



Maitai River Flood Improvement Works

Ecological Impact Assessment

Prepared for
Nelson City Council
Prepared by
Tonkin & Taylor Ltd

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Executive summary

Nelson City Council (NCC) is proposing to construct a range of flood improvement measures along approximately 900 m of the Maitai River from Hanby Park to Clouston Terrace. Works include upgrades to existing stopbanks, new floodwalls and floodway creation. The proposed works aim to reduce the frequency and magnitude of overtopping occurring along this stretch of the river during major flooding events.

This Ecological Impact Assessment (EclA) report has been prepared to inform a resource consent application. Due to the need to commence construction in early 2026, the resource consent application has been split into packages. This report presents an overview of terrestrial and freshwater ecology values of the broader site, and an assessment of effects of proposed works specific to the first consent package (Consent Package 1). The assessment was undertaken in general accordance with the EclA guidelines (Roper-Lindsay et al. 2018). A desktop assessment and site investigations were undertaken to assess the terrestrial ecological characteristics and values at the site, including vegetation and fauna habitat mapping and native lizards and bird surveys. T+T has previously undertaken desktop reviews and field assessments of the ecological and geomorphic properties in the Maitai River to assess the sediment cycle within the river and instream habitat and species present. The freshwater ecology assessment within this report has utilised this existing information where appropriate.

Terrestrial ecological values at the site range from **negligible** to **high** and include native and exotic vegetation along riparian margins which offer suitable habitat for native lizards (northern grass skink – ‘Not Threatened’) and a suite of native birds, including nationally ‘At Risk’ species (e.g. Kāruhiruhi/pied shag (*Phalacrocorax varius*) and kawaupaka/little shag (*Phalacrocorax melanoleucos brevirostris*). The mid Maitai River (containing the site) is regarded as an important site for native fisheries under the Nelson Resource Management Plan (NRMP), and as a ‘first’ priority for improvement. Several ‘At Risk – Declining’ freshwater fish species have been recorded in the Maitai River, including longfin eel, torrentfish, kōaro and inanga. ‘Threatened – Nationally Vulnerable’ lamprey are also present. Therefore, the site is of **high** ecological value for freshwater habitat and freshwater fauna.

Potential adverse effects of the proposed works for Consent Package 1 requiring ecological management measures include:

- Temporary loss of up to ~3,200 m² vegetation (comprising ~1,400 m² native and ~1,800 m² exotic).
- Temporary loss of up to ~3,150 m² of habitat suitable for native lizards (northern grass skink).
- Temporary loss of up to ~900 m² native bird breeding/nesting habitat.
- Injury or mortality of native lizards and birds during vegetation and habitat removal.
- Discharge of sediment laden water to the freshwater environment.

These potential adverse effects will be managed through implementation of an Erosion and Sediment Control Plan (ESCP) and an Ecological Management Plan (EMP) for the project. The EMP comprise several management plans to outline a range of measures to manage potential adverse effects on vegetation, fauna and the freshwater environment. These management plans are:

- Vegetation Management Plan (VMP).
- Avifauna Management Plan (AMP).
- Lizard Management Plan (LMP).

It will also include a Habitat Remediation Planting Plan that will detail requirements for full remediation of the site after works have been completed.

Following implementation of the ESCP and EMP, potential adverse effects on the terrestrial and freshwater ecological values on site can be managed to an overall **low to very low** level of effect. There will likely be a **net biodiversity gain** for the site in the medium to long-term following native planting remediation following completion of works.

Glossary of key terms

Term	Definition
Effect	The outcome to an ecological impact from an impact.
Effects management	Includes the full range of actions taken to address adverse effects on indigenous biodiversity and ecosystems. This includes: Avoid Remedy (remediate, restore, rehabilitate, reinstate) Mitigate Offset Compensate
Floodwall	A freestanding, permanent, engineered structure designed to prevent encroachment of floodwaters.
Floodway	An area alongside a river channel which can be covered with water when the river floods. Also known as a flood channel or high flow channel.
Net gain	A measurably positive impact on biodiversity, compared to what was there before development.
No net loss	The point at which habitat or biodiversity losses equal their gains, both quantitatively and qualitatively.
Portion	A defined area of works. This Project is split into five Portions.
Project	The works occurring to achieve a particular aim i.e. flood improvement works to reduce the frequency and magnitude of overtopping.
Project footprint	The area directly impacted by the project.
Consent Package 1	The first resource consent package, comprising Portions 1, 2 and 3 of the Project.
Site	The physical location where the Project is being executed, in this case, the Maitai River between Hanby Park and 5A Clouston Terrace.
Stopbank	A continuous elongated embankment that stops water from a river flooding nearby land.
True Left	The left-hand side of the river when looking downstream.
True Right	The right-hand side of the river when looking downstream.

Glossary of acronyms

Acronym	Definition
ACO	Artificial Cover Object
AEE	Assessment of Environmental Effects
AMP	Avifauna Management Plan
DOC	Department of Conservation
EciA	Ecological Impact Assessment
EciAG	Ecological Impact Assessment Guidelines
EIANZ	Environmental Institute of Australia and New Zealand
EMP	Ecological Management Plan
ESCP	Erosion and Sediment Control Plan
LMP	Lizard Management Plan
NCC	Nelson City Council
NES-F	National Environmental Standards for Freshwater
NIWA	National Institute of Water and Atmospheric Research
NPS FM	National Policy Statement for Freshwater Management
NPS IB	National Policy Statement for Indigenous Biodiversity
NRMP	Nelson Resource Management Plan
SNA	Significant Natural Area
VMP	Vegetation Management Plan
WAA	Wildlife Act Authority

1 Introduction

1.1 Background

The Maitai River from Hanby Park to Clouston Terrace overtops its banks during major flooding events, with the most recent incidents occurring during the August 2022 and May 2023 weather events. To reduce the frequency and magnitude of overtopping in this section during extreme flow events, Nelson City Council (NCC) proposes to increase the channel capacity with new floodways in key locations, and to build up the banks with stopbanks or floodwalls in more constrained areas.

1.2 Scope

Tonkin & Taylor (T+T) has been engaged by NCC to prepare an Ecological Impact Assessment (EcIA) to accompany the resource consent application. Due to the need to commence construction in early 2026, the resource consent application has been split into packages. The scope of this report is to provide an assessment of ecological effects of the proposed Maitai River flood improvement works applicable to Consent Package 1 within the project site (hereafter 'the site'). Figure 1.1 shows the location of the site, and work Portions 1, 2 and 3 included in Consent Package 1.

This EcIA includes:

- A description of the proposed activity.
- An outline of assessment methods used.
- A description of the ecological values of the broader terrestrial and freshwater environments of the site, based on desktop review of available information and site investigations.
- An assessment of the actual and potential ecological effects of proposed works applicable to Consent Package 1 on the ecological values identified, following the EcIA guidelines (Roper-Lindsay et al. 2018).
- Effect management recommendations for addressing adverse effects on terrestrial and freshwater ecology values for Consent Package 1.

This EcIA has been prepared in accordance our Master Services Agreement with NCC EC3906 project number 3982 and 3983 Maitai River Flood Improvement Works – VO2 consent application (T+T ref. 1006675.5170).

1.3 Geographical and ecological context

The Maitai River is the largest river in the Nelson Region, with a catchment area of over 9,000 ha. It originates in the Bryant Ranges to the east of Nelson and sits within the Bryant Ecological District. The upper catchment is within lowland hill country. It has two branches that drain conservation land (south branch) and water supply protection land (north branch). The latter provides water for Nelson City via a storage reservoir on the northern branch and an intake weir on the southern branch. Downstream of the reservoir the Maitai River flows westward as a single-thread channel towards Nelson City, passing through recreational sites set in coastal flats and alluvial terraces before entering the city and draining into Nelson Haven/Paruparuroa. The tidal influence on the Maitai River extends to approximately 950 m downstream of the site.

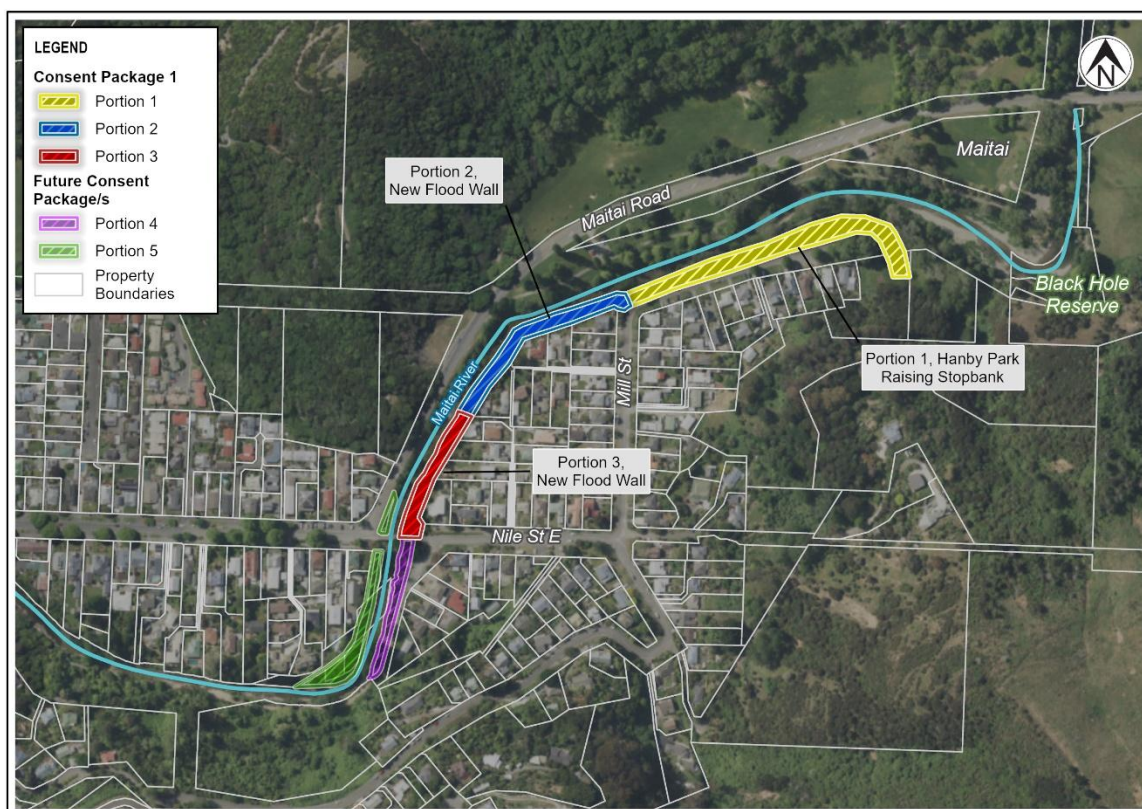


Figure 1.1: Site location

2 Description of the proposed works

2.1 Proposed upgrades

Flood improvement works are planned across the site in five different packages ('Portions') of work (Figure 1.1) across an approximate 900 m length of the Maitai River from Clouston Terrace to Hanby Park. The proposed works include upgrading existing stopbanks and floodwalls, as well as creating floodways (a high flow channel inundated during elevated flows). A high-level description of proposed flood improvement works for each Portion is provided in Table 2.1. A detailed description of proposed upgrades is provided in the Assessment of Environmental Effects (AEE) for the project. The works will be undertaken between January 2026 and June 2027.

Table 2.1: Description of proposed works

Portion	Overview of proposed works
Consent Package 1	
Portion 1 – Hanby Park true left stopbank	- Existing stopbank height to be raised. - Vegetation removal required.
Portion 2 – Mill Street bend true left stopbank	- Strengthening of existing stopbank – likely by an inground palisade wall near the floodwall at the top of the crest. - Up to 180 m length floodwall constructed along the top of the existing stopbank. - Riverside of existing stopbank cut back to reduce slope and increase stability, if required. Earthworks and vegetation clearance required. No works in the wetted channel. - Removal of strip of garden vegetation (on NCC land) immediately adjacent to works area possible.
Portion 3 – Mill Street bend to Clouston Bridge, true left	- Strengthening of existing stopbank – likely by an inground palisade wall near the floodwall at the top of the crest. - Riverside of existing stopbank cut back to reduce slope and increase stability, if required. Earthworks and vegetation clearance required. No works in the wetted channel. - Up to 150 m length floodwall on top of existing stopbank adjacent to footpath. - Potential habitat disturbance or minor clearance possible of native garden vegetation.
Future project portions	
Portion 4 – True left of Clouston Terrace and Clouston Bridge	Clouston Terrace: - New floodwall constructed. - Clouston Terrace raised and existing recreational footpath to be lowered. - Cut the existing stopbank to form new floodway. - Sewer to be realigned behind new wall.

Portion	Overview of proposed works
	- Stormwater pipe moved to under new wall, outlet to be stabilised. - Vegetation removal required. - Instream works potentially required. Clouston Bridge: - Lowering of ground level under true left span. - Potential pier strengthening. - Vegetation removal required.
Portion 5 – True right	Upstream of Clouston Bridge: - Existing floodwall removed and replaced with upgraded floodwall. Downstream of Clouston Bridge: - Floodway cut with a timber pole retaining wall constructed where space is limited between the river and private property or armoured slope where there is space available. - Vegetation removal required. - Instream works potentially required.
Laydown/ stockpiling	
Proposed laydown/stockpile area	- On the northern side of Maitai Valley Road in an existing laydown area. - No vegetation clearance required, habitat disturbance possible of up to 400 m² scree/exposed rock habitat.

2.2 Statutory context

While this is a technical EclA report, there are statutory matters which are relevant to the ecological assessment. These are identified at a high level in this section and are referred to where relevant within this EclA.

