Belmont Quarry Development – Part B

Substantive Application
Appendix B.5.A – Ecological Values, Effects, and their Management Report
Winstone Aggregates

16 August 2026

winstoneaggregates.co.nz

BlueGreen

Belmont Quarry OBDA Development

Ecological Values, Effects and their Management

Prepared for Winstone Aggregate Ltd.
10 August 2026

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Cover photograph: View south looking over existing Belmont Quarry (foreground) and eastern side of south-western gully

Executive Summary

Background
Winstone Aggregates (Winstone), a division of Fletcher Concrete and Infrastructure Limited (Fletcher), is undertaking development to establish and use a new Overburden Deposition Area (OBDA) adjacent to the Belmont Quarry, located in Lower Hutt in the Wellington Region.

Purpose
The purpose of this report is to provide a description and assessment of the vegetation and habitat that must be cleared to allow the overburden project, and how those ecological effects under the Resource Management Act 1991 (RMA) could be managed so as to conform with the various statutory requirements (specifically the Natural Resources Plan (NRP), Regional Policy Statement (RPS), National Policy Statement for Indigenous Biodiversity (NPS-IB) and National Policy Statement for Freshwater Management (NPS-FM) and National Environmental Standards for Freshwater (NES –FW)).

Scope of report
This report proceeds on the basis that the land exchange with DOC has been accepted and utilises the array of data and analysis provided in the exchange report as a foundation for the assessment in this report.

This report describes the biodiversity and freshwater values of the OBDA based on literature, databases, and historic and recent field surveys. Field investigations have been carried out in this area for more than ten years, supported by recent extended survey work that provides a detailed and current understanding of local ecological conditions. It contains a compilation of data from:

- botanic surveys (including natural inland wetland) surveys (Dr Keesing and Boffa Miskell staff, Mr Nicholas Singers, Mr Matt Ward (for DOC);
- herpetological surveys (Mr Tony Payne),
- bat survey (Dr Hazel Burridge),
- avian survey (Dr Bull); and
- includes downstream freshwater survey information (Boffa Miskell).

This information is assessed and contributes to a values assessment (following EIANZ 2018 guidance) and an RMA section 6(c) significance assessment (following policy 23 RPS regional significance criteria). An effects management analysis is prepared following guidance in the NPS-IB and NPSFM. The effects management hierarchy is applied and satisfied to ensure no net loss of biodiversity values, resulting in a long term net gain, and no net loss of values and extent

Summary of findings

Ecological surveys show that approximately 9ha of significant indigenous seral broadleaf shrub and forest and 6 ha of exotic dominated pine tree land, gorse and rough pasture and blackberry is required to be cleared over 35 years for the development of the overburden and 251m of mostly intermittent streams reclaimed.

Within the Project site (the OBDA (Ca. 15ha) there is a range of seral native broadleaf vegetation ages (regenerating form pastures), a predominantly kanuka area, a small terrace natural inland wetland and a number of rainwater draining damp gullies (6 main gullies; 3 west and 3 east draining). These gullies are the typical habitat of 10-14 swamp maire trees, present in ones and twos scattered throughout. There

are also 23 Ramarama generally distributed about the OBDA and 1 *Coprosma rubra* (wetland). These are the special flora of the site.
During the early site selection and design phrase of the proposal the extent of the Project Area (the site) and the design of the OBDA were amended to avoid key natural inland wetlands and the oldest largest swamp maire population (the central western gully). Those areas of effect design changes minimise the amount of wetland lost (now 0.07ha) and avoided the loss of the best, most abundant and oldest area of swamp maire locally.

While ecological values in the OBDA are generally low and the magnitude of the effect of removal of that habitat (at the ED and more local catchment scale) are also generally low (minor or less than minor), the ecological effects are still proposed to be managed through the effects hierarchy of the NPS IB - i.e. after avoidance and minimisation - remedy (site rehabilitation) and because of the time lag to return the same values and extent (perhaps 50 years) through remediation that residual effect is offset by way of additional forest regeneration determined by use of the standard BOAM offset model. In addition, there is a stream remediation program (with a failsafe offset detailed), a wetland offset program and a swamp maire avoidance program with a failsafe swamp maire offset program, as well as Ramarama transfer process to avoid loss of those individuals present.

The proposed effects management approach sees 15ha of indigenous forest restored to the OBDA area over time, and a further offset of 18 hectares of additional restoration in the Regional Park. It also sees a new 0.2ha wetland developed. The waterways affected, largely ephemeral and intermittent streams, are replaced or, if that proves impossible, offset at a 4.3:1 SEV developed ratio (in the terrestrial offset area (Speedys stream headwater) in the area agreed with GWRC in the Regional Park.

With respect to streams, the design approach considers that those intermittent streams on site can be rebuilt on the OBDA and the effects on streams remedied, (although there is also a time-lag in that response). A stream offset has been developed based on worst-case scenario should that remedy not prove successful, notwithstanding Winstone's best endeavours.

A very important component of the process is to ensure that there is no hydrological change and sediment discharge to any of the down-stream gullies is carefully managed and minimised to avoid material harm, but especially west to the central western swamp maire gully.

With the regime of effects management and offsets proposed (and assuming the regime functions as predicted) there will be an overall net gain in habitat amount, habitat quality, no loss of Ramarama and the overall swamp maire population will be considerably improved and secured.

This report has been jointly authored by Dr Vaughan Keesing (terrestrial and aquatic ecology) and Dr Leigh Bull (avifauna) (main authors) with input from Tony Payne (Herpetology) and Dr Hazel Burridge (bats). The authors confirm that, in our capacity as authors of this report, we have read and agree to abide by the Environment Court of New Zealand's Code of Conduct for Expert Witnesses Practice Note 2023.

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1.0 Definitions and Terms Used

Term	Definition
Three classes that describe vegetation development are generally age-related, and they are described as:	
Exotic seral	Predominantly exotic early colonisers or post farming land use, generally hardy species including the first indigenous species such as ferns that begin ecological succession toward a more biodiverse steady state ecosystem. Species presence is fluid and the community is highly responsive to external pressures.
Seral (early, mid, late)	An intermediate stage in ecological succession as an ecosystem advance toward its climax community. More than one seral stage may evolve until a steady state ecosystem forms. This is typically the most diverse stage with decreasing fluidity in species presence and abundance.
Climax or mature	A steady state ecosystem where dominant biomass is usually woody and forms a closed canopy. This stage is resistant to change and has stable species representation except where large disturbances occur.
Other definitions include:	
Endemic	Plants and animals that are unique to an area or species that may migrate but breed only in that area.
Ephemeral	As defined by Greater Wellington Regional Council guidance. A hydrological rather than ecological definition that is reflected here.
We note that just where on a river's continuum the boundaries between perennial-intermittent-ephemeral are changes seasonally and annually. The purpose here, though, is to demark the types of aquatic assemblages, and so a focus is on the apparent biological components rather than purely the hydrology.	
Ephemeral stream	A stream that flows only for short periods following heavy or persistent rain and is otherwise dry and without aquatic life. The bed is usually vegetated or, under canopy, full of leaf and woody litter.
Intermittent stream	A stream that flows for longer periods, typically during wet seasons, but may become dry during seasonal soil moisture deficit. It has a defined channel and may reduce to persistent pools that provide refugia for fish.
Perennial stream	A stream with permanent flows year-round.

Obligate (OBL)	Occurs almost always in wetlands (estimated probability >99% in wetlands)
Facultative Wetland (FACW)	occurs usually in wetlands (67–99%)
Facultative (FAC):	equally likely to occur in wetlands or non-wetlands (34–66%)
Upland (UPL)	rarely occurs in wetlands (non-wetland)

2.0 Introduction

2.1 Purpose of report

Winstone Aggregates (Winstone) is applying under the Fast Track Approval Act 2024 (FTAA) for firstly a land exchange with the Department of Conservation and then to use the exchanged area as a quarry over burden deposition area (OBDA) (Figure 1**Error! Reference source not found.**). This report collates the ecological data on the OBDA site; describes the ecological features; and assesses the values and RMA significance of the features in part and as a whole. It then determines how the effects of the staged clearance of the habitats in the proposed OBDA area can be managed in accordance with the effects management hierarchy.

In addition to the assessment and effects management under the RMA, there will be requirement for a wildlife authority under the Wildlife Act 1953 to salvage and transfer lizards. That requirement is processed through the separate lizard report of Mr Payne. Draft conditions are also recommended to minimise harm to other fauna and special plant species.

Figure 1 The OBDA (white), the DOC exchange areas (Blue)

2.2 Scope and limitations of ecological information

The vegetation surveys use standard sampling protocol and have occurred periodically over the last 10 years and do not involve examining every square meter of the 15 plus ha site. The RECCE plots and transect species description data represents the major vegetation assemblages and is used to map areas and describe their general condition and state and the results present a comprehensive understanding of the vegetation assemblage of the site.

The aquatic surveys undertaken are representative of the two main perennial systems but do not include the intermittent tributaries up the OBDA side slopes. These are described by standard observational records (Clapcott, 2015) and eDNA data samples.

The avian, bat and herpetological field work has been undertaken by specific experts in those fields in the correct season but is based on only one season of data collection.

Invertebrate surveys are not considered required because of the nature and age of the site.

3.0 The Proposed Activity

The placement of overburden material from the Belmont Quarry typically includes soil and subsoil, weathered or decomposed rock and other materials including process fines and silts from settlement ponds. Historically, this overburden material has been placed within the Cottle Block, under existing consent WGN240139, which includes conditions for erosion control and rehabilitation.

The new proposed Overburden Disposal Area (OBDA) is located on adjacent land north of the existing quarry pit. The design is based on an OBDA concept originally developed in 2016 and has subsequently been refined to reflect updated site information, operational requirements, and environmental constraints.

The OBDA footprint was further refined in 2025 using updated LiDAR topographic survey data. This refinement resulted in a reduction of the overall footprint in several locations primarily to avoid a wetland area in the north-east, areas of higher ecological value in the south-west (pukatea forest) and to avoid a number of swamp maire in the central western gully.

The OBDA is to be developed progressively in ten stages (Figure 2) with specific infrastructure constructed to support each stage. This may include haul roads and sediment and erosion controls outside of any one stage area. The vegetation clearance will occur progressively as stages are developed rather than across the entire footprint at once. Of the ten stages, clearance occurs in stages 1 – 6 and stage 8. Stages 7, 9 and 10 generally involve building on previously worked areas. This limits the amount of habitat removed and extent of exposed ground at one time, while allowing ecological values in later stage areas to be retained until those areas are required for works.

Ecologically, a stage requires clearance of all surface features (vegetation and topsoil (with required salvage and transfer of species (and topsoil)) and, therefore, the loss of ecological values not otherwise transferred. Until the stage is completed, all other stages will retain their existing ecological features and values (except where haul roads and supporting infrastructure are required over those areas). Once a stage is completed, the rehabilitation process will begin on areas where the landform has reached final design profiles and will be stabilised where it has not reached its final form. Thus, after stage 1 there is a sequential removal, fill and rehabilitation process occurring across all of the OBDA. By the completion of the final stage there will be sequentially aged native seral rehabilitation progressing across the entire site.

During construction and active overburden placement, each stage of the OBDA will operate as a self-contained stormwater catchment, with runoff directed internally to purpose-built sediment retention and fines containment facilities.

As individual stages reach their final design profile, external faces will be progressively topsoiled, stabilised, hydroseeded and revegetated.

Once stabilised, clean surface water runoff from rehabilitated slopes may be discharged in a controlled manner to downstream intermittent and perennial watercourses within the Te Awa Kairangi/Hutt River catchment, in accordance with approved erosion and sediment control measures and applicable regional consent conditions designed to minimise sediment effects on wetland ecosystems and avoid harm. The management and direction of the surface and subsurface hydrology is a key ecological concern and is required to mimic or simulate the current landform's ephemeral flow paths and so retain the hydrological inputs to the six tributaries and associated (eastern side) natural inland wetlands.

Subsoil drainage will be installed beneath overburden fill to manage groundwater and pore water pressures, and to assist the reestablishment of pre works downstream hydrological conditions. These drains will discharge at controlled locations at the toe of the OBDA and will integrate with the staged surface water management system.

The details of hydrology and sediment management are reported in the ESC technical report and the independent hydrology report.

We note that while the stormwater and subsurface drainage have a goal to manage surface erosion and overburden integrity, it must also provide the hydrological functional and resource necessary for the local and down-stream wetlands and streams in a similar pathway and quantity as now occurs. This will mean creating shallow gullies and stream beds that currently exist eastward and westward of the OBDA area in order to avoid potential adverse effects associated with depriving wetlands and streams of sources of water.

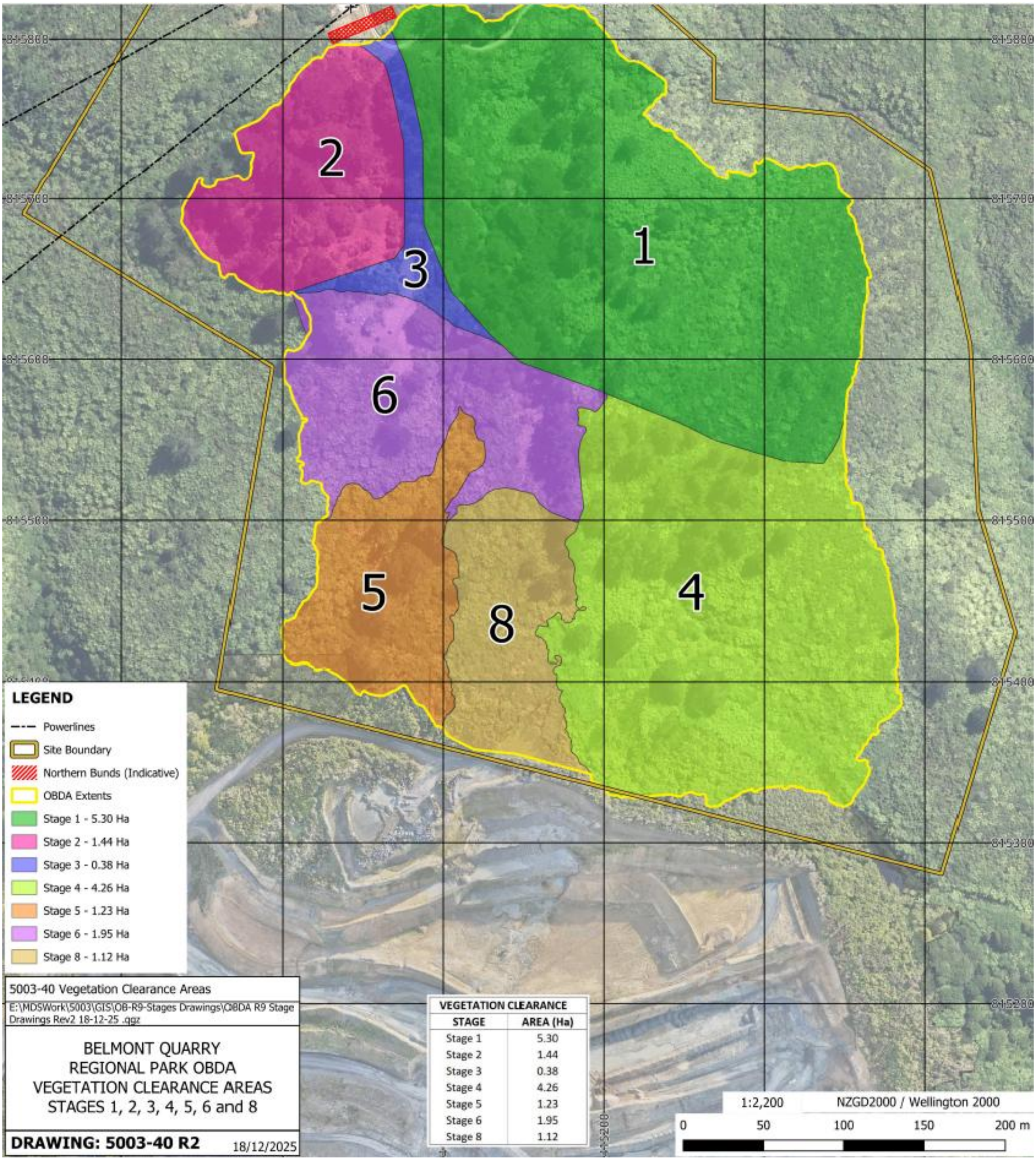

*Figure 2 OBDA Stages of Vegetation Clearance Areas**

*Vegetation is cleared in 8 stages, excluding enabling works, while the OBDA placement has 10 stages as material is placed over areas previously cleared to reach the OBDA's final form.

4.0 Site and surrounds

The site lies within the Sounds-Wellington Ecological Region (39) and the Wellington Ecological District (39.01). The Ecological District is characterised by steep, strongly faulted hills and ranges (McEwen, 1987). The district is very windy with frequent North-West gales, warm summers and mild winters. It includes a range of soils derived from greywacke and loess, as well as alluvial, peaty, and stony soils in the valley. The Wellington Ecological District was originally mostly forested; today it is modified by farming and urbanisation, with pasture, gorse, and regenerating shrublands throughout and only a few remaining remnant forest areas (McEwen, 1987).

The proposed site is approximately 24 ha area situated on upper slopes between two streams that drain east into the Hutt River and is part of the 615 ha Belmont-Dry Creek Key Native Ecosystem (KNE) (Greater Wellington Regional Council, 2015a, (Figure 3) an area identified by Forest and Bird as a Regional Park Corridor. The KNE contains remnant and regenerating (approximately 50 years) forest on the lower slopes and valley floors, as well as manuka scrubland on the hill country. Native avifauna species recorded within the KNE include tui, kereru, whitehead, bellbird, grey warbler, silvereye, fantail, harrier, NZ falcon, tomtit and black-backed gulls. (GWRC, 2023).

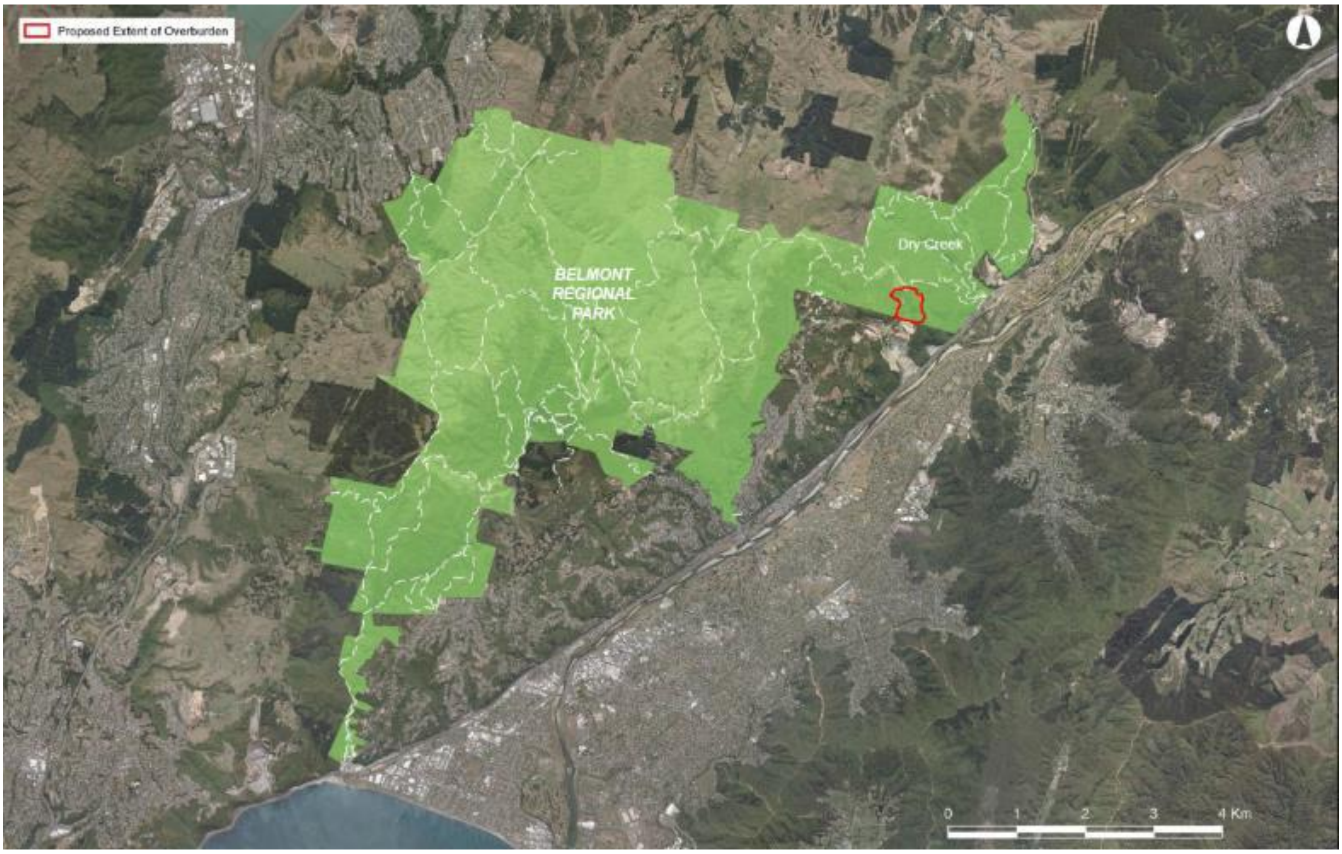

Figure 3: The Belmont Regional Park and the red area are the approximate areas of the proposed OBDA.

There are several areas adjacent to or near the proposed site that have been identified as Significant Natural Resources (SNRs) (Lower Hutt City Council, 2004). The values for which they are determined are provided in Table 1. Mitcalfe (1997) also recognised the Firth Block (Haywards Quarry Bush SNR 15), adjacent and east of the site, as being ecologically significant.

One tributary, at the eastern and southern end (but outside of the site) has been identified as within an SNR ((Mitcalfe, B. J., 1997) and identified as "significant" under the then GWRC criteria.

Table 1: Identified Hutt City Council SNRs that are within proximity to the proposed exchange areas.

HCC SNR		Values Identified
1	Belmont bush	Lowland forest vegetation. Pukatea-matai / tawa forest remnant. Kereru.
3	Boulder Hill bush	Lowland forest vegetation. Tawa/miro forest remnant. Regenerating broadleaf forest.
15	Hayward Quarry bush	Lowland forest in the hill country.
17	Haywards shrubland	Regenerating shrubland in the hill country
31	Liverton Road bush	Lowland forest in the hill country

4.1 Historic Forest Types

The Regional Forest Ecosystem Study (Singers et al., 2018) shows the land of the quarry and adjoining Belmont Regional Park as suitable for, and once covered in MF7 – Tawa, kāmahi, podocarp forest. This forest type is currently regionally endangered, with 22% remaining. Examples persist in the Dry Creek catchment in the nearby Belmont Regional Park (and one of the areas to be provided to DOC through the land exchange).

This ecosystem occurs on a wide range of parent materials, although soil fertility is typically low to moderately low (Singers et al., 2018). The canopy is dominated by tawa and kāmahi, with rimu generally the most abundant emergent podocarp tree, though locally northern rata is also common. Miro, kahikatea, matai, tōtara and Hall's tōtara may also be present.

Despite a large area of this forest type remaining nationally, a substantial proportion has been fragmented or entirely lost for pastoral agriculture and forestry. Animal pests are significant threats, resulting in declines in palatable canopy and sub-canopy species and in functionally important forest birds (Clout, 2006).

Die-back of northern rata and kāmahi has been attributed to possum browse, and in many locations, northern rata is now an uncommon emergent tree (Rogers & Leathwick, 1997).

Goats are locally a threat and, in combination with other pests, have the potential to cause canopy collapse, regeneration failure and species loss within this ecosystem.

The stream riparian system and side gullies, typical also of MF 7, were once (and still show signs of being) pukatea-swamp maire assemblages below the tawa hill slope components. The swamp maire was once a feature of the Hutt River floodplain (WF8).

4.2 Geology and soils

Heine (1975) records the parent material as Greywacke and Greywacke drift on weathered Greywacke and steep to very steep unstable (erodible) surfaces. These have Korokoro hill slopes (mainly) with lesser areas of Ngaio loams and Ruahine steep land soils, with land-use capability data (Hewitt et al., 2010) suggesting various degrees of susceptibility to sheets, rill gully and scree erosion (see Table 2). These soils held a pre-human rimu-rata forest with Hīnau-tawa-kāmahi. They are generally well-drained soils.

Table 2: Geomorphology and Soils of the Site

LCU Unit	Description
Dry Creek & Northern Tawa Soils	
4e1	Rolling to strongly rolling downlands mantled with loess and/or volcanic tephra below 200 m asl with Brown, Pallic and Melodic (yellow-brown earths and intergrades between yellow-brown earths and yellow-brown loam) soils in moderate to high (1200-2000 mm) rainfall areas, with a potential for severe sheet and rill erosion when cultivated.
6e6	Moderately steep to steep greywacke hill country below 400m asl with Brown (yellow brown earth) soils, in moderate (1100-1600mm) rainfall areas subject to periods of soil moisture deficit and wind, with a potential for moderate sheet, soil slip and scree erosion.
7e2	Steep to very steep greywacke hills and mountain lands below the treeline (1500m asl) with strongly leached low fertility Brown, Recent, Pumice and Ultic (yellow brown earth and yellow brown pumice) soils in moderate to high (1200-3000mm) rainfall areas with a potential for severe soil slip, debris avalanche and scree erosion, and moderate sheet and gully erosion.

