-Urban Development (2020).
   The National Environmental Standard for Freshwater (NES-FW) and National Policy Statement for Freshwater came into effect on 3 September 2020. The NES-FW and NPS:FM are part of a wider national directive for managing freshwater including amendments to the Resource Management Act. The NES-FW generally seeks to avoid any further loss of any

wetlands across the country, limit stream loss and legislate fish passage standards. From an option assessment process perspective, this means that an elevated consideration needs to be given to options that have potential impacts to natural wetlands and streams. In addition, the impacts associated with the options need to be adequately reflected in the scoring and narrative.

The NPS for Urban Development (2020) directs councils to remove overly restrictive planning rules and plan for growth and well-functioning urban environments -by allowing denser housing in areas where people want to live, that are well connected to jobs, transport and community facilities.

c) **Transport Policy** - updated GPS on Land Transport released, which places increased focus on climate change objectives and freight connections rather than broader environmental outcomes and value for money; The Transport Emissions Reduction Plan (TERP) was adopted by Auckland Council as a pathway to reducing vehicle emissions and the Road to Zero road safety strategy 2020 – 2030.

d) **Climate change policy -** The Climate Change Response (Zero Carbon) Amendment Act 2019, which supports contribution to the global effort under the Paris Agreement to limit the global average temperature increase to 1.5° Celsius above pre-industrial levels and allow New Zealand to prepare for, and adapt to, the effects of climate change; Ministry for the Environment: Te hau Mārohi ki anamata: Transitioning to a low-emissions and climate-resilient future - includes an emissions reduction plan.

e) **Modelled growth assumptions** - Overall growth projections in the Northern growth area remained generally consistent in terms of full build out quantum; At the time of the gap analysis, growth projections were expected to be slightly slower and more linear in terms of full build realisation.

f) **Transport projects –** Progress on a number of major projects including Ō Mahurangi Penlink: Included in the ATAP 2018 Package for implementation between 2018 and 2028; Albany to Silverdale bus shoulder lanes on SH1: Included in Regional Land Transport Plan and ATAP as part of improvements to SH1, between Albany and Ōrewa; Northern Corridor Improvements: A new continuous motorway route between the Northern Motorway (SH1) and Upper Harbour Motorway (SH18), plus extension of the Northern Busway from Constellation Station to Albany; Additional Waitematā Harbour Connections Business Case: A business case was completed in 2020 for the Additional Waitematā Harbour connections looking at cross harbour connectivity and changes to the RTN network through the North Shore; Additional work completed on the Auckland Rapid Transit Baseline document.

g) **Covid-19:** Global pandemic began in early 2020 and had a profound impact on the transport system including resilience of public transport operations; Change in funding levels and type; A kick start for working from home.

### 5.1.2 Conclusions of the gap analysis

The overall conclusion of the gap analysis was that the Indicative Corridor Assessment at IBC stage was sufficient to progress to a more detailed level of optioneering for the DBC phase. The gap analysis included a number of recommendations around the scope of the DBC/NOR optioneering for each project, and issues that required further analysis at a DBC level. This is detailed in relation to each NOR/Project in Parts B and C of this document. For example, in relation to the RTC, a Detailed Corridor Assessment was recommended, covering a wider area of the Dairy Flat FUZ and Silverdale West areas, recognising the uncertainty and evolving nature of land use strategy in the area.

Following the gap analysis process, the Project Team split the longer corridors (RTC, Upgrades to SH1, New Walking and Cycling Path along SH1, and Upgrade to Dairy Flat Highway) into segments based on logical 'breaks' in the environment and urban / rural form, geography and road typology. By splitting the corridor, the Project Team was able to recognise any area-based changes identified through the gap analysis and take a more localised approach to determining the extent of optioneering. This segmentation is explained further in the various NOR-specific chapters that follow.

## 5.2 Constraints and Opportunities Mapping

Following the gap analysis, a review of the AUP:OP maps and constraints was undertaken with input from Technical Specialists. The purpose of the review was to identify potential constraints and inform the scope of alternatives assessment and design refinement, including identifying whether more detailed corridor options should be developed.

A study area was identified for each project, informed by the gap analysis. For road upgrades, study areas were 100m wide either side of the corridor, with extensions as prudent or identified by the gap analysis and/or specialists. For new corridors, study areas were broader. Constraints were mapped on Te Tupu Ngātahi GIS and discussed at a workshop with the Project Team.

The following constraints were mapped and assessed as part of this process:

- Strategic land use plans including live zoning, future urban areas and structure plans.
- Cultural values – as identified by Manawhenua.
- Identified sensitive areas through the AUP:OP overlays.
- Environmental and social constraints.
- Property constraints including Department of Conservation land, QEII covenants, existing designations.
- Topography/contours.
- Geological conditions.
- Natural hazards such as flooding risk.

Opportunities were also identified in relation to integration with land use and proposed developments.

## 5.3 Form and Function Assessment

A Corridor Form and Function (CFAF) process was applied for assessment of multi-modal corridors in the North. The CFAF framework is a tool which formalises the optioneering process and provides consistent decision-making across the wider Te Tupu Ngātahi programme. It is based on the Auckland Transport Roads and Streets Framework (RASF) guidance.

During the development of this DBC, the CFAF assessment was revisited as necessary to address identified constraints and design considerations. Any modifications were taken back through the endorsement process. The iterative nature of the process allowed for high stakeholder and owner engagement and an efficient design process.

The key principles of the CFAF are related to place and movement as shown in **Figure 8** below.

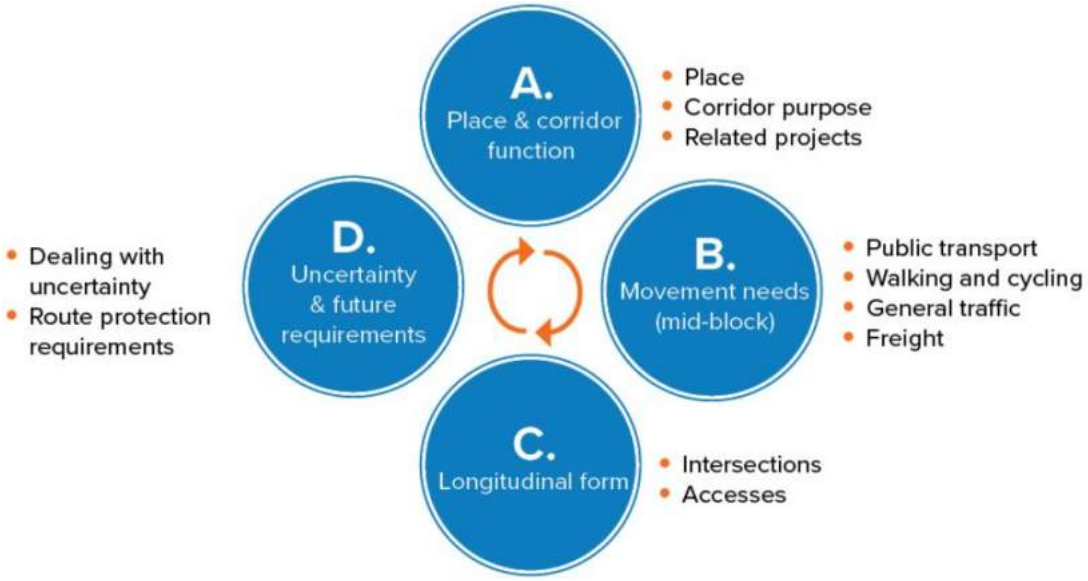



**Figure 8: CFAF principles**

In the North, the CFAF was applied to all arterial road corridors but was not immediately applicable to the single use corridors such as the Rapid Transit Corridor, State Highway upgrade or strategic cycleway projects. Each of these projects had bespoke consideration to understand the modal priorities. In addition, the Te Tupu Ngātahi Design Framework Principles and Auckland Transport Parking Strategy and Design Manual were used to develop the functional requirements for the public transport interchanges and Park and Ride infrastructure.

## 5.4 Option Development and Assessment

### 5.4.1 Approach

Following the gap analysis, constraints mapping and initial form and function assessment, the more detailed scope of alternatives assessment was defined for each of the projects proposed for route protection. This is summarised in **Table 8** below, with more detailed reasoning for the approach per projects provided in Parts B and C.

The projects generally proceeded down one of two paths (or in some cases, a combination of the two), as follows:

- **Detailed Corridor Assessments** - identification and assessment of options occupying different locations (sites or corridors) within a defined study area and potentially connecting to the network at different points. The Project team decided that (based on the gap analysis and constraints mapping) these corridors/projects required development of multiple route (or site) options, with assessment through full scored MCA analysis. Some of these projects also proceeded to Route Refinement (prior to Option Development) where part of the corridor comprised an upgrade to an existing corridor or more refined assessment was required.
- **Route Refinement Assessments** - identification and assessment of route options based on (or within close proximity to) an IBC indicative corridor or the outcome of a detailed corridor assessment), and considering the effects, constraints and opportunities present (for road upgrades this included consideration of widening the corridor on either side, both sides, or a

combination). These projects either comprised upgrades to existing corridors, new sections of corridor that connect two defined points, or projects where only one practicable option/footprint existed.

- The scope of the Route Refinement Assessment varied depending on the constraints present and recommendations of the gap analysis. The three forms of assessments comprised:
    a) **Full MCA scoring of multiple options** – this was applied where the Project Team recommended that more than one option should be developed and assessed and where there could be a range of considerations and potential trade-offs e.g. complex constraints were present which required a detailed comparison of options.
    b) **Targeted MCA analysis and constraints-led design of a single option** – this was applied where the Project Team decided that these projects/corridors could proceed with development of a single route option design and a qualitative consideration of alternatives. The MCA framework was applied to this process but with a more localised list of criteria focused on the key issues of relevance and comprised a qualitative (non-scored) assessment. The use of full MCA process would have been unnecessary and would not provide any extra information or assisted the identification of the preferred route. For road upgrades this included consideration of widening the corridor on either side, both sides, or a combination.
    c) **Constraints-led design of a single option –** this was applied where only one practicable option existed in terms of designation footprint e.g. Milldale Station. In this case, detailed constraints mapping was used to develop an initial footprint before the option proceeded to Option Refinement.

During this development and assessment, a series of road widening principles were adopted and typically employed for upgrades of arterial roads, except where there was a different context. The road widening principles included:

- There should be a general preference for widening on public land before private land.
- There should be a general preference to widen on either side of the existing road corridor as far as practicable unless there is a significant constraint.
- Where an existing road is rural on one side and zoned future urban on the other side, there is a general preference to widen on the FUZ side.
- Where a decision needs to be made which results in the relocation of a land use, consider the ease to which that land use can easily be relocated (e.g. availability of appropriately zoned land) and the importance of the land use within the existing community.
- Community facilities should generally be avoided.

In response to policy changes, freshwater issues such as avoiding potential natural wetlands and limiting stream loss were given a stronger focus in the DBC phase optioneering assessments. This included high level, desktop-based, potential natural wetland mapping in the GIS viewer for consideration by the Project Teams in the optioneering process; as well as consideration of these policy issues in the non-scored assessments. In response to the NPS-UD, the team considered this in developing options and in the consideration of the likely future environment for urban and FUZ areas, particularly in relation to likely intensification of land in walkable catchments around RT stations and town/metro centres. Climate change policy changes were given a greater focus in the DBC phase through preparation of a climate change assessment during the DBC phase. This analysed climate change considerations, including a gap analysis around where specific greenhouse gas (GHG) reduction interventions or considerations could be made. Specifically, the assessment tested whether each project could be eliminated from the network; whether GHG emissions could be reduced; and

whether each project could be optimised to minimise emissions. The assessment concluded that all of the projects were required, and elimination was not recommended. It also concluded that sufficient consideration of reduction of GHG was considered through the assessments (e.g. mode shift considerations in the investment objectives, embodied carbon considerations in the assessment of construction risk/cost, and climate change resilience through the natural hazards criterion and climate change outcomes non-scored criterion).

**Table 8: Scope of alternatives assessment per project**

| Project | NOR | Segment | Assessment type | | Assessment method | | | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | Detailed corridor assessment | Route refinement | Full MCA scoring | Mini-MCA with qualitative assessment | Constraints-led design of a single option | |
| Rapid Transit Corridor – Albany to Milldale (including new walking and cycling path along RTC) | 1 | Segment 1: Albany to Awanohi | | ✓ | ✓ | ✓ | | Multiple options. Optioneering combined with Upgrades to SH1 and New Walking and Cycling path on SH1.<br><br>Team considered segments 1 and 2 together in making decision |
| | 1 | Segment 2: Awanohi to Bawden (SH1 cross over) | | ✓ | | ✓ | | As above |
| | 1 | Segment 3: Dairy Flat FUZ | ✓ | | | ✓ | | Multiple options. Assessment occurred in parallel with the Dairy Flat integration workstream (discussed in Part B) to assist with land use and transport integration |
| | 1 | Segment 4: Postman Road and Future industrial area | ✓ | | | ✓ | | Multiple options. Interdependencies with segments 3 and 5 meant the decision this segment was made following decisions in Segment 3 and 5 |
| | 1 | Segment 5: Silverdale West area | ✓ | | | ✓ | | Multiple options considered either side of Dairy Flat Highway |
| | 1 | Segment 6: Milldale | | ✓ | | | ✓ | Single option developed - Fixed termination point at Milldale Station site and multiple corridors looked at in IBC |

| Project | NOR | Segment | Assessment type | | Assessment method | | | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | Detailed corridor assessment | Route refinement | Full MCA scoring | Mini-MCA with qualitative assessment | Constraints-led design of a single option | |
| New Milldale Station | 2 | N/A | | ✓ | | | ✓ | Single option developed – site set aside by developer |
| New Pine Valley Station | 3 | N/A | ✓ | | ✓ | | | Multiple options |
| Upgrades to SH1 between Albany and Silverdale | Part of 4 | Segment 1: Albany to Awanohi | | ✓ | ✓ | | | Multiple options. Optioneering combined with RTC and New Walking and Cycling Path on SH1. Team considered segments 1 and 2 together in making decision |
| | | Segment 2: Awanohi to Bawden | | ✓ | ✓ | | | As above |
| | | Segment 3: Bawden to Silverdale | | ✓ | | | ✓ | Single option developed as mostly within designation and no significant constraints |
| New Wilks Interchange | Part of 4 | N/A | ✓ | ✓ | ✓ | ✓ | | As well as full MCA of locations and alignments to connect to East Coast Road, assessment included:<br>• interchange spacing assessment considering Wilks and Ō Mahurangi Penlink (Redvale) Interchanges together<br>• interchange form assessment<br>• qualitative assessment of active mode bridge crossing locations |

| Project | NOR | Segment | Assessment type | | Assessment method | | | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | Detailed corridor assessment | Route refinement | Full MCA scoring | Mini-MCA with qualitative assessment | Constraints-led design of a single option | |
| Upgrade to Ō Mahurangi Penlink (Redvale) Interchange | Part of 4 | N/A | | ✓ | | ✓ | ✓ | Included:<br>• interchange spacing assessment considering Wilks and Ō Mahurangi Penlink (Redvale) Interchanges together<br>• interchange form assessment<br>• qualitative assessment of active mode bridge crossing locations |
| Upgrade to Silverdale Interchange | Part of 4 | | | ✓ | | | ✓ | Included:<br>• interchange form assessment<br>• qualitative assessment of active mode bridge crossing locations |
| New Walking and Cycling path along SH1 | Part of 4 | Segment 1: Albany to Awanohi | | ✓ | ✓ | | | Multiple options. Optioneering combined with RTC and Upgrades to SH1. Team considered segments 1 and 2 together in making decision |
| | | Segment 2: Awanohi to Bawden | ✓ | | ✓ | | | As above |
| | | Segment 3: Bawden to Silverdale | | ✓ | ✓ | | | MCA comparing west versus east side. Some interaction with Upgrade to SH1 Project |
| | | Segment 4: Silverdale to Wainui | | ✓ | ✓ | | | MCA comparing west versus east side. Some interaction with RTC Project |

| Project | NOR | Segment | Assessment type | | Assessment method | | | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | Detailed corridor assessment | Route refinement | Full MCA scoring | Mini-MCA with qualitative assessment | Constraints-led design of a single option | |
| | | Segment 5: Wainui to Grand Drive | | ✓ | ✓ | | | Some wider options qualitatively assessed. Then MCA comparing west versus east side |
| Silverdale to Highgate Active Mode Connection | Part of 4 | - | | ✓ | ✓ | | | MCA scoring of multiple options |
| Wainui Interchange Active Mode Upgrade | Part of 4 | - | | ✓ | | ✓ | ✓ | Targeted MCA comprising qualitative assessment of refined crossing locations, then single option developed |
| New Crossing of SH1 at Dairy Stream | 5 | - | | ✓ | | ✓ | ✓ | Targeted MCA comprising qualitative assessment of refined crossing locations, then single option developed |
| New Connection between Milldale and Grand Drive | 6 | Segment 1 – Upgrade of Upper Ōrewa Road | | ✓ | | ✓ | ✓ | Targeted MCA comprising qualitative assessment of which side of road to widen. Then single option developed |
| | | Segment 2 – New connection through to Ara Hills | | ✓ | ✓ | | | Two route options compared using full MCA analysis |

| Project | NOR | Segment | Assessment type | | Assessment method | | | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | Detailed corridor assessment | Route refinement | Full MCA scoring | Mini-MCA with qualitative assessment | Constraints-led design of a single option | |
| Upgrade to Pine Valley Road | 7 | - | | ✓ | | ✓ | ✓ | Targeted MCA comprising qualitative assessment of which side of road to widen. Then single option developed |
| Upgrade to Dairy Flat Highway between Silverdale and Dairy Flat | 8 | - | | ✓ | | ✓ | ✓ | Targeted MCA comprising qualitative assessment of which side of road to widen. Then single option developed |
| Upgrade to Dairy Flat Highway between Durey Road and Albany Village | 9 | - | | ✓ | ✓ | ✓ | | Full MCA of widening options, then more detailed assessment undertaken on where widening should occur. |
| Upgrade to Wainui Road | 10 | Segment 1 – western end | | ✓ | | ✓ | ✓ | Full MCA of widening options around bridge crossing, followed by targeted MCA of other segments comparing which side of road to widen |
| | | Segment 2 – bridge segment | | ✓ | ✓ | | | |
| | | Segment 3 – eastern end | | ✓ | ✓ | ✓ | ✓ | |

| Project | NOR | Segment | Assessment type | | Assessment method | | | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | Detailed corridor assessment | Route refinement | Full MCA scoring | Mini-MCA with qualitative assessment | Constraints-led design of a single option | |
| New Connection between Dairy Flat Highway and Wilks Road | 11 | - | | ✓ | | ✓ | | Targeted MCA assessing where to locate corridor within defined study area; followed by single option developed |
| Upgrade and Extension to Bawden Road | 12 | Segment 1 – western end connecting to Dairy Flat Highway | ✓ | ✓ | ✓ | ✓ | | Full MCA of multiple options with different connection points to Dairy Flat Highway, followed by targeted MCA assessing which side of road to widen |
| | | Segment 2 – eastern end connecting to Ō Mahurangi Penlink (Redvale) Interchange | | ✓ | | ✓ | ✓ | Road upgrade, then new corridor connecting to fixed point at Ō Mahurangi Penlink (Redvale) Interchange. |
| Upgrade to East Coast Road | 13 | | | ✓ | ✓ | ✓ | ✓ | Full MCA of road upgrade options; Followed by further targeted MCA comparing which side of road to widen, and single option developed |

### 5.4.2 Expert Briefing and Technical Input

Technical Experts from the following disciplines were involved in the options assessment:

- Transport
- Planning
- Social Impact
- Archaeology and Built Heritage
- Ecology
- Landscape and Visual
- Urban Design
- Stormwater / Flooding
- Construction / Engineering
- Geotechnical / Natural Hazards
- Property.

Manawhenua representatives provided input and identified option preferences from a project partner and cultural values perspective.

Site visits were undertaken in June 2020 and on 07/07/2022 to understand the subject environment. For projects subject to full MCA scoring, experts were also provided with briefing packs, containing background on the study area, the MCA framework and assessment guidelines, an overview of the projects and options and an MCA scoring sheet to record their scoring, reasoning, assumptions and recommendations. Various specialist briefings with the Project Team were also held on the options and assessment process.

The options for each Project were loaded into the Te Tupu Ngātahi GIS constraints viewer for experts' assessment. Experts were given access to the GIS viewer which showed the options against environmental, heritage, and social layers, as well as AUP:OP mapping and Auckland GIS datasets. The viewer mapped constraints and local site information to assist assessment. The GIS viewer was also an interactive tool where information could be displayed in different combinations by the user alongside the options. Specialists were asked to add comments, identify features or areas of concern, so they could be shared with other experts and the Project Team. Where appropriate, scoring, and/or qualitative analysis was completed by the experts and discussed at MCA workshops.

### 5.4.3 Application of the MCA Framework

As summarised above, there were two approaches to using the MCA framework in the options assessment process: a) scoring the options; or b) qualitatively assessing the options. Options scoring was undertaken when it assisted in differentiating between the options. Both approaches used the same programme-wide MCA framework but tailored to suit the particular project.

For the scored MCAs, tailoring involved the removal of criteria where it would result in double counting due to the criteria repeating themes assessed under the transport outcomes. This generally applied to criteria for 'transport system integration' and 'user safety.' Manawhenua provided qualitative feedback as part of the Project Partner workshops.

For the qualitative MCAs, criteria were limited to key constraints present along the corridor and what would differentiate in terms of constraints (for example, transport outcomes were not generally a differentiator for road upgrade widening options, so were removed). Experts qualitatively assessed the options against the relevant MCA framework criteria, commenting on what constraints were

present and recommending whether they should be avoided where practicable, or considered on balance with other issues, or no significant constraints were present. The project team then considered this analysis to make recommendations on what key constraints should be avoided and therefore whether widening both sides, or more to one side was recommended.

As a general principle for option design development for road upgrades, the starting point was widening on both sides of the road in order to reduce the property take for individual landowners and maximise the existing carriageway and road reserve (which minimises effects and costs of widening). However, where key constraints were present with the potential for moderate to high adverse effects, the Project Team made recommendations for widening more to one side, and these recommendations were considered by the design team as part of the option development process. Where recommendations were not considered feasible or practicable for engineering or other reasons, this was recorded and documented in this report (refer Sections 3.2.3 and 3.3.3).

### 5.4.4 Option Challenge Workshops

Following assessments, scoring and / or preferences were discussed at multi-disciplinary options challenge workshops with the Project Team and other Technical Experts. Throughout the options assessment process, workshops were held to discuss findings and undertake decision making. Two types of workshops were held: Options Assessment Workshops and Project Team Workshops. The process and purpose are detailed below.

**Options Assessment Findings Workshops, with Technical Experts** – The purpose of these workshops was to discuss and challenge initial options assessment findings with specialists and the Project Team. During these workshops, the scores (where applicable) and / or findings of each specialist was shared with the Project Team, discussed and challenged. Based on discussions in the workshop, changes to scores or assessments were made where appropriate prior to assessments being confirmed.

**Options Assessments Workshops, with Project Team** – The purpose of these workshops was to discuss and assess each option on a qualitative basis and challenge Project Team commentary. Assessments were confirmed at the workshop unless additional information or input was required.

Workshop outcomes are detailed in the project specific sections. Following option workshops, the Project Team identified the preferred option.

### 5.4.5 Intersection form assessment methodology

Likely intersection forms for the recommended network were assessed by the transport planning team as part of the DBC to identify the indicative intersection controls and subsequent footprint implications. Intersection forms identified in the DBC phase were then re-assessed at the NOR phase. The final decision on the form and control of the intersections could be modified when further land use certainties are known at time of implementation and the extent of proposed designation footprint provides flexibility for this.

To determine the intersection form contained within the indicative designs the following factors were considered:

- Safety.

- Transport network function (movement) and land use function (place).
- Form and Level of Service (LOS) / Quality of service required for different modes.
- Land use integration.
- Site specific constraints.
- Urban form.
- Design constraints.
- Roundabout vs signals guidance.
- Network staging and route protecting.
- Future land used assumptions.
- Future transport network assumptions.

For each intersection control chosen, design features were also considered to ensure that the intersection meets the needs of different users safely and effectively and responds to the site-specific factors. This check was completed by the engineering and urban design teams following the initial selection process completed by the transport planning team.

SH1 motorway interchanges followed a more bespoke process for considering intersection form – as discussed in Part B (Section 9.9.4).

### 5.4.6 Stormwater infrastructure design methodology

As part of route protection, the projects are required to identify and appropriately protect the land necessary to enable the future construction, operation and maintenance of required transport corridors / infrastructure. The design has therefore considered the appropriate stormwater management methods to meet likely catchment needs and potential future regulatory requirements, the process for identifying stormwater treatment form and location is summarised in **Figure 9**.

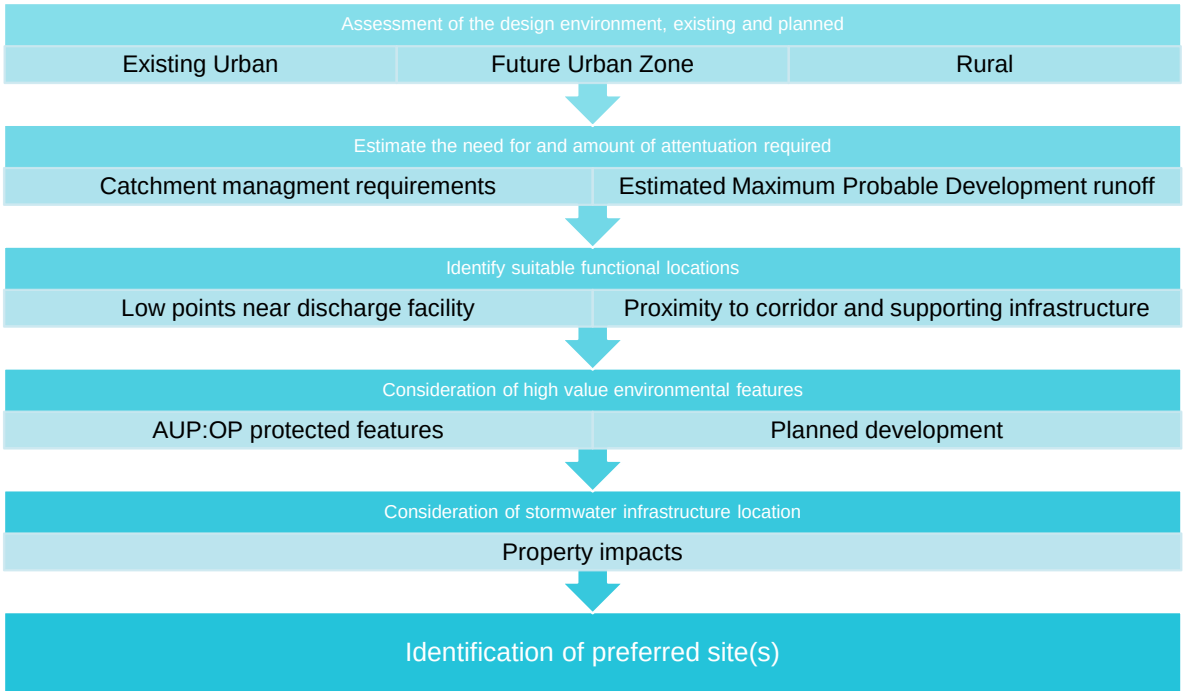



**Figure 9: Stormwater infrastructure design and location approach**

Alternative stormwater solutions were considered for the North Network to inform the boundaries for each Project.

The type of stormwater management device was identified based on the Te Tupu Ngātahi design framework which considered:

- The surrounding existing and planned land-use
- Form of the transport route
- Road hierarchy
- How connectivity to adjacent properties would be provided.

This approach is summarised in **Table 9**.

**Table 9: Stormwater management approach**

| Design Environment | Conveyance | Treatment | Retention | Detention (Attenuation) | Diversion |
|---|---|---|---|---|---|
| Existing Urban – footpath and cycleway within existing road reserve | Pits and pipes | Discharge across berm | Raingarden | Wetland / pond | N/A |
| Existing Urban – increased road reserve and road upgrade | Pits and pipes | Raingardens or treatment wetland / pond, or as a lesser preference, proprietary treatment devices | Raingarden | Wetland / pond | N/A |
| Future Urban Zone | Pits and pipes preferred | Raingardens or treatment wetland / pond | Raingarden | Wetland / pond | Diversion drain or cutoff channels as required |
| Rural | Conveyance channels | Treatment swales or treatment wetland / pond | Retention swales | Attenuation swale or wetland / pond | Diversion drain or cut-off channels as required |

Design of attenuation devices was undertaken at a high level to determine the need for, and amount of attenuation required. The design approach considered the following:

- Evaluate the overall catchment management plan requirements as approved by Council to determine if attenuation or a "pass it forward[4]" approach was proposed for the catchment.
- Determine the road runoff discharge conditions for any tie ins to existing systems or discharge to overland flow paths.
- Estimate runoff from maximum probable development in the catchment (i.e., maximum expected impervious areas).

This information was used in the:

- Design of a primary (10-year) network to cater for the estimated runoff.

[4] Pass it forward refers to a method which treats stormwater within the project footprint (i.e., swales ) and provides conveyance to an appropriate outlet.

- Location and sizing of primary (10-year) attenuation devices (if required) to address any capacity constraints in the downstream network, or to reduce the size of stormwater infrastructure (e.g., pipes) required.
- Identification of secondary (100-year) flow paths and floodplains.
- Location and sizing of secondary (100-year) attenuation devices to reduce floodplain and overland flow path extents.

If a pond was required, the location of the pond was selected by identifying a suitable functional location. The functional location considered the off-line low point along the alignment, which was in sufficient proximity to the corridor for ongoing maintenance access, and suitably located for supporting infrastructure such as pipes and discharge outlets to nearby natural streams.

Where there were opportunities to upgrade or share existing public stormwater assets these were preferred and have been selected in various places along the corridors. Co-locating or upgrading existing assets has the benefit of reducing project land requirements, more effectively managing ongoing maintenance requirements through larger and fewer stormwater facilities, rather than multiple smaller devices. If practicable, across the North network, new wetlands were also designed to service multiple routes, to achieve co-location efficiencies.

Once functional locations were considered, the design then sought to avoid high value environmental features and where practicable minimise impacts on existing residential or business development.

The preferred stormwater solution is generally use of centralised wetlands. Wetlands have the benefit of being more effective to operate and maintain, they serve as both attenuation and treatment, and they reduce the overall corridor cross section width. Swales and raingardens for example would impact many owners along the corridor, and in existing urban areas where development is built up this would be particularly undesirable. Additionally, the North Projects are seeking to support growth and developable land adjacent to the corridors should therefore be maximised. Wider corridors for open channel systems and swales would not be as supportive of this objective as wetlands. The exception to this approach is where the road will remain in greenfield area (Rural zoning), and swales may be used.

### 5.4.7 Engagement

Throughout the optioneering for the North Network, a range of engagement was undertaken with Project Partners (including Auckland Council and Manawhenua), as well as key stakeholders, the community and potentially affected landowners/developers. This included evaluation of the options and feedback at workshops and hui. The workshops are identified in this section and the outcomes for each Project described in their respective chapters. Engagement with the public and potentially affected landowners (within the study areas for the optioneering) was undertaken in 2018 and 2022. Further landowner engagement was undertaken in 2023 in relation to the preferred corridors and proposed designation boundaries.

As noted above, the alternatives assessment process incorporated Manawhenua input and feedback from the consultation and engagement process.

### 5.4.8 Ngā Manawhenua

Manawhenua are recognised as Treaty Partners by AT and Waka Kotahi, which is reflected in the engagement approach with Nga Manawhenua through the optioneering process for the IBC, DBC and NORs. This approach is summarised in the main DBC/AEE. Key features of the approach included:

- Monthly hui with Manawhenua representatives from the IBC phase in 2018 through to lodgement of the NORs in 2023 (with a year long pause during a Covid-related pause to the project in 2020)
- Site visits with Manawhenua representatives in June 2020 and July 2022
- Topic and project-specific hui, including MCA option assessment workshops (IBC and DBC phases), a workshop on the Wēiti River cultural values in January 2022, and Manawhenua involvement in the Dairy Flat Land Use Integration series of workshops with other partners (Auckland Council, WK and AT) from late 2021 to mid-2022.

Manawhenua representatives have expressed views, provided specialist advice and raised key issues though workshops and hui held throughout the process. Manawhenua were also invited to a constraints mapping exercise for the corridors during the DBC phase and provided some confidential mapping of areas/sites of cultural value, which were considered during the optioneering process.

### 5.4.9 Auckland Council

The Project Team has met with and worked with Council as a Project Partner on an ongoing basis to discuss land use integration opportunities along each project corridor and to seek views on the proposed transport network. Council has prepared the Draft Spatial Land Use Strategy for the Dairy Flat and Silverdale Future Urban Zones in response, which was adopted in 2023 (this is discussed further in Part B, Section 6.9). Council also attends Project Partner workshops and the monthly Te Tupu Ngātahi and Council Integration meetings.

### 5.4.10 Community and landowners

During the IBC phase, community engagement took place on the recommended indicative transport network in 2018. During the DBC phase, engagement with potentially affected landowners and the community on the preferred North transport network took place between 11th July and 19th August 2022. Feedback was provided through an online survey and interactive map, landowner meetings and a community drop-in event. Approximately 240 pieces of feedback were received across all channels. Feedback items included comments on Social Pinpoint, online surveys, mailed feedback, landowner meetings, emails and phone calls, and official information requests. Following the engagement period, feedback was collated and reviewed by the Project Team and informed the assessment of the options.

## 5.5 Preferred Options and Option Refinement

The outcome of the refined options assessment and engagement was preferred options for each project. These options were then refined through an engineering design process which confirmed that there was a feasible design for the proposed infrastructure and identified the construction and operational footprint of each project for designation boundary setting. The option refinement took a ‘design by designation’ approach which is described in the Main AEE.

Option refinement and designation boundary setting applied a series of Programme-wide principles, and included:

- All land that is reasonably necessary for the construction, operation, maintenance and mitigation of the project, including temporary works, batters and construction yards; stormwater wetlands/treatment; areas directly required to mitigate effects and provide alternative access where needed.

- Flexibility for future design evolution during detailed design when more will be known about the environment within which the corridor is situated.
- A wider designation boundary is generally provided in rural / undeveloped FUZ areas, as there is less certainty around ground conditions and more space available to account for this uncertainty, with generally larger land parcels.
- A narrower designation boundary is generally provided in built-up / urban environments, as there is less room for flexibility, smaller land parcels and more certain ground conditions.
- Typical construction area requirements applied are summarised in the Main AEE.

The Project Team prepared the designation boundaries, which were then reviewed by Technical Specialists and amendments made, prior to landowner engagement in May - June 2023. Refinements were made in response to Technical Specialist Assessments for the AEE and engagement feedback.

## 5.6 Affected landowner meetings

Meetings with affected landowners for the proposed NoRs were undertaken in June / July 2023. Letters detailing the proposed designation and indicative designs were sent to affected parties and an opportunity for a meeting with the project team was offered. A total of 710 letters were sent to landowners with the following uptake for meetings:

- Over 175 in person meeting were held with affected land owners.
- Around 63 online meetings were held with affected land owners.

The meetings with affected landowners lead to a number of minor tweaks to the proposed designation boundaries. Where there was new information or queries around the consideration of alternatives for specific projects, this has been addressed in the Design Refinement section for each project.

# Part **B**

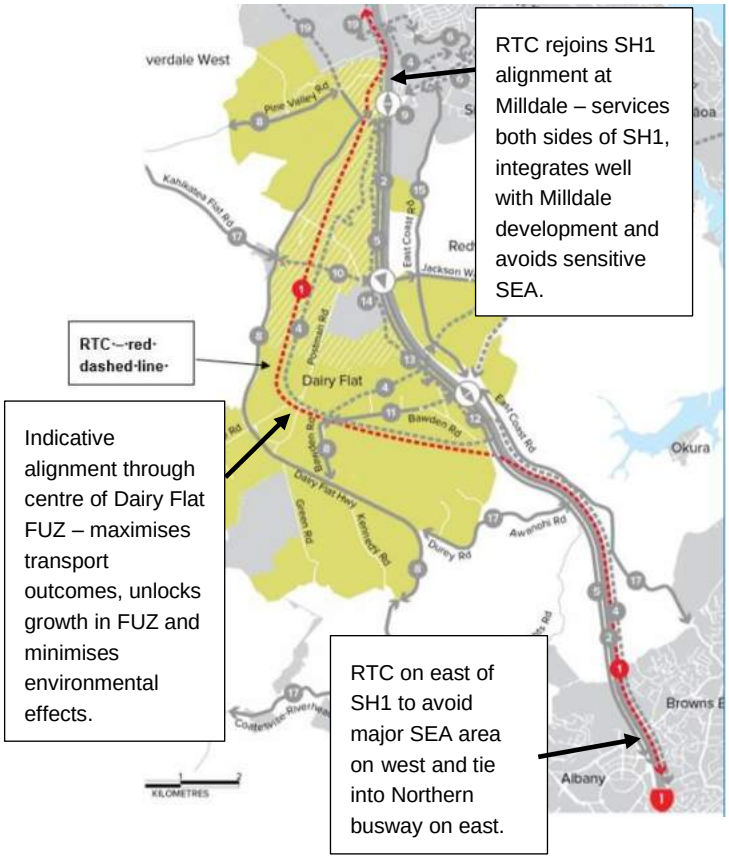
Consideration of Alternatives – North Strategic Package

# 6. NOR1 – Rapid Transit Corridor (RTC) Project

## 6.1 Summary

This section outlines the assessment of alternatives for the Rapid Transit Corridor project. The purpose of the RTC project is to provide a strategic public transport corridor and active mode facility to serve future urban growth in the North between Albany, Dairy Flat, Silverdale West and Milldale, leading to an increase in PT mode share and improved accessibility to social and economic opportunities. The corridor provides a segregated facility capable of accommodating bus rapid transit (BRT) or light rail transit (LRT). A dedicated walking and cycling path is provided alongside the corridor.

### 6.1.1 IBC phase (2019)




During the IBC phase a large number of indicative corridor options were considered using MCA analysis and engagement.

The recommended indicative RTC corridor (Figure 10) comprised a new RTC extending from Albany to Milldale via the Dairy Flat and Silverdale West FUZ. The option was assumed to tie into the existing Northern busway on the eastern side of SH1 just south of Ōteha Valley Road, before crossing over SH1 into the FUZ just south of Bawden Road and extending to Milldale via the future industrial area.

This phase considered but discounted a RTC following the SH1 corridor to Silverdale. A diversion through Dairy Flat was considered to better integrate with land use and attract additional public transport users.

**Figure 10: IBC alignment and key features**

### 6.1.2 DBC phase

At the start of the DBC phase, a gap assessment confirmed the IBC corridor as appropriate, and identified the need for a more detailed corridor assessment to be undertaken in collaboration with Auckland Council, considering uncertainties around land use including a future Dairy Flat town centre.

Multiple options were developed considering significant constraints along the SH1 corridor and land use uncertainty as shown in Figure 11.

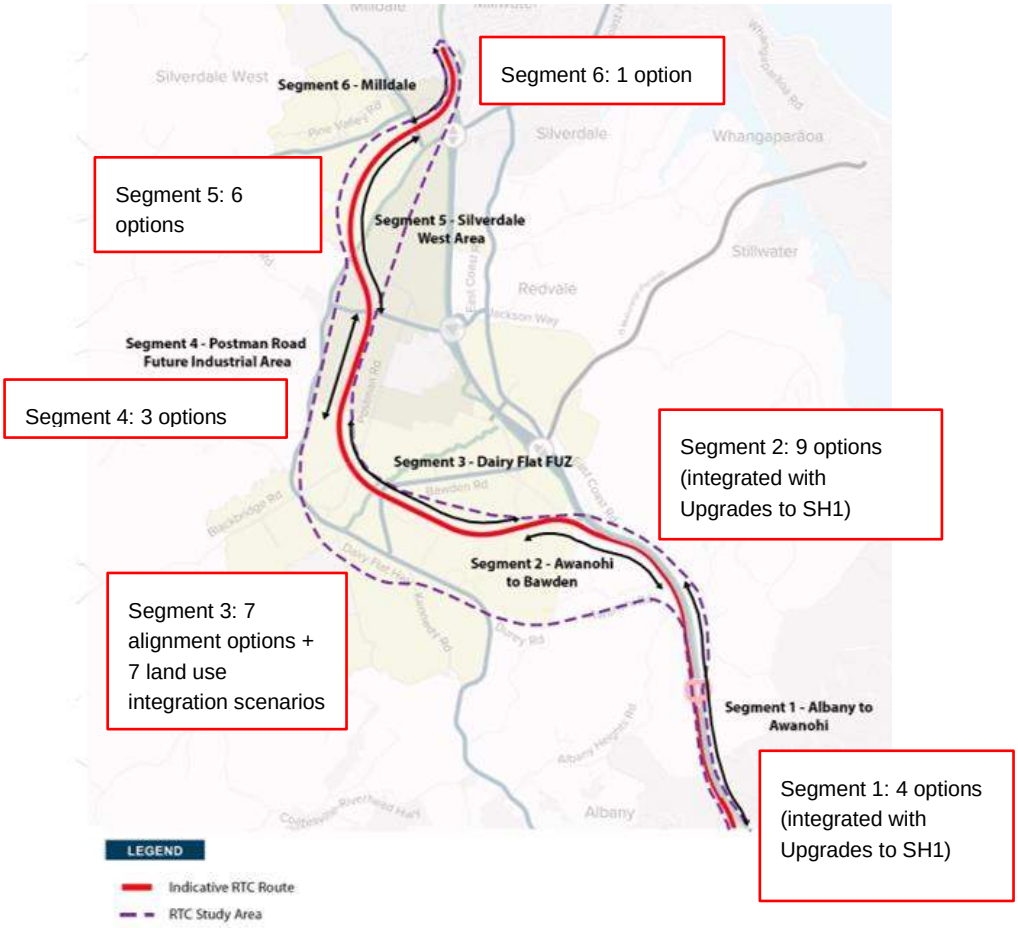



**Figure 11: RTC route and options considered in each segment (DBC phase)**

Consideration was given to adjoining sections when selecting preferred options.

### 6.1.3 Constraints

Parts of the study area are highly constrained and include SEA areas, particularly a large SEA on the west of SH1 in Segment 1 and SEAs both sides of SH1 in Segment 2; a high value SEA and QEII Covenanted area around the Wēiti in Segment 6; the sensitive Ōkura Creek catchment in Segment 2; live zoned land Albany-Bawden Road and Milldale; floodplains and potential natural wetlands (all segments); and archaeological sites (Segment 5).

### 6.1.4 Key issues/trade-offs for assessment

- **Transport outcomes:** Improving access to future social and economic opportunities and enhancing mode shift, balanced against selecting an alignment that minimises travel time for users accessing the more northern stations.
- **Integration with land use:** The Project team worked with Council to integrate the RTC with Council's land use aspirations, including the future industrial area (structure planned) and its Draft Spatial Land Use Strategy for Dairy Flat and Silverdale West (maps below). The RTC needs to pass through the industrial area while accessing likely high density town centre/residential areas to drive patronage and mode shift.

A Draft Spatial Land Use Strategy was developed by Council in parallel with the consideration of RTC options and evolved in an iterative manner across the business case development as illustrated in the figure below.

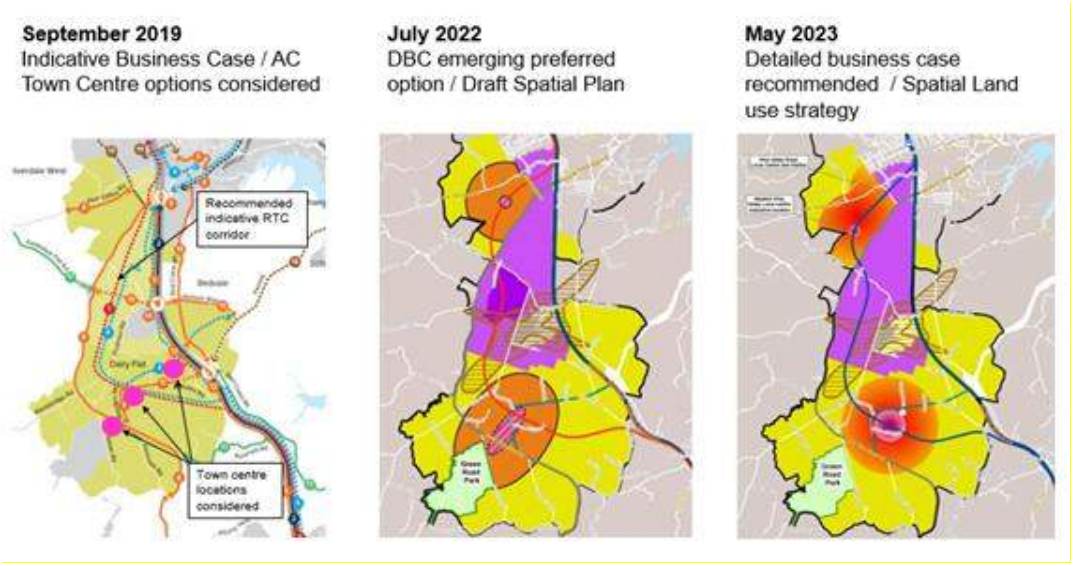
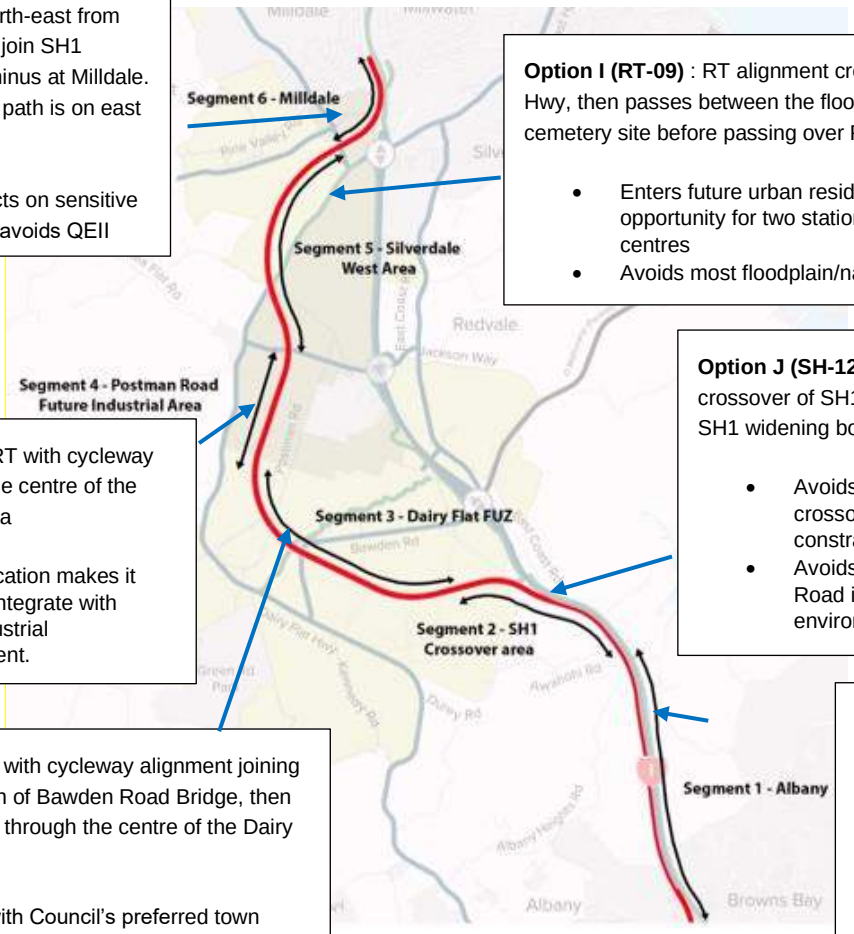



**Figure 12: Evolution of land use strategy for the northern area**

**Single option developed:** RT alignment travels north-east from Pine Valley Road to join SH1 alignment up to terminus at Milldale. Walking and cycling path is on east of SH1 at this point

- Minimises effects on sensitive SEA/Wēiti and avoids QEII




**Option I (RT-09)** : RT alignment crosses under Dairy Flat Hwy, then passes between the floodplain and an historic cemetery site before passing over Pine Valley Road.

- Enters future urban residential area with opportunity for two stations and connection to local centres
- Avoids most floodplain/natural wetland areas

**Option J (SH-12):** RT on west with no crossover of SH1 needed; cycleway on east; SH1 widening both sides.

- Avoids need for large SH1 crossover structures in highly constrained area.
- Avoids realignment of East Coast Road into sensitive coastal environment of Ōkura Creek

**Option B (RT-04):** RT with cycleway alignment through the centre of the Future Industrial Area

- Central location makes it easier to integrate with future industrial development.

**Option D: RT-04:** RT with cycleway alignment joining the SH1 corridor south of Bawden Road Bridge, then following the ridgeline through the centre of the Dairy Flat FUZ

- Connects with Council's preferred town centre location for the Dairy Flat FUZ
- High percentage of catchment within the FUZ
- Follows the ridgeline and has least environmental effects.

**Option D (SH-12):** RT on west (using north bound lanes) with cycleway on east and SH1 widening to east with motorway lanes shifted over.

- Largely avoids SEA on west and retirement village on east.
- Ties into existing Albany bus station on west.

15/09/2

**Figure 13: Preferred Option - RTC recommended.**

## 6.2 IBC to DBC gap analysis

The IBC[5] recommended option for the RTC Project comprised a new RTC extending from Albany to Milldale via the Dairy Flat and Silverdale West[6] FUZ– refer **Figure 14**. The option was assumed to tie into the existing Northern busway on the eastern side of SH1 just south of Ōteha Valley Road, before crossing over SH1 into the FUZ just south of Bawden Road. The corridor was assumed to comprise a mode neutral RTC (compatible for both busway or light rail) and would include a walking and cycling path between Albany and around Wilks Road, where the path would shift to an alignment along John Creek[7]. The IBC considered a number of RTC options within the northern, middle and southern sections of the Northern growth area[8]. The recommended option comprised a combination of the preferred options for each segment.

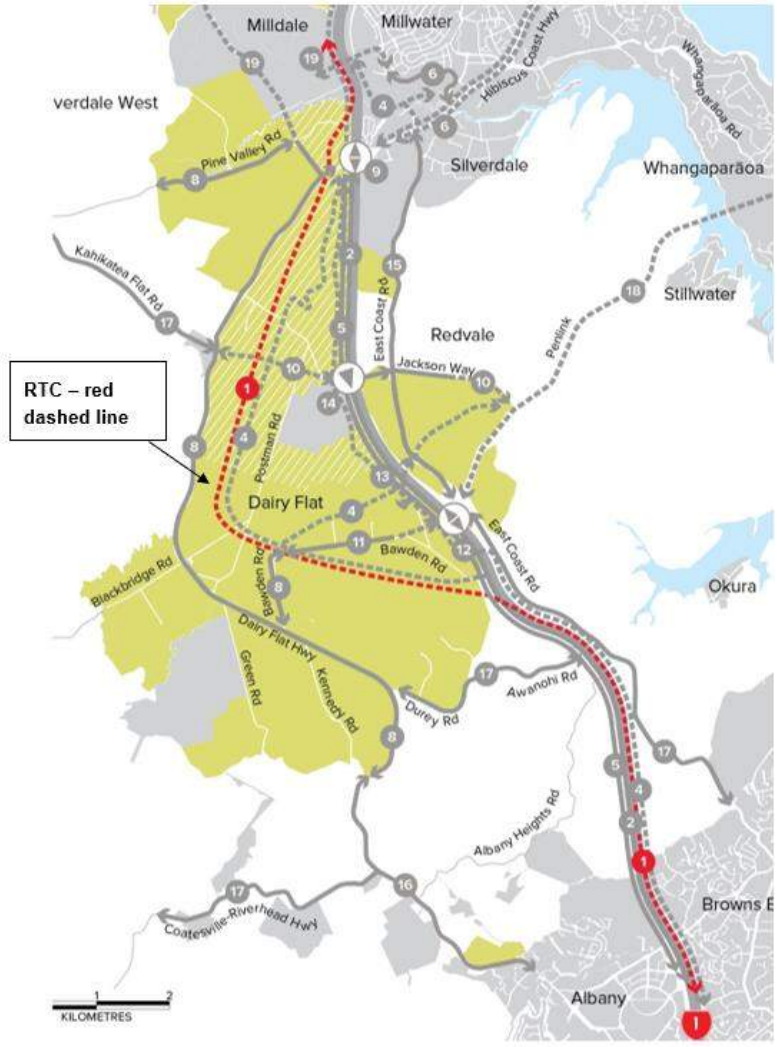



**Figure 14: Indicative Strategic Transport Network highlighting the RTC, recommended option (and associated walking and cycling path)**

[5] Supporting Growth Alliance, 2019. North (Silverdale, Ōrewa, Wainui and Dairy Flat) Indicative Business Case for Route Protection, Version 1.3.

[6] IBC recommended options for the RTC Project: MTS-1, MT2-2, MTN-1

[7] IBC recommended options for the walking and cycling path along John Creek: AT2-1; AT7-1

[8] Refer section 3.2.3 for longlist recommended options and section 3.3.3 for shortlist recommended options

The key recommendation within the IBC was for the RTC to traverse through the Dairy Flat and Silverdale West future urban growth areas instead of alongside State Highway 1 (SH1). By travelling through growth areas, the RTC would help to unlock urban growth in the Dairy Flat and Silverdale West growth areas and help shape a new town centre in Dairy Flat.

The gap analysis stage of the DBC reconfirmed that an indicative RTC corridor between Albany (just south of Ōteha Valley Road) via the Dairy Flat FUZ and terminating at Milldale, remained appropriate, considering changes in national policy since the IBC was completed in 2019 (see Part A, Section 3), and the importance of integration of the RTC with future land use. In particular, this indicative corridor alignment with diversion through Dairy Flat FUZ was reconfirmed because it would:

a) enable increased urban development density within walkable catchments along the RTC to support a compact, high-quality urban environment, as envisaged in the National Policy Statement on Urban Development 2020 (NPS:UD); and
b) encourage use of public transport (via the RTC) by future communities to improve access and contribute towards a reduction in greenhouse gas emissions.

The gap analysis confirmed that an appropriate range of alternative indicative corridors were considered at the IBC, but that further work was needed in the DBC phase to look at:

a) More detailed corridor assessment through the Dairy Flat FUZ in partnership with Council, considering the high uncertainty around land use and the future town centre location.
b) Opportunities to avoid or minimise impacts on the Wēiti River SEA and QEII covenant area.
c) Potential changes in transport network tie in/mode assumptions
d) Further assessment of the number and location of stations, along with assessment of configuration options where designations are proposed and private land is affected.
e) Considerations in the new NPS:FW (as discussed in Part A).

As the DBC progressed, additional optioneering was also recommended in relation to the following (as explained in the following sections):

a) The optimal SH1 crossover location.
b) More detailed consideration of ways to avoid/minimise encroachment on urban land uses such as the retirement village north of Ōteha Valley Road.
c) More detailed consideration of alignments through the Silverdale West-Dairy Flat Industrial. Structure Plan Area in partnership with Council and considering the developability of industrial land.

## 6.3 Corridor form and Function

An assessment was undertaken for the RTC following the CFAF methodology in Section 5.3. This recommendation informed the route refinement options developed and assessed for each segment.

Cross sections allowing for light rail and bus rapid transit were considered, with bus rapid transit requiring a larger cross section. **Figure 15** shows the cross sections considered.

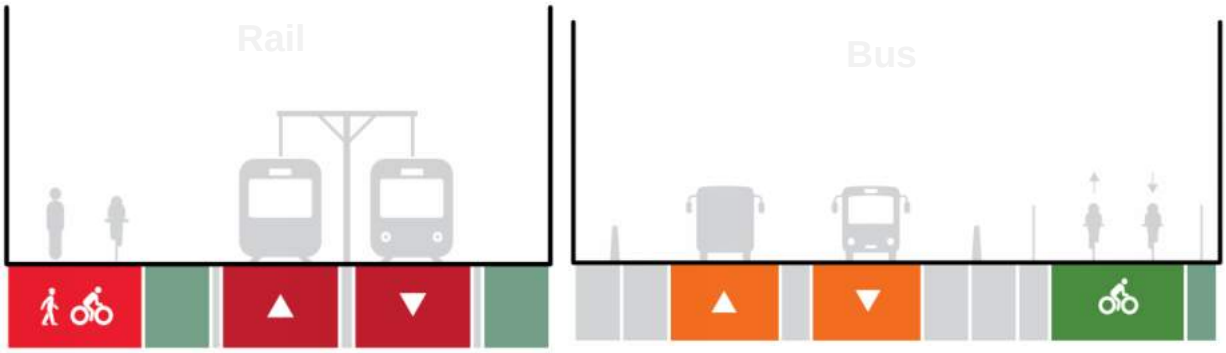



**Figure 15: RTC light rail and bus rapid transit mode cross section outcomes**

A high speed and fully separated RTC was assumed as this assumed cross section provides:

- Flexibility to accommodate bus, light rail and light metro modes.
- Provides the most efficient arrangement which minimises the additional travel time of the RTC corridor diversion through the Dairy Flat area.
- Does not preclude a slower speed at grade arrangement should this be preferred in the future.

As such, grade separation has been assumed at all road crossings across the RTC and wherever it crosses an existing or future corridor. As much of the area is yet to be developed, further road crossings are likely to occur across the RTC corridor.

From the existing Albany Bus Station to Bawden Road in Dairy Flat, the RTC and the State Highway 1 Improvements Package are adjacent to each other. Therefore, the two corridors were considered together, with their interface being a key consideration. The adopted typical cross section design was a combined RTC cross section alongside improvements to SH1, see **Figure 16** below.


**Figure 16: RTC and State Highway 1 Improvements Package indicative cross section**

## 6.4 Initial Transport assessment

An initial transport assessment of the RTC corridor and stations was undertaken to inform option development and assessments around stations. More detail on this assessment can be found in Appendix G: Transport Outcomes Report for the DBC.

As noted above, the North IBC identified an indicative RTC alignment through the Dairy Flat FUZ and Silverdale West Industrial Structure Plan areas, and only considered station locations at a high level. As such, as part of the DBC/NOR alternatives assessment process, a station identification and sizing process was undertaken. This approach is summarised in **Figure 17** and discussed below.

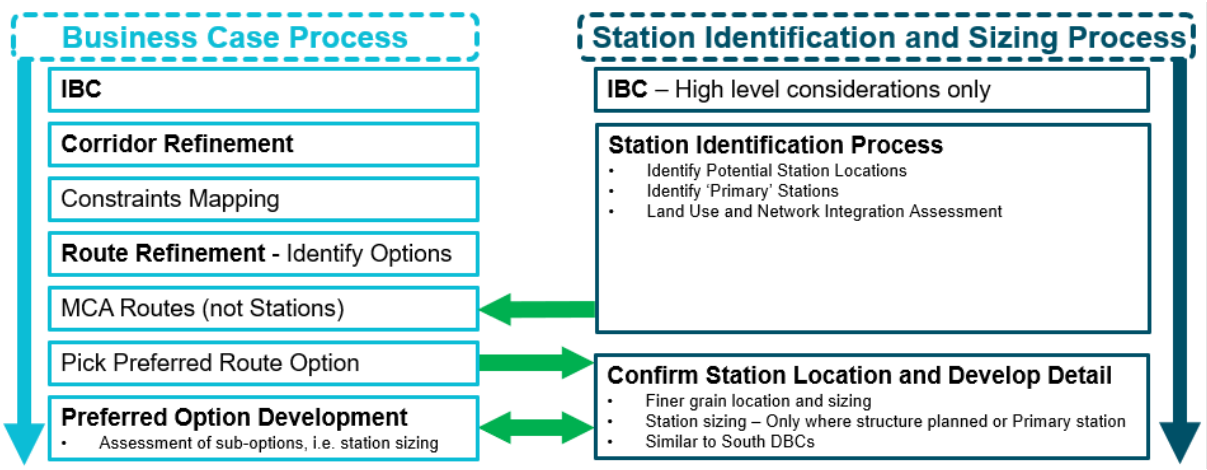



**Figure 17: Station Identification and Sizing Approach**

The station consideration process included the following steps:

1. **Consideration of initial transport modelling** - Initial transport modelling (based on the IBC alignment) was undertaken to inform the assessments around station types and locations. The expected patronage of the RTC and the travel patterns of users (volumes of boarding/alighting and origin / destination of trips) was considered in determining the number of, and location of, stations.
2. **Land use and network integration assessment –** Consideration was given to land use along the corridor and the anticipated supporting public transport network structure including how local bus services would connect to the RTC corridor.
3. **Identify Primary Station locations** - Primary Stations were identified as those with a key strategic network or land use requirement. The identification of a primary station considered whether the station was: an 'end of line' (terminating) station, had a requirement for stabling, had a park and ride and/or kiss and ride function, or was in the vicinity of a town centre.
4. **Identify secondary station locations -** Secondary stations provide additional access to the surrounding land use. Consideration was given to the overall station spacing and effects on RTC travel time and accessibility.

The assessment above was used to develop some working assumptions on where stations would be located for each of the RTC alignment options.

## 6.5 Option Segments and Study Area

For the purposes of option development in the DBC phase, the RTC study area was defined as per **Figure 18** and was divided into six segments. The segmentation was proposed recognising the long length of the overall corridor and allowed for more detailed consideration of the options in each location. The segments were identified based on the changes in land use and planning context along the corridor, as well as the presence of constraints and opportunities, as explained in the following subsections.

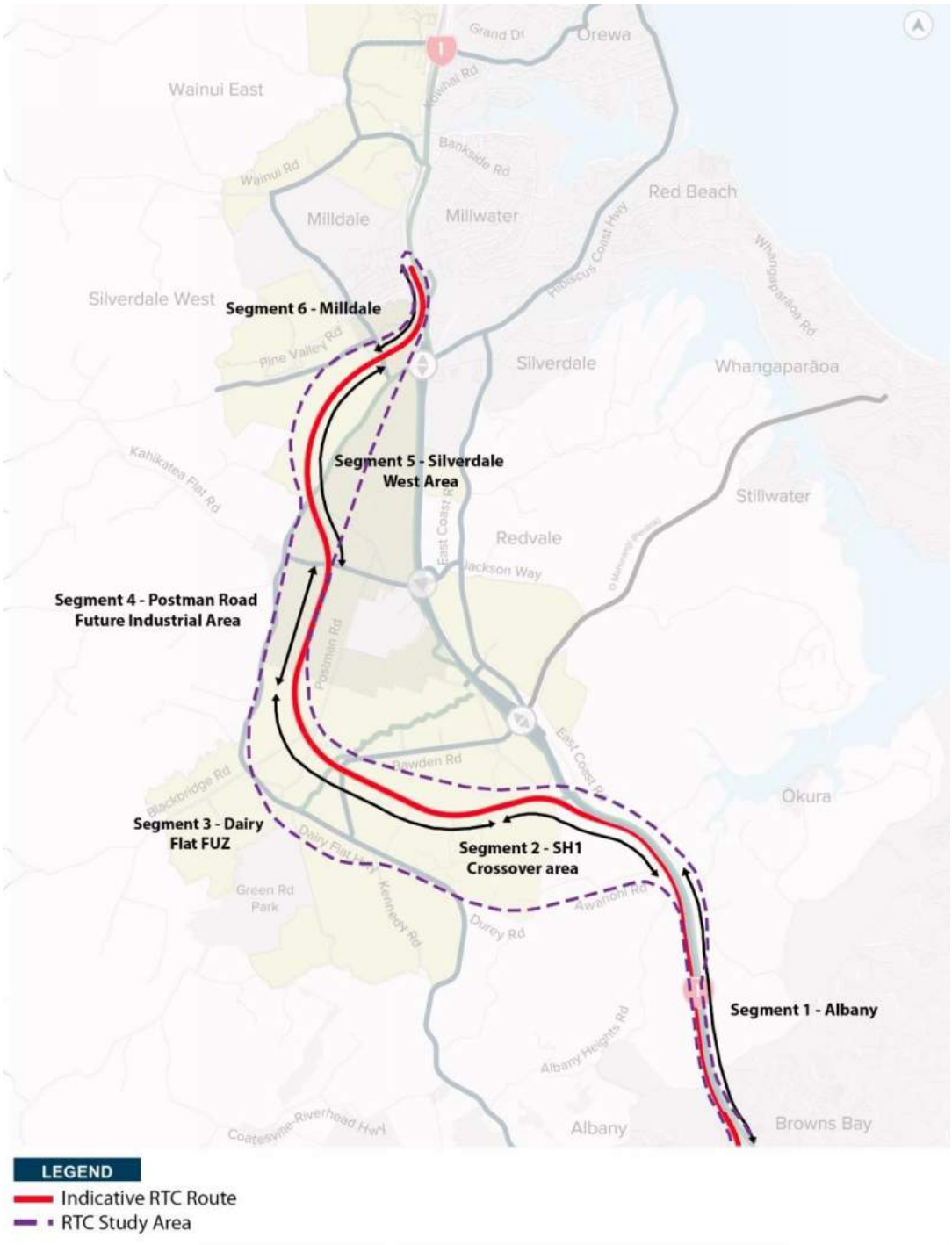



**Figure 18: RTC segments and study area**

For Segments 1 and 2, DBC optioneering for the RTC was done together with the SH1 improvements (Upgrades to SH1 and the New Walking and Cycling Path along SH1).

