IN THE MATTER	of the Resource Management Act 1991 ("RMA" or "the Act")
AND	
IN THE MATTER	of an application under section 88 of the Act to **WAIKATO REGIONAL COUNCIL** and **WAIKATO DISTRICT COUNCIL** (ref LUC0488/22) BY **GLEESON MANAGED FILL LIMITED** to establish and operate a managed fill disposal activity at 310 Riverview Road, Huntly.

STATEMENT OF EVIDENCE OF SCOTT JULIAN LOWRY AND OHARA MARIE MCLENNAN

TERRESTRIAL ECOLOGY

Dated 23 November 2022

---

1. INTRODUCTION

1.1 My full name is Scott Julian Lowry. I am the Director of Envoco Limited, a company specialising in environmental management services.

1.2 My full name is Ohara Marie McLennan. I am an Ecologist and Horticultural Technician at Envoco Limited.

1.1 This evidence is given jointly in respect of resource consent application LUC0488/22 by Gleeson Managed Fill Limited ("GMF") to Waikato Regional Council ("WRC") and Waikato District Council ("WDC") to establish and operate a managed fill disposal activity at 310 Riverview Road, Huntly ("Site"). "). GMF engaged us to prepare a joint statement of evidence for terrestrial ecology. Our involvement in the project and relevant experience

differs slightly but both professional opinions are required to ensure all relevant ecological issues are addressed thoroughly.

2. QUALIFICATIONS AND EXPERIENCE

Scott Lowry

2.1 I hold a Bachelor of Parks & Recreation Management (Soils & Ecology) from the University of Lincoln and a Diploma in Horticulture/Nursery Production from Massey University.

2.2 I have 30 years' experience in ecological and horticultural work, particularly within restoration ecology. I founded Envoco Limited in 2004 and have led the company through hundreds of successful environmental projects, ranging from large scale wetland restorations, landscaping, ecosourced plantings, pest animal control operations and ecological mitigation projects. My area of expertise lies in applied ecology and horticulture, and I have used this to assist clients in resource consent applications and compliance. I have consulted and worked on many quarrying, cleanfill, and landfill projects across South Auckland and North Waikato, including Stevenson Drury Quarry, Whitford Quarry/landfill, Stevenson Tauhei quarry, Stevenson Ngaruawahia Quarry, Hampton Downs landfill and Weddings Huntly Quarry.

Ohara McLennan

2.3 I hold a Bachelor of Science (Ecology; 2018) from the University of Auckland, New Zealand.

2.4 I have worked as an ecologist/horticultural technician at Envoco Limited for 2 years and 2 months. I have experience in ecological restoration work in terrestrial environments, particularly within the quarrying and cleanfill sector. I am involved in the management and implementation of ecological mitigation for Stevenson Drury Quarry, which has included terrestrial and freshwater assessments and monitoring, revegetation planting planning and implementation, and pest animal and plant control over a 50ha management area. I have been involved in 17 ecological projects (both terrestrial and freshwater based) at the consulting and/or implementation level for a range of clients, including quarries, land developers, farmers, councils, and trusts.

3. INVOLVEMENT IN THE PROJECT

Scott Lowry

3.1 My involvement has been consulting with GMF staff on terrestrial ecology, overseeing the implementation of the Ecological Management Plan for the compensation site, and assistance/peer review of ecological reports. I was first engaged by Gleeson & Cox in February 2021 to implement the Ecological Management Plan for the compensation site and provide advice on the proposed managed fill application. I have been involved in meetings with GMF staff and planner Kate Madsen since then to discuss ecological issues relating to the fill application. I have been approached to carry out several ecological assessments regarding the fill application, including a watercourse assessment (March 2022), macroinvertebrate community assessment (April 2022), wetland assessment on O'Reilley's property (June 2022), and assistance with section 92 response (August 2022). I have overseen this work and peer reviewed the reports prepared by my ecologist staff.

3.2 One of our assessments found that in Fill Areas 2 and 4 the proposed sediment retention ponds overlapped with areas of induced wetland. I was involved in a meeting with ESC expert Michael Parsonson (along with planner Kate Masden and GMF management) to discuss how these wetland areas can be avoided. A solution to move the SRP's >10m above the included wetlands was agreed upon. I have attended a meeting with Department of Conservation representatives to discuss and resolve terrestrial ecological issues raised in their submission.

3.3 I am familiar with the subject site and wider receiving environment.

Ohara McLennan

3.4 My involvement has included carrying out ecological assessments (both terrestrial and wetland) to assist in the consent application and implementing the Ecological Management Plan for the compensation area.

