11 March 2026

Honourable Raynor Asher (KC)
The Fast Track Panel
Haldon Solar Fast Track Application
c/- Environmental Protection Authority
Private Bag 63002,
Wellington 6140
Via email:

Our Ref: EPA.00812/00815

Dear Raynor,

Critical Information Gaps — Avifauna
Haldon Solar Project & The Point Solar Farm

1 Scope

I have been retained by the Environmental Protection Authority (EPA) to provide independent expert avifauna advice to The Panel in respect to the Haldon Solar Project (HSP) application at Haldon Station and The Point Solar Farm (PSF), south of Twizel. The details of the project and biodiversity values relating to avifauna values are provided for in the respective application and submitter documents and not repeated here.

My brief is as follows:

1) Review technical comments received, including from DOC, Forest and Bird, EDS, Environment Canterbury, and any other comments from invited parties, applicant responses and suggested conditions from the applicant on avifauna monitoring and effects management regime
2) Undertake a site visit as required
3) Discuss with and advise the Expert Panel, primarily on:
    a. Appropriateness and design of adaptive management approaches
    b. Residual effects
    c. Design of compensation and off sets
4) Prepare memoranda as required to the Expert Panel with the technical advisor's opinion and advice
5) Attend and contribute to any expert conferencing, workshops, hearings or other forums involving ornithologists
6) Further follow-up and advice as directed by the Expert Panel

This is a preliminary review outlining information gaps where I consider further information is required in order to be able to present my detailed review and recommendations.

Following my preliminary review of:

- Substantive applications and submitter documents as they relate to avifauna, applicant responses and draft management plans (including the February 2026 information) – for both projects

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- Expert evidence from Dr Colin O'Donnell (DOC) and Dr Rachel McClellan (Forest & Bird) – for both projects
- Peer review reports supplied by the application for the PSF from Dr Gary Bramley (Ecological Solutions) and Dr John Craig (Green Inc).

I conclude that information gaps remain for both the HSP and the PSF that prevent an adequate assessment of avifauna effects under the Fast-track Approvals Act 2024.

The applicants have both provided management frameworks and compensation proposals, but have not provided sufficient scientific assessments needed to:

- Quantify the full extent of collision risk to the key nationally Threatened and At-Risk bird species, or if quantification is unable to be obtained;
- Present a suitably detailed, and 'shovel ready', adaptative management response framework to determine and address the uncertainty surrounding collision risk;
- Evaluate the effectiveness of proposed mitigation measures; or
- Design monitoring systems capable of detecting population-level impacts.

Without this technical information, in my opinion, it is difficult to determine whether adverse effects can be avoided, remedied, or mitigated in accordance with the statutory framework.

2 Summary of Key Findings & Risks

Both projects sit at the confluence of three braided rivers (Takapō, Ōhau, Pūkaki) entering Lake Benmore. The sites are adjacent to, and possibly within, bird flyways connecting breeding colonies to nesting and feeding habitat, as well as night roosts, for a number of indigenous bird species.

My review of the material indicates the fundamental issue centres on collision risk by birds into the panel arrays, leading to injury or mortality of key bird species, and to a lesser extent, the loss and/or displacement of access by key bird species to feeding and breeding habitat. While both the HSP and PSF assessments conclude that there minimal bird use of the site and "very low" effects, experts for DOC (Dr Colin O'Donnell) and F&B (Dr Rachel McClellan) consider there are deficiencies in the assessments, and 18+ Threatened/At-Risk species regularly using the area, including three Nationally Critical species (kaki/black stilt, Australasian bittern, white heron).

Limited access to DOC GPS tracking data indicates regular key bird species movements near and over the sites, particularly at night when collision risk may be highest due to 'lake effect' from solar panel polarisation mimicking water bodies.

