

Addendum 3 - Ecology and Biodiversity

Executive summary

Project context and change since baseline

The Haldon Solar Project is proposed on an approximately 320 ha site at Haldon Station in the Mackenzie Basin. Lodestone engaged AG Science in 2024, whose baseline ecology work described the project area as highly modified dryland outwash grassland dominated by introduced species, with low indigenous vascular plant cover and very low densities of threatened flora identified at that time.

Following feedback from ECan, DOC and others in late 2025 Lodestone organised subsequent site visits in 2025 by:

- Department of Conservation and ECan ecologists, who identified additional biodiversity values on site. DOC confirmed *Lepidium solandri* (Threatened - Nationally Critical) at three locations within the project area and recorded *Convolvulus verecundus* (tussock bindweed; At Risk - Declining) across several locations.
- Blueprint Ecology completed multiple days of on-site survey including pitfall traps and found examples of lizard values including Southern Grass Skink; (At Risk - Declining)
- SLR specialist survey in late 2025 confirmed additional biodiversity dryland invertebrate values including Robust Grasshopper (Nationally Endangered), Minute Grasshopper (Nationally Vulnerable), Otago Short Horned Grasshopper (At Risk - Declining) and Tekapo Ground Wētā (Nationally Endangered).

Ecological Management Plan approach and key commitments

This Ecological Management Plan (EMP) applies the effects management hierarchy of avoidance, mitigation, offsetting, and contingency compensation where required, supported by monitoring and adaptive management triggers. From the outset, Lodestone made commitments to Haldon Station to install a rabbit-proof fence around the solar farm boundary, with ongoing pest and predator management. This is a foundational measure to reduce ongoing pest/erosion pressure and support ecological outcomes over the life of the project. Lodestone has worked to adapt the project design to incorporate deliberate avoidance and setbacks from sensitive receiving environments, including a ~200 m lakeshore buffer, a ~300 m buffer from Haldon Arm Road, and avoidance of higher value areas.

Lodestone has used a conservative earthworks disturbance envelope for offset sizing of 13.19 ha, comprising roads, cabling corridors, laydown, substation and minor piling disturbance. Accommodating for that disturbance, Lodestone proposes five Conservation Areas (Zones 1-5) totalling 26.55 ha, including a 4 ha predator-proof invertebrate enclosure within Conservation Area Zone 1.

Following findings from further surveys, Wildlife Act Authorities will be sought as required for handling, salvage, translocation, or disturbance of protected fauna associated with construction and ecological management activities. Monitoring and reporting are consolidated into a single schedule with defined triggers and responses, including escalation measures where monitoring indicates underperformance.

Key project metrics:

1. Project area: ~320 ha
2. Ground coverage area at ~40%
3. Rabbit-proof fence and pest control area: ~320 ha
4. Offset sizing disturbance envelope: 13.19 ha
5. Conservation Areas / offsets: 26.55 ha across Zones 1-5
6. Invertebrate enclosure: 4 ha predator-proof enclosure (Zone 1)
7. Key setbacks: ~200 m from lakeshore; ~300 m from Haldon Arm Road

Part A – Context and framework

1 Introduction

1.1. Project origin and baseline understanding

Lodestone Energy was approached by Haldon Station in 2023 to explore the site’s potential for solar farm development. Early planning and site inspections indicated the proposed development area was highly modified and had experienced long-term ecological degradation. Station management described a cycle of degradation driven by wind erosion, rabbit pressure and weed invasion (particularly *Hieracium*), resulting in reduced vegetation cover, topsoil loss, reduced moisture retention, and further loss of plant cover. Exotic pasture grasses were sown to counter erosion and improve grazing forage. Lodestone and Haldon saw the opportunity to create a solar development on a portion of Haldon Station that would experience continued degradation without intervention.