4.3 LENZ Threatened Environments

Table 3 shows the categories of the Land Environments of New Zealand (LENZ) threat classification (Walker et al., 2007a). There are six categories; the first five environments are threatened. The sixth is secure. These categories correspond with the colour coding for the Belmont Quarry areas surveyed and depicted within Figure 4.

The proposed OBDA is primarily a land class that retains very little indigenous vegetation (reflective of its past use as a working farm). The proposed exchange sites offered by Winstone (the DOC-Get) provide a mixture of land environments, including those that are underrepresented and lands that retain greater representation.

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

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

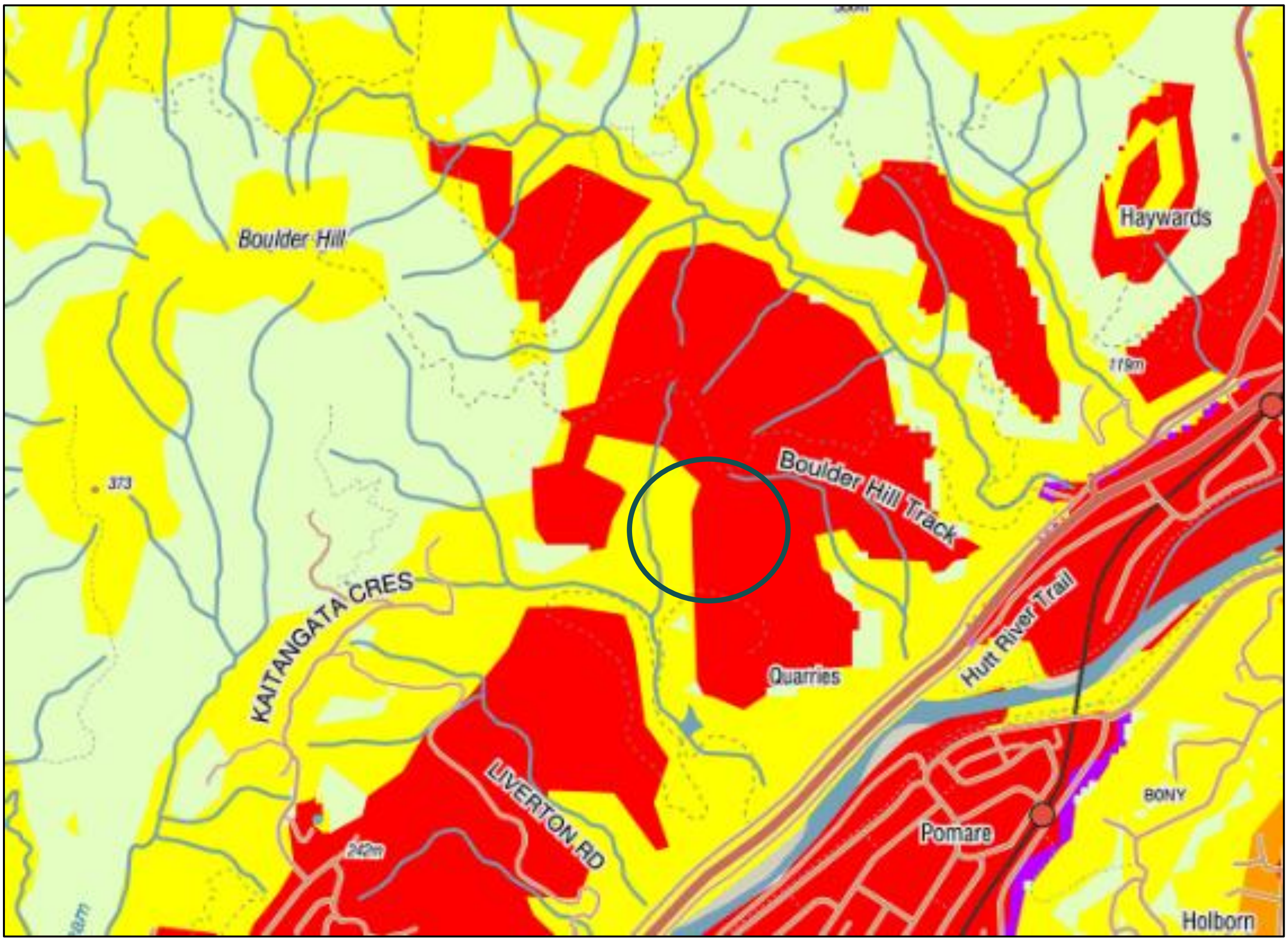

Figure 4: LENZ classification and related areas of this study, the OBDA.

4.4 The OBDA through time

The proposed OBDA and setback area (demarked only indicatively in the following old aerial photographs) is a product of historic use as farmland, followed by regeneration. Figure 5 illustrates the state of the vegetation cover from 1941 until 2010. It shows that in 1941, the site was pasture with exotic (pine) trees, and the gullies had a low gorse (we assume) mixed with a young broadleaf native canopy. This is where the current young swamp maire are located and reflects the lower level of modification of those areas. The wider landscape is clothed in a mixture of young gorse and native components on steep slopes. By 1974, the gully vegetation had spread, and the pasture component was diminishing.

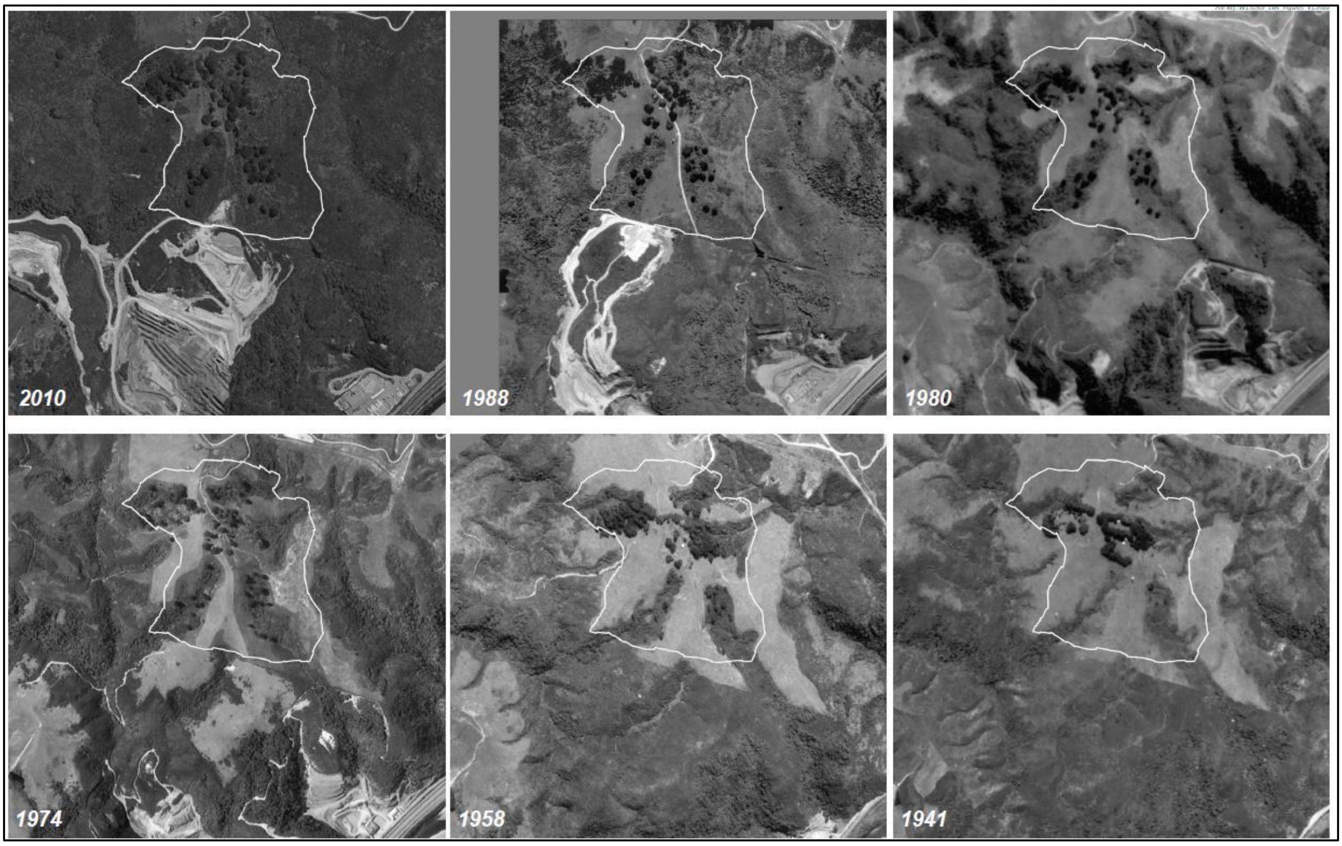

Figure 5: Aerial (1940-2010) photographs showing the land condition over time and an indication of the OBDA area.

5.0 Assessment Methods

This section describes the methods we have used to prepare our assessment. For this report:

- The survey of the OBDA focused on the OBDA and its immediate 100m outer area but also included the lower slopes as well. Surveys were carried out to evaluate ecological features, species, and values.
- Macroinvertebrate and fish surveys focused on the perennial lower gully reaches of the central main stem and western tributary, which are the main stems of perennial freshwater stream habitats.
- Stream SEV (Storey et al 2011, 2013) surveys were conducted within the OBDA where sufficient stream structure and flows allowed the method.
- eDNA samples (processed by Wilderlabs) were collected at the intersection of the OBDA outer boundary and tributaries east and west of the main ridge where there was sufficient water to attain a sample
- Acoustic surveys were conducted for birds and for bats and these, coupled with site habitat investigation, provide the evidential basis for expert opinions as to presence and condition for those faunal groups.
- Lizard surveys involving baited trapping, passive trapping, and active night spotlight search support expert opinion as to likely presence of species and distributions.

5.1 Desktop review of data and literature

Desktop resources which informed this current assessment of ecological values included:

- A review of relevant plans and documentation supplied by Winstone (Singers et al., 2018);
- Checking of existing biological databases (e.g. NIWA freshwater fish and FRBIS databases, OSNZ atlas and eBird);
- Searches for published information on the biological values within the affected area and surrounding landscape (e.g. (Forbes, A. S., 2013));
- Information derived from known datasets on landforms, soils, climate and topography of the site, including Land Environments New Zealand (LENZ) and Potential Vegetation of New Zealand (PVNZ – (Walker et al., 2007b));
- Published rarity and habitat contextual information, e.g. ((de Lange et al., 2018; Holdaway et al., 2012; Leathwick et al., 2002; Williams et al., 2007) (Townsend et al., 2008)); and
- Published research literature with respect to bats, birds, lizards and plants (e.g. Herbet et al 2025 on swamp Maire habitat refugia).

5.2 Field investigations

The field data relied upon for the purposes of this assessment comes from the following site investigations:

Date	Activity	Specialists
19/9/2016	Terrestrial ecologist and botanist undertook the vegetation investigations at the overburden site.	Terrestrial ecologist, botanist

Date	Activity	Specialists
21/9/2016	Freshwater and avifauna ecologists undertook initial aquatic investigations at the overburden site.	Freshwater ecologists, avifauna ecologist
9/11/2016	Freshwater and avifauna ecologists undertook further aquatic investigations at the overburden site and (for freshwater) sampled the northern and eastern perennial main stems.	Freshwater ecologists, avifauna ecologist
10/08/2022	Ecologist undertook wetland area surveys at the overburden site.	Ecologist
28–30/06/2025	Two ecologists undertook vegetation surveys of the OBDA, southwestern stream gully and forest and Firth Block.	Two ecologists
Early September 2022	Vegetation surveys of the Dry Creek site.	Ecologist
Early September 2022	Vegetation surveys of the northern tawa forest area.	Ecologist
20/11/2025	Botanical field survey of the Southern Gully wetland and surrounds and Northern Kamahi gully	Two Ecologists
08/07/2025	An ornithologist and herpetologist undertook a site visit to ascertain available habitat.	Ornithologist, herpetologist
13/05/2025	Ecologist retrieving bioacoustics recorders #1–3 and deploy bioacoustic recorder #4.	Ecologist
15/10/2025	Ecologist and ornithologist undertook a site visit to retrieve bioacoustic recorder #4.	Ecologist, ornithologist
17/10/2025	Ornithologist on site with Department of Conservation terrestrial (fauna) ecologist.	Ornithologist, DOC terrestrial fauna ecologist
20/10/2025	Wetland survey and swamp maire habitat surveys.	Ecologist

Date	Activity	Specialists
24/10 -14/11/ 2025	22 detectors over 21 nights distributed throughout	Ecologist
25/09/2025	75 Artificial cover objects (ACO's) set up for lizards - OBDA	Herpetologist
4-5th /11/2025	Set up of 105 baited pit fall traps for lizards - OBDA	Herpetologist
3rd-14/11/2025	Three nights of spot lighting for lizards - OBDA	Herpetologist
17/02/2026	eDNA samples	Freshwater
23/03/2026	Updated SEV measures	Freshwater

5.2.1 Vegetation

Prior to the site visit, the extent and types of vegetation were delineated in a geographic information system (GIS) using topographic maps and high-resolution aerial photography.
These delineated vegetation communities were then verified in the field, where each identified community type (within accessible areas) was walked and described (with species lists compiled and searches for threatened or at-risk species conducted). Any field variations that differed from the desktop map were noted, and the maps were corrected. Each community visited was assessed using photographs and descriptions, including species lists and basic structural measurements.

At points considered representative by the ecologist, standard 20m by 20m RECCE plots (McNutt, 2012) were undertaken in forest, shrub, or wetland environments, as the investigators considered it necessary to capture a representative assemblage description (in addition to species lists).

A drone was used to capture useful imagery that also assisted in mapping communities.

5.2.2 Avifauna

Given the mobile nature of birds and the mosaic of vegetation habitat types present, surveying habitat types rather than land areas (i.e., OBDA and proposed land exchange areas) was considered to be the most appropriate approach. Therefore, bioacoustics recorders were deployed at four locations to sample different habitat types (refer to Table 4 and Figure 6). Continuous audio recordings have been obtained across four sites. Styles Group analysed the bioacoustics data with the results provided to Dr Bull.

In addition to the bioacoustic surveys, EBird data (Figure 6**Error! Reference source not found.**) and on-site roaming inventories were collated of all birds seen and heard over the course of each site visit (listed in Section 5.2 above), and a specific site visit was undertaken by the qualified ornithologist to assist in their determination of the likely assemblages and values.

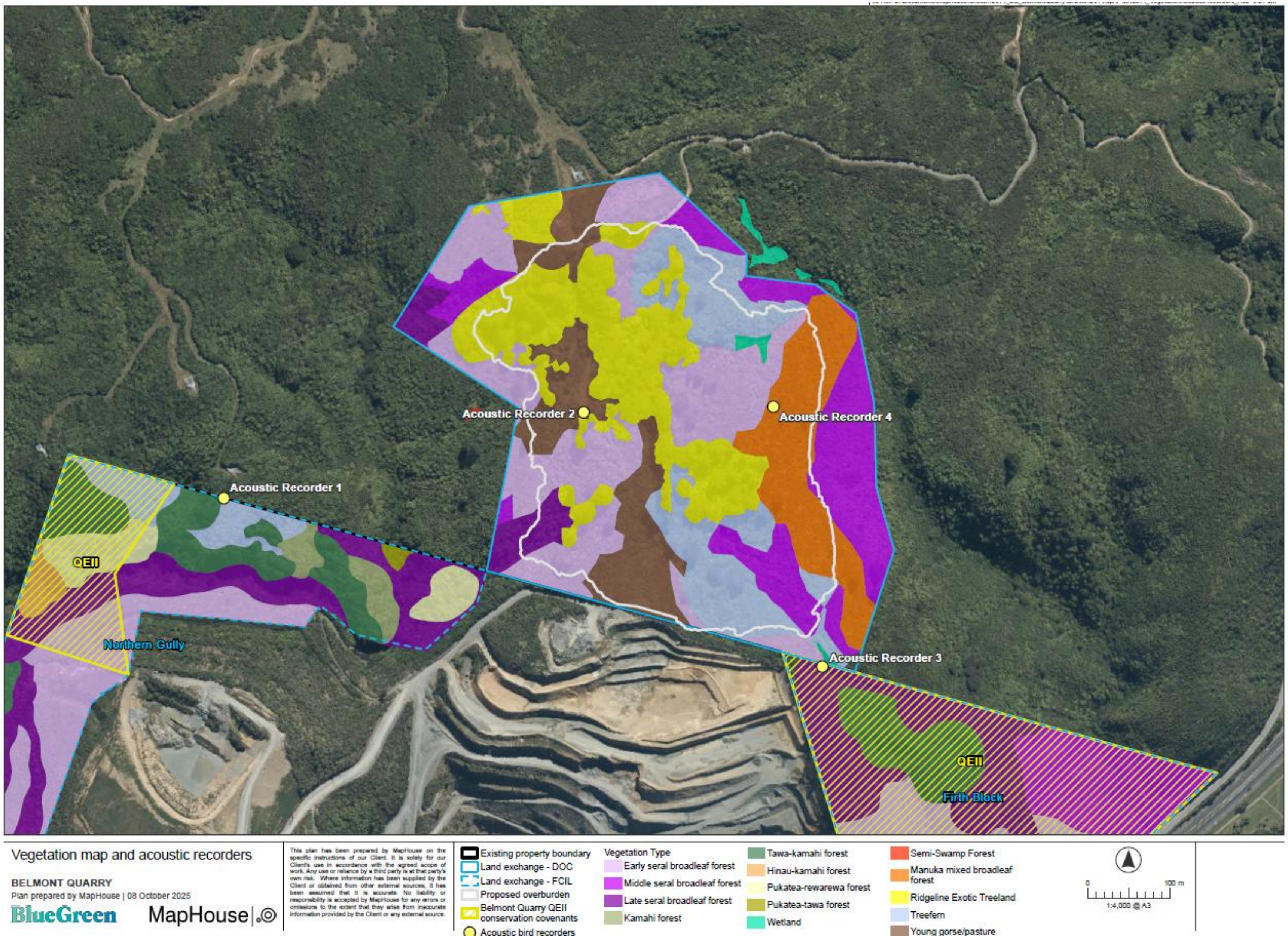

Figure 6: Location of bioacoustics records

Table 4: Bioacoustic recorder deployment details (locations shown in Figure 6)

BIOACOUSTIC RECORDER	HABITAT	SITE	RECORDING PERIOD
AR1 (Tawa)	Tree free and tawa-kāmahi forest	Northern gully	17-24 July 2025
AR2 (Exotic)	Ridgeline exotic treeland and young gorse/pasture	OBDA	17-24 July 2025
AR3 (Lake)	Lake surrounded by late seral broadleaf forest	Firth Block QE II	17-24 July 2025
AR4 (Manuka)	Manuka mixed broadleaf forest	OBDA	13-19 August 2025

5.2.3 Herpetofauna

As documented in Blueprint Ecology (2025, appended to this report), 75 triple-stacked artificial cover objects (ACOs) were set along forest margins and 105 pitfall traps within forest habitat at BRP/OBDA on 25 September 2025 (Figure 7).

In addition, three nights' spotlight survey and various habitat searches were undertaken while on site. The data is supported by previous lizard investigations in the QEII Firth block, adjacent to and immediately south of the OBDA (e.g. (Bell, T., Herbert, S., & Melzer, S., 2013)).

Figure 7: Lizard survey at OBDA. ACO (yellow square), pitfall trap (pink square), BRP site boundary (white line).

5.2.4 Bats

An acoustic bat survey was undertaken using Song Meter Mini Bat (Wildlife Acoustics) full spectrum recorders which passively record both long-tailed bat (at 40 kHz) and short-tailed bat (at 28 kHz) echolocation calls.

The survey was conducted over 21 nights between the 24th October and the 14th November 2025. The survey targeted 22 habitat features preferred by long-tailed bats for roosting, commuting, and foraging across both the land to be potentially used as the overburden site, and the parcels of land to be transferred to DOC in exchange (Figure 8). This report presents the findings as they relate to the proposed OBDA.

Figure 8: Location of bat recorders between 24 October to 14 November 2025

5.2.5 Aquatic

The OBDA includes the ephemeral headwaters and some intermittent reaches of several tributaries that feed into the surveyed main stem of the western central mainstream. For this part of the application we undertook eDNA samples to establish what fish and macroinvertebrate life are in the tributaries within the OBDA itself as these areas under the application for overburden will be directly affected (temporarily or permanently lost). The results of both the earlier downstream surveys and the recent OBDA eDNA samples are shared here in this report. The various methods and survey details of the earlier study are contained in the appendix. The data gathered for the stream values includes standard fish and macroinvertebrate surveys ((Joy et al., 2013; Stark et al., 2001)) and Rapid habitat assessments (Clapcott, 2015), and for the OBDA tributaries Wilderlab eDNA processes.

5.3 Limitations of assessment

We note that while bioacoustics recorders are an effective method for surveying avifauna, particularly nocturnal or cryptic species, this method has several limitations that need to be considered when interpreting data:

- This method only detects birds that vocalise. As such, the absence of a species in a dataset may be because it is not present, or because it did not vocalise when the bioacoustics recorders were deployed.
- One limitation of bioacoustics recorders is that they are not effective at identifying individuals (compared to tag and release) and therefore should not be used to try to estimate population sizes. They are limited to presence/absence monitoring.

5.4 Values Assessment - methodology

We determined the ecological values of the habitat and species present following EIANZ (2018) processes, Ecological value is on a continuum from negligible to very high, with an effort to discriminate subtle differences between the various assemblage mosaics in the OBDA.

Ecological value is a complex concept and may be interpreted in many ways. For this report, we refer to ecological values as being those features which are either:

(a) Indigenous species, or
(b) Indigenous habitats, or
(c) Are functions and processes used or "valued" by native species and their habitats to persist in the landscape, or
(d) As it relates to the rarity and representativeness at the Ecological District (ED) scale.

The NPS IB does not address how to measure values only that it seeks the maintenance of and at least no overall reduction of the following:

(i) the size of populations of indigenous species:
(ii) indigenous species occupancy across their natural range:
(iii) the properties and function of ecosystems and habitats used or occupied by indigenous biodiversity:
(iv) the full range and extent of ecosystems and habitats used or occupied by indigenous biodiversity:
(v) connectivity between, and buffering around, ecosystems used or occupied by indigenous biodiversity: and
(vi) the resilience and adaptability of ecosystems.

The NPS-IB has significance criteria (as does the RPS policy 23) and these criteria have similar heading to the EIANZ values assessment with conceptual overlaps, but they are not a values assessment.

We also consider the current health and condition, and their likely persistence, under permitted activities and realistic land management.

Some decisions on how value is graded and allocated has had to be made, and generally adheres to the following process:

- Indigenous species are valued more than exotic species;
- Indigenous dominated habitat types are valued more than exotic ones;
- Indigenous species are valued in terms of their rarity (i.e. Threatened or At Risk species) as defined by (Townsend et al., 2008);
- Underrepresented and naturally rare habitat types (Williams et al., 2007; Wiser et al., 2013) are valued more than common ones;
- Later successional species and "key stone" species are typically more valued than pioneer species;
- Functions and services relating to critical resources and processes are more valued than common resources or resources and services of minor (or transitory) importance.

- Intact and more representative assemblages (those with the "right" number of species in the "right" locations) are more valued than fragmented, weed-invasive, and species-deficient habitat areas.

In this way, we have made decisions on the ecological value of each community. Ecological values have been assigned to individual species as well as features/habitats, as per (Roper-Lindsay et al., 2018b) guidelines (Table 5, Table 6 and Table 7).

Table 5: Guidance for assigning ecological value or importance to a site or area of vegetation/habitat/community (EIANZ 2018).

MATTER	ATTRIBUTES TO BE CONSIDERED
Representativeness	Criteria for representative vegetation and aquatic habitats: • Typical structure and composition • Indigenous species dominate • Expected species and tiers are present • Thresholds may need to be lowered where all examples of a type are strongly modified Criteria for representative species and species assemblages: • Species assemblages that are typical of the habitat • Indigenous species that occur in most of the guilds expected for the habitat type
Rarity/distinctiveness	Criteria for rare/distinctive vegetation and habitats: • Naturally uncommon, or induced scarcity • Amount of habitat or vegetation remaining • Distinctive ecological features • National priority for protection Criteria for rare/distinctive species or species assemblages: • Habitat supporting nationally threatened or at-risk species, or locally[1] uncommon species • Regional or national distribution limits of species or communities • Unusual species or assemblages • Endemism
Diversity & pattern	• Level of natural diversity, abundance and distribution • Biodiversity reflecting underlying diversity • Biogeographical considerations - pattern, complexity • Temporal considerations, considerations of lifecycles, daily or seasonal cycles of habitat availability and utilisation
Ecological context	• Site history and local environmental conditions that have influenced the development of habitats and communities • The essential characteristics that determine an ecosystem's integrity, form, functioning, and resilience (from "intrinsic value" as defined in the RMA) • Size, shape and buffering • Condition and sensitivity to change • Contribution of the site to ecological networks, linkages, pathways and the protection and exchange of genetic material • Species role in ecosystem functioning - high level, key species identification, habitat as proxy

[1] Locally - defined as within Ecological District

Table 6: Scoring for sites or areas combining values for the four matters listed in Table 5

VALUE	DESCRIPTION
NEGLIGIBLE	Area rates Very Low for three matters listed in Table 5 and Moderate, Low or Very Low for the remainder.
LOW	Area rates Low or Very Low for the majority of assessment matters listed in Table 5 And Moderate for one. Limited ecological value other than as a local habitat for tolerant native species.
MODERATE	Area rates are High for one matter listed in Table 5, Moderate and Low for the remainder, or Area rates Moderate for two or more assessment matters, Low or Very Low for the remainder Likely to be important at the level of the Ecological District.
HIGH	Area rates are High for two of the assessment matters listed in Table 5, Moderate and Low for the remainder, or Area rates High for one of the assessment matters, Moderate for the remainder. Likely to be regionally important and recognised as such.
VERY HIGH	Area rates High for three or all of the four assessment matters listed in Table 5. Likely to be nationally important and recognised as such.

