TE TUPU NGĀTAHI
SUPPORTING GROWTH

VOLUME 2

Warkworth Assessment of Effects on the Environment

May 2023

Version 1.0

WAKA KOTAHI NZ TRANSPORT AGENCY

New Zealand Government

Document Status

Responsibility	Name
Author	Simon Titter, Sheetal Naidu, Nicholas Jantke and Jess Rose
Reviewer	Chris Scrafton / Tracey Grant / Daniel Wilcocks / Natasha Garvan
Approver	Tracey Grant

Revision Status

Version	Date	Reason for issue
1.0	12/05/2023	Issue for lodgement

The Assessment of Effects on the Environment report and supporting documents are structured as set out in the table below:

Volume	Title	Contents
1	Form 18	Attachment A: Designation Plans; Attachment B: Schedule of Directly Affected Property; and Attachment C: Conditions of Designation
2	Assessment of Effects on the Environment	Appendix A: Assessment of Alternatives Appendix B: Relevant statutory and strategic planning documents assessment Appendix C: Proposed NOR Conditions
3	Design and Designation Boundaries	Appendix A: General Arrangement Layout Plans Appendix B: Property Boundaries and Schedules
4	Supporting Technical Reports	Assessment of Arboricultural Effects Assessment of Archaeological Effects Assessment of Construction Noise and Vibration Effects Assessment of Ecological Effects Assessment of Landscape, Natural Character and Visual Effects Assessment of Flooding and Stormwater Effects Assessment of Traffic Noise and Vibration Effects Assessment of Transport Effects Urban Design Evaluation Report

Table of Contents

Appendices

Table of Figures

Table of Tables

Glossary and Abbreviations

Acronym / Term	Description
ADT	Annual Average Daily Traffic
AEE	Assessment of Effects on the Environment (this report)
AGRD	Austroads Guide to Road Design
ARI	Average Recurrence Interval
AT	Auckland Transport
ATAP	Auckland Transport Alignment Project
AUP:OP	Auckland Unitary Plan: Operative in Part
CCRA	Climate Change Response Act 2022
CEMP	Construction Environment Management Plan
CNVMP	Construction Noise and Vibration Management Plan
CTMP	Construction Traffic Management Plan
DBC	Detailed Business Case
FULSS	Future Urban Land Supply Strategy (2017)
FUZ	Future Urban Zone
GPS	Government Policy Statement
HNZPTA	Heritage New Zealand Pouhere Taonga Act 2014
IBC	Indicative Business Case
Indicative Strategic Transport Network for Warkworth	The indicative strategic transport network identified for Warkworth in the Warkworth Indicative Business Case
LGA	Local Government (Auckland Council) Act 2009
MPD	Maximum Probable Development
MSM	Macro Strategic Model
NES	National Environmental Standard
NOR	Notice of Requirement
NPS-F	National Policy Statement for Freshwater 2020
NPS-HPL	National Policy Statement on Highly Productive Land 2022
NPS-UD	National Policy Statement on Urban Development 2020

Acronym / Term	Description
Plan Change 25	Warkworth North Private Plan Change
PPF	Protected Premises and Facilities
PWA	Public Works Act 1981
RLTP	Regional Land Transport Plan
RMA	Resource Management Act 1991
RPS	Regional Policy Statement
SCEMP	Stakeholder Communication and Engagement Management Plan
SEA	Significant Ecological Area
SH1	State Highway 1
TAR	Threatened – At Risk species
TDM	Transport Design Manual
Te Tupu Ngātahi	Te Tupu Ngātahi Supporting Growth
TfUG	Transport for Future Urban Growth
ULDMP	Urban and Landscape Design Management Plan
Waka Kotahi	Waka Kotahi NZ Transport Agency
Warkworth Package	The package comprising the following new or upgraded transport corridors: Northern Public Transport Hub and Western Link – North Woodcocks Road (Western Section) State Highway 1 – South Matakana Road Sandspit Road Western Link – South Sandspit Link Wider Western Link – North
Warkworth Preferred Transport Network	The preferred transport network identified for Warkworth in the Warkworth Detailed Business Case

1 Introduction

This Assessment of Effects on the Environment (AEE) supports the Warkworth Package of Notices of Requirement (NORs) for Auckland Transport (AT) as a requiring authority under the Resource Management Act 1991 (RMA). The NORs seek to designate land for future strategic transport corridors and associated infrastructure as part of the Te Tupu Ngātahi Supporting Growth Programme to enable the future construction, operation and maintenance of transport infrastructure in Warkworth. Each NOR in the Warkworth Package is listed in Table 1.1, and shown in Figure 1.1 below.

Table 1.1: The Warkworth Package

Project	NOR	Description
Northern Public Transport Hub and Western Link – North	1	New northern public transport hub and associated facilities including a park and ride at the corner of State Highway 1 (SH1) and the new Western Link – North. New urban arterial cross-section with active mode facilities between the intersection of SH1 and Te Honohono ki Tai (Matakana Link Road) to the proposed bridge crossing, enabling a connection for development in the Warkworth Northern Precinct as provided for in the Warkworth North Precinct.
Woodcocks Road - West	2	Upgrade of the existing Woodcocks Road corridor between Mansel Drive and Ara Tūhono (Puhoi to Warkworth) to an urban arterial cross-section with active mode facilities.
State Highway 1 – South Upgrade	3	Upgrade of the existing SH1 corridor between Fairwater Road and the southern Rural Urban Boundary to an urban arterial cross-section with active mode facilities.
Matakana Road Upgrade	4	Upgrade of the existing Matakana Road corridor between the Hill Street intersection and the northern Rural Urban Boundary to an urban arterial cross-section with active mode facilities.
Sandspit Road Upgrade	5	Upgrade of the existing Sandspit Road corridor between the Hill Street intersection and the eastern Rural Urban Boundary to an urban arterial cross-section with active mode facilities.
Western Link – South	6	New urban arterial cross-section with active mode facilities between the intersection of SH1 and McKinney Road and Evelyn Street.
Sandspit Link	7	New urban arterial cross-section with active mode facilities between the intersection of Matakana Road and Te Honohono ki Tai (Matakana Link Road) and Sandspit Road.
Wider Western Link – North	8	New urban arterial cross-section with active mode facilities between Woodcocks Road and the Mahurangi River.

Figure 1.1: Warkworth Package overview

1.1 Te Tupu Ngātahi Supporting Growth

Te Tupu Ngātahi Supporting Growth (Te Tupu Ngātahi) is a collaboration between AT and Waka Kotahi NZ Transport Agency (Waka Kotahi) to plan transport investment in Auckland's future urban zoned (FUZ) areas over the next 10 to 30 years.

AT and Waka Kotahi have partnered with Auckland Council, Manawhenua and KiwiRail Holdings Limited and are working closely with stakeholders and the community to develop the strategic transport network to support Auckland's growth areas, which are shown in Figure 1.2 below.

The key objective of Te Tupu Ngātahi is to protect land for future implementation of the required strategic transport corridors / infrastructure. As a form of route protection, designations will identify and appropriately protect the land necessary to enable the future construction, operation and maintenance of these required transport corridors / infrastructure.

A designation is important as it provides certainty for the requiring authority that it can implement the work. It also provides property owners, businesses and the community with increased certainty regarding future infrastructure, so they can make informed decisions. It can also significantly reduce long-term costs for local and central government and enable more effective land use and transport outcomes.

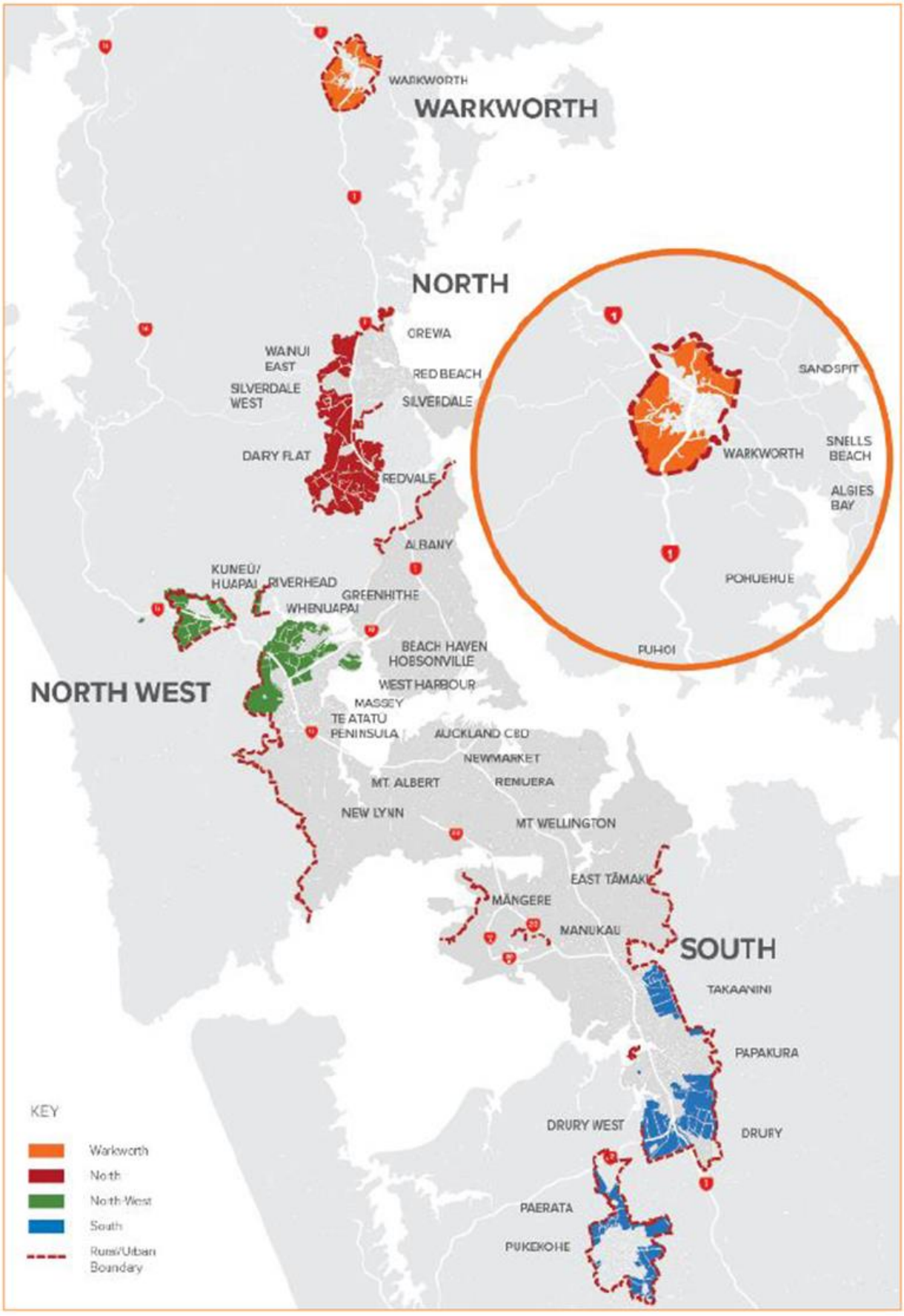


Figure 1.2: Future urban areas of Auckland, highlighting the Warkworth growth area (orange)

1.2 Auckland Transport

AT is financially responsible for Auckland's transport network and services (excluding state highways) including roads, footpaths, cycling, parking and public transport services such as rail. AT is a Council Controlled Organisation (CCO) under the Local Government (Auckland Council) Act 2009 (LGA), which states that AT's purpose is to "contribute to an effective, efficient and safe Auckland land transport system in the public interest".

AT's functions are identified in section 45 of the LGA. These functions include managing and controlling the Auckland transport system in accordance with the LGA, including performing the statutory functions and exercising the statutory powers set out in section 46 as if AT were a local authority or other statutory body, and acting as a requiring authority under section 167 of the RMA.

Under section 47(1) of the LGA, AT is deemed to be approved as a requiring authority and as a network utility operator, under section 167 of the RMA for the purpose of "constructing or operating or proposing to construct or operate roads in relation to the Auckland transport system" and "the carrying out of an activity or a proposed activity (other than an activity described in paragraph (a)) in relation to the Auckland transport system for which it or the Auckland Council has financial responsibility".

AT may therefore designate land to construct, operate and maintain roads and any other activities in relation to the Auckland transport system that Auckland Council has financial responsibility for.

1.3 Notification

AT requests that the NORs 1-8 described in this AEE are publicly notified.

2 Background and context

2.1 The problem

Auckland is New Zealand's largest city, home to approximately 1.65 million people. In 2017, Auckland attracted 36,800 new residents; more than the rest of New Zealand combined. The Auckland Plan 2050 – Development Strategy signals that Auckland could grow by 720,000 people to reach a population 2.4 million over the next 30 years. This will generate demand for more than 400,000 additional homes and require land for 270,000 more jobs.[1] Most of this growth will go into existing urban areas. However, around a third will go into FUZ areas (greenfields) as identified in the Auckland Unitary Plan: Operative in Part (AUP:OP).

In July 2017, the Future Urban Land Supply Strategy (FULSS) was updated in line with AUP:OP zonings, with 15,000 hectares of land allocated for future urbanisation. The FULSS provides for sequenced and accelerated greenfield growth in ten areas of Auckland, including Warkworth.

Warkworth is uniquely located as a satellite town at the northernmost extent of the Auckland region, approximately 60km north of the Auckland city centre, and 30km north of Orewa. The Warkworth FUZ area is less than 5km from the northern extent to the southern extent, and from the eastern extent to the western extent, resulting in compact future urban form.

Based on the FULSS, at full build out, the Warkworth growth areas are expected to accommodate:

17,100 additional people
8,200 new houses (~7,300 in the FUZ area)
4,600 new jobs.

This is a significant increase from the existing population and employment in an area that is currently predominantly rural in character.

The significant growth anticipated will pose a number of future transport challenges for Warkworth, including exacerbating existing transport problems and resulting in the current network being unsuitable to support this planned future growth.

Given the scale and duration of the growth proposed, the early route protection of these critical transport corridors and infrastructure is necessary to provide the required certainty for AT, Waka Kotahi, stakeholders and the community.

2.2 Previous programme phases

In 2015, AT, Waka Kotahi and Auckland Council formed the Transport for Future Urban Growth (TfUG) Programme to investigate, plan and deliver the transport networks needed to connect the urban growth areas across North, North West and South Auckland over the next 30 years. AT, Waka Kotahi and Auckland Council prepared a strategic business case, which confirmed the scale and urgency of the issue and a need to progress a transport response to the growth.

[1] Auckland Plan 2050 Development Strategy: https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/auckland-plan/development-strategy/future-auckland/Pages/what-auckland-look-like-future.aspx.

In 2016, AT, Waka Kotahi and Auckland Council worked in partnership to develop a TfUG Programme Business Case. The TfUG Programme Business Case identified route protection of key transport corridors as the priority focus area for the next steps of the programme. The TfUG Programme is now known as the Te Tupu Ngātahi Supporting Growth Programme.

In May 2019, AT and Waka Kotahi Boards approved Indicative Business Cases (IBC) for each of Auckland's growth areas (Warkworth, North, North West and South) to further test and develop the recommendations of the Programme Business Case. The IBCs identified an indicative strategic transport network, which includes indicative locations for new or upgraded public transport connections, walking and cycling links and roads or state highways.

The Warkworth IBC recommended the Indicative Strategic Transport Network for Warkworth as shown in Figure 2.1. This network was endorsed by the AT Board in February 2019 and the Waka Kotahi Board in May 2019.

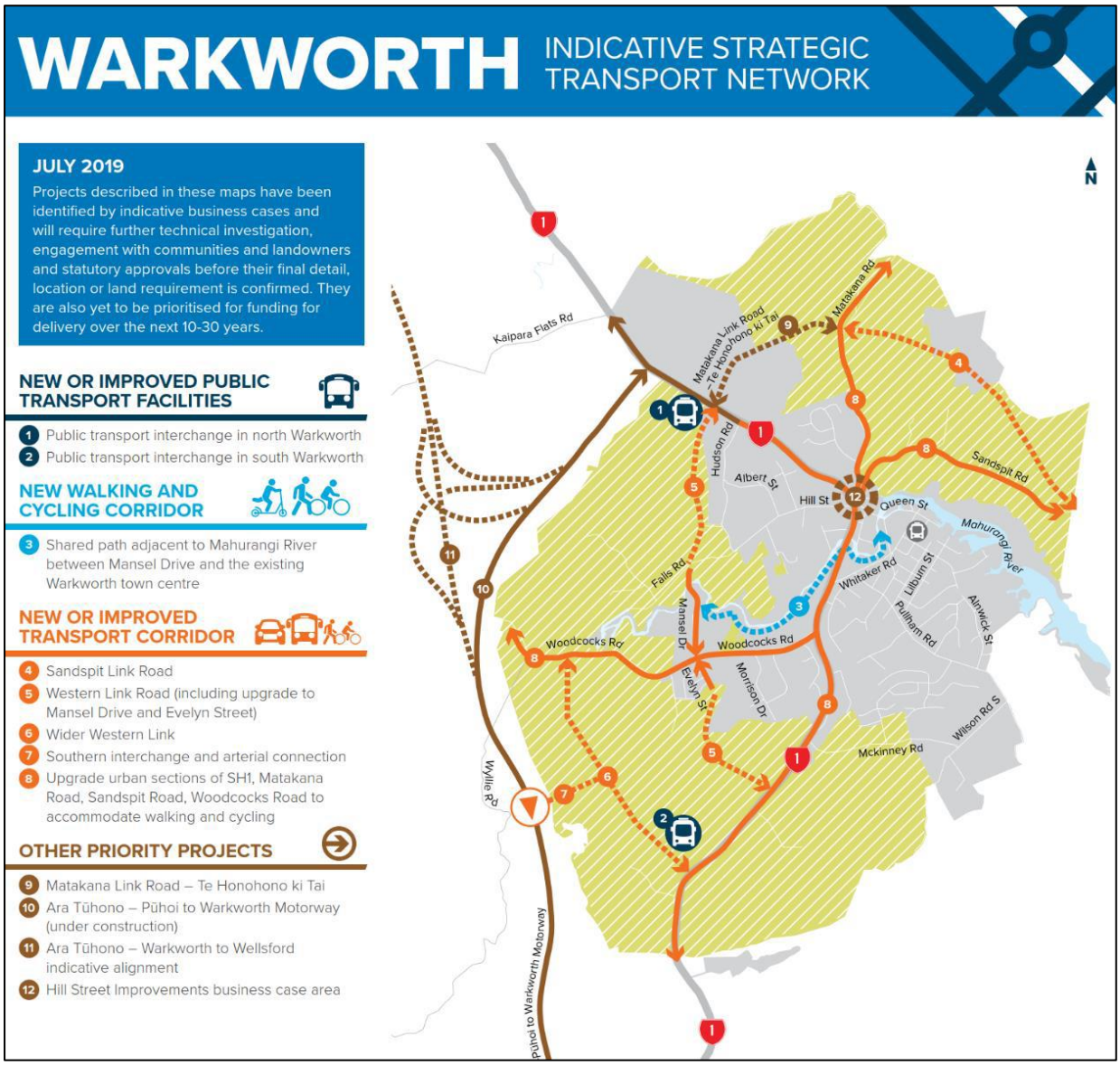


Figure 2.1: Indicative Strategic Transport Network for Warkworth

3 The recommended network

3.1 Purpose of the network

The IBC Indicative Strategic Transport Network for Warkworth was progressed to the Detailed Business Case (DBC) stage in 2022.

The Warkworth DBC identifies that the current transport network is already under pressure and future transport demands will exacerbate existing issues, limiting Warkworth's growth potential. The current form of the transport network in Warkworth is not capable of supporting the significant growth anticipated in the Warkworth FUZ areas, and in some places the transport network does not yet exist.

The key reasons why transport investment is required in Warkworth are set out in Table 3.1 below:

Table 3.1: Key reasons why transport investment is required in Warkworth

Issue	Key reasons why transport investment is required in Warkworth
Access	The current transport network's form and function, lack of active mode facilities and missing transport connections will not support future growth and will result in indirect / longer trips between existing and future key destinations, constraining access to economic and social opportunities in Warkworth.
Reliability / resilience	Without new transport corridors network resilience will be limited and public transport, private vehicles and freight will experience unreliability as transport demand grows.
Travel choice	The majority of travel in Warkworth is undertaken by private vehicle as there is limited provision for travel by alternative modes. The planned growth in Warkworth will generate more trips in the future, and without any investment in high quality, attractive and dedicated alternative modes, the majority of these additional trips will continue to be undertaken by private vehicles The additional trips generated will result in significant congestion on existing routes such as Woodcocks Road, SH1 and the Hill Street intersection, further reducing access to social and employment destinations within Warkworth.
Safety	Existing safety risks are likely to increase on key corridors without investment in safe solutions Active mode safety issues will also be exacerbated without investment in appropriate and safe walking and cycling facilities.
Integration	The current transport network does not support land use integration, nor does it support the desired compact urban form for Warkworth, limiting development potential and the quality of the urban environment.
Mode shift	The current transport system has an over-reliance on private vehicles. This combined with limited low carbon transport alternatives results in significant transport emissions, which is this inconsistent with New Zealand's aspirations for shifting to lower emission travel options.

3.2 Overview of the network

The DBC further refined the IBC Indicative Strategic Transport Network for Warkworth and proposed the Warkworth Preferred Transport Network to support the expected future growth in Warkworth as shown in Figure 3.1 below.

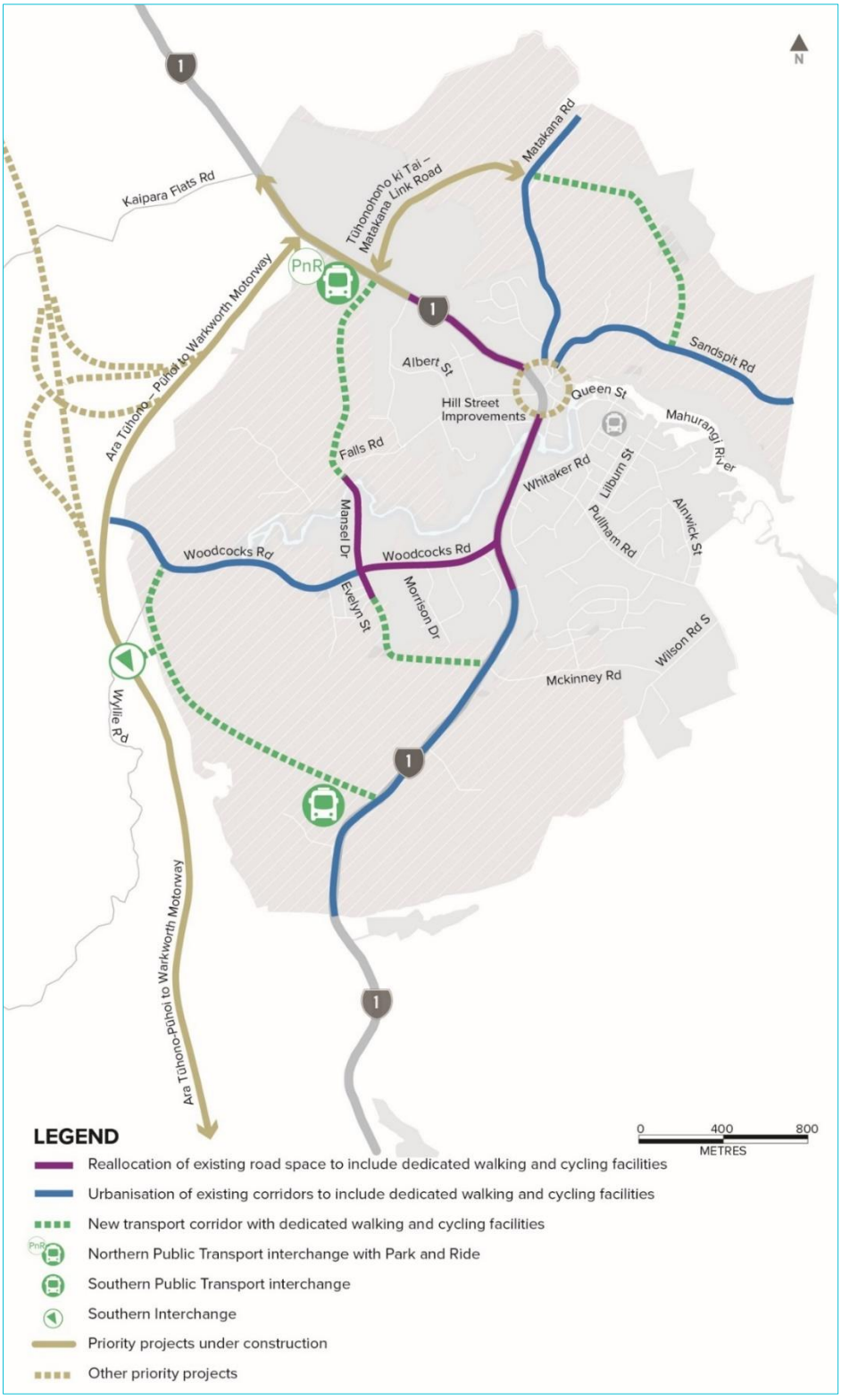


Figure 3.1: Warkworth Preferred Transport Network

The Warkworth Preferred Transport Network encompasses 12 projects from the IBC Indicative Strategic Transport Network for Warkworth, which together form a cohesive transport response for Warkworth to respond to planned future growth. The Warkworth Preferred Transport Network includes provision for frequent public transport, improved walking and cycling, and general traffic connections. Overall, the Warkworth Preferred Transport Network seeks to improve connectivity for Warkworth and support transformational mode shift by providing high quality, safe and attractive transport environments.

The Warkworth DBC was approved by the AT Board in March 2023 and the Waka Kotahi Board in April 2023. As part of the board approval, the decision was endorsed to prepare and lodge (with Council) eight NORs for the upgraded and new transport corridors and associated infrastructure within the Warkworth Package as shown in Figure 1.1 and summarised in Table 1.1 in Section 3.3 of this AEE.

3.3 Land use and transport integration

The required transport networks and infrastructure in Warkworth, which are part of the Warkworth Package, will play a vital role in the success of new neighbourhoods by providing safe, accessible and sustainable travel choices that connect communities and encourage a transformational shift from private vehicles to public transport and active transport.

The implementation of the strategic transport network required to support the growth will be staged over the next 30 years. A key part of this integrated approach is collaborating with Auckland Council. This is in relation to current plan changes in Warkworth to rezone land in the future urban areas, and in relation to subsequent plan changes that Auckland Council may progress to rezone land in the future urban areas in line with the Warkworth Structure Plan which was adopted by Auckland Council in June 2019.

As set out in Table 3.2, the DBC staging has been based on when the FULSS anticipates that Warkworth will be development ready. This has been tested in the Warkworth DBC transport modelling to confirm the anticipated build out of the network. DBC staging is specific to the Warkworth area and accounted for:

Other network projects being developed separately in Warkworth that are complementary to the Warkworth Package including Ara Tūhono (Puhoi to Warkworth) Motorway, Ara Tūhono (Warkworth to Wellsford) motorway, Te Honohono ki Tai – Matakana Link Road, improvements to the Hill Street / SH1 intersection, the Mahurangi Shared Path and the Warkworth Community Transport Hub

Transport demand using the regional transport model (the Macro Strategic Model (MSM)), as well as the Strategic Active Modes Model used for the assessment of the active modes demands and SATURN based traffic models (using MSM outputs)

I11v5 Population Growth Forecasts setting out residents and employments forecasts, with a 2048+ forecast year.

Table 3.2: Warkworth DBC modelled growth and staging

Transport project	FULSS staging	DBC staging	Rationale
Northern Public Transport Hub and Western Link – North	2022	2028 – 2033 (PT Hub) 2022 – 2028 (WLR Nth)	The implementation of the public transport hub is timed to leverage from the land development programmed to occur from 2022 Interrelationship with Western Link northern extents. Roading network required to provide access to the Public Transport Hub The early implementation of public transport infrastructure supports emissions reductions by enabling an efficient public transport network and mode shift outcomes.
Woodcocks Road (Western Section)	2028-2032	2028 – 2033	Follows land release. The requirement for this infrastructure is strongly linked to the release of land in South Warkworth Interrelationship with Wider Western Link – North.
State Highway 1 – South Upgrade	2028-2032	2028 – 2033	The requirement for this infrastructure is strongly linked to the release of land in South Warkworth.
Matakana Road Upgrade	2033-2037	2028 – 2033	Upgrade brought forward to the early part of the 2028-2038 decade in response to land use changes in Warkworth North and around Te Honohono ki Tai – Matakana Link Road Enables connection for residential development at Te Honohono ki Tai intersection to Warkworth Town Centre Surrounding infrastructure upgrades result in interrelationship and connectivity opportunity for wider network between Hill Street Intersection Upgrade and Te Honohono ki Tai – Matakana Link Road.
Sandspit Road	2033-2037	2038 – 2043	North East Warkworth is the latest planned land release Fragmented land ownership likely to support assumption of slower land release.
Western Link – South Upgrade	2028-2032	2028 – 2033	Follows land release. The requirement for this infrastructure is strongly linked to the release of adjacent land Interrelationship with Woodcocks Road and SH1.
Sandspit Link	2033-2037	2038 – 2043	Follows land release. The requirement for this infrastructure strongly linked to the release of adjacent land Plays a resilience role in Hill Street Intersection Upgrades which are programmed for implementation and are expected to operate satisfactorily in the short term.

Transport project	FULSS staging	DBC staging	Rationale
Wider Western Link – North	2028-2032	2033 – 2038	Follows land release. The requirement for this infrastructure strongly linked to the release of land in South Warkworth Interrelationship with Woodcocks Road and SH1 and Southern Interchange with Ara Tūhono (Puhoi to Warkworth) motorway.

The DBC staging shows that overall, the land use staging is generally consistent with work completed as part of the FULSS. However, in practice, the development rate will be influenced by market attractiveness, the owner / developer willingness to develop the surrounding land and regional growth trends meaning it could be many years before each of the areas is fully developed.

These timeframes have informed the project lapse dates which are outlined in Section 7.

3.4 Project objectives

Section 171(1)(c) of the RMA states that: *When considering a requirement and any submissions received, a territorial authority must, subject to Part 2, consider the effects on the environment of allowing the requirement, having particular regard to—*

(c) whether the work and designation are reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought;

The project objectives for the Project have been developed with section 171(1)(c) tests in mind. Specifically, particular regard to project objectives is had:

a) In the context of considering effects on the environment; and
b) Expressly subject to Part 2

Figure 3.2 illustrates the line of sight between the Indicative Business Case (IBC) and DBC investment objectives.

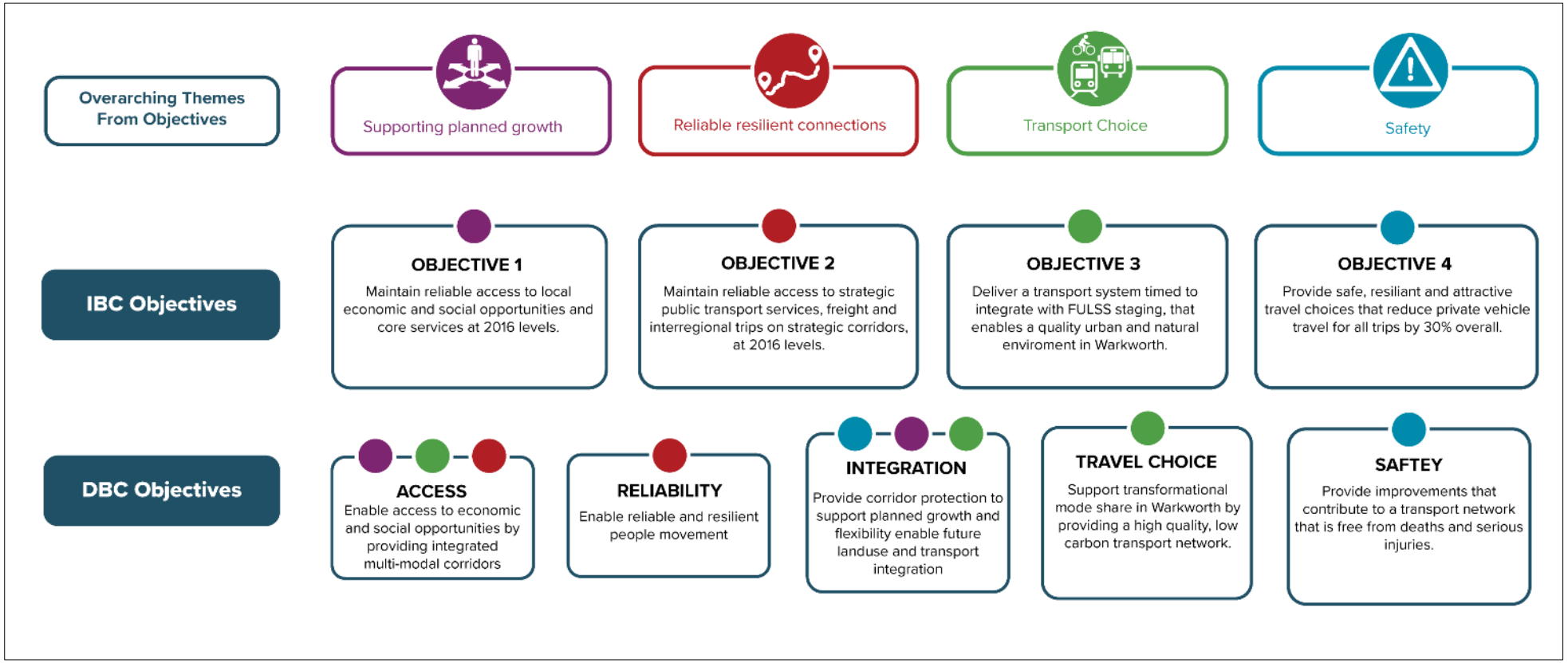


Figure 3.2: Business case objectives and key themes

Having regard to the above, the project objectives outlined below been developed.

Northern Public Transport Hub and Western Link - North
Provide for a transport interchange with associated facilities and park and ride, and a new transport corridor between the existing State Highway 1 and the Western Link North (Northern Section) that:

a) Improves connectivity.
b) Is safe.
c) Improves access to the public transport network.
d) Is efficient resilient, and reliable.
e) Integrates with and supports planned urban growth.
f) Integrates with and supports the existing and future transport network.
g) Improves travel choice and contributes to mode shift.

Woodcocks Road - West Upgrade
Provide for an upgrade to Woodcocks Road between Mansel Drive and Ara Tūhono (Puhoi to Warkworth) that:

a) Improves connectivity.
b) Improves safety.
c) Is efficient, resilient, and reliable.
d) Integrates with and supports planned urban growth.
e) Integrates with and supports the existing and future transport network.
f) Improves travel choice and contributes to mode shift.

State Highway 1 – South Upgrade
Provide for an upgrade to the existing State Highway 1 corridor between the intersection with Fairwater Road and the southern Rural Urban Boundary that:

a) Improves connectivity.
b) Improves safety.
c) Is efficient, resilient, and reliable.
d) Integrates with and supports planned urban growth.
e) Integrates with and supports the existing and future transport network.
f) Improves travel choice and contributes to mode shift.

Matakana Road Upgrade
Provide for an upgrade to Matakana Road between the Hill Street intersection and the northern Rural Urban Boundary that:

a) Improves connectivity.
b) Improves safety.
c) Is efficient, resilient, and reliable.
d) Integrates with and supports planned urban growth.
e) Integrates with and supports the existing and future transport network.
f) Improves travel choice and contributes to mode shift.

Sandspit Road Upgrade
Provide for an upgrade to Sandspit Road between the Hill Street intersection and the eastern Rural Urban Boundary that:
a) Improves connectivity.
b) Improves safety.
c) Is efficient, resilient, and reliable.
d) Integrates with and supports planned urban growth.
e) Integrates with and supports the existing and future transport network.
f) Improves travel choice and contributes to mode shift.

Western Link – South
Provide for a new transport corridor between Evelyn Street and the intersection with the existing State Highway 1 and McKinney Road that:
a) Improves connectivity.
b) Is safe.
c) Is efficient, resilient, and reliable.
d) Integrates with and supports planned urban growth.
e) Integrates with and supports the existing and future transport network.
f) Improves travel choice and contributes to mode shift.

Sandspit Link
Provide for a new transport corridor between Matakana Road and Sandspit Road that:
a) Improves connectivity.
b) Is safe.
c) Is efficient, resilient, and reliable.
d) Integrates with and supports planned urban growth.
e) Integrates with and supports the existing and future transport network.
f) Improves travel choice and contributes to mode shift.

Wider Western Link – North
Provide for a new transport corridor between Woodcocks Road and the Wider Western Link (Southern Section), and the intersection with the existing State Highway 1 that:
a) Improves connectivity.
b) Is safe.
c) Is efficient, resilient, and reliable.
d) Integrates with and supports planned urban growth.
e) Integrates with and supports the existing and future transport network.
f) Improves travel choice and contributes to mode shift.

3.5 Need for route protection

The need for route protection of the transport network in Warkworth is driven by the rate and scale of committed developments, including the planned release of land by Auckland Council and pressure from developers proposing to accelerate urban growth in the area.

This is demonstrated by the Warkworth North Private Plan Change (subsequently the I553 Warkworth North Precinct in the AUP:OP) which rezoned approximately 99 hectares of FUZ land to a mix of business and residential zones to provide for 1,000-1,200 dwellings, 13 hectares of industrial / commercial land and a new neighbourhood centre.

There is also further evidence of ongoing development pressure in Warkworth with various significant land developments occurring, or planned to occur throughout the future urban area in Warkworth. This includes proposed plan changes in South Warkworth, development aspirations adjacent to the new Western Link – South (NOR 6) and the new Western Link – North (NOR 8), potential for plan changes in FUZ land east of SH1 and north-east Warkworth, and a private plan change which is being prepared south of Sandspit Road.

If the transport corridors and infrastructure are not protected ahead of development, this may result in:

Uncertainty for private development investment
Significant disruption to future communities (e.g., if the corridor is built into prior to delivery)
Reduced ability to influence good urban form and land use integration
Compromised ability to deliver a comprehensive transport network which supports public transport and active modes.

As such, it is critical that the future transport network in Warkworth is route protected to ensure the required transport corridors and infrastructure can be provided when required.

4 Section 171 of the RMA

Section 171 of the RMA sets out the matters that a territorial authority must (subject to Part 2), have particular regard to when considering the effects of the environment of allowing a NOR. These matters are set out in Table 4.1 below:

Table 4.1: Section 171 matters to consider

Matter to consider	Section of the AEE where the matter is primarily addressed
Whether particular regard has been had to any relevant provision of:[2] a) A national policy statement b) A New Zealand coastal policy statement c) A regional policy statement or proposed regional policy statement d) A plan or proposed plan.	Refer to Appendix B for assessment against relevant policy documents.
Whether adequate consideration has been given to alternative sites, routes or methods of undertaking the work if:[3] a) The requiring authority does not have an interest in the land sufficient for undertaking the work; or b) It is likely that the work will have a significant adverse effect on the environment.	Refer to section 5 and Appendix A: Assessment of Alternatives for discussion on alternative sites, routes and methods. Refer to sections 10 - 20 for the assessment of effects on the environment.
Whether the work and designation are reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought.[4]	Refer to section 6.
Any other matter the territorial authority considers reasonably necessary in order to make a recommendation on the requirement.[5]	Refer to section 24.2.

[2] Section 171(1)(a) of the RMA.
[3] Section 171(1)(b) of the RMA.
[4] Section 171(1)(c) of the RMA.
[5] Section 171 (1)(d) of the RMA.

5 Assessment of alternatives

5.1 Statutory requirement to consider alternatives

Section 171(1)(b) of the RMA requires that when making a recommendation on a 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:

a) The requiring authority does not have an interest in the land sufficient for undertaking the work; or
b) 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:

The process should be adequately transparent and robust, and clearly recorded so that it can be understood by others;
An appropriate range of alternatives should be considered; and
The extent of options considered, and the assessment of these options, should be proportional to the potential effects of the options being considered.

AT does not have sufficient interest in the land required for each NOR and is required to give adequate consideration to alternatives. AT has considered an appropriately broad range of possible alternative sites, routes and methods for undertaking the projects in the Warkworth Package. A summary of the assessment is provided below. The Assessment of Alternatives report provided in Appendix A sets out the assessment of alternatives for each NOR in detail.

5.2 Assessment of alternatives methodology

This section provides an overview of the assessment of alternatives methodology used to develop and assess route options for the Warkworth network and ultimately determine the preferred option(s). This methodology was applied to both the IBC and DBC processes. Refer to Appendix A: Assessment of Alternatives report.

The methodology used for the assessment of alternatives involved the following steps:

a) Gap analysis of recommendation at each new phase of assessment (IBC to DBC)
b) Development of the multi-criteria assessment framework
c) Constraint mapping to inform option development
d) Option development
e) Pre-scoring of options
f) Interdisciplinary workshops
g) Analysis and testing of outcomes from workshops
h) Identification of technical preferred options
i) Engagement with partners and stakeholders
j) Analysis and testing of preferred options following feedback received through engagement
k) Recommendation by the Project Team.

An overview of the alternatives assessment process undertaken across the IBC and DBC is illustrated in Figure 5.1 below:

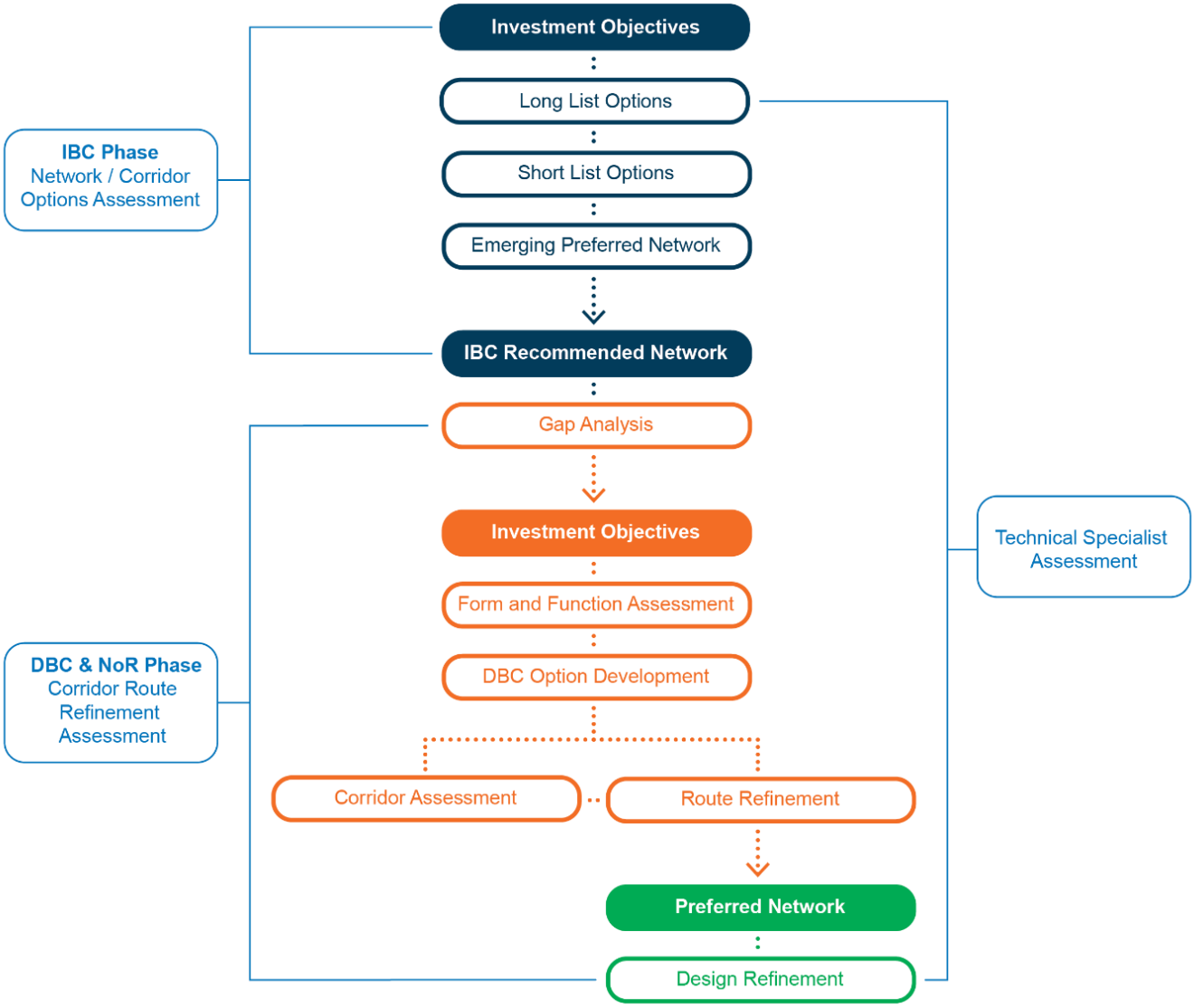


Figure 5.1: Alternatives assessment process

5.3 Consideration of alternative methods

As part of the consideration of alternatives, an evaluation of alternative methods was undertaken during the DBC. A range of methods, in light of a number of contextual elements including project importance, urgency, and complexity, were considered, including:

a) Designations;
b) Resource consents;
c) Plan changes and structure planning (initiated or submitted on);
d) Landowner / developer negotiations; and
e) Traditional property acquisition.

Of the identified methods, short term designations, and resource consents were not considered appropriate methods for the Projects from the outset because they would not offer the appropriate long-term protection of land required to implement the Projects.

