

# **Appendix I      Ecological Impact Assessment**

**Fast Track Approvals Act Application**

**Foxton Solar Farm**

**Genesis Energy Limited**

SLR Project No.: 810.V14848.00001

13 February 2026



# Ecological Impact Assessment

## Foxton Solar Farm – Fast Track Approvals Act Application

### Genesis Energy Limited

Prepared by:

**SLR Consulting New Zealand**

Level 1, 17 Grey Street, Tauranga 3141, New Zealand

SLR Project No.: 810.V14848.00004

Client Reference: Foxton Solar Farm

10 December 2025

Revision: V4.0

## Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
V0.2	16 December 2024	Andrew Briggs	Hamish Dean	Hamish Dean
V1.0	18 December 2024	Andrew Briggs	Hamish Dean	Hamish Dean
V2.0	14 February 2025	Andrew Briggs	Hamish Dean	Hamish Dean
V3.0	6 May 2025	Andrew Briggs	Hamish Dean	Hamish Dean
V4.0	16 December 2025	Andrew Briggs	Hamish Dean	Hamish Dean

## Basis of Report

*This report has been prepared by SLR Consulting New Zealand Limited (SLR), on the instruction of Genesis Energy (the Client), in accordance with the agreed scope of work. It is intended to support the Client's application under the Fast Track Approvals Act 2024 and may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application. While SLR has exercised due care in preparing this report, it does not accept liability for any use of the report beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated.*

*As an expert witness I have read, and am familiar with, the Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2023. This report has been prepared in compliance with that Code. In particular, unless I state otherwise, this response is within my area of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.*



## Table of Contents

<b>Basis of Report</b> .....	<b>i</b>
<b>Acronyms and Abbreviations</b> .....	<b>v</b>
<b>1.0 Introduction</b> .....	<b>1</b>
1.1 Background .....	1
1.2 Report purpose .....	1
1.3 Site description and ecological context.....	2
<b>2.0 Methodology</b> .....	<b>3</b>
2.1 Desktop assessment.....	3
2.2 GIS mapping .....	3
2.3 Site survey .....	3
2.3.1 Terrestrial habitats.....	3
2.3.2 Wetlands .....	3
2.3.3 Farm drainage canals.....	4
2.3.4 Aquatic fauna and habitat surveys.....	4
2.3.5 Terrestrial fauna surveys .....	4
2.4 Assessment of ecological effects.....	6
<b>3.0 Results</b> .....	<b>7</b>
3.1 Desktop assessment.....	7
3.2 Terrestrial habitats.....	9
3.3 Aquatic habitats.....	11
3.3.1 Wetlands (natural inland wetlands).....	11
3.3.2 Farm drainage canals and artificial ponds .....	13
3.4 Fauna.....	15
3.4.1 Birds.....	15
3.4.2 Bats.....	17
3.4.3 Fish .....	18
3.4.4 Lizards .....	19
3.4.5 Pest animals.....	20
<b>4.0 Assessment of ecological effects</b> .....	<b>21</b>
4.1 Ecological values.....	21
4.1.1 Vegetation and habitat.....	21
4.1.2 Birds.....	21
4.1.3 Bats.....	21
4.1.4 Fish .....	21



4.1.5 Lizards .....	21
4.2 Ecological effects and mitigation .....	25
4.2.1 Effects on vegetation.....	25
4.2.2 Wetlands .....	26
4.2.3 Effects on aquatic fauna and waterways .....	27
4.2.4 Effects of lighting and noise on fauna.....	28
4.2.5 Effects of solar panels on terrestrial fauna.....	28
4.2.6 Positive effects .....	29
<b>5.0 Monitoring.....</b>	<b>36</b>
<b>6.0 Summary.....</b>	<b>37</b>
<b>7.0 References.....</b>	<b>38</b>
<b>8.0 Closure.....</b>	<b>41</b>
<b>9.0 Feedback.....</b>	<b>42</b>

## Tables in Text

Table A: Birds recorded on site during the survey in March 2024. Tick marks indicate presence.....	17
Table B: Bat records from the project area during the survey period.....	18
Table C: Fish species present in the NZFFDB for the area, including eDNA results. Tick marks indicate presence. ....	19
Table D: Ecological values assessment for on-site habitat.....	22
Table E: Proposed restoration planting and retention area. ....	29
Table F: Effects assessment of ecological features considering level of effect without and with mitigation measures. ....	31
Table G: Draft criteria to inform adaptive management considerations.....	36

## Figures in Text

Figure A: Locality map for the proposed solar farm. ....	1
Figure B: Locations of the ABMs, ACOs and the eDNA sample points.....	5
Figure C: Historical imagery of the proposed solar farm site from 2001 (Retrolens, 2024). The approximate site boundary is shown in 'yellow'. ....	7
Figure D: Latest imagery of the proposed solar farm site from January 2024 (courtesy of Google Earth). The approximate site boundary is shown in 'yellow'. ....	8
Figure E: TEC and DOC areas map for the proposed solar farm.....	9
Figure F: Terrestrial vegetation cover within the project site. Note all non-shaded habitat within the property boundary constitutes exotic pasture. ....	11



Figure G: Wetland cover within the project area. .... 12  
Figure H: Existing drains and artificial ponds within the project site. .... 15

## Photos in Text

Photo 1: a) View of general managed pasture within the site; b) sparse pasture outside of irrigated areas; c) intermittent exotic trees around farm buildings and d) an exotic tree row within the site. .... 10  
Photo 2: a) and b): Remnant dune habitat on the far eastern extent of the site. .... 10  
Photo 3: a) and b): Representative wetland habitat observed within a predominantly pastoral landscape. .... 12  
Photo 4: a) An example of a drain containing standing water, within the site, and b): A typical culvert crossing found on site. .... 13  
Photo 5: a) Representative photo of an artificial pond within the site. .... 14  
Photo 6: a) Flock of Southern black-backed gull foraging within pasture on site; and b) Swamp harrier predating an immature southern black-backed gull. .... 16  
Photo 7: a) and b): Representative photos of bat monitors recording within exotic trees on site. .... 18  
Photo 8: a) and b): Representative photos of potential lizard habitat within the site. .... 20  
Photo 9: a) An example 2mx2m vegetation plot undertaken within potential wetland habitat. In this case the plot comprised >50% pasture grasses and was therefore non-wetland. b) An example of a soil sample excavated from a separate wetland area on site, which comprised orange mottles (i.e. hydric features). .... B-1

## Appendices

**Appendix A**      **General Arrangement of Proposed Solar Farm**  
**Appendix B**      **Wetland Delineation Data and Photographs**  
**Appendix C**      **Wetland Overview Map with Lables**  
**Appendix D**      **Individual Wetland Characteristics Table**  
**Appendix E**      **Full Bird Species List**



## Acronyms and Abbreviations

ABM	Automatic Bat Monitors
ACOs	Artificial Cover Objects
dB	Decibel
DOC	Department of Conservation
EclA	Ecological Impact Assessment
ED	Ecological District
eDNA	Environmental DNA
EIANZ	Environment Institute of Australia and New Zealand
FAC	Facultative plants
FACU	Facultative upland plants
FACW	Facultative wetland plants
HRC	Horizons Regional Council
L <sub>Aeq</sub>	The 'A' weighted equivalent noise level. It is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound.
LENZ	Land Environments New Zealand
MfE	Ministry for the Environment
NES-F	Resource Management (National Environmental Standards for Freshwater) Regulations 2020
NPS-FM	National Policy Statement for Freshwater Management (Amended 2022)
NZFFDB	New Zealand Freshwater Fish Database
NZPCN	New Zealand Plant Conservation Network
OBL	Obligate wetland plants
SPL	Sound Pressure Level
SQEP	Suitably Qualified and Experienced Professional
TEC	Threatened Environment Classification



# 1.0 Introduction

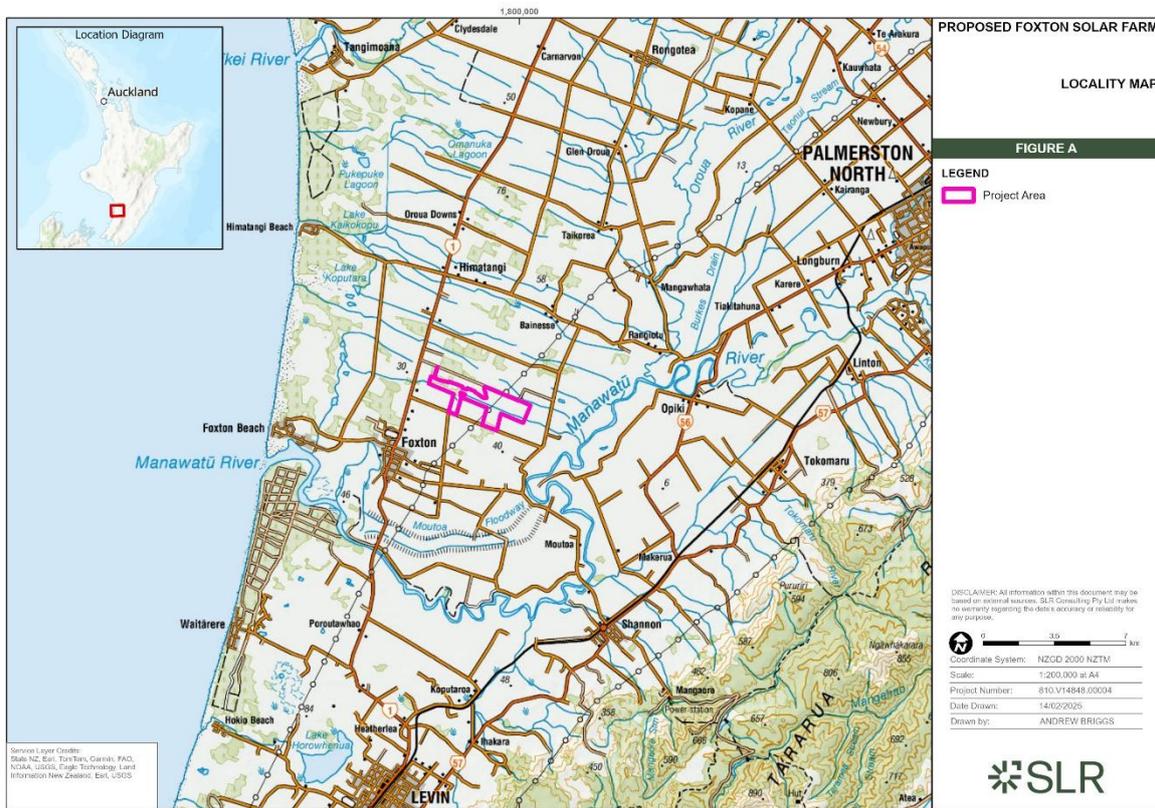
## 1.1 Background

Genesis Energy Limited (Genesis) is proposing the construction of an approximately 180 MWac solar farm on various land parcels between Wall Road and Motuiti Road near Foxton, within the Horowhenua District. A map showing the locality of the site is provided in Figure A.

The solar farm would be located within an existing agricultural operation where the vast majority of landcover is managed pasture for cattle grazing. The solar farm is planned to include solar panel arrays, inverters, a Battery Energy Storage System (BESS), a 220kV substation, a site office, additional internal roads and other ancillary infrastructure.

Existing farm races will be prioritised for use as access roads. Minor earthworks are required for the installation of necessary infrastructure including buildings, semi-permanent structures, piles to support the solar panels as well as trenching for underground cabling.

**Figure A: Locality map for the proposed solar farm.**



## 1.2 Report purpose

The purpose of this report is to provide an assessment of ecological effects to support the resource consent application to establish a solar farm at the site. The ecological assessment relates to the construction, operation and decommissioning of a solar farm.

Key features and habitat values of vegetation and fauna were identified, and an assessment of ecological effects was undertaken to assess the potential effects pertaining to the construction and operation of the proposed solar farm.



The latest indicative layout of the proposed solar farm is included in Appendix A, which includes proposed restoration areas.