Table 7: Factors to consider in assigning value to terrestrial species.

ECOLOGICAL VALUE	SPECIES CLASSIFICATION
VERY HIGH	*Nationally Threatened* (Nationally Critical, Nationally Endangered, Nationally Vulnerable, Nationally Increasing[2]) species found in the ZOI[3] either permanently or seasonally.
HIGH	Species listed as *At Risk – Declining* are found in the ZOI either permanently or seasonally.
MODERATE	Species listed as any other category of *At Risk* (Recovering, Relict, Naturally Uncommon) found in the ZOI either permanently or seasonally; or Locally (ED) uncommon or distinctive species.
LOW	Nationally and locally common indigenous species.
NEGLIGIBLE	Exotic species, including pests and species of recreational value.

5.5 RPS, Policy 23 and NPS IB Significance assessment

[2] Nationally Increasing is category that was devised by DOC (Michel, 2021) in 2021 to resolve a problem that would arise if the population of a taxon assessed as At Risk Recovering A should stabilise. Threatened – Nationally Increasing is assigned to "Small population that have experienced a previous decline (or for which it is uncertain whether it has experienced a previous decline) and that is forecast to increase >10% over the next 10 years or 3 generations, whichever is longer" (Rolfe et al. 2021). Thus, while such a threat category is not identified in Roper-Lindsay et al. (2018a), we have included it along with all other *Threatened* classifications in to the Very High ecological value category.

[3] Roper-Lindsay et al. (2018a) define the Zone of Influence (ZOI) as "*the areas/resources that may be affected by the biophysical changes caused by the proposed project and associated activities.*"

Policy 23 of the Regional Policy Statement (proposed change 1 version) contain criteria to determine whether a feature is significant in terms of section 6(c) of the RMA. These criteria are more or less the same as those of the NPS IB, but the NPS IB has clearer instructions as to how to measure each criterion. The criteria are subtly different to those used in the values assessment.

Significant indigenous biodiversity values and other significant habitats of indigenous fauna in the coastal marine area, the beds of lakes and rivers, and natural wetlands, are those that meet one or more of the following criteria:

> *a) representativeness: the ecosystems or habitats that are typical and characteristic examples of the full range of the original or current natural diversity of ecosystem and habitat types in a district or in the Wellington Region, and:*
>
> > *(i) are no longer commonplace (less than about 30% remaining); or*
> > *(ii) are poorly represented in existing protected areas (less than about 20% legally protected).*
>
> *b) rarity: the ecosystem or habitat has biological or physical features that are scarce or threatened in a local, regional or national context. This can include individual species, rare and distinctive biological communities and physical features that are unusual or rare.*
>
> *c) diversity: the ecosystem or habitat has a natural diversity of ecological units, ecosystems, species and physical features within an area.*
>
> *d) ecological context of an area: the ecosystem or habitat:*
>
> > *(i) enhances connectivity or otherwise buffers representative, rare or diverse indigenous ecosystems and habitats; or*
> > *(ii) provides seasonal or core habitat for protected or threatened indigenous species.*
>
> *e) mana whenua / Tangata whenua values: the ecosystem or habitat contains characteristics of special spiritual, historical or cultural significance to mana whenua / tangata whenua, identified in accordance with tikanga Māori.*

We note that this assessment, being ecological, does not and has not the required qualifications to test item (e) (mana whenua / tangata whenua values). That information must be sourced from mana whenua themselves.

6.0 Habitat Results

The following is a vegetation and habit description and assessment of the OBDA.

The fauna section is separate and follows this habitat section.

6.1 The OBDA and Setback Area

This section describes the ecological values of the OBDA within the site.

6.1.1 Current vegetation communities

A list of the plant species recorded during the vegetation survey is provided in the land exchange report**Error! Reference source not found.**, but the RECCE plot data is repeated in this report in Appendix 3 (with a map) locations. The survey included areas outside but contiguous to the proposed OBDA.

Seven different vegetation communities were delineated within the OBDA site (Figure 9). The assemblages are communities that reflect differing stages of forest regeneration and are due to differences in the intensity of past farming activity, which was concentrated on the ridgelines and the gentler slopes within the proposed OBDA site (see Figure 5, 1941). Approximately half the site remains largely in exotic species dominance, mostly rank pasture with blackberry and gorse and exotic treelands.

Of the native scrub and forest which are present, the seral mahoe shrubland is the ubiquitous type and mahoe is usually dominant with varying mixtures of tree ferns, manuka, and a variety of common Wellington seral broadleaf species (Coprosma species, wineberry, Olearia species, Mapu etc). There are a few seedlings and saplings of the possible future canopy present, with rewarewa being the most common. Holly (a woody weed) is also common.

A summary description of the vegetation communities is presented in the Table 8 below and is sorted by structural form, from wetlands through pioneer shrublands to seral broad leaf forests.

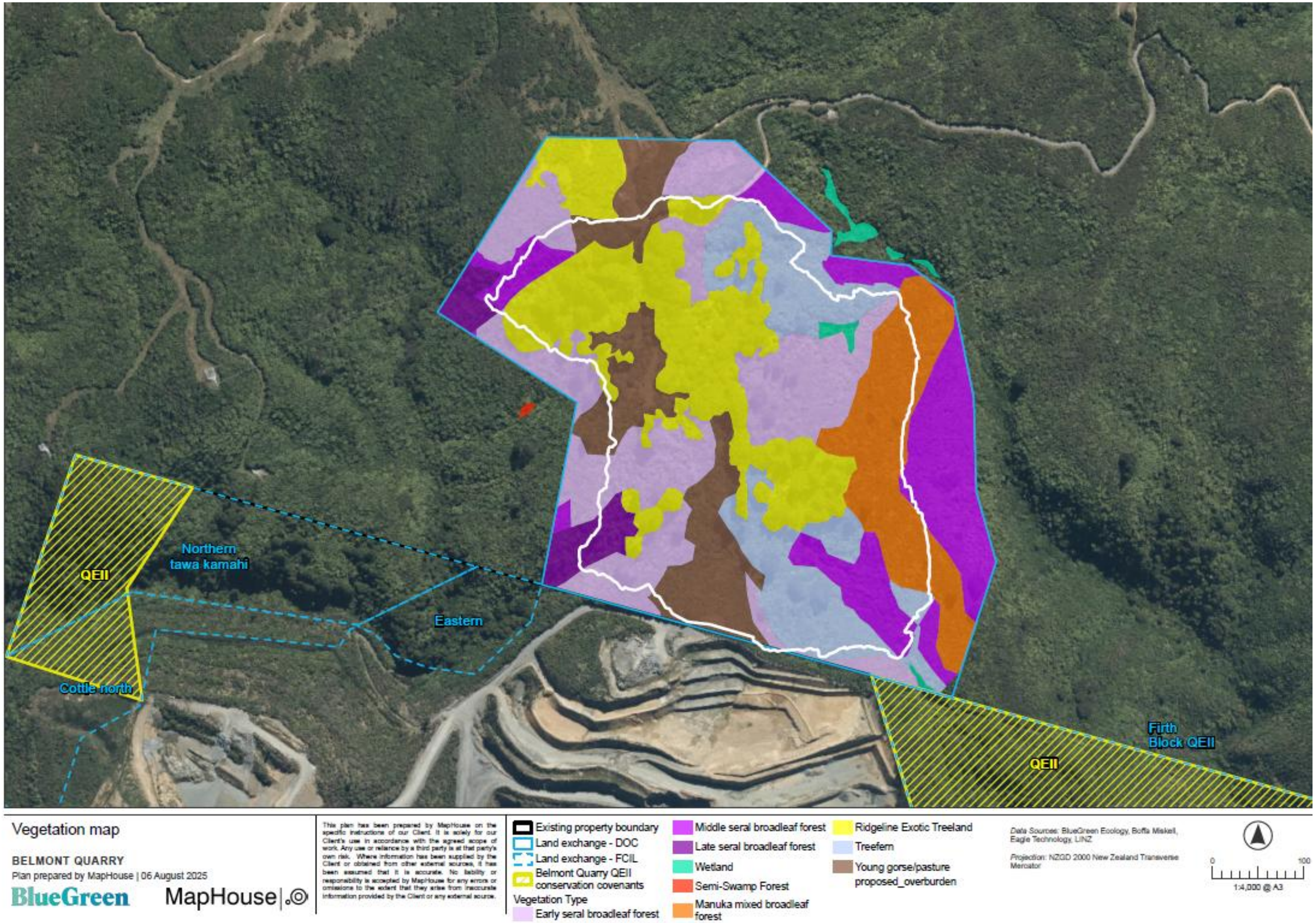

Figure 9: OBDA vegetation communities

Table 8: Summary of vegetation communities as shown in Figure 9

Main Habitats	Description
Wetland	
Natural inland kiokio-Carex wetlands	On the floor of several north-eastern tributaries are narrow areas of native species dominated wetlands. These wetlands have developed post forest clearance and represent the early successional stage of a Pukatea-Swamp Maire semi-swamp forest. The vegetation in these areas is predominantly kiokio, native sedges (such as *Carex geminata*), rushes (Isolepis and juncus) and ferns with edges of tree fern, manuka and broadleaf shrub species. They are typically 20m wide and 50-80m long with interceding broadleaf-manuka drier components between sedge features. Only one such wetland area is situated in the proposed OBDA area. One swamp maire has been located at the upper end of one of the gullies (that which is within the OBDA) in this habitat area  *Figure 10: Kiokio swamp*

Main Habitats	Description
	 *Figure 11: Rautahi Sedgeland, lower eastern gully*
Pioneer shrublands and emerging scrub (<80% woody cover - majority of stems < 10cm dbh[4])	
Gorse shrubland	On the dry ridgelines where pasture has been most recently, gorse is the main pioneer species forming a diversity of shrub-grasslands, and scrub depending on the time since it was last managed. The gorse is typically 1-3m tall, with a variety of pasture grasses and common herbaceous weeds beneath it. Off the ridge down slope, the proportion and height of native broadleaf shrubs (i.e. mahoe, hangehange, kanono, rangiora, five finger, karamu, pigeonwood and mapou) increase until it is māhoe and mamaku over the rest at around 4-6meters.  *Figure 12: Gorse shrubland*

[4] Diameter at Breast Height

Main Habitats	Description
Seral broadleaved forest (majority of stems > 10cm dbh)	
Mahoe-tree fern forest	This community forms a continuous strip along the main valley floor and most tributaries. It is dominated by mamaku, silver fern and gully fern on the shaded south-facing slopes, and māhoe and mamaku on the north-facing slopes. Māhoe stems are typically 30-40 cm DBH, but occasional large trees exceed 90 cm DBH. Tree ferns range in height up to 10m in the central gully. The canopy varies in height from 6 to 10m, with occasional large trees up to 12 m. In the understorey shrubs of kawakawa, kanono, rangiora, pigeonwood, pate and hangehange are common. Young nikau are also seen in the older (larger) vegetation. The floor cover is predominantly ferns (crown fern, kiokio, and hen and chicken). There are very few seedlings of potential canopy species (i.e., tawa, pukatea); the most common are occasional rewarewa seedlings and saplings.
Mahoe/ broadleaved scrub	This māhoe-dominated late seral forest is found in several south-facing gullies that lie adjacent to more mature native forest, thereby benefiting from dispersed seed. On wet south-facing faces, mamaku can dominate. In addition, several other hīnau broad-leaved species, such as hīnau, putaputaweta, tarata, and titoki, occasionally occur in the canopy. The canopy varies from 3-4 m on upper slopes to 6m on the valley floor, and some individual stems reach 8m. The stem size of the dominant māhoe is typically 20-40 cm with some specimens to 1.4 m. The slopes are generally steep to very steep (20° to 40°). Vines of supplejack, bush lawyer, pohuehue, and indigenous clematis are common in the canopy and understorey. The subcanopy and understorey have a good diversity of typical forest shrubs (rangiora, kawakawa, karamu, konono, hangehange, kawakawa, silver fern, pate, putaputaweta, pigeonwood) as well as scattered saplings of potential canopy species such as kohekohe, titoki, pukatea, tawa, nikau, and kāmahi. Notably absent was tree fuchsia, and the abundance of wineberry was lower than expected. The floor has a moderately diverse range of fern species and seedlings, and in a few places (near the older remnants), there are emerging vinelands of kiekie. The core of the vegetation is largely free of exotic weed species, but several invasive weeds occur along the modified margins.  *Figure 13: Mahoe/ broadleaved scrub*

Main Habitats	Description
Manuka scrub	The canopy of the manuka stands is even in height, normally ranging from 3-5 m, but up to 6m in the oldest stands. The stems of canopy plants are small, ranging from 5-10cm DBH in the youngest stands to 10-20cm dbh in the oldest. A small number of stems reach 35cm DBH. There are a few other species present in the canopy aside from occasional mahoe, pigeonwood and tree fern (silver fern). The understorey is relatively dense, with stems of kanuka, rangiora, mapou, kanono, and silver fern. There are also occasional seedlings of potential canopy species, such as hīnau and rewarewa. The floor cover has a variety of ferns and mosses, as well as the orchid (*Pterostylis alobula*).  *Figure 14: Manuka scrub*
Exotic trees	The upper ridge and lateral areas are covered in large old pines and macrocarpas. Still, they are also spread more widely, and into the various māhoe seral stages off the ridge line, are two holly species. These are prominent and extend throughout much of the north and western side, sloping down even to the mainstream. Old man's beard is very rare in the OBDA area but has been observed at several locations across the wider site.

6.1.2 Areas of habitat types in the OBDA

Table 9 provides the total areas of the different vegetation communities on the OBDA. Of the total amount present in the survey, the largest (most abundant) habitat types are the exotic tree central top ridgeline followed by early seral broadleaf forest reflecting the young age and historic modification by farming of the area. All of the seral communities are essentially composed of the same species, but they differ in age, canopy height and intactness. Then scattered about these are two special species present in ones and twos (generally).

Table 9: Areas (ha) of the different vegetation assemblages.

Row Labels	Sum OBDA (ha)
Early seral broadleaf forest	3.19

Late seral broadleaf forest	0.26
Manuka mixed broadleaf forest	1.76
Middle seral broadleaf forest	0.75
Ridgeline Exotic Treeland	4.43
Treefern	2.75
Wetland	0.07
Young gorse/pasture	2.31
Grand Total	15.52 ha

6.1.3 The RECCE data

A total of 83 plant taxa were recorded on the OBDA site (Mr Ward of DOC records >100), six of which were exotic. Typically, any one seral broadleaf RECCE plot (a 20m by 20m plot) indicated around 20 taxa).

Table 10). The manuka shrublands are slightly more diverse, with 27 taxa typical of a RECCE plot, and the pukatea forest (outside of the OBDA) has 26 taxa in a RECCE plot. The area under the closed canopy mamaku has few taxa (4), and the kiokio-sedge wetlands typically have around 10-12 taxa (of which one is in the OBDA).

Three local plant conservation network plant species lists also reflect the vegetation communities. The lists published come from records by (Mitcalfe, B. J., 1997). The lists are of “remnant 1” (about the north end of OBDA area, probably lower main gully), remnant 2 (the QEII – Firth Block) and “Haywards Quarry” which appears to be the south end of the OBDA area.

These lists, compared with the recent OBDA survey list, show considerable similarities between the 1997 condition and the present. A range of 65 to 82 taxa (the most being recorded in the recent survey), with the differences primarily being the number of ground and filmy ferns and grasses, and the current absence of tree fuchsia, but in essence, little has changed in the composition of the area at large for 30 years.

Table 10: RECCE plot species richness summaries

RECCE No.	1	2	3	4	5	6	7	8
VEGETATION COMMUNITY	Under Pine Ridge	Gully floor	Old gorse	Gully head	Gully head under mamaku	Kiokio wetland	Manuka shrub	Pukatea forest
TAXA RICHNESS	19	23	18	22	4	11	27	26

6.1.4 Plant taxa that are rare or have a conservation threat classification.

A number of sources have reported a number of swamp maire (Threatened - nationally vulnerable) and Ramarama (Threatened, nationally critical) (this report, Mr Ward for DOC, Friends of Belmont Regional Park, iNaturalist). There are somewhere between 10 and 14 swamp maire in the OBDA and 23 Ramarama. Mr Ward (for DOC), in undertaking his own surveys of the OBDA area also reports the presence of 1 *Coprosma rubra* (At Risk – declining (adjacent to the wetland)), a *Carex maorica* (Regionally uncommon), a population of *Isolepis Habra* (Regionally uncommon) in a nearby (but outside of the OBDA) wetland. We also report (outside of the OBDA) 18 other swamp maire (Figure 15).

The swamp maire trees in the OBDA (see Figure 15) do not constitute a forest; they are singular or at two places a loose cluster of three trees scattered in gullies over the site. There are no old trees, being Ca. 20-40 cm DBH, they appear to be around 40-60 years of age (i.e. middle aged) and likely developed post farming in the less affected gullies. It is assumed that there must be a parent tree or stand but this has not been located and may now be demised.

The central western gully outside of the OBDA (and removed from the exchange proposal (BlueGreen Ecology 2nd December 2025) has 16 canopy specimens of swamp maire, and in that gully under those trees is a dense carpet of swamp maire seedlings. Survey in the wider park and habitat modelling has also confirmed that there is swamp maire habitat outside of the OBDA and in the Winstone's exchange areas nearby (southern gully).

In a workshop with DOC and their experts, we were advised that the presence of swamp maire habitat in particular, was considered especially valuable in this area. The actual number of swamp maire has not been concluded but lies between 10 and (as posted on iNaturalist) 14 within the OBDA.

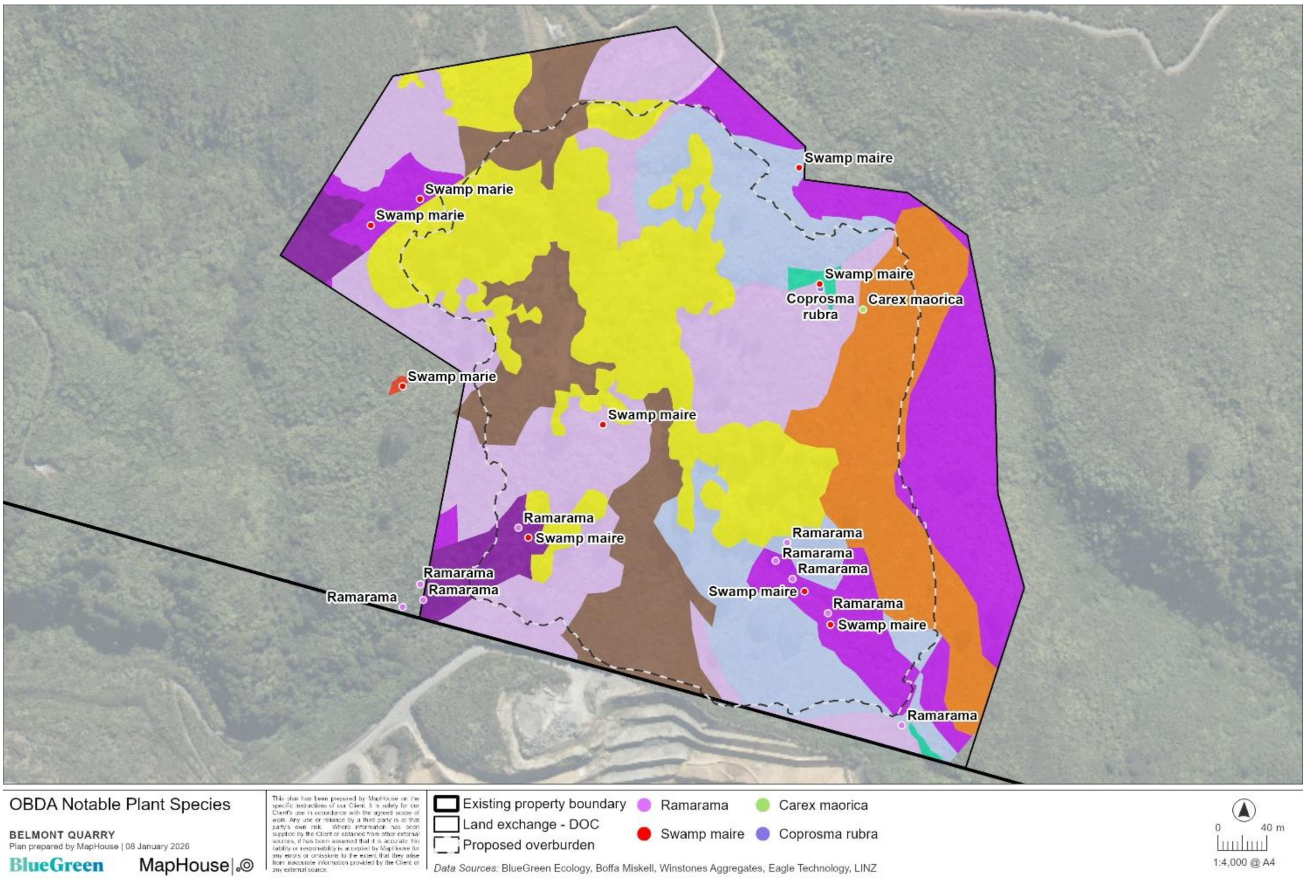

Figure 15 Locations of the Threatened and regional uncommon plants in the mapped vegetation communities (locations not actual numbers).

7.0 Fauna of the OBDA / Exchange Area and Nearby Park

7.1 Avifauna

Avifauna within the proposed OBDA has been characterised using species records from field surveys, acoustic monitoring devices, and supplementary datasets from the wider landscape. Table 11 provides a compiled list of avifauna species recorded by ecologists while undertaking various site investigations (as listed in Section 5.2), by the bioacoustics recorders, as well as by other sources in the wider area. The majority of species recorded in the area are native, Not Threatened (nationally and regionally), and primarily associated with native forests and shrublands (e.g., kereru, fantail, silvereye, grey warbler, ruru, tui, and bellbird). As shown in Figure 16, the OBDA area is located within the Belmont Regional Park eco-corridor, as identified by Forest & Bird[5]. This eco-corridor likely facilitates the movement of a number of the species listed in Table 11 across the landscape.

Figure 16: Belmont Regional Park eco-corridor (green) as identified by Forest & Bird[6], with approximate location of the OBDA circled in red

Due to the limitations of the bioacoustics method (as outlined in Section 5.3 above), analysis of this data set has focused on species diversity rather than abundance. The greatest diversity of species was recorded in the lake habitat (Firth Block) (n=31) (Figure 17) which also included two Threatened and one At Risk species (Figure 18). Interestingly, more species were recorded in the exotic habitat (n=27) than in the tawa-kāmahi forest habitat (n=15), but a greater proportion of those were introduced species (Figure 17 and Figure 18). The greater diversity recorded in the exotic habitat type may be due to its more open structure relative to the tawa-kāmahi forest.

Because of the mosaic of vegetation and habitat types in the OBDA, and the mobile nature of birds, the OBDA area is likely to provide foraging, as well as potentially nesting habitat for low numbers of most of the native species listed in Table 11. However, we note that the farm pond (just outside the OBDA

[5] https://www.forestandbird.org.nz/branches/lower-hutt/ecological-corridors-wellington-region

(south-eastern corner) and associated wetland within the boundary of the Firth QEII block is a unique feature that provides habitat for species that were not recorded in other habitats (e.g. shag species), and this was the only habitat type in which Threatened and At Risk species were recorded (refer to Table 11 and Figure 18).

