Appendices

Appendix A : Tauriko West Eastern Ring Road Technical Report

Tauriko West Network – Eastern Ring Road

Engineering Feasibility & Options Report

Tauranga City Council

Reference: 254330

Revision: 0

6 November 2017

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Bringing ideas to life

Document control record

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Document control						
Report title		Engineering Feasibility & Options Report				
Document ID		254330-0000-REP-CC-01	**Project number**		254330	
File path		\\Aurecon.info\shares\NZTRG\Projects\Projects\254330 - TCC Pyes Pa Rd to Oropi Road Link Rd\Project Delivery\Civil\254330-0000-RPT-CC-001 [A].docx				
Client		Tauranga City Council				
Client contact			**Client reference**			
Rev	**Date**	**Revision details/status**	**Author**	**Reviewer**	**Verifier** (if required)	**Approver**
0	7 November 2017	Working draft issue for client information	N Holman A Fosberry			
Current revision		**0**				

Approval			
Author signature		Approver signature	
Name		Name	
Title		Title	

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Tauriko West programme business case, NZTA	September 2016

Glossary of Abbreviations

Item	Description
AADT	Average annual daily traffic
BoP	Bay of Plenty
CAS	Crash analysis system
CIA	Cultural impact assessment
CLoS	Customer Level of Service
CVA	Cultural values assessment
DBC	Detailed business case
DOC	Department of Conservation
DSI	Deaths and serious injuries
ECMT	East Coast Main Trunk
GPS	Government Policy Statement
HNO	Highways and Network Operations
IBC	Indicative business case
ILM	Investment logic map
IO	Investment objective
IRS	Investment and revenue strategy
KPI	Key performance indicator
LoS	Level of service
LPHI	Low probability high impact
LTMA	Land Transport Management Act 2003
NLTF	National Land Transport Fund
NLTP	National Land Transport Programme
NRC	National Road Carriers Inc
ONRC	One Network Road Classification
PBC	Programme business case
PoT	Port of Tauranga
RLTP	Regional Land Transport Plan
RLTS	Regional Land Transport Strategy
RMA	Resource Management Act 1991
RTANZ	Road Transport Association New Zealand Inc
SH(#)	State Highway (number)
TCC	Tauranga City Council
SOI	Statement of intent
VOCB	Base vehicle operating costs

1 Introduction

1.1 Overview

The Tauranga City Council (TCC) is seeking to investigate a range of alternative options and confirm the recommended option for the Tauriko Network Western Corridor (Western Corridor). This corridor will form a new ring road connecting SH29 to SH39 and then SH36 to SH29A to cater for local movements (separate from national/regional through traffic) as well investments to improve and integrate local amenities (cycling, walking, public transport).

This report has been written with the intention of framing the first sections of a future Detailed Business Case (DBC). It is anticipated the information provided within this report can be incorporated into the full DBC.

1.2 The purpose of this report

The purpose of this report is to:

- Summarise the transport needs and problems for the current and future growth of customers who access the proposed local ring road corridor and the surrounding area to define the future business case principles;
- Explore a range of alternative options and activities which address the identified problems, provide value for money and can be delivered;
- Evaluate a short list of recommended options for investment that will best achieve the defined outcomes.

1.3 Document overview

Sections and numbering of the Engineering Feasibility Report is as follows in Table 1 below:

Table 1: Document overview

Business Case Section	Contents	5-Case Application
Part A	Strategic context	▪ Strategic case
Part B1	Option assessment – Western Ring Road	▪ Economic case
Part B2	Option assessment – Eastern Ring Road	▪ Economic case
Appendices for the single stage DBC		

1.4 Work completed to date

The following section describe the work completed to date relevant to the Engineering Feasibility Report.

1.4.1 Tauriko Network programme business case

In 2016, the Transport Agency completed the PBC for the Tauriko Network that identified the key problems along this corridor and potential benefits of investment. The PBC focussed on four important principles;

1. The 'network' must function to give effect to the SmartGrowth western corridor settlement pattern over 10, 30 and 50 year time horizons. The Tauriko Network PBC includes existing and new local arterial roads and connections, public transport and demand management activities such as promoting active modes (i.e. walking and cycling), and state highway interventions.
2. At the outset of the Western Corridor Strategic Study the partners approached the problems and interventions within a paradigm of minimising the number of local connections to SH29. The focus was on providing local roads for local journeys and SH29 for regional journeys.

3. The programme will require ongoing collaborative effort from a wide set of stakeholders to promote liveability and freight movement objectives. Objectives, programmes and recommendations have been jointly agreed. The recommended programme enables staged levels of investment and planning commitment amongst the partners.
4. Future structure plans and infrastructure projects will need to remain consistent with the SmartGrowth land use settlement pattern and the preferred transport network established through the PBC.

Out of these principles the PBC recommended a programme to solve identified problems within the Western Corridor. Overall the PBC found that providing for more efficiency to maintain current journey times pre-development, more liveable and connective communities and safe journeys for customers will contribute to achieving the SmartGrowth principles for the regional. These key recommendations are shown in Figure 1 below.

Figure 1: Tauriko Programme Business Case Recommended Investment

The recommended programme, comprised a mixture of operational and capital interventions for cyclists, pedestrians, road users, freight and public transport in the State Highway and local roads networks with a target year of 2030. The interventions were designed to help encourage the 'right traffic on the right route', optimising the local road network to free up SH29 and SH29A to focus on regional travel and freight demands.

1.5 Engineering Feasibility approach

This Engineering Feasibility Report combines some elements from the Strategy Case and Economic Case of a single staged business case to advance the development of the Western Corridor and better understand the feasibility, benefits and costs of this investment.

The evolving process of the Western Corridor settlement study, land use and transport planning and stakeholder engagement, alongside the parallel business cases (SH29 and SH29A Tauriko) lends itself into providing an interim feasibility report to add justification and confidence over the ring road elements. The Western Corridor settlement study is expected late 2018; once completed this study will be able to confirm further growth forecasts and confirm the economic and strategic cases and direction for the corridor investment.

The scope of the western corridor strategy excludes the upgrades of the state highway network and public transport. These elements form part of other separate business case. The focus of this report is on delivering

the local ring road elements and local network connectivity to form a future east-west link between SH29 to SH36 and to SH29A.

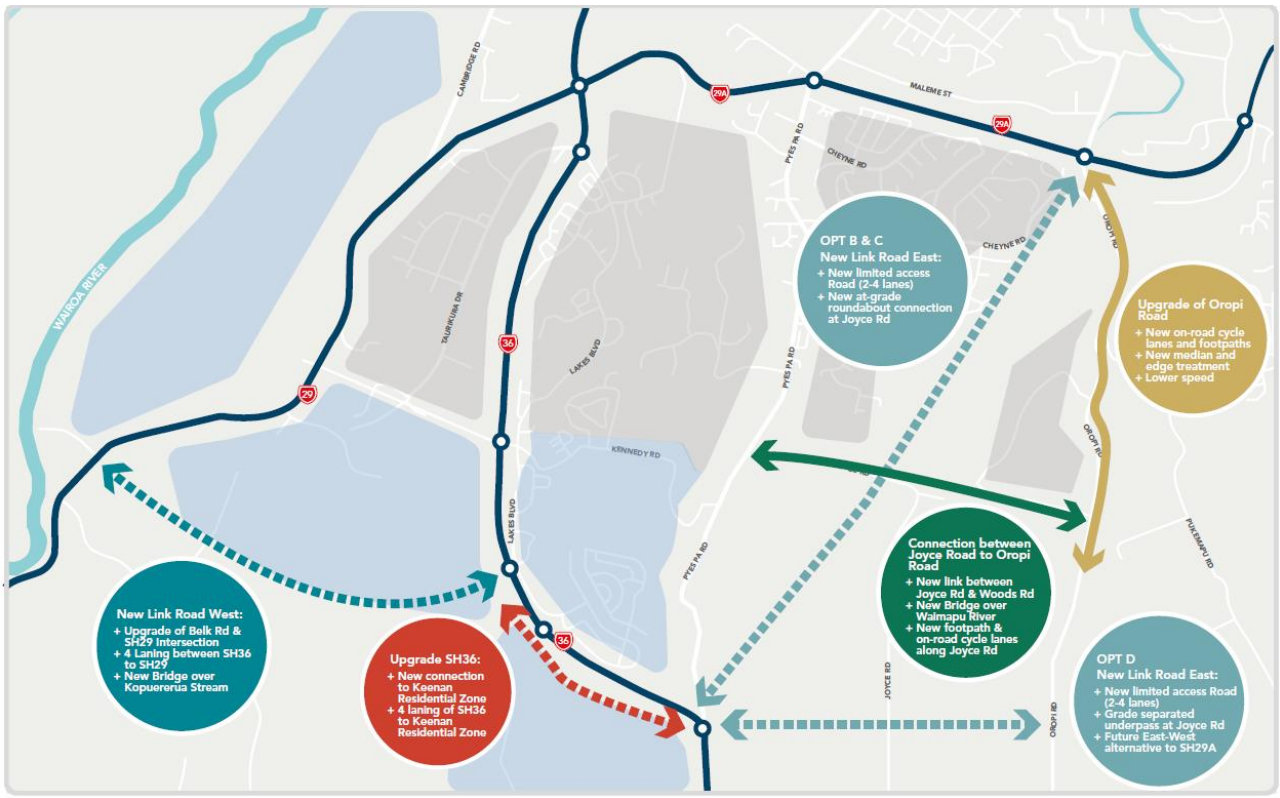


Figure 2: Western Corridor Elements of the Tauriko Programme Business Case

This Engineering Feasibility Report examines the engineering challenges, options and costs of this corridor. For ease and future integration into a detailed business case, the Western Corridor has been spilt into the section segments with the location of these shown in Figure 2 above:

Segment 1 – Western Ring Road: *This includes options for provisions to future widening SH36 and includes options to widen Gargan Road and provide a new road from Gargan Road to SH36 and to the future Belk Rd Interchange, as part of the SH29 Business Case*.

Segment 2 – Eastern Ring Road: *This includes options for a future new ring road from SH36 to SH29A as well as safety and connectivity improvements on Pyes Pa and Oropi Road and a new east-west link from Joyce Road to Oropi Road*

Part A – Strategic Content

2 Strategic context – the case for investment

This section outlines the geographic, customer, social, economic, transport, environmental and cultural context in relation to the Western Corridor (local ring road).

This section provides a summary to give content to the Engineering Feasibility assessment and will be further refined through the development of the future business case. Background Information Maps are included in Appendix B of this report.

2.1 Geographical context

The Western corridor covers the geographical area between SH29, SH39 and SH29A around Tauriko in the Bay of Plenty region. South of Tauranga City, the area forms the southern and western approaches to the city from Hamilton (SH29) and Rotorua SH36). The corridor and wider study area is shown in Figure 3 below.

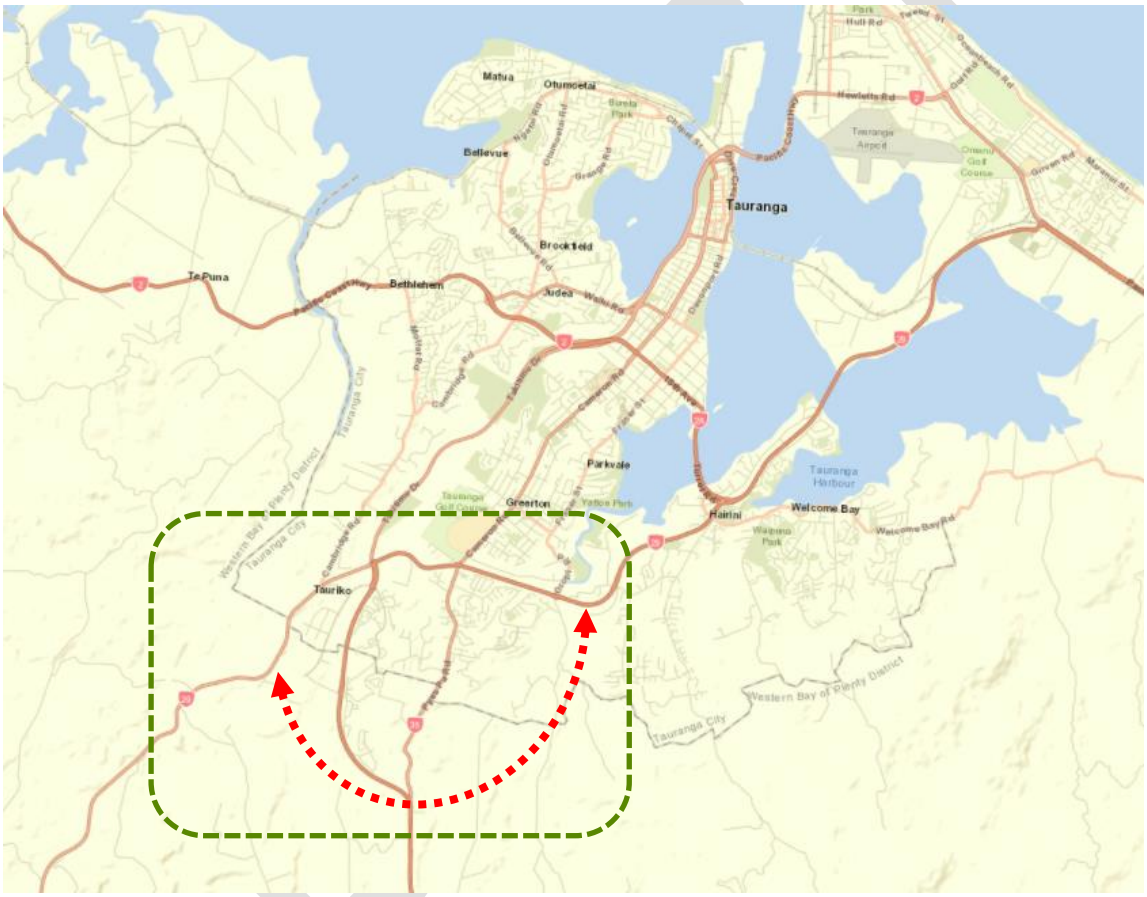


Figure 3: Geographical location of Western bay study area and indicative route for the PBC ring road

The corridor environment is predominantly semi-rural with a mixture of horticultural, grazing land and lifestyle blocks. The study area includes the Kopurererua Stream valley in the east and Waiorohi and Waimapu Stream valleys to the west. The land adjacent to the river rises to high escarpments were the majority of the residential and transport corridors, including SH29, SH36, Pyes Pa Rd and Oropi Road are situated. The rivers and the escarpment provide geographical and environmental constraints and challenges when considering the possible transport interventions across these features. The high escarpments and terrain can be seen in the 3d model shown in Figure 4 below.

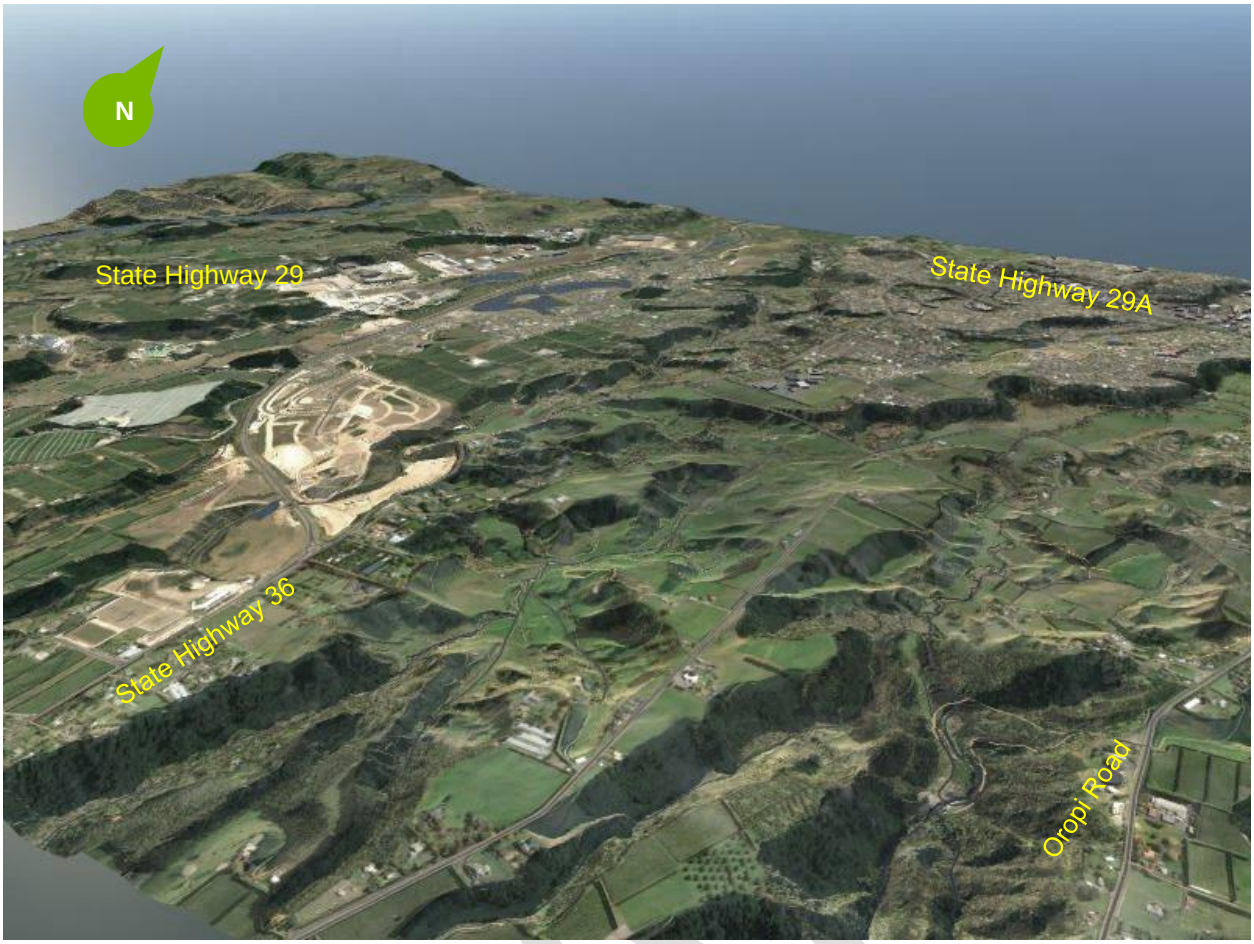
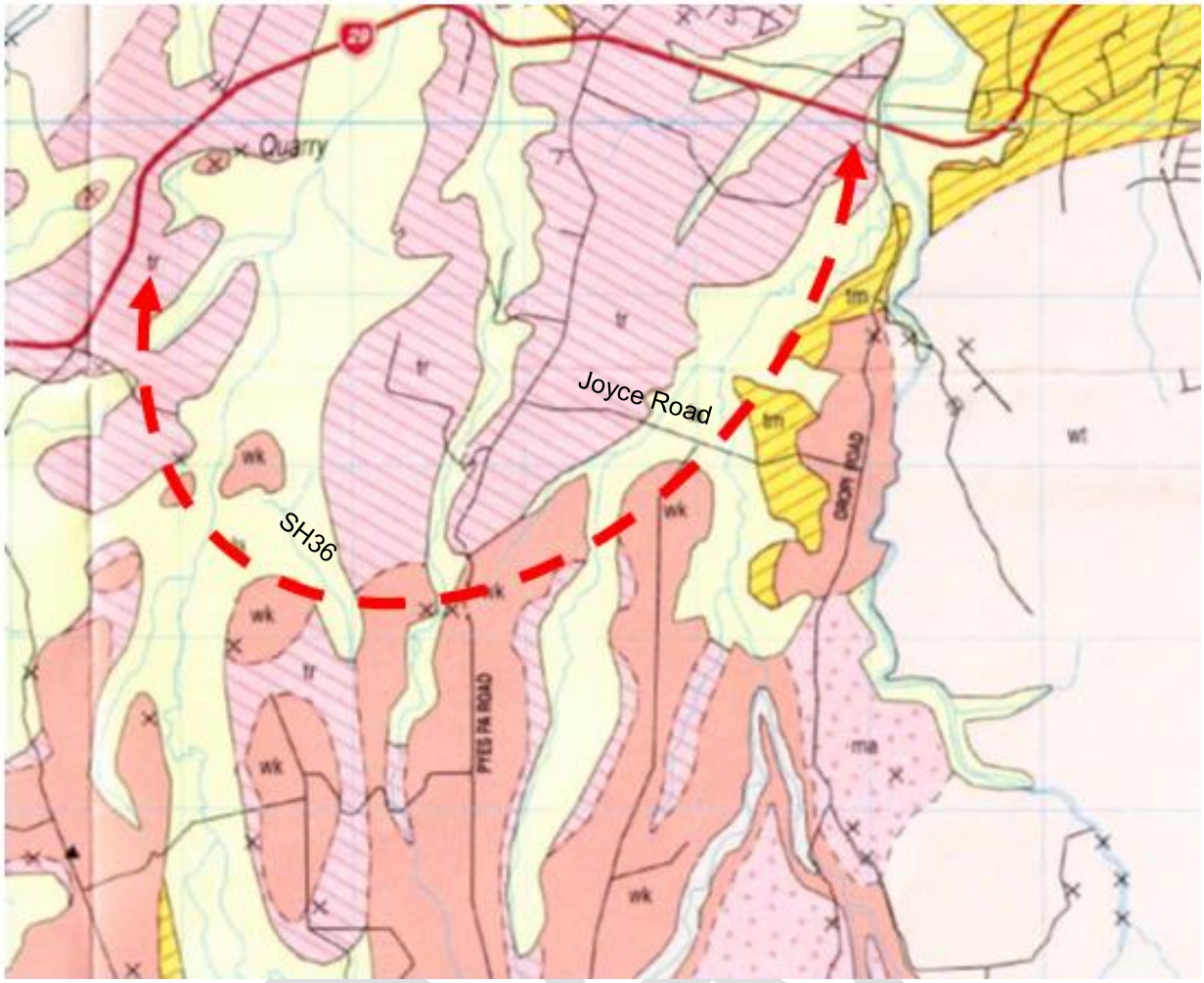


Figure 4: Aerial terrain overlay of underlying geography of the Western Corridor

2.1.1 Geology

A Preliminary Geotechnical Appraisal (Attached in Apppendix X) for the corridor highlights the variability in the geology between the higher escarpments and lower river valleys. It anticipated that the higher escarpments include Volcanic Ash, underline by Ignimbrite Rock. These materials will likely present the source for engineering fill, with some erosion protecting needed for the steep slopes. In the valleys, the deep Holocene alluvium will present challenges needing extensive ground improvement and surcharging for the construction of fill embankments and bridge approaches. These materials are likely to liquefy in a seismic event, requiring ground improvements treatment like stone columns, CFA piles or soil mixing at key lifeline structures.

The ground conditions are the same as the nearby Tauriko Development and therefore the engineering and construction properties of these soils will be known. The geological map of this area is shown in Figure 5 below.



Geological Unit		
Wk		**Waimakariri** Ignimbrite Pale grey, partially welded pumice-rich ignimbrite, with white to pale brown pumice gravel. Rock strength can be variable, ranging from weak (non-welded to weakly welded) to strong (partially or densely welded). Discontinuities (e.g. joints) are present in the stronger rock and are typically widely space
Tr		**Te Ranga Ignimbrite** Light grey, unwelded ignimbrite; typically comprising a medium dense to dense, fine to medium grained pumiceous sand
Tm		**Matua Subgroup fluvial deposits, Pahoia Tephras** A thick, complex sequence of silts, clays, sands and gravels reworked by alluvial and colluvial processes (generally of volcanic origin), intercalated with airfall tephra's and ignimbrites. Can include (old) peat and estuarine deposits, and is often highly variable both vertically and laterally.
fa		**Holocene alluvium** Gravel, sand, silt, mud and clay of modern streams, with peat in some areas

Figure 5: Western Corridor geological map and material description

2.2 Customer context

A range of customers travel, work and live within the Western Corridor. Tauriko is a fast-growing suburb with a significant business hub comprising industrial and commercial land alongside the SH29 on the south-western fringe of Tauranga. The Tauriko study area includes 'The Lakes' development and 'Pyes Pa West' residential development on either side of SH36. These development areas are currently expanding to Keenan Road in the south.

To the north-east is residential and commercial land use with the Tauranga Crossing and Tauriko Business Estate as key business and commercial hubs for the region. Cameron Road provides an important arterial route into Tauranga CBD with SH29 and 29A providing an important inter-regional route from the Waikato to the Port and the Bay of Plenty.

Customers who use and live in the area can be classed into three main separate groups;

- Local residents
- Business commuters and Freight
- Recreational and commercial visitors

2.3 Economic context

The local economy is growing strongly. Population growth, which is linked to growth in local GDP, has been 2.5% compared to 1.9% nationally over the last ten years. Manufacturing, health-care and construction are well-established in the local economy and make the highest contribution to local GDP. Retail and wholesale trade have also been significant growth contributors over the last 10 years. This local context is important because the large and growing number of trips generated locally are heavily dependent on use of the urban state highway network.

The Port of Tauranga is New Zealand's largest export port by volume. Exports increased over the first half of the 2016 financial year to nearly 6.5 million tonnes

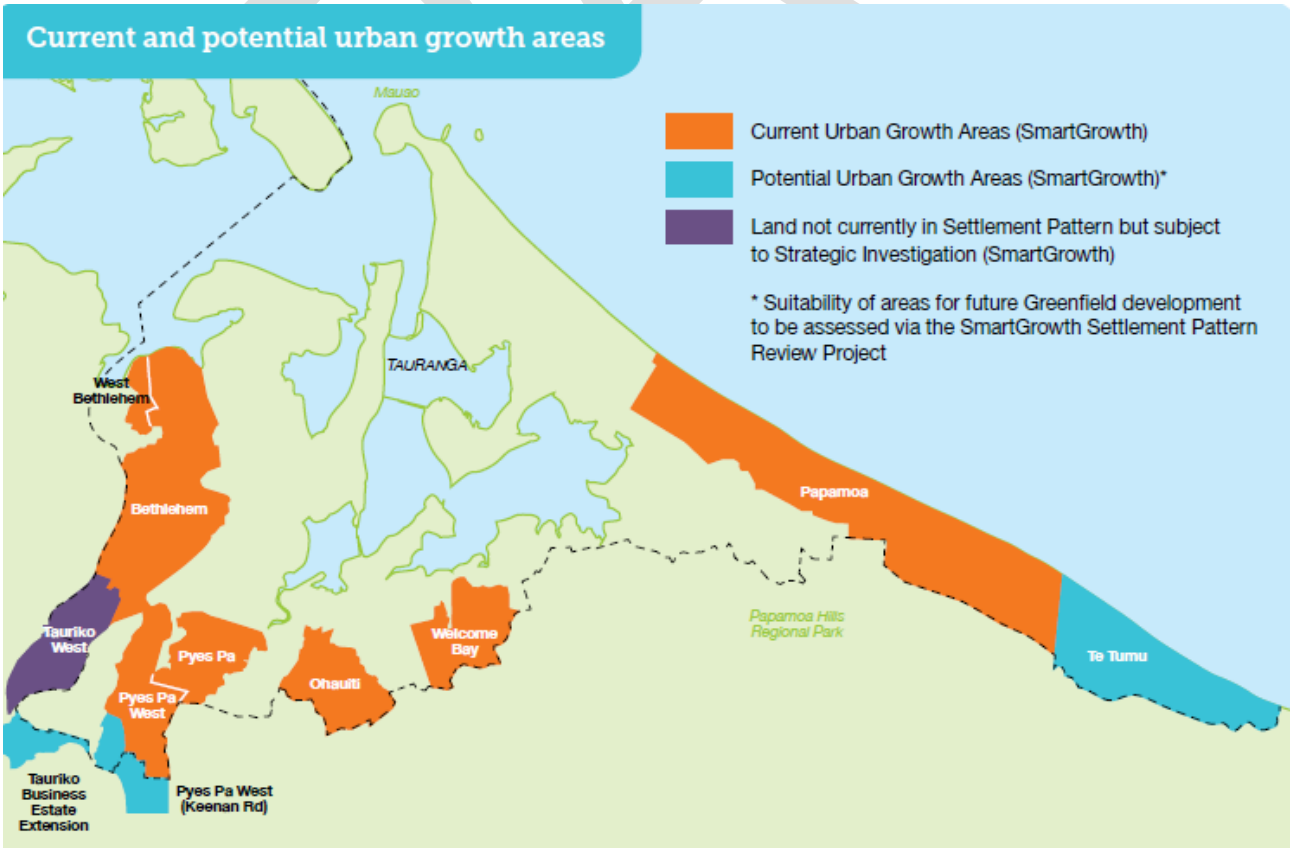


Figure 6: Current and potential urban growth areas - Source Tauranga City Long-term Plan 2015-25

2.4 Transport context

Transport corridors play a critical role in ensuring people or goods can move from one place to another and connects communities and business. The transport corridor specifically focused upon for this assessment includes both state highway and local roads. The western corridor is expected to undergo significant increases in transport demand to 2043 with >20,000 increase in AADT over the next 30 years[1].

A demand model has been developed between NZ Transport Agency and Tauranga City Council that provides the demand forecasts for 2030, 2043 and 2063. Several scenarios and land use contingencies form part of the model. The growth in the surrounding road network is shown below in Figure Figure 7, were sections of the existing road network are expected significant increases in daily trips by almost five times their current use.

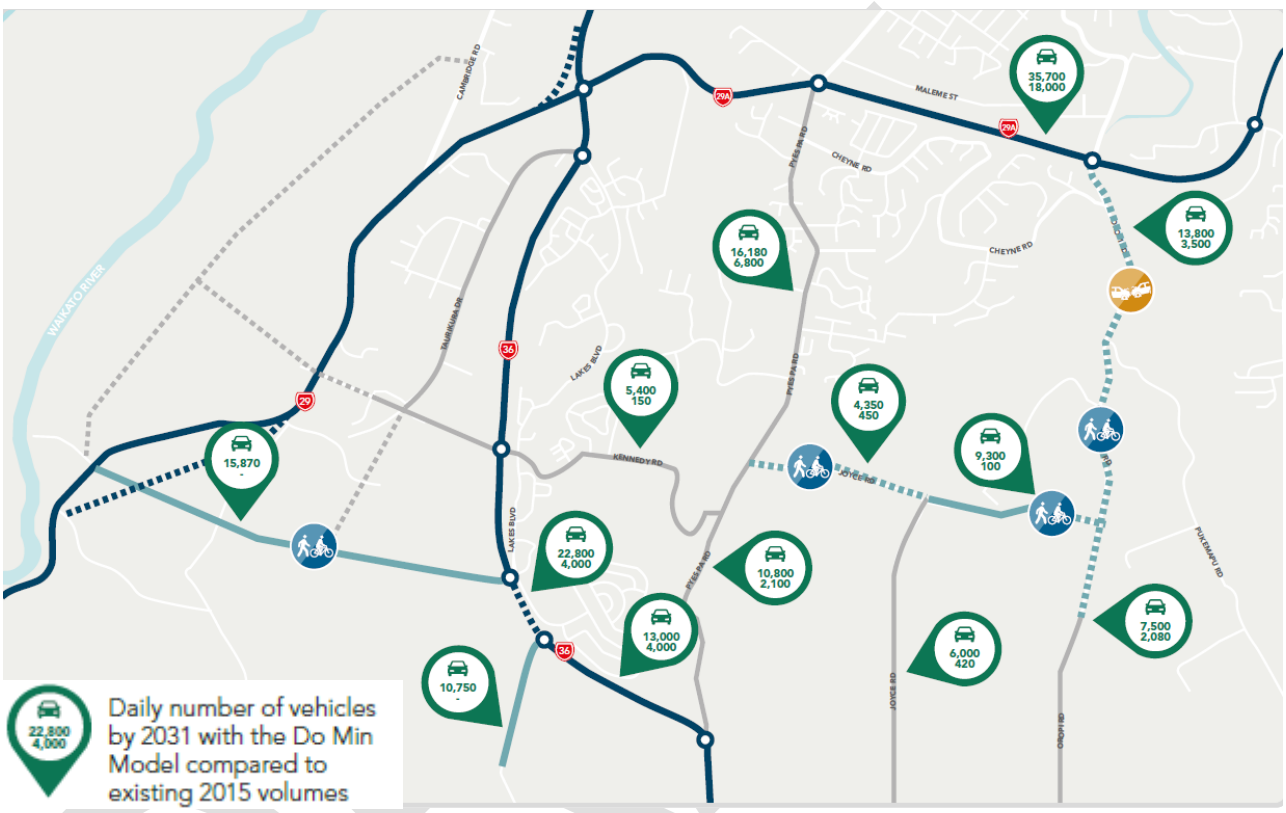


Figure 7: 2031 Traffic demand forecast compared to existing 2015 volumes

2.4.1 Other Transport Network Modes

A consistent theme across Tauranga City is that a significant transformation needs to occur in the share of trips made via the private motor vehicle. This recognises that given the amount of growth potentially able to be provided for in the city, including the western corridor, the transport network would not be able to sustainably provide for the current travel mode profile of Tauranga's residents.

The current public transport network, pedestrian and cycle network in this area are undergoing extensive changes with the current Tauriko development (The Lakes, Kennedy Road); however east-west linkages are still missing outside this development. As shown in Figure 8 an example is the lack of any pedestrian, cycle or public transport links in an east-west direction between Pyes Pa and SH36 to Oropi Rd and SH29A.

[1] Source Tauranga Transport Strategy 2012

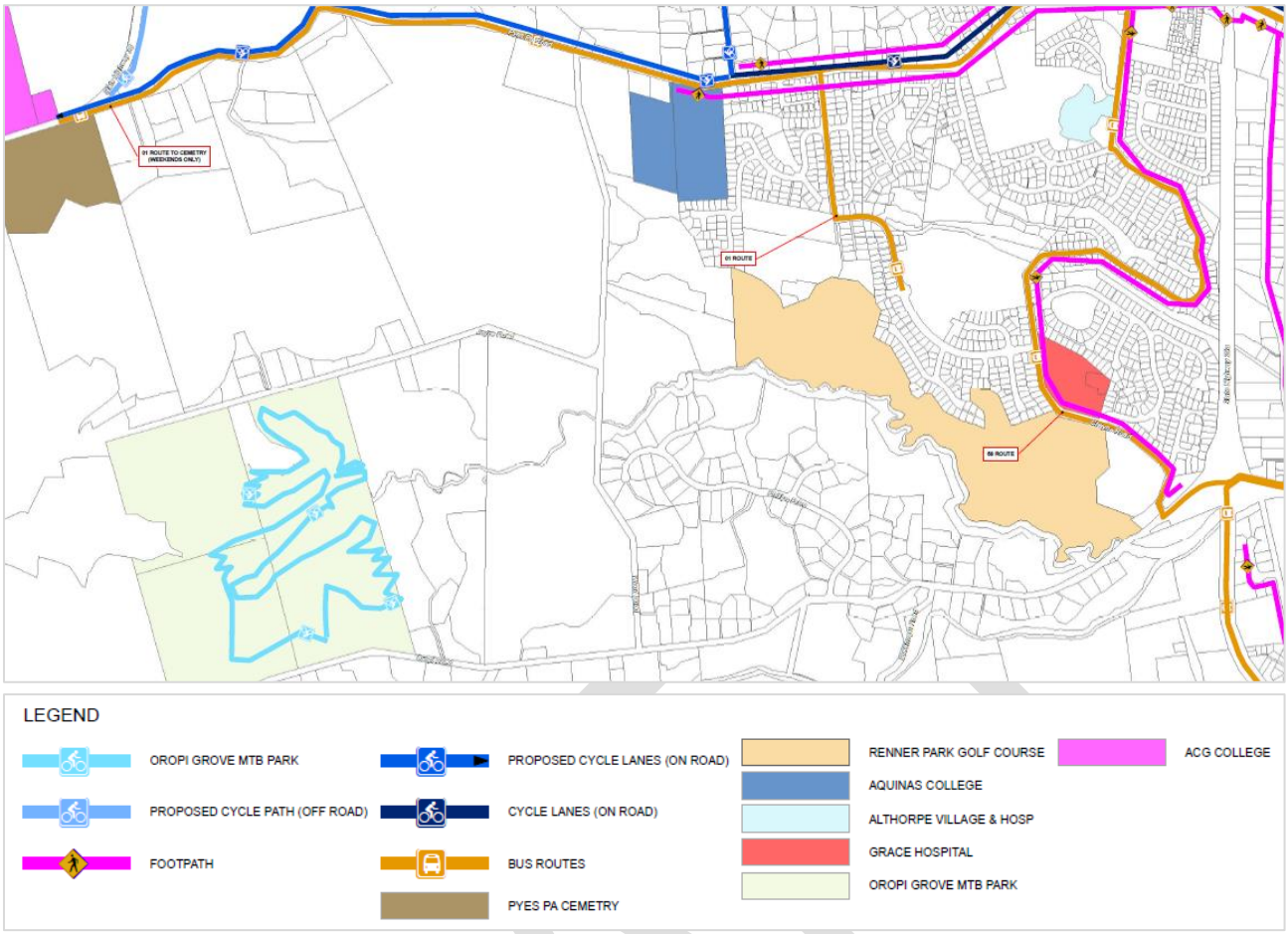


Figure 8: Other transport network mode links between Pyes Pa and Oropi Rd

2.5 Social and Environmental context

The study area is recognised to hold significant social and environment context. The Initial environmental context commentary on known constraints is provided below based on existing information. Preliminary environmental assessments will need to be undertaken to support future stages during the development of the DBC.

This initial assessment aims to confirm potential elements of the environment which may be affected by future proposals located within the surrounding area.

2.5.1 Land use and Ownership

The land use in the area is predominately rural with a growing residential use. The area contains sections of green belt mainly protecting existing streams and wetlands in the area.

TCC own large sections of land within the eastern side of the corridor including the Pyes Pa cemetery and the Merrick Farm land along Joyce Rd (proposed to contain around 20ha of future sport fields). Other notable TCC owned land includes the Oropi Recreational Area, Oropi Water Treatment Plant and land parcels along Waimapu River Esplanade.

2.5.2 Human Health, Social and recreation

The study area contains serval key community facilities, includes schools and colleges (ACG, Aquinas College and the future Pyes Pa West Primary School) and boarders Grace Hospital on Cheyne Road.

Recreational facilities include the Oropi Grove Mountain Bike Track (MTR), Renner Park golf course, The Lakes cycleway and pedestrian facilities and Waimapu River walkway.

2.5.3 Vegetation

The primary area and type of vegetation are exotic shelter belts and grasses. Orchards of Kiwifruit are on both the east and western sides of the corridor. The lower river valleys are prone to flooding and general grassed for grazing.

The Oropi Grove reserve contains native planting with further native planting re-established along the existing stream as riparian margins to create regional sensitive areas.

Figure 9: Typical vegetation types along the study area

2.5.4 Hazard Zones

The catchment and upstream flood risks in the valleys has been identified as areas of regional flood risk and therefore have limited residential development in these areas. Flood risk assessments have been undertaken to inform the option assessment and engineering feasibility of the Western Corridor. These flood assessments are appended to this report and whilst the flood risk remains a high risk, the likely effects can be managed and do not pose a fundamental flaw in the Western Corridor.

2.5.5 Cultural and historic context

The study area is recognised to hold significant cultural and heritage value to Mana Whenua and potentially other communities in the wider region.

This includes key sites such as the Te Ranga Battle Site on the corner of Joyce Road and Pyes Pa Road where in 1864 Maori leaders Rawiri Puhirake and Henare Taratoa both fell and 108 Maori of the Ngai Te Rangi and their allies were killed.

Figure 10: The site of the Te Ranga Battle in June 1864.

Elsewhere along the western corridor study area sites of archaeological interest, middens and pits are present. Potential for further archaeological discovers are also present within the corridor, due to his long historic use and settlement of Māori in this area.

The associations and values held by Mana Whenua in the study area require careful consideration in conjunction with ongoing engagement. Cultural Values Assessments (CVA) and/ or Cultural Impact Assessments (CIA) are recommended to be prepared in the future business case by Mana Whenua to assist with understanding the values Mana Whenua may hold in relation to any site or place potentially affected by the proposed corridor.

3 Defining the problems and benefits of investment

This chapter provides an understanding of the identified problems for a range of customers, both now and into the future, while supporting the reasons for investment to resolve the identified problems.

The evidence base for the key problems and rationale for investing has not been examined in this report with basis for investment from the PBC deemed to be sufficient for this interim phase. The potential benefits of investing will need to developed to use SMART (specific, measurable, agreed upon, realistic and time-related) transport key performance indicators (KPIs).

3.1 Problem statements

A workshop was held, in October 2016 with key stakeholders to reconfirm the problems based on PBC evidence relating to safety, resilience and travel time.

The Western Corridor investment problem statement was refined by the PBC to as follows:

- **Problem statement:** High traffic generating land use inappropriately connected to the network will lead to delay and conflict between road users

3.2 The benefits of investment

The Western Corridor benefits which have been agreed to be sought from any future DBC and other adjoining DBC's are as follows:

- **Benefit 1:** Western Corridor accessibility and liveability (live work play) - 70%
- **Benefit 2:** Efficient truck freight route to Port of Tauranga – 30%

The percentage weightings were identified and agreed by stakeholders, demonstrating the relative importance of each benefit.

3.2.1 Activity objectives and outcomes

The activity objectives are defined as follows:

- **Activity objective 1**: Maintain people's travel time and reliability – 50%
- **Activity objective 2**: Increase mode choice (PT, walk, cycle) – 20%
- **Activity objective 3:** Increase internalisation of vehicle trips – 30%

The term 'internalisation' used in activity objective 2, is defined as the % of overall trips that do not require customers to travel along the State Highway network with the local road network being the preferred route. The ILM benefit map for the Western Corridor is shown below in Figure 11.

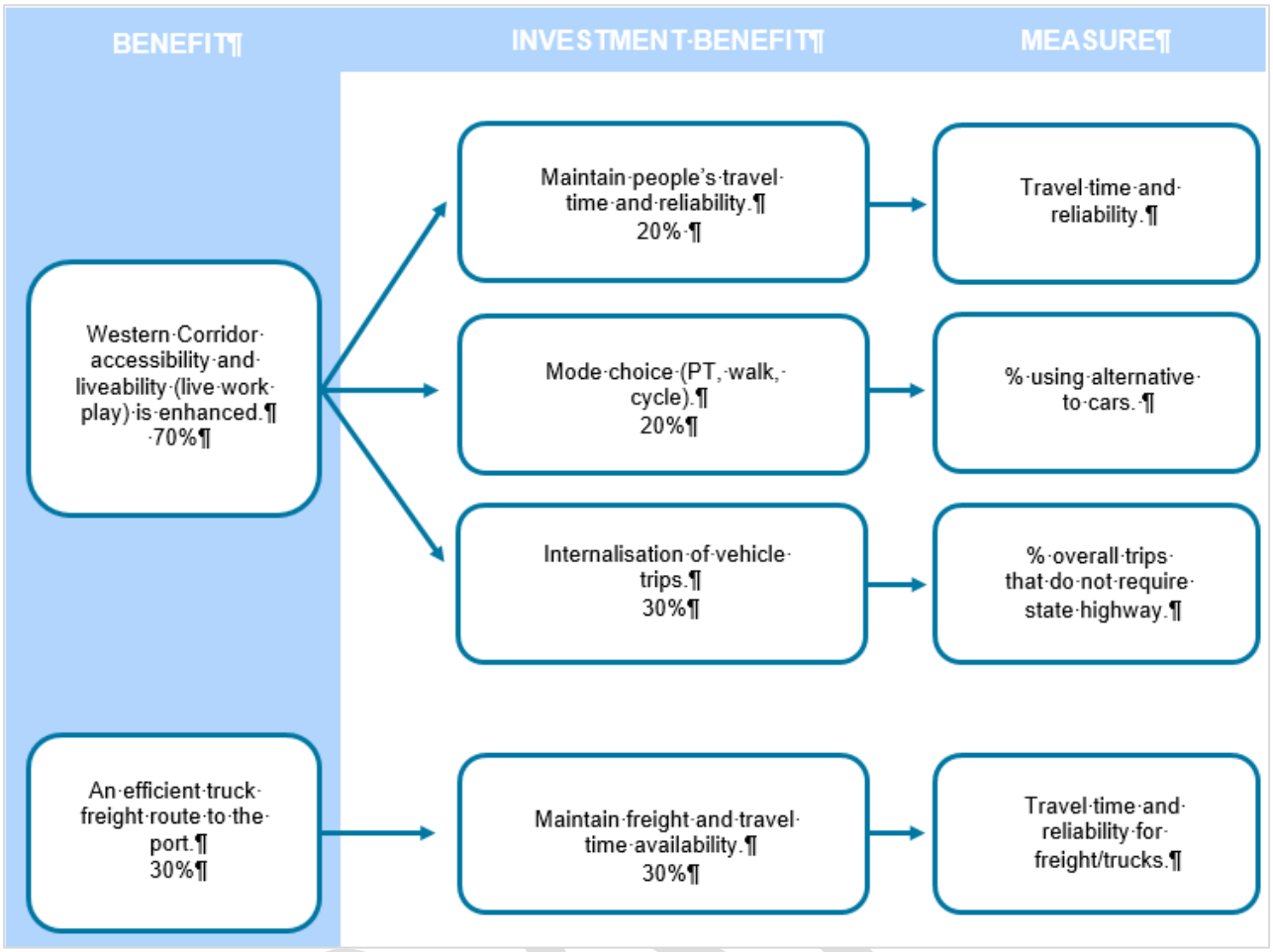


Figure 11: Western Corridor Investment Logic Map

3.2.2 Key performance indicators and measures

KPIs, performance measures, baselines and targets for each activity objective will need to be agreed during the development of any future Western Corridor Business Case

3.3 Issues and uncertainties

A number of issues and uncertainties that may impact on the project outcomes and outputs have been identified and are listed below.

3.3.1 Issues and uncertainties

A range of key issues and uncertainties which could influence the scope of the project outcomes and outputs have been identified. 'Issues' include uncertainties will need further exploring at the BDC phase of this project. Some identified issues include:

- The future growth and settlement patterns of the Western Corridor;
- The future upgrades and network improvements along SH29 and SH29A;
- Future predictions of traffic volumes (including increase in PT and mode share) within the Western Corridor and Tauranga City;
- Changing land use activities and zoning along the western corridor.

4 Partners and key stakeholders

4.1 Investment partners

The investment partner is identified as an organisation with roles and responsibilities for influencing, managing or co-funding elements of the land transport system in the Bay of Plenty region.

Table 2 provides an overview of the investment partner and their statutory functions, roles and responsibilities in relation to the investigation.

Table 2: Investment partners

Organisation	Roles and Responsibilities
NZ Transport Agency	Crown entity with a statutory objective to undertake its functions in a way that contributes to an effective, efficient and safe land transport system in the public interest in accordance with the Land Transport Management Act 2003 (LTMA). To manage the state highway system, including planning funding, design, supervision, construction and maintenance and operation, in accordance with the LTMA and the Government Roading Powers Act 1989. The Transport Agency is the road controlling authority (RCA) for SH29. The Transport Agency is a requiring authority under the RMA.
Tauranga City Council	. tbc

4.2 Key stakeholders

Several key stakeholders have been identified as having a potential influence on this assessment and future outcomes of the DBC going forward, and are summarised in Table 3 below.

Table 3: Key stakeholders

Stakeholder	Focus areas
Customers	The key customer groups have been identified as daily commuters, local residents accessing properties, schools and facilities, freight operators travelling along SH29 and SH36, domestic tourists. (Oropi Gorge Mountain Bike Track)
Bay of Plenty Regional Council	Bay of Plenty Regional Council is concerned with environmental affects and public transport integration of the western corridor
Western Bay of Plenty District Council	Western Bay of Plenty District Council's concerned with the safe and efficient operation of the local road network, as well as the safe, social and economic wellbeing of communities within this council, the growth aspirations around the western corridor and effects on the social and environment of the options
Automobile Association	Articulates the views of their members and provides an advocacy function for motorists.
NZ Police	NZ Police are responsible for enforcing criminal law, enhancing public safety, maintaining order and matters of national security. They also are responsible for traffic and commercial vehicle enforcement.
Heritage New Zealand Pouhere Taonga (Heritage NZ)	Heritage NZ is charged with conserving historic heritage and archaeological sites across New Zealand as well significant cultural archaeological sites within the corridor

4.3 Consultation and communication approach

Stakeholder and community engagement has been only partly undertaken with open day workshops held on the PBC recommendation. One on One engagement with Mana Whenua Iwi, NZ Transport Agency, Western Bay District and Tauranga City Councils and Bay of Plenty have occurred to explore constraints and future aspirations for the Western Corridor.

Engagement and consultation activities will be ongoing through the NZ Transport Agency DBC and Tauriko Network Growth Plans with more targeted engagement and collaboration needed during any future DBC for the Western Corridor.

5 Link Road Option Assessment

5.1 Background and Context

Although the need for the link road is a number of years away, given the rapid development within the area it is important to determine the preferred future road linkages and protect those road corridors.

The PBC recommended an east west link option though TBE, across Kopurererua Stream to SH 36.

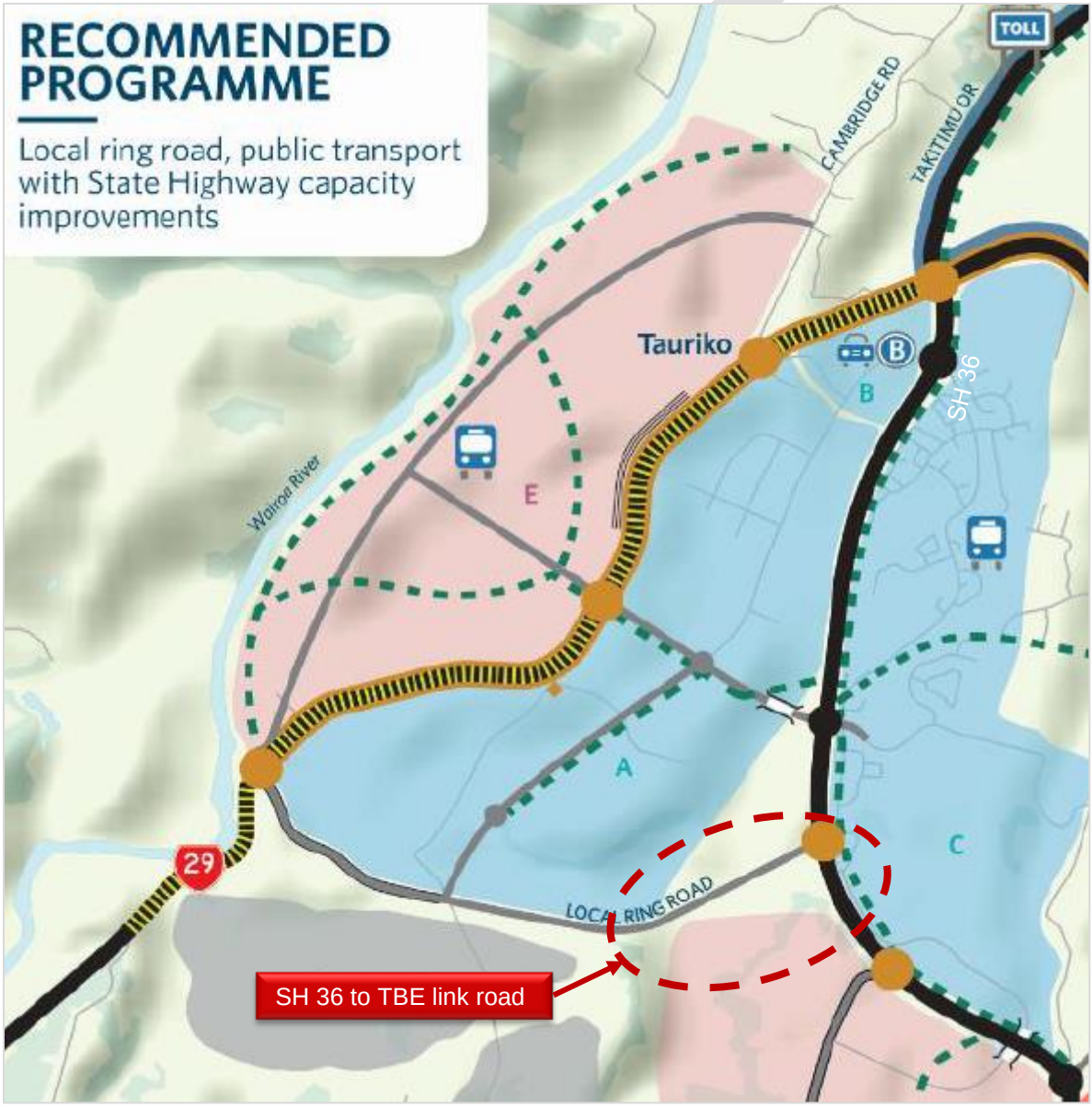


Figure 12 - Recommended Programme Business Case Scope showing the Link Road general location

The available envelope in which the link can be constructed is limited by a number of factors which are discussed below:

5.2 Constraints

5.2.1 TBE Infrastructure

The road layout and stormwater ponds for the TBE development on the western side of Kopurererua Stream are already determined with earthworks completed and a number of lots already under contract.

The point of connection therefore, to the TBE roading infrastructure provided little scope for variation, with locations and levels already set.

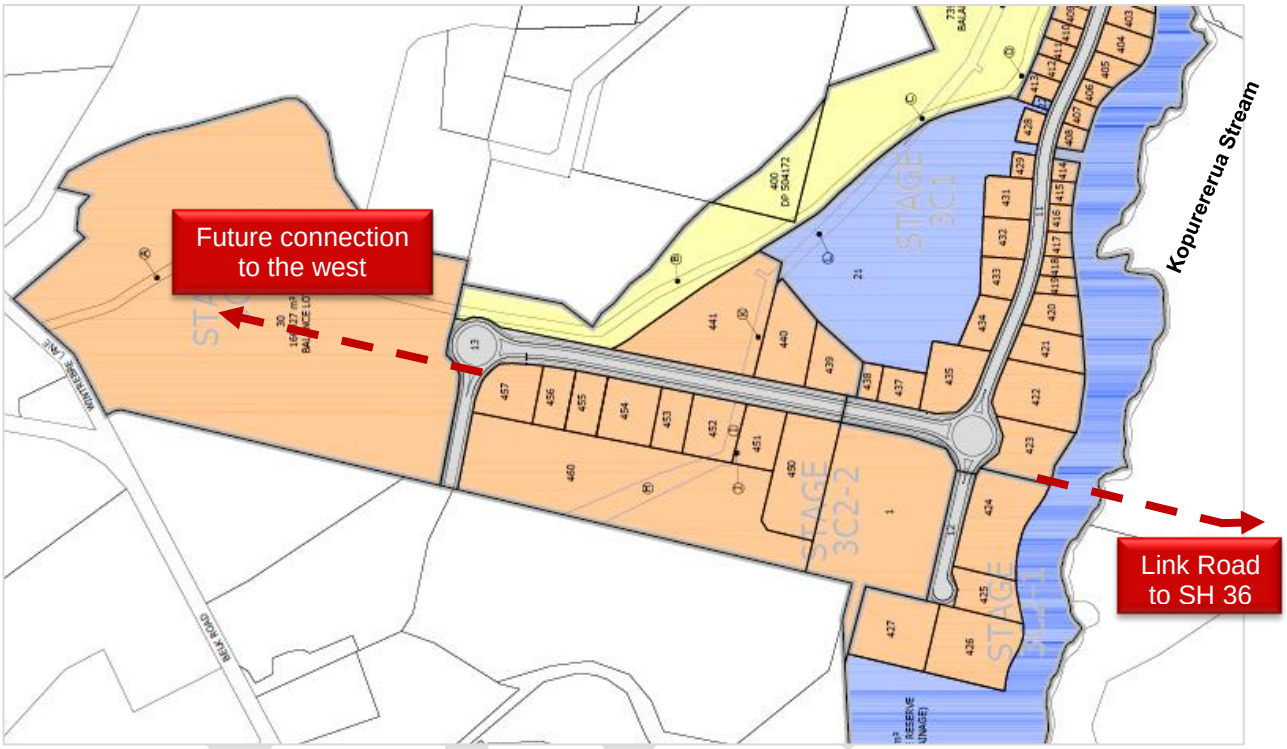


Figure 13 – Current proposed extent of TBE road network west of Kopurererua Stream - Source: TBE 3 Ltd Stage 3C proposed subdivision

5.2.2 Kopurererua Stream Flood level

Previous flood modelling has determined the expected 100 year flood level to which the TBE landform has been designed. This includes the width of the flood channel either side of the Kopurererua Stream.

The flood plain between the Kopurererua Stream and SH 36, extends across a wide area of low lying land over which several the alignment options traverse. The extent of the 100year flood zone is shown on the option alignments. Road construction across the flood plain will result in a road embankment.

An existing open drain is located within the flood plain.

In conjunction with Link Road feasibility, Tauranga City commissioned Aurecon to update the current 2D Mike Flood stormwater model of the Kopurererua Stream to include the landform and stormwater management of the TBE stage 3B and 3C areas of the Tauriko Staging Diagram – Diagram 9 of the City Plan.

Updating the model to include these aspects enables the stormwater model to better represent the built environment and be more accurate for use for development planning and impact assessments.

A separate modelling report has been delivered to Tauranga City and is included in Appendix A. The stormwater model update report concludes that'

"The consented floodplain infilling associated with the TBE development has been modelled in a more realistic manner in the Judea catchment model, including an update of the post-development hydrology to

reflect surface type changes and the new landforms. These changes have generally lowered the maximum water levels surrounding the Kopurererua Stream, particularly in areas adjacent to the development."

The model has not been updated to determine the effect of a road embankment between SH 36 and TBE.

5.2.3 Adjacent topography

The land rises steeply, to the south of the proposed route limiting the extent of alignment options.

A small hill exists to the north which is owned by Tauranga City and was included in alignment options and may be used as a source of fill material.

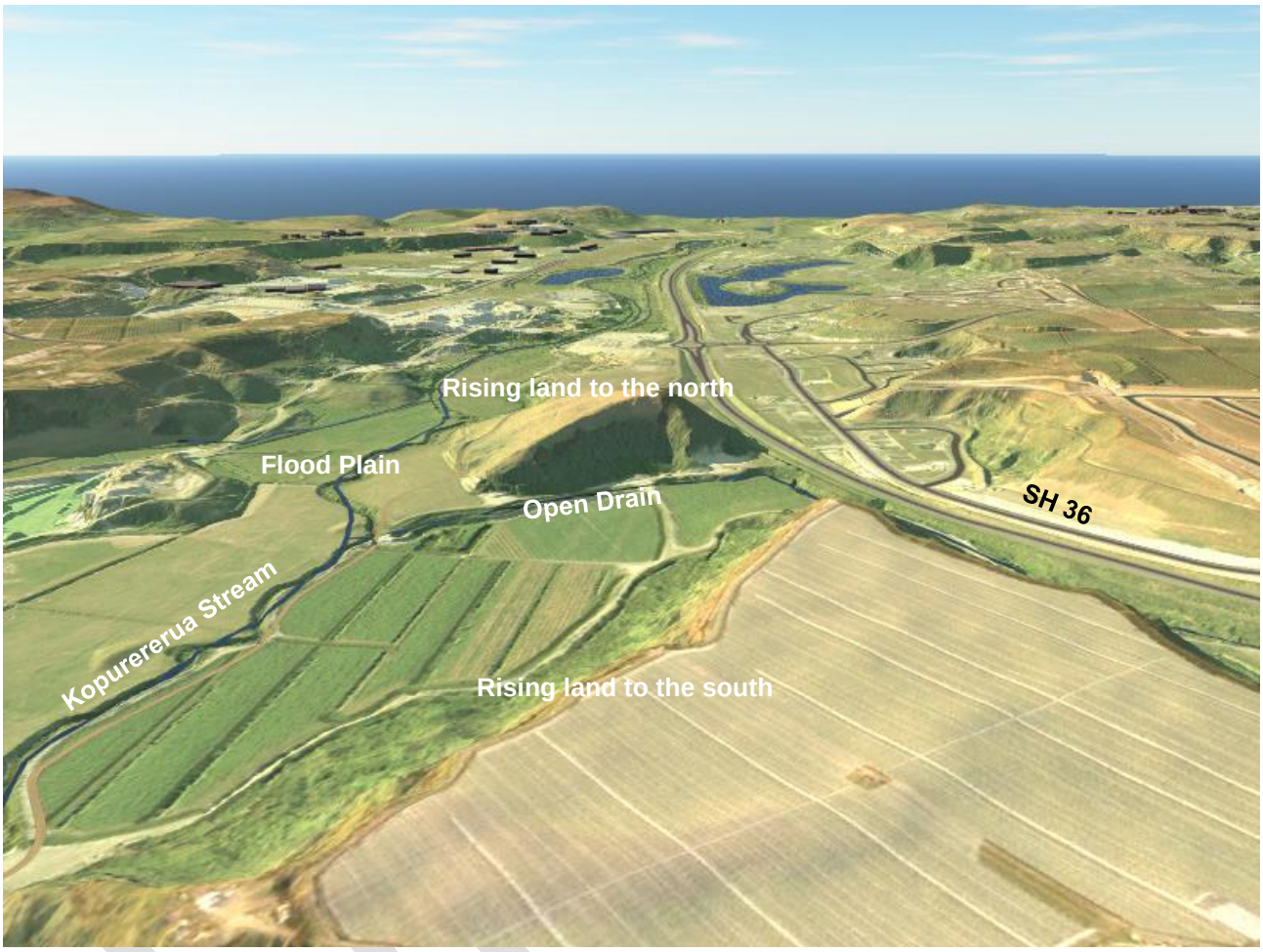


Figure 14 – Contour plan and aerial

5.3 Design Criteria and Assumptions

- Based on the future modelling data that has been undertaken by Tauranga City, the ultimate road cross section is to be four lane median divided road with an on road cycle lane in each direction;
- The assessment includes staging options to allow for an initial two lane connection with cycle lane;
- The design speed is 70km/hr;
- The roundabout lane configuration at SH 36 is as provided by Tauranga City from their analysis;
- The Kopurererua Stream bridge is assumed to be the same span and cost as the Kennedy Road Bridge, which is currently under construction;
- Provision of a local road connection on the eastern side of the Kopurererua Stream, extending south along the base of the escarpment, within the Southern Cross Hort (Dunstan) landholding. This road forms a T intersection with the new link road and is restricted to left in and left out movements only.

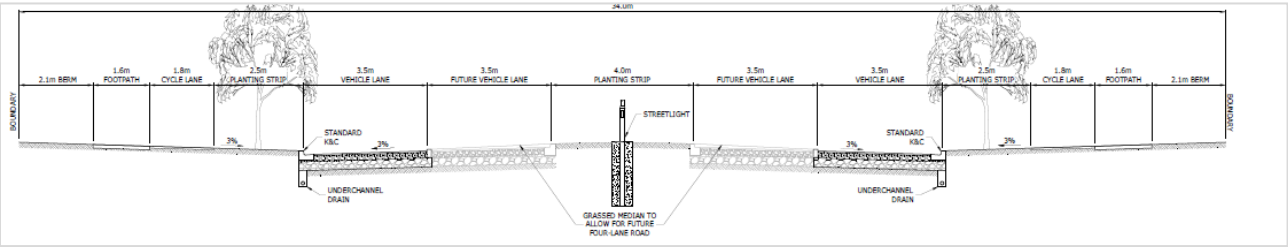


Figure 15 – Ultimate design cross section- Source:TCC

5.4 Long List Options

The available options for the location of the new road link are limited. Seven alignment options have been developed and discussed with TBE (Bryce Donne and Grant Downing) Southern Cross Hort (Andrew Dunstan) and Tauranga City.

The centre line aligments of the 7 options are shown in Figure 6 below, which also shows the TBE development to the west.

Figure 16 – Option centre lines

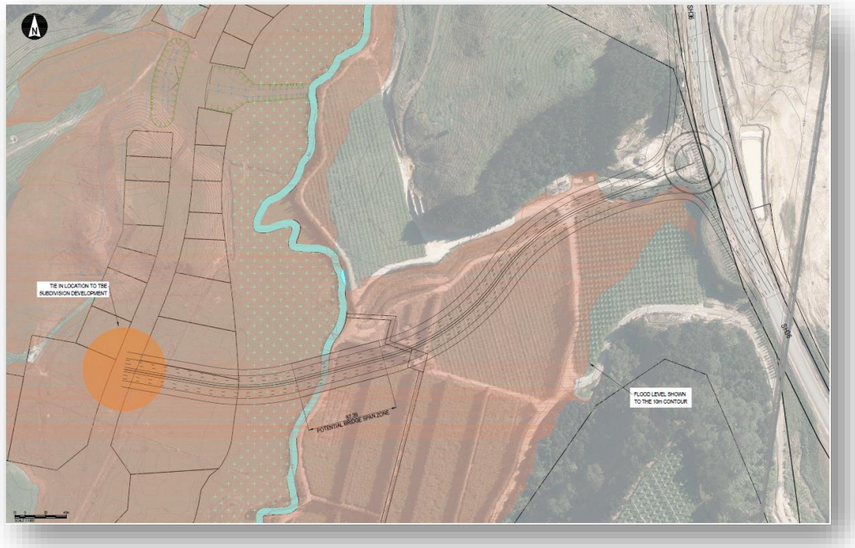
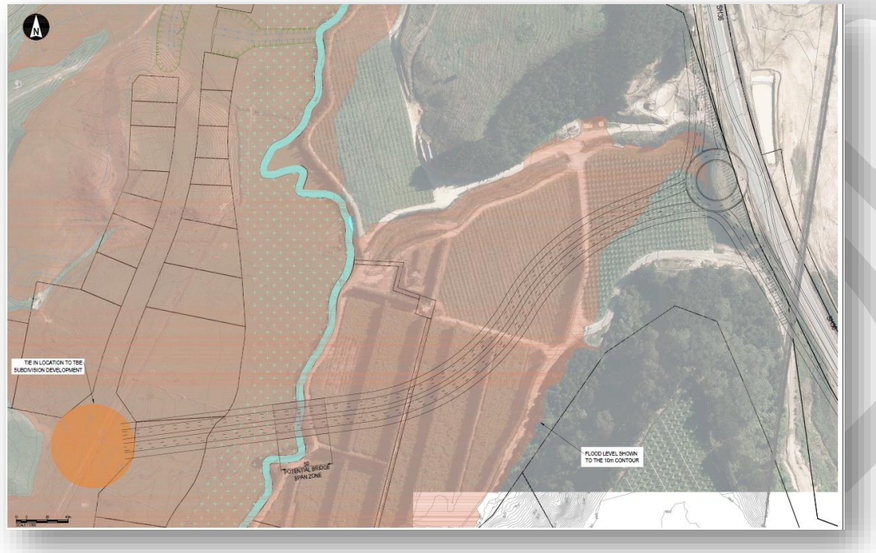
With land to the north being elevated above the expected 100year flood level and with improved soil conditions, Options 1, 3, 5 and 6 were considered, to took advantage of this and reduce the impact on the existing Kiwifruit orchard, should Southern Cross Hort wish to continue an orchard operation after construction of the road.

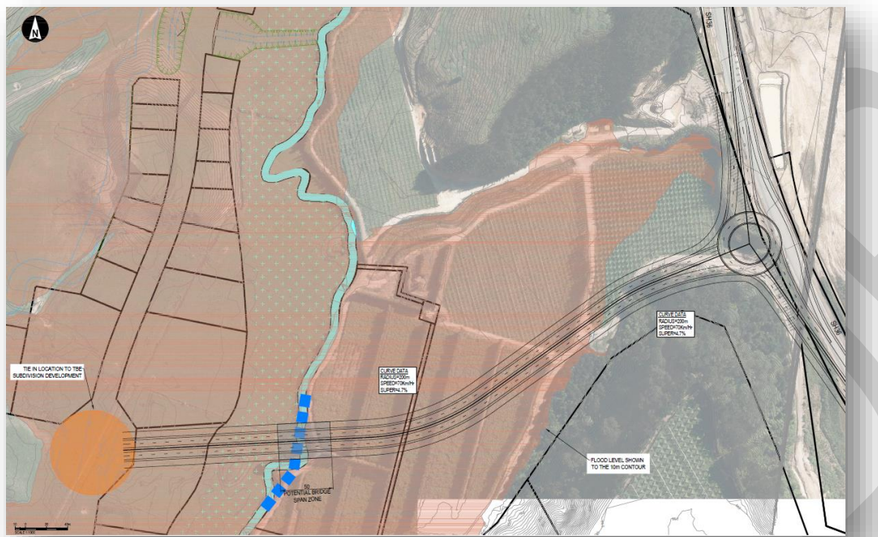
Each of the options is discussed below:

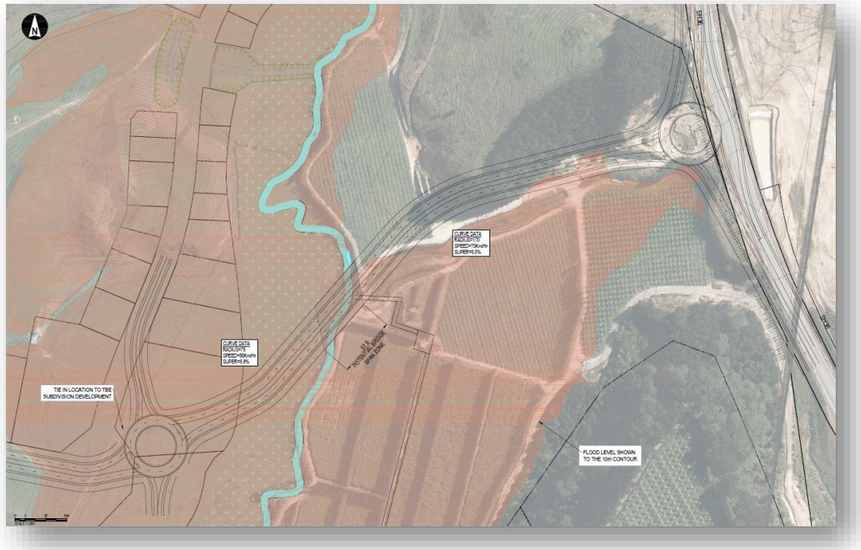
5.4.1 Long list Options Table

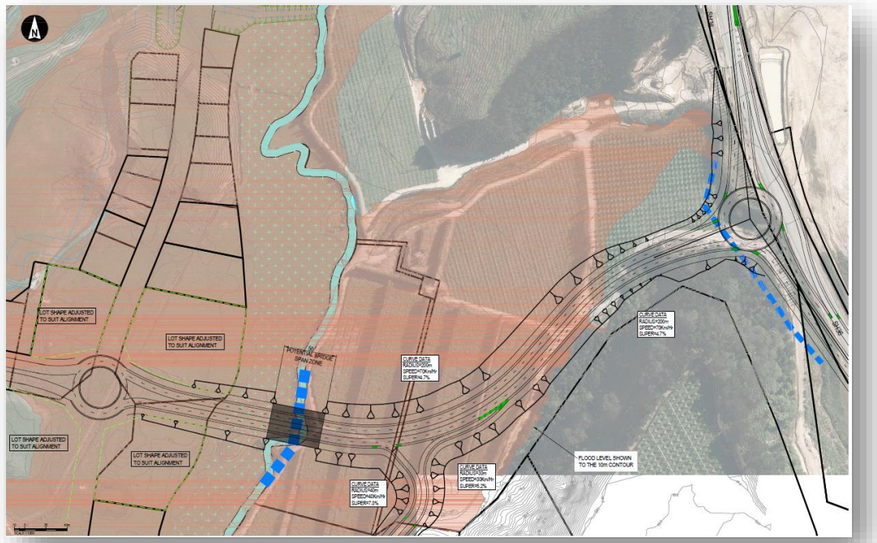
The following table summarises the key points and difference between the options. Option 7 is the preferred option a plan of which is included in Appendix B.

Table 4 – Option comparison

Option		Description	Preferred
1		• Commences at SH 36 within the relatively good soil foundation, and curves to the south, crosses K Stream and joins the TBE local road alignment, to the north of their indicated intersection; • Three horizontal curves matching recommended design speed for the east west link; • Crosses Kopurererua Stream at an angle impacting on the length of bridge required; • A stormwater pond is located to the west of the tie in location within TBE, behind the lots facing the local road. A new intersection at this location would necessitate an alteration to the stormwater pond to continue the alignment of the east west link towards SH 29, together with changes to the TBE lot layouts to the west.	Not preferred • This alignment was prepared in consultation with TBE, to enable them to determine the effects on their development and whether there would be any advantages in altering their plans • Deemed to be unsuitable given the stage of the TBE development, with some lots already being sold and the stormwater pond constructed.
2		• Commences at SH 36, roughly central within the flood plain; • Connects to TBE intersection; • Two horizontal curves matching recommended design speed for the east west link; • Approach angle to TBE roundabout is not square and the approach impacts on two TBE lots; • Crosses Kopurererua Stream at right angles to the stream channel, shortening the length of bridge required; • A squared up approach to the TBE roundabout is geometrically easier to design and will reduce impact on the number of TBE lots;	Not preferred • Angled approach to the TBE roundabout controlled intersection creates geometric design complexity

3		• Similar to option 1, but with the SH 36 roundabout moved further north to take better advantage of the improved soil conditions; • Same issues for option 1 with connection at TBE	Not preferred • This alignment was prepared in consultation with TBE, to enable them to determine the effects on their development and whether there would be any advantages in altering their plans • Deemed to be unsuitable given the stage of the TBE development, with some lots already being sold and the stormwater pond constructed.
4		• Commences at SH 36, on the south side of the flood plain at the bottom of the Southern Cross Hort escarpment; • Connects to TBE intersection; • Two horizontal curves with 200m radii, matching recommended design speed for the east west link; • Approach angle to TBE roundabout is not square; • Crosses Kopurererua Stream further south than option 2, in close proximity to a bend in the stream that will necessitate work in the stream, to straighten the stream channel. This is required to avoid stream erosion undermining the bridge abutments; • A squared up approach to the TBE roundabout is geometrically easier to design.	Not preferred • Angled approach to the TBE roundabout controlled intersection creates geometric design complexity

5		• Commences at SH 36, on the north side on the good foundation just north of the flood plain; • This alignment maximises the length of alignment on good ground above the flood plain and minimises the impact on the Southern Cross Hort kiwifruit orchard; • Connects to a relocated TBE intersection within proposed lots immediately west of the TBE proposed intersection location; • There are two horizontal curves; the curve to the west of the bridge is short and has a 50km/h design speed while the curve to the east has a 70km/h design speed; • Crosses Kopurererua Stream at an angle, with potential erosion issues at the bridge abutments; • Affects 2 proposed TBE lots	Not preferred • Results in major adjustment on TBE development • Complicates geometrical design on all approaches to the roundabout • Longer bridge
6		• Similar to option 5 - commences at SH 36, on the north side on the good foundation just north of the flood plain; • This alignment maximises the length of alignment on good ground above the flood plain and minimises the impact on the Southern Cross Hort kiwifruit orchard; • Connects to the TBE proposed intersection location; • There are two horizontal curves; the curve to the west of the bridge has a 50km/h design speed while the curve to the east has a 70km/h design speed; • The 50km/h design speed curve is longer in option 6 than in option 5 above and has more deflection with potential risk of loss of control crashes • Affects 2 proposed TBE lots	Not preferred • Additional length of road • 50km/hr bend east of TBE

7		Preferred option alignment; • Commences at SH 36, on the south side of the flood plain at the bottom of the Southern Cross Hort escarpment and continues along the base of the escarpment to provide a straight approach to the TBE roundabout ; • Provides for a local road connection south for Southern Cross Hort for future development options ; • Two horizontal curves with 200m radii, matching recommended design speed for the east west link; • Approach angle to TBE roundabout is square; • Crosses Kopurererua Stream further south than option 2, in close proximity to a bend in the stream that will necessitate work in the stream, to straighten the stream channel. This is required to avoid stream erosion undermining the bridge abutments; • TBE roundabout is pushed north slightly and will require a change to boundaries shown, to suit, but does not affect the stormwater pond or TBE's ability to develop	Preferred • Most appropriate option for connection to TBE and future road south within Southern Cross Hort; • Note, that TBE have made the appropriate adjustments on their Stage 3C development to accommodate the link road.

5.5 Consultation

5.5.1 Option assessment

During the option assessment, regular consultation was undertaken with TBE Limited to ensure coordination and acceptability of the connection at the TBE interface. The TBE part of the network will be constructed well in advance of the need for the connection to SH 36. TBE will be providing for the full 34m wide road corridor and will initially be constructing the outer traffic lanes only with a 10m median.

Tauranga City consultation included both transport and stormwater personnel within the City and Infrastructure Planning Section.

A meeting was held with Southern Cross Hort (Andrew Dunstan) to provide background on the PBC and the identified future need for and east west link. All of the options traverse Southern Cross Hort's lower Kiwifruit orchard. The preferred option 7 alignment has been provided to them together with a wider network plan showing the links further to the west. Interest was expressed in the potential to fill the flood plain area on the north side of the new link road, to enable residential development. At this stage, no assessment has been undertaken regarding access provisions to such a development or the potential impact on flood levels and stormwater modelling within the Kopurererua.

To maintain alignment with the NZ Transport Agency PBC and the Detailed Business Case (DBC) projects currently underway, both Ian Herbert and Wayne Troughton have been kept abreast of the link road options and have attended several liaison meetings.

5.5.2 TCC Business Case

Tauranga City Council will be preparing a Business Case, to plan local roading infrastructure to cater for the future demand from the development of the Western Corridor SmartGrowth Area. This process is in its early stages with the first Stakeholder Consultation Workshop undertaken on 21 September to confirm the Investment Logic Mapping (ILM) and support for the PBC objectives.

Stakeholders:

- NZ Police
- BOPRC
- NZTA
- TCC

5.6 Staging

Traffic modelling of future flows undertaken by TCC has determined that the link road between SH 29 and SH 36 will ultimately need to be a four-lane road. TCC has determined the final road cross section refer Figure 15 in section 5.3 above.

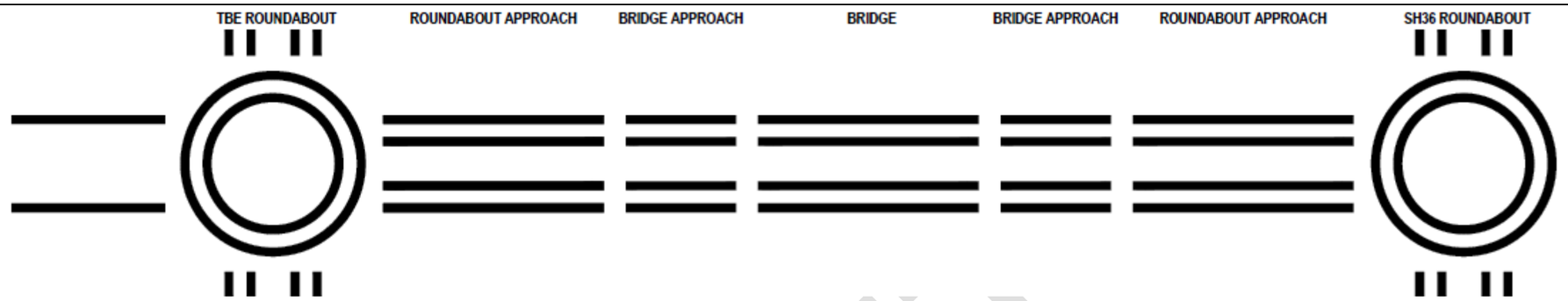
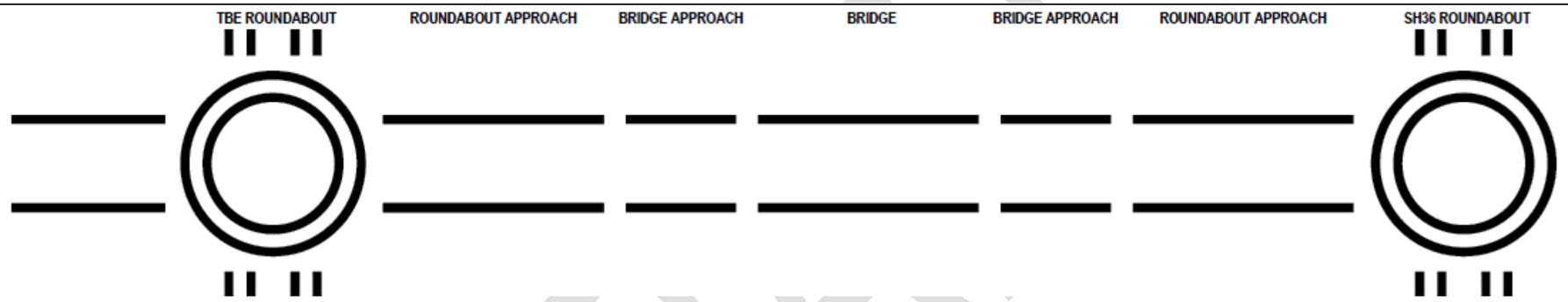
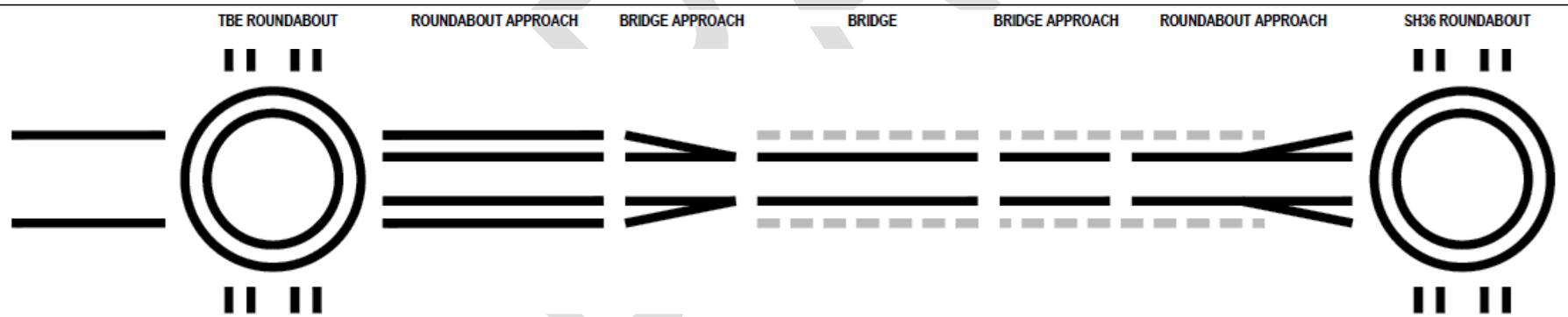
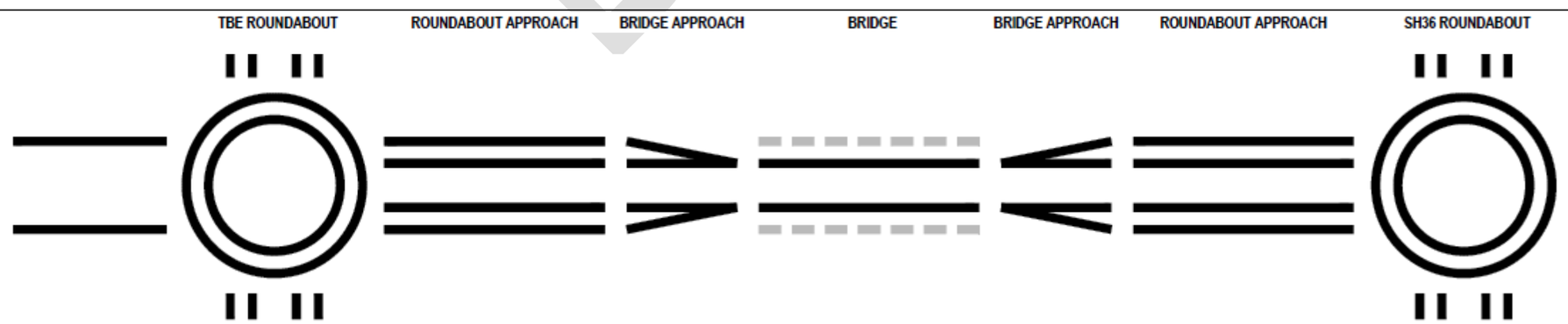
TBE have confirmed that the initial construction configuration will be the full 34m wide road corridor with the outer traffic lanes only with a 10m median. When the additional lanes are required, the median will be narrowed to 4m.

