

North West Strategic Assessment of Effects on the Environment

Volume 2

December 2022

Version 1

Document Status

Responsibility	Name
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Revision Status

Version	Date	Reason for Issue
1	13-12-2023	Notice of Requirement Lodgement

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Glossary and Abbreviations

Acronym / Term	Descriptions
ABM	Automatic Bat Monitors
Active Mode	Walking and Cycling
AEE	Assessment of Effects on the Environment (this report)
AGR D	Austrroads Guide to Road Design
ARI	Average Recurrence Interval
ASH	Alternative State Highway
AT	Auckland Transport
ATAP	Auckland Transport Alignment Project
AUP:OP	Auckland Unitary Plan: Operative in Part
CCRA	Climate Change Response Act 2002
CEMP	Construction Environmental Management Plan
CHI	(Auckland Council) Cultural Heritage Inventory
CIA	Cultural Impact Assessment
CNVMP	Construction Noise and Vibration Management Plan
CTMP	Construction Traffic Management Plan
DBC	Detailed Business Case
DSIs	Deaths and serious injuries
EMP	Ecological Management Plan
ERP	Emissions Reduction Plan
FULSS	Auckland Future Urban Land Supply Strategy (2017)
FUZ	Future Urban Zone
GPS	Government Policy Statement
GRPA	Government Rooding Powers Act 1989
HHMP	Historic Heritage Management Plan
HNZPTA	Heritage New Zealand Pouhere Taonga Act 2014
IBC	Indicative Business Case
KiwiRail	KiwiRail Holdings Limited
LGACA	Local Government (Auckland Council) Act 2009

Acronym / Term	Descriptions
LTMA	Land Transport Management Act 2003
MPD	Maximum Probable Development
MSM	Macro Strategic Model
NAL	North Auckland Line
NES-FW	National Environmental Standards for Freshwater
NOR	Notice of Requirement
NW Strategic Package	The North West Strategic network comprising the following extended and / or upgraded transport corridors: <ul style="list-style-type: none"> • Alternative State Highway • SH16 Main Road • Rapid Transit Corridor including Kumeū Station and Huapai Station • Access Road
NW Spatial Strategy	Strategic Land Use Framework for Kumeū-Huapai, Riverhead, and Redhills North
North West Transport Network	The following Te Tupu Ngātahi packages: <ul style="list-style-type: none"> • NW Local Arterials Package • NW Strategic Package
NPS-ET	National Policy Statement for Electricity Transmission 2008
NPS-HPL	National Policy Statement on Highly Productive Land 2022
NPS-UD	National Policy Statement on Urban Development 2020
PBC	Programme Business Case
PPF	Protected Premises and Facilities
PWA	Public Works Act 1981
RAMC	Regional Active Mode Corridor
RLTP	Auckland Regional Land Transport Plan
RMA	Resource Management Act 1991
RPS	Regional Policy Statement
RTC	Rapid Transit Corridor
RTN	Rapid Transit Network
RUB	Rural Urban Boundary
SCEMP	Stakeholder Communication and Engagement Management Plan
SEA	Significant Ecological Areas
SIA	Social Impact Assessment

Acronym / Term	Descriptions
SH16	State Highway 16
SH18	State Highway 18
TAR	Threatened or At Risk species
TDM	Transport Design Manual
Te Tupu Ngātahi	Te Tupu Ngātahi Supporting Growth Programme
TfUG	Transport for Urban Growth (now known as the Supporting Growth Programme)
ULDMP	Urban and Landscape Design Management Plan
VKT	Vehicle Kilometres Travelled
Waka Kotahi	Waka Kotahi NZ Transport Agency



PART A

Background and Receiving Environment

1 Explanation of the following Parts of this Report

The Assessment of Effects on the Environment (AEE) discusses common elements and the receiving environment for the NW Strategic Package (Part A) and then discusses each specialist topic (Part B). Each project is discussed where there are shared effects, then as necessary, each Notice of Requirement (NOR) is discussed where it differentiates, to consider corridor specific effects.

Due to the scale of the proposed transport corridors, a topic-based structure (rather than NOR-based) has been adopted to reduce reporting duplication between corridors, without sacrificing the nuances. To avoid further duplication, where the matter is satisfactorily covered in the specialist or a supporting document, this will be cross referenced to the relevant section. In summary, Parts A to B comprise:

Part A – Background and receiving environment

- Introduction
- Background and context
- The recommended network and the project objectives
- Lapse period sought and rationale
- Assessment of alternatives
- Design and assessment approach
- Receiving environment
- Engagement

Part B – Assessment of effects on the environment

- Assessment of effects under sections 171 and 181(2):
- Positive effects of the Local Arterials network
- Traffic and Transportation
- Traffic Noise and Vibration
- Construction Noise and Vibration
- Network Utilities
- Natural Hazards – Flooding
- Terrestrial Ecology
- Landscape and Visual
- Historic Heritage and archaeology
- Māori Culture, Values and Aspirations
- Social Impact
- Property and Land Use
- Urban Design Evaluation
- Proposed measures to manage adverse effects
- Statutory assessment against section 171 and Part 2
- Other statutory approvals required

Part C – Appendices

- Appendix A: Assessment of Alternatives
- Appendix B: NOR Conditions

2 Introduction

2.1 The Te Tupu Ngātahi Supporting Growth Programme

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 the country combined. The Auckland Plan 2050 – Development Strategy signals that Auckland could grow by 720,000 people to reach 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 jobs¹. Most of this growth will go into existing urban areas. However, around a third will go into future urban zoned areas (greenfields) as identified in the Auckland Unitary Plan: Operative in Part (AUP:OP).

Te Tupu Ngātahi Supporting Growth (Te Tupu Ngātahi) is a collaboration between Auckland Transport (AT) and Waka Kotahi NZ Transport Agency (Waka Kotahi) to plan transport investment in Auckland's future urban zoned areas over the next 10 to 30 years. AT and Waka Kotahi have partnered with Auckland Council, Manawhenua and KiwiRail Holdings Limited (KiwiRail) 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 2-1.

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 increased 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.

The North West Transport Network is intended to support the North West growth area as shown in Figure 2-1.

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

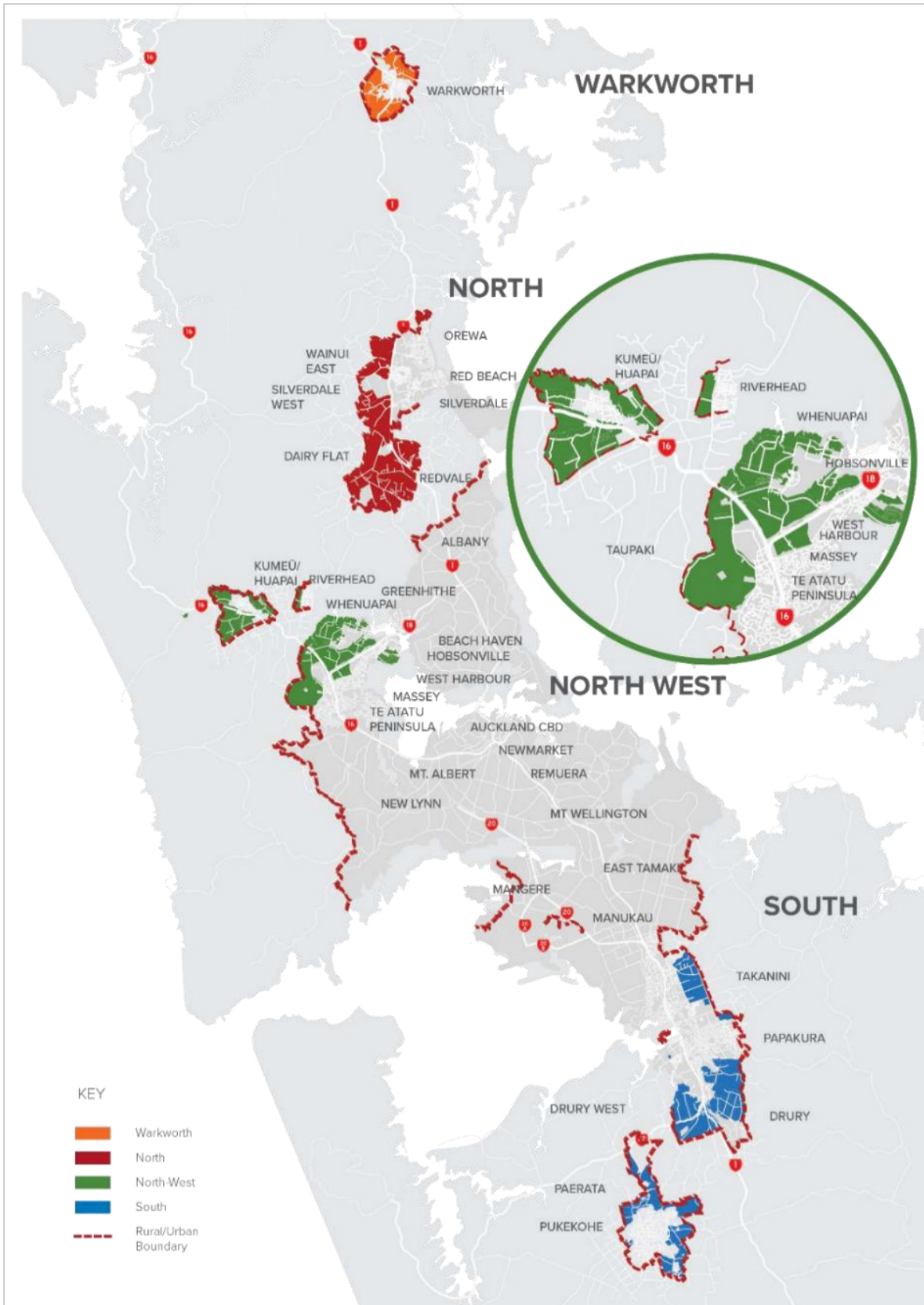


Figure 2-1: Future Urban Areas of Auckland, highlighting the North West Growth Area (Green)

2.2 Previous programme phases

Te Tupu Ngātahi NW Strategic Package recommended network follows an extensive business case process that commenced in 2015. The programme involved collaboration between Auckland Council, Waka Kotahi and AT, see Figure 2-2.

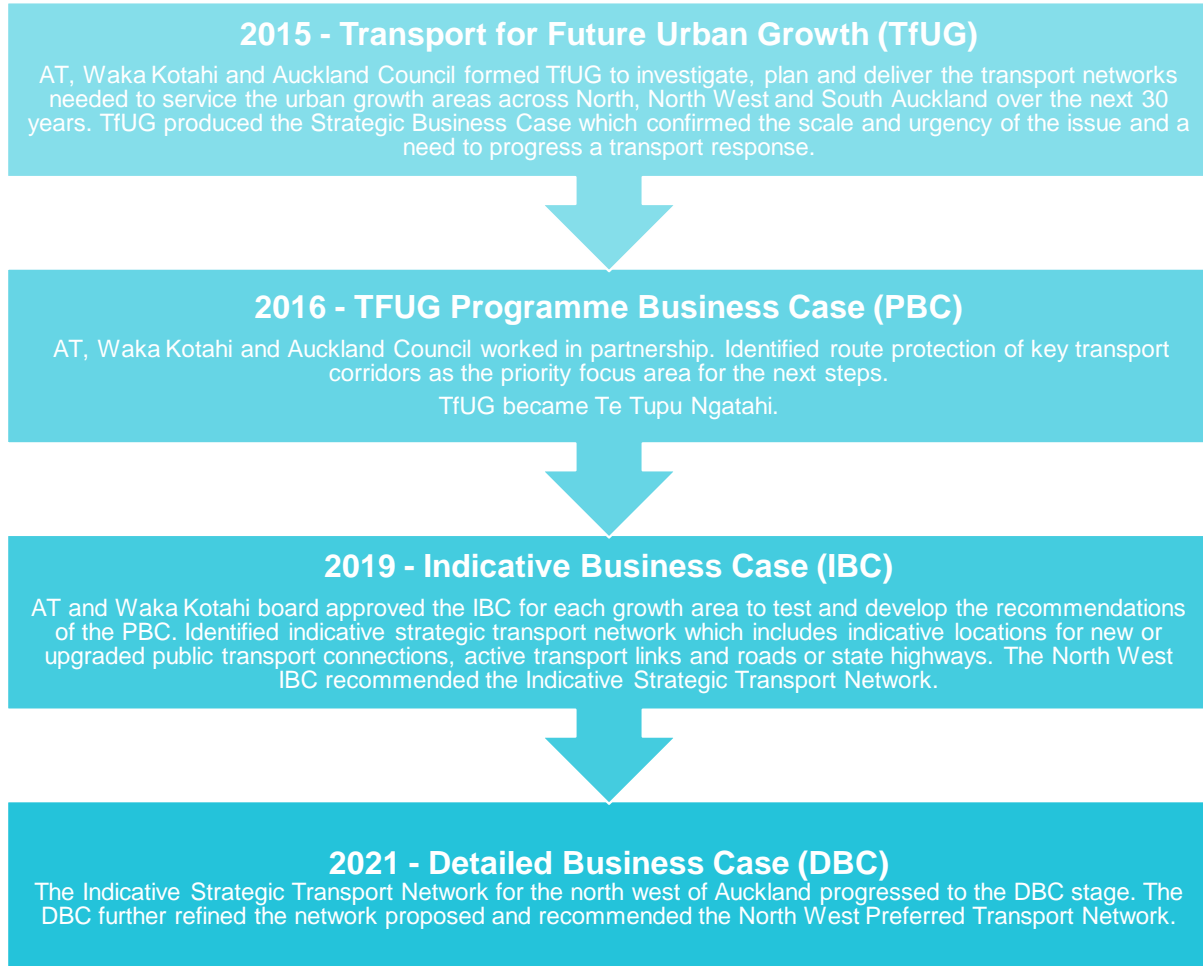


Figure 2-2: Te Tupu Ngātahi earlier programme phases

The North West Detailed Business Case (DBC) was approved by the AT Board and the Waka Kotahi Board in December 2021. As part of the board approval the decision was made to prepare NORs for the extended and / or upgraded transport corridors within the NW Strategic Package and within the NW Local Arterials Package.

The transport corridors within each package are shown in Figure 2-3.

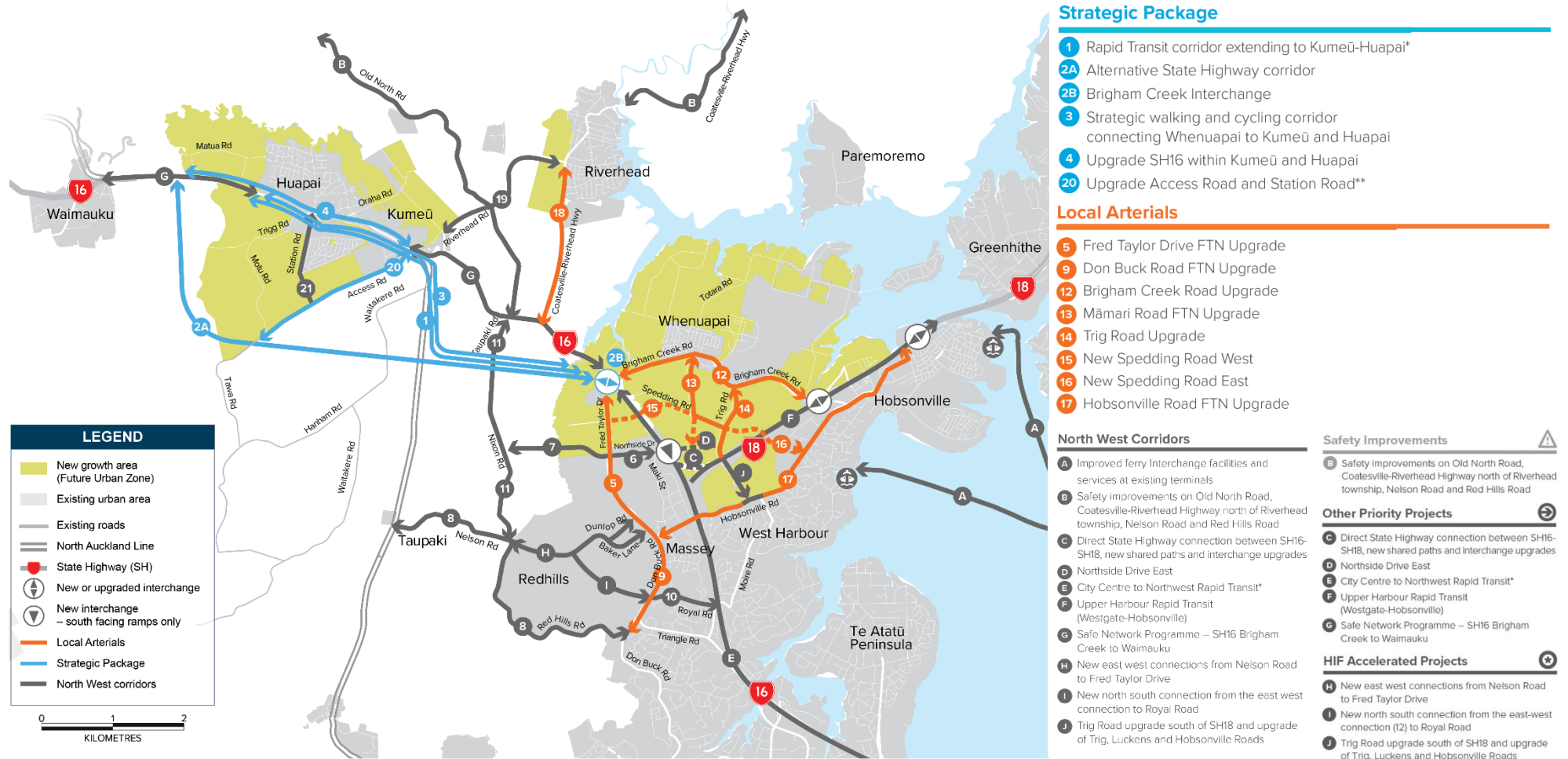


Figure 2-3: NW Strategic Package (subject of this application) and NW Local Arterials Package (a separate application) against wider North West Transport Network

3 The recommended network

3.1 Existing challenges and constraints

Te Tupu Ngātahi has responded to the challenge and assessed the network required, Table 3-1 sets out the key drivers and issues each NW Strategic Package project will address.

Table 3-1: Drivers and need for the NW Strategic Package

Project	Key Issues / Reason for Project
Highway Connections	
Alternative State Highway (ASH)	<ul style="list-style-type: none"> The current form and function of State Highway 16 (SH16) between Brigham Creek Road and Waimauku does not support the urbanisation of the north western growth area, resulting in deteriorating strategic access to economic and social opportunities As demand on the SH16 corridor grows, freight and inter-regional trips will experience travel time unreliability and susceptibility to network incidents The current SH16 corridor from Access Road to Matua Road and alternative rural routes experience a high level of deaths and serious injuries (DSIs), which is expected to be exacerbated by the future growth. <p>Brigham Creek Interchange</p> <ul style="list-style-type: none"> People movement through the Brigham Creek interchange is currently unreliable, which will be exacerbated by future demands A lack of dedicated, safe and attractive mode choice alternatives will increase reliance on private vehicle travel for movements through the Brigham Creek Interchange Insufficient integration of the Brigham Creek Interchange with the future transport network will limit high quality and attractive multi modal connections through the interchange resulting in reduced access to economic and social activities.
SH16 Main Road	<ul style="list-style-type: none"> The current form and function of the SH16 Main Road corridor between Old Railway Road and Foster Road does not support the urbanisation of the north western growth area, resulting in deteriorating local access to economic and social opportunities A lack of dedicated active mode facilities along SH16 between Matua Road and Access Road will result in more private vehicle trips as growth occurs The current SH16 corridor from Access Road to Matua Road and alternative rural routes experience a high level of DSI's which is expected to be exacerbated by the future growth.
Rapid Transit	
Rapid Transit Corridor (RTC)	<ul style="list-style-type: none"> The existing public transport network will not provide effective and attractive access to economic and social opportunities for Kumeū- Huapai
Kumeū Station	<ul style="list-style-type: none"> A lack of segregation and priority for public transport services results in travel time unreliability and susceptibility to network incidents
Huapai Station	<ul style="list-style-type: none"> A lack of high quality, accessible and competitive public transport will continue to drive an over reliance of private vehicle travel A lack of direct, dedicated active mode facilities between Kumeū- Huapai and Whenuapai / Westgate will limit the shift from private vehicle trips as growth occurs

Project	Key Issues / Reason for Project
	<ul style="list-style-type: none"> • The lack of strategic active mode facilities will constrain access between Kumeū-Huapai and Whenuapai / Westgate limiting access to economic and social opportunities • A lack of a safe and attractive separated active mode facility will result in use of inappropriate and less safe alternatives.
Local Roding	
Access Road	<ul style="list-style-type: none"> • The current form and function of Access Road does not support future growth and will constrain access to economic and social opportunities in Kumeū-Huapai • As demands grow on Access Road vehicle users (bus freight, HOV, private vehicle) will experience unreliability • A lack of high quality and attractive active mode and public transport facilities for Kumeū-Huapai will result in more private vehicle trips as growth occurs • Future growth and a lack of separated and safe active mode facilities will result in inappropriate quality of service on Access Road.

3.2 Project objectives

Section 171(1)(c) of the Resource Management Act 1991 (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 have been developed bearing in mind tests in section 171(1)(c), specifically:

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

Having regard to the above, the following project objectives have been developed. Figure 3-1 below illustrates the line of sight between the project objectives and the Indicative Business Case (IBC) and DBC investment objectives.

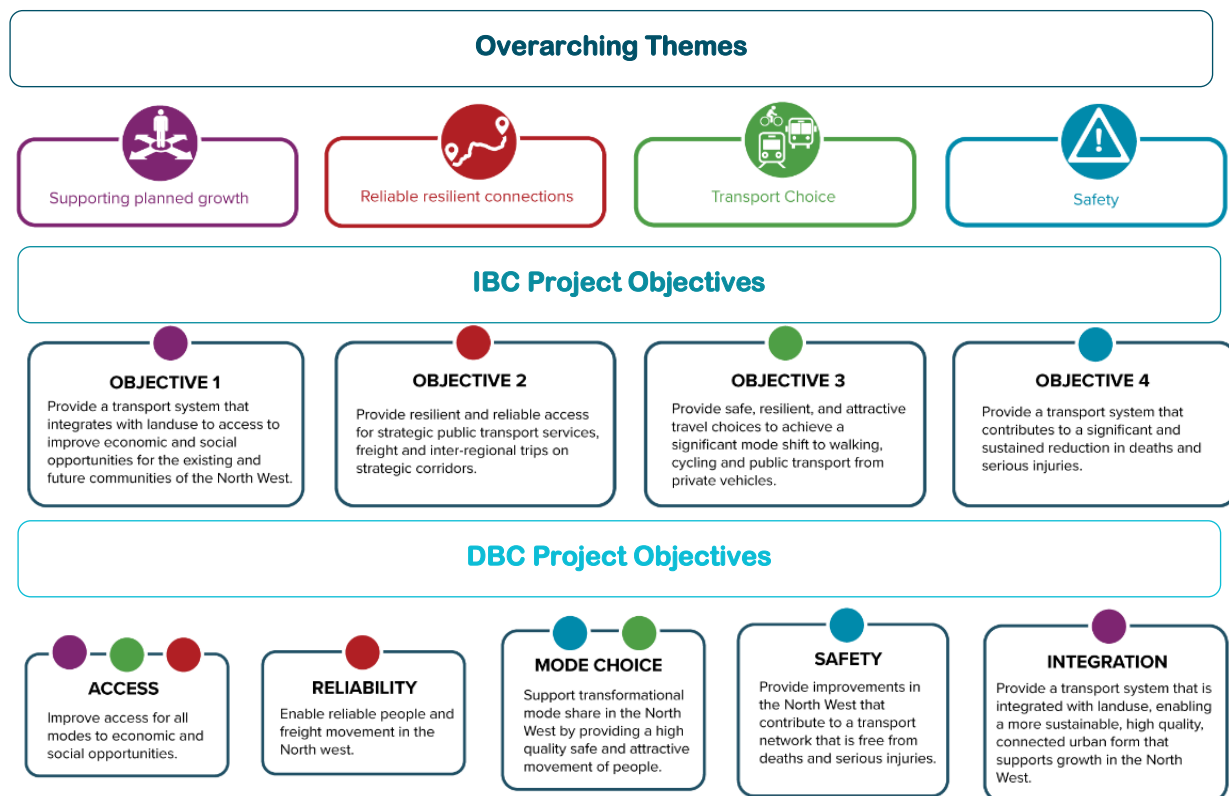


Figure 3-1: Business case objectives and key themes



Alternative State Highway

Enable the provision of a transport corridor that:

- a) Provides for an efficient, reliable and resilient strategic connection between Redhills North and SH16 west of Kumeū-Huapai.
- b) Supports planned urban growth.
- c) Supports connectivity within Kumeū-Huapai by providing a new corridor for interregional and freight trips to SH16 Main Road.
- d) Supports mode shift on the transport network.
- e) Supports a safe transport network for all users.
- f) Supports and integrates with the existing and future strategic transport network in the North West

SH16 Main Road

Enable the provision of a transport corridor that:

- a) Supports planned urban growth.
- b) Supports connectivity within Kumeū-Huapai.
- c) Contributes to mode shift by providing a choice of transport options including active modes.
- d) Supports a safe transport network for all users.
- e) Supports and integrates with the existing and future transport network in Kumeū-Huapai.

Access Road

Enable the provision of a transport corridor that:

- a) Supports planned urban growth.
- b) Improves connectivity within Kumeū-Huapai and to the existing and future strategic transport network.
- c) Contributes to mode shift by providing a choice of transport options including active modes.
- d) Supports a safe transport network for all users.
- e) Supports and integrates with the existing and planned transport network.

Rapid Transit Corridor

Enable the provision of a transport corridor that:

- a) Provides for an efficient, resilient, and reliable rapid transit between Redhills North and Kumeū-Huapai.
- b) Supports planned urban growth.
- c) Supports a quality urban form within Kumeū-Huapai.
- d) Contributes to mode shift by providing a choice of transport options including rapid transit and active modes.
- e) Supports a safe transport network for all users.
- f) Supports and integrates with the existing and future transport network in the North West.

Kumeū RTC Station

Enable the provision of a transport station that:

- a) Supports planned urban growth.
- b) Supports a quality urban form within Kumeū-Huapai.
- c) Contributes to mode shift by improving travel choice, via access to rapid transit.
- d) Supports a safe transport network for all users.
- e) Supports and integrates with the existing and future transport network.

Huapai RTC Station

Enable the provision of a transport station that:

- a) Supports planned urban growth.
- b) Supports a quality urban form within Kumeū-Huapai.
- c) Contributes to mode shift by improving travel choice, via access to rapid transit.
- d) Supports a safe transport network for all users.
- e) Supports and integrates with the existing and future transport network.

Figure 3-2: NW Strategic Package project objectives line of sight to business case objectives

3.3 Strategic corridors proposed for upgrade or extension

This AEE supports the NW Strategic Package. The NW Strategic Package consists of the future proposed or upgraded transport corridors within Kumeū-Huapai and Brigham Creek area.

Waka Kotahi is the requiring authority under the RMA for five of the proposed NORs and AT for one NOR. The notices are to designate land for future strategic transport corridors as part of the Supporting Growth Programme to enable the future construction, operation and maintenance of transport infrastructure in the North West area of Auckland.

Each NOR in the NW Strategic Package is listed in Table 3-2 and shown in Figure 3-3.

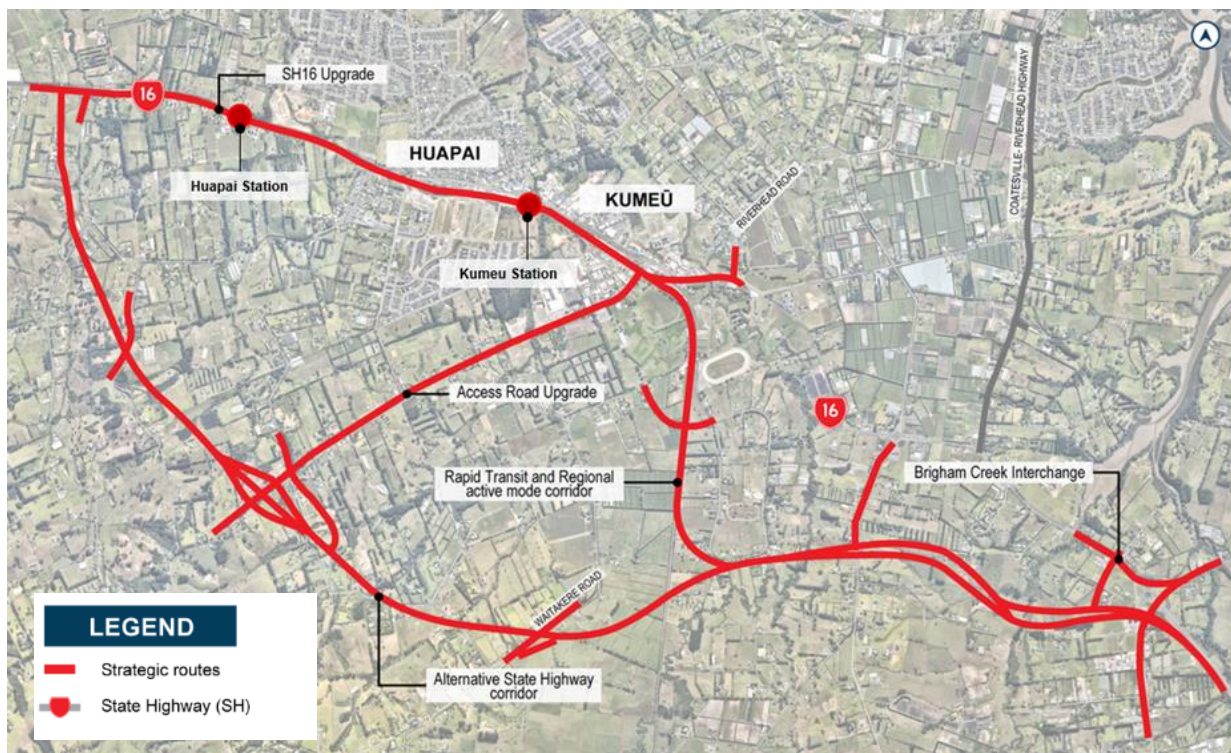


Figure 3-3: NW Strategic Package Overview

Table 3-2: NW Strategic Package – Project and Notice Reference

Project	Notice	Description	Requiring Authority
Highway Connections			
Alternative State Highway	S1	A new four-laned dual carriageway motorway and the upgrade of Brigham Creek Interchange.	Waka Kotahi
SH16 Main Road	S2	Upgrade to urban corridor including active modes and realignment of Station Road intersection with SH16.	Waka Kotahi
Rapid Transit			
Rapid Transit Corridor	S3	New RTC and active mode corridor in one co-located corridor.	Waka Kotahi

Project	Notice	Description	Requiring Authority
Kumeū Station	KS	New rapid transit station, including transport interchange facilities and accessway.	Waka Kotahi
Huapai Station	HS	New rapid transit station, including transport interchange facilities, park and ride and accessway.	Waka Kotahi
Local Roding			
Access Road	S4	Upgrade of Access Road to a four-lane cross-section with separated cycle lanes and footpaths on both sides of the corridor.	AT

3.4 Requiring authority status

3.4.1 Waka Kotahi

Waka Kotahi is a Crown entity with its functions, powers and responsibilities set out in the Land Transport Management Act 2003 (LTMA) and the Government Roding Powers Act 1989 (GRPA). The primary objective of Waka Kotahi under section 94 of the LTMA is to contribute to an effective, efficient, and safe land transport system in the public interest. An integrated approach to transport planning, funding and delivery is taken by Waka Kotahi. This includes investment in public transport, walking and cycling, local roads and the construction and operation of state highways. Section 96(1)(a) of the LTMA requires that Waka Kotahi exhibits a sense of social and environmental responsibility when undertaking its work. This statutory requirement is reflected in a raft of strategic and policy documents. One of the core position statements is that Waka Kotahi will responsibly manage the land transport system's interaction with people, places, and the environment. Waka Kotahi is also a network utility operator approved as a requiring authority under section 167 of the RMA for the construction and operation (including the maintenance, improvement, enhancement, expansion, realignment, and alteration) of any state highway or motorway, and for the purpose of constructing or operating (or proposing to construct or operate) and maintaining cycleways and shared paths.

Amongst other things, Waka Kotahi has a statutory function to oversee the planning, operation, implementation and delivery of public transport. There is also clear direction in the Government Policy Statement on Land Transport 2021/22 – 2030/31 for Waka Kotahi to provide better transport options to access social and economic opportunities, and to develop a low carbon transport system that supports reduced emissions. These functions and direction enable Waka Kotahi to designate land for a state highway for public transport purposes.

The GRPA provides for Waka Kotahi to construct and operate stations associated with state highways. In this case, Waka Kotahi can also designate land for relevant supporting public transport facilities such as stations, including with park and ride capabilities. In line with these statutory functions, the purpose of the proposed designations is “to construct, operate, maintain and improve a state highway for public transport, cycleway and / or shared path, and associated infrastructure”. The legal name for Waka Kotahi is the New Zealand Transport Agency. The corporate name Waka Kotahi is used throughout this AEE. When the designation is confirmed, the Requiring Authority name recorded in the district plan should be the New Zealand Transport Agency, and the purpose of the designation recorded as above.

3.4.2 Auckland Transport

AT is financially responsible for Auckland's land transport network and services (excluding state highways), including roads, footpaths, cycling, parking and public transport services. AT is a Council Controlled Organisation under the Local Government (Auckland Council) Act 2009 (LGACA), 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 LGACA. The functions include managing and controlling the Auckland transport system in accordance with the LGACA, 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 LGACA, AT is deemed to be approved as a requiring authority 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"*. Subsequently, AT may designate land to construct, operate and maintain roads and any other activities in relation to the Auckland transport system that Council has financial responsibility for.

4 Supporting Growth Programme

4.1 Programme context

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.

The significant growth anticipated will pose a number of future transport challenges for the region. Given the scale and duration of the growth proposed, the early route protection of critical transport corridors provides the required certainty for AT, Waka Kotahi, stakeholders and the community. 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 as it develops Structure Plans and works towards progressing subsequent plan changes to rezone land in the future urban areas.

The required transport networks 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 early protection of these strategic transport corridors will provide for the following outcomes at a Programme-wide level. Section 4.2 sets out the FULSS anticipated development readiness and the DBC transport modelling for the North West that identifies the anticipated build out of the network.

4.2 Land use and transport staging

The North West growth areas are approximately 30 kilometres north west of Auckland's central city. It makes a significant contribution to the future growth of Auckland's population by providing for approximately 42,355 new dwellings and employment activities that will contribute 13,000 new jobs across the North West. The growth areas are as follows:

- Kumeū-Huapai
- Whenuapai
- Redhills and Redhills North
- Riverhead

Staging was based on the FULSS and tested in the DBC modelling to confirm assumptions based on growth need and related projects delivery. Table 4-1 dates show the predictions of when areas will be development ready. DBC staging is specific to the North West area and accounted for:

- Other strategic network projects (outside scope of Te Tupu Ngātahi) including implementation of the NW Rapid Transit Network (RTN) from the CBD to Westgate, connecting at a future Brigham Creek station. Squadron Drive interchange west facing ramps; SH16 / State Highway 18 (SH18) Connections Project and SH18 RTN from Westgate to Constellation
- Transport demand using the regional transport model (the Macro Strategic Model (MSM)), as well as the Strategic Active Modes Model (SAMM) used for the assessment of the active modes demands and SATURN based traffic models (using MSM outputs)

Table 4-1: NW Strategic Package modelled growth and staging

Transport Project	FULSS Staging	DBC Model Staging
Highway Connections		
Alternative State Highway	2028-32 – 1st Half, Decade 2 Aligns planned growth in Kumeū-Huapai	2033-37 Implementation follows assumed SH16 / SH18 Connections (2028-32)
SH16 Main Road	2028-32 – 1st Half, Decade 2 Aligns planned growth in Kumeū-Huapai	2033-37 Aligns with RTC – assumes delayed growth in Kumeū – Huapai
Rapid Transit		
Rapid Transit Corridor	2028-32 – 1st Half, Decade 2 Aligns planned growth in Kumeū-Huapai	2033-37 Follows assumed NW RTN Full Implementation in 2028-32
Kumeū Station		
Huapai Station		
Local Roding		
Access Road	2028-32 – 1st Half, Decade 2 Aligns planned growth in Kumeū-Huapai	2033-37 Align with ASH and RTC – assumes delayed growth in Kumeū-Huapai

The DBC modelling shows that the extended and / or upgraded transport corridors are expected to be required later than anticipated under the FULSS. Table 4-1 notes the reasons or assumptions behind the change in timeframes.

In practice, the development rate will be influenced by market attractiveness, the owner / developer willingness to develop and underlying, 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 discussed in Section 5.

4.3 Sustainable outcomes

Sustainability is an overarching principle of the Te Tupu Ngātahi Programme. This reflects the core principles of the Government Policy Statement (GPS) on Land Transport 2021 to ensure the land transport system is both economically and environmentally sustainable.

4.3.1 Assessment approach to support sustainable outcomes

For the NW Strategic Package, sustainability has been considered in the course of assessing alternative options and throughout the business case process. The alternatives assessment process for each transport corridor has included evaluation of each proposed designation option against:

- The key investment objectives to support sustainable outcomes:
 - **Transport and land use integration** – providing a transport network to support land use development and good urban form

- **Prioritising mode choice** – specifically focusing on rapid transit, improved public transport reliability and services and creation of a well-connected walking and cycling network.
- The key aspects of the four ‘Wellbeings’ (cultural, social, environmental and economic) as they relate to sustainability and climate change:
 - **Cultural** – Extent and effects on sites and places of cultural heritage value to manawhenua and built heritage
 - **Environmental** – Providing a transport system that supports mode shift, limits impacts on our key natural assets such as wetlands and ecological habitats and is responsive to flooding impacts
 - **Social** – Transport has a key role in improving people’s wellbeing and the liveability of places
 - **Economic** – Access to jobs and businesses and enabling growth. At the regional level this includes network resilience, value for money and prioritisation

The assessment of alternatives has led to the identification of transport corridors which have the capability to actively reduce the future North West growth area’s reliance on private vehicles by providing accessible active mode routes and public transport options that connect people to social and economic activities in the North West.

The full Assessment of Alternatives for each transport corridor and more details of the assessment criteria are set out in Appendix A – Alternatives Assessment.

4.3.2 Additional approaches which support sustainable outcomes and climate change mitigation

In addition to the Alternatives Assessments for each proposed designation, additional factors have informed the development of each transport corridor in order to support sustainable outcomes. These factors include:

- Assessing modal priorities for each transport corridor to understand the corridor’s function. This informed the allocation of corridor space to best support sustainable mobility modes such as bus, walking and cycling.
- Designating corridors to provide a suitable footprint to allow future flexibility at the detailed design stage, to best accommodate sustainable outcomes.
- Focusing on proximity of rapid transit and public transport to population centres and social infrastructure. This is particularly relevant for the identification of the rapid transit station locations.
- Adopting an integrated transport response, which is particularly relevant for the ASH, SH16 and Access Road. The ASH supports heavy vehicle access to future industrial land on Access Road and removes strategic through trips from the Kumeū town centre. This will facilitate the upgrade of SH16 Main Road to provide active mode facilities. The ASH therefore supports the overall reduction in low occupancy vehicles in Kumeū-Huapai, which in turn will support land use development and good urban form.
- Developing a connected cycle network that provides both regional and local cycle links and maximises the ability of people to access public transport or key destinations.

5 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:

- It has been given effect to; or
- 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, or
- 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 an extended lapse period is a method that 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 between 15 and 20 years are required for the network (see Table 5-1).

Table 5-1: Summary of Proposed Lapse Periods for the NW Strategic Package

Notice	Extended and / or upgraded transport corridors	Lapse Period
Highway Connections		
S1	Alternative State Highway	20 years
S2	SH16 Main Road	Not applicable as existing designation 6766 has already been given effect to
Rapid Transit		
S3	Rapid Transit Corridor	20 years
KS	Kumeū Station	20 years
HS	Huapai Station	20 years
Local Roding		
S4	Access Road	20 years

5.1 Rationale of extended lapse date

The rationale for lapse dates consider the modelled land use demands (see Table 4-1) and account for uncertainty of urbanisation and funding timeframes.

In the context of the Projects, 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. As discussed in greater detail below, there is a high degree of uncertainty as to when urbanisation of the future urban zone (FUZ) will occur.

- It supports efficient landuse 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 Authorities 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 the Project construction.
- 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 (the end 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 within the lapse period being sought it is likely that the designation will be implemented 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 Drury Arterials (AT and Waka Kotahi), Southern Links (Waka Kotahi), the Northern Interceptor Wastewater Pipeline (Watercare) and the Hamilton Ring Road (Waikato District Council, Hamilton City Council)
- Setting an unrealistically short 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 Authorities are likely seek to extend the lapse period through the application of section 184 of the RMA.

When considering an extended lapse period, it is appropriate to balance the need for that lapse period against the potential prejudicial or "blighting" effects, the effects of which are considered in Section 23 Social Impact and Section 24 Property and Land Use.

6 Section 171 of the Resource Management Act 1991

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 Requirement. There matters are set out in Table 6-1 below:

Table 6-1: Section 171 RMA matters to consider when allowing a requirement

Matter to consider	Section of the AEE where the matter is primarily addressed
Whether particular regard has been had of any relevant provision of ² : <ul style="list-style-type: none"> • A national policy statement • A New Zealand coastal policy statement • A regional policy statement or proposed regional policy statement • A plan or proposed plan. 	Refer to the policy assessment, AEE Part B Section 28
Whether adequate consideration has been given to alternative sites, routes or methods of undertaking the work if ³ : <ul style="list-style-type: none"> • The requiring authority does not have an interest in the land sufficient for undertaking the work; or • It is likely that the work will have a significant adverse effect on the environment. 	Refer to the Assessment of Alternatives, Appendix A
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 8

For any other matter the territorial authority considers reasonably necessary in order to make a recommendation on the requirement⁵

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

7 Assessment of Alternatives

7.1 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 the requiring authority:

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

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

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

Waka Kotahi and AT do not have sufficient interest in the land required for the Project and as such are required to give adequate consideration to alternatives. Waka Kotahi and AT have considered an appropriately broad range of possible alternative routes and other methods for undertaking the Project. A summary of the assessment of alternatives is provided below. Appendix A of this report sets out the assessment in detail.

7.2 Assessment of alternatives methodology

This section provides an overview of the assessment of alternatives methodology used to develop and assess route options for the North West network and ultimately determine the preferred option(s). This methodology was applied to both the IBC and the DBC processes. In some instances, where specific circumstances required, deviation from the process set out below occurred. Where the process was deviated from, this was identified and described in the relevant sections of the Assessment of Alternatives Report (refer to Appendix A).

The methodology for the assessment of alternatives involved the steps below, as shown in Figure 7-1:

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

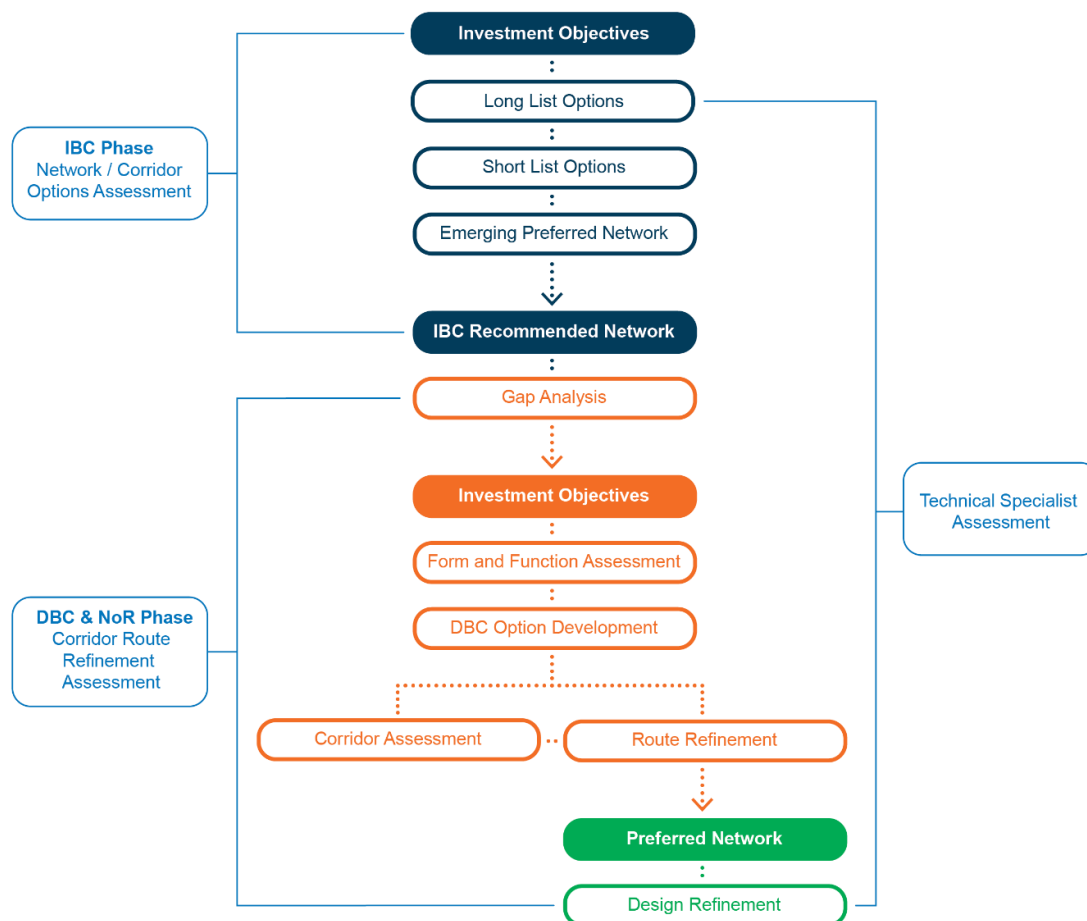


Figure 7-1: Alternatives assessment process

7.3 Consideration of alternative methods

As part of the consideration of alternatives, an evaluation of alternative methods was undertaken. This focused on methods that enabled route protection and future implementation of projects and were considered in light of a number of contextual elements including project importance, urgency, and complexity. An assessment of a range of methods was undertaken, including:

- a) Unitary Plan Overlay
- b) Resource consents
- c) Plan changes and structure planning (initiated or submitted on)
- d) Landowner / developer negotiations
- e) Traditional property acquisition
- f) Covenants; and
- g) Designations (inc. alterations to existing).

Of the identified methods short term designations, legislation / statutory document changes 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 (new or alterations to existing) were 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) A designation provides certainty to all parties including the community and affected landowners
- b) It is a well-recognised and understood tool for route protection which also enables land acquisition processes through the link to the Public Works Act 1981 (PWA)
- c) Maximises flexibility for future implementation
- d) Negates the need for additional land use consents to implement works authorised under the district plan (s9(3) of the RMA)
- e) Will continually provide for future operation and maintenance requirements.

Assessment of each project and method is detailed in Appendix A. Table 7-1 summarises the preferred methods for the transport corridors.

Table 7-1: Preferred methods for the Projects

Ref	Transport Corridor / project	Preferred Method
Highway Connections		
S1	Alternative State Highway	NOR
S2	SH16 Main Road	Alteration to existing Designation 6766
Rapid Transit		
S3	Rapid Transit Corridor	NOR
KS	Kumeū Station	NOR
HS	Huapai Station	NOR
Local Rooding		
S4	Access Road	NOR

7.4 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 of the North West Auckland over the next 30 years, provide certainty to transport authorities, partners, infrastructure providers, the community and investors / developers of the location and form of the strategic 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. 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 s171(1)(b) of the RMA.

8 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. Table 8-1 provides an assessment of whether the work and designation are reasonably necessary for achieving the project objectives.

Table 8-1: Projects reasonably necessary to achieve the Project objectives

NOR	Project Objective	Project achieves objectives by
Highway Connections		
S1: Alternative State Highway	<p>Enable the provision of a transport corridor that:</p> <ol style="list-style-type: none"> Provides for an efficient, reliable and resilient strategic connection for interregional and freight trips between Redhills North and SH16 west of Kumeū-Huapai, as an alternative to SH16 Main Road Supports planned urban growth Supports connectivity within Kumeū-Huapai Supports mode shift on the transport network Supports a safe transport network for all users Supports and integrates with the existing and future strategic transport network in the North West. 	<ul style="list-style-type: none"> Providing a strategic roading connection between SH16 west of Huapai and Redhills North Providing additional capacity to support the planned urban growth Enabling removal of through trips from Kumeū-Huapai, improving access to employment and social opportunities Providing an attractive travel choice for interregional trips and freight Supporting Vision Zero and road safety outcomes Connecting to strategic network at SH16 and Brigham Creek.
S2: SH16 Main Road	<p>Enable the provision of a transport corridor that:</p> <ol style="list-style-type: none"> Supports planned urban growth Supports connectivity within Kumeū-Huapai Contributes to mode shift by providing a choice of transport options Supports a safe transport network for all users Supports and integrates with the existing and future transport network in Kumeū-Huapai. 	<ul style="list-style-type: none"> Enabling an urban standard corridor to support planned growth and trips to / from and within Kumeū-Huapai Providing consistent walking and cycling space along full length and at intersections to support connectivity along SH16 Main Road Supporting Vision Zero and road safety outcomes Integrating with key transport routes at Access Road and Station Road.
Rapid Transit		
S3: Rapid Transit Corridor	<p>Enable the provision of a transport corridor that:</p> <ol style="list-style-type: none"> Provides for an efficient, resilient and reliable rapid transit between Redhills North and Kumeū-Huapai Supports planned urban growth Supports a quality urban form within Kumeū-Huapai 	<ul style="list-style-type: none"> Creating a dedicated transit corridor between Redhills North and Kumeū-Huapai Being located close to planned growth to provide attractive travel alternatives to private vehicles Providing for cycling and walking along full length and at intersections

NOR	Project Objective	Project achieves objectives by
	d) Contributes to mode shift by providing a choice of transport options including rapid transit and active modes e) Supports a safe transport network for all users f) Supports and integrates with the existing and future transport network in the North West.	<ul style="list-style-type: none"> • Supporting Vision Zero and road safety outcomes • Enabling integration with the planned rapid transit network.
KS Kumeū Station	Enable the provision of a transport station that: a) Supports planned urban growth. b) Supports a quality urban form within Kumeū-Huapai c) Contributes to mode shift by improving travel choice, via access to rapid transit d) Supports a safe transport network for all users e) Supports and integrates with the existing and future transport network.	<ul style="list-style-type: none"> • Providing growth areas attractive access to rapid transit network. • Locating to support quality urban form between the station and adjacent land use • Supporting Vision Zero and road safety outcomes • Integrating with existing and planned network at SH16 Main Road.
HS Huapai Station	Enable the provision of a transport station that: a) Supports planned urban growth b) Supports a quality urban form within Kumeū-Huapai c) Contributes to mode shift by improving travel choice, via access to rapid transit d) Supports a safe transport network for all users e) Supports and integrates with the existing and future transport network.	<ul style="list-style-type: none"> • Locating in proximity to planned growth areas in Kumeū • Locating to support quality urban form between the station and adjacent land use • Integrating with transport network at SH16 and Matua Road • Supporting Vision Zero and road safety outcomes • Providing growth areas access to the rapid transit network.
Local Roading		
S4 Access Road Upgrade	Enable the provision of a transport corridor that: a) Provides for an efficient, reliable and resilient rapid transit connection between Redhills North and Kumeū-Huapai b) Supports planned urban growth c) Supports a quality urban form within Kumeū-Huapai d) Contributes to mode shift by providing a choice of transport options e) Supports a safe transport network for all users.	<ul style="list-style-type: none"> • Forming key connection between SH16 and the planned ASH • Supporting access to local employment areas and freight routes. • Providing for active modes along full length and at intersections • Supporting Vision Zero and road safety outcomes.

9 Design and assessment approach

As discussed, in Section 3, it is anticipated that the NW Strategic 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 reflect the long-term implementation of the extended and / or upgraded transport networks within environments that are likely to change significantly. Regional consent applications and Outline Plans of Work will be prepared prior to construction.

9.1 Approach to design

The design of the future North West Transport Network has focused on developing an indicative design of the transport network that is sufficient to inform the proposed designation footprint and to assess an envelope of effects, whilst recognising the need for flexibility required due to the uncertainty of the future urban environment.

The NW Strategic Package alignments are included in the drawing set in Volume 3. These have informed the proposed designation footprint and include ancillary components, such as 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 Council as set out in section 176A of the RMA.

The final design of the NW Strategic Package (including the design and location of ancillary components and 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 NOR includes the following:

- General arrangement plan, including proposed designation boundary
- Typical cross-sections
- Bridge typical cross-section (as relevant).

While the design and effects assessment has focussed on the ultimate form of the transport infrastructure this does not preclude an interim step in the formation of part of the transport corridor to support development. For example, constructing one RTC station (Kumeū or Huapai) ahead of the other, or providing two lanes prior to four on the ASH, preceding the full level of anticipated growth.

9.1.1 Design input and standards

The design philosophy that informed the indicative designs for route protection is summarised in the following sections. Refer to the supporting technical reports (Volume 4) for standards adopted in the design philosophy for the NW Strategic Network, key transport standards included:

- Austroads Guide to Road Design (AGRD)
- Austroads Guide to Traffic Management (AGTM)
- Transport Design Manual (TDM) – AT
- State Highway Geometric Design Manual (SHGDM).

9.1.1.1 Designing the corridor

Geometric Design

The indicative design of the NW Strategic Package corridors were developed in line with a range of geometric design standards such as:

- For all strategic corridors and higher speed roads (over 60km/h) a design speed of 10km/h over posted speed limit was adopted
- Safe sight distances to intersections, approaches and curves were accounted for as per AGRD
- The horizontal alignment was designed to best accommodate each corridor taking into account the existing topography and future land use
- 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 5-6.0% was adopted for the alignments. Where possible, grades have followed the existing ground and are as flat as possible, consistent with the longitudinal drainage requirements
- Generally, unless constrained, 1V:3H slopes have been adopted as the default batter for cut and fill slopes to meet maintenance requirements. 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
- Bridge skew angles are limited to a maximum of 30 degrees relative to the service being crossed
- Given the limited geotechnical information available, retaining walls are detailed as typical. Final wall types will be confirmed during subsequent design phases.

The proposed geometric design for SH16 Main Road (existing over-dimension route) and the ASH has been informed by the function of these corridors, which includes accommodating freight movements and over-dimension or overweight movements. The design of Access Road does not preclude freight movements.

Intersections and road tie-ins

The general approach to 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 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 whilst 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.

Typical Cross-Sections

The cross-section design incorporates AT Urban Street and Road Design Guide, Austroads standards and Vision Zero design features, refer to the Assessment of Transport Effects at (Volume 4) for further detail. Typical cross-sections have been developed for the Projects within the NW Strategic Package which generally incorporate the following elements:

- Berm / shoulder space and duct for utilities
- Protected / separated footpath and separated cycleway
- Narrow traffic lanes and side friction to create ‘self-explaining’ roads that enable an appropriate speed environment
- In high-speed rural areas, barriers to separate the two directions of traffic and prevent cars running into oncoming traffic
- Stormwater management.

Cross sections are provided for each NOR in this report. Final cross-sections will be produced at detailed design and be submitted as part of the relevant Outline Plan(s).

9.1.1.2 Rapid Transit Design Specifications

The RTC and associated stations have been designed to accommodate a bus rapid transit corridor. A bus rapid transit system is designed to provide passengers with a convenient, comfortable and fast ride in a cost-effective manner with a series of stations linked by a roadway. There are no specific busway design standards in New Zealand, however previous project designs (e.g., Northern, Eastern busways) are considered alongside ATs draft technical specifications. Key elements of the RTC that impact the designation and effects assessment are set out below.

Table 9-1: Posted and design speed

Element	Articulated Bus	
Design Vehicle	19 -24m articulated bus	
Non-Urban Busway Speed: The busway facility is expected to be fast and efficient, with limited access and potential conflict with other transport networks, this enables higher speeds to be achieved.		
Posted limit	Design limit	At Station (Design and operating)
80 km/h	90 km/h	50 km/hr

Predicted Passenger Numbers and Vehicles

From Kumeū-Huapai to Brigham Creek Interchange, there is predicted to be 1,300 boarding and alighting passengers in the peak 2-hour period from Kumeū and 2,600 boarding and alighting at Huapai station (refer to ITA, Volume 4). Table 9-2 sets out the predicted AM peak patronage for each RTC station and combined.

Table 9-2: Predicted 2048+ RTC patronage – Weekday AM Peak (2 hours) (ITA, Volume 4)

Station	Boarding	Alighting	Total
Kumeū town centre station	900	400	1,300
Huapai Station – <i>Excluding car access</i>	1,100	350	1,450
Huapai Station – <i>Car access only</i>	1, 250	-	1,250
All stations	3,250	750	4,000

The predicted passenger numbers place the RTC in 'Double Articulated Bus' mode ideal service levels, see Figure 9-1.

Mode	Sub-mode	Indicative configuration	Pax. per vehicle	Absolute Min	Lower ideal	Upper ideal	Absolute max
				4 vph (15 min)	12 vph (5 min)	20 vph (3 min)	30 vph (2 min)
Bus	Standard bus	12.5m rigid triple axle	55	176	528	880	1,320
	Double decker	13.5m double decker	100	320	960	1,600	2,400
	Single Artic	18m single-articulated	105	336	1,008	1,680	2,520
	Double Artic	24m double-articulated	150	480	1,440	2,400	3,600
	Advanced BRT	31m metro style 'trambus'	200	640	1,920	3,200	4,800

Figure 9-1: Functional peak capacity by mode and service frequency @ 80% occupancy (passengers per hour per direction)

Station Design Elements

To inform the designation footprint for each RTC station the key facilities required were identified. The exact arrangement and layout of station facilities will be determined at detailed design. This approach enables the station(s) to respond to later innovations in design, changes in the receiving environment and optimise opportunities to integrate with surrounding land use at the time of construction. See Table 9-3 to Table 9-4 for station design specifications.

Table 9-3: Station Platform Specifications (approximate and indicative)

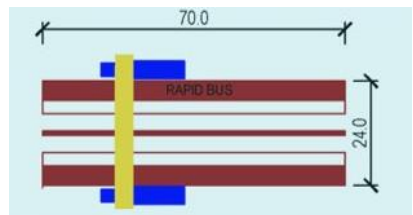
Arrangement	Specifications
	<p>Ground level, fenced.</p> <p>Covered platform:</p> <p>70m (L) x 4.5m (W) (platform only).</p>

Table 9-4: Predicted access and catchment design drivers

Element		Kumeū Station	Huapai Station
Land use served	Immediate catchment	Zoned land north and south of the corridor including town centre, see Table 10-6.	FUZ identified as 'residential and other uses' and local centre in the NW Spatial Strategy. See Table 10-6.
	Wider catchment	Residential in south and north FUZ, identified as 'residential and other uses' in the NW Spatial Strategy.	Will also serve wider rural catchment and users from Waimauku.
Access demand by mode	Private vehicle	<ul style="list-style-type: none"> Kiss and Ride 	<ul style="list-style-type: none"> Kiss and Ride Park and Ride
	Public transport	Local PT services, access from SH16.	Local PT services, access from Meryl Avenue off Matua Road.
	Active modes	Active modes access to north and south, via grade separated crossing	Active modes access to north and south via grade separated crossing of RTC, NAL and Main Road.