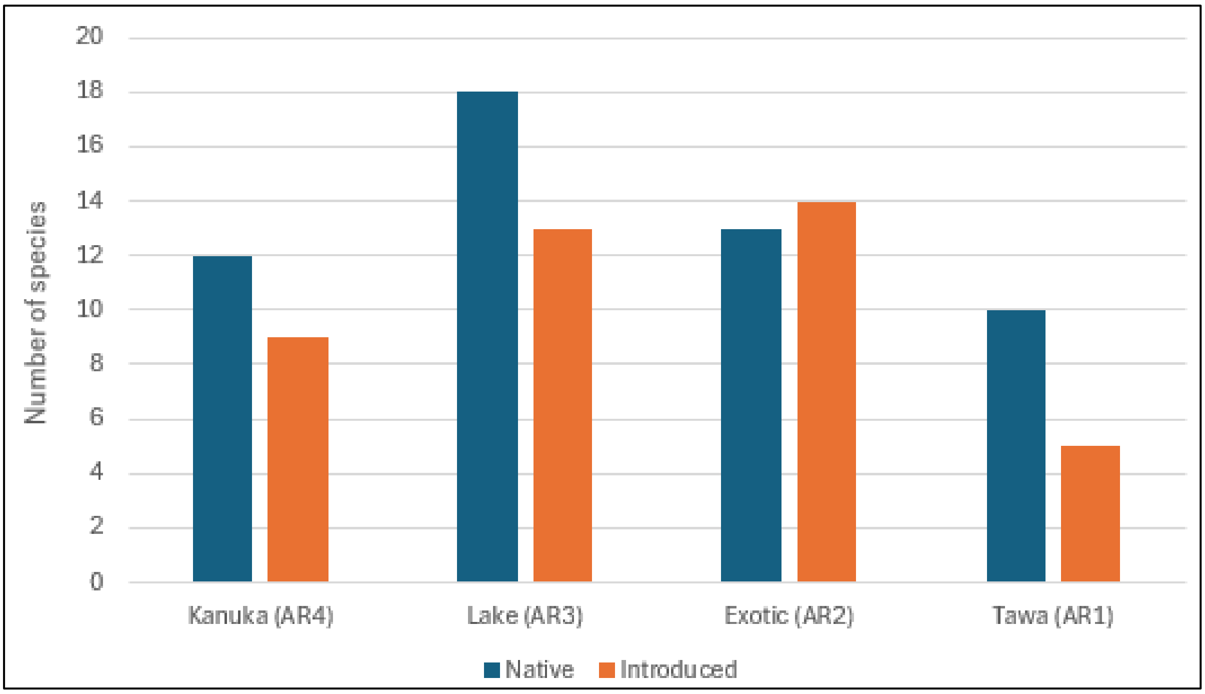

Figure 17: Number of native and introduced species recorded by the bioacoustics recorders within different habitat types (refer to Table 4 and Figure 6).

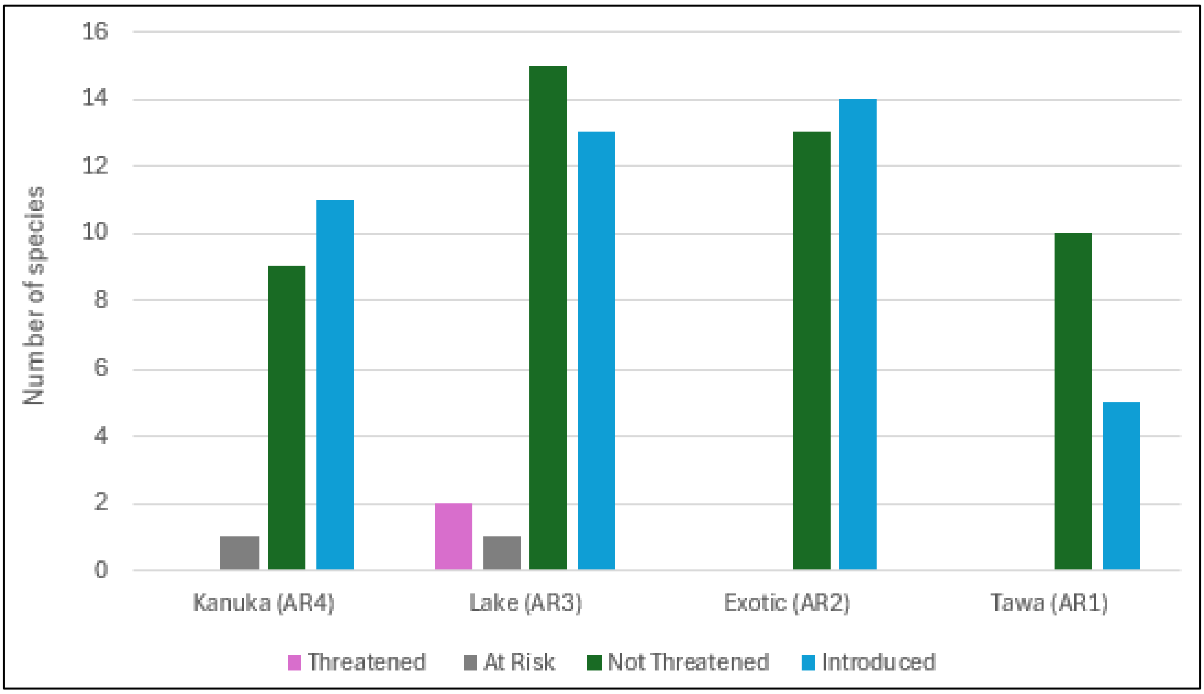

Figure 18: National conservation status of species recorded by the bioacoustics recorders within different habitat types (refer to Table 4 and Figure 6).

Table 11. Avifauna species occurring within the OBDA and/or wider landscape (ordered by decreasing conservation status)

SPECIES		NATIONAL CONSERVATION STATUS (Robertson et al. 2021)	REGIONAL CONSERVATION STATUS (Crisp et al. 2024)	DATA SOURCE							
				Site visits[6]	eBird	Belmont-Dry Creek KNE (GWRC 2023)	QEII Firth block (Stephenson 2013)	Lake bioacoustics (AR3)[7]	Exotic bioacoustics (AR2)[7]	Tawa bioacoustics (AR1)[7]	Manuka bioacoustics (AR4)[7]
Bush falcon	*Falco novaeseelandiae* "bush"	Threatened - Nationally Increasing	Threatened - Critical	✓		✓					
Caspian tern	*Hydroprogne caspia*	Threatened - Vulnerable	Threatened - Critical					✓			
Long-tailed cuckoo	*Eudynamys taitensis*	Threatened - Vulnerable	Threatened - Endangered					✓			
North Island robin	*Petroica longipes*	At Risk - Declining	Threatened - Vulnerable					✓	✓	✓	
Pied shag	*Phalacrocorax varius varius*	At Risk - Recovering	Threatened - Vulnerable					✓			
Little shag	*Phalacrocorax melanoleucos brevirostris*	At Risk - Relict	Threatened - Endangered				✓				
Red-crowned parakeet	*Cyanoramphus novaezelandiae*	At Risk - Relict	Threatened - Vulnerable								✓
Bellbird	*Anthornis m. melanura*	Not Threatened	Not Threatened	✓		✓	✓	✓	✓	✓	✓
Black-backed gull	*Larus d. dominicanus*	Not Threatened	Not Threatened	✓		✓	✓	✓	✓	✓	✓
Grey warbler	*Gerygone igata*	Not Threatened	Not Threatened	✓		✓	✓	✓	✓	✓	✓
Kereru	*Hemiphaga novaeseelandiae*	Not Threatened	Not Threatened	✓			✓				
Kingfisher	*Todiramphus sanctus vagans*	Not Threatened	Not Threatened	✓							
Morepork	*Ninox n. novaeseelandiae*	Not Threatened	Not Threatened				✓	✓	✓	✓	✓
Paradise shelduck	*Tadorna variegata*	Not Threatened	Not Threatened					✓			✓
North Island fantail	*Rhipidura fuliginosa placabilis*	Not Threatened	Not Threatened	✓	✓	✓	✓	✓	✓	✓	✓
North Island tomtit	*Petroica macrocephala toetoe*	Not Threatened	Not Threatened	✓				✓	✓	✓	✓
Shining cuckoo	*Chrysococcyx l. lucidus*	Not Threatened	Not Threatened					✓	✓		
Silvereye	*Zosterops lateralis lateralis*	Not Threatened	Not Threatened	✓		✓	✓	✓	✓	✓	✓
Pukeko	*Porphyrio m. melanotus*	Not Threatened	Not Threatened					✓			
Spur-winged plover	*Vanellus miles novaehollandiae*	Not Threatened	Not Threatened				✓	✓	✓	✓	✓
Swamp harrier	*Circus approximans*	Not Threatened	Not Threatened	✓		✓		✓	✓	✓	
Tui	*Prosthemadera n. novaeseelandiae*	Not Threatened	Not Threatened	✓	✓	✓	✓	✓	✓		✓
Whitehead	*Mohoua albicilla*	Not Threatened	Not Threatened	✓	✓	✓		✓	✓		✓
Blackbird	*Turdus merula*	Introduced	Introduced & Naturalised	✓			✓	✓	✓	✓	✓
California quail	*Callipepla californica*	Introduced	Introduced & Naturalised	✓			✓		✓		
Chaffinch	*Fringilla coelebs*	Introduced	Introduced & Naturalised	✓				✓	✓		✓
Pheasant	*Phasianus colchicus*	Introduced	Introduced & Naturalised						✓		✓
Canada goose	*Branta canadensis*	Introduced	Introduced & Naturalised					✓	✓		

[6] As listed in Section 5.2

[7] Refer to Table 4 and Figure 6 for location and habitat details

SPECIES		NATIONAL CONSERVATION STATUS (Robertson et al. 2021)	REGIONAL CONSERVATION STATUS (Crisp et al. 2024)	DATA SOURCE							
				Site visits[6]	eBird	Belmont-Dry Creek KNE (GWRC 2023)	QEII Firth block (Stephenson 2013)	Lake bioacoustics (AR3)[7]	Exotic bioacoustics (AR2)[7]	Tawa bioacoustics (AR1)[7]	Manuka bioacoustics (AR4)[7]
Dunnock	*Prunella modularis*	Introduced	Introduced & Naturalised				✓	✓	✓	✓	✓
Eastern rosella	*Platycercus eximius*	Introduced	Introduced & Naturalised				✓	✓	✓		✓
Goldfinch	*Carduelis carduelis*	Introduced	Introduced & Naturalised					✓	✓		✓
Magpie	*Gymnorhina tibicen*	Introduced	Introduced & Naturalised					✓	✓	✓	
Redpoll	*Carduelis flammea*	Introduced	Introduced & Naturalised					✓	✓		
Mallard	*Anas platyrhynchos*	Introduced	Introduced & Naturalised				✓	✓	✓	✓	
Song thrush	*Turdus philomelos*	Introduced	Introduced & Naturalised				✓	✓	✓	✓	✓
Wild turkey	*Meleagris gallopavo*	Introduced	Introduced & Naturalised					✓	✓		
Yellowhammer	*Emberiza citrinella*	Introduced	Introduced & Naturalised					✓			✓
Feral goose	*Anser anser*	Introduced	Introduced & Naturalised					✓	✓		✓
Starling	*Sturnus vulgaris*	Introduced	Introduced & Naturalised				✓				

7.2 Bats

No bats were detected. From the survey undertaken it is not considered likely that long-tailed or short-tailed bats are regularly roosting within the parcel of land to be used as the overburden area. No evidence of foraging was detected. While bat activity in a particular area can fluctuate across a season, the absence of any recordings from a survey undertaken in November (a period where bats are typically active) indicates that the site is unlikely to be important habitat for bats.

7.3 Herpetology

Blueprint Ecology (2025) assessed the habitats and the potential lizard species present and begun trapping surveys. The assessment provides the following information.

In total, four northern grass skink (*Oligosoma polychroma*) and three ngahere gecko (*Mokopirirakau* "Southern North Island") have been recorded from the OBDA.

The results show that northern grass skink are present in low abundance (CPUE 3%) 3 in thick grass along the forest margins within the centre of OBDA (Figure 19). The population recorded is not regionally or locally significant, and the number of lizards recorded indicates that the population is small but permanent and self-sustaining.

Ngahere gecko are present within kanuka-mānuka forest at the south-eastern area of the OBDA (and outside of the OBDA). Detection rate was one animal detected per 5 hours of search effort on average. This species is listed as 'At Risk - Declining' in the latest threat classification (Hitchmough et al., 2021) and the population on site is locally significant.

When considering the relatively large area of suitable habitat for other forest dwelling species, and northern grass skink and ngahere gecko as a proxy for other lizard species, we are cautious to entirely discount the presence of other potential lizard species on site (e.g., copper skink *Oligosoma aeneum*). Other species may occur in low abundance (below detectability) or in discrete, localised areas outside of our direct survey areas.

Figure 19: A northern grass skink was recorded in the proposed OBDA

7.3.1 Lizard Habitat Quality

Lizard habitat quality and the species present has been assessed based on existing lizard record datasets (Bioweb database, iNaturalist), aerial imagery, BlueGreen Ecology's vegetation mapping and site survey. The details of the species present, the habitat quality and the management of potential effects related to lizard habitat loss and avoidance of harm to lizards is addressed in the specific lizard habitat Memorandum of Mr Payne.

8.0 Ecological values of the OBDA area

An assessment of the ecological value of the proposed OBDA uses the common four criteria (*representativeness, rarity/distinctiveness, diversity/pattern, and context*) but includes a range of matters around each primary criterion for consideration and is given a value score (Very High, High, Moderate, Low, Negligible) for each criterion (see (Roper-Lindsay et al., 2018b)). These four scores are assessed for each of the main vegetation communities in the OBDA and then combined to provide an overall ecological value of the site.

8.1 Representativeness

The central ridge, open ground, and gorse/grass and pine are not representative of any indigenous community. There is, however, a development of gorse as the precursor to broadleaf seral development. Under the various pine and macrocarpa canopies are the usual range of native broadleaf shrubs, along with some ferns and ground cover, making local sources for more rapid spread as the gorse matures and/or the canopy exotics die of old age. But overall, the representativeness of this assemblage/area is **very low**.

The māhoe / broadleaf seral communities of varying ages are representative of the species and structures of Wellington regional broadleaf serial development. There is a small range of species absent, reflecting the wider landscape's history of modification and use, but in general, the fern, ground tier, and shrub layers are typical. What is absent are examples of the final canopy species as saplings, and a range of ground-cover shrubs, ferns, grasses, and herbs (as well as the epiphyte flora of mature forest). We consider the representation of typical mid-to late seral stages across the developing site to be **moderately** representative, whereas the early seral stage is less representative.

There is one small gully, a natural inland wetland, within the OBDA. It has the typical early seral sedge and fern (kiokio) cover with manuka and some *C. propinqua*. Still, it does not have the range of sedges and rushes of a more complete bush gully sedgeland (missing generally *Isolepis* and *Schoenus* species, *Machaerina* and wheki, and the expected swamp maire (there is one specimen). We consider this wetland to be of **moderate representation**.

The manuka-kanuka scrub has a good range of expected ground ferns, herbs, orchids, and some grasses. There is evidence of Rewarewa saplings, and, in general, the ground-to-low canopy structure is typical. We do not find it highly represented, because "high" would imply a natural state without absences or the presence of exotics, and so we consider that portion to have **moderate representational value**.

8.2 Rarity and distinctiveness

Natural inland wetlands are regionally rare (<3% remaining Regionally (GWRC[8]) and the eastern side of the OBDA has one such small area and several wet gullies that, while not currently natural inland wetlands, are potential habitat for swamp maire (one is present), Coprosma rubra (one present), as are two regionally uncommon/rare sedge taxa.

There are at least 10 (and up to 14) young swamp maire (Threatened - Nationally vulnerable) trees scattered in the gullies on the eastern and western side of the OBDA amongst generally later seral broadleaf forest.

[8] Greater Wellington — Wetlands in our region

There are at least 23 Ramarama specimens (Nationally critical) generally in the southern gullies of the OBDA.

In general, much of the OBDA is recorded as occurring in a threatened land environment (<10% remaining with indigenous vegetation cover). The eastern side of the OBDA is then indigenous vegetation in a threatened land environment, i.e. a land unit in which most of its original indigenous vegetation cover has been lost.

While the OBDA area at large is either early- to mid-seral broadleaf, tree fern, or exotic, and so not rare there are nevertheless several taxa with rarity classifications and the potential for some of these to expand. The number of these rare species is not high, and their positions are not secure, but we consider that the vegetation communities in which these specimens are found place those communities at the **higher end of this continuum**.

8.3 Diversity & pattern

The diversity of species as represented by the RECCE plots is typical of the seral stages measured and common in Wellington, and as compared to similar seral stages in the region. The diversity, however, is low, and the number of taxa is typically a common suite of 10-15 at any one location. A missing tier is the mature forest and its epiphyte community. There are also four habitat types associated with the hydrology regime of the OBDA: wetlands, wet gullies, ridge-tops and hill side slopes on drier soils. Thus, there is a range of habitat types across the OBDA. We consider this area to have a **moderate degree of pattern but a low level of diversity.**

8.4 Ecological context

When viewed within the wider ecological context the OBDA area forms a small chunk on the edge of the wider Belmont Regional Park and does not perform any significant role as a corridor or feature assisting in the movement of bird and ground-moving taxa. Nor is it a secure pocket of mature and diverse forest acting as a refugia for fauna. The QEII-Firth block is more important as a jump over the Hutt River to the Stokes Valley spurs, as is the Dry Creek area and the western stream corridor.

The OBDA, given its age and development, cannot yet be said to have integrity or to be functioning naturally, with weed potential interference likely and requiring pest control. There are many open exotic areas and an unknown seral successional process. The upper regions of the eastern slopes and gullies regulate water discharge and mitigate rain runoff to the east wetland systems. In terms of size and shape, it (if alone and not part of the wider vegetated park) would be a semi-solid feature (at 24ha), but open centrally. This open, central, large area means that there is generally an absence of secure core habitat; edge effects are largely evident throughout. Processes such as nutrient recycling and hydrology are functioning, and food webs are developing.

We consider the ecological context to be at the **low end of the continuum**.

A summary of each vegetation community's value in the OBDA is present below (Table 12) based on the analysis above. This process gives component values and then considers the proportion these areas contribute to the entire area to arrive at a site value but acknowledging that different components contribute differently.

Those areas contributing higher values are related to specific species and in all cases the specific species conferring higher values are not large populations but small numbers. This is also reflected in the small proportions of the sub-habitats in which higher-value species are typically found. In the absence of these particular conservation value taxa, the site is a basic Wellington hill country early regenerating site.

Table 12: Value and proportion of the different vegetation assemblages.

Vegetation type	Value	Presence of swamp maire or Ramarama, ngāhere gecko and North Island Robin	Proportion of area	In the round
Young gorse/pasture	Negligible		15.4%	Negligible
Ridgeline Exotic Treeland	Negligible		28.6%	Negligible
Treefern gully	Low	High	17.7%	Moderate
Early seral broadleaf forest	Low		20.5%	Low
Middle seral broadleaf forest	Moderate		4.8%	Moderate
Late seral broadleaf forest	Moderate	High	1.7%	High
Manuka/kanuka mixed broadleaf forest	Moderate	High	11.3%	High
Wetland	High	High	0.5%	High
Total area (ha)	15.51ha			Moderate

8.5 Values conclusion - OBDA as a whole

Fauna communities have not been assessed separately in terms of community representativeness, diversity, rarity etc because the assemblages (lizard or bird) are generally common peri-urban seral communities that utilise wide areas throughout the Park and are not specific to the OBDA and so values are considered related to the specific species and their conservation classification in the OBDA as per the EIANZ (2018).

The OBDA is home to two At Risk declining species, the Ngahere gecko and the North Island Robin, both in very low numbers. The presence of these taxa in a habitat would convey a high value aspect to the habitat. The North Island Robin was detected in the acoustic device located within the exotic negligible plant value open area. However, the robin will be present throughout the OBDA (Park) and in low numbers and we do not see the validity in making the exotic tree land or the OBDA high value on the presence of a (single) robin record in the poorest vegetation community.

The specimens of Ramarama can be said to be of very high value, and swamp maire specimens and the Coprosma rubra of high value (EIANZ 2018). However, where a treefern gully contains one swamp maire we do not then consider the entire tree fern gully to be of high value, rather we reflect the value to the lone tree. The same applies to the identification of Ramarama (23 specimens are an important number but they are scattered over 24 ha) and also the ngāhere gecko, because the rare species present in the OBDA are not in large numbers and not all across the site and may not even be overly viable populations.

There are a range of values (low to High) associated with the age and extent of seral development. As a whole, the total area of variously aged and variously developed systems has some current value. However, there are gaps and missing taxa and a lack of evidence of later seral stage species which may cause the successional process to stall (for a time). There are several conservation important taxa present in low abundance, often as young specimens, suggesting the area has potential for these species (i.e. swamp maire and Ramarama). The area as a whole can be seen as of **Moderate ecological value,** with the rarity of taxa (in low abundance) being the one high value component driving up the value from an otherwise low state (EIANZ (2018).

9.0 Significance Assessment

While the ecological values assessment is similar to the RMA section 6(c) assessment of significance, the significance test is a binary assessment, not a graduated one. The consideration of the parameters is similar but, as the NPS-IB and RPS (policy 23) criteria show in their explanations of each criterion, there is a subtle difference in the way of considering the criteria.

We have used the regional criteria in Policy 23 of the RPS to guide our assessment. This set is sufficiently similar to the NPS-IB set as to be only very marginally different. Where there is a requirement for more clarity than provided for Policy 23, we have referred back to the descriptions in NPS IB Appendix 1 as an interpretative aid for each criterion.

The criteria assessment outcomes (noting the details outlined in section 8.0) are expressed below in Table 13 for each of the main vegetation communities in the OBDA.

Vegetation type	Representativeness	Rarity	diversity	Context	Significant
Young gorse/pasture	No	No	No	No	No
Ridgeline Exotic Treeland	No	No[9]	No	No	No
Treefern gully	No	No[10]	No	No	No
Early seral broadleaf forest	No	No	No	Yes[11]	Yes
Middle seral broadleaf forest	Yes	No[12]	No	No	Yes
Late seral broadleaf forest	Yes	No	No	No	Yes
Manuka mixed broadleaf forest	Yes	Yes	No	No	Yes
Wetland	Yes	Yes	No	No	Yes

Table 13 Assessment of significance of vegetation types by reference to Policy 23 of the RPS

NB: As the authors are not mana whenua, we have not and cannot assess the proposal against criterion e) in Policy 23 relating to tangata whenua values.

There is no one significance outcome for the site as a whole and to do so would be inappropriate for a site with such variation in the habitat and communities present. The significant communities are acknowledged by the vegetation community labels in column one of the table above and those areas of each vegetation type are reflected in the vegetation map and area tables. Some 9ha of the site (i.e. around 2/3rds of the site) contain significant vegetation and / or habitat of indigenous fauna and 6ha do not.

[9] Noting the record of a north island robin does not cause the area to register as housing a rare taxa as that taxa is throughout in low abundance.

[10] Accepting the presence of three swamp maire and 5 Ramarama which alone are insufficient to trigger rarity in this habitat as a whole.

[11] Our assessment is that the early seral communities are a connective matrix between and around the later serial communities and do have a buffer role to those older more developed vegetation communities, including the gully wetland.

[12] The south western most gully head is seral vegetation but has a swamp maire and 2 Ramarama which alone are not enough to make the habitat type significant based on rarity.

10.0 Waterways

10.1 Stream network overview

The OBDA contains the ephemeral headwaters of six gully systems (three east, and three west) that feed into lower intermittent sections and then into the perennial systems (Figure 20) and finally into wetlands. The “intermittent-perennial” area in the east-central system has small areas of riparian wetlands but generally is non-wetland stream riparian weki, pate, kanono as well as kiokio until outside of the OBDA and then into the eastern main gully wetland. The western gullies contain streams under broadleaf forest, and other than the swamp maire central western gully (which can be found to be wetland under the RMA definition and MfE (2020) protocol) qualify as streams because the plant cover is FAC and FACU broadleaf forest canopy and ground tier species are not dominated by non-FAC/FACW wetland species. These tributaries deliver water into the central northern stream and to the eastern main stem wetland respectively. The lower reaches of these systems are all perennial. The mapped western tributaries were assessed as being predominantly ephemeral at and above the OBDA “line”. However, that division between intermittent and ephemeral is highly variable and the eDNA data collected in 2026 suggests that the northern western intermittent sections may be a little further up the catchment than depicted in the map below.