From early development, Lodestone and Haldon identified rabbit exclusion and operational pest management as foundational measures to stabilise and improve ecological conditions over the project life. The baseline concept included rabbit-proof fencing, ongoing pest control, and project design measures intended to reduce ongoing erosion pressure and support soil moisture retention. This was the first of Lodestone’s ambition to ensure a no net loss biodiversity and ecology outcome.

An ecological assessment commissioned in 2024 concluded the site comprised highly modified dryland outwash grassland dominated by introduced species, with indigenous vascular plant cover representing only a small proportion of the overall footprint. No rare or threatened plant species were recorded at that time, and only four low-frequency “At Risk – Declining” native species were observed, noted as widespread elsewhere in the Mackenzie Basin and well represented within nearby conservation areas.

1.2. New findings and need for an EMP

Subsequent site visits in 2025 by Department of Conservation ecologists and SLR identified individual specimens of *Lepidium solandri* (Threatened – Nationally Critical) in three discrete locations within the project area. Given the cryptic nature of the species, it was noted that additional individuals could occur elsewhere within the development envelope. *Convolvulus verecundus* (tussock bindweed; At Risk – Declining) was also recorded across several locations.

Lodestone commissioned further targeted surveys in late 2025 using specialist terrestrial invertebrate and lizard experts. These surveys confirmed additional ecological values, including threatened dryland invertebrates such as:

- Robust Grasshopper (Nationally Endangered)
- Minute Grasshopper (Nationally Vulnerable)
- Otago Short-horned Grasshopper (At Risk – Declining)
- Tekapo Ground Wētā (Nationally Endangered)

and lizard values including:

- McCann’s skink (Not Threatened)
- Southern grass skink (At Risk – Declining)

Considering these findings, Lodestone has developed this EMP to address adverse effects (including residual adverse effects) associated with construction and operation of the solar farm

on confirmed biodiversity values, and to respond to comments received on the substantive application.

1.3. Purpose and scope

This EMP:

- sets the project's enhancement intent and ecological outcomes;
- applies the effects management hierarchy to each ecological receptor;
- sets out avoidance, mitigation, offset and contingency compensation pathways;
- consolidates monitoring, reporting, compliance and governance requirements; and identifies related specialist plans and certification requirements.

2. Enhancement vision and project design intent

2.1. Enhancement vision

The project area is subject to ongoing pressures from pests (including rabbits, predators and invasive weeds and erosion driven by high winds and solar irradiation. Without intervention, these pressures are expected to continue and any inherent ecological values will continue to decline. While the current site ecology reflects a long history of modification, the project provides an opportunity to implement active and enduring management (fencing, pest control, monitoring, and targeted enhancement) to support biodiversity outcomes over the project life.

Lodestone and Haldon Station's intent is that ecological values at Haldon are safeguarded, and that the site is managed so the land is left as good or better than it was found.

2.2. Design measures supporting avoidance and minimisation

Recognising ecological and landscape sensitivity of adjacent environments, Lodestone has deliberately set back the project footprint from sensitive areas where practicable, including:

- ~200 m buffer from the lakeshore;
- ~300 m buffer from Haldon Arm Road (also reducing visual effects); and
- avoidance of higher value areas (including Mount Maggie) where practicable.

2.3. Whole-of-site pest exclusion and ecological management

Lodestone has committed to a rabbit-proof fence around the project boundary with ongoing operational pest control within the fenced area. This is a foundational measure to reduce pest-driven pressure, support vegetation recovery, and improve habitat conditions over the project lifetime. While the effects of partial shading are uncertain, with some ecologists suggesting potential for improvement; Lodestone understands vegetation change could result in detrimental outcomes for open-habitat flora or invertebrates, this EMP includes receptor-specific avoidance/mitigation and proposes offsets.

