REPORT

Tonkin+Taylor

Drury Metropolitan Centre: Stage 2

Ecological Management Plan - Final Draft

Prepared for
Kiwi Property Holding No. 2 Limited
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12 March 2025	1.1	Final Draft Ecological Management Plan	Dr R Behrens and D Cairns	J Quinn	L Dowson
26 March 2025	2.1	Final Draft Ecological Management Plan – updated to reflect change in footprint and conditions of consent	Dr R Behrens and D Cairns	J Quinn	L Dowson

Distribution:

Kiwi Property Holding No. 2 Limited	1 PDF copy
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Statement of Experience

This Ecological Management Plan has been prepared by a team of authors and reviewers with a breadth of experience with projects of a similar nature within the Auckland Region.

Specifically, Dr Behrens is a senior terrestrial ecologist with 10 years of experience and has been working for Tonkin & Taylor Ltd (T+T) since 2017. She completed her PhD in Environmental Management on urban ecology at Lincoln University, holds a Diploma (equivalent to Masters degree) in Landscape Ecology from Carl-von-Ossietzky University, Oldenburg, Germany, and is a Certified Environmental Practitioner (CEnvP). Dr Behrens has prepared a number of Ecological Impact Assessments for private, local council and government clients varying in complexity since working for T+T. She is also experienced in preparing and implementing Ecological Management Plans for a range of clients including the New Zealand Trasport Agency, Auckland Council and private clients.

Ms Cairns is a freshwater ecologist with 5 years of experience, and holds a MSc (First Class Honours) in freshwater management. In her role at T+T she works on a range of projects, delivering ecological impact assessments, ecological offset modelling, preparation of management plans, construction supervision, compliance monitoring, opportunities and constraints assessments, various field assessments and GIS analysis and mapping. Ms Cairns understands the relationship between consenting phase and implementation of management plans and conditions, following her construction experience in several large infrastructure projects including Transport Rebuild East Coast (TREC), O Mahurangi - Penlink, Te Ara o Te Ata - Mt Messenger Bypass and Ara Tūhono - Pūhoi to Warkworth.

Ms Quinn is a Technical Director - Freshwater Science & Ecology and has been employed at T+T since 2017. Ms Quinn holds the qualifications of BSc (Biology), PGDipSci (EnvSci), MLS (Env Law), is a Certified Environmental Practitioner with Ecology specialisation (CEnvP Ecology) and is a certified Independent Hearings Commissioner. She has appeared as an expert witness at Council and Environment Court hearings for resource consent and/or private plan change applications of varying scales and development types. In respect of Drury, Ms Quinn has been involved in the development at this site since the private plan change application.

The contributing authors, in their capacity as authors of this report, have read and abide by the Environment Court of New Zealand's Code of Conduct for Expert Witnesses Practice Note 2023. Where this report relies on information provided by other experts, this is outlined within the report.

1 Introduction

This Draft Ecological Management Plan (EMP) has been prepared to accompany the application by Kiwi Property Holdings No.2 Limited (the "applicant" or "Kiwi Property") for the development of Stage 2 of the Drury Metropolitan Centre as a Listed Project in Schedule 2 of the Fast-track Approvals Act. In summary, the Drury Metropolitan Centre ("Drury Centre project" or "the project") involves the subdivision and development of land for the development of buildings containing commercial, retail, accommodation and community activities. The project also includes the creation of open spaces, ecological enhancements, bulk earthworks, installation of infrastructure and roading networks. The project is across multiple contiguous properties on Flanagan Road, Drury, that are owned and controlled by Kiwi Property.

The site for the Drury Centre project forms part of a larger land area within Drury which was rezoned as part of Private Plan Change – Drury Central (PC48) promulgated by Kiwi Property (Figure 1.1). PC48 has rezoned the land from its former Future Urban Zone (FUZ) to urban zones which include Business - Metropolitan Centre, Business - Mixed Use and Open Space – Informal Recreation zones under the Auckland Unitary Plan (AUP(OP)). The relationship of this project and PC48 is detailed in the Assessment of Environmental Effects (AEE) prepared by Barker and Associates (B&A).

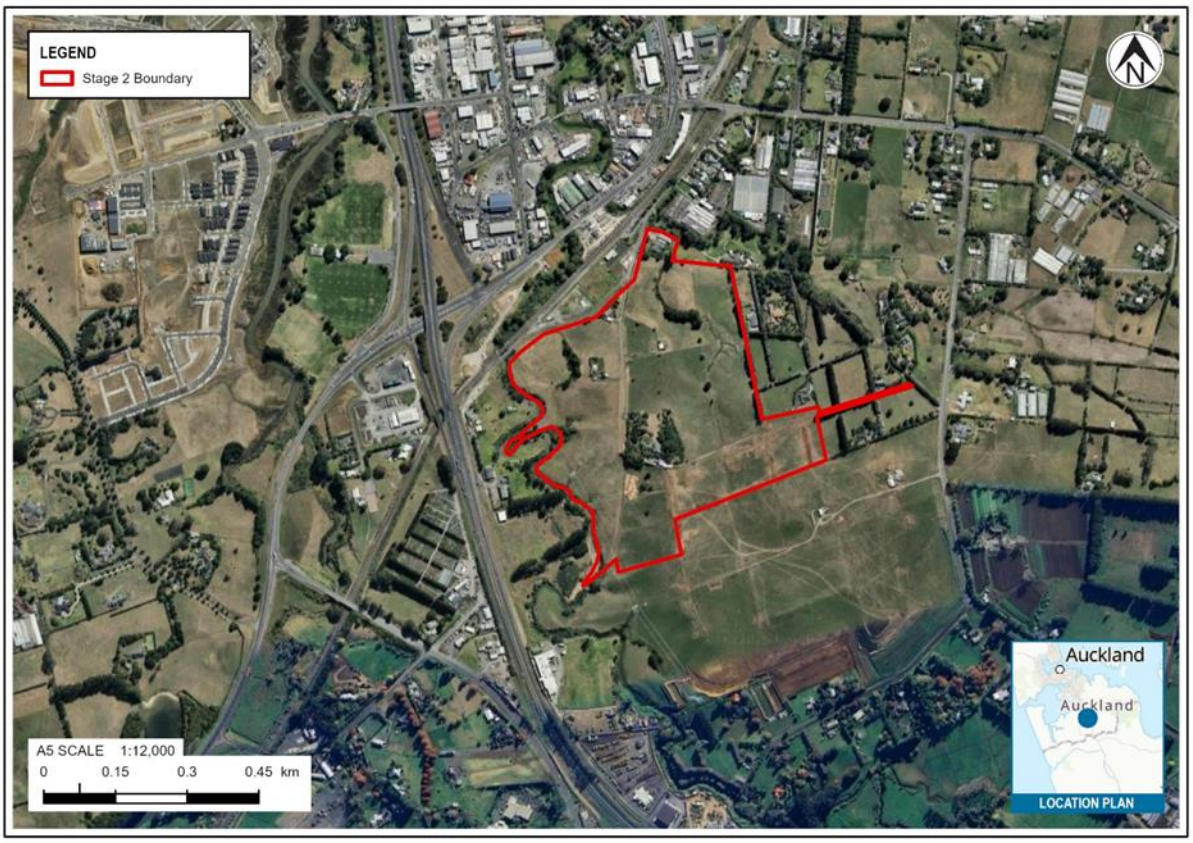

Figure 1.1: Location of Drury Metropolitan Centre site (red outline).

Tonkin & Taylor Ltd (T+T) has been commissioned by Kiwi Property Holding No.2 Limited to provide input into the conceptual design and consenting of the Drury Centre project. The Ecological Impact Assessment (EcIA) (T+T, 2025) identified potential impacts to native fauna species and ecosystems. This EMP has been developed in accordance with recommendations to remediate, minimise and offset adverse ecological effects as described in the EcIA and includes a:

- Native Fish Relocation Plan (NFRP).

- Avifauna Management Plan (AMP).
- Bat Management Plan (BMP).
- Lizard Management Plan (LMP).
- Riparian Planting Plan (RPP).
- Wetland Restoration Plan (WRP).

1.1 Plan purpose

This EMP has been prepared to outline protocols to avoid, minimise and remedy potential adverse effects on the ecological and biodiversity values within the site associated with the proposed works.

Each of the fauna management plans within this EMP includes good practice methods for fauna salvage and relocation that have been developed internally at T+T over time. The methods have been developed using project-based learnings, are in general accordance with New Zealand fauna sampling protocols (where applicable), and where necessary in line with current scientific literature.

In addition, two plans are included within this EMP as required by either precinct provisions or resource consent conditions.

- A Riparian Restoration plan is included within this EMP as required by special information requirement I450.9 (1) of the Auckland Unitary Plan (AUP).
- A Wetland Restoration Plan is included within this EMP which is required by conditions of consent for Stage 1 works. It has been included within this EMP for completeness as some works encroach on those natural inland wetlands.

1.2 Proposed works

For the Drury Centre project the following works are proposed:

- Reclamation of a natural inland wetland (Stream A wetland) and works within 10 m and 100 m of natural inland wetlands.
- Streamworks associated with the reclamation of 176 m of existing intermittent and permanent stream length, realignment of 97 m of existing permanent stream length and daylighting of approximately 80 m of existing piped permanent stream.
- Vegetation clearance and earthworks.

1.3 Iwi/Mana Whenua

Iwi consultation has been undertaken by B&A and a consultation summary is provided in the consultation report (B&A, 2025). A Cultural Values Assessment has been provided by Ngāti Te Ata Waiohua and it indicates that they would like to be involved in the implementation of ecological management measures. That approach is supported and the detail of the nature of that involvement will be further discussed and developed in the updates and finalisation of this EMP (as required by conditions of consent).

1.4 Responsibilities

Kiwi Property Holding No.2 Limited is ultimately responsible for the implementation of this EMP. Delivery of, and compliance with, this EMP will be the responsibility of the Construction Site Manager (i.e. the Contractor's representative on site). They will coordinate with the Project Ecologist(s) who has read this EMP. The Project Ecologist will be suitably qualified and experienced in managing effects on freshwater fauna, avifauna, herpetofauna and bats, and supporting and supervising riparian and wetland restoration.

Responsibilities of all parties involved in the implementation of the EMP are included but not limited to those outlined in Table 1.1.

Table 1.1: Responsibilities of those implementing the EMP

Title	Responsibility
Project owner (Kiwi Property Holding No. 2 Limited)	• Overall manager of the wider project, including overseeing the implementation of the EMP at a high level.
Project Manager	• Co-ordinates communication between the Contractor and Project Ecologist. • Project Ecologist to provide regular updates on fauna and vegetation management to the project manager.
Contractor/Construction Site Manager	• Delivery of and compliance with this EMP. • Implementation of the EMP including the following: – Reading and understanding the EMP. – Facilitating a project start-up meeting with the Project Ecologist before construction commences. – Contacting the Project Ecologist and iwi representatives (if part of the project team) a minimum of three weeks before any potential in-stream/in-wetland/vegetation clearance works are scheduled. – Establish with the Project Ecologist the areas scheduled for vegetation clearance during the upcoming earthworks season. – Maintain clear lines of communication with the Project Ecologist regarding changes to the works schedule. – Briefing new personnel about the contractor's responsibilities under this EMP.
Iwi	• To be confirmed prior to finalising this EMP.
Project Ecologist	The Project Ecologist is to be engaged by the project owner to provide technical advice to the Construction Site Manager/contractor and assist the Project owner with compliance against this EMP. The Project Ecologist(s) will: • Read and understand the EMP. • Ensure any required permits are attained and on hand during survey works. • Assist with technical advice for vegetation management. • Undertake any required fauna management measures (i.e. fish salvage, and relocation works) and lead pre-salvage communication with DOC/MPI ahead of these works in line with permit requirements. • Complete any required reporting.