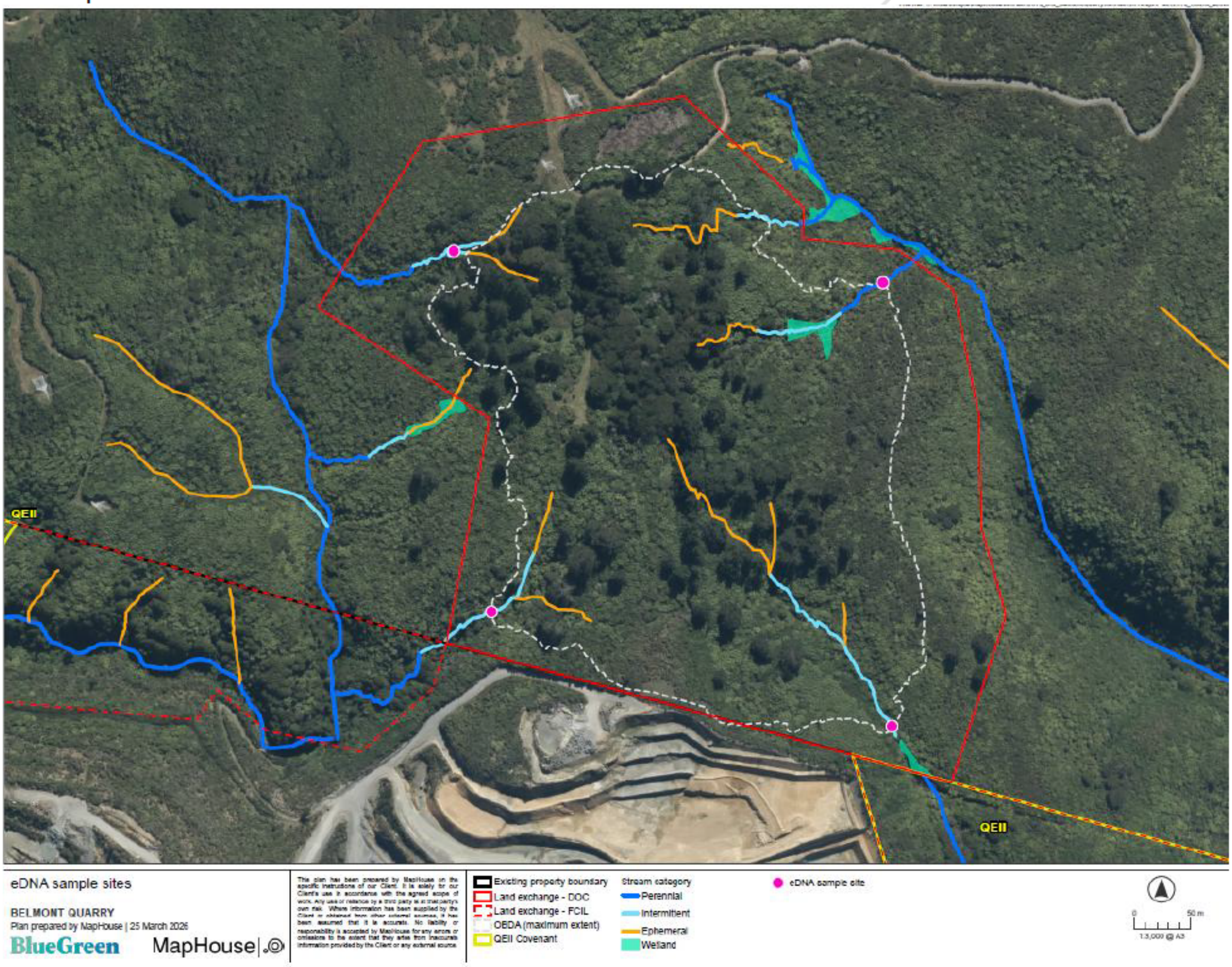

Figure 20: Waterways associated with the OBDA (red dots showing eDNA collection sites) and the green area immediately to the west of the OBDA boundary is the swamp maire gully wetland.

10.2 Surveyed reaches and sampling results

The gully areas downstream of the OBDA are largely intermittent or contain only a short reach of surface flow throughout the year. They are largely damp, muddy gully floors with relatively abundant woody and leaf debris. Those perennial reaches further downstream have good macroinvertebrate habitat, and koura are likely common (especially with the reduced fish presence in the central system, but also in the other streams).

Intermittent SEV scores (Neale et al 2016) were derived from field assessments for the middle eastern reach and the southeastern reach. These were the two streams with sufficient water to undertake the measures and scoring. The western systems did not contain sufficient water to undertake the scoring noting that both the northern and southern western systems are near ephemeral inside of the proposed OBDA. These are only identified as intermittent because there is often a shallow sheet over a reasonable formed morphology, rather than representing true aquatic habitat. That said, the eastern examples are representative in general, and their scores will reflect the western north and south intermittent portions of the gullies.

Below (Table 14) contains the SEV model outputs for the four primary variables (Hydraulic function, Biogeochemical function, Habitat provision and Biodiversity function). We used the eDNA species list to populate the macroinvertebrate model components.

The outputs (**eastern south = 0.551 and eastern central = 0.585**) shows moderate hydraulic functioning, good biogeochemical functioning, moderate habitat provision and low biodiversity functioning, leading to what might initially be perceived as a low score for a forested stream. However, in essence it is the limited amount of water within these streams that drives this score, despite relatively good riparian and low modification conditions.

Table 14 Intermittent stream sEV model summary out put.

Function category	Function	Variable (code)	Eastern central	Eastern south
		Vchann	1.00	1.00
		Vlining	0.80	0.80
		Vpipe	1.00	1.00
Hydraulic	**NFR**	**=**	**0.93**	**0.93**
		Vbank	0.00	0.00
		Vrough	0.80	1.00
Hydraulic	**FLE**	**=**	**0.00**	**0.00**
		Vbarr	0.30	0.30
Hydraulic	**CSM**	**=**	**0.30**	**0.30**
		Vchanshape	1.00	1.00
		Vlining	0.80	0.80
Hydraulic	**CGW**	**=**	**0.87**	**0.87**
		Hydraulic function mean score	**0.53**	**0.53**
		Vshade	0.80	0.80
biogeochemical	**WTC**	**=**	**0.80**	**0.80**
		Vdod	0.50	0.50
biogeochemical	**DOM**	**=**	**0.50**	**0.50**
		Vripar	1.00	1.00
		Vdecid	1.00	1.00
biogeochemical	**OMI**	**=**	**1.00**	**1.00**
		Vmacro	1.00	1.00
		Vretain	1.00	1.00
biogeochemical	**IPR**	**=**	**1.00**	**1.00**
		Vsurf	0.88	0.64
		Vripfilt	1.00	1.00
biogeochemical	**DOP**	**=**	**0.94**	**0.82**
		Biogeochemical function mean score	**0.85**	**0.82**

		Vgalspwn	1.00	1.00
		Vgalqual	0.00	0.00
		Vgobspwn	1.00	0.10
habitat provision	**FSH**	**=**	**0.50**	**0.05**
		Vphyshab	0.62	0.62
		Vwatqual	0.45	0.45
		Vimperv	1.00	1.00
habitat provision	**HAF**	**=**	**0.67**	**0.67**
		Habitat provision function mean score	**0.59**	**0.36**
		Vfish	0.00	0.00
Biodiversity	**FFI**	**=**	**0.00**	**0.00**
		Vmci	0.95	0.98
		Vept	1.00	1.00
		Vinvert	0.10	0.31
Biodiversity	**IFI**	**=**	**0.68**	**0.76**
		Vripcond	0.80	0.80
		Vripconn	0.00	0.00
Biodiversity	**RVI**	**=**	**0.00**	**0.00**
		Biodiversity function mean score	**0.23**	**0.25**
SEV averaged score			**0.585**	**0.551**

10.2.1 eDNA

On 17 February 2026, the author collected two eDNA samples from each OBDA tributary (where there was sufficient water to do so). The OBDA sample sites shown below (Figure 20).

The sample sites are called “eastern - central”, “eastern - south”, “western - south” and “western - north” , reflecting that there was sufficient water to sample in 4 of the 6 tributaries at (or about) the lower OBDA affected point. The eDNA samples will reflect the fauna upstream of the sample point. The southern gully stream (within the exchange are) was also sampled in this way.

10.2.1.1 Fish

There were no records of any fish species associated with the OBDA tributaries.

Fish	OBDA Western south	OBDA Western north	OBDA Eastern south	OBDA Eastern central
Banded kokopu	0	0	0	0
short fin eel	0	0	0	0
long fin eel	0	0	0	0

10.2.1.2 Macroinvertebrates

	OBDA Western south	OBDA Western north	OBDA Eastern south	OBDA Eastern central
RICHNESS	25.5	21	19	16
EPT	12	9	5.5	5
EPT%	47.1	42.9	28.6	29.4
MCI	104.3	88.6	95.6	88.7

The pattern here is that while each sample area has a typical species richness and a good representation of especially caddis fly (typically 2 stonefly and 2-3 mayfly), the OBDA western – north, eastern-central tributaries reflect a more ephemeral-intermittent nature. These areas had lower MCI scores because of more fly and crustacean species (rather than mayfly, stonefly and caddisfly), reflecting damp beds and sediments rather than flowing water and hard substrates.

The taxa reflected in the eDNA samples are listed in Appendix 1. We note that "worms" are represented by one taxa although there are many worm species recorded in the eDNA data, but from the MCI perspective "Oligochaeta" is the only recognised scoring group and so we simply reflect that with one of the species of the list.

10.3 Fish passage constraints

All of the systems present have considerable fish passage challenges from the Hutt River, leading to the conclusion that fish passage is not a feature of these systems. This fact has been confirmed by fish surveys in the central and western perennial system that indicate that there are no trout or a trout hatchery or fishery in any stream potentially affected by discharges from the proposed OBDA. The ephemeral and intermittent gullies are not trout hatcheries, as they have the wrong substrates, too little water and no trout adult (or juvenile) access from the Hutt River. The eDNA data collected in 2026 also confirms the absence of fish assemblages (see below) in the OBDA tributaries.

10.4 Downstream conditions

With respect to the central mainstream (the main stem west of the OBDA, locally known as Buchanan stream) into which the OBDA works will potentially discharge during stages 2, 3, 5 and 6, Boffa Miskell surveyed some 400m of that stream above the culvert under the quarry (March 2022).

The northern main stem had a single shortfin eel (*Anguilla australis*; 450 mm in length) and a single longfin eel (*Anguilla dieffenbachia*; 800 mm length). Kōura (freshwater crayfish; *Paranephrops planifrons*) were also observed during the fish survey.

Table 15: Summary benthic macroinvertebrate data indices for the northern main stem (N).

Species	N-01	N-02	N-03
Number of taxa	32	34	34
Number of EPT taxa	13	17	15
Total abundance of EPT	924	1391	194
MCI score	123.8	124.7	122.4
QMCI	6.8	6.2	4.9

The waterways upstream of the quarry do not have a fishery, despite the main stem of the central stream (west of the OBDA) having a few eel. The waterfall of the southwestern tributary from the OBDA impedes fish passage and the general lack of depth of surface water in any of the OBDA western tributaries is not conducive to support native fish even if there were no passage barriers downstream.

10.4.1 Habitat condition

The physical condition of each tributary within the OBDA area is improved from the historic farm condition with a well-formed riparian cover of mostly native seral broadleaf in the east and lower reaches also in the west. The upper reaches in the east and west are ephemeral under predominantly exotic tree and shrub cover in the riparian zone. The beds where there is some gradient are largely cobble and small gravel-based but reduce to mostly soft sediments in the lower intermittent and below reaches. There is a reasonable amount of woody debris and leaf matter and other coarse organic resources. Macrophytes are uncommon / absent. The flows are variable but typically there is always a damp bed in the intermittent sections and some of the lower ephemeral reaches.

10.5 Aquatic Values

The values of these tributaries are derived from what they supply to the downstream sections. The ephemeral systems have functional importance in that they direct sub-catchment flows to the tributaries' lower flowing sections, streams or wetland(s). The intermittent sections have reasonable macroinvertebrate assemblages. These are not food for fish or birds, but process instream organic matter and deliver resources and colonists downstream into the perennial reaches. The perennial reaches of the mainstems (as evidenced by the MCI and QMCI in the western stream) are in excellent habitat quality and so are representative of good quality macroinvertebrates assemblages. Nothing rare has been revealed by the eDNA samples and the habitat types themselves are not rare.

The **intermittent** reaches below the OBDA we value as of being of **low** value (some representative, value, without rarity, low in their diversity, and with minor contextual roles of organic matter and macroinvertebrate colonists). The lower **perennial** stream values (west) we rank as **moderate** with greater representativeness, the presence of an At Risk-declining species (i.e. long fin eel), greater diversity and patterns of hydraulic habitat variance, and greater contextual importance. All are reflective of their historic challenges, absence of fish but retention of macroinvertebrate assemblages with contextual functional values.

The central western gully, while being the least stream-like, with the least water, we consider is best described as wetland, with the predominance of swamp maire even while they are a single tree line. The eastern main stem we also consider is largely all wetland, at least in the northern areas proximate to the OBDA boundary. Both these gullies (**western central and eastern main stem,** which are located outside the proposed OBDA area) have **high value** which relates to the level of representativeness and rarity.

11.0 Adverse Ecological Effects & their Management

This effects assessment assumes that direct ecological effects are generated within the area identified as the OBDA and not within the area that is immediately around that area (the space between the land exchange boundary and the OBDA boundary). The staging as it relates to the vegetation communities are shown below (Figure 21) and this staging mostly determines when each area is affected. For early stages, those areas not yet affected retain all the values as reported here. The exception is the haul roads, which may be required to enter into that space between the property boundary (if the exchange is ratified) and the OBDA (or within staged areas that are not otherwise being cleared at the relevant time). Where that is the case, there will be a small amount of additional vegetation clearance (small relative to the amount assessed here within the OBDA). That additional clearance (where required) will not alter the values affected in any meaningful way or the magnitude of change within those areas. However, it will add to the sum of offset required in a minor way, which can be simply calculated and added when the haul road areas are finalised.

We strongly recommend that the external haul roads avoid and do not affect / enter any of the natural inland wetlands known to be at the outer edges of some of the OBDA. Some edge effects may occur in localised places may to allow the swamp maire trees to be trans-planted.

The effects are, in the main, habitat removal (terrestrial and freshwater), special species removal, common species disruption, the potential for sediment discharge to freshwater habitats downstream, hydrological changes to downstream, lighting effects, and noise as that relates to the wildlife in the park around the OBDA.

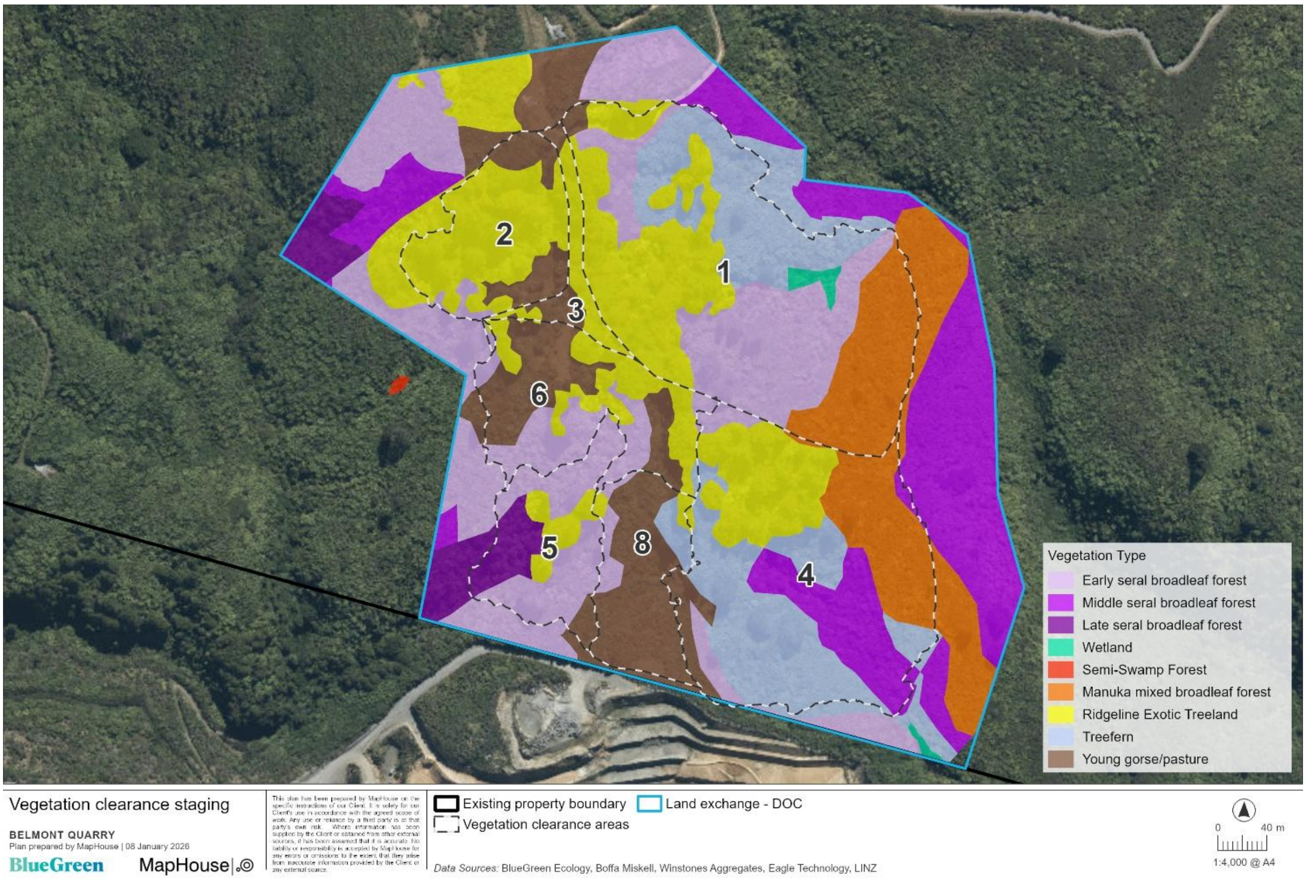

Figure 21 The staging of effect on the vegetation community map illustrates what is affected in what order.

11.1.1 Terrestrial habitat loss (in the absence of mitigation)

The main effect of the works at each stage is the entire removal of all of the vegetation, associated fauna and the topsoil. This removes all ecological value from the area. Some / many fauna will move out of the area; some will be crushed and lost despite best efforts. Mostly those lost will be invertebrates, most birds will remove themselves (depending on the time of year) and many lizards on the fringe of disturbance may flee outside of the area, but mostly lizards will be crushed if not managed.

Of the 15.51 ha to be removed, only 8.8ha (all that is not exotic dominated) qualifies as SNA based on my assessment against the NPS-IB, NES-FM/NES and RPS Policy 23 criteria (are significant vegetation and or significant habitats of indigenous fauna). These are the early middle and later seral broadleaf forest, the manuka ridge, treefern gully and the natural inland wetland.

The rest of the (very early) restoring stages present are not significant, and / or not indigenous dominated. Therefore, they are not identified as SNAs. While part of the wider vegetation matrix, the NPS-IB does not treat them in the same way as those significant areas. Thus, the effect of removal of 6.7ha of the remaining vegetation (exotic tree land, pasture and gorse) does not require ecological effects management.

At a site scale, the (rounded) 9 ha loss of seral broadleaf loss is a substantial amount, representing a set-back of around 70 years of successional development, although much of that development has resulted in a mahoe serial stage which will not develop further for some time.

We consider that the appropriate assessment to test the magnitude of effect (as per the EIANZ 2018) is at the wider scale of the Belmont Regional Park hill country within the Hutt River catchment, below the forested headwaters (i.e. in the developed lands). This is a lesser scale (i.e more conservative) that the suggested Ecological District Scale in the NPS-IB.

For the terrestrial communities from Land cover Data base 6 we have approximated the quanta of broadleaf (mahoe) early seral forest and manuka/kanuka shrub/scrub in the defined assessment scale area.

The analysis shows that for broadleaf (mahoe) forest, the site contributes less than 1% of the resource in the Belmont Park within the Hutt River catchment. The resultant magnitude of effect is therefore **negligible**. In terms of manuka/kanuka shrubland, the site contributes 1.6% of the resource (see Table 16), which results in a **low** magnitude of effect.

Scale	Area (ha) of broadleaf native forest	Area (ha) of Manuka/kanuka
Hutt Catchment (below upper forest)	60, 833.6 ha	623 ha
Belmont Regional Park within the Hutt River catchment	998 ha	163 ha
Site	9.56 ha	2.66 ha
Proportion of Belmont Park in Hutt River catchment	0.96%	1.6%

Table 16 Calcuated areas of particular habtat types at different scales and the resultant poroprtion the project effect is relative to the Belmont Regional Park scale.

With respect to the treefern gully, we have no basis from which to test the magnitude of the effect but suggest that it is similar to the seral broadleaf and that the 3ha loss would be a **Low** (1-10%) magnitude of effect at the ED scale.

11.1.2 Wetland aspects

With respect to wetlands, the 0.07ha Kiokio-sedgeland in the OBDA is only a small area of an unmapped quanta in the park and an unknown resource at the Ecological District level. The proportional loss of this area of wetland at an ED scale will not be large (<1%). The loss relative to the quanta possibly present in the Regional Park (using the total area of the known wetlands in the park as measured by us in this wider catchment of the park) is around 2%. This reasonably equates to a magnitude of loss that is nearer to negligible than low following EIANZ guidance processes, but we say low in respect of the level of uncertainty and that native dominated representative wetlands are in general rare in the region. We assessed this wetland as having high value based on representativeness and rarity, although it is a relatively simple assemblage wetland not considerably old or well advanced. As laid out in the table below a high value feature suffering a low magnitude of effect (one which is also permanent) results in a low level of effect.

At a wider receiving habitat level there are wetlands of value east (the large main gully) and west, the central western swamp maire gully. These are high and very high value features. The potential effects to these relate to ill managed (or accidental) sediment discharges reaching and smothering them and substantive changes in hydrology "draining" them. While some sedimentation is normal for these wetlands given the slopes and soils and disturbed history, too much deposited sediment causes vegetation changes by allowing invasion by terrestrial weed species and can in substantive discharges cause local wetland plant death. The eastern systems are tall kiokio-Carex sedgelands, with raupo and Eleocharis areas, mānuka-fern edges etc. and are reasonably resilient to sediments and are tall and not easily smothered. A "typical" sediment discharge would be from only the open stage and buffered to an extent by interceding vegetation even after the sediment controls. It is likely that discharges of sediment that escaped the controls and reached the wetlands would represent a low magnitude of effect to a high value (eastern) wetland system resulting in a low level of effect. Such an effect would need remedial actions including hand removal and securing the wetland against vegetation change away from a wetland cover. Discharge to the western central gully on the other hand (under stage2, 3, 5, 6 etc.) is less well buffered past controls and holds a very high value group of swamp maire whose aerial root systems would likely be buried and likely result in death or significant harm to those important more mature trees. Such a magnitude of effect is likely high and the value very high meaning a very high level of effect - an effect to be avoided. If such effects occurred and caused tree death or ceased fruiting a compensation that caused many more swamp maire to be produced and nurtured to maturity in the local area may be a solution to such an effect.

There is a remote possibility of a change in water drainage patterns to the east and west wetlands and although that potential effect is remote, it has been recognised by the design team and the project hydrologist (Dr McConche) and is highly unlikely given the persistence of the slope directions in the OBDA build and rain fall.

11.2 Level of effects to vegetation systems

The level of effect then as de0termined by the EIANZ (2018) matrix using value and magnitude of effect is as follows (Table 17).

Table 17 EIANZ level of effect outcome based on value and magnitude of effect. **Vegetation community**	**Value**	**Magnitude**	**Level of effect**
Seral broad leaf forest	Moderate	Negligible	Very Low
Manuka / kanuka forest	High	Low	Low
Treerfern gully	Moderate	Low	Low

Kiokio-Carex wetland	High	Low	Low

11.2.1 Freshwater - Tributaries

Within the context of the assessment (Hutt River catchment, northern tributaries within the developed area), there are some 61,162 linear meters of first order stream recognised by GIS data layers. These spatial data bases are conservative and typically do not account for every ephemeral tributary.

There are approximately 180 linear meters of intermittent headwater and 73m of perennial tributary within the OBDA. The contribution of the headwaters of the eastern and western tributaries together contributes less than 1% of the possible habitat in the spatial scale of this assessment.

This initial loss of perennial and intermittent stream (magnitude of effect) due to the proposal is, at the Hutt River catchment scale which is the scale we consider appropriate and consummate with the values assessment scale **very low** (but even at the very local scale the effects are low and moderate). The values directly affected are **low** making the overarching level of effect **very low (less than minor),** even where the values considered moderate the outcome would still be very low.

11.2.2 Terrestrial Fauna

Lizards are best described as 'sedentary' when considering movement and dispersal abilities, and the removal of lizard habitat could lead to mortalities and injuries (Bell et al., 2013). New Zealand lizards have a very slow life history, characterised by low annual reproductive output and great longevity.
Bell et al. (2013) determined the potential effect on native herpetofauna associated with the nearby Belmont Quarry extension into the Firth Block to be a combination of deaths and injuries to individual lizards, and habitat losses and fragmentation, including edge effects. In the context of the BRP Hutt Valley catchment, there is at least 1000 ha of similar habitat present. Thus, based on the High value of Ngahere gecko and a very low magnitude of effect (due to the relative lack of gecko identified in the OBDA area), we consider the overall effect of the site proposal on the ngāhere gecko population within the Hutt Valley catchment (prior to mitigation) will be **low.**

With respect to birds, there will be some 9 ha of indigenous habitat loss utilised by for a variety of widespread and *Not Threatened* native forest birds for feeding and nesting purposes. The area forms part of an identified eco-corridor, the function of which will not be compromised by the removal of vegetation associated with the proposal.

The mobile nature of the avifauna species present means that individuals will disperse outside of the site to avoid direct mortalities associated with vegetation removal. However, if vegetation clearance occurs during the breeding season, there would likely be some mortality of eggs and chicks (as they are not mobile). There are records of the *Threatened* NZ falcon breeding in the Belmont Regional Park, and measures (such as not undertaking tree felling during nesting season or an expert nest survey prior to felling in nesting season) would need to be implemented to avoid any effects on these birds.

