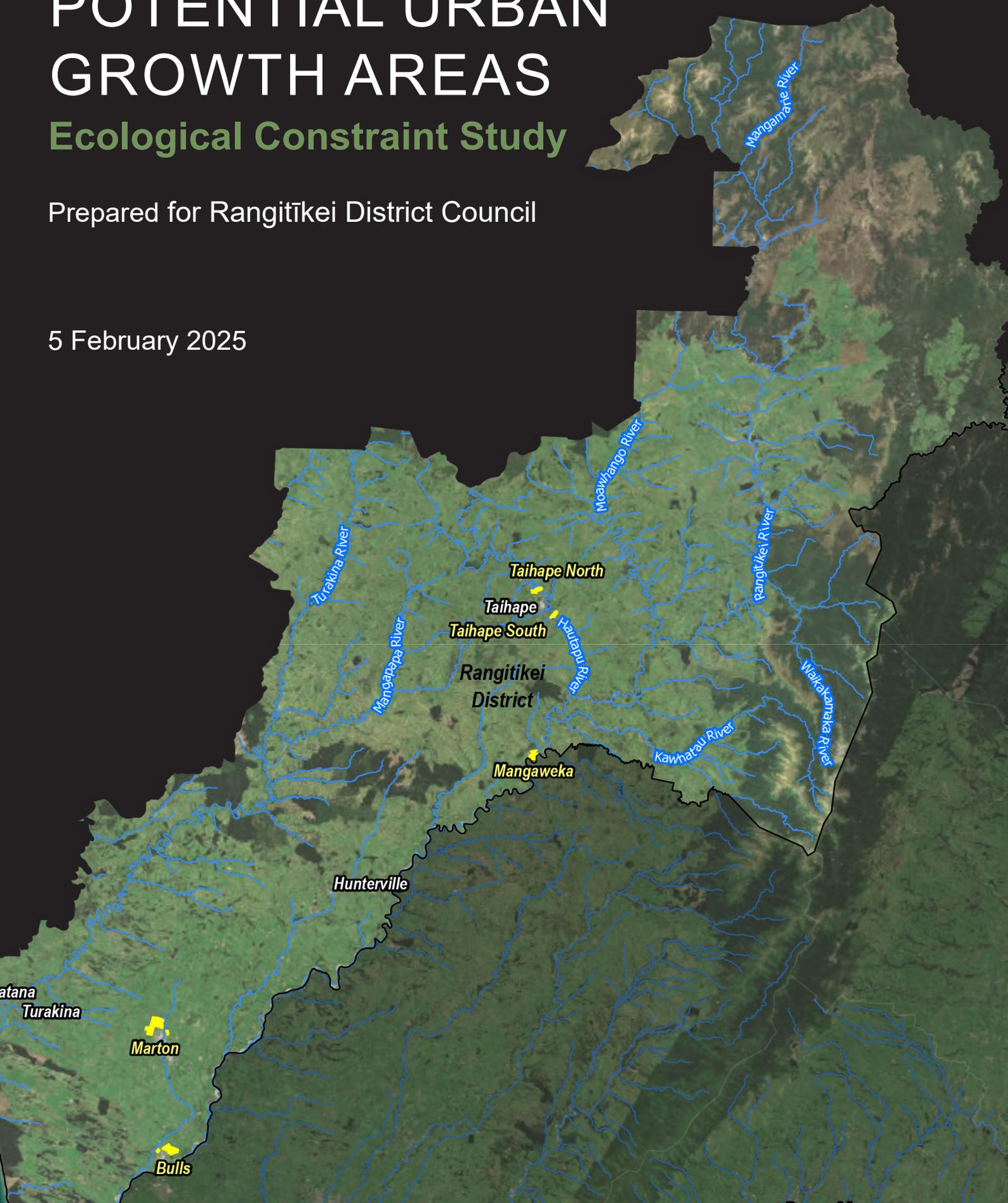


POTENTIAL URBAN GROWTH AREAS

Ecological Constraint Study

Prepared for Rangitikei District Council

5 February 2025





Boffa Miskell is proudly a
Toitū net carbonzero certified consultancy

Document Quality Assurance

Bibliographic reference for citation:

Boffa Miskell Limited 2025. *Potential Urban Growth Areas: Ecological Constraint Study*.
Report prepared by Boffa Miskell Limited for Rangitīkei District Council.

Prepared by: Antony Kusabs
Ecologist / Associate Principal
Boffa Miskell Limited



Hazel Burridge
Ecologist / Associate Principal
Boffa Miskell Limited



Matt Turner
Ecologist / Senior Professional
Boffa Miskell Limited



Vincent Jeon
Ecologist / Graduate
Boffa Miskell Limited



Tim Currie
Ecologist / Graduate
Boffa Miskell Limited



Hannah Cole
GIS Specialist
Boffa Miskell Limited



Reviewed by: Stephen Fuller
Ecologist / Partner
Boffa Miskell Limited



Charles Horrell
Planner | Associate Principal
Boffa Miskell Limited



Executive Summary

Introduction

Rangitikei District Council (RDC) are working on an urban growth plan change to be notified in July 2025. Urban growth areas are being investigated in Taihape, Mangaweka, Marton, and Bulls.

The purpose of this ecological desktop study is to identify ecological components and potential constraints within each potential urban growth area.

Methods

This report is based on a desktop study seeking to capture all known ecology literature for the Rangitikei Region (to inform ecological knowledge of all sites).

Our desktop analysis also compiled relevant information regarding standard site inventories, PNA surveys, management plans, and aerial photography (from 1942 to 2022).

National GIS data sets were reviewed and these included vegetation, avifauna, lizards, bat, invertebrate, and freshwater records.

Description of Existing Environment

The four towns of interest within this report lie within two main ecological districts. Taihape and Mangaweka are located within Rangitikei (30.01) and Marton and Bulls are within Manawatu Plains (31.01).

Historic podocarp and podocarp-hardwood forest types include tawa and/or kamahi. With broad forest types of rimu-tawa-kamahi and matai-kahikatea-totara also present. Swamp forest of kahikatea-pukatea-tawa forest was likely across the terraces and low plains of Mangaweka, Marton and Bulls.

The proposed urban growth areas (UGA's) for Mangaweka, Marton, and Bulls are located on land with the highest Threatened Environment Classification, with proposed Urban Development Zones for Taihape lying within land third most at risk. These classifications direct us to place greater value on any remaining indigenous vegetation communities and remnant forest trees within these zones.

No naturally uncommon ecosystems are known from these sites.

Several recommended areas for protection lie near the urban growth areas but none are close enough to be influenced by the development of potential urban growth areas.

Desktop Ecology Investigations

Vegetation

We identified some areas of scattered and continuous indigenous seral shrubland or remnant forest at the eastern end of TAI01. The data sets

reviewed suggest that very little original vegetation remains across all other sites.

Wetlands

No indigenous natural inland wetlands were detected during our desktop exercise. We identified some small areas as potential 'natural inland wetlands' within pasture, requiring confirmation by field inspection.

Freshwater & Aquatic Environs

The Hautapu, Mangaone, and Rangitikei Rivers lie alongside the Taihape and Mangaweka sites.

The Tutaenui Stream connects to the Marton and Bulls sites indirectly through ephemeral or small perennial waterways. One Bulls site is also indirectly connected to the Rangitikei River.

Herpetofauna

The dominant habitat present within all sites consists of grazed pastoral grassland, which is considered poor-quality habitat for lizards. Areas of rank grass and the margins of indigenous and exotic forest/scrub likely provides moderate quality habitat for northern grass skink and, to a lesser extent, glossy brown skink.

Avifauna

Falcon is the most widespread 'Threatened' or 'At-Risk' species, within all sites, often using open farmland for hunting grounds, and potentially nesting.

New Zealand Pipit have been observed within Marton sites, This species has a large habitat range per breeding pair, and is expected to adapt to land use change.

Some wetland or freshwater species are likely visitors across the Bulls sites due to proximity to river habitat, with the black-fronted tern the most likely of these.

Bats

Bats have been recorded within commuting distance of all sites and suitable habitat is present within or adjacent to all sites, with populations of long-tailed bats more likely but able to be managed by the effects management hierarchy.

Ecological Constraints

We identified potential ecological constraints as Low to High and used a traffic light system to visually identify these constraints within mapping. Broadly they are as follows within each town:

Taihape UGA's

- Low constraints (green) covers most of the sites and include exotic pasture grassland & some shelterbelts / ornamental trees.
- Moderate constraints (orange) covers three area of TAI01, and include four areas of indigenous shrubland and/or lizard habitat.

- High constraints (red) covers a potential natural inland wetland & perennial or ephemeral waterways.

Mangaweka UGA's

- Low constraints (green) covers most of the sites and include exotic pasture grassland & some shelterbelts / ornamental trees.
- High constraints (red) covers potential natural inland wetland areas & perennial or ephemeral waterways.

Marton UGA's

- Low constraints (green) covers most of the sites and include exotic pasture grassland & some shelterbelts / ornamental trees.
- Moderate constraints (orange) covers a scattered area of potential lizard habitat.
- High constraints (red) covers potential natural inland wetlands & perennial or ephemeral waterways.

Bulls UGA's

- Low constraints (green) covers most of the sites and include exotic pasture grassland & some shelterbelts / ornamental trees.
- High constraints (red) covers potential natural inland wetlands & perennial or ephemeral waterways.

Recommendations

There are no ecological constraints that are of a scale that would prevent a change in zoning to allow an urban growth area, but ground verification would provide RDC with some additional certainty of constraints, particularly with regards to:

1. the extent of wetland areas
2. designation of waterways

We recommend retaining a setback standard similar to GRUZ-S8 to ensure that there is an appropriate setback from the waterways to prevent degradation.

We recommend maintaining features within the landscape that provide habitat or act as ecological corridors that may be used by bats, birds or lizards.

Within areas of potential higher density, low-lying areas can be incorporated into water sensitive stormwater design, using rain gardens and treatment wetlands through the detailed design phase of development.

CONTENTS

Executive Summary	i
PART 1 – OVERVIEW	1
1.0 Introduction	1
1.1 Project	1
1.2 Scope	1
1.3 The Sites	1
1.4 Definitions & Acronyms	5
2.0 Methods	7
2.1 Legislative assessment	7
2.2 Literature and database review	7
2.3 Identification and mapping of ecological features	8
2.4 Data limitations	11
2.5 Ecological constraints	11
3.0 Description of Existing Environments	13
3.1 Context	13
3.2 National Priorities for Protection	15
PART 2 – ECOLOGY INVESTIGATIONS	18
4.0 Results of Site Desktop Investigations	18
4.1 Taihape Habitat Overview	18
4.2 Mangaweka Habitat Overview	25
4.3 Marton Habitat Overview	32
4.4 Bulls Habitat Overview	39
4.5 Summary Discussion of Ecological Components	44
PART 3 ECOLOGICAL CONSTRAINTS & RECOMMENDATIONS	47
5.0 Ecological Constraints Mapping	47
5.1 Assumptions/exclusions	48
5.2 Constraints summary	49
6.0 Recommendations	57
7.0 References	58

Figures

Figure 1 TAIHAPE potential urban growth areas - TAI01 and TAI02.....	1
Figure 2: A: MANGAWEKA potential urban growth areas MAN01 & MAN02.....	2
Figure 3: A: MARTON: RDC interested in investigating MAR01, 02 and 07 as well as small parts of MAR03 and 04 (outlined in red). B: BULLS: RDC interested in investigating BUL01, 02 & 03.....	3
Figure 4: BULLS: RDC interested in investigating BUL01, 02 & 03	4
Figure 5: Looking east-southeast across paddocks of TAI02 urban growth area (Source: Google Maps, 2024).....	18
Figure 6: MAN02 - Looking north from Raumaewa Road, paddock located between the one lane bridge and 9 Raumaewa Rd (Source: Google Maps, 2024)	25
Figure 7 - Aerial view of MAN02 (yellow outline) (with MAN01(red outline) in background) showing proximity to the river and vegetation	31
Figure 8 - View of MAN01 paddocks – looking northwest from SH1	31
Figure 9: Looking north-northeast, across paddocks of MAR03 from Calico Street (Source: Google Maps, 2024)	32
Figure 10: Looking west across BUL01, from SH1 (Source: Google Maps, 2024).....	39

PART 1 – OVERVIEW

1.0 Introduction

1.1 Project

Rangitikei District Council (RDC) are working on an urban growth plan change to be notified in July 2025. Urban growth plan change involves identifying and rezoning various blocks of land to enable urban development. We understand RDC has undertaken an initial opportunities and constraints exercise as well as evaluation to identify potential urban growth areas.

RDC is now seeking to better understand the opportunities and constraints of the identified urban growth areas. Urban growth areas are being investigated in the following towns; Taihape (Figure 1), Mangaweka (Figure 2), Marton (Figure 3)-and Bulls (Figure 4).

There are two potential urban growth areas identified for each of Taihape and Mangaweka, five potential urban growth areas identified for Marton and three potential urban growth areas identified for Bulls. This makes a total of 10 potential urban growth areas (See Map 1). Not all of these growth areas will be proposed to be rezoned.

1.2 Scope

The purpose of this ecological desktop study is to identify ecological components within each potential urban growth area.

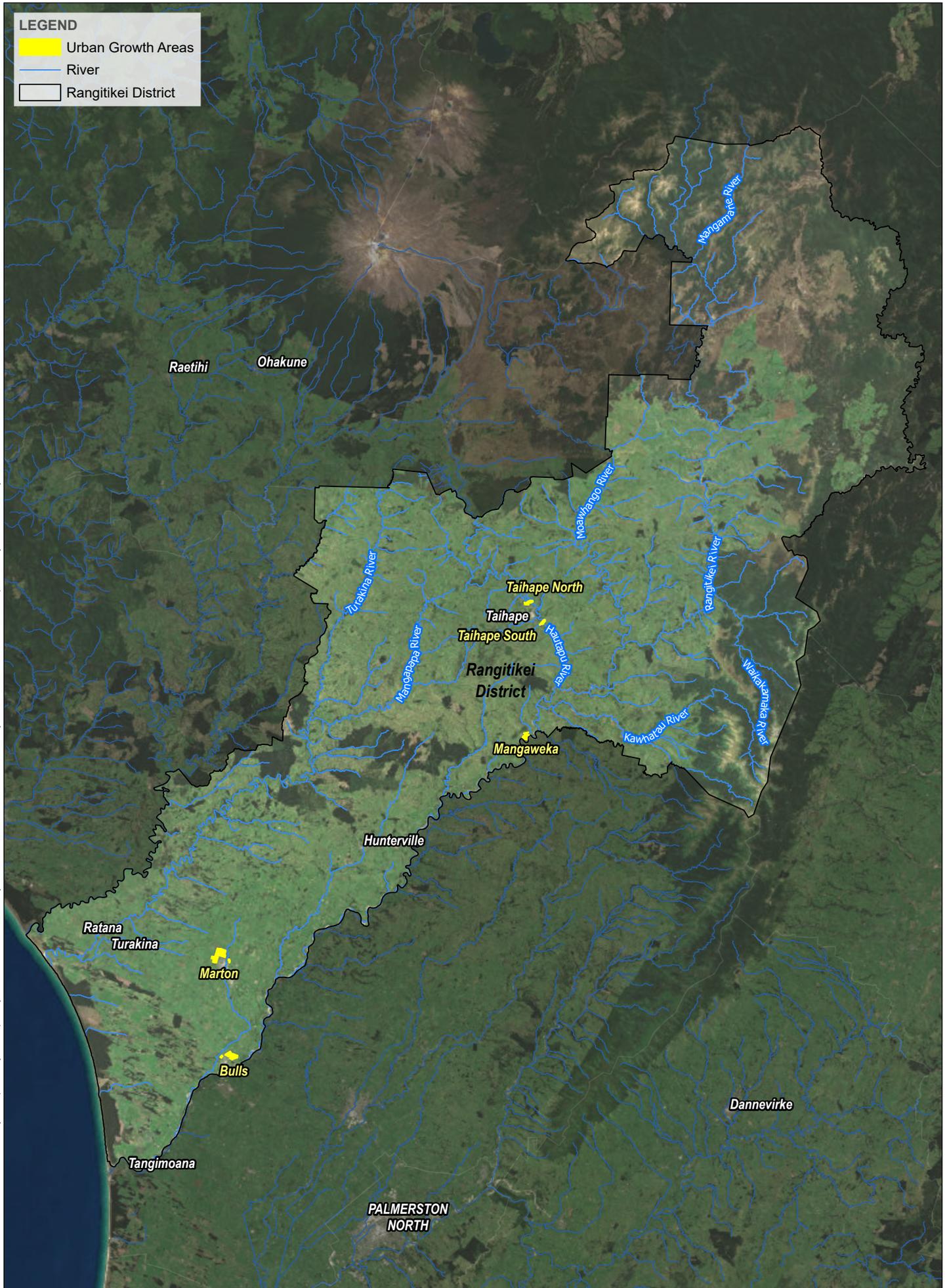
The findings of this study will assist RDC to prioritise and decide on the areas to include in the plan change, based on ecological constraints. BML proposed the following process.

1. Detailed ecology desktop review including:
 - a. Literature and website review of relevant secondary sources to inform broad ecological understanding within the areas of interest.
 - b. Species data searches, write up, and distribution maps for lizard, bird, bat, fish, and threatened plant records.
 - c. Identification of key habitats, including maps - protected areas, naturally uncommon ecosystem types, potential wetlands, and water ways.
2. Ecological constraints mapping. Based on our desktop study, we will be able to provide a 'traffic light' map for each urban growth area. This will roughly follow the following strategy:
 - a. Green – no habitat or species records of value.
 - b. Orange – potential habitat of ecological value. Additional field verification required.
 - c. Red – known protected or other important (terrestrial or freshwater) habitat.
3. Concluding recommendations for field verification required to complete our ecological study and inform the next stage of work.

This plan has been prepared by Boffa Miskell Limited on the specific instructions of our Client. It is solely for our Client's use in accordance with the agreed scope of work. Any use or reliance by a third party is at that party's own risk. Where information has been supplied by the Client or obtained from other external sources, it has been assumed that it is accurate. No liability or responsibility is accepted by Boffa Miskell Limited for any errors or omissions to the extent that they arise from inaccurate information provided by the Client or any external sources.

LEGEND

- Urban Growth Areas
- River
- Rangitikei District



1.3 The Sites

1.3.1 Taihape

There are two potential urban growth areas in Taihape (TAI01 and TAI02). RDC are considering rezoning a small part of TAI01 (Figure 1-A), located on the western side of Railway Farm Road, from Rural Living to General Residential. For the rest of the area identified, and for TAI02, accessed from Rauma Road (Figure 1-B), RDC may propose to revise the Rural Living Zone provisions. Currently the minimum lot size is 2ha and they would like to reduce this if appropriate, to provide greater opportunity to develop in this zone.

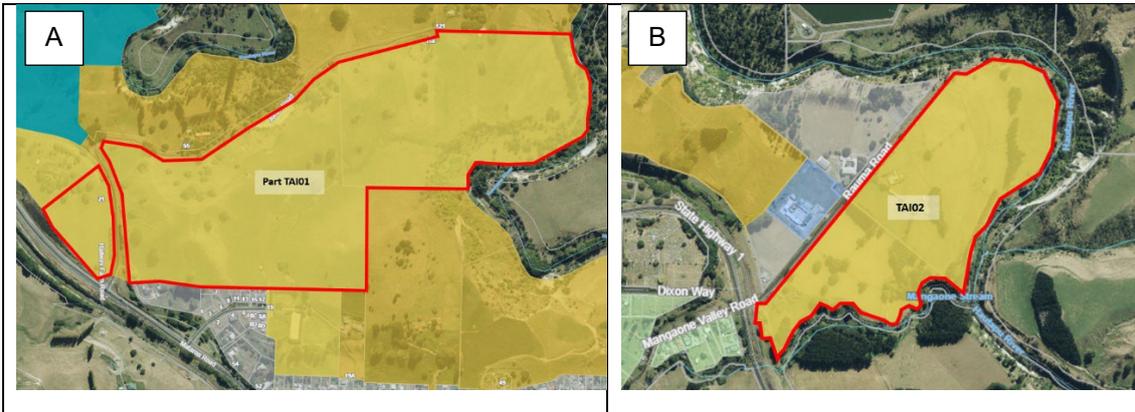


Figure 1 TAIHAPE potential urban growth areas - TAI01 and TAI02.

1.3.2 Mangaweka

There are two potential urban growth areas in Mangaweka. RDC is interested in exploring ecological constraints for blocks MAN01 & MAN02 to help decide which growth area to prioritise and rezone. MAN01 is positioned between the main trunk rail line and SH1, serviced by Weka and Kereru Streets. MAN02 is serviced by Raumaewa and Ruahine Roads.

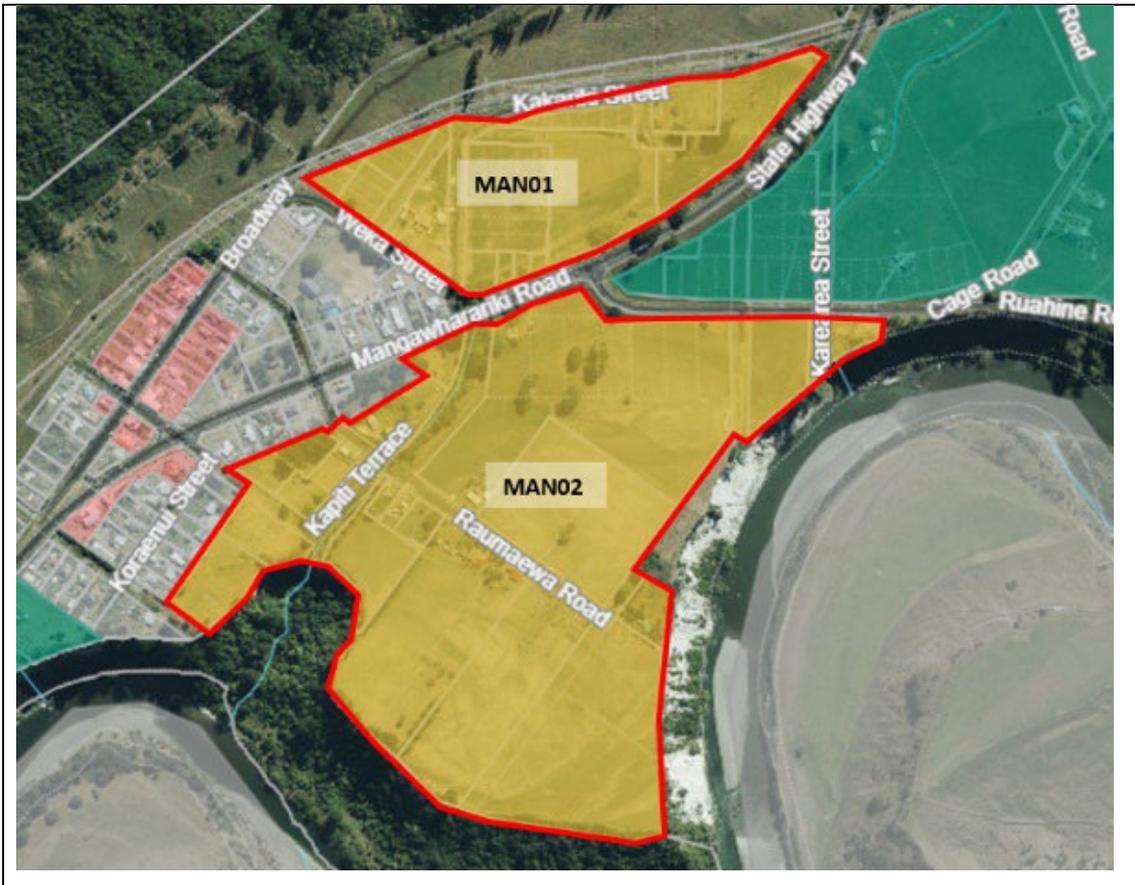


Figure 2: A: MANGAWEKA potential urban growth areas MAN01 & MAN02.

1.3.3 Marton

There are five potential urban growth areas in Marton (MAR01, 02 and 07). All these areas contain detention dams which are designated by the Horizons Regional Council and are part of their river control scheme for the Tutaenui Stream.

The ecology desktop study will only focus on the parts of MAR03 and 04 that are outlined in red, since greater parts of MAR03 and 04 are subject to flood hazard which makes them less desirable for residential development. MAR04 is currently zoned Rural Living.

MAR07 is serviced by Wanganui Road, MAR02 is serviced by Milne Street, and MAR01 is serviced by Tutaenui Road. MAR03 & MAR04 are serviced by Calico Line.

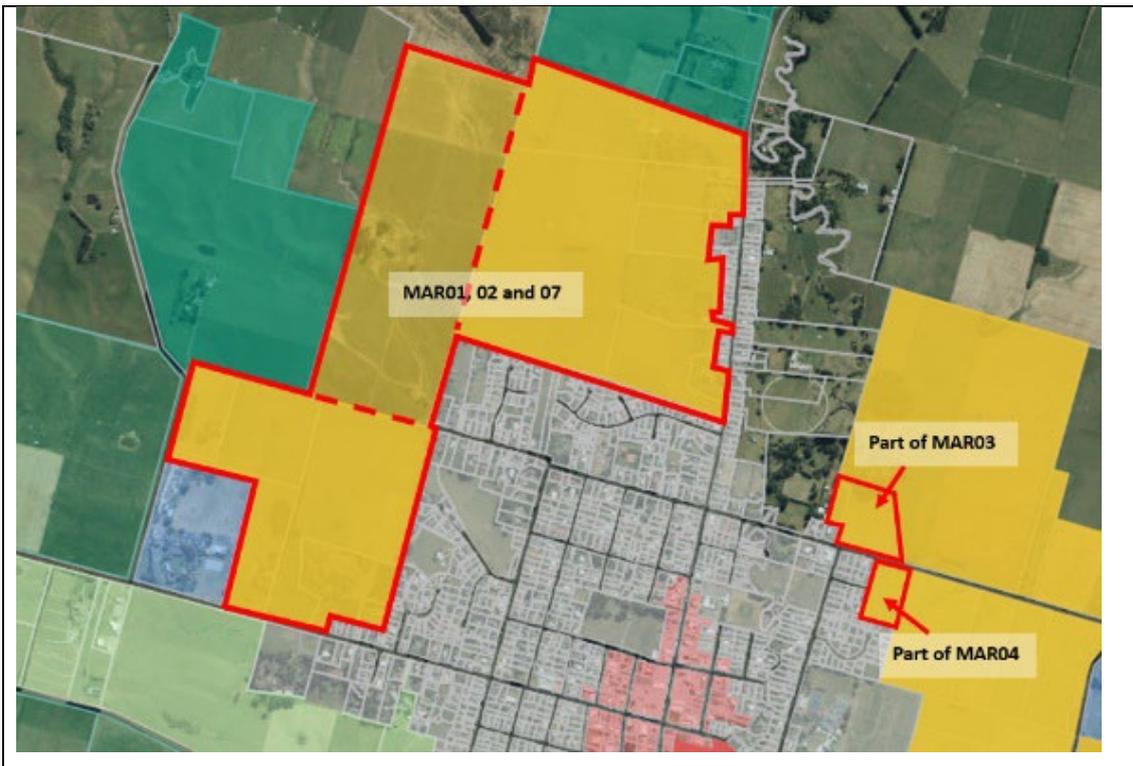


Figure 3: A: MARTON: RDC interested in investigating MAR01, 02 and 07 as well as small parts of MAR03 and 04 (outlined in red). B: BULLS: RDC interested in investigating BUL01, 02 & 03

1.3.4 Bulls

There are three potential urban growth areas in Bulls. BUL01 and 03 are both part of working farms and BUL02 is made up of a rural lifestyle property, the Rangitīkei polo grounds, and the former Rangitīkei racetrack. The latter now being privately owned. BUL01 and BUL02 are to the north-east of the town, potentially serviced by SH3, SH1, and Watson Street, and BUL03 to the west of the town is potentially serviced by Flower Street.

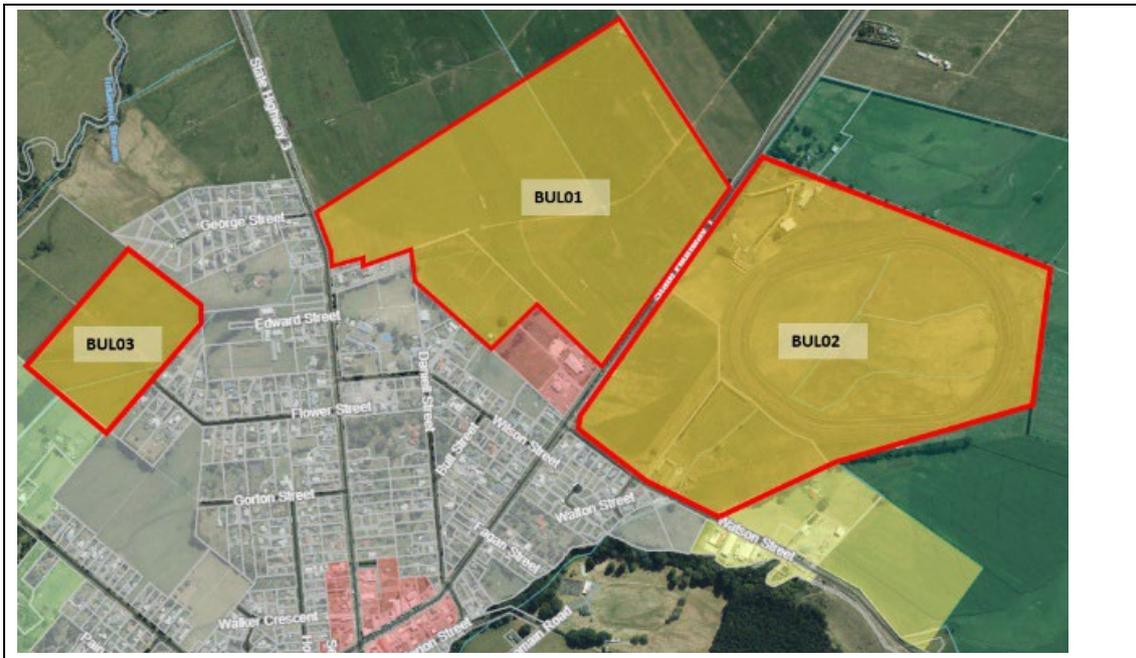


Figure 4: BULLS: RDC interested in investigating BUL01, 02 & 03

1.4 Definitions & Acronyms

Table 1: Definitions

Buffer	For these sites, buffer refers specifically to providing space around potential wetland areas, water ways or habitat corridors. A buffer can also refer to edge habitat that protects core habitat from edge effects
Ecotone	Transitional areas between ecosystems or ecological communities.
Endemic	Species that are native to and only found in Aotearoa, New Zealand
Fresh water	All water except coastal water and geothermal water ¹
Induced	In the context of this assessment, a community or habitat that has been influenced by (and may not exist without) human action. For example, induced wetlands
Introduced or exotic	A species or a community formed by a species that has been brought to New Zealand by humans. Can include naturalised or cultivated plants
Landcover Database (LCDB)	The LCDB is a classification of land cover and land use classes. It provides a significant and authoritative resource of national land cover data and describes changes in land cover at approximately 5-yearly intervals.
Land Environments of New Zealand (LENZ)	A quantitatively based classification of New Zealand's terrestrial environments to assist biodiversity conservation and natural resource management.
Macroinvertebrate Community Index (MCI),	Macroinvertebrate Community Index (MCI) measures water quality of fresh water streams. ^[1] The presence or lack of macroinvertebrates such as insects, worms and snails in a river or stream can give a biological indicator on the health of that waterway.
Native or Indigenous	Species, habitats, or communities that occur in New Zealand as the result of natural process – without human influence
Natural Inland Wetland	As defined in clause 3.21 in the NPS-FM (and Attachment 3)
National Policy Statement for Freshwater Management (NPS-FM) 2022.	Established central objectives and policies for freshwater management under the RMA 1991). Territorial Authorities (TA's) are required to consider this as part of processing consents.
National Policy Statement for Indigenous Biodiversity (NPS-IB) 2023.	A central government response to biodiversity decline in Aotearoa. It provides guidance to councils to protect, maintain and restore indigenous biodiversity.
New Zealand Fish Passage Assessment Tool (NZ FPAT)	The FPAT helps to assess the likely impact of an in-stream structure such as a culvert, weir or ford on fish movements along a waterway.
New Zealand Freshwater Fish Database (NZFFD)	Administered by NIWA, the FFD contains over 50,000 freshwater fish observations from across New Zealand from 1901 to the present.
Protected Natural Area (PNA)	An area of land that has a formal legal status intended to protect indigenous ecosystems, vegetation, habitats, or species.