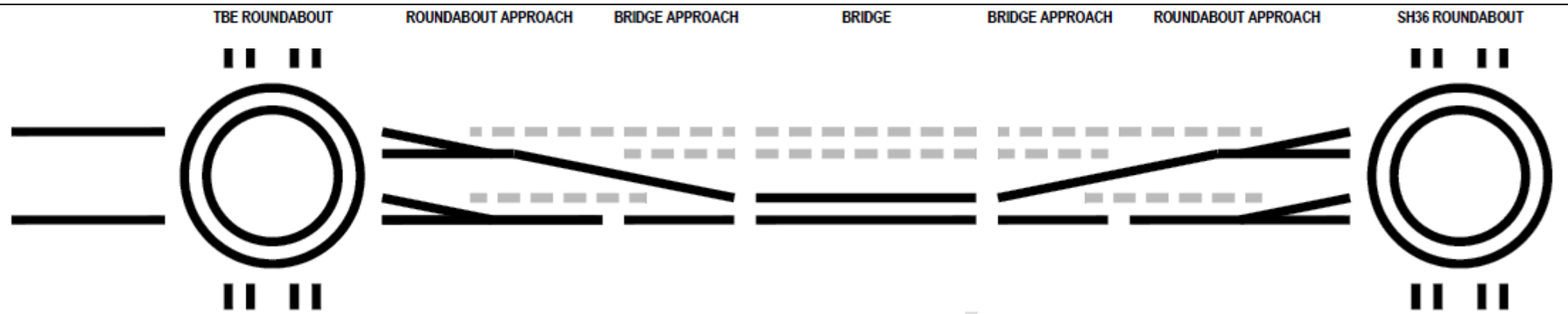
Several options for staging the section of the east west link between TBE and SH 36 are available and are provided in Table 2 below. The roundabouts should be constructed to suit the final lane configuration.

5.6.1 Match the TBE cross section

-

Table 5 – Staging Options

Option	Schematic Line diagram	Description
Construct ultimate four lane cross section from day 1		• 4 Lane median divided between TBE and SH 36 • 4m median • Single 4 lane bridge
Match the TBE cross section		• 2 lane median divided • 10m median • Single 4 lane bridge but 2 lane use • Median reduced to 4m when additional lanes required
2 lanes from bridge to SH 36 widening at SH 36 roundabout to match into roundabout		• Ultimate 4 lane from TBE roundabout to bridge **or** match the TBE cross section to the bridge • Single 4 lane bridge but 2 lane use • 2 lanes from bridge to SH 36 wending at SH 36 to match into roundabout lane configuration
Ultimate 4 lane construction width, with centralised 2 lane bridge that can be widened later to 4 lanes		• Ultimate 4 lane width from TBE roundabout to SH 36 roundabout • Centralised 2 lane bridge with the ability to add an extra lane on the outside when 4 lanes are required

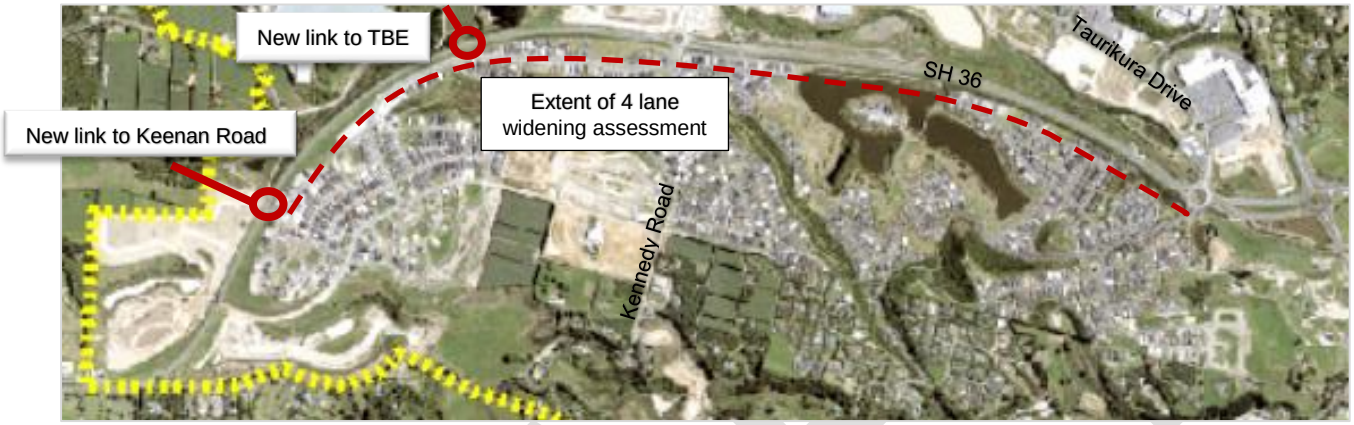
2 lane link road between roundabouts		• Taper from roundabouts to 2 lane link road • 2 lane link road is one side of carriageway only • Initial construction of one two lane bridge • When 4 lanes required, construct a second bridge and the matching carriageway • Initial construction recommended to be southern side to facilitate future road connection to the south on Southern Cross Hort land

5.7 Cost Estimate

6 SH 36 Widening

As part of the link road feasibility project between SH 36 and the Tauriko Business Estate (TBE), an assessment was undertaken to determine the extent of the required road corridor, to future proof SH 36 between Taurikura Drive and the future roundabout connection to the new spine road to the Keenan Road area. Refer Figure 7 below

Figure 17 – Extent of future 4 lane SH 36



6.1 Lane configuration

The extent of the future four lane requirement was provided by Tauranga City and was determined as part of the traffic modelling undertaken to determine future flows on the network, where future bottle necks will occur and the required capacity improvements to provide for future growth.

SH 36 between Taurikura Drive and SH 29 is three lanes in each direction while the section from the future spine road to Keenan Road and Pyes Pa Road is one lane in direction.

The SH 36 Kennedy Road roundabout has been constructed with two lane approach and departure lanes on SH 36.

The future modelling indicates that 4 lanes were only required between the future spine road connection to Keenan Road and Taurikura Drive.

6.2 Cycle way

Extensive off road cycle paths and walkways are provided in The Lakes development. The SH 36 widening assessment includes provision of an off road cycle way on the western side of SH 36 connecting to the existing underpass to The Lakes at the southern end and tying into proposed cycle routes on the link to TBE and via another underpass south of the TBE link to join into the exiting shared use facilities at Kennedy Road, east of SH 36. Refer plan 008 – Appendix xx

6.3 Securing the road corridor for the future

The preferred option to protect the corridor is to designate.

6.4 Background and Context

The eastern end of the proposed Ring Road (SH36 to SH29A), whilst generally unpopulated semi-rural presents some significant challenges in building a new ring road due to the topography and environmental constraints. The traffic forecast growth for this area is highly dependent on the future growth areas of Keenan, Upper Joyce and Upper Belk with traffic volumes on the local road network potentially increasing to five times the current daily demand.

The staging and timing for the development of this areas will determine the need and timing for the investment into the ring road. It is envisioned that planning for this ring road and investment into land purchases and protection of the corridor will be the focus for the next 10 years of investment. The investments into the construction of the road will be after 10 years when the southern growth areas start being populated.

The unpopulated landscape, also presents opportunities for alternative corridors or staging for this section of the Ring Road. This section of the Engineering Feasibility report looks at the feasibility and cost of alternative corridors and staging options for Ring Road by providing an east-west transport link between SH36 to SH29A.

6.5 Constraints and Opportunities

6.5.1 Topography

The key constraint with this area is the existing topography, were steep escarpments around 50m high with slopes at over 45 degrees limit the type and location of options to construct an arterial road.

A 3d model of the topography around the Western Corridor is shown in Figure 18 below.

Figure 18: Slope Terrain Map (Green 18-36 Degree; Yellow 36-54 degrees, Red >55^)

6.5.2 Future Land Development

The ring road will also present an opportunity to drive future development and growth in the area, with new infrastructure and road links. These links could promote future redeveloped and rezoning to resident development, creating around 100-120ha of developable land. This concept is shown in Figure 19 below.

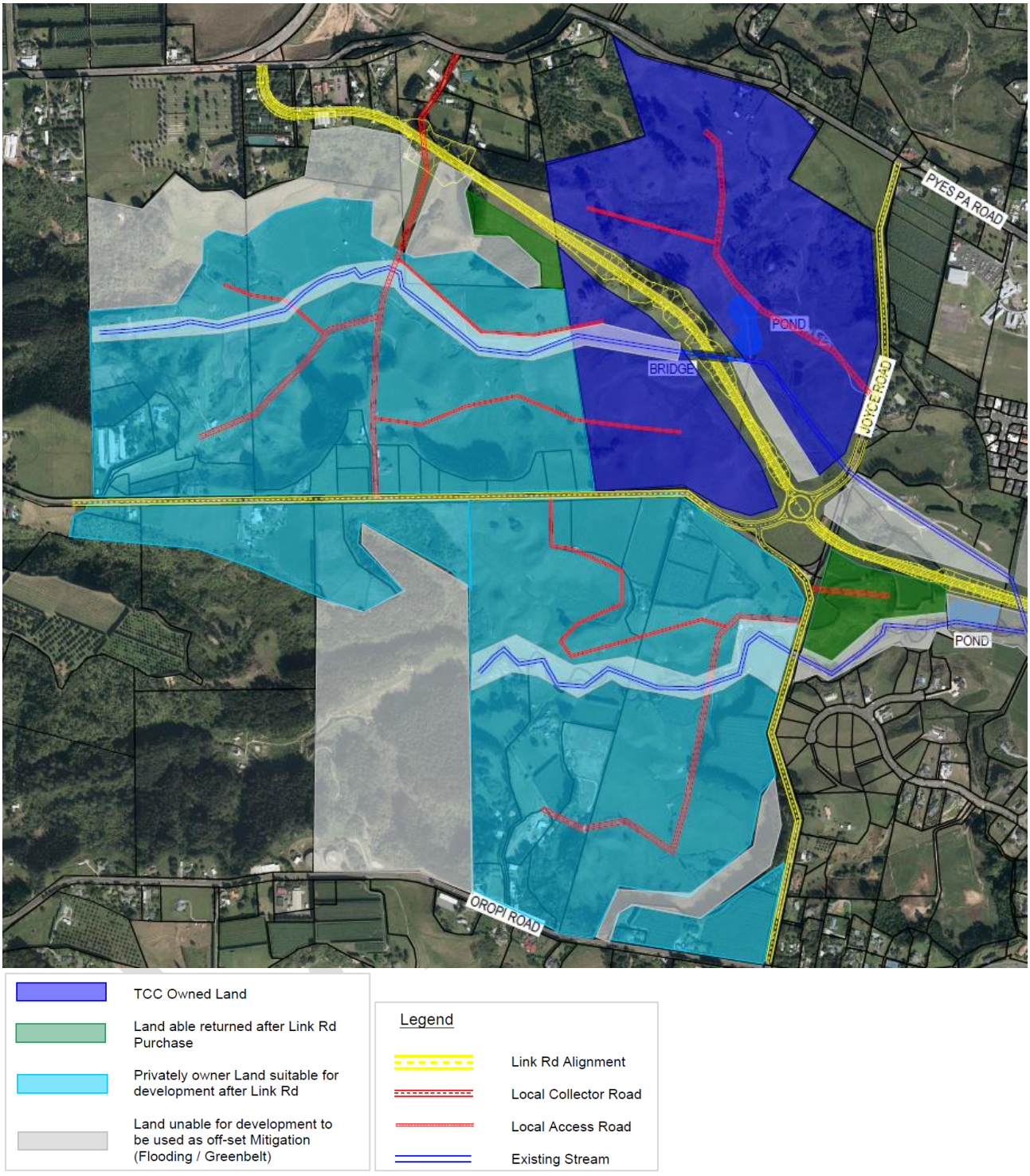


Figure 19: Potential Western Corridor led growth area and rezoning

6.5.3 Road Safety Risk

One key constraint for future traffic growth is the existing safety performance of parts of the local road network. A review of the CAS crash data highlights the following tends and accident types that have occurred on the local roads over the last 5-10 years

1. Loss of control / speed related crashes on Pyes Pa Rd between SH36 and Joyce
2. Head on / loss control crashes on Oropi Rd (more crashes occur at night north of Woods Rd)
3. Pedestrian, cyclist and turning crashes along Joyce Road, north of Joyce

A review of the current improvements and treatments undertaken on the network, appears items 1 and 3 have had investment to reduce these crashed with new roadside barriers, signs and pavement surfacing installed along north of Joyce Rd and new on-road cycle facilities, upgrades to pedestrian crossings and reduced speed limit, south of Joyce Rd extending to Kennedy Rd.

Oropi Road has not have the same level of investment and is considered a constraint, if more traffic is added along this road. Oropi Road from Pukemapu Road to SH29A is currently performing as a “Medium High” risk level for both collective and personal safety, under the Urban KiwiRap Risk Mapping with a multiple fatal crash occurring in 2011.

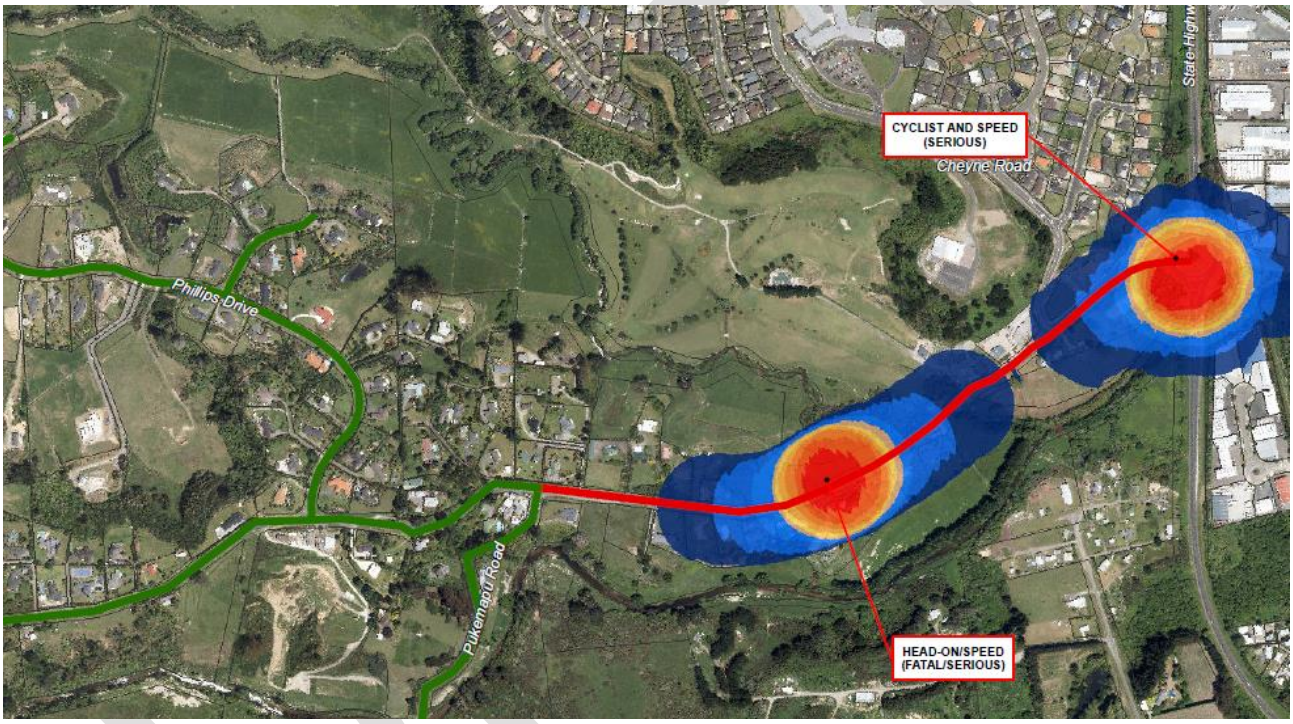


Figure 20: Crash Risk Map, showing crash black spots and “Medium High” KiwiRap Risk Section in red

6.5.4 Utility Services and Lifeline Services

The following Utilities Services and Lifeline Services have been identified within the corridor. The corridor plays a significant role in the water supply for Tauranga with bulk water mains running along Oropi Road and through the Waimapu river valley. In discussion with TCC the investment for the ring road along the Western Corridor may presents an opportunity to combine investment and funding for future additional bulk water main / supply running through the Waimapu River Valley to cater for Tauranga’s growing population.

A summary of utilities within the corridor include;

- TCC- 3 Bulk watermains along Oropi road (median & verge);
- TCC - Water Storage and Processing Plant on Oropi Road;
- Bulk watermains and through the Waimapu River Valley (provision for future lines requested from TCC);
- Overhead 11Kv power along Joyce Road and Oropi Road;
- Fibre and storm water along Joyce Road and Oropi Road;

- Wastewater along Oropi Road;
- Water Station on Joyce and Woods Road;
- Water Pump Station on Oropi Road near SH29A;
- Grace Hospital servers as a key lifeline facility and is located with access from Oropi Road near SH29A.

6.6 Design Criteria and Assumptions

The following section summaries the key assumptions and design criterion adopted in the development of the corridor options for the eastern side of the Western Corridor.

6.6.1 Road Design Philosophy

The road design philosophy is based on the TCC infrastructure guidelines, T100 Series and have been adapted to provide a safe system design in discussion with TCC traffic engineers. The key design parameters and philosophy is shown in the below tables.

Road Geometry

Table 6: Summary of the Road Geometry for the Western Corridor

Road Hierarchy Type	Example of Road	Posted Speed Limit (km/h)	Horizontal Geometry (Radius m min)	Vertical max. Grade
Arterial	Pyes Pa Road (north of Kennedy)	50-70	250	8% max grade
Primary Collector	Oropi Road (South of Wood Rd)	80-100	200	8% max grade
Secondary Collector	Joyce Road	70-80	150	10% max grade
Local Access	Wood Road	50	25	10% max grade

Typical Cross Section

The typical sections are based on the T100 perspective plans and adjusted for safe system design, mirroring the western corridor section for the western side. The details of these sections is detailed below with typical sections shown in Figure 21 below.

Table 7: Summary of the Typical Cross Sections for the Western Corridor

Road Hierarchy Type	Example of Road	Lane Numbers and Width	Median Treatment	Cycle & Pedestrian Facilities
Arterial	Proposed Ring Road	1+1 (3.5m width)	4m wide Median (option for wire-rope)	1.8m Cycle SHR Off-road 3m Shared Use Path
Arterial	Pyes Pa Road / Oropi Rd (north of Joyce)	1+1 (3.5m width)	2.5m wide painted Median	1.8m Cycle SHR 2.5m Footpath
Primary Collector	Oropi Road (South of Wood Rd)	1+1 (3.5m width)	NIL	1.8m Cycle SHR

Secondary Collector	Joyce Road	1+1 (3.0m width)	NIL	1.5m Cycle SHR 1.5m Footpath
Local Access	Wood Road	1 (5.0m width)	NIL	1.5m Footpath (if applicable)

* All typical sections include 2.0m berms for utilities and 1.5m berms for landscaping between footpaths and edge of road shoulder as required.

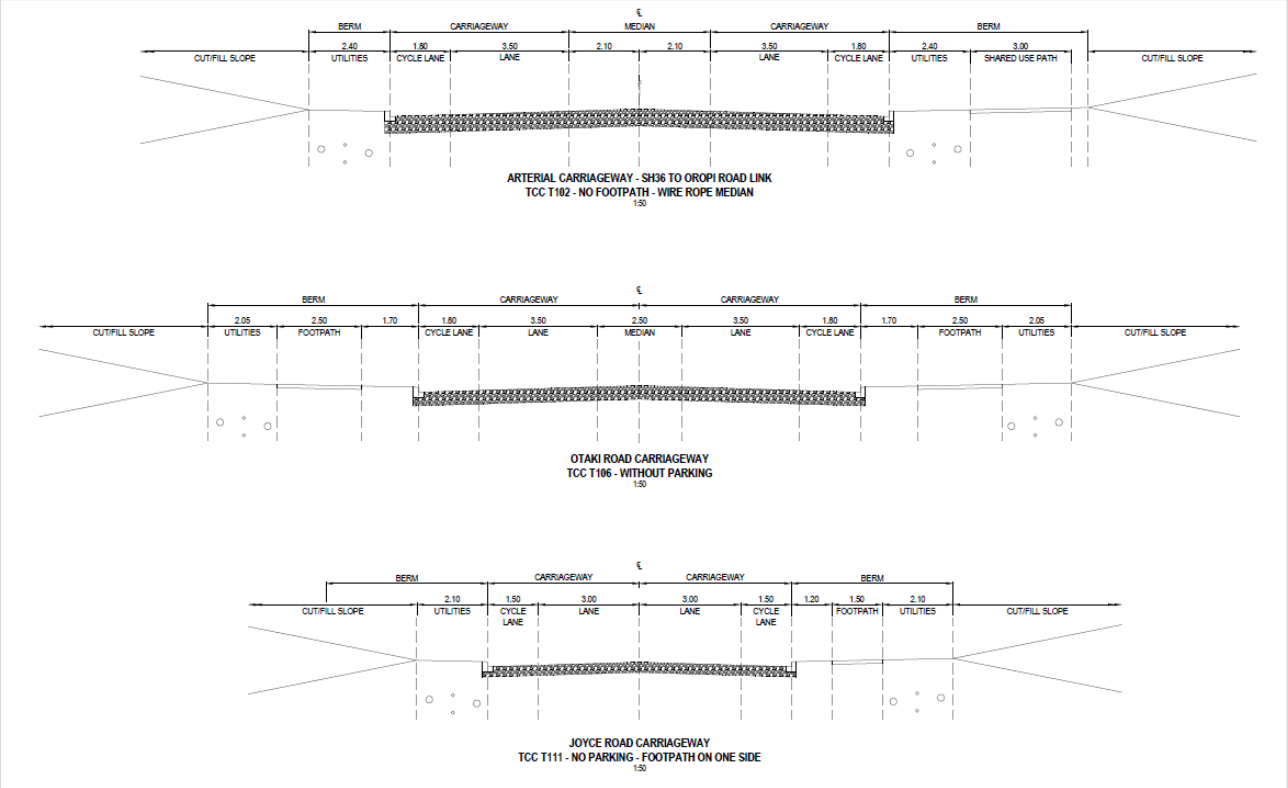


Figure 21: Typical Cross Sections adopted from Table 7 (Full scale Drawing attached in Appendix X)

6.6.2 Road Safety (Context-Sensitive) Design

Improvements to the local roads should account for the ongoing residential development and may include reducing the speed limit and providing a more Context-sensitive design. Example of these design approach include Pyes Pa Road and Welcome Bay Road where painted hatched medians, kerbs, cycle shoulders and footpaths highlight the urban environment and contribute in reducing driver speeds.

The difference between roadsides with these treatments are shown in Figure 22, with Pyes Pa Road presenting a roadside more in keeping with a lower speed urban environment compared to the more open roadside of Oropi Road.

Figure 22: Oropi Road (top) Pyes Pa Road (bottom). Pyes Pa road shows a good example of a context-sensitive design for an Urban Arterial Road

6.7 Western Corridor – Eastern Options

The following section summaries the options assessed for the Western Corridor - East between SH39 to SH29A. Multi-criteria option assessment breakdowns, engineering plans and cost estimate breakdown for each option are attached in Appendix X

6.7.1 Network Upgrades – Do Minimum

The following range of improvements were identified during reviews of the current network performance and gap assessment. The improvements target key investment goals and maybe considered a do-minimum option for further economic assessment. The network upgrade options able to be incorporated with the other main ring road corridor options. (Option A-D)

The proposed network upgrades include:

- Safety Improvements along Oropi Road;
- Enhancements to the existing Waimapu River pedestrian and cycleway path & new pedestrian and cycle facilities on Joyce Road and along Oropi Road;
- Traffic efficiency improvements to SH29A / Oropi Road Roundabout.

Safety Improvements – Oropi Road

The future growth and demand on Oropi Road presents a significant safety concern as discussed above. This option addresses the current medium – high safety risk with a range of safety improvements to Oropi Road. These options will account for the ongoing residential development and propose reducing the speed limit from 80km/h to 60km/h and providing a more “Context-Sensitive” design, similar to Pyes Pa Road and Welcome Bay Road with painted hatched medians, new kerbs, cycle shoulders and footpaths. A summary of these proposed measures includes;

- reducing posted speed from 80km/h to 60km/h;
- widening the road into the grassed verge to provide;
  - 2.5m hatched median and turn lanes;
  - 1.5m to 1.8m cycle shoulder on both sides;
- replacing grassed berms with kerbs and outfalls into the verge and existing channels;
- adding new 1.5m wide footpaths on one side (50% of the road) and both sides (50% of the road) with 2-3 new mid-block crossing islands; and
- providing new private access way treatments and relocation of letter boxes.

The design solution will need to account for protection of the existing underground bulk water and fibre utilities as well as some relocation of overhead power lines. Timber retaining walls will be needed along long stretches to limit earthworks outside the designation.

Enhancements to Pedestrian and Cycleway

The currently Waimapu river valley footpath appears low usage, with unclear signage and no connection to the west (Pyes Pa Rd). Improvements along this route to provide an all-weather gravel track, enhanced signage and linkage to Joyce Road with footpaths along Joyce will achieve a greater community linkage and achieve an east-west pedestrian and cycle link. This link shown in Figure 23 will connect key nodes like local schools, hospitals and provide an alternative access towards the city.

New footpaths along Oropi Road will assist with achieving the context sensitive design performance for a lower speed environment, as well as provide alternative non-vehicular access and movements for residents along Oropi Road.

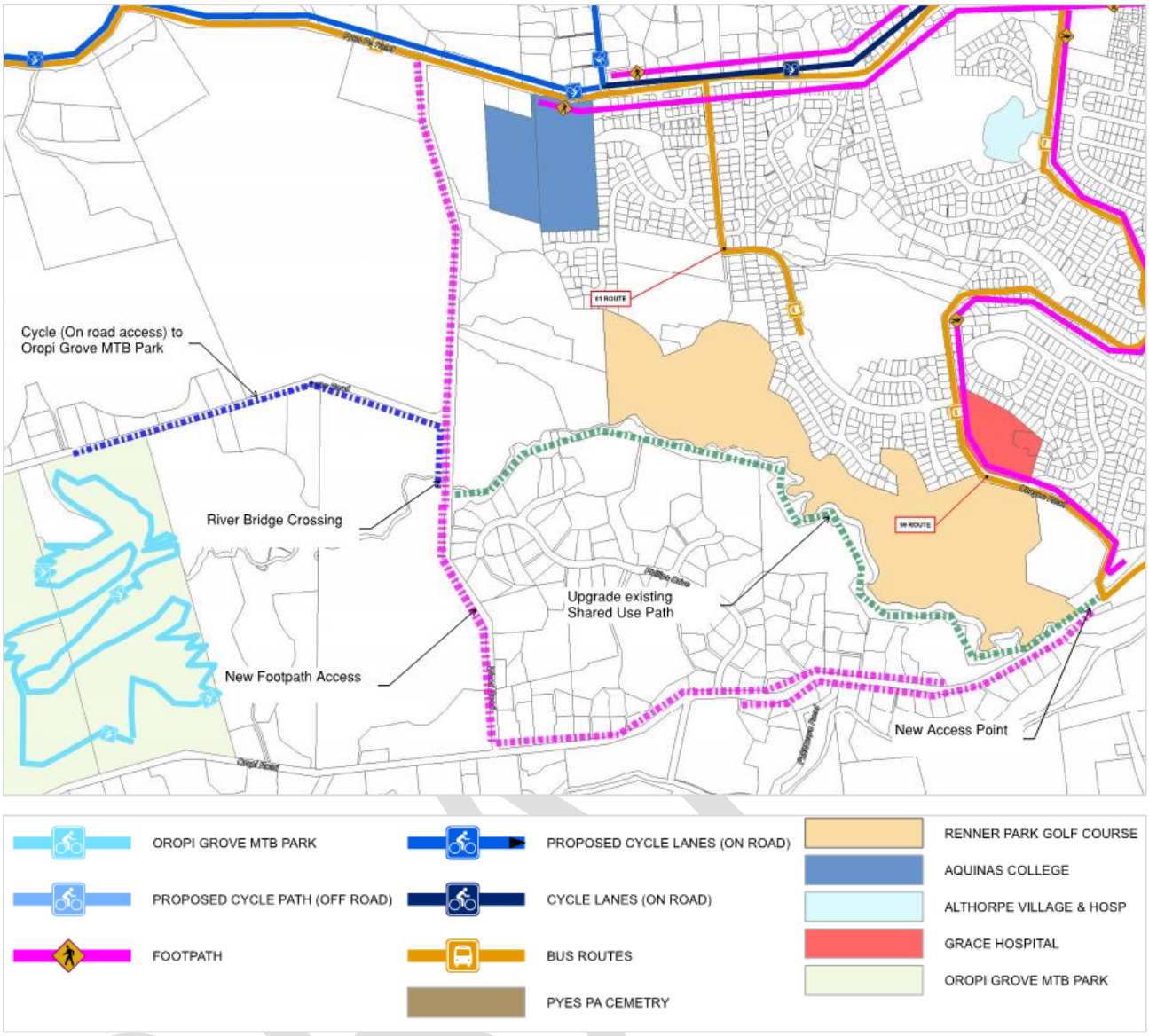


Figure 23: Proposed cycleway and pedestrian improvements within the corridor

Improvements to SH29A /Oropi Road Roundabout

The funding forecast for efficiency improvements along the Western Corridor includes investigations for the business case for the State Highway Network that includes options for major upgrades at SH29A / Pyes Pa Road roundabout. In additional along Pyes Pa Road TCC are currently funding the upgrade the Joyce Road and Pyes Pa intersection. The roundabout at SH29A and Oropi Road is the only other major intersection in the road network and doesn't form part of any future or current investment cases. This roundabout is likely to significantly under performance with the future traffic demand and will require efficiently improvements. The roundabout also does not cater for safe pedestrian and cycle crossing and forms a broken link in the cycleway network.

As part of the future business case the upgrade of the roundabout with additional lanes and pedestrian crossing facilities will need to be explored with funding spilt between the Transport Agency and Tauranga City Council to be confirmed. For this report, we have considered adding additional left turn lanes from Oropi Road and SH29A as part of the network upgrade. A new grade separation pedestrian / cycle crossing of this roundabout is excluded from the cost estimate and assessment.

Network Upgrade Option Assessment Results

The implementation of these options is likely to be relatively straight forward with some challenges along Oropi Road to protect the existing utility services. The works generally lie within the existing road reserves and therefore unlikely to present more than minor environment effects.

The enhancements are unlikely to change the traffic demand and trip journeys around the network without new road links. It is anticipated the improvements to the pedestrian and cycle network will reduce some commuting traffic, although this is likely to be minor in terms of overall trip numbers.

The following table summarises the assessment finding of the above option against the ILM investment objectives, costs and key risks:

Table 8: Network upgrade option assessment

Investment Benefit			**Cost Estimate**	**Risk**	
Maintain people's travel time and reliability	Increase mode choice (PT, walk, cycle	Increase internalisation of vehicle trips	Base Cost Estimate (*Construction, Land & Design costs*)	Environmental & Social Impact	Risk & Stakeholder Impact
-	√	-	$8.4M[2]	0	+1

6.7.2 Option A – Extension of Joyce Road to Woods Road

Option A considers the concept of providing an east-west connection by extending Joyce Road through the existing 'Paper Road" designation to Woods Road. This provides local road users with a new east-west link from SH36 to SH29 (Oropi Road) via Kennedy Road and Joyce Road.

The terrain does not suit an east-west route, as grades of the road would be around 10% (existing Joyce Road grade). Fill extents of the road as it works up the escapement to Woods Road will require around 2ha of land purchase from two property owners east of Joyce Road.

The main constraint is the crossing the Waimapu River. Further design investigation and community engagement over the cost and environmental benefits of providing a large fill embankment or large span bridge structure is required to firm up this option.

[2] Pedestrian Bridge over SH29A is excluded (*Note SH29 Poike Road Pedestrian Bridge cost estimate was $2M construction cost*)

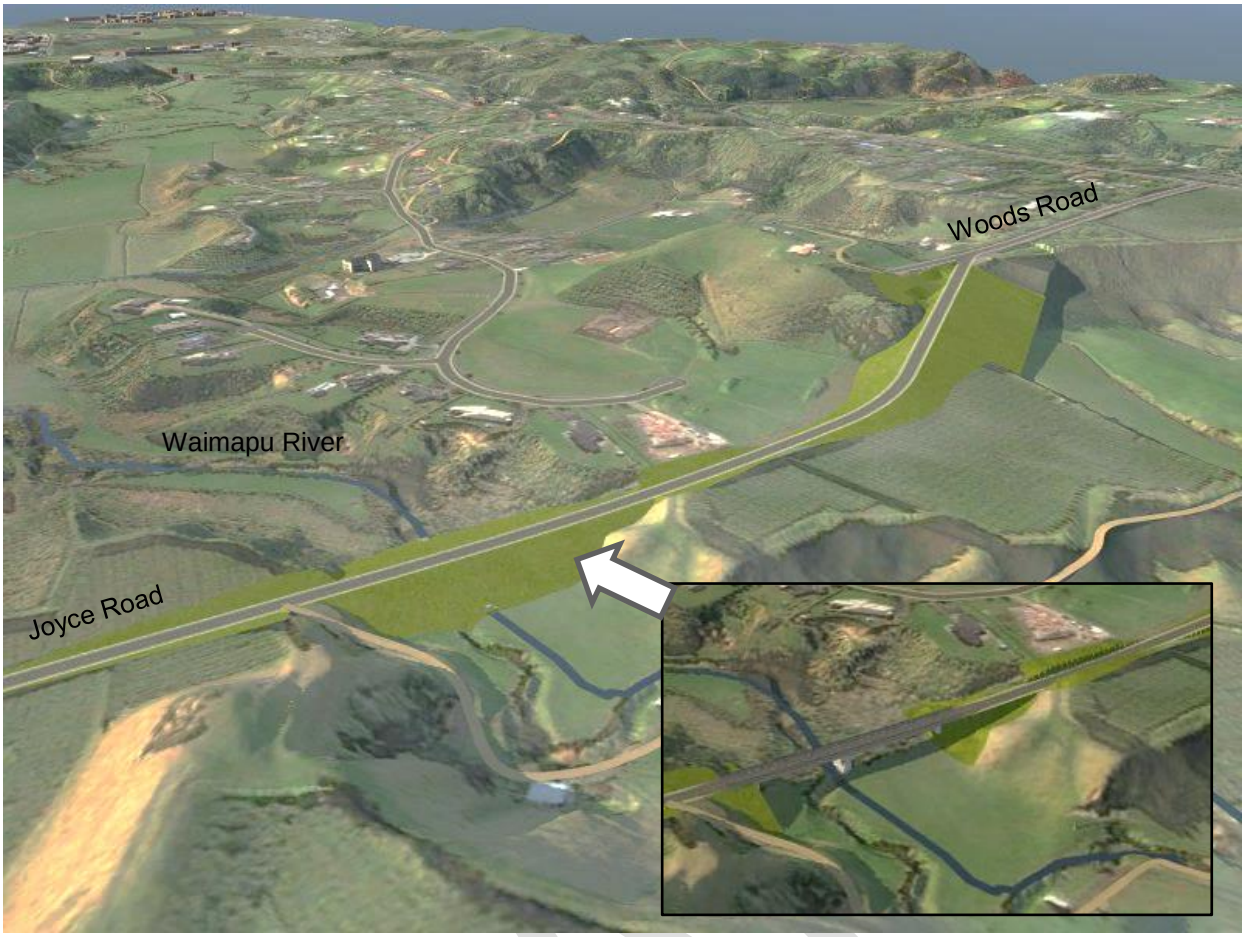


Figure 24: Visual Imagine of Option A, looking north with an alternative bridge option (bottom right)

Option A: Assessment Results

The traffic usage on Joyce Road for this option increased the daily demand from around 500 AADT now, to around 9,000 AADT in 2031 with another 10,000 AADT on Joyce and Oropi Roads between Joyce Road and SH29A. SH29A traffic volumes increase from 18,000 AADT now, to around 35,000 AADT in 2031.

There are few additional facilities for pedestrians and cyclists beyond the network upgrades with this option and the construction is deemed straight forward as similar to the current implementation of the Kennedy Road Bridge.

The following table summarises the assessment finding of the above option against the ILM investment objectives, costs and key risks:

Table 9: Network upgrade option assessment

Investment Benefits			**Cost Estimate**	**Risk and Environmental Impact**	
Maintain people's travel time and reliability	Increase mode choice (PT, walk, cycle	Increase internalisation of vehicle trips	Base Cost Estimate (*Construction, Land & Design costs*)	Environmental & Social Impact	Risk & Stakeholder Impact
-	√	√	$14.2M	--1	0

6.7.3 Option B New Ring Road (Joyce Road to SH29A)

On a similar alignment of the PBC Ring Road through Waimapu River valley, this option considers the provision of the northern section of the Ring Road from Joyce Road to SH29A only. Traffic from SH36 will travel along Kennedy Road or Pyes Pa Road to Joyce Road with a new roundabout starting the southern end of the link road. The option may be considered an early stage to the full link road, but for this report considered as an independent standalone option.

The corridor runs along low lying flood prone land, the road alignment will need to be raised 2-4m above the flood level with surcharging and ground improvement measures to manage the settlement over the soft ground. The effects of this embankment on the flood level will be a major risk. Preliminary assessment indicates the flood level in this area may increase around 0.5m with upstream attenuation; however, with residential properties generally around 7m higher this effect can be managed. (Refer to Appendix V for Preliminary Flood Impact Assessment).

At the northern end the connection to Oropi Road, Cheyne Road and SH29A are all within 500m. It is likely these connections will require some sort of dual roundabout solution with Cheyne Road becoming a left in / left out only intersection. (refer to Figure 25 below)

The corridor at this stage, is shown to the west of the Waimapu River to limit the number of river crossing and keep the road further from the low lying residential zone of Waimapu Road. 10ha of land purchase is likely to be required, affecting 3-4 private properties.

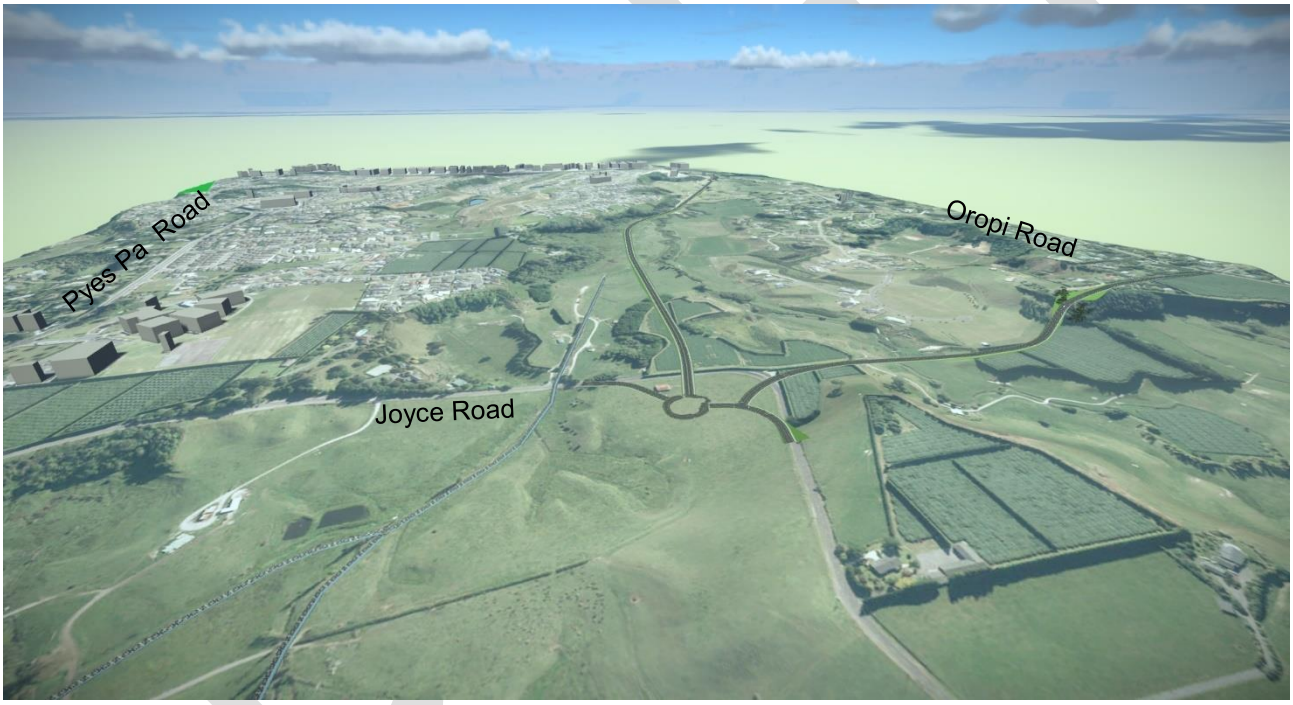


Figure 25: Visual Imagine of Option B, looking north from Joyce Road to SH29A

Figure 26: Proposed northern intersections for Option B

Option B: Assessment Results

The new link road provides demand for around 9,000 AADT in 2031, lowering traffic demand by around 3,000 to 4,000 AADT on Pyes Pa and Oropi Road between Joyce Road and SH29A compared to Option A. The new link road increases traffic on Joyce Road from Pyes Pa Road to around 10,000 AADT with traffic diverting off Pyes Pa Road to the new link road. SH29A traffic decreases by around 4,800 AADT compared to Option A. However, in regards to overall network internalisation of vehicle trips, this options shows no change from Option A (25-28% internal zoned trips).

There are few additional facilities for pedestrians and cyclists beyond the network upgrades with this option. The construction of the road is straightforward with several examples in the region of building roads in soft ground.

The following table summarises the assessment finding of the above option against the ILM investment objectives, costs and key risks:

Table 10: Network upgrade option assessment

Investment Benefits			**Cost Estimate**	**Risk and Environmental Impact**	
Maintain people's travel time and reliability	Increase mode choice (PT, walk, cycle	Increase internalisation of vehicle trips	Base Cost Estimate (*Construction, Land & Design costs*)	Environmental & Social Impact	Risk & Stakeholder Impact
√	√	√	$24M	--1	0

6.7.4 Option C: New Ring Road from SH36 to S29A

This corridor option aligns with the original PBC recommendation. A new arterial road will connect into the existing roundabout at Pyes Pa / SH36 roundabout running behind the existing properties along the escarpment, then crossing over Waimapu River connecting to Joyce Road with a new roundabout. The arterial road will extend north through the Waimapu river valley, like Option B.

The connection from SH36 to Joyce Road presents some challenges with major earthworks needed (20-30m cuts / fills) to lower the road down 50m (vertically) over 1.6km along the steep escarpments. An opportunity to replace a section of large fill with an underpass enables land to the east to remain accessible and limit the land purchase and environmental and social effects of this route.

15 ha of land is likely to be required, affecting 12-14 private properties. Opportunities to programme future land purchases with other Council led plans, including extensions to the Pyes Pa Cemetery and Joyce Road Sports Fields presents some cost savings and funding splits for the Western Corridor.

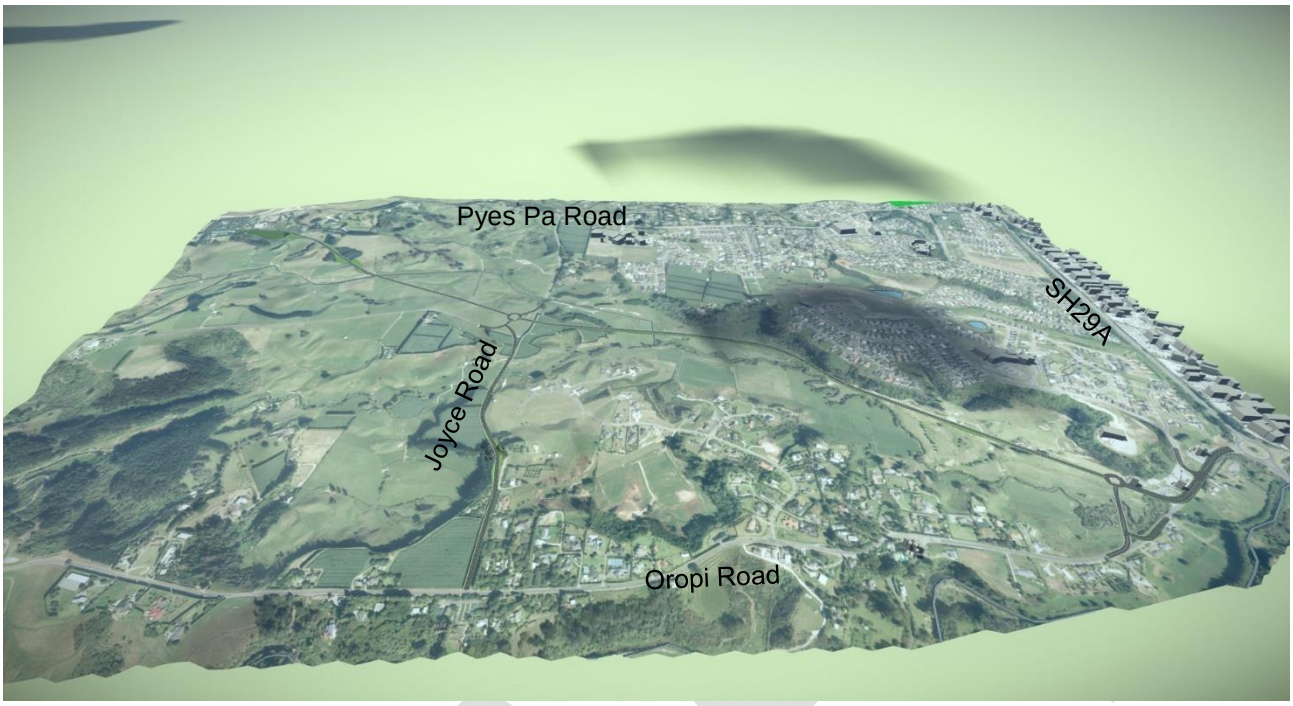


Figure 27: Visual Imagine of Option C, looking west from above Oropi Road to Pyes Pa Road

Option C: Assessment Results

The new link road provides demand for around 15,000 increasing to 20,000 AADT, north of Joyce Road in 2031. This lowers traffic demand by around 5,000 AADT on Pyes Pa and Oropi Roads between SH36 and SH29A compared to Option A. The new link road increases traffic on Joyce Road from Pyes Pa Road to around 5,000 AADT with traffic diverting directly from SH36 to the new link road.

SH29A traffic decreased by around 8,000 AADT compared to Option A, which presents a significant drop in volume. However, in regards to overall network internalisation of vehicle trips, this options shows no change from Option A (25-28% internal zoned trips).

As well as the network upgrades this option provides a new alternative off-road connection for pedestrians and cyclists further south from SH36 without travelling along Joyce Road.

This option presents some challenging consenting risks with private land acquisition and large earthworks.

The following table summarises the assessment finding of the above option against the ILM investment objectives, costs and key risks:

Table 11: Network upgrade option assessment

Investment Benefits			**Cost Estimate**	**Risk and Environmental Impact**	
Maintain people's travel time and reliability	Increase mode choice (PT, walk, cycle	Increase internalisation of vehicle trips	Base Cost Estimate (*Construction, Land & Design costs*)	Environmental Impact	Risk & Stakeholder Impact
√√	√√	√	$48M	-1	-1

6.7.5 Option D – New Southern Ring Road (SH36 – Oropi Rd)

An alternative corridor to the PBC Ring Road, Option D considers providing a direct east-west link from SH36 to Oropi Road. A key focus and consideration of this option is the potential long-term consideration of a future east-west ring road parallel to SH29A toward Welcome Bay.

The east-west corridor is constrained by the high escarpments, with the proposed route following a similar route to Option C from the Pyes Pa / SH36 roundabout to the Waimapu River valley. The corridor would turn east to cross under Joyce Road with further options for either loop connections or remain grade separated. Connecting to Oropi Road will require a steep 8-10% grade, but this section be may lowered under Oropi Road as a grade separated link for any future east-west ring road.

16ha of land is likely to be required, effecting 20 -22 private properties. Opportunities to programme future land purchases with other Council led plans, including extensions to the Pyes Pa Cemetery presents some cost savings and funding splits for the Western Corridor.

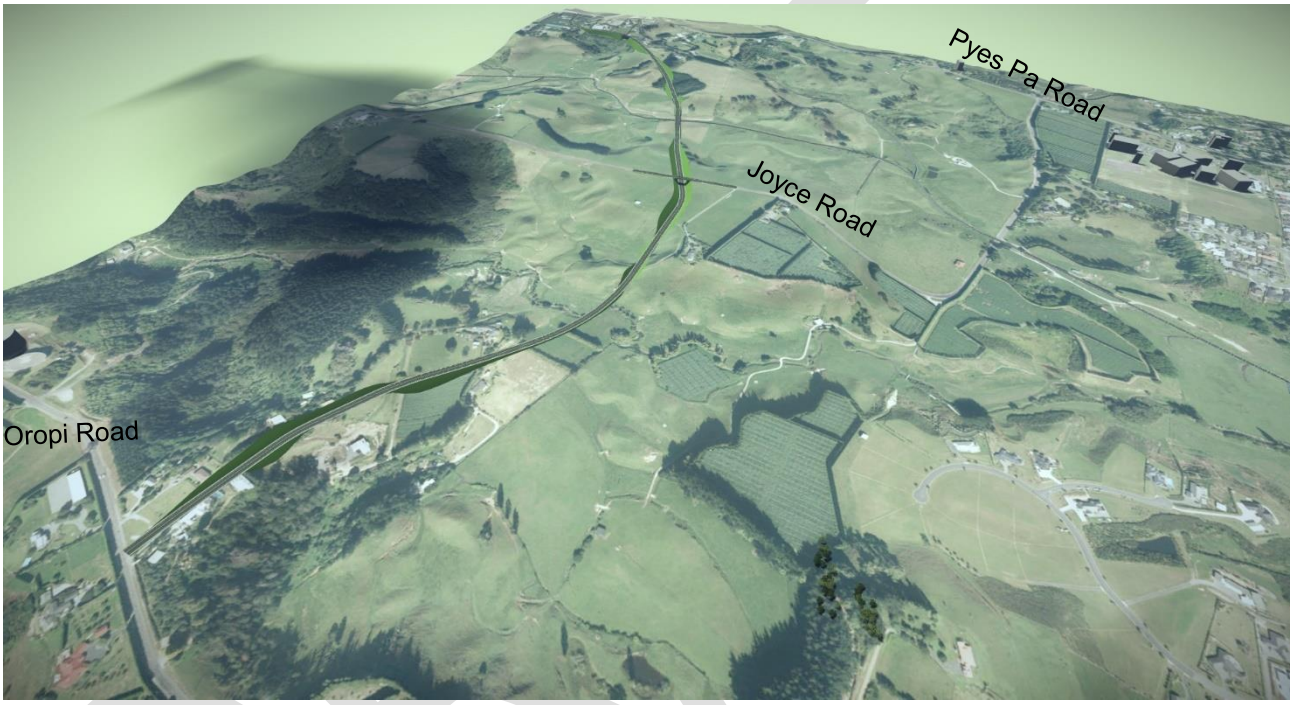


Figure 28: Visual Imagine of Option D, looking west from Oropi Road to Pyes Pa Road

Option D: Assessment Results

The new link road provides demand for around 10,000 AADT in 2031, lowering traffic demand by around 5,000 AADT on Pyes Pa from SH36 to SH29A compared to Option A. Joyce Road traffic demand lowers to around 2,000AADT. However, traffic demand for Oropi Road increases to around 15,000 AADT from the new link road to SH29A.

SH29A traffic decreased by around 2,700 AADT compared to Option A, lower than either Option B or C. However, regards to overall network internalisation of vehicle trips, this options shows no change from Option A (25-28% internal zoned trips).

As well as the network upgrades the east-west link provides another east-west connection for pedestrians and cyclists further south.

This option presents some challenging construction and consenting risks with the construction of an underpass under Joyce Road. The environmental effects are similar to the other options, but likely to have greater flood and environment effects due to crossing both river valleys with a deep cutting under Joyce Road.

The following table summarises the assessment finding of the above option against the ILM investment objectives, costs and key risks:

Table 12: Network upgrade option assessment

Investment Benefits			Cost Estimate	Risk and Environmental Impact	
Maintain people's travel time and reliability	Increase mode choice (PT, walk, cycle	Increase internalisation of vehicle trips	Base Cost Estimate (*Construction, Land & Design costs*)	Environmental Impact	Risk & Stakeholder Impact
-	√	-	$50M	-2	-2

6.8 Recommendation and Conclusion

6.8.1 Transport Economic Assessment

A relative BCR assessment between each option was undertaken with results shown below. This assessment was undertaken using the NZ Transport Agency Economic Assessment. These are based on the same implementation period of 5 years with results used for comparison purposes, rather than the economic case for the preferred option against a 'Do Nothing" option.

Table 13: Summary of relative BCR results

PV of Net Benefits	Option B	Option C	Option D
Travel Time Cost	-$3,901,671	$16,906	$1,211,514
Vehicle Operating Cost	-$2,057,612	-$602,455	-$475,738
Crash Costs	$0	$572,012	$572,012
CO_2	-$102,881	-$30,123	-$23,787
PV Total Benefits	-$6,062,164	-$43,660	$1,284,001
PV of Net Costs	$8,730,865	$30,090,780	$32,315,771
Indicative BCR	-0.69	0.0	0.04
FYRR	-8%	-1%	-1%

The assessment produced low (i.e. <3) BCRs for the options. There are no significant efficiency gains or differentiators between the options, and so at this stage an economic assessment is not the best tool to use to differentiate between the options.

6.8.2 Multi-Criteria Assessment

The multi-criteria assessment identified that whilst Option D presented the greatest risk and environmental impact, all option were deemed feasible for implementation with no fundamental flaws. The next stage to recommend a preferred solution would require community engagement and feedback in all options.

6.8.3 Recommendation

Based on the finding,

- Option B and D present minimal improvements compared to the cost and impact.
- Option A and C should be further examined within the integrated Business Case

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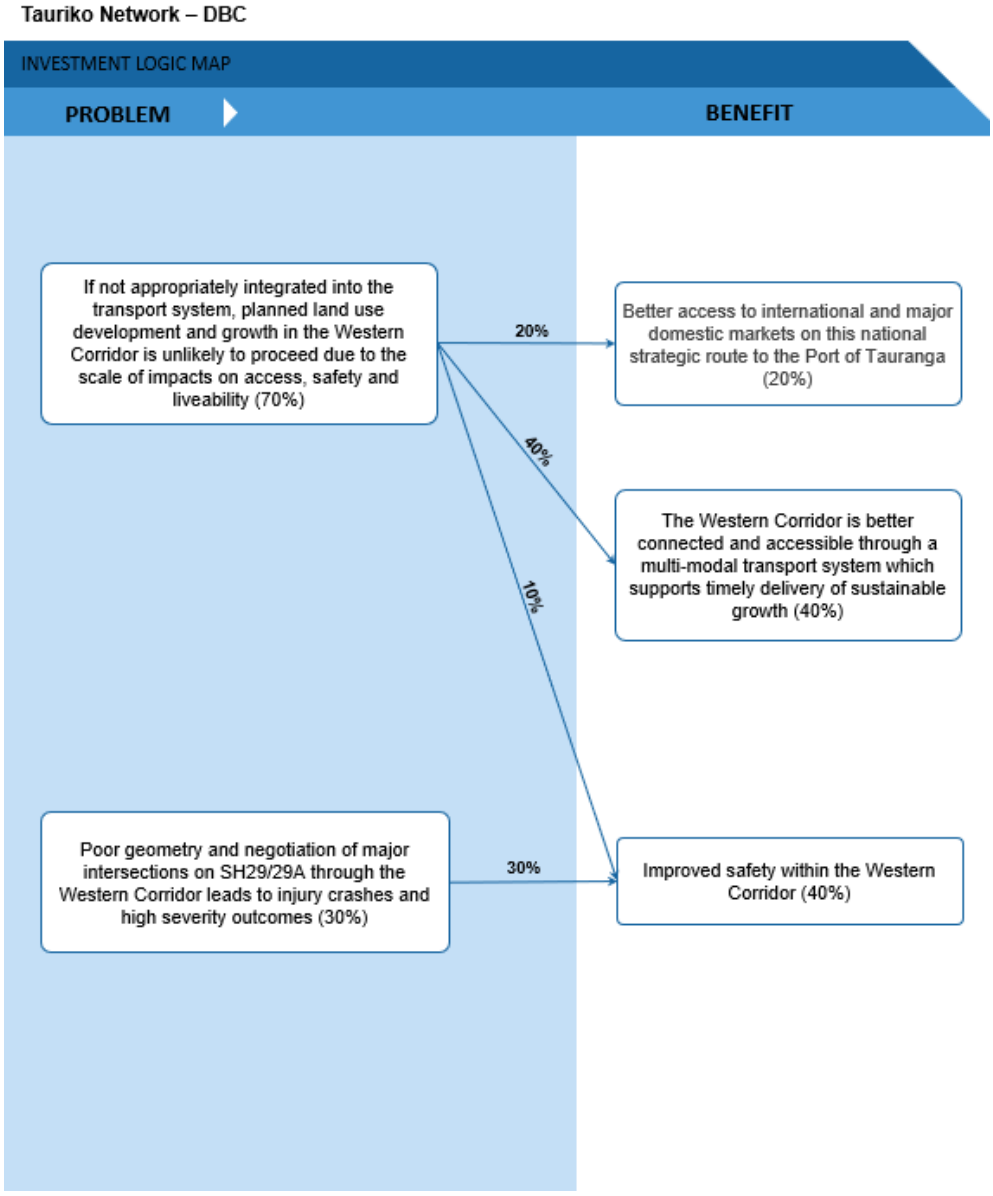
Bringing ideas to life

Appendix B : ILM Targets – Long Term and Enabling Works

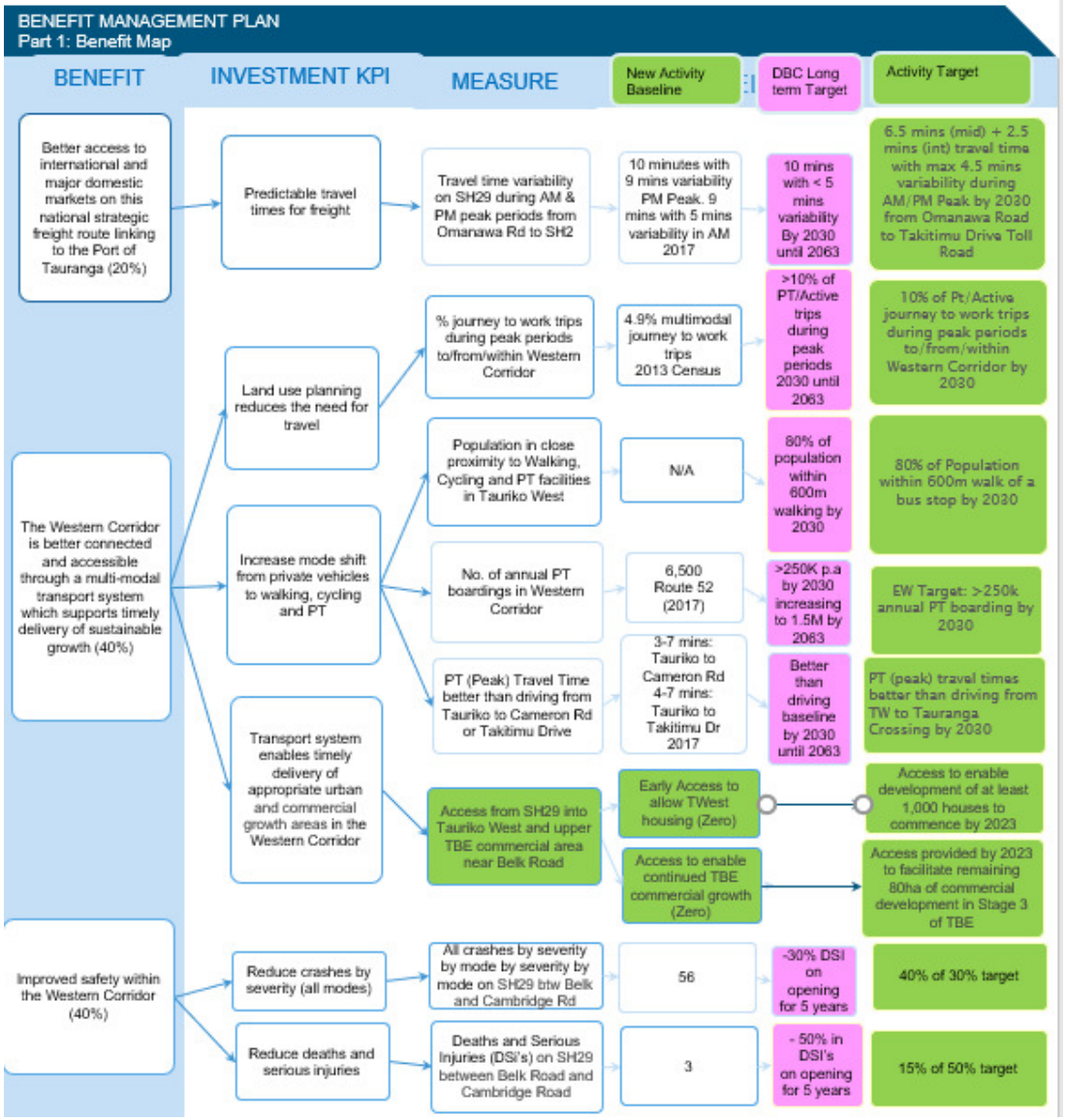
Appendix B : ILM Targets – Long Term and Enabling Works

Long Term investment logic map problem



Long Term and Enabling Works – Benefit Management plan – Alignment to ILM –

Tauriko Network – Long Term DBC + Enabling Works Activity



Long Term Benefits and Measures[114]			Long Term Baseline and Targets		Enabling Works Baseline and Target		
LT Benefit	LT Investment KPI	LT Measure	LT Baseline	LT Target	EW Baseline	EW Target/Outcome – Contribution to the Long Term DBC	Supporting Comments for Enabling Works Contribution
Better access to international and major domestic markets on this national strategic freight route linking to the Port of Tauranga	Predictable Travel Times for freight	Travel time variability on SH29 during AM & PM peak periods from Omanawa Rd to TNL	10 minutes with 9 mins variability PM Peak. 9 mins with 5 mins variability in AM 2017	10 mins with < 5 mins variability By 2030 until 2063		6.5 mins (mid) + 2.5 mins (int) travel time with max 4.5 mins variability during AM/PM Peak by 2030 from Omanawa Road to Takitimu Drive Toll Road	Increase in travel time between Belk and Cambridge Rd based on an extra 50secs/veh delay at each new intersection. (Representing LOS D increase). Existing Trip reliability between Belk and Cambridge Rd to be retained. Acknowledges additional traffic from TW will have an effect on intersections outside project scope. Primary route for freight travelling to the Port assumed to be SH29 and Takitimu Drive Toll Road. Values yet to be determined from TomTom data for EW target.
The Western Corridor is better connected and accessible through a multi-modal transport system which supports timely delivery of sustainable growth	Land Use reduces the need for travel	% Journey to work trips during peak periods to/from/within Western Corridor	4.9% multimodal journey to work trips (2013 census)	>10% of PT/Active trips during peak periods to/from/within Western Corridor by 2030 increasing to 15% by 2063.		10% of Pt/Active Trips during peak periods to/from/within Western Corridor by 2030	Enabling access to both housing (Tauriko West) and commercial development (TBE) will assist in reducing the need to travel outside the Western Corridor
	Increase mode shift from private vehicles to walking, cycling and PT	Popn within close proximity walking, cycling and PT facilities	N/A	80% Popn within 600m to walking, cycling and PT facilities in TW by 2030		80% of population within 600m walk of a bus stop by 2030	Looking to meet objective at the outset
		No. of annual boarding's in Western corridor	6,500 Route 52 (2017)	>250K p.a by 2030 increasing to 1,500,000 by 2063		250,000 PT trips per annum by 2030	
		PT (Peak) Travel Time from Tauriko to Cameron Rd or Takitimu Drive	3-7 mins: Tauriko to Cameron Rd 4-7 mins: Tauriko to Takitimu Dr 2017	Express PT (peak) travel times better than driving by 2030 and maintained until 2063.		PT in-vehicle peak travel time same or better than driving by car from Tauriko West to Tauranga Crossing by 2030	Early works target restricted to Tauriko West to Tauranga Crossing journey, as wider destinations rely on facilities outside scope of package. Locally specific measure therefore considered appropriate.
	Transport System Enables timely delivery of appropriate urban and commercial growth areas in the Western Corridor	Rezoning of Tauriko West, TBE Extension, and Keenan Road growth areas adopted by TCC	Year 2021 – TWest Year 2021 – TBE Year 2026 – K Rd	Adopted by Year – Yes/No?	Year 2021 – TWest Year 2021 – TBE Year 2026 – K Rd	Adopted by Year – Yes/No?	
		Access from SH29 into TW and upper TBE commercial area near Belk Rd	N/A	N/A	Early access to allow TW housing (0)	Access to enable development of at least up to 2,000 houses to commence by 2023	New specific target for early works. Min number of houses needed for subdivision to be viable.
			N/A	N/A	Access to enable continued TBE commercial growth (0)	Access provided by 2023 to facilitate the remaining 80ha of commercial development in stage 3 of TBE	New specific target for early works. 80ha reflects condition in latest TBE consent.
Improved Safety within the Western Corridor[115]	Reduce crashes by severity (all modes)	All crashes by severity by mode on transport facilities in Western Corridor	SH – 221 (2F, 8S, 35M, 176NI) LR – 80 (0F, 4S, 27M, 49NI) 2015-2019	30% reduction on opening for 5 years		40% of the 30% target	Relates to what is achievable with adopted intersection forms at each of the three sites. Safety effects on wider network outside early works scope which may arise from additional trip generation from Tauriko West development will be considered under safety effects
	Reduce DSis	DSis on transport facilities in Western Corridor	SH – 10, LR – 4 2015-2019	50% reduction in DSI's on opening for 5 years		15% of 50% Target	Relates to what is achievable with adopted intersection forms at each of the three sites.

Appendix Table 15-1: Enabling Works Alignment to Long Term Tauriko Network Connections objectives

[114] There are some new benefits for the long term project which will be measures and targets for the post DBC phase which recognise stretch targets particularly for journey to work and school trips. These are included in the Long Term DBC.
[115] Note that this Tauriko LT project states Western Corridor but is one of a few other projects that are included as part of the PBC phase. So, whilst the LT project signficiantly contributes to achieving the targets it is part of a package of works to achieving all of the targets.

Appendix C : Stage 1 – MCA Option and Evaluation Memo

Memorandum

To	Wayne Troughton, Neil Cree
From	Mike Meister/Cherie Mason
Reviewed	Simon Banks
Office	Hamilton
Date	7 December 2018
File	2-32735.01
Subject	DRAFT: Tauriko Interim Access Evaluation Process

Introduction

To allow early development of the Tauriko West growth cell, an interim connection onto SH29 is required. Following discussions between the Tauriko West landowner group, TCC and NZTA, four potential locations have been identified. WSP Opus have been tasked with identifying the favoured location taking into consideration the long-term requirements of the SH29 corridor.

This memo sets out the options considered, assessment process and favoured option for further discussion with project partners and stakeholders.

In developing and assessing the interim locations, the team has assumed the following:

- The interim access needs to be available by year 2021/2022 in time for residential blocks to come to market.
- The Tauriko School is unlikely to relocate within the next 5 years
- Cambridge Road/SH29 intersection will be upgraded, possibly with traffic signals, to improve safety and efficiency problems as part of the Transport Agency safety works programme.
- Bus priority measures will be provided as part of the interim access development in order to align with the Tauriko Network Connections business case objectives. Hence, the interim access form will be traffic signals in preference to a roundabout. This form will also need to provide a safe crossing over SH29 for walking and cycling.
- Whiore Ave is the desirable bus route connecting Tauriko West with Tauranga Crossing. Hence a bus connection will be provided between the Interim access location along SH29 and in/out of Whiore Ave - possibly linked with new Cambridge Rd/SH29 signals. No special bus priority treatment is required into Cambridge Road.
- Utility services will be required to service Tauriko West. These are understood to be located within the SH29 corridor. Whilst the exact location/form of these services is part of a separate TCC study, the project team will take into consideration any influencing factors on access locations that may arise from that study.

Site and Potential Interim Access Locations

Possible access points are located on SH29 between the existing Garden Centre (located south of the Caltex Service Station) and a point immediately to the south of Cambridge Road. These are shown in Figure 1 below. Location 1 has been previously identified during stakeholder workshops as a suitable site for both the interim and long-term connection to SH29.

More recently three new locations have been identified by various parties for consideration.

These options include:

- Site 1 – just west of the Cambridge Road Intersection
- Site 2 – Between the Caltex Service Station and Tauriko School (i.e. through the Tauriko Community Hall and Playcentre)
- Site 3 – West of the Caltex Service Station, through the Kiwifruit Pack house
- Site 4 – Adjacent to the country fare green grocer

Figure 1: Interim Access Location Map

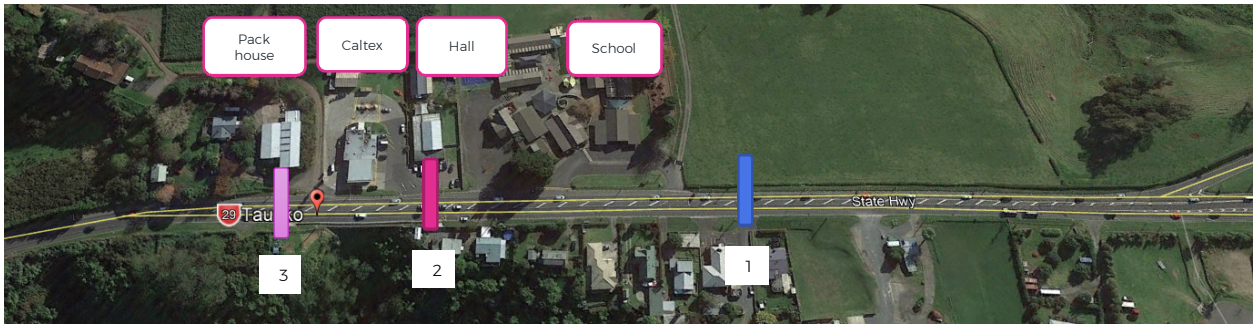


Figure 2: Interim Sites 1-3

Intersection Design

The form of the interim access is assumed to be a set of traffic signals. This has been determined by the project team as it aligns with the business case objectives of providing safe and efficient access for public transport and a walking/cycling crossing of SH29. The traffic signals also allow for bus priority measures to be provided at the outset to help achieve the target mode shift from single occupancy vehicle use.

Evaluation Framework

Because the evaluation has a specific focus, the evaluation has adopted a simplified multi criteria analysis approach. Criteria that was considered to be neutral or have minimal impact on the outcome has not been considered in this assessment.

Criteria

The following criteria and typical questions considered by the project team to assess the interim options is tabled below.

Criteria	Types of Questions
Safety	How safely does the intersection operate in this location – sight lines, speeds, potential for crash risk? How active modes are safely catered for.
Traffic	The degree to which option supports transport and land-use integration - i.e. enhancing or improved access to existing development or enabling future adjacent land-use development adjacent to the corridor (or vice versa). How does the intersection perform in this location in terms of levels of service? Are there any issues with proximity to other intersections or main accesses? Does this option create any wider network issues? Does this intersection provide for all modes?
Ability to Implement by 2021	Technical • Constructability - Can the intersection be constructed in this location? • Other Infrastructure - Services and connections, impact on programme • Consents - How difficult/complex will it be to obtain designations and resource consents from WBOPDC and BOPRC? Likely to get appeals?
Integration with the Long Term project	How well does this option integrate with the long term form and location. Is it a stageable part of any long term solution. Does the option need to be decommissioned and considered a sunk investment.
Project Partners	Is there likely to be any opposition for this option from the project partners (NZTA, TCC, WBOPDC, and BOPRC)?
Property	Landowner impact: • Can the property be used or purchased within the timeframe to enable access opening by 2021 or would there be potential risks to the project from a property acquisition perspective.

Evaluation Rating

The Evaluation of each option has been against the other options as there is no base case or do minimum. The scoring system used is as follows:

Rating	Score	Comments
Minor or negligible consideration	0	No, or minor, consideration that should not present a major obstacle for the option, or that results in a standard or routine technical solution.
Moderate adverse consideration	1	A moderate consideration that is likely to impose some impediment to proposed works and require some complex elements to address, but is achievable
Major adverse consideration	2	Major consideration that is likely to impose a significant risk to developing the option, and result in highly complex, non-standard solution, and should be avoided.

Option Evaluation

The WSP Opus evaluation of each option is provided below.

Criteria	Options			
	Opt 1	Opt 2	Opt 3	Opt 4
Safety	Greenfield site - sight lines and speeds considered ok. Close to Cambridge road intersection so road could be realigned to Tauriko West Link to create one intersection improving corridor safety. Also easier to provide safe crossing for all modes. Speeds still high but not as high as Option 4 - would need to include other measures. Rank 1	Site location ok in terms of sight visibility and speeds - lots of other access in the vicinity but assume that these would all be rationalised as part of any upgrade. Speeds still high but not as high as Option 4 - would need to include other measures. Accessibility with other businesses an issue. Could link service road for school and service station and improve highway safety. Rank 2	Site location ok in terms of sight visibility and speeds, however southern approach speed higher that options 1 and 2 - lots of other access in the vicinity but assume that these would all be rationalised as part of any upgrade. Could have sight distance issues from the south due to curves and vegetation, hence option 2 is slightly better than option 3. In terms of active modes, may be difficult to provide safe access for pedestrians and cycling due to huge drop off on southern side. Rank 3	High Speed approach and hence higher potential for crash risk and situated within a high risk corridor. Geometry ok if location next to garden shop. Would need additional speed mgmt and other measures to get speeds down. Would need to develop safe off road facilities for walking/cycling to connect to Whiore Ave. Rank 4
Traffic	New intersection. Close to Whiore Ave so less time spent on SH29 for Tauriko West Buses. Allows opportunity for Cambridge Road to be realigned onto Tauriko West Link resulting in just one intersection on SH29. If Cambridge Road/SH29 retained it is possible to co-ordinate (link) the signal operation to improve SH29 efficiency. Rank 1	Requires new intersection. Too far from Cambridge Road to link intersections, hence less efficient highway. Provides opportunity to remove direct access from SH29 to service station and school via a local road that gains access through this formal intersection Rank 2	Requires new intersection. Too far from Cambridge Road to link intersections, hence less efficient highway. Provides opportunity to remove direct access from SH29 to service station and school via a local road that gains access through this formal intersection.. Rank 2	Additional intersection on SH29. Less efficient highway that provided by option 1. This location cannot address traffic related issues on SH29 within the Tauriko business area. Rank 4
Ability to Implement by 2021	Technical - ok - standard. Consents - ok (assuming landowner approval) Rank 1	Technical - ok. Consents - possibly difficult - issues with removal of hall and playcentre, new access to Caltex Rank 3	Technical - big drop off located on southern side of highway - constructability issues. worse that 1, 2 and 4. Consents - possibly difficult - issues with new access to Caltex	Technical - ok but needs additional road connections to get up to Hopping land. Standard. Consents - ok Rank 1

Criteria	Options			
	Opt 1	Opt 2	Opt 3	Opt 4
			Rank 3	
Integration with the Long-Term project	Aligns well with short list options. Can be developed with minimal disruption to Tauriko West and in a stageable manner. Rank 1	Aligns well with short list options. Can be developed with minimal disruption to Tauriko West and in a stageable manner. Rank 1	Aligns well with short list options. Can be developed with minimal disruption to Tauriko West and in a stageable manner. Rank 1	doesn't integrate with current short list options. Likely to be removed as part of long term solution. Less optimal for PT travel time and walking and cycling Rank 4
Project Partners	NZTA - Neutral , TCC - Infrastructure impacts (water, sewer) , WBOP - not likely to have concerns, BOPRC - not likely to have concerns Rank 1	NZTA - Neutral , TCC - Infrastructure impacts (water, sewer) , WBOP - not likely to have concerns, BOPRC - not likely to have concerns Rank 1	NZTA - Neutral , TCC - Infrastructure impacts (water, sewer) , WBOP - not likely to have concerns, BOPRC - not likely to have concerns Rank 1	NZTA - Neutral , TCC - Infrastructure impacts (water, sewer) , WBOP - not likely to have concerns, BOPRC - may have concerns over longer PT travel time Rank 4
Property	Property - owned by one landowner. Previously expressed concern about using land for intersection. Acquisition could delay process. Rank 3	Property - goes through a hall and playcentre - social issue, BUT land owned by TCC so could be ok. Rank 3	Property - owned by one landowner, has indicated willingness to provide access; Rank 1	Property - owned by one landowner, has indicated willingness to provide access; Rank 1
Option Score*	0.2	0.5	0.3	1.0
Sensitivity Weighting Score	0.2	0.7	0.5	1.3
MCA order	***1***	***3***	***2***	***4***
Overall Ranked score	8	10	9	21
Ranking order	***1***	***3***	***2***	***4***

Note, the property and project partner comments and ranking have been undertaken by the WSP Opus team members and not the respective parties. As such they should be confirmed prior to making a final decision on the interim access location if the MCA results are to be used as a decision tool.

Using an equal weighting for each criteria (Overall Score *) indicates Option 1 is the most preferred and Option 4 the least preferred. However, there is little difference between Option 1 and 3, and Option 2 isn't far behind. If more emphasis is placed on safety (Sensitivity Weighting), Options 1 to 3 are still considered suitable locations.

In addition to the MCA score, the team also ranked each option within each of the criteria. This has resulted in Option 1,3,2, 4 as the order of overall preference, which is the same as the MCA order.

Conclusion

Ideally the decision about where to locate the interim access would be made after the preferred long term solution has been determined, although this decision is unlikely to be available before the middle of 2019. If a location needs to be identified now the parties need to recognise that the cost to implement the interim access may be a sunk cost (ie, the intersection may need to be closed in the medium to long term if the location does not align with the business case outcomes).

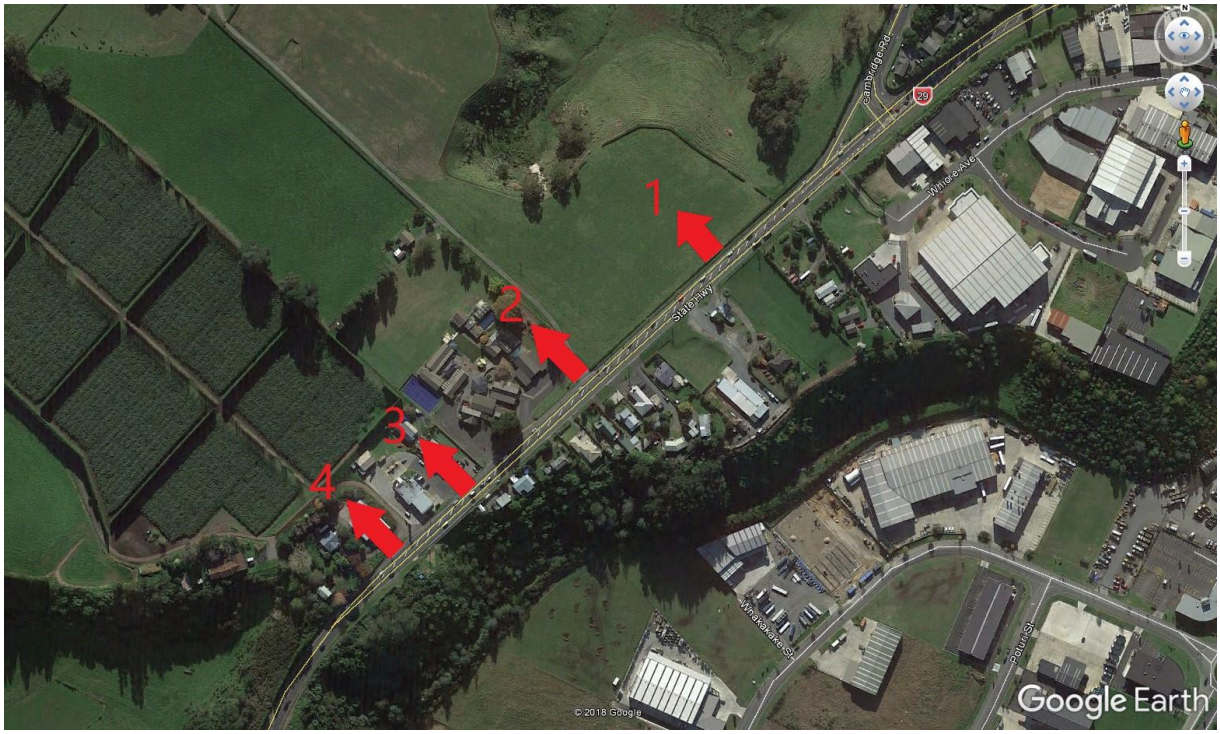
Based on the assessment presented above, WSP Opus are of the view that the location of the interim access can be either Option 1, 2 or 3, with the ultimate decision being made by TCC and the respective landowners/developers. From a Transport Agency perspective, we would recommend that the intersection is controlled by a signalised intersection with sufficient capacity to provide an agreed level of service (TCC/NZTA). At the outset, the intersection should also provide for bus priority and safe crossing over SH29 for walking and cycling. The intersection design should also be subjected to a full road safety audit before it is constructed in accordance with usual NZTA practices.

Appendix D : Interim Access – Meeting Minutes

Record of Meeting

Meeting name:	**Tauriko Network Connections - Interim Access to Tauriko West / TBE**		
Date and time:	10:30am to 12:30pm, 18 September 2018		
Location:	WSP Opus Tauranga		
Participants:	Who	Organisation	Attended
	Wayne Troughton (Project Manager)	NZ Transport Agency	Yes
	Neil Cree (Project Director for NZTA)	NB Consulting	Yes
	Bruce Robinson (Project Partner)	Tauranga City Council	Apologies
	Gareth Pottinger (Project Partner)	Tauranga City Council	Yes
	Campbell Larking (Project Partner)	Tauranga City Council	Yes
	Andrew Mead (Project Partner)	Tauranga City Council	Yes
	Anna Thurnell (Project Partner)	Tauranga City Council	Yes
	Gregory Bassam (Project Partner)	Tauranga City Council	Yes
	Mike Meister (Consultant Team Leader)	WSP Opus	Yes
	Cherie Mason (Business Case Manager)	WSP Opus	Apologies
	Simon Banks (Engagement)	WSP Opus	Yes
	Matt Stulen (Management Support)	WSP Opus	Yes
	Peter Cooney (Developer)	Classic Developments	Apologies
	Kevin Hill (Developer)	Classic Developments	Yes
	Bryce Donne (Tauriko Business Estate)	Element IMF	Yes
Minutes prepared by:	Matt Stulen, Mike Meister & Simon Banks		
ALL, PLEASE NOTE YOUR ACTIONS IN SECTION 4			

Ref	Item
1	**Introduction**
	Purpose • Discuss interim access options to Tauriko West (TW) from State Highway 29 (SH29) • Where is the best location for the interim access to work with the long-term options developed for the Tauriko Network Connections detailed business case (DBC). • The goal is to find the safest location that may also serve as the long-term access i.e. prefer not to build a sacrificial access.
	NZTA • All business cases are being re-evaluated. • SH29/Cambridge Road intersection short-term improvements (installing traffic signals on existing layout) will be progressed separately from DBC. • Short term improvements at Cambridge Rd could potentially incorporate bus only link to Whiore Ave via TCC owned property - need to re-look at designs. • On SH29, between Omanawa Road and Barkes corner it is proposed to reduce the PSL to 80km/h or 60km/h. This will also be progressed separately from DBC.