3.5 I was first engaged in February 2021 by Gleeson & Cox to implement the Ecological Management Plan for the compensation site, which initially involved planting preparation and preliminary pest monitoring. In March 2022 I was engaged to undertake an assessment to classify freshwater environments (stream/wetland) within a Significant Natural Area (SNA_16971) that lies to the west of the quarry and fill areas. I had also carried out a vegetation assessment within the same SNA in October 2021 for purposes outside the scope of this project. In April 2022 I was engaged to carry out macroinvertebrate sampling in the watercourses downstream of the discharge points of Fill Areas 2, 3 and 4 to obtain baseline data for long term monitoring purposes. I conducted a site visit to gather this data and prepared a report. In June 2022 I was engaged to assess the wetlands north

of Fill Area 3 (on O'Reilley's property) against the NPS-FM to provide further detail for the Assessment of Environmental Effects (AEE). I conducted a site visit to gather this data and prepared a report. In August 2022 I was engaged to provide a response to queries raised in the memorandum 'Re: Gleeson and Cox Fill Consent Application: Wetland Ecological Effects' (Karen Denyer, July 2022), which included an assessment to quantify the area of indigenous vegetation that will be impacted as a result of the fill areas. Along with assessing the vegetation I was also asked to identify potential natural wetlands downstream of the constructed wetlands within the fill area footprints to ensure compliance with the NPS-FW and to provide further detail to the AEE. I conducted site visits to gather this data and prepared a written response and a report. I found that the proposed sediment retention ponds overlapped with areas of induced wetland so I was involved in a meeting with ESC expert Michael Parsonson (along with planner Kate Masden and GMF management) to discuss how these wetland areas can be avoided. A solution to move the SRP's >10m above the included wetlands was agreed upon. I have attended a meeting with Department of Conservation representatives to discuss and resolve terrestrial ecological issues raised in their submission.

3.6 In September 2022 I was engaged to investigate additional ecological compensation areas if further wetland mitigation is required, and I prepared a report outlining further potential mitigation areas based on previous site visits.

3.7 I was responsible for the preparation of:

(a) Watercourse assessment in Significant Natural Area (March 2022). *Appendix 12.5 of consent application;*

(b) Macroinvertebrate Community Assessment Report Gleeson Huntly Quarry (May 2022). *Appendix 20 of consent application;*

(c) Ecological Mitigation & Monitoring Report (May 2022). *Appendix 20 of consent application;*

(d) Ecological assessment of wetlands north of Fill Area 3 at Gleeson Huntly Quarry (July 2022). *Appendix 2 Attachment 1 of consent application; and*

(e) Quantification of indigenous terrestrial vegetation in Fill Areas 2 and 4 (September 2022).

3.8 I am familiar with the subject site and wider receiving environment.

4. SITE VISITS AND BACKGROUND MATERIAL

Scott Lowry

4.1 I have overseen the implementation of the restoration works for the compensation area and provided advice and peer review to the ecological assessments carried out by my staff. I have visited the site and compensation area several times since we were first engaged to carry out works in early 2021.

Ohara McLennan

4.2 An assessment of the watercourse within SNA_16971 was conducted on 14 February 2022. The site visit involved assessing 534.5m length of watercourse within the SNA by noting hydrological characteristics and dominant vegetation species to determine which parts of the watercourse are streams or wetlands. Areas of watercourse were assessed against the NPS-FW. The report was completed on 7 March 2022.

4.3 Macroinvertebrate community sampling in watercourses within reference and impact areas was conducted on 11 April 2022. A fine-mesh (0.5mm) net was used to sample macroinvertebrates, which were collected along with stream water in a 250ml container. Samples were sent to a macroinvertebrate taxonomist for identification and assessment of macroinvertebrate community composition values. The report was completed on 13 May 2022.

4.4 The ecological mitigation and monitoring report was completed on 25 May 2022 to meet current resource consent conditions. The report details the works that were completed (pest plant and animal control, planting, monitoring) in the compensation area in the preceding 12 months associated with the Ecological Management Plan.

4.5 An ecological assessment of wetlands north of Fill Area 3 was conducted on 27 June 2022 and 4 July 2022. Work included assessing each wetland area against the NPS-FW using wetland delineation protocols and carrying out hydric soil assessments (which are both standard recognised wetland assessment methods). The report was completed on 12 July 2022.

4.6 A vegetation quantification assessment in Fill Areas 2 and 4 was conducted on 28 August 2022. The work undertaken included a site walkover using a handheld GPS to mark borders of contiguous indigenous vegetation and

individual mature trees, species identification, and estimating vegetation age and seedling/sapling ground cover. The report was completed on 7 September 2022.

Purpose of scope and evidence

4.7 The purpose of our evidence is to provide information on how the proposal affects terrestrial ecology.

4.8 Our evidence is structured as follows:

(a) Briefly describes the site (Section 3);

(b) Briefly describes the proposal (Section 4);

(c) Sets out the key policy matters (Section 5);

(d) Addresses the relevant terrestrial ecology issues arising (Section 6);

(e) Comments on issues raised by the Officer's Report relevant to our area of expertise (Section 7);

(f) Comments on the issues raised by Submitters relevant to my/our area of expertise (Section 8);

(g) Comments on the conditions (Section 9); and

(h) Provides a brief conclusion (Section 10).