Long term designations were generally identified as the preferred method in the context of the Projects as these were considered to be the most logical and effective method to protect a corridor in an evolving environment for the following reasons:

a) Provide certainty to all parties including the community and affected landowners;
b) Are a well-recognised and understood tool for route protection which also enable land acquisition processes through the link to the Public Works Act 1981 (PWA);
c) Maximise flexibility for future implementation;
d) Negate the need for additional land use consents to implement works authorised under the district plan (section 9(3) of the RMA); and
e) Will continually provide for future operation and maintenance requirements.

The other methods considered were discounted for the following reasons:

Resource consents could grant approval under the RMA for the projects but would not enable protection of the land from buildout and would not enable the corridors to be shown publicly in the AUP:OP

Plan changes and structure planning were considered, however Warkworth has already been structure planned, with parts live zoned for urbanisation. The route protection afforded by plan changes and certainty of design outcomes (to meet growth needs) is not high

Landowner and developer negotiations were considered, however where numerous owners are present this can be time prohibitive, and any route protection afforded by negotiations can be piecemeal if agreement cannot be reached with all parties. The route also remains unprotected during the period of negotiation

Traditional property acquisition is not appropriate for the Warkworth Package because property is typically purchased closer to construction when detailed design is available. Purchasing land ahead of detailed design may result in too much or too little land being acquired which would need to be corrected at construction, or otherwise the design may have to be compromised. Traditional acquisition would also not protect temporary construction areas or provide route protection until following acquisition, leaving routes with multiple owners vulnerable to buildout in the interim.

5.4 Summary

The sites, routes and methods chosen will achieve the overarching purpose, which is to identify the required strategic transport network needed to support identified growth in Warkworth over the next 30 years and provide certainty to transport authorities, partners, infrastructure providers, the community and investors / developers of the location and form of the strategic transport network. It will also enable long term integrated planning and investment, and route protect the required land and corridor, enabling phased delivery in line with land release and funding.

The preferred option for each NOR has been based on a comprehensive and robust optioneering process considering specialist assessment and feedback from Manawhenua, stakeholders and landowners and the community. As such it is concluded that adequate consideration has been given

to alternative sites, routes and methods for undertaking the work, satisfying the requirements of section 171(1)(b) of the RMA.

6 Whether the work and designation are reasonably necessary for achieving the objectives

Section 171(1)(c) of the RMA requires a territorial authority to have particular regard to whether the work and designation are reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought. We consider that "reasonable necessity" allows for a threshold assessment, proportionate to the circumstances to determine whether the Warkworth Package is justified in the context of Section 171(1)(c) of the RMA.

Table 6.1 provides an assessment of why the work and designation are reasonably necessary for achieving the project objectives:

Table 6.1: Assessment of the Warkworth Project against Section 171(1)(c) - reasonable necessity

Notice	Project	Project objectives	Assessment
NOR 1	Northern Public Transport Hub and Western Link – North	Provide for a transport interchange with associated facilities and park and ride, and a new transport corridor between the existing State Highway 1 and the Western Link North (Northern Section) that: a) Improves connectivity b) Is safe c) Improves access to the public transport network d) Is efficient, resilient and reliable e) Integrates with and supports planned urban growth f) Integrates with and supports the existing and future transport network g) Improves travel choice and contributes to mode shift.	The work is reasonably necessary to achieve the objectives because it will: Provide a connection to Ara Tūhono (Puhoi to Warkworth) motorway and the Warkworth network for future urban areas in northwest Warkworth Support Vision Zero and road safety outcomes Support regional and interregional public transport system Support mode shift and resilience by providing capacity for further public transport services, and park and ride facilities Enable an urban standard corridor to support growth and integrate with key transport corridors (Ara Tūhono (Puhoi to Warkworth) motorway, Te Honohono ki Tai – (Matakana Link Road) Support the transition to a low carbon transport network. The method of designation is reasonably necessary to achieve the objectives because it enables the identification and protection of the land required for the Project for an extended duration.
NOR 2	Woodcocks Road – West Upgrade	Provide for an upgrade to Woodcocks Road between Mansel Drive and Ara Tūhono (Puhoi to Warkworth) that: a) Improves connectivity b) Improves safety c) Is efficient, resilient and reliable	The work is reasonably necessary to achieve the objectives because it will: Improve connectivity between transport networks and development areas throughout Warkworth Support Vision Zero and road safety outcomes Support the development of an efficient and reliable multi-modal transport network for Warkworth

Notice	Project	Project objectives	Assessment
		d) Integrates with and supports planned urban growth e) Integrates with and supports the existing and future transport network f) Improves travel choice and contributes to mode shift.	Provide an upgraded transport corridor that is integrated with the surrounding urban growth areas Enable an urban standard corridor to support growth and integrate with key transport corridors Support mode shift by providing dedicated active mode facilities. The method of designation is reasonably necessary to achieve the objectives because it enables the identification and protection of the land required for the Project for an extended duration.
NOR 3	State Highway 1 – South Upgrade	Provide for an upgrade to the existing State Highway 1 corridor between the intersection with Fairwater Road and the southern Rural Urban Boundary that: a) Improves connectivity b) Improves safety c) Is efficient, resilient and reliable d) Integrates with and supports planned urban growth e) Integrates with and supports the existing and future transport network f) Improves travel choice and contributes to mode shift.	The work is reasonably necessary to achieve the objectives because it will: Improve connectivity between transport networks and development areas throughout Warkworth Support Vision Zero and road safety outcomes Support the development of an efficient and reliable multi-modal transport network for Warkworth Provide an upgraded transport corridor that is integrated with the surrounding urban growth areas. Enable an urban standard corridor to support growth and integrate with existing and new key transport corridors (Western Link, Wider Western Link, McKinney Road) Support mode shift by providing dedicated active mode facilities. The method of designation is reasonably necessary to achieve the objectives because it enables the identification and protection of the land required for the Project for an extended duration.
NOR 4	Matakana Road Upgrade	Provide for an upgrade to Matakana Road between the Hill Street intersection and the northern Rural Urban Boundary that: a) Improves connectivity b) Improves safety c) Is efficient, resilient and reliable d) Integrates with and supports planned urban growth	The work is reasonably necessary to achieve the objectives because it will: Improve connectivity between transport networks and development areas throughout Warkworth Support Vision Zero and road safety outcomes Support the development of an efficient and reliable multi-modal transport network for Warkworth Provide an upgraded transport corridor that is integrated with the surrounding urban growth areas

Notice	Project	Project objectives	Assessment
		e) Integrates with and supports the existing and future transport network f) Improves travel choice and contributes to mode shift.	Enable an urban standard corridor to support growth and integrate with existing and new key transport corridors (Te Honohono ki Tai – Matakana Link Road, Sandspit Link) Support mode shift by providing dedicated active mode facilities. The method of designation is reasonably necessary to achieve the objectives because it enables the identification and protection of the land required for the Project for an extended duration.
NOR 5	Sandspit Road Upgrade	Provide for an upgrade to Sandspit Road between the Hill Street intersection and the eastern Rural Urban Boundary that: a) Improves connectivity b) Improves safety c) Is efficient, resilient and reliable d) Integrates with and supports planned urban growth e) Integrates with and supports the existing and future transport network f) Improves travel choice and contributes to mode shift.	The work is reasonably necessary to achieve the objectives because it will: Improve connectivity between transport networks and development areas throughout Warkworth Support Vision Zero and road safety outcomes Support the development of an efficient and reliable multi-modal transport network for Warkworth Provide an upgraded transport corridor that is integrated with the surrounding urban growth areas Enable an urban standard corridor to support growth and integrate with existing and new key transport corridors (Sandspit Link) Support mode shift by providing dedicated active mode facilities. The method of designation is reasonably necessary to achieve the objectives because it enables the identification and protection of the land required for the Project for an extended duration.
NOR 6	Western Link – South	Provide for a new transport corridor between Evelyn Street and the intersection with the existing State Highway 1 and McKinney Road that: a) Improves connectivity b) Is safe c) Is efficient, resilient and reliable d) Integrates with and supports planned urban growth e) Integrates with and supports the existing and future transport network	The work is reasonably necessary to achieve the objectives because it will: Improve connectivity between transport networks and development areas throughout Warkworth Support Vision Zero and road safety outcomes Support the development of an efficient and reliable multi-modal transport network for Warkworth Provide a new transport corridor that is integrated with the surrounding urban growth areas Enable an urban standard corridor to support growth and integrate with existing and new key transport corridors (SH1)

Notice	Project	Project objectives	Assessment
		f) Improves travel choice and contributes to mode shift.	Support mode shift by providing dedicated active mode facilities. The method of designation is reasonably necessary to achieve the objectives because it enables the identification and protection of the land required for the Project for an extended duration.
NOR 7	Sandspit Link	Provide for a new transport corridor between Matakana Road and Sandspit Road that: a) Improves connectivity b) Is safe c) Is efficient, resilient and reliable d) Integrates with and supports planned urban growth e) Integrates with and supports the existing and future transport network f) Improves travel choice and contributes to mode shift.	The work is reasonably necessary to achieve the objectives because it will: Improve connectivity between transport networks and development areas throughout Warkworth Support Vision Zero and road safety outcomes Support the development of an efficient and reliable multi-modal transport network for Warkworth Provide a new transport corridor that is integrated with the surrounding urban growth areas Enable an urban standard corridor to support growth and integrate with existing and new key transport corridors (Sandspit Road, Matakana Road, Te Honohono ki Tai – Matakana Link Road) Support mode shift by providing dedicated active mode facilities. The method of designation is reasonably necessary to achieve the objectives because it enables the identification and protection of the land required for the Project for an extended duration.
NOR 8	Wider Western Link – North	Provide for a new transport corridor between Woodcocks Road and the Wider Western Link (Southern Section), and the intersection with the existing State Highway 1 that: a) Improves connectivity b) Is safe c) Is efficient, resilient and reliable d) Integrates with and supports planned urban growth e) Integrates with and supports the existing and future transport network	The work is reasonably necessary to achieve the objectives because it will: Improve connectivity between transport networks and development areas throughout Warkworth Support Vision Zero and road safety outcomes Support the development of an efficient and reliable multi-modal transport network for Warkworth Provide a new transport corridor that is integrated with the surrounding urban growth areas Enable an urban standard corridor to support growth and integrate with existing and new key transport corridors (Ara Tūhono (Puhoi to Warkworth) motorway)

Notice	Project	Project objectives	Assessment
		f) Improves travel choice and contributes to mode shift.	Support mode shift by providing dedicated active mode facilities. The method of designation is reasonably necessary to achieve the objectives because it enables the identification and protection of the land required for the Project for an extended duration.

7 Lapse period sought and rationale

In accordance with section 184 of the RMA, a designation lapses five years after it is included in the district plan unless:

a) It has been given effect to; or
b) Within three months of the designation lapsing, the territorial authority determines that substantial progress or effort has been and continues to be made towards giving effect to the designation, and fixes a longer period; or
c) The designation specifies a different lapse period.

A key objective of the Te Tupu Ngātahi Supporting Growth Programme is to identify and protect land now for future transport networks. We consider that a lapse period of 10 – 25 years is reasonably necessary to achieve this key objective as it provides statutory protection of the future transport corridors in a manner that enables a flexible and efficient infrastructure response to land use. As enabled by section 184(c) of the RMA, lapse periods of 10 – 25 years are specified for the Warkworth Package.

Table 7.1 sets out the proposed lapse dates for each of the NORs in the Warkworth Package:

Table 7.1: Lapse dates for the Warkworth Package NORs

Notice	Project	Lapse period
NOR 1	Northern Public Transport Hub and Western Link – North	20 years
NOR 2	Woodcocks Road (Western Section)	15 years
NOR 3	State Highway 1 – South	15 years
NOR 4	Matakana Road	15 years
NOR 5	Sandspit Road	25 years
NOR 6	Western Link – South	20 years
NOR 7	Sandspit Link	25 years
NOR 8	Wider Western Link – North	20 years

7.1 Need for an extended lapse date

The above lapse dates are proposed based on the modelled land use demands (see Table 3.2) accounting for uncertainty of urbanisation and funding timeframes.

In the context of the projects within the Warkworth Package, extended lapse periods are considered necessary for the following reasons:

It provides statutory protection of the land required for transport infrastructure to support future growth in a manner that recognises the uncertainty associated with the timing of that growth
It supports efficient land use and transport integration by enabling the efficient delivery of transport infrastructure at a time and in a way that is integrated with future urbanisation

It provides the requiring authority sufficient time to:

- Undertake the detailed design of the projects
- Obtain the necessary resource consents
- Procure funding
- Undertake tendering / procurement
- Undertake property and access negotiations and other processes associated with construction of the projects

It provides property owners, businesses and the community certainty on where transport routes will be located (i.e., within the designation boundaries) and within what timeframe (before end of the lapse date).

We also note that:

An extended lapse period does not mean that the designation will not be given effect to until the end of the lapse period sought. A lapse period is a limit and not a target. In other words, if urbanisation were to be confirmed earlier than the lapse date, it is likely that the designation will be given effect to, to enable appropriate integration with development

It is not uncommon for infrastructure projects to have a longer lapse period and this has been confirmed on recent projects such as Te Tupu Ngātahi Drury Arterials, Southern Links (Waka Kotahi), the Northern Interceptor Wastewater Pipeline (Watercare) and the Hamilton Ring Road (Waikato District Council, Hamilton City Council)

Setting a shorter lapse period would not be a significant factor in facilitating earlier availability of funding than is planned at the time the NOR is sought

Setting an unrealistically short lapse period will likely result in an inadequate suite of conditions to manage any uncertainty if the requiring authority is likely seeking to extend the lapse period through section 184 of the RMA.

It is acknowledged that when considering an extended lapse period, it is appropriate to balance the need for that lapse period against the potential prejudicial or "blighting" effects on landowners. These effects are discussed in Section 19.3 of this AEE.

8 Design and assessment approach

As discussed in Section 7 above, it is anticipated that the Warkworth Package will not be constructed for some time. As such, the Te Tupu Ngātahi approach to design and assessment of effects has been developed in a manner that reflects the long-term implementation of the projects, within environments that are likely to change significantly.

8.1 Approach to design

The approach to the Warkworth Package design has been to focus on developing an indicative design of the network that is sufficient to inform the designation footprint. This enables the assessment of an envelope of effects whilst recognising the need for flexibility due to the uncertainty of the future urban environment at the time the projects will be built.

The Warkworth Package alignments are provided in the drawing set in Volume 3. These have informed the designation footprint and include ancillary components, such as indicative construction areas and stormwater requirements. The detailed design will be undertaken before construction and an Outline Plan or Plans (as the Outline Plans may be staged to reflect project phases or construction sequencing) will be submitted to Auckland Council in accordance with section 176A of the RMA. Resource consents will also need to be applied for in the future.

The final design of the Warkworth Package (including the design and location of associated works including bridges, culverts, stormwater management systems, soil disposal sites, signage, lighting at interchanges, landscaping, realignment of access points to local roads, and maintenance facilities), will be refined and confirmed at the detailed design stage.

The drawing set contained in Volume 3 for each project provides a general arrangement plan and including designation boundary.

While the design and effects assessment has focussed on the ultimate form of the transport infrastructure this approach does not preclude the ability for an interim development of part of the transport corridor to take place to support development.

8.2 Urban design

An Urban Design Evaluation (UDE), included in Volume 4 has been completed for the Warkworth project based on the principles set out in the Urban Design Framework (appended to the UDE). The UDE provides urban design commentary on the concept designs of the projects and recommends how urban design opportunities and outcomes could be considered in future design stages of the projects. The opportunities and outcomes identified are either required to mitigate the effects of the projects or could be considered by AT, Waka Kotahi or other parties at future stages of design and development but are not required to mitigate effects of the projects.

In summary, the urban design opportunities and outcomes for the Package include:

The development of a landscape plan which considers recommendations from the Assessment of Landscape, Natural Character and Visual Effects, the Assessment of Arboricultural Effects, the Assessment of Flooding and Stormwater Effects and the Assessment of Ecological Effects including:

- street tree, stormwater raingarden and wetland planting
- construction compound and private property reinstatement and treatment of batter slopes

The landscape plan should also demonstrate integration of Mahurangi River and its tributaries where the corridor intersects or sits adjacent with the existing Blue-Green Network. The landscape outcomes should support the principles of Auckland's Urban Ngahere (Forest) Strategy and reinforce the wider vegetation patterns of the local landscape and create connections to greenways and the wider walking and cycling network

Integration of wetlands to enable an appropriate interface with adjacent land uses

Measures to demonstrate that the project design has included adaptations to climate change such as reducing urban heat island effects in future urbanised areas, supporting modal shift and accounting for flood hazard risks

In future design stages, Manawhenua shall be invited as Partners to provide input into relevant cultural, landscape and design matters including how desired outcomes reflect their identity and values

Potential conflicts between placemaking aspirations within local communities and the operating speed of the corridor should be addressed

Known or planned changes of land use and residential density that have the potential to alter the perceived scale and impact of the corridor functions should be identified and addressed

A modal integration strategy should be developed that addresses the movement and place function of the corridor that incorporates placemaking opportunities arising from adjacent land use

Demonstration of how any residual land portions following the construction of the Project is redefined and integrated with the expected future land use function.

The measures to achieve the opportunities and outcomes listed above will be confirmed at the detailed design stage and form part of the ULDMP as a condition on the designations.

8.3 Design input and standards

The design philosophy that informed the indicative designs for route protection is summarised in the following sections. As appropriate, the following design standards were adopted in the design philosophy for the Warkworth Package:

Transport Design Manual (TDM) – AT
Austroads Guide to Road Design (AGRD).

8.3.1 Geometric design

The indicative design of the Warkworth Package was developed in line with a range of geometric design standards such as:

The horizontal alignment was designed to best accommodate each corridor taking into account the existing topography and future land use

A normal crossfall of 3% is provided on all roads in accordance with the TDM and AGRD

A minimum desirable vertical gradient of 0.5% and a maximum vertical gradient of 8.0% was adopted for the alignments. Where possible, grades have followed the existing ground level, consistent with longitudinal drainage requirements

Generally, unless constrained, 1V:3H or 1V:5H slopes have been adopted as the default batter for cut and fill slopes (depending on the underlying geology) to meet maintenance requirements. Vertical abutment walls or 1V:2H spill through slopes have been adopted as the default approach for

abutments at bridge locations, radially transitioning to 1V:3H side batter slopes. In constrained areas, retaining walls are shown instead of batters in order to reduce construction footprints

Bridge skew angles are limited to a maximum of 30 degrees relative to the service being crossed

The designation footprints allow sufficient space for segregated active mode facilities and active mode crossings at intersections.

8.3.2 Intersections and local road tie-ins

The general approach to indicative designs of intersections is as follows:

New intersections are located on straights where possible or large constant elements such as a single large horizontal radius

Intersection approach angles are limited to between 70° and 110° from the main alignment

Intersection layouts take into consideration the input from traffic modelling data to inform the lane configuration

Intersections are graded to match the road profile and longitudinal grade of the main through road

Tie-ins with side roads are as close to the intersection as possible whist maintaining the safety to the road users. Vertically, the grade on the side road approach is between 0.5% and 8% to help avoid unnecessary earthworks and minimise tie in lengths.

8.3.3 Typical cross-sections

The indicative cross-section design incorporates the AT Urban Street and Road Design Guide and Vision Zero design features. Typical cross-sections have been developed for the projects within the Warkworth Package, which generally incorporate the following elements:

Berm space and ducts for utilities

Footpaths and cycleways

Traffic lanes with a solid or flush median

Stormwater management devices.

Cross sections for each transport corridor are provided in Section 9 of this AEE. Final cross-sections will be produced at detailed design and will be submitted as part of the relevant Outline Plan(s).

8.3.4 Stormwater design and management

The approach to the indicative stormwater design and management has focussed on identifying feasible stormwater treatment methods and locations to inform the required designation footprint (see Table 8.1). This considered the AUP:OP and industry standards, existing stormwater infrastructure and requirements, future discharge and diversion, runoff quality, and flood hazard management. Stormwater treatment for each project in the Warkworth Package will be further developed at the detailed design stage alongside applications for regional resource consents. The Assessment of Flooding and Stormwater Effects provided in Appendix F of Volume 4 provides a description of the method and preferred locations for each NOR.

Table 8.1: Stormwater design and management considerations

Element	Input considerations
Stormwater quality	The footprints allow for stormwater quality treatment in accordance with Auckland Council Guideline GD01 for all existing and future impervious areas, except where a corridor only consists of a pedestrian or cycle path. Generally, the indicative designs adopt treatment wetlands or swales, depending on the local conditions and topography.
Retention and detention	AUP:OP SMAF 1 design criteria for retention and detention measures has been allowed for each corridor in the Warkworth Package that is within the FUZ / greenfield environments, where discharging to freshwater streams. Criteria are summarised as follows: Provide retention (volume reduction) of at least 5mm runoff depth Provide detention and a drain-down period of 24 hours for the difference between the pre- and post-development runoff volumes from the 95th percentile, 24-hour rainfall event minus the 5mm retention.
Flooding	Where required, attenuation storage to match pre-project peak flows to post-project peak flows for either or both the 10 year and 100-year rainfall events has been provided. Attenuation will be provided within devices which can be designed to detain larger storm events, including wetlands, ponds and swales. In some instances, diversions or provision of compensatory flood storage is provided. Resilience to flooding was applied through: Setting the corridor vertical alignment above the 100 year Average Recurrence Interval (ARI) flood plain where practicable Providing 0.5m freeboard for culverts between the headwater level and edge of the corridor Providing freeboard to bridges in accordance with the Waka Kotahi Bridge Manual requirements.
Stream crossings	All existing stream crossings will be maintained through either culverts or bridges. Bridges (existing and / or proposed) are identified at selected locations within the indicative design where appropriate to manage effects on the environment. However, the final form of stream crossings with consideration to upstream ponding, erosion protection and fish passage will be confirmed at the detailed design and regional resource consent phase.

8.3.5 Design elements not developed

A design exercise for each corridor has been undertaken to support the identification of the designation boundary and to inform an adequate assessment of effects on the environment. Further design work for each corridor will be undertaken at the detailed design stage where elements such as pavements, signs, road markings, bus stop locations, safety barriers, lighting and other features will be confirmed.

8.4 Construction methodology

An indicative construction methodology has been developed for the Warkworth Package and has been used to inform the designation footprints, assess potential effects on the environment, and to identify measures to avoid, remedy or mitigate those effects, as appropriate and relevant to the NORs. The construction methodology includes:

Sequencing of the main construction activities
Indicative land required for construction works
Identification of any significant impacts on stakeholders
Approximate duration of activities and indicative construction programme.

This section is structured to address these inputs as they apply across the whole of the Warkworth Package. The construction methodology has been developed based on the design of the projects and current land use / landform in which the projects are located. However, the actual construction detail will be confirmed at detailed design, and will consider measures required to mitigate effects, the designation and any resource consents conditions. Importantly, timing of implementation of the projects will dictate what land development is present along the corridors and will inform the final methodology. As such, AT seeks flexibility in the construction methods for each NOR to accommodate these factors and retain opportunities to reduce the impact and duration of adverse construction effects at delivery. A condition requiring a construction management plan is therefore proposed for each NOR.

8.4.1 Sequencing of main construction activities

The programme assumes a generally staged construction sequence, starting with site establishment, enabling works, main works and ending with finishing works and demobilisation. The main works assume a staged construction process with exact staging to be determined at detailed design. The indicative construction sequencing is set out in Figure 8.1.

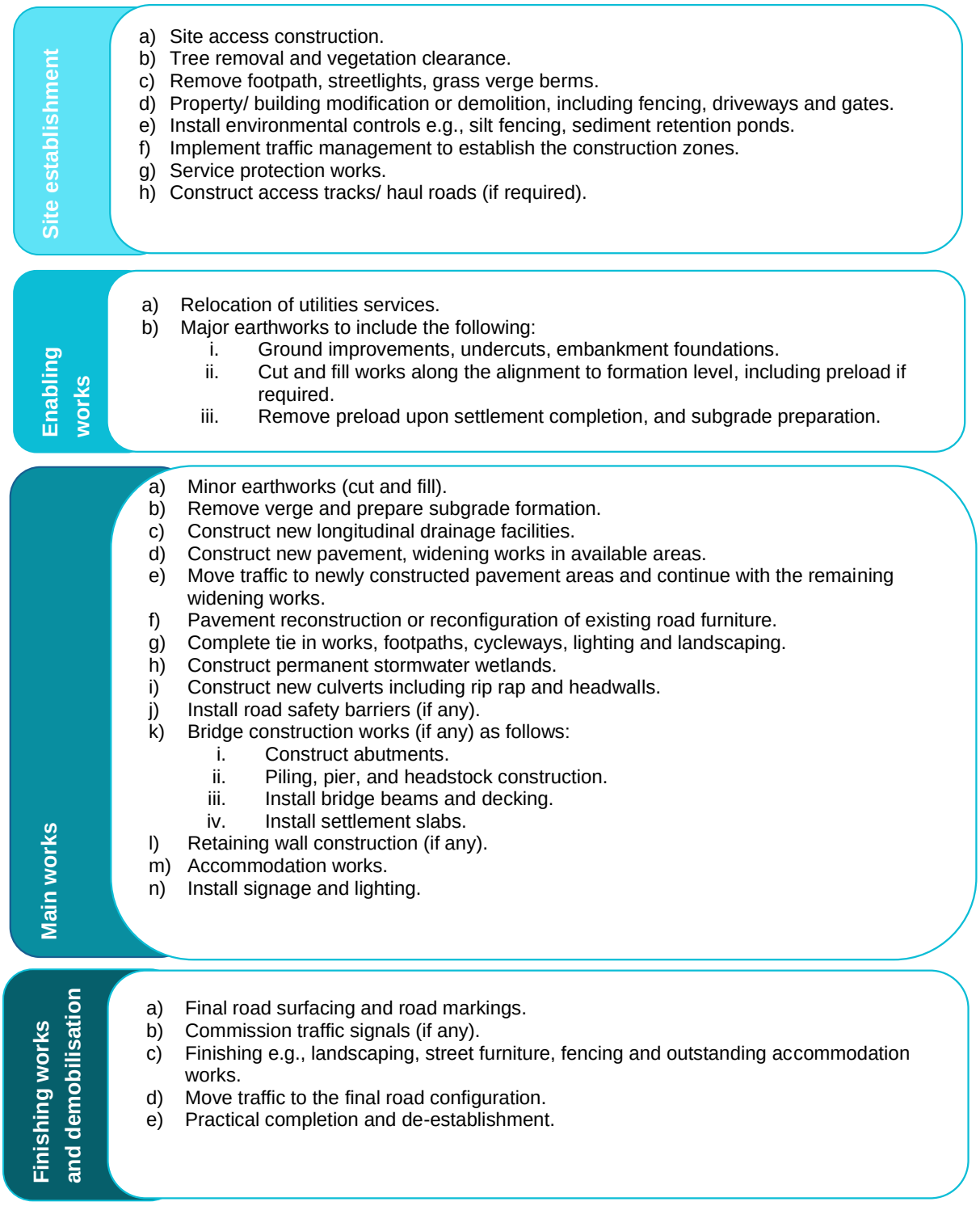
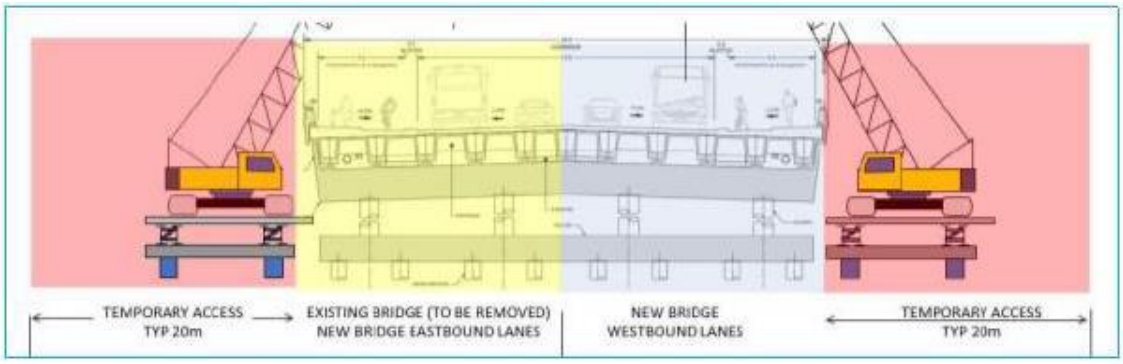


Figure 8.1: Indicative construction sequencing

8.4.2 Identification of land required for construction works

Typical areas required for construction have been identified and applied to the Warkworth Package NORs. These have informed the designation boundaries for each project. The main elements which influence the boundary of the NORs are in Table 8.2. Refer to the drawings provided in Volume 3 for the indicative location and application of construction elements.

Table 8.2: Typical construction areas

Construction element	Discussion
Construction of batter slopes: Rural Urban	For larger earthworks projects, the construction areas will differ significantly to account for the larger plant and equipment likely to be used, construction methodology and temporary works such as haul roads and sediment retention ponds. Typically, 20m from the earthworks batter slopes.
Bridge construction: Abutments Piers Deck	Generally, the design has enabled either a bridge or culvert to be constructed, with the form to be determined at the detailed design and regional consenting stage, unless identified in the AEE as necessary to address effects on the environment. The bridge construction method shall typically follow conventional bottom-up bridge construction techniques. Once the bridge structure is complete, the temporary staging and access ways will be removed. See Figure 8.2 for typical bridge construction area.
 **Figure 8.2: Typical new bridge construction area and methodology**	
Retaining wall construction: Retaining walls up to 5m high (e.g. timber or blockworks) Large retaining walls (e.g. secant pile or sheet pile)	Retaining structures are generally located near the project boundary to overcome overspill of earthworks batters or at the bridge abutments. Typically, retaining walls are constructed of mechanically stabilised earth walls to contain fill embankments and piled retaining walls and soil nails to retain cut batters. The working area required to construct the retaining walls will largely depend on the design and size of the wall. The specific design will be defined at the detailed design stage.
Stormwater treatment construction: Ponds Diversion drains / Overland Flow Path Culvert headwalls and scour protection	New stormwater drains will likely be required on both sides of the corridors. These will connect to the new stormwater wetlands. Additionally, new discharge lines are required from the stormwater wetlands to a suitable discharge point. The size of the working area will vary depending on the size of culvert being installed, the topography of the area, and volume of water being diverted. Works on new culvert constructions may require flow diversion or over pumping. Further investigations will be required to confirm the flow volumes and ecological requirements for the diversions.

Construction element	Discussion
	Access tracks will also be required for delivery of plant and materials. This requirement may change depending on the final design and scope of works, terrain and topography of the respective culvert location. Regional consents (including for earthworks and stream works) will be sought in the future before construction commences.
Temporary works: Sediment retention ponds Haul roads and construction access roads	Surface water running through the earthwork sites will need to be treated prior to discharge. The typical method for doing this is to contain the water from the earthworks areas and channel it into temporary sediment retention ponds. Locating the ponds at the low point of the zones and outside of the permanent works area is ideal so it can be operational and maintained throughout the construction works. Where possible, temporary and permanent ponds will be co-located, so that at the end of construction the pond can be reinstated as a permanent device. Haul roads are typically required for large earthworks projects for the movement of people, plant and materials along the alignment. These haul roads provide access and connectivity to critical work sites such as the culverts, bridge sites, and main cut and fill sites. These are best constructed outside the earthworks extent to avoid clashes with the permanent works.
Site facilities: Main site compound (project office) Additional / satellite site compound Construction yards for laydown / stockpile Construction yards for intersection works	Site compounds and laydown areas are required to support construction along the corridor alignments. The compound site locations identified for each NOR enable easy access to key construction zones and arterial routes. Examples of facilities include: Site offices including lunchrooms and ablution facilities Services connections (power, water and communications) Car parking, waste management and re-fuelling facilities Laydown areas and lockable storage containers Workshop space and plant / equipment storage areas and maintenance facilities Wheel washing and cleaning facilities Facilities for pre-casting products. The use of these compounds will only be required during the construction period and will be reinstated upon completion of the works.
Reconnecting property access Service lanes Access roads / driveways	There may be temporary disruptions to property access during construction. Where this is required, it will be discussed in advance with the affected user / owner. An access way assessment has been carried out on all legal accesses. As required, accesses have been included in the NOR boundary to enable reintegration to the permanent corridor. Where it has been determined that legal safe access cannot be reinstated after construction (e.g., due to gradient, angle, proximity), the property in its entirety is included in the designation.

8.4.3 Approximate activities duration and construction programme

Table 8.3 sets out the expected construction timing[6] and duration of each project within the Warkworth Package. The projects are generally expected to be constructed in a staged method along the corridor, however the exact approach will be confirmed at the detailed design and Outline Plan stage.

Table 8.3: Transport corridor construction timing and expected duration of programme

Notice	Project	Approximate timing of construction (implementation)	Approximate duration of construction
NOR 1	Northern Public Transport Hub and Western Link – North	2028 - 2033	2 – 3 years
NOR 2	Woodcocks Road (Western Section)	2028 - 2033	2.5 – 3.5 years
NOR 3	State Highway 1 – South	2028 - 2033	2.5 – 3.5 years
NOR 4	Matakana Road	2028 - 2033	2.5 – 3.5 years
NOR 5	Sandspit Road	2038 – 2043	2.5 – 3.5 years
NOR 6	Western Link – South	2028 – 2033	2.5 – 3.5 years
NOR 7	Sandspit Link	2038 – 2043	3 – 4 years
NOR 8	Wider Western Link – North	2033 – 2038	2 – 3 years

The construction of the projects will be undertaken within a management plan framework (see Section 21) and will be consistent with the conditions of each of the designations. If at the time of delivery, contractors are required to undertake activities that are not within the scope of the designations (or future resource consents) additional authorisations may need to be obtained.

8.5 Approach to the assessment of effects

Section 171(1) of the RMA sets out the matters that must be considered by a territorial authority in making a recommendation on a NOR for a new designation.

The assessment of effects on the environment has been limited to matters that trigger a district plan consent requirement under the AUP:OP as these are the only activities authorised by the designations. Where NES or regional plan consenting requirements are triggered, these will not be authorised by the designations and will require resource consents in the future. Notwithstanding this, relevant national and regional resource consent matters have been considered to inform the design of the projects, the alternatives assessment process and the designation footprint.

[6] Warkworth DBC Appendix N : Warkworth Proposed Staging Considerations

Prior to construction, the Project will require NES and regional resource consents for a number of activities to enable the construction and operation of the projects. These resource consents will be sought when detailed design for the Project is completed in order to understand the actual or potential effects of the activities that require consent and define the measures proposed to manage any adverse effects.

8.6 Approach to assessing the likely receiving environment

As set out above, a key purpose of these NORs is to protect the necessary transport network that will support the future urbanisation of Warkworth. Accordingly, it is anticipated that the network will not be constructed and operational until urbanisation of the Warkworth growth areas has at least been confirmed or is under development.

Assessing the effects on the environment solely as it exists today (i.e. at the time of this assessment) will therefore not provide an accurate reflection of the environment in which the effects of the construction and operation of the transport infrastructure will be experienced.

Within the Warkworth growth areas there are a range of existing and future urban zoning patterns, which influence the likely future environment for assessment purposes. The projects which are within existing urban zoning that is not identified for future urban growth are not likely to materially change in the future. Whereas those projects within areas that are currently rural zoned but have recently been live zoned or up-zoned for urban development, or have a future urban zoning (FUZ) are likely to experience material change because of the urbanisation contemplated by the operative planning provisions.

The Table 8.4 sets out our understanding of the current land use zoning, its likelihood of change and its potential future zoning for the Warkworth area.

Table 8.4: Land use likelihood of change based on current and potential future zoning

Land use today	Zoning type	Likelihood of change for the environment	Likely future environment
Residential	Residential	Low	Urban
Business	Business	Low	Urban
Open Space	Open Space	Low	Open Space
Special Purpose	Special Purpose	Low	Special Purpose
Rural	Countryside Living	Low	Rural
	Mixed Rural Use	Low	Rural
Greenfield / Rural	FUZ	High	Urban
Greenfield / Rural	Residential or Business	High	Urban

Where transport infrastructure is within FUZ, it is likely the construction of the infrastructure will occur ahead of, or in parallel to, the urbanisation of these areas. Accordingly, when considering the environment within which the effects of the construction and operation of the transport infrastructure is likely to occur, it is important to consider the likely future environment for each NOR.

Where relevant, the urban land use patterns outlined in Auckland Council's Structure Plan for the Warkworth growth areas has been considered together with proposed plan changes informed by how far advanced they are through the plan making process.

The likely future environment assessment has also been guided by overlays within the AUP:OP which identify features considered to be of high natural, cultural or heritage value with associated controls that apply to development which may adversely affect those features. The overlays and protective rules provide useful guidance on areas that are likely to remain unchanged or undeveloped in the future urban environment.

Section 9 of this AEE sets out the receiving environment including the existing environment and likely future environment for each NOR within the Warkworth Package.

8.7 Approach to the interface between the Warkworth Package and other projects

There are several projects being developed in Warkworth that will integrate with or affect the Warkworth Package.

Given the long-term delivery of the projects within the Warkworth Package, the assessment of effects considers the operational impacts of the Warkworth Package in the context of full build out of all urban areas at 2048+. This therefore accounts for the wider infrastructure upgrades not being progressed by Te Tupu Ngātahi that are anticipated to be in place at the time the Warkworth Package is operational.

Table 8.5 summarises these projects and demonstrates how their delivery may affect the Warkworth Package.

Table 8.5: Interface of the Warkworth Package with other projects

Project	Interface with the Warkworth Package	Status and agent
Ara Tūhono (Puhoi to Warkworth) Motorway – Section 1 Extension of motorway from the Johnstone's Hill tunnels to Warkworth. Expected Outcomes: The project will provide a safer, more resilient, and reliable route between Pūhoi and Warkworth.	Ara Tūhono (Puhoi to Warkworth) motorway is currently being constructed to provide a new route between Puhoi and Warkworth. It is expected this will reduce traffic on the existing SH1 and allow SH1 to provide an arterial function. Expected opening is 2023. The Warkworth Package ties into the Ara Tūhono project at the western extent of the Woodcocks Road Upgrade. The upgrade of Woodcocks Road will provide a safer, more resilient link to central Warkworth from Ara Tūhono. The new Wider Western Link – Northern Section provides access to the southern growth area of Warkworth from the new Ara Tūhono motorway interchange.	**Expected to open 2023** **Waka Kotahi**
Ara Tūhono (Warkworth to Wellsford) Motorway – Section 2	Waka Kotahi continues to work towards securing land designation and resource consents for the Warkworth to Wellsford project. NOR appeals were filed with the Environment Court in July 2021.	**Notice of Requirement, appeals closed 2021**

Project	Interface with the Warkworth Package	Status and agent
Extension of motorway from Warkworth to Wellsford Expected Outcomes: The project will provide a safer, more resilient and reliable route between Warkworth and Wellsford.		**Waka Kotahi**
Te Honohono ki Tai – Matakana Link Road New road connecting Matakana Road and SH1 Expected Outcomes: Facilitate future growth and improve safety and resilience for access to eastern beaches.	The Warkworth Package ties into Te Honohono ki Tai at Matakana Road. The Matakana Link Road will connect Matakana Road and Sandspit Road which will tie into the eastern end of Te Honohono ki Tai. The Warkworth Package also includes an upgrade to Matakana Road to coincide with urbanisation of the surrounding area. The new Western Link - North (associated with the Northern Public Transport Hub) ties into the intersection with Te Honohono ki Tai.	**Expected to open 2023** **AT**
Improvements to the Hill Street / SH1 intersection Redesign and upgrade of the intersection to facilitate ease of access and way finding for all modes through the intersection.	The Warkworth Package includes an upgrade to Sandspit Road and an upgrade to Matakana Road. These road upgrades will complement the Hill Street intersection improvement. Sandspit Road and Matakana Road are important arterial routes that link Warkworth to communities such as Matakana, Omaha and Snells Beach via the Hill Street intersection.	**Expected to open 2026** **AT**
The Warkworth Community Transport Hub Interim Park and Ride facilities Expected Outcomes: Support mode shift in Warkworth	The Warkworth Community Transport Hub was constructed as an interim solution to supporting mode shift in Warkworth. The Warkworth Package includes a new location for a Public Transport Hub with greater capacity in anticipation of further growth and usership of shared modes in Warkworth.	**Completed** **AT**

9 Strategic context and receiving environment

Section 9.1 provides an overview of the strategic context across the Warkworth area. Each NOR in the Warkworth Package is specifically discussed in Sections 9.3 to 9.10 including a description of the existing environment and likely future environment for each project. For detailed discussion of specialist topics, refer to Volume 4: Supporting Technical Reports.

9.1 Overview of the strategic context

9.1.1 Warkworth Structure Plan

The Warkworth Structure Plan was adopted by Auckland Council in June 2019. The Structure Plan sets out the pattern of land uses and supporting infrastructure network for the future growth areas of Warkworth. The land use will be progressively 'live zoned' through private and Auckland Council initiated plan changes. Figure 9.1 shows the indicative land uses as set out in the Structure Plan.

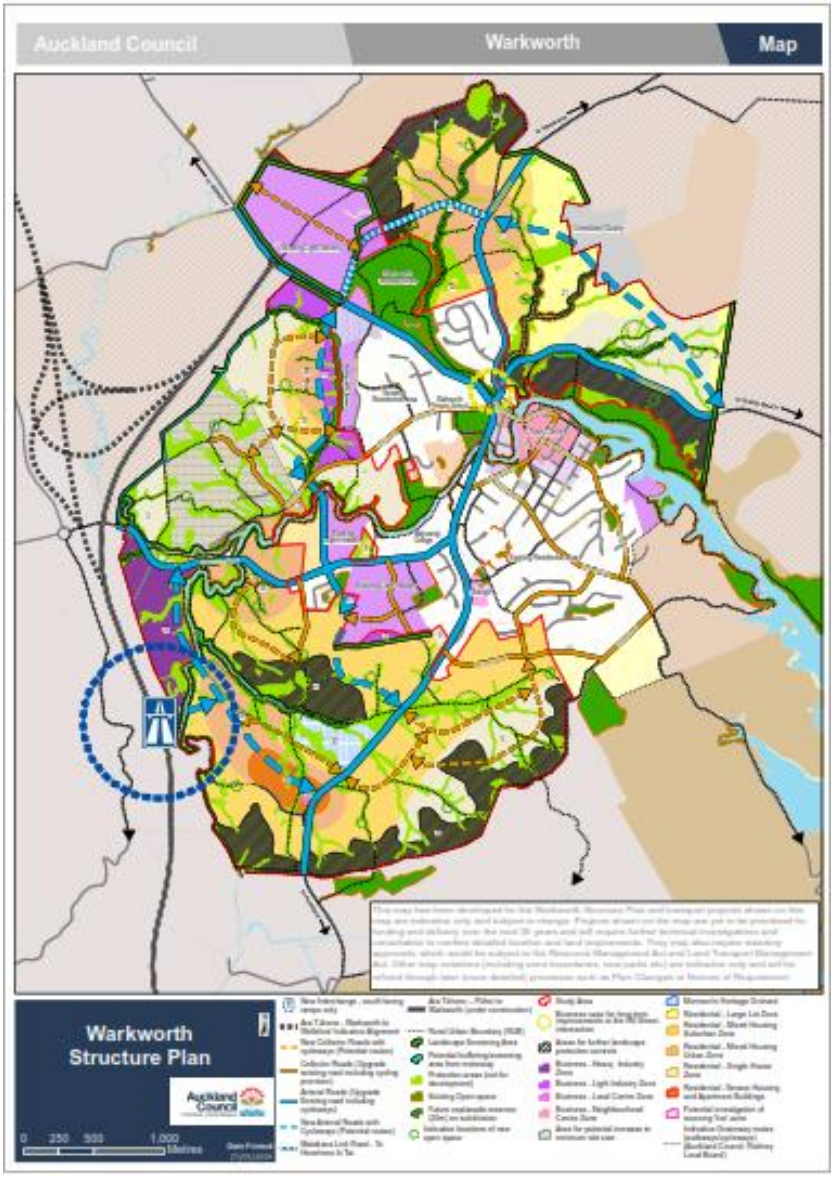


Figure 9.1: Warkworth Structure Plan

9.1.2 Plan changes and resource consents

There are numerous developer interests in the wider Warkworth area, with some areas already live zoned and others preparing plan change documents and resource consent applications or with lodged applications. These include:

Plan Change 25 (Warkworth North) was approved in March 2020**.** The plan change has resulted in the rezoning of approximately 99 hectares of FUZ land to a mix of business and residential zones to provide for 1,000-1,200 dwellings, 13 hectares of industrial / commercial land and a new neighbourhood centre. The resultant zoning has a higher density than previously expected, a local centre and additional mixed-use zoned land. Results of recent appeals have confirmed that the residual FUZ zoning in the Plan Change area adjacent SH1 will remain as general business zoning.

Plan Change 72 (McKinney Road, Warkworth) seeks to rezone approximately 8.2 hectares of land north of McKinney Road, from FUZ to Residential – Mixed Housing Suburban and to introduce a new precinct within the AUP:OP to address wastewater infrastructure staging, transport network, ecology, and water quality effects. It will also extend the SMAF 1 overlay across the plan change area. The plan change will enable approximately 150 to 200 dwellings to be built. The plan change has been approved, subject to appeals.