Ref	Item
	Tauranga City Council • Part of the ring road between SH36 and SH29 within the Tauriko Business Estate (TBE) is being progressed over the next 12 months • Traffic modelling will need to be undertaken to assess how much capacity is within SH29 to be able to accommodate the first stage of dwellings within TW (potentially in the region of 400-500 dwellings). • Ministry of Education has not confirmed the location of a school site within TW – waiting on NZTA designation. The structure plan will identify possible locations which are different depending on timing. The school will need to be twice the size of the existing Tauriko School to accommodate new residents in TW.
2	**Access Locations**
	There two main locations (the upper plateau and lower plateau) along SH29 for access to TW, with options within each location.
	Upper Plateau • There are four possible locations, discussed in more detail below, for access to TW from the upper plateau. 1. Northern access through Hopping's property (anywhere along that frontage) 2. Paper Road northeast of school 3. Southern access through existing Hall and Playcentre (immediately northeast of Caltex service station) 4. Southern access through/beside existing packhouse, southwest of Caltex)
	
	Northern Access (Location 1) • Pros ○ Could incorporate bus only connection to Whiore Ave for PT. ○ Can be easily integrated into wider SH29 solution (both interim and long-term).

Ref	Item
	○ Reduces the number of intersections along SH29 if connected to Cambridge Road in long term (reducing side friction). ○ Ease of bringing services (wastewater, electricity and telecom) from Whiore Ave (water connection at Gargan so will need to traverse along SH29). ○ The land is vacant. • Cons ○ Land owned by Hopping family - initially opposed to access – have their own development aspirations for their land. ○ Close to Cambridge Road intersection – possible sight distance issues. ○ No direct access to proposed first stage for development - Classics likely first developer.
	Paper Road (Location 2) • Pros ○ Land owned by Crown/TCC ○ Provides direct access into wider TW block, albeit via a circuitous route. ○ Potential to be long term access location ○ Provides closer access to proposed first stage of the TW subdivision. • Cons ○ Primary School leases part of Paper Road for school fields and playground. ○ Too far from Whiore Ave – more thinking around how to provide effective and efficient bus connection. ○ May not be wide enough, still relies on Hoppings land to provide direct access to upper plateau at rear of school.
	Southern Access (Hall Site – Location 3) • Pros ○ Provides safer access to primary school and Caltex. ○ Enables the first stage of the subdivision with more direct access. ○ Land owned by Council, but leased by Playcentre (who own building) ○ Community assets could potentially be relocated and rebuilt on alternative site within the wider Western Corridor. ○ Provides access for the Hoppings in the future. • Cons ○ Hall and Playcentre would have to be relocated – both community facilities so may result in community opposition. ○ Possible sight distance issues with curve to south. ○ Vegetation on opposite side of the road – may cause issues with maintenance as vegetation is on private property. ○ Unable to create a single intersection that serves effective and efficient bus connection into Whiore Ave.
	Southern Access (Alternative – Location 4)) • Pros ○ Preferred access for Classics – provides direct access to their land and proposed first stage of subdivision. ○ Caltex for sale – could be brought out? ○ Only two affected stakeholders – NZTA and Caltex ○ Caltex access could be reconfigured to come off TW access road - likely block right turns in and out from SH29 • Cons ○ Possible sight distance issues with curve to south.

Ref	Item		
	○ Vegetation on opposite side of the road – may cause issues with maintenance as vegetation is on private property. ○ Unable to create a single intersection that serves effective and efficient bus connection into Whiore Ave ○ Hoppings access would need to be resolved.		
	Lower Plateau – Belk Road • A number of historic agreements between NZTA, TCC and Element IMF regarding new connection to SH29 at or around Belk Road. • General agreement on WSP Opus proposed location and form of RAB at intersection of Redwood Lane and SH29, with existing Belk Road intersection closed and new connection to TBE provided from RAB. • Provides good access to southern end of TW via Redwood Lane, and could be incorporated into grade separated interchange if needed in future. • Landowner position unknown on the proposed RAB to the intersection of Belk Road and Redwood Lane. TCC and WSP Opus to undertake landowner consultation to progress the conversation. • Preferred alignment from proposed RAB to ring road through TBE crosses property whose owner is opposed to sale. NZTA would struggle to justify designation and acquisition of this property, as it is outside the footprint of the highway intersection. • Alternative alignment avoids this property, but compromises layout of industrial development. TBE and TCC to consider options on whether to purchase property and pursue preferred alignment, or accept alternative alignment for ring road. • Given the fast-paced progress south for TBE industrial land, and the revised staging (under the Tauranga City Council City Plan), the new intersection and connection to TBE needs to progress to enable TBE to open up more land.		
3	**Services**		
	• TW currently has no services to the boundary of the site. • Stormwater will be largely managed within the site, although area around Belk Road requires joint working to resolve. • Wastewater – there is an existing manhole connection at the end of Whiore Ave. • Water – a high-pressure connection will be brought from Gargan Road • Other services include: ○ Power ○ Gas ○ Telecommunications • All services will have to cross SH29, and occupy the highway corridor. • The location of the services will have to consider: ○ Future form of SH29 ○ Interim vs. long term access location to TW. • Stantec (MWH) have undertaken water modelling • Possible additional joint TCC/NZTA project to review options for interim services connections, including routes and locations in the highway corridor.		
4	Actions	Action Lead	By when
	• Belk Road/Redwood Lane roundabout – landowner consultation	WSP Opus / TCC	21/12/18

Ref	Item		
	• Compile all Belk Road/SH29 agreements – provide to WSP Opus	TCC / NZTA	26/10/18
	• Determine approach to landowner issues for TBE ring road connection to new SH29 / Redwood Lane RAB	TCC / Element IMF	
	• NZ Transport Agency – assign a representative to the Belk Road/Redwood Lane intersection upgrade	Wayne/Neil	26/10/18
	• Put together brief for additional piece of work to assess interim access and servicing options for TW on the upper plateau.	TCC / NZTA	26/10/18

Appendix E : Stage 2 – MCA Framework

Early Works Package

Tauriko West

Draft MCA Framework

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Document Details:

Date: Draft
Reference: 232735.01/AS013
Status: Issue 1:

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Contents

Document History and Status

Issue	Date	Author	Internal Review by	NZTA Review by	Status
1	30 July 2019	C Mason	M Meister		Draft 1
2	3 August 2019	C Mason M Meister			Draft 2
3	28 August 2019	S Banks			Draft 3

Revision Details

Revision	Details
R1	Amendments to the Investment Objectives
R2	Amendments to the Early Works Targets following partner input
R3	Further amendments to the Early Works Targets following partner input

1 MCA Framework – Overview

This MCA framework is for the early works activity which falls under the Tauriko Connections (Long Term) DBC project and MCA framework. For all key notes and overarching framework refer to that document.

The key objective of undertaking these early works is to make land available for housing within the next 2- 5 years in Tauriko West and provide a connection at Belk Road to facilitate growth in the TBE area. With this in mind, a subset of investment objectives using the Long Term Project ILM has been created for this activity. This is outlined in the following table. In some instances changes have been made to the DBC Investment measure, as shown in red text. Note, values in yellow highlight have yet to be determined, but will be available in time for the MCA workshop.

DBC KPI	Measure	Baseline	DBC Target	Early Works Target	Supporting Comments
Predictable travel times for freight	Travel time variability on SH29 during AM & PM peak periods from Omanawa Road and SH2	10 minutes with 9 mins variability PM Peak. (2019) 9 mins with 5 mins variability in AM (2019)	10 mins with < 5 mins variability during peak times by 2030	A mins + 150 secs with max B mins variability during AM Peak by 2030 from Omanawa Road to Takitimu Drive Toll Road AA mins +150secs with max BB mins variability during PM Peak by 2030 from Omanawa Road to Takitimu Drive Toll Road.	Increase in travel time between Belk and Cambridge Road based on an extra 50secs/veh delay at each new intersection. (representing LOS D increase). Existing Trip reliability between Belk and Cambridge Rd to be retained. Acknowledges additional traffic from Tauriko West will have an effect on intersections outside project scope. Primary route for freight travelling to the Port assumed to be SH29 and Takitimu Drive Toll Road *Values yet to be determined from TomTom data for early works target*
Land use planning reduces the need for travel outside of western corridor	% journey to work trips during peak periods to/from/within Western Corridor	TBC	TBC	Access provided from SH29 to enable development of employment land and residential land to commence by 2023.	Enabling access to both housing (Tauriko West) and commercial development (TBE) will assist in reducing the need to travel outside the Western Corridor
Increase mode shift from private vehicles to walking,	Population in close proximity to walking, cycling and	N/A	80% of population within 600m	Safe and attractive walking, cycling and PT facilities provided between Tauriko West and Tauranga Crossing	Looking to meet objective at the outset

DBC KPI	Measure	Baseline	DBC Target	Early Works Target	Supporting Comments
cycling and PT	PT facilities in Tauriko West		walking by 2030	by commencement of residential activity at Tauriko West	
	No. of annual PT boarding's in Western Corridor	6,500 Route 52 (2017)	>250K p.a by 2030	Average of 30 peak hour trips per household per year by 2030 to/from Tauriko West	
	PT (Peak) Travel Time from Tauriko to Cameron Rd or Takitimu Drive	3.7 mins: Tauriko to Cameron Rd. 4-7 mins: Tauriko to Takitimu Dr (2017)	Better than driving baseline by 2030	PT in-vehicle peak travel time same or better than driving by car from Tauriko West to Tauranga Crossing by 2030	Early works target restricted to Tauriko West to Tauranga Crossing journey, as wider destinations rely on facilities outside scope of package. Locally specific measure therefore considered appropriate.
Transport system enables timely delivery of appropriate urban and commercial growth areas in the Western Corridor	Access from SH29 into Tauriko West and upper TBE commercial area near Belk Road	Early Access to allow Tauriko West housing (Zero)	-	Access to enable development of at least 1,000 houses to commence by 2023	New specific target for early works. Min number of houses needed for subdivision to be viable.
		Access to enable continued TBE commercial growth (Zero)	-	Access provided by 2023 to facilitate remaining 80ha of commercial development in Stage 3 of TBE	New specific target for early works. 80ha reflects condition in latest TBE consent.
Reduce crashes by severity	All crashes by severity by mode on SH29 between Belk Road and Cambridge Road	SH – 49	30% reduction on opening for 5 years	Addresses 10 SH crashes by 2023 – this equates to 40% of the 30% Long Term target for SH's	Relates to what is achievable with adopted intersection forms at each of the three sites. Safety effects on wider network outside early works scope which may arise from additional trip generation from Tauriko West development will be considered under safety effects (refer 3.3 below).
Reduce DSIs	DSIs on SH29 between Belk Road and	SH – 8	50% reduction on opening for 5 years	Addresses 1 DSI by 2023. – this equates to 15% of the Long Term 50% target for SH	Relates to what is achievable with adopted intersection forms at each of the three sites.

DBC KPI	Measure	Baseline	DBC Target	Early Works Target	Supporting Comments
	Cambridge Road				

2 Methodology – using MCA and other

There are 3 separate items in the early works package as shown in Figure 2-1. However, given the proximity of Tauriko West northern site and Cambridge Road site, they will be evaluated together. The Belk Road intersection will be considered separately.

- The project team and appropriate specialists will assess (activity objectives, risk and effects on the short list of options for the 2 sites (3 parts) and the focus of the assessment
  - Belk Road/Redwood Lane Roundabout – agreement was reached by the Project Partners that previous optioneering and evaluation as part of the long-term project determined that a roundabout was the preferred intersection choice. The optioneering and evaluation of the early works will therefore focus on the location and layout details of that roundabout
  - Tauriko West North Intersection with SH29, Cambridge Road intersection with SH29 and the midblock between them. The form of both intersections was agreed to be traffic signals. The optioneering and evaluation will focus on location and layout details of those signalised intersections and the midblock linkages.

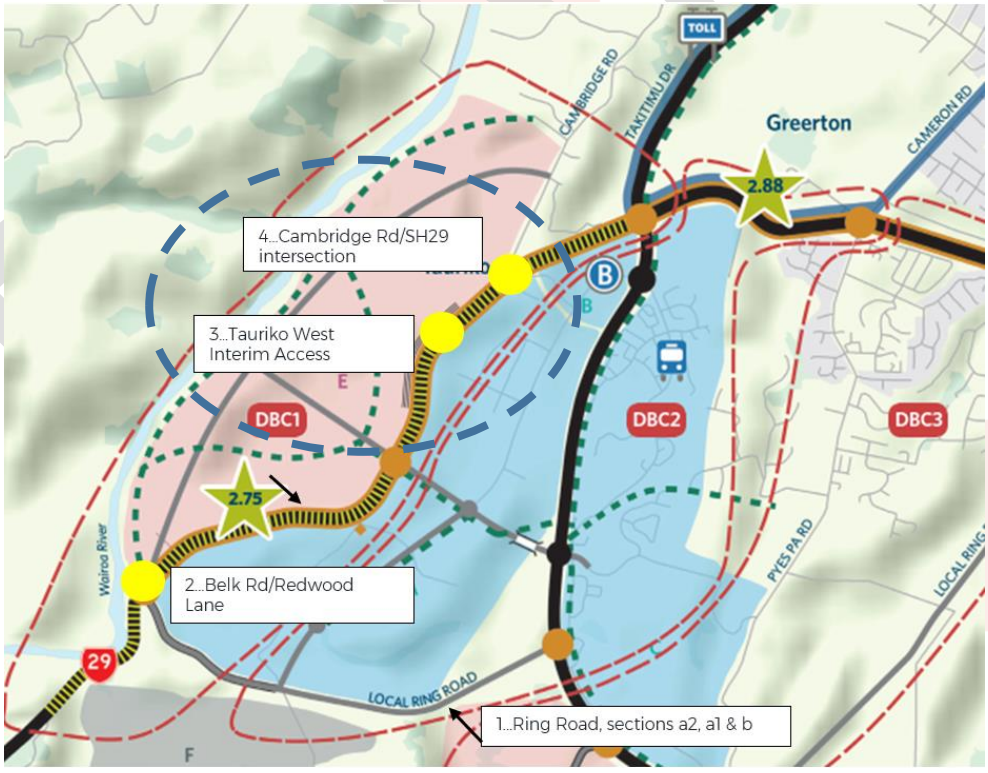


Figure 2-1: Tauriko Early Works Area

- Short list of options. The team's initial evaluation outputs will be provided and workshopped with the Project Partners to determine a preferred option. It should be noted that the MCA assessment, is not a full assessment of environmental effects. This will be undertaken as part of the pre-implementation/consenting phase if required.

- Weightings and sensitivity: Given there is only a limited number of criteria, the initial analysis will have equal weighting across all the categories. Sensitivity testing may consider higher alignment of some of the criteria versus the others. This is a flexible approach. That is, the types of sensitivity testing can be discussed and added during the process.

3 MCA Scale and Evaluation system

This section discusses the scale and evaluation used when comparing the short list of options across both sites against:

- Belk – do nothing
- TW/Cambridge road – existing road form with 60km/h speed limit in place and assumes Belk Road Roundabout constructed.

Assume reasonable mitigation in place. Options are assessed on their individual merit but are also considered in comparison to the other options.

3.1 Investment Activity Objectives

Given that the forms for both sites have been largely determined (that is roundabout at Belk/Redwood Road, and Traffic Signals at Tauriko West and Cambridge Road intersection), the MCA focuses on assessment against risk and effects rather than the alignment to why this is being invested in, in the first place – i.e. the investment objectives.

This is because all assessments against the investment objectives will be very similar and will 'water down' the evaluation. However, the outcomes from the evaluation including what benefits will be achieved with the various layouts (i.e. housing numbers, crashes, DSIs, and PT active trips proportions) will be documented as part of the decision-making process to determine the preferred option at both sites.

3.2 Risk Criteria

The following risks are proposed in terms of evaluating the early works on SH 29.

In terms of risks, these specific elements within this section are all based on whether there is a risk or whether the options have to deal with highly complex issues. For this reason, there are only negative ratings applicable across all options.

Scale

Rating	Score	Design Complexity/Risk
Neutral	0	No risk/issue, or not required
Low Risk	-1	Standard or routine technical solution
Medium Risk	-2	Some complex elements, but achievable
High Risk	-3	Highly complex, non-standard solution, likelihood of significant technical difficulty and potential for cost/programme increase
Fatal Flaw	N/A	Not feasible/ practicable

Key Questions

Note this is only an overall summary of some of the key questions that the specialists may ask when assessing each option. It is not an all-inclusive list. The question and considerations are determined by the individual specialist and are not directed by the project team. An overall assessment of the 'teams' questions to ensure that any 'doubling up' of criteria for assessment is limited. However, noting that it is difficult to completely avoid some double counting.

Criteria	Independent Assessment Question (Lead by Specialist)
Technical/ Constructability	How difficult/complex the design of the option will be including geometric, geotech, stormwater, pavements, structures and utilities, Positive ratings not considered appropriate. Are there any factors in this option that makes construction particularly difficult? Does the option involve significant work within live traffic lanes? Impact on other infrastructure – such as water service or transmission lines? Can the option be staged if needed to address interim demand for safety, access and traffic flows?
Consentability	How difficult/complex will the option be to obtain designations and resource consents from WBOPDC and BOPRC? Positive ratings not considered appropriate.
Financial Fundability	The degree to which capital and operational costs of option can be funded. This includes how the option aligns with associated benefits and costs. Does this option have significant sunk costs? Is the option likely to have a BCR less than 1?
Public	How likely will there be resistance from public to the proposed options?
Integration (transport & land) – Future proof	Are there wider transport system effects? How well does the option fit with the longer-term project? The degree to which option supports transport and land-use integration - i.e. enhancing or improved access to existing development or enabling future adjacent land-use development adjacent to the corridor (or vice versa).
Programme/ Housing	Will the option be operational by 2021/2022? Are there any major risks to achieving the dates? Does the option provide the intended level of housing development (1000+ hhs)

3.3 Effects

The following effects are proposed in terms of evaluating the early works package:

SCALE

Rating	Score	Comments
Significantly Positive	3	Significant positive effect and/or provide significant enhancement
Moderate Positive	2	Moderate positive effect and/or provide significant enhancement
Minor Positive	1	Minor positive effect
Neutral	0	Negligible
Minor Adverse Effect	-1	Standard or routine technical solution
Moderate Adverse Effect	-2	Some complex element but achievable
Significantly Adverse Effect	-3	Highly complex, non-standard solution. Likelihood of significant technical difficulty and potential for cost/programme increase
Fatal Flaw	Fatal Flaw	Of such national/regional/local significance that unlikely to be consented and/or effects can't be mitigated

- A one page marking sheet has been developed for each team member/specialist to mark per site. It is important that each decision is recorded to provide transparency throughout any potential hearing process. Example is attached.

- The team member/specialist will be expected to undertake their assessment considering reasonable mitigation and note what that mitigation is. Ideally effects should be based on the fact that mitigation has been applied but understanding there may be areas where this is not possible. Further consultation between the specialists will be undertaken to ensure the whole team is aware of the other specialist's assessment and assumptions on mitigation. Any changes as a result of this discussion will be recorded on the template sheet.
- It is important to understand there may be differences across the assessment of each specialist however each expert should be consistent across their own methods and any critical issues listed.

- Consideration should be given to the results of the ESR screen and how the critical issues / assumptions / mitigation considerations have been addressed. All reference material that is considered as part of the assessment should be listed and any assumptions that have been made as part of the ranking process should be listed

Key Questions

Note this is only an overall summary of some of the key questions that the specialists may ask when assessing each option. It is not an all-inclusive list. The question and considerations are determined by the individual specialist, not directed by the project team.

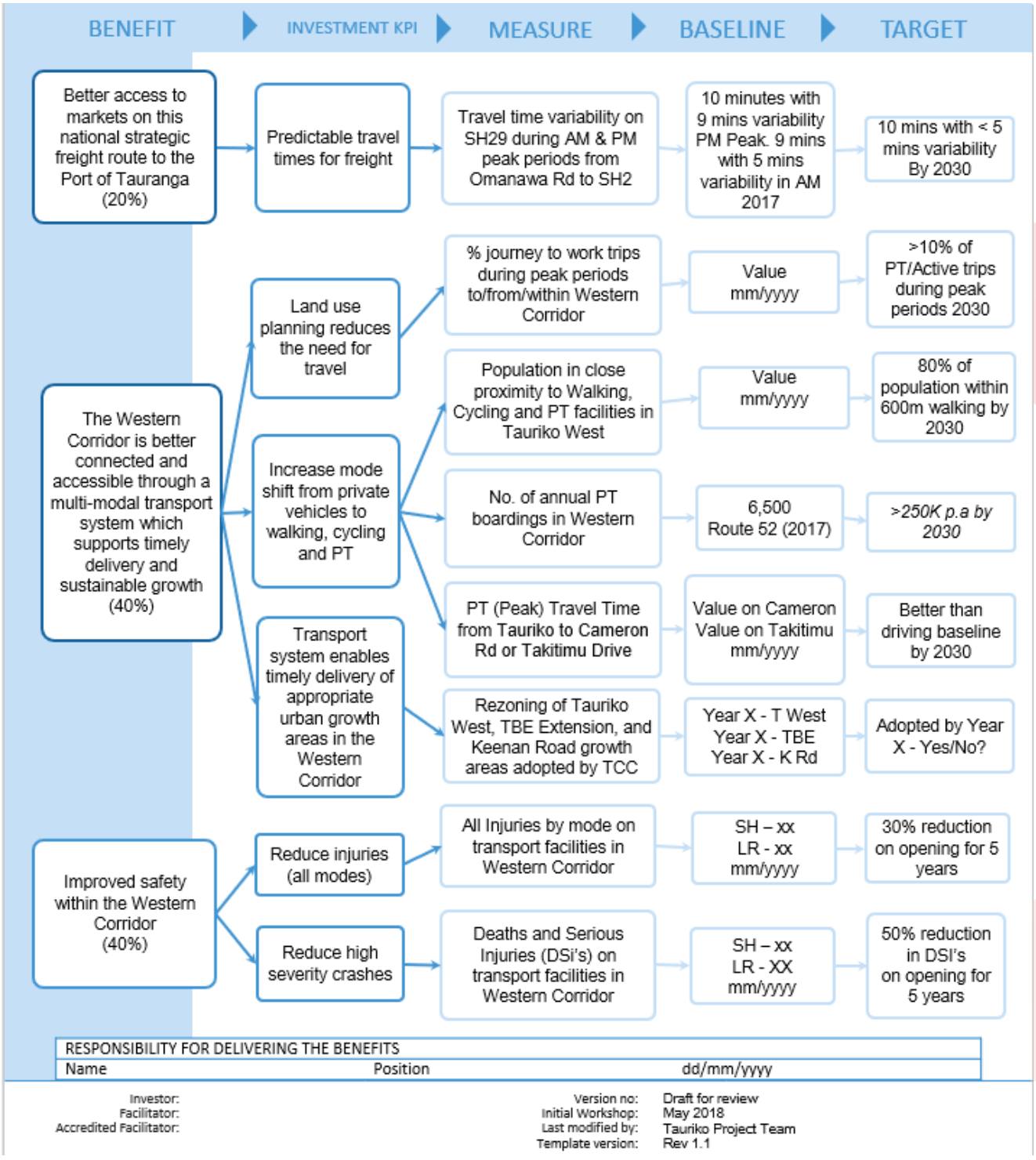
Criteria	Considerations
Traffic	The degree to which all active modes have been catered for. What are the impacts on the local and wider transport network as a result of the options;
Safety	The degree to which the option enhances safety for all modes. Does this option provide a safe system or a supporting safe system measures which will reduce high severity crashes? If crashes are occurring are they likely to be low or non injury type crashes. What is the impact on personal security and safety? Are there any wider safety implications?
Property	The degree to which the option impacts on the properties within the option alignment, the number of owners, the property type being impacted (i.e. residential vs rural or business use, community), the impacts on the surrounding land uses as a result the project and the potential risks to the project from a property acquisition perspective.
Cultural	Does the option impact on cultural and iwi values? Does it affect any areas of cultural significance?

Appendix A: Example Specialist Marking Sheet for assessment

Multi Criteria Assessment Scoring Sheet	
Name of assessor:	
Area of assessment:	
Specific assessment criteria considered:	
Alternative Reference:	
Initial assessment (to be completed prior to internal short list workshop, consider effects post-mitigation)	**MCA assessment** (to be completed at internal workshop (if needed), consider effects post-mitigation))
Score: (highlight or circle selection) -3 Significant Adverse or Risk -2 Moderate Adverse or Risk -1 Minor Adverse or Risk 0 Neutral 1 Minor Positive 2 Moderate Positive 3 Significant Positive	**Score**: (If different to initial assessment, highlight or circle selection) -3 Significant Adverse or Risk -2 Moderate Adverse or Risk -1 Minor Adverse or Risk 0 Neutral 1 Minor Positive 2 Moderate Positive 3 Significant Positive
Notes: Reasons for your assessment / comments Assumptions made Other Information relied upon	**Notes:** Reasons for change

Appendix B:

Appendix B: Tauriko West DBC – Investment Objectives



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Appendix F : Stage 2 – Environmental and Social Responsibility Screen for Long Term

ENVIRONMENTAL AND SOCIAL RESPONSIBILITY SCREEN V2.FEBRUARY 2016

Use to assess options in the Indicative Business Case

Use this screen to identify opportunities and risks and assess options for state highway projects. Complete the screen for each option to distinguish them from one another or bundle options where appropriate. Screen results will signal where technical assessments are required and provide a written record to support the alternatives assessment required for statutory applications. For further assistance contact the EUD Team.

Additional instructions and content, including information sources, to help complete the screen can be found on the Highways Information Portal Screen pages here

Decide how many times screen should be filled out (Group Options) ▶ Answer screen questions using project information and suggested information sources ▶ Refer to screen questions explanation, particularly if you answered yes to any of the questions ▶ Complete page 2 of screen ▶ Incorporate page 2 text in IBC assessment of options table (Background and MCA)

PROJECT LOCATION:	PROJECT PURPOSE:	DATE:	OPTION DESCRIPTION:
Tauriko West Network DBC	Safety, freight efficiency, supporting growth	28 June 2017	High level - corridor assessment

CATEGORY		QUESTION	ANSWER		USEFUL INFORMATION SOURCES
GENERAL	G1	What is the zoning of adjacent land? Are there any encumbrances on the land? e.g. Maori Reserve or other reserve/covenants	Rural ● / Commercial ● / Industrial ● / Residential ● / High density residential ☐ / Parks/open space ☐		District/Unitary Plan Zoning Maps
	G2	Does the option disturb previously undisturbed land?	Y ☐	N ○	
	G3	What is the construction timeframe?	>18 months ☐	<18 months ○	
NATURAL ENVIRONMENT	NE1	Are there any outstanding/significant natural features (e.g. geological or geothermal)/landscapes?	Y ☐	N ○	NZTA MapHub Environmental and Social Risk Map- Natural Environment
	NE2	Will the option affect the coastal marine area, wetlands, lakes, rivers, streams or their margins?	Y ☐	N ○	Regional Plan Maps and Schedules
	NE3	Will the option affect areas of the conservation estate, or areas of known significance for biodiversity or known habitats of uncommon or threatened species?	Y ☐	N ○	District Plan Maps and Schedules
	NE4	Is the option in an area of potential hazard risk e.g. fault lines, significant erosion, flooding, sea level rise etc?	Y ☐	N ○	Department of Conservation
	NE5	Will more than 0.5 hectares of vegetation be removed?	Y ☐	N ○	
		What type?			
CULTURAL AND HISTORIC HERITAGE	CH1	Are there sites/areas of significance to Maori within 200m of the area of interest?	Y ☐	N ○	Iwi
	CH2	Are any recorded, scheduled or listed archaeological sites within 200m of the area of interest?	Y ☐	N ○	NZTA MapHub Environmental and Social Risk Map- Culture and Heritage
	CH3	Are any scheduled, listed or other important heritage buildings/ structures within 200m of the area of interest?	Y ☐	N ○	Heritage New Zealand List
	CH4	Will the option affect the setting of any historic building/structure or archaeological site?	Y ☐	N ○	NZ Archaeological Association
	CH5	Is a group of archaeological sites or an area of historic built environment (even partially) within 200m of the area of interest?	Y ☐	N ○	District Plan Maps and Schedules Regional Plan Maps and Schedules IPENZ Heritage List NZTA GIS predictive models
HUMAN HEALTH	HH1	What is the One Network Road Classification?	National ● / Regional ☐ / Arterial ☐ / Collector ☐		NZTA MapHub Environmental and Social Risk Maps- Human Health and Community which includes: - Designated airsheds (including one network classification) - Highly sensitive receivers Regional Council Contaminated sites Team
	HH2	Is the area of interest designated as a non-compliant airshed?	Y ☐	N ○	
	HH3	Are there medical sites, rest homes, schools, child care sites, residential properties, maraes or other sensitive receivers located within 200m of the area of interest?	Y ☐	N ○	
	HH4	Does land use within 200m of the area of interest include industrial sites, chemical manufacturing or storage, petrol stations, vehicle maintenance, timber processing/treatment, substations, rail yards, landfills or involve other activities that may result in ground contamination? OR Are there HAIL or SLUR (contaminated) sites within 200m of the area of interest?	Y ☐	N ○	
SOCIAL	S1	Does the option affect access to community facilities i.e. libraries, open space etc (either temporarily or permanently)?	Y ☐	N ○	NZTA MapHub Project Team District Plan Maps Council and Community Strategy Documents
			Which? Tauriko West Growth Area		
	S2	Does the option affect community cohesion and accessibility including vehicular connectivity on the local road network?	Y ☐	N ○	
URBAN AND LANDSCAPE DESIGN	ULD 1	Are there opportunities to enhance infrastructure for, and/or improve access to, public transport and/or active modes of travel such as as walking and cycling?	Y ☐	N ○	NZTA MapHub Environmental and Social Risk Map- Natural Environment (Scenic Routes) Regional Land Transport Plan Project Team Strategies and District Plan
	ULD2	Does the option enhance the development potential of adjacent land where appropriate?	Y ☐	N ○	
	ULD3	Is the option located on a themed highway? Is the option part of or near a national cycle or walking route?	Y ☐	N ○	
	ULD4	Are there opportunities to enhance the urban character, landscape character and visual amenity?	Y ☐	N ○	

Answers and Comments	Refer to screen questions explanation to help complete this part.

1. **Summarize the potential environmental and social risks/impacts associated with this option. Consider short and long term risks and impacts.**

NATURAL ENVIRONMENT:	Potential effects associated with earthworks include increased stormwater runoff, and possible in-stream works (dependent on option). With appropriate option design and mitigation measures, it is anticipated that the effects on the environment could be avoided, remedied, or mitigated to an acceptable level. Appropriate mitigation measures could include: • Construction of any new stream crossings along the route (Omanawa River or Kopurererua Stream) to minimise any in-stream works. • Controlling sediment and storm water runoff at source and / or through grass swales and detention ponds. Measures to protect the highway from flooding may also need to be considered.
CULTURAL AND HISTORIC HERITAGE:	The corridor traverses the tribal area of several hapu of Ngāti Ranginui. Consultation with local iwi and hapu is ongoing, as part of a joint process with the Partner Councils, and a cultural values assessment(s) will be prepared. It is anticipated that option design and mitigation measures will be required to address the actual and potential cultural effects of the project. There is a high density of archaeological sites, likely that some will be damaged or destroyed. Detailed assessment and Archaeological Authority from Heritage NZ will be required.
HUMAN HEALTH:	The current options do not raise any significant human health issues. The majority of the works proposed through the options are on or adjacent to the existing alignment, and sensitive receptors (e.g. education or residential) adjacent to the corridor are protected under the City Plan or will be relocated. The additional capacity and safety improvements proposed by the options should assist in an overall reduction of congestion and improvement to journey time, which is linked to reduced emissions, traffic noise, and vibration. There are a number of HAIL sites along the corridor, most of which relate to the historic use of chemical sprays associated with horticulture or industrial land use. A PSI (and likely DSI) will be required to identify risks to human health from contaminated soil, and any measures to address these risks.
SOCIAL:	The current options have the potential to affect accessibility and convenience by introducing central and/or side barriers and limiting access to the new highway (which supports the LAR status of SH29). Providing for local road connectivity across the new highway at major intersections, will improve the safety and convenience of crossing the highway. Separation of local traffic from inter-regional traffic will provide for safer and more efficient journeys on the local road network, enabling the right traffic on the right road. Introducing more local road connections as part of the options considered provides for improved resilience for communities. Continued engagement with the community on these issues will be critical to both identifying the locations of highest concern, and managing community expectations around journey time.

The responses above will be used in the IBC assessment of options summary table: MCA of the Option.

URBAN AND LANDSCAPE DESIGN:	Care will be required to minimise visual effects on both amenity and landscape character values of the recommended option selected, both by its design and mitigation measures such as planting, especially for the section of SH29 in the rural zone around Belk Road, the capacity improvements between the intersection of SH29/SH29A/SH36, and at Barkes Corner due to the intensification of residential development in the vicinity of the corridor. With appropriate option design and mitigation measures, it is anticipated that any adverse visual and landscape effects of the project can be avoided, remedied, or mitigated to an acceptable level.

Incorporate the relevant comments from above into the economy, social and geography sections of the IBC assessment of options summary table.

2. **What are the environmental, social integration, landscape design or urban design benefits or opportunities presented by this option? Particularly record opportunities that could be lost if not considered early in the design process.**

The initial opportunities identified, which could be lost if not considered in the option development and evaluation phase, are:
- Opportunities to enhance water quality, urban design, landscape and amenity of corridor.
- Opportunities to improve local road connectivity and enhance liveability across and along corridor.

3. **Are there any impacts, risks or opportunities which require preliminary technical assessments to help understand risks or opportunities? Is further information required to support the development of the detailed business case or can it be left until the detailed business case/pre-implementation?**

The following preliminary assessments are recommended:
- Archaeological (underway in conjunction with Tauranga City Council) and cultural effects assessments
- Stormwater design, flood modelling (underway in conjunction with Tauranga City Council) and water quality effects management
- Thorough assessment of urban design and connectivity issues (incorporated as part of option development and evaluation)

Completed by	Matt Stulen - Intermediate Planner - Opus and Simon Banks - Senior Planner	
Reviewed by NZTA Project Manager		
Incorporated results into IBC assessment of options summary table?	**Yes** ☐	**No** ○

Appendix G : Enabling Works Safety Review

Preliminary Design Stage Road Safety Audit - Tauriko Early Works

Prepared for Tauranga City Council
Prepared by Beca Limited

29 November 2019

Contents

Beca

Revision History

Revision Nº	Prepared By	Description	Date
0	Dave Aldridge	DRAFT – for review	25.11.2019
1	Dave Aldridge	FINAL – issue to Client	29.11.2019
2	Mike Meister - WSP	Designer Comments Added	16.12.2019
3	Mike Meister - WSP	Design response to Clients decision	08.04.2021

Document Acceptance

Action	Name	Signed	Date
Prepared by	**David Aldridge**		25.11.2019
Reviewed by	**Colin Brodie / Ross Thomson**		27.11.2019
Approved by	**David Aldridge**		27.11.2019
on behalf of	Beca Limited		

1 Introduction

1.1 Safety Audit Procedure

A road safety audit is a term used internationally to describe an independent review of a future road project to identify any safety concerns that may affect the safety performance. The audit team considers the safety of all road users and qualitatively reports on road safety issues or opportunities for safety improvement.

A road safety audit is therefore a formal examination of a road project, or any type of project which affects road users (including cyclists, pedestrians, mobility impaired etc), carried out by an independent competent team who identify and document road safety concerns.

A road safety audit is intended to help deliver a safe road system and is not a review of compliance with standards.

The primary objective of a road safety audit is to deliver a project that achieves an outcome consistent with Safer Journeys and the Safe System approach, that is, minimisation of death and serious injury. The road safety audit is a safety review used to identify all areas of a project that are inconsistent with a safe system and bring those concerns to the attention of the client in order that the client can make a value judgement as to appropriate action(s) based on the risk guidance provided by the safety audit team.

The key objective of a road safety audit is summarised as:

To deliver completed projects that contribute towards a safe road system that is increasingly free of death and serious injury by identifying and ranking potential safety concerns for all road users and others affected by a road project.

A road safety audit should desirably be undertaken at project milestones such as:

- Concept Stage (part of Business Case);
- Scheme or Preliminary Design Stage (part of Pre-Implementation);
- Detailed Design Stage (Pre-implementation / Implementation); and
- Pre-Opening / Post-Construction Stage (Implementation / Post-Implementation).

A road safety audit is not intended as a technical or financial audit and does not substitute for a design check on standards or guidelines. Any recommended treatment of an identified safety concern is intended to be indicative only, and to focus the designer on the type of improvements that might be appropriate. It is not intended to be prescriptive and other ways of improving the road safety or operational problems identified should also be considered.

In accordance with the procedures set down in the *"NZTA Road Safety Audit Procedures for Projects*, *Interim Release* dated May 2013", the audit report should be submitted to the client who will instruct the designer to respond. The designer should consider the report and comment to the client on each of any concerns identified, including their cost implications where appropriate, and make a recommendation to either accept or reject the audit report recommendation.

For each audit team recommendation that is accepted, the client shall make the final decision and brief the designer to make the necessary changes and/or additions. As a result of this instruction, the designer shall action the approved amendments.

Decision tracking is an important part of the road safety audit process. A decision tracking table is embedded into the report format at the end of each set of recommendations to be completed by the designer and client for each issue documenting the designer response, Project Sponsor (and asset manager's comments in the case where the client and asset manager are not one and the same) and action taken.

A copy of the report including the designer's response to the client and the client's decision on each recommendation shall be given to the road safety audit team leader as part of the important feedback loop. The road safety audit team leader will disseminate this to team members.

1.2 Project Background

This report presents the findings of the preliminary design stage Road Safety Audit for the SH29 Tauriko Early Works project, undertaken by an independent Safety Audit Team (SAT) at the request of the Tauranga City Council (TCC).

To accommodate future residential developments in Tauriko west (potential up to 3000 lots), intersection and mainline improvements are needed to SH29. The existing state highway is already experiencing significant delays, especially at the Cambridge Road intersection and along the SH29 corridor during peak periods. WSP have therefore considered some early work improvements to enable access into these proposed residential development areas for up to 2,000 housing units.

SH29 is a high volume national strategic route, being a key link to the Tauranga Port, with an AADT of approximately 15,000, with ~ 17% of HCV's.

The early works project consists of:

- a new two-lane roundabout at SH29/Redwood Lane intersection,
- a new traffic signalised 'T' intersection immediately adjacent to the Tauriko Caltex service station,
- signalisation of the existing SH29/Cambridge Road intersection.

Safety issues have been considered against current guidelines, safety experience and best practice where relevant.

1.3 Safety Audit Team

The audit team was made up of the following personnel:

Auditor	Role	Title
Dave Aldridge	Lead Safety Auditor	Technical Director – Civil Engineering, Beca
Colin Brodie	Senior Safety Auditor	Director - Colin Brodie Consulting Ltd
Ross Thomson	Senior Safety Auditor	Traffic Safety Engineer - Urban Traffic Design Ltd

1.4 Report Structure

The potential road safety problems identified have been ranked as follows:

The expected crash frequency is qualitatively assessed on the basis of expected exposure (how many road users will be exposed to a safety issue) and the likelihood of a crash resulting from the presence of the issue. The severity of a crash outcome is qualitatively assessed on the basis of factors such as expected speeds, type of collision, and type of vehicle involved.

Reference to other projects, historic crash rates, and similar elements of other projects, have been drawn on where appropriate to assist in understanding the likely crash types, frequency and likely severity that may result from a particular concern raised in this report.

The frequency and severity ratings are used together to develop a combined qualitative risk ranking for each safety issue using the Risk Assessment Matrix in **Table** 1 below. The qualitative assessment requires professional judgement and a

wide range of experience in projects of all sizes and locations.

Table 1: Risk Assessment Matrix

Severity (Likelihood of Death or Serious Injury Consequence)	Frequency (Probability of a Crash)			
	Frequent	**Common**	**Occasional**	**Infrequent**
Very Likely	Serious	Serious	Significant	Moderate
Likely	Serious	Significant	Moderate	Moderate
Unlikely	Significant	Moderate	Minor	Minor
Very Unlikely	Moderate	Minor	Minor	Minor

While all safety concerns should be considered for action, the client or nominated project manager will make the decision as to what course of action will be adopted based on the guidance given in this ranking process with consideration to factors other than safety alone. As a guide a suggested action for each risk category is given in **Table 2** below.

Table 2: Risk Categories

RISK	Suggested Action
Serious	A major safety concern that should be addressed and requires changes to avoid serious safety consequence.
Significant	Significant risk that should be addressed and requires changes to avoid injury consequence
Moderate	Moderate risk that should be addressed to improve overall safety
Minor	Minor risk that should be addressed where practical to improve overall safety.

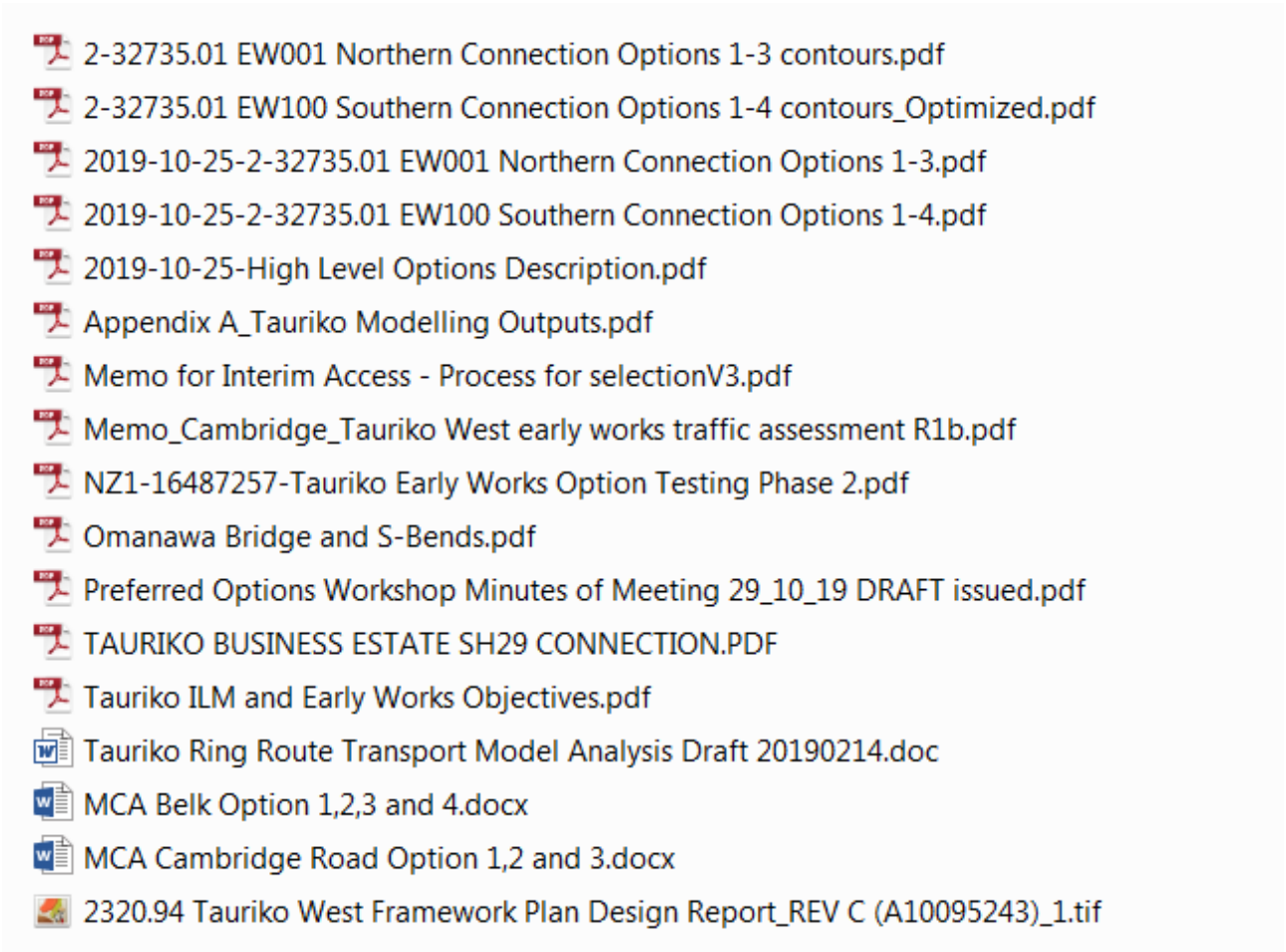
In addition to the ranked safety issues it is appropriate for the safety audit team to provide additional comments with respect to items that may have a safety implication but lie outside the scope of the safety audit. A comment may include items where the safety implications are not yet clear due to insufficient detail for the stage of project, items outside the scope of the audit such as existing issues not impacted by the project or an opportunity for improved safety but not necessarily linked to the project itself. While typically comments do not require a specific recommendation, in some cases suggestions may be given by the auditors.

1.5 Documents Reviewed

The following documents were received from TCC and WSP staff.

The safety audit is based on the information in these documents only.

Table 3: Documents Reviewed



1.6 Disclaimer

The findings and recommendations in this report are based on an examination of available relevant plans, the specified road and its environs, and the opinions of the Safety Audit Team. However, it must be recognised that eliminating safety concerns cannot be guaranteed since no road can be regarded as absolutely safe and no warranty is implied that all safety issues have been identified in this report. Safety audits do not constitute a design review, nor an assessment of standards with respect to engineering or planning documents.

Readers are urged to seek specific technical advice on matters raised and not rely solely on the report.

While every effort has been made to ensure the accuracy of the report, it is made available on the basis that anyone relying on it does so at their own risk without any liability to the safety audit team or their organisations.

2 Safe System Assessment

Although not specifically requested, the SAT has also undertaken a Safe System Assessment. The Safe System Assessment Framework (SSAF) was developed and published by Austroads in 2016. (https://austroads.com.au/publications/road-safety/ap-r509-16/media/AP-R509-16_Safe_System_Assessment_Framework.pdf)

The aim of the SSAF is to help road agencies methodically consider Safe System objectives in road infrastructure projects. It is useful in assessing how closely road design and operation align with the Safe System objectives, and in clarifying which elements need to be modified to achieve closer alignment with Safe System objectives. The approach involves identifying the key crash types that result in death and serious injury, and using a risk assessment approach, identifying elements that might contribute to severe outcomes. These key crash types include run-off-road, head-on, intersection, other (including rear end) and vulnerable road user (pedestrian, cyclist and motorcyclist) crashes. The risk elements considered include road user exposure to risk (e.g. traffic volumes), likelihood of a crash, and the likely severity outcome in the event of a crash. A risk score is developed which helps to determine how well a project may align with safe system objectives and outcomes, but equally important which elements of a project may need further consideration and improvement.

A number of Road Controlling Authorities (RCA's) including VicRoads (Victoria, Australia), Auckland Transport (AT) and the NZ Transport Agency are using the SSAF for various infrastructure improvement programmes. A recent review of the SSAF on 85 Victorian projects indicated that there was a substantial benefit (over and above normal preliminary design) for adjusted preliminary designs following the SSAF process, with FSI savings up to double that of the normal preliminary designs. The NZ Transport Agency is also looking to incorporating this into the Safety Audit process, particularly in the early phases of project development, where it can have the greatest effect.

The Safety Audit Team have elected to utilize the SSAF to gain further experience with this tool, and to help identify and confirm the areas of highest risk and components that may need further consideration.

The assessments for four components of the project (three intersections, plus the midblock through the existing Tauriko township can be found in Appendix A, however the key safety risks that require further consideration are:

- Redwood Lane
  - run off road
  - rollover
  - cyclists and motorcyclists
- Caltex / Packhouse intersection
  - high intersection conflicts
  - vulnerable road users
- Cambridge Road intersection
  - intersection turning conflicts
  - vulnerable road users
- Tauriko Township
  - access conflicts
  - u-turn conflicts
  - vulnerable road users

Road Safety Audit Findings

3 General Network Road Safety Comments

3.1 Network Capacity Significant

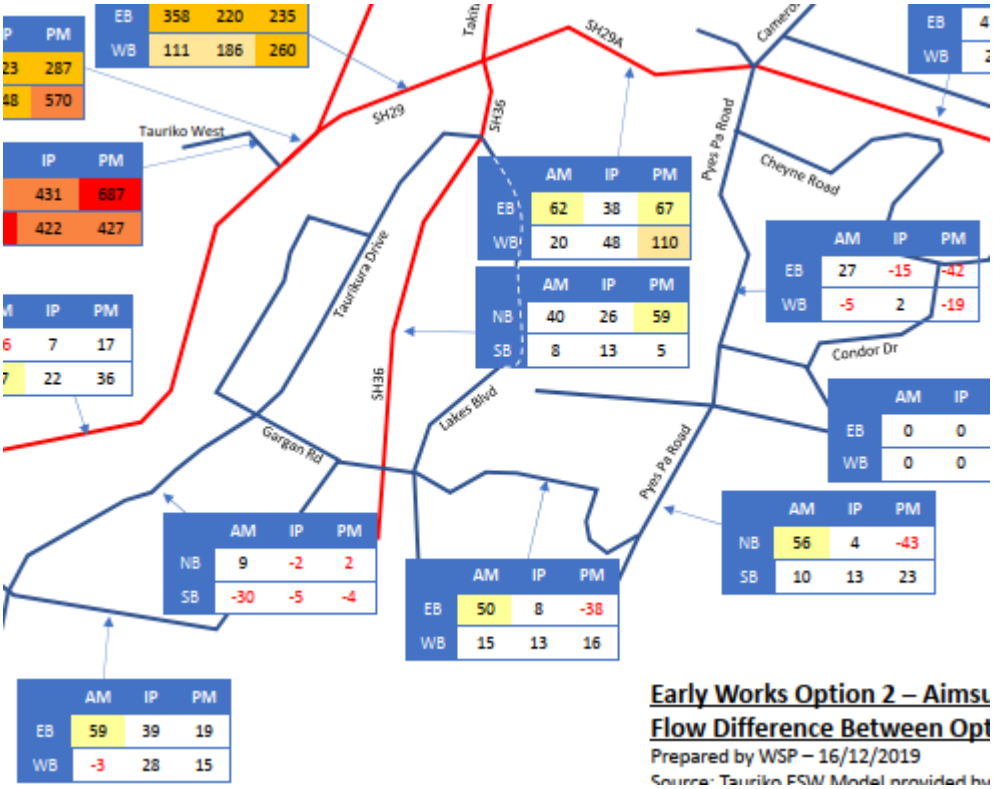
The SAT understand there are already network capacity and resilience issues with the road network and question the robustness of the traffic modelling and assumptions that have been made that suggest the network can accommodate the additional traffic from 2,000 units through these early works. There are intersection capacity issues under existing conditions that constrain the amount of free-flowing movement and affect desire lines within the local network. The modelling is extremely sensitive to these constraints and also the network improvements (or lack of) assumed in the base TTSM model (Beca memo 14 February 2019) and the Aimsun model (Beca memo 14 October 2019) including new links in the ring road. Upgrading and/or providing new intersections as part of this project will result in additional pressure on both the state highway and local network, leading to further traffic re-routing and rat-running on local roads. This in turn puts additional pressure and safety risk on the overall network, on roads and intersections not designed for that purpose, and mixing with a greater number of vulnerable road users.

The proposed 'early works' project has an unknown length of time that it could be operating before the ultimate upgrades are implemented. This may result in a greater volume of traffic throughout the project length and possibly resulting in an adverse effect on network performance and road safety.

Probability of crash occurring: Common
Likelihood of Fatal/Serious injury: Likely
Outcome: Significant

Recommendation:

Ensure the traffic modelling is robust with sensitivity testing and different scenarios undertaken. Scenarios should also assume some of the existing surrounding 'bottlenecks' have been improved. Consider the safety implications of the re-routed traffic on the wider network.

Designer Response:	**It is WSP understanding that the Aimsun model, commissioned by TCC, and operated by BECA, is robust and has been validated against appropriate validation criteria. Hence is fit for purpose.** **The early works package, consists of traffic signals at the proposed Tauriko/SH29 site and existing Cambridge Road/SH29 intersection and a Roundabout at Redwood Lane/SH29 which includes realignment of Belk Road to the new roundabout and closure of the existing Belk Road/SH29 intersection. As houses are built in Tauriko and generate vehicle trips onto the network, some existing SH29 users may divert onto the local road network as indicated by the Aimsun modelling. However, this effect is not likely to occur in the short term.** **In addition, the early works package is an enabler to get houses built as early as possible. Consideration of the wider network impacts of any diverted traffic is an issue to be dealt with through the wider Tauriko Connections Business Case, which is due to restart early in 2020.** **A review of the traffic differences indicates relatively minor flow diversions on the local roads – see below which indicates hourly flow in 2031.** 

Safety Engineer, NZTA Comment:	Designer's response is acknowledged. It is recommended to the Network Manager and the Manager, System Management that: • any proposed early works package is designed to provide the greatest safety outcome possible for all road users, and that these safety outcomes are not compromised to achieve any efficiency outcome. • safety outcomes for all road users do not deteriorate with any significant future increases in traffic volumes. • all safety related improvement features associated with the early works package are completed as part of the early works package, and not deferred for consideration, or dependant on implementation, as part of the wider Tauriko Connections Business Case.
Network Manager, NZTA Comment	Agree with safety Engineer NB Will place the word " Agreed" in subsequent items, which shall be read as Agree with Safety Engineer.
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineer, TCC Comment:	Agree with the SAT comments, and that of the NZTA Safety Engineer. TCC client needs to understand the extent to which additional traffic will re-route onto the local network during the life of the early works package under the different scenarios. In particular, what are the effects on the Taurko signals of resolving upstream bottlenecks at Takitumu Drive/SH29A/SH36 junction? TCC needs to understand the extent to which the safety for all affected road users does not deteriorate or become compromised by any deferral of the Tauriko Connections Business Case.
Client Decision:	Robust modelling has been undertaken to inform the Early Works package with a 10-year horizon. Due to this, assumptions have been made that within 10 years no changes are made to Barkes Corner, the Takitimu Drive Roundabout and that residential growth in the Keenan Road area is not starting yet. Further extensions of the Tauriko Business Estate and the Tauranga Northern Link have been included. The scope of the Early Works Package includes a preliminary design for a new ring road connecting from SH29, through the Tauriko Business Estate (Kaweroa Drive) towards SH36. This new connection will provide a safe alternative route which will avoid additional traffic onto the local network. For the interim, the Kennedy Road Bridge will cater for this. Network monitoring will be undertaken as is routine and normal practice to manage any unanticipated wider network safety impacts. The Long-term Business Case work will also investigate diversion issues through the modelling and identify necessary responses.

Action Taken:	No action required by Design team as part of Early Works Package.

3.2 Consistency of intersection treatments Moderate

The proposed design includes a roundabout at SH29 Redwood Lane, which the RSA team agree is an appropriate and acceptable treatment. Traffic signals are proposed at the peri-urban sites of the new Tauriko intersection and at the Cambridge Road intersection, before changing back to the existing roundabouts further to the east.

The roundabout layout provides

- better route consistency
- safe U turn facilities allowing the inclusion of raised central medians along the mid-block sections to better control access
- good speed management, especially when changes in the speed environment occur
- future proofing, by potential future signalisation of the roundabout or approaches

Traffic signals generally have a higher crash severity than roundabouts and are typically not used in high speed environments unless substantial threshold treatments can be provided to contain speeds to a safer level. A similar challenge was faced in the township of Bethlehem approximately a decade ago where the SH2 network needed to be upgraded to accommodate the residential and commercial growth in Bethlehem and areas to the north. A solution which has worked satisfactorily involved dual roundabouts, a central median island and mid-block signalised pedestrian crossings.

The SAT are concerned with the inconsistency and appropriateness of intersection control and potential crash risks along SH29.

Probability of crash occurring: Occasional
Likelihood of Fatal/Serious injury: Likely
Outcome: Moderate

Recommendation:

Reassess the intersection form at the new Tauriko intersection and Cambridge Road, and consider if roundabouts can be accommodated to provide a more consistent approach to intersection control along SH29.

If traffic signals remain as the preferred option, ensure appropriate speed mitigation and controls are in place and that these consider the potential u-turn demands.

Designer Response:	**A key objective of the early works is to ensure good public transport facilities are provided at the outset in conjunction with facilities for active modes to encourage alternative mode choice. To achieve this, the project partners agreed that traffic signals provided the best level of service for buses, as it also provided the ability to provide future bus priority measures if efficiency becomes an issue.** **On this basis roundabouts were not considered a suitable short to medium term measure.** **With regards the consistency of intersection forms along SH29, the current Tauriko Business Case is indicating upgrades of both the Takitimu and Barkes Corner intersections to larger traffic signals.** **Hence, traffic signals at Tauriko and Cambridge Rd intersections would result in a consistent intersection form along SH29.** **The WSP proposed concept design, includes a reduced posted speed limit to 60km/h or less on SH29 and the inclusion of road safety platforms at the two signalised intersections in order to achieve a safe system solution.**
Safety Engineer, NZTA Comment:	Designer's response is acknowledged. It is recommended to the Network Manager and the Manager, System Management that the intersection forms associated with early works package provide the greatest safety outcome and incorporate primary safe system treatments that also address the key safety risks as identified by the Safety Audit Team through the safe system assessment framework.
Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineer, TCC Comment:	Agree with the SAT comments. Signalising the main state highway between Tauranga and upper north island is a concern, with roundabouts typically considered a safer treatment. The design process should include quantifying all turning movements in the corridor between Belk Road/Redwood Roundabout and Cambridge Road, and ensure that these can be undertaken safely, with specific consideration for the U-turn benefit offered by roundabouts. This should extend over the life of the early works package. There may be an option identified that provides some staging of the early works package that restricts movement when required.

Client Decision:	The Client acknowledges the comments however considers that a signalised intersection at this location has been demonstrated as an appropriate intervention for the Early Works Package. Speed management and controls and the requirements for U-turns need to be developed further through the detail design stage. A signalised intersection with appropriate speed management, controls and U-turn ability (if needed) is considered: • To represent value for money for the Early Works Package given the long-term business case is still to confirm the solution at this location (potentially off-line from the existing state highway and grade-separated pedestrian and cycle connectivity). • An appropriate solution given the area is physically constrained to accommodate for a roundabout; • To support public transport priority as it can be better integrated via signals than a roundabout. To mitigate the potential safety concerns appropriate speed mitigation and controls need to be in place, and the demand for potential U-Turns need to be investigated given the proposed median barriers and raised median. The Designer needs to confirm appropriate speed management, as both 60 km/h and 50 km/h are being referred to on the next page. Speed management would have to begin south of the SH29-Redwood Lane-Belk Road Roundabout.
Action Taken:	WSP will consult with Waka Kotahi with regards the outcome of their SH29 Speed Management Review and ensure it is adopted when finalising the Enabling Works Concept plans. Although the need to accommodate U-Turns at the intersections of Tauriko West and Cambridge Road is a detailed design issue, WSP will consider and provide a recommendation as part of finalising the concept drawings.

3.3 Speed limits Moderate

SH29 is posted as 100km/h except for a 1km length through the Tauriko settlement where it is posted as 70km/h (400m west of Tauriko's Caltex petrol station to 100m east of Cambridge intersection). There is also a 40km/h school zone located within this 1km length.

The Safety Audit team recommend a full speed assessment is undertaken to ensure the posted speeds are safe and appropriate for the existing (and future) environment, taking into consideration the sight distances, direct SH29 access and pedestrian desire lines generated by the roadside businesses, Tauriko school, service stations and residential properties.

Probability of crash occurring: Occasional
Likelihood of Fatal/Serious injury: Likely
Outcome: Moderate

Recommendation:

Review the posted speeds throughout the project's length. Confirm the safe and appropriate speeds and enhance the speed thresholds to encourage and maintain safe speeds.

Designer Response:	**As part of the Tauriko West and Cambridge Road upgrade, the concept design was to include a 50km/h posted speed limit and include raised safety platforms** **WSP agree that a speed management review should be undertaken along SH29 to address the issues raised by the SAT. Ideally this would be completed by the NZ Transport Agency prior to any implementation of the early works.**
Safety Engineer, NZTA Comment:	The Designer's Response is acknowledged. It is recommended to the Network Manager and the Manager, System Management that any speed limit assessment undertaken be in accordance with the Speed Management Guide and the Setting of Speed Limits Rule. The assessment will need to incorporate any change in road form and/or road environment along the state highway as a result of the early works package.
Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineer, TCC Comment:	Agree with the SAT comments. NZTA should undertake the speed limit assessment undertaken in accordance with its processes. The early works project has identified a desired speed for this area, so should also incorporate speed management to ensure that the desired speed is met operationally.
Client Decision:	Agree with the comments. The client expects an approach that applies appropriate and consistent speed management measures to ensure that the desired speed is met operationally. NZTA noted that in the detailed design phase a technical assessment of speed management will need to be undertaken by NZTA in accordance with their processes.
Action Taken:	WSP will liaise with Waka Kotahi with regards the outcomes of the SH29 Speed Management review and take the recommendations into consideration as part of developing the enabling works.

3.4 Cyclepath/footpath/shared path connectivity Moderate

There appeared to be a lack of connectivity of footpaths and cycle paths throughout the project's length. As the Tauriko west development progresses there will be more demands for walking and cycling within this area, especially across SH29 to the industrial/commercial area.

This may lead to unsafe behaviour or unexpected movements by vulnerable road users across or alongside the road carriageway.

Probability of crash occurring: Occasional
Likelihood of Fatal/Serious injury: Likely
Outcome: Moderate

Recommendation:

Consider cycle and pedestrian connectivity in the wider network and allow appropriate connections and facilities at high conflict points. Provide wayfinding signage for the wider network.

Designer Response:	**The design of the three intersections will include facilities for walking/cycling across SH29 and along SH29 between Tauriko and Cambridge Road intersections. We recognise that improvements may be required with regards the wider network, however the agreed project scope of work is limited to the roundabout at Redwood Lane, and SH29 between the new Tauriko/SH29 intersection and Cambridge Road intersection.**

Safety Engineer, NZTA Comment:	The Designer's Response is acknowledged. As well as the safety risks identified by the Safety Audit Team, previous experience has shown there can be reputational risk where pedestrian and cycle connectivity is not provided with changes to an intersection form associated with adjacent development producing significant traffic generation. It is recommended to the Network Manager, and the Manager, System Management that: • the physical integration of the cycle path/ footpath/ shared path connectivity between the extents of the Tauriko rural town with Cambridge Road, and the existing cycle path/ footpath/ shared path network adjacent to the Tauranga Crossing development is implemented as part of the early works package. • the SH29/ Belk Road/ Redwood Lane intersection includes safe system primary treatments to allow cyclists, pedestrians, and other similar users to be able to safely negotiate the roundabout. • Wayfinding signage to the wider network is included in the early works package. • any shared pedestrian / cycle path and/or cycle lanes within the state highway designation be gazetted under the Agency's Traffic Controls on State Highways Bylaw. A component of the bylaw process is the completion of formal consultation under Section 22AD of the Land Transport Act. This states that the road controlling authority must give notice in writing, and provide reasonable time to make submissions on the proposal, to the following: a. the occupiers of any property adjoining the road to which the proposed bylaw would apply; and b. any affected road controlling authorities that are responsible for roads that join, or are located near, the road to which the proposed bylaw would apply; and c. the territorial authority for the area where the road is located; and d. any affected community; and e. the Commissioner of Police; and f. any other organisation or road user group that the road controlling authority considers affected; and internal engagement within the necessary teams within the Transport Agency.
Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager

Safety Engineers, TCC Comment:	Agree with the SAT comments. The current SH does not provide for any pedestrian or cycling connectivity between the north and the south of SH29, or provide any mode choice for those between the western suburbs of Tauranga, and the Lakes and TBE. Tauriko West with the current proposed early works package will also be limited by mode choice. It is TCC's desire to provide high quality connectivity for pedestrians and cyclists as early as possible as it is our assessment that there is significant latent demand for these facilities already. High quality facilities should be established early, so that expectations and good travel behaviours can be provided for as part of the development of a new community. TCC Safety Engineers strongly support the provision of grade separation for pedestrians and cyclists at the Cambridge Road intersection as part of the early works package, given the benefits for safety – there are geometrical approaches which will be difficult to manage for speed, visibility, and red-light runners, also efficiency of the traffic signals can be improved to reduce frustration and recklessness. We agree with NZTA that this should be connected to Taurikura Drive via Whiore Avenue as part of the early works package. The SH29/ Belk Road/ Redwood Lane intersection should also provide for grade separation to allow cyclists, pedestrians, and other similar users to be able to safely negotiate the crossing between residential and commercial/industrial. It would be difficult to provide a high level of service to these users on a dual lane rural roundabout, with the traffic volumes that are expected. The Tauriko Signalised T intersection should be able to provide for expected movements at-grade during the life of the early works package, but integration of pedestrian and cyclist connectivity should be made on both sides of SH29 between this intersection and the Cambridge Road Intersection. TCC also notes that shared paths, special lanes, parking restrictions, and vehicle restrictions on the local road network will also require inclusion in the TCC Traffic and Parking Bylaw.

Client decision (Northern intersections)	Tauriko West access & Cambridge Road intersection Agree with the comments that safe and high-quality safe ped/cycle connections and wayfinding to the wider network area are required as part of the Early Works Package. This will need to include connections to support desire lines and intersections at Cambridge Road, Belk Road and along / through the plateau area (e.g. school to Cambridge Road). It should be noted that it will take approximately five years for the first new houses in Tauriko West to be completed and occupied and therefore that long for the demand in walking and cycling to meaningfully increase in this location. Agree that a high-quality cycle/pedestrian connection is required to cross SH29, however in line with the comments at 3.2 that outlines that a long-term improvement to State Highway 29 through Tauriko is being worked upon, it is appropriate to have a signalled intersection with at-grade crossings, and appropriate speed management for a short-term intervention. In line with the comments from the TCC Road Safety Engineers in 3.4, an at-grade crossing at is considered appropriate at the new Tauriko West access for the Early Works Package. Also refer to the Client's decision in section 7.3. The long-term detailed business case will investigate an off-line state highway or the option of remaining on-line with likely further upgrade of intersections at Cambridge Road and for access to Tauriko West. At both junctions (or mid-block), the client agrees that options for grade separation for pedestrians and cyclists should be investigated through the Early Works Package. Implementation of one pedestrian and cycling grade separated solution could be either become part of the Long-term business case, or should there be substantial delays in the delivery of a long-term State Highway solution, it would be appropriate to reconsider grade separated pedestrian and cycling facilities as a standalone project. To support these outcomes staging provisions would be included for Tauriko West plan change that limit the amount of development that can occur until certain infrastructure improvements are made.

Client decision (Southern intersection)	Redwood Lane intersection Agree that grade-separation is required for pedestrians and cyclists at the roundabout SH29 and Redwood Lane. Further investigations to incorporate grade-separated walking and cycling connections will need to be undertaken as part of the Early Works Package to confirm whether this should be under or over the roundabout. If 'under', then the best time to construct, or at least futureproof this connection is likely to be in tandem with the new roundabout construction to avoid future disruption, costs and safety risks. If 'over' would be the recommended solution the actual construction could be postponed until the spine road through Tauriko West (connecting to Redwood Lane) will be developed as there is presently minimal origins or destinations for walking and cycling in this location and this is not anticipated to change until such time as the urbanisation of Tauriko West is physically connected via transport infrastructure to the Redwood Lane intersection. Staging provisions would be included for Tauriko West through the plan change that limit the amount of development that can occur until certain infrastructure improvements are made. Development in the vicinity of Redwood Lane is expected to take around 10 years from the commencement of development in Tauriko West (which equates to 15 years from today). The timing for any potential grade separation 'over' the roundabout would need to be confirmed as part of the Long Term DBC and could be altered by that DBC if a roundabout was not the preferred long-term treatment of this intersection and grade separation for vehicles was required (which remains one of the options being considered).
Action taken	Following discussions in 2021 with both Waka Kotahi and TCC, the Enabling Works will provide an "at-grade" signalised pedestrian crossing at Tauriko West Road and Cambridge Road intersections. However, grade separated pedestrian facilities associated with the long-term solution will be explored once the preferred long-term solution is established, as the requirements differ depending on which option is selected. That is, a pedestrian grade separation over SH29 is only required for Short List Opt 1, as the interchange layouts associated with Option 2 & 4 already provide a structure over the realigned SH29 that will provide safe passage for pedestrians and cyclists. At Redwood Lane, the Enabling Works will provide at grade crossing using the splitter islands as a central refuge area. A grade separated option, involving either an underpass or overbridge will be considered as part of developing Short List Opt 1, if it is chosen as the preferred Long-Term solution. Consideration of whether the grade separated solution is affected by early construction of a roundabout at Redwood, will be considered as part of the Enabling Works Business Case.

3.5 Bus routes Moderate

There did not appear to be any bus stop facilities or associated signage along the projects length, except for the existing designated area within the Tauriko school grounds.

The proposed design does however include a bus connection from SH29 into and out of Whiore Road.

Any bus stops along the route need to be appropriately located clear of the state highway traffic, with safe crossing and waiting facilities for the bus patrons.

Probability of crash occurring: Occasional
Likelihood of Fatal/Serious injury: Likely
Outcome: Moderate

Recommendation:

Review and consider the desire lines and demands that may dictate where bus stops should be located, including crossing points for pedestrians to access the facilities.

Designer Response:	**The drawings provided for the safety audit are Concept Only and were developed for the purpose of assisting the option multi criteria assessment process. They are not preliminary design drawings as stated by the SAT, and hence do not provide signage, bus stops or other detailed information.** **These details will be appropriately developed in conjunction with stakeholders during the pre-implementation phase of the project.**
Safety Engineer, NZTA Comment:	Acknowledge the Designer's Response. It is recommended to the Network Manager, and the Manager, System Management that: • any further design of bus stop locations and pedestrian crossing points to access these facilities will review and consider pedestrian demands and desire lines. • Any bus stop within the state highway designation be gazetted under the Agency's Traffic Controls on State highways Bylaw as detailed in the Safety Engineer response to *Item 3.4 Cycle path/ footpath/ shared path connectivity* above.
Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager

Safety Engineer, TCC Comment:	Agree with SAT and NZTA.
Client Decision:	Agreed, these actions will be undertaken as part of detailed design: desire lines to be reviewed to dictate where bus stops should be located, and including crossing points for pedestrians and cyclists to access the bus stop facilities.
Action Taken:	No WSP action required as part of the Enabling Works Business Case

3.6 Mid-block accesses Moderate

There is very little provision for mid-block turning facilities along this length of SH29. Of particular concern is the 100km/h section between Redwood Lane and the proposed Tauriko signalised "T" intersection. Within this length of SH29, there are numerous accesses into the likes of vege/fruit stalls, private properties, businesses and the Gargan Road "T" intersection. Many of these accesses have limited visibility due to the winding and undulating nature of the alignment and surrounding topography. There is also roadside parking with pedestrian movements back and forth across the state highway. As traffic volumes grow, finding gaps to turn or cross through will become increasingly difficult and dangerous.

The SAT are concerned with the safety risks created by these types of accesses directly off SH29 when located within the 100km/h speed environment (and a reasonably high AADT that is expected to continue to increase).

Roadside vege/fruit stall with berm advertising and roadside parking

Wide centreline transitioning into a right turn bay for Gargan Road at the end of an uphill gradient

Probability of crash occurring: Occasional
Likelihood of Fatal/Serious injury: Likely
Outcome: Moderate

Recommendation:

Consider installing central median barriers to improve safety and better manage access with the roadside developments along this section of SH29.

Otherwise lower the posted speed from the proposed SH29/Redwood Lane roundabout eastwards.

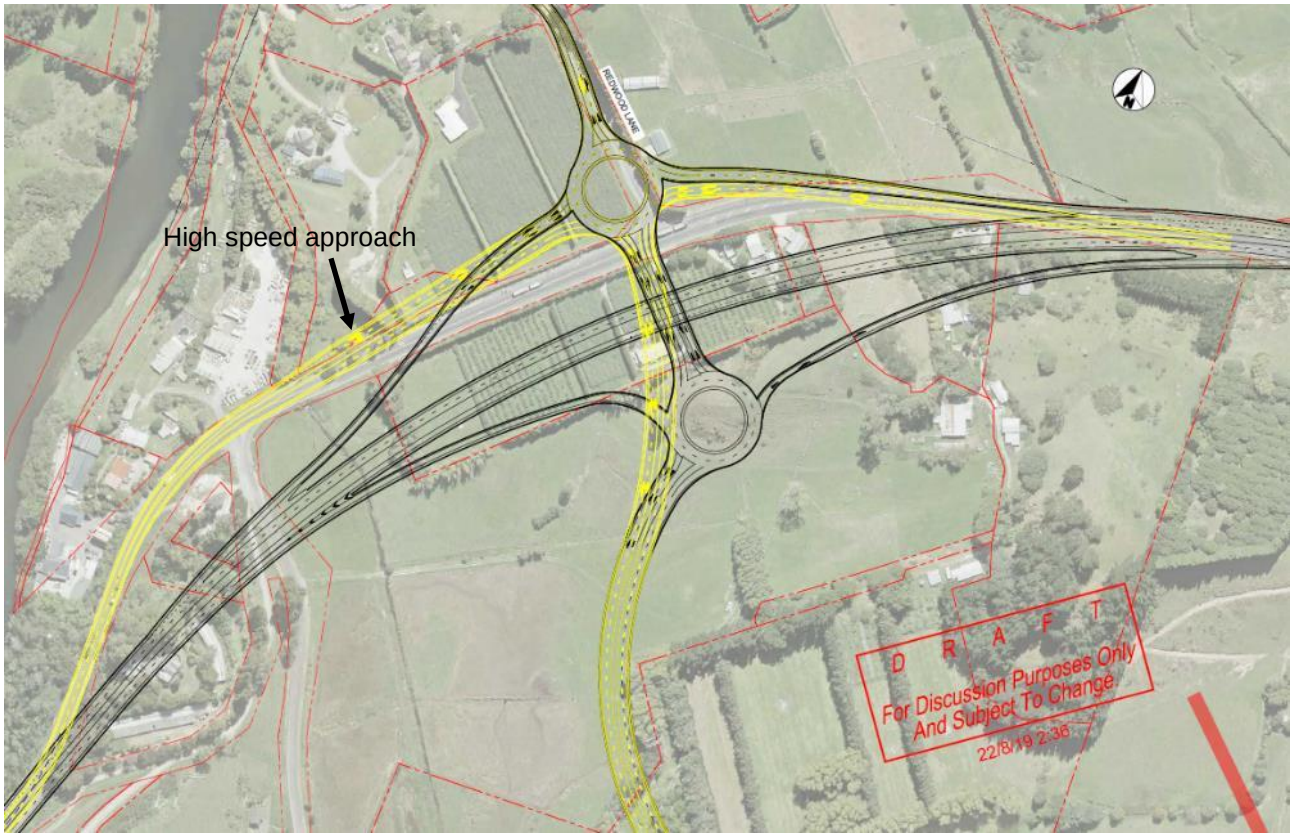
Designer Response:	**WSP accept their may be an existing safety issue, however do not consider it to be a direct effect of the early works which involves construction of three intersections.** **In our view the construction of the three intersections does not make this safety issue any worse in the short to medium term as it will take some years for the new houses in Tauriko West to have any material impact on SH29 traffic volumes.** **A decision around whether to deal with the existing safety problem needs to be determined by the NZ Transport Agency.** **We are however, concerned that the installation of a solid median will result in reduced side friction and increased speeds.**

Safety Engineer, NZTA Comment:	Acknowledge the Designer's response. It is considered that with the construction of the early works package: • there will not be a significant deterioration of the safety risk on the mid-block sections of the highway, until that point in time that the increased exposure related with the traffic generation from the adjacent residential development becomes significant. • the safety risk metrics of the modified Belk Road, Redwood Lane, and Cambridge Road intersections should not be worse than the existing safety risk metrics associated with these intersections. • The Tauriko intersection, being a new intersection, will increase the DSi casualty rate on the state highway network. It is recommended to the Network Manager, and the Manager, System Management that: • further to the Safety Engineer's Response to *Item 3.1 Network Capacity* above, all safety outcomes for the intersections are to be realised as part of the early works package, and not deferred for consideration, or dependant on implementation, of the wider Tauriko Connections Business Case, or other safety improvements on the adjacent sections of state highway. • in meeting with the objectives of the Road to *Zero Action Plan 2020-2022*, the combined three intersections associated with the early works package works demonstrate a targeted 40% reduction in death and serious casualties by 2030, exclusive of any proposed works associated with the wider Tauriko Connections Business Case.
Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineers, TCC Comment:	Agree with the SAT comments and NZTA responses.
Client Decision:	NZTA has provided the Client decision for this item. Agree with the Safety Engineer, NZTA, comment. The existing State Highway mid-block is the responsibility of NZTA. The Tauriko West long term SSBC will determine what the appropriate road form and speed management is for the mid-block. The items identified in this Safety Audit will be taken under consideration in that work.
Action Taken:	WSP to action as part of developing the Long Term DBC

4 Belk Road / Redwood Lane Roundabout – Option 4

The Safety Audit team have reviewed the early works layouts at the western end of the SH29 improvements project, and overall do not see any serious issues of the proposed dual lane roundabout. The location of the preferred 'Option 4' layout appears reasonable, with the majority being built off-line which has numerous cost, resilience and safety benefits during construction. The layout appears scalable, being able to accommodate full grade separation in the future. Although not specifically shown, the SAT has assumed that the existing Belk Road intersection will be closed as part of the early works package. We support this and in fact would have serious concerns if this was left open.

There are some minor improvements that should be considered, as discussed further below.



Proposed "Early Works" in yellow (the subject of this road safety audit), with the potential interchange layout in black.

4.1 Speed management on r/bout entry Significant

The proposed roundabout is located within a 100km/h zone, and of particular concern is the approach speeds from the west. This approach alignment as designed (as indicated on drawing) is high speed and while the roundabout is of a reasonable size, loss of control crashes are likely to occur, and possible nose-to-tail crashes due to heavy braking on the roundabout entrance. Good roundabout design practice is to slow the entry speed and allow the vehicle to enter and negotiate the roundabout before being able to accelerate as they exit.

This roundabout entry appears to be based on a 'tangential' design approach as opposed to the tighter

'radial' design philosophy. Conversely, the roundabout option 2 has a more 'radial' design which better manages approach speed, and an easier exit (refer section 4.2). A "redial" entry and "tangential" exit is the preferred design approach of many Continental countries.

Probability of crash occurring: Common
Likelihood of Fatal/Serious injury: Likely
Outcome: Significant

Recommendation:

Provide speed thresholds to the west of the roundabout and realign the approach to better encourage lower vehicles speeds as they approach and enter the roundabout.

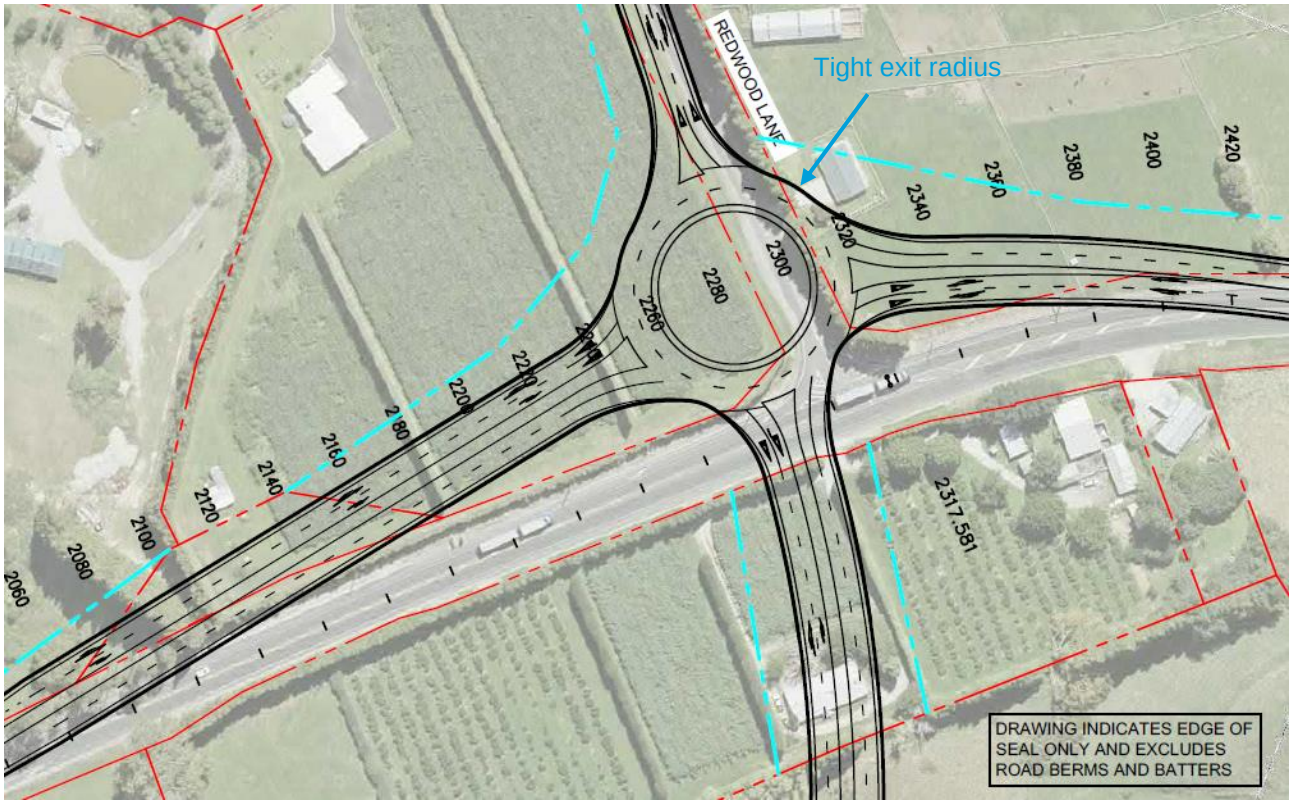
Designer Response:	**WSP accept the SAT recommendations, noting that the drawings provided are concept only developed for the purpose of MCA optioneering. During Pre-implementation phase the latest design guidelines will be utilised to design the roundabout and approaches.** **Some further development of the roundabout will occur as part of progressing the preferred option in the business case. During this phase speed management will be considered in more detail to ensure sufficient land is identified and available for detailed design during the pre-implementation phase.**
Safety Engineer, NZTA Comment:	The Designer's response is acknowledged. It is recommended to the Network Manager, and the Manager, System Management that: • further progression of the roundabout design will incorporate the Safety Audit Team's recommendation to include speed thresholds to the west of the roundabout and realign the approach to better encourage lower vehicles speeds as they approach and enter the roundabout, as stated by the Designer. • the design also includes the appropriate speed management features to minimise harm for pedestrians, cyclists and other active users whilst negotiating the roundabout.
Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineers, TCC Comment:	Agree with the SAT comments and NZTA responses.

Client Decision:	Agree with the comments above, these will be addressed through detailed design.
Action Taken:	No action required by WSP as part of the Early Works DBC

4.2 SH29 Roundabout deflection Moderate

The proposed roundabout in Option 4 is located to the north of the existing state highway. This is to cater for future grade separation which the Safety Audit team agree with. However, the resultant geometry for the main SH29 west to east movement is a large deflection through the roundabout, especially on the exit leg. There are numerous instances around New Zealand where truck roll-over crashes occur due to this tight exit geometry compounded by the short reverse curves and adverse crossfall. A similar example to this was the Early Works roundabout on SH1 at Otaki north of Wellington where trucks had a greater than expected turn through the roundabout and a number of truck rollovers occurred.

A large number of the trucks will also be turning over 270° to enter the Tauriko West industrial area. The SAT would prefer the exit legs to have more of a tangential exit rather than the designed radial exit. The tangential exits create an easier and smoother alignment for larger vehicles, especially on multi lane roundabouts where traffic lane containment is also important. This is particularly important along SH29 due to the high percentage of HCV's.



Probability of crash occurring: Infrequent
Likelihood of Fatal/Serious injury: Likely
Outcome: Moderate

Recommendation:

Improve the exit geometry on the SH29 departure legs to reduce the risk of loss of control and truck roll-over type crashes.