1.5 Accidental discovery protocol of At Risk or Threatened Species

All personnel working on site are responsible for alerting the Construction Site Manager and the Project Ecologist in the discovery of any 'At Risk' or 'Threatened' flora and fauna not otherwise identified in this EMP on the same working day as the discovery.

The discovery of 'At Risk' or 'Threatened' flora or fauna not otherwise identified in this plan will be notified to the DOC Local Area Manager (+64 9 307 9279) by the Project Ecologist. The Construction Site Manager must determine a course of action that is based on the advice of the Project Ecologist. The course of action must consider the outcomes of consultation with iwi representatives and DOC and submitted for certification to DOC and the relevant territorial authority.

2 Summary of Ecological Values and Effects Management

The proposed works associated with the Stage 2 Drury Centre project (refer to EcIA (T+T, 2025) for details) will result in the development of existing rural land to urban form.

The ecological values of the site are consistent with those typical to agricultural land use. Vegetation within the site is limited to grazed pasture grasses with interspersed clusters of predominantly exotic woody species along shelter belts and riparian margins. Streams within the site are degraded from unrestricted stock access, lack of riparian margins and degraded watercourses. However, the ultimate receiving environment is Drury Creek – a marine SEA. Several seepage wetlands of low to moderate value are present across the site.

The proposed works have the potential to impact the remaining ecological values of the site. Measures to manage the effects of the proposed works on the ecological values are summarised below:

- Implementation of appropriate erosion and sediment controls in accordance with best practice methods to reduce effects on receiving freshwater and marine environments.
- Implementation of a Native Fish Relocation Plan to reduce the risk of injury or mortality of freshwater fauna during instream works.
- Removal of existing fish passage barriers within Stream A (culverts, piped stream network) to improve fish passage (will be detailed in the Stream Enhancement Plan).
- Construction of an arch culvert to maintain fish passage within Stream A.
- Creation of new stream length comprising realigned and daylighted open channel with improved ecological value including riparian planting and instream habitat features.
- Riparian planting and addition of instream habitat features in 97 m of realigned stream channel within Stream A.
- Development of a Stream Enhancement Plan, prepared by a suitably qualified and experienced freshwater ecologist with input from stormwater engineers and geomorphologists, the purpose of which is to provide the detailed and finalised design for the enhancement of Stream A.
- Implementation of stormwater management devices in accordance with best practice guidelines to manage water quantity into receiving freshwater environments.
- Management of flows during and following construction to ensure hydrology of existing wetlands remains unchanged.
- Implementation of a Bat Management Plan, Avifauna Management Plan and Lizard Management Plan to manage effects on terrestrial fauna during vegetation clearance.

Through implementation of the above management measures, detailed in this EMP, it is considered that the majority of the potential effects of the proposed works can be avoided, minimised or mitigated to an overall low level of effect. Residual adverse effects remain, which are not addressed through effects management measures. There is a net loss in ecological value of natural inland wetland and open stream channel, and a net loss in extent of natural inland wetland and piped stream.

3 Native Fish Relocation Plan

While native fish are not explicitly protected in current New Zealand Legislation, any management should, at a minimum, follow the good practice principles for avoiding disturbance and mortality of freshwater fauna. This Native Fish Relocation Plan (NFRP) sets out the methods that shall be used to avoid or mitigate potential risks on native freshwater fauna associated with the proposed works.

3.1 Summary of freshwater fauna ecological values and effects

3.1.1 Freshwater fauna ecological values

Based on a review of the NZFFD and previous T+T surveys, nine native freshwater fish species have been recorded within the Hingaia catchment (Table 3.1), including two regionally 'Threatened – Regionally Vulnerable' species, longfin eel (*Anguilla dieffenbachii*), torrentfish (*Cheimarrichthys fosteri*) and īnanga (*Galaxias maculatus*) (Dunn et al., 2017). Due to the piped nature of Stream A presenting a fish passage barrier, and poor habitat quality and availability, only shortfin eel (*Anguilla australis*) have been detected and are likely to be present within Stream A.

Table 3.1: Freshwater fauna present within the Hingaia Stream Catchment (source: NZFFD)

Species	Common name	Threat Status	
		National (Dunn et al., 2018)	Regional (Bloxham et al., 2023)
Anguilla dieffenbachii	Longfin eel	At Risk – Declining	At Risk – Regionally Declining
Cheimarrichthys fosteri	Torrentfish	At Risk – Declining	Threatened – Regionally Vulnerable
Galaxias maculatus	Īnanga	At Risk – Declining	At Risk – Regionally Declining
*Anguilla australis**	Shortfin eel	Not Threatened	Not Threatened
Galaxias fasciatus	Banded kōkopu	Not Threatened	Not Threatened
Gobiomorphus basalis	Crans bully	Not Threatened	At Risk – Regionally Declining
Gobiomorphus cotidianus	Common bully	Not Threatened	Not Threatened
Gobiomorphus huttoni	Redfin bully	Not Threatened	At Risk – Regionally Declining
Retropinna retropinna	Common smelt	Not Threatened	Threatened – Regionally Vulnerable
Paranephrops planifrons	Kōura	Not Threatened	N/A
Paratya curvirostris	Freshwater shrimp	Not Threatened	N/A
Ameiurus nebulosus	Brown bullhead catfish	Introduced and Naturalised	Introduced and Naturalised
Cyprinus carpio	Koi carp	Introduced and Naturalised	Introduced and Naturalised
Gambusia affinis	Gambusia	Introduced and Naturalised	Introduced and Naturalised

Note:

* Also detected in eDNA sampling at Stream A – likely the only fish species within Stream A.

**Sea-going populations occur in river and streams near to the coast.

3.1.2 Freshwater fauna ecological effects and effects management

There is potential for direct construction effects on freshwater fauna during streamworks associated with daylighting and channel realignment if this NFRP is not implemented. Reclamation of permanent and intermittent streams may result in injury or mortality of freshwater fauna without prior management measures. While the daylighted channel and realigned channel will be constructed offline, there is also potential for injury or mortality of freshwater fish during 'tie ins' of the created channel to the upstream and downstream existing freshwater environment.

This NFRP sets out a range of measures to minimise effects to freshwater fauna potentially impacted by the construction of the Project. Measures to salvage and relocate freshwater fauna that are likely to be adversely affected by the construction of the Project are also described.

3.2 Proposed works and staging plan

Proposed instream works on Stream A (and Fitzgerald Stream) will occur over three stages:

- Reclamation of upper Stream A tributaries.
- Daylighting of the existing piped lower reach of Stream A.
- Realignment of the mid reach of Stream A.

The order of these stages may change dependent on construction preferences. All works will occur over one construction season (October to April inclusive).

Reclamation

If water is present during the impacted channels at the time of the works and a suitably qualified and experienced ecologist determines there to be sufficient habitat present, fish salvage will be undertaken prior to reclamation. Specific methodologies will be dependent on the stream condition at the time of works and be selected at the discretion of the Project Ecologist.

Daylighting

The construction of the daylighted channel will occur offline and stream flows will continue through the piped network for the duration of works. The created channel will be isolated from the existing open channel upstream on Stream A and downstream on Fitzgerald Stream using earth bunds; therefore there is no risk of fish moving into the designated works area.

Given that fish may be present within the existing piped section of Stream A, fish salvage will be undertaken prior to livening of the constructed channel and consequent dewatering of the piped stream. Following construction of the created channel, the immediate open channel upstream and downstream of the piped section will be isolated from the upstream/downstream open channel using fish exclusion fences and trapped for one night using baited nets and traps.

The constructed channel will be 'tied into' the existing open channel downstream over a maximum period of two days and area stabilised before removing the upstream bund and tying into the upstream Stream A channel (also a maximum of two days). The impacted area of existing stream will be no greater than 5 m length in each location and will be isolated using fish exclusion fences and fish salvage methodologies undertaken prior to instream works occurring.

Following livening of the constructed channel, the existing pipe will be removed in a downstream direction and resulting channel backfilled. Pipe removal will be undertaken under supervision by a suitably qualified and experienced ecologist for salvaging purposes.

Realignment

The works area will be isolated from the wider catchment using topsoil bunds. The created realigned channel will be constructed offline and stream flows will continue through the existing open channel for the duration of works. A bund will be left upstream and downstream of each end of the created channel to isolate the works area from the live stream.

Following this, fish exclusion fences will be installed upstream and downstream of the works area within the impacted section of live stream. Fish salvage methods outlined in Section 3.3 will be implemented within the exclusion area. Following fish salvage, the constructed channel will be tied into the existing open channel upstream and downstream as per a similar methodology to the daylighting and flows livened within the constructed channel.

Any remaining water within the existing open channel will be pumped to a sediment retention pond and the channel 'mucked out' under an ecologist's supervision. Once muck out is complete and the Project Ecologist is satisfied with the level of capture effort, backfilling of the existing channel can proceed.

3.3 Salvage and relocation protocols

3.3.1 Permits

The NFRP must be implemented by a suitably qualified and experienced Project Ecologist(s) and in accordance with relevant permits and approvals, which include:

- A Ministry for Primary Industries (MPI) Special Permit to catch fish for the purpose of relocating aquatic life.
- An approval from MPI pursuant to section 26ZM (2)(a) of the Conservation Act 1987 – to transfer any freshwater aquatic life to a location where they already occur (normally within the same catchment).

T+T holds an MPI special permit (fisheries special permit no. 857) which covers the implementation of this NFRP.

3.3.2 Timing of works

The timing of freshwater fauna salvage will depend on the construction schedule and weather conditions. The Project Ecologist shall consult with the Construction Site Manager to plan the staging and sequence for work area isolation, freshwater fauna salvage and diversion. The Construction Site Manager must communicate intended in-stream works at least three weeks in advance and confirm the in-stream works with at least seven (7) days' notice.

3.3.3 Salvage footprint

Previous eDNA surveys within Stream A have confirmed that there is a high probability that freshwater fauna (shortfin eel) are present within the proposed extent of the works within the site. Therefore, salvage attempts shall be undertaken in all areas to be impacted by the Project within the proposed extent of the works that contain suitable habitat for freshwater fauna.

3.3.4 Work area isolation

The following sections describe how the work area shall be isolated under each construction stage.

Immediately prior to electric fishing/setting traps for fish capture, the active channel affected by the works shall be isolated using fish exclusion screens to prevent native fish from moving into the designated works area. These screens shall:

- Be temporary and installed prior to fish salvage (Section 3.3.5) and the construction of the stream diversion and/or dam structures by the contractor (Section 3.2).
- Ensure that both upstream and downstream extents of the work area are isolated, minimising the risk of native fish moving into the designated works area.
- Be installed to minimise the ability of fish to swim under, or around the screen, but shall not impede water flow. The exclusion screens shall be embedded in the stream bed and banks and firmly secured.
- Extend well above the water surface to allow for increases in water level.
- Preferably be constructed from fine (4 mm) mesh, although larger mesh (e.g. 8 mm) may be used if there is a risk of the mesh blocking due to instream organic debris. If the mesh used in the construction of the exclusion screen is to be shade cloth, the percent shade shall range between 50 – 70 %. The mesh material shall be supported by wire netting or safety fence mesh, with construction being like a super silt fence.
- Be inspected and, where required, maintained daily by the contractor to ensure the screen's structural integrity is maintained until the fish salvage and stream diversion works in that section are completed.
- If an exclusion screen fails or becomes overtopped with water the methodology outlined within this NFRP shall need to be repeated.
- Allow the Project Ecologist to capture and relocate any fish from within the area prior to work beginning.
- The locations of the exclusion screens shall be agreed upon with the Construction Site Manager and Project Ecologist once an implementation programme is agreed.
- Weather forecasts shall be checked and exclusion fences not erected if heavy rain is forecasted. By erecting immediately prior to fish salvage this will reduce the risk of the screens being compromised, for example, due to increased flows from a wet weather event.