4.9 A summary of our evidence is contained in Section 6.

5. EXPERT WITNESS CODE OF CONDUCT

5.1 We have been provided a copy of the Code of Conduct for Expert Witnesses contained in the Environment Court's 2014 Practice Note. We have read and agree to comply with that Code. This evidence is within our area of expertise, except where we state that we are relying upon the specified evidence of another person. We have not omitted to consider material facts known to us that might alter or detract from the opinions that we express.

5.2 We understand and accept that it is our overriding duty to assist the Independent Commissioner in matters which are within our expertise as terrestrial ecologists.

6. SUMMARY OF EVIDENCE

6.1 GMF are proposing to establish and operate a managed fill disposal activity that will reclaim three gullies north of the existing quarry. The activity will involve the removal of approximately 3,327.5m2 of indigenous terrestrial vegetation, 160m of ephemeral stream, 90m of intermittent stream and 1054m2 of artificially constructed wetland. The loss of these features cannot be avoided or remedied, so a mitigation package has been proposed. This includes the ecological enhancement and legal protection of a 3.9ha gully hereby referred to as the 'compensation area', legal protection of a 1.5ha bat reserve, restoration of small induced wetlands below Fill Areas 2 and 4, and conversion of SRP's in each Fill Area into induced wetland habitat once each fill operation is complete. Fill Area 2 drains north into Lake Puketirini and Fill Areas 3 and 4 drain east into the Waikato River.

6.2 In the context of terrestrial ecology, the proposal is considered to be consistent with the objectives and policies of the Waikato Regional and District plans and the Waikato Regional Policy Statement, as adequate ecological mitigation has been offered to ensure adverse effects are minimised. The removal of indigenous terrestrial vegetation in Fill Areas 2 and 4 is being offset at a 4:1 (gain:loss) ratio. Fill Area 3 does not contain indigenous terrestrial vegetation. The loss of wetland quality for Fill Areas 2 and 4 (total of 1054m2) is being offset at a 1:1 gain:loss ratio, and the loss of wetland quantity is being offset at a 4:1 gain:loss ratio. The drainage of the 815m2 wetland in Fill Area 3, which occurred in June 2020, has been offset through a prior agreement to restore 2981m2 of exotic degraded wetland in the compensation area.

6.3 Indigenous terrestrial vegetation within Fill Areas 2 and 4 includes native broadleaved early successional scrub with interspersed mature native trees, exotic scrub, and isolated mature native trees. This vegetation was classed as having low ecological value in the Ecological Impact Assessment due to lack of representativeness, low likelihood of further succession, poor structural diversity and small spatial extent. Loss of habitat for indigenous fauna, which includes 3327m2 of indigenous terrestrial vegetation and 1054m2 of wetland habitat, is being addressed through compensation. Direct effects on indigenous fauna, in particular bats, lizards and fish, are being addressed through appropriate on-site management. Bat and fish management plans have been created for the site, and a lizard management plan will be created if native lizards are found in pre-construction surveys.

6.4 Compensation for the loss of wetland and ephemeral/intermittent streams is also being addressed through compensation at the compensation area, restoration of induced wetlands at the base of Fill Areas 2 and 4, and the conversion of Sediment Retention Ponds (SRP's) to engineered wetlands containing indigenous wetland flora once each fill area is complete. Restoration of these compensation areas will provide a holistic ecological net gain back to the Waikato River catchment.

6.5 Conditions of consent address ecological effects through the requirement of an ecological management plan and an ecological mitigation and monitoring report for the compensation area. A fish and bat management plan for the site is also incorporated in the conditions to ensure effects on fauna are mitigated.

6.6 Submissions have raised several concerns relating to ecology, including the scope of the ecological impact assessment, management plans, damage and loss of habitat and fauna, and wilding pines. These issues have been addressed and result in no change to the level of effect from the proposed activity, especially by incorporating the conversion of SRP's into the mitigation package.

7. SITE DESCRIPTION AND LOCALITY

7.1 The site (Fill Areas 2, 3 and 4 within Gleeson Huntly Quarry) lies within the Meremere Ecological District, which covers an area of c.105,300 hectares in the North Waikato region. Meremere Ecological District encompasses the lower reaches of the Waikato River (including the river mouth) and is characterised by the well-defined interior basin with alluvial flats, swamps, shallow lakes, and wetlands. The site is within the suburb of Huntly, which is surrounded by the Taupiri Range to the east and Hakarimata Range to the south, with the Waikato River intersecting in a south-north direction. Steep vegetated gullies within a pastoral matrix are typical of the local landscape, which is highly modified due to agriculture, open cast mining and aggregate extraction. The site is to the west of the Waikato River and has been used previously for agriculture and pine forestry.