Designer Response:	**WSP accept the SAT recommendations, noting that the drawings provided are concept only developed for the purpose of MCA optioneering. During Pre-implementation phase the latest design guidelines will be utilised to design the roundabout and approaches and tested in 3D software to ensure vehicle stability is not adversely affected.**
Safety Engineer, NZTA Comment:	The Designer's response is acknowledged. It is recommended to the Network Manager, and the Manager, System Management that further progression of the roundabout design will incorporate the Safety Audit Team's recommendation to improve the exit geometry on the SH29 departure legs to reduce the risk of loss of control and truck roll-over type crashes as stated by the Designer.
Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineers, TCC Comment:	Agree with the SAT comments and NZTA responses.
Client Decision:	Agreed with the comments, and this will be dealt with in detailed design.
Action Taken:	No action required by WSP as part of the Early Works DBC. Note, some improvements are being made as part of finalising the concept drawings

4.3 Roundabout efficiency Minor

In the short term the proposed roundabout is likely to operate satisfactorily with the dominant flows being west/east along the SH29 corridor. However, as development occurs to the north and south (especially the potential link into SH36) the flows into the roundabout are likely to become unbalanced with the southern approach from SH36 having priority over the SH29 western approach. This is likely to cause delays on the western leg, increasing the risk of nose to tail crashes and rerouting of traffic onto local roads.

Probability of crash occurring: Occasional
Likelihood of Fatal/Serious injury: Unlikely
Outcome: Minor

Recommendation:

Consider alternative treatments to manage potential capacity issues in the future, and ensure additional land is identified at the early stages.

Designer Response:	**The roundabout shown is developed for the early works package, that is, a short to medium term solution. The medium to long term period is covered by the Tauriko West Connections business case. One of the current short list options involves a partial three lane roundabout, while other options involve a grade separated interchange with roundabouts at the ramp terminals. The actual solution and associated land requirement will therefore be based on the outcome of the wider business case process.**
Safety Engineer, NZTA Comment:	Refer to the Safety Engineer's response to *Item 3.6 Mid-block accesses* above.
Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineers, TCC Comment:	Agree with the SAT comments and NZTA responses. TCC recommends that the early works package considers staging options to ensure that earlier than anticipated capacity issues do not result in safety concerns on the SH or local road network.
Client Decision:	The medium to long term period is covered by the long-term business case, and this issue will be dealt with through that work.
Action Taken:	WSP will consider intersection form and function as part of developing the Long term DBC. No action required under the Enabling Works Business Case.

4.4 Visibility to roundabout Minor

While there is no vertical design provided at this early design stage, the existing SH29 western approach to the roundabout is an undulating uphill alignment with poor visibility. There are quite significant dips in the vertical alignment where vehicles may become hidden resulting in poor visibility.

Looking west towards Redwood Lane and the undulating vertical approach geometry

Probability of crash occurring: Occasional
Likelihood of Fatal/Serious injury: Unlikely
Outcome: Minor

Recommendation:

As the design progresses, ensure the vertical alignments are optimised to provide adequate inter-visibility and forward sight distances on all approaches.

Designer Response:	**WSP recognise the need to ensure adequate sight distance is provided on approach to roundabouts. During development of the preferred option we will ensure this is given more consideration than during preparation of the current concept plan so land requirements are adequately determined. The actual design will be developed as part of the pre-implementation phase.**
Safety Engineer, NZTA Comment:	The Designer's response is acknowledged. It is recommended to the Network Manager, and the Manager, System Management that further progression of the roundabout design will incorporate the Safety Audit Team's recommendation that vertical alignments are optimised to provide adequate inter-visibility and forward sight distances on all approaches as stated by the Designer.

Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineers, TCC Comment:	Agree with the SAT comments and NZTA responses.
Client Decision:	Agreed, these matters will be addressed in detailed design.
Action Taken:	No action required by WSP as part of the Early Works DBC

4.5 Cyclist safety Moderate

At this stage there are no cycle facilities shown on the proposed roundabout. It is understood that this route is often used by recreational / training cyclists. Being in a high-speed environment, the cyclists are highly vulnerable to overtaking and turning traffic. As noted in item 2.4, the cycle facilities need to also consider the wider network connectivity. At the subsequent design stages, future demands/key attractors and developments need to be taken into consideration.

Probability of crash occurring: Occasional
Likelihood of Fatal/Serious injury: Likely
Outcome: Moderate

Recommendation:

Ensure cyclists are safely accommodated on the immediate approaches to and through the roundabout.

If cycle demand is high, consider off-road paths to help them safely negotiate the roundabout, minimising the conflict points with vehicles.

Designer Response:	**The concept drawing reviewed by the SAT, was prepared for the purpose of optioneering the favoured physical location of a roundabout near Redwood Lane. Hence, it does not show cyclist or pedestrian facilities. WSP will give further consideration to these modes as part of developing the preferred option during finalisation of the business case. However, actual design details will be determined as part of the Pre implementation phase.**
Safety Engineer, NZTA Comment:	Refer to the Safety Engineer's response to *Item 3.4 Cyclepath/ footpath/ shared path connectivity,* and *Item 4.1 Speed management on r/bout entry* above.

Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineers, TCC Comment:	Agree with the SAT comments and NZTA comments. TCC Safety Engineers strongly support the provision of grade separation of pedestrians and cyclists, for crossing the highway in particular.
Client Decision:	Agreed, please refer to the comments in section 3.4 on grade-separation. Investigation and options should be considered through the Early Works Package, however implementation may be deferred to either the long-term business case, or staging provisions provided through the Tauriko West plan change that limit the amount of development that can occur until certain infrastructure improvements are made to accommodate safe connections for pedestrians and cyclists. Consideration should be given to existing recreational / training cyclists utilising the State Highway and how they could be catered for Through the RAB through the next phases of design, including consideration of off-road paths to minimise conflict points if necessary.
Action Taken:	WSP will investigate grade separated options for Ped/Cyclists at, or near, the Belk Rd/Redwood Lane intersection and include commentary in the Enabling Works Business Case – refer to WSP response to item 3.4

4.6 Eastbound uphill truck speeds Moderate

The existing SH29 alignment consists of a reasonably long steep uphill gradient in the eastbound direction, east of Redwood Lane. This uphill alignment previously included a passing lane (refer photo below) to enable overtaking of slow-moving vehicles. However, the passing lane was removed in the last 5 years due to safety concerns with the merge located near the crest of the curve and the nearby Gargan Road intersection.

With the inclusion of the proposed roundabout, large and/or slow-moving eastbound vehicles exiting the roundabout will gain little speed due to the long uphill gradient. This will result in increased overtaking demand, and hence increased potential for conflicts and crashes.

It is therefore important that adequate lengths of downstream lanes, with an appropriate merge length and run-out space is provided. This needs to be considered in conjunction with managing the roadside accessways and intersections (Gargan Road) as mentioned in item 2.6.

The SAT would prefer this section of SH29 is median divided to eliminate the risk of head-on crashes.

Previous passing lane that was removed due to safety concerns.

Amended configuration after the passing lane was removed.

Probability of crash occurring: Infrequent
Likelihood of Fatal/Serious injury: Likely
Outcome: Moderate

Recommendation:

Ensure adequate length of roundabout exit lanes are provided to allow overtaking of slow uphill trucks. Consider if SH29 should be a median divided 4-lane section over this length.

Designer Response:	**Under the current scope of work, WSP will ensure sufficient land requirement is identified during the early works business case to ensure adequate performance of the exit merge from the Redwood Lane roundabout.** **Consideration of median treatment to the east of the roundabout needs to be considered by the NZ Transport Agency, as it is not considered a safety effect caused by the implementation of the early works.**
Safety Engineer, NZTA Comment:	The Designer's response is acknowledged. The proposed design shows the one-lane state highway approach widens to two lane approaches to, two circulating lanes around, and two departure lanes from, the roundabout, that merges then back to one lane. Several roundabouts like this design has been implemented on the state highway network in the past, and the speed management through the roundabout has been less effective resulting in higher crash rate than expected, and a greater number of truck roll-overs as outlined in *Item 4.2 SH29 Roundabout deflection* above. As the Designer stated in their response in *Item 3.6 Mid-block accesses* it will take some years for the new houses in Tauriko West to have any material impact on SH29 traffic volumes. It appears that a multi-lane roundabout is not required until a significant portion of the adjacent land is developed. Unless it is clearly demonstrated that a multi-lane roundabout is required from the onset, the roundabout construction should be staged to have a single lane approach and single departure lane initially and widened to a multi-lane in the future when a greater capacity and operational performance is required. It is recommended to the Network Manager, and the Manager, System Management that: • the Designer clearly demonstrate that the SH approach and departure lanes are clearly required due to the traffic demand associated with the adjacent land development at, or near, the date of commission. • if multi-lane approach and departure lanes are required then these be the absolute minimum length required so that effective speed management through the roundabout is maintained.
Network Manager, NZTA Comment	Agreed

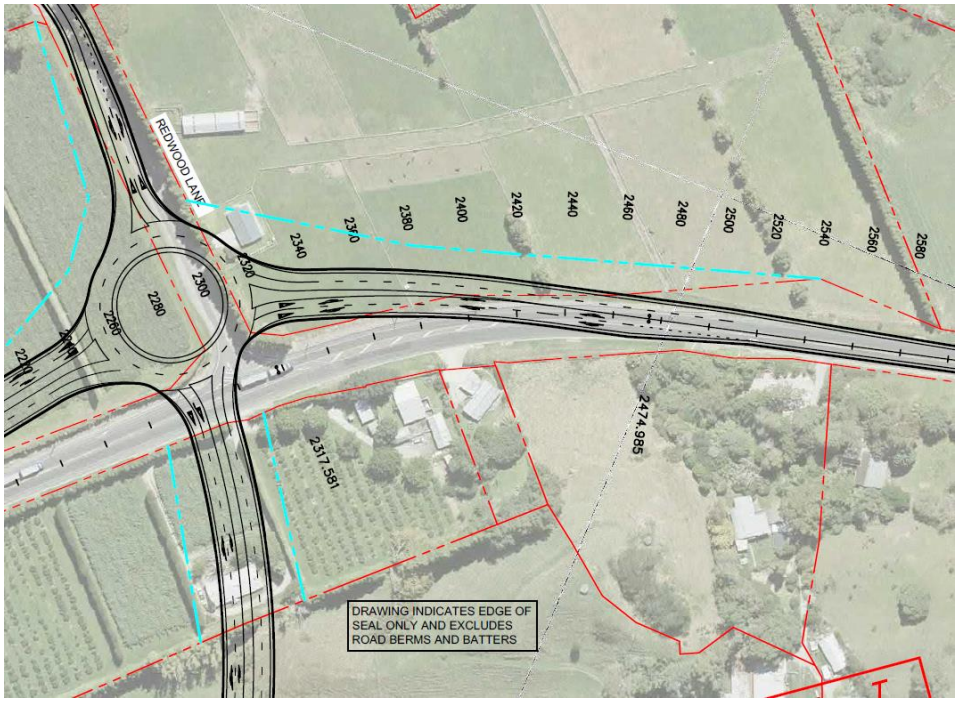
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineers, TCC Comment:	Agree with the SAT comments and NZTA comments. TCC recommends that the early works package considers staging options to ensure that earlier than anticipated capacity issues do not result in safety concerns on the SH or local road network.
Client Decision:	A multi-lane roundabout should be constructed (or fully futureproofed and opened up in stages with appropriate safety treatments) from the outset to support the demand and function of SH29 if transport modelling supports the need for this in the short-term (within 10 years from now). This transport modelling needs to be peer reviewed and the business case documentation needs to demonstrate that a multi-lane roundabout should be constructed from the outset, if that is the case. Appropriate safety treatments including approach and departure lanes and speed management need to be incorporated.
Action Taken:	WSP will consider whether staging options for this intersection are required and include outcomes in the Early Works DBC.

4.7 SH29 property access Minor

There are several properties that access directly onto SH29, and of particular concern are the properties located southeast of the proposed roundabout. Vehicles entering and exiting the state highway near the proposed roundabout can cause confusion leading to nose-to-tail type crashes. Ideally the properties should access onto the new roundabouts southern leg, preferably with a suitably designed single access connection away from the state highway traffic.

Any future land development in this vicinity, especially to the north should have its access restricted to the side roads and not directly onto SH29.

Consideration also needs to be given to the potential volumes on this southern leg of the roundabout and the implication his may have on local accesses.



Probability of crash occurring: Infrequent
Likelihood of Fatal/Serious injury: Unlikely
Outcome: Minor

Recommendation:

Ensure property access onto SH29 is kept to a minimum, and where possible relocate onto the lower volume/lower speed side roads.

Alternatively, provide service lanes with one formalised access point onto the state highway or local road.

Designer Response:	**Property access affected by the roundabout and new approaches will be addressed as part of developing the preferred option when finalising the business case.** **The actual access provisions will be determined during the pr-implementation phase in conjunction with affected landowners and the NZ Transport Agency.**

Safety Engineer, NZTA Comment:	The Designer's response is acknowledged. It is recommended to the Network Manager, and the Manager, System Management that further progression of the roundabout design will incorporate the Safety Audit Team's recommendation that: • property access onto SH29 is kept to a minimum, and where possible relocate onto the lower volume/lower speed side roads, • alternatively, provide service lanes with one formalised access point onto the state highway or local road as stated by the Designer.
Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineers, TCC Comment:	Agree with the SAT comments and NZTA responses. TCC will require involvement in this design process to ensure safe and appropriate access points are provided onto the local network.
Client Decision:	Agree, this will be dealt with in the detailed design.
Action Taken:	No WSP action required as part of Early Works DBC

4.8 Business carparking and access Significant

At the western extents of the project is a group of local business such as honey production, motorhome and machine hire companies. These businesses have some on-site parking, however there is also overflow parking provided on the opposite side of SH29. This area is possibly used by employees.

The carpark location creates a safety issue for pedestrians crossing the state highway in an undesirable location due to the road geometry, limited sightlines, and 100km/h posted speed limit.

As also discussed above, we have assumed that the existing Belk Road intersection will be closed and hence it is not clear how this overflow parking area would be accessed.

Informal/overflow vehicle parking located on the east of SH29 with businesses located opposite.

Probability of crash occurring: Occasional
Likelihood of Fatal/Serious injury: Very Likely
Outcome: Significant

Recommendation:

Review alternative locations for the carpark, ideally relocating to the western side of SH29 to minimise the need for pedestrians to cross the state highway.

Designer Response:	**WSP confirm that the existing Belk Road/SH29 intersection will be closed when the new roundabout at Redwood lane is constructed as Belk Road will be realigned to the new roundabout.** **The overflow carparking is an existing safety problem, and not as a result of implementing the early works. The NZ Transport Agency needs to determine whether the safety concern is to be dealt with as part of the early works.**
Safety Engineer, NZTA Comment:	The Designer's response is acknowledged. It is recommended to the Network Manager, and the Manager, System Management that Mossop's Honey be approached to understand their long-term parking strategy for their business and what implications this has on the parcel of state highway designated property that is being for the purpose of parking their staff vehicles.
Network Manager, NZTA Comment	Agreed

Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineers, TCC Comment:	Agree with the SAT comments and NZTA responses.
Client Decision:	Agree with the comments above. There is demand for informal park and ride, and it will be likely that this needs to be catered for. This issue is not a direct result of the Tauriko West Early Works Business Case, but an existing issue that remains the responsibility of NZTA.
Action Taken:	Issue to be addressed by the NZTA System Management team as appropriate and if necessary. No action required as part of the Enabling Works business case

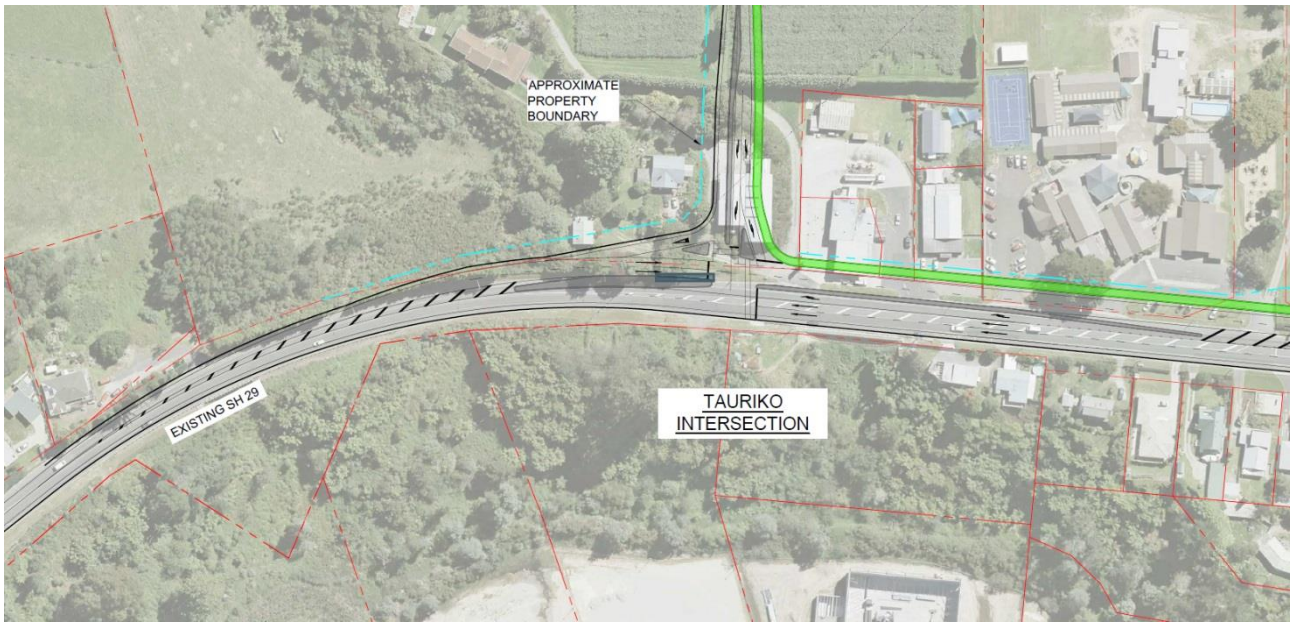
5 Tauriko Signalised “T” intersection

5.1 Speed management Significant

The proposed traffic signalised “T” intersection is located within the 70km/speed zone, and immediately west of the Caltex service station. Further to the east of the service station is a community hall and Tauriko primary school. To the west of the proposed “T” intersection, SH29 is in a generally rural, higher speed environment. Traffic signal intersections are prone to turning collisions as vehicles either intentionally or inadvertently run the red. The severity of these crashes increases as with the higher speeds. As such, traffic signals are not favoured in high speed (> 50kmh) environments.

The proposed design includes pedestrian crossing facilities at the signalised intersection. The SAT are concerned with the high approach speeds and exposure of the vulnerable road users when crossing SH29. If approaching drivers misjudge the braking distance, distracted, or are obscured from viewing the traffic signals, there is a risk of a death or serious injury crash.

The SAT was verbally advised at the briefing meeting that raised platforms were being considered. Whilst these have significant potential to help manage speeds at urban traffic signals, these are still relatively new in this part of the world and not tested in these environments. In fact, the VicRoads guidance for raised platforms recommends avoiding sites with high volumes of HCV and congested sites.



Higher speed environment to the west, and more built-up urban area to the east

Probability of crash occurring: Occasional
Likelihood of Fatal/Serious injury: Very Likely
Outcome: Significant

Recommendation:

Consider options to better control the approach speeds from the west when approaching the new traffic signals.

Designer Response:	**The drawings reviewed by the SAT are concept only and were developed for the purpose of optioneering a preferred traffic signal solution, so design details are minimal.** **Although yet to be confirmed with the NZ Transport Agency, current thoughts are that the posted speed limit will be reduced and raised safety platforms installed on SH29. This may include the use of speed thresholds and/or an overall SH29 corridor speed management strategy.** **Exact details will be determined prior to finalising the business case in consultation with the NZ Transport Agency and TCC.**
Safety Engineer, NZTA Comment:	Refer to the Safety Engineer's Response to *Item 3.1 Network Capacity, Item 3.2 Consistency of intersection treatments, Item 3.3 Speed limits, Item 3.4 Cyclepath/footpath/shared path connectivity,* and *Item 3.6 Mid-block accesses* above.
Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineers, TCC Comment:	Agree with the SAT comments and NZTA responses. Also refer to TCC comments under items 3.1, 3.2, 3.3, 3.4 and 3.5.
Client Decision:	Agreed, early works wide speed management approach to be undertaken and delivered as part of the Early Works Package and further assessment of the appropriateness of raised platforms will occur through detailed design.
Action Taken:	Speed management solutions (as defined by the Waka Kotahi review) will be incorporated as part of finalising the Early Works concept drawings.

5.2 Land for future proofing Moderate

As the design develops, it is important that adequate land is identified to enable future proofing of the intersection. The proposed layout shows provisions for pedestrian and possibly cyclist movements through and across the intersection. The design needs to allow for additional lanes as the proposed subdivision reaches it potential capacity, and the raised islands need to be large enough to provide sufficient storage area to safely accommodate the future pedestrian and cyclist demand.

Probability of crash occurring: Infrequent
Likelihood of Fatal/Serious injury: Likely

Outcome: Moderate

Recommendation:

Ensure the road reserve footprint is future proofed to safely accommodate additional vehicle demands and pedestrian/cycle facilities.

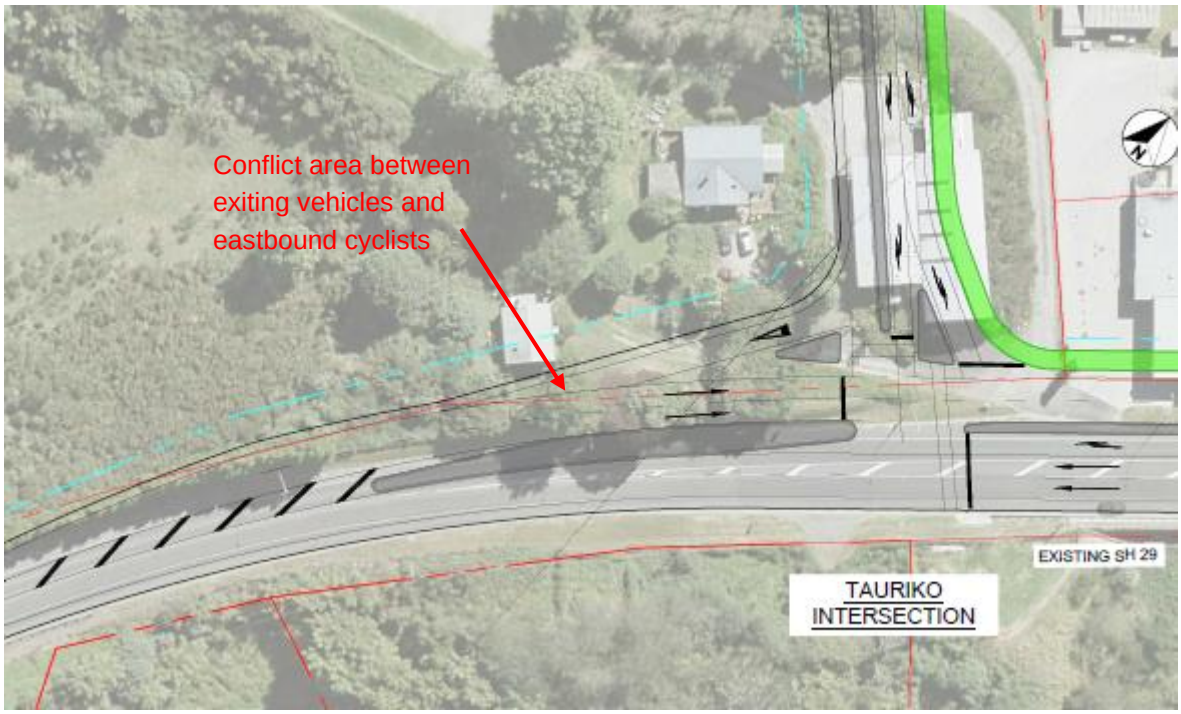
Designer Response:	**The early works are to allow development of the Tauriko West area. The chosen intersection option can accommodate up to 2000households without significantly affecting SH29 based on the Aimsun modelling.** **Despite this, the wider Tauriko West business case will determine the appropriate medium to long term option. This may be on line or off line. Hence provision for additional lanes as part of the early works is considered inappropriate.**
Safety Engineer, NZTA Comment:	Refer to the Safety Engineer's Response to *Item 3.1 Network Capacity, Item 3.2 Consistency of intersection treatments, Item 3.3 Speed limits, Item 3.4 Cyclepath/footpath/shared path connectivity,* and *Item 3.6 Mid-block accesses* above.
Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineers, TCC Comment:	Agree with the SAT comments and NZTA responses. Also refer to TCC comments under items 3.1, 3.2, 3.3, 3.4 and 3.5.
Client Decision:	Agreed, the design and land requirements for future improvements will be undertaken via the separate Long-term Business Case which is underway.
Action Taken:	WSP will address ultimate intersection form as part of Long Term DBC. No action required as part of the Enabling Works business case.

5.3 Proposed Slip lane Moderate

The proposed layout includes a left turn slip lane from SH29 into the new intersection side road. This is a reasonably high-speed exit into a Give Way controlled junction. This layout creates a conflict point between eastbound on-road cyclists and vehicles moving left into the left turn slip lane.

Although not shown, there are likely to be pedestrian and cyclist crossing movements across the new side road as properties develop to the west. Crossing of the slip lanes can be problematic for vulnerable road users.

Modern urban road design is trending towards eliminating left turn slip lanes to tighten up the intersection and improve the level of service provided to pedestrians.



Probability of crash occurring: Infrequent
Likelihood of Fatal/Serious injury: Likely
Outcome: Moderate

Recommendation:

Formalise the crossing point for cyclists and clearly show with road markings who has priority at the left turn diverge/cyclist conflict area. Review the need for the left turn slip lane.

Designer Response:	**The SAT concerns are noted and accepted. The current proposed left turn slip layout will be reviewed during development of the preferred option as part of the early works business case.**
Safety Engineer,NZTA Comment:	The Designer's response is acknowledged. It is recommended to the Network Manager, and the Manager, System Management that further progression of the intersection design will incorporate the Safety Audit Team's recommendation that: • the crossing point for cyclists will be formalised and clearly show with road markings who has priority at the left turn diverge/cyclist conflict area. • the need for the left turn slip lane will be reviewed. as stated by the Designer.

Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineers, TCC Comment:	Agree with the SAT comments and NZTA responses.
Client Decision:	Agreed, this issue will need to be resolved as per the Designer response and NZTA safety engineer response.
Action Taken:	WSP will remove the left turn slip and replace with a conventional left turn lane as part of developing the Enabling Works concept drawings

5.4 Left turn control Minor

The proposed traffic signalised intersection includes a left turn into the new access road and residential development. The design currently indicates this left turn will be a priority “Give Way” control. The stacking length is possibly up to 40m in length, however in peak hours this length may be inadequate and queuing back onto SH29 may occur, increasing the risk of nose to tail crashes.

There is also no formalised pedestrian crossing facility across this slip lane, resulting in uncertainty to the priority for pedestrians.

Probability of crash occurring: Infrequent
Likelihood of Fatal/Serious injury: Unlikely
Outcome: Minor

Recommendation:

Confirm the stacking length of the left turn slip lane is adequate and what mitigations can be put in place to minimise the risk of queueing back onto SH29.

Assess the need for pedestrian movements across the slip lane, allowing for future developments. If necessary, a formalised pedestrian crossing control may be required.

Designer Response:	**The pedestrian crossing is across the left turn exit lane to the shared pathway, NOT the left turn entry lane. Hence confusion for pedestrian’s on the left turn entry lane is not expected to exist.** **The left turn entry lane length will be sufficient to ensure the predicted 95%ile queue length is accommodated without blocking back onto SH29.**

Safety Engineer, NZTA Comment:	The Designer's response is acknowledged. The supplied drawing shows a pedestrian signalised cross walk perpendicular to the state highway between the splitter island to the north-west of the intersection to the north-east of the intersection. Pedestrians, cyclists and other active users will then need to cross both proposed auxiliary left turn lanes. It is recommended to the Network Manager, and the Manager, System Management that the form of active user access across the intersection provides an environment with the greatest harm minimisation and emphasis the "place" function being assigned to Tauriko. Refer also to the Safety Engineer's Response to *Item 3.1 Network Capacity, Item 3.2 Consistency of intersection treatments, Item 3.3 Speed limits, Item 3.4 Cyclepath/footpath/shared path connectivity,* and *Item 3.6 Mid-block accesses* above.
Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineers, TCC Comment:	Agree with the SAT comments and NZTA responses. Appropriate pedestrian and cyclists crossing facilities will be required across the full extent of both roads at the intersection. Also refer to TCC comments under items 3.1, 3.2, 3.3, and 3.4. Checks should be made during design that continuity of the pedestrian and cycling links are made.
Client Decision:	Agreed, the need for a slip lane in this location will need to be revisited and the concerns addressed. The option of a left-turn pocket should be considered. This area becoming more urban, and a slip lane is more a rural design treatment.
Action Taken:	WSP will remove the slip lane from the Enabling Works concept drawing as advised in Item 5.3. Actual pedestrian crossing facilities will need to be be developed as part of the detailed design when the wider walking/cycling strategy/facilities have been determined by TCC/Developers.

5.5 Petrol station Moderate

It is understood that the Caltex service station may be relocated when this project proceeds. The SAT strongly endorse this, as it will be very unsafe to retain the service station with the forecourt being in very close proximity to the SH29 through lanes.

There are examples of crashes occurring, especially nose to tail, and vulnerable road users with similar layouts of service stations located immediately downstream of traffic signals (eg Mobil Service Station on

Chapel Street in Tauranga). The layout is also unsafe for on-road cyclists, that conflict with vehicles entering and exiting the service station. Crashes with cyclists have been recorded at the entrances to the Mobil Service Station on Chapel Street.

View eastwards along SH29. The proposed design passes close to the Caltex canopy

Probability of crash occurring: Occasional
Likelihood of Fatal/Serious injury: Likely
Outcome: Moderate

Recommendation:

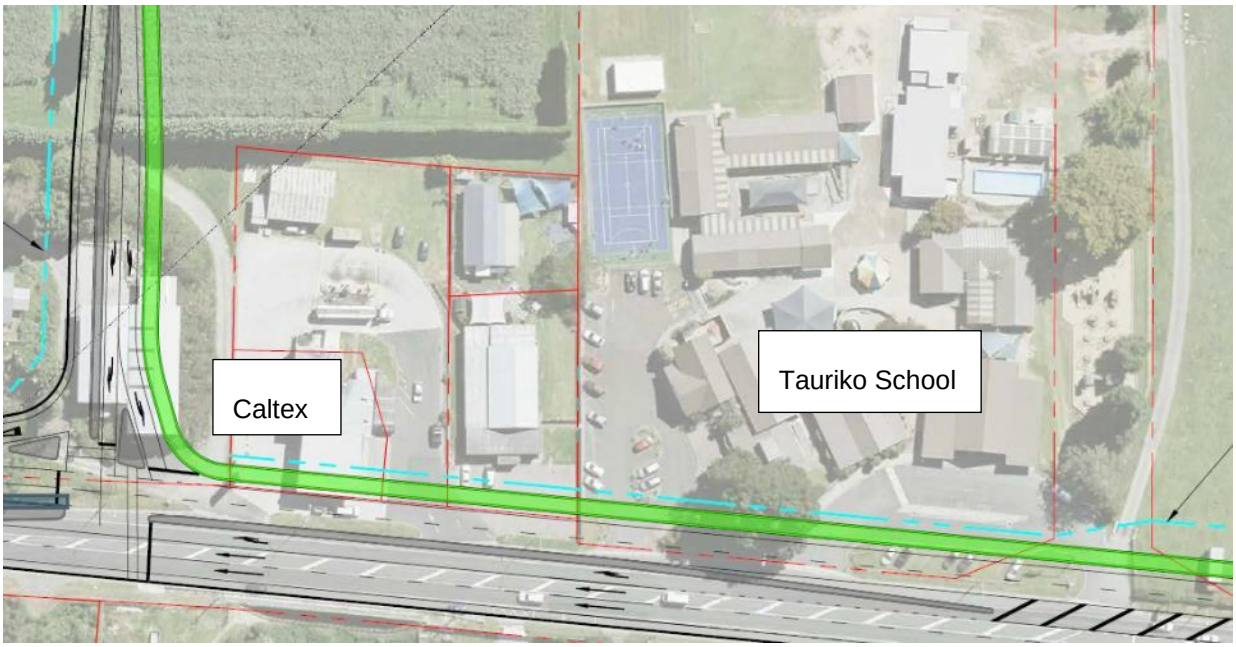
Ensure the service station is relocated prior to the project being completed, or relocate the entrance away from the intersection, preferably onto the side road.

Designer Response:	**The concept design is still in its early stages, hence consultation with affected land owners has not yet occurred. The design team is aware of the existing safety issues regarding the service station entranceway. In addition, implementation of Option 2 compromises the operation of the service station, hence requires site access to be relocated onto the new side road in conjunction with re-arrangement of other site activities. If the service station ceases to operate, then appropriate access restrictions should be part of any site redevelopment.**

Safety Engineer, NZTA Comment:	The Designer's response is acknowledged. It is recommended to the Network Manager, and the Manager, System Management that further progression of the intersection design will incorporate the Safety Audit Team's recommendation that either: • the service station is relocated prior to the completion of the early works package • relocate the service station ingress to be from the side road only, and the egress onto the state highway is a left turn only as stated by the Designer.
Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineers, TCC Comment:	Agree with the SAT comments and NZTA responses.
Client Decision:	Agree with recommendations above.
Action Taken:	The location of the Tauriko West intersection is no longer adjacent to the Service Station boundary, so access to the site is no longer feasible or in line with the proposed structure plan roading layout. The option of relocating the service station or altering the service station access arrangements is a negotiation matter for TCC, Waka Kotahi and the land owner. It is not something that will be finalised prior to completion of the Business Case. Inclusion of the existing or reeveloped site, will need to be addressed as part of the detailed design .

5.6 School Access Significant

As with the Caltex service station, the SAT understand the school may be relocated, or at least the access and carparking relocated away from the state highway. The SAT agree with this intention, as direct access onto SH29 is made substantially more dangerous due to the depth of school frontage being used for the state highway road widening. This greatly increases the exposure of vulnerable road users to passing SH29 traffic.



Existing boundary lines in red, proposed extent of widening in cyan, and shared path in green

Tauriko school parking and drop off/pick up zone will be lost when SH29 is widened.

Probability of crash occurring: Occasional
Likelihood of Fatal/Serious injury: Very Likely
Outcome: Significant

Recommendation:

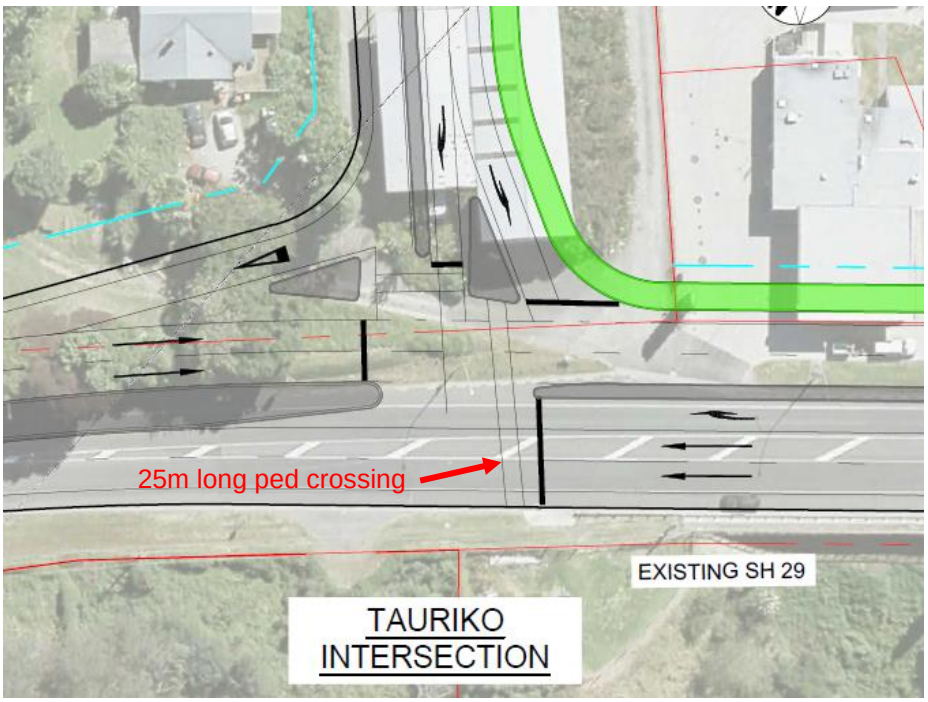
If the school is to remain, close off the vehicle access along the school frontage and relocate to the new side road (including the drop-off / pick-up zones).

Designer Response:	**The concept design is still in its early stages, hence detailed consultation with the school has not yet occurred. We agree that the safety of any direct access via SH29 is compromised as a result of the selected option (opt 2). We are aware that preliminary discussions with MoE and development of alternative access from the side road is being investigated as a separate TCC commission.** **Either way, restricted access from SH29 will be discussed with the Ministry of Education as part of the business case development with the aim of restricting access to the new side road.**
Safety Engineer, NZTA Comment:	The Designer's response is acknowledged. It is recommended to the Network Manager, and the Manager, System Management that: • the school access point be relocated to the side road, and for this to be operational in conjunction with the commissioning of any new intersection implemented as part of the early works package. • the road and roadside environment around the school access is such that it supports either the permanent, or variable, lower speed limit at the school that is to be implemented as part of the Government's Tackling Unsafe Speed programme. • if it is determined that school access is to be retained onto the state highway that this be restricted to left turn in, left turn out movements only.
Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineers, TCC Comment:	Agree with the SAT comments and NZTA responses. Also refer to TCC comments under items 3.1, 3.2, 3.3, 3.4 and 3.5.
Client Decision:	Agree with recommendations above.

Action Taken:	TCC, Waka Kotahi and Ministry of Education are in discussions over possible timing of the school relocation. At this stage, it could be up to 5 years away. Construction of an alternative access has been investigated by TCC, however the cost to implement the access and associated parking is considered uneconomic as it serves no long-term purpose, one the school has moved. Alternative staging arrangements for access into the Tauriko West Structure Plan are being considered as part of the Enabling Works business case. Consideration of interim access restrictions, such as left turn in/out will need to be dealt with during detailed design of the Enabling Works once staging options are clearly understood.

5.7 Pedestrian facility crossing SH29 Significant

There is a proposed pedestrian crossing facility at the new traffic signalised intersection. The crosswalk is approximately 25m in length that also utilises a reasonably small splitter island. It is quite likely this crossing point could receive regular use, potentially at school start and finish times given the close proximity to the school and lack of formalised crossing points along the state highway, particularly if an accessway is provided down into the industrial estate. There is a risk the facilities are inadequate to cater for the groups (possibly pedestrian and cyclist) wanting to cross at the same time. There will also be vehicle queuing on SH29 due to the long crossing distance and length of time for pedestrians to clear the roadway, reducing the efficiency / capacity and increasing the risk of nose-to-tail type crashes.



Probability of crash occurring: Occasional
Likelihood of Fatal/Serious injury: Very Unlikely
Outcome: Significant

Recommendation:

Ensure the facility adequately caters for groups of pedestrians and school children wishing to cross the road.

Ensure the traffic signals are clearly visible for approaching vehicles in both directions. Mast arms will likely be required and additional advance warning signs.

Consider if a grade separated facility can be provided to eliminate the conflict between SH29 traffic and pedestrians (and possibly cyclists).

Assess if a shared path is required along the southern side of SH29

Designer Response:	**The majority of pedestrian traffic is expected to walk along SH29 and enter Cambridge Road or cross SH29 at Cambridge Road. The number crossing SH29 at this location is not expected to be significant. However, the exact details of the pedestrian crossing facilities at this site will be dealt with during the pre-implementation phase and in discussion with the school/MoE, TCC and NZ Transport Agency.** **The provision of a grade separated crossing has been previously considered and will be dealt with as part of the wider Tauriko West business case.**
Safety Engineer, NZTA Comment:	The Designer's response is acknowledged. It is recommended to the Network Manager, and the Manager, System Management that further progression of the pedestrian crossing facility crossing SH29 will incorporate the Safety Audit Team's recommendations that: • the facility adequately caters for groups of pedestrians and school children wishing to cross the road. • the traffic signals are clearly visible for approaching vehicles in both directions. • a grade separated facility to eliminate the conflict between SH29 traffic and pedestrians and cyclists is assessed for implementation as part of the early works package. • assess the ability to provide a shared path along the southern side of SH29 Refer also to the Safety Engineer's Response to *Item 3.1 Network Capacity, Item 3.2 Consistency of intersection treatments, Item 3.3 Speed limits, Item 3.4 Cyclepath/footpath/shared path connectivity,* and *Item 3.6 Mid-block accesses* above.
Network Manager, NZTA Comment	Agreed

Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineers, TCC Comment:	Agree with the SAT comments Also refer to TCC comments in previous items. TCC Safety Engineers accept that well designed at-grade signalised crossing could be appropriate in this location during the early works package. Consideration should be given to the Tauriko Business Case long term solution of grade separation and if it is more appropriate to provide this in the early works package. Continuity of provision for cyclists and pedestrians should be made in the corridor, and to SH29 Cambridge Road Intersections on both sides of the highway.
Client Decision:	The desire line to cross the Stage Highway in this location needs to be investigated further through detailed design and the connection to the wider pedestrian and cycling network needs to be confirmed. Walking/cycle tracks along both sides of the State Highway need to be investigated (including the potential for a shared path on the northern side of the road as planned). There are physical constraints on the southern side of the road in respect of property boundaries and topography that may make a pedestrian and cycling connections challenging to provide without major design changes. Also refer to section 7.3. A grade separated facility for pedestrians and cyclists need to be assessed for implementation as part of the early works package, however construction could be deferred to either the long-term business case or considered through staging and triggers through the Plan Change for Tauriko West. The Plan Change can include staging provisions that limit the amount of development that can occur until certain infrastructure improvements are made or trigger points that require improvements to be implemented.
Action Taken:	Following subsequent discussions with TCC and Waka Kotahi, the investigation of grade separated Ped/cycle facilities will be considered as part of the Long-term business case, primarily as it would only be required if Short List Option 1 is selected as the preferred Long-term solution. Given the lack of physical space between the road edge of seal and the significant retaining wall on the northern side of SH29, the pedestrian crossing proposed across SH29 is unlikely to be utilised by pedestrians. Instead they would use the signalised crossing at Cambridge Road to cross SH29. No further action is therefore required as part of the Enabling Works business case.

5.8 SH29 Over Dimensional HCV's Minor

SH29 is the primary route to Tauranga Port, with HCV's making up approximately 17% of the vehicles. The route is also a designated Over Dimensional (OD) route. The design will therefore need to cater for these OD vehicles otherwise there is a risk that road furniture may get damaged. This can also result in loose debris on the state highway posing a safety hazard to other road users.

Probability of crash occurring: Infrequent
Likelihood of Fatal/Serious injury: Unlikely
Outcome: Minor

Recommendation:

Ensure the layout of lighting poles, traffic signals, roadside and advertising signs, and sign gantry's allow for the clearance envelope of over-dimensional vehicles.

Designer Response:	**SAT concern noted and accepted. These design elements will be dealt with during the pre-implementation phase.**
Safety Engineer, NZTA Comment:	The Designer's response is acknowledged. It is recommended to the Network Manager, and the Manager, System Management that further progression of the Road Safety Audit Team's recommendation that roadside environment design allows for the clearance envelope of over-dimensional vehicles as stated by the Designer.
Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineers, TCC Comment:	Agree with the SAT and NZTA responses.
Client Decision:	Agree with comments above.
Action Taken:	No action required as part of the Enabling Works.

5.9 U-turn facilities Moderate

Lengths of SH29 are intended to be median divided by a raised central island. This generally occurs on the approach and departure to intersections. The SAT believe SH29 should be a median divided road due to the high AADT and safety benefits created by separating opposing traffic, and avoiding access turning movements across multiple lanes.

If raised medians are provided, u-turning facilities are needed. A traffic signalised intersection is often not an ideal location for these u-turning movements as reasonable road width is required to provided adequate

turning paths and there is conflict between U turning vehicles and those left turning out of the side road. There is several properties and businesses opposite the Tauriko school and Caltex service station that would want to U-turn at the signalised intersection to head eastbound.

Even if the extent of the raised central median is retained as designed, some motorist may drive a short length into the opposing traffic lane to reach the painted median before heading eastbound, with the risk of head-on crashes.

Probability of crash occurring: Occasional
Likelihood of Fatal/Serious injury: Likely
Outcome: Moderate

Recommendation:

Extend the raised central median along the urban section of Tauriko to stop poor driver behaviour.

Confirm that adequate width is available at the traffic signalised intersection to perform u-turn movements (and ensure the signal phasing allows for this), or

- provide an area further along the new access road to undertake a u-turn movement, or
- change the form of intersection control to a roundabout

Designer Response:	**As previously noted, a roundabout in this location is not favoured as it cannot provide a high quality service for bus movements.** **The initial thoughts were to make provision for these movements at the signalised intersection subject to sufficient land being available to facilitate a turning vehicle. During development of the preferred option, as part of the early work business case, U turn movements will be considered in more detail in conjunction with TCC and the NZ Transport Agency.**
Safety Engineer, NZTA Comment:	The Designer's response is acknowledged. It is recommended to the Network Manager, and the Manager, System Management that further progression of the U-turn facilities design will incorporate the Road Safety Audit Team's recommendation that: • the raised central median is extended along the urban section of Tauriko to stop poor driver behaviour. • adequate width is available at the traffic signalised intersection to perform u-turn movements (and ensure the signal phasing allows for this). • alternatively provide an area further along the new access road to undertake a u-turn movement. Refer also to the safety engineer's response to *Item 5.6 School Access* above.

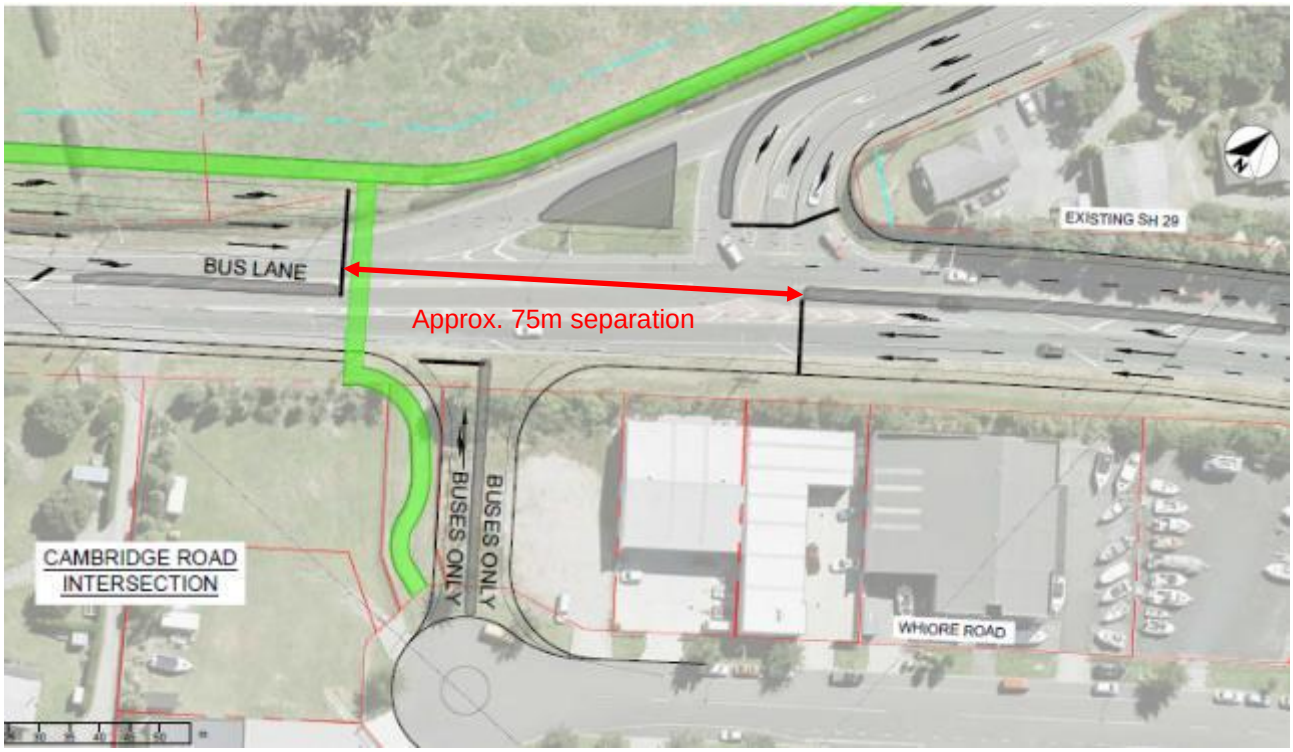
Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineers, TCC Comment:	Agree with the SAT comments and NZTA responses. Also refer to TCC comments under items 3.1, 3.2, 3.3, 3.4. comments relating to; • The reviewed design will need to ensure speed management is completed to attain the desired speed. • The design process should include quantifying all turning movements in the corridor between Belk Road/Redwood Roundabout and Cambridge Road, and ensure that these can be undertaken safely, with specific consideration for the U-turn benefit offered by roundabouts. This should extend over the life of the early works package. There may be an option identified that provides some staging of the early works package that restricts movement when required.
Client Decision:	Agree with comments above, noting that proposed intersection forms are supported, including signals.
Action Taken:	WSP will include investigation of extending the median barrier at Tauriko Village and how U-Turn's would be accommodated.

6 Cambridge Road Intersection

6.1 Overall Layout Moderate

Cameron Road intersects with SH29 at a very acute angle. The proposed design retains this geometry with the inclusion of full traffic signalisation. This acute skew results in a very long intersection, with about 75m of separation between traffic signal hold lines. This distance will result in long clearance phases, which often results in poor driver behaviour, risk taking and red light running.

To complicate the intersection, it is also proposed to include a bus only access with Whiore Road, including a designated right turn bus lane on SH29. The inclusion of the bus lanes and access results in a non-standard intersection layout – neither a typical "X" nor staggered "T" intersection. While the Safety Audit team understand the desire for the bus lane and connection with Whiore Road, it needs to be included without significant safety implications.



The Safety Audit team believe that the non-standard layout, poor approach angles, long intersection separation, partial bus lane, and Whiore Road access is likely to lead to driver confusion, poor behaviours and increased crash risks.

The SAT team are concerned about the available capacity at the intersection, especially for the right turn from SH29 east into Cambridge Road. The proposed layout shows this as a very long single lane. It is assumed that the long lane is required to provide adequate stacking for the traffic volumes traffic expected. To cater for this demand the right turn signal phase would need to be very long and the overall cycle length high, reducing efficiency. If the right turn capacity cannot cater for the demand and long delays occur, then drivers are more likely to become frustrated and run the red leading to right turn against type crashes. Safety Audit team members have

already observed significant queuing for this turn.

Probability of crash occurring: Common
Likelihood of Fatal/Serious injury: Unlikely
Outcome: Moderate

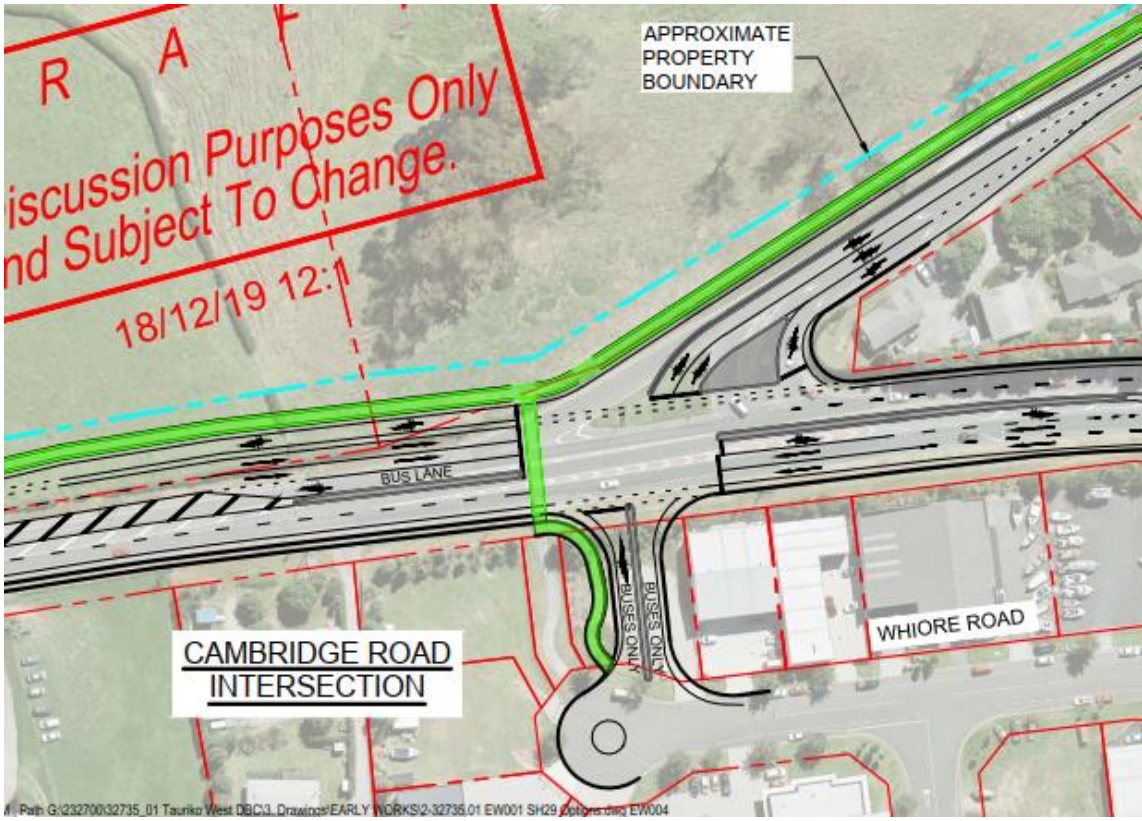
Recommendation:

Consider if a roundabout could be accommodated within the available footprint.

Improve the approach alignment of Cambridge Road to intersect SH29 at a better angle. This will result in a smaller intersection, better visibility and greater efficiency.

Consider alternative access points for the bus lane, either by relocating elsewhere, or realigning the approach to create a ‘cross roads’ type intersection.

Ensure that there is adequate capacity for all movements.

Designer Response:	**A roundabout is not considered a suitable option as previously noted due to the objective of providing a bus priority movement into Whiore Ave. The traffic signal option also helps control turning movements (buses only) into and out of Whiore Ave.** **Traffic modelling by Beca using Aimsun indicates no capacity problems in the short to medium term with the layout indicated in the concept design.** **Bus access into Whiore Ave is deemed to be the most appropriate location as it utilises land owned by TCC.** **Realignment of Cambridge Road to align at right angles has been considered during optioneering, however it results in significant geotechnical challenges due to the presence of a steep sided gully on the west of the intersection. It also has a considerable impact on the operation of the adjacent land as the high ground is used to manoeuvre around the head of the gully.** **WSP propose that the intersection layout is modified to reduce the separation distance between the SH29 limit lines. A tentative concept is shown below.** 

Safety Engineer, NZTA Comment:	The Designer's response is acknowledged. The tentative concept of the modified intersection layout as provided by the Designer does reduce the separation distance between the SH29 limit lines compared to that provided to the Safety Audit team. However, the design should also incorporate primary safe system treatments to provide the greatest safety outcome possible for all road users at the intersection. Refer to the Safety Engineer's Response to *Item 3.1 Network Capacity*, *Item 3.2 Consistency of intersection treatments, Item 3.3 Speed limits, Item 3.4 Cyclepath/footpath/shared path connectivity,* and *Item 3.6 Mid-block accesses* above.
Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineers, TCC Comment:	Agree with the SAT comments and NZTA comments. Also refer to TCC Comments previously made, in particular to item 3.4 regarding grade separation of vulnerable users.
Client Decision:	Agreed to take the comments into account and tighten up the design through the detailed design process. In line with item 3.2 a roundabout is not considered feasible for this junction for the Early Works Project.
Action Taken:	No action required as part of Enabling Works business case

6.2 Whiore Road bus connection Minor

As mentioned above, a bus connection from SH29 (and Cambridge Road) with Whiore Road is provided. It is likely local traffic will utilise this bus connection into and out of Whiore Road as it will provide a link from SH29 and Cambridge Road through to Taurikura Drive.

There is potential for vehicles to be trapped in these bus lanes if they are unable to activate the bus signals. The use of these facilities by local motorists may be difficult to enforce, and likely to result in unsafe behaviour with unexpected (and illegal) movements and risk taking.

Potential bus link will open up access from SH29 and Cambridge Road through to Taurikura Drive

Probability of crash occurring: Occasional
Likelihood of Fatal/Serious injury: Unlikely
Outcome: Minor

Recommendation:

Review the operation of the bus lane and connection to Whiore Road and consider how local motorists can be stopped from using this facility.

Designer Response:	**The turning lane is to be used by Buses only. The team recognise that general motorists may think that the lane can be used for general access into Whiore Ave (or used illegally).** **The exact design details will be developed as part of the pre-implementation phase in conjunction with regional council PT specialists. However, use of appropriate coloured lane markings and bus only signs will be used to ensure motorists are fully aware the right turn lane on SH29 is for buses only.**

Safety Engineer, NZTA Comment:	The Designer's response is acknowledged. It is recommended to the Network Manager, and the Manager, System Management that further progression of the Whiore Road bus connection will incorporate the Road Safety Audit Team's recommendation to actively discourage local motorists from using this facility as stated by the Designer. Note that any vehicle restriction placed within the state highway network will need to be included within the State Highway Traffic Control Devices Bylaw and require formal consultation similar to that process as outlined in the Safety Engineer's response to *Item 3.4 Cyclepath/footpath/shared path connectivity* above.
Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineers, TCC Comment:	Agree with the SAT comments and NZTA comments. TCC also raise the issue of buses accessing the Bus Lane from Cambridge Road. Future route changes which have been identified by BOPRC will potentially require this manoeuvre. No statements have been made as to how this can be accommodated safely within the intersection, and to stop vehicles intending to turn right from Cambridge Road, following the bus into the Whoire Ave bus access. This is another matter that will need to be addressed in the detailed design. TCC also notes that vehicle restrictions on the local road network will also require inclusion in the TCC Traffic and Parking Bylaw.
Client Decision:	Agreed. Suitable measure and treatments will need to be incorporated through the detailed design to designate a bus-only road, including dedicated signals from Whiore Ave to/from Cambridge Road.
Action Taken:	No action required as part of the Enabling Works business case

6.3 Whiore Road Moderate

The Safety Audit team endorse provisions for walking and cycling and use of Public Transport. However, there are concerns to the suitability of Whiore Road in its present form. Whiore Road is a cul-de-sac that services numerous industrial/commercial businesses. There is very high on-road parking demand, a significant number of property entrances, and the road alignment is winding with reasonably steep vertical gradients.

The inclusion of a designated bus route and cycle facilities in an already heavily parked and constrained environment is likely to lead to crashes, particularly with the vulnerable road users.

Probability of crash occurring: Occasional
Likelihood of Fatal/Serious injury: Likely
Outcome: Moderate

Recommendation:

Review the suitability of Whiore Road as a bus and cycle route. Either:

- relocate the cycle facilities
- relocate the bus route, or
- remove on-road parking to optimise sightlines and safety.

Designer Response:	**No specific consultation has occurred to date with regards the use of Whiore Ave for bus traffic.** **However, the concept design is that buses use the general traffic lane with on road parking allocated to one side of Whiore Ave only. Cyclists and Pedestrians would be accommodated on a new shared off-road pathway.**
Safety Engineer Comment:	The Designer's Response is acknowledged. This doesn't specifically relate to the state highway however a response is appropriate to provide consistency and integration of treatments for the future progression of any designs between the state highway and local road network. Refer to the Safety Engineer's response to *Item 3.4 Cyclepath/ footpath/ shared path connectivity* above.

Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineers, TCC Comment:	Agree with the SAT and NZTA responses. Also refer to comments made in 3.4. Whiore Ave should be further investigated as to the suitability and constructability of walking and cycling provisions. Issues to be considered are CPTED, grades, rest areas (for the grade), and lighting. If this is to be no public access via SH29 then surveillance outside the business and bus operating times will need to be provided by CCTV. TCC also notes that shared paths, special lanes, parking restrictions, and vehicle restrictions on the local road network will also require inclusion in the TCC Traffic and Parking Bylaw.
Client Decision:	Agree with the comments, Whiore Avenue will need to be included in the design process to develop this route into a multi-modal friendly corridor. It is noted that engagement with local business will be essential.
Action Taken:	Following direction by TCC, Whiore Ave upgrade is now part of the Enabling Works business case. This has resulted in the proposed provision of a shared waling/cycling path on both sides of Whiore Ave, and bus facilities consisting on in lane bus stops and shelters. Some loss of parking will be required. Engagement with local businesses is underway.

6.4 Cambridge Road/SH29 Visibility Moderate

The acute angle of Cambridge Road intersecting with SH29 results in very poor forward visibility for vehicles on the Cambridge Road approach. It is highly likely that most of the traffic signal aspects, especially the primary and tertiary aspects, will be hidden from view due to the angle and also the property on the inside corner of the intersection. The problem is compounded by the high bank on the left.

This poor forward visibility may result in misjudgement of the intersection controls and stopping distance ahead, resulting in nose-to-tail crashes.

Cambridge Road approach to SH29 with very poor visibility to the intersection. Purchase of the property on the left should be considered to provide appropriate sightlines.

Probability of crash occurring: Common
Likelihood of Fatal/Serious injury: Unlikely
Outcome: Moderate

Recommendation:

Improve the approach geometry of Cambridge Road to ensure sightlines to the primary traffic signal aspects are provided.

Ensure that sufficient land is acquired so that structures, vegetation and the surrounding topography allow the required sightlines to the traffic signals to be achieved. This may require purchase of all of the corner property.

Designer Response:	**The SAT concerns regarding sight lines are noted and accepted. This will be reviewed and confirmed as part of future development of the concept design during the early works business case.** **As part of our response to item 6.1 above, the intersection layout will be modified, which should help address the concern raised in this item.**

Safety Engineer, NZTA Comment:	The Designer's response is acknowledged. It is recommended to the Network Manager, and the Manager, System Management that further progression of the Cambridge Road/SH29 visibility design will incorporate the Road Safety Audit Team's recommendation to: • improve the approach geometry of Cambridge Road so that sightlines are provided to the primary traffic signal aspects, • acquire enough land so that structures, vegetation and the surrounding topography allow the required sightlines to the traffic signals, as stated by the Designer.
Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineers, TCC Comment:	Agree with the SAT and NZTA responses.
Client Decision:	Agreed, this need to be reviewed through the detailed design stage.
Action Taken:	During the preparation of draft land requirement plans for the Enabling Works, sufficient land will be identified to ensure sight lines can be met.

6.5 SH29 Left turn lane Minor

The intersection provides a left turn lane from SH29 into Cambridge Road. This left turn lane is controlled by the traffic signals however the geometry results in a high-speed exit due to the flat angle of the intersection. Vehicles using this exit will be reasonably high speed, increasing the risk of loss of control crashes. It also adds an unnecessary conflict point in an unexpected location.

This left turn lane is also adjacent to the proposed shared pathway (peds and cyclists) and will provide an uncomfortable environment to vulnerable road users particularly if the speeds cannot be better contained.

Probability of crash occurring: Infrequent
Likelihood of Fatal/Serious injury: Unlikely
Outcome: Minor

Recommendation:

Adjust the intersection layout to better control the turning speeds through the intersection.

Designer Response:	**The left turn lane is required to provide sufficient intersection capacity. The movement does not operate when the right turn in from SH29 operates, hence there is no conflict point.** **With regards the speed of left turn vehicles, the curvature is no more than currently exists, and we are unaware of loss of control crashes occurring. The radius is also controlled by the need to accommodate the turning paths of truck and trailer units.** **However, as part of addressing item 6.1 above, the intersection layout has been modified. The revised layout will help to address the concern raised in this item.**
Safety Engineer, NZTA Comment:	The designer's response is acknowledged. Refer to the Safety Engineer's response to *Item 6.1 Overall Layout* above.
Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineers, TCC Comment:	Agree with the SAT and NZTA responses. Also refer to previous comments regarding speed management and provision of walking and cycling.
Client Decision:	Agreed, design to be updated through the detailed design stage to better control turning speeds through the intersection.
Action Taken:	Intersection layout has been modified as part of the Enabling Works concept drawings. Further control of left turn vehicle speeds will need to be addressed during the detailed design stage.

6.6 Shared path facilities Minor

A shared cycle/pedestrian facility is included crossing SH29 on the western side of the signalised intersection. This caters for the vulnerable user, however the consequence of locating it in this position is likely to create significant delays to the SH29 traffic. The only movements that can occur when the crossing is activated is the left turn out from Cambridge Road and right turn into Cambridge Road from SH29. Locating the crossing to the eastern side of the intersection is likely to create less congestion as this allows the double right turn out of Cambridge Road, SH29 left turn into Cambridge Road and possibly the Busses only exit from Whiore Road.

The shared path "T" junction needs to better cater for cyclists with corner splays to minimise the risk of cycle v cycle or cycle v pedestrian crashes. It is also very likely fencing will be required on the western side of the shared path due to the steep topography.

Probability of crash occurring: Infrequent
Likelihood of Fatal/Serious injury: Unlikely
Outcome: Minor

Recommendation:

Review the desire lines and key destinations for cyclists and pedestrians and confirm the SH29 crossing is in the ideal location.

Ensure adequate platforms are provided at the shared path junctions to allow users to safely pass each other.

As the design progresses, asses the need to fencing where steep drop-offs exist.

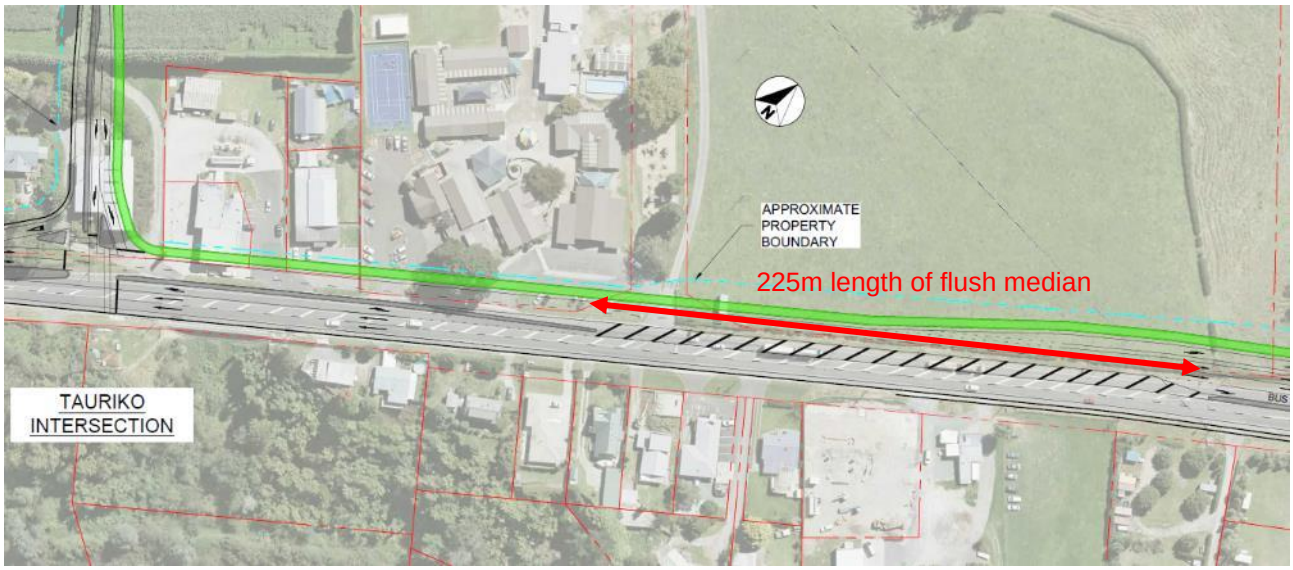
Designer Response:	**During preparation of the concept design, the location of the pedestrian crossing over SH29 is located to limit the number of roads that pedestrians are required to cross. In addition, there is insufficient land on the eastern side of Cambridge Road near the intersection for a footpath. Aimsun modelling and Sidra modelling has indicated that the pedestrian crossing over SH29 as shown on the concept plan can be accommodated without affecting roadway capacity.** **During detailed design in the pre-implementation phase the pedestrian crossing location will be confirmed in consultation with the MoE and TCC.**
Safety Engineer, NZTA Comment:	The Designer's response is acknowledged. It is recommended to the Network Manager, and the Manager, System Management that further progression of the shared facilities design will incorporate the Road Safety Audit Team's recommendation to: • review the desire lines and key destinations for cyclists and pedestrians and confirm the SH29 crossing is in the ideal location. • provide adequate platforms at the shared path junctions to allow users to safely pass each other. • asses the need to fencing where steep drop-offs exist adjacent to the shared path as stated by the Designer.
Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager

Safety Engineers, TCC Comment:	Agree with SAT comments. Also refer to previous comments from Section 3.1 and 3.4. in particular; *It is TCC desire to provide high quality connectivity for pedestrians and cyclists from the outset to provide for existing supressed demand, and to influence travel behaviour from the outset.* *TCC Safety Engineers recommend that grade separation for pedestrians and cyclists at the Cambridge Road intersection should be part of the early works package.*
Client Decision:	Agree with the comments from the NZTA Safety Engineer that the desire lines and associated design measures need to be reviewed. In particular, it needs to be reviewed whether a shared path along the south side of SH29 between the intersection with Cambridge Road and the new Tauriko Intersection is required and achievable. More pedestrian and cycle activity is expected as this part of the State Highway will become more urban and development within Tauriko West occurs. Item 3.2 and 3.4 clarify the Client's position with regards to grade-separated connections for pedestrians and cyclists. A grade separated facility for pedestrians and cyclists need to be assessed for implementation as part of the early works package, however construction could be deferred to either the long-term business case or considered through staging and triggers through the Plan Change for Tauriko West. The Plan Change can include staging provisions that limit the amount of development that can occur until certain infrastructure improvements are made or trigger points that require improvements to be implemented
Action Taken:	Refer to response at item 3.2 and 3.4 above.

7 Mid-block: Tauriko Intersection (The Packhouse) to Cambridge Road

7.1 SH29 Accesses Significant

Between the proposed Tauriko and Cambridge Road intersections, there are numerous roadside businesses that have direct access with SH29 (Mossops Honey, Gull service station, Driven Auto sales etc.). The preferred SH29 design includes 4 lanes (plus turning lanes) between the Tauriko and Cambridge Road intersections. In between these intersections is a 225m length of painted flush median catering for turning movements into and out of these businesses.



The Safety Audit team are concerned with the turning movements across multiple lanes on a busy strategic state highway, especially when located between 2 signalised intersections. It is very likely queuing back from the intersections will overlap creating crash risks for vehicles turning across SH29 into and out of the roadside businesses. These crashes could include side impact crashes. The inclusion of the bus lane also complicates the layout along this section of SH29.

The preference is to provide a continuous raised median between the two signalised intersection, eliminating any head-on crash and minimising side impact type crashes throughout this length. It is however acknowledged that adequate turning facilities need to be accommodated elsewhere – or review of the intersection control with the potential use of roundabouts.

Probability of crash occurring: Common
Likelihood of Fatal/Serious injury: Likely
Outcome: Significant

Recommendation:

Extend the raised central median between the two signalised intersections.

Review the intersection form and consider if roundabouts can be accommodated to cater for the U-turn

movements (this is also discussed in Item 2.2).

Designer Response:	**As previously noted roundabouts at these two sites are not considered suitable options for efficient bus operation.** **The idea of providing a physical median between the two intersections with U-turn facility is an option previously considered by the team when developing the concept design. However, a negative aspect is the number of potential u-turn movements that would occur from the right turn bus lane on SH29, which in turn will have a negative impact on bus operation and signal cycle times (as the right turn phase needs to be lengthened to cater for u-turners). In addition, it may encourage higher speeds as side friction is reduced.** **Severity of injuries due to a turning crash will be partly addressed by including the proposed raised safety platforms at each intersection and the reduction in posted speed limit.** **A review of the concept design will be undertaken in conjunction with Regional Council (regarding bus operation) and the NZ Transport Agency as part of developing this option further during the early works business case.**
Safety Engineer, NZTA Comment:	The Designer's response is acknowledged. It is recommended to the Network Manager, and the Manager, System Management that further progression of the SH29 access will incorporate the Road Safety Audit Team's recommendation to: • extend the raised median between the two signalised intersections. • review the intersection form to accommodate U-turn movement, as stated by the Designer. Refer also to the Safety Engineer's response to Item *Item 6.2 Whiore Road bus connection* above.
Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineer, TCC Comment:	Agree with the SAT comments regarding access arrangements. TCC needs to be comfortable that the safety for all roads users does not deteriorate or is compromised by any deferral of the Tauriko Connections Business Case.

Client Decision:	Agreed to extend a raised median and investigate U-Turn options.
Action Taken:	A review of the property impacts of extending the raised median has been undertaken as part of the Enabling Works business case. A separate report will be prepared to address this issue and provide a recommendation for client consideration. As sufficient road width is available the final decision of whether to implement a full median can be made during the detailed design stage.

7.2 Property set-back and visibility Moderate

Opposite the Caltex service station and Tauriko School the SH29 road reserve boundary is very close to the existing carriageway. The berm width appears to be about 3m wide between fence line and roadside kerb. This width creates significant issues for vehicles entering and existing the private properties with poor visibility and risk of side on and nose to tail crashes.

It is acknowledged that this is an existing situation, however SH29 traffic have the use of the central median to move and avoid an exiting vehicle. The proposed design includes 2 through lanes and a right turn lane adjacent to a raised central median. This results in no free room for the kerbside vehicle to avoid an exiting vehicle. This also creates a safety issue for on-road cyclists that have no escape route if an exiting vehicle protrudes into the road shoulder.

Probability of crash occurring: Occasional
Likelihood of Fatal/Serious injury: Likely
Outcome: Moderate

Recommendation:

Minimise the number of direct property accesses along this section of SH29.

Ensure any roadside landscaping is well maintained and trimmed back to optimise sightlines.

Encourage the local residents to drive out frontwards onto the state highway.

Designer Response:	**The team note the safety concerns raised by the SAT. There is however limited ability under the early works to minimise the number of existing property accessways onto SH29 along the eastern side.** **The works will include a reduction in posted speed, which may help reduce the severity of crashes.** **The concept design has only a minimal length of solid median at each intersection with the majority of the length retaining the painted median.**
Safety Engineer, NZTA Comment:	Refer to the Safety Engineer's response to *Item 3.3 Speed limits* and *Item 7.1 SH29 Accesses* above.
Network Manager, NZTA Comment	Agreed
Manager, System Management, NZTA Decision	Agree with Network Manager
Safety Engineer, TCC Comment:	Refer to previous comments regarding access arrangements and midblock treatment. Also, comments regarding speed management to support a reduced posted speed.
Client Decision:	Agree with the recommendations, in line with 7.1 with regards to raised median and U-turn options, mid-block treatment and speed management.
Action Taken:	See response to item 7.1 above

7.3 Mid-block pedestrian accessibility Minor

As the west Tauriko residential area develops there is likely to be more demand for pedestrian and cyclist to cross SH29. An overall strategy needs to be considered, assessing desire lines, key attractors and where safe crossing points can be provided. If the key desire lines are not catered for, risk taking will incur increasing the chance of serious injuries to vulnerable road users.

While the intersections provide safe crossing locations, desire lines need to be assessed. This may warrant formalised mid-block crossing points, or if feasible an underpass.

Probability of crash occurring: Infrequent
Likelihood of Fatal/Serious injury: Unlikely
Outcome: Minor

Recommendation:

Review pedestrian and cyclist desire lines and include mid-block crossing or grade-separated facilities.

Designer Response:	**The wider pedestrian/cycle facilities will be considered and developed as part of the Tauriko West business case which is due to restart early in 2020.**
Safety Engineer, NZTA Comment:	Refer to the Safety Engineer's Response to *Item 3.1 Network Capacity, Item 3.2 Consistency of intersection treatments, Item 3.3 Speed limits, Item 3.4 Cyclepath/footpath/shared path connectivity,* and *Item 3.6 Mid-block accesses* above.
Manager, System Management, NZTA Decision	Agreed.
Safety Engineer, TCC Comment:	Refer to previous comments, particularly section 3.4 regarding provision for pedestrian connectivity and continuity of routes.

Client Decision:	Agrees with the recommendation and comments With regards to walking and cycling facilities along the SH - (1) Investigate a path on the south side of the SH towards the new intersection. (in line with item 6.6). It is noted that there are significant constraints in respect of the property boundaries at property number 773 and the topography further to the south (where there was a significant slip in the past which was repaired through some significant engineering works). - (2) If that option is not feasible, consider moving the Tauriko intersection slightly to the north in the vicinity of the Caltex service station or the TCC community hall as there appears to be less constraints on the berm width on the south side in those locations. With regards futureproofing investigations for grade separation: (3) reassessment of pedestrian and cyclist crossing options at both this location and the Cambridge Rd intersection will be required, including consideration of a shared path from the south side of SH29, via property 773 (which would have to be acquired) in tandem with investigating grade-separated pedestrian and cyclist crossing (underpass) utilising the existing gradients (on property 773) or in the vicinity. However, construction could be deferred to either the long-term business case or considered through staging and triggers through the Plan Change for Tauriko West. The Plan Change can include staging provisions that limit the amount of development that can occur until certain infrastructure improvements are made or trigger points that require improvements to be implemented.
Action Taken:	The location of the Tauriko West intersection has moved further to the west to accommodate developer aspirations for development. Hence access along the south side is not feasible (given the pinch point at the retaining wall site). With regards grade separation for pedestrians this is now to be considered as part of the Long-term business case solution.

7.4 Bus stops Comment

The plans do not appear to show any bus stops along the proposed SH29 upgrade. As the area further develops, especially with the intended west Tauriko residential area, the use of PT will become more important. To encourage good bus patronage, adequate facilities need to be provided in safe and practical locations.

7.5 Tauriko Hall entrance Comment

It is understood that Tauriko's Caltex service station and Tauriko School may be either relocated or have their entrances adjusted to come of the new access road. However, in between these two facilities is the Tauriko Hall that will essentially become landlocked.

As the design progress the property access needs to be considered.

8 Audit Statement

We certify that in carrying out this audit we have inspected the site and used the drawings and information supplied. We have endeavoured to identify features that could be modified or removed in order to improve safety, although it must be recognised that safety cannot be guaranteed since no road can be regarded as absolutely safe.

The problems identified have been noted in this report together with recommendations that should be studied for implementation. Readers are urged to seek further specific technical advice on matters raised and not rely solely on the report. Where recommended actions are not taken, this should be reported in writing, providing the reasons for that decision.

Signed: ..... Date: 28.11.2019

Dave Aldridge (Technical Director, Beca)

Signed: ..... Date: 28.11.2019

Colin Brodie (Director; Colin Brodie Consulting)

Signed: ..... Date: 28.11.2019

Ross Thomson (Road Traffic and Safety Engineer)

Designer:	Mike Meister	Position: WSP - Technical Director Transport
	Signature:	Date: 16.12.2019
Safety Engineer, NZTA:	Adam Francis	Position: Team Leader- Safety Engineers
	Signature:	Date: 18th February 2020

Network Manager, NZTA:	Name: Terry Boyle Signature: 	Position: Senior Network Manager Date: 21 Feb 2020
Manager, System Management, NZTA:	Name:…Rob Campbell Signature: 	Position:…Manager System Management Date:……21/02/2020……...
Safety Engineer, TCC:	Name:…P Browne, D Wilson, W Hyde, B Robinson. Signature:…pp…  ...	Position: Senior Traffic and Safety Engineers. Date:……19/03/2020……...
NZTA confirms that they have reviewed the Client Decision and agree	Name: Angela Crean, Adam Francis, Terry Boyle Signature:…pp… 	Position: Senior Transport Planner Date:……22/4/2020……...
Client:	Signature: Nic Johansson Signature:… 	Position: General Manager: Infrastructure, Tauranga City Council Date:…28/04/2020
Action Completed:	Name:……. Signature:……...	Position:……. Date:……...

The Project Manager to distribute audit report incorporating decision to designer, Safety Audit Team

Leader, Safety Engineer and project file. ***Date:……..***

Appendix A

Company Name:	Colin Brodie Consulting	**Project Name:**	Tauriko Early works
Audit Name:	Feasibility/Concept Audit	**Option:**	Belk Road

Project Objectives – Record Sheet 1 of 3 Option Report

Prompts	Comments	
What is the reason for the **project?** Is there a specific crash type risk? Is it addressing specific issues such as poor speed limit compliance, road access, congestion, future traffic growth, freight movement, amenity concerns from the community, maintenance/asset renewal, etc.	To facilitate the development of up to 2000 houses in the Tauriko West estate. The objective of these early works is to allow access to SH 29 via two new intersections without adversely affecting the efficiency or safety of SH 29	Objectives
What is the **Function** of the road? Consider location, roadside land use, area type, speed limit, intersection type, presence of parking public transport services and vehicle flows. What traffic features exist nearly (e.g. Upstream and downstream)? What alternative routes exist?	SH 29 is a High Volume National Strategic Highway providing access to the BOP West and East, Tauranga City and the Port of Tauranga from the Waikato and Auckland/Northland. Tauriko is a small, historically rural settlement, severed by SH29 with accesses to residential properties, school, hall and new commercial properties. The new intersections link to Arterial Roads	Function
What is the **speed** environment? What is the current speed limit? Has it changed recently? Is it similar to other roads of the type? How does it compare to Safe System speeds? What is the acceptability of lowering the speed limit at this location?	To the west, the speed environment is 100 km/h although operates at 80/100 km/h. Through Tauriko, it is 70km/h however int peak periods it operates as slow as 40km/h	Speed
What **road users** are present? Consider the presence of elderly, school children and cyclists. Also note what facilities are available to vulnerable road users (e.g. Signalised crossings, bicycle lanes, school	At present it is primarily arterial traffic with a high % HCV. The school has off road pick up drop off. The route is used by recreational cyclists. However with	Road User

Company Name:	Colin Brodie Consulting	**Project Name:**	Tauriko Early works
Audit Name:	Feasibility/Concept Audit	**Option:**	Belk Road

zone speed limits, etc).	the new developments in Tauriko West and the Lakes/Crossing areas, the numbers of cyclists, pedestrians and commuter traffic is increasing.	
What is the **vehicle** composition? Consider the presence of heavy vehicles (and what type), motorcyclists and other vehicles using the roadway.	As above	Vehicles

Company Name:	Colin Brodie Consulting	**Project Name:**	Tauriko Early works
Audit Name:	Feasibility/Concept Audit	**Option:**	Belk Road

Safe System Matrix Scoring Analysis Sheet Sheet 2 of 3 Option Report

	Run-off-road	Head-on	Intersection	Rollover	Ped	Cyclist	Motorcyclist
Exposure	4	4	4	4	0	4	4
Likelihood	3	0	3	2	3	3	3
Severity	2	2	1	1	3	3	3
Product	24	0	12	8	0	36	36

						Total	116
						Max	448

Company Name:	Colin Brodie Consulting	**Project Name:**	Tauriko Early works
Audit Name:	Feasibility/Concept Audit	**Option:**	Belk Road

Summary Assessment Sheet Sheet 3 of 3 Option Report

Exposure components high score and why?

The traffic flows on SH 29 are very high, presently well in excess of 10,000 vpd and will exceed 20,000 by 2031

There is a high proportion of HCV, greater than 1500 vpd at present and will exceed 2000 vpd by 2031. Recreational cyclists and motorcyclists numbers are estimated to be above 100 vpd, particularly on weekends

Pedestrian numbers in the Belk Rd area should be very low or non existent.

Likelihood components high score and why?

Run off road crashes are the most common crash type at high speed rural roundabouts. With the high degree of turn required for trucks east, and into the industrial/commercial area to the south, and the desire to maintain speed for the climb up to Tauriko, there is quite a high likelihood for truck rollovers. Cyclist and motorcyclists conflicts are also quite common in multilane roundabouts.