Currently, avian species are present in areas adjacent to the operational quarry. Therefore, it is unlikely that there would be any significant effects relating to indirect disturbance associated with the site activities.

Based on Low value and a very Low magnitude of effect (based on the majority of the vegetation / habitat being that which is relevant), we consider the overall effect of the site proposal on the native avifauna within the Hutt Valley catchment of the BRP to be **very low.**

11.3 Sediment discharge

Through vegetation clearance and topsoil removal and storage and earthworks to prepare the site for deposition of quarry overburden, there will be a risk of and opportunity for rain-caused sediment run-off from exposed earth surfaces and earth worked areas and spoil storage.

Those potential sediment discharges run the risk of being sufficiently above naturally occurring levels so as to disrupt or harm the aquatic receiving habitats (streams west, central west swamp maire wetland gully and wetlands east). Given the history of farming in the local area and disturbance, the streams to the west already have a reasonable measure of deposited sediment and are not now clean hard substrate beds. Any one large input however, could bury macroinvertebrate communities and while these will re-establish over time, the effect locally and temporarily could be substantial. There are no sensitive fish communities of concern with regard to this potential effect. Small scale, even regular losses to these systems (wetland or stream) we consider will have no measurable or lasting adverse effect, but large-scale losses require considerable attention. That said, catastrophic storm related discharges which collect sediment from the proposed activities are also not of concern, given the likely amount of rain and naturally occurring discharge.

With respect to the western central swamp maire gully (as discussed above), additional sediment could smother the seedlings and may kill the trees. Without mitigation, this would be a **significant adverse effect**. These swamp maire account for around half of the local (OBDA / exchange area catchments) known swamp maire and are the largest, oldest best seed producing trees of the local area, if not the entire Belmont Regional Park.

It is understood that all earthworks in the Wellington Region are required to be managed and have suitable erosion and sediment controls and those must be monitored. A detailed strategy and plan is developed in the ESC (MPD 2026) and in conjunction with the LEMP recommends additional controls to ensure sediment to these areas are minmised to avoid harmWe consider that the eastern and western (but especially the central western gully and the area of the swamp maire) streams require monitoring to ensure that the defences and processes to avoid discharged sediment effects are effective. While sediments deposited into common wetland vegetation types (kiokio / Carex wetlands) do not in general harm those communities, deposition over swamp maire roots can cause significant harm. The recommended monitoring (following guidance in (Clapcott et al., 2011)) would include a current sediment deposition measure (SAM 2 and 5) outside of the OBDA in each of the three west and three east gullies (in the setback zone) to be established by a baseline set of measures and then measured when on-site control monitoring register a failing of the sediment management systems (i.e. a sediment release). And, in the central western gully, specific deposited sediment measures above and within the swamp maire stand to allow detection of the rate and amount of any new deposited sediment.

The effect of that deposited sediment is hard to associate with plant health, but burial of swamp maire roots would be an obvious negative outcome, as would observable plant dieback and loss of pre deposition ground cover and seedlings. Therefore, in addition to a sediment measure (depth and cover) a vegetation plot/s at the base of the gully under the swamp maire of the central western gully, and photographic evidence of the aerial root conditions should also be part of the baseline and monitoring regime.

The purpose of that monitoring would be to establish the extent longitudinally and with respect to bed cover and depth of the deposition of escaped sediments from the OBDA (should any escape the defences). And then how long that deposition remained and if swamp maire trees or seedlings (ground cover vegetation) were affected. An exceedance report would trigger remediation actions assessment by an ecologist as to the next step, which may include hand removal of sediments)and some form of immediate offset for seedling loss (assuming that was the case) and potentially some longer term offset or compensation if adult trees died. A measure would be triggered by device failures in the OBDA.

A report of sediment deposition (in the western gully) should be met with careful hand removal, which may not revive seedlings but will assist trees not to be affected. A report of deposition in the eastern system should be meet with a wetland vegetation health and cover measure to establish if the deposited sediments are causing localised plant harm or replacement. Sediment effects to sedge wetlands are notoriously difficult to prove or measure.

With respect to intermittent tributaries, an effect of deposition is highly unlikely to result in measurable change given the tolerances and simplicity of the fauna and current predominantly sediment-based bed of each system.

We think that while there is a small risk dependent on the amount of sediments discharged and the frequency, the tributary intermittent communities are not overly sensitive (be they kiokio wetlands east, or streams west) that the overall likely level of effect of managed sediment discharges is negligible (to moderate values) and so a very low level of impact.

However, large scale sediment or changes to hydrological conditions in the central western swamp maire gully from the proposed activities, must be avoided as adverse effects here (if allowed to occur) are likely to be significant and adverse.

Light pollution

I understand the proposed OBDA works will involve no night work and the site will not require lighting. Therefore, any effects of light pollution are considered to be negligible, provided that conditions are in place to control the hours of operation.

Noise

In some conditions and locations, noise can interrupt the breeding success of some birds. To date, the evidence has centred on bittern and disruption or interference with their mating calls. Most other common native birds (and we assume all other species) habituate to those local common noises. The surrounding Park habitats already manage the quarry noise, a nearby urban settings, motorway and people’s use of the park and there are no species likely to be additionally adversely affected by the noises likely to be generated at the OBDA.

Proximity disturbance

As with noise, most common natives habituate rapidly to new experiences and the OBDA process is just that, a new set of activities adjacent to the park’s seral habitats where they are relatively newly regenerated from farmlands and already experience some forms of small-scale disturbances. It is unlikely that the deposition of overburden via truck movements will result in any non-habituated species that become displaced by the use of the OBDA in a long term staged way. Monitoring such an effect to prove a displacement or reduction in breeding on common native species in the areas adjacent to the outer OBDA boundary would also be extremely challenging, if not impossible, and therefore is not recommended.

11.4 Effects management at a general level

For the activity to proceed, a loss (15.5ha) of vegetation cannot be avoided. The design iterations by Winstone have changed and minimised the effects reflecting avoidance of wetlands and swamp maire but cannot avoid the effects of vegetation removal in its totality and cannot, we understand, further reduce the potential effects on the habitat within the OBDA and have the extent of fill they require.

The levels of effect of habitat loss (threatened species aside) are generally low except for the seral broadleaf systems (very low) prior to any mitigation actions. In general, a low level of effect should be viewed as a minor (in RMA language) effect. This level of effect is also true of the fauna with the avoidance managements in place and for lizards where there is a successful salvage program such that the majority of the ngāhere population is salvaged.

Historically very low levels, even in some cases low levels, of effect were seen as a less than minor effect and of little concern, i.e. likely no mitigation required, especially with the correct additional managements related to the Wildlife Act etc. Under such an effect level it was interpreted that no offset was likely required and that remedies also might be put aside, but effects generally managed to minimise them (e.g. sediment controls).

However, the NPS-IB and the RPS/NRP and the overall requirement for no net loss (and no loss of value) of indigenous biodiversity have changed that perspective, to a degree.

I understand that the NPS-IB asks Councils to (generally) ensure that loss of extent and values of SNA are avoided. However, there are exceptions to those requirements, one of which applies to quarrying activities (including placement of overburden)13 that provide significant regional or national benefit where there is an operational and functional need for those activities to occur in a particular location. Instead, adverse effects on those areas are to be managed through the application of the effects management hierarchy. I understand that the same applies to the loss of natural inland wetland extent under the NPS-FM. (Effects to indigenous biodiversity (or freshwater) outside of SNAs and natural inland wetlands must also be managed as per the NPS-IB or the NPS-FM (as relevant). In the Wellington region, the provisions of those documents have been implemented through the RPS, and, in particular for indigenous biodiversity, Policy 23.

Thus, there is 9 ha of predominantly seral indigenous dominated terrestrial vegetation and 0.07ha of natural inland wetland to manage in accordance with the relevant effects management hierarchies in the NPS-IB and the NPS-FM, and a number of special species to also separately consider.

The NPS-IB effects management hierarchy is as follows:

(a) adverse effects are avoided where practicable; then

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13 NPSIB dines quarrying activities as quarrying activities mean the extraction, processing (including crushing, screening, washing and blending), transport, storage, sale and recycling of aggregates (clay, silt, rock, sand), the deposition of overburden material, rehabilitation, landscaping and cleanfilling of the quarry, and the use of land and accessory buildings for offices, workshops and car parking areas associated with the operation of the quarry

(b)	where adverse effects cannot be avoided, they are minimised where practicable; then
(c)	where adverse effects cannot be minimised, they are remedied where practicable; then
(d)	where more than minor residual adverse effects cannot be avoided, minimised, or remedied, biodiversity offsetting is provided where possible; then
(e)	where biodiversity offsetting of more than minor residual adverse effects is not possible, biodiversity compensation is provided; then
(f)	if biodiversity compensational is not appropriate, the activity itself is avoided.

With principles for offsetting and compensation in Appendices 3 and 4 of the NPS-IB.

The NPS-FM effects management hierarchy is of similar effect, save that it refers to aquatic offsetting and compensation, the principles of which are provided in Appendices 6 and 7 of the NPS-FM and NES-FW

11.5 Avoidance & Minimisation

As stated, the clearance of all of the cover of each OBDA stage cannot be avoided. That said, a number of iterations of the area and the design shape of the OBDA have been canvassed and sought to avoid (or minimise) the area and type of effect. This has seen the avoidance of the best specimens of swamp maire gully (a gully in the centre west with around 16 swamp maire and seedlings), retraction of the OBDA out of the mature pukatea lower southwestern gully, retraction from the southeastern waterbody and avoidance of most of the eastern natural inland wetlands. The ecological assessment that has informed the project has also resulted in a design that acknowledges the hydrological flow pattern need to be retained and the project hydrologist confirms that those patterns can be retained, as it drives the 6 tributaries and wetland hydrology east and in the central western swamp maire gully.

There are also ways to avoid the stated potential effects to special flora and fauna (or, at the very least, to minimise those effects).

Outlined below are recommended methods to avoid and minimise effects identified through the above assessment on fauna and special flora.

With respect to fauna most are required at each stage involving removal of vegetation and habitat and in summary involve the following:

- Apply the proffered Lizard Management Plan to the site in each staged clearance in order to avoid and minimise impacts on native lizards. Required each phase of clearance.
- Undertake a falcon survey prior to the removal of any vegetation on the site to determine if birds are breeding on the site. Required each phase of clearance.
- Undertake a nesting survey for any native birds if vegetation clearance is to be in the breeding season (August-February) and avoid with a 50m buffer any native active nests.

11.5.1 Avoidance of loss of Special species.

With respect to the threatened and regionally uncommon species (i.e. Ramarama, swamp maire, *Coprosma rubra*), we recommend a process that both avoids loss of the particular plants and a back up risk reduction for swamp maire. That process is direct transfer of the plants.

As mentioned above Winstone amended the Project Footprint to avoid swamp Maire main population (the central western gully).

Swamp maire

Swamp maire exists in locations within the proposed OBDA footprint across the stages (Figure 15). For example, there are two located in stage 1 (as well as the *Coprosma rubra* and the *Isolepis* (in the one wetland affected)); two in stage 2, and five in stage 4 (Figure 15).

There are three management processes proposed to avoid swamp maire loss and lowered numbers:

1. Direct transfer.
2. Uplift, grow on and replant 10:1 swamp maire seedlings.
3. Take cuttings and grow on and replant those trees.

The staged clearance regime means that the translocation method can be tested through stage 1 to measure if that method will work for swamp maire, ironing out the requirements of a successful uplift and replanting. This approach is acknowledged as experimental, which is why it will require an adaptive management regime (a backup offset) to ensure a precautionary approach is adopted. That is also why there are thresholds proposed to trigger alternative offset action, in the event that adverse effects on translocated swamp maire occur in earlier stages.

While we have recommended that the offset action be triggered by the failure of the first translocation, we recognise, in discussion with GWRC, that this results in some risk and time delays for replacement where the direct transfer fails slowly over time.

The proposed pre-effect offset approach is to establish a separate swamp maire population using the seedlings of the central western gully and expertise in that process of seedling capture, growing them up to saplings and replanting them. There are a number of suitable swamp maire areas in the local area (several are illustrated in Figure 22) in areas where swamp maire are already found or where there is suitable habitat.Figure 22

Applying this approach, the loss of effectively several decades of growth (we think 30 or 40 years) per tree must then be offset by way of numbers of saplings planted. In evidence (Forbes 2019) for the Manawatu Gorge bypass road (Te Ahu a Turanga), NZTA recommended the use of a 1:200 replacement ratio where 200 saplings are used to offset the effect of one permanent lost adult swamp maire to attain a net positive effect. Mr Singers (2025) in relation to the Cambridge to Piarere NZTA new highway recommended that the loss of 2 healthy adult swamp maire be compensated by the planting of 200 swamp maire seedlings (at 3m spacings) in wetland to be created.

We think that these trees at the OBDA could be suitably and appropriately offset at a 1:10 ratio given their age and condition but also considering that the translocations could work and there be actually no offset requirement needed.

If the translocation fails, this would still return between 50 and 140 swamp maire trees where there are currently 5-14, and more than likely cause those trees to be present in a much shorter time than nature would achieve that result in the OBDA without assistance.

Suitable translocation and / or replanting wetlands for swamp maire (and the *Coprosma rubra* and *Isolepis*) are illustrated (Figure 22). These are in the Belmont Regional Park although the OBDA buffer outer boundary has areas associated with the eastern gully wetlands and are most suitable for transplantation outside (technically) of the park. We note that a vehicle access may be required to transport the swamp maire to the replanting area to achieve the necessary translocation but would be planted by hand. If that is the case, we recommend the use of the eastern wetland because stage 1 of the proposed OBDA works will see the development of a track along the lower edge of stage 1. That will allow access to near the eastern wetland without the need for additional clearances. The replanted saplings could be placed in any area without any need of further clearance.

Figure 22. Suitable swamp maire replanting sites locally (blue areas).

Lastly, we recommend that the currently present swamp maire have cuttings taken from them to develop new individuals so as to preserve the genetic material. A suitably skilled plant nursery person should take appropriate numbers of cuttings and grow up those cuttings into plants for replanting in the park (in the areas suggested unless the GWRC has other areas for that planting). This is a further management approach to address the potential loss of swamp maire, in the event that translocation fails.

Ramarama

Ramarama also can be translocated by full excavation using appropriate machinery (we note than a number of plants are saplings at under 1m in height and smaller younger plants are easier to translocate), in the same way street trees are often moved where the device encompasses the entire root ball and stem, lifts it and replaces it into a purpose dug receiving hole. Ramarama is less habitat-limited than Swamp Maire and its successful translocation more likely.

Ramarama are located in areas identified as stages 4 and 5 and so this process, we recommend, should follow after stage 3. This will allow for replacement within Stages 1 and 2 which will be revegetated. . In part, the decision when to transfer the individuals should be determined by when Stage 1 is ready for revegetation, because the more years that pass, the larger the Ramarama may be and are therefore harder to transfer. We recommend that if Stage 1 is unlikely to be revegetated by year 10, then the Ramarama present now be transferred into the local park area in year 2 or 3 of the OBDA staging, to provide the best chance for their translocation and ongoing viability.

Again, where the transplantations are found not to survive, then a remedial replanting of seed reared plants will be required. Forbes in the NZTA Manawatu gorge bypass recommended to a 1:100 replacement ratio. Again, most of the Ramarama in the OBDA is in the small shrub stages and we consider that a 1:50 ratio better reflects the lag time to recover the same growth stage present here if direct transfer does not prove successful. As noted above, replanting is less restricted by habitat and could occur within areas of revegetating indigenous bush within the OBDA.

11.6 Remedy

The proposal is to restore native, appropriate, vegetation communities and intermittent streams over all of the overburden site throughout the process, leaving the site in a fully native vegetation cover at the end with the same extent and location of intermittent streams. This will be a 35 year process. The full revegetation of seral broadleaf, tree fern and manuka / kanuka areas will, over time, remedy entirely the clearance and loss of those same current vegetation communities. The same will apply to the affected waterways. However, that process may not begin for 10 or more years and will not be fully completed until perhaps 50 years after the biodiversity loss is experienced. Thus, while the proposed replanting and restoration of intermittent streams is a remedy (and we strongly recommend it), there is a time lag between the effect and the remediation, which results in (at least) minor residual effects. Because of that time factor, we consider the appropriate step is to then develop an offset to account for the biodiversity loss during the time-lag.

The replacement of natural wetlands on-site is unlikely to be achievable based on the likely hydrology at the end of the filling process.   That said we note that the sediment retention devices could be returned to indigenous dominated wetlands as is occurring for many of NZTA road SRP end of life repurposing. However, the opportunity to reintroduce wetlands would not exist until nearly the end of the entire filling process (30-35 years). Thus, a remedial approach is not feasible, and the effect will need to be offset.

The proposed revegetation (the remedy) will also cause the current exotic area (6ha) to more rapidly progress towards an indigenous state. This is a benefit of the proposed remedial approach, which extends beyond the footprint of proposed planting.

We and Boffa Miskell have prepared the basis of the landscape and ecological restoration in the Landscape Ecological Management Plan (LEMP):

The aim is:

- To achieve a better than current ecological habitat on the site at completion.
- To ensure that entire 15 ha site is restored to appropriate native vegetation (which, in reality, will be 6 ha more than is currently present through the regeneration promoted above).
- To ensure that the streams continue to be present and after final revegetation / restoration / reinstatement to receive appropriate clean rain run off through ephemeral systems.
- To advance the ability of the site to successional progress from that which it has achieved today (without management).

- To minimise the time period of loss of biodiversity and risk of success of the wider site revegetation.

We envisage the result in 35 years to be a series of differently aged sequences of indigenous revegetation, some planted, some managed natural regeneration, and all enriched with final canopy species targeting faunal resources.

Figure 23 & Figure 24 below are concept plans of how the ecological remedy will be formed and involves timely sequential active and passive managed revegetation technics to re-cloth the forming slopes and batters and waterways. The proposed landscape rehabilitation management plan (Boffa Miskell 2026) details the process, communities targeted, management, etc.

Post remedy, once all stages are completed and the restoration programme completed, the state of the OBDA will be a completely indigenous canopy cover of appropriate native species with final canopy tree species. This state will be at least as good as if the current condition was allowed to persist with its current management efforts, if not better, given the potential to accelerate the regeneration of the current exotic area. This is also an improvement from the status quo, which is not a completely indigenous canopy cover. We are confident that the end result through the remedial process proposed will be as good or better than the current state in 50 years' time and that the remedy will bring a net positive ecological outcome.

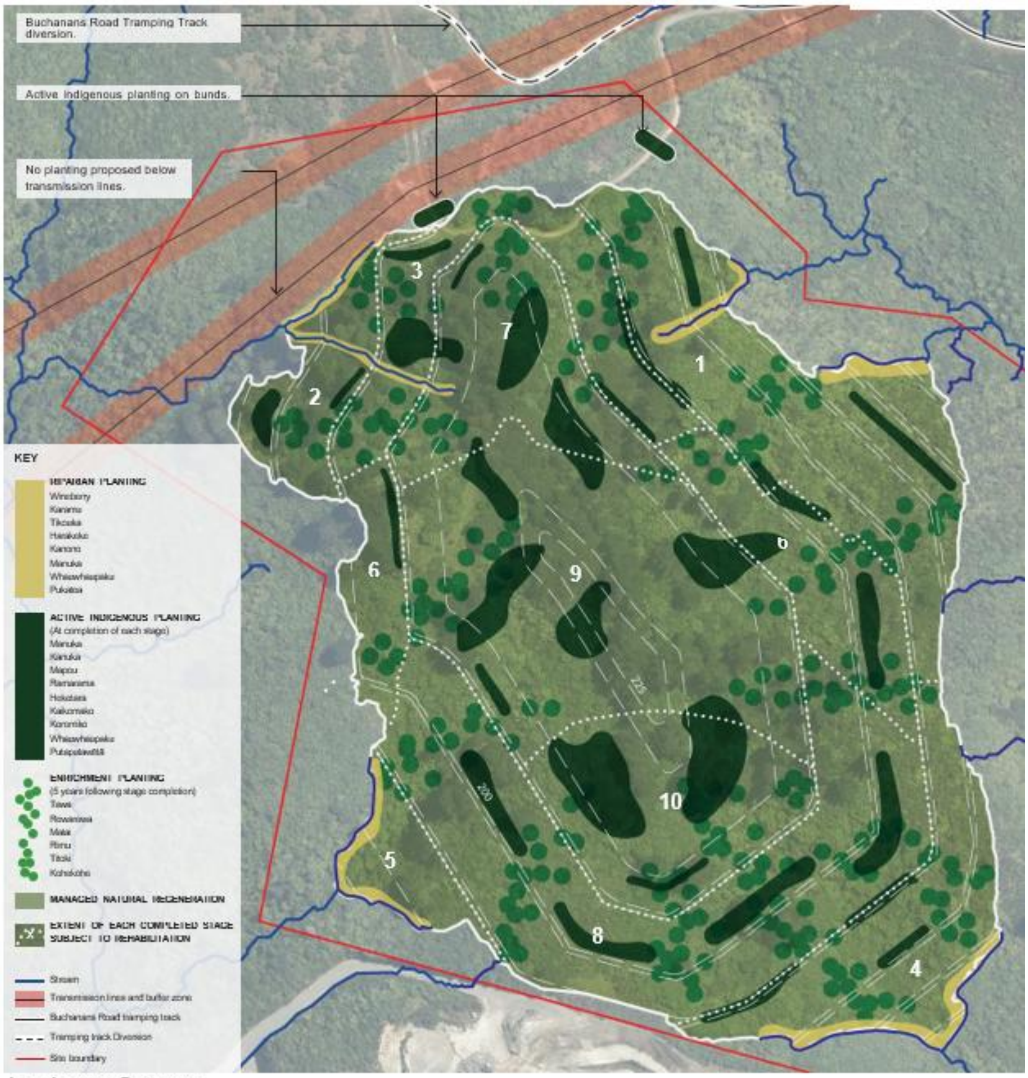

Figure 23 Conceptual remediated OBDA

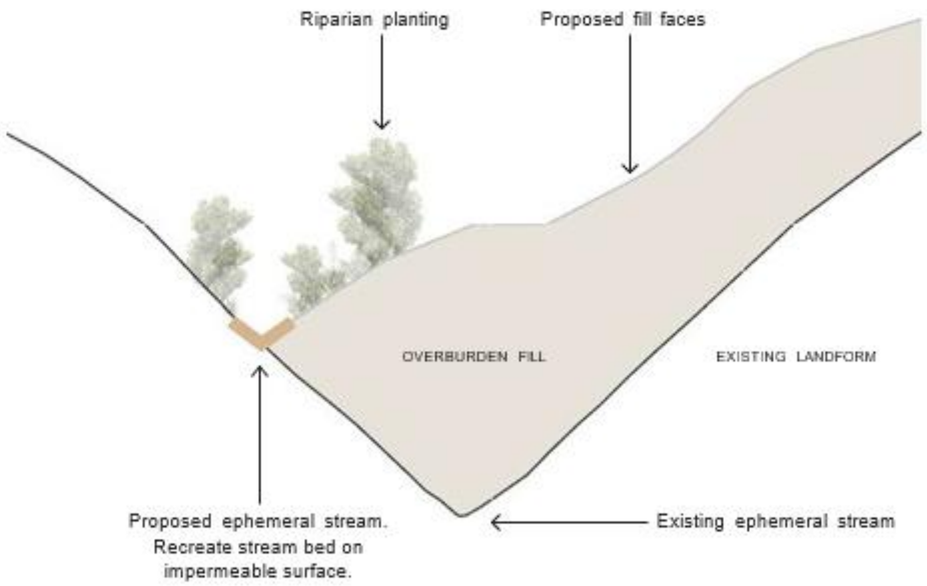

Figure 24. The envisaged process of a stream restoration.

11.7 Residual effects

As noted above, and because of the time lag in securing the remediation of the OBDA area, there are residual effects following the application of the avoid, minimise and remedy steps of the effects management hierarchy that require management.

- We consider that the effects of clearance of the existing seral stages of vegetation will have been managed to a no net loss outcome where: each OBDA staging achieves the appropriate full revegetation and enrichment planting and through monitoring is found to be richer in species with more future canopy species than now, with a full canopy cover and clear evidence of an appropriate duff (soil and leaf litter) formation; and
- the hydrological flow paths are well formed in the appropriate places to the point of intermittent stream areas with appropriate bed cover and riparian vegetation; and
- the swamp maire, *C. rubra* and Ramarama translocations succeed.

In those circumstances, the diversity and expedited succession of new planting will manage the loss in the current seral stages' growth and development, and the remediation of values and extent and condition of the relevant areas will have been achieved.

However, and as noted above, this does not satisfy the biodiversity loss that exists while the remediation takes hold.

The staged nature of the remediation, the time period over which it will occur (5-30 years), and the length of time before it is considered to be complete (ca. 20 years) results in a biodiversity loss which amounts to a residual effect that is at least minor. Therefore, that effect requires management in accordance with the offset and/or compensation principles in the NPS-IB.

11.7.1 Offset - Vegetation / habitat management

While the proposed remedial action is to revegetate and accelerate the current seral stages, there is substantial work required regarding the redevelopment of the sub-soil hydrology and soil horizons that drive plant success which may or may not be fully successful everywhere, at least initially. The time lag in the revegetation process exists as a return to the current ecosystem functions and values should not be expected for over 50 years. This requires offsetting away from the proposed OBDA activities.