7.2 Fill Area 2 forms part of a catchment that drains into Lake Puketirini to the north of the site, this then flows into Lake Waahi which discharges into the Waikato River. It comprises a shallow gully basin containing an open water wetland (artificially constructed) with a single ephemeral watercourse flowing out through a riparian strip. Vegetation within Fill Area 2 includes exotic scrub, several mature indigenous trees amongst young regenerating

indigenous scrub along the riparian margin, and a variety of sedges, rushes, and herbs around the wetland. Fill Area 2 has previously been used for forestry, farming, and other minor quarrying related activities.

7.3 Fill Area 3 forms part of a catchment that drains into the Waikato River to the east of the site. It comprises a shallow basin previously used for overburden disposal which, after the completion of disposal activities, was utilised for pine forestry and harvesting before being subsequently returned to agricultural use. Rank pasture, exotic scrub, herbs, and rushes make up the vegetation composition.

7.4 Fill Area 4 occurs within the same river-draining catchment as Fill Area 3 and consists of two feeder streams that converge to form a single stream running north out of the fill area. Vegetation comprises a stand of redwoods with mature indigenous trees amongst regenerating indigenous vegetation along riparian margins, isolated mature Rimu along gully fringes and exotic scrub throughout the fill area. Fill Area 4 has previously been used for forestry, farming, and minor quarrying related activities.

8. DESCRIPTION OF PROPOSAL

8.1 GMF have applied to Waikato District Council and Waikato Regional Council for resource consents to establish and operate a managed fill disposal activity that imports material to deposit within identified gullies (Fill Areas 2, 3 and 4) located north of an existing quarry within the same site. The reclamation of the three gullies and associated sediment pond construction and maintenance will involve the clearance of vegetation and topsoil, including 3,327.5m2 of indigenous terrestrial vegetation which provides habitat for fauna. To offset this loss, the ecological enhancement, monitoring and legal protection of a 3.9ha gully ('compensation area') and a 1.5ha bat reserve has been proposed, along with restoring induced wetlands at the base of Fill Areas 2 and 4 and conversion of SRP's to engineered indigenous wetlands.

9. KEY POLICY MATTERS

9.1 The proposal has been assessed against the key relevant ecological objectives and policies in the Operative Waikato Regional Policy Statement (WRPS), Waikato Regional Plan (WRP) and Waikato District Plan (WDP).

9.2 **WRPS Policy ECO-P1 – Maintain or enhance indigenous biodiversity.**

(a) Promote positive indigenous biodiversity outcomes to maintain the full range of ecosystem types and maintain or enhance their spatial

extent as necessary to achieve healthy ecological functioning of ecosystems, with a particular focus on:

(b) working towards achieving no net loss of indigenous biodiversity at a regional scale;

(c) the continued functioning of ecological processes;

(d) the re-creation and restoration of habitats and connectivity between habitats;

(e) supporting (buffering and/or linking) ecosystems, habitats and areas identified as significant indigenous vegetation and significant habitats of indigenous fauna;

(f) providing ecosystem services;

(g) the health and wellbeing of the Waikato River and its catchment;

(h) contribution to natural character and amenity values;

(i) tangata whenua relationships with indigenous biodiversity including their holistic view of ecosystems and the environment;

(j) managing the density, range and viability of indigenous flora and fauna; and

(k) the consideration and application of biodiversity offsets.

9.3 Under the WRP, the site is located within the Lower Waikato Catchment Management Zone Priority 1 sub-catchment. Vegetation Clearance and Riparian Vegetation Clearance within the site is a discretionary activity under Rule 5.1.4.15 of the WRP. The key relevant objectives of the WRP are to avoid and minimise adverse effects on ecological values of both terrestrial and aquatic ecosystems, particularly the adverse effects of soil disturbance and vegetation clearance in high risk erosion areas.

9.4 The site is within the Rural Zone of the Waikato District Plan. It is not within any Significant Natural Areas (SNA), although there is an SNA (SNA_16971) directly west of the site. The proposed Compensation Area is within an SNA (SNA_16743). Indigenous vegetation clearance is a restricted discretionary activity under Rule 25.43A. Section 2 of the WDP covers objectives and policies relating to indigenous biodiversity and habitats. Objective 2.2.1 states, 'Indigenous biodiversity and the life-supporting capacity of

indigenous ecosystems are maintained or enhanced.' Policies 2.2.2 - 2.2.8 are relevant to this objective.

9.5 The proposal is considered to be consistent with these objectives, as adequate ecological mitigation has been offered to ensure adverse effects are minimised. The removal of indigenous terrestrial vegetation is being offset at a 4:1 (gain:loss) mitigation ratio and wetland habitat is being offset at a 1:1 mitigation ratio for quality (restoration of existing wetland) and 4:1 mitigation ratio for quantity (creation of new wetland – SRP's). Ecological mitigation is explained further in sections 10 and 13.

