



LIZARD MANAGEMENT PLAN

NZ Transport Agency Waka Kotahi
Mill Road Stage 1

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QUALITY REVIEW AND APPROVAL RECORD

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1 INTRODUCTION

1.1 Project background

The Mill Road Stage 1 Project (Project) will provide a strategic transport connection between Manukau and Takaanini in South Auckland. Works include earthworks, vegetation clearance, bridge construction, stormwater infrastructure, ancillary construction areas, and associated ecological restoration and enhancement.

The Project footprint contains a mixture of modified urban, rural, planted, scrub, forest, and rank grass habitats. Some of these habitats provide potential habitat for native lizards, particularly where dense ground cover, leaf litter, woody debris, rock, artificial refugia, unmanaged garden areas, or forest and scrub margins are present. Native lizards are cryptic, typically occur at low densities in modified mainland landscapes, and can persist in small and spatially discrete habitat patches (Anderson et al., 2012; Van Winkel et al., 2018). For that reason, potential effects on lizards require specific management before, during, and after vegetation and habitat clearance.

The full description of project works, and associated drawings can be found in Part B of the Fast Track Approvals Application.

1.2 Ecological context

The Project is located within the Manukau and Hunua Ecological Districts. The Manukau Ecological District is a lowland landscape of flats and rolling hill country that was formerly almost entirely forested and has been extensively modified by clearance, farming, drainage and urban development. The Hunua Ecological District includes lowland hilly terrain and retains a greater proportion of indigenous forest, although the Project lies within a modified western part of that landscape where indigenous vegetation is fragmented and occurs mainly as remnants, riparian corridors, planted areas and regeneration.

1.3 Lizard Management Plan purpose and scope

This Lizard Management Plan (LMP) sets out the methods that will be used to manage adverse effects on native lizards as a result of activities authorised by the Wildlife Approvals obtained for the Project, being the capture, release and accidental killing of protected lizards during the construction of the Project. The LMP is informed by material included in the Terrestrial Ecological Impact Assessment (Appendix C4, Part C of the FTAA Substantive Application) and provides details on lizard habitat identification, pre-clearance survey and salvage, capture, handling, transport and release, release-site preparation, predator control, habitat enhancement, accidental discovery procedures, data collection, reporting, contingency actions, and post-release monitoring.

The effects of the Project on lizard habitat are addressed in the Terrestrial Management Plan.

1.4 Objectives of the Lizard Management Plan

The objective of this LMP is to reduce injury and mortality of native lizards within areas of vegetation clearance associated with the Project, and to establish and enhance the release sites for lizards captured during this process.

The methods to be used to meet this objective are:

- Identify suitable lizard habitats.
- Undertake lizard surveys to establish presence of native lizards.
- Prioritise areas for salvage methods and effort.
- Undertake lizard salvage before and during vegetation clearance.
- Relocate native lizards to a secure and protected area.
- Create and enhance lizard habitat within the release areas.

This LMP has been developed to follow the guidelines provided in the 'Key principles for lizard salvage and transfer in New Zealand' (Department of Conservation, 2019).

2 LIZARD VALUES

2.1 Previous lizard surveys

2.1.1 Method

Lizard surveys were undertaken within Cheesman's Bush and Puhinui Gully, within and adjacent to the Project footprint, using passive and active survey methods consistent with DOC best-practice guidance. The survey methods were selected to improve the likelihood of detecting both diurnal ground-dwelling skinks and nocturnal arboreal geckos. These methods included:

- Sixty ground artificial cover objects were deployed through SEA habitat, targeting forest edges, coarse woody debris and other suitable skink microhabitats.
- Forty tree-mounted artificial cover objects were deployed on mature native trees and other suitable arboreal habitat features.
- Ground ACOs were placed directly on the ground in suitable microhabitats, while tree-mounted ACOs were secured to trunks approximately 1 to 2 m above ground.
- ACOs were deployed between 16 and 20 December 2024, left undisturbed for approximately three months, and checked on 20 March 2025 and 14 April 2025.
- Targeted nocturnal spotlighting was undertaken between 14 and 16 January 2025 during calm, dry and warm conditions.
- Manual searches and incidental observations were undertaken opportunistically during fieldwork, including careful inspection of logs, rocks and vegetation where suitable habitat was present.
- Environmental DNA samples from selected stream sites were considered where relevant to potential lizard presence associated with riparian habitats.

2.1.2 Results

The 2024 and 2025 ACO surveys recorded exotic plague skink in Puhinui Gully and Cheesman's Bush. Native copper skinks were confirmed during manual searches under a decaying fallen log in Cheesman's Bush, and copper skink was also detected in an eDNA sample from stream S04 in [REDACTED]. No geckos were observed during the 2024 and 2025 spotlighting surveys. However, suitable arboreal gecko habitat is present in mature forest, scrub and forest margins.

The absence of widespread native lizard detections does not demonstrate absence across the alignment. Native lizards can occur at low densities, have low detection probabilities, and may occupy small patches of habitat that are difficult to survey effectively. The management approach in this LMP has been adopted on the basis that native lizards may be present in suitable habitat within the Project footprint, even where surveys have not detected them.

2.2 Potential species present

The native lizard species confirmed or potentially present within the Project footprint are copper skink, ornate skink, forest gecko, elegant gecko and Pacific gecko. Copper skink is confirmed present. The other native species are treated as potentially present where suitable habitat occurs, reflecting habitat suitability, previous local records, and the low detectability of lizards, particularly arboreal geckos and low-density populations.

Table 2-1: Potential and confirmed lizard species in the Mill Road

Common name	Scientific name	Threat status (Hitchmough et al., 2026)	Estimated number to be salvaged ¹	Relevance to Project
Copper skink	<i>Oligosoma aeneum</i>	At Risk - Declining	<80	Confirmed present during manual searches and detected in eDNA from stream S04 in [REDACTED]. Habitat occurs across forest, scrub, planted vegetation and rank grass habitats.
Ornate skink	<i>Oligosoma ornatum</i>	At Risk - Declining	<5	Potentially present where damp leaf litter, rock piles, woody debris and dense vegetation occur. Not confirmed within the Project area.
Forest gecko	<i>Mokopirirakau granulatus</i>	At Risk - Declining	<5	Potentially present based on previous unconfirmed gecko records and suitable arboreal habitat in mature forest, scrub and forest edges.
Elegant gecko	<i>Naultinus elegans</i>	At Risk - Declining	<5	Potentially present in forest and scrub habitats with suitable shrub and canopy structure. Not confirmed during the 2024 and 2025 surveys.
Pacific gecko	<i>Dactylocnemis pacificus</i>	At Risk - Relict	<5	Potentially present in forest, scrub, rock piles, crevices and structurally complex habitats. Not confirmed within the Project area.
Plague skink	<i>Lampropholis delicata</i>	Introduced	N/A	Recorded during ACO surveys. It has no indigenous ecological value.

2.3 Native lizard habitat within the Project footprint

Potential native lizard habitat within the Project footprint includes a range of remnant, modified and artificial habitats and these habitat types are detailed within Table 2-2. Regularly grazed or maintained pasture and closely mown grass generally provide limited native lizard habitat unless they contain discrete refugia or are immediately adjacent to higher-value habitat.

Table 2-2: Potential lizard habitats present within the proposed Mill Road designation

Habitat type	Habitat description
WF9 taraire, tawa, podocarp forest	Mature indigenous forest with deep leaf litter, coarse woody debris, shaded humid forest floor, mature trees, epiphytes, vine tangles, bark crevices and complex canopy structure. Provides habitat for copper skink and potential habitat for ornate skink and arboreal geckos.
VS5 broadleaved species scrub / forest	Regenerating scrub / forest with dense vegetation, leaf litter, woody debris and shrub structure. Habitat quality varies with weed dominance, canopy gaps, edge effects and pest pressure.

¹ Estimated number is based on authors experience with other similar projects and scale of habitat. Copper skink numbers are very hard to estimate and are highly unpredictable and spatially variable.