Severity high score and why?

The high severity scores relate to the vulnerable road users only.

The Product Score

The highest scores for run off road, cyclist and motorcyclist crashes require careful consideration.

Company Name:	Colin Brodie Consulting	**Project Name:**	Tauriko Early works
Audit Name:	Feasibility/Concept Audit	**Option:**	Cambridge Road Intersection Option 2

Safe System Matrix Scoring Analysis Sheet Sheet 2 of 3 Option Report

	Run-off-road	Head-on	Intersection		Ped	Cyclist	Motorcyclist
Exposure	4	4	4	0	4	4	4
Likelihood	1	1	3	0	2	2	2
Severity	2	2	2	0	3	3	3
Product	8	8	24	0	24	24	24

						Total	112
						Max	448

Company Name:	Colin Brodie Consulting	**Project Name:**	Tauriko Early works
Audit Name:	Feasibility/Concept Audit	**Option:**	Cambridge Road Intersection Option 2

Summary Assessment Sheet Sheet 3 of 3 Option Report

Exposure components high score and why?

The traffic flows on SH 29 are very high, presently well in excess of 15,000 vpd and will exceed 25,000 by 2031

There is a high proportion of HCV, greater than 1500 vpd at present and will exceed 2000 vpd by 2031. Cyclists, pedestrian and motorcyclists numbers are estimated to be above 100 vpd, particularly on weekends

Likelihood components high score and why?

The highest likelihood will be vehicle to vehicle conflicts, followed by conflicts with vulnerable road users

everity high score and why?

The high severity scores relate to the vulnerable road users only.

The Product Score

The highest scores for intersection and vulnerable road users requires careful consideration.

Company Name:	Colin Brodie Consulting	**Project Name:**	Tauriko Early works
Audit Name:	Feasibility/Concept Audit	**Option:**	Tauriko Township Mid Block Option 2

Safe System Matrix Scoring Analysis Sheet Sheet 2 of 3 Option Report

	Run-off-road	Head-on	Accesses	U-Turns	Ped	Cyclist	Motorcyclist
Exposure	4	4	4	2	4	4	4
Likelihood	0	1	3	2	2	2	2
Severity	1	1	3	3	3	3	3
Product	0	4	36	12	24	24	24

						Total	124
						Max	448

Company Name:	Colin Brodie Consulting	**Project Name:**	Tauriko Early works
Audit Name:	Feasibility/Concept Audit	**Option:**	Tauriko Township Mid Block Option 2

Summary Assessment Sheet Sheet 3 of 3 Option Report

Exposure components high score and why?

The traffic flows on SH 29 are very high, presently well in excess of 15,000 vpd and will exceed 25,000 by 2031

With the residential, commercial and community (School/Hall) developments on both sides of the highway, there is likely to be a high number of turning movements into and out of accessways and pedestrian and cyclist mid block crossings. With breaks in the physical median, we believe that there will be turning movements across multiple lanes and u - turn movements at the ends of the physical islands.

Likelihood components high score and why?

The highest likelihood will be vehicle to vehicle conflicts at accesses , followed by conflicts with pedestrians and cyclists crossing midblock.

Severity high score and why?

With a likely operating speed of around 60km/h in uncongested times the severity of side impacts with vehicles, and injuries to vulnerable road users could be reasonably severe. In congested conditions, the speeds and severities will be lower

The Product Score

The product score of 124 is the highest of all the elements of this project and suggest that further consideration is warranted to address the access, u-turn and vulnerable road user safety.

Company Name:	Colin Brodie Consulting	**Project Name:**	Tauriko Early works
Audit Name:	Feasibility/Concept Audit	**Option:**	Packhouse Intersection Option 2

Safe System Matrix Scoring Analysis Sheet Sheet 2 of 3 Option Report

	Run-off-road	Head-on	Intersection		Ped	Cyclist	Motorcyclist
Exposure	4	4	4	0	3	4	4
Likelihood	2	1	3	0	2	2	2
Severity	1	1	3	0	2	2	2
Product	8	4	36	0	12	16	16

						Total	92
						Max	448

Company Name:	Colin Brodie Consulting	**Project Name:**	Tauriko Early works
Audit Name:	Feasibility/Concept Audit	**Option:**	Packhouse Intersection Option 2

Summary Assessment Sheet Sheet 3 of 3 Option Report

Exposure components high score and why?

The traffic flows on SH 29 are very high, presently well in excess of 15,000 vpd and will exceed 25,000 by 2031

There is a high proportion of HCV, greater than 1500 vpd at present and will exceed 2000 vpd by 2031. Recreational cyclists and motorcyclists numbers are estimated to be above 100 vpd, particularly on weekends

Pedestrian numbers across SH 29 is likely to be quite low but quite likely to cross the side road, even though a pedestrian/cycle path is only shown on the eastern side of the side road.

Likelihood components high score and why?

Vehicle conflict crashes are likely at signalised intersections.

Similarly crashes involving motorcyclists and cyclists are likely at this signalised intersection, primarily those vehicles travelling along SH 29, across the Left Turn In slip lane and/or turning into and out of the side road

Pedestrian conflicts may occur with those crossing the side road particularly with the existing design incorporating LTI/LTO slip lanes.

Severity high score and why?

The reasonably high severity scores relate to vehicle to vehicle conflicts on SH29 due to the potential high speeds through the intersection.

Lower severity scores have been applied to the vulnerable road users as they are likely to be in conflict with lower speed turning vehicles

The Product Score

Consideration needs to be given to how to manage speed and severity through the intersection and the safe passage of Vulnerable road users across the side road.

Appendix H : Redwood Lane Walk/Cycle Facility Evaluation

			Preferred			Raw Scores			
Option	Option C(U)	Option D(U)	**Option E -** Option C/D (U) hybrid -path on both sides of road - underpass 3 arms with 3 culverts under Redwood	**Option F -** Option C/D (U) hybrid - lines up with Vehicle underpass(diagonal)		Option C(U)	Option D(U)	Option E - Optior	Option F - Optior
Useability	if you put it on one side you still need to cross high volume roads then not attractive. Underpass and at grade and short so ok from CPTED pov. Desire lines ok as it lines up with potential paths, however not as good as Option D and E	if you put it on one side you still need to cross high volume roads then not attractive. Underpass and at grade and short so ok from CPTED pov. Desire lines ok as it lines up with potential paths and park and ride, however better than Option C but not as good as Option D	shorter crossing point, underpass. (RAB at grade - not elevated but check). This option more attractive and better CPTED than Option C/D(Vertical) due to short length. Encourages more W & C, without significant over investment. Future proofs for a future path alogn the current SH29 alignment in line with walking cycling map. more tunnels (option E and F) considered unsafe however an at grade crossing across	could have one connection on Redwood side, then tie in to another path at Kawerao Drive (but crossing point still needed due to higher volumes); long crossing which may have CPTED issues. Better than Option C. More tunnels (option E and F) considered unsafe however an at grade crossing across Redwood still provided					
	Slight Positive	Moderate Positive	Significant Positive	Moderate Positive	11%	1	2	3	2
Constructability	BAU - Start on northern section first.	BAU - Start on northern section first.	BAU - Start on northern section first.	BAU - Start on northern section first.					
	Neutral	Neutral	Neutral	Neutral	11%	0	0	0	0
Op & Maint	BAU, needs to be considered as part of SID process in detail design	BAU, needs to be considered as part of SID process in detail design	BAU, needs to be considered as part of SID process in detail design. More underpasses than Option C and D but shorter	due to longer crossing, more maintenance and time spent (check the design of this)					
	Neutral	Neutral	Neutral	Slight Negative	11%	0	0	0	-1
Alignment to Enabling Works and long term form	good. Can be built in stages when southern portion of TBE comes in the long term	good. Can be built in stages when southern portion of TBE comes in the long term	ties in better than other options with the long term and delivery on mode shift outcomes - particularly if we end up with a Park and ride in the	good. Can be built in stages when southern portion of TBE comes in the long term					
	Significant Positive	Significant Positive	Significant Positive	Significant Positive	11%	3	3	3	3
Scale of Cost	assume main underpass widened to accommodate path on one side	assume main underpass widened to accommodate path on one side	assume main underpass widened + 3 additional box culverts/ramps to the north, 3 to the south. One step worse than Opt C and D but better than Opt F	longer structure than other options. More than Opt C,D and E					
	Slight Negative	Slight Negative	Moderate Negative	Significant Negative	11%	-1	-1	-2	-3
Env Impact	minor, some wetland areas planned for the site west of redwood but far enough away	BAU - along with construction of EW and LT, doesn't add anything more than the do nothing	BAU - along with construction of EW and LT, doesn't add anything more than the do nothing	BAU - along with construction of EW and LT, doesn't add anything more than the do nothing					
	Slight Negative	Neutral	Neutral	Neutral	11%	-1	0	0	0
Property Effects	minor as property already needed for both EW and Long term options	minor as property already needed for both EW and Long term options	minor as property already needed for both EW and Long term options	minor as property already needed for both EW and Long term options					
	Neutral	Neutral	Neutral	Neutral	11%	0	0	0	0
Safety	separated from traffic and short crossing areas, however users still need to cross over high volume Kaweroa Drive to the south - worse than Option D for exposure as not on the most used desire line	separated from traffic and short crossing areas, however users still need to cross over Redwood to the north, however lower volumes and better than option C as less exposure.	provides more separated facilities on desire lines without having to cross the road. Better than Options C, D and F	Facilities are separated from traffic so positive compared to do nothing. However due to the length, the rotary would be open in the middle and on other examples vehicles have loss control and gone in to the middle - potential for high severity ped/cycle outcome if hit. This is not as good as options C,D and E					
	Moderate Positive	Moderate Positive	Significant Positive	Slight Positive	11%	2	2	3	1
Other Effects	potential flooding due to location								
	Slight Negative	Neutral	Neutral	Neutral	11%	-1	0	0	0
Criteria									
					Sum	3	6	7	2
					Rank	3	2	1	4

- A: Omanawa Stream (and a short section along Wairoa River or along SH29 to connect to T-West TBC)
- B: Belk Rd (and a short section to connect to T-West - TBC.)
- C: South of Redwood Ln
- D: North of Redwood Ln.

Figure 4: Proposed Option Locations

Evaluation Framework

In summary, we will use some of the technical information used as part of the previous MCA and with a small team (from Waka Kotahi, TCC and WSP) undertake a high level MCA process for the 8 options, or a shorter list if some options are filtered out earlier.

The MCA will consider the following criteria for assessment.

- Use-ability – would people use it given the design i.e. CPTED (social safety), gradient, length of ramp, does this option align with desire lines, provide connectivity to user generator locations such as the Tauriko West UGA, Park and Ride facilities, aspiration walking and cycling routes, is it close to both residential and commercial areas minimising route journeys, comfort
- Constructability/Engineering Complexity-how easy is this to construct and what risks there are?
- Operation and Maintenance (including SiD) – level of difficulty and any health and safety concerns in managing and maintaining the option
- Alignment to Enabling works and Long term form – does this option work in with both the Enabling works design and the long term form, or would it require demolition and rebuilding once the long term form is being constructed
- Cost – what is the scale of cost between options.
- Environmental impact – what are the key environmental impacts for this option
- Property Effects – are there any significant issues with property in this location, This includes whether there is a need to provide connectivity to other paths (e.g. linking from Belk Rd towards Wairoa River Path and Redwood requires additional paths and land to link back to Redwood Lane)
- Safety – what are the impacts on all transport users - road, cyclists and pedestrians, Park and ride users?
- Other Effects – i.e. would any works impact on the wider water network, stormwater flooding. Location to stormwater ponds. Would the option result in flooding of the facility or further upstream? How often would this occur?

MCA Scoring

With the above criteria determined, we will use a 7 point scale – (-3 to + 3) as shown below. We will compare all options against the 'do nothing'. The 'do nothing' is defined as at-grade facilities, which will cross the legs of roundabouts and go across the on and off ramps of the long term form. An MCA table similar to that shown on the following page will be provided as part of the documentation. Some sensitivity analysis could be undertaken by the team, but at this stage it is assumed that these will all carry equal weighting.

Magnitude	Definition	Score
Large positive (+ve)	Major positive impacts resulting in substantial and long-term improvements or enhancements of the existing environment.	3
Moderate positive (+ve)	Moderate positive impact, possibly of short-, medium- or long-term duration. Positive outcome may be in terms of new opportunities and outcomes of enhancement or improvement.	2
Slight positive (+ve)	Minimal positive impact, possibly only lasting over the short term. May be confined to a limited area.	1
Neutral	Neutral – no discernible or predicted positive or negative impact.	0
Slight negative (-ve)	Minimal negative impact, possibly only lasting over the short term, and definitely able to be managed or mitigated. May be confined to a small area.	-1
Moderate negative (-ve)	Moderate negative impact. Impacts may be short, medium or long term and are highly likely to respond to management actions.	-2
Large negative (-ve)	Impacts with serious, long-term and possibly irreversible effect leading to serious damage, degradation or deterioration of the physical, economic, cultural or social environment. Required major rescope of concept, design, location and justification, or	-3

			Discard	Discard	Discard	Discard	Keep	Discard	Keep	Discard	New - keep	New - Keep	New - Discard
Option			Opt A(U)	Option A(O)	Option B(U)	Option B(O)	Option C(U)	Option C(O)	Option D(U)	Option D(O)	**Option E -** Option C/D (U) hybrid -path on both sides of road - underpass 3 arms with 3 culverts under Redwood	**Option F -** Option C/D (U) hybrid - lines up with Vehicle underpass(diagonal)	North of Redwood (Gargan)
	Useability		not desriable path for the short-medium term but option for long term fr recreational purposes; TBE could be looking to develop something as well (opportunity)	topograhpy puts overbidge quite high (with option 2) and not attractive for use	only useable for the short term, could design the off ramp to suit but other options are better.	only useable for the short term, and less attractive than underpass	If you put it on one side you still need to cross high volume roads then not atttactive. Underpass and at grade and short so ok from CPTED pov. Desire lines ok as it lines up with potential paths, however not as good as Option D and E	If you put it on one side you still need to cross high volume roads then not atttactive. Underpass and at grade and short so ok from CPTED pov. Desire lines ok as it lines up with potential paths, however not as good as Option D and E	If you put it on one side you still need to cross high volume roads then not atttactive. Underpass and at grade and short so ok from CPTED pov. Desire lines ok as it lines up with potential paths and park and ride, however better than Option C but not as good as Option D	topograhpy puts overbidge quite high (with option 2) and not attractive for use	shorter crossing point, underpass. (RAB at grade - not elevated but check). This option more attractive and better CPTED than Option C/D(Vertical) due to short length. Encourages more W & C, without signficaint over investment. Provides connection to northern path to TW access	could have one connection on Redwood side, then tie in to another path at Kawerao Drive (but crossing point still needed due to higher volumes); long crossing which may have CPTED issues. Better than Option C	houses are not going to be build there first off so useability will be very low given demand with be in the Redwood Area. Gargan located needed more in the long term once housing is built out more - possible opportunity
			Fatal Flaw	Fatal Flaw	Slight Positive	Neutral	Slight Positive	Fatal Flaw	Moderate Positive	Fatal Flaw	Significant Positive	Moderate Positive	Fatal Flaw
		Constructability	xx		restriction of the highway layout;	BAU - could use the existing landform to locate overbridge without additional large structural ramps	BAU - Start on northern section first.	BAU - Start on northern section first.	BAU - Start on northern section first.	BAU - Start on northern section first.	BAU - Start on northern section first.	BAU - Start on northern section first.	BAU
					Moderate Negative	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
		Op & Maint	xx				BAU, needs to be considerd as part of SID process in detail design	BAU, needs to be considerd as part of SID process in detail design	BAU, needs to be considerd as part of SID process in detail design	BAU, needs to be considerd as part of SID process in detail design	BAU, needs to be considerd as part of SID process in detail design. More underpasses than Option C and D but shorter; possibilities for 'utility tunnels', combined with the ped-cycle underpasses, which would make all utilities easily accessible without having any traffic management on SH29 (e.g. to the side). There'll be quite a few utilities	due to longer crossing, more maintenance and time spent (check the design of this)	
							Neutral	Neutral	Neutral	Neutral	Neutral	Slight Negative	
		Alignment to Enabling Works and long term form	xx		only useable for the short term	only useable for the short term; could do this in the interim, but wouldn't be so suitable in the long term as have to go under and over. Would have to reconstruct half of it for the long term.	good. Can be built in stages when southern portion of TBE comes in the long term	good. Can be built in stages when southern portion of TBE comes in the long term	good. Can be built in stages when southern portion of TBE comes in the long term		ties in better than other optiosn with the long term and delivery on mode shift outcomes - particulary if we end up with a Park and ride in the long term	good. Can be built in stages when southern portion of TBE comes in the long term	
					Significant Negative	Significant Negative	Significant Positive		Significant Positive		Significant Positive	Significant Positive	
	Criteria	Scale of Cost	xx				assume main underpass widened to accommodate path on one side	assume main underpass widened to accommodate path on one side	assume main underpass widened to accommodate path on one side		main underpass widened + 3 additional box culerts to the north, 3 to the south. One step worse than Opt C and D but better thand Opt F	longer structure than other options. More than Opt C,D and E	
							Slight Negative		Slight Negative		Moderate Negative	Significant Negative	
		Env Impact		significant visual imapct on top of an elevated highway		significant visual imapct on top of an elevated highway	minor, some wetland areas planned for the site west of redwood but far enough away	significant visual imapct on top of an elevated highway		significant visual imapct on top of an elevated highway			
				Significant Negative		Significant Negative	Slight Negative		Neutral	Neutral	Neutral	Neutral	
		Property Effects	xx				minor as property already needed for both EW and Long term options	minor as propoerty already needed for both EW and Long term options	minor as propoerty already needed for both EW and Long term options	minor as propoerty already needed for both EW and Long term options	minor as propoerty already needed for both EW and Long term options	minor as propoerty already needed for both EW and Long term options	
							Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	
		Safety	xx				separated from traffic and short crossing areas, however users still need to cross over high volume kaweroa Drive to the south - worse than Option D for expousre as not on the most used desire line	separated from traffic and short crossing areas, however users still need to cross over high volume kaweroa Drive to the south - worse than Option D for expousre as not on the most used desire line	separated from traffic and short crossing areas, however users still need to cross over Redwood to the north, however lower volumes and better than option C as less exposure.		provides more separated fracilites on desire lines without having to cross the road. Better than Optiosn C, D and F	Facilites are separated from traffic so postivie. Hoewver due to the length, the rotary would be open in the middle and on other examples vehicls have loss control and gone in to the middle - potential for high severity ped/cycle outcoe if hit. This is not as good as options C,D and E	
							Moderate Positive		Moderate Positive		Significant Positive	Slight Positive	
		Other Effects	potential flooding		Option B- is the location that looks to use existing culvert location; however opportunity to build something new, if underpass then straight into flooding and low lying land		potential flooding due to location						

Early filtering conversation

Options C and D dont work with the overbridge due to the elevated option 2

TBE would be supportive of a path along Omanawa Stream - could be location of the future

Option A - has to go under i.e Overbridge is not feasible to topography

Option A- flood level concerns

Other comments

Option B- is the location that looks to use existing culvert location; however opportunity to build something new, if underpass then straight into flooding and low lying land

Appendix I : Whiore Ave Evaluation

			Whiore Ave Walking, Cycling and PT Options - Compare to the existing road layout and facilities						
	Option		Opt 1	Opt 2	Opt 3a	Opt 3b	Opt 4	Opt 5	Opt 6
		Investment Benefit - increase Mode Shift	This option provides minimal facilities but is better than the existing layout. Cyclist have to share the road with traffic which is the same as the existing situation. Cyclists may use narrow footpath. Pedestrians will have a facility that connects rather than walking on the berm. PT stops provided. This is not as good as Options xx to xx.	This option separates modes and would be more attractive to cyclists with protected facility. Cyclists could still use footpath but less likely too. Would be attractive for mode shift. Better than option 1 as provided facilities for both modes. Best option for cyclists, much better for mode shift due to removing parking	This option is more attractive to peds and cyclists with shared path down one side of the route and footpath on the other. Better than Option 1 but not as good as Option 2 for cyclists and ped attractiveness of facilities. Attractive for interested but not confident cyclist. away from HCVs. if shared path constructed right next to K & C and parking might be less attractive	Similar level of attractiveness for peds to Option 3a. Cyclist have more protection on the high speed downhill and would use rather than peds. More attractive for ped and cyclists than Option 1 and 3a (as on the northern side) More attractive as more desire lines to the Tga crossing and PT links if going into crossing or CBD. Not as good as Option 2.	This option is better for pedestrians and more attractive with both sides of the road covered. Cyclists still have facility to use but would have to interact with peds or use the road - from a comfort point of view on the northern side of road you have accesses - grade changes etc - so not as attractive as Option2. Not as attractive for cyclist as option 3b is. Ok unless volumes get signficiantly high. Better than Option 3a for all peds and cycles. Could be bumped up to significant. Team felt this was a step change from Option 1	this option would be similar to Option 3a in terms of its attractiveness for modes. Ped facilities are minimal and limited to one side and less than Option 1. The bidirectional facilities available and they are protected, but wouldn't provide a significant difference in terms of attractiveness and mode share than those other options? Bi-direction - positives for cycling when cycling vols are low in Opp direction you can ride side by side and overtake. Inclusive' for all types of bikes, sep from traffic and peds. negative is accessibility to destinations on the side of the road, however this would be minimal as most would look to cross at the intersections. Team felt this was a step change from Option 1	minimal facility option but still improve connections and therefore an attractiveness to walk and or cycle with the introduction of a path. The side of the road could be changed. Does minimal facilities on both sides of the road equate to one better facility on one side of the road?
			Slight Positive	Significant Positive	Moderate Positive	Significant Positive	Moderate Positive	Moderate Positive	Slight Positive
		Investment Benefit - improve safety	Narrow footpath on both sides better for peds from safety pov. Cyclists - no difference. Would not reduce DSIs and peds prob already walked on berm, improves LoS for Walking, not for cycling, no changes to cross section. Encouraging cycling this route, increase volumes without protection from vehicles. Increase exposure to potential crashes	Good option for cyclists with protected cycle lanes. For pedestrians, similar to minimum requirements in option1. Would likely require removal of parking. Could lead to unsafe parking on berms and across footpath, buses would stop in lane. Access and vehicles crossing, especially downhill would increase likelihood of DSI. would require speed humps to slow vehicle turning and entry/exit speeds. Removes conflict between peds and cyclists. Drivers will be looking. in the same direction for cars and cyclists when exiting properties. some concern with interaction of HCVS and cyclists in on road facilities, but other road users except to find cyclist in the direction they should be. Marked on a higher standard than first thought. More detail needed in next phase, decent buffer etc	on road risk for cyclists but same as existing layout, pedestrians have greater facility on the sth side and cyclist could use this as well. Maybe some high speed conflict risk on the shared path. Parking would largely remain except around accesses on shared path side, buses could have dedicated bays or in lane. Clearance from parked vehicles, if not ample could be a risk of car doors opening in cycle path.	Cyclists would have protected lane on one side of road and shared path on other side. High speed cyclist may use road facility rather than shared path reducing the conflict between pedestrians. Pedestrians have same safety and LoS as Option 3a and better than Option 1 and 2. Parking is removed on one side, may create unsafe parking due to demand. Buses could stop in lane or bay on one side.	Cyclists would have the option of a shared path on both sides or use the road. Better than Options with only one shared path (3a and 3b) and normal footpaths (Option 1). Shared path on both sides best for peds. Some risk with cyclist conflict with high speed downhill, would be better for peds with cyclist on road in protected facility such as Option 2 and 3b. Parking remains largely unaffected except for at accessways. Buses could be stop or in lane. Access and vehicles crossing, especially downhill would increase likelihood of DSI. would require speed humps to slow vehicle turning and entry/exit speeds. Cyclists travelling in different directions, inconsistent with shared path and a cycle lane drivers may not expect cyclists as the exit or enter properties	Dedicated cycle facility for both directions, however high speed between two directions. Not as good as Option 2. Pedestrians have only one narrow path and would have to walk on the berm on the other side. Although better than the existing, not as good as an of the other options. Parking would have to be removed off one side of road and could lead to unsafe parking due to demand. Buses could be stop or in lane. confusion of rother road users as to which way cyclists are coming from. concerns over access safety issues versus bi direction, truck and cyclists etc	Cyclists would have to share the road or use shared path with peds on southern side. Risk with speed differential for downhill versus uphill . Not as good as option options which provide facilities on both sides of the road or protected on road. Peds have one path, wider but would be shared with cyclists and high downhill speeds may create risk. No change to parking and buses could be in lane or stops.
			Slight Positive	Moderate Positive	Moderate Positive	Moderate Positive	Moderate Positive	Neutral	Slight Positive
	Criteria	Technical Implementability	BAU	protected cycle facilities and accessways - implementation. BAU, footpath in berm should be ok and may be able to avoid trees and services etc. If you are removing parking with the on road cycle way, the removal of lines etc can cause mini ruts and some ponding if not done correctly.	BAU. Possible some tree remov	BAU. Possible some tree removal, some rutting in lines and ponding, but only one side of road	BAU	technical issues with bi direction cycling facility and the number of accesses it will have in it. you are removing parking with the on road cycle way, the removal of lines etc can cause mini ruts and some ponding if not done correctly.	BAU. Possible some tree removal
			Neutral	Slight Negative	Neutral	Neutral	Neutral	Slight Negative	Neutral
		Alignment to Policy and Strategy/integration	could keep street trees with this option (1). Peds have walking facility on both sides of the road (1) but cyclists have no specific facility and not protected (-2) ; other items could be accommodated	footpath on both sides for peds (1), cyclist have protected facility both sides of the road (3), street trees remain(0)	may have to remove street trees with shared path options (-1); peds have facilities on both sides of road (better than option 1) (2); cyclists do not have protected facility but can use shared path on one side (-2)	may have to remove street trees with shared path options (-1); peds have facilities on both sides of road (better than option 1) (2); cyclists do not have protected facility but can use shared path on one side (-2)	may have to remove street trees with shared path options (-2) . Provides good facility for peds (3); Align with policy for cyclists on one side of the road but not the other (2)	good facility for cyclists (3), only one side for peds (-1) , street trees remain largely intact (0)	may have to remove street trees with shared path options (-1) . Only provides ped facility on one side of road and would have to share with cyclists (-1), cyclist could use shared path but not protected from other users (-1)
			Slight Positive	Significant Positive	Slight Positive	Moderate Positive	Moderate Positive	Moderate Positive	Slight Positive
		Community/Residential	minimal impact and provides facility for staff to walk to work. No loss of street parking; some impact to berm parking	Significant impact to the business with removal of parking	positive as facilities provided for both asking and cycling for their staff, however loss of berm where cars are being parked currently. No loss of street parking	moderate impact due to parking being removed on one side	provides good facility for staff to walk or cycle. Some loss of parking on berm which currently exists and is being used. No loss of street parking	moderate impact due to parking being removed on one side	minimal impact and some positives for staff to be able to walk and or cycle on shared path. Some loss of space on berm which is used for parking. No loss of street parking
			Neutral	Significant Negative	Neutral	Moderate Negative	Slight Negative	Moderate Negative	Neutral
		Financial Fundability/Value for Money	Not sure - discussion -150k	slightly more exp than Option 1 and 6; 200k	225K	225k	most expensive; 300k	200k	150k
			Neutral	Slight Negative	Neutral	Slight Negative	Neutral	Slight Negative	Neutral
				probably all 150 - 200k apart from each of options, option 4 approx. 150k more than others, will be no other long term solutions - so no sunk costs.					
		Expected cost							
		95th %tile							

Appendix J : Public Transport Plan

:

Tauriko Early Works – Bus Layout

Stage One – Early Access

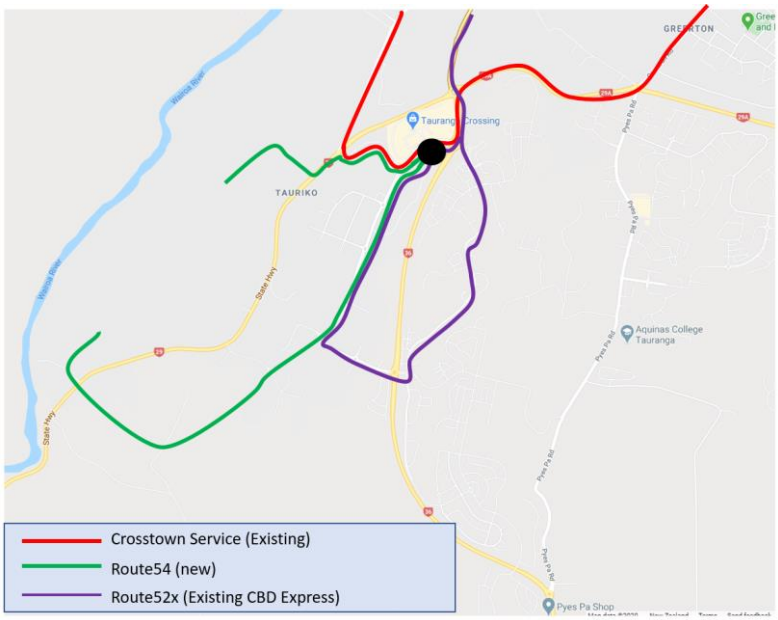
Conditions: Northern and southern access to Tauriko West provided, Furore Ave Bus only access in place, 100+ households each at northern and southern end of Tauriko West. No school in place.

School Bus Routes: Provision for school bus routes to Cameron Road Schools and Otumoetai schools. 200 households will typically have 90-100 school age children. Public bus routes may cater for some of this demand but requirement to transfer and relatively low public bus frequencies mean this will be marginal. Cycle and walking routes to schools outside the area are long with limited infrastructure in place so active mode transport is unlikely to cater for many students. It is anticipated that initially 2 additional bus routes will be required at a typical cost of $100k per annum. These services will be added to in line with population growth until such time as a local school is developed.

Public Routes: A single bus Route is planned for Stage One development. This service will provide a connection between the northern and southern sections of Tauriko West via Tauranga Crossing and would operate at a 30min frequency. The service will connect to two existing services at Tauranga Crossing which will provide access to most major trip generators:

- R52x – Tauranga Crossing - CBD express
- Crosstown – Greerton-Windermere-Bayfair (with a planned extension to Brookfield and Otumoetai)

The existing Route 52x is currently an express, peak time service. To provide a suitable level of connectivity this will initially be enhanced to an all-day service (30min in peaks, 60min off-peak). As population base grows the 52x service could be enhanced to a 30min off-peak frequency.



Initial Cost: $781,000 per annum ($1,335 targeted rate per household @ 200 households)

With enhanced service frequencies and 10 school buses: $1,814,000 per annum ($620 targeted rate per household @ 1000 households)

Stage Two – Spine Road Completion

Conditions: Spine Road in place, Secondary school in place 1,000-2,000 households (2035)

School Bus Routes: No internal school buses necessary due to provision of public service and relative short travel distances for most students. School buses from external areas likely to be required and will depend on total role of school and level of diversion from other schools. Expect some repurposing of existing school bus routes plus an additional 2-3 routes (Lakes, Cambridge Rd, Pyes Pa) to provide for additional demand.

Public Bus Routes: Two bus routes will serve Tauriko West with Route 54 providing Internal connections to Tauranga Crossing and TBE while Route 53x provides peak time services to the CBD. Outside peak periods Route52x provide express service to the CBD via a transfer at Tauranga Crossing. Both Route 54 and 53 will operate at 20min frequencies, providing a peak service frequency of 10minutes to Tauranga Crossing. As with Stage One these services will connect to the existing Crosstown Service.

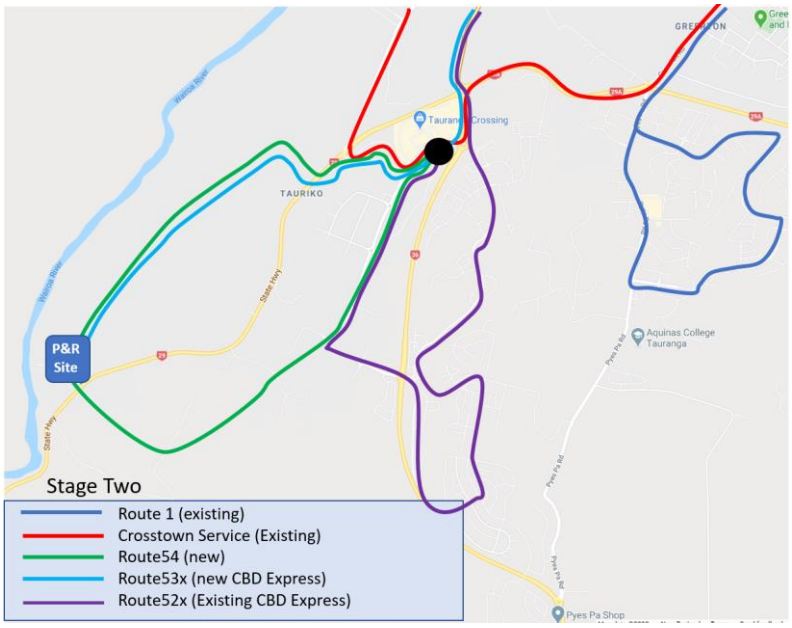
Bus Priority: Route 54 and 53x are both provided with bus priority via Whiore Ave. Modelling works should indicate whether delays at the northern and southern entrance to Tauriko West are required. Ideally delays for buses at these intersections should not exceed 3-minutes during peak to maintain a travel time advantage over private vehicles. Given the modest number of buses/hour this may be in the form of short queue jump lanes or signal pre-emption.

Park and Ride Facilities: With the introduction of peak period CBD express services PNR will become viable. Capacity on the service will provide approximately 150seat/hour direct to the CBD but capacity can be expanded if required at marginal additional cost. The level of take-up for a PnR service will be dependant on two factors; time and cost.

The shortcut via Whiore Ave and use of the toll way is likely to provide a small timesaving (5-10 minutes, TBC) and current parking prices will provide a cost saving of up to $8 per day. The level of benefits are enough to provide some uptake but is unlikely to exceed 50 AM peak trips without further pricing incentives. The park and ride site will also provide an opportunity for those travelling to the Waikato via SH29 to carpool, something that has been happening informally at Tauranga Crossing for some time.

Initial Cost: $781,000 per annum ($1,335 targeted rate per household @ 200 households)

With enhanced service frequencies and 10 school buses: $1,814,000 per annum ($612 targeted rate per household @ 1000 households, $306 @ 2000 households)



Appendix K : Travel Demand Measures

The following Table provides a review of the potential TDM initiatives that could be implemented as part of the Tauriko Enabling Works package. All measures marked in green are recommended.

The Table below includes the full list of potential interventions identified by the MR Cagney report titled Travel Demand Management and Behaviour Change Discussion Paper , Tauriko West" (June 2019. The interventions shaded in green were deemed by the MR Cagney report to have the greatest potential for Tauriko West.

Appendix Table 15-2: TDM Measures for Enabling Works and alignment to Long Term measures

ID and Reference	Package Elements	Measure	How to consider in the Enabling Works Package	TCC's role for implementation	Other Roles
Chapter 2 MRCagney					
2.1		Put Active and Public Transport at the centre of land use planning and development for Tauriko West	Apply IDC and Street Design standards through the structure planning, business case development and resource consenting processes. This will help to ensure that the majority of new dwellings are located within 400 metres of appropriately sheltered bus stop. Whiore Avenue PT corridor improvements and junction improvements at Cambridge Road to be introduced before BOPRC starts operating bus services. Through the business case it is recommended that BOPRC to operate 30-minute frequent bus services through Tauriko once first 100 houses are delivered (exact details of timing to be confirmed through the PT Services and Infrastructure DBC). It is critical to have bus infrastructure and services operating once people moving in, as a 'move' is a moment where people reconsider their travel options and where habits are formed. Changing behaviour at a later stage is harder. TCC to provide bus infrastructure and shared paths via Whiore Avenue and Tauranga Crossing. It is noted that Whiore Avenue has a significant gradient, which can be a challenge for active modes. The proposed paths along Whiore Avenue will need to be very attractive, not just for safety purposes, but also how users will experience this. A good level of amenity, signage and information will be required to make the 'hill' an appealing route.	Requiring through guidance Provide infrastructure Provide infrastructure Enable bus services Provide infrastructure	BOPRC
2.2	Work towards a f Transit – Oriented Development (TOD) along the western corridor MRCagney long-list Code: L1.	Prioritise peds and cyclists over vehicular access routes (to accommodate improved Public Transport Accessibility)	Implement design measures to support walking and cycling, as identified through the business case development Apply new IDC to the design of the new development, including the Spine road (in the medium term) through Tauriko West. The new IDC recommends lower design speeds, which helps to prioritise walking and cycling (low traffic neighbourhood). Through the design, designated pedestrian, and cycle network to be at the heart of the development, through direct routes and high permeability levels (ped shortcuts at potential cul-de-sacs etc). This will be part of the Structure Plan Development.	Provide infrastructure Require through guidance and Require through Structure Plan Require through guidance, and require through Structure Plan	Developer
2.3		Enable self-containment by locating retail and essential service activities (Medical for example) within local neighbourhood or at key interchange points	Land use framework planning and structure planning to enable neighbourhood centre (local convenience), small medical centre (i.e. 1 GP Practice) and education uses within the Tauriko West area. Partners continue discussions with the District Health Board on new small medical centre (i.e. 1 GP Practice) in Tauriko West, there are suitable sites within the Draft Structure Plan. Partners continue to have discussions with MoE on new school(s) in Tauriko West. Partners commit to investigate levels/incentives for new local businesses to already be in place before first residents move in (changing behaviour later is difficult).	Enable through zoning Encourage and Investigate with BOPRC Enable through zoning and Structure Plan Encourage and Investigate	

ID and Reference	Package Elements	Measure	How to consider in the Enabling Works Package	TCC's role for implementation	Other Roles
2.4		Enable provision of childcare centres/schools within local catchment	Partners commit to investigate levels/ (financial) incentives for new childcare centres to be already in place before residents in move (changing behaviour later or requiring children to go to a different childcare centre is very difficult). Existing Tauriko Primary School will continue to operate, until relocated and increased in size, thereby providing a local / Tauriko West schooling choice. Discussions with MoE are ongoing about a new high school as well. Walking and cycling infrastructure to local schools/childcare centres from the outset of development. Work with Tauriko Playcentre and MOE to consider opportunities for playcentre's relocation.	Encourage and Investigate Enable a new school in structure plan. Encourage and Investigate with MoE Enable a or new Playcentre in structure plan. Encourage and Investigate with the Playcentre	MoE
2.5		Consolidate and encourage more efficient use of parking supply around local neighbourhood centre	TCC will introduce residential zones for Tauriko West that will enable the delivery of density (25HUEs/ha nett average over TW), over time with a view to delivery on the outcomes for density in UFTI. Through the NPS-Urban Development, Councils no longer require minimum parking standards, which means that developer can choose to provide parking at their needs. This is likely to avoid over-supply of parking. TCC's adopted Parking Strategy recommends a Parking Management Plan (PMP) for areas where parking demand is higher than supply. In line with the Street Design Guide, any on-street parking spaces are intended for visitors, and will have a time limit At new neighbourhood centre (local convenience) TCC to investigate to what extent parking could be developed in the public realm instead of every local shop developing its own on-site in order to maximise best-use of spaces, this also allows Council to introduce a Parking Management Plan, outlining the use of parking management tools such as time limits and pricing, and undertake council-controlled parking enforcement.	Provide the relevant Plan Change Providing a PMP Investigate with Developers, and by Providing a PMP (for public parking spaces)	
		Encourage high housing density	TCC has agreed that the Tauriko West development should have higher housing densities, i.e. 25HUEs/nett average across Tauriko West (in cooperation with Kainga Ora)	Enabling density through the Plan Changes	
2.6	Adopt Complete Street Design Principles MRCagney long-list Code: L2	Key Ped and cycle routes	Implement design measures to support walking and cycling, as identified through the business case development Apply IDC design standards and Waka Kotahi's Cycling Network & Pedestrian Network Guidance through the structure planning and resource consenting processes. It is important that the key routes are in place before/once people move in, as a 'move' is a moment where people reconsider their travel options and where habits are formed. TCC to continue working on the Tauranga Cycle Plan, to further improve and connect wider cycle network.	Provide Infrastructure Require through guidance and structure plan Provide implementation of the Cycle Plan	Developer
2.7		Provision of neighbourhood reserves, and wider reserves network	TCC has a policy for required Level of Service for Neighbourhood Reserves (Active Reserve, Riverside Reserve, Non-developable land, and Neighbourhood Reserves). This aligns with this TDM measures, as high-quality public green space can make the prospect of living in higher density housing more palatable. Also green spaces and streets can encourage walking. This will also support the new IDC (street design guide) which includes requirements for trees, planting, and amenity.	Require through guidance and structure plan	Developer
2.9		Smaller lanes/walkways to improve ped connectivity between neighbourhoods	Apply IDC design standards (street design guide) through the structure planning and resource consenting processes to promote direct, convenient accessibility by walking and cycling.	Require through guidance and structure plan	Developer

ID and Reference	Package Elements	Measure	How to consider in the Enabling Works Package	TCC's role for implementation	Other Roles
			Street Design Guide requires pedestrian shortcuts through the residential areas and connecting to reserves to improve connectivity.	Require through guidance and structure plan	
2.10		Land either side of central boulevard purposed for cycle lanes, shared pathways and associated tree planting and lighting to ensure high amenity for peds and cyclist to encourage active urban realm	Apply the new IDC design standards, which includes the need for trees, amenities, footpaths and cycle paths through the structure planning and resource consenting processes.	Require through guidance and structure plan	Developer
2.11	Consider Establishment of a Transport Management Association (L3)	Community outreach and education	A TMA is more suitable to a business estate / commercial centre rather than a residential area. It is also more suitable for a citywide approach through a consortium of organisations. It is likely that such measures will be developed through the regional travel demand management programme, led by BOPRC. As such, it is not included here.	n/a	
2.12		Parking Brokerage Services	A Parking Brokerage Service is more suitable for a business estate / commercial area aligned with a TMA. As such, not included in the recommended programme for Tauriko West Enabling Works which has a focus on residential.	n/a	
2.13		Transport Planning Services	A Transport Planning Service is more suitable for a business estate / commercial area aligned with a TMA. As such, not included in the recommended programme.	n/a	
2.14		Allocation of Parking Revenues	This measure is more suitable for a business estate /commercial area aligned with a TMA. As such, not included in the recommended programme.	n/a	
Chapter 3 MRCagney					
3.1	Cycling Initiatives (M1)	Install Counters at strategic sites	This measure package (M1) is not part of the MRCagney shortlist, however, the costs of installing a counter are very low, but provides the data to measure the effects of the TDM package. In addition, it provides cyclists a sense of belonging to a larger sustainable transport initiative and could also be used for wayfinding (refer to the wayfinding elements). A counter should be installed at key locations, such as on the cycle route to the Tauriko School and the cycle route towards Whiore Avenue	Provide directly	
3.2		Incorporate Parklets including cycle parking at Tauriko Village local centre	Similar to 2.7, Green space helps to promote walking and cycling. Amenity, trees, seating (parklets), street furniture and cycle parking are now part of the new IDC, and as such required.	Require through guidance	Developer
3.3		Install free bike repair stands in neighbourhood	Bike repair stands to be installed as in Tauriko West on key locations. TCC has contracts in place (through the Cycle Plan). Costs are expected to be minimal.	Provide directly	
3.4		Provide secure bike parking/storage	To be included in Plan Changes / New City Plan Parking Requirements for residential, education and commercial development will include a requirement for safe and secure cycle parking. Also, the new IDC requires on-street cycle parking spaces at key locations, including Bus Stops.	Require through guidance and City Plan (change change)	
3.5	E-Bike Initiatives (M2)	Facilitate e-bike (or e-scooters) take up by reducing the initial costs and promoting e-bikes.	This measure was not included in the shortlist by MRCagney due to relatively high costs compared to benefits. It is noted that e-Bikes do have the potential of significantly improve the range for cyclists, in particular in a hilly area such as Tauriko West including the route along Whiore Avenue Providing subsidies, introduce hire-schemes etc, are more suitable for a regional TDM programme.	n/a	

ID and Reference	Package Elements	Measure	How to consider in the Enabling Works Package	TCC's role for implementation	Other Roles
			E-Scooters are already available in Tauranga (Lime Scooters). Further promotion of e-scooters could be undertaken via a regional TDM programme. Refer Section 8 for further details on promotional measures, which could include cooperation with local bike shops who may consider providing a discount for new residents.		
3.6	Pedestrian Initiatives	Introduce "Walk our city" Concept	The 'walk our city' concept was not included in the shortlist in the MRCagney report; however wayfinding and signage are considered essential for new residents, please see 3.8	n/a	
3.7		Develop Walking Tours	Walking tours are not considered a shortlisted option in the MRCagney report. Community-led initiatives could be facilitated though.		
3.8	Wayfinding Initiatives	Adopt Wayfinding design Principles	Wayfinding measures were not included in the recommended shortlist by MRCagney; however wayfinding is considered essential and is common practice in new growth areas. Typical destinations should include local centre, Tauranga Crossing, the Wairoa River Path, and local reserves. Signs can typically be provided on existing lamp posts or (Street) signposts.	Provide directly, and Investigate working directly with Developers	Developer
3.9		Provide traditional wayfinding brochures	Brochure could be included in 'new residents' welcome package (see 8.1)	n/a	
3.10		Provide Trail Signage	This is part of the wayfinding measures, please see 3.8.	n/a	
3.11		Incorporate Digital Wayfinding	No , such initiatives are more City Centre type of activities, and therefore not included.	n/a	
3.12		Incorporate interactive lighting	No , such initiatives are more City Centre type of activities, and therefore not included.	n/a	
3.13		Avail Wayfinding apps and emerging tech	Apps would be recommended through the travel plans and TBC programmes (Travel Behaviour Change), this could include information about the Transit App. It is recommended that as the new suburb develops, that new routes and streets need to be included in apps such as Google Maps.	n/a	
3.14	Support Public Transport Initiatives	Extend PT catchment with folding bikes	All developable land in Tauriko West is located within 400 metres from the Spine Road, and as such no additional PT Catchment measures are considered relevant.	n/a	
3.15		Enhance PT Legibility and branding	This measure is recommended in the MRCagney report. Comms and marketing activity to promote and inform residents that TW will have high frequency bus services Tauranga Crossing and the City Centre. Consistent design for bus shelters across the area, design requirements are already standardised. BOPRC might consider a uniform branding concept through the regional TDM programme.	Require through guidance and design standards Investigate with BOPRC	BoPRC
3.16		Integrate PT with active travel	The new IDC requires high quality bus stops and shelters with adequate accessibility for pedestrians and cyclists, including cycle parking, drinking fountains, and a good amenity. This aligns with Waka Kotahi's Public Transport Design Guidance (PTDG).	Require through guidance and design standards	
3.17		Integrate ride-sharing and private vehicles with PT (M3).	This measure refers to 'access to bus stops', with signage, and information about connection options from that bus stop. Signage and legibility are already considered above.	Require through guidance and design standards	
3.18		Provide Real-Time passenger info (M4)	Realtime information is a recommended measure in the MRCagney report. This is becoming more common at bus stops across Tauranga, but not a standard option for every bus stop. It is recommended to	Provide (or investigate with Developers whether delivery can be provided in one go)	

ID and Reference	Package Elements	Measure	How to consider in the Enabling Works Package	TCC's role for implementation	Other Roles
			introduce digital signage at new bus stops in Tauriko West at every bus stop. Promotion of the Transit App should be undertaken through the TBC initiatives ((Travel Behaviour Change, Chapters 8 and 9 below).		
3.19		Develop Park and Ride/Kiss and Ride (M5)	A Park and Ride is not a shortlisted measure in the MRCagney Report. The project team agrees, as a Park and Ride is not recommended for Tauriko West residents but rather for residents who live in rural areas. Investigations are ongoing as part of the PT Infrastructure and services BC.	n/a	
3.20		Consider Community transport initiatives: Alliances/Partnerships	This measure is not a shortlisted option in the MRCagney report. This is supported, as high-quality public transport services will be available. Also, there are other city-wide community-led initiatives already in place, e.g. St John's Health Shuttle.	n/a	
3.21		Expand public transport options via technology (M6, part 1)	This measure was shortlisted in the MRCagney report; however, development of apps and technology is more suitable for a regional TDM Programme. As such, no specific recommendation for Tauriko West.	n/a	
3.22		Expand public transport options via technology (M6, part 2)	Promotion of the Transit App should be undertaken through the TBC initiatives (below).	Provide directly, as part of the TBE initiatives	BoPRC
3.23	Facilitate take up of Shared Services (chapter 3.5)	Smart Travel NZ	The Transit App would be promoted through the TBC (see below).	n/a	
3.24		Business to Peer vs Peer to Peer Ride Share	Ride-share was not part of the recommended shortlist in the MRCagney report. Initiatives for ride share are more suitable for a regional TDM Programme. It is noted that taxi companies (including those using apps) are already available in the region, and no actions are required.	n/a	
		Car share	Car share was not a recommended shortlisted option in the MRCagney report; however car-share has an important role to reduce high car ownership levels. This measure is also supported by Waka Kotahi. Car share is defined as a 'rental' vehicle that is available for people for generally shorter periods of time. As this would be Tauranga's first Car Share scheme it is expected that one or two vehicles would be provided in Tauriko West. The introduction of a car-share should be considered through the TBC initiatives, see below (with e.g. reduced membership or user fees). This may need to be subsidised through the business case to get a car share company interested to locate a vehicle in Tauriko West. It is noted that such scheme could only be introduced with the support of third-party car share companies, who may or may not be interested to cooperate. TCC has taken a similar approach with the introduction of Lime e-scooters (although no subsidy was provided). With a limited number of nearby residents in the early stages of the development a subsidy to car share operators may be required to compensate for initial losses. TCC will allocate a public car parking space for a car-share vehicle where required, which is aligned to the Parking Strategy.	Provide a subsidy for up to 5 years, and Investigate interest of Car-share companies Provide a PMP to allocate space for car share vehicles	
Chapter 4 MRCagney					
4.1		Review PT Pricing	This it outside the scope of this business case. BOPRC are progressing a project to review PT Pricing city-wide.	n/a	

ID and Reference	Package Elements	Measure	How to consider in the Enabling Works Package	TCC's role for implementation	Other Roles
	Demand Management Measures To address private vehicle dependency		Although city-wide pricing is not considered, Section 8 does recommend including 'Public Transport Taster Tickets'. See Section 8 for more details.		
4.2		Review Parking Pricing	Tauranga City Council have recently adopted a city-wide Parking Strategy. Parking Pricing will be reviewed through PMP's across all centres in Tauranga. Also, the street design guide and toolkit notes that on-street parking is intended for visitors. Time limits measures to manage this will be implemented. TCC Parking Enforcement uses automated LRP (license plate recognition) to improve effective and efficient parking enforcement. The amount of visitor parking spaces (on-street) is not specifically managed, but developers are encouraged to limit the numbers to increase the housing yield. On-street parking spaces will be subject to a PMP and will likely have time limits.	Provide through PMP's	
4.3		Incorporate innovative local delivery options	It is acknowledged that 'centrally located collection points' for package delivery can reduce mileages for delivery vehicles, but such initiatives are led by the private sector. Such collection points are often integrated within local dairies or shops. There are limited examples known in New Zealand, but should the private sector be interested, council should be supportive. Such initiatives are likely to be city-wide, and it is recommended that these are to be integrated in the Regional Travel Demand Programme rather than the Tauriko West EW DBC. Where appropriate, the Parking Management Plans (PMP's) can allocate a parking space dedicated to loading/unloading across Tauriko West.	n/a	
Chapter 5 MRCagney					
5.1	Incentivising Behaviours	Feedback and self-monitoring (motivational posters and campaigns), fostering social networks, establishing Rewards Scheme.	This category includes campaigns such as 'cycle to workday'. Such projects consist of social networks and rewards. This wasn't part of the shortlist in the MRCagney report. This is supported by the project team, and such initiatives are more suitable to a regional TDM programme. Also the introduction of apps seems more a regional TDM development.	n/a	
Chapter 6 MRCagney					
6.1	Expand Travel Options	Workplace travel plan, Incentivise Behaviours, Incorporate Travel "Reduction" Scheme	Workplace Travel Behaviour Programmes are recommended as a shortlisted measure in the MRCagney report. Due to Tauriko West's residential focus, the project team notes this is more suitable for larger businesses (typically over 25 staff). Such businesses are not expected in Tauriko West. Instead, this Workplace Travel Plans are more suitable for the long-term business case which will enable more commercial/industrial growth. In such areas, workplace travel plans are recommended. Technology, such as apps for carpooling and Mobility as a Service (MAAS) are recommended through the regional TDM programme, as well as for the Tauriko Long-term DBC (which includes large employment areas)Section 8 does further explain the Residential Travel Plans (which includes travel to work, the business estate etc).	n/a	
Chapter 7 MRCagney					

ID and Reference	Package Elements	Measure	How to consider in the Enabling Works Package	TCC's role for implementation	Other Roles
7.1	Introduce School TBC	School Travel Plan	Travel behaviour change programmes for schools are recommended in the MRCagney report, and the project team supports this. This includes all measures that are recommended, which aligns with the Waka Kotahi Safe School Travel Plans guide[116]. These are listed in 7.2 to 7.7. School Travel Plans are considered a suitable way to require a package of measures to be implemented. TCC will encourage the MoE to prepare a School Travel Plan for all schools in Tauriko West. This needs be an action in the business case and supported by the Plan Change (City Plan). It is noted that schools are also a focus of the regional TDM programme, and some initiatives could become part of this wider TDM programme.	Provide support to the MoE with the development of the School Travel Plan (staff time, and co-funded through the business case) Encourage MoE to develop School Travel Plan programmes	MoE
7.2		Walking to school	Walking Incentive Schemes will be part of the School Travel Plan, and could include e.g. walk to school events, classroom training.	Part of the School Travel Plan (7.1)	
7.3	Encourage Cycling to School	Cycle programmes	Cycling to School schemes will be part of the School travel Plan. This can also include scootering. It is noted that the Travel Safe Team works with all schools in the region to provide cycle training as well as escorted cycling to school trips. Other initiatives include a 'cycling focus week' at the start of the new school year.	Part of the School Travel Plan (7.1) Provide the Cycle Programme	MoE
7.4		Cycle parking	The School Travel Plan will include actions to provide sufficient cycle parking on the school grounds. Future cycle parking requirements to be included in Plan Changes (City Plan) or the full City Plan update. The street design guide also notes the importance of cycle parking near schools, and some cycle parking (for visitors) should be provided in the public realm or on the school grounds.	Part of the School Travel Plan (7.1) Require through guidance and design standards (Street Design Guide)	MoE
7.5	Encourage School Bus Use	School Travel Plans	These measures will be included in the School Travel Plan. Initiatives include Introducing bus ambassadors, Meet The Bus Driver events, and 'bus buddies'.	Part of the School Travel Plan (7.1)	MoE
7.6		Reduce bus fares for students	In 2019, the BOPRC have introduced free rides for school children, for bus services run by the BOPRC (subsided by BOPRC). This subsidy was extended for one year in 2020. Free, or reduced bus fares for school buses are a recommended TDM measure in the MRCagney report. It is noted that free buses do compete with walking and cycling, in particular for shorter journeys. However, all modes are considered sustainable transport and should be encouraged. It is noted that some schools have privately operated bus services. Most schools have a regional catchment, and as such any reduced fares for school buses should be undertaken at a regional level. The BOPRC are preparing a 'Bus Fare Review' project which will address this too	Encourage and Investigate	BoPRC

[116] https://education.nzta.govt.nz/teacher-resources/school-community-partnerships/school-travel-plans/

ID and Reference	Package Elements	Measure	How to consider in the Enabling Works Package	TCC's role for implementation	Other Roles
			Please note, the cost estimates for the TDM activities include budget to continue this subsidy for school buses in Tauriko West (for 5 years) should the current BOPRC subsidy not be extended in the future.		
7.7		Car Parking Restrictions near schools	This is a recommended measure in the MRCagney report. The school gate and surrounding streets will be designed the new Street Design Guide and Tool. Parking restrictions are recommended near the school gate. It is noted that the Tauriko School will serve both an urban community, but also serves a rural community too (Kaimai Ranges), therefore drop-off need to be catered for to some extent. This aligns with the draft Parking Strategy direction, but it is recommended to have such drop-off points a bit further away from the school gate. Project team to have ongoing discussions with the MoE about the design of the new schools to be consistent with the access hierarchy developed to prioritise active travel and school buses above car drop offs.	Providing a PMP Providing a PMP Provide support to the MoE with the development of the School Travel Plan	MoE
Chapter 8 MRCagney					
8.1	Residential TBC Programme	Residential TBC Programme	A residential TBC is recommended measure in the MRCagney report, given its relative low costs and high effects. The recommended measures are listed below.	Provide the Residential Travel Behaviour Change programme (staff time, and co-funded through the business case)	
		Development website with transport links/timetables walking and cycling maps	It is recommended to include information on the Tauriko for Tomorrow website about future transport modes, and once available, bus timetables and routes, parking situations. This will include links to the Developer's marketing website.	Part of the TBC programme (see 8.1) Provide Tauriko for Tomorrow website Encourage Developers to align marketing initiatives	Developers
		New residents welcome pack (brochures, vouchers)	A welcome pack should be prepared for all future households. This package could include: - loaded BEE card to try bus ('taster tickets' sufficient to make several return trips by bus, assumed 3 return trips per household) - maps and information on bus, cycle, and walking routes + time/cost saving - How to get personalised Travel Planning advise - How to join cycle lessons (TCC Travel Safe Team) - Car-share vehicle locations, and vouchers to try these car-share vehicles.	Part of the TBC programme (see 8.1) (staff time, and co-funded through the business case) Investigate and encourage BOPRC See car-share information in section 3.24 for more details	Developer BoPRC
		Develop Marketing Strategies	A marketing strategy should be prepared. This should make 'make sustainable travel' part of identity of the area. This can be combined with the New Resident Welcome Pack and the Development Websites.	Part of the TBC programme (see 8.1)	Developer
Measures outside MRCagney Scope					
9.1	TDM monitoring	Yearly travel survey with residents and schools, including report with recommendations for improvements.	Include budget to undertake yearly travel surveys. Monitoring should be undertaken at a regional level as well as specific for Tauriko West enable comparison with other suburbs that have no, or less, TDM measures in place.	Provide surveys	

ID and Reference	Package Elements	Measure	How to consider in the Enabling Works Package	TCC's role for implementation	Other Roles
		Cycle and pedestrian counters at strategic locations	This measure has been further described, and is recommended in 3.1	Provide counters	
		Vehicular traffic counters at strategic locations	Counters are essential for monitoring purposes. Tauranga Traffic Operation Centre (TTOC) has numerous counters across the city, and counters are recommended on the key routes in and out of Tauriko West.	Provide counters	

Appendix L : Kaweroa Drive Drawings and Subdivision Plan

NOTIFICATION DECISION IN RESPECT OF

RESOURCE CONSENT APPLICATION – RC27099

Under the Resource Management Act 1991

Tauranga City Council resolves:

That pursuant to Sections 95A and 95B of the Resource Management Act 1991, the application for resource consent made by TBE 3 Limited to undertake a discretionary activity staged subdivision of a piece of land under the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health Regulations 2011 ('NESCS') within Stage 3A of Tauriko Business Estate at 440L Wintrebre Lane, R11 Belk Road, R29 Wintrebre Lane, 30 Wintrebre Lane, 20 Gargan Road, Tauriko, legally described as Lot 1 DP 415597 (RT 460091), Lot 1 DPS 65163 (RT SA52D/294), Lot 1 DPS 74439 (RT SA59D/803), Lot 1 DPS 75391 and Lot 2 DP 462833 (RT 611388), Lot 3 DP 5000010 (RT 759760), Lot 4-6 DP 480187 (RT 670626), Lot 4 DP 62337 (RT SA51A/933), and Lot 30 (created by RC26003), be processed without notification.

Reasons for Decision:

The proposal is to subdivide 77.03 hectares of Industrial, Rural and Greenbelt Zoned land located within Stage 3A of the Tauriko Business Estate and is set out in detail in Section 5.0 of the application assessment of environmental effects ('AEE') prepared by Harrison Grierson Consultants Limited, HG Document No. r001v1-TGA-145476-01-rca-jem, dated May 2019. In addition, the addendum to the AEE prepared by Harrison Grierson Consultants Limited (dated 15/11/019), sets out all changes to the original proposal since it was lodged.

The proposal includes the establishment of 36 industrial allotments, nine roads to vest in Council, three drainage reserves to vest in Council, and several balance lots for future industrial development in general accordance with the Urban Grown Area Structure Plan for Tauriko Business Estate, version SP 14 V9, dated 28/05/2019. The subdivision will be undertaken in five stages. A preliminary boundary adjustment, known as Stage 3A0, will initially create three future development blocks for industrial subdivision (Lots 1, 2 and 3), as well as Lot 501 that is currently proposed to be used by one large manufacturing company. The remaining stages, 3A1 to 3A4, will further subdivide Lots 1, 2 and 3 into industrial allotments and establish the roads and drainage reserves to vest in Council.

The reasons for consent are set out in full in section 4 of the Council Planner's Report (Council reference: *4 – RC27051 – Planners Report – TBE Stage 3A Subdivision*) and are summarised below:

1. A boundary adjustment subdivision pursuant to Rule 12A.5 of the City Plan;
2. A subdivision pursuant to Rule 12D.5 of the City Plan. In this regard, the proposal results in lots that are smaller than the minimum requirement of 2 hectares;

3. A subdivision in the Tauriko Industrial Zone as a Restricted Discretionary Activity pursuant to Rule 12E.4(b) of the City Plan. In this regard, the proposal results in the following reasons for which consent is necessary pursuant to Rule 12E.3.1.10(a – m):

    a. The proposed subdivision deviates from Diagram 10, Section 5 (Part B, Plan Maps) (Tauriko Business Estate Outline Development Plan) of the City Plan with different road alignments and locations, no upgrade of Belk Road and State Highway 29, no connection of Taurikura Drive to Gargan Road, no connection of Belk Road and Taurikura Drive, and no landmark entry treatment area. Additionally, landscape planting will be established, but it is not in accordance with Appendices 18D or 18H of the City Plan, as required by Rule 12E.3.1.10(a);

    b. A landscape plan has been provided, but the landscaping is not in accordance with Appendices 18D or 18H and does not show all of the features listed, as required by Rule 12E.3.1.10(b);

    c. Pond C (the proposed drainage reserve on Lot 50) will be constructed in stages prior to a section 224(c) certificate is issued for each proposed stage within Stage 3A, rather than in its entirety, as required by Rule 12E.3.1.10(e);

    d. The proposal does not include the 10-metre planted buffer strip, as required by Rule 12E.3.1.10(l);

    e. The applicant identifies that there are no convenience centres proposed, as required by Rule 12E.3.1.10(m);

4. A subdivision in the Tauriko Industrial Zone that does not comply with the Sequencing Schedule Table in Appendix 18F.7 of the City Plan is a Discretionary Activity pursuant to Rule 12E.5(a) of the City Plan. In this regard, the proposal results in the following reasons for which consent is necessary:

    a. Not finalising the design and alignment of the connection of Taurikura Drive to Gargan Road for Stage 3A;

    b. Not upgrading the intersection of Belk Road and State Highway 29, or providing an agreed alternative to a standard approved by statutory road authorities;

    c. Not providing the 10m planted buffer adjacent to Belk Road; and

    d. Stormwater Pond C will be established in stages rather than constructed in its entirety.

5. A Detailed Site Investigation ('DSI') prepared by the applicant has identified that the subdivision is occurring on a piece of land as specified within Regulations 5(7) and 5(8) of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health Regulations 2011 ('NESCS'). Therefore, the activity is a Controlled Activity pursuant to Regulation 9(3) of the NESCS. The matters of control are reserved to the adequacy of the DSI, as set out under regulation 9(4) of the NESCS.

Overall, when applying the bundling principle, the application is for a Discretionary Activity under the City Plan and is subject to the matters set out under section 87A(4) of the Resource Management Act 1991. As well as a Controlled Activity pursuant to Regulation 9(3) of the NESCS.

Section 5 of the Council Planner's Report (Council reference: *4 – RC27051 – Planners Report – TBE Stage 3A Subdivision*) provides a full assessment on the requirement of notification of the application, with a summary below.

In relation to section 95A of the Resource Management Act 1991 it has been determined (in accordance with Steps 1 – 4) that public notification is not mandatory, and that public notification is precluded as the proposal is a Discretionary Activity subdivision. Consequently, consideration is not required of Step 3 under section 95A(7) of the Resource Management Act 1991. Furthermore, there are no special circumstances which exist in relation to the application. For these reasons public notification of the application is not required.

In relation to section 95B of the Resource Management Act 1991 it has been determined (in accordance with Steps 1 – 4) that limited notification is not mandatory and limited notification is not precluded. In determining determine whether a person is an affected person in accordance with section 95E, pursuant to Step 3 and section 95B(8) of the Resource Management Act 1991, it is my opinion that the effects on persons are limited to changes to topography and landform, landscaping, non-compliance with the minimum allotment size, and the development occurring out of sequence with the sequencing schedule and prerequisites of the City Plan. The effects associated with servicing and infrastructure, cultural and historic heritage, connectivity and transportation, and contaminated land, were not considered relevant to the determination of potentially affected persons and these matters were assessed as part of the substantive decision under section 104 of the Resource Management Act 1991. Overall, the effects of the subdivision on persons are less than minor and therefore, there are no affected persons. There are also no special circumstances which exist in relation to the application. For these reasons limited notification of the application is not required.

Recommended and Assessed by:

Cole Burmester

Development Planner

Delegated Authorisation by:

Stacey Hikairo

Development Planner

Date: 10 December 2019

DECISION ON RESOURCE CONSENT APPLICATION – RC27099

Under the Resource Management Act 1991

Tauranga City Council resolves:

That pursuant to Sections 104 and 104B of the Resource Management Act 1991, the application for resource consent made by TBE 3 Limited to undertake a discretionary activity staged subdivision of a piece of land under the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health Regulations 2011 ('NESCS') within Stage 3A of Tauriko Business Estate at 440L Wintrebre Lane, R11 Belk Road, R29 Wintrebre Lane, 30 Wintrebre Lane, 20 Gargan Road, Tauriko, legally described as Lot 1 DP 415597 (RT 460091), Lot 1 DPS 65163 (RT SA52D/294), Lot 1 DPS 74439 (RT SA59D/803), Lot 1 DPS 75391 and Lot 2 DP 462833 (RT 611388), Lot 3 DP 5000010 (RT 759760), Lot 4-6 DP 480187 (RT 670626), Lot 4 DP 62337 (RT SA51A/933), and Lot 30 (created by RC26003), is granted.

Reasons for Decision:

The proposal is to subdivide 77.03 hectares of Industrial, Rural and Greenbelt Zoned land located within Stage 3A of the Tauriko Business Estate. The proposal is set out in detail in Section 5.0 of the application assessment of environmental effects ('AEE') prepared by Harrison Grierson Consultants Limited, HG Document No. r001v1-TGA-145476-01-rca-jem, and dated May 2019. In addition, the addendum to the AEE prepared by Harrison Grierson Consultants Limited (dated 15/11/019), sets out all changes to the proposal since it was lodged.

The proposal includes the establishment of 36 industrial allotments, five larger balance lots for future industrial development, and nine roads and three drainage reserves to vest in Council in general accordance with the Urban Grown Area Structure Plan for Tauriko Business Estate, version SP 14 V9, dated 28/05/2019. The subdivision will be undertaken in five stages. A preliminary boundary adjustment, known as Stage 3A0, will initially create three future development blocks for industrial subdivision (Lots 1, 2 and 3), as well as Lot 501 that is currently proposed occupied by single activity. The remaining stages, 3A1 to 3A4, will subdivide the development blocks (Lots 1, 2 and 3) into industrial allotments and establish the roads and drainage reserves to vest in Council.

The reasons for consent are set out in full in section 4 of the Council Planner's Report (Council reference: *4 – RC27051 – Planners Report – TBE Stage 3A Subdivision*) and are summarised below:

1. A boundary adjustment subdivision pursuant to Rule 12A.5 of the City Plan;
2. A subdivision pursuant to Rule 12D.5 of the City Plan. In this regard, the proposal results in lots that are smaller than the minimum requirement of 2 hectares;
3. A subdivision in the Tauriko Industrial Zone as a Restricted Discretionary Activity pursuant to Rule 12E.4(b) of the City Plan. In this regard, the proposal results in the following reasons for which consent is necessary pursuant to Rule 12E.3.1.10(a – m):

a. The proposed subdivision deviates from Diagram 10, Section 5 (Part B, Plan Maps) (Tauriko Business Estate Outline Development Plan) of the City Plan with different road alignments and locations, no upgrade of Belk Road and State Highway 29, no connection of Taurikura Drive to Gargan Road, no connection of Belk Road and Taurikura Drive, and no landmark entry treatment area. Additionally, landscape planting will be established, but it is not in accordance with Appendices 18D or 18H of the City Plan, as required by Rule 12E.3.1.10(a);

b. A landscape plan has been provided, but the landscaping is not in accordance with Appendices 18D or 18H and does not show all of the features listed, as required by Rule 12E.3.1.10(b);

c. Pond C (the proposed drainage reserve on Lot 50) will be constructed in stages prior to a section 224(c) certificate is issued for each proposed stage within Stage 3A, rather than in its entirety, as required by Rule 12E.3.1.10(e);

d. The proposal does not include the 10-metre planted buffer strip, as required by Rule 12E.3.1.10(l);

e. The applicant identifies that there are no convenience centres proposed, as required by Rule 12E.3.1.10(m);

4. A subdivision in the Tauriko Industrial Zone that does not comply with the Sequencing Schedule Table in Appendix 18F.7 of the City Plan is a Discretionary Activity pursuant to Rule 12E.5(a) of the City Plan. In this regard, the proposal results in the following reasons for which consent is necessary:

   a. Not finalising the design and alignment of the connection of Taurikura Drive to Gargan Road for Stage 3A;

   b. Not upgrading the intersection of Belk Road and State Highway 29, or providing an agreed alternative to a standard approved by statutory road authorities;

   c. Not providing the 10m planted buffer adjacent to Belk Road; and

   d. Stormwater Pond C will be established in stages rather than constructed in its entirety.

5. A Detailed Site Investigation ('DSI') prepared by the applicant has identified that the subdivision is occurring on a piece of land as specified within Regulations 5(7) and 5(8) of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health Regulations 2011 ('NESCS'). Therefore, the activity is a Controlled Activity pursuant to Regulation 9(3) of the NESCS. The matters of control are reserved to the adequacy of the DSI, as set out under regulation 9(4) of the NESCS.

Overall, when applying the bundling principle, the application is for a Discretionary Activity under the City Plan and is subject to the matters set out under section 87A(4) of the Resource Management Act 1991. As well as a Controlled Activity pursuant to Regulation 9(3) of the NESCS.

The application has been considered against the relevant matters under section 104 and 104B of the Resource Management Act 1991. As a Discretionary Activity the Council's

consideration of the application is unrestricted, with particular regard being given to the objectives and policies of the City Plan and the matters of control reserved in the NESCS.

An assessment of environmental effects is provided in the Council Planner's Report (Council reference: *4 – RC27051 – Planners Report – TBE Stage 3A Subdivision*). It has been determined that allowing this activity, subject to the conditions set out below, will avoid any unacceptable actual and potential effects on the environment. A summary of this assessment is provided below.

It is concluded that undertaking the subdivision out of sequence with the prerequisites specified in Appendix 18F.7 of the City Plan will not result in unacceptable effects on the transport network. While there will be no completed connection of Taurikura Drive to Gargan Road at this point in time, it was confirmed by Council's Manager of City & Infrastructure Planning that the proposed spine road alignment to the boundary of the applicant's property (but not to Gargan Road) was acceptable as there is an alternative access available to Stage 3A from Kaweroa Drive (from Stage 3C). This included confirmation that any future road connections from this subdivision is being managed through a process outside the Resource Management Act 1991 between Council and the applicant. Furthermore, the New Zealand Transport Agency has provided their written approval to the proposal, including confirmation that they accept that no connection between the Tauriko Business Estate (from Stage 3A) and State Highway 29 is being provided at this time. The applicant also confirmed that prior to any application for certification pursuant to section 224 of the Resource Management Act 1991 on any Lot in Stage 3A, the part of Wintrebre Lane within Stage 3A of the Tauriko Business Estate will be legally stopped. A requirement for this to be confirmed prior to any application for certification pursuant to section 224 of the Resource Management Act 1991 is included as a condition of consent at the applicant's request and in accordance with section 108AA of the Resource Management Act 1991.

In terms of not meeting all the landscaping requirements of the City Plan, it was determined that any potential and actual effects will be managed through consent notices on all relevant lots that will identify the following features:

- Boundary between the Tauriko Industry Zone with the Rural Zone
- Boundary between the Tauriko Industry Zone with the Greenbelt Zone;
- Escarpment areas;
- Landmark Entry Treatment Area;
- Convenience centre;
- Special Height Control Area;
- Visual mitigation buffer;
- Visual extension of green connector; and
- Zone interface 10 metre buffer strip and 80 metre separation strip adjacent to Belk Road.

This will ensure that no industrial land use may occur on areas where it is not permitted, or until the required landscaping is provided, or a land use consent is obtained that permits the use of the lots for industrial activities.

In terms of servicing, the Council Development Engineer and Council Asset Managers have reviewed the proposal. It was confirmed that the location, design and capacity of infrastructure that is to be vested in Council is acceptable, subject to the Development Works Approval process. This is to be managed through the conditions of consent. This includes confirmation within the applicant's Geotechnical Investigation Report that confirms this infrastructure can be established across the site. Furthermore, it was agreed that establishing Stormwater Pond C in stages, as the subdivision stages progress, rather than constructing the entire drainage reserve in its entirety is acceptable.

Regarding the effects from the subdivision occurring on contaminated land, it was confirmed that the information within the DSI was acceptable. As such, provided the subdivision occurs in accordance with the recommendations in the DSI, the effects were acceptable.

The activity is considered to be consistent with the provisions of the NESCS. Furthermore, it has been determined that the proposal is generally consistent with the relevant provisions of the Tauranga City Plan. In particular, this includes a level of infrastructure and services that will facilitate land use activities in a manner that is consistent with the purpose of the Tauriko Industrial Zone, will not affect the existing and anticipated landscape character, or will not unacceptably affect the transport network.

It is considered that the proposal is reasonably consistent with the relevant objectives and policies of the Bay of Plenty Regional Policy Statement as the subdivision will provide for the sustainable management of natural and physical resources by enabling the development of the industrial zoned land.

As the Part 2 matters in relation to this proposal have been properly covered in the City Plan, it is not necessary to revert back to consider Part 2 of the Resource Management Act 1991. Conditions as appropriate under section 108AA of the Resource Management Act 1991 shall ensure the activity proceeds as per the application documentation and does not exceed the scale proposed.

In consideration of section 106 of the Resource Management Act 1991 matters, the development will be undertaken with sufficient legal access and Council's Development Engineer has raised no geotechnical or drainage concerns with the site or development, provided the works are undertaken in accordance with the recommendations of the Geotechnical Investigation Report and any subsequent Geotechnical Completion Report. Therefore, it is my opinion that the development proposed is not likely to be subject to material damage with any subsequent use not likely to accelerate, worsen or result in material damage to the land or neighbouring properties through erosion, subsidence, slippage and inundation.

Overall, it is considered appropriate to grant to resource consent pursuant to section 104B of the Resource Management Act 1991, with the following conditions of consent.

The granting of this resource consent is subject to the following conditions pursuant to Section 220 of the Resource Management Act 1991:

General Conditions

1. *The proposal shall proceed in accordance with the application submitted including:*

- *Assessment of Environmental Effects prepared by Harrison Grierson entitled 'Resource Consent Application', HG Document No. r001v1-TGA-145476-01-rca-jem, dated May 2019;*
- *TBE Stage 3A Subdivision Addendum prepared by Harrison Grierson, HG Project No. 1520-145476-01, dated 15/11/2019;*
- *The letter prepared by Beca Limited to Tauriko Business Estate 2 Ltd entitled 'Tauriko Business Estate Review of Belk Road Connection Staging Requirements', dated 10 April 2019;*
- *The report prepared by Focus Environmental Services Limited entitled 'Detailed Site Investigation & Site Management Plan, Stage 3A & 3B (Part), Tauriko Business Development, Tauriko, Tauranga', referenced FES 1050.001 October 2018 (R3), dated October 2018;*
- *The report prepared by CFG Heritage Limited entitled 'Tauriko Business Estate Stage 3 extension: archaeological assessment', reference 18-0844, dated 23 May 2018;*
- *The report prepared by CMW Geosciences entitled 'Stage 3A, Tauriko Business Estate, Geotechnical Investigation Report, TBE 2 Ltd', referenced TGA2016_0010DX Rev 0, dated 2 May 2019.*
- *The report prepared by CMW Geosciences entitled 'Geotechnical Design Review: Gargan Service Road, Stage 3A Tauriko Business Estate', Document Ref: TGA2019-0010EY Rev 0, and dated 14 November 2019.*
- *The report prepared by Harrison Grierson entitled 'Infrastructure Assessment Report', HG Document No. R003v2-145476-tbe200-iar, dated 3 May 2019.*
- *Plans prepared by Harrison Grierson for TBE 3 Limited, as follows:*
    - *'Stage 3A – Proposed Development Block Scheme Plan', Drawing No. 145476-RC100, Rev. 3, dated 28.11.19;*
    - *'Stage 3A – Proposed Subdivision Overall Layout Plan', Drawing No. 145476-RC101, Rev. 11, dated 15.11.19;*
    - *'Stage 3A – Proposed Subdivision Proposed Contour Plan', Drawing No. 145476-RC211, Rev. 6, dated 15.11.19;*
    - *'Stage 3A – Road Layout Plan', Drawing No. 145476-RC301, Rev. 7, dated 15.11.19;*
    - *'Stage 3A – Future Road Layout Plan', Drawing No. 145476-RC302, Rev. 1, dated 03.07.19;*
    - *'Stage 3A – Future Road Layout Plan Road and Bike Lane / Footpath Layout Plan', Drawing No. 145476-RC303, Rev. 1, dated 24.06.19;*
    - *'Stage 3A – Road Cross Sections Sheet 1', Drawing No. 145476-RC331, Rev. 7, dated 23.08.19;*

- *'Stage 3A – Road Cross Sections Sheet 2', Drawing No. 145476-RC332, Rev. 6, dated 07.08.19;*
- *'Stage 3A – Road Cross Sections Sheet 3', Drawing No. 145476-RC333, Rev. 3, dated 07.08.19;*
- *'Stage 3A – Road Cross Sections Sheet 3', Drawing No. 145476-RC334, Rev. 3, dated 07.08.19;*
- *'Stage 3A – Road Cross Sections Sheet 3', Drawing No. 145476-RC335, Rev. 5, dated 23.08.19;*
- *'Stage 3A – Wastewater Pump Station Layout Plan', Drawing No. 145586-RC450, Rev. 1, dated 15.08.19;*
- *'Stage 3A – Gargan Services Corridor Typical Cross Section', Drawing No. 145476-GA570, Rev. 3, dated 15.11.19;*

- *Plan prepared by CMW Geosciences Limited titled 'Stage 3A – Tauriko Business Estate: Gargan Service Road Corridor', Drawing No. 206, Rev. 0, dated 14/11/19.*

Subject to any changes required through compliance with the following conditions.

2. *All matters and works relating to the servicing and accessing of the subdivision, shall be designed, supervised, constructed and certified in accordance with requirements of the Council's Infrastructure Development Code.*
3. *Prior to any application for certification pursuant to section 224 of the Resource Management Act 1991 for any lot within Stage 3A, as shown as shown on drawing 145476-RC101 Rev 11, the consent holder shall confirm that land has been vested as public road to connect Stage 3A to the Tauriko Business Estate via Taurikura Drive or Kaweroa Road.*
4. *Any staging of subdivision consent, by way of sections 223 / 224 certificates issued on separate survey for this subdivision, is appropriate subject to that staging complying with all relevant conditions as listed for that stage within this subdivision consent.*
5. *Lot 501 substage created by way of Stage 3A0 as shown on plan entitled 'Proposed Development Block Scheme Plan' 145476-RC100 rev 3 may be created in its own separate sub-stage.*
6. *Prior to any works commencing on the site (exclusive of site clearance or bulk earthworks associated with any Bay of Plenty Regional Council earthworks consent) the consent holder shall submit to the Council, plans of the proposed activity; and, obtain Development Works Approval. The information to be submitted shall include, but not be limited to, the following:*

   a. *The information and plans required by the Infrastructure Development Code;*
   b. *All flood risk areas;*
   c. *All potential slope run out areas and mitigation measures;*

d. *Details of the construction of the road to vest and the proposed traffic management measures;*

e. *Details of the design, construction and maintenance schedule of any temporary turning head required until a permanent solution is required;*

f. *Details of the design and construction of any permanent turning head;*

g. *Details of alternative surfacing options, additional signage or other appropriate treatment devices to mitigate approach speeds to the roundabout(s) on Lot 103 (Road 1N - Taurikura Road);*

h. *Details of the sewer and stormwater extension that is required to service the upstream catchment;*

i. *Details of the design and construction of the water reticulation network that is required to service Stage 3A. Any design elements that depart from the requirements of the IDC would need to include an adequate safety in design report;*

j. *Confirmation of the location of the water and wastewater connections to Gargan Road.*

k. *Details of proposed sanitary sewer pump station and rising main including a summary report clearly identifying the serviced area, flow rates and how the proposal services the entire development stage;*

l. *Details of design and construction of any stormwater wetland area / detention pond(s);*

m. *Details of any culvert upgrade required under proposed roads to vest;*

n. *Details of Fire Fighting system;*

o. *Details of any reserve to vest, including vegetation and planting where necessary;*

p. *Details of any overland flowpaths;*

q. *Details of the works to establish a suitable building platform on each proposed lot;*

r. *Locations of easements in gross required for vested infrastructure within private property.*

Prior to any application for certification pursuant to section 224 of the Resource Management Act 1991 on any Lot in Stage 3A, the works approved by the Development Works Approval pursuant to condition 6 of this resource consent, shall be fully completed and operational to service that stage.