Element	Kumeū Station	Huapai Station
	of RTC and North Auckland Line (NAL).	

9.1.2 Detailed design elements

A design exercise for each corridor has been undertaken to support the identification of the proposed designation boundary. Further design work for each corridor is anticipated 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.

9.1.3 Stormwater design and management

The approach has focussed on identifying feasible stormwater treatment methods to inform the required designation footprint (see Table 9-5). This considered AUP:OP and industry standards (such as GD01), the existing stormwater infrastructure, future discharge and diversion, runoff quality, and flood hazard management. Stormwater treatment for each Project will be further developed at detailed design alongside application for any required resource consents. The Flooding Assessment (see Volume 4) provides a description of the stormwater method and preferred locations selected for each NOR.

Table 9-5: Stormwater design and management considerations

Element	Input considerations
Stormwater Quality	The identified designation footprints allow for stormwater quality treatment in accordance with Auckland Council Guideline GD01 for all existing and proposed 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 Strategic Network that is within the FUZ / greenfield environments, where discharging to freshwater streams. Criteria are summarised as follows: <ul style="list-style-type: none"> • Provide retention (flood 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: <ul style="list-style-type: none"> • 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.

Element	Input considerations
Stream Crossings	All existing stream crossings will be maintained through either culverts or bridges. Bridges are identified at selected locations within the indicative design where appropriate to manage environmental effects. However, the final form of stream crossings with consideration to upstream ponding, erosion protection and fish passage will be confirmed at detailed design and resource consent phase.

9.2 Construction methodology

An indicative construction methodology has been developed for the NW Strategic Package and has been used to inform the proposed 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
- Approximate activities durations and indicative construction programme.

This section is structured to address these inputs, as they apply across the NW Strategic Package. Specific commentary on each Project is provided within the relevant project sections.

The construction methodology has been developed to inform the designation boundary. It is based on the design of each project and current land use / landform in which the corridors are located. However, the actual construction detail will be confirmed at the detailed design, and will consider, measures required to mitigate effects, the designation and any resource consents conditions. Importantly, timing of implementation of extended and / or upgraded transport networks will dictate what land development is present along the corridors and will inform the final methodology.

Waka Kotahi and AT seeks flexibility in each NOR's construction methods 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.

9.2.1 Sequencing of main construction activities

The programme assumes a generally staged construction process, starting with site establishment, enabling works, main works and ending with finishing works and demobilisation. Exact staging will be determined at detailed design. Construction sequencing is set out in Figure 9-2:

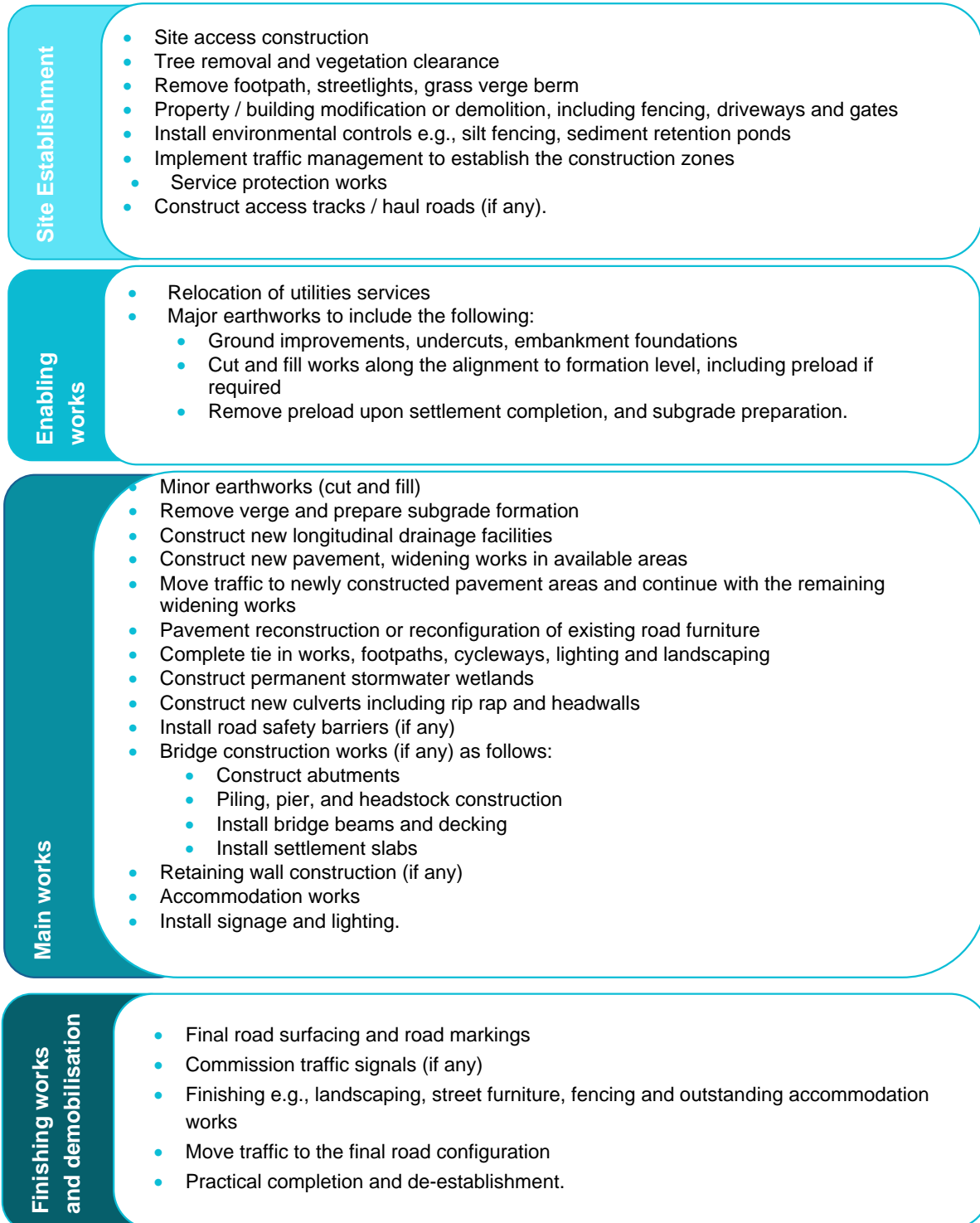


Figure 9-2: Indicative construction sequencing

9.2.2 Identification of land required for construction works

Typical areas required for construction have been identified and applied to the NW Strategic Package. These have informed the extents of the projects and the designation boundaries. The main elements which influence the boundary of the project are set out in Table 9-6, refer to each project's drawings at Volume 3 for the location and application of construction elements.

Table 9-6: Typical construction areas

Construction element	Discussion
<p>Construction of batter slopes:</p> <ul style="list-style-type: none"> Rural Urban 	<p>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.</p>
<p>Bridge construction:</p> <ul style="list-style-type: none"> Abutments Piers Deck 	<p>Generally, the project has enabled either a bridge or culvert to be constructed, with the form to be determined at regional consent / detailed design stage, unless identified in AEE as necessary to address effects on the environment.</p> <p>The bridge construction method shall typically follow conventional bottom-up bridge construction techniques. Once the bridge structure is complete, the temporary staging and accessways can be removed. See Figure 9-3 for typical bridge construction area.</p>
<p>Figure 9-3: Typical new bridge construction area</p>	
<p>Retaining Wall construction:</p> <ul style="list-style-type: none"> Retaining walls up to 5m high (e.g., timber or blockworks) Large retaining walls (e.g., secant pile or sheet pile). 	<p>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 MSE walls to contain fill embankments and piled retaining walls and soil nails to retain cut batters.</p> <p>The specific design will be defined in the future detailed design phase. The working area required to construct the retaining walls will largely depend on the design and size of the wall.</p>
<p>Stormwater treatment construction:</p> <ul style="list-style-type: none"> Ponds Diversion drains / Overland Flow Path Culvert headwalls and scour protection. 	<p>New stormwater drains will likely be required on both sides of the proposed road corridors. These will connect to the new stormwater wetlands. Additionally, new discharge lines are required from the proposed stormwater wetlands to a suitable discharge point.</p> <p>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 the new culvert construction may require flow diversion or over</p>

Construction element	Discussion
	<p>pumping. Further investigations will be required to confirm the flow volumes and ecological requirements for the diversions.</p> <p>Regional consents (including for earthworks and stream works) will be sought in the future before construction commences.</p> <p>Access track 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.</p>
<p>Temporary works:</p> <ul style="list-style-type: none"> • Sediment retention ponds • Haul roads and construction access roads. 	<ul style="list-style-type: none"> • 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, the project has also where possible co-located temporary and permanent ponds, so that at the end of construction the pond can be reinstated as a permanent device. <p>Haul roads are typically required for large earthworks projects for the movement of people, plant and materials along the proposed 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 earthwork's extent to avoid clashes with the permanent works.</p>
<p>Site facilities:</p> <ul style="list-style-type: none"> • Main site compound (project office) • Additional / satellite site compound • Construction yards for laydown / stockpile • Construction yards for intersection works. 	<p>Site compounds and laydown areas are required to support construction along the proposed Project alignments. The proposed compound site locations identified for each Project enable easy access to key construction zones and arterial routes. Example of facilities include:</p> <ul style="list-style-type: none"> • Site offices including lunchrooms and toilet facilities • Services connection (power, water and communications) • Car parking, waste management and refuelling 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. <p>The use of these compounds will only be required during the construction period and the site will be reinstated upon completion of the works if not required for permanent work or maintenance.</p>
<p>Reconnecting property access</p> <ul style="list-style-type: none"> • Service lanes • Access roads / driveways. 	<p>Legal vehicle access will be maintained to all private properties during construction and including reinstatement after works. However, there may be temporary disruptions to access. Where this is proposed, it will be discussed in advance with the affected user / owner.</p> <p>An accessway assessment has been carried out on all legal accesses. As required, accesses are designated 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 proposed designation.</p>

9.2.3 Identification of potential construction impacts

During the construction, environmental controls will be implemented to manage the effects of works on the environment and community. Construction can be expected to require environmental controls for the reason set out below. Effects on the environment and mitigation are discussed in detail in the Supporting Technical Assessments (see Volume 4).

Site Clearance, along the corridor in enabling works will create a change in the existing environment for stakeholders who remain during works (aren't required to move). This will typically include:

- Demolition along the alignment to remove the buildings, structures and existing roads that clash with the proposed project alignment and other areas that require to be cleared within the designation boundary
- Vegetation and tree removal within the construction corridor, including under bridge structures.

This will have impacts on the existing amenity and landscape of the area for users, although temporary. See the Landscape and Visual Effects Assessment at Volume 4 and AEE, Part B Section 20 for detail.

Earthworks, and temporary erosion and sediment release, geotechnical investigations will be required to inform the final design and ratify the assumptions for earthworks slope batters, total earthworks volumes, ground improvements, identifying potential onsite borrow sites or spoil disposal sites. Impacts can be controlled through use of:

- Restricting bulk earthworks to summer months
- Silt fencing around ponds and earthwork batters
- Temporary sediment ponds to contain and treat runoff
- Mulching of exposed earthworks
- Wheel wash station for trucks carting spoil
- Stormwater diversion to minimise overland flows across earthworks areas.

Construction noise and vibration (Construction Noise and Vibration Assessment at Volume 4, and AEE Section 16), can be controlled through use of construction works controls:

- Construction operating hours being between 7am and 6pm, Monday to Saturday
- Extended hours during summer earthworks season (e.g., 6am to 8pm, Monday to Sunday)
- Work is only to be undertaken outside these hours and on public holidays if critical works are required (e.g., road closures for culvert construction and road surfacing)
- Night works shall be limited to critical activities. Noise and vibration impacts shall be assessed and monitored.

Generally, construction noise and vibration will be managed to ensure its compliance with the relevant standards through a Construction Noise and Vibration Management Plan (CNVMP), which will be prepared for each NOR.

Network utility works

The new and / or upgraded transport projects will all require the relocation or realignment of a number of network utilities including gas transmission and distribution, overhead electricity transmission, and telecommunications, some corridors will impact larger regional or national utilities. The types of utilities affected and measures to manage these during construction are set out in AEE, Part B Section 17.

Construction air quality impacts (dust and particulates), can be controlled through use of:

- Water carts to minimise dust during earthworks
- Covered trucks hauling material onto and off site
- Mulching and top soiling of exposed earthworks.

These will be controlled through a Construction Environment Management Plan (CEMP) condition.

Stream works and stormwater

Stormwater will discharge to, and works will be required within existing water ways. Resource consents for diversion and discharge of stormwater and stream works will be sought as part of future resource consent processes.

Culverts will be constructed at the initial phase of construction to ensure surface water flow can be directed through the construction zone without becoming contaminated from the earthwork activities. Works on new culverts may require flow diversion or over pumping. Further investigations will be required during the detailed design and resource consenting phase to confirm the flow volumes and ecological requirements for the diversions. These works and activities will be undertaken in accordance with applicable management and mitigation measures and resource consent conditions.

Construction traffic impacts, construction movements within and outside the site are managed via a temporary Construction Traffic Management Plan (CTMP). The CTMP considers the construction activities and safe integration of the activities on general corridor users during the construction period. The CTMP usually consists of:

- Methods to manage the effects of temporary traffic management activities on traffic
- Measures to ensure the safety of all transport users
- 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
- Size access routes and access points for all construction vehicles, the size and location of parking areas for plant, construction vehicles, and the vehicles of workers and visitors
- Identification of detour routes and other methods to ensure the safe management and maintenance of traffic flows, including pedestrians and cyclists, on existing roads
- Methods to maintain vehicle access to property and / or private roads where practicable, or to provide alternative access arrangements when it will not be
- The management approach to loads on heavy construction vehicles, including covering loads of fine material, the use of wheel-wash facilities at site exit points and the timely removal of any material deposited or spilled on public roads
- Methods that will be undertaken to communicate traffic management measures to affected road users (e.g., residents / public / stakeholders / emergency services)
- Auditing, monitoring and reporting requirements relating to traffic management activities will be undertaken in accordance with relevant Code of Practice for Temporary Traffic Management.

See Transport Assessment at Volume 4 and AEE Part B, Section 14 for details of each Projects potential transport impacts during construction and recommended effects management.

Release or disturbance of hazardous substances can be caused by disturbing a piece of land or be introduced from construction equipment. Potential impacts of this can be managed through use of:

- Asbestos register identifying any locations where asbestos may be present

- Asbestos handling procedures to control demolition, transport and disposal
- Refuelling procedures to ensure no fuel enters waterways and stormwater system
- Emergency response management plan for environmental incidents
- Correct hazardous substance storage systems
- Fill material required will need to be of suitable standard to meet the specified design and free from contaminants. Additional fill material required to complete the earthworks would ideally be sourced from a borrow site within the proposed designation.

It is anticipated some unsuitable excavated material can be placed and compacted as non-structural fill outside of the road alignment and where practicable, to utilise excavated material, soil improvement measures, such as cement or lime stabilisation could be used to improve the soil parameters. Alternatively, cut material will be disposed of at a suitable tip site.

The effects on the environment from construction activities are able to be managed through a CEMP. This CEMP will be developed at detailed design and consent stage to address environmental effects specific to the construction of each Project and site. The works and activities will also be undertaken in accordance with future National Environmental Standards and regional resource consent conditions (if required).

9.2.4 Approximate activities duration and construction programme

Table 9-7 sets out each Projects expected construction timing and duration. As stated at Section 9.2.1, the projects are expected to be constructed in a generally staged method, with exact staging approach to be confirmed at detailed design and Outline Plan stage.

Table 9-7: Project construction timing and expected duration of programme

Notice	Project	Approximate timing of construction	Approximate duration of construction
Highway Connections			
NOR S1	Alternative State Highway	2033-37	4-5 years
NOR S2	SH16 Main Road	2033-37	4 years
Rapid Transit			
NOR S3	Rapid Transit Corridor	2033-37	5 years
NOR KS	Kumeū Station		
NOR HS	Huapai Station		
Local Roading			
NOR S4	Access Road	2033-37	2-3 years

The construction of the Projects will be undertaken within a management plan framework (see AEE, Part B Section 26) and will be consistent with the conditions of each of the proposed designations or alteration to designation. If at the time of delivery, contractors are required to undertake activities that are not within the scope of the proposed designations (or future resource consents), additional authorisations may need to be obtained.

9.3 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. Under section 181(2), those same matters are to be considered ‘with all necessary modifications’, in relation to a notice of requirement for an alteration as if it were a notice of requirement for a new designation. The NW Strategic Package includes one alteration to an existing designation, being NOR S2 SH16 Main Road (Designation 6766) by Waka Kotahi. The remainder are new notices.

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 proposed designations and alterations. Where NES or regional plan consenting requirements are triggered, these are not authorised and will require future resource consents.

Notwithstanding this, relevant national and regional consenting matters have been considered in the alternatives assessment, each Project’s design and the resulting designation footprints. Consents will be sought when detailed design for each Project is completed to confirm exact consent requirements, understand the actual or potential effects of activities that require consent and define the measures proposed to manage those adverse effects.

9.4 Approach to assessing the likely receiving environment

As set out in Section 4, the NORs seek to protect the future transport network necessary to support the planned urbanisation in the North West. Accordingly, it is anticipated that the network will not be constructed and operational until urbanisation of the North West growth areas has been confirmed or commenced. Table 9-7 in Section 9.2.4 sets out the expected construction date and duration for each NOR, however construction may occur sooner or later than this date.

Due to the time period between designation and construction, assessing the effects on the environment solely as it exists today (i.e., at the time of this assessment) will not provide an accurate reflection of the environment in which construction and operation effects will be experienced.

Within the NW Strategic Package area there are a range of existing and future urban zoning patterns, which influence the likely future environment for assessment purposes. Project areas with existing urban zoning or rural zoning that is not identified for future urban growth are not likely to materially change in the future (e.g., rural zoned sections of the ASH and the RTC alignment). Areas that are recently live zoned, up-zoned or FUZ and are currently rural, or peri-urban are likely to experience material change as a result of urbanisation, enabled or anticipated by planning provisions (e.g., Kumeū-Huapai areas).

Table 9-8 sets our understanding of the current land use zoning, its likelihood of change and its potential future environment.

Table 9-8: Land use likelihood of change based on current and potential future zoning

Land use today	Zoning	Likelihood of Change for the environment ⁶	Likely Future Environment ⁷
Residential	Residential	Low	Urban
Business	Business	Low	Urban
Open Space	Open Space	Low	Open Space
Special Purpose	Special Purpose Zone	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 Projects are within FUZ, it is likely the construction of the transport project 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 corridor are likely to occur, it is important to consider the likely future environment for specific Project areas. The likely future environment of the FUZ during the operation of the transport corridors has, therefore, been assessed as an urban or a developing urban environment albeit without a confirmed urban land use pattern or form. A description of the zoning outcomes anticipated is set out in Table 9-9 below.

Where the NW Strategic Package runs through rural zones outside the Rural Urban Boundary (RUB), these are anticipated to have a low level of change from the existing environment and are not included in Table 9-9.

Table 9-9: AUP:OP Zoning Potential Urban Form

Zone	Anticipated Outcomes	Urban Form Visualisation
Residential Single House Zone	<p>Maintain and enhance the amenity values of established residential neighbourhoods.</p> <p>Multi-unit development is not anticipated and limited to the conversion of existing dwellings into two dwellings and minor dwelling units.</p> <p>The zone is generally characterised by one to two storey buildings with a suburban character.</p>	

⁶ Based on AUP:OP zoning/policy direction

⁷ Based on AUP:OP zoning/policy direction

Zone	Anticipated Outcomes	Urban Form Visualisation
Residential – Mixed Housing Suburban	Development is typically two storey detached and attached housing in a variety of types and sizes.	
Residential – Terraced Housing and Apartment Building	Provides for urban residential living in the form of terrace housing and apartments. Buildings are enabled up to five, six or seven storeys.	
Business – Local Centre Zone	Provides for local convenience of residential areas providing local retail, commercial offices food and beverage. Provisions typically enable up to four storeys with residential use at upper floors.	

Zone	Anticipated Outcomes	Urban Form Visualisation
<p>Business – Mixed Use Zone</p>	<p>Provides for residential activity as well as smaller scale commercial, is expected to be designed to enhance street quality and public open space.</p> <p>Provisions typically enable heights up to four storeys. Greater height may be enabled in areas close to the city centre, metropolitan centres and larger town centres.</p>	
<p>Business – Light Industry</p>	<p>Anticipates industrial activities that do not generate objectionable odour, dust or noise. This includes manufacturing, production, logistics, storage, transport and distribution activities.</p>	

9.4.1 Spatial strategies

Where relevant, the urban land use patterns outlined in AC’s Strategic Land Use Framework for Kumeū-Huapai, Riverhead, and Redhills North (**NW Spatial Strategy**) has been considered. It is however important to note that it is not a structure plan and is a high-level outline of future land uses.

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 and apply associated controls to development which may adversely affect those features. The overlays and protective rules provide useful guidance on areas that are likely to remain in the future urban environment.

Section 10.1 sets out the receiving environment for the area generally and Section 10.2- 10.5 for each NOR within the NW Strategic Package. Each specialist has also set out the methodology for assessing effects and approach in their subject area, see Volume 4 (Supporting Technical Documents) and this is summarised in the relevant effects section of the AEE, Part B.

9.5 North West transport projects interface

There are several transport projects being developed separately in the North West which will integrate with or affect the proposed NW Strategic Package. These projects combined with the NW Local Arterials (separate Te Tupu Ngātahi application) and NW Strategic Package form the complete transport response for the North West. Given the long-term delivery of the projects, the assessments

consider the operational impacts in the context of full build out of urban areas at 2048+⁸, accounting for wider infrastructure upgrades anticipated to be progressed by others.

Table 9-10 summarises these additional projects and demonstrate how their delivery (or not) will affect the NW Strategic Package. Figure 9-4 shows the indicative location of the projects.

Table 9-10: Other North West Transport Projects

Project	Integration with NW Strategic Network	Status and agent
<p>North West RTC full implementation</p> <p>Short Term – Northwestern Bus Improvements City Centre to Westgate</p> <ul style="list-style-type: none"> • Medium Term – Northwestern bus improvements • City Centre to Brigham Creek NW RTC full implementation (longer term). <p>Expected outcomes:</p> <ul style="list-style-type: none"> • Transformational mode shift to connect North West to the City Centre and North Shore through provision of rapid transit. 	<p>North West Busway improvements has an interim (short-term) solution, which includes bus stations as Lincoln Road, Te Atatū and Westgate using shoulders on SH16.</p> <p>This will be later upgraded to a segregated RTC for the North West from the City Centre to Brigham Creek, with interchanges at Brigham Creek Road, Westgate and Te Atatū / Lincoln Road.</p> <p>NOR S3 extends the NW RTC infrastructure to connect to the growth in Kumeū-Huapai. This will significantly improve connectivity between Kumeū-Huapai, the City Centre and sub destinations.</p> <p>The Station NORs enable access to NOR S3 and the NW RTC full implementation as outlined above.</p>	<p>Indicative Business Case</p> <p>Waka Kotahi</p>
<p>SH16 Safety Improvement Programme</p> <p>Stage 1 (Huapai to Waimauku), not interfacing.</p> <p>Stage 2 (Brigham Creek to Kumeū)</p> <p>Expected outcomes:</p> <ul style="list-style-type: none"> • Additional capacity (two new lanes) between Brigham Creek Road and Taupaki Road • New shared path between two areas • Safety improvements for drivers (barriers, medians) and roundabout at SH16 / Coatesville-Riverhead Highway intersection. 	<p>The SH16 Brigham Creek to Waimauku project provides an interim solution on SH16 and the NW Strategic Package provides a long-term solution with the provision of the ASH and RTC.</p>	<p>Detailed Design</p> <p>Works planned to commence 2024</p> <p>Waka Kotahi</p>
<p>SH16 / 18 Connection's project.</p> <p>Expected outcomes:</p>	<p>Strategic Network (NOR S1 and S2) provides long term improvements for the Brigham Creek interchange to provide reliable movement through the</p>	<p>Investigation stage</p> <p>Delivery date TBC</p>

⁸ Refer to Transport Assessment, Volume 4 for further details on staging and build out assumptions.

Project	Integration with NW Strategic Network	Status and agent
<ul style="list-style-type: none"> • Direct connections from SH16 to SH18 to remove strategic trips from Brigham Creek Road and increase access for Whenuapai • New Northside Drive city facing ramps to provide a new SH16 connection for Redhill's North and Whenuapai • Interim improvements to Brigham Creek Interchange. 	interchange for all modes and will connect the ASH to SH16 and SH18, via SH16.	Waka Kotahi
<p>Park and Ride – Huapai Reserve</p> <p>Expected outcomes:</p> <ul style="list-style-type: none"> • Bus Park-and-Ride for local bus services within Huapai and Kumeū. 	<p>This Park and Ride will no longer be required once the Huapai RTC station is constructed. The RTC will provide park-and-ride at the Huapai Station for convenient access to the RTN replacing the need for the Park and Ride proposed within Huapai Reserve.</p> <p>Local bus services are expected to service and connect the wider catchment to the RTN station.</p>	<p>Investigation Stage</p> <p>Delivery Date: TBC</p> <p>Rodney Local Board (through AT)</p>
<p>Huapai Triangle Improvements</p> <p>The Huapai Improvements projects consists of two projects, Access Road and Station Road.</p> <ul style="list-style-type: none"> • Re-alignment of Station Road further west and signalisation of the intersection with SH16 • Access Road level crossing upgrade including a 10m exit lane from Access Road. <p>Expected outcomes:</p> <ul style="list-style-type: none"> • The upgrades will allow for the increased traffic, and to provide better safety for drivers and pedestrians. 	<p>The works interface with NOR S2 Main Road, includes connections at Access Road and Station Road. NOR S3 RTC and S4 Access Road also interface with the works. These projects are important infrastructure upgrades to allow for the future growth with the nearby Special Housing Area being constructed.</p> <p>Compared to the Huapai Improvements upgrade of Station Road, NOR S2 SH16 Main Road and NOR S3 RTC provide a future and long-term solution which forms a direct connection between Station Road and Tapu Road. The NORs respond to the future network by bridging both the RTC and the NAL.</p>	<p>Stage: Construction</p> <p>AT</p>
<p>North West Local Arterials</p> <p>Expected outcomes:</p> <ul style="list-style-type: none"> • Upgrades and extensions to key routes in Whenuapai, Riverhead and Redhill's to include walking and cycling and additional PT RTN routes. 	The Local Arterial routes which interface with the NW Strategic Package are Brigham Creek Road and Fred Taylor Drive.	<p>NOR stage</p> <p>Delivery Date: Various out to circa 2040</p> <p>AT</p>

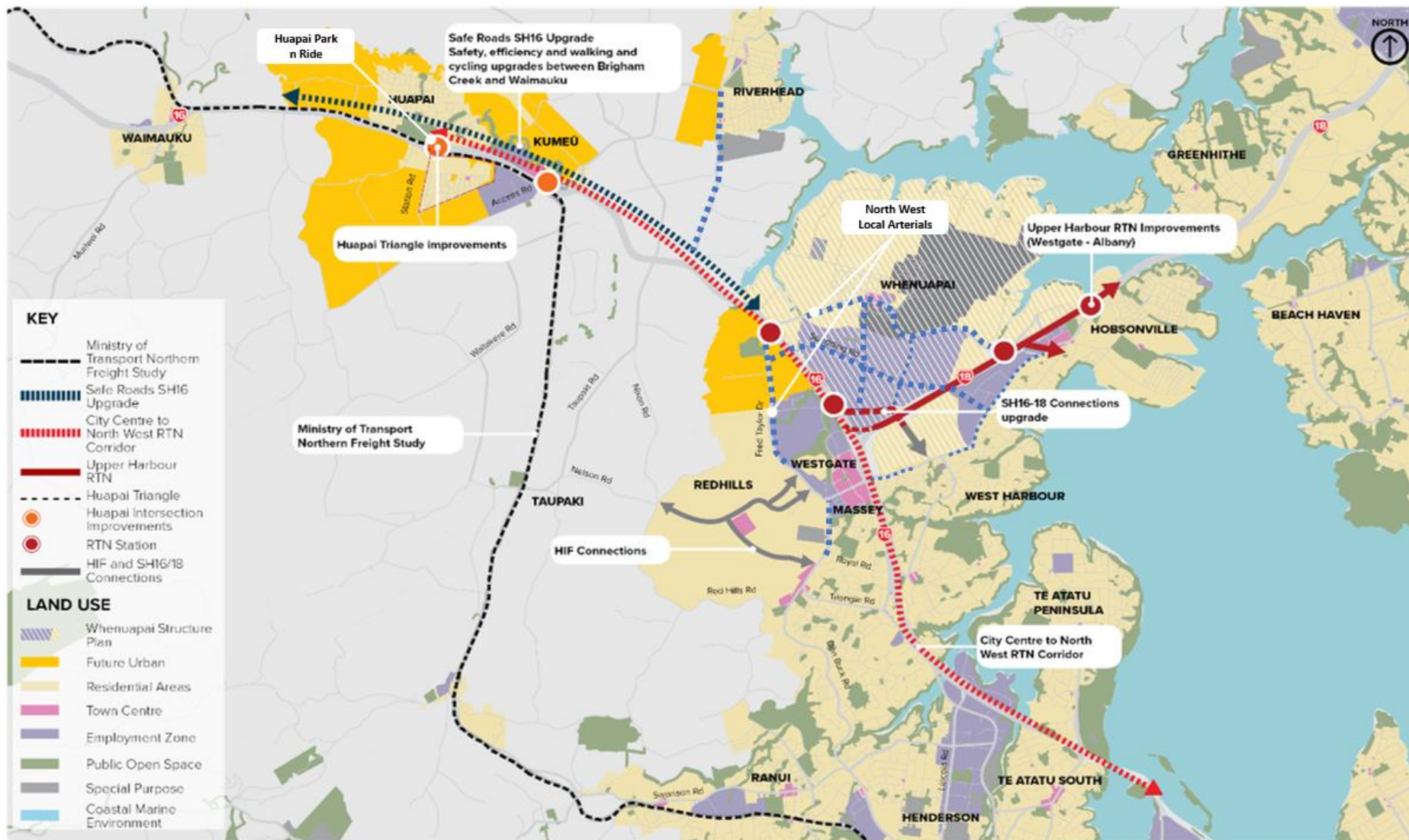


Figure 9-4: North West Strategic – Interfacing projects (various delivery timeframes, indicative for context)

10 Strategic Context and NOR Receiving Environment

Section 10.1 sets out the overall receiving environment elements common across the NW Strategic Package. Each project is then discussed specifically in Sections 10.2 to Section 10.5. For a detailed discussion of each discipline, refer to the Supporting Technical Documents, Volume 4.

10.1 Overall planning context

The NW Strategic Package comprises five new NORs and one alteration to an existing Designation at SH16 Main Road. The projects are located within the Kumeū-Huapai area and / or connect at Brigham Creek. The Kumeū-Huapai urban area is located along the NAL and SH16 Main Road which is the key arterial linking to centres in the south. The Kumeū-Huapai urban form extends north and south to the RUB, which is demarcated by the Kumeū River in the north and Access / Tawa Road and Puke Road respectively in the south.

Table 10-1 sets out the anticipated dwelling capacity for Riverhead and Kumeū-Huapai identified in the in the FULSS. Kumeū-Huapai will also provide land for business and an expanded centre as signalled by the NW Spatial Strategy. The anticipated development readiness of the area is identified through proposed staging of the area, from existing live zones (2012-2017) through Decade Two (2028-2032). Noting that modelling has indicated later build outs than anticipated under the FULSS (see Section 3). The population of Kumeū-Huapai is predicted to grow from 3,400⁹ (2018) to over 21,500 by 2048¹⁰, which is an approximately 500% increase.

Table 10-1: Kumeū-Huapai (and Riverhead) urban capacity under the FULSS

Area	Anticipated dwelling capacity (approx.)	Area (in ha)
Kumeū-Huapai (live zoned) ready by 2012-2017	1,400 dwellings	81
Kumeū Huapai Riverhead (ready by 2028-2032)	6,600 dwellings	992

10.1.1 Spatial planning

Kumeū-Huapai, Redhills North and Riverhead have not been structure planned yet. The NW Spatial Strategy only outlines centres and business land use and does not identify further residential or community space, as it is high level and not a structure plan. In Kumeū-Huapai it indicates an expanded 'Future Town Centre' near the existing industrial centre, a smaller 'Future Neighbourhood Centre' further west near Meryl Drive. A few smaller 'local centres' are identified, and an expanded industrial area along the edge of the RUB at Access Road. The remainder of the FUZ is unspecified as 'Future Residential and Other Uses' (see Figure 10-1). The land along the SH16 corridor near the centre is already zoned under the AUP:OP for business uses, including Business – Mixed Use and Business – Local Centre, as well as residential (see Figure 10-1).

The Brigham Creek Interchange and RTC in Redhills North is identified as FUZ. There is an existing open space sports park at Fred Taylor Drive (Fred Taylor Park) and a 'local centre' identified. East of SH16, the Whenuapai Structure Plan (Council, 2016) has identified the area as residential, however it

⁹ StatsNZ Tauranga Aotearoa (<https://www.stats.govt.nz/tools/2018-census-place-summaries/Kumeū-huapai>)

¹⁰ Full build out based on the FULSS modelled as per 2048+ modelling scenario using land use scenario i11.5

is still zoned FUZ under the AUP:OP until plan changes are in place (see Figure 10-1). Outside of the RUB and NW Spatial Strategy extent, the area is primarily zoned Rural – Mixed Use, Production Zone and Countryside Living. The RTC and ASH both extend through this rural area.

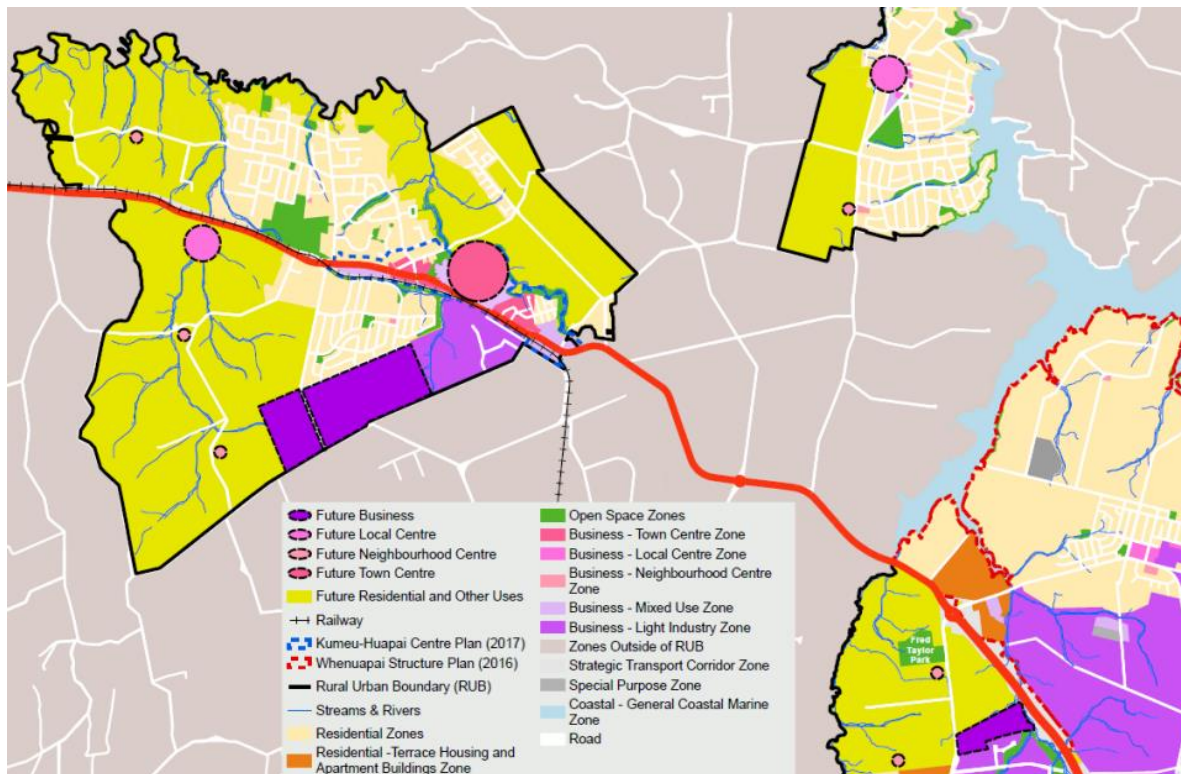


Figure 10-1: NW Spatial Strategy (Auckland Council, 2021)

10.1.2 Plan Changes

Some areas already live zoned, and others have active plan changes, these include notified Plan Changes 69 and 78.

Approved Plan Change 69 (Spedding Block): aligns with the FULSS, which identifies land within Whenuapai as development ready between 2028 and 2032. It seeks to rezone approximately 52 hectares of land at 23-27 & 31 Brigham Creek Road and 13 & 15-19 Spedding Road, Whenuapai from FUZ to Business –Light Industry Zone. The plan change could expedite growth in Whenuapai and advance requirements for delivery of supporting infrastructure if approved and implemented.

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 State Highway 16 and Access Road are proposed to be retain their existing Single House Zone.

10.1.3 Kumeū-Huapai Centre Plan

The Kumeū-Huapai Centre Plan was developed by the local community, Auckland Council and Local Board in 2017 and sets a vision for how the centre will respond to growth over the next 30 years. All of the NW Strategic Projects have a part in realising the vision of the Kumeū-Huapai Centre Plan. Key components identified by the Kumeū-Huapai Centre Plan are changes to town land use, with greater commercial and residential activity in the town centre and industrial land use shifting away from SH16 Main Road, to create a more people-oriented place, see Figure 10-2. The NW Strategic Package will route protect several of the transport priorities identified as required within the Kumeū-Huapai Centre Plan, including:

- **No. 2.10 Rapid Transit:** Investigate opportunities to secure the RTC and stations between Kumeū-Huapai and Westgate. NOR S3 RTC provides for a rapid transit corridor between the centre and Westgate
- **No. 2.11 Park and ride facilities:** NOR HS as part of the RTC Huapai Station provides for a Park and Ride facility
- **No. 2.12 Alternative road corridor to south of town centre:** Investigate and route protect a new road connection south of the Kumeū-Huapai town centre (alternative corridor parallel to SH16). NOR S1 provides for a strategic alternative to SH16, see image at corner of Figure 10-2
- **No. 2.13 Upgrade of Tapu / Station / SH16 intersection:** Design and implement the upgrade and realignment of the SH16 / Tapu Road / Station Road. NOR S2 Main Road realigns this intersection improving safety outcomes
- **No. 2.21 Dedicated cycleways:** Implement long term proposed dedicated cycleway* in the wider Kumeū-Huapai area. All Strategic Projects include provision for safe dedicated cycling facilities that will connect Kumeū-Huapai to the wider North West cycling network.



<p>Anticipated land uses*</p> <ul style="list-style-type: none"> Retail development and residential intensification Short term change from Industry or Residential to Commercial and Residential Residential intensification (limit 2-3 storeys) Long term change from Industry to Commercial and Residential Open Space (existing and consented) <p><small>*based on zones and/or consented development</small></p>	<p>Key</p> <ul style="list-style-type: none"> Railway Private road or consented future road Existing pedestrian bridge Existing pedestrian crossing 	<ul style="list-style-type: none"> Potential Northern Link Road (landowner built) New pedestrian bridge Investigate potential pedestrian crossing Shared Path - Priority Greenway route Long-term Greenways Priority dedicated cycleway Proposed dedicated cycleway Kumeū River floodway 	<ul style="list-style-type: none"> SH 16 safety & capacity improvements Potential gateway features Limit commercial sprawl Investigate rapid transit to Westgate Investigate rail service Rail corridor safety Screen southern industrial area Intersection upgrade Huapai Hub Upgrade and expand arts centre 	<ul style="list-style-type: none"> Review SH16 speed limit Redevelopment of industrial area Interface and connections between town and river Potential esplanade road Enhance Kumeū River Esplanade to acquire Potential community garden Potential civic heart
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Figure 10-2: Kumeū-Huapai Centre Plan (Auckland Council, 2017)

10.1.4 Hydrological and flooding environment

The NW Strategic Package is located across four catchments including Whenuapai and Taupaki, but is primarily within the Kumeū-Huapai catchment with a portion of the ASH and RTC within the Redhills catchment. The Kumeū-Huapai and Taupaki catchment receiving environment is the Kaipara Harbour in the north and for the Redhills catchment the Waitematā Harbour in the east (see Figure 10-3).

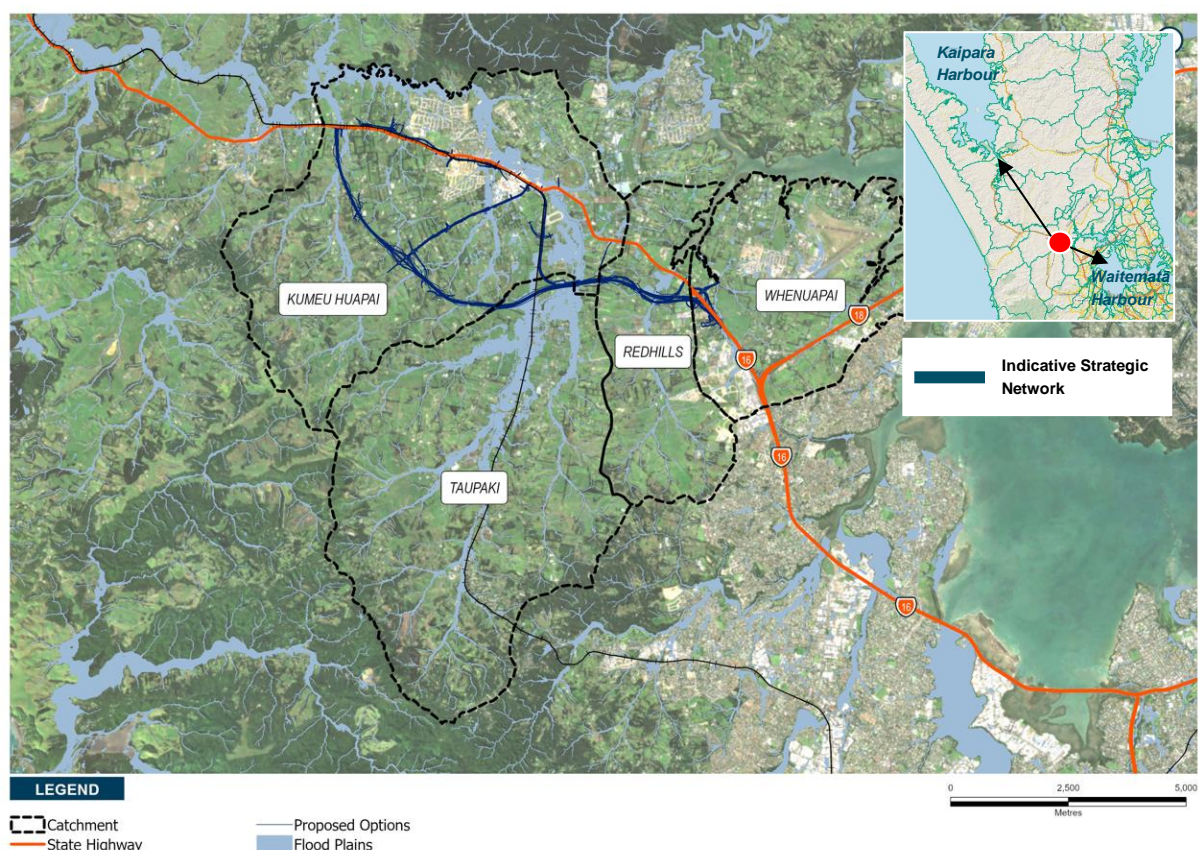


Figure 10-3: NW strategic flooding environment blue shows NW Strategic Network, call out shows two different catchments, being the Kaipara Harbour to the north and Waitematā Harbour in the south. (source: Flooding Assessment, Volume 4)

The North West area was subject to a significant flooding event in August of 2021, where extreme weather caused extensive flooding across west Auckland resulting in civil emergency call outs and closure of SH16 for several hours. The flooding was identified in a 2022 Auckland Council stormwater conference paper as being greater than the 250-year return period, despite the impervious area in the area being less than that enabled under the plan (Auckland Council Stormwater Conference paper, 2022).

Refer to each project section for a description of the hydrological and natural hazard environment and the stormwater provision for each project. Refer to Volume 4 Flooding Assessment for further detail.

10.1.5 Productive soils and geological environment

NOR S1 ASH and part of NOR S3 RTC traverse land outside the RUB. Under the AUP:OP, rural areas are not identified for future urban use and will not experience a high degree of land use change. NOR S2 SH16 Main Road and NOR S4 Access Road are within the RUB and primarily adjacent to urban zone or FUZ, with the exception of the eastern side of NOR S4, which also borders Rural – Countryside Living and Mixed Rural Zone.

The FUZ was identified and confirmed through the AUP:OP hearings process in 2016. FUZ is predominantly greenfield identified for conversion from rural to urban land use. Figure 10-4 identifies at the Auckland region scale, location of productive soils. Class 1 'Elite Soils' are identified south near Pukekohe and the North West is identified as 'Prime Soils' Classes 2 and 3.

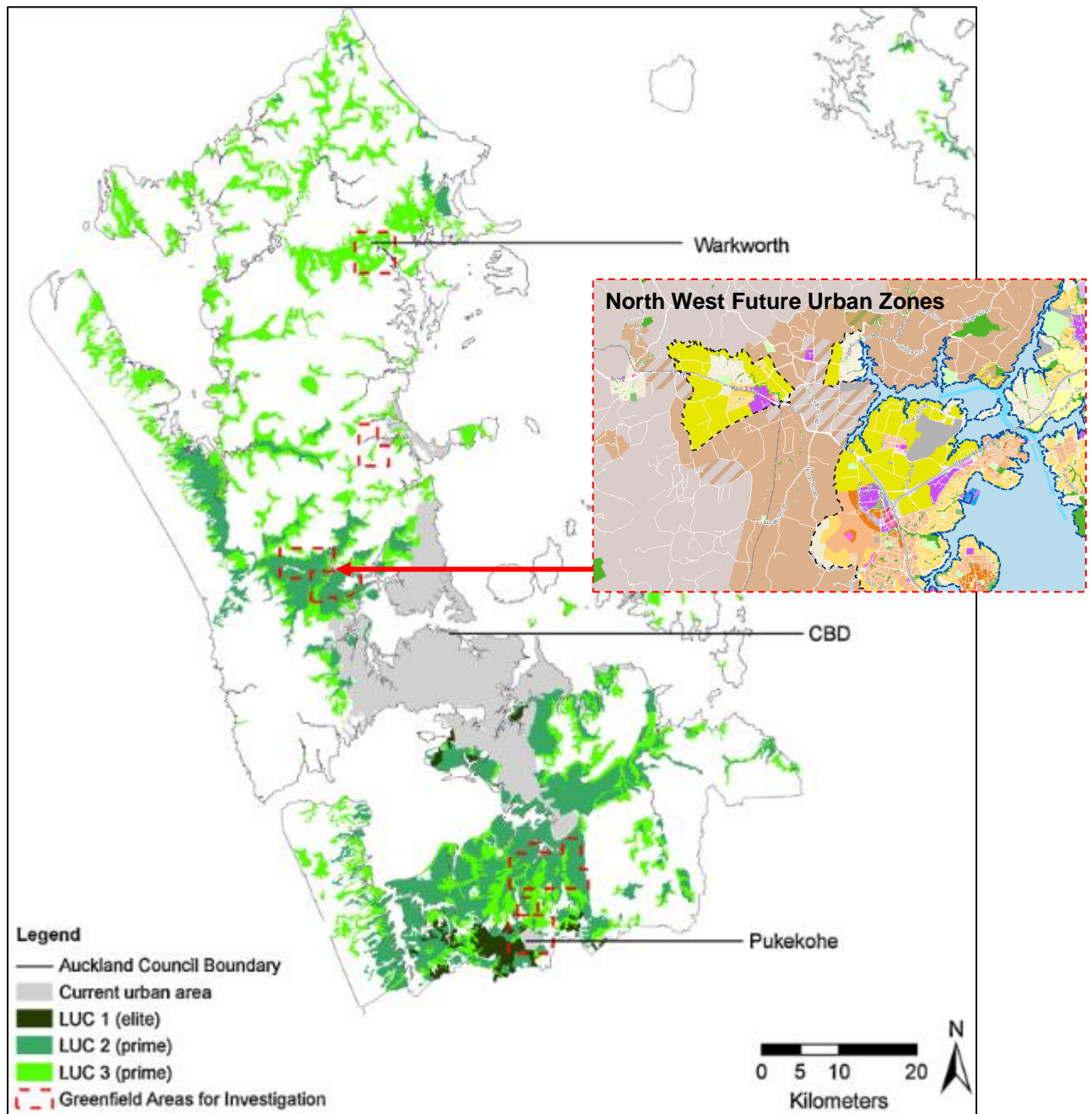


Figure 10-4: Distribution of Land Use Capability Classes 1-3 across Auckland, with North West Future Urban Zone call out (adapted from (Curran-Cournane, Vaughan, Memon, & Fredrickson, 2014)

Soils are natural capital assets and a non-renewable resource, under the AUP:OP the key objective of the Rural Zones are that 'Elite' soils are protected and 'Prime' soils are managed for their production potential, avoiding fragmentation of productive land with rural lifestyle development¹¹. Prime land is

¹¹ Elite land (Class 1) is versatile and have multiple uses, typically flat to undulating with slopes not greater than 7°. Land that is not identified as Elite or Prime is classified as 'Other'. Other land (Classes 4-8) is less versatile and less suitable for intensive primary production uses.

considered very good agricultural and horticultural land with slight to moderate physical limitations¹² to arable use. This classification is based on New Zealand Land Resource Inventory¹³ 1:50,000 maps and may be reclassified to a lower value with field studies.

10.1.5.1 Project alignment through Rural zones

The North West FUZ is non-contiguous, with the urban ‘islands’ of Kumeū-Huapai and Riverhead separated from Whenuapai and Redhills by rural areas (see Figure 10-5). This makes servicing planned growth whilst avoiding rural areas (and associated soil values) impracticable. For a summary of the alignment options considered refer to Assessment of Alternatives, Appendix A.

Although classified as ‘prime soil’ the area which the ASH and RTC cross is primarily zoned Rural Countryside Living, serving ‘rural lifestyle’, rather than ‘rural production’ like the Rural Production or Mixed Rural Zone, where the soils full potential would be protected and utilised.

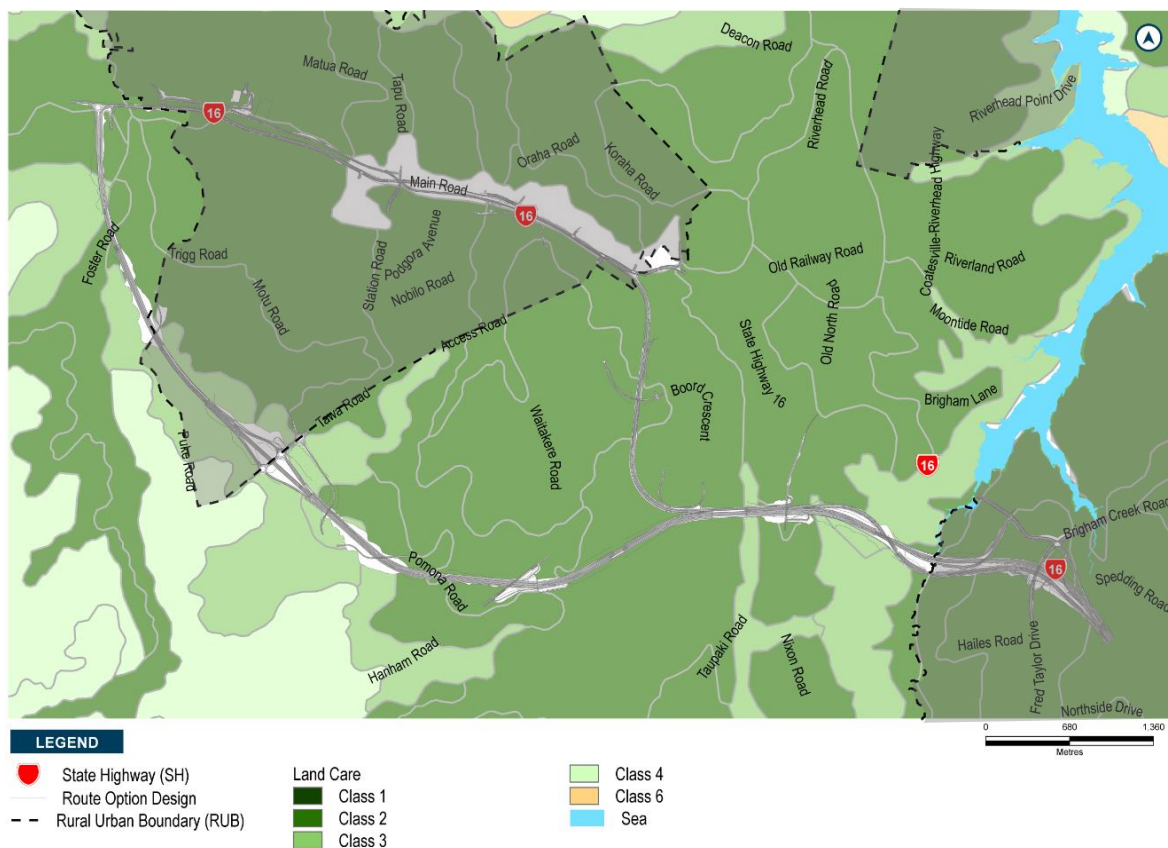


Figure 10-5: Relationship between Future Urban Areas and Rural Zones (AUP(OP), figure shows the rural urban boundary (in black dash), soil classes and the proposed NOR S1 and S3 alignments.

Geologically, the network is within the Waitematā Residual soils at the eastern end (NOR S1 and NOR S3) and the southern extent of the Kumeū-Huapai FUZ (NOR S1), the remainder of the NORs are entirely underlain by Alluvial Soils. The geological conditions are not anticipated to change in future.

¹² Limitations can include slope angle, clay textures, or propensity for remaining wetness after artificial drainage e.g., high-water table in low lying area.

¹³ NZLRI online portal <https://lris.scinfo.org.nz/layer/48076-nzlr-land-use-capability-2021/>

10.1.6 Strategic transport environment

10.1.6.1 Strategic roading and active mode network

The North West is currently serviced by SH16 as the primary north south route which drops from a high-volume 'State Highway' to a 'Primary Collector' classification at Brigham Creek roundabout (see Figure 10-6). The remainder of the routes serving Waimauku, Kumeū-Huapai and Riverhead are lower order high speed rural routes which do not provide efficient alternatives for interregional or intra-regional movement. The North West is currently poorly serviced for active modes, with reliance on shared road space and footpaths. The NW Strategic Package identifies a cycle network that connects to interfacing active mode project networks (see Table 9-10 for detail).

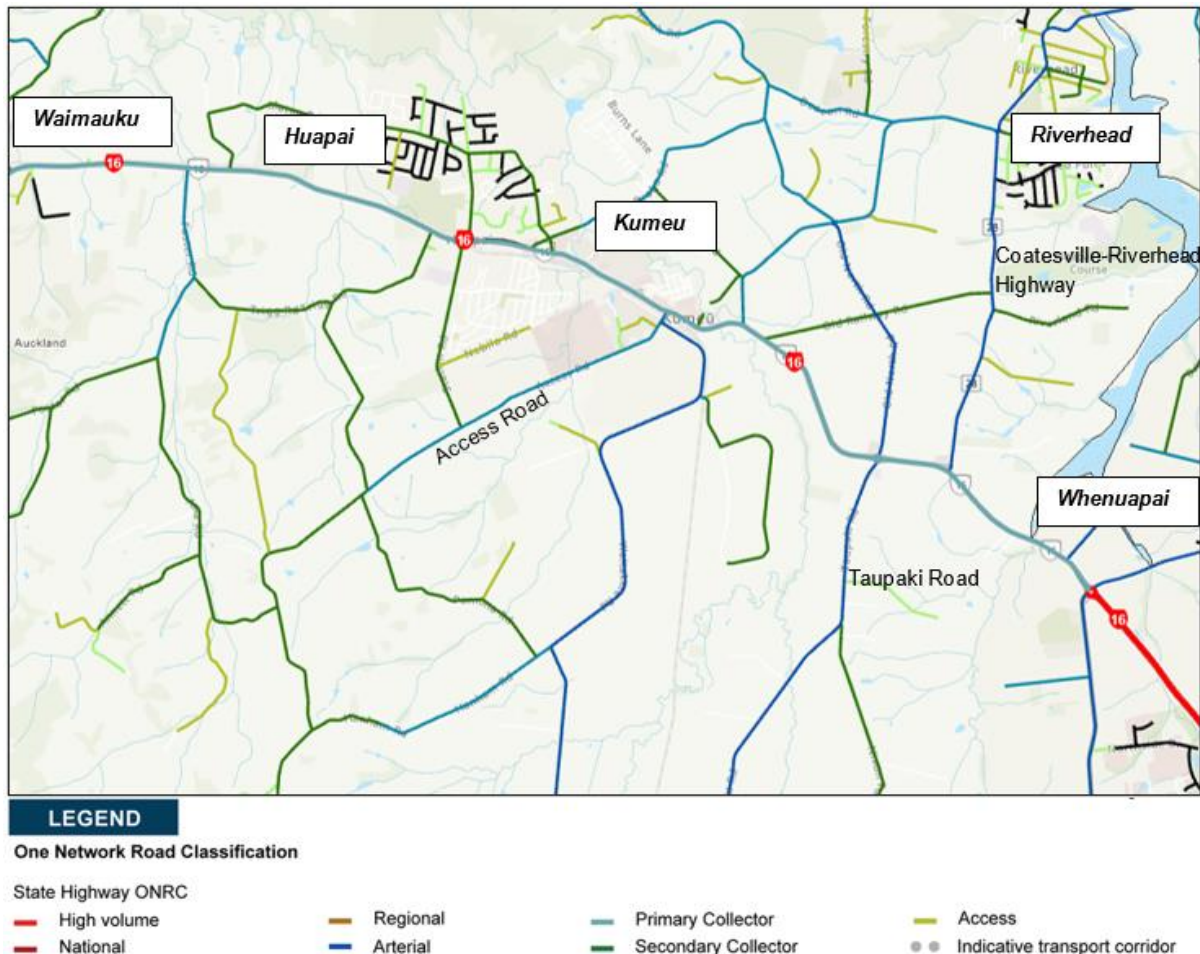


Figure 10-6: Strategic roading network in area, showing the SH16 drop from High Volume at Brigham Creek roundabout to a Primary Collector. There are few alternative routes to SH16 going between urban areas (Source: ONRC GIS, Waka Kotahi).

10.1.6.2 Strategic public transport network

The North West area is not currently serviced by a RTN service and is served by on road buses that utilise SH16, alongside general traffic. The future RTN is a high-level plan proposed by the Auckland Plan 2050 that will provide the highest level of public transport service. The RTN is focused on moving people quickly, safely and reliably throughout the network, usually with a dedicated right of way to achieve this. As part of the NW Strategic Package, NOR S3 RTC will link the North West area into the long-term Auckland RTN. For further detail on the existing PT network see the ITA Volume 4, for RTC project details, see Section 10.4.