Waimana Warkworth South Proposed Plan Change seeks to rezone 165 hectares of land to provide for 1600 new residential lots, parks, a retail / business centre, public transport hub and possibly a school. The proposed plan change also recognises an opportunity for a future public transport interchange and the wider western link. The plan change is currently being reviewed by Auckland Council and is yet to be publicly notified.

The Kilns Limited Sandspit Road Private Plan Change and Resource Consent Application - a Private Plan Change application was made to Auckland Council in September 2021 for the rezoning of the site(s) at 34 and 36 Sandspit Road. The application is currently on hold awaiting further information from the applicant and is yet to be opened for public submission. A resource consent application was subsequently made to Council in April 2022 for the residential development of the site(s) 34 and 36 Sandspit Road, including enabling works and associated infrastructure. The application was publicly notified in June 2022, with a hearing on the resource consent application held on 28 and 29 March 2023. At the time of writing no decision had been made on the consent application.

Proposed Plan Change 78 (Intensification) has been prepared in response to the National Policy Statement on Urban Development (NPS-UD) and requirements of the RMA to enable more intensive development in and around neighbourhood, local, town and city centres and rapid transit stops and incorporate Medium Density Residential Standards into the AUP:OP. Areas of residentially zoned land adjacent to Woodcocks Road, Great North Road, SH1, Matakana Road, and McKinney Road are proposed to be upzoned from Single House Zone to Mixed Housing Urban Zoned and Mixed Housing Urban Zone to Terrace Housing and Apartment Building Zone.

Mason Heights, Warkworth Resource Consent Application – A resource consent application was made to Council in February 2021 to undertake a 72-lot subdivision on a site located within the FUZ consisting of 71 residential lots and 1 lot set aside for future light industry or commercial activities. The application was publicly notified on February 2022, with a hearing scheduled for 18 April 2023. At the time of writing no decision had been made on the consent application.

9.2 Overall hydrological context

The Warkworth Package falls within the Warkworth stormwater catchment which has an overall area of approximately 5,893 hectares with the township of Warkworth at its outlet. The extent of the catchment is shown in Figure 9.2. The main river running through the catchment is the Mahurangi River. Many unnamed tributaries within the Warkworth catchment feed into the Mahurangi River, which runs past the Warkworth Town Centre before discharging to the Mahurangi Harbour.

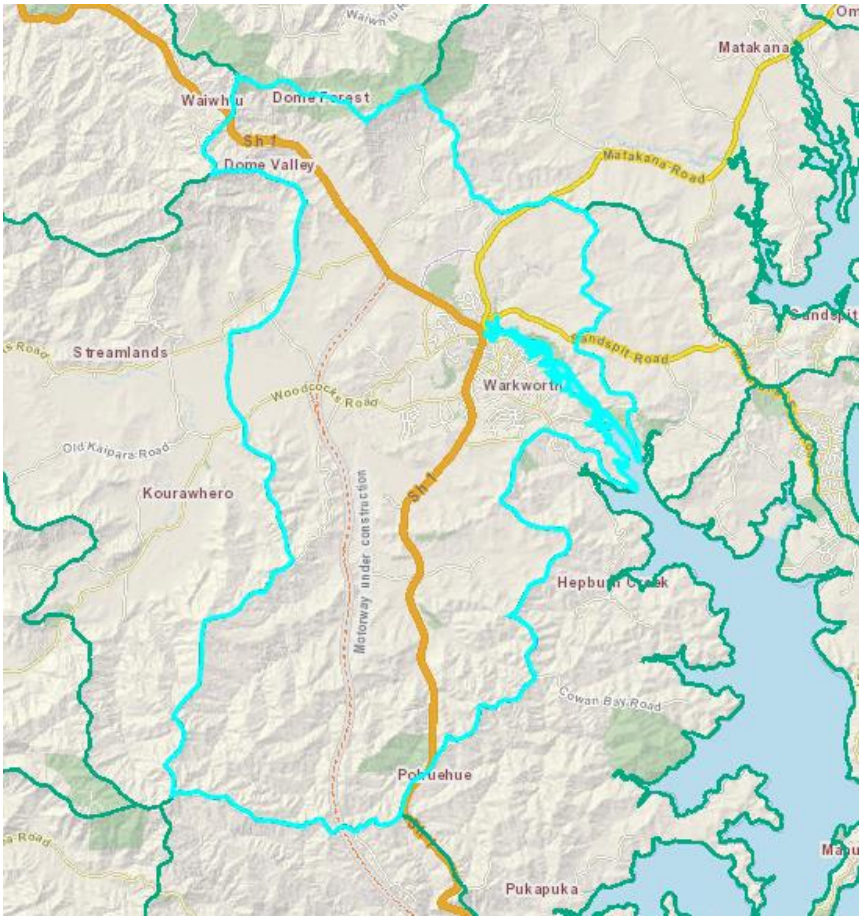


Figure 9.2: Warkworth Stormwater Catchment Boundary outlined in blue

9.3 NOR 1 – Northern Public Transport Hub and Western Link – North

9.3.1 Project overview

The new designation will provide for:

a) A new Northern Public Transport Hub and associated facilities including a park and ride, cycle storage, electric charging facilities and bus layover spaces to support Warkworth Town Centre services; and
b) A new urban arterial cross section with active mode facilities between the intersection of SH1 and Te Honohono ki Tai - Matakana Link Road to the proposed bridge crossing.

The new Northern Public Transport Hub will provide a long-term public transport interchange to support a more resilient public transport system and help to transition Warkworth to a low carbon transport network. The Northern Public Transport Hub will support regional and interregional public transport access for northern Warkworth, and the provision of a park and ride facility will support the wider rural catchments of the Kōwhai Coast to use public transport for longer interregional trips.

The new Western Link – North will enable access to the North Warkworth Precinct in the north Warkworth growth area, including a proposed local centre. The corridor will support mode shift by enabling reliable bus access to northern Warkworth and by future proofing for bus lanes to support the corridors function as a key public transport link for Warkworth. The corridor will provide safe and connected active mode facilities to support active mode access. The corridor provides an alternative north-south route to SH1 that will reduce the pressure on the existing SH1 / Hill Street intersection, increasing resilience. It will also provide direct connectivity to Te Honohono ki Tai-Matakana Link Road to improve access to the Kōwhai Coast and surrounding rural areas.

The designation footprint as shown in Figure 9.3 shows the envelope required to construct, operate and maintain the Northern Public Transport Hub and Western Link – North project. The designation footprint includes sufficient space for the intersections with the future Western Link - North and SH1, and all ancillary components including construction areas, stormwater infrastructure, batter slopes and retaining walls.

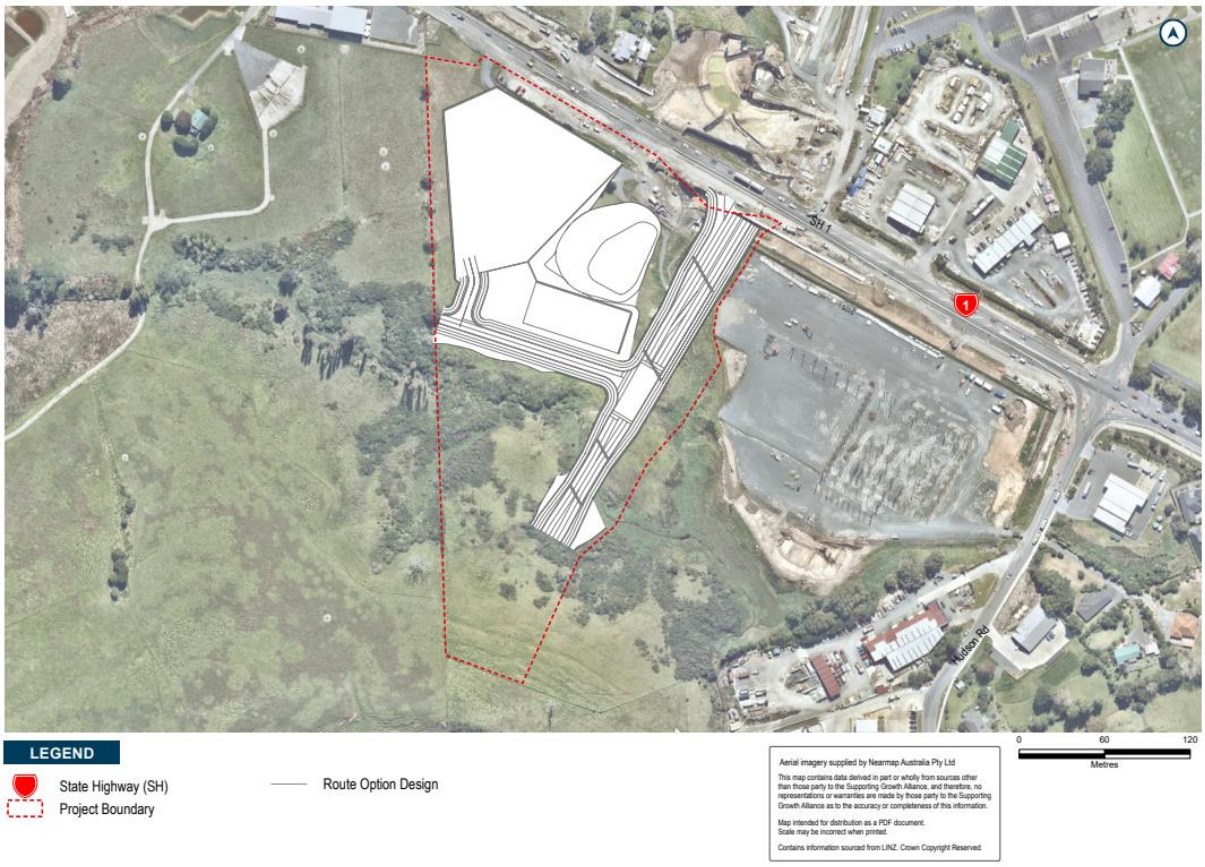


Figure 9.3: NOR 1 – Northern Public Transport Hub and Western Link – North indicative designation footprint

The key features of the Northern Public Transport Hub and Western Link – North project include:

A new Northern Public Transport Hub located adjacent to the intersection of SH1 and the new Western Link - North including all associated facilities such as a park and ride, cycle storage, electric charging facilities and bus layover spaces to support Warkworth Town Centre services
Tie-ins with existing roads and localised widening around the existing intersections to accommodate new intersection forms
New or upgraded stormwater ponds, bridges and culverts (where applicable)
Batter slopes to enable widening of the corridor, and associated cut and fill earthworks
Vegetation removal along the existing road corridor
Other construction related activities required outside the permanent corridor including the re-grade of driveways, construction traffic manoeuvring and construction laydown areas.

Figure 9.4 shows the indicative cross section for the Western Link – North.

Figure 9.4: NOR 1 – Indicative cross section for the Western Link - North

9.3.2 Receiving environment for NOR 1

Table 9.1 provides a summary of the relevant receiving environment features within which the project will be constructed, operated, and maintained.

Table 9.1: Summary of relevant receiving environment features for NOR 1

Features	Description
Planning context and land use	
Current land use and urban form	The site is currently rural in nature with one residential property located near the centre of the site and construction activities associated with the Ara Tūhono (Puhoi to Warkworth) motorway project along the road edge of the site.
Current zoning	Future Urban Zone Business – General Business Zone

Features	Description
Likely future zoning – Warkworth Structure Plan	Business – Light Industry Zone Business – General Business Zone.
Overlays	High-Use Stream Management Areas Overlay High-Use Aquifer Management Areas Overlay.
Controls	Macroinvertebrate Community Index Stormwater Management Area Control (south of the Northern Public Transport Hub and Western Link - North (Public Transport Hub Section)) Vehicle Access Restriction Control (Motorway Interchange Control).
Existing designations	Designation 6763 – State Highway 1 from Titfords Bridge, Puhoi to Ross Road, New Zealand Transport Agency Designation 6764 – Road widening, State Highway 1 intersection with Hudson Road, New Zealand Transport Agency Designation 6769 – Construction, operation and maintenance of a State Highway (Ara Tūhono Pūhoi to Wellsford Road of National Significance: Pūhoi to Warkworth Section), State Highway 1, Puhoi to Warkworth, New Zealand Transport Agency.
Human environment	
Transport	*Existing Environment* The existing Warkworth public transport network is largely reflective of the predominantly rural or semi-rural environment. The buses are relatively infrequent and Auckland city bound services are supplemented by private bus services (the Mahu Express). The core focus of the current public transport route services is focused on the Warkworth Town Centre. The Town Centre experiences significant congestion and has limited facilities for drivers, layover facilities and other ancillary activities such as charging. To address this immediate need, the Rodney Local Board worked with AT to provide an interim facility in the north of Warkworth. The interim facilities include 137 parking spaces, two bus stops and a bus layover. While the site has been designed to support an immediate need, it is bound by SH1 and the Mahurangi River with limited opportunities to expand. The site is not adequate to accommodate the forecasted increase in demand for park and ride, bus stops, bus layovers and charging facilities. It also does not provide sufficient space to provide for driver facilities required to support operational increases in bus services. *Likely Future Environment* By 2038, there is likely to be significant increase in public transport services, largely as a response to the majority of land release in Warkworth being completed. The exception to this is the north eastern growth areas, which is forecast to be the last land area released. It is anticipated that there will be a public transport interchange located at the subject site (known as a Northern Public Transport Hub) and an additional southern public transport interchange located to the south of Warkworth. It is assumed that both new public transport interchanges and the park and ride will be operational and will be serviced by a number of public transport routes. The southern station in particular will provide a terminus for up to four routes, and the northern station will provide charging and layovers for up to four services.

Features	Description
Historic heritage and archaeological values	*Existing Environment* There are no recorded historic heritage or archaeological sites on the subject site. Any unrecorded archaeological sites are protected under provisions of the Heritage New Zealand Pouhere Taonga Act 2014 (HNZPTA) but will not be uncovered until works commence (if present). *Likely Future Environment* The existing environment as it relates to historic heritage and archaeological values is likely to remain the same in the future.
Community and recreational facilities	*Existing Environment* There are no community and recreational facilities on the subject site. The site is located approximately 500 m north of the Warkworth Show Grounds and Mahurangi Rugby Club. The Warkworth Town Centre is located approximately 2 km from the site. *Likely Future Environment* It is likely additional community facilities will be provided in the wider surrounding area as the population increases. However, as the subject site and surrounding land uses are expected to be zoned for industrial and business land uses, additional community and recreational facilities in proximity to the site are anticipated to be limited.
Noise and vibration	*Existing Environment* The site for the Northern Public Transport Hub is currently located in a rural environment with few dwellings nearby. The noise environment is dominated by road traffic noise from vehicles using SH1. *Likely Future Environment* The subject site and surrounding land uses are expected to be zoned for industrial and business land uses. This zoning would likely result in an increase in ambient noise levels.
Natural and physical environment	
Geology	The underlying geology of the site is expected to be Mahurangi Limestone. The geological conditions are not anticipated to vary in the future.
Hydrology and natural hazards, including watercourses	*Existing Environment* An unnamed stream runs through the site from south to north. The site is affected by the existing flooding of SH1 due to the existing SH1 culvert. Existing flood prone areas have been identified by Auckland Council GeoMaps on the eastern edge of the site and across SH1. *Likely Future Environment* Although urban development is anticipated to change the hydrological environment through increases to impervious surface and associated runoff, the natural hazard conditions are not expected to significantly vary in the future, provided new urban development manages its flooding effects. It is understood that the Ara Tūhono (Puhoi to Warkworth) motorway project will replace the existing culvert underneath SH1 which connects to the site with a larger 2.4 m diameter culvert on the existing culvert alignment. This will reduce the risk of SH1 overtopping, flooding of the SH1 and Te Honohono ki Tai (Matakana Link Road) intersection and upstream of the culvert inlet. A new wetland on the site will provide water

Features	Description
	quality treatment and attenuation for the additional impervious area created by the Public Transport Hub.
Terrestrial ecology	*Existing Environment* Habitat The ecological features associated with the Public Transport Hub and park and ride footprint are mainly characterised by a south-east facing hillslope bordered by two stream wetland complexes; one to east and one to the south of the footprint. Terrestrial areas mainly consist of exotic pasture species and gorse. Wetland areas are indicated by exotic grass and sedges. The area is associated with an unnamed tributary of the Mahurangi River. Species Long-tailed bats have been recorded within a 3km radius of the site. A number of avifauna have been observed or are likely to appear in the project area, including a number of Threatened – At Risk (TAR) species including Australasian bittern, New Zealand pipit and Spotless crake. There are records of Copper skink, inhabiting the project area. Two existing wetlands are associated with the area, they are: WW1-W1 is a natural inland wetland assessed as having a moderate ecological value. It is a known foraging area for Australasian bittern. It is also a known nesting and foraging area for spotless crake WW1-W2 is a natural inland wetland assessed as having a low ecological value. It is not likely a supporting habitat for any TAR species. *Likely Future Environment* The AUP:OP places emphasis on the protection and enhancement of existing watercourses such as the Mahurangi River, wetlands and areas of significant natural value, such as riparian vegetation. If these features are retained, in a future scenario, these features of ecological value could be similar or in some cases enhanced. It is also assumed that stormwater management will be provided, and sediment and pollutants will be controlled through development applications. Mature trees associated with roadside and shelterbelt are expected to be removed in the future environment as vegetation clearance (excluding within riparian areas, notable trees and certain street trees) is permitted under the AUP:OP and unlikely to remain in an urbanised scenario.
Topography and landscape context	*Existing Environment* The designation and surrounding area are on the existing urban fringe of Warkworth to the west. Adjacent to the designation is a developing industrial area. The landscape is dissected by the existing SH1, which runs parallel to the designation. To the north, Te Honohono ki Tai (Matakana Link Road) provides a new transport corridor through a once rural landscape, which is in the process of being urbanised. The area is relatively flat, with elevated land to the north and south. The designation is located away from prominent landforms. The hill above the designation, between Hudson Road and Falls Road, is a notable landform in Warkworth. *Likely Future Environment* Through zoning and precincts in the AUP:OP, it is anticipated that the future area of the designation and surrounding landscape will be characterised by business activities

Features	Description
	(including light industry, a local centre and mixed use), residential urban mixed housing, FUZ, and open space for sport and active recreation (to the north across the current SH1). It is acknowledged that the area may undergo some landform modifications as part of the urbanisation process of Warkworth separate to the Warkworth Package.

9.4 NOR 2 – Woodcocks Road (Western Section)

9.4.1 Project overview

Woodcocks Road is an existing arterial corridor, which provides an important east-west connection from SH1 in the east to Ara Tūhono (Puhoi to Warkworth) motorway in the west.

The new designation will provide for the upgrade of the existing rural section of the Woodcocks Road corridor from the interchange with Te Ara Tūhono (Puhoi to Warkworth) motorway in the west to the Mansel Drive intersection in the east to an urban arterial with active mode facilities.

Urbanisation of the existing rural section of Woodcocks Road will connect key land uses along the corridor and the provision of safe walking and cycling facilities on Woodcocks Road will contribute to a connected active mode network in Warkworth, enabling the transition to a low carbon transport network and supporting the desired compact urban form.

The remainder of the Woodcocks Road corridor from the intersection with Mansel Drive through to SH1 (the urban section) is not being designated as the existing road space can be reallocated to upgrade the road corridor to provide for dedicated walking and cycling facilities.

The designation footprint in Figure 9.5 shows the envelope required to construct, operate and maintain the Woodcocks Road project. The designation footprint includes sufficient space for the intersections with the Wider Western Link and all ancillary components including construction areas, stormwater infrastructure, batter slopes and retaining walls.

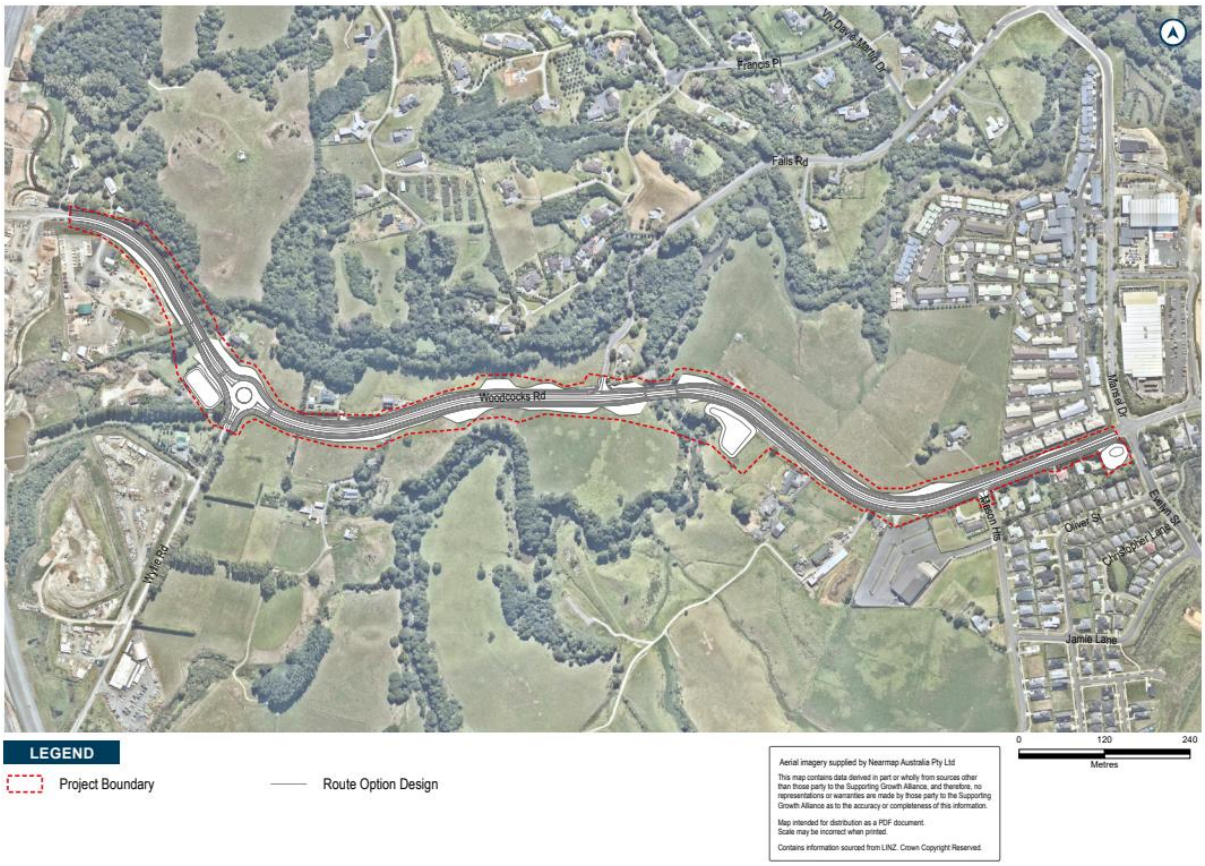


Figure 9.5: NOR 2 – Woodcocks Road indicative designation footprint

The key features of the Woodcocks Road project include:

Widening of Woodcocks Road from its current general width to an urban arterial cross section including cycle lanes and footpaths

Tie-ins with existing roads and localised widening around the existing intersections to accommodate new intersection forms.

New or upgraded stormwater ponds, bridges and culverts (where applicable)

Batter slopes to enable widening of the corridor, and associated cut and fill earthworks

Vegetation removal along the existing road corridor

Other construction related activities required outside the permanent corridor including the re-grade of driveways, construction traffic manoeuvring and construction laydown areas.

Figure 9.6 shows the indicative cross section for the Woodcocks Road project.

Figure 9.6: NOR 2 - Indicative cross section for the Woodcocks Road project

9.4.2 Receiving environment for NOR 2

Table 9.2 provides a summary of the relevant receiving environment features within which the project will be constructed, operated, and maintained.

Table 9.2: Summary of relevant receiving environment features for NOR 2

Features	Description
Planning context and land use	
Current land use and urban form	The eastern end of Woodcocks Road is urbanised in nature, with residential and industrial land uses bordering both sides of the road. Further west, surrounding land uses become more rural in nature.
Current zoning	Future Urban Zone Residential – Single House Zone Residential – Mixed Housing Suburban Zone.
Likely future zoning – Warkworth Structure Plan	Residential – Mixed Housing Suburban Zone Residential – Mixed Housing Urban Zone Open Space Zones Business – Heavy Industry Zone.
Overlays	High-Use Stream Management Overlay Significant Ecological Areas (SEA) Overlay (terrestrial) High-Use Aquifer Management Areas Overlay.
Controls	Macroinvertebrate Community Index Stormwater Management Area Control - Flow 1.
Existing designations	6769, State Highway 1 – Puhoi to Warkworth, New Zealand Transport Agency
Human environment	
Transport	*Existing Environment* The posted speed limit along Woodcocks Road is currently 60 km/h between

Features	Description
	Mason Heights and Falls Road, the speed limit then becomes unrestricted through the remainder of the rural section. Woodcocks Road is rural in character with two general traffic lanes (one in each direction). There is no kerb and channel on either side of the corridor and no footpaths. Woodcocks Road connects to SH1 to the east of the corridor. The latest traffic data for the rural portion of Woodcocks Road shows that the corridor has an Annual Average Daily Traffic (ADT) count of 4,529. There are no existing bus services on Woodcocks Road. There are three intersections along the corridor as follows: Woodcocks Road / Wyllie Road - priority controlled intersection Woodcocks Road / Falls Road - priority controlled intersection Woodcocks Road / Mason Heights - no control. *Likely Future Environment* It is expected that the upgraded road will have an urban character with two general traffic lanes (one in each direction) and a central median, with a posted speed limit of 60 km/h. There will be a consistent corridor form with kerb and channels on both sides and continuous footpaths and cycle facilities. There will be connections to SH1 to the east, connections to the Wider Western Link to the south and the Western Link to the west. The indicative 2048 AT bus network forecasts 8 buses during the peak hour along the road. The forecast ADT in 2048 is 9,000 vehicles. The Woodcocks Road / Falls Road intersection is likely to be closed-off. There will be two intersections along the road including: Woodcocks Road / Wyllie Road/ Wider Western Link – single-lane roundabout Woodcocks Road / Mason Heights – priority-controlled intersection.
Historic heritage and archaeological values	*Existing Environment* There are no recorded historic heritage sites within the designation footprint that will be impacted by the upgraded transport corridor, however the following archaeological features are present within the designation footprint: Archaeological site: R09/2244 (Cherry's Bridge). Colonial period site construction in 1937 named after local landowner Francis Cherry. No surface evidence of 19th Century structures visible due to vegetation in the area Archaeological site: R09/2247 (artefacts). Site was recorded in 2018 during earthworks for the construction of Ara Tūhono (Puhoi to Warkworth) motorway. A number of wooden artefacts were encountered in a former tributary of the Mahurangi River Auckland Council CHI site: 17004 (WWII Camp). This is the site of one of several WWII camps around Woodcocks Road. *Likely Future Environment* There is some potential for archaeological or historic material and features from R09/2244 (Cherry's Bridge), R09/2247 (artefacts), and 17004 (WWII Camp) to be affected by the road upgrade works. However, the environment as it relates to historic heritage and archaeological values is otherwise likely to remain the same in the future.
Community and	*Existing Environment*

Features	Description
recreational facilities	There are no community or recreational facilities along the designation corridor of Woodcocks Road. Mahurangi College is located approximately 1 km east of the designation boundary. There is a Mitre 10 Mega located on Mansel Drive, and a landscape and garden supplies store near the intersection of Woodcocks Road and Wyllie Road. *Likely Future Environment* It is likely additional community facilities will be provided in the wider surrounding area as the population increases. Recreational opportunities are also likely to increase as the area develops. Schools in the area are expected to remain and could grow as the population in the area increases.
Noise and vibration	*Existing Environment* The noise environment is dominated by road traffic noise from vehicles on Woodcocks Road. *Likely Future Environment* The Warkworth Structure Plan indicates that the area surrounding Woodcocks Road is likely to be zoned as Residential. This zoning would likely result in an increase in ambient noise levels as the area urbanises.
Natural and physical environment	
Geology	The underlying geology of the road corridor is expected to be Pakiri Formation and alluvium. The geological conditions are not anticipated to vary in the future.
Hydrology and natural hazards, including watercourses	*Existing Environment* Woodcocks Road has two bridge crossings across the Mahurangi River. The first is located east of Falls Road and the second is located adjacent to 2 Wyllie Road. There are no significant floodplains impacting the road. Existing flood prone areas have been identified by Auckland Council GeoMaps along the periphery of the Mahurangi River which runs along the northern edge of Woodcocks Road. *Likely Future Environment* Although urban development is anticipated to change the hydrological environment through increases to impervious surface and associated runoff, the natural hazard conditions are not expected to significantly vary in the future, provided new urban development manages its flooding effects. The two existing bridges will be upgraded as part of the road upgrade works. Flood modelling will be required at the detailed design phase to confirm the bridges will comply with the NOR conditions. The aim being to stay within flood design criteria, particularly with the downstream catchments being future development, which could occur before this NOR is constructed.
Terrestrial ecology	*Existing Environment* <u>Habitat</u> The corridor features an east-west alignment, crossing the right branch of the Mahurangi River and running parallel to the left branch for approximately 800m. The riparian features associated with the Mahurangi River north of Woodcocks Road constitutes a terrestrial SEA (T 6676). The SEA is relatively consistent with a Kauri, podocarp broadleaved forest type. However, the portion of the SEA north of the Mahurangi River (left branch) crossing is more consistent with a native and

Features	Description
	exotic treeland mix. To the south of the crossing the riparian features are generally consistent with Kanuka shrub forest. The Woodcocks Road upgrade section is associated with three tributaries of the Mahurangi River (two left branch tributaries, and one right branch tributary). Two wetlands as defined by the NES-F are associated with this section of Woodcocks Road. Both of these wetlands have been assessed as unlikely to be habitats for TAR species WW2-W1 is a natural inland wetland assessed as having low ecological value WW2-W2 is a natural inland wetland assessed as having low ecological values. Species Long-tailed bats have been recorded within a 2.3km radius of the area. A number of avifauna have been observed or are likely to appear in the project area including a number of TAR species. Black shag, Little black shag, Little shag, Long-tailed cuckoo, New Zealand pipit, North Island kākā and Pied shag are all likely to inhabit the surrounding area. There are records of a large range of herpetofauna inhabiting the area too such as; Copper skink, Elegant gecko, Forest gecko, Ornate skink and Pacific gecko. It is also likely a number of invertebrates inhabit the area including flax snails, large land snails and Auckland tree wētā. *Likely Future Environment* The AUP:OP places emphasis on the protection and enhancement of existing watercourses such as the Mahurangi River, wetlands and areas of natural value, such as riparian vegetation. If these features are retained, in a future scenario, these features of ecological value could be similar or in some cases enhanced. It is also assumed that stormwater management will be provided, and sediment and pollutants will be controlled through development applications. Mature trees associated with roadside and shelterbelt are expected to be removed in the future environment as vegetation clearance (excluding within riparian areas, notable trees and certain street trees) is permitted under the AUP:OP and unlikely to remain in an urbanised scenario.
Topography and landscape context	*Existing Environment* Woodcocks Road is currently a rural road. Within the designation and adjacent area, there is an extensive amount of pastural farmland, which is fragmented in places by native bush and the sinuous left and right branches of the Mahurangi River. Towards the eastern extent of the designation there is an existing residential area on either side of the road. The designation is within the flat basin west of Warkworth Town Centre. Rolling hills gently extend upwards to the north and south of Woodcocks Road. *Likely Future Environment* As part of the AUP:OP zoning, it is expected that the future area will be largely urbanised, with the exception of Open Space Conservation zoned land adjacent the Mahurangi River. The existing residential area at the eastern extent of the designation is zoned as Residential Single House and Residential Mixed Housing on the southern side of Woodcocks Road, and Residential Mixed Housing on the northern side of the road. Although, the designation is located away from prominent landforms, views of the transport corridor will likely be attainable from

Features	Description
	adjacent raised areas, such as along Viv Davie-Martin Drive looking south.

9.5 NOR 3 – State Highway 1 – South

9.5.1 Project overview

The existing SH1 bisects Warkworth and plays a key role for traffic moving through Warkworth, as well as for traffic travelling within Warkworth. When Ara Tūhono (Pūhoi to Warkworth) motorway opens the role of the existing SH1 will change. Much of the existing traffic through Warkworth will shift from SH1 to Ara Tūhono, allowing this part of SH1 to function as an urban arterial, as opposed to a state highway as a main central route for public transport as well as active modes. Waka Kotahi is currently undertaking a revocation process of the existing State Highway status in anticipation of the opening of the new SH1 corridor to then transfer of the urban arterial corridor to AT.

A new designation will provide for the upgrade of the existing SH1 corridor between Fairwater Road and the southern Rural Urban Boundary from Valerie Close to an urban arterial cross-section with active mode facilities.

The upgrade of SH1 – South will provide improved access to and from social and employment opportunities in the south Warkworth growth area and the Warkworth Town Centre. Provision of multimodal facilities will support a shift from private vehicles to active modes and public transport, and a reduction in road hierarchy to an arterial function along with a reduced speed environment will support improved access east-west across SH1.

The remainder of the existing SH1 corridor through Warkworth from Fairwater Road to Hudson Road is not being designated as the existing road space can be reallocated to upgrade the road corridor to provide for dedicated walking and cycling facilities.

The designation footprint as shown in Figure 9.7 shows the envelope required to construct, operate and maintain the project. The designation footprint includes sufficient space for the intersections with McKinney Road, the Wider Western Link, Valerie Close and all ancillary components including construction areas, stormwater infrastructure, batter slopes and retaining walls.

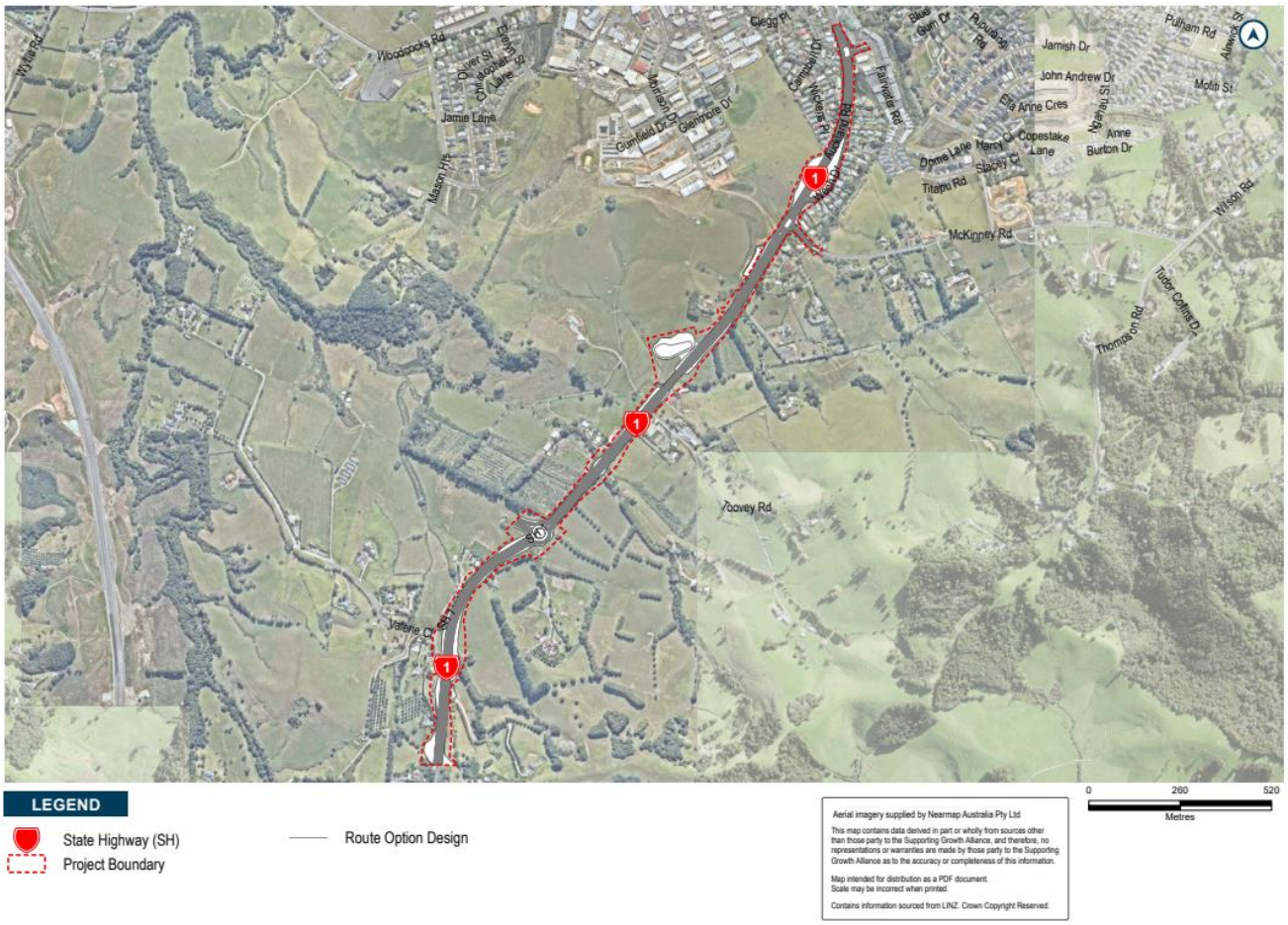


Figure 9.7: NOR 3 – State Highway 1 – South indicative designation footprint

The key features of the SH1 – South project include:

Widening and upgrading of SH1 to an urban arterial cross section including cycle lanes and footpaths
A bidirectional cycling facility from Woodcocks Road to McKinney Road
Tie-ins with existing roads and localised widening around the existing intersections to accommodate new intersection forms
New or upgraded stormwater ponds, bridges and culverts (where applicable)
Batter slopes to enable widening of the corridor, and associated cut and fill earthworks
Vegetation removal along the existing road corridor
Other construction related activities required outside the permanent corridor including the re-grade of driveways, construction traffic manoeuvring and construction laydown areas.

Figure 9.8 shows the indicative cross section for the SH1 project.

Figure 9.8: NOR 3 – Indicative cross section for State Highway 1 – South

9.5.2 Receiving environment for NOR 3

Table 9.3 provides a summary of the relevant receiving environment features within which the project will be constructed, operated, and maintained.

Table 9.3: Summary of relevant receiving environment features for NOR 3

Features	Description
Planning context and land use	
Current land use and urban form	The existing SH1 is the main highway and arterial route between Auckland, Warkworth and further north. Surrounding land uses are rural in nature, with lifestyle properties and farming activities bordering the highway. Further north towards Warkworth, residential land uses become more dominant.
Current zoning	Future Urban Zone Residential – Single House Zone Business – Local Centre Zone.
Likely future zoning – Warkworth Structure Plan	Residential – Terrace Housing and Apartment Building Zone Residential – Mixed Housing Urban Zone Residential – Single House Zone Open Space Zones.
Overlays	High-Use Stream Management Areas Overlay High-Use Aquifer Management Areas Overlay.
Controls	Macroinvertebrate Community Index Stormwater Management Area Control.
Existing designations	6763 – State Highway 1 from Titfords Bridge, Puhoi to Ross Road, New Zealand Transport Agency.
Human environment	
Transport	*Existing Environment*

Features	Description
	The posted speed limit along SH1 is currently 100 km/h from the edge of the FUZ to McKinney Road. SH1 has urban character with two general traffic lanes (one in each direction) between Woodcocks Road and Fairwater Road. This changes to rural character with two general traffic lanes (one in each direction) between Fairwater Road and Valerie Close. The latest traffic data for SH1 was obtained from AT. The data was recorded in March 2001 and shows that the corridor has an ADT count of 18,840 vehicles. SH1 currently has the following intersections: SH1 / Fairwater Road – priority-controlled intersection SH1 / Welch Drive – priority-controlled intersection SH1 / McKinney Road – priority-controlled intersection SH1 / Toovey Road – no control SH1 / Valerie Close – priority-controlled intersection. Currently there are no existing walking and cycling facilities along the rural portion of the corridor extents between Fairwater Road and Valerie Close. There is a footpath on the eastern side of the corridor and on-road cycle lanes on both sides of the corridor between Fairwater Road and Woodcocks Road. The cycle lanes are narrow and have inconsistent markings to indicate priority. There is one existing bus service along SH1. The 995 has a service frequency of every 30 minutes during the peak hour. *Likely Future Environment* It is expected that once constructed, Ara Tūhono (Puhoi to Warkworth) motorway will become SH1 and the existing SH1 will undergo a revocation process and become an urban arterial. The road will have an urban character with two general traffic lanes (one in each direction) and a central median, with a posted speed limit of 50 km/h. The road will have a consistent corridor form with kerb and channels on both sides and continuous footpaths and cycle facilities. There will be connections to the Western Link - South the Wider Western Link. The forecast ADT in 2048 is 15,400 vehicles. The following intersections are expected to be provided: SH1 / Fairwater Road – signalised intersection SH1 / Welch Drive – priority-controlled intersection SH1 / Western Link/ McKinney Road – signalised intersection SH1 / Toovey Road – priority-controlled intersection SH1 / Wider Western Link – single-lane roundabout SH1 / Valerie Close – priority-controlled intersection The indicative 2048 AT bus network forecasts 10 buses during the peak hour.
Historic heritage and archaeological values	*Existing Environment* There are no recorded historic heritage or archaeological sites along the project alignment. Any unrecorded archaeological sites are protected under provisions of the Heritage New Zealand Pouhere Taonga Act 2014 (HNZPTA) but will not be uncovered until works commence (if present). *Likely Future Environment* The existing environment as it relates to historic heritage and archaeological values is likely to remain the same in the future.

Features	Description
Community and recreational facilities	*Existing Environment* There are no zoned community or recreational facilities along the designation corridor of SH1. There is a driving range located at 1794 SH1. Mahurangi College is located approximately 1 km north of the designation boundary. The Warkworth Town Centre is located approximately 2km from the designation boundary. *Likely Future Environment* It is likely additional community facilities will be provided in the wider surrounding area as the population increases. Recreational opportunities are also likely to increase as the area develops. Schools in the area are expected to remain and could grow as the population in the area increases.
Noise and vibration	*Existing Environment* The land on both sides of the southern section of the alignment is zoned FUZ. The northern section of the alignment is predominantly zoned as Residential – Single House Zone and to the east of the corridor as Business – Local Centre Zone. SH1 is an existing busy motorway with commercial buildings and residential dwellings along the road corridor. The noise environment is dominated by road traffic noise from vehicles on SH1. *Likely Future Environment* The Warkworth Structure Plan indicates that the area surrounding the existing SH1 is likely to be zoned as Residential. This zoning would likely result in an increase in ambient noise levels as the area urbanises. Road noise may reduce, as the speed limit along the alignment will be reduced.
Natural and physical environment	
Geology	The transport corridor is identified as being within the Pakiri Formation which is part of the Waitematā Group. The geological conditions are not anticipated to vary in the future.
Hydrology and natural hazards, including watercourses	*Existing Environment* This section of SH1 has two culvert crossings of tributaries of the Mahurangi River. There are some flood plains in this area which cross SH1. Existing flood prone areas have been identified by Auckland Council GeoMaps on the eastern and western edges of SH1. *Likely Future Environment* Although urban development is anticipated to change the hydrological environment through increases to impervious surface and associated runoff, the natural hazard conditions are not expected to significantly vary in the future, provided new urban development manages its flooding effects. SH1 is likely to be raised as part of the upgrade works. In addition, the two existing culvert crossings are likely to be upgraded to bridges with raised road formations and longer / wider bridge spans. A treatment pond is proposed to be located near 81 Morrison Drive on the downstream side which will be out of the flood plain after the road is raised.
Terrestrial ecology	*Existing Environment*

Features	Description
	Habitat Existing ecological features associated with the SH1 southern section upgrade mostly include exotic roadside planting, exotic shelterbelt, exotic pasture, several stream crossings (west draining tributaries of the Mahurangi River) and exotic wetlands (notably to the south-west of the State Highway and McKinney junction, as well as to the west of the State Highway opposite the driving range). Five wetlands as defined by the NES-F are associated with the SH1 southern section upgrade. These are: WW3-W1 is a natural inland wetland assessed to have a moderate ecological value. It is known to be a foraging habitat for Australasian bittern and a nesting and foraging habitat for spotless crake WW3-W2 is a natural inland wetland assessed to have a low ecological value. It is not likely a supportive habitat for any TAR species WW3-W3 is a natural inland wetland assessed to have a moderate ecological value. It is known to be a foraging habitat for Australasian bittern and a nesting and foraging habitat for spotless crake WW3-W4 is a natural inland wetland assessed to have a moderate ecological value. It is known to be a foraging habitat for Australasian bittern and a nesting and foraging habitat for spotless crake WW3-W5 is a natural inland wetland assessed to have a low ecological value. It is known to be a foraging habitat for Australasian bittern and a nesting and foraging habitat for spotless crake Species. Long-tailed bats have been recorded within a 3.5km radius of the project area. A number of avifauna have been observed or are likely to appear in the project area including a number of TAR species such as; Australasian bittern, New Zealand pipit and Spotless crake. There are records of a range of Copper skink inhabiting the project area including. It is likely that invertebrate species also inhabit the nearby area. Kauri snail were identified in a desktop study approximately 1km east of the area. *Likely Future Environment* The AUP:OP places emphasis on the protection and enhancement of existing watercourses such as the Mahurangi River, wetlands and areas of natural value, such as riparian vegetation. If these features are retained, in a future scenario, these features of ecological value could be similar or in some cases enhanced. It is also assumed that stormwater management will be provided, and sediment and pollutants will be controlled through development applications. Mature trees associated with roadside and shelterbelt are expected to be removed in the future environment as vegetation clearance (excluding within riparian areas, notable trees and certain street trees) is permitted under the AUP:OP and unlikely to remain in an urbanised scenario.
Topography and landscape context	*Existing Environment* SH1 currently transitions from a rural road in the south to the urban fringes of Warkworth in the north, becoming the southern ‘gateway’ of Warkworth at the northern extent of the designation. At the northern extent of the designation, there is an existing residential area which flanks the current SH1. There is an existing large-format retail area at the northern extent of the designation too with a number of retail stores, a petrol station, fast food restaurants and a building materials store. The southern area of the

Features	Description
	designation is rural in nature. Aspects which contribute to the amenity of the setting include residential planting, roadside planting (which largely consists of exotic species), and tree species typical of farms (such as eucalyptus, poplar and willow trees). These farmland trees are often planted in regimented stands as shelterbelts, providing a linear landscape pattern. *Likely Future Environment* The existing rural landscape either side of SH1 is zoned FUZ in the AUP:OP and is expected to become urbanised in the future. Other AUP:OP zoning includes Residential Single House at the northern extent of the designation, as well as a Business Local Centre. When the Ara Tūhono (Puhoi to Warkworth) motorway opens in 2023 the classification of the existing SH1 will change to operate as a local urban arterial road.