### 1.3 Site description and ecological context

The solar farm would be located within two adjacent agricultural property clusters, with a project development footprint of approximately 488 Ha, inclusive of the solar development area (335 Ha), planting areas (26 Ha), non-development area (45 Ha) and other incidental areas (e.g. accesses, drainage channels, non-planted set-backs, etc. – 30 Ha). The site is primarily set in irrigated exotic pasture along with small areas of shrubland, exotic tree rows and standalone exotic trees. The site is within a generally very low gradient setting. The eastern extent of the site drains in an easterly direction towards the Manawatū River while the western extent of the site drains in a westerly direction towards a mosaic of wetlands and lakes, which eventually terminates at the Manawatū River mouth near Foxton Beach.

The site is situated within the Foxton Ecological District (ED), the Horowhenua District, and the Horizons (Manawatū-Whanganui) Region. Vegetation cover within the ED is currently dominated by pasture for dairying with some pine plantations also present. Extensive sand dunes are still present throughout the region although the vegetation has been modified to a large extent. Multiple estuaries, wetlands, and dune lagoons persist along with a few native coastal forest remnants comprising nīkau (*Rhopalostylis sapida*), pukatea (*Laurelia novae-zelandiae*) and kahikatea (*Dacrycarpus dacrydioides*). The ED experiences westerly and north westerly winds, relatively frequent gales, warm summers and mild winters with an annual rainfall of between 800-1000mm (McEwan, 1987).

Soils within the ED comprise primarily sandy soils within a coastal complex although can be variable with gleyed sands and peaty soils also occasionally present (McEwan, 1987).



## 2.0 Methodology

### 2.1 Desktop assessment

Prior to the site visit a desktop assessment of the site was undertaken. The review of relevant background literature and databases conducted to understand the ecological values within the site and surrounding areas included:

- Relevant planning maps for the Horowhenua District and Horizons Region;
- Threatened Environment Classification (TEC) version 2012 (Cieraad et al. 2015);
- S-Map online administered by Landcare Research (S-Map, 2023);
- NZ Herpetofauna Atlas database published by DOC;
- iNaturalist and eBird;
- DOC bat Database (DOC, 2023); and
- NZ Plant Conservation Network (NZPCN) plant distribution database.

Any potentially threatened species found would be recorded and their threat status checked against the relevant national threatened species classification lists (O'Donnell et al. 2023; de Lange et al. 2024; Robertson et al. 2021; Dunn et al. 2018 and Hitchmough et al. 2021).

### 2.2 GIS mapping

The proposed project area was mapped using ArcGIS Pro. Within the proposed development area, existing vegetation and drains were mapped onto aerial imagery to allow for quantification of the areas of vegetation to be impacted by the solar panel installation and construction of associated infrastructure.

### 2.3 Site survey

Following a preliminary desktop assessment, the terrestrial and aquatic habitat characteristics of the site and proximal surrounding area were assessed during a site visit from the 11<sup>th</sup> to 14<sup>th</sup> March 2024. A brief additional survey to retrieve bat and lizard sampling equipment was undertaken on the 10<sup>th</sup> May 2024.

#### 2.3.1 Terrestrial habitats

During the site visit, both native and exotic plant communities were recorded, and a qualitative assessment of on-site vegetation habitats was conducted. The assessment focused on the botanical and ecological value of identified plant communities. Notes were also collected on areas with potential for restoration.

#### 2.3.2 Wetlands

Potential wetland features of the site were initially assessed by a review of aerial imagery. These features were then assessed on the ground using the wetland delineation protocols developed by the Ministry for the Environment (MfE, 2022a) to support the National Policy Statement for Freshwater Management (NPS-FM, 2020).

The wetland assessments were undertaken under 'normal circumstances', with fair weather conditions during the site assessment. All wetlands were groundtruthed during the site assessment.



During the site assessment, seven representative vegetation plots were established within potential wetland habitats in order to ascertain whether a designated area would meet the definition for a natural inland wetland per the NPS-FM. Vegetation and cover were recorded per stratum within the plots, whilst soil sampling (with reference to Fraser et al. 2018) was undertaken as an additional measure where marginal results were recorded for the wetland indicator status tests (Dominance Test and Prevalence Test; Clarkson, 2014). The 'rapid test' was undertaken at the majority of wetlands sites, although a conservative approach was taken to ensure that wetlands meeting the definition were identified and recorded (MfE 2022a). Representative photographs and basic plot data is included in Appendix B.

In many cases, the Pasture Exclusion Assessment Methodology was applied to areas potentially meeting the definition for a natural inland wetland (MfE 2022b). These potential wetland areas, within actively grazed pasture, often comprised mud, cattle pugging and a mix of pasture and wetland grasses. These areas were, however, excluded as wetland habitat in terms of the wetland delineation protocols developed by the MfE as they meet the pasture exclusion criteria (i.e. greater than 50% pasture grass cover).

### 2.3.3 Farm drainage canals

The watercourses on site were all assessed as farm drainage canals. In order to determine the classification of the farm drainage canals as artificially created watercourses, a review of past aerial imagery and topographical maps for the area was undertaken.

### 2.3.4 Aquatic fauna and habitat surveys

Aquatic fauna were sampled through an Environmental DNA (eDNA) assessment with no physical sampling of fish or macroinvertebrates being undertaken. eDNA assessments survey cellular material of species that are dispersed into the environment and include genetic information from cells such as larvae, urine, scales and exoskeletons (David et al. 2021). For this survey, two three-replicate water samples were collected from two receiving farm drains within the project area (see Figure B, below). Replicate sampling involved a 50ml syringe with a 1.2 µm cellulose acetate encapsulated syringe filter. Water samples were repeatedly pushed through the filter until the filter was saturated with material, and no additional water could be pushed through. Once filtering of water was complete, each syringe was filled with air and forced through the filter to remove excess water. The filters were preserved in 300 µl of DNA/RNA Shield preservative (Zymo Research Cat No. R1200-125). Samples were kept at ambient temperature following the DNA/RNA Shield standard protocol ((r1100-50\_r1100-250\_r1200-25\_r1100-125\_dna\_rna\_shield.pdf (zymoresearch.com)) and couriered to the Wilderlab laboratory (Wellington) for analysis.

No further qualitative assessment of watercourse habitat was considered necessary given that all watercourses within the project site were excavated farm drains and mostly devoid of flow.

### 2.3.5 Terrestrial fauna surveys

#### 2.3.5.1 Bats

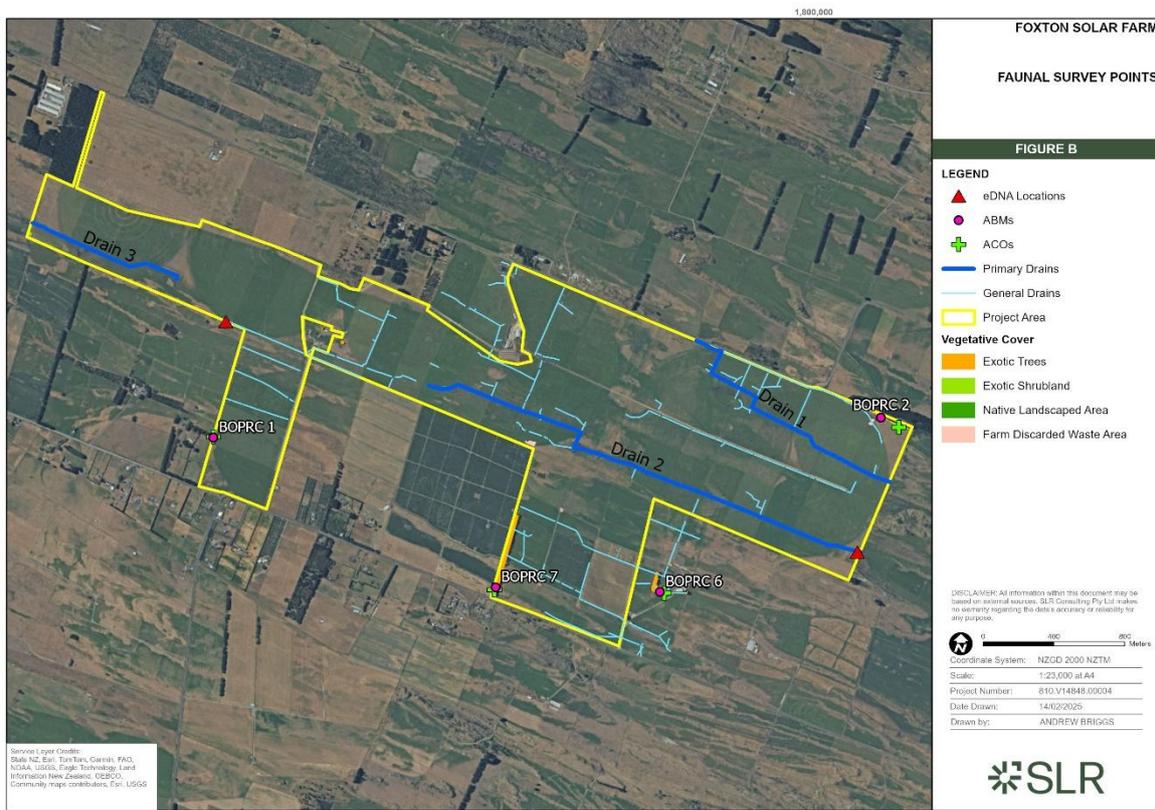
The site was assessed for bat habitat suitability as part of the field survey. A bioacoustics survey to detect the presence of New Zealand long-tail Bats (*Chalinolobus tuberculatus* – Threatened: Nationally Critical; O'Donnell et al. 2023) was conducted from the 14<sup>th</sup> March 2024 until 10<sup>th</sup> May 2024. This late summer / autumn survey period is appropriate for long-tail bats, and although activity is known to decrease during the winter months, they can be active all year. For the survey, four Automatic Bat Monitors (ABM; AR4 model, manufactured by DOC) were deployed in tree habitat on site (see Figure B, below). The ABM recordings



were analysed visually using AviaNZ Bioacoustic Analysis Software in accordance with protocols described by Lloyd (2017). All recorders were pre-set to start monitoring at 6:00 pm (i.e. just after sunset) until 6:30 am (i.e. just before sunrise).

The minimum recording nights for long-tail bats is varied and can be as little as 2 consecutive nights with suitable weather, although a period of 2-weeks is preferred. The ABMs deployed at the proposed Foxton Solar Farm site lasted a maximum of 39 nights prior to the end of battery life.

**Figure B: Locations of the ABMs, ACOs and the eDNA sample points.**



### 2.3.5.2 Birds

Alongside a desktop review of online databases such as iNaturalist (2024) and eBird (2024), all birds seen and heard during the site visit were recorded.

### 2.3.5.3 Lizards

The site was assessed for lizard habitat suitability as part of the field survey. Lizard searches were conducted by searching any suitable lizard habitats, including refugia such as deadwood, rocks, wood stockpiles and leaf litter.

In addition to active searches, four double-layered artificial cover objects (ACOs) were installed on site on the 14<sup>th</sup> March 2024 in various habitat types considered suitable for native lizards, including exotic tree stands and hedgerows. The location of the ACOs are shown in Figure B, above. The ACOs were deployed until the 10<sup>th</sup> May 2024 for a total of 56 full days before being surveyed. There is no accepted minimum amount of days to leave the ACOs deployed, however, during ongoing monitoring, ACOs are generally set up 1-3 months



before monitoring commences (e.g. Lettink and Monks, 2016) while other studies have allowed for a 'settling-in' period of 6 weeks before checking (e.g. Lettink and Cree, 2007).

## 2.4 Assessment of ecological effects

The assessment of ecological effects was informed by the EclA guidelines of the Environment Institute of Australia and New Zealand (Roper-Lindsay et al. 2018).