¹ Horizons One Plan definition

Quantitative Macroinvertebrate Community Index (QMCI)	The QMCI provides a more sensitive measure, responding to changes in relative proportions of different species.
Rangitikei District Council (RDC)	TA's within the Manawatu-Wanganui Region and includes the townships of Taihape, Mangaweka, Hunterville, Marton & Bulls.
River	Means a continually or intermittently flowing body of fresh water and includes a stream and modified watercourse; but does not include any artificial watercourse (including an irrigation canal, water supply race, canal for the supply of water for electricity power generation, and farm drainage canal).
Resource Management Act 1991 (RMA)	New Zealand's main legislation which sets out how we manage New Zealand's resources and environment.
Seral	Transitory, early-stage successional plant communities that develop during the ecological process of succession from bare ground to a climax state
Significant Natural Area (SNA)	Vegetation that is dominated by indigenous species, displays natural composition and successional processors. Can also include habitat of indigenous fauna.
Stormwater	Any run-off that has been intercepted, channelled, diverted, intensified or accelerated by human modification of a land surface, or run-off from the surface of any structure, as a result of precipitation and includes any contaminants contained within (National Planning Standard)
Study area	Refers to all land, waterways and receiving environments that could potentially be affected by development of the sites or UGA' Plant records are studied for the immediate general area or closest bush remnant. For avifauna, the study area typically extends across a 10km x 10km grid For herpetofauna the study area is up to a 50km radius from the site For bats, 25km is the accepted study area
The Site	Sometimes used to refer to the urban growth areas (UGA's), described in Section 1.3
Threatened habitat	In the Horizons One Plan, this means 'a habitat that since human settlement has been reduced to 20% or less of the likely land area covered by the habitat prior to human settlement.' (Threatened habitats are identified in accordance with Schedule E).
Urban Growth Area (UGA)	Potential area identified for urban intensification by Rangitikei District Council
Wildlife Act 1953	Provides legal protection for the majority of vertebrate wildlife indigenous to New Zealand.

2.0 Methods

2.1 Legislative assessment

A review of relevant national, regional, and local level environmental legislation and policy was conducted to help identify ecological constraints and considerations.

2.1.1 National level legislation and policy

- Resource Management Act 1991 (RMA): Sections 6a and 6c.
- Wildlife Act 1953.
- National Policy Statement for Freshwater Management (NPS-FM) 2020 (amended 2022).
 - Resource Management National Environmental Standards for Freshwater (NES-F) Regulations 2020.
- National Policy Statement for Indigenous Biodiversity 2023.

2.1.2 Local & Regional Environmental policy

- Horizon's Regional Council combined Regional Policy Statement and Regional Plan (OnePlan);
- Operative Rangitikei District Plan

2.2 Literature and database review

A document search was undertaken to capture all known ecology literature for the Rangitikei Region, to help gauge the current ecological knowledge of all sites.

This desktop analysis compiled relevant information regarding standard site inventories, PNA surveys, management plans, aerial photography (from 1942 to 2022) and national GIS data sets. We searched national datasets for vegetation, avifauna, lizards, bat, invertebrate, and freshwater records. These include:

- Land Cover Database (Ministry for the Environment, n.d.)
- LENZ model (Leathwick et al., 2004)
- Land Atlas of NZ (Manaaki Whenua Landcare Research, 2021)
- iNaturalist records
- New Zealand Plant Conservation Network (NZPCN) plant lists
- Department of Conservation Herpetofauna Database (BioWeb)
- 'Ebird'
- Ornithological Society of New Zealand (OSNZ) bird atlas (Robertson et al., 2007)

- National Institute of Water and Atmospheric Research (NIWA) freshwater fish database (NZFFD)
- NZ river environment classification (REC).

2.3 Identification and mapping of ecological features

Ecological features were captured within five separate GIS databases; vegetation, freshwater habitats, herpetofauna, avifauna, and bats.

2.3.1 Vegetation

Vegetation & habitats initially based on Landcover Database (LCDB), was checked using both published reports, aerial images, and google maps (street view). Reports sometimes described species present. Google aerial images and google street view were used to check species and provided roadside viewpoints and images of some sites. Historic aerial imagery was used to see trends over time for some sites.

2.3.2 Bats

The Department of Conservation database of bat records was reviewed to identify sightings and recordings of bats within the surrounding 25² km of each proposed development area. The geographical range of each species was also considered for areas where no surveys have been undertaken.

Aerial mapping and google map site photographs were considered to identify potential habitat and landscape scale connectivity. Features on site that could provide connectivity and foraging opportunities have been assessed in the context of the wider landscape, noting habitats and features outside of the site boundary that could support roosts or provide extended connectivity to suitable habitat.

The presence of potential roost features and the suitability of foraging and commuting habitats were considered together to assess the overall suitability of the site to support bats.

Table 2: Potential suitability of a site to support roosting bats

Suitability	Roosting habitats	Commuting and foraging habitats
Negligible	Negligible habitat features on site likely to be used by bats	Negligible features on site likely to be used by commuting or foraging bats. No bats have been recorded within 25km if surveys have been undertaken ³ .
Low	A tree of sufficient size and age to contain potential roost features (PRFs) but with none seen from the ground, or features seen with only very limited roosting potential, such	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated, i.e. Not very well connected to the surrounding landscape by other habitat.

² This is the recommended buffer by DOC roost protocols.

Suitability	Roosting habitats	Commuting and foraging habitats
	as a small void with space for only a single bat.	Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree or patch of scrub.
Moderate	A tree with one or more potential roost sites that could be used by bats due to their size ³ , conditions ⁴ and surrounding habitat, but unlikely to provide optimal conditions for a large or maternity roost.	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water. Bats have previously been recorded within 25km if surveys within this area have been undertaken ³ .
High	A tree with one or more potential roost features that are suitable for use by larger numbers of bats due to their size, conditions and surrounding habitat, such as a large, thermally stable cavity, high in a mature tree.	Continuous high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting and foraging bats such as rivers, vegetated gulleys, shelterbelts, forests and edge features. Site is close to and connected to known roosts ⁵ .

2.3.3 Herpetofauna

The herpetofauna assessment is based on a desktop review of data from the Department of Conservation Herpetofauna Database (BioWeb), used to determine what species are known to be present in wider landscape. A desktop habitat assessment has also been carried out to assess which species could inhabit the site. No targeted on-site herpetofauna surveys have been undertaken.

⁴ Conditions – e.g., temperature and exposure, moisture and humidity, height above ground, light levels, canopy density, level of disturbance

⁵ A lack of records does not necessarily imply absence, as bats are highly mobile species and survey coverage is incomplete.

2.3.4 Avifauna

A desktop review has been undertaken which relied on two key sources: the NZ Bird Atlas Effort⁶ and the eBird New Zealand⁷ databases. These sources were supported by behavioral information on each species as detailed in the Birds New Zealand⁸.

The eBird effort map divides a map of New Zealand into 10km x 10km grids aggregating all observations within those grid squares. For this project, the relevant squares that were interrogated for data are outlined below:

- Taihape - BH76
- Mangaweka - BI75 and BI76
- Marton - BL72
- Bulls - BM72

A species list was comprised using data from these grids, with further refinement conducted using the eBird Species Map to pinpoint individual observations.

The results were then analyzed based upon known habitat preferences which can be found in the New Zealand Bird Online site.

2.3.5 Freshwater / Aquatic Ecology

Fresh water data sets and papers were reviewed to gather information on the existing ecological state and values within freshwater systems present near each of the urban growth areas. These included:

- Readily available reports on the ecological values of waterbodies within close proximity to proposed urban growth areas (if applicable). This included a scan of websites and publicly accessible literature through the Google Scholar search engine.
- The Sites of Significance as noted in the Rangitikei District Plan and/or Horizons Regional Plan.
- Readily available reports and data associated with long-term water quality and ecological monitoring programmes. This data was sourced from Horizons Regional Councils monitoring presented through the Orangai Wai website⁹ and Land Air and Water (LAWA) website for the Rangitikei catchment¹⁰. Data was accessed from LAWA on 18th November 2024.
- GIS (spatial) databases and aeriels, such as:
 - The NIWA-administered New Zealand Freshwater Fish database (NZFFD): this database holds records of freshwater fish distributions and occurrences based on previous surveys¹¹. The conservation status of freshwater fish and invertebrate species found in the NZFFD records was assessed based on the most recent

⁶ <https://ebird.org/atlasnz/effortmap>

⁷ <https://ebird.org/newzealand/home>

⁸ <https://nzbirdsonline.org.nz/species>

⁹ <https://storymaps.arcgis.com/stories/e7f1ed8034fa468fbd3a8f16247ac786>

¹⁰ <https://www.lawa.org.nz/explore-data/manawatu-whanganui-region/river-quality/rangitikei>

¹¹ Downloaded 18 November 2024

conservation threat status for New Zealand's freshwater fish (Dunn et al., 2018) and invertebrates (Grainger et al., 2014).

- The NIWA-administered Fish Passage Assessment Tool (FPAT) webpage, which holds records of in-stream structures and relevant assessments assigning them a fish passage risk class and an ecological prioritisation score.
- Waterways and associated predictions within the NIWA-administered NZ River Maps (Whitehead & Booker, 2020).
- Waterways (river centre lines) shown on New Zealand Topographical Maps.
- The Wilderlab-administered Discover DNA explore webpage. This database holds records of eDNA samples based on previous freshwater surveys.

2.4 Data limitations

The NZ Bird Atlas Effort Map, eBird Species Maps and iNaturalist are citizen science projects, allowing broad participation in the collection of bird observation data. While this data is useful with sufficient data from prominent or reliable birders, data quality from these sources can be subject to inconsistency, limited sampling, and questions of validity. Thus, caution is advised when handling this data and further insights and investigations are recommended to properly assess avifauna presence on site.

Significant Natural Areas and Natural Inland Wetlands are yet to be mapped in the district and regional planning documents¹². While this is a limitation, we have made assumptions on the ecological character of habitats based on the desktop information.

Note that field visits have not been undertaken for any ecological components. Site visits would be required for more refined and localised ecological values of habitats, including waterbodies, and terrestrial fauna habitat.

2.5 Ecological constraints

Ecological constraints within the project area were identified and mapped to help inform any subsequent subdivision / development design(s). All known ecological features within the site were assigned one of four levels of developmental constraint, as defined below.

- **High constraint:**
 - Feature with high or very high ecological value/s (e.g. mature indigenous forest).
 - Outstanding Natural Features and Landscapes¹³
 - Significant ecological habitats¹⁴
 - Feature with high regulatory protection e.g. QEII covenant, features with "avoid" policy governors (e.g. natural inland wetlands, intermittent and perennial streams).

¹² Both are required to be identified and mapped in accordance with the National Policy Statement for Indigenous Biodiversity and National Policy Statement for Freshwater Management.

¹³ As identified in Schedule C4 of the Rangitikei District Plan

¹⁴ As identified by Schedule F of Horizon's OnePlan

- **Moderate constraint:**
 - Feature with moderate ecological value/s (e.g. seral mixed broadleaf forest). Likely lizard habitat.
 - Feature with moderate developmental risk that would require moderate mitigation, offset and / or compensation packages to manage effects.
- **Low constraint:**
 - Feature with low ecological value/s (e.g. mixed exotic / indigenous shrubland).
 - Feature with no regulatory protection.
 - Feature with low developmental risk that would likely require low-level mitigation and / or offset packages to manage effects.

3.0 Description of Existing Environments

3.1 Context

The towns of interest within this report lie within two main ecological districts. Taihape and Mangaweka are located within Rangitikei (30.01) and Marton and Bulls are within Manawatu Plains (31.01).

Rangitikei Ecological District is characterised by hill-country and valleys mostly between 300 to 600 a.s.l. Geology includes siltstone (with occasional sandstone beds), limestone; fossiliferous sand, mud and thin limestone beds; Pleistocene gravel, sand and mud. Manawatu Plains Ecological District is characterised as low altitude loess covered plains and terraces. Climate across both districts are generally warm summers and mild winters, with rainfall between 900 – 1250mm per annum (McEwen, 1987).

Potential development growth units in Taihape are situated at around 500m and 400m a.s.l. These sites drain into the Hautapu River & Mangaone Stream, which in turn runs into the Hautapu River. Both sites also border the Hautapu River. The Hautapu flows south into the Rangitikei River.

The river terrace areas being considered for Mangaweka are located at 300-320m a.s.l. These sites drain into the Mangateweka Stream, and old Mangateweka Stream which lead into the Rangitikei River. MAN02 borders the Rangitikei River.

Marton areas are situated at about 160m-180m a.s.l., Marton sites drain into the Tutaenui Stream which flows to the west of Bulls. It enters the Rangitikei River to the south-west of Bulls.

In Bulls, they sit at around 60m a.s.l. These sites also drain into the Tutaenui Stream or Rangitikei River.

3.1.1 Soils

We have separated McEwen's (1987) broad soil descriptions by general landform.

Rangitikei Ecological District:

- Steeplands - soils from sedimentary rocks, mostly with high natural fertility with soils in the SW droughty in summer.
- Flattish rolling and hilly slopes in the north – Deep, well drained volcanic ash soils.
- Terraces – deep, stony and droughty soils dominant. Alluvial soils on river flats sometimes with impeded drainage.

Soils at the Taihape sites are classified as Orhtis Allophanic. Soils at Mangaweka sites are classified as Orthic gley soils (Landcare Research Ltd, n.d.).

Manawatu Plains Ecological District:

- Higher rainfall areas - deep, friable, silty and well drained volcanic ash and loess.
- Higher terraces and hill country - gleyed clay soils from loess, with compact clay texture and poor natural drainage.

- Low terraces - shallow and stony soils, with alluvial soils ranging from well drained sandy and silty soils on levees to poorly drained clayey textured soils in backswamps.

Marion soils are classified as Immature Pallic, with some Perch-Gley Pallic. Soils within Bulls development zones are classified as Orthic Gley (Landcare Research Ltd, n.d.).

3.1.2 Historic Vegetation

McEwen states that podocarp and podocarp-hardwood forest types are common through the Rangitīkei district, with remnants sometimes including tawa (*Beilschmedia tawa*) and/or kamahi (*Weinmania racemosa*). Kowhai-houheria forest is a distinctive forest type of the region, especially through Taihape hill country. He notes that ngaio (*Myoporum laetum*) and akiraho (*Olearia paniculata*) occur inland as far as Mangaweka township. This is represented in the maps of Land Environments of New Zealand (LENZ) data, which show broad forest types of rimu-tawa-kamahi and matai-kahikatea-totara.

Records from the Kawhatau Valley (Rogers, 1985) provide a detailed description of forest cover over hill country in the northern part of the district. Podocarp forest of rimu (*Dacrydium cupressinum*), mataī (*Prumnopitys taxifolia*) and totara (*Podocarpus totara* var. *totara*) once dominated. At slightly higher elevations white maire (*Nestegis lanceolata*), miro (*Pectinopitys ferruginea*), rewarewa (*Knightia excelsa*), pōkākā (*Eleacarpus hookerianus*), mahoe (*Melicytus ramiflorus*), heketara (*Olearia rani* var. *rani*) and toro (*Myrsine salicina*), although kamahi and tawa were said to be absent from this country. Instead, there are red beech (*Fuscospora fusca*), mingimingi (*Leucopogon fasciculus*), ponga (*Cyathea dealbata*), and mapou (*Myrsine australis*). On steep slopes tarata (*Pittosporum eugenioides*), hinau (*Eleacarpus dentatus* var. *dentatus*), houhere (*Hoheria sextylosa*), and black maire (*Nestegis cunninghamii*) dominate.

Further south LENZ data shows a predominance of swamp forest was likely across the terraces and low plains of Mangaweka, Marton and Bulls. This is primarily kahikatea-pukatea-tawa forest, with rimu-tawa-kamahi influencing the Mangaweka and Marton landscape.

3.1.3 Historic Wetlands

Historic wetlands were predicted (Landcare Research Ltd, 2012) for most of the potential urban growth areas for Mangaweka, Marton and Bulls (see Historic Vegetation Maps, Appendix 3). These wetlands were in the form of indigenous swamp forest, featuring kahikatea-pukatea-tawa forests, rather than open indigenous raupo or sedge wetlands.

3.1.4 Land Use

All land parcels appear to have been cleared of original forest for at least 70 years (Local Government Geospatial Alliance, n.d.), (Appendix 4). Pastoral and crop farming have been dominant land uses since that time. The Taihape sites have perhaps seen the greatest change in terms of additional specimen trees and shelterbelts. At Mangaweka, the SH1 realignment during the 1980's caused the realignment of the Mangateweka Stream. This impacted both the MAN01 and MAN02 sites.

3.2 National Priorities for Protection

3.2.1 LENZ – Threatened Environments

Table 3 shows the categories of the Land Environments of New Zealand (**LENZ**) threat classification (Walker et al., 2007) This is one relevant reference used within assessments of ecological value and significance. There are six categories, the first five environments are considered 'Threatened'. The sixth is secure.

Table 3: Threatened Environment Classification 2007 (colour coding as per mapping)

Category	Criteria	Name
1	<10% indigenous vegetation left	Acutely Threatened
2	10–20% indigenous vegetation left	Chronically Threatened
3	20–30% indigenous vegetation left	At-Risk
4	>30% left and <10% protected	Critically under protected
5	>30% left and 10-20% protected	Under protected
6	>30% left and >20% protected	Less reduced and better protected

All Proposed Urban Development Zones for Mangaweka, Marton, and Bulls are located on land with the highest Threatened Environment Classification. That being land environments that are Acutely Threatened, with <10% of indigenous vegetation remaining.

Proposed Urban Development Zones for Taihape lie within land classified as At Risk, with 20-30% indigenous vegetation remaining.

Higher threatened environment classifications direct us to place greater value on any remaining indigenous vegetation communities and remnant forest trees within these zones.

Threatened environment maps are provided for all proposed development zones within Appendix 3

3.2.2 Naturally Uncommon Ecosystems

To date, 72 types of naturally uncommon ecosystems have been identified as occurring in New Zealand (Holdaway et al., 2012; Williams et al., 2007; Wiser et al., 2013). These ecosystems fall into 6 broad categories: Coastal, geothermal, induced by native vertebrates, inland and alpine (generally includes systems with poorly developed soils, associated with a specific type of geology), subterranean/ semi-subterranean, and wetlands.

Of these potential six categories of naturally uncommon ecosystems, inland, and wetland ecosystems could potentially be encountered within the sites of interest. However, no naturally uncommon ecosystems are known from these sites.

3.2.3 National Priority Environments

The Ministry for the Environment has produced a list of national priority environments for protecting rare and threatened biodiversity of private land (Ministry for the Environment & Department of Conservation, 2007). Note that this is not a statutory document. The priorities are:

“National Priority 1: To protect indigenous vegetation associated with land environments (defined by Land Environments of New Zealand at Level IV) that have 20 per cent or less remaining in indigenous cover.”

- All potential urban growth areas within Mangaweka, Marton, and Bulls do meet this criterion. All of these areas are mapped within the highest threatened environment classification - ‘Acutely Threatened’. This places additional importance and values on any remnant indigenous habitat.

“National Priority 2: To protect indigenous vegetation associated with sand dunes and wetlands; ecosystem types that have become uncommon due to human activity.”

- Although the sites may contain areas of natural inland wetland’ as defined by the NPS-FM, we note that all potential urban growth areas are unlikely to contain indigenous vegetation associated with wetlands.

“National Priority 3: To protect indigenous vegetation associated with ‘originally rare’ terrestrial ecosystem types not already covered by priorities 1 and 2.”

- The sites do not contain ‘originally rare’ ecosystems.

“National Priority 4: To protect habitats of acutely and chronically threatened indigenous species.”

- There is low probability that these sites are habitat for acutely and chronically threatened species, equivalent to Nationally Critical & Nationally Endangered under the current NZ Threat Classification System (Michel, 2021).

3.2.4 Protected Areas

Protected Natural Areas (PNA) Programme

The Department of Conservation began the Protected Natural Areas Programme (PNAP) in 1981 with the aim of identifying natural ecosystems that should be targeted for protection by landowners, local level and central government. The PNAP surveyed natural areas in ecological districts, including the Rangitikei and Manawatu Plains Ecological Districts. These reports listed Recommended Areas for Protection (RAP).

Rangitikei Ecological District

The closest RAP to Taihape township is listed as Ridge Road South Bush (RAP 26). This encompassed mainly horopito-putaputawētā-kotukutuku forest and is situated over 6km from the sites. The closest RAP to Mangaweka township is listed as Ridge Pouwhakaura Bush (RAP 33). This is a mixture of rimu,-rewarewa-kanuka-tawa forest (Lake & Whaley, 1995).

Manawatu Plains Ecological District

Marton has three RAP's which surround it. These were:

- Westoe (RAP 21) – 5ha of predominantly kahikatea remnant 5.2km to the southeast of Marton.
- Monkton's Bush (RAP 23) – 20ha of kanuka-podocarp-tawa-titoki forest 3.98km west of Marton.
- Nevill's Back Bush (RAP 26) – 5ha of predominantly pukatea-kahikatea forest remnant 1.8km north of Marton.

The closest RAP to Bulls is Te Rakehou Bush (RAP 18) between 8-10km to the east. This is predominantly a spread out 20ha remnant of matai-mahoe-kahikatea forest.

Significantly Natural Areas (SNA), QEII, or other Protected Areas

Significant Natural Areas are yet to be identified in the Rangitikei District. It is understood that SNAs will be identified following a comprehensive review of the district and in accordance with the National Policy Statement for Indigenous Biodiversity.

There are no identified protection areas (including areas subject to QEII covenants) within any of the potential urban growth areas.

The closest protected area borders a Mangaweka potential urban growth area, MAN02. Mature old growth forest forms part of the Kahu Scenic Reserve, administered by the Department of Conservation. This area is also recognised as an Outstanding Landscape and Natural Feature, under the name Rangitikei Narrows and Gorges within Schedule C4 of the Draft Rangitikei District Plan.

Summary

These RAP's & Kahu Scenic reserve (in Mangaweka) help provide reference points as examples of vegetation communities within the district. None of the RAP's are close enough to be influenced by these potential urban growth areas. However, the Marton sites are close enough to be a stepping stone or seed source for future habitat developed on these sites. All protected area maps can be found as part of Appendix 3.

PART 2 – ECOLOGY INVESTIGATIONS

4.0 Results of Site Desktop Investigations

These sections are to be read with the relevant constraints maps, contained within the separate appendices document.

4.1 Taihape Habitat Overview

The northern Taihape UGA (TAI01) site is an elevated river terrace, with a mostly gentle slope. There are two prominent hills in the south-west of the site which are moderately steep. Altitude ranges between 420m a.s.l. near the Hautapu River to above 520m a.s.l. at the hill summits.

The southern Taihape UGA (TAI02) covers a large area near the Hautapu River. The site is an elevated river terrace which slopes gently down towards the north-east. Altitude ranges roughly between 420m a.s.l. and 400m a.s.l. All maps of ecological features are displayed in Appendix 3



Figure 5: Looking east-southeast across paddocks of TAI02 urban growth area (Source: Google Maps, 2024)

4.1.1 Current Vegetation

Current vegetation, as mapped by LCDB 2018, was checked against aerial photos. Vegetation type, location and extent was found to be broadly accurate within urban growth areas TAI01 and TAI02. The map shows high producing grassland mostly covers TAI01, and TAI02. A small portion of both areas are mapped as indigenous forest.

Exotic vegetation

On both TAI01 and TAI02 the current vegetation is dominated by pastoral exotic grassland.

TAI01 has large exotic specimen trees (possibly poplar and willow) which have been planted throughout the site, possibly to provide erosion control and shade for stock. In the far east of

TAI01 is an evergreen shelter belt (possibly radiata pine). Weeds include cotoneaster, and pampas. Old man's beard is well established in the general Taihape region.

At TAI02 features a eucalyptus species which are arranged as hedgerows and scattered individual trees. There are also two groupings of exotic deciduous trees (probably poplar species, based on google map aerials).

Indigenous vegetation

Within the TAI01 block there is a group of mature indigenous trees (potentially including podocarp species) covering 0.39ha in a northern central portion of the block that can be easily avoidable. There is scattered indigenous vegetation which covers 3.66ha in the south-east of the site. Taller, more continuous vegetation closer to the river may contain podocarp and kowhai (*Sophora spp.*). More scattered vegetation upslope will probably contain mānuka (*Leptospermum scoparium*), *Coprosma spp.*, and tauhinu (*Ozothamnus leptophyllus*). This area can be easily avoided by low density development.

Within the TAI02 block, we were unable to distinguish indigenous vegetation. If it exists here it is in small numbers and area.

Rare / threatened species

A number of species considered At-Risk or Threatened that have been found in the general Taihape area. These include gossamer grass (*Anemthele lessoniana*), simplicia grass (*Simplicia buechananii*) (Ogle, 2010), rōhutu (*Lophomytus obcordata*), deciduous tree daisy (*Olearia gardneri*), Tāpia/white mistletoe (*Tupeia antarctica*), and teucridium (*Teucium parvifolium*), *Melicytus flexuosus*, pua o te Reinga (*Dactylanthus taylorii*), and *Coprosma virescens*.¹⁵

There is a possibility that Tāpia/white mistletoe could be hosted by scattered indigenous vegetation to the east of TAI01. Most of the other species are not expected within the Taihape urban growth areas, due to unsuitable habitat preferences for these species within these highly modified environments.

4.1.2 Wetlands

There are no indigenous wetlands associated with the Taihape TAI01 and TAI02 UGA's.

A relatively small expanse of low-lying areas within TAI01 will require wetland delineation to identify 'natural inland wetlands' under the NPS-FM, as part of obtaining resource consent for site development.

If natural inland wetlands are identified within this area, these will be classified as induced exotic pastoral wetlands. It is likely that the ecological value of such wetlands will be 'very low' and may meet the threshold for pasture exclusion. For areas of higher density low lying areas can often be incorporated into stormwater treatment wetlands.

4.1.3 Freshwater / Aquatic Fauna

Taihape South is at the north-western boundary of the Rangitikei-Turakina, sub-area Lower Hautapu (Rang_2g), FMU (Horizons Regional Council, 2014). Taihape North is at the southern

¹⁵ New Zealand Plant Conservation Network, Taihape Bush, Hautapu River Species List, 1983 & 2001.

end of the Rangitikei-Turakina, sub-area Upper Hautapu (Rang_2f), FMU (Horizons Regional Council, 2014).

The Rang_2g and Rang_2f sub-areas are characterised by its hill soft sedimentary and upland hard sedimentary life supporting capacities, respectively (Horizons Regional Council, 2014). Both management sub-areas have aesthetic, contact recreation, mauri, industrial abstraction, irrigation, stock water, existing infrastructure, capacity to assimilate pollution, amenity, and water supply values (Horizons Regional Council, 2014). Both areas are valued for their natural state and are valued for their trout spawning and fishery (Horizons Regional Council, 2014).

Description and significance

The proposed urban growth area in Taihape South, namely TAI02, borders the Mangaone Stream on the southern border and the Hautapu River on the northern and eastern border. The Taihape oxidation pond is located to the north of TAI02.

The proposed urban growth area in Taihape North, namely TAI01, borders the Hautapu River along the northern and western borders. The confluence of the Mangamate Stream joining the Hautapu River is to the north of TAI01.

Water quality / habitat (in-stream and riparian)

The Hautapu River at Alabasters Horizons Regional Council monitoring site is located north of the Taihape North proposed urban growth area (TAI01). The site is classified as upland rural.

This monitoring site is in the worst 50% of all upland rural sites in New Zealand for *E. coli*, turbidity, and total phosphorus. Clarity is within the worst 25% of all upland rural sites, while total nitrogen is within the best 50% of all upland rural sites. Further data on these parameters can be found on LAWA's website.

Water quality suspended fine sediments, and ecosystem health all had an NPS-FM grade of D ('poor') at the Alabasters monitoring site.¹⁶ Ammonia toxicity and dissolved reactive phosphorus had NPS-FM grades of B ('good') and nitrate toxicity had a grade of A ('very good').

Macroinvertebrate community

Aquatic life is also monitored at the Alabasters monitoring site. Aquatic life, Macroinvertebrate Community Index (MCI), and Quantitative Macroinvertebrate Community Index (QMCI) had NPS-FM grades of C ('fair').²⁰

Based upon predictions in the NZ River Maps (Whitehead & Booker, 2020), the macroinvertebrate community index (MCI) for 2021 was estimated to be 91.8 ('fair') in the Hautapu River segment to the east of the proposed Taihape South urban growth area. The MCI score for the Hautapu River segment east of the proposed Taihape North urban growth area was 94.4 ('fair').

The MCI score predictions for 2021 in the Mangaone Stream south of the Taihape South urban growth area was 95.2 ('fair'). The MCI score predictions for 2021 in the Mangamate Stream north of the TAI01 was 92.0 ('fair').

Fish community and passage

A total of five native freshwater fish species, one non-indigenous salmonid species, and one freshwater invertebrate species have been recorded in Hautapu River (Table 6). The 'At Risk – Declining' species include longfin eel (*Anguilla dieffenbachia*).

¹⁶ <https://storymaps.arcgis.com/stories/e7f1ed8034fa468fbd3a8f16247ac786>

There was no New Zealand Freshwater Fish Database (NZFFD) records for the Mangaone Stream (TAI02) or Mangamate Stream (TAI01).

Table 4. NZFFD Records for Hautapu River. Data accessed on 18th November 2024. Note there were also unidentified bully, eel, and salmonid entries in the NZFFD, which have not been included in the table.

Common name	Scientific name	Threat status
Brown trout	<i>Salmo trutta</i>	Introduced and naturalised
Upland bully ¹⁷	<i>Gobiomorphus breviceps</i>	Not Threatened
Longfin eel	<i>Anguilla dieffenbachii</i>	At Risk - Declining
Cran's bully ¹⁷	<i>Gobiomorphus basalis</i>	Not Threatened
Common smelt	<i>Retropinna retropinna</i>	Not Threatened
Shortfin eel	<i>Anguilla australis</i>	Not Threatened
Koura	<i>Paranephrops planifrons</i>	Not Threatened

In relation to TAI02, there is a New Zealand Fish Passage Assessment Tool (NZ FPAT) entry for the Mangaone Stream culvert under State Highway One (response 127444), with the fish passage risk not reported. There is no NZ FPAT entry within close proximity to TAI01, however, there is an entry downstream in the Hautapu River near Spooners Hill Rd (response ID 148373) that is a dam structure with an assessed very high risk to fish passage.

Environmental DNA

There are no eDNA records identified near the Taihape township and proposed urban growth areas.

4.1.4 Herpetofauna

Department of Conservation Bioweb records were retrieved for a 50 km radius surrounding the proposed site. Within this radius, there are records for five species of indigenous lizards, including two skink species and three geckos (Table 11).

iNaturalist does not provide exact locations for herpetofauna, however this data was consulted as a cross reference against the DOC records, to identify if any additional species are present in the wider area. No additional lizard species have been recorded within or adjacent to the site.

The five recorded species include:

- northern grass skink (*Oligosoma polychroma* - Not Threatened)

Northern grass skinks were generally widespread occupying a variety of grassland habitat including pastoral grassland.