9.6 NOR 4 – Matakana Road

9.6.1 Project overview

A new designation will provide for an upgrade of the existing Matakana Road between the Hill Street intersection to the edge of the FUZ to provide for an urban arterial cross-section with active mode facilities. The portion of the corridor between Hill Street and Melwood Drive will have a bidirectional facility for cyclists, rather than separated cycle lanes on both sides of the corridor. The project will tie in with the intersection at Sandspit Road in the south and will tie into the intersection with Te Honohono ki Tai (Matakana Link Road). The intersection upgrade with Sandspit Road forms part of the Hill Street intersection improvements which is a separate project led by AT.

Matakana Road currently provides an important north-south connection between Warkworth and the towns of Matakana and Omaha. The upgrade, with the provision of walking and cycling facilities will support mode choice and improve active mode safety from Matakana Road to Warkworth. Close integration with the Hill Street improvements will create a well-connected active mode network.

The designation footprint in Figure 9.9 shows the envelope required to construct, operate and maintain the Matakana Road upgrade project. The designation footprint includes sufficient space for the intersections with Clayden Road, Melwood Drive and Sandspit Road, and all ancillary components including construction areas, stormwater infrastructure, batter slopes and retaining walls.

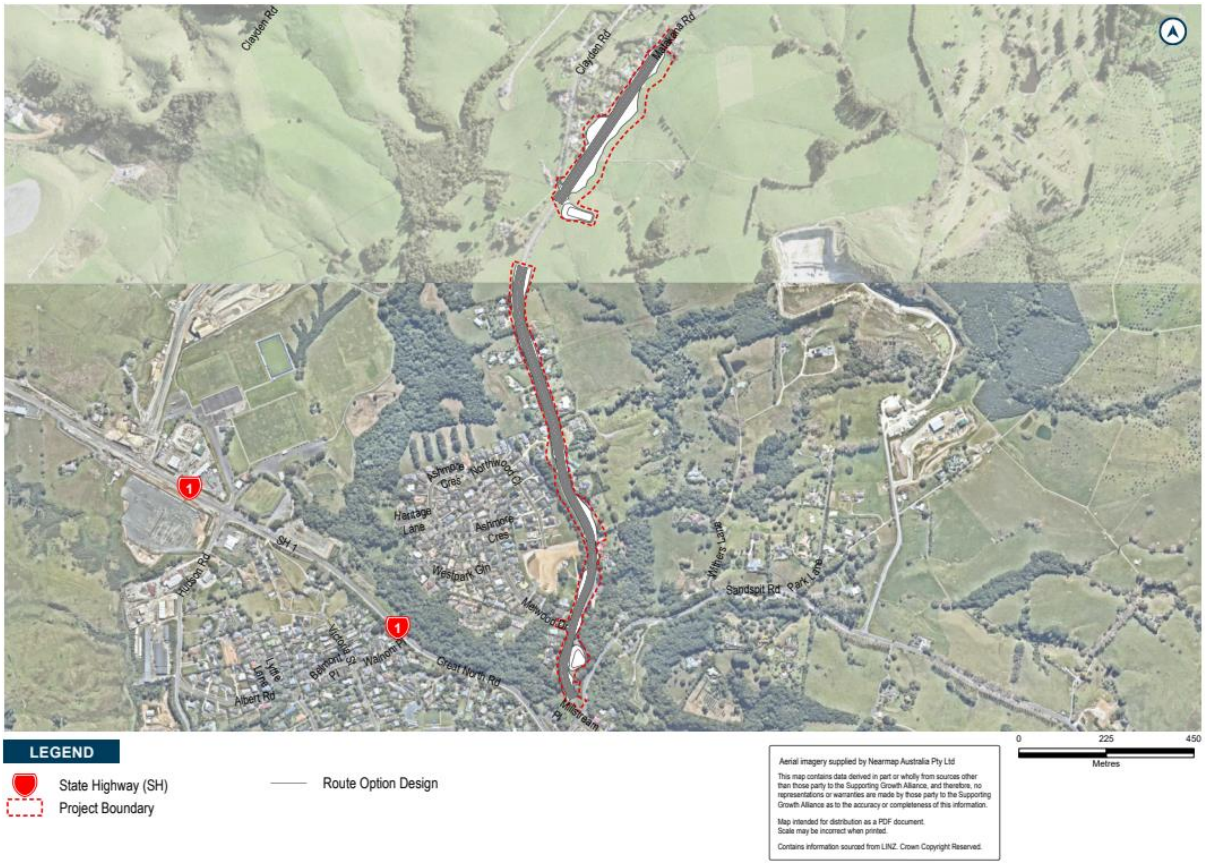


Figure 9.9: NOR 4 – Matakana Road indicative designation footprint

The key features of the Matakana Road project include:

Widening of the existing road corridor to an urban arterial cross section, including cycle lanes and footpaths

A bidirectional shared path which will integrate with the Hill Street intersection walking and cycling infrastructure

Tie-ins with existing roads, localised widening around the existing intersections with Clayden Road, Melwood Drive and Sandspit Road to accommodate new intersection forms

New or upgraded stormwater ponds, bridges and culverts

Batter slopes to enable widening of the corridor, and associated cut and fill earthworks

Vegetation removal along the existing road corridor

Other construction related activities required outside the permanent corridor including the re-grade of driveways, construction traffic manoeuvring and construction laydown areas.

Figure 9.10 shows the indicative cross section for the Matakana Road project.

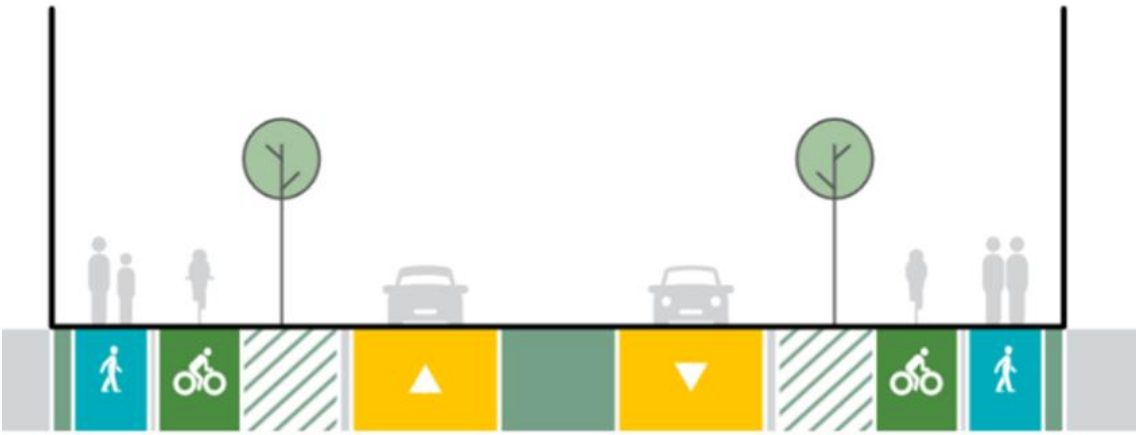


Figure 9.10: NOR 4 – Indicative cross section for the Matakana Road project

9.6.2 Receiving environment for NOR 4

Table 9.4 provides a summary of the relevant receiving environment features within which the project will be constructed, operated, and maintained.

Table 9.4: Summary of relevant receiving environment features for NOR 4

Features	Description
Planning context and land use	
Current land use and urban form	The northern extent of the project area is currently semi-rural in nature with some residential properties to the west. The southern extent of the project area is features more established residential land use than the northern extent.
Current zoning	Future Urban Zone Residential – Mixed Housing Urban Zone Residential – Single House Zone Open Space – Conservation Zone.
Likely future zoning – Warkworth Structure Plan	Residential – Mixed Housing Urban Zone Residential – Mixed Housing Suburban Zone.
Overlays	High-Use Stream Management Areas Overlay High-Use Aquifer Management Areas Overlay Significant Ecological Areas Overlay (Terrestrial).
Controls	Arterial Roads Macroinvertebrate Community Index – Native Macroinvertebrate Community Index – Rural Macroinvertebrate Community Index – Urban Stormwater Management Area Control, Flow 1 (to the west of Matakana Road).
Existing designations	Designations - 1478, Matakana Link Road, Designations, Auckland Transport
Human environment	

Features	Description
Transport	*Existing Environment* Matakana Road is a semi-rural road with two vehicle lanes (one in each direction) with a 50km/h speed limit between Hill Street and Melwood Drive before changing to 80km/h through to the edge of the FUZ. Much of the corridor has no existing walking or cycling facilities. One bus service (997) operates along this route with a frequency of every 2 hours on weekdays. The bus route connects Warkworth to the towns of Matakana and Omaha. ADT data shows a count of 10,000 vehicles. There are three intersections along the corridor as follows: Matakana Road / Sandspit Road - priority controlled intersection Matakana Road / Melwood Drive – priority-controlled intersection Matakana Road / Clayden Road - priority controlled intersection. *Likely Future Environment* The forecasted ADT in 2048 is 10,000 vehicles with an increased public transport capacity of four buses during the peak hour. Land use is expected to intensify in the surrounding areas to residential and urban land uses. It is expected that the upgraded road will have an urban character with two general traffic lanes (one in each direction) and a central median with a posted speed limit of 50km/h. There will be a consistent corridor form with kerbs and channels on both sides and cycle lanes and footpaths. Along the southern portion of the corridor there will be a bidirectional facility along one side of the corridor. There will be four intersections along the corridor as follows: Matakana Road / Sandspit Road - priority controlled intersection Matakana Road / Melwood Drive – priority-controlled intersection Matakana Road / Clayden Road - priority controlled intersection Matakana Road / Te Honohono ki tai (Matakana Link Road) / Sandspit Link.
Historic heritage and archaeological values	*Existing Environment* There are no recorded historic heritage sites within the designation footprint that will be impacted by the upgraded transport corridor, however the following archaeological feature is present within the designation footprint: Archaeological site: R09/2253 – Timber Cottage. 190 Sandspit Road was constructed for family members by George Young in the mid-1870s, though it is unclear if they resided there. The dwelling was refurbished in the 1970s, adding a wrap-around verandah, a lean to and dormer windows. The five oak trees on the property also date to the 19th century, as does the outhouse and barn, though the barn has been relocated. The grounds of the property have been fossicked, though the structure itself remained in good condition at a 2018 site visit. *Likely Future Environment* There is some potential for archaeological or historic material and features from R09/2253 (190 Sandspit Road) to be affected by the road upgrade works. Aside from this, the existing environment as it relates to historic heritage and archaeological values is likely to remain the same in the future.
Community and recreational facilities	*Existing Environment* There are no community or recreational facilities along the Matakana Road upgrade corridor. There is a retirement home (Totara Park Village) located approximately

Features	Description
	500 m away on Melwood Drive. The Warkworth Town Centre is located south of the Hill Street intersection approximately 300m away from the southern extent of Matakana Road. Kōwhai Park is located at the corridor's southern extent. Warkworth Primary school is located 400m from the corridor's southern extent on the opposite side of SH1, and Mahurangi College is located 1.5km south of Matakana Road. *Likely Future Environment* The Warkworth Structure Plan indicates the area adjacent to the Matakana Road Upgrade corridor to be zoned residential in the future. It is likely additional community facilities will be provided in the wider surrounding area as the population increases. Recreational opportunities are also likely to increase as the area develops. Schools in the area are expected to remain and could grow as the population in the area increases.
Noise and vibration	*Existing Environment* The Matakana Road corridor runs through mostly residential environments. There are some dwellings located close to the road corridor. The noise environment is dominated by road traffic noise from vehicles using Matakana Road and the surrounding road network. *Likely Future Environment* The FUZ to the east of the corridor is likely to be zoned residential in future, which would likely result in an increase of ambient noise as the area urbanises.
Natural and physical environment	
Geology	Mahurangi Limestone (Northland Allochthon) is mapped in the subject site area. The geological conditions are not anticipated to vary in the future.
Hydrology and natural hazards, including watercourses	*Existing Environment* Matakana Road does not directly impact on any flood plains or overland flow paths – apart from the southern extent of the corridor near the intersection with Sandspit Road. Matakana Road does not cross any existing rivers or streams. *Likely Future Environment* Although urban development is anticipated to change the hydrological environment through increases to impervious surface and associated runoff, the natural hazard conditions are not expected to significantly vary in the future, provided new urban development manages its flooding effects. Two wetlands are proposed near the floodplain at the intersection of Matakana Road and Sandspit Road in order to manage and treat runoff from the upgraded road.
Terrestrial ecology	*Existing Environment* <u>Habitat</u> Matakana Road follows a north-south alignment and runs along a watershed of several small catchments draining into the Mahurangi River. In the northern section of Matakana Road, there are several headwater seep wetlands and intermittent streams in a pasture setting. The central and southern parts of Matakana Road are associated with a peri-urban landscape, characterised by roadside planting and treelands (exotic and native). The southernmost section is flanked by two SEAs; T

Features	Description
	5440 to the east and T 2260 to the west. The Matakana Road upgrade section is associated with three unnamed tributaries of the Mahurangi River. Three wetlands as defined by the NES-F are associated with Matakana Road, they are: Wetland WW4-W1 is a natural inland wetland assessed as having a moderate ecological value. It is a known foraging habitat for Australasian bittern, and a foraging and nesting area for spotless crake Wetland WW4-W2 is a natural inland wetland assessed as having a moderate ecological value. It is a known foraging area for Australasian bittern and spotless crake Wetland WW4-W3 is a natural inland wetland assessed as having a low ecological value. It is a known foraging area for Australasian bittern and spotless crake. <u>Species</u> Long-tailed bats have been recorded within a 4.3km radius of the project. A number of avifauna have been observed or are likely to appear in the project area including Australasian bittern / Matuku-hūrepo, Long-tailed cuckoo, pipit, Spotless crake and North Island kākā have been observed or are likely to appear in the project area. There are records of a range of herpetofauna inhabiting the project area including – copper skink, elegant gecko, forest gecko, ornate skink, Hochstetter's frog, and pacific gecko. It is likely that invertebrate species such as flax snails, large land snails and Auckland tree wētā inhabit the project area too. *Likely Future Environment* The AUP:OP places emphasis on the protection and enhancement of existing watercourses such as the Mahurangi River, wetlands and areas of natural value, such as riparian vegetation. If these features are retained, in a future scenario, these features of ecological value could be similar or in some cases enhanced. It is also assumed that stormwater management will be provided, and sediment and pollutants will be controlled through development applications. Mature trees associated with roadside and shelterbelt are expected to be removed in the Future Environment, as vegetation clearance (excluding within riparian areas, notable trees and certain street trees) is permitted under the AUP:OP and unlikely to remain in an urbanised scenario.
Topography and landscape context	*Existing Environment* Matakana Road is currently an urban road to the south, transitioning to a rural road in the north. There is an existing residential area to the southwest of the road. Scattered residential housing extends northwards up both sides of the road. At the southern extent of the designation, there is mature native vegetation in the adjacent Kōwhai Park. This connects with the bush along the Mahurangi River escarpment, providing a natural contrast to the busy roads in the area. On the eastern side of Matakana Road, a section of this vegetation is protected with a QEII covenant. Heading north the existing road is sandwiched between established residential plantings, which are a mix of native and exotic species. The AUP:OP identifies two Notable Trees on the western side of the designation, near Melwood Drive. The roadside in the northern section of the designation is predominately covered with pastural grass.

Features	Description
	Within the southern extent of the designation, sections of land drop to the west and rise away from the road to the east. Towards the northern end of the designation the landscape becomes more open and views of the rolling hill country to the east are attainable. However, it is anticipated that these views may become somewhat obscured by future urbanisation separate to the Warkworth Package. *Likely Future Environment* Under the zoning in the AUP:OP, it anticipated that the transport corridor and surrounding area will become fully urbanised in the future. The area is primarily zoned as residential (including single house, mixed housing suburban and mixed housing urban) or FUZ. There is also a small section of existing open space conservation land southeast and southwest of the designation.

9.7 NOR 5 – Sandspit Road

9.7.1 Project overview

A new designation will provide for an upgrade of Sandspit Road between the Hill Street intersection to the edge of the FUZ to provide for an urban arterial cross-section with active mode facilities. A shared offline boardwalk path will be installed from the Vipond Culvert to Matakana Road which will integrate with facilities at the Hill Street intersection. The project will tie in with the future intersection at the western extent of Sandspit Road at the intersection with SH1, Elizabeth Street, Millstream Place, Matakana Road. This intersection upgrade forms part of the Hill Street intersection improvements which is a separate project led by AT.

Sandspit Road currently provides an important connection between Warkworth and rural settlements Snells Beach, Algies Bay and the Sandspit area. The upgrade, with the provision of walking and cycling facilities will support mode choice and improve active mode safety from residential properties in the Sandspit Road area to Warkworth. Close integration with the Hill Street intersection improvements will create a well-connected active mode network.

The designation footprint in Figure 9.11 shows the envelope required to construct, operate and maintain the Sandspit Road project. The designation footprint includes sufficient space for the intersections with Withers Lane, Park Lane and the future Sandspit Link (NOR 7), and all ancillary components including construction areas, stormwater infrastructure, batter slopes and retaining walls.

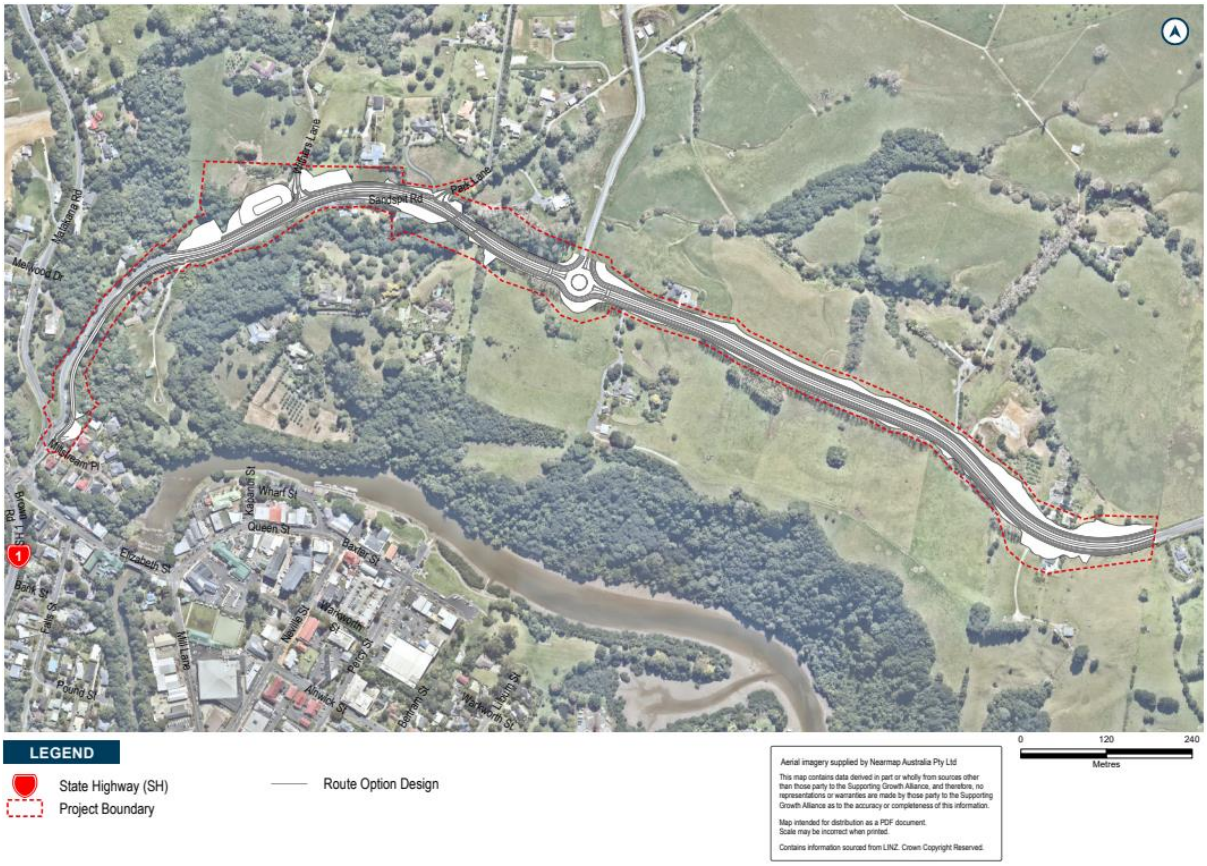


Figure 9.11: NOR 5 – Sandspit Road indicative designation footprint

The key features of the Sandspit Road project include:

Widening of the existing Sandspit Road to an urban arterial cross section, including cycle lanes and footpaths

A shared offline boardwalk path to Sandspit Road from the Vipond Culvert to Matakana Road

Tie-ins with existing roads, localised widening around the existing intersections with Withers Lane, Park Lane and the future Sandspit Link to accommodate intersection forms and roundabouts

New or upgraded stormwater ponds, bridges and culverts (where applicable)

Upgrade of the Sandspit Road Bridge

Batter slopes to enable widening of the corridor, and associated cut and fill earthworks

Vegetation removal along the existing road corridor

Other construction related activities required outside the permanent corridor including the re-grade of driveways, construction traffic manoeuvring and construction laydown areas.

Figure 9.12 shows the indicative cross section for the Sandspit Road project.

Figure 9.12: NOR 5 – Indicative cross section of the Sandspit Road project

9.7.2 Receiving environment for NOR 5

Table 9.5 provides a summary of the relevant receiving environment features within which the project will be constructed, operated, and maintained.

Table 9.5: Summary of relevant receiving environment features for NOR 5

Features	Description
Planning context and land use	
Current land use and urban form	Sandspit Road is currently rural in nature with a number of large lot and single house rural properties on either side of the corridor in the eastern extent. A number of these have agricultural land use. The western extent of the corridor is more densely populated with residential dwellings. There is a large area of SEA to the south of the area, alongside the Mahurangi River.
Current zoning	Future Urban Zone Open Space – Conservation Zone.
Likely future zoning – Warkworth Structure Plan	Residential – Single House Zone Residential – Large Lot Zone.
Overlays	Significant Ecological Areas Overlay (Terrestrial) Outstanding Natural Landscapes Overlay High Natural Character Area Overlay High-Use Aquifer Management Areas Overlay Quarry Buffer Area.
Controls	Macroinvertebrate Community Index – Exotic Macroinvertebrate Community Index – Native Macroinvertebrate Community Index – Rural Arterial Roads Coastal Inundation 1 per cent AEP Plus 1m Control – 1m sea level rise.

Features	Description
Existing designations	Designations - 6763, State Highway 1 - Puhoi to Kaipara District Boundary and Silverdale Interchange improvements, Designations, New Zealand Transport Agency
Human environment	
Transport	*Existing Environment* Sandspit Road is a rural road with two vehicle lanes (one in each direction) with a 50km/h speed limit on approach to the Hill Street intersection, 80km/h to the access road to the quarry and becomes unrestricted further east toward the edge of the FUZ. The corridor form is consistent, with no kerb and channel on either side of the corridor and no footpaths. The road connects to SH1 at its western extent via the Hill Street intersection. Much of the corridor has no existing walking and cycling facilities. One bus service (996) operates along this route at a frequency of every 2 hours during the weekdays. The bus route connects Warkworth with Snells Beach and Algies Bay. ADT data shows a count of 8,215 vehicles. There are six intersections along the corridor as follows: Sandspit Road / SH1 – signalised intersection Sandspit Road / Elizabeth Street – priority-controlled intersection Sandspit Road / Millstream Place – priority-controlled intersection Sandspit Road / Matakana Road - priority controlled intersection Sandspit Road / Withers Lane – no control Sandspit Road / Park Lane – no control. *Future Environment* The forecasted ADT for 2048 is 12,000 vehicles with an increased public transport capacity of four buses an hour during peak hour. Planned land use is expected to intensify to urban and residential use. It is expected that the upgraded road will be urban in character with two general traffic lanes (one in each direction) and a central median with a posted speed limit of 50km/h. There will be a consistent corridor form along most of the corridor with cycle lanes and footpaths, with an offline cycle and walking facility between Vipond Culvert and Matakana Road. There will be seven intersections along the corridor as follows: Sandspit Road / SH1 – single-lane roundabout (Hill Street Improvements – AT) Sandspit Road / Elizabeth Street – single-lane roundabout (Hill Street Improvements – AT) Sandspit Road / Millstream Place – priority-controlled intersection Sandspit Road / Matakana Road – single-lane roundabout (Hill Street Improvements – AT) Sandspit Road / Withers Lane – priority-controlled intersection Sandspit Road / Park Lane – priority-controlled intersection Sandspit Road / Sandspit Link – single-lane roundabout.
Historic heritage and archaeological values	*Existing Environment* There are no recorded historic heritage sites within the designation footprint that will be impacted by the upgraded transport corridor, however the following archaeological feature is present within the designation footprint: Archaeological site: R09/2263 - Reinforced concrete gravity-arch dam. The current dam was built in 1913 and is associated with the Warkworth Cement Works. It was built on

Features	Description
	the site of an older, 1879 structure which supplied water to steamers. The extant structure is in excellent condition, but the earlier dam is no longer visible. *Future Environment* There is some potential for archaeological or historic material and features from R09/2263 (1913 Gravity-arch dam) to be affected by the road upgrade works. Aside from this, the environment as it relates to historic heritage and archaeological values is otherwise likely to remain the same in the future.
Community and recreational facilities	*Existing Environment* There is a waste transfer station located at 183 Sandspit Road which services the Warkworth area. The western extent of the corridor connects with SH1 is in close proximity to Warkworth Town Centre. The nearest schools are Warkworth Primary School which is located 300m from the western extent of Sandspit Road, and Mahurangi College located 1.2km south. *Future Environment* As the majority of the surrounding land use is likely to be urban in nature in the future, it is likely that further community and recreational facilities will be provided as the population increases. Schools in the area are expected to remain and could grow as the population in the area increases.
Noise and vibration	*Existing Environment* Sandspit Road runs through both urban and rural environments. In the rural area there are relatively few dwellings near the road. The noise environment is dominated by road traffic noise from vehicles using Sandspit Road and the surrounding network. *Likely Future Environment* The land on both sides of Sandspit Road is zoned as FUZ. There is a high likelihood of urban development in the FUZ to the north of the corridor. An increase in ambient noise levels is expected as the area urbanises.
Natural and physical environment	
Geology	Mahurangi Limestone (Northland Allochthon) is mapped in the subject site area. The geological conditions are not anticipated to vary in the future.
Hydrology and natural hazards, including watercourses	*Existing Environment* Sandspit Road crosses six tributaries of the Mahurangi River. Existing flood prone areas have been identified by Auckland Council GeoMaps along the northern and southern edges of Sandspit Road. *Likely Future Environment* Although urban development is anticipated to change the hydrological environment through increases to impervious surface and associated runoff, the natural hazard conditions are not expected to significantly vary in the future, provided new urban development manages its flooding effects. A raised bridge is proposed over the existing stream near Park Lane to mitigate flood impacts in this area. Two wetlands are proposed near the floodplain at the intersection of Matakana Road and Sandspit Road in order to manage and treat runoff from the upgraded roads.

Features	Description
Terrestrial ecology	*Existing Environment* Habitat Sandspit Road generally follows an east-west alignment. The western section crosses over two relatively large Mahurangi River tributaries. The riparian areas associated of both streams are SEAs (the western most stream, north of Sandspit Road and the second tributary to the south of Sandspit Road). Ecological features to the east of the quarry road include exotic shelterbelt, mature roadside planting and exotic grass within a pasture setting. Several relatively larger (exotic) seep wetlands are located to the south of Sandspit Road. Six streams are located in the Sandspit Road upgrade area, each are tributaries of the Mahurangi River. Three existing wetlands as defined by the NES-F are associated with the Sandspit Road upgrade area as follows: WW5-W1 is a natural inland wetland (classified – exotic) that is assessed as being unlikely habitat for TAR species and has a low ecological value WW5-W2 is a natural inland wetland (classified – exotic) that is a known foraging habitat for Australasian bittern. It is also a nesting and foraging habitat for spotless crake. It is assessed as having low ecological value WW5-W3 is a natural inland wetland (classified – exotic) that is a known foraging habitat for Australasian bittern. It is also a nesting and foraging habitat for spotless crake. It is assessed to have low ecological value. Species Long tailed bats have been recorded within a 4.3km radius of the project. A number of avifauna have been observed or are likely to appear in the project area including species such as Australasian bittern, Long-tailed cuckoo, New Zealand pipit, Spotless crake and North Island kākā. There are records of a range of herpetofauna inhabiting the project area including – Copper skink, Elegant gecko, Forest gecko, Ornate skink, Pacific gecko and Hochstetter's frog. *Likely Future Environment* The AUP:OP places emphasis on the protection and enhancement of existing watercourses such as the Mahurangi River, wetlands and areas of natural value, such as riparian vegetation. If these features are retained, in a future scenario, these features of ecological value could be similar or in some cases enhanced. It is also assumed that stormwater management will be provided, and sediment and pollutants will be controlled through development applications. Mature trees associated with roadside and shelterbelt are expected to be removed in the future environment as vegetation clearance, (excluding within riparian areas, notable trees and certain street trees) is permitted under the AUP:OP and unlikely to remain in an urbanised scenario.
Topography and landscape context	*Existing Environment* Sandspit Road is currently a rural road which provides a transit route west into Warkworth Town Centre. Tributaries to the north of Sandspit Road feed down to the Mahurangi River on the south side of the road. Sandspit Road is characterised by roadside planting which is a mix of native and exotic trees and shrubs, as well as open vistas over paddocks, which in places afford views of the vegetated ridgeline to the north. The topography either side of Sandspit Road is steep, with rolling hill country

Features	Description
	characterising the landform north of the road. To the south of road, the land typically rises before sharply descending to the Mahurangi River. The escarpment on the northern side of the Mahurangi River is a significant feature in Warkworth. *Likely Future Environment* In the AUP:OP, the area along Sandspit Road is primarily FUZ, so the area is likely to become urbanised in nature. There is also an area of open space conservation zone to the south of Sandspit Road, adjacent the Mahurangi River, as well as along a tributary at the northwest extent of the designation. Much of the vegetation located in the FUZ is expected to be removed as part of the urbanisation process.

9.8 NOR 6 – Western Link – South

9.8.1 Project overview

A new designation will provide for a new urban arterial corridor with active mode facilities between the intersection of SH1 and McKinney Road and Evelyn Street.

The new Western Link – South will enable development in south Warkworth by providing access for all modes to the southern growth area of Warkworth. The corridor completes the Western Link active mode network contributing to mode shift from private vehicle to active modes for short trips. The corridor will provide efficient east-west access across SH1 for all modes, connecting proposed high-density residential land use to schools and employment. The corridor will provide an alternative north-south route to SH1, reducing the pressure on Woodcocks Road between Mansel Drive and SH1 and improving resilience.

The designation footprint in Figure 9.13 shows the envelope required to construct, operate and maintain the Western Link – South project. The designation footprint includes sufficient space for the intersection with Evelyn Street and SH1, and all ancillary components including construction areas, stormwater infrastructure, batter slopes and retaining walls.

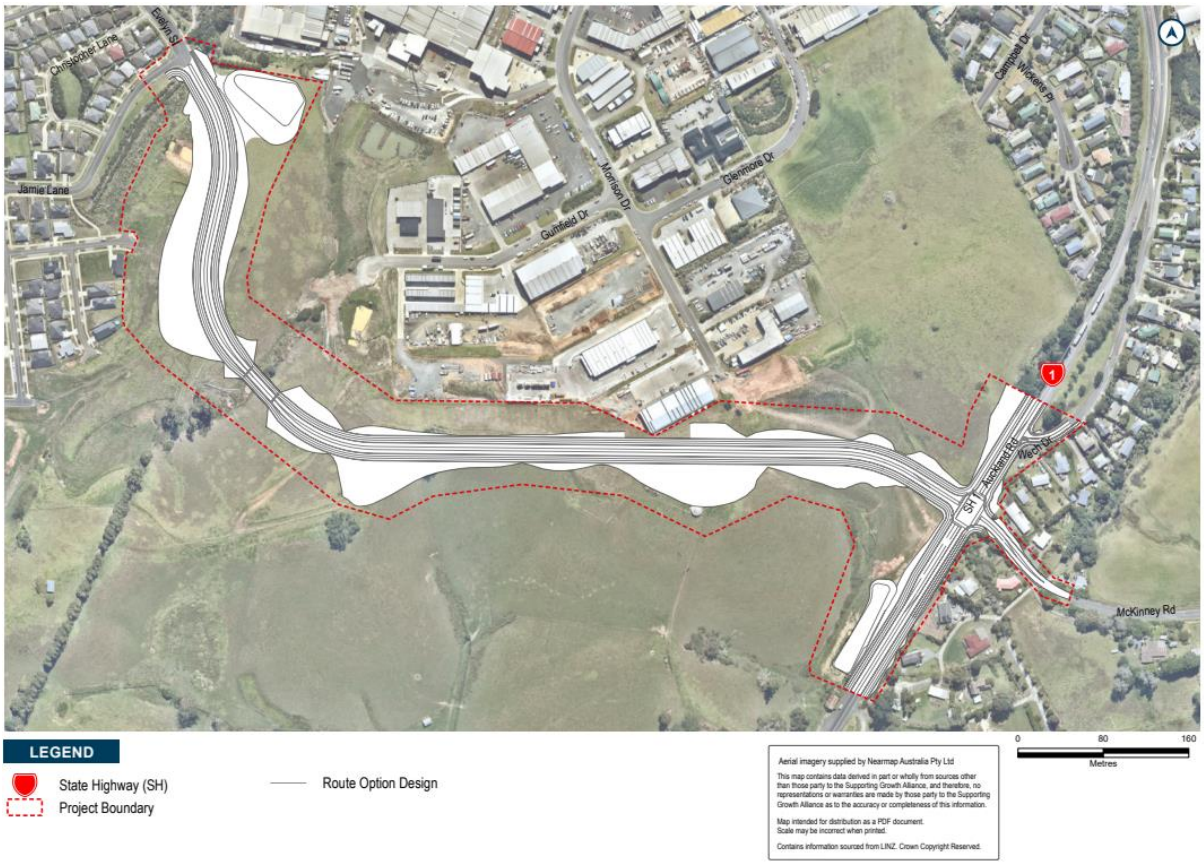


Figure 9.13: NOR 6 – Western Link – South indicative designation footprint

The key features of the Western Link – South project include:

A new urban arterial cross-section with active mode facilities between SH1 and Evelyn Street
Tie-ins with existing roads, and a new intersection at the connection to SH1 and Evelyn Street
New or upgraded, stormwater ponds, bridges and culverts
Batter slopes, and associated cut and fill earthworks
Vegetation removal
Other construction related activities required outside the permanent corridor including the re-grade of driveways, construction traffic manoeuvring and construction laydown areas.

Figure 9.14 shows the indicative cross sections for the Western Link – South project.

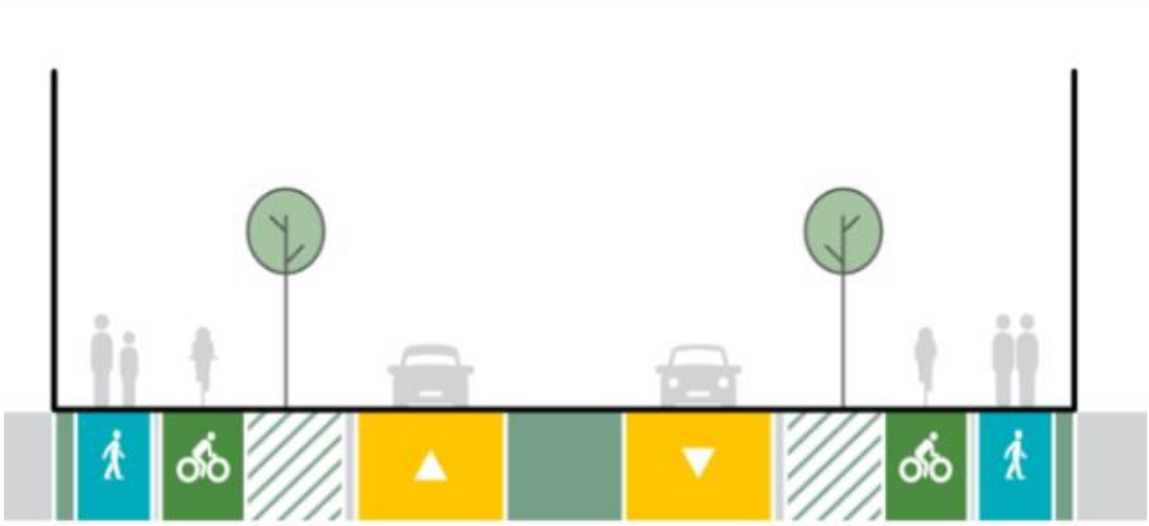


Figure 9.14: NOR 6 – Indicative cross section for the Western Link - South project

9.8.2 Receiving environment for NOR 6

Table 9.6 provides a summary of the relevant receiving environment features within which the project will be constructed, operated, and maintained.

Table 9.6: Summary of relevant receiving environment features for NOR 6

Features	Description
Planning context and land use	
Current land use and urban form	The alignment is through mostly undeveloped greenfield sites. Surrounding land use is currently rural in nature with large lot residential dwellings. The area to the north-west of the corridor is characterised by medium density residential dwellings, and to the north-east a light industrial area.
Current zoning	Future Urban Zone Business – Light Industrial Zone Residential – Mixed Housing Suburban Zone.
Likely future zoning – Warkworth Structure Plan	Residential – Mixed Housing Suburban Zone Protection Areas / Open Space.
Overlays	High-Use Aquifer Management Areas High-Use Stream Management Areas.
Controls	Macroinvertebrate Community Index – Rural Macroinvertebrate Community Index – Urban Stormwater Management Control Area.
Existing designations	Designations - 6763, State Highway 1 - Puhoi to Kaipara District Boundary and Silverdale Interchange improvements, Designations, New Zealand Transport Agency.
Human environment	

Features	Description
Transport	*Existing Environment* There is no existing road corridor between Woodcocks Road / Evelyn Street and the existing SH1, the existing environment is semi-rural with the existing SH1 running east to west in the south. *Future Environment* The new road corridor will have an urban character with two general traffic lanes (one in each direction) and a central median, with a posted speed limit of 50km/h. There will be consistent corridor form with kerbs and channels on both sides and continuous footpaths and cycle facilities. There will be connections to Woodcocks Road in the north via Evelyn Street, and to SH1 in the south. The indicative 2048 AT bus network forecasts 4 buses during peak hour along the road. The forecast ADT in 2048 is 9,000 vehicles. There will likely be two intersections as follows: Western Link – South / Jamie Lane – priority-controlled intersection Western Link – South / SH1 / McKinney Road – signalised intersection.
Historic heritage and archaeological values	*Existing Environment* There are no recorded historic heritage or archaeological sites on the subject site. Any unrecorded archaeological sites are protected under provisions of the Heritage New Zealand Pouhere Taonga Act 2014 (HNZPTA) but will not be uncovered until works commence (if present). *Future Environment* The existing environment as it relates to historic heritage and archaeological values is likely to remain the same in the future.
Community and recreational facilities	*Existing Environment* There are no community or recreational facilities in the immediate corridor area. Mahurangi College is located on Woodcocks Road, less than 1km away from the northern extent of the corridor. Warkworth Primary School is located less than 2km north of the corridor. Rodney Surgical Centre is located on Morrison Drive, adjacent to the corridor. *Future Environment* The Warkworth Structure Plan indicates the location for a possible new school on Woodcocks Road, west of Mahurangi college. As the surrounding greenfield area urbanises, it is likely that more recreational and community facilities will be constructed. The Warkworth Structure Plan also indicates potential areas of open space adjacent to the corridor.
Noise and vibration	*Existing Environment* Western Link – South is not an existing corridor. The corridor area is predominantly greenfield. The noise environment is dominated by road traffic noise from vehicles on the nearby roading network, including SH1 to the south. *Future Environment* The new corridor will travel through area currently zoned as FUZ. The Warkworth Structure Plan indicates the area will be predominantly residential, with Business – Light Industry remaining in the north. This will likely result in an increase in ambient

Features	Description
	noise, and an increase in road traffic noise as a consequence of the new road.
Natural and physical environment	
Geology	Pakiri Formation of Warkworth Subgroup (Waitemata Group) is mapped in the subject site area. The geological conditions are not anticipated to vary in the future.
Hydrology and natural hazards, including watercourses	*Existing Environment* The greenfield area currently has some small stream tributaries which feed into the Mahurangi River downstream. Some existing flood prone areas have been identified by Auckland Council GeoMaps, mainly associated with these streams. *Future Environment* Although urban development is anticipated to change the hydrological environment through increases to impervious surface and associated runoff, the natural hazard conditions are not expected to significantly vary in the future, provided new urban development manages its flooding effects. The new Western Link - South alignment crosses a small stream near the centre of the alignment. Two wetlands are proposed at either end of the road alignment.
Terrestrial ecology	*Existing Environment* <u>Habitat</u> The western portion of the corridor crosses an unnamed stream / wetland complex (tributary of the Mahurangi River), while the central and eastern sections aligning near the hilltop and avoids direct effects to several downslope headwater wetland systems. Two streams are associated with the Western link – South, both of which are tributaries of the Mahurangi River. Two wetlands are associated with the Western Link – South as follows: WW6-O1 is an artificial wetland (classified – open water) and is assessed as having a low ecological value WW6-W1 is classified as a Raupō reedland (WL19). It is a natural inland wetland that is known to support foraging of Australasian bittern. It is also a knowing nesting a foraging area for spotless crake. It has been assessed as having a moderate ecological value. <u>Species</u> Long-tailed bats have been recorded within a 2.7km radius of the project area. A number of avifauna have been observed or are likely to appear in the project area including Australasian bittern, New Zealand pipit and Spotless crake. There are records of Copper skinks inhabiting the project area. *Likely Future Environment* The AUP:OP places emphasis on the protection and enhancement of existing watercourses such as the Mahurangi River, wetlands and areas of natural value, such as riparian vegetation. If these features are retained, in a future scenario, these features of ecological value could be similar or in some cases enhanced. It is also assumed that stormwater management will be provided, and sediment and pollutants will be controlled through development applications. Mature trees associated with roadside and shelterbelt are expected to be removed in the future environment, as

Features	Description
	vegetation clearance (excluding within riparian areas, notable trees and certain street trees) is permitted under the AUP:OP and unlikely to remain in an urbanised scenario.
Topography and landscape context	*Existing Environment* The designation and surrounding area are currently predominately a rural landscape. There are residential and light industrial areas to the north of the corridor. The area is home to a distinctive knoll. The north of which slopes steeply down towards the adjacent industrial buildings, with existing buildings cut into the hillside. *Likely Future Environment* According to the zoning in the AUP:OP, it is anticipated that the industrial area will extend through part of the designation. The remaining area is primarily FUZ meaning the area will likely be urbanised in nature. There is also a proposed area of informal recreation space existing at the northern edge of the designation.

9.9 NOR 7 – Sandspit Link

9.9.1 Project overview

A new designation will provide for a new urban arterial cross-section with active mode facilities between the intersection of Matakana Road and Te Honohono ki Tai (Matakana Link Road) and Sandspit Road.

The new Sandspit Link will enable development in north-east Warkworth by providing multi-modal access to the north-east growth area of Warkworth. This direct connection will also provide an alternative route between Ara Tūhono (Pūhoi to Warkworth) motorway and the wider coastal settlements such as Sandspit and Snells Beach, avoiding the Hill Street intersection and increasing resilience. The new dedicated walking and cycling facilities will support mode shift for the north-eastern growth area and will improve active mode access to the Warkworth Town Centre.

The designation footprint in Figure 9.15 shows the envelope required to construct, operate and maintain the Sandspit Link project. The designation footprint includes sufficient space for the intersections with Sandspit Road, and all ancillary components including construction areas, stormwater infrastructure, batter slopes and retaining walls.