The following steps were used for this assessment:

- Ecological values are assigned a level on a scale of Low, Moderate, High or Very High based on assessing the values of species, communities and habitats identified against criteria set out in the EclA guidelines.
- The magnitude of effect of the proposed works on ecological values is evaluated as either No Effect, Negligible, Low, Moderate, High, or Very High. The 'Magnitude of Effect' is based on:
  - The scale of the unmitigated effect per se (i.e. the proposed works, impacts on hydrology, impacts on wetland vegetation);
  - The proportion of habitat loss versus local availability;
  - The expected duration of effect (e.g. permanent versus temporary); and
  - The intensity of the effect (i.e. the extent to which habitat loss within the site is complete or partial).
- The overall level of effect in the absence of mitigating measures is determined using a matrix that is based on the ecological values and the magnitude of effects on these values in the absence of any efforts to avoid, remedy or mitigate for potential effects.

The overall level of effect is used to determine if mitigation is required. Effects assessed as 'Moderate' or greater warrant efforts to avoid, remedy and/or mitigate them.



## 3.0 Results

### 3.1 Desktop assessment

Based on historic aerial imagery, it appears that the site was under a mix of pasture and plantation forestry between 2001 and the mid 2010's (see Figure C, below). The review of past aerial imagery showed an alteration in land use to pasture within the past ten years (see Figure D, below), accompanied by significant earthworks to reshape the land through the removal of dune features and excavation of additional drains.

**Figure C: Historical imagery of the proposed solar farm site from 2001 (Retrolens, 2024). The approximate site boundary is shown in 'yellow'.**



**Figure D: Latest imagery of the proposed solar farm site from January 2024 (courtesy of Google Earth). The approximate site boundary is shown in 'yellow'.**



The Land Environments New Zealand (LENZ) Threatened Environments Classification (TEC) classifies the majority of the terrestrial areas on site as having less than 10% indigenous cover with a small section in the 10%-20% indigenous cover category (see Figure E, below; Cieraad et al. 2015). The TEC is a source of broad (i.e. national) scale background information: specifically, how much indigenous vegetation remains within land environments; its legal protection status; and how past vegetation loss and legal natural heritage protection are distributed across New Zealand's landscape.

TEC recognises that indigenous environments in this area have been severely reduced and have no formal protection. This is consistent with the on-site assessments, where the vast majority of native vegetation has been cleared to enable farming land use.

A Site of Significance - Aquatic, under Schedule 2: Surface Water Management Values in the One Plan for the Horizons Regional Council is located approximately 5 km downstream to the west of the proposed solar farm site (HRC, 2022). This Site of Significance has been identified due to the historic records of brown mudfish (*Neochanna apoda*: At Risk - Declining) within the Omarupapaku / Round Bush Scenic Reserve and its associated tributary. The Scenic Reserve, identified as DOC Public Conservation Land, covers approximately 51 ha and is located approximately 1.5 km west of the site at its closest point. Two additional DOC areas were identified nearby; namely a smaller area of 0.39 ha identified as the Motuiti Conservation Area and the 18.76 ha Himatangi Bush Scenic Reserve (see Figure E).

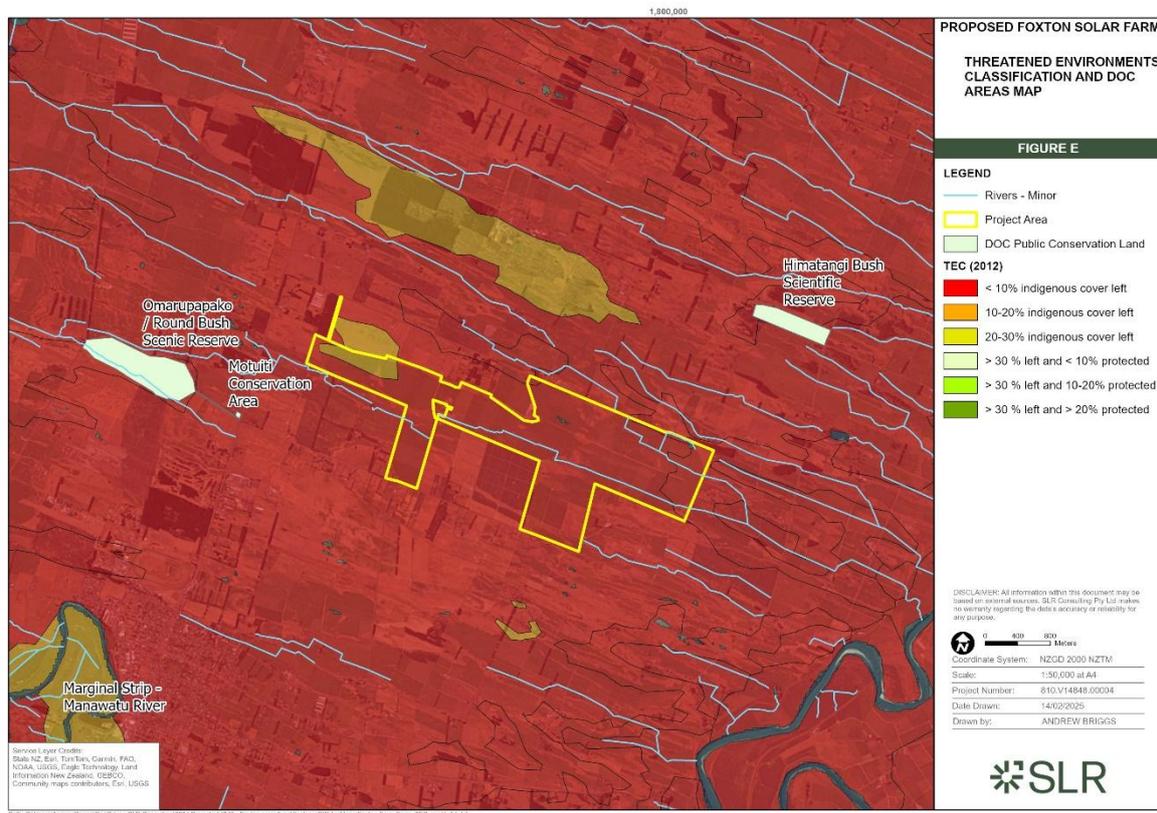
Another important ecological area, the Manawatū Estuary, is within 7 km south-east of the proposed development site near Foxton Beach, and has been designated as a RAMSAR site given the ecological importance of the area, particularly for wading birds.

The potential vegetation of New Zealand dataset indicates that conditions on the site historically suited the Kahikatea – mataī (*Prumnopitys taxifolia*) / tawa (*Beilschmiedia tawa*)



– mahoe (*Melicytus ramiflorus*) forest vegetation type with smaller areas of duneland (Leathwick et al. 2004).

**Figure E: TEC and DOC areas map for the proposed solar farm.**



### 3.2 Terrestrial habitats

The primary terrestrial vegetation type identified within the site is exotic pasture grass cover, with comparatively minor areas of exotic tree cover, shrubland cover and degraded dune cover. A small, landscaped area was identified adjacent to the driveway on the southern property, outside the development footprint, comprising a few native species such as cabbage tree (*Cordyline australis*) and flax (*Phormium tenax*).

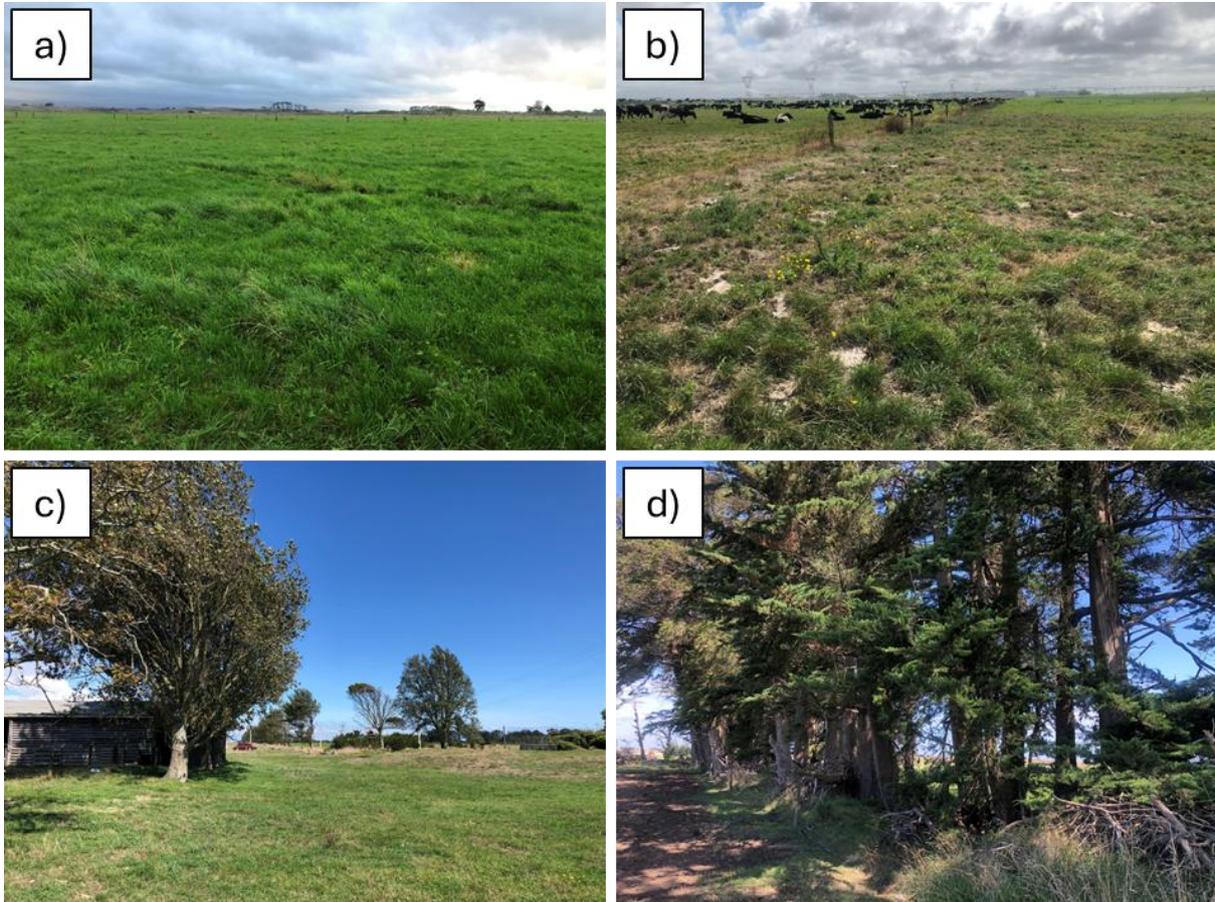
The predominant land use within the properties is cattle grazing across the managed pasture areas. These managed pastures are subject to centre-pivot and sprinkler irrigation which allows for consistent pasture cover throughout the year across most of the site. Smaller areas on the periphery of the paddocks, out of the centre-pivot reach, comprised sparse herbaceous cover reflective of the seasonally drier conditions. Common pasture grasses observed within this vegetation type included rye grass (*Lolium* spp.), cocksfoot (*Dactylis glomerata*) and paspalum (*Paspalum dilatatum*). Common legumes included white clover (*Trifolium repens*) whilst exotic herbaceous species within pasture included buttercup (*Ranunculus repens*), dock (*Rumex* spp.), narrow-leaved plantain (*Plantago lanceolata*) and broad-leaved plantain (*Plantago major*).

Woody vegetation across the site was limited to two radiata pine (*Pinus radiata*) / macrocarpa (*Hesperocyparis macrocarpa*) shelterbelts, intermittent individual exotic trees including poplar (*Populus* sp.), English oak (*Quercus robur*) and banksia (*Banksia integrifolia*) as well as a small area of exotic shrubland dominated by gorse (*Ulex europaeus*)



with tree lupin (*Lupinus arboreus*) and blackberry (*Rubus fruticosus*). Photos of the general terrestrial habitat on site are provided in Photo set 1, below.

**Photo 1: a) View of general managed pasture within the site; b) sparse pasture outside of irrigated areas; c) intermittent exotic trees around farm buildings and d) an exotic tree row within the site.**



Small areas at the edges of the site also include elevated sand dune areas, comprising primarily pasture grasses and marram grass (*Calamagrostis arenaria*) with scattered gorse and tree lupin (see Photo set 2, below).