¹⁷ Thacker et al. (2023) revealed that what were previously identified as Cran's bullies (*Gobiomorphus basalis*) and upland bullies (*Gobiomorphus breviceps*) in the lower North Island were misidentifications. These species are, in fact, Dinah's bullies (*Gobiomorphus dinae*) and Kaharore bullies (*Gobiomorphus mataerae*), respectively.

- small scaled skink (*O. microlepis* - Nationally Vulnerable)
found in rocky substrates, screes, cliffs, and boulder banks etc.
- Raukawa gecko (*Woodworthia maculata* - Not Threatened)
Small scaled skink and Raukawa are typically associated with rocky habitat (e.g. boulder fields or riverbanks), with the latter also occupying scrubland and forests.
- ngahere gecko (*Mokopirirakau* ‘southern north island’ - At Risk – Declining)
South-eastern New Zealand in mature forest, shrubland, and swamps.
- barking gecko (*Naultinus punctatus* - At Risk – Declining)
Ngahere and barking gecko typically were detected in areas of indigenous vegetation.

Of the five species potentially present within the site, two (northern grass skinks and Raukawa gecko) have a national threat classification of Not Threatened. Barking geckos are classed as At Risk – Declining. Small scaled skink have a threat class of Nationally Vulnerable.

Desktop Habitat Assessment:

TAI01:

The northern Taihape site (TAI01) is predominantly improved, exotic pastoral grassland, with much of the area intensively grazed. This low stature grassland is not considered to provide suitable habitat (shelter and food resources) for indigenous lizards due to the lack of adequate cover. Two areas of potential rank (long) grassland were identified by the desktop assessment; a fenced off c. 1.3 ha area to the north of the site along Jones Road and a c. 4.0 ha area to the east of the site along the Hautapu River. These sites appear to have reduced or no grazing from livestock. Rank grassland can provide potential habitat for northern grass skink. This species is more tolerant to disturbed and modified habitat, and have been recorded in these habitat types throughout their known distribution in the North Island. Additionally, rank grass potentially present in other areas (e.g. under fence lines or around farm buildings) may also provide some habitat for these species or enable populations of skinks to persist when other habitats have been grazed.

Natural and/or artificial cover may also provide habitat to lizards. On the western most hill, scattered boulders are present which could provide shelter for terrestrial lizards (skinks and Raukawa gecko). However, given the heavily grazed surrounding grassland, we consider it unlikely that lizards would be present except for close to Jones Road, where unmanaged roadside grasses could allow for northern grass skink if present to move into the site. We consider this area very unlikely to have the Nationally Threatened small-scaled skink present.

Vegetation and trees within the site largely appear to be largely exotic trees (e.g. poplar, oak, willows) which are scattered throughout and often isolated from others. These features are not considered to provide habitat for arboreal geckos. Some scrubland trees (exotic or native) appear to be present along Jones Road and along the Hautapu River, however, these are considered isolated from larger patches of indigenous bush where arboreal geckos would likely be present and unlikely to have lizards (in particular, where exotic scrubland exists).

TAI02:

TAI02 is for the most part grazed improved, exotic pastoral grassland and appears to provide little to no potential terrestrial lizard habitat where grazing is frequent. Some areas of longer rank grass which may support northern grass skink, are present within the site constrained to

along fence lines, residential properties and potentially along the river margin in places where grazing is infrequent. No habitat for small scale skink was present.

Exotic trees including eucalyptus trees, poplar trees and pine trees, either in clusters or planted as shelterbelts, are considered to provide no habitat for arboreal geckos. Where rank grass or dense leaf litter habitats are present under and along the margins of the exotic trees, these could provide some habitat, enabling species such as northern grass skink or glossy brown skink to potentially persist at low densities if present previously.

4.1.5 Avifauna

The grid square BH76 was used to identify the species present in Taihape. A total of 39 bird species were identified at BH76 from the eBird Effort Map. This included 21 native or endemic species and 18 exotic species. Of the 21 native or endemic species, only four species were identified as holding a threat classification under the New Zealand Threat Classification System (NZTCS) (Table 5). This included two Threatened species:

- the bush falcon (*Falco novaeseelandiae* “bush” – Threatened, Nationally Increasing)
- and the NZ dabchick (*Poliiocephalus rufopectus* – Threatened, Nationally Increasing).

And two At-Risk species:

- the spotless crane (*Porzona t. taubuensis* – At Risk, Declining)
- and the little black shag (*Phalacrocorax sulcirostris* – At Risk, Naturally Uncommon).

Other than these four, the remaining 35 avian species, native and exotic, are common and widespread across the region and are not considered further in this report. A list of these species can be found in Appendix 2.

Table 5: Species recorded from the Taihape area, which have a New Zealand Threat Classification System (NZTCS).

Species	Status	Conservations status	Habitat
NZ falcon (bush)	Endemic	Threatened – Nationally Increasing	Native forest, exotic forest, shrubland
NZ dabchick	Endemic	Threatened – Nationally Increasing	Freshwater/wetlands
Spotless crane	Native	At Risk – Declining	Wetlands
Little black shag	Native	At-Risk – Naturally Uncommon	Freshwater/wetlands, coastal/estuarine

The NZ dabchick, spotless crane and little black shag are all species well associated with lakes, braided rivers, and ponds. Further desktop investigations through eBird Species Map, revealed these birds were only observed in wetland ponds on properties outside the area of concern (all three species observed approximately 9km southeast of Taihape, and the NZ dabchick approximately 4km north-east of Taihape). These three species are likely observed in this region infrequently, traversing and visiting small ponds and lakes, en route to larger more favourable habitat. No such habitat exists within the two potential urban growth areas, TAI01 and TAI02, or it’s vicinity but may be observed in Taihape, while they are in transit between freshwater bodies.

The New Zealand falcon however has frequently been observed in the Taihape township and are known to utilise farmland habitat, of which there is plenty in the region. They are also known to be found in exotic vegetation – mainly pines and can also nest on the ground.

4.1.6 Bats

The DOC database identified long-tailed bat presence 6km northwest of the Taihape North site. The database does not include results from any surveys undertaken closer than this. Long-tailed bats have been recorded at eight locations within a 25km radius of the Taihape sites. Additional surveys undertaken, but not included in the DOC database, have identified high levels of long-tailed bat activity at locations within 25km of the site.

One short tail bat record is shown approximately 22km east of the Taihape South site. Two unidentified bat species records are also present within the area reviewed.

Both parts of the site border the Hautapu river, which provides linear connectivity through the landscape and foraging opportunities for bats. Both the sites and the wider landscape form a mosaic of open pasture, shelterbelts, isolated trees and forest stands which combine to form. Mature trees are present which could provide roosting opportunities.

4.2 Mangaweka Habitat Overview

The northern Mangaweka UGA (MAN01) lies at the base of a forest covered slope, south-west of Mangateweka stream at approximately 330m a.s.l. Current landuse (as at April 2024) was predominantly grazing. Horses can be seen in google images.

The southern Mangaweka UGA (MAN02) is centred around Raumaewa Road. It occupies a flat elevated Rangitīkei River terrace at 300m a.s.l. defined by a bend in the river, and SH1. Mapping of ecological features displayed in Appendix 3.



Figure 6: MAN02 - Looking north from Raumaewa Road, paddock located between the one lane bridge and 9 Raumaewa Rd (Source: Google Maps, 2024)

4.2.1 Current Vegetation

Current vegetation, as mapped by LCDB 2018, was checked against aerial photos. Vegetation type, location and extent was found to be broadly accurate within urban growth areas MAN01 and MAN02. The map shows high producing grassland entirely covers MAN01 and mostly covers MAN02. A small portion of MAN02 is mapped as indigenous forest.

Exotic & Indigenous Vegetation

Pastural grassland dominates MAN01 & MAN02 urban growth areas with scattered trees planted as specimens, shelter, or a firewood resource. These include Lombardy poplar, oak, poplar, willow, elm, macrocarpa and radiata pine. There appears to be an orchard lot within MAN02. Recorded weed species include blackberry, and convolvulus.

Within MAN01 the, scattered (probably planted) flax bushes were the most obvious sign of indigenous vegetation. Within the MAN02, we can see large indigenous trees (including totara and kānuka) associated with the unnamed waterway (old lower Mangateweka Stream) flowing toward the Rangitīkei gorge to the south-west. This feature will be easily avoided as part of any development.

Rare / threatened species

Species that are considered at-risk or threatened that are found nearby, include a prostrate daisy, two dwarf mistletoe (*Korthalsella spp.*) and Tāpia/white mistletoe, the parasitic wood rose, and two *Lophomytus* species (rohutu)¹⁸. Records from another reserve nearby show herbs such as *Leptinella sp.*, linin flax (*Linum monogynum var. monogynum*), and koheriki (*Scandia rosifolia*)¹⁹.

None of these species are expected within the Mangaweka urban growth areas, due to unsuitable habitat preferences for these species within these modified environments.

4.2.2 Wetlands

There are no indigenous wetlands associated with the Mangaweka (MAN01 and MAN02) urban growth areas.

Urban growth area MAN01 is situated in a locally low-lying area, bordered by embankments which support SH1 and the main trunk railway. The Mangateweka Stream used to cross part of this site before it was diverted during the SH1 realignment in the 1980s. Currently, the site is drained by a culvert that runs under SH1 to an unnamed waterway (formerly the lower Mangateweka Stream), which then flows into the Rangitīkei River.

Although these paddocks generally appear well-drained, one Google photo shows high moisture levels. Due to the site's low elevation, historic waterway, and surrounding embankments, site surveys will be necessary to identify 'natural inland wetlands' under the NPS-FM as part of obtaining resource consent for site development.

If natural inland wetlands are identified within this area, these will be classified as induced exotic pastoral wetlands. It is likely that the ecological value of such wetlands will be 'very low', and they may meet the threshold for pasture exclusion. For areas of higher density low lying areas can often be incorporated into stormwater treatment wetlands.

4.2.3 Freshwater / Aquatic Fauna

Description and significance

Mangaweka is at the northern end of the Rangitīkei-Turakina, sub-area Lower Rangitīkei (Rang_3a), FMU (Horizons Regional Council, 2014).

The Rang_3a FMU is characterised by its hill mixed life supporting capacity and aesthetic, contact recreation, mauri, industrial abstraction, irrigation, stockwater, existing infrastructure, capacity to assimilate pollution, amenity, water supply, and flood control and drainage values (Horizons Regional Council, 2014). The area also has aquatic and riparian sites of significance and is valued for its trout spawning and fishery (Horizons Regional Council, 2014).

The Rangitīkei River borders the eastern, southern, and south-western boundaries of the MAN02 proposed urban growth zone. This river is one of New Zealand's longest rivers, which starts in the Kaimanawa Ranges and flows out to the Tasman Sea (Rangitīkei District Council, 2013). Horizons Regional Council has noted the Redfin Bully in the lower Rangitīkei and the Giant Kokopu in the Forest Road wetland near Parewanui as a Site of Significance – Aquatic (Horizons Regional Council, 2014). The Rangitīkei Narrows and Gorges Natural Feature in the

¹⁸ New Zealand Plant Conservation Network, Mangaweka Scenic Reserve Species List, 1991.

¹⁹ New Zealand Plant Conservation Network, Hautapu Reserve Species List, 1999.

Rangitikei District Plan (NFL-07) includes the area of the river that runs beside Mangaweka. Ecologically, this area of the river is valued for its indigenous riparian vegetation and water quality (Rangitikei District Council, 2013)

The Mangateweka Stream borders the eastern corner of the MAN01 UGA and passes through the eastern corner of the MAN02 area. This stream is a tributary to the Rangitikei River.

No water quality, macroinvertebrate, or freshwater fish information was identified for Mangateweka Stream.

Both streams have a pasture catchment and hill topography class (Whitehead & Booker, 2020).

Water quality / habitat

The water quality of the Rangitikei is monitored at Mangaweka. The site is classified as upland rural.

The monitoring site is in the best 50% of all upland rural sites in New Zealand for *E. coli*, total nitrogen, and total phosphorus. Clarity is within the worst 25% of all upland rural sites. Further data on these parameters can be found on LAWA’s website.

Water quality suspended fine sediments, and ecosystem health all had an NPS-FM grade of D (‘poor’) at the Rangitikei at Mangaweka monitoring site.²⁰ Ammonia toxicity and dissolved reactive phosphorus had NPS-FM grades of B (‘good’) and nitrate toxicity had a grade of A (‘very good’).

Macroinvertebrate community

Aquatic life is monitored at the Rangitikei at Mangaweka monitoring site. Aquatic life, MCI, and QMCI had NPS-FM grades of C (‘fair’), ASPM had a grade of B (‘good’), and Chlorophyll-a was graded an A (‘very good’).²⁰

Based upon predictions in the NZ River Maps (Whitehead & Booker, 2020), the macroinvertebrate community index (MCI) for 2021 was estimated to be 103 and 100.08 for Rangitikei River and Mangateweka Stream, respectively. These values place both streams above the bottom limit for the ‘good’ quality class (100-119 MCI; Stark and Maxted, 2007).

Fish community and passage

A total of eight native freshwater fish species, three non-indigenous salmonid species, and one freshwater invertebrate species have been recorded in Rangitikei River (Table 6). The ‘At Risk – Declining’ species include longfin eel (*Anguilla dieffenbachia*) and torrent fish (*Cheimarrichthys fosteri*).

Table 6. New Zealand Freshwater Fish Database (NZFFD) Records for Rangitikei River. Data accessed on 18th November 2024. Note there were also unidentified bully, eel, and salmonid entries in the NZFFD, which have not been included in the table. The * next to the common name identifies those species that were also in the eDNA batch 73609.

Common name	Scientific name	Threat status
Post-2000		
Brown trout*	<i>Salmo trutta</i>	Introduced and naturalised
Rainbow trout	<i>Oncorhynchus mykiss</i>	Introduced and naturalised
Redfin bully	<i>Gobiomorphus huttoni</i>	Not Threatened

²⁰ <https://storymaps.arcgis.com/stories/e7f1ed8034fa468fbd3a8f16247ac786>

Upland bully ^{21*}	<i>Gobiomorphus breviceps</i>	Not Threatened
Longfin eel*	<i>Anguilla dieffenbachii</i>	At Risk - Declining
Torrent fish*	<i>Cheimarrichthys fosteri</i>	At Risk - Declining
Common bully*	<i>Gobiomorphus cotidianus</i>	Not Threatened
Pre-2000 (excluding species above)		
Cran's bully ^{21*}	<i>Gobiomorphus basalis</i>	Not Threatened
Common smelt	<i>Retropinna retropinna</i>	Not Threatened
Shortfin eel*	<i>Anguilla australis</i>	Not Threatened
Koura*	<i>Paranephrops planifrons</i>	Not Threatened
Chinook salmon	<i>Oncorhynchus tshawytscha</i>	Introduced and naturalised

The only NZ FPAT entry within proximity to the Mangaweka township is a box culvert (response 142768) located in a small tributary entering the Rangitīkei River near the intersection of Te Kapua Road and State Highway One. The culvert was assessed as having a low risk to fish passage.

No fish passage barrier was identified for the Rangitīkei River below Mangaweka or the Mangateweka Stream.

Environmental DNA

An eDNA record, with 6 replicates, was collected on the 25th of September 2024 from the Rangitīkei River at Mangaweka and presented on the Wilderlab Discover DNA website.

In addition to those fish species in Table 6, the dwarf galaxias (*Galaxias divergens*; At Risk - Declining) was identified in the eDNA record.

A large number of insects were also detected, including species from all three EPT (Ephemeroptera, Plecoptera, Trichoptera) taxa. The average taxon-independent community index (TICI)²² for the batch was 109.53, which classifies the sample in the 'good' stream condition group (TICI scores of 100-110) and almost in the excellent grouping (110-120).

4.2.4 Herpetofauna

Records from Bioweb were obtained for a 20 km radius around the proposed site, showing five species of native lizards, including three species of skink and three species of gecko. Herpetofauna observations from iNaturalist were also analyzed to better understand potential species resident within the Mangaweka area. No records of native lizards have been recorded within Mangaweka.

The five recorded species include:

²¹ Thacker et al. (2023) revealed that what were previously identified as Cran's bullies (*Gobiomorphus basalis*) and upland bullies (*Gobiomorphus breviceps*) in the lower North Island were misidentifications. These species are, in fact, Dinah's bullies (*Gobiomorphus dinae*) and Kaharore bullies (*Gobiomorphus mataeraore*), respectively. The more recent species names were used in the Wilderlab database.

²² <https://www.wilderlab.co.nz/tici>

- northern grass skink (*Oligosoma polychroma* - Not Threatened)
- small scaled skink (*O. microlepis* - Nationally Vulnerable)
- Raukawa gecko (*Woodworthia maculata* - Not Threatened)
- ngahere gecko (*Mokopirirakau* 'southern north island' - At Risk – Declining)
- barking gecko (*Naultinus punctatus* - At Risk – Declining)

Additionally, glossy brown skink (*O. zelandicum*), classified as At Risk - Declining were detected within 50 km of Mangaweka in a residential suburb in Fielding.

Desktop Habitat Assessment:

MAN01:

The desktop habitat assessment of habitat for lizards for MAN01 suggests that if lizards are present within the proposed site are likely only to be grassland dwelling skinks (northern grass skink and to a lesser extent glossy brown skink). Potential habitat appears to be restricted within the site to areas along the margins of roads and the railway line where long grasses are present in areas and enable populations of lizards, particularly grass skink to persist. The remainder of the site from available imagery looks to be grazed exotic grassland providing little cover and is considered to provide little to no habitat.

All observed vegetation appears to be exotic and is not considered to provide suitable habitat for geckos.

MAN02:

Sheep and cattle grazed pastoral grassland occupies most of the proposed site, providing little to no habitat for terrestrial skinks. Within these areas isolated slash piles and small lengths of rank grass were observed from aerials/street view, however, these appeared to be isolated from larger areas where terrestrial skinks may persist onsite and unlikely to have residing lizards.

Areas of rank grassland are present across multiple locations within, and directly adjacent to, the proposed site. A narrow band of rank grass follows the eastern cliff/drop off, being left ungrazed. These unmanaged areas may have enabled a population of northern grass skinks to persist, however, it has likely reduced over time due to what appears to be frequent slippages narrowing their available habitat. A c. 0.9 ha property (south of Raumaewa Road, western end) has patchy rank grass throughout, which could support a potential population of grassland dwelling skinks. Log/slash piles are also scattered within this area and may provide additional shelter for lizards.

Arboreal gecko was identified within the site in native forest edge along the southern border of the site. This forest edge is connected to a larger forest fragment which stretches downslope towards the river. This remnant fragment of forest may potentially support population of ngahere and barking gecko which may use the forest edges for thermoregulation. Glossy brown skink may be present residing in dense leaf litter and under woody cover objects, using the edge also for thermoregulation.

Mixed natural established and riparian planting, including kānuka which is known to be occupied by arboreal geckos are present along the stream, however, given that this area is isolated from any potential remnant populations, it is considered unlikely for arboreal geckos to be present. Some grassland skinks may utilize the undergrowth which is a mix of rank grass and low stature weeds.

4.2.5 Avifauna

The grids squares BI75 and BI76 were used for the desktop component of this avifauna study. A total of 40 bird species were identified in the eBird Effort Map, of which 20 were native or endemic and 20 were exotic.

Of these, two species were identified as currently holding a NZTCS threat status. These being:

- bush form of the NZ falcon (*Threatened – Nationally Increasing*),
- black shag (*Phalacrocorax novaehollandiae – At risk, Relict*).

Due to the proximity of the Rangitīkei River, south of Mangaweka, black shag and other cormorant species may be frequent visitors to the site, as they are likely to use the river as flyways between roosting habitats.

Table 7: Species recorded from the Mangaweka area, which have a New Zealand Threat Classification System (NZTCS).

Species	Status	Conservations status	Habitat
NZ falcon (bush)	Endemic	Threatened – Nationally Increasing	Native forest, exotic forest, shrubland
Black shag	Native	At Risk – Relict	Freshwater/wetland, coastal/estuarine

Falcon may also be present breeding in native forests and pine plantations as well as using open farmland for hunting grounds. These habitat types commonly surround Mangaweka and therefore the New Zealand falcon may be found frequently visiting the proposed area of rezoning in Mangaweka and may even be resident.

4.2.6 Bats

The closest long-tailed bat record in the DoC database is approximately 9km southeast of the Mangaweka site. There are ten locations where long-tailed bats have been recorded within 25km of the site. There are three records for unidentified bat species, and no records of short-tailed bats, within the area reviewed.

MAN02 is adjacent to the Rangitīkei River and dense riparian vegetation covering the sloping riparian terrain to the south, providing connectivity and foraging habitat for bats (Figure 7)

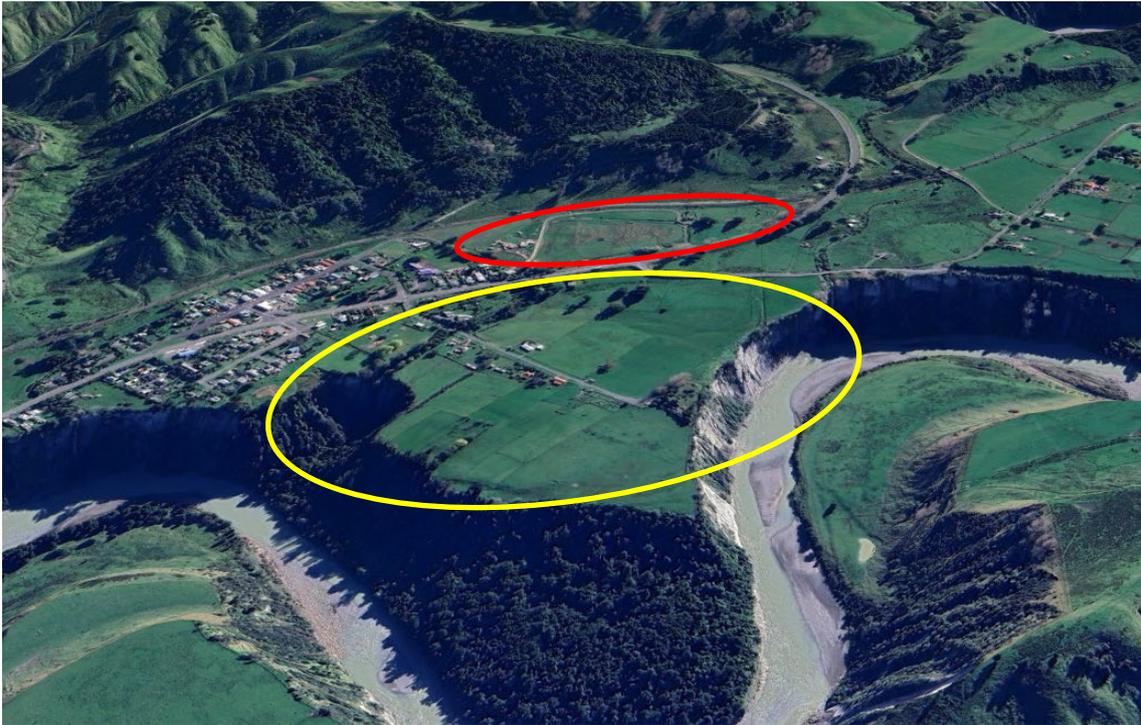


Figure 7 - Aerial view of MAN02 (yellow outline) (with MAN01 (red outline) in background) showing proximity to the river and vegetation

MAN01 includes pastures, shelterbelts and isolated trees, all of which could be used by long-tailed bats. To the north of the site forested slopes and gullies provide additional bat habitat (Figure 7)



Figure 8 - View of MAN01 paddocks – looking northwest from SH1

4.3 Marton Habitat Overview

The Marton urban growth areas are categorised by flat or gently rolling land surrounding Marton township, between 160m and 180m a.s.l. Current landuse is predominantly grazing and cropping (WSP, 2023). Mapping of ecological features displayed in Appendix 3.



Figure 9: Looking north-northeast, across paddocks of MAR03 from Calico Street (Source: Google Maps, 2024)

4.3.1 Current Vegetation

Current vegetation, as mapped by LCDB 2018, was checked against aerial photos. Vegetation type, location and extent was found to be broadly accurate within urban growth areas MAR01, MAR02, MAR03, MAR04, and MAR07. The map shows high producing grassland dominates all areas. Small areas of deciduous hardwoods are mapped for MAR01, MAR02, and MAR03. Small area of built-up area are mapped for MAR01, MAR07, MAR03, and MAR04.

Exotic Vegetation

Pasture grassland – grazed pasture features across all Marton sites. Shelterbelts along the eastern boundary of MAR02 and western boundary of MAR07 include macrocarpa²³, corkscrew willow, blue gum, large pines, and black poplar. Natives, toetoe, flax, houpara, and taupata were also present along with exotic shrubs, gorse and elephants' ears.

In addition to exotic shelterbelts, large specimen, woodlot, or ornamental trees are scattered through the Marton urban growth areas. For example, the 2023 WSP report provides some detail of large gums and pines. Willow weed was recorded in wetter pasture areas.

Pampas and blackberry are noted common weeds through Potential Urban Growth area MAR01.

Indigenous vegetation

Indigenous plants include occasional ti kouka, kohuhu, karaka, and (potentially) totara²⁴. We did not identify continuous indigenous forest areas in any of the Marton urban growth areas.

²³ Macrocarpa with an average diameter at breast height (DBH) of 30 cm.

²⁴ Google images

Rare / threatened species

No threatened species are expected within the Marton urban growth areas, due to unsuitable habitat preferences for these species within these modified environments.

4.3.2 Wetlands

There are no indigenous wetlands associated with the Marton urban growth areas.

Two small wetlands were identified within the WSP report within MAR02. Other areas may require wetland delineation to identify 'natural inland wetlands' under the NPS-FM, as part of obtaining resource consent for site development.

If natural inland wetlands are identified within these other areas, they will likely be classified as induced exotic pastural wetlands. It is likely that the ecological value of such wetlands will be 'very low', and they may meet the threshold for pasture exclusion.

For areas of higher density low lying areas can often be incorporated into stormwater treatment wetlands.

4.3.3 Freshwater / Aquatic Fauna

Bulls & Marton Freshwater Introduction

Both Bulls and Marton are located within the Rangitīkei-Turakina freshwater management unit (FMU), sub-area Tūtaenui (Rang_4d) (Horizons Regional Council, 2014). The Tūtaenui Stream has its headwaters above the Tūtaenui Reservoir, to the north of Marton. The stream runs through the Marton township and on the western side of the Bulls township, before converging with the Rangitīkei River south of Bulls. Tributaries to Tūtaenui Stream are present in both Bulls and Marton.

The Rang_4d FMU has aesthetic, contact recreation, mauri, industrial abstraction, irrigation, stockwater, existing infrastructure, capacity to assimilate pollution, amenity, water supply, and flood control and drainage values (Horizons Regional Council, 2014). It does not have the value of natural state but is listed as having an aquatic site of significance with brown mudfish within a Tūtaenui Stream tributary in the downstream extent of the FMU (Horizons Regional Council, 2014).

Site description - Marton

The largest potential urban growth area in Marton, namely MAR01, 02 and 07 all contain detention dams which are designated by the Horizons Regional Council and are part of their river control scheme for the Tutaenui Stream.

The Tūtaenui Stream runs through the township of Marton. The stream lies to the east of MAR01, 02 and 07 and to the west of MAR03 and 04. Small areas within MAR01, 02 and 07 are within Natural Hazard Area 2 – flooding and experience ponding.

A site visit from a previous ecological impact assessment (WSP MAR07 Report 2023) identified three ephemeral streams, three culverts, and three ponds in the MAR01, 02 and 07 areas. Water ways identified as ephemeral streams 1 & 2 in the 2023 WSP report converge at the southern east corner of the site, where they become an 'unnamed' tributary to Tutaenui Stream. This stream crosses the north-east corner of MAR02. This stream is highly modified and is bordered by shelterbelt and gazed pasture. This tributary has no Schedule B Surface Water Management Values, according to the Horizons Regional Council online mapping system. The

WSP report states the unnamed tributary is part of the wider catchment with suitable habitat and water quality and no impediments to fish passage.

WSP ecologists considered the habitat value of the ephemeral streams to be negligible to moderate value (unnamed tributary). They recommended surveys occur to ensure no brown mudfish were present. The value of aquatic fauna in the wider catchment was considered to be high due to the presence of Threatened At Risk – Declining species in the wider catchment.

Tūtaenui Stream

Description and significance

The Tūtaenui Stream from the Rangitīkei River confluence at approx. NZMS 260 S23:101-095 to source has a lowland mixed classification for its life supporting capacity (Horizons Regional Council, 2014), that is rated as being fair (Rangitīkei District Council, 2013).

Water quality / habitat

The relevant water quality monitoring site of Tūtaenui Stream for Bulls and Marton townships is located south of the Marton township at the upstream of the Marton sewage treatment plant (STP). There is also an impact monitoring site directly downstream of the STP.

The land use in the catchment upstream is predominantly rural and the site is classified as lowland rural (LAWA, 2024).

Both monitoring sites are in the worst 25% of all lowland rural sites in New Zealand for total phosphorus and total nitrogen. Turbidity is within the best 50% of all lowland rural sites at the upstream site, but in the worst 25% of all lowland sites at the downstream site. *E. coli* is within the worst 50% of all lowland rural sites at the upstream site and in the worst 25% of all lowland sites at the downstream site. Further data on these parameters can be found on LAWA's website.

The water quality, ammonia toxicity, dissolved reactive phosphorus, and ecosystem health all had an NPS-FM grade of D ('poor') at the upstream Marton STP monitoring site.²⁵ Nitrate toxicity had an NPS-FM grade of C ('fair').

Macroinvertebrate community

No macroinvertebrate monitoring data was identified for Tūtaenui Stream.

Based upon predictions in the NZ River Maps (Whitehead & Booker, 2020), the macroinvertebrate community index (MCI) for 2021 was estimated to be 80.1 which is on the upper limit of 'poor' and bottom limit of 'fair' quality class (Stark & Maxted, 2007).

Fish community and passage

A total of six freshwater fish species and two freshwater invertebrate species have been recorded in Tūtaenui Stream (*Table 8*). The 'At Risk – Declining' species include inanga (*Galaxias maculatus*), longfin eel (*Anguilla dieffenbachia*), and torrent fish (*Cheimarrichthys fosteri*).

The NZFFD record 130190 on 26th March 2024 is close to the Bull's urban growth area BUL03.

²⁵ <https://storymaps.arcgis.com/stories/e7f1ed8034fa468fbd3a8f16247ac786>

Brown mudfish (*Neochanna apoda*; 'At Risk – Declining') have been recorded downstream of the Bulls township in a tributary to Tūtaenui Stream (NZFFD records after 2015: 125525, 112496, 112296, 105107-105109).

Goldfish (*Carassius auratus*; Exotic) have been recorded (NZFFD record 17721) within a pond located within the proposed MAR01, 02, and 07 urban growth area in Marton.

Table 8. New Zealand Freshwater Fish Database (NZFFD) Records for Tūtaenui Stream. Data accessed on 18th November 2024. (Note there were also unidentified bully and unidentified eel entries in the NZFFD, which have not been included in the table).