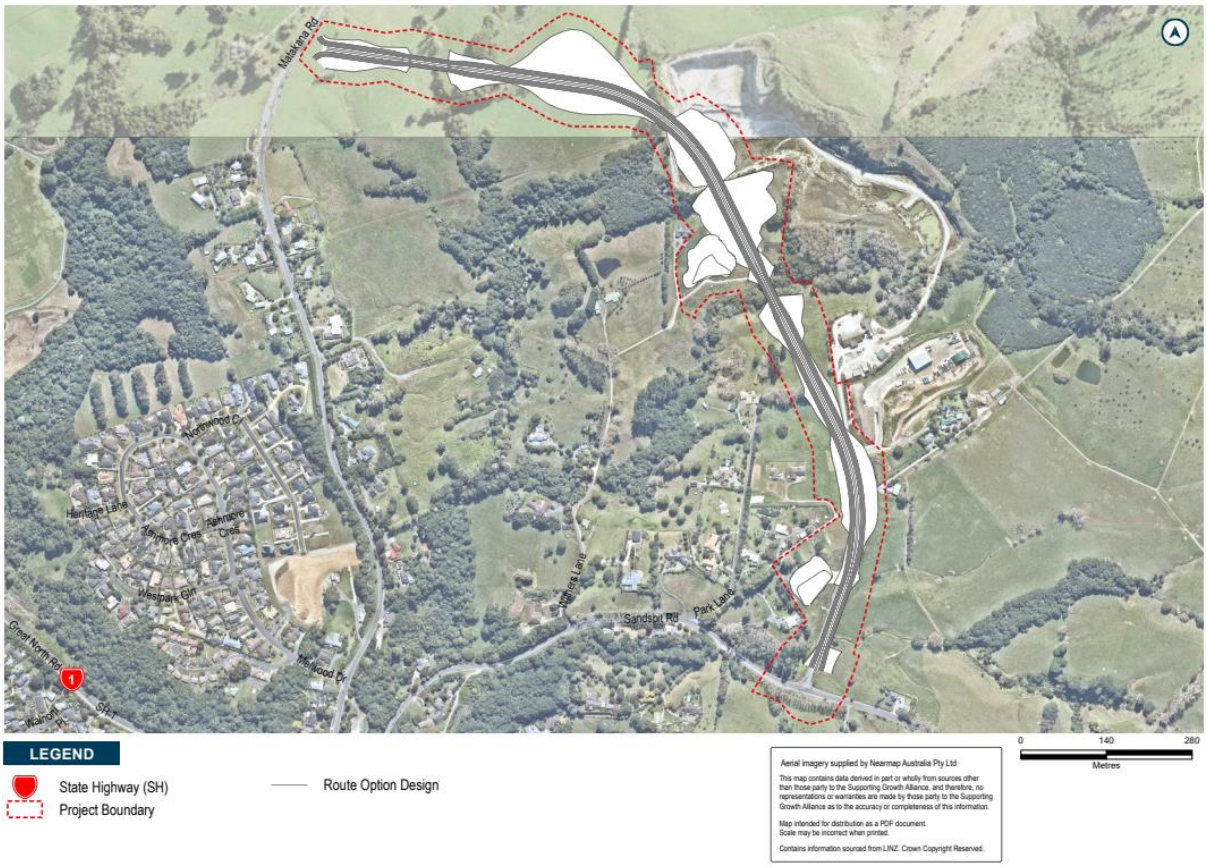


Figure 9.15: NOR 7 – Sandspit Link indicative designation footprint

The key features of the Sandspit Link project include:

A new urban arterial cross-section with active mode facilities between the Matakana Road and Te Honohono ki Tai intersection and Sandspit Road

Tie ins with existing roads and new intersections at the connection with Sandspit Road and Matakana Road

New or upgraded stormwater ponds, bridges and culverts (where required)

Batter slopes, and associated cut and fill earthworks

Vegetation removal

Other construction related activities required outside the permanent corridor including the re-grade of driveways, construction traffic manoeuvring and construction laydown areas.

Figure 9.16 shows the indicative cross sections for the Sandspit Link project.

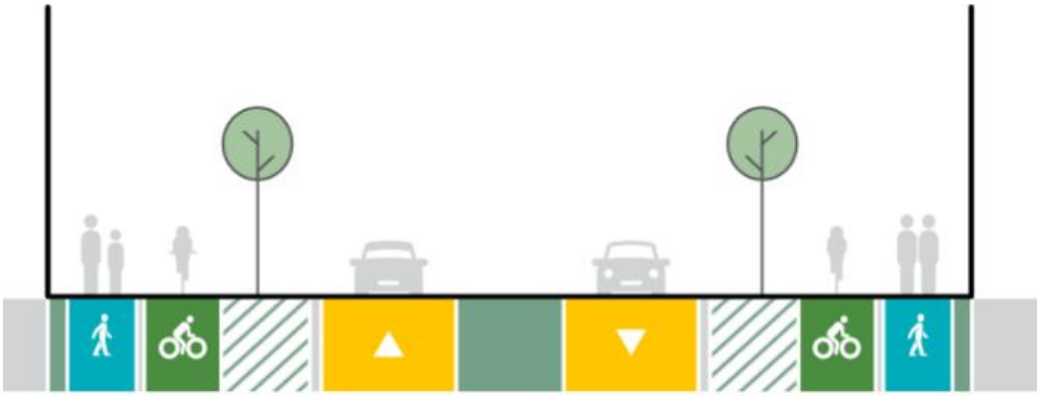


Figure 9.16: NOR 7 – Indicative cross section for the Sandspit Link project

9.9.2 Receiving environment for NOR 7

Table 9.7 provides a summary of the relevant receiving environment features within which the project will be constructed, operated, and maintained.

Table 9.7: Summary of relevant receiving environment features for NOR 7

Features	Description
Planning context and land use	
Current land use and urban form	Current land uses surrounding the Sandspit Link are rural in nature with large lot residential dwellings set back from the southwestern extent. A recycling plant is situated to the southeast of the site and an operational limestone quarry is located to the northeast of the site. There are construction activities associated to the new Te Honohono ki Tai along the northern edge of the site.
Current zoning	Future Urban Zone Open Space – Conservation Zone Special Purpose Zone – Quarry.
Likely future zoning – Warkworth Structure Plan	Residential – Large Lot Zone Residential – Mixed Housing Urban Zone Residential – Mixed Housing Suburban Zone Residential – Single House Zone.
Overlays	High-Use Aquifer Management Areas Overlay Quarry Buffer Area Overlay.
Controls	Macroinvertebrate Community Index.
Existing designations	Designation 1478 - Matakana Road Link – State Highway 1 to Matakana Road, Warkworth, Auckland Transport.
Human environment	
Transport	*Existing Environment* There is no existing road corridor in the area. The existing environment is undeveloped greenfield with Matakana Road running east to west in the north and Sandspit Road

Features	Description
	running east to west in the south. A road associated with the limestone quarry (Quarry Road) intersects with Sandspit Road in the south and currently services access to residential dwellings, the quarry, and the recycling plant. *Likely Future Environment* It is expected that the corridor will have an urban character with two general traffic lanes, cycle lanes and footpaths on both sides of the corridor, with a posted speed limit of 50kph. It will facilitate access to the planned growth within this area as well as improve connectivity between Matakana and Kōwhai Coasts. The forecast ADT in 2048 is 4,000 vehicles, whilst there are no bus routes proposed under the indicative 2048 AT bus network along the Sandspit Link, the corridor cross-section will provide adequate spacing to facilitate public transport and associated bus stops if bus services are proposed in the future. The corridor will merge with the current Quarry Road and become the southern section of Sandspit Link as it forms an intersection with Sandspit Road in the south. The corridor will also form an intersection with Matakana Road and Te Honohono ki Tai in the north. Details of these intersections are as follows: Sandspit Link / Matakana Road / Te Honohono ki Tai – single-lane roundabout Sandspit Link / Sandspit Road – single-lane roundabout.
Historic heritage and archaeological values	*Existing Environment* There are no recorded historic heritage or archaeological sites along the designation corridor. Any unrecorded archaeological sites are protected under provisions of the Heritage New Zealand Pouhere Taonga Act 2014 (HNZPTA) but will not be uncovered until works commence (if present). *Likely Future Environment* The existing environment as it relates to historic heritage and archaeological values is likely to remain the same in the future.
Community and recreational facilities	*Existing Environment* There are no community and recreational facilities near the designation corridor. The Warkworth Town Centre is located approximately 2 km from the site and the Warkworth Showgrounds is approximately 2.9 km west of the site. *Likely Future Environment* The subject site and surrounding land uses are expected to be zoned for residential land uses, as a result it is likely community and recreational activities will be provided in close proximity to the area as the population increases.
Noise and vibration	*Existing Environment* The Sandspit Link runs through a rural environment with few dwellings. Currently, the noise environment is encompassed of road traffic noise from Matakana Road as well as noise associated to the nearby limestone quarry. *Likely Future Environment* The subject site and surrounding land uses are expected to be zoned for residential land uses which would result in an increase in ambient noise levels as the area urbanises.
Natural and physical environment	

Features	Description
Geology	Mahurangi Limestone (Northland Allochthon) is mapped in the subject site area. The geological conditions are not anticipated to vary in the future.
Hydrology and natural hazards, including watercourses	*Existing Environment* The corridor crosses six existing streams varying in upstream catchment size. There are predicted flood plains along the three major streams, with minor flooding mapped along the three other streams. *Likely Future Environment* Although urban development is anticipated to change the hydrological environment through increases to impervious surface and associated runoff, the natural hazard conditions are not expected to significantly vary in the future, provided new urban development manages its flooding effects. The road slopes from Sandspit Road intersection at approx. 42m RL to approx. 65m RL at the Matakana Road intersection. There are deep cuttings at the Matakana Road end of the alignment where flow will need to be conveyed through them and drains at the top of the cuttings to divert water away from the cutting faces. There are two proposed wetlands with one near the centre of the alignment and the second by Sandspit Road.
Terrestrial ecology	*Existing Environment* <u>Habitat</u> The northern portion of the Sandspit Link area is rural in nature with two patches of mature native forest (largely modified podocarp broadleaved forest dominated by Totara canopy) assessed as having high value, mature exotic treeland assessed as having moderate value and exotic grass. The southern portion of the corridor area is mostly associated with existing planting, shelterbelt, and exotic grass having low value. Eleven streams are within the designation footprint, seven are classed as intermittent and four as permanent. Eight natural wetlands as defined under NES-F are associated with the Sandspit Link, they are: WW7-W1, WW7-W2, WW7-W4, WW7-W5, WW7-W6, WW7-W7, WW7-W8 are all natural inland wetlands. They have been assessed as having low ecological value and are not likely supportive habitats for TAR species. WW7-W3 is a natural inland wetland known as a foraging habitat for Australasian bittern. It is also a known foraging and nesting area for spotless crake. It has been assessed as having a moderate ecological value. <u>Species</u> Mature trees associated to the native forest in the northern portion of the corridor area could provide suitable habit for bats. Therefore, bat use of the area cannot be excluded from consideration. Incidental observations of bird species were noted. The most commonly noted birds were introduced species including Blackbird, Chaffinch, Common Pheasant, Eastern Rosella, House Sparrow, Skylark, as well as not threatened native species including Tūi, Welcome Swallow, Spur Winged Plover, Swamp Harrier, Pūkeko, Kingfisher, and Paradise Shelduck. Six indigenous lizards are likely to be present within and adjacent to the corridor. This includes Hochsetter's Frog, Ornate Skink, Forest Gecko, Elegant Gecko, Copper Skink and Pacific Gecko

Features	Description
	Due to the presence of native forest and dense leaf litter within the corridor area it is likely that flax snails, large land snails, and Auckland tree wēta are present. *Likely Future Environment* The AUP:OP places emphasis on the protection of and enhancement of existing watercourses, wetlands and areas of natural value. If these features are retained, in a future scenario, these features of ecological value could be similar or in some cases enhanced. It is also assumed that stormwater management will be provided, and sediment and pollutants will be controlled through development applications. Shelterbelts are expected to be removed in the future environment (as vegetation clearance, excluding within riparian areas, notable trees and certain street trees) is permitted under the AUP:OP and unlikely to remain in an urbanised scenario.
Topography and landscape context	*Existing Environment* The transport corridor is set within a currently rural landscape. This character is contributed to by extensive areas of pasture, fence lines, farm infrastructure (such as water tanks), and linear patterns of farm trees and shelterbelts. There are residential properties scattered towards the southern extent of the designation and quarrying activity is present to the northeast. The area is located near a notable hill (below the prominent ridgeline) to the north of Warkworth Town Centre. There are several streams within the area that have dense riparian vegetation. *Likely Future Environment* It is expected that the future area of the designation and surrounding landscape will be largely urbanised in the future (FUZ), with a small area of open space conservation land along the lower extent of some tributaries.

9.10 NOR 8 – Wider Western Link – North

9.10.1 Project overview

A new designation will provide for a new urban arterial cross-section with active mode facilities between Woodcocks Road and the Mahurangi River, known as the Wider Western Link – North.

The new Wider Western Link – North will provide a new north-south connection between Woodcocks Road and SH1. It will connect to the Southern Interchange on Ara Tūhono (Pūhoi to Warkworth) motorway via a new arterial connection. The multimodal corridor will provide direct access for all modes to the south-western growth area of Warkworth and in particular will connect the proposed high density residential land use to the proposed local centre and provide access to key future heavy industrial land which will provide local employment.

The corridor will also provide a continuous active mode facility to connect into the wider Warkworth active mode network. It will also serve as a key public transport route connecting South Warkworth to the rest of the public transport network, as well as supporting access to the proposed Southern Public Transport Interchange, enabling regional bus services within Warkworth as well interregional bus trips via the Southern Interchange.

The southern section of the Wider Western Link corridor from the Mahurangi River through to the intersection with SH1 is not being designated as part of the Warkworth Package. It is anticipated that this section will be delivered by the landowner who intends to develop the area via a plan change –

refer to previous commentary on Waimanawa (Warkworth South) proposed plan change in section 9.1.2. However, to ensure the continuity of the link and to provide for the completion of the southern section of the corridor, the corridor's intersection with the existing SH1 and the crossing of the Mahurangi River will be included as 'anchor points' in the designation for this NOR. The intersection will not be constructed during the construction of the Wider Western Link – North but will remain as a fixed tie in point for the southern section of the Wider Western Link as it is provided.

The designation footprint in Figure 9.17 shows the envelope required to construct, operate, and maintain the Wider Western Link – North project. The designation footprint includes sufficient space for its intersection with Woodcocks Road, and all ancillary components including construction areas, stormwater infrastructure, batter slopes and retaining walls.

Figure 9.17: NOR 8 – Wider Western Link – North indicative designation footprint

The key features of the Wider Western Link – North project include:

A new urban arterial cross-section with active mode facilities from Woodcocks Road to the Mahurangi River
Tie ins with existing roads and upgrades of existing intersections
New or upgraded stormwater ponds, bridges and culverts (where relevant)
Batter slopes, and associated cut and fill earthworks
Vegetation removal
Other construction related activities required outside the permanent corridor including the re-grade of driveways, construction traffic manoeuvring and construction laydown areas.

Figure 9.18 shows the indicative cross section for the Wider Western Link – North project.

Figure 9.18: NOR 8 – Indicative cross section for the Wider Western Link – North project

9.10.2 Receiving environment for NOR 8

Table 9.8 provides a summary of the relevant receiving environment features within which the project will be constructed, operated, and maintained.

Table 9.8: Summary of relevant receiving environment features for NOR 8

Features	Description
Planning context and land use	
Current land use and urban form	Land uses surrounding the Wider Western Link – North are comprised of generally rural activities with a limited number of large lot residential dwellings along its north and southeast extent. The Ara Tūhono (Pūhoi to Warkworth) motorway currently under construction runs along the western extent the corridor.
Current zoning	Future Urban Zone Open Space Conservation Zone.
Likely future zoning – Warkworth Structure Plan	Business - Heavy Industry Zone Open Space Conservation Zone. The southern portion of the corridor that is not the subject of this NOR is anticipated to have the following future zoning: Residential – Large Lot Zone Residential – Mixed Housing Suburban Zone Residential – Mixed Housing Urban Zone Business – Local Town Centre.
Overlays	High-Use Stream Management Areas High-Use Aquifer Management Areas Natural Stream Management Areas Significant Ecological Areas (Terrestrial).
Controls	Macroinvertebrate Community Index.

Features	Description
Existing designations	Designation 6769 - State Highway 1 – Puhoi to Warkworth, New Zealand Transport Agency (to the west of the alignment)
Human environment	
Transport	*Existing Environment* There is no existing road corridor between Woodcocks Road and the existing SH1, the existing environment is rural with the existing SH1 running east to west in the south. Wyllie Road is an existing road corridor which has been reformed as a cul-de sac due to the provision of Ara Tūhono (Puhoi to Warkworth) motorway, and which has an intersection with Woodcocks Road. *Likely Future Environment* The Wider Western Link will be a new arterial corridor on the Warkworth transport network. The corridor is expected to have an urban character with two general traffic lanes and cycle lanes and footpaths on both sides of the corridor, and a posted speed of 50kph. The Wider Western Link – North will merge with the northern portion of the existing Wyllie Road to connect to Woodcocks Road at the location of the existing intersection. By utilising the existing Wyllie Road connection, the corridor will reduce the number of intersections on Woodcocks Road, improving safety and efficiency on the Woodcocks Road corridor. The corridor will connect Woodcocks Road with the existing SH1. In addition, the corridor will provide a strategic connection to the motorway network (Ara Tūhono (Puhoi - Warkworth) motorway) via the Southern Interchange. The indicative 2048 AT bus network forecasts one core frequent bus service which will use the northern portion of the Wider Western Link. This service is forecast to operate every 15 minutes in the peak commute hours, and every 30 minutes outside of the peak. The forecast ADT in 2048 is 10,000 vehicles. There will be two intersections along the road including: Wider Western Link / Woodcocks Road – single-lane roundabout Wider Western Link / Link to Southern Interchange – single-lane roundabout.
Historic heritage and archaeological values	*Existing Environment* There are no recorded historic heritage sites within the designation footprint, however the following heritage feature is within proximity to the designation footprint: Auckland Council CHI site: 17004 (WWII Campsite). This site was recorded in 2007, a field assessment completed for the purpose of this project found no visible evidence related to the campsite. *Likely Future Environment* The existing environment as it relates to historic heritage and archaeological values is likely to remain the same in the future. CHI – 17006 is likely to remain unchanged (if present).
Community and recreational facilities	*Existing Environment* There are no community or recreational facilities within the Wider Western Link designation. There are existing community facilities to the east of the corridor including Mahurangi College (approximately 2.2 km), Mitre 10 Mega (approximately 1.7km) and Summerset Falls Rest Home (approximately 1.4 km). *Likely Future Environment*

Features	Description
	It is likely that additional community and recreational facilities will be provided within the subject site as development occurs and the population in the surrounding area grows. This includes a proposed school on Woodcocks Road, and high-density residential land use and a Local Town Centre to the south of the corridor as identified in the Warkworth Structure Plan.
Noise and vibration	*Existing Environment* The Wider Western Link – North runs through a predominantly rural area with some residential dwellings located close to the road corridor (Woodcocks Road). The noise environment is dominated by road traffic noise from vehicles on Woodcocks Road. *Likely Future Environment* The Wider Western Link – North is located on land which is zoned as FUZ. There is a high likelihood of urban development within this area signalled by the Warkworth Structure Plan which identifies a future change to Business – Heavy Industrial Zone in the northern section of the alignment and residential land uses in the southern section of the alignment. This zoning would likely result in an increase in ambient noise levels as the area urbanises compared to the current rural nature.
Natural and physical environment	
Geology	The transport corridor is identified as being within the Tauranga Group Alluvium and the Pakiri Formation which is part of the Waitematā Group after the Mahurangi River crossing. The geological conditions are not anticipated to vary in the future.
Hydrology and natural hazards, including watercourses	*Existing Environment* The Mahurangi River runs east-west along the southern portion of the Wider Western Link – North. The river has a large catchment upstream with flood plains surrounding the river alignment. *Likely Future Environment* Although urban development is anticipated to change the hydrological environment through increases to impervious surface and associated runoff, the natural hazard conditions are not expected to significantly vary in the future, provided new urban development manages its flooding effects. The new road will cross the Mahurangi River using appropriately sized bridges and / or culverts. There are two proposed wetlands along the alignment, one beside the intersection with Woodcocks Road and one near the southern end of the road.
Terrestrial ecology	*Existing Environment* <u>Habitat</u> The northern section of the corridor area is a section of the existing Wyllie Road, while the rest of the area consists of pasture and a native planted wetland. The central portion is associated with exotic pasture while the south-eastern portion crosses a first order stream and floodplain wetlands of the Mahurangi River (Right Branch). The riparian vegetation associated with the Mahurangi River is generally consistent with semi-mature regenerative forest (Kanuka / manuka). The Mahurangi River (Right Branch) classed as high value is within the designation footprint and three of its tributaries, two which are intermittent and one which is permanent are within the project area. Four natural wetlands as defined under NES-F are within the Wider Western Link – North area, they are:

Features	Description
	WW8-W1 is a natural inland wetland that is a known nesting and foraging habitat for dabchick and spotless crake. It is also a foraging habitat for Australasian bittern. It has been assessed as having a moderate ecological value WW8-W2 is a natural inland wetland assessed as having a low ecological value. It is not likely to support TAR birds WW8-W3 is a natural inland wetland assessed as having a low ecological value. It is not likely to support TAR birds WW8-W4 is a natural inland wetland and is a known nesting and foraging area for spotless crake. It is also a foraging habitat for Australasian bittern. It has been assessed as having a moderate ecological value. <u>Species</u> Existing desktop records confirm there are long-tailed bat records within 1.6km to the south the Wider Western Link – North area, within SEA_T_2367 adjacent to Wyllie Road. Incidental observations of bird species were noted. The most commonly noted birds were introduced species including Chaffinch, Common Pheasant, Goldfinch, Starling, as well as not threatened native species including Tūi, Grey Warbler, and Fantail. Five indigenous lizards are likely to be present within and adjacent to the corridor. This includes Ornate Skink, Forest Gecko, Elegant Gecko, Copper Skink and Pacific Gecko. *Likely Future Environment* The AUP:OP places emphasis on the protection of and enhancement of existing watercourses, wetlands and areas of natural value. If these features are retained, in a future scenario, these features of ecological value could be similar or in some cases enhanced. It is also assumed that stormwater management will be provided, and sediment and pollutants will be controlled through development applications. Shelterbelts are expected to be removed in the future environment, as vegetation clearance (excluding within riparian areas, and notable trees) is permitted under the AUP:OP and unlikely to remain in an urbanised scenario. It is additionally assumed that impact management will be provided to ensure the protection of wildlife species.
Topography and landscape context	*Existing Environment* The transport corridor is set within a currently rural landscape. This character is contributed by extensive areas of pasture, fence lines, farm infrastructure (such as water tanks), and linear patterns of farm trees and shelterbelts. There is low density residential property in the southwestern area near Valerie Close. The Mahurangi River crosses the area with dense riparian vegetation flanking it. *Likely Future Environment* The Ara Tūhono (Puhoi to Warkworth) motorway and associated Warkworth interchange currently under construction will flank the western side of the area. As part of the AUO:OP zoning, it is expected that the future area of the designation and surrounding landscape will be largely urbanised in the future (FUZ). Much of the vegetation in the area will be removed to account for this urbanisation.

9.11 Overview of NORs

Table 9.9 provides an overview of the purpose, objectives, lapse period and affected properties for each NOR in the Warkworth Package.

Table 9.9: Overview of the Warkworth Package – purpose, objectives, lapse period and affected properties.

Notice	Project	Purpose	Objectives	Lapse period	Overview of affected properties
NOR 1	Northern Public Transport Hub and Western Link – North	Construction, operation and maintenance of a transport facility and transport corridor.	Provide for a transport interchange with associated facilities and park and ride, and a new transport corridor between the existing State Highway 1 and the Western Link North (Northern Section) that: a) Improves connectivity b) Is safe c) Improves access to the public transport network d) Is efficient, resilient, and reliable e) Integrates with and supports planned urban growth f) Integrates with and supports the existing and future transport network.	20 years	Total: 4
NOR 2	Woodcocks Road (Western Section)	Construction, operation, and maintenance of a transport corridor	Provide for an upgrade to Woodcocks Road between Mansel Drive and Ara Tūhono (Puhoi to Warkworth) that: a) Improves connectivity Improves safety b) Is efficient, resilient and reliable c) Integrates with and supports planned urban growth d) Integrates with and supports the existing and future transport network e) Improves travel choice and contributes to mode shift.	15 years	Total: 25
NOR 3	State Highway 1 – South	Construction, operation and maintenance of a transport corridor	Provide for an upgrade to the existing State Highway 1 corridor between the intersection with Fairwater Road and the southern Rural Urban Boundary that:	15 years	Total: 74

Notice	Project	Purpose	Objectives	Lapse period	Overview of affected properties
			a) Improves connectivity b) Improves safety c) Is efficient, resilient and reliable d) Integrates with and supports planned urban growth e) Integrates with and supports the existing and future transport network f) Improves travel choice and contributes to mode shift.		
NOR 4	Matakana Road	Construction, operation and maintenance of a transport corridor	Provide for an upgrade to Matakana Road between the Hill Street intersection and the northern Rural Urban Boundary that: a) Improves connectivity b) Improves safety c) Is efficient, resilient and reliable d) Integrates with and supports planned urban growth e) Integrates with and supports the existing and future transport network f) Improves travel choice and contributes to mode shift.	15 years	Total: 36
NOR 5	Sandspit Road	Construction, operation and maintenance of a transport corridor	Provide for an upgrade to Sandspit Road between the Hill Street intersection and the eastern Rural Urban Boundary that: a) Improves connectivity b) Improves safety c) Is efficient, resilient and reliable d) Integrates with and supports planned urban growth e) Integrates with and supports the existing and future transport network f) Improves travel choice and contributes to mode shift.	25 years	Total: 29
NOR 6	Western Link – South	Construction, operation, and maintenance of a	Provide for a new transport corridor between Evelyn Street and the intersection with the existing State Highway 1 and McKinney Road that:	20 years	Total: 18

Notice	Project	Purpose	Objectives	Lapse period	Overview of affected properties
		transport corridor	a) Improves connectivity b) Is safe c) Is efficient, resilient and reliable d) Integrates with and supports planned urban growth e) Integrates with and supports the existing and future transport network f) Improves travel choice and contributes to mode shift		
NOR 7	Sandspit Link	Construction, operation, and maintenance of a transport corridor	Provide for a new transport corridor between Matakana Road and Sandspit Road that: a) Improves connectivity b) Is safe c) Is efficient, resilient and reliable d) Integrates with and supports planned urban growth e) Integrates with and supports the existing and future transport network f) Improves travel choice and contributes to mode shift	25 years	Total: 20
NOR 8	Wider Western Link – North	Construction, operation, and maintenance of a transport corridor	Provide for a new transport corridor between Woodcocks Road and the Wider Western Link (Southern Section), and the intersection with the existing State Highway 1 that: a) Improves connectivity b) Is safe c) Is efficient, resilient and reliable d) Integrates with and supports planned urban growth e) Integrates with and supports the existing and future transport network f) Improves travel choice and contributes to mode shift.	20 years	Total: 13

10 Positive effects of the network

The Warkworth Package will play a vital role in the success of new neighbourhoods in Warkworth by providing safe, accessible and sustainable travel choices that connect communities and encourage a transformational shift from private vehicles to public transport, walking and cycling.

The early protection of the Warkworth Package will provide for the following outcomes:

Supporting and enabling growth: Protecting improved and new transport corridors will support Auckland Council's growth aspirations for the growth areas of Auckland, including intensification or density of growth, resulting in more efficient urban land development.

Improved access to economic and social opportunities and resilience of the strategic transport network: Protecting improved and new transport corridors will:

Improve travel choices and access to the critical economic and social needs of the existing and future communities;
Reduce an over-reliance on existing strategic transport corridors;
Better align the form and function of existing transport corridors with the planned urban form; and
Support freight service operations for business in the industrial and commercial areas of Warkworth, particularly in the southern growth area adjacent to Ara Tūhono (Puhoi to Warkworth) motorway.

Transformational mode shift: The Warkworth Package supports a shift from private vehicles to public transport, walking and cycling which will provide for greater people moving capacity and travel choice for all people as the city grows, and will support lower carbon travel choices.

Land use and transport integration: Integrating future transport outcomes with Auckland Council's aspirations for land use and urban form can provide for growth in a way that delivers high quality urban outcomes, place making and enhanced liveability including the desire for a quality, connected urban environment.

Improved safety: Protecting improved and new transport corridors will help to address existing and increasing safety risks on transport corridors as growth areas urbanise, including:

Provision of dedicated space for cyclists and pedestrians to safely accommodate these modes
Specific safety improvement projects, such as improvements to existing transport corridors.

Sustainable outcomes: Protecting improved and new transport corridors will support the Government's policy shift towards more sustainable outcomes through effective land use and transport integration and supporting mode shift towards more sustainable travel choices such as public transport and walking and cycling.

Infrastructure integration: Integrating the transport response with the needs and opportunities of network utility providers to provide a better whole of system outcome as Te Tupu Ngātahi will provide space for utility provision within its conceptual design.

11 Māori culture, values and aspirations

This section draws on engagement that has been undertaken with Manawhenua and inputs provided by Manawhenua representatives during the preliminary design of each corridor. In developing the transport corridors, recognition has been given to both the relationship of Tangata Whenua to their lands, culture and traditions in the Warkworth area and the commitment to partnership between Manawhenua and AT (as a representative of the Crown) founded through Te Tiriti o Waitangi.

A Cultural Impact Assessment (CIA) has been provided by Ngāti Manuhiri.

11.1 Methodology

Only Manawhenua can speak to the impact that a project may have on their cultural values, heritage and aspirations. The methodology for assessing effects has been to engage with Manawhenua representatives and seek input on the potential impacts of each corridor.

Te Tupu Ngātahi maintains a Manawhenua forum (for operational and kaitiaki level discussions), with specific discussion on the future network proposed by Te Tupu Ngātahi for Warkworth. This has involved presenting to Manawhenua on a regular basis, seeking input on the corridor development and potential effects on cultural values. This has informed the corridor alignments and the mitigation measures proposed.

At the beginning of the Te Tupu Ngātahi Supporting Growth Programme, all iwi representatives were invited. As specific projects developed, iwi interests became more focused. Iwi with specific interests in the Warkworth area and who regularly attended project hui include Ngāti Manuhiri, Ngāti Maru, Ngāti Tamatera, Ngāti Whanaunga, Te Ākitai Waiohua, Ngai Tai Ki Tamaki; Ngāti Whātua o Kaipara, Ngāti Paoa Trust Board, Te Kawerau a Maki, Te Runanga o Ngāti Whātua, Te Patu Kirikiri and Ngāti Paoa Iwi Trust.

11.2 Manawhenua feedback

The project team engaged with Manawhenua on the Warkworth programme prior to and during wider community engagement, primarily through the Te Tupu Ngātahi Manawhenua forum, with Manawhenua also attending Project workshops. Ngāti Manuhiri also facilitated a cultural induction for Te Tupu Ngātahi Warkworth project team members.

We heard from Manawhenua that they were generally supportive of the proposed long-term transport network. Manawhenua highlighted to the project team a number of considerations, including:

1. Preference to avoid locating infrastructure within floodplains
2. Minimising environmental impacts, particularly those on streams, wetlands, and the Mahurangi River, as well as flooding impacts
3. Avoiding areas of cultural significance to Manawhenua
4. Retaining and enhancing connectivity to communities.

The project team broadly heard about the areas of interest to Manawhenua (as noted above), as well as any complexities and features to consider. We also heard about the importance of the Mahurangi River, as well as the proximity of floodplain areas to some projects, notably the new Wider Western

Link corridor. We also heard that there are ecologically sensitive areas around the new Sandspit Link study area.

11.3 Cultural Impact Assessment

The project team invited all Manawhenua groups to prepare to prepare CIAs for the project in December 2021. The team received the below responses following on from the invitation:

Ngāti Manuhiri – accepted the invitation and have provided a CIA to the project team.

11.4 Manawhenua Treaty areas and sites of significance

The upgraded and new transport corridors do not directly affect any identified properties or land currently being negotiated under Treaty settlements, land returned under a Treaty settlement, marae, Māori freehold lands, Tupuna Maunga Affected Areas, Tangata Whenua Management Areas, or Sites of Significance under the AUP:OP. The sites are also not within the coastal environment under the Marine and Coastal Area (Takutai Moana) Act 2011, therefore there are no customary marine title areas / groups or protected customary rights that need to be considered in relation to these corridors.

The transport corridors do not fall within or are not in proximity to Ngāti Manuhiri statutory acknowledgement areas (recorded in Appendix 21.3 of the AUP:OP).

11.5 Recommended measures to avoid, remedy or mitigate potential adverse effects

The following measures are proposed to avoid, remedy or mitigate potential adverse effects from the projects:

General: Manawhenua groups will be invited to prepare a Cultural Advisory Report in advance of the detailed design. This will assist in understanding and identifying treasures which may be affected by the project and inform their management and protection

Cultural design and expression: Manawhenua will be invited to participate in the development of the ULDMP to input into relevant cultural landscape and design matters on each corridor. This includes the management of potential effects on cultural sites, landscapes, and values, how corridor features will integrate with the corridor as a whole, including any proposed mitigation, and how the transport corridors can contribute to or reduce effects on the relevant cultural landscape. The ULDMP is provided for via a condition on each NOR

Risk of archaeological discovery: A Cultural Monitoring Plan will be prepared prior to the start of construction works or enabling works. These plans will be prepared in collaboration with Manawhenua so that the effects are managed appropriately, including where features discovered by accident. Archaeological mitigation will be in line with the recommendations of the Assessment of Archaeological Effects (Volume 4) and Section 18 of this AEE

Construction environmental controls: Construction works and the associated potential impacts of sediment on streams and wetlands will be considered through the CEMP, and future regional consents. The construction methodology and environmental controls are discussed in Section 8 of this AEE report. Detailed design will provide the opportunity to reduce earthwork extents, where practicable

Impacts on biota: Construction and operational impacts on fish, lizards, birds and bats have been considered through the Assessment of Ecological Effects (Volume 4) and Section 15 of this AEE report. An Ecological Management Plan (EMP) which includes Bat Management Plans (BMP) and Avifauna Management Plans (AMP) are proposed where potential adverse effects have been identified for these species

Riparian vegetation: Effects and mitigation for impacts on riparian vegetation will be considered at the detailed design stage, for those corridors that have impacts on streams. Where there is known impact on riparian vegetation due to a crossing or culvert design, suitable space for future mitigation planting has been included in the designation footprint, however mitigation will be confirmed under regional consents

Engagement: A Stakeholder and Communications Engagement Management Plan (SCEMP) will be prepared prior to the start of construction works or enabling works. This plan will include details of the specific methods for engaging with manawhenua, with these methods to be developed in consultation with manawhenua.

11.6 Summary of effects on Māori culture, values and aspirations

Te Tupu Ngātahi has engaged with Manawhenua from the commencement of the Te Tupu Ngātahi programme, through corridor identification, development and NOR preparation. The upgraded and new transport corridors do not directly impact on AUP:OP mapped sites of significance, however there is the potential for impacts on cultural values to the natural environment and cultural landscape context, identified through direct engagement with Manawhenua. It is considered that the recommendation above is appropriate to adequately manage these impacts.

12 Traffic and transportation

The potential effects of the Warkworth Package on traffic and transportation have been assessed in the Assessment of Transport Effects report in Volume 4. The summary below should be read in conjunction with the specialist report.

12.1 Methodology

Given the long-term nature of the transport corridors, the interim staging of individual transport corridors over the next three decades has not been assessed but instead the effects assessment has been undertaken on the likely future environment, based on the full build out of future urban areas. There are several transportation projects being developed separately in Warkworth including: Ara Tūhono (Puhoi to Warkworth) motorway, Te Honohono ki tai – Matakana Link Road, Hill Street intersection upgrades, and Ara Tūhono (Warkworth to Wellsford) motorway which will integrate with the Warkworth Package. These wider transport infrastructure upgrades have also been taken into account when assessing the transport related effects of the Warkworth Package.

The assessment has two elements: operational effects on the transport network and construction effects on the transport network. The methodology for the operational and construction related transport effects are applicable for each transport corridor.

The assessment is focussed on route protection, rather than imminent implementation. As such, it:

Makes greater use of generic cross-sections and design standards
Focuses more on desired outcomes and footprints
Takes a longer-term view, with its inherent uncertainties
Assumes more use of recommended management plans and planning processes rather than specific design details to manage potential effects.

A key element of the assessment is the definition of the ‘existing / likely future environment’, against which the effects are assessed. This is a complex issue as the works are planned to support urban development and will be unlikely to occur without such development. Additionally, the source of the potential effects (such as people and vehicle movements), is generally from urban development itself, rather than from the planned infrastructure.

To isolate the effects of the planned works, the existing environment includes the likely future urban development but does not include the planned projects for which designations are sought. The effects of the projects are then assessed using the same land use assumptions. Given the long-term perspective of the assessment, the analysis is based on the estimated ‘full build out’ for the future urban area. This is based on development yield estimates provided by Auckland Council through the Warkworth Structure Plan and the Auckland Forecast Centre.

12.2 Assessment of operational traffic and transport effects

The purpose of the Warkworth Package is to enable the provision of transport corridors that improve connectivity, contribute to mode shift by providing active mode and public transport facilities, are safe for users and improve network resilience. Therefore, all of the transport corridors have been assessed to have positive operational effects on the transport network. Specific outcomes are identified below.

12.2.1 Walking and cycling

Each transport corridor includes active mode facilities and includes sufficient space to provide dedicated pedestrian and cycle crossing facilities. The majority of the projects indicatively show separated walking and cycling facilities on both sides of the corridor, which connect with expected future adjacent facilities. However, there are some corridors that indicatively propose to have alternative facilities for walking and cycling due to environmental and engineering constraints. These are:

NOR 3 – State Highway 1 – South – a bidirectional cycling facility from Woodcocks Road to McKinney Road, which will integrate with the SH1 facilities and intersection improvements at Woodcocks Road (not within scope of NOR 3)

NOR 4 – Matakana Road – a bidirectional cycle facility to integrate with the Hill Street intersection walking and cycling infrastructure (not within scope of NOR 4)

NOR 5 – Sandspit Road – a shared offline boardwalk path adjacent to Sandspit Road from Vipond Culvert to Matakana Road integrating with facilities at the Hill Street intersection (not within scope of NOR 5).

The walking and cycling facilities (including the variations listed above) have been designed in accordance with relevant AT standards and policies including the AT Vision Zero Strategy and the AT Transport Design Manual. As the interim design of each transport corridor is aligned with the transport safety principles from AT no adverse walking and cycling effects have been identified.

Overall, the transport corridors will have a number of significant positive effects on walking and cycling as they will:

Significantly reduce the likelihood and exposure to potential crashes as it will enable safe movement for vulnerable road users along and across the corridor

Improve integration with the future walking and cycling network, resulting in improved east-west and north-south walking and cycling connectivity

Lead to environmental and health benefits as a result of increased active mode trips and reduced reliance on vehicle trips

Support growth adjacent to the corridor and significantly improve safety and access to employment and social amenities.

12.2.2 Public transport

It is anticipated that the expected growth in Warkworth will be supported by incremental improvements in public transport services. This includes the provision of new public transport routes, and increased frequency on existing routes. This improved public transport offering is necessary to support a shift to alternative modes and increase the attractiveness of public transport as a mode choice.

The NOR 1 designation boundary includes sufficient area to provide for public transport priority lanes and for the Public Transport Hub itself. The establishment of the Public Transport Hub will support a more resilient public transport system and transition to a low carbon network. The Public Transport Hub will support regional and interregional public transport access for Northern Warkworth. The facility will support the wider rural catchment of the Kōwhai Coast to use public transport for longer interregional trips. The Public Transport Hub will also include cycle storage, electric charging facilities and bus layover spaces to support Warkworth Town Centre services.

For NOR 2 - 8, there are no specific components of the designation to enable infrastructure based measures in the carriageway such as bus lanes or bus priority measures at intersections. Sufficient capacity is expected to be available within the intersections and vehicle lanes of these projects, and as such dedicated facilities are not warranted. Sufficient berm space has also been allocated along the corridors to facilitate bus shelters and bus stops. Once greater certainty is available on the location of key land use activities, such as urban centres, areas of higher intensification, schools etc., more certainty on high demand locations for bus stops can be determined.

The design of each corridor is intended to support public transport and, as such, no adverse public transport effects have been identified. The positive operational effects on public transport for the Warkworth Package are:

Specific provision of a Public Transport Hub (NOR 1) to facilitate access to public transport for northern Warkworth
Improved accessibility for future frequent public transport network
Improved integration with the future public transport network and improved east-west connectivity, as well as improved access to employment and social amenities
Increased attractiveness and uptake of public transport trips which will reduce reliance on vehicle trips, resulting in positive environmental and health benefits.

12.2.3 Corridor safety

The design of all projects has been undertaken with consideration of the latest safety guidance. This includes AT's Vision Zero and Waka Kotahi's Road to Zero. The new corridors are expected to result in positive effects on safety due to the:

New, walking and cycling facilities (including separation), resulting in improved protection for vulnerable road users
New, walking and cycling crossing facilities (crossing the arterial) and at key intersections, resulting in a significantly safer environment for all road users
Appropriate urban speeds on the upgraded and new arterials and consequential reductions in the risk of death or serious injuries.

It is anticipated walking and cycling demands will increase significantly as the Warkworth area urbanises. Given the expected traffic volumes along the corridors, there will be a safety risk for active mode users travelling along the corridor without appropriate facilities. Therefore, the projects have been designed to have 50km/h posted speed limits and largely provide segregated walking and cycling facilities to reduce the likelihood and severity of a potential crash.

The indicative designs are well aligned with the transport safety principles from AT and Waka Kotahi. It will provide a safe transport corridor and reduce the risk of deaths and serious injuries occurring, and, as such, no adverse road safety effects have been identified.

12.2.4 Access

All corridors for the Warkworth Package are expected to be limited access corridors in the future. As the areas develop, it is expected that future vehicle access to the network will be facilitated by collector road networks within the urbanised area adjacent to each road. Walking and cycling access will be provided to the corridors where practicable.

The collector network for Warkworth has been indicatively identified by the Warkworth Structure Plan; however, it is expected that these will be subject to change as developers progress these connections through plan change processes. These will be assessed by standard planning and approval processes through Council.

In terms of existing properties, the overarching design philosophy for the project has been to maintain driveway access where practicable and minimise impacting land for access purposes other than where necessary to re-instate driveways. In some instances, vehicle access has not been able to be maintained and the dwelling is included in the designation. These instances and opportunities for enhanced accessed are described in Table 12.1. Some NORs do not have access constraints and are therefore not included in the table.

Two conditions are expected to manage any potential vehicle access impacts:

the proposed Urban Landscape Design Management Plan (ULDMP) condition that requires that the ULDMP shall include landscape and urban design details that cover reinstatement of construction and site compound areas, driveways, accessways and fences, including alternative access where appropriate

the proposed Construction Traffic Management Plan (CTMP) condition that requires that the CTMP shall include methods to maintain vehicle access to property and / or private roads where practicable, or to provide alternative access arrangements when it will not be and methods that will be undertaken to communicate traffic management measures to affected road users (e.g. residents / public / stakeholders / emergency services).

Table 12.1: Specific access considerations for the Warkworth Package

NOR	Comment
NOR 1	An opportunity exists to improve access to a cemetery site located to the west of the Public Transport Hub. Access to this cemetery is currently via SH1 and turning movements are compromised by high traffic volumes and multiple lanes. This will be considered at the detailed design stage.
NOR 2	In the case of property at 101 Woodcocks Road a driveway reinstatement is not considered possible, and as such these properties are included within the designation boundary.
NOR 5	Two existing properties at 34 and 36 Sandspit Road have been identified where access will not be able to be reinstated to the existing smaller parcels following the project due to retaining work required, as such these have been included within the designation. For the avoidance of doubt, access can be retained to the adjacent larger parcel of 36 Sandspit Road via the existing access in the north-east corner. As noted previously these properties, and the adjacent larger parcel are currently the subject of a proposed development, with a lodged resource consent and proposed private plan change ('The Kilns'). It is anticipated that should development of this site proceed as proposed, or similar, that integration of the frontage of the site(s) with the proposed Sandspit Road upgrades will occur. Specifically, if these parcels are to be developed (either the whole site or just the two front lots), there are opportunities for the developer to tie back onto Sandspit Rd across the proposed footpath, provided they undertake earthworks to provide a safe / compliant tie in. Access to 325 Sandspit Road will likely need to be relocated following detailed design and can be accommodated within the designation boundary.
NOR 7	In terms of existing access, vehicle access to the dwelling at 195 Sandspit Road is not able to be retained and as such the dwelling has been included within the designation. The alignment of the Sandspit Link follows an existing driveway / access that currently services residential properties, a quarry, and a recycling plant. Should these properties still require access at

NOR	Comment
	time of implementation there are several options to provide access, including construction from the northern extent of the corridor or provision of an access route adjacent to the corridor within the designation. The designation is considered sufficiently wide enough to provide for this. Notwithstanding this, the implementation of the ULDMP and CTMP will manage potential vehicle access impacts appropriately.
NOR 8	The alignment of the Wider Western Link connects with Wyllie Road, replacing an existing cul de sac (resulting from Ara Tūhono (Puhoi to Warkworth) motorway). A small cul de sac will need to be formed to connect the residual Wyllie Road corridor with the new arterial. Sufficient space has been provided within the designation to enable this connection.

Overall, adverse effects on access have been avoided by including impacted driveways within the designation where practicable and safe, or by designating the entire properties where access cannot be maintained.

In terms of wider access, it is considered that any adverse access effects are minimal. This is due to the ability of future collector roads to integrate with the transport corridors, and with existing collector roads having been considered as part of the design of each corridor.

