Volume 1 Assessment of Effects on the Environment

State Highway 2 - Waikare Gorge Realignment Project

NZ TRANSPORT AGENCY WAKA KOTAHI

New Zealand Government

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Definitions and explanation of acronyms and terms

The table below defines the acronyms and terms used in the Assessment of Environmental Effect report.

Abbreviation/Term	Meaning/Definition
AEE	Assessment of Effects on the Environment
Best Practicable Option or BPO	Has the same meaning as in Section 2 of the Resource Management Act 1991
CEMP	Construction and Environmental Management Plan
CNVMP	Construction Noise and Vibration Management Plan
Consent Authority	Hawke's Bay Regional Council
Consent Holder	Waka Kotahi NZ Transport Agency
Construction Works	Activities undertaken to construct the Project
CIA	Cultural Impact Assessment
CTMP	Construction Traffic Management Plan
EIMP	Electrical Infrastructure Management Plan
EMP	Ecology Management Plan
ESCP	Erosion Sediment Control Plan
GRPA	Government Roading Powers Act 1989
HDC	Hastings District Council
HBRC	Hawke's Bay Regional Council
HHMP	Historic Heritage Management Plan
LMP	Landscape Management Plan
LMTA	Land Management Transport Act 2003
LTA	Land Transport Act 1998
Manager Compliance	Hawke's Bay Regional Council Manager Compliance
NOR	Notice of Requirement
NZS 6803	New Zealand Standard 6803:1999: Acoustics – Construction Noise, or any subsequent version 8
NES-CS	Resource Management (National Environmental Standards for Assessing and Managing Contaminants In Soil To Protect Human Health) Regulations 2011

Abbreviation/Term	Meaning/Definition
NES-F	Resource Management (National Environmental Standards for Freshwater) Regulations 2020
NPS-FM	National Policy Statement for Freshwater Management 2020
PBC	Programme Business Case
Project	The construction, operation, maintenance and improvement of the state highway and associated infrastructure of State Highway 2
Requiring Authority	Waka Kotahi NZ Transport Agency
RMA	Resource Management Act 1991
Territorial Authorities	Hastings District Council and Wairoa District Council
SMP	Stormwater Management Plan
SSBC	Single Stage Business Case
UDLF	Urban Landscape Design Framework
Waka Kotahi	Waka Kotahi NZ Transport Agency
WDC	Wairoa District Council

1. INTRODUCTION

1.1 Report Purpose

Waka Kotahi New Zealand Transport Agency (Waka Kotahi) is submitting a Notice of Requirement (NOR) to designate land for the construction, operation, maintenance and improvement of the state highway and associated infrastructure and is lodging applications for resource consent for earthworks and vegetation clearance, discharges to water, and works and structures within watercourses under the provisions of the Resource Management Act 1991 (RMA). These activities are associated with the State Highway 2 (SH2) Waikare Gorge Realignment Project.

The NOR and resource consent applications are collectively referred to in this report as "the Application" unless the context requires specific reference to either the NOR or the resource consent applications.

This Assessment of Effects on the Environment (AEE) report has been prepared in support of the Application, in accordance with Section 104 and Section 168 of the RMA.

The separate NOR document for the Hastings District Council (HDC) and Wairoa District Council (WDC) has been prepared in accordance with the requirements of Form 18 of the Resource Management (Forms, Fees, and Procedure) Regulations 2003.

The separate resource consent application form for the Hawke's Bay Regional Council (HBRC) has been prepared in accordance with the requirements of Form 9 of the Resource Management (Forms, Fees, and Procedure) Regulations 2003.

The Application is based on the existing environment prior to Cyclone Gabrielle which occurred in February 2023. The technical reports supporting the Application were also prepared prior to this serious weather event and assess the environment as it was at the time.

The full impact of Cyclone Gabrielle resulted in the destruction of Waikare Gorge Bridge and widespread damage to the surrounding area. However, no notable changes have occurred in the proposed designation area as a result of the cyclone that would alter the assessment conclusions in this AEE – this is discussed further in section 1.4.

1.2 Waka Kotahi NZ Transport Agency

Waka Kotahi[1] is a Crown entity with its functions, powers and responsibilities set out in the Land Transport Management Act 2003 (LTMA) and the Government Roading Powers Act 1989 (GPRA). 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.

[1] The legal name for Waka Kotahi is the Waka Kotahi New Zealand Transport Agency. The corporate name Waka Kotahi is used throughout this AEE.

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.

Climate change response is considered in Waka Kotahi policy, planning and development of the transport network. This includes greenhouse gas emissions, resilience to natural hazards and adapting to climate change impacts.

Waka Kotahi is also a network utility operator approved as a requiring authority under Section 167 of the RMA.

1.3 Volumes 1, 2 and 3

The information contained within the following volumes, support the regional resource consent applications to HBRC, and the NORs to HDC and WDC.

Volume 1 Assessment of Effects on the Environment

Volume 2 Technical Reports and Supporting Information (Appendices)

Volume 3 Drawings

The AEE and technical assessments cover the relevant NOR and resource consent matters, to support an integrated assessment of the Project overall.

The relevant statutory matters for each of the Councils to consider are set out in Section 11 of the AEE (and Appendix J in Volume 2).

1.4 Overview of Project and Activity

The SH2 Waikare Gorge Realignment Project ('Project') is located midway between Napier and Wairoa, Hawke's Bay.

The proposed two-lane new state highway ("realignment") extends over a distance of approximately 3.8km and will sit west of the existing 6km section of SH2. It diverges from the existing SH2 south of Putorino Station Road, briefly runs parallel to the rail corridor (and on the existing Putorino Station Road alignment) and crosses Kings Creek (also known as Pohatanui Stream). It then heads across moderately undulating farm and pastureland to traverse the Waikare Gorge at a new proposed bridge. From the northern side of the Waikare Gorge, it veers westwards towards and crosses over the KiwiRail corridor to reconnect and tie into the existing SH2 after the McKenzie's Rail Overbridge. The general site location is shown in Figure 1. The realignment is shown by the dashed red line.

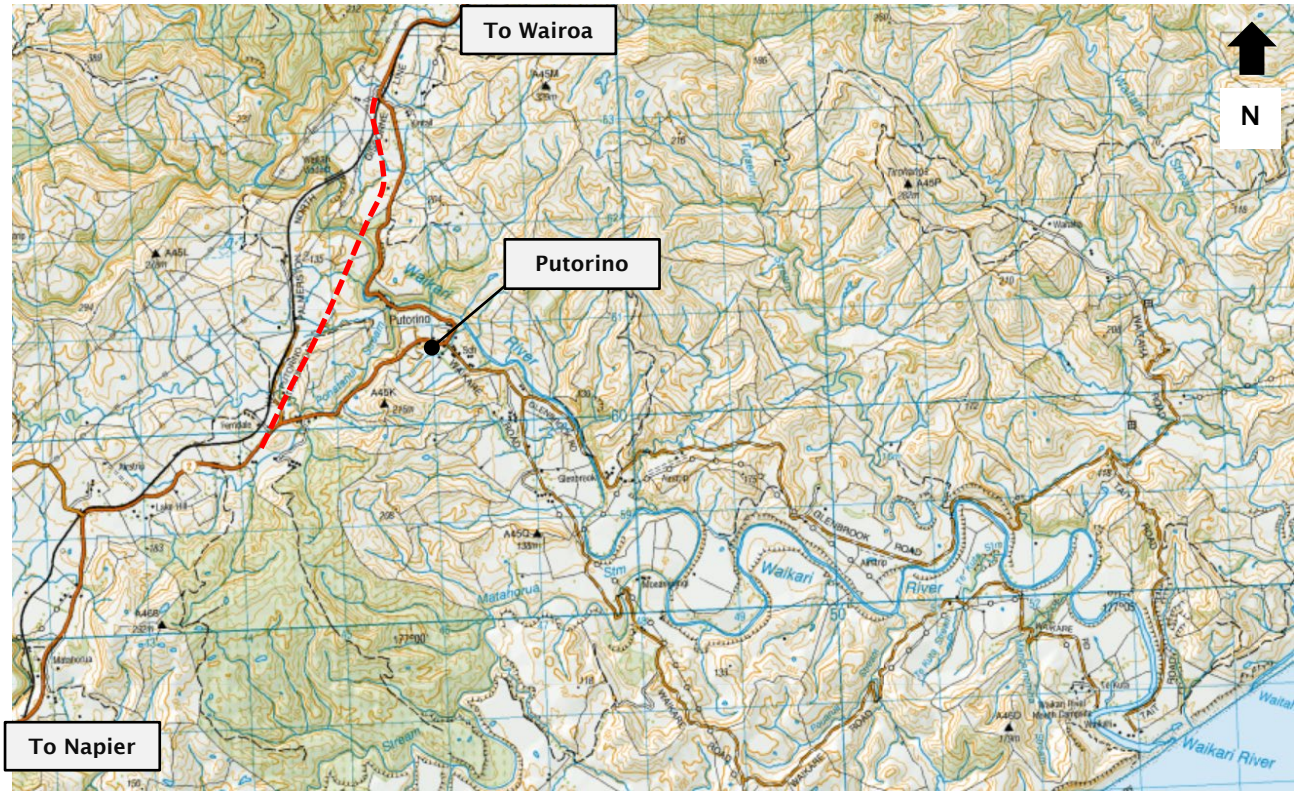

Figure 1: Site location and proposed realignment (Source: NZ Topo)

The existing Waikare Gorge section of SH2 is narrow and windy, and SH2 is regularly impacted by flooding and rockfalls which cause closure of the road. There is no local road-based detour of the state highway through the Waikare Gorge, meaning that all road-based traffic between Gisborne and Napier needs to re-route via SH5 and SH30. This detour adds an additional 3 hours and 14 minutes to the journey time between Napier and Gisborne, or close to six hours for local communities travelling between Napier and Wairoa.

Traffic volumes on SH2 on the journey between Gisborne and Napier range significantly between rural and urban sections. Generally, the corridor carries approximately 2,000 vehicles per day (vpd)[2] with approximately 13% of the traffic being heavy vehicles. The route has experienced traffic growth due to increased economic activity in the region.

The Project comprises the following key features and activities:

- A 3.8km[3], two lane greenfields alignment
- Waikare Gorge Bridge
- A new railway overpass bridge
- Kings Creek road bridge and stock bridge
- Stock underpasses
- Passing lane and slow vehicle bay
- Tie-ins to the existing SH2 and local roads
- A new safe stopping place
- Installation of a wire rope median barrier and edge barriers
- Culvert extensions and new culverts with associated headwalls and rock rip rap aprons
- Installation of stormwater treatment facilities including forebay, wetland and pond installations

[2] Based on the average daily traffic (ADT) data sourced from Waka Kotahi Traffic Management System (TMS) for the Tangoio telemetry site (TMS 24).

[3] For this report the proposed realignment is described as extending over a length of 3.8km. This distance may vary in length as reported upon in supporting Technical Reports to allow for differing interpretations of starting and finishing points for the new state highway realignment 'tie-ins' to the existing road.

- Earthworks – cut and fill
- Installation of retaining walls
- Planting and landscaping
- Land disturbance and vegetation clearance
- Stream bed disturbance and temporary stream diversion (including dewatering), during construction
- Temporary installation of erosion and sediment control devices, during construction.

The proposed work includes the construction, operation, maintenance and improvement of the state highway and all associated infrastructure.

The existing Waikare Gorge Bridge was destroyed during Cyclone Gabrielle and a temporary bridge is now being constructed. The area of the proposed realignment is more elevated than the existing SH2 corridor and substantially less prone to natural hazards, hence the proposed location. No notable changes have occurred in the proposed designation area as a result of the cyclone that would alter the assessment conclusions in this AEE.

2. APPLICATIONS AND NOTICES OF REQUIREMENT

2.1 Resource Consent Applications

Waka Kotahi is seeking resource consent from the Hawke's Bay Regional Council (HBRC) to undertake works associated with a new realignment of SH2, namely, to construct, maintain and improve the state highway and associated infrastructure in the vicinity of Putorino and Waikare Gorge.

The following regional resource consents are required for the Project and are being applied for:

- Land use consent for earthworks, vegetation clearance and land disturbance
- Land use consent for the installation, use and maintenance of bridges, culverts, culvert extensions, and erosion and scour protection structures in and over the bed of watercourses
- Land use consent for vegetation clearance, earthworks or land disturbance within, or within a 10 m setback from, a natural for the purpose of constructing a wetland utility structure
- Water permit for taking, use, damming, diversion, or discharge of water within, or within a 100 m setback from, a natural wetland
- Water permit to temporarily divert streams/watercourse during construction
- Discharge permit for construction related discharges which may enter surface water
- Discharge permit for the operational stormwater discharges to surface water
- Discharge of contaminants to land, (cleanfill and earth) within 20 metres of watercourses.

2.2 Proposed Designations

Concurrent with the resource consent applications, Waka Kotahi is submitting Notices of Requirement (NOR) to designate the proposed new alignment for state highway purposes in the Hastings and Wairoa District Plans. The proposed new alignment traverses both council jurisdictions.

The purpose of the proposed designation is to *'construct, operate, maintain and improve a state highway and associated infrastructure.'*

Waka Kotahi is the requiring authority for the proposed designations.

3. PROJECT BACKGROUND AND NEED

3.1 Connecting Tairāwhiti Programme Business Case

The Connecting Tairāwhiti Programme Business Case (PBC)[4] was developed with key regional stakeholders in 2017. It identified the need to support regional economic growth by improving connections between communities and markets through improvements to the transport system to provide benefits to regional safety, resilience, and access. SH2 provides important connections between Gisborne in the north, to Napier in the south, and is recognised as a key journey for residents, businesses, and visitors.

Enhancing the journey on SH2 through the Waikare Gorge was identified in the PBC as a project that could deliver a significant contribution to the programme outcomes by improving safety, improving resilience, and enhancing access to economic and social opportunities within the region. Following completion of the PBC, Tairāwhiti was identified as a surge region for Provincial Growth Funds (PGF), requiring early investment to enable economic growth within the region. The Government's PGF package for the Tairāwhiti region was announced in September 2018. Consequently, several projects and activities across the region were able to be funded from the PGF, with Waikare Gorge being one of those identified for preliminary design only at that stage.

The Connecting Tairāwhiti PBC identified transport related problem statements and investment benefits at a regional level, and specifically recommended improvements at Waikare Gorge to resolve problems on SH2. Three problem statements were developed:

- **Resilience**: Due to the relative isolation and lack of viable alternatives, when transport infrastructure is closed, there is a significant impact on communities and economic productivity.
- **Access**: The nature of access in the region constrains the ability to realise community and economic opportunities.
- **Safety**: The unforgiving nature of the terrain, combined with typically long journeys and poor driver behaviour is resulting in high personal safety risk.

The Project and NOR objectives are derived from these problem statements. The SH2 Waikare Gorge project was identified as part of the "resilience package" of improvements outlined within the PBC's programme, siting benefits relating to travel time reliability and resilience.

3.2 Single Stage Business Case

Based on a clearly defined scope from the PBC, there was the opportunity to prepare a Single Stage Business Case (SSBC)[5], following approval of the PBC. Further work was done to prepare a business case which developed the scope of the Waikare Gorge project in more detail.

The primary purpose of the SSBC was to develop a recommended long-term option for SH2 to resolve the long-standing problems associated with the section passing through Waikare Gorge as outlined in the PBC.

It also documented the long list of alternatives and options identified in response to these problems, and outlined the process used in evaluating the risks and effects of each option to establish a recommended solution. Details of the alternatives explored by the SSBC are described in Section 5 of this AEE.

[4]https://www.nzta.govt.nz/assets/projects/connecting-tairawhiti/Connecting-Tairawhiti-PBC-18072018.pdf

[5] Waikare Gorge Single Stage Business Case, dated June 2021 (Author: Rob Partridge, Waka Kotahi)

In support of the need for the Project, some background on the crash history and road closures is provided below.

Crash history

Crash data for the previous full five-year period (January 2017 to December 2021 and including up to September 2022)[6] analysed the crash history which indicated that the current road geometry (winding alignment) and the limited passing opportunities that presently exist, as being the main contributors to the risk of crashes. A total of eight crashes were recorded along the section of SH2 between the McKenzie's Rail Overbridge and the Putorino Station Road intersection over the previous five years.

It was also noted in the SSBC that due to the lack of cell phone reception in the area, there is potentially a higher rate of under-reporting of crashes occurring.

Road closures

Road closures due to unplanned factors result in significant disruption to traffic. An analysis undertaken in the SSBC of the data from the period between 2015 and 2019 found that a total of 33 unplanned road closures relating to environmental, or traffic incidents have occurred on SH2 within the vicinity of the Waikare Gorge. Environmental factors (mainly flooding, landslips and rock falls) accounted for 48% of all these unplanned closures.

Cyclone Gabrielle has led to widespread damage, including loss of life, in the region. Settlements were completely cut off from Gisborne and Napier with the closure of SH2 because of the destruction of Waikare Gorge bridge.

The data suggests that road closures are becoming more frequent at Waikare Gorge. Cyclone Gabrielle is further evidence of the significant effects of natural hazards on the road network resulting in road closures.

[6] Waka Kotahi Crash Analysis System (CAS)

4. DESCRIPTION OF EXISTING ENVIRONMENT

4.1 Project Location

The existing site is located midway between Napier and Wairoa, a road distance of approximately 58 kilometres in each direction of the Project site. The general location of the site is indicated in Figure 2.

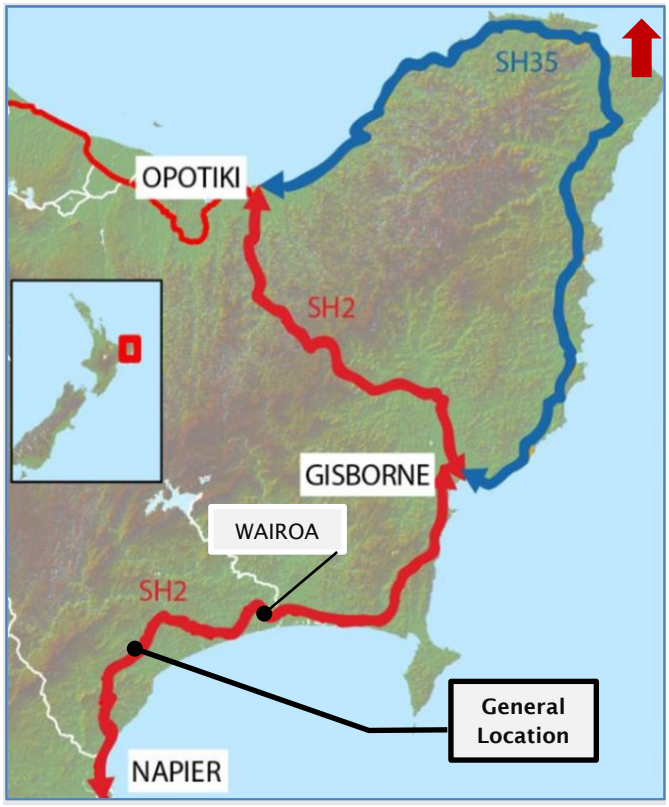

Figure 2: Project site location

The adjacent and surrounding land is predominantly rolling rural farmland, dispersed with rural residential dwellings, and farming associated buildings. Site photographs providing a visual description of the Project area are set out in Section 4.2.