3.3.5 Fish salvaging methodologies

The implementation of the fish salvage methods described in the following sections will reduce the potential effects of mortality or injury during the construction activities associated with the Project. It may not be possible to completely avoid the mortality of all freshwater fish, however, the objective of the salvage approach is to minimise mortality as much as practicable and allow the recovery of any fish populations as quickly as possible.

Salvaging will include a range of methodologies (described in subsequent sections below) and follow good practice with reference to the standard survey protocols for New Zealand freshwater fish where appropriate as they relate to electric fishing machine (EFM) and trapping techniques (e.g., Joy et al, 2013). However, it is recognised that these survey protocols are designed to collect reproducible data rather than maximise the capture of aquatic life and it would therefore not be appropriate to strictly adhere to them during fish salvage operations.

Once the work area is isolated, salvage shall generally occur as a two-stage process, starting with trapping/electric fishing, followed by searches of the site once dewatering has occurred.

3.3.5.1 Trapping

Depending on the water depth and area of wetted habitat, the trap density used shall be nine fyke nets and 18 gee minnow traps per 150 m stream reach. This is a higher density than recommended in the New Zealand native fish monitoring protocols (Joy et al., 2013) because the objective of this exercise is fauna salvage rather than monitoring.

The actual trap density used in each reach will depend on the available habitat, channel size and water depth. For example, fewer traps shall be set in the reach if channel width is narrow and pool habitats are small. Only Gee's minnow traps shall be deployed where there is insufficient water depth or channel width to deploy fyke nets. All fyke nets used shall have an internal exclusion system to separate larger fish from smaller fish and reduce the risk of predation.

Where there is a risk of night-time anoxia (e.g. slow-flowing macrophyte dominated streams), traps shall not be fully submerged to allow the fish to have the ability to surface breathe. Each trap shall be checked the following morning, with any captured fish, held and relocated according to the relocation protocol below. Trapping effort for every 150 m reach shall be set to a minimum of one night per reach and will then proceed, depending on the following situations (refer to Bloxham et al. 2023 for Auckland region threat classifications):

- If native fauna with a conservation status of 'Threatened' are captured, trapping shall continue until no further 'Threatened' are captured.
- If native fish with a conservation status of 'At Risk' are captured, then further trapping shall be undertaken until the catch numbers are less than 10% of the initial catch rate for 'At Risk – Declining' species.
- If non-threatened native fauna are captured at densities of greater than 10 fish per 150 m reach, then trapping shall continue until a reduction of > 50 % between the highest and the lowest number of individuals captured on any one night is achieved or a maximum of four nights (whichever is achieved first).
- If the Project Ecologist considers the site suitable, then the second or third night of trapping prior to dewatering may be done after partial dewatering has occurred in accordance with the dewatering protocol (Section 3.3.6).

3.3.5.2 Electric fishing

Electric fishing is unlikely to be used as part of the fish salvage methodologies for the proposed works given the soft-bottom nature of Stream A. Electric fishing may be undertaken where water depths are between approximately 100 mm and 600 mm, and where stream conditions are suited to this method (consideration shall be given to conductivity, water clarity, visibility, water velocities and if present, macrophyte cover).

In brief, the electric fishing protocols are:

- Electric fishing shall occur for a minimum of three passes.
- After three passes, if the number of fish for each species captured has decreased by > 50% between each of the three passes, then it shall be considered appropriate to begin diverting the stream.
- If native fish with a conservation status of 'Threatened' or 'At Risk' are captured, then further electric fishing passes shall be undertaken until no further 'Threatened' or 'At Risk – Declining' individuals are captured.
- For native freshwater fish without 'Threatened' or 'At Risk' conservation status, if the number of fish captured between any two consecutive passes decreases by < 50% then further electric fishing passes shall be undertaken until the decrease is > 50%, or ≤ 10 individuals are captured in a pass within the isolated area (note these reduction rates do not apply to non-threatened juvenile gobiidae).[1]

[1] Determined to be gobiidae species ≤ 40 mm in size.

- If after multiple passes the specific reduction rates have not been meet, at the discretion of the Project Ecologist the stream reach can begin to be diverted and the salvage work shift to diverted reach searches as set out in the following section.

3.3.6 Dewatering and muck-out

Following the completion of fishing and once the Project Ecologist has indicated dewatering can commence, flows shall be diverted around the works area. The Project Ecologist shall supervise the dewatering of the channel to inspect the streambed and channel base, under-bank margins and any other in-stream habitat for freshwater fish that may have been missed.

Should netting and electric fishing be deemed impractical upon site visit (e.g. water level too low, macrophyte cover high) and should suitable habitat be present, the Project Ecologist may proceed with only dewatering supervision and salvage within the isolated section of the watercourse.

A fish exclusion screen shall be installed on all pumps used during dewatering activities. This screen shall have a maximum mesh size of 3 mm and shall have intake velocities of < 0.3 m^3/s to avoid entrainment of fish.

At the discretion of the Project Ecologist, muck-out may be deemed necessary following dewatering. In brief, this will involve:

- An excavator to spread out at least the top 300 mm layer of spoil in a thin layer on the bank near the watercourse for inspection by the staff undertaking the muck-out. The requirement to spread the top layer of spoil shall be at the discretion of the Project Ecologist based on an assessment of the level of risk to freshwater fish.
- When it is safe to access the spoil, it shall be visually checked for any fish.
- Where practical, this shall occur near the watercourse but in some situations, this may have to be at a disposal site (e.g. if the spoil is very liquid and needs removal from site).

Any fish captured during dewatering and/or muck-out shall be relocated in accordance with the relocation protocols in Section 3.4.

3.3.7 Biosecurity and pest fish

All equipment used shall be cleaned, sterilised and allowed to dry for no less than one week prior to use ensuring that all plant material (seeds or plant material that is able to regenerate) and freshwater fauna (e.g. planktonic larvae) is either removed or dead, reducing the risk of transferring freshwater pest plants or animals to new locations.

Any pest fish caught shall be humanely euthanized using clove oil (50 mL per 10 L of water) or benzocaine (3.3% solution in ethanol, 50 mL per 10 L of water). All euthanized pest fish shall be buried within the riparian margin of the stream in which they were caught.

For some relocation activities, it is necessary to recycle stream water to reduce the risk of transporting unwanted organisms. For this Project, it is not considered necessary. The movement of freshwater fauna will be from upstream to downstream within the same watercourse or catchment, it is expected that no unwanted organisms will be introduced downstream that are not already found upstream.

3.4 Relocation protocols

3.4.1 Handling, transportation and relocation

Following capture, all freshwater fauna shall be relocated in a lidded container of an appropriate volume of clean stream water for the number caught. An aerator shall be installed into the container

and any freshwater fauna shall be transferred to the relocation site within approximately one hour of capture. If for any reason freshwater fauna must be held for longer than one hour, insulated holding tanks will be required to maintain suitable water temperatures and water shall be either changed or filtered to maintain water quality.

Whilst contained, freshwater fauna shall be constantly monitored and if any individual shows signs of stress (e.g. loss of righting response, and for fish gulping air, and/or gaping) the water shall be changed to provide more oxygen and/or the fish shall be moved to the relocation site immediately. Although unlikely to be present, sensitive fish species, e.g. galaxiidae or gobiidae species, shall be kept in a separate bucket to eels, to avoid any further disturbance to these species.

Large eels (> 500 mm) shall be contained separately within separate holding bins or alternatively in wetted mesh sacks and kept hydrated to avoid injury to other smaller captured fish.

Fish shall be always handled with wet hands and/or equipment to minimise potential injury. As a general principle, any handling of all freshwater fauna shall be minimised to reduce potential stress. When freshwater fauna are being released into relocation sites, care shall be taken to ensure that the temperature differential between the transportation container and the receiving environment does not noticeably differ. The water temperature shall be equilibrated by gradually mixing water from the receiving water body into the transport container over a minimum of five minutes.

Following freshwater fauna being captured within Stream A, these shall be relocated downstream within Stream A, outside of the stream works area. At the time of stream works, availability and suitability of habitat at the relocation site shall be confirmed. Should habitat be deemed unsuitable, or in order to distribute larger numbers of individuals, individuals may be relocated to the nearest suitable habitat within the same catchment, being Fitzgerald Stream.

As mentioned in Section 3.2, fish are not expected to be found in areas that do not provide suitable habitat, such as the stormwater pipe on Stream A being daylighted. If fish are found within this section, relocation shall be downstream to Fitzgerald Stream.

3.4.2 Mortality monitoring

If mortality occurs during the implementation of the handling, transportation, and relocation protocols described in Section 3.3, in the first instance the water in the holding tanks/bins shall be cycled with fresh stream water to provide more oxygen to the captured freshwater fauna. Then the salvage and handling protocols shall be reviewed and any updates to protect captured freshwater fauna within the protocols shall be made to the NFRP (following the adaptive management process outlined in Section 3.5).

Any mortality of freshwater fauna while in holding tanks/bins shall be recorded with species identified, length and any physical signs of stress/harm (e.g. reddening of the gills, skin abrasion, loss of/tears in fins) detailed.

Furthermore, within the vicinity of each relocation release site, a minimum of 10 minutes shall be spent observing the relocation site once freshwater fauna have been released to identify any mortality. This observation period must include walking upstream and downstream of the relocation release site.

Any mortality shall be recorded, with species identified, length and any physical signs of stress/harm (e.g. reddening of the gills, skin abrasion, loss of/tears in fins) detailed. If during the 10 minute observation period, mortality is observed to be high (i.e. mortality of released fauna > 30 %), any further relocation attempts to that site shall be halted, dead fish removed from the site, and the cause of the high mortality investigated (e.g. through collecting relocation site water quality information) and a review of the handling and relocation protocols within the NFRP shall be

completed and if needed any updates to the protocols shall be made (following the adaptive management process outlined in Section 3.5).

Whilst undertaking the protocols outlined within this NFRP, the stress of captured freshwater fauna shall be monitored and appropriate responses to signs of an increase in stress applied. These responses are outlined in Section 3.4.1.

Any occurrences of high fish mortality shall be reported to Auckland Council and as required by permit conditions with an approach to determining the likelihood of the mortality event and any amendments to the NFRP outlined as per the adaptive management process in Section 3.5.

3.5 Adaptive management

To achieve the desired objectives, changes may need to be made to this NFRP. The construction programmes and methodologies outlined that have been used to prepare this NFRP have not been finalised. Therefore, the NFRP may need to be updated to incorporate any change to these methodologies. Further information on the presence and abundance of freshwater fauna may also come to light during the construction phase and this shall be incorporated into salvage methodologies.

If changes are required, these shall be communicated to the Construction Site Manager and Kiwi Property prior to implementing any changes. The rationale behind any changes made must be based on best practice management techniques and stay in line with salvage philosophies identified in this plan. Any changes that are fundamentally different to the methods and approaches outlined within this NFRP shall be communicated to Auckland Council prior to implementation.

4 Avifauna management plan

This Avifauna Management Plan (AMP) sets out how Kiwi Property Holding No. 2 Limited proposes to avoid, minimise or remedy potential adverse effects on avifauna as a result of the Project.

Most native birds are protected by the Wildlife Act 1953 and the RMA affords protection to significant habitats of indigenous fauna. Several native bird species are expected to use the Project footprint based off observations on site, potential habitat observed on site and records from eBird and iNaturalist.

4.1 Summary of ecological values and effects

4.1.1 Avifauna ecological values

It is likely that native birds of open spaces are using the diverse terrestrial and wetland vegetation within the Stage 2 works footprint. It is unlikely that these birds are regionally or nationally 'Threatened' or 'At Risk' ((Robertson et al., 2021; Woolly et al., 2024). The ecological value for native birds has been assessed as **low** (T+T, 2025).