Options were generally limited to the DBC study area shown above, extending from Albany (near SH1 and Ōteha Valley Road) to Milldale via the Dairy Flat and Silverdale West growth areas. The study area included a wider area within Segment 3 – Dairy Flat FUZ due to uncertainties in land use and the need for further land use integration analysis in partnership with Council. The DBC options included:

- **Segment 1 – Albany to Awanohi –** four Route Refinement options assessed, including different tie-in options at Albany (and RTC west versus eastern side of SH1) to test whether a tie-in to the existing Albany bus station on the western side of SH1 (with the RTC extending up on the west) is a feasible/better option than the IBC option to tie into the existing Northern Busway on the east (see section 6.6 for further discussion on this).
- **Segment 2 – Awanohi to Bawden (SH1 Crossover Area) –** Ten Route Refinement options assessed for an RTC crossover of SH1 (versus no crossover) between Awanohi and Bawden Road considering the significant constraints in this area – as explained further in section 6.7 below.
- **Segment 3 – Dairy Flat FUZ –** A range of Detailed Corridor Options (seven options) assessed through the main Dairy Flat FUZ (as explained in section 6.9 below).
- **Segment 4** – **Postman Road Future Industrial Area –** three Detailed Corridor Options assessed (as explained in section 6.10).
- **Segment 5 – Silverdale West area –** Nine Detailed Corridor Options assessed in Silverdale West, recognising the large number of constraints and the desire to test the opportunity to connect into the future urban residential area west of Dairy Flat Highway (as explained in section 6.11 below).
- **Segment 6- Milldale** – single Route Refinement option considered further in option development (as explained in section 6.12 below).

The DBC Options Assessment for the RTC is explained further in the following subsections, on a segment by segment basis, followed by consideration of the combined RTC segments.

## 6.6 RTC (and Upgrades to SH1) Segment 1: Albany to Awanohi

Albany to Awanohi (Segment 1) extends from Albany bus station and follows the existing SH1 corridor up to Awanohi Road. **Figure 19** below shows the extent of the segments study area where options were generally developed within as well as the preferred alignment.

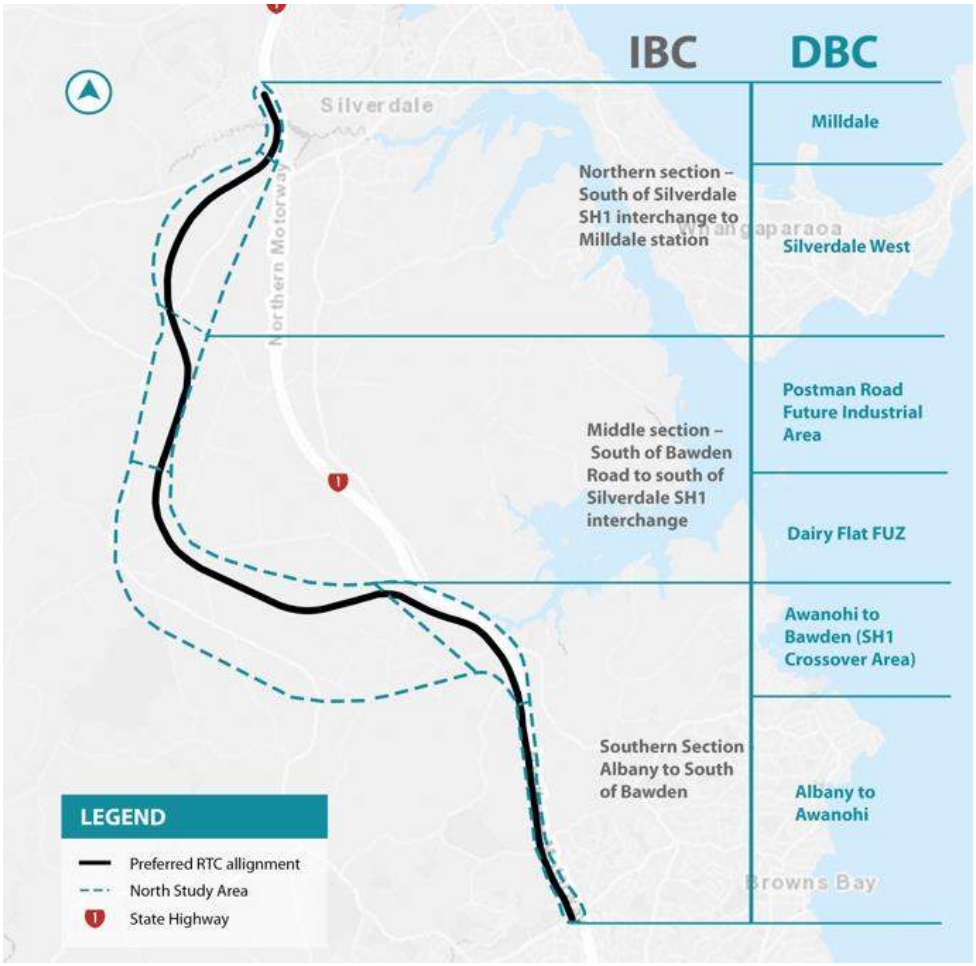



**Figure 19: RTC segment 1 – Albany to Awanohi (DBC)**

### 6.6.1 Route Refinement Option Assessment

Route options in this segment were generally limited to an area along the SH1 Motorway corridor extending from just south of Ōteha Valley Road in Albany to about 1.8km south of Awanohi Road in Redvale for the following reasons:

a) The IBC recommended an indicative corridor for the RTC through this area, and this was reconfirmed as appropriate through the gap analysis as detailed above.

b) There is a significant opportunity to share a corridor with the existing SH1 corridor and the proposed SH1 Improvements Project (refer Section 9)

c) The RTC needs to tie-in to the broader future rapid transit or existing rapid transit (Northern Busway) corridor south of Ōteha Valley Road,

d) The presence of significant constraints west and east of SH1 (refer **Figure 20**) including:
- major areas of SEA on the west and major areas of high value indigenous vegetation (not currently assessed as SEA) on the east.
- an active embankment slip near Lonely Track overbridge.
- the Fairview Retirement Village and existing residential and Countryside Living land uses.
- Floodplains and streams. All options needed to cross Waiokahukura (Lucas Creek), a feature of high ecological and cultural value to Manawhenua.

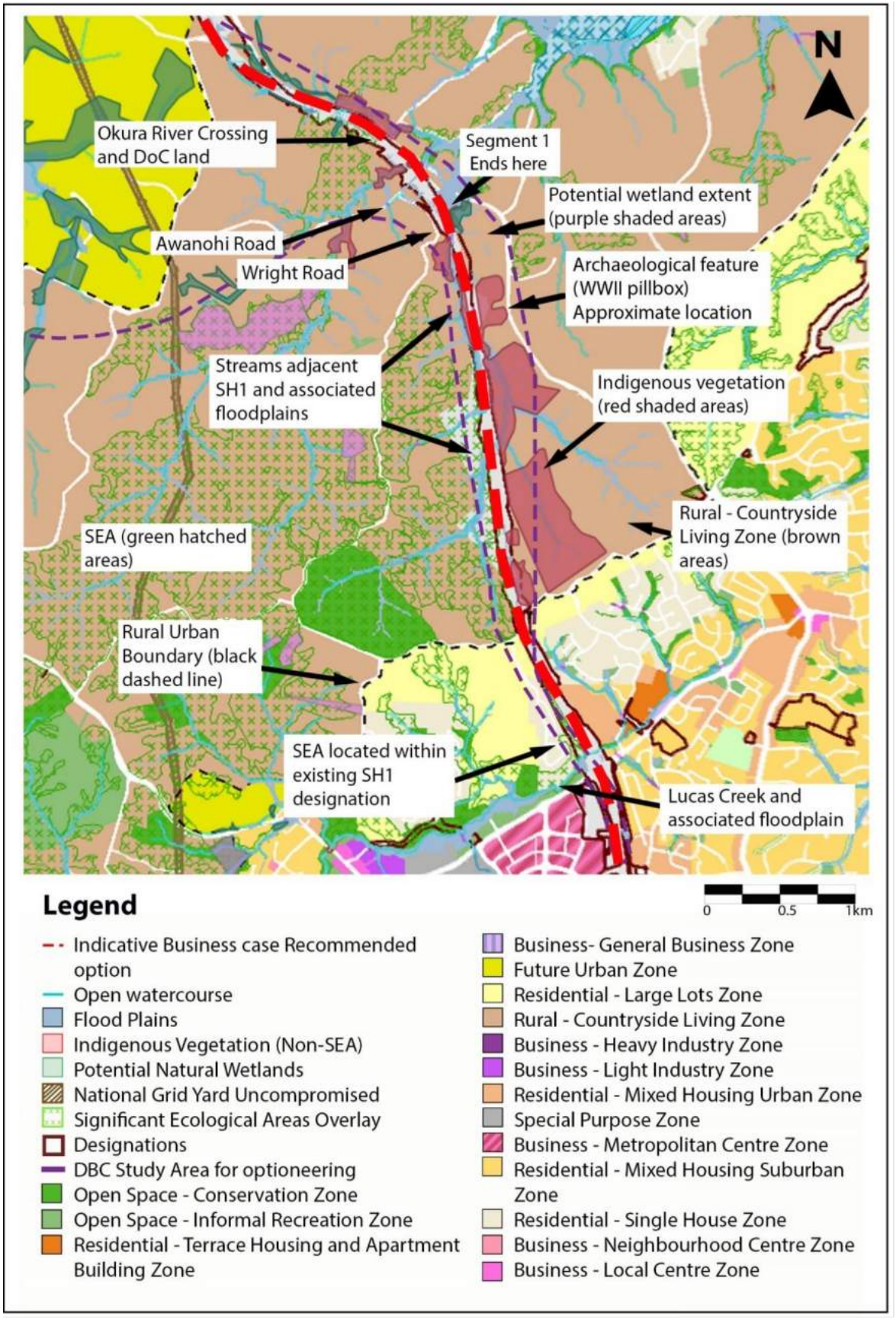



**Figure 20: Map of key constraints and features in the RTC Segment 1 for optioneering.**

The DBC optioneering was done in two stages, as there was a change in assumptions around the southern tie-in for the RTC following the first stage of optioneering, as explained below.

### 6.6.1.1 Phase 1 Assessment (2020)

For the **first stage** of assessment (in 2020), the underlying assumption was that the RTC would tie-in to the Northern Busway on the eastern side of SH1 just south of Ōteha Valley Road. Two route refinement options were developed in this stage as outlined in Table 10 and **Figure 21** below.

**Table 10: Summary of 2020 Segment 1 options for RTC and SH1 Upgrade (Albany to Awanohi)**

| Option Reference | Option Name | Description |
|---|---|---|
| **Option A** | Option SH-01A | **RTC with cycleway alignment east of SH1 widening**<br>SH1 widening both sides along the outside of the carriageway, north of Lonely Track Road Bridge to south of Awanohi Road Underpass |
| **Option B** | Option SH-03A | **RTC with cycleway alignment east of SH1 widening.**<br>SH1 widening to the east by retaining the northbound carriageway from Lonely Track Road Bridge to south of Awanohi Road Underpass |

Both options assumed an eastern tie-in of the RTC at Albany.

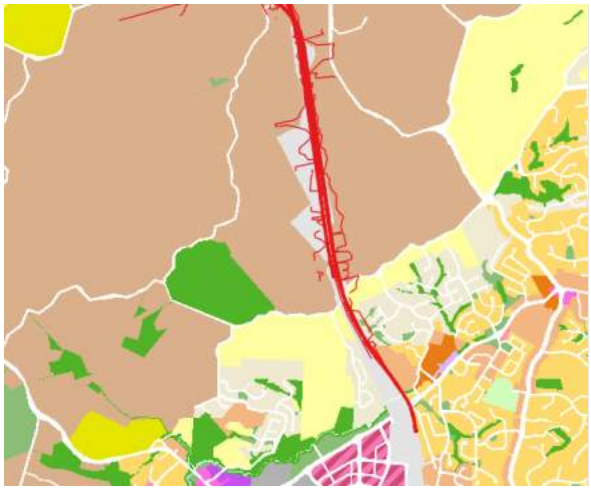
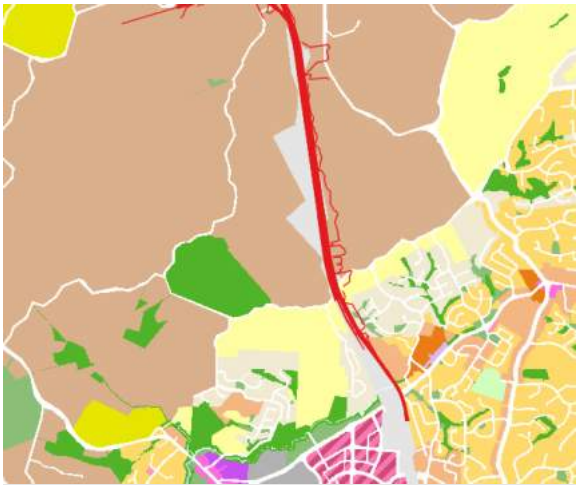
| Option A (SH-01A) | Option B (SH-03A) |
|---|---|
|  |  |

**Figure 21: Map of 2020 Segment 1 options for RTC and SH1 Upgrade (Albany to Awanohi)**

For all segments, as outlined in Section 2 [methodology], options were assessed against the Investment Objectives and criteria within four well-beings, cultural, social, environmental and economic. Technical specialists engaged in an MCA workshop to undertake an assessment, scoring each option on a gradual scale from 'Very High Adverse Effect' (red) to 'Very High Positive Impact' (green). Scores were accompanied by a description and reason for the scores.

The following table identifies the outcomes from this assessment for the first phase of optioneering in 2020, when the underlying assumption was that the RTC would tie-in to the Northern Busway on the eastern side of SH1 just south of Ōteha Valley Road.

**Table 11: Summary of RTC and SH1 Upgrade Segment 1 assessment (Phase 1 2020 assessment)**

| MCA Criteria | Option A (SH-01A)<br>RTC on east; SH1 widen both sides | Option B (SH-03A)<br>RTC on east; SH1 widen to the east |
|---|---|---|
| Investment Objective 1: Access | 4 | 4 |
| Investment Objective 2: Resilience | 4 | 4 |
| Investment Objective 3: Integration | 4 | 4 |
| Investment Objective 4: Mode Choice | 4 | 4 |
| Investment Objective 5: Safety* | 4 | 4 |
| 1a. Heritage | 0 | 0 |
| 2a. Land use futures | -1 | -1 |
| 2b. Urban design | -1 | -1 |
| 2c. Land requirement | 0 | 0 |
| 2d. Social cohesion | 0 | 0 |
| 2e. Human health and wellbeing | 1 | 1 |
| 3a. Landscape / visual | -4 | -3 |
| 3b. Stormwater/flooding | -3 | -2 |
| 3c. Ecology | -4 | -3 |
| 3d. Natural hazards | -2 | -1 |
| 5a. Construction impacts on utilities / infrastructure | -2 | -3 |
| 5b. Construction disruption | -1 | -1 |
| 6a. Construction costs / risk | -3 | -2 |

*Only related to cycleway component of RTC

The Project Team reviewed and compared the options identified above and noted that matters relating to landscape/visual, stormwater/flooding, ecology, natural hazards, construction impacts on utilities/infrastructure and construction costs/risk/value capture are the key considerations for this segment and the key differentiators between options.

In terms of non-scored criteria:

- Option B was a stated preference of Manawhenua at the time of the assessment (July 2020), recognising it avoids effects to the west of SH1 which has a larger, less fragmented bush area.
- Option B was preferred from a Policy Analysis perspective, as widening to the east of the existing carriageway avoids the SEA overlay to the west of SH1. This is consistent with AUP policy and section 6 of the RMA which include the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna.
- Option A was slightly preferred from a Value for Money perspective as the estimated cost is lower and benefits are the same for both options.

Accordingly, the Project Team identified **Option B (RTC on east; widen to east only)** as the preferred route refinement option for the following reasons:

a) Avoids impacts on the identified SEA to the west and is more in line with policy direction of the AUP:OP
b) Less impacts on landscape/visual amenity, stormwater/flooding, ecology and natural hazards.
c) Less cost and construction risk due to the reduced scope of works and infilling.
d) Slightly worse for construction impacts on utilities/infrastructure and value for money as widening both sides is slightly easier to construct and less complex/safer from a traffic management perspective, but this is outweighed by impact considerations (less effects for most criteria).
e) Aligned with Manawhenua preferences.

Option A was discounted by the Project Team for the following reasons:

a) Notably greater adverse effects on the SEA to the west than Option B, which is less in line with the policy framework of AUP:OP
b) Greater environmental effects.
c) No increase in benefits.
d) Did not align with Manawhenua preferences.

#### 6.6.1.2 Phase 2 Assessment (2022)

In 2022, the Project Team considered options with a tie-in of the RTC into the existing Albany bus station site on the west, just south of Ōteha Valley Road. This was because a future RT station (bus or LRT) could be on the west at or near the existing Albany bus station site (previous advice from the NCI project team was that this could be on the east). This change in assumption recognised:

a) The philosophy had changed since 2020 in relation to the wider RT network in Auckland – in particular light rail was looking more likely as the preferred mode in this area in the long term.
b) An RT station on the west would enable better integration with the Albany Metro Centre and transit-oriented development opportunity (better land use/transport integration). This was supported by new national policy direction - NPS-Urban Development.
c) An RTC on the west would enable direct interchange with the newly established Albany bus station on the west. Since light rail vehicles could not use the bus bridge over SH1 to access the bus station site, a western tie in for the RTC would provide better futureproofing for a light rail mode.

In consideration of the above factors, two further options were developed through route refinement as outlined in **Table 12** and **Figure 22** below. Option C was the same as Option B but assumed a western tie in at the southern end to the Albany bus station (rather than a tie in to the Northern Busway on the eastern side of SH1). Option D also assumed a western RTC tie-in and proposed separating the SH1 active mode corridor through this segment away from the RTC and onto the eastern side of SH1 for the following reasons:

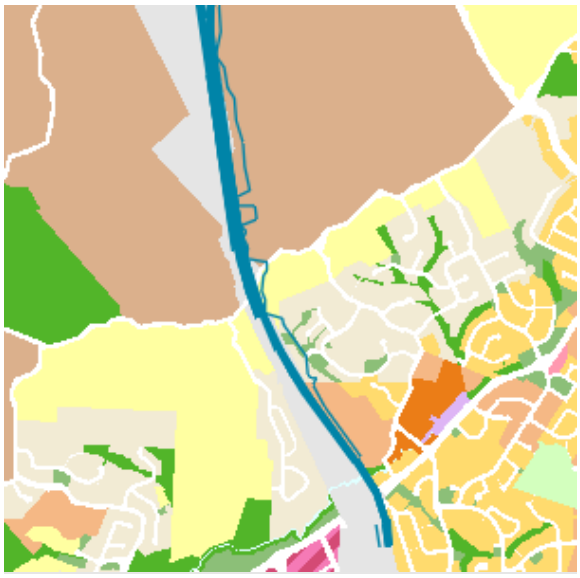
a) This would limit encroachment into the high value SEA areas on the west of SH1.
b) This would enable the new walking and cycling path to tie directly into the walking and cycling path constructed by the Northern Corridor Improvements project to the south of Ōteha Valley Road.

The SH1 upgrade component (providing three lanes in each direction north of Lonely Track Road bridge) for Option D was also different to Options A-C, as it involved shifting motorway lanes over to

the east with widening to the east, in order to fit the RTC on the west while avoiding significant effects on high value SEA areas to the west.

**Table 12: Summary of Phase 2 RTC Segment 1 options (in combination with SH1 Upgrade Project)**

| Option Reference | GIS Option number | Option Name/Description |
|---|---|---|
| **Option C** | • **Option EP_SH11** | • **RTC with cycleway alignment –east of SH1 widening (and assuming RTC tie-in on west to Albany bus station)**<br>• SH1 widening to the east by retaining the northbound carriageway from Lonely Track Road Bridge to south of Awanohi Road Underpass<br>• Similar to Option B<br>• Option assumes Lonely Track motorway bridge replacement. |
| **Option D** | • **Option SH-12** | • **RTC on west of SH1 (on northbound berm) with cycleway on the east (and assuming RTC tie-in on west to Albany bus station)**<br>• SH1 widening to the east by shifting motorway lanes eastwards (widening to east)<br>• Option assumes Lonely Track motorway bridge replacement |

| Option C (EP_SH11) | Option D (EP_SH12) |
|---|---|
|  |  |

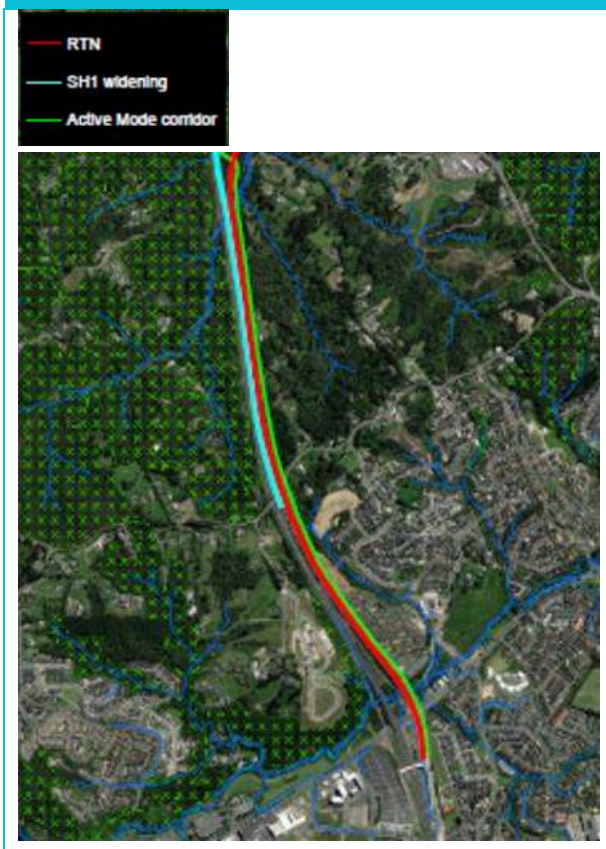
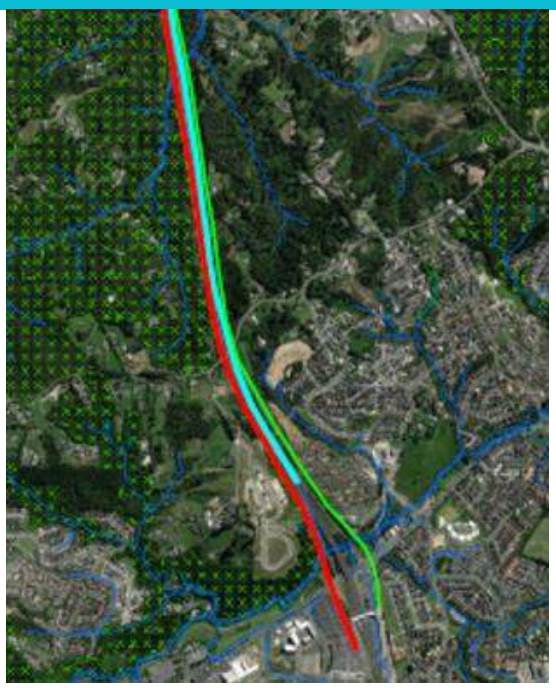
| Option C (EP_SH11) | Option D (EP_SH12) |
|---|---|
|   |  |

**Figure 22: Map of Phase 2 RTC Segment 1 options (in combination with SH1 Upgrade Project)**

The following table identifies the outcomes from this assessment for the second phase of optioneering in 2022, when the project team were asked to reconsider the underlying assumption about the RTC tie-in at Albany (to assume all options tie into an RTC station on the west at the site of the Albany bus station). This led to the development of a new option (Option D) with RTC on the west and cycleway on the east.

**Table 13: Summary of RTC and SH1 Upgrade Segment 1 assessment (Phase 2: 2022 assessment)**

Note: P refers to 'preferred' where scoring is same but specialist identified a preference for an option but did not warrant a different numerical score in accordance with the scoring criteria.

| MCA Criteria | Option C (SH-11)**<br>RTC on east (including cycleway) with western tie-in; SH1 widen to the east | Option D (SH-12)<br>RT on west with western tie-in; cycleway on east; SH1 widen to east by shifting motorway lanes |
|---|---|---|
| Investment Objective 1: Access | 4 | 4 (P) |
| Investment Objective 2: Resilience | 4 | 4 |
| Investment Objective 3: Integration | 4 | 4 (P) |
| Investment Objective 4: Mode Choice | 4 | 4 |
| Investment Objective 5: Safety* | 4 | 4 |
| 1a. Heritage | 0 | 0 |
| 2a. Land use futures | 0 | 1 |

| | | |
|---|---|---|
| 2b. Urban design | -2 | 0 |
| 2c. Land requirement | -3 | -1 |
| 2d. Social cohesion | -3 | 0 |
| 2e. Human health and wellbeing | -3 | 0 |
| 3a. Landscape / visual | -3 | -3 |
| 3b. Stormwater | 0 | 0 |
| 3c. Ecology | -4 (P) | -4 |
| 3d. Natural hazards | -1 | 0 |
| 5a. Construction impacts on utilities / infrastructure | -2 | -3 |
| 5b. Construction disruption | -3 | -3 |
| 6a. Construction costs / risk / value capture | -3 (P) | -3 |

* Only related to cycleway component of RTC

** Similar to Option B (SH-03A) but extent scored is slightly longer at southern end -extends from Albany

The Project Team reviewed and compared the options identified above and noted that matters relating to land use futures, urban design, land requirement, social cohesion, human health and wellbeing, and natural hazards and construction impacts on utilities/infrastructure are the key considerations for this segment and showed differentiation between the options. Although scored the same, the Transport Specialist also noted a preference for Option D in relation to IO 1: Access and IO 3: RT integration because of more direct access to an assumed future RT station on the west at Albany (not part of this project) and the existing Albany bus station.

In relation to non-scored criteria:

- Option C was slightly preferred as it better aligns with AUP policy and section 6 matters than Option D because it avoids an area of SEA on the western side that is affected by Option D.
- There was no real difference in value for money between the options.
- Manawhenua who stated a preference, noted a preference for Option D.

In this second stage of optioneering, the decision on Segment 1 was made in combination with the decision for Segment 2 because of the close interrelationship between the segments (and particularly the implications for the presence/absence of a SH1 crossover) – therefore the decision is discussed further in section 6.8.

In regard to Segment 1 in isolation, however, the Project Team identified a number of advantages of **Option D (RT on west with cycleway on east and SH1 widening to east with motorway lanes shifted over)** relative to Option C, as follows:

a) No difference in investment objectives scoring – but Option D is preferred for access and transport integration objectives, because of more direct access to the future RT station on west and the existing Albany bus station.
b) Option D scores better for land use futures, urban design, land requirement and social effects (mainly because it avoids direct and indirect amenity impacts on a large retirement village to the east).
c) Option D scores better for natural hazards (geotech) as it has less overall cut/fill at the southern end.
d) Although not scored (as it would comprise part of a separate project to the south), Option D would also avoid any need south of Ōteha Valley Road for an additional crossover of SH1 to

connect to Albany bus station if the future mode is light rail – noting such a crossing would very likely result in more adverse effects and more cost.

The Project Team noted a number of disadvantages of Option C, including:

a) Less direct access to the existing Albany bus station and no future proofing for light rail access to a future RT station on the west.
b) Greater effects on the Fairview retirement village, which is reflected in greater property risk, land use futures, urban design and social effects.
c) Greater geotech risk at southern end.
d) No increase in benefits and greater adverse effects.

Ecology scores were the same for both options, although the ecology specialist noted a slight preference for Option C, as Option D affects a small section of SEA with Regionally endangered WF11 Kauri, Podocarp Broadleaved forest on the western wide north of Albany, plus it includes two crossings of Waiokahukura (Lucas Creek) (one for RT and one for active modes).

## 6.7 RTC (and Upgrade to SH1) Segment 2: Awanohi to Bawden (SH1 Crossover area)

Awanohi to Bawden (SH1 Crossover area) (Segment 2) extends from around Awanohi Road to Bawden Road following the existing SH1 corridor. **Figure 23** below shows the extent of the segments study area where options were generally developed within as well as the preferred alignment.

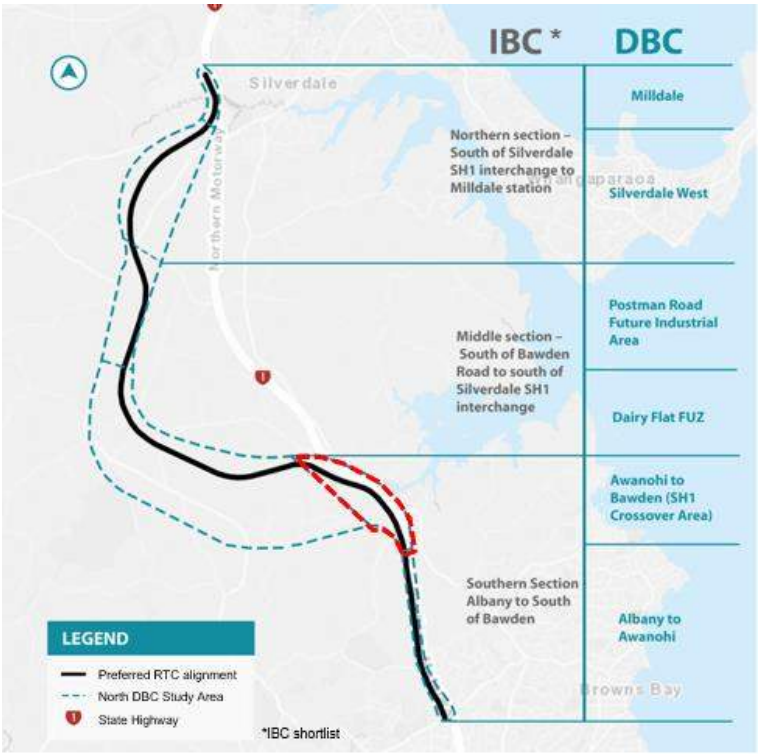



**Figure 23: RTC segment 2 – Awanohi to Bawden (SH1 Crossover Area) (DBC)**

### 6.7.1 Route Refinement Option Assessment

Route options in this segment were generally limited to an area along the SH1 Motorway corridor extending from about 1.8km south of Awanohi Road in Redvale to Bawden Road for the following reasons:

a) The IBC recommended an indicative corridor for the RTC through this area and this was reconfirmed as appropriate through the gap analysis as detailed above.

b) There is a significant opportunity to share a corridor with the existing SH1 corridor and the proposed SH1 Improvements Project (refer Section 0)

c) The presence of significant constraints west and east of SH1 (refer **Figure 24**) including:
   - Areas of SEA on the west and east of SH1 and areas of high value indigenous vegetation on the east (which may be classified as SEA in the future following ecological assessment)
   - The sensitive Ōkura Creek catchment both sides of SH1, including coastal environment east of SH1 and a DoC reserve known as the Redvale Marginal Strip.
   - A Natural Stream Management Area overlay associated with a tributary of Ōkura Creek, which has high ecological and landscape value.
   - East Coast Road – which extends close to and parallel with SH1.
   - Floodplains and streams, including tributaries of Ōkura Creek which are highly sensitive from an ecological and cultural perspective.
   - Rural Countryside Living zoned land, which is not anticipated to change in future.
   - Watercare designation (#9368) south of Bawden Road.

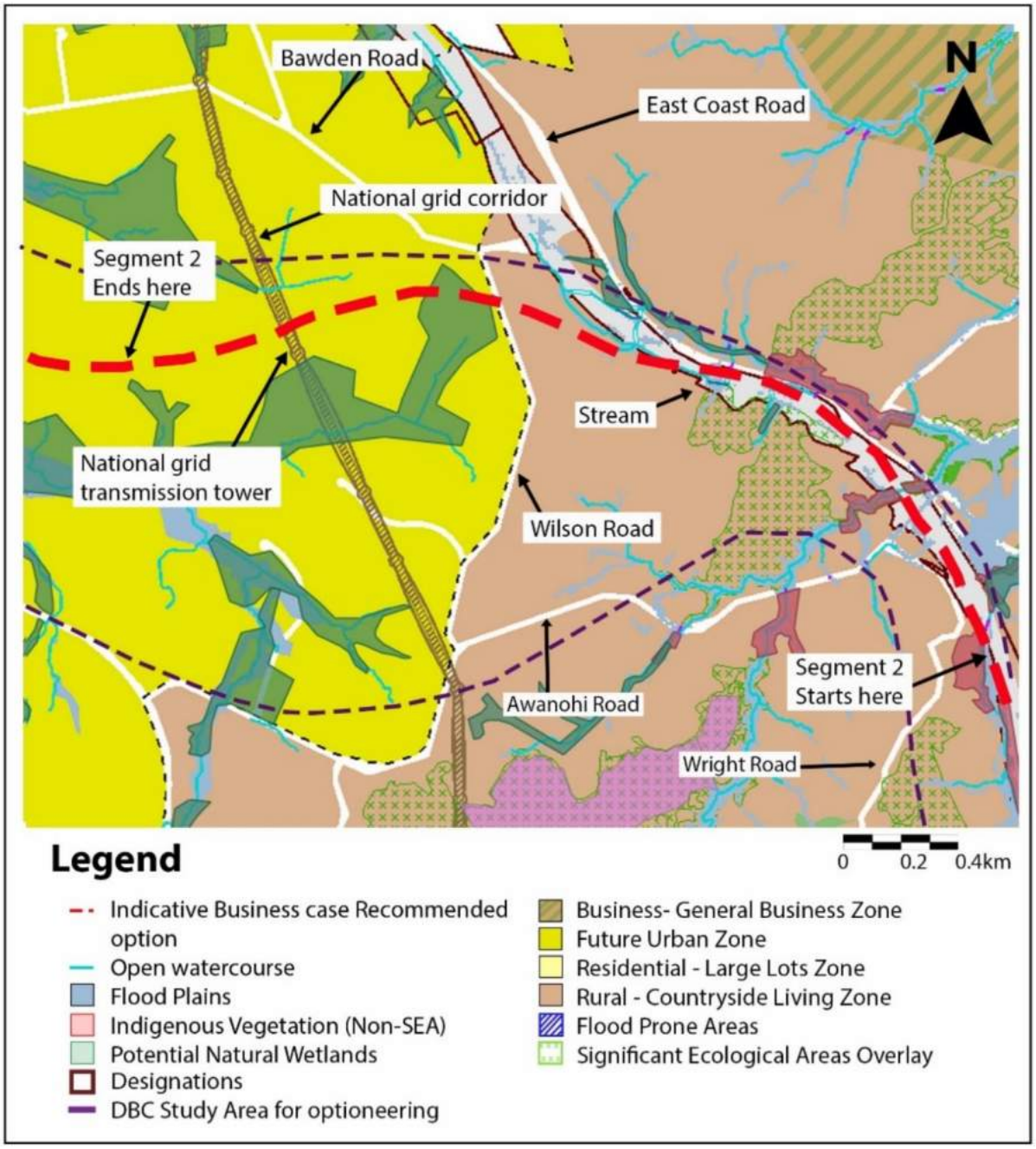



**Figure 24: Map of key constraints and features in the RTC Segment 2 for optioneering.**

As for Segment 1, route options were developed for this RTC Segment in tandem with the Upgrade to SH1 and the Walking and Cycling Path on SH1 Project components of the SH1 Improvements NoR.

As for Segment 1, the DBC optioneering for Segment 2 was done in two stages, as there was a change in assumptions around the southern tie-in for the RTC following the first stage of optioneering, as explained above in Section 6.6.1.2.

### 6.7.1.1 Phase 1 Assessment (2020-2021)

For the **first stage** of the assessment (in 2020-2021), the assumption was that the RTC would tie-in to the Northern Busway on the eastern side of SH1 just south of Ōteha Valley Road -and hence

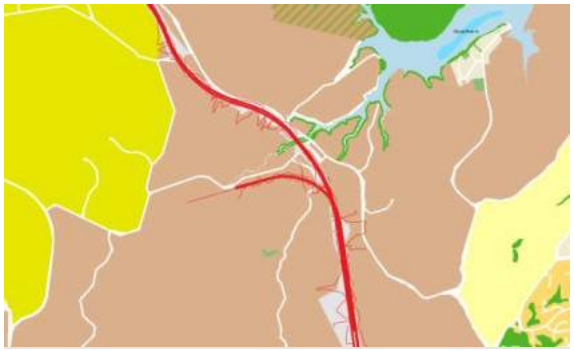
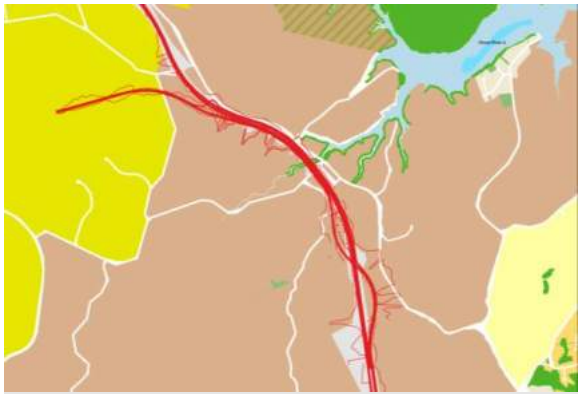
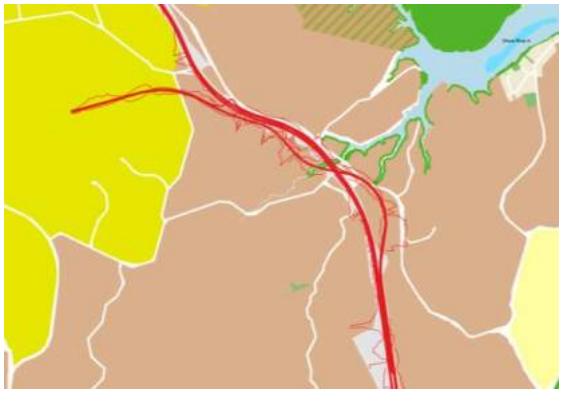
options in this segment placed the RTC on the east, with requirement for a crossover of SH1 from east to west.

In consideration of the above factors, **nine initial options** were developed through route refinement as outlined in **Table 14** and **Figure 25** below.

**Table 14: Summary of initial (2020-2021) RTC Segment 2 options (in combination with SH1 Upgrade Project)**

| Option Reference | Option Name/Description |
|---|---|
| **Option A (SH–01A)** | • **RTC (including cycleway) on east** with southern RTC crossover south of Awanohi Road Underpass.<br>• SH1 **widening both sides** along the outside of the carriageway, south of Awanohi Road Underpass to south of Bawden Road Bridge; |
| **Option B (SH–01B)** | • **RTC (including cycleway) on east** with **northern RTC crossover** south of Bawden Road Bridge<br>• SH1 **widening both sides** along the outside of the carriageway, south of Awanohi Road Underpass to south of Bawden Road Bridge; |
| **Option C (SH–02A)** | • **RTC (including cycleway) on east** with **southern RTC crossover** south of Awanohi Road Underpass.<br>• SH1 **widening to west** by retaining the southbound carriageway, south of Awanohi Rd Underpass to south of Bawden Rd Bridge; |
| **Option D (SH–02B)** | • RTC **(including cycleway) on east** with **northern RTC crossover** south of Bawden Road Bridge<br>• SH1 **widening to west** by retaining the southbound carriageway, south of Awanohi Rd Underpass to south of Bawden Rd Bridge; |
| **Option E (SH–03A)** | • **RTC (including cycleway) on east** with **southern RTC crossover** south of Awanohi Road Underpass.<br>• SH1 **widening to east** by retaining the northbound carriageway, south of Awanohi Road Underpass to south of Bawden Road Bridge; |
| **Option F (SH–03B)** | • **RTC (including cycleway) on east** with **northern RTC crossover** south of Bawden Road Bridge<br>• SH1 **widening to east** by retaining the northbound carriageway, south of Awanohi Road Underpass to south of Bawden Road Bridge; |
| **Option G (SH–04)** | • RTC with **eastern tie-in at Albany** and **RTC crossover 1km south of Awanohi**<br>• SH1 **widening to west** of the carriageway, south of Awanohi Rd Underpass to south of Bawden Rd bridge; and RT that crosses to the west of SH1 approximately 1km south of Awanohi Rd Underpass.<br>• The cycleway alignment continues along the eastern side of SH1 and crosses SH1 south of Bawden Rd bridge to merge back with the RTN. |
| **Option H (SH–05A)** | • **RTC (including cycleway) on east** with **RTC crossover above Awanohi underpass.**<br>• SH1 **widening to west** of the carriageway, south of Awanohi Rd Underpass to south of Bawden Rd bridge; |

| Option Reference | Option Name/Description |
|---|---|
| | • The cycleway alignment continues along the eastern side of SH1 and crosses SH1 south of Bawden Rd bridge to merge back with the RTN. Option includes some realignment of East Coast Road. |
| **Option I (SH-06A)** | • **RTC (including cycleway) on east** with **RTC crossover ~400m south of Awanohi.**<br>• SH1 **widening to west** of the carriageway, south of Awanohi Rd Underpass to south of Bawden Rd bridge;<br>• Active mode corridor continues along the eastern side of SH1 and crosses over SH1 to join the RT corridor further north, before the existing Bawden Rd bridge. Option includes the realignment of Wright Rd. |

| Option A – SH-01A | Option B – SH-01B |
| --- | --- |
|  |  |
| **Option C – SH-02A** | **Option D – SH-02B** |
|  |  |
| **Option E – SH-03A** | **Option F – SH-03B** |
|  |  |
| **Option G – SH-04** | **Option H – SH-05A** |
|  |  |

**Option I – SH-06A**

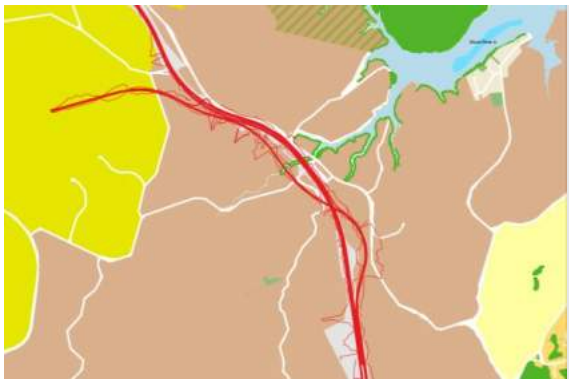


**Figure 25: Map of initial (2020-2021) RTC Segment 2 options for RTC and SH1 Upgrade (Awanohi to Bawden)**

The following table identifies the outcomes from this assessment for the first phase of optioneering in 2020-2021, when the underlying assumption was that the RTC would tie-in to the Northern Busway on the eastern side of SH1 just south of Ōteha Valley Road – and hence a crossover of SH1 was needed within this segment to enable the RTC to enter the Dairy Flat FUZ.

**Table 15: Summary of RTC and SH1 Upgrade Segment 2 assessment (Phase 1 2020-2021 assessment)**

| MCA Criteria | Options | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Option A: SH-01A | Option B: SH-01B | Option C: SH-02A | Option D: SH-02B | Option E: SH-03A | Option F: SH-03B | Option G: SH-04 | Option H: SH-05A | Option I: SH-06A |
| Investment Objective 1: Access | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Investment Objective 2: Resilience | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Investment Objective 3: Integration | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Investment Objective 4: Mode Choice | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Investment Objective 5: Safety* | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 1a. Heritage | -1 | -3 | -1 | -3 | -1 | -3 | -2 | -2 | -1 |
| 2a. Land use futures | -2 | -2 | -2 | -2 | -2 | -2 | -2 | -2 | -2 |
| 2b. Urban design | -1 | 0 | -1 | 0 | -1 | 0 | 0 | 0 | 0 |
| 2c. Land requirement | -2 | -3 | -2 | -3 | -2 | -3 | -2 | -2 | -2 |
| 2d. Social cohesion | -3 | -2 | -3 | -2 | -3 | -2 | -1 | -1 | -1 |
| 2e. Human health and wellbeing | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 |
| 3a. Landscape / visual | -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 |
| 3b. Stormwater/flooding | -2 | -3 | -1 | -3 | -2 | -3 | -3 | -3 | -2 |
| 3c. Ecology | -4 | -4 | -4 | -4 | -4 | -4 | -4 (P) | -4 | -4 |
| 3d. Natural hazards | 0 | -1 | 2 | 1 | -2 | -3 | -1 | 0 | -1 |
| 5a. Construction impacts on utilities / infrastructure | -2 | -2 | -3 | -3 | -3 | -3 | -3 | -3 | -3 |
| 5b. Construction disruption | -2 | -2 | -2 | -2 | -2 | -2 | -2 | -2 | -2 |
| 6a. Construction costs / risk | -3 | -3 | -2 | -3 | -2 | -3 | -3 | -4 | -4 |

Note: Options A, C, E include a 'southern crossover' of SH1 around Awanohi Road and pass through Countryside Living Land before entering the FUZ in Segment 3. Options B, D and F include a 'northern crossover' of SH1 just south of Bawden Road and enter almost directly into the FUZ. Options G, H and I crossover SH1 around Awanohi and proceed up the western wide of SH1 before crossing into the FUZ south of Bawden Road.

The Project Team reviewed and compared the options identified above and noted that criteria relating to heritage, urban design, land requirement, social cohesion, stormwater/flooding, natural hazards, construction impacts on utilities/infrastructure and construction cost/risk are the key considerations for this segment and showed differentiation between the options. Furthermore, ecology is a key issue for this segment, and all options scored high adverse (-4) consideration the significant ecological constraints present.

In relation to non-scored criteria:

- Relative to the southern/Awanohi Road crossing options (A, C, E), Option G avoided a new crossing of a high value tributary of the Ōkura Tributary within the Countryside Living zone west of SH1, which is subject to a Natural Stream Management Area overlay. From a policy perspective Option G was preferred relative to Option H and Option I because it avoided more of the SEA area west of SH1, which has a strong avoidance directive unless it is not practicable to do so.
- Option A was the preferred option from a Value for Money perspective as it is the likely cheapest option, with no difference in benefits between options.
- Option G was the preference of those Manawhenua that stated a preference, on the proviso that stormwater/flooding risks are mitigated through design (e.g. viaducts).

In Phase 1 an initial preference was made between these options. The Project Team identified **Option G: SH-04 (RT crossover ~1km south of Awanohi Road with RTC entering FUZ near Bawden Road; SH1 widening to west)** as the initial preferred route refinement option for the following reasons:

a) Although all options scored -4 for ecology, this was the overall preferred option for ecology (a key issue for this segment) because it confines impacts to the SH1 corridor i.e. causes less overall habitat fragmentation.
b) Avoids East Coast Road realignment (which is required for some other options) and associated impacts on Ōkura Creek/Hauraki Gulf Marine Park/coastal environment.
c) Preference noted by some Manawhenua.
d) Avoids major earthworks and new stream crossing through sensitive Ōkura Creek catchment to west of SH1 (Countryside Living zone and NSMA overlay) – which is an impact of the southern crossover options (Options A, C, E).
e) Scores better than the southern crossover options (A, C, E) from a social/urban design perspective and more preferred from a land use futures perspective, as avoids severing large areas of Countryside Living land.

The southern crossover options A, C and E were discounted by the Project Team for the following reasons:

a) Less preferred in relation to ecology as departs from SH1 alignment and crosses the sensitive Ōkura Creek catchment including an NSMA.
b) Not a stated preference of any Manawhenua.
c) Require significant earthworks through sensitive Ōkura Creek catchment to west of SH1.
d) Less preferred in relation to social/urban design and land use futures perspective, as sever large areas of Countryside Living land, which is not anticipated to change in future.

The northern crossover options B, D and F were discounted by the Project Team for the following reasons:

a) These options require realignment of East Coast Road in a sensitive area, with associated impacts on Ōkura Creek/Hauraki Gulf Marine Park/coastal environment.

b) Not a stated preference of any Manawhenua.
c) More adverse effects on heritage, land requirement and stormwater/flooding than the other options.

Options H and I were discounted by the Project Team for the following reasons:

a) Similar scores overall to Option G but less preferred as have high adverse scores (-4) for construction cost/risk. Option H has greater effects on East Coast Road, plus diagonal flyover crossing over Awanohi Road will require a 3-level interchange, or relocation of Awanohi Road, increasing scope, project risk and complexity. Option I has a complex interchange at RT crossover (diagonally with SH1), intersects Wright Road and has some interface with East Coast Road (extent of earthworks batter) which will require mitigation.

#### 6.7.1.2 Phase 2 Assessment (2022)

As for Segment 1, in 2022, the Project Team identified a change in underlying assumption around the RTC tie-in at Albany with a western tie-in of the RTC to the existing Albany bus station site, just south of Ōteha Valley Road (see reasons in Section 6.6.1.2). For this reason, one additional option (Option J) was tested and compared with the shortlisted option from Phase 1 (Option G), as outlined in **Table 16** and **Figure 26**.

**Table 16: Summary of 2022 RTC Segment 2 options (in combination with SH1 Upgrade Project)**

| Option Reference | Option Name/Description |
|---|---|
| **Option G (SH-04) – shortlisted as preferred from Phase 1 assessment** | • **RTC with eastern tie-in at Albany and RTC crossover 1km south of Awanohi.**<br>• SH1 widening to west of the carriageway, south of Awanohi Rd. Underpass to south of Bawden Rd bridge; and RT that crosses to the west of SH1 approximately 1km south of Awanohi Rd Underpass;<br>• The cycleway alignment continues along the eastern side of SH1 and crosses SH1 south of Bawden Rd bridge to merge back with the RTN. |
| **Option J (SH-12) -new option** | • **RT on west of SH1 on northbound berm with no SH1 crossover.**<br>• Cycleway on east of SH1 (separate to RT) with cycleway crossover just south of Bawden Road.<br>• SH1 widening on both sides to minimise impacts on East Coast Road - with motorway lanes shifted over to east. |

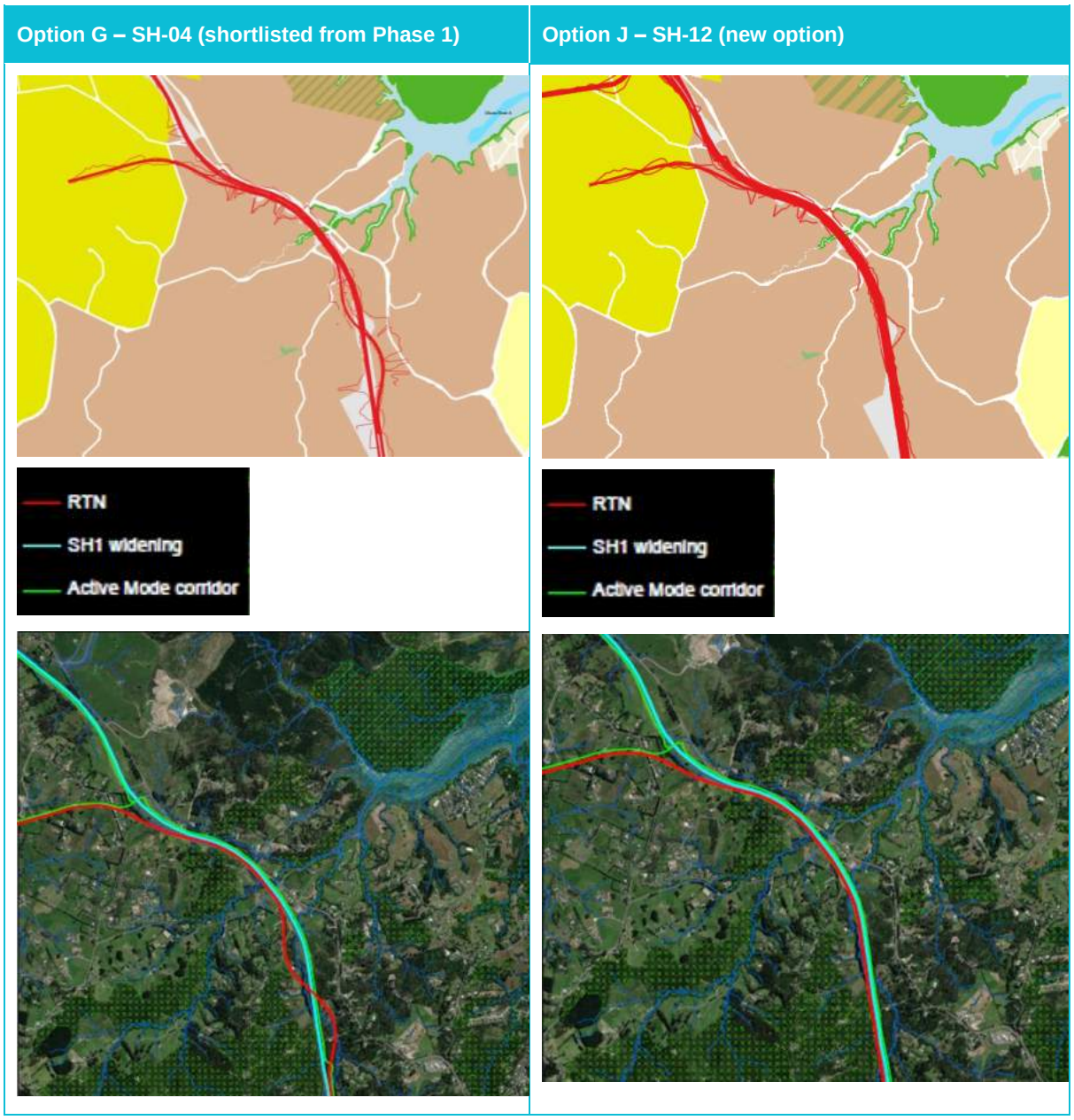



**Figure 26: Map of 2022 RTC Segment 2 options (in combination with SH1 Upgrade Project)**

The following table identifies the outcomes from this assessment for the second phase of optioneering in 2022, when the project team changed the underlying assumption about the RTC tie-in at Albany (to assume all options tie into an RTC station on the west at the site of the Albany bus station). This led to the development of a new option with RTC on the west and cycleway on the east. That new option (**Option J: SH-12**) was compared with the previous initial preferred SH1 crossover option SH-04 (Option G) as set out below.

**Table 17: Summary of RTC and SH1 Upgrade Segment 2 assessment (Phase 2: 2022 assessment)**

| MCA Criteria | Option G (SH-04)<br>RT on east with crossover of SH1 approx. 1km south of Awanohi Road underpass; Cycleway crosses around Bawden Road; SH1 widen to the east | Option J (SH-12)<br>RT on west; cycleway on east with crossover near Bawden Road; SH1 widening both sides |
|---|---|---|
| Investment Objective 1: Access | 4 | 4 |
| Investment Objective 2: Resilience | 4 | 4 |
| Investment Objective 3: Integration | 4 | 4 |
| Investment Objective 4: Mode Choice | 4 | 4 |
| Investment Objective 5: Safety* | 4 | 4 |
| 1a. Heritage | -2 | -2 |
| 2a. Land use futures | -2 | -1 |
| 2b. Urban design | 0 | 1 |
| 2c. Land requirement | -2 | -3 |
| 2d. Social cohesion | -1 | -1 |
| 2e. Human health and wellbeing | -1 | -1 |
| 3a. Landscape / visual | -3 | -3 |
| 3b. Stormwater/flooding | -3 | -3 |
| 3c. Ecology | -4 | -4 |
| 3d. Natural hazards | -1 | -2 |
| 5a. Construction impacts on utilities / infrastructure | -3 | -2 |
| 5b. Construction disruption | -2 | -2 |
| 6a. Construction costs / risk / value capture | -3 | -3 |

* Only related to cycleway component of RTC

The Project Team reviewed and compared the options identified above and noted that matters relating to land use futures, urban design, natural hazards and construction impacts on utilities/infrastructure are the key differentiators between options.

In relation to non-scored criteria:

- From a Policy Analysis perspective, there was a slight preference for Option J as it is more consistent with section 6(c) of the RMA around protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna due to the reduced overall footprint as a result of no crossover structure and minimised habitat fragmentation. The option also avoids as much SEA area as practicable by being located close to the SH1 corridor.
- Manawhenua who stated a preference noted a preference for the new Option J over Option G.
- There was no differentiation between the options noted in regard to value for money.

In the second stage of optioneering, the decision on Segment 2 was made in combination with the decision for Segment 1 because of the close interrelationship between the segments (and particularly the implications for the presence/absence of a SH1 crossover) – this is discussed further in Section 6.8.

In regard to Segment 2 in isolation, however, the Project Team identified a number of advantages of **Option J (RT on west with no crossover; cycleway on east; SH1 widening both sides)** relative to Option G, as follows:

a) Option avoids need for large SH1 crossover structures and the associated earthworks, flooding, landscape/visual and ecological effects (as well as construction disruption)
b) Manawhenua indicated an overall preference for this option.
c) Scores better for land use futures and urban design - mainly because it 'hugs' the existing motorway corridor and avoids effects on Wright Road properties.
d) Scores better for construction impacts on utilities/infrastructure as it avoids large crossover structure(s).

The MCA identified an issue with Option J (as designed) regarding ecology and stormwater/flooding impacts on an approx. 1km section of an Ōkura Creek tributary on the western side of SH1. However, the project team also identified a strong opportunity to avoid stream realignment here through option refinement – e.g. by SH1 widening to east in this area (not both sides as drawn). This would make the new option preferred overall from an ecology perspective due to the reduced overall footprint and minimised habitat fragmentation. It would also make it preferred from a stormwater/flooding perspective and also improve the natural hazards (Geotech) score.

The Project Team also noted a number of disadvantages of Option G, including:

a) Need for large SH1 crossover structures.
b) No increase in benefits and greater adverse effects in relation to land use futures, urban design and construction impacts on utilities/infrastructure.

Segments 1 and 2 were considered together in making the decision. This is covered in Section 6.8.

## 6.8 RTC Segments 1 and 2 combined

The options analysis for Segments 1 and 2 showed an initial preference for an RTC route on the west of SH1 between Albany and Bawden Road, without a SH1 crossover, and assuming a cycleway on the east (for the New Walking and Cycling path on SH1) and motorway lanes shifted over to the east (for the Upgrades to SH1) – refer **Figure 27**.

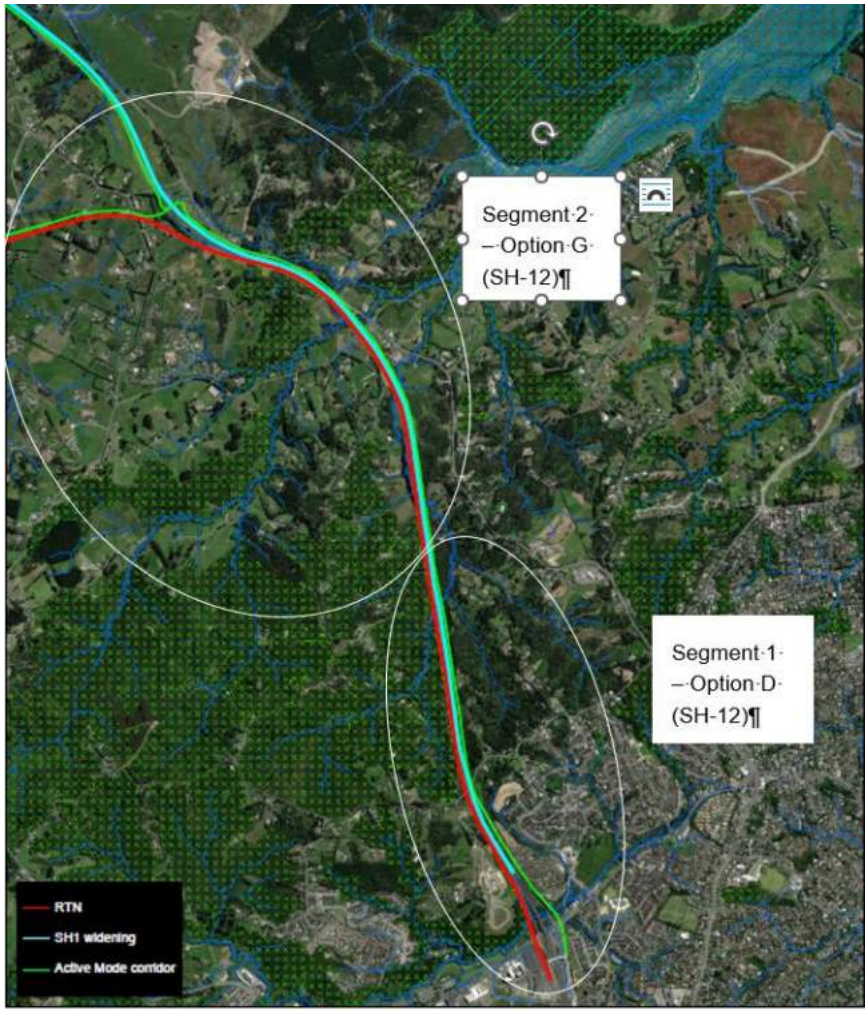



**Figure 27: Combined Segments 1 and 2 – RTC (and Upgrades to SH1, with New Walking and Cycling path on SH1**

In order to confirm these decisions and to make a combined decision on RTC Segments 1 and 2 (Albany to Bawden), the team undertook some quantitative analysis of cost differentials to compare the two top performing options for these segments i.e. comparing:

- **Initial preferred options:** RT on west of SH1 (no SH1 crossover) with cycleway on east and motorway lanes shifted over to east (i.e. Option D (SH-12) from Segment 1 PLUS Option J (SH-12) from Segment 2)); and
- **Second optimal performing options:** RT on east of SH1 with crossover of SH1 approx. 1km south of Awanohi Road underpass; Cycleway on east and crosses SH1 around Bawden Road; SH1 widen to the east (Option C (SH-11 from Segment 1) PLUS Option G (SH-04) from Segment 2)

This analysis was done because an RT crossover of SH1 would be a major structure with associated capital/property costs. Also, the initial preferred options for Segments 1 and 2 require shifting over of existing motorway lanes to the east, which was likely to have a cost difference. The assessment confirmed that, overall, the differences in cost were within 5% and not considered a differentiator. This confirmed the initial preferred options for Segments 1 and 2.

## 6.9 RTC Segment 3: Dairy Flat FUZ

Dairy Flat FUZ (Segment 3) extends through the main areas in Dairy Flat zoned as FUZ. **Figure 28** below shows the extent of the segments study area where options were generally developed within as well as the preferred alignment.

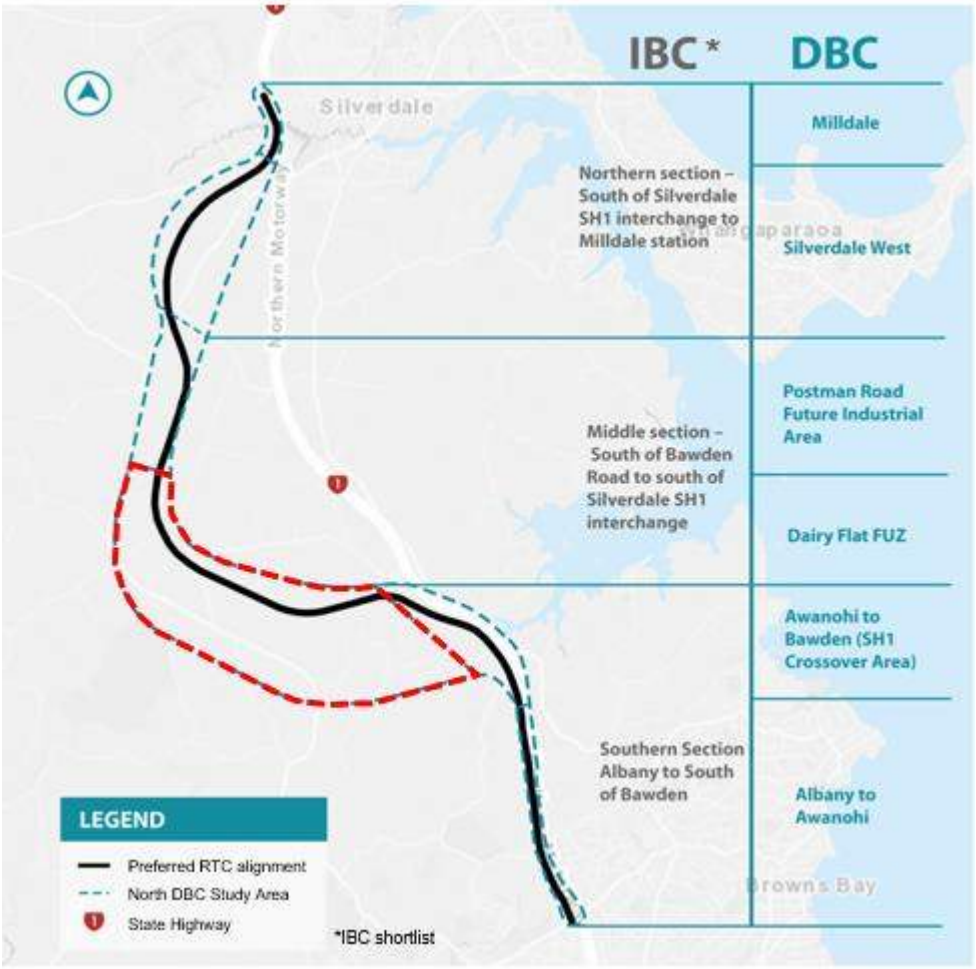



**Figure 28: RTC segment 3 – Dairy Flat FUZ (DBC)**

Assessment of options for the RTC segment through the main Dairy Flat FUZ included two key processes that proceeded in parallel, and both fed into each other and the decision-making process:

a) **Detailed Corridor Assessment through the main MCA framework** – six alignment options (see section 6.9.1)
b) **A Dairy Flat Land use integration assessment process** (see section 6.9.2) – which included a workshop series with Manawhenua, Auckland Council, Auckland Transport and Waka Kotahi representatives (in 2021-2022), with a separate scoring process focusing on integration between the RTC and a future town centre in Dairy Flat. This comprised an assessment of a further seven transport-land use integration scenarios (combinations of alignment options and town centre options).