The nearby rural settlement of Putorino is the centre of the farming community and marks the halfway point between Wairoa to the north and Napier to the south.

The surrounding area is shown in further detail on maps in Figures 3 and 4.

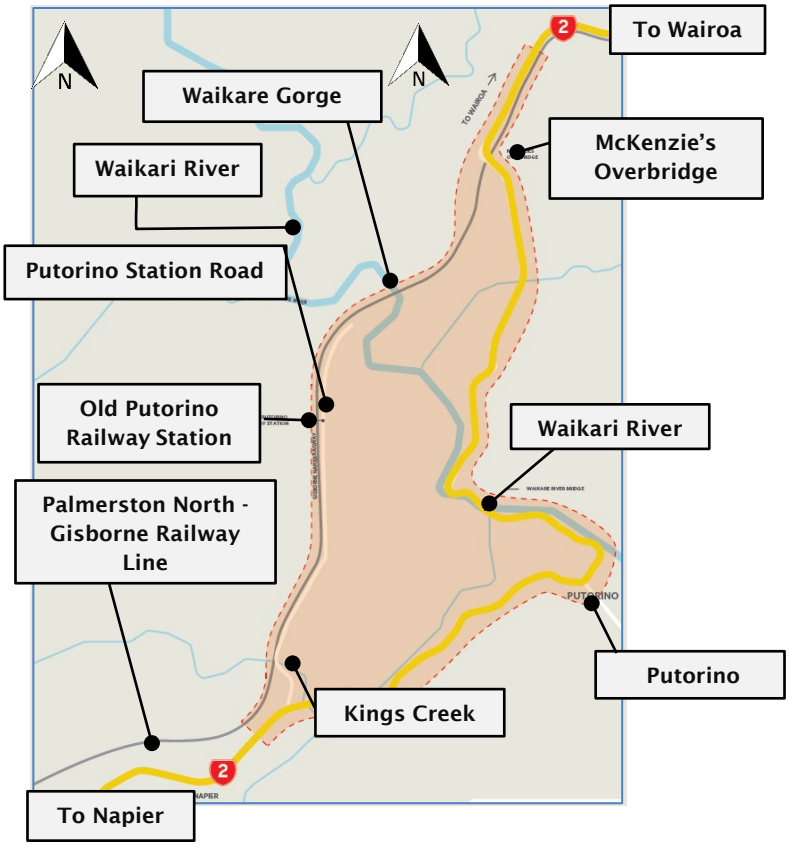

Figure 3: Surrounding area of the realignment site

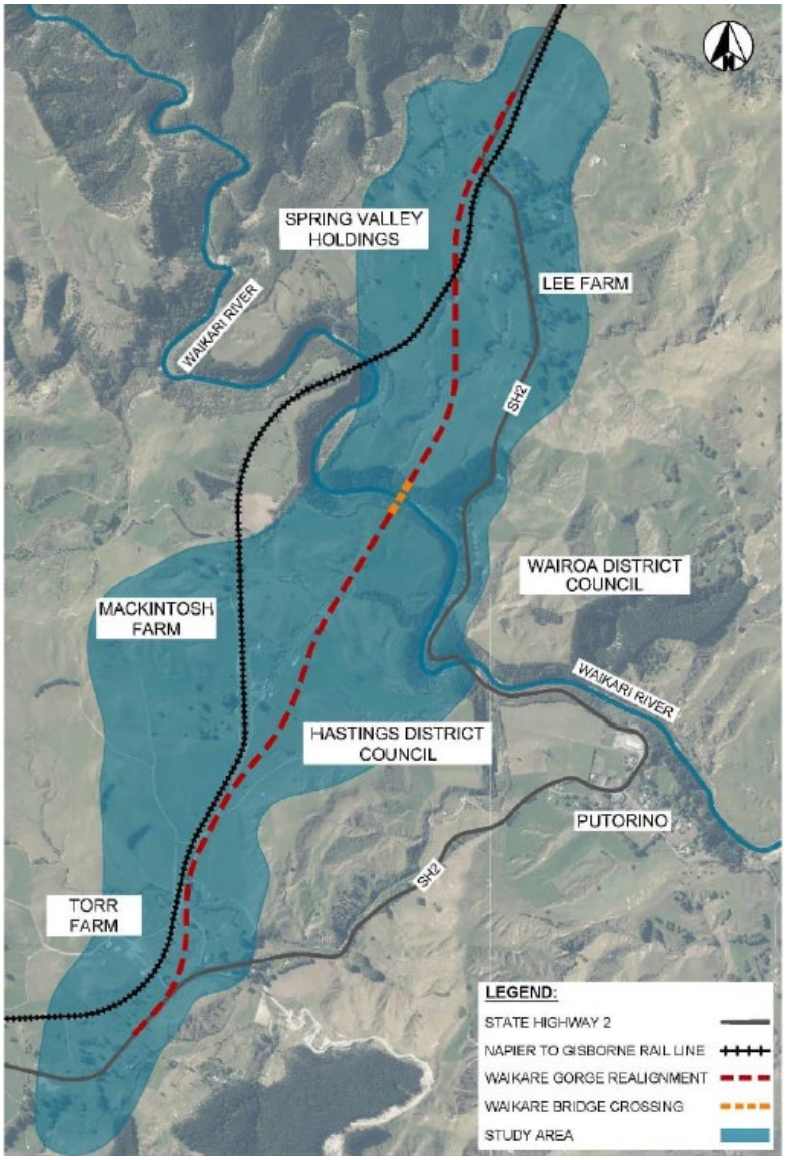

Figure 4: Wider site showing key landmarks (Source: Landscape and Visual Assessment, 2022)

The Palmerston North to Gisborne Rail Line (PNGL) is located to the west of the existing SH2 alignment and crosses the Waikare Gorge and Waikari River[7] before running alongside SH2, as it passes over the railway line at the northern extent at McKenzie's Rail Overbridge.

At Putorino Station Road, travelling in a northerly direction, the current state highway diverts away from this point and meanders in an easterly direction through Putorino township before winding its way in a north-westerly direction, traversing Waikari River and then crossing the PNGL to continue northwards towards Wairoa.

The Waikari River forms the boundary between HDC and WDC.

[7] For clarification purposes, the name of the gorge is "Waikare", and the name of the river is "Waikari".

4.2 Visual description

The following images provide an overview of the Project area described from a southern to northern direction (photos taken prior to Cyclone Gabrielle).

Figure 5: Site at southern end of the realignment

Figure 5 shows images of the existing dwelling at the southern end of the tie-in of the realignment, located south of the existing SH2 – Putorino Station Road intersection.

Figure 6: Southern starting point of realignment

Figure 6 shows a view looking north along Putorino Station Road and the farm access track leading towards Kings Creek. The railway line lies to the west of this image (not shown). A set of Transpower power lines partially traverses this area.

Figure 7: Existing fenced area on the Torr site

Figure 8: Indicative area for the realignment across the Torr site

Figure 7 shows an existing fenced area of an unnamed watercourse, and Figure 8 shows the relative flat pastureland, and the indicative area for the realignment traversing this farmland property (known as the Torr site).

4.3 Rivers and streams

The major feature within the realignment area is the Waikare Gorge. Lying to the west of the realignment is the Maungaharuru Range, part of the eastern basement range of the North Island. From the site location of the realignment, the coastline lies some 8km to the east where the Waikari River flows into Hawke Bay.

The meandering Waikari River has eroded the underlying Mangaheia Group over millions of years, cutting into and forming the Waikare Gorge. The river flows in an eastly direction through the Waikare Gorge, commencing its 35km long journey from its sources within the Maungaharuru Ranges to the river mouth with Hawke Bay. A number of tributaries, gullies and stream incisions define the surrounding hill slopes.

The Project is located entirely within the Waikari River catchment with the two largest watercourses being the Waikari River and Kings Creek. The Project includes seven crossings of existing watercourses, shown indicatively in Figure 9. Two crossings would be by bridges. The other five stream crossings are by culverts of between 40 metres and 120 metres in length.

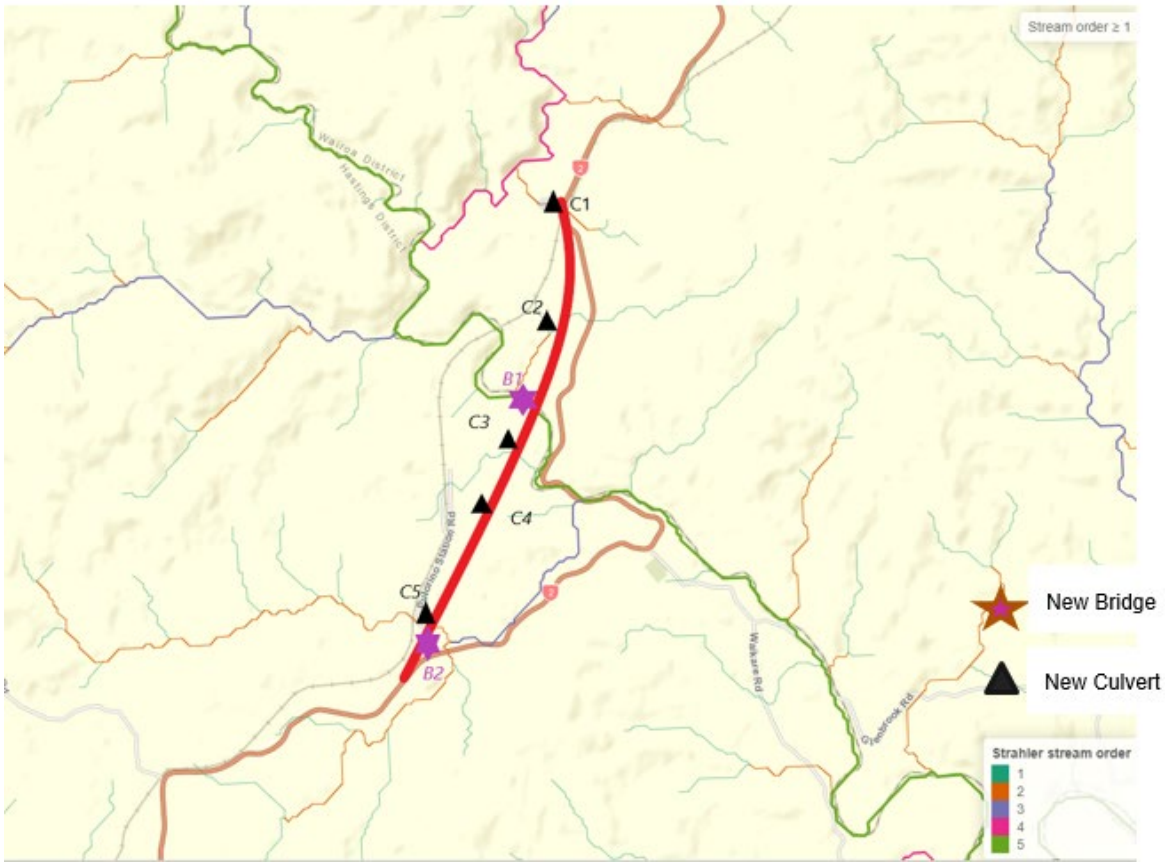

Figure 9: River crossings

The following images provide a visual description of the two largest watercourses in the Project area.

Waikari River and Kings Creek

Figure 10: Kings Creek and gully to the right of Putorino Station Road

Figure 11: Realignment running midway through this site

Figure 10 shows Kings Creek and the overgrown nature of this gully. This area is located approximately 300m along Putorino Station Road. Figure 11 is looking north across the northern farmland towards the Waikare Gorge.

Figure 12: Remnant native and exotic vegetation along realignment

Figure 13: Looking north towards Waikare Gorge

Figure 12 shows remnant native and exotic vegetation within the gully located on south of the Waikare Gorge. Figure 13 is looking north towards Waikare Gorge and Waikari River. The site is relatively moderate to flat rolling pastureland.

Waikari River and Waikare Gorge

Figure 14: Looking northwards towards Waikare Gorge

Figure 14 is looking north towards Waikare Gorge across relatively flat agricultural farmland.

Figure 15: Looking southwards across pastureland

Figure 15 is looking in a southern direction towards Waikare Gorge. The surrounding area is slightly undulating agricultural farmland. (Note that the Transpower line and tower to the right of Figure 15 is outside of the proposed realignment).

There are also several existing cross-drainage culverts within the KiwiRail corridor adjacent to the proposed realignment.

The main waterbody of Kings Creek is located on the Torr Farm near the southern end of the realignment. As shown in Figure 16 and Figure 17, the stream is deeply incised, fenced from stock and partly shaded with existing native and exotic vegetation. The substrate of the stream is rock and bedrock. The watercourse is already piped for a distance of approximately 50 metres beneath existing roads and the railway line.

Figure 16: Kings Creek showing deeply incised area

Figure 17: Kings Creek stream channel

Refer to the Ecological Assessment Report (Appendix B in Volume 2) for more details on the rivers and stream, and the aquatic ecology of the area.

4.4 Terrestrial Ecology

The site is located within the Waihua Ecological District which is part of the Wairoa Ecological Region and is located entirely within the Waikari River catchment. The ecological district includes the lowlands of the Hastings and Wairoa Districts from Pakuratahi Stream in the south, near Whakaari, to Waitaniwha Bay east of the Mahia Peninsula in the north.

The Waihua Ecological District is typified by dry coastal hill country and river terraces draining to the coast. The climate is temperate with very warm dry summers, moderate winter temperatures, and rainfall of 1,000 to 1,500mm per annum. The area has been modified by human activity, creating large areas of pasture and exotic forest, with scattered native shrubland.

The site is almost exclusively pasture, with open pasture and stream side habitat provided by native and exotic shrubs, are located along streams and the railway line.

Small pockets of manuka and/or kanuka shrubland are confined to the banks of the Waikari River. Notable native bird species in this ecological district includes spotless crake (*Porzana tabuensis tabuensis*), Australasian shoveler (*Anas rhynchotis*), New Zealand scaup (*Aythya novaeseelandiae*), grey teal (*Anas gracilis*), fernbird (*Bowdleria punctata vealeae*), and dabchick (*Poliocephalus rufopectus*. These are species predominantly associated with open water and wetlands. In a general sense the avifauna habitat within and surrounding the Project area is suitable for common native and introduced birds.

Refer to the Ecological Assessment Report (Appendix B) for more details on the terrestrial ecology of the area.

4.5 Archaeology and Heritage

The Waikari River was most likely an important travel route prior to European arrival, which is evidenced by the presence of numerous recorded archaeological sites in close proximity to the river between the Project site and the river mouth. The Waikare Gorge is likely to have presented opportunities for defendable sites, such as pa and food storage. This area presents a favourable environment for kumara horticulture, and it is possible that there was gardening activity in the area of the proposed road realignment.

The closest recorded sites are in the hills about 3km to the east of the Project area (see Figure 18). They include Pukepiripiri (W19/302), a large pa complex comprising several large raised-rim pits with drains, numerous other pits and terraces. The three other sites in this area are all pits, or groups of pits (W19/299, W19/300, W19/301). The presence of these site types indicate that the wider area and landscape was probably utilised for kumara horticulture.

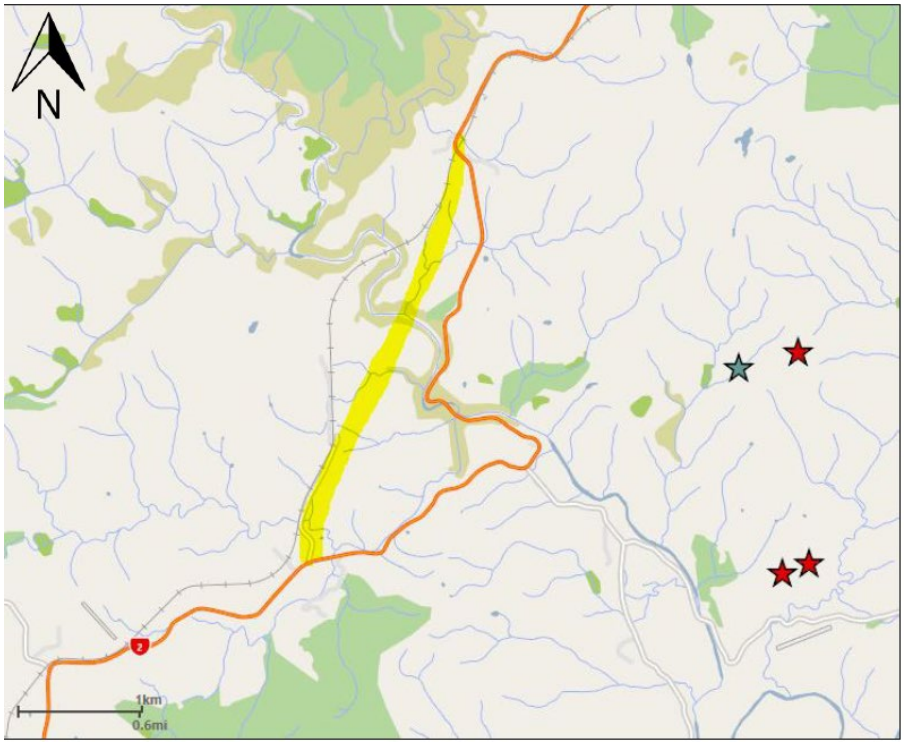

Figure 18: Archaeological site records (stars) near the proposed alignment (highlighted in yellow).

(Source: ArchSite Database)

The Archaeological Screening Report (refer to Appendix D) found that the wider Waikari River environs is one of both archaeological and cultural significance however, the majority of archaeological features are often not visible on the surface and will only be found during excavation.

4.6 Contaminated land

A preliminary site investigation (PSI) was undertaken to assess the extent of contamination potentially present along the wider SH2 Waikare Gorge corridor. The PSI identified two HAIL[8] sites (identified in Figure 19 below) next to the proposed realignment which could be considered potentially contaminated by virtue of having been, at one time or another, sites where activities appearing on the HAIL have taken place.

The Contaminated Land Preliminary Site Investigation is attached as Appendix E.