<u>High-Risk Avifauna species identified</u> include:

- Kaki (Black Stilt) - Nationally Critical, ~140 wild birds globally
- Black-fronted tern - Nationally Endangered, flyway crosses site
- Australasian bittern - Nationally Critical, highly mobile between wetlands
- Banded dotterel - At Risk-Declining, breeds in similar dryland habitat
- Multiple other waterbird species using adjacent rivers/lake systems

<u>Primary Risk Factors</u>:

a) Location: Sites are positioned under major established flyways
b) Timing: Peak movements occur at dawn/dusk when collision risk highest
c) Technology: Solar panels create polarised light mimicking water bodies
d) Scale: 320 ha development + 670 ha adjacent "Point Solar" = cumulative 990 ha impact
e) Species vulnerability: Three Nationally Critical species where even single fatalities could affect population viability

Collision Risk Science

While solar-bird collision mechanisms are poorly understood, patterns emerge from overseas studies: waterbirds across all families can experience collision mortalities at photovoltaic installations, likely due to polarised light reflection causing navigation dysfunction or "lake effect" misidentification.

This uncertainty on the extent and risk of collision risk at an international level is further compounded for these two proposals because:

- No scientifically valid local collision studies exist in New Zealand;
- The sites are adjacent, or across the flight paths between habitat, in a locality which has disproportionately high threatened species avi-fauna densities to any other solar farm proposal yet considered in New Zeland;
- They may affect three Nationally Critical species where any mortality could affect national population viability; and
- Cumulative pressure: Multiple large solar farms are proposed simultaneously in this locality

3 Assessment Quality Disagreement

Both applications have undertaken avi-fauna surveys using insufficient and/or non-standard methods to be able to reliably detect use of the sites by bird species, including flightpaths and heights (especially nocturnal behaviours), and behaviours of cryptic waterbird species. This has led to an underestimation of both species' diversity, site use (including flight pathways) and site significance determination.

Dr O'Donnell and Dr McClellan consider the sites both meet ecological significance criteria under the Canterbury Regional Policy Statement, as the sites and adjacent habitats support multiple threatened species and serve as habitat linkages in an internationally recognised locality for indigenous birds.

While the updated National Policy Statement for Renewable Electricity Generation strengthens renewable energy direction, my understanding it still requires effects management hierarchy application and consideration of offsetting or compensation where residual effects occur on Section 6(c) matters.

4 Shortfalls of the Haldon Solar Project application

In terms of the HSF application, the assessment of ecological effects (AEE) departs from best practice because there is no methodological basis for creating a solid foundation for the effect assessment itself. While not a statutory requirement, the majority of AEEs prepared for consent applications associated with large infrastructure projects align with the effects assessment and effects management in accordance with the Ecological Impact Assessment Guidelines (EcIA) guidelines, developed by the Ecological Institute of Australia and New Zealand (EIANZ). I am aware that some ecologists do not favour this approach. However, adherence with the EciA guidelines can allow for a more systematic and nuanced analysis of the potential effects on each of the ecological aspects.

In this approach a 'Low' or 'Very Low' level of mitigated impact (residual effect after efforts to avoid, minimise or remedy impacts are considered) is not normally of concern, though design should still take measures to minimise potential effects.

A 'Moderate' to 'High' level of mitigated impact indicates a level of impact that qualifies careful assessment on a case-by-case basis. Such activities could be managed through avoidance (revised design) or appropriate remediation and/or mitigation.

A 'Very High' level of mitigated impact is unlikely to be acceptable on ecological grounds alone and should be avoided. The consequence of strike mortality causing a significant adverse effect on nationally Threatened or At-Risk bird species is potentially a Very High level of unmitigated effect for this proposal - even in low numbers.

There is also another component to consider in the ecological effects assessment. That is, the level of uncertainty and risk associated with each of the effects categories. In particular, the significant level of uncertainty (and disagreement between experts) on the risk of strike with the solar panels in relation to avifauna.

Dr O'Donnell and Dr McClellan conclude that avoidance (I assume by not constructing the solar farm) is their preferred option. Dr O'Donnell has also suggested a lesser preferred option of trialling a staged approach to construction and an adaptive monitoring and management regime to monitoring effects and only allowing further development until the effects have been shown, by monitoring, to be less than minor.

A Very High level of unmitigated effects can be reduced to a lower level of effects category if it can be shown that subsequent mitigation and remediation measures have addressed the matters causing the very high level. In addition, demonstrating a net gain or net positive outcomes for biodiversity values by implementing biodiversity offsetting or compensation measures can be an appropriate pathway to address any remaining residual adverse ecological effects.