**Photo 2: a) and b): Remnant dune habitat on the far eastern extent of the site.**

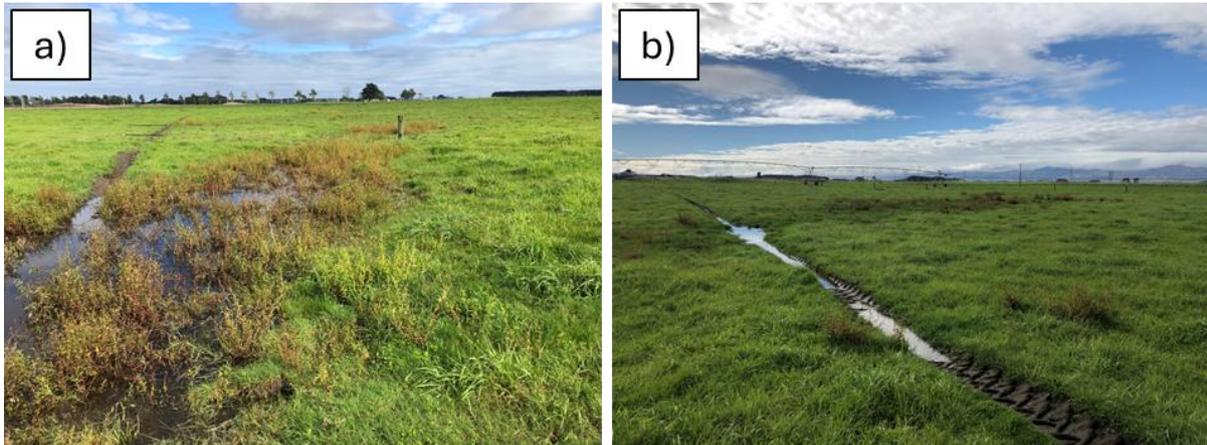




habitat in terms of the wetland delineation protocols developed by the Ministry for the Environment as they meet the pasture exclusion criteria (i.e. greater than 50% pasture cover; MfE 2022b).

Photos of the general wetland habitat on site are provided in Photo set 3, below, and a map of wetland habitat on site is provided in Figure G. Note that an additional map showing the labels of each wetland is included in Appendix C and a table detailing the characteristics of each wetland is included in Appendix D.

**Photo 3: a) and b): Representative wetland habitat observed within a predominantly pastoral landscape.**



**Figure G: Wetland cover within the project area.**



### 3.3.2 Farm drainage canals and artificial ponds

An extensive network of generally shallow, well vegetated farm drains were observed within the site extent. These drains were likely excavated to reduce the level of saturation within the historically wet paddocks to allow for improved agricultural prospects.

The determination that the watercourses on site were farm drainage canals is based on the following rationale and is further discussed in SLR (2024a):

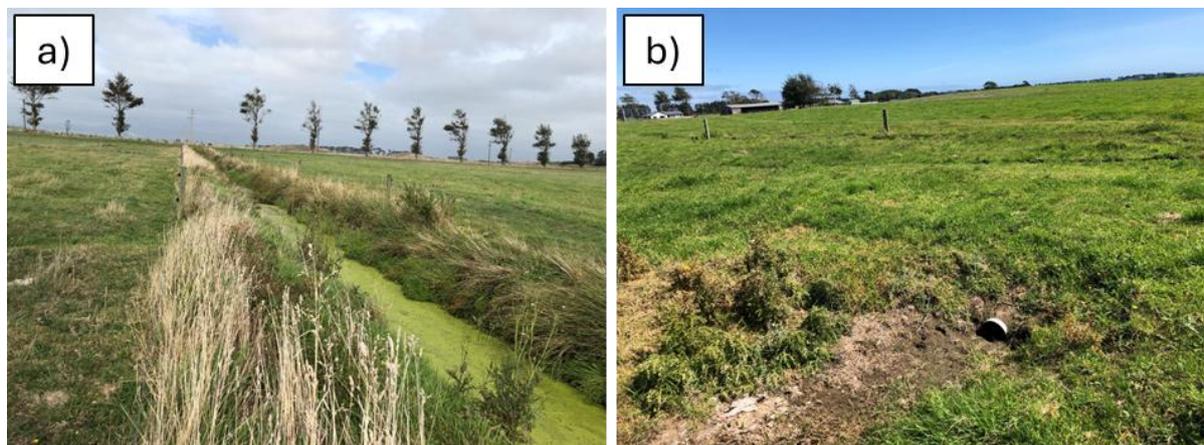
- Aerial imagery for the site taken in 2001 before the site was earth worked for dairy farming does not show any streams on the site.
- Historic topographical maps from 1959 do not show any watercourses within the site extent, despite clearly annotating streams and drains in nearby areas.
- No natural headwater sections appear to be located within the site. The middle reaches of the site represent a local high point within the area, with flows draining in both a general westerly and easterly direction from this point. It is possible that there were wetlands historically within the low points of the dune landscape, which may have lost water to evaporation and interflow instead of through channelised outflows.
- The drains on the site are most likely to exist to drain wetlands that are likely to have historically been present. This and the flat topography, with the highpoint being in the middle of the site, creates a very small catchment for any stream, making the likelihood of one having existed being small.

The drains were 1 – 4 m wide, 0.2 – 1.5 m deep, generally U-shaped, comprised absent or otherwise lentic flow, and were vegetated by a variety of herbaceous plants ranging from OBL to facultative upland (FACU) species. The drains were crossed by multiple culverts, primarily allowing for the centre-pivots to function unhindered, as well as for general access throughout the farming area.

In addition to the farm drains, one small artificially constructed farm pond was identified and delineated on site.

Representative photos of the drains and ponds on site are provided in Photo sets 4 and 5, below. A map of the drains and ponds on site is provided in Figure H.

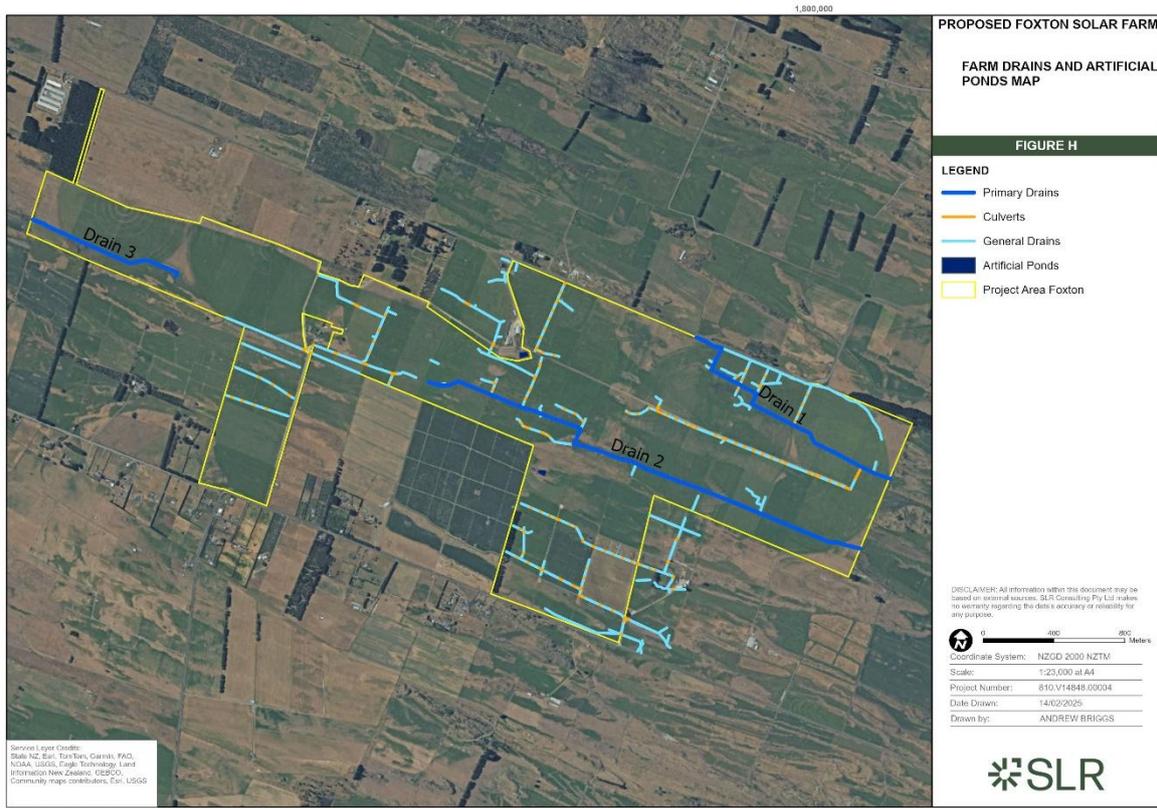
**Photo 4: a) An example of a drain containing standing water, within the site, and b): A typical culvert crossing found on site.**



**Photo 5: a) Representative photo of an artificial pond within the site.**



**Figure H: Existing drains and artificial ponds within the project site.**



## 3.4 Fauna

### 3.4.1 Birds

All birds seen and heard during the site visit between the 11<sup>th</sup> and 14<sup>th</sup> March 2024 were noted, which included a total of 17 bird species comprising eight 'Introduced: Naturalised' species and 10 'Not Threatened' native species (see Table A, below). Mallard duck (Introduced: Naturalised) were picked up using eDNA, but not directly observed during the site assessment. The majority of recorded birds were common open country or shrubland species.

European goldfinches (*Carduelis carduelis*: Introduced), common starlings (*Sturnus vulgaris*: Introduced) and Southern black-backed gulls (*Larus dominicanus*: Not Threatened) were frequently observed foraging within the paddocks in relatively large flocks exceeding 20 individuals (see Photo set 6).



**Photo 6: a) Flock of Southern black-backed gull foraging within pasture on site; and  
b) Swamp harrier predated an immature southern black-backed gull.**



In terms of bird refuge or nesting areas within the site, suitable habitat is limited, however, exotic trees within and adjacent to the study site are available for nesting.

Note that a full bird species list, including potential species known to occur in the vicinity of the site, is provided in Appendix E. Note that a high diversity of migratory sea birds, as well as multiple 'Threatened' and 'At Risk' species, have been recorded within a 10 km radius of the site (see Appendix E). It is possible that these birds may fly over the site or temporarily utilise the site for foraging.