- Nelson Resource Management Plan (NRMP) with particular emphasis on the objectives, policies and standards within:
 - Appendix 6 as it relates to riparian values of the Maitai River.
 - Appendix 28 as it relates to freshwater fauna within the Maitai River.
- Nelson Regional Policy Statement with particular emphasis on the objectives, policies and standards within:
 - Chapter 7 as it relates to management of riparian margins and beds of rivers.
- National Policy Statement for Freshwater Management (NPS FM 2020, as amended in October 2024) (Ministry for the Environment, 2024a).
 - Alongside the policies and objectives in the NPS FM, the specific definitions of effects management hierarchy is relevant to this assessment.
- National Policy Statement for Indigenous Biodiversity (NPS IB 2023, as amended in October 2024) (Ministry for the Environment, 2024b).
 - Alongside the policies and objectives in the NPS IB, the specific definition of effects management hierarchy is relevant to the assessment.

- Resource Management (National Environmental Standards for Freshwater) Regulations 2020 (NES-F).
 - The NES-F includes specific provisions in respect of fish passage.

3 Assessment methods

3.1 Desktop review of available information

Publicly available information and databases were reviewed to inform the methodology and approach to the assessment of ecological values and to establish the ecological context and values of the site. This included a review of the following available information:

- Nelson City Council Map Viewer – Natural Environment (Nelson City Council, 2025):
 - Outstanding Natural Features and Landscapes layer.
 - Significant Landscapes Features layer.
 - Significant Natural Area layer.
 - Marine Area of Significant Value layer.
 - Wetlands layer.
 - Land Cover Database mainland layer.
- New Zealand Freshwater Fish Database. Accessed May 2025.
- Fish Passage Assessment Tool (<https://fishpassage.niwa.co.nz/>). Accessed May 2025.
- eBird database (<https://ebird.org>). Accessed May 2025.
- iNaturalist database (<https://iNaturalist.org>). Accessed May 2025.
- Department of Conservation NZ Herpetofauna Atlas Database (DOC, updated 2024).
- Conservation status of New Zealand flora and fauna. Publications by the Department of Conservation.
- Bat records from the New Zealand bat distribution database (DOC) (updated August 2024).
- Historical aerial imagery (Retrolens (<https://retrolens.co.nz/>) and Google Earth Pro historical imagery tool). Accessed May 2025.

3.2 Freshwater ecology

T+T has previously undertaken desktop reviews and field assessments of the ecological and geomorphic properties in the Maitai River to assess the sediment cycle within the river and instream habitat and species present. Field sampling and an initial desktop assessment were completed in March 2022 for the Maitai Flood Management Options – Geomorphology and Ecology Assessments report (T+T, 2022). A further desktop assessment was completed in November 2023 for the Addendum report to the Maitai Flood Management Options Report (T+T, 2023).

Field methods relevant to this assessment include reach typing, instream and riparian habitat attributes, qualitative habitat assessments, electric fishing surveys, environmental DNA (eDNA) collection, macroinvertebrate sampling. Relevant desktop assessment assessments include a literature review of potential flooding effects on freshwater fauna. This information has been relied on to inform the freshwater ecological values of the site.

3.3 Wetlands

No potential wetlands were identified within 100 m of the project site, based on assessment using the NCC Natural Environments GIS layer. Whilst in-stream works within the Maitai catchment have the potential to affect downstream environments such as coastal wetlands in Nelson Haven/Paruparuroa (approximately 2.2 km from site), appropriate Erosion and Sediment and Control Plan (ESCP) measures will be implemented and any impacts associated with instream works will be localised (see Section 5). Effects on wetlands are therefore not considered further in this assessment.

3.4 Terrestrial ecology

Site investigations were undertaken between 28 April - 7 May 2025 to assess terrestrial ecological values of the site. Conditions were generally fine and sunny and were appropriate for the survey methods used.

3.4.1 Vegetation

Vegetation on site was assessed, documented and mapped including the likely presence of nationally 'Threatened' or 'At Risk' plants (de Lange et al., 2024). A broad description of vegetation and habitat types was made and assessment of likely fauna presence/use.

3.4.2 Birds

Suitable habitat for native birds was identified and potential bird nesting habitat mapped throughout the site and immediate surrounds. The presence of native birds was assessed through incidental observations (both visual and auditory). A list of all bird species observed during site visits is provided in Appendix C.

3.4.3 Lizards

Suitable habitat for indigenous lizards (skinks and geckos) was identified and mapped across the site and immediate surrounds.

Based on a desktop assessment of native lizard records within a five-kilometre radius of the site (DOC Herpetofauna Database and iNaturalist), northern grass skink (*Oligosoma polychroma*)¹; Raukawa gecko (*Woodworthia maculata*)², northern spotted skink (*Oligosoma kokowai*)³ and glossy brown skink (*Oligosoma zelandicum*) were considered potentially present at the site. Habitat present is not considered suitable for starved gecko (*Naultinus stellatus*)⁴ despite nearby records.

Manual searching for lizards (four person-hours) was undertaken within the project site and 50 tracking tunnels (baited with banana) were deployed on 29 April 2025 in suitable habitat (Figure Appendix A.3). Both methods aimed at determining presence/absence of lizards. Tracking tunnels were left on site for one week and retrieved on 7 May 2025. Ideally tracking tunnels for cryptic species need to be deployed for a minimum of three weeks to reliably pick up species potentially present. However, northern grass skink were observed on site during manual searching efforts and heavy rain was forecast after the one-week tracking tunnel deployment period. As such, the tracking tunnel survey undertaken was deemed sufficient as lizard presence was already determined.

Conditions for manual searching were suitable for the detection of northern grass skink. However, despite warm and sunny conditions, the timing of the lizard survey was sub-optimal in late April (colder nights, shorter daytime basking opportunities, less foraging activity) and lizard detections were likely lower than during optimal conditions. There was also a high number of mouse prints detected from the tracking tunnels, indicating that skinks may have avoided the tunnels due to high predator scent markings.

3.4.4 Bats

A review of the DOC National Bat Database identified 20 acoustic bat surveys conducted within a 10 km radius of the site in the last 20 years⁵. No bats were recorded during any of these surveys.

¹ iNaturalist ~200 m from site, observation dated 2023

² BIOWEB ~2.8 km from site, observations pre – 1960's

³ BIOWEB ~1.2 km from site, observation dated 1991, edited 2024

⁴ BIOWEB ~2 km from site observations pre – 1990's

⁵ All bat surveys were undertaken by Forest and Bird between 2008 and 2009.

Within 20 km of the site there have been 20 detections of long-tailed bat (*Chalinolobus tuberculatus*; Threatened – Nationally Critical (O'Donnell et al., 2023)). Of these 20 records, 19 are in Richmond Forest Park to the east, with the closest being approximately 15.2 km away, and one is in the Aniseed Valley, approximately 15.6 km to the south of the site.

Based on the vegetation observed, lack of suitable roosting habitat, paucity of nearby records and existing light and noise from the surrounding urban environment, it is considered highly unlikely that bats are utilising the site, and an acoustic survey for bats was not deemed warranted. Bats are therefore not considered further in this assessment.

3.5 Approach to ecological impact assessment

The method applied to this ecological impact assessment report broadly follows the Ecological Impact Assessment Guidelines 2018 (EclAG) published by the Environment Institute of Australia and New Zealand (EIANZ) (Roper-Lindsay et al., 2018). The guidelines provide a standardised framework and matrix allowing a consistent and transparent assessment of ecological effects.

The guidelines were used to establish the following:

- The ecological values within the site (Appendix B Table 1 to Appendix B Table 4).
- The magnitude of effect (Appendix B Table 5 and Appendix B Table 6) on ecological values from the proposed Maitai River flood improvement works in the absence of any controls and considering:
 - The spatial scale of the effect.
 - The relative permanence of the effect.
 - The intensity of the effect within the impact footprint.
 - Timing of the effect in respect of key ecological factors.
 - Level of confidence in understanding the expected effect.
- The overall level of effects to determine whether avoidance, minimisation, remediation or mitigation is required (Appendix B Table 7).
- The magnitude of effect and overall level of effect, taking into consideration measures to avoid, minimise, remedy or mitigate effects and whether there are residual adverse effects that should be offset or compensated.

Refer to Appendix B for the criteria and tables used in this assessment.

The EclAG guidelines state that practitioners may deviate from the guidelines framework where it is considered ecologically relevant and justifiable to do so.

While the assessment criteria for terrestrial habitat and fauna values is fairly well defined in the EclAG (Appendix B Table 1 to Appendix B Table 3), the freshwater habitat values are less so. For this assessment, we have adapted freshwater values criteria based on the EclAG (Appendix B Table 4) which assigns ecological value based on biodiversity and ecological function values of the freshwater systems.

Note that the National Policy Statement Freshwater Management 2020 (NPS FM) requires that consideration of the loss of 'potential' value of freshwater systems is incorporated into assessments of effects. As such, the ecological value of freshwater systems is provided as 'current' ecological value and 'potential' ecological value.

4 Ecological characteristics and values

4.1 Terrestrial

4.1.1 Flora

A list of plant species identified on site during site investigations is presented in Appendix C. Several native and exotic species were noted. All indigenous plant species observed at the site have a national conservation status of 'Not Threatened' (de Lange et al. 2024) and have therefore been assigned an ecological value of **low**.

4.1.2 Vegetation and habitats

While the botanical value of vegetation on site is considered to be low, the vegetation types present do provide habitat for native fauna, including birds and lizards. Descriptions of each broad vegetation and habitat type and photographs are provided below (Photograph 4.1 to Photograph 4.13). Vegetation types are mapped in Figure Appendix A.1.

Vegetation types within the site comprise:

- Type 1: Native dominated riparian
- Type 2: Native dominated planted garden vegetation
- Type 3: Early successional native treeland
- Type 4: Exotic dominated grasslands
- Type 5: Exotic dominated planted garden vegetation
- Type 6: Exotic dominated amenity mature planting
- Type 7: Exotic dominated riparian

4.1.2.1 Native dominated riparian

Native dominated riparian vegetation consists mainly of harakeke intermixed by a rank exotic grass groundcover. Other native species are sparsely scattered but include, māhoe (*Melicytus ramiflorus*), lemonwood (*Pittosporum eugenoides*), kōhūhū (*Pittosporum tenuifolium*), and tree tutu (*Coriaria arborea*). Large exotic trees are sparse, but include European oak (*Quercus robur*), sycamore maple (*Acer pseudoplatanus*), European ash (*Fraxinus excelsior*) and *Populus* sp.

The vegetation type is located on the true left bank of the river in Portion 1 and Portion 2. Due to the sparse canopy and high amount of sun exposure, due to its north facing aspect, native lizard habitat is abundant and widespread.

The vegetation offers very little suitable nesting habitat for native birds. The large exotic trees are unlikely to provide roosting habitat for native forest birds but could provide habitat for crevice dwelling species such as kingfisher and morepork. Larger vegetation may also provide a food source and perching habitat for native avifauna as they move through the landscape.

4.1.2.2 Native dominated planted garden vegetation

A diverse habitat type which is variable between properties. Predominantly native species including *Myrsine australis*, *Pittosporum tenuifolium*, akeake (*Dodonaea viscosa*), Mahoe (*Melicytus ramiflorus*), cabbage tree (*Cordyline australis*). Subcanopy is more variable, and includes harakeke, English ivy (*Hedera helix*), and regenerating natives and exotics. Ground cover consists of *Tradescantia fluminensis*, English ivy, rank grass and agapanthus.

This vegetation type is located on the true left bank of the river adjacent to the private/public property interface in Portions 2 to Portion 4. Due to its north facing aspect and dense ground cover, suitable lizard habitat is present throughout vegetation. The vegetation offers suitable nesting habitat for native birds.

4.1.2.3 Early successional native treeland

Native dominated treeland consisting of a few individual native trees. Native vegetation is interspersed by large patches of rank grassland over rock riprap. Native species are sparsely scattered and are generally comprise lemonwood (*Pittosporum eugenoides*) and kōhūhū (*Pittosporum tenuifolium*). Large exotic trees are sparse, but occasional European oak (*Quercus robur*) and sycamore maple (*Acer pseudoplatanus*) are present.

This vegetation type is located on the true left bank of the river in Portion 4. This vegetation type offers suitable habitat for native lizards but little suitable habitat for nesting birds. The large exotic trees are unlikely to provide roosting habitat for native forest birds but could provide habitat for crevice dwelling species such as kotare/kingfisher (*Todiramphus sanctus*) and ruru/morepork (*Ninox novaeseelandiae*).

4.1.2.4 Exotic dominated grasslands

Rank exotic grasslands intermixed with harakeke, occasional specimen tree including European oak (*Quercus robur*), sycamore maple (*Acer pseudoplatanus*), European ash (*Fraxinus excelsior*) and *Populus* sp. This vegetation type is located on the true left bank of the river in Portions 1 to Portion 4. Due to the sparse canopy and high amount of solar radiation, and due to its north facing aspect, areas of rank grass offer suitable habitat for native lizards and minimal suitable nesting habitat for native birds. The sporadic large exotic trees are unlikely to provide habitat for native forest birds but could provide roosting habitat for kotare/kingfisher (*Todiramphus sanctus*) and ruru/morepork (*Ninox novaeseelandiae*).

4.1.2.5 Exotic dominated planted garden vegetation

Highly variable exotic garden vegetation is present on the true left bank of the river adjacent to the private/public property interface in Portion 3 and Portion 4. Vegetation type is highly variable meaning vegetation characterisation is difficult. Most commonly, it has few species in the canopy tier being mostly short stature (shrub) vegetation. A wide variety of garden species present in the shrub tier, and in more open sunlit areas, rank grass is common as ground cover. Also present are rows of *Agapanthus* sp. in sections. Where densely vegetated, it provides suitable lizard habitat, while having less suitable habitat for nesting birds.