Habitat type	Habitat description
TL.2, TL.3 and EF.1 treeland / exotic forest habitats	Provide lizard habitat where there is ground cover, leaf litter, woody debris, scrubby edges, bark features or arboreal structure. Value varies with complexity, disturbance and connectivity.
PL.1, PL.2 and PL.3 planted native, mixed and amenity vegetation	Can provide lizard habitat where plantings have developed dense cover, leaf litter, woody debris and low vegetation structure. Younger or managed amenity plantings are generally lower value.
ES exotic scrub	Dense exotic scrub can provide suitable copper skink habitat and possible ornate skink habitat where dense cover, leaf litter, woody debris and humid ground conditions are present.
EG exotic grassland and open space grassland	Rank or unmanaged grassland can provide copper skink habitat where dense grass, debris, logs, rubbish or rough margins provide cover. Managed grassland, mown areas and grazed pasture usually provide low practical value.
Road corridor, hardstand and built surfaces	Built surfaces provide negligible habitat, although road edges, rubble, debris piles, retaining edges and unmanaged margins may provide localised refugia for copper skink.

3 EFFECTS ON LIZARDS

The principal potential construction effects on native lizards are mortality and injury during vegetation clearance, earthworks, demolition, removal of refugia, mulching, stockpile movement and removal of woody or artificial debris. Native lizards may shelter within dense vegetation, leaf litter, logs, rock, artificial debris, root mats and other ground-level refugia. Arboreal geckos, if present, may also occupy mature trees, scrub, bark crevices, epiphytes, vine tangles and dense foliage. These animals may not be able to move away from machinery or clearance quickly enough to avoid harm.

4 LIZARD SALVAGE, TRANSFER, AND RELEASE

4.1 Competencies

Lizard salvage will be delivered through a competence-based team structure overseen by a suitably qualified and experienced herpetologist (SQEH) consisting of the SQEH, Field Work Supervisor/s, and Field Worker/s (who are referred to collectively as the “project herpetologists” hereafter in this plan). Table 4-1 defines the competence/experience levels used for this plan and the typical roles that may be undertaken at each level.

Tasks may be allocated to field work supervisors and Field workers where they have been inducted and confirmed as competent for the relevant methods. Field work supervisors may lead day-to-day salvage activities and supervise field teams onsite under the direction of the SQEH. The SQEH retains overall accountability for compliance with permit conditions, animal welfare and hygiene standards, and for decisions at hold points/decision points (unless explicitly delegated in writing for defined tasks).

The SQEH is also responsible for assigning roles and assessing competence.

A field team must comprise of at least one field work supervisor with up to four field workers being supervised by one field work supervisor.

Table 4-1: Competencies for carrying out the lizard salvage, transfer and release works under this LMP.

Competence/experience level	Roles	Required qualification/experience/competence
Suitable Qualified and Experienced Herpetologist (SQEH)	Leads the implementation of the lizard salvage process. Coordinates timings, constraints and dependencies. Acts as lead technical advisor to field teams. Able to work alone and able to supervise field work supervisors and field workers. Responsible for understanding team experience and confirming competence and experience.	Holds a relevant tertiary degree in a relevant ecological field. Extensive experience in target species biology, behaviour, survey and capture techniques. Demonstrated experience in writing effects assessments for impacts on herpetofauna and lizard management plans. Extensive experience in managing salvage programmes and activities.
Field work supervisor (FWS)	Responsible for supervising field teams and leading day-to-day implementation of salvage activities under the direction of the SQEH. Able to work alone and able to supervise up to four field workers.	Extensive experience in active lizard survey and salvage activities under the supervision of a SQEH. Minimum of 120 hours of direct and active involvement in lizard salvage activities under the supervision of a SQEH. Must include active handling of native lizards. Must have demonstrated competence in animal welfare (including recognising stress in lizards), hygiene requirements, and identification of plague skinks as confirmed by a SQEH. To be considered competent to supervise specific methods that experience must include at least 60 hours of experience in the specific method.
Field worker (FW)	Undertakes field tasks as directed by and under the direct supervision² of the SQEH or Field work supervisor, including trap/ACO deployment and checks, hand searching, data recording, and supporting capture/transfer/release activities where competent.	Has received project induction and method-specific briefing, including animal welfare and hygiene requirements. Works under the supervision of a Field work supervisor or SQEH. Where required for a task, has demonstrated competence in safe handling of native lizards and identification of plague skinks, as confirmed by a SQEH.

4.2 Process and habitats

Lizard salvage will not be undertaken during winter months as indigenous lizards undergo physiological changes during the colder months (i.e., torpor: a state of semi-hibernation). Therefore, lizard salvage will only be undertaken between October and April inclusive when indigenous lizards are more active. Warmer weather and higher activity levels mean that lizards are easier to detect and catch. During this time lizards relocated also have an increased chance of surviving.

The capture and translocation measures shall be implemented for all potential native lizard microhabitats within the non-pasture vegetation present within the Project site. Initial ACO and spotlighting surveys

² SQEH or Field work supervisor must be present on site actively undertaking the work alongside the field worker and be available for identification checks, questions and guidance throughout the work period.

failed to detect native lizards and therefore the likelihood of detection at the expected densities within this landscape is very low. Therefore, the salvage of microhabitats will be based on a staged salvage prioritisation process which responds to initial survey findings to appropriately determine the salvage effort in any one location.

The main stages and hold points for lizard salvage in non-pasture vegetation are summarised in Table 4-2. The salvage steps and activities are described in more detail in Sections 5.1 to 5.7.

Table 4-2: Salvage steps, hold points, and roles and responsibilities.

Step	Roles and responsibilities
Pre-clearance activities	
Identification of suitable lizard microhabitats.	Construction Contractor to identify areas of potential earthworks, clearance, plant and equipment storage, or other disturbance throughout the Proposed Designation. SQEH to carry out identification of potential lizard habitat.
Establish ACOs with closed pitfall traps closed underneath them in suitable microhabitats. At least six weeks prior to potential vegetation clearance.	Project herpetologists to carry out deployment of survey devices.
Check ACOs and open pitfall traps and then proceed to check these devices for four consecutive days (three nights).	Project herpetologists to carry out survey and salvage.
Spotlight potential arboreal gecko habitat.	
Salvage effort prioritisation.	SQEH to prioritise areas for subsequent salvage activities based on capture rates and onsite observation of habitat and conditions.
Hold point and Decision Point 1	SQEH to communicate next stages with the Construction Contractor and associated team. Map to be provided of areas that are: • Clear from continued salvage requirements – incidental discovery process applies. Vegetation clearance, earthworks and construction may start in these areas. • Requires targeted destructive salvage by hand. Not cleared for clearance or construction.
Destructive salvage hand searching.	Project herpetologists to undertake destructive hand searching and salvage.
Hold point and Decision Point 2	SQEH to communicate next stages with the Construction Contractor and associated team. Map to be provided of areas that are: • Clear from continued salvage requirements – incidental discovery process applies. Cleared for clearance and construction. • Requires machine-assisted destructive salvage. Not cleared for clearance or construction without supervision of the project herpetologists. Construction Contractor and SQEH to organise required plant and assistance to complete salvage requirements.

Clearance activities	
Machine assisted destructive salvage.	Project herpetologists and Construction Contractor to carry out machinery-assisted destructive salvage under the supervision and direction of the project herpetologists.
Hold point	SQEH to confirm with the Construction Contractor which areas have completed salvage and are clear from continued salvage requirements. The incidental discovery process applies.
Reporting.	SQEH to report to the Construction Contractor, NZTA and DOC on results of salvage. Fill in and submit Amphibian and Reptile Distribution Scheme (ARDS) cards. Provide a map and summary of actions undertaken and captures.

5 SALVAGE ACTIVITIES

Salvage activities will step sequentially through Sections 5.1 to 5.7.

5.1 ACOs and Pitfall trapping

ACOs and pitfall traps (lid closed under ACOs) must be set 6 weeks before being checked to allow any potential lizards on site to habituate to the equipment. Methods should follow the guidance provided in The Herpetofauna inventory and monitoring toolbox (Department of Conservation, 2012). Site selection, trap placement and equipment will follow the guidance of Turner et. al. (2023) to prevent elevated temperatures within the pitfalls. Prior to being checked the pitfall traps will be baited with soft fruit (e.g., banana) and a water-soaked sponge and the lids removed.