3. Effects management framework and application

For each ecological receptor, this EMP applies:

1. Avoid – prevent effects where practicable (e.g., micro-siting, exclusion zones).
2. Minimise – limit effects where practicable (limit off-track vehicle movements, laydown areas).
3. Mitigate – reduce intensity and likelihood of effects (e.g., construction controls, protocols).
4. Offset – deliver measurable biodiversity gains to counter residual effects.
5. Compensate (contingency only) – considered where monitoring confirms a project-attributable deficit and offsets/mitigation cannot reasonably achieve no net loss.

Adaptive management triggers and defined responses are built into monitoring and reporting (Part D).

Part B – Spatial plan, disturbance envelope and offsets

1. Project footprint and disturbance envelope (offset sizing basis)

The project covers approximately 320 ha on Haldon Station. The conservative earthworks disturbance envelope used for offset sizing is 13.19 ha, comprising roads, cabling corridors, laydown, substation and minor piling disturbance, noting this will be refined during detailed design.

Table 1: Project disturbance envelope

Item	Length (m)	Width (m)	Number	Area (m ²)	Area (ha)
Substation access road	1500	5	1	7,500	0.75
Internal roads	11,970	4	1	47,880	4.79
AC MV cable	14,178	0.5	1	7,089	0.71
DC LV homerun cable	37,100	1.25	1	46,375	4.64
Inverter station	6	2.5	48	720	0.07
Pile (array posts)	–	–	65,840	0.003394	0.02
Laydown area	–	–	–	10,000	1.00
Substation footprint	153.3	78.7	1	12,064.71	1.21
Total	–	–	–	–	13.19

2. Construction vehicle movement

Construction vehicles (including piling rigs) will traverse the site during construction. Piling rigs operate slowly and predictably, enabling effective implementation of ecological exclusion zones, access route controls, and ecological oversight during works. This reduces the likelihood of unmanaged disturbance to threatened flora or habitat features supporting dryland invertebrates compared to higher-speed or less controlled traffic, particularly where works are staged and confined to defined corridors.

3. Conservation areas and offsets

In addition to avoidance/setbacks and whole-of-site rabbit fencing and pest management, Lodestone proposes conservation areas for offsets, monitoring reference plots and adaptive trials.



Figure 1: Conservation Areas (Zones 1-5)

Note: change in colouration in the image is due to high-resolution drone imagery over site and lower resolution satellite imagery in the wider area.

Five conservation areas (Zones 1-5) totalling 26.55 ha provide a mosaic of dryland, stony and irrigation-adjacent environments.

Table 3: Detail of conservation areas

Zone	Area (ha)	Location	Environments	Conservation solution
All	26.55	NW, NE, SE, S, Centre	Outwash plain, dryland, irrigation adjacent, lakeshore adjacent, rocky outcrop	Offset delivery, monitoring reference plots, adaptive trials
1	12.5	NW	Dryland	Lepidium nursery + threatened/at-risk flora nursery; 4 ha invertebrate enclosure (also supports lizards)
2	1.15	NE	Dryland, irrigation adjacent	Habitat enhancement; monitoring/reference
3	2.5	SE	Dryland, stony	Lizard habitat with leaky fence approach; no enclosure
4	1.2	S	Increasing water availability	Lizard enclosure
5	9.2	Central	Outwash plain, dryland, stony	Lizard habitat + stone reuse microhabitats; dryland planting for threatened/at-risk flora

Part C – Receptor management plans

1. Flora management

1.1. Objective

Achieve no net loss of indigenous flora values associated with the Project, with particular focus on *Lepidium solandri* and other threatened/at-risk species present.

1.2. Key receptors

- *Lepidium solandri* (Threatened - Nationally Critical)
- *Convolvulus verecundus* (At Risk - Declining)
- Other Threatened or At-risk indigenous dryland species recorded on site

1.3. Primary risks

- Direct damage during construction (earthworks, traffic impacts)
- Browsing pressure (especially rabbits)
- Weed competition affecting establishment and recruitment

1.4. Avoidance, minimisation and mitigation

- Targeted pre-construction botanical surveys and mapping.
- Micro-siting and exclusion zones around confirmed *Lepidium* locations where practicable.
- Physical protection/caging of retained individuals where required.
- Construction access route controls and ecological oversight.
- Use of occasional grazing to manage weeds.