**Figure 29** summarises how these two processes interacted and influenced the decision on a preferred RTC alignment.

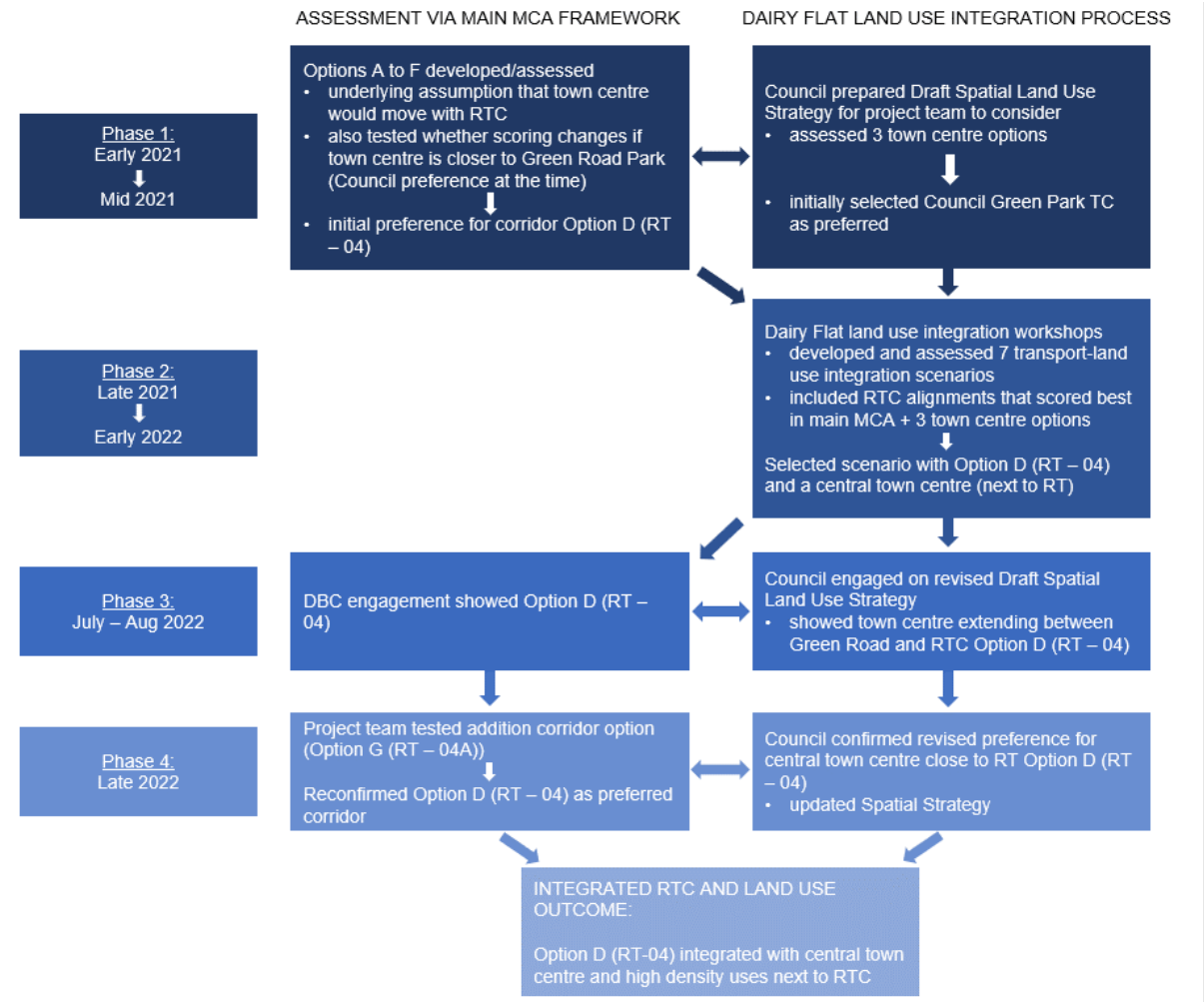



**Figure 29: RTC in the Dairy Flat FUZ segment – integration of main MCA Framework assessment and Dairy Flat land use integration process**

Route options in this segment were generally limited to an area through the area of Dairy Flat zoned as FUZ between the RTC connection to SH1 (northern end of Segment 2) and the southern end of the Dairy Flat-Silverdale West Industrial Structure Plan area (southern end of Segment 4), with a north-south extent between the IBC alignment north of Bawden Road and an area south of Dairy Flat Highway – for the following reasons:

a) The significant opportunity to enable higher density growth and sustainable, transit-oriented development in the FUZ, and integrate with a future town centre in Dairy Flat.

b) Consideration of the developable catchment around potential RTC stations i.e. avoiding floodplains and sensitive areas.

c) The presence of the North Shore Airport, potential plans by the airport to extend their runway and associated airport safety zones, which would limit transit-oriented development around the RTC.

A number of key constraints and opportunities were also identified in the study area which informed option development (refer **Figure 30**). These included:

a) Areas of wetlands, floodplains and stream crossings.

b) Green Park (a Council owned regional park) which Council has aspirations to develop over time as a regional leisure and park facility -and the opportunity to access this via the RTC.

c) Location of the future Dairy Flat town centre – refer Figure 35 below.

d) An Outstanding Natural Landscape overlay just south of Dairy Flat Highway along Huruhuru (Dairy Stream).

e) Areas of steep topography and challenging geotechnical conditions.

f) The presence of Bawden Road and Dairy Flat Highway, which are both proposed for upgrade as separate projects – and which would need to be crossed by the RTC (grade-separated).

g) Important community facilities including Dairy Flat School, a community hall and tennis club, the North Shore Riding Club and Matea Trust– a residential service for people with intellectual disabilities.


**Figure 30: Map of key constraints and features in the RTC Segment 3 for optioneering.**

### 6.9.1 Phase 1 - Detailed Corridor Assessment (early-mid 2021)

In consideration of the gap analysis and constraints analysis, **six Detailed Corridor Options** were developed for MCA in the first phase of assessment (early-mid 2021), as outlined in **Table 18** and Figure 31 below.

**Table 18: Summary of RTC Segment 3 options – Phase 1 Options for MCA**

| Option Reference | Option Name/Description |
|---|---|
| **Option A (RT-01)** | • RT with cycleway alignment joining Segment 2 south of Awanohi Road underpass, then passing through the Dairy Flat FUZ adjacent to Dairy Flat Highway |
| **Option B (RT-02)** | • RT with cycleway alignment joining Segment 2 south of Awanohi Road Underpass. The alignment then cuts across the FUZ towards the ridgeline, which is centrally located within the FUZ. |
| **Option C (RT-03)** | • RT with cycleway alignment joining Segment 2 south of Bawden Road Bridge, then crossing the Dairy Flat FUZ towards Dairy Flat Highway, crossing the local road corridor and continuing adjacent to Dairy Flat Highway, on the southern side. |
| **Option D (RT-04)** | • RT with cycleway alignment joining Segment 2 south of Bawden Road Bridge, then following the ridgeline through the centre of the Dairy Flat FUZ. |
| **Option E (RT-05)** | • Variant of RT-03 to avoid Outstanding Natural Landscape and Dairy Flat school. RT with cycleway alignment joining Segment 2 south of Bawden Road Bridge, then crossing the Dairy Flat FUZ towards Dairy Flat Highway, crossing the local road corridor and continuing adjacent to Dairy Flat Highway, on the southern side – crossing back over Dairy Flat Highway at the Green Road intersection |
| **Option F (RT-06)** | • Blend of Options RT-02 and RT-05.<br>• RT with cycleway alignment joining Segment 2 south of Awanohi Road Underpass. The alignment then cuts across the FUZ towards the ridgeline, then turns towards the Dairy Flat FUZ towards Dairy Flat Highway, crossing the local road corridor and continuing adjacent to Dairy Flat Highway, on the southern side.<br>• The alignment then continues north to the edge of the industrial Structure Plan area. |

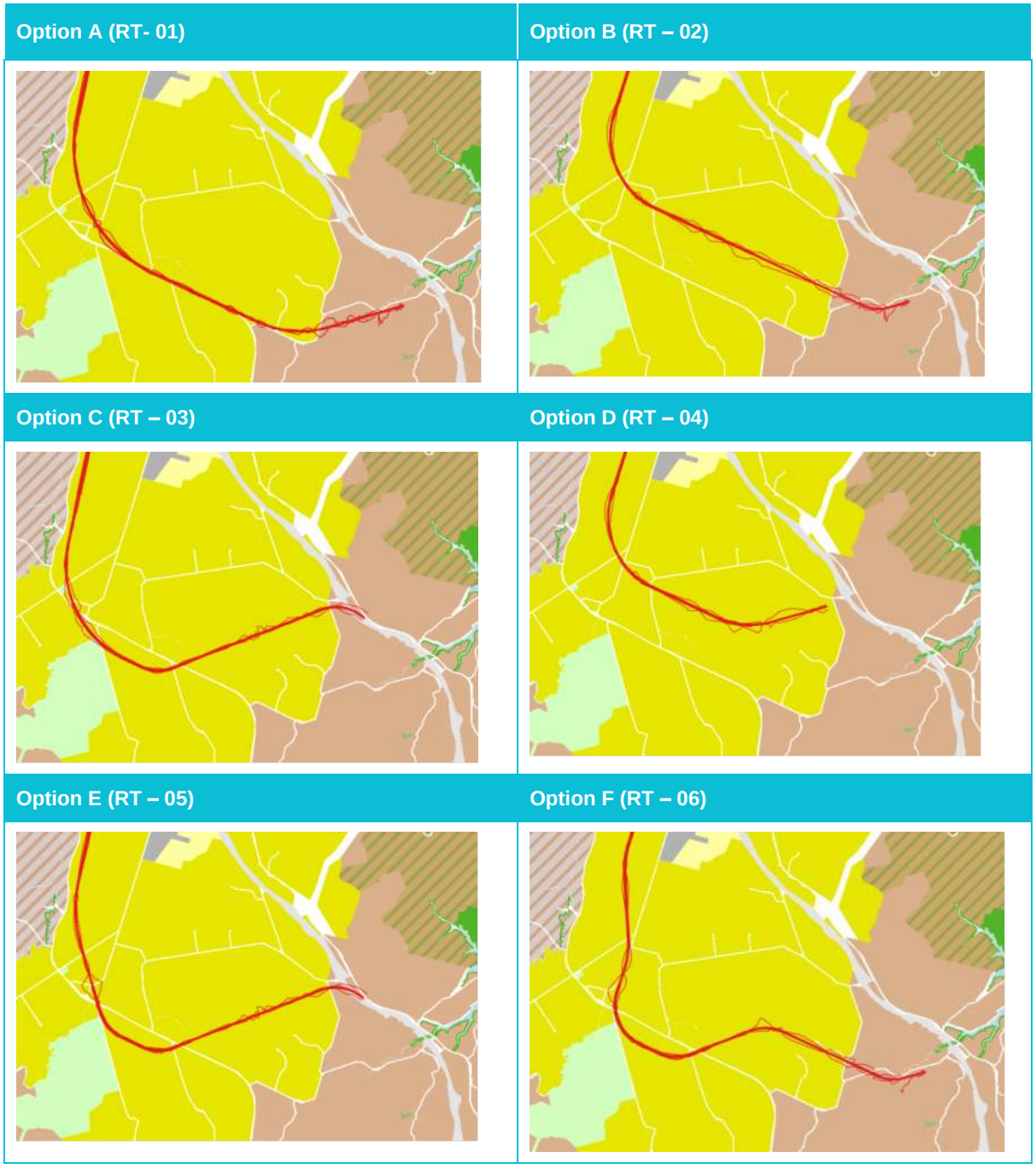



**Figure 31: Phase 1 Detailed Corridor Options for RTC**

The development and assessment of RTC alignment options in this segment was undertaken in close partnership with Auckland Council, including consideration of Council's land use aspirations for the FUZ area and, in particular, the proposed location of a future town centre. Council's consideration of town centre options proceeded in parallel with and integrated with the RTC Segment 3 optioneering.

In May 2021, Council assessed three options for town centres in Dairy Flat **and initially selected a town centre next to Green Park** (as shown in Figure 32 below).

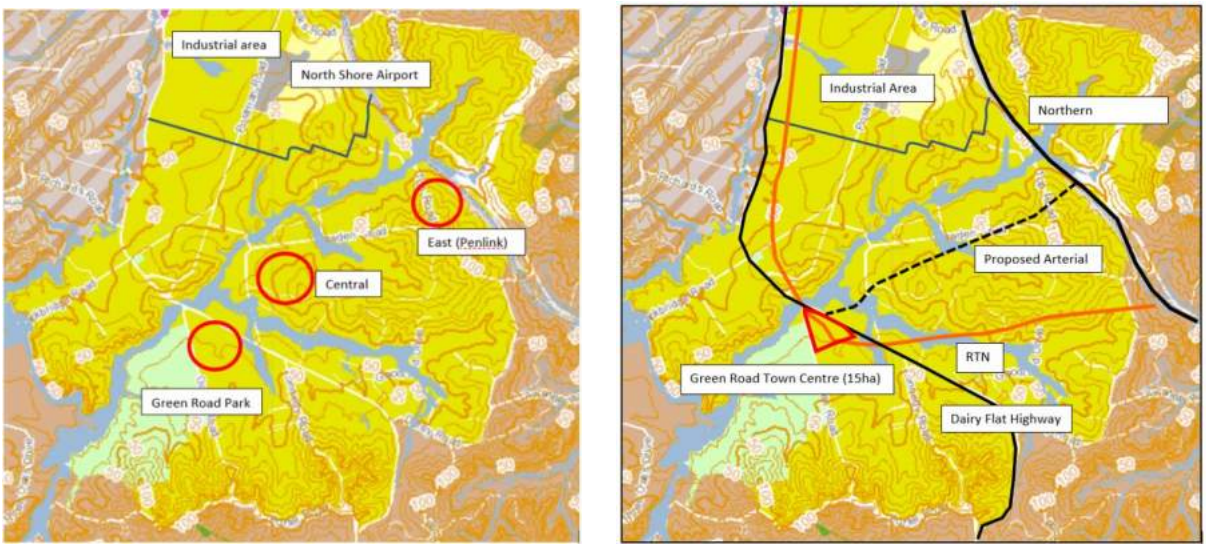



**Figure 32: Town centre options and Council's initial preferred town centre option (May 2021)**

The following table identifies the outcomes from the MCA assessment of the six Detailed Corridor Options outlined above. Options A to F were first scored with an underlying assumption that the town centre would move with the RT. The scoring was then tested to see if there were any scoring changes if the town centre was located closer to Green Park, considering this was a stated preference of Council at the time of the assessment.

The Project Team reviewed and compared the options identified above and noted that matters relating to landscape/visual, stormwater/flooding, ecology, natural hazards, construction impacts on utilities/infrastructure and construction costs/risk/value capture are the key considerations for this segment and showed differentiation between the options.

In relation to non-scored criteria:

- Options D and E were preferred overall in relation to Policy Analysis particularly due to policy directives within the AUP:OP.
- Option A was the preferred option from a Value for Money perspective as it is the likely cheapest option, with the most optimal value for money outcome (followed by Options B and D which all have a lower but similar Value for Money Outcome).
- Option D was the preference of those Manawhenua that stated a preference, recognising that the option follows the ridgeline (which reduces impacts and aligns with traditional transport routes).

Accordingly, the Project Team identified **Option D (RT-04)** as the preferred corridor option for the following reasons:

a) Scored best equal against investment objectives (equal to RT-02) for access and transport integration because these are the shortest routes and have the highest percentage of the route catchments (both 1km and 3km catchments) within the FUZ.
b) Manawhenua stated preference as the option most closely follows the ridgeline and has the least environmental effects.
c) Scored optimal overall in relation to ecology.

d) Overall, scored optimally against MCA criteria – which is generally related to its location along the ridgeline which limits stream/potential wetland crossings, simplifies construction complexity and limits stormwater/flooding issues.

**Table 19: Summary of RTC Segment 3 assessment – Assumes Town centre moves with RT**

| MCA Criteria | Option A (RT-01) | Option B (RT-02) | Option C (RT-03) | Option D (RT-04) | Option E (RT-05) | Option F (RT-06) |
|---|---|---|---|---|---|---|
| Investment Objective 1: Access | 3 | 4 | 3 | 4 | 3 | 3 |
| Investment Objective 2: Resilience | 3 | 4 | 4 | 4 | 4 | 4 |
| Investment Objective 3: Integration | 3 | 4 | 3 | 4 | 3 | 3 |
| Investment Objective 4: Mode Choice | 3 | 4 | 4 | 4 | 4 | 4 |
| Investment Objective 5: Safety* | 3 | 3 | 3 | 3 | 3 | 3 |
| 1a. Heritage | -2 | -1 | -1 | -1 | -1 | -1 |
| 2a. Land use futures | -2 | -2 | -3 | -1 | -1 | -2 |
| 2b. Urban design | -2 | -2 | 2 | 2 | 2 | 1 |
| 2c. Land requirement | -2 | -2 | -4 | -2 | -2 | -2 |
| 2d. Social cohesion | -3 | -3 | -4 | -2 | -2 | -3 |
| 2e. Human health and wellbeing | -2 | -2 | -4 | -2 | -2 | -2 |
| 3a. Landscape / visual | -3 | -3 | -4 | -2 | -3 | -3 |
| 3b. Stormwater/flooding | -3 | -1 | -2 | -1 | -2 | -3 |
| 3c. Ecology | -4 | -3 | -4 | -2 | -3 | -3 |
| 3d. Natural hazards | -2 | -3 | -1 | -1 | 0 | -2 |
| 5a. Construction impacts on utilities / infrastructure | -2 | -1 | -1 | -1 | -1 | -2 |
| 5b. Construction disruption | -4 | -3 | -4 | -3 | -4 | -3 |
| 6a. Construction costs / risk | -3 | -3 | -3 | -2 | -3 | -3 |

* Only related to cycleway component of RTC

Option A (RT-01) was discounted by the Project Team for the following reasons:

a) The option is not preferred by the Transport expert because investment objective scoring scores less favourably than alternative options.
b) The option is not preferred by Manawhenua.
c) The option was least preferred in relation to ecology (-4) as it affects regenerating secondary kahikatea forest (Critically Endangered Regionally) around the Huruhuru (Dairy Stream) crossing.
d) The option was least preferred in relation to construction disruption (-4) due to the expected disruption of Dairy Flat Highway which is a key access connection for local residents.

Option B (RT-02) was discounted by the Project Team for the following reasons:

a) Scored well from investment objectives perspective (equal to RT-04) but scored less positively/more adversely for most other MCA criteria.
b) The option is not preferred by Manawhenua.

Option C (RT-03) was discounted by the Project Team for the following reasons:

a) Scored most adversely overall in relation to MCA criteria – including direct impacts on an Outstanding Natural Landscape Overlay near Green Park, Green Park itself, the Dairy Flat School and Dairy Flat Tennis Club.
b) The option is not preferred by Manawhenua.

Option E (RT-05) was discounted by the Project Team for the following reasons:

a) Scored less positively against the access and integration investment objectives as it is a longer route than the more northern options and has less percentage of catchment within the FUZ.
b) The option is not preferred by Manawhenua.
c) More adverse effects than RT-04 in relation to landscape/visual, stormwater/flooding, construction cost/risk and ecology.

Option F (RT-06) was discounted by the Project Team for the following reasons:

a) Scored less positively against the access and integration investment objectives as it is a longer route than the more northern options and has less percentage of catchment within the FUZ.
b) The option is not preferred by Manawhenua.
c) More adverse effects than RT-04 in relation to land use futures, social cohesion, landscape/visual, stormwater/flooding, ecology, natural hazards, construction impacts on utilities/infrastructure and construction cost/risk.

For the scenario where a town centre is closer to Green Park, the assessment showed the following:

- **Investment objectives**:
    - The Access investment objective score would remain as a +4 for Option D (RT-04). Whilst this scenario would not support the opportunity for access to and from a higher density node around the RT station, there would still be potential to integrate the RTC with supporting PT services, such as the Whangaparāoa FTN (and other services). Although direct access between Whangaparāoa and the future Dairy Flat town centre would be reduced, there are identified town centres at Whangaparāoa and Silverdale serving those communities.

  - The Integration investment objective would drop from +4 to +3 for Option B (RT-02) and Options D/G (RT-04), as there would be less opportunity for access to and from the higher density node around the station, albeit density around the station would be supported by the NPS UD.
- **Land use futures:** If the Town Centre was removed from the RTN, the integration with land use would score slightly worse for Option B (RT-02), and Options D/G (RT-04) (-2), as the density and business uses expected in a town centre would be further removed from the RT - although this would be moderated by the NPS-UD which supports dense residential land uses around an RT station.
- **Urban design:** Similarly, the scores for urban design for Options B, D, G (RT-02/04) would score slightly worse if the town centre was removed from the RT (-3 for RT-02 and 0 for RT-04).
- **No changes to other scores.**

This assessment confirmed that Option D (RT-04) would remain the preferred alignment even if the town centre moved closer to Green Park or somewhere in between.

### 6.9.2 Phase 2 – Dairy Flat Land Use Integration Workshops (late 2021-early 2022)

In late 2021 and early 2022, the project team facilitated a series of Dairy Flat Land Use Integration workshops with Auckland Council, Waka Kotahi, Auckland Transport and Manawhenua representatives.

The process is summarised in **Figure 33**.

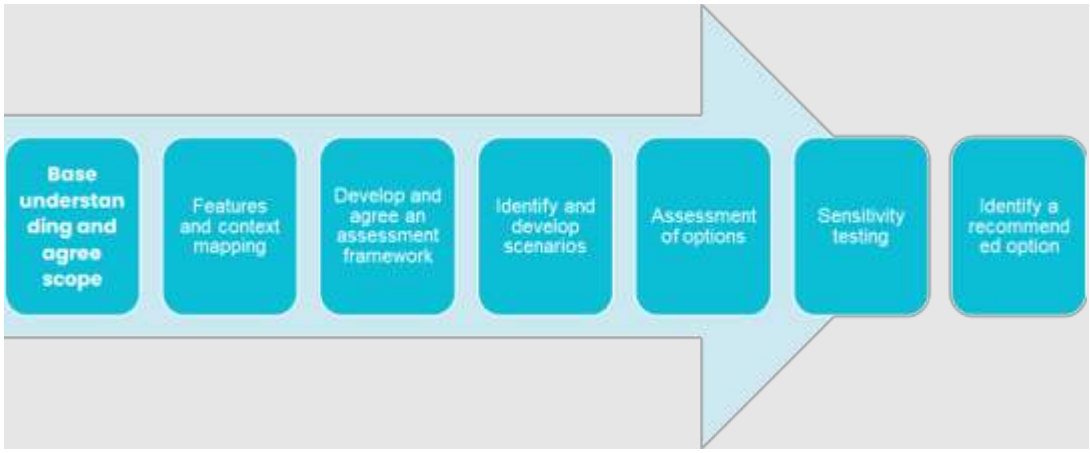


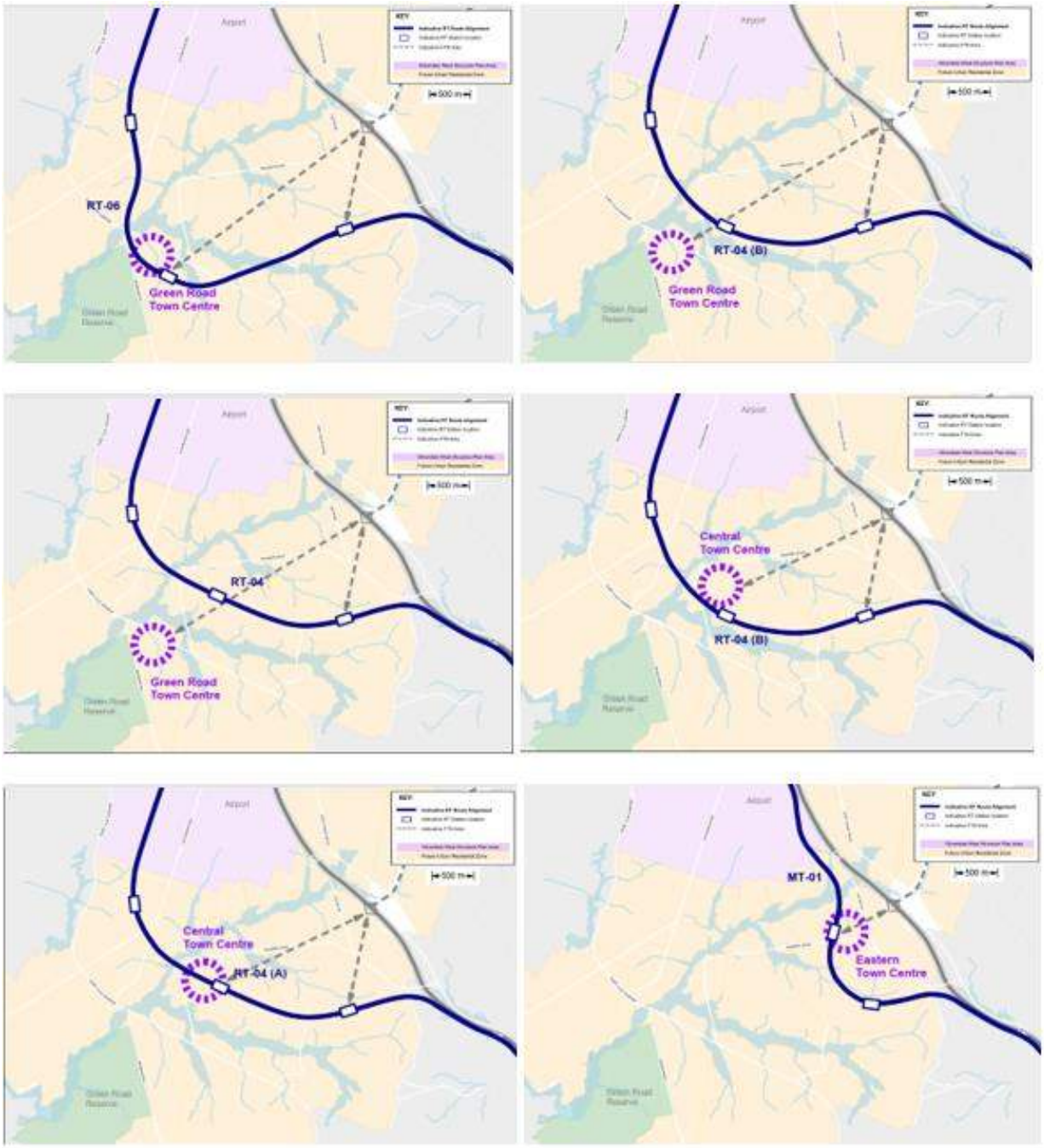

**Figure 33: Dairy Flat land use integration assessment process**

Through this process, those in attendance developed a series of seven RTC Land Use Integration Scenarios as shown on **Figure 34**. These scenarios included combinations of three town centre options and the following high level RTC alignments:

- **RT-06** – which extends below Dairy Flat Highway to access a potential town centre location next to Green Park and was the same RTC alignment as Option F (RT-06) in the full MCA process.
- **RT-04** - which was the same RTC alignment as Option D (RT-04) in the full MCA process.
- **RT-04 (B)** – which was a variant of Option D (RT-04), but extends further south to the northern edge of the Huruhuru (Dairy Stream) floodplain.

- **MT-01** – which was an alignment parallel to SH1, which was previously considered at IBC phase and dismissed in favour of a general corridor through the Dairy Flat FUZ. This option was included as a 're-check' of this high-level option in the context of a potential town centre to the east near Ō Mahurangi Penlink.

RTC options A, B, C and E (RT-01, RT-02, RT-03 and RT-05) were not included in the scenarios as they did not score as well through the full MCA process in the Phase 1 Detailed Corridor Assessment (see Section 6.9.1).



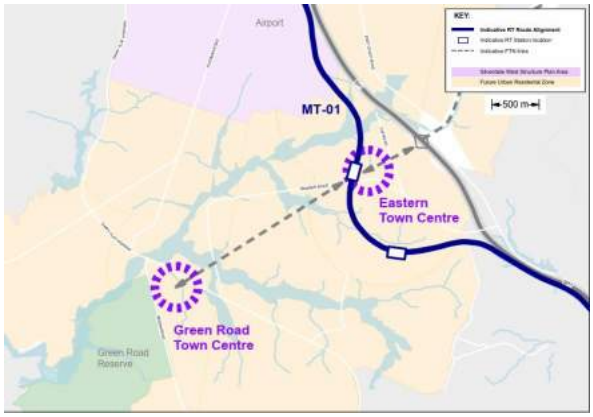



**Figure 34: RTC and land use integration scenarios**

Options were qualitatively assessed against a set of land use and transport criteria, agreed by the workshop participants. Initial assessment was completed by the Project Team for the transport criteria, and Auckland Council for the land use criteria. The results were then challenged in the workshops. Following the qualitative assessment, the scenarios were ranked in terms of preference and sensitivity testing was performed on the rankings. This sensitivity testing considered whether if more weighting was applied to any of the categories, this would change the overall ranking and/or the decision.

The outcome of this analysis and workshop process is included in **Table 20**.

**Table 20: Summary of Dairy Flat integration assessment**

| | | Green Park Centre options | | | Central centre options | | East centre | Dual Town Centres |
|---|---|---|---|---|---|---|---|---|
| Categories | Short list Criteria | SCENARIO 1: Green Park centre and Southern RTC (RT-06) | SCENARIO 2: Green Park centre and south central RTC | SCENARIO 3: Green Park and Central RTC (RT-04B) | SCENARIO 4: Central centre and south central RTC (RT-04B) | SCENARIO 5: Central centre and central RTC (RT-04) | SCENARIO 6: East centre and Eastern RTC (MT1-1) | SCENARIO 7: Dual Town Centre and eastern RTC (MT1-1) |
| Ranking by category | Te Ao Maori | | | | | P | | |
| | Environmental | | | P | | | | |
| | Town centre | P | | | | | | |
| | Transport outcomes | | | | | | | |
| | Development around stations | | | | | P | | |
| | Social | | | | P | | | |
| | Cost / staging | | | | | | P | P |
| | | | | | | | | |
| Overall ranking | Overall ranking | | | | | P | | |

In summary, the analysis concluded that **Scenario 5: Central Centre and central RTC alignment** (which is Option D or RT-04 in MCA analysis above) ranked highest overall, followed by Scenario 3: Green Park Centre and Central RTC. This confirmed the conclusion from the MCA analysis that Option D (RT-04) is the overall preferred RTC alignment, and that it is flexible to work with different town centre options – but would work best with a central centre close to the alignment.

### 6.9.3 Phase 3 – Engagement (July-August 2022)

Following the Dairy Flat Land Use Integration process, Council publicly released (in parallel with the North Projects DBC engagement) a Draft Dairy Flat and Silverdale West Spatial Land use Strategy that proposed a town centre extending in an elliptical shape between Green Park and the Project Team's Emerging Preferred RTC alignment (Option D -RT-04) – see **Figure 35**.

In July-August 2022, the Project team engaged on the Emerging Preferred option for the RTC, which included the Option D (RT-04) alignment through Dairy Flat.

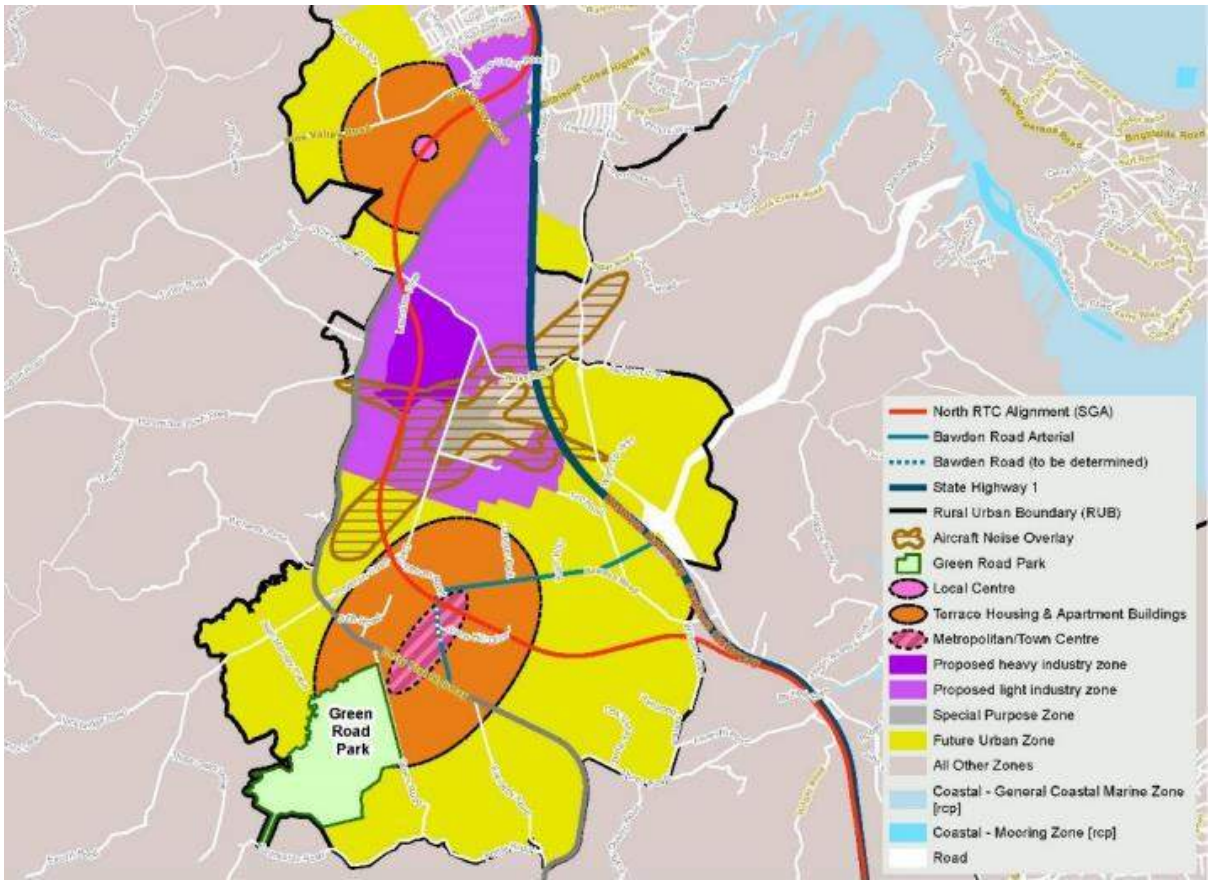



**Figure 35: Draft Spatial Land Use Strategy Silverdale Dairy Flat / DBC emerging preferred option - July 2022**

### 6.9.4 Phase 4 – Additional Corridor Assessment and Updated Spatial Strategy (Late-2022-early 2023)

In response to feedback during engagement, Option G (RT-04A) was added into the Detailed Corridor Assessment process in August 2022 (see **Table 21** and **Figure 36**). Option G is similar to Option D but is up to 300m further north (closer to Bawden Road).[9] Both the Option D and G alignments closely resemble the indicative IBC corridor through this segment, as shown in the indicative strategic transport network for the North but were developed in more detail than the IBC option (i.e. with more detailed consideration of geometric and other engineering constraints). Option G was added into the assessment post the August 2022 DBC engagement in response to feedback from some landowners who supported an alignment closer to the indicative IBC corridor shown on the maps. Adding the

[9] The IBC alignment shown was highly indicative and was recommended to be further considered at DBC phase. Option D and Option G are both similar to the recommended IBC option (albeit Option D is approx. 300m further south at the widest point of divergence).

option into the assessment enabled it to be fully compared with the other options (at a similar level of design) as an input into the decision-making process.[10].

**Table 21: Additional Detailed Corridor Option G**

| Option Reference | Option Name/Description |
|---|---|
| **Option G (RT-04A)** | • Similar to IBC corridor .<br>• RT with cycleway alignment joining Segment 2 south of Bawden Road Bridge, then following the ridgeline through the centre of the Dairy Flat FUZ - approx. 300m north of RT-04, closer to Bawden Road. |

**Figure 36: Additional Detailed Corridor Option G**

The outcome of the MCA analysis is shown in **Table 22**.

**Table 22: MCA Summary – Comparing Emerging Preferred option D with additional Option G**

| MCA Criteria | Option D (RT-04) – Emerging Preferred Option | Option G (RT-04A) |
|---|---|---|
| Investment Objective 1: Access | 4 | 4 |
| Investment Objective 2: Resilience | 4 | 4 |
| Investment Objective 3: Integration | 4 | 4 |
| Investment Objective 4: Mode Choice | 4 | 4 |

| | | |
|---|---|---|
| Investment Objective 5: Safety* | 3 | 3 |
| 1a. Heritage | -1 | -1 |
| 2a. Land use futures | -1 | -1 |
| 2b. Urban design | 2 | 2 |
| 2c. Land requirement | -2 | -3 |
| 2d. Social cohesion | -2 | -2 |
| 2e. Human health and wellbeing | -2 | -2 |
| 3a. Landscape / visual | -2 | -2 |
| 3b. Stormwater/flooding | -1 | -1 |
| 3c. Ecology | -2 | -3 |
| 3d. Natural hazards | -1 | -1 |
| 5a. Construction impacts on utilities / infrastructure | -1 | -1 |
| 5b. Construction disruption | -3 | -3 |
| 6a. Construction costs / risk | -2 | -2 |

* Only related to cycleway component of RTC

This analysis showed that Option G (RT-04A) had similar scores to the emerging preferred Option D (RT-04) for most criteria, but scored more adversely for:

- land requirement as it has greater property impacts in terms of dwellings and potential full acquisitions.
- ecology as it crosses (fragments) a number of additional streams with associated potential natural wetlands and riparian vegetation.

In relation to non-scored criteria:

- There was no real differentiation between the options from a Policy Analysis or Value for Money perspective.

Option G was discussed with Manawhenua, who confirmed a preference for the emerging preferred Option D (RT-04).

In October 2022, Council considered engagement feedback on the Draft Spatial Land Use Strategy from the community, Healthy Waters, Auckland Council's Community Facilities team, Waka Kotahi and Auckland Transport. Council subsequently confirmed a preference for a Central Town Centre next to the emerging preferred RT alignment (Option D- RT-04). The reasons for this change in strategy for the town centre location are as follows (as advised by Council in October 2022):

- The Auckland Council community facilities team advised that it is preferable that community facilities are located as close as possible to the likely RTC station in Dairy Flat as possible, even if that means purchasing additional land. Therefore, the Green Road Park was no longer the preferred location for community facilities. They also pointed out that it was not essential that a centre be located near the major sports facilities contemplated for the Park, as such sports facilities had regional rather than local catchments. Also, with the likely development of intensive sports facilities, with floodlighting etc and extended hours of operation, there would be reverse sensitivity issues if high density residential activity was located too close to the parts of the park where these activities would be located.

- Community engagement on the plan raised concerns regarding flooding issues in the Huruhuru (Dairy Stream) floodplain hindering town centre development – if a town centre is located closer to Green Park.
- Healthy Waters also carried out some additional flood modelling to reflect increased temperature increase scenarios. This demonstrated that the extent of the flood plains in the area will increase slightly, particularly the east-west floodplain just north of Dairy Flat Highway, which could make it more difficult to integrate the parts of the centre on either side.

Council revised their Spatial Land Use Strategy in April 2023[10], as shown in **Figure 37** below.

The Project Team also discussed Option G with Auckland Council, who confirmed a preference for the emerging preferred Option D (RT-04), given its location on the ridgeline and its more central location within the Dairy Flat FUZ.

For the reasons noted above, Option G (RT-04A) was therefore discounted by the Project Team and Option D was confirmed as the preferred option.

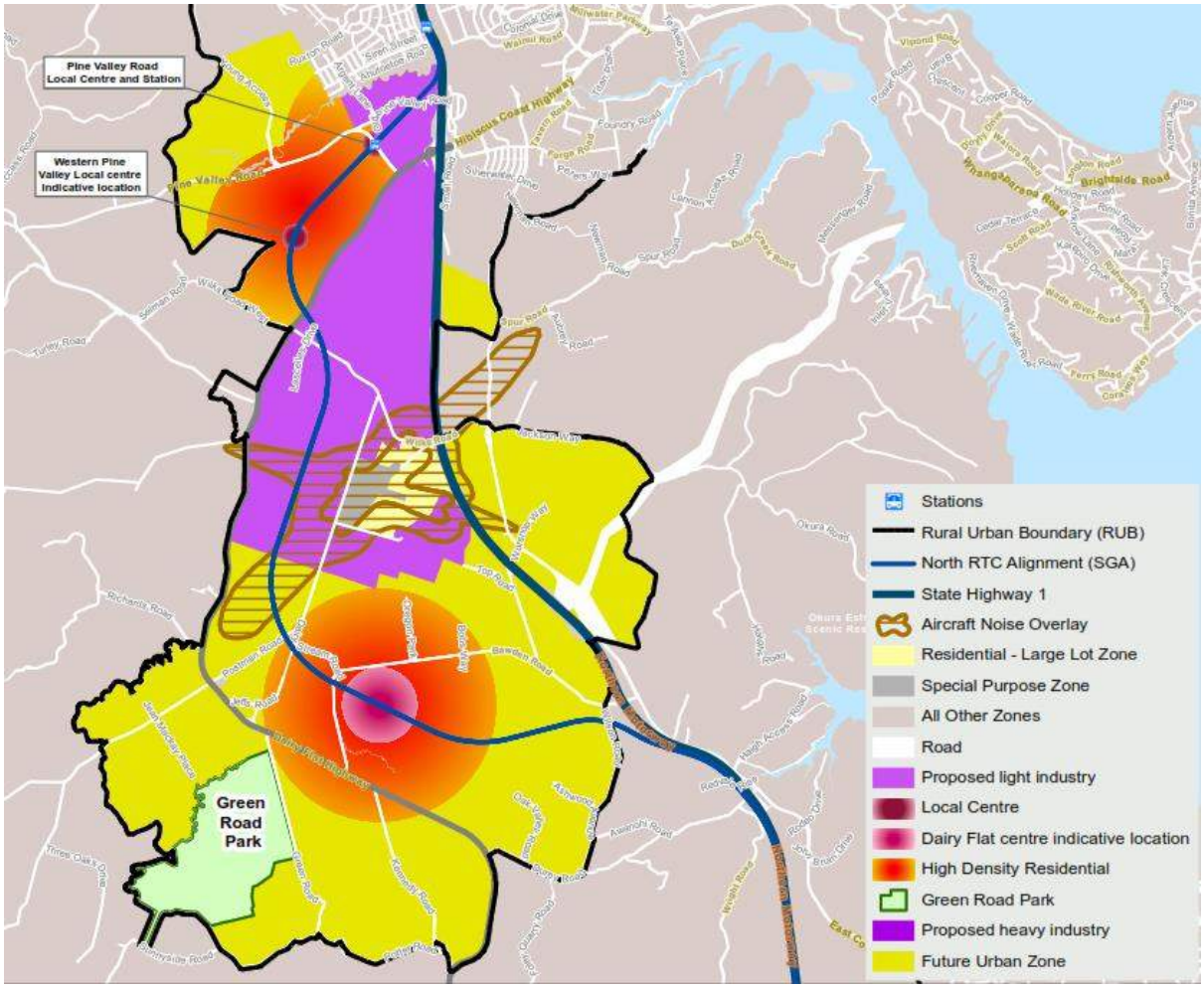



**Figure 37: 13 April 2023 – DBC emerging preferred option / Draft Spatial Plan[11]**

[11] The Spatial Land Use Plan Silverdale Dairy Flat is draft and has not been adopted by the council's Planning, Environment and Community Committee

## 6.10 RTC Segment 4: Postman Road Future Industrial Area

Postman Road Future Industrial Area (Segment 4) extends through the Future Industrial Area from Postman Road to Wilks Road. **Figure 38** below shows the extent of the segments study area where options were generally developed within as well as the preferred alignment.

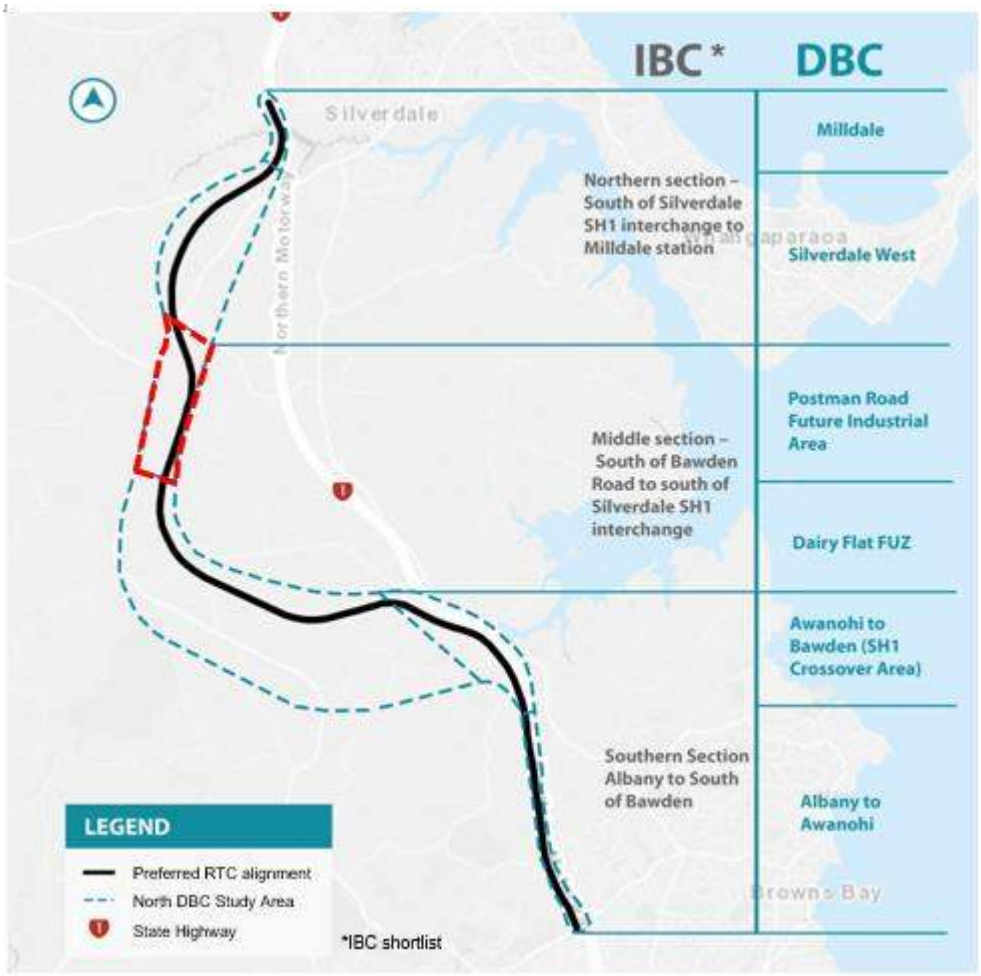



**Figure 38: RTC segment 4 – Postman Road Future Industrial Area (DBC)**

### 6.10.1 Detailed Corridor Option development

Route options in this segment were generally limited to a north-south area between the southern extent of the Dairy Flat- Silverdale West Industrial Structure Plan area (northern end of Segment 3) and Kahikatea Flat Road; and a west-east area between Dairy Flat Highway and Postman Road- for the following reasons:

a) The IBC recommended an indicative corridor for the RTC through the Dairy Flat FUZ area and this was reconfirmed as appropriate through the gap analysis as detailed above.

b) The southern boundary of the segment indicates a difference in anticipated future land use (i.e., future industrial) relative to the main Dairy Flat FUZ to the south (which is anticipated as future urban residential and town centre).

c) The presence of the Rural Urban Boundary (RUB) west of Dairy Flat Highway i.e., the area west of the highway is zoned rural (not FUZ) and is intended to mark the edge of the FUZ.

d) The presence of the North Shore airport to the east including associated aircraft noise overlays (which would limit transit-oriented development around the RTC) and potential plans by the airport to expand to the south-west.

The northern extent of this segment was set at Kahikatea Flat Road (and not Wilks Road) because options for the segment to the north (Segment 5) varied between Kahikatea Flat Road and Wilks Road, and the variations were strongly linked to whether and where the RTC extends westwards to cross Dairy Flat Highway.

Other constraints and features in this area are shown on **Figure 39** and include:

a) Areas of wetlands, floodplains and stream crossings.

b) The existing Dairy Flat town/business centre around the Kahikatea Flat Road and Dairy Flat Highway intersection (zoned Business-Light Industry).

c) Redvale Landfill and Energy Park.

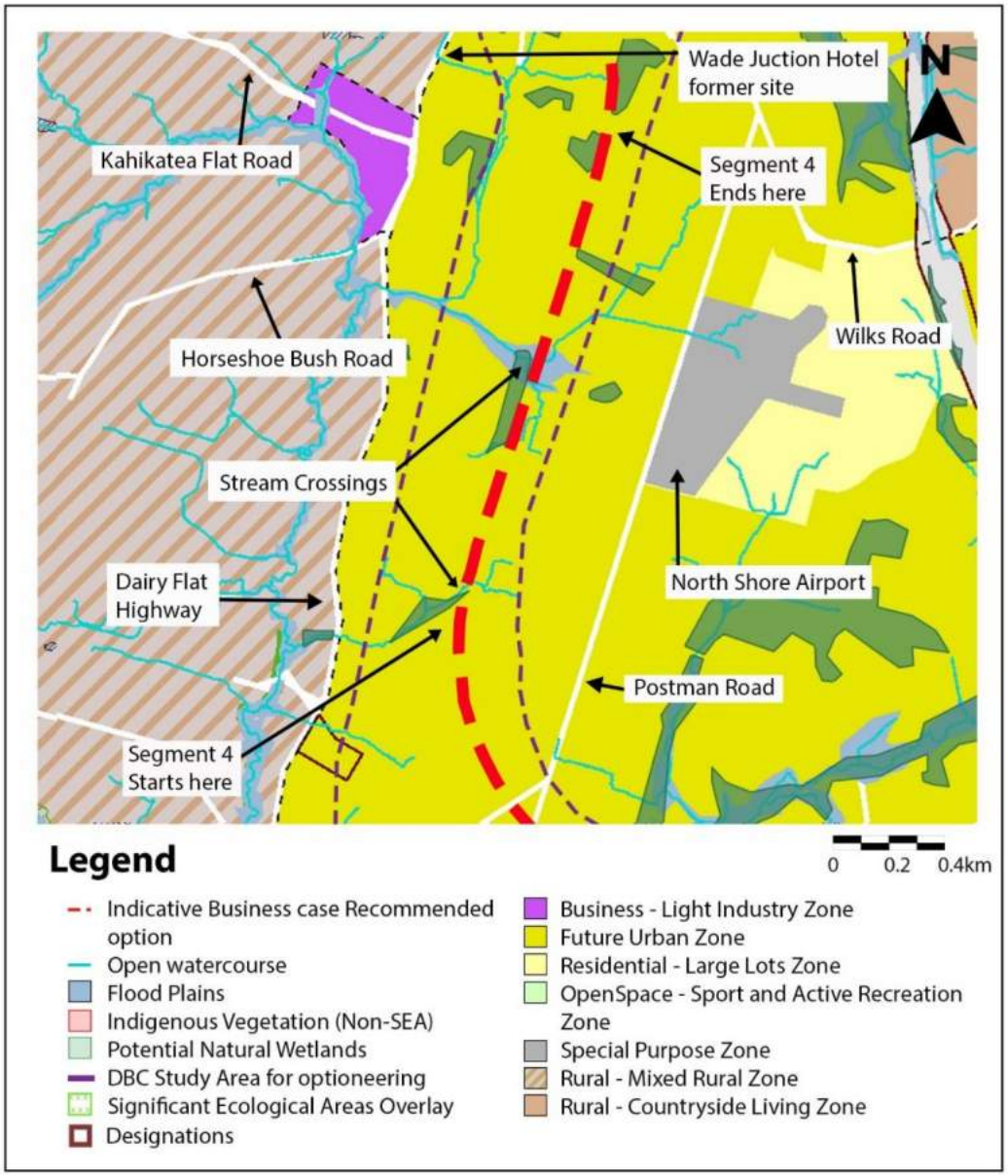



**Figure 39: Map of key constraints and features in the RTC Segment 4 for optioneering.**

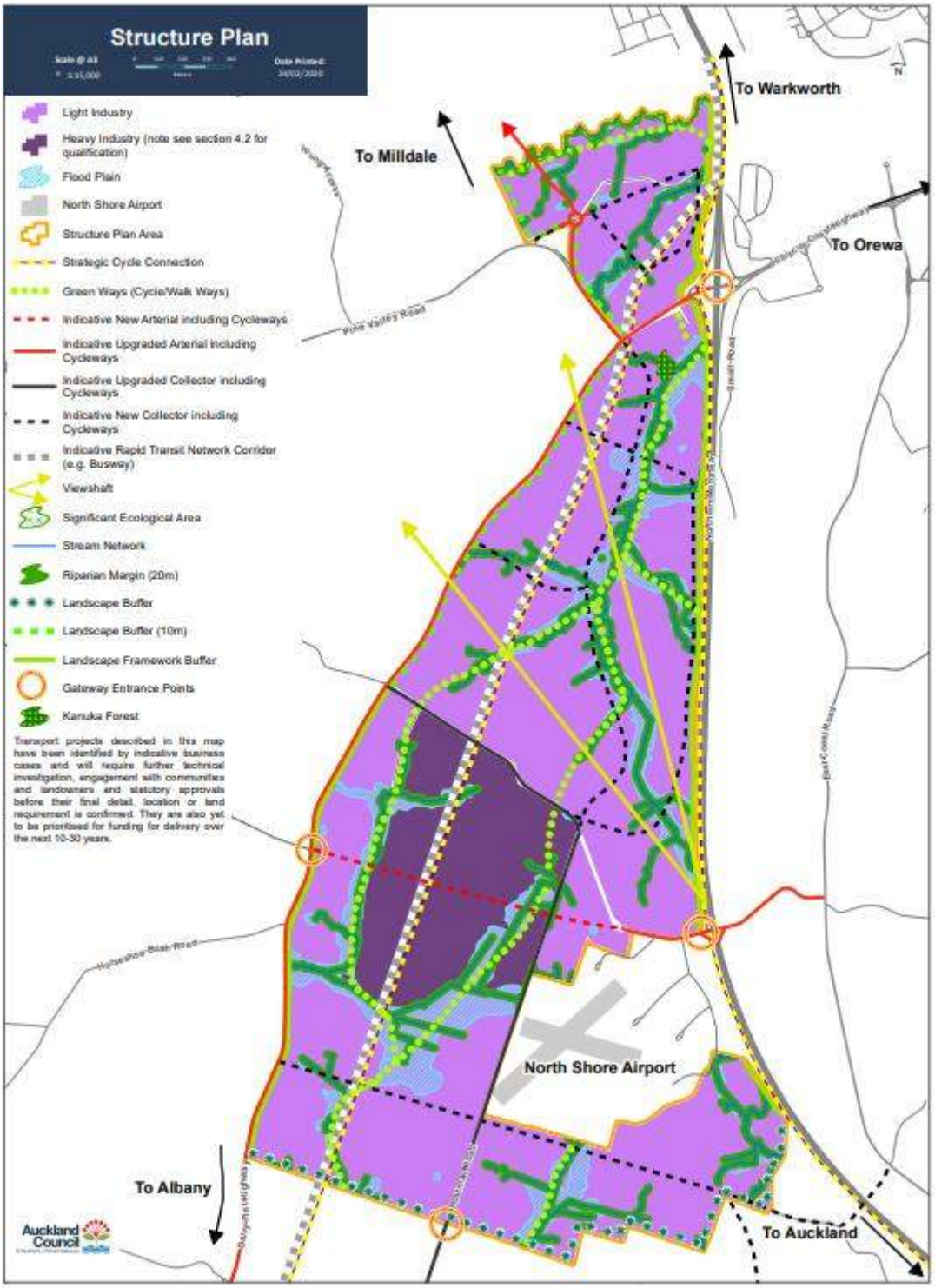



**Figure 40: Dairy Flat – Silverdale West Industrial Structure Plan**

In consideration of the above factors, **three options** were developed through route refinement as outlined in **Table 23** and **Figure 41** below.

**Table 23: Summary of RTC Segment 4 options**

| Option Reference | Option Name/Description |
|---|---|
| **Option A (RT-01)** | • RT with cycleway alignment adjacent to the eastern side of Dairy Flat Highway (through an area identified in the Structure Plan as light industrial). Located to west of indicative alignment assumed in Structure Plan. |
| **Option B (RT-04)** | • RT with cycleway alignment through the centre of the Industrial Area (through an area identified in the Structure Plan as heavy industrial). Very similar to RT-06 – other than a slight diversion at the southern end of the segment to connect to Option RT-04 in Segment 3. Generally aligns with indicative alignment assumed in Structure Plan. |
| **Option C (RT-06)** | • RT with cycleway alignment through the centre of the Industrial Area (through an area identified in the Structure Plan as heavy industrial). Very similar to RT-04 – other than a slight diversion at the southern end of the segment to connect to Option RT-06 in Segment 3. Generally aligns with indicative alignment assumed in Structure Plan. |

| Option A (RT-01) | Option B (RT-04) | Option C (RT-06) |
|---|---|---|
|  |  |  |

**Figure 41: Map of RTC Segment 4 options**

## 6.10.2 Detailed Corridor Option assessment

To recap, options were assessed against the Investment Objectives and criteria within four well-beings, cultural, social, environmental and economic. Technical specialists engaged in an MCA workshop to undertake an assessment, scoring each option on a gradual scale from 'Very High Adverse Effect' (red) to 'Very High Positive Impact' (green).

The following table identifies the outcomes from this assessment.

**Table 24: Summary of RTC, Segment 4 assessment**

| MCA Criteria | Option A (RT-01) | Option B – RT-04 | Option C – RT-06 |
|---|---|---|---|
| Investment Objective 1 | 4 | 4 | 4 |
| Investment Objective 2 | 4 | 4 | 4 |
| Investment Objective 3 | 3 | 4 | 4 |
| Investment Objective 4 | 3 | 3 | 3 |
| Investment Objective 5 | 3 | 3 | 3 |
| | | | |
| 1a. Heritage | -2 | 0 | 0 |
| | | | |
| 2a. Land use futures | -2 | -2 | -2 |
| 2b. Urban design | -2 | 1 | 1 |
| 2c. Land requirement | -1 | -1 | -1 |
| 2d. Social cohesion | -2 | -1 | -1 |
| 2e. Human health and wellbeing | -1 | -1 | -1 |
| | | | |
| 3a. Landscape / visual | -2 | -2 | -2 |
| 3b. Stormwater | -2 | -1 | -1 |
| 3c. Ecology | -1 | -1 | -1 |
| 3d. Natural hazards | -1 | -1 | -1 |
| | | | |
| 5a. Construction impacts on utilities / infrastructure | -1 | -1 | -1 |
| 5b. Construction disruption | -1 | -1 | -1 |
| 6a. Construction costs / risk / value capture | -2 | -2 | -2 |

The Project Team reviewed and compared the options identified above and noted that overall there wasn't a lot of differentiation between the options in terms of scoring; however matters relating to the investment objective 3 (RT integration), heritage, urban design, social cohesion and stormwater/flooding showed some differentiation between options which ended up being the key criteria considerations.

In relation to non-scored criteria:

- There was no real differentiation between the options from a Policy Analysis or Value for Money perspective.
- Options B or C were the preference of those Manawhenua that stated a preference, considering specialist scoring.

The Project Team identified a slight preference for **Option B (RT-04)** as the preferred route refinement option for the following reasons:

a) Option B (RT-04) and Option C (RT-06) score the same as the alignments are very similar (slight difference at southern end where tie-into Segment 3 occurs). However, Option B aligned with emerging preferred alignment for Segment 3 and hence was preferred over Option C.
b) Option B (or C) score more positively for IO3 (RT integration) than Option A as the option has a higher % FUZ area within a 1km walking /cycling catchment, as well as a greater overall urban catchment within 1km.

c) An alignment more central to the industrial area (i.e. Option B - RT-04 or RT-06) was preferred from an urban design perspective as it would provide the highest level of access to the employment area and would be easier to integrate with the surrounding industrial land use relative to Option A (which would leave a narrow strip of land between the floodplain and Dairy Flat Highway which is also proposed to be widened).
d) Option B aligned with Manawhenua preferences with Manawhenua placing importance on the north-west wild link and stream quality.
e) Option B scores better than Option A for heritage as there are no known archaeological/heritage constraints.
f) Option B scores better than Option A for social cohesion (which focuses on existing communities) as there would be less disruption to the existing community close to Dairy Flat Highway.
g) Option B scores better than Option A for stormwater/flooding as it would have less flooding risk.

The remaining options were discounted by the Project Team for the following reasons:

**Table 25: Reasons for discounting options**

| Option | Reasons for discounting option |
|---|---|
| **Option A** | • Option not preferred from an urban design perspective as its location close to Dairy Flat Highway could create a compromised area of land that becomes difficult to develop due to its narrow width and limited access, creating a poor urban design outcome. Also, the option could create development pressure to the west outside of the Rural Urban Boundary.<br>• Greatest potential for effects on flooding/stormwater, heritage and social cohesion.<br>• Not a stated preference of Manawhenua. |
| **Option C** | • Very similar to Option B, but does not align with emerging preferred option for segment 3. |

## 6.11 RTC Segment 5: Silverdale West

Silverdale West (Segment 5) extends through Silverdale West from Wilks Road to the proposed Pine Valley Station. **Figure 42** below shows the extent of the segments study area where options were generally developed within as well as the preferred alignment.

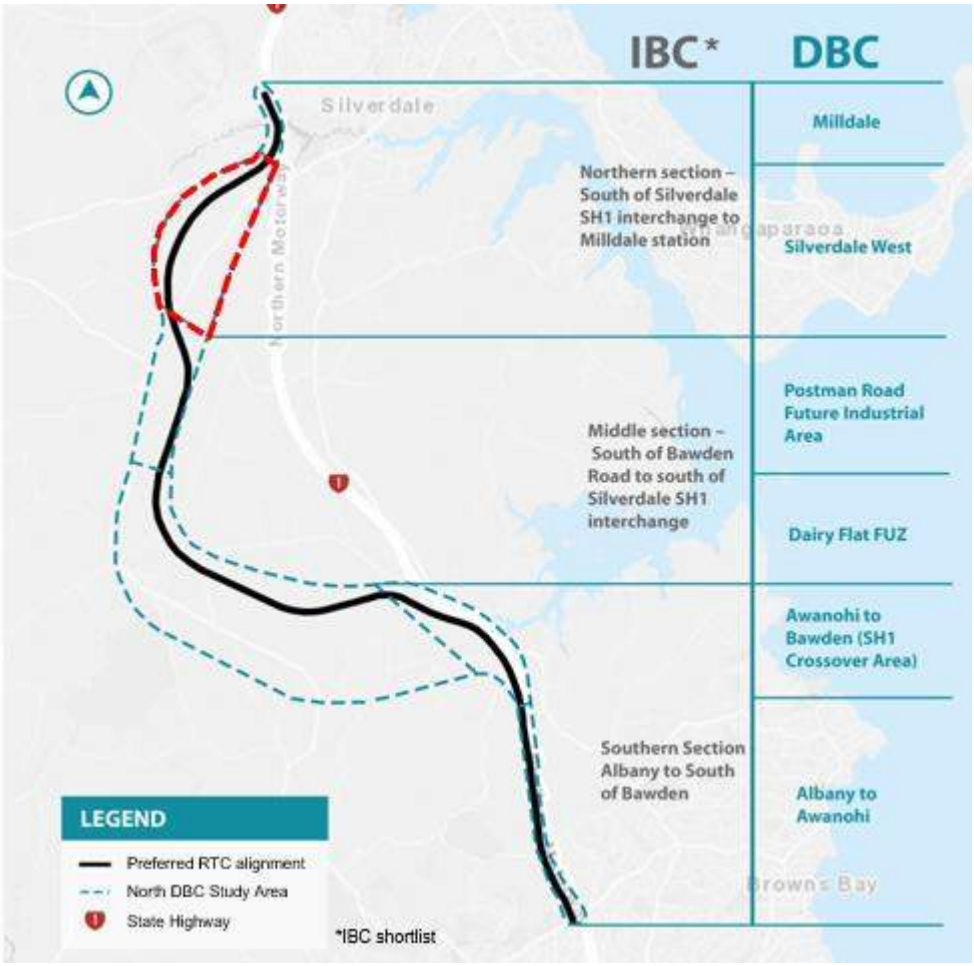



**Figure 42: RTC segment 5 – Silverdale West (DBC)**

### 6.11.1 Detailed Corridor Option development

Route options in this segment were generally limited to a north-south area between Kahikatea Flat Road (the northern boundary of Segment 4) and Old Pine Valley Road; and a west-east area between Pine Valley Road and John Creek- for the following reasons:

a) The IBC recommended an indicative corridor for the RTC east of Dairy Flat Highway in this area.
b) The identified opportunity for the RTC to access the future urban residential area (as indicated within Council's Draft Silverdale Dairy Flat Spatial Land Use Strategy) and a potential local centre west of Dairy Flat Highway to enable growth and support transit oriented development in this area. This included the potential for two stations within this segment if this area is accessed (one near Pine Valley Road and one further south).
c) The desire to align the RTC as close to SH1 as possible on the western side around the Wēiti crossings and associated SEA/QEII covenant in Segment 6 to the north (noting IBC assessment discounted alternatives to the Segment 6 alignment).

In terms of a **change from the IBC**, the IBC recommendation for the cycleway to split from the RT and follow the John Creek riparian margin in this segment was not pursued at DBC phase, as urban design analysis confirmed the attractiveness of the facility and safety of its use (in terms of CPTED)

would be affected by having it separate from the RTC. It is also anticipated the John Creek cycleway will be included within Council's plan change process for Silverdale, with this contributing towards why it was not progressed to route protection.

Other constraints and features in this area are shown on **Figure 43** and include:

a) An area of SEA north of Wilks Road (which is excluded from the FUZ).

b) The new Pine Valley Road designation.

c) Future industrial land east of Dairy Flat Highway.

d) In order to avoid the cycleway being caught between the RTC and SH1 corridor, the cycleway needs to split off onto Dairy Flat Highway towards the Silverdale interchange.

e) The RUB south-west of Wilks Road-Dairy Flat Highway intersection.

f) European heritage features including a historic cemetery, Kelly's Homestead and Wade Junction Hotel archaeological sites.

g) High value Kānuka forest (non-SEA near John Creek).