10. TERRESTRIAL ECOLOGY ISSUES

Vegetation clearance

10.1 Approximately 3,327.5m2 of indigenous terrestrial vegetation and 9 isolated mature indigenous trees will be affected (removed) as a result of gully reclamation and sediment pond construction associated with the development of Fill Areas 2 and 4. Fill Area 3 does not contain indigenous terrestrial vegetation. None of the areas of indigenous vegetation to be removed meet significance criteria outlined in the Waikato Regional Policy Statement (Appendix 5) as they contain only common lowland podocarp-broadleaf species, are a small size, and are affected by the adverse effects of plant and animal pests. We agree with the ecological values assigned to this vegetation outlined in the Ecological Impact Assessment (EcIA) (Boffa Miskell, 2019). Native broadleaved early successional scrub including several mature trees (present in Fill Areas 2 and 4) was assigned as having low ecological value due to lack of representativeness, low likelihood of further succession, poor structural diversity, and small spatial extent. We believe that the individual mature trees outside of the contiguous fragments of indigenous vegetation also have low value due to their isolation and state of health. After pine harvesting activities ceased it is clear the fill areas underwent regular aerial herbicide applications to control pest plants. This has clearly affected these remaining isolated trees as seen through canopy thinning, loss of limbs and foliage, leaf discolouration, basal shooting, and prolific flowering/fruiting.

Faunal habitat

10.2 Terrestrial habitat for indigenous fauna is present in all fill areas and has been outlined in the EcIA (Boffa Miskell, 2019). The native broadleaved early successional scrub is classified as low-quality habitat due to its small size

and isolation in the context of the surrounding landscape and is unlikely to provide habitat for 'Threatened' or 'At Risk' avifauna species. The rank pasture in Fill Area 3 may provide habitat for NZ pipit, an 'at risk - naturally uncommon' endemic species that was observed during initial site visits associated with the EcIA. After a pre-hearing meeting with the Department of Conservation on the 16/11/22 it was agreed that bird surveys will not be required because any avifauna species that may inhabit the site are mobile and able to vacate the impact area once works commence. The loss of avifauna habitat is being addressed through compensation, which is described in detail in section 10.5 - 10.7 below.

10.3 The EcIA identified the overall likelihood of 'Threatened' or 'At Risk' herpetofauna being present within the impact area as low. However due to the threat classification change of copper skink from 'Not Threatened' to 'At Risk - Declining' a pre-construction survey of potential habitat within the fill areas is advised. This survey is planned for the week of 21/11/22 and will involve setting Artificial Cover Objects (ACO's) in suitable lizard habitat within the fill areas to determine the presence of copper skink.

10.4 Potential bat habitat (roost trees) was identified in Fill Areas 2 and 4 in the EcIA. At the time, Fill Area 2 contained two old growth pines that were identified to be potential roost habitat, but these have since collapsed due to unknown causes. Potential bat roost habitat in Fill Area 4 is within the redwood stand and mature indigenous trees that remain along the riparian margins of the main stream. Bat surveys (Wildlands, 2019) found evidence of long-tailed bats in Fill Area 4. A bat management plan was developed to provide protocols for tree removal that aim to eliminate the risk of injuring or killing bats, and also includes management activities to address potential adverse effects upon bat populations to meet the requirements of the Wildlife Act (1953). Mitigation activities include legal protection, fencing and pest animal control in a 1.5ha area ('bat reserve') of old-growth pine and eucalyptus. We believe the BMP is robust and provides sufficient management and mitigation measures to address the adverse effects on bats and their habitat.

Restoration / compensation

10.5 To offset the loss of approximately 3,327.5m2 of indigenous terrestrial vegetation and 9 individual mature indigenous trees, ecological compensation has been proposed in a 3.9ha gully ('compensation area') to the west of the site. Area (m2) is being used as the currency for ecological compensation. The applicant has begun compensation works well in advance

of fill area construction, which is considered best practice to reduce the time lag between biodiversity loss and gain.

10.6 Approximately 14,552m2 of indigenous terrestrial planting has been completed in the compensation area. This is more than what was proposed in the EMP and creates a more appropriate offset ratio of 4:1 (gain:loss) rather than the original 2.84:1 offset ratio. The terrestrial planting provides like-for-like offsetting, enhances the existing ecological values (species richness, quality habitat for fauna, provision for ecosystem services), and aims for a no net loss of indigenous biodiversity as a result of proposed vegetation clearance. Along with planting to directly address loss of values, a holistic approach is provided whereby the entire gully is restored through stock-proof fencing, pest plant and animal control, biodiversity monitoring and legal protection in the form of a covenant. This accounts for the loss of ecological condition at the impact site.

10.7 Enrichment planting of almost 2000 plants of later-successional indigenous species will occur once there is sufficient canopy cover from the pioneer planting. All plants are eco-sourced from the Meremere Ecological District and are representative of local lowland podocarp-broadleaf forest, including kahikatea-pukatea swamp forest and rimu-tawa forest. The majority of species that will be removed as a result of fill works are represented in the planting. Measures of success are vital in any restoration project, and although they are not fully outlined in the EMP, initiative has been taken to record monitoring data on pest animals, birds, and plantings. This is outlined in the Mitigation and Monitoring Report (Envoco, 2022). Measures of success were not described in the Ecological Management Plan (Wildland Consultants, 2020), but could include a <5% tracking tunnel and chew card index for pest animals, increase in presence of native seed and fruit dispersing birds (recorded in 5MBC), >80% survival of the planting and natural regeneration of indigenous flora (measured in abundance counts in vegetation plots).