4.1.2.6 Exotic dominated amenity mature planting

Mature treeland consisting of a European oak (*Quercus robur*), sycamore maple (*Acer pseudoplatanus*), European ash (*Fraxinus excelsior*) and *Populus* sp. Sub-canopy vegetation is sparse and limited to ground cover vegetation. The ground cover vegetation is generally limited to rank grassland, however large patches of English ivy (*Hedera helix*) and *Tradescantia fluminensis* are present throughout. Along the stream edge, where light is more available the areas of rank grassland, ivy, and *Tradescantia* are more common and considered more valuable habitats for native lizards due to increased solar radiation.

The trees provide limited roosting habitat for native birds as their canopies are generally too open for native forest bird species. Habitat for native birds of greater suitability is present with 150 m of this habitat in Branford Park. However, if cavities are present in the trees, this could be suitable habitat for kotare/kingfisher (*Todiramphus sanctus*) and ruru/morepork (*Ninox novaeseelandiae*).

4.1.2.7 Exotic dominated riparian

Exotic dominated riparian vegetation consists mainly of exotic specimen trees in the main canopy. These include European oak (*Quercus robur*), sycamore maple (*Acer pseudoplatanus*), European ash (*Fraxinus excelsior*) and *Populus* sp. The exotic canopy, and sub-canopy is intermixed with some native tree species and shrubs, though these are relatively sparse.

In the subcanopy bay laurel (*Laurus nobilis*) is the most common species, other less common native species are harakeke (*Phormium tenax*), karamū (*Coprosma robusta*), māhoe (*Melicytus ramiflorus*), kānuka (*Kunzea robusta*), lemonwood (*Pittosporum eugenioides*), kōhūhū (*Pittosporum tenuifolium*), koromiko (*Veronica stricta*) and tree tutu (*Coriaria arborea*). The ground cover vegetation is mostly garden weed or exotic grass species over natural rock.

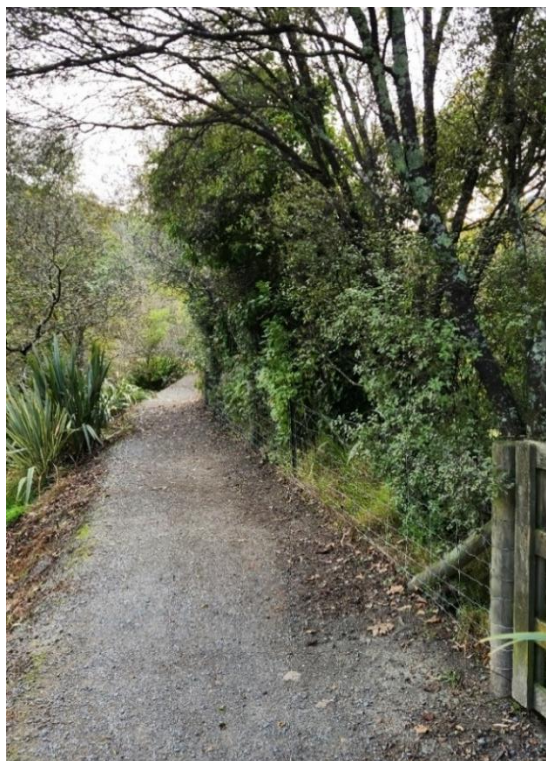
The vegetation type is predominantly located on the true right bank of the Maitai River Portion 5. It is highly suitable for native skinks and is similar in habitat quality to the vegetation on the true left bank. However, it does not receive as much sun exposure from the north. As such, the lizard population is likely to be lower than that of the true left bank. This vegetation also offers likely nesting habitat for some native bird species such as grey warbler and fantail and may provide roosting habitat for riverine birds such Kāruhiruhi/pied shag (*Phalacrocorax varius*) and kawaupaka/little shag (*Phalacrocorax melanoleucos brevirostris*).



Photograph 4.1: Representative image showing native dominated riparian vegetation on the true left of the Maitai River.



Photograph 4.2: Looking to the north from the path showing native dominated riparian vegetation on the true left of the Maitai River.



Photograph 4.3: Looking to the north from the path showing native dominated garden vegetation on the true left of the Maitai River (Portion 2).



Photograph 4.4: Native dominated garden vegetation on the true left of the Maitai River (Portion 2).



Photograph 4.5: Looking south showing early successional native treeland on the true left of the Maitai River (Portion 4).



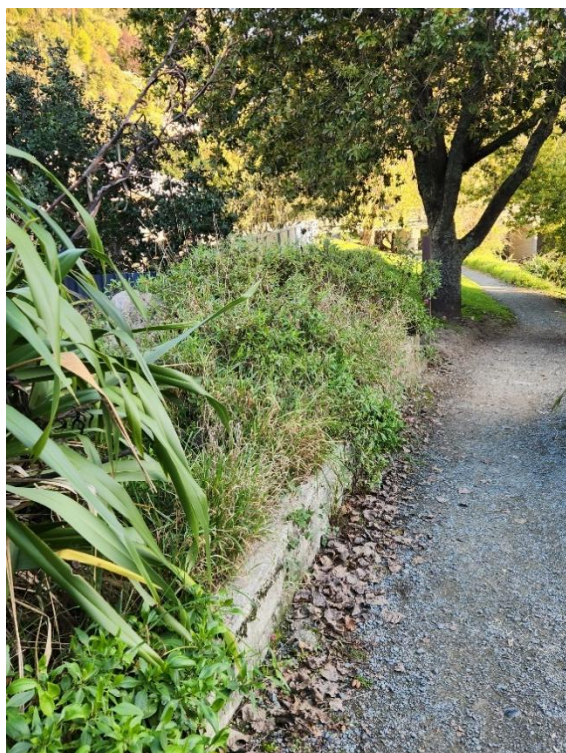
Photograph 4.6: Early successional native treeland on the true left of the Maitai River (Portion 4).



Photograph 4.7: Looking north, upstream on the true left bank showing exotic dominated rank grass with sporadic harakeke.



Photograph 4.8: Looking south, downstream towards Nile Street bridge, showing exotic dominated rank grass with sporadic harakeke.



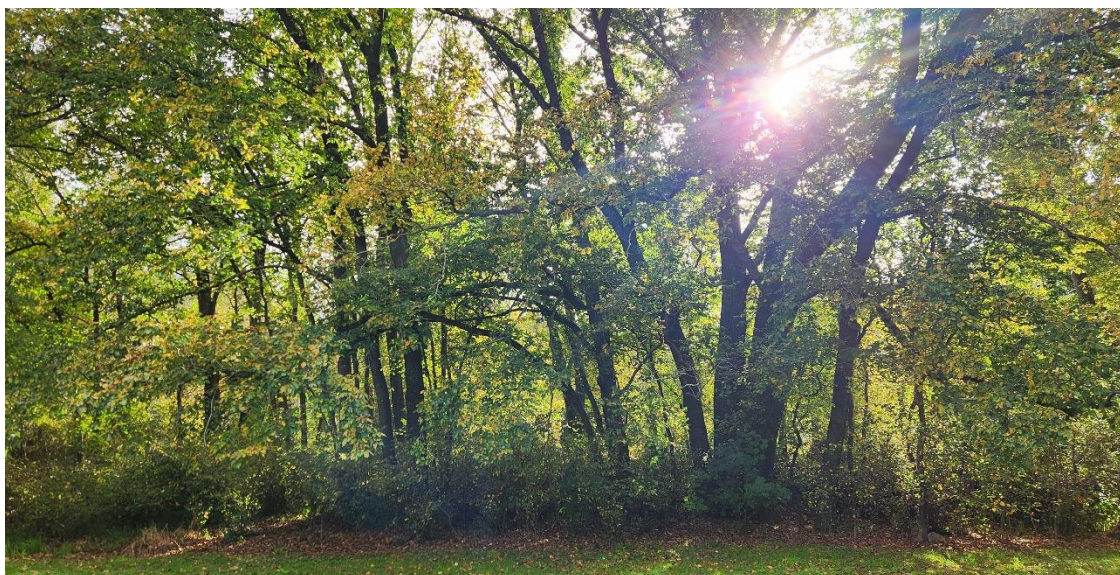
Photograph 4.9: Rank grass and garden vegetation on the true left bank in Portion 3.



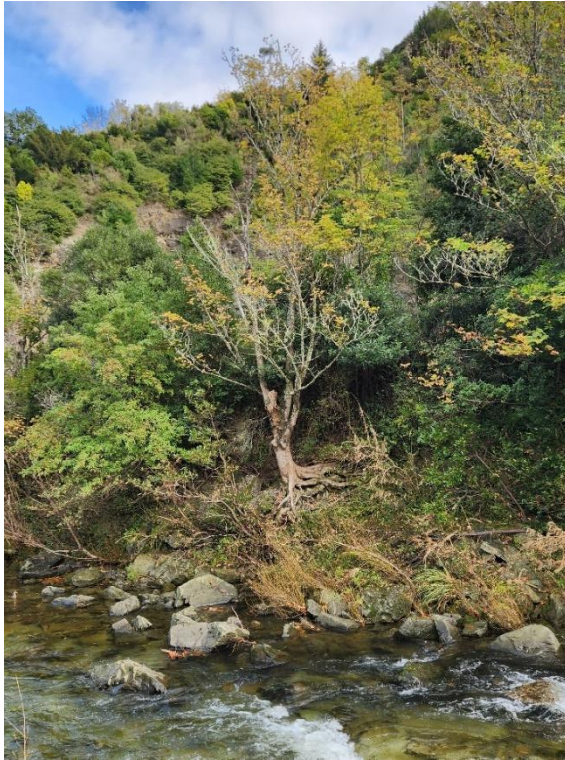
Photograph 4.10: Rank grass and garden vegetation on the true left bank in Portion 3.



Photograph 4.11: Exotic dominated amenity mature planting in Portion 1, showing suitable lizard habitat.



Photograph 4.12: Exotic dominated amenity mature planting in Portion 1 of the site.



Photograph 4.13: Exotic dominated riparian vegetation on the true right bank of the Maitai River (Portion 5).



Photograph 4.14: Looking north towards the true right bank of the Maitai River showing the exotic dominated riparian vegetation (Portion 5).

4.1.3 Birds

Suitable breeding and nesting habitat for native birds comprises a mix of native and exotic vegetation. Potential bird breeding habitat at the site is shown in Figure Appendix A.2. Within the entire project footprint (Portions 1-5), ~ 3,600 m² of suitable habitat for breeding and nesting birds is present, comprising a mix of native and exotic dominated garden vegetation, exotic mature amenity planting and exotic dominated riparian planting.

Five common native species were observed during the site visit, including abundant tauhou/silvereye (*Zosterops lateralis*) flocking along stream banks, pīwakawaka/New Zealand fantail (*Rhipidura fuliginosa*), bellbird (*Anthornis melanura*), little pied shag (*Phalacrocorax melanoleucos melanoleucos*) and tui (*Prothemadera novaeseelandiae*). Other likely species present include grey warbler (*Gerygone igata*) and welcome swallow (*Hirundo neoxena*). All of these species are 'Not Threatened' (Robertson et al. 2021).

There are desktop records of 52 native bird species (including the five observed on site) within 5km of the project site, nine of these records are located within 200m of the site (Appendix C) and are 'Not Threatened' species. There are records of 29 species classified as nationally 'Threatened' or 'At Risk' (Robertson et al. 2021). These records are all greater than 200m from the project site and most species are likely to have been observed in the ecologically rich lower reaches of the Maitai, where freshwater meets the estuary (e.g. kotuku/white heron *Ardea modesta* – 'Threatened Nationally Critical').

Several 'At Risk' shag species are however likely to be present on site based on habitat suitability (Table 4.1). Kāruhiruhi/pied shag (*Phalacrocorax varius*) and kawaupaka/little shag (*Phalacrocorax melanoleucos brevirostris*) are common along the Maitai River and may utilise tall exotic trees such

as poplars and English oak for perching and potentially nesting. They may also nest on rock outcrops or artificial structures near the river.

Due to their threat classifications and in accordance with the EIANZ EclAG guidelines (Appendix B), nationally 'Not Threatened' bird species are of **low** ecological value. Tūī (*Prothemadera novaeseelandiae*) and kererū (*Hemiphaga novaeseelandiae*), despite being nationally 'Not Threatened', are considered of **moderate** ecological value as key pollinators and seed dispersers. Ecological values of 'At Risk' shag species and habitat preferences are shown in Table 4.1.

Table 4.1: Native terrestrial birds observed or likely present at site with a raised national threat classification (Robertson et al. 2021).

Common name	Species name	National threat classification (Robertson et al. 2021)	Ecological value (based on EIANZ EclAG guidelines, Appendix B)	Habitat use
Kāruhiruhi/ Pied shag	<i>Phalacrocorax varius</i>	At Risk - Recovering	Moderate	Use tall exotic trees (e.g. <i>Populus spp.</i>) as perching habitat and possible nesting habitat. Commonly observed freshwater foraging along Maitai River, roosting, perching and wing-drying.
Kawaupaka/ Little shag	<i>Phalacrocorax melanoleucos brevirostris</i>	At Risk - Relict	Moderate-High	
Black shag	<i>Phalacrocorax carbo novaehollandiae</i>	At Risk - Relict	Moderate-High	
Little black shag	<i>Phalacrocorax sulcirostris</i>	At Risk - Naturally uncommon	Moderate-High	

4.1.4 Lizards

4.1.4.1 Lizard habitat

Visual assessment of ecological values confirmed potential lizard habitat along the riparian margins of the Maitai River, comprising a mosaic of:

- Native riparian vegetation.
- Rank exotic grass with harakeke (*Phormium tenax*).
- Pockets of ivy and Tradescantia.
- Sparsely scattered native species (including lemonwood (*Pittosporum eugenioides*) and kōhūhū (*Pittosporum tenuifolium*) with rank grass groundcover.
- Exotic dominated riparian canopy vegetation with exotic rank grass ground cover.
- Native and exotic dominated planted gardens (including Agapanthus).
- Exotic grass groundcover over natural rock of riprap erosion medium.
- Exposed rocky outcrops.
- Coarse woody debris/logs.