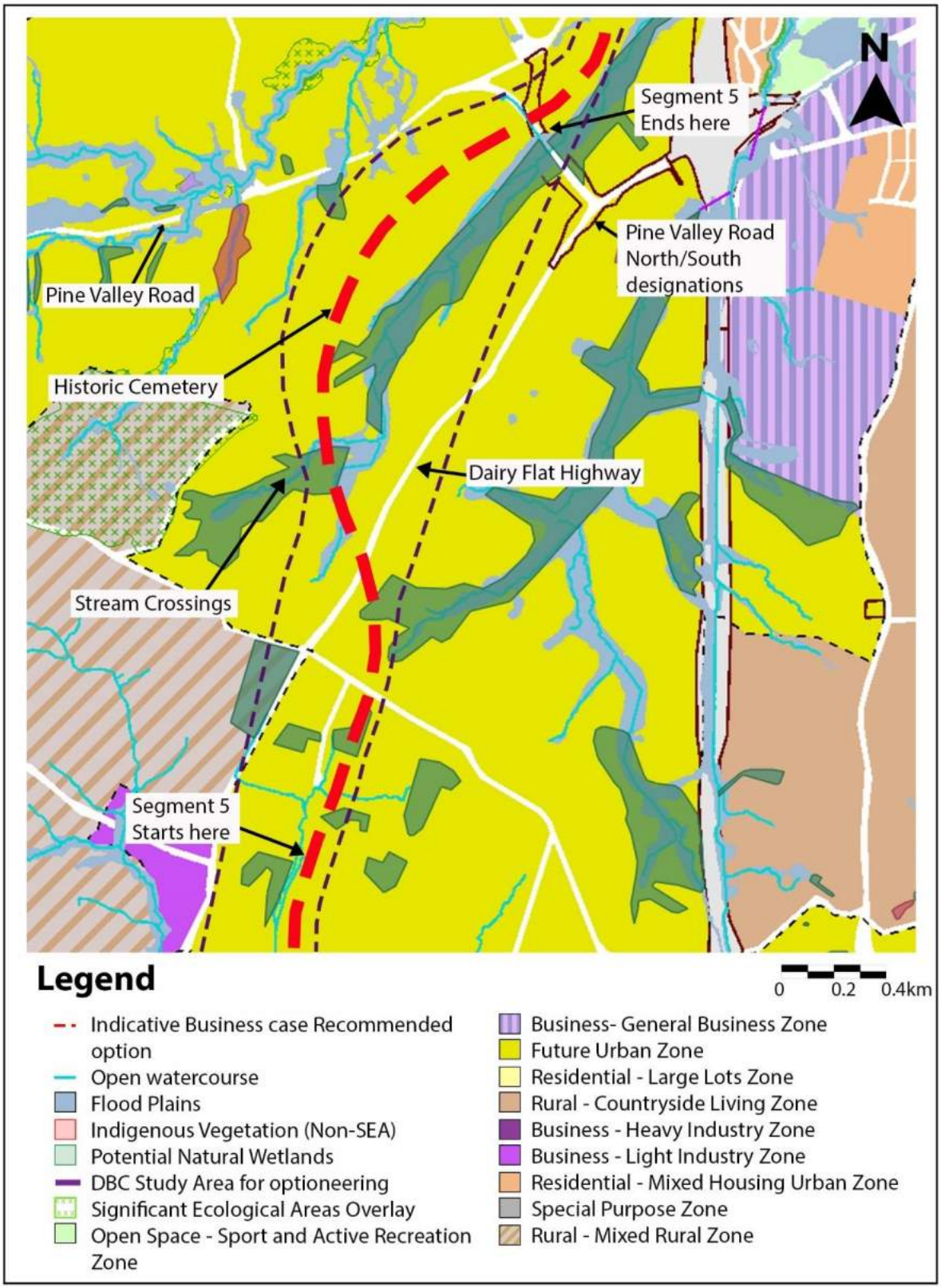



**Figure 43: Map of key constraints and features in the RTC Segment 5 for optioneering**

In consideration of the above factors, **nine options** were developed through route refinement as outlined in **Table 26** and **Figure 44** below.

**Table 26: Summary of RTC Segment 5 options**

| Option Reference | Option Name/Description |
|---|---|
| **Option A (RT-01)** | • **RT with cycleway alignment** adjacent to the **eastern side of Dairy Flat Highway** (through an area identified in the Structure Plan as light industrial).<br>• **Assumes one RTC station** near Pine Valley Road (see **Figure 45**) |
| **Option B (RT-04)** | • **RT with cycleway alignment through the centre of the Industrial Area** (through an area identified in the Structure Plan as light industrial)<br>• **Assumes one RTC station** near Pine Valley Road (see **Figure 45**) |
| **Option C (RT-06)** | • **RT with cycleway alignment traverses towards Dairy Flat Highway**. At this point the **RT passes west (underneath) Dairy Flat Highway, before passing underneath Pine Valley Road.**<br>• **Cycleway splits** from RT at Dairy Flat Highway, travelling up eastern side of the highway to Silverdale interchange.<br>• **Assumes one RTC station** south of Pine Valley Road (see **Figure 45**) |
| **Option D (RT-07)** | • **RT alignment crosses under Wilks Road and heads north-west towards Dairy Flat Hwy.** An RT underpass is proposed at Dairy Flat Hwy before the alignment crosses the OLFP / flood plain and then over Pine Valley Road.<br>• **Cycleway splits** from RT at Dairy Flat Highway, travelling up eastern side of the highway to Silverdale interchange.<br>• **Assumes one RTC station** south of Pine Valley Road (see **Figure 45**) |
| **Option E (RT-08)** | • **RT alignment crosses under Dairy Flat Hwy / Wilks Road intersection**. The RT alignment then shifts to the northern side of the OLFP / flood plain before passing over Pine Valley Road.<br>• **Assumes one RTC station** (see **Figure 45**)<br>• **Cycleway splits** from RT at Dairy Flat Highway, travelling up eastern side of the highway to Silverdale interchange. |
| **Option F (RT-09)** | • **RT alignment crosses under Dairy Flat Hwy / Wilks Road intersection.** The RT alignment then passes between the OLFP / flood plain and the historic cemetery site before passing over Pine Valley Road.<br>• **Cycleway splits** from RT at Dairy Flat Highway, travelling up eastern side of the highway to Silverdale interchange.<br>• **Assumes one RTC station** south of Pine Valley Road (see **Figure 45**) |
| **Option G (RT-01 but with two stations)** | • **As per RT-01 but assumed two stations as per Figure 45** |
| **Option H (RT-07 but with two stations)** | • **As per RT-07 but assumed two stations as per Figure 45** |
| **Option I (RT-09 but with two stations)** | • **As per RT-09 but assumed two stations as per Figure 45** |

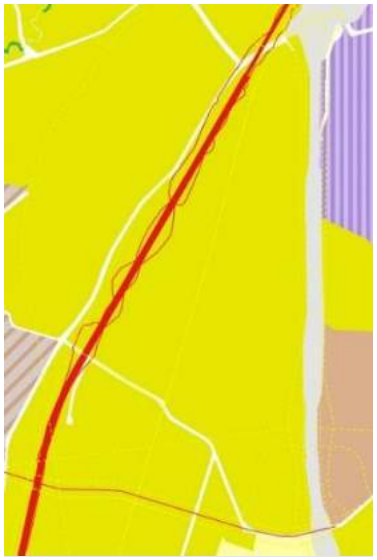
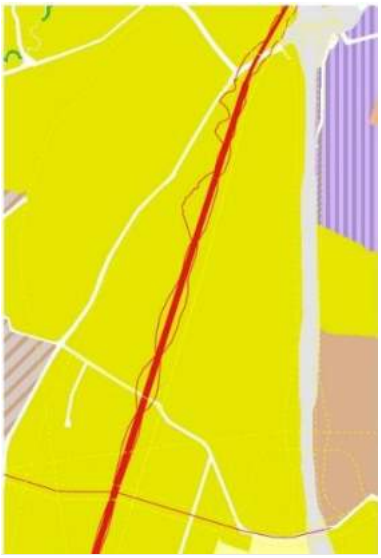
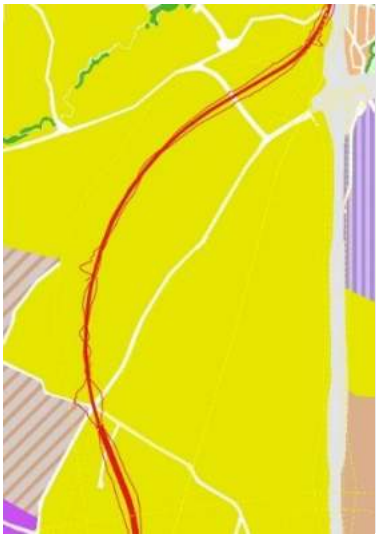
| Option A: RT-01 | Option B: RT-04 | Option C: RT-06 |
|---|---|---|
|  |  |  |
| **Option D: RT-07** | **Option E: RT-08** | **Option F: RT-09** |
|  |  |  |

**Figure 44: RTC Segment 5 options**

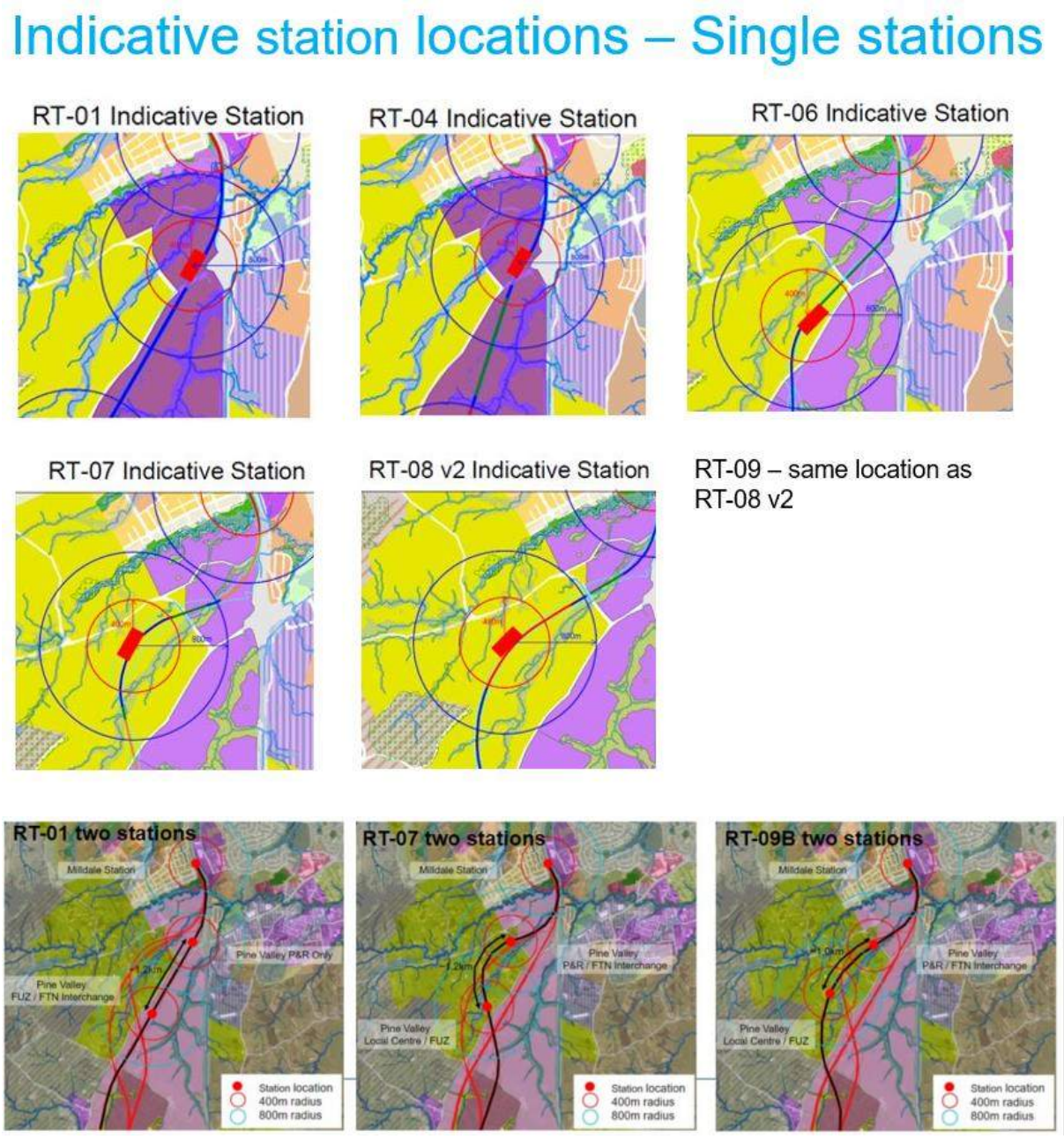



**Figure 45: Map of RTC Segment 5 indicative station locations**

## 6.11.2 Detailed Corridor Option assessment

To recap, options were assessed against the Investment Objectives and criteria within four well-beings, cultural, social, environmental and economic. Technical specialists engaged in an MCA workshop to undertake an assessment, scoring each option on a gradual scale from 'Very High Adverse Effect' (red) to 'Very High Positive Impact' (green).

The following table identifies the outcomes from this assessment.

### Table 27: Summary of RTC, Segment 5 assessment

| MCA Criteria | Option A (RT-01, 1 station) | Option B – RT-04, 1 station) | Option C – RT-06, 1 station) | Option D – RT-07, 1 station) | Option E (RT-08, 1 station) | Option F (RT-09, 1 station) | Option G (RT-01, 2 stations) | Option H (RT-07, 2 stations | Option I (RT-09, 2 stations) |
|---|---|---|---|---|---|---|---|---|---|
| IO1 – RT: Access: Provide effective and attractive Public Transport access to economic and social opportunities for the Northern Growth area | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 4 |
| IO2 - RT: Resilience: Enable reliable and resilient public transport trips between the Northern Growth area and Albany | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| IO3 - RT: Integration: Provide a Rapid Transit corridor that is integrated with land use and the transport system. | 3 | 3 | 3 | 4 | 4 | 4 | 3 | 4 | 4 |
| IO4 - RT: Mode Choice: Enable transformational mode share in the North by providing a high quality, low carbon transport network. | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 4 | 4 |
| IO5 - Cycleway RT: Safety: A safe facility which separates vulnerable users from conflict with vehicles. | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 1a. Heritage | -3 | -2 | -3 | -2 | -5 | -3 | -3 | -2 | -3 |
| 2a. Land use futures | -2 | -2 | 0 | 2 | 1 | 3 | -1 | 1 | 3 |
| 2b. Urban design | 0 | 0 | -2 | 2 | 2 | 2 | 1 | 2 | 3 |
| 2c. Land requirement | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 |
| 2d. Social cohesion | -2 | -1 | -2 | -1 | -2 | -2 | -2 | -2 | -2 |
| 2e. Human health and wellbeing | -1 | 0 | -1 | -1 | -1 | -1 | -1 | -1 | -1 |
| 3a. Landscape / visual | -2 | -2 | -2 | -3 | -3 | -3 | -3 | -3 | -3 |
| 3b. Stormwater/flooding | -1 | -2 | -2 | -2 | -3 | -3 | -1 | -2 | -3 |
| 3c. Ecology | -1 | -3 | -2 | -3 | -3 | -3 | -1 | -3 | -3 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 3d. Natural hazards | -1 | -1 | -2 | -1 | -1 | -1 | -1 | -1 | -1 |
| 5a. Construction impacts on utilities / infrastructure | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 |
| 5b. Construction disruption | -1 | -1 | -2 | -2 | -2 | -2 | -1 | -2 | -2 |
| 6a. Construction costs / risk | -2 | -2 | -2 | -3 | -3 | -3 | -2 | -3 | -3 |

The Project Team reviewed and compared the options identified above. The team identified that criteria relating to heritage, land use futures, urban design, stormwater/flooding and ecology are the key considerations for this segment and showed differentiation between the options.

In relation to non-scored criteria:

- From a Policy Analysis perspective, Options A, B, and C were generally consistent with the NPS-Freshwater; however options that cross to the west of Dairy Flat Highway (Options C to I) are more preferred from an NPS-UD perspective as they are more likely to support a well-functioning urban environment.
- From a Value for Money perspective, Options H and I were preferred.
- Options A or F/I were the preference of those Manawhenua that stated a preference.

Accordingly, the Project Team identified a preference for **Option I (RT-09, 2 stations)** as the preferred detailed corridor option because this option scored most optimally overall and was slightly preferred over Option F (RT-09, 1 station) and Option H (RT-7, 2 stations) which were the next optimal scoring options. In particular:

a) The options that enter the future urban residential FUZ area west of Dairy Flat Highway scored optimally overall in relation to the investment objectives because they provide better outcomes in relation to integration with land use and the transport system (IO3) and mode choice (IO4) than options that only pass through the future industrial area. Although they scored the same, the transport specialist noted a preference for the RT-09 options (F or I) over the RT-07 options (option D or H) due to opportunities for integration with local walking and cycling catchments.
b) Option I provides the opportunity for two stations to be provided in future, which would enhance urban design, transport access, mode shift and land use integration outcomes (noting that an NOR is only sought for a single Pine Valley East Station at this point – refer section 8). For this reason, Option I is preferred over Option F.
c) The option was preferred from a land use futures/integration perspective, primarily due to it having favourable station locations with development opportunities.
d) The option is preferred from an urban design perspective because the two station locations that are facilitated by this alignment provide additional placemaking and density opportunities, including access to a potential local centre.
e) The Option I (and Option F) alignment was the stated preference of some Manawhenua (noting some preferred Option A -RT-01).
f) the Option I (and Option F) alignment was slightly preferred over Option H - RT-07 from an ecology perspective as it avoids a potential wetland area east of Dairy Flat Highway.

g) Although the option scores worse for stormwater/flooding than Option H – RT-07, the MCA identified the opportunity to improve the level of effects on stormwater/flooding if the option refinement looks at shifting the alignment out of as much of the floodplain as possible near Pine Valley Road.
h) The Option I (and Option F) alignments have a similar cost to Option H but had a better value for money assessment as benefits are more likely to be realised.

The remaining options were discounted by the Project Team for the following reasons:

**Table 28: Reasons for discounting options**

| Option | Reasons for discounting option |
|---|---|
| **Option A – RT-01, 1 station** | • These alignments remain in future industrial land use and do not enter urban residential FUZ area to west of Dairy Flat Highway. As a result, the options have lower investment objectives scores in relation to Integration and Mode Choice, and also lower scores for land use futures/integration and urban design. |
| **Option B, RT-04, 1 station** | |
| **Option C, RT-06, 1 station** | |
| **Option D, RT-07, 1 station** | • Scored well overall, but slightly less preferred than RT-09 options (Options F and I) as it does not score as positively for land use futures/integration as the potential station locations are not as favourable for development opportunities;<br>• Not the stated preference by any Manawhenua.<br>• Although it scored the same as preferred option from an ecology perspective, the Ecologist noted this option was slightly less preferred as it affected an additional potential wetland area east of Dairy Flat Highway.<br>• Although the option scored better than the RT-09 options from a stormwater/flooding perspective, the MCA noted opportunities to minimise these effects of RT-09 through option refinement. |
| **Option E, RT-08, 1 station** | • This option had a very high adverse effect on a historic cemetery site and was discounted for this reason (Option RT-09 was then developed to avoid the cemetery on a similar alignment to RT-08) |
| **Option F, RT-09, 1 station** | • This option also scored well overall and shared an RT alignment with the preferred option (Option I) - but was slightly less preferred than Option I as it would not allow for the opportunity to provide two stations, which would enhance urban design, transport access, mode shift and land use integration outcomes. |
| **Option G, RT-01, 2 stations** | • This alignment remains in the future industrial land use (does not enter urban residential FUZ area to west of Dairy Flat Highway). As a result the option scores lower for the investment objectives in relation to Integration and Mode Choice, and also lower for land use futures/integration and urban design. |
| **Option H – RT-07, 2 stations** | • Discounted for similar reasons as Option D above. |

## 6.12 RTC Segment 6: Milldale

Milldale (Segment 6) extends from the proposed Pine Valley Station to the proposed terminus Milldale Station. **Figure 46** below shows the extent of the segments study area where options were generally developed within as well as the preferred alignment.

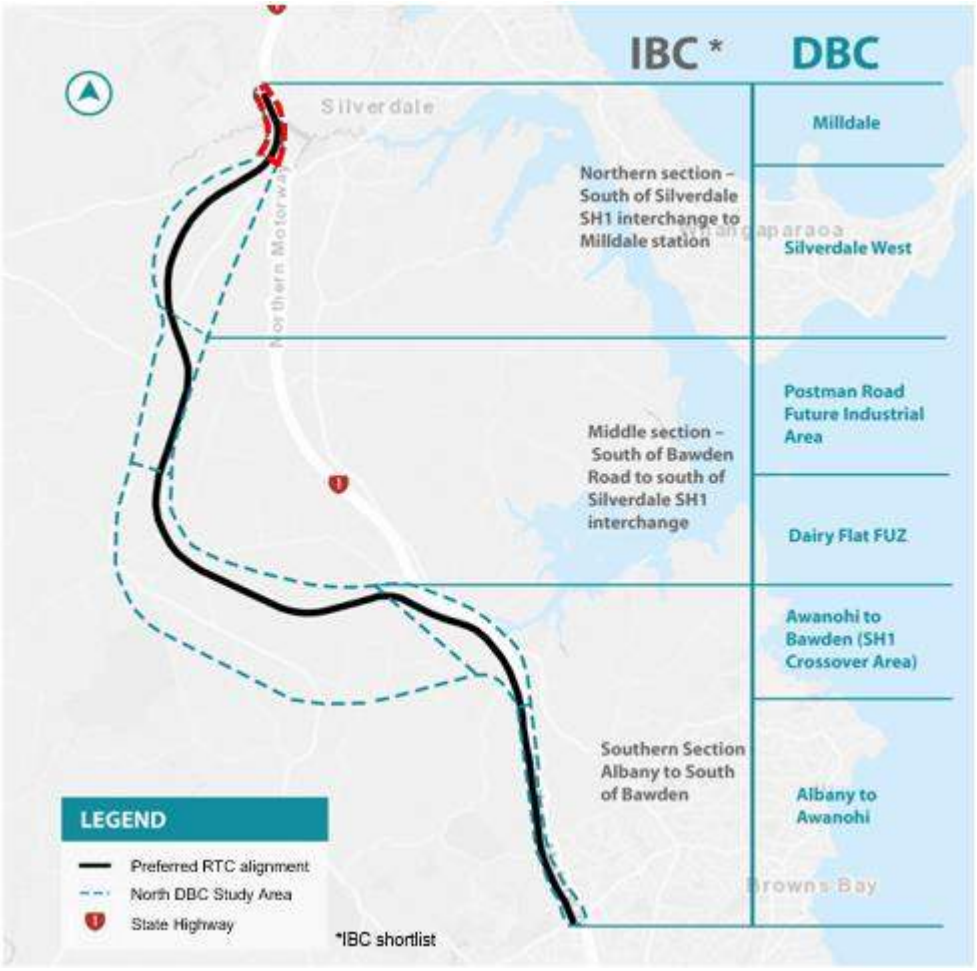



**Figure 46: RTC segment 6 – Milldale (DBC)**

### 6.12.1 Route Refinement

One route option **(Option A)** was developed in this segment extending in a corridor on the western side of SH1 between Old Pine Valley Road and Milldale for the following reasons:

a) The IBC recommended an indicative corridor for the RTC through this area and this was reconfirmed as appropriate through the gap analysis as detailed above.

b) The desire to align the RTC as close to SH1 as possible on the western side around the Wēiti crossings and associated Natural Stream Management Area overlay, SEA and QEII covenant – considering the significant cultural and ecological values of these features.

c) IBC assessments discounted alternatives to the Segment 6 alignment considering the significant constraints and the desire to tie into the proposed RT station at Milldale – where the developer has set aside land as per the Milldale Masterplan/Wainui Precinct Plan

d) In the IBC phase, initial investigations into design suboptions suggested there was potential to minimise environmental impacts of the recommended option through localised narrowing of the RTC and/or changes to the neighbouring SH1 Motorway corridor.

e) At DBC phase, the opportunity to shift the cycleway to the eastern side of SH1 was identified- in order to minimise encroachment of the significant constraints and values on the west. This was confirmed through selection of the strategic cycleway alignment between Silverdale and Grand Drive (refer Section 9.6).

Other constraints and features in this area are shown on **Figure 47** and include:

a) Challenging topography and the presence of floodplains, streams and wetlands.

b) The Milldale development at the northern end with newly built residences close to the alignment.

c) A large culvert under SH1 – where the Wēiti crosses from west to east.

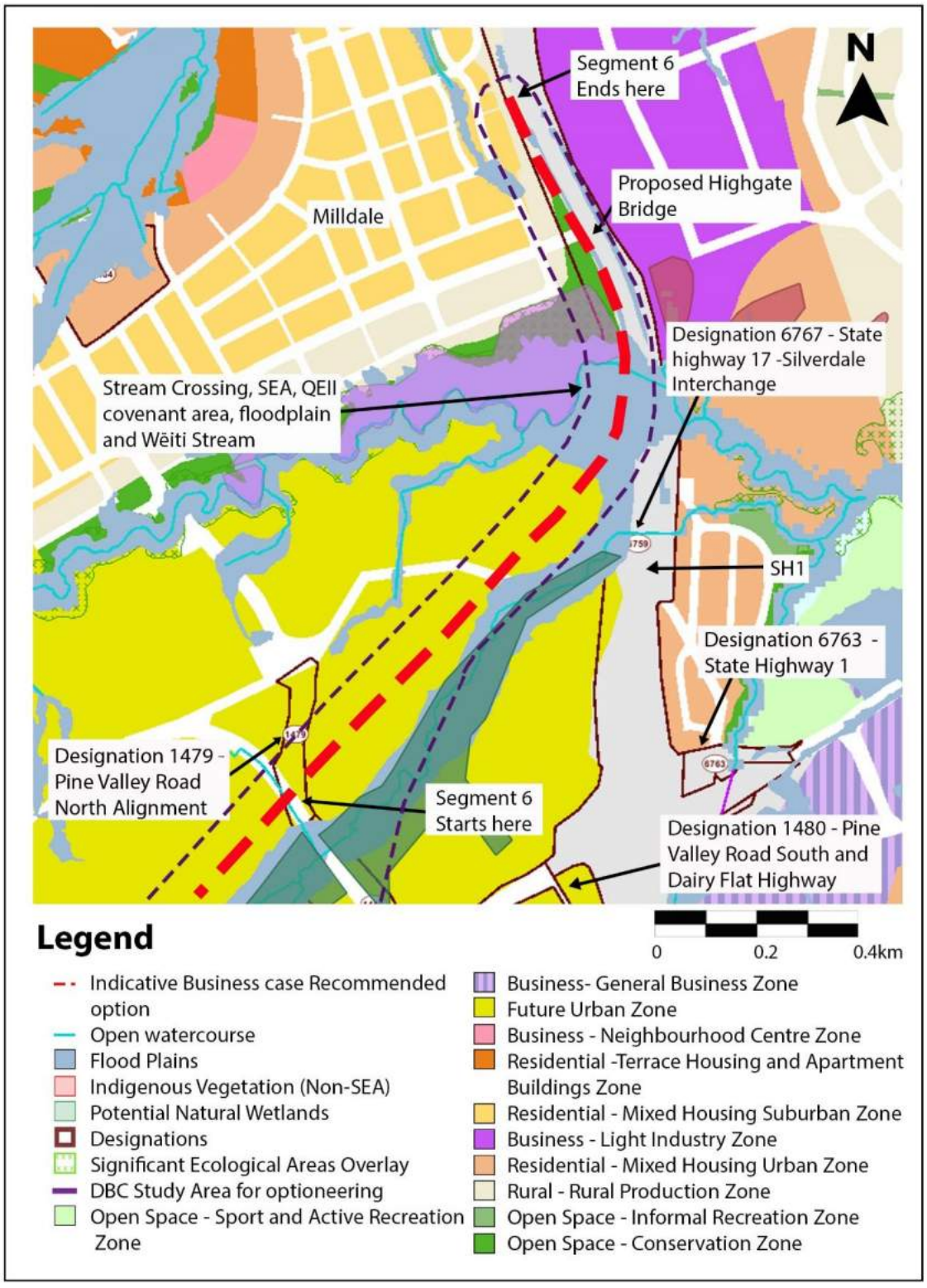



**Figure 47: Map of key constraints and features in the RTC Segment 6 for option development.**

In consideration of the above factors, **one route option** was developed through route refinement as outlined in **Table 29** and **Figure 48** below.

**Table 29: Summary of RTC Segment 6 preferred option**

| Option Name/Description |
| --- |
| • **RT on western side of SH1 between Old Pine Valley Road and the proposed terminating RTC station at Milldale**<br>• Assumes strategic cycleway on eastern side of SH1 (as per decision detailed in Section 9.6.8). |

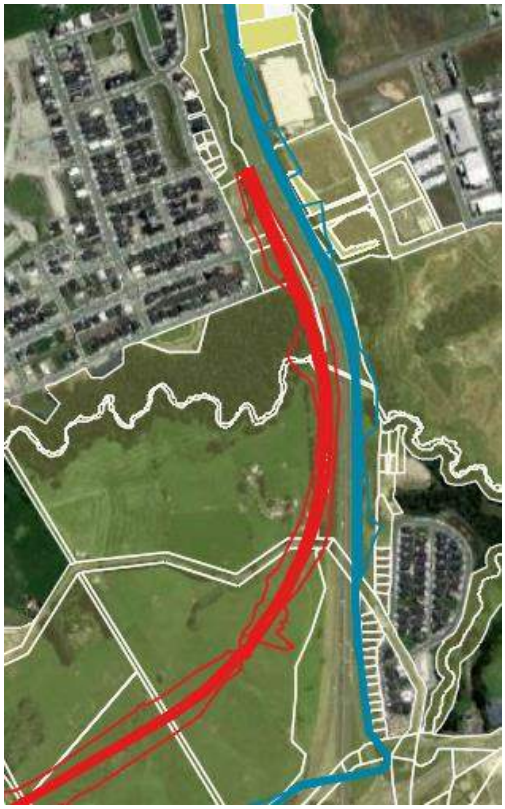
| Preferred option |
| --- |
|  |

**Figure 48: Map of RTC Segment 6 option (red line; blue line is preferred option for New Walking and Cycling Path along SH1)**

## 6.13 Consideration of combined RTC segments

Once emerging preferred options were identified for each segment, the team considered how the preferred segments would perform together as a full RTC project alignment. Accordingly, the emerging preferred option within each segment (selected prior to DBC public engagement) was 'stitched' together to form the overall emerging preferred route for the RTC to proceed to engagement. The preferred route option for each segment is outlined in **Table 30**, and the full alignment of the RTC is illustrated in **Figure 49**.

### Table 30: RTC preferred options

| Section | Preferred Option |
|---|---|
| ***NOR 1*** | |
| Segment 1: Albany to Awanohi (also includes part of NoR 4) | **Option D (SH-12):** RT on west with cycleway on east and SH1 widening to east with motorway lanes shifted over |
| Segment 2: Awanohi to Bawden (also includes part of NoR 4) | **Option J (SH-12):** RT on west with no crossover; cycleway on east; SH1 widening both sides |
| Segment 3: Dairy Flat FUZ | **Option D: RT-04:** RT with cycleway alignment joining the SH1 corridor south of Bawden Road Bridge, then following the ridgeline through the centre of the Dairy Flat FUZ. |
| Segment 4: Postman Road Future Industrial Area | **Option B (RT-04):** RT with cycleway alignment through the centre of the Industrial Area (through an area identified in the Structure Plan as heavy industrial) |
| Segment 5: Silverdale West | **Option I (RT-09, 2 stations)** : RT alignment crosses under Dairy Flat Hwy / Wilks Road intersection, then passes between the flood plain and the historic cemetery site before passing over Pine Valley Road. Cycleway splits from RT at Dairy Flat Highway, travelling up eastern side of the highway to Silverdale interchange. Assumes two stations. |
| Segment 6: Milldale | **Option A: Single option developed:** RT alignment travels north-east from Pine Valley Road to join SH1 alignment up to terminus at Milldale (avoiding sensitive SEA and QEII covenant). Walking and cycling path are on east of SH1 at this point |

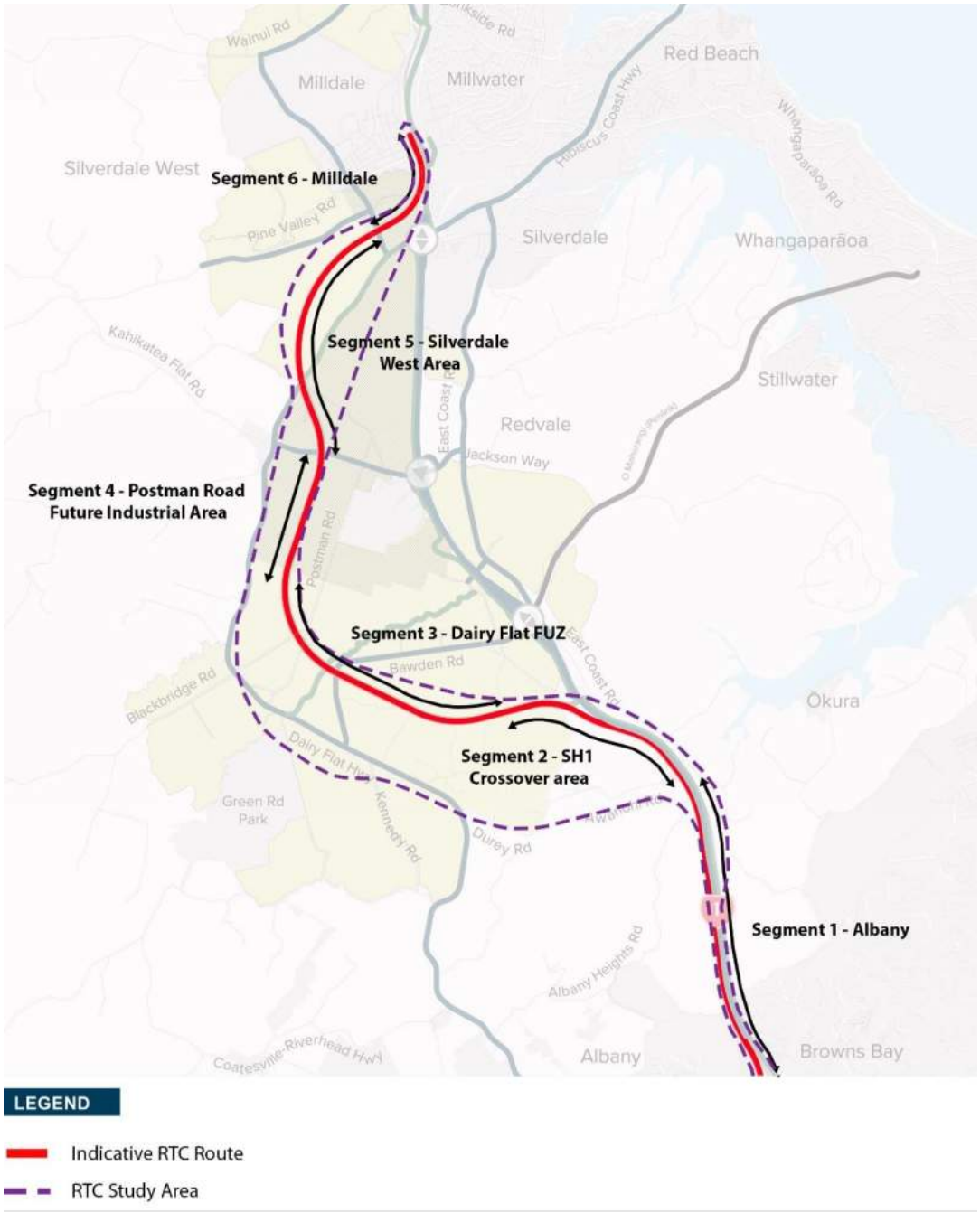



**Figure 49: RTC emerging preferred route.**

Key issues that came out of the analysis included:

- Segments 1 and 2 – The preferred segment options work well together as they collectively avoid the need for a major RT/SH1 crossover structure (which would have high adverse effects and high costs) and provide optimal integration with the existing Albany RTC station. The preferred option in this segment also provides a more direct connection to the Albany Station which provides a minor travel time advantage to rapid transit services.
- Segments 2 and 3 – The preferred segment options work well together as this alignment enables the greatest potential for dense and high-quality urban form around potential station locations while managing additional distance of the RTC corridor as it extends to the FUZ area.

- Segments 3 and 4 – The preferred segments tie-in directly and provide a good overall outcome including providing appropriate opportunity for station provision and managing the overall distance of the corridor (affecting travel time). A key design criterion within this interface was allowing sufficient clearance of the North Shore Airport to not preclude any future extensions to the runway to the southeast of the existing facility.
- Segments 4 and 5 - The preferred segments require some minor changes to Segment 4 in the northern area of the segment. The segments tie into each other with no significant impacts.
- Segments 5 and 6 - The preferred segments tie-in directly and provide a good overall outcome. Option development focused on minimising impacts on the floodplain to the south of the RTC alignment between Segment 5 and 6.

## 6.14 Consideration of DBC engagement

Engagement was undertaken with potentially affected landowners and the community on the North network, including the emerging preferred RTC alignment, between July and August 2022. The RTC project attracted the most feedback. Key issues raised and the response from the Project Team are summarised below.

**Table 31: Consideration of RTC issues raised during engagement.**

| Issue/feedback during DBC engagement | Project team response |
|---|---|
| **RTC alignment through Dairy Flat FUZ**<br><br>A number of people did not support the alignment through the Dairy Flat future growth area due to the impact on property owners, the existing rural environment, floodplains and because it is a less direct route for existing communities. Some feedback noted the alignment of the RTC should follow SH1 and that the area is not appropriate for new transport links, a town centre or urban development due to flooding.<br><br>In contrast, some noted that the proposed alignment through the future urban area was preferred as it will allow it to more directly serve the new neighbourhoods built in the area. | The RTC is primarily intended to serve future communities within the future urban areas of Dairy Flat, Silverdale West and Wainui East -and is required to support planned future urban growth, support a shift towards more sustainable transport modes and improve access to public transport. By locating through the main Dairy Flat FUZ, the RTC will best enable high density residential development within walkable catchments of high-quality public transport. The corridor will also serve the existing (developing areas) of Milldale and Millwater at its northern end, and Albany at its southern end. Upgrades to SH1 are also proposed as part of the North Projects to route protect for bus shoulder lanes/managed lanes along SH1 between Albany and Silverdale.<br><br>The alignment along SH1 was investigated as part of the Indicative Business Case and discounted in favour of an indicative corridor through the FUZ (as described above). An indicative alignment through the Dairy Flat FUZ was reconfirmed at the beginning of the Detailed Business Case. More detailed corridor assessment was undertaken as part of the DBC (as described above) to select the preferred detailed corridor alignment through the FUZ, with multiple alignments considered. This included engagement with Auckland Council around the likely future town centre location (which went through its own engagement process in parallel with the North network).<br><br>The Project team and Council have since reviewed flooding information provided to the during the engagement process |

| Issue/feedback during DBC engagement | Project team response |
|---|---|
| | and have continued discussions regarding the location of the town centre and how it integrates with the RTC. The selected RTC alignment minimises floodplain crossings by locating the corridor on the ridgeline. As noted above, Council has reconsidered its preferred town centre location and now supports a central location next to the RTC and out of floodplains. |
| **Concern about the noise and visual impact of the RTC on the ridgeline** | Noise and visual impacts and mitigation (where required) will be assessed as part of the Assessment of Environmental Effects to support the NoRs. These issues were also considered in the multi-criteria analysis that fed into the options assessment and selection. |
| **Potentially affected landowner concerns including severance of existing communities in Dairy Flat, impacts on planted areas and the valued rural lifestyle** | The RTC is located through and is intended to support future urban growth of a large future urban area through Dairy Flat. This area of FUZ is expected to include a large town centre as well as high density residential uses by the time the RTC is implemented. Effects on existing landowners are acknowledged but need to be considered in the context of future urban development. |
| **Questions around why the IBC corridor is no longer proposed** | The Indicative Strategic Network included an indicative corridor for the RTC rather than a detailed alignment. As noted above, an additional detailed corridor option was added into the full MCA assessment process called Option G – RT-04A in response to matters raised by some landowners that the preferred RTC alignment (RT-04, Option D) was further south of the indicative corridor shown in the IBC maps. This option was tested against the full MCA framework but was not preferred over Option G – RT-04 for the reasons noted above. |
| **Mode for the RTC**<br><br>Some preferred the same mode from the city centre to the RTC; whereas others preferred a busway for better reliability. | The RTC and NoR boundary has been designed to futureproof it for multiple modes of rapid transit including a busway, as the long-term mode from the city centre is uncertain |
| **Questions around how people living east of SH1 in Whangaparāoa and Hibiscus Coast Bays will access the RTC**<br><br>Also some preferred the RTC to stop in the centre of Milldale and continue on north from Milldale onto Ōrewa | The Project Team considered options for extension to Ōrewa, Milldale centre and Silverdale as part of the IBC as described in Section 3.<br><br>The team considers a Milldale station adjacent to SH1 provides the optimal balance for providing access to the various existing and future communities in this area.<br><br>Connections to Whangaparāoa will be provided for via a future park and ride in Whangaparāoa and bus services connecting to the RTC corridor in the future. |

| Issue/feedback during DBC engagement | Project team response |
|---|---|
| **Ensure the walking and cycling provision does not compromise the RTC** | All walking and cycling facilities are separated from the RTC facility. |

## 6.15 Design Refinement

### 6.15.1 Key design refinements

During the design refinement phase, three key changes were made to the preferred RTC alignment following more detailed assessment and responding to opportunities raised in the MCA assessment. These include:

- Changes in vertical alignment – The design refinement included some adjustment to the vertical alignment of the RTC corridor in the Dairy Flat and Pine Valley areas to ensure the grade of mainline is future proofed with flexibility for where stations are provided in the future (as per Figure 53). This change in vertical alignment involved maintaining a shallow gradient (less than 3% grade) for areas where stations would be desirable. This change did not alter the horizontal alignment of the corridor but affects earthworks extents and the designation boundary in a varied manner along the corridor.
- The RTC corridor crosses underneath the national grid power transmission line to the south of Bawden Road around Follies Way. During design refinement, the vertical alignment of the RTC corridor was adjusted to allow sufficient clearance under the transmission line.
- Wilks Road Crossing – The preferred RTC alignment crossed underneath the Wilks Road / Dairy Flat Highway intersection. The intersection is part of the Upgrade to Dairy Flat Highway (Silverdale to Durey Road, NOR 8) and a roundabout is proposed. The preferred alignment would require a significant portion of the roundabout to be on a structure as the RTC passes below. As the Dairy Flat Highway upgrade is likely to be constructed first, this adds further complexity to the construction of the RTC corridor in the future. In addition to the construction complexity, the option would likely have impacts on an archaeological site to the northeast of the intersection (Wade Junction Hotel) and a potential natural wetland to the southwest of the intersection. During design refinement, the corridor was shifted north (by 200m) to cross Dairy Flat Highway north of the intersection. This reduced effects, construction complexity and cost.
- Realignment north of Pine Valley – The assessment of the preferred alignment within the Pine Valley area showed some minor effects on the floodplain to the south of the corridor. An opportunity was identified to shift the corridor north to avoid impacts on the floodplain. During design refinement, the corridor was shifted north (around 160m at furthest point) to ensure earthworks would all be located outside the floodplain.

### 6.15.2 Consideration of Minor Realignment in Silverdale West

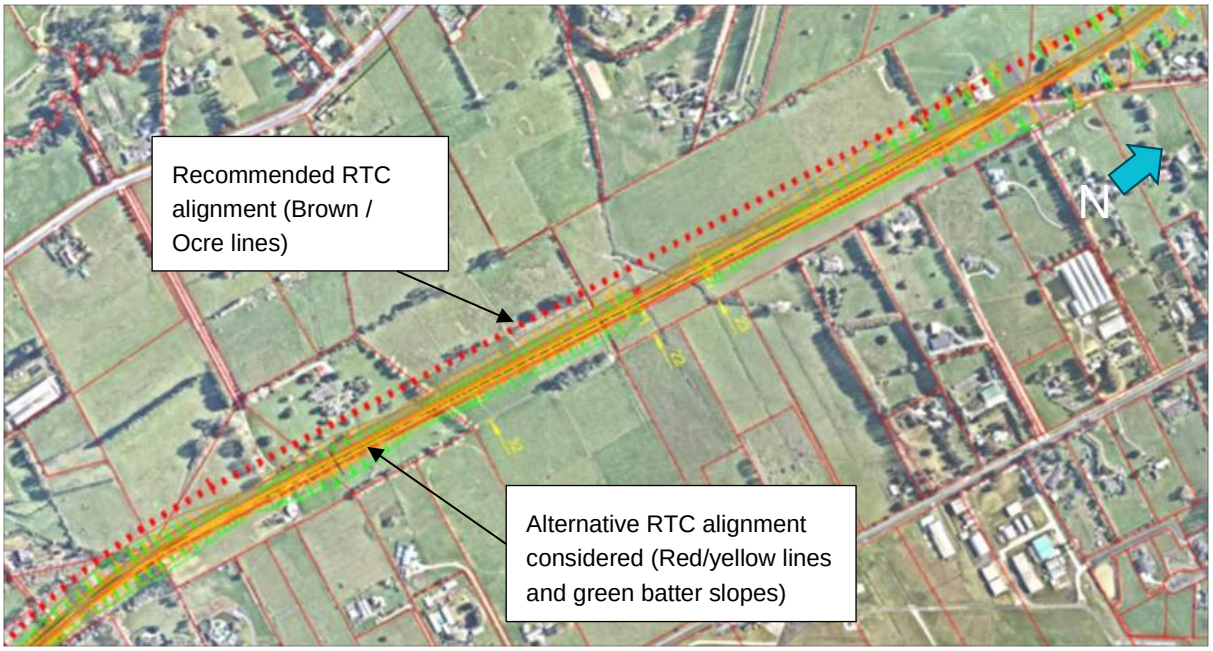
Through landowner consultation, a minor realignment of the RTC corridor was considered in the vicinity of 1350 Dairy Flat Highway. The feedback from landowners in this location expressed the concern that a strip of redundant and sterile land would be created from the RTC alignment proposed at that time, which would affect their plans for development of the site into a Surf Park. Consideration

was given to shifting the RTC corridor to the east of the site. The following constraints were considered when developing an alternative alignment through this area:

- If the RTC alignment was shifted too far east, impacts to several Postman Road properties would occur i.e., realigning the corridor too far east would double the number of properties affected by the designation.
- A 20m construction space is required to be provided within the designation.
- The RTC is required to cross under the new connection between Wilks Road to Dairy Flat Highway. There is limited scope for this crossing to move, due to streams and property accesses.

Based on the constraints highlighted above, an alternative alignment was developed which shifts the corridor to the east by around 20m. The project team then considered the merits of that alternative alignment.

**Figure 50: Alternative RTC alignment considered.**




The alternative alignment has the following implications:

- Additional stream realignment is required (as indicated on Figure 50).
- Stormwater ponds on the eastern side of the alignment would need to be relocated to the west.
- Additional space would be required for stream diversions, construction space and stormwater management.

The alternative alignment was considered by the project team on review of this information. The following conclusions were reached:

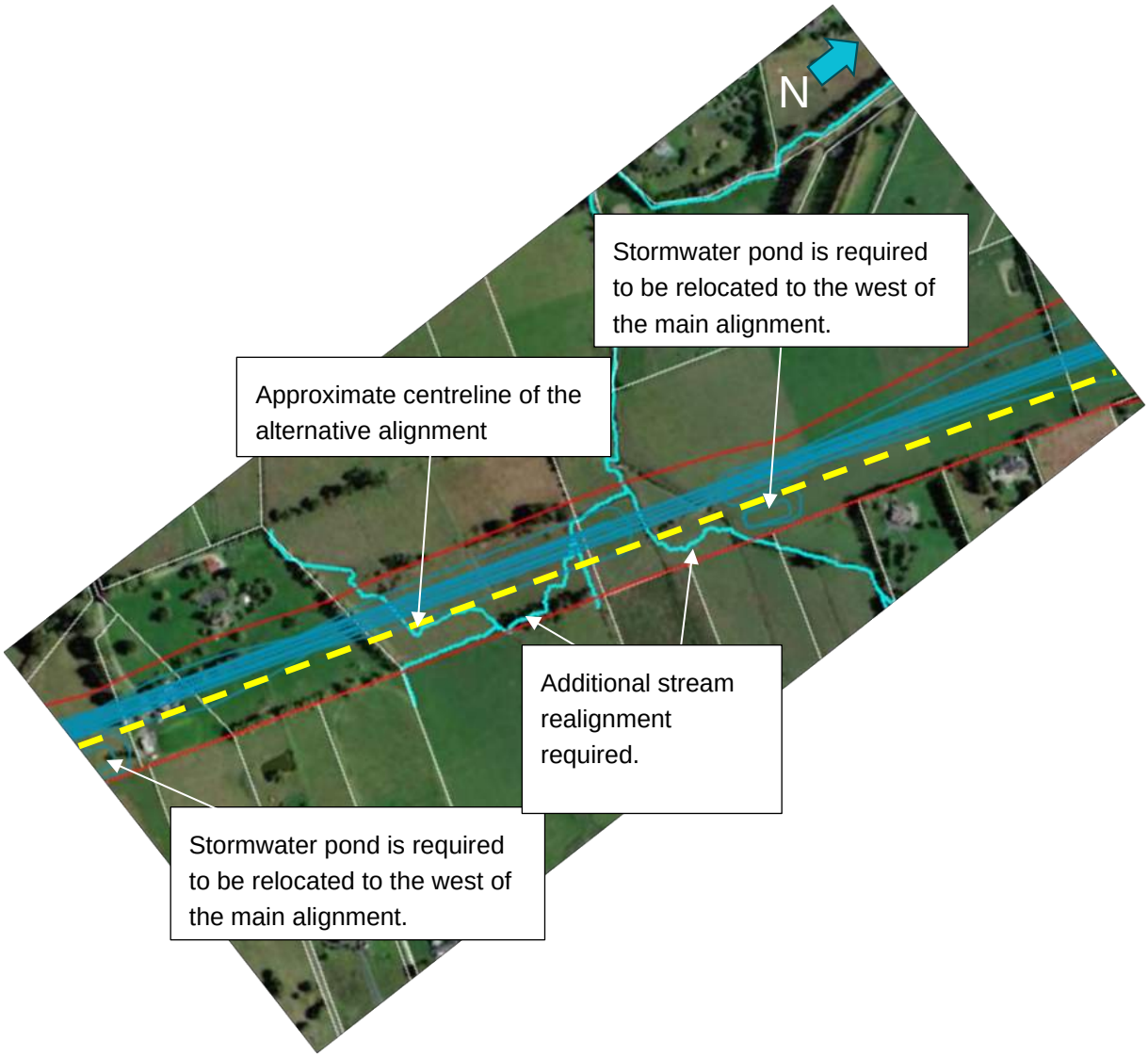
- The proposed designation as it stands does not preclude minor adjustments of the RTC alignment.
- The alternative alignment has an increased effect on streams in the area and requires a greater degree of diversion and modification. It therefore has greater effects on the natural

environment and may be less consistent with relevant policy direction relating to protection of streams and watercourses.

- The alternative alignment is unlikely to meaningfully reduce the designation footprint in this location as space will be required to deal with stream diversions and shifting of stormwater devices.

Overall, the preferred option is considered favourable in this location and no realignment was proposed. The designation boundary provided can accommodate some refinement to the alignment through future design phases.

**Figure 51: Implications of alternative alignment**



## 6.16 RTC: Preferred Route

The preferred route for the RTC is as shown in **Figure 52** and **Figure 53**.


**Figure 52: RTC preferred route**

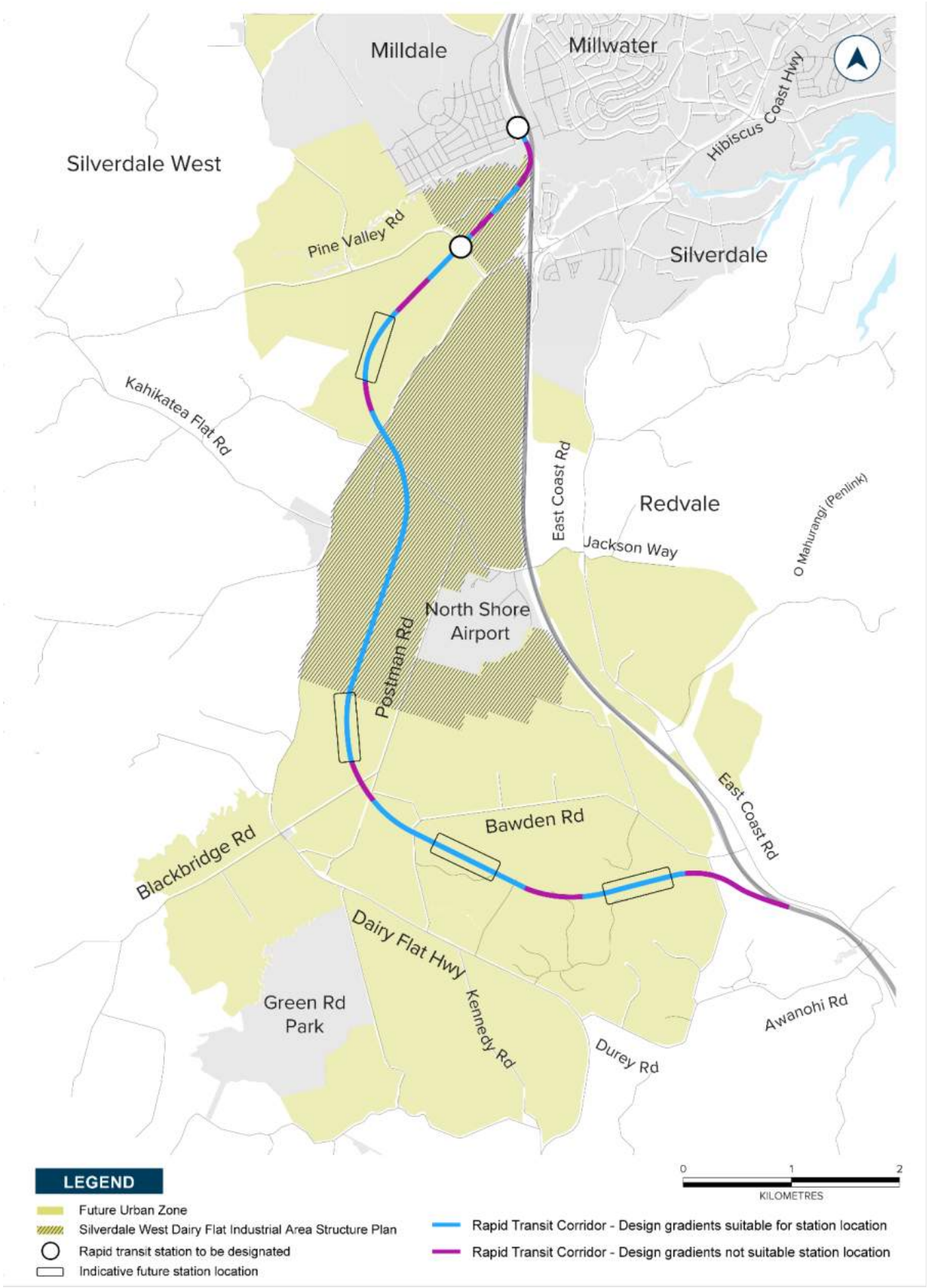



**Figure 53: RTC - Preferred Route (with inset showing SH1 corridor)**

# 7. NoR 2 – New Milldale Station and Associated Facilities

## 7.1 Summary

This section outlines the assessment of alternatives for the new Milldale Station and associated facilities. The RTC station forms the end of line station and provides for a Frequent transit network (FTN) public transport interchange (for buses).

The proposed station includes the following:

- Station facilities (~240 $m^2$).
- Bus layover ~5000 $m^2$.
- Drop-off /pickup and accessible spaces.
- Cycle parking (~500 spaces).
- Local bus connection (bus bays) – local bus drop-off (3x terminating and 2x through services).
- Parking bays for on-demand vehicles and station operations/services.

### 7.1.1 Options Assessment

The IBC did not identify stations; however the IBC to DBC gap analysis identified further assessment of the number and location of stations was required.

A single site option was developed on the land at Milldale that was left undeveloped by the developer through discussions with AT and WK. This option allows flexibility for different layouts within the footprint.

### 7.1.2 Preferred option

The DBC option development considered constraints including the SEA and a QEII covenant to the south (Kathy's Thicket), the existing SH1 carriageway to the east, recently developed Milldale residential properties to the west, a proposed bridge from Milldale to Highgate through the proposed station footprint, and a steep change in topography from Milldale down to the SH1 carriageway. An indicative layout of the single station option developed is provided in Figure 54.


**Figure 54: New Milldale Station and Associated Facilities indicative layout**

## 7.2 IBC to DBC gap analysis

The North IBC did not identify RTC stations. The IBC-DBC gap analysis identified that further assessment of the number and location of stations was required at the DBC stage, along with assessment of configuration options where designations are proposed and private land is affected. The gap analysis also identified that land has been set aside for the Milldale Station by the developer through an agreement with AT and that all available land was likely required for the station. RTC alignment alternatives bypassing the station were considered as part of the IBC phase, however these options were not pursued. It was also noted that the DBC optioneering should consider the new NPSs, including the NPS:FW and NPS:UD (as discussed in Part A).

A NoR is proposed to be lodged for the new Milldale Station, considering development pressure in the area and the need for sufficient land to be protected for the station and associated facilities.

## 7.3 Route (Site) Refinement

Considering the results of the gap analysis, the DBC optioneering for Milldale Station followed a route refinement process whereby the station location, catchment and function were looked at from a transport perspective, and then a single option was developed at the available site, through a constraints-led design process with urban design and transport planning input.

### 7.3.1 Identification of Station location, catchment and function

An initial step in the development of detailed corridor options for the RTC was to identify potential station locations and catchments and the function of those stations. This is described in Section 6.4 above.

The proposed Milldale Station for the RTC was identified as having the following function/purpose:

- RT end of line (i.e. a terminating station in the network)
- Frequent transit network (FTN) public transport interchange (for buses).

The Milldale Station spatial and functional requirements were also confirmed as including:

- Station facilities - 240m$^2$
- Bus layover - 5000m$^2$
- Drop-off /pickup and accessible spaces
- Cycle parking - 500 spaces
- Local bus connection (busbays) – local bus drop-off (3Xterminating and 2Xthrough services)
- Parking bays for on-demand vehicles and station operations/services.
- **Figure 55** below shows the general location of the Milldale Station and its catchment.

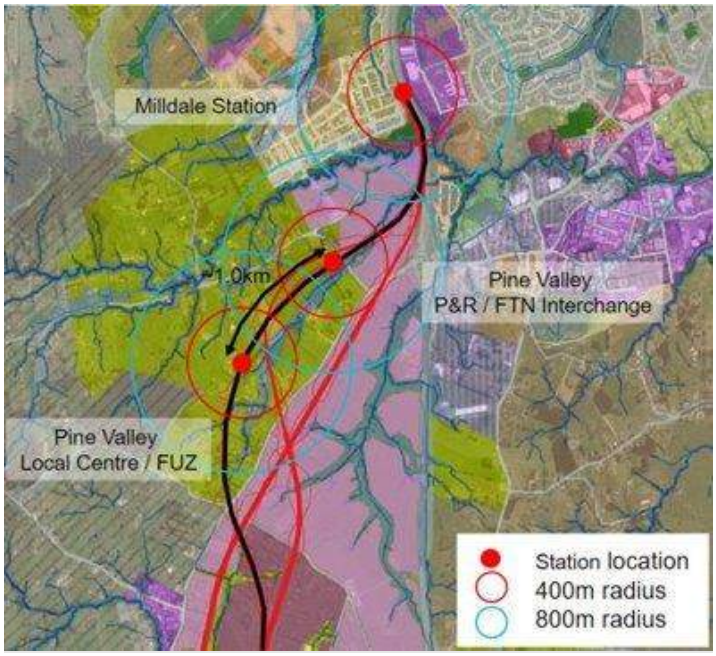



**Figure 55: RTC indicative station locations and catchments**

### 7.3.2 Development of a single station option

The Milldale development, through discussions with AT has set aside land for the station at the site. The site is also quite constrained and all available land is required for the station. For these reasons, only one option was developed; although there is flexibility for different layouts within this footprint.

The single route/site option for the Milldale Station was limited to the indicative station area shown in **Figure 56** for the following reasons:

- The site comprises land set aside by the landowner/developer for the station. The surrounding land (outside the set aside land) is built out with houses already in place.
- The station needs to be along the alignment developed for the RTC and at an appropriate grade (no more than 0.5%)
- The site is very constrained with a QEII covenanted SEA area to the south (Kathy's Thicket), a steep embankment down to the motorway to the east, new residential development to the west, and a newly consented bridge across the Motorway (Highgate Bridge).
- There are no other practicable locations for the station, refer section 6.12.1 above (RTC Segment 6: Milldale. Route refinement).

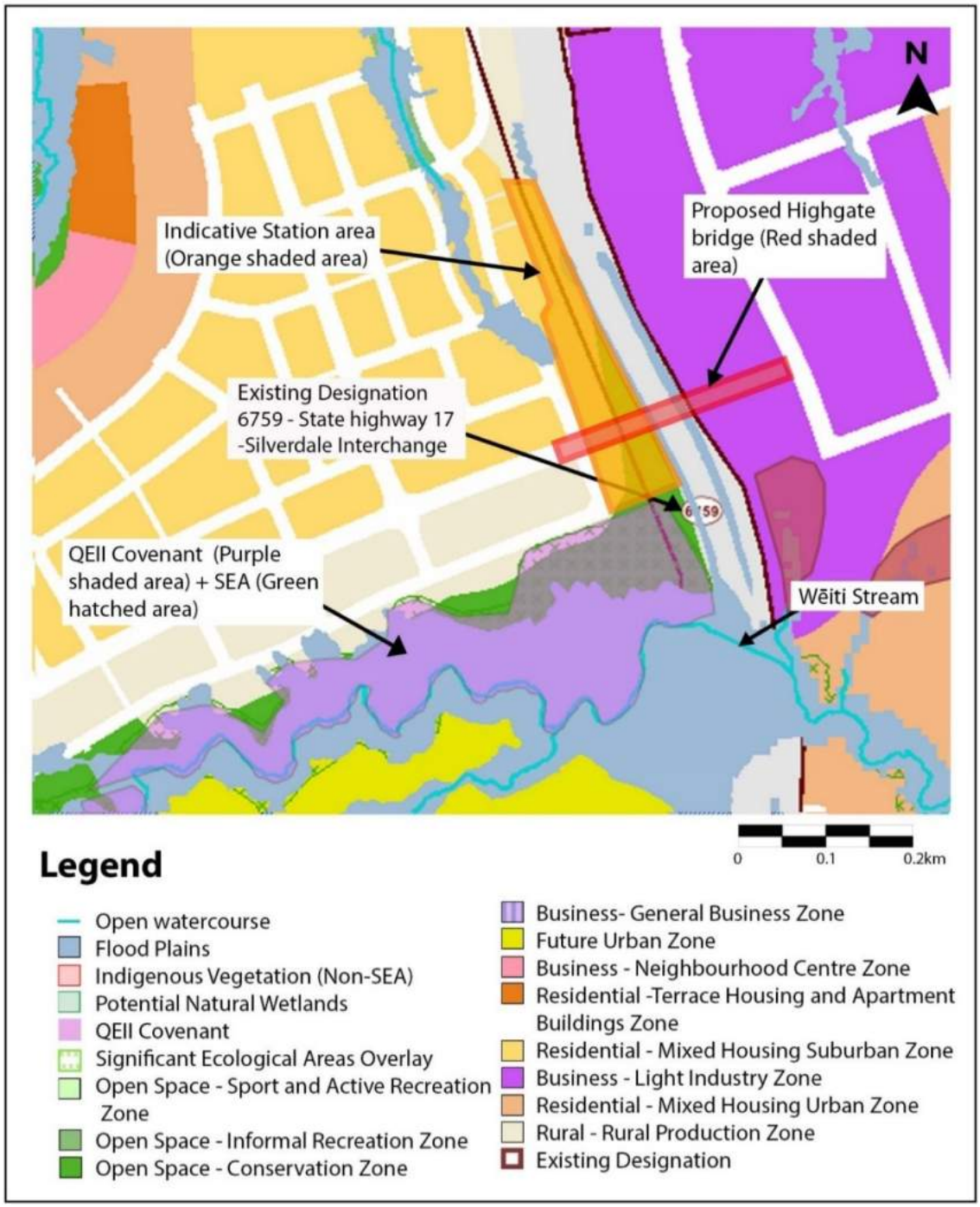



**Figure 56: Map of key constraints and features of Milldale Station study area**

The development of the single station spatial layout option also considered the above constraints, which are shown in more detail in **Figure 56.** A key recommendation was to avoid encorachment into the SEA and/or QEII covenant as much as possible in option development. Other features and constraints in the area include:

- Floodplains to the immediate west of the indicative station area and adjacent to the SH1 carriageway.
- Wēiti stream (which is culturally significant) and an associated floodplain to the south.
- Recent residential development to the west – part of the Milldale development.

- Existing Waka Kotahi SH1 designation (ID 6759) overlays approximately half of the indiicative station area.
- The proposed Highgate bridge is for all modes (a traffic lane in either direction plus active modes on both sides) – key opportunity to connect.

The indicative station location/layout is shown in **Figure 57**.