1.5. Offsets/enhancement

- Seed collection, propagation and augmentation where beneficial.
- Establishment of on-site nursery function in Conservation Area Zone 1.
- Dryland-appropriate planting and reinforcement in conservation areas and selected project footprint areas.

1.6. Monitoring and success criteria

- Permanent photo points and fixed quadrats.
- Success criteria (initial draft):
 - $\geq 50\%$ survival at Year 2 (planted/augmented flora)
 - $\geq 30\%$ vegetation cover at Year 1 in reinstated patches
 - Evidence of flowering and/or seed set for threatened species

1.7. Triggers and response

- Trigger: survival/cover thresholds not met; lack of flowering/seed set.
- Response: remedial planting, protection and maintenance adjustments; escalation if underperformance persists.

2. Invertebrate management

2.1. Objective

Maintain and enhance habitat suitable for threatened dryland invertebrates, addressing construction disturbance and potential longer-term habitat change (e.g., shading/vegetation shift).

2.2. Key receptors

The Terrestrial Invertebrate Assessment prepared by SLR Consulting concludes that the site supports a diverse dryland invertebrate community, including several nationally Threatened and At Risk species (see below). The assessment finds that construction and operation of the solar farm are likely to result in some invertebrate mortality and habitat modification, particularly from earthworks, vehicle movements, and changes in microclimate and vegetation caused by panel shading, noting uncertainty due to the lack of comparable New Zealand solar farm data.

To address these effects, the report outlines a mitigation framework consistent with the effects management hierarchy, including avoidance and minimisation where practicable, habitat remediation, establishment of conservation zones, and long-term monitoring with adaptive management, and concludes that offsetting or compensation is likely to be required to demonstrate no net loss of indigenous biodiversity values over the life of the project.

To this effect, an Invertebrate Management Plan will be produced.

- Robust grasshopper (*Brachaspis robustus*; Nationally Endangered)
- Minute grasshopper (*Sigauss minutus*; Nationally Vulnerable)
- Otago short-horned grasshopper (*Phaulacridium otagoense*; At Risk – Declining)
- Tekapo ground wētā (*Hemiandrus furcifer*; Nationally Endangered)

2.3. Design principles

- Maintain open, sun-exposed habitat conditions.
- Avoid excessive vegetation shading within key habitat areas.
- Provide warmed stony structures and refugia.

2.4. Avoidance and mitigation

- Pre- and post-construction baseline surveys
- Construction protocols to reduce uncontrolled disturbance to identified habitat features.

2.5. Offsets/enhancement

- Construct a 4 ha predator-proof invertebrate enclosure in Conservation Area Zone 1 (Appendix B).
- Establish microhabitat features using salvaged stones/gravels with sparse dryland planting.
- Vegetation management in conservation areas to maintain open habitat characteristics.

2.6. Predator management

- Integrated suppression of hedgehogs, rodents and mustelids.

2.7. Monitoring

- Seasonal timed searches, sweep netting, pitfall trapping.
- Monitoring locations: enclosure (reference), microhabitats, and matched control sites.

2.8. Triggers and response

- Trigger and response: habitat enhancement if populations decline by 10%, escalation to translocation and/or additional protected areas if additional declines occur.
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2.9. Legal compliance

- Wildlife Act Authority application(s) as required for salvage/handling/translocation.

3. Lizard management

3.1. Status

Desktop review and field surveys confirmed that only two lizard species are present on site: McCann's skink (Not Threatened) and Southern grass skink (At Risk - Declining).

The assessment concludes that over 99% of the development footprint avoids lizard habitat, and that only ~2.4 ha of low to moderate quality habitat would be affected, representing a negligible magnitude of effect at both the local and ecological district scale. Construction effects are expected to be short-term and manageable through a Lizard Management Plan, including salvage, relocation, and habitat enhancement. Importantly, the change in land use—particularly rabbit-proof fencing and reduced grazing—is expected to result in a net gain in lizard habitat over time, with increased vegetation cover and improved microclimatic conditions beneath solar panels.