The main areas of lizard habitat within the project footprint are mapped and shown in Figure Appendix A.3. Areas of lizard habitat are contiguous with riparian or esplanade vegetation beyond the project footprint where native lizards are likely to also occur based on habitat suitability.

Approximately ~5,500 m² of potential lizard habitat is present within the broader project area (Portion 1-5) and up to ~3,150 m² will be impacted by the proposed works in Consent Package 1 (Portions 1-3). Up to ~400 m² of exposed rock with scree and sporadic rank grass also provides potential lizard habitat in the proposed laydown/stockpile area off Maitai Valley Road (Figure Appendix A.3). A description of lizard habitat and impact area for each of the five Portions within the project area are provided in Table 4.2 below.

Table 4.2: Suitable lizard habitat within project footprint

Portion (Refer to Figure 1.1)	Lizard habitat description	Likelihood of lizard presence	Approximate impact area (m ²)
Portion 1 – Hanby Park true left stopbank	- Exotic rank grass over riprap features - Occasional harakeke	Very high	550 m ²
Portion 2 – Mill Street bend true left stopbank	- Exotic garden vegetation - Exotic rank grass over riprap features	Very high	1,800 m ²
Portion 3 – Mill Street bend to Clouston Bridge, true left	- Exotic (rank) grass - Exotic garden vegetation	Very high	770 m ²
Portion 4 – True left of Clouston Terrace and Clouston Bridge	- Sparsely scattered natives - Exotic rank grass over riprap features - Exotic garden vegetation	Very high	720 m ²
Portion 5 – True right	- Exotic rank grass - Exotic dominated riparian canopy vegetation - Gabion baskets	Very high	1,430 m ²
Proposed laydown/stockpile	- Exposed rock with scree features - Rank grass over loose rock	Very high	Less than 400 m ²

4.1.4.2 Lizard observations and records

Two northern grass skink (*Oligosoma polychroma*) were observed within the project footprint and skink prints were detected from tracking tunnels. Both observations of northern grass skink were made during tracking tunnel set out. Both lizards were actively basking on harakeke and in rank grass. 10% of tracking cards showed skink prints, largely in Portion 3, Portion 4, and the proposed laydown area (See Figure Appendix A.4).

The DOC Herpetofauna Database does not hold any records for lizards at the site, but there are records of multiple species in the last 10 years within a 5 km radius, as well as on iNaturalist. These species and their preferred habitat types are shown in Table 4.2. Based on the observed vegetation and habitat, Raukawa gecko (*Woodworthia maculata*), glossy brown skink (*Oligosoma zelandicum*) and northern spotted skink (*Oligosoma kokowai*) are however unlikely to be present. The habitat is not considered suitable for starred gecko (*Naultinus stellatus*), Minimac gecko (*Woodworthia "Marlborough mini"*) or Forest gecko (*Mokopirirakau granulatus*). For the purpose of this assessment, northern grass skink is considered the only likely native lizard species present.

Northern grass skink are classified as nationally 'Not Threatened' (Hitchmough et al. 2021) and in accordance with the EIANZ EciAG guidelines (Appendix B), due to their threat classification, they are

of **low** ecological value. All native lizards are however protected by the Wildlife Act 1953 and appropriate management is required.

Table 4.2: Herpetofauna species recorded within 5 km of the site. Retrieved from DOC Herpetofauna Database and iNaturalist (09 May 2025).

Common name	Scientific name	National conservation status (Hitchmough et al., 2021)	Preferred habitat type	Presence likelihood on site
Northern grass skink	<i>Oligosoma polychroma</i>	Not Threatened	Diurnal, inhabit a wide range of habitat types, rock piles, grassland, shrubland, forest margins and modified environments.	Very likely (confirmed)
Raukawa gecko	<i>Woodworthia maculata</i>	Not Threatened	Nocturnal, terrestrial, and mostly rock-dwelling, but can also be semi-arboreal, found from shorelines to inland beech and broadleaf forest.	Very unlikely
Glossy brown skink	<i>Oligosoma zelandicum</i>	At Risk – Declining	Diurnal, inhabit coastal and lowland damp areas, particularly grasslands, forest edges, shrublands.	Very unlikely
Northern spotted skink	<i>Oligosoma kokowai</i>	At Risk - Relict	Open sunny areas such as boulder beaches, sand dunes, open coastal forest and scrub, as well as grassland, shrubland and scree slopes at inland sites. Mainly terrestrial but will also climb shrubs or branches to forage.	Very unlikely
Starred gecko	<i>Naultinus stellatus</i>	Threatened – Nationally Vulnerable	Cathemeral, but predominantly diurnal. Primarily arboreal but can be found in ground-hugging vegetation. Inhabit a wide variety of forest types including swamps, scrubland and mature forest.	N/A
Forest gecko	<i>Mokopirirakau granulatus</i>	At Risk - Declining	Primarily nocturnal and arboreal but are almost exclusively terrestrial in subalpine/alpine environments. Associated with a range of different habitats including swamps, scrubland, mature forest and rock fields.	N/A
Minimac gecko	<i>Woodworthia “Marlborough mini”</i>	At Risk – Declining	Nocturnal and terrestrial. Found in a variety of habitats from the coast, where it inhabits boulder beach habitats, through to the alpine zone where it is associated with rocky habitats.	N/A

4.2 Freshwater

4.2.1 Freshwater habitat

The site is approximately 2.2 km upstream of the mouth of the Maitai River at the Nelson Haven. It spans over approximately 900 m between Clouston Terrace and Hanby Park.

The freshwater habitat within the 900 m reach is predominantly run – riffle – pool habitat with gravel, cobble and boulder substrates (Photograph 4.15 to Photograph 4.23). Small pockets of sand are present along the bank in places. Deposited fine sediment (<2 mm) is overall low but increases in pools. The NIWA Fish Passage Assessment Tool (NIWA, 2021) has no records of barriers to fish passage within this 2.2 km section of river, or the 900 m reach of river where stopbank and floodway works are proposed. The NRMP lists the reach of the Maitai River from Riverside to Almond Tree Ford (which contains the site) as an area with native fisheries as a value, and as a ‘first’ priority for improvement.

A riparian vegetation strip provides partial shading to the channel. It is a mixture of exotic and native tree species, as well as an understory of mixed native and exotic shrubs. Extensive bank controls have been implemented throughout the reach, with large rip rap and gabion baskets on both the true right and true left banks which provide protection to the urban and recreational areas in the surrounding area (T+T, 2022). No periphyton were present during a site walkover on 20 May 2025. However, previous data does show that visible periphyton growth (including algae) becomes obvious and prolific in some areas (e.g. on larger cobbles and immersed boulders), covering greater than 20% of available substrate cover during summer.

The 900 m reach of the Maitai River has a **high** current ecological value (Appendix B Table 4). This is due to the range of habitat types within the river that sustains a diverse native fish community, no barriers to fish passage, but modifications to the riparian zone, banks and catchment.

In the absence of the project, the freshwater habitat within this reach would remain at its current ecological value of **high**. The urban land use and requirement of flood protection controls limits the riparian zone and likely introduces contaminants from human activities, such as stormwater runoff. Therefore, the potential ecological value of the reach within the Maitai River is considered **high**.



Photograph 4.15: Looking downstream from the transition of Portion 1 to Portion 2 (20 May 2025).



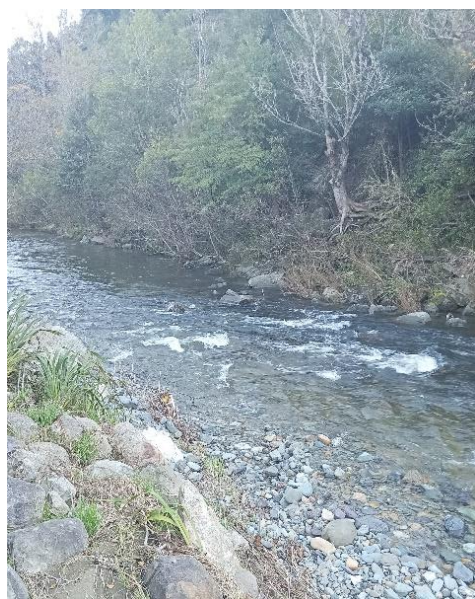
Photograph 4.16: Looking upstream from the transition of Portion 1 to Portion 2 (20 May 2025).



Photograph 4.17: Looking downstream from the true left bank in Portion 2 (20 May 2025).



Photograph 4.18: Looking upstream from true left bank in Portion 2 (20 May 2025).



Photograph 4.19: Run and riffle habitat at the Portion 2 bend (20 May 2025).



Photograph 4.20: Slow flowing deeper habitat at the Portion 2 bend (20 May 2025).



Photograph 4.21: Slow run habitat upstream of Clouston Bridge at the upstream end of Portion 4 (20 May 2025).



Photograph 4.22: Mixed hard substrate upstream of Clouston Bridge at the upstream end of Portion 4 (20 May 2025).



Photograph 4.23: Portion 4 downstream of the Clouston Bridge (21 January 2025).

4.2.2 Freshwater fauna

Several species of native freshwater fish have been recorded in the Maitai River catchment on the New Zealand Freshwater Fish Database (NZFFD; accessed 07 May 2025), or by T+T staff, within or upstream of the site since 2014 (Table 4.3). This includes four nationally 'At Risk – Declining' species, longfin eel (*Anguilla dieffenbachii*), torrentfish (*Cheimarrichthys fosteri*), kōaro (*Galaxias brevipinnis*)

and īnanga (*Galaxias maculatus*), and one nationally 'Threatened – Nationally Vulnerable' species, lamprey (*Geotria australis*) (Dunn et al., 2018). Each of these species (as well as others identified within the catchment) is migratory to some degree, going between freshwater and the sea as part of their lifecycle. Bluegill bully (*Gobiomorphus hubbsi*; At Risk - Declining) have been historically identified within the Maitai River, but no data on a current population exists.

Table 4.3: Records of freshwater fauna species present within the Maitai River at or upstream of the site since 2014

Common Name	Scientific name	National conservation status (Dunn et al., 2018)
Lamprey	<i>Geotria australis</i>	Threatened – Nationally Vulnerable
Longfin eel	<i>Anguilla dieffenbachii</i>	At Risk – Declining
Torrentfish	<i>Cheimarrichthys fosteri</i>	At Risk – Declining
Kōaro	<i>Galaxias brevipinnis</i>	At Risk – Declining
Īnanga	<i>Galaxias maculatus</i>	At Risk – Declining
Shortfin eel	<i>Anguilla australis</i>	Not Threatened
Upland bully*	<i>Gobiomorphus breviceps</i>	Not Threatened
Common bully	<i>Gobiomorphus cotidianus</i>	Not Threatened
Redfin bully	<i>Gobiomorphus huttoni</i>	Not Threatened
Kaharoa bully*	<i>Gobiomorphus mataraerore</i>	Not Threatened
Kōura	<i>Paranephrops planifrons</i>	Not Threatened
Common smelt	<i>Retropinna retropinna</i>	Not Threatened
Brown trout	<i>Salmo trutta</i>	Introduced and Naturalised

Note: *Likely one species with differing identification in records

The ecological value of freshwater fauna within the Maitai River at the site is considered **high** based on the presence of multiple native species that are classified as 'At Risk – Declining' or 'Threatened – Nationally Vulnerable' (Appendix B Table 1). In the absence of this project, the potential value of freshwater fauna within the Maitai River at this site would remain **high**.

4.3 Summary of ecological values

Terrestrial and freshwater habitat and species values identified within the project site and immediate surrounds range from **negligible** to **very high**, see Table 4.4 below.

Table 4.4: Summary of terrestrial and freshwater ecological values

Ecological feature	Ecological value	Potential ecological value*
Vegetation		
Type 1: Native dominated riparian	Moderate	N/A
Type 2: Native dominated planted garden vegetation	Low	N/A
Type 3: Early successional native tree land	Moderate	N/A
Type 4: Exotic dominated grasslands	Negligible	N/A
Type 5: Exotic dominated planted garden vegetation	Negligible	N/A
Type 6: Exotic dominated amenity mature planting	Negligible	N/A
Type 7: Exotic dominated riparian	Negligible	N/A
Terrestrial fauna		
Native birds: Nationally 'Not Threatened' species	Low	N/A
Native birds: Tui & Kereru (‘Not Threatened’ but important for pollination/seed dispersal)	Moderate	N/A
Native birds: Nationally ‘At Risk’ species: - Black shag - Little Pied Shag - Little Black Shag - Pied Shag	Moderate-High	N/A
Lizards: Northern grass skink (Not Threatened')	Low	N/A
Freshwater values		
Habitat	High	High
Fauna	High	High

*Potential ecological value is only considered for freshwater values (as required by the NPS- FM 2024).

5 Assessment of ecological effects

The following section describes the proposed activities and the potential effects of those activities, before and after mitigation measures, on the ecological features and values discussed above. Measures to address the potential effects are included within the relevant section and conclusions are drawn to the overall level of effect considering those ecological values. The proposed design and construction methodology show that works in water will not occur as part of Consent Package 1. This must be followed so that there are no effects on downstream freshwater habitats and faunal communities. Since works are not occurring in water, any potential ecological effects resulting from direct instream works are not discussed any further in this EclA.

5.1 Proposed works and summary of actual and potential effects

The following assessment has been undertaken based on the proposed flood improvement works for Consent Package 1, detailed in the AEE report and summarised in Section 2.1.