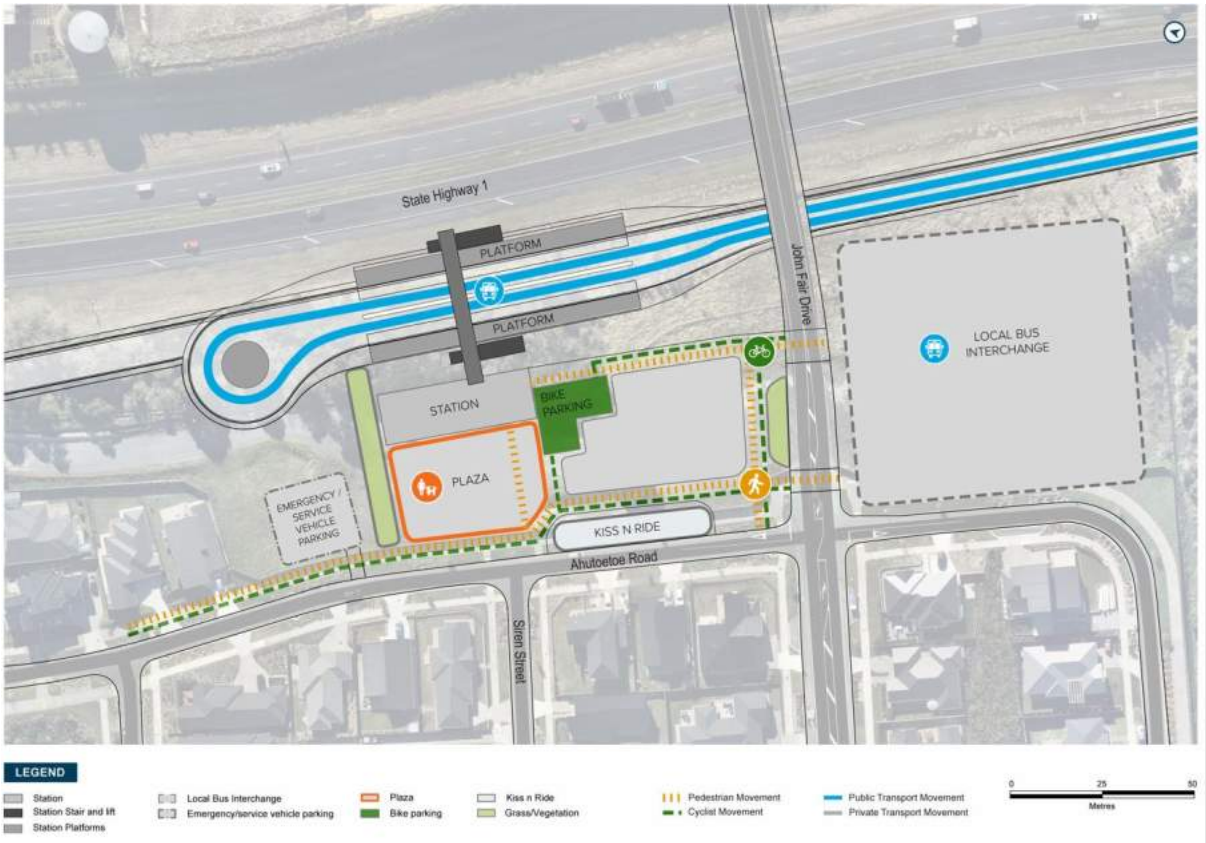



**Figure 57: Indicative Milldale Station layout**

## 7.4 Consideration of DBC engagement

The DBC engagement focused on the RTC corridor as a whole and did not specify the location of RTC stations; although it was noted/shown that the RTC would terminate at Milldale close to SH1.

Some feedback during the DBC engagement noted a preference for Milldale Station to be located more centrally to the Milldale development, rather than close to SH1. A more central terminus at Milldale was considered during the previous IBC phase, as summarised in Part A (Section 3). The Project team concluded that a Milldale Station adjacent to SH1 provides the optimal balance for providing access to the various existing and future communities in the area (including Millwater on the eastern side of SH1). Furthermore, land has been set aside by the Milldale developer for a station next to SH1. Another key consideration was that a very high value SEA and QEII covenanted area would be affected by a new corridor across into the middle of Milldale, as well as major property and land use effects.

## 7.5 Preferred Route (Site) – New Milldale Station

The preferred location for the New Milldale Station is as shown in **Figure 58**.

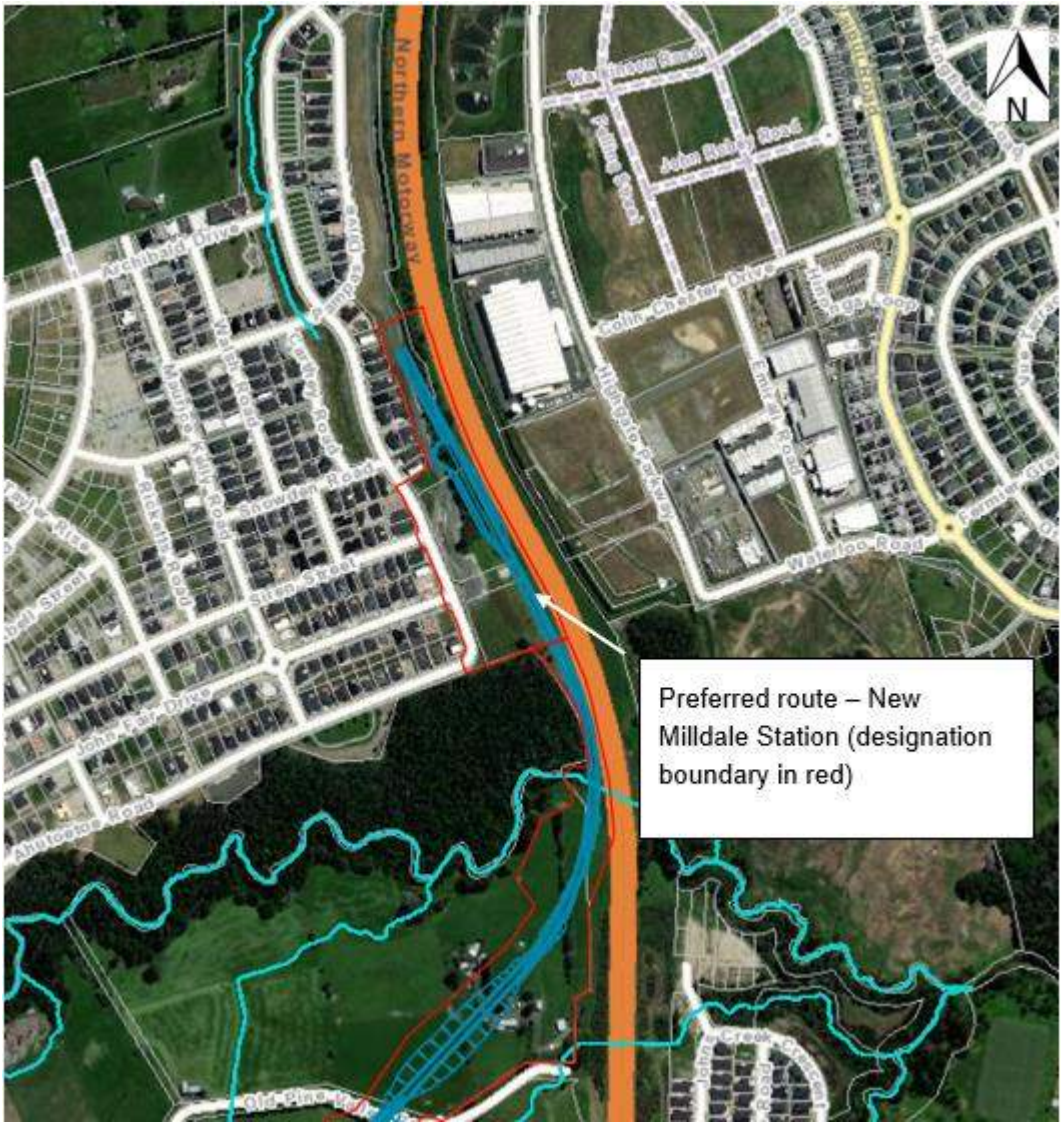



**Figure 58: Milldale Station Preferred Location**

# 8. NoR 3 – New Pine Valley East Station and Associated Facilities

## 8.1 Summary

This section outlines the assessment of alternatives for the new Pine Valley East Station and associated facilities. The RTC station provides for a frequent transit network (FTN) public transport interchange (for buses) and a Local centre opportunity.

The proposed station includes the following:

- Station facilities (~240 $m^2$), bus layover and drop-off /pickup, accessible spaces, cycle parking (~350 spaces), station operations parking and local bus bays.
- Park and ride (500 spaces).

### 8.1.1 Options Assessment

The IBC did not identify stations, however the IBC to DBC gap analysis identified further assessment of the number and location of stations was required. A NoR is proposed to be lodged for the new Pine Valley East Station, considering development pressure in the area and the need for sufficient land to be protected for the station and park and ride.

At the DBC phase, a study area around Pine Valley Road was determined with six options developed, each with differing locations and layouts. The options were assessed through a multi criteria analysis.

A number of constraints were considered through the option development and assessment process including: floodplains and associated potential natural wetland areas to the south, proximity to Milldale Station to the north, existing AT road designations, a potential local centre within the vicinity of the study area, and the need for the RTC to pass over the new Pine Valley Road in this area.

The preferred option identified is Option D with a station over New Pine Valley Road with park-n-ride and bus layover to the north-east. The key reasons for this recommendation are:

- Overall preferred option in relation to transport outcomes (investment objectives), land use futures and urban design - which are critical issues for an RTC station.
- Environmental effects neutral to low adverse, except for construction disruption (a temporary effect) and construction costs/risk.
- Equal best value for money.
- Option aligns with Manawhenua and Council preferences.

Figure 59 shows the preferred option for Pine Valley Station.

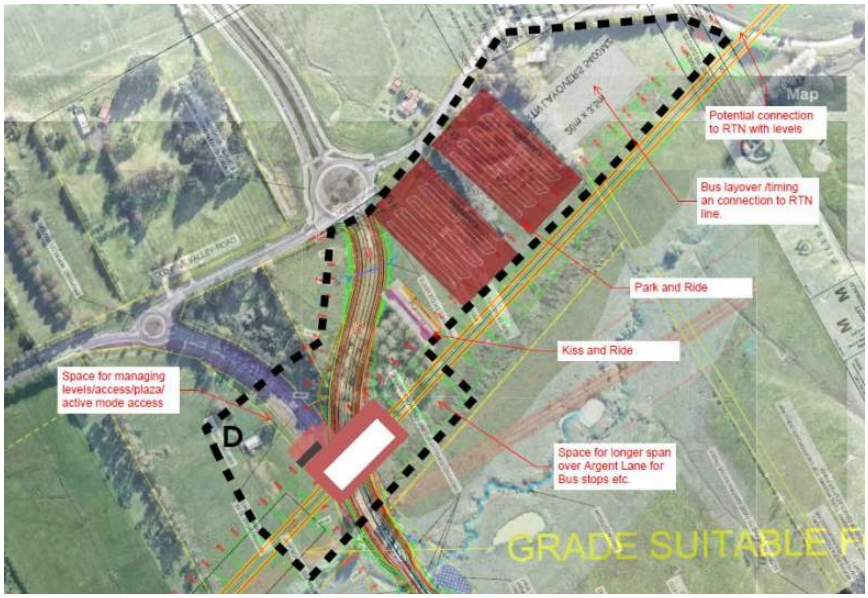



**Figure 59: New Pine Valley Station and Associated Facilities preferred option showing station location and park and ride facilities - Option D**

## 8.2 IBC to DBC gap analysis

The North IBC did not identify RTC stations. The IBC-DBC gap analysis identified that further assessment of the number and location of stations was required at the DBC stage, along with assessment of configuration options where designations are proposed and private land is affected. Unlike Milldale Station, no land has been set aside by a developer for a Pine Valley East Station. It was also noted the DBC optioneering should consider the new NPSs, including the NPS:FW and NPS:UD (as discussed in Part A).

A NoR is proposed to be lodged for the new Pine Valley East Station, considering development pressure in the area and the need for sufficient land to be protected for the station and park and ride.

## 8.3 Detailed Corridor (Site) assessment

Considering the results of the gap analysis, the DBC optioneering for Pine Valley Station followed a Detailed Corridor (Site) Assessment process, whereby:

- an initial assessment of station location, catchment and function was identified through transport assessment.
- then a range of detailed site locations and configurations were developed and assessed with full MCA scoring.

### 8.3.1 Identification of Station location, catchment and function

An initial step in the development of detailed corridor options for the RTC was to identify potential station locations and catchments and the function of those stations. This was undertaken primarily by transport experts and is described in Section 6.4 above.

Through this process, the proposed Pine Valley East Station was identified as having the following function/purpose:

- Park and ride.
- Frequent transit network (FTN) public transport interchange (for buses).
- Local centre opportunity.

The Pine Valley station spatial and functional requirements were also confirmed as including:

- Park and ride (approx. 500 spaces)- This matches the existing provision provided at the Hibiscus Coast Bus Station and is considered a reasonable provision in this location, noting overprovision can discourage those living locally from accessing the station by local buses/active modes.
- Station facilities - 240m$^2$
- Bus layover - 5000m$^2$
- Drop-off /pickup and accessible spaces.
- Cycle parking - 500 spaces.
- Local bus connection (busbays) – local bus drop-off (1Xterminating and 3Xthrough services).
- Parking bays for on-demand vehicles and station operations/services.

**Figure 60** below shows the general location of the Pine Valley East Station and its catchment.

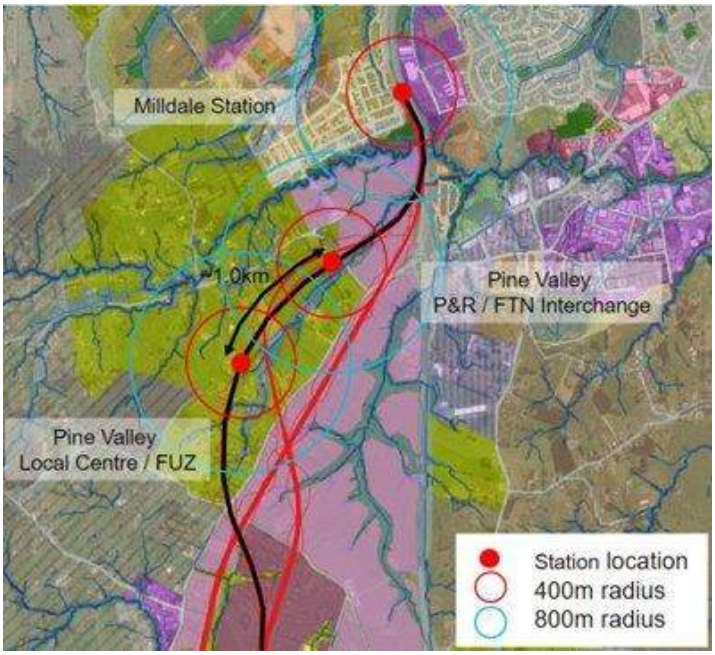



**Figure 60: RTC indicative station locations and catchments**

## 8.3.2 Detailed Site Option development

Route/site options for the Pine Valley East Station were generally limited to the study area shown in **Figure 61** below for the following reasons:

a) The station needs to be along the alignment developed for the RTC.

b) The area for where the main station could be located is limited by grades -assumed 0.5% grade – and for this reason most options have the main station to the west of Pine Valley

Road. The exception is Option D, which includes a slight change in vertical alignment to provide the station above New Pine Valley Road.

c) A location near to the new Pine Valley Road (recently designated by AT) will enable ease of access for park and ride and bus FTN interchange, and will also allow the opportunity in future for a more western Pine Valley station with a more local catchment (see **Figure** 60 above).

d) The station needs to be a suitable distance from the terminating station at Milldale to avoid overlapping catchments for both stations and to provide for the overall efficiency of the corridor (i.e.: avoiding stations too close together).

e) Suitable land needs to be available for a park and ride area of approx. 500 spaces, as well as other functional requirements.

f) There is a large floodplain to the south and associated potential natural wetlands.

The option development also considered the constraints and features in the area, as summarised in **Figure 61** below including:

a) Potential natural wetlands and floodplains to the south.

b) The new Pine Valley Road designation.

c) The proposed Upgrade to Pine Valley Road (see Section 12).

d) A potential local centre(s) in the vicinity as identified in Council's Draft Spatial Land use Strategy.

e) The need for the RTC to pass over the new Pine Valley Road in this area.

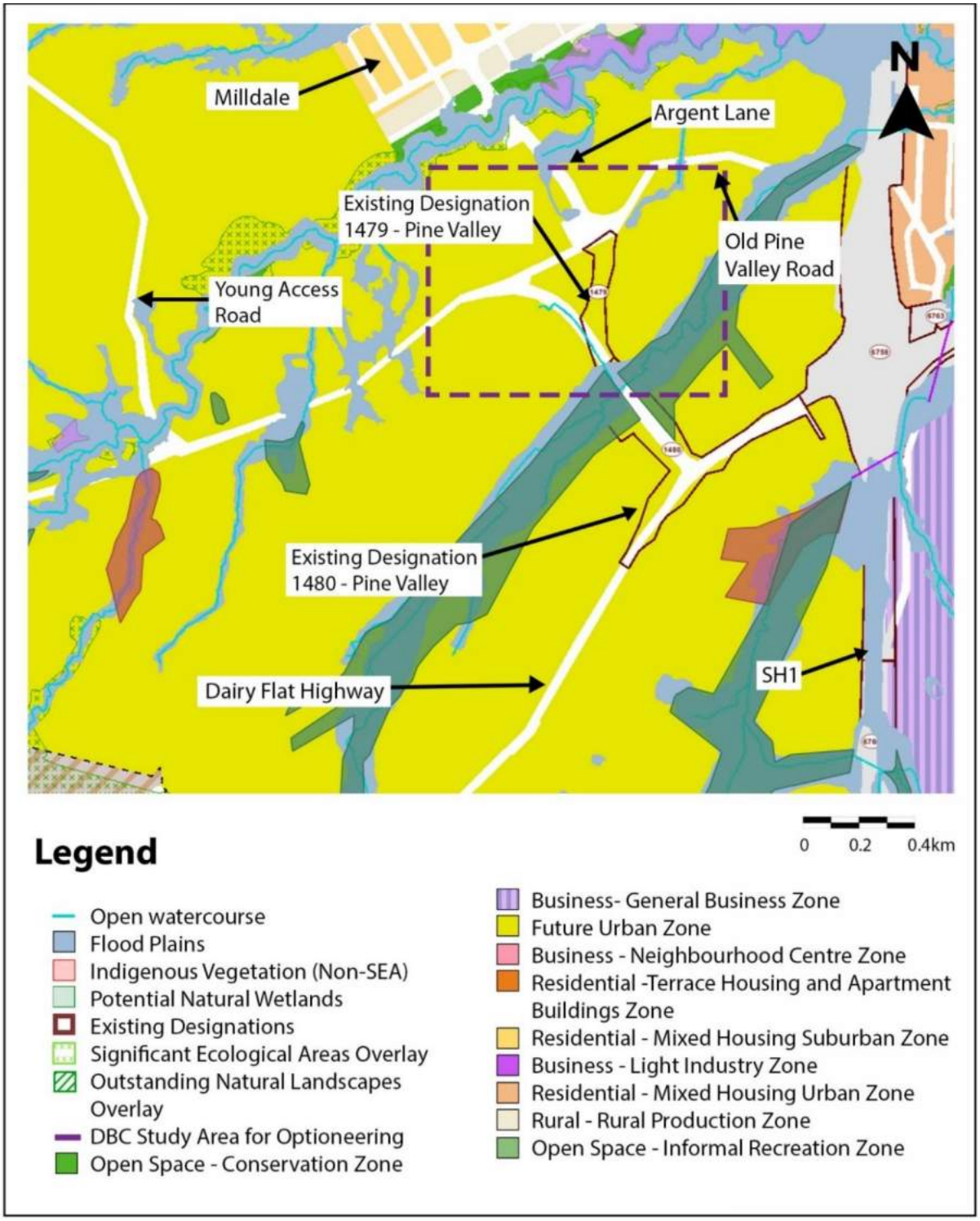



**Figure 61: Pine Valley Station Study area - Key Features and Constraints Map**

In consideration of the above factors, **six options** (including 3 sub options) were developed through route refinement as outlined in **Table 32** and **Figures 62 – 67** below.

### Table 32: Summary of Pine Valley East Station location/configuration options

Note: 'New Pine Valley Road' refers to the recent AT designated arterial shown in **Figure 61**.

| Option Reference | Option Name/Description |
|---|---|
| **Option A1** | **Station and Park-n-ride west of new Pine Valley Road – variant A1**<br>Includes station building/platforms just west of new Pine Valley Road with bus layover and park-and-ride areas to the north adjoining Pine Valley Road |
| **Option A2** | **Station and park-n-ride west of new Pine Valley Road variant A2**<br>Includes station building/platforms commencing approx. 200m west of new Pine Valley Road with bus layover and park-and-ride areas to the north adjoining Pine Valley Road |
| **Option A3** | **Station and Park-n-ride west of new Pine Valley Road – variant A3**<br>Includes station building/platforms commencing approx. 200m west of new Pine Valley Road with bus layover and park-and-ride areas to the north/north-east adjoining Pine Valley Road |
| **Option B** | **Station west of new Pine Valley Road with Park-n-ride to north-east**<br>Includes station building/platforms and bus layover areas immediately west of new Pine Valley Road with park-and-ride areas to the east of new Pine Valley Road, north of the RTC -with a bridge connecting over new Pine Valley Road |
| **Option C** | **Station west of new Pine Valley Road with Park-n-ride to south-east**<br>Includes station building/platforms and bus layover areas immediately west of new Pine Valley Road with park-and-ride areas to the east of new Pine Valley Road, south of the RTC -with a bridge connecting over new Pine Valley Road |
| **Option D** | **Station over New Pine Valley Road with Park-n-ride and bus layover to north-east**<br>Includes station buildings/platforms raised above the New Pine Valley Road, with park-n-ride and bus layover areas to north-east |

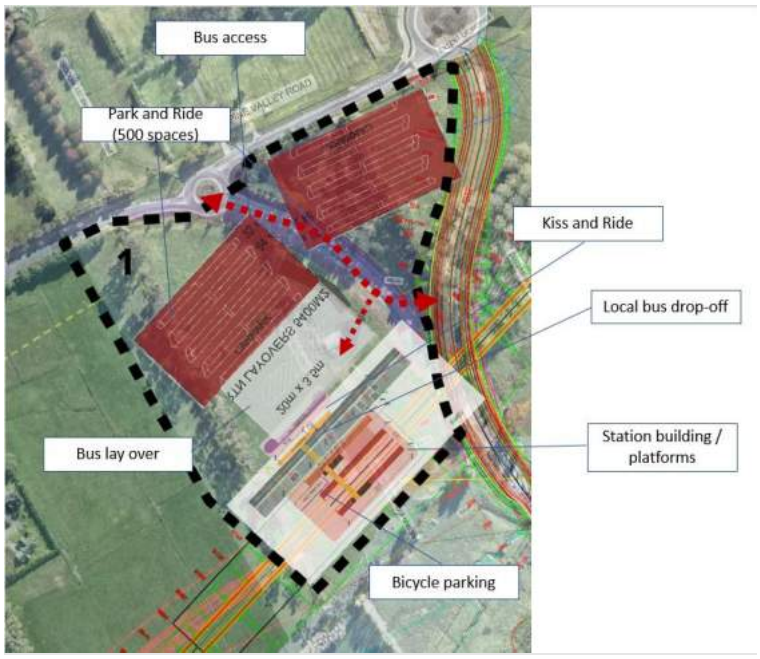


**Figure 62: Option A1 – Station and Park-n-ride west of new Pine Valley Road (variant A1)**

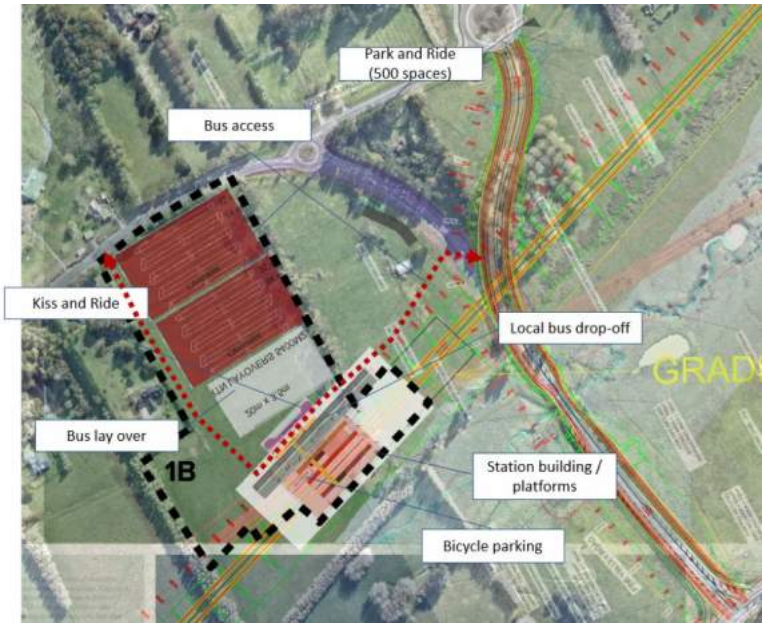



**Figure 63: Option A2 –Station and park-n-ride west of new Pine Valley Road variant A2**

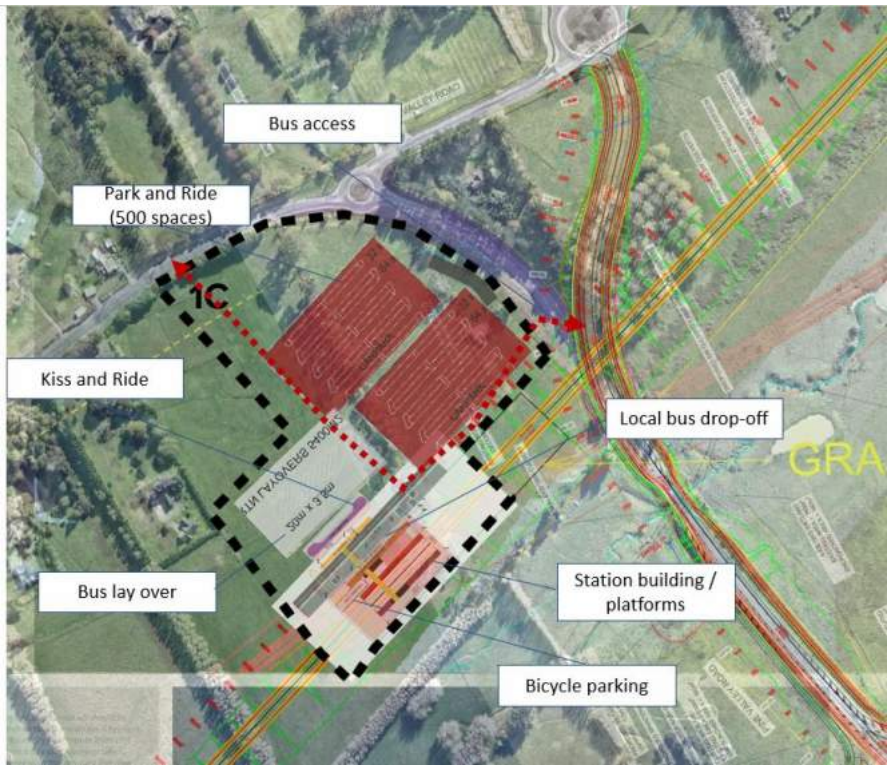



**Figure 64: Option A3 – Station and Park-n-ride west of new Pine Valley Road – variant A3**

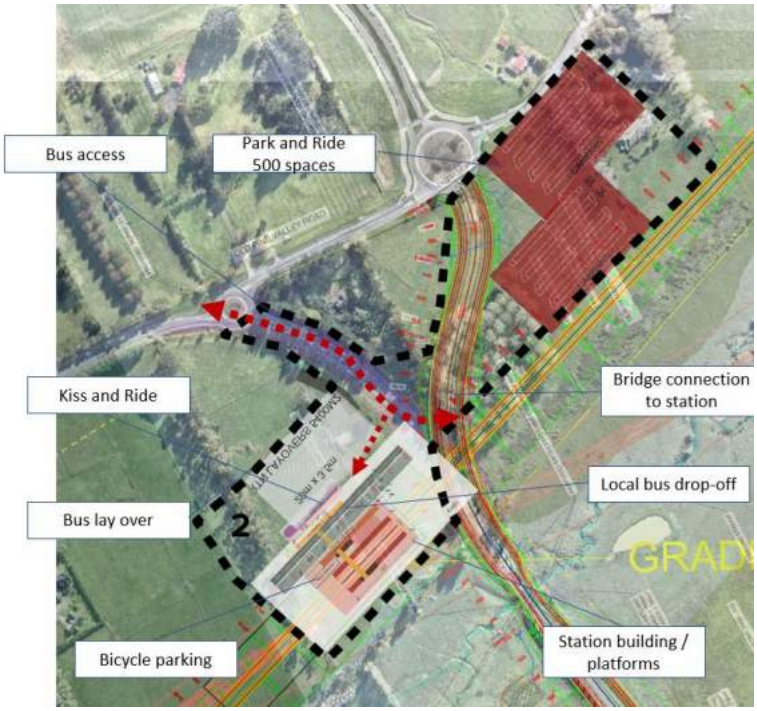



**Figure 65:Option B – Station west of new Pine Valley Road with Park-n-ride to north-east**

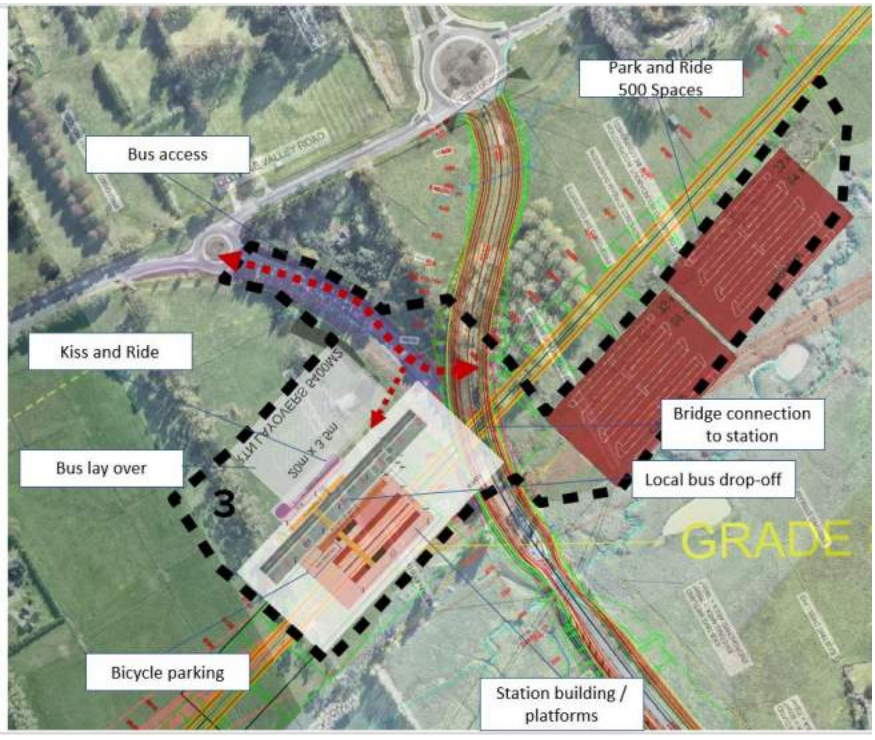



**Figure 66: Option C – Station west of new Pine Valley Road with Park-n-ride to south-east**

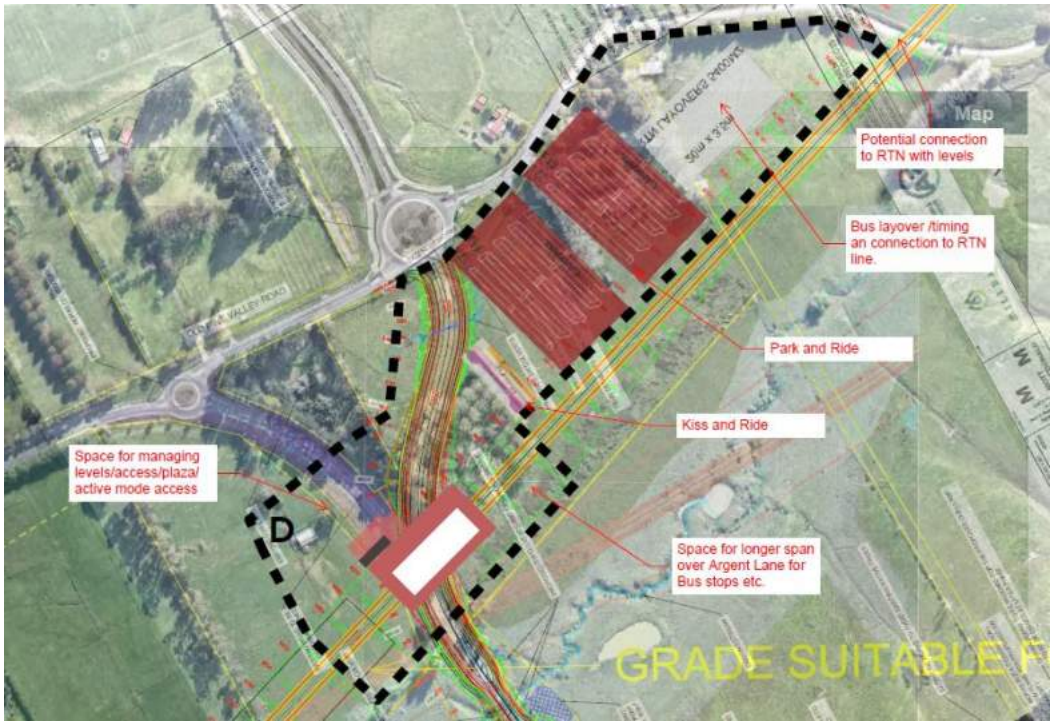



**Figure 67: Option D – Station over New Pine Valley Road with park-n-ride and bus layover to north-east**

All options assumed Old Pine Valley Road between the western roundabout and the station is closed to general traffic in the future; however this may still provide access for buses.

The station footprints are designed to be flexible for mode but the high level designs assume bus rapid transit as that takes the greatest amount of space.

### 8.3.3 Detailed Site Option assessment

Options were assessed against the Investment Objectives and criteria within four well-beings, cultural, social, environmental and economic. Technical specialists engaged in an MCA workshop to undertake an assessment, scoring each option on a gradual scale from 'Very High Adverse Effect' (red) to 'Very High Positive Impact' (green).

The following table identifies the outcomes from this assessment.

**Table 33: Pine Valley East Station (RTC) MCA Summary**

| MCA Criteria | Option A1 | Option A2 | Option A3 | Option B | Option C | Option D |
|---|---|---|---|---|---|---|
| Investment Objective 1: Access - Provide effective and attractive Public Transport access to economic and social opportunities for the Northern Growth | 3 | 2 | 2 | 3 | 2 | 3 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Investment Objective 2: Integration - Provide a Rapid Transit corridor that is integrated with land use and the transport system. | 3 | 2 | 3 | 2 | 1 | 3 |
| 1a. Heritage | -1 | -1 | -1 | -1 | -1 | -1 |
| 2a. Land use futures | 2 | 2 | 1 | 2 | 3 | 3 |
| 2b. Urban design | 3 | 3 | 2 | 1 | 1 | 3 |
| 2c. Land requirement | -1 | -1 | -1 | -1 | -1 | -1 |
| 2d. Social cohesion | 3 | 3 | 3 | 1 | 1 | 2 |
| 2e. Human health and wellbeing | -2 | -2 | -2 | -1 | -1 | -1 |
| 3a. Landscape / visual | -2 | -2 | -2 | -3 | -3 | -2 |
| 3b. Stormwater/flood | -1 | -1 | -1 | -2 | -3 | -1 |
| 3c. Ecology | -1 | -1 | -1 | -1 | -2 | -2 |
| 3d. Natural hazards | 0 | 0 | 0 | 0 | -1 | -1 |
| 5a. Construct. impacts on utilities / infrastructure | -1 | -1 | -1 | -1 | -1 | -1 |
| 5b. Construction disruption | -2 | -2 | -2 | -1 | -1 | -3 |
| 6a. Construction costs / risk | -2 | -2 | -2 | -2 | -3 | -3 |

The Project Team reviewed and compared the options identified above and noted that criteria relating to relating to the investment objectives (transport outcomes), land use futures, urban design, social cohesion, human health/wellbeing, landscape/visual, stormwater/flooding, ecology, natural hazards, construction disruption and construction costs/risk are the key considerations for this segment and showed differentiation between the options.

The two optimal performing options overall were Options A1 and D. In making a decision, the Project Team considered that both options scored relatively well from an environmental perspective, although Option D was likely to cause more disruption during construction and would have a bit more construction cost/risk (as the station would be above new Pine Valley Road). The team also considered that for an RTC station, the criteria relating to transport outcomes (investment objectives), land use integration and urban design are particularly important. For this reason, specialists were asked to confirm a preference between the options for these criteria. In addition, Council, and transport/urban design specialists from AT and Waka Kotahi were engaged with to seek input on the options. This assessment identified the following:

- For investment objectives 1 and 2 (access and integration respectively) there is a slight preference for Option D over Option A1 (despite both options scoring +3 for both investment objectives) as it has the most convenient access for local bus services to the station interchange considering future AT identified future bus routes on Argent Lane and new Pine Valley Road. Bus

stops on Argent Lane provide the most direct access. This was supported by subject matter experts from AT.

- Land use futures/integration scored more positively (+3) than Option A1 (+2) because of the differences in future land use i.e.: the location of the park and ride and bus layover for Option A1 (to the west of new Pine Valley Road) is within an area of likely future residential/local centre and hence would use up land that could be used for higher density residential or mixed use development around the station, and would result in a less positive land use integration outcome (which is also critical for patronage of the RTC). For Option D, the park and ride and bus layover are in future industrial land. Although this would take some land from industrial use, the proportion is small considering the large future industrial land envisaged in Council's industrial structure plan. This reasoning was supported by Council planners during engagement on the options.
- Both options A1 and D score +3 for urban design. There is a slight preference for Option D because the walk-up catchment around the station can be maximised to the west of new Pine Valley Road and the park and ride/bus layover to the east has a better interface/amenity outcome (than if a large paved area was located in a high density area around the station, as per A1). This reasoning was supported by Council planners during engagement on the options.

In relation to non-scored criteria:

- Option D was overall preferred from a policy analysis perspective recognising that this option minimises the footprint of the station and associated facilities within future residential land. This means the option has the highest level of alignment with the NPS-Urban Development given it maximises available residential land for intense development around the RT station. Like all the options with the exception of Option 3, this option also generally aligns with the NPS-Freshwater, as it avoids potential natural wetlands and permanent waterbodies.
- Those **Manawhenua** who stated a preference, noted a preference for Option D.
- From a **value for money perspective**, Options A1 and D were equally preferred. Option A1 has one of the lowest land requirement areas and highest transport benefits with good opportunity for value capture through development of land within the station footprint. Option D has slightly more land requirement, but the likely property cost is lower due to the likely future industrial land use to the east of new Pine Valley Road. It also has good transport benefits, although this is balanced with reduced opportunity for value capture through development of land within the station footprint given the industrial land use to the east.

Accordingly, the Project Team identified **Option D – Station over New Pine Valley Road with park-n-ride and bus layover to the north-east** as the preferred option for the following reasons:

- Overall preferred option in relation to transport outcomes (investment objectives), land use futures and urban design - which are critical issues for an RTC station.
- Better land use futures score than the next best performing Option A1.
- Environmental effects neutral to low adverse, except for construction disruption (a temporary effect) and construction costs/risk.
- Equal best value for money.
- Option aligns with Manawhenua and Council preferences.

## 8.4 Consideration of DBC engagement

The DBC engagement focused on the RTC corridor as a whole and did not specify the location of RTC stations. No specific comments were received on a Pine Valley East Station.

As noted above, Council and subject matter experts from AT and WK were engaged with during the options assessment process and were generally supportive of Option D.

## 8.5 Preferred route (site) – New Pine Valley East Station

The preferred route (site) for the New Pine Valley East Station is as shown in Figure 68 and the preferred station design is shown in Figure 69.

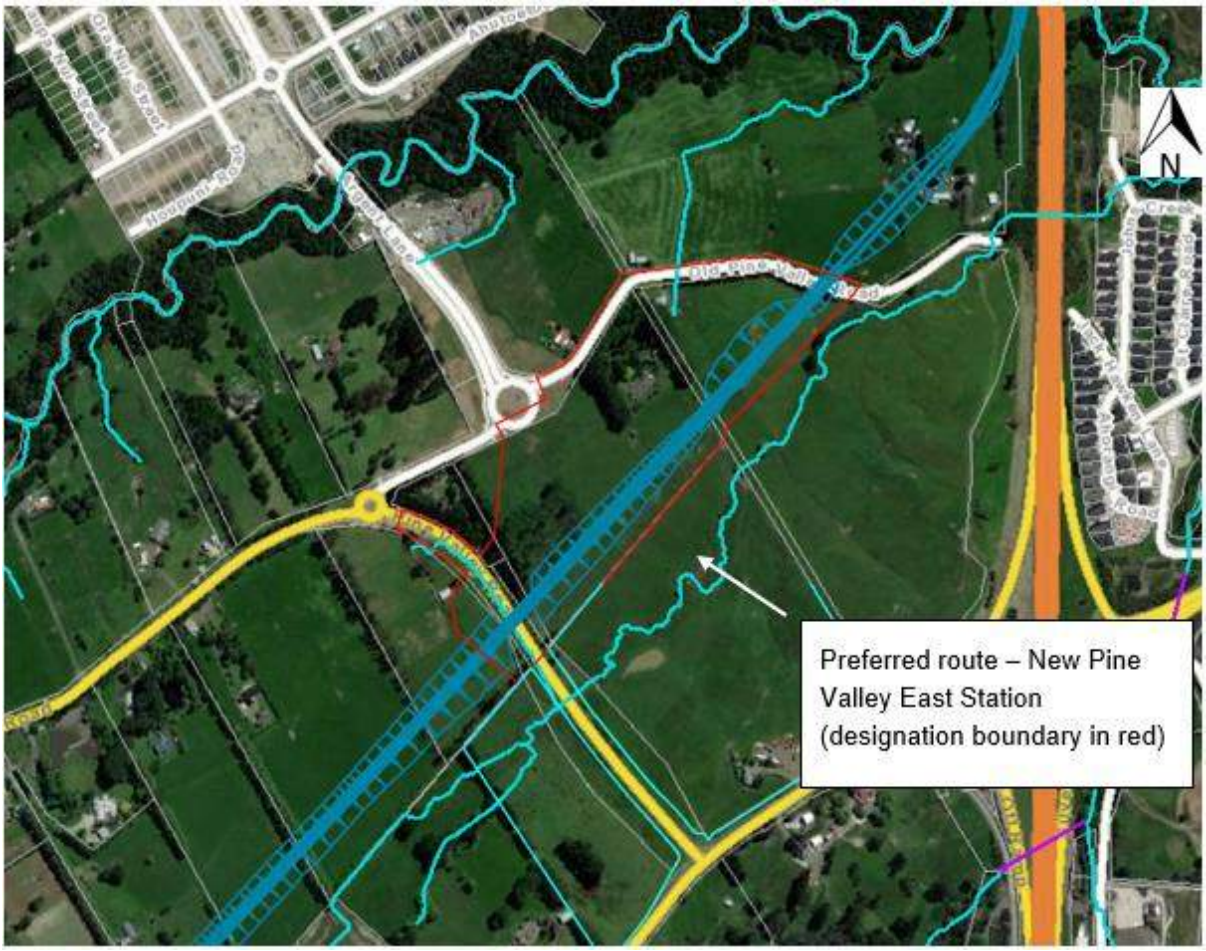



**Figure 68: Preferred location for Pine Valley East Station**


**Figure 69: Indicative Pine Valley East Station Design**

# 9. NoR 4 – State Highway 1 Improvements Package

## 9.1 Summary

This section outlines the assessment of alternatives for the projects included in the State Highway 1 Improvements (NOR 4). A number of different projects are contained within the proposed alteration to the existing SH1 designations (as per Figure 70). The components and the function of each are outlined below:

- Upgrades to SH1 between Albany and Silverdale: Widening to SH1 (3-laning) will provide opportunity for bus shoulder lanes from Albany to Silverdale in the interim with managed motorway capacity between Albany and Silverdale in the long term.
- New Walking and Cycling Path along SH1: Strategic active mode connection adjacent to SH1 between Albany and Grand Drive, Ōrewa.
- Silverdale to Highgate active mode connection: An active mode connection between the New Walking and Cycling Path and the Highgate development.
- Wainui Interchange Active Modes Upgrade: To enable active mode users to cross east to west across SH1 and provide access to the strategic active mode corridor that runs north/south between Albany and Upper Ōrewa and Grand Drive.
- SH1 Interchanges: New Wilks Road and upgraded Redvale motorway interchanges to integrate adjacent FUZ with the strategic motorway network. Silverdale Interchange improvements and upgrade for all modes.

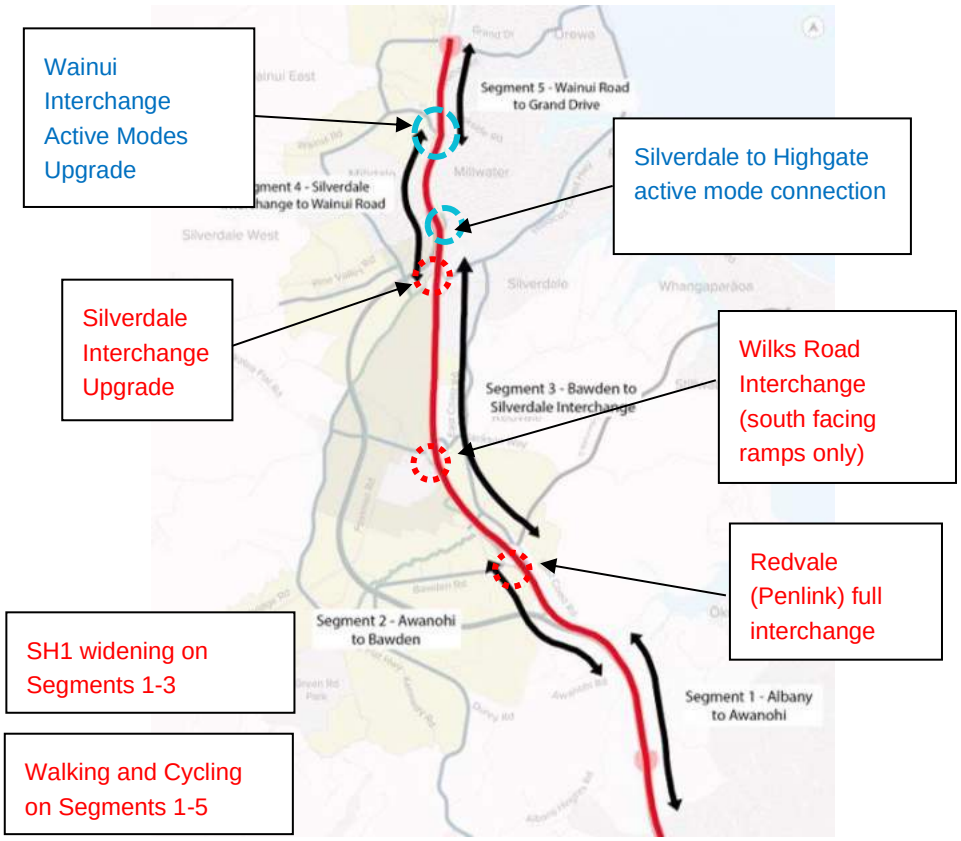



**Figure 70: Projects within SH1 improvements NOR**

### 9.1.1 IBC phase (2019)

During the IBC phase a large number of indicative corridor options were considered using MCA analysis and engagement. The recommended options included:

- Walking and cycling path along SH1 (Albany to Grand Drive interchange).
- Bus shoulder lanes from Albany to Silverdale in the short to medium term.
- Additional motorway capacity between Albany and Silverdale in the longer term.
- New or upgraded interchanges at Redvale, Wilks Road and Silverdale.

### 9.1.2 DBC phase

Following a gap assessment, the IBC recommendations were confirmed with a more detailed assessment undertaken on SH1 carriageway widening extents/locations, location of the New Walking and Cycling Path along SH1, active mode upgrades and connections, interchange locations and forms.

The optioneering and assessment approach for each project is outlined below:

Upgrades to SH1 between Albany and Silverdale:

- Segments 1 and 2 were integrated with the RTC multi criteria analysis. A constraints led design process was undertaken for Segment 3 to determine what side of the existing SH1 carriageway to widen towards.

New Walking and Cycling Path along SH1:

- Segments 1 and 2 – assessments integrated with the RTC multi criteria analysis.
- Segment 3, 4 and 5 – multi criteria analysis undertaken.

Silverdale to Highgate active mode connection:

- Multi criteria analysis undertaken, including options previously known (at IBC stage) as the Curley Avenue Active Mode connections. The study area is heavily constrained by environmental features such as an SEA, steep topography and the Wēiti Stream which has significant cultural values.

Wainui Interchange Active Modes Upgrade:

- Targeted multi criteria analysis undertaken; a full MCA was not considered necessary given the options were largely located within the existing motorway designation.

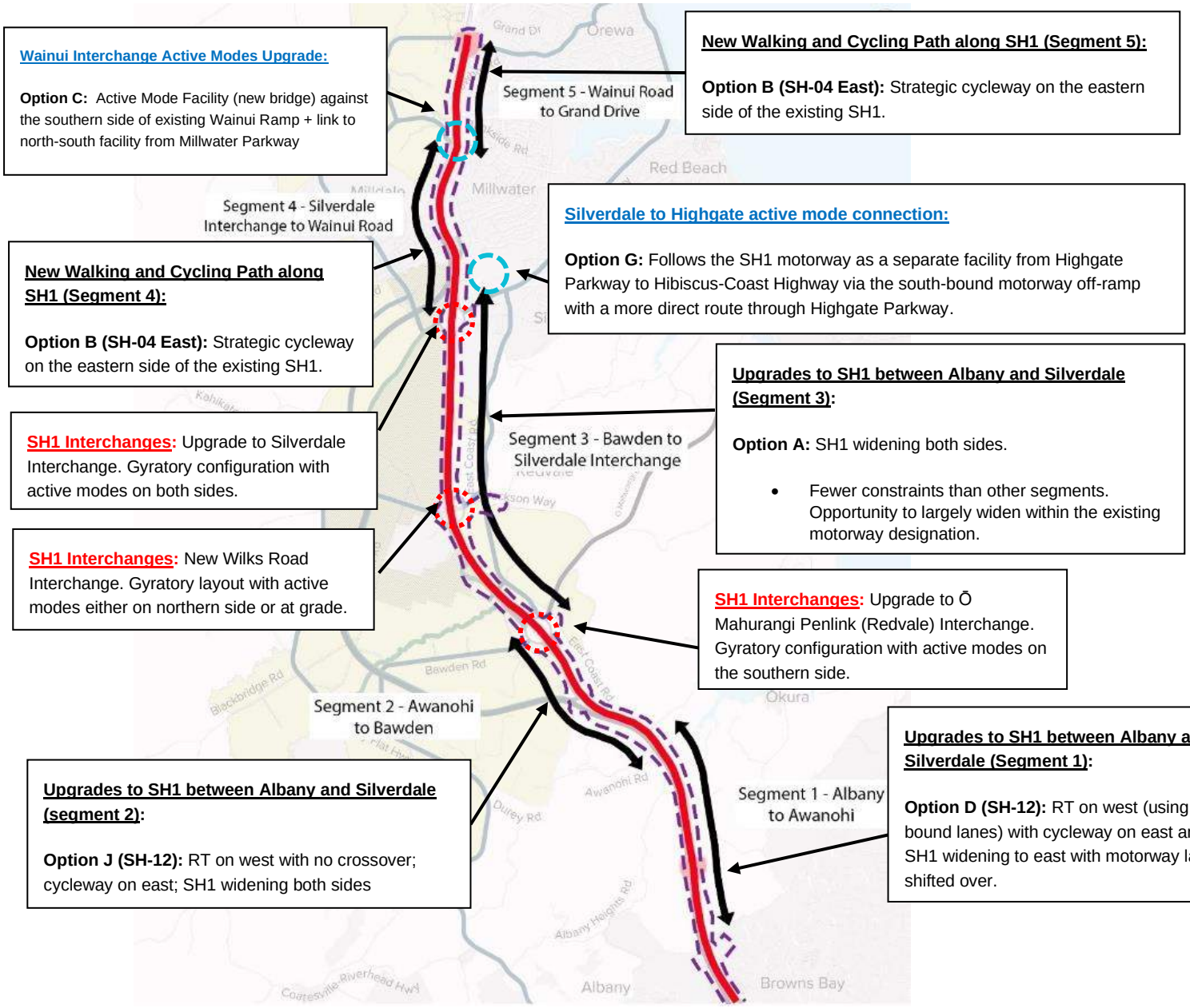
SH1 Interchanges:

- Three interchange projects – Silverdale Interchange upgrade, New Wilks Road Interchange and the Ō Mahurangi Penlink (Redvale) Interchange upgrade. Interchange spacing options were developed for the New Wilks Road Interchange and the Ō Mahurangi Penlink (Redvale) Interchange upgrade. Interchange form assessments were undertaken for all three interchanges, principally determining the interchange and active mode configurations. The new Wilks Road Interchange and associated connection across to East Coast Road was subject to a detailed multi criteria analysis.

### 9.1.3 Preferred option

Figure 71 sets out the preferred option for each project.

**Figure 71: Preferred options**




## 9.2 Corridor form and function

An assessment was undertaken for the SH1 Improvements Package that segmented the corridor into distinct segments based on the surrounding rural and urban zoning. This recommendation informed the route refinement options developed and assessed for each segment.

Widening to SH1 will provide bus shoulder lanes from Albany to Silverdale in the interim with managed motorway capacity between Albany and Silverdale in the long term.

From the existing Albany Bus Station to Bawden Road in Dairy Flat, the SH1 Improvements Package and RTC are adjacent to each other. Therefore, the two corridors were considered together with their interface being a key consideration with this outlined in Section 6.5 above.

From Bawden Road to Silverdale, the adopted typical cross section is shown in Figure 72 below.

**Figure 72: State Highway 1 Improvements Package indicative cross section – Bawden Road to Silverdale**

The typical cross section for active mode corridors in urban environments is shown in Figure 73 below and this was employed for both the Silverdale to Highgate and Wainui Interchange active mode connections.

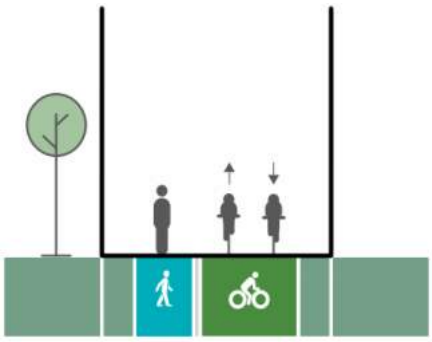


**Figure 73: State Highway 1 Improvements Package indicative cross section – Active mode connections**

A specific assessment was undertaken for each of the SH1 interchange projects (Silverdale, Wilks Road and Redvale) as described in more detail in Section 9.9 (SH1 interchanges).

## 9.3 Upgrades to SH1 between Albany and Silverdale

### 9.3.1 IBC to DBC gap analysis

The IBC recommended option for the Upgrades to SH1 between Albany and Silverdale comprised widening the SH1 carriageway from two to three lanes in each direction from the Lonely Track Road overbridge northwards to the Silverdale Interchange. Figure 74 below illustrates this extent.

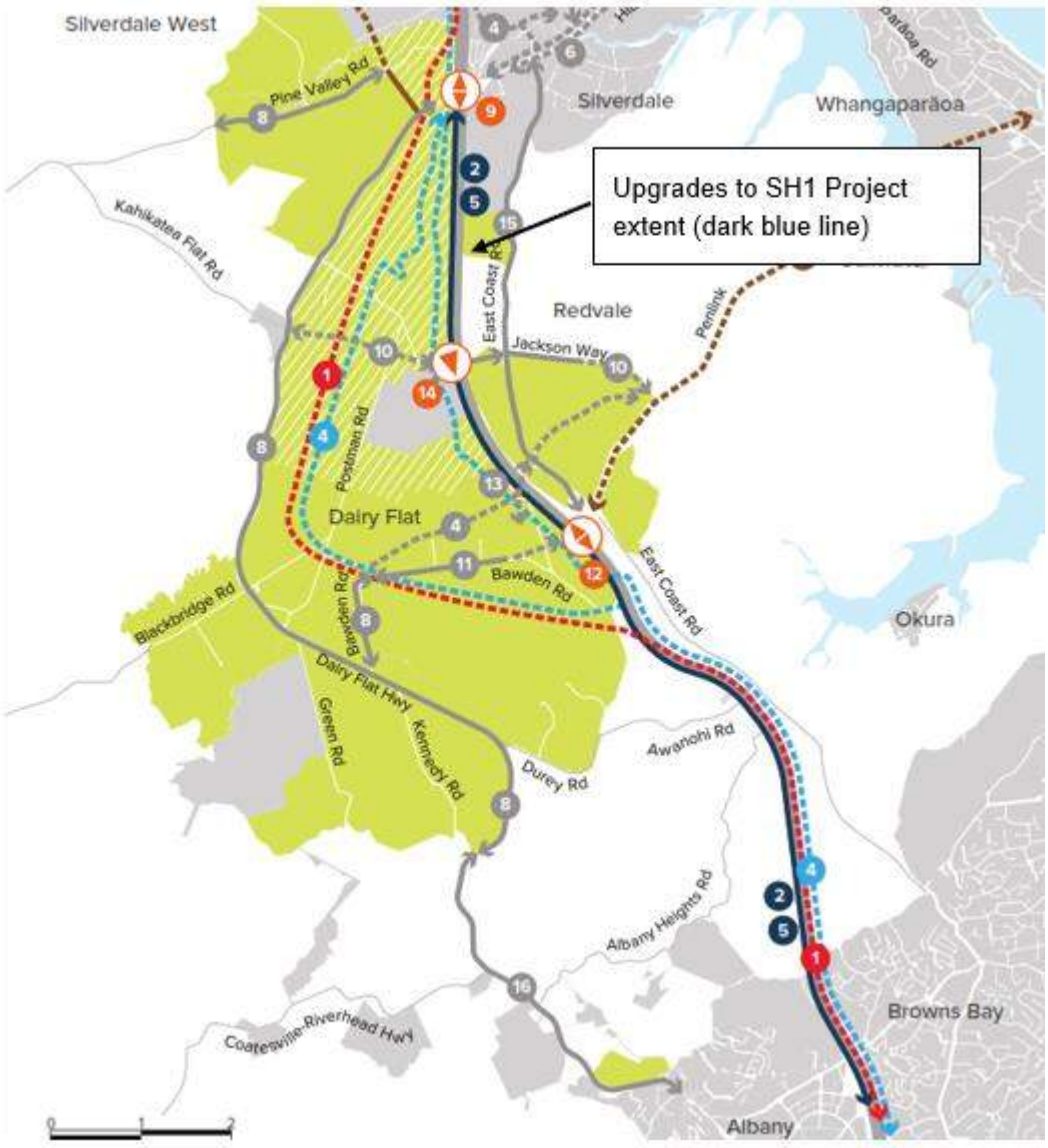



**Figure 74: Indicative Transport Network - SH1 Upgrades**

Several options were shortlisted for assessment in the IBC to provide North-South access and resilience (including additional capacity) on SH1. The options included both bus shoulder lane options between Albany and Grand Drive, and additional motorway capacity (additional vehicle lanes) over the same extent. The two preferred options were:

- Additional motorway capacity on SH1 between Albany and Silverdale (SR7-1) – in the form of an additional vehicle lane, and
- Bus shoulder lanes on SH1 between Albany and Silverdale interchange (SR2-1) – widening of shoulder to allow for use as shoulder bus lanes.

The IBC also identified that the bus shoulder lane option may require localised widening and could be combined with SR7-1 as long as a SH1 shoulder is retained.

SR7-1 was preferred as this option will help retain the strategic function of SH1 in light of higher local demand from the communities in the study area and recognising a separate Rapid Transit Corridor

would be provided in the long term. The option will manage additional capacity in the longer-term to deliver on targets for mode share and urban form.

SR2-1 was considered to provide a short- to medium-term staging option for improving reliability and travel time for public transport in the area. Bus lanes are only considered effective where there is a need to bypass congestion; hence the recommended option terminates at Silverdale. They will provide the function of connecting the study area with key destinations within and outside the study area. In the long term, the bus lanes have the benefit of being converted into general traffic lanes to provide added capacity for SH1.

An IBC to DBC Gap Analysis was undertaken at the start of the DBC phase in 2020. This concluded that the Indicative Corridor Assessment in the IBC was sufficient to progress to DBC; however, it was noted that there are complex interdependencies with other projects that should be investigated further at DBC phase. In particular, Upgrades to SH1 will need to interface with the proposed motorway interchange projects at Silverdale (interchange upgrade), Wilks Road (new south-facing ramps) and the Redvale (Ō Mahurangi Penlink) full interchange. In addition, the widening will also share a corridor with the RTC (from Albany to the SH1 crossover) and the New Walking and Cycling Path along SH1.

As noted in Part A (section 5.4.1), a climate change assessment was undertaken during the DBC phase to document climate change considerations, including a gap analysis around where specific greenhouse gas (GHG) reduction interventions or considerations could/have been made. In relation to the proposed Upgrades to SH1, this included consideration of whether the project could be eliminated from the network, GHG emissions be reduced, and could the project be optimised. This concluded that the project is required (cannot be eliminated), and that sufficient consideration of reduction of GHG was considered through the assessment (e.g. mode shift considerations in the investment objectives, embodied carbon considerations were undertaken through consideration of construction risk/cost (i.e.: length of corridor and extent of potential earthworks and structures), use of lanes for freight and climate change resilience through the natural hazards criterion and opportunities). It also identified some opportunities for optimising climate change outcomes in future project phases.

The gap analysis also recommended that the DBC optioneering should include further consideration of widening on either or both sides of SH1 (in tandem with consideration of RTC/strategic cycling options along SH1). Significant constraints were also noted along the SH1 corridor between Albany and Bawden Road (including SEAs either side and mainly rural zoning), with less constraints, mainly FUZ zoning and a generally wider SH1 designation between Bawden Road and Silverdale Interchange.

It was also noted that the DBC optioneering should consider the new NPSs, including the NPS:FW and NPS:UD (as discussed in Part A).

### 9.3.2 Option Segments and Study area

For the purposes of DBC Route option development, the Upgrades to SH1 study area was defined as per Figure 75 and was divided into three segments. For the sections of the project where the Upgrades to SH1 share a corridor with the RTC, the route options were developed in tandem with the RTC project as explained in Section 6.3:

- **Segment 1: RTC and Upgrade to SH1 – Albany to Awanohi**: Refer **section 9.3.3**.
- **Segment 2: RTC and Upgrade to SH1 - Awanohi to Bawden**: Refer **section 9.3.4** below.
- **Segment 3: Bawden to Silverdale Interchange**: Refer **section 9.3.5** below.

The segments were identified based on where the project team considered a change in alignment should be considered based on changes in land use context, the level of constraints present, and interrelationships with other projects in the same segment.

As summarised in Part A, the form and function developed for all three segments was the same. The Upgrades to SH1 will feature three lanes in each direction once construction is complete, with one of these lanes in each direction proposed to be used as managed lanes for public transport / bus use. Once the RTC is operational, these managed lanes will then likely be managed lanes for general traffic and freight. The speed environment is recommended to be 100 / 110 kph.

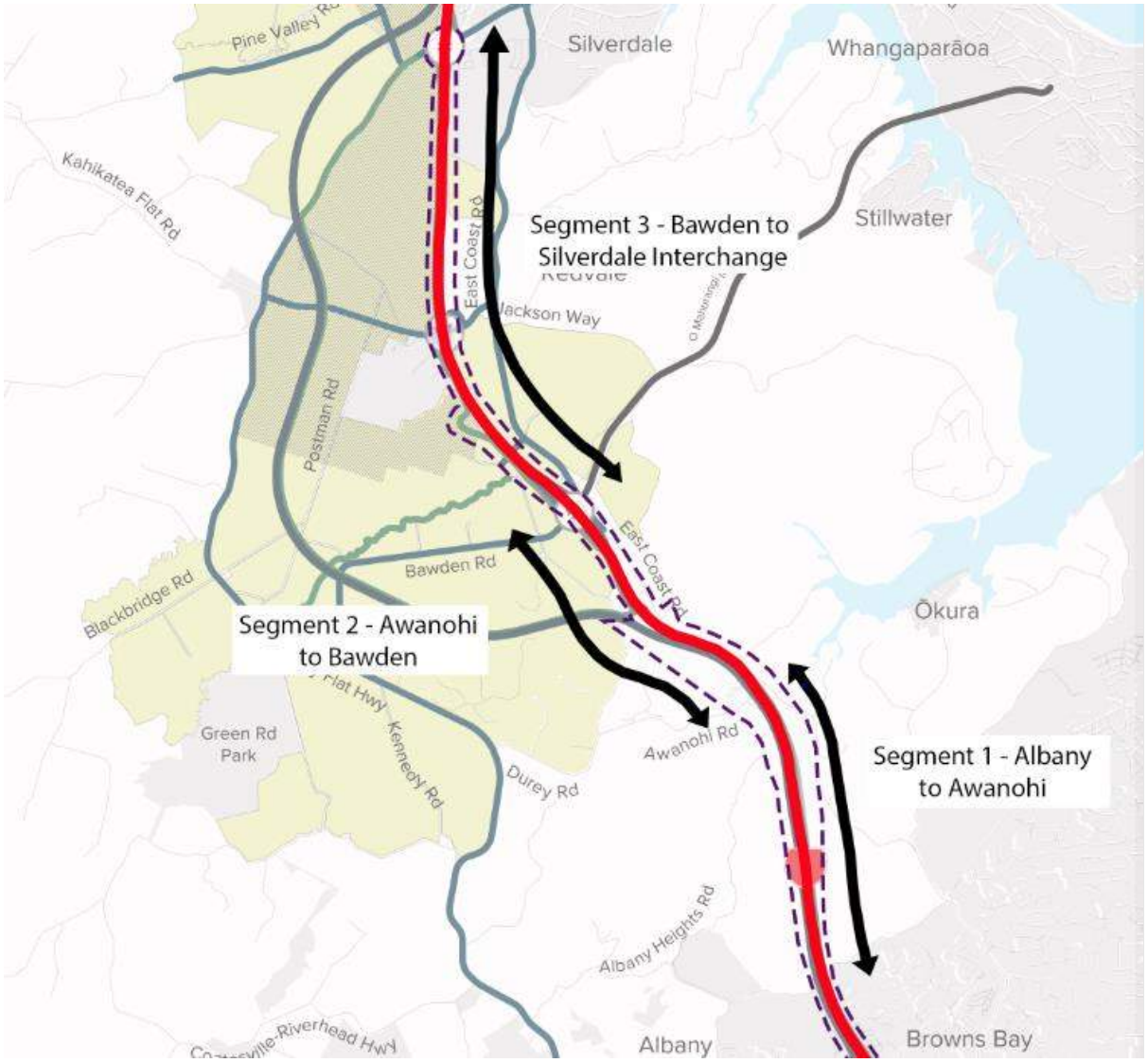



**Figure 75: SH1 Widening study area and segments.**

Options were generally limited to the study area shown in Figure 75 extending from Albany to the Silverdale Interchange for the following reasons:

a) The IBC recommended an indicative corridor for the Project through this area and this was reconfirmed as appropriate through the gap analysis as detailed above.

b) The options share a corridor with the RTC options in Segments 1 and 2 - between Albany and around Bawden Road. For Segments 1 and 2, reasons why the combined SH1 and RTC options are focused on this area are described in section 6 above.
c) South of the Lonely Track Road overbridge, three lanes already exist, so no widening is needed for additional lanes; however works would still be required further south of this point to tie into the existing motorway layout.
d) North of Silverdale Interchange, the IBC and subsequent Gap Analysis confirmed there was no need to provide additional lanes.