12.3 Assessment of construction traffic and transport effects

The main construction works required for the Warkworth Package will likely be adjacent to or in the live carriageway, which means that temporary traffic management will be required. The scale of temporary traffic management to delineate live traffic away from the construction zones is largely dependent on the various stages and requirements of the construction activities being undertaken. It is expected that short term temporary road closures for nights or weekends may be required for some specific activities, such as road surfacing, traffic switches and gas relocation. Other activities may require stop / go or contraflow traffic management, such as drainage works, utility relocation, survey and investigation work.

The effect of temporary road closure or other traffic management methods to existing traffic on the specific corridor and adjacent road network will be confirmed in the future as part of the CTMP for each project on the basis of the current traffic environment. This will take into account the level of growth and activities that have occurred in Warkworth, the availability of the alternative routes, and any additional sensitive land use activities that may need to be managed.

The construction of the projects will each likely require significant earthworks. Final cut and fill volumes will be confirmed following detailed design prior to construction. The construction traffic movements to accommodate the earthworks will likely result in the increase of traffic volumes on construction routes used during the construction period of each of the projects.

Given the construction timing and staging of the package has yet to be determined, there is a degree of uncertainty associated with any predicted construction methodology and associated traffic routes. This means:

The routes that will be used by construction vehicles will depend on the location of quarries and disposal sites which are not yet certain

The exact location and extent of compound sites / lay down areas has yet to be determined

The timing of construction of other projects could impact on likely construction vehicle routes, for example, if the Wider Western Link is constructed prior to or after the upgrade of Woodcocks Road.

Notwithstanding this, it is considered that with available connectivity to the strategic network and available capacity in the network, construction traffic will be able to be readily accommodated. It is noted that the access to compound sites / laydown areas and construction zones for construction vehicles, plant and materials will be via site access points identified as part of future CTMPs.

Details of the routes and time restrictions will need to be updated and refined as part of the CTMP process. It is anticipated that the routes for construction traffic will likely be limited to arterial corridors and intersections with the provision of adequate vehicle tracking.

12.3.1 Speed limits

In order to maintain the safety of all road users, safe and appropriate temporary speed limits will be implemented during the construction period on the network within the extent of works, and along the construction routes if needed. This will be in accordance with the latest traffic management standards at the time of construction. These recommended measures and other measures highlighted in the CTMP are expected to reduce the potential safety risks that may be associated with construction traffic.

12.3.2 Pedestrians and cyclists

The existing provision for pedestrian and cyclists is variable across the network. It is likely that the demand for these modes will increase if urbanisation occurs prior to construction, but future parallel collectors could also be used as alternative routes. Therefore, effects should be assessed again when a greater level of detail is available about surrounding facilities and land use activities prior to construction. However, residents and stakeholders will be kept informed of construction times and progress, and general observations of pedestrian and cyclist activity will be used to inform appropriate traffic management measures in the CTMP.

12.3.3 Property access for residents and businesses

During the time of construction, there will be temporary traffic management controls such as temporary concrete or steel barriers. Existing driveways that remain during construction will be required to have temporary access provision. It is anticipated that the contractor will undertake a property specific assessment of any affected driveways and provide temporary access arrangements if required. The temporary access should enable the ability for residents to safely access and exit the property. These requirements will be captured in the CTMP.

12.3.4 Construction movements - timing

Warkworth is located in proximity to the state highway network and also in proximity to very popular recreational and holiday areas for the wider Auckland area. The area currently experiences significant congestion in peak periods such as public holiday weekends and over the Christmas / New Year period. As such, the development of the CTMP prior to construction of any of the projects will need to consider the implications on construction movements through the Hill Street intersection in particular.

The CTMP will need to consider if the Hill Street intersection has been upgraded as planned, the performance of the intersection post opening of Ara Tūhono (Puhoi to Warkworth) motorway and Tūhonohono ki Tai (Warkworth to Wellsford) motorway and construction movement timings in peak periods including holiday periods.

The proposed CTMP condition in Volume 1 states that the CTMP will be required to include methods to manage the effects of temporary traffic management activities on traffic and the estimated numbers, frequencies, routes and timing of traffic movements, including any specific non-working or non-movement hours to manage vehicular and pedestrian traffic near schools or to manage traffic congestion. This will include consideration of the Hill Street intersection as a key intersection in Warkworth.

12.3.5 Land use activities that will need further consideration in the CTMP

Some key land uses or activities located adjacent to the corridors will need consideration during the development of the CTMP. This could include restricted truck movements during school pick up and drop off, or additional controls at key access locations. Key land uses that will need specific consideration include Mahurangi College and a new proposed school at 100 Woodcocks Road for the Woodcocks Road upgrade (NOR 2) and a quarry site located near the Sandspit Road Upgrade (NOR 5) and Sandspit Link (NOR 7). The CTMP will also consider other land uses that have been established at the time of development of the CTMP.

12.4 Recommended measures to avoid, remedy or mitigate potential adverse traffic and transport effects

12.4.1 Operational traffic and transport effects

Based on the Assessment of Transport Effects, and summarised above, the Warkworth Package will have significant positive effects on the wider transport network in Warkworth. There are no anticipated adverse effects that require mitigation.

12.4.2 Construction traffic and transport effects

It is considered that the potential construction traffic effects can be accommodated and managed appropriately through the implementation of a CTMP which will be developed as part of the outline plan process prior to construction, as outlined in the condition set in Volume 1. Any potential construction traffic effects will be confirmed prior to construction taking into account the specific construction methodology and traffic environment at the time of construction. As set out in the proposed condition, the objective of the CTMP is to avoid, remedy or mitigate, as far as practicable, adverse construction traffic effects. This will include methods to manage the effects of temporary traffic management activities on traffic, safety measures, site access and detour routes, and methods to communicate traffic management measures to affected road users.

12.5 Summary of traffic and transport effects

Based on the assessment of effects, as summarised above, the Warkworth Package will have considerable positive effects on the operation of the transport system, in particular improved safety, connectivity, resilience and contribution to mode shift. There are no anticipated adverse operational effects that require mitigation.

In terms of construction traffic effects, it is considered that there is sufficient network capacity to enable construction traffic. To address the potential construction effects identified, a CTMP will be prepared prior to the start of construction. Proposed condition wording is provided in Section 12.4.2 and in the condition set in Volume 1.

13 Noise and vibration

This section provides an assessment of the potential noise and vibration effects from the construction and operation (traffic noise) of the project. The potential construction and operational noise and vibration effects of the Warkworth Package have been assessed in the Assessment of Construction Noise and Vibration Effects (Volume 4) and the Assessment of Traffic Noise and Vibration Effects (Volume 4). The summary below should be read in conjunction with the specialist reports.

13.1 Methodology

The Assessment of Construction Noise and Vibration Effects, included in Volume 4 contains predictions for construction noise and vibration levels carried out using the method recommended in the NZS 6803 in accordance with the AUP:OP. The assessment methodology included:

Reviewing noise and vibration emission data for each construction task based on equipment data previously measured for similar activities;
Predicting the noise and vibration levels from construction based on relevant standards and guidelines; and
Determining setback distances where compliance with the relevant standards can be achieved.

The Assessment of Traffic Noise and Vibration Effects, included in Volume 4, sets out predictions of road traffic noise carried out using the method in NZS 6806 in accordance with rule E25.6.33 in the AUP:OP. The assessment of effects was twofold and considered NZS 6806 noise criteria categories as well as the anticipated noise level change with and without the Project.

13.2 Construction noise effects

Construction noise is generally higher than that of ongoing continuous activities. Therefore, while effects are based on how people are likely to react to equivalent internal noise levels, construction is a temporary activity with a finite duration. Most people are more likely to accept increased noise (or vibration) levels if durations and magnitudes are well communicated prior to works occurring.

Overall, predicted noise levels for most of the works will be able to comply with the relevant daytime standards of 70 Db LAeq, which means that effects are generally acceptable inside neighbouring buildings. Where high noise activities are likely (e.g. demolition of close by buildings, piling of bridges or retaining walls, and earthworks), these activities would occur for short periods only close to any one building, generally extending over a few days at most, before moving along the alignment or being completed. Night-time and weekend works will be limited and only occur for critical activities. Construction activities can be managed through the implementation of a Construction Noise and Vibration Management Plan (CNVMP) as outlined in Section 13.5.1 below.

13.3 Construction vibration effects

Vibration levels could exceed the Category B criteria at some existing dwellings for all corridors except NOR 1 prior to mitigation being implemented, if high vibration generating equipment such as the roller compactor is used on the construction boundary at the closest position to the receiver. Without mitigation, at these receivers (listed in Appendix B of the Assessment of Construction Noise

and Vibration Effects) there is potential for cosmetic damage to buildings (such as cracking) and annoyance from perception of vibration.

Mitigation such as the use of non-vibratory compaction equipment within 8 m of buildings is recommended to avoid potential cosmetic damage. Vibration can typically be tolerated inside buildings if it occurs intermittently during the day, is of limited duration and where there is effective prior engagement. Where an exceedance is predicted at any receiver that exists at the time of construction, the effects will be mitigated and managed through the CNVMP and Schedules.

13.4 Operational traffic noise effects

In accordance with NZS 6806, the Warkworth Package consists of “altered roads” and “new roads” and roads that do not meet either definition. Existing Protected Premises and Facilities (PPFs) within 100 m from the proposed altered and new road edges were assessed based on NZS 6806. NZS 6806 is not applicable to new and altered roads predicted to carry less than an Annual Average Daily Traffic (ADT) of 2000 vehicles at the design year, or where the change in noise level due to a project (i.e. the horizontal or vertical realignment of a road) does not reach certain thresholds of effects (e.g. a change of at least 3 dB for at least one PPF). NORs 1, 2, and 5 did not meet the definition of ‘altered road’ and therefore mitigation measures were not considered for those corridors.

The number of PPFs for each NOR is shown in Table 13.1 below:

Table 13.1: Number of PPFs for each NOR

NOR	Number of PPFs
NOR 1 – Northern Public Transport Hub and Western Link – North	0
NOR 2 – Woodcocks Road (Western Section)	53
NOR 3 – State Highway 1 – South	97
NOR 4 – Matakana Road	68
NOR 5 – Sandspit Road	16
NOR 6 – Western Link – South	27
NOR 7 – Sandspit Link	2
NOR 8 – Wider Western Link - North	2

The individual traffic noise level predictions were compared with the noise criteria categories A, B and C of NZS6806, and the anticipated noise level change due to the Project was calculated.

Overall, the change in noise level was predicted to be minimal due to the actual degree of traffic generation itself. The removal of the first row of houses in some locations will result in noise level changes to PPFs behind the dwellings that will be removed.

Mostly, those PPFs would still receive noise levels within Category A (the desired noise criteria category), however, there is a small number of PPFs where noise levels are predicted to be in Category B. These PPFs are located in NORs 3 and 4. One PPF located in NOR 3 is predicted to be in Category C. With the installation of an AC-14 low noise road surface as recommended in the Assessment of Traffic Noise and Vibration Effects, all PPFs in these NORs fall into Category A. For the vast majority of PPFs, the noise level changes due to the projects will be insignificant.

Traffic from new or upgraded roading projects is not generally expected to create any vibration issues. The smooth and even surface typical of urban roads would likely generate no more than negligible traffic vibration impacts. Therefore, traffic vibration has not been assessed for the Projects.

13.5 Recommended measures to avoid, remedy or mitigate noise and vibration effects

The following sections outline the proposed measures to manage the effects of construction noise and vibration and operational traffic noise.

13.5.1 Construction noise and vibration mitigation

An CNVMP will be prepared as part of the outline plan process prior to construction, as outlined in the condition set in Volume 1. The CNVMP will determine and implement the BPO management of construction noise and vibration, and reduce, as far as practicable, any exceedance of the noise of vibration standards. The Assessment of Construction Noise and Vibration Effects sets out the minimum level of information that must be provided in the CNVMP. The information required to be submitted as part of the CNVMP is included in the condition set in Volume 1 and includes: the identification of receivers where noise and vibration standards apply, management and mitigation options, methods for noise and vibration monitoring, and procedures for maintaining contact with stakeholders.

13.5.2 Operational traffic noise mitigation

There are broadly three mitigation options that can be applied to manage road traffic noise that are discussed in NZS6806:

The choice of road surface material, a mitigation option that reduces noise at the source (especially for roads with speeds above 40-50 km/h where the road-tyre interaction is the controlling noise source rather than engine noise)
The installation of noise barriers either on the roadside or on the property boundary
The inclusion (for new builds) or retrofitting (for existing buildings) of Building Modification Mitigation (e.g., alternative ventilation to enable windows and doors to remain closed, improved joinery and / or glazing, or, in rare cases, the installation of additional wall and ceiling lining).

A number of conditions are proposed in the Condition set in Volume 1 so that operational traffic noise effects are considered appropriately prior to detailed design and construction of the projects. Application of AC-14 or equivalent low noise road surface has been recommended for NOR 3 and 4 in order to mitigate traffic noise effects. This mitigation is considered to be the most effective noise mitigation measure for existing PPFs but will also benefit any future PPFs.

For NORs 1, 2, 5, 6, 7 and 8 it is noted that AT adheres to road resealing guidelines which sets out the requirements where asphaltic concrete (low noise road surface) must be used. The requirements include minimum traffic volumes and consideration of adjoining land use.

13.6 Summary of noise and vibration effects

Construction noise levels are expected to be within the permitted levels for the majority of the construction works. Some minor exceedances associated with high noise generating activities or night-time works may breach the permitted levels.

Construction vibration may result in some cosmetic damage to neighbouring buildings; however, this is expected to be able to be avoided with mitigation measures in place. Construction noise and vibration will be managed through the implementation of a CNVMP as outlined above. With the CNVMP in place, it is considered that effects will generally be reasonable for the majority of activities for the construction of all corridors.

Operational traffic noise for all NORs is expected to be reasonable, with the implementation of low noise road surfaces for NORs 3 and 4 proposed as specific noise mitigation for these corridors.

14 Terrestrial ecology

The Assessment of Ecological Effects provided in Volume 4 assesses the potential ecological effects which are the subject of district plan controls under the AUP:OP, for each of the proposed transport corridors. The summary below should be read in conjunction with this report.

For ecological effects that relate to regional plan and / or NES matters, these will be assessed and resource consents sought through a future consenting process. Any required mitigation will be identified as part of that future consenting process. While these matters are not required to be assessed as part of this AEE, potential ecological effects relating to future regional resource consents and / or wildlife permits have been considered to the extent they are relevant to inform the alignment and the designation footprint for each proposed transport corridor.

14.1 Methodology

The Assessment of Ecological Effects follows the Ecological Impact Assessment Guidelines (EIANZ, 2018). These guidelines were used to assess the ecological value of identified ecological features for each NOR and evaluate the magnitude and level of potential effects that the proposed transport corridors could have on these features as summarised in the sections below. The key EIANZ assessment stages are outlined in Figure 14.1.

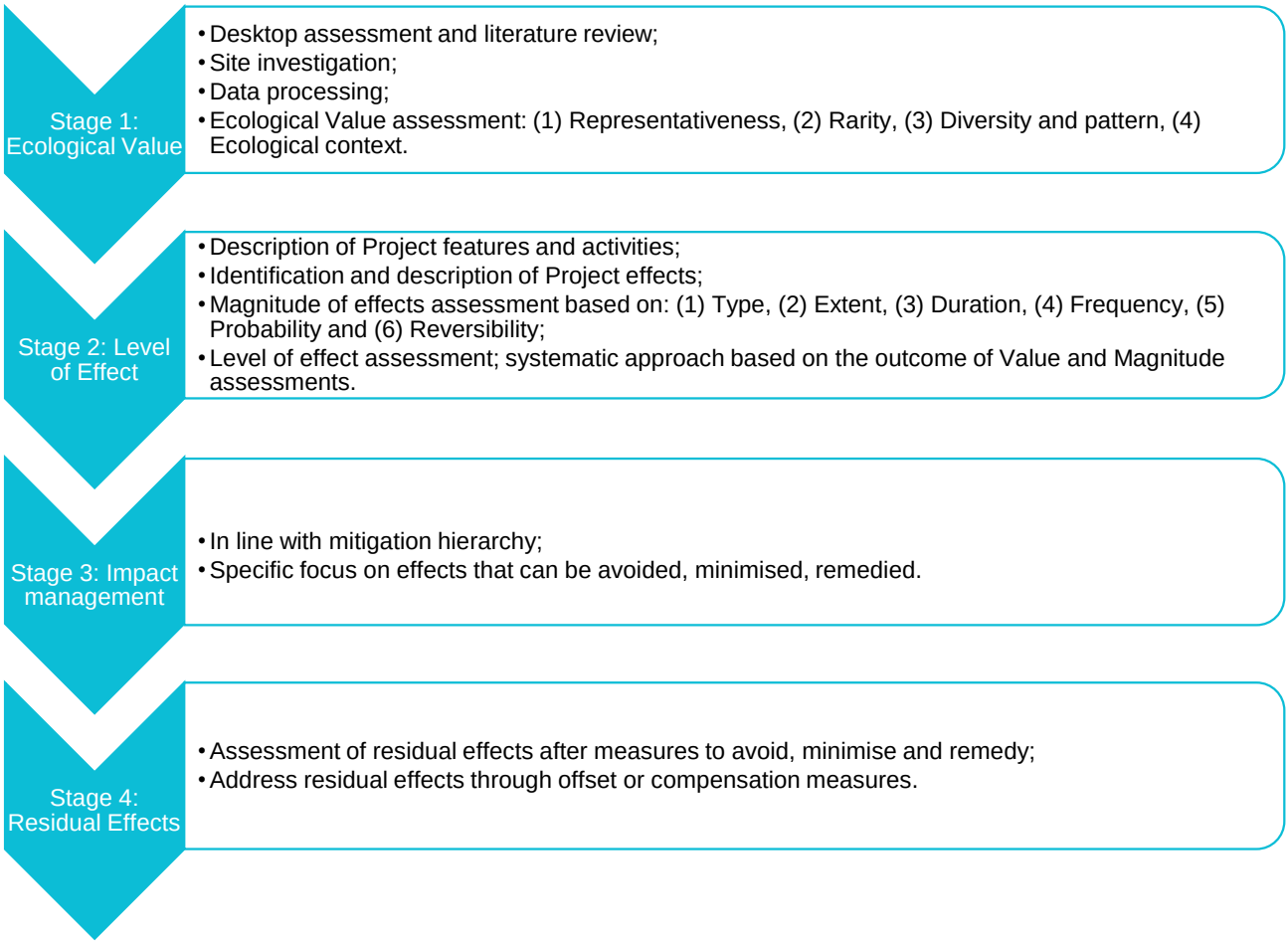


Figure 14.1: Assessment of ecological effects process

The EIANZ Guidelines provide guidance to assist with the assessment of the likely future ecological environment in this report. The assessment states:

"The ecologist needs to consider the permitted baseline in order to describe the potential "future ecological environment and to assess effects at that time, and should discuss this with the project planner or legal advisor if in any doubt".

In line with the above, the Assessment of Ecological Effects has assessed the existing environment as well as the likely future environment at the time of construction of the corridors. Desktop and site investigations were undertaken for ecological features within all eight NORs. Ecological features within the designation boundary and a distance of approximately 100 m radius of the designation have been mapped and included in the Assessment of Ecological Effects. Terrestrial, stream, and wetland features were investigated and mapped to provide context for potential adjustments to the designation boundary.

14.2 Assessment of effects on terrestrial ecology across the Warkworth Package

14.2.1 Assessment of positive effects on terrestrial ecology

The following positive effects were identified for the Warkworth Package projects:

Improved blue / green infrastructure (stormwater wetlands, swales, raingardens) and associated landscaping (which will be indigenous species)

Revegetation of sloping berms, batters and embankments to connect with retained forest remnant / mature trees

The proposed bat mitigation in association with the revegetation and stormwater wetlands will have positive ecological outcomes for all native fauna. The proposed bat mitigation associated with Mahurangi River (and associated tributaries) are likely to improve ecological connectivity through the FUZ for other native fauna.

Specific positive effects for specific transport corridors are summarised in Table 14.1.

Table 14.1: Summary of positive effects for specific transport corridors

NOR	Ecological Feature	Positive Effect
NOR 2	Mahurangi River (WW2-S3), Mahurangi Tributary (WW2-S2)	The Project landscape planting will tie into stream and riparian corridors. Riparian vegetation will be retained (where practicable) and enhanced (weeds control and indigenous vegetation planted).
NOR 3	Mahurangi Tributary (WW3-S1, WW3, S2, WW3-S4)	
NOR 5	Mahurangi Tributary (WW5-S1, WW5-2S)	
NOR 6	Mahurangi Tributary (WW6-S2) and raupo wetland (WL19)	
NOR 8	Mahurangi Tributary (WW8-S2)	

NOR	Ecological Feature	Positive Effect
NOR 2	Mahurangi River (WW2-S3), Mahurangi Tributary (WW2-S2)	Existing infrastructure upgrades will include new bridge structures, culvert upgrades and additional / improvements to stormwater infrastructure. Upgrading undersized structures and improvements in culvert design such as embedding culverts with natural substrate / increased design capacity will improve habitat connectivity for freshwater and terrestrial species. This will include improved fish passage and improved riparian habitat connectivity.
NOR 3	Mahurangi Tributary (WW3-S1)	
NOR 5	Mahurangi Tributary (WW5-S1, WW5-2S)	
NOR 7	Mahurangi Tributary (WW5-S2), and stream (WW7-S2)	

14.2.2 Assessment of construction effects on terrestrial ecology

The construction activities associated with each new or upgraded transport corridor have the potential to cause adverse effects on ecological features within or adjacent to the designation footprint if they are not mitigated. Potential construction effects that relate to the activities authorised by the designation include the disturbance and displacement of roosts / nests and individual (existing) long-tailed bats, avifauna and herpetofauna due to construction activities (noise, light, dust etc.). It is assumed that this effect will occur after vegetation clearance (subject to regional consent controls) has been implemented and is therefore likely to happen in habitats adjacent to the project footprint / designation or underneath structures such as bridges.

The following sections detail the potential magnitude of effect and subsequent level of effect on ecological features. Impact management and residual effects are also presented where the level of effect is assessed to be Moderate or higher.

14.2.2.1 Vegetation

Effects on district plan vegetation have been considered in the Assessment of Arboricultural Effects Report and Section 20. A total of 5 individual trees and 2 groups of trees, identified as protected under the AUP:OP provisions, were noted as being affected by the NOR alignments, across all the NORs. The effects relating to the removal of these trees is considered negligible from an ecological perspective, and as such these have not been considered any further in this section or in the Assessment of Ecological Effects.

Additionally, there are three locations (NOR 2, 4 and 5) where there is an Open Space zone (subject to district plan rules) with an SEA overlay (subject to regional plan rules). The ecological effects of the removal of these areas of SEA vegetation are considered to be a regional consenting matter and as such have not been considered further as part of this assessment. The exact extent of any potential impacts on SEAs will be confirmed through the detailed design phase and will be the subject of a separate regional resource consent application process, including consideration given at this time as to any potential mitigation which may be required.

14.2.2.2 Long-tailed bats

The ecological value of bats is assessed to be very high. Bats may utilise the land surrounding each of the projects for roosting, foraging or commuting. During construction, night works may be required and site compounds are likely to be lit overnight. Lighting at night has the potential to affect the behaviour of bats if foraging within this area or roosting nearby.

Noise and vibration during construction can be an issue if bats are roosting in the immediate vicinity of construction works. While bat foraging has been confirmed in the Warkworth area, surveys at the corridor scale cannot confirm roost occupation within or adjacent to transport corridors. However, it can be assumed that bats will utilise roost sites within the designation footprints based on:

Confirmed habitat suitability (numerous trees with moderate to high bat roost potential, connected to linear stream corridors and wetlands) (some NORs have more suitable habitat than others)
Confirmed foraging presence
Frequent utilisation of numerous roosting sites throughout their home range.

During construction the overall level of effect due to the potential disturbance and displacement to roosts and individual bats for each project is presented in Table 14.2 below. Where effects are assessed as Moderate or higher, mitigation is proposed. Details on the proposed mitigation is provided in Section 14.4 below. With mitigation in place, the overall level of effect reduces to Low or Very Low for all corridors.

Table 14.2: Overall level of effect on bats from construction for each NOR

NOR	Disturbance and displacement to roosts and individual bats (existing)	Mitigation required?	Level of effect post-mitigation
NOR 1	Low	No	n/a
NOR 2	Moderate	Yes	Very Low
NOR 3	Low	No	n/a
NOR 4	Moderate	Yes	Very Low
NOR 5	Moderate	Yes	Very Low
NOR 6	Low	No	n/a
NOR 7	Moderate	Yes	Very Low
NOR 8	Moderate	Yes	Very Low

14.2.2.3 Birds

There are a number of TAR bird species and non-TAR bird species likely to be present within the project areas. The key species likely to be present in each NOR area are outlined in Table 14.3.

Noise, vibration and lighting disturbance caused by construction activities could potentially displace native birds from suitable nesting and foraging habitat within and adjacent to construction works for all

NORs. During construction the overall level of effect on birds for each NOR is presented in Table 14.3.

Effects are limited where birds are unlikely to be nesting in or adjacent to construction areas or where birds are likely to naturally relocate to alternative habitats during construction. Where effects are considered to be Moderate or higher, mitigation is proposed. The overall level of effect with mitigation is also presented in the table below. Details on the proposed mitigation is provided in Section 14.4. With mitigation in place, the overall level of effect on birds reduces to Low or Very Low for all corridors.

Table 14.3: Overall level of effect on birds from construction for each NOR

NOR	Species	Disturbance and displacement to nests and individual birds during construction	Mitigation required?	Level of effect post-mitigation
NOR 1	Non-TAR birds	Very Low	No	n/a
	New Zealand pipit	High Very Low*	Yes No*	Low n/a*
	Australasian bittern	Low	No	n/a
	Spotless crake	Moderate	Yes	Very Low
NOR 2	Non-TAR birds, North Island kākā, Black shag, Little black shag, Little shag, Pied shag	Very Low	No	n/a
	New Zealand pipit	High Very Low*	Yes No*	Low n/a*
	Long-tailed cuckoo	Low	No	n/a
NOR 3	Non-TAR birds	Very Low	No	n/a
	New Zealand pipit	High Very Low*	Yes No*	Low n/a*
	Australasian bittern	Low	No	n/a
	Spotless crake	Moderate	Yes	Very Low
NOR 4	Non-TAR birds and North Island kākā	Very Low	No	n/a
	New Zealand pipit	High Very Low*	Yes No*	Low n/a*
	Long-tailed cuckoo and Australasian bittern	Low	No	n/a

NOR	Species	Disturbance and displacement to nests and individual birds during construction	Mitigation required?	Level of effect post-mitigation
	Spotless crake	Moderate	Yes	Very Low
NOR 5	Non-TAR birds and North Island kākā	Very Low	No	n/a
	New Zealand pipit	High Very Low*	Yes No	Low n/a*
	Long-tailed cuckoo and Australasian bittern	Low	No	n/a
	Spotless crake	Moderate	Yes	Very Low
NOR 6	Non-TAR birds	Very Low	No	n/a
	New Zealand pipit	High	Yes	Low
	Australasian bittern	Low	No	n/a
	Spotless crake	Moderate	Yes	Very Low
NOR 7	Non-TAR birds, North Island kākā, Black shag, Little black shag, Little shag, Pied shag	Very Low	No	n/a
	New Zealand pipit	High Very Low*	Yes No*	Low n/a*
	Long-tailed cuckoo and Australasian bittern	Low	No	n/a
	Spotless crake	Moderate	Yes	Very Low
NOR 8	Non-TAR birds and North Island kākā	Very Low	No	n/a
	New Zealand pipit	High Very Low*	Yes No*	Low n/a*
	Long-tailed cuckoo	Low	No	n/a
	Australasian bittern	Low	No	n/a
	Spotless crake	Moderate	Yes	Very Low
	Dabchick	Moderate	Yes	Low

*Indicates a level of effect associated with the future ecological environment that is different from the baseline level of effects.

14.2.2.4 Herpetofauna

There are a number of herpetofauna species likely to be present within the project areas. The key species identified in the Assessment of Ecological Effects for each NOR is outlined in Table 14.4. During construction activities associated with the upgrade of existing transport corridors, lizards are likely to be habituated to noise and vibration from the existing road. For new corridors, lizards will not be habituated to noise and vibration due to the construction taking place in greenfield areas which increases the likelihood of adverse effects occurring.

The overall level of effect due to the disturbance and displacement of individuals adjacent to construction activities for each NOR on herpetofauna species is presented in Table 14.4 below. As outlined below, the overall level of effect on herpetofauna species is expected to be Low to Very Low for all NORs. Therefore, no mitigation is proposed.

Table 14.4: Overall level of effect on herpetofauna species from construction for each NOR

NOR	Species	Disturbance and displacement of individuals adjacent to construction activities	Mitigation required?
NOR 1	Copper skink	Low	No
NOR 2	Copper skink and ornate skink	Very Low	No
	Elegant gecko, forest gecko, pacific gecko	Low	No
NOR 3	Copper skink	Very Low	No
NOR 4	Copper skink and ornate skink	Very Low	No
	Elegant gecko, forest gecko, pacific gecko	Low	No
	Hochstetter's frog	Very Low	No
NOR 5	Copper skink and ornate skink	Very Low	No
	Elegant gecko, forest gecko, pacific gecko	Low	No
	Hochstetter's frog	Low	No
NOR 6	Copper skink	Very Low	No
NOR 7	Copper skink and ornate skink, elegant gecko, forest gecko, pacific gecko	Low	No
	Hochstetter's frog	Low	No
NOR 8	Copper skink and ornate skink, elegant gecko, forest gecko, pacific gecko	Low	No
	Hochstetter's frog	Low	No

14.3 Assessment of operational effects on terrestrial ecology

The operational activities associated with each of the transport corridors have the potential to cause adverse effects on ecological features within or adjacent to the designation footprints. The potential operational effects are:

Loss in connectivity for indigenous fauna, in particular bats, birds, lizards, associated with light, noise and vibration effects from the operation of the road, leading to fragmentation of habitat; and

Disturbance and displacement of indigenous fauna and their nests / roosts, in particular bats, birds, herpetofauna, associated with light, noise and vibration effects from the operation of the road.

For corridors or the section of corridors that are being upgraded, it should be noted that many of the operational effects are likely to be pre-existing. Bats, birds and particularly lizards may therefore be habituated to noise, light, and vibration from the existing road operations. The following sections detail the level of effect on ecological features (habitat and species), as relating to district plan matters only.

14.3.1 Long-tailed bats

The ecological value of bats is assessed to be very high. The loss of connectivity through permanent habitat loss and disturbance such as operational noise, vibration and light from the operation of each transport corridor can lead to an overall reduction in size and quality of bat foraging habitat and can impact on bat movement in the broader landscape. Lighting spillage from street lighting could disturb commuting and foraging bats at night and adversely affect insect prey populations.

The overall level of effect from the operation of each corridor is presented in Table 14.5 below. For NORs 1 and 6, the overall level of operational effect on bats is assessed as low due to the low probability of disturbance and the expected negligible loss in connectivity as a result of the projects. As such impact management (mitigation) is not required for these corridors. For all other transport corridors, the overall level of effect is assessed as Moderate to Very High without mitigation. With mitigation in place, the level of effect reduces from Low to Very Low for all corridors. Details on the proposed mitigation is provided in Section 14.4 below.

Table 14.5: Overall level of effect on bat species from operation for each NOR

NOR	Disturbance and displacement of roosts and individual bats due to lighting and noise / vibration	Loss in connectivity due to permanent habitat loss, light, and noise effects from the road	Mitigation required?	Overall level of effect with mitigation
NOR 1	Low	Low	No	n/a
NOR 2	Moderate	High	Yes	Low
NOR 3	Very Low	Moderate	Yes	Very Low
NOR 4	Low	Moderate	Yes	Very Low
NOR 5	Low	Moderate	Yes	Very Low

NOR	Disturbance and displacement of roosts and individual bats due to lighting and noise / vibration	Loss in connectivity due to permanent habitat loss, light, and noise effects from the road	Mitigation required?	Overall level of effect with mitigation
NOR 6	Low	Low	No	n/a
NOR 7	Moderate	Moderate	Yes	Very Low
NOR 8	Moderate	Very High High*	Yes	Low

*Indicates a level of effect associated with the future ecological environment that is different from the baseline level of effects.

14.3.2 Birds

Noise, vibration, and lighting disturbance caused by the presence of the road corridors, could potentially disturb and displace native birds from suitable nesting and foraging habitat within and adjacent to the NORs. Additionally, permanent habitat loss and operational noise, vibration, and light may also affect connectivity in the broader landscape.

The overall level of effect from the operation of each corridor is presented in Table 14.6 below. For NOR 2 the overall level of operational effect on birds is assessed as very low, as such, no mitigation is required for the operation of this corridor. For the remaining NORs, mitigation will be required due to the presence of spotless crake (and Dabchick for NOR 8). These birds will need to be managed so that nesting sites can be avoided or provided for within the corridor. With mitigation in place, the level of effect reduces from Low to Very Low for all corridors. Details on the proposed mitigation is provided in Section 14.4 below.

Table 14.6: Overall level of effect on bird species from operation for each NOR

NOR	Species	Disturbance and displacement to nests and individual birds due to road	Loss in connectivity due to habitat loss, light and noise from road	Mitigation required?	Overall level of effect with mitigation
NOR 1	Non-TAR birds, New Zealand pipit	Very Low	Very Low	No	N/A
	Australasian bittern	Low	Low	No	N/A
	Spotless crake	Moderate	Very Low	Yes	Very Low
NOR 2	Non-TAR birds, New Zealand pipit, North Island kākā, Black shag, Little	Very Low	Very Low	No	N/A

NOR	Species	Disturbance and displacement to nests and individual birds due to road	Loss in connectivity due to habitat loss, light and noise from road	Mitigation required?	Overall level of effect with mitigation
	black shag, Little shag, Pied shag				
	Long-tailed cuckoo	Low	Low	No	
NOR 3	Non-TAR birds, New Zealand pipit	Very Low	Very Low	No	N/A
	Australasian bittern	Low	Low	No	N/A
	Spotless crake	Moderate	Very Low	Yes	Very Low
NOR 4	Non-TAR birds, New Zealand pipit, North Island kākā	Very Low	Very Low	No	N/A
	Long-tailed cuckoo, Australasian bittern	Low	Low	No	N/A
	Spotless crake	Moderate	Very Low	Yes	Very Low
NOR 5	Non-TAR birds, New Zealand pipit, North Island kākā	Very Low	Very Low	No	N/A
	Long-tailed cuckoo, Australasian bittern	Low	Low	No	N/A
	Spotless crake	Moderate	Very Low	Yes	Very Low
NOR 6	Non-TAR birds, New Zealand pipit	Low Very Low*	Very Low	No	N/A
	Australasian bittern	Low	Low	No	N/A
	Spotless crake	Moderate	Very Low	Yes	Very Low
NOR 7	Non-TAR birds,	Low Very Low*	Low Very Low*	No	N/A
	New Zealand pipit, North	Very Low	Very Low	No	N/A

NOR	Species	Disturbance and displacement to nests and individual birds due to road	Loss in connectivity due to habitat loss, light and noise from road	Mitigation required?	Overall level of effect with mitigation
	Island kākā, Black shag, Little black shag, Little shag, Pied shag				
	Long-tailed cuckoo, Australasian bittern	Low	Low	No	N/A
	Spotless crake	Moderate	Very Low	Yes	Very Low
NOR 8	Non-TAR birds	Low Very Low*	Very Low	No	N/A
	New Zealand pipit, North Island kākā	Very Low	Very Low	No	N/A
	Long-tailed cuckoo, Australasian bittern	Low	Low	No	N/A
	Spotless crake	Moderate	Low	Yes	Very Low
	Dabchick	Moderate	Low	Yes	Low

*Indicates a level of effect associated with the future ecological environment that is different from the baseline level of effects.

14.3.3 Herpetofauna

Suitable habitat (exotic scrub, exotic treeland edge and rank grassland) has been identified within the designation footprint for each corridor which could potentially support native herpetofauna species. These species require vegetated corridors to facilitate natural dispersal, although they are considered to be relatively resident species and do not require migration or large-scale movement to support reproduction, refuge and feeding. The overall level of effect from the operation of each NOR is presented in Table 14.7. Overall, effects on herpetofauna species from the operation of the projects are expected to be Low to Very Low without mitigation. As such, no mitigation measures are proposed for herpetofauna.

Table 14.7: Overall level of effect on herpetofauna species from operation for each NOR

NOR	Species	Disturbance and displacement of individuals adjacent to construction activities	Loss in connectivity due to permanent habitat loss	Mitigation required?
NOR 1	Copper skink	Very Low	Very Low	No
NOR 2	Copper skink and ornate skink	Very Low	Very Low	No
	Elegant gecko, forest gecko and pacific gecko	Low Very Low*	Very Low	No
NOR 3	Copper skink	Very Low	Very Low	No
NOR 4	Copper skink and ornate skink	Very Low	Very Low	No
	Elegant gecko, forest gecko, pacific gecko	Very Low	Very Low	No
	Hochstetter's frog	Very Low	Very Low	No
NOR 5	Copper skink and ornate skink	Very Low	Very Low	No
	Elegant gecko, forest gecko, pacific gecko	Very Low	Very Low	No
	Hochstetter's frog	Very Low	Low Very Low*	No
NOR 6	Copper skink	Very Low	Very Low	No
NOR 7	Copper skink and ornate skink, elegant gecko, forest gecko, pacific gecko	Low Very Low*	Low	No
	Hochstetter's frog	Low Very Low*	Low	No
NOR 8	Copper skink and ornate skink, elegant gecko, forest gecko, pacific gecko	Low Very Low*	Low Very Low*	No

*Indicates a level of effect associated with the future ecological environment that is different from the baseline level of effects.

14.4 Recommended measures to avoid, remedy or mitigate potential adverse effects on terrestrial ecology

14.4.1 Construction effect mitigation

Pre-construction ecological surveys and Ecological Management Plans (EMP) will be prepared for each project prior to construction. The pre-construction ecological surveys will inform the detailed design of the EMP by confirming whether the identified species of value are still present in the project areas, and confirming whether the project will or may have a moderate or greater level of ecological effect on the ecological species of value prior to the implementation of management measures. Where moderate or higher effects are identified, EMPs will be developed which will include the following specific measures:

Implementation of a Bat Management Plan (BMP) for NORs 2, 4, 5, 7 and 8. The BMP will include the following:

Surveys prior to construction to confirm presence / likely absence. Surveys to confirm bat roost locations if activity is confirmed
Confirmation of maternity roosts may require a seasonal restriction on construction activity (no or restricted construction during Dec-Mar)
Siting of compounds and laydown areas to avoid bat habitat
Lighting design to reduce light levels and spill from construction areas
Restriction of nightworks around bat habitat.

Bat management will also be incorporated with any regional consent conditions that may be required for regional compliance.

An Avifauna Management Plan (AMP) for all NORs will be developed to include consideration of:

Pre-construction nesting bird surveys in suitable habitats (including wetland habitat)
Timing consideration for construction works (avoiding breeding season, where practicable)
Methods to minimise disturbance if the breeding season cannot be avoided
Methods to protect and buffer nesting birds (if present).

14.4.2 Operational effect mitigation

Operational effect mitigation measures will include:

Implementation of a Bat Management Plan (BMP) for NORs 2, 3, 4, 5, 7, and 8. The BMP will include the following:

Indicative early-stage / mature buffer planting, late-stage buffer planting, and retention of existing mature trees between the road alignment and features with potential for bat roosts
Light and noise management through design
Future presence of roosts within the alignment (placement of flaps on features with high roost potential)
Assumptions in the efficacy of the proposed mitigation will be addressed through an adaptive management framework that will outline bat activity thresholds, robust monitoring, and potential corrective action.

An Avifauna Management Plan (AMP) for all NORs should be developed to include consideration of:

Retention of vegetation near wetland habitat, where practicable
Buffer planting between the road alignment and suitable habitat adjacent to the road
Mitigation required to address any potential operational disturbance.

14.5 Summary of effects on terrestrial ecology

Following the implementation of the identified mitigation measures the residual level of construction and operation effects on terrestrial ecology associated with the construction and operation of all upgraded or new transport corridors is assessed as low to very low. Potential effects are therefore able to be appropriately managed, as outlined above.

15 Landscape, natural character and visual

The Assessment of Landscape, Natural Character and Visual (LNCVA) effects provided in Volume 4 provides an assessment of the potential effects on landscape character, natural character and visual effects associated with the construction and operation of the Warkworth Package and recommends ways of mitigating potential adverse effects. The summary below should be read in conjunction with the LNCVA.

15.1 Methodology

The LNCVA was undertaken using best practice guidance for landscape assessment as provided by 'Te Tangi a te Manu: Aotearoa New Zealand Landscape Assessment Guidelines', Tuia Pito Ora New Zealand Institute of Landscape Architects, July 2022 (Te Tangi a te Manu).

The methodology used is best aligned with an area-based landscape assessment, which is typically a policy-driven assessment as opposed to a proposal-driven assessment. Area-based assessments are higher level assessments which assess the potential effects of generic activities, where specific project details are absent.

The New Zealand Institute of Landscape Architects seven-point scale of effects has been used in this report when assessing the potential landscape effects arising from the Warkworth Package. The effects scale ranges between" 'Very Low' to 'Low' to 'Low-Moderate' to 'Moderate' to 'Moderate-High' to 'High' to 'Very High' (Table 15.1).

Table 15.1: New Zealand Institute of Landscape Architects effects rating table

Very Low	Low	Low-Moderate	Moderate	Moderate-High	High	Very High

15.2 Assessment of landscape, natural character and visual effects consistent across the Warkworth Package

15.2.1 Assessment of positive landscape, natural character and visual effects

Positive effects in relation to landscape and visual elements are primarily associated with the provision or improvement of urban design and landscape amenity associated with the transport corridors and / or specific mitigation measures.

The positive effects of each of the new and / or upgraded transport corridors are summarised below:

Enhanced connectivity for Warkworth as a whole by integrating with the existing local street network and improving road user safety. It will also improve transport network connectivity to the adjacent landscape outside of Warkworth

Potential for stormwater wetlands to become attractive focal points through considered planting and wetland construction, and for stormwater wetlands to be integrated with active transport routes

Amenity planting has the potential to create attractive environments, which can enhance the built character of their surroundings and positively contribute to the visual quality of the streets and the area's sense of place

Potential opportunity for the transport corridors to provide elevated views towards the rural landscape outside the Rural Urban Boundary (RUB) and views of vegetated areas within the RUB

Opportunity to highlight heritage and cultural narratives in the landscape

There is the opportunity for further positive effects to be achieved by integrating active travel routes and recreational paths with Warkworth's 'green network' of bush and vegetated riparian margins.

15.2.2 Assessment of landscape, natural character and visual effects associated with construction

The following section discusses the temporary potential landscape and natural character and visual effects which could arise during construction of the Warkworth Package. It is noted that bulk earthworks and works within waterbodies will be the subject of a future regional resource consent process where the effects of these works will be considered and assessed in detail, and mitigation measures will be confirmed. It is acknowledged that there is overlap in the consideration of the landscape and visual effects of these activities between the district and regional plan provisions of the AUP:OP.

Construction footprint: Potential adverse construction effects are expected to result from the construction works footprint, with the footprint expected to be somewhat wider than the finished road. Construction machinery will also be present (including heavy vehicles), which may require access tracks. The additional width of works required during construction may cause vegetation outside of the permanent corridor to be removed and for work to occur within the drip line of existing trees. If riparian vegetation is removed this will likely have implications for natural character

Waterbodies: It is anticipated that work will be undertaken near waterways and wetlands potentially resulting in effects on natural character. Potential effects on waterbodies are applicable to landscape character but relate predominately to natural character

Exposed earthworks: Exposed earthworks can result in visual landscape effects during construction

Reduced amenity: During the construction phase of the transport corridors, adjacent residents are likely to experience reduced amenity, including from noise, dust, and lighting, as well as from visual effects caused by the presence of construction activities

Temporary effects: It is anticipated that activities during construction of the upgraded or new transport corridors will be generally consistent in nature and scale to road works and infrastructure activities commonly anticipated by public transient viewing audiences within an arterial corridor. Another important consideration is that landscape change by way of vegetation removal and land modification forms part of the expected backdrop of the existing environment as the area urbanises. Notwithstanding this, some public and private vantage points within transport corridors are likely to witness heightened adverse visual effects through the construction phase. Adverse effects of this nature are common to infrastructure projects and are mitigated by the short-term duration of the works and subsequent remediation.

Without mitigation in place, construction effects on landscape and natural character are assessed as 'moderate'.

15.2.3 Assessment of operational landscape, natural character and visual effects

The following sections discuss the anticipated operational landscape and natural character and visual effects of the Warkworth Package. Without mitigation in place, operational effects on landscape and natural character are assessed as ‘moderate’.

15.2.3.1 Landscape character effects and amenity

For corridors or sections of corridors located in existing residential zones it is anticipated that in a number of circumstances greater urban intensification compared to what presently exists will occur. Where existing residential properties and houses are directly adjacent to the designation boundaries, it is possible that there will be amenity effects, including loss of privacy, compromised views, reduced buffers between houses and transport corridors, reduced section size, and increased traffic noise and light disturbance (e.g. from car headlights and streetlights).

For the corridors or sections of corridors located in currently greenfield and / or rural FUZ locations it is anticipated that the built outcomes of the land adjacent to the corridors will be in character with the planned urban intensification of the area, with roads being an essential element of urban areas. As such, amenity effects on future planned residential areas and dwellings will be limited.