Potential adverse effects on **flora and vegetation/habitat** ecological values include:

- Temporary loss of up to 3,200 m² vegetation, comprising ~1,400 m² native dominated riparian and amenity planting and 1,800 m² exotic dominated vegetation. Note permanent loss of vegetation and habitat is not expected as following completion of works, all affected areas will be fully remediated with largely native plantings.
- Temporary loss of up to ~3,150 lizard habitat, mostly comprising:
 - Native dominated riparian vegetation including harakeke (~800 m²).
 - Exotic dominated vegetation, including gardens (~2,350 m²).
 - Plus rocky outcrops (~400 m²) in the proposed lay down area.

Temporary loss of up to ~900 m² bird breeding largely comprising exotic dominated garden and amenity planting.

Potential adverse effects on **terrestrial fauna** ecological values include:

- Temporary loss of habitat in the short-term.
- Injury or mortality of native fauna (lizards and birds) during vegetation and habitat removal.
- Temporary disturbance to native birds and lizards (northern grass skink) during construction (e.g., from noise and vibration from heavy machinery).

Potential adverse effects on **freshwater** ecological values include:

- Temporary construction effect of sedimentation on freshwater habitat and fauna.
- Riparian vegetation removal effects on stream function.

Effects identified and proposed measures to manage these effects described in more detail below.

An Ecological Management Plan (EMP) will be prepared to detail effects management measures. The EMP will include an Avifauna Management Plan (AMP), Lizard Management Plan (LMP), and Vegetation Management Plan (VMP).

5.2 Terrestrial

5.2.1 Vegetation

Efforts to avoid or minimise the potential for adverse ecological effects have been undertaken through the optioneering and concept design phases of the project. However, vegetation and habitat removal will still be required. Assuming all terrestrial and riparian vegetation within the project footprint will be removed to facilitate the proposed works for Consent Package 1, the total area of

vegetation loss will be up to 3,200 m², comprising ~1,400 m² native dominated and 1,800 m² exotic. The project design for Portion 1 has been refined to avoid several large landscape trees which are to be retained. Vegetation to be removed is mapped in Figure Appendix A.1.

The maximum amount of vegetation loss for each vegetation type within the areas considered in Consent Package 1 (Portion 1, 2 and 3) is as follows:

- Native dominated riparian (~800 m²)
- Native dominated planted garden vegetation (~600 m²)
- Exotic dominated grasslands (~1,450 m²)
- Exotic dominated planted garden vegetation (~150 m²)
- Exotic dominated amenity mature planting (~175 m²)

Exotic dominated (rank) grassland, exotic dominated garden vegetation and exotic dominated amenity planting vegetation types are dominated by exotic species and are not representative of naturally-occurring ecosystems. These vegetation types have been assigned an ecological value from a botanical perspective of **negligible**.

While areas of native dominated planted garden vegetation do comprise native plant assemblages, these areas are not naturally occurring and are considered to be of **low** ecological value. The native dominated riparian areas have a higher proportion of indigenous plant species and the composition is more akin to a natural ecosystem. These vegetation types are considered to be of **moderate** ecological value.

It has been conservatively assumed that vegetation within entire footprint of each of the works portions (1, 2, 3) will be removed to facilitate the proposed works. However, where possible, if vegetation can be retained, this will be undertaken to minimise the scale of vegetation loss. Vegetation management is to be undertaken by experienced arborists, demarcating the clearance extent and minimising impacts to adjacent vegetation. The VMP, which forms part of the EMP, will outline measures to ensure vegetation management is undertaken in a way that minimises vegetation loss where possible.

The removal of all vegetation from the project footprint will result in a major alteration to the baseline condition, however the environment post-construction will be fully remediated with largely native eco-sourced vegetation. The vegetation loss is therefore considered temporary and short-term.

Remediation planting will include planting native species representative of a natural riverine ecosystem and the quantum of native vegetation cover in the medium to long term will be substantially greater than present. The area of native dominated vegetation loss is approximately 1,400 m², versus 1,800 m² exotic dominated vegetation. Remediation of the site will likely result in a **net gain** in native biodiversity.

A Habitat Remediation Planting Plan will be prepared as part of the EMP and will include planting zones, specifications, spacing and plant densities, as well as site preparation, maintenance and monitoring requirements. Native plants will be eco-sourced and endemic to the awa environment, provided from the local Ngāti Kuia or Kūmānu plant nursery. Recommended plant species for different riparian zones are provided in Appendix C.

Given the temporary effect of vegetation loss and the proposed remediation planting, the magnitude of effect of vegetation removal is considered to be **moderate** in the short-term during the construction phase and **low** over the medium to long term.

In accordance with the EclA guidelines (Appendix B) combining the ecological values for each vegetation type and the magnitude of effect, the overall long-term level of effect of vegetation loss is:

- **Very low** for exotic vegetation types with a negligible ecological value.
- **Low** for vegetation with a low ecological value (native dominated garden planting).
- **Low** for vegetation with a moderate ecological value (native dominated riparian areas).

5.2.2 Birds

Potential adverse effects on native terrestrial birds include:

- Temporary loss of nesting/breeding habitat (up to ~900 m²).
- Disturbance, injury or mortality during vegetation and habitat clearance.

The loss of up to 900 m² constitutes a relatively minor loss of habitat for native terrestrial birds, given the scale of similar available habitat within the immediate vicinity (10,300 m² within the broader site), as well as upstream and downstream of the project footprint and wider surrounds. However, habitat removal during the peak forest bird breeding season (September to January inclusive) can result in direct harm to nests, eggs and nestlings. Most native birds are protected by the Wildlife Act 1953 and appropriate management will be required.

Without measures to avoid, remedy and mitigate effects, the potential magnitude of effect on the local terrestrial/urban bird populations could be **moderate** without efforts to remediate habitat or protect native birds during peak bird breeding season.

To reduce potential adverse effects on native birds, the following effects management measures are proposed:

- Minimisation of bird roosting and nesting habitat loss, where possible.
- Conducting bird nest checks if clearance or pruning of specimen trees occurs during peak native bird breeding season (September to January inclusive).
- Habitat remediation across the project footprint, which will include provision of plant species suitable for perching, roosting and nesting behaviour in the medium-long term.

It is recommended to avoid habitat clearance during peak native forest bird breeding season. If habitat clearance of native vegetation or exotic specimen trees is required during peak native forest bird breeding season (September to January), bird nest checks should be undertaken in accordance with the project EMP which includes an Avifauna Management Plan (AMP). In summary, bird nest checks include the following protocols:

- Footprint delineation, marking out the area required for clearance.
- A suitably qualified ecologist to undertake a thorough survey of the clearance area and specimen trees immediately adjacent (within 10 m). For arboreal nests, binoculars will be used. Bird behaviours will be observed to determine likelihood of nest presence (some birds undertake behavioural displays to protect nests).
 - Arborists may be required to climb taller trees that may have cavities potentially used by cavity nesters (such as kōtare/sacred kingfisher)
- If no active native bird nests are found, checked vegetation may be cleared within three days of the survey.
- Where active native bird nests are identified, individual trees and immediate surrounding vegetation to be left in situ, cordoned off until nesting birds have fledged or nests have been naturally abandoned, as verified by a suitably qualified ecologist. A buffer of 10 m is considered suitable for nationally Not Threatened species, while a 30 m buffer should be established for nationally 'At Risk' species.

Following implementation of the above recommendations, the magnitude of effect on birds is considered to be **very low**.

A **low** to **high** ecological value for terrestrial birds combined with a **very low** magnitude of effect results in an overall **low** to **very low** level of effect.

5.2.3 Lizards

Potential adverse effects of the proposed works on native lizards (northern grass skink⁶) include:

- Temporary loss of lizard habitat equating to approximately 3,150 m², mostly comprising:
 - Native vegetation including harakeke (~800 m²).
 - Exotic dominated vegetation, including gardens (~2,350 m²).
 - Plus rocky outcrops (~400 m²).
- Lizard disturbance, injury or mortality during vegetation and habitat removal.

The loss of lizard habitat constitutes a relatively minor loss of habitat for native skinks in the local area as there is ample similar habitat on either side of the project footprint, which continues for several kilometres along the Maitai River. However, without measures to avoid, remedy or mitigate effects, the potential magnitude of effect on native lizards is considered **moderate**. All native fauna are protected under the Wildlife Act (1953) and appropriate management is required.

To reduce potential adverse effects on lizards, the following effects management measures are proposed:

- Minimisation of lizard habitat loss where possible.
- Lizard salvage prior to and during vegetation/habitat clearance.
- Lizard relocation to a suitable site for northern grass skink approved by DOC.
- Provision and reconstruction of lizard habitat within the project area, including rock piles, logs and coarse woody debris, where practicable.
- Habitat remediation across the project footprint including provision of lizard habitat (e.g. habitat features and plant species that support native lizards).

Permanent loss of lizard habitat is not expected as following completion of works, all affected sites will be fully remediated to provide habitat for lizards. The planting palette will include suitable species for northern grass skink habitat, including native shrubs, grasses and groundcovers that provide shelter, foraging habitat and basking sites. Suitable climbing plant species (e.g. *Muehlenbeckia* spp.) are recommended to provide lizard habitat over riparian facing floodwalls, with native shrubs and grasses (in keeping with existing environment) at the base to allow for lizard movement in the event of any future flood events. In the short term (2-5 years following completion of construction) it is anticipated that there will be no overall loss of lizard habitat.

A Habitat Remediation Planting Plan will be prepared for the project as part of the broader EMP and will detail planting and habitat creation requirements (and scale) to mitigate the loss of lizard habitat. This will broadly follow the guidance set out by the DOC Technical Advisory Group (2023).

A Lizard Management Plan (LMP) has been prepared follow industry-standard guidelines (DOC 2018 and DOC 2019) to manage potential lizard injury or death during habitat clearance. The LMP has also been prepared as part of an application for a Wildlife Act Authority (WAA) application to DOC. A WAA is required to catch, handle and relocate native lizards. The LMP outlines the following:

⁶ Based on their national threat classification (Not Threatened) and as per EIANZ criteria (Roper-Lindsay et. al, 2018; Appendix B) northern grass skink are of low ecological value.

- Responsibilities of personnel involved in lizard management.
- Summary of lizard ecological values, effects and effects management.
- Salvaging protocols for lizards. Includes the following methods:
 - Artificial Cover Object (ACO) salvage.
 - Manual habitat salvage.
 - Machine-assisted salvage.
 - Establishment of a silt fence to prevent native lizards from homing (where practicable).
 - Habitat enhancement measures such as relocation of logs and rocks (where practicable).
- Lizard relocation protocols including relocation site description.
- Adaptive management protocols.
- Reporting requirements.
- Key principles for lizard salvage.

In accordance with the EclA guidelines (Appendix B), a **low** ecological value for northern grass skink combined with a **low** magnitude of effect (following the above efforts to avoid, remedy, minimise and mitigate impacts), results in an overall **very low** level of effect on native lizards.

5.3 Freshwater

5.3.1 Temporary construction effects – sedimentation

The proposed works will involve excavating the existing bank to construct new stopbanks. These works have the potential to result in uncontrolled discharge of sediment into the Maitai River. Without mitigation, sediment could accumulate in the river at the immediate works area and downstream, leading to adverse effects on freshwater fauna. Sediment entering the river can negatively impact freshwater habitat and fauna through changes in water clarity and sediment deposition. These can reduce interstitial spaces utilized by fish and macroinvertebrates, cover fish spawning habitat, clog gills, and reduce the feeding ability of fish and macroinvertebrates (Reid and Quinn, 2011).

The potential effects of sediment discharge to the river with no sediment control measures in place could result in a temporary (the duration of the construction works) **moderate** magnitude of effect on both freshwater habitat and freshwater fauna from an alteration of freshwater habitat via sedimentation compared to baseline conditions. This would result in an overall level of effect of **high** for both freshwater habitat and freshwater fauna.

Sedimentation effects on water quality can be minimised by adherence to good practice construction methods and the development and implementation of Erosion and Sediment Control Plans (ESCP) prepared in accordance with the Nelson Tasman Erosion and Sediment Control Guidelines (Nelson City Council and Tasman District Council, 2019). The works will not require working within the wetted area of the channel which will avoid sediment being stirred up from the riverbed.

We understand that no works will be undertaken within the wetted area for Consent Package 1.

With appropriate sediment controls in place the magnitude of effect from sedimentation will be reduced to **low** with conditions being similar to pre-development circumstances. A **low** magnitude of effect and **high** ecological values for freshwater habitat and freshwater fauna results in an overall **low** level of effect in accordance with Appendix B Table 7.

5.3.2 Riparian vegetation removal effects on stream function

Riparian vegetation plays an important role in the health of a freshwater system. Acting as a buffer between the freshwater and terrestrial environments, this vegetation filters out contaminants such as sediment and nutrients in runoff, stabilises the soil, provides shade to the watercourse which reduces temperature fluctuations of the water and reduces periphyton growth, and provides in-stream food supplies and habitat (e.g. woody debris and leaf litter). All these effects lead to improved water quality and increased biodiversity compared to a system with no riparian buffer.

The proposed works are likely to remove some riparian vegetation on the true left bank. With no management measures in place, the loss of riparian vegetation can have negative effects to the freshwater habitat within the Maitai River. This could result in a potentially long-term **moderate** magnitude of effect based on the loss of a key element of existing baseline conditions for shading, and a potentially temporary short-term **moderate** magnitude of effect for filtering and bank stabilisation. The Branford Park hill on the true right of the river will provide some shading to the stream in the absence of riparian vegetation, and rank herb/grasses will quickly grow to replace the removed vegetation, providing some benefit, but not to the same extent as the current riparian vegetation. A **moderate** magnitude of effect and a **high** ecological value for freshwater habitat would result in a **high** overall level of effect.