In response to the gap analysis, the scope of DBC optioneering was confirmed to include:

- Route Refinement with full MCA scoring of widening either side of SH1 between Albany and the point where the RTC separates from SH1 and enters the FUZ (Awanohi to Bawden) – combined with the RTC and New Walking and Cycling Path on SH1 optioneering.
- Route Refinement with development of a single option (widening on either side of SH1) between Bawden Road and Silverdale.

### 9.3.3 RTC and Upgrades to SH1- Segment 1: Albany to Awanohi

Route refinement option development and assessment for this segment are outlined in section 6.6.

The preferred option selected was **Option D (SH-12)** - RT on west with cycleway on east and SH1 widening to east with motorway lanes shifted over (for the reasons detailed in section 6.6).

### 9.3.4 RTC and Upgrades to SH1 Segment 2: Awanohi to Bawden (SH1 Crossover area)

Route refinement option development and assessment for this segment are outlined in section 6.7.

The preferred option selected is **Option J (SH-12):** RT on west with no crossover; cycleway on east; SH1 widening both sides (for the reasons outlined in section 6.7).

### 9.3.5 Upgrades to SH1 Segment 3: Bawden to Silverdale Interchange

#### 9.3.5.1 Option development

A single route option (**Option A – SH1 widening both sides**) was developed for this segment of the project using the constraints-led design process for the following reasons:

- Detailed constraints mapping during the DBC (refer Figure 76) confirmed a general lack of significant constraints along this segment of the corridor and mainly FUZ zoning either side.
- The relatively wide existing motorway designation through this area could be utilised for much of the widening both sides of SH1.
- The likely low cost and complexity for construction relative to widening on one side.

In developing the option, the Project team also considered the following key features in the area. These are mapped in Figure 76 and include:

a) National grid corridor (Transpower electricity transmission towers and lines)
b) Existing Motorway Service Centre to the west of SH1 (access needs to be provided for – and this is assumed to be retained in future based on direction from Waka Kotahi)
c) Stream crossings, flood plains and flood prone areas

d) Potential natural wetland areas.
e) Live zoned land near the Silverdale Interchange – developing area including businesses.
f) Dairy Flat - Silverdale West Industrial Structure Plan to the west and FUZ to the east.

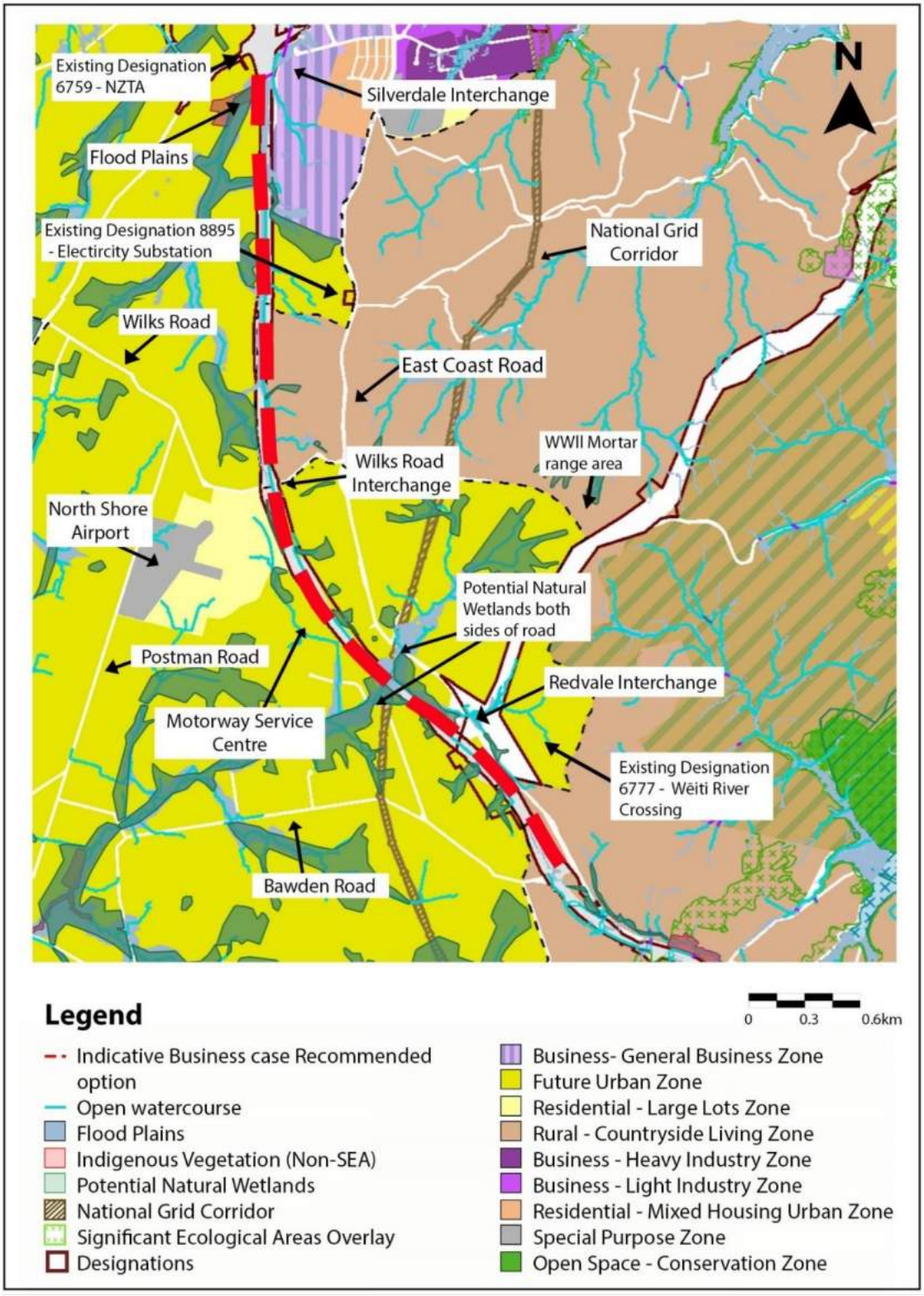



**Figure 76: Upgrades to SH1 Segment 3: Bawden to Silverdale Interchange - Key Features and Constraints Map**

### 9.3.6 Consideration of combined segments for Upgrades to SH1 (with RTC)

Once emerging preferred options were identified for each segment, these segments were 'stitched' together to form the overall emerging preferred option for the project to proceed to the design refinement stage. The preferred route refinement option for each segment is outlined in Table 34, and the full alignment is illustrated in Figure 77.

**Table 34: Upgrades to SH1 - preferred route summary**

| Section | Recommended Option |
|---|---|
| Segment 1: Albany to Awanohi (also includes part of NoR 1) | **Option D (SH-12):** RT on west with cycleway on east and SH1 widening to east with motorway lanes shifted over |
| Segment 2: Awanohi to Bawden (also includes part of NoR 1) | **Option J (SH-12):** RT on west with no crossover; cycleway on east; SH1 widening both sides |
| Segment 3: Bawden to Silverdale Interchange | **Option A (SH-01):** SH1 widening both sides |

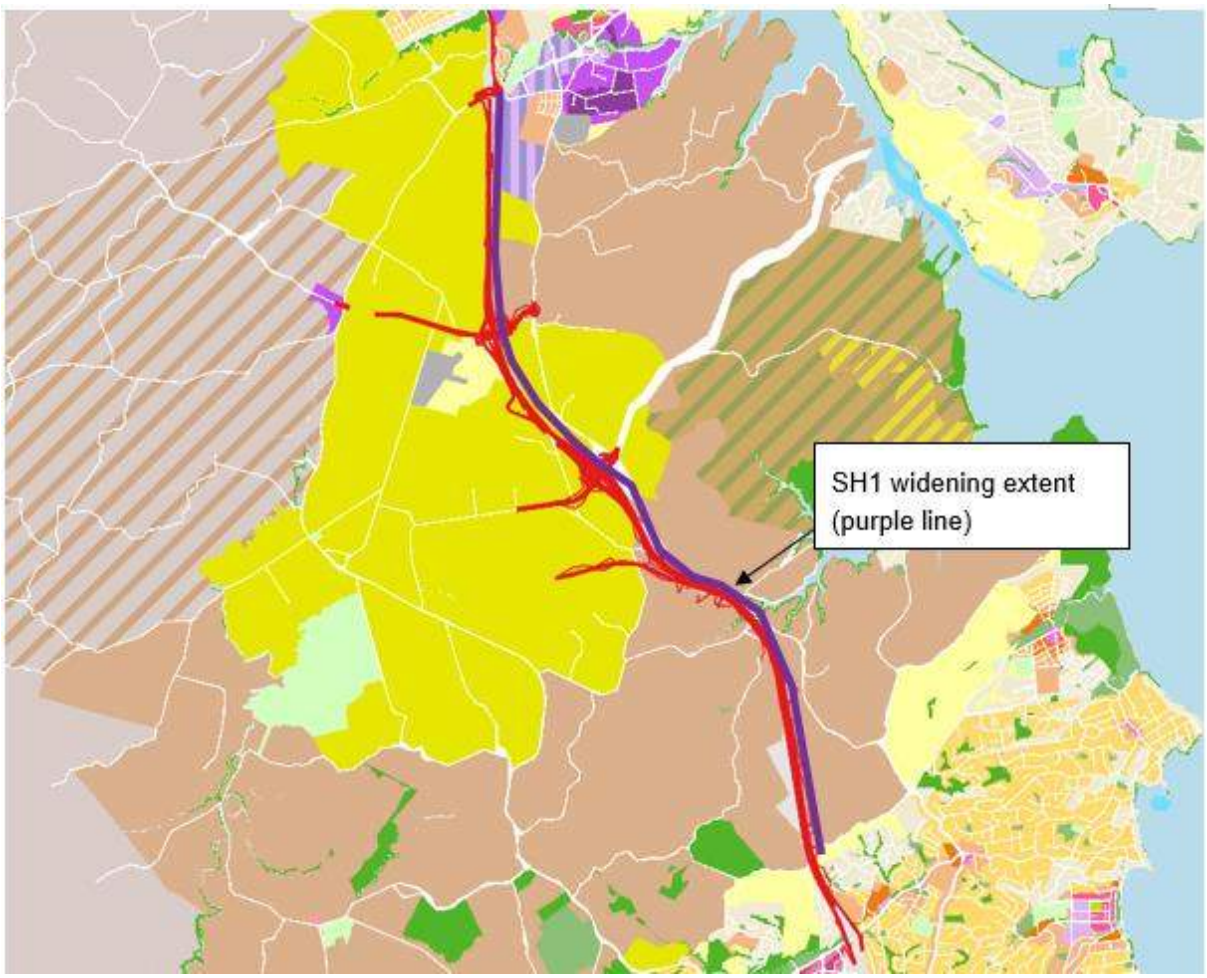



**Figure 77: Upgrades to SH1 between Albany and Silverdale extent**


**Figure 78: Upgrades to SH1 - Preferred Route (Segments 1 and 2 -bottom figure), Segments 3 (top figure)**

### 9.3.7 Consideration of DBC engagement

Future improvements to SH1 were included in the DBC engagement process in July-August 2022, including additional space (lanes) on SH1 between Albany and Silverdale to cater for more people

moving around in future. Overall people were supportive of the widening of SH1 and few comments were received on this.

Some people suggested that provision for more lanes was needed to provide greater flexibility and options in the future and that the widening “should be for cars and not just buses/freight”. One person noted that bush around Lonely Track Road and SH1 that forms links Tiri Tiri Matangi and Whangaparāoa to the Waitākere Ranges should be avoided. In response to this comment, the project team have considered numerous options in this location and have considered impacts on ecological areas in identifying the emerging preferred option.

## 9.4 Design Refinement

### 9.4.1 Lonely Track Bridge/Road

During the design refinement phase, it was confirmed that the existing bridge of SH1 at Lonely Track Road (approx. 1km north of Ōteha Valley Road, Albany – see Figure 79) is not long enough to accommodate the space on the eastern side required for the Upgrades to SH1 project (or the New Walking and Cycling path along SH1). The project team identified the need to realign a segment of Lonely Track Road and rebuild the bridge to enable these projects to be constructed.

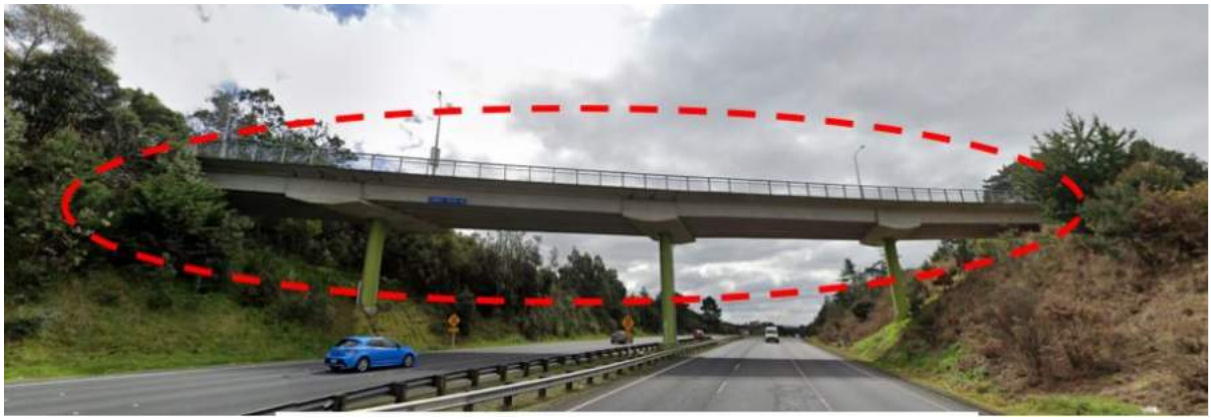


**Figure 79: Existing Lonely Track Bridge**

Two options were developed for assessment using a targeted MCA process, with qualitative assessment. Both options (refer Figure 80) have the same tie in on the western wide of SH1 and the same bridge location. The difference is in the eastern road realignment and associated earthworks.

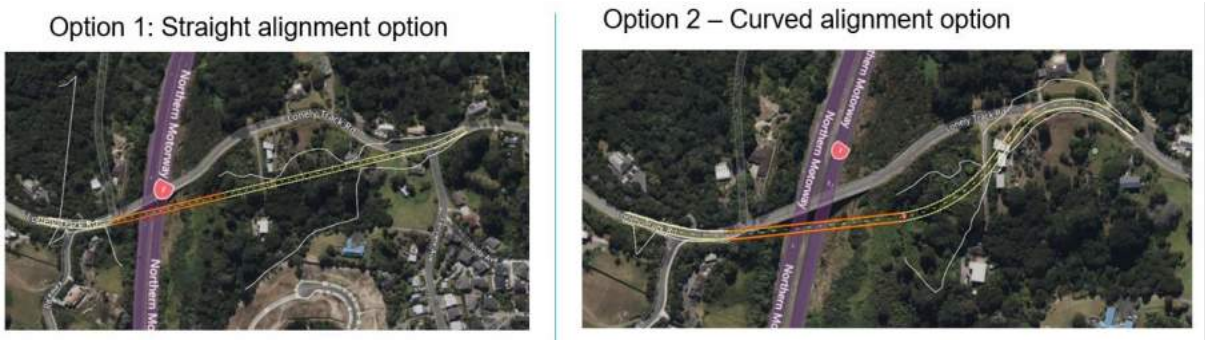



**Figure 80: Lonely Track bridge/road realignment options**

Key constraints and considerations were identified, as summarised in Figure 81.

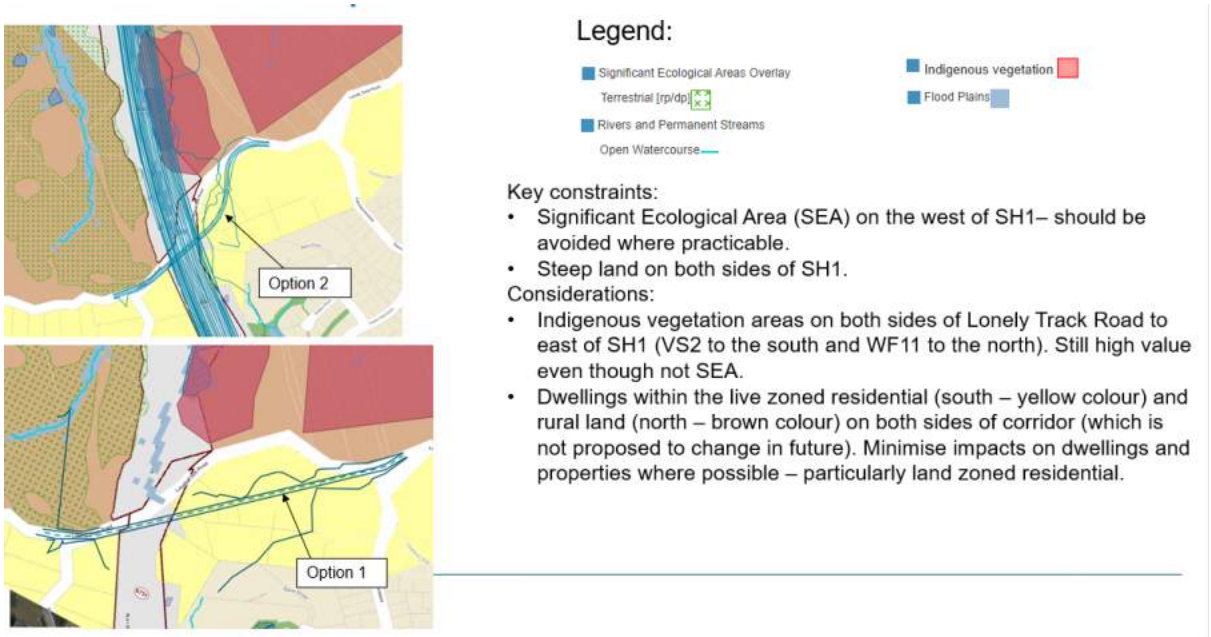



**Figure 81: Key constraints and considerations**

The two options were assessed using a targeted qualitative MCA, considering the presence of constraints and potential effects, as summarised in **Table 35**.

**Table 35: Targeted MCA assessment for Lonely Track bridge/road options**

| | |
|---|---|
| | High/significant constraints or potential effects (avoid where practicable) |
| | Moderate constraints or potential effects present (consider avoiding on balance with other issues) |
| | No key constraints present or potentially low adverse/positive effects |

| MCA criteria (targeted to those criteria that may differentiate) | Option 1 – Straight alignment | Option 2 – Curved alignment |
|---|---|---|
| **1a Heritage** | No known Issues | No known Issues |
| **2a. Land use futures** | Likely affects Residential – Large Lot Zone and Residential – Single House Zone land. The area around the affected Single House Zone land has recently been developed and it is considered unlikely for this land to be developed in the future (although this remains a possibility). | Affects Residential – Large Lot Zone and a small portion of Rural – Countryside Living Zone land. Unlikely for this land to be intensified in the future.<br>Preferred option |
| **2b. Urban design** | No key issues | No key issues.<br>Slight preference over option 1 as earthworks extents smaller |
| **2d Social cohesion;**<br>**2c. Land requirement** | Likely affects ~12 land parcels and 4-5 dwellings (although if retaining is used, this number could possibly reduce to 2 dwellings) | Likely affects ~7 land parcels and 2 dwellings (although if retaining is used, this number could possibly be reduced to 1 dwelling) |
| **3b. Stormwater/flooding** | No key issues. | No key issues. |
| **3c. Ecology** | Vegetation of moderate value. Potential to find high ecological value fauna. Larger package of land, so greater potential for adverse effects. Potentially more opportunity to mitigate broader ecological effects of project in footprint. | Vegetation of moderate value. Potential to find high ecological value fauna. Smaller package of land, so lower potential for adverse effects. Potentially less opportunity to mitigate broader ecological effects of project in footprint. Slightly preferred over option 1. |
| **3d Natural hazards**<br>**5a Construction impacts on utilities/infrastructure**<br>**6a Construction cost/risk** | No real differentiation between the options.<br>Fairview Road would need to be tied into alignment.<br>Additional ground information would be required for both options. | As for Option 1 |
| **4b. User safety** | No real differentiation between the options | No real differentiation between the options.<br>Slightly tighter horizontal geometry but has a minimum acceptable horizontal alignment assuming a 50km/h speed environment (currently situated on a threshold between 50-60km/h). |

Policy and cost were also considered as potential issues that could differentiate between the options. Option 2 was preferred from a policy perspective because it avoids more areas of ecological value on the eastern side (although both avoid SEAs on the west). Option 2 was preferred from a cost perspective because it has less earthworks and property requirement, with less anticipated cost than Option 1.

Option 2 was identified as the preferred option for the Lonely Track Bridge/road realignment for the following reasons:

a) Less property impacts – particularly on dwellings.

b) Smaller earthworks extent and less impacts on live zoned residential land (south of Lonely Track Road); therefore likely better land use integration and urban design outcome.
c) Likely less effects on ecological values.
d) Preferred from a cost and policy perspective.

## 9.5 Upgrades to SH1: Preferred Route

The preferred route for the Upgrades to SH1 is as shown in **Figure 82**.


**Figure 82: Upgrades to SH1 between Albany and Silverdale preferred route**

## 9.6 New Walking and Cycling Path along SH1

### 9.6.1 IBC to DBC gap analysis

The IBC considered various indicative corridor options for strategic active mode corridors in the North and recommended that several proceed through to DBC phase. The recommended IBC network included a Shared Path along SH1 (Albany to Grand Drive interchange) -Option AT1-1. The option followed the RTC on the eastern side of SH1 from Albany and then crossed to the western side of SH1 (near Bawden Road) continuing north to Grand Drive, Ōrewa. The intent of this connection was to provide a strategic walking and cycling connection connecting existing and new communities in the northern growth area. A high quality separated walking and cycling facility was envisaged. Figure 83 below illustrates the extent of the New Waling and Cycling Path.


**Figure 83: Indicative Transport Network – New Walking and Cycling Path along SH1**

An IBC to DBC Gap Analysis was undertaken at the start of the DBC phase. The gap analysis reconfirmed that a New Walking and Cycling Path along SH1 remained appropriate and the IBC Indicative Corridor Assessment was generally sufficient to proceed to DBC. Further work was recommended at the DBC stage in relation to:

a) Consideration of options to avoid or mitigate effects of the facility on an SEA and QEII covenant in the northern section of the alignment next to Wēiti Stream (in tandem with consideration of the RTC alignment in this area).
b) Consideration of options to avoid or mitigate effects on an area of SEA and coastal marine area at Ōrewa River, considering the policy tests in the AUP:OP and national policy statements.
c) Consideration of the wider active mode network in the North, including whether changes in the routes and hierarchy of the cycle network assumed in the IBC were needed in the DBC to reflect the programme-wide design framework guidelines and also documents such as the final Dairy Flat – Silverdale West Industrial Structure Plan, the Auckland Transport: North Cycle Network (June 2020), Rodney Local Board Greenways plans and indicative RTC stations for the North Strategic DBC.
d) Consideration of the appropriate tie-into the local road network at Ōteha Valley Road and Wainui Road.

Issues a), b) and d) were addressed through the DBC alternatives assessment as summarised in the following sections. Issue c) was addressed through a transport planning and urban analysis of the entire North active mode network, which is summarised within the DBC report.

The recommended IBC option has interdependencies with the RTC at the northern end (up to Milldale) and the southern end (between Albany and the SH1 crossover); and with the Upgrades to SH1– and hence this was also recommended as a focus of optioneering at the DBC stage.

It was also noted that the DBC optioneering should consider the new NPSs, including the NPS:FW and NPS:UD (as discussed in Part A).

### 9.6.2 DBC study area

The study area for optioneering was generally limited to an area extending along the SH1 motorway corridor from Albany to Grand Drive for the following reasons:

a) The IBC recommended an indicative corridor for the Project through this area and this was reconfirmed as appropriate through the gap analysis as detailed above.

b) South of Albany, a similar cycleway already exists which runs alongside SH1.

c) North of Grand Drive there is no future urban growth planned nor is there a large enough existing population to support extending the cycleway further north.

d) As confirmed in the IBC, there is significant opportunity to share a corridor with the existing SH1 corridor, the parts of the RTC along SH1 and the proposed Upgrades to SH1 (refer section 9.3).

### 9.6.3 Transport planning and urban analysis of the North active mode network

At the commencement of the DBC phase, a transport planning and urban design analysis was completed for the entire North network active mode network. This analysis focused on environment, social, built form, movement and land use, and cultural and sustainability values, which were then used to analyse the proposed transport network and how it would contribute to the system as a whole. This network planning was updated as the projects progressed.

### 9.6.4 Option Segments and study area

For the purposes of DBC option development, the study area for the New Walking and Cycling Path along SH1 was defined as shown in Figure 84 and divided into the following five segments:

- **Segment 1: Albany to Awanohi:** The project shares a corridor with the RTC and Upgrades to SH1 through this section and was considered together with these projects. Refer Section 6.6 above.
- **Segment 2: Awanohi to Bawden:** This section shares a corridor with the RTC and Upgrades to SH1 through this section. Refer Section 6.7 above.
- **Segment 3: Bawden to Silverdale Interchange:** Refer Section 9.6.7 below.
- **Segment 4: Silverdale Interchange to Wainui Road:** Refer Section 9.6.8 below.
- **Segment 5: Wainui to Grand Drive:** Refer Section 9.6.9 below.

In response to the IBC to DBC gap analysis, the scope of optioneering at DBC phase was confirmed to comprise Route Refinement with development of multiple options (with widening for the path to the west or east), and full MCA scoring. Options were considered in tandem with other projects in the corridor. Some wider options were also qualitatively assessed in the area of the SH1 crossing of Ōrewa River, to determine whether a preferred option existed that would avoid works in the coastal marine area and/or SEA in this area.

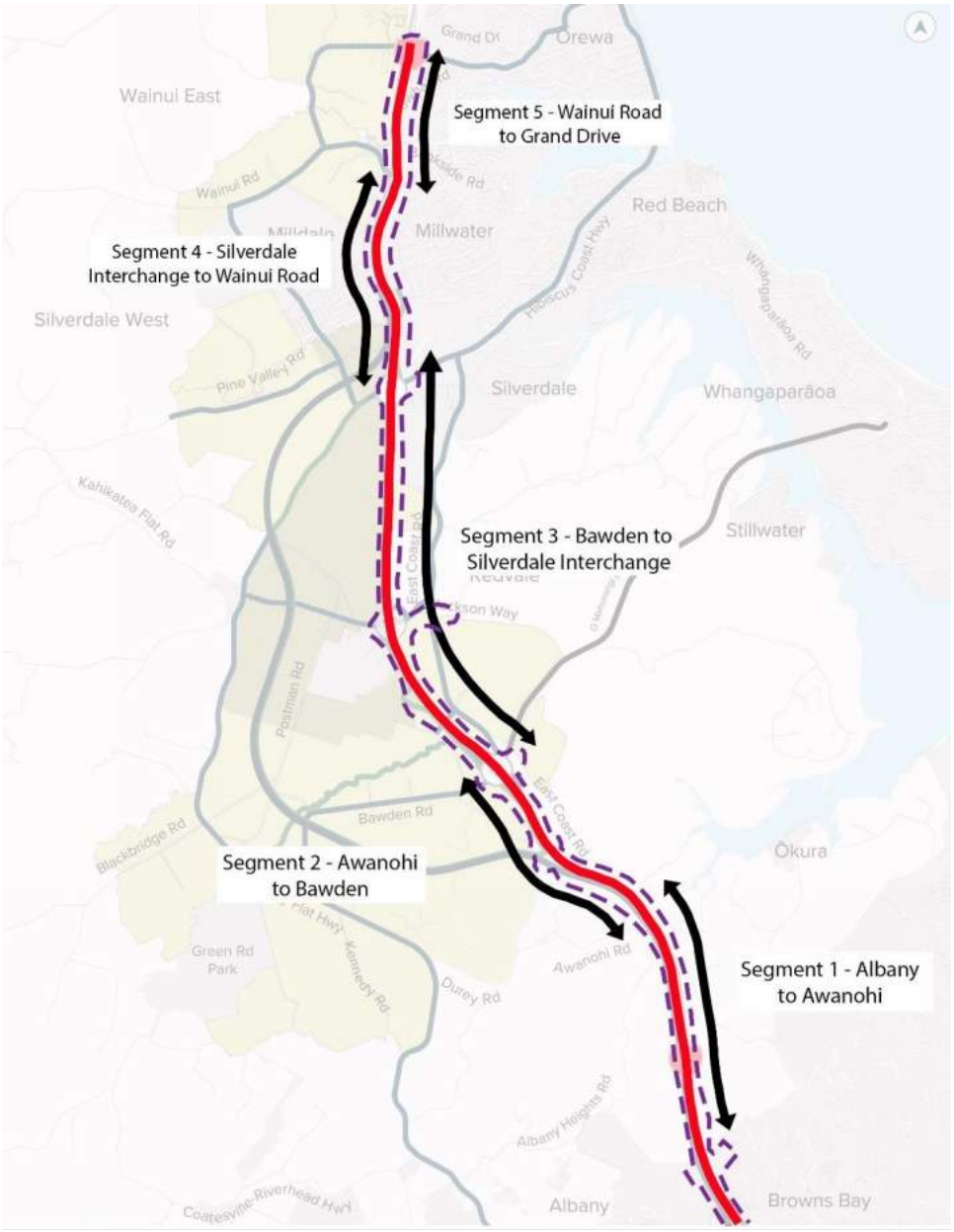



**Figure 84: New Walking and Cycling path on SH1 segments and study area.**

### 9.6.5 Segment 1 - Albany to Awanohi

Albany to Awanohi (Segment 1) extends from Lonely Track Road to Awanohi Road. **Figure 85** below shows the extent of the study area where options were generally developed within as well as the preferred alignment.

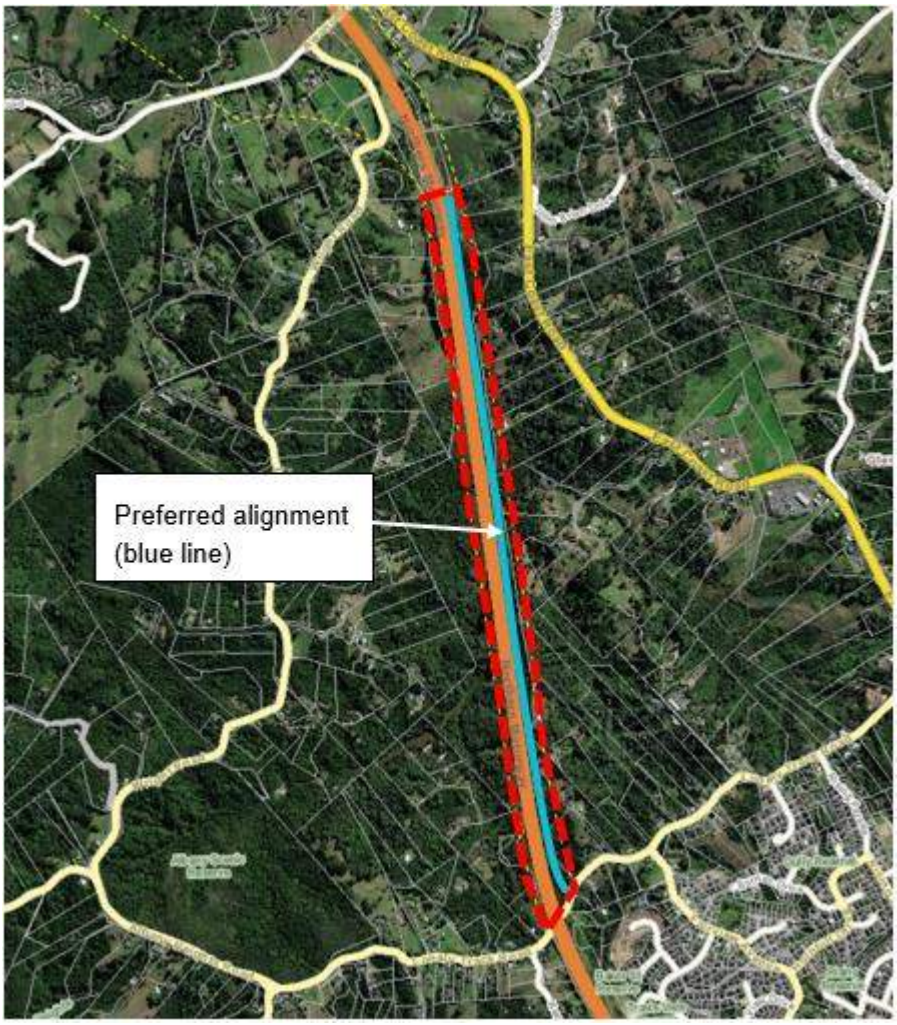



**Figure 85: New Walking and Cycling Path Segment 1 – Albany to Awanohi**

#### 9.6.5.1 Option development and assessment

Option development and assessment for this segment are outlined in section 6.6.

The preferred option selected was **Option D (SH-12)** - RT on west with cycleway on east and SH1 widening to east with motorway lanes shifted over (for the reasons detailed in section 6.6). In this option, the New Walking and Cycling Path along SH1 locates on the eastern side of the SH1 carriageway, separate from the RTC.

### 9.6.6 Segment 2 – Awanohi to Bawden

Awanohi to Bawden (Segment 2) extends from Awanohi Road to Bawden Road. Figure 86 below shows the extent of the segments study area where options were generally developed within as well as the preferred alignment.

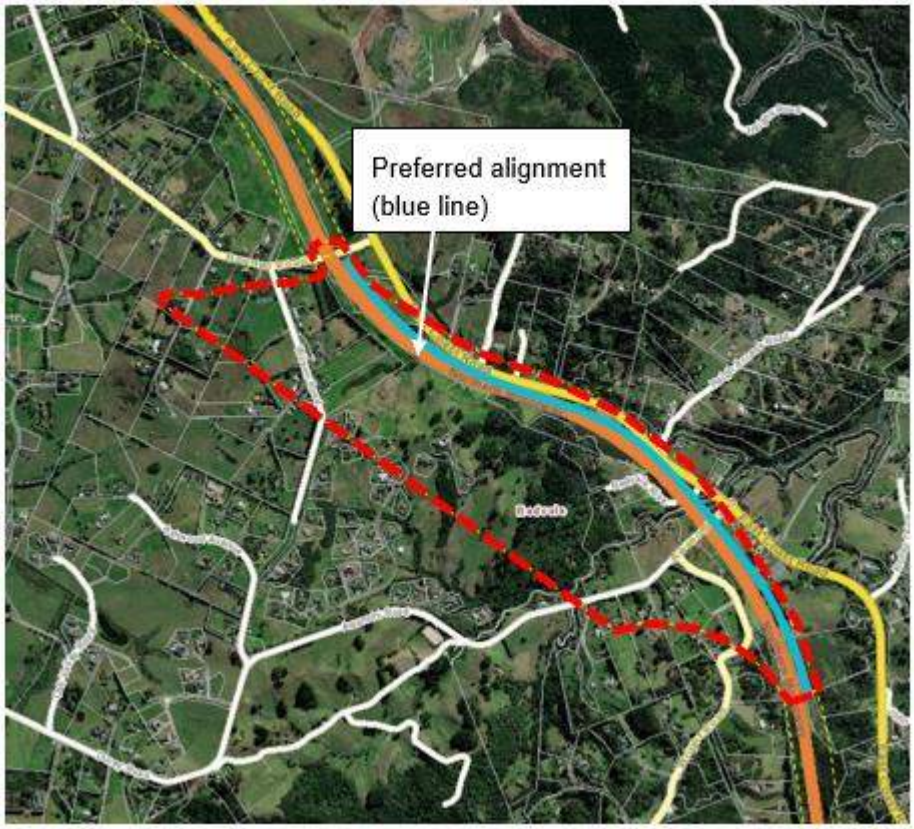



**Figure 86: New Walking and Cycling Path Segment 2 – Awanohi to Bawden**

#### 9.6.6.1 Option development and assessment

Option development and assessment for this segment are outlined in section 6.7.

The preferred option selected is **Option J (SH-12):** RT on west with no crossover; cycleway on east; SH1 widening both sides (for the reasons outlined in section 6.7). In this option, the New Walking and Cycling path along SH1 locates on the eastern side of the SH1 carriageway, separate from the RTC and then crosses SH1 via a bridge near Bawden Road. At this point the path splits into two, with one path following on alongside the RTC, and the other joining segment 3 below.

### 9.6.7 Segment 3 -Bawden to Silverdale Interchange

Bawden to Silverdale Interchange (Segment 3) extends from Bawden Road to the Silverdale Interchange. Figure 87 below shows the extent of the study area where options were generally developed within as well as the preferred alignment.

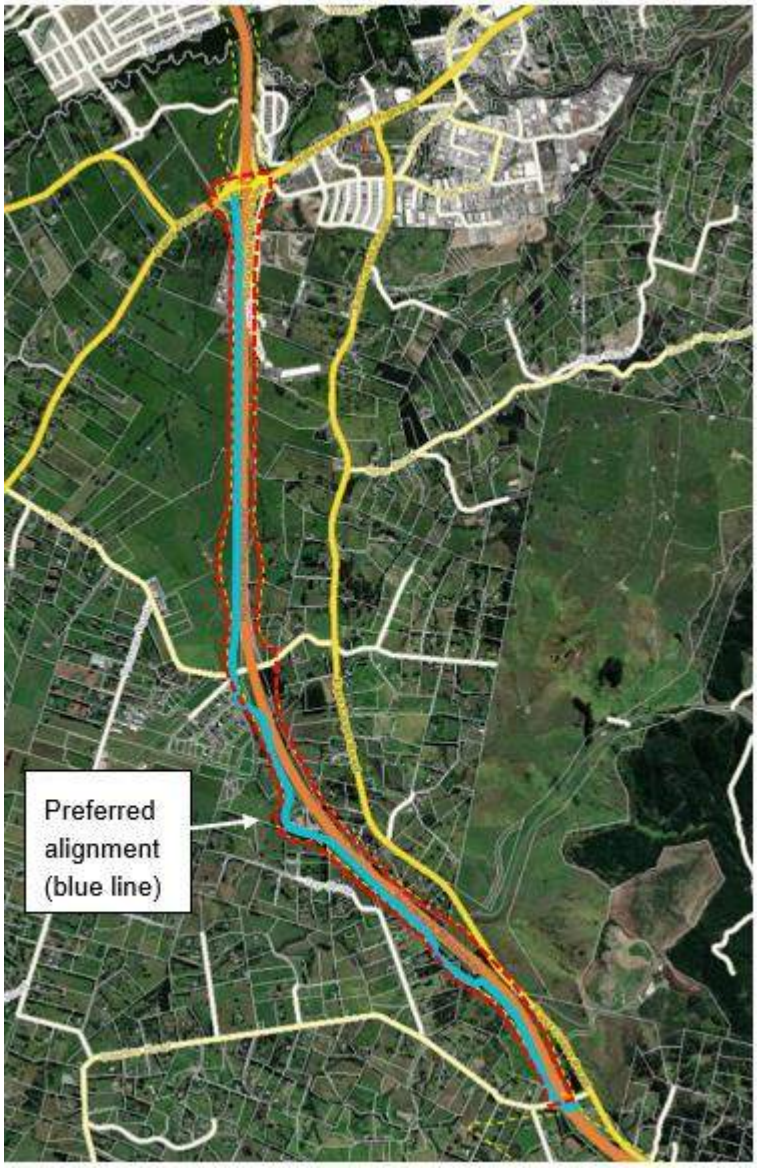



**Figure 87: New Walking and Cycling Path Segment 3 – Bawden to Silverdale Interchange**

### 9.6.7.1 Option development

In developing options for the Bawden to Silverdale Interchange MCA segment, the Project Team also considered known key features in the area. These are listed and mapped in Figure 76 in Section 9.3.5 and include:

- Areas of non-SEA indigenous vegetation.
- Streams, floodplains and areas of potential natural wetlands.
- Live zoned areas of business, residential and rural land.
- FUZ zoning east of the SH1 corridor south of Wilks Road, and west of the corridor right up to Silverdale interchange, with an Industrial Structure Plan applying west of the corridor.
- Existing local roads near SH1 carriageway (Small Road to the north and East Coast Road to the south).
- Existing Silverdale Interchange and the proposed upgrades to the interchange.
- Ō Mahurangi Penlink designation and the Upgrade to Ō Mahurangi Penlink Interchange project.

- The proposed New Crossing of SH1 at Huruhuru (Dairy Stream) (refer Section 10).
- North Shore Airport and associated large lot residential precinct area.
- Existing motorway service centre on the western side, which was assumed to be retained in future based on direction from Waka Kotahi who own the land.
- National grid corridor.

In consideration of the above factors, two options were developed through route refinement as outlined in **Table 36** and **Figure 88** below. These are discussed in the sections to follow:

**Table 36: New Walking and Cycling Path (Bawden to Silverdale Interchange) – MCA option descriptions.**

| Option Reference | Option Name | Description |
|---|---|---|
| **Option A** | Option SH-04 West | Strategic cycleway on the western side of the proposed SH1 widening. |
| **Option B** | Option SH-04 East | Strategic cycleway on the eastern side of the proposed SH1 widening. |

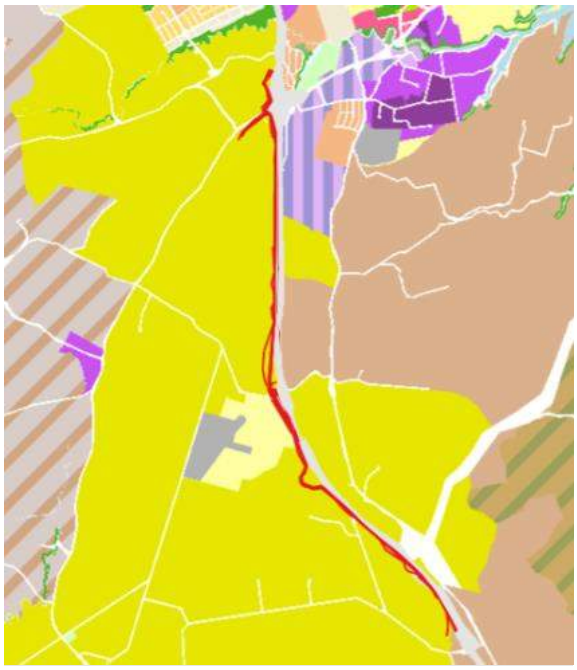
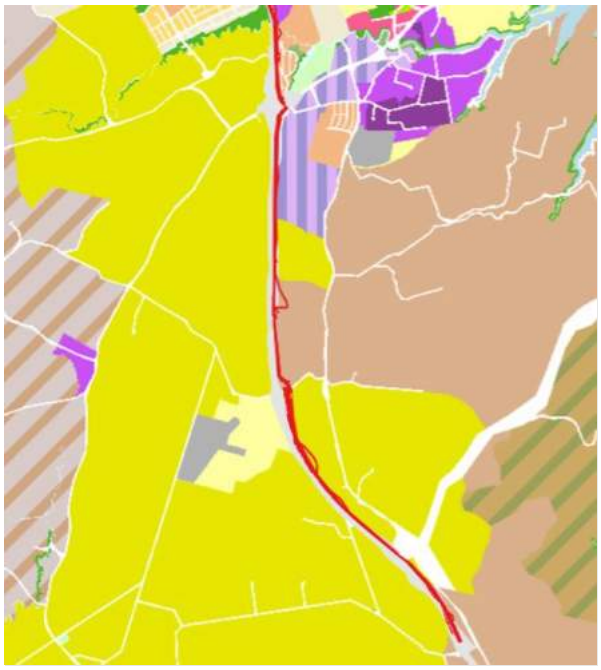
| Option A – SH-04 West | Option B – SH-04 East |
|---|---|
|  |  |

**Figure 88: Options for the New Walking and Cycling Path – Segment 3 for MCA assessment.**

### 9.6.7.2 Option assessment

For all segments, as outlined in Section 2, options were assessed against the Investment Objectives and criteria within four well-beings, cultural, social, environmental and economic. Technical specialists engaged in an MCA workshop to undertake an assessment, scoring each option on a gradual scale from 'Very High Adverse Effect' (red) to 'Very High Positive Impact' (green).

**Table 37** below identifies the outcomes from this assessment.

**Table 37: Summary of New Walking and Cycling Path on SH1 – Bawden to Silverdale Interchange MCA scoring.**

| MCA Criteria | Option A: SH-04 Cycleway on the west | Option B: SH-04 Cycleway on the east |
|---|---|---|
| Investment Objective 1: Access / Integration | 4 | 3 |
| Investment Objective 2: Mode Choice | 3 | 3 |
| Investment Objective 3: Safety | 4 | 4 |
| 1a. Heritage | 0 | -2 |
| 2a. Land use futures | 0 | -3 |
| 2b. Urban design | 3 | 2 |
| 2c. Land requirement | -1 | -1 |
| 2d. Social cohesion | -1 | 0 |
| 2e. Human health and wellbeing | -1 | 0 |
| 3a. Landscape / visual | -2 | -2 |
| 3b. Stormwater/flooding | -1 | -3 |
| 3c. Ecology | -1 | -2 |
| 3d. Natural hazards | -1 | -1 |
| 5a. Construction impacts on utilities / infrastructure | -1 | -1 |
| 5b. Construction disruption | -1 | -1 |
| 6a. Construction costs / risk | -2 | -2 |

The Project Team reviewed and compared the options identified above and noted that matters relating to the investment objectives (transport outcomes), heritage, land use futures, urban design, social cohesion, human health and wellbeing, stormwater/flooding and ecology are the key considerations for this segment and showed differentiation between options.

In relation to non-scored criteria:

a) There was no clear difference between the options in relation to value for money.
b) Option A was preferred from a policy analysis perspective because Option B had greater effects on RMA section 6 and NPS – Freshwater matters such as effects on streams.
c) No strong preference was noted from Manawhenua, although one comment was made in support of a west option (Option A) as an opportunity for people to access jobs through cycling.

Accordingly, the Project Team identified **Option A -SH-04 (cycleway on west)** as the preferred route refinement option for the following reasons:

a) Scored optimally for Investment Objective 1: Access/Integration, because the main area of FUZ is to the west, whilst the eastern side is adjacent to some rural land. The western side

therefore enables improved opportunities for local access between interchanges and reduces the need for active mode users to cross ramps or local roads at interchanges to access the facility. It also has more potential to tie-into the Walking and Cycling Path along the RTC through Dairy Flat / Silverdale West.

b) Better land use futures and urban design scores, as the western side is entirely FUZ land (whereas east includes live zoned land, including Countryside Living). Also the option has more potential to create a quality urban environment by providing access to the adjacent FUZ, a more direct connection from the southern area of the FUZ to employment in the north, as well as the opportunity for passive surveillance and an active integration between adjacent land use and the public cycleway.
c) Less potential impacts on heritage -specifically a gum store recorded in the CHI just east of the route.
d) Less stormwater/flooding risk as the eastern side has a significant length within the floodplain at Huruhuru (Dairy Stream).
e) Less potential for ecological effects on streams.
f) Aligned with Manawhenua preference (where this was stated).
g) Was preferred in relation to policy analysis.

Option B (SH-04) Cycleway on east was discounted by the Project Team for the following reasons:

a) Less preferred for investment objectives and most criteria as outlined above.
b) Potential impacts with consolidation and development potential around the existing general business zone and some impact on Countryside Living Zone parcels, which are not expected to change in land use.
c) Greater likelihood of potential impacts on heritage, specifically a gum store.
d) Poorly serves future urban communities as it would principally locate alongside existing and future rural land uses.
e) Greater stormwater/flooding risk as a significant length would be located within floodplains.
f) Greater impacts on ecology – specifically streams.
g) Less preferred from a policy perspective.

### 9.6.8 Segment 4 - Silverdale Interchange to Wainui Road

Silverdale Interchange to Wainui Road (Segment 4) extends from the Silverdale Interchange to Wainui Road. Figure 89 below shows the extent of the study area where options were generally developed within as well as the preferred alignment.

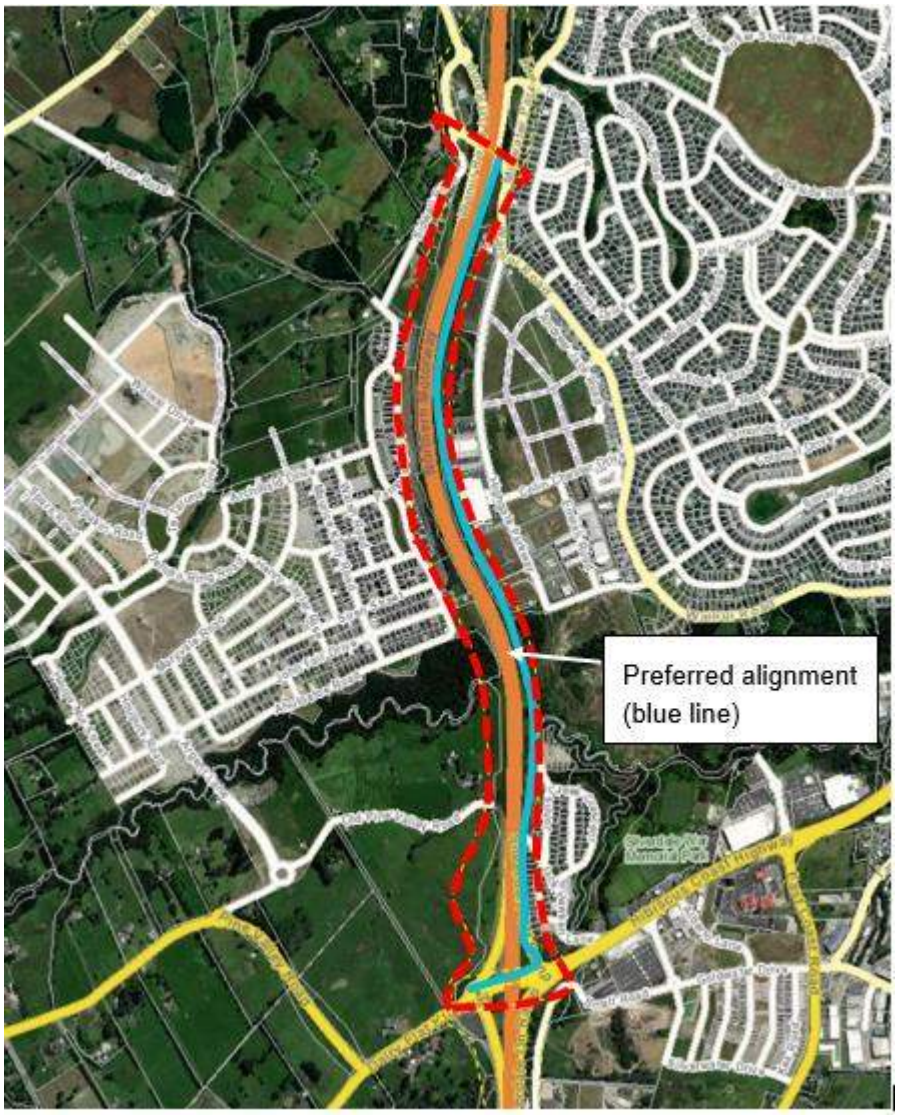



**Figure 89: New Walking and Cycling Path Segment 4 – Silverdale Interchange to Wainui Road**

### 9.6.8.1 Option development

In developing options for the Silverdale Interchange to Wainui Road MCA segment, the Project Team also considered the following known key features in the area. These are mapped in Figure 90 below and include:

- The Wēiti River and Kathy's Thicket reserve on the west (SEA, QEII covenant and Natural Stream Management Area Overlay) – very high cultural and ecological value.
- SEA on the east of SH1 around Wēiti and tributaries.
- Stream crossings and flood plain areas.
- DOC managed reserve along the northern bank of Wēiti Stream on the eastern side of SH1.
- Wainui precinct to the west – live zoned development known as Milldale.
- Archaeological sites (Two historic dwellings and Wēiti portage route).
- Milldale to Highgate Parkway proposed bridge over SH1 (consented).
- Live zoned land near the Silverdale Interchange, Milldale and Highgate – developing area including business (including industrial land) and residential land uses.
- Vector designation to the east – Millwater substation.

- BP motorway service station to the east.
- Existing stormwater infrastructure (including a large stormwater pond ‘Mathew’s Lakes’ to the east).
- Meraki Montessori Primary School on the west.
- Interface with other projects including Silverdale interchange upgrade, Wainui Road Upgrade, Active mode crossing at Wainui Road, Dairy Flat highway upgrade, RTC.

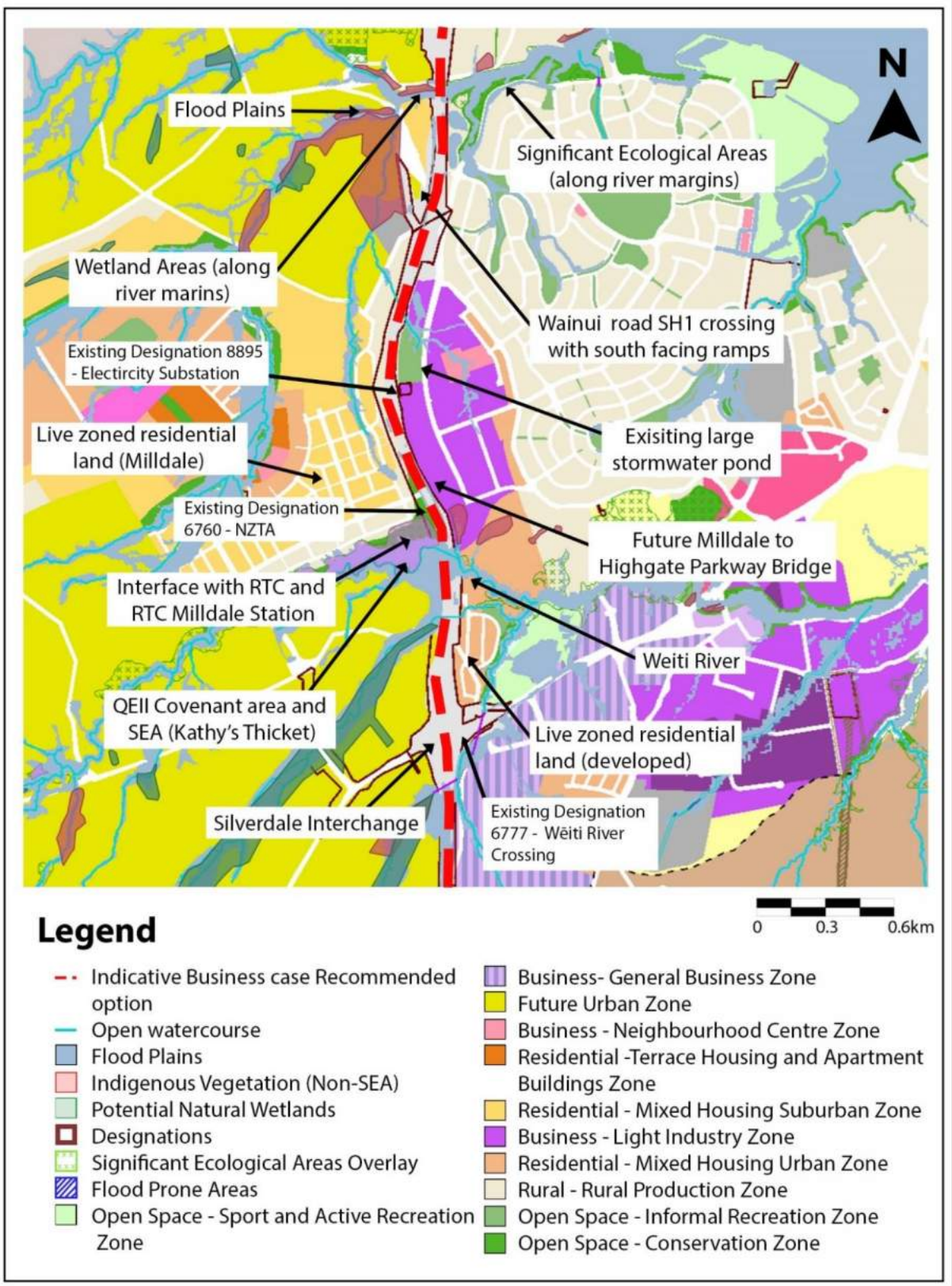



**Figure 90: Segment 4 study area - Silverdale Interchange to Wainui Road - Key Features and Constraints Map**

In consideration of the above factors, two options were developed through route refinement as outlined in **Table 38** and **Figure 91** below.

**Table 38: New Walking and Cycling Path (Silverdale Interchange to Wainui Road) – MCA option descriptions.**

| Option Reference | Option Name | Description |
|---|---|---|
| **Option A** | SH-04 West | Strategic cycleway on the western side of the existing SH1. |
| **Option B** | SH-04 East | Strategic cycleway on the eastern side of the existing SH1. |

| Option A: SH-04 West | Option B: SH-04 East |
|---|---|
|  |  |



**Figure 91: New Walking and Cycling Path (Silverdale Interchange to Wainui Road) segment – MCA option alignments.**

### 9.6.8.2 Option assessment

**Table 39** below identifies the outcomes from this assessment.

**Table 39: Summary of New Walking and Cycling Path on SH1 - Silverdale Interchange to Wainui Road MCA scoring.**

| MCA Criteria | Option A: SH-04 Cycleway on the west | Option B: SH-04 Cycleway on the east |
|---|---|---|
| Investment Objective 1: Access / Integration | 3 | 3 |
| Investment Objective 2: Mode Choice | 3 | 3 |
| Investment Objective 3: Safety | 4 | 4 |
| 1a. Heritage | -1 | -1 |
| 2a. Land use futures | -1 | -1 |
| 2b. Urban design | 3 | 2 |
| 2c. Land requirement | -3 | -1 |
| 2d. Social cohesion | -1 | -1 |
| 2e. Human health and wellbeing | 1 | 1 |
| 3a. Landscape / visual | -3 | -2 |
| 3b. Stormwater/flooding | -2 | -2 |
| 3c. Ecology | -4 | -2 |
| 3d. Natural hazards | 0 | -1 |
| 5a. Construction impacts on utilities / infrastructure | -1 | -1 |
| 5b. Construction disruption | -1 | -1 |
| 6a. Construction costs / risk | -3 | -2 |

The Project Team reviewed and compared the options identified above and noted that matters relating to urban design, land requirement, landscape/visual, ecology, natural hazards and construction costs/risks are the key considerations for this segment and showed differentiation between options.

In relation to non scored criteria:

- Option B was preferred in relation to policy analysis as Option A has a greater effect on overlays under the AUP and section 6(c) RMA matters including a very high value SEA and Natural Stream Management Area around the Wēiti.
- There was no clear differentiation between the options in relation to value for money.
- Manawhenua noted a preference for Option B, as the SEA on the west affected by Option A is seen as highly valuable from a cultural perspective. In addition, Option B on the east potentially avoids the need for a Curley Ave active mode connection.

Accordingly, the Project Team identified **Option B- SH-04 Cycleway on east** as the preferred route refinement option for the following reasons:

a) Splitting the cycleway from the RTC in this location and placing it on the east would minimise ecological and cultural impacts on the very high value SEA (Kauri podocarp broadleaved forest (WF11) and Kahikatea forest (MF4)), a QEII covenant and Natural Stream.

Management Area along Wēiti Stream in Kathy's Thicket to the west – these are significant constraints that policy under the AUP:OP supports avoidance where practicable.

b) Aligns with Manawhenua preference (for those Manawhenua that stated a preference).
c) Scores better for land requirement as the option runs through less private land and avoids the QEII covenanted and reserve land at Wēiti Stream which is affected by the western option.
d) Scores better for landscape/visual as it avoids the terrestrial SEA and Natural Stream Management Areas Overlay area affected on western side, including mature native specimen trees.
e) Scores better for Cost and Construction Risk as it is on the downstream end of the floodplain, so avoids need to upgrade existing culverts under the motorway (required for western side option).
f) Aligns better with AUP:OP Policy as it avoids high value overlay areas.

Option A - SH-04 Cycleway on west was discounted by the Project Team for the following reasons:

a) Higher potential adverse effects on Wēiti River and its riparian margin, including the QEII Covenant and SEA to the west. There is also a higher land requirement risk associated with the QEII covenant.
b) Not a stated preference of any Manawhenua.
c) Less aligned with AUP:OP Policy as outlined above.

### 9.6.9 Segment 5 - Wainui to Grand Drive

Wainui to Grand Drive (Segment 5) extends from Wainui Road to Grand Drive. **Figure 92** below shows the extent of the segments study area where options were generally developed within as well as the preferred alignment.

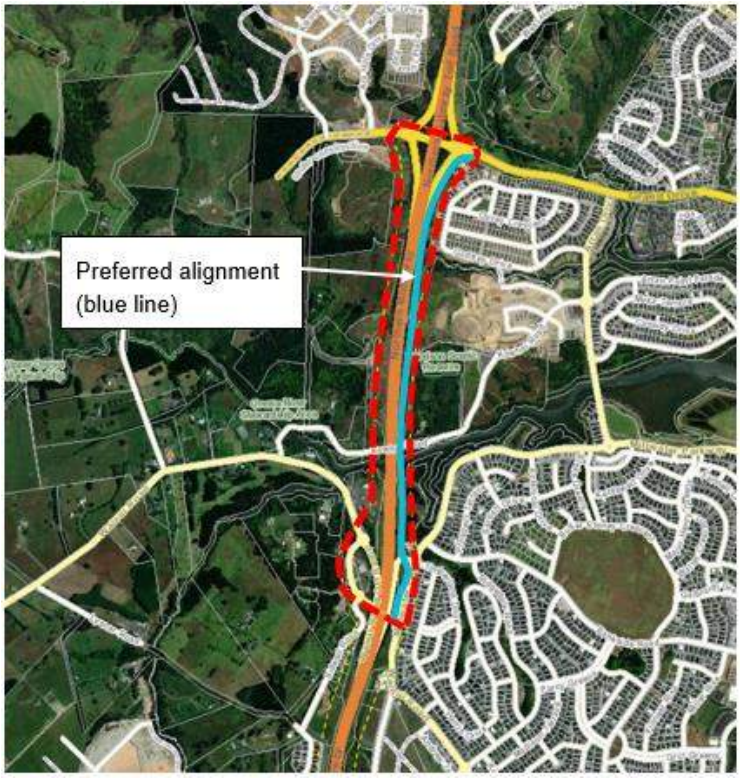



**Figure 92: New Walking and Cycling Path Segment 5 – Wainui Road to Grand Drive**

#### 9.6.9.1 Option development

In developing options for the Wainui Road to Grand Drive MCA segment, the Project Team also considered the following known key features in the area. These are mapped in Figure 93 below and include:

- Ōrewa River which is of high cultural value to Manawhenua (and Coastal Marine Area located on the immediate east of the SH1 carriageway).
- Stream crossings and flood plain areas.
- SEA located on both sides of SH1 around the Ōrewa River (potential to support 'At Risk' lizard species).
- Ōrewa sub-precincts on the east – live zoned land and recently developed or is currently being developed. Small section of Wainui precinct on the west – subdivision proposed.
- DOC managed reserve land on both sides, predominantly on the east.
- Gull petrol station on the west
- Existing stormwater infrastructure (including a large stormwater pond to the east)
- Archaeological sites (terraces, midden, pit and a landing. Generally located around the Ōrewa River. Some undiscovered heritage features and / or deposits are likely around this area also).

- Geotechnical instability near the existing Ōrewa River SH1 bridges.
- Emily's Reserve (along Arran Drive).
- Alluvium geology adjacent Millwater Parkway.
- Steep existing cut slopes on both sides of existing SH1 corridor - low visual amenity - contained corridor environment.