10.1.6.3 RTC network interface

The RTC (NOR S3) will ultimately connect into the long-term RTN, via the north western rapid bus network (see Table 9-10). This project includes a rapid transit station near Brigham Creek / Westgate. In the event that the NW RTC is progressed ahead of this project, the RTC (NOR S3) has been designed to enable a connection to the Brigham Creek Interchange at Fred Taylor Drive within the designation footprint.

The northern section of the RTC has a road link from Huapai Station to Matua Road and proposed grade separated road connection to SH16. These features are within in NOR S3 and NOR HS.

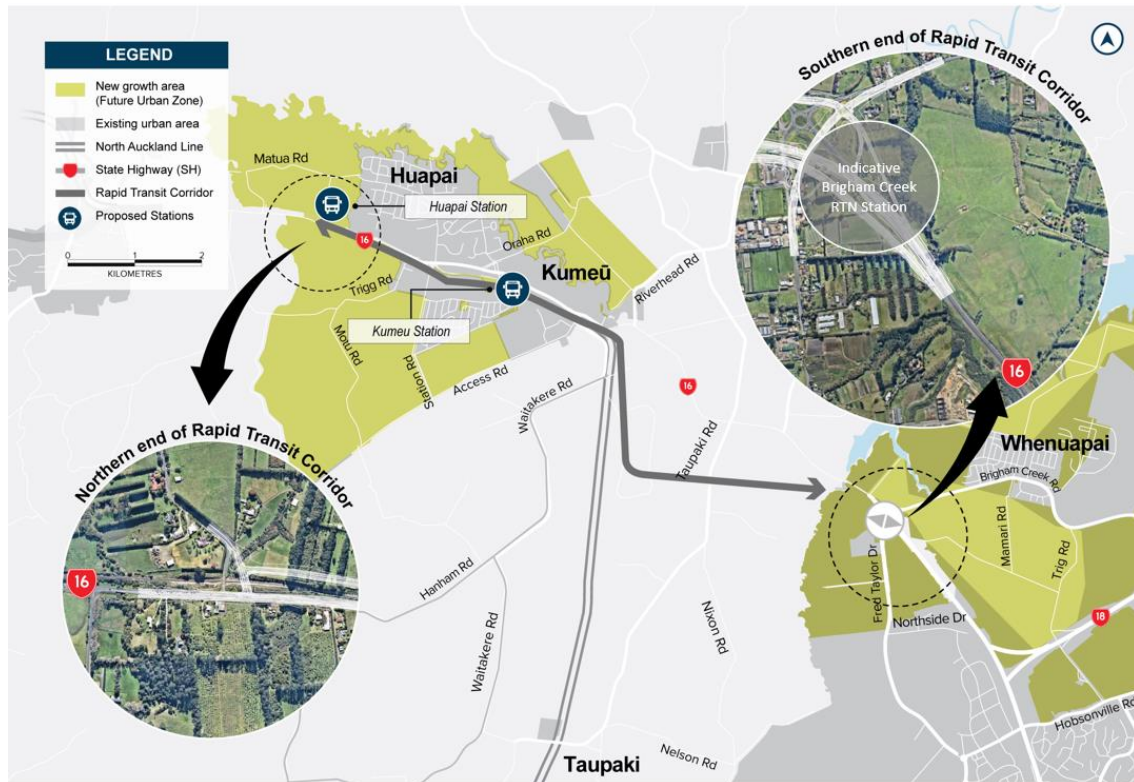


Figure 10-7: RTC connection into existing transport network

10.1.7 Manawhenua cultural values

This section presents our summary of the cultural areas of significance in the project areas of Kumeū-Huapai and Redhills North. These are drawn from the AUP:OP, discussion with manawhenua and the Cultural Impact Assessment (CIA), prepared by Te Kawerau a Maki (see Volume 4).

10.1.7.1 Mapped features

There are no mapped Sites of Significance to Manawhenua identified under the AUP:OP within or in close proximity to the corridors, however the majority of the project area from Nixon Road to east of Foster Road is within a Te Kawerau a Maki statutory acknowledgement area (under Te Kawerau a Maki Act Claims Settlement Act 2015, OTS-106-11). The AUP:OP identified this as applying to the Kumeū River 'te Awa Kumeū' and its tributaries. The area has significant historical and cultural significance to the iwi with historical events and traditions tied to the tributaries. A nearby commercial redress for Te Kawerau in Riverhead forest (outside project). Mapped archaeological sites are concentrated along the coastline.

10.1.7.2 Discussed features

Through engagement, cultural values identified by Manawhenua within the Project area include water and ecological value, particularly for permanent streams and areas of high indigenous value such as Significant Ecological Areas (SEAs). The Te Kawerau a Maki CIA prepared for the project area provides context on the history of the area and particular sites of significance.

Te Kawerau a Maki have retained close associations with the wahi tupuna and wahi tapu around the study area and have a number of statutory acknowledgements across the broader area. The Upper Harbour-Waimauku area as a cultural landscape holds deep meaning and history, due to its place within the landscape and contemporary cultural redress within the study area.

“The character and integrity of the whole is made up of its constituent parts, such as the northern end of Ngā Rou Pou ā Maki to the south, the hillcountry of Riverhead to the north, Te Wai Roa ō Kahu in the east and Te Tōangaroa (Kaipara Portage) that connects it to Te Awa Kumeū, the expansive and fertile alluvial plains of the Kumeū and Kaipara rivers and their tributaries, the many pā and kāinga that fringe the Site corridor, and the wāhi tapu and pūrakau, such as the kaitiaki Tangihua and the peace-making meetings between Te Kawerau ā Maki and Te Tāou, associated with the area spanning the last 1000 years and earlier” (Te Kawerau a Maki CIA, June 2022).

Specific features identified are usually near waterways (awa) in particular Kumeū River, or key ridgelines.

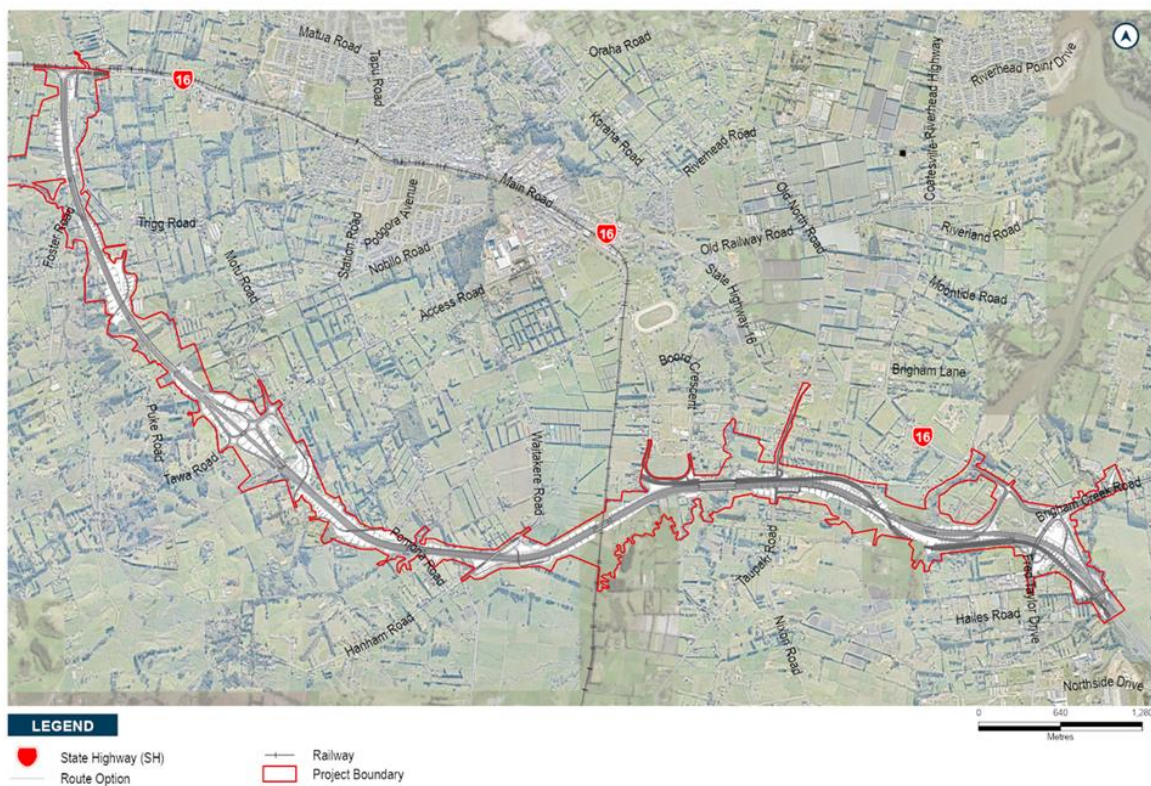
10.2 NOR S1: Alternative State Highway

10.2.1 Project Overview

The ASH will be a four-laned dual carriageway motorway with an approximately 50m wide cross section providing for both vehicles and active modes. Connecting west of the Kumeū-Huapai township (outside the RUB) south, connecting at Access / Tawa Road and re-joining the SH network at Brigham Creek Interchange, Figure 10-8 sets out the ASH alignment.

A new designation will allow sufficient land to construct the ASH, associated interchanges and shared path and realignment of local roads. The NOR footprint shows the envelope proposed to operate and maintain the ASH and all its ancillary components, including construction, stormwater infrastructure, batter slopes, retaining walls and mitigation. For detail refer to drawings at Volume 3.

Figure 10-8: NOR S1 ASH project overview



10.2.2 Alternative State Highway description

The key features of the ASH include:

- The construction of a new four-lane motorway corridor with a cross-section of approximately 50m to accommodate a four-lane dual carriageway and an active mode corridor with side barriers
- An underpass at Taupaki Road and bridges over the NAL with further grade separations at Waitakere Road, Pomona Road, Tawa Road, Puke Road and Foster Road
- The western end of the alignment ties-in at a proposed three-legged roundabout with SH16 Main Road, immediately west of Foster Road
- The re-alignment of the following local roads:
 - Pomona Road, approximately 1.5km (two sections)
 - Motu Road, approximately 200m
 - Puke Road, approximately 500m
 - The Tawa Road interchange, designed to future proof for a full diamond interchange
- Likely posted speed of 100km/h, design speed (of which effects will be assessed on) is 110 km/h
- Stormwater treatment including wetlands and culverts
- Batter slopes to enable the construction of the corridor, and associated cut and fill activities
- Vegetation removal within the proposed corridor
- Other construction related activities required outside the permanent corridor including re-grade of driveways, construction traffic manoeuvring and construction laydown areas
- Ecological mitigation areas.

Key features at the Brigham Creek Interchange (BCR) include:

- Fully grade separated interchange with on and off ramps in a ‘Split-Fork’ type arrangement
 - New ASH: Four lanes (two either direction)
 - Upgraded Fred Taylor Drive: Four lanes (two additional) to tie into separate NOR for Fred Taylor Drive upgrade
 - Upgraded Brigham Creek Road: Four lanes (two additional) to tie into separate NOR for BCR upgrade
 - Upgraded SH16: two lanes, tying into separate project *SH16 Brigham Creek to Waimauku* by WK¹⁴
- Separated walking and cycling paths on all local roads, and shared path.

Figure 10-9 shows the typical ASH corridor cross section, Figure 10-10 shows the indicative cross sections at Boord Crescent. See Figure 10-11 for indicative cross section at Brigham Creek interchange.

Note that the ASH design is compatible with S3 RTC, see Section 10.4. For further design detail refer to drawings at Volume 3.

¹⁴ Refer to Waka Kotahi project website for details, <https://www.nzta.govt.nz/projects/sh16-brigham-creek-and-waimauku/>

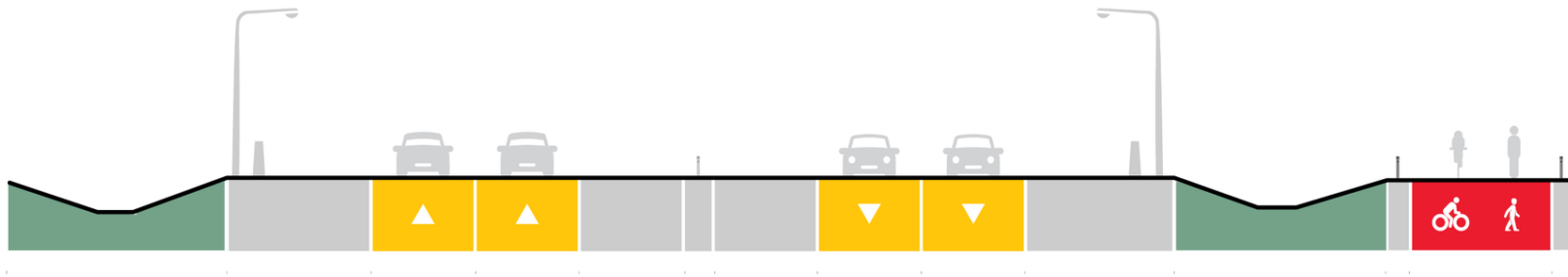


Figure 10-9: NOR S1 ASH, typical 50m cross section

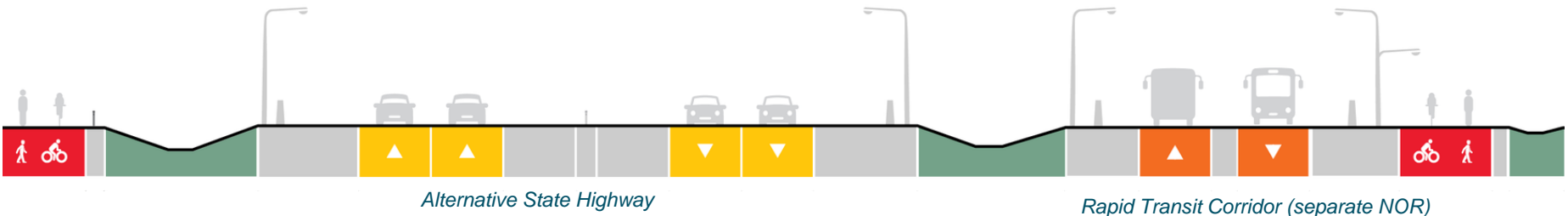
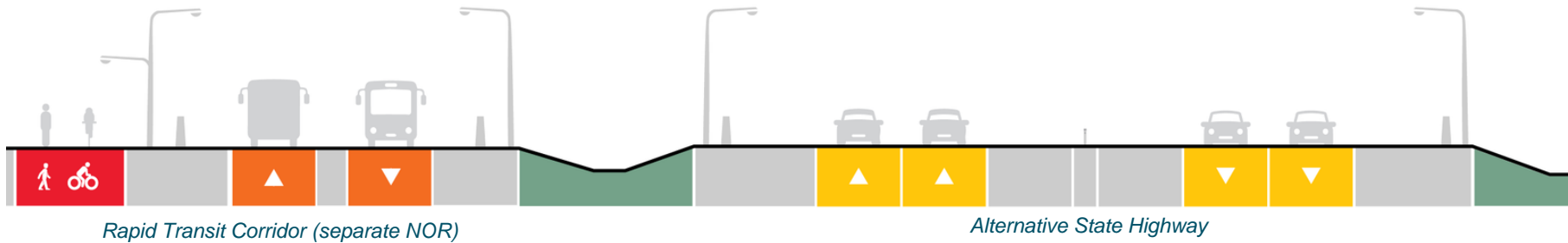


Figure 10-10: NOR S1 ASH, typical cross section at Boord Crescent (showing RTC alongside)

Figure 10-11: NOR S1 ASH typical cross section at Brigham Creek Interchange (showing RTC alongside)



10.2.3 Existing and likely future environment

This section provides a description of the human, physical and natural features of the existing environment, and the likely future environment within which the Project will be constructed, operated, and maintained.

Table 10-2 summarises the range of land use scenarios and planning provisions along the corridor and on land adjacent to the corridor.

Table 10-3 summarises the key physical and natural features, as identified in supporting technical documents (Volume 4). Transport and noise and vibration have not been duplicated here, refer to those relevant supporting technical documents.

Table 10-2: NOR S1 ASH Planning Context

Planning Context	Provision
Land use – Existing AUP:OP zoning	<p>ASH</p> <ul style="list-style-type: none"> • FUZ • Strategic Transport Corridor Zone. <p>Residential: Single House Zone</p> <p>Rural: Mixed Rural Zone, Rural Production Zone, Countryside Living Zone</p> <p>Business: Light Industry Zone</p> <p>Open Space: Informal Recreation Zone, Sport and Active Recreation Zone, Conservation Zone</p>
	<p>Brigham Creek Interchange</p> <ul style="list-style-type: none"> • FUZ • Strategic Transport Corridor Zone. <p>Open Space: Sport and Active Recreation Zone, Conservation Zone</p> <p>No precincts identified in corridor footprint</p> <p>Live zoned areas (such as rural and open space zones) have a low likelihood of land use change compared to the FUZ. The area outside of the RUB is not expected to undergo urban development.</p>
NW Spatial Strategy (Auckland Council)	<p>The ASH lies within the NW Spatial Strategy at Brigham Creek Interchange and the lower portion of Kumeū-Huapai FUZ only.</p> <p>At Brigham Creek Interchange the NW Spatial Strategy identifies an area of residential-Terrace Housing and Apartment Building Zone and ‘other residential’ within the footprint. Within the RUB at Kumeū-Huapai, it comes across the lower portion, it joins via an interchange at Motu Road, a future neighborhood centre is identified in the vicinity.</p> <p>The Kumeū-Huapai FUZ was identified as ‘residential and other uses’ no further land use planning is expected to occur until the area is structure planned and subsequent plan changes sought.</p> <p>See Figure 10-1: NW Spatial Strategy for details.</p>
Whenuapai Structure Plan (Auckland Council)	<p>The Whenuapai Structure Plan (2016) identifies a <i>RTN Station – Park and Ride</i> at the Brigham Creek Interchange. This is part of an interdependent project and is identified approximately in proximity to the proposed RTC (NOR S3).</p>

Planning Context	Provision	
AUP:OP Overlays	<p>ASH</p> <ul style="list-style-type: none"> Significant Ecological Areas Overlay (SEA_T_6674, SEA_T_6674a, SEA_T_2087, SEA_T_2134) High-Use Stream Management Areas Overlay High-Use Aquifer Management Areas Overlay National Grid Corridor Overlay. 	<p>Brigham Creek Interchange</p> <ul style="list-style-type: none"> High-Use Aquifer Management Areas Overlay Notable Trees Overlay – 1808, Totara, Kauri, Rimu, Karaka (on edge of boundary) Aircraft Noise Overlay SEA Overlay (SEA-M2-57b, SEA_T_2034) Aircraft Noise Overlay National Grid Corridor Overlay.
AUP(OP) Controls	<p>ASH</p> <ul style="list-style-type: none"> Arterial Road Macroinvertebrate Community Index (Rural & Urban) Emergency Management Area Control Subdivision Variation Control. 	<p>Brigham Creek Interchange</p> <ul style="list-style-type: none"> Arterial Road Macroinvertebrate Community Index – (Rural & Urban) Coastal Inundation 1 per cent AEP Plus 1m Control – 1m sea level rise Stormwater Management Area Control Flow 1.
Designations – Transport Related	<p>#1433, Road – Fred Taylor Drive Transport Corridor, AT</p> <ul style="list-style-type: none"> This road is subject of a proposed alteration as part of the NW Local Arterials Package. The two projects have been planned to integrate. Waka Kotahi will however require AT's section 177 approval for works in the earlier designation <p>#6300, North Auckland Railway Line from Portage Road, Otahuhu to Ross Road, Topuri, KiwiRail</p> <ul style="list-style-type: none"> Waka Kotahi will be required to obtain written consent from KiwiRail under section 177 of the RMA for works within their designation <p>#6766, State Highway 16 – Hobsonville to Wellsford, Designations, New Zealand Transport Agency</p> <p>#6741, State Highway 16 and State Highway 18 – Westgate to Whenuapai and Hobsonville, New Zealand Transport Agency</p> <p>#6740, State Highway 16 – North end of Fred Taylor Drive to Ngongetepara Stream, Brighams Creek, New Zealand Transport Agency</p> <ul style="list-style-type: none"> Waka Kotahi is also requiring authority for these designations, no written consent is required 	
Non Transport related – Designations	<p>#4311, Airspace Restriction Designations – Defence purposes – protection of approach and departure paths (Whenuapai Air Base), Minister of Defence</p> <ul style="list-style-type: none"> Works do not affect this designation <p>#9100, Taupaki to Kaukapakapa Gas Pipeline, First Gas Limited</p> <p>#9101, Taupaki to Topuni Gas Pipeline, First Gas Limited</p> <p>#6500, Petroleum Pipeline – Rural Section, New Zealand Refining Company Ltd</p>	

Planning Context	Provision
	<ul style="list-style-type: none"> The three designations are generally parallel and interact with the ASH at Foster Road, where they are within the proposed boundaries, but are not directly affected by permanent works, and the intersection with SH16, where they are on the outer edge Waka Kotahi will be required to seek written consent under section 177 from First Gas Limited and NZ Refining Company Ltd, where the works affect the earlier designations.

Table 10-3: NOR S1 Natural and Physical Environment Features

Features	Description
Current land use	<p><i>Existing Environment</i></p> <p><u>Corridor</u></p> <ul style="list-style-type: none"> Corridor will traverse land zoned Rural – Countryside Living, Mixed Rural and some Rural Production Zone From Brigham Creek Roundabout to south of Kumeū-Huapai is undulating rural land that is elevated in the west, high points along the corridor are present at intersections with Tawa Road and Puke Road The corridor also crosses low lands, at floodplains and watercourses. The corridor traverses the Totara Inlet, Totara Creek, Ngongetepara Creek, Karure Stream, Kumeū River (and its branches), Pakinui Stream and the Ahukurama Stream. Several watercourses will be impacted by the proposed road Landscape character is generally modified from the natural vegetation, comprising of hedgerows, trees and shrubs across field boundaries and exotic pasture with agricultural and viticulture present. <p>Where the corridor connects to the existing road network at Brigham Creek roundabout, the area is more built up. The SH16 connection in the north is located outside of the RUB.</p> <p><u>Brigham Creek interchange</u></p> <ul style="list-style-type: none"> Rural agricultural and viticulture land and low-rise large lot residential with a density in keeping with the Rural – Countryside Living Zone character. The Zone provides for rural lifestyle activities, uses include farmlets (hobby farms), horticultural sites, bush areas across mixed site sizes and topography Development comparatively low density at Brigham Creek roundabout which is within the existing motorway network and Strategic Transport Corridor Zone. <p><i>Likely Future Environment</i></p> <ul style="list-style-type: none"> Unlikely to change significantly outside of the RUB with rural areas are expected to retain its existing aesthetic, land use and character. Land will experience change within the FUZ from rural to urban land use The area surrounding the Brigham Creek Interchange is expected to urbanise with higher density residential uses (as identified in the Whenuapai Structure Plan) Where the ASH comes across lower Kumeū FUZ is of comparatively difficult topography and is less likely to be built out than those FUZ areas closer to the township of Kumeū-Huapai. Refer to Section 9.4, Table 9-9 for summary of anticipated urban form In Kumeū-Huapai and Redhills north, the nature of this urbanisation is still undefined, within Whenuapai, land is expected to be urbanised for residential purposes over the next 10-20 years. Physical features of the FUZ will be altered as the landscape is urbanised

Features	Description
	<ul style="list-style-type: none"> Majority of the project area will continue to have a rural function at completion of the project with the abiotic and biotic features generally retained.
Community and recreational facilities	<p><i>Existing Environment</i></p> <ul style="list-style-type: none"> Harrier Rise Vineyard at 744 Waitakere Road, Kumeū. A privately owned winery, providing for local tourism and employment in the area Gracehill Vineyard Estate at 34 Pomona Road, which also operates as a wedding venue Kumeū Riding School at 122 Tawa Road which provides horse riding lessons and activities for the community. <p>The only public community facility is Fred Taylor Park at 184 Fred Taylor Drive. This Council facility provides for organised sports including two general sports fields, and four football fields, with parking and passive recreation areas. The site is also homefield for the Waitakere United Football Club.</p> <p>Facilities in proximity include the Kerr Farm Vineyards a local winery and tourism attraction, as well as Little Wilderness (wedding venue) and Te Awa Equestrian.</p> <p><i>Likely Future Environment</i></p> <ul style="list-style-type: none"> Existing open space areas and recreational activities are expected to remain largely unchanged outside of the RUB. The existing rural activities are likely to remain in some form in the area Additional community facilities will be provided within the FUZ and existing urban areas as development occurs and the population in the surrounding area grows The rural areas are not expected to undergo significant change overall, but new or changes to existing community facilities can be expected.
Watercourses	<p><i>Existing Environment</i></p> <p>Several overland flow paths and six major streams, namely Totara Creek, Ngongetepara Stream, Karure Stream, Kumeū River and Ahukuramu Stream. The existing 100-year ARI flood maps from the latest catchment models with Maximum Probable Development (MPD)¹⁵ and existing terrain show flooding at:</p> <ul style="list-style-type: none"> Totara Creek, Ngongetepara Stream, Kumeū River and some smaller unnamed streams Properties at 32, 40 and 44 Brookvale Lane, Taupaki; and 116 Foster Road, Huapai <p>Existing flood prone areas from Auckland Council Geomaps are evident where overland flow paths and streams traverse the corridor. Flooding is prevalent particularly near Boord Crescent where the stream branches into two tributaries and, east of Taupaki Road where the RTC switches to the north of the ASH.</p> <p><i>Likely Future Environment</i></p> <ul style="list-style-type: none"> Where the alignment goes through the rural zone with limited urban development or impervious surface anticipated, flooding receiving environment is anticipated to remain relatively similar to the existing situation Within the FUZ which the ASH alignment impacts at Tawa Road interchange and BCI, realisation of the FUZ will change the hydrology, terrain, and buildings exposed to flooding. Future developments are anticipated to take account and address flood risk as part of their development as per the AUP rules, not increasing the existing flood hazard environment.

¹⁵ MPD based on zonings as permitted under AUPOP (MPD)

Features	Description
Vegetation and ecology	<p><i>Existing Environment</i></p> <ul style="list-style-type: none"> The existing environment surrounding the Project includes a diversity of habitat values ranging from Negligible to Very High value and native species. Despite no regional consents being sought at this stage, freshwater habitat values have been considered to inform the options and ensure regional consents can be sought in future. <p><u>Habitats</u></p> <ul style="list-style-type: none"> The ASH corridor area is within the Rodney Ecological District, with the Brigham Creek Interchange also within the Tamaki Ecological District. The extent of remaining indigenous vegetation in the project area is significantly reduced from original extents and remains in pockets of indigenous vegetative cover with the wider area largely being under rural (agricultural) land use. Where indigenous habitat remains, these are generally identified as SEAs under the AUP:OP There are two SEAs within the S1 ASH project area, both are located near Brigham Creek: <p>SEA_T_2034, Terrestrial</p> <ul style="list-style-type: none"> This SEA follows the Totara Creek corridor and flows under Brigham Creek Road out to the Upper Waitematā Harbour. North of Brigham Creek Road bridge the same stream alignment is covered under a Marine SEA, noted below SEA_T_2034 is identified due to having Factor #2, which is threat status and rarity, meaning either the habitat, community or ecosystem is assessed as threatened or it supports some biota identified as threatened or at risk. <p>SEA-M2-57b, Marine 2</p> <ul style="list-style-type: none"> 'Herald Island to Lucas Creek' is identified in the AUP:OP as the <i>best example of the muddy, mangrove lined inlets of the inner Waitematā Harbour</i>. The environment is identified as an important habitat for birds and fish especially where it abuts terrestrial vegetation (as it does in this location). <p><u>Freshwater</u></p> <p>The freshwater habitat within the Project area includes 18 streams ranging from Low to High value, 12 stream branches identified as intermittent and six as permanent. Streams were assessed using a combination of field and desktop survey, four were of Moderate value, two High value and the remainder Low.</p> <ul style="list-style-type: none"> Moderate Value Streams (S1-S1a) (S1-S2) (S1-S20a) (S1-S21) High Value Streams (S1-S1b) (W4-S1) <p>A total of 32 natural wetlands (per National Policy Statement for Freshwater Management 2020 definition) were identified within NOR S1, the majority are exotic or planted wetlands. The value of wetlands ranged from Negligible to High value and had a mixture of features and abilities to support native species. Seven moderate value wetlands and seven High value wetlands are directly affected, including four notable <i>Machaerina Sedgeland</i> wetlands identified.</p> <ul style="list-style-type: none"> Moderate Value Wetlands (S1-W4) (S1-W20) (S1-W41)(S1-W44) (S1-W46)(S1-W54)(S1-W69) High Value Wetlands (S1-W6) (S1-W11) (S1-W19) (S1-W21)(S1-W22) (S1-W40)(S1-W53)s <p><u>Species</u></p> <p>Trees in the Project area for NOR S1 were identified as having bat roost potential, this included mature trees throughout, which were largely exotic species. The Automatic Bat Monitors (ABM) survey subsequently confirmed bat activity at survey locations, these areas</p>

Features	Description
	<p>coincide with the Ahukuramu Stream, Ngongetepara Creek, Kumeū stream and Pakinui Stream and associated tributaries.</p> <p>The majority of bird species observed incidentally in the area are common, introduced and naturalised or common native species such as tūī and silvereye. However, pied shag (At Risk – Recovering) was observed adjacent to Totara Creek (W3-S1) near associated mangroves. There was also suitable habitat observed for Threatened or At Risk (TAR) species at locations throughout the project area, particularly near waterbodies.</p> <p>Plague skink (not native) was identified during opportunistic searches in the project area and records of copper skink in NOR S1 vicinity have been recorded and is likely associated with all vegetation units especially rank grass, unmanaged land (i.e., not grazed or mown lawns). Although less likely ornate skink may also use the Project area. No dedicated fish surveys were undertaken as this will be subject to a future resource consent phase.</p> <p><i>Likely Future Environment</i></p> <p>The area traverses an area of identified intensification where it crosses the FUZ or is within the Strategic Transport Corridor Zone. These areas have a higher likelihood of change as urbanisation progresses.</p> <p>As land is developed, the majority of terrestrial vegetation (such as planted vegetation, forestry and shelterbelts outside riparian and wetland features), adjacent to the NOR will be cleared and developed. However, these features may be present during the construction phase of the road (depending on the time difference between road construction and urban development).</p> <p>Streams, wetlands and riparian vegetation is likely to be retained and potentially locally improved through protection within esplanade reserves and habitat enhancement. Habitat connectivity may be reduced as road crossings and urbanisation fragment the catchment. The majority of the corridor is outside the RUB and is unlikely to experience material habitat change.</p>
Historic heritage and archaeological values	<p><i>Existing Environment</i></p> <p>The ASH has potential to impact on several archaeological or heritage sites, between Brigham Creek and Tawa Road, those in the footprint include one possible archaeological site relating to an early church ((Auckland Council) Cultural Heritage Inventory (CHI) #3711) shown as 027). The church site is likely pre 1900 and has archaeological values. There is a CHI building of – a takeaway shop – ((CHI #3713) shown as 028) also along the corridor.</p> <p>Near Brigham Creek Road is a shell midden site ((CHI #13579), shown as 001), indicating that the stream crossings (Totara Creek, Waiarohia / Ngongepetara Stream and Ahukuramu Stream) are high.</p> <p>Between Tawa Road interchange and SH16, there are less recorded sites, within the proposed Tawa Road interchange footprint is one historic house ((CHI #16387) mapped as 022), the Ahukuramu stream crossing is also noted as high risk discovery area.</p> <p><i>Likely Future Environment</i></p> <p>The future environment as it relates to historic heritage and archaeological values is likely to remain the same, except where there is future discoveries of unrecorded archaeology.</p>

10.3 NOR S2: SH16 Main Road

10.3.1 Project Overview

SH16 Main Road is proposed to be upgraded to a 24m urban corridor providing for two-lanes (one each direction) with walking and cycling facilities. The upgrade generally follows the existing alignment and includes 600m of active modes upgrade only between Oraha Road and Tapu Road. The project will also provide the important function of connecting people safely to the two proposed RTC stations (NOR KS and NOR HS) and the strategic cycle network (NOR S3 RTC) and will support the realisation of a people oriented commercial centre that provides for the existing and future community needs.

As part of this project, the works include upgrades to existing stream crossings and Station Road will also be realigned to form a new signalised intersection with Main Road and Tapu Road. The indicative alteration footprint shows the envelope proposed to operate and maintain Main Road and all its ancillary components, including stormwater infrastructure, bridges, batter slopes and retaining walls, mitigation areas and construction, see Figure 10-12, for detail refer to drawings at Volume 3.



Figure 10-12: NOR S2 SH16 Main Road project overview

10.3.2 SH16 Main Road Upgrade description

Key features of the SH16 Main Road upgrade include:

- Widening of the existing 20m wide two-lane urban arterial to a 24m wide corridor with walking and cycling facilities on both sides of the corridor
- Realignment of Station Road to form a new signalised intersection with SH16 and Tapu Road
- Tie-ins with existing roads, stormwater dry ponds, wetlands and culverts
- Likely posted speed of 50kph, design speed (of which effects will be assessed on) is 60 kph
- Batter slopes to enable widening of the corridor, and associated cut and fill activities (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 show the indicative cross sections, for further details see the Drawings at Volume 3.

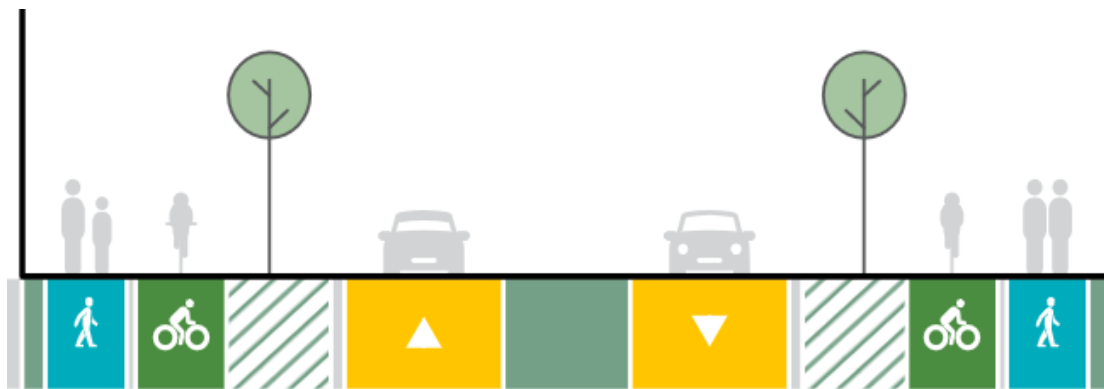


Figure 10-13: SH16 Main Road 24m urban arterial typical cross section

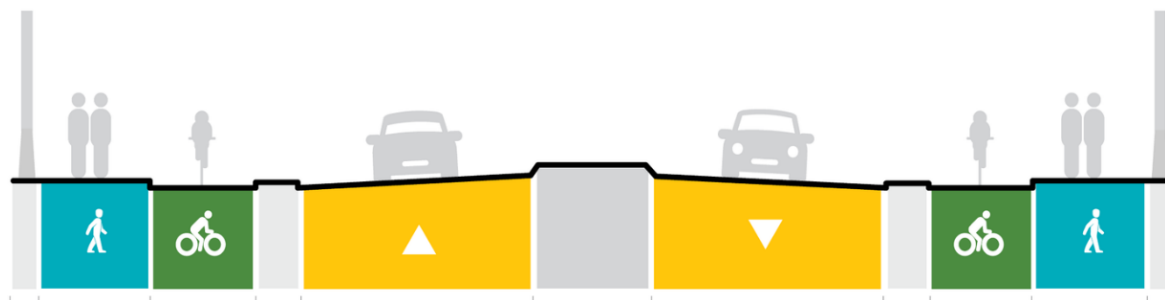



Figure 10-14: SH16 Main Road 24m urban arterial (typical bridge)

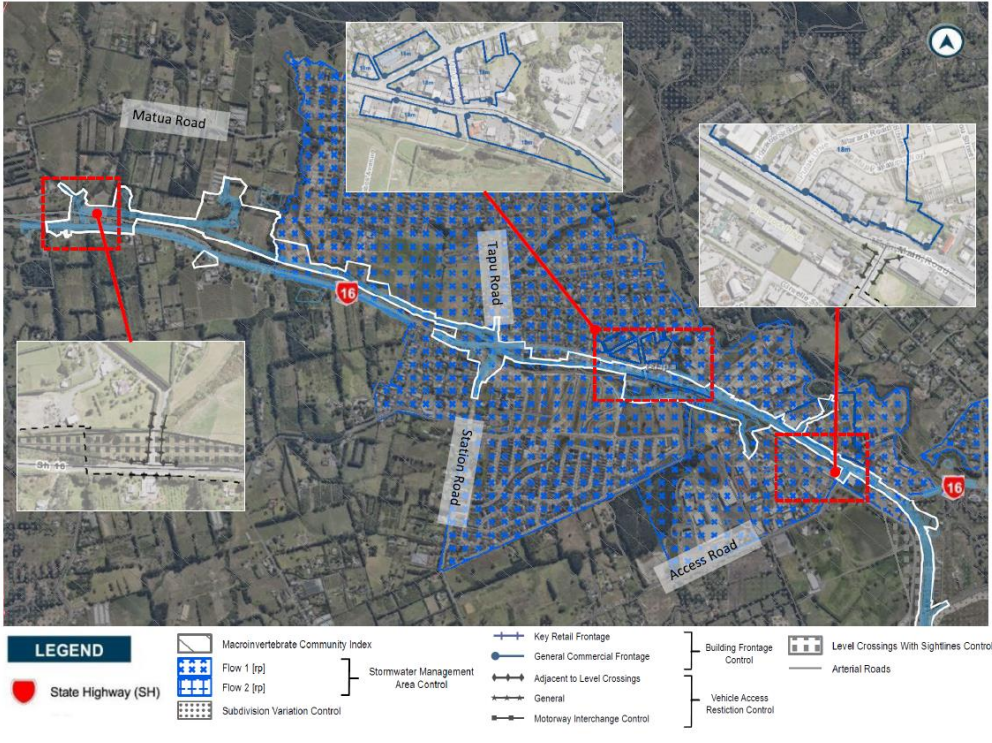
10.3.3 Existing and likely future environment

This section provides a description of the human, physical and natural features of the existing environment, and the likely future environment within which the Project will be constructed, operated, and maintained. Table 10-4 summarises the range of land use scenarios and planning provisions along the proposed transport corridor and on land adjacent to the corridor.

Table 10-5 summarises the key physical and natural features, as identified in supporting technical documents (Volume 4). Transport and noise and vibration have not been duplicated here, refer to those relevant supporting technical documents.

Table 10-4: NOR S2 SH16 Main Road Planning Context

Planning Context	Provision																								
Land use – Existing AUP:OP zoning	 <p>LEGEND</p> <table border="0"> <tr> <td> State Highway (SH)</td> <td> Residential - Mixed Housing Suburban Zone</td> <td> Open Space - Informal Recreation Zone</td> <td> Business - Neighbourhood Centre Zone</td> <td> Green Infrastructure Corridor (Operative in some Special Housing Areas)</td> <td> Rural - Countryside Living Zone</td> </tr> <tr> <td> Railway</td> <td> Residential - Mixed Housing Urban Zone</td> <td> Open Space - Sport and Active Recreation Zone</td> <td> Business - Mixed Use Zone</td> <td> Rural - Rural Production Zone</td> <td> Strategic Transport Corridor Zone</td> </tr> <tr> <td> Route Option Design</td> <td> Open Space - Conservation Zone</td> <td> Business - Town Centre Zone</td> <td> Business - Light Industry Zone</td> <td> Rural - Mixed Rural Zone</td> <td> Special Purpose Zone</td> </tr> <tr> <td> Project Boundary</td> <td> Residential - Single House Zone</td> <td> Future Urban Zone</td> <td> Water [I]</td> <td> Road [I]</td> <td></td> </tr> </table> <p>Live zoned areas have a lower likelihood of land use change than the FUZ or greenfield sites. The I516 Kumeū Precinct is located to the north of the corridor, with only a small extent bordering the northern side of SH16 Main Road.</p>	State Highway (SH)	Residential - Mixed Housing Suburban Zone	Open Space - Informal Recreation Zone	Business - Neighbourhood Centre Zone	Green Infrastructure Corridor (Operative in some Special Housing Areas)	Rural - Countryside Living Zone	Railway	Residential - Mixed Housing Urban Zone	Open Space - Sport and Active Recreation Zone	Business - Mixed Use Zone	Rural - Rural Production Zone	Strategic Transport Corridor Zone	Route Option Design	Open Space - Conservation Zone	Business - Town Centre Zone	Business - Light Industry Zone	Rural - Mixed Rural Zone	Special Purpose Zone	Project Boundary	Residential - Single House Zone	Future Urban Zone	Water [I]	Road [I]	
State Highway (SH)	Residential - Mixed Housing Suburban Zone	Open Space - Informal Recreation Zone	Business - Neighbourhood Centre Zone	Green Infrastructure Corridor (Operative in some Special Housing Areas)	Rural - Countryside Living Zone																				
Railway	Residential - Mixed Housing Urban Zone	Open Space - Sport and Active Recreation Zone	Business - Mixed Use Zone	Rural - Rural Production Zone	Strategic Transport Corridor Zone																				
Route Option Design	Open Space - Conservation Zone	Business - Town Centre Zone	Business - Light Industry Zone	Rural - Mixed Rural Zone	Special Purpose Zone																				
Project Boundary	Residential - Single House Zone	Future Urban Zone	Water [I]	Road [I]																					
Spatial Strategy (Auckland Council)	<p>The NW Spatial Strategy identified an extended area of industrial along Access Road in the south moving away from Main Road, and the existing town centre extending east to connect the two centres. No further land use planning is expected to occur until the area is structure planned and subsequent plan changes sought. The relevant features of the strategy are:</p> <ul style="list-style-type: none"> • Future Town Centre extending from the existing across the current industrial land on the north of Main Road • New Future Local Centre on the south of Main Road • New industrial along Access Road away from Main Road • Future Residential and Other Uses within the FUZ left unspecified. 																								
AUP:OP Overlays	<ul style="list-style-type: none"> • High-Use Aquifer Management Areas Overlay – Kumeū Waitematā Aquifer • Notable Trees Overlay – #2603, Silver dollar gum • National Grid Yard Overlay (Uncompromised). 																								

Planning Context	Provision
AUP:OP Controls	 <ul style="list-style-type: none"> • Macroinverteberate Community Index • Stormwater Management Area Control (Flow 1) • Level crossing with sightline controls • Arterials Roads. • Building Frontage Control • Key Retail Frontage • General Commercial Frontage • Vehicle Access Restriction Control • Adjacent to level crossings.
Designation – Transport related	<p>#6768, State Highway 16 – Road widening, New Zealand Transport Agency</p> <ul style="list-style-type: none"> • Waka Kotahi is also requiring authority and will not require any additional permissions <p>#6766, State Highway 16 – Hobsonville to Wellsford, New Zealand Transport Agency (subject of this alteration)</p> <p>#6300, North Auckland Railway Line from Portage Road, Otahuhu to Ross Road, Topuri, KiwiRail</p> <ul style="list-style-type: none"> • The works impact the designation at both Access Road and Station Road. At Access Road, the project will widen the intersection to the new cross section proposed. At Station Road the realignment of the intersection and two additional rail bridges will require working with KiwiRail. Other ancillary works may also impact the designation area. Where the Project impacts the designation it will require written consent from KiwiRail for works under section 177

Planning Context	Provision
Designation – non transport related	#4311, Defence purposes – protection of approach and departure paths (Whenuapai Air Base), Minister of Defence <ul style="list-style-type: none"> The works do not affect this designation

Table 10-5: NOR S2 SH16 Main Road Natural and Physical Environment Features

Features	Description
Current land use	<p><i>Existing Environment</i></p> <ul style="list-style-type: none"> The urban extent of SH16 traverses well-established retail, commercial and residential environs. This corridor contains a range of business, residential and open space uses. After the Huapai Recreation Reserve the landscape becomes increasingly rural up to the RUB at the conclusion of the Main Road upgrade near Foster Road. The local vegetation along the corridor varies, with viticulture fields within the rural eastern boundary as you enter the town, giving way to varied streetscape planting and standalone non-indigenous trees. Clusters of more mature riparian and tree land around the streams, particularly near the library and then going west giving way to mature park trees within Huapai reserve and then rural agriculture landscapes. The NAL is a defining feature in the landscape, forming a hard barrier along the southern side of Main Road, with commercial buildings near Access Road backing onto it. The value of the existing landscape character along SH16 Main Road is very low. The existing town is bookended by public open space, with the Kumeū Showgrounds in the east, Kumeū River reserve in the middle, and Huapai recreation reserve at the existing urban edge. The western portion of the Project within rural zoned land is characterised by pastoral and arable geometric fields and rural residential properties. <p><i>Likely Future Environment</i></p> <ul style="list-style-type: none"> For the existing urban areas in Kumeū-Huapai, a change in use from industrial to town centre has been signalled by the NW Spatial Strategy at the entrance to Kumeū. This would connect to the existing centre zone near the supermarket, backing onto the Kumeū River. Zoned areas are generally expected to undergo less transformative change than FUZ or areas of greenfield (see Table 9-8), however further commercial development akin to that at Matua Road may be provided as population increases and as the identified town centre areas are developed. The FUZ west of Huapai has not been structure planned, however the NW Spatial Strategy indicates a Future Local Centre opposite Meryl Avenue (see Table 10-4). The future environment can be expected to have urban features such as sealed curb and channel roading with footpaths, street trees, light poles and smaller residential lots with private gardens set closer to the road, rather than openness of the rural landscape.
Community and recreational facilities	<p><i>Existing Environment</i></p> <ul style="list-style-type: none"> Kumeū Fire Station at 331 Main Road Kumeū Library at 18 Oraha Road Huapai Tavern (Historic) at 301 Main Road Supermarket and essential commercial stores – various locations along Main Road Huapai Recreation Reserve (public park) at 46 Tapu Road, Huapai Kumeū Showgrounds and Community Centre at 27-35 Access Road

Features	Description
	<ul style="list-style-type: none"> NZ Post Shop at 88 Main Road Vineyards within rural and FUZ at 550 SH16, Kumeū <p>The facilities in proximity to NOR S2 include a number of education facilities, private and public including Huapai District School and Matua Ngaru School as well as pre-school care such as Secret Garden Pre-School and Jojos Childcare. There is also a church at 7 Matua Road, Huapai.</p> <p><i>Likely Future Environment</i></p> <ul style="list-style-type: none"> Existing open space areas and recreational activities are expected to remain unchanged. Public schools in the area are expected to remain and could grow as the population in the area increases, pre-school care may shift or move but activity likely to remain in area. Other facilities such as the Library and Fire Station are also expected to remain in the town centre As development occurs and the population in the surrounding area grows, additional community facilities will be provided within the FUZ and existing urban areas.
Watercourses	<p><i>Existing Environment</i></p> <p>The corridor crosses several overland flow paths, unnamed streams and Kumeū River. The existing 100-year ARI flood maps from the latest Kumeū-Huapai catchment model with MPD and existing terrain show flooding at:</p> <ul style="list-style-type: none"> Kumeū River bridge crossings (east Main Road entrance to Kumeū township) Properties at 22 Riverhead Road, Kumeū; 550, 573 and 695 SH16, Huapai; 9-11, 14, 16 Weza Lane, Huapai; 68, 74, 395, 399 and 401 Main Road, Huapai and at commercial properties north of Main Road, within the Business – Light Industry Zone. <p>Existing flood prone areas from AC Geomaps are evident where overland flow paths and streams traverse the corridor. Flooding is concentrated around the town centre and the eastern entrance near the RUB.</p> <p><i>Likely Future Environment</i></p> <ul style="list-style-type: none"> Within the FUZ which the Main Road alignment traverses at the western extent, realisation of the FUZ will change the hydrology, terrain, and buildings exposed to flooding Future developments are anticipated to take account of and address flood risk as part of their development as per the AUP:OP rules, not increasing the existing flood hazard environment. In the existing urban areas, the hydrological environment and natural hazard conditions are not expected to significantly vary as they are already significantly impervious.
Vegetation and ecology	<p><u>Habitats</u></p> <ul style="list-style-type: none"> The habitat within the project area varies in value from Negligible to Very High. With denser vegetation typically located adjacent to stream banks, such as near the entrance to Kumeū township and the Kumeū bridge at entrance to Huapai Six stream branches were identified during desktop and site investigations within the project footprint. One stream was identified as intermittent and the remaining five as permanent. Streams quality ranged from Poor to Moderate in value. 16 wetlands were identified within the NOR S2 corridor three were classified as artificial and 13 as natural wetlands (under NPS-FM definition). Nine of the natural wetlands were dominated by exotic species and classed as exotic wetlands The value of these wetlands varied, with most being of Low value, S2-W2 was the only wetland identified as High value.

Features	Description
	<p><u>Species</u></p> <ul style="list-style-type: none"> • Bat roost potential was considered Negligible or Low due to small number of mature trees affected along the alignment considered suitable for bat habit. Bats have been detected in the wider area particularly along the Kumeū River and within mature shelterbelts and therefore their presence cannot be excluded • No dedicated bird surveys undertaken, however incidental observations noted the majority of species as common, naturalised or common native species. Some habitats were identified as having potential for TAR species, although they were not observed at the time. Potential TAR species that might use habitats include Brown teal, Dabchick, North Island Fernbird, North Island Kaka, Little black shag, Long -tailed cuckoo, New Zealand Pipit, Pied Shag and Spotless Crake • No dedicated lizard surveys were carried out, and none were observed during opportunistic searches, copper skink is likely to be associated with a variety of vegetation types within the area, other native species are generally restricted to indigenous forest, scrub and habitat contiguous to these areas. Ornate skink may be present within well vegetated riparian corridors • No dedicated fish surveys were undertaken as this will be subject to a future resource consent phase. <p><i>Likely Future Environment</i></p> <ul style="list-style-type: none"> • The protection and enhancement of existing watercourses is provided in the AUP:OP. Therefore, it is assumed the future urbanised scenario will largely retain permanent streams such as the Kumeū River tributaries, requiring these areas to be accommodated within the future urban environment • The Kumeū-Huapai Centre Plan also shows an enhanced Kumeū River environment and greenways linking the areas along Main Road (refer to Figure 10-2) • Mature trees associated with roadside and shelterbelt are expected to be removed in the Future Environment, excluding vegetation within riparian zones, notable trees and certain street trees, as removal is permitted under the AUP:OP and therefore unlikely to remain in an urbanised scenario.
<p>Historic heritage and archaeological values</p>	<p><i>Existing Environment</i></p> <p>The existing historic heritage is reflective of the town's history of kauri logging, gum digging, and importance of the railway. A number of historic sites are either partially within the boundaries of NOR S2 or are very close to the extent. Two historic sites in the area are the railway shed (019 in the maps), which is scheduled as 00483 in the AUP:OP, and previously the railway carriages (017) used for a café (Note: these carriages have since been moved from the site) as CHI #18493. Both structures were likely moved to their respective positions and are not in their original location and therefore both places don't have any archaeological, sub surface values.</p> <p>The SH16 Main Road upgrades do not impact the Huapai Tavern building, although the design extends into the historic heritage overall extent of place overlay (AUP:OP, Huapai Tavern #482). The Masonic Lodge and a residential house are recorded in the CHI as #16388 and CHI #16385 and both are outside but very close to the extent of the NOR S2.</p> <p><i>Likely Future Environment</i></p> <p>The existing environment as it relates to historic heritage and archaeological values is likely to remain the same in the future.</p>

10.4 NOR S3: Rapid Transit Corridor and Stations

10.4.1 Project Overview

The RTC has a total length of approximately 9.5km and is intended to operate in an uninterrupted free flowing manner with all road crossings grade separated. The RTC corridor is designed to enable bus rapid transit and is generally assessed in two sections, a rural section extending from Brigham Creek Interchange (adjacent NOR S1 ASH) and an urban section from Waitakere Road where it is alternately co-located with SH16 Main Road (NOR S2) and / or the existing NAL, terminating at Matua Road.

NOR KS Kumeū Station, is proposed to be within the Business-Town Centre Zone and will be accessible by local bus services, walking and cycling and on demand travel (pick up / drop off). An active mode overbridge and path will connect station users to Wookey Lane and Vintry Drive. The station forms a transport node for the Kumeū community for trips south towards key employment centres such as Westgate and the city centre. NOR HS Huapai Station is proposed to be on the NALs northern side, south of Meryl Avenue and be an 'end of the line' station. NOR HS provides for service interchange, walking and cycling, on demand travel as well as park-and-ride. An active mode overbridge will connect station users to the southern FUZ, where the NW Spatial Strategy shows an indicative centre.

The indicative footprint shows the envelope proposed to operate and maintain the RTC and all its ancillary components including bridges, shared path, stormwater infrastructure, batter slopes, retaining walls, mitigation areas as well as construction, refer to Figure 10-15 for detail refer to drawings at Volume 3.

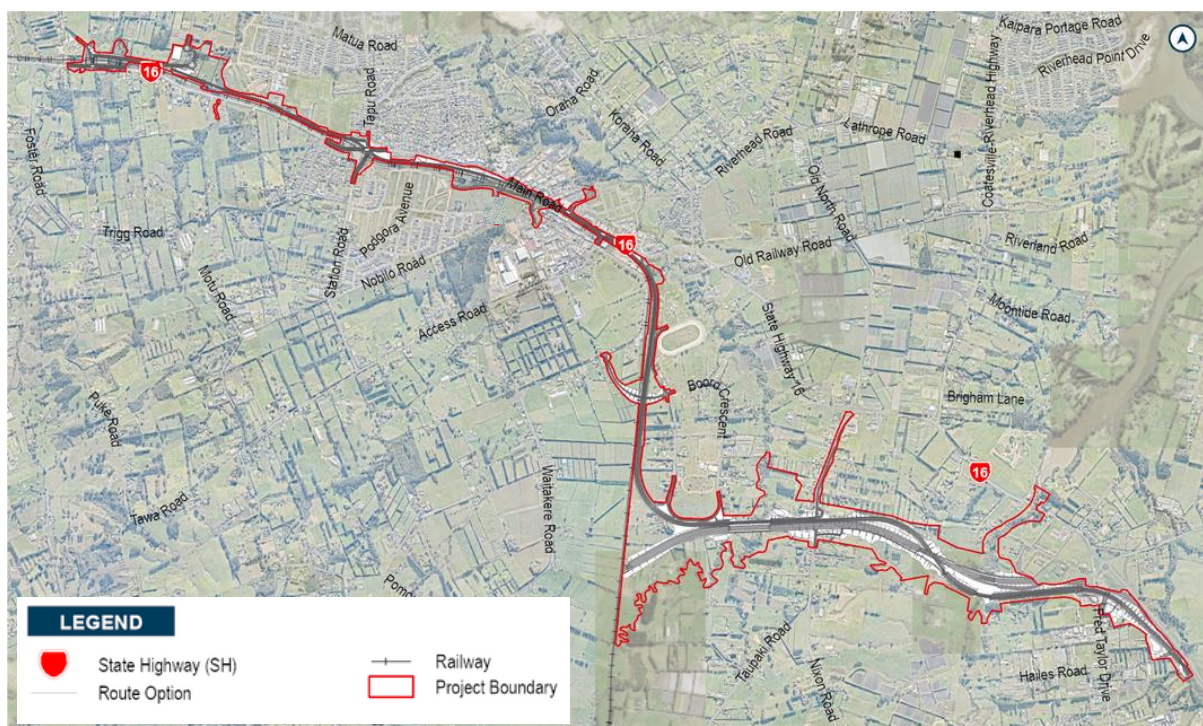


Figure 10-15: NOR S3 RTC and Huapai and Kumeū Stations overview (showing ASH design for context through rural section)

10.4.2 Rapid Transit Corridor description

The key features of the RTC project include:

- An approximately 9.5km long corridor of approximately 14m, increasing to 20m wide where the active mode path abuts the corridor. The RTC is intended to operate in an uninterrupted free flowing manner, designed to operate at 80km/h, (design speed of 90km/hr)
- A regional active mode facility (shared path) connecting from Fred Taylor Drive, alongside the ASH and RTC, then abutting the RTC to conclude at SH16 Main Road
- The RTC will be at ground level except at key sections to pass over or under arterial roads (Fred Taylor Drive, Taupaki Road, new Waitakere-Boord Crescent Link Road, Access Road and Station Road). The ASH over the RTC bridges to cross from the north to south side in the rural section

Within Kumeū-Huapai township, upgrades of:

- SH16 Main Road between Access Road and John MacDonald Lane. At this section, the RTC abuts the KiwiRail NAL and the proposed SH16 Main Road Upgrade, which will need to be shifted north of its existing alignment
- SH16 Main Road Upgrade includes the realignment of Station Road and Tapu Road to form a signalised cross-intersection. The RTC will pass under this proposed intersection to shift to the north side of SH16, as it continues along the side of KiwiRails NAL
- Batter slopes to enable the construction of the corridor, and associated cut and fill activities (earthworks)
- Vegetation removal within the proposed new corridor
- Ecological mitigation areas
- Land for tie-ins including re-grade of driveways, stormwater infrastructure and retaining walls
- Other construction activities, such as areas for traffic manoeuvring and laydown areas.

Figure 10-16 to Figure 10-20 show the indicative cross sections at various sections of the alignment, alongside adjacent networks as relevant. For further detail refer to drawings at Volume 3.