Lot Servicing

7. *All industrial lots shall be provided with a separate underground connection to the sanitary sewer and stormwater, reticulation systems in accordance with the Council's Infrastructure Development Code.*

8. *All lots shall have adequate ability to connect to a telecommunications and electricity network.*

9. *The Consent Holder shall provide confirmation from a telecommunications and electricity provider that all lots have adequate ability to connect.*

10. *All road ends where a future road connection may be made, being Lots 102, 107 and 108, shall provide sufficient space to enable turning in accordance with Tauranga City Plan Appendix 4F: 90 Percentile Tracking Curve for a 19 metre Truck.*

11. *The consent holder shall supply to the Council a set of 'as built' plans of all engineering works in accordance with the Council's Infrastructure Development Code.*

12. *The location of any subsoil drains shall be shown on the as-built drawings submitted to the Council and within the "Geotechnical Completion Report" required by Condition 15.*

Earthworks

13. *All earthworks design, testing and construction shall be undertaken in accordance with the Infrastructure Development Code and the specific requirements of the consent holders appointed Geo-Professional.*

14. *Where earthworks and/or pre-load operations occur over the Council's infrastructure the consent holder shall undertake a Closed-Circuit TV (CCTV) survey of the mains prior to; and upon completion of the earthworks and/or pre-load operations. Monitoring of the Council's underground services shall continue via CCTV survey at monthly intervals during the earthworks and pre-load phases of the project as an ongoing check of the condition of the mains and to ensure their serviceability. The results of these surveys shall be forwarded to Council within five working days of the footage being taken. In the event that damage is sustained to the mains during the earthworks and/or pre-load operations the Consent Holder shall stop work in the area, and contact Council to arrange repair at the consent holder's expense. Any fee for repairs or losses arising as a result of the damage shall be paid in full to Council prior to certification pursuant to Section 224 of the Resource Management Act 1991.*

15. *The Consent Holder shall provide to the Council a "Geotechnical Completion Report" complied by a Category 1 Geo-Professional. The report shall include, but not be limited to:*

    a. *Compliance with the Council's Infrastructure Development Code QA5 requirements;*

    b. *Display the position of all designated building platforms and building restriction lines, where applicable;*

    c. *Provide recommendations for the disposal of wastewater and stormwater, if applicable;*

    d. *Provide requirements for the ongoing maintenance of any cut, fill and terraced slopes, and how the stormwater from these slopes shall be managed;*

    e. *Provide recommendations for the ongoing development of the lots (i.e. maximum cut/fill heights, management of steep slopes, etc.);*

    f. *Provide details of any landslip inundation protection and how they are to be maintained;*

g. *Provide requirements for landslip protection for future structures;*

h. *Confirm earthworks and/or building platforms have been constructed to comply with the New Zealand Building Code requirements;*

i. *Provide an analysis of the liquefaction risk and determine any specific foundation requirements to mitigate the effects;*

j. *Certify that any residual settlement or differential settlement that may still occur shall not exceed the manufacturer's recommendations with respect to the installed underground pipe networks to be vested in Council or exceed accepted design techniques with respect to road settlement or long-term deflection, or exceed the settlement limitations as detailed in the New Zealand Building Code;*

k. *Comment on removal or amendment of existing land feature/s displayed on Council's Geospatial Information System;*

l. *Provide recommendations for maximum cut heights before further geotechnical investigations are required for the purposes of building foundations design;*

m. *Certify that any engineering structures constructed to support the landform have been completed.*

16. *Pursuant to Section 221 of the Resource Management Act 1991, the Council may, upon receipt of the "Geotechnical Completion Report" under condition 15 of this consent, require a Consent Notice to be registered on the Certificate of Title of any allotments to which the recommendations of the "Geotechnical Completion Report" relate to. That:*

    a. *All development within this Lot including, but not limited to, the design and construction of any building or structure requiring a Building Consent in accordance with the Building Act 2004, shall be undertaken in accordance with the requirements and recommendations in the Geotechnical Completion Report.*

17. *All building line restrictions or designated building platforms shall be clearly identified and dimensioned on the survey plan prior to certification pursuant to Section 223 of the Resource Management Act 1991.*

Easements

18. *All easements required for underground services and rights of way serving lots within the subdivision shall be duly granted or reserved.*

19. *All infrastructure and services to be vested to Council and located within private property shall be protected by an appropriately sized easement in gross in favour of Council.*

20. *The consent holder shall register an easement in gross in favour of the Council over any stormwater overland flowpath located on private property, including those resulting from overload of the roading primary stormwater system.*

21. *Any overland flowpath easement required by condition 20 shall be shown on the survey plan prior to certification, pursuant to Section 223 of the Resource Management Act*

1991, as the "Right to Drain Stormwater", and shall be registered on the survey plan under a "Memorandum of Easements in Gross".

22. *The consent holder shall register an easement in gross in favour of the Council over any Temporary Road Turning Head, in accordance with condition 10, that is required to be located on private property.*

23. *The consent holder shall vest in the Council:*

    a. *Lots 101 to 109 shown on the overall scheme plan as Road;*

    b. *Lot 50 shown on the overall scheme plan as Local Purpose Reserve (Stormwater);*

    c. *Lot 51 as Drainage Reserve;*

    d. *Lot 52 as Local Purpose Reserve (Wastewater).*

    The lot(s) to vest shall be shown on the survey plan prior to certification pursuant to Section 223 of the Resource Management Act 1991.

24. *Pursuant to Section 221 of the Resource Management Act 1991, a consent notice shall be registered on the Certificate of Title of any property that shares a common boundary with any of the following Drainage Reserves:*

    a. *Accessway;*

    b. *Recreation;*

    c. *Sewage;*

    d. *Stormwater.*

    The consent notice shall advise the owners and subsequent owners thereof, of the following requirement to be complied with on a continuing basis, as follows:

    a. *"The owners are required to meet the full cost of any fencing along the common boundary between the lot and adjoining land that are intended to be vested in Tauranga City Council as local purpose reserve."*

    Upon application for the Section 223 certificate for the subdivision the consent holder shall confirm in writing to Council, which property boundaries require a fencing consent notice to be registered on its title.

25. *Prior to establishment of any landscape planting, the consent holder shall provide the following for certification:*

    a. *A final landscape planting plan to include plant and tree numbers, plant and tree species, grade of plant and tree at time of planting;*

    b. *Shrubs and groundcovers are to be a minimum grade of Planter Bag 2 (PB2) at the time of planting;*

    c. *A plan detailing methodology and timing of maintenance, which is to include weed control, mulching, replacement planting for dead/dying/diseased trees and plants, watering, removal of dust or dirt arising from construction works from trees and plants to ensure they remain healthy.*

26. *Prior to any application for certification pursuant to section 224 of the Resource Management Act 1991 on any Lot in Stage 3A, the consent holder shall erect a physical barrier that prevents through traffic between Lot 102 (Road 1S - Taurikura Drive) and Belk Road. The barrier is to remain in place until the intersection with Belk Road and State Highway 29 is upgraded, or an agreed alternative is provided to a standard approved by the New Zealand Transport Agency to address safety issues at that intersection.*

27. *Prior to any application for certification pursuant to section 224 of the Resource Management Act 1991 on any Lot in Stage 3A, the part of Wintrebre Lane within Stage 3A of the Tauriko Business Estate is legally stopped.*

28. *Development of industrial land in Stage 3A shall be limited to a maximum of 36 hectares until the intersection of Belk Road and State Highway 29 is upgraded, or an agreed alternative is provided to a standard approved by the New Zealand Transport Agency to address safety issues at that intersection.*

29. *All works that relate to the disturbance of soil within the site are undertaken in accordance with the Detailed Site Investigation and the conditions of resource consent RC26684.*

30. *Pursuant to Section 221 of the Resource Management Act 1991, a consent notice shall be registered on the Certificate of Title for Lot 501 advising the owners and subsequent owners thereof, of the following requirement to be complied with on a continuing basis:*

    a. *No vehicular access to Belk Road is permitted until the intersection of Belk Road and State Highway 29 is upgraded, or an alternative is provided to a standard approved by the New Zealand Transport Agency.*

    b. *Identify the location and extent of the 10 metre buffer strip from any other Zone boundary, and 80 metre separation strip from Belk Road, as defined in Tauranga City Plan Appendix 18D: Tauriko Business Estate Mitigation, Landscape Features and Buffer Zones.*

       Note: Clause b) of Condition 30 shall not be required where a land use consent is approved for Lot 501 which addresses the matters relating to the buffer strip and separation distances from Belk Road.

    c. *Upon receipt of the "Geotechnical Completion Report" required by Condition 15 of RC27099, require a Consent Notice to be registered on the Certificate of Title of any allotments to which the recommendations of the "Geotechnical Completion Report" relate to.*

31. *Pursuant to Section 221 of the Resource Management Act 1991, a consent notice shall be registered on the Certificate of Title for Lots 55, 56, 58, 534 and 535 advising the owners and subsequent owners thereof, of the following requirement to be complied with on a continuing basis:*

    a. *For the areas defined in Diagram 10, Section 5, Plan Maps (Part B): Tauriko Business Estate Outline Development Plan as "Escarpment Area" or "Visual*

Mitigation Buffer", Permitted Activities shall be limited to protection, establishment, enhancement, and maintenance of landscape planting, and provision of walkways.

Note: Clause a) of Condition 31 shall not be required where a land use consent is approved for Lots 55, 56, 58, 534 and 535 which authorises other land use activities to be undertaken on any "Escarpment Area".

b. *The owner shall maintain a wire mesh (or other visually permeable material) fence or other physical barrier generally no greater than 1.2 metres in height to prevent an encroachment of any activity into any Escarpment Area, Visual Mitigation Buffer or Stormwater Management Area.*

32. *Pursuant to Section 221 of the Resource Management Act 1991, a consent notice shall be registered on the Certificate of Title for Lots 50, 52, 53, 54, 59, 575, 576, 577, and 578, advising the owners and subsequent owners thereof, of the following requirement to be complied with on a continuing basis:*

    a. *Identify the location of the boundary between the Tauriko Industry Zone with the Rural Zone; and boundary between the Tauriko Industry Zone with the Greenbelt Zone, as defined in Tauranga City Plan, where applicable.*

33. *Pursuant to Section 221 of the Resource Management Act 1991, a consent notice shall be registered on the relevant Certificate of Titles advising the owners and subsequent owners thereof, of the following requirement to be complied with on a continuing basis:*

    a. *Identify the location of any Landmark Entry Treatment Area and Convenience Centres, as defined in Tauranga City Plan, where applicable.*

34. *The consent holder shall, at the time of Development Works Approval Application, submit to Council's Corporate Information Section three alternative street names for authorisation in accordance with Council's Street Naming Policy (including Iwi consultation), for each proposed new street and lane in the subdivision. The authorised street name signs will be manufactured and erected by the consent holder at the consent holder's expense. All traffic and pedestrian access signage shall be manufactured by an approved certifier and erected by the consent holder at the consent holder's expense.*

35. *Prior to any application for certification of each stage, pursuant to Section 224 of the Resource Management Act 1991, all planting shall be undertaken by the consent holder in accordance with the Landscape Planting Plan approved under condition 25 of this resource consent, within any road, Escarpment Areas and Stormwater Management Areas.*

Lot 50

36. *Prior to any application for certification pursuant to section 224 of the Resource Management Act 1991 on any Lot in Stage 3A, the consent holder shall provide confirmation that Stormwater Pond C (Lot 50 Drainage Reserve) has sufficient functionality to service each stage of the development.*

Lot 54

37. *Prior to the issue of 224 certification for Lot 107 (new road) the consent holder shall form the temporary turning head within Lot 54 as shown on drawing 145476-RC101 Rev 11.*

38. *Pursuant to Section 221 of the Resource Management Act 1991, a consent notice shall be registered on the certificate of title for Lot 54 advising the owners and subsequent owners thereof, of the following requirement to be complied with on an ongoing basis:*

    a. *The temporary turning head detailed in drawing 145476-RC101 Rev 11 is to be retained and maintained until such time as Lot 54 is developed or further subdivided, when a permanent solution will be required.*

Lots 56 and 57

39. *Lot 109 shall be formed in accordance with Tauranga City Council Infrastructure Development Code and vested in Council in conjunction with the North-Eastern round-a-bout contained within Lot 103, unless, the natural ground levels within Lot 2 DP 326286 are unchanged from the date of issuing of this consent, making it impractical to form Lot 109, at which time Lot 109 shall be vested in Council as unformed road reserve inclusive of any land requirement to achieve the future road design layout as illustrated in plan 'Stage 3A – Future Road Layout Plan', Drawing No. 145476-RC302, Rev. 1, dated 02.07.19.*

Lot 535

40. *Prior to the issue of 224 certification for Lot 108 (new road) the consent holder shall form the temporary turning head within Lot 535 as shown on drawing 145476-RC101 Rev 11, dated 15.11.19.*

41. *Pursuant to Section 221 of the Resource Management Act 1991, a consent notice shall be registered on the certificate of title for Lot 535 advising the owners and subsequent owners thereof, of the following requirement to be complied with on an ongoing basis:*

    a. *The temporary turning head detailed in drawing 145476-RC101 Rev 11 is to be retained until such time as Lot 535 is developed or further subdivided, when a permanent solution will be required.*

Costs

42. *All costs associated with the conditions of this consent, including those required under the Infrastructure Development Code, shall be met by the consent holder.*

    a. *The consent holder shall pay a financial contribution for the deferred provision of footpaths, which shall be agreed during the Development Works Approval required by condition 6 of this resource consent.*

Recommended and Assessed by: Delegated Authorisation by:

Cole Burmester
Development Planner

Stacey Hikairo
Development Planner

Date: 10 December 2019

Advice Notes:

1. *Under sections 357A and 357B of the Resource Management Act 1991, you have a right of objection to the consent authority in respect of the above decision or any additional fees and charges required in respect of this decision. In accordance with section 357C, notice of any such objection must be in writing to the Council within 15 working days of receiving this decision and/or the date on which the invoice is received. Any notice given under section 357C should describe the reasons for the objection.*
2. *Should the actual processing cost exceed the deposit fee paid at lodgement, if not already accompanying this decision, an invoice may be sent at a later date.*
3. *Development contributions under LGA 2002 – Requirement for development contribution: Pursuant to section 198(1)(a) of the Local Government Act 2002, Council requires that a development contribution provided for and in accordance with Council's Development Contributions Policy (which is subject to change), be made (paid) by the consent holder to Council.*
4. *Where any building or drainage works are required to satisfy conditions of this consent, all consents required under the Building Act 2004 must be obtained prior to the works being carried out.*
5. *Construction noise from starting up and operation of construction equipment and all other construction activities on the site of the subdivision are required to meet the limits recommended in Table 1 in NZS6803:1999, and shall be measured and assessed in accordance with, NZS6803P:1984 - "The measurement and assessment of noise from construction, maintenance and demolition work". Adjustments provided in Clause 6.1 of NZS6803P:1984 shall apply for the full duration of the project, and references in the tables to NZS6802 shall read as references to Clause 4.2.2 of NZS6802:1991.*
6. *Erosion and sediment control (including dust) is to be in accordance with the City Plan and the Council's Infrastructure Development Code. The Consent Holder is advised that they are required by the Bay of Plenty Regional Natural Resources Plan to take the appropriate measures to prevent or minimise sediment generation and yield (sediment discharge).*
7. *All archaeological sites whether recorded or unrecorded under Subpart 2 of the Heritage New Zealand Pouhere Taonga Act 2014 cannot be destroyed, damaged or modified*

without the consent of Heritage New Zealand. In the event that an archaeological site(s) and/or koiwi are unearthed, the consent holder is advised to immediately stop work on the part of the site that the archaeological site(s) is located, and contact Heritage New Zealand for advice. Contact Details: email - infolowernorthern@heritage.org.nz; phone - 07 577 4530.

8. *Please direct any information in relation to the compliance with the above conditions to the following email: environmentalmonitoringandcompliance@tauranga.govt.nz.*
9. *When undertaking earthworks on site the consent holder is advised to refer to the following documentation in relation to the management of sediment pollution and Council's Stormwater (Pollution Prevention) Bylaw 2015.*
10. *For new connections to Council infrastructure pipework shall be inspected and approved by Council prior to backfilling.*
11. *For all new connections to Council's infrastructure, a services connection approval is required. Applications can be made to sca@tauranga.govt.nz.*

NOTES:

1. PROPOSED TITLES

LOT 1	14.8086 ha
LOT 2	29.8247 ha
LOT 3	9.7406 ha
LOT 501	12.7852 ha
TOTAL	67.1591 ha

2. AREAS & DIMENSIONS ARE APPROXIMATE ONLY & ARE SUBJECT TO RESOURCE CONSENT AND LAND TRANSFER SURVEY.

3. THIS PLAN MAY NOT PROVIDE ENOUGH INFORMATION FOR HEIGHT TO BOUNDARY CALCULATIONS. WHERE ANY PROPOSED BUILDING OR PART THEREOF IS REQUIRED TO MEET COUNCIL'S HEIGHT IN RELATION TO BOUNDARY CONTROLS, HARRISON GRIERSON SHOULD BE CONSULTED.

4. THIS PLAN IS ISSUED FOR A SPECIFIC PROJECT AND MAY NOT BE ALTERED OR USED FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF HARRISON GRIERSON.

5. EXISTING SERVICES LOCATION ARE APPROXIMATE AND SHOULD BE CONFIRMED ON SITE.

LEGEND:

- PROPOSED DEVELPMENT BLOCK BOUNDARY
- EXISTING BOUNDARY
- PROPOSED RIGHT OF WAY

SCHEDULE OF PROPOSED EASEMENTS

PURPOSE	SHOWN	SERVIENT TENEMENT (BURDENED LAND)	DOMINANT TENEMENT (BENEFITED LAND)
RIGHT OF WAY	A	LOT 2	LOT 501

REF	REVISIONS	BY	DATE
3	PROPOSED ROAD BOUNDARY UPDATED	JTL	28.11.19
2	PROPOSED AREA UPDATED	JTL	26.11.19
1	ISSUED FOR RESOURCE CENSENT	MPD	15.11.19

ORIGINATOR: MPD DATE: 15.11.19 SIGNED:
DRAWN: JTL DATE: 15.11.19 SIGNED:
CHECKED: MPD DATE: 28.11.19 SIGNED:
APPROVED: MPD DATE: 28.11.19 SIGNED:
PLOT BY: JTL PLOT DATE: 28.11.19
SURVEY BY: SURVEY DATE:

ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND

ISO 9001 QUALITY ASSURED

TAURANGA OFFCE
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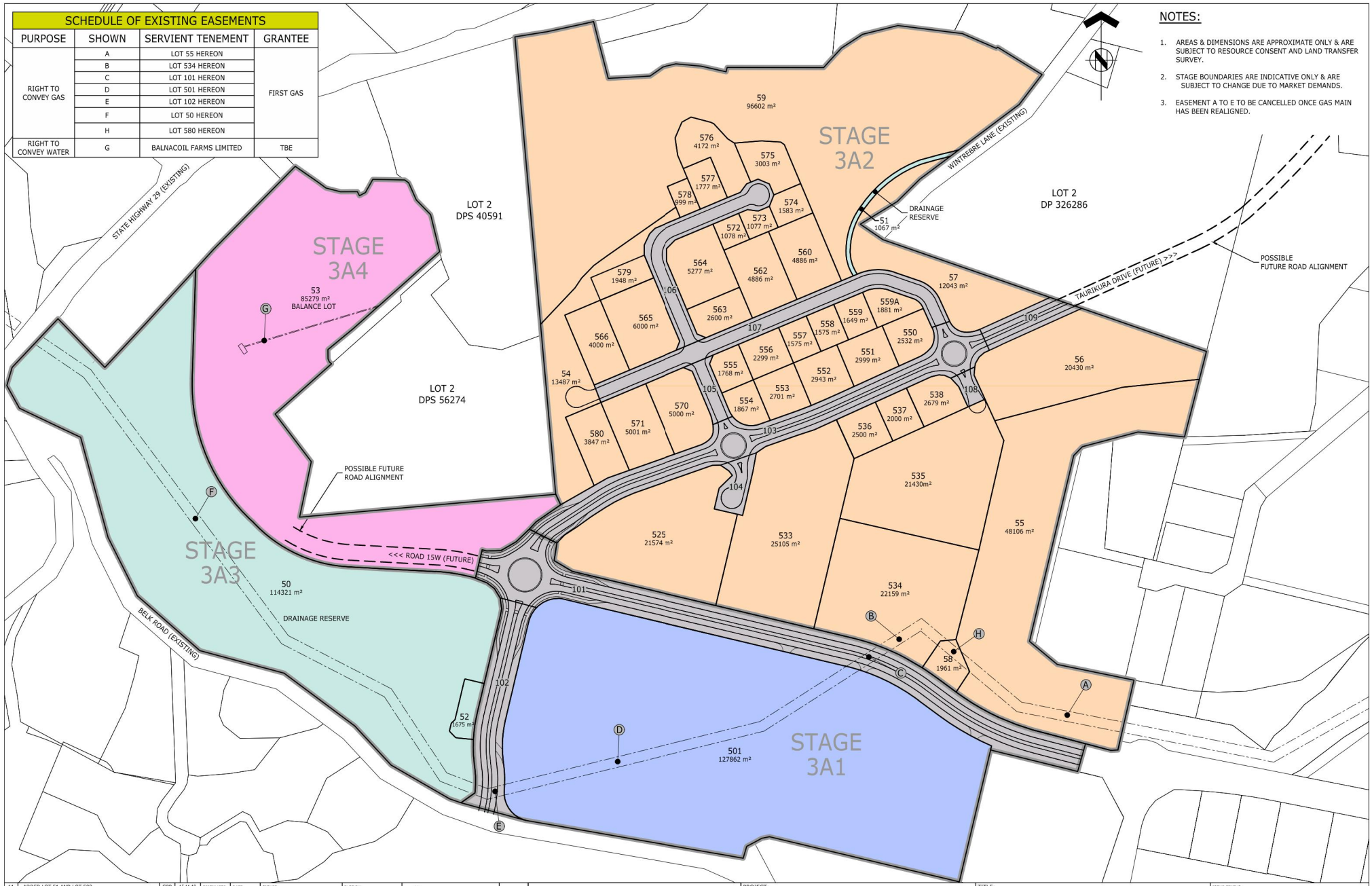
W www.harrisongrierson.com

PROJECT:
TBE 3 LIMITED
TAURIKO BUSINESS ESTATE
TAURIKO

TITLE:
STAGE 3A
PROPOSED DEVELOPMENT BLOCK
SCHEME PLAN

ISSUE STATUS: RESOURCE CONSENT
PROJECT No: 1520-145476-01
SCALES: 1:2000 - A1, 1:4000 - A3
A1
DRAWING No: 145476-RC100
REV 3

REFER TO APPROVED MASTER DRAWINGS FOR ORIGINAL SIGNATURES File: TAURANGA N:\1520\145476_A\CAD\145476-RC100.DWG



11	ADDED LOT 51 AND LOT 580	GPR	15.11.19	ORIGINATOR:	DATE:	SIGNED:	PLOT BY:	NXS	ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND	ISO 9001 QUALITY ASSURED
10	ROAD AND LOT LAYOUT ADJUSTED	GPR	06.11.19	HEH	20.03.19					
9	BOUNDARIES UPDATED ON LOT 50 AND 53	GPR	28.08.19	DRAWN:	DATE:	SIGNED:	PLOT DATE:	15.11.19		
8	VARIOUS AMENDMENTS	GPR	27.08.2019	NXS	20.03.19					
7	UPDATED LOT LAYOUT AND NUMBERS	GPR	10.07.19	CHECKED:	DATE:	SIGNED:	SURVEY BY:			
6	ADJUSTED BDY AT LOT 54/ WINTREBRE LANE	GPR	27.06.19	GPR	15.11.19					
5	ISSUED FOR RESOURCE CONSCENT	GPR	03.05.19	APPROVED:	DATE:	SIGNED:	SURVEY DATE:			
REF	REVISIONS	BY	DATE	GPR	15.11.19					

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PROJECT:
TAURIKO BUSINESS ESTATE
TBE 3 LIMITED
TAURIKO BUSINESS ESTATE
TAURIKO

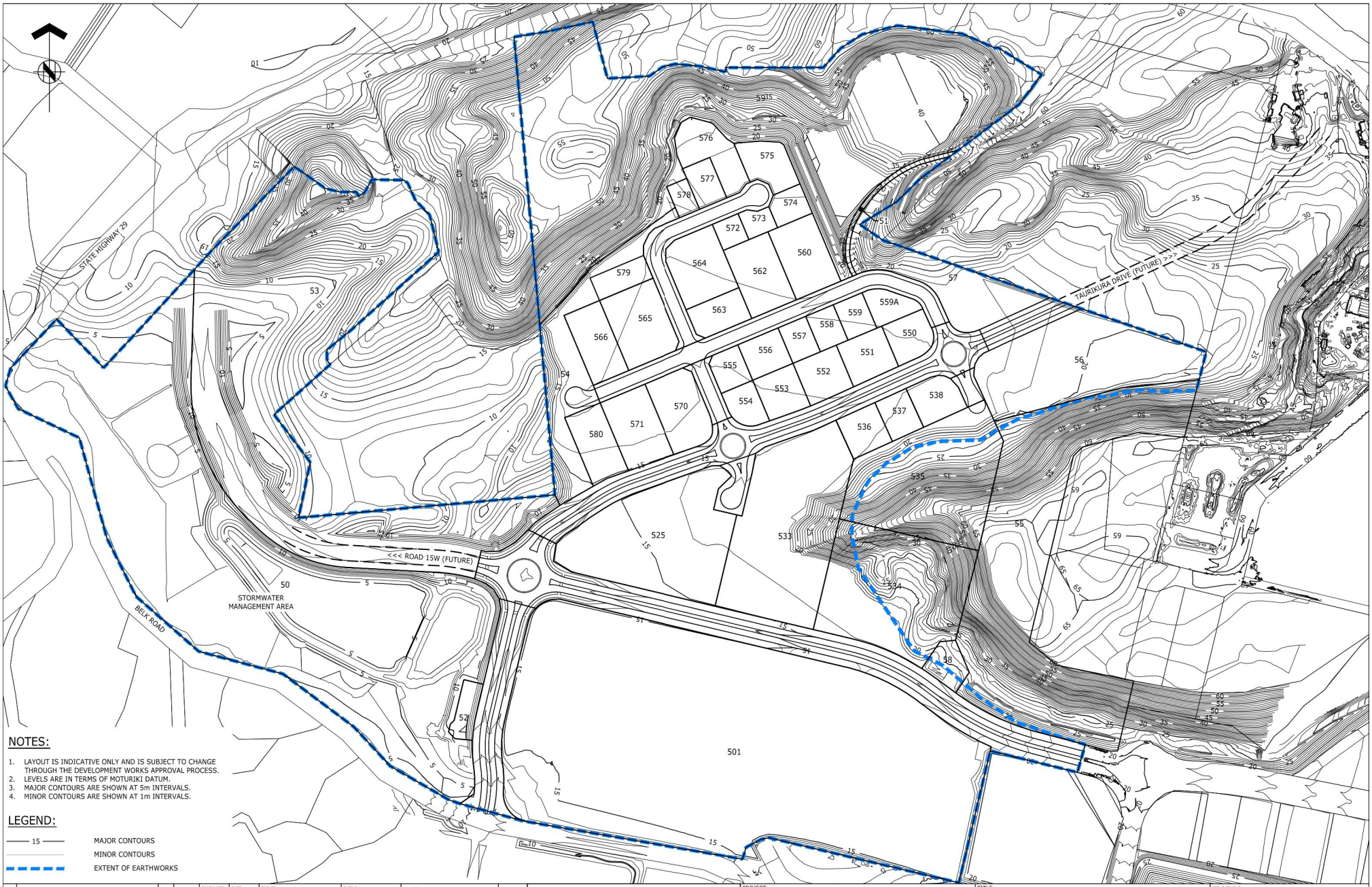
TITLE:
STAGE 3A
PROPOSED SUBDIVISION
OVERALL LAYOUT PLAN

ISSUE STATUS: RESOURCE CONSENT

PROJECT No: 1520-145476-01 | SCALES: 1:2000 - A1, 1:4000 - A3 | A1

DRAWING No: 145476-RC101 | REV 11

REFER TO APPROVED MASTER DRAWINGS FOR ORIGINAL SIGNATURES File: TAURANGA N:\1520\145476_A\CAD\145476-RC101.DWG



NOTES:

1. LAYOUT IS INDICATIVE ONLY AND IS SUBJECT TO CHANGE THROUGH THE DEVELOPMENT WORKS APPROVAL PROCESS.
2. LEVELS ARE IN TERMS OF MOTURIKI DATUM.
3. MAJOR CONTOURS ARE SHOWN AT 5m INTERVALS.
4. MINOR CONTOURS ARE SHOWN AT 1m INTERVALS.

LEGEND:

15 — MAJOR CONTOURS

MINOR CONTOURS

EXTENT OF EARTHWORKS

6	ADDED LOT 51 AND LOT 580	GPR	15.11.16	ORIGINATOR: HEH	DATE: 20.03.19	SIGNED:	PLOT BY: NXS	
5	VARIOUS AMENDMENTS	GPR	06.11.19	DRAWN: HEH	DATE: 20.03.19	SIGNED:	PLOT DATE: 15.11.19	
4	BOUNDARY AND ROAD ALIGNMENT ADJUSTMENT	LDP	22.08.2019	CHECKED: GPR	DATE: 15.11.16	SIGNED:	SURVEY BY:	
3	ISSUED FOR RESOURCE CONSENT	GPR	03.05.19	APPROVED: GPR	DATE: 15.11.16	SIGNED:	SURVEY DATE:	
2	PRELIMINARY	GPR	09.04.19					
1	PRELIMINARY	GPR	28.03.19					
REF	REVISIONS	BY	DATE					

ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND — ISO 9001 QUALITY ASSURED

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PROJECT:
TAURIKO BUSINESS ESTATE
TBE 3 LIMITED
TAURIKO BUSINESS ESTATE
TAURIKO

TITLE:
STAGE 3A
PROPOSED SUBDIVISION
PROPOSED CONTOUR PLAN

ISSUE STATUS: RESOURCE CONSENT

PROJECT No: 1520-145476-01 | SCALES: 1:2000 - A1, 1:4000 - A3 | A1

DRAWING No: 145476-RC211 | REV 6

REFER TO APPROVED MASTER DRAWINGS FOR ORIGINAL SIGNATURES File: TAURANGA N:\1520\145476_A\CAD\145476-RC211.DWG

1 - TRACKING CURVE DIAGRAM
SCALE 1:500 - A1, 1:1000 - A3

2 - TRACKING CURVE DIAGRAM
SCALE 1:500 - A1, 1:1000 - A3

NOTES:

1. ALL WORKS TO BE IN ACCORDANCE WITH TCC IDC 2017 STANDARDS AND ALL SUBSEQUENT AMENDMENTS.
2. LAYOUT IS INDICATIVE ONLY AND IS SUBJECT TO CHANGE THROUGH THE DEVELOPMENT WORKS APPROVAL PROCESS.

REF	REVISIONS	BY	DATE
7	ADDED LOT 51 AND LOT 580	GPR	15.11.19
6	VARIOUS AMENDMENTS	GPR	06.11.19
5	VARIOUS AMENDMENTS	GPR	29.08.2019
4	UPDATED LOT LAYOUT AND NUMBERS	GPR	10.07.19
3	ISSUED FOR RESOURCE CONSENT	GPR	03.05.19
2	PRELIMINARY	GPR	09.04.19
1	PRELIMINARY	GPR	28.03.19

ORIGINATOR: HEH — DATE: 20.03.19 — SIGNED:
DRAWN: NXS — DATE: 29.03.19 — SIGNED:
CHECKED: GPR — DATE: 06.11.19 — SIGNED:
APPROVED: GPR — DATE: 06.11.19 — SIGNED:
PLOT BY: NXS
PLOT DATE: 15.11.19
SURVEY BY:
SURVEY DATE:

ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND — ISO 9001 QUALITY ASSURED

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PROJECT:
TBE 3 LIMITED
TAURIKO BUSINESS ESTATE
TAURIKO

TITLE:
STAGE 3A
ROAD LAYOUT PLAN

ISSUE STATUS: RESOURCE CONSENT
PROJECT No: 1520-145476-01
SCALES: 1:2000 - A1, 1:4000 - A3
A1
DRAWING No: 145476-RC301
REV 7

NOTES:

1. ALL WORKS TO BE IN ACCORDANCE WITH TCC IDC 2017 STANDARDS AND ALL SUBSEQUENT AMENDMENTS.
2. LAYOUT IS INDICATIVE ONLY AND IS SUBJECT TO CHANGE THROUGH THE DEVELOPMENT WORKS APPROVAL PROCESS.

LEGEND:

STAGE BOUNDARY

				ORIGINATOR: HEH	DATE: 20.06.19	SIGNED:	PLOT BY: HEH	
				DRAWN: NXS	DATE: 20.06.19	SIGNED:	PLOT DATE: 02.07.19	
				CHECKED: GPR	DATE: 03.07.19	SIGNED:	SURVEY BY:	
1	ISSUED FOR RESOURCE CONSENT	GPR	03.07.19	APPROVED: GPR	DATE: 03.07.19	SIGNED:	SURVEY DATE:	
REF	REVISIONS	BY	DATE					

ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND

ISO 9001 QUALITY ASSURED

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PROJECT:
TBE 3 LIMITED
TAURIKO BUSINESS ESTATE
TAURIKO

TITLE:
STAGE 3A
FUTURE ROAD LAYOUT PLAN
EXISTING GARGAN/ TAURIKURA DR ROUNDABOUT

ISSUE STATUS: RESOURCE CONSENT

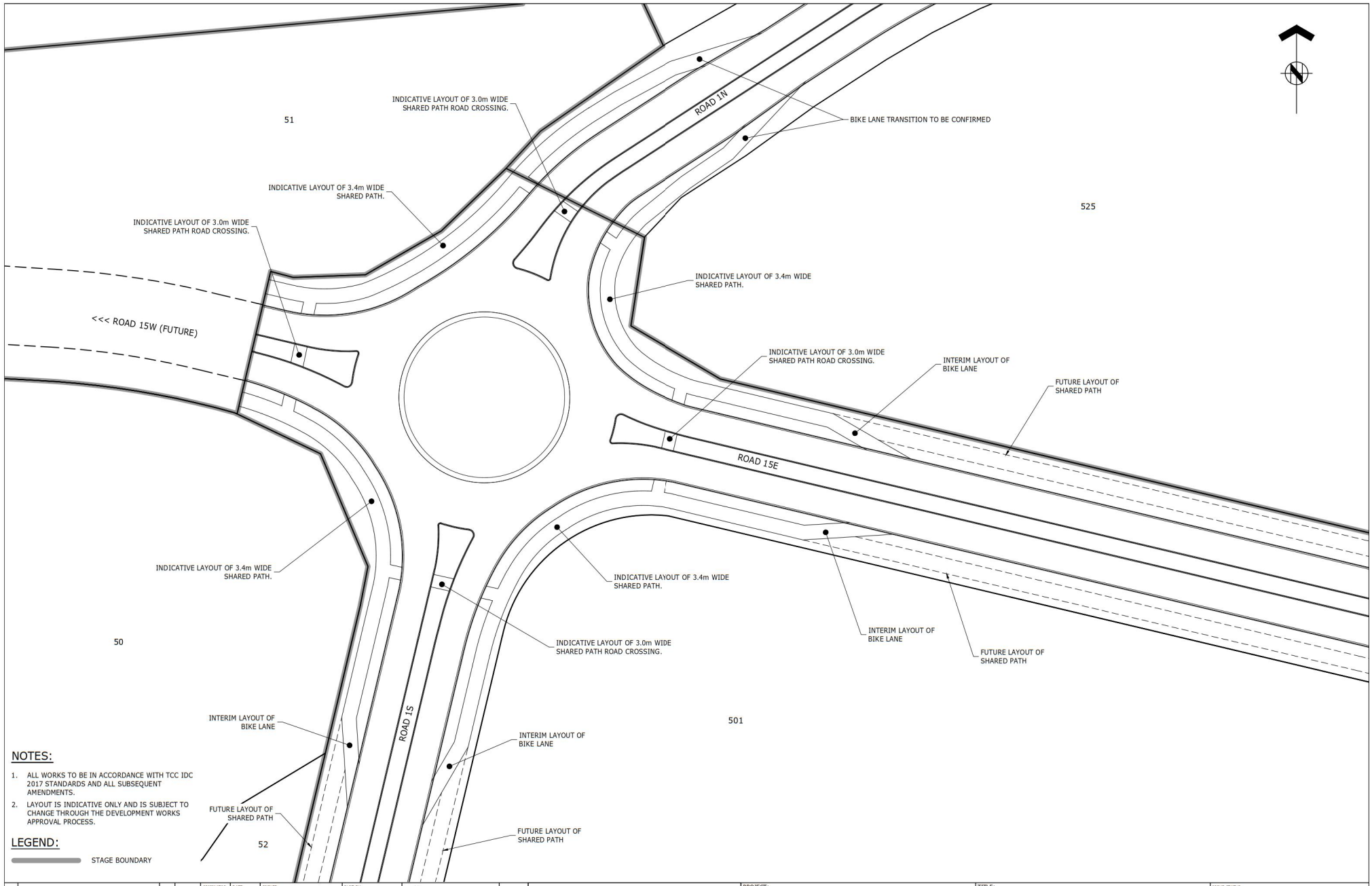
PROJECT No: 1520-145476-01

SCALES: 1:2000 - A1, 1:4000 - A3

A1

DRAWING No: 145476-RC302

REV 1



NOTES:

1. ALL WORKS TO BE IN ACCORDANCE WITH TCC IDC 2017 STANDARDS AND ALL SUBSEQUENT AMENDMENTS.
2. LAYOUT IS INDICATIVE ONLY AND IS SUBJECT TO CHANGE THROUGH THE DEVELOPMENT WORKS APPROVAL PROCESS.

LEGEND:

STAGE BOUNDARY

REF	REVISIONS	BY	DATE
1	ISSUED FOR RESOURCE CONSENT	GPR	24.06.19

ORIGINATOR: HBH DATE: 24.06.19 SIGNED: PLOT BY: NXS
DRAWN: NXS DATE: 24.06.19 SIGNED: PLOT DATE: 24.06.19
CHECKED: GPR DATE: 24.06.19 SIGNED: SURVEY BY:
APPROVED: GPR DATE: 24.06.19 SIGNED: SURVEY DATE:

ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND — ISO 9001 QUALITY ASSURED

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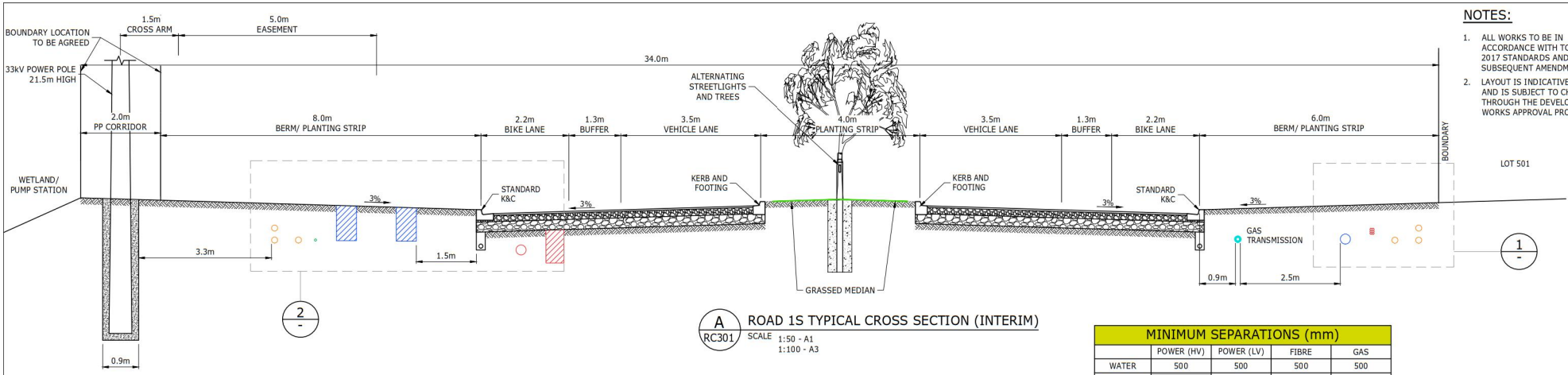
PROJECT:
TBE 3 LIMITED
TAURIKO BUSINESS ESTATE
TAURIKO

TITLE:
STAGE 3A
FUTURE ROAD LAYOUT PLAN
ROAD AND BIKE LANE/ FOOTPATH LAYOUT PLAN

ISSUE STATUS: RESOURCE CONSENT
PROJECT No: 1520-145476-01
SCALES: 1:250 - A1, 1:500 - A3
A1
DRAWING No: 145476-RC303
REV 1

REFER TO APPROVED MASTER DRAWINGS FOR ORIGINAL SIGNATURES File: TAURANGA N:\1520\145476_A\CAD\145476-RC303.DWG

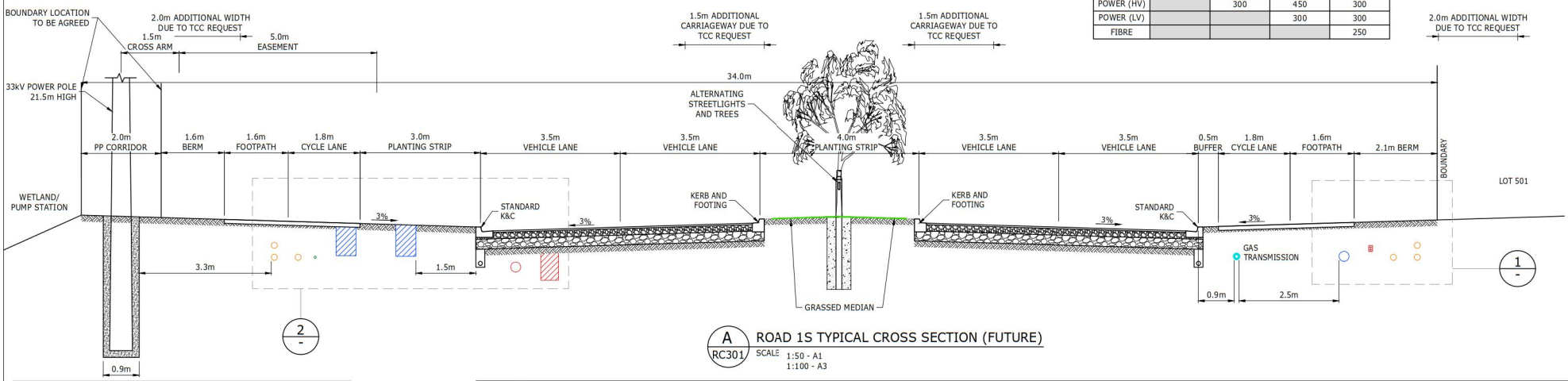


A RC301 ROAD 1S TYPICAL CROSS SECTION (INTERIM)
SCALE 1:50 - A1
1:100 - A3

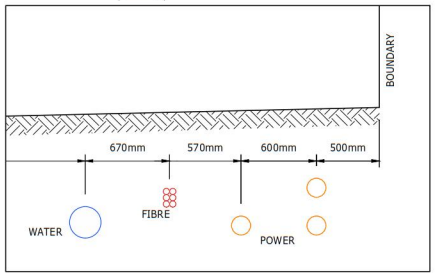
NOTES:

1. ALL WORKS TO BE IN ACCORDANCE WITH TCC IDC 2017 STANDARDS AND ALL SUBSEQUENT AMENDMENTS.
2. LAYOUT IS INDICATIVE ONLY AND IS SUBJECT TO CHANGE THROUGH THE DEVELOPMENT WORKS APPROVAL PROCESS.

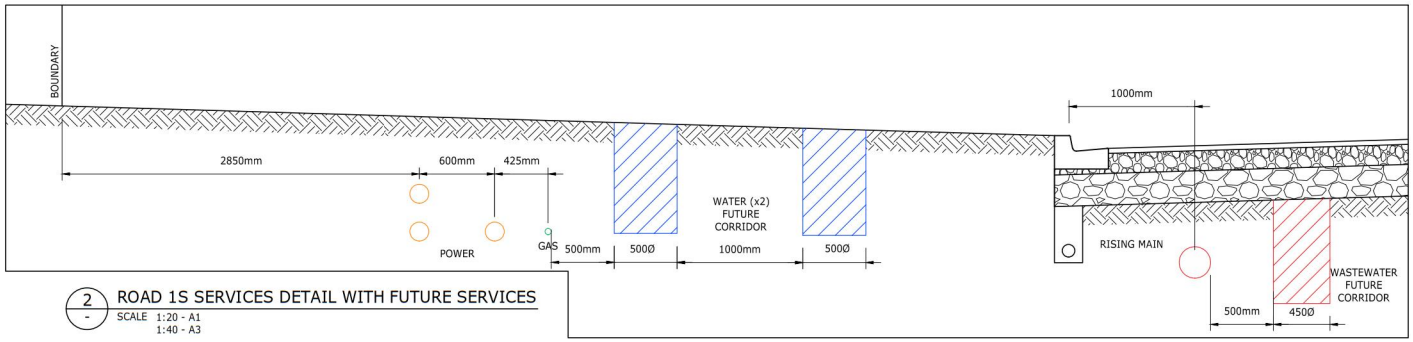
MINIMUM SEPARATIONS (mm)				
	POWER (HV)	POWER (LV)	FIBRE	GAS
WATER	500	500	500	500
POWER (HV)		300	450	300
POWER (LV)			300	300
FIBRE				250



A RC301 ROAD 1S TYPICAL CROSS SECTION (FUTURE)
SCALE 1:50 - A1
1:100 - A3



1 - ROAD 1S TYPICAL SERVICES DETAIL
SCALE 1:20 - A1
1:40 - A3



2 - ROAD 1S SERVICES DETAIL WITH FUTURE SERVICES
SCALE 1:20 - A1
1:40 - A3

REF	REVISIONS	BY	DATE	APPROVED:	DATE:	SIGNED:
7	MINOR EASEMENT CORRECTION	GPR	23.08.19			
6	UPDATED LHS BERM	GPR	22.08.19			
5	SERVICES LOCATIONS REVISED	GPR	07.08.19			
4	UNDERGROUND SERVICES, GUARDRAIL ADDED	GPR	03.07.19			
3	ISSUED FOR RESOURCE CONSENT	GPR	03.05.19			
2	PRELIMINARY	GPR	09.04.19			
1	PRELIMINARY	GPR	28.03.19	GPR	23.08.19	

ORIGINATOR: HEH — DATE: 26.03.19 — SIGNED:
DRAWN: NXS — DATE: 26.03.19 — SIGNED:
CHECKED: GPR — DATE: 23.08.19 — SIGNED:
APPROVED: GPR — DATE: 23.08.19 — SIGNED:

PLOT BY: HEH
PLOT DATE: 23.08.19
SURVEY BY:
SURVEY DATE:

ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND

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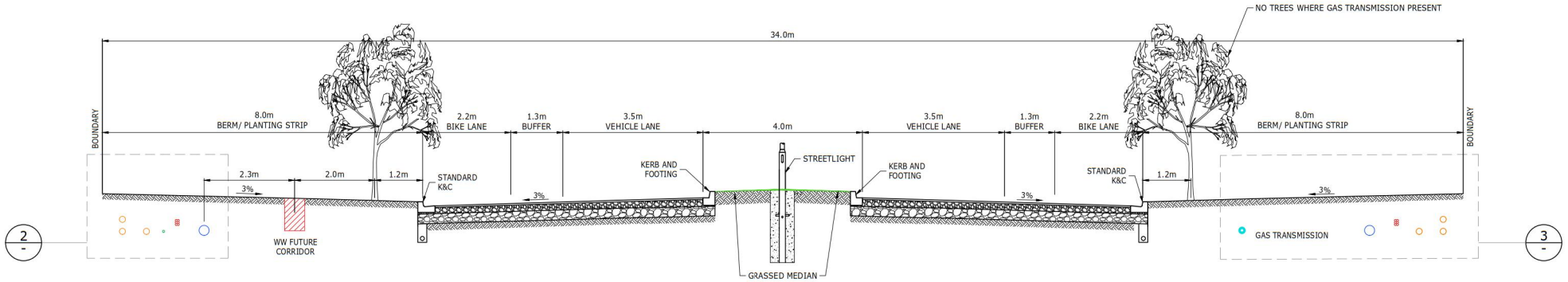
PROJECT:
TAURIKO BUSINESS ESTATE
TBE 3 LIMITED
TAURIKO BUSINESS ESTATE
TAURIKO

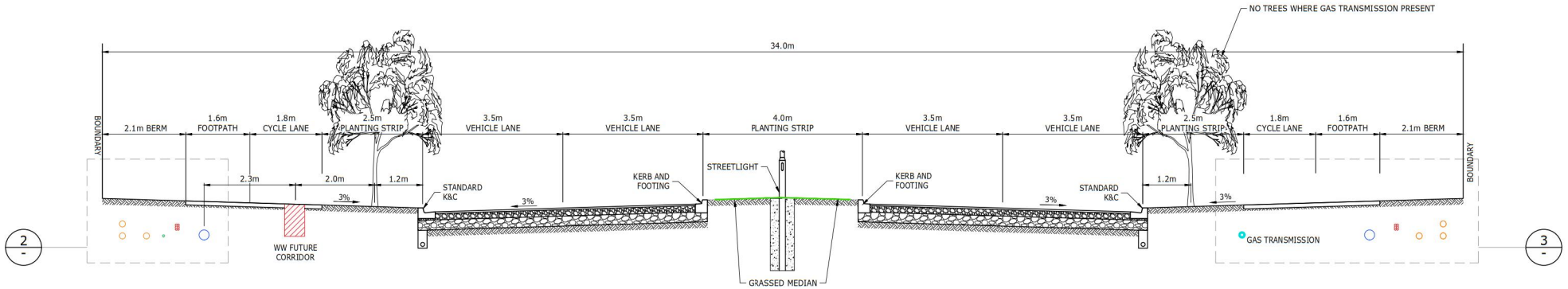
TITLE:
TBE STAGE 3A
ROAD CROSS SECTIONS
SHEET 1

ISSUE STATUS: RESOURCE CONSENT
PROJECT No: 1520-145476-01
SCALES: AS SHOWN
A1
DRAWING No: 145476-RC331
REV 7



B / RC301 ROAD 15E TYPICAL CROSS SECTION (INTERIM)

SCALE 1:50 - A1
1:100 - A3

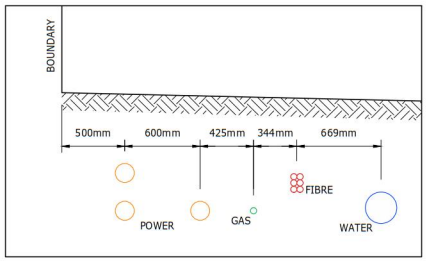


B / RC301 ROAD 15E TYPICAL CROSS SECTION (FUTURE)

SCALE 1:50 - A1
1:100 - A3

NOTES:

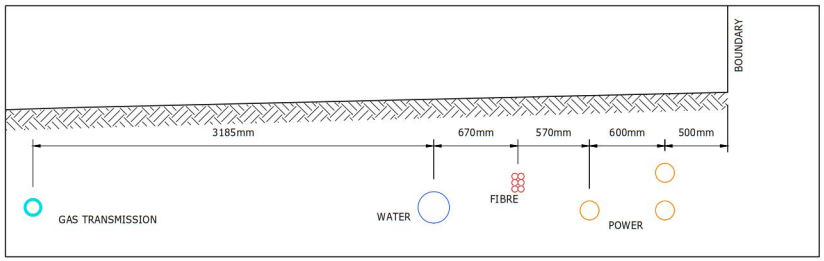
1. ALL WORKS TO BE IN ACCORDANCE WITH TCC IDC 2017 STANDARDS AND ALL SUBSEQUENT AMENDMENTS.
2. LAYOUT IS INDICATIVE ONLY AND IS SUBJECT TO CHANGE THROUGH THE DEVELOPMENT WORKS APPROVAL PROCESS.



2 / - ROAD 15E TYPICAL SERVICES DETAIL

SCALE 1:20 - A1
1:40 - A3

MINIMUM SEPARATIONS (mm)				
	POWER (HV)	POWER (LV)	FIBRE	GAS
WATER	500	500	500	500
POWER (HV)		300	450	300
POWER (LV)			300	300
FIBRE				250



3 / - ROAD 15E TYPICAL SERVICES DETAIL

SCALE 1:20 - A1
1:40 - A3

REF				ORIGINATOR:	DATE:	SIGNED:	PLOT BY:
6	SERVICE LOCATIONS REVISED	GPR	07.08.19	HEH	26.03.19		HEH
5	ISSUED FOR RESOURCE CONSENT	GPR	12.07.19	DRAWN:	DATE:	SIGNED:	PLOT DATE:
4	UNDERGROUND SERVICES ADDED	GPR	24.06.19	NXS	26.03.19		08.08.19
3	ISSUED FOR RESOURCE CONSENT	GPR	03.05.19	CHECKED:	DATE:	SIGNED:	SURVEY BY:
2	PRELIMINARY	GPR	09.04.19	GPR	07.08.19		
1	PRELIMINARY	GPR	28.03.19	APPROVED:	DATE:	SIGNED:	SURVEY DATE:
REF	REVISIONS	BY	DATE	GPR	07.08.19		

ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND

ISO 9001 QUALITY ASSURED

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W www.harrisongrierson.com

PROJECT:
TAURIKO BUSINESS ESTATE
TBE 3 LIMITED
TAURIKO BUSINESS ESTATE
TAURIKO

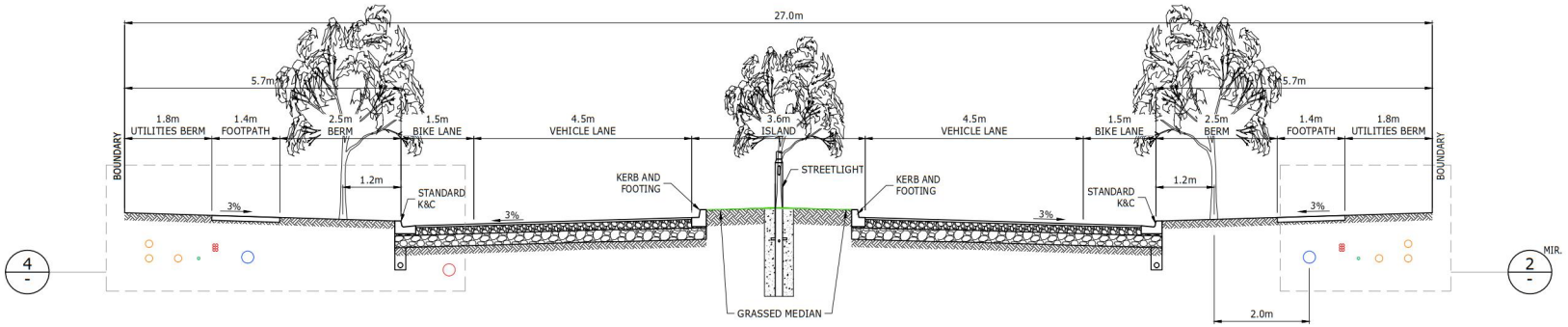
TITLE:
TBE STAGE 3A
ROAD CROSS SECTIONS
SHEET 2

ISSUE STATUS: RESOURCE CONSENT

PROJECT No: 1520-145476-01
SCALES: AS SHOWN
A1

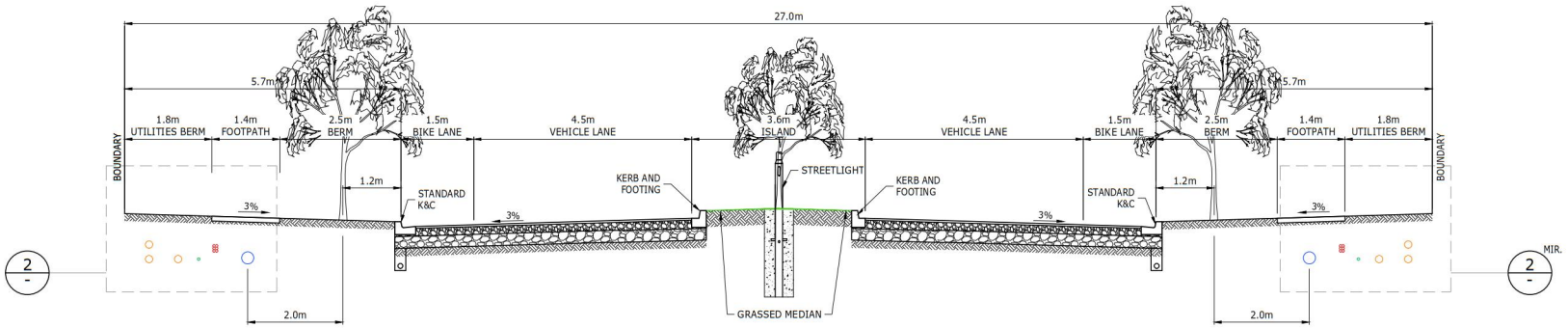
DRAWING No: 145476-RC332
REV 6

REFER TO APPROVED MASTER DRAWINGS FOR ORIGINAL SIGNATURES File: TAURANGA N:\1520\145476_A\CAD\145476-RC331-335.DWG



C RC301 ROAD 1N TYPICAL CROSS SECTION (WITH RISING MAIN)

SCALE 1:50 - A1
1:100 - A3



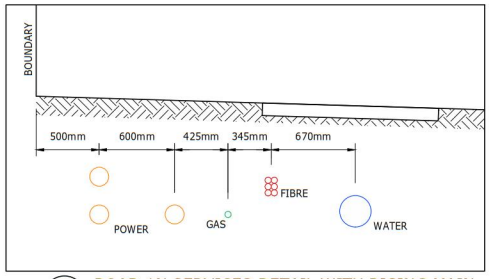
D RC301 ROAD 1N TYPICAL CROSS SECTION (WITHOUT RISING MAIN)

SCALE 1:50 - A1
1:100 - A3

MINIMUM SEPARATIONS (mm)				
	POWER (HV)	POWER (LV)	FIBRE	GAS
WATER	500	500	500	500
POWER (HV)		300	450	300
POWER (LV)			300	300
FIBRE				250

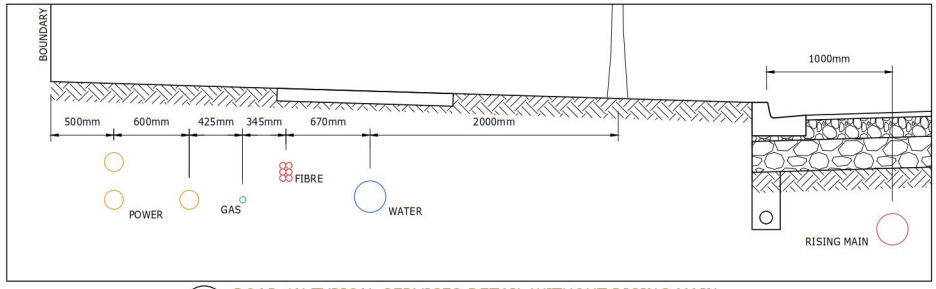
NOTES:

1. ALL WORKS TO BE IN ACCORDANCE WITH TCC IDC 2017 STANDARDS AND ALL SUBSEQUENT AMENDMENTS.
2. LAYOUT IS INDICATIVE ONLY AND IS SUBJECT TO CHANGE THROUGH THE DEVELOPMENT WORKS APPROVAL PROCESS.



2 - ROAD 1N SERVICES DETAIL WITH RISING MAIN

SCALE 1:20 - A1
1:40 - A3



4 - ROAD 1N TYPICAL SERVICES DETAIL WITHOUT RISING MAIN

SCALE 1:20 - A1
1:40 - A3

REF	REVISIONS	BY	DATE
3	SERVICE LOCATIONS REVISED	GPR	07.08.19
2	ISSUED FOR RESOURCE CONSENT	GPR	12.07.19
1	ISSUED FOR CLIENT REVIEW	GPR	24.06.19

ORIGINATOR: HEH DATE: 26.03.19 SIGNED:
DRAWN: NXS DATE: 26.03.19 SIGNED:
CHECKED: GPR DATE: 07.08.19 SIGNED:
APPROVED: GPR DATE: 07.08.19 SIGNED:
PLOT BY: HEH
PLOT DATE: 08.08.19
SURVEY BY:
SURVEY DATE:

ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND
ISO 9001 QUALITY ASSURED

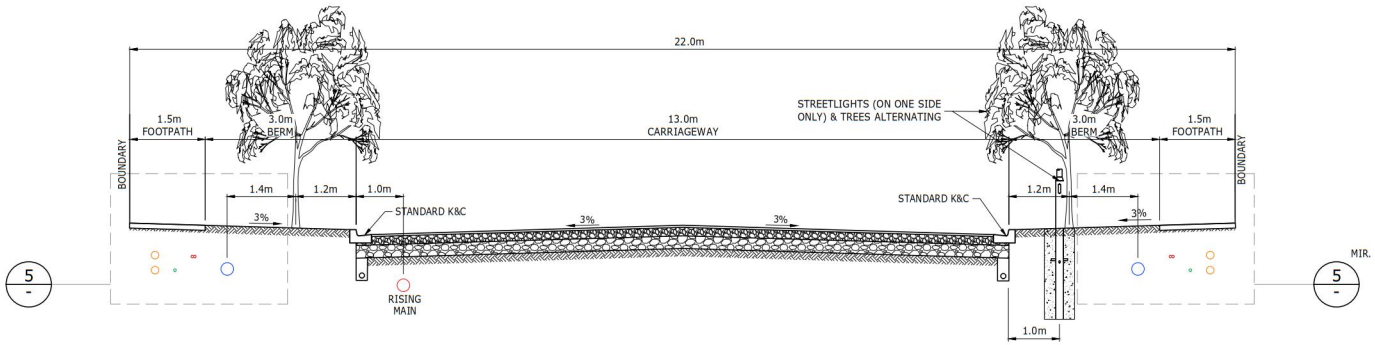
TAURANGA OFFICE
LEVEL 1, 60 SPRING STREET
TAURANGA 3110
T +64 7 578 0023
W www.harrisongrierson.com

PROJECT:
TBE 3 LIMITED
TAURIKO BUSINESS ESTATE
TAURIKO

TITLE:
TBE STAGE 3A
ROAD CROSS SECTIONS
SHEET 3

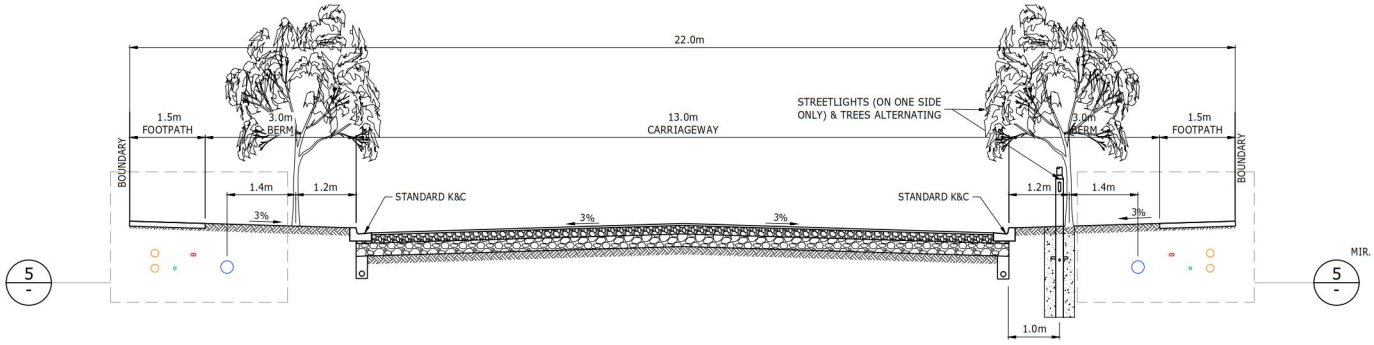
ISSUE STATUS: RESOURCE CONSENT
PROJECT No: 1520-145476-01
SCALES: AS SHOWN
A1
DRAWING No: 145476-RC333
REV 3

REFER TO APPROVED MASTER DRAWINGS FOR ORIGINAL SIGNATURES File: TAURANGA N:\1520\145476_A\CAD\145476-RC331-335.DWG



E RC301 ROAD 29 TYPICAL CROSS SECTION (WITH RISING MAIN)

SCALE 1:50 - A1
1:100 - A3



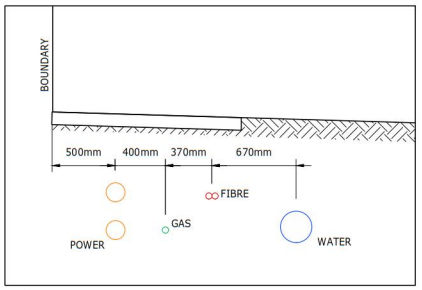
F RC301 ROAD 29/30/31 TYPICAL CROSS SECTION (WITHOUT RISING MAIN)

SCALE 1:50 - A1
1:100 - A3

NOTES:

1. ALL WORKS TO BE IN ACCORDANCE WITH TCC IDC 2017 STANDARDS AND ALL SUBSEQUENT AMENDMENTS.
2. LAYOUT IS INDICATIVE ONLY AND IS SUBJECT TO CHANGE THROUGH THE DEVELOPMENT WORKS APPROVAL PROCESS.

MINIMUM SEPARATIONS (mm)				
	POWER (HV)	POWER (LV)	FIBRE	GAS
WATER	500	500	500	500
POWER (HV)		300	450	300
POWER (LV)			300	300
FIBRE				250



5 - ROAD 29/30/31 TYPICAL SERVICES DETAIL

SCALE 1:20 - A1
1:40 - A3

REF	REVISIONS	BY	DATE
3	SERVICE DETAILS AMENDED	GPR	07.08.19
2	ISSUED FOR RESOURCE CONSENT	GPR	12.07.19
1	ISSUED FOR CLIENT REVIEW	GPR	24.06.19

ORIGINATOR: HEH DATE: 26.03.19 SIGNED:
DRAWN: NXS DATE: 26.03.19 SIGNED:
CHECKED: GPR DATE: 07.08.19 SIGNED:
APPROVED: GPR DATE: 07.08.19 SIGNED:
PLOT BY: HEH PLOT DATE: 08.08.19
SURVEY BY: SURVEY DATE:

ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND — ISO 9001 QUALITY ASSURED

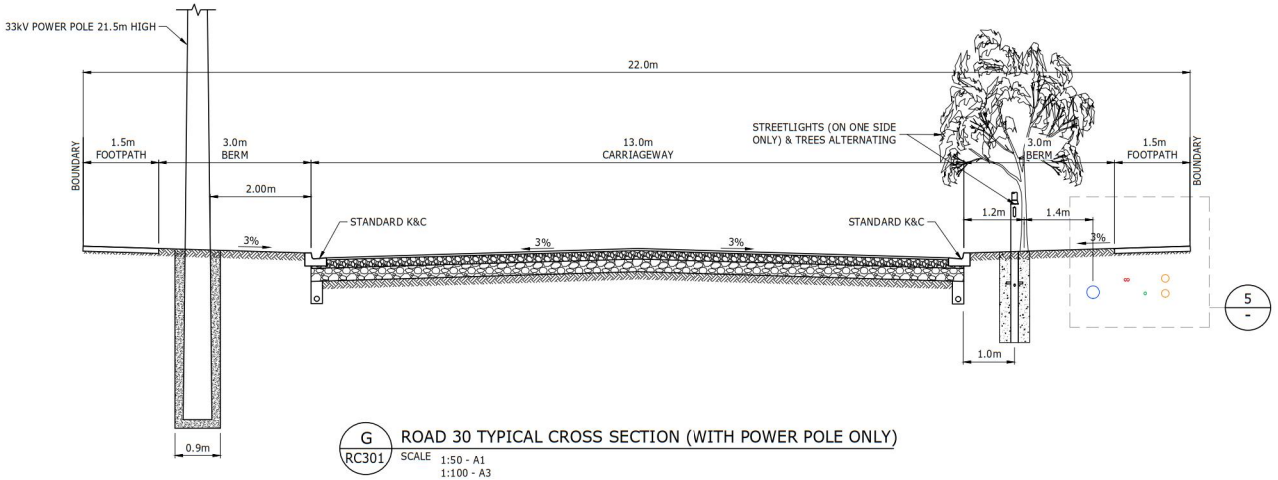
TAURANGA OFFICE
LEVEL 1, 60 SPRING STREET
TAURANGA 3110
T +64 7 578 0123
W www.harrisongrierson.com

PROJECT: TBE 3 LIMITED
TAURIKO BUSINESS ESTATE
TAURIKO

TITLE: TBE STAGE 3A
ROAD CROSS SECTIONS
SHEET 3

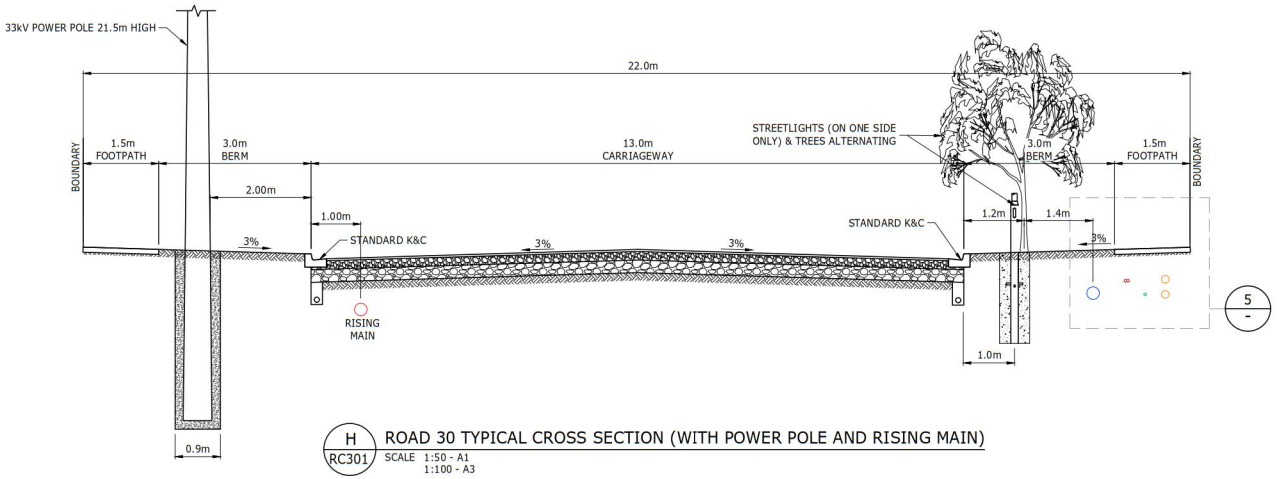
ISSUE STATUS: RESOURCE CONSENT
PROJECT No: 1520-145476-01
SCALES: AS SHOWN
A1
DRAWING No: 145476-RC334
REV 3

REFER TO APPROVED MASTER DRAWINGS FOR ORIGINAL SIGNATURES File: TAURANGA N:\1520\145476_A\CAD\145476-RC331-335.DWG



G RC301 ROAD 30 TYPICAL CROSS SECTION (WITH POWER POLE ONLY)

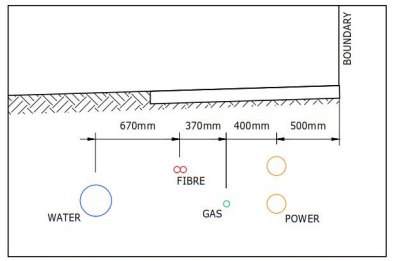
SCALE 1:50 - A1
1:100 - A3



H RC301 ROAD 30 TYPICAL CROSS SECTION (WITH POWER POLE AND RISING MAIN)

SCALE 1:50 - A1
1:100 - A3

MINIMUM SEPARATIONS (mm)				
	POWER (HV)	POWER (LV)	FIBRE	GAS
WATER	500	500	500	500
POWER (HV)		300	450	300
POWER (LV)			300	300
FIBRE				250



5 - ROAD 29/30/31 TYPICAL SERVICES DETAIL

SCALE 1:20 - A1
1:40 - A3

NOTES:

1. ALL WORKS TO BE IN ACCORDANCE WITH TCC IDC 2017 STANDARDS AND ALL SUBSEQUENT AMENDMENTS.
2. LAYOUT IS INDICATIVE ONLY AND IS SUBJECT TO CHANGE THROUGH THE DEVELOPMENT WORKS APPROVAL PROCESS.

				ORIGINATOR: HEH	DATE: 26.03.19	SIGNED:	PLOT BY: HEH	ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND	ISO 9001 QUALITY ASSURED
5	MINOR LHS BERM CORRECTION	GPR	23.08.19	DRAWN: NXS	DATE: 26.03.19	SIGNED:	PLOT DATE: 23.08.19		
4	UPDATED LHS BERM	GPR	22.08.19						
3	SERVICE DETAILS AMENDED	GPR	07.08.19	CHECKED: GPR	DATE: 23.08.19	SIGNED:	SURVEY BY:	THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF, AND MAY NOT BE REPRODUCED OR ALTERED, WITHOUT THE WRITTEN PERMISSION OF HARRISON GRIERSON CONSULTANTS LIMITED. NO LIABILITY SHALL BE ACCEPTED FOR UNAUTHORISED USE OF THIS DRAWING.	
2	ISSUED FOR RESOURCE CONSENT	GPR	12.07.19						
1	ISSUED FOR CLIENT REVIEW	GPR	24.06.19	APPROVED: GPR	DATE: 23.08.19	SIGNED:	SURVEY DATE:		
REF	REVISIONS	BY	DATE						

HG
TAURANGA OFFICE
LEVEL 1, 60 SPRING STREET
TAURANGA 3110
T +64 7 578 0023
W www.harrisongrierson.com

PROJECT:
TAURIKO BUSINESS ESTATE
TBE 3 LIMITED
TAURIKO BUSINESS ESTATE
TAURIKO

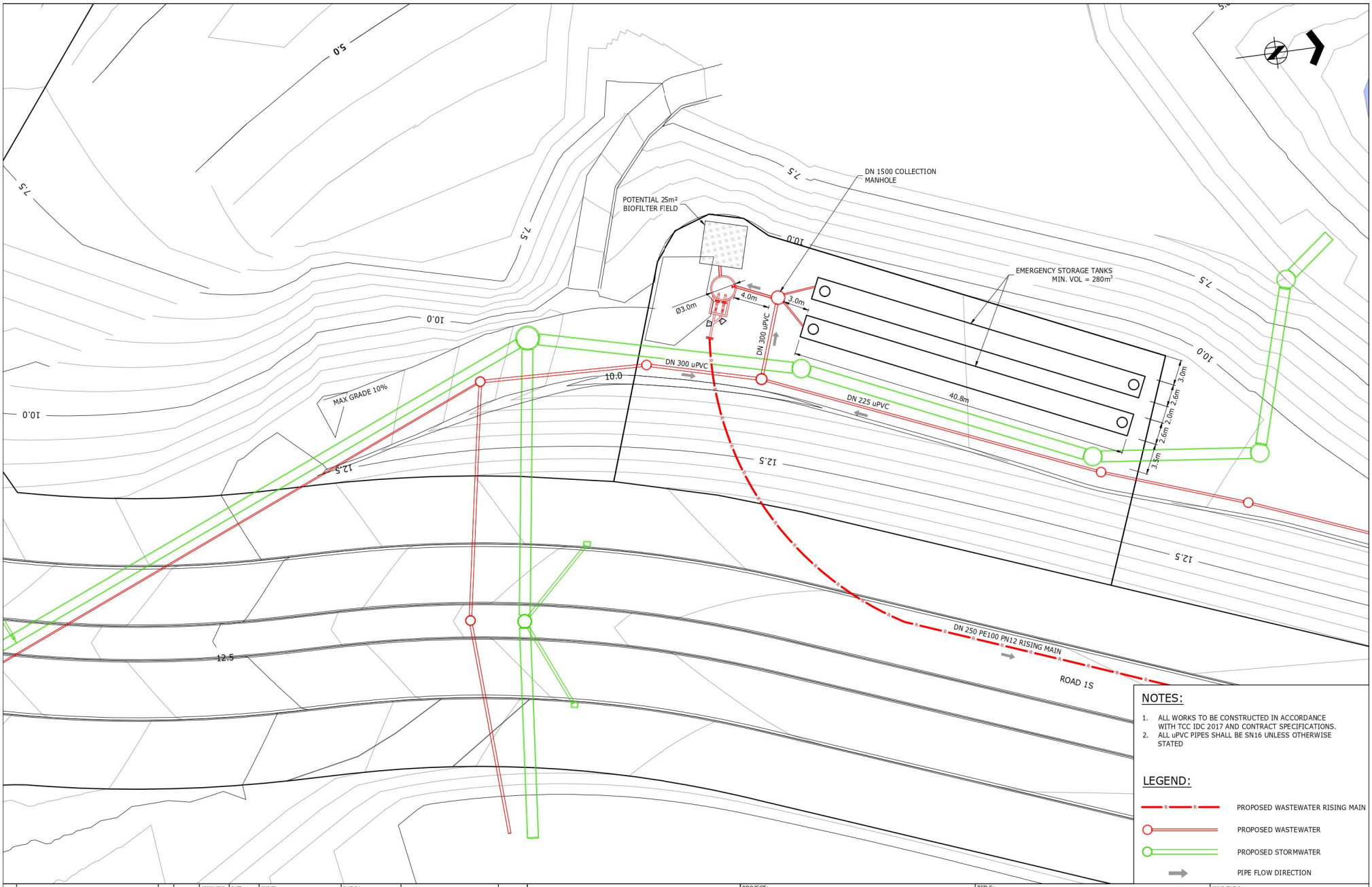
TITLE:
TBE STAGE 3A
ROAD CROSS SECTIONS
SHEET 3

ISSUE STATUS: RESOURCE CONSENT

PROJECT No: 1520-145476-01
SCALES: AS SHOWN
A1

DRAWING No: 145476-RC335
REV 5

REFER TO APPROVED MASTER DRAWINGS FOR ORIGINAL SIGNATURES File: TAURANGA N:\1520\145476_A\CAD\145476-RC331-335.DWG



NOTES:

1. ALL WORKS TO BE CONSTRUCTED IN ACCORDANCE WITH TCC IDC 2017 AND CONTRACT SPECIFICATIONS.
2. ALL uPVC PIPES SHALL BE SN16 UNLESS OTHERWISE STATED

LEGEND:

- PROPOSED WASTEWATER RISING MAIN
- PROPOSED WASTEWATER
- PROPOSED STORMWATER
- PIPE FLOW DIRECTION

REF	REVISIONS	BY	DATE
1	ISSUED FOR RESOURCE CONSENT	GPR	15.08.19

ORIGINATOR: KGH DATE: 23.05.19 SIGNED:
DRAWN: RNV DATE: 15.08.19 SIGNED:
CHECKED: HCH DATE: 15.08.19 SIGNED:
APPROVED: GPR DATE: 15.08.19 SIGNED:
PLOT BY: KGH PLOT DATE: 16.08.19 SURVEY BY: SURVEY DATE:

ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND

ISO 9001 QUALITY ASSURED

TAURANGA OFFICE
LEVEL 1, 60 SPRING STREET
TAURANGA 3110
T +64 7 578 0123
W www.harrisongrierson.com

PROJECT:
TBE 3 LIMITED
TAURIKO BUSINESS ESTATE
TAURIKO

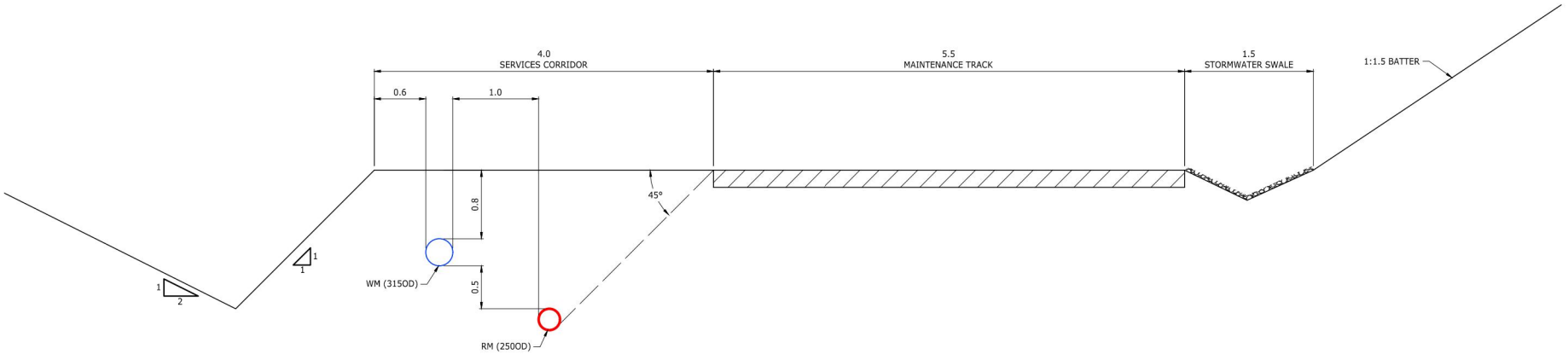
TITLE:
STAGE 3A
WASTEWATER PUMP STATION
LAYOUT PLAN

ISSUE STATUS: RESOURCE CONSENT

PROJECT No: 1550-145586-01
SCALES: 1:200 - A1, 1:400 - A3
A1

DRAWING No: 145586-RC450
REV 1

REFER TO APPROVED MASTER DRAWINGS FOR ORIGINAL SIGNATURES File: TAURANGA N:\1550\145586_A TBE 3A WWPS\CAD\145586-RC450.DWG



SERVICES CORRIDOR

SCALE 1:25 - A1 , 1:50 - A3

REF	REVISIONS	BY	DATE
3	REVISED CROSS SECTION	GPR	15.11.19
2	REVISED CROSS SECTION	GPR	03.10.19
1	PRELIMINARY	GPR	17.09.19

ORIGINATOR: GPR DATE: 17.09.19 SIGNED:
DRAWN: PSJ DATE: 17.09.19 SIGNED:
CHECKED: GPR DATE: 15.11.19 SIGNED:
APPROVED: GPR DATE: 15.11.19 SIGNED:
PLOT BY: NXS
PLOT DATE: 15.11.19
SURVEY BY:
SURVEY DATE:

ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND

ISO 9001 QUALITY ASSURED

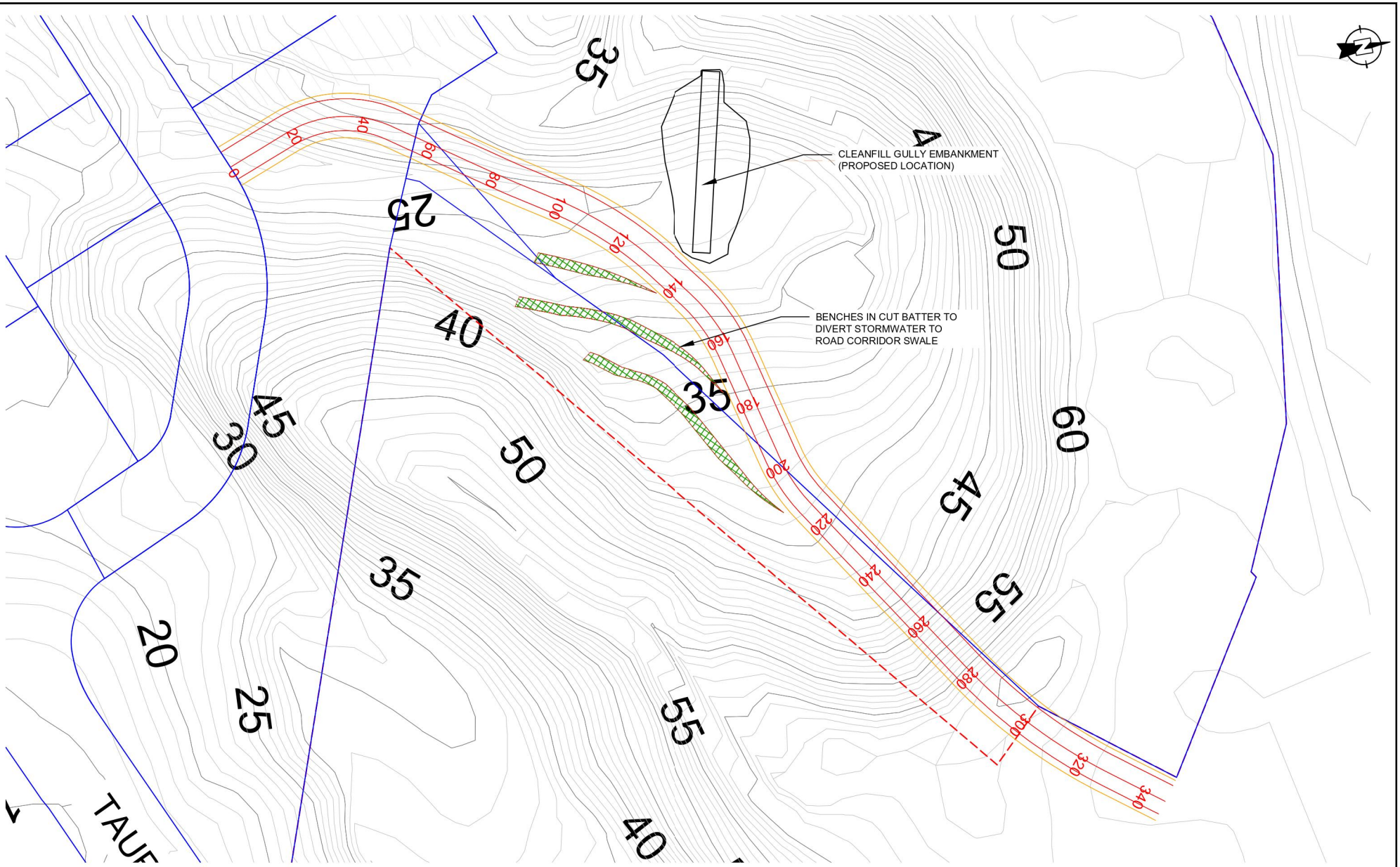
TAURANGA OFFCE
LEVEL 1, 60 SPRING STREET
TAURANGA 3110
T +64 7 578 0013
W www.harrisongrierson.com

PROJECT:
TBE 2 LIMITED
TAURIKO BUSINESS ESTATE
TAURIKO

TITLE:
STAGE 3A
GARGAN SERVICES CORRIDOR
TYPICAL CROSS SECTION

ISSUE STATUS: FOR INFORMATION
PROJECT No: 1520-145476-01
SCALES: AS SHOWN
A1
DRAWING No: 145476-GA570
REV 3

REFER TO APPROVED MASTER DRAWINGS FOR ORIGINAL SIGNATURES File: TAURANGA N:\1520\145476_A\CAD\145476-GA570 (TBE 3A SERVICES CORRIDOR SECTION).DWG



LEGEND:

- LOT BOUNDARY
- STAGE BOUNDARY
- 220 CHAINAGE

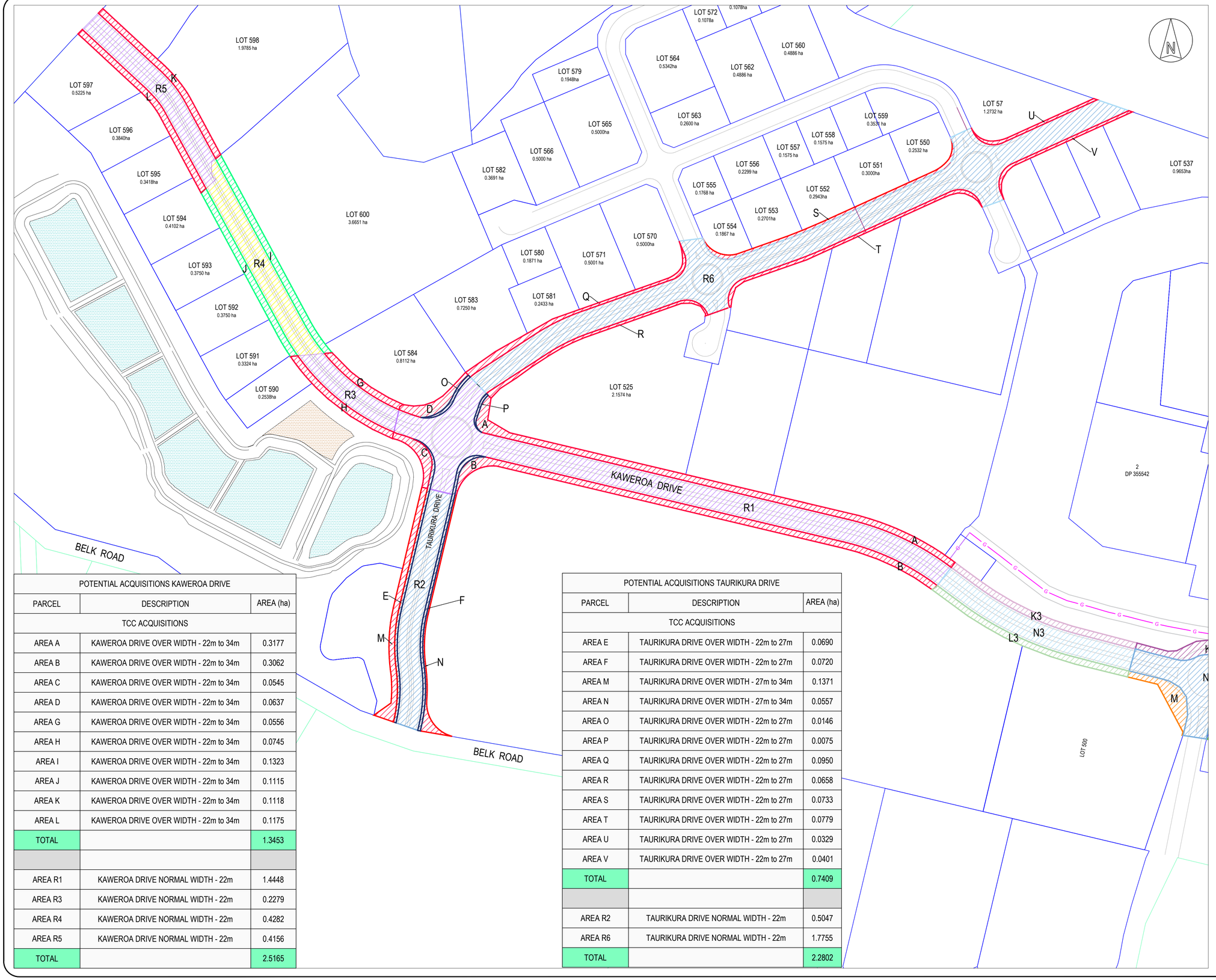
NOTES:

1. SERVICES CORRIDOR ALIGNMENT DATA PROVIDED BY TBE 2 LTD OCTOBER 2019.
2. ORIGINAL CONTOURS SHOWN. CONTOURS ARE IN 1M INTERVALS AND WITH RESPECT TO MOTURIKI DATUM.