Given this is a salvage operation, a high density of traps is required. This density will need to be determined by the SQEH and/or FWS carrying out the survey in response to habitat complexity and area. The density used must ensure a high capture rate of any native lizards on site. The salvage operation will involve a minimum of four checks over five consecutive days (each trap checked once in the morning).

Trapping shall continue until there are no captures in a discrete spatial location for a minimum of three consecutive nights. After three consecutive nights of no capture has been achieved, the salvage process can proceed. Trapping will be the priority method of lizard salvage of ground dwelling native skinks, followed by hand searching and destructive habitat searches for areas where vegetation is proposed to be cleared.

For the Mill Road EclA assessment, ACOs (both ground and tree mounted) had very limited success in detecting lizards compared to manual searching under a decaying log in the Cheesman's SEA. If during the salvage stages ACOs and pitfall trapping results in very low trapping rates, despite being deployed in suitable habitats, the SQEH will consider whether discontinuing those methods and immediately transitioning to the more effective hand searching and mechanically assisted destructive salvage would be a more effective means to maximise the number of lizards salvaged.

5.2 Spotlighting for arboreal geckos

Spotlighting for arboreal geckos will be undertaken during the same week as the pitfall trapping detailed within Section 7.1. Spotlighting search effort will be determined by the SQEH leading out the survey, taking into account vegetation type, height, structural complexity, visibility, weather conditions and the extent of suitable arboreal habitat. Spotlighting will only be undertaken in good weather conditions (i.e., calm, fine and warm nights >15°C with little or no rain). An attempt to capture any geckos spotted during

spotlighting will be undertaken (up to and including manually felling smaller vegetation with hand tools at the time of detection). If a gecko is sighted but not able to be captured, the tree will be marked with flagging tape and prioritised for destructive salvage as soon as possible.

5.3 Decision point 1

Following the survey steps, and based on capture rates and habitat conditions, the SQEH will classify affected areas into two categories:

- areas that are clear from continued salvage requirements, where the incidental discovery protocol will apply; and
- areas requiring targeted destructive salvage by hand before clearance can proceed.

5.4 Hand searching

Targeted destructive hand searches will be undertaken before mechanical destructive habitat searches or vegetation removal. The project herpetologists will search suitable refugia, including leaf litter, logs, woody debris, artificial debris, root mats, rock, dense groundcover and other microhabitats likely to shelter native lizards. Any native lizards found will be captured and transferred in accordance with this LMP.

Search effort will be determined by the SQEH leading the survey, taking into account vegetation type, structural complexity, density of habitat features. Determining an effort per hectare search effort is inappropriate as a small area of decaying logs may take a full day to destructively salvage while a large area of trees with little undergrowth may take relatively little time.

5.5 Decision point 2

At this point, based on the results of the salvage and survey efforts detailed in sections 5.1 to 5.4, the prioritisation of subsequent actions needs to take place by the SQEH. Areas where indigenous lizards have been found and/or salvaged will be targeted by mechanically assisted destructive salvage (Section 5.6), as well as those areas not feasible to survey or salvage by hand³. Those areas where no indigenous lizards were found will be subject to incidental discovery protocols.

5.6 Mechanically assisted destructive salvage

Habitats that cannot be effectively searched by hand and where indigenous lizards have been found will be searched with the assistance of an excavator or other suitable equipment. Lizards may flee or be revealed during vegetation removal, including during the movement of large objects such as logs. Clearance is best achieved with an excavator with a thumb attachment that can pick up debris and pull apart dense cover slowly and in a controlled manner. Works may also include slowly raking through debris and topsoil where interstitial spaces are present. Communication with machinery contractors is critical to ensuring that lizard salvage is carried out in a way that minimises risk to lizards.

Following mechanically assisted destructive salvage, the site must be devoid of lizard habitat and able to be further cleared or subject to earthworks without supervision by the project herpetologists.

5.7 Management of post-search debris

There are several potential fates for post-search debris such as vegetation and wood, including immediate disposal or mulching.

Where post search debris are to be stockpiled for future movement or mulching, ACOs should be deployed within and around the pile and checked weekly for a minimum of 4 weeks prior to movement or mulching. Visual and hand searches should also occur weekly and where gecko species have been previously detected this should include a weekly spotlight search. Movement and mulching can only occur where no lizards have been detected for two consecutive checks.

³ These areas may be too dense, contain large heavy debris unable to be lifted unassisted, or otherwise requiring mechanical dismantling (for example large dense pampas).

Stockpiled debris piles that have had native lizard species detected within or around them or have been in place for more than 12 weeks and are adjacent to retained habitat must be treated using the full salvage methods outlined above, as native lizards may migrate into the dense cover provided by the debris pile from surrounding areas.

Preferably, vegetation and debris (if clean organic debris) will be deposited in areas to be retained adjacent to existing vegetation and left to naturally decay, or in discrete piles in areas where planting is proposed to provide suitable lizard refugia. This is the best outcome as any lizards caught up in debris may survive and use these piles for refuge and are not subject to later disturbance or hazard by moving or mulching.

6 INCIDENTAL DISCOVERY PROTOCOL

Should any lizards be detected incidentally within cleared vegetation or during vegetation clearance when a SQEH or FWS is not present, an exclusion area with a 10 m radius and clear signage will be established around the area, and the SQEH contacted to arrange a further search the area. Any further vegetation clearance works will cease within the exclusion area until the area has been cleared for vegetation removal by the SQEH.

If the lizard(s) detected are injured contact the SQEH for advice on next steps or if they are unable to be reached call the DOC emergency hotline (0800 362 468).

7 INJURED OR DEAD LIZARDS

All injured native lizards, if found, shall be transported by the SQEH or FWS (whoever is on site) to the nearest suitable veterinarian experienced in indigenous wildlife rehabilitation. Contact details of a DOC-approved veterinarian are to be confirmed before the start of any vegetation removal works.

Vets must euthanise lizards whose injuries are causing suffering and are not likely to heal sufficiently to allow rehabilitation and return to the wild. Equally, if the project herpetologists determine that it is clear that injuries are causing suffering and are unlikely to heal and/or are incompatible with continued life the project herpetologists must immediately euthanise the lizard in the field. The complete and total destruction of the brain by blunt force trauma is likely to be the only available field euthanasia method and must be carried out by an experienced person⁴. If there is any uncertainty of death, pithing promptly afterwards may be used to ensure death.

The storage, transport, and end fate of any native lizard bodies in the event of dead lizards being found or injured lizards dying should be determined in consultation with hapū and DOC.

8 LIZARD TRANSPORTATION

The procedures outlined below must be followed for the transfer of indigenous lizards to minimise stress associated with capture and relocation.

- Lizards must be transferred between capture and release habitats in individual cloth bags in appropriately sized, well-ventilated containers with secure lids. The storage container must be cleaned and thoroughly disinfected prior to use and will contain habitat elements (cover objects) to reduce stress (e.g., leaves, sticks, soil or grass). Handling will be minimised to ensure they do not become stressed.

⁴ Crushing injuries although rare, do happen in the course of salvage activities and injuries such as puncturing of the abdominal cavity and/or evisceration can happen. There is no recovery potential and transportation to a vet only prolongs suffering. Note: simple decapitation is not an acceptable method of euthanasia for lizards and must not be used in the field or in a clinical setting.

- While contained, lizards will be kept in a cool place and transferred within 4 hours of capture to the approved release site. Due to the proximity of the release site, it is feasible (and preferred) to immediately transfer lizards post capture.
- Lizards from each area shall be stored separately to reduce stress and the likelihood of possible overcrowding and territorial/dominance behaviours.
- Lizards are to be released into suitable microhabitats such as log piles, and good cover of leaf litter which will be provided within the soft release pens of the release site.
- Captured lizards are to be released one at a time, and not at the exact same location within a release site to minimise stress from overcrowding and territorial/dominance behaviour.