**Table A: Birds recorded on site during the survey in March 2024. Tick marks indicate presence.**

Common Name	Scientific Name	Threat Status (Robertson et al. 2021)	eDNA Sample
Common myna	<i>Acridotheres tristis</i>	Introduced: Naturalised	
Eurasian skylark	<i>Alauda arvensis</i>	Introduced: Naturalised	
Mallard	<i>Anas platyrhynchos</i>	Introduced: Naturalised	✓
Goldfinch	<i>Carduelis carduelis</i>	Introduced: Naturalised	
Swamp harrier	<i>Circus approximans</i>	Not Threatened	
Rock pigeon	<i>Columba livia</i>	Introduced: Naturalised	
White-faced heron	<i>Egretta novaehollandiae</i>	Not Threatened	
Grey warbler	<i>Gerygone igata</i>	Not Threatened	
Australian magpie	<i>Gymnorhina tibicen</i>	Introduced: Naturalised	
Pied stilt	<i>Himantopus himantopus leucocephalus</i>	Not Threatened	
Welcome swallow	<i>Hirundo neoxena neoxena</i>	Not Threatened	
Southern black-backed gull	<i>Larus dominicanus</i>	Not Threatened	
Sparrow	<i>Passer domesticus</i>	Introduced: Naturalised	
Pūkeko	<i>Porphyrio melanotus melanotus</i>	Not Threatened	✓
Starling	<i>Sturnus vulgaris</i>	Introduced: Naturalised	
Paradise shelduck	<i>Tadorna variegata</i>	Not Threatened	
Spur-winged plover	<i>Vanellus miles novaehollandiae</i>	Not Threatened	
Silvereye	<i>Zosterops lateralis lateralis</i>	Not Threatened	

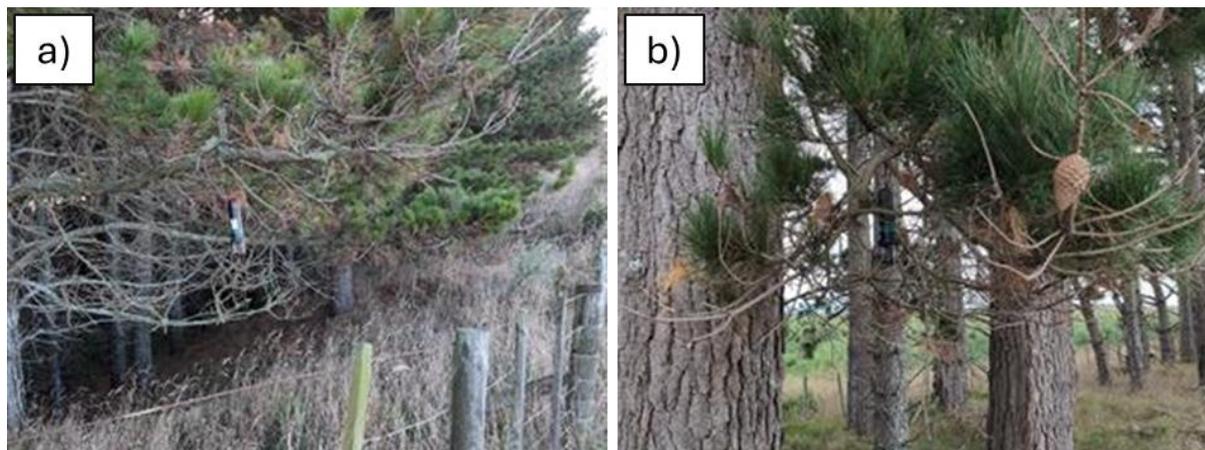
### 3.4.2 Bats

The nearest known record of New Zealand long-tail bats (*Chalinolobus tuberculatus*) was recorded in excess of 30 km southeast of the site within the Tararua Range during a survey in 1998/99 (DOC 2023).

The bat monitors recorded data on site for between 17 and 39 nights, while one bat monitor malfunctioned and recorded no data (see Table B, below). The survey found no indication that there were New Zealand long-tail bats utilising the study area. This is not unexpected, as there have been several surveys in the wider area but none have recorded bats. In addition, potential bat roosting habitat within the site was limited to narrow shelterbelts and relatively small exotic tree stands (as seen in Photo set 7).



**Photo 7: a) and b): Representative photos of bat monitors recording within exotic trees on site.**



Results of the bat monitoring using ABMs are presented in Table B, below.

**Table B: Bat records from the project area during the survey period.**

ABM No.	Nights of Detections/ Total Nights Recorded	No. of Detections	Mean Detections / Night	Notes
BOPRC 1	0 / 31	0	0	No bats detected
BOPRC 2	0 / 17	0	0	No bats detected
BOPRC 6	0 / 0	0	0	No data recorded (equipment failure)
BOPRC 7	0 / 39	0	0	No bats detected.

### 3.4.3 Fish

Active electrofishing to ascertain fish species and abundance data was not undertaken within the farm drains although two eDNA samples were obtained from two sub-catchments within the site (see Figure B). The farm drainage canals were generally not flowing or were devoid of flow, although a few primary drains comprised very shallow water depths (<0.2m), which presented unsuitable conditions for active electrofishing. Species of fish known to occur within freshwater habitat in the vicinity of the site according to the New Zealand Freshwater Fish Database (NZFFDB) and eDNA sample have been listed in Table C, below.

Four fish species were recorded within the assessed drains, namely, the 'Not Threatened' native shortfin eel (*Anguilla australis*) and common bully (*Gobiomorphus cotidianus*) as well as the exotic / introduced gambusia (*Gambusia affinis*) and goldfish (*Carassius auratus*). Most drains within the site were devoid of water and generally provided poor instream habitat quality for native fish species, which was reflected by the low diversity of native species recorded within the site.



**Table C: Fish species present in the NZFFDB for the area, including eDNA results.**  
Tick marks indicate presence.

Common Name	Scientific Name	Threat Status (Dunn et al. 2018)	NZFFD (within 10 km)	eDNA Sample
Yelloweye mullet	<i>Aldrichetta forsteri</i>	Not Threatened	✓	
Shortfin eel	<i>Anguilla australis</i>	Not Threatened	✓	✓
Longfin eel	<i>Anguilla dieffenbachii</i>	At Risk: Declining	✓	
Unidentified eel	<i>Anguilla</i> sp.	n/a	✓	
Goldfish	<i>Carassius auratus</i>	Introduced: Naturalised	✓	✓
Īnanga	<i>Galaxias maculatus</i>	At Risk: Declining	✓	
Unidentified galaxiid	<i>Galaxias</i> sp.	n/a	✓	
Gambusia	<i>Gambusia affinis</i>	Introduced: Naturalised	✓	✓
Upland bully	<i>Gobiomorphus breviceps</i>	Not Threatened	✓	
Common bully	<i>Gobiomorphus cotidianus</i>	Not Threatened	✓	✓
Giant bully	<i>Gobiomorphus gobioides</i>	At Risk: Naturally Uncommon	✓	
Redfin bully	<i>Gobiomorphus huttoni</i>	Not Threatened	✓	
Unidentified bully	<i>Gobiomorphus</i> spp.	Not Threatened	✓	✓
Grey mullet	<i>Mugil cephalus</i>	Not Threatened	✓	
Brown mudfish	<i>Neochanna apoda</i>	At Risk: Declining	✓	
Rainbow trout	<i>Oncorhynchus mykiss</i>	Introduced: Naturalised	✓	
Perch	<i>Perca fluviatilis</i>	Introduced: Naturalised	✓	
Common smelt	<i>Retropinna retropinna</i>	Not Threatened	✓	
Black flounder	<i>Rhombosolea retiaria</i>	Not Threatened	✓	
Unidentified flounder	<i>Rhombosolea</i> sp.	n/a	✓	
Brown trout	<i>Salmo trutta</i>	Introduced: Naturalised	✓	

### 3.4.4 Lizards

Potential lizard habitat within the site included exotic tree stands, discarded farm waste (i.e. tyres, plastic pipes, etc.), woody debris and shrubland (see examples in Photo set 8). No lizards were found during the active or passive searches. The majority of the site comprises grazed pasture offering very limited habitat for lizards therefore it is highly unlikely that these reptiles are present in significant numbers within the proposed development site. Skink species that could potentially be found within the area according to distribution maps and habitat preferences include the copper skink (*Oligosoma aeneum*: At Risk – Declining), the



Northern grass skink (*Oligosoma polychroma*: Not Threatened), the glossy brown skink (*Oligosoma zelandicum*: At Risk – Declining), the ornate skink (*Oligosoma ornatum*: At Risk – Declining) and the kupe skink (*Oligosoma aff. infrapunctatum* "southern North Island": Threatened – Nationally Critical).

**Photo 8: a) and b): Representative photos of potential lizard habitat within the site.**



### 3.4.5 Pest animals

European rabbits (*Oryctolagus cuniculus*), brown hare (*Lepus europaeus*) as well as a deceased European hedgehog (*Erinaceus europaeus*), were observed during the site assessment, while the house mouse (*Mus musculus*) was also picked up by the eDNA sample.

It is likely that other pest animals such as rats, possums, cats and mustelids are all present within the general area.



## 4.0 Assessment of ecological effects

This assessment is based broadly on the EIANZ EclA guidelines (Roper-Lindsay et al. 2018), guided by expert opinion as outlined in the EclA framework (Section 2.4.) used to determine ecological values, magnitude of effects, and overall level of effect associated with the proposed works at the site. The values and effects assessment has also considered the National Policy Statement for Indigenous Biodiversity and Schedule 6 of the One Plan for the Manawatū-Whanganui Region (HRC, 2022).

### 4.1 Ecological values

#### 4.1.1 Vegetation and habitat

All habitat ecological values present within the proposed solar farm have been assessed as 'Negligible' to 'Low' based on the highly modified nature of the site comprising predominantly grazed pasture with a very low abundance of exotic trees and shrubs.

No forest or wetland habitat on the site meets the classification for 'rare', 'threatened' or 'at-risk' habitat within Schedule 6 of the One Plan (HRC, 2022). Aside from two exotic tree shelterbelts and a few standalone exotic trees, no other trees were identified onsite whilst the wetlands are within paddocks dominated by pasture or exotic species.

A breakdown of each habitat type assessed is include in Table D, below.

#### 4.1.2 Birds

The site observations and eDNA sampling confirmed that all bird species currently utilising the site were locally common and either 'Introduced' or 'Not Threatened'. The site is located within 7 km of an internationally important coastal wetland area / estuary which hosts a high diversity of wading birds, particularly during the summer migratory season. It is possible that these birds may temporarily forage within the pasture areas on site, or overfly the site, although it is unlikely they would utilise the site for an extended period of time with more preferential habitat available along the coast. Given that no 'Threatened' or 'At Risk' species were recorded within the site, the ecological value of the birdlife is assessed as 'low'.

#### 4.1.3 Bats

The bat survey conducted over a total period of approximately 6 weeks during early autumn indicated that New Zealand long-tail bats are not utilising the proposed development site. As bats were not detected, they were not assessed further.

#### 4.1.4 Fish

The drains within the site offer low refuge opportunities for fish and habitats are degraded. Access to the site by migratory species may be constrained by instream barriers between the site and the Manawatū River, however, the migratory shortfin eel ('Not Threatened') was recorded within the eDNA sample. The ecological value of fish within the site extent is 'low'.

#### 4.1.5 Lizards

The site has been anthropogenically modified, comprising limited and fragmented herpetofauna habitat as well as a likely high abundance of pest animals. No species were recorded during active searches and passive searches (i.e. with ACOs), and it is unlikely that native herpetofauna species are present in significant numbers. The ecological value of herpetofauna at the site is 'low'.



**Table D: Ecological values assessment for on-site habitat.**

Habitat	Approx. disturbance area (m <sup>2</sup> )	Representativeness		Rarity / distinctiveness		Diversity and Pattern		Ecological context		Overall Ecological Value
<b>Pasture grassland</b>	~375,000 m <sup>2</sup> (~375 Ha)	Very Low	Site likely previously dominated by Kahikatea – mataī / tawa – mahoe forest with smaller areas of duneland.	Very Low	Pasture areas for cattle and stock grazing are common in the area.	Low	Dominated by common pasture grasses with intermittent exotic weeds and legumes.	Very Low	Site and region generally comprises open, grazed grassland associated with dairy and sheep farming	<b>Negligible</b>
<b>Exotic grass dominated wetlands</b>	7,873 m <sup>2</sup> (0.79 Ha)	Low	Exotic grassland – herbfield habitat within area formerly dominated by native forest.	Moderate	Wetlands are under-represented nationally and are a national priority for protection (e.g. Ausseil et al. 2008), however, these wetlands are almost entirely vegetated in exotic species and are grazed as part of a farm.	Low	Comprises primarily exotic FACW and OBL grasses.	Low	Wetlands were grazed and largely located within, and surrounded by, pasture areas. Generally small size, low floral diversity and limited biodiversity value. Clustered in certain areas presenting a restoration opportunity.	<b>Low</b>
<b>Exotic tree cover (incl</b>	6,000 m <sup>2</sup> (0.60 Ha)	Very Low	Site likely previously	Low	Intermittently spread at a	Very Low	Comprises primarily	Low	Isolated across the site, low refuge value	<b>Low</b>