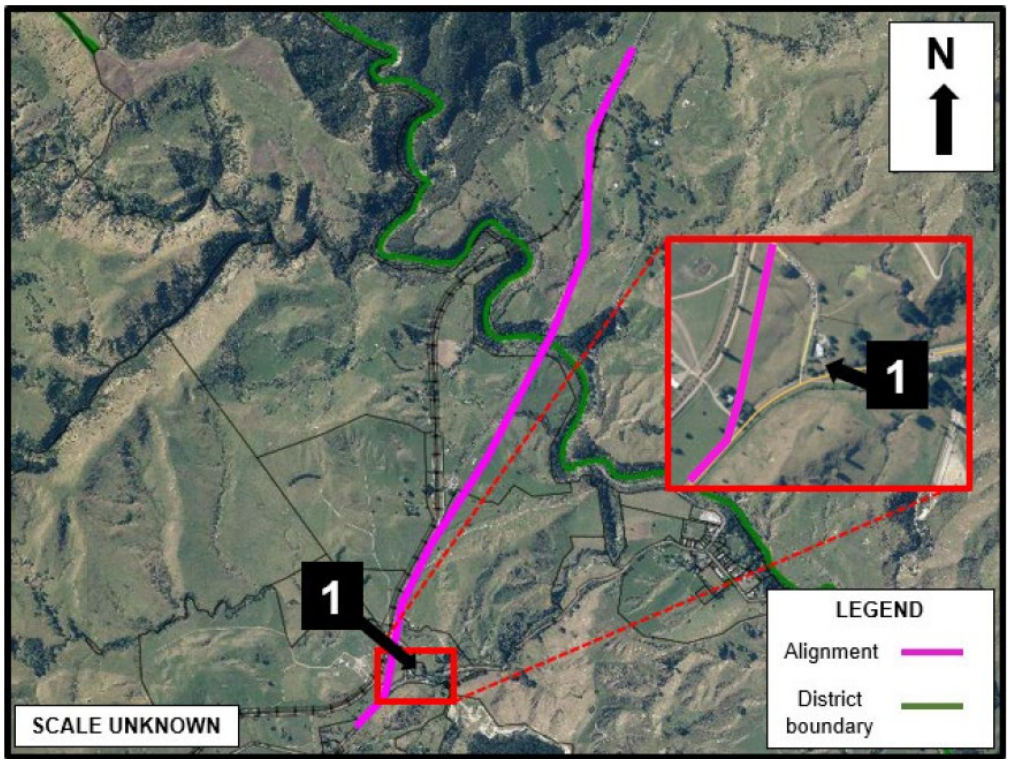

Figure 19: Location of HAIL Activities

The PSI finds that a potential risk exists that soil and groundwater has been contaminated in these areas. Based on the available information assessed during this PSI, it is unclear if the migration of potential contamination from this property has been sufficient to present a risk to human health or the environment in the proposed work areas of the realignment.

Following further consideration of the low level and small contaminated site/'hot spot' a consent under the NESCS is not considered necessary and has not been applied for. However, a Contaminated Land Management Plan (CLMP) has been prepared covering the assumed surficial roading works around 4 Putorino Station Road (where historical HAIL activities were identified during the PSI). This information will be used to support the Outline Plan of Works prior to the construction works commencing. The CLMP is contained within Appendix E.

[8] Ministry for the Environment's Hazardous Activities and Industries List.

4.7 Landscape and Cultural Environment

Landscape

The landscape within the Project area is characterised by low lying, rolling to steep hill country. The steeply incised landform further to the east and west contrast with the relatively flat terrain of the Project area. A small number of farm dwellings, milking sheds, shearers dwellings and other ancillary buildings are dispersed throughout. The only exception is the small farming settlement of Putorino which currently has a resident population of approximately 100 people and operates as a local service centre for the surrounding rural communities.

Key services located within the township of Putorino include the Putorino School (a co-educational state primary school), the Fire and Emergency NZ station and the Waikare Districts Sports Centre. The Sports Centre also serves as a meeting point for the rescue helicopter.

Waikare Road passes through the township providing access to the Waikari River Mouth Campsite, a Department of Conservation facility located approximately 13km south-east. The Waikare Hotel (a public house built in 1902) located on SH2 has recently ceased public trading. It was formerly used as a stop for inter-city bus services and has a recently installed electric vehicle charging station within its car park.

As mentioned previously in this report, the Waikari River and Waikare Gorge form the primary natural feature within the extent of the Project and wider landscape.

European settlement in the area began in early 1860s and was originally located at the mouth of the Waikari River, as this was a stopping point for Māori canoes, whalers, coastal traders and other travellers. However, by 1900 the inland road (the pre-curser to SH2) was formed bypassing the settlement on Waikari River mouth, upon on which the new township of Putorino developed.

The railway, located to the west of the existing SH2 alignment, extending from Putorino Station Road to the existing McKenzie's Rail Overbridge is another notable feature in the landscape.

Cultural

Maungaharuru-Tangitū and Ngāti Pāhauwera associate particular cultural, spiritual, historical, and traditional associations with the rohe and the Waikari River and its associated tributaries. A Statutory Acknowledgement exists with Maungaharuru Tangitū hapū and Ngāti Pāhauwera under Ngāti Pāhauwera Treaty Claim Settlement Act 2012 and Maungaharuru-Tangitū Hapū Claims Settlement Act 2014 respectively.

Both Maungaharuru-Tangitū and Ngāti Pāhauwera are preparing Cultural Impact Assessment (CIA) reports. It is envisaged that these will describe their specific cultural values and aspirations for the area of interest, identify how the Project may affect those cultural values, aspirations and sites, and will make recommendations to Waka Kotahi on how to manage and mitigate potential cultural effects in relation to this Project.

A Landscape and Visual Assessment was undertaken and is provided in Appendix G.

4.8 Transport Environment

Road network

SH2 is currently classified as a 'National Route' and 'Regional Arterial' in both the Hastings District Plan and Wairoa District Plan, with the section between Gisborne and Napier identified within Waka Kotahi One Network Road Classification (ONRC) framework as a 'Regional Arterial' route.

The route is also identified as a lifeline connection for communities within the Hastings, Wairoa and Gisborne Districts, providing access to essential supplies and emergency services in the event of natural disasters (such as earthquakes or flooding).

The posted speed limit along the route section ranges from 100 km/h on rural sections to 70 km/h through Putorino township.

Traffic volumes on SH2 on the journey between Gisborne and Napier range significantly between rural and urban sections. Generally, the corridor carries approximately 2,000 vehicles per day (vpd). Based on the average daily traffic (ADT) data sourced from Waka Kotahi Traffic Management System (TMS) for the Tangoio telemetry site (TMS 24)[9], the section of SH2 through the Waikare Gorge has an ADT volume of approximately 2,665 vehicles per day (vpd)[10]. Approximately 13% of the daily traffic volume is classed as heavy commercial vehicles (HCVs). An analysis of traffic volumes over the previous five-year period (2017 to 2021) indicates that the route has experienced a traffic growth rate of approximately 2.4% per annum.

While traffic volumes on SH2 are typically lower than expected for a regional route, its classification reflects the importance of regional connectivity and associated economic and social importance of the route.

Lying within the district of Hastings, Putorino Station Road intersects SH2 and is classified in the Hastings District Plan as a 'Low Volume' road. The no-exit road provide access to several rural residential properties.

Waikare Road is classified in the Hastings District Plan as an 'Access' Road. Waikare Road passes through Putorino township and provides access to Putorino School and the Waikare River Mouth Campsite, located approximately 13km south-east of the township.

Palmerston North – Gisborne Line (PNGL)

PNGL is a secondary main line railway in the North Island. It branches from the North Island Main Trunk at Palmerston North and runs east through the Manawatū Gorge to Woodville, where it meets the Wairarapa Line, and then proceeds to Hastings and Napier in Hawke's Bay before following the coast north to Gisborne (the Gisborne to Napier Section or Line).

In 2012, the line was closed following several large washouts north of Wairoa resulting in significant damage to rail infrastructure. Given the high costs for repairing the line and the rising maintenance costs from aging infrastructure, KiwiRail announced the line would be closed indefinitely. In 2019 the line between Wairoa to Napier was reopened with funding from the Provincial Growth Fund (PGF). The route caters for the transport of logs from the surrounding forest areas in Wairoa to Napier Port. At present, the line is only operational at weekends and most freight in the region is expected to continue being transported on road.

Within the Project area, the existing SH2 route crosses the railway line (via an overpass) at the McKenzie's Rail Overbridge. The railway line crosses several farm tracks in the area around the existing SH2/Putorino Station Road intersection at grade.

Walking and Cycling

There are currently no pedestrian facilities (footpaths or crossings) provided along the section of SH2 that the proposed realignment bypasses. This is typically due to the current rural road speed environment and a focus on through traffic/mobility function for the state highway. The rolling topography and heavy vehicle volumes, combined with a speed environment of 80-90 km/h, makes for an unsafe cycling environment.

Details are outlined in the Transport Impact Assessment attached as Appendix F.

[9] Telemetry site 24 is located on SH2, approximately 36 km south of the Project site.
[10] Based on data collected between 1 January 2021 and 31 December 2021.

4.9 Utilities

Transpower's Redclyffe -Tuai A (RDF-TUI A) 110Kv transmission line is located to the west of the realignment and crosses the existing PNGL north and south of the Waikare Gorge.

The remaining utilities within the vicinity of the realignment are low voltage powerlines servicing rural properties along with fibre and copper communication cables within the existing state highway corridor.

4.10 Description of land subject to the NOR

The sites and areas that are the subject of the NORs are shown on the Designation Plan WGR-PLA-GEN-00-DRG Sheet Nos 0001-0005. The land was previously described above in Sections 4.1 to 4.9.

The requirement applies to 17 parcels of land of approximately 66.68 hectares (36.33 hectares located within HDC and 30.35 hectares located within WDC), as summarised in Table 1.

Table 1: Land required for the new designation

ID on plan	Record of Title	Legal description	Ownership	Approx area (ha)	Council
10	HBW2/409	Lot 1 DP 26609	Stephen Alexander Greer, Stephen Hugh Orr Reaney, Christopher Morris Torr, Dianne Elleanor Torr	9.2365	HDC
11	HBP4/388	Lot 1 DP 23291	David Stuart Wallace	0.6415	HDC
12	HBV4/130	Lot 1 DP 25330	Benjamin Mackintosh, Kristin Daniele Rachel Mackintosh	12.9375	HDC
13	HBP2/890	Section 41 SO 6201	Stephen Alexander Greer, Stephen Hugh Orr Reaney, Christopher Morris Torr, Dianne Elleanor Torr	0.6673	HDC
14		Part Awaototara B Block	Her Majesty the Queen	2.5125	HDC
15	HBF4/1448	Part Lot 1 DP 13713	Spring Valley Holdings Limited	5.523	WDC
16	HBV4/132	Lot 3 DP 25330	Stephen Alexander Greer, Stephen Hugh Orr Reaney, Christopher Morris Torr, Dianne Elleanor Torr	1.4897	HDC

ID on plan	Record of Title	Legal description	Ownership	Approx area (ha)	Council
17	HBP2/890 HBA1/1250	Part Sections 34 SO 2516	Stephen Alexander Greer, Stephen Hugh Orr Reaney, Christopher Morris Torr, Dianne Elleanor Torr Her Majesty the Queen Deed of easement under Section 60 Land Act 1948	4.1412	HDC
18	HBG3/1433	Part Lot 1 DP 13541	Richard Lee Land Holdings Limited	17.975	WDC
19			Railway	3.2028	WDC/HDC
20			Railway	0.8448	WDC
21			Road	0.4934	HDC
22			Road	2.8531	HDC
23			Road	2.5713	WDC
24			Road	1.1212	HDC
25			Road	0.08	HDC
26			Hydro	0.5639	WDC/HDC

5. ALTERNATIVES

When considering a requirement, the Councils must have particular regard to whether adequate consideration has been given to alternative sites, routes, or methods of undertaking the work if:

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

b) *it is likely the work will have a significant adverse effect on the environment.* (s171(1)(b) RMA)

Waka Kotahi does not currently own or have an interest in all of the land subject to the NORs. An assessment of alternatives was undertaken prior to confirmation of the Project alignment. The alternatives and process followed is outlined in the following section.

5.1 Route options

Waka Kotahi commenced with the Connecting Tairāwhiti Programme Business Case (2018) during the early stages of developing options with key stakeholders. The business case is described in Section 3.1

As mentioned, three problem statements were developed which are resilience, access and safety.

The PBC was followed by the SSBC that investigated the wider corridor (refer to Section 3 of this AEE for more details on the business cases). This included options to enhance the existing SH2 alignment through Waikare Gorge and new realignment options within the wider area.

Options and alternatives considered through the SSBC process included:

- Improvement works on the existing SH2 corridor referred to as "Full Online Improvements"
- A full upgrade of the existing SH2 corridor
- Eight new realignment options across the Waikare Gorge, including three identified through historical investigations and five new realignment options identified by the project team.

The "Full Online Improvements" option was discarded early in the long-list assessment process as it was identified as having relatively high construction costs and minimal investment benefits, especially as SH2 through Waikare Gorge would remain at risk of severance following natural hazard events. The lack of viable alternative local routes to support detours also meant the option would result in unacceptable delays or route closure for motorists during construction.

The new realignment options were therefore assessed. Figure 20 shows the extent of the options considered and Table 2 provides a summary of these options.

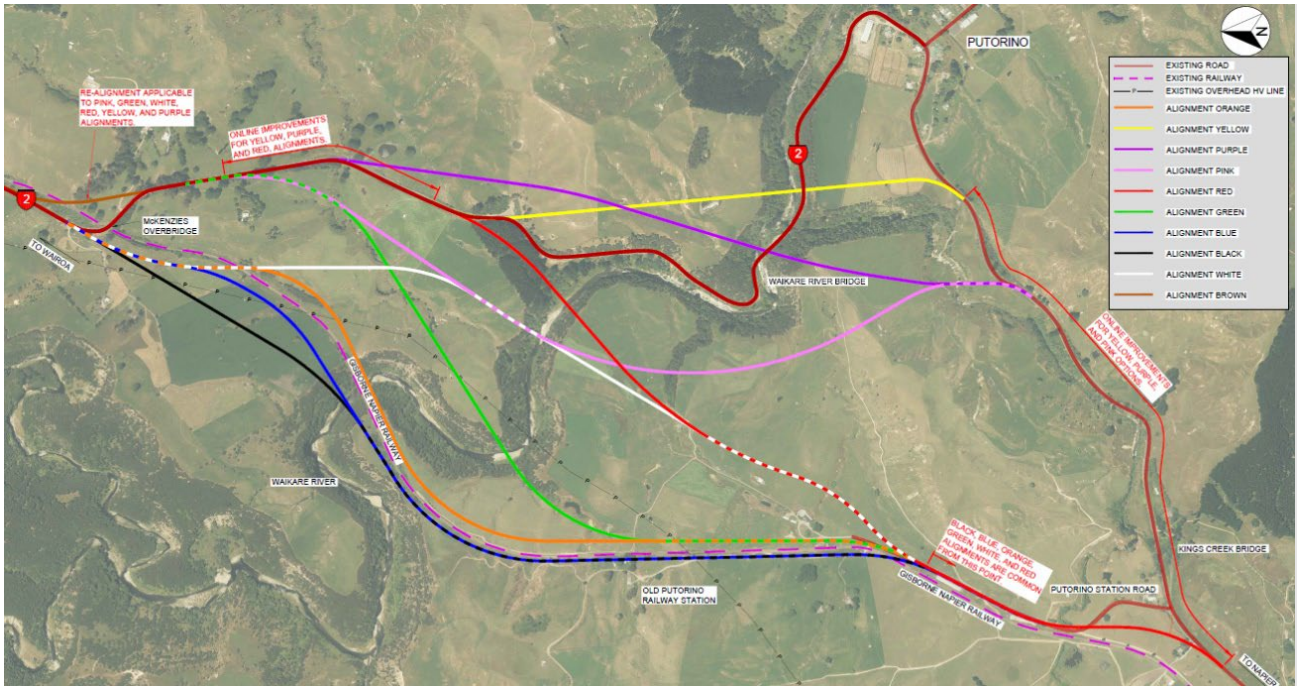

Figure 20: Extent of the options and alternatives considered

Table 2: Route options

Option	Length
Red Option:	approx. 2.8km long; SH2 bypassed length 4.5km
Blue/Black Option	approx. 4.0km long, SH2 bypassed length 5.6km
Green Option	approx. 3.8km long; SH2 bypassed length 5.4km
Orange Option	approx. 4.0km long; SH2 bypassed length 5.6km
White Option	approx. 3.8km long; SH2 bypassed length 5.6km
Pink Option	approx. 2.9km long; SH2 bypassed length 4.1km
Purple Option	approx. 2.3km long; SH2 bypassed length 3.6km
Yellow Option	approx. 1.6km long; SH2 bypassed length 2.7km
Brown Extension	short realignment viable for multiple options at northern extent

A Multi-Criteria Assessment (MCA) was undertaken of the long list of options. The MCA outcome was that the following three options were progressed for further analysis:

- **Online Improvements Option** – improvements to the existing alignment based on numerous low costs, low risk type road and infrastructural interventions along with speed limit reviews and rock netting protection within Waikare Gorge.
- "**White" Realignment Option** – diverges from SH2 south of Putorino Station Road and briefly follows the Palmerston North - Gisborne rail corridor before passing through farmland to cross the Waikare Gorge and rail corridor, before reconnecting to SH2 immediately north of the McKenzie's Rail Overbridge.
- **"Orange" Realignment Option** – diverges from SH2 south of Putorino Station Road and follows the eastern side of the rail corridor and crosses the Waikare Gorge adjacent to rail bridge, before crossing the rail corridor and reconnecting to SH2 immediately north of the McKenzie's Rail Overbridge.

Preliminary investigations covering geotechnical and resilience risks, topographical survey, bridge engineering and geometric design were undertaken on the "Orange" and "White" Options.

The short-listed options were reassessed through a further MCA in mid-2020. The MCA included an assessment criterium that considers RMA Section 6 matters in the weighting system. These are matters of national importance and include:

a) 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:
b) the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development:
c) the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:
d) the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers:
e) the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga:
f) the protection of historic heritage from inappropriate subdivision, use, and development:
g) the protection of protected customary rights:
h) the management of significant risks from natural hazards.

The MCA concluded that the "White" Option be put forward as the recommended option, as it best met the investment objectives and PGF Outcomes of the Project.

The 'White Option', being the preferred option, is the Project which is now described and assessed in this AEE, the NORs, consent applications, technical assessment reports and supporting information.

5.2 Bridge design options

Waikare Gorge Bridge

Alternative designs for the proposed bridge across the Waikare Gorge were also considered.

A number of bridge design options for the Orange and White Alignments referred to above were assessed:

Orange Alignment with bridge options
- Network arch bridge
- Two span composite bridge
- Two span balanced cantilever bridge
- Three span balanced cantilever bridge
- Cable stayed bridge

White Alignment with bridge options
The White Alignment has a shorter Waikare Gorge crossing than the Orange Alignment and this is expected to result in a lower cost bridge.
- Network arch bridge
- Three span balanced cantilever bridge
- Cable stayed bridge
- Three span bridge propped from the Waikare Gorge banks

The Network Arch option selected, with its more visible above deck features and gateway/threshold characteristics, will be a landmark type opportunity. The design of the bridge is described in further detail in Section 6.

Structures – overpasses, underpasses and minor bridges
Options for the other structures (excluding the Waikare Gorge Bridge) have also been assessed. These structures include the overpass (rail), underpasses (stock) and minor bridges (Kings Creek). The main considerations used to develop the structure options are based on the Project's site location, topographical, hydrological and geotechnical information, the relatively simple forms proposed for the short span structures, resilience, durability, whole-of-life costs, urban design considerations and current construction practice in New Zealand. Consideration of design options will continue at the detailed design phase, within the parameters of the final designation and consent conditions.