Freshwater Ecology Issues

10.8 Freshwater ecology is not our area of expertise, but we have included this section to address freshwater compensation for freshwater features and indigenous freshwater fauna.

10.9 The total loss of wetland area in Fill Areas 2 and 4 is 1054m2. These have been determined by both council and applicant ecologists as artificially constructed wetlands. The total loss of wetland in Fill Area 3 was 815m2, which was drained in June 2020. All wetland areas are considered significant

under the Waikato Regional Policy Statement, as they meet criteria 4 and 6 in Table 11-1: Criteria for determining significance of indigenous biodiversity. The ecological value of wetlands was assessed in the EcIA on the basis of representativeness, rarity/distinctiveness, diversity and pattern, and ecological context. All wetlands were determined to have low ecological value with the key reasons being small size, modification, low habitat quality and limited connectivity. The level of effect of the removal of wetland vegetation was also assessed as low.

10.10 The loss of wetland habitat and the associated flora and fauna values is being addressed through compensation. Several areas for wetland restoration and creation are proposed, including small, induced wetlands at the base of Fill Areas 2 and 4 (approximately 60m2 total), the creation of new wetland habitat in the compensation area (415m2 total) and the conversion of each SRP to engineered indigenous wetland after the completion of each fill area (3,878.5m2 total). This can provide 4,293.5m2 of mitigation for wetland quantity at a ratio of 4:1 (gain:loss) and can also provide an additional 475m2 to mitigate for wetland quality. Wetland mitigation for Fill Area 3 has already been addressed through the restoration of a degraded wetland (2981m2) in the compensation area. There is also potential to restore the induced wetlands at the base of Fill Area 2 and 4 after further assessment.

10.11 The total loss of intermittent stream at the impact site is 40m and the total loss of ephemeral stream is 210m. In the EcIA, ephemeral streams were classed as having negligible ecological value and the intermittent streams were classed as having low ecological value. No streams were considered significant under the WRPS significance criteria. Mitigation for the loss of stream habitat has included riparian restoration of 150m of stream in the compensation area, as well as restoration along 330m of natural wetland.

10.12 The loss of wetland and stream habitat has the potential to adversely affect indigenous freshwater fauna. Surveys for fish and macroinvertebrates were carried out in all fill areas as part of the EcIA. Shortfin eel (*Anguilla australis*) was present in all three fill areas, and the macroinvertebrate community richness was low, as expected for modified/artificially induced wetland systems. The limited species assemblage for all three survey sites scored 'poor' in the fish Index of Biotic Integrity (IBI), indicating the wetlands are characterised by limited connectivity and restricted access for native migratory fish species and/or limited ecological value as freshwater habitat for native aquatic biota. Koura (*Paranephrops planifrons*) and banded kokopu (*Galaxias fasciatus*) were present in the impact area of Fill Area 5, and these may also be present in Fill Areas 2 and 4.

10.13 As the streams and wetlands provide habitat for indigenous fish species, proposed works at the site have the potential to injure or kill resident aquatic fauna at the time of works. A Fish Management Plan (Wildland Consultants, 2022) has been developed for the site, which outlines measures to remove fish and kōura from streams and wetlands within the site before works commence. This management is considered appropriate to mitigate adverse effects on indigenous freshwater fauna.

11. ISSUES RAISED BY COUNCIL OFFICER'S REPORT

11.1 We have read the report prepared by Ms Emma Cowan, the Council's reporting planner.

11.2 The S42A report raises several ecological issues, including induced wetlands within 100m of Fill Areas 2 and 4 not being described or quantified, inadequate wetland compensation, and stock-proof fencing and Fill Area 3 mitigation works needing to be discounted from the mitigation package.

11.3 The induced wetlands below Fill Areas 2 and 4 are being avoided by fill works but will still be within 100m of the proposed sediment retention ponds. These wetlands were determined by way of a rapid delineation assessment while on site, and contain the obligate wetland species *Carex geminata*. A formal wetland delineation assessment is able to be done prior to the hearing to determine their extent more accurately, but a rapid assessment during a site visit estimated their sizes as 25m2 (Fill Area 2) and 35m2 (Fill Area 4). The Erosion and Sediment Control (ESC) evidence by Mr Michael Parsonson determines that adverse effects of sediment discharge on these wetlands can be avoided by installation of best practice ESC measures, which have proved their reliance in other similar projects within sensitive receiving environments.