Record number(s)	Date(s)	Common name	Scientific name	Threat status
130190	26/03/2024	Dinah's bully	<i>Gobiomorphus dinae</i>	-
130190 110371	26/03/2024 14/12/2009	Koura	<i>Paranephrops planifrons</i>	Not Threatened
130190	26/03/2024	Inanga	<i>Galaxias maculatus</i>	At Risk - Declining
130190 4170	26/03/2024 11/12/1980	Shortfin eel	<i>Anguilla australis</i>	Not Threatened
130190 4170	26/03/2024 11/12/1980	Torrentfish	<i>Cheimarrichthys fosteri</i>	At Risk - Declining
130190 110371 9390 4170	26/03/2024 14/12/2009 29/10/1992 11/12/1980	Common bully	<i>Gobiomorphus cotidianus</i>	Not Threatened
110371	14/12/2009	Cran's bully ²⁶	<i>Gobiomorphus basalis</i>	Not Threatened
9390 4170	29/10/1992 11/12/1980	Longfin eel	<i>Anguilla dieffenbachii</i>	At Risk - Declining
4169	11/12/1980	Freshwater shrimp	<i>Paratya curvirostris</i>	Not Threatened

There are no fish passage barrier entries within the FPAT in the reach of Tūtaenui Stream between Bull's and the confluence with the Rangitīkei River. There are two entries of culverts near one another in Tūtaenui Stream, northwest of the Bulls township. Moving upstream, the first culvert (response 179100) is a double barrel pipe culvert, and the second culvert (response 179099) is a single barrel pipe culvert. Both are identified as having a very low risk to fish passage.

Environmental DNA

There is no eDNA records for Tūtaenui Stream or other waterbodies within the Bulls and Marton townships.²⁷

²⁶ Thacker et al. (2023) reported that Cran's bullies (*Gobiomorphus basalis*) previously identified in the lower North Island were misidentified and are, in fact, Dinah's bullies (*Gobiomorphus dinae*).

²⁷ There is an eDNA record at Bulls Bridge on the Rangitīkei River, but this site is outside the scope of the desktop assessment for Bulls.

4.3.4 Herpetofauna

iNaturalist records were cross-referenced with DOC data to determine species present in the broader Marton area. These were found to include the following:

- northern grass skink (*Oligosoma polychroma* - Not Threatened)

Only northern grass skink were recorded within the Marton township, approximately 1 km from the MAR04 site. Other species known within 50 km of Marton were:

- glossy brown skink (*O. zelandicum* - At Risk – Declining)
- Raukawa gecko (*Woodworthia maculata* - Not Threatened)
- ngahere gecko (*Mokopirirakau* 'southern north island' - At Risk – Declining)
- barking gecko (*Naultinus punctatus* - At Risk – Declining)

Ornate skinks were also recorded in the wider area in Palmerston North, occupying native vegetation in urban areas.

Goldstripe geckos (*W. chrysosireticus*) and Kupe skink (*O. aff. infrapunctatum* "southern North Island") were also recorded within 50 km of the site west of Marton, however these were excluded from the analysis as the Bulls area is outside the known distribution of the species. Plague skinks (*Lampropholis delicata*) are an invasive species have been recorded within 50 km of the site and could be present within the area. These are classified as unwanted organisms and are not protected in New Zealand.

Desktop Habitat Assessment:

MAR01:

MAR01 is predominantly grazed low stature exotic grassland, lacking obvious lizard refugia features such as large areas of woody debris (smaller bits may be present) and long grasses. Vegetation around the buildings is amenity planted vegetation and has a low likelihood to provide habitat to native skinks, given its isolation from any other suitable habitat for the species. No arboreal gecko habitat is considered to be present on the site. Shelterbelts may provide habitats for lizards if dense undergrowth or grass is allowed to grow, however, given the intensive grazing likely present across the site, it is likely that these areas are either low stature or bare ground.

MAR02:

Much of the proposed area is grazed low stature exotic grassland, providing low quality habitat for lizards. Some areas of longer rank grass which could support low numbers of northern grass skink, do appear to be present across the site but small in area along fence lines, road margins, and potentially around shelterbelts. Additionally, small areas of woody slash are present across the site. While these often can provide refugia for terrestrial skinks, given the surrounding landscape is grazed pasture, the likelihood lizards may be present is considered low. Vegetation across the site is largely amenity plantings or stands of exotic planted forest and appears to lack adequate ground cover for lizards. No habitat for arboreal geckos was present.

MAR03:

Mown and/or grazed grassland which most of the site consist of provides little to no cover for lizards. Small pockets of rank grassland may be present in areas, but these features are likely to be small and unlikely support a population of any species of terrestrial skink potentially present. Given the modified surrounding landscape and lack of suitable connecting habitat to

the exotic tree stand, the likelihood that a population of native lizards persists is considered to be low. No arboreal gecko habitat is considered to be present on the site.

MAR04:

Potential habitat for grassland skinks is present within the site but is restricted to areas along the roadsides and fence lines. Outside these areas, the grassland is grazed and provides little to no habitat. Within the site, manmade debris objects and wood debris piles appear to be present, potentially providing habitat for skinks moving from the rank grass fences located throughout the site. Vegetation around the site is predominantly exotic and provides no habitat for arboreal geckos.

MAR07:

Most of the proposed site is grazed pasture or cropland. Potential lizard habitats are likely confined to the vegetated areas towards the center of MAR02 and along the eastern border of the site. Old stands of predominantly pine and macrocarpa trees are present at the center of the site. Wood and debris piles, tall grass, leaf litter, along with various natural and artificial cover objects, offer potential habitats for terrestrial skinks, in particular under felled woody debris and old roofing materials (WSP 2023). We acknowledge that a high-level visual assessment for lizards was conducted in this area by WSP in 2023 but no lizards were detected²⁸. No habitat for arboreal geckos was present.

4.3.5 Avifauna

Birds identified within part of UGA MAR01, MAR02, and MAR07 (WSP, 2022), included common exotic species: magpie, chaffinch, Canada goose, rock pigeon, house sparrow, , mallard duck, thrush, and starling. Indigenous species were: tui, grey warbler, spur winged plover, paradise shelduck, pukeko, NZ pipit, NZ kingfisher and pied stilt were recorded. Numerous other species were identified on eBird. Of these, only the NZ pipit was listed as *At Risk – Declining*. However, since the WSP survey this species has been re-classified as *At Risk - 'Naturally Uncommon*, and was the only at-risk species observed on site.

The ecology desktop study will only focus on the parts of MAR03 and 04 that are outlined in red (Figure 3), since greater parts of MAR03 and 04 are subject to flood hazard which makes them less desirable for residential development. MAR04 is currently zoned Rural Living.

In BL72, 37 bird species were identified. This included 20 native or endemic species, 16 exotic species, and one coloniser species.

Of all these species, three species were At-Risk, the black shag (*At Risk – Declining*), the royal spoonbill (*Platalea regia – At Risk, Naturally Uncommon*), and the Australian coot (*Fulica atra australis – At Risk, Naturally Uncommon*), a coloniser species. The NZ pipit (*At Risk – Naturally Uncommon*), observed by WSP ecologists was noted as not listed on eBird. This brings the at-risk total to four species on site.

Table 9: Species recorded from the Marton area, which have a New Zealand Threat Classification System (NZTCS).

Species	Status	Conservations status	Habitat
---------	--------	----------------------	---------

²⁸ Lizards are visually and behaviorally cryptic making them hard to detect. Additionally, populations of lizards are often at low densities therefore, comprehensive surveys are often required to determine whether lizards may be present on any site.

Black shag	Native	At Risk – Relict	Freshwater/wetland, coastal/estuarine
NZ Pipit	Native	At-Risk – Naturally uncommon	Open ground from coastal to alpine.
Royal spoonbill	Native	At Risk – Naturally Uncommon	Coastal/estuarine, freshwater/wetland
Australian coot	Coloniser	At Risk – Naturally Uncommon	Freshwater/wetland

All three At-Risk species from eBird are primarily associated with water, yet no such habitat exists in the areas being considered for rezoning at Marton. The wider region of Marton is characterised by urban habitat and farmland, which is favoured by NZ pipit.

NZ pipit is a species of open country, including pastoral grasslands. In our experience, NZ pipit are attracted to newly turned soil. This may temporarily increase the local population where development occurs. Long term the development will result in the loss of pastoral habitat. However, this species can have a home range of up to several square kilometres (Beauchamp, 2007, 2009) so, only one or 2 pairs would be present, and the loss of habitat would be gradual, providing time for the birds to adjust their range.

The eBird Species Map shows the black shag observation was approximately 4km south of the MAR04 section, the royal spoonbill was spotted approximately 1km east of the MAR04 section and the Australian coot, 3.1km southeast of MAR04. Each species only had one observation record and were all spotted on pastoral habitat. Therefore, these species are unlikely to be resident in these areas, nor the grid square BL72.

4.3.6 Bats

The closest long-tailed bat record in the DOC database is approximately 7.7 km west of the UGAs. There are 19 locations within the 25km radius where long-tailed bats have been recorded. There are also three records of unidentified bat species and no records of short-tailed bats.

WSP ecologists undertook an acoustic survey in 2021 at the Marton rail hub development, (WSP report, 2022). This survey recorded long tailed bats at all monitoring sites. Streams, mature trees, shelterbelts, and pasture are found within all UGAs being assessed. These features all provide potential habitat for bats.

4.4 Bulls Habitat Overview

All Bulls urban growth areas are highly modified and feature predominantly grazed pasture and/or cropping. These are large flat areas of the Manawatu plains. All Bulls urban growth areas have modified waterways running through them. All areas are about 160m a.s.l. Area BUL03 is particularly close to Tutaenui Stream. Mapping of ecological features displayed in Appendix 3.



Figure 10: Looking west across BUL01, from SH1 (Source: Google Maps, 2024)

4.4.1 Current Vegetation

Current vegetation, as mapped by LCDB 2018, was checked against aerial photos. Vegetation type, location and extent was found to be broadly accurate within urban growth areas BUL01, BUL02, and BUL03. The map shows high producing grassland dominates BUL01 and BUL03, and a smaller portion in the south of BUL02. Small areas of deciduous hardwoods are mapped for all areas. A large portion of BUL02, including the racetrack, is mapped as built-up area.

Exotic & Indigenous Vegetation

Improved exotic pasture features across all UGAs. The racetrack features within BUL02. A blue gum shelter belt has been planted along the south-eastern boundary of the area. Rank grass persists on the verge of the highway edges.

Weed species recorded in the general area include, tradescantia, Jerusalem cherry, crack willow, blackberry, tutsan, hawthorn, hemlock, grey sedge, and barberry²⁹.

Flax was the only indigenous vegetation noted from google images.

Rare / threatened species

Species that are considered at-risk or threatened that have been in the wider area, include ramarama (*Lophomytus bullata*), rōhutu, and teucridium³⁰.

None of these species are expected within the Bulls urban growth areas, due to unsuitable habitat preferences for these species within these modified environments.

²⁹ New Zealand Plant Conservation Network

³⁰ New Zealand Plant Conservation Network.

4.4.2 Wetlands

Areas qualifying as 'natural inland wetland' under the NPS-FM are possible within small areas of all Bulls UGAs. However, mostly these will qualify as improved pasture, through pasture exclusion of standard pasture.

There are linear areas running east-west (one within urban growth area BUL01 and one within urban growth area BUL03) which may be considered 'natural inland wetland', although these may meet the threshold for pasture exclusion.

For areas of higher density low lying areas can often be incorporated into stormwater treatment wetlands.

4.4.3 Freshwater / Aquatic Fauna

Site description - Bulls

The Tūtaenui Stream lies on the western side of the Bulls township.

The urban growth area BUL03 is situated on the flood level 2 overlay area of Tūtaenui Stream, as well as a small area within the western corner of BUL01. The flood level 2 overlay means the land is at risk of inundation from flood events with a 0.5% Annual Exceedance Probability (1 in 200 year) where flood waters will be no deeper than 0.5m above finished ground level with a maximum water velocity of 1.0m/s excluding freeboard (Rangitikei District Council, 2013).

Additionally, the upper reaches of a modified waterway/drain tributary to Tūtaenui is flows through in BUL01 and BUL03.

The Rangitikei River is to the east of BUL02 and was not considered for this urban growth area due to not being within close proximity (i.e. > 500 m away).

4.4.4 Herpetofauna

iNaturalist observations were also analyzed to provide further insight to what lizards may be located around Bulls. No lizards have been recorded in Bulls.

Species within a 50 km radius of the site include:

- northern grass skink (*Oligosoma polychroma* - Not Threatened)
- ornate skink (*Oligosoma ornatum* - At Risk – Declining)
- glossy brown skink (*O. zelandicum* - At Risk – Declining)
- Raukawa gecko (*Woodworthia maculata* - Not Threatened)
- ngahere gecko (*Mokopirirakau* 'southern north island' - At Risk – Declining)
- barking gecko (*Naultinus punctatus* - At Risk – Declining)

Kupe skink were excluded from the analysis as Bulls was outside the known distribution of the species. Plague skinks, an invasive species, have been documented within 50 km of the UGAs and may be present in the area. They are classified as unwanted organisms and are not protected in New Zealand. Kupe skink (*O. aff. infrapunctatum* "southern North Island") were also recorded within 50 km of the site northwest of Bulls in Whanganui, however these were excluded from the analysis as the Bulls area is outside the known distribution of the species.

Desktop Habitat Assessment:

BUL01:

No potential lizard habitat was observed to be present within the site, with the site almost entirely grazed pasture. We note that suitable habitat for northern grass skinks is present directly outside the site. If lizards are present within these areas, there is the potential for skinks to move into the site if habitat becomes available (e.g. grazing is removed from an area or man-made debris is present). No habitat for arboreal geckos was present.

BUL02:

The BUL02 site is predominantly a mixture of grazed and mowed grassland. Areas of rank grass were abundant around the edges of the southwestern paddock where mowing has not reached, and around the perimeter of the former racecourse. Both these habitats appear to be infrequently mowed or grazed, potentially providing suitable habitat for northern grass skink. Rank grass was also present along the western and northern borders of the site providing similarly suitable habitat for grass skinks.

Vegetation and trees within the site largely appear to be largely exotic tree shelter belts or isolated amenity plantings around residential dwellings. These features are not considered to provide habitat for arboreal geckos. The shelter belts appear to lack dense undergrowth, and grass is either grazed or mowed underneath, therefore, a low likelihood for skinks to be present underneath.

BUL03:

No lizard habitat was observed on the site, which consists mostly of grazed pasture. However, potential habitat for northern grass skinks exists along the border fence lines and the narrow watercourse. If lizards are present in these areas, there is a possibility for skinks to move onto the site if suitable habitat becomes available, such as when grazing is removed, or man-made debris is introduced. No suitable habitat for arboreal geckos was observed.

4.4.5 Avifauna

A total of 50 bird species were identified in BM72 which contains 29 native or endemic species, 18 introduced species, and 2 coloniser species.

This included three 'threatened' species and seven 'At-Risk' species.

Threatened species included:

- NZ dabchick (Nationally Increasing)
- Australasian bittern (Nationally Critical)
- Caspian tern (Nationally Vulnerable)

At-Risk native/endemic species included:

- Little shag (Relict)
- Black shag (Relict)
- Little black shag (Naturally Uncommon)
- Royal spoonbill (Naturally Uncommon)

- Banded dotterel (Declining)

At-Risk coloniser species included:

- Black-fronted dotterel (Naturally Uncommon)
- Australian coot (Naturally Uncommon)

Table 10: Species recorded from the Bulls area, which have a New Zealand Threat Classification System (NZTCS).

Species	Status	Conservations status	Habitat
Australian coot	Coloniser	At Risk – Naturally Uncommon	Freshwater/wetland
Little black shag	Native	At-Risk – Naturally Uncommon	Freshwater/wetlands, coastal/estuarine
Black shag	Native	At Risk – Relict	Freshwater/wetland, coastal/estuarine
Little shag	Native	At Risk – Relict	Freshwater/wetland
Black-fronted dotterel	Coloniser	At Risk – Naturally Uncommon	Freshwater/wetland, farmland/open country, coastal/estuarine
Royal spoonbill	Native	At Risk – Naturally Uncommon	Coastal/estuarine, freshwater/wetland
Banded dotterel	Endemic	At Risk – Declining	Coastal/estuarine, freshwater/wetland
NZ dabchick	Endemic	Threatened – Nationally Increasing	Freshwater lakes, ponds
Australasian bittern	Endemic	Threatened – Nationally Critical	Freshwater wetlands
Caspian tern	Endemic	Threatened – Nationally Vulnerable	Braided riverbeds, estuaries, coastal, farmland

The environment surrounding Bulls is characterised by urban habitat, open farmland and various small patches of exotic plantation – predominantly pine. The UGAs are all pastoral habitat, surrounded by urban environments. Similar to Mangaweka, the Rangitīkei River flows south of the township.

All At-Risk and Threatened species observed in BM72 on eBird were associated with freshwater habitats mainly coastal/estuarine but also wetland birds such as the Australasian bittern and the cormorant species (little black shag and black shag). Some of these species are likely to be frequent visitors in Bulls due to the river habitat and the associated surrounding vegetation. So, they may be seen in the UGAs, especially the black-fronted tern, that can often opportunistically forage in turned-over soil and paddocks. Other birds may be seen traversing over BUL01-BUL03, likely in transit to or from the Rangitīkei River.

4.4.6 Bats

The nearest long-tailed bat record is approximately 13km east of the site. Long tailed bats have been recorded at eight locations within 25 km of the site. There are no records for short-tailed bats within the area reviewed.

The habitat at Bulls is predominantly pasture with one shelterbelt and occasional trees within the site. Additional shelterbelts and small tree stands are present along the boundary. A vegetated stream is present approximately 200m northwest of BUL03. The wider landscape is a mix of agricultural land and forest blocks, providing some connectivity and foraging habitat for bats.

4.5 Summary Discussion of Ecological Components

4.5.1 Vegetation

We identified some scattered and continuous indigenous shrubland/short forest at the eastern end of TAI01. We are confident that very little original vegetation remains across all other sites. There is low probability of the presence of threatened plant species. The sites are dominated by exotic, pasture grassland, shelterbelts and small woodlots. Due to grazing and other land management, weeds do not appear prevalent, although some ecological weed species can be seen on and near sites.

4.5.2 Wetlands

No indigenous natural inland wetlands were detected during the desktop study. We identified some areas as potential 'natural inland wetlands' within pasture. We suspect that the extent of these wetland areas will be a minor component of total land area across all potential urban growth areas. We note that MAN01 is situated in a locally low-lying area. Although wetlands could not be detected, we have included part of the area within our constraints map to emphasise the necessity of wetlands survey to fully inform a plan change.

Based on our experience within similar landscapes, if natural inland wetlands are identified within pastoral areas, these are likely to have been induced by land clearance, conversion to pasture and stock activities. These potential wetlands would likely have been seeps creating areas of wet forest or merging into small streams beneath a forest canopy. Potential wetlands in this environment would revert to forest if stock were excluded from them. To persist as wetland, they would require active management in a similar way that grazing has maintained them as wetland.

With this in mind, the ecological value of such wetlands is likely to be 'very low', and they may also meet the threshold for pasture exclusion.

4.5.3 Freshwater / Aquatic Fauna

The Hautapu, Mangaone, and Rangitikei Rivers are connected to the Taihape and Mangaweka sites. The Tutaenui Stream connects to the Marton and Bulls sites indirectly through ephemeral or small perennial waterways. One Bulls site is also indirectly connected to the Rangitikei River.

This ecological connection, which requires consideration by development. For example, Brown mudfish (*Neochanna apoda*; 'At Risk – Declining') have been recorded downstream of the Bulls township in a tributary to Tūtaenui Stream. The WSP report (2023) noted the possibility of mudfish habitat within urban growth area MAR02.

Mudfish require at least seasonally wetted habitat, including intermittent or perennial streams or wetlands, and we have identified this potential habitat within the constraints mapping. Potential effects on this species can be further investigated as part of the resource consent process.

4.5.4 Herpetofauna

Table 11 summarises all potential lizard species present in appropriate habitat in proximity to each site. However, some of these species have habitat requirements that mean they are unlikely to be present. Most sites have habitat which would support northern grass skink. Parts of other sites could support one or two other species.

As shown, the dominant habitat present within all sites consists of grazed pastoral grassland, which is considered poor-quality habitat for lizards, and considered low risk for lizards.

Areas of rank grass and the margins of indigenous and exotic forest/scrub likely provides moderate quality habitat for northern grass skink and, to a lesser extent, glossy brown skink. Other species may potentially be present as listed. We have noted lizard habitat as a constraint only where there is greater likelihood (for example in Taihape) or where it has been highlighted by ecological reports (example Marton).

Areas with potential lizard habitat will require survey as part of obtaining resource consent for site development.

Table 11: Lizard species present within 50 km of the sites and their habitat requirements.

Species	Common name	Threat class (National)	Preferred habitats	Taihape	Mangaweka	Marton	Bulls
<i>Oligosoma polychroma</i>	Northern grass skink	Not Threatened	Dry open areas with low vegetation (e.g., grasslands) or debris such as logs or stones for cover	x	x	x	x
<i>Oligosoma ornatum</i>	Ornate skink	At Risk - Declining	Forests, shrublands and grasslands where thick leaf litter or stable ground cover (e.g., rocks and logs) are present			x	x
<i>Oligosoma zelandicum</i>	Glossy brown skink	At Risk - Declining	Coastal pebble banks, grassland, wetland, dense scrubland, mature forest with dappled sunlight.		x	x	x
<i>O. microlepis</i>	Small scaled skink	Threatened – Nationally Vulnerable	Rocky substrates, pebble and boulder banks on the edges of rivers and sometimes dense vegetation associated with such habitats. Can occur in modified agricultural land	x	x		
<i>Woodworthia maculata</i>	Raukawa gecko	Not Threatened	Forest, scrub, grassland, and coastal areas. Debris and rockpiles	x	x	x	x
<i>Mokopirirakau</i> “southern North Island”	Ngāhere gecko	At Risk - Declining	Forest and scrub, especially kānuka / mānuka	x	x	x	x
<i>Naultinus punctatus</i>	Barking gecko	At Risk - Declining	Forest and scrub, especially kānuka / mānuka.	x	x	x	x

4.5.5 Avifauna

Falcon is the most widespread 'Threatened' or 'At-Risk' species, potentially occurring within all sites, particularly within the Taihape and Mangaweka sites. As stated in Section 4.0, falcon are known to utilise farmland habitat and can also nest on the ground. They may be resident at the Taihape or Mangaweka sites, but more likely they'd be using open farmland for hunting grounds.

NZ pipit was recorded by WSP ecologists at the Marton sites in 2022. This species prefers open habitat and has large home range, both of which means this species will be fairly resilient to land use change, provided development is gradual.

Some wetland or freshwater species are likely visitors across sites at Bulls due to proximity to river habitat. The black-fronted tern was said to be the most likely to be seen in the UGAs.

4.5.6 Bats

Bats have been recorded within commuting distance of all sites and suitable habitat is present within or adjacent to all sites. Previous survey distribution is patchy, and bats are likely to be present in additional areas that have not yet been surveyed. Surveys have not been undertaken to identify bat activity levels within the sites or to locate trees roost potential.

Bats are the only native terrestrial mammals in New Zealand. There are two species of bats in New Zealand, the long-tailed bat (*Chalinolobus tuberculatus*) and the lesser short-tailed bat which is separated into three subspecies (*Mystacina tuberculata* spp.). The long-tailed bat is classified as Threatened – Nationally Critical and the central lesser short-tailed bat is classified as At Risk – Declining due to predation, habitat degradation and loss, and competition. Both bat species in the region; the long-tailed bat and central lesser short-tailed bat are designated as Regionally Critical (Crisp et al., 2023)

Short-tailed bats typically live within areas of mature native forest where they use hollow trees for roosting. Short-tailed bats are aerial and ground foragers, eating a variety of invertebrates, nectar, fruit, and pollen. So, this species is less likely within the sites.

Long-tailed bats preferentially roost in small cavities of old, large trees, but have also been observed to utilise other features such as loose bark, hollow limbs or epiphyte growth for roosting. They are able to fly long distances at night when they are commuting between roosts and / or foraging, for which they use echolocation to hunt for flying insects. Long-tailed bats are known to preferentially use linear habitat features such as shelterbelts or edges of vegetation margins to commute and forage but utilise a wide range of habitat types. This species is known to frequently switch roosts and relies on a large network of roosts used periodically.

Survey will be necessary as part of resource consent investigations. However, populations of Long-tailed bats can be managed through the effects management hierarchy.

PART 3 ECOLOGICAL CONSTRAINTS & RECOMMENDATIONS

5.0 Ecological Constraints Mapping

As discussed in Section 4.0, the UGAs contain, or potentially contains terrestrial, wetland and freshwater values and features; these each have varying ecological value and associated developmental constraints as outlined in Section 2 and depicted in Table 12. In summary:

- **High constraint (red):**
 - Feature with high or very high ecological value/s (e.g. mature indigenous forest or bat habitat).
 - Outstanding Natural Features and Landscapes³¹
 - Significant ecological habitats³²
 - Feature with high regulatory protection e.g. QEII covenant, features with “avoid” policy governors (e.g. natural inland wetlands, intermittent and perennial streams).
- **Moderate constraint (orange):**
 - Feature with moderate ecological value/s (e.g. seral mixed broadleaf forest).
 - Feature with moderate developmental risk that would require moderate mitigation, offset and / or compensation packages to manage effects, including potential lizard habitat.
- **Low constraint (green):**
 - Feature with low ecological value/s (e.g. mixed exotic / indigenous shrubland).
 - Feature with no regulatory protection.
 - Feature with low developmental risk that would likely require low-level mitigation and / or offset packages to manage effects.

³¹ As identified in Schedule C4 of the Rangitīkei District Plan

³² As identified by Schedule F of Horizon's OnePlan

5.1 Assumptions/exclusions

In mapping the constraints, a number of assumptions were made about the data, values, and ongoing land use, as follows:

- Although we have mapped areas as red on the maps, we conclude there is low risk of 'fatal flaws' associated with all potential urban growth areas, from an ecology perspective. Specifically, we consider the high-risk ecological areas are localised and any effects of development can be appropriately managed through a resource consent process.
- Most areas do not have previous ecology assessments and have had their constraints tentatively mapped based on the desktop exercise. This is often based on aerial imagery and would require ground verification to be confident in their types and values. This is particularly relevant to 'natural inland wetlands' as defined by the RMA and NPS-FM. Ground verification can be completed as part of an effects assessment during a resource consent process.
- We have based identification of potential wetlands on our desktop exercise. We note that most land is grazed, and would include species that qualify for pasture exclusion (Ministry for the Environment, 2022).
- We have mapped ecological features conservatively to account for uncertainty. As noted above, we assume that grassland is managed via grazing and as such grassland has been assigned a low-level constraint. However, if management ceases, grassland will become rank and could provide lizard habitat and nesting habitat for pipit. In addition, a lack of grazing then brings into contest the acceptability of the pastoral exclusion provision in the NPS-FM (2020) for wetlands. In the above scenarios the constraint level would be elevated from low to moderate for pipits and lizards and potentially high in the case of wetlands.

5.2 Constraints summary

This section is to be read with the relevant constraints maps, contained within the separate appendices document.

Table 12. Developmental constraint levels associated with ecological values and features in the UGAs.

Ecological feature	Type of constraint (e.g. high, moderate, low, potentially high)	Reason for constraint (e.g. ecological value, legislation, etc)	Possible outcomes if not constrained (e.g. need to offset – which has land use implications elsewhere)
Taihape - TAI01			
Perennial, or ephemeral waterways/seepages (and riparian margins) <ul style="list-style-type: none"> • 0.75ha 	High	If classified as rivers, subject to regional and national planning documents. Of note, the NPS-FM, which, among other things, requires no loss to river extent or their values. Provide habitat for At Risk and potentially Threatened fish and bird species.	Development should be designed and located to avoid and enhance waterways. Where avoidance is not possible, further mitigation will be required, which could include offsetting. Where indigenous fish are present, management is required following obligations under Freshwater Fisheries Regulations. Associated riparian vegetation may require low to high scale management, through mitigation, offset and / or compensation, depending on type.
Potential natural inland wetlands – not identified as SNAs – 1 site: <ul style="list-style-type: none"> • 0.4ha 	High	Low ecological value if confirmed as exotic plant communities. There is directive policy through the NPS-FM and Horizon’s OnePlan to protect wetlands. If development is proposed within wetlands, there is onerous consenting requirements and high consent risk.	Potential legal proceedings. Development should be designed and located to avoid and enhance wetlands. Where avoidance is not possible, further mitigation will be required, which could include offsetting.

Ecological feature	Type of constraint (e.g. high, moderate, low, potentially high)	Reason for constraint (e.g. ecological value, legislation, etc)	Possible outcomes if not constrained (e.g. need to offset – which has land use implications elsewhere)
<p>Potential (scattered and continuous) regenerating indigenous shrubland and/or lizard habitat – 4 areas:</p> <ul style="list-style-type: none"> • 1.85ha. • 0.85ha • 0.38ha • 0.43ha 	Moderate	<p>Potentially moderate ecological value and potentially provides habitat for At Risk and Threatened fauna species.</p> <p>However, this does not entirely preclude development in those areas. The regenerating communities.</p>	<p>Easy to avoid or improve.</p> <p>Moderate scale mitigation and offset also very likely required for regenerating native forest, preferably on site.</p> <p>Best to avoid such features.</p>
Exotic pasture grassland	Low	Low ecological value.	<p>Highly unlikely to require any mitigation or offsetting.</p> <p>Potential lizard and/or avifauna and/or bat surveys required.</p>
Shelterbelts and ornamental trees	Low (and mapped as low) but potentially high	<p>Such features generally have low ecological value.</p> <p>Likely elevated to moderate ecological value if it provides habitat for bats.</p>	<p>The outcome is dependent on presence, and if present, abundance and habitat use. Low abundance and foraging, roosting and / or thoroughfare habitat use only could possibly be managed through mitigation and offsetting. High abundance and foraging, roosting, thoroughfare, and /or maternity roost habitat use may require avoidance of the feature and associated corridors used by bats.</p>
Taihape - TAI02			
Exotic pasture grassland	Low	Low ecological value.	Highly unlikely to require any mitigation or offsetting.