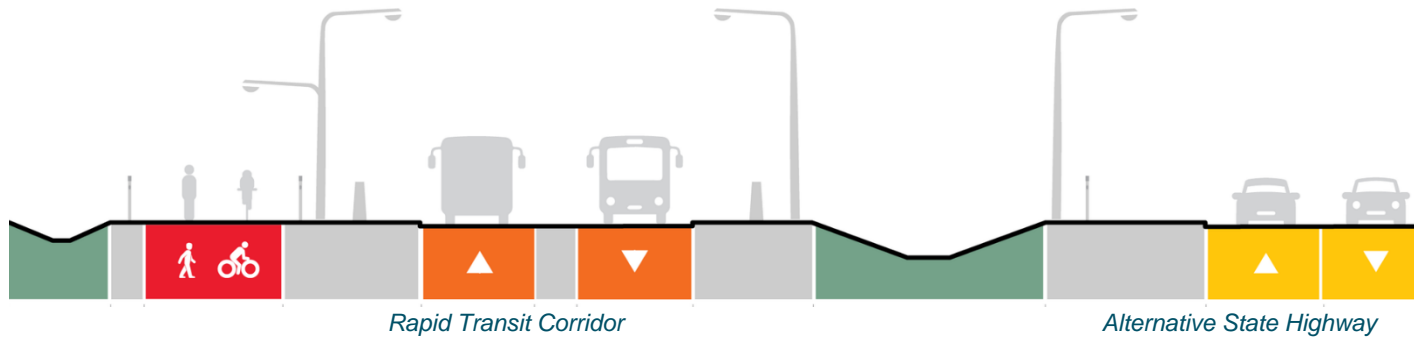


Figure 10-16: Typical Cross Section – RTC near Brigham Creek Interchange

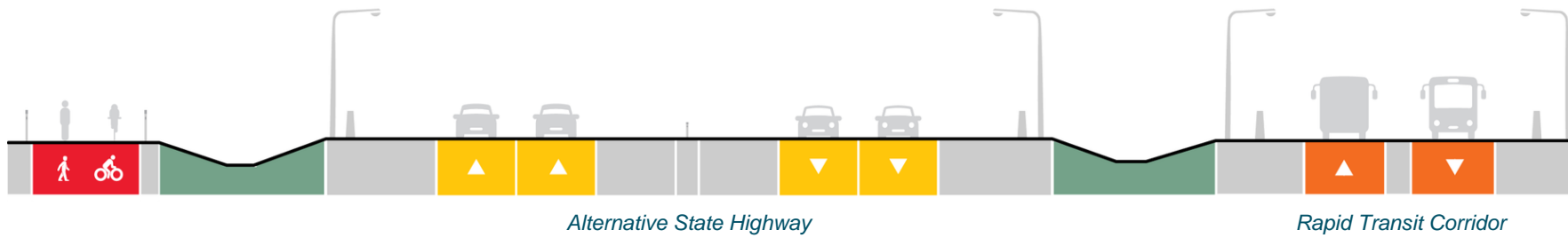


Figure 10-17: Typical Cross Section – RTC alongside ASH at Taupaki Road (shared path will re-join RTC at Boord Crescent)



Figure 10-18: Typical Cross section – Rural RTC

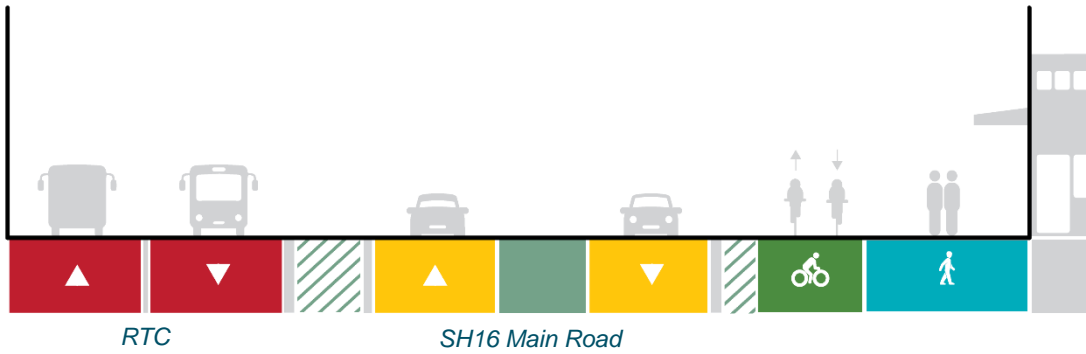


Figure 10-19: Typical Cross Section – Urban RTC at SH16 Main Road

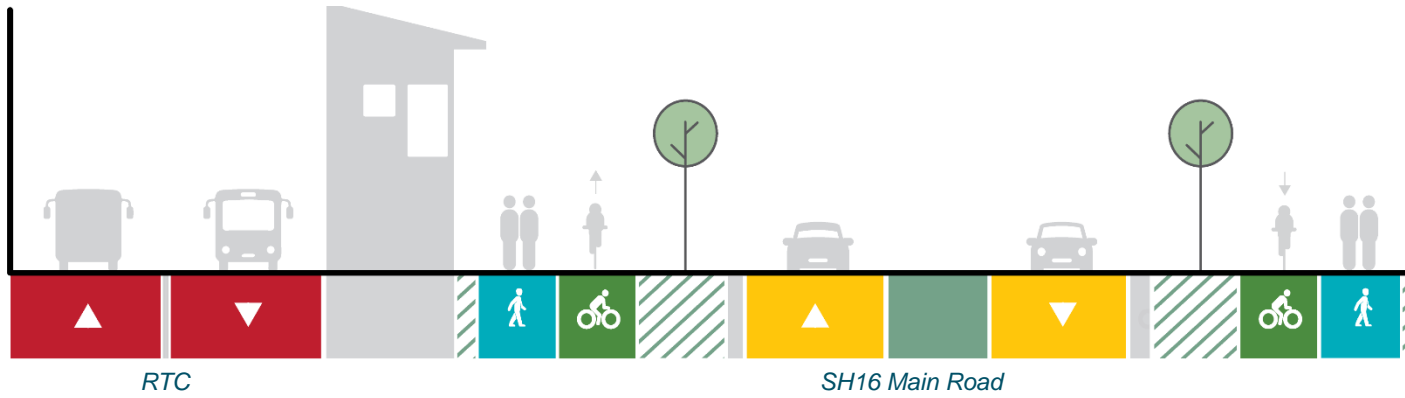


Figure 10-20: Typical Cross section – RTC at rear of urban block, SH16 Main Road on northern side and NAL on southern side (not shown)

10.4.3 Kumeū and Huapai Stations description

The form and function of the stations was derived from strategic considerations, including anticipated demand for station access over time, strategies relating to desired station outcomes and integration with the wider network and land use. Refer to Section 9.1.1.2 for rapid transit design which applies to both stations.

10.4.3.1 Kumeū Station key features

Key features of the Kumeū Station project include:

- Station building, with provision for customer service, public toilets, ticketing facilities, staff rooms and maintenance and equipment rooms
- Transport interchange facilities including:
 - Bus layover spaces and bus turnaround provisions
 - Parking spaces for emergency and maintenance vehicles
 - Pick up and drop off bays for on demand travel (e.g., ride share, taxi)
 - Bicycle and micro mobility provision, up to 350 cycle parks
- Passenger platforms to access RTC, including overbridge with universal access facilities
- Tie ins to existing network at SH16 Main Road and walking and cycling access (via overbridge) to a southern side shared path to Wookey Lane and Vintry Drive
- Retaining walls and batter slopes with associated cut and fill activities (earthworks)
- Vegetation removal within the footprint, as required
- Stormwater capture and treatment.

10.4.3.2 Huapai Station key features

Key features of the Huapai Station project include:

- Station building, with provision for customer service, public toilets, ticketing facilities, staff rooms and maintenance and equipment rooms
- Transport interchange facilities including:
 - Bus end of line layover and turnaround space, with provision for bus electric charging
 - Parking spaces for emergency and maintenance vehicles
 - Pick up and drop off bays for on demand travel (e.g., ride share, taxi)
 - Bicycle and micro mobility provision, up to 350 cycle parks
 - Park-n-ride provision of up to 500 spaces
- Passenger platforms to support bus rapid transit to access RTC, including overbridge with universal access facilities
- Tie ins to existing network at Meryl Avenue and Matua Road, with walking and cycling access (via overbridge) to south at SH16
- Replacement of Matua Roads NAL level crossing with new grade separated road access to SH16
- Retaining walls and batter slopes with associated cut and fill activities (earthworks)
- Vegetation removal within the footprint, as required
- Stormwater capture and treatment.

Other construction related activities required outside the permanent footprint including the re-grade of site, construction traffic manoeuvring and construction laydown areas. Figure 10-21 and Figure 10-22 show the indicative cross sections, for further details see the drawings at Volume 3.

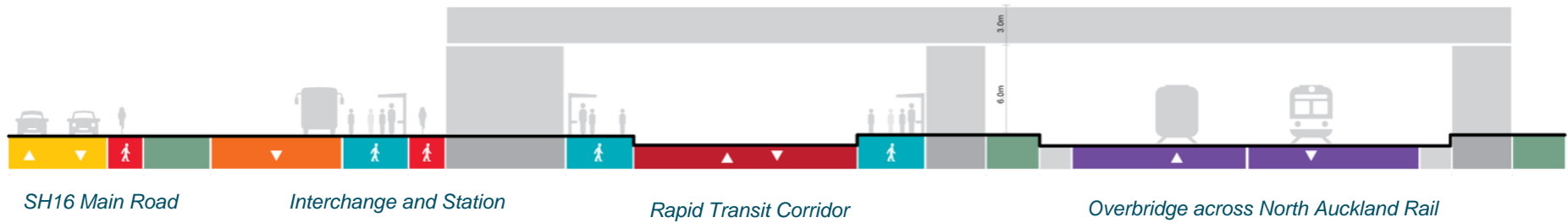


Figure 10-21: Kumeū Station indicative cross section (including overbridge across NAL to southern side)



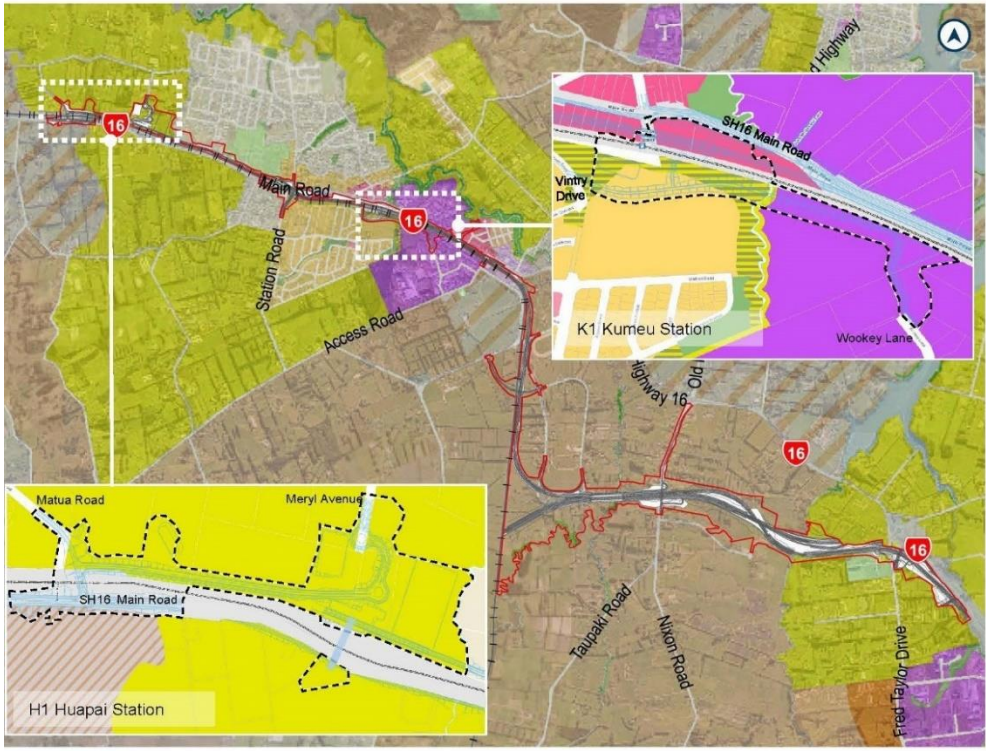
Figure 10-22: Huapai Station indicative cross section (including overbridge across NAL and SH16 to southern side)

10.4.4 Existing and likely future environment

This section provides a description of the human, physical and natural features of the existing environment, and the likely future environment within which the Projects will be constructed, operated, and maintained. Table 10-6 summarises the range of land use scenarios and planning provisions along the proposed transport corridor and stations and on land adjacent to the Projects.

Table 10-7 summarises the key physical and natural features, as identified in supporting technical reports (Volume 4). Transport and noise and vibration have not been duplicated here, refer to those relevant supporting technical documents.

Table 10-6: NOR S3 RTC and Stations Planning Context

Planning Context	Provision																														
Land use – Existing AUP:OP zoning	 <p>LEGEND</p> <table border="0"> <tr> <td> State Highway (SH)</td> <td> Residential - Mixed Housing Urban Zone</td> <td> Open Space - Informal Recreation Zone</td> <td> Business - Neighbourhood Centre Zone</td> <td> Green Infrastructure Corridor (Operative in some Special Housing Areas)</td> <td> Strategic Transport Corridor Zone</td> </tr> <tr> <td> Route Option Design</td> <td> Residential - Terrace Housing and Apartment Buildings Zone</td> <td> Open Space - Sport and Active Recreation Zone</td> <td> Business - Mixed Use Zone</td> <td> Rural - Rural Production Zone</td> <td> Special Purpose Zone</td> </tr> <tr> <td> Project Boundary</td> <td> Open Space - Conservation Zone</td> <td> Business - Town Centre Zone</td> <td> Business - Light Industry Zone</td> <td> Rural - Mixed Rural Zone</td> <td> Coastal - General Coastal Marine Zone [rcp]</td> </tr> <tr> <td> Residential - Single House Zone</td> <td></td> <td> Business - Local Centre Zone</td> <td> Future Urban Zone</td> <td> Coastal - Coastal Transition Zone</td> <td> Water [I]</td> </tr> <tr> <td> Residential - Mixed Housing Suburban Zone</td> <td></td> <td></td> <td></td> <td> Rural - Countryside Living Zone</td> <td> Road [I]</td> </tr> </table> <p>Precincts</p> <ul style="list-style-type: none"> • Kumeū sub-precinct A, sub-precinct Kumeū sub-precinct B, sub-precinct • Huapai Triangle sub-precinct A, sub-precinct C, sub-precinct E • Kumeū Showgrounds, Precinct <p>The rural area outside of the RUB is not expected to undergo any further urban development. Live zoned areas have a lower likelihood of land use change than FUZ or greenfield areas with</p>	State Highway (SH)	Residential - Mixed Housing Urban Zone	Open Space - Informal Recreation Zone	Business - Neighbourhood Centre Zone	Green Infrastructure Corridor (Operative in some Special Housing Areas)	Strategic Transport Corridor Zone	Route Option Design	Residential - Terrace Housing and Apartment Buildings Zone	Open Space - Sport and Active Recreation Zone	Business - Mixed Use Zone	Rural - Rural Production Zone	Special Purpose Zone	Project Boundary	Open Space - Conservation Zone	Business - Town Centre Zone	Business - Light Industry Zone	Rural - Mixed Rural Zone	Coastal - General Coastal Marine Zone [rcp]	Residential - Single House Zone		Business - Local Centre Zone	Future Urban Zone	Coastal - Coastal Transition Zone	Water [I]	Residential - Mixed Housing Suburban Zone				Rural - Countryside Living Zone	Road [I]
State Highway (SH)	Residential - Mixed Housing Urban Zone	Open Space - Informal Recreation Zone	Business - Neighbourhood Centre Zone	Green Infrastructure Corridor (Operative in some Special Housing Areas)	Strategic Transport Corridor Zone																										
Route Option Design	Residential - Terrace Housing and Apartment Buildings Zone	Open Space - Sport and Active Recreation Zone	Business - Mixed Use Zone	Rural - Rural Production Zone	Special Purpose Zone																										
Project Boundary	Open Space - Conservation Zone	Business - Town Centre Zone	Business - Light Industry Zone	Rural - Mixed Rural Zone	Coastal - General Coastal Marine Zone [rcp]																										
Residential - Single House Zone		Business - Local Centre Zone	Future Urban Zone	Coastal - Coastal Transition Zone	Water [I]																										
Residential - Mixed Housing Suburban Zone				Rural - Countryside Living Zone	Road [I]																										

Planning Context	Provision
	residential or business zoning. Live zoned areas have a lower likelihood of land use change, however proximity to a RTN station will enable greater density of up to 6 stories, as per the National Policy Statement on Urban Development 2020 (NPS-UD).
NW Spatial Strategy (Auckland Council)	The NW Spatial Strategy identified a desire to expand the existing commercial area to connect Kumeū and Huapai town centre. Kumeū Station site was identified as retaining centre and open space areas. Opposite proposed Huapai Station identified a future local centre south side of SH16. FUZ was identified as 'residential and other uses' no further land use planning is expected to occur until the area is structure planned.
AUP:OP Overlays	<ul style="list-style-type: none"> • High-Use Stream Management Areas Overlay • High-Use Aquifer Management Areas Overlay <p>RTC</p> <ul style="list-style-type: none"> • National Grid Corridor Overlay • Historic Heritage Overlay Extent of Place – 483, Kumeū Railway Station goods shed • Notable Trees Overlay – 2603, Silver dollar gum, Verified position of tree <p>Kumeū Station</p> <ul style="list-style-type: none"> • Historic Heritage Overlay Extent of Place – 482, Huapai Tavern <p>Huapai Station</p> <ul style="list-style-type: none"> • (no additional overlays)
AUP:OP Controls (urban)	<ul style="list-style-type: none"> • Arterial Road • Macroinvertebrate Community Index • Stormwater Management Area Control – Kumeū-Huapai, Flow 1 <p>RTC</p> <ul style="list-style-type: none"> • Emergency Management Area Control • Subdivision Variation Control <p>Kumeū Station</p> <ul style="list-style-type: none"> • Macroinvertebrate Community Index – Urban Exotic Rural <p>Huapai Station</p> <ul style="list-style-type: none"> • Vehicle access control – adjacent to level crossing • Macroinvertebrate Community Index – Rural
AUP:OP Controls (rural)	<ul style="list-style-type: none"> • Stormwater Management Area Control REDHILLS, Flow 1 • Arterial Road • Macroinvertebrate Community Index • Vehicle access control – adjacent to level crossing • Vehicle Access Restriction Control – Motorway Interchange Control
Designation transport related	<p>Waka Kotahi is the requiring authority for the RTC and station NORs and therefore does not require written consent.</p> <ul style="list-style-type: none"> • #6768, State Highway 16 – Road widening, New Zealand Transport Agency • #6766, State Highway 16 – Hobsonville to Wellsford, New Zealand Transport Agency • #6740, State Highway 16 – Westgate to Whenuapai, New Zealand Transport Agency • #6741, State Highway 16 and State Highway 18 – Westgate to Whenuapai and Hobsonville, New Zealand Transport Agency

Planning Context	Provision
	<p>AT has been engaged with on the project as part of the alliance. The new cross section proposed for Fred Taylor Drive as part of Brigham Creek Interchange has been factored into the design footprint. Written consent under section 177 will be sought from AT prior to works commencing that affect the earlier designation.</p> <ul style="list-style-type: none"> #1433, Road – Fred Taylor Drive Transport Corridor, AT #1468, Road Widening – State Highway 16 (Westgate to Whenuapai), AT <p>KiwiRail has been engaged with as part of the design process as a key stakeholder. The RTC corridor will run alongside the NAL from Boord Crescent and has a number of close interactions with the RTC. The Kumeū and Huapai station designs are future proofed for rail electrification and access will be grade separated. Waka Kotahi will require written consent under section 177 from KiwiRail Services Ltd where the works affect the earlier designation.</p> <ul style="list-style-type: none"> #6300, North Auckland Railway Line from Portage Road, Otahuhu to Ross Road, Topuri, KiwiRail
Designation – Not transport related	<p>#4311, Defence purposes – protection of approach and departure paths (Whenuapai Air Base), Minister of Defence</p> <ul style="list-style-type: none"> The works will not affect this designation

Table 10-7: NOR S3 Existing and Likely Future Physical and Human Environment

Features	Description
Current land use	<p><i>Existing Environment</i></p> <p><u>RTC</u></p> <p>The RTC travels through two distinct environments, a rural section in the south where it adjoins Brigham Creek Interchange within the Strategic Transport Corridor Zone, through rural zones to the beginning of Kumeū township where it becomes an urban corridor.</p> <p>The rural section is characterised by larger plots and rural agriculture uses, as well as lifestyle lots. The NAL and SH16 form the key built infrastructure in the area particularly where they run together through the Kumeū-Huapai township. The RTC is proposed to run between the NAL and SH16 Main Road through the township until the Station Road / Tapu Road intersection. There are relatively few property accesses impacted due to the NAL restricting development to the southern side or north of SH16 Main Road.</p> <p>Built form through the township is a mixture of commercial lots, dominated by car parking with inconsistent building frontages, with the exception at Matua Road / SH16 intersection. The township is also intersected by several tributaries of the Kumeū River which form gateways.</p> <p>The western edge of the urban area is Huapai Recreation Reserve, a large sport and active recreation park. Built form reduces further west until the FUZ (Gilbransen Road (north side) and Trig Road (south side)). Within FUZ rural land use is prevalent, with viticulture and agriculture landscapes, the NAL (on north) and SH16 (south of NAL) continue in parallel beyond the RUB. The proposed RTC alignment concludes at Matua Road, within the RUB.</p> <p><u>KS Kumeū Station</u></p> <p>The station is situated on a site located within a levelled and sealed lot with no retained natural landform features. The Kumeū River in the east has been modified to provide a stormwater pond between SH16 and the NAL, forming the main modified natural landscape feature. The southern side is characterised by the construction being undertaken within the</p>

Features	Description
	<p>Huapai Triangle as the area becomes increasingly urban, and the remaining area of open private space with associated exotic grassland between the construction of housing in the west and large lot industrial use to the east. There are no notable trees or scheduled landscape or ecological features within or proximate to the site.</p> <p>The environment is urban with commercial buildings including the historic Huapai Tavern as well as a liquor store and garden centre. Areas of vehicle parking and circulation are dominant features, along with the SH16 Main Road / Matua Road intersection, forming a key node. Across the road is the public library and community facilities, alongside an area of public open space fronting the Kumeū River. The Kumeū River bridge marks the entrance to Huapai township.</p> <p>North east of the site is industrial land use including the Atlas Concrete site, and south of the site (south of NAL) is a greenfield lot, adjacent to recent residential development at Huapai Triangle Precinct. The south is characterised by new urban residential and an area of green space identified as 'Green Infrastructure Corridor'. Further east towards Wookey Lane is industrial zoned land, characterised by containers, yards and warehousing.</p> <p><u>HS Huapai Station</u></p> <p>The site is located in the FUZ, currently under rural residential use, at the end of a dead-end rural street (Meryl Avenue). There are no regionally or nationally significant landscapes (ONLs, ONFs or ONCs) within or proximate to the proposed designation boundary, the Kumeū River tributary forms the natural eastern boundary of the site.</p> <p>The site is bordered on the south side by the NAL and SH16 Main Road and to the east across the Kumeū River tributary is existing urban zone characterised by one-two storey residential properties on smaller lots.</p> <p><i>Likely Future Environment</i></p> <p><u>RTC</u></p> <p>Existing urban areas are expected to undergo less transformative change than the FUZ or urban zoned greenfield (see Table 9-8). Those areas undergoing construction are expected to be fully developed (such as within the Huapai Triangle and Residential-Single House Zone located off Lockyer Road).</p> <p>A change in use from industrial to town centre has been signalled by the NW Spatial Strategy along SH16 Main Road in Kumeū-Huapai. This would connect the existing centre zone near Harikoa Street to the Kumeū River bridge. The FUZ area of Kumeū-Huapai has not been structure planned, however the NW Spatial Strategy indicates a Future Local Centre opposite Meryl Avenue (see Table 10-6). A degree of change may occur within Huapai Recreation Reserve, including new interim park-and-ride facility. Although currently unconsented, it is being progressed by the Local Board.</p> <p>Considering the Whenuapai Structure Plan and NW Spatial Strategy, the land at the proposed Brigham Creek Interchange is expected to urbanise with higher density residential development. Outside of the RUB the rural zoned environment is unlikely to change significantly.</p> <p><u>KS Kumeū Station</u></p> <p>The land surrounding the majority of the Project area within existing urban area is expected to retain its aesthetic, land use and character, with key features being the Kumeū River, NAL and SH16 through the landscape. Areas of greenfield such as Huapai Sub Precinct C and the industrial land on the south are likely to experience high change with residential development characterised by smaller lots, private dwellings, and gardens with an urban street environment (kerb and channel, footpaths, street lighting). The NW Spatial Strategy has identified that industrial use may over time shift to the south along Access Road. The</p>

Features	Description
	<p>expanding town centre (along SH16) may be expected to have a range of building heights, with mixed commercial, leisure, residential, tourist, community and civic uses.</p> <p><u>HS Huapai Station</u></p> <p>The NW Spatial Strategy identifies a potential town centre opposite the proposed station on the south, increased density of residential and commercial land use is anticipated. The FUZ will change significantly and likely be similar in character to urban land in the east. Immediately adjacent the Huapai Station, higher density due to proximity to an RTN station may be provided for under the NPS-UD. Existing landscape definers such as the SH16, NAL, streams and open spaces are expected to remain in the future. The character of the Kumeū River branch to the east is expected to remain, and elements such as urban trees, amenity planting areas around buildings will be predominant natural features of the landscape.</p>
Community and recreational facilities	<p><i>Existing Environment</i></p> <p><u>RTC</u></p> <p>A range of existing community and recreational facilities are located along the RTC, many of which are shared with NOR S1 ASH or NOR S2 Main Road. along the rural section of the RTC the following facilities are present or within the alignment:</p> <ul style="list-style-type: none"> • Fred Taylor Park at 184 Fred Taylor Drive • Kumeū District Trotting Cub at 15 Boord Crescent Kumeū and facility at Trotting Course Drive • Kumeū Showgrounds off Waitakere Road, as well as AC Kumeū Community Centre (co-located). <p>A range of community and recreational facilities are located in the urban section along SH16 Main Road, the majority of facilities in proximity are on the southern side of SH16, adjacent to the NAL. There is a slice of properties between the two corridors of varying width and include:</p> <ul style="list-style-type: none"> • Huapai Tavern (Historic) at 301 Main Road • Kumeū Fire Station at 331 Main Road • Various commercial and hospitality venues such as the Beer Spot, Fish and Chip shop and the Kumeū Garden Centre • Just Kidz Huapai childcare facilities and Oma Rapeti Early Learning Centre. <p>On the northern side of SH16 Main Road, are:</p> <ul style="list-style-type: none"> • Supermarket and commercial stores – various locations along Main Road • Kumeū River reserve (Auckland Council passive recreation space) • Kumeū Library and art centre at 18 Oraha Road • Huapai Recreation Reserve (AC park) at 46 Tapu Road, Huapai. <p>The Huapai Recreation Reserve forms a significant park and facility in the area, with a number of building facilities and organised sport fields. There is also an adjacent primary school (Matua Ngaru School), off Gilbransen Road.</p> <p><u>KS Kumeū Station</u></p> <p>Currently located at the proposed Kumeū Station site is the Historic Huapai Tavern, the Bottle-O Huapai, the Kumeū Garden Hub (garden centre) and 'In the Cut Barbershop'. Facilities in proximity include the Kumeū Public Library and Kumeū River reserve on the north side of SH16 Main Road. There is also a variety of commercial stores alongside the Kumeū Library. Set back from SH16, the New Zealand Police Kumeū Huapai station and Kumeū Arts building are accessible along Matua Road.</p> <p><u>HS Huapai Station</u></p>

Features	Description
	<p>There are no community or recreational facilities within the proposed footprint of the station. On the southern side, the proposed overbridge footprint impacts Coopers Creek Vineyard, at 601 SH16 Kumeū. The overbridge avoids the vines themselves, however, will affect a building and outdoor amenity area. Those facilities in proximity include the Matua Ngaru School, at 47 Gilbransen Road, east of the Station and Huapai Domain.</p> <p><i>Likely Future Environment</i></p> <p><u>RTC, KS Kumeū Station and HS Huapai Station</u></p> <p>Community sites such as the Library, Police and Fire Station as well as existing parks (Huapai Recreation Reserve, Kumeū Showgrounds, Fred Taylor Park) are expected to remain in the urban areas. As population in the surrounding area grows and development occurs, additional community facilities may be provided within the existing urban areas. The Kumeū-Huapai Centre Plan and NW Spatial Strategy identify an expanded town centre west of the proposed Kumeū Station, joining the Huapai and Kumeū town centres, enabling an expanded commercial area with more community facilities.</p> <p>Schools in the area such as Matua Ngaru are expected to remain and may grow as the population increases or new ones be created. It is likely additional community facilities will be provided within the FUZ. The NW Spatial Strategy identified a town centre south of the proposed Huapai Station, and new commercial activities including community services could be expected to be provided in that area. Uses outside the RUB, such as Trotting Club and other rural community features are expected to generally remain in some form, with less change.</p>
Watercourses	<p><i>Existing Environment</i></p> <p>The RTC crosses several overland flow paths, unnamed streams and major streams namely, Kumeū River, Totara Creek and Ngongetepara Stream. Existing flood prone areas from Auckland Council GIS are evident where overland flow paths and streams traverse the corridor. The existing 100-year ARI flood maps from the latest Kumeū-Huapai catchment model with MPD and existing terrain show flooding at:</p> <ul style="list-style-type: none"> • Kumeū River bridge crossing near the rear of 202 Fred Taylor Drive • Properties at 993 Waitakere Rd, Kumeū • Properties at 12, 32, 40 and 58 Brookvale Lane, Taupaki. <p>Proposed Kumeū Station location is in proximity to a main tributary of the Kumeū River, the area is already subject to flooding where overland flow paths traverse the eastern and southern sides of the site. The Kumeū River flows underneath SH16 and the NAL with the main stream continuing south beyond the site. North of SH16 is an extensive area of floodplain associated with the Kumeū River.</p> <p>The proposed Huapai Station site is subject to flood plains associated with tributaries of the Kumeū River, where the new access connects to a realigned Matua Road and the middle of the site. On the southern side of SH16 Main Road, the proposed Huapai Station overbridge is located east of a stream and associated flood plain. For catchments discussion refer to Section 10.1.4.</p> <p><i>Likely Future Environment</i></p> <p>Outside the RUB within the rural zone, development is less likely to occur, and flooding environment is expected to remain largely unchanged. Where the alignment traverses the FUZ at the eastern end near Brigham Creek Interchange and the section within Kumeū-Huapai FUZ, realisation of the FUZ will change the hydrology, terrain, and buildings exposed to flooding. Future developments are anticipated to take account of and address flood risk as part of their development as per the AUP:OP rules, not increasing the existing flood hazard environment. Therefore, for those FUZ areas, although urban development is anticipated the</p>

Features	Description
	<p>hydrological environment and natural hazard conditions are not expected to significantly vary in the future.</p> <p><u>KS Kumeū Station</u></p> <p>The Kumeū River tributaries are anticipated to remain in their existing position, the AUP:OP identified the area south of the site as predominantly 'Green Infrastructure Corridor' identified in the AUP:OP Chapter I, Specials Housing Areas Huapai Triangle Chapter as being intended for stormwater attenuation. The Kumeū-Huapai Centre Plan does not talk to the southern side of the corridor, however, notes extensive Kumeū River floodway to the north.</p> <p>The area is in a process of being developed, it is anticipated that future development in the area will take account of and address their respective flood effects as per the AUP:OP rules. This means that urbanisation should not increase the existing flood hazard environment. Therefore, although urban development is anticipated on the southern side which will change the hydrological environment, the natural hazard conditions are not expected to significantly increase in the future.</p> <p><u>HS Huapai Station</u></p> <p>The hydrological environment will change in the future, however as discussed above each development should take account of and address flood effects not increasing the existing flood hazard. Although urban development is anticipated on both the northern and southern sites, that will change the hydrological environment, natural hazard conditions are not expected to significantly increase in future. Existing permanent streams are also anticipated to be retained under AUP:OP provisions.</p>
Vegetation and ecology	<p><i>Existing Environment – Habitats</i></p> <p><u>RTC</u></p> <p>The existing terrestrial habitats are highly modified and dominated by agricultural uses, exotic ecosystems, including grassland and amenity planting within private properties, and areas of low value 'Treeland' formed by shelterbelts. Small areas of high to moderate value native or mixed exotic vegetation occur with areas of planted natives and riparian vegetation along the Kumeū River tributaries, particularly south of Boord Crescent. There is one notable tree identified within NOR S3, the tree is a mature eucalyptus tree at the southern edge of 396 Main Road, open space trees are also present at Huapai Recreation Reserve.</p> <p>The freshwater habitat within NOR S3 includes seven streams identified during the desktop and site investigations as directly impacted, including 21 stream branches (nine identified as intermittent and 12 identified as permanent).</p> <p>The streams were assessed through site investigations and where access was not possible, through desktop survey, freshwater stream habitat values ranged from Low to Moderate, with one identified as High value (W4-S1) and two as Moderate (S1-S20a, S1-S21) value.</p> <p>Nine Moderate value wetlands are directly impacted by NOR S3, and two High value wetlands including a planted wetland (S2-W2) with potential to support TAR species and a Raupo Reedland wetland (S2-W9), also with potential to support TAR species.</p> <p><u>KS Kumeū Station</u></p> <p>The Kumeū Station site north of the NAL consists of hardstand and existing development with few ecological features of value. On the southern side of the NAL, where the Kumeū Station proposes a shared path facility, connecting to Wookey Lane and Vintry Drive, greenfield sites remain. Notably an area of exotic scrub and treeland border the NAL, with established riparian vegetation present along the banks of the Kumeū River tributaries. Scattered mature trees are present among land remaining in pastoral use. Towards Wookey</p>

Features	Description
	<p>Lane, and area of scrub and planting are present among exotic grassland. Mixed native and exotic Treeland is of high to moderate value.</p> <p>One stream runs through the area, being a tributary of the Kumeū River (a permanent stream (S2-S4)), which runs beneath SH16 and the NAL, branching east and west with the main stream continuing south beyond the site, this stream was identified as having Moderate value. Two wetlands were classified via desktop study as Natural (S2-W12 and S2-W12a) under the National Environmental Standards for Freshwater (NES-FW) definition, both are exotic wetlands associated with the Kumeū River, and may be suitable for Spotless Crake (TAR bird species). Both natural wetlands were considered to have Moderate ecological value.</p> <p><u>Huapai Station</u></p> <p>The Huapai Station site has a number of habitat types present, including planted native areas, exotic grassland (unlabelled, including pasture and gardens), including high value mixed native and exotic treeland and native planted areas. Riparian habitat is present along the eastern edge, near the Kumeū River tributary (S2-S1), which has an area of mature treeland along its banks. Shelterbelts also form treeland at the western edge near the proposed access to Matua Road.</p> <p>Although there are two streams at the edge of NOR HS, there are no streams within the footprint itself. One intermittent stream (S2-S1) scored as having Low ecological value, and the permanent stream (S2-S2) as having Moderate ecological value. Three natural wetlands as defined under the NES-FW were identified within the project footprint, these were:</p> <ul style="list-style-type: none"> • S2-W2 a High ecological value planted wetland with potential to support TAR species. • S2-W3 a Moderate ecological value planted wetland unlikely to support TAR species. • S2-W5 a Low ecological value exotic wetland, partially dammed with potential to support TAR species such as spotless crake and dabchick. <p><i>Existing Environment – Species</i></p> <p><u>RTC and Stations</u></p> <p>Area wide bat surveys have been undertaken and bat presence was detected in the wider area. For all the NORs (the RTC corridor NOR S3, Kumeū Station NOR KS and Huapai Station NOR HS) terrestrial ecology is considered to have very high value for long tailed bats. These areas are generally focused on mature treeland and riparian stream corridors.</p> <p>No dedicated bird surveys were undertaken for the Project; however, incidental observations of bird species were noted during site walkovers. The majority of bird species observed were common, introduced and naturalised or common native species such as silvereye and welcome swallow. Pied shag (At Risk – Recovering) was observed adjacent to Totara Creek (W3-S1) near Brigham Creek associated mangroves. Potential Very High value habitat was identified for a number of TAR bird species including Long-Tailed Cuckoo, Brown Teal and Dabchick for the corridor and stations. High value habitat for Banded Rail, North Island Fernbird, Spotless crake and New Zealand Pipit were also identified for NOR S3, KS and HS. High value habitat potential was predominantly near wetlands, or streams with remaining riparian vegetation, some species may also utilise pasture areas, refer to Volume 4 Ecological Assessment for detail.</p> <p>No dedicated lizard surveys were undertaken for the Project, and native lizards were not identified during opportunistic searches completed during the site walkover. However, copper skink has been recorded within 0.5 km of NOR S3. Copper skink is likely to be associated with all the vegetation types present such as unmanaged land (not grazed or mown) and likely the vegetation units present across the Kumeū and Huapai Station site in particular exotic scrub, and grasses. Other native lizard species are generally restricted to indigenous forest, indigenous scrub, coastal habitat types or habitat contiguous to such area. However</p>

Features	Description
	<p>Ornate skink may be present and have a low probability of occurring within suitable modified habitat, such as dense riparian vegetation along the Kumeū River.</p> <p>Habitat connectivity to SEAs is limited within the wider project Zone of Influence so it is unlikely that any other lizard species are present, however ornate skink can occur in modified habitat including riparian habitat and may be present.</p> <p>No dedicated fish surveys were undertaken for any site (RTC or Stations) as this will be subject to a future regional consent phase.</p> <p><i>Likely Future Environment</i></p> <p><u>RTC</u></p> <p>Where the RTC extends outside of the RUB through rural zone, significant change is not anticipated to occur. It is assumed that permanent streams and wetlands will generally be retained, and the pastoral use of the wider area will remain. Where the RTC traverse FUZ at Redhills North, the NW Spatial Strategy generally classifies the land as 'Future Residential and other uses', the expansion of urban land use means areas of unprotected vegetation under the AUP:OP, such as non-riparian, not notable or over a certain height within parks or roads are expected to be removed. This will result in the loss of mature shelterbelts and other flora and fauna as the area is developed. Replacement with private gardens and street and open space trees will become the predominant vegetation.</p> <p>Through the urban area of Kumeū-Huapai township, little change is anticipated, given the land is already zoned and urbanised. The RTC leaves the existing urban area west of Huapai Reserve where the land is zoned FUZ and held in rural use. This area is not structure planned, however like Redhills North, permanent streams and natural wetlands are anticipated to remain in the landscape given the protections under the AUP:OP, and vegetation not identified as protected (riparian, notable, SEA or over a certain height / girth) will be removed to enable development.</p> <p><u>KS Kumeū Station</u></p> <p>It is assumed that in a future urbanised scenario, permanent streams and wetlands will generally be avoided and retained. The AUP:OP identified the majority of immediate stream corridor (a tributary of Kumeū River) as being within a 'Green Infrastructure Corridor', it is therefore likely to be retained in some form for stormwater management functions. East of the Kumeū River on the site, parts of the Light Industry Zone are likely to be built out, with removal of exotic grasses and vegetation not protected under the AUP:OP, including exotic scrub, but the riparian corridor and associated Treeland potentially retained. The undeveloped area of the Huapai Triangle is expected to be built out with associated removal of vegetation and exotic grasses. Urban development will generally provide features such as private gardens within residential areas, street trees and amenity planting.</p> <p><u>HS Huapai Station</u></p> <p>The FUZ is likely to undergo significant change from the current habitat. It is assumed that in a future urbanised scenario, permanent streams and wetlands will generally be avoided and retained, due to greater emphasis on the protection and enhancement given in the AUP:OP and NES-FW. Vegetation not identified as protected under the plan such as riparian vegetation, (no SEAs) notable trees (there are none currently on site) or meeting criteria for protection in the road reserve are expected to be removed in a future urban scenario. The likely future vegetation will mainly consist of private gardens, street trees and amenity planting.</p>
Historic heritage and	<p><i>Existing Environment</i></p> <p><u>RTC</u></p>

Features	Description
archaeological values	<p>NOR S3 impacts on Historic Huapai Tavern at 301 Main Road, a historic heritage building tracing its origins back to the 1870s and the Historic Heritage Overlay Extent of Place #482. The current tavern building is formed of a cluster of buildings, added to the original over time, however the original heritage structure (pre-1900 buildings) still forms the core tavern.</p> <p>A historic structure under Historic Heritage Overlay and Extent of Place #00483 Kumeū Railway Station goods shed ('Railway Goods Shed') will be impacted by the RTC located at 37 Main Road. The Railway Goods Shed was previously relocated and are not in their original location. Both the Tavern and the Railway Goods Shed are Category B places which have <i>considerable significance to a locality or greater geographic area</i> and are identified as having the following particular values A (historical), B (social), D (knowledge), F (physical attributes), and H (context) values. These heritage structures are important features of the areas past industry, and importantly still in use by the community today through the Tavern.</p> <p>There is a historic house CHI ID #16385 located at 7 Main Road which will be impacted by the RTC alignment. The RTC also crosses the former location of railway carriages CHI ID #18493 which were located at 299 Main Road Huapai. The railway carriages were being utilised as a café but have been removed at the time of writing this assessment.</p> <p><u>KS Kumeū Station</u></p> <p>The Kumeū Station also impacts on the Tavern at 301 Main Road. NOR S3 impacts the more recent extension of the Huapai Tavern within the Historic Heritage Overlay Extent of Place, and the Kumeū Station affects the original building footprint. Refer to NOR S3 discussion above for the Huapai Tavern and also the railway carriages CHI ID #18493 which were formerly located at 299 Main Road Huapai.</p> <p><u>HS Huapai Station</u></p> <p>There are no recorded archaeological sites or historic areas, structures or buildings within the extent of the proposed station site. The station is in proximity to the Kumeū River tributary (east of the site), and there is potential to encounter archaeological sites within the tributary vicinity.</p> <p><i>Likely Future Environment</i></p> <p>The existing environment as it relates to historic heritage and archaeological values is likely to remain the same in the future.</p>

10.5 NOR S4: Access Road

10.5.1 Project Overview

It is proposed to widen the existing Access Road / Tawa Road corridor from its current width of 20m to a 30-35m wide four-lane cross-section (two lanes either direction) with walking and cycling facilities. The upgrade of the corridor transitions from an urban cross-section at Wookey Lane intersection to a 35m rural edge cross-section going south. Along the RUB Access Road upgrade has a rural edge treatment (e.g., swales) and walking and cycling facilities on the FUZ (west) side. Through the existing business and industrial area, a 30m urban corridor is provided, with walking and cycling facilities on both sides and urban stormwater treatment (wetlands).

The indicative NOR footprint shows the envelope proposed to operate and maintain Access Road and all its ancillary components, including stormwater infrastructure, bridges, batter slopes and retaining walls, as well as construction, see Figure 10-23 and Volume 3 for drawings.



Figure 10-23: NOR S4 Access Road project overview

10.5.2 Access Road Upgrade description

Key features of the Access Road upgrade include:

- Upgrading the existing Access Road corridor to a 30m wide four-lane arterial road with walking and cycling provisions, and to 35m rural corridor
- Combination of stormwater wetlands and swales typically with a 9m wide width, on Access Road
- A posted speed limit of 60km/h through the urban FUZ-rural edge area and 50km/h through the business and industrial area
- Tie-ins with existing roads, stormwater dry ponds, wetlands and culverts
- Batter slopes to enable widening of the corridor, and associated cut and fill activities
- 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 10-24 and Figure 10-25 show the indicative cross sections, for further detail see drawings at Volume 3.

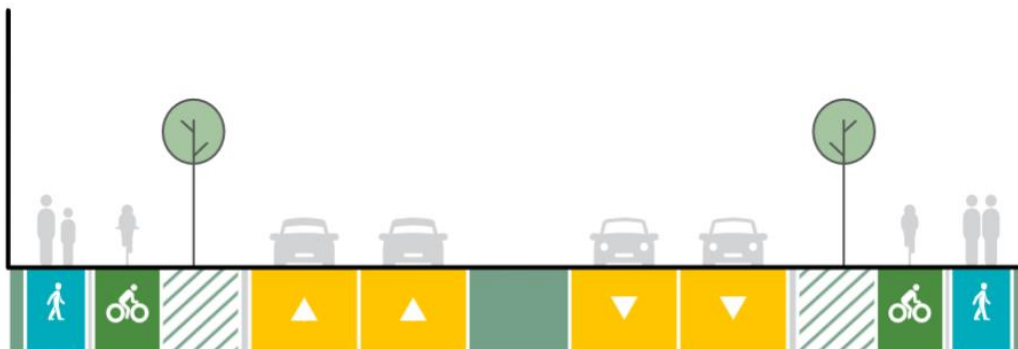


Figure 10-24: Typical urban cross section 30m – Access Road (north of Wookey Lane)

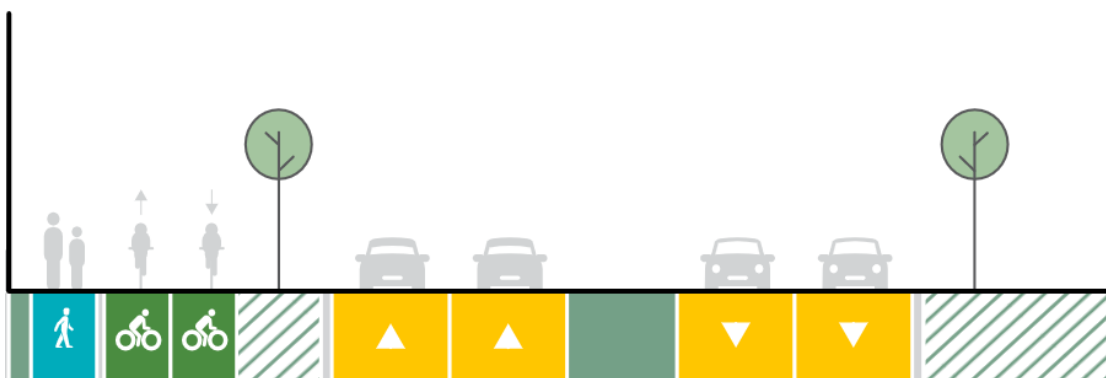


Figure 10-25: Typical rural cross section 35m – Access Road (south of Wookey Lane)

10.5.3 Existing and likely future environment

This section provides a description of the human, physical and natural features of the existing environment, and the likely future environment within which the Project will be constructed, operated, and maintained. Table 10-8 summarises the range of land use scenarios and planning provisions along the proposed transport corridor and on adjacent land to the corridor.

Table 10-9 summarises the key physical and natural features, as identified in specialist reports (Volume 4). Transport and noise and vibration have not been duplicated here, refer to those relevant supporting technical documents.

Table 10-8: NOR S4 Access Road Planning Context

Planning Context	Provision
Land use – Existing AUP:OP zoning	<ul style="list-style-type: none"> • FUZ • Business – Light Industry Zone, Mixed Use Zone • Rural – Countryside Living Zone, Mixed Rural Zone <p>The urban zoned areas have a lower likelihood of land use change than the FUZ which has a high likelihood of change, see Section 9.2. The rural area outside of the RUB (eastern side) is not expected to undergo urban development, other than provided for by the Countryside Living Zone. I517 Kumeū Showgrounds Precinct is also adjacent to the site.</p>
NW Spatial Strategy (Auckland Council)	<p>The NW Spatial Strategy identifies an extended business area on the west of Access Road, indicating commercial uses are intended to be enabled.</p> <p>No further land use planning is expected to occur until the area is structure planned and subsequent plan changes sought.</p>
AUP:OP Overlays	<ul style="list-style-type: none"> • High-Use Stream Management Areas Overlay • High-Use Aquifer Management Areas Overlay – Kumeū Waitematā Aquifer
AUP:OP Controls	<ul style="list-style-type: none"> • Arterial Road (Waitakere Road and Main Road) • Macroinvertebrate Community Index • Stormwater Management Area Control – Flow 1 • Subdivision Variation Control – Rural, Kumeū – Huapai Countryside Living
Designation – Transport related	<p>No other transport related designations. Access Road upgrade concludes at Waitakere Road, short of NAL level crossing (KiwiRail) and SH16 intersection (Waka Kotahi).</p>
Designation – non-transport	<p>#4311, Defence purposes – protection of approach and departure paths (Whenuapai Air Base), Minister of Defence.</p> <ul style="list-style-type: none"> • The works do not affect this designation

Table 10-9: NOR S4 Existing and Future Physical and Human Environment

Features	Description
Current land use	<p><i>Existing Environment</i></p> <p>The northern extent of Access Road is urbanised with industrial land use typified by larger warehousing and commercial stores on the west and the Kumeū Showgrounds open space on the east. Beyond the showgrounds the southern side of Access Road is rural, with</p>

Features	Description
	<p>agricultural and viticulture land uses, low scale large lot residential and established private vegetation in the form of trees and hedging. The corridor has a gravel or grassed berm on either side, private fencing and non-uniform mature trees and planting on the rural edge and established private trees at non-uniform intervals on the west side.</p> <p>Access Road is situated along gently sloping topography that slopes towards the southern end of the corridor, with high points in the north near existing industry. The corridor traverses one tributary of Kumeū River, no additional watercourses will be impacted by the proposed road upgrade. The majority of road reserve vegetation comprises pastoral fields bound by hedgerows, pockets of native and exotic trees intermittently along the road. Rural lifestyle blocks including gardens and amenity planting contribute to the landscape. No notable trees, scheduled landscape or ecological features are within the project area.</p> <p><i>Likely Future Environment</i></p> <p>The rural zone is unlikely to change significantly, as it is zoned and outside of the RUB. The Mixed Rural Zone provides for horticulture, viticulture, farming and equine activities, ancillary commercial activities to these are cafes, restaurants and tourist / visitor facilities. The Countryside Living Zone includes areas of scattered rural residential, farmlets (i.e., small farm, hobby farm) and horticulture as well as bush lots and papakainga.</p> <p>The existing commercial and open space areas on the western side are expected to remain with business land extending further along Access Road into the FUZ, with a resulting change from agricultural to urban use. The majority of the FUZ land use is undetermined and will be subject to later structure planning, however the NW Spatial Strategy has identified additional industrial area along Access Road extending the existing industry.</p> <p>The land on the eastern side of Access Road (majority Rural – Countryside Living Zone) is expected to retain its existing aesthetic, land use and character, the Kumeū Showgrounds are also expected to be retained at the north eastern end. Land within the FUZ will experience change from rural to urban land use. This land is expected to be urbanised for residential and commercial purposes over the next 10-20 years. It is anticipated that the physical features of the landform will be altered over time as the landscape is urbanised.</p>
<p>Community and recreational facilities</p>	<p><i>Existing Environment</i></p> <p>A range of existing community and recreational facilities are located along Access Road, including:</p> <ul style="list-style-type: none"> • Kumeū Community Centre at 35 Access Road adjacent Kumeū Showgrounds at 27 Access Road • Early childcare centre adjacent the Kumeū Showgrounds at 21 Access Road • Kumeū Showgrounds, which is owned and operated by the Kumeū District Agricultural & Horticultural Society. The site hosts a number of shows and events throughout the year, as provided for by the Kumeū District Agricultural and Horticultural Society Act 1991. <p>On the western side is:</p> <ul style="list-style-type: none"> • Kumeū Racquets Club at 50 Access Road, volunteer run providing for squash, badminton, pickleball and racquet ball • Kumeū Film Studios at 116 Access Road, with a variety of film infrastructure, stage, workshop and manufacture spaces, production offices, forest, water tanks, and greenscreen. <p>On the southern end where Access Road turns to Tawa Road</p> <ul style="list-style-type: none"> • Maria Miller Equestrian Academy is present at 48b Tawa Road <p>In proximity to Access Road includes Huapai Pony Club and Kumeū Cemetery.</p>

Features	Description
	<p><i>Likely Future Environment</i></p> <p>Existing open space areas and recreational activities are expected to remain unchanged, with the exception of those more rural activities within the FUZ which may shift into the nearby rural zone (Pony Clubs etc). It is likely additional community facilities will be provided within the FUZ and existing urban areas as development occurs and the population in the surrounding area grows.</p>
Watercourses	<p><i>Existing Environment</i></p> <p>The corridor is mostly on a ridge between Motu Road and Farrand Road and then crosses an unnamed stream and an overland flow path just before Grivelle Street. The existing 100 year flood maps from the latest Kumeū-Huapai catchment model with MPD and existing terrain show flooding at properties; 27, 35, 95, 116, 123, 151 and 161 Access Road, Kumeū. Existing flood prone areas from AC GIS are evident next to the corridor.</p> <p><i>Likely Future Environment</i></p> <p>On the northern side, realisation of the FUZ will change the hydrology, terrain, and buildings exposed to flooding. Future developments are anticipated to take account of and address flood risk as part of their development as per the AUP:OP rules, not increasing the existing flood hazard environment. In the existing urban areas, the hydrological environment and natural hazard conditions are not expected to significantly vary as they are already significantly impervious.</p>
Vegetation and ecology	<p><i>Existing Environment</i></p> <p><u>Habitats</u></p> <p>Within the Access Road corridor there are a range of existing habitat types, including brownfield (hardstand, concrete and including cropland market garden and commercial), exotic grass land characterised by pasture and private gardens, making up the majority of the corridor. High value habitats include planted mature native vegetation, and Moderate Value recently planted natives or mature exotic treeland, there are no SEAs, or Notable trees within the corridor, trees within Kumeū Showgrounds are not classified as Open Space trees, as the showgrounds is a rural zone.</p> <p>One stream branch was identified within the corridor, the stream is permanent and scored Moderate habitat quality overall. One wetland (S4-W1) was identified within the corridor footprint, determined to be of Low value. In proximity but outside the footprint at Waitakere Road is natural Raupo Reedland wetland (S2-W13), an endangered wetland type is identified as having Moderate value.</p> <p><u>Species</u></p> <p>Area wide bat surveys were undertaken and found bats within the wider area, some habitats present in Access Road is considered suitable for long tailed bats and of 'Very High' value. This is generally around the riparian vegetation and mature treeland.</p> <p>No dedicated bird surveys were undertaken, and no incidental sightings of birds were noted during site visits. Potential habitat for birds was however noted including for a number of TAR species including Long Tailed Cuckoo, New Zealand Pipit and North Island Kaka. These may use native / exotic treeland, scrub and grassland.</p> <p>Native lizards were not identified during opportunistic searches completed during the site walkover, however Copper skink have been recorded 3 km northeast of Access Road. Within the site there is suitable habit for Copper Skink, including exotic grass, exotic scrub, planted vegetation and treeland. It is unlikely other native skinks utilise the stream however ornate skink may occur in suitably modified habit such as dense riparian vegetation.</p>

Features	Description
	<p>No dedicated fish surveys were undertaken as this will be subject to a future regional consent phase.</p> <p><i>Likely Future Environment</i></p> <p>It is assumed that in a future urbanised scenario, permanent streams and wetlands will generally be avoided and retained, due to greater emphasis on the protection and enhancement given in the AUP:OP and NES-FW. Vegetation not identified as protected under the plan is expected to be removed in a future urban scenario, this will include the majority within the corridor not riparian, notable or of a height and girth to be protected, within the road reserve or park land. As the road abuts the Rural Zone removal of trees within the road is also permitted under the AUP:OP. Future terrestrial vegetation is likely to consist of private amenity planting, within commercial or residential sites, as well as street trees. Outside the RUB, the landscape is not expected to undergo significant changes, and generally retain its existing habitats.</p>
<p>Historic heritage and archaeological values</p>	<p><i>Existing Environment</i></p> <p>There are two heritage sites along Access Road, these are Pomona Hall CHI ID #18795 located at 35 Access Road and Historic structure 'Shed, gates and railings CH ID # 16377 at 211 Access Road. Pomona Hall is set back from the road reserve and is outside the area of works, this building was moved to the site and there is no potential for subsurface features to be identified.</p> <p><i>Likely Future Environment</i></p> <p>The existing environment as it relates to historic heritage and archaeological values is likely to remain the same in the future.</p>

10.6 Strategic NOR Package Overview

Table 10-10: Strategic NOR Package Overview

Notice	Purpose	Objectives	Approx. extent	Lapse Period	Properties Directly Affected
NOR S1 Alternative State Highway	Construction, operation and maintenance of a transport corridor	<p>Enable the provision of a transport corridor that:</p> <ul style="list-style-type: none"> a) Provides for an efficient, reliable and resilient strategic connection between Redhills North and SH16 west of Kumeū-Huapai b) Supports planned urban growth c) Supports connectivity within Kumeū-Huapai by providing a new corridor for interregional and freight trips to SH16 Main Road d) Supports mode shift on the transport network e) Supports a safe transport network for all users f) Supports and integrates with the existing and future strategic transport network in the North West. 	<p>Linear designation from Brigham Creek roundabout to SH16</p> <ul style="list-style-type: none"> • 11km • 50m (w) 	20 years	Total: 268
NOR S2 SH16 Main Road (alteration to existing designation 6766)	State Highway 16	<p>Enable the provision of a transport corridor that:</p> <ul style="list-style-type: none"> a) Supports planned urban growth b) Supports connectivity within Kumeū-Huapai c) Contributes to mode shift by providing a choice of transport options including active modes d) Supports a safe transport network for all users e) Supports and integrates with the existing and future transport network in Kumeū-Huapai. 	<p>Linear designation from Riverhead Road to Foster Road.</p> <ul style="list-style-type: none"> • 4.5Km • 24m wide 	Not applicable	Total: 223

Notice	Purpose	Objectives	Approx. extent	Lapse Period	Properties Directly Affected
NOR S3 Rapid Transit Corridor	Construction, operation and maintenance of a public transport corridor	<p>Enable the provision of a transport corridor that:</p> <ul style="list-style-type: none"> a) Provides for an efficient, resilient, and reliable rapid transit between Redhills North and Kumeū-Huapai b) Supports planned urban growth c) Supports a quality urban form within Kumeū-Huapai d) Contributes to mode shift by providing a choice of transport options including rapid transit and active modes e) Supports a safe transport network for all users f) Supports and integrates with the existing and future transport network in the North West. 	<p>Linear designation from SH16 south of Brigham Creek roundabout, to SH16 Main Road</p> <ul style="list-style-type: none"> • 9.5 km • 14-20m wide 	20 years	Total: 350
NOR KS Kumeū Station	Construction, operation and maintenance of a public transport station and associated facilities	<p>Enable the provision of a transport station that:</p> <ul style="list-style-type: none"> a) Supports planned urban growth b) Supports a quality urban form within Kumeū-Huapai c) Contributes to mode shift by improving travel choice, via access to rapid transit d) Supports a safe transport network for all users e) Supports and integrates with the existing and future transport network. 	Site specific designation at 301 Main Road	20 years	Total: 13
NOR HS Huapai Station	Construction, operation and maintenance of a public transport station and associated facilities	<p>Enable the provision of a transport station that:</p> <ul style="list-style-type: none"> a) Supports planned urban growth b) Supports a quality urban form within Kumeū-Huapai c) Contributes to mode shift by improving travel choice, via access to rapid transit d) Supports a safe transport network for all users e) Supports and integrates with the existing and future transport network. 	Site specific designation at 29 Meryl Avenue	20 years	Total: 18

Notice	Purpose	Objectives	Approx. extent	Lapse Period	Properties Directly Affected
NOR S4 Access Road	Construction, operation and maintenance of a transport corridor	<p>Enable the provision of a transport corridor that:</p> <ul style="list-style-type: none"> a) Supports planned urban growth b) Improves connectivity within Kumeū-Huapai and to the existing and future strategic transport network c) Contributes to mode shift by providing a choice of transport options including active modes d) Supports a safe transport network for all users e) Supports and integrates with the existing and planned transport network. 	<p>Linear designation from SH16 Main Road to Tawa Road</p> <ul style="list-style-type: none"> • 2.8km • 30m wide 	20 years	Total: 65

11 NW Strategic Engagement

11.1 Introduction

This section provides an overview of engagement undertaken for the NW Strategic Package in Kumeū-Huapai and Redhills North. It summarises the approach during each phase of the Project focusing on key themes and common issues raised across the NW Strategic Package and North West Transport Network generally. Where engagement has affected a specific project design outcome, such as alternatives consideration or identification and management of an environmental effect that is considered in either the Assessment of Alternatives (Appendix A) or the AEE Part B, as relevant.

11.2 Groups Engaged

Te Tupu Ngātahi has worked with partners, stakeholders, potentially affected landowners and the wider community through all project stages. The following parties (see Table 11-1) were engaged using a variety of tools and methods (see Figure 11-1). Following the COVID19 pandemic, online engagement use increased, however this was supported by face-to-face engagement in particular for public and landowners.