During an MCA process for the bridge, it was concluded that the no piers option will be developed as preferable for cultural, ecological and visual reasons. During this process the 'Network Arch' design was preferred over the three-span 'Propped' design (used at nearby Matahoura Gorge further to the south). Images showing the two options are shown in Figure 21.

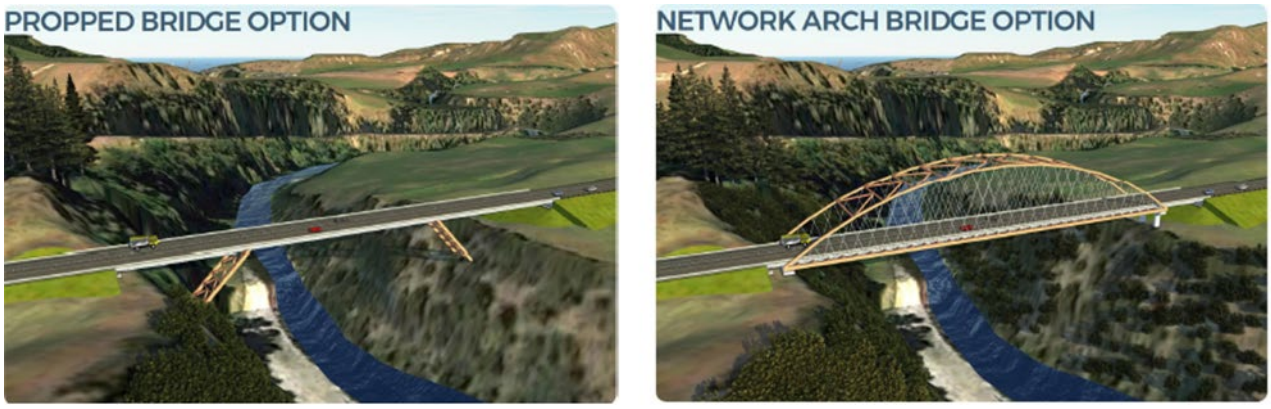

Figure 21: Bridge design options

6. DESCRIPTION OF THE PROJECT

6.1 Overview

The information provided in this section is indicative and is intended to provide sufficient detail to assess the actual and potential effects on the environment and to identify measures to avoid, remedy, or mitigate any adverse effects, where appropriate. The preliminary design drawings are set out in Volume 3 of the Application. They include the following:

- General Arrangement Plans - WGR-PLA-GEM-00-DRG Sheet Nos 0001-0010 (Rev F) show the preliminary design.
- Stormwater Drawings - Culverts, swales and stormwater treatment facilities – WGR-DES-DNG-00-DRG Sheet Nos 0001 - 0031 (Rev D).
- Structure Drawings - Bridges and underpasses (excluding Waikare Gorge Bridge) - Structures WGR-PLA-STR-00-DRG Sheet Nos 00046-00060.

The Designation Plans – WGR-PLA-GEN-00-DRG Sheet Nos 0003 – 0005 (Rev A) are included as Attachment C of the NORs. Those plans set out the land required for the Project based on the design proposals in the General Arrangement Plans, along with the land required for temporary construction activities.

The design will be refined through subsequent phases of the Project and the details may change. Changes to the design will be undertaken within the scope of the final designation and consent conditions. All works required for the Project will be undertaken within the new designations. The detailed design of the Project will be reflected in the Outline Plan of Works and any other documentation, such as Management Plans, required to be submitted to the Council prior to construction.

Bulk earthworks and associated land disturbance and vegetation clearance, installation of scour protection structures and instream erosion controls, along with erosion and sediment control will be required. Stormwater treatment facilities typically consisting of forebay area, attenuation pond and constructed wetland, along with landscape planting areas and maintenance access will be incorporated into the Project.

Elements of the design which support resilience to natural hazards and climate change include realignment away from known rockfall and slip hazards, location and design of structures at watercourses, and design of the stormwater management system to mitigate risks of increased frequency and intensity of rainfall events. Resilience is a core element of the Project and work will be done in subsequent Project phases to also consider opportunities for carbon reduction, in line with Waka Kotahi policy and processes.

The Project is outlined below.

Southern Section: South of Putorino Station Road to Waikare Gorge
The SH2 realignment will deviate from the existing SH2 and continue northwards with two sweeping curves. The realignment, including a proposed southbound passing lane, will traverse rolling farmland on a gentle uphill grade before converging again alongside the rail corridor. The realignment will roughly follow the current Putorino Station Road, parallel to the rail corridor, before it deviates as it heads towards Waikare Gorge. The new Waikare Gorge Bridge will be located approximately 560m east of the existing rail bridge.

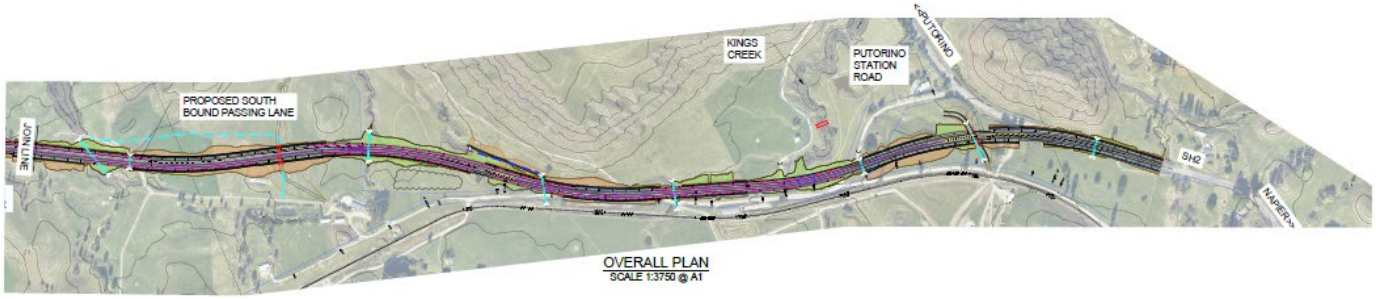

Figure 21: Extract from the General Arrangement Plans showing the southern section of the proposed realignment

Northern Section: Waikare Gorge to north of the McKenzie's Rail Overbridge

The realignment will then enter a large cutting on the approach to the northern side of the Waikare Gorge. A new bridge is proposed to traverse the Waikare Gorge ("Waikare Gorge Bridge"). A slow vehicle bay is proposed in the northbound/uphill direction. The realignment tie-in to existing SH2 will commence just north of the existing McKenzie's Rail Overbridge

Figure 22: Extract from the General Arrangement Plans showing the northern section of the proposed realignment

The Project comprises the following key features and activities:

- A 3.8km, two lane greenfields alignment;
- Passing lane and slow vehicle bay;
- Tie-ins to the existing SH2 and local roads;
- A new safe stopping place;
- Wire rope median barrier and side and edge barriers;
- Waikare Gorge Bridge;
- A new railway overpass bridge;
- Kings Creek road bridge and stock bridge;
- Stock underpasses;
- Culvert extensions and new culverts with associated headwalls and rock rip rap aprons;
- Installation of stormwater treatment facilities including forebay, wetland and pond installations;
- Earthworks – cut and fill;
- Installation of retaining walls;
- Planting and landscaping;
- Land disturbance and vegetation clearance;
- Stream bed disturbance and temporary stream diversion (including dewatering), during construction; and
- Temporary installation of erosion and sediment control devices, during construction.

These components are described in greater detail below.

As noted above, all details and information below are based on the preliminary design and will be subject to confirmation of the NORs and grant of the regional resource consents to inform the final design of the Project.

6.2 Road Corridor

The Project is a 3.8km, two lane greenfields alignment. The proposed works include a typical road cross section consisting of a minimum 1.2 -1.5m sealed shoulders, 3.5m traffic lanes and provision for a physical wire median barrier within a minimum 2 - 3m wide central median. The intention is to include an approximately 520m long northbound uphill slow vehicle bay commencing just after the northern abutment of the proposed Waikare Gorge Bridge. There will also be an approximately 550m southbound passing lane.

Figure 24 shows a typical cross section of the road along a section of fill, where batter slopes and swale drains are present. Refer to the General Arrangement Plans in Volume 3 for more details.

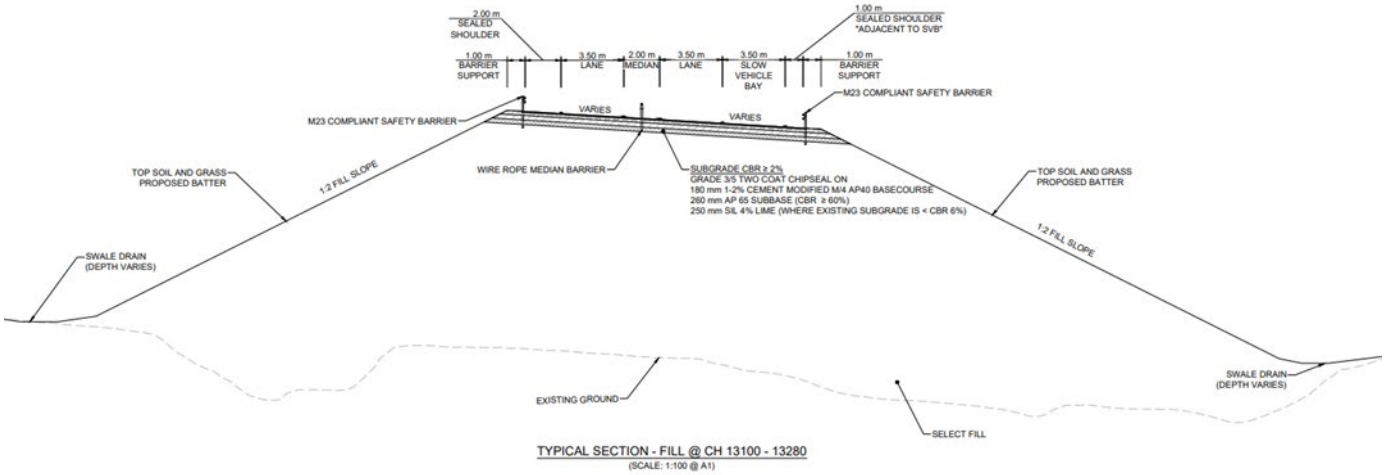

Figure 23: Typical cross section of proposed fill, batter and slope

As part of the Project, there will be a need to realign local roads to provide connections. A new access at the location where the new highway route deviates from the existing SH2 alignment in the northern section, will be constructed to retain access to the property located at 5517 SH2, Putorino (chainage 12300). The existing SH2/Putorino Station Road intersection will be closed (chainage 15620), and Putorino Station Road will be reformed to maintain the existing access to private property.

Retaining walls are proposed at bridge structures - the McKenzie's Rail Overbridge, Waikare Gorge Bridge, Kings Creek Bridge and at the stock underpasses. The locations of these retaining walls are shown indicatively on the General Arrangement Plans. Further details will be developed during the detailed design stage.

6.3 Waikare Gorge Bridge

The main bridge structure along the realignment is the new Waikare Gorge Bridge. This is an approximate 160m long bridge about 70m above the Waikari River. It could be one of New Zealand's highest road bridges once built.

Known as a Network Arch bridge solution, it has a single main span of approximately 130m and is made from a steel and reinforced concrete deck slab suspended from steel arch chords using narrow hangers. The carriageway passes through the arches. There are short 20m approach spans at each end which are made of conventional precast concrete beams. The main span is piled close to the edge of the Waikare Gorge to minimise the span length.

The following image provides an artist impression of the proposed Network Arch Bridge.

Figure 24: Artist impression of the Waikare Gorge Network Arch Bridge

An indicative elevation of the Waikare Gorge Bridge is shown in Figure 26.

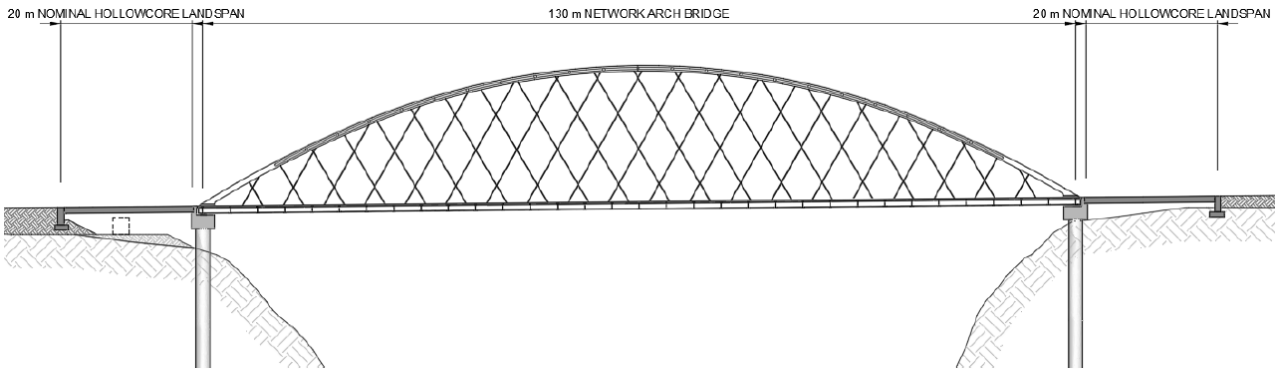

Figure 25: Elevation of proposed Waikare Gorge Bridge

The elevation of the bridge shows two piers, one at each end of the gorge - no piers are planned within the riverbed. The bridge structure selection has responded in particular to a desire to avoid piles in the river, and to avoid disturbance to the sides of the gorge.

A shallow deck and minimal vertical support that avoids piers within the riverbed maintains views beneath the bridge deck up and down the river. The intention is to incorporate landscape planting at the bridge approaches and integrated art on the concrete balustrades of the bridge and approaches. The combination of native planting and bridge art reinforces the rich history and culture of the Waikare Gorge and its place in the Putorino locality. This concept will be refined during the detailed design.

The new bridge will become a significant feature of the Waikare Gorge, the state highway, and the overall Project.

Further information on the visual aspects of the bridge is outlined in the Urban Landscape Design Framework (ULDF) (Appendix H).

6.4 Bridges, overpasses and underpasses

The Project also includes the construction of a railway overpass bridge, a road bridge and stock bridge at Kings Creek, and four stock underpasses. The location of the railway overpass, bridge and stock underpass structures are listed in Table 3. Details of the structures are set out in drawings - Structures WGR-PLA-STR-00-DRG Sheet Nos 00046-00060 in Volume 3 and are referenced in the following table.

Table 3: Details of Railway Overpass Bridge, Bridge and Stock Underpasses

Chainage	Structure Name	Requirements	Reference (Sheet No in drawings)
CH12750	Railway Overpass Bridge	Crosses the PNGL	00059 - 00060
CH15550	Kings Creek Road Bridge	Crosses the Kings Creek at the southern end of the realignment	00057 - 00058
CH15550	Kings Creek Stock Bridge	Facilitates access for landowners across the Kings Creek	00055 - 00056
CH12840	Stock underpass	Facilitates private access to farmland	00047 - 00054
CH13275	Stock underpass		
CH14540	Stock underpass		
CH15820	Stock underpass		

Where the PNGL crosses the new highway route, a grade separated crossing (near the McKenzie's overbridge) is included as part of the project's scope of works.

All structures have been hydrologically assessed against cross-drainage catchments and catchments for the roading design. Sizing of conveyance, treatment elements and overflow systems were designed to meet the water quality storm, 10-year ARI amenity, 20-year ARI erosion standards and 100-year ARI flood protection performance standards. The assessment and designs also considered climate change and resilience.

The design working life of all structures will be 100 years. The design aspects for all structures were developed in accordance with these best practice manuals and guides:

- NZ Bridge Manual (SP/M/022), May 2013.
- Bridging the Gap, NZ Waka Kotahi urban design guidelines, incorporating Appendix 5 – Urban Design Considerations in Bridge Design Matrix, October 2013.
- Bridge Aesthetic design guidance set out by Roads and Maritime Services, February 2019.

6.5 Stormwater treatment facilities

Approximately 75,000m^2 of pasture and farmland will become impermeable road surface. Road runoff is proposed to be captured in swales, providing primary treatment, and conveyed to grassed or planted treatment swales and constructed wetlands forming a stormwater treatment train approach. Over 90% of the new road surface can be treated to some extent before being discharged to the receiving environment, with 35% of runoff being treated by both swale and wetland.

A total of 54 catchments, road or corridor catchments where treatment of runoff is required, have been determined along the realignment. The stormwater design proposes six stormwater treatment facilities (STF's), which incorporate a forebay area, attenuation basin and constructed wetland, along with area for landscape planting and maintenance access. Further details on planting are discussed in Section 6.8 and Figure 27.

By adopting a treatment train approach, with vegetated fill batter slopes, swales and stormwater treatment, the STF's are designed to treat a wide range of contaminant types and improve the treated water quality of stormwater discharges typically generated from the pavement and surrounding environs.

Cross-drainage culverts will be used to divert existing watercourses and overland flow paths under the proposed road, with fish passage incorporated to maintain and enhance existing habitats upstream from those installed culverts. Details on the stormwater management layout, devices and typical wetland drainage are set out in the drawings - Stormwater Drainage Preliminary Plans WGR-DES-DNG-00-DRG Sheet Nos 0001-00031 (Rev D) in Volume 3.

Refer to more details in the Stormwater Preliminary Design Report in Appendix C.

6.6 Culverts and fish passage construction

The construction of structures – bridges and culverts over Kings Creek and other unnamed watercourses, will require works in the margins, banks and within the bed of Kings Creek and smaller watercourses along the realignment. No works are necessary within the bed of the Waikari River.

Culvert extensions and the installation inlet and outlet wingwalls and rock rip rap will be carried out in line with the findings within the Stormwater Preliminary Design Report (Appendix C) and the Ecological Assessment Report (Appendix B).

6.7 Earthworks and vegetation clearance

Vegetation clearance and land disturbance required to undertake the realignment works, will result in an estimated 400,000m^3 of earthworks associated with cut to fill, cut to waste and imported fill (if any) taking place throughout the Project. Table 4 sets out the estimated volumes as follows:

Table 4: Estimated Volumes of Cuts to Fill and Waste and Imported Fill

Type	Estimated Volume (m^3)
Cut to fill. This includes topsoil removed, stockpiled on site and respread at the completion of construction works	280,000
Cut to waste	120,000
Imported fill	None at this stage

These volumes are derived from the design model for the Project and are approximate/conservative volumes. They will be further refined during the final detailed design stage of the Project.

While there are numerous locations of cut and fill along the proposed realignment as shown on the General Arrangement Plans, the general location of significant cuts and fill features are summarised in Table 5 as follows:

Table 5: Significant Features of Cuts and Fills

Chainage	Feature (cut or fill) height
13940 (south of Waikare Gorge)	9.5 m (cut)
13985 (south of Waikare Gorge)	7.5 m (cut)
14170 (south of Waikare Gorge)	5 m (cut)
14225 (south of Waikare Gorge)	10 m (fill)
13440 (north of Waikare Gorge)	10.5 m (cut)
13218 (north of Waikare Gorge)	14.5 m (fill)

It is proposed to re-use surplus cut material on site for revegetation and planting purposes. Geotechnical testing concluded that topsoil is in relatively good condition, and therefore the likelihood of having to import fill is low. This has further project benefits as it reduces the need to transport this material away from the project site and reduces the need to import good quality topsoil for re-planting purposes.