The Ecological Management Plan (EMP) approach presented by Lodestone Energy, including the avifauna management section (section 4) and Proteus Avifauna Monitoring Plan (AMP) supplied by the applicant, provides a potentially appropriate approach to dealing with the avi-fauna collision risk and loss/displacement of habitat. The proposed layout and design measures are likely to reduce the risk of avian collision, although not entirely, (for example I would prefer a 5 m gap between the panel array rows as opposed to the 3.4 m proposed). Moreover, the monitoring programme (focussing on robust carcass searches) is in-line with best practice. The EMP also provides opinion, supported by international literature, which counters that of Dr O'Donnell and Dr McClellan in regard to the collision risk, which is helpful in clarifying that design solutions can reduce strike risk.

However, the overall package is still incomplete in my view and requires not only a substantively upgraded effects assessment on avifauna, but also a more detailed review of the management regime (and condition set) proposed. The reason is I am not convinced the applicant has provided sufficient evidence or management approach detail to address a possible scenario of multiple and ongoing collision strikes of the Threatened and At Risk bird species in question.

I do, see a possible pathway to resolve this matter of uncertainty relating to assessing collision risk by the trigger response approach by the applicant (EMP, section 4.2 page 14) (and applicable to both projects). The proposed Southland Wind Farm, the consented Waipipi Wind Farm and the consented but never built, Hauāuru mā raki Wind Farm have taken approaches to assessing, quantifying and managing the risk associated with turbine blade strike which could be tailored to this solar farm proposal, and in particular, to address panel strike. These wind farm projects have identified bird strike risk issues which were addressed through a range of approaches in management plans, performance standards, and off-site animal pest control packages, using trigger response approach supported by a detailed adaptive management framework. However, the amount of supporting studies, expert evidence and independent expert reviews associated with these wind farm applications was far more comprehensive than that presented by both the HSP and PSF applications to date.

I suspect the collision risk profiles of solar farms is less than for windfarms, but the location of these two solar projects, and the lack of any scientific data in a New Zealand context on the risk of collision with panels by specific birds, especially those with such high threat status, justify a precautionary approach.

In terms of buffers, I understand HSP application proposes a 200 m buffer from Lake Benmore, which I support. My preference is that a 200 m buffer is also applied the edge of any landscape planting along the north-west margins to the sensitive wetland habitat of the Pukai River complex it abuts the solar farm in this location.

5 Shortfalls for the Point Solar Farm Application

The PSF applicant has provided management frameworks and compensation proposals, but has not provided the fundamental scientific assessments needed to:

- Quantify collision risk to Nationally Critical species, or if quantification is unable to be obtained;
- Present a suitable adaptative management response framework to determine and address the uncertainty surrounding collision risk;
- Evaluate the effectiveness of proposed mitigation measures; or
- Design monitoring systems capable of detecting population-level impacts.

Without this technical information, in my opinion it is difficult to determine whether adverse effects can be avoided, remedied, or mitigated in accordance with the statutory framework.

The proposed solar farm is:

- Located within an internationally recognised Important Bird Area
- Located within active flight corridors for multiple Threatened and At-Risk species
- Adjacent to habitat, and within flight paths of Nationally Threatened and At-Risk species, and for other indigenous bird species, including nightly roost routes of black-fronted terns

Given there is high uncertainty and a high consequence, in terms of collision strike risk on key avi-fauna species, there is a need for precaution. This is because the mechanisms of collision are poorly understood; no New Zealand data exist; and the site is in an internationally recognised Important Bird Area.

No species-specific collision-risk assessment has been provided despite documented GPS evidence showing extensive bird movements directly over the proposed site. International literature demonstrates that utility-scale photovoltaic installations can cause significant bird mortality, including waterbird species ecologically equivalent to those at The Point.

Further information is required because:

- The ecological effects assessment did not evaluate collision risk for each species
- The spatial location of the solar farm is within nationally significant bird movement corridors
- Multiple Nationally Threatened and At Risk bird species are present in the locality
- Two expert witnesses (DOC + Forest & Bird) consider adverse mortality effects may be at population-level for some species
- The proposed compensation is not clearly linked relative to potential loss
- The current Avifauna Management Plan lacks scientific basis
- International evidence shows high mortality rates at PV farms
- No baseline data exist for NZ bird species interactions with solar installations

- Monitoring designs must be sufficiently robust to reliably detect a single kakī death

In terms of buffers of the PSF from sensitive bird habitat areas, I note 100 m is proposed. My preference is that a 200 m buffer is applied , from the edge of the landscape planting to the sensitive habitat, rather than the edge of the infrastructure.