9 RELEASE SITES

Two release sites are proposed for the Project. [REDACTED] & Cheesman's Bush (extent of SEA_T_9102 within the proposed designation) see APPENDIX B for the locations of these sites. Salvaged lizards will not be released to locations outside the specified release sites, unless an amendment to the Wildlife Approval is approved by DOC. The purpose of selecting these two release sites is to provide clearly defined, protected and managed receiving environments where release-site preparation, habitat enhancement, pest animal control, monitoring, and reporting can be implemented consistently.

The release sites have been selected because they are either part of (Cheesman's Bush) or directly adjacent to ([REDACTED] release site) the Project's wider residual effects management package area, contain confirmed native lizard presence, provide existing forest and scrub habitat suitable for copper skink and other native lizards. Additionally, Cheesman's Bush is proposed to be subject to pest plant control, pest animal control, and enrichment planting. The [REDACTED] release site is part of a complex package of restoration planting being undertaken by Auckland Council throughout the catchment within [REDACTED]. The two sites provide an opportunity to release salvaged lizards into habitat that can be enhanced before release and managed over time to improve cover, refugia, microclimate, and predator control outcomes. The [REDACTED] site is likely to be used early in the construction programme when pre-release work has not yet commenced at Cheesman's Bush.

The SQEH will confirm precise release locations within Cheesman's Bush and [REDACTED] before salvage begins. We anticipate the potential locations to be reasonably unconstrained within the release site areas as there are wide areas of suitable habitat. Release locations must be outside active construction areas, avoid areas subject to future clearance or earthworks, and contain or be enhanced to contain suitable refugia, dense groundcover, leaf litter, woody debris, appropriate microclimate, low predator pressure, and protection from future disturbance. Release locations will be selected having regard to the species captured, capture location, construction staging, animal condition, release-site capacity, habitat enhancement readiness, pest control readiness, and any relevant approval conditions. Releases may occur in a variety of locations within the release site to spread released lizards across suitable habitat.

The low number of native lizard detections during survey, combined with proposed habitat enhancement and predator control, indicates that Cheesman's Bush has capacity to receive the low numbers of native lizards expected from salvage.

9.1 Predator control

Pest animal control is required at the release sites to support lizard relocation by reducing predator pressure on salvaged and resident native lizards. Cheesman's Bush will sit within the wider 10-year pest animal control and monitoring programme proposed for the Project (refer to the Terrestrial Management Plan for details), which also includes Puhinui Gully, the WF9 vegetation at 134 Mill Road, and restoration planting areas within the designation. [REDACTED] has existing predator control throughout the park. This broader control context is expected to provide greater pest suppression than would typically be achieved for a small, isolated release sites and the requirements within this LMP should be considered minimum standards and may require total implementation or supplementation to existing control sufficient to achieve the standard required.

Pest control shall continue at each release site for a minimum of three years following completion of releases into that site⁵.

Before any native lizards are released, pest control must have been operational at the release sites for at least three months (the initial 'knockdown phase' referred to below). Control will target the principal mammalian predators of native lizards, including rats, mice, mustelids, hedgehogs, possums and cats where practicable. The SQEH and pest control contractor will confirm the final device layout, checking schedule, toxin approach, data management requirements, and any release-site-specific knockdown or maintenance requirements before implementation.

The methods for pest control will be integrated within the wider pest control proposal but the specific requirements within the release site are summarised below. To increase relocation success, predator control (targeting rodents, possums, and mustelids) will include an initial 'knockdown' phase of high intensity baiting and trap checks 3 months prior to lizard release.

Compared with the rest of the proposed pest control areas for the Project, control within Cheesman's Bush will require specific targeting of mice. This will require a bait station network at 25 m x 25 m grid spacing, using bromadiolone bait for the knockdown pulse and diphacinone bait for subsequent pulses. During the first knockdown pulse, all bait stations will be filled with bromadiolone bait and checked and topped up twice weekly for between four and eight weeks, or until rodent tracking is less than 10% for rats and 20% for mice. At the end of the knockdown period, all bait should be removed and disposed of in accordance with the toxin label requirements. Subsequent pulses will be undertaken using diphacinone bait.

After the initial knockdown phase, bait stations will be inspected and re-baited quarterly in the first year. Thereafter, they are to be reviewed annually and maintained as appropriate. While pest control is proposed, emphasis must also be placed on providing complex microhabitats, such as woody debris piles, to provide refugia from predators.

To further enhance possum, mustelid and hedgehog control in the wider area, Timms traps at four per hectare and DOC 200 traps at five per hectare will be installed within the 3.66 ha release area. These traps will be checked and serviced on a schedule aligned with the initial knockdown phase of the bait station network and then aligned with the pulse schedule of the bait stations.

9.2 Predator monitoring

9.2.1 Rodents and Mustelids

Tracking tunnels will be used to monitor changes in rodent and mustelid abundance during the control period (as specified within Section 9.1) within the relocation sites. A network of tracking tunnels at 50 m x 50 m spacing will be installed in the release sites and monitored before and after each baiting pulse. Due to the relatively small size of the areas, compared with large-scale pest control activities, and the large home ranges of mustelids, no tracking target is proposed for mustelids.

For all monitoring rounds all tracking tunnels should be activated using crunchy peanut butter during fine weather and left overnight. The following day tracking tunnels should be checked. If the cards are still clear they can be utilised for mustelid monitoring (see below).

Every second tracking tunnel (i.e., 100 m spacings) should be activated for mustelid control. To do this peanut butter should be removed (if no tracks are present) and replaced with fresh rabbit meat. Cards should then be left out for a further two fine nights before being retrieved. If tracks are on cards following rodent monitoring these should be replaced with new cards and baited.

9.2.2 Contingencies for rodent and mustelid control

If rats and/or mice are detected at the above thresholds (10% and 20%, respectively) after a baiting pulse, an additional two weeks of baiting should be carried out, comprising two additional bait installs in the current pulse, followed by a second round of monitoring. If tracking indices remain high, additional devices should be installed. The control device network be infilled to allow for a 10 m x 10 m bait station layout.

⁵ Note Cheeseman's release site is part of a wider 10-year duration pest control programme and as such control may continue beyond this three year period depending on the staging and timing of activities.

If any mustelids are detected during the monitoring period, the DOC200 traps should be adjusted to a twice-monthly check and rebait. This will ensure that bycatch in these traps i.e., rats are removed quickly to ensure these traps can continue to catch mustelid species.

If control thresholds are not able to be met with increased baiting frequency, and control device density, the SQEH and pest animal control contractor shall review methods and monitoring results. The review shall look at patterns of detections, hot spots (both bait take and tracking), and determine methods to increase control efficacy to reduce populations in these locations.

9.2.3 Possums

Wax tags are an easy way of monitoring possums and may be used to support tracking tunnel monitoring methods to determine the efficacy of the pest control within the relocation site. Two wax tag lines should be randomly installed within the relocation site. Monitoring lines should include 10 wax tags at 20 m intervals i.e., 200 m monitoring line. Once installed wax tags should be left out for 7 nights before being retrieved. Monitoring should be carried out in conjunction with tracking tunnel monitoring i.e., prior to and following each pulse. As the relocation site is small the wax tag index is unlikely to give an accurate measure of abundance but should determine whether possums are within the site. If possums are detected following a pulse, additional traps may be installed during subsequent pulses.

9.2.4 Other species

Tracking tunnel monitoring may detect the presence of additional species such as hedgehogs. Specific monitoring of these species is not proposed; however, their presence will be noted and additional DOC200 traps may be installed if presence appears high.

Monitoring results will be used to guide implementation of contingency management responses at the release sites. Indicative response triggers are summarised in Table 9-1.

Table 9-1 Predator monitoring and response.