Similarly, the natural inland wetland could not be reinstated on the new OBDA until at least year 40 and even then, it is unlikely that there will be a surface with appropriate hydrology and at least 0.07ha. For those reasons, any offset for the loss of the natural inland wetland will likely need to be offsite.

We have run a simple DOC BOAM model to help quantify what that offset looks like.

The parameters for the model are an 8.7 ha habitat area affected, 20 species typical cover (averaged OBDA plot data value), a 50 species bench mark related to average RECCE plot data for mahoe forest and 27 for kanuka shrub (Allan, Bellingham, Holderway and Wiser 2013), and a seral stage functional scale estimate – a factor to approximate the maturity of the habitat and its functional level – which is a subjective opinion on a scale of 0-1. We use both the remedial revegetation proposed and additional revegetation areas as the offset part of the model to account for the remedial actions.

These three parameters in essence capture the effect to the habitat. We set up in the model two dummy lines (Kanuka) in the effect section to allow the introduction of the additional offset areas and actions in the one model. The impact on the net present biodiversity value outcome is tested against the restoration process and then the deficit accounted for by the offset requirements envisaged. The time frames used are 20 years until the area (9ha) is started to be revegetated and 40 years until all the species and functions are in play for the restoration. I note that we initially tested how timeframes for the time lag (i.e. shortening them) affected the offset requirements but in reality Winstone's are unlikely to be able to hasten the areas of revegetation. A 1% discount rate has been used.

Biodiversity Component	Biodiversity Attribute		Measurement Unit	Area of Impact (ha)	Benchmark	Measure prior to Impact	Measure after Impact	Biodiversity Value
seral forest	0.1a	Area	ha	8.7	8.7	8.7	0	-8.70
	0.1b	species richness	count	8.7	50	20	0	-3.48
	0.1c	seral stage	scale	8.7	0.75	0.3	0	-3.48
	0.1d	offset	ha	8.7	20	10	10	0.00
	0.1e	offset sp rich	count	8.7	50	0	0	0.00

Figure 25. Impact BOAM model factors and out comes (Biodiversity value change)

For reference there is 3.19ha of early seral, 0.75ha of mid seral, 0.26ha late seral, 1.76ha of manuka mixed broadleaf, 2.75ha of tree fern gully = 8.71ha of indigenous systems of the 15.56ha of area in the OBDA, the rest being grassland, gorse-blackberry, pine.

For the natural inland wetland (0.07 ha kiokio sedgeland), these are the impact (damage) inputs

This section captures which elements of biodiversity, and over what area, will be impacted by the proposal					This section is where the change in measure of each Biodiversity Attribute due to the proposed Impact is quantified, and Attribute Biodiversity Value calculated. Inputs are derived from direct measures, existing data or models where available, or expert estimated predictions			
Biodiversity Component	**Biodiversity Attribute**		**Measurement Unit**	**Area of Impact (ha)**	**Benchmark**	**Measure prior to Impact**	**Measure after Impact**	**Biodiversity Value**
wetland	0.2a	size	ha	0.07	0.07	0.07	0	-0.07
	0.2b	species richness	taxa no.	0.07	30	10	0	-0.02
	0.2c	function	scale	0.07	0.8	0.5	0	-0.04

Figure 26 Wetland BOAM model impact factors and biodiversity chnage

11.7.1.1 BOAM (DOC) Offset model.

Restoration of the OBDA (8.7ha) following the suggested stage 8 start, which is 20 years after loss of stage 1, and 40 years before near full recovery of the native seral stages, (i.e. big time delay) with an offsite revegetation / restoration program results in the following, noting the first 3 rows are the rehabilitation gains (the remedy) and the last two are to offsite offset component:

0.1

accrued over time use the Offset Model_5 yearly worksheet.
Step 7: Repeat for additional Biodiversity Components (scrolling down the sheet)

This section captures which elements of biodiversity are to be accounted for, and the benchmark value for the Attribute. The information matches that in the Impact Model					These cells provide information about the proposed Offset Actions			Calculations can be made for a finite end point, or at five yearly time-steps over 35 years. Indicate preference in Column K and Follow the instructions in Column L		This section is where the marginal change in the measure of Biodiversity Attribute due to the Offset Action is quantified. Inputs are derived from direct measure, existing data or models where available, or expert estimated predictions. Attribute Biodiversity Value at the Offset Site is compared to the Attribute Biodiversity Value at the Impact Site to calculate the Net Present Biodiversity Value for each Attribute						This is the average Net Present Biodiversity Value for the Biodiversity Component
Biodiversity Component	**Biodiversity Attribute**		**Measurement Unit**	**Benchmark**	**Proposed Offset Actions**	**Offset area (ha)**	**Confidence in Offset Actions**			**Measure prior to Offset**	**Measure after Offset**	**Time till endpoint (years)**	**Biodiversity Value at Offset Site**	**Biodiversity Value at Impact Site**	**Attribute Net Present Biodiversity Value**	**Component Net Present Biodiversity Value**
seral forest	0.1a	Area	ha	8.7	revegetation OBDA	15	Confident 75-90%	Finite end point	Continue to Column M	0	15	20	1.84	-8.70	-6.86	0.04
	0.1b	species richness	count	50	plant species richness	15	Very confident >90%	Finite end point	Continue to Column M	0	20	3	4.31	-3.48	0.83	
	0.1c	seral stage	scale	0.75	seral stage	15	Confident 75-90%	Finite end point	Continue to Column M	0	15	20	1.84	-3.48	-1.64	
	0.1d	offset	ha	20	offset reveg	17	Confident 75-90%	Finite end point	Continue to Column M	0	18	15	3.02	0.00	3.02	
	0.1e	offset sp rich	count	50	offset species	17	Very confident >90%	Finite end point	Continue to Column M	0	20	3	4.88	0.00	4.88	

The CNPBV outcome from the model under this scenario is 0.04 (a net gain).

Note we could use the 5 yearly progressive model, predicting gains at each 5 year step through the 40 years such that the CNPBV accumulates to a crescendo and through this process the offset requirements can be reduced but there is more guessing involved at each 5 year and the result is not really materially that different.

We have assumed the ability to access 17 ha in the Belmont Park known as the Heffernan Block[14] . GWRC representatives have confirmed that this area currently has no budgeted or planned restoration.

The CPNBV outcome over all actions under this scenario with 4 ha established at year 1 of clearance and progressing 4 ha every 5 years is a net positive biodiversity out come and is sufficient to deliver the long-

[14] This block is described in the offset management plan draft for this application

term site restoration required to offset the residual adverse effects related to the lag time of the OBDA restoration.

We could use other parameters such as canopy height etc., but adding more variables does not materially change the modelled outcome.

The potential habitat offset - terrestrial ecology / wetland / stream

We have investigated potential sites for the offset in the Regional Park. We undertook to examine the current land rehabilitation plan of GWRC and in consultation with GWRC sought to locate areas which:

- have suitable soils and potential for riparian stream gains;
- allow for a comparable forest ecosystem as on the OBDA;
- allow for stream offset and natural inland wetland offset; and
- are outside of the current budgets and immediate future plans of GWRC.

GWRC's Heffernan Block was identified as a suitable area which was also near the site of effect. This is shown in Figure 27 below and is approximately 2km to the west of the OBDA site. It forms part of Belmont Regional Park, is largely old pastures and provides opportunities for offset planting, riparian planting and wetland re-establishment and lizard habitat.

Below, the 5 yearly staging (delineated by contour) is illustrated. Excluding pasture, most of the vegetation present is gorse and gorse with scattered young broadleaf native species. These areas will not be cleared but planted through. Several areas do not contribute to the total area for the offset (they are existing wetlands and native canopy stands). The Heffernan Block had some of the better soils and climatic conditions to promote more rapid and successful restoration of native bush. The area comes also with a potential for riparian enhancements in the upper catchment of Speedy's Stream. This is one of the better urban streams in the lower Hutt River catchment (Kingett Mitchell Ltd 2005) and protection of its headwaters allow for a substantive gain. A full offset management plan has been provided in draft as part of the proposal.

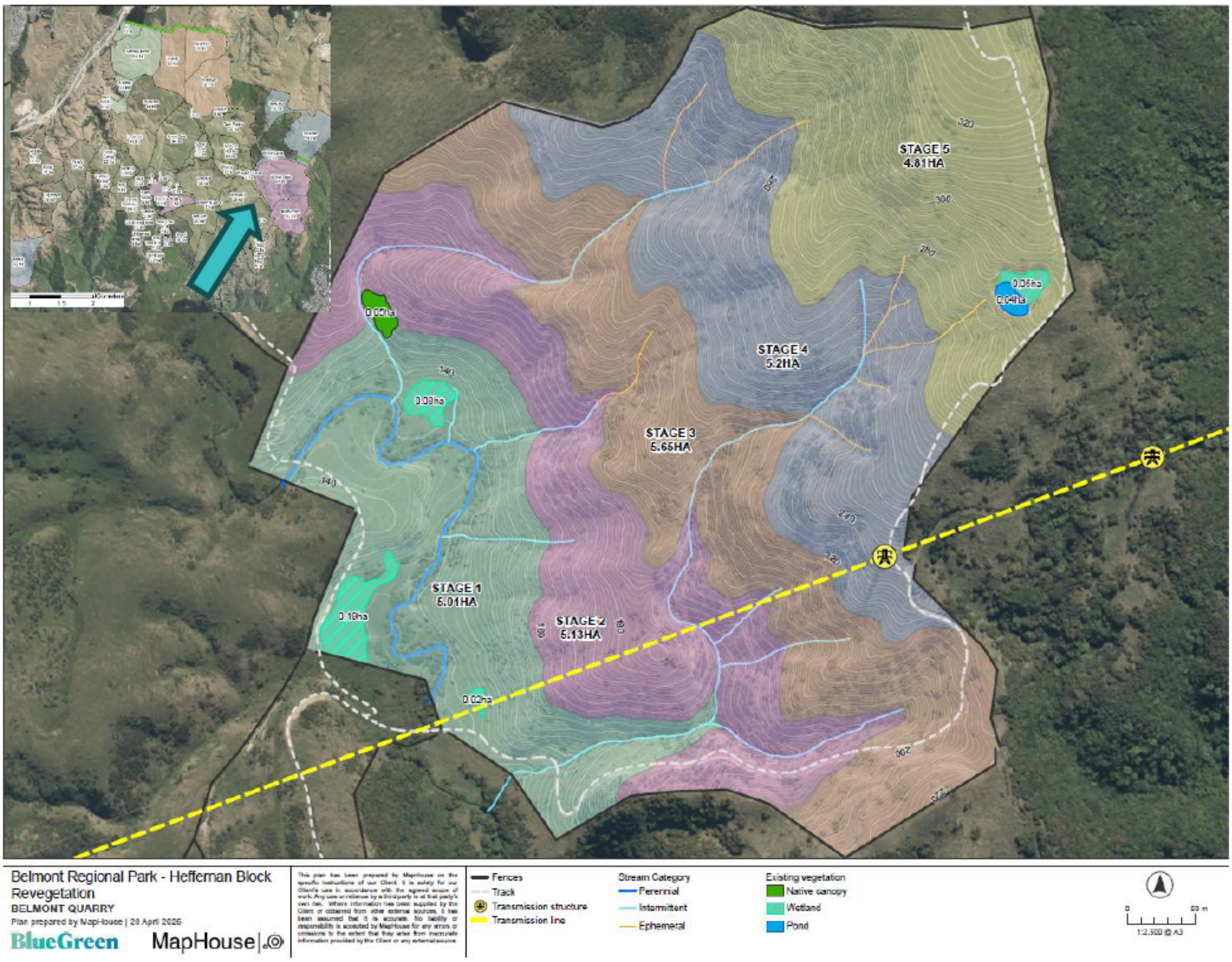

Figure 27. Offset location and proposed revegetation staging. Existing features are also illustrated.

11.7.2 Wetlands

We have assumed that the surface of the OBDA will not, after the last stage, be suitable to create a new wetland as hydrology will be problematic at the top of the hill and the side slopes cannot be made to hold an area of gully type wetland.

The wetland area in the OBDA affected is 0.07ha. At a minimum, it typically takes 3-5 years to attain an established functioning wetland from re-creation. I have modelled the wetland establishment at 1 year post clearance (stage 1) at the offset site (see draft OMP), being re-creation 2 years prior to clearance. Obviously, this could be sooner. I have assumed 15 taxa will be able to be planted, considering a rush and sedge and fern land, and that after 3 years the wetland will be functioning at 60%. The offset model is as follows:

Biodiversity Attribute		Measurement Unit	Benchmark	Proposed Offset Actions	Offset area (ha)	Confidence in Offset Actions	Column K and Follow the instructions in Column L		Measure prior to Offset	Measure after Offset	Time till endpoint (years)	Biodiversity Value at Offset Site	Biodiversity Value at Impact Site	Attribute Net Present Biodiversity Value	Component Net Present Biodiversity Value
0.2a	size	ha	0.07	create wetland	0.2	Confident 75-90%	Finite end point	Continue to Column M	0	0.2	3	0.12	-0.07	0.05	0.05
0.2b	species richness	taxa no.	30	plant taxa	0.2	Confident 75-90%	Finite end point	Continue to Column M	0	15	1	0.08	-0.02	0.05	
0.2c	function	scale	0.8	functions	0.2	Confident 75-90%	Finite end point	Continue to Column M	0	0.6	3	0.09	-0.04	0.05	

The CNPBV is positive using this set of factors (0.05).

If the Heffernan Block is accepted as the offset, then a wetland of the required size 0.2ha (2,000m2) is likely to be able to be accommodated (created) in that land area as there are areas of wetland hydrology already present. Further details are provided in the Ecology Offset Management Plan.

11.7.3 Waterways

Currently, the assessment assumes that the ephemeral flow paths and intermittent waterways reclaimed by the OBDA can be returned by way of correct landform creation and hydrology such that there will be as much of similar condition intermittent waterway post completion of the OBDA and the effects so remedied.

There has been, and is required to be, substantive design to ensure the sub-catchments deliver the same water flows downstream as is current and into sufficiently shaped waterways. If that is not the case, or the effects occur tens of years prior to this restoration action then we say the following.

The loss of extent and value, should there be losses, is not a total avoid policy in the NPS-FM (as with wetlands) as the avoid criterion only applies to the extent practicable. We consider that those losses are at the very low level of effect end, i.e., less than minor and may, under normal regimes, not require any effects management depending on how these streams are classified. However, for completeness we offer the following a standard SEV offset calculation.

There are very little intermittent streams and no perennial streams lost to the western side, mostly ephemeral. On the eastern side there is 178m of intermittent and 73m of perennial lost under the OBDA. That sums to 251 meters.

If we make the assumption that it is unlikely that Winstone will have an opportunity to develop new suitable stream length within the OBDA site and will need to fall to enrichment of an existing stream system as an offset (one with a current low SEV (0.3-0.5) then the following should apply.

The SEV of the central and southern eastern catchment streams is modelled (without the biotic components of fish and macroinvertebrates) as approximately 0.57 (see SEV calculation tables in Appendix 2) and this represents the upper score likely as it is at its upper potential now (more or less). The SEV process uses a formulae that is the potential SEV value of the effect less the value after the impact divided by the increase in SEV caused by the proffered offset and then with a multiplier if there is a reasonable lag time to recovery. Typically, enrichment is the addition of riparian vegetation (fencing and management) which in the round offers a 0.2 SEV gain. There are a small number of other approaches that can offer further SEV gains, typically 0.1-0.2 but these depends on the condition of the offset stream.

The likely offset formulae looks like: (0.57-0) / (0.6-0.4) x 1.5 = 4.3

It is sometimes possible to remove the multiplier where there is little time lag recovery but that is most often in cases of stream re-creation where recovery of the aquatic component is typically fast in-stream, the reliance of riparian development and function is not fast (10 years or so).

Thus, where our assumption that the streams on-site can be rebuilt and fit condition and hydrology requirements, there is no offset requirement. Where that is not possible, then we suggest the offset process requires a 4.3: 1 offset ratio. That would mean currently enhancement of around 1,318m of similar sized headwater stream that has currently an absent riparian state. There is that length and condition present in the proposed Heffernan Block, including the headwaters of Speedy's Stream. Therefore, if the proposed remediation of stream environments within the OBDA does not prove possible, there is an acceptable offset that addresses any residual adverse effects on stream extent and value.

11.7.4 Compensation

This last step of the effects hierarchy is not required as all of the residual adverse effects are accounted for by suitable and appropriate offsets such that after the offset actions (and success) there is a net gain in the ecology of the local area.

11.8 In summary

A range of species (swamp maire and Ramarama) are to be transplanted whole. One taxa (swamp maire) require additive risk aversion processes related to seed collection and rearing, cutting and rearing and seedling transplantation after on-growing into new areas to minimise the risk of effects of transplantation failures. These systems and processes should result in no-loss and a net-gain in numbers and distribution of swamp maire and the same levels of Ramarama etc.

For the habitat area removed, restoration of the terrestrial components has a substantive time lag and while it is required as part of the overall effects management approach that the OBDA be reinstated, the residual effect caused by the time lag requires a further 17 ha of indigenous seral community to be established as an offset elsewhere.

Similarly, the loss of natural inland wetland (0.07ha) cannot be restored on the property and requires an offset wetland re-establishment of 0.2ha of wetland elsewhere. The Heffernan Block provides a suitable offset area.

Where 251m of intermittent and perennial streams are lost under the OBDA and are not rebuilt on-site, the offset would be in the order of 4.3:1 where it was primarily riparian enhancement of currently unvegetated small streams which are now around SEV 0.4. That means some 1080m of stream enhancement would be required and preferably in the Regional Park. The Heffernan Block provides a suitable offset area for this.

A draft offset management plan (Draft EOMP) and the Draft Landscape and Ecology Management Plan (Draft LEMP) filed with the lodged documents details how these offsets would be accommodated and accounted for.

12.0 GWRC Ecological Review

Ms Melanie Dixon (Collaborations) has undertaken a review of the wetland and stream aspects (including swamp maire) for the Regional Council, and after field visits and conversations with the author of this assessment has published a review on the 19th May 2026. While there were a range of queries, suggestions and critiques, in the round it appears to us that the author has concluded the assessment is sufficient for decision makers, provides appropriate effects management reposes and offsetting but requires three management plans: a site OBDA clearance management plan (faunal and species management), an onsite remedial restoration plan (streams and terrestrial habitat) and the ecological offset plan (Heffernan block and swamp maire). We have taken that review into consideration in the formulation of this final assessment for lodgement and trust we have clarified or added those aspects the review suggested were required.

The queries raised and responded to are appended to this assessment as Appendix 3.

13.0 Ecological Recommendations

The following are the summary set of recommendations arising from the assessment:

Avoidance

Stringently manage and minimise any sediment loss from the site to any waterway (ephemeral, intermittent and perennial and wetland gully) to exiting levels.

Ensure the surface flow patterns retain the hydrology of all of the downstream waterways and wetlands.

Species salvage (avoiding death)

Translocate Ramarama and swamp maire and *C. rubra* relocating these in the suitable habitats shown in the draft management plans.

Salvage and relocate lizards (see LMP draft).

There are three management techniques put forward to avoid harm to nesting native bird species associated with vegetation clearance but our preference and recommended approach is to clear vegetation only outside of the breeding season (August- February) , or if during the breeding undertake a pre clearance survey of the area by an suitably experienced ornithologist and if nests are present establish an exclusion zone around the nest until breeding is completed (20-50m exclusion species dependent).

There will be no requirement for fish salvage associated with any waterway or wetland, as there is no evidence to support the presence of fish species in the affected areas. The proposal therefore avoids effects on those species.

Remedy

For Ramarama, where translocations fail plant new Ramarama within the OBDA comensulate wit the number of failures. Use only eco sourced material.

Fully rehabilitate the OBDA (including streams) in appropriate native serial and later stage species. Do this through establishment of appropriate substrates and hydrology, through direct revegetation (planting eco source plants), adding a mulch to assist in soil and hydrology retention, and through managed natural regeneration, including maintaining the areas through weed and pest control. This is to be set out in the OBDA Rehabilitation Management Plan, which is provided as part of the substantive application.

Offsets

Develop a full restoration plan for the 17 ha of the Heffernan Block regional park to be revegetated to offset the time delay in the OBDA areas restoration / rehabilitation, wetland loss (a draft plan is provided as part of the substantive application). Enact the plan in 5ha lots begun *prior to* the start of stage 1 vegetation clearance and progressed 5 yearly until complete.

Ensure the restoration area has a legal protection mechanism Establish 2 new wetland offset areas to develop a new 0.2ha natural inland wetland (where that is undertaken prior to removal of the onsite wetland) focused on a representative marsh or fen in an area that is protected or can be protected in perpetuity (the Heffernan Block).

Where the reconstruction of intermittent stream channels in the OBDA does not occur or is unsuccessful (measured by a lack of water retention) then an offset has been calculated and the ECR is 4.3:1 which means 1080m of stream enhancement would be required (preferable in the terrestrial vegetation offset area (Speedy's stream headwater).

Undertake the seed and seedling and cutting programme for swamp maire to cause sufficient new plant material (maximum 140) to plant into the identified areas adjacent in the park at a 10 for 1 ratio as the precautionary offset for swamp maire tree transplantation failure Where the initial and following transplantations succeeds then those 10 plants are not required to be planted and that material could be used elsewhere.

The offset programme is such that there is no residual adverse effects and so no compensations are required.

Monitor and measure

Develop a monitoring program to detail baseline measures for the western and eastern wetlands and in each stage and area of work monitor the sediment management systems and any downstream receiving systems so that any discharges and those impacts can be tracked and measured.

Develop a plan and undertake measures to show and ensure that the hydrology of each of the central and southern gully systems is retained more or less (within natural variation) as it is today in accordance with the recommendations of the ESCP and hydrology report and reflected in the LEMP.

Develop a monitoring program that allows tracking of rehabilitation planting within the OBDA and offset planting areas and species planted, identifies weed and pest control and persistence of those pests, success measures for areas revegetated that include survival, canopy cover, new seedling germination and successional processes evident.

Prior to vegetation clearance locate and GPS mark accurately all Swamp Maire, Ramarama, Coprosma Rubra on site and prepare a translocation plan for specimens to be relocated prior to commencement of that stage.

Follow the health (using on site observational characteristics) of all salvaged and transferred special plants. Determine a success or fail set of criteria and trigger further responses as required. Monitor the back-up planted saplings form the seedling raised population to ensure they establish and succeed (likely a 5 year program).

14.0 Conditions

I have reviewed the draft conditions for the proposed OBDA activities (Part B) and the Wildlife Act authority (Part C) and confirm that the conditions appropriately address the recommendations above.

Conditions need to ensure:

- Adequate sediment management with checks and monitoring of the receiving environments (wetlands) for length of open earthworks.
- A baseline wetland and swamp maire gully set of deposited sediment measures.
- Appropriate hydrological flows returned to streams and wetlands.

Habitat clearance occurs only with lizard salvage and transfer (follows the LMP); apply the proffered Lizard Management Plan to the site in each staged clearance in order to avoid and minimise impacts on native lizards. Required each phase of clearance:

- Avian checks preclearance when in bird breeding season (all native nesting). Active nest discover causes either halt to clearance or a 50m buffer of no clearance around any native active nests.
- Transfer of swamp maire, Ramarama, and C. rubra specimens in clearance areas to allocated receiving areas.
- Success of transfers and response to failure of transfer (Ramarama remedy and swamp maire offsets).

<u>Site Remediation</u>

Site rehabilitation as per draft LEMP plan occurs is monitored and has responses to failure for success.

<u>Offsets</u>

The offsets at the levels and types reported here and in the places suggested in the draft EOMP.
And that there be responses to failure of translocation and stream reinstatement through the monitring and trigger points requiring the offsets, determined in the final EOMP (along with adaptive measures to ensure offsets are achieved).

15.0 Overall Ecological Conclusion

The OBDA area proposed to be used for overburden disposal will cause the removal of the existing native and exotic vegetation communities (terrestrial and wetland), over a time frame of around 30 years (in stages). The losses are temporary, but it will take many decades to replace through remediation. Eventually the proposed remedial actions will return the 15.5ha area into native vegetation assemblages. That process is unlikely to include natural wetland. The intermittent / perennial streams will be recreated, and the hydrology and habitat should be replaced through processes such that there will be no loss of extent or value. The remedial actions include salvage and translocation of special plant species and lizards and avoidance of native bird breeding harm.

However, the remedial actions to return the entire area to a native terrestrial and stream habitat will take many decades and therefore there is a substantive lag time between the loss and the in the return of the current indigenous values.

Around 8.7ha of the 15.5 ha of the OBDA is significant indigenous vegetation and significant indigenous fauna habitat. The rest (Ca. 6ha) is predominantly exotic grassland, weeds and pine. The removal of the seral broadleaf systems on the OBDA is of minor or less effect based on current value and the relatively minor magnitude of the extent of the effect at a Regional Park scale, but through the direction of the NPSIB (and NRP) is assessed as a Significant Natural Area and the effects need to be managed to a net zero or positive outcome.