With the proposed mitigation and enhancement measures in place, the report concludes that the project will result in no net loss, and likely a long-term positive outcome, for lizard populations at Haldon. Interim measures apply pending completion and certification of the specialist Lizard Management Plan (LMP).

3.2. Key receptors

- McCann's skink
- Southern grass skink (At Risk - Declining)

3.3. Avoidance and mitigation

- Ecologist-led lizard encounter protocols during works in line with the Lizard Management Plan,
- Additional surveys, salvage and relocation to Zone 1 ecological zone with enhancement planting and pest control as per Section 7.2 of the Lizard Assessment.
- Undertaking a post release monitoring programme as per Section 7.2 of the Lizard Assessment.

3.4. Enhancement

- Fenced habitat enhancement area (Zones 1) with predator suppression.

3.5. Legal Compliance

- Lizard enclosure in Zone 1.
- Wildlife Act Authority application(s) as required.

4. Avifauna management

While the likelihood of avian mortality associated with the construction and operation of the Haldon Solar Farm is assessed as low, Lodestone recognises that any mortality involving nationally Threatened or At-Risk species—such as black stilt (kakī), wrybill, or black-fronted tern—could have disproportionately high conservation consequences. Accordingly, Lodestone has adopted a precautionary approach that combines avoidance through site selection and design, robust monitoring capable of detecting rare events, and clearly defined adaptive management responses. This framework ensures that, should low-probability but high-consequence effects occur, they can be promptly identified and addressed through targeted mitigation and, where necessary, offsite compensation to achieve no net loss of these species.

The Haldon Solar Farm has been designed to minimise the risk of avian mortality through the following measures:

- ≥200 m setback from Lake Benmore.
- Insulated cabling with no exposed conductors meaning birds are not at risk of electrocution.
- Minimal night lighting
- Panel orientation and spacing reduce any potential for “lake effect” and allow birds to safely navigate through the site via access corridors (minimum 3.4 m between panel rows when panels are flat).
- Panels are to be installed on a tracking system that slowly moves panels during the day to orient towards the sun. This has been shown in overseas studies to be beneficial for avoiding avifauna collision risk.
- Panels cover a maximum of 40% of the ground when they are flat at solar noon; ground coverage is reduced when panels are tilted at all other times.
- No new transmission lines are proposed; only a substation is required to connect to existing transmission infrastructure. There will be one new transmission tower and short span of conductor (~20m) to connect the new substation to the existing line.
- The site is located away from important bird areas and is not in close proximity to the DOC kakī aviaries. The figure below shows tracking data for black-fronted terns in the surrounding area.



Figure 2: Bird flight paths and location fixes as identified by DOC surveys¹

¹ Left hand picture: Tracks of 35 black-fronted terns (Nationally Endangered) (1,104 fixes 6/11/20 - 21/1/22). Each colour denotes a different bird. The dots are precise location fixes and the lines interpolated flightpaths between consecutive fixes

Right hand picture: Tracks of 16 black-fronted terns (Nationally Endangered) (55 fixes 22/10/22 - 29/1/24). Each colour denotes a different bird. The dots are precise location fixes and the lines interpolated flightpaths between consecutive fixes (Data source: DOC).

4.1. Management of Collision Risk to Avifauna

International literature in relation to the avian “lake effect hypothesis” indicates that collision risk at solar farms is generally low, but not zero²³. The literature also suggests there are very site-specific considerations and point to water scarcity as being a potentially critical factor. However, the applicability of this literature to the New Zealand context is limited.