Earthworks including construction and temporary works activity will be undertaken within the proposed designation and accessed from defined access construction routes.

6.8 Planting

The proposed planting treatment of the route will be informed by the vegetation characteristics and patterns of the surrounding landscape. Planting of all the construction earthworks would become expensive to install and maintain. Consequently, the proposals in the ULDF focus on providing high quality revegetation outcomes in key strategic locations where landscape planting will reduce visual effects and provide environmental benefits and cost-effectiveness. The remainder of the disturbed areas along the route will be grassed to maintain existing rural pastoral character.

The key strategic locations include planting at:

- Stormwater ponds which involve grassed conveyance swales, vegetated treatment swales, wetlands, kerb and channel and culverts. This revegetation will include planting at each culvert, where appropriate, where works are being undertaken (Figure 27).
- Earthworks – batter slopes and cuttings
- Watercourses and wetlands as part of mitigation and offset plantings.

A stream restoration area has been identified on a tributary of Waikari River, as shown in the Ecology Maps in the Ecological Assessment Report (Appendix B). The stream restoration has a lineal stream length of approximately 700m and an area of approximately 1,492 m2, the restoration of which is sufficient to offset the effects of the Project. This watercourse is located to the west of the proposed road, connecting existing remnant kanuka vegetation and occasional areas of wetland with the established vegetation on Waikari Gorge.

Figure 26 is an extract from the stormwater design showing typical planting around stormwater ponds (refer to WGR-DES-DNG-00-DRG Sheet No 0015).

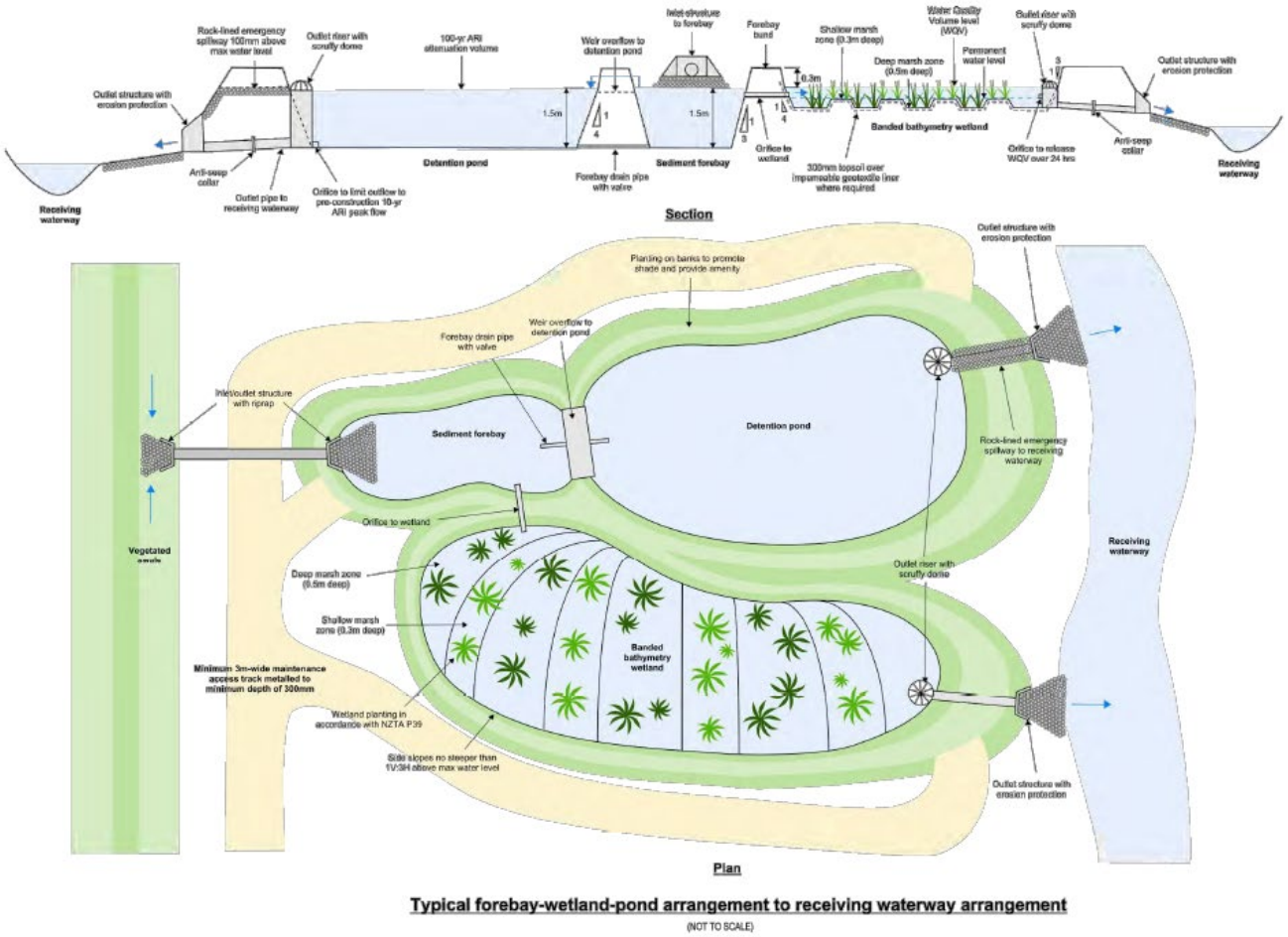

Figure 26: Typical stormwater pond with plantings

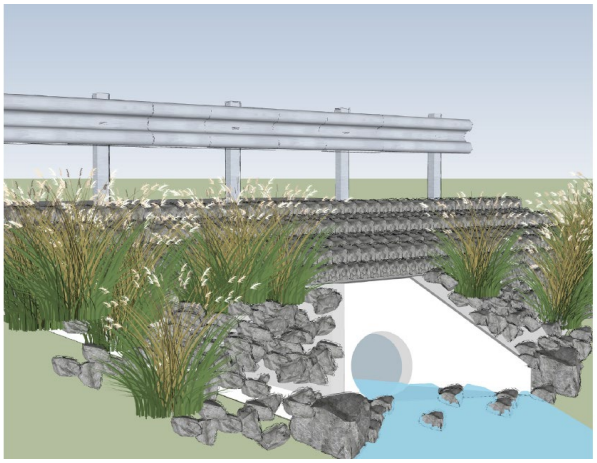

Figure 27: Typical planting at culvert outlets

Vegetation lost during the construction phase will be regrassed and/or replanted and landscaped in line with the details and methods set out in a Landscape Management Plan (LMP). Details of the landscaping and planting will be finalised during the detailed design stage.

The LMP would take into account matters in the Ecology Management Plan (EMP) and Stormwater Management Plan (SMP) respectively to incorporate native riparian species planting to promote ecological habitat for aquatic and terrestrial species, and the provision of stormwater treatment including bank stability and sediment filtration.

The LMP will also be submitted at the time of lodging an Outline Plan of Works to the territorial authorities.

6.9 Construction methodology

The information provided in this section is indicative and is intended to provide sufficient detail to assess the potential effects of construction on the environment and to identify measures to avoid, remedy or mitigate any adverse effects, where appropriate.

The Project construction footprint is approximately 31.27 hectares based on the preliminary design. The Project is greenfields, so as an 'offline' project, construction activities can proceed generally with less disruption and less need for traffic management for the movement of day-to-day traffic.

In very broad terms, the construction sequence and methodology involve the following:

- site possession and establishment, including construction laydown areas, office and associated buildings
- property fence setbacks
- vegetation clearance and service relocations
- installation of erosion and sediment control measures
- construction of haul roads and cross culverts
- earthworks
- bridge construction, including piling
- drainage infrastructure
- pavement and surfacing, road tie-ins
- road safety installations and line marking
- landscaping works.

Two indicative locations for site yards have been considered (one at the northern end and one at the southern end of the realignment). The repositioning of fences to property boundaries and any required service relocations will be early-stage activities, along with the installation of erosion and sediment control measures during construction. Fencing of property boundaries will reflect discussions with property owners and land acquisition negotiations.

Given the scale and nature of the Project, and based on the preliminary design to date, typical plant and heavy machinery will be excavators, dump trucks and water carts, cranes, jackhammers, compactors and rollers, and generators.

Temporary access roads will be constructed within the designation boundary to enable plant and equipment to access work sites and move around the site.

Construction and environmental management plan

The overall construction methodology will be finalised by the contractor and reflected in a Construction and Environmental Management Plan (CEMP). The CEMP will set out the management procedures and construction methods to be undertaken to avoid, remedy or mitigate adverse effects associated with construction works.

Bridge construction

The design and construction methodology for the Waikare Gorge Bridge will be confirmed during the detailed design phase and once a contractor is appointed. In very simple terms, the construction is likely to be undertaken from the road level (due to the challenging topography), commencing with the installation of abutment foundations. Crawler cranes will be used at each abutment to lift segments of the bridge into place, and to connect midspan. Helicopters may be used where necessary to transport and install elements of the bridge frame and cables.

In stream works

Works will include the construction of new culverts and the extension of existing culverts, which will require some in stream works. As part of the works, headwalls will be constructed and to avoid downstream bank and bed erosion, the placement of rip rap in the stream bed will be required in places.

The installation of culverts and fish passage will require construction provisions for working in the bed of stream and the temporary diversion of streams. Culvert installation and/or extension works will generally be undertaken during the summer months when there is a little or no flow in the stream. However, should temporary diversions of the watercourse be required, a diversion will be created taking into consideration the recommended erosion and sediment control measures as well as any fish passage requirements during construction.
This will involve the following brief steps during construction:

- Identify a clear weather forecast over the critical parts of the construction timeframe.
- Mobilise equipment and labour to site.
- Install site-specific erosion and sediment control measures such as silt fencing, bunding and catchment diversions.

Erosion and Sediment Control
An Erosion and Sediment Control Plan (ESCP) will be developed and submitted to HBRC for certification prior to the start of works.

The main purpose of the ESCP is to minimise exposed earthworks to rainfall by minimising open areas at any one time through staging of works, speedily reinstating exposed surfaces with either planting or stable hardfill materials and targeting high risk areas with ESCP strategies. Batter slopes will be hydroseeded and replanted in parts to reduce runoff during rainfall events. Planning for specific operations during the works period would include short range weather forecasting and coordination of works to close exposed land in the shortest timeframes.

The implementation of the ESCP will mitigate the potential effects of sediment discharges from construction works. The ESCP will set out a monitoring, inspection and reporting regime involving:

- Informal daily inspections to ensure that approved controls are installed correctly and that they are operating efficiently.
- Recording of any maintenance issues and verification of maintenance undertaken, and
- Weekly inspections to verify outcomes of daily inspections and maintenance requirements. The weekly inspections will also provide an opportunity to fine tune any existing controls to improve the efficiency of these controls.

Timing and duration
The Project does not yet have funding for construction and there is no confirmed construction start date. A construction start date of late 2023 was assumed at the time the technical assessment reports were prepared to support this AEE. The actual timing for construction will depend on national and regional priorities for the transport network and funding availability.

Securing the designation and resource consents will enable Waka Kotahi to progress the Project once funding is available.

The construction duration is likely to be around 2.5 – 3 years. This proposed construction timeframe will be subject to, amongst other things, availability of material, plant and contractors.

The final construction methodology will be influenced by:

- Final designation and consent conditions
- Final detailed design
- Construction duration and target completion date
- Type of delivery contract; and
- Technological advances and innovation in construction methods.

Once a contractor is appointed, Waka Kotahi and the contractor will confirm the final construction methodology. This will be undertaken within the scope of the final designation and consent conditions.

Should a contractor wish to undertake construction activities beyond the scope of the proposed designation, or the consents granted, the need for any additional authorisations would be assessed at that time.

6.10 Existing State Highway

The completed Project, as a new state highway alignment, will become the new SH2 and will replace the existing SH2. Following the completion and opening of the Project, it is likely the existing section of SH2 (then bypassed by the Project) will function as a local road providing access for communities to various local amenities and uses for the community of Putorino, including as access to the new state highway. At the time of preparing this AEE, it was assumed that a local crossing of the Waikari River would also form part of that local access. This would provide an alternative strategic route for resilience, and act as a potential cycleway, as part of the 'Heartland' experience for cyclists.

The process associated with changing the form and function of the existing state highway is subject to separate procedures and discussions with HDC, WDC, landowners and other stakeholders. This will include consideration of changes as a result of Cyclone Gabrielle in February 2023. The revocation process will be carried out in accordance with the relevant provisions of the Land Transport Management Act 2003 (LTMA), Public Works Act 1981 (PWA) and Government Roading Powers Act 1989 (GRPA).

7. STATUTORY CONTEXT AND RMA APPROVALS REQUIRED

The following sets out the key matters that are relevant to the Project under the RMA, including the approvals required and a commentary on the relevant statutory considerations. An assessment of the Project against the provisions of relevant planning documents, and against all relevant statutory considerations, is included in Appendix J.

As mentioned previously, the location of the Project lies within three local authority jurisdictions:
- Hawke's Bay Regional Council (HBRC)
- Wairoa District Council (WDC)
- Hastings District Council (HDC)

The relevant Hawke's Bay plan and rules, identifies the status of the activities associated with the Waikare Gorge realignment, including the reasons for the regional resource consent applications.

7.1 Resource Consents

Regional Authority – Hawke's Bay Regional Council
The activities associated with the Waikare Gorge realignment are located entirely within the Hawke's Bay Region and come under the jurisdiction of HBRC.

Under the RMA, the management of the discharge of water and contaminants to water, land and air within the Hawke's Bay Region lie with the HBRC. HBRC also controls land uses, such as land disturbance, the clearance of vegetation, the erection of structures in, on, under or over the beds of rivers and the disturbance of riverbeds.

The RMA status of the activities associated with the Project is determined by the Regional Resource Management Plan (RRMP) made operative in August 2006. Proposed Plan Change PC9 to the RRMP – Tūtaekurī, Ahuriri, Ngaruroro and Karamū Catchments (TANK) (Decision version dated 9 September 2022) is also applicable.

This is discussed below.

The general environmental issues in the RRMP, TANK and NES-F in relation to this Project and adverse effects are provided in Tables 6 and 7 respectively. They set out the following activities, regional rules and the activity status under the RRMP and NES-F.

Table 6: Activity, Regional Rule and Status under the RRMP

ACTIVITY	RELEVANT REGIONAL RULE	ACTIVITY STATUS
Vegetation clearance and soil disturbance associated with earthworks to construct the proposed state highway and Waikare Gorge bridge, stormwater discharge structures and stormwater treatment facilities where: - Vegetation clearance is within 5 metres of a permanently flowing river, or any other river with a bed width in excess of 2 metres.	Rule 8	Restricted Discretionary

ACTIVITY	RELEVANT REGIONAL RULE	ACTIVITY STATUS
Discharge of contaminants to land, including clean fill, and earth, that will not enter water, associated with the construction, operation and maintenance of the Project, including all structures (i.e., bridges, culverts and underpasses) where: - Discharges are within 20 m of a surface water body (Waikari River, Kings Creek and various unnamed watercourses).	Rule 52	Discretionary
Discharges to land that may enter water associated with vegetation clearance and soil disturbance associated with earthworks and construction of stormwater treatment facilities where: - Surface ponding will occur in the area of discharge - Dewatering activities as required	Rule 52	Discretionary
Use of the Waikare Gorge Bridge, Kings Creek Bridge and all structures traversing unnamed watercourses, following construction.	Rule 63	Permitted
Maintenance of all structures, construction, including associated disturbance, discharges of sediment and diversions.	Rule 64	Permitted
Construction of all structures over the bed of a river and the construction of all stormwater treatment facilities, stormwater outfall structures where the catchment size is greater than 150 hectares, or the structure occupies an area exceeding 10m^2.	Rule 69	Discretionary

Table 7: National Environmental Standards Freshwater Management Regulations (NES-F)

ACTIVITY	RELEVANT RULES	ACTIVITY STATUS
Vegetation clearance in, or within a 10m setback from wetlands, for the purpose of constructing a wetland utility structure.	NES-F Reg 42 (1)	Restricted discretionary
Earthworks or land disturbance within, or within a 10 m setback from, a natural wetland for the purpose of constructing a wetland utility structure.	NES-F Reg 42 (2)	Restricted discretionary

ACTIVITY	RELEVANT RULES	ACTIVITY STATUS
The taking, use, damming, diversion, or discharge of water within, or within a 100 m setback from, a natural wetland is a restricted discretionary activity if it— (a) is for the purpose of constructing a wetland utility structure; and (b) complies with the conditions.	NES-F Reg 42 (3)	Restricted discretionary

7.2 Activities not requiring resource consent

The Fourth Schedule, Clause 3(a) requires that where a permitted activity forms part of a proposal, the AEE must include a description of the permitted activity and how it complies with the permitted activity requirements and conditions.

The following permitted activities apply to this proposal:

Table 8: Permitted activities

ACTIVITY	RELEVANT REGIONAL RULE	ACTIVITY STATUS
Use of the Waikare Gorge Bridge, Kings Creek Bridge and all structures traversing unnamed watercourses, following construction.	Rule 63	Permitted
Maintenance of all structures, construction, including associated disturbance, discharges of sediment and diversions.	Rule 64	Permitted

Under Rule 63 of the RRMP, the use of structures over the bed of the watercourse is a permitted activity.

In addition, under Rule 64 of the RRMP, the maintenance of any established structures, including associated disturbance of the bed of the watercourse, discharge of sediment and diversion of water is a permitted activity. Maintenance functions is an ongoing operational role of the Waka Kotahi. It is managed by the Waka Kotahi and delivered on the state highway network by its contractors. The contractors are obliged to follow the conditions, standards and terms of Rule 64 as per their operating instructions and work practices.

7.3 Designations

Local Authorities - Hastings District Council and Wairoa District Council

The land use activities associated with the Project come under the jurisdictions of two local territorial authorities – HDC and WDC. Within HDC, the Hastings District Plan became operative on 12 March 2020, with the exception of Section 16.1 and Appendix 50 – Wāhi Taonga District Wide Activity. Within WDC, the Wairoa District Plan became operative on 25 June 2005.

The scope of the proposed designation and the land requirements are set out earlier in Sections 2.2 and 4.10 of this AEE.

8. ASSESSMENT OF EFFECTS ON THE ENVIRONMENT

8.1 Overview

This section provides an assessment of the effects on the environment (AEE) of the Project. The AEE has been provided in such detail as corresponds with the scale and significance of the effects that the activity may have on the environment.