A BOAM modelled outcome for the lag time has confirmed that a 17 ha enhanced restoration process is required, a suitable site has been identified in the Regional Park in the Heffernan Block. That area is well suited to staged forest restoration and also holds wetlands, opportunity to create more wetland, and stream riparian enhancement.

The stream effects are minor and most of the affected streams are ephemeral and intermittent. Nevertheless, where these are not remediated through the build, then an offset will be required. The applicant proposes stream enhancement by way of riparian planting of the headwaters of Speedy's Stream within the Regional Park on the Heffernan Block (recently retired farm land). enhancement plan for existing streams in poor condition in the Regional Park. A ratio using SEV processes has been established and results in a 1080 linear meter riparian stream enhancement.

There is only a small area of natural inland wetland lost under the footprint and that effect requires an off-site offset as it is unlikely wetland can be reestablished on the new landform. That offset has been calculated (0.2ha) and provided in the terrestrial offset set site (The Heffernan Block).

The OBDA wetland edges may need some remedial actions related to access for swamp maire transfers There are several special taxa present, and the unmitigated effect of loss of those would be more than minor. Thus, there are processes proposed to manage those effects through direct transferal (swamp maire, Ramarama and 1 *Coprosma rubra*) to wetland in the area with swamp maire present, and separately a back up offset process to reestablishment swamp maire in other areas of the site and park as a safety in case the transfer process does not succeed.

While the direct transfer of swamp maire has its challenges and is experimental it is worth attempting, but the management of effects to that species is not reliant on that process being successful, as there are a number of offset actions proposed as part of the overall adaptive management approach.

Lizards on-site are managed via a Wildlife authority the transfer of them to suitable relocation sites within the Belmont Regional Park and a standard lizard management plan. An offset for loss of 10.93 ha of lizard habitat is also proposed and within the terrestrials offset set site on the Heffernan Block in the Regional Park.

Native bird species harm is managed by avoiding the breeding season or by using nest surveys prior to native vegetation clearance resulting in avoidance of clearance in those areas.

Under the above regime the overall outcomes of the Winstone's over-burden proposal will be a long-term net ecological gain, effectively causing 17ha of new terrestrial habitat, no loss of wetlands or stream habitat, and greater numbers of swamp maire.

16.0 References

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Appendix 1 eDNA macroinvertebrate & fish results

ScientificName	Southern	Southern	east north	east northern	east southern	east southern	west northern	west northern	west southern	west southern
Arachnocolus phillipsi	0	0	0	0	0	0	0	1	1	0
Archichauliodes diversus	0	1	0	0	0	0	0	0	0	0
Aulodrilus pluriseta	1	1	1	1	1	1	1	0	1	1
Austroclima sepia	1	1	0	0	0	0	0	0	1	1
Austroperla	1	1	0	0	0	0	0	0	0	0
Austrosimulium australense	1	1	0	1	1	1	0	0	1	1
Candonidae	1	1	1	1	1	1	1	0	1	1
Chironominae	1	1	0	0	1	1	1	0	1	1
Chironomus	1	1	0	0	0	0	0	1	0	0
Coloburiscus humeralis	1	1	1	1	1	0	1	0	1	1
Deleatidium	0	0	1	0	0	0	0	0	0	0
Diplectrona	1	1	0	0	1	1	1	0	1	1
Diplostraca	0	0	0	0	0	0	0	0	1	0
Dixidae	0	0	0	0	1	0	0	0	0	0
Edpercivalia shandi	1	0	0	0	0	0	0	1	0	0
Edpercivalia thomasoni	1	1	1	1	1	1	1	0	1	1
Harpacticoida	1	1	0	1	1	1	0	1	1	1
Hyalella	1	1	1	1	1	1	1	0	1	1
Hydrobiosis gollanis	0	1	0	0	0	1	1	1	1	1
Hydrophilidae	1	0	1	0	1	1	1	0	1	1
Isopoda	1	1	1	1	1	1	1	1	1	1
Limoniidae	1	1	1	1	1	1	1	1	1	1
Malacostraca	0	0	1	1	1	1	1	0	1	1
Neozephlebia scita	1	0	1	0	1	1	0	0	0	0
Nippotipula	0	1	0	1	0	0	1	0	1	1
Notonemouridae	1	0	0	0	0	0	0	1	0	0
Oeconesus maori	1	1	0	1	0	0	1	0	1	1
Paranephrops planifrons	1	1	1	1	1	1	1	0	1	1
Philopotaminae	1	1	1	0	0	1	1	1	1	1
Polyplectropus aurifuscus	0	1	0	0	0	0	0	0	0	0
Potamopyrgus antipodarum	1	0	0	0	0	0	0	0	0	0
Pseudoeconesus mimus	1	0	0	0	0	0	0	0	1	1
Psilochorema mimicum	0	0	0	1	0	0	0	1	0	0
Psychodidae	0	1	0	0	0	0	0	0	0	1
Pycnocentria forcipata	1	1	0	0	0	0	0	1	0	0
Pycnocentria funerea	1	1	0	1	0	1	1	1	0	1
Spaniocerca zelandica	0	0	0	1	0	0	1	0	1	1
Sphaeriidae	1	1	0	0	0	0	0	0	0	0
Triplectides dolichos	1	1	1	1	1	1	1	0	1	1
Uropetala carovei	0	0	0	0	0	0	1	1	0	0
Zelandobius	1	1	0	1	1	1	1	0	1	1
Zephlebia borealis	0	0	0	0	0	1	0	0	1	0
Species richness	28	27	14	18	18	20	21	13	26	25
EPT	15	16	2	8	4	7	9	7	12	12
EPT%	53.6	59.3	14.3	44.4	22.2	35.0	42.9	53.8	46.2	48.0
MCI	108.6	110.4	78.6	98.9	91.1	100.0	88.6	106.0	103.1	105.6

Fish –Only sites where fish were reported are included in the table below

System	Fish	OBDA western-south	OBDA Western north	OBDA Eastern south	OBDA Eastern central	Southern gully
	Banded kokopu	0	0	0	0	present
south gully	shirt fin eel	0	0	0	0	present
East central	long fin eel	0	0	0	0	present

Appendix 2 RECCE Plot Data – Exchange and OBDA

RECCE 1 - Under pine and macrocarpa on a ridge of the western side slopes

Ridge Recce 1

Recorded by Vaughan Keesing and Nick Singers

Landform Shallow ridge

Date 29/05/2025

Lat 1764036.4625 Long 5441725.2482

Height Class	Species	Common name	% cover	Comments
>25m	*Pinus radiata*	radiata pine	30	up to 40 m tall
	Hesperocyparis macrocarpa	macrocarpa pine	40	up to 35 m tall
2-5m	*Ilex aquifolium*	holly	25	Two leaf forms
	Melicytus ramiflorus	māhoe	30	
	Sphaeropteris medullaris	mamaku	10	
	Myrsine australis	red mapou	2	
	Parsonsia heterophylla	New Zealand jasmine	<1	
	Geniostoma ligustrifolium var. *ligustrifolium*	hangehange	3	
	Coprosma grandifolia	kanono	1	
0.3-2m	*Alsophila dealbata*	silver fern	5	
	Asplenium oblongifolium	huruhuruwhenua, shining spleenwort	5	
	Zealandia pustulata subsp. *pustulata*	hound's tongue	2	
	Asplenium flaccidum	hanging spleenwort	<1	
	Brachyglottis repanda	rangiora	1	
	Corynocarpus laevigatus	karaka	<1	
	Hedycarya arborea	porokaiwhiri, pigeonwood	<1	
	Asplenium hookerianum var. *hookerianum*	Hooker's spleenwort	<1	
	Pseudopanax crassifolius	lancewood	<1	
	Coprosma areolata	thin-leaved coprosma	<1	

Gully Recce 2

Recorded by Vaughan Keesing and Nick Singers

Landform Gully

Date 29/05/2025

Lat 1763947.2482 Long 5441698.3763

Height Class	Species	Common name	% cover
5-12m	*Dicksonia squarrosa*	wheki	5

	Alsophila cunninghamii	gully tree fern	5
	Alsophila dealbata	silver fern	10
	Sphaeropteris medullaris	mamaku	40
	Alsophila smithii	kātote, Smith's tree fern	1
	Melicytus ramiflorus	māhoe	15
	Syzygium maire	swamp maire	5
	Myrsine australis	red mapou	1
	Ripogonum scandens	supplejack, kareao	1
	Hedycarya arborea	porokaiwhiri, pigeonwood	3
2-5m	*Schefflera digitata*	patē, seven-finger	1
	Geniostoma ligustrifolium var. *ligustrifolium*	hangehange	1
	Piper excelsum subsp. *excelsum*	kawakawa	1
	Dicksonia squarrosa	wheki	5
	Alsophila cunninghamii	gully tree fern	5
	Alsophila dealbata	silver fern	5
	Alsophila smithii	kātote, Smith's tree fern	5
	Myrsine australis	red mapou	1
0.3-2m	*Asplenium flaccidum*	hanging spleenwort	1
	Austroblechnum lanceolatum	lance fern, nini	5
	Pakau pennigera	gully fern	1
	Hedycarya arborea	porokaiwhiri, pigeonwood	<1
	Asplenium gracillimum	hen & chicken fern	<1

Old Gorse - Recce 3

Recorded by Vaughan Keesing and Nick Singers

Landform Hillslope

Date 29/05/2025

Lat
1763926.8584 Long 5441637.4327

Height Class	Species	Common name	% cover
2-5m	*Ulex europaeus*	gorse	20
	Myrsine australis	red mapou	10
	Ilex aquifolium	holly	10
	Hedycarya arborea	porokaiwhiri, pigeonwood	5
	Melicytus ramiflorus	māhoe	15
	Brachyglottis repanda	rangiora	5
	Leptospermum scoparium var. *scoparium*	mānuka	5
	Sphaeropteris medullaris	mamaku	10
0.3-2m	*Coprosma robusta*	karamū	1
	Coprosma grandifolia	kanono	1

	Brachyglottis repanda	rangiora	<1
	Alsophila dealbata	silver fern	<1
	Rubus cissoides	tātarāmoa, bush lawyer	<1
	Geniostoma ligustrifolium var. *ligustrifolium*	hangehange	<1
	Paesia scaberula	lace fern	30
	Parsonsia capsularis var. *capsularis*	small flowered jasmine	<1
	Parablechnum novae-zelandiae	kiokio	<1
	Knightia excelsa	rewarewa	<1

Gully head – RECCE 4

Recorded by Vaughan Keesing and Nick Singers

Landform Head of gully above-ground water seepage exit

Date 29/05/2025

Lat 1763996.8207 Long 5441595.1522

Height Class	Species	Common name	% cover
5-12m	*Pseudopanax arboreus*	five finger, whauwhaupaku	40
	Melicytus ramiflorus	māhoe	40
	Dicksonia squarrosa	wheki	5
	Alsophila dealbata	silver fern	1
	Sphaeropteris medullaris	mamaku	1
	Ripogonum scandens	supplejack, kareao	<1
	Metrosideros diffusa	white rātā	<1
	Geniostoma ligustrifolium var. *ligustrifolium*	hangehange	<1
	Piper excelsum subsp. *excelsum*	kawakawa	<1
	Brachyglottis repanda	rangiora	<1
	Ilex aquifolium	holly	1
	Coprosma crassifolia		<1
2-5m	*Alsophila dealbata*	silver fern	5
	Sphaeropteris medullaris	mamaku	1
	Geniostoma ligustrifolium var. *ligustrifolium*	hangehange	2
	Piper excelsum subsp. *excelsum*	kawakawa	1
0.3-2m	*Asplenium bulbiferum*	pikopiko	<1
	Lomaria discolor	crown fern	<1
	Austroblechnum lanceolatum	lance fern, nini	<1
	Asplenium oblongifolium	huruhuruwhenua, shining spleenwort	1
	Icarus filiformis	climbing hard fern	<1
	Knightia excelsa	rewarewa	<1

East side – Wet gully head – RECCE 5

Recorded by Vaughan Keesing and Nick Singers

Landform Wetland gully on the north side below the pines and macrocarpa

Date 29/05/2025

Lat

1764213.6342 Long 5441638.1515

Height Class	Species	Common name	% cover
2-5m	*Carpodetus serratus*	putaputawētā	10
	Coprosma robusta	karamū	40
	Dicksonia squarrosa	wheki	10
0.3-2m	*Parablechnum novae-zelandiae*	kiokio	80

Kiokio wetland - RECCE 6

Recorded by Vaughan Keesing and Nick Singers

Landform Wetland gully, near pest control track

Date 29/05/2025

Lat

1764328.9017 Long 5441638.0753

Height Class	Species	Common name	% cover
2-5m	*Dicksonia squarrosa*	wheki	5
	Leptospermum scoparium var. *scoparium*	mānuka	10
	Coprosma robusta	karamū	10
	Carpodetus serratus	putaputawētā	5
	Ulex europaeus	gorse	<1
	Coprosma grandifolia	kanono	5
	Schefflera digitata	patē, seven-finger	<1
0.3-2m	*Parablechnum novae-zelandiae*	kiokio	45
	Carex geminata	cutty grass, rautahi	35
	Eleocharis acuta	sharp spike sedge	<1
	Carex maorica	Māori sedge	<1

Manuka Ridge – RECCE 7

Recorded by Vaughan Keesing and Nick Singers

Landform Northern manuka hill slope along either side of pest control track

Date 29/05/2025

Lat

1764336.7359 Long 5441554.6833

Height Class	Species	Common name	% cover
2-5m	*Leptospermum scoparium* var. *scoparium*	mānuka	30
	Knightia excelsa	rewarewa	2
	Pseudopanax arboreus	five finger, whauwhaupaku	1
	Myrsine australis	red mapou	5
	Carpodetus serratus	putaputawētā	1
	Hedycarya arborea	porokaiwhiri, pigeonwood	5
	Coprosma grandifolia	kanono	1
	Alsophila dealbata	silver fern	5
	Sphaeropteris medullaris	mamaku	5
	Geniostoma ligustrifolium var. *ligustrifolium*	hangehange	1
	Ulex europaeus	gorse	1
	Melicytus ramiflorus	māhoe	1
0.3-2m	*Coprosma grandifolia*	kanono	5
	Melicytus ramiflorus	māhoe	<1
	Geniostoma ligustrifolium var. *ligustrifolium*	hangehange	5
	Alsophila dealbata	silver fern	<1
	Sphaeropteris medullaris	mamaku	<1
	Leptospermum scoparium var. *scoparium*	mānuka	<1
	Knightia excelsa	rewarewa	<1
	Pseudopanax arboreus	five finger, whauwhaupaku	<1
	Myrsine australis	red mapou	5
	Carpodetus serratus	putaputawētā	<1
	Hedycarya arborea	porokaiwhiri, pigeonwood	<1
<0.3m	*Paesia scaberula*	lace fern	25
	Geniostoma ligustrifolium var. *ligustrifolium*	hangehange	<1
	Rubus cissoides	tātarāmoa, bush lawyer	<1
	Leucopogon fasciculatus	tall mingimingi	<1

Appendix 3 GWRC freshwater Ecology review and responses.

Winstone's, Belmont OBDA Ecology Review responses	To: Shalini Sanjeshni Project Coordinator, Winstone's aggregates
	From: Dr Vaughan Keesing
Date:11.06.2026	**Project title:** Belmont Ecology

Dear Shalini

Ms Melanie Dixon (Collaborations) acting in review for GWRC with respect to freshwater ecology and terrestrial biodiversity, has responded on the 19 May 2026 with commentary of her review of the ecological assessment *Belmont Quarry OBDA Development: Ecological Values, Effects and their Management*" for the substantive application by Winstone Aggregates (WA), at Belmont, Lower Hutt.

We appreciate the review and, in the following clarify some misinterpretation or matters that were not clear in the ecological reporting.

The conclusion of the review (it appears to us) is that **three plans**, one site OBDA clearance management (faunal and species management), an onsite restoration plan (streams and terrestrial habitat) and the ecological offset plan require drafting.

Description and Context

Firstly, we note that while the land exchange is 23.86 ha the application for overburden deposition only involves ~16 ha of that area (the OBDA) and several haul roads / tracks.

There is general agreement between us as to with the area's description. However, the reviewer suggests that the boundary between intermittent and ephemeral in the northwestern tributary is further upstream. We consider that the placement is representative of a fair location to differentiate between ephemeral and intermittent stream given that in this tributary that boundary shifts up. There should be no material change to the outcome whether the boundary indicated should be further upstream or not as the recreation of channel in stage 2 will effectively return the hydrological state of that end of the tributary (ie remedy the effect).

The reviewer requests that we the following data to the report (which we shall do):

- plot data, species lists and plot locations all of which are in the land exchange report and can uplift and supply in this report also,
- SEV full tables, which we shall do,
- eDNA data, which we shall also append.

With respect to the values assessment, while it appears the reviewer accepts the final value assessed, we do not understand the comment from the reviewer that the report "talks down' the threat status of the OBDA". The report outlines that there are a range of values low to high present but that some of those values rest on a single or a few individuals of a taxa, not a community of (say) swamp maire or a population of North Island robin. Rather than talk down the value it simply adds clarity by pointing out that the values assessed in an otherwise early seral vegetation stage recovering from farmland use are raised by site uncommon presences of a some species. In the absence of the 14 swamp maire (over 23 ha) or 24 Ramarama and ngāhere gecko, the most likely evaluation of the site over all would be low not moderate.

One aspect we must disagree on is that following on from this discussion the reviewer simple states that "*I also consider the entire OBDA area to be significant. While there are patches of non-native vegetation, I would not exclude them from the larger corridor of vegetation that also forms the Key Native Ecosystems (KNE)5 Belmont-Dry Creek*."

The assessment recognises that 9 of the 16 ha affected (56%) is exotic grasslands, pine and blackberry scrub which is of low value and not significant and because of the large area of that exotic community does not simply incorporate the area into the consideration of the whole or as a subpart of the better more advanced native regeneration. We consider it is entirely appropriate to first separate out the main assemblages, different in degrees and assess them as individual communities of the area firstly and not lump them or the exotic tree land into one assessment hiding both better and poorer elements.

Vegetation type	Representativeness	Rarity	diversity	Context	Significant
Young gorse/pasture	No	No	No	No	No
Ridgeline Exotic Treeland	No	No[1]	No	No	No
Treefern gully	No	No[2]	No	No	No
Early seral broadleaf forest	No	No	No	Yes[3]	Yes
Middle seral broadleaf forest	Yes	No[4]	No	No	Yes
Late seral broadleaf forest	Yes	No	No	No	Yes
Manuka mixed broadleaf forest	Yes	Yes	No	No	Yes
Wetland	Yes	Yes	No	No	Yes

We feel that considering this area as part of the "larger corridor of vegetation that also forms the Key Native Ecosystems (KNE) Belmont-Dry Creek" is a way of putting the values and importance of the whole (the KNE) upon a smaller subset, which does not share yet those values and importances of the wider feature. This approach conflates the importance of the site in the KNE. Until the area reaches the potential it has, we do not consider that the values currently absent should be reflected on as though they are and so make the area significant by association.

Effects

Sediment release

The reviewers feedback, and concerns are noted. In discussion of potential sediment effects, the reviewer recommends that the ecological reports recommendations be incorporated, in detail, into the next version of the erosion and sediment control assessment report. The ecological concerns and requirements were raised with, and did guide, the hydrology and ESCP authors' consideration with respect to management of potential effects and we understand that there will be greater reflection on these matters in the updated version of those reports.

Hydrology

The reviewer feels that the issue of hydrological change should be a separate section and discussed in more detail. We appreciate that request but suggest that the assessment sits reliant on the hydrological assessment by Mr McConchie and following his assessment the issues that are potentially evident - a change in flow, surface and subsurface, to each sub catchment and so the streams and lower wetlands has very little potential to change and so the potential adverse effect is theoretical only.

In essence, water will still flow as it does and through careful design of surfaces in the same proportion but because the effect is so high in the catchment and in such small areas, the potential for substantive change is very limited. Thus, the ecological report did not go into substantive potential effects of changing water delivery because the magnitude of those impacts was assessed as small even if incorrectly designed, but also even with poor design and the result potential change to the wetlands (and stream ephemeral - Intermittency patterns) would result in only a small chance of minor change (the kiokio / sedge dominated wetlands would persist on less water) and minor alteration of the instream values. In short, the assessment is reliant on the hydrological assessment and that the affected systems are very robust.

The reviewer notes the need for and the absence of a hydrological monitoring plan referencing specifically the central western swamp maire gully. The issue for the swamp maire relates mostly to sediment discharge and less so to the potential for reduced hydrology which the hydrologist states is highly unlikely. We think ecologically that the important aspect is the monitoring of deposited sediment change. We had some discussion with Iwi representatives on this matter on site. Ecologically we see some simple staff gauges placed into the current sediments to record accumulation of deposition and some form of sediment moisture content measure - drying is more critical than minor increase in water - primarily from a seedling establishment process rather than health of the mature trees.

Level of effect

The reviewer has an unusual comment here – "..... *has followed the EIANZ (2018) guidelines in assigning values but has **not** used this guide to assign overall level of effects and overall magnitude of effects. It's not clear why this guidance has not been followed.*"

We are uncertain why this comment has been made. Table 17 (section 11.2) makes it clear that we consider the value and the magnitude of the effect to determine the level of effect (exactly as suggested by EIANZ 2018). The sections above that table show how we came to the magnitude of effect levels – section 11.1.1 (Table 16).

For freshwater streams section 11.2.1 lays out the magnitude of change and sets this against the value present to get the level of effect.

This is the EIANZ (2018) process.

The reviewer notes that the report does not come to a conclusion about the overall magnitude of effects, concluding instead the effects of each community and particular effects issues (noise etc). We do not consider that there is an accumulative or averaged effect to make fo the site as a whole. It is agreed that the ecological assessment does correctly identify that offsetting is required to address:

1. the time lag between site clearance and the re-establishment of terrestrial vegetation and headwater stream function within the OBDA; and
2. the permanent loss of approximately 0.07 ha of wetland, which cannot be directly recreated within the development footprint.

We will add a table showing each effect outcome for terrestrial vegetation communities, wetlands, freshwater streams, fauna, sediments, hydrology, noise.

Effects management

We accept the reviewers note that management plans and the offset plan as at least drafts will be required. We will suggest that the approach will be one site ecological management plan and not numerous ecology plans. The reviewer offers her opinion as to the additions or other aspects to consider in the offset plan development for which we thank the reviewer. These plans are in process of being drafted and we will seek further GWRC input.

Her review is that "*as a minimum, the final application submitted to the EPA should include a clear description of the proposed offset design, how it will be implemented, how it will satisfy the effects management hierarchy, including demonstrating that the offset is additional to existing or planned restoration by Regional Parks*." We hear that and are seeking to ensure that plan is sufficiently developed.

Further we note that the project team will work with the councils to develop a suite of conditions to enable the delivery of the offset and mitigation package

Overall, it appears that the reviewer is accepting of the ecological report and its conclusions as to the values and effects potentially present and their management such that the outcomes after avoidance, minimization, remedy and offset there will be in the round a neutral if not positive net ecological outcome.

Monitoring and Management Plans

We (and the reviewer) see the need for:

- A Lizard Management Plan (to be developed by a suitably qualified and experienced herpetologist),
- Sediment monitoring plan generally and for swamp maire (to be developed by a suitably qualified and experienced erosion and sediment control consultant ,
- Offset terrestrial and wetland habitat creation plan to ensure the successful offset is achieved, which must include: stream enhancement, wetlands, terrestrial vegetation, fauna improvements (pest control).
- We are odds with the Reviewer in that we do not see the need for a hydrological monitoring plan, especially where there is a separate ESCP than will confirm hydrological discharge to each sub catchment.

On site

- A remedial Restoration plan of each stage (revegetation, pest management, monitoring success).
- Stream Re-creation Methodology Plan (with the measure of success being the successful re-creation of stream environments on-site, or a suitable offset),

The reviewer notes the other recommendations within the Ecological Assessment:

- Pre-clearance checks for nesting birds,
- Ramarama and swamp maire translocations,
- swamp maire propagation and cutting new plant development and revegetation of areas with swam maire (including protocols at the nursery for myrtle rust).

We see **three plans**, one site OBDA clearance management (faunal and species management), an on site restoration plan (streams and terrestrial habitat) and the ecological offset plan.

The reviewer concludes, positively:

- The ecological assessment provides a solid baseline for assessing the values and the effects,
- Provides appropriate effects management responses,
- Provides a robust approach to offsetting the residual effects.
- However, further detail (drafts) are required with respect to the management / offset plans which are appropriate effects management responses.

Yours Sincerely

Dr Vaughan Keesing

BlueGreen Ecology.

11.06.2026

[1] Noting the record of a north island robin does not cause the area to register as housing a rare taxa as that taxa is throughout in low abundance.

[2] Accepting the presence of three swamp maire and 5 Ramarama which alone are insufficient to trigger rarity in this habitat as a whole.

[3] Our assessment is that the early seral communities are a connective matrix between and around the later serial communities and do have a buffer role to those older more developed vegetation communities, including the gully wetland.

[4] The south western most gully head is seral vegetation but has a swamp maire and 2 Ramarama which alone are not enough to make the habitat type significant based on rarity.

BlueGreen