Habitat	Approx. disturbance area (m <sup>2</sup> )	Representativeness		Rarity / distinctiveness		Diversity and Pattern		Ecological context		Overall Ecological Value
<b>tree shelterbelts and individuals)</b>			dominated by Kahikatea – mataī / tawa – mahoe forest with smaller areas of duneland.		very low density within the site, exotic stands common in the region. Possible bird resting and nesting habitat.		radiata pine and macrocarpa.		and covers very small areas compared to exotic tree plantations in the region.	
<b>Exotic shrubland</b>	0	Very Low	Site likely previously dominated by Kahikatea – mataī / tawa – mahoe forest with smaller areas of duneland.	Low	Very small areas at the edges of the site. May provide some refuge to lizards and birds.	Very Low	Comprises primarily exotic species (gorse, tree lupin and blackberry).	Low	Isolated across the site, low refuge value and covers very small areas compared to other shrubland in the region.	<b>Low</b>
<b>Modified Duneland</b>	0	Low	Previously may have comprised native shrubs, sand binding herbs and tussock grasses. Not representative of indigenous duneland in the district.	Low	Very small remnant areas at the eastern edge of the site. Large former dunes on site appear to have been removed for agricultural reasons.	Very Low	Comprises primarily exotic species (pasture grasses, marram grass, gorse and tree lupin).	Low	Very small areas compared to similar elongated dune habitat adjacent to the site. No indigenous remnant vegetation observed on dunes.	<b>Low</b>
<b>Farm drains</b>	0	Very Low	Drains have been	Low	Farm drains excavated to	Low	Low vegetative diversity	Low	Minimal vegetative width although	<b>Low</b>



Habitat	Approx. disturbance area (m <sup>2</sup> )	Representativeness		Rarity / distinctiveness		Diversity and Pattern		Ecological context		Overall Ecological Value
			implemented over time, wetlands likely present within low points between dunes.		assist with drainage on site, no uncommon or distinct features. No 'At Risk' or 'Threatened' species detected in drains.		dominated by exotic grasses and herbaceous species, soft bottomed and comprised minimal flow (mostly dry during assessment).		certain drains were fenced off from stock, low connectivity to nearby river, potential refuge for common semi-aquatic macroinvertebrates	



## 4.2 Ecological effects and mitigation

The proposed works associated with the proposal include the construction of solar panel arrays and various ancillary infrastructure. Construction and operational impacts associated with the proposed solar farm may result in the following direct and indirect ecological effects:

- Small-scale soil disturbance, associated with piling, for insertion of the steel poles holding the solar array structures. Piles will be vibro- or hammer driven with limited associated soil disturbance. This will occur throughout the site (see Appendix A for indicative layout).
- Minor vegetation disturbance and hydrological alteration within exotic grass dominated wetland habitat;
- Earthworks associated with construction of access roads and cable trenches within the proposed solar farm area resulting in localised habitat disturbance;
- Earthworks to implement ancillary infrastructure associated with the proposed solar farm (e.g. inverters, transformers, a substation, a BESS and a site office) resulting in localised habitat disturbance;
- Stormwater runoff during construction potentially resulting in watercourse sedimentation and habitat disturbance;
- Alteration of bird foraging habitat as a result of the placement of solar panel arrays throughout previously open pasture areas;
- Collision of birds with solar panels; and
- Lighting and noise associated with on-site infrastructure causing disturbance of terrestrial fauna.

There is potential for positive ecological effects associated with the proposal. Based on the proposed indicative layout, positive effects would include improved aquatic habitat and water quality from the change in farm system (i.e. sheep farming in place of dairying) and recommended planting near drains, enhancement of biodiversity values through the proposed restoration plantings, and enhanced connectivity of restored areas in a landscape context through buffer and corridor plantings, particularly around the central reaches of the site where wetland habitat is concentrated. The positive effects are briefly discussed in Section 4.2.5. while a detailed overview of proposed restoration activities is available within the Landscaping Plan graphic package (SLR 2024b).

The potential effects are discussed in the paragraphs below, and a summary of the potential ecological effects on ecological values is provided in Table F.

### 4.2.1 Effects on vegetation

The vast majority of vegetation that may be affected by the proposed works comprises irrigated exotic pasture with sporadic weeds, as well as exotic grass dominated wetland habitat, which are of negligible and low ecological value, respectively. Anticipated vegetation disturbance effects to the majority of the site are related to disturbance of vegetation from piling rigs installing the piles as well as earthworks disturbance associated with roads, buildings and trenching for cabling.

Approximately 0.6 ha of exotic trees would be removed on the southern boundary of the site. These are mature exotic trees and may risk damaging solar infrastructure in the future if retained.



Most of the site is under centre-pivot irrigation, which will cease once the proposed infrastructure is placed. This may result in the current managed pasture areas reverting to sparse herbaceous cover, similar to that observed during the site visit outside of the reach of the centre-pivots. Overall, the magnitude of effect on terrestrial vegetation and habitats is expected to be low to negligible while the overall level of effect is expected to be very low.

## 4.2.2 Wetlands

### 4.2.2.1 Effects management hierarchy

Consent to place solar panels over Natural Inland Wetlands is required under the Resource Management (National Environmental Standards for Freshwater) Regulations 2020 (NES-F) which specifies that an applicant must demonstrate, among other things, that the effects management hierarchy has been applied (NES-F regulation 45(6)(c)).

The effects management hierarchy is defined in the National Policy Statement for Freshwater Management 2020 (NPS-FM) as follows:

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

### 4.2.2.2 Wetland effects

The wetlands on site are located within actively grazed pasture areas and an area of approximately 0.79 ha of wetland will have solar panels placed over them. These wetlands are not habitat for indigenous flora and fauna and their remaining values lies only in the remnant wetland hydrology the potential of these wetlands for future restoration must also be considered.

It is important to remember the existing environment when considering the effects of people and machines in wetlands. The current situation is that this is a working farm and the wetlands are managed as part of the paddocks they are in. They are regularly subject to heavy livestock trampling and machinery such as tractors and quadbikes going through them. Periodic pasture renewal also involves more extreme disturbance such as ploughing or discing. It is against this environment that the effects of the proposal are assessed.

The removal of heavy livestock from these critical source areas is expected to improve water quality and may allow the regeneration of a few hardy native wetland species. There are three potential adverse effects that must be considered:

- 1 The direct impact on wetland vegetation from installing the poles that hold up the panels and any machine work associated with that;
- 2 The potential to disrupt the movement of water through the wetlands by the placement of these poles or from trenching; and



- 3 The change to the water inputs to the wetlands resulting from panels intercepting rainfall.

None of these potential adverse effects can be practicably avoided if the solar farm is to be a viable proposition. However, all these effects have been minimised through the design stages by opting for low-impact driving or drilling of piles and by the wide spacing of panel rows (5 – 7 m).

### **Direct impacts on wetland vegetation**

The total impact area from pole installation will be very small so the overall magnitude of this effect is low. These wetlands are dominated by exotic grasses and have low ecological value so the level of effect can be considered very low and, under the effects management hierarchy no residual effects require further management.

### **Disruption of water movement through the wetlands**

Given the method of construction, with poles being driven or screwed into the ground, the poles will not provide a significant barrier to the natural movement of water into, within or discharging from the wetlands. This effect has been minimised by design and no further management is required. This potential effect is considered to be of low magnitude, resulting in a very low level of effect.

There is potential for trenching for cable installation to alter water flow through wetlands. Trenching in wetlands should be avoided where possible, minimised by taking the shortest possible route through wetlands, or remedied by backfilling and re-grassing. If none of these mitigation measures are carried out the level of effect would be low to moderate, but with mitigation in place the level of effect will be very low and no further management would be required.

### **Change in water inputs resulting from placement of panels over wetlands**

Solar panels are considered disconnected impervious surfaces when rainfall running off the panel is discharged to a pervious surface (e.g. pasture). An assessment of the hydrological response of solar farms by Cook and McCuen (2013) found that solar panels do not have a significant effect on the runoff volumes, peaks or times to peak, when any rainfall running off the panels is discharging to pasture. The current ground cover (i.e. pasture) of the Foxton site will be retained so the hydrological effect to any natural inland wetland is likely to be low in magnitude, resulting in a very low level of effect. Again, this effect has been minimised by design and no further management is required under the effects management hierarchy.

The irrigation is also likely to be supplementing the water feeding the wetland areas but very unlikely that they are the cause of them. Ceasing irrigation may reduce the size of some of the wetland areas but is unlikely to cause them to dry up completely. In this case, the change in extent is a restoration of the natural state from an artificial state and cannot be considered an adverse effect.

### **4.2.3 Effects on aquatic fauna and waterways**

There is potential for sediment to discharge into nearby receiving environments, via the drains, during the construction period. However, earthworks associated with the proposed solar farm construction are expected to be limited in extent. Provided appropriate sediment and erosion control measures are implemented and adhered to during the construction phase, the low gradient nature of the site and surrounding catchment as well as the scale of the site works will mean the scale and temporal effects of these risks to the receiving



environment and aquatic fauna are expected to be low in magnitude, resulting in a very low level of effect.

New internal access roads are proposed, while existing farm races will be retained, upgraded, and used for accessing the solar farm. Assuming adherence to regional standards for stormwater management during road construction, the potential level of adverse effects of increased stormwater runoff is considered to be low.

The client intends to make use of existing drain crossings, therefore no specific instream works are planned at this point.

There are no expected adverse effects associated with stormwater management during the operational phase. The solar panels themselves are built on steel frames and pasture remains in place below the panels, only a small proportion of the solar farm will be changed to impervious surface. The remainder of the site remains in pasture suitable for sheep grazing, and runoff from panels is on to pasture, where it can be expected to infiltrate the ground.

Riparian planting proposed along certain drains can be expected to result in increased shading of the drains to the benefit of aquatic fauna. Likewise, as discussed in section 4.2.4. below, the lowered levels of nutrient losses as a result of conversion from dairying to sheep and solar farming, are expected to have a positive effect on water quality. As such, the long-term effects of the proposal on the aquatic environment are considered to be positive in nature.

#### **4.2.4 Effects of lighting and noise on fauna**

The solar farm would require very little permanent lighting and won't create significant light pollution. Although some security lighting may be required at key infrastructure, such as the substation and offices, it should be limited and designed to shine below the horizontal plane. Accordingly, lighting is unlikely to impact indigenous flora and fauna on or around the site.

The loudest activity related to the construction of solar farms is usually related to the piling machinery. Construction disturbance linked to the implementation of the solar panels using a small piling rig with a shroud may create some localised noise disturbance, which has been recorded at a Sound Pressure Level (SPL) OF 85 dB  $L_{Aeq}$  at a 10 m distance (SLR, 2024d). It is likely that mobile fauna would temporarily move out of areas where the noise disturbance would be highest during construction.

Operational solar panels are considered noise-free with only the inverters producing a slight hum. This noise would only be audible from within the site and only during the day when the panels are generating electricity. The low levels of noise emitted by the inverters is highly localised and not expected to adversely affect fauna utilising the wider site. The operational noise associated with the solar farm will be loudest at the BESS site, with an acoustic screen proposed to reduce the potential noise effects to a nearby property (SLR, 2024d). The noise affect should be localised around the BESS.

The findings of the acoustic assessment indicate that noise effects will be within required noise limits at surrounding dwellings during both the construction and operation phases. The magnitude and level of effect from potential increases in noise and lighting above background levels to local fauna is considered to be low and very low, respectively.

#### **4.2.5 Effects of solar panels on terrestrial fauna**

Overseas studies, discussed below, show that birds strike on solar panels can cause injury or death, possibly as a result of reflections of the sky, misinterpreting the reflective surface



as water, or due to polarisation of light. Similar impact effects are seen with other reflective surfaces like windows in buildings.

The 'lake effect' theory is that large fields of solar panels may appear to be water and birds (particularly water birds) may try to land on it or drink from it, resulting in injury (Kagan *et. al.* 2014). There is very little data on the level of impact of solar panels on birds and none in the New Zealand context, however bird fatality detections from three solar farms in California showed rates of between 0.02 birds/ha/year to 0.6 birds/ha/year (Western Ecosystems Technology 2017). None of these studies showed high rates of water birds being adversely affected by solar panels and raptors made up only 0% to 4% of all birds impacted (Western Ecosystems Technology 2017).