Monitoring result	Indicative response
Rat tracking remains above approximately 10% after control	Extend or repeat baiting pulse and review bait station spacing, bait take and servicing frequency.
Mouse tracking remains above approximately 20% after control	Review bait type and bait station density; consider infilling the rodent control network where practicable.
Mustelids detected	Increase DOC-series trap checks and rebaiting to at least twice monthly until activity reduces.
Hedgehogs detected frequently	Review trap placement and add additional hedgehog-capable traps where detection is concentrated.
Persistent high pest activity despite increases in control device density and control intensity	SQEH and pest control contractor to review methods and make recommendations to increase the efficacy of control.

9.3 Soft release pens

Soft release pens may be used within the release sites where the SQEH considers that temporary containment will improve release outcomes, reduce homing risk or assist staged release. Pens should be constructed from suitable silt fence or equivalent material, with the lower edge buried approximately 5 to 10 cm to prevent lizards escaping underneath. Pens should contain both shaded and open areas, dense cover, woody debris and leaf litter, and should be installed before salvage commences.

The number of skinks released into a single soft release pen within release sites will be determined by the SQEH based on pen size, habitat complexity, animal condition and release-site context. If capture numbers exceed the capacity of a pen, additional pens will be installed within release sites or the release approach will be reviewed before salvage continues.

9.4 Lizard habitat enhancement

Habitat enhancement within the release sites will focus on increasing the availability of complex, moist, predator-resistant refugia suitable for released and resident native lizards. Enhancement may include log piles, wooden disc stacks, salvaged woody debris, root plates, dense low planting, leaf-litter accumulation, and localised habitat manipulation. Log piles should be constructed to create small interstitial spaces, shaded and humid internal conditions, and cover from predators. Where suitable material is available from clearance areas and biosecurity risk is acceptable, salvaged logs and woody debris should be reused within the release sites.

9.5 Relocation site protection

The two release sites must be protected from avoidable disturbance during construction and during the required management period. Protection may include temporary fencing, signage, mapping for construction personnel, exclusion from laydown or stockpile areas, and integration with the Project's environmental controls.

Release and habitat enhancement areas should be included in construction drawings and environmental maps so that contractors understand where restrictions apply.

Long term protection for Cheesman's Bush will be provided through a 10 year covenant. Auckland Council has agreed to the use of the [REDACTED] release site, and additional pest control for a period of three years.

10 CONTINGENCY ACTIONS

There is inherent uncertainty in lizard salvage and release outcomes because success depends on capture rates, animal condition, release-site capacity, predator control effectiveness and long-term site management. Contingency actions may be required if a Threatened species is found, the release site is no longer suitable, a high number of native lizards is captured, or predator control is not achieving the required level of suppression. These triggers may require works to pause while the SQEH, NZTA and DOC confirm the appropriate response.

In the event of unanticipated Threatened lizard species being discovered, vegetation clearance works will be stopped in the affected area and DOC will be notified. If the number of native lizards captured is very high, the SQEH will review the capacity of the release sites before further salvage continues. Additional habitat enhancement, additional soft release pens, increased pest control, or a formal review of the release strategy may be required before further lizards are released.

11 DATA COLLECTION AND REPORTING

At the release sites⁶, prior to release, morphometric data of all captured native lizards will be recorded where practicable, including species, sex, snout-vent length, tail length and tail regeneration. Any unique or unusual markings or injuries will also be noted. In addition, the habitat type from which capture took place, time, weather, capture location, release location and GPS points are to be recorded. Photographs of each specimen are to be taken and appropriately catalogued for later reporting.

All captured lizards are to be recorded using the Amphibian and Reptile Distribution Scheme (ARDS). A copy of the ARDS cards will be submitted to DOC if native lizards are found.

⁶ Do not collect morphometric data at the time of capture, only at the release site as a lizard may escape from handling during measurements and judgement calls can be made to forgo morphometric data collection and release immediately if individuals are showing signs of stress.

12 POST-RELEASE MONITORING

Monitoring is not recommended for small relocations such as fewer than a cumulative total of 20 individuals, as these can be extremely challenging to monitor due to low detection rates. For releases of more than 20 individuals, post-release monitoring should be conducted within the release sites after 12 months and then annually for five years to help evaluate the outcome of the relocation. For small relocations, resources are better allocated to mitigation activities such as enhancing lizard habitat within Cheesman's Bush and maintaining pest animal control.

Post-release monitoring methods within Cheesman's Bush will be carried out at the discretion of the SQEH but may involve tracking tunnels, artificial cover objects and other passive methods. Monitoring is not to include destructive or intensive searches. Monitoring effort will reflect the number of lizards salvaged, the species released, release locations, and the habitat enhancement and pest control implemented within Cheesman's Bush.

If post-release monitoring is triggered by the salvage and release of more than 20 native lizards, a monitoring report will be prepared after each monitoring event. Reports and lizard records will be provided to DOC.