11.4 Additional wetland compensation sites have been proposed in response to the issue of inadequate wetland compensation which was initially raised by Ms Karen Denyer. The additional compensation has included small, induced wetlands at the base of Fill Areas 2 and 4 (approximately 60m2 total), the creation of new wetland habitat in the compensation area (415m2 total) and the conversion of each SRP to engineered indigenous wetland after the completion of each fill area (3,878.5m2 total). This can provide 4,293.5m2 of mitigation for wetland quantity at a ratio of 4:1 (gain:loss) and can also provide an additional 475m2 to mitigate for wetland quality. The induced wetlands and SRP's are within the Waikato River catchment, so if this

mitigation is accepted, it will demonstrate a net benefit to the Waikato River catchment.

11.5 Stock exclusion regulations require natural wetlands and rivers wider than 1 metre to be fenced with a 3-metre setback to exclude stock. 2007 lineal metres of stock-proof fencing has been completed around the entire compensation area as of March 2022, some parts over 60m from the watercourse. Ms Emma Cowan recommends that this fencing be discounted from the ecological compensation proposal on the basis that it is already required under current legislation (NESFW, NPSFM, Stock Exclusion s360 RMA), and any ecological mitigation works offered be additional to what is already required. Fencing the entire compensation area was completed as part of the mitigation package for the pre-consented drainage of Fill Area 3. The farm has been retired from livestock and is now being planted in radiata pine for the purpose of carbon farming, so the stock exclusion rules do not apply.

12. ISSUES RAISED BY SUBMITTERS

12.1 A total of 42 submissions have been received. The topics raised in submissions that I/we can comment are as follows:

(a) Scope of ecological impact assessment;[1]

(b) Management plans;[2]

(c) Damage / loss of habitat of flora;[3]

(d) Damage / loss of fauna;[4] and

(e) Wilding pines.[5]

Scope of ecological impact assessment

12.2 The submission of Director-General of Conservation (#12) raises the issue of the EcIA being undertaken without surveys for lizards, bats, breeding birds and waterfowl. The EcIA states that it was required to be completed within

1 Submission of Director-General of Conservation (#12).
2 Submission of Director-General of Conservation (#12).
3 Submissions of: Wayne Robert Rutherford (#3), Jennifer Lee Malloy (#8), Director-General of Conservation (#12), Daisy Thomas (#14), Denise Lamb (#5), Nola Morland (#18), Kathie Shepard (#21), Nicola Vitasovich (#22) and Te Kauri Maarae Trust (#37).
4 Submissions of: Wayne Robert Rutherford (#3), Jennifer Lee Malloy (#8), Director-General of Conservation (#12), Daisy Thomas (#14), Nola Morland (#18), Kathie Shepard (#21), Nicola Vitasovich (#22) and Te Kauri Maarae Trust (#37).
5 Submission of Colleen Earby (#24).

a timeframe outside of the season for such surveys. This issue has been partially addressed through undertaking a bat survey in areas of potential bat habitat (Fill Areas 4 and 5), which was conducted by Wildland Consultants (Gleeson Quarry Huntly Bat Survey, Appendix 17.4). Bats were detected in both fill areas and a management plan (Bat Management Plan, Wildland Consultants, 2020) was developed to address potential effects. Measures required by the BMP have already been implemented by Fredrik Hjelm from Biosense.

12.3 The EcIA recommends appropriate fauna surveys to be carried out within the recommended season (August - May inclusive for birds and October - February inclusive for lizards). As outlined in section 10.2, the pre-hearing meeting with the Department of Conservation determined that bird surveys will not be required because any avifauna species that may inhabit the site are mobile and able to vacate the impact area once works commence. Surveys for lizards are underway in all fill areas as of 21/11/22 which will determine if any native lizards are present at the site and inform management actions if required.

Management plans

12.4 Management plans associated with terrestrial ecology that are incorporated into consent conditions are the Ecological Management Plan (EMP) (Wildlands, 2020). Schedule 1 General Conditions - Condition 19 outlines requirements of the EMP, which have mostly been met within the approved EMP. Although monitoring requirements and methodologies have not been included in the EMP, monitoring activities including pest animal, vegetation, and bird monitoring, have been carried out at the compensation site since restoration works began. Within the consent condition for the Ecological Management Plan, a pest animal control target of 5% or less tracking tunnel/chew card index would be recommended so that success of mitigation activities can be measured. An updated EMP should be provided as a condition of consent, to reflect the additional compensation offered.

Damage / loss of habitat of fauna

12.5 Several submissions raise the issue of damage and loss of habitat of fauna as a result of construction and operation of the proposed fill areas. The damage/loss of habitat of bats (relevant to Fill Area 4 only) has been addressed through the Bat Management Plan (Wildland Consultants, 2020). Measures required by the BMP have already been implemented by Fredrik Hjelm from Biosense. It is yet to be covenanted, but this is a formality.