Table 11-1: Groups across the NW Strategic Package

Group	In particular
Partners	Manawhenua, Auckland Council
Elected members	MP's and Ward Councillors, Auckland Council Planning Committee, Local Boards (Upper Harbour, Rodney, and Henderson and Massey)
Stakeholders	Ministry of Education, New Zealand Defence Force, Department of Conservation, Ministry of Business, Innovation and Employment, and Kāinga-Ora, Heritage New Zealand Pouhere Taonga, Fire and Emergency New Zealand and KiwiRail
Network Utilities	Watercare, Transpower, Vector, First Gas, Spark
Interest Groups	Bike and Walk Auckland, Heritage New Zealand, Forest and Bird, Greater Auckland, Generation Zero, accessibility groups, business associations, road user groups
Developers	Oyster Capital, Cabra Development Limited, Liberty Property Trustees, Hugh Green Group, Woolworths New Zealand, Roscrea No. 2 Trustee Limited, Neil Group
Landowners	Who own property within the study corridor
Public	Members of the North West community and wider

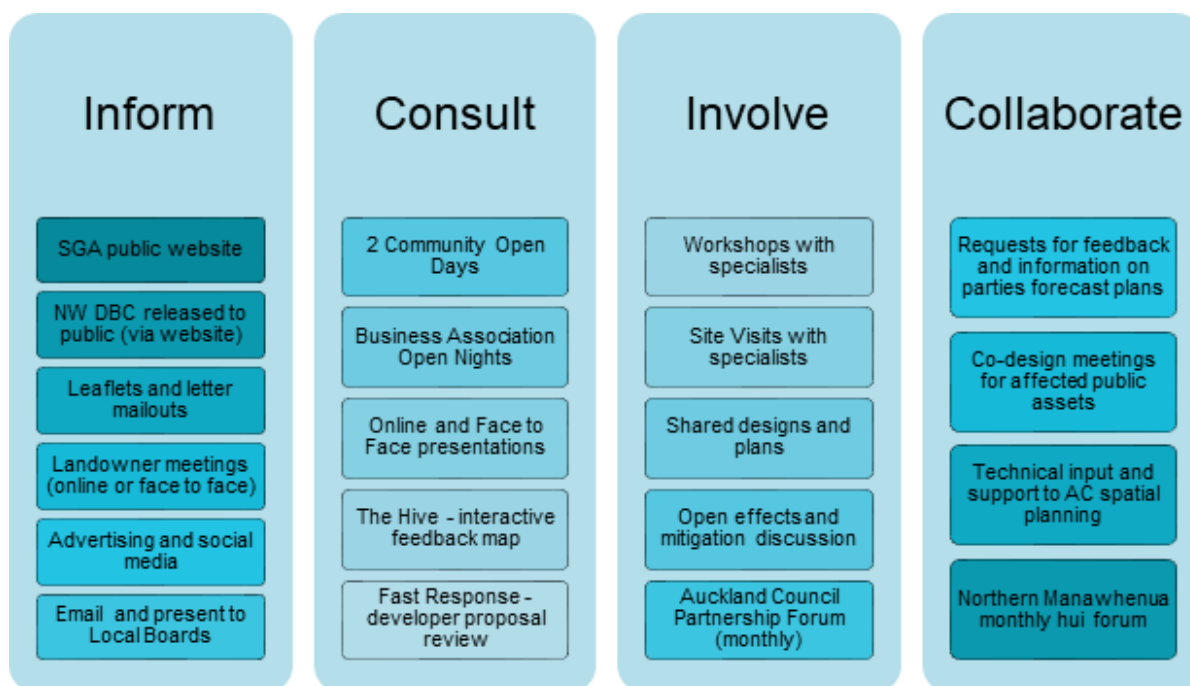


Figure 11-1: Engagement methods and tools

11.3 Engagement Stages and Approach

Te Tupu Ngātahi has engaged through all project stages including IBC, DBC and preparation of the route protection package. Although there is no statutory obligation to engage it is widely accepted as best practice, and has generally had the following objectives:

- Provide information to landowners on how projects might impact their property, the route protection and anticipated timelines
- Identify and understand constraints including any characteristics or features of properties (environmental, historic, cultural) not previously known to the Project team, in order to inform and develop the project(s)
- Integrate and collaborate with other network providers to achieve strategic co-benefits where practicable and / or not preclude future network plans
- Keep community informed of the projects progress
- To avoid, remedy and manage potential adverse effects where practicable either created by or likely to impact on the NW Strategic Network.

Following broad engagement at business case which indicated a high level of support, the NW Strategic Package moved into the NOR engagement, focusing on directly affected landowners and stakeholders (see Figure 11-2). These engagement phases are summarised in Figure 11-2: Te Tupu Ngātahi engagement process

Table 11-2. It is noted that consultation for detailed design and delivery engagement will be undertaken in future by the requiring authority.

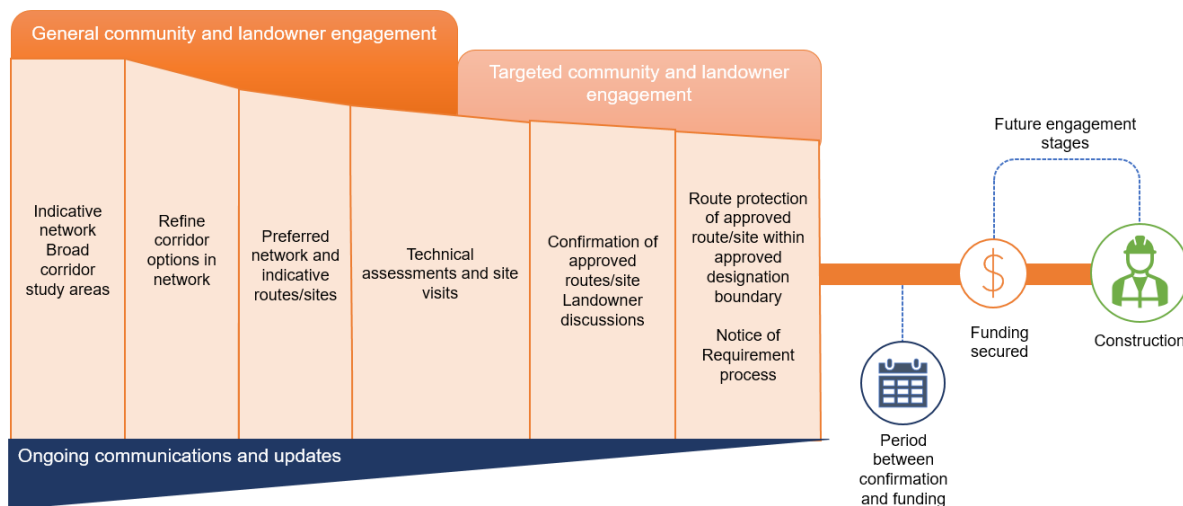


Figure 11-2: Te Tupu Ngātahi engagement process

Table 11-2: Project engagement stages summary

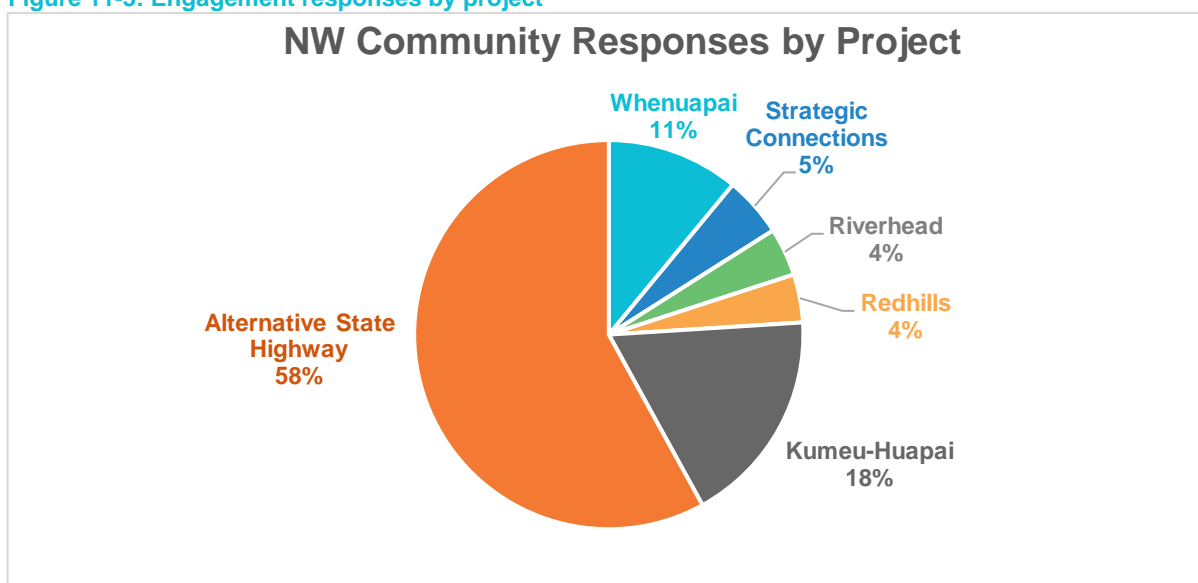
Project Stage	Timing	Engagement Summary
IBC	2018/19	<ul style="list-style-type: none"> Receive feedback on the short-listed options considered for the business case Information drop ins, workshops to develop an IBC for the North West future transport network.
DBC / Options assessment	2020 – 2021	<ul style="list-style-type: none"> Collaborate with Auckland Council for combined drop-in sessions with other projects led by Waka Kotahi and AT to inform communities of projects happening in the North West Elected members engaged to provide insights from the community and inform the DBC and options assessment Key stakeholders (e.g., government, network utilities, interest groups and developers owning property) provided regular updates and opportunities to provide feedback Landowners and community engagement between the 1st of November 2020 and 1st February 2021. People invited to provide feedback using a range of platforms, including via drop-in sessions, face-to-face, email, phone call, feedback forms, Social Pinpoint and online surveys.
NOR phase	2022	<ul style="list-style-type: none"> Briefing and presentations to local boards and elected representatives Publicly released the North West DBC documentation to the Te Tupu Ngātahi website Community Drop-in sessions held at Te Manawa in Westgate Identified affected property owners sent letters in May 2022 NOR boundary plans sent in September and October 2022 to affected landowners with offer of engagement. Over 90 emails and phone calls were received across NW Strategic Package and 68 meetings held to date with landowners.

11.4 Engagement Response

11.4.1 Project and area context

The NW Strategic Package includes two new and two upgraded transport corridors and two stations, totalling approximately 60km of new / upgraded network. Over the next 30 years the North West is forecast to grow tenfold from approximately 9,000 to 100,000 people, increasing from 3,200 to 40,000 dwellings and providing 20,000 new jobs up from current 5,000 (source: FULSS). These figures represent an extensively changed community. Figure 11-3 is a snapshot of North West Transport Network engagement and responses. Alternative State Highway and Strategic Connections are the NW Strategic Package projects, the remainder NW Local Arterials Package (separate package).

Figure 11-3: Engagement responses by project



11.4.2 Feedback and projects response

The following provides the key themes from engagement along with the source and how representative of the aggregate the feedback is. The intention of providing this data is to highlight key issues raised in relation to the proposed NW Strategic Package and how the project has responded to them. As stated at Section 11.1, where feedback affected a specific project or option design, this is detailed in the AEE Part B or the Assessment of Alternatives at Appendix A, as relevant. Note that Table 11-3 is intended to be representative, not exhaustive.

Table 11-3: NW Strategic key feedback themes

Feedback	Most raised by	Project Response
General		
Traffic congestion and travel time concerns and desire for projects to be brought forward	Public	The NW Strategic Package projects are significant trunk infrastructure with long lead times. The expected delivery period is set out in Section 4.2, the projects will not be immediately delivered. Shorter term projects (separate to NW Strategic Package) are proposed to help relieve transport constraints in interim, see Section 9.5 Interfacing projects.

Feedback	Most raised by	Project Response
Concern regarding property impacts inc. value, access, future acquisition process	Landowners	Noted and acknowledged. The project has communicated with those directly affected landowners separately to discuss the project and expectations. Access has been considered for each property and legal access will be maintained where practical, or the property acquired were not. Refer to Volume 3 drawings, for property requirement and AEE Section 24 for Property and Land Use impact discussion.
Support for public transport upgrades	All	Noted. The RTC will enable significant PT improvements.
Support for safe cycle lanes and pedestrian facilities	All	Noted. All corridors will provide separated safe walking and cycling facilities.
Frustrations with lack of certainty over transport projects timing	Public	Route protection of the corridors will provide certainty re. the extent and location. For the lapse date timeframes discussion see AEE Section 5.
Concern re. noise and vibration effects on properties (operational)	Kāinga-Ora	Noted. The Project provides an assessment of acoustic effects, see Volume 4 and AEE Section 15.
Feedback on sequencing sought invest in better transport connections prior to additional housing being built 75% of survey respondents supported route protecting land now	Public	Noted. The project lapse durations reflect the anticipated build out of the FUZ and transport demand. See AEE Section 4.2 and Section 5.
Concern about the flooding issues at Kumeū and risk of flooding being exacerbated by or affecting the projects	Public	The projects have accounted for predicted rainfall events and the corridors have provided space for stormwater ponds or swales. The projects are not expected to exacerbate flood hazard and are designed to be resilient, generally avoiding most at risk areas, refer to Flooding Assessment at Volume 4.
Requests for changes to the town centre location and associated landuse and zoning existing/planned.	Interest groups	The North West Transport network has responded to Auckland Council planned landuse scenario, as set out through the AUP:OP, structure planning, centre plans and NW Spatial Strategy, see Section 10. Landuse and zoning changes are outside the scope of the project.
Alternative State Highway		
High support for project (78% supported moving SH function out of Kumeū-Huapai)	Public	Noted. Generally wider public were supportive of the project, where the alignment affected property or amenity it was less supported or not supported.
Alignment – suggestions north of SH16 or extending to Waimauku and Helensville 55% of respondents rated the proposed NOR alignment as	Public and landowners	Various alignments options were considered, the option selected needed to both meet the project objectives and sought to minimise adverse impacts. Refer to Assessment of Alternatives (Appendix A) for detail, in particular long list options.

Feedback	Most raised by	Project Response
good or very good, 28% as poor or very poor		
SH16 Main Road		
Congestion was seen as a key issue, with support for a new direct connection between SH16 and SH18	Public	Noted and agreed. Congestion and impacts on strategic trips is a key driver for the NW Strategic Package. The ASH is the key project for building network resilience (see Section 10.2).
Many commented on the need for safety upgrades to SH16	Public	Noted. Upgrades are proposed to SH16 which will be designed to support Vision Zero and Safe Roads principles.
Suggested that Station, Tapu, Access and Matua Roads should be prioritised for upgrades	Public	Noted. Station Road and Tapu Road are proposed to be upgraded into one intersection. This is also required to support the NOR S3 RTC construction. Matua Road level crossing is to be grade separated as part of S2 SH16 Main Road.
Rapid Transit Corridor (inc. Kumeū and Huapai station)		
Prioritise heavy rail and / or rapid transit to Kumeū-Huapai, or provide passenger rail services	Public	Heavy rail and use of the existing line were considered at options assessment and discounted as a long term solution. The project does not preclude interim passenger rail services being provided; however, they are not preferred long term. For further details refer to Appendix A Assessment of Alternatives.
Concern regarding the physical impacts of the project on properties, businesses and the community. (Huapai Tavern, domain etc)	All	A social impact assessment has been undertaken to detail the impact of the project on the community, see Volume 4. There has been ongoing engagement with Auckland Council. Consultation for the NW Spatial Strategy was undertaken with DBC consultation this signals future land uses within Kumeū Huapai and North West FUZ areas. The corridor alignment was considered through the Assessment of Alternatives and has been refined.
Broad support for stations and desire for PT solutions now	All	Noted. The projects are planning for the long term, there are interim PT projects proposed as part of the Rodney Local Board plans, see interfacing projects, Section 9.5.
Desire for park and ride facilities to be provided at both stations	Public	No Park and Ride is planned at Kumeū Station. This will have a walk-up urban catchment and will be supported by PT. Huapai Station is designed to provide a Park and Ride, as it is an end of the line facility, see Section 10.4.3.2.
Mixed response towards a bus based RTC vs other modes	Public	The Project has been designed for a bus RTC, this mode level of service is within the predicted demand for the extension from Westgate / Brigham Creek. Bus RTC can be frequent, reliable and fast when on dedicated route and gives flexibility if the route is delivered ahead of southern RTN network with ability to connect at Brigham Creek.

Feedback	Most raised by	Project Response
Access Road		
80% of respondents rated upgrade as very important or important, 15% as very unimportant or unimportant	Public	Refer to AEE, Section 3.1 for the existing challenges and constraints.

11.5 Summary of engagement

Engagement has occurred for the NW Strategic Package through all project stages including at the IBC, the DBC including options assessment and NOR preparation. Engagement has been with partners, other network providers, stakeholders, directly affected land owners and the wider community. Engagement has been used by the project team to inform and as appropriate update or change the transport projects put forward to NOR. As noted, further detail on engagement outcomes is set out in relevant report sections of Assessment of Alternatives (Appendix A) or AEE Part B.

Prior to detailed design and construction, further engagement will be undertaken by the requiring authority, as needed to manage impacts of the projects, this is set out in detail in the AEE Part B and the proposed conditions at Volume 2, Appendix B.



PART B

Assessment of Effect on the Environment

12 Scope of Assessment of Effects under s171 and s181(2) of the RMA

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

When assessing the actual or potential effects on the environment under section 171 of the RMA, the assessment of effects on the environment for the NW Strategic Package has been limited to matters that trigger a district plan consent requirement. These are the only activities authorised by the proposed designations and alteration to existing designation.

Where NES or regional plan consenting requirements are triggered, these will not be authorised by the proposed designations and alterations to an existing designation and will require regional resource consents to be obtained in the future.

In this AEE, the assessment of effects is limited to matters that would trigger a district plan consent requirement under the AUP:OP. However, relevant national and regional resource consent matters have been considered to inform the transport corridors design and development and the proposed designation footprint.

Under section 181(2), those same matters are to be considered 'with all necessary modifications', in relation to a NOR for an alteration as if it were a NOR for a new designation. NOR S2 alters the existing SH16 – Hobsonville to Wellsford (6766) held by Waka Kotahi. The alteration is limited to the works proposed as part of the alteration. It does not include works that could be undertaken within (or effects that are or could reasonably be generated by) the existing designations.

The assessments that have been undertaken to support the NW Strategic Package include and are addressed in the following order:

- Positive effects
- Traffic and transportation
- Traffic noise and vibration
- Construction noise and vibration
- Network Utilities
- Natural hazards (flooding)
- Terrestrial Ecology
- Landscape and visual
- Historic heritage and archaeology
- Māori culture, values and aspirations
- Social impact assessment
- Property and land use
- Urban design evaluation.

13 Positive effects of the strategic network

The NW Strategic Package will play a vital role in the success of future neighbourhoods 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 these strategic transport corridors will provide for the following outcomes at a network-wide level:

Supporting and enabling growth: Identifying and designating improved and new transport corridors will support Auckland Council's growth aspirations for the growth areas of Auckland, including intensification and 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
- Support freight service operations for businesses in the industrial and commercial areas of Whenuapai, Kumeū-Huapai and the wider Auckland region
- Support interregional travel through the provision of the ASH as an alternative route to SH16 Main Road and the provision of park and ride facilities as part of the Huapai RTC Station.

Transformational mode shift: The transport network supports a shift from private vehicles to public transport, walking and cycling, which will provide greater travel choice and healthier outcomes for all people as the city grows. This is achieved through the provision of a new RTC and active mode facilities along or adjacent to all corridors in the strategic network. Additionally, the ASH will facilitate the removal of freight and intra-regional movements from SH16 Main Road, which allows for the addition of active mode corridors on SH16 Main Road.

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, placemaking 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
- A reduction in private vehicle travel as a result of mode shift towards public transport and walking and cycling.

Sustainable outcomes: Protecting improved and new transport corridors will support the Government's policy shift towards more sustainable outcomes through effective land use 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 provide space for utility provision within conceptual design.

14 Traffic and Transportation

The potential effects of the new and upgraded transport corridors in the NW Strategic Package on traffic and transportation have been assessed in the Assessment of Transport Effects report provided in Volume 4. The effects are considered in this section and should be read in conjunction with that report.

The effects assessment has been undertaken on the likely future environment, based on the full build out of future urban areas, and taking into account wider transport infrastructure upgrades (see AEE Part A).

14.1 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. Instead, when considering the transport effects of the transport corridors, a greater focus has been placed on the full build out of the future urban area to support future communities with wider infrastructure upgrades in place. These wider infrastructure upgrades include the North West Local Arterial Package which is the subject of a separate AEE package prepared by Te Tupu Ngātahi, as well as other projects which are not progressed by Te Tupu Ngātahi and are identified in Table 9-10. These projects will integrate with or affect the NW Strategic Package and therefore form the complete transport response for the North West. Transport effects of the NW Strategic Package therefore need to be assessed in this context.

A key element of the assessment is the definition of the existing / likely future environment, against which the effects are assessed. Transport corridors are planned to support urban development and would unlikely be progressed without such development. Additionally, the source of potential effects (such as people and vehicle movement), is generally from urban development and intensification, rather than from the planned infrastructure.

To isolate the effects of the planned works, the existing environment for the purpose of assessing transport related effects includes the likely future urban development but does not include the planned transport corridors for which designations are sought. The effects of the transport corridors are then assessed using the same land use assumptions.

The assessment is focussed on identifying and designating improved and new transport corridors, 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
- Assumes greater use of recommended management plans and planning processes rather than specific design details to manage potential effects.

14.2 Positive Traffic and Transportation Effects

The NW Strategic Package will have positive operational effects on the transport network. Key outcomes that each NOR within the NW Strategic Package are intended to deliver, and which will result in positive effects, include:

- A high quality, fast and reliable RTC connecting Kumeū-Huapai to Westgate, Whenuapai and the city centre, which will include the Kumeū and Huapai Rapid Transit Stations that will support intensification of adjacent land uses and maximise walk-up catchments
- An ASH which will remove strategic trips from within Kumeū-Huapai. This will improve amenity and access to the Kumeū town centre, support the implementation of the RTC and provide direct and efficient heavy vehicle access from the state highway to the future industrial area via Access Road
- A reliable bus infrastructure network that connects both existing and new land uses to key destinations and Rapid Transit Stations, along SH16 Main Road. It will support both collector and local bus services and there will be provision for intersection bus priority at key locations in the network
- New and upgraded active mode facilities to improve safety, attractiveness and connectivity within and between centres. This includes the Regional Active Mode Corridor (RAMC) which will be aligned with the RTC, and a strategic facility alongside the ASH, which both support separated, uninterrupted and higher speed cycling and micro-mobility. In addition, separated cycle lanes are provided on the SH16 Main Road and Access Road urban corridors.

14.3 Construction Effects Assessment

In order to assess the potential construction traffic effects, an indicative construction methodology has been prepared and the assessment of construction effects has been based on this. The assessment considers:

- Key considerations including speed, potential impacts to pedestrians and cyclists, residential, recreational and business property access, and on-street / public parking
- Identification of any works that should not occur at the same time
- Assessment of potential conflict areas with vulnerable road users that will need specific mitigation within a CTMP.

On-line and off-line construction works

Off-line construction works – Construction works required for the rural sections of the ASH and RTC, sections of the urban section of the RTC and the Kumeū and Huapai Rapid Transit Stations will largely be able to be delivered offline away from live carriageways. This will minimise traffic disruption to where the corridor interfaces with the road network and to corridors required for construction traffic.

On-line construction works – The SH16 Main Road Upgrade, sections of the urban section of the RTC, where it crosses existing roads, and Access Road Upgrade will be delivered within or adjacent to a live carriageway which will require increased traffic management.

Construction effects

The delivery of projects adjacent to or within the live carriageway will require temporary traffic management. The scale of temporary traffic management to delineate live traffic away from the construction zones will be dependent on the various stages and requirements of the construction activities.

It is expected that short term road closure for nights or weekends may be required for some activities, such as road surfacing, traffic switches and gas relocations. Other activities may require stop / go or contraflow traffic management, such as drainage, utility relocation, survey and investigation work. Road closures occur frequently throughout Auckland (i.e. general maintenance or installation of new utilities) and therefore Waka Kotahi and AT have well-established processes to manage potential disruption.

The effect of temporary road closures or other traffic management methods associated with each of the new and upgraded transport corridors on the transport network will be considered at the detailed design stage and set out in the CTMP, prior to implementation. This will allow the CTMP for each corridor to be informed by the transport environment present prior to implementation. This approach will consider the level of growth and change in land use that has occurred in Kumeū-Huapai and the availability of the alternative routes.

The construction of each new or upgraded transport corridor will likely require large scale earthworks, particularly the ASH corridor and RTC. 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 volume on construction routes used during the construction period of each of the corridors.

Property access

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 should undertake a property specific assessment of any affected driveways and provide temporary access arrangements if required. The temporary access should ensure safe access and exit the property. These requirements should be captured in the CTMP.

Land use activities that will need further consideration in the CTMP

Table 14-1 provides a high-level summary of the key land use or activities that are located adjacent to the corridors and will need further consideration during development of the CTMP. This could include additional controls at key access locations, temporary diversions of local roads, restricted truck movements during school pick up and drop off, or mitigation relating to the effects on parking within the properties.

Table 14-1: Sites for Consideration within future CTMP

Corridor	NOR	Sites for Consideration
Alternative State Highway	NOR S1	<ul style="list-style-type: none"> • Business premises, including rural businesses, located along the corridor • Fred Taylor Park • NAL • Local public transport (bus) stops.
SH16 Main Road	NOR S2	<ul style="list-style-type: none"> • Business premises located along the corridor • Kumeū Showgrounds • Huapai District School, Huapai • Tau Te Arohanoa Akoranga School, Huapai • Community facilities, including Kumeū Library • Emergency services

Corridor	NOR	Sites for Consideration
		<ul style="list-style-type: none"> • NAL • Local public transport (bus) stops.
Rapid Transit Corridor	NOR S3	<ul style="list-style-type: none"> • Business premises located along the corridor • Fred Taylor Park • Kumeū Showgrounds • Huapai Recreation Reserve • Matua Ngaru School, Huapai • Emergency services • NAL • Local public transport (bus) stops.
Kumeū and Huapai RTC Stations	NOR KS, NOR HS	<ul style="list-style-type: none"> • Business premises, including rural businesses, located along the corridor • Community facilities, including Kumeū Library for NOR KS. • Emergency services • NAL.
Access Road	NOR S4	<ul style="list-style-type: none"> • Business premises located along the corridor • Kumeū Showgrounds • Community facilities, including Kumeū Community Centre • Emergency services.

Timing of Implementation

The construction of the section of the SH16 Main Road Upgrade between Access Road and Oraha Road will need to occur in advance of the construction of the RTC. This is due to a combination of either the existing SH16 corridor needing to be relocated to facilitate the RTC or the construction of the SH16 Main Road Upgrade requiring temporary diversion during construction utilising areas that form part of the proposed RTC designation. This is a matter to be considered in relation to the implementation of the corridors. The proposed lapse dates provide sufficient flexibility to enable this to be achieved.

The relative timing of the SH16 Main Road Upgrade, RTC and ASH corridor will be considered prior to implementation. The assessment has identified that depending on the timing of the SH16 Main Road Upgrade, relative to future urban growth occurring in Kumeū-Huapai, the implementation of the ASH may be necessary in advance of this upgrade to manage potential adverse effects on the urban areas. The delivery of the RTC through Kumeū-Huapai is also noted as being dependent on the completion of some segments of the SH16 Main Road Upgrade in advance.

14.3.1 Measures to Avoid, Remedy or Mitigate Construction Effects

It is considered that the potential construction traffic effects can be accommodated and managed appropriately via a CTMP which is to be developed closer to the time of construction. Based on the assessment of transport construction effects, it is recommended:

- A CTMP shall be prepared prior to the start of construction. Any potential construction traffic effects shall be reassessed prior to construction taking into account the specific construction methodology and traffic environment at the time of construction

- The objective of the CTMP is to avoid, remedy or mitigate, as far as practicable, adverse construction traffic effects. To achieve this objective, the CTMP shall include:
 - Methods to manage the effects of temporary traffic management activities on traffic
 - Measures to ensure the safety of all transport users
 - 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
 - Size access routes and access points for all construction vehicles, the size and location of parking areas for plant, construction vehicles, and the vehicles of workers and visitors
 - Identification of detour routes and other methods to ensure the safe management and maintenance of traffic flows, including pedestrians and cyclists, on existing roads
 - Methods to maintain vehicle access to property and / or private roads where practicable, or to provide alternative access arrangements when it will not be
 - The management approach to loads on heavy construction vehicles, including covering loads of fine material, the use of wheel-wash facilities at site exit points and the timely removal of any material deposited or spilled on public roads
 - Method that will be undertaken to communicate traffic management measures to affected road users (e.g., residents / public / stakeholders / emergency services).

14.4 Operational Transport Effects Assessment

Road Safety Effects

The design of each project within the Strategic package has been undertaken with consideration of the latest safety guidance. This includes AT's Vision Zero and Waka Kotahi's Road to Zero. Each project is expected to result in positive effects on safety when compared to the existing network.

Walking and Cycling Effects

Each transport corridor within the strategic network proposes separated active mode facilities and includes sufficient space in the designation to provide dedicated pedestrian and cycle crossing facilities. The RTC stations will provide active mode facilities. This will enable safe movements for vulnerable road users along and across the network as there will be a significantly reduced likelihood and exposure of pedestrians and cyclists to potential crashes.

Public Transport Effects

The RTC will support transformational mode shift in Kumeū-Huapai through the provision of a safe, high-quality, frequent, and reliable public transport system that connects Kumeū-Huapai with Brigham Creek Interchange with local connections onwards to Westgate and the Auckland city centre.

The Brigham Creek Interchange element of the ASH will provide for better public transport reliability as it will separate key local public transport services from the strategic traffic movements that currently use SH16 enroute to Kumeū-Huapai and beyond and vice versa.

No dedicated public transport facilities are proposed on the wider ASH; however local public transport services not requiring dedicated facilities will be able to use the ASH. The corridor will be an alternative route for freight and private vehicles, which will reduce the vehicle volumes on SH16 Main Road through Kumeū-Huapai. This, alongside the upgrades proposed on SH16 Main Road, will improve capacity within the urban corridor to carry more public transport trips.

The upgrades to Access Road will improve the reliability of Access Road for public transport.

General Traffic and Freight

The ASH has been designed to accommodate the large traffic volumes expected along the corridor. This will minimise congestion during peak periods, and will support the resilience of the strategic network in the North West.

The ASH will provide an alternative strategic route for longer distance regional and sub-regional connections, allowing this traffic to avoid SH16 Main Road. It will reduce current and future reliance on existing unsuitable rural roads as alternative informal arterial routes which are not designed for increased volumes of traffic and the use of which exacerbates safety issues on these rural roads.

The ASH, SH16 Main Road and Access Road will provide sufficient capacity to accommodate the predicted level of growth in Whenuapai, Redhills and Riverhead. All proposed intersections have been assessed using inputs from a local traffic model and are predicted to perform at a satisfactory level of service during peak periods.

The RTC will contribute to reducing the future traffic demand on the SH16 corridor between Kumeū-Huapai and Westgate / Whenuapai, which will improve the effectiveness and reliability of this corridor.

Effects on Access

The ASH and RTC will maintain access along all existing local roads along the route via grade separation of local road corridors, and in some cases, permanent realignment of local roads.

SH16 Main Road and Access Road, are expected to have limited access. As the FUZ in Whenuapai, Redhills North and Riverhead develops, it is expected that future access to each corridor will be facilitated by collector road networks within the surrounding urbanised areas.

In terms of existing property access, the overarching design philosophy has been to maintain driveway access, where practicable, and minimise impacting other land except where necessary to continue to provide access to properties. Where access cannot be maintained properties have been included within the designation footprint.

Parking

SH16 Main Road – Along SH16 Main Road, there is existing on-street parking (around 41 car parking spaces) within the road reserve between Access Road and 92 Main Road. These spaces will be removed as part of the upgrade of the corridor. The long-term form and function identified for the corridor has on-street parking as a low priority. This is consistent with the current AT Parking Strategy (2015), particularly as this relates to Parking on Arterial Roads (Policy 4A), which states AT will manage parking on arterial roads by extending clearways or removing parking where it:

- Inhibits the capacity of the road to carry more people (and goods) particularly in the peak periods; and / or
- Causes significant delays to the speed and reliability of public transport on the FTN; and / or
- Causes safety risks for cyclists or impedes quality improvements on the Auckland Cycle Network.

In addition, the draft AT Parking Strategy (2022) includes principles guiding the role of the road corridor, and the role of parking within the road corridor. This identifies that to align with Government and Council direction parking should be managed to encourage travel by sustainable and efficient transport modes such as public transport and active modes, prioritise trips by modes other than

private motor vehicles and enable kerbside space to be utilised for more beneficial activities. The principles identify kerbside space will typically be allocated in a priority order with parking (and particularly general vehicle parking), as the lowest priority. This is consistent with the approach in the long-term form and function assessment identified for the corridor.

Given the anticipated future land use and transport context, it is considered that the effects from the loss of on-street parking can be managed at implementation to align with broader parking strategies that will complement the locations proximity to the Kumeū town centre and proposed Kumeū Rapid Transit Station.

RTC – For Huapai Recreation Reserve, Waka Kotahi is working with Auckland Council Community Facilities to consider how impacted car parking may be replaced.

Access Road – The Kumeū Showgrounds and Kumeū Community Centre are impacted by the Access Road Upgrade. The upgrade will affect access to and parking within these sites. It is considered that the identified loss of on-site parking is unlikely to affect day-to-day operation given the number of remaining car parking spaces, and engagement with these occupiers is recommended prior to implementation.

There is the potential, given the overall size of the Kumeū Showgrounds, that revised arrangements for more occasional high demand event parking could be managed within the existing site. The Showgrounds could also potentially (by arrangement with Auckland Council) be used for overspill parking associated with larger events at the Kumeū Community Centre. Engagement will be undertaken with the Showgrounds prior to the implementation of the project in order to find a practicable solution in the future land use and transport context.

Kumeū Community Centre is a Council owned asset and AT is a Council Controlled Organisation. Discussions are currently underway, including the re-configuration of the existing car parking as one mitigation option.

Furthermore, the upgrades to Access Road and SH16 Main Road will support mode shift to active modes and will support local bus services. The RTC will also provide an alternative transport mode to travel to both sites. This will provide an alternative to private vehicles to access and park at the sites.

Given the above it is considered that the effects from the RTC, SH16 Main Road Upgrade and Access Road Upgrade on existing on and off-street car parking can be appropriately managed or mitigated.

14.4.1 Measures to Avoid, Remedy or Mitigate Operational Effects

The NW Strategic Package provides significant positive effects. Any adverse operational effects will be mitigated. This includes through realigning proposed local roads, grade separating the ASH from local roads, regrading private accessways and reconfiguring on-site parking or other agreed arrangements, where necessary.

Where on-street car parking is lost the extent that this is required to be replaced, will depend on the parking policies which are in place prior to implementation. The detailed design will take account of these policies.

Where effects on property access cannot be mitigated, the effects have been managed by including the relevant properties within the proposed designation.

14.5 Summary of Transport Effects

Based on the assessment of effects, as summarised above, the NW Strategic Package provides considerable positive effects on the operation of the transport system, in particular improved safety, connectivity, resilience and contribution to mode shift. Adverse effects have been identified and have been demonstrated to be appropriately managed through mitigation measures identified.

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.

15 Traffic Noise and Vibration

The Assessment of Operational Noise Effects, included in Volume 4, assesses operational noise from road and station operations, and road vibration against relevant standards and guidelines. The assessment below should be read in conjunction with this report.

The assessment contains predictions of road traffic noise carried out using the method recommended in New Zealand Standard – Acoustics – Road traffic noise – New and altered roads (NZS 6806) in accordance with the AUP:OP. Vibration effects have also been considered below.

The assessment of effects undertaken in the report considers both effects in accordance with NZS 6806 and in relation to the predicted noise level changes comparing the future traffic noise levels with and without the new and upgraded corridors.

15.1 Methodology

The assessment methodology takes account of the different noise sources across the different corridors which includes from road traffic noise (including rapid bus transit), stations and active mode transport (e.g. walking and cycling).

Road traffic noise (both for general traffic and rapid transit bus lanes) is assessed against NZS6806. Active mode transport (e.g. walking and cycling) does not cause any significant noise levels that are noticeable adjacent to the integrated major transport corridors and therefore have not been assessed in detail. Noise from station operation (e.g. PA systems) needs to be controlled to comply with the relevant AUP:OP noise limits.

Noise effects of road traffic on existing noise sensitive locations, referred to as Protected Premises and Facilities (PPFs) within NZS6806, have been assessed. In accordance with NZS6806 PPFs within a 200 metre radius of the rural transport corridors and a 100 metre radius of the urban transport corridors have been included.

As required by NZS6806, the assessment methodology included the prediction of existing and future traffic noise levels, both without (Existing and Do Nothing scenarios) and with the proposed transport corridors (Do Minimum scenario). The scenarios are explained below:

- The Existing scenario represents the current road network with current traffic volumes, i.e. the existing environment as it is experienced now
- The Do Nothing scenario represents the current road network with future traffic volumes, assuming a full build out of the area
- The Do Minimum scenario represents the proposed future road network, incorporating the proposed transport corridors and other transport projects in the area. This scenario assumes a full build out of the area, and the transport infrastructure to enable the development. This is a realistic scenario at a point in time when all new or upgraded transport corridors are operational.

In accordance with NZS6806 where transport corridors are considered to be 'Altered Roads', these have been assessed by comparing the predicted noise levels in the design year without the projects (Do Nothing) with the predicted noise levels in the design year with the projects (Do Minimum). Transport corridors considered to be 'New Roads' have been assessed by comparing the predicted existing noise levels with the Do Minimum predictions.

It is important to note in the context of assessing noise effects of the operational transport corridors, the NW Strategic Package is intended to unlock the development potential of land surrounding the transport corridors. The proposed urban development of land in the vicinity is predicted to result in traffic volumes increasing, thus resulting in noise level increases for some areas when comparing current and future 2048 traffic volumes.

15.2 Positive Traffic Noise and Vibration Effects

In some cases the redistribution of traffic (e.g. traffic moving from SH16 to the ASH) will result in a reduction in traffic noise for some PPFs.

15.3 Potential Adverse Operational Traffic Noise and Vibration Effects

Adverse noise effects as a result of traffic noise may result in sleep disturbance, loss of concentration, annoyance, a reduction in speech intelligibility and reduced productivity. The magnitude of effects will largely depend on noise levels received in noise-sensitive spaces within buildings, although there are also potential annoyance effects associated with a loss of amenity when high noise levels are received in outdoor living or recreation spaces.

Road traffic vibration is generally a non-issue, particularly for newly constructed and well-maintained transport corridors and therefore has not been assessed further for each corridor.

15.3.1 NOR S1 Alternative State Highway Corridor

The ASH corridor is located largely within a rural area. Intermittent rural dwellings are generally located 50 metres or more from the highway. Brigham Creek Interchange is located largely within the FUZ, as well as another section passing through the south western extent of the Kumeū-Huapai FUZ, all of which it is anticipated will be developed in the future.

The introduction of a new major road into a currently low noise mainly rural environment is anticipated to result in significant noise level increases for some PPFs, especially in areas away from the local road network.

The ASH is generally a New road in accordance with NZS6806, i.e. will consist of a new road that is established where there is currently no road. However, where the ASH corridor connects with the existing SH16, including the area around the Brigham Creek Interchange and the western connection to SH16, the existing state highway corridor controls the ambient noise environment as it is the highest noise generator in the area. This section of the highway is therefore assessed as an Altered Road.

For the PPFs assessed against the Altered road criteria, it has been predicted that an average noise level increase from the existing to Do-nothing scenario of 3 dB across the 63 PPFs.

With the Alternate State Highway in place (with low noise road surface assumed), and including existing local roads, noise levels are predicted to reduce on average 2 dB compared with the Do-nothing scenario. When predicting the noise levels from only the ASH, excluding existing local roads that are not being changed, then the average reduction is 7 dB.

With additional mitigation (which will be confirmed in accordance with operational noise conditions, see Appendix 4) at selected properties, and including local roads, the noise levels are predicted to

reduce on average by 3 dB, with many PPFs receiving noticeable to significant noise level reductions compared with the ASH not being implemented.

15.3.2 NOR S2 SH16 Main Road Upgrade

The SH16 Main Road upgrade proposes the alteration of an existing SH16 designation to provide for the provision of active mode facilities. The establishment of active mode facilities along SH16 Main Road is not predicted to cause any appreciable noise level change as such, no specific mitigation measures have been proposed.

15.3.3 NOR S3 Rapid Transit Corridor, including NOR K1 Kumeū and NOR H1 Huapai Rapid Transit Stations

The RTC will connect Kumeū-Huapai with Westgate and Auckland City. A RAMC is also proposed adjacent to the RTC and within the proposed designation footprint. For the purpose of this assessment, the RTC is split into the following sections:

- The **rural section** of the RTC runs from the Brigham Creek Interchange to the entry to Kumeū-Huapai township and is co-located with the RAMC along this section. Within the rural section, the designation footprint requires an extended width to accommodate both the transport corridors
- The **urbanised section** of the RTC runs from northern end of Waitakere Road to Foster Road and is co-located with the proposed SH16 Main Road upgrade along this section. Within this section, the corridor requires approximately 38 metre width to locate two Frequent Transit Network lanes, separated active mode facilities and the SH16 Main Road upgrade.

It is understood that only electric buses will be used on the RTC in line with the AT “Low Emission Bus Roadmap”¹⁶.

The operation of the RAMC does not cause any appreciable noise levels compared with surrounding rail lines and roads. Therefore, we have not assessed it further. However, we note that the RAMC provides additional distance between the RTC and surrounding sites thus adding a small buffer.

For the RTC, a total of 227 sensitive receivers in the vicinity of the corridor have been identified. Of the total 227 PPFs, 37 have been assessed against the New road criteria, and 190 against the Altered road criteria. For both New and Altered road sections, all PPFs are predicted to receive noise levels within Category A, with a highest predicted noise level of:

- 56 dB $L_{Aeq(24h)}$ for the Altered road section; and
- 48 dB $L_{Aeq(24h)}$ for the New road section.

With regards to the proposed Rapid Transit Stations, station noise is generally defined by PA system noise and it is understood that these can be easily designed to comply with the relevant AUP:OP zone noise limits.

15.3.4 NOR S4 Access Road Upgrade

Access Road is an existing road in a predominantly rural area with some industrial and commercial operation at the Kumeū end of the road. Existing noise levels are relatively low, given the distance from major transport or commercial areas, except where Access Road connects with SH16 Main

¹⁶ <https://at.govt.nz/media/1985010/aucklands-low-emission-bus-roadmap-version-2-october-2020.pdf>

Road. Should the ASH be implemented in advance, ambient noise levels in the vicinity of Access Road would be somewhat more elevated due to the connection with the new transport route.

Widening of the existing road is proposed with the provision for active mode facilities. Road widening will bring traffic lanes closer to some dwellings. However, with the implementation of the suite of new and upgraded transport corridors provided by the NW Strategic Package, an overall reduction in traffic volume and subsequent noise from the use of the road is predicted on Access Road.

With the upgrade and additional mitigation (which will be confirmed in accordance with the operational noise conditions) in place the noise level is predicted to marginally reduce by an average of 3 dB.

15.4 Summary of Operational Noise and Vibration Effects

The NW Strategic Package is predicted to result in a reduction in noise level across all PPFs compared to existing noise levels. This is because while some PPFs are predicted to receive noise level increases with mitigation in place, noise levels will still be lower than would be the case if the NW Strategic Package were not implemented. Road traffic vibration is generally a non-issue, particularly for newly constructed and well maintained roads and therefore has not been assessed further for each corridor.

The ASH corridor will result in a noise level increase to a number of PPFs that are currently in a rural area with few major noise sources. Nevertheless, with mitigation, most PPFs are predicted to receive noise levels acceptable for residential use.

The upgrade of SH16 Main Road is to add active mode facilities. These facilities do not generate high noise levels therefore no mitigation is proposed and will not add to existing ambient noise levels.

The RTC will be operated by electric buses. The use of electric buses results in a negligible level of assessed effect, and as such, specific mitigation is not proposed.

Kumeū and Huapai Stations will be designed so that compliance with the relevant noise limits can be achieved. It is therefore not anticipated that station noise will have any discernible effect on the overall noise environment.

Access Road upgrade will result in a noise level increase at three PPFs. With the upgrade and additional mitigation in place the noise level is predicted to marginally reduce by an average of 3 dB.

16 Construction Noise and Vibration

The Assessment of Construction Noise and Vibration Effects, included in Volume 4, contains predictions for construction noise carried out using the method recommended in NZS6803 in accordance with the AUP:OP. The assessment below should be read in conjunction with this report.

16.1 Methodology

The methodology for the construction noise assessment included modelling inputs in regard to a reasonable worst-case scenario. Vibration emission radii were also calculated to provide a reasonable worst-case estimate at receivers. It has been assumed that no concurrent project works will occur across the multiple areas where receivers may be subjected to impacts from work associated with more than one designation. Any receivers that may be impacted by more than one project would be confirmed closer to the time of construction. Any buildings within the proposed designation footprint will be removed and therefore have not been assessed.

Construction noise setback distances and vibration emission radii have been determined (based on assumptions on the type of construction activities and equipment) for each of the transport corridors. The construction noise setback distances and vibration emission radii were then used to identify any potentially affected receivers and determine where any potential construction noise and vibration exceedances of the relevant criteria could occur.

Potential effects of construction noise and vibration have then been assessed and construction management and mitigation measures identified where appropriate. To avoid and / or minimise exceedances of construction noise and vibration criteria, Best Practicable Option mitigation and management measures will be utilised.

16.2 Potential Construction Noise Effects

Construction phases for each of the new or upgraded transport corridors are expected to occur for a minimum of 30 months. Predictions have therefore been assessed against the noise criteria for greater than 20 weeks “long-duration” under NZS6803. It is expected that the majority of the works will be carried out between 7am and 6pm Monday to Saturday. There will be extended hours during summer earthworks season (e.g. 6am to 8pm, Monday to Sunday). Where projects affect existing major transport corridors (e.g. at tie ins and intersections or during the construction of new bridges) where potential closures or limitations are required to construct the corridors, night time works will likely be required from time to time.

Various construction activities and pieces of equipment will act as noise sources on site during construction works. An indicative construction equipment list has been used in the construction noise and vibration assessment to assess the noise effects. Given construction will occur in the future, the current methodology may not be inclusive of all equipment used nearer the time of construction. Confirmation of potential construction noise sources will need to be undertaken nearer the time of production of the CNVMP.

For the purposes of the construction noise assessment, a minimum set back distance from receivers to comply with day-time noise criterion of 70 dB without mitigation has been calculated.

16.2.1 Predicted Noise Level Exceedances

Construction activity will occur in close proximity to receivers in the following areas:

- Urban areas of Kumeū-Huapai associated with the SH16 Main Road upgrade
- Brigham Creek Interchange covers the area between Fred Taylor Drive, Brigham Creek Road and SH16. The closest buildings are as close as 60 metres from the works
- At Waitakere and Pomana Roads, a small number of dwellings are within 40 to 60 metres from the highway alignment, local road connections and stormwater ponds
- A new interchange consisting of three roundabouts at Tawa and Motu Roads with the construction of ramps and connections with local roads. The closest houses to these works would be less than 10 metres from the works, with most houses at 20 to 40 metres distance
- Where the transport corridor passes under Puke Road, a new local road bridge will be constructed, and Puke Road partially realigned. A number of dwellings are as close at 10 metres from construction works in the vicinity of this Puke Road tie in
- In the vicinity of Foster Road and the tie in with the existing SH16, a small number of dwellings are between 45 and 55 metres from the construction works
- Where tie ins with existing roads occur (e.g. Fred Taylor Drive, Taupaki Road and Boord Crescent).

As the designation areas associated with rural sections of the ASH corridor and RTC are extensive, the majority of existing properties in these areas are more than 100 metres set back from work areas.

A number of properties have been identified where construction noise levels have the potential to exceed the relevant criteria. As new or upgraded transport corridors traverse FUZ, additional buildings will have potentially been developed by the time of implementation. Therefore, at the time of construction, the receiving buildings will be confirmed to ensure all relevant receivers are considered in the CNVMP. The proposed designation footprint is generally wide enough to avoid or to enable the management of effects on all existing receivers and any new receivers that might be in place at the time of construction.

16.2.2 Daytime Works

In general, the loudest construction activity is likely to be earthworks, which will be undertaken in a staged and managed manner. Piling for the construction of bridges will also be a notable noisy activity. However, this will occur for only a brief period over the overall construction duration, and can be mitigated through equipment choice, barriers and placement of equipment.

Mitigation measures as set out in Section 16.4 will be implemented across the construction works. There are no specific construction activities close to buildings that would require mitigation in addition to common best practice.

Predicted noise levels may be as high as 85 dB at the closest dwellings, during times of earthworks in close proximity. These works would likely occur only for a few days, but this is subject to the staging and management of construction works. Only a small number of buildings may be affected by such levels. For most of the construction works it is predicted that noise levels can comply with the 70 dB noise criterion.

Any exceedances will be limited and passing. Good communication and timing of activities will assist in reducing effects. Effects are therefore considered reasonable provided relevant mitigation measures are implemented.

16.2.3 Night-time Works

Night works may be required where major local roads and rail would need to be closed for the construction. The following locations where this may be the case have been identified:

- ASH tie in with:
 - SH16 at Brigham Creek Interchange
 - Fred Taylor Drive at Brigham Creek Interchange
 - SH16 at the northern extent
- Bridge construction across the North Auckland Rail Line (will require a Block of Line and may occur at night or on a long weekend)
- Bridge construction across Pomona Road
- Bridge construction across Foster Road
- Bridge construction across the North Auckland Rail Line at the intersection with Station Road (likely requiring a Block of Line and may occur at night or on a long weekend)
- Resurfacing of SH16 following the upgraded bridges where the new and existing roads tie in
- Where roads would need to be closed for the construction, e.g. during final surfacing and at the tie ins with SH16.

Works required during the night will be limited in duration, often requiring only two or three nights' work for any one element of construction. In any event, such works will need to be managed through the CNVMP. It is considered that with appropriate management the construction can be undertaken within reasonable noise levels that would be expected from construction of such infrastructure.

16.3 Potential Construction Vibration Effects

Vibration generation and propagation is highly site specific. The generation of vibration is dependent on the local site geology, the equipment being used, the nature of the works, and the management of the construction activity.

To account for the inaccuracy in the prediction of vibration, the likely worst-case vibration has been calculated based on the equipment and hard ground geology to provide offset distances. The offset distance that complies with the applicable criteria is considered to be the safe working distance. At this offset distance it is considered likely that compliance with the building standards, avoiding building damage.

Vibratory rollers are likely to be the most common high vibration generating equipment across construction of the new or upgraded transport corridors. In addition, piling for bridges also causes high vibration levels.

A number of PPFs, have been identified as potentially requiring monitoring for vibration level during construction. This would allow for further consideration of and response to any adverse effects. If on-site measurements confirm the predicted vibration levels, then alternative compaction methods will be considered, e.g. non-vibratory compaction.

A number of PPFs have been identified that may receive vibration levels exceeding DIN 4150-3:1999 Standard Category A criteria which aims to avoid annoyance of receivers. This criterion will be used as a trigger to engage with potentially affected people.

Vibration generally occurs intermittently, when equipment passes the building, and can be tolerable if prior notification is given. However, high vibration generation is not appropriate for night-time and will be avoided as far as practicable.

There are two heritage buildings (Huapai Tavern AUP:OP Schedule 14.1 #00482 and Kumeū Railway Goods Shed AUP:OP Schedule 14.1 #00483) located on SH16 Main Road that are proposed to be repositioned along the corridor following works commencing on the RTC to enable construction. The buildings will be transported to their new location, which will involve high levels of vibration through the loading, transport and unloading. It is therefore considered that with appropriate siting and careful construction management, construction vibration associated with the construction of each corridor is unlikely to cause damage to these buildings.

Similar to noise, a hierarchy of vibration mitigation measures will be adopted through the CNVMP and Schedules (where produced) as follows:

- Managing times of activities to avoid night works and other sensitive times (communicated through community liaison)
- Liaising with neighbours so they can work around specific activities
- Operating vibration generating equipment as far from sensitive sites as possible
- Selecting equipment and methodologies to minimise vibration
- Offering neighbours temporary relocation
- In specific situations, a cut-off trench may be used as a vibration barrier if located close to the source.

In general, there are less options available to mitigate vibration propagation and insulate receiver buildings, compared to noise. Mitigation will therefore focus on scheduling of activities, effective communication with neighbours, and selection of appropriate equipment and methods, where practicable. Appropriate vibration mitigation measures for each activity will be listed in the CNVMP and Schedules (where produced).

16.4 Measures to avoid, remedy or mitigate potential adverse construction noise and vibration effects

The Assessment of Construction Noise and Vibration Effects outlines that the implementation of a CNVMP is the most effective way to control construction noise and vibration impacts. The CNVMP will provide a framework for the development and implementation of best practicable options to avoid, remedy or mitigate the adverse effects on receivers of noise and vibration resulting from construction. A hierarchy of mitigation measures will be adopted through the CNVMP and Schedules (where produced), as follows:

- Managing times of activities to avoid night works and other sensitive times
- Liaising with neighbours so they can work around specific activities
- Selecting equipment and methodologies to restrict noise
- Using screening / enclosures / barriers
- Offering neighbours temporary relocation.

By following this hierarchy, the Best Practicable Option for mitigation will be implemented, whilst avoiding undue disruption to the community. In particular, temporary relocation of neighbours can cause significant inconvenience and should only be offered where other options have been exhausted and noise levels still require mitigation.

In addition to a CNVMP, a Site Specific or Activity Specific Construction Noise and Vibration Management Schedules will be required where noise and / or vibration limits are predicted to be exceeded for a more sustained period or by a large margin.

17 Network Utilities

This section identifies existing utilities within or adjacent to the new or upgraded corridors, the expected effects of the NW Strategic Package on those utilities and any measures proposed to manage potential impacts. Construction of the new or upgraded corridors will cause disruption in the corridor and may require the protection or relocation of existing network utilities. The impacts of construction can generally be grouped into two categories:

- Impacts to general services and assets
- Impacts to non-typical assets, where works around them require additional control beyond business as usual, due to the potential risks or disruptions to the service being significant.

17.1 Methodology

The NW Strategic Package and proposed designation footprints have considered desktop information from publicly available Before-U-Dig website¹⁷ and Auckland Council GeoMaps. However, thorough site investigations are required to confirm the full scope of works for service relocations. As part of the Te Tupu Ngātahi programme, regular engagement with network utility operators has also been undertaken to better understand how each new or upgraded transport corridor interfaces with utilities.

The typical utilities associated with each transport corridor include:

- Three waters – wastewater, potable water, stormwater
- Electricity overhead and underground lines
- Gas lines
- Ethernet and telecommunications.

Additional non-typical utilities are identified in Table 17-1.

Table 17-1: Non-Typical network utilities affected by each transport corridor

NOR	Non-Typical Utilities
Highway Connections	
S1 Alternative State Highway	Transpower National Grid – 110kV and 220kV High Voltage Transmission in the vicinity of Boord Crescent North of SH16 North-Western Motorway and Brigham Creek Road at Totara Creek Bridge Southern Cross International Fibre Cable Network – Along existing SH16
S2 SH16 Main Road Upgrade	Transpower National Grid – Kumeū River No. 1 Bridge Southern Cross International Fibre Cable Network – Along existing SH16
Rapid Transit	
S3 Rapid Transit Corridor	Transpower National Grid – 110kV and 220kV High Voltage Transmission in the vicinity of Boord Crescent

¹⁷ <https://www.beforeudig.co.nz/nz/home>

NOR	Non-Typical Utilities
KS Kumeū Rapid Transit Station	N/A
HS Huapai Rapid Transit Station	N/A
Roading Upgrades	
S4 Access Road Upgrade	Southern Cross International Fibre Cable Network – Along Access Road and Tawa Road

17.2 Positive Effects

The implementation or upgrade of each of the transport corridors and associated relocation of utilities, if required, will allow utilities to be generally located outside the carriageway in the future, making ongoing access and maintenance easier.

Subject to ongoing engagement with utility providers there is the potential for positive effects resulting from the rationalisation of utilities service locations in the existing corridors and co-location within a common services trench for underground services for both new and existing corridors. This will also make future access and maintenance of the different utilities more manageable.

17.3 Existing Utility Approval Protocols

To understand the potential effects on utilities an understanding of the existing utility approval protocols is required.

There are established protocols for works within the existing road reserve controlled under the Utilities Access Act 2010 and associated National Code of Practice for Utility Operators' Access to Transport Corridors (Code of Practice).

Under the Code of Practice utility providers can access the road reserve (excluding motorways) as of right, subject to reasonable conditions imposed from the transport authority. Access is managed through the Corridor Access Request process, provided through AT as the regions road controlling authority.

All parties also have a duty to take all practicable steps to protect other parties' assets when working through its transport corridors. Effects of the new or upgraded transport corridors on these utilities can be effectively managed under the Code of Practice or subsequent superseding document as part of standard roading authority and network utility practice.

In addition, where a designation is in place for a utility under the RMA, AT will be required to seek approval for works, noting that approval will typically only be given where the later designation works do not prevent or hinder the public work or project or work to which the earlier designation relates under section 177. There are established protocols for obtaining this approval under the RMA.

17.4 Construction Effects

The works will have construction disruption on existing network utilities within each transport corridor and may require the protection or relocation of services. The impacts of the corridor's construction can generally be grouped into two categories:

- impacts to general services and assets
- impacts to non-typical assets, where works around them require additional control beyond business as usual, due to the potential disruptions to the service being significant.

General services and assets

New transport corridors will be formed as part of the ASH corridor and the rural section of the RTC. While there are no known existing network general utilities services within greenfield land, the two corridors cross multiple rural roads that are expected to carry network utilities. All other transport corridors are existing therefore the works will impact the existing road reserve and are expected to have the following impacts on network utilities:

- Limitations on access to utilities within the corridor whilst construction works are being undertaken
- Risk of uncovering assets or potential damage to assets if depths are unknown, resulting in temporary disruption to users and requiring repair
- Location of devices shifting in relation to the road reserve corridor due to reallocation of corridor space.

As road controlling authorities, AT and Waka Kotahi have existing established processes for engaging and coordinating works with utility providers in the corridor. Although there will be temporary disruption, the staging of construction along the alignment will limit prolonged disruption in any section.¹

Engagement with network utilities will occur to coordinate works where practicable (such as laying new cables or services under the 'dig once' principle). These works will be coordinated to align with the Code of Practice and / or RMA requirements.

Non-Typical Utilities

Construction for the new or upgraded corridors with non-typical utilities in Table 17-1, have the potential for significant effects if carried out in an unplanned and uncoordinated way. Given the established protocols which exist under the Code of Practice and AT and Waka Kotahi's role as roading authority significant impacts are unlikely to occur.

Te Tupu Ngātahi holds a recurring network utilities forum for the network. Affected utility providers were engaged via meetings, phone call and email. This was to ascertain the design did not constitute a material risk to the utility and identify design cooperation that may benefit both parties. Prior to lodgement the drawings were distributed to utilities for feedback of any outstanding issues, no opposing feedback was received.

The Project Team have engaged with KiwiRail throughout the north west network development as a key stakeholder and infrastructure partner. The RTC and ASH align with and/or cross the NAL at several locations, any crossings of the NAL are designed to be grade separated. The NAL is covered under existing Designation 6300, therefore any works within the designated area will be required to seek written consent from KiwiRail the earlier designation authority as per section 177 of the RMA,.

For the ASH corridor, the following three designations and associated infrastructure are generally in parallel with the corridor and interact with the new corridor, where they are within the proposed designation footprint but not directly affected by permanent works:

- #9100, Taupaki to Kaukapakapa Gas Pipeline, First Gas Limited
- #9101, Taupaki to Topuni Gas Pipeline, First Gas Limited
- #6500, Petroleum Pipeline – Rural Section, New Zealand Refining Company Ltd.