6 Further information request

Accordingly, I recommend that the Panel seek further information from the applicants as detailed in **Attachment 1** and **Attachment 2** below.

7 Concluding Statement

Once this further information is received, I will be in a better position to present a more detailed review of the applications in terms of their potential effects on avifauna.

Caucusing between the experts (and planners) may be useful to provide the Panel further assurance that the effects management hierarchy has been properly considered and residual adverse effects on significant indigenous avifauna and their habitat use can be comprehensively addressed.

Yours faithfully

Gerry Kessels - Principal Ecologist

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My recommendation is that the HSP applicant prepare a revised avi-fauna effects assessment in accordance with the Ecological Impact Assessment Guidelines, or similar. The applicant should also prepare a fulsome AMP (building on the foundation provided by the Proteus report), which quantifies, as far as reasonably possible, the performance standards and outcomes, in terms of adaptive management approaches, required to give effect to solar farm design changes and compensatory packages to ensure adverse effects on birds have been addressed so that the overall net effect will be low or negligible if not net positive.

Specifically, the assessment should include responses to the following:

Attachment 1- A

A species-specific collision-risk assessment for all Threatened and At-Risk species using or traversing the site, including:

(a) Flight frequency analysis based on available GPS tracking datasets and field observations

(b) Flight height distributions and panel interaction zones

(c) Seasonal and diurnal variation in collision exposure

(d) Species-specific vulnerability factors (body size, flight behaviour, habitat requirements, polarised light sensitivity)

(e) Collision probability estimates for:

- Kakī/black stilt
- Black-fronted tern
- Australasian bittern
- Australasian crested grebe
- Other waterbird species using the area

(f) Known breeding, roosting, and foraging locations within 5 km

Justification:

GPS data from DOC and university research demonstrates extensive bird movements over the project site that have not been analysed for collision risk. Without quantitative assessment, it is difficult to evaluate whether effects are minor or potentially more than minor for threatened populations.

Attachment 1- B

Panel Technology and Design Risk Analysis

Provide technical assessment of the proposed solar array configuration including:

(a) Polarization and UV reflectance signatures of proposed panels

(b) Evidence for efficacy of anti-reflective coatings in reducing bird attraction

(c) Comparative collision risk: 60-degree vs vertical night positioning

(d) Panel spacing effectiveness (3.6 m gaps) in reducing the hypothetical "lake effect"

(e) An updated literature review of proven panel technologies that demonstrably reduce bird mortality

Justification

Current panel design assumptions lack supporting evidence. Avi-fauna experts recommend vertical night positioning, but the applicant proposes 60-degree. Anti-reflective coatings are proposed without evidence of effectiveness. Panel configuration could significantly influence collision rates but remains unanalysed.

Attachment 1-C

Infrastructure Collision and Electrocution Assessment

Provide assessment of bird collision and electrocution risks from non-panel infrastructure:

(a) Perimeter fencing collision risk analysis

(b) Substation and inverter collision/electrocution potential

(c) Internal road and track collision risk

(d) Lighting impacts (construction and operational)

(e) Building strike risk assessment

(f) Mitigation design for all infrastructure types

Justification

Avian mortality at solar installations results from multiple infrastructure types, not just panels. Expert evidence identifies overhead cables, fencing, and buildings as significant collision hazards that remain unassessed (International literature cited by expert witnesses).

Attachment 1 -D

Population-Level Impact Thresholds & Adaptive Management Options

Provide population viability analysis determining:

(a) Maximum sustainable annual mortality rates for regional kakī population

(b) Population consequences of 1-2 adult kakī deaths per year

(c) Regional population estimates and trends for black-fronted tern, bittern, crested grebe

(d) Mortality thresholds that would trigger population declines for each Threatened and At-Risk species

(e) Conservation context: relationship to existing conservation investments in the basin

(f) Adaptive management triggers and response mechanisms with defined timelines

Justification

Population viability analysis necessary to determine acceptable risk levels and compensation requirements. Adaptive management requires pre-defined alternatives if initial approaches fail.