In summary, the actual and potential effects of this Project are:

- Positive effects
- Effects on aquatic ecology and water quality
- Effects of stormwater including flood risk and hydrology
- Effects of earthworks
- Effects on vegetation and terrestrial ecology
- Effects on landscape and visual, including natural character
- Effects on cultural values, heritage and archaeology
- Transport effects
- Noise and vibration effects
- Effects on contaminated land
- Effects on utilities
- Effects on air quality
- Effects on highly productive land

The optioneering phases of the Project considered, amongst other things, the potential social, cultural and environmental effects of the different options. The complete avoidance of adverse effects is not practicable for a project of this scale and with the need to meet accepted design criteria for a state highway. Measures have either been incorporated in the preliminary design (e.g. proposed design of Waikare Gorge Bridge), or will be undertaken in subsequent phases to avoid, remedy and mitigate adverse effects.

With the implementation of these measures, overall the positive effects of the Project will be significant, while the adverse effects will be minimised and acceptable, given the nature of the Project.

8.2 Positive effects

There are multi-faceted positive effects from the Project once the construction works are completed and the realignment is operational.

The completed Project will have a number of positive effects. These are:

- Provision of additional lane capacity, including slow vehicle bays and passing lanes for regional traffic;
- Reduced likelihood of head-on crashes by providing median wire rope barriers;
- Reduced journey times for traffic travelling through Waikare Gorge;
- The new bridge over the Waikari River will increase the resilience of the route and provide a safe alternative to the existing SH2;
- Reliability, in terms of reduced road closures resulting from traffic incidents, flooding, rock falls and landslips;
- Shorter alignment for through traffic on SH2; and
- More resilience – e.g., designing bridges, culverts and underpasses to respond to increased frequency and intensity of rainfall.

Details of the transport safety benefits are outline in Section 8.9.

The most significant positive effects of the Project therefore relate to resilience of SH2 through the Waikare Gorge, improvement of access to and from the regions of Hawke's Bay and Gisborne, travel time predictability and reliability and improvement of road safety to users.

Overall, the proposed design of the Project is well aligned with the Road to Zero transport safety objectives adopted by Waka Kotahi and the New Zealand Government. It will provide a much safer transport corridor, which will reduce the potential number of deaths and serious injuries (DSIs).

8.3 Effects on aquatic ecology and water quality

The potential aquatic ecology and water quality effects of the Project include loss of stream habitat and riparian vegetation, sediment caused by construction, and loss of wetlands. These are discussed below. Further information and detail is included within the Ecological Assessment Report, included as Appendix B.

Streams

New culverts, culvert extensions, installation of new wingwalls, rip rap and fish passage enhancements (culverts that are extended will have appropriate fish passage provided) will all involve construction within stream beds. If not, appropriately managed construction activities could potentially impact, permanently or during construction, stream water quality and ecology as a result of:

- Mobilisation of fine sediment associated with stream diversions, streambank/bed disturbance and generation of a plume of sediment laden water extending downstream of the works site.
- Increased rates of fine sediment deposition in downstream habitats.
- Increased water pH (alkalinity) due to discharge of concrete waste or cement slurry.
- Water column toxicity via hydrocarbon pollution in the event of fuel spillage into the channel.
- Interruption of seasonal fish migrations.
- Loss of stream habitat due to culvert extensions and new culverts, and associated inlet and outlet works.
- Removal of riparian vegetation at culvert inlet and outlets.

Stormwater treatment aims to remove suspended solids, hydrocarbons and dissolved metals from road runoff before it discharges to the Waikari River, Kings Creek and other unnamed watercourses. With the inclusion of STF's over 90% of stormwater run-off will be treated before discharging to the receiving environment.

Loss of riparian vegetation can reduce the quality of instream habitat for macroinvertebrates and fish due to increased bank erosion, increased nutrient and sediment inputs to the stream, loss of shading and temperature regulation, increase likelihood of nuisance periphyton production, loss of cover for fish, loss of habitat for spawning fish, and loss of woody debris inputs to the watercourse. Some vegetation removal is likely to be required at each culvert extension; however riparian planting will be undertaken to mitigate this effect.

Barriers to fish passage and loss of stream habitat where watercourses intercept the road realignment by culvert is assessed as having a moderate level of adverse effect.

During construction works, there is the potential for adverse effects from clearance of vegetation, sediment runoff, and spillage of concrete slurry or diesel fuel.

The effects on water quality during construction will be mitigated by site-specific erosion and sediment control measures, including options such as general erosion and sediment control

measures including stormwater diversions and silt fencing implemented in accordance with the ESCP.

The risk of discharging debris, cement slurry or fuel spillage into the stream is managed by culvert construction methodologies, primarily by ensuring that construction activities occur in the dry.

Good culvert design can effectively mitigate adverse effects on fish passage. These designs will form part of the overall final design.

Although there will still be some reduction in water quality during construction, this will be temporary and will be managed with the implementation of the ESCP. The ESCP will work in tandem with the Construction and Environmental Management Plan (CEMP). With mitigation measures such as the ESCP, effects of the Project on water quality will be reduced as far as practical and have a minor effect on the environment.

The length of stream affected by the project is estimated at 339m. Stream restoration will entail fencing and planting an area extending at least 15m on either side of the stream, and the removal of existing artificial barriers to fish passage. A minimum riparian vegetation width of 15m on either side of the stream would achieve most of the identified aquatic benefits, such as shade, food supply, and habitat. So as to mitigate the loss of stream, a potential stream restoration area has been identified on a tributary of Waikari River, as shown in the Ecology Maps of the Ecological Assessment Report. The stream restoration has a lineal stream length of approximately 700m and an area of approximately 1,492 m^2.

With the mitigation measures outlined above, the overall level of effect on instream ecology is considered minor.

Wetlands

For the purposes of this project, seven wetlands are potentially directly impacted by drainage or discharges from the Project. All seven wetlands are considered to be induced wetlands under the NPS-FW. Five comprise of small areas of damp pasture that have been created through changes in drainage, pugging and/or grazing by stock. Two sites have formed as a result of culvert installation which has created damp ground and wetland plants to grow upstream.

The project will result in the loss of approximately 1,600 m^2 of natural wetland area, Options to avoid impacts to wetlands were considered during the project business case phase, and in early design. These existing wetlands are all modified through pastoral land use and grazing, with little to no native vegetation cover and limited biodiversity value. A total estimate of 2,200m^2 of new wetland area will be created, in the form of constructed wetlands for stormwater treatment. This area is based on planted wetlands only, excluding forebay area and other infrastructure. These constructed wetlands will be planted, and not accessible to stock, so a gain in wetland function and habitat will be achieved. The estimated new wetland area exceeds the area of existing wetland that may be lost. It also presents additionality over the minimum required treatment of grass-lined swales and attenuation ponds.

While it is not possible to entirely avoid impacts on all wetlands, there is the potential to further minimise drainage and infilling of wetlands during the detailed design and during the construction phases (through construction methodologies) of the Project.

8.4 Effects of increased stormwater

The stormwater effects of the Project include the increase in runoff into watercourses and the potential for increased sediment discharges during construction. These are discussed below. Further information and detail is included within the Stormwater Preliminary Design Report, included as Appendix C.

Overall, the runoff volumes directed to watercourses will increase post-construction. In addition to this, the conveyance of runoff to STFs means that flow which in pre-construction conditions entered the watercourse over a dispersed area will be concentrated to the STF outlets, which also provide for the peak flow attenuation. The attenuation ponds will be sized to minimise the impacts of changes to catchments and runoff volumes. The STF outlets will also be throttled to further control flow directed to the watercourses. These measures will reduce post-development flows being directed to watercourses back down to pre-development flows.

The minor effects, amongst other things, will be addressed through various sized attenuation ponds to minimise the impacts of changes to catchments and runoff volumes. Through careful design, run-off flows to watercourses will be at pre-development flows. The design of the STFs will be addressed through the detailed design, however preliminary design features outlining the stormwater management principles are described in the Stormwater Preliminary Design Report.

The final design of STFs will be co-ordinated with other management plans, including the ESCP and the CEMP. A Stormwater Management Plan (SMP) will be prepared to set out the design elements to avoid, remedy or mitigate adverse stormwater discharge effects. Additional matters addressed in the Ecological Assessment Report and linked into the preparation of the Ecological Management Plan (EMP) will provide additional integrated mitigation measure for managing stormwater discharges.

Stormwater will be managed by stormwater treatment system as described in the Stormwater Preliminary Design Report in Appendix C.

Overall, the environmental effects from catchment run-off and the increase in stormwater run-off is considered to be no more than minor.

8.5 Effects of earthworks

The earthworks effects of the Project include a potential for increased sediment discharges. This is discussed below. Further information and detail, including erosion and sediment control measures are described in the Stormwater Preliminary Design Report (Appendix C).

During construction there is potential for exposed areas and disturbed soils to transport sediment into the Waikari River, Kings Creek and other watercourses. An estimated 400,000m^3 of earthworks are associated with the construction of cuttings and batter slopes for the Project. Deposited sediment occurs naturally in the beds of rivers however, the Project and earthwork activities (if not appropriately managed) can accelerate the delivery of sediment to streams with an increased proportion of finer sediment. This can have adverse effects on stream health, by smothering habitats used by benthic invertebrates and fish, altering food resources and by removing sites used for egg laying.

The effects of earthworks on aquatic ecology are outlined in further detail in the Ecological Assessment Report (Appendix B).

To minimise sediment discharges, an ESCP will be prepared and implemented. The purpose of the ESCP will be to minimise the adverse effects of land disturbance activities on stream habitats and instream biota by minimising the amount of land disturbance, and staging construction as set out in the CEMP. It is envisaged that site earthworks are undertaken in small areas over time with progressive re-vegetation, diverting clean runoff away from the site by perimeter controls and using detention devices to treat sediment laden runoff.

Although there will still be some reduced water quality during construction, this will be temporary and with the implementation of the ESCP the potential adverse effects will be minimised as far as practical and have no more than a minor effect on the environment.

8.6 Effects on vegetation and terrestrial ecology

The effects of the Project on vegetation and terrestrial ecology include the loss of vegetation and associated habitat. These are discussed below. Further information and detail is included within the Ecological Assessment Report, included as Appendix B.

SH2 runs through highly modified rural and agricultural farmland. Existing natural character and areas of vegetation comes from the watercourses along the alignment namely Waikari River, Kings Creek and the watercourses within the respective Project catchments. In terms of terrestrial ecology, riparian vegetation along the Kings Creek is mixed. While the mixed vegetation has a valued role in shading the stream and providing fish species habitat, it does not have high natural character. Overall, the existing natural character value of the Kings Creek and watercourses surroundings the Project is in the low range.

The vegetation on the banks of Waikare Gorge will not be removed but will be directly impacted by increased shading and a reduction in precipitation immediately beneath the structure. However, due to the design of the bridge and placement of footings outside of the Gorge, all of this vegetation will remain and at least some is likely to survive.

The length of stream affected by the project and calculation of biodiversity offsets are summarised in Table 5-3 of the Ecological Assessment Report (Appendix B). A calculated stream restoration length of 678 m and 1,016 m^2 in area is required to offset the habitat degradation caused by the Project. Stream restoration in this context would entail fencing and planting an area extending at least 15m on either side of the stream, and the removal of existing artificial barriers to fish passage. A minimum riparian vegetation width of 15m on either side of the stream would achieve most of the identified aquatic benefits, such as shade, food supply, and habitat.

In order to mitigate the effects of removing vegetation and habitat, planting elsewhere within the Project will be undertaken. Areas to be planted will be within the designation and are shown on the Ecology Maps in the Ecological Assessment Report (Appendix B).

The Project has an obligation to achieve no net loss in ecological value of terrestrial vegetation. Based on an estimated loss of 0.85 ha of native vegetation and 1.14 ha of mixed native/exotic shrubs and trees, a minimum of 5.0 hectares of revegetation is recommended, incorporating eco-sourced native species, including kanuka. Details of the planting design and maintenance regime (including weed and/or pest control) will be included in the Landscape Management Plan (LMP).

The ULDF proposes approximately 7 ha of native planting (excluding wetland and swales) which would comfortably achieve the environmental mitigation requirements for terrestrial vegetation loss arising from the Project.

The LMP, including planting plans will be prepared prior to construction and included with the Outline Plan of Works submitted to the territorial authorities. The LMP will be aligned and linked to the Ecology Management Plan and the Stormwater Management Plan prepared in accordance with conditions of the resource consents, so that collectively the management plans support integrated management and mitigation of effects of the Project.

Overall, following the removing of vegetation and habitat, and mitigation and offset planting to be addressed in the LMP and the EMP, the effects are no more than minor upon the environment.

8.7 Effects on landscape, visual and natural character

The effects of the Project on landscape, visual and natural character include:

- Visible earthworks associated with the construction of the new corridor;

- Visibility of the new bridge across the Waikare Gorge;
- Visibility of the new road formation and moving vehicles; and
- Effects on the natural character values of the Waikare Gorge.

These are discussed below. Further information and detail is included within the ULDF included as Appendix H.

The proposed realignment will be a noticeable new linear element within the rural landscape through which it passes. The landscape effects will arise from changes to the landform, landcover and land use through cut and fill formations, removal of vegetation, construction of new bridges, and the loss of productive farmland, which will overall have a moderate localised effect.

Visual changes associated with the proposed realignment relate to the placement and construction of highway elements (i.e., road surface, bridge, culverts, signage, and lighting), earthworks, mitigation planting and the associated removal of pasture and trees along the corridor. Overall, there will be a noticeable change in outlook for a small number of viewpoints in proximity to the proposed realignment, in particular where views are near the Waikare Gorge and bridge crossing. For these viewers construction of the proposed realignment will have noticeable adverse effects on their visual outlook and visual amenity of the rural landscape and the effect is considered to be moderate.

The new Waikare Network Arch bridge will become a noticeable feature due to its height that will contrast with the rural, undeveloped landscape and Waikare Gorge backdrop.

Proposed measures to mitigate potential landscape and visual effects are to:

- Retain as much of the existing vegetation as possible;
- Establish or reinforce physical and visual links to adjacent planting areas;
- Return productive land to pasture as possible once construction is complete;
- Screen adjacent affected properties from the new alignment and bridge;
- Utilise exotic and native tree species to reflect the existing planted character of the area;
- Include vegetation clear zones and frangible plant species to provide a high degree of visibility and maximise safety;
- Utilise vegetation to integrate the Waikare Gorge overbridge and approach embankments into the landscape;
- Incorporate mitigation/wetland planting around the stormwater wetlands and along the grassed swales;
- Incorporate planting on batters which are too steep to be regularly and safely mown (Refer to Transport Agency Landscape Guidelines for slope break requirements); and
- Identify and maintain views to key landscape features.

Urban design enhancements to be further refined through the detailed design process, (in addition to the landscape mitigation above) include:

- Incorporation of themed detailing or patterning on the new bridge structure;
- Treatment of the new bridge structure as a ‘landmark’ on the journey, and the threshold/transition between Hastings and Wairoa Districts;
- Opportunities for high amenity natural feature and rural landscape outlook and views for users of the corridor;
- Opportunities to design landscape and ecological mitigation planting to integrate with the surrounding landscape;
- Opportunity for a convenient stopping place and mobile phone opportunity in a strategic location mid-way between the urban areas of Napier and Wairoa; and
- Opportunities to celebrate local natural, built and cultural heritage of the area adjacent to

the alignment.

The detail of these measures will be set out in the LMP prepared prior to construction and submitted with the Outline Plan of Works to the territorial authorities.

With the implementation of these measures, overall effects on the landscape and visual environment will be less than minor.

8.8 Effects on cultural values, cultural heritage and archaeology

The effects of the Project on cultural values, cultural heritage and archaeology include the possibility that archaeological features or materials could be encountered during construction work. These are discussed below. Further information and detail are included within the Archaeological Screening Report, included as Appendix D.

The Archaeological Screening Report concluded that the Waikari River environs are of both archaeological and cultural significance, and that there are recorded sites present within approximately 3km of the Project.

There are no archaeological site records situated on the proposed road realignment. There is currently no observed indication either on the ground or in aerial imagery of any immediate archaeological risks in the affected portions of the four properties visited during the archaeological screening assessment. Whilst the earthworks for the realignment will be significant, on a landscape level it will be localized to 50 – 100m wide swathe across the landscape.

It is noted in the report that this does not preclude the possibility that archaeological features or materials could be encountered during work.

As noted earlier, Ngāti Pāhauwera and Maungaharuru Tangitū are preparing CIAs. Waka Kotahi has worked in partnership with Maungaharuru Tangitū Trust and Ngāti Pāhauwera during the development of the project to date and will continue to do so. This partnership approach reflects the well documented principles of Te Tiriti o Waitangi which involve active protection, good faith consultation and communication, and the spirit of partnership.

Mitigation measures to manage effects on the cultural values, cultural heritage and archaeology of the Project will include further archaeological field survey prior to construction and preparation of a Historic Heritage Management Plan (HHMP), both of which will inform detailed design and construction methods. An archaeological authority will be sought if required (e.g. depending on outcomes of field survey), and an Accidental Discovery Protocol (ADP) will apply to any areas not covered by an authority.

The Waka Kotahi Minimum Standard P45 (Accidental Archaeological Discovery Specification) sets out the standard procedure to follow in the event that an archaeological site, kōiwi/human remains or taonga (Māori artefacts) are accidentally discovered during investigation, construction and/or maintenance of the State Highway network and associated works.

The Accidental Discovery Protocol would be superseded if an Archaeological Authority is required and granted. An Archaeological Authority may be sought from Heritage New Zealand Pouhere Taonga as a risk management strategy upon Waka Kotahi confirmation to proceed with the final design, and prior to any construction commencing. A further archaeological survey will be undertaken to determine if an Archaeological Authority is required.

It is considered that the level of effects will be no more than minor.

8.9 Transport effects

The overall effects of the completed Project on transport are positive given that the main objectives of the Project are to improve safety and resilience. These are discussed below. Further information and detail is included within the Transport Impact Assessment, included as Appendix F.

The transport effects include effects on the corridor and intersection capacity, property access, road safety and public transport operations – walking and cycling. The following key conclusions are drawn from the Transport Impact Assessment:

The positive effects of the Project consist of:

- Significantly reduced likelihood of head-on crashes by providing a median divided highway, separating the two directions of traffic.
- Significantly reduced number of loss-of-control crashes due to the much-improved road geometry (by removing sub-standard and out-of-context curves).
- Improved number of passing opportunities by providing an approximately 520m long northbound slow vehicle bay as well as an approximately 550m southbound passing lane, resulting in a reduction of crashes related to the currently limited passing opportunities (e.g., overtaking at unsafe locations).
- Significantly reduced likelihood and severity of intersection/access crashes by:
  - Limiting the number of accesses to only a few, and
  - Providing auxiliary turning facilities at each access and intersection.
- Reduced risk and likelihood of road closures as a result of the proposed improvements. The increased carriageway width will also allow incidents to be managed more efficiently and reduce the number of responses requiring full or partial closure.

There will be improved transport safety perceptions, especially for communities and settlements whose regular journeys travel via the Waikare Gorge. The new highway section is expected to have a 4-Star KiwiRAP[11] rating with wider sealed shoulders, wide centreline, well designed geometric alignment, and no unprotected roadside hazards.