4.1.2 Avifauna ecological effects

The vegetation within the Drury Centre project provides limited foraging and breeding habitat and the magnitude of effect of removing the habitat has been assessed as low, while the direct effect on native birds has been assessed as moderate. The implementation of the avifauna management measure outlined in Section 4.2 reduce the magnitude of direct effects on native avifauna to low.

4.2 Effects management for avifauna

4.2.1 Preventative management

Adult avifauna are expected to fly away during vegetation clearance and habitat removal activities, minimising the likelihood of harm. However, during peak bird breeding season, these activities could potentially harm nests, eggs, and unfledged chicks. Therefore, vegetation clearance and habitat removal should be avoided, where practicable, during the peak bird breeding season, which runs from September to January inclusive.

If vegetation clearance or habitat removal must occur during the peak bird breeding season, clearance and/or removal shall be subject to the protocols outlined in Section 4.2.2.

4.2.2 Vegetation clearance and management protocols

Where vegetation clearance cannot be avoided during the peak breeding season:

- The terrestrial vegetation identified for removal shall be clearly marked, prior to the Project Ecologist conducting a bird nest survey of all trees/vegetation scheduled for felling/clearance. The Project Ecologist may require assistance from a climbing arborist for checking large trees and/or confirming the nest status.
- If no active[2] nests are found, the trees/vegetation must be felled/cleared within **24 hours**; otherwise, an additional breeding bird survey shall be required.
- If active[2] nests of native 'Not Threatened' bird species (protected under the Wildlife Act 1953) are found, the individual trees or vegetation with the nest and the immediate surrounding vegetation within a 10 m buffer must remain in situ. This buffer shall be clearly marked and

[2] Active nests are defined as nests containing a breeding bird, eggs, fledglings and/or chicks.

cordoned off until the nesting birds have fledged, or the nests are naturally abandoned, as verified by the Project Ecologist.

- In the case of active nests of 'At Risk' or 'Threatened' bird species (protected under the Wildlife Act 1953), a 30 m buffer around the individual trees or vegetation with the nest and surrounding vegetation must be left intact. These areas shall also be clearly marked and cordoned off until the nesting birds have fledged, or the nests are naturally abandoned, as confirmed by the Project Ecologist.

To enhance nest survival and protect active[2] nests of 'At Risk' or 'Threatened' species, three pest traps targeting rats and mice shall be installed within the designated buffer zone. The traps shall be rat trap boxes designed to exclude non-target species and shall contain either bait or a T-Rex rat trap. If bait is used, only recognised and DOC approved rat toxins shall be used. Bait shall be refreshed as per manufacturers recommendations. If traps are used, these shall be set and operated during the active[2] nest status. Daily trap checks shall be required as well as regular refresh (minimum once per week) of bait (i.e. peanut butter, eggs). Any dead animals shall be disposed of responsibly to landfill. The Construction Site Manager shall agree with the Project Ecologist who will be responsible for the trapping.

4.2.3 Accidental discovery protocol

Active nests can occur outside the peak breeding season, so construction personnel and arborists must remain vigilant for signs of nests and consult with the Project Ecologist if a nest is suspected.

If at any time during or outside the bird breeding season, a contractor discovers a bird nest, eggs, or chicks during vegetation clearance or construction works, the contractor shall:

- Immediately stop all construction activities within a 30 m radius of the nest.
- Contact the Construction Site Manager and Project Ecologist.
- Wait until an ecologist has conducted a visual inspection of the nest to determine if the protocols in Section 4.2.2 need to be implemented.

4.2.4 Accidental harm during construction

In the event that a dead or injured native bird is found during the construction of the project, the Project Ecologist shall ensure that the following procedures are implemented:

- Injured native birds shall be taken to BirdCare Aotearoa. The address is 74 Avonleigh Road, Green Bay, Auckland 0604 and the phone number is 027 816 9219.
- If it is after hours and a bird needs urgent vet attention, the DOC hotline is 0800 DOC HOT (0800 362 468). They will advise where to go for veterinary treatment.
- Birds shall be placed in a cool, dark, material-lined box/bag.
- DOC shall be notified via email (auckland@doc.govt.nz) of the discovery within 48 hours of the injured or dead bird being found.

DOC and veterinary advice shall be sought in conjunction with advice from the Project Ecologist when considering the rehabilitation requirements of any injured native birds (for example, legislative requirements will need to be considered). Once the vet has made an assessment, the Project Ecologist shall determine any rehabilitation action required and the long-term future for the bird/s, considering the advice from the vet. If the bird is dead (naturally or euthanised by the vet), DOC shall be contacted to enquire about further steps, i.e. autopsy.

5 Bat management plan

5.1 Summary of bat values and effects

5.1.1 Bat values

A known population of nationally 'Threatened-Nationally Critical' (O'Donnell et al., 2023) and regionally 'Threatened – Regionally Critical' (Woolly et al., 2023) long-tailed bats (*Chalinolobus tuberculatus*) is located in the Hunua Ranges and sightings have been recorded within approximately 4 km of the site. Potential bat habitat for foraging and roosting is limited on site and highly dispersed. As a result, long-tailed bats have a **very high** ecological value, however, the likelihood of long-tailed bats being present, especially for roosting is considered low (T+T, 2025).

5.1.2 Effects management for bats

The vegetation within the Drury Centre project provides limited foraging and roosting habitat for long-tailed bats. The magnitude of effect on losing potential foraging and roosting habitat has been assessed as negligible. However, long-tailed bats can be directly affected through tree felling. The magnitude of affecting long-tailed bats directly has been assessed as low. The implementation of the bat management measure outlined in Section 5.2 reduce the magnitude of direct effects on long-tailed bats to negligible.

5.2 Preventative management measures

The measures outlined below only apply to high-risk bat roost trees (see Section 5.2.1.1 for details on identification). Vegetation clearance of other vegetation can be undertaken with no bat management.

5.2.1 Tree removal protocols

Tree removal protocols (TRPs) will be used to avoid injury or mortality to bats arising from the felling of occupied trees during tree clearance. The protocols below detail the techniques used to detect roosting activity prior to clearance of vegetation, and procedures to guide the clearance process. The protocols are consistent with best practice methodologies (DOC, 2024).

The TRPs aim to:

- Identify potential bat roost trees that exist within key habitats within the Project footprint prior to vegetation clearance.
- Provide clear, concise procedures that are to be followed prior to removal of all trees within the Project footprint, with the aim of avoiding mortality or injury to bats in the event that they are found.
- Set out how any bat injury or mortality that may occur will be dealt with.

There are three protocols to be followed, which are set out below:

- Protocol A: Identification of Potential Bat Roost Habitat.
- Protocol B: Pre-felling Procedures.
- Protocol C: Bat Injury or Mortality.

5.2.1.1 Protocol A: Identification of Potential Bat Roost Habitat

For the purpose of this protocol, trees offering high potential as bat roosts will be considered 'High-Risk'. High-Risk trees are those positively identified by a suitably qualified and experienced bat

ecologist(s) (Competency Level 3.3) and defined as being ≥15cm Diameter at Breast Height (DBH), with one or more of the following features:

- Cracks, crevices, cavities and/or fractured limbs large enough to support roosting bat(s).
- Sections of loose flaking bark or epiphytes large enough to support roosting bat(s).
- A hollow trunk, stem or branches.
- Deadwood in a canopy or stem of sufficient size to support roost cavities or hollows.
- Bat droppings, grease marks and/or urine staining around the aforementioned features.

Trees with evidence of bat droppings, grease marks and/or staining around cavities will be noted and investigated as 'High-Risk' probable roost trees, regardless of size.

There are some areas proposed for clearance where identification of potential roost trees via visual assessment will be either too difficult (e.g. due to the height of the trees), or very time consuming. In these cases, it is at the bat ecologist's discretion to classify an entire area as High-Risk habitat and proceed directly to the pre-felling procedures for High-Risk trees.

All trees ≤15 cm DBH that lack the potential roost features above will be considered 'Low-Risk' and may be felled at any time, without the need for further assessment or monitoring, and without the need for an approved bat ecologist to be present.

5.2.1.2 Protocol B: Pre-felling Procedures

All High-Risk trees can only be felled between 1 October and 30 April when the temperature is 8° C or greater at official sunset and shall be subjected to a pre-felling assessment using acoustic surveys in the first instance as outlined below:

- High-Risk trees will be acoustically monitored overnight with acoustic bat monitors (ABM) over two consecutive valid nights immediately prior to removal. Valid nights are defined as:
  - Begin one hour before official sunset and end one hour after official sunrise.
  - Temperature 8° C or greater for the first four hours after official sunset time.
  - No to very little precipitation within the first four hours after official sunset. If a light mist or occasional drizzle occurs, ABM data may still be valid if accepted by a bat ecologist with Competency 3.1.
  - No to light wind within the first four hours after official sunset.
- All ABM data gathered during the pre-felling survey shall be reviewed the same morning the survey specified in Protocol B ends, in order to give the tree felling contractor sufficient time to fell trees prior to dusk if no bats are recorded.
- If no bat activity is recorded during the two nights of acoustic monitoring, the Project Ecologist(s) shall inform the lead construction contractor within one hour of reviewing the data to give permission for the affected tree(s) to be felled.
- If the Project Ecologist considers that bat activity patterns recorded on the ABM(s) suggest that bats may be roosting in the vicinity of the ABM, or if a bat roost is observed, the Project Ecologist shall inform the lead construction contractor, within one hour that the affected tree(s) cannot be felled until further investigations of the trees have been undertaken. In this case the tree will be identified as a 'likely roost tree'.

If considered appropriate by the Project Ecologist, likely roost trees will be climbed by a suitably qualified arborist under the supervision of a suitably qualified bat ecologist (Competency 3.3). The arborist must take care when climbing so as not to harm or disturb any roosting bats. The arborist will take photographs of any roosts or roost evidence found. If necessary, an endoscope and hand-held bat detector will be used to examine potential roost features suspected of housing bats.

If climbing is not considered safe or appropriate by the arborist, the likely roost tree(s) should be observed by an experienced bat ecologist(s) (Competency Level 3.2). The roost watches will begin from sunset until it becomes too dark to see and begin two hours prior to official sunrise until one hour after sunrise over two consecutive nights. This must be supported by the use of hand-held bat detectors. The observation should be done by sufficient people to cover all potential bat exit points. Temperature must be greater than 8° C from sunset to sunrise and no to little precipitation must fall for each two-hour period between official sunset and sunrise. Roost watches should include the deployment of ABMs and analysis of data for the roost watch. If the check or observations over the two consecutive nights reveals no bats are roosting in the tree(s) at present, the lead construction contractor will be informed that the tree(s) can be felled on the morning after the second night of observation.

If bats are confirmed to be roosting within the tree, the following actions shall be taken:

- It will not be removed until further acoustic monitoring (a minimum of two consecutive nights) confirms that the bats have abandoned the roost.
- Trees should be clearly marked, and all relevant staff briefed to ensure the tree is not removed.
- The immediate area will be cordoned off with safety fencing and signage erected in a 10m radius around the suspected roost, alerting any person approaching the area that a bat roost is present and to stay clear.
- All adjacent construction and vegetation removal activities (within 100 m) will be assessed for noise and vibration and where, in the opinion of the Project Ecologist, the method of construction may disturb the roost, steps will be taken to eliminate, isolate or minimise the disturbance where possible.
- Representatives of DOC, the territorial authorities, and local iwi will be informed by email with relevant information and photos if applicable.
- If bats are still roosting in the tree after seven nights, the Project Ecologist will contact the Project Manager and representatives of DOC, the territorial authorities, and iwi to arrange a meeting or teleconference to be held within seven working days to decide an appropriate way forward.