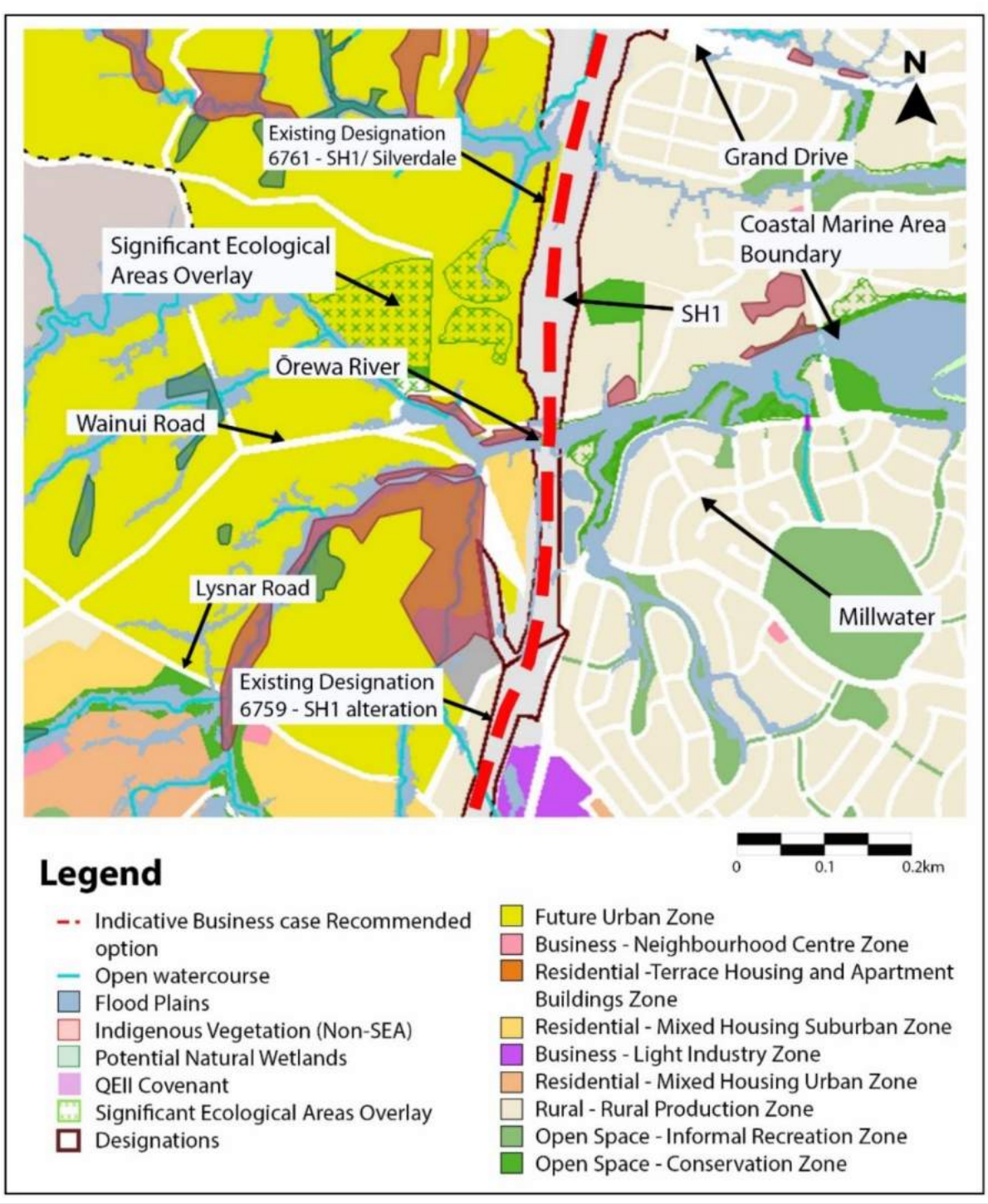



**Figure 93: Segment 5 study area – Wainui to Grand Drive - Key Features and Constraints Map**

In response to the gap analysis recommendation, the following two local road options (refer Figure 94) were considered at a high level to determine whether a feasible option existed that would avoid the need for works in the coastal marine area at Ōrewa River including the SEAs at that crossing:

- CW 20 - Via Wainui Road / Kowhai Road.
- CW 30 - Via Millwater Parkway and Arran Drive.

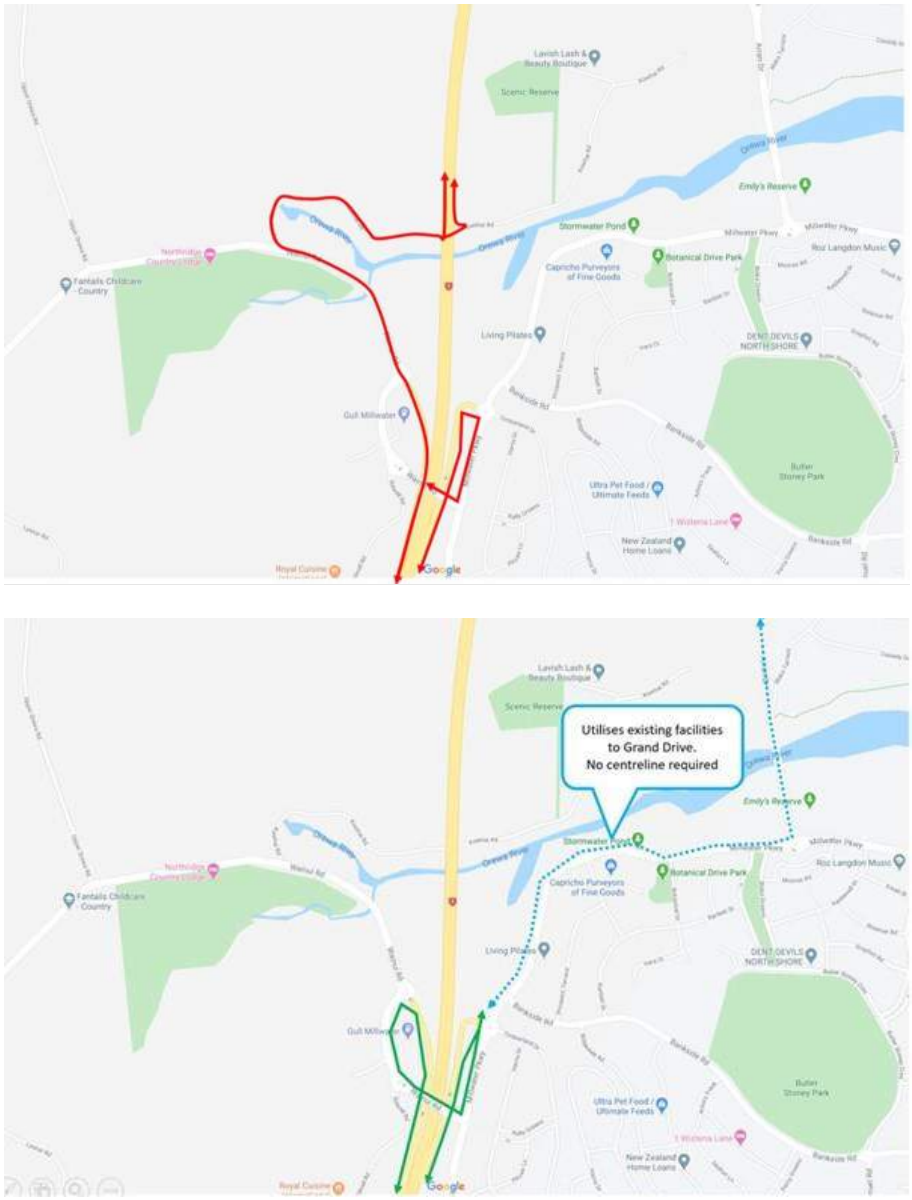



**Figure 94: Wainui to Grand Drive local road options**

It was concluded that relative to a SH1 alignment, these options are not preferred because:

- They both deviate significantly from the SH1 corridor. Investment Objective 1: Access/Integration, looks at access to economic and social opportunities through the Northern Growth area which is better achieved by the more direct route provided by an alignment alongside the existing SH1 corridor.
- CW 30 features significant interaction between driveways along Millwater Parkway, Arran Drive and Grand Drive and the shared path which creates potential for conflicts. An alignment along SH1 would minimise the risk of potential conflict and therefore would better align with Investment Objective 3: Safety.
- Options CW 20 and CW 30 have significant ecological, planning and heritage constraints as shown in Figure 93.

This process confirmed that there is no practicable option for the project that avoids works in the CMA/SEA at the SH1 Ōrewa River crossing. Subsequently, two route refinement options were

developed for MCA purposes for the New Walking and Cycling Path alongside SH1 as outlined in **Table 40** and **Figure 95** below.

**Table 40: New Walking and Cycling Path (Wainui to Grand Drive) – MCA option descriptions.**

| Option Reference | Option Name | Description |
|---|---|---|
| **Option A** | SH-04 West | Strategic cycleway on the western side of the existing SH1. |
| **Option B** | SH-04 East | Strategic cycleway on the eastern side of the existing SH1. |

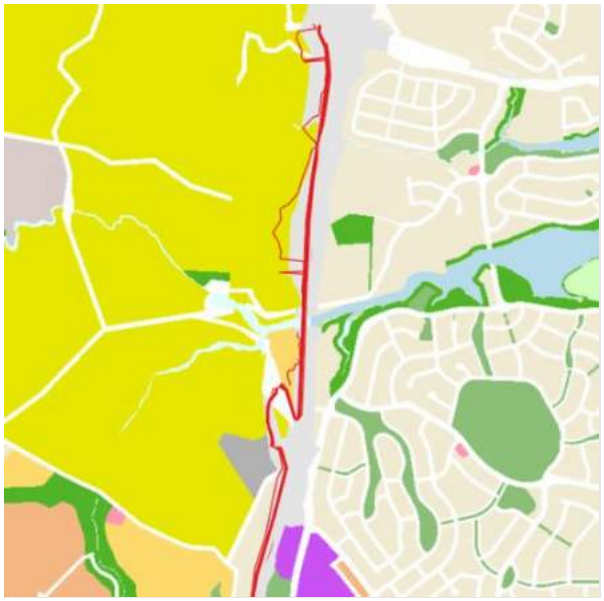
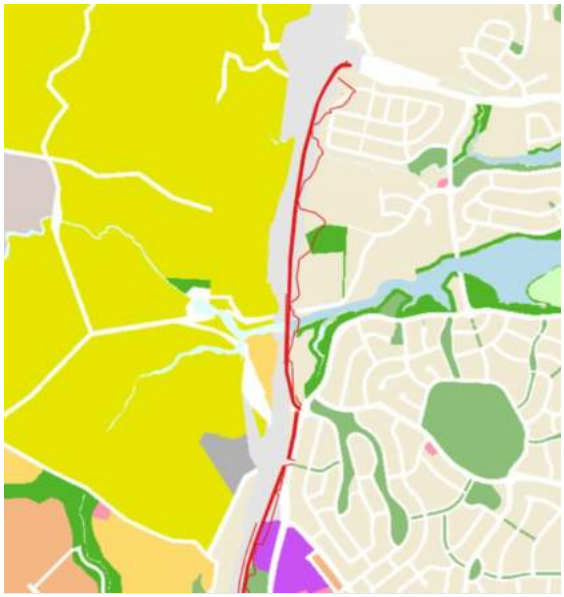
| Option A: Option SH-04 West | Option B: Option SH-04 East |
|---|---|
|  |  |

**Figure 95: Options for the New Walking and Cycling Path - Wainui to Grand Drive segment for MCA assessment.**

### 9.6.9.2 Option assessment

**Table 41** below identifies the outcomes from this assessment.

**Table 41: Summary of New Walking and Cycling Path on SH1 – Wainui to Grand Drive MCA scoring.**

| MCA Criteria | Option A: SH-04 Cycleway on the west | Option B: SH-04 Cycleway on the east |
|---|---|---|
| Investment Objective 1: Access / Integration | 3 | 3 |
| Investment Objective 2: Mode Choice | 3 | 3 |
| Investment Objective 3: Safety | 4 | 4 |

| | | |
|---|---|---|
| 1a. Heritage | -3 | -3 |
| 2a. Land use futures | -1 | -1 |
| 2b. Urban design | 3 | 3 |
| 2c. Land requirement | 0 | 0 |
| 2d. Social cohesion | 0 | -1 |
| 2e. Human health and wellbeing | 1 | 1 |
| 3a. Landscape / visual | -3 | -3 |
| 3b. Stormwater/flooding | -2 | -2 |
| 3c. Ecology | -2 | -3 |
| 3d. Natural hazards | 0 | 0 |
| 5a. Construction impacts on utilities / infrastructure | -1 | -1 |
| 5b. Construction disruption | -1 | -2 |
| 6a. Construction costs / risk | -3 | -2 |

The Project Team reviewed and compared the options identified above and noted there was little differentiation between the options overall; however criteria relating to social cohesion, ecology, construction disruption and construction costs/risk were the key considerations for this segment and showed differentiation between the options.

In relation to non-scored criteria:

- There was no clear preference from a Policy Analysis perspective. Although Option B requires a structure within the coastal marine area (CMA), the structure is considered to have a functional or operational need to be located in the CMA as per policies in the AUP.
- There was no real differentiation between the options from a value for money perspective.
- Manawhenua did not state a strong preference between the options, although it was noted that the west has more planned population growth so may be more appropriate for a cycleway.

Because there was no clear preference from the scoring for this segment it was concluded that the preferred option should be determined by the preference for the previous segment (Silverdale to Wainui Road) to minimise the number of SH1 crossings, as this impacts the overall safety and attractiveness of the cycleway project. Therefore, the preferred option (**Option B- SH-04 East**) is for the New Walking and Cycling Path to be located on the eastern side of the existing SH1 carriageway as this aligns with the option for the Silverdale to Wainui Road segment.

### 9.6.10 Consideration of Combined Segments

Following selection of the preferred options per segment, these segments were ‘stitched’ together to form the overall emerging preferred option for the New Walking and Cycling Path along SH1 to proceed to the design refinement stage. The preferred route refinement option for each segment is outlined in **Table 42**, and the full alignment of the project is illustrated in Figure 96.

**Table 42: New Walking and Cycling Path along SH1: Preferred Route**

| Section | Recommended Option |
|---|---|
| Segment 1: Albany to Awanohi (shared with RTC and Upgrades to SH1) | **Option D (SH-12)** where the New Walking and Cycling path along SH1 locates on the **eastern** side of the SH1 carriageway, separate from the RTC. |
| Segment 2: Awanohi to Bawden (shared with RTC and Upgrades to SH1) | **Option J (SH-12)** where the New Walking and Cycling path along SH1 locates on the **eastern** side of the SH1 carriageway, separate from the RTC and then crosses SH1 via a bridge near Bawden Road. At this point the path splits into two, with one path following on alongside the RTC, and the other joining segment 3 below. |
| Segment 3: Bawden to Silverdale Interchange | **Option A -SH-04;** New Walking and Cycling path along SH1 locates on the **western** side of the SH1 carriageway. |
| Segment 4: Silverdale Interchange to Wainui Road | **Option B- SH-04;** New Walking and Cycling path along SH1 locates on the **eastern** side of the SH1 carriageway. |
| Segment 5: Wainui Road to Grand Drive | **Option B- SH-04:** New Walking and Cycling path along SH1 locates on the **eastern** side of the SH1 carriageway. |

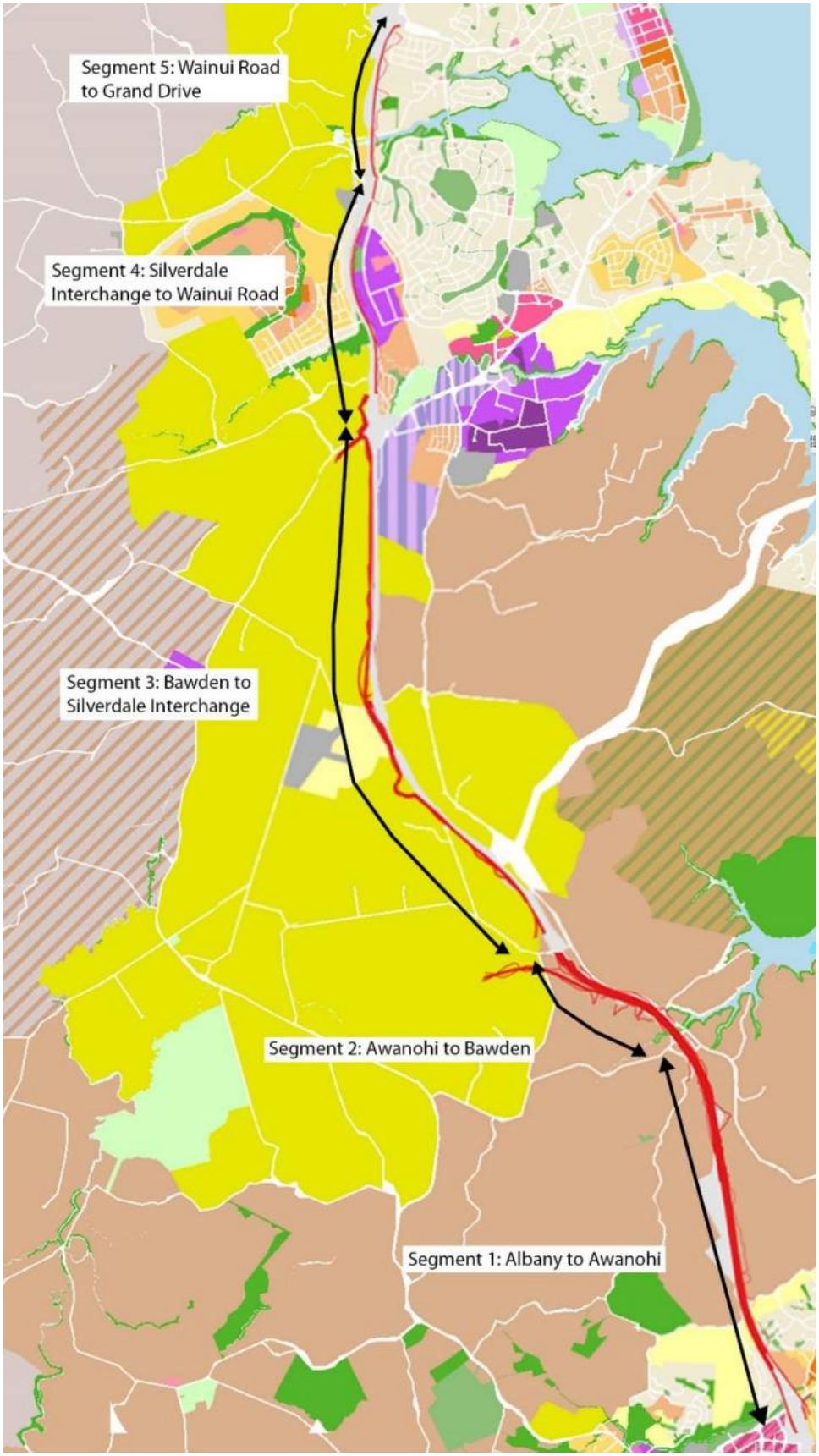



**Figure 96: New Walking and Cycling Path along SH1 full alignment.**

### 9.6.11 Consideration of DBC engagement

Future walking and cycling paths, including the new path along SH1 between Albany and Grand Drive, was engaged on through the DBC engagement in July to August 2022.

Overall support was expressed for separated walking and cycling facilities on new and upgraded roads and that they should connect to schools, parks and playgrounds. There was some concern about the safety and attractiveness of shared paths for pedestrians and young children. The importance of the design of walking and cycling paths was also raised including attractive infrastructure, adequate lighting, landscaping to separate paths from driveways. It is noted that as the focus of Te Tupu Ngātahi projects is route protection, these design details would be worked out closer to implementation.

Some respondents also requested walking and cycling facilities to Ōrewa (town centre) and Hibiscus Coast. In response, the Project team explained that walking and cycling facilities from Silverdale along Hibiscus Coast Highway and Grand Drive (via Ōrewa town centre) will be included in the Detailed Business Case. This project is not proposed for route protection in the North Projects as the project will be limited to works within the existing road corridor.

### 9.6.12 Design Refinement

The following changes were made during design refinement:

- Refinements to the Ōteha Valley connections including connectivity to Masons Road.
- Refinements of path to reduce impacts on Retirement village north of Ōteha Valley Road.
- Bawden Road E-W connection was integrated with the replacement of the road bridge required as part of the Upgrades to SH1.
- Retaining walls and bridges assumed in a number of locations to reduce the extent of earthworks.
- Active mode connections at interchanges refined following form and function process.
- Active mode connections made to Millwater Parkway and Kowhai Road to enhance connectivity.

#### 9.6.12.1 Kowhai Road active mode connection

Through design refinement, the proposed walking and cycling connection between the mainline and Kowhai Road was considered on the northern side of the Ōrewa River. The ecological assessment highlighted the effects of SEA vegetation removal from this connection. In addition, information was obtained on the recently consented development to the East of SH1 provides a connection between the local road network and SH1 facility (as per Figure 97).

The team removed this connection from the preferred design as the connection had high effects and an alternative was available with lower cost and effects.

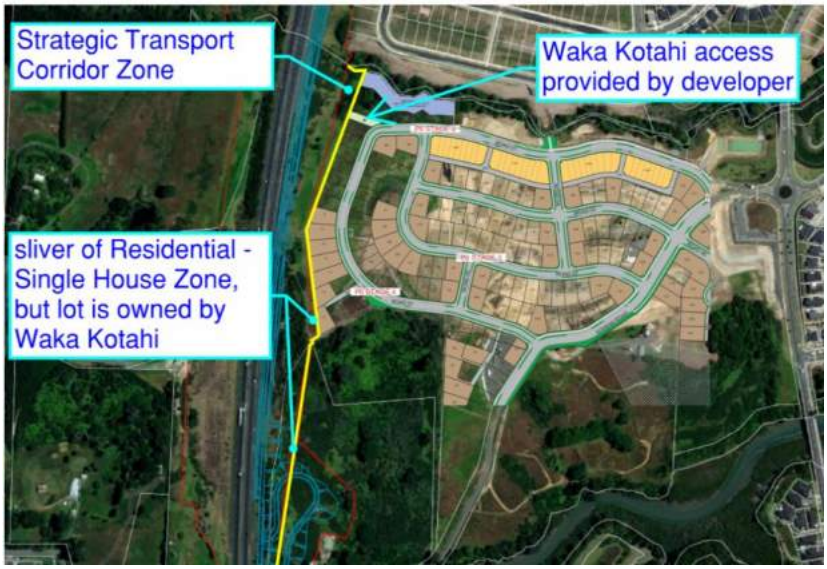



**Figure 97: New walking and cycling path along SH1 – connections around Kowhai Road**

### 9.6.13 Preferred Route: New Walking and Cycling Path along SH1

The preferred route for the New Walking and Cycling Path along SH1 is as shown in **Figure 98**.

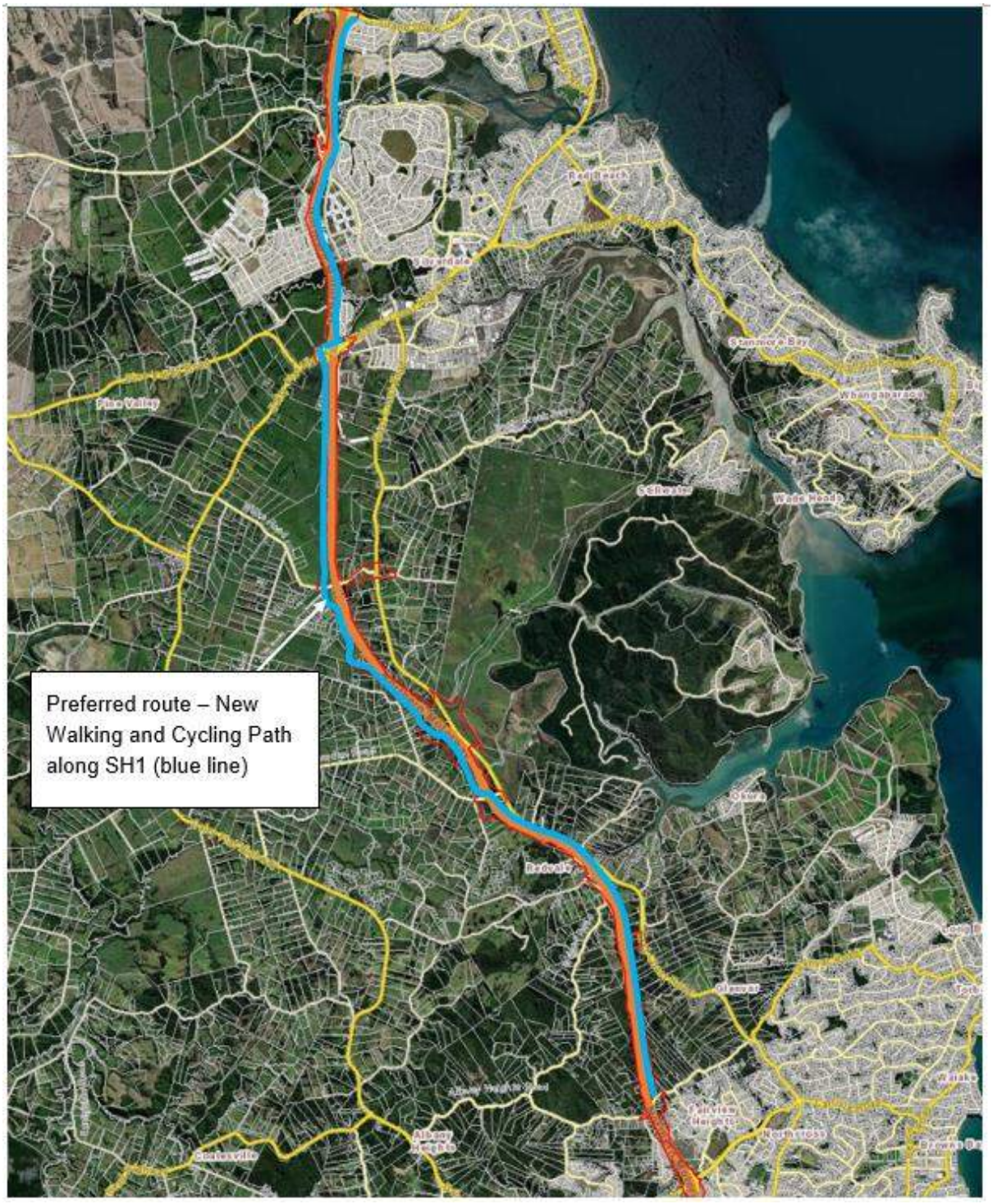



**Figure 98: New Walking and Cycling Path along SH1 preferred alignment.**

## 9.7 Silverdale to Highgate active mode connection

### 9.7.1 IBC to DBC gap analysis

The IBC considered various corridor and mode options for a local connection between Hibiscus Coast Bus Station, Silverdale Town Centre, Millwater and Milldale – previously known as the Curley Ave Improvements Project. The short list included several options with three components being carried

through to the DBC phase for route refinement, referred to in the IBC as the Curley Ave Active Mode Connections Project (R16-3):

- A walking and cycling connection that uses existing roads with an active mode only connection on Curley Avenue and a bridge to Brian Smith Drive.
- Upgrading the Silverdale Street / Hibiscus Coast Highway intersection with signals.
- A Milldale to Highgate all-modes SH1 crossing – already proposed by AT as a separate project.

Following the IBC, the Project team did additional work including ecological surveys, an assessment of town centre values, and options for using existing roads. This assessment identified potential for high adverse effects relating to a new road connection and confirmed the decision for an active mode only project.


**Figure 99: IBC recommended option for Silverdale to Highgate Active Mode Connections (previously known as Curley Ave Improvements Project)**

An IBC to DBC Gap Analysis was undertaken at the start of the DBC phase. The gap analysis recommended the following for the DBC optioneering:

- Considering the potentially high adverse effects on ecology and cultural values, a wide study area was recommended to be considered at the DBC phase, including testing whether there are any options that avoid or minimise SEA impacts and engaging further with Manawhenua.
- There is a separate strategic cycleway proposed up the eastern side of SH1 in the vicinity of Curley Ave (see Section 9.6) – it was recommended that the DBC looked at options to tie into this broader connection instead of a separate local connection.
- Considering the new NPSs, including the NPS:FW and NPS:UD (as discussed in Part A).

### 9.7.2 Detailed Corridor Option development

Considering the results of the gap analysis and the sensitivity of the study area, multiple Detailed Corridor options were developed for the Project. Options were generally limited to the area shown in Figure 100 for the following reasons:

a) The IBC recommended an indicative corridor for the Project through this area, and this was reconfirmed as appropriate through the gap analysis as detailed above.

b) The project seeks to provide a local active mode connection between Hibiscus Coast Bus Station, Silverdale Town Centre, Millwater and Milldale.

In developing options, the Project Team also considered the following known key features in the area. These are mapped in **Figure 100** below and include:

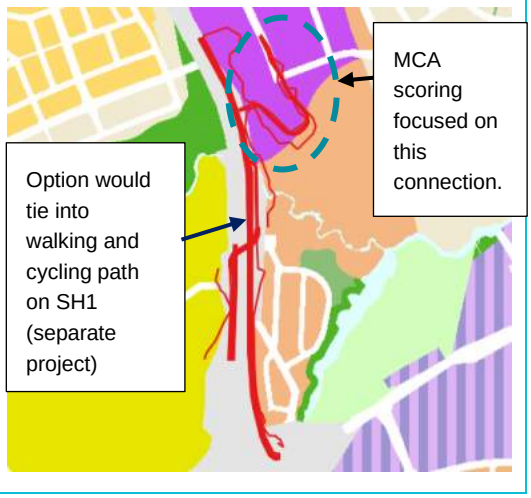
- Wēiti Stream and associated tributaries and flood plains – very high cultural significance to Manawhenua (Manawhenua advised the stream is waahi tapu through the engagement process).
- SEA (high value kauri, podocarp and broadleaved forest) and areas of non-SEA indigenous vegetation.
- Unstable geology (northland allochthon).
- Silverdale War Memorial Park including sports fields and a tennis club.
- An Anglican Church and Cemetery.
- New residential development in the south-west corner next to SH1
- Live zoned land including Business - Light Industry, Residential, Business - Town Centre and an Open Space - Sport and Active Recreation Zone. Much of the central part of the study area. remains undeveloped but could develop in future – although some areas are also covered with SEA, which is likely to limit future development.


**Figure 100: Silverdale to Highgate active mode connections constraints map (previously known as Curley Ave Active Mode Connections Project)**

In consideration of the above factors, seven options were developed through route refinement as outlined in **Table 43** and **Figure 101** below.

**Table 43: Silverdale to highgate active mode connections – MCA option descriptions (previously known as Curley Ave Active Mode Connections Project)**

| Option Reference | Option Name | Description |
|---|---|---|
| **Option A** | CA-01A | Active mode link utilising the existing road corridor from Highgate Parkway to Hibiscus-Coast Highway via Waterloo Road, Wainui Road and Silverdale Street. Separated facilities along both sides of Waterloo Road and Wainui Road. |
| **Option B** | CA-01B | Active mode link utilising the existing road corridor from Highgate Parkway to Hibiscus-Coast Highway via Waterloo Road, Wainui Road and Silverdale Street. Separated facility where there is available berm space along the southern side of Waterloo Road and Wainui Road. |
| **Option C** | CA-02A | Active mode link from Highgate Parkway to Hibiscus Coast Highway through greenfield land. The route diverges into two pathways at the top of Waiokahukura (Lucas Creek) towards Curley Avenue and Brian Smith Drive. |
| **Option D** | CA-02B | Active mode link from Highgate Parkway to Hibiscus Coast Highway through the greenfield land via Brian Smith Drive. |
| **Option E** | CA-02C | Active mode link from Highgate Parkway to Hibiscus Coast Highway through the greenfield land. The route diverges into two pathways at the top of Wēiti Stream towards Curley Avenue and round the back of the Memorial grounds / rugby fields. |
| **Option F** | CA-04 | Option F follows the SH1 motorway as a separate facility from Highgate Parkway to Hibiscus-Coast Highway via the south-bound motorway off-ramp. |
| **Option G** | CA-04B | Option G follows the SH1 motorway as a separate facility from Highgate Parkway to Hibiscus-Coast Highway via the south-bound motorway off-ramp with a more direct route through Highgate Parkway. |

| Option A: CA-01A | Option B: CA-01B |
| --- | --- |
|  |  |
| **Option C: CA-02A** | **Option D: CA-02B** |
|  |  |
| **Option E: CA-02C** | **Option F: CA-04** |
|  |  |

**Option G: CA-04B**

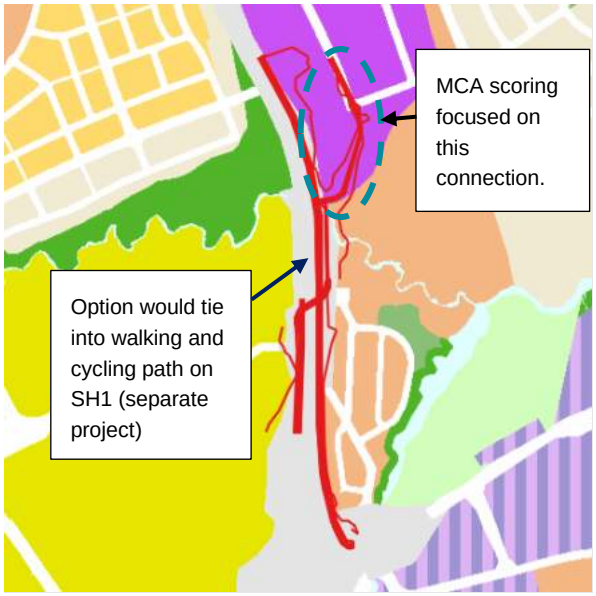



**Figure 101: Options for the Silverdale to Highgate active mode connections project as designed within the SGA GIS viewer for MCA assessment (previously known as Curley Ave Active Mode Connections Project)**

### 9.7.3 Detailed Corridor Option assessment

Options were assessed against the Investment Objectives and criteria within four well-beings, cultural, social, environmental and economic. Technical specialists engaged in MCA workshops to undertake an assessment, scoring each option on a gradual scale from 'Very High Adverse Effect' (red) to 'Very High Positive Impact' (green).

**Table 44** below identifies the outcomes from this assessment.

**Table 44: Summary of Silverdale to Highgate active mode connections MCA scoring (previously known as Curley Ave Active Mode Connections Project)**

| MCA Criteria | Options | | | | | | |
|---|---|---|---|---|---|---|---|
| | A: CA-01A | B: CA-01B | C: CA-02A | D: CA-02B | E: CA-02C | F: CA-04 | G: CA-04B |
| Investment Objective 1: Access - Improve access to economic and social opportunities through direct and attractive active mode facilities | 1 | 1 | 3 | 2 | 2 | 1 | 1 |
| Investment Objective 2: Travel choice: Provide a high quality, low carbon strategic active mode | 1 | 1 | 3 | 2 | 3 | 0 | 0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| facility within the catchment | | | | | | | |
| Investment Objective 3: Safety: A safe facility which separates vulnerable users from conflict with vehicles | 2 | 1 | 3 | 3 | 3 | 3 | 3 |
| 1a. Heritage | -4 | 0 | -1 | -1 | -1 | 0 | 0 |
| 2a. Land use futures | 0 | 0 | -1 | -1 | -1 | 0 | 1 |
| 2b. Urban design | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| 2c. Land requirement | -3 | -1 | -2 | -2 | -2 | -1 | -1 |
| 2d. Social cohesion | -3 | 0 | 2 | 2 | 2 | 1 | 1 |
| 2e. Human health and wellbeing | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3a. Landscape / visual | -3 | -3 | -4 | -3 | -4 | -3 | -2 |
| 3b. Stormwater/flooding | 0 | 0 | -2 | -1 | -3 | -1 | 0 |
| 3c. Ecology | -3 | -3 | -5 | -4 | -5 | -4 | -2 |
| 3d. Natural hazards | -2 | -3 | -4 | -3 | -3 | -2 | -1 |
| 5a. Construction impacts on utilities / infrastructure | -2 | -2 | -1 | 1 | -1 | -2 | -2 |
| 5b. Construction disruption | -2 | -1 | 0 | 0 | 0 | -2 | -1 |
| 6a. Construction costs / risk | -2 | -2 | -3 | -3 | -3 | -2 | -2 |

The Project Team reviewed and compared the options identified above and noted that criteria relating to the investment objectives (transport outcomes), heritage, land use futures, urban design, social cohesion, landscape/visual, stormwater/flooding, ecology, natural hazards, construction impacts on utilities/infrastructure, construction disruption and construction costs/risk are the key considerations for this segment and showed differentiation between the options.

In relation to non-scored criteria:

- Ngā Manawhenua noted a very strong preference to avoid any options that add another crossing of the Wēiti (which is waahi tapu) and/or cross through the high value SEA areas of the study area (this includes Options C, D and E). Option G was preferred by Manawhenua who stated a preference between the options.
- Option G was preferred from a value for money perspective considering the options has lower costs and lower benefits but proportionally higher value for money.
- Option G was preferred from a Policy Analysis perspective as it avoids new stream crossings and mostly avoids SEAs affected by most other options (other than one SEA/Wēiti crossing which would be bridged and close to SH1). The next preferred option was Option F, which would affect slightly more indigenous non-SEA vegetation.

Considering the MCA and feedback from Manawhenua for this project, the Project team subsequently discounted the options that comprised new corridors through the most sensitive part of the study area (Options C, D and E) for the following reasons:

a) The options had potentially significant cultural effects and were strongly opposed by Manawhenua (as noted above)
b) Although these new corridor options scored better against the investment objectives for access and travel choice, they scored poorly for ecology (with high to significant effects), natural hazards (geotech risk), and landscape/visual effects.

Of the remaining options, the Project Team identified **Option G – CA-04B** as the preferred route refinement option for the following reasons:

a) Avoids SEA areas and mapped areas of non-SEA indigenous vegetation.

b) Minimises adverse impacts on streams and waahi tapu areas (avoids a new crossing of the Wēiti)

c) Supported by those Manawhenua who have stated a preference.

d) Scored better than Options A and B overall, including for investment objective 3: Safety, social cohesion (as it avoids direct effects on important social facilities like the Anglican cemetery), ecology, landscape/visual and natural hazards.

e) Scored better than Option F overall including for ecology and land use futures, landscape/visual, ecology, natural hazards and construction disruption.

f) Preferred from a policy perspective as it avoids SEAs and minimise effects on streams and waahi tapu areas.

g) Preferred from a value for money perspective as it has lower overall costs of construction.

Although the preferred option did not score as positively against the Investment Objectives, the option was still considered to be viable/worthwhile, which is reflected in the value for money assessment.

Commentary on why the remaining options were discounted is contained within **Table 45** below.

**Table 45: Reasons for discounting options for Silverdale to Highgate active mode connections (previously known as Curley Ave Active Mode Connections Project)**

| Option | Commentary |
|---|---|
| **Option A**<br><br>CA-01A | • Potential to impact historical cemetery.<br>• Poor performance against Investment Objectives.<br>• High amount of property parcels potentially affected (relative to other options) where land acquisition would be required.<br>• Poor landscape and visual scoring due to impacts on SEA and earthwork impacts on steep slopes – potential for exposure, particularly when combined with vegetation loss.<br>• Adverse construction related impacts on existing road corridor.<br>• Area has been recently developed and there is likely to be impacts on existing utilities during construction. |
| **Option B** | • Poor performance against Investment Objectives. |

| Option | Commentary |
|---|---|
| CA-01B | • Poor landscape and visual scoring due to impacts on SEA and earthwork impacts on steep slopes – potential for exposure, particularly when combined with vegetation loss.<br>• Adverse construction related impacts on existing road corridor.<br>• Area has been recently developed and there is likely to be impacts on existing utilities during construction. |
| **Option C**<br>CA-02A | • Significant impacts on SEA and indigenous vegetation.<br>• Requires several stream crossings (including culverts and a bridge over the Wēiti Stream)<br>• Impacts on Wēiti and surrounding SEA strongly opposed by Manawhenua.<br>• Significant landscape and visual impacts.<br>• Significant slope instability issues.<br>• Poor construction vehicle access. |
| **Option D**<br>CA-02B | • Similar reasons as Option C above, although with fewer stream crossings. |
| **Option E**<br>CA-02C | • Similar reasons as Option C above. |
| **Option F**<br>CA-04 | • Similar scores to option G for some criteria but scored more poorly in relation to land use futures, landscape/visual, ecology, natural hazards and construction disruption. |

### 9.7.4 Consideration of DBC engagement

A new walking and cycling connection between Silverdale and Highgate was included in the DBC engagement in July-August 2022.

Overall support was expressed for separated walking and cycling facilities on new and upgraded roads and that they should connect to schools, parks and playgrounds. There was some concern about the safety and attractiveness of shared paths for pedestrians and young children. The importance of the design of walking and cycling paths was also raised including attractive infrastructure, adequate lighting, landscaping to separate paths from driveways. It is noted that as the focus of Te Tupu Ngātahi projects is route protection, these design details would be worked out closer to implementation.

### 9.7.5 Design Refinement

During the design refinement phase, consideration was given to nearby Department of Conservation (DOC) managed land located south of the preferred option, along the northern margin of the Wēiti Stream. The boundary of the DOC managed land was refined in the SGA GIS viewer and determined the preferred option would not impact it. While no refinement to the design was required, the DOC land, and its refined boundary extents, remains a consideration for future design iterations.

### 9.7.6 Preferred Route: Silverdale to Highgate active mode connection

The preferred route for the Silverdale to Highgate Active Mode Connection is as shown in **Figure 102.**

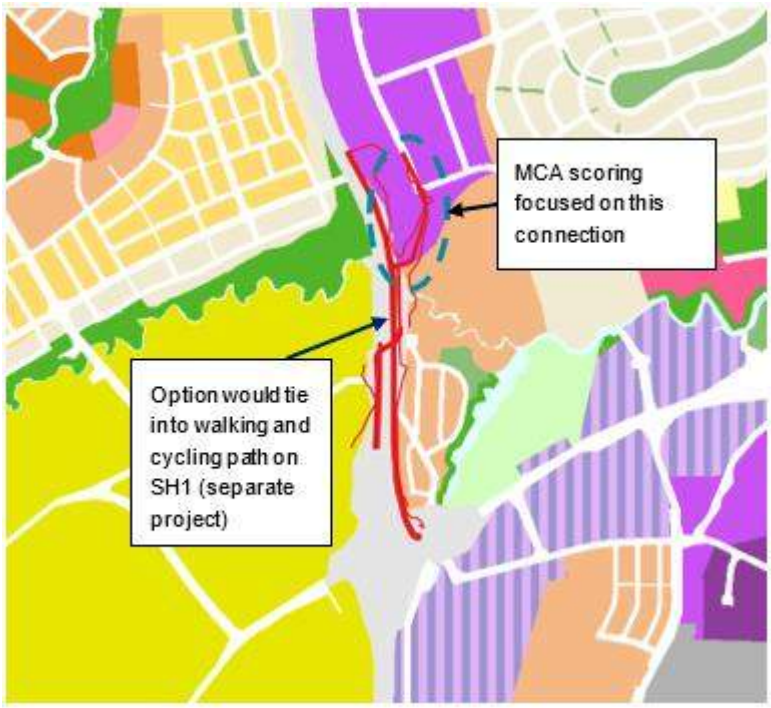



**Figure 102: Silverdale to Highgate active mode connection preferred route**

# 9.8 Wainui Interchange Active Modes Upgrade

## 9.8.1 IBC to DBC gap analysis

The IBC recommended option for this project was EW3-1: Wainui Road Active Mode-only Crossing - an active mode only crossing of SH1 from Wainui Road on the western side of SH1, to Millwater Parkway on the eastern side.

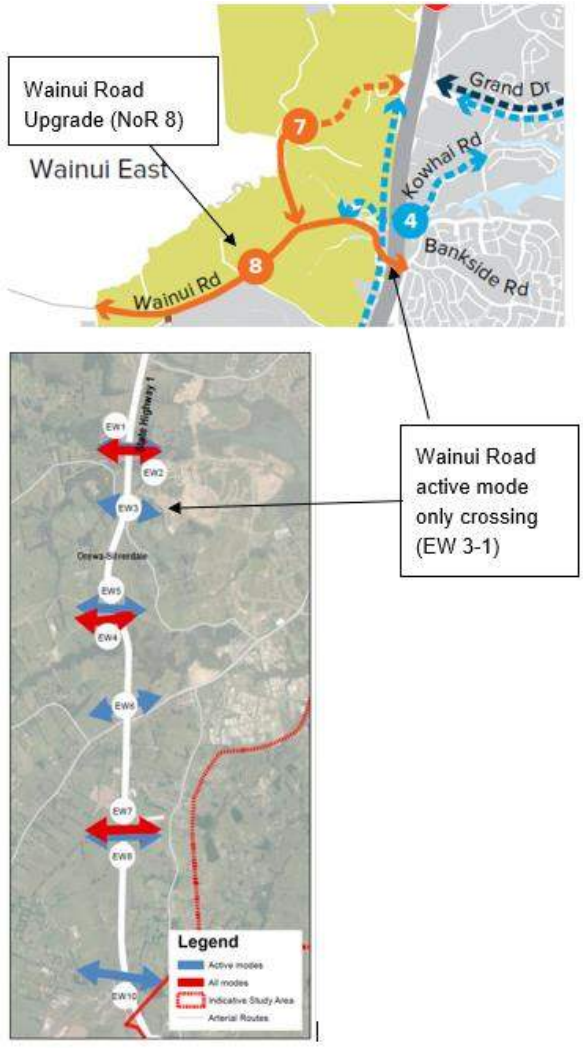



**Figure 103: IBC recommended option for Wainui interchange Active Modes Upgrade**

The Wainui Interchange Active Modes Upgrade will connect active mode facilities that are to be provided along Wainui Road as part of the Upgrade to Wainui Road (see NoR 8 in **Figure 103** above and Section 15 of this report) with the New Walking and Cycling Path along SH1 (see section 9.6). This will provide an important connection across the State Highway corridor, enabling active mode users to cross east to west and for those on the western side of SH1 to access the strategic active mode corridor that runs north/south between Albany and Upper Ōrewa and Grand Drive.

The IBC to DBC gap analysis did not identify any gaps associated with the optioneering at a corridor level and recommended the project could proceed to route refinement. However, it was noted during the DBC phase that there are interfaces with other projects. In particular, the DBC will need to

consider how the project interfaces with the other SH1 Improvements Package projects (Upgrades to SH1 and New Walking and Cycling Path along SH1 – refer Sections 9.3 and 9.6), as well as the Upgrade to Wainui Road (refer Section 15).

In addition, the gap analysis recommended that the DBC optioneering:

- Tests the need for route protection of this project considering the majority of the crossing is within a fairly wide SH1 designation.
- Considers the new NPSs, including the NPS:FW and NPS:UD (as discussed in Part A).

### 9.8.2 Route refinement Option development

Options for the initial route refinement were generally limited to the study area shown in Figure 104 for the following reasons:

a) The IBC identified the need for an active mode crossing in this area. The crossing needs to connect to the Upgrade to Wainui Road on the west and across to the east to connect to the New Walking and Cycling path on SH1 as well as the Millwater development.

b) There is an existing overbridge for vehicles at the Wainui interchange – so there is an opportunity to add walking and cycling to this bridge.

c) There is a new residential subdivision proposed in the Residential-Single House zone east of Wainui Road (part of the Wainui precinct).

In developing options, the Project Team also considered the following known key features in the area. These are mapped in **Figure 104** below and include:

- Meraki Montessori Primary School- accessed from Wainui Road to the north of the Sidwell/Wainui roundabout.
- An existing service station in between two roundabouts on Wainui Road – on FUZ land.
- The Wainui precinct residential subdivision development (332 Wainui Road)- under construction.
- Non-SEA Indigenous vegetation areas to the west in the FUZ.
- Existing motorway designation 6761.
- Floodplains.

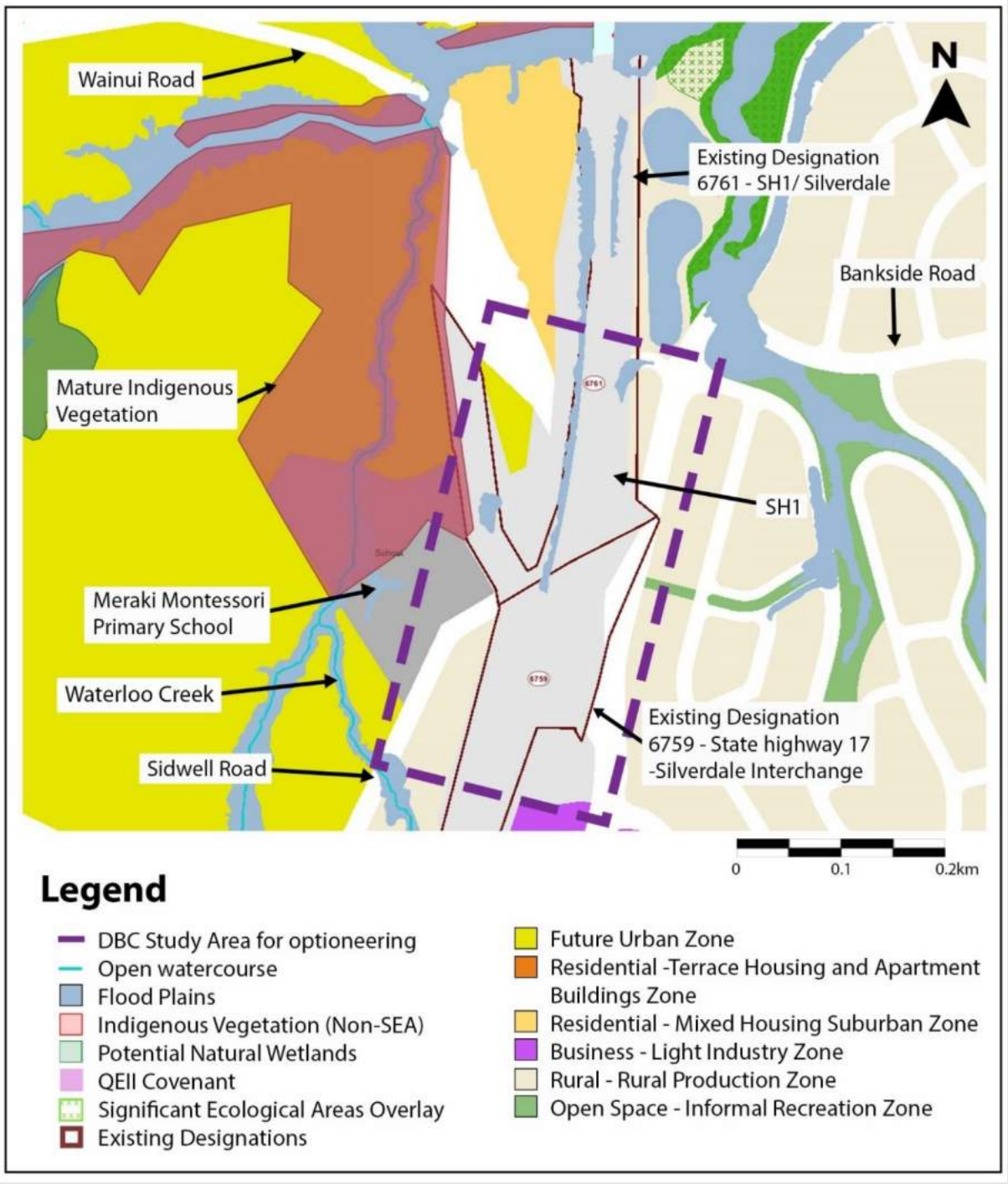



**Figure 104: Wainui Interchange Active Modes constraints map.**

In consideration of the above factors, three options were developed through route refinement as outlined in **Table 46** and **Figure 105** below.

**Table 46: Wainui Interchange Active Modes Upgrade – option descriptions.**

| Option Reference | Description |
|---|---|
| **Option A** | Active mode connection (new bridge) from SH1 strategic corridor over the south bound on-ramp |
| **Option B** | Active mode facility (new bridge) against the northern side of the existing Wainui Ramp + link to north-south facility from Millwater Parkway. |
| **Option C** | Active mode facility (new bridge) against the southern side of existing Wainui Ramp + link to north-south facility from Millwater Parkway. |

**Option A**


**Option B**


**Option C**

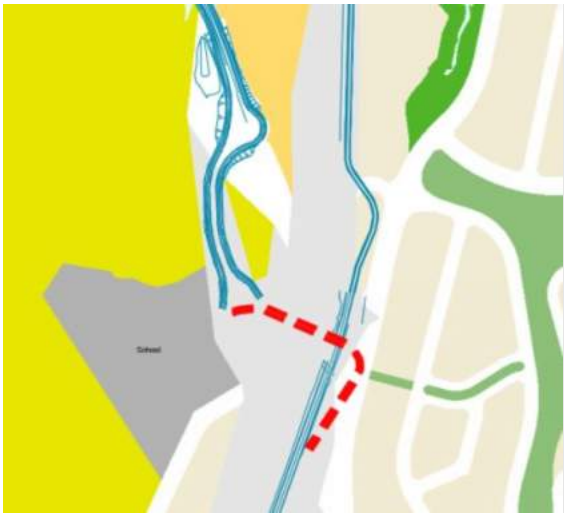


**Figure 105: Options for the Wainui Interchange Active Modes Upgrade project.**

### 9.8.3 Route refinement Option assessment

The options assessment comprised a targeted MCA with qualitative assessment of the refined crossing locations, as summarised below in **Table 47**. A full MCA assessment was not considered necessary as the options are largely located within the existing motorway designation.

**Table 47: Targeted MCA assessment for Lonely Track bridge/road options**

| | |
|---|---|
| | High/significant constraints or potential effects (avoid where practicable) |
| | Moderate constraints or potential effects present (consider avoiding on balance with other issues) |
| | No key constraints present or potentially low adverse/positive effects |

| MCA criteria (targeted to those criteria that may differentiate) | Option A | Option B | Option C |
|---|---|---|---|
| Investment objective Access/Integration | All options are able to be designed to provide an attractive active mode facility.<br>Option A is the most direct route between the West and the East with the least grade. It does require users to cross the Wainui Road roundabout to gain access to the school, which would add additional distance. | All options are able to be designed to provide an attractive active mode facility.<br>Option B is the least direct between the SH1 Corridor and Wainui Road Corridor and results in the most distance travelled, requiring the most investment. The investment will add additional permeability to the network and provide a connection for future growth to the south-west, adjacent to Sidwell Road and a future school. It does however, require users to cross the Wainui Road roundabout to gain access to the school. | All options are able to be designed to provide an attractive active mode facility.<br>Option C is a similar distance to Option A, however, provides a connection to the school. It does require slightly more additional investment, when compared to Option A. The investment will add additional permeability to the network and provide a connection for future growth to the south-west, adjacent to Sidwell Road and a future school. It does require users to cross the Sidwell Road roundabout to gain access to the school. It also provides a connection to Sidwell Road, which has some existing cycling facilities |
| Investment objective: Mode choice | All options are considered to be able to provide a high quality, safe and attractive strategic active mode facility through detailed design. In the context of the medium to longer distance cycle trips that access to the Regional Active Mode Corridor will provide, the relative length of the different options is not considered a differentiator. | | |
| Investment objective: Safety | All options will be designed to appropriate safety standards. Appropriate active mode facilities are to be provided along Wainui Road from the Sidwell Road roundabout to the north / | All options will be designed to appropriate safety standards. Appropriate active mode facilities are to be provided along Wainui Road from the Sidwell Road roundabout to the north / | All options will be designed to appropriate safety standards. Appropriate active mode facilities are to be provided along Wainui Road from the Sidwell Road roundabout to the north / |

| MCA criteria (targeted to those criteria that may differentiate) | Option A | Option B | Option C |
|---|---|---|---|
| | west through a separate SGA project.<br>To connect to the School and south to the Milldale development, Option A will require students to cross the Wainui Road Roundabout, requiring a safe crossing facility to be constructed, but not removing this conflict with a busy arterial corridor. | west through a separate SGA project.<br>Option B also requires active mode users to cross Wainui Road, further south near the Sidwell Road roundabout, to access the School and south to the Milldale development. | west through a separate SGA project.<br>Option C requires users to navigate the Sidwell Road approach to the southern roundabout, which will need safe crossing facilities |
| 2a. Land use futures<br>2c. Land requirement | Requires property acquisition from recent subdivision at Wainui Rd to provide for the overbridge connection into the Wainui Road Roundabout. | Likely connection can be provided within the SH1 designation. | Likely connection can be provided within the SH1 designation. |
| 2d Social cohesion (and accessibility) | Provides access to residents of Millwater Parkway to the east and Wainui Road to the west.<br>Includes active mode crossings of busy arterial road (Wainui Rd) to access bridge. | Provides access to residents of Millwater Parkway to the east and Wainui Road to the west.<br>Includes active mode crossings of busy arterial road (Wainui Rd) to access bridge.<br>This option provides direct access to the future school, which is a significant benefit to the community and encouraging mode shift. | Provides access to residents of Millwater Parkway to the east and Wainui Road to the west.<br>Does not necessarily require active mode crossings of busy arterial road (Wainui Rd) to access bridge.<br>This option provides direct access to the existing school, which is a significant benefit to the community and encouraging mode shift |
| 5a Construction impacts on utilities/infrastructure.<br>6a Construction cost/risk | Would require construction of an overbridge of approximately 140m between elevated sections.<br>Total trip distance from Wainui Road roundabout to common point on north/south active mode path: 660m. | Would require construction of approx. 140m of additional cycleway on the eastern side of SH1 to provide access between the New Walking and Cycling path on SH1 and Millwater Parkway to provide access to the bridge (moderate grade). It would also require construction of a bridge of approximately 140m (4% grade).<br>Total trip distance from Wainui Road roundabout to common point on north/south active mode path: 975m. | Would require the construction of approx. 100m of additional cycleway on the eastern side of SH1 to provide access between the New Walking and Cycling Path on SH1 and Wainui Road (eastern side of SH1) to provide access to the bridge (moderate grade). It would also require construction of a bridge of approximately 140m (4% grade).<br>Total trip distance from Wainui Road roundabout to common point on north/south active mode path: 675m. |

The Project Team reviewed and compared the options identified above and noted that matters relating to access / integration, length and accessibility are the key differentiators between options.

Accordingly, the Project Team identified **Option C - Facility (new bridge) against the southern side of existing Wainui Ramp + link to north-south facility from Millwater Parkway** as the preferred route refinement option for the following reasons:

a) Provides a connection of a similar distance to Option A with the additional benefit of safer and more direct connection to the school and existing facilities on Sidwell Road.
b) Safer and more direct connection to the existing school and Milldale development than Option A, which provides additional social and mode shift benefits.
c) Does not impact additional properties outside of the existing SH1 designation.

The remaining options were discounted by the Project Team for the reasons contained within **Table 48** below.

**Table 48: Reasons why options were discounted.**

| Option | Reasons for discounting option |
|---|---|
| **Option A**<br>Connection (new bridge) from SH1 strategic corridor over the south bound on-ramp | • Least safe because it would require active mode users to cross a busy arterial corridor.<br>• Likely to affect private properties outside of the existing SH1 designation – which are proposed for residential subdivision. |
| **Option B**<br>Facility (new bridge) against the northern side of the existing Wainui Ramp + link to N-S facility from Millwater Parkway. | • Most indirect alignment.<br>• Requires a greater additional cycleway length over Options A and C – greater investment |

### 9.8.4 Consideration of DBC engagement

An active mode crossing at Wainui Interchange was included in the DBC engagement in July-August 2022.

No specific comments were received in relation to this project; however general support was noted for new and upgraded roads and that they should connect to schools, parks and playgrounds. There was some concern about the safety and attractiveness of shared paths for pedestrians and young children. The importance of the design of walking and cycling paths was also raised, including attractive infrastructure, adequate lighting and landscaping to separate paths from driveways. The focus of Te Tupu Ngātahi projects is route protection and these design details would be prepared during implementation.

### 9.8.5 Design Refinement

No design refinements were required.

### 9.8.6 Preferred route: Wainui interchange active modes upgrade

The preferred route for the Wainui interchange active modes upgrade is as shown in **Figure 106**.

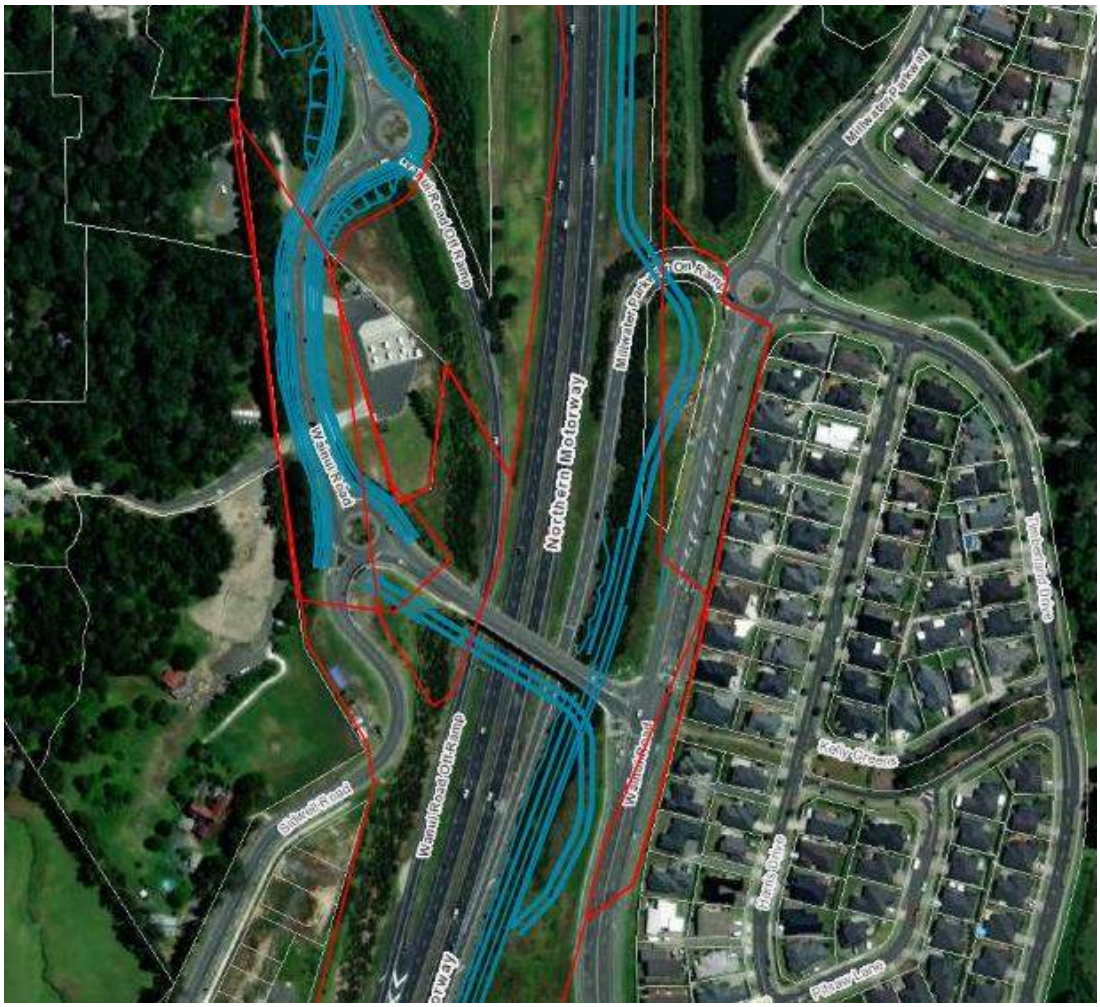



**Figure 106: Wainui Interchange Active Modes Upgrade preferred route**

## 9.9 SH1 Interchanges

### 9.9.1 IBC to DBC gap analysis

The IBC considered a number of upgraded and new interchange options between Bawden Road and Grand Drive. The IBC included options for interchanges at four discrete locations (Silverdale, Spur Road, Wilks Road and Redvale), with various arrangements (full movements or only south facing ramps) and combinations of the options. The recommended interchanges (refer Figure 107) included the following:

- **New Wilks Road interchange with south facing ramps only (IC4-1) -** Linked to this option, the IBC also selected an option to upgrade Wilks Road bridge over SH1 for active modes (EW10-1).
- **Redvale (Ō Mahurangi Penlink) full interchange (IC5-1) -** This option would require a change to the form and footprint of the already designated Ō Mahurangi Penlink interchange which provides for south-facing ramps only i.e. north-facing ramps will be added.
- **Silverdale interchange capacity upgrade (IC7-1)** – including additional northbound off-ramp capacity, additional east-west movement and changes to intersections. Linked to this option, the IBC also selected an option to provide an active mode crossing at Silverdale interchange (EW6-1).

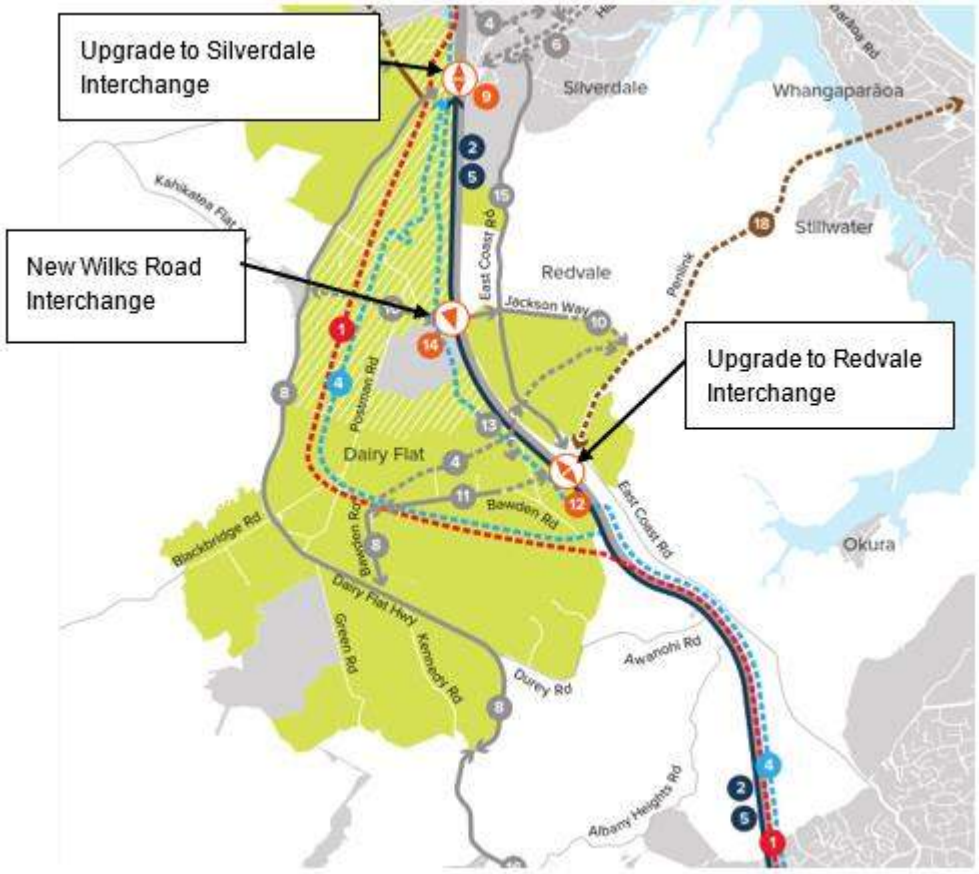



**Figure 107: IBC recommended options for SH1 Interchanges**

For all three interchanges, the IBC noted the form and operation of the interchange connections was yet to be determined. Potential options included general traffic access or managed access (e.g. bus, freight).