Corridor and intersection capacity

Overall, the expected ADT on the new highway route is likely to remain at the same level observed on the existing SH2 alignment (i.e., around 2000 vpd), although there is likely to be some increase over time as population increases. Traffic volumes along the section of SH2 that will be bypassed by the realignment and surrounding local road network will remain well below the typical capacity of a two-way rural road.

No adverse capacity and efficiency effects are anticipated on SH2 and the surrounding road corridors with the implementation of the Project. Once completed, the realignment will result in the positive effects outlined above.

[11]KiwiRAP provides a systematic and internationally recognised way of measuring the actual and predicted safety performance of roads. KiwiRAP Risk Ratings provide NZ Police, road planners, engineers and investors with vital benchmarking information to show how well, or how poorly, a particular road performs in comparison to other roads. https://www.kiwirap.org.nz/star_ratings.html

Property access

While the new highway route impacts on local travel, the impact on journey times and property access for local residents living on either side of the new highway will be minimal. A private property access (chainage 12200) is affected, and this access will be reconstructed in its current location. The existing SH2 will connect to the new realignment at chainage 12300 with a new road link. A section of Putorino Station Road will be closed (chainage 14905) and reconstructed to create a new road connection to the new highway and to an existing property at the north-eastern corner of the existing intersection.

The proposed accesses, intersections, and extension of the existing local road connections and farm tracks will ensure that access is retained for the local communities living in Putorino township and surrounds.

On this basis, the effects on property access are considered to be no more than minor.

Road safety

The road safety benefits are discussed under the positive effects. The proposed design of the Project is well aligned with transport safety objectives adopted by Waka Kotahi and the New Zealand Government. It will provide a much safer transport corridor, which will reduce the potential number of crashes resulting in deaths and serious injuries.

Public transport operations

Minimal disruptions to the existing public transport operations are expected. Given that the existing SH2 will be retained as a local road, existing public transport services can continue using the existing route. If no passengers are bound for/departing from Putorino, the bus service can remain travelling on the new highway route, improving passenger journey times.

Walking and cycling

Given that the Project area comprises of a predominantly rural environment, and that the new highway will be a rural high-speed corridor with a focus on through traffic/mobility, walking and cycling facilities have not been incorporated into the design of the Project. However, the improved road realignment and wide shoulders would enable cyclists to use the new safer route.

The traffic and transportation related effects of the Project on the surrounding transport environment are predominantly positive due to the significantly improved road realignment and the provision of passing opportunities. Effects on local access to/from Putorino and adjacent properties as described above will be no more than minor.

Railway line

The PNGL crosses several farm tracks in the area around the existing SH2/Putorino Station Road intersection. Where the PNGL crosses the new highway route, a grade separated crossing (near the McKenzie's overbridge) is proposed.

Given the rural nature of the area surrounding the existing level crossings, it is anticipated that the traffic volumes over the rail crossings will not change much compared to existing conditions, unless significant development occurs the land located to the west of the railway line.

Construction Traffic Effects

The proposed construction activities are expected to be fairly typical for any road construction project. As this is an off-line realignment, the effects of construction traffic on the existing roading network will be relatively limited to only the main construction site access points. The construction traffic effects can be managed and mitigated to acceptable levels for the duration of works. A

Construction Traffic Management Plan (CTMP) will be prepared by the contractor prior to construction, in accordance with the Waka Kotahi contract requirements.

8.10 Noise and Vibration Effects

The noise and vibration effects of the Project include both construction effects and operation effects. These are discussed below. Further information and detail is included within the Noise and Vibration Assessment, included as Appendix I.

Construction noise and vibration effects

A Noise and Vibration Assessment of the proposed works was undertaken, and it concluded that the highest noise levels are predicted to be experienced during vegetation removal, haul road construction and earthworks[12]. The highest construction noise levels will only be experienced for limited periods when construction works are located near to noise sensitive receiver locations (e.g., occupied residential dwellings). Noise levels will vary or reduce in each geographic locality as construction progresses along the road realignment and the nature of the construction activity changes over time.

The two indicative locations for site yards are separated from noise sensitive receivers by at least 130 metres. Site yards are typically used for the storage of materials and equipment. Minimal noise levels are expected from the site yards (in comparison to the main construction works) because of the separation distances between site yards and receivers.

Construction vibration levels are predicted to comply with Waka Kotahi State Highway Construction and Maintenance Noise and Vibration Guide requirements at all surrounding receivers. Whilst the potential still exists for low levels of vibration to be felt by the closest receivers, negligible effects upon receivers are anticipated.

The acoustic assessment concludes that noise and vibration levels are predicted to be compliant at surrounding receivers during typical construction hours. Notwithstanding this, the implementation of Best Practicable Option (BPO) mitigation measures referenced within NZS 6803:1999 will be applied to minimise construction noise effects on neighbouring properties.

At this stage of the Project, the final construction methodology is not confirmed. Most activities will occur during day-time hours, but there may be times where work is required in shoulder periods and potentially at night. As noted above, BPO measures will be implemented to ensure that construction noise (and vibration) levels are minimised and effectively managed at all times. These will be set out in the Construction Noise and Vibration Management Plan (CNVMP) prepared in accordance with the Waka Kotahi State Highway Construction and Maintenance Noise and Vibration Guide.

Based on the above mitigation measures, the relevant construction noise and vibration effects are considered no more than minor.

Operational noise effects

The operational noise effects are summarised in the Noise and Vibration Assessment (refer to PPF locations in Table 2.1 in the Noise and Vibration Impact Assessment). An assessment of the effects of the Project has been undertaken, summarised as follows.

Whilst no definitive quantitative assessment has been completed, the reduction in traffic vehicles numbers anticipated to travel along the existing SH2 alignment (i.e., Residual) with the introduction

[12] Based on compliance with the NZS 6803 construction noise assessment criteria during typical daytime working hours.

of the bypass is likely to lead to a 7 dBA decrease in noise levels at approximately 10 noise sensitive receivers along that alignment. This represents a noticeable, positive effect of the Project.

A reduction in noise from the existing SH2 alignment as it passes through Putorino will also generally benefit the surrounds of that area including receivers located further away from the realignment.

Reductions in noise level are due to the Project moving traffic further away from properties near the existing SH2 alignment.

The predicted road traffic noise levels as a result of the new highway are up to 52 dB LAeq(24 hr) and therefore this indicates a 6 dBA increase compared to the existing ambient noise levels. This is considered a noticeable change in noise levels. It is also worthwhile considering that observations made during noise measurements noted that traffic noise from SH2 is already audible. As such, whilst noticeable – the proposal does not add a new type of noise to the soundscape. Notwithstanding, it must be noted that road traffic noise will become the dominant source of noise for residential dwellings near the new alignment.

In addition to consideration of changes in noise level and character of the soundscape it is useful when assessing effects to consider the 'absolute' levels of noise being discussed and compare this to reference literature. This is discussed in further detail in the Noise and Vibration Assessment.

Aside from two properties as discussed below, the operational noise effects of the Project are considered acceptable without the need for noise mitigation.

On the balance of the assessment of effects presented, the operational noise effects of the Project are considered acceptable without the need for noise mitigation above and beyond that already inherent to the proposed design.

In the later design phase, opportunities to use excess cut or fill material for noise bunding to adjacent residential dwellings will be considered.

8.11 Effects on contaminated land

The contaminated land effects of the Project include the presence of two sites. These are discussed below. Further information and detail is included within the Contaminated Land Assessment and Contaminated Land Management Plan, included as Appendix E.

Contaminated land was identified at two sites at 4 Putorino Station Road. When the Project is constructed, work will be undertaken in this area to create a new connection between Putorino Station Road and the new state highway. HBRC records in relation to this land parcel indicate that a motor vehicle workshop was located at this site from 1981 to 2002 which included two fuel storage tanks. The contaminant risk in the preliminary site investigation is rated as low to medium.

Protocols and mitigation measures to manage any earthworks, contractor safety and environmental controls are outlined in the Contaminated Land Management Plan (CLMP) which has been prepared covering the surficial roading works around 4 Putorino Station Road.

This CLMP provides a guide for on-site roading workers and contractors for managing potentially contaminated material to protect human health and the environment. Procedures to be implemented in the event of unexpected and/or accidental discovery of contaminated material are also outlined.

Based on the above, the effects of contaminated land on human health and the environment are considered less than minor.

8.12 Effects on utilities

Transpower's Redclyffe -Tuai A (RDF-TUI A) 110Kv transmission line is located within the western extent of the Project and crosses the existing Palmerston North – Gisborne Line North and south of the Waikare Gorge, however the new state highway is not located near to the powerline. While Transpower noted in the MCA process that the proposed realignment option has the least impact on Transpower's assets, discussions with Transpower have highlighted that an access track may be impacted by the realignment. Further discussions will be undertaken with Transpower during the detailed design stage. A proposed designation condition addresses access to Transpower assets and for any construction works within 50 metres of the Redclyffe -Tuai A (RDF-TUI A) 110Kv transmission line by way of an Electrical Infrastructure Management Plan (EIMP) prepared alongside the CEMP.

The remaining utilities within the vicinity of the realignment are low voltage powerlines servicing rural properties along with fibre and copper communication cables within the existing state highway corridor. These will be addressed during the detailed design stage.

Effects on utilities are no more than minor.

8.13 Effects on air quality

The proposed works and in particular earthworks has the potential to result in discharges of dust that can impact on human health and the environment.

The management of dust will be addressed through the CEMP to apply during construction. The dust control provisions in the CEMP will be aligned with the measures for earthworks, with the objective of managing the works to minimise the impact of dust from the works on the environment.

Potential effects of dust on air quality are no more than minor.

8.14 Effects on highly productive land

The Project route traverses Land Use Capability (LUC) 3, 4 and 5 land zoned Rural in both the Hastings District Plan and the Wairoa District Plan (refer to Figure 29 in Appendix J). Highly productive land is recognised as a resource with finite characteristics and long-term values for land-based primary production and needs to be protected from inappropriate use and development. Highly productive land is identified as LUC classes 1 to 3[13].

The alternatives assessment process, considered impacts on productive land when selecting the preferred alignment for the Project. Furthermore, through the design refinement process the actual loss of highly productive land will be minimised and given the nature of the Project it will avoid reverse sensitivity effects on primary production activities. This will be achieved through minimising the state highway footprint on LUC 3, 4 and 5 class soil.

Other mitigation measures are providing stock underpasses and a stock bridge to maintain existing uses of highly productive land.

[13] National Policy Statement for Highly Productive Land (NPS HPL)

Potential effects on highly productive land are no more than minor.

9. SUMMARY OF MITIGATION MEASURES

This section summarises the proposed measures to mitigate the actual and potential adverse effects identified in the preceding assessment of effects. Table 9 sets out a summary of mitigation measures. The mitigation measures are reflected in the proposed designation and consent conditions. Overall, the effects of the Project are considered to be predominantly no more than minor and can be managed appropriately in accordance with the proposed conditions.

Table 9: Summary of mitigation measures

EFFECT	MITIGATION MEASURES	STATUS OF EFFECT
Positive effects	None	Positive
Effects on aquatic ecology and water quality	Good culvert design to enable fish passage. Erosion and sediment control measures, including stormwater diversions and silt fencing implemented in accordance with the ESCP, to work in tandem with the CEMP. A stream restoration area has been identified on a tributary of Waikari River, as shown in the Ecology Maps. It has a lineal stream length of approximately 700m and an area of approximately 1,492 m^2 A total estimate of 2,200m^2 of new wetland area will be created, in the form of constructed wetlands for stormwater treatment.	Minor
Effects of increased stormwater, including flood risk and hydrology	Approximately 90% of the road surface runoff conveyed through STFs will be treated before discharging into the environment. The final design of STFs will be co-ordinated with other management plans, including the SMP, ESCP and CEMP.	No more than minor
Effects of earthworks	Implementing the ESCP will mitigate sediment being released into Kings Creek and other watercourses during construction.	No more than minor
Effects on vegetation and terrestrial ecology	A CEMP and EMP will be prepared to manage the effects upon vegetation and ecology species. The Project will improve the indigenous natural character of Kings Creek and wetland areas through restoration planting, fish passage improvements, and treatment of stormwater before discharging into the stream.	No more than minor
Effects on landscape and visual, including natural character	Mitigation planting elsewhere on the site will be undertaken as per the Landscape Management Plan.	Less than minor
Effects on cultural values, heritage and archaeology	Further archaeological field survey prior to construction will be undertaken and a HHMP will be prepared. An Archaeological Authority will be obtained (if required) from HNZPT prior to works commencing. Ngāti Pāhauwera and Maungahururu Tangitū Trust are preparing CIAs which will assist to identify potential effects of the Project on cultural values, aspirations and sites, and what measures might be taken to manage or mitigate those effects.	No more than minor

EFFECT	MITIGATION MEASURES	STATUS OF EFFECT
Transport effects	Positive effects will be achieved through significant safety and resilience improvements. A CTMP will document the stages and procedures to determine, quantify, and mitigate any transportation related effects of construction traffic.	No more than minor
Effects from noise and vibration	Implementation of best practice and in line with Waka Kotahi noise and vibration guidelines will be adhered too. A CNVMP will be prepared to manage noise and vibration during construction.	No more than minor
Effects on contaminated land	Contaminants have been assessed as below background levels at the subject site. A CLMP will be prepared to manage one identified 'hot spot' site.	Less than minor
Effects on utilities	A condition requiring Waka Kotahi to consult with Transpower will be included. Temporary and permanent works in the vicinity of overhead transmission lines will comply with the necessary standards and will be included in an EIMP.	No more than minor
Effects of dust	The management of dust will be addressed through the CEMP.	No more than minor
Effects on highly productive land	State highway footprint on LUC 3, 4 and 5 class soil to be minimised; stock underpasses and a stock bridge provided to maintain existing uses of highly productive land.	No more than minor

10. CONSULTATION AND ENGAGEMENT

10.1 Overview

Initial consultation commenced with regional stakeholders in 2017 during the Connecting Tairāwhiti Programme Business Case (PBC) (refer to details in Section 3). Following the PBC, the SSBC was developed though a further collaborative process with the Waka Kotahi project team and active participation from Ngāti Pāhauwera and Maungahururu Tangitū Trust, Councils, stakeholders from industry and local community, and road users.

Following the SSBC, Waka Kotahi continued with extensive consultation and engagement with landowners, mana whenua, the Putorino community and key stakeholders.

A collective summary of key issues raised during consultation on this Project is set out in Table 10.

10.2 Landowners

Engagement with directly affected landowners has informed the consideration of alternatives and project development. Feedback from landowners informed the concept and preliminary design including consideration of preferred stock underpasses and other farm access and operational requirements.

The Notice of Requirement sets out the land required for the Project and included within the proposed designation. Negotiations with landowners on land acquisition for the Project will be undertaken in a separate process under the Public Works Act.

Discussions will be ongoing as the design becomes more refined during the detailed design stage.

10.3 Department of Conservation

The Department of Conservation has a particular interest within the vicinity of Waikare Gorge and Waikari River (and manages riparian land along the Waikari River on behalf of the Crown), and noted the significance of natural values, such as native vegetation and habitats within Waikare Gorge.

10.4 Ngāti Pāhauwera and Maungahururu Tangitū Trust

Ngāti Pāhauwera and Maungahururu Tangitū Trust are Crown partners whom Waka Kotahi has been working closely with since the onset of this Project.

Their input and advice on cultural values has informed the concept and preliminary design stages of the Project to date. Understanding of these values was further enriched during cultural walkovers and korero. Cultural values assessments and impact assessment reports are currently being prepared by Ngāti Pāhauwera and Maungahururu Tangitū Trust.

10.5 KiwiRail

Engagement has been undertaken with KiwiRail and will continue through the detailed design process. KiwiRail has agreed in principle to retaining (and upgrading where required) the existing rail level crossings subject to design and other details.

The proposed Waka Kotahi designation crosses over the existing KiwiRail designation. Waka Kotahi will seek written consent from KiwiRail under Section 177(1)(a) of the RMA prior to start of construction.

10.6 Other Stakeholders

Engagement has been undertaken with other stakeholders including Transpower and Heavy Haulage Association during the concept and preliminary design of the Project. This engagement included working through measures to mitigate potential environmental, social and cultural effects.

Waka Kotahi responses to the consultation undertaken are reflected in the preliminary design, and proposed designation and consent conditions.

A collective summary of key issues raised and responses during consultation is in Table 10.

Table 10: Collective Summary of Key Issues and Responses

KEY ISSUES	RESPONSE TO KEY ISSUES RAISED
• Resilience, access and safety.	• These key objectives have been addressed throughout development of the Project and are reflected in the preliminary design.
• Impacts on land and property	• The concept and preliminary designs took into account potential land and property impacts through options assessment and selection of the preferred option, location of railway overpass bridge, bridges and stock underpasses. • Construction accessways are indicatively noted on the drawings sets and will be finalised prior to construction. They are all within the designation boundary. • Technical Assessment Reports address matters relating to noise and vibration, traffic (construction and operational), stormwater treatment and facilities to manage and mitigate water quality and quantity. • Management Plans will be prepared prior to construction to confirm the methods and procedures to manage construction effects and potential impacts on adjacent property.
• Protection/enhancement of bird and plants	• Ecological Assessment Report addresses aquatic and terrestrial impacts upon birds and plants. • Ecology, stormwater and landscape mitigation measures are addressed in the respective Technical Assessment Reports. • Ecology, stormwater, and landscape management plans will be aligned and linked so that collectively the management plans support integrated management and mitigation of effects of the Project.
• Engagement and consultation	• Engagement with landowners, local community, mana whenua and key stakeholders has been ongoing since development of the Tairāwhiti PBC in 2017. • This engagement will continue during the statutory phase and subsequent project development.
• Cultural awareness and impacts	• Cultural walkovers assisted Waka Kotahi and mana whenua to better understand the Project scope, objectives, values and potential effects. • CIAs are being prepared by Ngāti Pāhauwera and Maungaharuru-Tangitū Trust.

KEY ISSUES	RESPONSE TO KEY ISSUES RAISED
• Project design and use	• The Project will be designed and constructed to Waka Kotahi specifications taking into account varying road users including heavy haulage crossing all bridges and culverts, maintenance track clearance, slope stability and drainage, and permits/approvals to enter KiwiRail property.
• Stormwater treatment and water quality	• Stormwater treatment facilities to provide primary treatment of road run-off and ecological mitigation. • Ecology, stormwater and landscape mitigation measures are addressed in the respective Technical Assessment Reports. • Ecology, stormwater, and landscape management plans will be aligned and linked so that collectively the management plans support integrated management and mitigation of effects of the Project.

11. STATUTORY ASSESSMENT

The following provides an assessment of the statutory matters that are relevant to the Project under the RMA. The assessment is particularly guided by the requirements of Sections 104 and 104D, Section 105, Section 107, Section 171(1) and Part 2 (being Sections 5 to 8) of the RMA. Those provisions set out the matters that must be considered by a local authority when considering a resource consent and making a recommendation on a notice of requirement respectively.