Waka Kotahi will be required to seek written consent under section 177 from First Gas Limited and NZ Refining Company Ltd, where the works affect the earlier designations.

As part of the construction works, the non-typical utilities will likely require temporary diversion or relocation prior to being integrated in the permanent location. Temporary diversions of utilities are expected to be accommodated within the designation footprint, which will reduce the geographical extent of impacts. Early engagement with the respective utility provider will be required to identify the critical service and confirm a relocation methodology. These steps alongside meeting the Code of Practice and if relevant meeting RMA requirements for existing utilities that are designated will ensure effects are avoided and or managed appropriately.

17.5 Operational Effects

Once the projects are constructed and transport corridors operational there will be no ongoing adverse effects to the utility operations. As set out above in the positive effects discussion, it is considered that the rationalisation or utility services and location outside the carriageway will make access and maintenance easier.

17.6 Measures to Avoid, Remedy or Mitigate Potential Adverse Effects

To provide clarity and recognise the existing access controls in place, the works listed below are not anticipated to prevent or hinder each of the proposed designations. Network Utility Operators with existing infrastructure located within the proposed designation footprints will not require RMA written consent under section 176 of the RMA for the following prior to construction:

- Operation, maintenance and urgent repair works
- Minor renewal works to existing network utilities necessary for the on-going provision or security of supply of network utility operations
- Minor works such as new service connections
- The upgrade and replacement of existing network utilities in the same location with the same or similar effects as the existing utility.

This has been offered via NOR condition for each transport corridor, to streamline and provide certainty to utility partners. For works that will exceed this threshold, AT and Waka Kotahi has an established process for sections 176 / 178 approvals. This will not replace any of the existing approvals required e.g., Corridor Access Request will still apply.

17.7 Summary of Effects on Network Utilities

Service relocation works are expected to be accommodated within the construction corridor within the proposed designation footprint. Additional work area may be required for realignment of key services for example overhead power lines. The exact scope of services for relocation works will be confirmed through detailed design in consultation and engagement with the respective utility providers. If additional works are required outside the designation, approvals will be sought as necessary based on the detailed methodology at the time.

An assessment of the existing utilities within the corridor has been carried out and considered. Through the implementation of the Requiring Authority approval for ongoing access and maintenance of works in advance of construction, it is considered that potential adverse effects on network utilities can be avoided or appropriately managed.

18 Natural Hazards – Flooding

The Assessment of Flood Hazard Effects, included in Volume 4, assesses the potential flood hazard effects of the proposed transport network during its construction and operational phases on the flood extents and levels in the surrounding area. The assessment 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 focuses on flood hazard effects which is a district plan matter under the AUP:OP.

18.1 Methodology

The assessment of flooding 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 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
- Production of 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 new or upgraded 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 proposed designation footprint. These devices have been designed to attenuate the 100 year ARI using 10% of the total impervious road catchment area in accordance with Auckland Council and Waka Kotahi guidance^{18,19}. Note for SH16 Main Road and Access Road, which are existing roads, the widening of these roads allows for greater impervious road area being treated than the additional extent of widened road alone.

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

¹⁸ Auckland Council's Stormwater Management Devices in the Auckland Region, Guideline Document 2017/001 (December 2017)

¹⁹ Waka Kotahi NZTA's Stormwater Design Philosophy Statement (May 2010)

18.2 Positive Effects on Natural Hazards – Flooding

Positive effects identified in the assessment of flooding effects are those where the predicted 100-year ARI flood level difference mapping show a decrease in water levels and an increase in freeboard for bridges, culverts and habitable buildings. Positive effects specific to each transport corridor are summarised in Table 18-1 below.

General positive effects associated with the NW Strategic Package include:

- Raising the existing road levels which will have a positive effect for road users by preventing flood flows across the road and reducing flood hazard
- Where new bridges are proposed, the maximum freeboard requirement has been adopted to provide flood resilience
- The proposed designation footprint creates the opportunity to improve existing culvert capacities and / or propose new culvert crossings to improve overland and stream flow in the area.

Table 18-1: Project positive effects on flooding

NOR	Effect
S1 Alternative State Highway	New bridges are proposed at Ngongetepara Stream which will increase the freeboard for the road with the bridge soffit greater than 1.2 metres. This reduces the potential flood effects for road users.
S2 SH16 Main Road Upgrade	There are positive effects for Kumeū township downstream of SH16. This is due to the raised elevation of SH16 / RTC which prevents SH16 overtopping in certain places and reduces the flood depth downstream. While there is a potentially moderate adverse effect upstream, this can potentially be avoided at detailed design through new or improved crossings in this area. This is discussed further below.
S3 Rapid Transit Corridor KS Kumeū Rapid Transit Station HS Huapai Rapid Transit Station	The upgrade of the bridge of the bridge over Kumeū River provides improvement to flood resilience with adequate freeboard between the 100 year flood level and bridge soffit level greater than 1.2 metres. The new bridge allows for water to move more easily under the road and results in minor positive effects upstream and downstream of the crossing. A positive effect is also associated with the Kumeū River crossing with a reduction in the flood depth. The bridge also provides greater than 1.2 metre freeboard. There is also a positive effect at 223 Main Road with a reduction in flood level. This reflects the broader positive effects due to a reduction in flooding across the town centre.
S4 Access Road Upgrade	The existing road at 151 Access Road overtops during a 100 year flood event. The new bridge over the unnamed stream provides an improvement to flood resilience. The new bridge has a freeboard greater than 1.2 metres between the 100 year ARI flood level and bridge soffit level. The 100 year ARI flood difference at the bridge shows there is negligible effect on the water levels upstream and downstream.

18.3 Construction Effects

The following construction works can result in flooding effects:

- Construction of new culvert crossings or upgrading of existing culvert crossings
- Construction of new bridges over streams or overland flow paths
- Installation of diversion drains and realignment of existing overland flow paths

- Construction of new dry ponds or wetlands and upgrading of existing dry ponds or wetlands
- Temporary use of lay down areas.

The potential effects of these works are:

- Bulk earthworks to complete the contouring for new landscape features e.g., dry ponds or stormwater wetlands and new or upgraded culverts require a dry works area and can alter overland flow paths or generate erosion and sediment effects
- The construction of new bridges over streams will require temporary staging platforms for piling rigs and cranes to be constructed on the banks and possibly over the stream bed and potentially causing a constriction to flood flows and raising upstream flood levels
- The siting of dry ponds or stormwater wetlands within an existing overland flow path can obstruct runoff and result in flows being diverted towards existing properties.

There is the potential for the above effects on each transport corridor, however effects may vary based on the location of works in terms of overland flows or known flood extents in the vicinity.

It should be noted that the construction lay down areas for each proposed transport corridor are located outside flood plains and major overland flow paths and therefore do not result in an increased flood hazard risk.

18.4 Measures to Avoid, Remedy or Mitigate Construction Effects

The management and mitigation measures for construction effects throughout the proposed designation area are as follows:

Construction of new or upgraded transport corridors

- Carrying out earthworks during the summer or dry months to reduce the risk of flooding
- Locating lay down areas outside of existing overland flow paths
- Managing the overland flow paths to make sure flows are not diverted toward existing buildings or properties
- A Construction Environmental Management Plan will be developed prior to construction by an experienced Stormwater Engineer and will consider the effects of temporary works, earthworks, storage of materials and temporary diversion and drainage on flow paths, flow level and velocity.

Construction of new and upgrades to existing culvert crossings, stormwater wetlands and dry ponds

- Existing culvert extensions will be completed prior to commencement of bulk earthworks to allow for the passage of clean water across the site
- Installation of temporary diversions to allow flows to be maintained while new culverts, stormwater wetlands and dry ponds are constructed
- For larger embankments requiring a longer duration of works or for overland flow paths with more regular and higher flow rates diversions should be installed prior to works commencing
- Where no diversion is required a six-metre working clearance between any earthworks and designation boundary should be adopted to accommodate access and materials
- For larger diameter pipes a working clearance of ± 20 metres from the upstream extent and ± 15 metres from the downstream extents is provided.

Construction of new bridges

- Temporary platforms will generally be set back as far as practicable from the stream banks and main channel to minimise the risk of flooding
- Staging of earthworks for the abutments and stockpiling of materials outside the flood plain to mitigate the potential for blocking flow paths and flood plains.

18.5 Operational Effects

There are a range of operational effects particularly from proposed new bridges and crossings. The model is based on an indicative design which may be subject to further refinement and it may be that some of these structures are modified in the future. For the project the assessment of operational flooding effects considered:

- New culvert crossings (≥ 600 mm diameter)
- New bridge structures at Totara Creek, Ngongetepara Stream, Kumeū River and its tributaries, and Ahukuramu Stream
- Significant areas where the new road embankment encroaches existing flood prone areas
- The extent of flooding on existing properties due to the new project corridor.

The effects of these are:

- Increasing impervious areas resulting in increased runoff and potentially increased flood levels
- Altering existing overland flow paths resulting in flows being redirected towards existing properties
- 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.

The new bridge structures resulted in positive effects (see Table 18-1). For the culverts the effects were considered to be negligible to moderate prior to mitigation. A summary of flooding effects for each NOR is set out in Section 18.5.1. Full details are contained within the Flooding Assessment contained in Volume 4.

18.5.1 Summary of Operational Effects for each NOR

Table 18-2 to Table 18-5 provide an overview of the operational flooding effects for each project, pre and post mitigation.

Table 18-2: NOR S1 ASH Summary of Operation Flooding Effects

Location	Potential effect without mitigation	Potential effect with implementation of the recommended flooding outcomes
Ngongetepara Stream crossing	+0.17m upstream, +0.03m downstream Minor effect upstream, no effect downstream Adequate freeboard	No more than 0.05m increase in flood level, Negligible up to minor effect
Pomona Road	-0.50m upstream, +0.03m downstream	No more than 0.05m increase in flood level, Negligible up to minor effect

Location	Potential effect without mitigation	Potential effect with implementation of the recommended flooding outcomes
	Positive effect upstream and negligible effect downstream Adequate freeboard	
Pomona Road crossings	+0.25m upstream, +0.06m downstream Moderate effect upstream and minor effect downstream Adequate freeboard	No more than 0.05m increase in flood level, Negligible up to minor effect
Totara Creek	+0.09m upstream, +0.52m downstream Minor effect upstream, moderate effect downstream Less than 1.2m freeboard	No more than 0.05m increase in flood level, Negligible up to minor effect
Karure Stream	+0.58m upstream, +1.63m downstream Moderate effect upstream and downstream Adequate freeboard	No more than 0.05m increase in flood level, Negligible up to minor effect
Boord Crescent	+1.52m upstream, +0.32m downstream Moderate effect upstream and minor effect downstream Adequate freeboard	No more than 0.05m increase in flood level, Negligible up to minor effect
Pomona Road crossings	+0.25m upstream, +0.06m downstream Moderate effect upstream and minor effect downstream Adequate freeboard	No more than 0.05m increase in flood level, Negligible up to minor effect
Foster Road crossings	+0.49m upstream, -0.01m downstream Moderate effect upstream, positive effect downstream Adequate freeboard	No more than 0.05m increase in flood level, Negligible up to minor effect

Table 18-3: NOR S2 SH16 Main Road Summary of Operation Flooding Effects

Location	Potential effect without mitigation	Potential effect with implementation of the recommended flooding outcomes
Kumeū Township	+0.30m Moderate effect	No more than 0.05m increase in flood level, Negligible up to minor effect
Foster Road	+0.09m upstream, +0.09m downstream Minor effect upstream and downstream Adequate freeboard	No more than 0.05m increase in flood level, Negligible up to minor effect
Main Road	+0.79m upstream, -0.27m downstream	No more than 0.05m increase in flood level, Negligible up to minor effect

Location	Potential effect without mitigation	Potential effect with implementation of the recommended flooding outcomes
	Moderate effect upstream and positive effect downstream	

Table 18-4: NOR S3 RTC Summary of Operation Flooding Effects

Location	Potential effect without mitigation	Potential effect with implementation of the recommended flooding outcomes
RTC / RAMC	+0.67m upstream, -0.27m downstream Moderate effect upstream and minor effect downstream	No more than 0.05m increase in flood level, Negligible up to minor effect
Karure Stream crossing	+1.74m Moderate effect	No more than 0.05m increase in flood level, Negligible up to minor effect
Kumeū Rapid Transit Station	0m No flood hazard effects	No flood hazard effects
Huapai Rapid Transit Station	+0.25m upstream, +0.05m downstream Minor effect upstream, negligible effect downstream	No more than 0.05m increase in flood level, Negligible up to minor effect

Table 18-5: NOR S4 Access Road Upgrade Summary of Operation Flooding Effects

Location	Potential effect without mitigation	Potential effect with implementation of the recommended flooding outcomes
Unnamed stream crossing	+0.01m upstream, -0.04m downstream Negligible effect upstream, positive effect downstream Adequate freeboard	No more than 0.05m increase in flood level, Negligible up to minor effect
Access Road	+0.12m to +0.22m Minor to moderate effect	No more than 0.05m increase in flood level, Negligible up to minor effect

For each transport corridor, it is recommended that during detailed design additional flood modelling is carried out and mitigation measures implemented as required to achieve the outcomes set out below:

- No increase in flood levels for existing authorised habitable floors that are already subject to flooding (that is, no increase in flood level where the flood level using the pre project model scenario is above the habitable floor level)
- No more than a 10% reduction in freeboard for existing authorised habitable floors (that is, if existing freeboard was 500mm, an acceptable change would be to reduce freeboard to 450mm)
- No increase of more than 50mm in flood level on land zoned for urban or future urban development where there is no existing habitable dwelling
- No new flood prone areas (with a flood prone area defined as a potential ponding area that relies on a single culvert for drainage and does not have an overland flow path)

- 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.

Compliance with the above outcomes will be required as a designation condition.

18.6 Measures to Avoid, Remedy or Mitigate Potential Adverse Effects

Measures to avoid, remedy or mitigate potential adverse effects may include:

- Creating new overland flow path diversions to discharge to nearby overland flow paths or streams to mitigate ponding and decrease flood levels at affected properties
- Increasing culvert sizes so that the upstream and downstream water level differences do not increase by more than 0.5m on land zoned for urban and future urban development
- Upgrading culverts by adding smaller culverts to create a balance between the flood level differences upstream and downstream
- Installing drains at the toe of embankment sloping towards the culverts can also allow for additional storage to decrease the velocity and peak flow through the culvert crossings
- Optimising the proposed bridge span and freeboard during detailed design
- Integrating development design requirements for FUZ upstream and downstream of the proposed corridor.

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 will be confirmed at the detailed design stage.

18.7 Summary of Effects on Flooding

A number of positive effects associated with the new or upgraded transport corridors have been assessed particularly where new bridges are proposed which raise the existing road levels reducing the potential for flood levels to overtop the road and reducing flood hazard. Additional positive effects have the potential to be realised through upgrades to existing culverts or new culvert crossings to improve overland and stream flow under the roads. Additional flood risk effects during construction are unlikely as nearly all proposed lay down areas are proposed outside of the flood plain and overland flow paths. For those areas where there is an increased risk, mitigation measures will be adequate to manage this risk.

Potential operational effects included increased flood levels upstream and downstream of crossings and bridges. Some of the effects were assessed as moderate based on an increase in flood level of greater than 0.15 metres for habitable buildings and 0.5 metres for general property. These effects are a result of the changing terrain, based on the spatial land take for the proposed new infrastructure, which obstructs existing overland flows and flood plains. These effects are likely overstated as they can be addressed through the detailed design of the bridges, culverts and crossings to manage flows upstream and downstream in order to minimise flooding effects. A number of management and mitigation measures have been provided to ensure that effects will be adequately managed. With mitigation measures in place, it is assessed the flooding effects associated with the proposed designations for the NW Strategic Package are able to be appropriately managed.

19 Terrestrial Ecology

The Assessment of Ecological Effects, included in Volume 4, assesses the potential ecological effects of the NW Strategic Package on the environment that are subject to district plan controls in the AUP:OP. The assessment below should be read in conjunction with this report, and the Alternatives Assessment, included in Appendix A, which outlines the process adopted to avoid or minimise effects on areas with ecological value.

For ecological effects that relate to regional plan and / or NES-FW, 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.

19.1 Methodology

The ecological assessment of effects follows the Ecological Impact Assessment Guidelines (EIANZ, 2018). These guidelines were used to assess the ecological value of identified ecological features and evaluate the magnitude and level of potential effects that each of the new or upgraded transport corridors could have on these features, this is summarised in Figure 19-1 below.

19.1.1 Ecological Impact Assessment Guideline Process

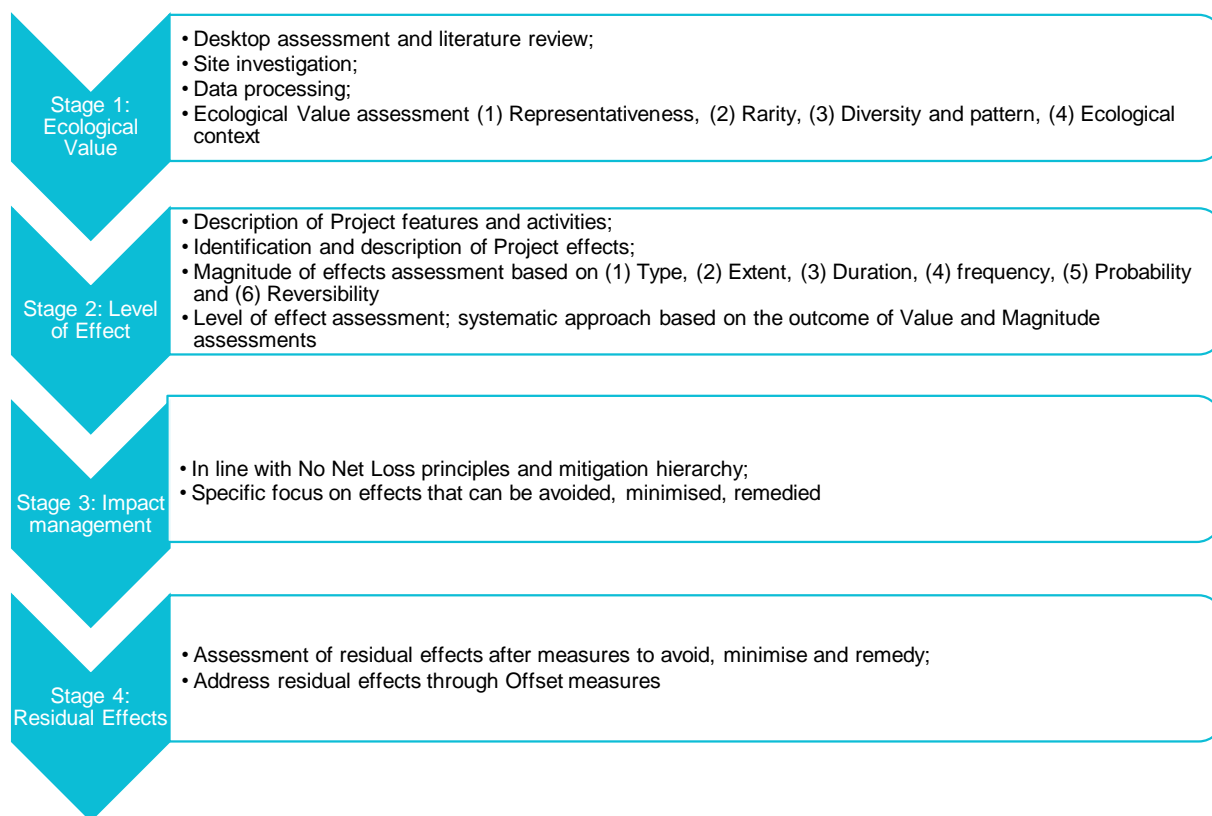


Figure 19-1: Approach process followed for Assessment of Ecological Effects

The EIANZ Guidelines provide guidance to assist with the assessment of the likely future ecological environment in this report. The guidelines 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 light of the above the ecological assessment has been informed by:

- The permitted baseline: The AUP:OP permits certain activities which provide for infrastructure, and as such would not require resource consent. These activities include vegetation clearance and the removal of trees, excluding notable trees and street trees
- The likely future environment: This takes account of the permitted activities for infrastructure, but also the planned urbanisation of the FUZ land in Kumeū-Huapai growth areas. This is because assessing the effects on the environment solely as it exists today would not provide an accurate reflection of the environment in which ecological effects, resulting from the construction and operation of each of the proposed transport corridors, will be experienced, i.e. existing greenfields on FUZ land will be urbanised in the future.

Whilst not assessed to inform the AEE, potential ecological effects relating to future regional resource consents and / or wildlife permits have been considered to inform the alignment and the proposed designation footprint for each proposed transport corridor.

Site visits

The ecological assessment has been informed by site visits to key ecological features (identified from a desktop screening exercise), where features were accessible. Additional bat surveys²⁰ were carried out which confirmed the presence of bat activity in the broader landscape.

19.2 Positive Effects on Terrestrial Ecology

The following positive effects were identified for each of the proposed transport corridors:

- Improved blue / green infrastructure (stormwater ponds and swales) and associated landscaping (which will be indigenous species)
- Mass revegetation of sloping berms and embankments to provide connection with remnant / mature forest. This is particularly relevant for the ASH corridor which largely traverses rural land use
- The scale of proposed mitigation associated with revegetation and stormwater wetlands will have positive ecological outcomes for native fauna. Specifically, the development of the ASH corridor will result in a ‘green’ corridor which will buffer the rural areas to the south of the corridor with future urban development to the north. Similarly, the proposed mitigation associated with Ngongetepara, Kumeū and Ahukuramu watercourses are likely to improve ecological connectivity around and through the future urban environment.

Specific positive effects for each transport corridor are summarised in Table 19-1 below.

²⁰ Automatic Bat Monitors (ABM) were deployed across the NW Strategic area in two separate survey sessions (December 2021 and April 2022). ABMs were placed in a network within habitats that would be affected by the NW Strategic Package and would provide suitable habitat for bat roosting, foraging, and commuting.

Table 19-1: Project positive terrestrial ecology effects

Relevant NOR	Ecological Feature	Positive Effect
NOR S1, NOR S3	Ahukuramu Stream, Kumeū River, Pakinui Stream, Karure Stream, Ngongetepara Creek, Brigham Creek and Totara Creek	The corridor landscape planting will tie into stream and riparian corridors. Riparian vegetation will be retained (where possible) and enhanced (weed control and indigenous vegetation planting).
NOR S2	Ahukuramu Stream and Kumeū River tributaries	
NOR S4	Kumeū River tributaries, Totara Creek and Brigham Creek tributaries	
NOR HS. NOR KS	Kumeū River tributaries	
NOR S1, NOR S3	Ahukuramu Stream, Kumeū River, Pakinui Stream, Karure Stream, Ngongetepara Creek, Brigham Creek and Totara Creek	Existing infrastructure upgrades will include new bridge structures, culvert upgrades and 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 S2	Ahukuramu Stream and Kumeū River tributaries	

19.3 Construction Effects on 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 new or upgraded transport corridors, without mitigation. Potential adverse effects that relate to the construction activities are:

- Vegetation removal leading to the permanent loss of terrestrial habitats, fragmentation and edge effects (changes in population or community structures that occur at the boundary of two or more habitats)
- Construction activities causing light, noise and vibration leading to the disturbance and displacement to roosts / nests and individual bats, birds and lizards. It is assumed that this effect will occur after vegetation clearance (subject to regional consent controls) has occurred and is therefore likely to happen in habitat adjacent to the corridor footprint or underneath structures such as bridges.

The construction effects assessment has been informed by the potential adverse effects that relate to the construction activities, as set out above.

19.3.1 Terrestrial Vegetation

Due to the low overall extent of vegetation and the low likelihood that fragmentation and edge effects will occur despite the definite removal of vegetation, the overall level of ecological effect in the

removal of vegetation subject to district plan controls is assessed as very low to low. As such no impact management (mitigation) is required during construction.

There is a single AUP:OP Notable Tree identified within the proposed SH16 Main Road Upgrade designation footprint that is subject to district plan controls that may be removed. This relates to a mature eucalyptus located on the southern boundary of 396 Main Road. The tree constitutes a single and isolated tree, located in an area of Kumeū that is mostly urban. The ecological value of the tree is assessed as negligible. Therefore, the overall level of effect on habitat fragmentation and edge effect due to the removal of the tree is assessed as very low and no mitigation is required.

19.3.2 Bats

The ecological value of bats is assessed as very high. Bats may utilise the habitats within the proposed designation footprint for roosting, foraging or commuting. During construction of each transport corridor, night works may be required and site compounds will potentially be lit overnight. Lighting at night has the potential to modify the behaviour of bats if foraging within this area or roosting in nearby isolated stands of mature trees.

Noise and vibration during construction can be an issue if bats are roosting in the immediate vicinity of construction works. ABM surveys have confirmed bat activity at survey locations throughout the proposed designation footprint of the ASH corridor and RTC particularly coinciding with streams that intersect the corridor. ABM surveys at the corridor scale cannot confirm roost occupation within or adjacent to the designation footprint. However, it has been assumed that bats will utilise roost sites within the footprint based on:

- Confirmed habitat suitability (numerous trees with moderate to high bat roost potential, connected to linear stream corridors and wetlands),
- Confirmed foraging presence; and
- Frequent utilisation of numerous roosting sites throughout their home range.

Due to the relatively short duration of construction related effects the overall level of effect is assessed as moderate in relation to disturbance and displacement to roosts and individual bats associated with construction activities. Due to the unlikely probability and local extent if impact occurs effects due to the removal of district plan vegetation on loss of foraging habitat, roost loss and mortality or injury is assessed as moderate. As such bat mitigation is required during construction of the ASH corridor and RTC.

Associated with the Access Road upgrade:

- Due to the unlikely probability, relatively short duration of construction related effects and the low baseline bat activity rate, the overall level of effect is assessed as low in relation to disturbance and displacement to roosts and individual bats associated with construction activities. Due to the unlikely probability and local extent if impact occurs, effects due to the removal of district plan vegetation on loss of foraging habitat are assessed as low.
- Due to the unlikely probability and local extent if impact occurs, effects due to the removal of district plan vegetation on mortality or injury to bats are assessed as moderate. As such bat mitigation is required during construction of Access Road upgrade.

As mitigation, bat mitigation will be incorporated into an Ecological Management Plan (EMP) which will include consideration of:

- Surveys prior to construction to confirm bats presence in the areas

- Measures to minimise disturbance at bat roosts. This may require a seasonal restriction on construction activity (no or restricted construction during Dec-Mar)
- Planting or retention of bat habitat (including suitable indigenous or exotic trees or artificial alternatives)
- Siting of compounds and laydown areas to avoid identified habitat
- Lighting design to reduce light levels and spill from construction areas
- Restriction of nightworks around identified habitat (buffer areas)
- Timing of vegetation removal

With the implementation of the above mitigation the assessed level of effect on bats due to construction activities reduces to very low.

In the urbanised environment associated with the SH16 Main Road Upgrade:

- Due to the unlikely probability, relatively short duration of construction related effects and the low baseline bat activity rate, the overall level of effect is assessed as low in relation to disturbance and displacement to roosts and individual bats associated with construction activities
- Due to the unlikely probability and local extent if impact effects occur due to the removal of district plan vegetation on loss of foraging habitat, roost loss and mortality or injury, these effects are assessed as low.

As such no mitigation is required during construction of the SH16 Main Road upgrade.

19.3.3 Birds

Noise, vibration and lighting disturbance caused by construction activities has the potential to displace native birds from suitable nesting and foraging habitat adjacent to the construction. The overall level of effects during construction of the ASH corridor, RTC and SH16 Upgrade on wetland TAR birds specifically the brown teal and dabchick has been assessed as moderate, prior to mitigation. This is due to the assessed very high ecological value of these species, likely probability of disturbance and frequent occurrence.

As mitigation, bird mitigation for the brown teal and dabchick will be incorporated into an EMP which will include consideration of:

- Where practicable, construction works near suitable wetland habitat should commence prior to the bird breeding season (September to February) in order to discourage bird nesting
- Bird management should be consistent with any regional consent conditions that may be required for regional compliance.

With the implementation of the above mitigation the assessed level of effect on birds due to construction activities reduces to very low.

Mitigation is not required for other bird species identified as potentially present within or adjacent to the proposed designation footprint due to the lower probability and short duration of effect if disturbance occurs.

Associated with the Access Road Upgrade, the overall level of effects during construction on bird species identified as potentially present within or adjacent to the proposed designation footprint has been assessed as very low to low. This is due the low probability and short duration of effect if disturbance occurs. As such no specific bird mitigation is required during construction of the Access Road upgrade.

19.3.4 Lizards

Construction activity associated with the ASH corridor and the rural section of the RTC involves the construction of a new transport corridor through a largely rural landscape. The lizards present in these areas will not be used to noise and vibration which increases the likelihood of potential effects occurring. However, the overall level of effect on lizards is assessed as low due to the low probability of disturbance associated with construction related noise and vibration, as such no lizard mitigation is required.

Construction activity associated with the SH16 Main Road and Access Road Upgrade and the urban section of the RTC involves the upgrades to or are in proximity of an existing transport corridor, within these locations lizards are likely to be habituated to noise and vibration from the existing environment. The ecological value of copper skink and ornate skink is assessed as high, however the magnitude of effect is assessed as low due to unlikely probability of lizard disturbance associated with construction related noise and vibration. Therefore the overall level of effect due to construction disturbance is assessed as low. As such no lizard mitigation is required during construction.

Given the overall assessment of effect of construction activities have been assessed as low for all district matter ecological features assessed no specific measures to avoid, remedy or mitigate effects on lizards have been proposed.

19.4 Operational Effects on Ecology

The ASH corridor and the RTC propose the development of new transport corridors within a rural landscape with sections traversing existing and FUZ areas. It is therefore assessed that operational effects such as from noise and lighting sources will result in fragmentation of movement corridors. In general, the following potential operational effects exist where operation of the transport corridors will be occurring within a rural landscape and a future urban environment:

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

The SH16 Main Road and Access Road upgrades are associated with existing transport corridors and although some impacts may increase from the current baseline, many operational effects such as fragmentation and noise and lighting effects are likely to be pre-existing.

19.4.1 Bats

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

The level of effect on bats due to the presence and operation of the ASH corridor and rural sections of the RTC associated with loss in connectivity has been assessed in the context of confirmed bat activity in the broader landscape, the presence of two important ecological nodes of Riverhead Forest

and Waitakere Ranges, the low degree of existing fragmentation and the future environment predominantly remaining rural.

In terms of disturbance and displacement of roosts and individuals associated with lighting, noise and vibration effects, the overall level of effect is assessed as high for these transport corridors, prior to mitigation. This is due to the relatively local extent of disturbance and high likelihood of disturbance occurring. In terms of the loss in connectivity due to permanent habitat loss, light, and noise effects from these transport corridors, the overall level of effect is assessed as very high, prior to mitigation. This is due to the high probability of loss in connectivity associated with the operation of a new transport corridor with confirmed bat presence between two known ecological nodes important to the regional bat population.

The level of effect on bats due to the presence and operation of the SH16 Main Road and Access Road upgrade and urban sections of the RTC associated with loss in connectivity is assessed in the context of confirmed bat activity in the broader landscape, the existing degree of fragmentation and that of the future urban environment.

Due to the unlikely probability and infrequent occurrence of effect, the overall level of effect of disturbance and displacement of roosts and individuals is assessed as low. Due to existing fragmentation at a regional extent the level of effect on loss in connectivity due to permanent habitat loss, light, and noise effects from the transport corridor is assessed as moderate, prior to mitigation.

Given the potential for moderate to very high level of effect on bats, the mitigation requirements have informed the extent of the designation footprint and areas of land in proximity to key bat corridors are required in order to protect existing vegetation or provide for bat mitigation planting. As mitigation, bat mitigation will form part of the EMP and include consideration of:

- 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 , i.e. placement of flaps on features with high roost potential
- Lighting designed to minimise light levels and light spill along the road corridor
- Restoration planting, either early on-site planting or the planting of mature trees prior to construction-related vegetation removal
- The adoption of an adaptive management framework that will be informed by bat activity thresholds, robust monitoring and potential corrective action.

The area of land required to mitigate effects on bats is shown in the Ecology Assessment, Appendix 14 (see Specialist Reports, Volume 4).

With implementation of mitigation outlined above the residual level of effect due to the presence of the NW Strategic Package on bats is assessed as low.

19.4.2 Birds

Noise, vibration and lighting disturbance caused by the presence of the ASH and RTC has the potential to displace native birds from suitable nesting and foraging habitat within and adjacent to the transport corridors, while noise light and vibration may also affect connectivity in the broader landscape. The overall level of effects during operation on wetland TAR birds specifically the brown teal and dabchick and terrestrial TAR bird specifically the long-tailed cuckoo has been assessed as

moderate, prior to mitigation. This is due to the assessed very high ecological value and high probability of disturbance.

- Mitigation is required for brown teal and dabchick, and the following measures will be implemented:
- Retention of vegetation near wetland habitat, where practicable
- Buffer planting between the road alignment and suitable habitat adjacent to the road
- Installation of vegetation hop-overs in key areas where the road corridor fragments local areas of suitable habitat (open water and some wetlands)
- Mitigation is required for long-tailed cuckoo. This is due the very high value of the species. Since it is a highly mobile migrant species, it is assessed that mitigation associated with landscape planting, riparian planting and implementation of bat mitigation will result in a very low residual impact post mitigation.

With the implementation of mitigation as outlined above the residual level of effect due to the presence of the NW Strategic Package on birds is assessed as very low.

As the SH16 Main Road and Access Road upgrades are associated with existing transport corridors, birds are likely habituated to noise, light and vibration from existing road operation. The overall level of operational effects on bird species identified as potentially present within or adjacent to the proposed designation footprint has been assessed as very low to low. This is due the low probability of disturbance occurring. As such no specific bird mitigation is required.

Mitigation is not required for other bird species identified as potentially present within or adjacent to the proposed designation boundary due to the lower ecological value, lower probability and / or local extent of effect if disturbance occurs.

19.4.3 Lizards

Suitable habitat such as exotic scrub, exotic treeland edge and rank grassland has been identified within or adjacent to the ASH corridor and RTC which could potentially support native copper skink and ornate skink. Native lizards 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.

Due to the presence of the new transport corridors, it has been assessed that there will be some localised disturbance to lizard populations from noise, vibration, and lighting and associated fragmentation of lizard habitat. The overall level of effect due to the presence of the corridor has been assessed as low. As such mitigation is not required. In sections of these corridors with existing transport infrastructure, additional fragmentation of lizard habitat is not expected.

The SH16 Main Road and Access Road upgrades are associated with existing roads. Operation of the upgraded transport corridors is therefore not expected to result in the additional fragmentation of lizard habitat. Similarly, resident (existing and future) copper skink and ornate skink are likely to be habituated to disturbance such as noise, vibration and lighting and no additional effect on lizards are expected.

19.5 Summary of Effects on Ecology

Following the implementation of the identified mitigation measures the residual level of construction effect associated with the construction of all of the proposed notices of requirement are assessed as

negligible to low, for all ecological features assessed. Potential effects are therefore able to be appropriately managed.

Following the implementation of the identified mitigation measures the residual level of operational effect associated with the operations of all of the proposed notices of requirement are assessed as very low to low, for all ecological features assessed. Potential effects are therefore able to be appropriately managed.

20 Landscape and Visual

The potential effects on landscape character, natural character and visual effects associated with the construction and operation of the new and upgraded transport corridors and recommendations as mitigation of adverse effects have been assessed in the Assessment of Landscape and Visual Effects, provided in Volume 4. The assessment below should be read in conjunction with this report.

20.1 Methodology

Landscape effects are a result of physical change in the landscape, which may change the character of the landscape over time. Landscape effects relate to biophysical: abiotic (geophysical processes (landform) and drainage patterns), biophysical: biotic (vegetation cover, quality and pattern) and human attributes (land uses, active and passive recreation, amenity and built form).

Effects are assessed based on the following two categories:

Temporary Effects (Construction Effects): Describe the anticipated impacts on the bio-physical elements and features of the landscape resource (landform, vegetation and hydrology) resulting from the construction of the transport corridors. It also includes visual amenity effects for both public and private viewing audiences from construction works.

Permanent Effects (Operational Effects): Describes the effects on the landscape of completed works (including integrated landscape mitigation measures), the significance of physical landscape change and ultimately the resulting effects of the transport corridors on landscape character, natural character and visual amenity for both public and private viewing audiences.

Natural character effects pertain to changes to the coastal environment, wetlands, and lakes and rivers and their margins, noting that any alterations to these features will be subject to a future regional consent process. Effects are primarily concerned with the degree to which natural processes, natural patterns and natural elements have undergone human modification.

The natural character assessment applies to the existing water bodies and wetlands. Visual effects relate to the changes that arise in the composition of available views as a result of changes to the landscape.

20.2 Positive Landscape and Visual Effects

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

A number of positive landscape and visual effects are anticipated as a result of the operation of the new and upgraded transport corridors:

- A streetscape to support the emerging urban form of the SH16 Main Road and Access Road corridors
- An increase in green infrastructure within the urban transport corridors with the potential inclusion of street trees, berm and stormwater plantings and planted stormwater wetlands, resulting in improved visual amenity for users and adjacent audiences

- Slower speed limits adjacent to existing dwellings and businesses improving the experiential qualities of transport corridors for users as well as private properties adjacent to urban corridors
- The protection of existing vegetation and planting along either side of the ASH corridor and RTC provided as part of the ecological mitigation outlined in Section 19 and Urban and Landscape Design Management Plan (ULDMP) planting programme. This will provide linear habitat and landscape integration along the length of the corridor, which will have ecological and landscape character benefits.

20.3 Assessment of Construction Landscape and Visual Effects

Construction Areas

Adverse construction effects are expected to be primarily related to the presence of construction plant and earthworked areas within corridors which cross undeveloped land. Outside of urbanised areas, site compound and construction areas will temporarily occupy pastoral land that is generally modified by existing rural land use. Given the undulating topography of the ASH corridor, the number of stream crossings via bridges and culverts and the number of stormwater ponds, it is anticipated that a significant extent of earthworks (cut and fill) will be required.

Additional construction effects relate to lighting of night works, construction sites, the construction of wetlands and where existing buildings and development are removed. The phasing of construction will increase the intensity of construction traffic as active construction moves along the transport corridors throughout the construction period. Phasing of works will reduce the length of time audiences are expected to experience adverse effects.

Private Properties

Residential properties within and adjacent to the new or upgraded corridors (including those which are partially designated) have the potential to be impacted during construction in the following ways:

- Surface level changes between private property boundaries and transport corridors, requiring existing driveways and private accessways to be regraded
- Encroachment into private yard areas and the removal of private garden plantings and trees, ancillary buildings and boundary fences
- Potential construction of implemented noise mitigation measures and retaining walls
- Demolition of existing dwellings and ancillary buildings (required properties).

Vegetation Clearance

During construction of rural sections of the ASH corridor and RTC linear stretches of vegetation typically within pastoral field boundaries and rural residential lots will be removed to accommodate the construction and operation of the transport corridor.

In urban areas, broad areas of street side vegetation will be removed to accommodate the wider transport corridors and batter slopes. This generally consists of trees and shrubs located within the road-side boundaries of private properties, within the proposed designation footprint. Exotic pasture, trees, shelterbelt plantings, private gardens, exotic forest patches and cropland make up the vegetation to be removed.

Temporary Visual Amenity Effects

Viewing audiences will consist of existing private viewing audiences within the visual catchment of the construction areas and transient audiences within live carriageways. Some vantage points are likely to witness heightened adverse visual effects. Adverse visual amenity effects are likely to be heightened for private viewing audiences adjacent to construction activities due to more direct and prolonged engagement. This will include the presence of heavy machinery and the visible disturbance of the landscape, particularly within a rural context.

The nature and significance of the potential adverse visual effects is considered to be lessened within urban areas where the existing road corridor landscape is already the central element within the visual composition of the area and has already been modified.

Recommended Measures to Avoid, Remedy or Mitigate Potential Adverse Effects

The mitigation measures for all construction activities and built elements are outlined below and will be incorporated into the ULDMP, CEMP, and CTMP as appropriate, which are proposed as conditions of each NOR:

- Reinstatement of construction and site compound and earthworked areas by removing any left-over fill and shaping ground to integrate with surrounding landform
- Hoarding around the boundaries of site compounds that face on to adjacent residential properties
- Where practicable, during construction, install construction hoardings with interpretive panels in selected areas which are in close proximity and visible to the public, to provide information about the project and its progress
- Limit the removal of notable trees (trees that have no protection but are an identifiable feature within the landscape) and indigenous vegetation
- Consideration in locating stockpiles at the edge of site compounds to provide visual screening
- Wherever practicable retain stockpile and re-use topsoil from existing pastoral land (within project areas) to reduce the amount of truck movements and associated visual effect
- Measures to limit lighting during night time works by using directional lighting to prevent sky glow and glare / spill light falling on residential properties.

Conclusion

With the implementation of mitigation measures outlined above, it is assessed that residual effects on the landscape will be low for urban areas and low to moderate in rural areas associated with construction of the ASH corridor and rural sections of the RTC.

20.4 Assessment of Operational Landscape and Visual Effects

Natural Character Effects

Natural character forming elements, features and processes in the vicinity of transport corridors are limited, with the exception of specific features identified on each corridor in Table 20-1 and on the predominantly rural ASH corridor and rural sections of the RTC. There are no regionally or nationally significant landscapes within or proximate to the proposed designation footprint of each transport corridor.

Table 20-1: Natural Character Features

NOR	Natural Character and Landscape Feature
S1	Gently sloping topography, steep gullies and mature stands of vegetation are a recognisable and distinct feature within the rural landscape. Braided stream and wetland network cross the corridor, in particular the Kumeū River and Ahukuramu Stream networks. Modified areas of the landscape, including geometric field division, exotic shelterbelts, managed hedgerows and highly managed pastoral fields.
S2	Within an existing heavily urbanized landscape with limited value. Huapai Recreation Reserve, Kumeū River Park and Kumeū River have a heightened landscape and amenity value within the landscape.
S3	Gently sloping topography and mature stands of vegetation are a recognisable and distinct feature within the rural landscape. Braided stream and wetland network cross the corridor, in particular the Kumeū River and Ahukuramu Stream networks. Huapai Recreation Reserve, Kumeū River Park and Kumeū River have a heightened landscape and amenity value within the landscape.
KS	The modified landscape has limited natural features, which are restricted to the Kumeū River branch and pond to the east of the station location.
HS	The gently sloping topography and the mature stands of vegetation and braided stream and wetland network contribute to the visual amenity of the landscape.
S4	Largely modified rural landscape has limited natural features, which are restricted to individual stands of native vegetation and riparian vegetation within watercourses.

Across each of the corridors indigenous vegetation is limited in the heavily modified pastoral landscape. Indigenous riparian vegetation is more pronounced adjacent to watercourses. Overall, the natural character value in the landscape is comparatively low across the entirety of the NW Strategic Package landscape.

Clearance of indigenous vegetation within corridors is expected as part of the required works, however these clearance areas will be limited and will not comprise any large areas of protected habitat. This does have the potential to alter the character of these areas by heightening the impression of human modification. Clearance of indigenous riparian vegetation and habitat will be necessary to facilitate the construction of proposed bridges however this will be limited to the areas required for construction. It is noted that this will be considered further at the detailed design stager and as part of future regional consenting.

A planting plan and vegetation protection plan will be developed as part of the detailed design of transport corridors in response to effects on landscape as well as identified ecological effects. This will ensure that natural character values are preserved as an outcome of the transport corridors.

Visual Amenity Effects

Across each of the new or upgraded corridors there are likely to be a range of visual amenity effects on public and private viewing audiences relative to their proximity to transport corridors.

Properties in urban areas have short distance views of existing transport infrastructure and will therefore experience very little difference between baseline views and during operation of the upgraded transport corridor. As FUZ land is urbanised over time visual effects will reduce based on

improved visual amenity for users associated with streetscape improvements, maturing vegetation, berm planting and accessibility to active modes of transport.

Few rural viewing audiences in the existing environment have a direct view of the designation footprint proposed for the ASH and rural sections of RTC, viewpoints are limited to existing public local roads that intersect the corridor and private residences.

Visual effects are anticipated to be mitigated by measures implemented during the finishing phase of the construction period that will mature as transport corridors become operational. These will reduce the long-term residual visual effects of the corridors, however new and modified transport networks will be a noticeable new feature within the landscape. New or upgraded transport corridors will become less notable as the surrounding area is urbanised over time.

Landscape Character Effects

Principle infrastructure elements of the ASH will permanently alter the character of the rural features of the landscape. The protection of existing vegetation stands and comprehensive planting along either side of the ASH corridor and RTC provided as part of the ecological mitigation outlined in Section 19 and ULDMP planting programme will be implemented throughout the designation footprint. This will integrate the corridor into the wider rural landscape.

Upgrades to SH16 Main Road and Access Road will be experienced within the context of a wider landscape undergoing urban intensification. With the introduction of features such as segregated active modes, structured street planting, integrated stormwater management and engineered roading elements, the upgraded transport corridors will resemble that of an urban arterial road with urban aesthetic. A structured planting programme will be implemented as part of the ULDMP, which will provide integration of the corridor into the urban landscape.

Recommended Measures to Avoid, Remedy or Mitigate Potential Adverse Effects

The mitigation measures for all activities and built elements associated with each transport corridor will be achieved through the implementation of a ULDMP, proposed as a condition of each NOR. The objective of the ULDMP is to:

- Enable integration of permanent works into the surrounding landscape and urban context
- Ensure potential adverse landscape and visual effects are managed as far as practicable, contributing to a quality urban environment.

To achieve the objective, in response to potential landscape effects outlined above, the ULDMP will provide details of how the project is designed to integrate with the adjacent urban or rural context, including the surrounding existing or proposed topography, urban environment, natural environment, landscape character and open space zones.

Conclusion

With the implementation of mitigation measures outlined above, it is assessed that residual effects on the landscape once the NW Strategic Package is operational will be low for urban areas and low to moderate in rural areas associated with the introduction of the ASH corridor and rural sections of the RTC into the landscape.

The addition of a comprehensive vegetation protection and planting program proposed as ecological mitigation will provide further improvement and landscape integration.

20.5 Summary of Landscape and Visual Effects

Rural areas of the landscape are more sensitive to the introduction of new transport corridors, in particular sections of the ASH and RTC situated away from existing transport corridors. The optimisation of landscape integration, through the ULDMP, will assist with the integration of the slopes and embankments into the landscape through earth shaping and mitigation planting.

Within urban and future urban areas, 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 or upgraded transport corridors including the opportunity to formalise the streetscape and provide consistent amenity throughout transport corridors.

Overall adverse landscape and visual effects with mitigation range from low to moderate for the construction phase and positive to moderate adverse for the operational phase. Any adverse effects are able to be appropriately managed through implementation of the UDLMP, and other management plans proposed as part of the NW Strategic Package and will reduce over time associated with the urbanisation of the surrounding landscape and integration of the transport corridors into the landscape.

21 Historic Heritage and Archaeology

An Assessment of Historic Built Heritage Effects and an Assessment of Archaeological Effects, included in Volume 4 assesses the potential effects on historic heritage and archaeology as a result of the construction and operation of the NW Strategic Package. The reports assess the potential effects on any identified recorded historic heritage sites and unidentified subsurface archaeological remains that might be exposed during future construction. The assessment below should be read in conjunction with the reports.

21.1 Methodology

Archaeology

There are two main pieces of legislation in New Zealand that control work affecting heritage and archaeological sites. These are the Heritage New Zealand Pouhere Taonga Act 2014 (HNZPTA) and the RMA, both have been relied upon in the assessment of effects.

The assessment criteria assess first 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).

Built Heritage

This assessment of effects of built heritage is based on standard international practices for Environmental Impact Assessment such as those described in:

- Waka Kotahi 2014: Guide to assessing historic heritage effects for state highway projects (Draft Version 2.4).

The methods set have been aligned to regional values assessment criteria for Auckland set out in the AUP:OP Regional Policy Statement (RPS) Statement B5.2.2.1. Identification and evaluation of historic heritage places.

21.2 Positive Effects

Positive effects in terms of heritage and archaeology are generally associated with disturbance during construction works. There is the potential for the following positive archaeological effects:

- Construction around wetlands and / or streams on each of the transport corridors will allow environmental archaeological research to be undertaken that could clarify the dates, sequence and details the anthropogenic vegetation change from forest to open fern lands
- Pre-contact horticulture has not been observed in the North West. Linear developments like the new and upgraded transport corridors proposed create a rare opportunity to close this knowledge gap.

There is the potential for the following positive heritage effects:

- The Huapai Tavern (AUP:OP Schedule 14.1 #00482) and Kumeū Railway Goods Shed (AUP:OP Schedule 14.1 #00483) are both impacted by the RTC and SH16 Main Road Upgrade in the vicinity of Kumeū Station and are proposed to be relocated as part of construction. The final

mitigation measures will be confirmed through the Historical Heritage Management Plan, which is a condition of the NOR.

21.3 Operational Effects

On completion of earthworks there will be no effects on archaeological or heritage sites associated with the operation of the NW Strategic Package, noting that vibration effects as a result of the NW Strategic Package on the heritage buildings have been considered in Section 15.

Therefore, operational effects or measures to avoid, remedy or mitigate operational effects are not discussed further and the below sections consider construction effects only.

21.4 Assessment of Construction Effects on Historic Heritage

Alternative State Highway – There is one possible archaeological site (CHI #3711) within the Brigham Creek Interchange section of the ASH. The site is the reported location of an early church which is within the designation footprint.

There are no recorded archaeological sites along the remainder of the ASH corridor. The corridor, however crosses the Totara Creek, Waiarohia / Ngongepetara Stream and Ahukuramu Stream. These are areas where there is a risk of encountering archaeological features associated with seasonal camps used to exploit local resources in close proximity to stream crossings.

Historic heritage features within the corridor and within 200 metres of the corridor exist, these are:

- One historic building, an early fruit packing shed, is recorded (CHI ref #16400) within the corridor and one possible archaeological site. The possible archaeological site (CHI #3711) is the reported location of an early church which is within the designation footprint. Both would be impacted by the transport corridor
- Five historic buildings (four recorded in the CHI only, one is also scheduled in the AUP:OP), two archaeological sites, one scheduled notable tree and one scheduled historic heritage place are identified within 200 metres of the designation footprint. These are outside of the designation footprint and therefore unlikely to be affected.

For heritage sites that are not scheduled and the archaeological site (CHI #3711), practicable measures to avoid, remedy or mitigate effects will be detailed in the Historic Heritage Management Plan (HHMP). This may include documentation before removal and an investigation of the sub-floor assemblage and curtilage, which would allow preservation through documentation. A precautionary archaeological authority would mitigate the risk of encountering unrecorded archaeological sites.

SH16 Main Road Upgrade – There are no recorded archaeological sites within the extent of the proposed designation footprint for the SH16 Main Road Upgrade.

Built heritage features within the corridor and within 200 metres of the corridor are:

- One historic building is recorded close to the corridor, Kumeū Railway Goods Shed a historic railway goods shed (ref #00483)
- Railway carriages were formerly situated at 299 Main Road (CHI #18493). The carriages have been moved from 299 Main Road previously and not presently located on site
- The curtilage of Huapai Tavern is crossed by the designation, but the building itself is not impacted

- There are three significant streams (Kumeū river, Turakiawareta stream and an unnamed stream), two of which were likely navigable by waka in pre-Contact times are within the proposed designation footprint. These are areas of high risk to encounter archaeological features that have not been recorded previously as archaeological sites.

Given the above features, there is the potential for adverse effects on historic heritage and / or archaeology.

For the above heritage sites, practicable measures to avoid, remedy or mitigate effects will be detailed in the HHMP. A precautionary archaeological authority would mitigate the risk of encountering unrecorded archaeological sites.

Rapid Transit Corridor, Kumeū Rapid Transit Station and Huapai Rapid Transit Station – There are no recorded archaeological sites within the extent of the proposed designations. There is a higher potential for discoveries at the following sites:

- There is a small risk of encountering unrecorded archaeological sites at the Kumeū Rapid Transit Station; however discoveries have likely been destroyed by construction of existing development of the site
- There are three significant streams (Kumeū river, Turakiawareta stream and an unnamed stream), two of which were likely navigable by waka in pre-Contact times are within the footprint of the corridor. These are areas of high risk to encounter archaeological features that have not been recorded previously as archaeological sites.

Built heritage features within the corridor and within 200 metres of the corridor are:

- Two historic buildings are recorded within the proposed corridor and one possible archaeological site which is the location of the original Kumeū train station building, is within the corridor. One of the historic buildings, the Huapai Tavern which dates back to the 1870s, is scheduled as a historic place in the AUP:OP (ref #00482)
- The curtilages of three further CHI items have the potential to be impacted by the corridor. These three structures are in the vicinity of the corridor and there is one further heritage building, a historic house, within 200 metres of the corridor.

The proposed designation has the potential to have significant adverse effects on historic heritage values of the Huapai Tavern as the RTC traverses the property, with the Kumeū Rapid Transit Station located within and adjacent to the property. To mitigate these effects, it is proposed to re-locate the buildings within the vicinity of the Kumeū Rapid Transit Station. Some demolition may be required to later additions of the building in order to appropriately relocate it adjacent to the station, and to support placemaking outcomes. Details of the relocation will be confirmed at the detailed design stage and as part of the HHMP.

For heritage sites that are not scheduled, practicable measures to avoid, remedy or mitigate effects will be detailed in the HHMP. This may include documentation before removal and an investigation of the sub-floor assemblage and curtilage, which would allow preservation through documentation.

NOR S4 Access Road Upgrade – There is one CHI site (#16377) at 211 Access Road for 'Shed, Gates and Railings', the fences will be impacted and re-instated. There are no other recorded sites within the extent of the proposed designation footprint for the Access Road Upgrade. There is only a small risk to encounter unrecorded archaeological features associated with the proposed designation with effects on frontage of 211 Access Road managed via the re-instatement of the boundary treatment.

21.5 Measures to Avoid, Remedy or Mitigate Construction Effects

As a proposed condition for each NOR, a HHMP will be prepared in consultation with Auckland Council, Heritage New Zealand Pouhere Taonga and Manawhenua prior to the start of construction. The HHMP will:

- Set out the methods for the identification and assessment of historic heritage within the designation to inform detailed design
- Identify the known and potential historic heritage sites within the designation
- Set out the HNZPTA authority requirements for any pre-1900 sites identified for a precautionary authority.

Relocation of any historic building is a preferable option to demolition, this particularly relates to the Huapai Tavern which is affected by the RTC including Kumeū Rapid Transit Station and SH16 Main Road Upgrade. The relocation of the Huapai Tavern, any associated structures and other identified heritage structures will be considered through the development of the HHMP. This will include measures to manage effects on the heritage features, as they will be moved from their existing heritage overlay.

Since archaeological survey cannot always detect sites of traditional significance to Māori, or wāhi tapu, the appropriate Manawhenua authorities will be consulted regarding the possible existence of such sites, and the recommendations in the Assessment of Historic (Built) Heritage Effects and an Assessment of Archaeological Effects.

21.6 Summary of Heritage and Archaeological Effects

Overall, the most significant potential adverse effect on historic heritage and archaeology are associated with the proposed designation for the RTC and Kumeū RTC Station. Potential adverse effects are on the few remaining historic buildings, in particular the Huapai Tavern, and structures of early Kumeū from the time when it was a service centre for a rural community. These buildings form a strong tie to the past and the local identity.

Relocation of the Huapai Tavern is the preferred approach to reduce potential adverse effects on historic heritage. The final location will be confirmed through the HHMP, which is a condition of the proposed designation.

All proposed new and upgraded transport corridors associated with the NW Strategic Package cross navigable streams. This opens the risk of encountering unrecorded sub surface archaeological sites. Adverse effects can be mitigated through the above noted measures and within the legal framework set out by archaeological authorities which involve preservation by documentation of existing and newly discovered sites and places of significance.

With mitigation in place, adverse effects on heritage and archaeology associated with the NW Strategic Package are able to be appropriately managed.

22 Māori culture, values and aspirations

This section draws on engagement with manawhenua and inputs provided by manawhenua representatives during the development of the NW Strategic Package. In developing the corridors, recognition has been given to both the relationship of Tangata Whenua to their lands, culture and traditions in this area and the commitment to partnership between manawhenua and Waka Kotahi and AT (as representatives of the Crown) founded through Te Tiriti o Waitangi.

22.1 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 effects of each transport 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 the North West. 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 transport corridor alignments and the mitigation measures proposed.

22.2 Manawhenua Feedback

22.2.1 Cultural Impact Assessment

An invite was made for CIAs to be prepared for the NW Strategic Package at the Te Tupu Ngātahi hui on the 3 March 2022, which was attended by Ngāti Whanaunga, Te Patukirikiri, Ngai Tai Ki Tāmaki, Ngāti Paoa Trust Board (Ngāti Paoa), Ngāti Manuhiri, Ngāti Tamaterā. The team received the following responses during the hui:

- Ngāti Whanaunga - will not provide a CIA
- Ngāti Paoa Trust Board - will not provide a CIA
- Te Patukirikiri - will not provide a CIA
- Ngāti Tamatera - will not provide a CIA

The team received one acceptance by Te Kawerau ā Maki.

22.3 Manawhenua Treaty areas and sites of significance

The NW Strategic Package does 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.

Transport corridors proposed within the NW Strategic Package fall within or are proximate to Te Kawerau ā Maki's statutory acknowledgement area (recorded in Appendix 21.7 of the AUP:OP). As such, the relevant consent authorities must have regard to the statutory acknowledgement relating to the area.

22.3.1 Te Kawerau ā Maki

Te Kawerau ā Maki are associated with the area surrounding both the NW Local Arterial Package and the NW Strategic Package. The CIA prepared by Te Kawerau ā Maki addresses both areas.

Specific points from the Te Kawerau ā Maki CIA are noted under Section 22.3.2, denoted by (CIA) to distinguish from wider manawhenua feedback.

22.3.2 Key matters raised by manawhenua

As part of the regular hui and CIA, manawhenua have provided commentary on the new and upgraded transport corridors/sites. This is set out below:

Impacts on streams and ecology

- The catchment holds numerous tributaries and streams identified as having significance to Te Kawerau ā Maki in the CIA. These drain into the Kumeū/Kaipara River, Mānutewhau River, Pītoitoi River (Brigham Creek), Wai ō Pareira (Henderson Creek) and Te Wai Roa ō Kahu and Te Waitematā.
- The CIA notes that where works are occurring near streams (ASH, SH16 Main Road Upgrade, RTC, Access Road Upgrade) there is the potential for adverse impacts on freshwater systems and receiving environment, and identifies that there is a need for protection during construction.
- Manawhenua outlined the importance of streams and wetlands mauri, including lower quality ecological areas and vegetation. This informed the optioneering process to minimise or avoid impacts on streams and wetlands, where feasible and practicable.
- Manawhenua raised concerns relating to effects on native bats, lizards, birds and fish from proposed transport corridors as well as potential loss of native vegetation along corridors and near stream crossings.
- Manawhenua were interested in stormwater treatment and were presented to by the Te Tupu Ngātahi flooding specialists.
- Te Kawerau ā Maki identified in the CIA that the stormwater management approach proposed has minor beneficial effect. The CIA also notes that there is a need for stormwater treatment before discharges from the transport corridors.
- The CIA notes that impacts of SH16 Main Road bridge construction on the awa are potentially large adverse. (Works are required at this site in order to upgrade the existing bridge). The CIA notes provision for cultural design as potential mitigation for works at this site.