If during felling of a tree bats are detected, felling of that tree must stop immediately if safe to do so, and DOC and an approved bat ecologist (Competency 2.1) must be consulted on how to proceed.

Immediately after tree felling, all High-Risk trees will be inspected for bats and evidence of bat roosts by a suitable person, who is familiar with Borkin (2019) 'Initial Veterinary Care for New Zealand Bats' and is physically capable of inspecting the felled tree for bats.

5.2.1.3 Protocol C: Bat injury or Mortality

If bats are detected once high-risk tree(s) have been felled, all further work must stop and DOC and an approved ecologist accredited with Competency 2.1 will be contacted. The felled tree(s) will be inspected by an approved ecologist (Competency 2.1) for further bats.

Found bats will be placed in a cloth bag and kept in a dark, quiet place at ambient (or slightly warmer) temperatures and will be taken to a veterinarian for assessment as soon as possible. A maximum of two bats can be kept in one bag. After delivery of the bat(s) to the veterinarian, an approved person accredited with Competency 2.1 in contact with the veterinarian and DOC will be contacted.

Bats will be kept for three days under observation and must be kept out of torpor for this time. Additional detail is found at Resources for bat workers: Bats/pekapeka. Vets must euthanise bats whose injuries are causing suffering and are not likely to heal sufficiently to allow rehabilitation and

return to the wild. The approved person accredited with Competency 2.1 and the vet will consult with DOC to consider appropriate rehabilitation options where suffering is minimal and chances of return to the wild are high.

Euthanised bats or any dead bats (or bat parts) found will be handed to DOC and is a legal requirement under the Wildlife Act. If the bat is held for longer than 12 hours, store it in a food grade safe glass jar in the freezer to preserve the bat's smell for the potential use of training conservation dogs.

6 Lizard management plan

This Lizard Management Plan (LMP) sets out how Kiwi Property Holding No. 2 Limited proposes to avoid, minimise or remedy potential adverse effects on lizards as a result of the Project.

All native lizard species are protected under the Wildlife Act 1953. Additionally, the Resource Management Act 1991 (RMA) affords protection to significant habitats of indigenous fauna, including lizards.

6.1 Summary of lizard values and effects

6.1.1 Lizard values

The site provides limited potential lizard habitat, mostly as rank grass and any refugia that may exist in the treed areas such as riparian margins and shelterbelts, and from farming debris. No lizards have been recorded from site. Native nationally (Hitchmough et al., 2021) and regionally (Melzer et al., 2022) 'At Risk- Declining' copper skinks (*Oligosoma aeneum*) and the exotic rainbow (or plague) skink (Unwanted Organism, *Lampropholis delicata*) were recorded in proximity to the site. While it is considered unlikely that any regionally and/or nationally 'Threatened' or 'At Risk' lizard species are present onsite, it cannot be concluded that native lizards are not onsite. Therefore, the ecological value of native lizards within the site is considered to be **high** (T+T, 2025).

6.1.2 Effects management for lizards

Similar to native avifauna and long-tailed bats, the vegetation provides limited habitat for native lizards. The loss of the potentially suitable habitat has been assessed as low. Removal of potential lizard habitat can cause harm to lizards through injury or killing. Without any preventive management measures the magnitude of effect on native lizards has been assessed as moderate. With the implementation of the management measures outlined in Section 6.2 the magnitude of effect can be reduced to low.

6.2 Preventative management measures

Potential adverse ecological effects shall be avoided, minimised, or remedied through the following measures:

- Any vegetation that needs to be felled shall be felled into the Project footprint, away from vegetation to be retained.
- Where possible, woody pest plants shall be managed using techniques such as 'drill and fill' to avoid the need for felling.
- Where vegetation is required to be felled, works shall only be undertaken between 1 October and 30 April, when lizards are more active and can be detected.
- Where felling is proposed within potential suitable lizard habitat, a passive approach to lizard management shall be implemented to avoid the need for salvaging or handling native lizards:
  - Potential habitats such as logs, rocks, and human refuse shall be manually inspected at least 24 hours prior to felling and, where practicable, carefully relocated to remaining vegetation within or immediately adjacent to the site to encourage native skinks to vacate the construction area.
  - Ground cover, which is considered potential skink habitat by the Project Ecologist, shall be manually checked, raked, and removed at least 24 hours prior to any felling to reduce habitat suitability and encourage skinks to move into adjacent native vegetation.

- Grassed areas shall be cut with a line trimmer/weed cutter/mower to approximately 10 cm in height at least three days prior to works being undertaken. Grass cuttings to be removed where possible.

6.3 Accidental discovery protocol

In addition to the preventive management measures, an accidental discovery protocol is proposed. Adaptive management is required if native lizards are discovered during construction which will result in increased adverse ecological effects from the proposed works above those anticipated in the EcIA (T+T, 2025).

If at any time, a contractor discovers a native lizard during construction works, including the preventive management actions and vegetation clearance, the contractor shall:

- Immediately stop all construction activities within a 100 m radius of the find.
- If the native lizard was caught, put it carefully in a box (i.e. plastic container with holes), with some leaf litter, sticks or grass, and keep it out of direct sunlight
- Contact the Construction Site Manager and Project Ecologist
- Wait until an ecologist has conducted a visual inspection of the native lizard and habitat.

If a native lizard is detected adaptive management measures will be required. These include but are not limited to:

- Update to this lizard management plan including robust salvaging and relocation techniques.
- Updated lizard management plan to be agreed with Auckland Council Regulatory and DOC.
- If salvage and relocation is proposed, a Wildlife Act Authority (WAA) will be required.

[Add additional salvaging and relocation measures as required after DOC consultation]

7 Riparian Restoration Plan

7.1 Summary of riparian vegetation values and effects management for stream enhancement

This Riparian Restoration Plan (RRP) has been prepared in accordance with special information requirement I450.9 (1) of the Drury Centre Precinct provisions in the AUP. The RRP is required to present the location (please refer to the Landscape Plan (Boffa Miskell, 2025), species, planter bag size and density of plants. Plant species are required to be native and the RRP to be prepared in accordance with Auckland Unitary Plan (AUP) Appendix 16 – Guidelines for native revegetation planting. This RRP has been prepared to accompany the Landscape Plan (Boffa Miskell, 2024) and should be read in conjunction.

7.2 Riparian vegetation values

Stream A is located within the Drury Centre project of which 176 m of existing stream length is proposed to be reclaimed and partially realigned into a channel of 97 m, and 80 m of existing piped stream length will be daylighted. Riparian vegetation along Stream A is absent across much of the stream, with grazed grass to the stream edge and limited shading of the stream channel by a shelterbelt of large non-native trees (*Quercus* sp.) and gorse (*Ulex europaeus*).

7.2.1 Effects management for stream enhancement

The riparian restoration planting proposed along the existing Stream A will be undertaken as required under the Drury Centre Precinct provisions. Riparian restoration planting surrounding the daylighted stream section and realigned stream section will be provided to offset some of the stream effects associated with the proposed works.

7.3 Reference ecosystem

Riparian zones occur between land and water ecosystems, along streams and rivers and usually extend from the bank of the watercourse to the upper flood extent. Riparian zones provide important connections not only between land and water ecosystems but also as ecological corridors between terrestrial, wetland and coastal ecosystems. Riparian zones have their own structure (wet to dry; stream margin to slope) and depending on the surrounding ecosystems species composition may differ.

The Drury Centre project site is located in what was historically covered in a Pūriri, tōtara forest (WF7; Singers et al., 2017), which established on silty clay, well-drained, alluvial terraces. Auckland Council's Te Haumanu Taiao (2023) riparian restoration guideline is used as reference riparian ecosystem, with some additional plant species added from the WF7 restoration guidance in the same document. In regard to fauna species composition, the objective is to create diverse and complex habitats to attract a variety of native fauna species, including various insect groups, lizards and birds.

7.4 Goals and objectives

Intended goals of the riparian restoration plan are as follows:

- A closed canopy cover (≥ 80%) with subcanopy and understory layers successfully regenerating. The closed canopy cover can be achieved within the proposed 5-year management timeframe while successful regeneration can only be achieved in the medium to long term.
- Riparian planting will be located within an approximate 8 m margin either side of the stream.

- Pest plant presence will be managed through establishment of the riparian planting to very low levels and ongoing to levels that do not affect the ecological integrity of the riparian planting or surrounding ecological planting or natural remnants.

7.5 Riparian restoration

7.5.1 Site preparation

For the riparian restoration to be successful, good site preparation is key including pest animal control and pest plant control. Stock fencing will not be required around the riparian restoration area, as it will be urbanised. Access by people will need to be monitored over time to assess damage to planting and consequent reduction in ecological value and biodiversity benefits.

Damage to the planting will be recorded during the plant establishment monitoring (Section 7.7) and adaptive management actions will be further discussed in the monitoring report(s). Options for managing people access may include signage or planting of 'prickly' plants along the edge.

7.5.1.1 Stock exclusion

Stock exclusion is not required, because Stream A will be located within Drury Centre project, an urban land use area (Woods Drawing P24-447-02-0010-SC REV3).

7.5.1.2 Pest animal control

Restoration planting offers a new food source for native and exotic animals inhabiting the surrounding landscape. It can be expected that at least hares (*Lepus europaeus*), rabbits (*Oryctolagus cuniculus*) and pūkeko (*Porphyrio melanotus*) are present and will feed on the newly planted plants. Intensive control of any pest animals will be required during the establishment of the plants and can be lessened as plants establish. The intensity of the pest animal control required depends on the pest animal present. During the planting, plants shall be regularly (at least once a week) inspected by the Construction Site Manager or delegated contractor. As the damage can happen very fast resulting in loss of plants, fast, decisive action will be required, when pest animal browse will be detected.

New plantings could be protected using plant guards made out of biodegradable fibre, non-degradable wire or plastic (optional). Non-degradable plant guards if used will need to be removed when plants have established and the risk of plant mortality from browse damage has been reduced.

7.5.1.3 Pest plant control

All pest plants and those likely to compete with the newly planted native plants will be controlled to very low-density with herbicide or mechanically removed prior to planting. Herbicides that are likely to be harmful to the wider environment (i.e. waterways), adjacent existing native plant species, or those that contain a residual factor that may be harmful to native plants, will not be used.

Manual or mechanical removal of pest plant species will occur if it is unsafe to use herbicides for native flora and fauna.

Spot spraying (rather than blanket coverage) should be prioritised during pest plant control after the planting has been undertaken. It is imperative that all native species, including small ground covers, be encouraged to grow and thrive in order to meet the goals and objectives of the RRP.

An ecological approach to pest plant control will be undertaken, including consideration of:

- Identifying any existing/regenerating native plant species that may be encouraged through selective control.

- Undertaking a range of pest plant control and management activities to establish a new successional pathway that can be managed to establish the desired riparian margin.
- Ensuring removal of major pest plant seed burden and pest plant re-invasion sources.

7.6 Riparian planting

7.6.1 Eco-sourcing

All native plants produced for restoration planting shall be eco-sourced from the Manukau Ecological District. Where practicable, material is to be sourced as close as possible to the planting site. This ensures propagation material used for restoration planting is genetically suitable for the local environment.

Where eco-sourcing is not practicable, consultation with Auckland Council will be required to confirm alternative sources.

7.6.2 Species selection

The plant species for the riparian planting have been selected in accordance with Auckland Council's Te Haumanu Taiao (2023) guidance document. Species lists for each of the anticipated planting zones (stream edge, flood area and slope) are presented in the following tables (Table 7.1, Table 7.2, Table 7.3). The plants are predominately early successional species, with few species that require part-shade to establish. Wind and aspect have not been considered in detail, as the species are known to grow on either side of stream banks, tolerating a wide range of conditions including wind and aspect.