The ULDMP condition directs the integration of the transport corridors with future surrounding land uses. At the completion of the projects, the upgraded and new transport corridors will resemble that of urban arterial roads on account of the active modes of transport, structured planting, integrated stormwater management and engineered roading elements that have an inherently urban aesthetic.

15.2.3.2 Changes to landform

The ‘basin’ formation of Warkworth’s landscape means that the visual effects of the transport corridors will be restricted to the Warkworth area. Within Warkworth there are also a series of distinctive spaces created by knolls, hills, and ridges. These will further limit the visual effects of the transport corridors, likely resulting in relatively localised effects. There is the potential for cut and fill required as part of the construction for the transport corridors to result in visual effects for the Warkworth community due to loss of vegetation, visibility of new transport corridors on elevated landforms, and changes in the topography of the landform.

While the designation alignments generally avoid prominent spurs and ridgelines, some alignments travel across elevated landforms (particularly NOR 6 and NOR 7). It is noted however that landform modification is expected to occur as part of the urbanisation of Warkworth. It is expected that the transport corridors will be absorbed into the adjacent land through contouring of cut and fills and planting. The integration of the transport corridors with future landform and development will be enabled through the proposed Warkworth Package conditions.

15.2.3.3 Effects on vegetation

The Warkworth Package will result in the removal of some vegetation, which may potentially include mature indigenous species. It is anticipated that the designations may also cross several small sections of SEA. Where riparian vegetation is affected, it is likely that there will be effects on the natural character of these areas. There is scope within the designation to include new areas of vegetation and street trees as part of the ULDMP.

15.2.3.4 Effects on waterbodies and wetlands

Works near waterbodies are anticipated which may result in effects on the natural character of the affected areas. These effects are most likely to occur where the modification of natural overland flow paths is required, bridge piers are required in waterways or wetland beds, and where the removal of riparian vegetation is required.

15.3 Recommended measures to avoid, remedy or mitigate potential adverse landscape and visual effects

The following sections outline the proposed measures to manage the construction and operational landscape, natural character and visual effects.

15.3.1 Construction

The mitigation measures for all activities and built elements are outlined below and will be incorporated into the ULDMP, Construction Environmental Management Plan (CEMP), and Construction Traffic Management Plan (CTMP) which are proposed as conditions of each NOR, as outlined in Volume 1. Construction management measures will include:

Consider how the project can appropriately integrate with existing landscape features and the wider landscape

Consider opportunities for topsoil stripping and stockpiling for re-use, ensuring that topsoil is suitable for landscape purposes

Where appropriate, select visually discrete locations for the placement of construction yards and material storage. Consider screening of construction yards as mitigation for temporary visual effects

Reinstate construction yards in a manner appropriate for the anticipated future use of the land

Take into account the potential visual impacts of structures and look to adopt appropriate architectural and landscape treatment to manage these effects

Consider how the project can enable the integration of street trees into the transport corridor designs

Where practicable, avoid piers in the beds of waterways and wetlands, minimise piers on riverbanks, and minimise fill over waterbodies. It is noted that detailed responses to waterway and natural wetland treatment will be detailed in the future regional resource consenting stages of the Warkworth Package.

As required, NOR specific recommendations build on the recommendations for the overall network by providing more detail which is specific to individual transport corridors. With mitigation in place, landscape and natural character effects are anticipated to be ‘low-moderate’ in scale.

15.3.2 Operational

The operational landscape, natural character and visual effects of the Warkworth Package will be mitigated through the implementation of best practice urban design principles. These considerations are outlined in the UDE provided in Volume 4 and summarised in Section 8.2 and will be implemented through a ULDMP, which is provided as a condition in Volume 1. Key considerations of the ULDMP will be:

How the project can appropriately integrate with existing landscape features (including natural wetlands) and the wider natural landscape

How the project (including roadside elements such as lighting, signage and the landscape treatment of structures) can:

- Enable integration of the Project's permanent works into the surrounding landscape and urban context; and
- Ensure that the Project manages potential adverse landscape and visual effects and contributes to a quality urban environment.

Consider further refinement of stormwater treatment wetland design to appear 'natural' with a variety of habitats, e.g. irregular shape with curved boundaries, varying depths and islands

Consider water sensitive urban design principles. Recommendation to prioritise the use of soft engineering strategies for stormwater management

Take into account the potential visual impacts of structures and look to adopt appropriate architectural and landscape treatment to manage these effects

Re-validate the landscape and natural character values identified in the LNCVA prior to the commencement of conceptual design.

It is noted that detailed responses to waterway and natural wetland treatment will be detailed in the future regional resource consenting stages of the Warkworth Package.

As relevant, NOR specific recommendations build on the recommendations for the overall network by providing more detail which is specific to individual transport corridors. These are outlined in Table 15.2. With mitigation in place, landscape and natural character effects are anticipated to be 'Low' in scale for the Warkworth Package.

Table 15.2: NOR specific recommendations to mitigate operational landscape and visual effects

NOR	Specific mitigation measures
NOR 2	Minimise visual effects on adjacent residential dwellings with appropriate buffering and screening Integration of the transport corridor where the corridor intersects waterways and areas of vegetation Opportunity to provide cultural markers and interpretation panels for historical and culturally significant areas.
NOR 3	Provide detailed plans at the future regional resource consent stage for the enhancement of Warkworth's southern 'gateway' Large area of cut at the southern end of the designation is well integrated with the adjoining SH1 corridor in a way that is sensitive to the landform and reduces the extent of cut Provide suitable separation between natural and artificial wetlands Where practicable, avoid impacts on Morrison's Heritage Orchard. Avoid adverse effects to orchard trees where intrusion into the property boundaries is unavoidable Provide detailed plans at the future regional resource consent stage illustrating how the location of Morrison's Heritage Orchard will be positively enhanced through the transport corridor design

NOR	Specific mitigation measures
	It is noted that detailed responses to waterway and natural wetland treatment will be detailed in the future regional resource consenting stages of the Warkworth Package.
NOR 4	To the north of the Te Honohono ki Tai tie-in, consider opportunities to frame key rural views for northbound transport corridor users.
NOR 5	Where feasible, and appropriate, enable opportunities for cultural expression in the design of the Mahurangi River boardwalk Investigate opportunities to frame key rural views to the north of Sandspit Road, for transport corridor users.
NOR 6	Consider opportunities to frame key rural views in the surrounding landscape outside the RUB for transport corridor users.
NOR 7	Through planting design frame key views, as appropriate, of vegetated areas and the wider rural landscape outside the RUB for transport corridor users.
NOR 8	Through planting design frame key views, as appropriate, of vegetated areas and the wider rural landscape outside the RUB for transport corridor users.

15.4 Summary of landscape and visual effects

Overall adverse landscape and visual effects are able to be appropriately managed and reduced over time in relation to the urbanisation of the surrounding landscape. The surrounding landscape context has a lower level of sensitivity to change due to the existing context of the transport network. There are a number of positive landscape and visual effects that will result from the new and / or upgraded transport corridors including the opportunity to formalise the streetscape and amenity provide consistent amenity throughout transport corridors.

16 Natural hazards - flooding

The Assessment of Flooding and Stormwater Effects provided in Volume 4, assesses the potential effects of the transport corridors during construction and operational phases on flood extents and levels in the surrounding area. The summary below should be read in conjunction with this report.

Stormwater quantity, quality and effects on streams will be considered as part of a future regional consent process. This assessment focusses on flood hazard effects which is a district plan matter under the AUP:OP.

16.1 Methodology

The Assessment of Flooding and Stormwater Effects involved the following steps:

Desktop assessment to identify potential flooding locations from Auckland Council GeoMaps
Modelling of the pre-development and post-development terrain with Maximum Probable Development (MPD) and 100 year (ARI) plus climate change rainfall
Two climate scenarios were modelled, one allowing for 2.1°C of temperature increase and one for 3.8°C of temperature increase. The higher climate change scenario has been used to undertake a sensitivity analysis to understand the increased risk of greater climate change impacts
Producing flood level maps for pre-development and post-development scenarios and flood difference maps to show the change in flood levels and extents (greater than 50mm) as a result of the transport corridors
Inspection and review of flood difference maps at key locations such as bridges and where there are noticeable changes in flood extents or flood levels.

While stormwater effects apart from flooding are not assessed, provision is made for the future mitigation of potential stormwater effects (stormwater quantity, stormwater quality and instream structures) by identifying the space required for stormwater management devices (for example drainage channels and ponds) and incorporating land for that purpose into the designation footprint. These devices have been designed to attenuate the 100 year ARI event using 10% of the total roading impervious catchment area (proposed and existing) in accordance with Auckland Council[7] and Waka Kotahi guidance[8]. For existing roads being widened this allows for greater impervious area than the road widening alone.

Flooding effects will be confirmed at the detailed design stage. It is expected that coordination and integration of the corridor design with FUZ development will be undertaken to confirm and address potential future adverse effects.

16.2 Assessment of flood hazards consistent across the Warkworth Package

16.2.1 Assessment of positive effects on flood hazards

The positive effects of each transport corridor on flood hazards are summarised in Table 16.1 below.

[7] Auckland Council's Stormwater Management Devices in the Auckland Region, Guideline Document 2017/001 (December 2017)
[8] Waka Kotahi NZTA's Stormwater Design Philosophy Statement (May 2010)

Table 16.1: Project specific positive effects on flooding

NOR	Effect
NOR 1	The development of the Northern Public Transport Hub and Western Link – North provides an improvement to the flood resilience of SH1 as there is an opportunity for Te Tupu Ngātahi to work with P2W (through Waka Kotahi) to locate the culvert outlet for the benefit for both projects.
NOR 2	The upgrade of the existing single lane Mahurangi Bridge and the existing two-lane bridge (to the west of the Mahurangi River) will reduce the potential for road overtopping and flooding as the upgraded bridges will allow for higher flow volumes during flood events.

NOR 3	The upgrade of two existing culvert crossings to bridges will reduce the potential for road topping flooding. The two existing culvert crossings will have the following future performance issues if not upgraded:
	• Culvert 1 can only cope with:
	  • Approximately 30% of the total approach flow in the 100yr 2.1° temperature increase
	  • Dropping to 23% in the 100yr 3.8° temperature increase
	• Culvert 2 can only cope with:
	  • Approximately 47% of the total approach flow in the 100 yr 2.1° temperature increase
	  • Dropping to 37% in the 100yr 3.8° temperature increase
	The wetland location has been selected to be downstream of the existing SH1 to reduce the flood risk to the wetland
	The wetland associated with NOR 6: Western Link – South will provide treatment and attenuation opportunities for the existing SH1 upgrade
	Treatment and attenuating all the road surfaces will improve water quality and provide attenuation for 10 and 100yr flood flows associated with the added impervious road area.

NOR 4	Corridor does not impact on any flood plains or overland flow paths and the two proposed wetlands will improve water quality treatment and retention.
NOR 5	Two new proposed wetlands will provide treatment and attenuation. The wetland associated with NOR 7 Sandspit Link will also provide treatment and attenuation Upgrade of the bridge over the existing stream (downstream of NOR 7 intersection) and associated road formation will provide improvement to flood resilience.
NOR 6	There are minor potential flooding and stormwater issues associated with NOR 6 The proposed wetlands will provide water quality improvements and flood attenuation associated with the new road carriageway The second NOR 6 wetland located in proximity to NOR 3 can be used to provide improved stormwater quality and attenuation effects for NOR 3, in particular McKinney Road, and the NOR 3 and NOR 6 intersection.
NOR 7	The corridor alignment allows for the road surface to be well above any predicted flood plains and treatment wetlands to treat and attenuate flows.
NOR 8	No impacts are predicted to flood plains if bridge and culverts are appropriately sized and meet the proposed NOR conditions New impervious area from road carriageway will be diverted to the proposed wetlands for treatment and attenuation as required.

16.2.2 Assessment of construction flood hazard effects

The following construction works can result in flooding effects if not managed appropriately:

Construction of new culvert crossings or upgrading of existing culvert crossings or bridges
Installation of diversion drains or realignment of existing overland flow paths or natural streams (to be undertaken only as a last resort)
Construction of new attenuation wetlands or upgrading of existing attenuation wetlands
Temporary use of lay down and construction areas
The location and number of wetlands.

The potential effects of these works are:

Bulk earthworks to complete the contouring for new landscape features (e.g. attenuation wetlands and new or upgraded culverts) require a dry works area and can alter overland flow paths or generate erosion and sediment effects on surrounding waterbodies
The siting of attenuation wetlands within an existing overland flow path can obstruct runoff and result in flows being diverted towards existing properties due to the need for embankments.

There is potential for the above effects to occur during the construction on all of the transport corridors, however effects may vary based on the location of works (e.g. whether there are overland flow paths or known floodplains or flood prone areas in the vicinity).

In order to address these potential risks, the indicative construction lay down areas for each transport corridor have located outside floodplains and major overland flow paths and therefore will not result in an increased flood hazard risk. Appropriate areas for construction works such as construction lay down areas will be considered and included in the Construction Environmental Management Plan (CEMP) to avoid an increase in flood hazard risk.

16.2.3 Assessment of operational flood hazard effects

There are a range of potential operational effects particularly from road crossings (formations, bridges and culverts). The model used in the Assessment of Flooding and Stormwater Effects is based on an indicative design which will be the subject to further refinement, and it may be that some of these structures are modified in the future. A separate detailed flood assessment will be undertaken at the detailed design stage in order to inform the design and to confirm the final corridor design will comply with the NOR conditions.

The assessment of operational flooding and stormwater effects considered:

New culverts (≥ 600 mm diameter) and bridge crossings
Areas where the new road embankment encroaches onto predicted flood plains and flood prone land
Potential bridge and culvert sizing to convey flows and not increase flood levels upstream and downstream of the bridge or culvert in the future 100yr 2.1° temperature increase scenario
Land requirements for wetlands
The potential of flooding on existing properties due to the new project corridor.

The potential effects of these activities are:

Increasing impervious areas resulting in increased runoff and potentially increased flood levels at adjacent sites
Altering existing overland flow paths resulting in flows being redirected on a different alignment

Obstructing an existing overland flow path resulting in ponding at existing low points or newly created depressions along the corridor
Improving flows under the road reducing upstream flood levels and increasing flood levels at properties further downstream
Increased impervious area to treat for attenuation, treatment (or both) and pond locations.

The proposed mitigation measures set out in Section 16.3 have been developed to enable flood effects to be adequately addressed during the detailed design. With the implementation of mitigation measures during the detailed design and construction phases there is unlikely to be any adverse flood effects from the operation of each of the transport corridors.

16.3 Recommended measures to avoid, remedy or mitigate potential adverse effects on flood hazards

The following sections outline the proposed measures to manage the construction and operational flood hazard effects.

16.3.1 Construction

Flood hazard risks for the construction phase will be addressed through the Flood Hazard Condition and in a Construction Environmental Management Plan (CEMP) proposed as a condition on the designations and alteration to designation (as outlined in Volume 1 for all projects). In preparing the CEMP, key issues to consider include:

Siting construction yards and stockpiles outside the predicted flood plains
Maintaining overland flow paths around / through areas of work
Minimising the physical obstruction to flood flows at the road sag points
Staging and programming to provide new drainage prior to raising road design levels and carry out work when there is less risk of extreme flood events
Actions to take in response to heavy rain warnings which may include reducing the conveyance of materials and plant that are considered necessary to be stored or sited within the predicted flood plain or significant overland flow path.

The proposed Flood Hazard condition will require the detailed design of the transport corridors to achieve the following flood risk outcomes during the construction phase:

No increase in flood levels for existing authorised habitable floors that are already subject to flooding
No more than a 10% reduction in freeboard for existing authorised habitable floors
No increase of more than 50mm in flood level on land zoned for urban or future urban development where there is no habitable existing dwelling
No new flood prone areas
No more than a 10% average increase of flood hazard (defined as flow depth times velocity) for main access to authorised habitable dwellings existing at time the Outline Plan is submitted.

16.3.2 Operational

During detailed design, additional flood modelling will be carried out and measures implemented to achieve the following outcomes (proposed as a designation condition for all projects as outlined in Volume 1):

No increase in flood levels for existing authorised habitable floors that are already subject to flooding
No more than a 10% reduction in freeboard for existing authorised habitable floors
No increase of more than 50 mm in flood level on land zoned for urban or future urban development where there is no existing dwelling
No new flood prone areas
No more than a 10% average increase of flood hazard (defined as flow depth times velocity) for main access to authorised habitable dwellings existing at the time the Outline Plan is submitted.

Where the above outcomes can be achieved through alternative measures outside of the designation such as flood stop banks, flood walls and overland flow paths, this may be agreed with the affected property owner and Auckland Council.

16.4 Summary of effects on flood hazards

The Assessment of Flooding and Stormwater Effects for the transport corridors was based on an indicative design of the new transport network. A number of positive effects have been identified associated with the development particularly where new bridges are proposed. These bridges will raise the existing road levels reducing the potential for flood levels to overtop the road and reducing flood hazard. Additional positive effects can be realised through upgrades to existing culverts or new culvert crossings to improve overland and stream flow under the roads.

The assessment found that there was unlikely to be additional risk of flood effects during construction as all indicative laydown areas are outside of the floodplain and overland flow path. For those areas where there is an increased risk mitigation measures such as carrying out construction works during dry weather and using diversion drains will be adequate to manage this risk.

Potential operational effects include increased flood levels downstream of crossings and bridges. Design considerations and management measures have been incorporated to ensure adverse effects are addressed. Based on the findings and recommendations of the Assessment of Flooding and Stormwater Effects, adverse effects of the new and / or upgraded transport corridors associated with flood hazards are able to be appropriately managed.

17 Archaeology and built heritage

The Assessment of Heritage Effects provided in Volume 4 assesses the potential effects on historic heritage and archaeological sites as a result of the construction and operation of the Warkworth Package. The report assesses the potential effects on any identified recorded historic heritage and archaeological sites and unidentified subsurface archaeological remains that might be exposed during future construction. The summary below should be read in conjunction with this report.

17.1 Methodology

17.1.1 Archaeology

The Heritage New Zealand Pouhere Taonga Act 2014 (HNZPTA) and the RMA control work affecting heritage and archaeological sites. Both the HNZPTA and the RMA have been considered in the assessment of effects. The assessment criteria used in the Assessment of Archaeological Effects first provides an assessment of the archaeological values within the site context (condition, rarity /

uniqueness and information potential), and second the archaeological values between sites (archaeological landscape / contextual value, amenity value, cultural association).

17.1.2 Built heritage

This Assessment of Archaeological Effects also addresses built heritage. The assessment based on standard international practices for Environmental Impact Assessment such as those described in the Waka Kotahi 2014: Guide to assessing historic heritage effects for state highway projects (Draft Version 2.4). The methods have been aligned to the regional values assessment criteria for Auckland set out in the AUP:OP Regional Policy Statement (RPS) B5.2.2.1. Identification and evaluation of historic heritage places.

17.2 Assessment of effects on archaeology and built heritage

17.2.1 Assessment of positive effects on archaeology and built heritage

Positive effects on historic heritage and archaeological sites can occur where the disturbance of sites as part of the project works enable research to be undertaken on those sites. This would potentially enable more to be understood about pre-European Warkworth, and also early European settlements.

17.2.2 Assessment of construction effects on archaeology and built heritage

The removal of topsoil for the construction of the new corridors or corridor upgrades has the potential to uncover archaeological features. The Warkworth area is largely rural in nature. Some corridors (NORs 1, 6, 7 and 8) will pass through currently undeveloped rural areas. All of the projects run alongside or cross rivers and streams. Therefore, there is potential for pre-European Māori or colonial sites to be present within any of the transport corridors. Adverse effects from the discovery and subsequent disturbance of these sub-surface sites are possible. Uncovered sub-surface sites have no existing amenity value and their cultural association would be related to the iwi and hapū of the area. The potential adverse effects of accidentally discovering archaeological sites can be managed through the implementation of mitigation measures detailed in Section 17.4 below.

Corridors with identified features or potential features are set out in Table 17.1 below:

Table 17.1: Recorded archaeological and historic heritage sites for each NOR

NOR	Site description
NOR 2	The Woodcocks Road Upgrade (Western Section) is located within 200m of four archaeological sites, and two Auckland Council CHI sites as follows: Cherry's Hut (R09/2243) is located in the general vicinity of the project, although sub-surface remains are unlikely to be within the designation footprint Cherry's bridge (R09/2244) constructed in 1859, rebuilt in 1894 was not visible during a site visit by the project archaeologist and is potentially obscured by vegetation or the tide. However, it is likely that piles or other structures are still present and may be affected by construction works as the site is likely to be near the existing one-way bridge supporting the current road carriageway

NOR	Site description
	There is a known historical track and ford (R09/2246) believed to be remnants of a track to Puhinui Falls likely based on a Māori pathway to the west coast however this site is outside the designation boundary Previous earthworks undertaken for Ara Tūhono (Puhoi to Warkworth) motorway uncovered a number historic items such as kānuka kō (digging sticks) likely to be secondary deposits from stream washout, or potentially a remnant of previous taro horticulture as it is a suitable floodplain for such activity. These artefacts were removed at the time but additional items may be present subsurface in the western extent of the corridor upgrade Two United States WWII Camp (CHI17004, CHI17006) sites are located in the area. Concrete remains from CHI17004 may be encountered during construction works.
NOR 4	There is one recorded archaeological site within 200m of the designation. The site is a timber cottage built in the mid-1870s (R09/2253 – Domestic). The site may contain further subsurface material, but with proposed mitigations during construction, the level of impact on the site is expected to be low.
NOR 5	There is one archaeological site within 200m of the works and designation. The site (R09/2263) was likely the site of a dam built in the 1870s/80s. This dam is no longer visible but a dam built to service the nearby cement works in 1913 is visible. There are several sparse scatters of highly fragmented shells, thought to be related to a possible midden of which some is scattered within the designation extent.
NOR 6	The corridor will traverse a pre-1900s road bench (R09/2284) and will need to be partially destroyed. Earthworks associated with a recent nearby subdivision development have destroyed much of the remaining historical road bench (See Assessment of Archaeological and Heritage Effects in Volume 4). A small portion of the remaining historical road bench is within the NOR 6 designation boundary. The site may have contextual value as a piece of Warkworth's colonial history.
NOR 8	There is one archaeological site within 200m of the designation boundary but the works are unlikely to have any impact on the site. The site is a United States WWII military camp site (CHI17006). Only fragments of concrete remain within the designation footprint.

17.3 Assessment of operational effects on archaeology and built heritage

For NOR 5, upstream works to R09/2263 may affect the flow of water and potentially the abrasion and weathering of the Wilson Portland Cement Dam over time. However, any impacts are expected to be low and damage can be mitigated through monitoring and the provisions in the HHMP.

17.4 Recommended measures to avoid, remedy or mitigate potential adverse effects on archaeology and built heritage

It is recommended that, prior to works starting, an authority to damage or destroy recorded sites (R09/2244, R09/2247, R09/2253, R09/2284) and any unrecorded archaeological sites and any other archaeological features that may be encountered within the identified works areas be applied for from HNZPT under Section 44 of the HNZPTA.

No authority will be applied for without consultation with the appropriate tangata whenua authorities; evidence of consultation and views expressed will be required by HNZPT and will be taken into account when making a decision about the granting of the authority.

The works will be completed under an archaeological authority obtained from HNZPT and should be guided by a Historic Heritage Management Plan (HHMP) which is proposed as a condition for all NORs. Where risk of encountering archaeological sites or post-1900 heritage sites is increased, archaeological monitoring will take place. Any archaeological or heritage material identified during works will be recorded, sampled, and analysed as relevant.

While there is a risk of damage to archaeological / heritage sites, which is an adverse effect, by having an archaeologist on site and available to record and analyse material there will be potential to learn more about the history of Warkworth.

Appropriate tikanga (protocols) will be followed during works and Manawhenua may make recommendations outlining these. In the event of kōiwi (human remains) being uncovered during any future construction, work will cease immediately and the appropriate tangata whenua authorities will be contacted so that suitable arrangements can be made. As archaeological survey cannot always detect sites of traditional significance to Māori, or wāhi tapu, the appropriate tangata whenua authorities will be consulted regarding the possible existence of such sites, and the recommendations in this report.

17.5 Summary of effects on archaeological and built heritage

The nature of historic heritage, especially archaeological features recorded and unrecorded, is that all disturbances including construction have an adverse effect that is unable to be remediated, only mitigated. Nonetheless the discovery or disturbance of these sites (particularly around wetlands and streams) will allow environmental archaeological research to be undertaken.

All transport corridors have potential for adverse effects occurring during construction activities. Heritage and archaeology features have been identified and assessed for each corridor with the key features outlined above. Potential effects are able to be appropriately managed through the implementation of mitigation detailed in a HHMP prepared for a HNZPTA authority for each of the corridors. Operational effects are expected to be limited to NOR 5 - R09/2263 (Wilson Portland Cement Dam), and damage can be managed through the provisions in the HHMP.

18 Social / community

The Warkworth Package will have impacts on the existing and future communities of Warkworth. This section of the AEE assesses the potential effects from changes to the local social and community facilities on existing and future communities. The existing communities in Warkworth will change as urbanisation occurs. Over the next 30 years an extra 17,100 people are expected to live in the area, along with 8,200 new dwellings and 4,600 new jobs.

Section 18 considers effects on the community generally. Specific effects on property and business are considered in Section 19.

18.1 Methodology

To determine the social and community impacts (effects) and an understanding of the existing and future communities, the following steps have been undertaken:

A desk top research which included a review of:

The AUP:OP and the Warkworth Structure Plan
Te Tupu Ngātahi consultation and engagement feedback
Population and other growth statistics within the FULSS
Online mapping.

Additional primary research included:

Site visits to each of the corridors
Engagement with the Local Board
Discussion with landowners, the wider community, and partners and stakeholders at open days, meetings, Hui and public consultation events.

18.2 Assessment of social / community effects consistent across the Warkworth Package

18.2.1 Assessment of positive social / community effects

The Warkworth area is predominantly FUZ with existing urbanisation along the central northeast and northwest section along the existing SH1 and the area around the Hill Street intersection. The following positive effects were identified for the Warkworth Package:

The Warkworth Package will provide certainty regarding the location of required transport infrastructure to support the planned growth in Warkworth, which will avoid build out into the corridor and subsequently reduce future community disruption, which would be greater if the routes were designated later over intensified land use
Ensure that the corridors can be delivered in a way that supports their integration with surrounding land use and supports quality urban design outcomes for future communities
Provide corridors aligned with Safe Systems and Vision Zero which enhances community health and safety, by minimising the likelihood of DSIs to users.
Improved connectivity through the Warkworth area, including by active modes and public transport to access:

- Employment opportunities, retail and services located within existing centres and business areas, and future centres and business areas on FUZ land
- Social and community infrastructure including schools (e.g., Mahurangi College on Woodcocks Road, Mahurangi Primary School on Hill Street), recreational facilities (Warkworth Showgrounds on the existing SH1, Mahurangi Rugby Club on the existing SH1, Warkworth Tennis and Squash Club on Shoesmith Street, Shoesmith Reserve) and future sites within Warkworth.

18.2.2 Assessment of general construction effects

Construction of the transport corridors will not occur simultaneously and is likely to be staged in line with urbanisation demand from growth areas. This means residents will be exposed to construction effects over different time periods and with varying levels of directness. Similar construction effects are anticipated along urbanised corridors. Potential effects include:

Disruption of normal business
Alteration or limitations to existing access for vehicles, pedestrians, or cyclists
Changes to normal traffic flows due to route diversion
Capacity and speed restrictions
Changes to amenity.

In regard to impacts on existing communities, it should be noted that for corridors (or sections of corridors) on FUZ land there is likely to be change in the community once urbanisation occurs. In these areas construction is anticipated to take place before or alongside urbanisation.

Construction will be undertaken in a staged and linear manner, limiting prolonged impacts on any businesses, community facilities and residential properties (excluding areas immediately adjacent to construction laydown areas which will be required for a prolonged period). Engagement with businesses can also limit the extent of impacts, by for instance identifying peak business hours or the timing of deliveries which construction works can be planned around, as far as practicable.

18.2.2.1 Specific project construction effects

The following section outlines the effects of specific projects from the Warkworth Package on the Warkworth community and facilities.

Commercial Facilities

The works will impact on several businesses in Warkworth, however impacts are generally limited to business frontages. Works associated with Sandspit Road and Sandspit Link may disrupt vehicle access to the limestone quarry adjacent to Sandspit Link although this can be managed through the implementation of a CTMP.

Community Facilities

There is potential for disruption to community facilities and social construction from construction works on specific corridors. Key effected community facilities and social infrastructure are identified in Table 18.1 below.

Table 18.1: Key community facilities and infrastructure in Warkworth

Corridor	Asset	Commentary on the potential impact
NOR 2: Woodcocks Road (Western Section)	Mahurangi College (corner of Woodcocks Road and SH1)	Traffic disruption as a result of construction vehicle movement and associated safety controls during period of construction work.
	The Ministry of Education (MOE) is proposing a new school site at 100 Woodcocks Road	The proposed school is yet to be confirmed however the upgrade of Woodcocks Road may impact on the frontage of the proposed school site. It is anticipated that development will integrate with the corridor.

Residential

Existing and future residents will experience temporary disruptions to traffic, access restrictions or diversions due to construction works on each of the corridors. Along Woodcocks Road, Matakana Road, Sandspit Road and SH1 a number of driveway tie-ins are required to be modified to achieve adequate levels between private property and the road corridor. These effects can be managed through the implementation of a CTMP.

There is potential for amenity impacts during the period construction works to occur in proximity to residents. These can be mitigated and / or managed via the CNVMP (which will include measure to minimise the impacts on residents, as far as practicable), complaints processes and ongoing and proactive communication, via the Stakeholder Communication and Engagement Management Plan (SCEMP).

18.2.3 Business and commercial

For existing businesses and commercial properties there is the potential for impacts from construction work along each corridor, these impacts include traffic disruption and impacts on visibility and accessibility, including for services and deliveries, of shops, office and other commercial areas. These impacts can be mitigated and / or managed via a CEMP and ongoing engagement with businesses and wider community, via a SCEMP

Businesses and commercial properties that fall entirely within the designation footprint will be acquired to allow for the upgrade or construction of the new corridor. The landowners of these businesses will have recourse through the Public Works Act (PWA). Communication with the impacted businesses will be required to allow them to plan ahead. In terms of the wider community, while they will no longer have access to the displaced businesses, they will have access to new businesses and centres as the FUZ areas urbanise.

For businesses and commercial properties, where the designation extends along the frontage of the sites, access will be reinstated with temporary access arrangements identified as part of a CTMP (if required). Land required for the construction of the transport corridors will be made good and returned once the road upgrades are complete.

Where a partial acquisition of a site is required, communication with the landowner and occupier will be required to discuss the ongoing operation of the site. Depending whether the partial acquisition will impact on the operation of the business, landowners may have recourse through the PWA.

Disruption can be managed through the CEMP and CTMP, implementation of recommendations from the specialist assessments, including the CNVMP, to manage amenity impacts and communication with stakeholders / operators so that work is undertaken in a way which minimises impacts, e.g., avoiding construction servicing and deliveries during peak school drop off / pick up times.

18.3 Assessment of operational social / community effects

Overall, the projects are anticipated to have positive effects on the future community in which they will operate. The new corridors and upgrades to corridors will improve connectivity within Warkworth. In particular, the provision of safe, separated active mode facilities on each corridor will assist the community in accessing their everyday needs and activities, in addition to providing for exercise and recreation. This will also support mode choice for the community, i.e., shifting from private cars to active modes and public transport.

Where on street parking is impacted, this will be mitigated by the provision of active mode facilities and the provision of facilities to support public transport. This will provide the opportunity for people to access facilities, business, and other areas within the local community, via modes other than driving.

There are no existing requirements for minimum parking to be provided for the transport corridors under the AUP:OP, other than for accessibility parks. Where private parking areas are permanently affected, this is considered a property matter and will be addressed through the PWA process.

18.4 Recommended measures to avoid, remedy or mitigate potential adverse social / community effects

It is anticipated that community effects during the construction of the new and upgraded corridors will be temporary and able to be minimised. A SCEMP will be prepared prior to the start of construction to identify how the public and stakeholders (including directly affected and adjacent owners and occupiers of land) will be communicated with throughout the construction works. Ongoing community with business community and schools will occur to meet business and education requirements and manage potential impacts.

Access and trip disruption including measures to avoid disruptions at peak travel times or school pickups and drop-offs will be managed by the CTMP and SCEMP proposed as conditions. This will allow the contractors to identify movement and access requirements of residents and businesses along the corridor and enable alternate access or access at peak times and minimise trip disruption where practicable. Access to community resources including schools and parks will be maintained.

Construction effects on amenity values of property can be managed by engagement with corridor residents and stakeholder (identified through the SCEMP), noise management (CNVMP), and the overall CEMP to manage potential effects.

18.5 Summary of social / community effects

The construction of new and upgrades to existing corridors will provide positive effects to the community in which it will operate. The corridors will support planned urban growth and will have significant safety and transport benefits providing a safe and resilient connection which provides for active transport and public transport connections. The projects will also improve community cohesion and access to community resources.

The adverse construction effects can be managed with the development and implementation of the appropriate plans and mitigations measures outlined above and communication with the community and affected landowners and occupiers. Where construction effects cannot be fully mitigated, they can be managed through discussions with the affected parties.

19 Property, land use and business disruption

Construction of the Warkworth Package will have impacts on property, land use and businesses. This section of the AEE assesses the potential effects from these impacts. Section 18 considers effects on the community generally. This section considers specific effects on property and business.

19.1 Methodology

The Warkworth Package has sought to reduce potential adverse effects on existing private properties and businesses through alignment and corridor design, where practicable, while acknowledging the planned urban growth will result in substantial changes to the area over the next 10 - 30 years. The assessment has included specific consideration of the potential property and business impacts in the Assessment of Alternatives report provided in Appendix A. Efforts have been made through engagement with affected stakeholders to refine the corridor design and the designation footprint.

The designation extents for the Warkworth Package provide a sufficient footprint to enable the construction, operation and maintenance of the transport corridors. Private properties directly affected vary across the corridors between primarily rural, rural-residential, open space / reserve and commercial / industrial land use. A detailed description of the existing land use of the land adjacent to the transport corridors is provided in Section 9.

19.2 Positive effects

The corridors will support the intensification of land, in line with the AUP:OP and the Warkworth Structure Plan in the following scenarios:

In FUZ areas impacts on land and existing property can be viewed in the context of a changing environment from greenfield to urban with increased density of development

Redevelopment and intensification may also occur as a result of the NPS-UD, enabling greater density.

19.3 Effects of an extended lapse date

19.3.1 Uncertainty and extended lapse date

Lapse dates of 15 to 25 years are sought for the Warkworth Package designations. The rationale for this is set out in section 7. When considering an extended lapse period, it is appropriate to balance the need for that lapse period against the potential “blighting" effects. The effects associated with an extended lapse period are generally associated with a lack of certainty as to:

When construction will commence;

How long an affected party will be subjected to construction effects and the degree to which they will be affected by those effects; and

The form of the potential effects of the future operation of the designation.

Notwithstanding the influence of any proposed mitigation, the significance of potential effects resulting from this lack of certainty is generally proportional to the length of the lapse period. In other words, a longer lapse period can create uncertainty for a longer period of time than a shorter lapse period.

In the absence of a specific construction commencement date, and other precise information regarding construction duration within any specific area, we consider that the most workable method for managing any outstanding uncertainty associated with the lapse period being sought is ongoing communication, and we discuss the adequacy of proposed conditions (including those relating to ongoing communication) in more detail below.

19.3.2 Future Urban Zone

When considering effects associated with an extended lapse period, it is important to note that the majority of the Warkworth Package is within the FUZ. The FUZ is a land use zoning that is applied to greenfield land that has been identified as suitable for urbanisation. It is located entirely within the boundaries of the RUB so is acknowledged as being potentially suitable for urban development.

The FUZ enables the land to continue to be used for rural purposes until such a time as the zoning is changed to an urban zoning. The AUP:OP identifies the FUZ as being a transitional zone where land can be used for a range of general rural activities but cannot be used for urban activities until the site is rezoned for urban purposes; and while the FUZ anticipates urbanisation, it does not require it, nor does it set a timeframe for when the urbanisation will occur. In this regard, it is considered that:

People who currently live within the FUZ experiencing a rural lifestyle are unlikely to remain within that area as urbanisation of the FUZ is confirmed and implemented. As such, there is likely to be some uncertainty for existing residents about when urbanisation is likely to occur. It is considered that the people who live within the FUZ are likely already experiencing the effects of uncertainty irrespective of an extended designation lapse date

The network is unlikely to be implemented until urbanisation is (at least) confirmed. If urbanisation does not occur, it is likely that the network will not be constructed. Confirmation of urbanisation is therefore considered to be critical to providing certainty on the likely construction of the network

Future communities, i.e. people who move into the area as the FUZ urbanises, will do so with knowledge of where the network will be in the future.

19.3.3 Project delivery timeframe uncertainty

The designations will provide long term certainty regarding the alignment of each corridor and the future transport network as a whole. This will inform directly impacted landowners' and future residents' future investment and operational decisions about how land may be impacted. In order to manage uncertainty of restrictions and project delivery timeframes for individual properties, AT will establish information platforms following confirmation of the designations and before construction starts which will inform owners of project progress.

19.3.4 Land use and the section 176(1)(b) process

The designations will not preclude the continued (unchanged) use of any directly affected properties prior to construction. However, in accordance with section 176(1)(b) of the RMA, anyone (other than a requiring authority with an earlier designation) is restricted from carrying out work on the designated land that would prevent or hinder the designated work without first obtaining the requiring authority's written consent. For properties partially designated, any works in areas outside the designation are not required to obtain written consent.

Where feasible, AT will work with landowners and developers through the section 176(1)(b) process to help them integrate earthworks, road upgrades (or extensions to roads), stormwater solutions and development so that those works will not prevent or hinder the work authorised by the designation, and to enable written consent to be provided. For those properties adjacent or in proximity to the designations, before implementation of the transport corridors, urban development and investment can continue to occur, informed by the designation.

Where landowners contact AT in advance of the property acquisition process, AT will engage with those owners and refer them to public information on the PWA process and AT's timeframes for the corridor delivery.

19.4 Effects during and following construction

19.4.1 Land impacted permanently

Land required for the ongoing operation and maintenance of each corridor will be acquired typically in a period of 2 - 3 years leading up to main construction works for each project. The PWA is the legislative framework under which entitled landowners will receive compensation. This is a non-RMA process.

19.4.2 Land impacted temporarily

The designations include land required for temporary construction and permanent works. These areas are shown as indicative in the NOR plans and will not be confirmed until the detailed design stage. If temporary occupation of the land is required at construction, it will typically be leased. Potential effects from the temporary lease / use of land within the designations include:

Disruption to business access and parking

Disruption to farm activities, temporary loss of grazing pasture, stock-proof fencing (given the proposed urbanisation in the Warkworth growth areas this is most likely to be an issue on the FUZ and RUB boundaries of NOR 4 (Matakana Road) and NOR 5 (Sandspit Road)

Changes to driveways including gradient or alignment, loss of yard vegetation and construction impacts (including noise and vibration, and visual amenity). Where driveways are required to be re-graded the driveways have been included within the designation.

19.4.3 Land no longer required following completion of works

On completion of the works:

Private land not required for on-going operation, maintenance or effects management will be reintegrated in coordination and discussion with directly affected landowners. This may include the reinstatement of private driveways, parking, fences, gardens, and yards, and re-integrating construction areas (e.g., batters, stormwater wetlands) with the surrounding landform

As per section 182 of the RMA, the designation footprint will be reviewed upon completion of the projects and will be uplifted from those areas not required for the on-going operation, maintenance or effects mitigation associated with corridors.

Refer to Volume 3 for the general arrangement plans for each NOR.

19.5 Recommended measures to avoid, remedy or mitigate potential adverse effects

19.5.1 Land use uncertainty and property impacts

Following confirmation of the designations, a project website or other suitable information source with information on the projects within the Warkworth Package such as status and anticipated construction timeframes will be established. Additional measures that are available for landowners include:

The provision of information on the section 176(1)(b) process and AT contact details to support the integration of development within each corridor, where practicable
The provision of information on the PWA to address uncertainty for landowners, noting that the PWA is a non-RMA process.

A SCEMP will be implemented prior to the start of construction to identify how the public and stakeholders (including directly affected and adjacent owners and occupiers of land) will be communicated with before and during construction works. This will include the following:

Determine adequate notice periods for the commencement of construction activities and works that affect access to properties
Identify appropriate communication channels to support property owners and occupier to understand and plan around works, (such as a project website). The selected communication channels will include:

- Inform parties of the expected timing, duration and staging of works
- Type and nature of effects to be anticipated and regular updating of progress
- Provide avenues for feedback, inquiries, and complaints during the construction process.

At the detailed design stage engagement will be undertaken with affected owners on AT's approach to temporary and permanent land impacted (including any leasing or acquisition processes, as covered under the PWA). For those properties that are fully designated and required permanently they will be purchased and no longer be present at construction. For partially acquired properties management plans will be implemented to manage adverse amenity impacts.

19.5.2 Access

Disruption to traffic and transport patterns will be managed via the implementation of a CTMP. The CTMP will include methods to:

Maintain vehicle access to property and / or private roads where practicable, or to provide alternative access arrangements when it will not be practicable
Communicate traffic management measures to affected parties.

Construction traffic effects are discussed in more detail in Section 11.

19.5.3 Noise and vibration

Reductions in amenity from noise and vibration disturbing normal residential and business use will be managed by implementation of a CNVMP, the CNVMP will include methods to:

Communicate and engage with nearby residents and stakeholders
Minimise construction disruption for affected properties during construction

In addition to a CNVMP, it may be necessary to produce site specific or activity specific Construction Noise and Vibration Management Schedules where noise and / or vibration limits are predicted to be exceeded for a more sustained period or by a large margin.

Noise effects are discussed in more detail in Section 13.

19.5.4 Construction activities

Construction activities can be expected to temporarily reduce amenity, effects will be managed and minimised through implementation of a CEMP. At detailed design stage, affected parties will be engaged on the approach to temporary and permanent land impacted (including leasing or acquisition required, covered under the PWA).

19.5.5 Land re-integration

Where property features are damaged, features will be re-instated, as far as practicable, including private driveways, parking, fences, gardens, and yards, and re-integrating of construction areas with the surrounding landform. This will be discussed at the time with those landowners and follow those provisions under the PWA. Once projects are completed a review of the designation footprints as per section 181 of the RMA will be undertaken to review any areas no longer required for the projects.

19.6 Summary of effects on property, land use and business disruption

The new and / or upgraded transport corridors can be expected to have a range of effects on normal property and land use activity from the time that the designations are confirmed. Potential effects include restrictions imposed on private property due to the designation being on their site, and the uncertainty this can create for landowners. Before and during construction, effects will include changes to the amenity of the surrounding environment, disturbance to enjoyment whilst construction is carried out, as well as direct permanent changes to private property in some cases.

Prior to construction, measures are proposed which will assist in alleviating the associated uncertainty for landowners and enable those activities in the interim, which will not prevent or hinder the projects. Measures have also been proposed to manage effects of the works during construction and suitable RMA management plans are proposed to enable this. Property impacts outside the scope of the RMA will be managed under other legislative processes, as appropriate.

With the proposed mitigation in place, it is considered that effects on property, business and amenity will be appropriately managed.

20 Trees

The Assessment of Arboricultural Effects included in Appendix A of Volume 4 provides an assessment of the actual and potential effects of the future construction and operation of the Warkworth Package on existing trees protected under the district plan provisions and recommends ways of managing these effects. Any trees that trigger regional plan requirements will be assessed and managed through a future regional consenting process.

20.1 Methodology

Trees were recorded singularly, or in groups where logical groupings could be made based on species, configuration and / or size. Sufficient information was gathered to allow an assessment of the existing environment and consideration of the future environment. Tree details are presented in Appendix A of the Assessment of Arboricultural Effects provided in Volume 4.

Given that the Project is to be delivered in 10 – 25 years, a verification assessment at the time of implementation will be undertaken prior to construction to confirm that the current conditions are still relevant. Any future tree removal, tree planting or mass planted vegetation will be assessed at that time, with the current Assessment of Arboricultural Effects intended to provide a baseline survey.

20.2 Assessment of effects on trees consistent across the Warkworth Package

20.2.1 Assessment of positive effects on trees

All of the proposed corridor cross sections include sufficient space for a formal berm on both sides of the corridor for the majority of each route. This will allow for the replanting of new trees in an environment conducive to good tree growth with suitable setbacks provided from future roading infrastructure, although in some cases, such as near intersections, further planting may not be possible. The full extent of replacement planting will be determined at the detailed design stage which will be completed prior to construction, however urban design principles will be followed when determining the type and extent of replanting new and upgraded corridors.

20.2.2 Assessment of construction effects on trees

The removal of district plan protected trees will be required for the construction of NORs 2, 3, 4, 5 and 6 as outlined in Table 20.1 from open space zoned land and in the road reserve. Works may also occur in the root zone of protected trees. NORs 1, 7, and 8 do not traverse areas which have trees protected by district plan provisions. Any vegetation alteration, removal or disturbance for these NORs will be assessed in the future to determine whether regional resource consents are required for vegetation removal.