As described in Section 5.2.1 remediation planting is proposed for the project area as part of the effects management package for vegetation loss. This remediation planting will account for the riparian vegetation felled as part of the project, with the added benefit of exotic species being replaced with native species enhancing biodiversity. Low stature vegetation such as sedges and shrubs have relatively fast growth rates, providing the same level of ecological benefit of filtering and bank stabilisation as pre-construction within a few years. With remediation planting of riparian vegetation, the magnitude of effect will be **low** based on a minor shift from baseline conditions until the vegetation matures. A **low** magnitude of effect and a **high** ecological value for freshwater habitat will result in a **low** overall level of effect.

5.4 Summary of effects and proposed effects management

Terrestrial and freshwater values of the site and immediate surrounds range from **negligible** to **high**. Measures are proposed to address effects on these values. These measures (to be detailed in a project EMP), if fully implemented, will reduce the overall level of effects on ecological values to **low to very low**. Table 5.1 summarises the ecological values of the site, potential adverse effects, magnitude and overall level of effect following the recommended effects management measures.

An EMP will be developed to outline protocols to avoid, minimise, remedy and mitigate potential adverse effects on the ecological and biodiversity values within the project area associated with the proposed works. It will include an AMP, LMP, and VMP.

The EMP will include a summary of the roles and responsibilities of those implementing the EMP, accidental discovery protocols for native fauna, adaptive management measures and reporting requirements. Specific management measures for vegetation, birds, lizards and fish are summarised below.

Table 5.1: Summary of ecological effects of Consent Package 1 following the implementation of effects management measures

Ecological feature	Ecological value	Effects summary	Proposed effects management	Magnitude of effect after effects management	Overall level of effect
Vegetation:					
Native dominated riparian (~800 m²)	Moderate	Temporary vegetation loss up to ~3,200 m².	Implementation of VMP, including: - Refinement of vegetation clearance footprint to minimise vegetation clearance. Full native remediation planting of site post-construction. Details to be provided in Habitat Remediation Planting Plan.	Low (medium-long term)	Low
Native dominated planted garden vegetation (~600 m²)	Low				Low
Exotic dominated grasslands (~1,450 m²)	Negligible				Very Low
Exotic dominated planted garden vegetation (~150 m²)	Negligible				Very Low
Exotic dominated amenity mature planting (~175 m²)	Negligible				N/A
Terrestrial fauna:					
Native birds: Nationally 'Not Threatened' species (but protected under Wildlife Act 1953)	Low	Temporary loss of bird habitat (up to 900 m² of breeding/nesting habitat).	Implementation of AMP, including: - Avoiding vegetation removal outside of bird breeding season (Sept – Jan) where practicable. - If specimen tree clearance or pruning occurs between Sept – Jan, native forest bird nest checks prior to vegetation works required.	Low	Very Low
Native birds: Tui & Kereru ('Not Threatened' but important for pollination/seed dispersal)	Moderate	Disturbance, injury or mortality during vegetation clearance.		Low	Low
Native birds: Nationally 'At Risk' species: - Black shag	Moderate - High			Low	Low

Ecological feature	Ecological value	Effects summary	Proposed effects management	Magnitude of effect after effects management	Overall level of effect
- Little Pied Shag - Little Black Shag - Pied Shag			- Incidental discovery protocols for birds. - Habitat remediation following works completion (including planting species suitable for bird perching, foraging, breeding and nesting).		
Lizards: Northern grass skink ('Not Threatened' but protected under Wildlife Act 1953)	Low	Temporary loss of lizard habitat up to approximately 3,150 m ² . Disturbance, injury or mortality during vegetation clearance.	Implementation of LMP, including: - Seasonal restrictions requiring clearance of potential lizard habitat vegetation between Oct – April inclusive. - Lizard salvage pre and during vegetation clearance. - Lizards to be relocated to suitable relocation site with animal pest control approved by DOC. - Habitat remediation following works completion (including planting species suitable for lizard habitat).		
Freshwater					

Ecological feature	Ecological value	Effects summary	Proposed effects management	Magnitude of effect after effects management	Overall level of effect
Freshwater habitat Freshwater fauna	High	Temporary construction effects – sedimentation.	Develop and implement an ESCP.	Low	Low
Freshwater habitat	High	Riparian vegetation removal effects on stream function	Remediation planting of riparian margins.	Moderate	Low

6 Summary and recommendations

Existing banks on both sides of the Maitai River between Hanby Park and Clouston Terrace are overtopped during major flood events. Nelson City Council proposes flood improvement works to the true left of the river (Portions 1, 2 and 3; Consent Package 1) to reduce the frequency and magnitude of overtopping.

Terrestrial ecological values at the site range from **negligible** to **high** and include native and exotic vegetation along riparian margins which offers suitable habitat for native lizards (northern grass skink) and a suite of native birds, including nationally 'At Risk' species. The mid Maitai River (containing the site) is regarded as an important site for native fisheries under the Nelson Resource Management Plan, and as a 'first' priority for improvement. Several 'At Risk – Declining' freshwater fish species have been recorded in the Maitai River, including longfin eel, torrentfish, kōaro and īnanga. 'Threatened – Nationally Vulnerable' lamprey are also present. Therefore, the site is of **high** ecological value for freshwater habitat and freshwater fauna.

The proposed works have the potential to impact terrestrial and freshwater ecological values within the site and immediate surrounds. Without management, potential adverse effects include:

- Temporary loss of ~3,200 m² vegetation (comprising 1, 400 m² native and 1,800 m² exotic).
- Temporary loss of up to ~3,150 m² of habitat suitable for northern grass skink.
- Temporary loss of up to ~900 m² bird breeding/nesting habitat.
- Injury or mortality of native lizards and birds during vegetation and habitat removal.
- Temporary disturbance to birds and lizards during construction (e.g., from noise and vibration from heavy machinery).
- Discharge of sediment laden water to the freshwater environment.
- Removal of riparian vegetation on stream function.

Recommended measures to manage potential adverse effects on terrestrial and freshwater ecological values include:

- Vegetation management to be undertaken by experienced arborists, demarcating the clearance extent and minimising impacts to adjacent vegetation.
- Vegetation to be removed outside of bird breeding season (Sept-Jan, inclusive), where practicable. Where this is not possible, native forest bird nest checks prior to clearance or pruning of specimen trees by a suitably qualified ecologist will be required.
- Lizard salvage must be undertaken between October to April (inclusive), when lizards are most active. Lizard salvage is to be undertaken immediately before and during vegetation clearance through the checking of ACOs, manual searches and machine-assisted salvage. Northern grass skink will be relocated to a release site (as approved by DOC), following industry standard protocols.
- Implementation of an erosion and sediment control plan prepared in accordance with best practice methods and aligned with Nelson Tasman Erosion and Sediment Control Guidelines.
- In the event any native fauna is found during works, injured or dead, incidental discovery protocols will be implemented.
- Following completion of works, full remediation of the site will be undertaken to replace the native and exotic vegetation removed. A predominantly native planting palette will be used, including a suite of species representative of a natural riverine ecosystem. Provisions for lizard and bird breeding/nesting habitat will also be included. Planting specifications will also include exotic specimen park trees only in areas where practicable, e.g. Hanby Park.

An EMP will be developed to outline the above protocols to avoid, minimise, remedy and mitigate potential adverse effects on the ecological and biodiversity values within the project area associated with the proposed works. It will include an Avifauna Management Plan, Lizard Management Plan, Vegetation Management Plan, and Habitat Remediation Planting Plan.

Following implementation of the EMP, potential adverse effects associated with Consent Package 1 activities on the terrestrial and freshwater ecological values can be managed to an overall **low to very low** level of effect. There will likely be a **net biodiversity gain** for the site in the medium to long-term following native planting remediation following completion of works.

7 Applicability

This report has been prepared for the exclusive use of our client Nelson City Council, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that our client will submit this report as part of an application for resource consent and that Nelson City Council as the consenting authority will use this report for the purpose of assessing that application.

Tonkin & Taylor Ltd
Environmental and Engineering Consultants

Report prepared by:

Authorised for Tonkin & Taylor Ltd by:



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Damian Vellupillai
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Matt Barson
Freshwater Ecologist

Technically reviewed by: Patrick Lees (Senior Freshwater Ecologist) and David Pickett (Senior Terrestrial Ecologist)

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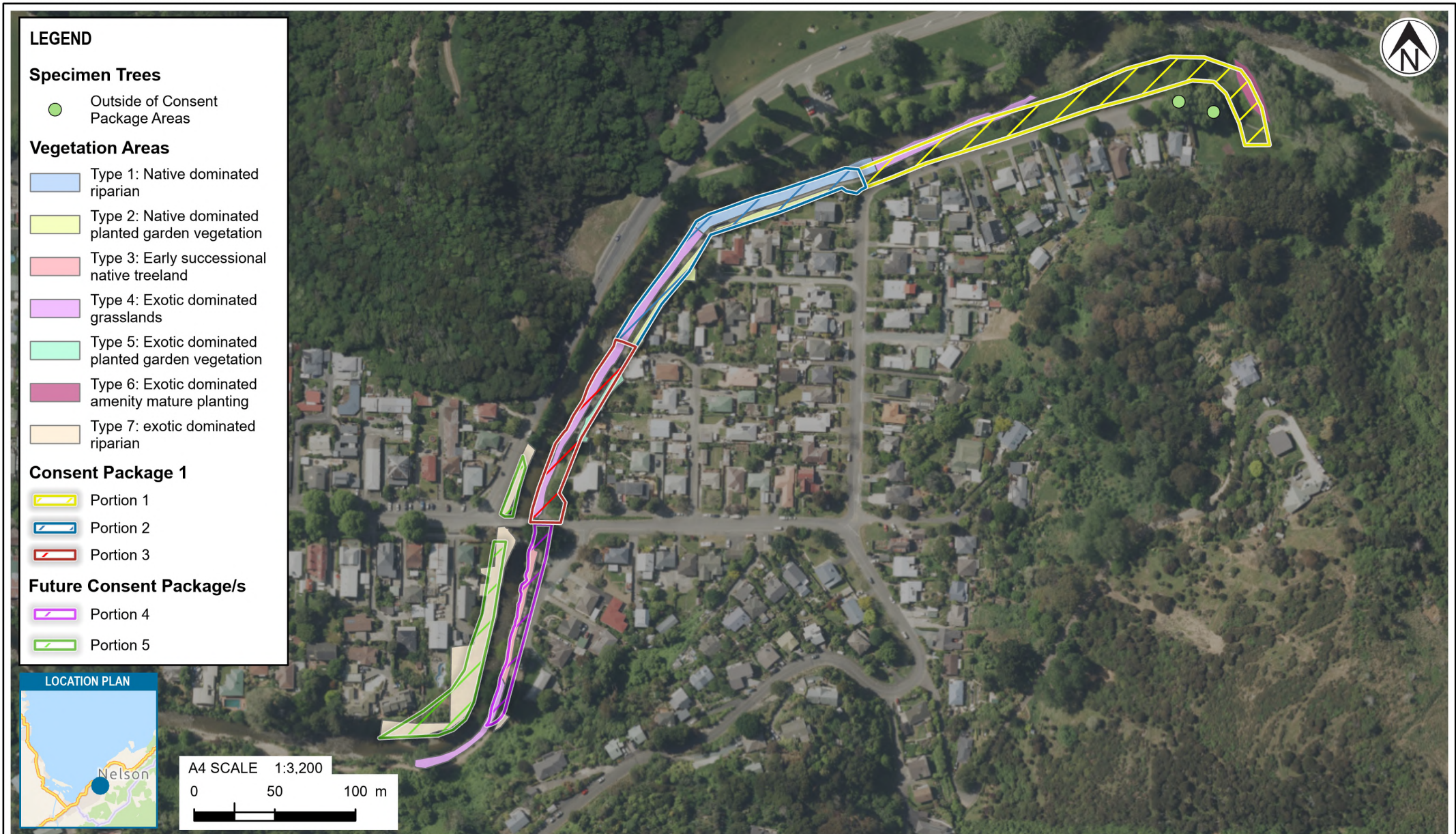
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Appendix A Site figures

- **Figure Appendix A.1: Vegetation types within the site**
- **Figure Appendix A.2: Bird breeding habitat within the site**
- **Figure Appendix A.3: Lizard habitat within the site**
- **Figure Appendix A.4: Lizard observations and tracking tunnel survey locations**



 Tonkin+Taylor www.tonkintaylor.co.nz Exceptional thinking together	NOTES: Dark Background Overlay: . Specimen Trees: T+T, NZ Navigation Map: Eagle Technology, LINZ, StatsNZ, NIWA, Natural Earth, © OpenStreetMap contributors.. NZ Imagery: Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors	REVISIONS			PROJECT No. 1006675.5170			CLIENT NELSON CITY COUNCIL			
		First version (28/08/2025)	0	DSMI	DESIGNED	DSMI	AUG.25	PROJECT	MATAI RIVER FLOOD IMPROVEMENT WORKS (AREA 1)		
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LEGEND

Specimen Trees

-  Outside of Consent Package Areas

Bird Breeding Habitat

(derived vegetation areas)

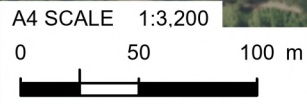
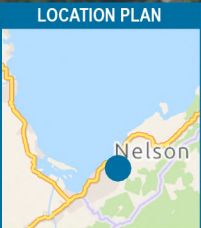
-  Type 2: Native dominated planted garden vegetation
-  Type 5: Exotic dominated planted garden vegetation
-  Type 6: Exotic dominated amenity mature planting
-  Type 7: exotic dominated riparian