Table 7.1: Native plant species list - stream edge (within 1 m from stream bank)

Botanical name	Common name	Spacing (m)	Min. size	%
Acaena novae-zelandiae	NZ bidibidi	0.5	2L	5
Austroderia fulvida	Toetoe	1.4	2L	5
Blechnum novae-zelandiae	Kiokio	0.5	2L	5
Carex germinata	Rautahi	0.5	2L	25
Carex lessoniana	Rautahi	0.5	2L	25
Carex virgata	Pukio, swamp sedge	0.5	2L	20
Carpodetus serratus	Putaputaweta	1.4	2L	5
Cordyline australis	Tī kōuka	1.4	2L	13
Veronica stricta	Koromiko	1.4	2L	2
			Total	105

Note: Where stream banks are too steep for planting, kiokio and NZ bidibidi to be planted under riparian trees/shrubs (see 'flood area' and 'terrestrial' planting schedules) on the top of the bank, with the aim of natural colonisation along the banks.

The total percentage cover is greater than 100%, because understory plants have been included to increase structural diversity in the sub-canopy tier.

Table 7.2: Native plant species list – flood area

Botanical name	Common name	Spacing (m)	Min. size	%
Austroderia fulvida	Toetoe	1.4	2L	8
Blechnum novae-zelandiae	Kiokio	0.5	2L	3
Carex dissita	Forest sedge	0.5	2L	10
Carex germinata	Rautahi	0.5	2L	5
Carex lessoniana	Rautahi	0.5	2L	5
Carex virgata	Pukio, swamp sedge	0.5	2L	4
Carpodetus serratus	Putaputaweta	1.4	2L	7
Cordyline australis	tī kōuka	1.4	2L	10
Corynocarpus laevigatus	Karaka	4.0	2L	2
Dacrycarpus dacrydioides	Kahikatea	4.0	2L	5
Leptospermum scoparium	Mānuka	1.4	2L	10
Melicytus ramiflorus	Māhoe	1.4	2L	8
Phormium tenax	Harakeke	1.4	2L	5
Sophora microphylla	Kōwhai	1.4	2L	10
Veronica stricta	Koromiko	1.4	2L	8
			Total	100

Table 7.3: Native plant species list - terrestrial

Botanical name	Common name	Spacing	Min. size	%
Carex dissita	Forest sedge	0.5	2L	5
Coprosma propinqua	Mingimingi	1.0	2L	10
Coprosma robusta	Karamu	1.4	2L	8
Coprosma tenuicaulis	Hukihuki	1.0	2L	10
Cordyline australis	Tī kōuka	1.4	2L	5
Corynocarpus laevigatus	Karaka	4.0	2L	2
Geniostoma ligustrifolium var. ligustrifolium	Hangehange	0.5	2L	2
Kunzea robusta	Kānuka	1.4	2L	10
Leptospermum scoparium	Mānuka	1.4	2L	10
Melicytus ramiflorus	Māhoe	1.4	2L	10
Myrsine australis	Māpou	1.4	2L	5
Phormium tenax	Harakeke	1.4	2L	5
Plagianthus regius	Ribbonwood	1.4	2L	3
Podocarpus totara	Tōtara	4.0	2L	3
*Rhopalostylis sapida^*	Nīkau	1.4	2L	3
*Schefflera digitata^*	Pate	1.4	2L	7
Sophora microphylla	Kōwhai	1.4	2L	10
Veronica stricta	Koromiko	1.4	2L	2
			Total	120*

Note:

* The total percentage cover is greater than 100%, because understory plants have been included to increase structural diversity in the sub-canopy tier. ^ Plant in sheltered locations in part-shade.

7.6.3 Propagation

All planting material will be:

- Grown to specification.
- Well-grown with well-formed root systems that fill the growing container but that are not root bound, and with well-formed foliage above ground.
- Well-hardened before delivery to the planting site.
- Free from obvious disease and fungal infections.

7.6.4 Nursery requirements

When acquiring plants from the nursery, the lead contractor must ensure the following:

- Nurseries growing Myrtaceae plants are expected to follow and use NZPPI Myrtle Rust Protocols to minimise the risk of spreading myrtle rust, including:
  - Nursery protocols (NZPPI, n.d.).
  - Plant Transport Protocol (NZPPI, 2017).
- Inspection of potted plant selection for plague skink eggs. Potting mix and plant material are the most frequent vectors of plague skinks and their eggs. All potting mix and plant material shall be inspected for plague skinks and eggs prior to importation to site

Plants will be inspected at the supply nursery by the Construction Site Manager or agreed delegated contractor prior to delivery and any plants not meeting specifications will be rejected.

7.6.5 Timing

Planting will be undertaken during the planting season (April to September). Site specific environmental factors will need to be considered. For example, sites prone to winter flooding or frost will need to be planted during periods where the risk of such events is low. This will be at the discretion of the Construction Site Manager.

If practicable, the timing of planting (particularly but not solely) of culturally significant tree species will be co-ordinated with Project iwi partners to maximise opportunities to enable the restoration planting to be consistent with Maramataka.

7.6.6 Plant methodology and staging

All planting shall be undertaken by experienced personnel in accordance with the best recognised horticultural practises.

All plants shall be planted into holes at their current depths found in root trainers/plant bags, so that the soil level after settlement shall match the original soil mark on the stem of the plant. The bottom of each hole shall be loosened to allow root penetration and free drainage. Holes shall be approximately one and half times the width of the root ball and a fertiliser tab added immediately prior to planting. Plants shall be 'pressed or heeled in' by lightly compacting the soil surrounding the plant.

7.6.7 Planting layout and spacing

Growing conditions vary over small distances and plant locations will need to be altered accordingly to ensure plant tolerances are matched to site conditions to achieve successful plant growth and survival.

An experienced restoration ecologist will delineate planting zones for the restoration plantings.

Plant spacings are as follows, as outlined in the planting design specifications and in accordance with Auckland Councils Te Haumanu Taiao (Auckland Council, 2023) guidelines:

- 0.5 m spacing for low stature plants such as *Carex* species.
- 1.4 m for most other species.

7.6.8 Plant maintenance

Plants shall be monitored on an annual basis for a minimum of 5 years following planting. Replacement planting will be undertaken to ensure survival rates are consistent and still meet the requirements of a minimum of 80% canopy cover. Any plants that have failed to establish during this period shall be replaced with the same species (Section 7.6.2). Where failure is due to environmental conditions being unsuitable for the original species, a new native species shall be planted as confirmed with the Project Ecologist.

Once the riparian restoration planting has been undertaken, a plant release and maintenance programme will ensure any pest plants that establish are controlled to very low levels. Pest plants will be controlled to ensure replacement plantings are not inhibited, and performance target (80% canopy cover) will be met.

Pest plants are defined by those listed as such within the AC Regional Pest Management Plan 2020-2030 (RPMP) and following documents, and those considered by the Project Ecologist as capable of inhibiting replacement plantings.

Pūkeko, rabbits or hares can inhibit new plantings through foliar browse, pulling out or ring-barking small seedlings, and large pest populations can damage many hundreds of seedlings over a short time period (e.g. a few days). Pūkeko, rabbit and/or hare control may be required to ensure successful establishment of plants. Control of pest animals is outlined in Section 7.5.1.2.

7.6.9 Habitat enhancement

The purpose of providing habitat enhancements is to provide additional structural diversity to increase ecosystem function, especially for ground-dwelling fauna and decomposers.

7.6.9.1 Reuse of organic material

Fallen trees are ecologically important to regeneration processes and as habitat for a wide range of species. Fallen wood provides habitat for decomposers including invertebrates, fungi and bacteria, and are sites for plant regeneration.

Fallen and decaying logs and new logs cut from vegetation cleared shall remain in situ where practicable until they can be relocated to the riparian restoration area. Suitable areas for temporary placement of logs and felled vegetation will be physically marked out prior to vegetation clearance occurring and will not be placed where material could move and enter streams or wetlands.

Smaller volumes of material can be placed without further work, while larger logs (of greater than 50 cm DBH or more than 5 m long) will be cut into manageable sections.

7.6.9.2 Large wood for stream restoration

Large wood is an important instream component providing habitat and food for many detritivores including kōura, fish and birds. Large wood is usually defined as >100 mm diameter and >1 m long, however larger pieces can provide for better stability of habitat.

Prior to vegetation clearance, the Project Ecologist will confirm that the trees on site are suitable for stream restoration. For example, some woody plant species can resprout from cuttings and are considered usually unsuitable material for stream restoration. Further, the Project Ecologist will confirm the wood type, quantities and sizes required based on the detailed design. For example, 1-5 pieces of wood per 20 m of stream length may be required. Wood sizes will be determined based on the size and type of streams being restored e.g. smaller wood is more appropriate in narrower streams.

During the process of vegetation clearance, some large wood will be stockpiled for use in stream restoration/daylighting where practicable. This will include root wads and logs as confirmed by the project ecologist. Suitable areas for temporary placement of large wood will be physically marked out prior to vegetation clearance occurring and will not be placed where material could move and enter streams or wetlands.

7.7 Monitoring

7.7.1 Plant establishment monitoring

During the first year of planting, at least four site visits will be undertaken to monitor plant establishment and record plant mortality. Any dead plants will be replaced in the following planting season.

If the plants have established well in Year 1 and pest animal and pest plant control manages the risks to plant establishment, ongoing monitoring can be reduced to twice annually in Year 2 and Year 3 following planting and to annually in Year 4 and Year 5 following planting.

Plant establishment monitoring will be undertaken by the Construction Site Manager or delegated contractor.

7.7.2 Compliance monitoring

In Year 5 following planting, the Project Ecologist will undertake compliance monitoring to assess if closed canopy cover (≥ 80%) with subcanopy and understory layers has been achieved.

The monitoring methodology will be determined closer to the time of monitoring but will need to address:

- The objective and goals set for the riparian restoration planting.
- Statistical viability, i.e. number of plots.
- Best practice, peer reviewed methods, i.e. RECCE plots.

Adaptive management actions may be required following the compliance monitoring to achieve compliance. Any adaptive management recommendation will be provided in the compliance monitor report (Section 10.3) and could recommend:

- Infill planting.
- Additional pest animal and/or pest plant control.

8 Wetland Restoration Plan

This Wetland Restoration Plan (WRP) is prepared in accordance with condition 86 of the Drury Centre Precinct (Stage 1) Decision (New Zealand Government, 2023). The consent condition states the following:

Condition*	Content of condition
86	Following construction of the shared use path, the consent holder must prepare and submit Wetland Restoration Plan (WRP) to the Council for certification and the consent holder must implement the certified WRP thereafter. The WRP must include: (a) A plan showing proposed planting of Wetland 1 and Wetland 2. (b) Appropriate species list including planting densities and planting methodologies. (c) Site preparation details with specific reference to the approaches proposed within the wetlands. (d) A monitoring and maintenance plan to ensure that the outcomes proposed will be achieved. (e) Confirmation that all planting will be generally in accordance with the Wetland Restoration Guide prepared by Auckland Council and AUP Appendix 16 – Guideline for Native Revegetation Planting. (f) An explanation demonstrating how the WRP complies with the permitted activity standards in Regulation 55 of the National Environmental Standards for Freshwater or any subsequent equivalent amendment to the NES-FM.

Note: *New Zealand Government 2023.

This WRP has been prepared in accordance with Auckland Council's Te Haumanu Taiao, which succeeded Auckland Council's Wetland Restoration Guide, and AUP Appendix 16 – Guidelines for native revegetation planting. Further the wetland restoration planting outlined below complies with the permitted activity standards in Regulation 55 of the National Environmental Standards for Freshwater as follows.