The recent NZ consent decision for Glorit Solar Farm elaborates on some of the evidential matters with regard to collision risk⁴. The decision confirms that the existing literature is largely based on installations in the southwestern United States. The following additional comments are noted:

- The risk of collision is exacerbated by the absence of nearby water bodies. The immediately adjacent Lake Benmore (Te Ao Marama) at Haldon represents a large mitigating factor likely to substantially reduce the collision risk.
- Higher fatality rates are biased toward large > 1000 ha installations.
- There is limited evidence to suggest that collision risk is a significant issue at solar farms outside of arid, desert sites in the US.
- Most waterbird collisions in the literature apply to sites where migratory waterbirds may be drawn to solar farms in search of open water bodies.
- Many of the US studies are conducted on solar farms that use different or older technology. For example, Concentrated Solar Power (CSP), or fixed tilt systems, or panels without anti-reflective coating. As the Haldon site will utilise modern photovoltaic panels with anti-reflective coating, and is a single axis tracking system, these collision studies are not applicable.
- Even in the desert contexts with higher fatality rates, the high-end estimates are still significantly lower than that associated with other anthropogenic structures such as communication towers, wind turbines and road mortality (in particular, vehicle collisions).
- There are numerous records of birds regularly interacting with solar panels and solar farms without harm. Lodestone also has anecdotal video evidence of harmless water fowl interaction at one of our sites during a flood.
- The US studies themselves specifically stated that they should not be used to extrapolate fatality rates for sites with markedly different habitats.
- Follow-up research in the US is in progress by Argonne National Laboratory. The research utilises cameras and AI technology coupled with ground-based fatality monitoring and includes 100,000 camera tracks and 70,000 hours of video. Preliminary analysis has reported no diurnal avian collisions.

Lodestone has four operational solar farms in New Zealand and therefore has direct experience within the local context. To date, there have been no known bird fatalities associated with the operation of Lodestone’s solar farms.

Notwithstanding this operational experience, Lodestone acknowledges the importance of providing confidence that the operation of the Haldon Station Solar Farm will not adversely

² [Aquatic Habitat Bird Occurrences at Photovoltaic Solar Energy Development in Southern California, USA](#) Aquatic Habitat Bird Occurrences at Photovoltaic Solar Energy Development in Southern California, USA

³ <https://www.energy.ca.gov/sites/default/files/2024-06/CEC-500-2024-055.pdf> Investigating the “Lake Effect” Influence on Avian Behavior From California’s Utility-Scale Photovoltaic Solar Facilities

⁴ <https://www.epa.govt.nz/assets/Uploads/Documents/Fast-track-consenting/NBEA-process/NBEA-Glorit-Solar-Farm/Glorit-Solar-Farm-decision-with-amended-conditions-of-consent-4-November-2025.pdf>

affect nationally Threatened or At-Risk species, including black stilt (kakī), wrybill, and black-fronted tern.

4.2. **Avian Mortality Monitoring Programme**

As part of its commitment to responsible development and environmental stewardship, Lodestone engaged Proteus to provide independent statistical advice on the design of an avian mortality monitoring programme and to review existing evidence relating to potential bird interactions with solar infrastructure. The report summarises current scientific understanding of avian risks at solar facilities, evaluates the relevance of the “*lake effect hypothesis*”, and presents a robust, simulation-based framework for monitoring bird mortality at the site. The findings are intended to support transparent, evidence-based decision-making and to ensure that any potential impacts on avifauna mortality are appropriately assessed and managed.

Through this process, it has become clear that the scientific understanding of avian interactions with utility-scale solar farms remains subject to substantial uncertainty, particularly where observed carcass detections are rare. Studies such as Smallwood (2022) highlight the methodological challenges of estimating avian mortality at solar facilities when annual carcass detections are typically in the low single digits or zero. In these circumstances, estimated mortality rates are highly sensitive to assumptions regarding searcher efficiency, carcass persistence, and site coverage.