13 REFERENCES

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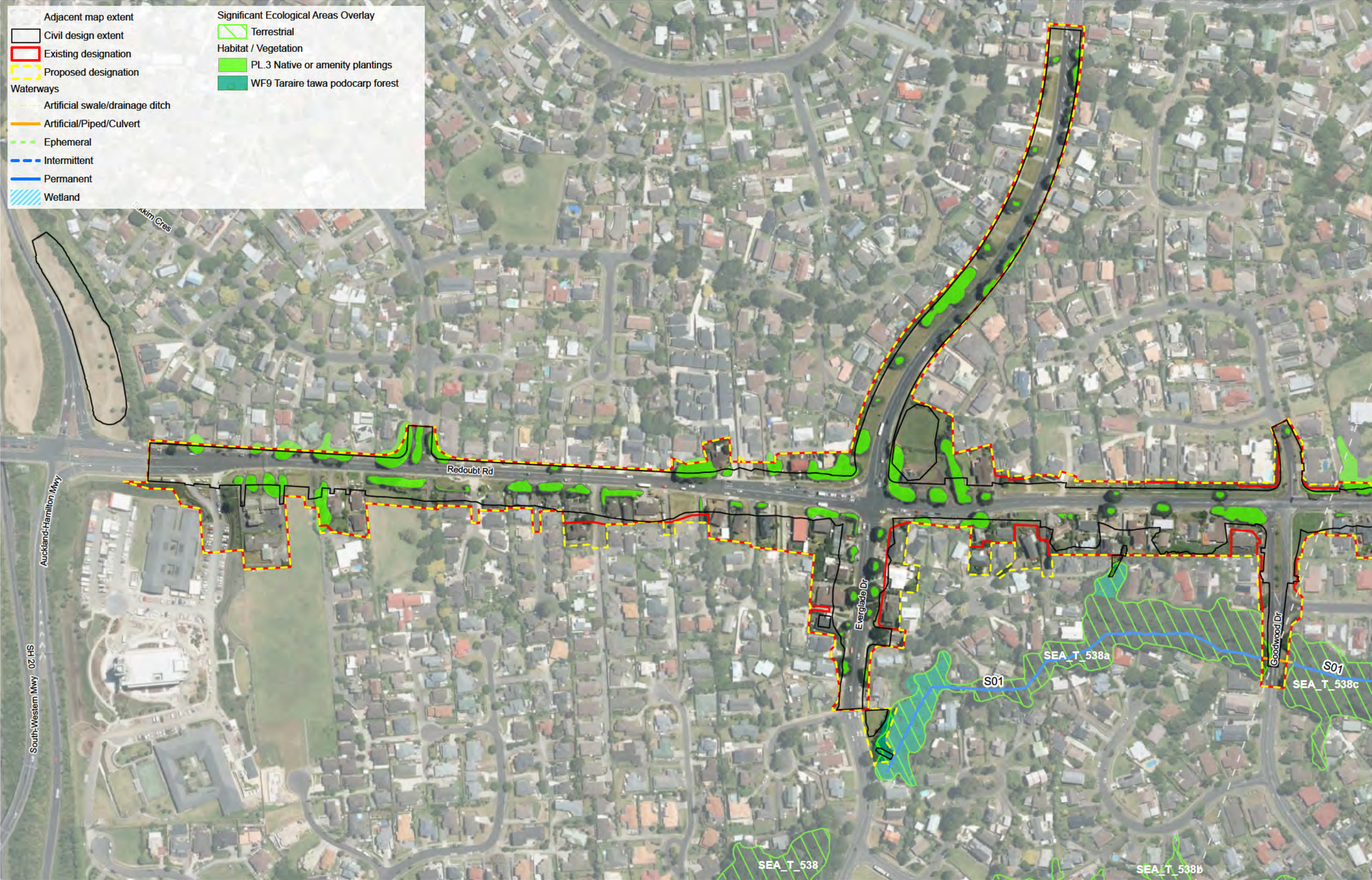
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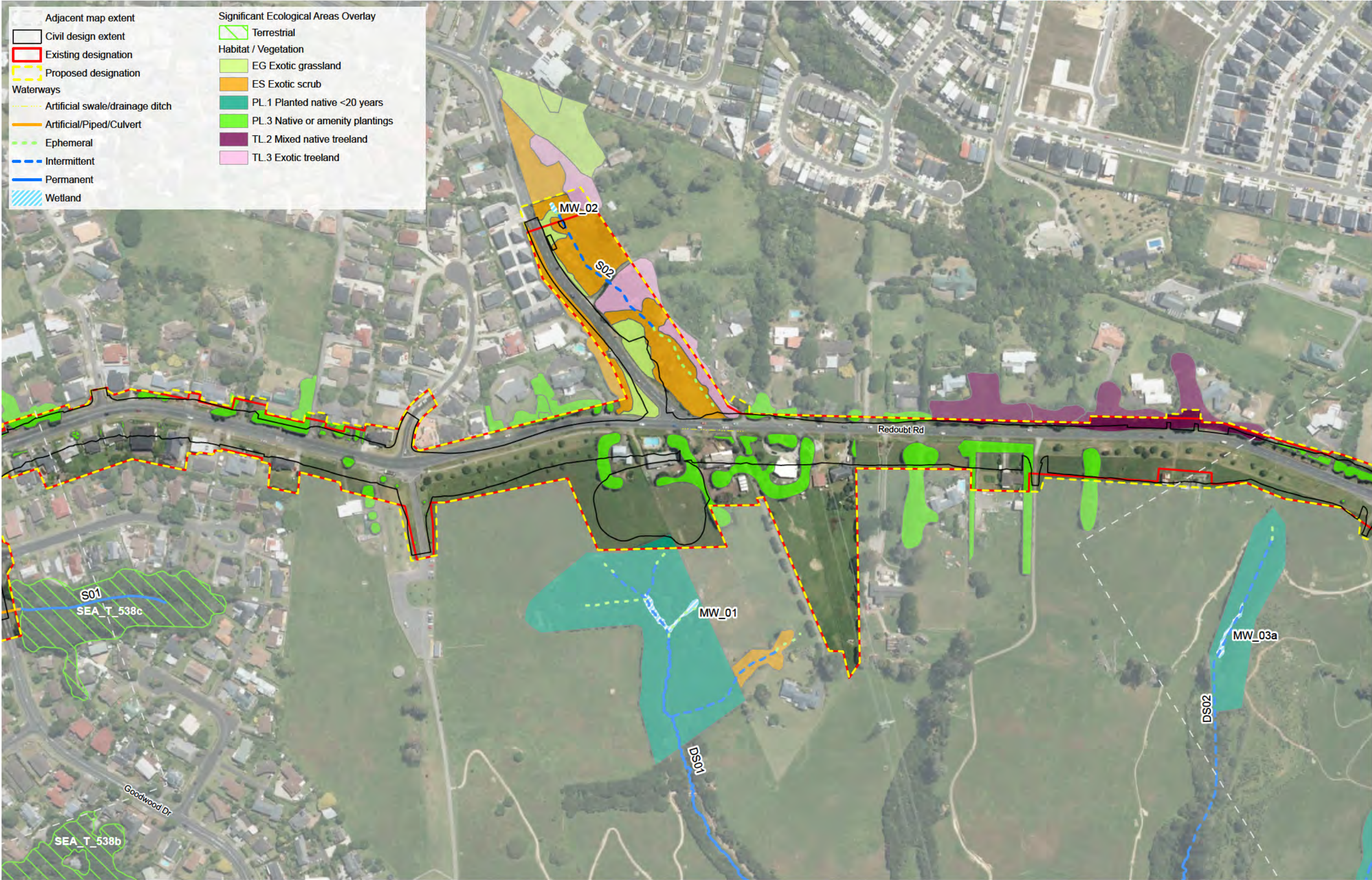
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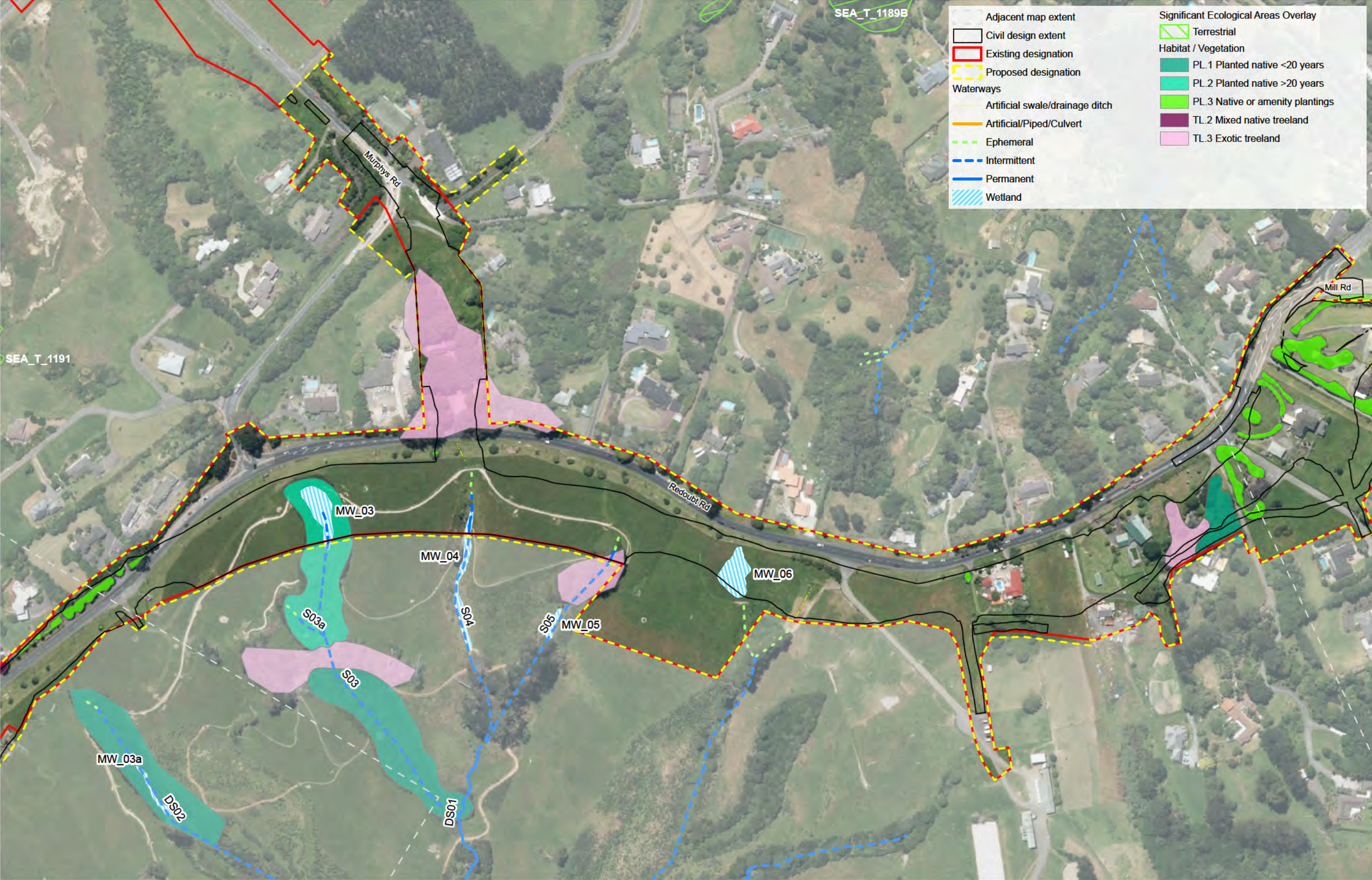