11.1 Assessment of relevant planning documents

An assessment of the following planning documents is outlined in Appendix J:

- National policy statements
- National environmental standards
- Statutory Acknowledgements
- Regional Plan
- District Plans

11.2 Statutory considerations relevant to the proposed designation

Waka Kotahi holds requiring authority status pursuant to section 167 of the RMA. Section 168 of the RMA provides the power for a requiring authority to issue a Notice of Requirement for designation to the Territorial Local Authority having jurisdiction for the area within which the designation is sought. Accordingly, Waka Kotahi has issued a Notice of Requirement for the Project to both HDC and WDC.

Section 171 of the RMA applies to the Notices of Requirement issued by Waka Kotahi. Pursuant to Section 171(1) of the RMA, when considering a requirement, a territorial authority must, subject to Part 2 of the RMA, consider the effects on the environment of allowing the requirement, having particular regard to:

"(a) any relevant provisions of:

(i) a national policy statement:

(ii) a New Zealand coastal policy statement:

(iii) a regional policy statement or proposed regional policy statement:

(iv) a plan or proposed plan; and

(b) whether adequate consideration has been given to alternative sites, routes, or methods of 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; and

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

(d) any other matter the territorial authority considers reasonably necessary in order to make a decision on the requirement."

Appendix J of this report addresses the relevant policy statements and plans as required by section 171(a). The remaining s171 matters are addressed in the following sections of this report.

11.2.1 Adequate consideration of alternatives (Section 171(1)(b))

Section 171(1)(b) requires the territorial authority, when considering a NOR, to have particular regard to whether adequate consideration has been given to alternative sites, routes and methods for undertaking the work (where the requiring authority does not have an interest in the land sufficient for undertaking the work, or the work is likely to have a significant adverse effect on the environment).

This entails the territorial authority considering whether a requiring authority has given adequate (and not arbitrary or cursory) consideration to alternatives. The focus is on the process followed to consider alternatives, rather than the outcome; in particular, the RMA does not require the 'best' or 'most preferred' option (if any) to be selected.

The process by which Waka Kotahi has considered alternative sites, routes and methods for the Project is explained in Section 5 of this report and has involved an MCA which concluded that the "White" Option be put forward as the recommended option, as it best met the investment objectives and PGF Outcomes of the Project.

The 'White Option', being the preferred option, is the Project which is now described and assessed in this AEE, the NORs, consent applications, technical assessment reports and supporting information.

The alternatives consideration process was robust, comprehensive and iterative, and included engagement with stakeholders and assessments undertaken by independent technical experts. As such the process clearly meets the relevant statutory test in Section 171(1)(b).

11.2.2 Reasonably necessary to achieve objectives (Section 171(1)(c))

Section 171(1)(c) of the RMA provides that when considering a NOR a territorial authority must 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".

In the context of Section 171(1)(c), 'reasonably necessary' is to be understood as requiring something less than 'absolutely necessary' or essential. It is also important to note that, as a requiring authority, Waka Kotahi is able to establish its own priorities and objectives in relation to the state highway network. The Project objectives respond directly to the well identified safety and resilience problems associated with the existing SH2 alignment.

Based on the above, the work is clearly necessary to meet the Project objectives, as set out in the NOR.

11.2.3 Positive effects on the environment to offset or compensate for adverse effects (Section 171(1B))

As described in Section 8.6, and as set out in the Ecological Assessment, the Project includes riparian planting and revegetation at key locations in the affected catchments, and the establishment of new wetland areas. Restoration planting is proposed to offset stream loss arising from the project. Collectively, these measures would result in improved environmental outcomes.

11.2.4 Outline Plan of Works

Section 176A of the RMA requires Outline Plans to be submitted to the territorial authorities for any work to be constructed on designated land, except where the details were included in the original notice of requirement, or the territorial authorities waives the requirement for an Outline Plan.

Waka Kotahi will submit an Outline Plan of Works to both HDC and WDC with accompanying management plans when the detailed design has been prepared prior to construction in accordance with Section 176A of the RMA. An Outline Plan is required for the works, so that the territorial authority is able to understand in detail the nature of proposed physical works, and if necessary, request any changes prior to construction commencing.

11.3 Statutory considerations relevant to the applications for resource consents

11.3.1 Section 104

Section 104(1) outlines the following matters, which are relevant to Council's consideration of the Application:

"When considering an application for a resource consent and any submissions received, the consent authority must, subject to Part 2, have regard to–

(a) any actual and potential effects on the environment of allowing the activity; and
(b) any relevant provisions of-

(i) a national environmental standard:
(ii) other regulations:
(iii) a national policy statement:
(iv) a New Zealand coastal policy statement:
(v) a regional policy statement or proposed regional policy statement:
(vi) a plan or proposed plan; and

(c) any other matter the consent authority considers relevant and reasonably necessary to determine the application".

Under Section 104(1)(a), an Assessment of Effects on the Environment (this report, plus Volumes 2 and 3) is presented. The policy and planning documents listed under Section 104(1)(b) are discussed in Appendix J.

Section 104(2) states that:

"When forming an opinion for the purposes of subsection (1)(a), a consent authority may disregard an adverse effect of the activity on the environment if a national environmental standard or the plan permits an activity with that effect."

Council's decision in terms of a discretionary activity must be made in terms of Section 104B of the RMA. Section 104B states that:

"After considering an application for a resource consent for a discretionary activity or non-complying activity, a consent authority—

(a) may grant or refuse the application; and
(b) if it grants the application, may impose conditions under Section 108."

The actual and potential effects on the environment of allowing the activity are discussed in Section 8 of this report.

11.3.2 Section 105 and Alternatives

Section 105 identifies specific matters the consent authority must have regard to, when processing applications for particular activities (including discharge permits).

Section 105 states:

(1) If an application is for a discharge permit or coastal permit to do something that would contravene section 15 or section 15B, the consent authority must, in addition to the matters in section 104(1), have regard to—

(a) the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and

(b) the applicant's reasons for the proposed choice; and

(c) any possible alternative methods of discharge, including discharge into any other receiving environment.

This AEE, the Stormwater Preliminary Design Report and Ecological Assessment Report, discuss the nature of the discharge (temporary and permanent) and the sensitivity of the receiving environment. The stormwater treatment facilities, requiring a discharge permit, was extensively examined during the early stages of the Project.

Schedule 4 of the RMA refers to alternatives and addresses alternative methods of discharge (including discharge into any other receiving environment) The circumstances under which the RMA requires a consideration of alternatives is set out below, noting that the information required in the assessment of environmental effects is:

(1) *An assessment of the activity's effects on the environment must include the following information:*

(a) if it is likely that the activity will result in any significant adverse effect on the environment, a description of any possible alternative locations or methods for undertaking the activity:

(b) …

(c) …

(d) if the activity includes the discharge of any contaminant, a description of—

(i) the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and

(ii) any possible alternative methods of discharge, including discharge into any other receiving environment:

Clause 6(1)(d) of Schedule 4 and Section 105 will only apply if the proposal involves the discharge of contaminants to the environment. Therefore, clause 6(1)(a) of Schedule 4 sets the requirement for the assessment of environmental effects (AEE) to include a description of any possible alternative locations or methods for undertaking the activity i.e.the discharge of stormwater.

The Stormwater Preliminary Design Report examines stormwater options and proposes stormwater treatment facilities (STF's) best suited to the Project. Details of the STF's are described in Appendix C.

11.3.4 Section 107

Section 107 states that a consent authority shall not grant a discharge permit, such as the scale and nature of a discharge proposed in this application, if, after reasonable mixing, the contaminant

Section 107 states:

(*1) Except as provided in subsection (2), a consent authority shall not grant a discharge permit or a coastal permit to do something that would otherwise contravene section 15 or section 15A allowing—*

- *a) the discharge of a contaminant or water into water; or*
- *b) a discharge of a contaminant onto or into land in circumstances which may result in that contaminant (or any other contaminant emanating as a result of natural processes from that contaminant) entering water; or*
- *c) the dumping in the coastal marine area from any ship, aircraft, or offshore installation of any waste or other matter that is a contaminant, —*
- *d) if, after reasonable mixing, the contaminant or water discharged (either by itself or in combination with the same, similar, or other contaminants or water), is likely to give rise to all or any of the following effects in the receiving waters:*
- *e) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials:*
- *f) any conspicuous change in the colour or visual clarity:*
- *g) any emission of objectionable odour:*
- *h) the rendering of fresh water unsuitable for consumption by farm animals:*
- *i) any significant adverse effects on aquatic life.*

(2) A consent authority may grant a discharge permit or a coastal permit to do something that would otherwise contravene section 15 or section 15A that may allow any of the effects described in subsection (1) if it is satisfied—

- *(a) that exceptional circumstances justify the granting of the permit; or*
- *(b) that the discharge is of a temporary nature; or*
- *(c) that the discharge is associated with necessary maintenance work—*

and that it is consistent with the purpose of this Act to do so.

(3) (In addition to any other conditions imposed under this Act, a discharge permit or coastal permit may include conditions requiring the holder of the permit to undertake such works in such stages throughout the term of the permit as will ensure that upon the expiry of the permit the holder can meet the requirements of subsection (1) and of any relevant regional rules.

"… is likely to give rise to all or any of the following effects in the receiving waters:

- *(c) The production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials:*
- *(d) Any conspicuous change in the colour or visual clarity:*
- *(e) Any emission of objectionable odour:*
- *(f) The rendering of freshwater unsuitable for consumption by farm animals:*
- *(g) Any significant adverse effects on aquatic life."*

In assessing Section 107(1)(c) to (g), stormwater discharges after mixing within the surface water environment, i.e. open channels, have the potential to exceed sub-section (c) with respect to suspended materials, and sub-section (d), a change in the colour or visual clarity of the receiving environment. This is generally of a temporary nature as result of intense rainfall and flows within the open channels. This 'temporary nature' is one of the 'exception cases' noted within Section 107(2)(b) and is discussed below.

In assessing 107(2)(d) the ECSP in particular, seeks to manage these potential adverse effects, thereby minimising potential adverse effects on the receiving environment and aquatic life.

However, sub-section (2) of Section 107 allows for discharge permits to be granted where the discharge is of a temporary nature during periods of rain, rather than being a continuous discharge.

In assessing sub-section (3) of Section 107, this allows for discharge permits to include conditions requiring the consent holder to undertake such works in stages throughout the term of the consent, to ensure that the requirements, i.e. discharge of stormwater and the effects listed under Section 107(1)(c) to (g), can be met. This is the case where the discharge of stormwater continues to be discharged temporarily during rainfall events, and during construction.

11.4 Part 2 Purpose and Principles of the RMA

The statutory framework is centred around the RMA. The RMA sets in place Part 2 which identifies the RMA purpose and principles and Sections 5 to 8 requirements along with identifying the national and regional local policy statements and plans that need to be considered when considering an application for resource consent.

Section 104 requires the Regional Council when considering this application and any submissions received (if relevant), 'subject to Part 2', to have regard to the various policies and plans relevant to the activities and the potential environmental effects of the proposal.

Part 2, encompassing Sections 5 to 8 of the RMA are now assessed below.

11.4.1 Purposes – Section 5

The cornerstone of Part 2 of the RMA and its single purpose is to promote the sustainable management of natural and physical resources. This is set out in Section 5(1) and then defined in Section 5(2), which states:

(2) In this Act, sustainable management means 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.

Thus, in applying Section 5 an overall balanced judgment of whether this application promotes the sustainable management of natural and physical resources is required.

In terms of Section 5, this application provides for new infrastructure. The Waikare Gorge realignment mitigation and management measures presented in this report will ensure that the potential adverse effects on the receiving environment, namely waterways such as Waikari River and Kings Creek, and surrounding land parcels are avoided or appropriately mitigated.

The state highway including structures such as bridges and culverts will be physical and built resources of significance in the district. The realignment once completed will enable people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety.

The ongoing treatment and management of stormwater within the respective catchments provides for people's social, economic, and cultural wellbeing while mitigating adverse effects on the environment. Furthermore, the adverse effects on the receiving environment will be no more than minor or otherwise managed appropriately through the implementation of the designation and

consent conditions, including management and maintenance activities carried out by contractors implementing good management practices.

Future generations are addressed through the provision of infrastructure where effects have been avoided or mitigated and life-supporting capacity through management of potential effects on waterways and the surrounding land.

This application is considered to provide for the sustainable management and therefore is consistent with the purpose of the RMA.

11.4.2 Matters of National Importance – Section 6

The following matters of national importance are considered relevant to this proposal:

(a) the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:

The proposed realignment is not considered to be an 'inappropriate' use and development.

The natural character of Waikari River and other watercourses along the vicinity of the realignment will be preserved as the stream diversions for works on existing culverts will only be temporary. Implementation of the ESCP will mitigate the effects of sediment being released into watercourses.

Riparian planting and stream restoration will be undertaken to mitigate the loss of vegetation and streams associated with construction. Fish passage will be enabled as part of the works. These will all preserve the natural character of relevant streams along the realignment.

(c) the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:

The findings of the Ecological Assessment Report identified areas of significant indigenous vegetation and significant habitats of indigenous fauna. A stream restoration area has been identified on a tributary of Waikari River, as shown in the Ecology Maps. It has a lineal stream length of approximately 700m and an area of approximately 1,492 m^2.

A total estimate of 2,200m^2 of new wetland area will be created, in the form of constructed wetlands for stormwater treatment.

(e) the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga:

The Waka Kotahi partnership with Maungaharuru Tangitū Trust and Ngāti Pāhauwera recognises and provides for the relationship of Māori and their culture and traditions. The relationship is integral to the overall approach adopted in the preparation of this Application and will continue through further development and implementation of the Project.

(f) the protection of historic heritage from inappropriate subdivision, use, and development:

While there are no known historic heritage sites within the Project footprint a further archaeological field survey will be undertaken prior to construction, and an Archaeological Authority sought from HNZPT should one be required.

Both Maungaharuru Tangitū Trust and Ngāti Pāhauwera are preparing CIAs specific to their values and aspirations, thus reflecting their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga. The CIAs will assist to identify potential effects of the Project on cultural values, aspirations and sites, and what measures might be taken to manage or mitigate those effects.

(h) the management of significant risks from natural hazards.

Improving the resilience of the road network is an objective of the Project. The realignment will address the relative isolation and lack of viable alternatives, when transport infrastructure is closed following flooding, landslips and rockfalls due to extreme weather events.

This application is therefore consistent with Section 6 of the RMA.

11.4.3 Other Matters – Section 7

The following other matters are considered relevant to this proposal:

(a) kaitiakitanga:

(aa) the ethic of stewardship:

Both kaitiakitanga and the ethic of stewardship are embedded within the ongoing relationship of Waka Kotahi, Maungaharuru Tangitū Trust and Ngāti Pāhauwera.

(b) the efficient use and development of natural and physical resources:

The realignment of SH2 and the associated safety and resilience improvements will enhance reliability and the safety of road users along the state highway, while supporting efficient use of the state highway network.

(c) the maintenance and enhancement of amenity values:

The safety and resilience improvements resulting from the Project will maintain the amenity values of the existing environment.

(d) intrinsic values of ecosystems:

Riparian planting and stream restoration will be undertaken to mitigate the loss of vegetation and streams associated with construction. Fish passage will be enabled as part of the works. These will all preserve the natural character of relevant streams along the realignment and will ensure that the intrinsic values of the existing environment are not adversely affected.

(f) maintenance and enhancement of the quality of the environment:

Measures such as riparian planting and stormwater treatment facilities will be constructed to maintain, and in some locations improve, the quality of the environment and the ecosystem.

(i) the effects of climate change:

Elements of the design which respond to effects of climate change include location and design of bridges, culverts and underpasses, and design of the stormwater management system to mitigate risks of increased frequency and intensity of rainfall events.

This application is therefore considered consistent with Section 7 of the RMA.

11.4.4 Treaty of Waitangi – Section 8

Section 8 requires that *"In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi)"*.

Those principles of the Treaty of Waitangi (Te Tiriti o Waitangi) which are of relevance to this proposal are:

- Participation
- Tino Rangātiratanga – chiefly authority over resources and taonga
- Partnership/ the duty to act reasonably and in good faith.

Waka Kotahi has worked in partnership with Maungaharuru Tangitū Trust and Ngāti Pāhauwera during development of the project to date and will continue to do so. This partnership approach reflects the well documented[14] principles of Te Tiriti o Waitangi which involve active protection, good faith consultation and communication, and the spirit of partnership.

This application is therefore considered consistent with Section 8 of the RMA.

Overall, it is considered the Project promotes the sustainable management of natural and physical resources in accordance with Part 2 encompassing Sections 5, 6, 7 and 8 of the RMA.

11.4.5 Section 176A – Outline Plan

An Outline Plan is required for the works, so that the territorial authorities are able to understand in detail the nature of proposed physical works, and if necessary, request any changes prior to construction commencing.

The design will be refined through subsequent phases of the Project and the details may change. Changes to the design will be undertaken within the scope of the final designation and designation and consent conditions. All works required for the Project will be undertaken within the new designations. The detailed design of the Project will be reflected in the Outline Plan of Works and any other documentation, such as Management Plans, required to be submitted to the Council prior to construction.

[14] https://waitangitribunal.govt.nz/assets/Documents/Publications/WT-Principles-of-the-Treaty-of-Waitangi-as-expressed-by-the-Courts-and-the-Waitangi-Tribunal.pdf

12. CONCLUSION

The SH2-Waikare Gorge Realignment Project comprises a 3.8km, two lane greenfields realignment. The realignment will include a new approximately 160m long vehicle bridge across Waikare Gorge. Proposed works include new structures and upgrades including a new railway overpass bridge, new bridge and stock bridge across Kings Creek, retaining walls, new, extended and replacement culverts, and new stock underpasses. Stormwater treatment facilities and planting and landscaping will be established along the length of the Project.

The Project once completed achieves the transportation objectives for Waka Kotahi resulting in significant positive effects for road users, specifically in respect of resilience of SH2 through the Waikare Gorge, improvement of access, travel time predictability and reliability and improvement of road safety to users.

Ngāti Pāhauwera and Maungahururu Tangitū Trust are partners whom Waka Kotahi has been working closely with since the onset of this Project. Their input and advice on cultural values has informed the concept and preliminary design stages of the Project to date. Understanding of these values was further enriched during cultural walkovers and korero. Cultural values assessments are currently being prepared by Ngāti Pāhauwera and Maungahururu Tangitū Trust.

The AEE describes the Project, assesses effects on the environment and outlines mitigation measures It concludes that any actual or potential adverse effects of the Project will be predominantly no more than minor.

The Project gives rise to significant positive effects and will form an integral part of the region's transport network. The Project will enable people and communities to provide for their social, economic, and cultural well-being and for their health and safety, consistent with the purpose of the RMA.

The actual and potential adverse effects on the environment of the Project will be addressed by measures described within this AEE and reflected in the proposed designation and draft resource consent conditions.

The Project is consistent with the key RMA policy and planning documents. Overall, the Project will achieve and promote the purpose of the RMA.

Therefore, for the reasons set out above, the NOR can be confirmed, and the resource consents can be granted subject to the proposed designation and consent conditions.