Consent Package 1

-  Portion 1
-  Portion 2
-  Portion 3

Future Consent Package/s

-  Portion 4
-  Portion 5



NOTES:

Dark Background Overlay: . Specimen Trees:
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CLIENT **NELSON CITY COUNCIL**

PROJECT **MATAI RIVER FLOOD IMPROVEMENT WORKS (AREA 1)**

TITLE **BIRD BREEDING HABITAT**

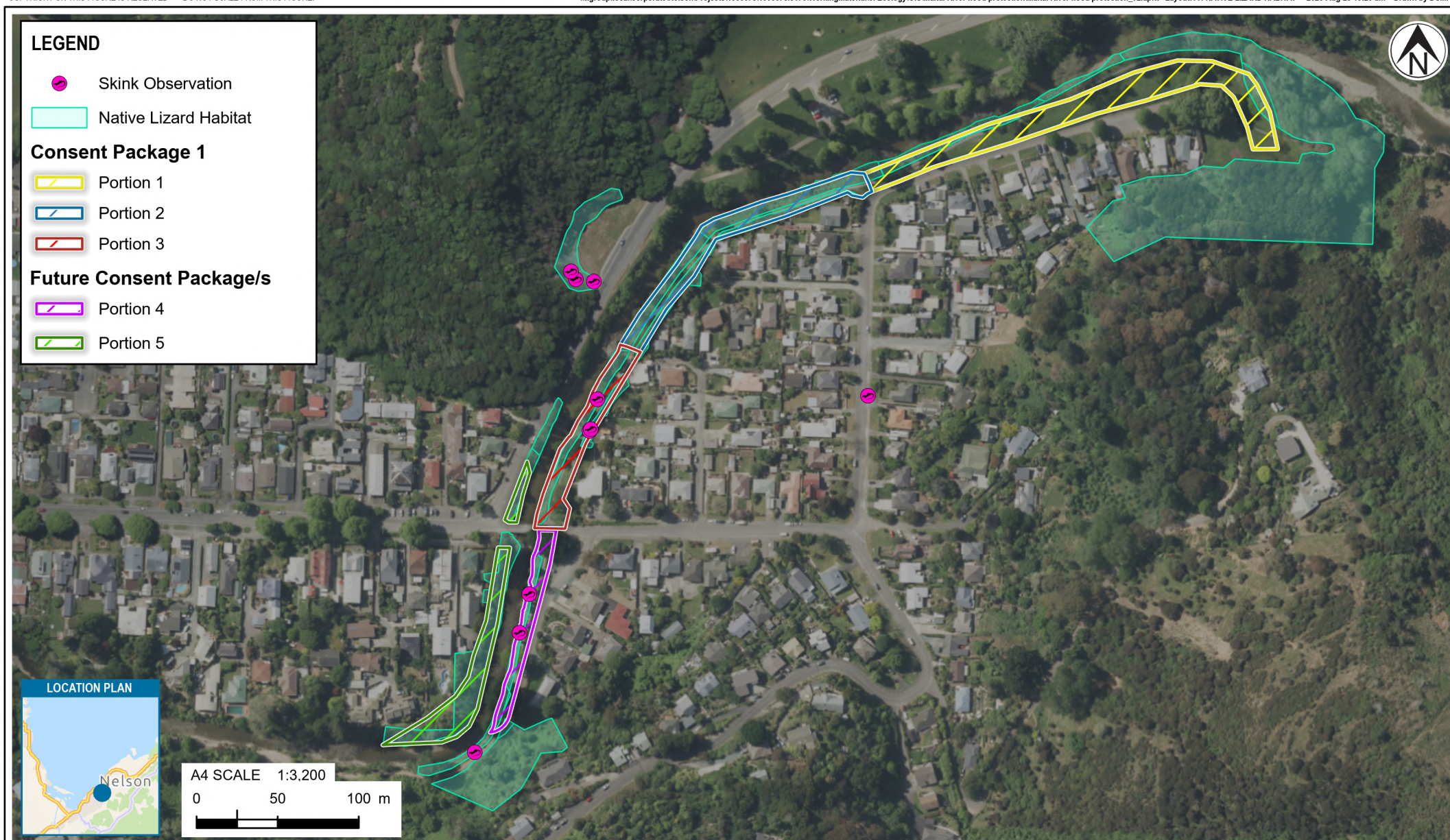
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PROJECT MATAI RIVER FLOOD IMPROVEMENT WORKS (AREA 1)

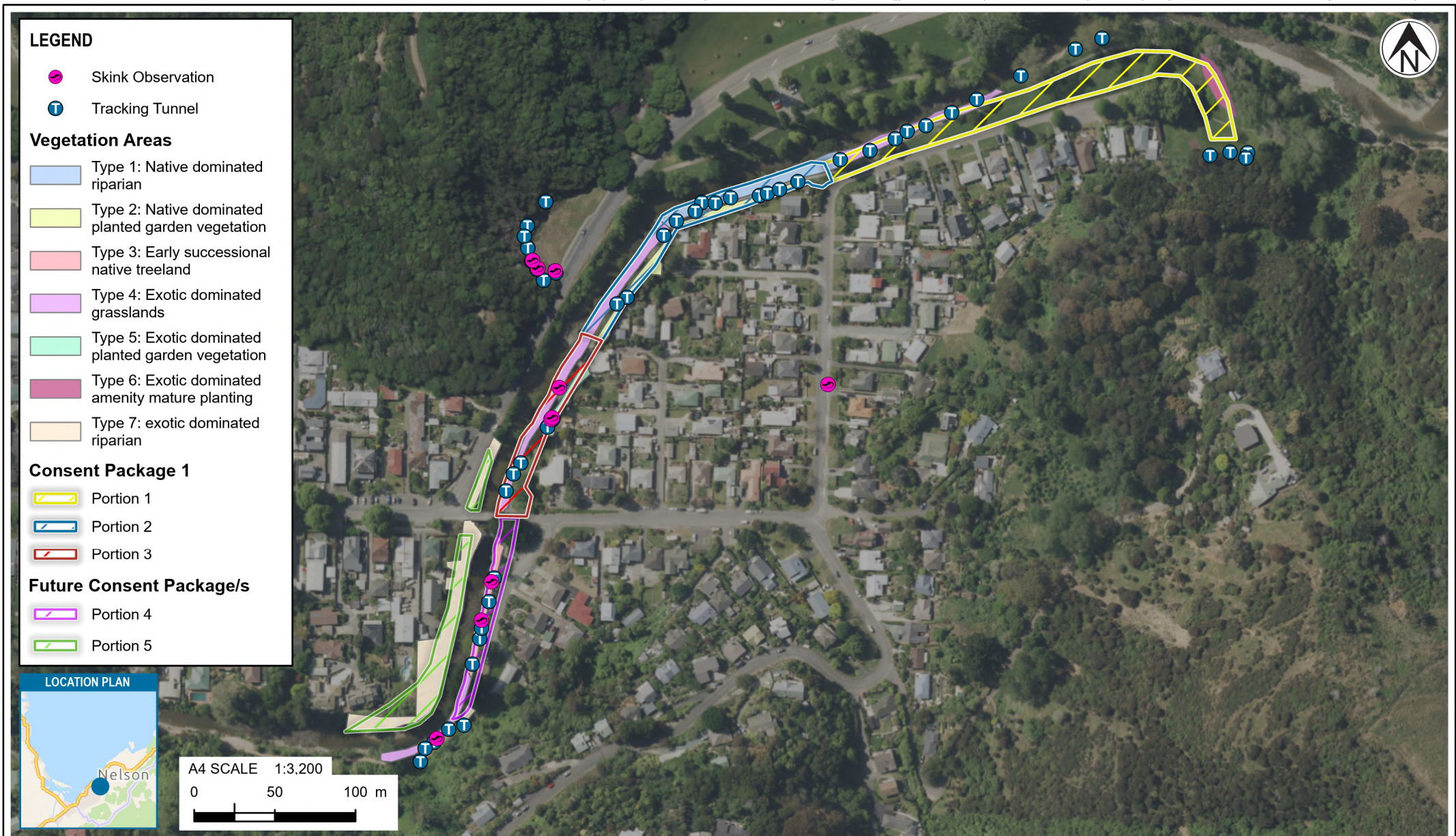
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Reptile Observations: . Tracking Tunnel: . Dark
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Natural Earth, © OpenStreetMap contributors..
NZ Imagery: Eagle Technology, Land
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CLIENT NELSON CITY COUNCIL

PROJECT MATAI RIVER FLOOD IMPROVEMENT WORKS (AREA 1)

TITLE LIZARD OBSERVATIONS, DETECTIONS AND TRACKING TUNNEL LOCATIONS

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Appendix B Ecological Impact Assessment Guidelines

Appendix B Table 1: Factors to consider in scoring sites values in relation to species representativeness, rarity, diversity and pattern, and ecological context (adapted from EIANZ, 2018)

Value	Species values	Vegetation/Habitat values
Very High	Nationally threatened – endangered, critical, or vulnerable.	Supporting more than one national priority type. Nationally Threatened species found or likely to occur there, either permanently or occasionally.
High	Nationally At Risk– declining.	Supporting one national priority type or naturally uncommon ecosystem and/or a designated SEA in a regional or District Plan. At Risk - Declining species found or likely to occur there, either permanently or occasionally.
Moderate-high	Nationally At Risk– recovering, relict, or naturally uncommon.	A site that meets ecological significance criteria as set out the relevant regional or district policies and plans.
Moderate	Not nationally threatened or At Risk, but locally uncommon or rare.	A site that does not meet ecological significance criteria but that contributes to local ecosystem services (e.g. water quality or erosion control).
Low	Not threatened nationally, common locally.	Nationally or locally common with a low or negligible contribution to local ecosystem services.

Appendix B Table 2: Ecological values assigned to terrestrial habitats (adapted from EIANZ, 2018)

Attributes to be considered when assigning ecological value or importance to a site or area of vegetation/habitat/community.	
Matters	Attributes to be considered
Representativeness	Attributes for representative vegetation and aquatic habitats: • Typical structure and composition. • Indigenous species dominate. • Expected species and tiers are present. Attributes for representative species and species assemblages: • Species assemblages that are typical of the habitat. Indigenous species that occur in most of the guilds expected for the habitat type.
Rarity/distinctiveness	Attributes for rare/distinctive vegetation and habitats: • Naturally uncommon, or induced scarcity. • Amount of habitat or vegetation remaining. • Distinctive ecological features. • National priority for protection. Attributes for rare/distinctive species or species assemblages:

Attributes to be considered when assigning ecological value or importance to a site or area of vegetation/habitat/community.	
	- Habitat supporting nationally Threatened or At-Risk species, or locally uncommon species. - Regional or national distribution limits of species or community. - Unusual species or assemblages. Endemism
Diversity and Pattern	- Level of natural diversity, abundance, and distribution. - Biodiversity reflecting underlying diversity. - Biogeographical considerations – pattern, complexity. Temporal considerations, considerations of lifecycles, daily or seasonal cycles of habitat availability and utilisation.
Ecological context	- Site history, and local environmental conditions which have influenced the development of habitats and communities. - The essential characteristics that determine an ecosystem's integrity, form, functioning, and resilience (from "intrinsic value" as defined in the RMA). - Size, shape, and buffering. - Condition and sensitivity to change. - Contribution of the site to ecological networks, linkages, pathways and the protection and exchange of genetic material. Species role in ecosystem functioning – high level, key species identification, habitat as proxy.

Appendix B Table 3: Scoring for sites or areas combining values for four matters in Appendix B Table 2

Value	Description
Very High	Area rates High for three or all the four assessment matters listed in Appendix B Table 2. Likely to be nationally important and recognised as such.
High	Area rates High for two of the assessment matters, Moderate and Low for the remainder, or Area rates High for one of the assessment matters, Moderate for the remainder. Likely to be regionally important and recognised as such.
Moderate	Area rates High for one matter, Moderate and Low for the remainder, or Area rates Moderate for two or more assessment matters Low or Very Low for the remainder. Likely to be important at the level of the Ecological District.
Low	Area rates Low or Very Low for majority of assessment matters and Moderate for one. Limited ecological value other than as local habitat for tolerant native species.
Negligible	Area rates Very Low for three matters and Low or Very Low for remainder.

Appendix B Table 4: Factors to consider in scoring ecological freshwater values (adapted from Roper-Lindsay et al., 2018)

Value	Explanation	Characteristics
Very High	A reference quality watercourse in condition close to its pre-human condition with the expected assemblages of flora and fauna and no contributions of contaminants from human induced activities including agriculture. Negligible degradation e.g. stream within a native forest catchment.	Benthic invertebrate community typically has high diversity, species richness and abundance. Benthic invertebrate community contains many taxa that are sensitive to organic enrichment and settled sediments. Benthic community typically with no single dominant species or group of species. MCI scores typically 120 or greater. EPT richness and proportion of overall benthic invertebrate community typically high. SEV scores high, typically >0.8. Fish communities typically diverse and abundant. Riparian vegetation typically with a well-established closed canopy. Stream channel and morphology natural. Stream banks natural typically with limited erosion. Habitat natural and unmodified.
High	A watercourse with high ecological or conservation value but which has been modified through loss of riparian vegetation, fish barriers, and stock access or similar, to the extent it is no longer reference quality. Slight to moderate degradation e.g. exotic forest or mixed forest/agriculture catchment.	Benthic invertebrate community typically has high diversity, species richness and abundance. Benthic invertebrate community contains many taxa that are sensitive to organic enrichment and settled sediments. Benthic community typically with no single dominant species or group of species. MCI scores typically 80-100 or greater. EPT richness and proportion of overall benthic invertebrate community typically moderate to high. SEV scores moderate to high, typically 0.6-0.8. Fish communities typically diverse and abundant. Riparian vegetation typically with a well-established closed canopy. No pest or invasive fish (excluding trout and salmon) species present. Stream channel and morphology natural. Stream banks natural typically with limited erosion. Habitat largely unmodified.
Moderate	A watercourse which contains fragments of its former values but has a high proportion of tolerant fauna, obvious water quality issues and/or sedimentation issues. Moderate to high degradation e.g. high-intensity agriculture catchment.	Benthic invertebrate community typically has low diversity, species richness and abundance. Benthic invertebrate community dominated by taxa that are not sensitive to organic enrichment and settled sediments. Benthic community typically with dominant species or group of species. MCI scores typically 40-80. EPT richness and proportion of overall benthic invertebrate community typically low. SEV scores moderate, typically 0.4-0.6.