1:1000 0 10 20 30 40 50 m

CMW Geosciences

CLIENT: TBE 2 LIMITED		DRAWN: DH	PROJECT: TGA2016-0010
PROJECT: STAGE 3A TAURIKO BUSINESS ESTATE		CHECKED: DM	DRAWING: 206
		REVISION: 0	SCALE: 1:1000
TITLE: GARGAN SERVICE ROAD CORRIDOR		DATE: 14/11/19	SHEET: A3 L



POTENTIAL ACQUISITIONS KAWEROA DRIVE		
PARCEL	DESCRIPTION	AREA (ha)
TCC ACQUISITIONS		
AREA A	KAWEROA DRIVE OVER WIDTH - 22m to 34m	0.3177
AREA B	KAWEROA DRIVE OVER WIDTH - 22m to 34m	0.3062
AREA C	KAWEROA DRIVE OVER WIDTH - 22m to 34m	0.0545
AREA D	KAWEROA DRIVE OVER WIDTH - 22m to 34m	0.0637
AREA G	KAWEROA DRIVE OVER WIDTH - 22m to 34m	0.0556
AREA H	KAWEROA DRIVE OVER WIDTH - 22m to 34m	0.0745
AREA I	KAWEROA DRIVE OVER WIDTH - 22m to 34m	0.1323
AREA J	KAWEROA DRIVE OVER WIDTH - 22m to 34m	0.1115
AREA K	KAWEROA DRIVE OVER WIDTH - 22m to 34m	0.1118
AREA L	KAWEROA DRIVE OVER WIDTH - 22m to 34m	0.1175
TOTAL		1.3453
AREA R1	KAWEROA DRIVE NORMAL WIDTH - 22m	1.4448
AREA R3	KAWEROA DRIVE NORMAL WIDTH - 22m	0.2279
AREA R4	KAWEROA DRIVE NORMAL WIDTH - 22m	0.4282
AREA R5	KAWEROA DRIVE NORMAL WIDTH - 22m	0.4156
TOTAL		2.5165

POTENTIAL ACQUISITIONS TAURIKURA DRIVE		
PARCEL	DESCRIPTION	AREA (ha)
TCC ACQUISITIONS		
AREA E	TAURIKURA DRIVE OVER WIDTH - 22m to 27m	0.0690
AREA F	TAURIKURA DRIVE OVER WIDTH - 22m to 27m	0.0720
AREA M	TAURIKURA DRIVE OVER WIDTH - 27m to 34m	0.1371
AREA N	TAURIKURA DRIVE OVER WIDTH - 27m to 34m	0.0557
AREA O	TAURIKURA DRIVE OVER WIDTH - 22m to 27m	0.0146
AREA P	TAURIKURA DRIVE OVER WIDTH - 22m to 27m	0.0075
AREA Q	TAURIKURA DRIVE OVER WIDTH - 22m to 27m	0.0950
AREA R	TAURIKURA DRIVE OVER WIDTH - 22m to 27m	0.0658
AREA S	TAURIKURA DRIVE OVER WIDTH - 22m to 27m	0.0733
AREA T	TAURIKURA DRIVE OVER WIDTH - 22m to 27m	0.0779
AREA U	TAURIKURA DRIVE OVER WIDTH - 22m to 27m	0.0329
AREA V	TAURIKURA DRIVE OVER WIDTH - 22m to 27m	0.0401
TOTAL		0.7409
AREA R2	TAURIKURA DRIVE NORMAL WIDTH - 22m	0.5047
AREA R6	TAURIKURA DRIVE NORMAL WIDTH - 22m	1.7755
TOTAL		2.2802

Notes:

THIS PLAN HAS BEEN PREPARED TO ACCOMPANY AN ELEMENT IMF VOLUME REPORT. IT IS TO BE USED ONLY IN CONJUNCTION WITH OUR REPORT. THE CONCEPT DEPICTED HEREON IS SUBJECT TO APPROVAL.

BOUNDARY POSITIONS AND AREAS ARE INDICATIVE ONLY AND ARE SUBJECT TO SURVEY.

LEGEND:

TCC ACQUISITIONS

- A-D KAWEROA DRIVE OVER WIDTH
- E - F TAURIKURA DRIVE OVER WIDTH
- G - H KAWEROA DRIVE OVERWIDTH
- I - J KAWEROA DRIVE OVERWIDTH
- K - L KAWEROA DRIVE OVERWIDTH
- M - P TAURIKURA DRIVE OVER WIDTH
- Q - V TAURIKURA DRIVE OVERWIDTH
- R1 KAWEROA DRIVE NORMAL WIDTH
- R2 TAURIKURA DRIVE NORMAL WIDTH
- R3 KAWEROA DRIVE NORMAL WIDTH
- R4 KAWEROA DRIVE NORMAL WIDTH
- R5 KAWEROA DRIVE NORMAL WIDTH
- R6 TAURIKURA DRIVE NORMAL WIDTH

C	AREA IDENTIFICATION REVISED	RH	2021-07-29
B	ADD TAURIKURA Dv AREAS	RH	2020-10-29
A	PRELIMINARY ISSUE	RH	2020-07-31
	DESCRIPTION:	BY:	DATE:

STATUS: SURVEY

element IME
INVESTMENT MANAGEMENT FINANCE

CLIENT: TBE 2
TAURIKURA DRIVE
TAURIKO
TAURANGA

PROJECT: STAGE 3A
TAURIKO

TITLE: TCC LAND ACQUISITION
KAWEROA/TAURIKURA DRIVE

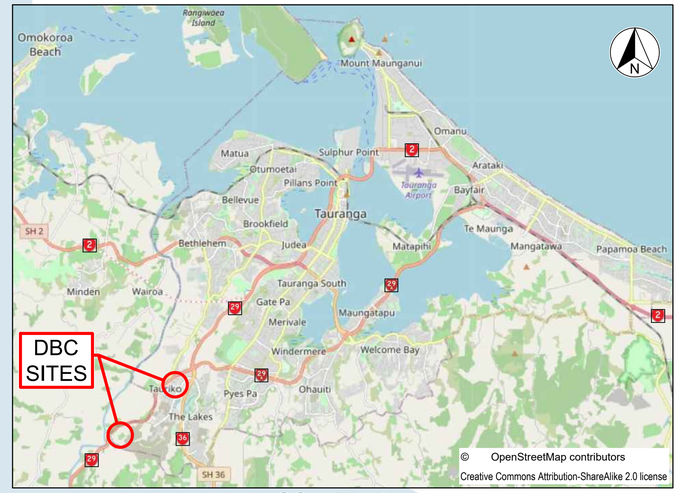
SCALE AT A1:	DATE:	DRAWN:	CHECKED:
1 : 1750	31-07-2020	RH	
PROJECT NO:	DRAWING NO:		REVISION:
509820	S-021		C

Appendix M : DBC Enabling Works Drawings

SHEET INDEX

DRAWING REGISTER		DATE OF ISSUE												
PROJECT TITLE:	DAY	27	12	06										
WAKA KOTAHI / TAURANGA CITY COUNCIL	MONTH	08	11	12										
SH29 REDWOOD LANE TO CAMBRIDGE RD	YEAR	21	21	21										
ENABLING WORKS	CHKD	MPM	MPM	MPM										
DETAILED BUSINESS CASE														

DRAWING No.	SHEET No.	SIZE	DRAWING TITLE	REVISION										
			COVER SHEET											
2-32735.01	C1	A1	PROJECT OVERVIEW PLAN	A	B	C								
2-32735.01	C2	A1	REDWOOD LANE ROUNDABOUT - SHEET 1 OF 2	A	B	C								
2-32735.01	C3	A1	REDWOOD LANE ROUNDABOUT - SHEET 2 OF 2	A	B	C								
2-32735.01	C4	A1	TAURIKO WEST TRAFFIC SIGNALS	A	B	C								
2-32735.01	C5	A1	CAMBRIDGE ROAD TRAFFIC SIGNALS	A	B	C								
2-32735.01	C6	A1	WHIORE AVE - SHARED WALKING AND CYCLING FACILITY	A	B	C								
2-32735.01	C7	A1	INTERSECTION LAYOUT: REDWOOD LANE ROUNDABOUT	A	B	C								
2-32735.01	C8	A1	INTERSECTION LAYOUT: TAURIKO VILLAGE SIGNALS	A	B	C								
2-32735.01	C9	A1	INTERSECTION LAYOUT: CAMBRIDGE RD/WHIORE AVE SIGNALS	A	B	C								



LOCALITY PLAN

WAKA KOTAHI / TAURANGA CITY COUNCIL
SH29 REDWOOD LANE TO CAMBRIDGE RD
ENABLING WORKS

CIVIL
DETAILED BUSINESS CASE - CONCEPT DESIGN

Project No: 2-32735.01
Date: DECEMBER 2021

300 mm
200
100
50
0 10 mm

REVISION	AMENDMENT	APPROVED	DATE
A	ISSUED FOR REVIEW	MPM	27/08/2021
B	ISSUED FOR BUSINESS CASE	MPM	12/11/2021
C	ISSUED FOR BUSINESS CASE	MPM	06/12/2021

WAKA KOTAHI NZ TRANSPORT AGENCY

Tauranga City

wsp
Hamilton Office
+64 7 838 9344
Private Bag 3057
Waikato Mail Centre
Hamilton 3240

CIVIL

SCALES 1:5000

ORIGINAL SIZE A1

DRAWN	DESIGNED	APPROVED
A. BAIRD	B. HARRIS	M. MEISTER

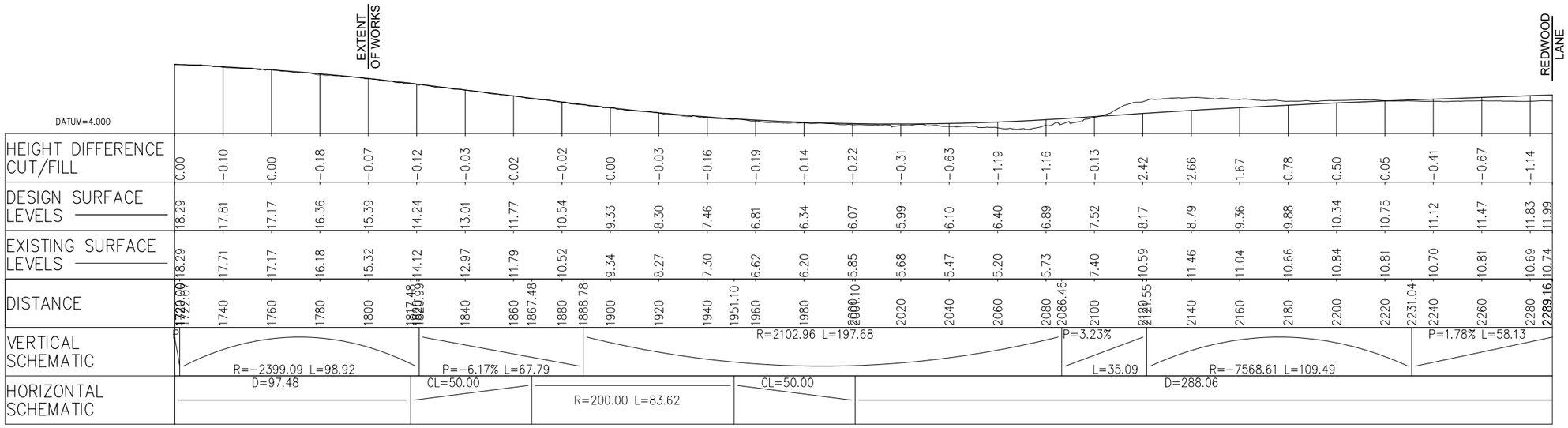
DRAWING VERIFIED	DESIGN VERIFIED	APPROVED DATE
		AUGUST 2021

DETAILED BUSINESS CASE

PROJECT
WAKA KOTAHI / TAURANGA CITY COUNCIL
SH29 REDWOOD LANE TO CAMBRIDGE RD
ENABLING WORKS - CONCEPT DESIGN

TITLE
PROJECT OVERVIEW PLAN

WSP PROJECT NO. (SUB-PROJECT)	SHEET NO.	REVISION
2-32735.01	C1	C



REVISION	AMENDMENT	APPROVED	DATE
A	ISSUED FOR REVIEW	MPM	27/08/2021
B	ISSUED FOR BUSINESS CASE	MPM	12/11/2021
C	ISSUED FOR BUSINESS CASE	MPM	06/12/2021

WAKA KOTAHI NZ TRANSPORT AGENCY

Tauranga City

wsp
Hamilton Office
+64 7 838 9344
Private Bag 3057
Waikato Mail Centre
Hamilton 3240

CIVIL

SCALES: 1:1000
ORIGINAL SIZE: A1

DRAWN	DESIGNED	APPROVED
A. BAIRD	B. HARRIS	M. MEISTER
DRAWING VERIFIED	DESIGN VERIFIED	APPROVED DATE
	-	AUGUST 2021

DETAILED BUSINESS CASE

PROJECT
WAKA KOTAHI / TAURANGA CITY COUNCIL
SH29 REDWOOD LANE TO CAMBRIDGE RD
ENABLING WORKS - CONCEPT DESIGN

TITLE
REDWOOD LANE ROUNDABOUT
SHEET 1 OF 2

WSP PROJECT NO. (SUB-PROJECT)	SHEET NO.	REVISION
2-32735.01	C2	C

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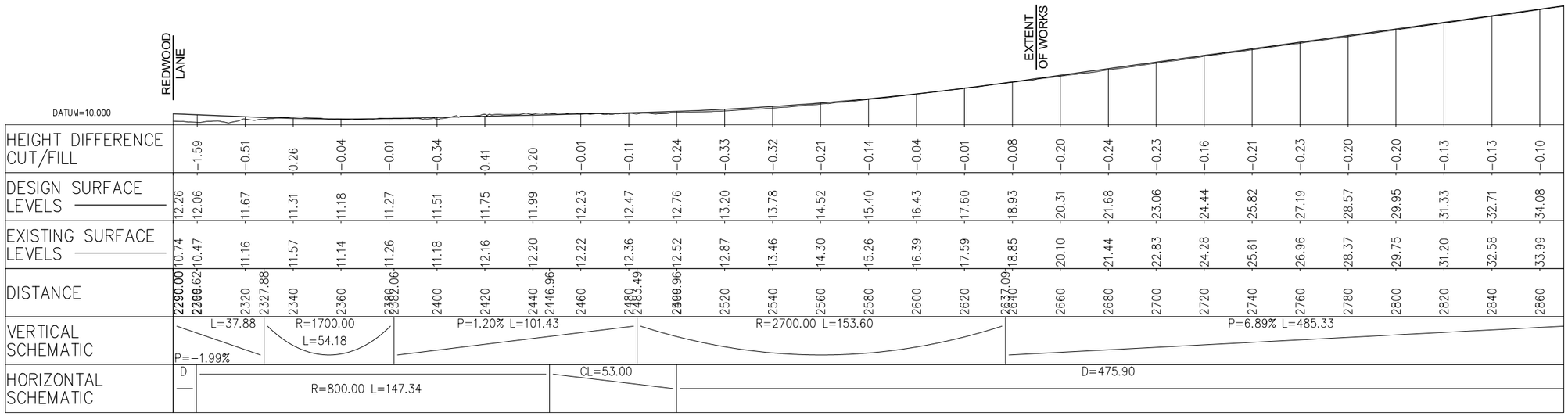

REVISION	AMENDMENT	APPROVED	DATE
A	ISSUED FOR REVIEW	MPM	27/08/2021
B	ISSUED FOR BUSINESS CASE	MPM	12/11/2021
C	ISSUED FOR BUSINESS CASE	MPM	06/12/2021

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CIVIL

SCALES: 1:1000
ORIGINAL SIZE: A1

DRAWN	DESIGNED	APPROVED
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DRAWING VERIFIED	DESIGN VERIFIED	APPROVED DATE
		AUGUST 2021

DETAILED BUSINESS CASE

PROJECT
WAKA KOTAHI / TAURANGA CITY COUNCIL
SH29 REDWOOD LANE TO CAMBRIDGE RD
ENABLING WORKS - CONCEPT DESIGN

TITLE
REDWOOD LANE ROUNDABOUT
SHEET 2 OF 2

WSP PROJECT NO. (SUB-PROJECT): 2-32735.01
SHEET NO.: C3
REVISION: C

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DETAILED BUSINESS CASE

PROJECT
WAKA KOTAHI / TAURANGA CITY COUNCIL
SH29 REDWOOD LANE TO CAMBRIDGE RD
ENABLING WORKS - CONCEPT DESIGN

TITLE
TAURIKO WEST TRAFFIC SIGNALS

WSP PROJECT NO. (SUB-PROJECT)	SHEET NO.	REVISION
2-32735.01	C4	C

Original sheet size A1 (841x594) Plot Date 2021-12-07 at 2:46:36 PM U:\WSPOpusNZ\HA\ha_civ_g\232700\32735_01 Tauriko West DBC\3. Drawings\1-Enabling Works\Current\2-32735.01_C2-C6 Design.dwg C4(C)

LARGE RETAINING WALL

EXTENT OF WORKS

CAMBRIDGE RD

CAMBRIDGE ROAD / WHIORE AVE SIGNALISED INTERSECTION

AT-GRADE SIGNALISED CROSSING OF SH29 FOR WALKING AND CYCLING

RETAINING WALL

RETAINING WALL

EXTENT OF WORKS

TAURANGA CROSSING

WHIORE AVE ACCESS FROM/TO SH29 AND CAMBRIDGE ROAD FOR BUS ONLY VIA SIGNALS.

<< HAMILTON

BUS LANE

BUSES ONLY

BUSES ONLY

CONSTRUCTED STORMWATER WETLAND

TAURANGA CITY CENTRE AND PORT ->

PAPAMOA >>

EXTENT OF WORKS

TAURANGA CROSSING

<< ROTORUA

REVISION	AMENDMENT	APPROVED	DATE
A	ISSUED FOR REVIEW	MPM	27/08/2021
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CIVIL

SCALES 1:1000

ORIGINAL SIZE A1

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DRAWING VERIFIED	DESIGN VERIFIED	APPROVED DATE
		AUGUST 2021

DETAILED BUSINESS CASE

PROJECT
WAKA KOTAHI / TAURANGA CITY COUNCIL
SH29 REDWOOD LANE TO CAMBRIDGE RD
ENABLING WORKS - CONCEPT DESIGN

TITLE
CAMBRIDGE ROAD TRAFFIC SIGNALS

WSP PROJECT NO. (SUB-PROJECT) 2-32735.01

SHEET NO. C5

REVISION C

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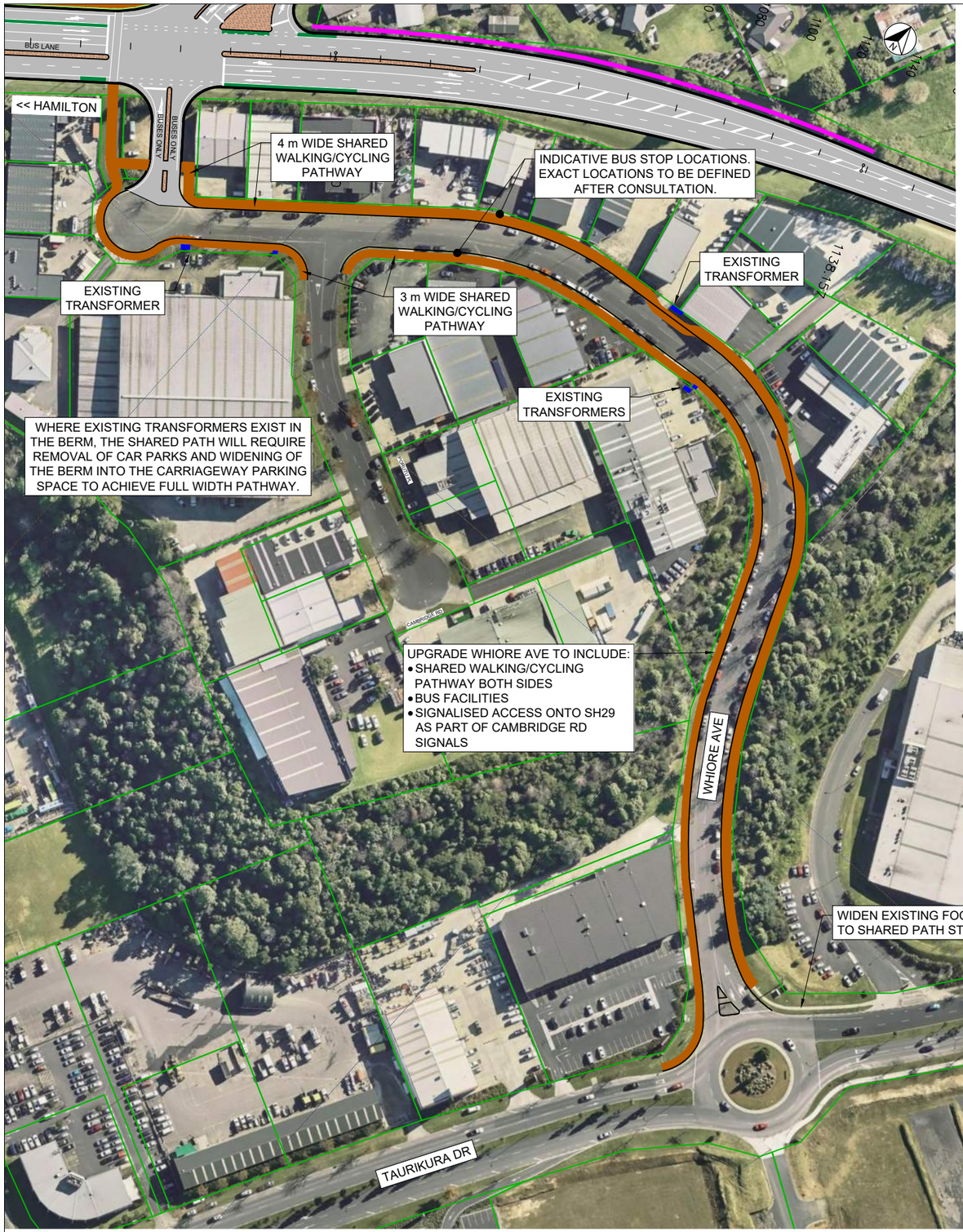

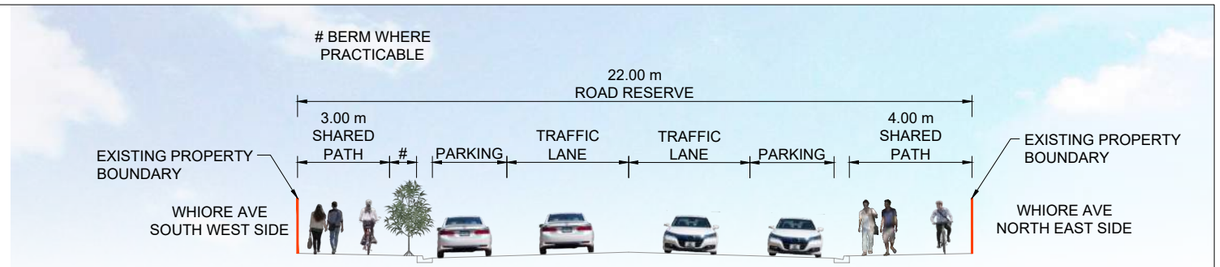

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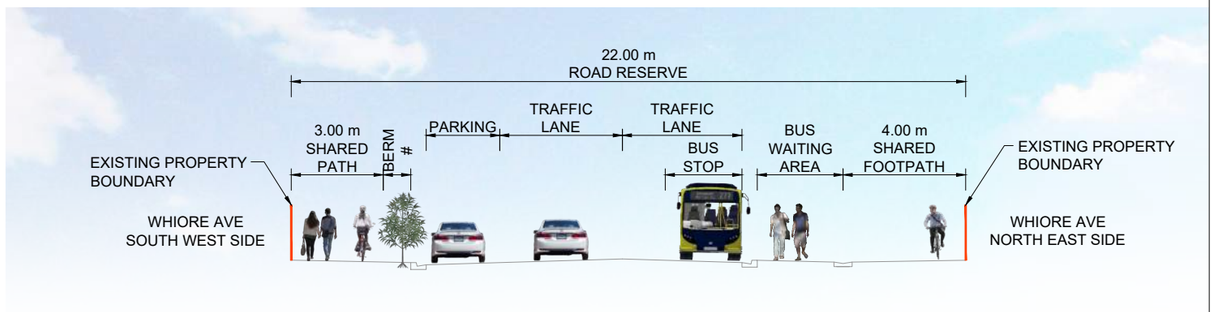
NOT TO SCALE



2 - WHIORE AVE TYPICAL CROSS SECTION WITH BUS STOP
NOT TO SCALE

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REVISION	AMENDMENT	APPROVED	DATE
A	ISSUED FOR REVIEW	MPM	27/08/2021
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CIVIL

SCALES 1:1000
ORIGINAL SIZE A1
DRAWN A. BAIRD
DESIGNED C. MASON
APPROVED M. MEISTER
DRAWING VERIFIED
DESIGN VERIFIED
APPROVED DATE AUGUST 2021

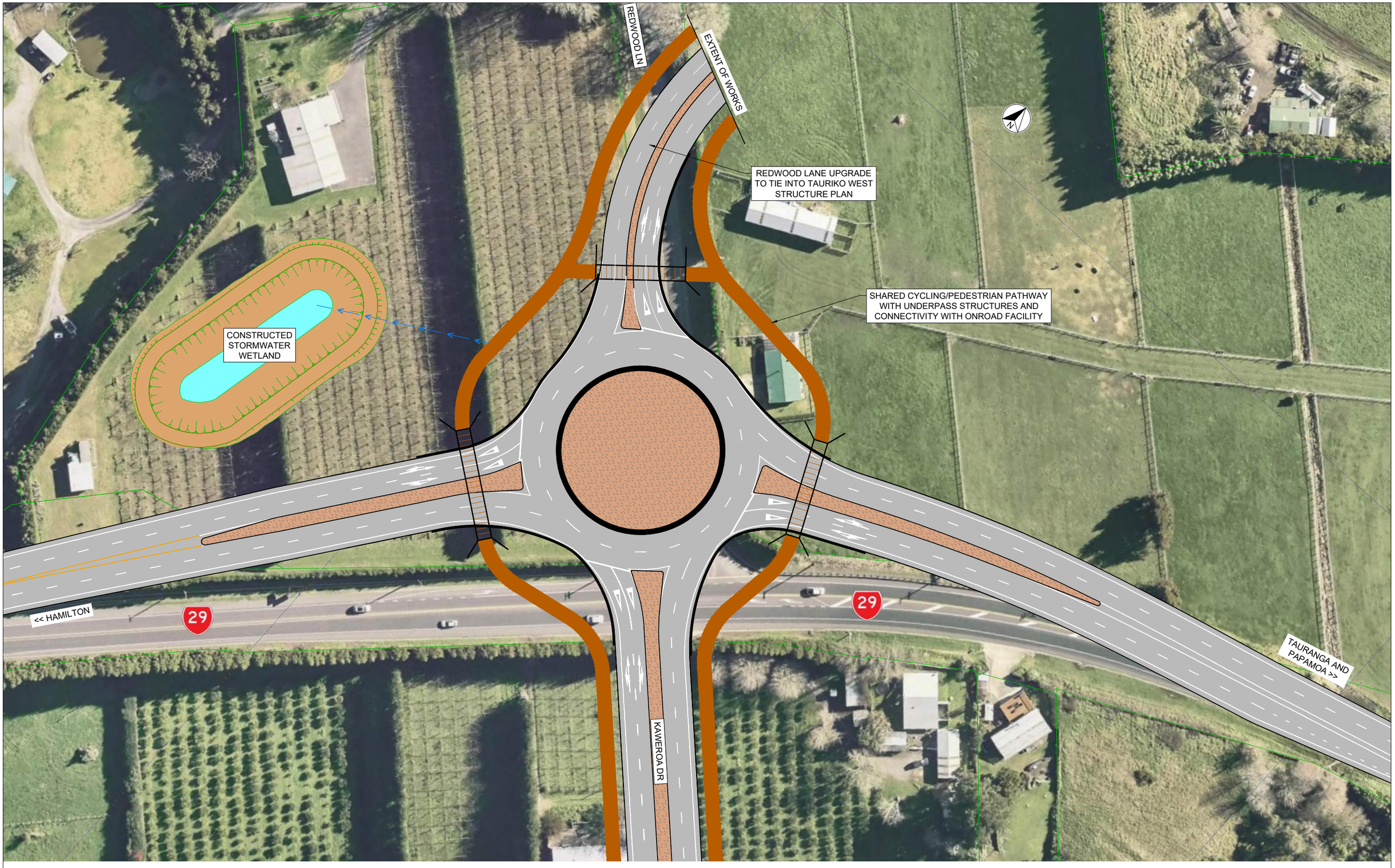
DETAILED BUSINESS CASE

PROJECT
WAKA KOTAHI / TAURANGA CITY COUNCIL
SH29 REDWOOD LANE TO CAMBRIDGE RD
ENABLING WORKS - CONCEPT DESIGN

TITLE
WHIORE AVE - SHARED WALKING AND CYCLING FACILITY

WSP PROJECT NO. (SUB-PROJECT) 2-32735.01
SHEET NO. C6
REVISION C

Original sheet size A1 (841x594) Plot Date 2021-12-07 at 2:46:48 PM U:\WSPOpusNZ\HA\ha_civ_g\232700\32735_01 Tauriko West DBC\3. Drawings\1-Enabling Works\Current\2-32735.01_C2-C6 Design.dwg C6(C)



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REVISION	AMENDMENT	APPROVED	DATE
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CIVIL

SCALES: 1:500 (A1), 1:1000 (A3)
ORIGINAL SIZE: A1

DRAWN	DESIGNED	APPROVED
A. BAIRD	B. HARRIS	M. MEISTER

DRAWING VERIFIED	DESIGN VERIFIED	APPROVED DATE
		AUGUST 2021

DETAILED BUSINESS CASE

PROJECT
WAKA KOTAHI / TAURANGA CITY COUNCIL
SH29 REDWOOD LANE TO CAMBRIDGE RD
ENABLING WORKS - CONCEPT DESIGN

TITLE
INTERSECTION LAYOUT
REDWOOD LANE ROUNDABOUT

WSP PROJECT NO. (SUB-PROJECT)	SHEET NO.	REVISION
2-32735.01	C7	C

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100
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0 10 mm

REVISION	AMENDMENT	APPROVED	DATE
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ORIGINAL SIZE: A1

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DRAWING VERIFIED	DESIGN VERIFIED	APPROVED DATE
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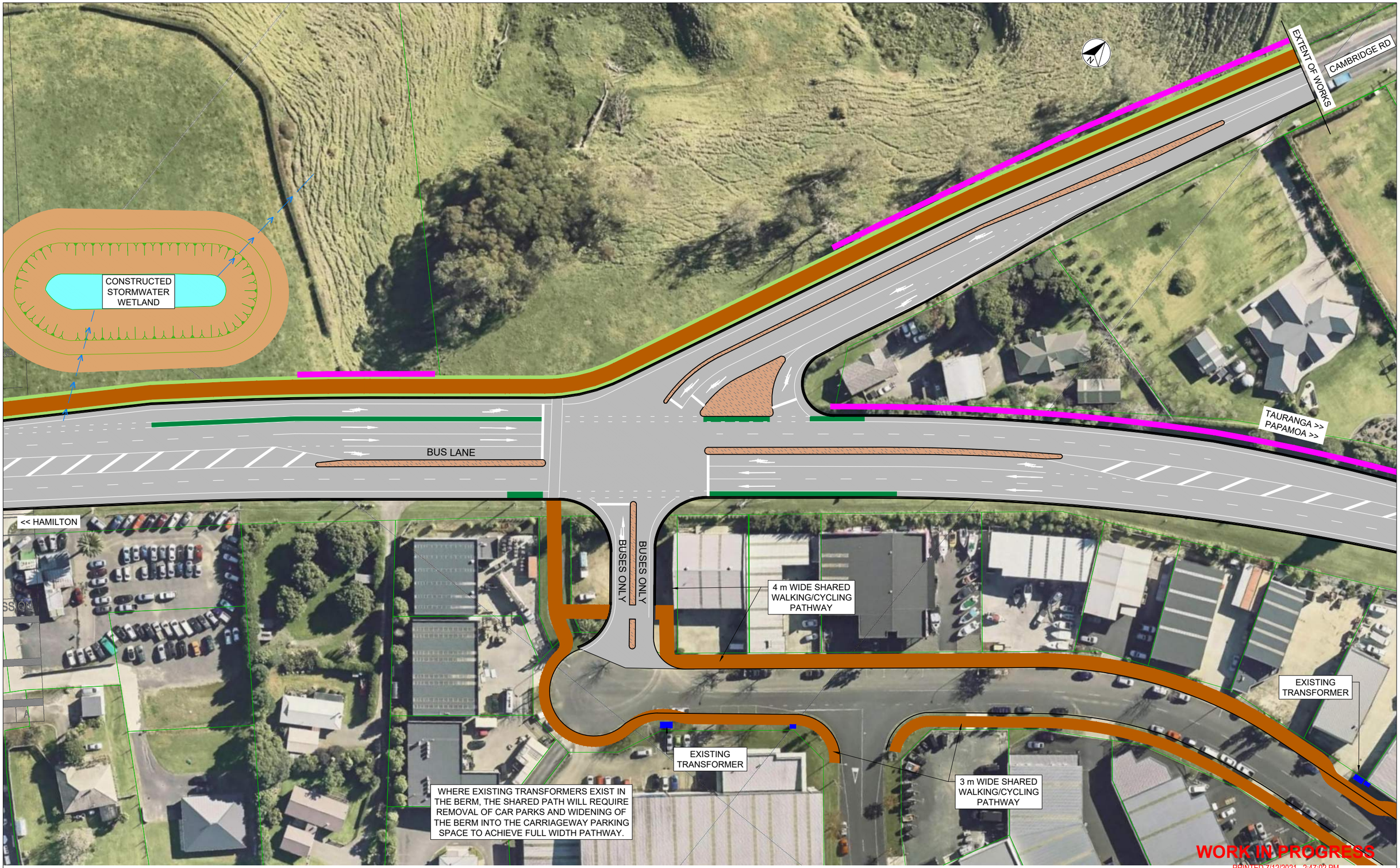
DETAILED BUSINESS CASE

PROJECT
WAKA KOTAHI / TAURANGA CITY COUNCIL
SH29 REDWOOD LANE TO CAMBRIDGE RD
ENABLING WORKS - CONCEPT DESIGN

TITLE
INTERSECTION LAYOUT
TAURIKO VILLAGE SIGNALS

WSP PROJECT NO. (SUB-PROJECT)	SHEET NO.	REVISION
2-32735.01	C8	C



WORK IN PROGRESS

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REVISION	AMENDMENT	APPROVED	DATE
A	ISSUED FOR REVIEW	MPM	27/08/2021
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A. BAIRD	B. HARRIS	M. MEISTER

DRAWING VERIFIED	DESIGN VERIFIED	APPROVED DATE
		AUGUST 2021

DETAILED BUSINESS CASE

PROJECT
WAKA KOTAHI / TAURANGA CITY COUNCIL
SH29 REDWOOD LANE TO CAMBRIDGE RD
ENABLING WORKS - CONCEPT DESIGN

TITLE
INTERSECTION LAYOUT
CAMBRIDGE RD/WHIORE AVE SIGNALS

WSP PROJECT NO. (SUB-PROJECT)	SHEET NO.	REVISION
2-32735.01	C9	C

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Appendix N : Environmental Social Responsibility Screen – Recommended Option

ENVIRONMENTAL AND SOCIAL RESPONSIBILITY SCREEN V2.FEBRUARY 2016

Use to assess options in the Indicative Business Case

Use this screen to identify opportunities and risks and assess options for state highway projects. Complete the screen for each option to distinguish them from one another or bundle options where appropriate. Screen results will signal where technical assessments are required and provide a written record to support the alternatives assessment required for statutory applications. For further assistance contact the EUD Team.

Additional instructions and content, including information sources, to help complete the screen can be found on the Highways Information Portal Screen pages here

Decide how many times screen should be filled out (Group Options) ▶ Answer screen questions using project information and suggested information sources ▶ Refer to screen questions explanation, particularly if you answered yes to any of the questions ▶ Complete page 2 of screen ▶ Incorporate page 2 text in IBC assessment of options table (Background and MCA)

PROJECT LOCATION:	PROJECT PURPOSE:	DATE:	OPTION DESCRIPTION:
Tauriko West Network DBC	Safety, freight efficiency, supporting growth	28 June 2017	High level - corridor assessment

CATEGORY		QUESTION	ANSWER				USEFUL INFORMATION SOURCES
GENERAL	G1	What is the zoning of adjacent land? Are there any encumbrances on the land? e.g. Maori Reserve or other reserve/covenants	Rural	✔	Commercial	✔	District/Unitary Plan Zoning Maps
			Industrial	✔	Residential	✔	
			High density residential		Parks/open space		
	G2	Does the option disturb previously undisturbed land?	Y	○	N	○	
	G3	What is the construction timeframe?	>18 months	○	<18 months	○	
NATURAL ENVIRONMENT	NE1	Are there any outstanding/significant natural features (e.g. geological or geothermal)/landscapes?	Y	○	N	○	NZTA MapHub Environmental and Social Risk Map- Natural Environment
	NE2	Will the option affect the coastal marine area, wetlands, lakes, rivers, streams or their margins?	Y	○	N	○	Regional Plan Maps and Schedules
	NE3	Will the option affect areas of the conservation estate, or areas of known significance for biodiversity or known habitats of uncommon or threatened species?	Y	○	N	○	District Plan Maps and Schedules
	NE4	Is the option in an area of potential hazard risk e.g. fault lines, significant erosion, flooding, sea level rise etc?	Y	○	N	○	Department of Conservation
	NE5	Will more than 0.5 hectares of vegetation be removed?	Y	○	N	○	
		What type?					
CULTURAL AND HISTORIC HERITAGE	CH1	Are there sites/areas of significance to Maori within 200m of the area of interest?	Y	○	N	○	Iwi NZTA MapHub Environmental and Social Risk Map- Culture and Heritage Heritage New Zealand List NZ Archaeological Association District Plan Maps and Schedules Regional Plan Maps and Schedules IPENZ Heritage List NZTA GIS predictive models
	CH2	Are any recorded, scheduled or listed archaeological sites within 200m of the area of interest?	Y	○	N	○	
	CH3	Are any scheduled, listed or other important heritage buildings/ structures within 200m of the area of interest?	Y	○	N	○	
	CH4	Will the option affect the setting of any historic building/structure or archaeological site?	Y	○	N	○	
	CH5	Is a group of archaeological sites or an area of historic built environment (even partially) within 200m of the area of interest?	Y	○	N	○	
HUMAN HEALTH	HH1	What is the One Network Road Classification?	National	✔	Regional		NZTA MapHub Environmental and Social Risk Maps- Human Health and Community which includes: - Designated airsheds (including one network classification) - Highly sensitive receivers Regional Council Contaminated sites Team
			Arterial		Collector		
	HH2	Is the area of interest designated as a non-compliant airshed?	Y	○	N	○	
	HH3	Are there medical sites, rest homes, schools, child care sites, residential properties, maraes or other sensitive receivers located within 200m of the area of interest?	Y	○	N	○	
	HH4	Does land use within 200m of the area of interest include industrial sites, chemical manufacturing or storage, petrol stations, vehicle maintenance, timber processing/treatment, substations, rail yards, landfills or involve other activities that may result in ground contamination?	Y	○	N	○	
		OR Are there HAIL or SLUR (contaminated) sites within 200m of the area of interest?	Y	○	N	○	
SOCIAL	S1	Does the option affect access to community facilities i.e. libraries, open space etc (either temporarily or permanently)?	Y	○	N	○	NZTA MapHub Project Team District Plan Maps Council and Community Strategy Documents
			Which? Tauriko West Growth Area				
	S2	Does the option affect community cohesion and accessibility including vehicular connectivity on the local road network?	Y	○	N	○	
URBAN AND LANDSCAPE DESIGN	ULD 1	Are there opportunities to enhance infrastructure for, and/or improve access to, public transport and/or active modes of travel such as as walking and cycling?	Y	○	N	○	NZTA MapHub Environmental and Social Risk Map- Natural Environment (Scenic Routes) Regional Land Transport Plan Project Team Strategies and District Plan
	ULD2	Does the option enhance the development potential of adjacent land where appropriate?	Y	○	N	○	
	ULD3	Is the option located on a themed highway? Is the option part of or near a national cycle or walking route?	Y	○	N	○	
	ULD4	Are there opportunities to enhance the urban character, landscape character and visual amenity?	Y	○	N	○	

Answers and Comments	Refer to screen questions explanation to help complete this part.

1. **Summarize the potential environmental and social risks/impacts associated with this option. Consider short and long term risks and impacts.**

NATURAL ENVIRONMENT:	Potential effects associated with earthworks include increased stormwater runoff, and possible in-stream works (dependent on option). With appropriate option design and mitigation measures, it is anticipated that the effects on the environment could be avoided, remedied, or mitigated to an acceptable level. Appropriate mitigation measures could include: • Construction of any new stream crossings along the route (Omanawa River or Kopurererua Stream) to minimise any in-stream works. • Controlling sediment and storm water runoff at source and / or through grass swales and detention ponds. Measures to protect the highway from flooding may also need to be considered.
CULTURAL AND HISTORIC HERITAGE:	The corridor traverses the tribal area of several hapu of Ngāti Ranginui. Consultation with local iwi and hapu is ongoing, as part of a joint process with the Partner Councils, and a cultural values assessment(s) will be prepared. It is anticipated that option design and mitigation measures will be required to address the actual and potential cultural effects of the project. There is a high density of archaeological sites, likely that some will be damaged or destroyed. Detailed assessment and Archaeological Authority from Heritage NZ will be required.
HUMAN HEALTH:	The current options do not raise any significant human health issues. The majority of the works proposed through the options are on or adjacent to the existing alignment, and sensitive receptors (e.g. education or residential) adjacent to the corridor are protected under the City Plan or will be relocated. The additional capacity and safety improvements proposed by the options should assist in an overall reduction of congestion and improvement to journey time, which is linked to reduced emissions, traffic noise, and vibration. There are a number of HAIL sites along the corridor, most of which relate to the historic use of chemical sprays associated with horticulture or industrial land use. A PSI (and likely DSI) will be required to identify risks to human health from contaminated soil, and any measures to address these risks.
SOCIAL:	The current options have the potential to affect accessibility and convenience by introducing central and/or side barriers and limiting access to the new highway (which supports the LAR status of SH29). Providing for local road connectivity across the new highway at major intersections, will improve the safety and convenience of crossing the highway. Separation of local traffic from inter-regional traffic will provide for safer and more efficient journeys on the local road network, enabling the right traffic on the right road. Introducing more local road connections as part of the options considered provides for improved resilience for communities. Continued engagement with the community on these issues will be critical to both identifying the locations of highest concern, and managing community expectations around journey time.

The responses above will be used in the IBC assessment of options summary table: MCA of the Option.

URBAN AND LANDSCAPE DESIGN:	Care will be required to minimise visual effects on both amenity and landscape character values of the recommended option selected, both by its design and mitigation measures such as planting, especially for the section of SH29 in the rural zone around Belk Road, the capacity improvements between the intersection of SH29/SH29A/SH36, and at Barkes Corner due to the intensification of residential development in the vicinity of the corridor. With appropriate option design and mitigation measures, it is anticipated that any adverse visual and landscape effects of the project can be avoided, remedied, or mitigated to an acceptable level.

Incorporate the relevant comments from above into the economy, social and geography sections of the IBC assessment of options summary table.

2. **What are the environmental, social integration, landscape design or urban design benefits or opportunities presented by this option? Particularly record opportunities that could be lost if not considered early in the design process.**

The initial opportunities identified, which could be lost if not considered in the option development and evaluation phase, are:
- Opportunities to enhance water quality, urban design, landscape and amenity of corridor.
- Opportunities to improve local road connectivity and enhance liveability across and along corridor.

3. **Are there any impacts, risks or opportunities which require preliminary technical assessments to help understand risks or opportunities? Is further information required to support the development of the detailed business case or can it be left until the detailed business case/pre-implementation?**

The following preliminary assessments are recommended:
- Archaeological (underway in conjunction with Tauranga City Council) and cultural effects assessments
- Stormwater design, flood modelling (underway in conjunction with Tauranga City Council) and water quality effects management
- Thorough assessment of urban design and connectivity issues (incorporated as part of option development and evaluation)

Completed by	Matt Stulen - Intermediate Planner - Opus and Simon Banks - Senior Planner	
Reviewed by NZTA Project Manager		
Incorporated results into IBC assessment of options summary table?	**Yes** ○	**No** ○

Appendix O : Risk and SiD Registers

This document records the H&S hazards that could give rise to reasonably foreseeable risks to the health & safety of those interacting with the design option, or any part of it, as a work place during its lifecycle.

Limitation on Safety in Design Information provided : Only H&S hazards and risks which will or may result from the design have been identified and recorded. The hazards recorded are those that were identified at the date and associated with stage of the design.

Project information					
Project Name	SH29 Redwood Lane to Cambridge Road - Enabling Works	Project Number	2-32735.01	Date	13-09-21
Client	Waka Kotahi NZTA	Project Stage	DBC		
Brief description of design option, including its intended use	**Enabling Works - SH29 Realignment Belk Road to east of Redwood Lane; Redwood Lane Roundabout; Stormwater Ponds; Tauriko Village Signalised Intersection; SH29 widening between Tauriko Village and Cambridge Road intersections; Cambridge Road /Whiore Avenue Signalised Intersection; Whiore Avenue Shared Path Network**	Prepared by	B. Feary		

	Project Stage and Element Construction Operations Maintenance Disposal/Demolition	**Identified Hazards** Identify Health and Safety hazards that may arise from the design during the lifecycle of the 'structure' and that users need to be aware of to ensure there are no resulting risks to their Health and Safety. How could someone be injured during the life of this component? Can I influence this hazard through my design?	**How is hazard managed in design?** Eliminated / Minimised Can I eliminate the risk of injury through my design? If not, how can I reduce or control the risk so harm is unlikely or less serious?	Likelihood	Consequence	Risk	Residual Risk recorded on drawing sheet #
1	Construction, Contaminated and Hazardous Materials	The agricultural and industrial land north and south of SH29 may have unknown dump sites which could contain pesticides, petroleum products, chemicals, asbestos, biological material etc. These are all a risk to the health and safety of construction workers and the public.	The HAIL (Hazardous Activities and Industries List) register confirms there are potentially contaminated land areas in areas of land take. There are HAIL sites identifying 'persistent pesticide use' at Redwood Lane and southwest of Tauriko Village adjacent to SH29. Further investigation required and a contamination plan for earthworks is required.	Almost Certain	3	High	
2	Construction, Contaminated Land	SH29 widening between Tauriko Village and Cambridge Road effects two existing petrol station, Gull and Caltex. There is a risk of illness from contact with contaminated soil exposed during excavations within reclaimed land or brownfield sites	Undertake PSI and DSI during investigation and design phase to enable a safety plan to be developed for those working with or coming into contact with contaminated soils	Likely	3	High	
3	Construction, Earthworks	Risk of injury due to construction machinery roll-over while compacting subgrade within constrained sites, particularly adjacent to steep embankments or near the edge of cut slopes.	Relocate road formation or building platform away from cut slopes Reconstruct overly steep natural cuts with engineered embankments Consider retaining structures	Moderate	5	High	
4	Construction, Earthworks	Risk to illness/injury to the public from construction noise and/or vibration.	Consider less noisy alternatives. Consider including resource consent conditions.	Likely	3	High	
5	Construction, Earthworks	Deep trenches There is a risk that a workers could be injured while working in deep trenches installing pipes or building underpass structures. The cause of this risk is deep excavations below the groundwater table in soft soils. Although trench shields would be used the ends are often exposed and the shields do not always enclose services crossing the trench.	Follow the Code of Practice for Excavations Use Trench Shields Use Pumps to manage water ingress into trench Review ability to construct using trenchless technologies Where excavations are required inspect shields installed to check excavated faces are supported, including ends and around services	Moderate	5	High	
6	Construction, Earthworks	Embankments and cuttings will be created during construction. There is a likelihood of overslips, fretting, debris on the road and from volumes of material to be transported within the corridor.	Make slopes flatter (1:3 for e.g.) Provide Debris walls/barriers Balance cut to fill volumes to minimise cut to waste trips outside the corridor	Moderate	5	High	
7	Construction, Environment	Safety risk to workers located in areas subjected to flooding - particularly at Redwood Lane near the Wairoa River	Consider historic flood levels and whether weather and water level monitoring are required	Moderate	5	High	
8	Construction, Environment	Settlement and Geotechnical Risks There is a risk that properties could suffer damage / settlement during construction either by open trench or trenchless construction. Slumping and vibration from construction machinery may result in vibration or settlement to the buildings causing cracking or other damage	Geotechnical investigation to determine ground properties to inform the construction methodology. Complete a settlement risk assessment Complete building condition surveys pre, during and post construction Undertake settlement monitoring during construction	Moderate	3	Medium	
9	Construction, Environment	Working around Live Traffic There is a risk that a workers could be injured while working in the road corridor and around live traffic.	Comply with the Code of Practice for Working on the road Traffic Management Site establishment and relevant controls Monitor traffic and provide adequate clearance from the traffic zones. Adopt Worksafe practices including spotters to manage interactions between live traffic and turning trucks and machinery	Moderate	5	High	
10	Construction, Environment	There is a risk that the public would be injured if the construction sites are not properly isolated. The cause of the risk is construction activity including machinery, material storage, open excavation, etc. The consequence is potential injury to public.	Follow the Code of Practice for Excavations An approved TMP/CAR will be required and traffic impact assessment undertaken. Contractor's safety management plan Liaise with property owners to ensure construction occurs in the most reasonable timeframe to avoid potential clashes with the public. An approved TMP/CAR will be required and traffic impact assessment undertaken.	Moderate	4	High	
11	Construction, Environment	Health effects to workers exposed to contaminants while excavating through contaminated land and dealing with contaminated groundwater	Identification of likely contaminants (PSI and DSI). Contamination Management Plan and PPE gear	Moderate	4	High	
12	Construction, Live Traffic	Online configuration more difficult to build due to working in a live traffic environment. This will cause conflicts with other road functions including commuting, parking, and modes of travel; congestion and a higher exposure of workers to conflicts with live traffic and the public to construction activities. The space to work and create safety zones will be limited.	Look at traffic management, construction staging, the possibility of using other roads in the corridor for haul roads and construction access.	Moderate	4	High	
13	Construction, Property Access	Tauriko School needs separation from construction activities during construction to avoid conflict with kids/people. There is a risk of injury from conflicts between construction vehicles and school traffic. The school also has school bus routes running (Rural Routes #12, 13, 14 AM and PM, Cambridge Road and Lakes Bus Routes #814b and 704b run in the PM only)	Where possible incorporate safe access to the school in the design and manage pedestrian and vehicle loading/unloading and manoeuvring off line.	Moderate	4	High	

	Project Stage and Element Construction Operations Maintenance Disposal/Demolition	Identified Hazards Identify Health and Safety hazards that may arise from the design during the lifecycle of the 'structure' and that users need to be aware of to ensure there are no resulting risks to their Health and Safety. How could someone be injured during the life of this component? Can I influence this hazard through my design?	How is hazard managed in design? Eliminated / Minimised Can I eliminate the risk of injury through my design? If not, how can I reduce or control the risk so harm is unlikely or less serious?	Likelihood	Consequence	Risk	Residual Risk recorded on drawing sheet #
14	Construction, Retaining Walls	Retaining Wall Construction on SH29 and Cambridge Road will involve working at height. There is the potential for wall failure and impacts on public safety.	Work from a safe platform and with harnasses where work involves working at height. Use precast elements that can be installed by machinery.	Moderate	5	High	
15	Construction, Stormwater	There is a risk that a workers could be injured while working in the road corridor and around live traffic.	Locate manholes and pipes away from the live carriageway. Provide safe access to the structures. An approved TMP/CAR will be required	Moderate	5	High	
16	Construction, Stormwater	There is a risk that the operating personnel may enter or be injured while accessing the manholes that are deeper than 5m	Safe entry procedures to deep manholes. Incorporate a safety grille if needed and check with the Operator to understand their expectations	Moderate	5	High	
17	Construction, Underpasses	Redwood Lane Underpass is proposed for construction in proximity to the Wairoa River and a potential floodplain area. There are potential issues with safe access to the floodplain and weak/unstable ground for lifting and earthworks creating a risk of structure collapse or machinery tipping during construction injuring workers.	Provide sufficient ground investigation data to enable design of appropriate footings and loads. Avoid structures in the floodplain area. Design to accommodate flood levels.	Moderate	4	High	
18	Construction, Underpasses	Risk of illness from effects of dust.	Avoid need to drill or grind materials that generate dust including concrete.	Moderate	4	High	
19	Construction, Underpasses	Construction of the underpass structures at the Redwood Lane roundabout. The consequence of the threat is inundation during sudden unexpected weather conditions	Eliminate construction around flood plains and close to rivers or streams as much as possible. Manage site drainage particularly in excavations. Plan construction during dry periods. Monitor Weather forecast. Arrange for stand by pumps so that water can be drained from excavations	Moderate	4	High	
20	Construction, Underpasses	Construction of a shared cycling/pedestrian path with underpass Structures at Redwood Lane. Danger to workers of working in an excavation - potential for collapse of material, entrapment.	Consider using precast elements to limit time in excavation. Excavation management to ensure materials properties are managed with shoring/supports, access to excavation is limited and excavation is mechanical to ensure workers are isolated from hazards.	Moderate	5	High	
21	Construction, Retaining Walls	Retaining walls are proposed for construction on SH29 and Cambridge Road. There is risk of damage to existing properties or the stability of the adjacent road and settlement which could cause damage to other structures creating a risk of injury to the public and construction workers.	Monitor displacement level during excavation and set an alarm level Geotechnical investigation to ensure settlement is understood.	Unlikely	4	Medium	
22	Construction, Traffic Management	Traffic Management is required for all options at the construction interface with existing road infrastructure. There is a risk to construction personnel and the public of delays and crashes.	Staging of works to ensure separation of workers from live traffic. Temporary Traffic Management to manage speeds, access and conflicts.	Likely	4	High	
23	Construction, Traffic Management	Risk of road users being injured due to hauling materials long distances over high volume roads and highways.	Consider use of in-situ and locally available materials Consider safe haul routes in design.	Likely	4	High	
24	Construction, Traffic Management	Online construction will create congestion, creating driver frustration leading to hasty and dangerous actions. Congestion creates fumes. which can have an impact on public health.	Construction site management and temporary traffic management to reduce conflicts between construction activities and the existing road corridor.	Likely	4	High	
25	Construction, Utilities	Online alignment will likely result in conflict with existing services. Risk of electrocution during excavation from underground services.	Consider temporary re-location of electrical supply cables (and sub stations) as part of enabling works. Undertake investigation during investigation and design phase, including Ground Penetrating Radar and pot holing	Moderate	5	High	
26	Construction, Utilities	When working with existing services there is a risk of workers being buried due to the collapse of trench walls; a risk of electrocution during excavation if workers or equipment come into contact with underground services; and risk of damaging existing services which include lifeline services.	Avoid the need for trenching - consider hydrovac to identify services, thrusting for new services. Design to limit trench depths. Consider temporary re-location of electrical supply cables (and substations) as part of the enabling works. Undertake utilities investigation during the investigation and design phase, including using Ground Penetrating Radar and pot holing.	Moderate	5	High	
27	Construction, Utilities	There are existing transformers on Whiore Avenue which are remaining in place - at these locations construction of the shared path will require removal of car parks and widening of the berm into the carriageway parking spaces to achieve the full width pathway. Risk to workers of working around high voltage power supply.	Identify location of all electrical services in the vicinity of the transformers and ensure all works have appropriate permits and approvals including confirming any safe proximity requirements before any excavation is undertaken.	Likely	5	Critical	
28	Construction, Utilities	Known and Unknown underground utilities are at risk of being struck during excavation work - which could affect the safety of the construction workers and disrupt essential lifelines.	Extensive potholing programme to identify underground utilities. Relocate utilities ahead of time as part of the enabling works	Likely	5	Critical	
29	Demolition, Hazardous Materials	Risk of illness from contact with hazardous materials during the demolition process of underpass structures and any infrastructure	Provide a complete and accurate description of materials (even those known to not be hazardous) used on as-built drawings and specifications for the records to be held by the owner and building consent authority.	Unlikely	4	Medium	
30	Demolition, Stormwater	There is a threat that workers when they demolish existing assets that they would be exposed to risks similar to those involved in construction. The source of the risk is the high water table and unstable ground. The consequence is potential injury to workers or settlement issues	As-built to include description of ground conditions encountered, survey the asset to be abandoned to obtain accurate knowledge of the existing condition	Moderate	4	High	
31	Demolition, Underpass	Risk of injury caused by unexpected collapse of underpass structures during demolition process.	Provide accurate as-built drawings and clear design philosophy statement for the records held by the owner and building consent authority.	Unlikely	5	High	
32	Demolition, Underpass	There is a risk of injury from contact with power utilities installed within the underpass structure and any hazardous materials	Provide a complete and accurate description of services within the underpass structure and the materials they involve (even those known not to be hazardous)	Unlikely	4	Medium	
33	Maintenance, Geometric Design	Risk of injury resulting from conflict between vehicles driven by maintenance personnel and other vehicles.	Designation and land requirement plans to provide areas to park maintenance vehicle and provide safe access from parked vehicles to areas requiring inspection and maintenance activities.	Moderate	4	High	
34	Maintenance, Live Traffic	There is a risk of injury resulting from conflict between vehicles and maintenance personnel when undertaking inspections or maintenance on the widened SH29 corridor and new intersections.	Segregate access for maintenance personnel from vehicle lanes. Low maintenance lighting including LED. Locate lighting poles behind barriers and/or behind cycleways/footpaths. Landscape planting that has low maintenance requirements.	Unlikely	5	High	

	Project Stage and Element Construction Operations Maintenance Disposal/Demolition	Identified Hazards Identify Health and Safety hazards that may arise from the design during the lifecycle of the 'structure' and that users need to be aware of to ensure there are no resulting risks to their Health and Safety. How could someone be injured during the life of this component? Can I influence this hazard through my design?	How is hazard managed in design? Eliminated / Minimised Can I eliminate the risk of injury through my design? If not, how can I reduce or control the risk so harm is unlikely or less serious?	Likelihood	Consequence	Risk	Residual Risk recorded on drawing sheet #
35	Maintenance, Retaining Walls	Retaining Wall Maintenance on SH29 and Cambridge Road will involve working at height and will require safe access.	Design shoulder width for access equipment (handrails and fences)	Moderate	5	High	
36	Maintenance, Roadside Infrastructure	Maintenance of roadside infrastructure in the will involve dealing with frequent property accesses and the existing pedestrian and cyclist road users.	Segregate access for maintenance personnel from vehicle lanes Provide space for safe parking of maintenance vehicles near areas needing to be inspected or maintained Low maintenance lighting including LED Locate lighting poles behind barriers and/or behind cycleways/footpaths Landscape planting that has low maintenance requirements Avoid planting landscape elements that require regular maintenance (e.g. grass near live traffic lanes)	Moderate	5	High	
37	Maintenance, Retaining Walls	Working at height at retaining structures there is the potential for falls from height.	Design to comply with building code regarding fencing at retaining walls. Design to incorporate either fencing around structure or planting to prevent access to the higher areas of the structure	Moderate	4	High	
38	Maintenance, Underpass	There is a risk of injury when inspecting and maintaining underpass elements by vehicle with restricted headroom	Provide headroom of 2.1m (or less than 1.6m).	Moderate	3	Medium	
39	Operations , Side Friction	The section from Tauriko West to Cambridge Road is urban in nature. There is potential for conflict with cars, peds, cycles.	Separate pedestrian and cyclists from vehicles after considering desire lines and anticipated use Use kerbs, bollards and barriers to prevent vehicles inadvertently using dedicated pedestrians and cycle lanes Consider pedestrian desire lines, provide safe alternatives using landscape elements to redirect access as required	Likely	5	Critical	
40	Operations, Geometric Alignment	Online alignment of SH29 means tighter radii and steeper grades, a less desirable outcome as this needs to be retrofitted into the existing alignment and to tie into property access and side roads. Risk of road geometry and grade out of context with road speed environment which could lead to crashes.	Look at access restrictions to reduce requirement to tie into existing properties.	Likely	5	Critical	
41	Operations, Geometric Alignment	The work is predominantly online and there is a risk of injury resulting from conflict between vehicles along the corridor, at property accesses, where parking is permitted, at retail/commercial sites, and at side roads.	Provide adequate sight distance and stopping sight distances on roads and at intersections, making allowance for steep grades Ensure sightlines are not compromised by barriers, signs, parked cars and vegetation Use self-explaining road design which is consistent with posted speed limit, including use of side friction as a traffic calming measure if appropriate	Likely	5	Critical	
42	Operations, Property Access	Online properties have direct access to state highway. Potential for more conflicts with vehicles entering/exiting all along the corridor.	Look at the possibility of access management.	Likely	5	Critical	
43	Operations, Side Friction	At grade intersections create conflict points for opposing traffic and between traffic and pedestrians.	Minimise conflicts or consequence of conflicts by providing safe and efficient intersection designs with sufficient sight distance and intervisibility. Roundabouts should have appropriate entry and circulating angles and be used where flows are balanced. Signalised intersections should be compact and based on design vehicle tracking with clear sightlines and phasing that runs as many non-conflicting movements together as possible to optimise efficiency and safety	Likely	5	Critical	
44	Operations, Underpasses	There is a safety risk for pedestrians and cyclists using underpasses at the Redwood Lane Roundabout from people who can hide within the structures. If the underpasses are not considered safe pedestrians and cyclists will use the overland route putting them at risk of conflicts with traffic.	Provide passive surveillance of active modes from vehicle lanes, ensure design considers CPTED and OPTED principles to ensure safety and security are incorporated.	Moderate	4	High	
45	Construction, Traffic	Local Road traffic will be mixing with heavy vehicles and plant along the existing road corridor. Increasing the risk of crashes	Traffic management, appropriate site controls and safety buffers	Likely	4	High	
46	Construction, Utilities	Working with asbestos pipes (risk to workers and general public)	Provide contractor with DSI and notify of identified asbestos pipes. Appropriate PPE for workers. Appropriate asbestos subcontractor to be engaged to contain the risk (for works, residents and the general public).	Unlikely	4	Medium	
47	Construction, Utilities	Risk of electrocution during construction activity under overhead services.	Design to avoid overhead power lines. Consider temporary re-location of electrical lines.	Moderate	5	High	
48	Construction, Utilities	Damage to a potable water supply network resulting in contamination risk to the public.	Site investigations including use of GPR and potholing. Consider temporary re-location of water supply. Allow for temporary backflow prevention devices.	Moderate	4	High	
49	Construction, Utilities	Health risk to workers if sewer is encountered during excavation.	Undertake investigation during investigation and design phase, including GPR and pot holing.	Moderate	4	High	
50	Construction, Infrastructure	Oversize loads (overweight, overdimension) on the road which could damage the road pavement or other street furniture and affect the safety of other road users	Work at night to minimise interactions with other road users.	Unlikely	4	Medium	
51	Construction, Underpasses	New underpass structures are proposed for construction in potential floodplain area at Redwood Lane. There are potential issues with safe access to the floodplain and weak/unstable ground for lifting and earthworks creating a risk of structure collapse or machinery tipping during construction injuring workers.	Provide sufficient ground investigation data to enable design of appropriate footings and loads. Avoid structures in the floodplain area. Design to accommodate flood levels.	Unlikely	5	High	
52	Construction, Traffic Signals	Electrical Hazards Isolation of electrical hazards from workers and the public. Earthing of equipment. Connection to mains supply.	Only use contractors certified to work with electricity. Coordinate with the mains supply company to ensure the supply is isolated from the signals when live. Use pole top terminations for electrical components.	Moderate	5	High	
53	Construction, Traffic Signals	Excavation and Trenches for ducting and poles may effect: Safety of excavating across live traffic lanes. Safety of excavations for workers and the public - slips, trips and falls. Adequate protection of workers and the pubic from entering excavations	Consider thrusting ducts across live traffic lanes rather than trenching to eliminate trenches. consider temporary relocation of the public from the vicinity of excavations rather than continuing to provide guarded access. Fence excavations, provide sufficient working space, cover trenches when access is not required.	Moderate	4	High	

	Project Stage and Element Construction Operations Maintenance Disposal/Demolition	Identified Hazards Identify Health and Safety hazards that may arise from the design during the lifecycle of the 'structure' and that users need to be aware of to ensure there are no resulting risks to their Health and Safety. How could someone be injured during the life of this component? Can I influence this hazard through my design?	How is hazard managed in design? Eliminated / Minimised Can I eliminate the risk of injury through my design? If not, how can I reduce or control the risk so harm is unlikely or less serious?	Likelihood	Consequence	Risk	Residual Risk recorded on drawing sheet #
54	Construction, Traffic Signals	Overhead Services Lifting in of poles when services are overhead Installing mast arms and joint use poles Proximity of poles to power lines for power to jump.	Consider temporary relocation of electrical lines Design within limits specified in NZ Electrical Code of Practice for Electrical Safe Distances, NZECP34:2001.	Moderate	5	High	
55	Construction, Traffic Signals	Underground Services Striking underground services during excavation for poles, ducting, chambers	Site investigations including use of GPR and potholing for each signal pole.	Moderate	4	High	
56	Construction, Traffic Signals	Construction of detector loops - risks include: Working in live traffic lanes. Noise and dust hazards when sawcutting. Pavement integrity, loop integrity.	Consider alternative detection methods Minimise length of sawcutting required by locating KJB close to detectors Minimise number of cuts and acute angles, seal sawcuts appropriately.	Likely	4	High	
57	Operations, Traffic Signals	Controller Location/ orientation/ maintenance access Safe access to controller Safe controller location for maintenance - able to see signals to not affect operations when adjusting settings when signals are live.	Locate controller where safe entry/exit is provided for maintainer on foot or in a vehicle with a stable work platform. Consider location of controller with respect to pedestrian and cycle paths to minimise conflict with the public Align controller with door to side allowing maintainer to look into cabinet and at signals displays	Unlikely	4	Medium	
58	Operations, Intersections	illumination of traffic islands, pedestrian facilities and priority controlled components of intersections at night is require to ensure traffic does not strike traffic islands or poles	Incorporate street lighting design into intersection designs to ensure aillumination requirements are met	Moderate	4	High	
59	Operations, Intersections	Pedestrian facilities Layout of pedestrian facilities to ensure the continuous accessible path is appropriately defined or assistance is put in place. Long crossing distances expose users to traffic.	Design using RTS 14, Pedestrian Planning and Design Guide Maximum 10m long crosswalks without island protection Provide full protection of pedestrian phase where appropriate Utilise current standards for RCA signals will be operating under, consider kerbside displays, consider segregated or separated markings, push buttons and displays	Moderate	4	High	
60	Maintenance, Traffic Signals	Controller Location - Risk to personnel if there is no safe access route to the controller, no safe and stable platform to work from. Controller location needs to be in a location the maintainer can see the signals to ensure worker can monitor effects of changes so no hazards are created. Worker at risk if they are not able to be seen by the public if working in path areas.	Locate controller where safe entry/exit is provided for maintainer on foot or in a vehicle with a stable work platform. Consider location of controller with respect to pedestrian and cycle paths to minimise conflict with the public Align controller with door to side allowing maintainer to look into cabinet and at signals displays	Unlikely	4	Medium	
61	Maintenance, Traffic Signals	Signals Pole Locations create a risk of: Working at height – on a ladder Working at height – on a platform Risk to personnel if there is not space to put up a ladder on any traffic island and create a safety zone. Risk if there is no stable platform to work on. Risk if there is no safe access route to all poles for vehicle/equipment/tools.	Provide safe and stable space on traffic islands and kerbside to allow a ladder to be placed against the pole, secured and a safety zone to be created. Consider size of traffic islands where poles are installed for safety zone, tools, ladder and working space. Consider safe route from parking to intersection to carry tools to access all poles, chambers and controller	Moderate	4	High	
62	Maintenance, Traffic Signals	Electrical Hazards Risk to personnel of working with live electricity. Power supply goes to all poles. Working at height	Only use contractors certified to work with electricity. Consider mounting electrical terminations lower on poles to allow working from ground level. Consider public access to poles and likelihood of vehicles striking pole when considering lower mounting height.	Likely	5	Critical	
63	Maintenance, Traffic Signs and Markings	Signs Locations Risk to personnel if insufficient space to work on signs including working zone and safety zone and ground slope and surface condition.	Consider safe access route and maintenance platform to work at all signs for cleaning/repair	Moderate	4	High	
64	Operations, Geometric Alignment	Risk to road users from aquaplaning and loss of traction due to water ponding.	Include vertical gradient to prevent sections of flat cross fall associated with change in super elevation.	Moderate	4	High	
65	Operations, Landscaping	Risk to road users from reduced sight distances from vegetation encroachment from berm, gardens and traffic island planting	Landscape planting that is unlikely to encroach. Alternatives to planting that are low maintenance.	Moderate	4	High	
66	Construction, Underpasses	Risk of noxious fumes, reduced oxygen levels, risk of fire, drowning or asphyxiation from working within confined spaces associated with underpasses	Ensure space is not confined and has adequate ventilation and drainage.	Unlikely	5	High	
67	Maintenace, Underpasses	Risk of noxious fumes, reduced oxygen levels, risk of fire, drowning or asphyxiation from working within confined spaces associated with underpasses	Ensure space is not confined and has adequate ventilation and drainage.	Unlikely	5	High	

Appendix P : Recommended Option Estimate

Tauriko West UGA Enabling Works

Enabling Works

DBE

Item	Description	Base Estimate	Contingency	Funding Risk Contingency
A	**Nett Project Property Cost**	**26,800,000**	**6,500,000**	**15,200,000**
	Project Development Phase			
	- Consultancy Fees			
	- Client Managed Costs			
B	**Total Project Development**	-	-	-
	Pre-Implementation Phase			
	- Consultancy Fees	6,066,000		
	- Client Managed Costs	6,066,000		
C	**Total Pre-implementation**	**12,132,000**	**1,214,000**	**3,638,000**
	Implementation Phase			
	Implementation Fees			
	- Consultancy Fees	3,791,000		
	- Client Managed Costs	2,275,000		
	- Consent Monitoring Fees	190,000		
	Sub Total Base Implementation Fees	**6,256,000**	**1,252,000**	**1,250,000**
	Physical Works			
2	**Environmental Compliance**	341,000		
3	**Earthworks**	4,770,000		
4	**Ground Improvements**	1,453,000		
5	**Drainage**	7,342,000		
6	**Pavement and Surfacing**	22,585,000		
7	**Bridges**	2,350,000		
8	**Retaining Walls**	7,905,000		
9	**Traffic Services**	3,685,000		
10	**Service Relocations**	2,887,000		
11	**Landscaping**	2,723,000		
12	**Traffic Management and Temporary Works**	6,113,000		
13	**Preliminary and General**	13,673,000		
14	**Extraordinary Construction Costs**	0		
	Sub Total Base Physical Works	**75,827,000**	**13,563,000**	**14,929,000**
D	**Total construction**	**82,083,000**	**14,815,000**	**16,179,000**
E	**Project base estimate (A+C+D)**	**121,015,000**		
F	**Contingency** (Assessed/Analysed) **(A+C+D)**		**22,529,000**	
G	**Project expected estimate (E+F)**		**143,544,000**	
	Nett Project Property Cost Expected Estimate		33,300,000	
	Project Development Phase Expected Estimate		-	
	Pre-implementation Phase Expected Estimate		13,346,000	
	Implementation Phase Expected Estimate		96,898,000	
H	**Funding risk** (Assessed/Analysed) **(A+C+D)**			**35,017,000**
I	**95th percentile Project Estimate (G+H)**			**178,561,000**
	Project property cost 95th percentile estimate			48,500,000
	Investigation and reporting 95th percentile estimate			-
	Design and project documentation 95th percentile estimate			16,984,000
	Construction 95th percentile estimate			113,077,000

Date of e	**Estimate 12/11/2021**	**Cost Index (Qtr/Year) 04/21**	
Estimate prepared by	**simon Drummond/Joshua Braithwa**	**Signed**	
Estimate internal peer review by	**Bod Burrows**	**Signed**	
Estimate external peer review by	**Mike Southby (BondCM)**	**Signed**	
Estimate accepted by the NZTA		**Signed**	

Note: (1) These estimates are exclusive of escalation and GST.
(2) Project Development Phase Estimates are set to Nil as these are now sunk costs.

Appendix Q : Recommended Option Economics

Waka Kotahi

TAURIKO WEST ENABLING WORKS

DRAFT ECONOMICS

11 FEBRUARY 2022

DRAFT

TAURIKO WEST ENABLING WORKS

DRAFT ECONOMICS 2022

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REV	DATE	DETAILS
1	11 December 2022	Draft

	NAME	DATE	SIGNATURE
Prepared by:	Nerissa Harrison	11 February 2021	
Approved by:	Mike Meister		

TABLE OF CONTENTS

1 BACKGROUND

1.1 REPORT PURPOSE

This report outlines the methodology and assumptions used to determine benefit cost ratios (BCR) for Tauriko West Enabling Works.

It also provides the expected BCR for a range of sensitivity tests.

1.2 ASSESSED SCENARIOS

1.2.1 ENABLING WORKS DO MINIMUM (REFERENCE SCENARIO)

Intersection treatments consist of

- Belk Road/SH29 intersection open - GW control
- Redwood Lane Tee intersection - GW control
- Tauriko Village Tee Intersection - GW control
- Cambridge Road Tee Intersection - GW control

The enabling works have been tested with and without the Spine Road in the do minimum and option tests. The Tauriko West Spine Road has a staged approach.

- Access to SH29 at Redwood Lane and Tauriko Village intersections (allows the Traffic model to distribute traffic onto SH29 based on the origin/destination)
- Post 2031, Spine Road connects internally between Redwood lane and Tauriko Village connection

The public transport network consists of:

- Services as provided by Regional Council (understand this is 30min interval into Tauriko West)
- year 2021 to 2031, assume access into Tauriko West occurs at Redwood Lane and Tauriko Village connection via SH29.
- year 2031 onwards, assume the Spine Road in Tauriko West is connected internally between Redwood Lane and Tauriko Village connection.
- Assume the existing PT transfer hub near Pak n Save is retained.

Walking/Cycling Network:

- No facilities across SH29.

1.2.2 ENABLING WORKS OPTION SCENARIO

Intersection treatments - upgraded as follows:

- Belk Road/SH29 intersection - closed and linked to Kaweroa Dr

- Redwood Lane/Kaweroa Dr/SH29 - replace with multi lane roundabout with grade separated ped facilities across SH29 and Redwood Lane.
- Tauriko Village/SH29 Intersection - upgrade to Signals
- Cambridge Road/SH29/Whiore Ave - upgrade to signalised Intersection and associated road widening between Tauriko Village access and Cambridge Rd and northern tie in.

PT Network

- Services as provided by Regional Council
- Access into Tauriko West available via Redwood Lane from Kaweroa Dr (thru proposed roundabout) and via Tauriko Village connection and the proposed traffic signals at Whiore Ave.
- Post 2031, Spine Road connected between Redwood and Tauriko Village.
- Assume the existing PT transfer hub near Pak n Save is retained.

Walking/Cycling networks

- walking/cycling under SH29 via underpass at Redwood Lane and across SH29 via traffic signals at Cambridge Road/Whiore Ave
- shared off road walking/cycling pathway along SH29 between Cambridge Road and Tauriko Village Access
- New cycling/walking connection into Whiore Ave via traffic signals at Cambridge Road
- New facilities on Whiore Ave (shared path on both sides of the road).

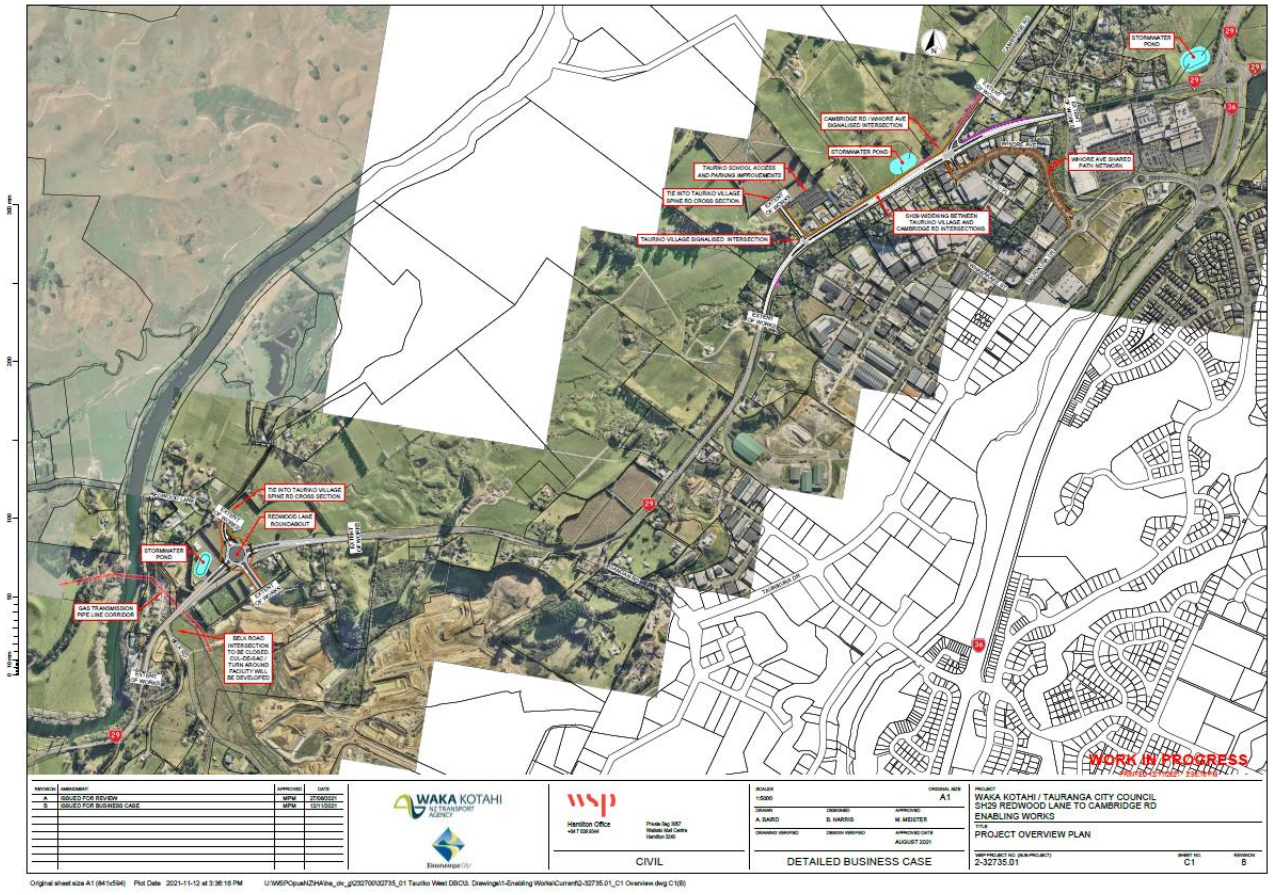

Figure 1-1 Enabling Works Option

2 ASSESSMENT ASSUMPTIONS AND INPUTS

2.1 LAND USE

Table 2-1 shows the land use assumptions. In Tauriko West, the land use assumption is 1,371 households in 2031 and 3,000 households in 2048/2048+. Year 2048+ is assumed to be the year 2060 for economics.