Ecological feature	Type of constraint (e.g. high, moderate, low, potentially high)	Reason for constraint (e.g. ecological value, legislation, etc)	Possible outcomes if not constrained (e.g. need to offset – which has land use implications elsewhere)
			Potential lizard and/or avifauna and/or bat surveys required.
Shelterbelts and ornamental trees	Low (and mapped as low) but potentially high	Such features generally have low ecological value. Likely elevated to moderate ecological value if it provides habitat for bats.	The outcome is dependent on presence, and if present, abundance and habitat use. (See TAI01 for further detail)
Mangaweka - MAN01			
Perennial, or ephemeral waterway/ modified waterway/drain (and riparian margins) <ul style="list-style-type: none"> 0.34ha 	High	If classified as rivers, subject to regional and national planning documents. Of note, the NPS-FM, which, among other things, requires no loss to river extent or their values. Provide habitat for At Risk and potentially Threatened fish and bird species.	Development should be designed and located to avoid and enhance waterways. Where avoidance is not possible, further mitigation will be required, which could include offsetting. (See TAI01 for more detail)
Exotic pasture grassland	Low	Low ecological value.	Highly unlikely to require any mitigation or offsetting. Potential lizard and/or avifauna and/or bat surveys required.
Shelterbelts and ornamental trees	Low (and mapped as low) but potentially high	Such features generally have low ecological value. Likely elevated to moderate ecological value if it provides habitat for bats.	The outcome is dependent on presence, and if present, abundance and habitat use. (See TAI01 for further detail)
Mangaweka - MAN02			

Ecological feature	Type of constraint (e.g. high, moderate, low, potentially high)	Reason for constraint (e.g. ecological value, legislation, etc)	Possible outcomes if not constrained (e.g. need to offset – which has land use implications elsewhere)
<p>Original Lower Mangateweka Stream channel.</p> <p>Perennial, or ephemeral waterways/seepages (and riparian margins)</p> <ul style="list-style-type: none"> • 0.38ha 	High	<p>If classified as rivers, subject to regional and national planning documents. Of note, the NPS-FM, which, among other things, requires no loss to river extent or their values.</p> <p>Provide habitat for At Risk and potentially Threatened fish and bird species.</p>	<p>Development should be designed and located to avoid and enhance waterways. Where avoidance is not possible, further mitigation will be required, which could include offsetting.</p> <p>(See TAI01 for more detail)</p>
<p>Potential natural inland wetlands – not identified as SNAs – 3 sites:</p> <ul style="list-style-type: none"> • 0.45ha • 0.05ha • 0.05ha 	High	<p>Low ecological value if confirmed as exotic plant communities.</p> <p>There is directive policy through the NPS-FM and Horizon's OnePlan to protect wetlands. If development is proposed within wetlands, there is onerous consenting requirements and high consent risk.</p>	<p>Potential legal proceedings.</p> <p>Development should be designed and located to avoid and enhance wetlands. Where avoidance is not possible, further mitigation will be required, which could include offsetting.</p>
Exotic pasture grassland	Low	Low ecological value.	<p>Highly unlikely to require any mitigation or offsetting.</p> <p>Potential lizard and/or avifauna and/or bat surveys required.</p>
Shelterbelts and ornamental trees	Low (and mapped as low) but potentially high	<p>Such features generally have low ecological value.</p> <p>Likely elevated to moderate ecological value if it provides habitat for bats.</p>	<p>The outcome is dependent on presence, and if present, abundance and habitat use. (See TAI01 for further detail)</p>
Marton - MAR01,02,07			

Ecological feature	Type of constraint (e.g. high, moderate, low, potentially high)	Reason for constraint (e.g. ecological value, legislation, etc)	Possible outcomes if not constrained (e.g. need to offset – which has land use implications elsewhere)
Perennial, or ephemeral waterways/seepages (and riparian margins) <ul style="list-style-type: none"> • 0.40ha • 0.70ha • 0.44ha 	High	If classified as rivers, subject to regional and national planning documents. Of note, the NPS-FM, which, among other things, requires no loss to river extent or their values. Provide habitat for At Risk and potentially Threatened fish and bird species.	Development should be designed and located to avoid and enhance waterways. Where avoidance is not possible, further mitigation will be required, which could include offsetting. (See TAI01 for more detail)
Potential natural inland wetlands – not identified as SNAs – 2 sites: <ul style="list-style-type: none"> • 0.012ha • 0.015ha 	High	Low ecological value if confirmed as exotic plant communities. There is directive policy through the NPS-FM and Horizon's OnePlan to protect wetlands. If development is proposed within wetlands, there is onerous consenting requirements and high consent risk.	Potential legal proceedings. Development should be designed and located to avoid and enhance wetlands. Where avoidance is not possible, further mitigation will be required, which could include offsetting.
Exotic pasture grassland	Low	Low ecological value.	Highly unlikely to require any mitigation or offsetting. Potential lizard and/or avifauna and/or bat surveys required.
Shelterbelts and ornamental trees	Low (and mapped as low) but potentially high	Such features generally have low ecological value. Likely elevated to moderate ecological value if it provides habitat for bats.	The outcome is dependent on presence, and if present, abundance and habitat use. (See TAI01 for further detail)
Marton - MAR03			

Ecological feature	Type of constraint (e.g. high, moderate, low, potentially high)	Reason for constraint (e.g. ecological value, legislation, etc)	Possible outcomes if not constrained (e.g. need to offset – which has land use implications elsewhere)
Exotic pasture grassland	Low	Low ecological value.	Highly unlikely to require any mitigation or offsetting. Potential lizard and/or avifauna and/or bat surveys required.
Shelterbelts and ornamental trees	Low (and mapped as low) but potentially high	Such features generally have low ecological value. Likely elevated to moderate ecological value if it provides habitat for bats.	The outcome is dependent on presence, and if present, abundance and habitat use. (See TAI01 for further detail)
Marton - MAR04			
Exotic pasture grassland and shelterbelts and ornamental trees	Low	Low ecological value.	Highly unlikely to require any mitigation or offsetting. Potential lizard and/or avifauna and/or bat surveys required.
Shelterbelts and ornamental trees	Low (and mapped as low) but potentially high	Such features generally have low ecological value. Likely elevated to moderate ecological value if it provides habitat for bats.	The outcome is dependent on presence, and if present, abundance and habitat use. (See TAI01 for further detail)
Bulls – BUL01			
Perennial, or ephemeral waterway/ modified waterway/drain (and riparian margins) <ul style="list-style-type: none"> 0.18ha 	High	If classified as rivers, subject to regional and national planning documents. Of note, the NPS-FM, which, among other things, requires no loss to river extent or their values. Provide habitat for At Risk and potentially	Development should be designed and located to avoid and enhance waterways. Where avoidance is not possible, further mitigation will be required, which could include offsetting.

Ecological feature	Type of constraint (e.g. high, moderate, low, potentially high)	Reason for constraint (e.g. ecological value, legislation, etc)	Possible outcomes if not constrained (e.g. need to offset – which has land use implications elsewhere)
		Threatened fish and bird species.	(See TAI01 for more detail)
Potential natural inland wetlands – not identified as SNAs – 1 site: <ul style="list-style-type: none"> 0.2ha 	High	Low ecological value if confirmed as exotic plant communities. There is directive policy through the NPS-FM and Horizon’s OnePlan to protect wetlands. If development is proposed within wetlands, there is onerous consenting requirements and high consent risk.	Potential legal proceedings. Development should be designed and located to avoid and enhance wetlands. Where avoidance is not possible, further mitigation will be required, which could include offsetting.
Exotic pasture grassland	Low	Low ecological value.	Highly unlikely to require any mitigation or offsetting.
Bulls – BUL02			
Perennial, or ephemeral waterway/ modified waterway/drain (and riparian margins) 0.18ha	High	If classified as rivers, subject to regional and national planning documents. Of note, the NPS-FM, which, among other things, requires no loss to river extent or their values. Provide habitat for At Risk and potentially Threatened fish and bird species.	Development should be designed and located to avoid and enhance waterways. Where avoidance is not possible, further mitigation will be required, which could include offsetting. (See TAI01 for more detail)
Exotic pasture grassland	Low	Low ecological value.	Highly unlikely to require any mitigation or offsetting.
Shelterbelts and ornamental trees	Low (and mapped as low) but potentially high	Such features generally have low ecological value. Likely elevated to moderate ecological	The outcome is dependent on presence, and if present, abundance and habitat use. (See TAI01 for further detail)

Ecological feature	Type of constraint (e.g. high, moderate, low, potentially high)	Reason for constraint (e.g. ecological value, legislation, etc)	Possible outcomes if not constrained (e.g. need to offset – which has land use implications elsewhere)
		value if it provides habitat for bats.	
Bulls – BUL03			
Perennial, or ephemeral waterway/ modified waterway/drain (and riparian margins) 0.18ha	High	If classified as rivers, subject to regional and national planning documents. Of note, the NPS-FM, which, among other things, requires no loss to river extent or their values. Provide habitat for At Risk and potentially Threatened fish and bird species.	Development should be designed and located to avoid and enhance waterways. Where avoidance is not possible, further mitigation will be required, which could include offsetting. (See TAI01 for more detail)
Potential natural inland wetlands – not identified as SNAs – 1 site: <ul style="list-style-type: none"> 0.2ha 	High	Low ecological value if confirmed as exotic plant communities. There is directive policy through the NPS-FM and Horizon’s OnePlan to protect wetlands. If development is proposed within wetlands, there is onerous consenting requirements and high consent risk.	Potential legal proceedings. Development should be designed and located to avoid and enhance wetlands. Where avoidance is not possible, further mitigation will be required, which could include offsetting.
Exotic pasture grassland	Low	Low ecological value.	Highly unlikely to require any mitigation or offsetting.

6.0 Recommendations

There are no ecological constraints that are of a scale that would prevent a change in zoning for proposed UGAs. However, if the UGAs are developed residentially in the future, some parts may need protection, or offsetting if avoidance is not possible.

Additional ecological work to ground verify the potential ecological constraints identified is not deemed necessary at this stage. However, ground verification would provide RDC with some additional certainty of constraints, particularly with regards to:

- the extent of wetland areas
- designation of waterways

We recommend maintaining features, within UGAs, that provide habitat or act as ecological corridors that may be used by bats, birds or lizards. Examples are:

1. the old stream channel of Mangateweka Stream (MAN02), and other stream corridors
2. large trees and hedgerows

For areas of higher density housing, requiring combined storm water management, low-lying areas can be incorporated into water sensitive stormwater design, using rain gardens and treatment wetlands through the detailed design phase of development. Ecological value can be enhanced by using indigenous plant species.

We note that riparian setbacks are excluded from Rural Lifestyle zones and General Residential zones. Setbacks from waterways prevent degradation of freshwater habitat. We recommend retaining a setback standard similar to GRUZ-S8 to ensure that there is an appropriate setback from the ecological features. Any development within this setback should be subject to a consent process that would allow for a site-specific assessment of the ecological values.

7.0 References

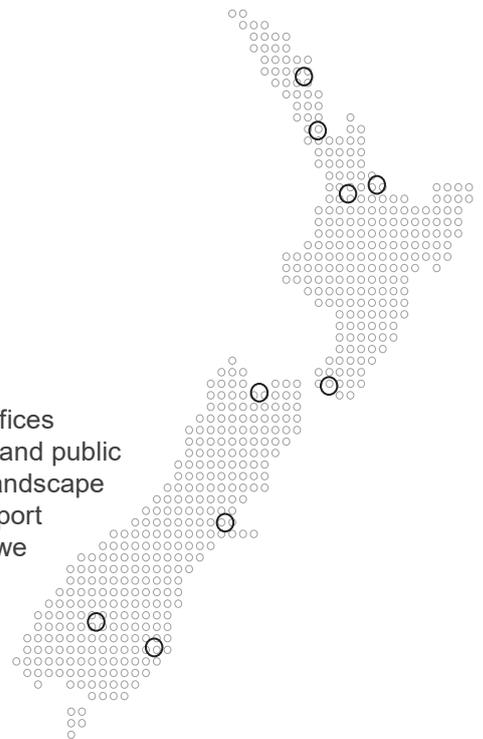
- Crisp, P., O'Donnell, C. F. J., Pryde, M. A., Ryan, J., Spearpoint, O., Hulme-Moir, A., Bell, T., Herbert, S., Spearpoint, O., Nelson, N., & Nelson, N. (2023). *Conservation status of bat species in the Wellington region* (Publication GW/ESCI-G-23/01). Greater Wellington Regional Council.
- Department of Conservation, Wanganui (2000). List of vascular plants for the Manawatu Plains Ecological District, plus significant adventive species in natural areas.
- Dunn, N. R., Allibone, R. M., Closs, G. P., Crow, S. K., David, B. O., Goodman, J. M., Griffiths, M., Jack, D. C., Ling, N., Waters, J. M., & Rolfe, J. R. (2018). *Conservation status of New Zealand freshwater fishes, 2017* (New Zealand Threat Classification Series 24). Department of Conservation. <https://www.doc.govt.nz/Documents/science-and-technical/nztcs24entire.pdf>
- Grainger, N., Collier, K., Hitchmough, R. A., Harding, J. S., Smith, B., & Sutherland, D. (2014). *Conservation status of New Zealand freshwater invertebrates, 2013* (New Zealand Threat Classification Series 8). Department of Conservation.
- Holdaway, R. J., Wiser, S. K., & Williams, P. A. (2012). Status assessment of New Zealand's naturally uncommon ecosystems. *Conservation Biology*, 26(4), 619–629.
- Horizons Regional Council. (2014). *One plan: The consolidated Regional Policy Statement, Regional Plan and Regional Coastal Plan for the Manawatu-Wanganui Region*. Horizons Regional Council.
- Lake, C. M., & Whaley, K. J. (1995). *Rangitikei Ecological Region: Survey report for the Protected Natural Areas Programme* (New Zealand Protected Natural Areas Programme 32). Department of Conservation.
- Landcare Research Ltd. (n.d.). *S-map - New Zealand's national digital soil map*. <https://smap.landcareresearch.co.nz/>
- Landcare Research Ltd. (2012). *Land Environments of New Zealand (LENZ)*. Landcare Research. <http://www.landcareresearch.co.nz/resources/maps-satellites/lenz>

- Leathwick, J., McGlone, M., Walker, S., & Briggs, C. (2004). *Predicted potential natural vegetation of New Zealand*. Manaaki Whenua Press.
- Local Government Geospatial Alliance. (n.d.). *Retrolens historical image resource*.
<https://retrolens.nz/>
- Manaaki Whenua Landcare Research. (2021). *Land atlas of New Zealand*. Our Environment.
https://ourenvironment.scinfo.org.nz/?gclid=CjwKCAjwqvvyFBhB7EiwAER786e7MfLxFIAVdku74dcKcUjefJBcfAtOpRiobEZ0ILjpn5FotNReOixoCpZsQAvD_BwE
- McEwen, W. M. (Ed.). (1987). *Ecological regions and districts of New Zealand* (3rd rev. ed. in four 1:500 000 maps). Department of Conservation.
- Michel, P. (2021). *Amendment to the New Zealand Threat Classification System manual 2008: Revised categories 2021*. Department of Conservation.
- Ministry for the Environment. (n.d.). *New Zealand land cover database*. Retrieved July 29, 2013, from <http://www.mfe.govt.nz/issues/land/land-cover-dbase/>
- Ministry for the Environment. (2022). *National list of exotic pasture species*. Ministry for the Environment. <https://environment.govt.nz/assets/publications/National-list-of-exotic-pasture-species.pdf>
- Ministry for the Environment, & Department of Conservation. (2007). *Protecting our places: Introducing the national priorities for protecting rare and threatened native biodiversity on private land* (ME 799). Ministry for the Environment & Department of Conservation.
- Ogle, C. (2010). Rediscovery of a rare species of grass in the genus *Simplicia* in the North Island. *Wellington Botanical Society Bulletin*, 52, 38–46.
- Rangitīkei District Council. (2013). *Operative district plan: Rangitīkei District Council*. Rangitīkei District Council. <https://www.rangitikei.govt.nz/council/publications/district-plan>
- Robertson, C. J. R., Hyvonen, P., Fraser, M. J., & Pickard, C. J. (2007). *Atlas of bird distribution in New Zealand: 1999-2004*. Ornithological Society of New Zealand.
- Rogers, G. M. (1985). Auputa — a striking bush remnant, Mangaweka. *Wellington Botanical Society Bulletin*, 42, 76–83.

- Stark, J. D., & Maxted, J. R. (2007). *A user guide for the Macroinvertebrate Community Index* (Cawthron Report 1166). Prepared by Cawthron Institute for the Ministry for the Environment.
- Thacker, C. E., Geiger, D. L., & Shelley, J. J. (2023). Two new cryptic species of the freshwater fish genus *Gobiomorphus* (Gobiiformes: Gobioidae: Eleotridae) in New Zealand. *New Zealand Journal of Marine and Freshwater Research*, 57(1), 119–135.
- Walker, S., Cieraad, E., Grove, P., Lloyd, K., Myers, S. C., Park, T., & Porteous, T. (2007). *Guide for users of the threatened environment classification* (Ver 1.1).
- Whitehead, A. L., & Booker, D. J. (2020). *NZ River Maps: An interactive online tool for mapping predicted freshwater variables across New Zealand*. NIWA, Christchurch.
<https://shiny.niwa.co.nz/nzrivermaps/>.
- Williams, P. A., Wisser, S. K., Clarkson, B. R., & Stanley, M. C. (2007). New Zealand's historically rare terrestrial ecosystems set in a physical and physiognomic framework. *New Zealand Journal of Ecology*, 31(2), 119–128.
- Wisser, S. K., Buxton, R. P., Clarkson, B. R., Hoare, R. J. B., Holdaway, R. J., Simpson, S. J., Smale, M. C., West, C., & Williams, P. A. (2013). New Zealand's naturally uncommon ecosystems. In *Ecosystem Services in New Zealand – Conditions and Trends* (pp. 49–61). Manaaki Whenua Press.
- WSP, (2023). Wanganui Road Sub-division Ecological Values Assessment Report. [Project number 5-WT686.00].
- WSP (2022). 56 Whanganui Road Ecology [Project number 5-WT686.00].

Together. Shaping Better Places.

Boffa Miskell is a leading New Zealand environmental consultancy with nine offices throughout Aotearoa. We work with a wide range of local, international private and public sector clients in the areas of planning, urban design, landscape architecture, landscape planning, ecology, biosecurity, Te Hīhiri (cultural advisory), engagement, transport advisory, climate change, graphics, and mapping. Over the past five decades we have built a reputation for creativity, professionalism, innovation, and excellence by understanding each project's interconnections with the wider environmental, social, cultural, and economic context.



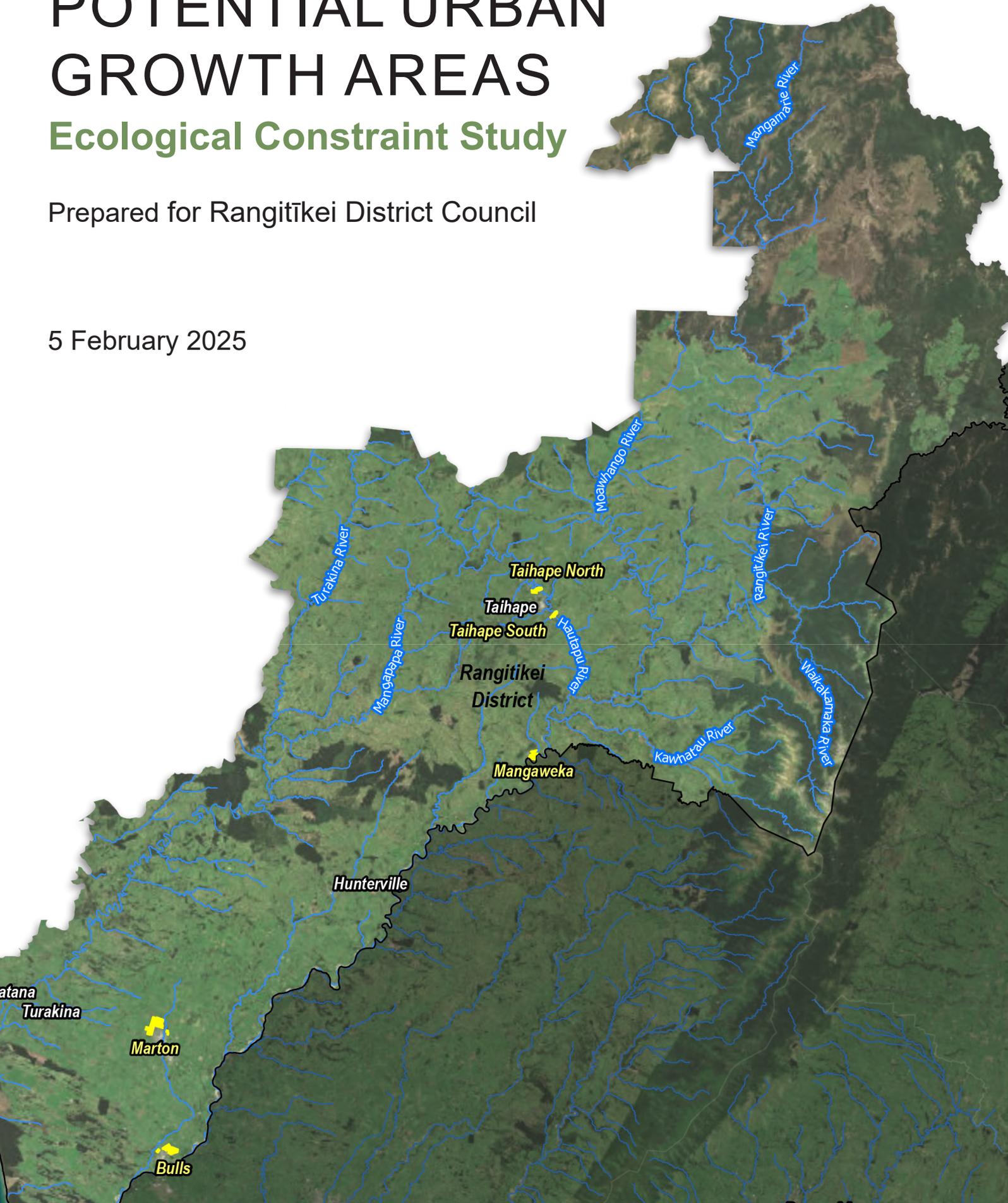
www.boffamiskell.co.nz

Whangarei	Auckland	Hamilton	Tauranga	Wellington	Nelson	Christchurch	Queenstown	Dunedin
09 358 2526	09 358 2526	07 960 0006	07 571 5511	04 385 9315	03 548 8551	03 366 8891	03 441 1670	03 470 0460

APPENDICIES: POTENTIAL URBAN GROWTH AREAS Ecological Constraint Study

Prepared for Rangitīkei District Council

5 February 2025



Appendix 1: Species List	1
Appendix 2: Avifauna records	2
Appendix 3: Maps	4
Constraints	5
Predicted (Historic) Vegetation - Taihape North	11
LENZ Threatened Environment Classification – Taihape North	17
Protected Areas - Taihape North	23
Current Vegetation (LCDB – 2018) - Taihape North	28
Freshwater - Taihape North	34
Lizards	40
Birds	42
Bats	44
Appendix 4: Google Images of Potential Urban Growth Areas	46

Appendix 1: Species List

Table A1.1: General plant species noted within potential urban growth areas

Species	Common Name	Threat Status ¹
Acacia sp.	Acacia	Exotic
Austroderia sp.	toetoe	Not Threatened
Colocasia sp.	elephants' ears	Exotic
Coprosma repens	taupata	Not Threatened
Cordyline australis	Cabbage tree	Not Threatened
Cortaderia selloana	Pampas	Exotic
Cupressus macrocarpa	macrocarpa	Exotic
Eucalyptus globulus	blue gum	Exotic
Juncus sp.	Rush	Not Threatened
Lolium perenne	Rye grass	Exotic
Pinus sp.	pine	Exotic
Phormium tenax	flax	Not Threatened
Pittosprum crassifolium	Karo	Not Threatened
Pittosporum tenuifolium	kohuhu	Not Threatened
Populus nigra	black poplars	Exotic
Pseudopanax lessonii	houpara	Not Threatened
Rhododendron ponticum	Rhododendron	Exotic
Rubus fruticosus	Blackberry	Exotic
Salix Matsudana	corkscrew willow	Exotic
Ulex europaeus	gorse	Exotic

Appendix 2: Avifauna records

Table A2.1: Taihape eBird Avifauna records

SPECIES	CONSERVATION STATUS - Robertson et al. 2021					Native forest	Exotic forest	Scrub / shrubland	Farmland / open country	Freshwater / wetlands	Coastal / Estuary
Kingfisher	<i>Todiramphus sanctus vagans</i>	Native	Not Threatened	Not Threatened							
Tui	<i>Prosthemadera n. novaeseelandiae</i>	Endemic	Not Threatened	Not Threatened ^{inc}							
North Island fantail	<i>Rhipidura fuliginosa placabilis</i>	Native	Not Threatened	Not Threatened ^{EF}							
Bush falcon	<i>Falco novaeseelandiae</i> "bush"	Endemic	Threatened	Nationally Increasing ^{CR inc}							
Kereru	<i>Hemiphaga novaeseelandiae</i>	Endemic	Not Threatened	Not Threatened ^{CD inc}							
Shining cuckoo	<i>Chrysococcyx l. lucidus</i>	Native	Not Threatened	Not Threatened							
Morepork	<i>Ninox n. novaeseelandiae</i>	Native	Not Threatened	Not Threatened							
Grey warbler	<i>Gerygone igata</i>	Endemic	Not Threatened	Not Threatened							
Silvereye	<i>Zosterops lateralis lateralis</i>	Native	Not Threatened	Not Threatened ^{SO}							
Blackbird	<i>Turdus merula</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}							
Eastern rosella	<i>Platycercus eximius</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}							
Magpie	<i>Gymnorhina tibicen</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}							
Wild turkey	<i>Meleagris gallapavo</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}							
Welcome swallow	<i>Hirundo n. neoxena</i>	Native	Not Threatened	Not Threatened ^{SO ST}							
Swamp harrier	<i>Circus approximans</i>	Native	Not Threatened	Not Threatened ^{SO}							
Redpoll	<i>Carduelis flammea</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}							
Yellowhammer	<i>Emberiza citrinella</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}							
Starling	<i>Sturnus vulgaris</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}							
House sparrow	<i>Passer domesticus</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}							
Goldfinch	<i>Carduelis carduelis</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}							
Greenfinch	<i>Carduelis chloris</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}							
Song thrush	<i>Turdus philamelos</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}							
Dunnock	<i>Prunella modularis</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}							
Chaffinch	<i>Fringilla coelebs</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}							
Spur-winged plover	<i>Vanellus miles novaehollandiae</i>	Native	Not Threatened	Not Threatened ^{SO}							
Skylark	<i>Alauda arvensis</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}							
Canada goose	<i>Branta canadensis</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}							
Paradise shelduck	<i>Tadorna variegata</i>	Endemic	Not Threatened	Not Threatened							
Mallard	<i>Anas platyrhynchos</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}							
Black swan	<i>Cygnus atratus</i>	Native	Not Threatened	Not Threatened ^{SO}							
NZ scaup	<i>Aythya novaeseelandiae</i>	Endemic	Not Threatened	Not Threatened ^{inc}							
Pukeko	<i>Porphyrio m. melanotus</i>	Native	Not Threatened	Not Threatened ^{inc SO}							
Spotless crane	<i>Porzana t. tabuensis</i>	Native	At Risk	Declining ^{DPS DPT PF SO}							
NZ dabchick	<i>Poliiocephalus rufopectus</i>	Endemic	Threatened	Nationally Increasing ^{inc}							
Little black shag	<i>Phalacrocorax sulcirostris</i>	Native	At Risk	Naturally Uncommon ^{RS SO}							
Black-backed gull	<i>Larus d. dominicanus</i>	Native	Not Threatened	Not Threatened ^{SO}							
White-faced heron	<i>Egretta novaehollandiae</i>	Native	Not Threatened	Not Threatened ^{SO}							
Rock pigeon	<i>Columba livia</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}							
Myna	<i>Acridotheres tristis</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}							

Table A2.2: Mangaweka eBird Avifauna records

SPECIES		CONSERVATION STATUS - Robertson et al. 2021				Habitat						
						Native forest	Exotic forest	Scrub / shrubland	Farmland / open country	Freshwater / wetlands	Coastal / Estuary	Urban/Residential
Kingfisher	<i>Todiramphus sanctus vagans</i>	Native	Not Threatened	Not Threatened								
Bush falcon	<i>Falco novaeseelandiae</i> "bush"	Endemic	Threatened	Nationally Increasing ^{CR Inc}								
Shining cuckoo	<i>Chrysococcyx l. lucidus</i>	Native	Not Threatened	Not Threatened								
Tui	<i>Prosthemadera n. novaeseelandiae</i>	Endemic	Not Threatened	Not Threatened ^{Inc}								
Bellbird	<i>Anthornis m. melanura</i>	Endemic	Not Threatened	Not Threatened								
North Island fantail	<i>Rhipidura fuliginosa placabilis</i>	Native	Not Threatened	Not Threatened ^{EF}								
Morepork	<i>Ninox n. novaeseelandiae</i>	Native	Not Threatened	Not Threatened								
Kereru	<i>Hemiphaga novaeseelandiae</i>	Endemic	Not Threatened	Not Threatened ^{CD Inc}								
North Island robin	<i>Petroica longipes</i>	Endemic	At Risk	Declining ^{CD CI PD}								
Silvereye	<i>Zosterops lateralis lateralis</i>	Native	Not Threatened	Not Threatened ^{SO}								
Blackbird	<i>Turdus merula</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}								
Grey warbler	<i>Gerygone igata</i>	Endemic	Not Threatened	Not Threatened								
Eastern rosella	<i>Platycercus eximius</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}								
Pheasant	<i>Phasianus colchicus</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}								
Swamp harrier	<i>Circus approximans</i>	Native	Not Threatened	Not Threatened ^{SO}								
Spur-winged plover	<i>Vanellus miles novaehollandiae</i>	Native	Not Threatened	Not Threatened ^{SO}								
Starling	<i>Sturnus vulgaris</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}								
Welcome swallow	<i>Hirundo n. neoxena</i>	Native	Not Threatened	Not Threatened ^{SO ST}								
Magpie	<i>Gymnorhina tibicen</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}								
Song thrush	<i>Turdus philomelos</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}								
Duncock	<i>Prunella modularis</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}								
Chaffinch	<i>Fringilla coelebs</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}								
Greenfinch	<i>Carduelis chloris</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}								
Goldfinch	<i>Carduelis carduelis</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}								
Yellowhammer	<i>Emberiza citrinella</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}								
Peafowl	<i>Pavo cristatus</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}								
Redpoll	<i>Carduelis flammea</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}								
Wild turkey	<i>Meleagris gallopavo</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}								
Skylark	<i>Alauda arvensis</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}								
House sparrow	<i>Passer domesticus</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}								
Canada goose	<i>Branta canadensis</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}								
Paradise shelduck	<i>Tadorna variegata</i>	Endemic	Not Threatened	Not Threatened								
Mallard	<i>Anas platyrhynchos</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}								
Pukeko	<i>Porphyrio m. melanotus</i>	Native	Not Threatened	Not Threatened ^{Inc SO}								
Grey teal	<i>Anas gracilis</i>	Native	Not Threatened	Not Threatened ^{Inc SO}								
Feral goose	<i>Anser anser</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}								
Black shag	<i>Phalacrocorax carbo novaehollandiae</i>	Native	At Risk	Relict ^{CR DPS DPT SO Sp}								
Black-backed gull	<i>Larus d. dominicanus</i>	Native	Not Threatened	Not Threatened ^{SO}								
White-faced heron	<i>Egretta novaehollandiae</i>	Native	Not Threatened	Not Threatened ^{SO}								
Rock pigeon	<i>Columba livia</i>	Introduced	Introduced	Introduced & Naturalised ^{SO}								