Table 8.1: Compliance with Regulation 55 National Environmental Standards for Freshwater

Regulation 55 - Clauses	Compliance	Justification
(2) Prior notice of activity	Yes	See Section 8.4.1 for details.
(3)- (6) Water quality and movement	Yes	Adverse effects on water quality will be prevented through undertaking any work within Wetland 1 and Wetland 2 manually and during dry conditions (i.e. pest plant control and planting to be undertaken during late summer). Water movement will not be impacted, either through altering natural water movement, taking or discharging water or placement of debris or sediment. The planting is unlikely to increase the level of flood water due to their location. Wetland 1 and Wetland 2 are located on property owned by Kiwi Property Holding No 2 Limited.
(7) Earth stability and drainage	Yes	The wetland restoration measures are not creating or contributing to land surface instability, erosion of wetland bed or bank, a change in the points of which water flows into or out of Wetlands 1 and 2, a constriction of water flow within, into or out of Wetlands 1 and 2 or flooding.

Regulation 55 - Clauses	Compliance	Justification
(8) Earthworks, land disturbance and vegetation clearance	Yes	No earthworks or land disturbance are proposed. Vegetation clearance is proposed through pest plant control rather than removal of vegetation. Ground will not be bared.
(9) Vegetation and bird and fish habitat	Yes	Section 8.4.4.2 provides a list of appropriate indigenous species that will be planted. Any indigenous vegetation present will not be impacted through the wetland restoration activities. The remaining clauses do not apply, as Wetlands 1 and 2 do not provide habitat for freshwater fauna and wetland birds
(10) – (11) Historic heritage	Yes	See Section 8.4.2 for details.
(12) Machinery, vehicles, equipment and construction materials	Yes	Clauses do not apply, as no machinery, vehicles, equipment and construction materials will be used for the wetland restoration.
(13) Miscellaneous	Yes	The wetland restoration will be undertaken in Wetland 1 and Wetland 2 as outlined in Condition 86. No fire or explosive will be used. The public has currently no access to Wetlands 1 and 2. Debris, material, equipment and litter will be removed from the wetland restoration sites as required within 5 working days after completion of the restoration.

All information required to be provided per Schedule 2 of the NES F has also been provided within either this document, or the accompanying EcIA or resource consent application.

8.1 Current wetland ecological values

Wetlands 1 and 2 are seepage wetlands located within depressions on the true right margin of the Hingaia Stream. Wetland 1 is approximately 355 m^2 in size. During site assessments, the wetland was highly degraded due to stock access. The plant species present were predominantly exotic. Wetland 2 is larger in size (approximately 1,580 m^2). The upper section was unfenced in 2021 with vegetation consisting of grazed pasture grasses, sporadic gorse (*Ulex europaeus*) and *Juncus spp.* The lower wetland section was fenced and contained willow (*Salix spp.*) creeping buttercup (*Ranunculus repens*), mercer grass (*Paspalum distichum*), Yorkshire fog (*Holcus lanatus*) and *Gahnia spp.* as dominant species. Both wetlands have been assessed as being of low ecological value (T+T, 2025).

8.2 Reference ecosystem

The Drury Centre project site is located in what was historically covered in a Pūriri, tōtara forest (WF7; Singers et al., 2017), which established on silty clay, well-drained, alluvial terraces. Seepage wetlands along streams, including the Hingaia Stream, will have been present historically within the forest and riparian mosaic along streams. Through land use change, many of these wetlands were drained and a reference ecosystem could not be identified in proximity to the site (Auckland Council Geomaps Ecosystem Current Extent layer). Auckland Council Geomaps Ecosystem Potential Extent layer suggest that this area was historically covered in kahikatea, Pūriri forest (WF7-3; Singers et al., 2017).

Auckland Council's Te Haumanu Taiao (2023) identified nine naturally occurring wetland types in Tāmaki Makaurau/Auckland. Figure 4.5 in Te Haumanu Taiao was used to determine which wetland type to restore at Wetland 1 and Wetland 2. Based on the conditions at site (alluvial terraces with

silty soils, poorly drained (Te Haumanu Taiao WF7 -3), the reference ecosystem has been identified as Flaxland (WL18).

The wetland restoration focusses not only on restoring wetland vegetation but to create diverse and complex wetland fauna habitats in the medium to long term to attract a variety of native fauna species, including various insect groups, and birds.

8.3 Goals and objectives

The overall goal for the wetland restoration is to restore a local native wetland type (Flaxland) that provides diverse habitat for native wetland fauna. This goal is supported through the following objectives:

- 80% of indigenous plant species present after 5 years.
- Plant species achieve a height of up to 1.5 m after 5 years.
- At least 10 indigenous species to be present after 5 years.
- Five fauna habitat features (i.e. low tier, mid tier and high tier vegetation to be present, stock has been excluded and wetland buffer planting protects the wetland areas.
- Pest plant presence will be managed through establishment of the riparian planting to very low levels and ongoing to levels that do not affect the ecological integrity of the riparian planting or surrounding ecological planting or natural remnants.

8.4 Wetland restoration

8.4.1 Notification prior to works commencing

Auckland Council will be notified in writing at least 10 working days prior to starting the wetland restoration measures outlined below. The following information will be provided:

- A description of the wetland restoration measures to be undertaken.
- A description of, and map showing where the wetland restoration measures will be undertaken.
- A statement of when the wetland restoration measures will start and when it is expected to end.
- A description of the extent of the wetland restoration measures.
- Contact details.

Much of the above information is covered in this WRP. Notification is the responsibility of the Construction Site Manager or delegated contractor.

8.4.2 Archaeology

An archaeological assessment has been undertaken for the project location. It is understood that an Archaeological Authority form Heritage New Zealand Pouhere Taonga has been issued for the entire Stage 2 area and this will enable wetland restoration to proceed.

8.4.3 Site preparation

8.4.3.1 Stock exclusion

Stock exclusion is often the first step in restoring wetland areas to prevent browsing, trampling and pugging of vegetation and enable natural regeneration, because seeds can remain for long times in the soil.

Stock exclusion will not be required, because Wetland 1 and 2 will be part of the Esplanade Reserve on the eastern banks of the Hingaia Stream and part of the wider urban development (Drury Metropolitan Centre Context Plan, Landscape Plan, Boffa Miskell, 2025).

8.4.3.2 Pest animal control

Restoration planting offers a new food source for native and exotic animals inhabiting the surrounding landscape. It can be expected that at least hares, rabbits and pūkeko are present and will feed on the newly planted plants. Intensive control of any pest animals will be required during the establishment of the plants and can be lessened as plants establish. The intensity of the pest animal control required depends on the pest animal present. During the planting, plants shall be regularly (at least once a week) inspected by the Construction Site Manager or delegated contractor. As the damage can happen very fast resulting in loss of plants, fast, decisive action will be required when pest animal browse is detected.

New plantings can be protected using plant guards made out of biodegradable fibre, non-degradable wire or plastic (optional). Non-degradable plant guards, if used, will need to be removed when plants have established and the risk of plant mortality from browse damage has been reduced.

8.4.3.3 Pest plant control

All pest plants and those likely to compete with the newly planted native plants will be controlled to zero-density with herbicide or manually removed prior to planting. Herbicides that are likely to be harmful to adjacent existing native plant species, or those that contain a residual factor that may be harmful to native plants, will not be used.

Manual removal of pest plant species will occur if it is unsafe to use herbicides for native flora and fauna.

Spot spraying (rather than blanket coverage) should be prioritised during pest plant control after the planting has been undertaken. It is imperative that all native species, including small ground covers, be encouraged to grow and thrive in order to meet the goals and objectives of the WRP.

An ecological approach to pest plant control will be undertaken, including consideration of:

- Identifying any existing/regenerating native plant species that may be encouraged through selective control.
- Undertaking a range of pest plant control and management activities to establish a new successional pathway that can be managed to establish the desired wetland type.
- Ensuring removal of major pest plant seed burden and pest plant re-invasion sources.

8.4.4 Wetland planting

8.4.4.1 Eco-sourcing

All native plants produced for restoration planting shall be eco-sourced from the Manukau Ecological District. Where practicable, material is to be sourced as close as possible to the planting site. This ensures propagation material used for restoration planting is genetically suitable for the local environment.

Where eco-sourcing is not practicable, consultation with Auckland Council will be required to confirm alternative sources.

8.4.4.2 Species selection

The plant species for the wetland restoration have been selected in accordance with Auckland Council's Te Haumanu Taiao (2023) guidance document and are presented in Table 8.2. The plants are suitable for the site conditions including sun/shade, aspect, wind and frost.

Table 8.2: Flaxland (WL18) species selection for planting at Wetland 1 and wetland 2

Botanical name	Common name	Spacing (m)	Size	%	Notes
Blechnum novae-zelandiae	Kiokio	0.75	root trainer/ 0.5 L	5	Moist areas
Carex secta	Pūrei	0.5	root trainer/ 0.5 L	5	Wet areas
Carex virgata	Pūkio	0.5	root trainer/ 0.5 L	5	Wet and moist areas
Coprosma robusta	Karamū	1.4	PB3	5	Moist areas
Cordyline australis	Tī kōuka	1	PB3	10	Wet and moist areas
Cyperus ustulatus	Giant umbrella sedge	0.5	root trainer/ 0.5 L	5	Wet and moist areas
Leptospermum scoparium	Mānuka	1.4	PB3	5	Wet and moist areas
Machaerina articulata	Jointed twig rush	0.5	root trainer/ 0.5 L	5	Wet areas
Machaerina rubiginosa	Baumea	0.5	root trainer/ 0.5 L	5	Wet areas
Phormium tenax	Harakeke	1	PB3	50	Wet and moist areas; plant in clumps

8.4.4.3 Propagation

All planting material will be:

- Grown to specification.
- Well-grown with well-formed root systems that fill the growing container but that are not root bound, and with well-formed foliage above ground.
- Well-hardened before delivery to the planting site.
- Free from obvious disease and fungal infections.

8.4.4.4 Nursery requirements

When acquiring plants from the nursery, the lead contractor must ensure the following:

- Nurseries growing Myrtaceae plants are expected to follow and use NZPPI Myrtle Rust Protocols to minimise the risk of spreading myrtle rust, including:
  - Nursery protocols (NZPPI, n.d.).
  - Plant Transport Protocol (NZPPI, 2017).
- Inspection of potted plant selection for plague skink eggs. Potting mix and plant material are the most frequent vectors of plague skinks and their eggs. All potting mix and plant material shall be inspected for plague skinks and eggs prior to importation to site.

Plants will be inspected at the supply nursery by the Construction Site Manager or delegated contractor prior to delivery and any plants not meeting specifications will be rejected.

8.4.4.5 Timing

Planting will be undertaken during late summer (March and April). Site specific environmental factors will need to be considered, i.e. drought conditions during very dry summers. This will be at the discretion of the Construction Site Manager.

If practicable, the timing of planting (particularly but not solely) of culturally significant wetland plant species will be co-ordinated with Project iwi partners to maximise opportunities to enable the restoration planting to be consistent with Maramataka.

8.4.4.6 Plant methodology and staging

All planting shall be undertaken by experienced personnel in accordance with the best recognised horticultural practises.

All plants shall be planted into holes at their current depths found in root trainers/planter bags, so that the soil level after settlement shall match the original soil mark on the stem of the plant. The bottom of each hole shall be loosened to allow root penetration. Holes shall be approximately one and half times the width of the root ball. Plants shall be 'pressed or heeled in' by lightly compacting the soil surrounding the plant.

No fertiliser will be used in wetland restoration plantings.

8.4.4.7 Planting layout and spacing

Growing conditions vary over small distances and plant locations will need to be altered accordingly to ensure plant tolerances are matched to site conditions to achieve successful plant growth and survival.

An experienced restoration ecologist will delineate planting zones for the wetland restoration planting.

Plant spacings are as follows, as outlined in the planting design specifications and in accordance with Auckland Councils Te Haumanu Taiao (Auckland Council, 2023) guidelines:

- 0.5 m spacing for small stature wetland plants such as *Carex* species.
- 1.4 m for most other species.