Productive soils

- It was acknowledged that the option would either impact existing residential land or productive soils. Manawhenua conveyed to Te Tupu Ngātahi that productive soils are scarce and valuable. These comments were provided in relation to the proposed ASH. Feedback on the value of soils was provided by Ngāti Whātua o Kaipara during the option development stage and informed the alternatives assessment (refer to the Alternatives Assessment for further details).
- The CIA states that alluvial soils have a unique composition and organic content which makes them highly productive and hence have a strong sense of mauri, all soils are also associated with Papatūānuku (the earth mother).

Wider feedback and coordination between projects

- Manawhenua requested information on traffic volume calculations and population growth projection and demographics, with the transport specialists providing an explanation of the 2048 modelling and the growth projections set out in the FULSS.
- There was interest in the public transport facilities connecting and operating on the Rapid Transport Corridor.
- The need for wider engagement with other Council Controlled Organisations was expressed, with the approach to engagement sent out to manawhenua.

Support for the future transport network

- Manawhenua have set out general support for all corridors within the NW Strategic Package, with the exception of the ASH.
- The CIA notes the potential positive operational benefits of the NW Strategic Package through contribution of cultural design, place naming, and walking and cycling access opportunities. This has also been recognised by manawhenua as part of the hui discussions. The CIA is not supportive of the ASH element of the NW Strategic Package, this is further discussed below.

Alternative State Highway

- The CIA is not supportive of the ASH and notes residual large adverse effects of the project. Key concerns in particular relate to:
 - The sensitivity of the landscape through which the ASH is located in, specifically Te Awa Kumeu and productive soils of the region.
 - Impact on setting of wahi tohu and cultural landscape features.
 - Changes to rural character resulting from the ASH enabling urban growth is considered undesirable to Te Kawerau ā Maki.
 - Earthwork impacts on whenua and removal of productive soils (as discussed above).
 - Effects on Wai Māori from construction and operation near freshwater ways.
 - Potential for urbanisation outside the existing FUZ, as a result of the ASH.

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

Engagement with manawhenua is naturally broad and encompasses matters beyond those matters required to be considered in relation to a notice of requirement under a district plan, including regional plan matters and broader partnership interests. Section 22.3.2 has included these matters for context. The measures proposed to avoid, remedy and mitigate potential adverse effects of the NW Strategic Package in Section 22.4 address the relevant district plan matters and enable the relationship with manawhenua to continue, without predetermining regional consenting outcomes or matters best addressed directly between the treaty parties.

Cultural landscape and design expression

Manawhenua will be invited to participate in the development of the ULDMP to input into relevant cultural landscape and design matters on each transport corridor. This includes the management of potential effects on cultural sites, landscapes and values. The ULDMP is provided for via a condition on each proposed designation.

Risk of archaeological discovery

Prior to the start of construction works or enabling works, a Heritage and Archaeology Management Plan and a Cultural Monitoring Plan will be prepared. These plans will be prepared in collaboration with manawhenua to ensure that effects on the cultural values and heritage of manawhenua are managed appropriately, including features discovered by accident.

Archaeological mitigation will be in line with the recommendations of the Assessment of Heritage / Archaeology Effects (Appendix 3) and this AEE.

Construction environmental controls

Concerns relating to construction works and potential impacts of sediment on streams and wetlands will be considered through the CEMP, and future regional consents, refer to AEE Part B, Section 7 for construction environment controls. 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 (Appendix 3) and this AEE. Refer to Section 6 for recommendations and mitigation recommended.

Riparian vegetation

Impacts on trees under the district plan controls are proposed to be addressed through a Tree Management Plan on the NORs.

Effects and mitigation for impacts on riparian vegetation will be considered at detailed design, for those corridors that have impacts on streams. Where there is a 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 future regional consents.

Alternative State Highway

Te Kawerau ā Maki has noted outstanding concerns regarding the potential impacts of the ASH. Whilst not resolved at the time of writing this AEE, Waka Kotahi and Te Kawerau ā Maki are committed to ongoing conversations regarding these impacts and the treaty partnership. This includes a discussion of any offsetting measures identified within the CIA, noting these have the potential to reduce the effects stated in the CIA. As appropriate and relevant, outcomes of the discussion will be shared with Auckland Council as addressed and/or agreed.

22.5 Māori culture, values and aspirations summary

Te Tupu Ngātahi has engaged with manawhenua from the commencement of the Te Tupu Ngātahi programme, through corridor identification, development and NOR preparation. The new or upgraded transport corridors do not directly impact on AUP:OP mapped sites of significance, however there is potential for impacts on cultural values related to the natural environment and cultural landscape features, identified through direct engagement with manawhenua.

Provision for cultural input and engagement will be enabled through the ULDMP and various management and monitoring plans to manage adverse effects on cultural heritage and potential of new archaeological discovery. The ULDMP will also consider how corridor features, which will be the subject of future regional consents, 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.

Te Kawerau ā Maki has expressed outstanding concerns related to the ASH project. Waka Kotahi is committed to ongoing discussions with Te Kawerau ā Maki. These conversations were ongoing at the time of writing this AEE and updates will be provided as and when appropriate to the Council.

23 Social Impact

The Social Impact Assessment (SIA), included in Volume 4, assesses the actual and potential social impacts associated with the planning (route protection phase), construction, operation and maintenance of the NW Strategic Package on the regional, wider and local communities. Assessment is based on the existing and likely future environment and provides recommended measures that may be implemented to avoid, remedy and / or mitigate these impacts. These effects are summarised below and should be read in conjunction with that report.

23.1 Methodology

The methodology used for the SIA is based on the International Association for Impact Assessment Guidelines²¹ and Waka Kotahi social impact assessment guidelines²². The methodology has been developed to identify and predict the key social impacts of the construction and operation of the new and upgraded transport corridors from the perspective of those potentially affected by it.

Actual and potential effects associated with the route protection phase, construction phase and operational phase for each transport corridor have been considered. Effects identified can either be positive or negative on the basis of whether anticipated social consequences will either enhance or detract from community values, social processes or social infrastructure.

23.2 Positive Effects

Identification and the subsequent designation of a transport project will have a positive impacts on people's aspirations for the region. This is reflected in the Local Board Plans for the North West which have aspirations around improving the resilience of the transport network, making it easier to get around the area, and investing in active mode infrastructure. The designation for each new of upgraded transport corridor will provide certainty to the regional community that these aspirations will be realised through the creation of new transport corridors and the provision of additional transport choice.

Through Kumeū-Huapai the SH16 Main Road Upgrade, RTC, Kumeū and Huapai Rapid Transit Stations will provide the impetus and opportunity to improve economic opportunities for existing and future properties and businesses through a comprehensive transport network and dedicated rapid transport system.

These projects will support future development to meet the outcomes anticipated by the NPS:UD and will support quality urban form within the Kumeū-Huapai.

Additional positive effects are identified for the Operational Phase and discussed in Section 13.

23.3 Route Protection Phase

Identification and the subsequent designation of a transport project will have a positive impacts on people's aspirations for the region. This is reflected in the Local Board Plans for the North West

²¹ Social Impact Assessment: Guidance for assessing and managing the social impacts of project – International Association for Impact Assessment, April 2015. Retrieved from https://www.iaia.org/uploads/pdf/SIA_Guidance_Document_IAIA.pdf.

²² <https://www.nzta.govt.nz/assets/resources/guide-to-assessing-social-impacts-for-state-highway-projects/16-243-People-and-place-state-highway-social-impact-guide-2017-FINAL.pdf>

which have aspirations around improving the resilience of the transport network, making it easier to get around the area, and investing in active mode infrastructure.

The route protection of each transport corridor will provide certainty to the regional community that these aspirations will be realised through the creation of new transport corridors and the provision of additional transport choice.

23.4 Pre-construction Phase

Urban Areas

Subject to the level of clarity that is provided on the timing of construction activities, there is the potential for stress and anxiety to be experienced by the community. These effects are more likely to be experienced in existing urban zone areas along SH16 Main Road where the RTC and Stations are proposed.

This could result in businesses being reluctant to invest in the area until after the upgrades have occurred. This would have an adverse social impact on quality of environment if there is an increase in vacant properties and an adverse impact on people's way of life and ability to sustain oneself if people in the local community need to travel further afield to access goods and services.

If pre-construction phase results in directly affected properties being vacant and associated reduction in amenity, this has the potential to increase impacts on people's health and wellbeing more broadly. Measures to address this are set out under Section 24 Property and Land Use.

Rural Areas

For communities located in areas zoned rural, these areas are not anticipated to undergo much change in land use. Engagement carried out has found that this rural community values its quiet, rural feel, with many residents having lived in the area for a long time. For this community, anxiety and uncertainty may threaten their sense of stability and social impacts may be more significant.

In the FUZ areas, there are existing AUP:OP restrictions on urban development until the areas are rezoned. Change and growth is also expected in the zone, and as such there may be more tolerance for uncertainty around the timing of the new or upgraded transport corridors.

The Access Road upgrade is bordered by both FUZ and rural zones, the proposed designation footprint also involves relatively limited road widening. Community cohesion and way of life are not expected to be adversely impacted during the pre-construction phase.

23.5 Construction Phase

Noise, vibration and traffic congestion could adversely impact people's quality of environment and may give rise to adverse impacts on health and wellbeing by causing stress and anxiety for local residents. However, noise and vibration will only be experienced directly by residents for a short period (i.e., weeks or months) compared with the overall construction duration of several years.

Rural Areas

For the ASH Corridor and RTC sections constructed through rural areas, current residents value these rural areas for their quiet rural character, noise, vibration and visual effects caused by construction have the potential to temporarily alter this valued community character, from a quiet rural

environment to one characterized by construction, such as areas of earthworks, building activity (e.g., temporary site offices) and noise and vibration. Traffic flow on local roads may be impacted by construction traffic and controls could cause delays for local residents in addition to existing congestion along SH16.

Urban Areas

Within existing urban areas along SH16 Main Road (a major transport corridor), there is potential for traffic disruption during the construction phase which could make it more difficult for people to move through the area to go about their daily activities.

Construction could temporarily impact people's ability or desire to access businesses along SH16 Main Road. This could then affect people's way of life and ability to sustain oneself if there is a need to travel further afield to access goods and services. If businesses experience an ongoing period of reduced patronage as a result of changed customer access, business owners could experience stress and anxiety about their ability to continue operating.

Community Facilities

During construction, normal access and enjoyment of some community facilities will be affected, including Huapai Recreation Reserve (by the RTC), the Kumeū Community Centre and Kumeū Showgrounds (Access Road) and Fred Taylor Park (ASH and RTC).

Sections of Huapai Recreation Reserve may be off-limits to the public, and access from SH16 will be closed to the public. This is a large, well-used community resource that is home to a number of community facilities and activities as well as a popular location for informal recreation. This has the potential to affect community cohesion if people no longer have opportunities to participate in activities that usually connect them to others in the community.

Construction may impact the Kumeū Community Centre and the Kumeū Showground's ability to fully operate (temporarily) if construction works outside the facility and in the frontage of each facility are disruptive.

23.6 Operational Phase

Alternative State Highway – The provision of the ASH will help to facilitate easier local movement around and within Kumeū-Huapai. This will positively influence way of life, sustaining oneself and community cohesion in that it will become easier for the community to go about their daily activities, including accessing work, education, retail and recreation and connecting to other people and places throughout the community. These changes, particularly when considered as part of a wider suite of transport network upgrades, will also help to realise the aspirations that the wider community have expressed for ability to move easily around their local environment.

The ASH will provide an alternative route for vehicles moving through North West Auckland. By relocating vehicles (particularly interregional and large freight vehicles) away from SH16 Main Road. It will become easier for the wider community to access businesses and services safely and efficiently in Kumeū-Huapai, providing benefits in terms of way of life, health and wellbeing. Relocating heavy vehicles away from SH16 could also help to achieve the aspirations of the Kumeū-Huapai Centre Plan 2017 in creating a more pedestrian and cyclist-friendly destination.

SH16 Main Road Upgrade – Upgrades to SH16 Main Road complement the ASH, by facilitating easier movement around the wider community for those who regularly travel through and within

Kumeū-Huapai urban area. Particularly, those who wish to walk or cycle will now have the infrastructure to facilitate this. Drivers will also benefit from the upgrades if other road users switch to walking and cycling instead of driving, reducing the number of cars on the road and improving traffic flows. Upgrades to SH16 Main Road could result in community members spending time on Main Road, providing opportunity for the public to socialise and improve community cohesion.

Rapid Transit Corridor – The RTC and RAMC component will facilitate easier movement around the North West region through connections to the strategic transport network. Active and public transport users will have a safe, efficient way of travelling, while drivers will also benefit in the reduction of congestion of the road network. This will have positive impacts on general way of life and community cohesion, providing alternatives to private car to access work, recreation, retail, education and connecting to other people and places throughout the community. The provision of the alternative modes of transport will particularly assist vulnerable groups, such as the elderly or those unable to drive, in accessing key services and amenities throughout the North West and beyond.

An improvement in the Kumeū-Huapai town centre environment quality is anticipated to result from implementation of the RTC and SH16 with the creation of an improved pedestrian streetscape and reduction in traffic congestion. There is potential for adverse effects associated with the change in the long-term composition of the business community along SH16 Main Road due to impacts to existing business properties, primarily on the southern side. This is not assessed as a significant impact on community cohesion or quality of environment however as the town centre is planned to undergo transition regardless and changes are likely as this occurs.

Access Road – Access Road upgrades will improve connectivity between the ASH and SH16, assisting people in movement around the North West. In particular, the provision of safe, separated walking and cycling infrastructure along the road will assist the local community in using active modes to access SH16 for their daily needs and activities, as well as for exercise and recreation. Members of the community have reported traffic congestion in this area and the road widening and active mode infrastructure will help to reduce this congestion.

Community Facilities

Te Tupu Ngātahi have engaged with Auckland Council Community Facilities team throughout the development of the NW Strategic Package to consider ongoing effects on park assets and how these can be appropriately managed.

Waka Kotahi, as the requiring authority for the ASH and RTC will continue to work with Auckland Council Community Facilities to ensure continued operation of Fred Taylor Park and Huapai Recreation Reserve, including any replacement facilities, either in the current location or at an agreed offsite location.

The removal of carparks at the Kumeū Community Centre may also impact on people's ability to access the community facilities. This impact will be somewhat mitigated by the provision of walking and cycling infrastructure along Access Road, as this will provide the opportunity for local community to access the centre via walking or cycling rather than driving. Access Road works will also affect the northern corner and frontage of the Kumeū Showgrounds site, including a portion of the parking.

23.7 Measures to Avoid, Remedy or Mitigate Adverse Effects

The following mitigation measures are able to be implemented for each of the new or upgraded transport corridors, to mitigate adverse social and community effects.

Pre-construction phase

Adverse effects on the community due to anxiety or uncertainty regarding project delivery are able to be reduced by providing accurate and up to date information about what to expect throughout the planning and pre-construction phase. This provides the community with a greater degree of certainty around the future of their community

It is proposed that a project website, or equivalent virtual information source, will be established within 12 months of the date on which the designations are included in the AUP:OP. This website or virtual information source will provide information on:

- The status of the NW Strategic Package
- Anticipated construction timeframes
- Contact details for enquires
- A subscription service to enable receipt of project updates by email.

Construction Phase

Clear communication about construction timing will be provided to residents so they are able to prepare for the works and have the opportunity to have questions and concerns responded to. The management and form of this communication will be set out as part of the Stakeholder, Communication and Engagement Management Plan (SCEMP) which is proposed as a condition of each NOR.

Construction disruption impacts, including temporary changes to the transport network can be mitigated through the management plan framework proposed. The plans address construction transport, noise and vibration and general construction activities, and are informed by the identified effects and relevant specialist reports, as discussed in each topic section. These management plans include:

- Construction Traffic Management Plan
- Construction Environment Management Plan
- Construction Noise and Vibration Management Plan.

A complaints register will be set up for the duration of the construction period, so that the community have a dedicated contact number for any issues during the construction period with the contact details available to the community.

Construction effects on community facilities are temporary and can be mitigated through engagement with each community facility owner in the lead-up to the construction period so that alternative plans can be made for this temporary disruption period. Waka Kotahi as the requiring authority for RTC and ASH corridor, will continue to work with Auckland Council Community Facilities on management during the construction stage and any replacement facilities (temporary or otherwise).

Operational Phase

The operational phase of the NW Strategic Package has been assessed as positive therefore the requirement for mitigation is minimal. Continuation of public information updating the community of the status of projects as they become live and informing the community of the benefits of use of installed infrastructure will ensure positive outcomes.

The provision of noise barriers as identified in the Operational Noise Assessment will reduce disruption for people working from home and / or spending time outdoors. In the rural community, visual screening i.e., through landscaping, will minimise adverse impacts on people's viewing outlook.

23.8 Summary of Social Impact Assessment

The NW Strategic Package once operational will have largely positive impacts for the communities they serve. New and upgraded transport corridors will improve the connectivity and reliability of the transport network and provide additional transport choices, making it easier for people to travel to and through the North West. Identification of the corridors will provide certainty to the local, wider and regional communities that plans are in place to help enable planned growth and manage the traffic congestion which is currently an issue for many in the North West.

Uncertainty about timing of changes have the potential for adverse social impacts for residents, however provision of project information and lapse dates proposed provide relative certainty regarding when delivery is expected. If pre-construction phase results in directly affected properties being vacant and associated reduction in amenity, this has the potential to increase impacts on wider people's health and wellbeing, measures to address this are set out under Section 24 Property and Land Use.

Adverse social impacts at the construction phase from noise, vibration and additional traffic movements disruption including changes to normal business activity will be temporary and can be managed through stakeholder engagement and appropriate disruption management measures (e.g., noise, vibration, traffic).

At the operational phase, social impacts may occur if access to community assets such as community halls and parks is made more difficult. Impacts on parks will be managed via continued engagement between Auckland Council and Waka Kotahi to ensure continued operation. The implementation of mitigation measures identified in Section 23.7 above will ensure that potential social effects are able to be appropriately managed.

24 Property and Land Use

24.1 Methodology

The NW Strategic Package proposes to designate land to provide a sufficient footprint to enable the construction, operation and maintenance of the proposed transport corridors. Private properties will be directly affected, refer to Form 18 for a list of properties impacted by each corridor. The land impacted varies between rural, FUZ, residential, open space and commercial zones. The existing and likely future land use of each corridor footprint is provided in AEE Part A.

This section relates specifically to properties directly affected, both temporarily and / or permanently, wider social impacts are discussed in Section 23.

24.2 Positive Effects

The proposed transport corridors support the intensification of land and at a network level are designed to support the identified urban growth as enabled through the AUP:OP. This is most evident in the following scenarios:

- Existing urban zones where land has not realised the available development potential (i.e., greenfield or bare land) such as the Huapai Triangle Precinct (Kumeū-Huapai) and the western extent of Huapai
- FUZ land, where the land is to undergo plan changes and rezoning, the designations identify the infrastructure required to support that development.

The identified designations will enable integrated planning and delivery of environments from greenfield to urban with infrastructure suitable to support anticipated development density and desirable urban form. This will support the development of impacted property in the future.

24.3 Pre-Construction and Post Designation Phase

The proposed designations seek lapse durations (pre-construction periods) of up to 20 years. This is to provide a sufficient timeframe to enable the construction of each of the transport corridors in response to the progressive urbanisation of the FUZ and align with planned release of land and project funding availability (see AEE, Part A Section 5 for further discussion on lapse date).

In relation to the RTC and Stations, a significant area of existing business land along SH16 Main Road is within the designation footprint. This has the potential to result in uncertainty for businesses if there is not clear information provided about when acquisition and construction is expected to take place.

Similar to businesses, uncertainty about the acquisition process and the future of their communities has potential for adverse social impacts on private residential owners. There is potential that residential owners experience stress and difficulty in planning ahead if there is a lack of information on the process for property acquisition and construction timeframes.

During the pre-construction period, restrictions on development and owner decisions to reduce investment in properties can lead to gradual deterioration, and the condition of 'planning blight'. This is characterized as *'the harmful effects of uncertainty about likely restrictions on the types and extent*

of the future development in a particular area on the quality of life of its inhabitants and the normal growth of its business and community enterprises’.

Uncertainty and extended lapse dates

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

Notwithstanding the influence of any proposed mitigation, 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, the most workable method for managing any outstanding uncertainty of the project commencement is ongoing and effective communication.

Development on designated land

When considering effects associated with an extended lapse period, it is important to note that sections of the Strategic Network are within the Rural Zone and the FUZ.

The FUZ is a land use zoning that is applied to greenfield land that has been identified as suitable for urbanisation. The 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 set a timeframe for when the urbanisation will occur.

For those rural areas, the existing rural zone places restrictions on development and activities. It is therefore likely that the ongoing use and development of these rural areas will continue as they are. Significant development is not anticipated.

The majority of disruption and potential for planning blight will be experienced in existing urban areas, such as along SH16. In order to manage uncertainty of restrictions and project delivery timeframes for owners Waka Kotahi and AT will establish information platforms following confirmation of the designations and before construction starts to inform owners of project timeframes.

Land development and the section 176(1)(b) process

Properties adjacent to or in proximity to the proposed designations, urban development and investment can continue to occur, informed by the designation. Similarly at partially designated properties, those areas outside the designation footprint are not subject to any additional controls. For directly affected land (within the footprint), the proposed designations do not preclude the continued (unchanged) use and enjoyment of that property prior to construction.

However, on the designated land in accordance with section 176(1)(b) of the RMA, anyone (other than a requiring authority with an existing designation) is restricted from carrying out work that would prevent or hinder the designated work without first obtaining the requiring authority’s (Waka Kotahi or AT) written consent. There are established processes within both requiring authorities for processing and considering proposals under section 176(1)(b).

Where feasible, Waka Kotahi and AT will proactively work with landowners and developers through the section 176(1)(b) process to help them integrate earthworks, road works, stormwater solutions and development so that those works will not prevent or hinder the work authorised by the proposed designation, to enable written consent to be provided.

The Public Works Act process

The land may continue to be sold or leased whilst designated. Where landowners contact Waka Kotahi or AT in advance of the property acquisition process the respective requiring authority will engage with those owners to:

- Direct them to public information on the PWA²³ process and its provisions for landowners (noting that the PWA is a non-RMA process)
- Explain expected timeframes for the corridor delivery to address landowners' uncertainty
- Explain how to seek written consent under section 176(1)(b) of the RMA for works in the designation.

Refer to Form 18 for a list of properties within the proposed designation footprint for each corridor, and to Volume 3 for Conceptual Design Drawings.

24.4 During Construction

The proposed designation footprints include land required for temporary construction and permanent works, these specific areas will not be confirmed until detailed design.

Land required permanently

Land required for the ongoing operation and maintenance of each transport corridor (including project mitigation, ongoing maintenance, and operation) will be identified and acquired typically in a period of 2-3 years leading up to main construction. The PWA is the legislative framework under which entitled landowners will receive compensation, this a non-RMA process. Therefore, land required permanently will be purchased and owners relocated prior to construction occurring.

Land required temporarily

If temporary occupation of the land is required at the time of construction (such as construction area and access arrangements), it is typically leased in agreement with the property owner. Potential effects from the temporary lease / use of land within the proposed designation footprint include:

- Disruption to normal business access and parking
- Disruption to farm activities, temporary loss of grazing pasture, stock-proof fencing (given the existing and proposed urbanisation of Kumeū-Huapai, this is predominantly an issue associated with the ASH and rural sections of the RTC)
- Changes to driveways including gradient or alignment, loss of yard vegetation and construction impacts (including noise and vibration, and visual amenity).

23

[https://www.lin.govt.nz/regulatory/15703#:~:text=The%20Public%20Works%20Act%201981%20\(PWA\)%20sets%20out%20the%20procedures,t he%20process%20of%20land%20acquisition.](https://www.lin.govt.nz/regulatory/15703#:~:text=The%20Public%20Works%20Act%201981%20(PWA)%20sets%20out%20the%20procedures,t he%20process%20of%20land%20acquisition.)

24.5 Post Construction

Private properties

On completion of the work private land not required for on-going operation, maintenance or effects management will be reintegrated in coordination and discussion with directly affected landowners. Land that is permanently required for the transport corridor will have been purchased and those landowners will no longer be affected by the designation. There will therefore be no ongoing effects for these parties.

Temporarily affected properties will be reintegrated, this may include reinstatement of private driveways, private parking, fences, gardens and yards, and reintegrating construction areas (e.g., batters, laydown areas, stormwater ponds) with the surrounding landform. Following completion, the designation boundary will be removed from areas no longer required, and there will be no ongoing property impacts.

For properties in proximity to operating corridors where post completion effects related to ongoing visual landscape and noise and vibration changes are likely, these are discussed in the relevant topic sections along with any specific mitigation. This is most relevant for rural areas of the ASH and RTC, where a lower built environment character is expected.

Community Facilities

Partial acquisition of Huapai Recreation Reserve and Fred Taylor Park for the RTC and ASH will affect the use of this space for exercise and informal recreation and reduction in field capacity has the potential to limit operations.

Te Tupu Ngātahi have engaged with Auckland Council Community Facilities team throughout the development of the NW Strategic Package to consider effects on park assets and how these can be appropriately managed. Waka Kotahi, as the requiring authority for the ASH and RTC, will continue to work with Auckland Council Community Facilities to reach an agreement on long term use of Fred Taylor Park and Huapai Recreation Reserve, including any replacement facilities, be it in its current location or at an agreed offsite location.

Kumeū Fire Station is impacted by the RTC. Waka Kotahi is currently engaging with FENZ on an agreement to re-locate the station to an appropriate location within Kumeū.

The Kumeū Showgrounds is operated by a private trust and provides an important community function as an agricultural and horticultural facility for the area. The trust hosts numerous events throughout the year including the annual Kumeū Show. The Access Road upgrade identifies a stormwater pond in the corner of the site, where currently dog training and space is hired out for activities, in addition to a reduction in parking space. Impacts of private parking removal on showgrounds activities are considered in the transport assessment, the loss of the corner site will displace existing activities in that area, and these may be required to use other areas on the site. Specific mitigations for the showgrounds will be determined through the PWA process.

24.6 Recommended Measures to Avoid, Remedy or Mitigate Potential Adverse Effects

Land use uncertainty and property impacts

Following confirmation, establishing a project website or other suitable information source with information on the Project such as status and anticipated construction timeframes.

As requested, additional measures for landowners available include:

- Provide information on the section 176(1)(b) process and Waka Kotahi or AT contact details to support the integration of development with the extension and / or upgrade of each corridor, where practicable
- Provide information on the PWA to address uncertainty on landowners, noting that the PWA is a non-RMA process.

Implementation of a SCEMP will occur 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.

- 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.

At detailed design stage engagement will be undertaken with affected owners on Waka Kotahi and 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.

Access

Disruption to property access will be managed via the CTMP for each corridor. The approach is to maintain vehicle access to property and / or private roads where practicable, or to provide alternative access arrangements when it will not be practicable.

- Where legal access cannot be maintained the impacted property typically falls wholly within the designation footprint and will likely have been fully acquired prior to operation.

Land re-integration

Where property features are damaged on properties that are not fully designated and will remain in place, features will be re-instated, as far as practicable, including private driveways, parking, fences, gardens, and yards, and reintegrating of construction areas with the surrounding landform.

- Following project completion, a review of the designation footprint as per section 181 of the RMA will be undertaken to identify areas no longer required for the ongoing use and operation of each transport corridor.

24.7 Summary of effects on property

The new and upgraded transport corridors can be expected to have a range of effects on property. These include the private property restrictions and landowner uncertainty imposed by the designation throughout its duration. Prior to and during construction, effects will include changes to the existing environments amenity, disturbance to normal enjoyment whilst works are carried out, as well as permanent changes to private properties.

Measures are proposed which will alleviate the associated uncertainty for landowners and enable activities in the pre-construction period, which will not prevent or hinder implementation of the transport corridors. Suitable management plans and measures have also been proposed to manage effects of the works during construction.

Property impacts outside the RMA are summarised above, and as appropriate will be provided for under specific legislative processes. As per section 182 of the RMA, the designation footprint will be reviewed upon completion of the project and will be uplifted from those areas not required for the on-going operation, maintenance or effects mitigation associated with corridors. Given the mitigation proposed, it is considered that effects on property will be appropriately managed.

25 Urban Design Evaluation

25.1 Methodology

The Urban Design Framework and Evaluation, included in Volume 4, is based on the guidance and principles established in the Te Tupu Ngātahi Design Framework. It provides urban design focused commentary on the conceptual corridor design and recommends the framework for how and where any urban design outcomes should be considered in future design stages.

The Design Framework takes a systems approach as the basis on which urban areas are organised and understood and considers these in layers; environment, social, built form, movement and land use, with cultural and sustainability values underpinning and spanning across these. In this way transport networks are not seen in isolation rather in terms of how they can contribute to the urban system as a whole.

There are twenty design principles that have been established within these layers to provide high level guidance (appropriate to the NOR stage) on the attributes of responsive, resilient, sustainable, vibrant and high-quality urban environments. Each of the principles describe what ‘good looks like’ and what to aim for in the design of transport networks.

The Design Framework sits within the context of a range of established strategic plans, policies and design guidance that guide urban development outcomes at the:

- National level (e.g. NPS on Urban Development, GPS on Land Transport 2021, NZ Transport Agency Bridging the Gap, Regional Land Transport Plan)
- Local level (e.g. Auckland Plan 2050, Auckland Transport Alignment Project (ATAP), Auckland Transport Roads and Streets Framework, TDM, AUP:OP, Auckland Transport Sustainability Framework, Auckland Transport Code of Practice).

The established strategic plans and guidance outlined above informed the development of the Design Framework content and they are referenced in general terms as they relate to the attributes that will contribute to healthy, connected and sustainable communities.

25.2 Outcomes sought

The following provides a summary of the key outcomes sought for each transport corridor. These will be considered at detailed design and through the development of an ULDM which is a proposed condition for each NOR and is the mechanism which will support the delivery of the outcomes below.

Note the figures below also identify land use integration and transport opportunities. These are not required to mitigate the impacts of the corridors; however they will support growth and urban design outcomes in the North West. The decision to implement the opportunities will be for Auckland Council, development agencies, developers / landowners and the community within the North West with land use integration enabled by the outcomes sought below.

25.2.1 NOR S1 Alternative State Highway Corridor

Key urban design outcomes for the Alternative State Highway are:

The ASH corridor will alter the existing identity and character of the area, particularly the rural areas outside of the FUZ land. The ULDMP will need to demonstrate how to minimise the impact on the built, natural and cultural values of the area and optimise integration with adjacent zones by:

- Recognising the transition from rural to urban land uses
- Resolving interface issues including access to properties
- Incorporating acoustic barriers and screen planting where required
- Utilising the corridor and interchanges to respond to the future environment the transport corridor passes through to support placemaking and ensure the interchanges are legible for access to Kumeū and Huapai
- Minimising land disturbance, conserving resources and materials
- Inviting Manawhenua to provide input into environmental and cultural landscape matters throughout the detailed design and construction phases including how desired outcomes reflect their identity and values
- Considering recommendations from the landscape and visual, flooding and ecological assessments in the landscape plans. The landscape outcomes should reinforce the wider vegetation patterns of the local landscape and create connections to proposed greenways and the wider active mode network.



NOR S1 - ALTERNATE SH + BRIGHAM CREEK INTERCHANGE : OUTCOMES & OPPORTUNITIES

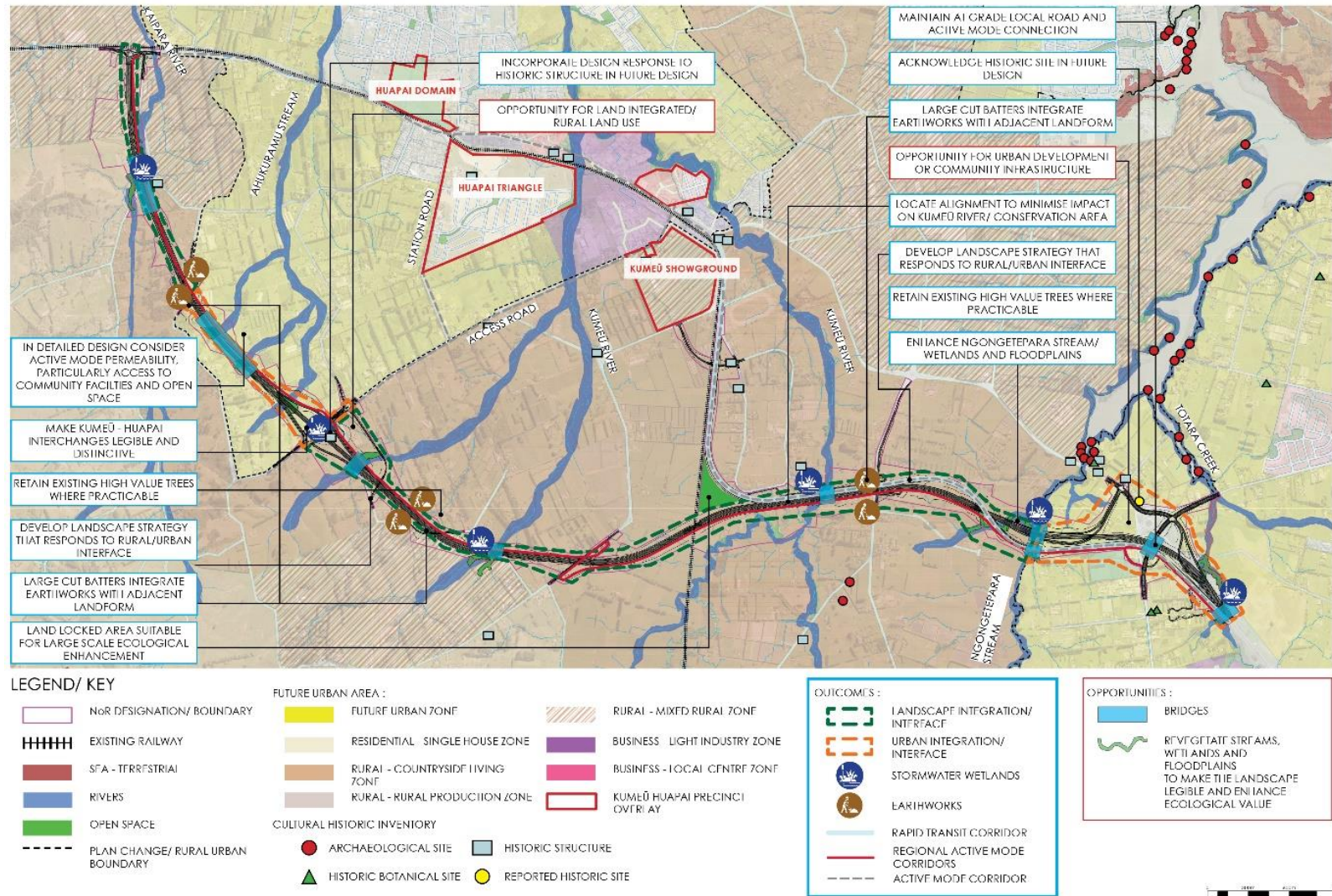


Figure 25-1: NOR S1 ASH Corridor Urban Design Outcomes and Opportunities

25.2.2 NOR S2 SH16 Main Road Upgrade

Key urban design outcomes for SH16 Main Road Upgrade are:

The ULDMP will need to demonstrate how to minimise the impact on the built, natural and cultural values and optimise integration with adjacent land by:

- Addressing interface issues with existing and future development, in particular around the development of the Rapid Transit Stations and connection into the future town centres and communities to the south
- Utilising a gateway entrance and placemaking at the southern end of Kumeū and at the northern end at the junction with Station Road to define the extent of the Kumeū-Huapai town centre as envisioned in the Kumeū-Huapai Centre Plan
- Creating corridor permeability and connectivity (midblock crossings) for active modes, modal priority and permeable access to destinations such as open spaces and community facilities between areas of high density
- Inviting Manawhenua to provide input into environmental and cultural landscape matters throughout the detailed design and construction phases including how desired outcomes reflect their identity and values
- Responding to recommendations from the landscape and visual and ecological assessments in landscape plans. The landscape plans should enable a strong vegetated framework and identity for the SH16 Main Road.

NOR S2 - SH 16 MAIN ROAD UPGRADE : OUTCOMES & OPPORTUNITIES

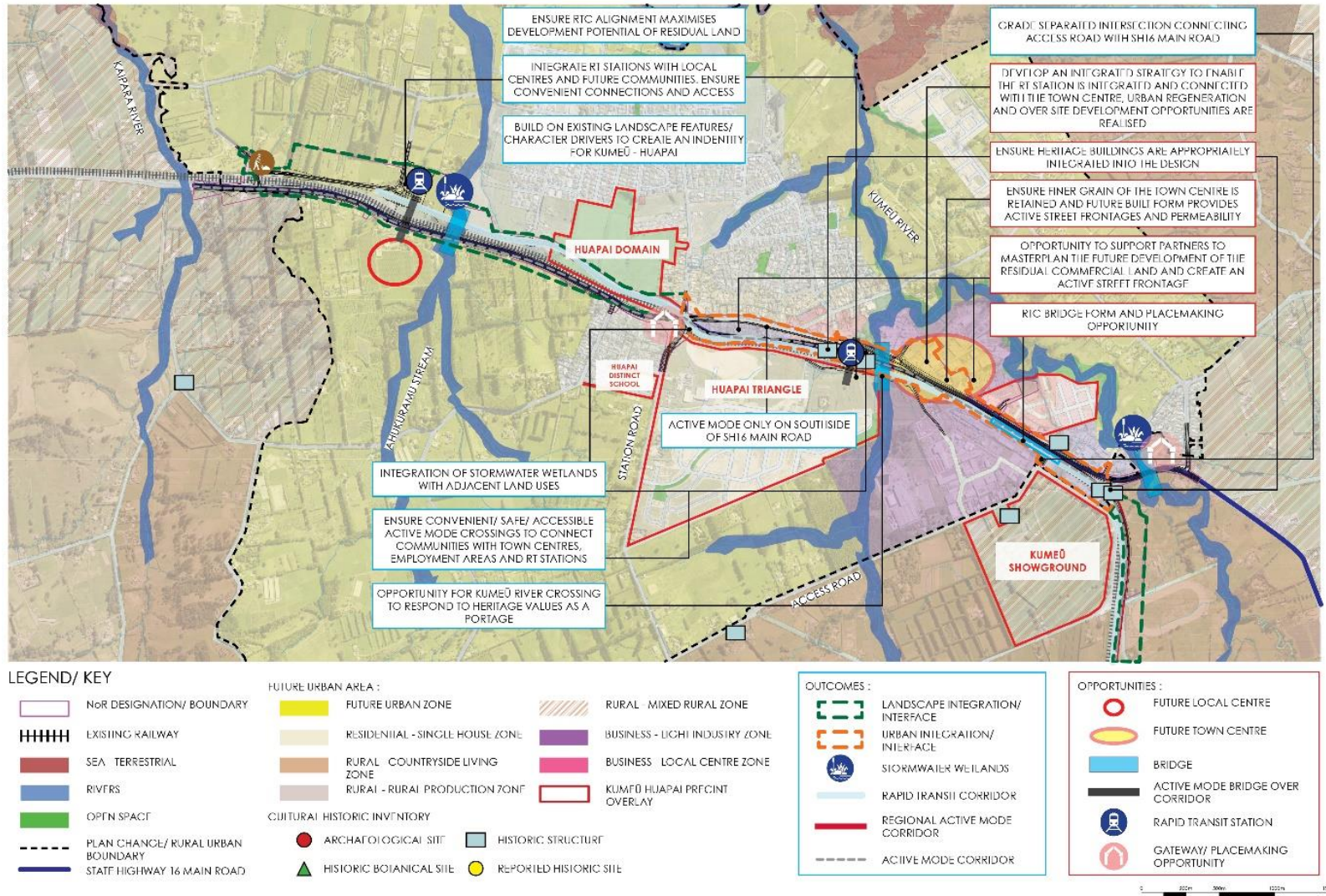


Figure 25-2: NOR S2 SH16 Main Road Upgrade Urban Design Outcomes and Opportunities

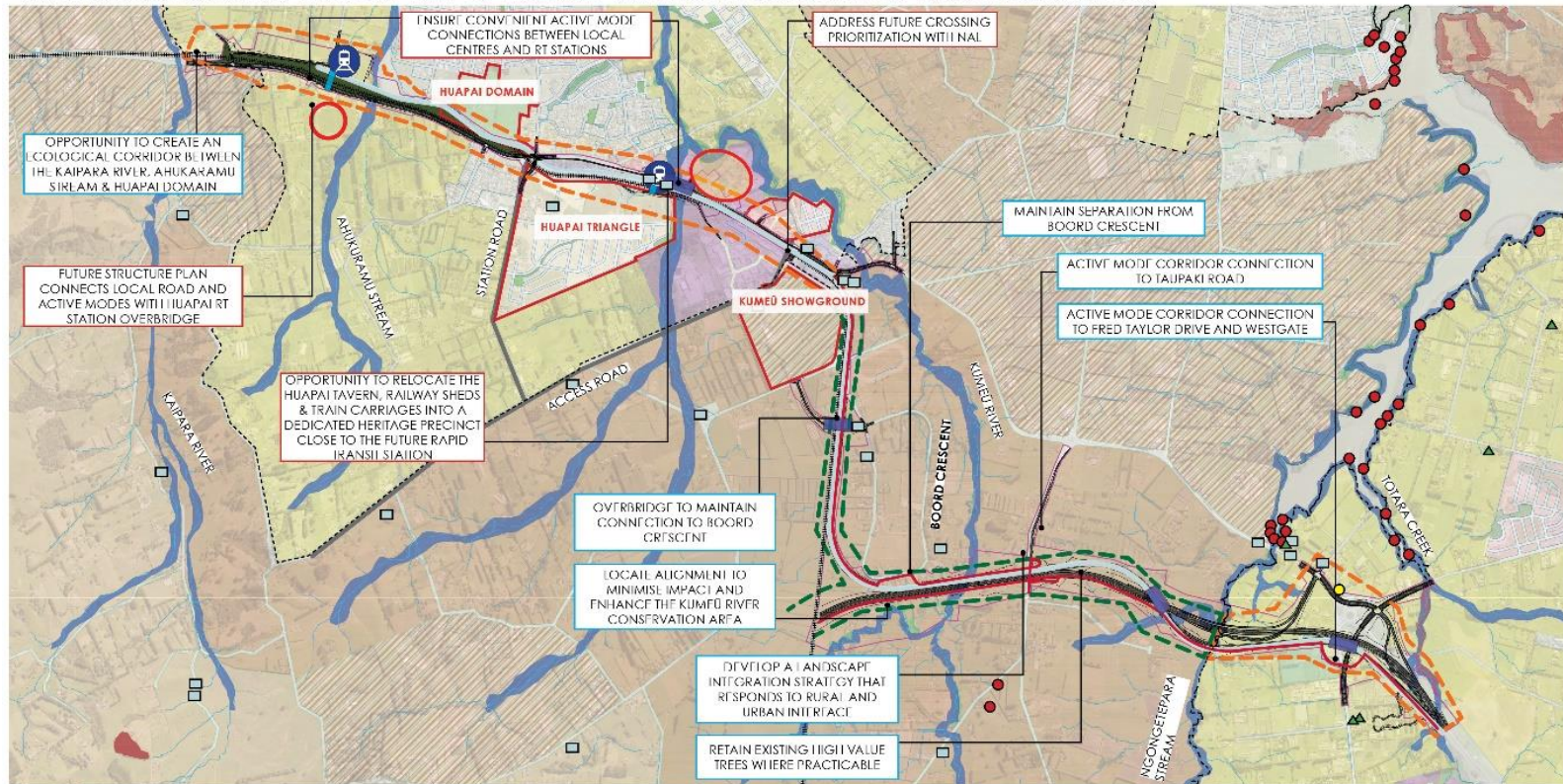
25.2.3 NOR S3 Rapid Transit Corridor, including Kumeū Rapid Transit Station and Huapai Rapid Transit Station

Key urban design outcomes identified for the Rapid Transit Corridor, including, Kumeū Station and Huapai Station are:

The ULDMP will need to demonstrate how to minimise the impact on the built, natural and cultural values and optimise integration with adjacent land by:

- Recognising the transition from rural – countryside living to future urban. Through the urban section, future land integration should be considered in the detailed design phase and refine the alignment to maximise the opportunity for adjacent / residual land redevelopment
- Integrating land use and transport networks to optimize connectivity with the Rapid Transit Stations. Noting that details of the surrounding FUZ land use is currently unconfirmed as Kumeū-Huapai is yet to be structure planned
- Responding to the changing built form interface, in particular providing legible and convenient pedestrian access between the corridor and adjacent development, and between Rapid Transit Stations, local centres and adjacent future urban land uses
- Considering the Rapid Transit Stations connectivity with SH16 Main Road and adjacent commercial and residential areas, incorporating crime prevention through environmental design principles
- Inviting Manawhenua to provide input into environmental and cultural landscape matters throughout the detailed design and construction phases including how desired outcomes reflect their identity and values
- Responding to recommendations from the landscape and visual and ecological assessments in landscape plans.

NOR S3 - RAPID TRANSIT CORRIDOR; REGIONAL ACTIVE MODE CORRIDOR; NOR KS: KUMEU RAPID TRANSIT STATION & NOR HS: HUAPAI RAPID TRANSIT STATION : OUTCOMES & OPPORTUNITIES



LEGEND/ KEY

NOR DESIGNATION/ BOUNDARY	FUTURE URBAN AREA:	RURAL - MIXED RURAL ZONE	LANDSCAPE INTEGRATION/ INTERACT	FUTURE LOCAL CENTRE
EXISTING RAILWAY	RESIDENTIAL - SINGLE HOUSE ZONE	BUSINESS - LIGHT INDUSTRY ZONE	URBAN INTEGRATION/ INTERFACE	FUTURE TOWN CENTRE
SFA - TERRITRIAL	RURAL - COUNTRYSIDE LIVING ZONE	BUSINESS - LOCAL CENTRE ZONE	RAPID TRANSIT CORRIDOR	ACTIVE MODE BRIDGE OVER CORRIDOR
RIVERS	RURAL - RURAL PRODUCTION ZONE	KUMEU HUAPAI PRECINCT OVERLAY	REGIONAL ACTIVE MODE CORRIDOR	RTC BRIDGE
OPEN SPACE	CULTURAL HISTORIC INVENTORY	ARCHAEOLOGICAL SITE	RAPID TRANSIT STATION	
PLAN CHANGE/ RURAL URBAN BOUNDARY	HISTORIC STRUCTURE	HISTORIC BOTANICAL SITE		
	REPORTED HISTORIC SITE			

Figure 25-3: NOR S3 RTC, including Kumeū Rapid Transit Station and Huapai Rapid Transit Station, Urban Design Outcomes and Opportunities

25.2.4 NOR S4 Access Road Upgrade

Key design outcomes for the Access Road upgrade are:

- The corridor aligns with the RUB, future detailed design should demonstrate an appropriate response and integration with the urban and rural character and reinforce an urban edge. The interim design includes green infrastructure, i.e., a swale on the rural side this will help ensure any built form is set back from the road whereas the urban side of the road cross section allows for built form to address the street. Further consideration should be given at the detailed design stage to ensure the rural character is retained with an appropriate interface
- Permeability of the corridor for active modes that addresses cross corridor connectivity (midblock crossings), modal priority and permeable access to destinations such as open spaces and community
- Manawhenua shall continue to provide input into environmental and cultural landscape matters throughout the detailed design and construction phases including how desired outcomes reflect their identity and values
- Landscape plans that consider recommendations from the landscape and visual and ecological assessments including stormwater wetland planting, construction compound and private property reinstatement and treatment of batter slopes.

NOR S4 - ACCESS ROAD UPGRADE : OUTCOMES & OPPORTUNITIES

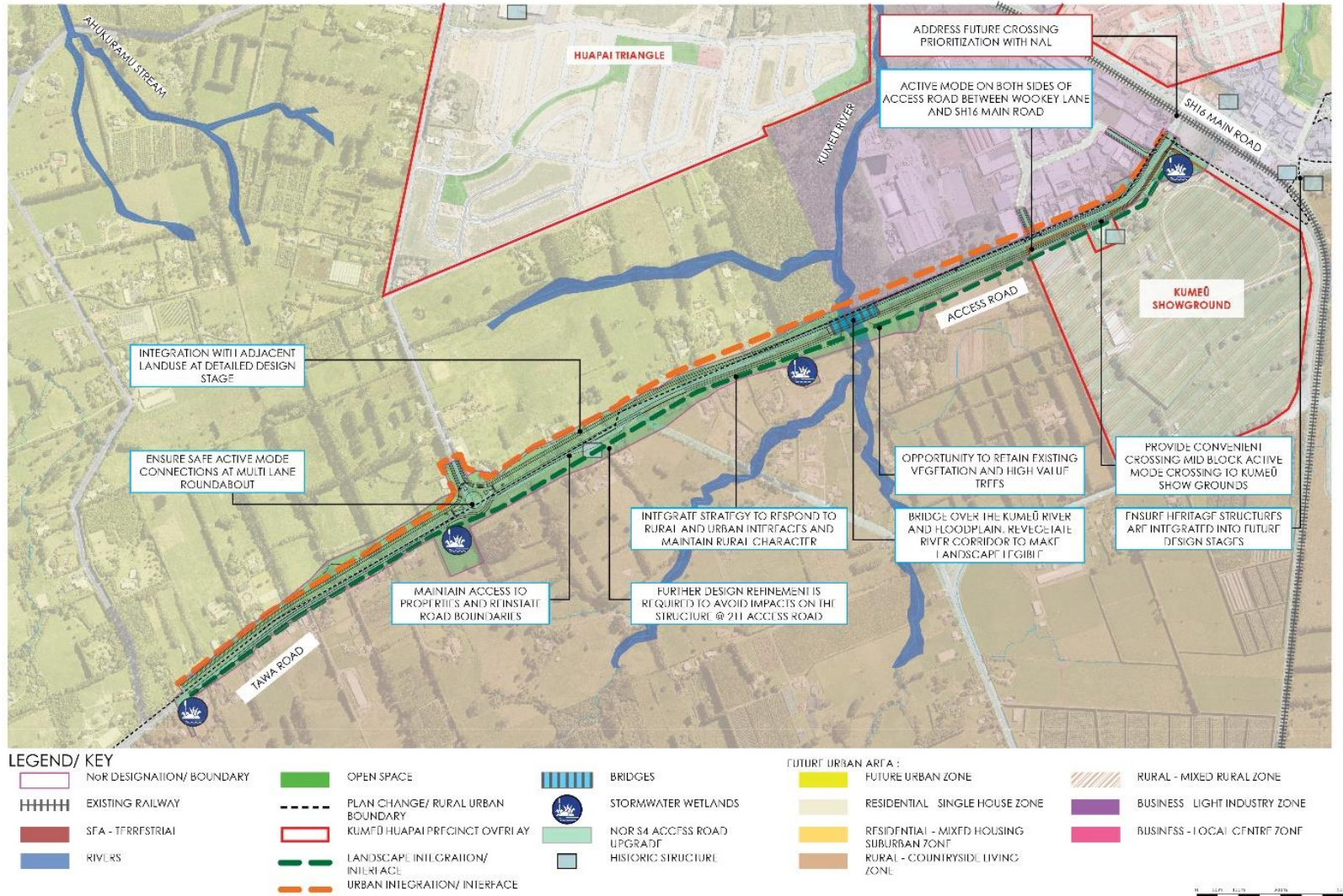


Figure 25-4: NOR S4 Access Road Upgrade Urban Design Outcomes and Opportunities

25.3 Summary of Urban Design Evaluation

Overall, the NW Strategic Assessment Package design and corridor configuration is supportive of the Te Tupu Ngātahi Design Framework. A range of urban design outcomes and opportunities have been identified in the Urban Design Framework and Evaluation. These outcomes will form part of the Urban Design and Landscape Design Management Plan in future delivery stages. This will ensure the detailed design of each corridor supports land use integration and to the transport specific outcomes sought.

26 Proposed measures to manage adverse effects

The majority of adverse effects have been avoided and mitigated via alignment decisions and design choices. Where potential effects have not been designed out, measures are proposed to avoid, remedy or mitigate the potential adverse effects identified in this AEE, these are summarised in Table 26-1. These measures are included in the proposed conditions as relevant, for each NOR.

Table 26-1: Summary of measures to avoid, remedy or mitigate potential adverse effects

AEE Section / Topic	Specific Measure – to be conditioned
Traffic and Transportation	<ul style="list-style-type: none"> Construction Traffic Management Plan (CTMP)
Traffic Noise and Vibration	<ul style="list-style-type: none"> S1 and S4: Application of low noise road surface and specific PPF mitigation as enabled through the operational noise conditions S2, S3, KS, HS: No specific mitigation required
Construction Noise and Vibration	<ul style="list-style-type: none"> Construction Noise and Vibration Management Plan (CNVMP) Construction Noise and Vibration Management Schedule
Network Utilities	<ul style="list-style-type: none"> Network Utility Operators (Section 176 Approval)
Natural Hazards	<ul style="list-style-type: none"> Construction Environment Management Plan (CEMP) Flood risk outcomes to be achieved at detailed design (demonstrated through the Outline Plan(s))
Terrestrial Ecology	<ul style="list-style-type: none"> Ecological Management Plan (EMP) Pre-construction ecological survey
Landscape and Visual	<ul style="list-style-type: none"> Urban Landscape and Design Management Plan (ULDMP) Construction Environment Management Plan (CEMP) Construction Traffic Management Plan (CTMP)
Historic Heritage	<ul style="list-style-type: none"> Historic Heritage Management Plan (HHMP)
Māori Culture, Values and Aspirations	<ul style="list-style-type: none"> Cultural Advisory Report Cultural Monitoring Plan
Community	<ul style="list-style-type: none"> Project information condition Stakeholder Communication and Engagement Management Plan (SCEMP) Complaints register condition
Property, Land use and Business	<ul style="list-style-type: none"> Project information condition Designation boundary review condition
Urban Design	<ul style="list-style-type: none"> Urban Landscape and Design Management Plan (ULDMP)

27 Resource Management Amendment Act 2020

To date, the overlap between the RMA regime and climate change has been limited as sections 104E and 70A of the RMA have constrained the ability of local authorities to account for climate change considerations in exercising their roles and functions. However, the amendment to the RMA that came into effect on 30 November 2022 is intended to better align the RMA with the Climate Change Response Act 2002 (CCRA). The Resource Management Amendment Act 2020 repeals the restrictions under the RMA in relation to climate change with the following consequences:

- The repeal of section 104E means that effects on climate change of a discharge to air of greenhouse gases can in future be considered in the context of an application for a discharge permit or coastal permit to do something that would otherwise contravene section 15 or section 15B.
- The repeal of section 70A means that when making a rule to control the discharge into air of greenhouse gases a regional council may now have regard to the effects of such a discharge on climate change.
- An amendment to section 74(2)(c) means that when preparing or changing a district plan, a territorial authority must now have regard to any Emissions Reduction Plan (ERP) or national adaptation plan made in accordance with the CCRA.

The above RMA amendments do not directly affect the NW Strategic Package NORs as no resource consent is sought or required for the discharge of contaminants to air. The control of discharges of contaminants into air remains a regional council function in accordance with s 30(1)(f) of the RMA. As such, the effects associated with a discharge to air will remain a regional plan matter. The proposed implementation timeframe for the NW Strategic Package (15-20 years) means that only designations are proposed at this stage and the designations will not authorise regional plan consenting requirements. Resource consents will be required in the future to authorise activities controlled under the regional plan matters of the AUP:OP or the relevant planning document that applies at the time of implementation.

28 Assessment against Section 171 and Part 2

Section 27 follows the order of requirements under Section 171(1) of the RMA, concluding with an assessment against Part 2 of the RMA. To reduce duplication, cross reference is made to the preceding sections of this report including:

- Parts A-B Section 1 to 25.3: AEE
- Part A, Section 11 NW Strategic Engagement
- Parts B, Section 26: Summary of Measures to Manage Adverse Effects
- Appendix A: Assessment of Alternatives.

28.1 Section 171(1)(a) Relevant Planning Provisions

Section 171(1)(a) of the RMA sets out that a territorial authority in making a recommendation on a NOR must have particular regard to any relevant provisions of:

- a national policy statement
- a New Zealand coastal policy statement
- a regional policy statement or proposed regional policy statement
- a plan or proposed plan.

Table 28-1 sets out the NW Strategic Package assessment against Section 171(1)(a) in addition to those plans and strategies considered relevant matters under RMA Section 171(1)(d). The assessment was undertaken by:

- **Reviewing:** Identifying within National Policy Statements and the AUP:OP the key objectives and policies relevant to the transport corridors
- **Grouping:** Where similar themes were identified across documents, provisions were grouped and assessed collectively. Similarly, where assessment against the relevant provisions of RMA planning documents is consistent between the NORs within the NW Strategic Package, a combined assessment is provided. The blue table sections set out each key theme
- **Bespoke:** Where required, bespoke assessment for each NOR is also provided.

Figure 28-1 shows the RMA section 171(1)(a) planning documents considered.

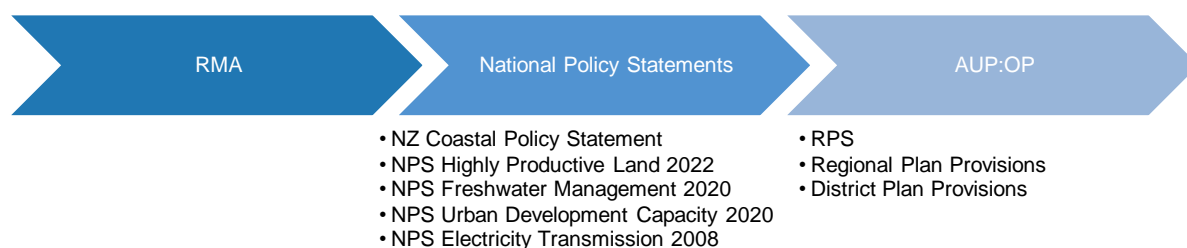


Figure 28-1: Statutory Framework Applicable to the NW Strategic Package

Table 28-1: Statutory Assessment

Applicable Notice	Key Objectives and Policies	Analysis
<p>Urban growth and development capacity</p> <ul style="list-style-type: none"> • Development capacity is planned and sequenced with infrastructure to meet the future needs of communities. • Urban growth and its associated infrastructure is provided for (and integrated) in appropriate locations, whilst recognising the values of highly productive rural land. 		
<p>All</p>	<p>NPS-UD Objective 1 & 6. Policy 1(c)(e)(f), Policy 6.</p> <p>National Policy Statement for Highly Productive Land (NPS-HPL) Objective 1. Policy 2, Policy 5.</p> <p>AUP:OP [RPS]: B2.2.1(1), B2.4.1(6), B2.4.2(6), B3.2.1(5), B3.3.1(1)(b), B3.3.1(1)(c), B3.3.2(4)(b), B3.3.2(5)(a), B9.2.1(2)</p> <p>AUP:OP [DP]: E27.2(1), E27.2(2), E27.2(5), E27.2(6).</p>	<p>Summary of Objectives and Policies</p> <ul style="list-style-type: none"> • The NPS-UD seeks to ensure urban environments are well-functioning and enable all people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety. Within the NPS-UD Auckland is recognised as a Tier 1 urban environment and therefore is subject to a greater policy direction in terms of intensification and density of urban form. The NPS-UD directs that urban development is integrated with infrastructure planning and funding decisions and is strategic over the medium to long term • The NPS-HPL seeks to ensure highly productive land is protected for use in land-based primary production, both now and for future generations. The NPS-HPL requires that territorial authorities avoid the inappropriate use and development of highly productive land. A use or development of highly productive land is inappropriate except where the exemptions in clause 3.9(2) apply. These exemptions include where a use or development of highly productive land is for an activity by a requiring authority in relation to a designation or a notice of requirement under the RMA, or where a use or development is associated with the maintenance, operation, upgrade, or expansion of specified infrastructure, and there is a functional or operational need for the use or development to be on the highly productive land. Where one of the exemptions applies, territorial authorities must also take measures to ensure that any use or development on highly productive land minimises or mitigates any actual loss or potential cumulative loss of the availability and productive capacity of highly productive land in their district, and avoids if possible, or otherwise mitigates, any actual or potential reverse sensitivity effects on land-based primary production activities from the use or development • The objectives and policies of the AUP:OP seek to provide sufficient feasible development capacity for housing with set dwelling targets over the next 30 years. In order to reach these targets adequate infrastructure must be existing or provided prior to or with development • Provisions in Chapter E27 – Transport seek to ensure that land use and all modes of transport are integrated in a manner that realises the benefits of an integrated network and managing the adverse effects of traffic generation.