Table A2.3: Marton eBird Avifauna records

SPECIES	CONSERVATION STATUS - Robertson et al. 2021					Native forest	Exotic Forest	Scrub / shrubland	Farmland / open country	Freshwater / wetlands	Coastal / Estuary
Kingfisher	<i>Todiramphus sanctus vagans</i>	Native	Not Threatened	Not Threatened							
North Island fantail	<i>Rhipidura fuliginosa placabilis</i>	Native	Not Threatened	Not Threatened ^{5F}							
Tui	<i>Prosthemadera n. novaeseelandiae</i>	Endemic	Not Threatened	Not Threatened ^{inc}							
Kereru	<i>Hemiphaga novaeseelandiae</i>	Endemic	Not Threatened	Not Threatened ^{CD,inc}							
Bellbird	<i>Anthornis m. melanura</i>	Endemic	Not Threatened	Not Threatened							
Pheasant	<i>Phasianus colchicus</i>	Introduced	Introduced	Introduced & Naturalised ⁵⁰							
Grey warbler	<i>Gerygone igata</i>	Endemic	Not Threatened	Not Threatened							
Silvereye	<i>Zosterops lateralis lateralis</i>	Native	Not Threatened	Not Threatened ⁵⁰							
Blackbird	<i>Turdus merula</i>	Introduced	Introduced	Introduced & Naturalised ⁵⁰							
Eastern rosella	<i>Platycercus eximius</i>	Introduced	Introduced	Introduced & Naturalised ⁵⁰							
Swamp harrier	<i>Circus approximans</i>	Native	Not Threatened	Not Threatened ⁵⁰							
Welcome swallow	<i>Hirundo n. neoxena</i>	Native	Not Threatened	Not Threatened ^{50, 5T}							
House sparrow	<i>Passer domesticus</i>	Introduced	Introduced	Introduced & Naturalised ⁵⁰							
Maggie	<i>Gymnorhina tibicen</i>	Introduced	Introduced	Introduced & Naturalised ⁵⁰							
Starling	<i>Sturnus vulgaris</i>	Introduced	Introduced	Introduced & Naturalised ⁵⁰							
Song thrush	<i>Turdus philomelos</i>	Introduced	Introduced	Introduced & Naturalised ⁵⁰							
Goldfinch	<i>Carduelis carduelis</i>	Introduced	Introduced	Introduced & Naturalised ⁵⁰							
Spur-winged plover	<i>Vanellus miles novaehollandiae</i>	Native	Not Threatened	Not Threatened ⁵⁰							
Greenfinch	<i>Carduelis chloris</i>	Introduced	Introduced	Introduced & Naturalised ⁵⁰							
Skylark	<i>Alauda arvensis</i>	Introduced	Introduced	Introduced & Naturalised ⁵⁰							
Chaffinch	<i>Fringilla coelebs</i>	Introduced	Introduced	Introduced & Naturalised ⁵⁰							
Dunnock	<i>Prunella modularis</i>	Introduced	Introduced	Introduced & Naturalised ⁵⁰							
Yellowhammer	<i>Emberiza citrinella</i>	Introduced	Introduced	Introduced & Naturalised ⁵⁰							
Paradise shelduck	<i>Tadorna variegata</i>	Endemic	Not Threatened	Not Threatened							
Mallard	<i>Anas platyrhynchos</i>	Introduced	Introduced	Introduced & Naturalised ⁵⁰							
Grey teal	<i>Anas gracilis</i>	Native	Not Threatened	Not Threatened ^{inc, 50}							
NZ scaup	<i>Aythya novaeseelandiae</i>	Endemic	Not Threatened	Not Threatened ^{inc}							
Black swan	<i>Cygnus atratus</i>	Native	Not Threatened	Not Threatened ⁵⁰							
Australian coot	<i>Fulica atra australis</i>	Coloniser	At Risk	Naturally Uncommon ^{inc, 50}							
Muscovy duck	<i>Cairina moschata</i>		Introduced	Introduced, not established							
Pukeko	<i>Porphyrio m. melanotus</i>	Native	Not Threatened	Not Threatened ^{inc, 50}							
Australasian shoveler	<i>Anas rhynchos</i>	Native	Not Threatened	Not Threatened ⁵⁰							
Black shag	<i>Phalacrocorax carbo novaehollandiae</i>	Native	At Risk	Relict ^{CR, DPS, DPT, 50, 5P}							
White-faced heron	<i>Egretta novaehollandiae</i>	Native	Not Threatened	Not Threatened ⁵⁰							
Black-backed gull	<i>Larus d. dominicanus</i>	Native	Not Threatened	Not Threatened ⁵⁰							
Royal spoonbill	<i>Platalea regia</i>	Native	At Risk	Naturally Uncommon ^{50, 5p}							
Rock pigeon	<i>Columba livia</i>	Introduced	Introduced	Introduced & Naturalised ⁵⁰							

Table A2.3: Bulls eBird Avifauna records

SPECIES		CONSERVATION STATUS - Robertson et al. 2021				Native forest	Exotic forest	Scrub / shrubland	Farmland / open country	Freshwater / wetlands	Coastal / Estuary	Urban/Residential
Kingfisher	<i>Todiramphus sanctus vagans</i>	Native	Not Threatened	Not Threatened								
North Island fantail	<i>Rhipidura fuliginosa placabilis</i>	Native	Not Threatened	Not Threatened ^{EF}								
Tui	<i>Prothemadera n. novaeseelandiae</i>	Endemic	Not Threatened	Not Threatened ^{inc}								
Bellbird	<i>Anthornis m. melanura</i>	Endemic	Not Threatened	Not Threatened								
Shining cuckoo	<i>Chrysococcyx l. lucidus</i>	Native	Not Threatened	Not Threatened								
Kereru	<i>Hemiphaga novaeseelandiae</i>	Endemic	Not Threatened	Not Threatened ^{CD inc}								
Morepark	<i>Ninox n. novaeseelandiae</i>	Native	Not Threatened	Not Threatened								
Silvereye	<i>Zosterops lateralis lateralis</i>	Native	Not Threatened	Not Threatened ^{SD}								
Grey warbler	<i>Gerygone igata</i>	Endemic	Not Threatened	Not Threatened								
Blackbird	<i>Turdus merula</i>	Introduced	Introduced	Introduced & Naturalised ^{SD}								
California quail	<i>Callipepla californica</i>	Introduced	Introduced	Introduced & Naturalised ^{SD}								
Pheasant	<i>Phasianus colchicus</i>	Introduced	Introduced	Introduced & Naturalised ^{SD}								
Eastern rosella	<i>Platyercus eximius</i>	Introduced	Introduced	Introduced & Naturalised ^{SD}								
Spur-winged plover	<i>Vanellus miles novaehollandiae</i>	Native	Not Threatened	Not Threatened ^{SD}								
Swamp harrier	<i>Circus approximans</i>	Native	Not Threatened	Not Threatened ^{SD}								
Yellowhammer	<i>Emberiza citrinella</i>	Introduced	Introduced	Introduced & Naturalised ^{SD}								
Greenfinch	<i>Carduelis chloris</i>	Introduced	Introduced	Introduced & Naturalised ^{SD}								
Canada goose	<i>Branta canadensis</i>	Introduced	Introduced	Introduced & Naturalised ^{SD}								
Chaffinch	<i>Fringilla coelebs</i>	Introduced	Introduced	Introduced & Naturalised ^{SD}								
Goldfinch	<i>Carduelis carduelis</i>	Introduced	Introduced	Introduced & Naturalised ^{SD}								
Dunnock	<i>Prunella modularis</i>	Introduced	Introduced	Introduced & Naturalised ^{SD}								
Song thrush	<i>Turdus philomelos</i>	Introduced	Introduced	Introduced & Naturalised ^{SD}								
Welcome swallow	<i>Hirundo n. neoxena</i>	Native	Not Threatened	Not Threatened ^{SD ST}								
Starling	<i>Sturnus vulgaris</i>	Introduced	Introduced	Introduced & Naturalised ^{SD}								
Magpie	<i>Gymnorhina tibicen</i>	Introduced	Introduced	Introduced & Naturalised ^{SD}								
House sparrow	<i>Passer domesticus</i>	Introduced	Introduced	Introduced & Naturalised ^{SD}								
Skylark	<i>Alauda arvensis</i>	Introduced	Introduced	Introduced & Naturalised ^{SD}								
Mallard	<i>Anas platyrhynchos</i>	Introduced	Introduced	Introduced & Naturalised ^{SD}								
Pied stilt	<i>Himantopus h. leucocephalus</i>	Native	Not Threatened	Not Threatened ^{SD}								
Feral goose	<i>Anser anser</i>	Introduced	Introduced	Introduced & Naturalised ^{SD}								
Australasian shoveler	<i>Anas rhynchotis</i>	Native	Not Threatened	Not Threatened ^{SD}								
Grey teal	<i>Anas gracilis</i>	Native	Not Threatened	Not Threatened ^{inc SD}								
NZ scaup	<i>Aythya novaeseelandiae</i>	Endemic	Not Threatened	Not Threatened ^{inc}								
NZ dabchick	<i>Pollocephalus rufopectus</i>	Endemic	Threatened	Nationally Increasing ^{inc}								
Australian coot	<i>Fulica atra australis</i>	Coloniser	At Risk	Naturally Uncommon ^{inc SD}								
Little shag	<i>Phalacrocorax melanoleucus brevirostris</i>	Native	At Risk	Relict ^{CR DPT}								
Pukeko	<i>Porphyrio m. melanotus</i>	Native	Not Threatened	Not Threatened ^{inc SD}								
Paradise shelduck	<i>Tadorna variegata</i>	Endemic	Not Threatened	Not Threatened								
Black shag	<i>Phalacrocorax carbo novaehollandiae</i>	Native	At Risk	Relict ^{CR DPS DPT SD Sp}								
Little black shag	<i>Phalacrocorax sulcirostris</i>	Native	At Risk	Naturally Uncommon ^{inc SD}								
Australasian bittern	<i>Botaurus poiciloptilus</i>	Native	Threatened	Nationally Critical ^{inc SD}								
Black-fronted dotterel	<i>Elsyornis melanops</i>	Coloniser	At Risk	Naturally Uncommon ^{SD Sp}								
Black swan	<i>Cygnus atratus</i>	Native	Not Threatened	Not Threatened ^{SD}								
Muscovy duck	<i>Cairina moschata</i>	Introduced	Introduced	Introduced, not established								
Caspian tern	<i>Hydroprogne caspia</i>	Native	Threatened	Nationally Vulnerable ^{inc SD}								
Royal spoonbill	<i>Platalea regia</i>	Native	At Risk	Naturally Uncommon ^{inc SD Sp}								
Black-backed gull	<i>Larus d. dominicanus</i>	Native	Not Threatened	Not Threatened ^{SD}								
White-faced heron	<i>Egretta novaehollandiae</i>	Native	Not Threatened	Not Threatened ^{SD}								
Banded dotterel	<i>Charadrius bicinctus bicinctus</i>	Endemic	At Risk	Declining ^{CD CR DPS PD}								
Rock pigeon	<i>Columba livia</i>	Introduced	Introduced	Introduced & Naturalised ^{SD}								

Appendix 3: Maps

Constraints



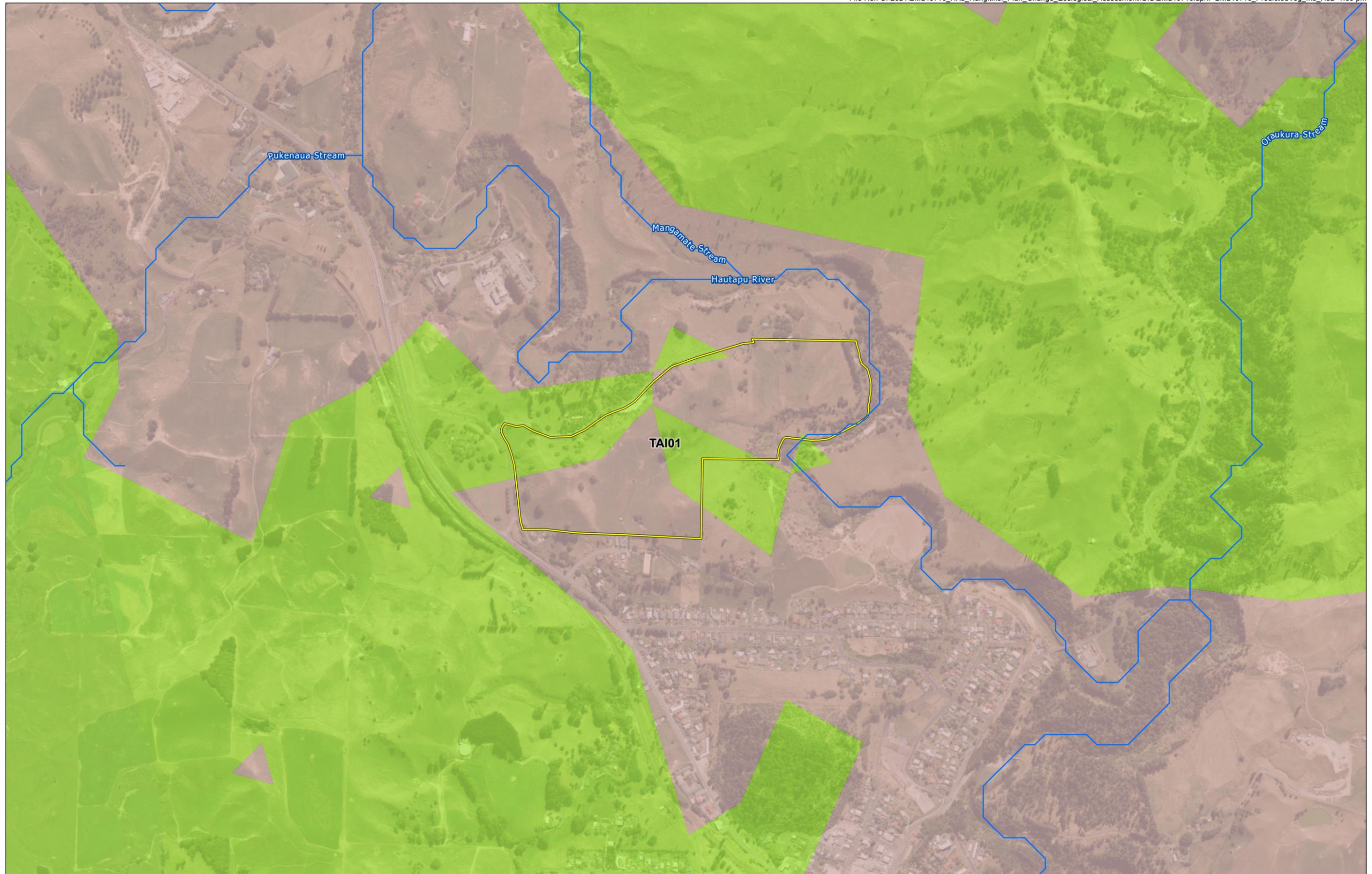


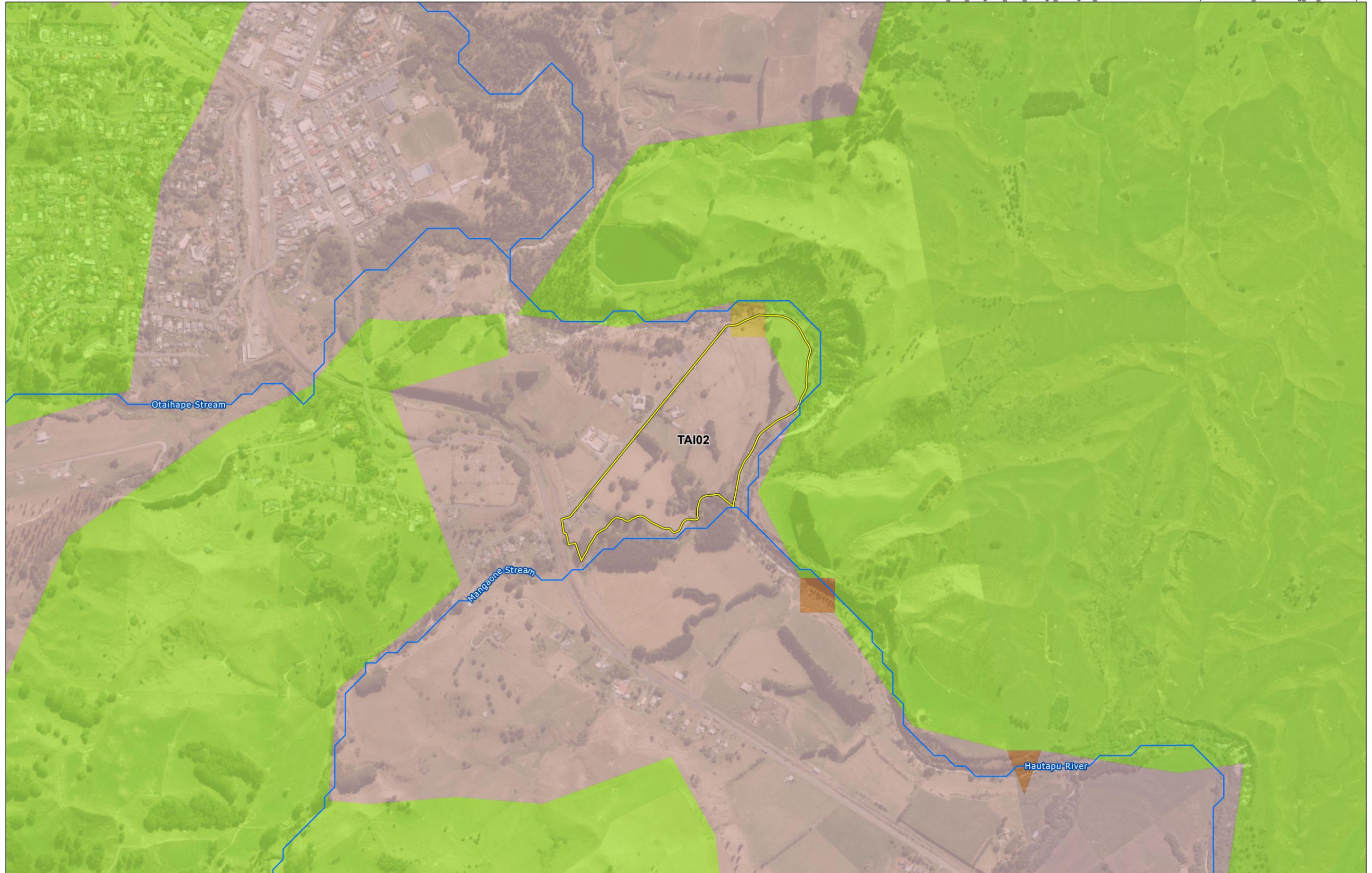




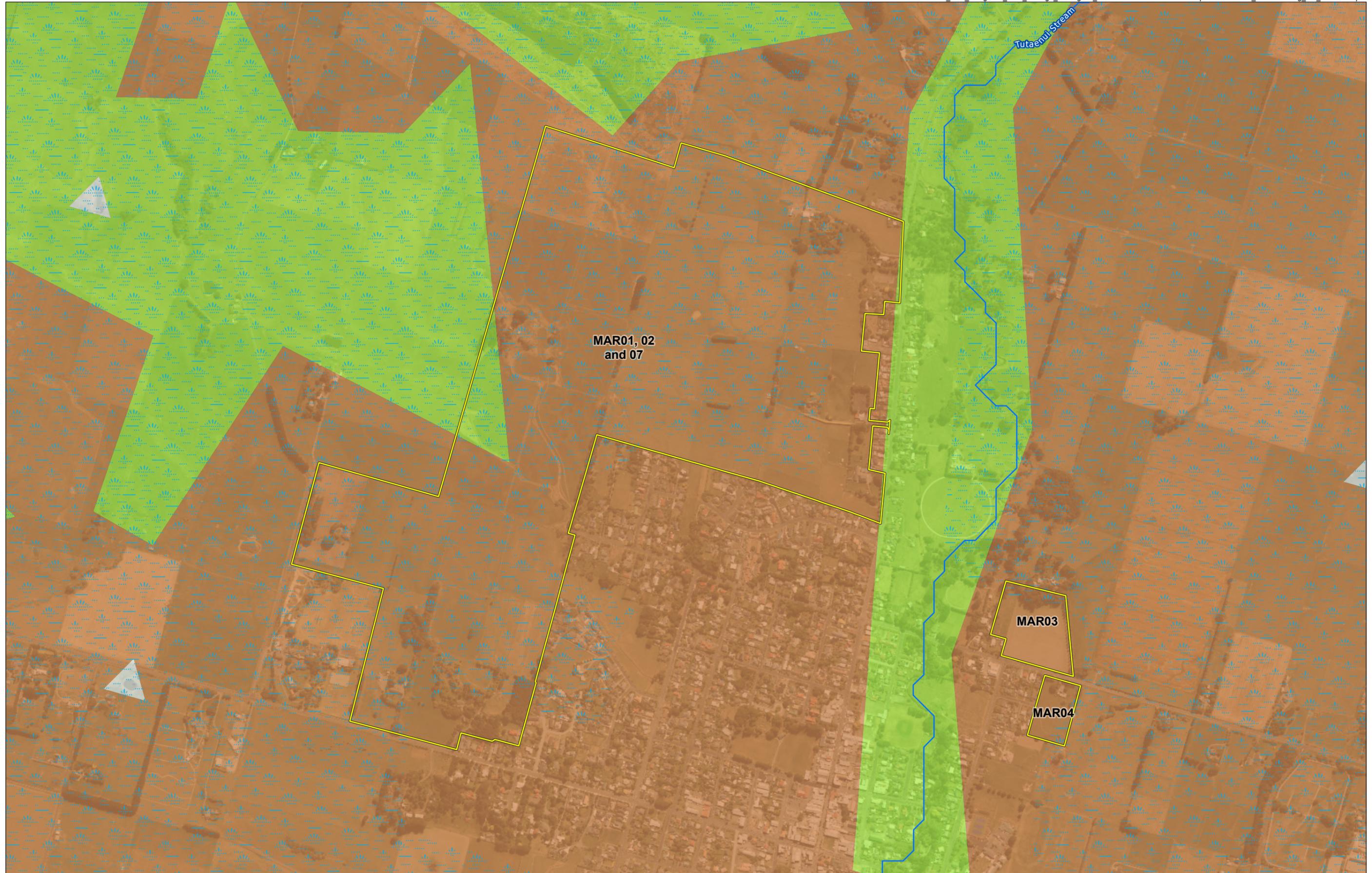


Predicted (Historic) Vegetation - Taihape North



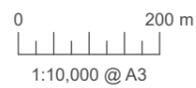
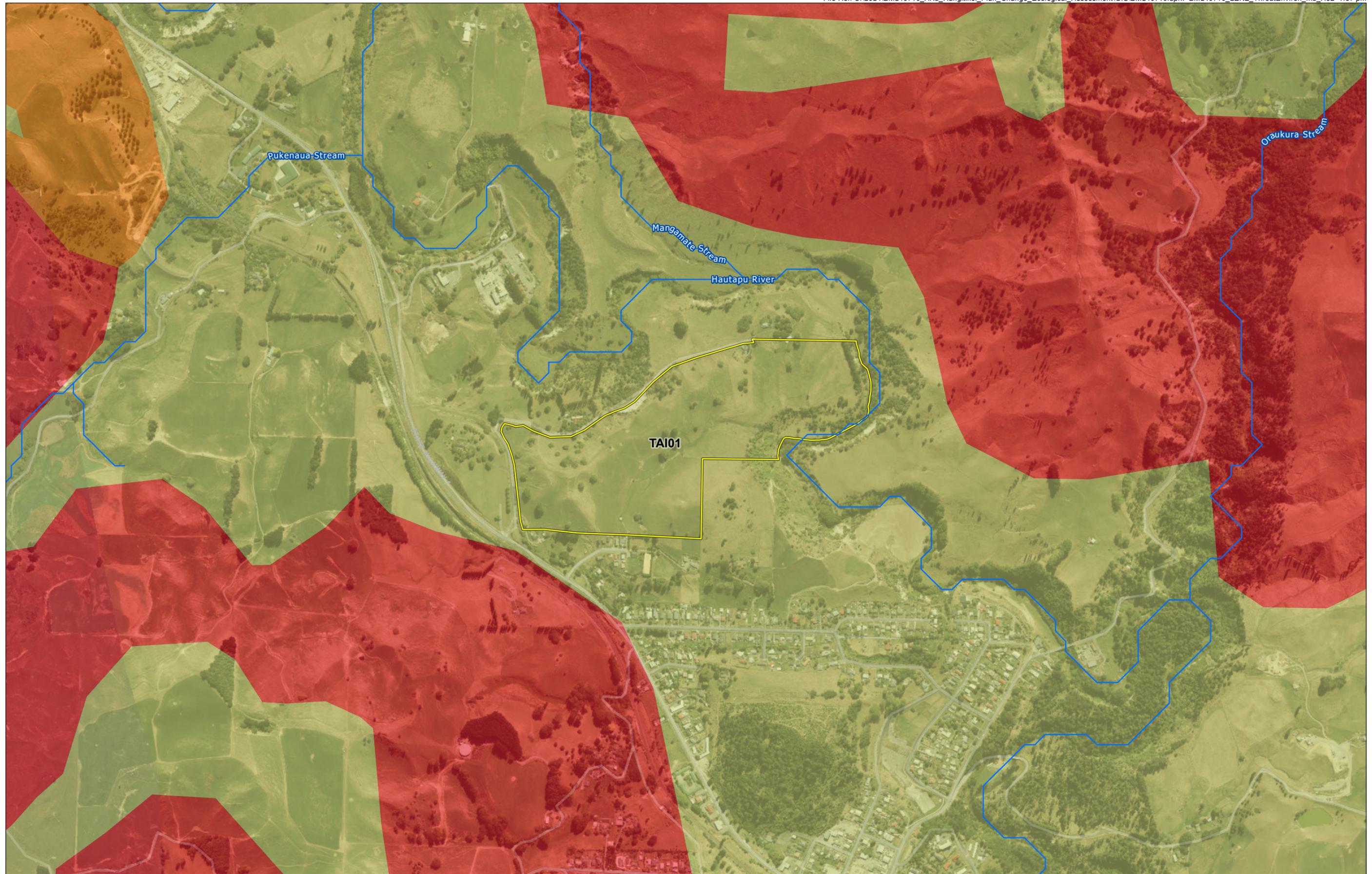








LENZ Threatened Environment Classification – Taihape North

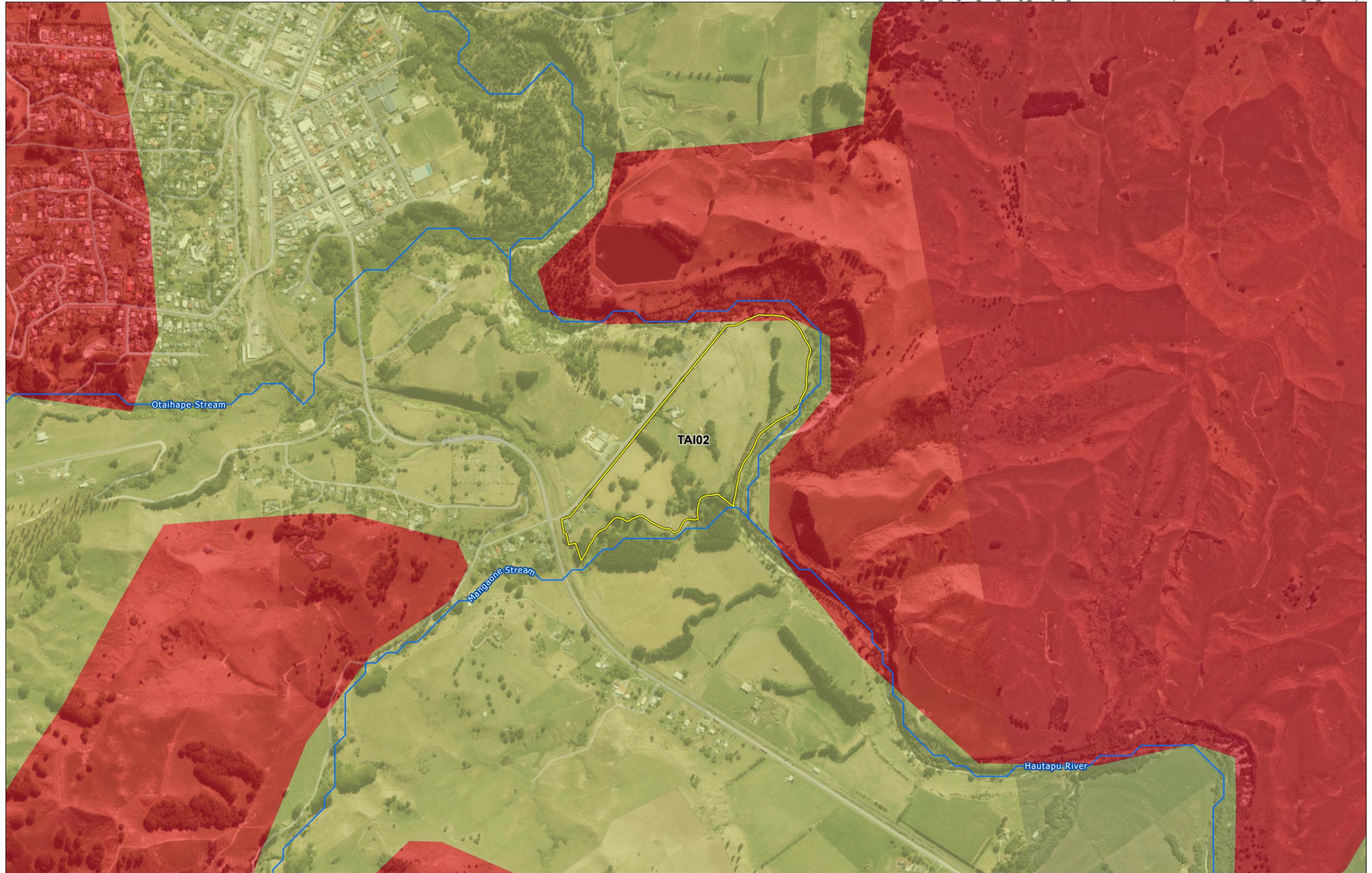


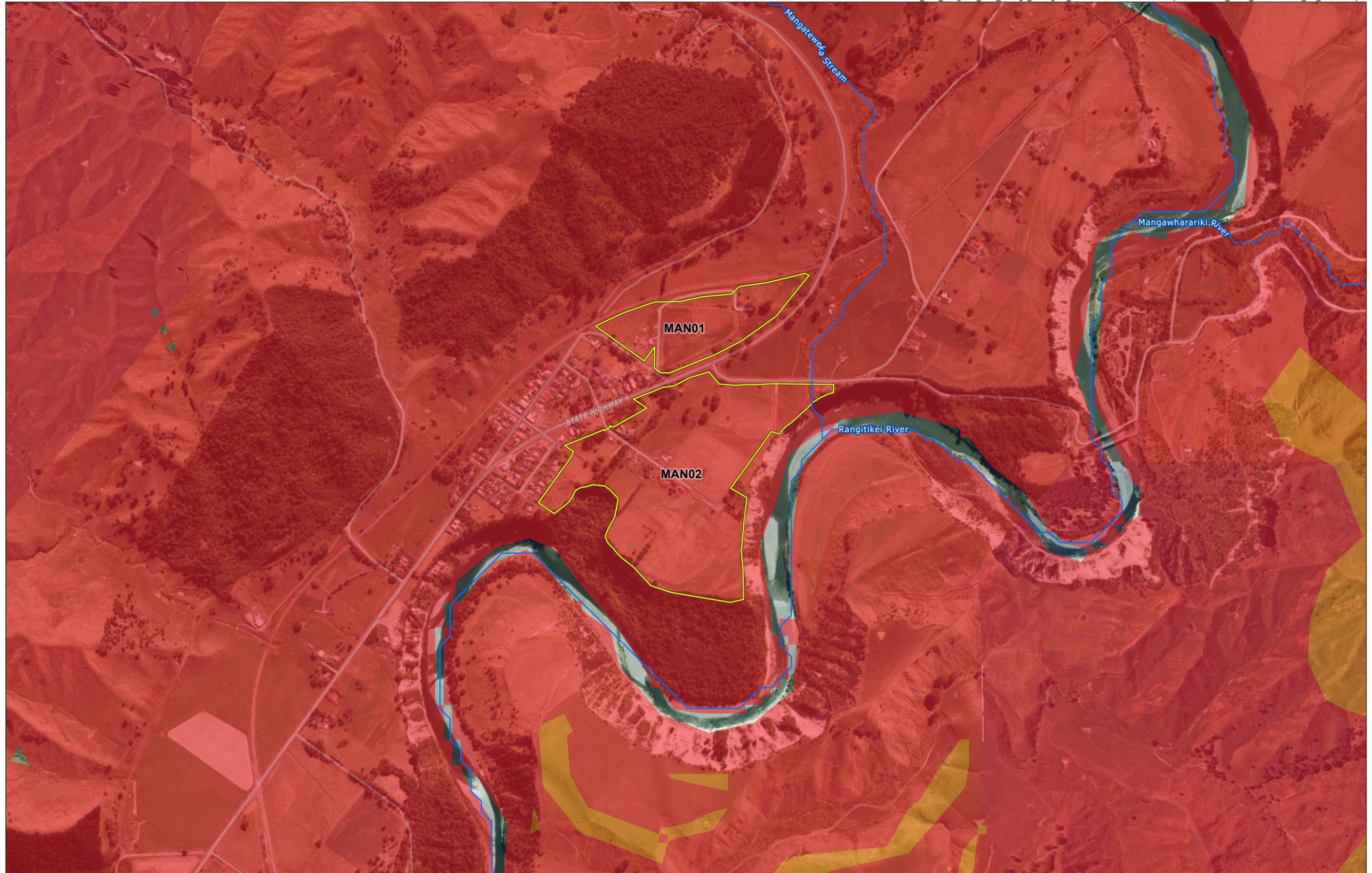
- LEGEND**
-  Urban Growth Areas
 - Threatened Environment Classification**
 -  < 10% indigenous cover left
 -  10-20% indigenous cover left
 -  20-30% indigenous cover left