Value	Explanation	Characteristics
		Fish communities typically moderate diversity of only 3-4 species. Pest or invasive fish species (excluding trout and salmon) may be present. Stream channel and morphology typically modified (e.g. channelised) Stream banks may be modified or managed and may be highly engineered and/or evidence of significant erosion. Riparian vegetation may have a well-established closed canopy. Habitat modified.
Low	A highly modified watercourse with poor diversity and abundance of aquatic fauna and significant water quality issues. Very high degradation, e.g. modified urban stream.	Benthic invertebrate community typically has low diversity, species richness and abundance. Benthic invertebrate community dominated by taxa that are not sensitive to organic enrichment and settled sediments. Benthic community typically with dominant species or group of species. MCI scores typically 60 or lower. EPT richness and proportion of overall benthic invertebrate community typically low or zero. SEV scores moderate to low, typically less than 0.4. Fish communities typically low diversity of only 1-2 species. Pest or invasive fish (excluding trout and salmon) species present. Stream channel and morphology typically modified (e.g. channelised). Stream banks often highly modified or managed and maybe highly engineered and/or evidence of significant erosion. Riparian vegetation typically without a well-established closed canopy. Habitat highly modified.

Appendix B Table 5: Summary of the criteria for describing the magnitude of effect (EIANZ, 2018)

Magnitude	Heading
Very High	Total loss of, or very major alteration to, key elements/features/ of the existing baseline conditions, such that the post-development character, composition and/or attributes will be fundamentally changed and may be lost from the site altogether; AND/OR Loss of a very high proportion of the known population or range of the element/feature.
High	Major loss or major alteration to key elements/features of the existing baseline conditions such that the post-development character, composition and/or attributes will be fundamentally changed; AND/OR Loss of a high proportion of the known population or range of the element/feature.

Magnitude	Heading
Moderate	Loss or alteration to one or more key elements/features of the existing baseline conditions, such that the post-development character, composition and/or attributes will be partially changed; AND/OR Loss of a moderate proportion of the known population or range of the element/feature.
Low	Minor shift away from existing baseline conditions. Change arising from the loss/alteration will be discernible, but underlying character, composition and/or attributes of the existing baseline condition will be similar to pre-development circumstances or patterns; AND/OR Having a minor effect on the known population or range of the element/feature
Negligible	Very slight change from the existing baseline condition. Change barely distinguishable, approximating to the 'no change' situation; AND/OR Having negligible effect on the known population or range of the element/feature.

Note: Baseline conditions are defined as 'the conditions that would pertain in the absence of a proposed action' (Roper-Lindsay et al., 2018).

Appendix B Table 6: Timescale for duration of effect (EIANZ, 2018)

Timescale	Description
Permanent	Effects continuing for an undefined time beyond the span of one human generation (taken as approximately 25 years).
Long-term	Where there is likely to be substantial improvement after a 25-year period (e.g. the replacement of mature trees by young trees that need >25 years to reach maturity, or restoration of ground after removal of a development) the effect can be termed 'long term'.
Temporary¹	Long term (15-25 years or longer – see above). Medium term (5-15 years). Short term (up to 5 years). Construction phase (days or months).

Note: ¹Note that in the context of some planning documents, 'temporary' can have a defined timeframe.

Appendix B Table 7: Criteria for describing overall levels of ecological effects (EIANZ, 2018)

Magnitude of effect	Ecological value				
	Very high	High	Moderate	Low	Negligible
Very High	Very high	Very high	High	Moderate	Low
High	Very high	Very high	Moderate	Low	Very low
Moderate	High	High	Moderate	Low	Very low
Low	Moderate	Low	Low	Very low	Very low
Negligible	Low	Very low	Very low	Very low	Very low
Positive	Net gain	Net gain	Net gain	Net gain	Net gain

Note: Overall level-of-effect categories are used to determine if residual effects management is required over and above measures to reduce the severity of effects through efforts to avoid, remedy or mitigate adverse effects. Usually, if the level of residual effect is assessed as being "Moderate" or greater, this warrants efforts to offset or compensate for these effects.

Appendix C Species lists

Appendix C Table 1: Terrestrial vegetation species identified on site during site visit

Common name	Scientific name	National conservation status (de Lange et al., 2024)
Karamū	<i>Coprosma robusta</i>	Not Threatened
Tree tutu	<i>Coriaria arborea</i>	Not threatened
Cabbage tree / tī kōuka	<i>Cordyline australis</i>	Not Threatened
Akeake	<i>Dodonaea viscosa</i>	Not Threatened
Kānuka	<i>Kunzea robusta</i>	Not threatened
Whiteywood / māhoe	<i>Melicytus ramiflorus</i>	Not Threatened
Red matipo / māpou	<i>Myrsine australis</i>	Not Threatened
Flax / harakeke	<i>Phormium tenax</i>	Not Threatened
Lemonwood / tarata	<i>Pittosporum eugenioides</i>	Not Threatened
Black matipo / kōhūhū	<i>Pittosporum tenuifolium</i>	Not Threatened
Koromiko	<i>Veronica stricta</i>	Not Threatened
Sycamore maple	<i>Acer pseudoplatanus</i>	Exotic
Agapanthus	<i>Agapanthus praecox</i>	Exotic
European ash	<i>Fraxinus excelsior</i>	Exotic
English ivy	<i>Hedera helix</i>	Exotic
Bay laurel	<i>Laurus nobilis</i>	Exotic
Poplar	<i>Populus</i> sp.	Exotic
English oak	<i>Quercus robur</i>	Exotic
Wandering willie	<i>Tradescantia fluminensis</i>	Exotic
Rank grass	N/A	Exotic

Appendix C Table 2: Native bird species recorded within 5 km of the site. Retrieved from iNaturalist and eBird (08 May 2025)

Common name	Scientific name	National conservation status (Robertson et al., 2021)	Observed or potentially on site based on habitat suitability
Grey teal	<i>Anas gracilis</i>	Not Threatened	✓
Grey duck x mallard	<i>Anas superciliosa x platyrhynchos</i>	Not Threatened	✓
Bellbird / Korimako**	<i>Anthornis melanura melanura</i>	Not threatened	✓
New Zealand pipit	<i>Anthus novaeseelandiae novaeseelandiae</i>	At Risk - Declining	
White heron / Kotuku	<i>Ardea modesta</i>	Threatened - Nationally Critical	
New Zealand Scaup	<i>Aythya novaeseelandiae</i>	Not Threatened	✓
Banded dotterel	<i>Charadrius bicinctus bicinctus</i>	At Risk - Declining	
Red-billed gull*	<i>Chroicocephalus novaehollandiae</i>	At Risk - Declining	
Shining cuckoo / pīpīwharau	<i>Chrysococcyx lucidus lucidus</i>	Not Threatened	
Australasian harrier / Kahu	<i>Circus approximans</i>	Not Threatened	
Orange fronted parakeet / Kakariki	<i>Cyanoramphus malherbi</i>	Threatened - Nationally Critical	
Black swan	<i>Cygnus atratus</i>	Not Threatened	
Pacific reef heron	<i>Egretta sacra sacra</i>	Threatened - Nationally Endangered	
Little penguin	<i>Eudyptula minor</i>	At Risk - Declining	
New Zealand Falcon / Karearea	<i>Falco novaeseelandiae ferox</i>	Threatened - Nationally Increasing	
Weka*	<i>Gallirallus australis australis</i>	Not Threatened	✓
White-faced heron	<i>Gallirallus australis australis</i>	Not Threatened	
Grey warbler / riroriro	<i>Gerygone igata</i>	Not threatened	
South Island pied oyster catcher	<i>Haematopus finschi</i>	At Risk - Declining	
Variable oyster catcher	<i>Haematopus unicolor</i>	At Risk - Recovering	
New Zealand Pigeon / Kereru*	<i>Hemiphaga novaeseelandiae</i>	Not Threatened	✓
Pied stilt	<i>Himantopus himantopus leucocephalus</i>	Not Threatened	
Welcome swallow*	<i>Hirundo neoxena neoxena</i>	Not threatened	✓
Caspian tern	<i>Hydroprogne caspia</i>	Threatened - Nationally vulnerable	

Common name	Scientific name	National conservation status (Robertson et al., 2021)	Observed or potentially on site based on habitat suitability
Blue duck / whio	<i>Hymenolaimus malacorhynchos</i>	Threatened - Nationally vulnerable	
Black-billed gull	<i>Larus bulleri</i>	At Risk - Declining	
Southern-black backed gull	<i>Larus dominicanus dominicanus</i>	Not Threatened	
Eastern bar-tailed godwit	<i>Limosa lapponica baueri</i>	At Risk - Declining	
Brown creeper / Pipipi	<i>Mohoua novaeseelandiae</i>	Not Threatened	
Kea	<i>Nestor notabilis</i>	Threatened - Nationally Endangered	
Morepork / Ruru*	<i>Ninox novaeseelandiae novaeseelandiae</i>	Not Threatened	
South Island robin / Kakarui	<i>Petroica australis australis</i>	At Risk - Declining	
Tomtit	<i>Petroica macrocephala</i>	Not Threatened	
Black shag	<i>Phalacrocorax carbo novaehollandiae</i>	At Risk - Relict	✓
Little pied shag ⁺	<i>Phalacrocorax melanoleucos melanoleucos</i>	Non-resident Native - Vagrant	✓
Little black shag	<i>Phalacrocorax sulcirostris</i>	At Risk - Naturally uncommon	✓
Pied shag	<i>Phalacrocorax varius varius</i>	At Risk - Recovering	✓
South Island saddleback	<i>Philesturnus carunculatus</i>	At Risk - Recovering	
Royal spoonbill	<i>Platalea regia</i>	At Risk - Naturally uncommon	
Pukeko	<i>Porphyrio melanotus melanotus</i>	Not Threatened	✓
Marsh crake	<i>Porzana pusilla affinis</i>	At Risk - Declining	
Tui**	<i>Prosthemadera novaeseelandiae novaeseelandiae</i>	Not Threatened	✓
Fluttering shearwater	<i>Puffinus gavia</i>	At Risk - Relict	
Fantail**	<i>Rhipidura fuliginosa fuliginosa</i>	Not Threatened	✓
White-fronted tern	<i>Sterna striata striata</i>	At Risk - Declining	
Paradise shelduck / putangitangi*	<i>Tadorna variegata</i>	Not Threatened	✓
Sacred kingfisher / Kotare ⁺	<i>Todiramphus sanctus vagans</i>	Not Threatened	✓
Spur-winged plover	<i>Vanellus miles novaehollandiae</i>	Not Threatened	
Silvereye / Tauhou ⁺	<i>Zosterops lateralis lateralis</i>	Not Threatened	✓

Note: *located within a 200 m radius of the site on databases. ⁺observed on site during site walkover 28 April 2025.

Appendix C Table 3: Indicative plant species for different riparian zones recommended for habitat remediation (a full species list will be provided in the Habitat Remediation Planting Plan)

Common name	Latin name	Notes
LOWER BANK/FLOODWAYS: Prone to flooding. For plant species that can tolerate waterlogged roots		
Purei / swamp sedge	<i>Carex secta</i>	Overhanging leaves great egg-laying habitat for inanga.
Common sedge	<i>Carex virgata</i>	Provide shelter and nesting habitat for birds.
South Island toetoe	<i>Austroderia richardii</i>	
MIDDLE BANK/RIPARIAN MARGINS: For plant species that can tolerate damp roots, occasionally flooded		
Groundcover / small shrubs		
Harakeke/Flax	<i>Phormium tenax</i>	Good for erosion control. Best planted a row back from the bank edge due to larger size.
Coprosma	<i>Coprosma crassifolia</i>	Berries attract skinks. Upright columnar habit is good for narrow spaces.
Mingimingi	<i>Coprosma propinqua</i>	
Coprosma/Karamū	<i>Coprosma robusta</i>	
Trees/large shrubs (trees will not be planted on riverside of the stopbank)		
Kohuhu	<i>Pittosporum tenuifolium</i>	
Cabbage tree / tī kōuka	<i>Cordyline australis</i>	Good for bank stabilisation and tolerates very wet to moderately dry conditions.
Manuka	<i>Leptospermum scoparium</i>	
Koromiko	<i>Hebe stricta</i>	
Tree tutu	<i>Coriaria arborea</i>	
Ribbonwood	<i>Plagianthus regius</i>	Deciduous tree, fast growing. Good for bank stabilisation.
UPPER BANK: May occasionally partially flood. For plant species that can tolerate dry conditions		
Trees/large shrubs		
Totora	<i>Podocarpus toara</i>	Good for bank stabilisation.
Whiteywood / māhoe	<i>Melicope ramiflorus</i>	
Lemonwood / tarata	<i>Pittosporum eugenioides</i>	Good for bank stabilisation.
Kahikatea	<i>Dacrydium dacrydioides</i>	Good for erosion control.
Kōwhai	<i>Sophora microphylla</i>	
Narrow-leaved lacebark	<i>Hoheria angustifolia</i>	Fast growing.