A new Wilks Road Interchange (IC4-1) was preferred over other options because:

- south-facing ramps were seen to be critical to enabling development of the proposed Silverdale West / Dairy Flat business/industrial area.
- traffic modelling and investigations demonstrated improved levels of access when two sets of south-facing ramps are provided (i.e.: Redvale/Ō Mahurangi Penlink and an additional site), which was reflected by a fivefold increase in benefits over ramps at Redvale alone.

The IBC records that only one set of additional north-facing SH1 ramps in the network are required to service future demand.

The Redvale (Ō Mahurangi Penlink) full interchange (IC5-1) was selected as:

- North-facing ramps were predicted to be most effective at that location as this would minimise impacts on longer distance (strategic) traffic movements, including freight.
- A combination of south-facing only ramps at Wilks Road and a full interchange at Redvale (Ō Mahurangi Penlink) would provide good benefits to the wider and more local communities (existing and future) seeking access to the SH1 strategic network.

For the purposes of the IBC, it was assumed that the Motorway Service Centre (MSC) off SH1 just south of the Wilks interchange on the western side could be removed or relocated prior to these options being implemented, considering the centre is located within the FUZ.

A Silverdale interchange capacity upgrade (IC7-1) was preferred because:

- It has good benefits in enabling development in the short term (pre-Ō Mahurangi Penlink) and catering for cross connectivity in the longer term.
- These improvements would service an important existing and future connection between communities.
- The interchange is already at capacity; therefore, an upgrade is critical prior to development of the new business/industrial area within the FUZ.

An IBC to DBC Gap Analysis was undertaken at the start of the DBC phase. No gaps were identified for the SH1 Interchange projects i.e. the indicative corridor optioneering was considered sufficient to progress to DBC. However, near the start of the DBC, a change in assumption was identified around the MSC, which is located in between the Redvale and Wilks interchanges. Following engagement with Waka Kotahi it was confirmed that the MSC should be assumed to be retained in future and hence the project team should test the ability to retain access to this service centre in between the Redvale and Wilks interchanges. This factor was considered as part of the DBC optioneering process.

The gap analysis also noted that there are interconnections with other projects that need further consideration at the DBC phase including  the other SH1 Improvements Package projects (all interchanges), the Upgrade to Dairy Flat Highway (for Upgrade to Silverdale interchange), the Upgrade and Extension to Bawden Road (for Upgrade to Ō Mahurangi Penlink Interchange), Upgrade to East Coast Road (for Upgrade to Ō Mahurangi Penlink Interchange and New Wilks Interchange), New Connection between Dairy Flat Highway and Wilks Road (for New Wilks Interchange).

It was also noted that the DBC optioneering should consider the new NPSs, including the NPS:FW and NPS:UD (as discussed in Part A).

### 9.9.2 DBC optioneering process

DBC option development for the interchanges followed the following steps:

- **Interchange spacing option development** - focusing on consideration of high level Wilks and Ō Mahurangi Penlink (Redvale) interchange arrangement options that enable access to the MSC to be retained in future.
- **Interchange form option development** – undertaken for all three interchanges. This included options for which side of the interchange active mode bridges should locate.
- **Detailed Corridor (Site) Assessment** i.e. Interchange **location** option development – for the purpose of full MCA of Wilks Road interchange location options. This step was only considered necessary for the New Wilks Interchange as the location of the other interchanges is fixed i.e.

Silverdale interchange already exists, and the next interchange to the south is fixed in its future location as the Ō Mahurangi Penlink (Redvale) Interchange designation is in place and interchange works were expected to commence construction in 2022.

For the purposes of DBC option development, the SH1 interchanges study areas were defined as per Figure 108, Figure 109 and Figure 110. These locations aligned with the recommended indicative locations in the IBC. However, the Wilks interchange study area was larger as this comprises a new interchange. An additional factor was the spacing of the Wilks interchange ramps relative to the Ō Mahurangi Penlink (Redvale) Interchange and how to retain access to the MSC. The other two interchanges are fixed in location, and hence the study areas were limited to those locations.

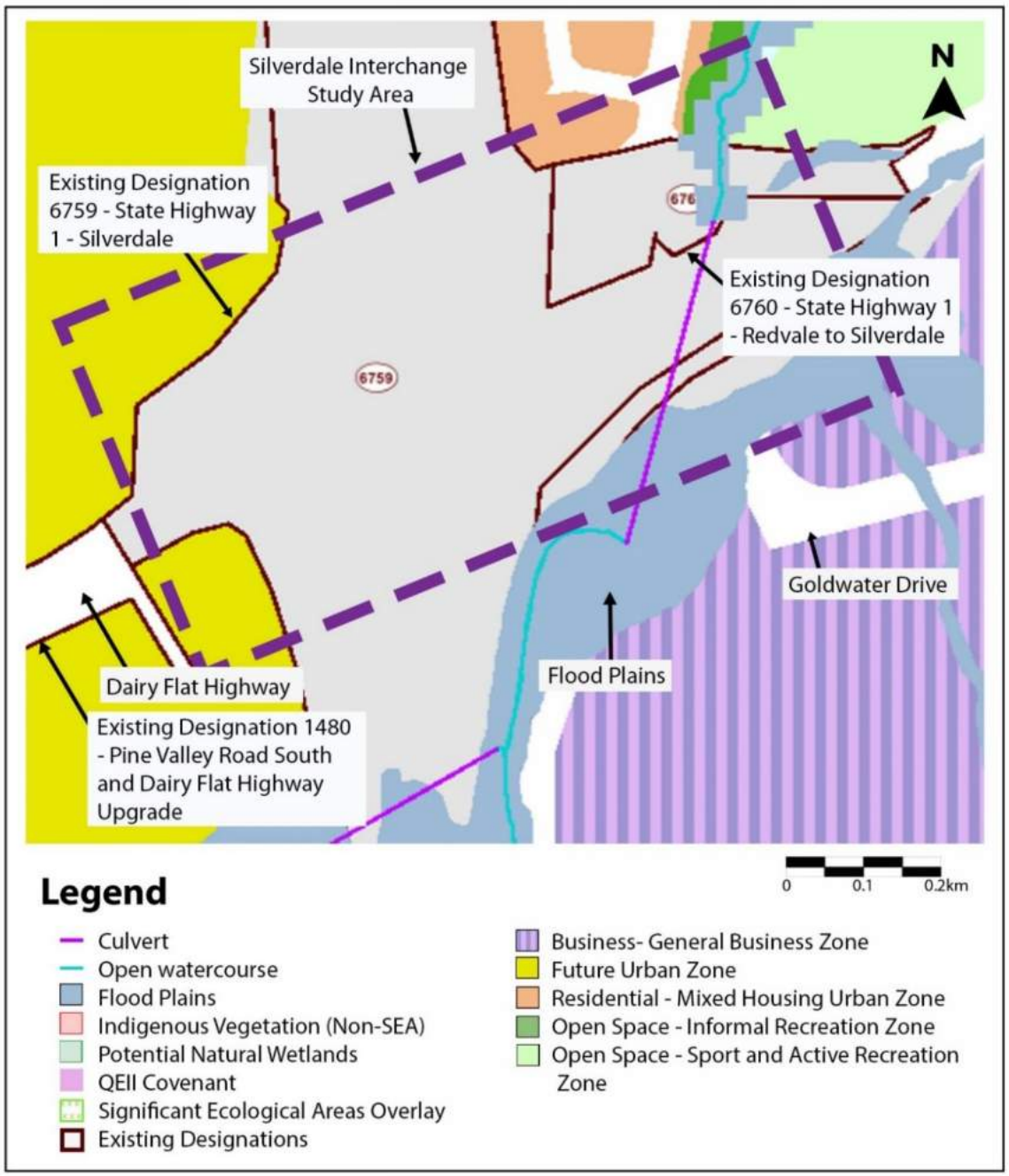



**Figure 108: Silverdale interchange key features and study area**

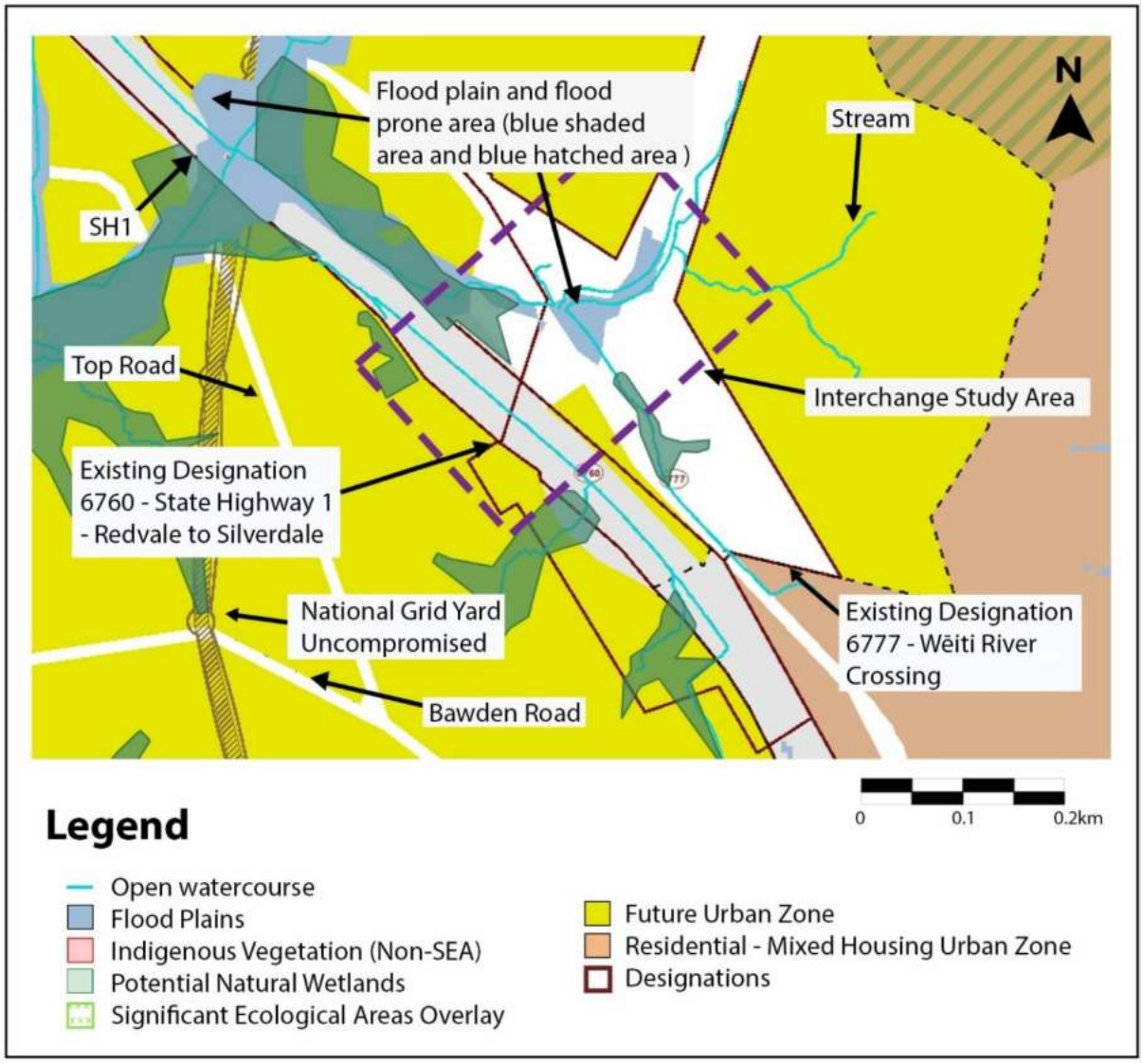



**Figure 109: Ō Mahurangi Penlink (Redvale) Interchange key features and study area**

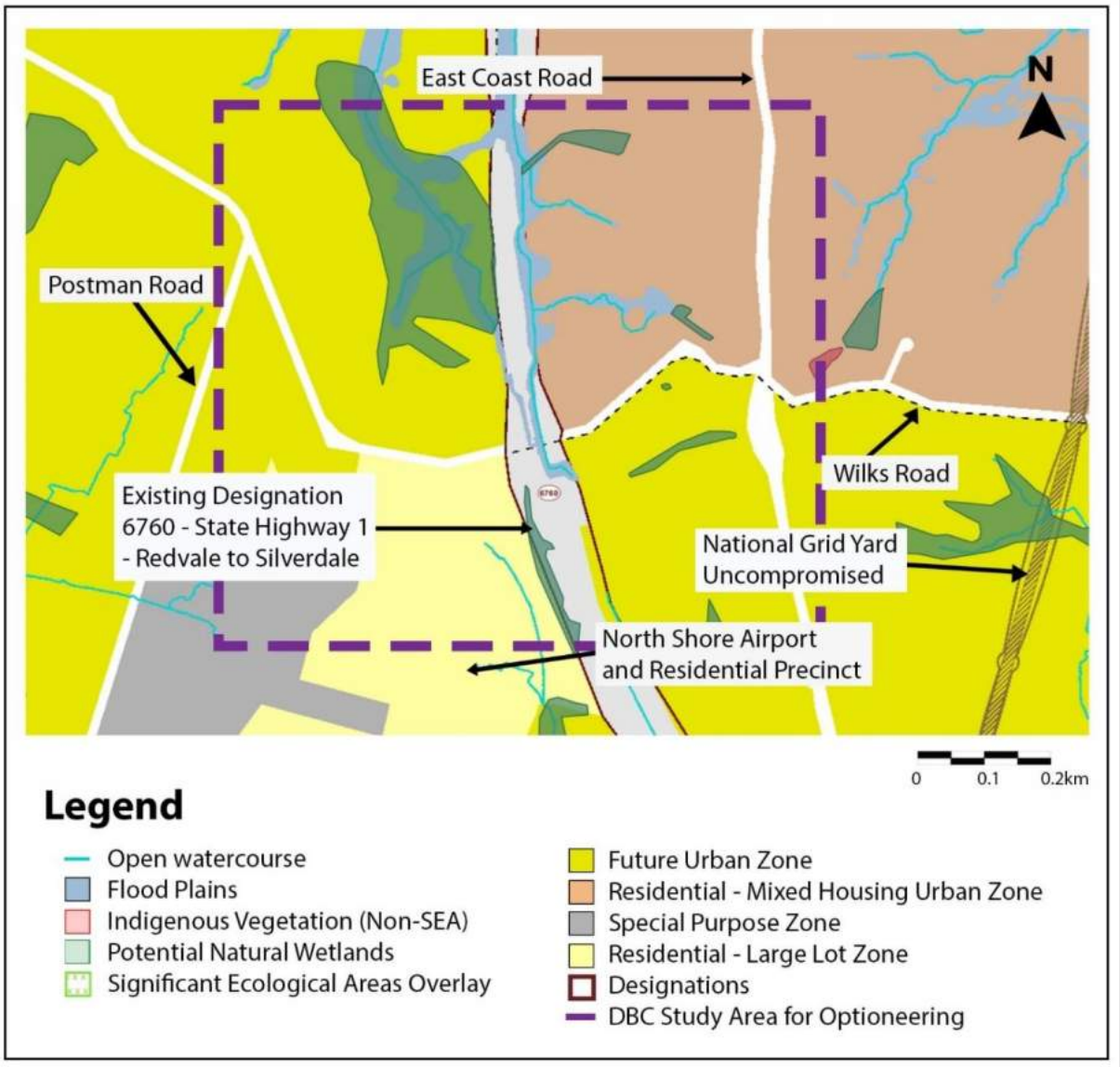
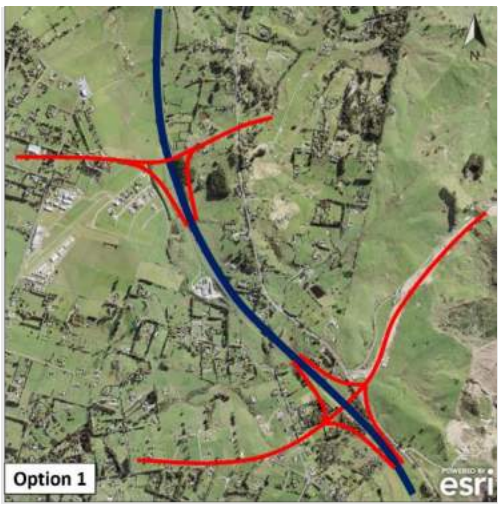
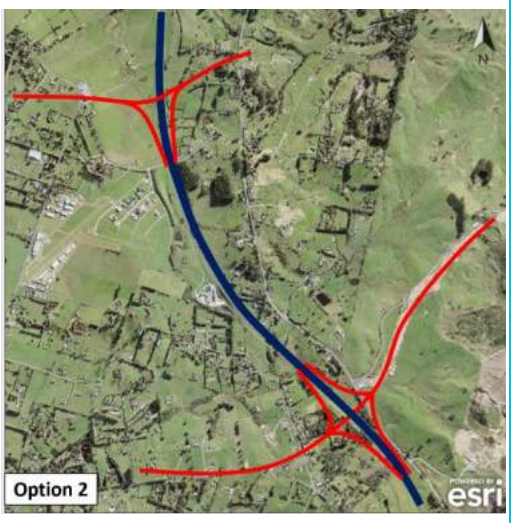


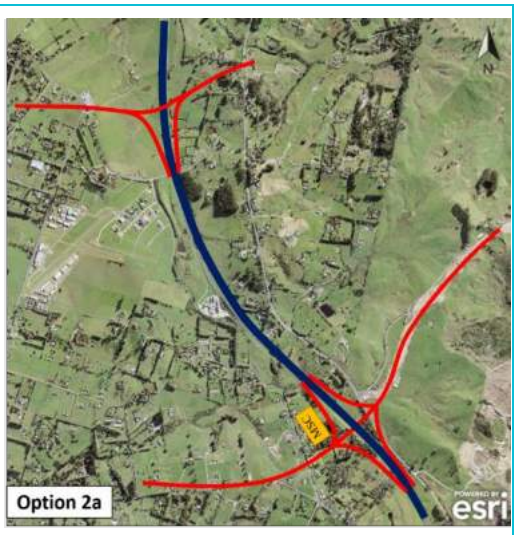
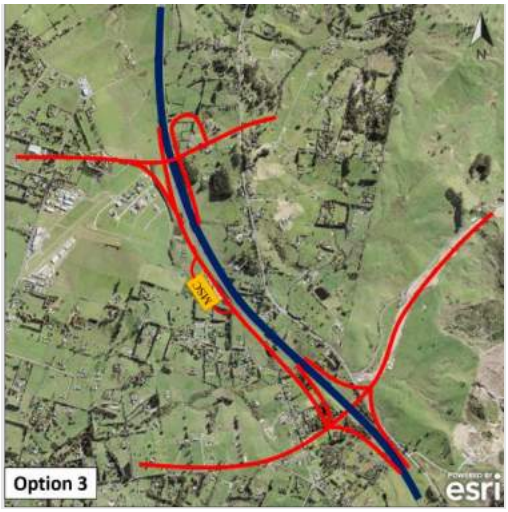
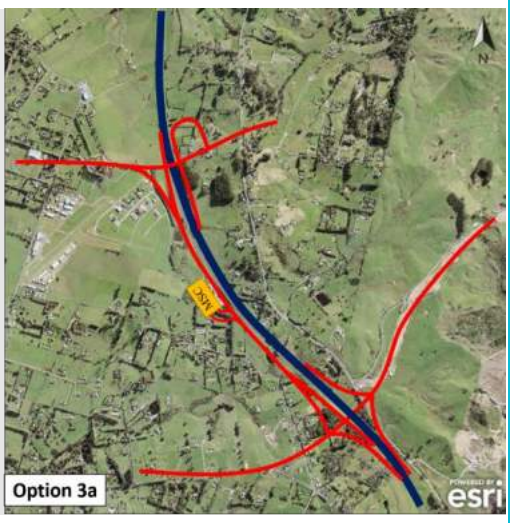

**Figure 110: Wilks interchange key features and study area**

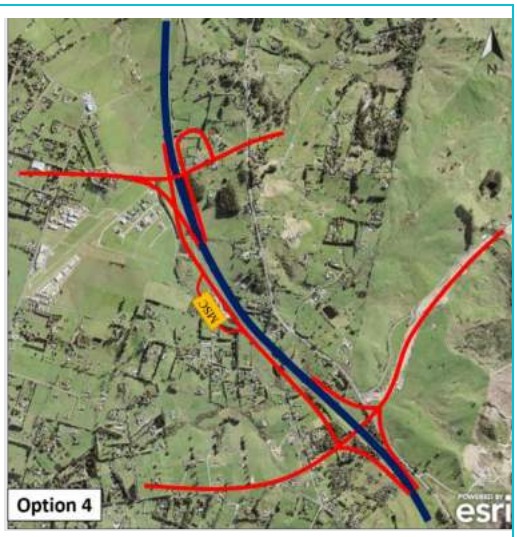
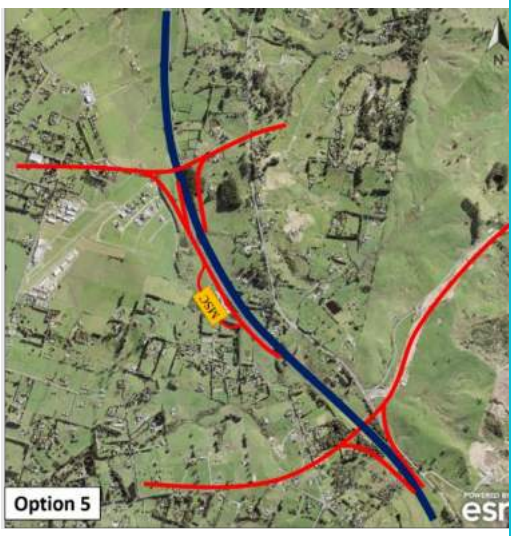
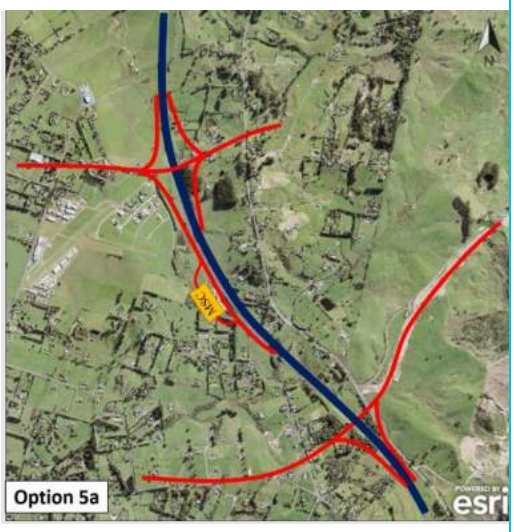
The sections below describe options that were developed at each step.

### 9.9.3 Interchange spacing assessment for Wilks and Redvale – including options that retain access to MSC

Multiple interchange spacing options were developed for the New Wilks Interchange and Upgrade to Ō Mahurangi Penlink (Redvale) Interchange as shown in **Figure 111**. Some of these enabled access to the MSC to be retained in future, as requested by Waka Kotahi.

| | |
|---|---|
| Option 1: Full Ō Mahurangi Penlink (Redvale) Interchange+ Wilks Road interchange – South (south facing ramps only) (Option W20_SH-04). No MSC connection is provided |  |
| Option 1a: Full Ō Mahurangi Penlink (Redvale) Interchange + Wilks Road interchange – South (south facing ramps only) with relocated MSC (Option W20_SH-04). Relocated MSC connection is provided |  |
| Option 2: Full Ō Mahurangi Penlink (Redvale) Interchange + Wilks Road interchange – North (south facing ramps only) (Option W20_SH-05). (assumes removal of existing Wilks Road overbridge). No connection to the MSC is provided. |  |

| | |
|---|---|
| Option 2a: Full Ō Mahurangi Penlink (Redvale) Interchange + Wilks Road interchange – North (south facing ramps only) with relocated MSC (Option W20_SH-05). (assumes removal of existing Wilks Road overbridge). Relocated MSC connection is provided |  |
| Option 3: Full Ō Mahurangi Penlink (Redvale) Interchange + Wilks (South interchange) with Slower Speed service road in NB direction. Maintains access to MSC |  |
| Option 3a: Full Ō Mahurangi Penlink (Redvale) Interchange + Wilks (South interchange) with Slower Speed service road in NB direction. Wilks Road is separated from Ō Mahurangi Penlink (Redvale) Interchange. Maintains access to MSC |  |

| | |
|---|---|
| Option 4: Full Ō Mahurangi Penlink (Redvale) Interchange + Wilks (South interchange) (south facing ramps only) with MSC via a slower speed service road. Wilks Road remains separate via grade separation. Maintains access to MSC. |  |
| Option 5: No Redvale north facing ramps. Wilks (South interchange) and MSC via a slower speed service road. Maintains access to MSC. |  |
| Option 5a: No Redvale north facing ramps, full interchange at Wilks (South interchange) with MSC via NB offramp. Maintains access to MSC. |  |

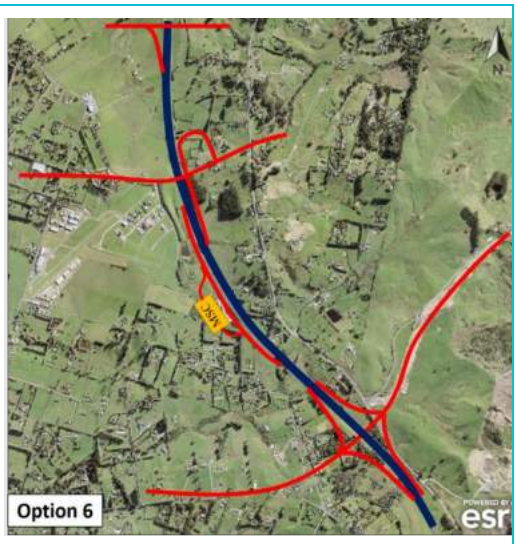
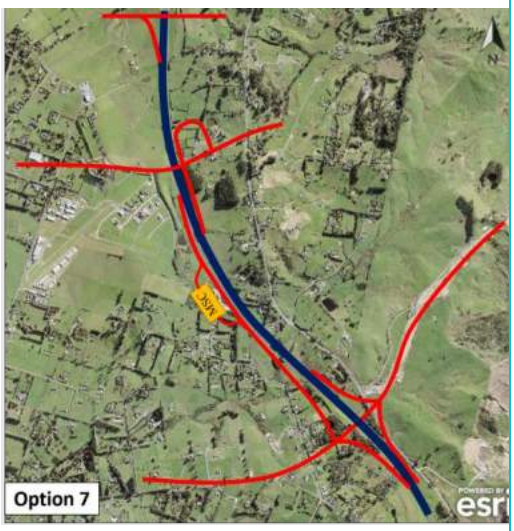
| | |
|---|---|
| Option 6: Full Ō Mahurangi Penlink (Redvale) Interchange + Wilks Road split interchange (south facing ramps only) and MSC. Maintains access to MSC via separate access. |  |
| Option 7: Full Ō Mahurangi Penlink (Redvale) Interchange + Wilks Road (South interchange) split interchange (south facing ramps only). MSC together and Wilks separate. Maintains access to MSC via Redvale. |  |

**Figure 111: Interchange spacing options for Wilks and Ō Mahurangi Penlink (Redvale) Interchange, including options that assume retention of access to MSC**

For this assessment, a targeted MCA process, focusing on the key likely differentiators between the spacing options. This included qualitative analysis of the options with input from transport planning and planning specialists. An initial sieve of the options revealed Options 1A, 2a and 6 were not feasible.

The remaining options were scored against the following criteria from the Programme-wide MCA framework:

- Investment objective on Access: Improve productivity of the SH1 corridor between Albany and Silverdale
- Investment objective on Resilience: Improve reliability and resilience of the SH1 corridor between Albany and Silverdale for general vehicles and freight.
- Investment objective on Integration: Integration with both the transport network and the timing and pace of development in the area.
- Investment objective on Mode Choice: Support the transition to a reduced reliance on single occupancy vehicle (SOV) travel from both existing areas and Future growth areas.

- User Safety 5b: Extent of safety effects on all transport users.
- Land use futures 2a: Impact on the future development of land (within the corridor, adjacent to it and impacted by it).
- Construction impacts: 5a. Construction impacts on utilities / infrastructure.
- Non-scored: Value for money.

**Table 49** provides a summary of option scores against the assessment criteria. No weighting has been applied to the various criteria assessed.

**Table 49: Summary of Targeted MCA assessment – Interchange Spacing assessment**

| MCA Criteria | Option 1 | Option 2 | Option 3 | Option 3a | Option 4 | Option 5 | Option 5a | Option 7 |
|---|---|---|---|---|---|---|---|---|
| Investment Objective 1: Access | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 3 |
| Investment Objective 2: Resilience | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 |
| Investment Objective 3: Integration | 2 | 3 | 2 | 3 | 3 | 2 | 2 | 1 |
| Investment Object 4: Mode choice | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Transport | 0 | 1 | -1 | 1 | 1 | 0 | 1 | 0 |
| Construction impacts | -2 | -1 | -2 | -2 | -2 | -2 | -2 | -2 |

The outcome of this analysis was that the following option was recommended for further investigation in the DBC:

- **Option 3a** – as it provides the optimal overall performance for options which retain access to the MSC and provides a conservative footprint to accommodate access to the MSC.

Option 4 also scored well but was discounted as it does not provide as much future flexibility for access to the MSC as Option 3A.

Options 1 and 2 were discounted as they do not retain access to the MSC.

At this point in the assessment, Option 3a had not been tested through the full MCA process – this analysis is described below.

### 9.9.4 Interchange form assessment (all three interchanges)

All three interchanges then went through an option development and assessment process to determine a preferred configuration for each interchange. The configuration options considered were:

- Roundabouts (usually this occupies a larger footprint than traffic signals, but has a similar footprint to gyratory) – refer the example in **Figure 112**.

- Gyratory (which usually has a similar footprint to roundabouts) – refer the example in **Figure 113**.
- Traffic signals (usually this occupies the smallest footprint) – refer the example in **Figure 114**.

Additionally, as part of the configuration option development, the appropriate form of active mode provision (at-grade / grade separated) was identified. Options for grade separated active mode connections across SH1 were also considered:

- Active mode connection on the **north side** of the interchange.
- Active mode connection on the **south side** of the interchange.
- Active mode connections on **both sides** of the interchange.


**Figure 112: Greenlane Interchange - Roundabout Example**

**Figure 113: Waikato Expressway / Te Rapa Road Interchange – Gyratory Interchange Example**


**Figure 114: Te Atatu Interchange - Signalised Example**

In assessing the interchange configurations, Te Tupu Ngātahi programme followed a process to determine the intersection configuration which considered an appropriate response to the transport and land use context. This was supplemented by urban design and engineering inputs. There is an inter-relationship between the configuration of the interchange and its associated intersections and the appropriateness of providing for active modes at the interchange. Once the interchange configuration was identified, the appropriate active modes response was reviewed.

In assessing options, the Project Team considered the recommended interchange configuration in addition to considering the form of active mode provision.

The outcomes of the configuration assessments are summarised in **Table 50** below.

**Table 50: Assessment summary for the interchange configurations (applies to all three interchanges)**

| Option | Commentary | Preferred Option |
|---|---|---|
| **Roundabouts** | • Equally preferred from an operational perspective as gyratory – preferred over traffic signals.<br>• Selection of roundabouts or a gyratory with grade separated active modes would provide flexibility in the footprint to accommodate future signalisation, if necessary.<br>• Potential for vehicles to use roundabouts for u-turning which is an adverse outcome. | ☒ |

| Option | Commentary | Preferred Option |
|---|---|---|
| **Gyratory** | • Equally preferred from an operational perspective as roundabouts – preferred over traffic signals.<br>• Selection of roundabouts or a gyratory with grade separated active modes would provide flexibility in the footprint to accommodate future signalisation, if necessary.<br>• A 'gyratory' configuration preferred overall, as this removes the potential for re-circulating (u-turning) vehicles that can be associated with roundabouts. | ✔ |
| **Traffic signals** | • Less preferred than roundabouts and gyratory configurations from an operational perspective.<br>• Less opportunity to accommodate roundabout or gyratory configurations within a traffic signal designated footprint. | ✘ |

The preferred option for each interchange configuration was a **gyratory configuration** because this offers the largest footprint, enabling flexibility in the future design of each interchange, as well as avoiding the potential for vehicles to use the interchange for u-turning purposes.

Once the general configuration of the interchanges was identified, the appropriate form of active mode provision (at-grade / grade separated) was identified. This also considered whether provision should be provided on one or both sides of the interchange.

For gyratory interchanges, grade separation of active modes (bridges) was recommended for interchange arrangements where active modes need to cross roads as they travel through the interchange. This is for safety reasons and attractiveness of the connections i.e. bridges provide the safest option for active modes by removing conflict with vehicles and enabling uninterrupted journeys. Also, removing active modes from intersections enhances the safety and efficiency for all users travelling through the interchange, by removing signal crossing times.

The number and location of the active mode bridges at each interchange was then considered, as summarised in **Table 51** below, including the preferred options and reasoning.

**Table 51: Assessment summary for active mode bridge connection locations**

| Option | Commentary | Preferred Option |
|---|---|---|
| **Upgrade to Silverdale Interchange – active mode bridge options** | | |
| **North side of main interchange** | • This option doesn't provide an efficient and safe connection for active mode users using the cycle facilities that are anticipated to exist on both the northern and southern sides of Dairy Flat Highway and Hibiscus Coast Highway. | ✘ |
| **South side of main interchange** | • This option doesn't provide an efficient and safe connection for active mode users using the cycle facilities that are anticipated to exist on both the northern and southern sides of Dairy Flat Highway and Hibiscus Coast Highway. | ✘ |

| Option | Commentary | Preferred Option |
|---|---|---|
| **Both sides side of main interchange** | • There are currently limited east-west connections between Dairy Flat Highway and Silverdale. The next point where an east-west connection can be provided is at the Wilks Road Interchange, approximately 3km south of the Silverdale Interchange. Dairy Flat Highway and Silverdale serve a large catchment of both residential and employment areas. Facilitating active mode movements between these two key areas is vital for supporting the planned growth within them. This will ensure that this growth is sustainable in the future.<br>• There are expected to be future active mode facilities on both the northern and southern sides of Dairy Flat Highway and Hibiscus Coast Highway to facilitate movement both along and across each of these respective corridors. Providing connections on both sides of the Interchange will enable safe, legible and continuous active mode connections between these two growth areas. This is important to encourage the uptake of active modes, particularly for short to medium distance trips that would otherwise occur through private vehicle use without appropriate and attractive alternatives.<br>• Given engineering and environmental constraints on the western side of SH1 (south of the Interchange), there is a need for the New Walking and Cycling Path along SH1 to cross from the western side (south of the interchange) to the eastern side (north of the interchange). Providing a connection from this point is necessary to support the residential land use on this corner of the Silverdale Interchange.<br>• The Hibiscus Coast Bus Station (Park and Ride) is expected to remain in place within Silverdale for the foreseeable future – at least until the main RTC is operational. The station is a significant attractor within the area and is anticipated to attract trips from the adjacent FUZ on the western side of the Interchange. Therefore, providing a continuous active mode connection on the southern side of the Interchange is vital for supporting last mile trips (via active modes) between the Bus Station and urban land use on the west. This is necessary for supporting wider mode shift and accessibility goals within the North. | ✔ |
| **New Wilks Road Interchange – active mode bridge options** | | |
| **No bridge – at grade** | • As this interchange is south-facing ramps only, active modes may not need to cross roads through the interchange – depending on the arrangement selected (i.e., they can travel on northern side and ramps on south side) | ✔ (if active modes **do not** need to cross roads through interchange) |
| **North side of main interchange** | • This option is preferred as it is located further away from the existing North Shore Airport facility. Additional bridge structures (and the height associated with them) are a potential hazard for planes landing and departing from the airport. In addition, providing a facility on the northern side, would avoid the south-facing ramps for the Interchange. | ✔ (if active modes **do** need to cross roads through interchange) |

| Option | Commentary | Preferred Option |
|---|---|---|
| **South side of main interchange** | • A bridge on the southern side of the interchange would impact access onto Aeropark Drive and is therefore not preferred. | ☒ |
| **Both sides side of main interchange** | • A bridge on the southern side of the interchange would impact access onto Aeropark Drive and is therefore not preferred. | ☒ |
| **Upgrade to Ō Mahurangi Penlink (Redvale) Interchange – active mode bridge options** | | |
| **North side of main interchange** | • This option would not directly connect to the proposed Ō Mahurangi Penlink shared path (the Ō Mahurangi Penlink path will be located on the southern side of the interchange). | ☒ |
| **South side of main interchange** | • This option would directly connect to the Ō Mahurangi Penlink shared path (which will be on the southern side of the interchange) – and hence is preferred | ✓ |
| **Both sides side of main interchange** | • Only the southern bridge would connect to the Ō Mahurangi Penlink shared path. The northern side would not connect to an active mode facility. Therefore, this option is not preferred. | ☒ |

### 9.9.5 Detailed corridor (site) assessment (New Wilks Interchange location options)

The Project Team developed three options for the location of the Wilks Road interchange as part of the interchange location route refinement process. All three options included a connection across to East Coast Road, assumed a gyratory interchange configuration and enabled access to the MSC.

In developing options for the Wilks Road interchange location, the Project Team considered the following known key features in the area. These are mapped in Figure 110 above and include:

- Areas of potential natural wetland, streams, floodplains and flood prone areas.
- Unstable geology (northland allochthon).
- Steep topography to the east.
- North Shore Airport and adjacent residential precinct to the south-west.
- The MSC to the south-west along SH1.
- A pocket of Countryside Living zone land to the north-east, which is not expected to change in future and includes some businesses and residences.
- FUZ land to the west and south-east- the FUZ to the north is structure planned as future industrial, while FUZ to the south-east is expected to be future urban residential (not structure planned).
- Existing Wilks Road bridge over SH1 and Wilks Road connection to East Coast Road – significant opportunity to use existing road corridor -although this road has safety issues due to an unsafe bend and steep grades.

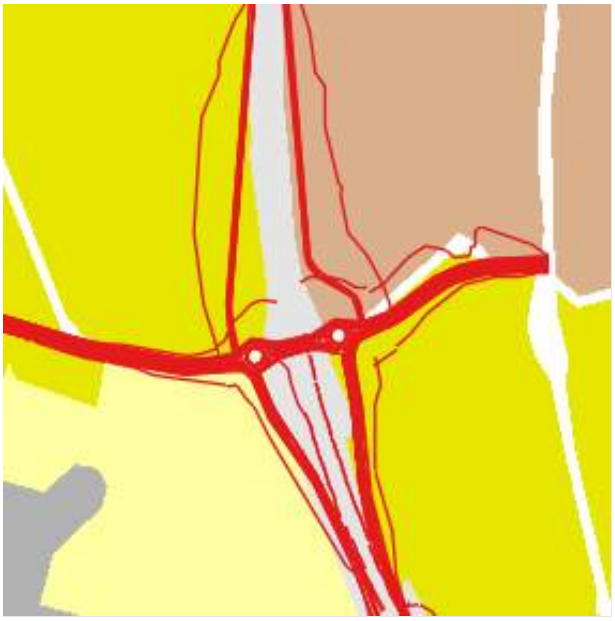
- The spacing of the Wilks Road interchange to the proposed upgraded Ō Mahurangi Penlink (Redvale) Interchange and adequacy of this spacing for safe weaving movements to occur.
- A culturally significant puke.

In consideration of the above factors, three options were developed for the Wilks Road interchange through route refinement for the purposes of full MCA, as outlined in **Table 52** and **Figure 115** below.

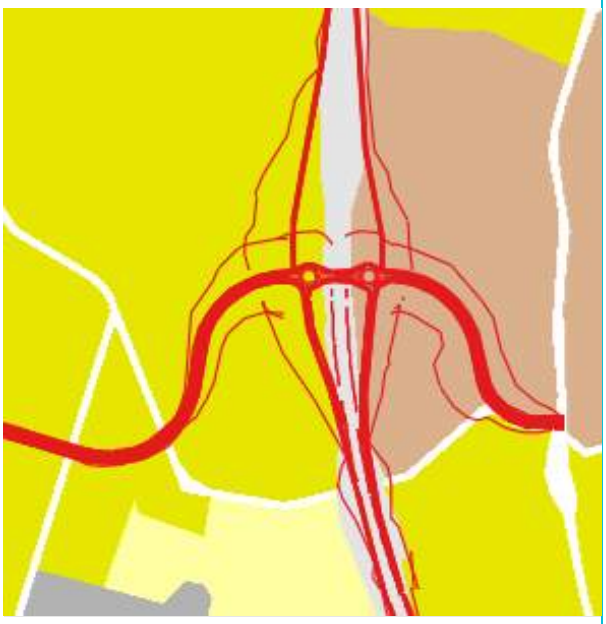
**Table 52: Summary of Wilks Road interchange location options**

| Option Reference | Option Name | Description |
|---|---|---|
| Option A | SH-04 | Wilks Road interchange – South. (at location of existing Wilks Road bridge) |
| Option B | SH-05 | Wilks Road interchange – North. (Assumes removal of existing Wilks Road overbridge) |
| Option C | SH-12 | Wilks Road interchange – South with loop onramp and realigned connection with East Coast Road.<br>Note: This option with a south loop onramp was designed to increase the merge distance (relative to Option A) between this new interchange southbound ramps and the Ō Mahurangi Penlink northbound ramps to the south (recognising that this may slightly improve the user safety outcome). |
| Option D (variant of Option A)(not in GIS) | SH-04B | Variant of Option A: but with max gradients on Wilks to East Coast Road connection plus addition of a roundabout at East Coast Road and a minor realignment of Jackson Way. Allows for lower bridge over SH1 and less earthworks |
| Option E (variant of Option A) | SH-04C | Variant of Option A – but with more southern connection to East Coast Road. Allows for lower bridge over SH1 and less earthworks around interchange. East Coast Road connection seeks to avoid a culturally significant site on East Coast Road and allow maximum grades to be applied to minimise overall earthworks. |

**Option A: W20_SH-04 (Wilks Road interchange South)**



**Option B: W20_SH-05 (Wilks Road interchange North)**



**Option C: W42_SH-12 (Wilks Road interchange south with loop onramp)**

**Option E: W68_SH-04C (Variant of Option A)**

**Option D: SH-04B (Variant of Option A)**

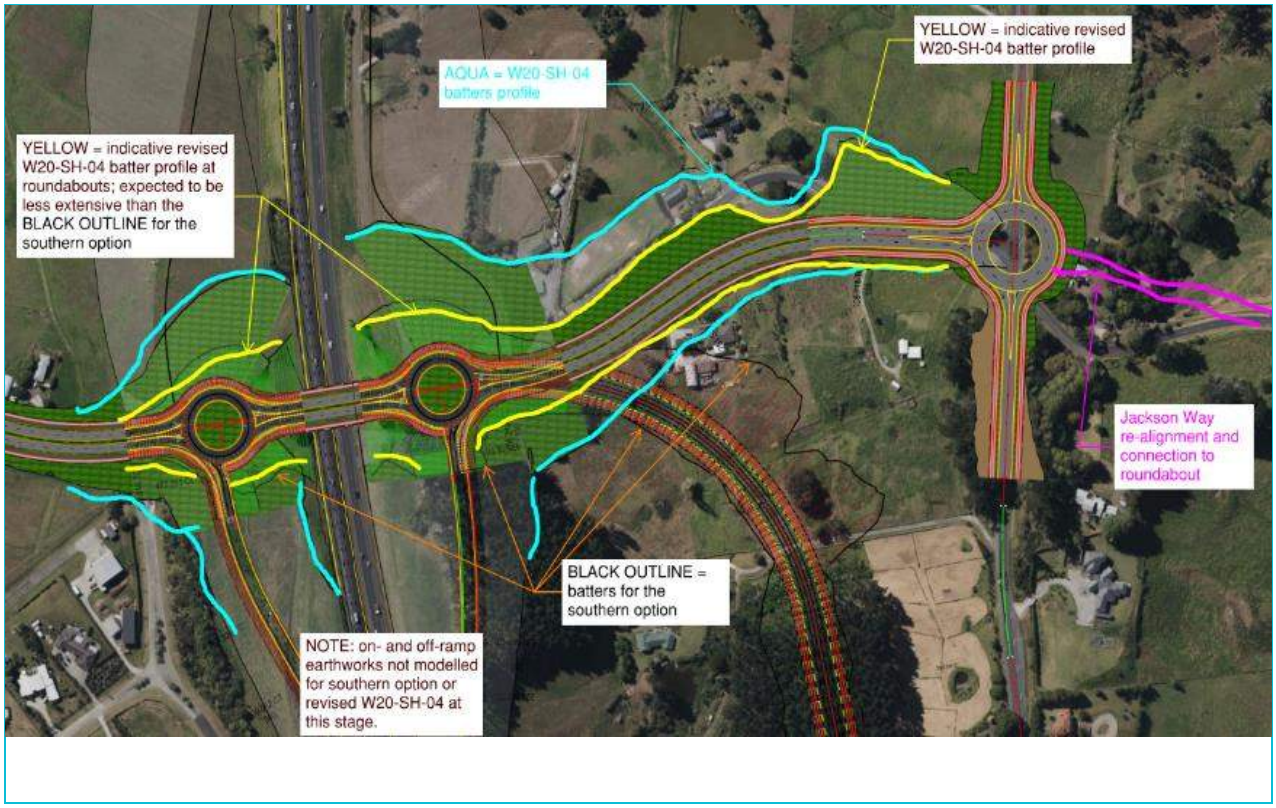



**Figure 115: Options for the Wilks Road Interchange locations as designed within the SGA GIS viewer**

Options for the location of the Wilks Road interchange were assessed use the Programme-wide MCA Framework - against the Investment Objectives and criteria within four well-beings, cultural, social, environmental and economic. Technical specialists engaged in MCA workshops to undertake an assessment, scoring each option on a gradual scale from 'Very High Adverse Effect' (red) to 'Very High Positive Impact' (green).

**Table 53** below identifies the outcomes from this assessment.

**Table 53: Summary of Wilks Road Interchange MCA scoring**

| MCA Criteria | Option A (W20_SH-04) | Option B (W20_SH-05) | Option C (W42_SH-12) | Option D (SH-04B) (Option A variant) | Option E (W68_SH-04C) (Option A variant) |
|---|---|---|---|---|---|
| Investment Objective 1: Access / Integration | 3 | 3 | 3 | 3 | 3 |
| Investment Objective 2: Resilience | 3 | 3 | 3 | 3 | 3 |
| Investment Objective 3: Integration | 2 | 2 | 2 | 2 | 2 |
| Investment Objective 4: Mode choice | 0 | 0 | 0 | 0 | 0 |
| 1a. Heritage | -1 | -1 | -1 | -1 | -1 |
| 2a. Land use futures | -1 | -3 | -2 | -1 | -1 |
| 2b. Urban design | 0 | -2 | -1 | 0 | -1 |
| 2c. Land requirement | -1 | -1 | -1 | -1 | -2 |

| | | | | | |
|---|---|---|---|---|---|
| 2d. Social cohesion | -1 | -3 | -2 | -1 | -1 |
| 2e. Human health and wellbeing | -3 | -2 | -3 | -3 | -3 |
| 3a. Landscape / visual | -2 | -3 | -3 | -3 | -2 |
| 3b. Stormwater/flooding | -1 | -2 | -1 | -1 | -1 |
| 3c. Ecology | -2 | -3 | -2 | -2 | -2 |
| 3d. Natural hazards | -1 | -1 | -1 | 0 | -1 |
| 4b. Transport - User safety | 1 | 1 | 1 | 1 | 1 |
| 5a. Construction impacts on utilities / infrastructure | -2 | -2 | -2 | -1 | -1 |
| 5b. Construction disruption | -3 | -3 | -3 | -3 | -3 |
| 6a. Construction costs / risk / | -2 | -3 | -2 | -2 | -2 |

The Project Team reviewed and compared the options identified above and noted that matters relating to land use futures, urban design, land requirement, social cohesion, human health and wellbeing, landscape/visual, stormwater/flooding, ecology, natural hazards and construction impacts/risk are the key considerations for this segment and showed differentiation between the options. There was no difference between the options in relation to investment objectives (transport outcomes), with all options scoring positively.

The assessment included a Transport- User Safety criterion (4b) in order to assess whether there was a user safety difference due to differences in southbound onramp merge spacing between this new interchange and the Ō Mahurangi Penlink interchange further south i.e. Option B would provide the greatest merge spacing, and Option C would provide a slightly greater spacing for southbound movements relative to Options A, D or E. The assessment showed that all options scored minor positive for transport user safety and the differences in merge spacing was not a differentiator in terms of user safety scoring. The positive scores reflect that all options provide local safety benefits by reducing the need for trucks to travel on local roads through adjacent residential areas.

In relation to non-scored criteria:

- For Policy Analysis, Option B was the least preferred as it may place pressure on the Rural Urban Boundary and also had the greatest effect on freshwater features including John Creek. The other options generally align with the policy framework.
- Manawhenua who stated a preference, confirmed their preference for Option D.
- For Value for Money, Option D was the most preferred as it has the smallest amount of earthworks overall and similar benefits to the other options.

Accordingly, the Project Team identified **Option D – SH-04B** (New Wilks Interchange at location of current Wilks Road overbridge, with maximum grades up to East Coast Road to reduce earthworks) as the preferred route refinement option for the following reasons:

a) Scores well against the investment objectives and transport user safety (although there was no difference between the options in relation to these criteria)
b) Scored optimally overall in relation to effects.
c) Option aligns with Manawhenua preferences (where stated)

d) Relative to the next optimal scoring option (Option A), the option narrows the earthworks footprint and lowers the interchange (this improves value for money, reduces effect on Countryside Living properties north of Wilks Road (east of SH1) and avoids need for a separate active mode bridge)
e) Option preferred from a value for money perspective.

Option A (SH-04) Wilks Road interchange – South was discounted by the Project Team for the following reasons:

a) As explained above, relative to the preferred Option D, this option had a larger earthworks footprint and a higher interchange, which meant a less positive value for money outcome, a greater effect on Countryside Living properties (and the associated existing community) and the need for a separate active mode bridge to cross the interchange from east to west.

Option B (SH-05) Wilks Road interchange –North was discounted by the Project Team for the following reasons:

a) Option scored most adversely of all the options in relation to a number of criteria including land use futures, urban design, social cohesion, ecology and construction cost/risk. Key issues highlighted in the MCA included severance of Countryside Living Zone land on the north-east side of the interchange and severance of future industrial FUZ land on the north-west side (due to location of the interchange away from the existing Wilks Road alignment), and encroachment into John Creek and its floodplain on both sides of SH1.

b) Option was least preferred from a Policy perspective due to the potential freshwater ecology effects, and because it may place pressure on the Rural Urban Boundary by locating the most works within the Countryside Living zone to the north-east of the interchange.

c) One of the least preferred options from a value for money perspective.

Option C (SH-12) Wilks Road interchange – South with loop onramp and realigned connection with East Coast Road was discounted by the Project Team for the following reasons:

a) This scored worse than Option D (and A) in relation to land use futures and social cohesion, recognising that the new loop ramp and realigned East Coast Road connection would cause severance effects on Countryside Living zoned land (and the existing community) which is not proposed to change land use in future.
b) Analysis of Transport user safety (criterion 4b) confirmed that the southbound loop onramp would only have a very minor improvement in user safety relative to the more direct southbound onramp designs of the other options.

Option E (SH-04C) Wilks Road interchange South with southern connection to East Coast Road was discounted by the Project Team for the following reasons:

a) This option is a variant of Option A but scored more adversely than both Option A and Option D in relation to urban design and land requirement. This recognised that like the preferred Option (Option D), the maximum gradients allowed for a lower interchange than Option A (which reduced earthworks close to the interchange); however the more southern connection to East Coast Road would affect more properties than either Option A or D. It would also create a pocket of FUZ to the north east of the alignment that is an awkward shape for future

development of the FUZ, and large amounts of earthworks would mean that it would be difficult to achieve an active interface with the corridor.

b) The option was assessed as having a poorer value for money outcome than Option A or D due to the increased earthworks and property required.

### 9.9.6 Consideration of DBC engagement

The proposed SH1 interchanges formed part of the DBC engagement in July-August 2022 as per Figure 116 below.

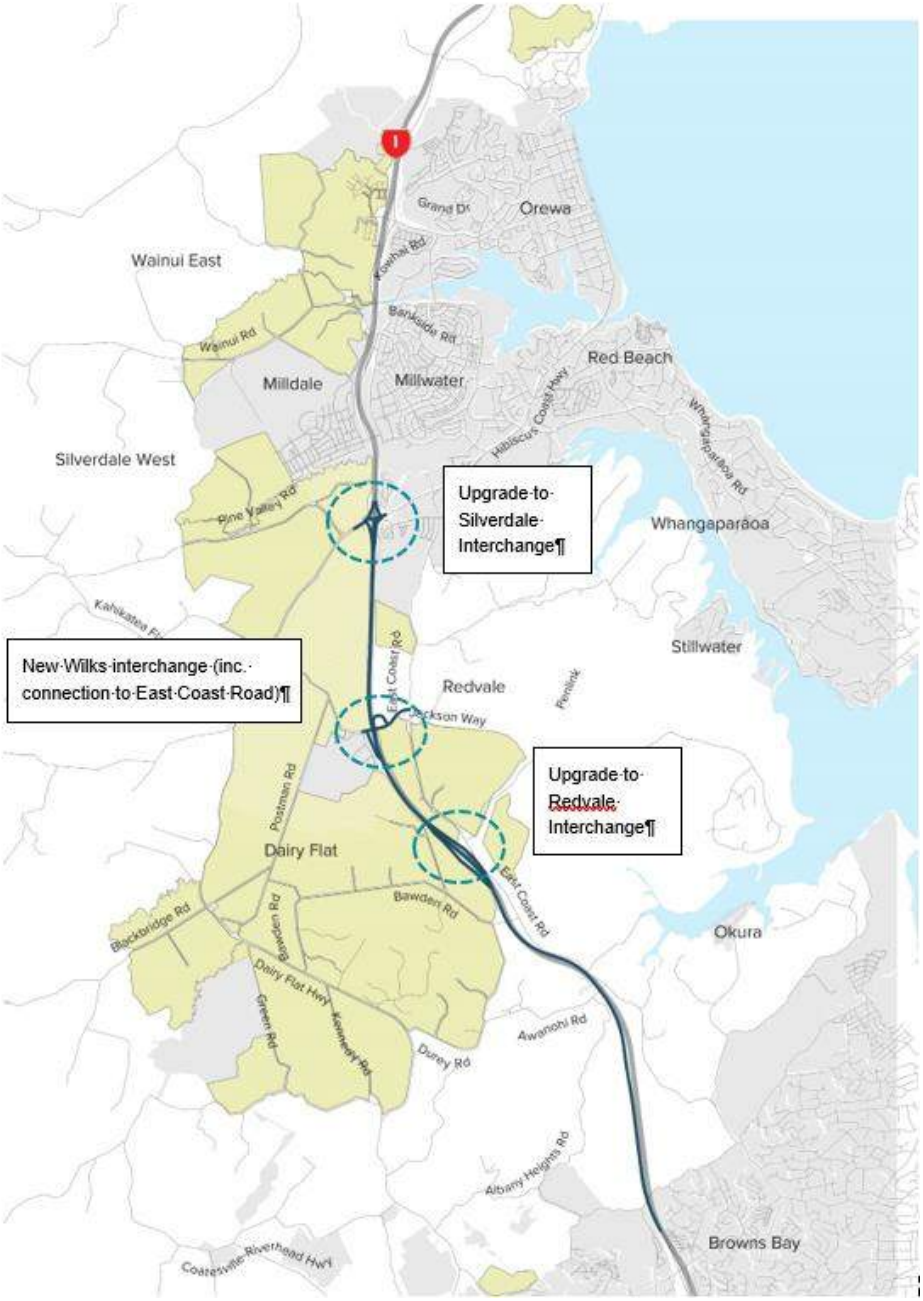



**Figure 116: DBC engagement SH1 Interchanges locations**

Generally, support was expressed for upgrades to the Silverdale interchange.

- One comment noted that Wilks interchange should also have north-facing ramps. In response, the Project team noted that this was considered at the IBC stage.

- Investigations showed that one additional set of north facing ramps would service demand and that these would be most effective at the Ō Mahurangi Penlink (Redvale) Interchange.
- Another comment suggested bringing forward the implementation of the Wilks Road Interchange. The scope of Te Tupu Ngātahi is focused on route protections and once that is in place, implementation can occur when funding is available.

Another comment expressed support for the inclusion of bus lanes on upgraded corridors and specifically around the Ō Mahurangi Penlink Interchange. In response, while the Ō Mahurangi Penlink project is outside the scope of Te Tupu Ngātahi, consideration will be given to buses in the ultimate design of the Ō Mahurangi Penlink (Redvale) Interchange.

Some comments noted that the loop ramp at Wilks Road is not suitable due to steep terrain, the fact that it appears to sever rural properties and that it generates additional noise and traffic. In response, the Project Team considered additional options that removed the need for a loop ramp and minimised earthworks and effects on Countryside Living land to the north of Wilks Road. The preferred route was amended in response to this additional assessment. The preferred option (**Option D – SH-04B** (New Wilks Interchange at location of current Wilks Road overbridge, with maximum grades up to East Coast Road to reduce earthworks)) avoids the need for a loop ramp and also minimises earthworks in the Countryside Living zone by maximising grades up to East Coast Road.

### 9.9.7 Design Refinement

The following design refinements were made:

**Upgrade to Silverdale interchange**:

- Geometric refinements to active mode connections to Dairy Flat Highway and Hibiscus Coast Highway from each active mode bridge.
- Refinements to minimise property effects outside the existing road reserve.
- Consideration of the Small Road access on south-east side of interchange.

**Upgrade to Ō Mahurangi Penlink (Redvale) Interchange:**

- New design information was made available from the Ō Mahurangi Penlink project. This included shifting of the active mode facility to the southern side of the corridor. This required change to the proposed design to tie in with an active mode facility to the south of the interchange.
- A section of East Coast Road at the southern end has been included in the design due to a need for a realignment based on conflict with the structure as a result of the proposed roundabout.

**New interchanges at Wilks Road**:

- Adjustments to vertical geometry of the interchange and the eastern approach to the interchange to reduce impact on adjacent property.
- Provision of access road to maintain access to property to the north of Wilks Road.
- Changes to the intersection between Wilks Road and East Coast Road including realignment of the western end of Jackson Way.
- Active mode facility integrated with main structure on northern side.

### 9.9.8 Preferred routes (sites): SH1 interchanges

The preferred routes (sites) for the SH1 interchanges are as shown in **Figure 117**, **Figure 118** and **Figure 119**.


**Figure 117: Preferred route for Upgrade to Silverdale Interchange**

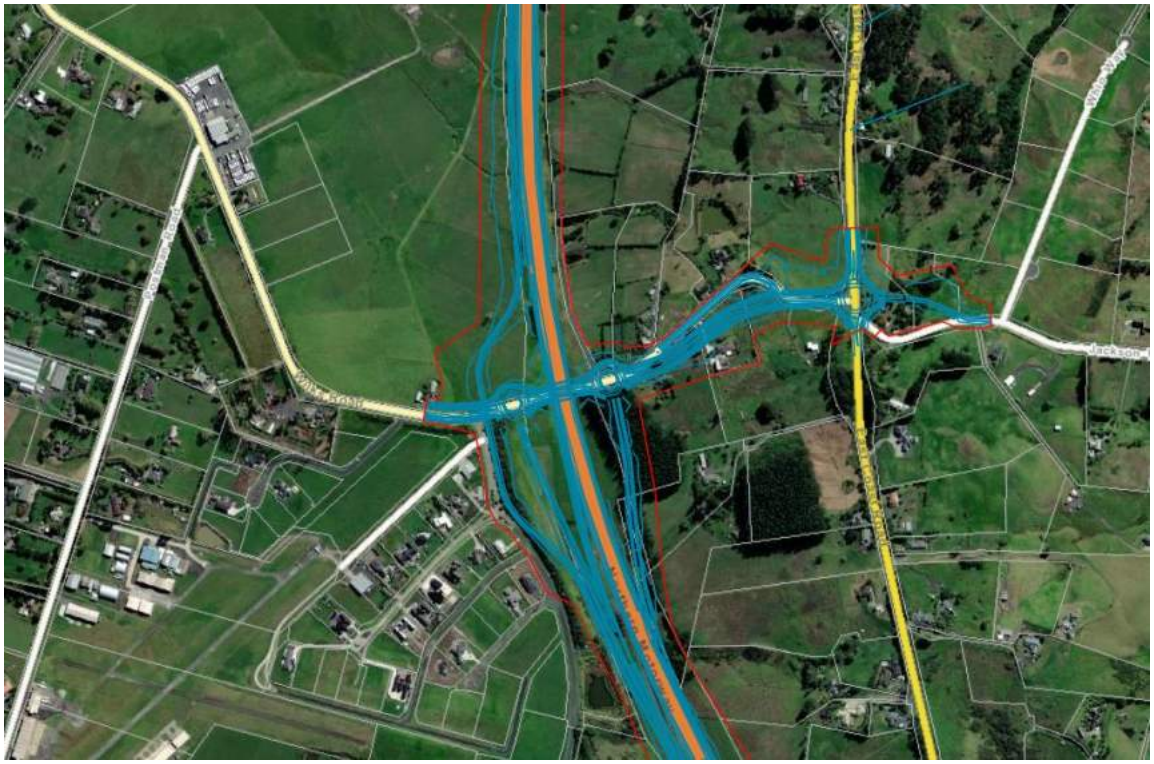


Figure 118: Preferred route for New Wilks Road Interchange

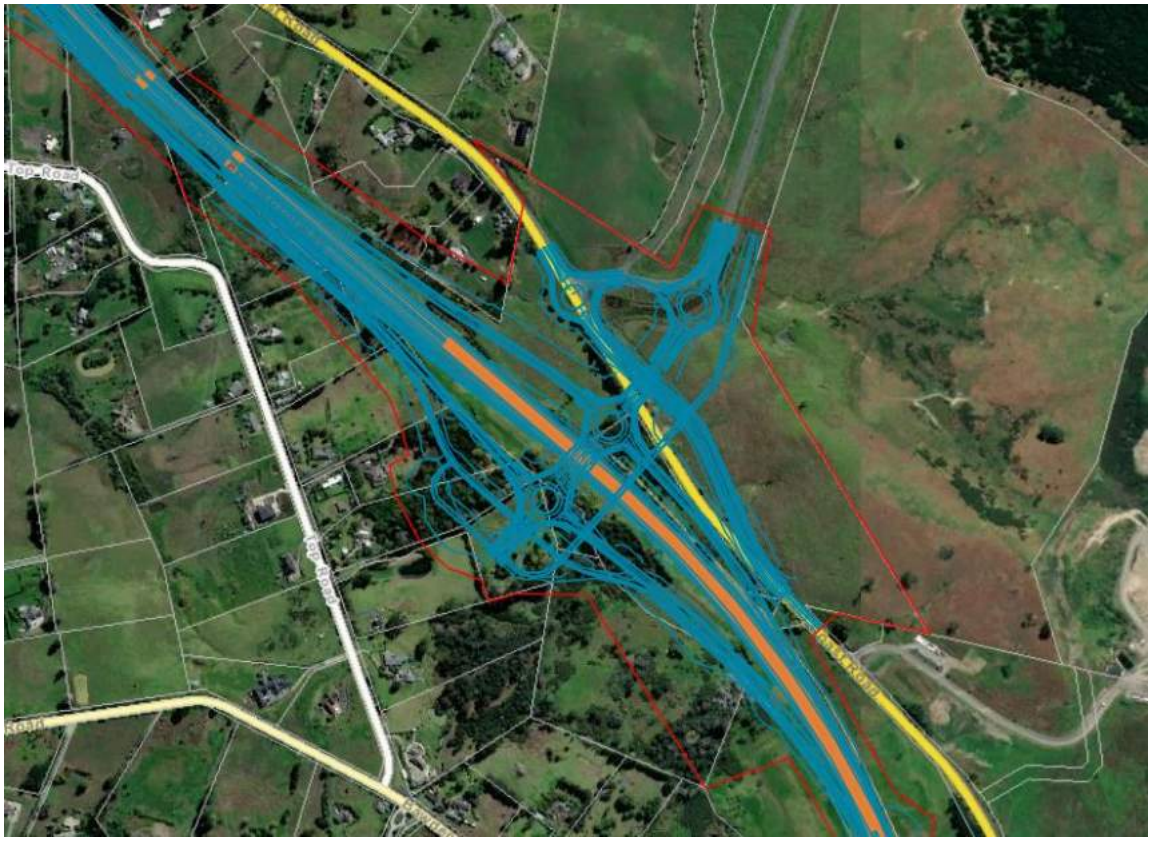


Figure 119: Preferred route for Upgrade to Ō Mahurangi Penlink (Redvale) Interchange