Applicable Notice	Key Objectives and Policies	Analysis
		<p>Assessment</p> <ul style="list-style-type: none"> • The objectives and policies emphasise the importance of providing short, medium and long term residential and business capacity. This includes medium and long-term strategic planning for urban development. The NW Strategic Package is consistent with these objectives and policies by providing for the necessary transport infrastructure to support the zoning of land in the North West future urban areas and the establishment of the necessary development capacity which is becoming increasingly imminent as a result of numerous private plan changes being lodged with Auckland Council. Route protection will ensure that the necessary transport infrastructure is planned and integrated (and identified in the AUP:OP) to meet the feasible development capacity targets over the next 30 years • The NPS-UD and AUP:OP recognise the benefits of urban development where they contribute to people’s social, economic, cultural and environmental wellbeing. Of particular relevance to the NW Strategic Package: where good accessibility is provided for all people between housing, jobs, community services, natural spaces, and open spaces, including by way of public or active transport. The Package will ensure land is protected to contribute to the accessible, high quality, effective, efficient and safe transport routes (including public and active transport modes) that support the movement of people, goods and services for the future urban areas in the North West • The NPS-HPL recognises that there may be situations where it is appropriate for use and development to occur on highly productive land. While the NW Strategic Package largely traverses FUZ, or urban zoned land, which is not highly productive land for the purposes of the NPS-HPL, the ASH and RTC does include some land zoned Rural – Mixed Rural Zone and Rural – Countryside Living Zone which may come within the definition of highly productive land. In accordance with clause 3(9)(2) of the NPS-HPL where any land within the NW Strategic Package is considered to be highly productive land, that use and development is required in relation to a designation or a notice of requirement under the RMA and is therefore an appropriate use or development of highly productive land • Impacts on highly productive land were considered in the Assessment of Alternatives for the ASH. The proposed corridor avoids highly productive soil by crossing FUZ land where practicable and by locating adjacent to existing local transport corridors and network utilities to minimise the fragmentation of productive areas.
<p>Enabling Infrastructure</p> <ul style="list-style-type: none"> • Infrastructure is enabled and where appropriate protected. • Benefits of infrastructure are recognised while adverse effects are avoided, remedied or mitigated. 		

Applicable Notice	Key Objectives and Policies	Analysis
<p>All</p>	<p>AUP:OP [RPS]: B3.2.1(1), B3.2.1(2), B3.2.1(3), B3.2.2(1), B3.3.1(1), B3.3.2(1), B3.3.2(3).</p> <p>AUP:OP [DP]: E26.2.1(1), E26.2.1(2), E26.2.1(4), E26.2.1(9), E26.2.2(4), E26.2.2(14), E26.2.2(15).</p> <p>AUP:OP [DP]: E27.2(1), E27.2(2), E27.2(5).</p> <p>AUP:OP E17.2(1), E17.2(3), E17.3(1).</p>	<p>Summary of Objectives and Polices</p> <ul style="list-style-type: none"> Objectives and policies in RPS Chapter B3 of the AUP:OP recognise the importance infrastructure plays in realising Auckland’s economic potential. This includes integrating the provision of infrastructure with urban growth, avoiding incompatible land uses and increasing resilience. The policy direction recognises the importance of the transport network in the movement of people, goods and services, urban form, enabling growth, and providing choices Objectives and policies in Chapter E26 of the AUP:OP identify that infrastructure is critical to the social, economic, and cultural well-being of people and communities and the quality of the environment. The development, operation, use, repair, maintenance, upgrading and removal of infrastructure is anticipated and enabled, and the benefits infrastructure can have, as well as a range of adverse effects, are acknowledged within the objectives and policies. <p>Assessment</p> <ul style="list-style-type: none"> The NW Strategic package achieves the objectives and policies of the AUP:OP RPS and district plan by enabling the upgrades and new transport infrastructure which provides for a wide range of transport benefits for the community whilst ensuring that adverse effects are avoided, remedied or mitigated The AUP:OP RPS and district plan provide objectives and policies that seek to ensure infrastructure is provided in an integrated manner, with both land use and existing infrastructure. Waka Kotahi and AT have been working closely with Auckland Council, Watercare, First Gas, Transpower, KiwiRail and other providers to ensure the future transport network is delivered in an integrated way with existing and future infrastructure Infrastructure has operational and functional needs that need to be recognised to ensure that the relevant infrastructure is effective. The NW Strategic Package has sought to avoid adverse effects as far as practicable and where possible, demonstrated through the upgrade existing roads and through the assessment of alternatives Any potential adverse effects that cannot be avoided through design have been remedied or mitigated where appropriate through the conditions of the proposed designations and by the design and management framework which has been adopted Further refinement of the location and design of the transport corridors will occur as part of the Outline Plan of Works and / or Management Plan framework. The proposed designation footprint is sufficient width to enable this to occur and enable further avoidance of effects where possible.
<p>National Grid</p> <ul style="list-style-type: none"> Significance of the National Grid is recognised. Allow development where it does not compromise the National Grid’s effective development, operation, maintenance and upgrading are enabled. 		

Applicable Notice	Key Objectives and Policies	Analysis
<p>S1 and S2</p>	<p>NPS for Electricity Transmission (NPS-ET): Objective, Policies 1, 10, AUP:OP B3.2.1(7), B3.2.2(7) AUP:OP D26.2(1), D26.3(1) AUP:OP E26.2.1(7)</p>	<p>Summary of Objectives and Policies</p> <ul style="list-style-type: none"> • The relevant objectives and policies of the NPS-ET and the AUP:OP RPS seek to enable and provide for the National Grid, recognising the national significance of the electricity transmission network and to manage the adverse effects of other activities on the network to ensure its operation is not compromised • The objectives and policies of Chapter B3 of the AUP:OP RPS also encourage co-location of infrastructure where safe to do so and operational and technical requirements are satisfied • Specific AUP:OP objectives and policies aim to ensure the efficient development, operation, maintenance, upgrading and removal of the National Grid is not compromised by subdivision, use and development by ensuring operational and technical requirements and standards are satisfied. <p>Assessment</p> <ul style="list-style-type: none"> • The National Grid Overlay is located within the areas of SH16 Main Road Upgrade (NOR S2) and the ASH corridor (NOR S1) • For the SH16 Main Road Upgrade widening and earthworks are proposed within the National Grid Yard Uncompromised Overlay (under lines). Works will be managed to reduce the potential adverse effects from working beneath and around the National Grid • For the ASH corridor the proposed designation is within the National Grid Yard Uncompromised overlay (220kV and 110kV lines). Works will be managed to reduce the potential adverse effects from working beneath and around the National Grid • Engagement with Transpower has been ongoing throughout the development of the NW Strategic Package and their feedback has been considered as part of refinement of the corridors. The design has been informed from engagement with Transpower • At detailed design, and through the implementation of the Network and Utility Management Plan which is a condition of the designation, ongoing engagement will be undertaken with Transpower to confirm working room clearance around the 110kV lines and 220kV lines during construction. Any potential adverse effects on the National Grid can be managed appropriately.

Applicable Notice	Key Objectives and Policies	Analysis
<p>Indigenous Biodiversity and Ecological Values</p> <ul style="list-style-type: none"> The protection and enhancement of indigenous biodiversity and ecological values (including in degraded areas) is promoted. Protect scheduled values but provide for infrastructure in sensitive areas considering: <ul style="list-style-type: none"> the benefits and value of providing that infrastructure the functional or operational need to locate or traverse that location whether any practicable alternatives would avoid or reduce effects on the scheduled values how the infrastructure contributes to the planned growth and intensification of Auckland. 		
<p>All</p>	<p>AUP:OP [RPS]: B7.2.1(2), B7.5.1(2), B7.5.2(1)(f).</p> <p>AUP:OP [DP]: E12.2(1), E12.3(1), E12.3(2)(c).</p> <p>AUP:OP E15.2(1), E15.2(2), E15.3(2), E15.3(3) E15.3(4)(b), E15.3(7)</p> <p>AUP:OP [RPS]: B3.2.1(1), B3.2.1(2), B3.2.1(3), B3.2.2(1), B3.3.1(1), B3.3.2(1), B3.3.2(3).</p>	<p>Summary of Objectives and Policies</p> <ul style="list-style-type: none"> The AUP:OP objectives and policies seek to protect and enhance ecological values across terrestrial, freshwater and coastal environments The primary method the AUP:OP uses to protect biodiversity is the identification of SEAs. These areas receive the highest level of protection. Biodiversity values outside SEAs also need to be considered and effects on them addressed Adverse effects on biodiversity are to be avoided as far as practicable, and where avoidance is not practicable to be minimised. Other adverse effects on biodiversity and ecosystems should be avoided, remedied or mitigated. The provisions recognise that avoidance of areas with biodiversity values is not always practicable for infrastructure. Where biodiversity is affected, measures to protect and restore biodiversity through legal protection and active management should be considered While the objectives and policies of the AUP:OP generally seek to recognise the benefits, functional and operational needs and value of investment in infrastructure and to enable the safe, efficient and secure provision of infrastructure where appropriate, the objectives and policies also anticipate that there may be some adverse effects as a result of the provision of such infrastructure. The objectives and policies recognise that in some instances such adverse effects may be appropriate given the necessity of, and essential services provided by, infrastructure. <p>Assessment</p> <ul style="list-style-type: none"> Although resource consents are not being sought for the NW Strategic Package at this time, ecological effects arising in respect of activities that require consents have been considered to inform assessment of alternatives, transport corridor design and the proposed designation footprints Areas for bat mitigation have also been identified within the designation footprint for the ASH In light of this, generally, the new and upgraded transport corridors have sought to avoid or minimise impacts on a range of high value ecological areas including wetlands and streams. This is demonstrated through the comprehensive alternatives assessment

Applicable Notice	Key Objectives and Policies	Analysis
	AUP:OP [DP]: E26.2.1(9), E26.2.2(4), E26.2.2(6)	process undertaken and design refinement. The proposed transport infrastructure is critical to enable existing and future communities to provide for their social, economic, and cultural well-being.
Freshwater <ul style="list-style-type: none"> The health and well-being of water bodies and freshwater ecosystems is prioritised. The permanent loss and significant modification or diversion of lakes, rivers, streams (excluding ephemeral streams), and wetlands are to be avoided unless, amongst other matters, it is necessary to provide for infrastructure and no practicable alternative exists. 		
All	NPS Freshwater Management Objective 1, Policies 6, 7, 8, 9. AUP:OP [RPS]: B7.2.1(2), B7.3.1(3), B7.3.2(1), B7.3.2(4), B7.3.2(5), B7.3.2(6), B7.4.1(4), B7.4.1(5), B7.4.2(1)(a), B7.4.2(1)(d), B7.4.2(7)(b), B7.4.2(9), AUP:OP [DP]: E12.2(1), E12.3(1), E12.3(2)(c).	<p>Summary of Objectives and Policies</p> <ul style="list-style-type: none"> The NPS Freshwater objective and policies seek to ensure that natural and physical resources are managed in a way that prioritises first, the health and well-being of water bodies and freshwater ecosystems followed by the health needs of people and then the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future. In particular, the NPS Freshwater seeks to protect natural wetlands, rivers, outstanding waterbodies and habitats of indigenous freshwater species The relevant AUP:OP objectives and policies seek to protect and enhance ecological values in freshwater environments. The permanent loss and significant modification or diversion of lakes, rivers, streams (excluding ephemeral streams), and wetlands are to be avoided unless, amongst other matters, it is necessary to provide for infrastructure and no practicable alternative exists. The objectives and policies seek to manage subdivision, use, development, including discharges and activities in the beds of lakes, rivers, streams, and in wetlands, to limit the establishment of structures within the beds of lakes, rivers and streams and in wetlands to those that have a functional need or operational requirement to be located there. <p>Assessment</p> <ul style="list-style-type: none"> Although resource consents (regional and NES-FW) are not being sought for the NW Strategic Package at this time, ecological effects arising in respect of activities that require consents have been considered to inform alternatives assessment, transport corridor design and the proposed designation footprints In light of this, generally, the transport corridors within the North West network have sought to avoid or minimise impacts on streams and high value wetlands. This is demonstrated through the comprehensive alternatives assessment process undertaken and design refinement. Specifically, high value wetland environment has been avoided and / or reduced where practicable, new bridge structures are proposed over high value streams

Applicable Notice	Key Objectives and Policies	Analysis
		<ul style="list-style-type: none"> As discussed under the indigenous biodiversity assessment above, some freshwater environments have been impacted where there is a functional and operational need to do so. The proposed transport infrastructure is critical to enable existing and future communities to provide for their social, economic, and cultural well-being. In considering the potential future effects arising from activities that may require resource consent in the future, the Assessment of Ecological Effects identified that any potential effects of the North West network on ecological features within or adjacent to transport corridors, can be adequately managed, and will be subject of assessment as part of any future consent processes. Additionally, there is flexibility in the proposed designation to further minimise impacts at detailed design.
<p>Ngā Manawhenua</p> <ul style="list-style-type: none"> Mana Whenua values are recognised and protected. Mana Whenua are to be included in resource management processes, particularly in decision making in their role as kaitiaki. 		
All	AUP:OP [RPS] B4.2.1(2), B6.2.1(1), B6.2.1(2), B6.3.1(1), B6.3.1(2), B6.3.1(3), B6.3.2(1), B6.3.2(2)(d), B6.3.2(3), B6.3.2(6), B6.5.1(1), B6.5.1(3), B6.5.1(5), B6.5.2(1), B6.5.2(4), B6.5.2(5), B6.5.2(6), B6.5.2(9), B7.4.1(6).	<p><u>Kaitiakitanga</u></p> <p>Summary of Objectives and Policies</p> <ul style="list-style-type: none"> The RPS requires recognition of and provision for the principles of Te Tiriti o Waitangi, in particular through Manawhenua participation in resource management processes. <p>Assessment</p> <ul style="list-style-type: none"> Recognition of Te Tiriti o Waitangi partnerships is a key objective for Te Tupu Ngātahi and Manawhenua have been involved throughout the development of the NW Strategic Package Manawhenua have been actively involved throughout development of the early concepts, through alternatives assessment and identification of the preferred options. This partnership approach has allowed understanding and the incorporation of Manawhenua values and expression of kaitiakitanga throughout the NW Strategic Package. This has included participation in identifying any opportunities for mitigation, and any opportunities for representing cultural features in the landscape Further incorporation of Manawhenua values and the expression of kaitiakitanga was enabled through monthly Manawhenua at hui, including information sharing, discussion regarding the approach and methodology for assessment of environmental effects, updates from project technical specialists and discussion and approach to CIA Waka Kotahi and AT are committed to ongoing engagement with Manawhenua which aligns closely with the RPS' long term view. Manawhenua will continue to be involved in the NW Strategic Package to help maintain consistency with these objectives and policies. The proposed designation conditions set out ongoing engagement and participation of manawhenua in the future design and implementation of transport corridors. These conditions have been developed in consultation with Manawhenua.

Applicable Notice	Key Objectives and Policies	Analysis
	<p>AUP:OP [DP] E12.3(1), E12.3(2)(c), E12.3(4).</p> <p>AUP:OP [RP/DP] D9.2(3), D9.3(17)</p>	<p><u>Māori values</u></p> <p>Summary of Objectives and Policies</p> <ul style="list-style-type: none"> The principles of the Te Tiriti o Waitangi are also recognised and provide for the sustainable management of natural and physical resources, wāhi tapu and other taonga. Sites and places of significance to Manawhenua are recognised and provided for in the objectives and policies of the AUP:OP. <p>Assessment</p> <ul style="list-style-type: none"> The partnership approach that the NW Strategic Package have taken with Manawhenua, means that values are embedded which gives effect to the provisions of the AUP:OP. Having involved Manawhenua in design development and decision-making on transport corridor alignments and design, has enabled the incorporation of the holistic and long-term inter-generational Māori world view The NW Strategic Package 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 lesser adverse effects avoided, remedied or mitigated as appropriate The NW Strategic Package area has no Sites of Significance to Manawhenua as identified in the AUP:OP Designation conditions for each of the proposed designations are proposed to provide for ongoing consultation with Manawhenua as well as accidental discovery protocols which require Manawhenua involvement. Appropriate actions will be taken ensuring tikanga Maori is adhered to particularly where any kōiwi are accidentally discovered.
<p>Natural hazards, including climate change</p> <ul style="list-style-type: none"> Avoid increasing risk of adverse effects in areas subject to natural hazards (including climate change). Where infrastructure and development is required in these areas, natural hazard risks must be managed. 		
<p>All</p>	<p>NPS-UD Objective 8, Policy 1(e)(f), Policy 6(e).</p> <p>AUP:OP [RPS] B2.3.1(1)(f), B10.2.1(2), B10.2.1(3),</p>	<p>Summary of Objectives and Policies</p> <ul style="list-style-type: none"> The NPS-UD directs that urban environments support reductions in greenhouse gas emissions and are resilient to the current and future effects of climate change The objectives and policies of Chapter B10 of the AUP:OP enable and recognise the importance of infrastructure to support urban growth which includes integrating the provision of resilient transport networks and infrastructure in these areas and avoiding effects in areas subject to natural hazards and risk and adapting to the effects of climate change

Applicable Notice	Key Objectives and Policies	Analysis
	<p>B10.2.1(5), B10.2.1(6), B10.2.2(7), B10.2.2(8), B10.2.2(12), B10.2.2(13).</p> <p>AUP:OP [DP] E12.2(1), E12.3(5), E12.3(6).</p> <p>AUP:OP [DP] E36.2(1), E36.2(2), E36.2 (3), E36.2 (4), E36.2(5), E36.3(21-28), E36.3(35)</p>	<ul style="list-style-type: none"> Specific AUP:OP objectives and policies reinforce the unique requirements of infrastructure and that it can have an operational or functional need to locate within a natural hazard area. Where infrastructure is required to locate within a hazard area, significant adverse effects on people and property are sought to be first avoided and otherwise mitigated to the extent practicable. <p>Assessment</p> <ul style="list-style-type: none"> The NW Strategic Package will deliver better accessibility and mode choice by providing a rapid transit network and active mode facilities, therefore reducing the reliance on low occupancy vehicles A number of design measures to provide resilience to flooding, inundation and climate change have been adopted across the North West network. Flood modelling undertaken for the NW Strategic Package assessed the existing terrain and proposed network terrain – both using MPD with 10 and 100 year average recurrence interval plus climate change rainfall considerations. In doing so, the modelling considered flood hazard and risk associated with both rainfall events, climate change and the coastal inundation 1 per cent AEP plus 1m control. The flood risk assessment has recommended outcomes to ensure at detailed design that existing flooded properties are not exacerbated, no flood prone areas are created and any increase in flood risk for existing or future habitable floor levels or access to properties are less than minor. For some transport corridors as discussed in more detail below, flood risk and resilience will be improved The proposed designations provide for street tree planting that, when delivered, will contribute to reducing urban heat island effects in the future as well as contribute to the amenity of the area by providing shade and microclimatic cooling qualities.
<p>Urban form and quality design</p> <ul style="list-style-type: none"> Transport networks support a quality urban form and are designed to achieve high levels of amenity and safety for users. The place function of transport networks is balanced with the functional movement purpose. 		
<p>All</p>	<p>AUP:OP B2.2.1(1)(e), B2.3.1(3), B2.3.2(1)(d-f), B2.3.2(2)(b), B2.3.2(4), B3.3.1(1)(d), B3.3.2(4)(a), B3.3.2(7).</p>	<p>Summary of Objectives and Policies</p> <ul style="list-style-type: none"> The objectives and policies seek to create and protect urban environments that are both functional and enjoyable for people, by balancing the place and movement function of transport networks with achieving high levels of amenity and safety for users To achieve balance between place and movement, the objectives and policies recognise a necessary mode shift, minimising private vehicle travel in favour of public transport, walking and cycling The objectives and policies also require that the impacts of construction on amenity is managed (dust, noise and vibration) whilst acknowledging that some disturbance and reduced amenity is inevitable. <p>Assessment</p>

Applicable Notice	Key Objectives and Policies	Analysis
	<p>AUP:OIP E12.2(1), E12.3(2), E12.3(3)</p> <p>AUPOIP E17.2(1), E17.2(2), E17.2(3), E17.3(1), E17.3(4).</p> <p>AUP:OIP E24.2(1), E24.2(2), E24.3(1), E24.3(2).</p> <p>AUPOIP E25.2(1), E25.2(2), E25.3(2), E25.3(5)].</p>	<ul style="list-style-type: none"> • Each transport corridor in the NW Strategic Package gives effect to the objective and policies providing for separated and safe active mode facilities and integrating transport infrastructure with existing and future urban areas to support urban development • There is flexibility within the proposed designation footprints to integrate with adjacent development and the environmental features. Due to the anticipated long delivery timeframe, the final details of amenity considerations for the operation of each transport corridor in the North West network (including landscaping, street trees, street furniture, lighting etc.) will be decided at detailed design through Outline Plan of Works and Management Plan framework • A ULDMP is proposed as a condition of the proposed designations. The ULDMPs will integrate the permanent works of each transport corridor into the surrounding landscape and urban context and ensure that the NW Strategic Package contributes to a quality urban environment and manages potential adverse landscape and visual effects. The ULDMPs will be consistent with the Bridging the Gap: NZTA Urban Design Guidelines (2013) • Amenity of the corridors during construction will be managed appropriately through engagement with residents, the community and stakeholders, and through the construction noise and vibration, and construction management plans proposed as conditions of the designations.
<p>Historic Heritage</p> <ul style="list-style-type: none"> • Recognises the importance of heritage to the identity of Auckland by avoiding significant adverse effects on scheduled historic heritage, where practicable, and encouraging new development to have due regard to significant historic heritage. • Protect scheduled values but provide for infrastructure in sensitive areas considering: <ul style="list-style-type: none"> • the benefits and value of providing that infrastructure • the functional or operational need to locate or traverse that location • whether any practicable alternatives would avoid or reduce effects on the scheduled values • how the infrastructure contributes to the planned growth and intensification of Auckland. 		
<p>All</p>	<p>AUP:OP [RPS]: B5.2.1(1), B5.2.2(6), B5.2.2(7), B5.3.1(2), B5.3.2(4)(c), B5.3.2(4)(d).</p>	<p>Summary of Objectives and Policies</p> <ul style="list-style-type: none"> • The RPS recognises the importance of heritage to the identity of Auckland, and the importance of active stewardship to protect it from inappropriate subdivision use and development. The provisions seek to avoid significant adverse effects on scheduled historic heritage, where practicable, and to encourage new development to have due regard to significant historic heritage • The policies of Chapter B3 and E26 seek to enable the development, operation and maintenance of infrastructure, even in sensitive areas that are scheduled in the AUP:OP in relation to historic heritage, provided adverse effects are avoided or reduced where practicable and an operational and functional need to locate in sensitive areas arises

Applicable Notice	Key Objectives and Policies	Analysis
	B3.2.1(1), B3.2.1(2), B3.2.1(3), B3.2.2(1), B3.3.1(1), B3.3.2(1), B3.3.2(3). AUPOIP [DP] E26.2.1(9), E26.2.2(4), E26.2.2(6).	<ul style="list-style-type: none"> While the objectives and policies of the AUP:OP generally seek to recognise the benefits, functional and operational needs and value of investment in infrastructure and enable the safe, efficient and secure provision of infrastructure where appropriate, the objectives and policies also anticipate that there may be some adverse effects as a result of the provision of such infrastructure. However, the objectives and policies recognise that in some instances such adverse effects may be appropriate given the necessity of, and essential services provided by, infrastructure. <p>Assessment</p> <ul style="list-style-type: none"> The RTC will impact two scheduled Historic Heritage Places. Through the optioneering phase, alternatives were considered to avoid these places, however alternative options were discounted (please refer to Alternatives Assessment). Given these scheduled buildings cannot be avoided, to manage adverse effect, it is proposed to re-locate the two heritage buildings within the vicinity of the existing location of the Huapai Tavern (refer to the Assessment of Built Heritage) A HHMP will be prepared at detailed design before construction commences for each project. As part of the HHMP, further research and survey of the Project area, and specific sites, will be undertaken to support a precautionary HNZPTA authority for the designation footprint Any adverse effects to potential previously unrecorded archaeological deposits that are exposed during the works will be mitigated under the provisions of a precautionary HNZPTA authority, and the means of mitigation detailed in an Archaeological Management Plan prepared for the HNZPTA authority application. An authority under the HNZPTA will be sought at a later date prior to construction.
<p>Natural Landscapes</p> <ul style="list-style-type: none"> Natural landscapes and features with outstanding values are to be protected from inappropriate subdivision use, and development by avoiding where practicable, and otherwise remedying or mitigating, adverse effects on those areas or features. 		
All	AUP:OP RPS B4.2.1(1), B4.2.1(3), B4.2.2(3), B4.2.2(6), B4.2.2(7), B4.2.2(8), B4.3.1(1), B4.3.1(2),	<p>Summary of Objectives and Policies</p> <ul style="list-style-type: none"> The RPS seeks to recognise and protect natural heritage. In particular, the policies of the RPS seek to identify features with outstanding natural values, evaluate and schedule those outstanding natural features, protect the physical and visual integrity of those features from inappropriate subdivision use, and development, and, where practicable and appropriate, enhance outstanding natural features The RPS identifies that the volcanic heritage of Auckland is a particularly notable feature across the region. The RPS also indicates that notable trees are a particularly important natural feature. Therefore, the RPS seeks to protect the values of both volcanic features and notable trees

Applicable Notice	Key Objectives and Policies	Analysis
	B4.3.2(3), B4.5.1(1), B4.5.2(4). AUP:OP [DP]: D13.2(1), D13.3(2).	<ul style="list-style-type: none"> The Notable Trees overlay seeks to retain and protect notable trees from inappropriate use and development. Notable trees are required to be retained and protected by considering alternative methods that could result in retaining the trees, whether the values that would be lost if the tree is removed, and the extent to which removal is necessary to accommodate the efficient operation of the road network. <p>Assessment</p> <ul style="list-style-type: none"> There are no identified outstanding natural landscapes, features or characters identified in AUP:OP within the NW Strategic Package. Nor are any volcanic viewshafts affected There are however two notable trees that are affected by the designation (Notable Trees 1808, Totara, Kauri, Rimu, Karaka within NOR S1 and Notable Trees 2603, Silver dollar gum within NOR S2 and NOR S3 Notable Trees 2603 at 396 Main Road require removal to accommodate the RTC and SH16 upgrades. Alternative methods have been considered for the intersection. Through the optioneering phase, the indicative alignment and designation was decided as the preferred option. Removal of this notable tree is deemed necessary to accommodate the efficient operation of the transport network, therefore meets the objectives and policies Significant adverse landscape and visual effects have been 'avoided through a substantive alternatives assessment process involving specialist inputs and design refinement to minimise effects and integrate the works within the landscape. As a result, the new or upgraded transport seek to limit physical effects on SEAs, high value streams and wetlands and other high value landscape features within the local landscape Throughout the NW Strategic Package, there is generally significant opportunity for natural character values to be improved and opportunities to integrate with the proposed Auckland Council Blue-Green network. The proposed designation conditions require the implementation of an ULDMP during the detailed design. With this in place, and through future regional consenting stages, the proposed features are able to be integrated into the existing and future landscape to remedy any potential adverse effects on landscapes.
<p>Open Space Zones</p> <ul style="list-style-type: none"> Enable infrastructure while protecting values of open space zones and avoiding, remedying or mitigating adverse effects on residents, communities and the environment. 		
All	AUP:OP E16.2(1), E16.2(2), E16.3(2), E16.3(3)	<p>Summary of Objectives and Policies</p> <ul style="list-style-type: none"> The objectives and policies of open space zones in the AUP:OP seek to enable infrastructure while avoiding, remedying or mitigating adverse effects on residents, communities and the environment. Objectives and policies in Chapter E16 of the AUP:OP

Applicable Notice	Key Objectives and Policies	Analysis
	<p>H7.2(2), H7.6.2(1), H7.6.2(2), H7.6.3(4), H7.6.3(1)</p>	<p>seek to protect the cultural, amenity, landscape and ecological values of trees in open space zones and increase the quality and extent of tree cover in open space zones.</p> <p>Assessment</p> <ul style="list-style-type: none"> The transport corridors within the NW Strategic Package have sought to reduce adverse effects on Open Space Zones and community facilities as far as practicable and this has been demonstrated through the alternatives assessment process. However, the NW Strategic Package does propose transport corridors that impact Fred Taylor Park and Huapai Recreation Reserve and an upgrade to Access Road that impacts Kumeū Community Hall, all of which are located within open space zones The transport corridors have sought to reduce impact on open space zones where practicable. In particular, impacts to Fred Taylor Park, Huapai Recreation Reserve and Kumeū Community Hall have been reduced where practicable and AT and Waka Kotahi have committed to ongoing engagement with Auckland Council Community Facilities to ensure continued operation and public access to community facilities within open space zones Potential construction effects on amenity values of Open Space Zones can be managed through engagement with residents, the community and stakeholders (through a SCMP), and through construction management plans (CNVMP, CTMP and CEMP) to minimise potential effects. A ULDMP is provided as a condition of the designation which will require all areas be reinstated at the completion of the construction period and will require any remaining fill to be removed from construction areas and shaping of the ground to integrate with surrounding landform The transport corridors will provide for improved and new opportunities for active modes of transport and the ability to provide improved connectivity to open space areas, reserves and recreation facilities.
<p>Residential Zones</p> <ul style="list-style-type: none"> Development maintains and is in keeping with the existing or planned neighbourhood scale and intensity. Non-residential development provides for communities' wellbeing and avoids adverse effects on residential amenity. 		
<p>All</p>	<p>AUP:OP H3.2(2), H3.2(4), H3.3(7)(a)(b)(c) AUP:OP H4.2(4), H4.3(9) (a)(b)(c)(d)</p>	<p>Summary of Objectives and Policies</p> <ul style="list-style-type: none"> The relevant objectives and policies of the Residential – Single House and Residential – Mixed Housing Suburban zones seek to ensure development is in keeping with the amenity and character values of established or planned neighbourhood character. Specific objectives and policies also seek to recognise the functional and operational requirements for development, in particular that non-residential activities provide for communities' social, economic and cultural well-being while avoiding, remedying or mitigating adverse effects on residential amenity. <p>Assessment</p>

Applicable Notice	Key Objectives and Policies	Analysis
		<ul style="list-style-type: none"> The transport corridors traverse existing residential zones. The NW Strategic Package is consistent with these objectives and policies through the provision of the necessary transport infrastructure to support the residential zoning currently under development throughout the North West and increases the development capacity The transport corridors will ensure land is protected to contribute to the accessible, high quality, effective, efficient and safe transport routes (including public and active transport modes) that support the movement of people, goods and services for residential zoned areas enabling communities' social, economic and cultural wellbeing to be provided for A ULDMP is proposed as a condition of the proposed designations. The ULDMP will integrate the permanent works of each transport corridor into the surrounding landscape and urban context and ensure potential adverse landscape and visual effects are appropriately managed Amenity of the corridors during construction will be managed appropriately through engagement with residents, the community and stakeholders, and through construction management plans proposed as conditions of the designations.
<p>Business Zones</p> <ul style="list-style-type: none"> Positively contribute towards planned future form and quality, creating a sense of place, amenity and convenience. Recognise requirements of development while avoiding, remedying or mitigating adverse effects. 		
All	<p>AUP:OP H10.2(5), H10.2(6), H10.2(7), H10.2(8), H10.3(15), H10.3(16), H10.3(17), H10.3(21)</p> <p>AUP:OP H11.2(3), H11.2(7), H11.2(8), H11.3(3), H11.3(12), H11.3(20)</p> <p>AUP:OP H12.2(3), H12.2(7), H12.3(3),</p>	<p>Summary of Objectives and Policies</p> <ul style="list-style-type: none"> The relevant objectives and policies for all centre zones and the Business – Mixed Use Zone in the AUP:OP seek development to positively contribute towards planned future form and quality, creating a sense of place particularly with regard to streets by providing pedestrian amenity, movement, safety and convenience for people of all ages and abilities The relevant objectives and policies for the Business – Heavy Industry Zone in the AUP:OP seek to ensure heavy industry operates efficiently and is not unreasonably constrained by other activities Objectives and policies of the relevant business zones also seek to recognise the functional and operational requirements of activities and development while avoiding, remedying or mitigating adverse effects on amenity values and the natural environment of adjacent public open spaces and residential areas. <p>Assessment</p> <ul style="list-style-type: none"> The transport corridors traverse existing business zones. The NW Strategic Package will positively contribute towards the planned future form and quality. They will create a sense of place particularly for streets by providing improved pedestrian amenity, movement, safety and convenience for people of all ages and abilities. They provide a safe and reliable arterial network including

Applicable Notice	Key Objectives and Policies	Analysis
	<p>H12.3(12), H12.3(17)</p> <p>AUP:OP H13.2(3), H13.2(9), H13.3(3), H13.3(12), H13.3(20), H13.3(21)</p> <p>AUP:OP H17.2(1), H17.2(3), H17.2(4), H17.3(4), H17.3(7)</p> <p>H10, H11, H12, H13, H17</p>	<p>active mode and public transport facilities that supports growth, enables sustainable travel choice, addresses safety concerns and improves access to employment and social amenities</p> <ul style="list-style-type: none"> • The transport corridors will improve the reliability of the transport network enabling business zones to operate efficiently, particularly with regard to improved efficiency of freight movements and better transport connections • A ULDM is provided as a condition of the proposed designations. The ULDMs will integrate the permanent works of each transport corridor into the surrounding landscape and urban context and ensure potential adverse landscape and visual effects are managed • Amenity of the corridors during construction will be managed appropriately through engagement with residents, the community and stakeholders (through the SCEMP), and through the construction noise and vibration, and construction management plans (in particular the CTMP) proposed as conditions of the designations.
<p>Rural Zones and Future Urban Zone</p> <ul style="list-style-type: none"> • Maintain and complement rural character and amenity. • Protect elite soils and manage prime soils. 		
<p>All</p>	<p>NPS-HPL Objective 1, Policy 2, Policy 5.</p> <p>AUP:OP H18.2(1), H18.2(2), H18.2(3), H18.2(4), H18.3(1), H18.3(2), H18.3(3), H18.3(4), H18.3(5), H18.3(6)</p> <p>AUP:OP H19.2.1(1), H19.2.1(3), H19.2.2(3),</p>	<p>Summary of Objectives and Policies</p> <ul style="list-style-type: none"> • The NPS-HPL seeks to ensure the availability of New Zealand’s most favourable soils for food and fibre production, now and for future generations. The NPS-HPL requires that territorial authorities protect highly productive land from inappropriate use and development except where exemptions in clause 3.9(2) apply, specifically being for an activity by a requiring authority in relation to a designation or a notice of requirement under the RMA • The relevant objectives of Chapter H18 seek for land to be developed to achieve the objectives of the Rural Production Zone until such time as it has been rezoned for urban purposes, and that urbanisation is avoided until the sites have been rezoned • The relevant policies seek to avoid use and development that may compromise the efficient and effective operation of the local and wider transport network, require significant upgrades to infrastructure, inhibit the efficient provision of infrastructure or undermine the form or nature of future urban development. Further, use and development is required to maintain and complement rural character and amenity

Applicable Notice	Key Objectives and Policies	Analysis
	<p>H19.2.2(4), H19.2.2(5)</p>	<ul style="list-style-type: none"> The relevant objectives and policies of Chapter H19 seek to protect elite soils and manage prime soils. Chapter H19 enables rural production activities on elite and prime soil and avoid land-use activities and development not based on, or related to, rural production from locating on elite soil and avoid where practicable such activities and development from locating on prime soil. <p>Assessment</p> <p>The NW Strategic Package traverses the FUZ. The NW Strategic Package will positively contribute towards the future urban form and quality. The transport corridors will enable efficient provision of infrastructure for existing activities and future urban development.</p> <p>The ASH project traverses the Rural – Countryside Living Zone, and achieves the objectives and policies of the zone through the provision of efficient provision of infrastructure. The rural character and amenity values will be impacted for properties in close proximity to the ASH and rural sections of the RTC. The ULDMP, provided as a condition of the designations, will integrate the permanent works of each transport corridor into the surrounding landscape and ensure potential adverse landscape and visual effects are managed.</p> <ul style="list-style-type: none"> In terms of maintenance of rural character and amenity, it is considered that the new and upgraded transport corridor will serve and improve connectivity (through vehicle roads and active modes) for both existing rural areas and future urban areas.
<p>Strategic Transport Corridor Zone</p> <ul style="list-style-type: none"> Railway and state highway corridors to be used safely, effectively and efficiently. 		
<p>All</p>	<p>AUP:OP H22.2(1), H22.3(1), H22.3(2), H22.3(4)</p>	<p>Summary of Objectives and Policies</p> <ul style="list-style-type: none"> The relevant objectives and policies of Chapter H22 seek for railway and state highway corridors to be used safely, effectively and efficiently for the transportation of people and goods in an integrated manner. The objectives and policies seek to provide for transport related activities, walking and cycling (where feasible) and enable the provision of works and measures to enhance infrastructure and minimise its adverse effects. <p>Assessment</p> <ul style="list-style-type: none"> The SH16 Main Road Upgrade is anticipated to have significant positive effects on the transport network once operational. The upgrade improves access (including active modes), safety, reliability and efficiency of the existing state highway and the wider network The RTC will be classified as a state highway by Waka Kotahi due to its strategic purpose of moving people between main centres. The new transport corridor will transport people in an effective, efficient and integrated manner, improving access (including active modes), safety and reliability of the wider network

Applicable Notice	Key Objectives and Policies	Analysis
		<ul style="list-style-type: none"> • The ASH will be classified as a state highway by Waka Kotahi due to its strategic purpose transporting freight and people. The new transport corridor improves access (including active modes), freight movements, safety, reliability and efficiency of the existing state highway and the wider network • The NW Strategic Package will improve facilities for all modes of transport and significantly reduce the risk of DSIs and improve road safety for those that travel by car, commercial vehicle, active mode and public transport. It improves corridor capacity, resulting in improved journey times and reliability for future freight and public transport demand • While there are temporary adverse effects during construction, effects can be appropriately avoided, remedied and mitigated.

28.2 Section 171(1)(b) Adequate Consideration of Alternatives

Section 171(1)(b) requires the territorial authority to have particular regard to whether adequate consideration has been given to alternative, sites, routes and methods for undertaking the work, if:

- i. the requiring authority does not have an interest in the land sufficient for undertaking the work; or
- ii. it is likely that the work will have a significant adverse effect on the environment.

The process by which Waka Kotahi and AT have considered alternative sites, routes and methods of the transport corridors is summarised in Part A, Section 7. A wide range of alternatives have been investigated for addressing the transport needs of the North West growth area, the process and conclusion for each transport corridor is documented in the Assessment of Alternatives Report, at Appendix A.

The preferred options are based on a comprehensive and robust optioneering process taking into account engagement feedback and specialist assessment inputs. 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.

28.3 Section 171(1)(c) Reasonable Necessity

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’.

The proposed designations and alterations to existing designations are reasonably necessary for achieving the relevant NOR objectives, as set out in AEE Part A, Section 8. The protection of the transport corridors through designation will:

- Enable flexibility and ability to construct, operate and maintain the transport corridor in accordance with the proposed designations and the proposed alteration to existing designation
- Enable the future works to be undertaken in a comprehensive and integrated manner
- Provide certainty to landowners, the community and stakeholders through identifying in the AUP:OP the location, nature and likely extent of the transport corridors and the Requiring Authority’s intended use of that land
- Protect the land from incompatible development by third parties
- Protect the land so that transport corridors can be implemented when required in line with growth
- Enable the Requiring Authority to avoid, remedy and mitigate any adverse effects of the transport corridors.

28.4 Section 171(1)(d) Other Matters

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.

28.5 Other Policy Considerations

Other legislation and policy that has informed development and will inform the future implementation of the NW Strategic Package is set out in Table 28-2, Table 28-3, and Table 28-4.

Table 28-2: Assessment against potential other matters - National

National
<p>Government Policy Statement on Land Transport for 2021/22 – 2030/31</p>
<p>The Government Policy Statement on Land Transport 2021 continues the strategic direction of 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:</p> <ul style="list-style-type: none"> • Safety – a safe system, free of death and serious injury • 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. <p>The NW Strategic Package provides a safe and reliable strategic transport network that supports growth, enables sustainable travel choice, addresses safety concerns and improves access to employment and social amenities. The NW Strategic Package is anticipated to significantly reduce the risk of DSI’s and improve road safety for all users. The NW Strategic Package will significantly improve transport facilities for all modes, resulting in improved safety for those that travel by car, commercial vehicle, active mode and public transport. It improves corridor capacity, resulting in improved journey times, reliability and resilience for future freight and public transport demand.</p> <p>The GPS 2021 prioritises reduction of greenhouse gas emissions and a shift to active modes, public transport and low emission vehicles. This focus is well aligned to the new or upgraded transport corridors which provide an increase in modal choice including active modes and public transport, thereby seeking to reduce reliance on single occupancy vehicles. Overall, the NW Strategic Package positively contributes towards the strategic priorities in the GPS.</p>
<p>Climate Change Response Act, 2002</p>
<p>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).</p> <p>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 (refer Section 4.3 of this AEE). This includes considering how an efficient transport network can be developed that:</p> <ul style="list-style-type: none"> • 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. <p>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</p>

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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 ERP setting out policies and strategies for meeting emissions budgets.

The first ERP sets the following specific transport targets:

- Reduce total VKT by the light fleet (private vehicles) by 20 per cent by 2035 through improved urban form and providing better travel options, particularly in our largest cities.
- Increase zero-emissions vehicles to 30 per cent of the light fleet by 2035.
- Reduce emissions from freight transport by 35 per cent by 2035.
- Reduce the emissions intensity of transport fuel by 10 per cent by 2035.

The NW Strategic Package has taken into account transport target 1 as it seeks to support planned growth and connect communities in a manner that assists in reducing VKT by the light fleet when compared to a scenario that is not driven by mode shift targets. The NW Strategic Package will provide an efficient transport network that reduces congestion and encourages and facilitates mode shift. The extent to which the NW Strategic Package contributes to meeting New Zealand's emissions reduction targets is a transport policy consideration that has guided the options assessment and alternatives assessment processes for the NW Strategic Package (see the Alternatives Assessment for more details).

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 makes 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, co-ordinated and contribute to a strong economy and high living standards.

The Plan notes that challenges exist around projected population growth with Auckland forecast to grow by another 716,000 people by 2045 meaning that over the next 25 years, the city will need to provide 400,000 more dwellings. The NW Strategic Package provides an integrated approach to land-use and infrastructure planning which is critical to deliver good urban outcomes. The plan envisages \$18.7 billion being spent on infrastructure between 2015 and 2025. The NW Strategic Package forms part of this spending and falls within the scope of this Plan by enabling and providing for future urban growth in the North West Growth Area in Auckland.

Waka Kotahi 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 Government Policy Statement on land transport 2021/22 – 2030/31. 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 NW

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Strategic Package provides a safe and reliable strategic transport network that supports growth, enables sustainable travel choice, addresses safety concerns and improves access to employment and social amenities, and is consistent with the Waka Kotahi 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 NW Strategic Package plays a key role in providing opportunity to plan and design system improvements that embed the Road to Zero strategy. The NW Strategic Package is anticipated to significantly reduce the risk of DSI's and improve road safety for all users. The NW Strategic Package will significantly improve all transport facilities for all modes, resulting in improved safety for those that travel by car, commercial vehicle, active mode and public transport.

Table 28-3: Assessment against potential other matters - Regional

Regional

Auckland Transport Alignment Project

The 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 into three main areas including for arterial roads and footpaths (including bus and cycle lanes where required). The NW Strategic Package is consistent with ATAP as it will provide a safe and reliable strategic network that integrates with land use planning, supports growth, enables sustainable travel choice for all transport users, addresses safety concerns and improve access to employment and social amenities.

Auckland Regional Land Transport Plan 2018-2028

The Regional Land Transport Plan (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. Te Tupu Ngātahi 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.

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

Regional

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 Aucklanders will be able to get where they want to go more easily, safely and sustainably. The NW Strategic 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 improve access to employment and social amenities. The development of the NW Strategic Package has been a direct response to the Auckland Plan. The NW Strategic Package will help facilitate the sustainable growth of the North West area 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 place 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 DSIs by 2050 (in line with the Auckland Plan 2050). The NW Strategic 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 NW Strategic Package is anticipated to significantly reduce the risk of DSI's and improve road safety for all users. The NW Strategic Package will significantly improve all transport facilities for all modes, resulting in improved safety for those that travel by car, commercial vehicle, active mode and public transport.

Auckland Parks and Open Spaces Strategic Action Plan (2013)

This Action Plan seeks to protect, and conserve Auckland's environment, heritage and landscape, expand and develop Auckland's park and open space networks, and to connect and utilise these parks and open spaces. The NW Strategic Package will require the acquisition of land from a number of parks/open spaces along the route during construction. This will reduce the amount of park space available to Auckland residents for the construction period. However, once complete, each of the transport networks within the NW Strategic Package will reinstate parks and provide new connections between existing parks and open spaces via proposed walking and cycling infrastructure.

Auckland Sport and Recreation Strategic Action Plan 2014-2024 (refreshed 2017)

This plan seeks to increase the availability to, and participation in, physical activities, recreation and sport within Auckland. In particular, the Plan focuses on increasing participation in informal recreation, providing infrastructure to improve access to open spaces and waterbodies, sporting achievement and improving Council's parks and recreation sector. Through the Alternatives Assessment for the NW Strategic Package, sports and recreation facilities including Huapai Recreation Reserve and Fred Taylor Park were considered, impacts reduced where possible, and engagement with Auckland Council Community Facilities has been ongoing throughout network development to ensure continued operation of these important community sport and recreation facilities. The NW Strategic Package will also provide cycleway and walkway connections which will help increase informal physical activity and improve access to open spaces and recreation facilities.

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 NW Strategic Package has been designed having regard to and taking into account climate change and resilience to it. The NW Strategic 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.

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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 NW Strategic Package seeks the removal of some trees within the proposed designation footprint (protected by district plan rules), this will be mitigated by planting within the new road layouts. A range of mitigation measures have been proposed as part of the NW Strategic Package to respond to potential effects on ecological features. Areas of existing valuable vegetation within the designation boundary will be protected and additional planting will take place in locations where they are likely to provide value for bats. 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.

Table 28-4: Assessment against potential other matters - Local

Local

Local Board Plans

The NW Strategic Package is situated within three local board areas: Rodney, Upper Harbour and Henderson-Massey. The Local Board Plans outline outcomes for the respective local board areas. The plans identify outcomes relating to an improved and well-connected transport system, including active modes, managing growth, economic prosperity and protection and care for the environment.

The NW Strategic Package is consistent with the outcomes of the Local Board Plans. The upgrade will integrate well with proposed surrounding land uses and the wider transport network, to respond to the timing, scale and form of urban development triggers and staging of future infrastructure corridors. In doing so the NW Strategic Package manages any adverse effects on the environment. The NW Strategic Package will provide a multimodal, safe and reliable arterial network that supports growth, enables sustainable travel choice for all transport users, address safety concerns and improve access to employment and social amenities. The NW Strategic Package will also support the economic outcomes sought by supporting economic growth and increased productivity. The NW Strategic Package will help facilitate the sustainable growth of the Rodney, Upper Harbour and Henderson-Massey areas.

28.6 RMA Part 2 Assessment

With regard to the relevance of Part 2, it has been well established, that where a plan has been competently prepared under the RMA it may be that in many cases there will be no need to refer to Part 2. However, if there is doubt that a plan has been “competently prepared” under the RMA, then it will be appropriate and necessary to have regard to Part 2. That is the implication of the words “subject to Part 2” in section 171(1) of the RMA.

In the context of these NOR application's, the objectives and policies of the relevant statutory documents were prepared having regard to Part 2 of the RMA, they capture all relevant planning considerations and contain a coherent set of policies designed to achieve clear environmental outcomes. They also provide a clear framework for assessing all relevant potential effects, and there is no need to go beyond these provisions and look to Part 2 in making this decision. However, in the interests of caution, an assessment has been provided.

This section considers the NW Strategic Package against the purpose and principles of Part 2 of the RMA.

28.6.1 Section 6 Matters of national importance

In considering if confirmation of the NORs for the NW Strategic Package would achieve the purpose of the RMA, matters of national importance are to be recognised and provided for. Section 6 matters considered relevant are addressed in Table 28-5. It is considered that the NW Strategic Package is consistent with section 6 of the RMA.

Table 28-5: Part 2, section 6 matters of national significance

Part 6 Matter	Assessment
<p><i>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</i></p>	<p>The proposed transport infrastructure is critical to enable existing and future communities to provide for their social, economic, and cultural well-being. Ecological effects arising in respect of activities that require consents have been considered to inform assessment of alternatives, transport corridor design and the proposed designation footprints. In light of this, generally, the new and upgraded transport corridors have sought to avoid or minimise impacts on a range of high value ecological areas including wetlands and streams. This is demonstrated through the comprehensive alternatives assessment process undertaken and design refinement.</p> <p>Adverse effects on natural character values identified have largely been avoided through the alternatives assessment process. As a result, the NW Strategic Package avoids significant landscape features and seeks to limit physical effects on SEAs, streams and other high value landscape features within the local landscape.</p> <p>The corridors will support the natural character of the stream environments through reinstatement and mitigation planting at the completion of works with further consideration at the regional resource consent stage. The NW Strategic Package provides opportunities for natural character values to be improved through enhancements to landscaping.</p>
<p><i>the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development</i></p>	<p>The transport corridors in the NW Strategic Package avoid outstanding natural features and landscapes.</p>

Part 6 Matter	Assessment
<p><i>the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna</i></p>	<p>The transport corridors within the NW Strategic Package have sought to avoid or minimise impacts on a range of high value ecological areas including high value wetlands, streams and SEAs. This is demonstrated through the comprehensive alternatives assessment process undertaken and assessment provided in this AEE.</p> <p>Where avoidance or minimisation of effects is not practicable, measures are proposed to mitigate effects of the works. Additionally, the proposed designations have provided further opportunities to minimise any impacts within the transport corridor alignments during the detailed design.</p> <p>Further mitigation related to resource consent requirements will also be incorporated in the future consenting phase of the transport corridors.</p> <p>In considering the potential future effects on areas of significant indigenous vegetation and habitats arising from activities that may require resource consent in the future, it was determined that any potential effects of the NW Strategic Package can be adequately managed in any future consent processes.</p>
<p><i>the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers</i></p>	<p>The proposed designations will not impact upon any existing public access to streams or the coastal marine area. The NW Strategic Package has the potential to provide enhanced access to streams and the coastal marine area in the transport corridor areas through the provision of active transport facilities and future integration with Auckland Council's proposed Blue-Green Network.</p>
<p><i>the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga</i></p>	<p>This matter is recognised and provided for throughout the NW Strategic Package. Manawhenua have been actively involved throughout development of the corridors, including through alternatives assessment and identification of the preferred options. The opportunity to provide Cultural Assessment was provided and Te Kawerau ā Maki have provided an assessment which has been considered as part of this AEE (see Volume 4).</p> <p>The ongoing partnership with Manawhenua has provided an understanding of, and the incorporation of Manawhenua values and expression of kaitiakitanga throughout the development of the transport corridors.</p> <p>There are no sites of significance to Manawhenua, wāhi tapu, other taonga or Māori land identified within the transport corridors. The relationship of the respective iwi with the transport corridors, their ancestral lands, wāhi tapu and taonga will be recognised and provided for through the involvement of Manawhenua in developing and implementing various mitigation measures and management plans at the time of detailed design and construction.</p>
<p><i>the protection of historic heritage from inappropriate subdivision, use, and development</i></p>	<p>The corridors within the NW Strategic Package will not adversely affect any recorded historic heritage sites. While the transport corridors avoid any recorded historic heritage sites, previously unrecorded deposits may potentially be exposed during construction. The potential to disturb unrecorded sites is managed by the requirement for an accidental discovery protocol and implementation of a HHMP requiring further research and survey.</p>
<p><i>the protection of protected customary rights</i></p>	<p>None of the transport corridors within the NW Strategic Package impact upon any known protected customary rights.</p>
<p><i>the management of significant risks from natural hazards</i></p>	<p>The NW Strategic Package manages risk from natural hazards during both the construction and operation phases. Measures to mitigate flood risk during construction (measures included in the CEMP proposed as a condition of the designation) and future flood risk modelling will ensure the design does not exacerbate flood risks.</p>

Part 6 Matter	Assessment
	Additionally, the transport corridors will improve the resilience of the stream crossings to flood hazard and climate change through improved freeboard and slight decreases in flood depth and velocity.

On that basis the NW Strategic Package is considered to be consistent with section 6 of the RMA.

28.6.2 Section 7 Other matters

Each transport corridor in the NW Strategic Package has had particular regard and appropriately responded to the matters in section 7 of the RMA. It is considered that the NW Strategic Package is consistent with section 7 of the RMA. In particular:

- Manawhenua kaitiakitanga has been recognised through engagement at each stage and will continue through construction and operation
- Ethic of stewardship is recognised through engagement and participation with stakeholders and partners who have a specific interest in or exercise stewardship over particular resources
- Input from various stakeholders has enabled development of an integrated transport solution providing important community and environmental outcomes
- The alternatives assessment process, has determined the most efficient use of natural and physical resources, in particular in utilising existing corridors
- Alignment selection and design process has sought to avoid adverse effects on existing and future amenity. Particular regard has been given to the management of amenity values during construction and on streams and tributaries, considered to have moderate to heightened, localised natural character values. Walking and cycling facilities will be notably improved throughout the North West, improving the safety and amenity of the urban environment
- Transport corridor development has sought to avoid adverse effects on ecosystems as far as practicable while allowing flexibility for refinement during detailed design
- Each corridor is designed to provide adaptation resilience to flooding taking into account climate change and reducing urban heat island effects through the provision for street tree planting.

On that basis the NW Strategic Package is considered to be consistent with section 7 of the RMA.

28.6.3 Section 8 Treaty of Waitangi

Section 8 of the RMA requires that the principles of the Treaty of Waitangi (Te Tiriti o Waitangi) are taken into account when managing the use, development, and protection of natural and physical resources.

Waka Kotahi and AT have partnered with Manawhenua throughout the development of the NW Strategic Package. This has resulted in the selection of transport corridors which avoid and minimise adverse effects on cultural values where practicable. This has included 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 are taken into account. Given these factors, the development of the NW Strategic Package is considered to be consistent with the principles of the Treaty of Waitangi.

28.6.4 Section 5 Purpose and Principles

Section 5 states the purpose of the Act is to promote the sustainable management of natural and physical resources. Sustainable management is defined in Section 5(2) to mean “*Managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic and cultural wellbeing and for their health and safety while-*

- a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and
- b) Safeguarding the life-supporting capacity of air, water, soil and ecosystems; and
- c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment.”

The NW Strategic Package will meet this by:

Part 2 S5 (2) enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety

- Enabling planned urban growth within the North West growth areas by providing critical transport infrastructure required to unlock growth and capacity of the FUZ land resource
- Providing a safe and reliable arterial network that supports and integrates with planned growth, enables sustainable travel choice, addresses safety concerns and improves access to employment and social amenities by:
 - Increasing active modes and public transport choices
 - Reducing the risk of DSI's and improving road safety for all users
 - Improving connectivity between future town centres and within the North West area
 - Improving corridor capacity, resulting in improved journey times and reliability for future freight and public transport
 - Improving amenity through upgraded transport corridors which can be integrated with the surrounding environment, dedicated active mode facilities and berm planting within the upgraded corridors.

Part 2 S5 (a) Sustaining the potential of natural and physical resources for future generations

- Improving the resilience of the transport network to flood hazard by accounting for future rainfall predictions and inclusion of stormwater facilities for each corridor
- Meeting the future transportation needs of the North West area by generally utilising existing road corridors, enabling the efficient use of existing physical resources
- The ASH corridor provides for an efficient, reliable and resilient strategic connection between Redhills North and SH16 west of Kumeū-Huapai while supporting connectivity within the future Kumeū-Huapai
- The RTC supports planned urban growth while contributing to mode shift by providing a choice of transport options including active modes.

Part 2 S5 (b) Safeguarding the life supporting capacity of air, water, soil and ecosystems

- Improving mode choice and reducing congestion, which has the potential to benefit air quality at a local level
- Providing sufficient land to manage water quality and quantity at future consenting stage
- Managing future construction works

- Avoiding (where practicable), remedying and mitigating the adverse effects on high value ecological areas including wetlands, streams and SEAs
- Having significant positive effects on the transport network, urban growth capacity and potential economic growth.

Part 2 S5 (c) Avoiding, remedying or mitigating any adverse effects

Each of the transport corridors within the NW Strategic Package avoids, where practicable, remedies or mitigates adverse effects on the environment through the conceptual design, and through identification of mitigation measures to be captured in the subsequent outline plan of works phases of the NW Strategic Package.

On this basis, the NW Strategic Package is considered to be consistent with section 5 of the RMA.

29 Other statutory approvals required

Further and separate approvals under other legislation will be required and will be sought in future. This report does not seek authorisation or approval for those works, but they are set out under Table 29-1 for clarity purposes.

Table 29-1: Other statutory approvals required

Other statutory authority required	Discussion
Outline Plan of works	In accordance with section 176A of the RMA, Waka Kotahi and AT (as the requiring authorities) 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	<p>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) consents required for each corridor are set out in AEE Part A.</p> <p>While written consent 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, it is not required in order to designate the land. For this reason, written approval under section 177(1)(a) of the RMA has not yet been obtained.</p> <p>Consultation has occurred with these 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 the status of earlier designations.</p>
Future resource consents	<p>The transport corridors will require NES and regional resource consents to enable works. Although not being sought at this stage, this has been considered in the indicative designs, options assessment and the proposed designation footprints.</p> <p>These consents will be sought when the detailed design for each of the transport corridors is completed.</p>
Considerations under other legislation	<ul style="list-style-type: none"> • Public Works Act 1981 – the acquisition of required land • Heritage New Zealand Pouhere Taonga Act 2014 – authorities for works on or in any archaeological sites • Wildlife Act 1953 – the disturbance or relocation of protected species (e.g., taking and / or killing of wildlife for certain purposes and / or causing damage)



PART C

Appendices

Assessment of Alternatives

Appendix A

December 2022

NOR Conditions

Appendix B

December 2022