Importantly, the conditions at Haldon are expected to be more favourable for carcass detection and persistence than those assumed in many overseas studies. The site will be subject to perimeter pest fencing and active pest control, which is expected to reduce scavenger pressure and increase carcass persistence. Repeated carcass persistence trials (see below) will allow us to account for this difference in mortality estimates. The solar array will be established on predominantly barren or sparsely vegetated ground, improving visual detectability relative to agricultural sites with dense pasture cover. In addition, the availability of regular drone flyovers provides a supplementary detection method that could reduce reliance on conservative detection methods. This project is an opportunity to test and implement these new methods. In this context, the use of generic or highly precautionary assumptions in the absence of well-designed, site-specific trials has the potential to materially overstate inferred mortality risk relative to the likely conditions at Haldon.

Review of the “*lake effect hypothesis*”

The hypothesis suggests birds may be attracted to solar panels because their reflective properties mimic water bodies, potentially increasing collision risk. The review finds that:

- Empirical evidence supporting the *lake effect hypothesis* is limited and held back geographic and ecotype biases.
- Existing studies are heavily biased towards North American, arid environments and older solar technologies.

Avian interactions with solar facilities appear highly context-dependent, varying with local species assemblages, habitat characteristics, and facility design. There is limited understanding of how these factors will interact within New Zealand systems.

Recommended monitoring framework

The report recommends a monitoring programme built around three complementary studies:

- **Avian mortality surveys** to record bird carcasses within the solar array at regular intervals.
- **Searcher efficiency trials** to estimate how likely search agents (i.e., humans, dogs or drones with AI image classification) are to detect carcasses when present.
- **Carcass persistence trials** to estimate how long avian carcasses of relevant species (or suitable proxies) remain detectable before scavenging or decay.

This integrated approach is necessary because raw carcass counts alone substantially underestimate true mortality due to imperfect detection and carcass loss.

Simulation-based evaluation of monitoring designs

Extensive simulations were run to test how different survey intervals, site coverage levels, carcass sizes, detection probabilities, and scavenging rates affect monitoring performance. Key findings include:

- Weekly to bi-weekly surveys with approximately 10-25% site coverage strike the best balance between statistical reliability and operational feasibility. We anticipate that higher site coverage is feasible with the use of drones.
- Observing no carcasses does not necessarily imply zero mortality; upper bounds on plausible mortality rates should be reported alongside “no-detection” results. The upper bounds will decline with increased coverage, searcher efficiency and carcass persistence.

The simulations show that monitoring design choices have a strong influence on what conclusions can reasonably be drawn from survey results.

A condition of consent has been proffered in relation to the Avian Mortality Monitoring Programme including adaptive management triggers. Monitoring will commence at commissioning. Preconstruction monitoring will allow us to assess baseline mortality, which can help reduce estimates of facility-caused mortality. The results will be reviewed at defined intervals and will trigger pre-specified adaptive management responses, including the implementation of additional mitigation or compensation measures where required.

Triggers and response

- Trigger: ≥ 1 or more mortality of a Threatened species per year, or material increase in corrected mortality.
- Response: method review; additional mitigation (deterrents/operational adjustments/layout refinements within tolerances); escalation pathway.
- Compensation is considered if monitoring demonstrates no net loss cannot reasonably be achieved through mitigation and adaptive management.

A pre-construction survey is proposed to confirm the absence of nesting birds within the site. Surveys undertaken to date, together with information provided by the landowners, indicate that the site is not used for nesting or regular occupation by birds. Should any nesting birds be identified, appropriate exclusion zones would be established and maintained until chicks have fledged. These measures are considered capable of being effectively managed through consent conditions including pre-construction monitoring.

Appendices

Appendix 3a: SLR Invertebrate Assessment
Appendix 3b: Blueprint Ecology Lizard Assessment
Appendix 3c: Proteus Literature Review and Avifauna Monitoring Plan
Appendix 3d: Witness Statement P Espie
Appendix 3e: Witness Statement Blueprint Ecology
Appendix 3f: Witness Statement SLR