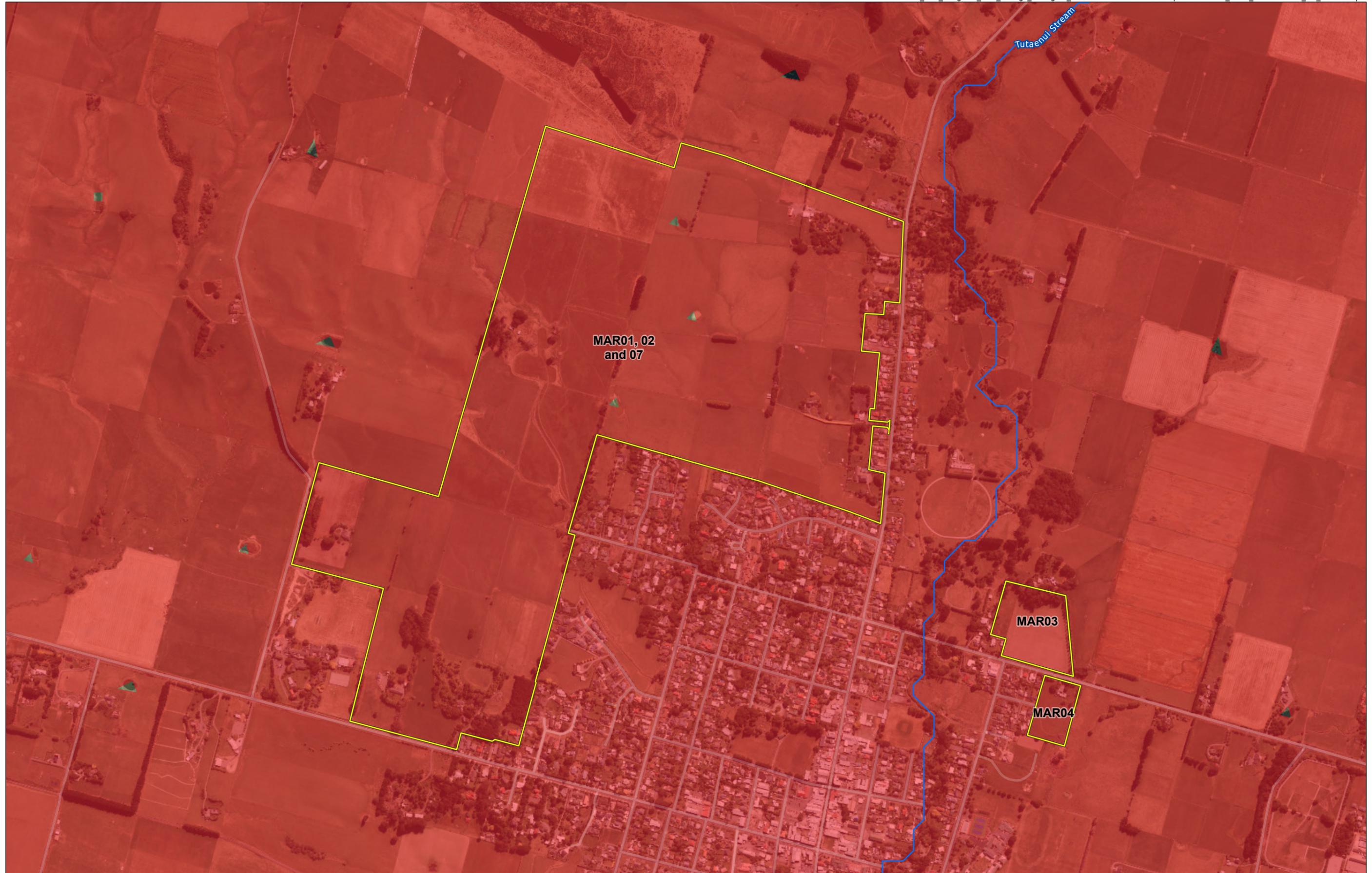
RANGITIKEI URBAN GROWTH ECOLOGICAL ASSESSMENT
 Threatened Environment Classification – Taihape North

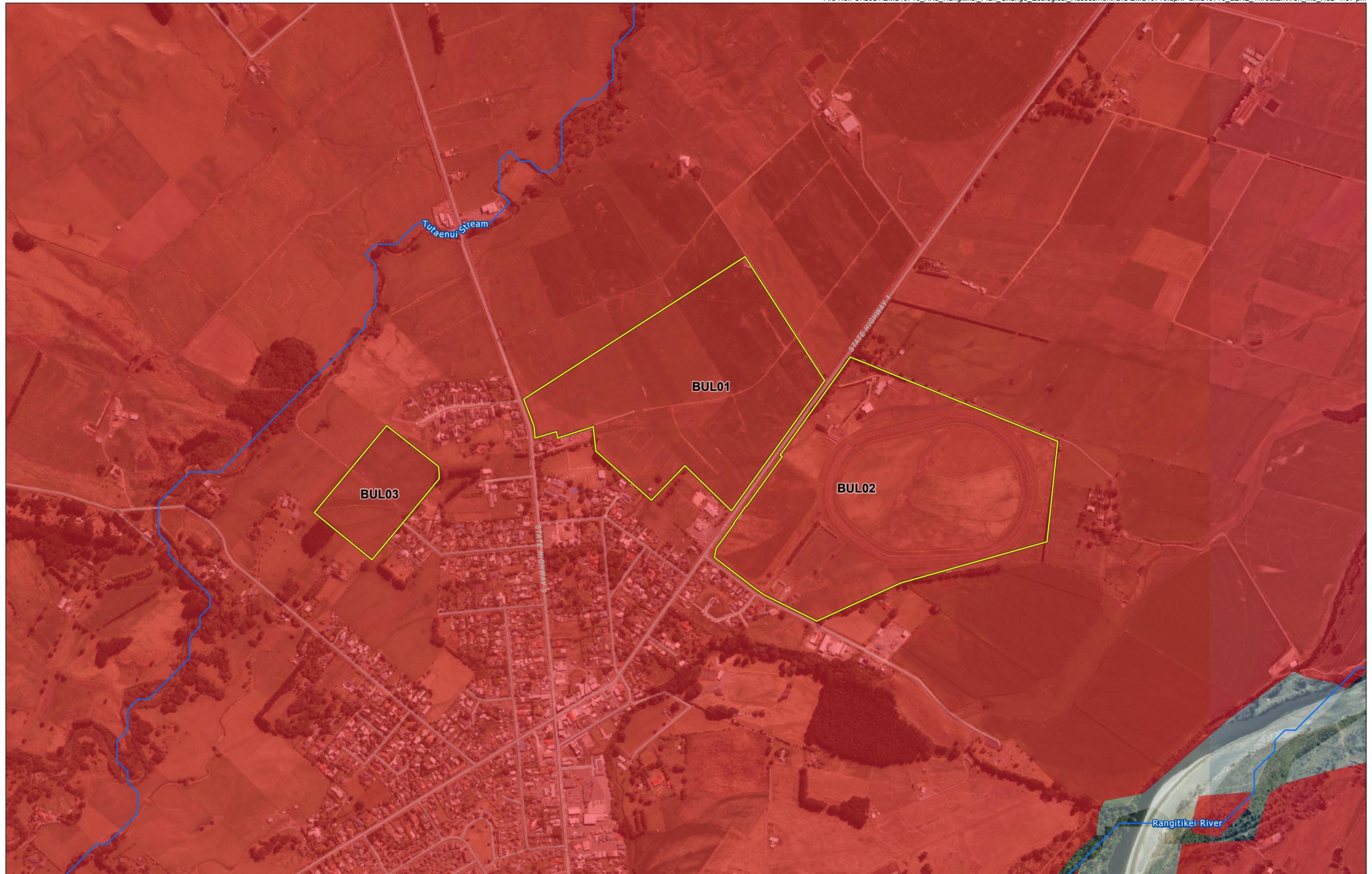
Date: 04 February 2025 | Revision: 0

Plan prepared for Rangitikei District Council by Boffa Miskell Limited
 Project Manager: Antony.Kusabs@boffamiskell.co.nz | Drawn: HCo | Checked: AKU





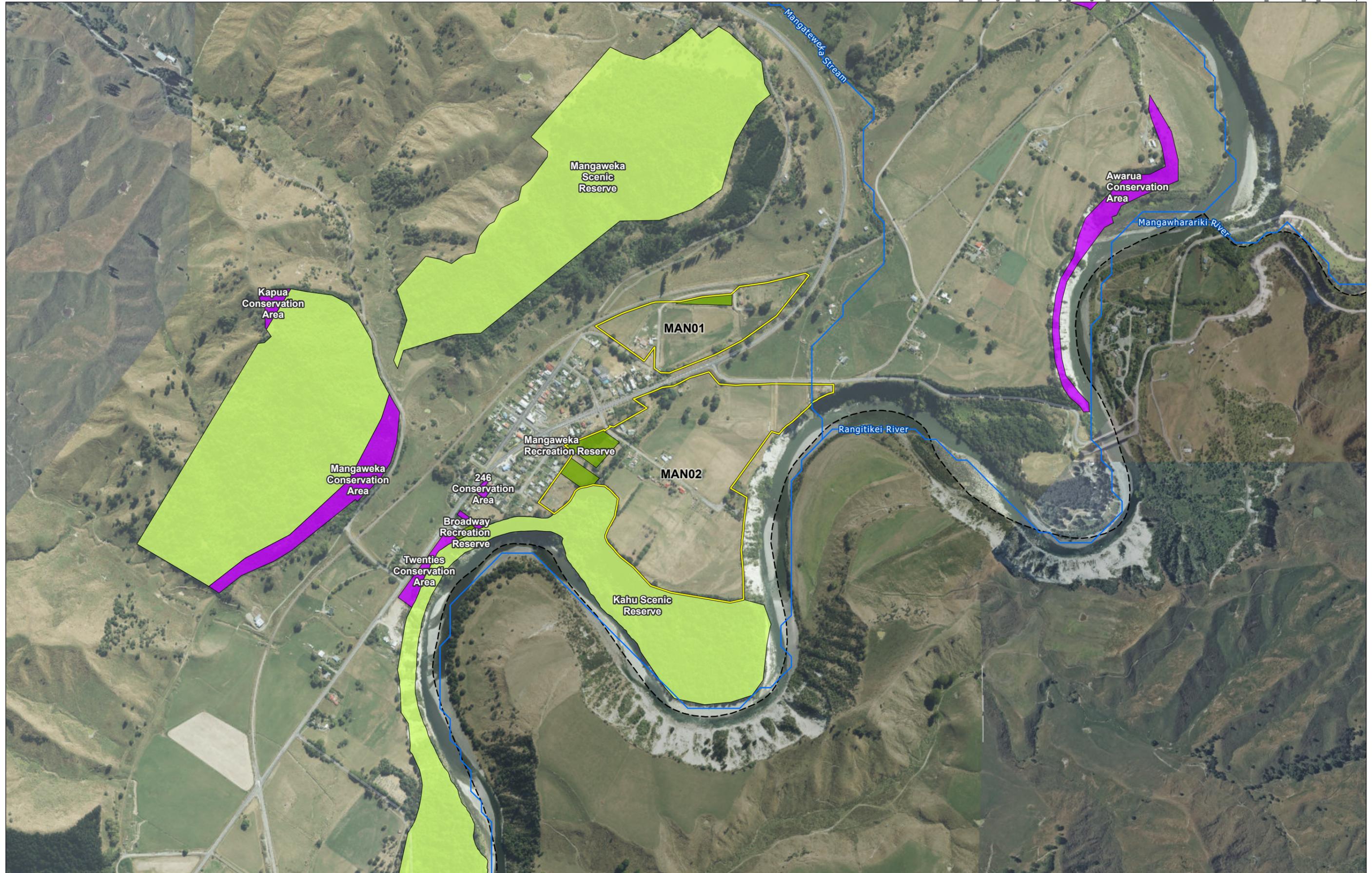




Protected Areas - Taihape North

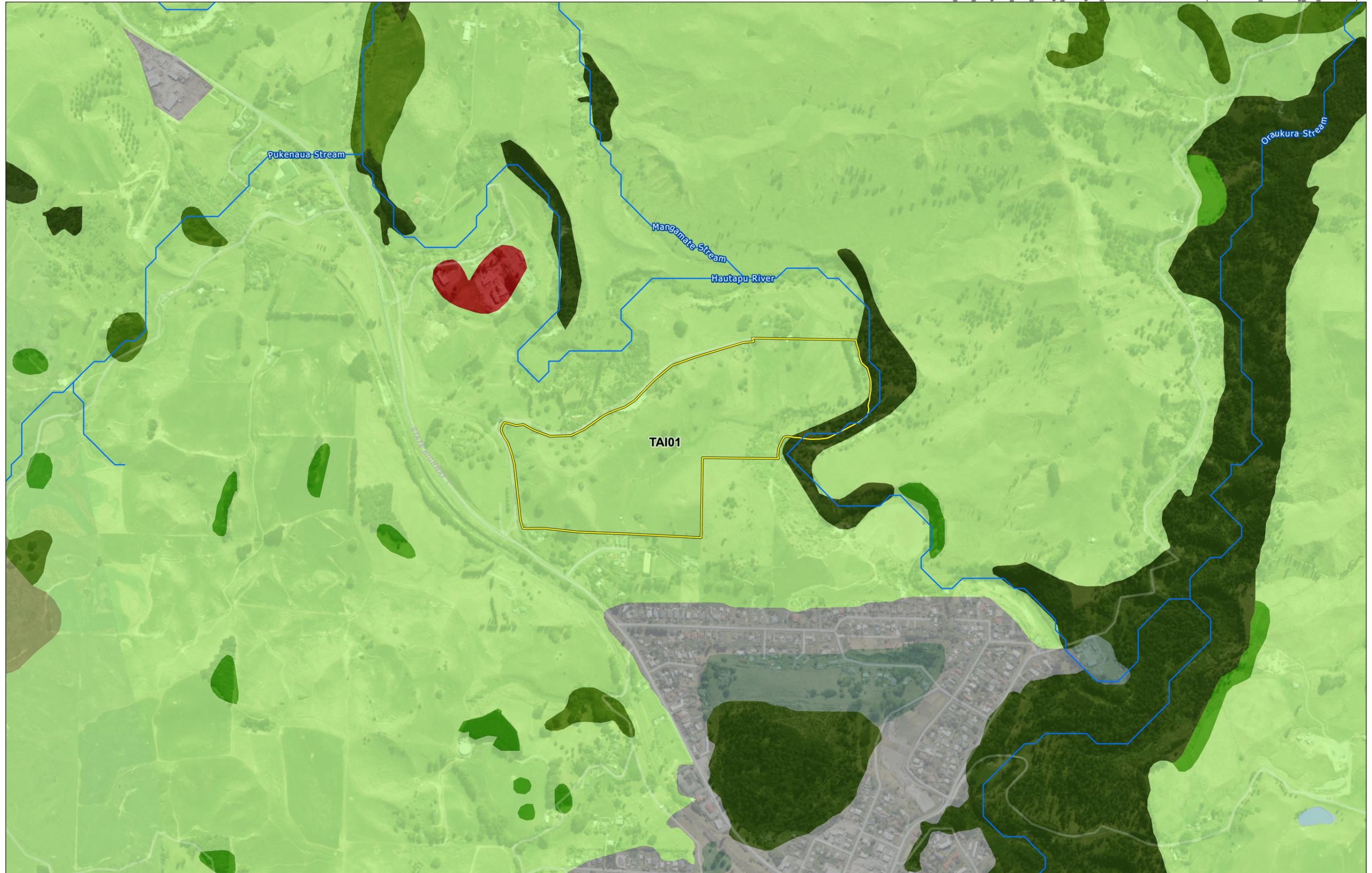






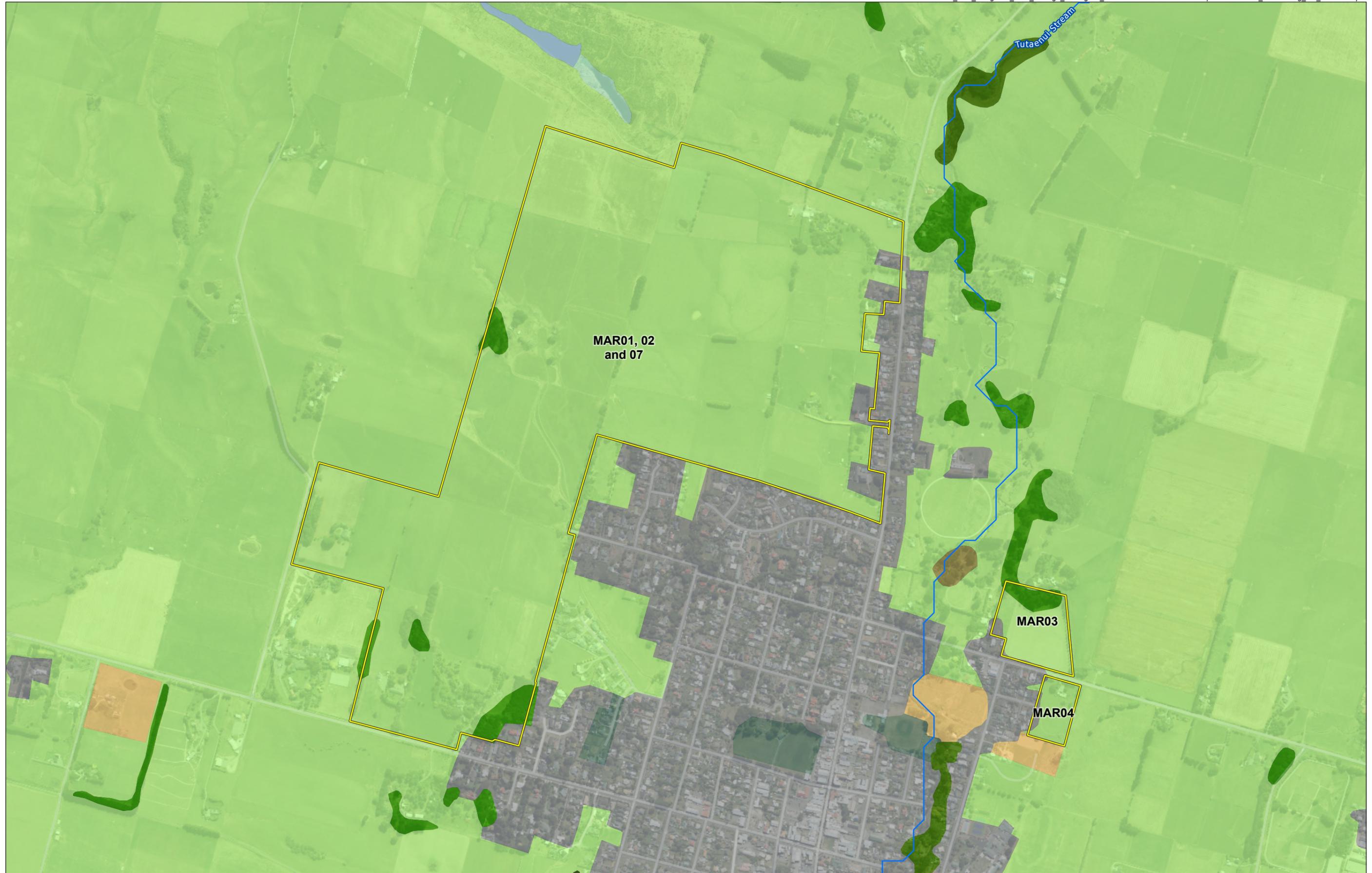


Current Vegetation (LCDB – 2018) - Taihape North





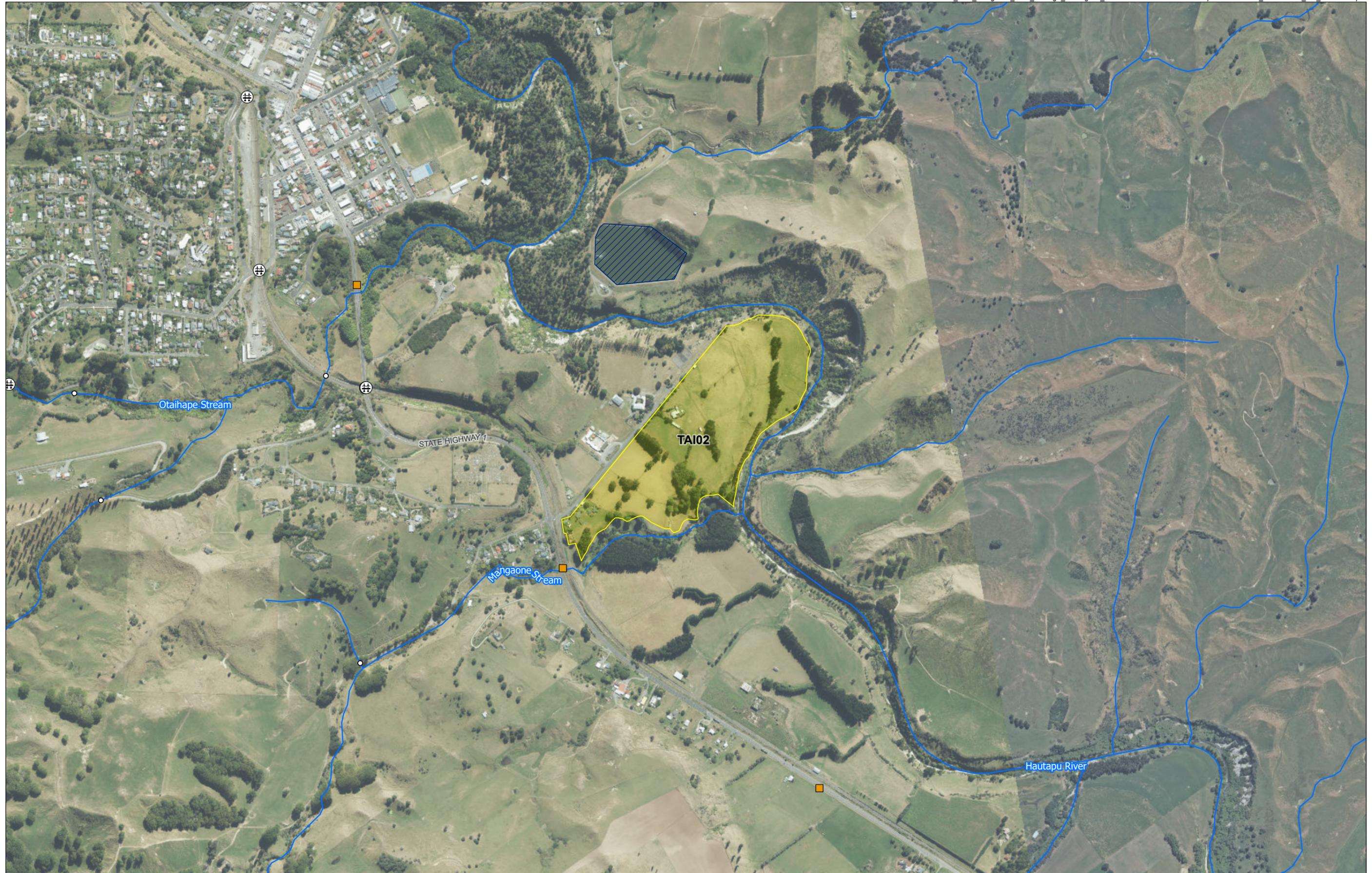






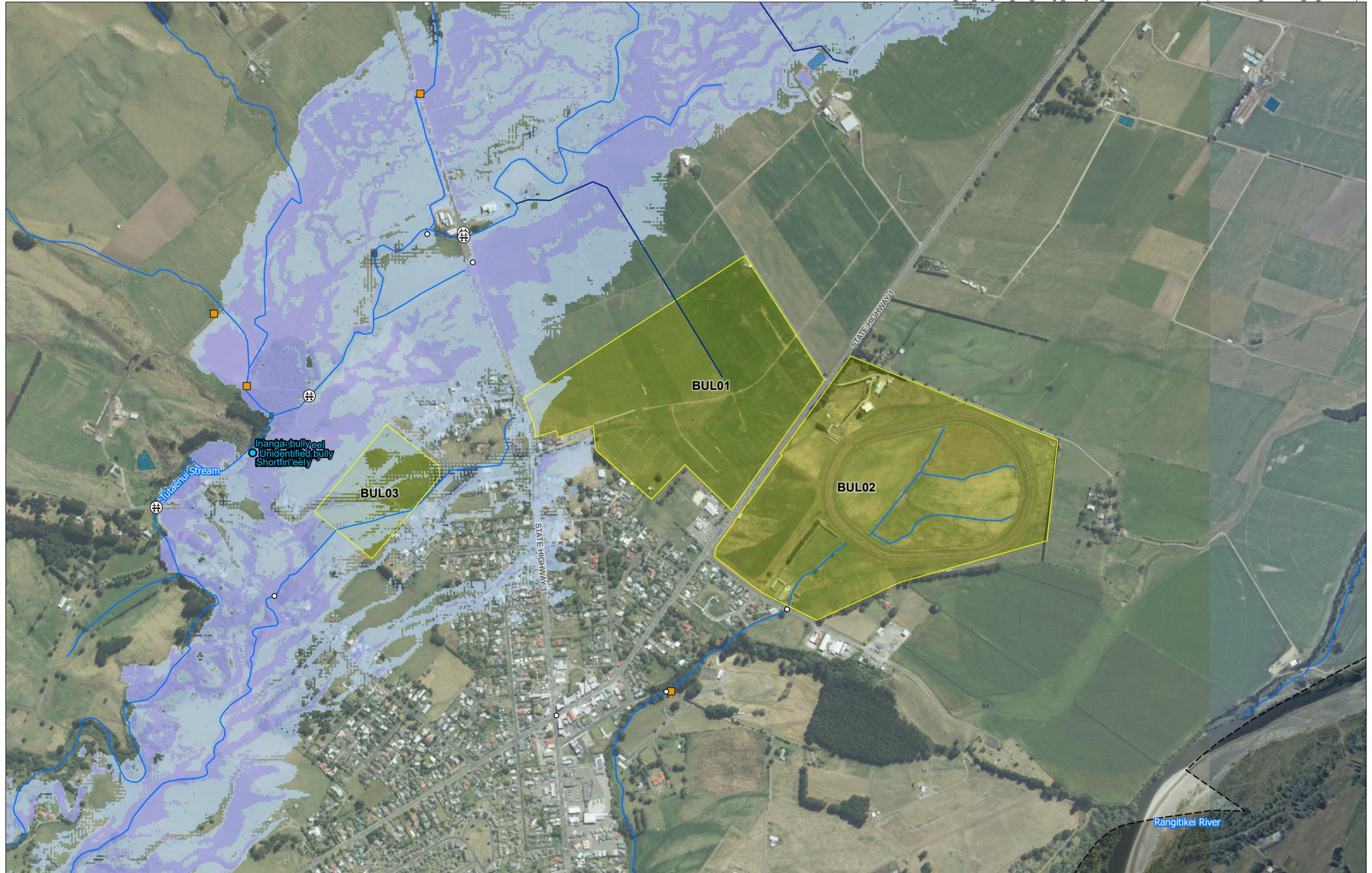
Freshwater - Taihape North





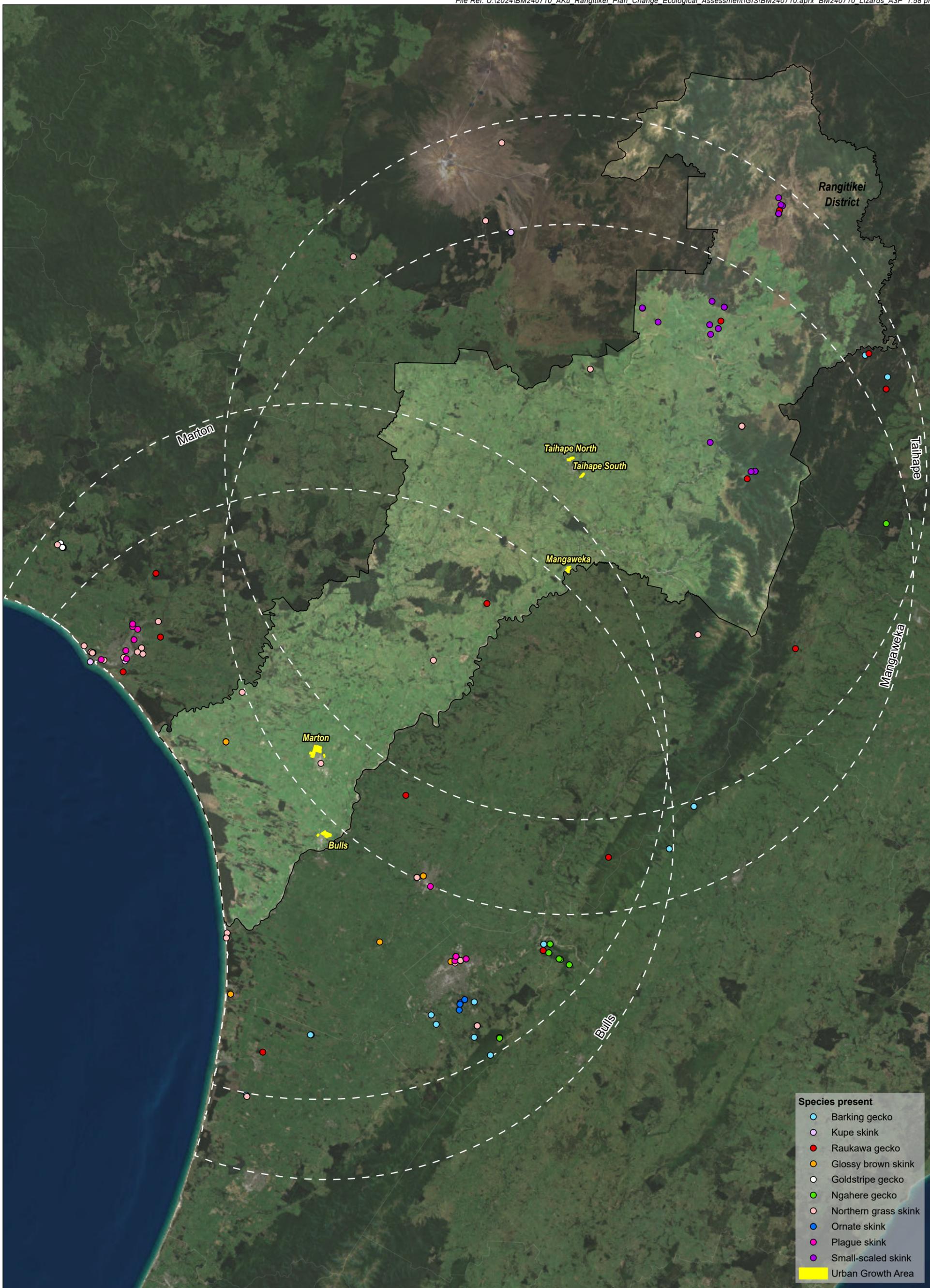






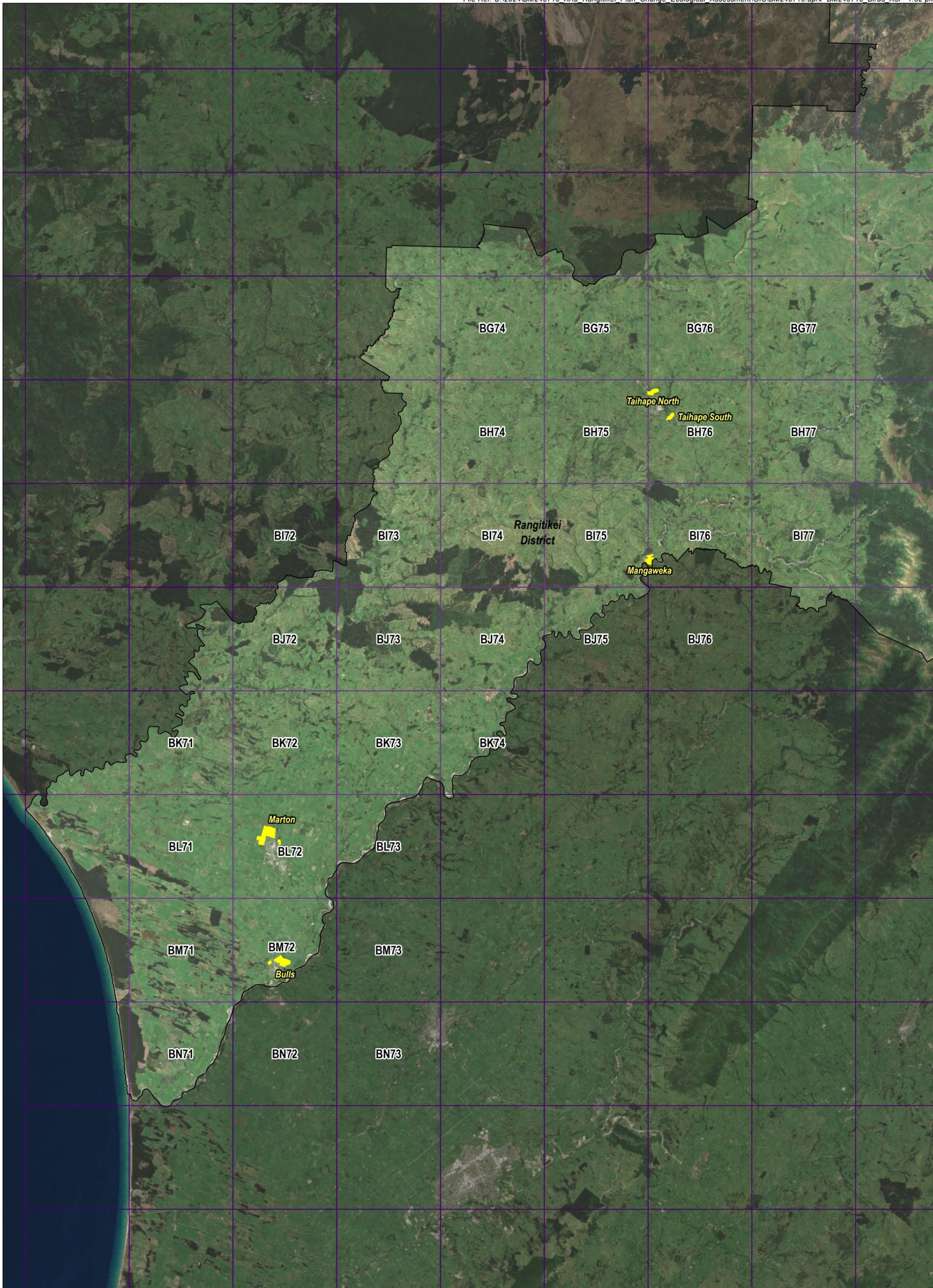
Lizards

This plan has been prepared by Boffa Miskell Limited on the specific instructions of our Client. It is solely for our Client's use in accordance with the agreed scope of work. Any use or reliance by a third party is at that party's own risk. Where information has been supplied by the Client or obtained from other external sources, it has been assumed that it is accurate. No liability or responsibility is accepted by Boffa Miskell Limited for any errors or omissions to the extent that they arise from inaccurate information provided by the Client or any external source.