Table 20.1: Summary of protected trees and groups and vegetation requiring removal for each NOR

NOR	Number of protected trees / requiring removal	Mass planted areas / groups of vegetation requiring removal
NOR 1	0	0
NOR 2	11	12
NOR 3	0	1
NOR 4	5	2
NOR 5	0	3
NOR 6	2	3
NOR 7	0	0
NOR 8	0	0
Total	**18**	**21**

Tree removal has the potential to result in adverse amenity and ecological effects on the surrounding environment. Works near trees may require works within the protected root zone or trimming of trees. These works have the potential to affect the health of trees where tree protection methodologies are not followed. A full tree schedule of specific trees affected by each corridor is provided in Appendix A, of the Assessment of Arboricultural Effects in Volume 4. In order to manage potential adverse effects, a Tree Management Plan is proposed for each NOR, as described in Section 20.3.

20.2.3 Assessment of operational effects on trees

Operational effects of the projects are largely limited to the maintenance of sight lines and the overhead and lateral clearances of general traffic lanes and the walking and cycling facilities. The required clearances will largely be limited to existing retained vegetation and newly planted vegetation within the proposed berm areas which will require management in the medium term.

20.3 Recommended measures to avoid, remedy or mitigate potential adverse effects on trees

Mitigation measures commensurate with the anticipated effects on the environment from impacts on protected trees have been considered, with the aim of avoiding, remedying and mitigating effects on trees. The effects on trees protected by the district plan will be mitigated by replacement planting within the corridor and on adjacent land. To address the potential effects identified, a Tree Management Plan (TMP) will be prepared prior to construction to identify the existing trees protected under the district plan, confirm the construction methods and impacts on each tree and detail methods for all work within the root zone of trees that will be retained. The TMP is proposed as a condition for each designation, as outlined in Volume 1. The TMP will include:

Confirmation that protected trees identified in the Assessment of Arboricultural Effects still exist;
Advice on how the design and location of works can avoid, remedy or mitigate effects on the existing trees;

Recommended planting to replace protected trees that require removal;
Establishing tree protection zones and specifying tree protection measures such as protective fencing, ground protection and physical protection of roots, trunks and branches;
Detailing methods for all work within the root zone of trees that are to be retained in line with appropriate arboricultural standards; and
Where good quality trees in the road reserve are identified for removal, consideration of tree transplanting will be included in the TMP. An assessment of the quality of the trees and the feasibility of transplantation will form part of the plan.

The TMP is limited to trees identified in the Assessment of Arboricultural Effects that are protected under the district plan. Trees protected under regional plan provisions will be addressed as part of a future consenting process.

The effects of tree loss can be mitigated by comprehensive planting within the new berms, and areas identified in the UDE. Replacement planting will be decided through a planting plan for the Project under the proposed ULDMP condition. The ULDMP will also include methodologies to establish new trees within the road reserve, including creation of quality below ground environments, correct planting methods and appropriate maintenance. The replanting to be specified under the ULDMP will provide the appropriate mitigation for the potential effects from the removal of trees protected by the district plan. The long-term outcome of comprehensive street tree planting will be more trees in the public realm and increased amenity value within the public transport corridor.

21 Summary of proposed mitigation

The majority of adverse effects have been avoided and / or mitigated via alignment decisions and design choices. Where potential effects have not been able to be addressed via alignment or design, measures are proposed to avoid, remedy or mitigate the potential adverse effects. The proposed mitigation measures are summarised in Table 21.1 and included in the proposed conditions for each NOR as relevant. The proposed condition set for each NOR is provided in Volume 1.

Table 21.1: Summary of measures to avoid, remedy or mitigate potential adverse effects

Matter	Condition title
Manawhenua partnership	Outline Plan Management Plans Cultural Advisory Report Urban Landscape Design Management Plan (**ULDMP**) Stakeholder and Communications Engagement Management Plan (**SCEMP**) Cultural Monitoring Plan Historic Heritage Management Plan (**HHMP**).
Transport	Construction Environmental Management Plan (**CEMP**) Construction Traffic Management Plan (**CTMP**) Urban Landscape Design Management Plan (**ULDMP**).
Noise and Vibration	Construction Noise and Vibration Management Plan (**CNVMP**) Stakeholder and Communications Engagement Management Plan (**SCEMP**) Complaints Register Construction Noise Standards Construction Vibration Standards Traffic Noise conditions including low road noise surfaces.
Terrestrial ecology	Ecological Management Plan (**EMP**) Pre-Construction Ecological Survey Urban Landscape Design Management Plan (**ULDMP**).
Landscape	Urban Landscape Design Management Plan (**ULDMP**) Construction Environmental Management Plan (**CEMP**).
Flooding	Construction Environmental Management Plan (**CEMP**) Urban Landscape Design Management Plan (**ULDMP**) Flood Hazard condition.
Archaeology and built heritage	Historic Heritage Management Plans (**HHMP**).
Social / Property	Project Information condition Designation Review condition Stakeholder and Communications Engagement Management Plan (**SCEMP**) Construction Noise and Vibration Management Plan (**CNVMP)** Construction Traffic Management Plan (**CTMP**).
Arboriculture	Tree Management Plan (**TMP**) Urban Landscape Design Management Plan (**ULDMP**).

22 Engagement

22.1 Introduction

This section provides an overview of the engagement undertaken for the Warkworth Package. It summarises the engagement approach taken during each phase, focusing on key themes and common issues raised and how this has informed the development of the Warkworth Package.

Where engagement has affected a specific corridor design outcome, such as alternatives consideration or identification and management of environmental effects, this has been considered in either Appendix A: Assessment of Alternatives or the AEE, as relevant.

Prior to detailed design and construction, further engagement will be undertaken by AT, as needed to manage impacts of the projects within the Warkworth Package.

The Warkworth Package has been through various stages of engagement, summarised in Table 22.1 and Figure 22.1.

Table 22.1 – Warkworth Package Engagement Summary

Project stage	Timing	Engagement summary
Indicative Business Case	2018-2019	Receive feedback on the options considered for the business case Information drop-ins, workshops to develop an IBC for the Warkworth future transport network.
Detailed Business Case	2022	Engagement undertaken to inform the preparation of the DBC and options assessment Briefings with key stakeholders, advocacy groups and local boards Landowner engagement took place from 26 April until 7 June 2022. 455 letters were sent to potentially impacted property owners inviting them to contact us to discuss projects further and provide feedback. 20 landowners got in touch with the Project Team, and seven meetings were held Community engagement consisted of an advertising and social media campaign to raise awareness of the engagement with the wider community, which directed people to the online interactive engagement platform to provide feedback. During the engagement period there were 1,388 unique visitors to the project site. 30 comments were added to the social map and 37 responses to the survey.
Pre-lodgement of Notice of Requirement	2023	The project team have engaged with (emailed, called and / or met with) a total of 86 affected properties Briefings and presentations to local board members and other elected representatives 123 letters (and one letter sent to 25 body corporates) sent to potentially affected property owners in March 2023 21 emails and 29 phone calls were received from landowners

Project stage	Timing	Engagement summary
		52 meetings were held with landowners, which have covered a total of 66 affected properties Engagement with directly impacted landowners has help inform the final designation boundaries.

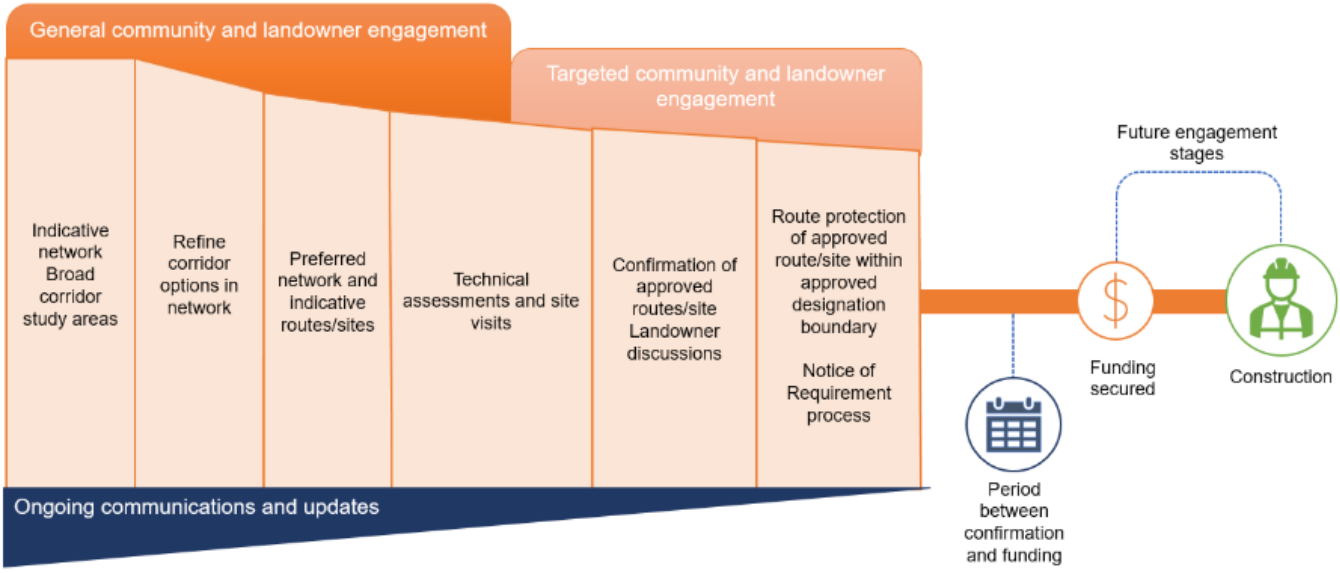


Figure 22.1: Te Tupu Ngātahi Engagement Process

22.2 Previous engagement undertaken for the Warkworth Package

As set out in Table 22.1 above, during the previous business case stages of the Warkworth Package, engagement was undertaken with the partners, stakeholders and the Warkworth community. Engagement with manawhenua has occurred throughout all stages of the project development. Table 22.2 outlines the range of engagement activities undertaken during the preparation of the IBC and the DBC.

Table 22.2: Groups and engagement activities in the IBC / DBC phase

Who we engaged	How we engaged
Partners	**Auckland Council** Partnership Forum – twice monthly meetings to update Council on Te Tupu Ngātahi projects (including Warkworth) **Northern Manawhenua Hui** – monthly hui with Manawhenua partners and Te Tupu Ngātahi project teams from North, Northwest and Warkworth **Auckland Council (Plans and Places)** – regular meetings with Auckland Council (Plans and Places).
Elected Members	**Rodney** Local Board – Presentation on preferred routes in April 2022 prior to wider public engagement, and an update of engagement and next steps in July 2022. Joint memo to Rodney, Upper Harbour, and Hibiscus Coast and Bays Local Boards in May 2022 updating them on Te Tupu Ngātahi North projects, including Warkworth

Who we engaged	How we engaged
	Rodney Ward Councillor Greg Sayers – meeting in March 2022 to seek feedback on approach to engagement.
Stakeholders	**One Mahurangi Business Ass**ociation – two meetings in May 2022, ongoing meetings continued **Matakana Coastal Trail Trust** – Meeting in May 2022, and a written submission was also received **Ministry of Education** – written feedback received. Te Tupu Ngātahi programme overview provided to ministry on a bi-monthly basis **Infrastructure interface meetings** – ongoing meetings with Watercare, Vector and First gas updating them with progress across all Te Tupu Ngātahi projects.
Potentially affected landowners	**Letters** – 455 letters sent to landowners identified as being potentially affected by the proposed routes. The letters invited them to discuss the projects and provide feedback **Landowner interactions** - 20 landowners got in touch with the project team, and seven meetings were held. Regular meetings were held with some landowners, particularly those affected by the Western Link and Wider Western Link.
Wider Community	**Advertising and social media campaign** to promote the consultation to the wider community. Information was shared on Twitter and Facebook by AT, Rodney Local Board and One Mahurangi Business Association. The project also featured in articles in Local Matters, Greater Auckland and Mahurangi Matters **Online interactive engagement platform** - During the engagement period there were 1,388 unique visitors to the project site. 30 comments were added to the social map and 37 responses to the survey.

22.2.1 Summary of key feedback from IBC / DBC phase engagement

The key feedback received during the IBC / DBC phase can be summarised as follows:

Manawhenua were generally supportive of the long-term transport network. A number of suggestions and concerns were raised including avoiding floodplains, minimising environmental impacts, avoiding areas of cultural significance. The importance of protecting and enhancing the culturally significant Mahurangi River was also raised

Auckland Council were generally supportive of the Package, noting the ability for the Western Link - South to provide a buffer between and future residential land uses, potential risks of 'urban creep' outside of the current Rural Urban Boundary (RUB) around Sandspit Link and support for a southern interchange of Ara Tūhono (Puhoi to Warkworth) motorway

The Ministry of Education generally supported the Package but asked for consideration of Mahurangi College and a future planned primary school at 100 Woodcocks Road.

One Mahurangi Business Association were generally supportive of the Package but wanted to see faster progress and raised concerns regarding regional transport model forecasting and considered the modelling assumptions were in need of a review

The wider community were generally supportive of the Warkworth Package and Te Tupu Ngātahi's approach of route protection but were concerned that there are existing issues that need addressing and development is already occurring, so improvements are needed urgently.

22.3 Engagement during NOR phase of the Warkworth Package

A high level of support for the projects was received during engagement at the business case stage. Engagement during the NOR phase has focussed directly on affected landowners and stakeholders. This phase of engagement commenced in late-February 2023.

The sections below summarise the engagement undertaken in the NOR phase of the Project. The sections identify key matters raised through engagement and how these have been addressed by Project teams.

22.3.1 Auckland Council

There is regular engagement between Te Tupu Ngātahi and Auckland Council. Regular meetings occur with the Auckland Council Partnership Forum. These forums are an opportunity to share Project progress and seek feedback from Council.

22.3.2 Local Board

The Project team met with the Rodney Local Board in December 2022. The purpose of this presentation was to update the board on engagement undertaken prior to this point in time, and to update newly elected board members on the Warkworth Package.

Another meeting scheduled for February 2023 was delayed until March as a result of Cyclone Gabrielle and the Auckland flooding events. The meeting outlined the preferred options for the Warkworth Package and the next steps including targeted landowner engagement and preparation of NORs.

The Local Board requested more information regarding the property acquisitions process and Public Works Act following the December meeting, which the project team supplied. There was also general interest regarding flood modelling.

22.3.3 Manawhenua

Regular Hui were held with Northern Manawhenua and the project team. The hui were an opportunity to strengthen the relationship between the project team and Manawhenua and provided an opportunity to share project updates regarding engagement activities and findings of technical reports. The partnership with Manawhenua is detailed in Section 11 of this report.

22.3.4 Local and central politicians

Political memos were sent to the Mayor of Auckland Wayne Brown, the Auckland Council Planning Committee, Local Boards, Councillors including Grey Sayers (Rodney Ward) and members of parliament Hon Mark Mitchell, Marja Lubeck and Hon Kelvin Davis. These memos (sent following local government elections in November 2022, and March 2023) provided updates on progress including the preparation of NORs and engagement being undertaken.

22.3.5 Business associations – One Mahurangi Transport and Infrastructure Forum

One Mahurangi were informed of the plans to engage with impacted landowners in March 2023. A presentation occurred to One Mahurangi on 14 April 2023 for the Project team to update One Mahurangi on progress and engagement feedback.

22.3.6 Landowners

Engagement with landowners potentially affected by the refined options consisted of the following:

123 letters were sent to directly affected landowners on 1 March 2023. The letter included a plan of the affected property, showing the property boundary and the extent of the proposed designation within the property. Directly affected landowners were invited to meet with the Project Team to discuss the impacts to their property

To date, the project team have held 52 landowner meetings. In the meetings, the Project Team assisted landowners by:

- Providing an overview and history of the Warkworth Package;
- Explaining the rationale for the concept design of the Warkworth Package;
- Explaining the NOR process, including lodgement timing, the ability to make a submission and attend a hearing; and
- Providing an information pack on the NOR process, and AT Landowner Guide.

During landowner engagement, questions were raised around property (including the acquisition process, loss of value, and access), timing and likelihood of construction. Specific queries regarding ongoing tenure of property, property subdivision, noise and privacy were also raised.

Specific matters identified through engagement with directly affected landowners were used to make small changes to designation boundaries where possible. The Project Team will continue to meet and engage with directly affected landowners as required, to ensure landowners have adequate information about the Warkworth Package.

23 Assessment of relevant objectives and policies

This section acknowledges the recent changes to the RMA which have come into effect and sets out an assessment of section 171(1)(a) and Section 171(1)(d) RMA matters.

23.1 Section 171(1)(a)

In accordance with section 171(1) of the RMA, an assessment has been undertaken of the relevant statutory provisions. This is set out in full in Appendix B of the AEE. A summary assessment of the key themes identified in the context of the Project is set out in the subsequent sections.

23.1.1 Manawhenua

The objectives and policies of the AUP:OP seek to recognise and provide for the principles of the Treaty of Waitangi in the sustainable management of natural and physical resources including ancestral lands, water, air, coastal sites wāhi tapu and other taonga[9] and protects Manawhenua values while also recognising Manawhenua role, and requiring Manawhenua to be included in resource management processes, particularly in decision making in their role as kaitiaki[10]. Sites and places of significance to Manawhenua are also recognised and provided for in the objectives and policies of the AUP:OP[11].

Manawhenua have been in partnership with the Te Tupu Ngātahi Supporting Growth Programme from the start of the early IBC works. In developing the transport corridors, recognition has been given to both the relationship of Tangata Whenua to their lands, culture and traditions in the Warkworth area and the commitment to partnership between Manawhenua and AT (as a representative of the Crown) founded through Te Tiriti o Waitangi.

Through the Te Tupu Ngātahi Manawhenua forum, and with Manawhenua also attending Project workshops, Manawhenua have been actively involved in the discussions and decision-making process on the future network proposed by Te Tupu Ngātahi for Warkworth. This has included input into the development of the early concepts, through the options / alternatives assessment, identification of the preferred options and recommended network, engagement and the further assessment and documentation of this through the NOR / AEE phase. The feedback received from Manawhenua informed the decisions made by the Project team at each step in the assessment process.

The proposed designation conditions set provides a conditions framework for the ongoing engagement and participation of Manawhenua in the future design and implementation of the transport corridor(s) which make up the Warkworth Package as outlined in Volume 1 and in Section 11.

23.1.2 Enabling infrastructure

The AUP:OP recognises the role that resilient, effective and efficient transport infrastructure has in improving Auckland's social, economic and cultural wellbeing. As part of this, the construction,

[9] AUP:OP B6.2.1(1), (2)
[10] AUP:OP B6.2.2(1)
[11] AUP:OP D21

operation and maintenance of infrastructure is anticipated.[12] In giving effect to this policy direction, Chapter E26 of the AUP:OP acknowledges that:

Infrastructure is critical to the social, economic, and cultural well-being of people and communities and the quality of the environment
Infrastructure can have a range of adverse effects on the environment
When assessing the adverse effects of infrastructure, consider the need and benefit of the infrastructure
Infrastructure and in particular linear infrastructure often have a functional and operational need to traverse or locate within or across different environments, including areas of identified value.

As set out in Section 10 there is a need for the Warkworth Package and the projects provide a range of transport benefits for the community both individually and as part of the wider network, including:

Improving access to and around Warkworth to enable future anticipated development in the area;
Increasing public transport mode share; and
Improving the safety, reliability, and efficiency of the public transport network. The adverse effects of the Warkworth Package have been largely addressed through the implementation of proposed conditions on the designations. Not all effects of the projects can be avoided or mitigated. Chapter E26 also recognises that linear infrastructure may have an operational need to traverse features or areas of value identified in the AUP:OP.[13] The same policy recognises the benefits derived from infrastructure, the adverse effects of not providing the infrastructure[14] and seeks consideration of how the infrastructure contributes to the strategic form or function, or enables the planned growth and intensification, of Auckland.[15] As established, the Warkworth Package will enable intensification and growth of Auckland.

23.1.3 Urban growth, amenity and form

The objectives and policies of the NPS:UD (which the AUP:OP has been updated to reflect) seek that urban environments are well-functioning and that people and communities are enabled to provide for their social, economic, and cultural wellbeing, and for their health and safety, now and into the future.

As set out in Section 10 of the AEE, the Warkworth Package will:

Support and enable growth by protecting improved and new transport corridors that will support Auckland Council's growth aspirations for the growth areas of Auckland, including intensification or density of growth resulting in more efficient urban land development;
Improve access to economic and social opportunities and resilience of the strategic transport network in Warkworth; and
Support transformational mode shift from private vehicles to public transport, walking and cycling.

Therefore, the Warkworth Package will contribute to achieving a well-functioning urban environment by providing people and communities with improved public transport access and walking and cycling facilities.

[12] AUP:OP B3.2.1(1), (2), (4), B3.2.2(1), B3.3.1(1), B3.3.2(1), B3.3.2(1), (3)
[13] AUP:OP E26.2.2(6)(b)
[14] AUP:OP E26.2.2(6)(a)
[15] AUP:OP E26.2.2(6)(f)

23.1.4 Ecology

The AUP:OP objectives and policies seek to protect and enhance ecological values across both terrestrial, freshwater and coastal environments16. The objectives and policies place particular emphasis on avoiding or managing effects on SEA as far as is reasonably practicable and where it is not practicable minimising the adverse effects, and then remedying or mitigating these effects17. Specific recognition is also given through the policies that it is not always practicable to locate and design infrastructure to completely avoid SEA. Similarly, other adverse effects on biodiversity and ecosystems should also be avoided, remedied or mitigated.

In line with the above, the Warkworth Package placed emphasis on avoidance of SEA as far as practicable in the first instance. However, for existing corridors (NOR 2, 4 and 5) the presence of SEA both directly adjacent to, and in some case within, the existing road reserve boundaries meant that some areas of SEA are unable to be avoided. In these cases, emphasis was placed on minimising potential impacts, including where possible a preference to follow the existing road corridor boundary to limit potential impacts to the fringe areas of the SEA. Encroachment into SEA outside the existing road reserve was minimised. It is anticipated that through the detailed design phase and future regional consenting process there will be further opportunities to minimise and mange potential impacts on SEA.

23.2 Section 171(1)(d)

Section 171(1)(d) requires the territorial authority to have particular regard to:

> *Any other matter the territorial authority considers reasonably necessary in order to make a recommendation on the requirement.*

It is considered that there are no other matters under section 171(1)(d) that are reasonably necessary to make a recommendation on the NORs.

23.3 Other policy considerations

Other legislation and policy that has informed the development of, and will inform the future implementation of, the Warkworth Package is set out in Table 23.1.

Table 23.1: Assessment against other policy considerations

National
Government Policy Statement on Land Transport for 2021/22 – 2030/31
The GPS 2021 continues the strategic direction of the GPS 2018, but provides stronger guidance on what Government is seeking from land transport investments. The GPS 2021 outlines the Government's strategy to guide land transport investment over the next 10 years, influencing decisions on how money from the National Land Transport Fund will be invested across activity classes, such as state highways and public transport. The overall strategic priorities for GPS 2021, the national objectives for land transport and the themes and the results the Government wishes to achieve through the allocation of the fund are summarised as follows: Safety – a safe system, free of death and serious injury

16 AUP:OP B7.2.1(1), (2), D9.2(1)
17 AUP:OP D9.2(1)

National

Access – a system that provides increased access to economic and social opportunities
Climate change – a low carbon transport system that supports emissions reductions, while improving safety and inclusive access
Improving freight connections – improving freight connections for economic development.

The Warkworth Package provides a safe and reliable arterial network that supports growth, enables travel choice, addresses safety concerns and improves access to employment and social amenities. The Warkworth Package is anticipated to significantly reduce the risk of deaths and serious injuries, and improve road safety for all users. The Warkworth Package will improve all transport facilities for all modes, resulting in improved safety for those that travel by car, freight, active mode and public transport. It improves corridor capacity, resulting in improved journey times and reliability for future freight and public transport demand.

The GPS 2021 prioritises reduction of greenhouse gas emissions and a shift to active modes, public transport and low emission vehicles. The Warkworth Package is well aligned with this objective as it provides an increase in modal choice including active modes and public transport, which supports a reduction in greenhouse gas emissions compared to trips taken in private vehicles. Overall, the Warkworth Package positively contributes towards the strategic priorities in the GPS 2021.

Climate Change Response Act 2002 (CCRA)

The main regulatory tool for managing New Zealand's climate change response is the CCRA. The CCRA sets a system of emissions budgets to meet a long term 2050 emissions target (net zero GHG emissions, other than biogenic methane).

The CCRA sets the overarching legal framework to drive domestic emissions reductions to enable New Zealand to meet its international climate change commitments, and to provide a means for identifying and adapting to the effects of climate change that pose a material level of risk to New Zealand now and in the future. Waka Kotahi and AT work within this framework and actively consider climate change considerations throughout the business case, optioneering and planning phase of project development. This includes considering how an efficient transport network can be developed that:

Seeks to reduce carbon emissions from transport infrastructure, particularly in the context of vehicle kilometres travelled (VKT), and
Seeks to ensure both existing and new transport infrastructure can adapt and be resilient to the effects of climate change.

The CCRA also sets a framework to enable New Zealand to adapt effectively to the consequences of climate change. The CCRA requires risks and opportunities arising from the effects of climate change to be identified through National Climate Change Risk Assessments, and appropriate policy responses to be developed through National Adaptation Plans.

Emissions Reduction Plan 2022

Section 5ZN of the CCRA provides that a person or body may, in exercising or performing a public function, power, or duty conferred on that person or body by, or under law, take into account the following matters "if they think fit":

The 2050 target; or
An emissions budget; or
An emissions reduction plan.

In May 2022 the Government published the first three emissions budgets (for 2022-25, 2026-30 and 2031-35), as well as the national Emissions Reduction Plan (ERP) setting out policies and strategies for meeting emissions budgets.

The first ERP sets the following specific transport targets (relevant targets are bolded):

1. Reduce total vehicle kilometres travelled (VKT) by the light fleet (private vehicles) by 20 per cent by

National
2035 through improved urban form and providing better travel options, particularly in our largest cities; 2. Increase zero-emissions vehicles to 30 per cent of the light fleet by 2035; 3. Reduce emissions from freight transport by 35 per cent by 2035; and 4. Reduce the emissions intensity of transport fuel by 10 per cent by 2035. The Warkworth Package projects have taken into account transport target 1 as it seeks to connect communities in a manner that assists in reducing vehicle kilometres travelled by light fleet by providing safe and reliable public transport facilities (NOR 1) and high-quality walking and cycling facilities. Transport targets 2, 3 and 4 in the ERP are more effectively addressed through the other national and regional policy and economic levers set out above which sit outside the RMA and form part of the CCRA framework which is the primary mechanism for regulating responses to climate change in New Zealand.
The Thirty Year New Zealand Infrastructure Plan 2015
The Thirty Year New Zealand Infrastructure Plan looks to make changes to the current approach to planning and management and to encourage investment in New Zealand's infrastructure while recognising the challenges the country needs to navigate. The Plan envisages that by 2045 New Zealand's infrastructure will be resilient and co-ordinated and will contribute to a strong economy and high living standards. In regard to Auckland, the Plan notes that challenges exist around projected population growth with Auckland forecast to grow by another 716,000 people by 2045 meaning Auckland will need to provide 400,000 more dwellings. The Warkworth Package provides an integrated approach to land-use and infrastructure planning which is critical to delivering good urban outcomes. The Warkworth Package forms part of this spending and falls within the scope of this plan by supporting future urban growth in Warkworth.
Waka Kotahi Amended Statement of Intent 2021-2026
This document sets out how Waka Kotahi will realise the vision of its new strategic direction, Te kāpehu | Our compass. Te kāpehu was developed in response to changes to the strategic and operating environments, including release of the GPS 2021. The Waka Kotahi focus is on creating an efficient and sustainable transport system that is safe, easy and connected providing one integrated land transport system that helps people get the most out of life and supports business. The Warkworth Package provides a safe and reliable arterial network that supports growth, enables sustainable travel choice, addresses safety concerns and improves access to employment and social amenities. It is therefore consistent with the Waka Kotahi Amended Statement of Intent.
Road to Zero: New Zealand's Road Safety Strategy 2020-2030
Road to Zero outlines a strategy to guide improvements in safety on our roads, streets, footpaths, cycleways, bus lanes and state highways in New Zealand over the next 10 years. The vision of the strategy is a New Zealand where no one is killed or seriously injured in road crashes. The strategy focuses on achieving this vision through system management, road user choices, vehicle safety, work-related road safety and infrastructure improvements and speed management. The Warkworth Package plays a key role in providing the opportunity to plan and design system improvements that embed the Road to Zero strategy. The Warkworth Package is anticipated to reduce the risk of deaths and serious injuries and improve road safety for all users. The Warkworth Package will improve all transport facilities for all modes, resulting in improved safety for those that travel by car, freight, active mode and public transport.

National

Regional

Auckland Transport Alignment Project

ATAP is a joint project involving Auckland Council, the Ministry of Transport, AT, Waka Kotahi, the Treasury and the State Services Commission. The final report (April 2018) sets out a clear direction for the development of Auckland's transport system over the next 10 years. The vision seeks transport investment decisions that deliver broad economic, social, environmental and cultural benefits to Auckland and New Zealand by providing safe, reliable and sustainable access to opportunities. Specifically, this includes easily connecting people, goods and services to where they need to go, providing high-quality and affordable travel choices for people of all ages and abilities, seeking to eliminate harm to people and the environment, supporting and shaping Auckland's growth, and creating a prosperous, vibrant and inclusive city.

The ATAP package highlights the need for significant investment in transport infrastructure to enable urban growth in greenfield FUZ areas, encourage the use of public transport and active modes, and to provide a reasonable level of service to future residents. ATAP specifically notes investment in three main areas including arterial roads and footpaths (including bus and cycle lanes where required).

The Warkworth Package is consistent with ATAP as it will provide a safe and reliable arterial network that integrates with land use planning, supports growth, enables sustainable travel choice for all transport users, addresses safety concerns and improves access to employment and social amenities.

Auckland Regional Land Transport Plan 2018-2028

The RLTP sets out the funding programme for Auckland's transport services and activities over a 10 year period. Planned transport activities for the next three years are provided in detail while proposed activities for the following seven years are outlined. The RLTP is jointly delivered by AT, Waka Kotahi and KiwiRail, and forms part of the National Land Transport Programme.

The Te Tupu Ngātahi Supporting Growth Programme is identified as a committed, ongoing programme in the RLTP which it identifies will enable the sequence of land release specified in the FULSS, and improves access to places where people live and work.

Hauraki Gulf Marine Park Act 2000

The Hauraki Gulf Marine Park Act seeks to integrate the management of natural, historic and physical resources of the Hauraki Gulf, the islands and its catchment. The Act recognises the national significance of the Hauraki Gulf and life supporting capacity of the environment of the Gulf.

The Warkworth Package is designed with provision for stormwater treatment through the use of ponds and / or swales. Space for the relevant stormwater treatment features is provided within the designations to enable the treatment of runoff from the corridor before discharge into the receiving environment of the Hauraki Gulf. This enables the protection of the Hauraki Gulf environments life supporting capacity.

Auckland Plan 2050

The purpose of the Auckland Plan is to contribute to Auckland's social, economic, environmental and cultural well-being through a 30 year vision for Auckland's growth. It sets a strategic direction for Auckland and its communities that integrates social, economic, environmental, and cultural objectives. The Auckland Plan's Development Strategy outlines the direction Auckland will take managing expansion in future urban areas noting the constraint that these areas are predominantly rural at present and have little or no infrastructure in place to cope with urban development. The Auckland Plan outlines the need to provide the required bulk infrastructure (water, wastewater, storm water and transport) to these areas in the right place at the right time. The Auckland Plan also seeks that Aucklander's will be able to get where they want to go more easily, safely and sustainably.

National
The Warkworth Package will provide a safe and reliable arterial network that integrates with land use planning, supports growth, enables sustainable travel choice for all transport users, addresses safety concerns and improves access to employment and social amenities. The development of the Warkworth Package has been a direct response to the Auckland Plan. The Warkworth Package will help facilitate the sustainable growth of Warkworth enabling the bulk transport infrastructure required to unlock development potential.
Vision Zero for Tāmaki Makaurau: a transport safety strategy and action plan to 2030
Developed in 2019, Vision Zero extends the existing safe system approach to stop the human sacrifice of mobility, placing safety at the forefront of the future transport system for all modes by designing safe places for people. Vision Zero has a goal to eliminate transport deaths and serious injuries by 2050 (in line with the Auckland Plan 2050). The Warkworth Package plays a key role in providing opportunity to plan and design system improvements that embed Vision Zero principles, and specifically contribute to the Vision Zero priorities. The Warkworth Package is anticipated to reduce the risk of deaths and serious injuries and improve road safety for all users. The Warkworth Package will improve all transport facilities for all modes, resulting in improved safety for those that travel by car, freight, active mode and public transport.
Auckland Long-Term Plan 2018-2028 / The 10-Year Budget 2021-2031 (Our Recovery Budget)
The Auckland Long Term Plan 2018-2028, which is required to be prepared under the Local Government Act 2002, sets out Auckland Council's 10 year financial plan, and is guided by the strategic direction set by the Auckland Plan, as described and assessed above. The budget was superseded by 'Our Recovery Budget' 2021-2031 as a result of COVID19. The new budget responds to investment demands from rapid growth, transport demand, aging assets, and climate change. The Warkworth Package supports investment in transport, as well as support rapid growth demands. It proposes upgrades to existing assets (roads) and future proofs them for example through provision for new rainfall / flooding expectations and supporting shift to active mode for changing communities.
Te Tāruke-ā-Tāwhiri: Auckland's Climate Action Framework and Plan
The purpose of Auckland's Climate Action Framework and Plan is to increase Auckland's resilience to the impact of climate change and reduce emissions that cause climate change, with one of the key moves identified to deliver clean, safe and equitable transport options. The Warkworth Package has been designed having regard to and taking into account climate change and resilience. The Warkworth Package will deliver better accessibility and mode choice (thus reducing the present reliance on low occupancy vehicles). This provides an important component to realising the regional emissions benefits of an integrated network. This shows alignment with, and a positive contribution towards the Climate Action Framework and Plan.
Te Ara Whakaheke Tukuwaro Ikiiki: Transport Emissions Reduction Pathway
The Transport Emissions Reduction Pathway sets out a plan to reduce Auckland's transport emissions by 64 per cent by 2030. The Transport Emissions Reduction Pathway sets out 11 areas for transforming Auckland's transport system and land use planning that align with the government's Emissions Reduction Plan. They are (relevant areas are bolded): **making walking and cycling safer, easier and more accessible** **using public transport much more** prioritising and resourcing sustainable transport reducing travel where possible and appropriate **making neighbourhoods safer with less traffic**

National
putting things closer to where people live using vehicles powered by electricity **enabling new transport options** using low emission buses, trains and ferries making freight and services cleaner and more efficient **helping Aucklanders make sustainable transport choices**. The Warkworth Package is unlikely to be built within the 2030 target but is well-aligned with the Transport Emissions Reduction Pathway as it seeks to connect communities in a manner that assists in reducing vehicle kilometres travelled by light fleet by providing safe and reliable public transport facilities (NOR 1) and high-quality walking and cycling facilities.
Auckland's Urban Ngahere (Forest) Strategy
The Auckland Urban Ngahere (Forest) strategy recognises the ecosystem services as well as economic and cultural benefits delivered by green infrastructure within the urban environment and sets out objectives of the strategy which include the need to grow and protect urban ngahere in existing and future urban areas. Although the Warkworth Package will require the removal of some street trees and trees within SEAs (i.e., trees that are protected by the district plan rules), this will be mitigated by planting within the new road layouts and results in overall increase of trees from existing, due to the general lack of trees within Warkworth. The long-term outcome of comprehensive street tree planting will be more trees in the public realm and increased amenity value within the road network, consistent with the Auckland Urban Ngahere (Forest) strategy.
Local
Rodney Local Board Plan
The Warkworth Package is situated within the Rodney Local Board area. The Rodney Local Board Plan 2020 identifies outcomes relating to provision of safe, improved transport options that connect communities, infrastructure and development meeting the needs of growing communities and protection and care for the natural environment. The Warkworth Package is consistent with the outcomes of the Rodney Local Board Plan as it will provide high quality transport corridors including walking and cycling facilities that integrate with surrounding land uses and the wider transport network.
Warkworth Structure Plan
The Warkworth Structure Plan is the strategic planning document for Warkworth, which is supported by a number of planning principles. These principles seek to achieve a vision developed for Warkworth which is: *"Warkworth is a Satellite Town that retains its rural, natural, and cultural character. It is centred around the Mahurangi River and has easy walking and cycling access around the town. There are a variety of high-quality residential neighbourhoods. Warkworth is largely self-sufficient with plenty of employment, education, shopping and recreation opportunities. Transport and other infrastructure are sequenced to support Warkworth's planned growth."* A number of planning principles were developed as part of the Warkworth Structure Plan in order to guide Warkworth's growth to achieve the vision above. The key planning principles of relevance to the Warkworth Package include: Use the development of Warkworth's growth areas to help address Warkworth's existing road congestion through integrated land use and transport planning and new infrastructure Prioritise convenient, segregated, and safe walking and cycling routes through the FUZ connecting residential areas with key locations (e.g. schools, parks, centres), and the existing town, and to regional walking / cycling routes

National
Provide convenient, high quality public transport routes through the FUZ (connecting to the rest of Warkworth, the surrounding rural settlements, and Auckland) Plan for infrastructure (transport, water, etc.) to be sequenced to enable new houses and businesses are built in the FUZ. All of the new transport corridors and corridor upgrades in the Warkworth Package contain walking and cycling facilities, achieving safe, connected and high amenity linkages. Public transport will be able to utilise the upgraded roads and new corridors providing efficient public transport linkages throughout Warkworth as it develops. NOR 1 will also provide a Public Transport Hub which will enable safe and efficient public transport access for residents of North Warkworth.

24 Assessment of Part 2 of the RMA

Section 171(1) states that when considering a NOR, a territorial authority must consider the effects on the environment having particular regard to a number of matters (assessed above) and subject to Part 2 of the RMA.

Section 5(1) of the RMA states that the purpose of the RMA is to promote the sustainable management of natural and physical resources. Section 5(2) of the RMA provides a definition of sustainable management. In our view, in determining whether the Warkworth Package promotes sustainable management, consideration of sections 6, 7 and 8 of the RMA is required before drawing any conclusions regarding consistency with section 5 of the RMA.

The following section provides an assessment of the effects of the Warkworth Package against Part 2 of the RMA.

24.1 Matters of national importance

Section 6 of the RMA states that in achieving the purpose of the RMA, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall recognise and provide for specified matters of national importance. Table 24.1 provides an assessment against Section 6 of the RMA.

Table 24.1: Section 6 Assessment

Matter of national importance	Assessment
the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development	The Warkworth Package NORs will preserve the natural character of the stream environments through reinstatement and mitigation planting at the completion of works.
the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development	The Warkworth Package projects avoid outstanding natural features and landscapes.
the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna	SEA vegetation and significant habitats have been avoided through corridor alignment choice where possible. Some vegetation removal is unable to be avoided. Potential impacts on natural wetlands will be assessed and managed through a future consenting process.
the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers	The Warkworth Package does not impact on public access to and along the coastal marine area, lakes and rivers.
the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	Manawhenua have been actively involved throughout the development of the Warkworth Package. This has included through the alternatives assessment and identification of the preferred options.

Matter of national importance	Assessment
	The partnership with Manawhenua has involved the identification of opportunities to acknowledge and respond to the cultural landscape along the Warkworth Package corridors and restore and enhance the natural and cultural landscapes. The Project has also recognised Manawhenua cultural values, particularly with regards to the mauri of, and the relationships of Manawhenua with natural and physical resources including freshwater, land, air and coastal resources. Significant adverse effects on these values are required to be avoided, with adverse effects avoided, remedied or mitigated as appropriate.
the protection of historic heritage from inappropriate subdivision, use, and development	Effects on historic heritage will be managed through the implementation of a HHMP. Effects on heritage and archaeological sites will be avoided where possible. No scheduled heritage sites will be impacted by the Warkworth Package.
the protection of protected customary rights	The Warkworth Package does not impact upon any known protected customary rights.
the management of significant risks from natural hazards	A number of design measures to provide resilience to flooding, inundation and climate change have been adopted across the Warkworth Package. The Assessment of Flooding and Stormwater Effects has made recommendations which are to be implemented at detailed design so that: There is no increase in flood levels for existing authorised habitable floors that are already subject to flooding; and There are no new flood prone areas created. There is sufficient space within the designations for stormwater and flood mitigation.

The Warkworth Package is considered to be consistent with section 6 of the RMA for the reasons set out above.

24.2 Other matters

Section 7 of the RMA states that, in achieving the purpose of the RMA, particular regard shall be had to specified other matters. Table 24.2 provides an assessment against Section 7 of the RMA.

Table 24.2: Section 7 assessment

Other matter	Assessment
kaitiakitanga	Manawhenua have been actively involved through the NOR phase of the Warkworth Package and will continue to exercise kaitiakitanga through the future phases of these projects. This includes the preparation of management plans and the involvement of Manawhenua as partners in the detailed design and consenting phases of these projects.
the ethic of stewardship	This has been recognised through engagement with key stakeholders, business associations, community groups and the

Other matter	Assessment
	wider community who exercise stewardship over particular resources.
the efficient use and development of natural and physical resources	Through the assessment of alternatives process, the Warkworth Package was determined to be the most efficient use of natural and physical resources to achieve the needs of the community.
the efficiency of the end use of energy	Not considered relevant to the Warkworth Package.
the maintenance and enhancement of amenity values	This will primarily be achieved through the implementation of the ULDMP which is a condition on the designations.
intrinsic values of ecosystems	Adverse effects on ecosystems have been avoided as far as practicable while providing sufficient width within the designation boundaries. It is expected that designation boundaries will be further refined during the detailed design. Appropriate mitigation will be undertaken where ecosystem values are compromised.
maintenance and enhancement of the quality of the environment	The quality of the environment will be maintained and enhanced in some places through the implementation of the ULDMP which is a condition on the designations.
any finite characteristics of natural and physical resources	Not considered relevant to the Warkworth Package.
the protection of the habitat of trout and salmon	Not considered relevant to the Warkworth Package.
the effects of climate change	The Project responds to the effects of climate change and the reduction of greenhouse gas emissions by providing improved reliability for public transport and high quality walking and cycling facilities. The Project responds to the effects of climate change through the provision of replanting that, when delivered, will contribute to reducing urban heat island effects.
the benefits to be derived from the use and development of renewable energy	Not considered relevant to the Warkworth Package.

The Warkworth Package is considered to be consistent with section 7 of the RMA for the reasons set out above.

24.3 Section 8: Treaty of Waitangi

In achieving the purpose of the RMA, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).

AT has partnered with Manawhenua throughout the development of the Warkworth Package. This has resulted in the selection of transport corridors which avoid and minimise adverse effects on cultural values where practicable. This has included avoiding or minimising impacts on SEAs, wetlands and streams and ensuring that construction management plans will be in place to protect

water quality and any previously unrecorded items of cultural heritage encountered.

Further engagement will be undertaken in the detailed design and construction phases to ensure that the principles of the Treaty of Waitangi (Te Tiriti o Waitangi) are taken into account.

Given the above, the development of the Warkworth Package is considered to be consistent with the principles of the Treaty of Waitangi (Te Tiriti o Waitangi), and section 8 of the RMA.

24.4 The purpose of the Act

Section 5 of the RMA sets out the purpose of the RMA which is to promote the sustainable management of natural and physical resources.

The Warkworth Package will result in some adverse effects, however, when considering the significant regional and local benefits of the package, and the measures proposed to avoid, remedy and mitigate the adverse effects, the Warkworth Package achieves the purpose and principles of the RMA.

25 Other statutory approvals required

Further and separate approvals under other legislation are required and will be obtained in the future. This report does not seek authorisation or approval for those works, but they are set out in Table 25.1 for clarity.

Table 25.1: Other statutory approvals required

Other statutory approval required	Discussion
Outline plan of works	In accordance with section 176A of the RMA, AT (as the requiring authority) will submit to Auckland Council (as the territorial authority) one or more Outline Plan(s), detailing all relevant aspects of the transport corridors following the completion of detailed design and prior to the commencement of construction.
Land subject to existing designations	Some land to be designated for the transport corridors is subject to existing designations by other requiring authorities. In order to undertake work in accordance with a designation on land with an existing designation, written consent from the requiring authority of the earlier designation is required under section 177(1)(a). The section 177(1)(a) approvals required for each corridor are set out in Section 9 under the existing planning environment. Written approval is required in order to undertake works within the earlier designations where those works may prevent or hinder the earlier designation's purpose or project. Consultation has occurred with these requiring authorities to confirm acceptability of indicative designs; however, it is appropriate that written consent is sought at detailed design prior to construction when further detail will be known and to account for any changes to status of earlier designation. Therefore, written approval under section 177(1)(a) of the RMA will be sought closer to construction.
Future resource consents	The transport corridors will require NES and regional resource consents to enable works. Although not being sought at this stage, their implications have been considered in the indicative designs, options assessment and the designation footprints. These consents will be sought when the detailed design for each of the transport corridors is completed.
Approvals under other legislation	Other matters which will need to be considered include: PWA – the acquisition of required land HNZPTA – authorities for works on or in any archaeological sites Reserves Act 1977 – approvals as required for affected reserves Wildlife Act 1953 – wildlife permits for the disturbance or relocation of protected species (e.g., taking and / or killing of wildlife for certain purposes and / or causing damage).

Appendix A: Assessment of Alternatives

Appendix B: Statutory Assessment

Appendix C: Proposed NOR Conditions