Photovoltaic panels causing polarisation of light has also been thought to be an issue for wildlife, however a study in South Africa found no evidence that birds were responding to polarised light (Visser 2018). The anticipated gaps between the rows of panels may provide enough a visual cue for birds to be able to perceive the panels themselves and not mistake them for water or be disoriented by reflections.

Solar panels are designed to absorb light and not to reflect it, with panel arrays having a similar reflectance to still water, and less reflectance than concrete (Riley & Olsen 2011). Whether the effects of solar panel arrays are any greater than that posed by buildings has not been well studied and the overall effect of solar arrays on birds is not well understood.

As mentioned in section 4.1.2., preferential nesting and foraging habitat exists for the migratory wading birds associated with the Manawatū Estuary. It is highly unlikely that these birds will nest at the site, although, they may overfly or temporarily forage at the site. In this regard, a simple monitoring procedure is recommended (see section 5) to gain an insight into the potential effects to birds.

The magnitude of this potential effect is considered to be low as all of the bird species at this site are common native or exotic species and the level of effect of the panel arrays on them is expected to be very low.

#### 4.2.6 Positive effects

Enhancement and restoration measures are proposed on site that would provide positive ecological outcomes associated with the proposed solar farm. These measures include planting of wetland areas, nearby buffer areas, certain dune habitat and certain drain banks with suitable species that would have historically been present. Additionally, planting around the margins of the site with appropriate indigenous species will enhance connectivity through the site and with the surrounding landscape. Certain areas of the site will also be left undeveloped (i.e. will remain open pasture). A key component of the proposed restorative works includes the fencing off, and planting of, approximately 1 ha of wetland habitat and 8 Ha of 'Riparian Edge Planting'. The proposed restoration areas and areas to be retained (i.e. No Works Proposed – Unaffected) are shown Appendix A while a summary of the restoration areas provided in Table E, below.

**Table E: Proposed restoration planting and retention area.**

Type	Area (Ha)
Wetland Vegetation Restoration	1.00
Riparian Edge Planting	8.00
General Native Vegetation Planting	16.30
Site Boundary Planting	9.00



Type	Area (Ha)
No Works Proposed – Unaffected (Open Pasture)	45.00

Finally, changing the farming system from dairy cattle to lower-intensity sheep grazing is expected to reduce the pressure on the land and impacts on downstream aquatic ecosystems and water quality through reduced losses of contaminants such as nutrients (Brown et al. 2011; PCE, 2013). Nutrient yields tend to be lower for sheep farming compared to dairy farming, especially for Nitrogen (47 kg/ha/yr for dairy versus 12 kg/ha/yr for sheep), but also phosphorus (1.1 kg/ha/yr for dairy versus 0.8 kg/ha/year for sheep) (McDowell et al. 2021). The cessation of irrigation may also reduce nitrogen leaching and will reduce pressure on local water resources. Sediment losses can be higher on a national average for sheep farming, however this is often associated with farming marginal, steep land with higher erosion potential. The project site is of flat topography, and the sediment losses compared to current farming practices, especially after planting of certain drain margins, are not expected to increase in this case.

The lowered levels of nutrient losses achieved through the conversion to sheep farming in combination with drain bank and wetland plantings is expected to enhance aquatic habitat values over time.



**Table F: Effects assessment of ecological features considering level of effect without and with mitigation measures.**

Ecological Feature	Ecological Value	Effects	Before Mitigation		Proposed Mitigation	Post Mitigation	
			Magnitude of Effect	Level of Effect		Magnitude of Effect	Level of Effect
<b>Vegetation</b>							
Pasture grassland	Negligible	Vegetation and earth disturbance of areas currently under exotic pasture related to construction of access roads, solar arrays and other solar farm infrastructure.	Low	Very Low	Not required.	Low	Very Low
Exotic grass dominated wetlands	Low	Local direct effect on vegetation and wetland hydrology during earthworks and placement of solar arrays within identified wetland habitat. Direct impacts on exotic wetland vegetation. (Wetlands W01 – W03, W07, W08, W11 – W14, W16, W18 – W29, W31, W48, W54, W55, W59, W60, W62 – W64, W74, W75, W79 – W83, W86, W88 – W91, W93, W94, W96; see Appendix C, D).	Low	Very Low	To further minimise these effects: <ul style="list-style-type: none"> <li>Machine tracking and vehicular movement in exotic grass dominated wetlands should be minimised as much as possible.</li> </ul>	Low	Very Low
		Trenching through wetlands causing changes in hydrology.	Moderate	Low	<ul style="list-style-type: none"> <li><b>Avoid</b> trenching through wetlands where it is practicable to do so.</li> <li><b>Minimise</b> the length of trench that goes through wetlands by taking the most direct route.</li> </ul>	Low	Very Low



			Before Mitigation			Post Mitigation	
					<ul style="list-style-type: none"> <li>Backfill and re-grass any trenches dug through the wetlands but avoid hard packing the backfill to <b>remediate</b> effects on wetland hydrology.</li> </ul>		
		Minor indirect effects from sediment run-off causing vegetation die-off and hydrological modification are possible, no planned direct negative effects to wetlands identified in retained areas, general planting areas or specific restoration areas (Wetlands W04 – W06, W09, W10, W15, W17, W30, W32 – W47, W49 – W53, W56 – W58, W61, W65 – W73, W76 – W78, W84, W85, W87, W92, W95, W97 – W99; see Appendix C, D).	Negligible	Very Low	<ul style="list-style-type: none"> <li>Erosion and sediment control measures will be implemented as necessary to avoid sediment discharge to the wetlands.</li> <li>Remove weeds from wetlands.</li> <li>Revegetate and restore identified wetlands W32 – W34, W36 – W47, W49, W50, W52, W66 – W72.</li> </ul>	Positive	Net gain
Exotic tree cover (incl tree shelterbelts and individuals)	Low	Local direct effect from the removal of a small area of mature exotic trees.	Low	Very Low	Not required, however: <ul style="list-style-type: none"> <li>Boundary planting including a mix of native and exotic species is planned, which should result in a small biodiversity gain for the tree coverage.</li> </ul>		
Exotic shrubland	Low	These areas are to be avoided therefore no direct negative effects are anticipated.	Negligible	Very Low	Not required, however: <ul style="list-style-type: none"> <li>Boundary planting including a mix of native and exotic</li> </ul>		



				Before Mitigation		Post Mitigation	
						species is planned, which should result in a small biodiversity gain for the shrubland.	
Modified Duneland	Low					Not required, however: <ul style="list-style-type: none"> <li>Revegetation of a minor duneland area in the eastern corner of the site with native species is planned, which should result in a small biodiversity gain for the duneland.</li> </ul>	
<b>Watercourses</b>							
Farm drains	Low	Indirect effects related to sedimentation from stormwater run-off during construction. Vehicle tracking through farm drains.	Moderate	Low	Not required, however: <ul style="list-style-type: none"> <li>Implement erosion and sediment control and stormwater management, as mentioned in section 4.2.3., above.</li> <li>Avoid unnecessary machine tracking and vehicular movement in watercourses by making use of existing bridges and crossings.</li> </ul>	Low	Very Low
<b>Aquatic fauna</b>							
Fish	Low	Effects related to sediment run-off, increased turbidity and fish kills from direct and indirect impacts during construction.	Low	Very Low	Not required, however: <ul style="list-style-type: none"> <li>Implement erosion and sediment control and stormwater management,</li> </ul>	Low	Very Low



			Before Mitigation		Post Mitigation		
					as mentioned in section 4.2.3., above. <ul style="list-style-type: none"> <li>Avoid unnecessary machine tracking and vehicular movement in watercourses by making use of existing bridges and crossings.</li> </ul>		
<b>Terrestrial fauna</b>							
Birds	Low	<ul style="list-style-type: none"> <li>Direct bird mortality / injury relating to earthworks, vegetation clearing and general plant movement during construction.</li> <li>Potential collision with solar panels.</li> <li>Noise and vibration disturbance from construction and the BESS, reducing habitat suitability for birds.</li> </ul>	Low	Very Low	Not required, however: <ul style="list-style-type: none"> <li>Monitoring is recommended (see Section 5).</li> </ul>	Low	Very Low
Lizards	Low	<ul style="list-style-type: none"> <li>Direct lizard mortality / injury relating to earthworks, vegetation clearing and general plant movement during construction.</li> <li>Noise and vibration disturbance from construction and the</li> </ul>	Low	Very Low	Not required, however: <ul style="list-style-type: none"> <li>An incidental discovery condition should be included, which may read as follows: In the case a native lizard is incidentally detected on site during construction; a) the project herpetologist or SQEP should be contacted within the day of discovery, b) a</li> </ul>	Low	Very Low



			Before Mitigation			Post Mitigation	
		BESS, reducing habitat suitability for lizards.			preliminary 10m buffer exclusion area around the native lizard sighting should be established, c) if the lizard is at imminent risk from works, it should be salvaged and placed into a container with air holes, a small amount of vegetation and a damp cloth or suitable alternative, until the project herpetologist or SQEP can handle and relocate the lizard.		



## 5.0 Monitoring

As there is a small level of uncertainty on the impact of solar panels on avifauna in the New Zealand context a simple monitoring programme is recommended to record any bird deaths or injuries observed by the farm staff or solar farm staff and contractors. In other countries intensive carcass monitoring is undertaken but given that the vast majority of birds at the site are common or exotic species and the level of effect on all birds are expected to be very low, an intensive programme is not deemed necessary. The following is recommended:

- If dead or injured birds are discovered, the species and number should be recorded, along with date, time, location and information on injuries. If these birds can't be identified by operations staff, the carcasses should be photographed and stored in a freezer whereafter an ecologist can assist with identification. In addition to incidental discovery during general operations, a targeted walk-through of the site to check for bird carcasses should be undertaken monthly, for an initial period of 1-year, to ascertain risk to avifauna.
- If dead or injured, Threatened or At-Risk species are discovered, they should be reported to the Department of Conservation who may wish to inspect carcasses and can give advice on where injured birds can be taken. The following criteria could be implemented to establish adaptive management conditions on site with regards to potential bird strike by Threatened, At Risk or Not Threatened species (Table G):

**Table G: Draft criteria to inform adaptive management considerations**

Bird Threat Status	Adaptive management entry limit
Threatened – Nationally Critical / Endangered	One (1) carcass detected during any time
Threatened – Nationally Vulnerable	Two (2) carcasses detected during a targeted survey / Five (5) carcasses detected over 12-months
Threatened – Nationally Increasing and At Risk	Five (5) carcasses detected over 12-months
Not Threatened	Five (5) carcasses detected during a targeted survey / 20 carcasses detected over 12 months

- Information on any bird strikes should be kept by the solar farm operator should they be required to be inspected by the consenting authority or the Department of Conservation.
- After the first year of monitoring a bird strike report should be compiled by a suitably experienced ecologist to analyse the actual impact on birds and make recommendations about ongoing mitigation measures. An updated report should be written within three years and then every 5 years after that.
- If monitoring shows that adverse effects on avifauna are more than minor, additional mitigation measures will need to be agreed. This is considered highly unlikely however.



## 6.0 Summary

Genesis is proposing the development of a ~180 MWac solar farm near Foxton, within the Horowhenua District. An assessment of ecological effects was prepared to inform a resource consent application to establish a solar farm at the site. This ecological assessment relates to the construction, operation and maintenance of a solar farm at the site.

Historic aerial imagery is limited for the area although the site has been under mix of pasture and plantation forestry since at least 2001, becoming predominately pasture in the mid-2010's. Additional terrestrial vegetation within the site comprised individual exotic trees, exotic shelterbelts, shrubland, modified duneland and secondary wetland vegetation. Only common open country and coastal bird species were observed and recorded on site, and it was considered unlikely that lizards are present in high densities due to the limited habitat available. Limited bat habitat on site was corroborated by the findings of the 6-week bat monitoring survey which indicated that New Zealand long-tailed bats were absent within the site.