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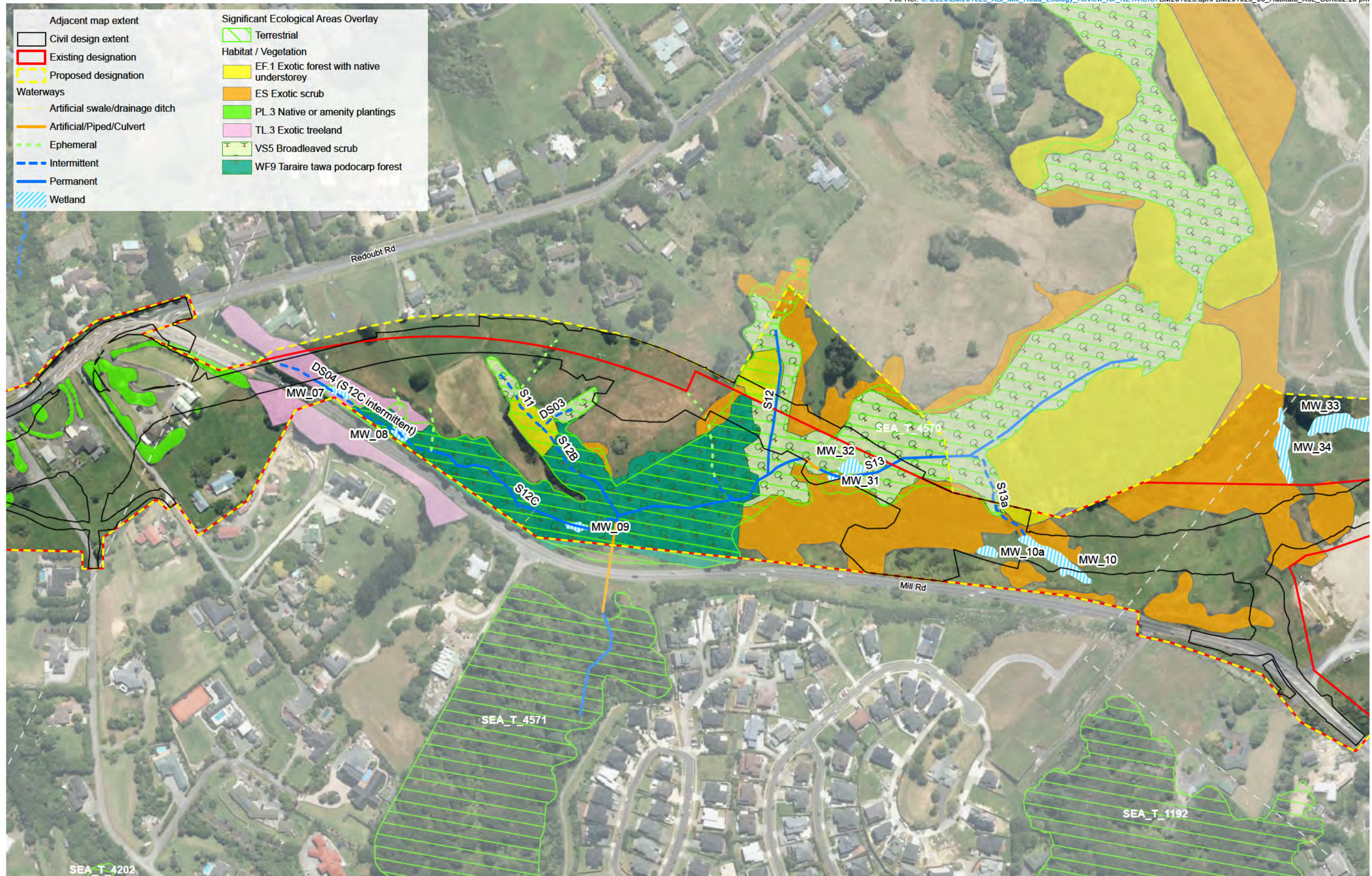
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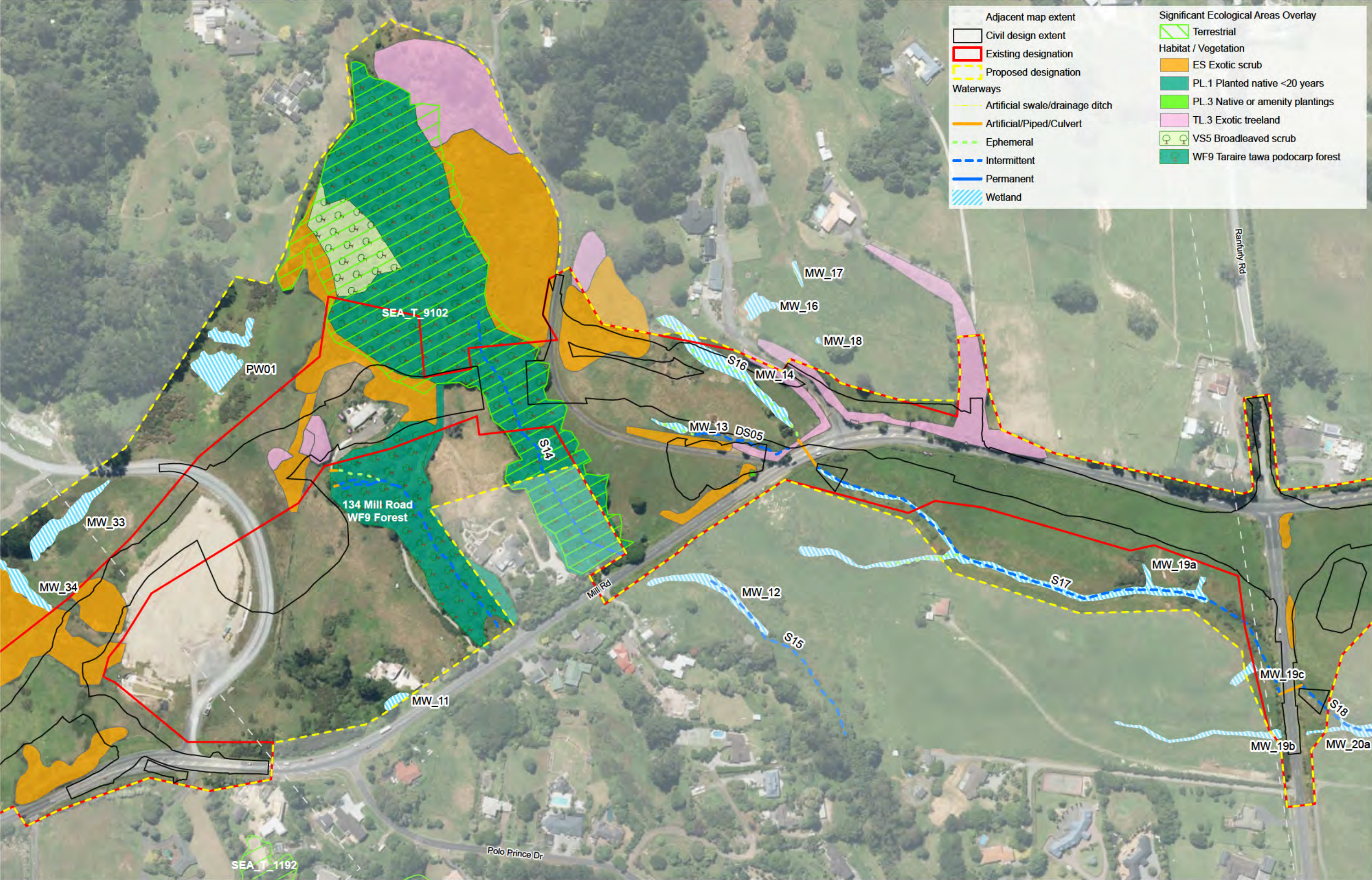
APPENDIX A MAP OF HABITATS WITHIN THE ALIGNMENT