Attachment 2: Further Information request for The Point Solar farm application

Attachment 2- A

A species-specific collision-risk assessment for all Threatened and At-Risk species using or traversing the site, including:

(a) Flight frequency analysis based on available GPS tracking datasets and field observations

(b) Flight height distributions and panel interaction zones

(c) Seasonal and diurnal variation in collision exposure

(d) Species-specific vulnerability factors (body size, flight behaviour, habitat requirements, polarised light sensitivity)

(e) Collision probability estimates for:

- Kakī/black stilt
- Black-fronted tern
- Australasian bittern
- Australasian crested grebe
- Other waterbird species using the area

(f) Known breeding, roosting, and foraging locations within 5 km

Justification:

GPS data from DOC and university research demonstrates extensive bird movements over the project site that have not been analysed for collision risk. Without quantitative assessment, it is difficult to evaluate whether effects are minor or potentially more than minor for threatened populations. Existing research demonstrates hundreds of birds traverse the site nightly. The applicant's 12 flight observation surveys captured only 14 birds and missed the core threatened species entirely. Integration of existing datasets is essential to understand actual (not theoretical) collision risk exposure.

Attachment 2- B

Panel Technology and Design Risk Analysis

Provide technical assessment of the proposed solar array configuration including:

(a) Polarisation and UV reflectance signatures of proposed panels

(b) Evidence for efficacy of anti-reflective coatings in reducing bird attraction

(c) Comparative collision risk: 60-degree vs vertical night positioning

(d) Panel spacing effectiveness (3.8-4.8m gaps) in reducing the hypothetical "lake effect"

(e) An updated literature review of proven panel technologies that demonstrably reduce bird mortality

Justification

Current panel design assumptions lack supporting evidence. Avi-fauna experts recommend vertical night positioning, but the applicant proposes 60-degree. Anti-reflective coatings are proposed without evidence of effectiveness. Panel configuration could significantly influence collision rates but remains unanalysed.

Attachment 2-C

Infrastructure Collision and Electrocution Assessment

Provide assessment of bird collision and electrocution risks from non-panel infrastructure:

(a) Perimeter fencing collision risk analysis

(b) Substation and inverter collision/electrocution potential

(c) Internal road and track collision risk

(d) Lighting impacts (construction and operational)

(e) Building strike risk assessment

(f) Mitigation design for all infrastructure types

Justification

Avian mortality at solar installations results from multiple infrastructure types, not just panels. Expert evidence identifies overhead cables, fencing, and buildings as significant collision hazards that remain unassessed (International literature cited by expert witnesses).

Attachment 2-D

Monitoring System Technical Specifications

Provide detailed carcass monitoring methodology capable of detecting mortality of Nationally Critical species including:

(a) Justification for whole-of-site vs representative sampling for kakī detection

(b) Use of trained conservation detection dogs

(c) Searcher efficiency trial protocols

(d) Carcass persistence trial protocols

(e) Autopsy requirements and cause-of-death determination

(f) Panel surface eDNA swabbing for missed carcasses

(g) Statistical power analysis for detecting population-level changes

Justification

Current monitoring (monthly searches at representative locations) cannot reliably detect single kakī mortality. Expert evidence demonstrates that detecting one bird death in 670 hectares requires validated search methods. Representative sampling risks missing Nationally Critical mortalities. (McClellan paras 165-169, O'Donnell recommendations, international best practice).

Attachment 2-E

Population-Level Impact Thresholds & Adaptive Management Options

Provide population viability analysis determining:

(a) Maximum sustainable annual mortality rates for regional kakī population

(b) Population consequences of 1-2 adult kakī deaths per year

(c) Regional population estimates and trends for black-fronted tern, bittern, crested grebe

(d) Mortality thresholds that would trigger population declines for each Threatened and At-Risk species

(e) Conservation context: relationship to existing conservation investments in the basin

(f) Adaptive management triggers and response mechanisms with defined timelines

Justification

Population viability analysis necessary to determine acceptable risk levels and compensation requirements. Adaptive management requires pre-defined alternatives if initial approaches fail.