Table 2-1 Land use assumptions

Area Name	Population			Dwellings			Employment		
	2031	2048	2048+	2031	2048	2048+	2031	2048	2048+
Tauriko Business Estate	160	160	160	51	51	51	3,292	4,938	4,938
Pyes Pa West	6,350	6,400	6,400	2,331	2,400	2,400	184	188	188
Pyes Pa	7,780	7,780	7,780	2,770	2,770	2,770	2,271	2,728	2,728
Keenan Rd	100	4,600	4,600	150	2,000	2,000	48	59	59
Tauriko West	2,700	6,900	6,900	1,371	3,000	3,000	158	222	222
Upper Belk	547	553	13,800	194	195	6,000	993[1]	3,074	3,074
Merrick Road	366	366	5,750	123	123	2,500	78	76	76
Upper Joyce	558	558	4,600	229	230	2,000	108	53	53
Grand Total	**18,561**	**27,317**	**49,990**	**7,219**	**10,769**	**20,721**	**7,132**	**11,338**	**11,338**

2.2 TRAFFIC VOLUMES

Beca provided traffic turning volumes for both AM and PM peak hours at the following key intersections:

- SH29/ Redwood
- SH29/ Tauriko West
- SH29/ Cambridge

The turning volumes were derived from the TTSM at the following model years:

- 2031
- 2048
- 2048+ (assumed to be the year 2060 for economics)

Beca advised that the equation to convert AM and PM peak hour flows to annual daily traffic (ADT) is:

- ADT = 5xAM+5xPM

2.3 TIME PERIODS

Time periods used to annualise the benefits from the TTSM, are:

TRAFFIC BENEFITS ANNULISATION	MODEL USED	EQUIVALENT HRS PER DAY		DAY PER YEAR	FACTORS	
		TTSM	TTHM		TTSM	TTHM
Weekday AM	AM	2	1	245	490	245
Weekday PM	PM	2	1	245	490	245
Weekday IP	IP	7	4.33	245	1715	1060.85
Weekday evening/night	IP	3.04		245	744.8	
Weekend / holiday	IP	9.62	5.15	120	1154.4	618

PT ANNULISATION	MODEL USED	EQUIVALENT HRS PER DAY	DAY PER YEAR	FACTORS
Weekday AM	AM	2	245	490
Weekday PM	PM	2.75	245	673.75
Weekday IP/night	IP	7.139	245	1749.055
Weekend / holiday	IP	1.25	120	150

2.4 TRAVEL SPEEDS

The travel speed limits assumed for both the do minimum and option are:

- 80km/h between Redwood Lane and Tauriko Village
- 60km/h Tauriko Village to Takitimu Dr roundabout
- 60km/h Takitimu to Barkes Corner
- 80km/h SH36 as per existing

2.5 MODE SHARE

The mode shares calculated from the Tauranga model data are as follows:

Table 2-2 Mode share (all day)

OPTION	CAR	PT	CYCLIST
2031_DM	98.78%	1.22%	0.00%
2031_EW	98.51%	1.23%	0.26%
2048_DM	98.63%	1.37%	0.00%
2048_EW	98.18%	1.47%	0.35%

Walking has been ignored in this economics, except for people walking to and from bus stops. Therefore, walking is not shown in the mode share.

2.6 EXPECTED PROJECT COSTS

2.6.1 TAURIKO ENABLING WORKS

The DBE cost estimate is summarised in the table below.

Table 2-3 EXPECTED PROJECT COSTS (nearest $1thousand)

COST COMPONENT	EXPECTED COSTS (INCLUDING CONTINGENCY)
Property Costs	$33,400,000
Pre- Implementation	$14,238,000
Construction & Implementation	$87,338,000
Total	**$134,976,000**

In addition to the DBE cost estimate, there is also a cost estimate for travel behaviour change, as summarised in Table 2-4.

Table 2-4 Travel demand management cost estimate

DESCRIPTION	COST BUILD UP	ESTIMATE
One Full time equivalent (FTE) role to deliver measures for the first 5 years and then 0.5 FTE for the following 5 years	$120,000 per year for 5 years and $60,000 for 5 years	$900,000
Traffic counters	10 @ $10k each for installation + time to monito($5k)r	$150,000
Bike repair stands	5 @ $7500k each + PM	$50.000
Wayfinding Signs	50 signs @ $1000 each	$50,000
Marketing for PT	Bus Stop signage	$150,000
Real time passenger info digital signs	10 bus stops at $15k per device	$150,000
Facilitate take up of shared services	provide a subsidy to supplier get cars involved $20k per year operational costs for supplier for 5 years or until financially viable - $100k * 2 vehicles - $200k	$200,000
Cycle Programme	Every year there are 100 new students at school, need 2 * teachers (teacher days = 8 hours, so need 4 * 8 = (32 hrs for 10 kids) for 10 kids is 320 hours Hourly rates at $35/h – 320 * 35 = $11,000 (for one school) for one year. So for two schools for 5 years = $22k * 5 = $110k	$110,000
Cycle Parking	Provide secure cycle parking at two new schools –could be $100k per school ($200k) = FTE + PM	$200,000

Reduced Bus fare use	Reg council currently subsidises. If that should stop = need to pay. Could be $4per day for (800 kid in primary, 2000 in high school). Proportion taking bus is around 10% - with 280 kids * $4 per day for * 40 weeks - $800 per kid per year, total cost - 280 * $800 = $224k per year (for 5 years, duration of travel plan - $1.1M	$200,000
New Residents Welcome pack	Loaded bus card – 2000 houses * $21 (3 * return trip @ $7) = $42K	$42,000
Yearly Travel Survey	External consultant $50k per year for 5 years) - $250k	$250,000
Traffic Counters	3 counters and analysis - $20k per year for 5 years	$100,000
TOTAL (for Enabling Works	—	$2,502,050

2.7 MAINTENANCE COSTS

Two new signalised intersections are included in the option. $7,500 per year per signalised intersection has been included in the economics. Maintenance would include:

- a preventative maintenance programme,
- an inspection programme and
- provision for unscheduled maintenance for faults and damage.

Maintenance would include a regular monthly cost for a contractor to undertake an inspection programme and to check, clean and service equipment, call outs for faults to replace any faulty LED modules, detector loops, call boxes etc. and repair damaged equipment like displays that have rotated or backing boards or poles that have been hit and to check electronic components if the signals have an outage or there is a power outage. Routine maintenance for things like painting poles, re-marking of road markings. TTM is expected to be a significant cost for all maintenance activities as lane closures would be required for anything within the carriageway and the intersection are on SH29.

The intersection upgrades and additional walking and cycling facilities would also require maintenance. Reseal costs every 8 years have been included at $100,000 – this only represents the cost difference between the option and do minimum.

2.8 DETERMINATION OF TRAVEL TIME, VEHICLE OPERATING, AND EMISSIONS BENEFITS

Travel time, vehicle operating costs, public transport costs and emission costs were derived from model outputs provided by Beca for the TTSM.

Travel time, vehicle operating, and public transport values were provided by Beca as differences between the do minimum and option (ie benefits).

Table 2-5 provides the daily emission rates for Tauriko West Enabling Works, which are extracted from VEPM 6.2. Beca provided the emission costs for the pollutants of PM10, NO_x and CO, which are identified as part of the CO_2 equivalent pollutants. As such, the CO2 equivalent value was used to determine the monetised emissions costs.

Table 2-5 Daily Emission for Tauriko West Enabling works scenarios - VEPM 6.2 rates

EMISSIONS	2031	2031	2048	2048	2048+	2048+
	Y2031_DM	Y2031_EW	Y2048_DM	Y2048_EW	Y2048+_DM	Y2048+_EW
CO kg	4,011	4,012	978	979	1,028	1,032
CO_2-e kg	1,346,189	1,347,071	904,598	906,422	939,853	944,176
VOC kg	172	172	33	33	34	34
NO_X kg	2,725	2,729	534	535	556	559
NO_2 kg	551	551	95	95	99	100
$PM_{2.5}$ E kg	84	85	13	13	13	13
PM_{10} B & T kg	118	118	141	142	149	150
FC litres	536,124	536,464	351,503	352,192	365,572	367,235
VKT	5,549,508	5,553,281	6,880,435	6,895,667	7,265,223	7,300,079

2.9 DETERMINATION OF CRASH BENEFITS

Crash costs were determined for intersections only, as minor improvements will be applied to midblock sections that crashes should be similar between the do minimum and option. The three intersections assessed were:

- Redwood
- Tauriko West
- Cambridge

Crash costs for the do minimum were determined using CAS data for a 5-year period (between 2017 and 2021, inclusive) and adjusted to account for the new Tauriko West intersection in the do minimum. Method A (crash by crash) was used for the Cambridge intersection, which has sufficient history of crashes, Method C (weighted) was used for the Redwood intersection and the Tauriko West intersection.

The Enabling works option crash costs were determined using Method B (crash rate).

2.10 DETERMINATION OF WALKING AND CYCLING BENEFITS

The option presents a significant improvement for pedestrians and cyclists crossing SH29 and moving between residential areas, employment, and education. There are also expected to be numerous new public transport users, who will walk to and from buses. It also improves accessibility for existing pedestrians using Whiore Ave you currently walk in the berm.

Walking and cycling benefits were determined using:

- The new length of infrastructure (0.8km) between Tauriko West and Cambridge Road and Whiore Ave (ie Redwood ignored),
- The hazardous site value for health benefits of $6.60,
- Travel time benefits of $6.60/hr based on commuter cyclists
- New pedestrians based on new PT users,
- New cyclists based on TCM outputs, and
- The rule of half applied to new pedestrians and cyclists.

Conservatively:

- Benefits for existing pedestrians were ignored for the enabling works.

The BCR is not sensitive to pedestrian and cyclist numbers, so the level of uncertainty with pedestrian and cyclist benefits is not considered significant.

3 ECONOMIC ASSESSMENT

3.1 ASSUMPTIONS

The economic assessment has been undertaken in accordance with the 2021 Waka Kotahi Monetised Benefits and Costs Manual (MBCM) procedures. The following general assumptions have been adopted to determine the National BCR.

- Time Zero = 1 July 2021
- Base Date = 1 July 2021
- Discount = 4%
- The earliest construction start for the project = 1 July 2022
- Evaluation Period = 40 years from the start of construction
- Wider economic benefits are excluded from the base BCR but included as a sensitivity test.
- Project benefits are assumed to start at the year 2031 to the end of the year 2061. This includes 31 years' benefits. The benefits for interim years were calculated based on linear interpolation between two modelled years (between 2031 and 2048, and between 2048 and 2060)
- Due to the lack of model data before the year 2031, no benefits are assumed before the year 2031. A linear extrapolation of the benefits growth between 2031 to 2048 to estimate benefits prior to 2031 is not reasonable given the high growth rate between 2031 and 2048, which would unreasonably result in negative benefits prior to 2031.
- The annual benefits capped at the year 2060 (ie 0% benefit growth after 2060)
- A 3-year construction period is assumed for the Tauriko West enabling works with no benefits claimed during the construction period. This is conservative as implementation is likely to be staged over 3 years with some benefits starting during the construction period.

3.2 NATIONAL BENEFIT TO COST RATIO

3.2.1 TAURIKO WEST ENABLING WORKS BCR – NO SPINE ROAD

This option assessed Tauriko West Enabling works with the Spine Road excluded from the do minimum and option (ie no Spine Road).

The project BCR is expected to be 1.0 with a first-year rate of return of <1%. A PDF copy of the supporting worksheets is attached to this memo.

The primary benefits stem from travel time and vehicle operating costs, which are both derived from the Tauranga model (TTSM). A summary of the discounted costs and benefits is provided in Table 3-1 below.

Table 3-1 National BCR for Enabling works excluding Spine Road

		ENABLING WORK($ THOUSAND)
Costs	Capital Costs	$122,432
	TDM costs	$2,040
	Maintenance Costs	$416
	Total Costs	**$124,889**
Benefits	Travel time benefits	$90,059
	Vehicle operating benefits	$19,999
	Public transport benefits	$2,039
	Walking and Cycling benefits	$5,219
	Emissions benefits	-$4
	Crash benefits	$7,114
	Total Benefits	**$126,824**
B/C Ratio		1.04

3.2.2 TAURIKO WEST ENABLING WORKS BCR – WITH SPINE ROAD

This option assessed Tauriko West Enabling works with the Spine Road included in both the do minimum and option (ie the Spine Road costs and benefits are not included because it is in the do minimum and option but the effect of the Spine Road traffic patterns on the enabling works are considered).

The project BCR is 1.0 with a first-year rate of return of <1%. A PDF copy of the supporting worksheets is attached to this memo.

The primary benefits stem from travel time (70%) and vehicle operating costs (15%), which are both derived from the Tauranga model (TTSM). A summary of the discounted costs and benefits is provided in Table 3-2 below.

Table 3-2 National BCR for Enabling works

		ENABLING WORK($ THOUSAND)
Costs	Capital Costs	$122,432
	TDM costs	$2,040
	Maintenance Costs	$416
	Total Costs	**$124,889**
Benefits	Travel time benefits	$89,494
	Vehicle operating benefits	$19,634
	Public transport benefits	$4,266
	Walking and Cycling benefits	$5,219
	Emissions benefits	-$4

	Crash benefits	$7,114
	Total Benefits	$127,388
B/C Ratio		1.05

3.3 SENSITIVITY TESTS

3.3.1 TAURIKO WEST ENABLING WORKS SENSITIVITY

A range of sensitivity tests has been undertaken to gauge the impact on the BCR.

Table 3-3 below indicates the BCR ranges from 0.6 to 1.4 for Tauriko Enabling works.

Table 3-3 Sensitivity testing of the Tauriko West Enabling Works BCR

SCENARIO	UPPER	LOWER
Base case	**1.05**	
Discount rate (3%/6%)	1.33	0.66
Cost (95th percentile)	-	0.71
Time period (60 years)	1.52	-
Benefits (+/- 20%)	1.26	0.84
4% discount rate + 0 household development between 2040-2048	0.62	-

4 CONCLUSIONS

Based on the information provided within this report, and the economic analysis worksheets appended to the report, the following conclusions can be drawn based on a 40-year analysis period and 4% discount rate:

- The National Benefit to Cost Ratio for the Tauriko West enabling works is 1.05
- Sensitivity testing indicates the Benefit to Cost Ratio, depending on the adopted inputs, could range between 0.6 - 1.4 for the Tauriko West Enabling Works
- The first year rate of return is less than 1%

5 LIMITATIONS

The determination of the Benefit to Cost Ratio for the Tauriko West enabling works, is based on third- party inputs, upon which the economic assessment relies. This includes outputs from the TTSM Tauranga model and Tauranga cycle model (TCM), supplied by Beca, and the Crash Analysis System (CAS) outputs.

APPENDIX A – ECONOMIC WORKSHEETS

Appendix R : Appraisal Summary Table

Appraisal Summary Table Template

Date: 3-07-2020	**Evaluation Period: (baseline and forecast year) e.g 2020 - 2060** 2021-2030	**Option Name:** Enabling works	
Problem/opportunity statement: Enabling housing growth	**Investment objectives:** - **Better access** to international and major domestic markets on this national strategic **freight route** linking to the Port of Tauranga - The Western Corridor is better connected and accessible through a **multi-modal transport system** which supports timely delivery of sustainable growth - **Improved safety** within the Western Corridor	**How project gives effect to GPS:** Actions three of the four strategic priorties: - Improving freight connections - Improved safety - Better travel options	**How project gives effect to local community outcomes:** **Enables housing growth** - Transport System Enables timely delivery of appropriate urban and commercial growth areas in the Western Corridor

Transport Outcomes	**Non-Monetised Impact:** (description in numerical or narrative terms)				**Monetised Impact:** (description in dollar terms in real terms, non-discounted)	
Name of Benefit	**Name of Measure:**	**Baseline:**	**Do Minimum Impact:**	**Preferred Option Impact:**	**Do Minimum Impact:**	**Option Impact:**
Healthy and safe people						
1.1 Impact on social cost and incidents of crashes	1.1.2 Crashes by severity	56 crashes (over 5 years)	New intersection introduced, so increase in crashes possible	42 crashes (40% reduction at Cambridge, 10% reduction in remainder) = 25% reduction overall		
1.1 Impact on social cost and incidents of crashes	1.1.3 Deaths and serious injuries	3 DSI (over 5 years)	New intersection introduced, so increase in crashes possible	2 DSI (40% reduction at Cambridge, 10% reduction in remainder) = 30% reduction overall	$ -	$440,000 crash saving per year compared to do min
Economic prosperity						
5.1 Impact on system reliability	5.1.2 Travel time reliability - freight	10 minutes with 9 mins variability PM Peak. 9 mins with 5 mins variability in AM 2017	New intersection introduced, so reduction in reliability for SH29 traffic	6.5 mins (mid) + 2.5 mins (int) travel time with max 4.5 mins variability during AM/PM Peak by 2030 from Omanawa Road to Takitimu Drive Toll Road	-	$ -
Environmental sustainability						
8.1 Impact on greenhouse gas emissions	8.1.1 CO2 emissions	n/a	New intersection introduced, which will likely affect traffic flow causing an insignificant increase of emissions	New intersection introduced and speed management, which will affect traffic flow causing a small increase of emissions	-	$70 per year increase of emissions (because of intersections and speed management affecting traffic flow)
Inclusive access						
12.1 Impact on Te Ao Māori	12.1.1 Te Ao Māori					
10.2 Impact on mode choice	10.2.10 Traffic - mode share (number)	4.9% multimodal journey to work trips (2013 census)	model forecast: approximately 6% of all peak period trips are PT or cycling (walking ignored) 1.2% all day mode share for PT and cycling	model forecast: approximately 7.5% of all trips are PT or cycling (walking ignored) 1.5% all day mode share for PT and cycling	-	Mode change and improved coverage of walking, cycling and public transport results in: $250,000/yr travel time savings $490,000/yr vehicle operating cost savings $31,000/yr public transport benefits $52,000 walking benefits $100,000 cycling benefits
10.2 Impact on mode choice	10.2.6 Spatial coverage - public transport - resident population (Pop. within close proximity walking, cycling and PT facilities)		No / insignificant change from existing	80% of population within 600m walk of a bus stop by 2030	-	
10.1 Impact on user experience of the transport system	10.1.1 People - throughput of pedestrians, cyclists and public transport boardings (No. of annual boardings in Western corridor)	6,500 Route 52 (2017)	model forecast: 120,000 annual PT trips to/from Tauriko West	model forecast: 122,000 annual PT trips to/from Tauriko West ie extra 2,000 trips	-	
10.1 Impact on user experience of the transport system	Public transport travel time (Peak Travel Time from Tauriko to Cameron Rd or Takitimu Drive)	3-7 mins: Tauriko to Cameron Rd 4-7 mins: Tauriko to Takitimu Dr 2017	No / insignificant change from existing	PT in-vehicle peak travel time same or better than driving by car from Tauriko West to Tauranga Crossing by 2030	-	

1. Summary of Non-Monetised Impacts (Description)	**2. Summary of Financial Impacts**		**3. Summary of Monetised Option Impacts**	
Summary description of non-monetised measures and impacts	Capital Costs (includes some TDM capital costs)	$134,976,000	Total Monetised Benefits, excluding Wider Economic Benefits (WEBs)	$126,825,632
			Total Monetised Benefits, including Wider Economic Benefits (WEBs)	$126,825,632
	Operating Costs (maintenance and some TDM operational costs)	$320,000	Total Monetised Benefits (costs)	$124,888,594
			BCR (excluding WEBs)	1.0
	Total Financial Costs	$135,296,000	BCR (including WEBs)	1.0

Rationale for selecting preferred option

Enabling housing growth in sustainable way, with improved public transport and walking and cycling access

Appendix S : Consenting Strategy

Tauriko Enabling Works

Consenting Strategy

Version 5

October 2021

Contents

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Document Details:

Date: 15 October 2021
Reference: 2-32735.01
Status: Final

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1 Introduction

The purpose of this memorandum is to summarise the consenting strategy for the Enabling Works Transport Package (EWP) for the Tauriko Network Connections project. The EWP is the first phase of a long term programme of transport investment, and comprises the following works:

- Northern Connection
  - A new signalised intersection on State Highway 29 (SH29) to provide access into Tauriko West;
  - Upgrade and signalisation of the intersection of Cambridge Road and SH29;
  - Provision of bus priority measures and at-grade walking and cycling linkages between Tauriko West and Taurikura Drive via SH29 and Whiore Ave;
  - Widening of SH29 to accommodate the new and upgraded intersections; and
  - Associated stormwater management works.
- Southern Connection
  - A new roundabout on SH29 to provide access into Tauriko West via Redwood Lane, and into Tauriko Business Estate via Kaweroa Drive
  - Provision of grade-separated walking and cycling connections between Tauriko West and Tauriko Business Estate via underpasses beneath SH29;
  - Realignment and widening of SH29 and Redwood Lane, and extension of Kaweroa Drive, to tie into the new roundabout; and
  - Associated stormwater management works

These works are shown on the plans attached at Appendix XX. The consenting strategy covers the potential consenting pathways for these works, considering land requirements and the relevant statutory approvals.

2 Land Requirements and Designations

The anticipated land requirements for the EWP are shown on the Land Requirement Plans attached at **Appendix A** and outlined below.

For the Northern Connection, land acquisition is required from 11 properties. Three of these properties are owned by the Tauranga City Council, and one by the Ministry of Education (MoE). Further properties include greenfield land owned by developers (or intended developers) and a Caltex Service Station. For the southern connection, land acquisition is required from 11 properties, predominantly in rural or rural residential use.

Access to a number of other properties is also likely to be affected (e.g. by median barriers restricting right turn movements in and out of the property) by the EWP, depending on the final design and safety audit requirements. Some of these properties may also need to be acquired for the EWP.

3 Statutory Approvals Assessment

The purpose of this section is to identify the relevant statutory provisions that need to be considered to progress the project, and to provide a high-level assessment of these respective provisions. These provisions are identified and assessed under the respective subsections below.

3.1 Zoning and Features

The Bay of Plenty Regional Natural Resources Plan (RNRP) does not identify zones. However, it does identify water quality standards for lakes, rivers, and streams. There is a watercourse located between Belk Road and Redwood Lane which drains to the Wairoa River. This watercourse is unnamed and is classified as 'Regional Base line' and the Wairoa is classified as 'Aquatic Ecosystem'.

The Local Government boundary alteration process for the southern part of Tauriko West was completed in January 2021, and all of the works are therefore within TCC jurisdiction. The EWP will therefore need to be assessed against the operative Tauranga City Plan (including the Western Bay of Plenty section for those areas previously within that district) as well as the Proposed Plan Change for the Tauriko West, if it has been notified.

Under the Tauranga City Plan, the area at the northern connection is zoned Rural, and there are no relevant overlays. Under the Tauranga City Plan (Western Bay of Plenty section), the area at the southern connection is zone rural, and is subject to the following overlays:

- Flood Hazard - Extreme Rainfall 100 year Event
- Outstanding Natural Features and Landscapes Plan Area – S7: Wairoa River Landscape Management Area

The area identified as visually significant includes the Wairoa River and margins (300m each side on Rural Zoned land) from McLaren Falls Dam to MHWS. This landscape feature is divided into two distinct areas. The area within 50m of the riverbank (shown as S7a on the Planning Maps) is deemed to be the more significant and thus greater restrictions apply.

A future plan change to enable rezoning and urbanisation of Tauriko West will be undertaken by TCC. The relevant zoning and overlays will likely be altered or removed at this time. If this change has been notified at the time statutory approvals are sought for the EWP, it will need to be considered alongside the operative plan.

3.2 Designation

The following designations currently apply to the project area:

- Tauranga City Plan
  - NZTA 6 – Waka Kotahi NZ Transport Agency – Limited access road and interchange roundabout: Road as a State Highway.
- Tauranga City Plan (Western Bay of Plenty section)
  - Designation D204 – Waka Kotahi NZ Transport Agency – Road purposes - State Highway 29
  - Designation D139 – Waka Kotahi NZ Transport Agency – Road purposes – State Highway 29 (Alteration of Designation) – State Highway No 29, Redwood Lane to Ruahihi.

An alternation to the above designations will be required to authorise the EWP under the Tauranga City Plan (including the Western Bay of Plenty section).

As part of any alteration to the SH29 designation in the Tauranga City Plan (NZTA6) at Tauriko Village, the existing designation for Tauriko School (ME24) will also need to be amended. The process to alter the school designation and transfer land from MoE to Waka Kotahi will need to be resolved prior to any works proceeding.

Alterations to designations generally follow a similar process to new designations, in accordance with section 181(1) and (2) of the RMA, as discussed above. The exception to these sections of the RMA is minor alterations under section 181(3), which offers a simpler pathway in certain circumstances.

The full text of section 181 is included below.

181 Alteration of designation

(1) A requiring authority that is responsible for a designation may at any time give notice to the territorial authority of its requirement to alter the designation.

(2) Subject to subsection (3), sections 168 to 179 and 198AA to 198AD shall, with all necessary modifications, apply to a requirement referred to in subsection (1) as if it were a requirement for a new designation.

(3) A territorial authority may at any time alter a designation in its district plan or a requirement in its proposed district plan if—

(a) the alteration—

(i) involves no more than a minor change to the effects on the environment associated with the use or proposed use of land or any water concerned; or

(ii) involves only minor changes or adjustments to the boundaries of the designation or requirement; and

(b) written notice of the proposed alteration has been given to every owner or occupier of the land directly affected and those owners or occupiers agree with the alteration; and

(c) both the territorial authority and the requiring authority agree with the alteration—

and sections 168 to 179 and 198AA to 198AD shall not apply to any such alteration.

(4) This section shall apply, with all necessary modifications, to a requirement by a territorial authority to alter its own designation or requirement within its own district.

Section 170 of the RMA gives territorial authorities discretion to include a notice of requirement in a proposed plan (which includes a "proposed plan change" as per section 43AAC). This also applies where the territorial authority proposes to use a collaborative or streamlined planning process.

The full text of section 170 is included below:

170 Discretion to include requirement in proposed plan

(1) If a territorial authority is given notice of a requirement under section 168, and proposes to notify a proposed plan under clause 5 of Schedule 1 within 40 working days of receipt of that requirement, the territorial authority may, with the consent of the requiring authority, include the requirement in its proposed plan instead of complying with section 169.

(2) To obtain consent for the purposes of subsection (1), (4), or (8), the territorial authority must—

(a) notify the requiring authority as to which planning process it intends to use under Schedule 1; and

(b) seek the consent of the requiring authority to use that planning process for considering the requirement; and

(c) *if a collaborative planning process is to be used, inform the requiring authority that it must nominate a representative for appointment to the collaborative group.*

Where proposal is to use collaborative planning process

(3) Subsection (4) applies if a territorial authority—

(a) receives notice of a requirement under section 168; and

(b) proposes to notify that it will use a collaborative planning process under clause 38 of Schedule 1 within 40 working days of receiving the requirement.

(4) If this subsection applies, the territorial authority may, if the requiring authority consents,—

(a) include the requirement with the matters that will be subject to the proposed plan when it gives a notice under clause 38 of Schedule 1; and

(b) include the requirement in the terms of reference set under clause 41 of Schedule 1, instead of complying with section 169.

(5) If the requiring authority agrees to be part of the relevant collaborative group, the provisions of Part 4 of Schedule 1 apply to the notice of requirement.

(6) If the requiring authority does not agree to be part of the collaborative group, or withdraws from the group before the group delivers its report under clause 44 of Schedule 1, the notice of requirement must not proceed using the collaborative planning process proposed under subsection (3)(b).

Where proposal is to use streamlined planning process

(7) Subsection (8) applies if a territorial authority—

(a) receives a notice of requirement under section 168; and

(b) within 40 working days of receiving that notice of requirement, proposes to apply to the responsible Minister under section 80C for a direction to use a streamlined planning process.

(8) If this subsection applies, the territorial authority may, if the requiring authority consents, include in its application to the responsible Minister the requirement as well as the matters that will be the subject of the proposed planning instrument, instead of complying with section 169.

This would likely be a preferable designation pathway for the EWP in the event that compulsory land acquisition was required, or the consent authority indicated they were likely to notify the alteration to designation. It would be more efficient and enable more consistent decision making than a separate standalone designation process, or even joint notification and hearings.

This provision would also allow TCC to include the new designation for the relocated Tauriko School and a new Secondary School from MoE, subject to their agreement.

3.3 Resource Consents

Land use and discharge consents are likely to be required from Bay of Plenty Regional Council (BoPRC) under the RNRP. These will be confirmed through a pre-application meeting with the Regional Council, but are expected to include:

- Earthworks for land disturbance to create the northern and southern connections.
- Disturbance of contaminated land, given the potential for contaminated soils to be present at both the Caltex at the northern connection, and historic orchard use at the southern connection.
- Stormwater discharge consent for the ongoing discharge of stormwater from the road carriageway, and consent for any discharge structures in the bed of a stream.

In the unlikely event that the alteration to designation has not been completed prior to construction, resource consents may also be required from TCC under the Tauranga City Plan (including the Western Bay of Plenty section). Earthworks in the Road Zone are a permitted activity under Rule 4C.2.1 of the City Plan.

3.4 National Environmental Standards

The National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health 2011 (NESCS) is a nationally consistent set of planning controls and soil contaminant values. It ensures that land affected by contaminants in soil is appropriately identified and assessed before it is developed - and if necessary, the land is remediated, or the contaminants contained to make the land safe for human use.

There are land parcels required for the project that are identified on BoPRC's geospatial planning maps as containing HAIL activities at the location of both the Northern and Southern Connections, as shown in the figures below. For the structure planning of Tauriko West, TCC also commissioned Aurecon to undertake a preliminary site investigation (PSI) which included the areas of the northern and southern connection.

At the Northern Connection, in the Tauriko Village, the property located at 745 SH29 and the land to the rear of the Caltex service station, as shown in Figure 1 has been subject to pesticide use and is therefore potentially contaminated. The Caltex service station itself at 782 SH29 is also identified as a contaminated site.

At the Southern Connection, as shown in Figure 3-1 much of the land required for the project is currently in kiwifruit and mandarin orchards. Both the properties are identified as potentially contaminated also as a result of persistent pesticide use. Under the Hazardous Activities and Industries List (HAIL): October 2011, both potentially contaminated sites at each end of the project extent are classified as A10 – Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds.

The NESCS consent provisions are likely to be applicable to the works at both the Northern and Southern Connection, as they both affect land identified as contaminated. A contaminated land Detailed Site Investigation (DSI) is recommended to determine the extent soil contamination for the potentially contaminated land at the Southern Connection. This will enable WSP to determine the consent requirements under the NESCS and seek any required resource consents from TCC.

Figure 3-1: Contaminated sites at the Northern Connection (left) and Southern Connection (right) (Source: TCC Mapi)

TCC have also commissioned Aurecon to complete a Preliminary Site Investigation (PSI) assessment. The study area is shown in Figure 3-2.

Figure 3-2: Aurecon PSI study area – indicated by green outline (Source: Aurecon PSI)

The PSI identified, assessed and classified the HAIL sites within the study area on the basis of likely contamination present, distribution and the mobility of contaminants. The three classes are:

- Class 1 – High risk
- Class 2 – Medium risk
- Class 3 – Low risk.

Of these 90 properties identified as containing HAIL activities (shown in Figure 3-3) there are 11 in Class 3, 22 in Class 2 and 57 within Class 1. As noted in the PSI *"Thirteen types of current and historical HAIL activities were identified within the study area and fall into the following categories:*

- *Chemical manufacture, application and bulk storage;*
- *Mineral extraction, refining and processing, storage and use;*
- *Vehicle refuelling, service and repair;*
- *Cemeteries and waste recycling, treatment and disposal".*

The 11 properties that fall into the Class 3 category are recommended by Aurecon to have more extensive investigations undertaken in the form of a Detailed Site Investigation and a remediation and/or management plan developed for each site. This is as a result of the potential for higher concentrations of widespread contamination given the land use activities such as timber treatment sites, railways and service station land use occurring within the study area that make up the majority of the Class 3 category.

Figure 3-3: Aurecon PSI identified contaminated sites in the study area (Source: Aurecon PSI)

3.5 Other Approvals

There are two archaeological sites recorded within the project area, one at the northern connection adjoining Cambridge Road and one at the southern connection adjoining the southern side of SH29 (see Figure 3-4). These existing sites are protected under the Heritage New Zealand Pouhere Taonga Act 2014. The wider environment also contains a populated archaeological landscape. Therefore, an archaeological assessment in the form of a desktop and possibly an onsite survey is recommended to assess the extent of the recorded sites and determine the effects of the proposed intersection upgrade works on these recorded sites.

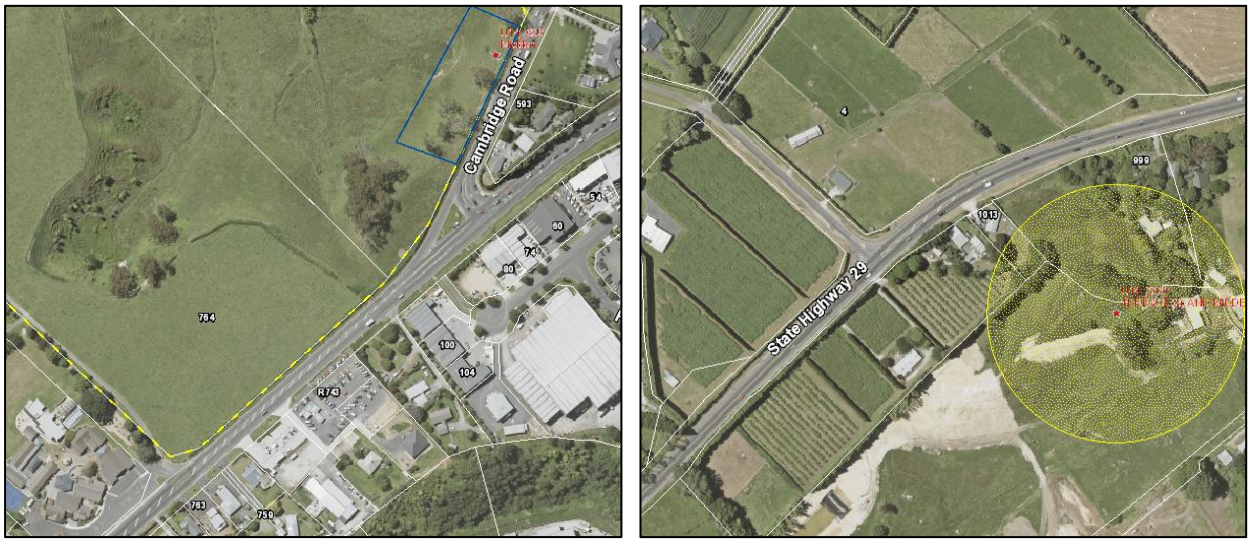


Figure 3-4: Archaeological sites at the Northern Connection (left) and Southern Connection (right) (Source: TCC Mapi)

Depending on the outcome of the archaeological assessment, the road construction works will have to proceed under an Archaeological Authority from Heritage New Zealand Pouhere Taonga.

TCC has also commissioned an archaeological assessment by CFG Heritage for the Tauriko West urban growth area in 2018. The report concluded that there is no new archaeological evidence within the proposed urban growth area and two new sites were recorded during the site assessment. The location of the Southern Connection upgrades is located within an area of low risk of discovering unrecorded archaeological sites and features, and the Northern Connection is located in an area of high risk of unrecorded archaeological sites and features being found.

4 Technical Inputs and Management Plans

4.1 Technical Inputs

There are a range of technical inputs required to support a resource consent and designation application, and these are summarised below. Please note that this list is not exhaustive:

- Stormwater Assessment
- Cultural Values Assessment (undertaken)
- Air Quality Assessment
- Contaminated Land Assessment (undertaken)
- Archaeological Assessment
- Noise Assessment

- Environmental – Streams/Ecology
- Traffic Modelling (completed)
- Consultation Summaries

4.2 Management Plans

An overarching Construction Environmental Management Plan (CEMP) will be required to be provided with the resource consent application. The CEMP will have a number of sub-plans that are identified below, with a brief discussion provided for each.

- Temporary Traffic Management Plan
- Construction Noise and Vibration Management Plan
- Erosion and Sediment Control Plan
- Spill Response Plan

4.2.1 Temporary Traffic Management Plan

The proposed road construction works will require works within the live traffic lane and adjacent to the traffic lane of SH29, as well as on local roads, including Redwood Lane, Whiore Ave and Cambridge Road. A Temporary Traffic Management Plan (TTMP) will be required from both TCC and Waka Kotahi to ensure that the disruption to road users are managed appropriately.

4.2.2 Construction Noise and Vibration Management Plan

The purpose of a Construction Noise and Vibration Management Plan (CNVMP) is to provide a mechanism to effectively and appropriately manage and control the noise and vibration effects of construction works upon nearby sensitive receivers. It is a tool to be used for the development and implementation of methodologies and practices on the construction site to appropriately avoid, remedy or mitigate adverse noise and vibration effects upon the health and amenity of the occupiers of nearby buildings and/or to protect against the cosmetic and structural damage to those buildings.

4.2.3 Erosion and Sediment Control

Earthworks have the potential to generate adverse effects related to erosion, sediment and dust. Given the scale of the earthworks required and the subsequent potential for the discharge of sediment laden water to water or to land, an Erosion, Sediment and Dust Control Plan will be required.

4.2.4 Spill Response Plan

The use of machinery involves the use of fuel (primarily diesel), petrol (vehicles), hydraulic oils and other lubricants. Given the use of these fuels and oils, there is the potential for spillage to occur which could either lead to soil or surface water contamination. Fuels and oils must be stored in accordance with relevant standards and regulations to minimise the risk of spillage to the environment.

A spill response plan shall be established prior to any works Methods for risk management and spill management include:

- Minimise or eliminate bulk storage of fuels and oils on site where practicable
- Locating storage facilities an adequate distance from the foreshore area.
- Isolate and secure storage areas to minimise risk of damage or puncture from plant use.
- Keep spill kits available and accessible at all times during the works.

- Secure any spilled material at the time of event, which can include the use of bunding.

Undertake the clean-up of spilled material, including excavation of contaminated soils and/or removal of liquids spilt. Disposal is to be at an authorised facility appropriate to the substance spilt.

5 Property Acquisition and Consenting Pathway Options

The options for property acquisition, alterations to designations, and resource consent pathways are detailed in the table below. Consenting Pathway Option (CPO) 1 is the identified pathway as Waka Kotahi is to take the lead on all implementation post the Business Case being approved. It is noted that while Waka Kotahi is identified as the lead agency for property acquisition at this time, this does not prevent TCC (or any of the other developers) from advancing property acquisition ahead of time.

Table 5-1: Property Acquisition and Consenting Pathways

	CPO 1	CPO 2	CPO 3	CPO 4
Lead Agency	Waka Kotahi	TCC	Waka Kotahi or TCC	TCC
Property	Willing Seller / Willing Buyer	Willing Seller / Willing Buyer	Compulsory Acquisition	Compulsory Acquisition
Designation	s181(3) minor alteration, or non-notified if full NoR alteration process under s181(1) and (2) deemed necessary	s181(3) minor alteration, or non-notified if full NoR alteration process under s181(1) and (2) deemed necessary	Full alteration process under s181(1) and (2), likely to be notified	Included in proposed plan change under s170
Resource Consents	BOPRC resource consents prior to construction NESCS resource consents from TCC	BOPRC resource consents prior to construction NESCS resource consents from TCC	BOPRC resource consents prior to construction Likely joint application and AEE with NoR NESCS resource consents from TCC	BOPRC resource consents prior to construction NESCS resource consents from TCC
Sequence	1. Property acquisition 2. Alteration to designation and resource consents 3. Physical works	1. Property acquisition - vest as road 2. Resource consents 3. Physical Works 4. Alteration to designation (tidy-up)	1. Alteration to designation and resource consents (joint application) 2. Property acquisition 3. Physical Works	1. Plan change with designation included 2. Property acquisition 3. Resource consents 4. Physical works

For the designation and consenting process, as the works involve a State Highway it is Waka Kotahi who will be named as the 'Requiring Authority' for the designation and 'Consent Holder' for any resource consents.

Whichever agency is named as 'leading', WSP have assumed that a joint approach will be pursued to the whole project. The joint approach is the protocol that has been followed for the project to date.

In terms of the sequencing, some of the items listed in the above table could be undertaken in parallel to therefore reduce timeframes. Further, if willing buyer/willing seller negotiations fail, then formal compulsory acquisition of properties will be required under the Public Works Act.

6 Conclusions

This memorandum has identified the statutory approvals required and assessed the possible consenting pathways available for implementation of the EWP. It is understood that once the Business Case is approved by Waka Kotahi, that agency will lead the implementation of the project work, with support from TCC.

As a result, Waka Kotahi would be responsible for:

- Project management,
- Property acquisitions;
- Alterations to designations;
- Design and consenting; and
- Implementation and engagement.

TCC is also enabled to undertake forward land purchase for the works, as described in this assessment, if it so determines to do so ahead of Waka Kotahi implementing the project.

Appendix T : Summary of Community Feedback

Tauriko for Tomorrow – Open Day Consultation Summary Report

This report ('**Report**') has been prepared by WSP exclusively for Waka Kotahi NZ Transport Agency ('**Client**') in relation to the Tauriko Network Connections public open days feedback ('**Purpose**') and in accordance with the Professional Services Contract (No. 16-237) with the Client dated 18 November 2016. The findings in this Report are based on and are subject to the assumptions specified in the Report. WSP accepts no liability whatsoever for any reliance on or use of this Report, in whole or in part, for any use or purpose other than the Purpose or any use or reliance on the Report by any third party.

1 Introduction

Between April and May 2021, representatives from Waka Kotahi, Tauranga City Council and WSP NZ Limited engaged with and the community on proposed plans for the new community in Tauriko West and options for the transport network to provide access to the new community (the Project) . This involved hui with Te Kauae a Roopu, 1:1 meetings with landowners and stakeholders, five community information days held at Tauranga Crossing, followed up with an online survey. In addition, the community was able to access to the information via a range of channels, including local media, social media, radio and online.

We received over 200 responses to our online survey, and more than 1000 people attended the information days. Responses were received by email following the information days. A full summary of the responses is provided in Appendix 1.

The Project Team also held 1:1 meetings with 80 parties whom included landowners, business owners and other stakeholders. Feedback from the 1:1 landowner meetings is private and confidential, hence is not recorded in this report.

2 What we have heard

Of the responses received, 100% expressed support for the project. In terms of the long-term State Highway 29 (SH29) upgrade, 59%, or 29 people indicated they preferred Option B, with 31% or 15 people preferring Option C and 10% or 5 people preferred Option A, with 1 response preferring Option B and C. 60% of responses did not express a preference for either Option A, B or C.

Those who preferred Option B generally cited it was the right level of investment for the city as the reason for their preference, however that the transport infrastructure needs to be built prior to housing being enabled within the Tauriko West urban growth area. Those who preferred Option C cited reasons such as the option enables better separation of traffic and promotes traffic flow. Common reasons for preferring Option A related to enabling incentives for public transport and walking and cycling. Option A is also cheaper than the other two.

In terms of the Enabling Works, some of the responses received provided support for the short-term SH29 improvements, however some of the responses stated that the Enabling Works are not enough to get through the next 5-10 years of traffic growth along the SH29 corridor. There were also a significant proportion of comments related to the speed limit along the SH29 corridor, of which the majority requested a reduction in the current posted speed limit.

In regard to the new community to be established in Tauriko, West, there was support for the new development, however some comments received reiterated the fact that there needs to be a range of housing provided, that the new community needs a hub i.e. community facilities such as shops, convenience stores etc and that the transport network needs to be upgraded well in advance of the housing being built in the new community.

3 Key themes

The responses received highlighted a number of common issues in relation to the perceived benefits of the project, areas of concern or unanswered questions, and general comments. These common issues may be loosely grouped together into the following key themes:

- Housing

- Education facilities
- Traffic effects
- Multi-modal
- Road upgrade works
- Heavy vehicles

These key themes are described below with summarised comments from the consultation responses.

3.1 Housing

The provision of housing within the Tauriko West urban growth area brings a range of effects as a result of the location being close to a major state highway network and within a changing landscape setting.

Support	Oppose
Minimum housing density of 30 houses/ha with 10% being inclusionary zoning	Don't spread into rural areas - emphasis on intensive housing within existing areas
Good mix of open space, connected walkways, and mixed density housing	Residential growth should not occur until funding is secured for roading
Set clear development parameters	Filling in Wairoa River area with housing is a joke
Community spaces that reflect requirements of all age	Transport options should be built prior to housing
Areas for multi-level housing should be defined early	Roundabout with this much traffic volume should not be near housing
Housing only permitted after infrastructure is in place	Worried about amenity/appearance of new residential area
Plan for co-housing and different housing types - papakainga, apartments, etc	Request investigation into whether development of residential land will create affordable housing or more of the same unaffordable development

3.2 Education facilities

Of the feedback received, there is support for the provision for new schools (primary and secondary) within the Tauriko West urban growth area as well as protecting the land for the Play Centre to continue to operate. There were only two comments, as indicated below where there was no support. Overall the general sentiment is positive.

Support	Oppose
New land allocated to play centre car park and construction of new school	Playcentre closing and cost involved with relocation
Building a new intermediate and high school	Unsafe place for pedestrians and school children
New primary school and secondary school	
Co-ed secondary school required for Tauranga west	
Supports creating new secondary school	
Support keeping play centre	

3.3 Traffic effects

Traffic effects, such as noise and air quality and congestion related to the current and future SH29 alignments and how these are managed on the receiving environment, especially in light of the

proposed increase in density of housing within the Tauriko West urban growth area are key issues for the transport upgrades to address. From the main issues raised in the feedback received, the general sentiment is neutral in terms of how the various long term transport network options manage traffic effects.

Support	Improvements
Separates commuter traffic and local traffic Slip lane added to SH29/Cambridge Rd to speed up traffic Option B supports traffic flows and future traffic flows Roundabouts and traffic lights will allow more efficient vehicle movements Separate bus lanes from heavy traffic and cars Option B is sensible and accounts for population and traffic growth Option C promotes traffic flow Option B will keep traffic moving All roads should be double lanes to cater for traffic volumes - possible T3/Bus lanes Option C is the best as it separates traffic with different destinations (local and commuter)	Option B and C (both) don't have off ramps for traffic going to Cameron Road or Pyes Pa Road Existing traffic cannot handle more trucks, contractors Avoid use of traffic lights on SH29 Options have not addressed traffic congestion Allow traffic to flow during construction Options do not consider increased traffic volumes - not enough capacity Build roads with 4 to 6 lanes - support traffic Use off ramps and fly overs - no traffic lights and roundabouts Construction work in later evenings, early mornings, and night to avoid traffic hold ups more access roads Ensure construction does not interfere with local traffic Fix traffic congestion Traffic lights at Cambridge Road and SH29 intersection should be avoided. Don't priories pedestrian crossing at SH29 and Cambridge Road intersection- will stop traffic Do not support roundabout at Redwood Lane - will not handle traffic volumes and will be noisy Move noise and congestion away from residential areas Does not support traffic lights as they create tails Option B sends traffic to City rather than along SH29

3.4 Multi-modal

A transport network that support multiple transport modes is important and is done successfully through providing dedicated lanes for buses, walking and cycling. If these transport options are provided from when the first house is built in the Tauriko West urban growth area, it will provide residents with transport choice. Overall, the general sentiment is positive based on the support for a multi-modal transport network.

Support	Improvements
Supports buses if they are electric Separate cycle and walking tracks to roads Direct bus routes with dedicated lanes Frequent public transport will work with increased frequency Supports walking and cycle ways Supports use of bus lanes Smaller and more frequent buses with direct links Supports new bus routes and bus lanes Supports new bus routes and park and ride Increased frequency of buses - smaller buses	Walking and cycle lanes need separation from cars T3 lanes for cars and buses should be provided Do not support buses for public transport Need a bus service running along Cambridge Road Do not support cycle way along Wairoa River Delay bus terminal until process of residential development is made

Support	Improvements
Supports public transport and uses of buses - make it reliable Support dedicated and faster bus routes Supports cycle and walking pathways alongside use of overbridges rather than lights to cross SH and Cambridge Road Supports dedicated bus lanes and subsidised bus fees that connect to the CBD Supports cycle and walking pathways - safe crossings Supports park and ride Support cycle track along the Wairoa River. Support bus lanes and buses going to useful destinations Supports cycle and walking pathways if they are correctly connected Supports cycle and walking pathways near the Wairoa River Consider the use of light rail as well as buses and cycle lanes Supports walking and cycle tracks but questions suitability with aging population Increase use of rail rather than trucks Supports clean electric public transport - light rail? Supports dedicated bus lanes (if buses are used)	Consider other public transport options - not just buses Large gaps in transport networks and cycle and walking tracks Separate cycle and walking tracks to roads Direct bus routes with dedicated lanes Is there evidence for park and ride - will it be used Interchanges and intersections should give priority to buses Don't waste money on cycle and walking tracks Do not support public transport spending No allowance for horse riding on walking and cycle pathways Consider other public transport options - not just buses Park and Ride will not be as effective on traffic volumes as thought

3.5 Road upgrade works

The works to upgrade SH29 will result in short term construction effects and long term operational effects. How these are managed will determine the amenity of the surrounding environment, which includes a range of land use activities.

Support	Oppose
Option B is future proof and well thought out Supports Cambridge intersection works Need increased road capacity to support trucks from port Interchanges make more sense than lights and roundabouts Keep old and new road - toll the new one. Future proofing for the long term growth of Tauranga All roads should be double lanes to cater for traffic volumes - possible T3/Bus lane	Not a radical enough change - bigger and bolder Upgrading existing road would be expensive and a waste of time 2-3 years is too long to wait (for Enabling Works) Sort driveway access prior to works start Proposed infrastructure is not future proof Upgrade Omanawa Road intersection Install large signs and bollards at intersection of SH29 and Omanawa Road Join Kaweroa Drive to (Tauriko) business estate Work on Cambridge x SH29, and through road SH29 to SH36. Fix Cambridge Road intersection and ban heavy vehicles on Cambridge Road More signage for speed limits and road rules Keep existing local roads separate to SH(commuter routes) Option A and C are band aids Does not support public transport taking over roading Proposed road changes need serious work Redwood Lane interchange is not suitable for half a dozen houses Plan alongside the port and don't skimp on budget or timing of works. Road (SH29) should be 3 lanes each way

Support	Oppose
	Reduce speed limits Change speed limits for Belk Road intersection Build roads with 4 to 6 lanes - support traffic Roundabout (no lights) at Cambridge Road intersection Toll road (Takitimu Drive) is already congested and this will not improve it Shocked at lack of roading improvements Plan alongside the port and don't skimp on budget or timing of works Proposal operational in far shorter time - works underway now.

3.6 Heavy vehicles

State Highway 29 is one of the main freight routes to the Port of Tauranga, and the expanding Tauriko Business Estate. Providing for unimpeded access to the Port and ensure the right traffic is on the right road is important to achieve through the Tauriko Network Connections business case.

Support	Oppose
Consult with road transport and road users Get heavy vehicles off local roads Good intersections to allow heavy freight without local traffic Separate industrial zone, trucks, and dwellings via buffers	Provide for heavy haulage and over dimension loads Ban heavy vehicles on Cambridge Road Need increased road capacity to support trucks from Port (of Tauranga) Too many trucks using Gargan Road as a shortcut Increase use of rail rather than trucks

4 Issues analysis

Detailed analysis of the comments received, and the key themes highlighted a number of patterns in the consultation responses. These patterns are shown on the Issues Matrix included at **Appendix 2**, in which responses were analysed to identify whether they contained reference to the key themes. While there is clearly some crossover between issues in many of the responses, the issues generally relate to one of the identified key themes, as outlined below:

Summarised key themes	Housing	Education facilities	Traffic effects	Multi-modal	Road upgrade works	Heavy vehicles
Relevant Issues	Location Amenity Visual	Playcentre Primary School Secondary School	Traffic Noise Traffic Congestion	Public Transport Walking and Cycling Park & Ride	Timing of works Local road connection upgrades Safety	Port of Tauranga Access Trucks and heavy vehicles

The relevant issues were developed from the likely effects of the Enabling Works, the three shortlisted long term options for the SH29 upgrade, the proposal for dedicated bus and walking and cycling lanes, and the proposed housing to be developed within the Tauriko West urban growth area.

Key results which emerged from the issues analysis are summarised below:

- One of the most frequently mentioned issue overall was the provision of dedicated walking and cycling lanes, which was mentioned in 30% of responses with public transport mentioned in 20% of responses. Frequent comments on these issues included *"supports public transport and uses of buses - make it reliable"*, *"supports cycle and walking pathways if they are correctly connected"* and comments like *"don't waste money on cycle and walking tracks"*, *"do not support public transport spending"*. These comments are a result of the transport network options presented during the Open Days. The proposed Park & Ride was mentioned in 6% of responses.
- Safety and local road connection upgrades were mentioned in 35% of comments respectively, with comments including *"Redwood Lane interchange is not suitable for half a dozen houses"*, *"upgrade Omanawa Road intersection"*, *"Create more consistent speed limits - less variation"* and *"more signage for speed limits and road rules"*.
- The top five issues raised in the responses by ranking are:
    - Local road connections and safety (35% each)
    - Walking and cycling (30%)
    - Traffic congestion (21%)
    - Public transport (20%)
- Provision of new schools (both primary and secondary) was mentioned in 17% of comments and retaining the Tauriko Playcentre was mentioned in 15% of responses received. Comments for the Playcentre included "*playcentre closing and cost involved with*

relocation" "Maintain area for play centre", "Support keeping play centre" and *"Support keeping play centre and allowing expansion"*

- Issues of less concern to respondents were:
    - Traffic noise – mentioned in 2% of responses
    - Housing – mentioned in 3% of responses
    - Port of Tauranga access – mentioned in 6% of responses
    - Park n'Ride – mentioned in 6% of responses.

5 Summary

The responses received clearly show that while there is broad support for the Project in principle, many respondents have outstanding concerns that will need to be addressed through further consultation and engagement as the project develops. In terms of suggested modifications to the project and future process, the following comments are representative of the range of suggestions received:

- SH29/29A needs to be upgraded prior to housing being developed.
- Option B is the right level of investment.
- Providing separation for active modes is important.
- More schools are required to support the new growth area.
- Road upgrades need to happen now.

This feedback, combined with the feedback from the 1:1 landowner meetings will enhance the Project Team's understanding of the communities concerns of the project and where changes could be made in terms of the staged approach to how improvements to the transport network could be implemented.

6 Next steps

TBC once we talk with TCC

Appendix U : Draft Early Works Point of Entry Document

RECORD OF THE POINT OF ENTRY

The record of the point of entry (PoE) is a critical part of a business case. It is also the initial record of the pathway to be followed through investment decision making processes where a business case is established.

Please ensure you address each question carefully, and consider the full range of risks, timeframes, and costs. It is essential that you also anticipate the business case development pathway appropriate to the proposed investment, including the next step, as this will inform the level of detailed information you must capture here.

Note that completion of this record **is not** a substitute for the necessary critical thinking and discussions that **must** characterise the development of a PoE.

All fields are required to be completed for the NZ Transport Agency to consider whether or not a business case will receive endorsement. Where appropriate, reference or additional information can be added to this record, such as evidence used to answer the 16 investment questions.

The text in *blue italics* is a guide to how to consider the questions. The actual information provided needs to be detailed, specific and relevant. The level of detail should reflect the risk and complexity of the proposed investment.

For more comprehensive guidance visit the Transport Agency's Business Case Approach (BCA) guidance.

This template should be completed by the problem owner in consultation with a Point of Entry specialist from the Transport Agency Strategy Policy and Planning team, to ensure effective early engagement and access to clear and consistent advice to ensure fit-for-purpose effort.

Context	
Initiative name	*Western Corridor Growth Management – Tauriko West Connections – Tauriko Early Works Package*
Author	*Anna Thurnell, Team Leader, Growth Funding and Policy, Tauranga City Council*
Lead organisation or business group	*Tauranga City Council*
Problem owner	*Andrew Mead,* Manager, City & Infrastructure Planning, Tauranga City Council
Transport Agency point of contact	*Vaughan Roberts, Investment Advisor, Partnership investments*
File reference	TCC to add their Objective link to point of entry The Tauriko Network Connections – Detailed Business Case, Part A: *https://infohub.nzta.govt.nz/otcs/cs.dll/Overview/35378085* Point of Entry Tauriko Early Works *https://infohub.nzta.govt.nz/otcs/cs.dll/Overview/37750673*
Date	16 July 2019
Background	
Tauranga is one of New Zealand's fastest growing cities and as the population increases, the demand for housing will exceed supply in the near future (within the next 3 years). The 2013 SmartGrowth Strategy sets the strategic vision and direction for the growth and development of the western Bay of Plenty by identifying corridors and focus	

areas to help deliver urban growth (Figure 1-2). Tauriko West is a part of the Western Corridor that has been identified through Smartgrowth as a key growth corridor.

In 2016, the Tauriko Network Programme Business Case (PBC) determined that to give effect to the SmartGrowth Strategy for Tauranga's western corridor over the 10, 30 and 50-year time horizons, the function of the transport network must also support this growth.

The status of Tauriko Business Estate and Tauriko West and the need for identifying early works to support ongoing growth was reported to the NZ Transport Agency Board in October 2018 as an area requiring ongoing focus to resolve whilst funding and prioritisation of the wider Detailed Business Case for the Tauriko West Network Connections was resolved. The NZTA Board endorsed the proposed revised approach for SH29 Tauriko West (NZ Transport Agency Board Paper 2018/10/1289). The project partners (NZTA, Tauranga City Council (TCC), the Western Bay of Plenty District Council and the Bay of Plenty Regional Council) have been working together to scope an immediate investment package for housing and industrial growth in Tauriko West and the Tauriko Business Estate. This point of entry outlines the scope of works required to develop a business case and funding application for this investment package.

Tauriko Business Estate

Within the Tauriko Business Estate, development has accelerated significantly over the past 18 months to the point where the developer is constrained from developing land beyond a threshold derived from the Tauranga City Plan (no more than 80ha across development stages 3A, 3B & 3C) until a new connection is provided onto SH29 near Belk Rd/Redwood Lane. This connection is a requirement of the operative structure plan for the Tauriko Business Estate and sequencing schedule within the City Plan (in 2007 Transit endorsed providing access to the southern part of their land via a roundabout near Belk Road intersection with SH29. This was deemed necessary to accommodate the increased heavy commercial vehicle traffic safely during and post construction). Without a connection onto SH29 (or a resource consent to allow development within the Business Estate without such a connection), development within the Business Estate will not be able to proceed beyond this threshold.

The developers of the Business Estate have obtained NZTA affected party approval to subdivide the southern portion of the estate and defer the connection to SH29 in the vicinity of Redwood Lane. However, it remains that to fully develop this land, local road alignments will need to be identified and protected in the short term to protect delivery of the outcomes sought by the PBC. Further, without a connection the developable land within the Business Estate will be constrained. Therefore, even with NZTA affected party approval and an approved subdivision consent, the connection onto SH29 is required to enable full development of this area.

Tauriko West Urban Growth Area

The Tauriko West housing development is necessary to meet Tauranga City Council's National Policy Statement on Urban Development Capacity obligations which it currently falls short on in the short, medium and long term. Recent work commissioned by TCC concludes that a shortage in the delivery of new housing over the next 3 years due to supply side constraints will number some 1,000 new homes.

Tauranga City Council has been progressing the long-term planning of Tauriko West as a new growth area which will provide for approximately 3,000 new residential dwellings. These dwellings will be supported by an increased in size primary school, large riverside reserve areas, local commercial centre, and opportunity for the delivery of a variety of different housing typologies and densities. Tauriko West is situated next to the Tauriko Business Estate which provides significant current and future employment opportunities. It is also located next to Tauranga Crossing, a significant retail, entertainment, dining and commercial development providing many local amenities.

The design and security of land for interim access off SH29 into Tauriko West is critical to the structure plan and zoning proposal which will ultimately allow housing to proceed once a formal Resource Management Act planning process had been completed. Without an agreed understanding on the location, design and capacity of such a multi-modal access along with an understanding of the short-term impact of access on the wider transport network, Tauriko West as an urban growth area, would not be able to proceed. A connection off SH29 to Whiore Avenue to cater for bus priority and active travel routes is a key additional component required to achieve multi-modal access outcomes.

Setting out the problem or opportunity

Problem or opportunity description	The opportunity in Tauriko, as described in the Tauriko Network Plan PBC, is to enable a safe and liveable community to be created in Tauriko by providing multi-

	modal transport choices, enhanced local connections for local journeys, maintaining road freight access along SH29 to the Port of Tauranga, and enabling access to local amenities (schools, businesses, recreation, and culturally significant places) integrated with urban place-making activities being implemented through a Structure Plan. A stakeholder workshop was held on the 25th January 2017 consisting of representatives from the Transport Agency, Western Bay of Plenty District Council, Tauranga City Council, Bay of Plenty Regional Council and other selected stakeholders. The purpose of the workshop was to confirm and refine the problem statements developed at the Programme Business Case (PBC) stage. The problem statements were reconsidered and slightly modified at a stakeholder workshop in May 2018 involving the Transport Agency, WBoPDC, TCC and BoPRC. The two confirmed problem statements, as defined in the *Tauriko Network Connections – Detailed Business Case, Part A* are: 1. If not appropriately integrated into the transport system, planned land use development and growth in the Western Corridor is unlikely to proceed due to the scale of impacts on access, safety and liveability (70%). 2. Poor geometry and negotiation of major intersections on State Highway 29/29A through the Western Corridor leads to injury crashes and high severity outcomes (30%). The project partners recognise that the DBC was developed under the previous GPS for transport and that there has been a change in funding priorities. Despite this, the DBC problem statements are still relevant for the early works package with the provision for multi-modal infrastructure investment being consistent with Problem 1. Whilst further development of the Tauriko DBC is on hold until funding and prioritisation of the wider Detailed Business Case for the Tauriko West Network Connections is resolved, investment in transport infrastructure is required to meet commercial and residential development obligations, as per The NZTA Board endorsed proposed revised approach for SH29 Tauriko West (NZ Transport Agency Board Paper 2018/10/1289). On the western side of SH29 through Tauriko, a proposed large residential development (Tauriko West) will require connections to the transportation network. On the eastern side of SH29 near Belk Road, the roll out of Tauriko Business Estate is threatening the opportunity to protect future local road options. Local road alignments, cycleways and public transport priority measures need to be identified and protected in the short term to protect delivery of the outcomes sought by the PBC and the GPS. Further, without the Ring Road connection onto SH29 the developable land within the Business Estate will be constrained.

Outcomes sought	The outcomes sought by the Tauriko DBC are as follows:
	• Network Performance and Capability:
	  ○ Throughput – increase/maintain
	  ○ Reliability – increase/maintain
	  ○ Access – improve/maintain
	  ○ Comfort and customer experience – improve/maintain
	• Safety: - improve/maintain
	• Health: Pollution (No2 PM10) - decrease/maintain
	• Environment: Pollution and greenhouse gases – decrease/maintain

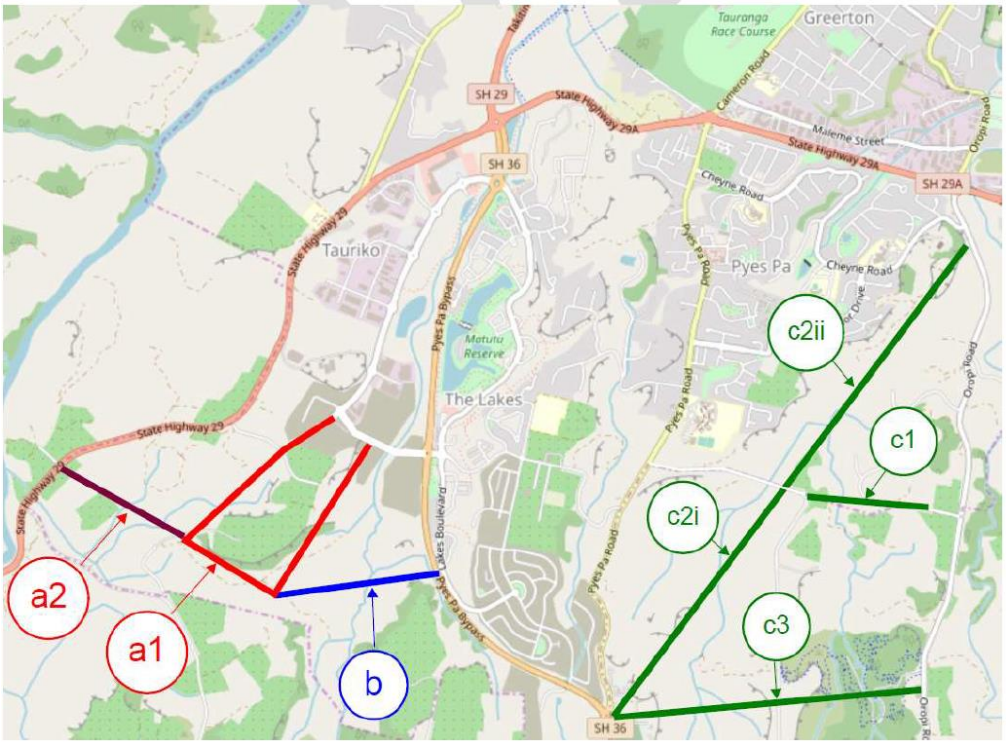
Ensuring alignment with strategy (see Note 6)	
Describe how the investment aligns with strategy	The Tauriko Network Connections – Detailed Business Case, Part A outlines the strategic context for why investment in the Tauriko Transport Network is necessary to support land use development.

	Through SmartGrowth, population and housing projections have been undertaken for the western Bay of Plenty sub-region. As a result, it is clear that population growth has and will create a housing demand that will eventually exceed supply. There is a need to ensure there is sufficient development capacity in the region not only to meet the National Policy Statement on Urban Development Capacity (NPS-UDC) but also to address continuing market pressures. In response to the shortfall of total dwellings, SmartGrowth identified the western corridor as a key location where this growth could occur to relieve the current and future pressure; and four urban growth areas (Tauranga Urban Strategy, Te Tumu, Keenan Road and Tauriko West), aimed at delivering additional development capacity in the medium to long term for the sub-region. Tauriko West and Keenan Road are located in the Western Corridor. As is the Tauriko Business Estate which is currently experiencing rapid growth. A future extension to the Tauriko Business Estate is also planned within the next 5-10 years. Due to the increasing demand for housing in the western Bay of Plenty sub-region, and the current rate of population growth, there is a high risk there will be a gap in supply if Tauriko West are not ready for market by 2021. The vision of Tauriko West reflects that of the SmartGrowth vision which is "*To create a thriving community for locals to live, work, learn and play*." To achieve this vision, the community will need to have access to amenities such as schools, parks, cycle and walkways, safe and efficient access to shopping and community facilities, and a multi-modal transport network in close proximity; all of which enhances liveability. These objectives are all about establishing a high quality of liveability for the new community and providing choice. An integral part of meeting those objectives and the core of the western corridor is the Tauriko Business Estate (TBE) and Tauranga Crossing which provides the community with commercial and retail spaces and places to work.		
Level of risk, uncertainty and complexity (see Note 7)			
Key risks	The early works do not align with the final long-term solution.	**Overall risk level:**	Low
	Landowners may not accept interim options and land take required is unacceptable, land purchase delayed	**Overall risk level:**	High
	The required structure plan change could be delayed, resulting in project implementation delay	**Overall risk level:**	High
	Housing development capacity may not be achieved in Stage 1 resulting in delays to housing, developer losses, reputational damage to TCC and NZTA	**Overall risk level:**	Medium
Key uncertainties	The long-term network layout is not finalised because the DBC is on hold due to the TAIP re-evaluation of projects.	**Overall uncertainty level:**	Medium

Level of complexity	The early works have been modelled and can be configured to align as much as possible with the DBC options which were being considered.	**Overall complexity level:**	Low
Previous and related work (see Note 8)			
Summarise previous work	In 2016 the SmartGrowth Western Corridor Strategic Study was completed. This identified development potential for up to 20,000 houses and around 400ha of industrial and commercial land in the broader Pyes Pa /Tauriko area ("western corridor") long-term as the most effective and efficient integrated solution for providing for future housing and economic growth. This included: • Current urban growth areas: Pyes Pa, Pyes Pa West (The Lakes), Tauriko Business Estate and Tauranga Crossing. • Planned urban growth areas: Tauriko West, Keenan Road and Tauriko Business Estate extension. Development of these areas is largely anticipated to occur in the next 5-20 years. • Potential future urban growth areas: Belk Road plateau, Merrick Road, Joyce Road. Development of these areas is uncertain and, if progressed, would likely to occur in the next 20-50+ years. At the same time a PBC was developed in the western corridor led by NZTA and supported by project partners Tauranga City Council (TCC), the Western Bay of Plenty District Council and the Bay of Plenty Regional Council. This resulted in a preferred transport network being determined for this area focused on Public transport and walking/cycling; Local roads investment; and State Highway improvements. <u>Tauriko Business Estate – Ring Road (excluding SH36 connection)</u> Tauriko Western Corridor DBC partners have been working with the developer of Tauriko Business Estate in planning for and enabling the future proofing of the ring road corridor identified in the Tauriko Network Plan PBC. As part of the Detailed Business Case the following detailed options analysis for the Ring Road concept has been undertaken, including: • Modelling; • Design and analysis; • Engineering Feasibility and Options Report; • Costs estimates In parallel, TCC has been working with the developer of Tauriko Business Estate to: • define the roads function & agreeing design criteria; and		

- agreeing to acquire a long-term future proofed road corridor and to construct Section a1 (see Figure 2 for Ring road sections).

Figure 2 - Ring road sections



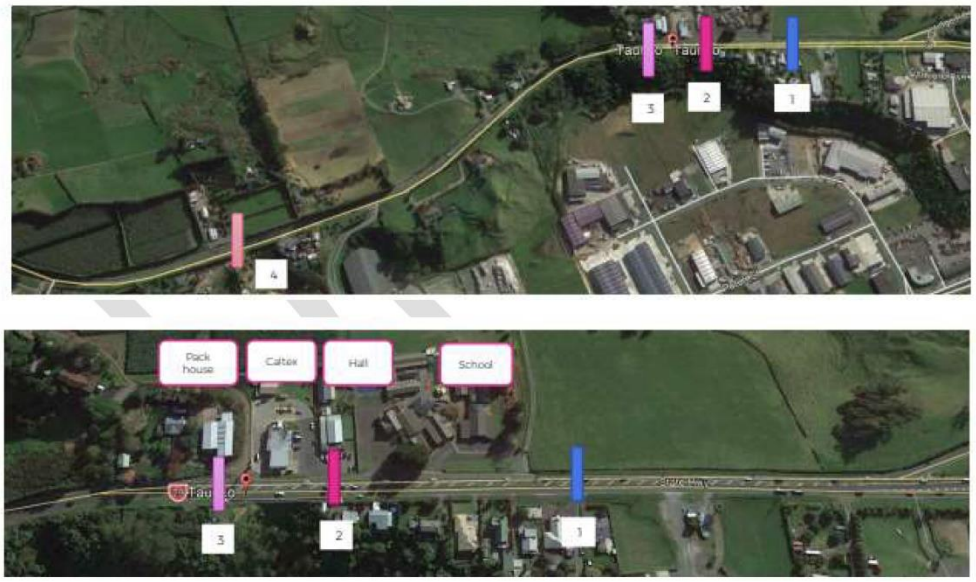
Tauriko West Interim Access

Tauriko West Network Connections (Tauriko for Tomorrow) DBC partners have been working with the developers of Tauriko West in planning for and enabling the implementation of the proposed Tauriko West Urban Growth Area. As part of this, the following work has been undertaken:

- transport modelling;
- development of short list options;
- option evaluation;
- development of utilities options to integrate with the transport network.

As discussed above, following discussions between the Tauriko West landowner group, TCC and NZ Transport Agency, four potential locations for the interim access onto SH29 were identified.

The form of the Tauriko West access is assumed to be a set of traffic signals as determined by the Tauriko West Network Connections project team. Such an interim access will align with the business case objectives of providing safe and efficient access for public transport and a walking/cycling crossing of SH29. The traffic signals would also allow for bus priority measures to be provided at the outset to help achieve the target mode shift away from single occupancy vehicle use. High level assessments and engagement with landowners by the Tauriko for Tomorrow project team identified 4 possible locations for an interim access. It was found that Options 1-3 would be suitable as an interim access, with Option 3 (to the south of the Caltex Service station) the most favourable. Further work is required to confirm this within the context of the long-term requirements of the SH29 corridor.

	Figure 3 - Upper plateau interim access options  As part of the early works funding application process further work is required to: • confirm the quantum of new housing that could be delivered off the Tauriko West access as part of the early works package; • confirm the impacts of the Tauriko West access on the wider network levels of service and the operation of adjacent intersections identifying any necessary additional interim measures to maintain levels of service for the interim period, particularly at the intersection of SH29/Cambridge Rd; • Identify low cost low risk safety improvements in the corridor between Belk Road and Takitimu Drive (including speed management) consistent with the Agency's wider safer roads programme; and • confirm the expected 'life-span' of the early works measures with respect to level of service degradation. A significant amount of investigation work has already been completed by the Tauriko for Tomorrow Project Team. These include: • Optioneering of SH29 improvements as part of the DBC – WSP Opus • The Tauriko Network Connections Interim Connections Report - WSP Opus Nov 2018 • Engineering reports for the Ring Road prepared by Aurecon for TCC • Initial draft DBC report (sections 1-3) – WSP Opus Sept 2018 • Traffic modelling outputs from TTM Stage 2,3, & 4 modelling undertaken by BECA • Cambridge Rd/SH29 intersection options prepared by Aurecon for NZTA • Tauriko West – Utility Services Feasibility Study – WSP Opus for TCC.
Summarise related work	As described above, the wider Detailed Business Case for the Tauriko West Network Connections is on hold due to funding constraints. However, providing interim access is also part of the NZTA Board endorsed revised approach for SH29 Tauriko West until funding and prioritisation of the wider DBC is resolved. This Early Works package will deliver the interim access component. While the wider Network Connections DBC has progressed through short-listing, an Urban Form and Transport Initiative (UFTI) for Tauranga has started. UFTI will deliver an updated Tauranga Transport Programme for the whole city designed to be more integrated with land use plans and achieve greater mode shift and land use intensification than previously targeted.

	Part of the UFTI deliverable will be a Transport System Masterplan defining the preferred strategic form of the city's transport network over the long-term to deliver appropriate levels of service for all transport modes, which can then be "chunked up" into an investment programme. This masterplan will include a variety of system components within the current scope of the Tauriko Network Connections DBC and the proposed early works package. These including the function and form of SH29 between Belk Road and Barkes Corner/Cameron Road, public transport in and out of the Western Corridor, parts of the strategic cycling network and demand management initiatives. On-going discussions are underway to ensure the interim works and wider Tauriko DBC align with UFTI and there are some common personnel involved in both projects. The Tauriko West Network Connections DBC shortlisting process established a range of multi-modal sub-options for the Early Works Package between SH29 Belk Road and Cambridge Road that can be readily incorporated into any of the shortlisted options for the long-term. None conflict with the short-list. As and when the wider DBC is restarted, we will need to confirm that the short-list remains aligned to UFTI, and in particular, the Transport system masterplan. Given that none of the Early Works Package options conflict with the shortlist, any refinements to the shortlist generated through UFTI programme are unlikely to be misaligned with any final early works package for Tauriko in the short-term. Minor safety improvements for SH29 between Belk Road and Cambridge Road have previously been developed by NZTA. Improved road safety will be incorporated within the Early Works proposal. Tauranga City Council are preparing Plan Changes to reflect higher densities, a variety of housing typologies and associated parking requirements to further influence mode shift.
Planning the next stage (see Note 9)	
Recommended next phase	Detailed Business Case
Scope of next phase	A work package is proposed with the aim of developing a detailed business case and funding application to be submitted to NZ Transport Agency and TCC investment decision makers for pre-implementation and implementation funding. This work package will contain a number of early projects which form an element of the Tauriko West Network Connections DBC but which early delivery/route protection is required to enable ongoing residential/economic growth. Early works package draft report (DBC) structure is proposed as follows: • Summary of the Tauriko Strategic case (updated to reflect 2019); • Demonstration of an assessment of options against the investment objectives (including review of engineering options assessment); • Justification for the timing of need and design standard and cross section for the ring road; • Confirmation that early works package does not obviate or constrain long term options to be confirmed through the DBC; • Cost estimates (DBC level); • Consenting and land procurement strategy (including options assessment); • Funding agreement (who pays for what); • Confirmation status of previously proposed funding agreements; • Assessment against Investment Assessment Framework; • Peer reviews (as required); • Management Case – who is going to do what next (accountabilities, roles and responsibilities); • Communications strategy/messaging; • Risk Management; and

	• Assessment against significance policies of NZTA/TCC.
Target completion date	*November 15, 2019*
Budget requirements	*The offer of service from Opus outlines an overall budget of $272k + GST ($313k). This can be accessed here:* https://infohub.nzta.govt.nz/otcs/cs.dll/link/37754333 *Tauranga City Council have offered to fund $113k of this work without NLTF subsidy.* *It is proposed that the remaining $200k be funded through the DBC phase of the 'Western Corridor Growth Management – Tauriko West Connections' activity (in TIO under TCC, activity ID: 124719; phase ID: 259256). This activity was prioritised as 'likely' in the recent NLTP re-prioritisation process for the local road improvements activity class. The FAR for this activity is 51%, so the total NLTF share will be $102k.*

Business case pathway (see Note 10)

In developing the Tauriko Early Works package DBC and funding submission it will be assumed that the strategic case and investment objectives in support of this early works package are the same as those for the Tauriko West Network Connections DBC (TIO activity ID: 116972/248953). This proposed early works package will provide answers to all of the 16 business case questions that are required for NLTF Investment assurance. The early works package report (with draft structure as outlined above) in combination with the work conducted to date for the Tauriko West Network Connections DBC will answer the 16 business case questions and will be submitted as the detailed business case for the Tauriko Early Works package of works.

For clarity this means:

- Problem statements, benefit statements, and investment objectives may be refined to reflect the specific elements of the DBC, but in principal, the wider DBC for which project objectives have already been determined will provide the basis for the investment objectives for this project. The submission will demonstrate the contribution the early works elements make to the DBC desired outcomes
- Further work will be incorporated into the submission which expands on earlier sections of this point of entry demonstrating the significance and need for urgency.

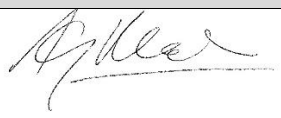
A proposed form of funding application has been developed for the early works package as outlined below. This structure has been developed on the basis that the Tauriko West Network Connections DBC will be the umbrella document and that the submission needs to be shaped to recognise:

1. Business case principals
2. The scale of the decision being sought
3. Risks associated with the decision
4. The technical content in support of an investment decision which would be expected in the DBC (when complete)

Throughout the development of the DBC we will obtain more information on the potential risks identified above. Any potential delays associated with land purchase and structure plan changes will likely dictate how the implementation is phased. It is likely that implementation will progress as two separate phases:

- one phase for the Belk/Redwood roundabout
- one phase for the Tauriko West access/Whiore Ave/Cambridge Rd

Decision/next steps (to be completed by Lead Organisation – Problem owner)

	**Recommended** ~~**/ Not recommended**~~ (strike out applicable) **Name:** *Andrew Mead* **Role: Manager: City & Infrastructure Planning** **Date: 16/7/19**

Decision/next steps (to be completed by NZ Transport Agency – Senior Manager, System Planning)

Decision *(signature required here)* 	**Endorsed** / ~~**Not endorsed**~~ (strike out as applicable) **Endorse the Western Corridor Growth Management – Tauriko West Connections – Tauriko Early Works Package Point of Entry that that next business case pathway be a Detailed Business Case subject to approval of funding.** **Name:** *Mayurie Gunatilika* **Date: 16/08/2019**
Conditions and/or agreements required	
Decision/next steps (to be completed by NZ Transport Agency – Chief Financial Officer)	
Decision *(sig*  *l here)*	**Endorsed /** ~~**Not endorsed**~~ (strike out as applicable) *That the CFO approve funding for the Western Corridor Growth Management – Tauriko West Connections – Tauriko Early Works Package Detailed Business Case with a total (apportioned) shared project cost of $200,000 and NLTF share of $102,000 at a FAR of 51% from the Local Road Improvements activity class.* **Name:** ~~*Howard Cattermole*~~ John Coulter, acting CFO **Date:** 4/10/19
Conditions and/or agreements required	*Set out any conditions or agreements that the decision is contingent upon.*
Mandatory Information	1. That the activity is included (or varied into) the RLTP and NLTP 2. That the Manager, Treasury and Cashflow confirms funds are available from the relevant activity class. 3. That the activity class owner has been engaged and confirmed priority for the activity. 4. That relevant DP&S and PI staff have been engaged in understanding the need and priority for the activity.
NZTA Assessment for Endorsement (Completed by NZTA Staff only)	
Additional relevant Context/Background	High priority area for the Board given Tauranga is a high growth area and the indicative implementation cost of the Tauriko West Network Connections is $360M. While the substantive DBC for Tauriko West Network Connections is on hold due to NLTF funding constraints, growth pressures jn Tauranga remain and there is an immediate need to provide infrastructure, so growth can be unlocked. The proposed early works have been carefully scoped to ensure that they reflect the current drivers of the GPS and ensure that they will not be out of alignment with the substantive DBC. This activity has been included in the recent NLTP re-prioritisation package and has been included as a 'likely' for funding approval. TCC and NZTA have worked closely to ensure that the risks of undertaking an early works package are minimised.
Confirmation of Strategic Context	The Tauriko Network Programme Business Case (PBC) was undertaken in 2016 prior to the development of the current GPS. Therefore, the early works package will have to provide a 'mode neutral' investment package in order to give effect to the GPS. This has been recognised by the project partners and the problem and benefit statements, and investment objectives may need to be refined to reflect this, however in principal, the wider Tauriko West Network Connections DBC will provide the basis for the investment objectives.
IAF Results Alignment Assessment (if Applicable)	The results alignment has been assessed as High. This is based on Tauriko forming a part of the Western Corridor high growth area in Smartgrowth (to be replaced by UFTI). This aligns to the criteria of supporting a high priority element in an agreed

	integrated land use and multi-modal plan. The early works package will also address a significant gap in access to new housing in a high-growth urban area. The BCR appraisal is 1.7. Therefore the IAF is rated as a HL. This means the activity has funding priority of 5 which is above the line for funding eligibility in the NLTF.
Timing/Urgency	Timing of the early works package is urgent as this will enable the immediate investment package for housing and industrial growth in Tauriko West and the Tauriko Business Estate.
Funding Position	The DBC was included in the NLTP reprioritisation as an above the line activity and is therefore eligible for NLTF funding. Funding has been confirmed by the Manager, Treasury & Cashflow. Refer to email: https://infohub.nzta.govt.nz/otcs/cs.dll/link/37948834
Recommendation	That the Senior Manager System Planning endorse the Point of Entry that that next business case pathway be a Detailed Business Case subject to approval of funding. Condition: • That the funding approval for the Detailed Business Case of $200,000 total ($102,000 NLTF) be approved by the Chief Financial Officer.
Reasons for Recommendation	Tauranga is a high priority area of investment for NZTA. Tauriko has been identified as an area of high growth in the Western Bay's Smartgrowth Strategy (to be replaced by UFTI). The Board have been advised that this area needs ongoing focus while the funding and prioritisation of the substantive DBC is resolved, therefore by advancing a package of early works this will enable growth to continue in a co-ordinated and planned manner.