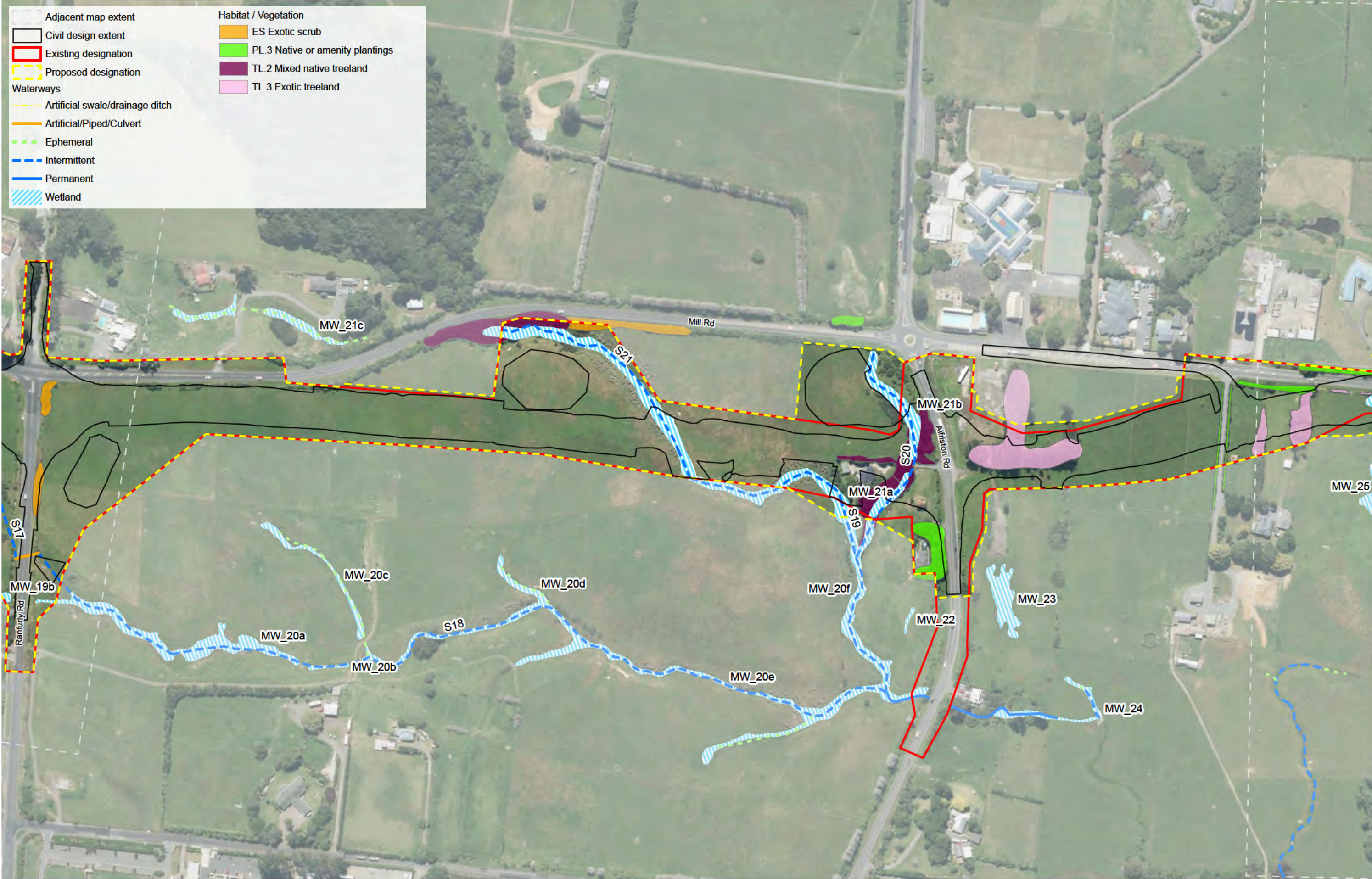


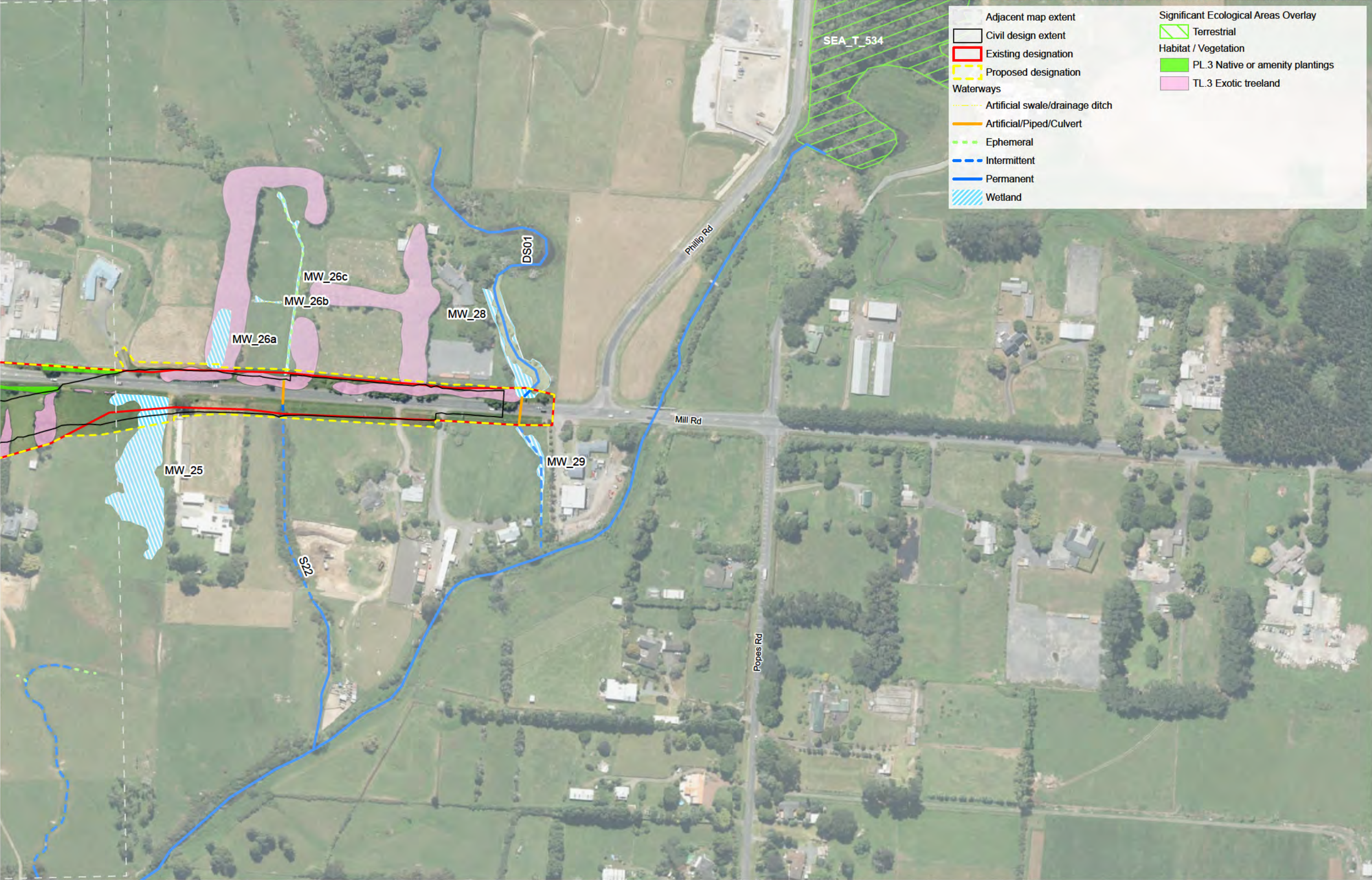












APPENDIX B MAP OF RELEASE SITES & RESTORATION
AREAS WITHIN THE ALIGNMENT