12.6 The damage/loss of habitat for lizards has been addressed through compensation with 14,552m2 of indigenous terrestrial planting completed in the compensation area. The direct effect on lizards is now being addressed through conducting surveys in potential lizard habitat within all fill areas. Artificial Cover Objects (ACO's) will be set throughout suitable habitat and checked for native lizards under the supervision of qualified herpetologist Mr Andrew Blayney (Boffa Miskell). If native lizards are detected, a Lizard Management Plan will be created and implemented. The compensation site is deemed as a suitable release site for any native lizards caught during surveys and fill works.

12.7 The damage/loss of habitat for birds has also been addressed through terrestrial planting in the compensation area. Like-for-like habitat is being restored and created at the compensation area at a 4:1 compensation ratio. Efforts to decrease the time lag between loss of habitat at the impact site and gain of habitat at the compensation site are acknowledged. We believe it is important to mention the high-quality habitat that is present in the local area outside of the site, including many Significant Natural Areas (SNAs), that have significantly higher ecological value than the vegetation within the site. There are SNA's and smaller forest fragments bordering the site that likely provide better foraging and breeding habitat compared to the smaller isolated fragments of indigenous vegetation within the site.

12.8 The matter of acid sulphate contamination in soils and water is best addressed by contaminants experts. High levels of acid sulphate adversely affect flora and fauna; however, it is expected that the fill areas are managed in a way that ensures waste/contaminant acceptance criteria is adhered to.

Damage / loss of flora

12.9 The damage to and loss of flora is a concern raised in several of the public submissions. This issue is addressed through biodiversity offsetting following industry best-practice methods and principles. A biodiversity offset is a commitment to compensate for significant residual adverse impacts on biodiversity identified after appropriate avoidance, minimisation and on-site rehabilitation measures have been taken according to the mitigation hierarchy (DOC, 2014). The currency used for biodiversity offsetting for terrestrial vegetation in this proposal is area (m2). Approximately 3,327m2 of indigenous terrestrial vegetation of low ecological value will be removed as a result of construction/operation of the fill areas. This vegetation includes native broadleaf early successional scrub with several mature remnant trees. Species to be removed are not threatened and are abundant in local forest

fragments. Much of the vegetation appears to be adversely affected by pest plants and animals and regular aerial herbicide application. It was classed as having low value due to lack of representativeness, low likelihood of further succession, poor structural diversity, and small spatial extent. However, any area of indigenous vegetation plays an ecological role in the landscape by providing habitat for fauna and provision of ecosystem services/functions.

12.10 We are confident that this loss of vegetation and associated ecological value is able to be offset using the mitigation hierarchy; in fact, revegetation planting has already taken place in the compensation area in an effort to decrease the time lag between loss and gain of biodiversity. Approximately 14,552m2 of indigenous terrestrial planting has been completed which gives an offset ratio of 4:1 (gain:loss). Species that make up the planting include those that will be lost as part of the fill works.

Wilding pines

12.11 The submission of Collen Enderby (#24) raises the issue of wilding pine risk as a result of pine forestry proposed as fill rehabilitation. The pine species planned for this plantation is *Pinus radiata* which is, due to low vigour and high palatability, considered a low-risk species for wilding spread. Risk of wilding spread is also considerably lower in the warmer, wetter parts of New Zealand, as compared to the eastern South Island, due to the faster growth and higher stature of vegetation in these areas (Paul, 2015). Other pine plantations are also already present in the area, such as the bat reserve created for compensation for loss of bat roost habitat in Fill Areas 4 and 5.

13. COMMENTS ON CONDITIONS

13.1 We believe that Condition 19 (Ecology) adequately covers requirements of an Ecological Management Plan (EMP). Timeframes, methodologies, project specifications (eg. numbers of plants) and monitoring requirements will help to form a robust plan that achieves ecological outcomes. We believe that Condition 21 (Ecological Mitigation & Monitoring Report) is adequate to ensure compliance with Condition 19. We note that the Ecological Enhancement Programme (appended to conditions of consent in Schedule Two), referred to in Condition 20, does not include mitigation actions and timeframes but rather refers to the programme of works outlined in Section 10 of the EMP. Because ecological mitigation works have already commenced, we recommend Schedule Two is updated to include proposed timelines of remaining ecological works. We note that conditions associated with fauna management (bats and lizards) are not included, only Waikato Regional Council proposed conditions are included. As the Director General

of Conservation has recommended, we also advise that district consent conditions are made available and include appropriate fauna management.

14. CONCLUSIONS

14.1 It is of our informed opinion that the proposal will result in no more than minor effects on terrestrial ecology. The applicant proposes to restore and legally protect a compensation area, and uses indigenous planting, pest and weed control, and monitoring in this area to offset the loss of indigenous habitat caused by managed fill activities. Additional wetland compensation within the site's catchment offers compensation for the loss of both quality and quantity of wetland. More indigenous habitat is being created/restored than what is being lost, which ensures an ecological gain back to the Waikato River catchment.

Scott Julian Lowry
Ohara Marie McLennan
Envoco Limited
23 November 2022

Appendix A - Mitigation map

0.0