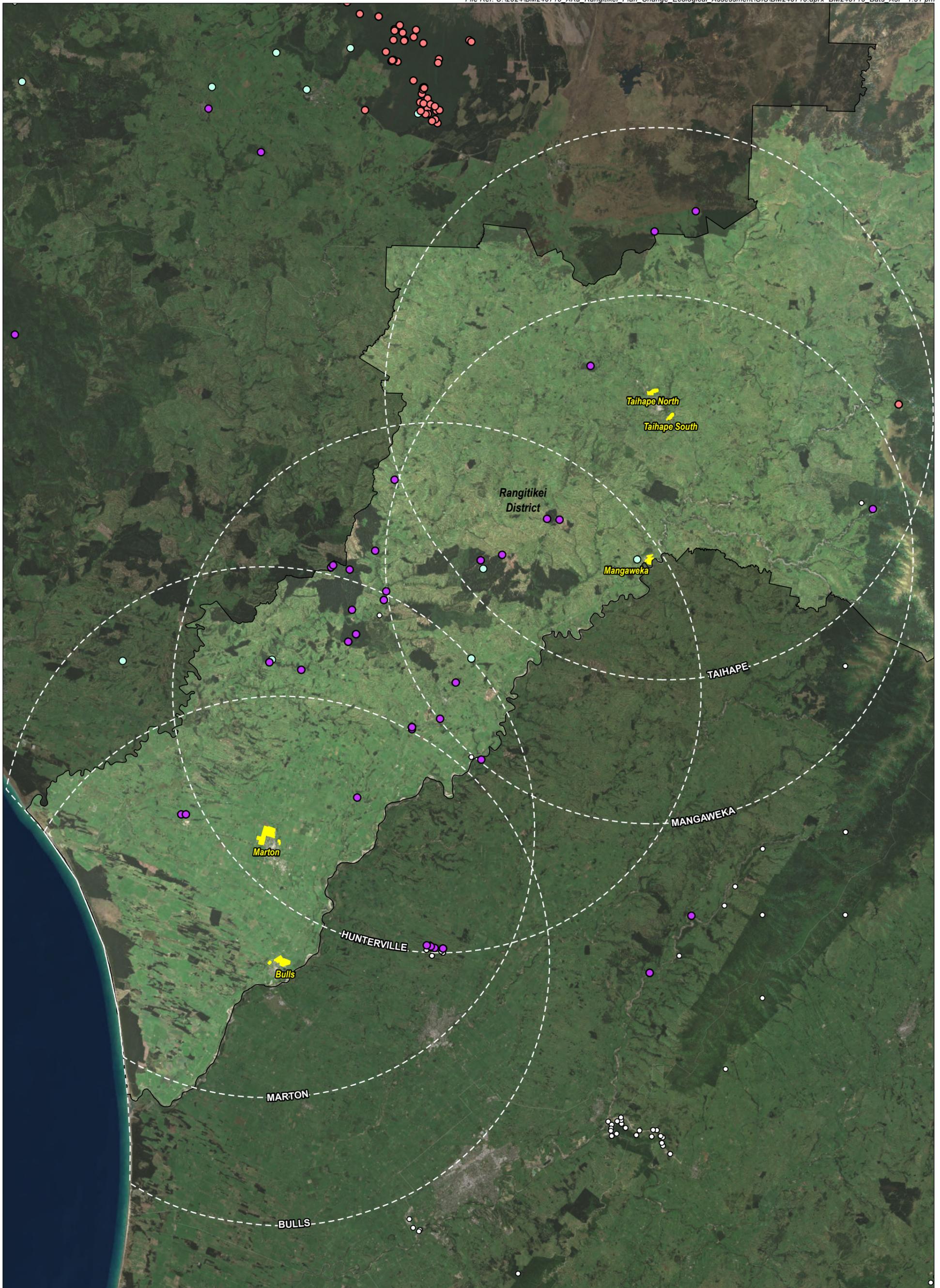
Birds

This plan has been prepared by Boffa Miskell Limited on the specific instructions of our Client. It is solely for our Client's use in accordance with the agreed scope of work. Any use or reliance by a third party is at that party's own risk. Where information has been supplied by the Client or obtained from other external sources, it has been assumed that it is accurate. No liability or responsibility is accepted by Boffa Miskell Limited for any errors or omissions to the extent that they arise from inaccurate information provided by the Client or any external source.



Bats

This plan has been prepared by Boffa Miskell Limited on the specific instructions of our Client. It is solely for our Client's use in accordance with the agreed scope of work. Any use or reliance by a third party is at that party's own risk. Where information has been supplied by the Client or obtained from other external sources, it has been assumed that it is accurate. No liability or responsibility is accepted by Boffa Miskell Limited for any errors or omissions to the extent that they arise from inaccurate information provided by the Client or any external source.



Appendix 4: Google Images of Potential Urban Growth Areas



Photo 1: TAIHAPE - Potential Urban Growth Areas TAI01 & TAI02.



Photo 2: TAIHAPE - Looking south-east towards one of the hills in urban growth area TAI01.



Photo 3: TAIHAPE - Aerial photo of TAI01 from 1950/11/28, showing a cleared landscape with establishment/remnant indigenous vegetation.



*Photo 4: TAIHAFE
- Looking east-southeast across paddocks of TAI02 urban growth area.*



*Photo 5: TAIHAFE
- Aerial photo of TAI02 from 1950, showing a cleared pastoral landscape with occasional exotic vegetation.*

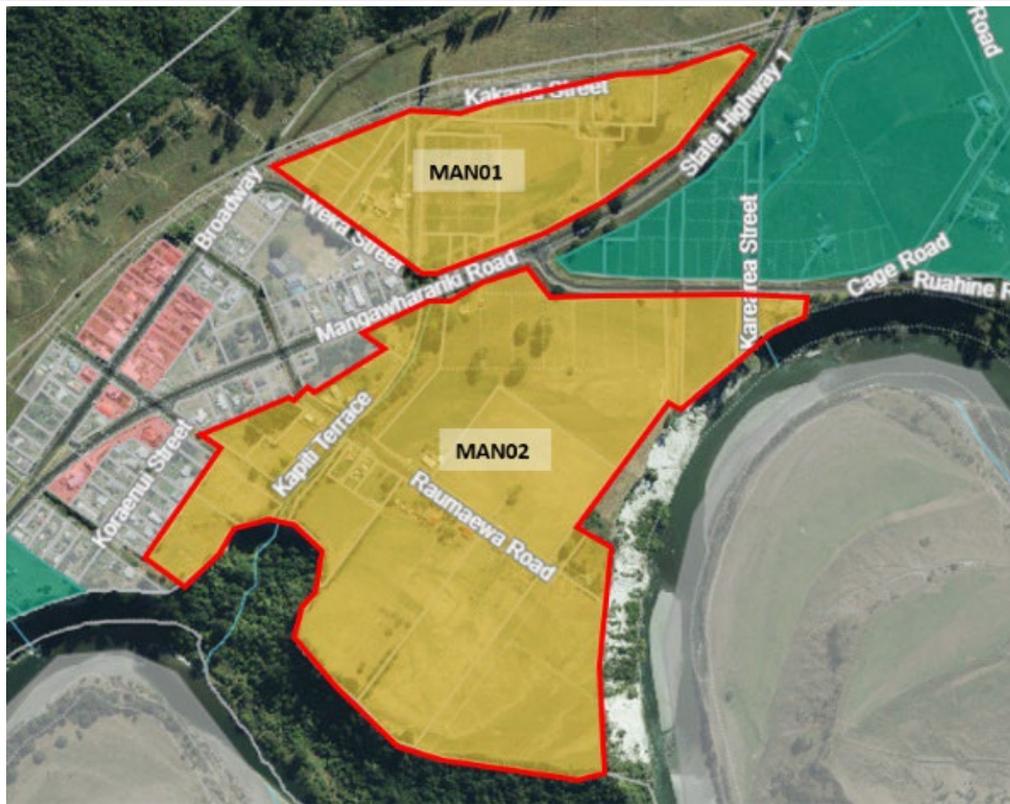


Photo 6:
MANGAWEKA -
Potential Urban
Growth Areas
MAN01 & MAN02



Photo 7:
MANGAWEKA -
Image of the
western corner of
MAN01 from corner
of Weka and
Broadway.



*Photo 8:
MANGAWEKA -
Image of the
central paddocks of
MAN01 taken from
a bend in Kereru
Street. Apr, 2024.*



*Photo 9:
MANGAWEKA -
View of MAN01
paddocks – looking
north west from
SH1. Apr, 2024.*



*Photo 10:
MANGAWEKA -
Aerial from 1952
showing the mainly
pastoral habitat of
MAN01 and the old
Mangaweka
Stream channel,
which was later
modified. Apr,
2024.*



*Photo 11:
MANGAWEKA -
MAN02 - Looking
north from
Raumaewa Road,
paddock located
between the bridge
and 9 Raumaewa
Rd. Apr, 2024.*



Photo 12:
MANGAWEKA -
MAN02 - Looking
south from the end
of Raumaewa
Road. North facing
cliffs formed by the
Rangitikei River in
the background.
Apr, 2024.



Photo 13:
MANGAWEKA -
MAN02 - Looking
south across
MAN02, from mid
Ruahine Road,
Apr, 2024.

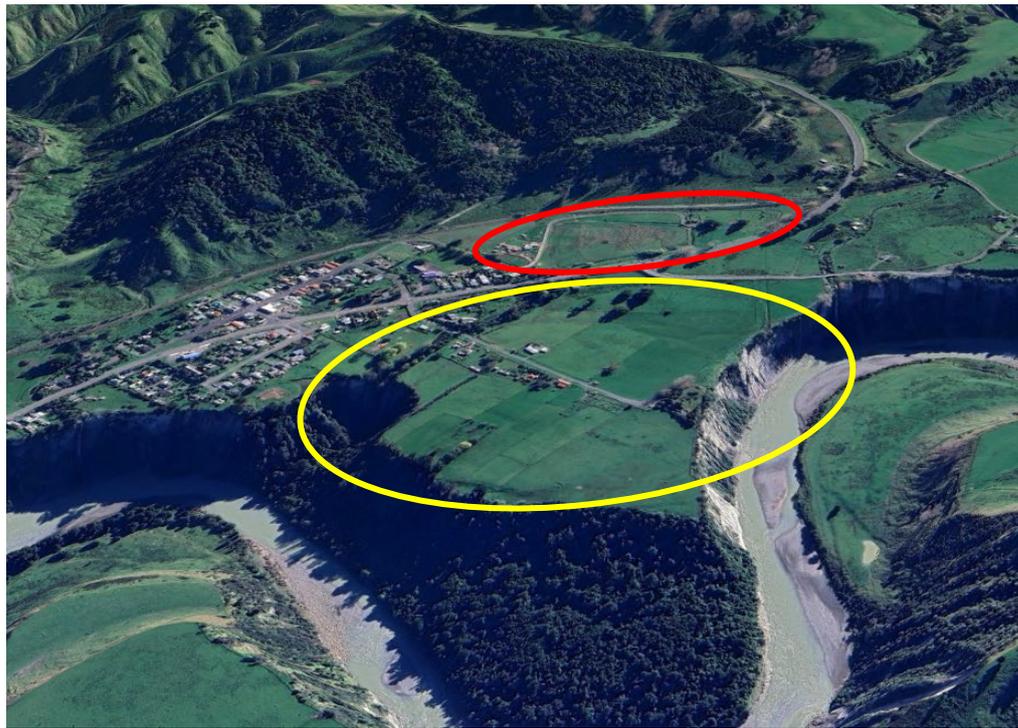


Photo 14:
MANGAWEKA -
Aerial view of
MAN02 (yellow
outline) (with
MAN01 (red outline)
in background)
showing proximity
to the river and
vegetation

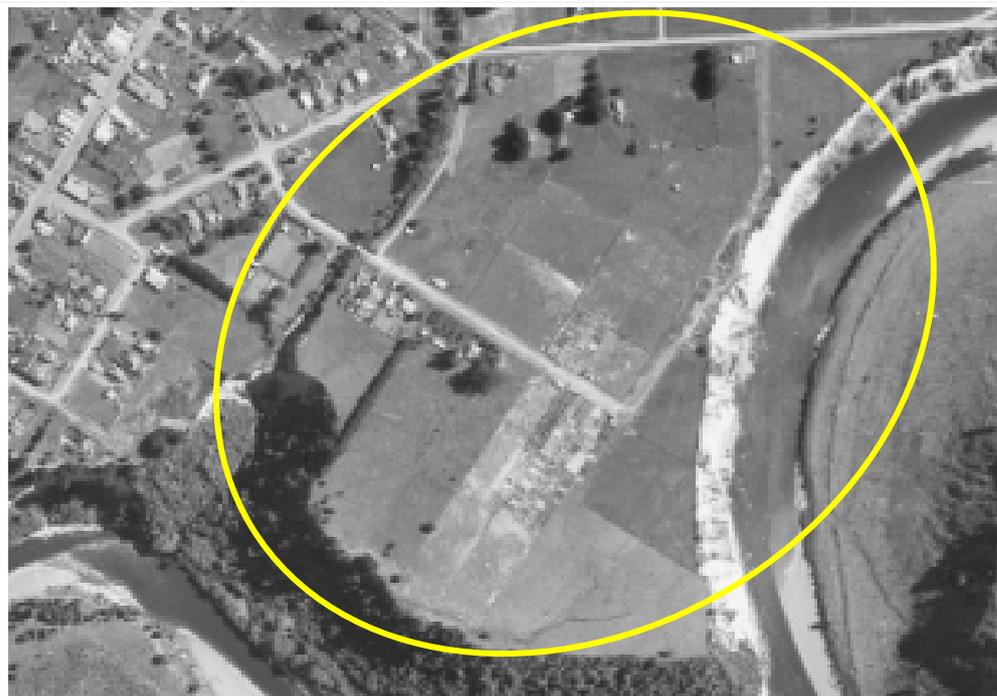


Photo 15:
MANGAWEKA -
Aerial from 1952
showing the mainly
pastoral habitat of
MAN02. Note the
Mangataweka
stream within its
original channel.

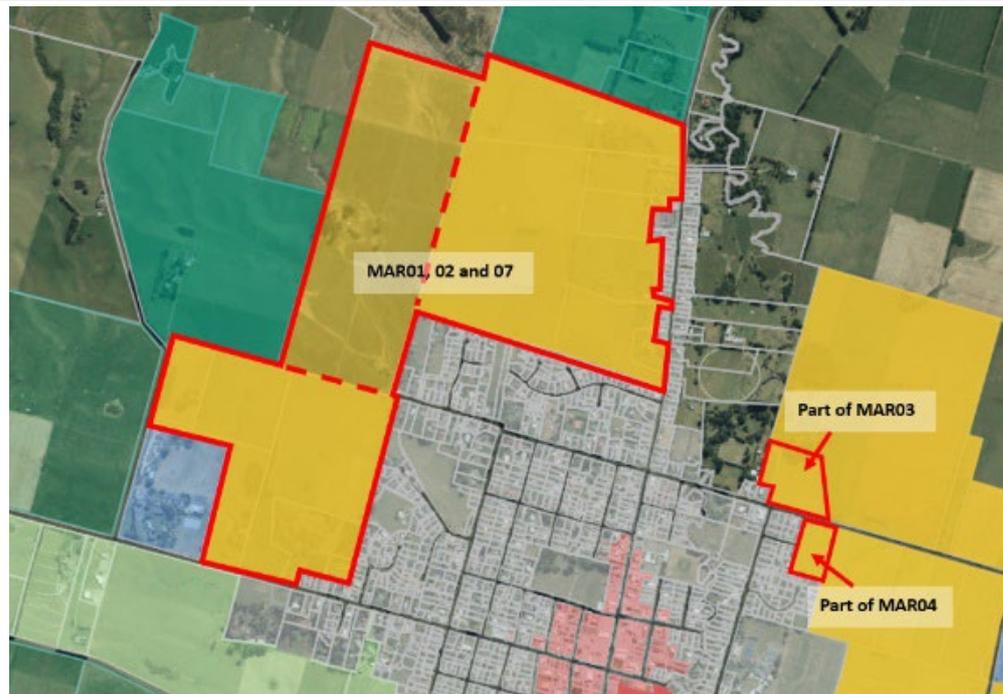


Photo 16:
MARTON –
Potential Urban
Growth Areas:
MAR01, 02 and 07
as well as small
parts of MAR03
and 04 (outlined in
red). B:



Photo 17:
MARTON –
Looking north-east
into paddocks of
MAR07 from the
southwest corner.
(Google, Feb,
2024)



Photo 18:
MARTON –
MAR07. Looking
east, across
paddocks from 66
Johnston Road.
(Google, Feb,
2024)



Photo 19:
MARTON -
MAR01. Looking
west, across
paddocks from 21
Tutaenui Road
(Google, Feb,
2024)



Photo 20:
MARTON -
MAR01. Looking
west, across
paddocks from 98
Tutaenui Road
(Google, Feb,
2024)



Photo 21:
MARTON - Looking
north-west, across
paddocks of
MAR02 from the
west end of Milne
Street, Marton.
(Google, Feb,
2024)



Photo 22:
MARTON –
Scenes within
MAR02, from
WSP report.

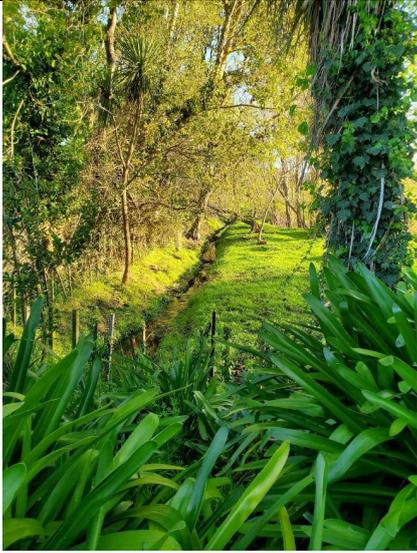
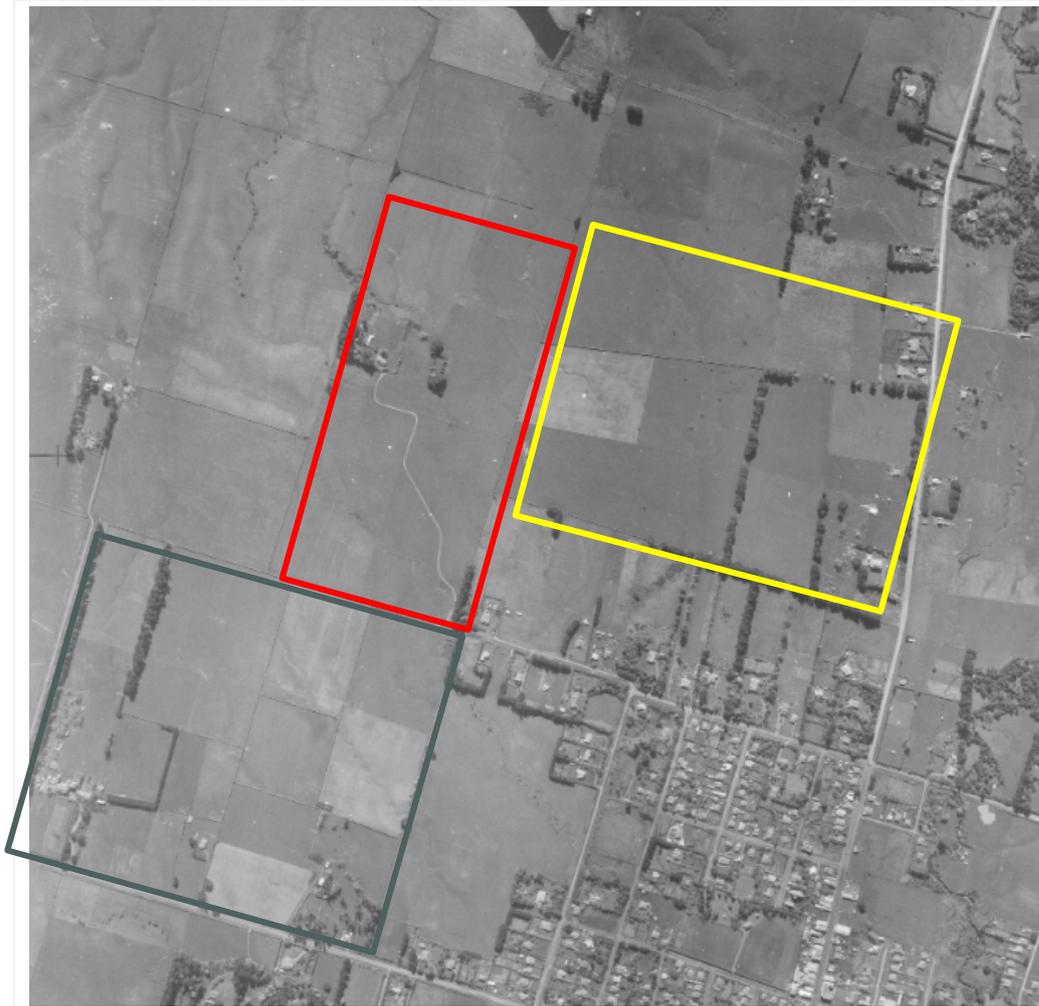


Photo 23:
MARTON. MAR07.
From WSP report
(Photos: WSP)

A. Unnamed
tributary to the
Tutaenui Stream
and

B. ephemeral
stream.



*Photo 24:
MARTON - Aerial
from August 1942
showing the heavily
modified, mainly
pastoral, habitat of
MAR01 (yellow
outline), 02 (red
outline) and 07
(blue outline).*



*Photo 25:
MARTON - Looking
north-east, across
paddocks of
MAR03 from 25
Calico Street,
Marton. (Google,
Feb, 2024)*



Photo 26:
MARTON - Looking south-west, into MAR04, from 65 Calico Street, Marton. (Google, Feb, 2024)

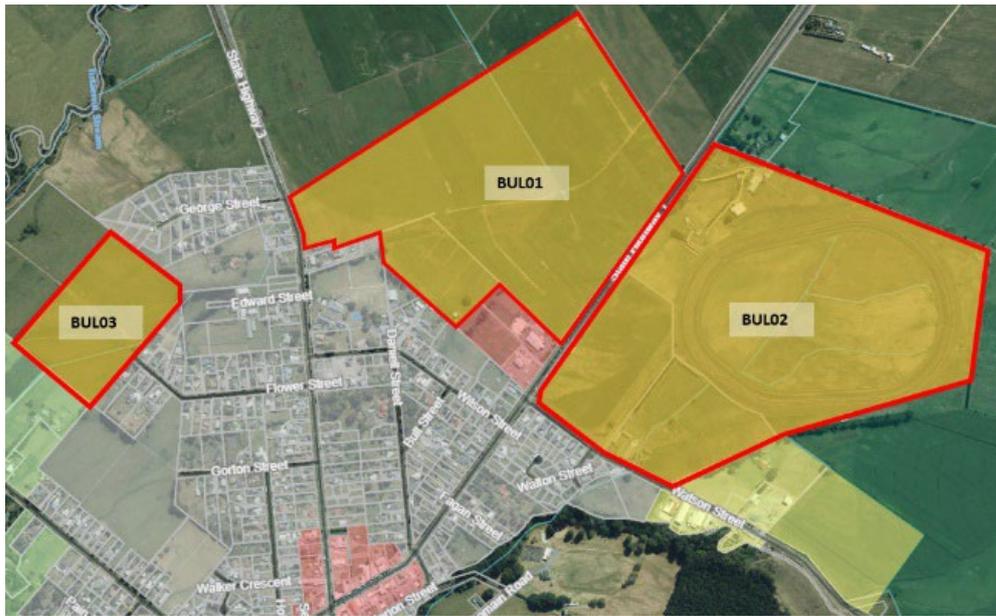


Photo 27: BULLS – Potential Urban Growth Areas. BUL01, 02 & 03



Photo 28: BULLS
Looking west
across BUL01,
from SH1



Photo 29: BULLS
Looking north-east
across BUL01,
from SH3



Photo 30: BULLS
Looking north-east
across BUL02 from



Photo 31: BULLS
Looking south-east
across BUL02 from
the north end of the
block, SH1



Photo 32: BULLS
Looking south-west
towards BUL03
from the west end
of George Street,
Bulls.

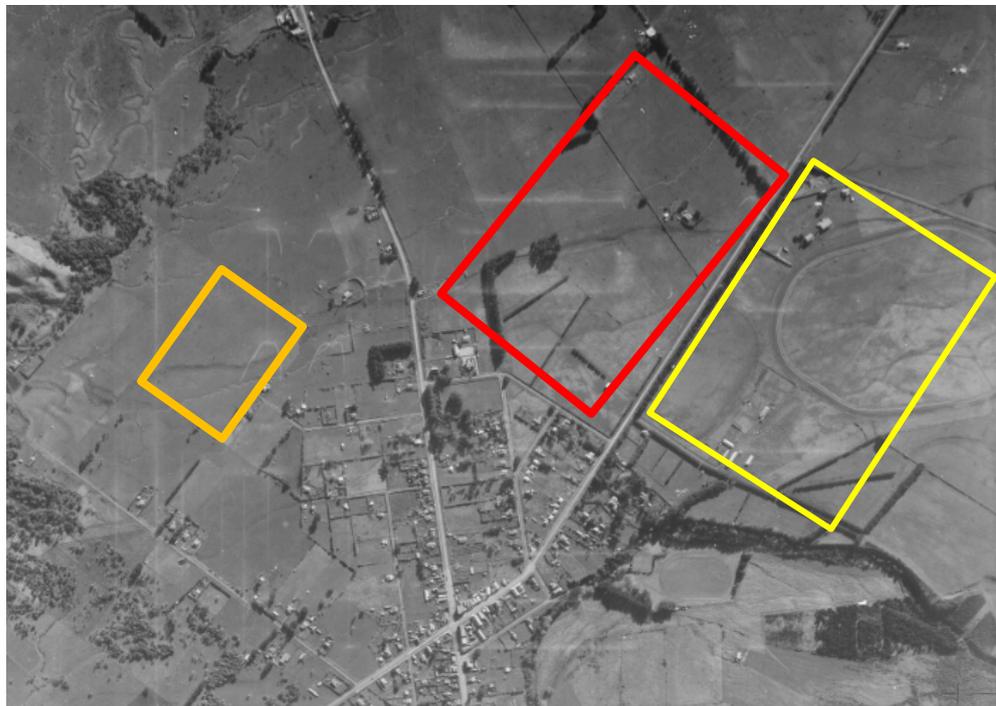
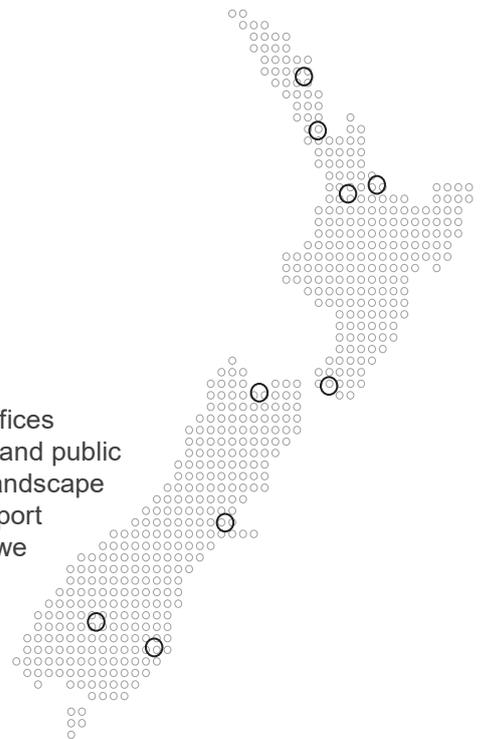


Photo 33: BULLS
Aerial from August
1942 showing the
heavily modified,
pasture dominated
habitat at that time.
This has continued
to the present day.
BUL01 (red),
BUL02 (yellow),
and BUL03
(Orange).

Together. Shaping Better Places.

Boffa Miskell is a leading New Zealand environmental consultancy with nine offices throughout Aotearoa. We work with a wide range of local, international private and public sector clients in the areas of planning, urban design, landscape architecture, landscape planning, ecology, biosecurity, Te Hīhiri (cultural advisory), engagement, transport advisory, climate change, graphics, and mapping. Over the past five decades we have built a reputation for creativity, professionalism, innovation, and excellence by understanding each project's interconnections with the wider environmental, social, cultural, and economic context.



www.boffamiskell.co.nz

Whangarei	Auckland	Hamilton	Tauranga	Wellington	Nelson	Christchurch	Queenstown	Dunedin
09 358 2526	09 358 2526	07 960 0006	07 571 5511	04 385 9315	03 548 8551	03 366 8891	03 441 1670	03 470 0460