8.4.4.8 Plant maintenance

Plants shall be monitored on an annual basis for a minimum of 5 years following planting. Replacement planting will be undertaken to ensure survival rates are consistent and still meet the objectives outlined in Section 8.3. Any plants that have failed to establish during this period shall be replaced with the same species (Section 8.4.4.2). Where failure is due to environmental conditions being unsuitable for the original species, a new native species shall be planted as confirmed with the Project Ecologist.

Once the wetland restoration planting has been undertaken, a plant release and maintenance programme will ensure any pest plants that establish are controlled to very low levels. Pest plants will be controlled to ensure replacement plantings are not inhibited, and the objectives (Section 8.3) are met.

Pest plants are defined by those listed as such within the AC Regional Pest Management Plan 2020-2030 (RPMP) and following documents, and those considered by the Project Ecologist as capable of inhibiting wetland planting.

Pūkeko, rabbits or hares can inhibit new plantings through foliar browse, pulling out or ring-barking small seedlings, and large pest populations can damage many hundreds of seedlings over a short time period (e.g. a few days). Pūkeko, rabbit and/or hare control may be required to ensure successful establishment of plants. Control of pest animals is outlined in Section 8.4.3.2.

8.4.5 Wetland buffer planting

It is generally recommended to undertake wetland buffer planting of at least 10 m surrounding the wetlands.

Riparian planting of native species to at least 10 m within the Esplanade Reserve along the right bank of the Hingaia Stream is required under the Drury Centre Precinct Decision (New Zealand Government, 2023). The Esplanade Reserve includes Wetland 1 and Wetland 2 in parts. Where practicable, the riparian planting within the Esplanade Reserve will surround Wetlands 1 and 2, creating a 10 m wetland buffer.

8.5 Monitoring

8.5.1 Plant establishment monitoring

During the first year of planting at least four site visits will be undertaken to monitor plant establishment and record plant mortality. Any dead plants will be replaced in the following planting season.

If the plants have established well in Year 1 and pest animal and pest plant control manages the risks to plant establishment, ongoing monitoring can be reduced to twice annually in Year 2 and Year 3 following planting and to annually in Year 4 and Year 5 following planting.

Plant establishment monitoring will be undertaken by the Construction Site Manager or delegated contractor.

8.5.2 Compliance monitoring

In Year 5 following planting, the Project Ecologist will undertake compliance monitoring to assess if the objectives of the wetland restoration have been achieved.

The monitoring methodology will be determined closer to the time of monitoring but will need to address:

- The objective and goals set for the wetland restoration.
- Statistical viability, i.e. number of plots.
- Best practice, peer reviewed methods; i.e. RECCE plots.

Adaptive management actions may be required following the compliance monitoring to achieve compliance. Any adaptive management recommendation will be provided in the compliance monitoring report (Section 10.3) and could recommend:

- Infill planting.
- Additional pest animal and/or pest plant control.

9 Ecological effect monitoring

The EcIA established that construction for Drury Centre Stage 2 could result in hydrological changes that could affect Wetlands 1 and 2, and result in possible loss of wetland extent and value. Wetland monitoring has been recommended, and details are provided in the following paragraphs.

9.1 Baseline monitoring

Prior to construction commencing within a 100 m buffer around Wetlands 1 and 2, baseline monitoring will be undertaken as follows:

- Using the Wetland delineation protocols (Ministry for the Environment, 2022), wetland extent will be confirmed on site.

9.2 Construction monitoring

During construction within a 100 m buffer around Wetlands 1 and 2, and Channel D wetland, annual wetland monitoring will be undertaken as follows:

- Using the Wetland delineation protocols (Ministry for the Environment, 2022), wetland extent will be assessed.

9.3 Post-construction monitoring

9.3.1 Wetland monitoring

Annual wetland monitoring for three consecutive years will be undertaken following completion of construction within a 100 m buffer around Wetlands 1 and 2, and Channel D wetland as follows:

- Using the Wetland delineation protocols (Ministry for the Environment, 2022), wetland extent will be assessed.

9.3.2 Outfall monitoring

Further to the wetland monitoring, photo monitoring of the potential effects of Wetland 2-2 outfall on Wetland 2 will be undertaken annually for three consecutive years as follows:

- At least five suitable photo points will be established during the first year post construction. The intention of the photo monitoring is to capture the Wetland 2-2 outfall and the downstream area of where the water discharges into Wetland 2.

Results of the effects monitoring including recommendations to minimise effects will be reported with the annual compliance report (Section 10.2).

10 Reporting

10.1 Restoration completion report

A restoration completion report will be submitted to AC within 30 working days of completion of the planting required for riparian and wetland restoration respectively to confirm that the restoration measures have been completed in accordance with the RRP and WRP.

The report shall include, but not be limited to, confirmation on:

- Planting species matrix and number of plants planted.
- Areal extent and location of plantings.
- Felled log deployment locations in riparian margins.

10.2 Annual compliance report

A compliance report will be supplied to the Construction Site Manager and Auckland Council by the Project Ecologist which documents the outcomes of all avoidance, minimisation and remediation measures outlined in the EMP. The report will be submitted annually to AC on 31 July. The compliance report shall contain a summary of all works undertaken including:

- Freshwater:
  - Date and time of capture and release.
  - Capture method.
  - Capture and release locations (including GPS coordinates).
  - Number and size of individuals of each species released.
  - Detail any observed mortality and the adaptive management methods undertaken to amend the NFRP.
  - Representative species photographs.
  - All records of aquatic fauna captured and translocated shall also be forwarded to the Ministry of Primary Industries, DOC and uploaded the NZFFD in accordance with conditions attached to any permits or authorities.
- Terrestrial:
  - Map/s or table/s that illustrate where site specific flora and fauna management measures were undertaken.
  - Details of breeding bird search efforts undertaken including:
    - Date and time of breeding bird check.
    - GPS location and/or area of check.
    - Outcome of bird/nest check (e.g. presence/absence of active native nest, location and species if known).
  - Details of lizard presence noted on site during manual searches.
  - Representative photos showing vegetation for removal within the project footprint and stockpile locations.
- Wetland monitoring:
  - Map/s that illustrate the wetland extent/change in wetland extent.
  - Representative photos of the wetland changes.
  - Results of the wetland extent and wetland value assessments.

- If applicable, recommendations to minimise adverse effects on wetland extent and/or wetland value.

10.3 Restoration compliance report

The restoration compliance report will be submitted within 60 working days after the Year 5 compliance monitoring has been undertaken for the riparian and wetland restoration respectively. The report will be supplied to the Construction Site Manager and AC and shall include, but not be limited to:

- Description of monitoring methodology.
- Results of individual monitoring plots if applicable.
- Pest animal and pest plant control undertaken.
- Information on plant mortality and replacement.
- Description of how these meet the objectives of the riparian and wetland restoration outlined in this EMP.

If compliance with the restoration objectives is not met at Year 5 after planting, adaptive management actions, such as ongoing pest plant control, could be proposed.

11 References

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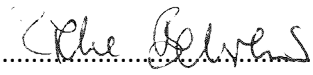
12 Applicability

This report has been prepared for the exclusive use of our client Kiwi Property Holding No. 2 Limited, 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 the Environmental Protection Agency 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:



Rieke Behrens
Terrestrial Ecologist

Report prepared by:

Danielle Cairns
Freshwater Ecologist

Authorised for Tonkin & Taylor Ltd by:

Lisa Dowson

Project Director

DACA
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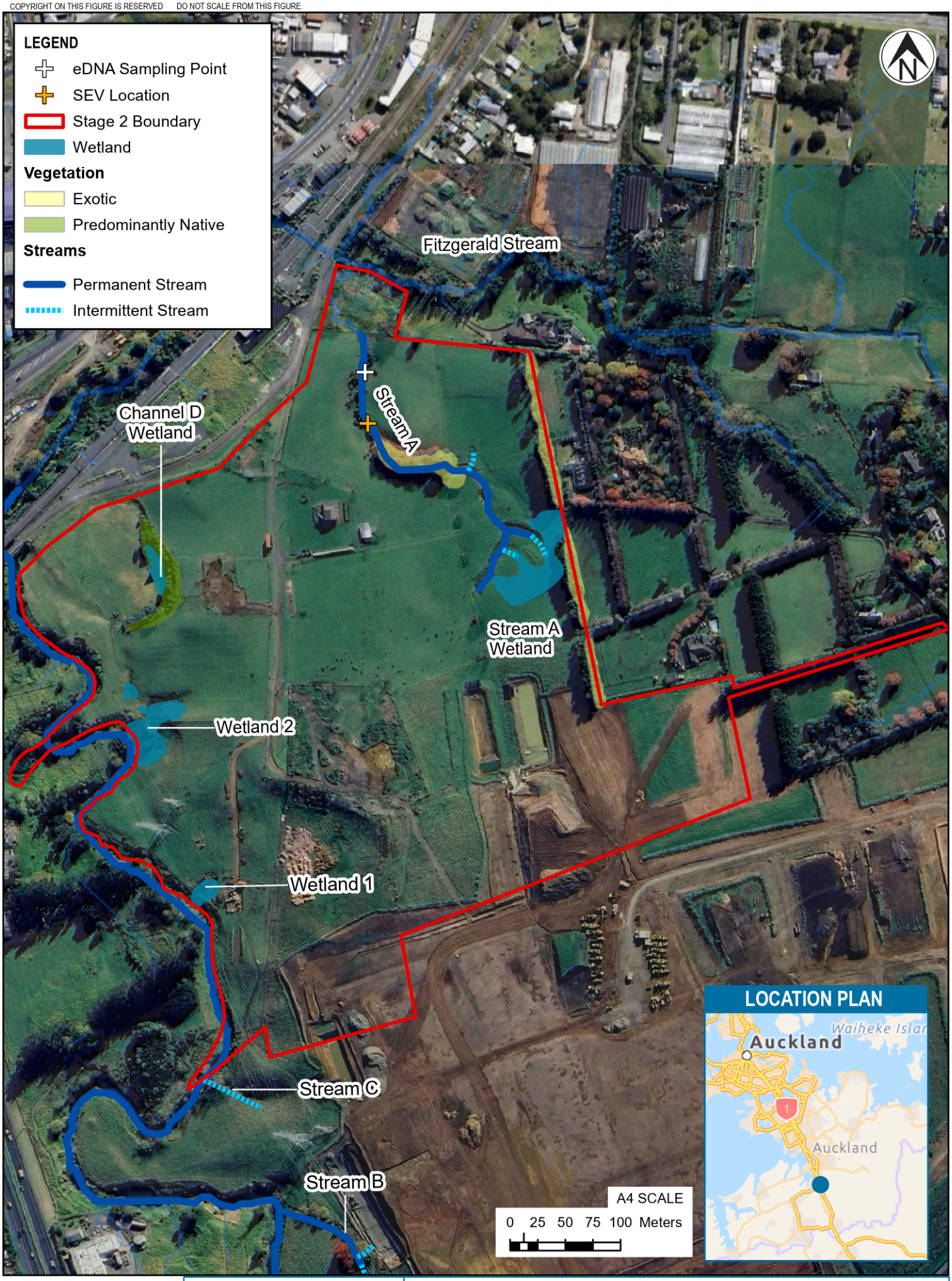
Appendix A Ecological Features Map



PROJECT No.	1003297.6004		
DESIGNED	DACA	FEB.25	
DRAWN	DACA	FEB.25	
CHECKED	CHSA	FEB.25	
APPROVED		DATE	

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CLIENT **KIWI PROPERTY GROUP LIMITED**
PROJECT **DRURY TOWN CENTRE STAGE 2**
TITLE ECOLOGICAL FEATURES
SCALE (A4) 1:4,500 FIG No. FIGURE 1. REV 0

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