No active fish or macroinvertebrate sampling was undertaken on site, however, an assessment of eDNA results indicated the presence of 'Not Threatened' native and introduced fish.

Most ecological values of habitat on this site were assessed as 'Negligible' to 'Low' based on the predominate land cover, which was managed pasture used for cattle grazing. Exotic trees provided minor refuge areas and comprised no native species whilst wetlands, although a nationally under-represented ecosystem, comprised primarily secondary exotic grassland vegetation.

The ecological value of species ranged from low, which is primarily based on the absence of threatened, 'At Risk' or locally uncommon faunal species.

Potential adverse ecological effects associated with the proposed solar farm include construction works, stormwater run-off associated with construction, panel collision by birds, as well as lighting and noise associated with on-site infrastructure. The level of effects was assessed as 'Low / Very Low' when considering proposed mitigation measures for the solar farm.

A number of positive effects are expected to occur with proposed enhancement and restoration measures. It is likely that if the proposed enhancement opportunities are implemented by the client, the overall ecological impact would result in a 'Net Gain' for the site.



## 7.0 References

- Ausseil, A., Gerbeaux P, Chadderton WL, Stephens T, Brown D, Leathwick J. 2008. Wetland ecosystems of national importance for biodiversity: criteria, methods and candidate list of nationally important inland wetlands. Landcare Research Contract Report LC0708/158. 174 p.
- Brown, I., Norton, N., Wedderburn, L., Monaghan R., Harris, S., Hayward, S., and Ford, R. 2011. Nutrient management in Hurunui: A case study in identifying options and opportunities. Report prepared for Environment Canterbury.
- Cieraad, E., Walker, S., Price, R., Barringer, J. 2015. An updated assessment of indigenous cover remaining and legal protection in New Zealand's land environments. *New Zealand Journal of Ecology* 39(2).
- Clarkson, B. R. 2014. A vegetation tool for wetland delineation in New Zealand. New Zealand: Landcare Research. doi: 10.7931/J2TD9V77. December 2013.
- Cook, Lauren & McCuen, Richard. (2013). Hydrologic Response of Solar Farms. *Journal of Hydrologic Engineering*. 18. 536-541. 10.1061/(ASCE)HE.1943-5584.0000530.
- David, B.O., Fake, D.R., Hicks, A.S., Wilkinson, S.P., Bunce, M., Smith, J.S., West, D.W., Collins, K.E., Gleeson, D.M. 2021. Sucked in by eDNA—a promising tool for complementing riverine assessment of freshwater fish communities in Aotearoa New Zealand. *New Zealand Journal of Zoology*, 48(3-4), pp.217-244.
- de Lange, P.J.; Gosden, J.; Courtney, S.P.; Fergus, A.J.; Barkla, J.W.; Beadel, S.M.; Champion, P.D.; Hindmarsh-Walls, R.; Makan, T.; Michel, P. 2024: Conservation status of vascular plants in Aotearoa New Zealand, 2023. *New Zealand Threat Classification Series* 43. Department of Conservation, Wellington. 105 p.
- DOC (Department of Conservation) 2023. Bat database. Spatial data provided by Department of Conservation. Dated 24 August 2023.
- Dunn, N. R., Allibone, R. M., Gloss, G. P., Crow, S. K., David, B. O., Goodman, J. M., Griffiths, M., Jack, D. C., Ling, N., Waters, J. M., & Rolfe, J. R. 2018. Conservation status of New Zealand freshwater fishes, 2017. *New Zealand Threat Classification Series* 24. Department of Conservation, Wellington. 11 p.
- eBird. 2024. Manawatu District New Zealand. <https://ebird.org/region/NZ-MWT-039>. Accessed on 18<sup>th</sup> April 2024.
- Franklin, P.A., Gee, E., Baker, C.F., Bowie, S. 2018. *New Zealand Fish Passage Guidelines – for structures up to 4 metres*. Hamilton (NZ): NIWA.
- Fraser S, Singleton P, Clarkson B 2018. Hydric soils – field identification guide. Envirolink Tools Contract C09X1702. Manaaki Whenua – Landcare Research Contract Report LC3233 for Tasman District Council. Available at: [https://www.landcareresearch.co.nz/assets/Discover-Our-Research/Biodiversity/Species-ecosystem-services/Restoring-wetland-ecosystem-functioning/hydric\\_soils\\_fieldguide.pdf](https://www.landcareresearch.co.nz/assets/Discover-Our-Research/Biodiversity/Species-ecosystem-services/Restoring-wetland-ecosystem-functioning/hydric_soils_fieldguide.pdf) Accessed: 15<sup>th</sup> February 2024.
- FRV. 2024. General Layout: Proposed Foxton Solar Farm. Version 1.12. Compiled by FRV. Dated 12<sup>th</sup> November 2024.
- Hitchmough, R.A.; Barr, B.; Knox, C.; Lettink, M.; Monks, J.M.; Patterson, G.B.; Reardon, J.T.; van Winkel, D.; Rolfe, J.; Michel, P. 2021: Conservation status of New Zealand reptiles, 2021. *New Zealand Threat Classification Series* 35. Department of Conservation, Wellington. 15 p.



HRC (Horizons Regional Council). 2022. One Plan: The Consolidated Regional Policy Statement, Regional Plan and Regional Coastal Plan for the Manawatu-Whanganui Region. Compiled by the HRC in 2014, amended 2022. Report No. 2014/EXT/1338.

iNaturalist. 2024. Various. <https://www.inaturalist.org/>. Accessed on 8<sup>th</sup> April 2024.

Kagan, R. A., T. C. Viner, P. W. Trail, and E. O. Espinoza. 2014. Avian mortality at solar energy facilities in Southern California: a preliminary analysis. National Fish and Wildlife Forensics Laboratory, Ashland, Oregon, USA.

Leathwick, J.R., McGlone, M.S., Walker, S. 2004. New Zealand's potential vegetation pattern. Lincoln, New Zealand, Manaaki Whenua Press.

Lettink, M., Cree, A. 2007. Relative use of three types of artificial retreats by terrestrial lizards in grazed coastal shrubland, New Zealand. *Appl Herpetol.* 4:227–243.

Lettink, M., Monks, J.M. 2016. Survey and monitoring methods for New Zealand lizards, *Journal of the Royal Society of New Zealand*, 46:1, 16-28, DOI: 10.1080/03036758.2015.1108343

Lloyd, B. 2017. Bat call identification manual for DOC's spectral bat detectors. (Ed. by The Department of Conservation). Wellington, New Zealand.

McDowell, R, Monaghan, R., Smith, C, Manderson, A., Basher, L., Burger, D., Laurenson, S., Pletnyakov, P., Spiekermann, R. & Depree, C. 2021. Quantifying contaminant losses to water from pastoral land uses in New Zealand III. What could be achieved by 2035?, *New Zealand Journal of Agricultural Research*, 64:3, 390-410, DOI: 10.1080/00288233.2020.1844763.

McEwen, W.M. 1987. Ecological Regions and Districts of New Zealand. Third revised edition in four 1:500,000 maps. Department of Conservation, Wellington, New Zealand. June 1987.

MfE (Ministry for the Environment). 2022a. Wetland delineation protocols. Wellington: Ministry for the Environment.

MfE. 2022b. Pasture exclusion assessment methodology. Wellington: Ministry for the Environment.

O'Donnell, C.F.J. Borkin, K.M. Christie, J.E., Davidson-Watts, I., Dennis, G., Pryde, M., Michel, P. 2023. Conservation status of bats in Aotearoa New Zealand, 2022. *New Zealand Threat Classification Series 41*. Department of Conservation, Wellington. 18 p.

PCE 2013. Water quality in New Zealand: land use and nutrient pollution. Report published by the Parliamentary Commissioner for the Environment.

Retrolens 2024. <https://retrolens.nz> and licensed by LINZ CC-BY 3.0. Accessed 8<sup>th</sup> April 2024.

Riley E., Olson, S., 2011. A Study of the Hazardous Glare Potential to Aviators from Utility-Scale Flat-Plate Photovoltaic Systems. *ISRN Renewable Energy*, vol. 2011.

Robertson, H.A., Baird, K.A., Elliott, G.P., Hitchmough, R.A., McArthur, N.J., Makan, T.D., Miskelly, C.M., O'Donnell, C.F.J., Sagar, P.M., Scofield, R.P., Taylor, G.A., Michel, P. 2021. Conservation status of birds in Aotearoa New Zealand, 2021. *New Zealand Threat Classification Series 36*. Department of Conservation, Wellington. 43 p.

Roper-Lindsay, J., Fuller S.A., Hooson, S., Sanders, M.D., Ussher, G.T. 2018. Ecological impact assessment. EIANZ guidelines for use in New Zealand: terrestrial and freshwater ecosystems. 2nd edition.



SLR (SLR Consulting). 2024a. P Confirmation of Streams and Drains - Regional Plan Definitions Proposed Solar Farm – Wall Road and Motuiti Road, Foxton. Compiled by SLR Consulting for the Horizons Regional Council. Dated 11<sup>th</sup> July 2024.

SLR. 2024b. Proposed Mitigation and Enhancement – Graphic Package: Proposed Foxton Solar Farm. Compiled by SLR Consulting for Genesis. Unpublished. Dated September 2024.

SLR. 2024c. Ōpunake Solar Farm Response to EPA Questions. Compiled by SLR Consulting for the Environmental Protection Authority. Dated 19<sup>th</sup> June 2024.

SLR. 2024d. Acoustic Assessment: Foxton Solar Farm Project. Specialist acoustic assessment report compiled by SLR Consulting for Genesis. Report version 0.1. Unpublished draft. Dated 11<sup>th</sup> November 2024.

S-Map soil map and factsheets accessed on 8<sup>th</sup> April 2024 under Creative Commons Attribution. Non-Commercial-No Derivative Works 3.0 New Zealand License (BY-NC-ND).

Visser, E., Perold, V., Ralston-Paton, S., Cardenal, A.C., Ryan, P.G. 2018. Assessing the impacts of a utility-scale photovoltaic solar energy facility on birds in the Northern Cape, South Africa, *Renewable Energy* (2018), <https://doi.org/10.1016/j.renene.2018.08.106>

Western Ecosystems Technology 2017. Draft Bird and Bat Conservation Strategy for the Palen Solar Voltaic Project. Prepared for Palen Solar III LLC by Western EcoSystems Technology Inc. 158 p.



## 8.0 Closure

We trust you will find the above in order, should there be any queries regarding the findings kindly contact the author on [REDACTED].

Sincerely,

**SLR Consulting New Zealand**



**Andrew Briggs, CEnvP**  
Associate Ecologist



**Hamish Dean, CEnvP**  
Principal Ecologist

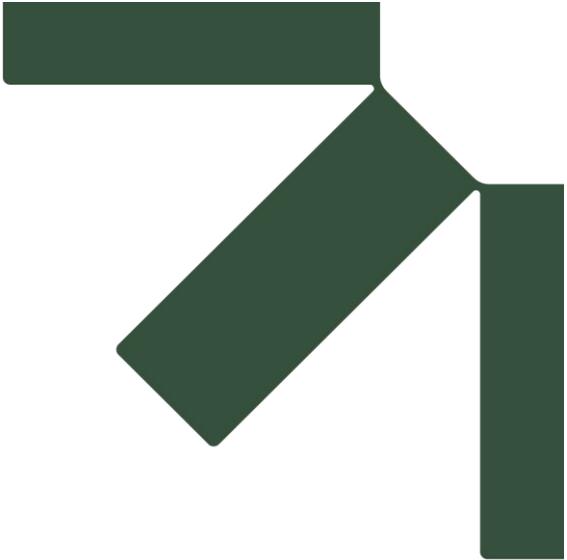


## 9.0 Feedback

At SLR, we are committed to delivering professional quality service to our clients. We are constantly looking for ways to improve the quality of our deliverables and our service to our clients. Client feedback is a valuable tool in helping us prioritise services and resources according to our client needs.

To achieve this, your feedback on the team's performance, deliverables and service are valuable and SLR welcome all feedback via <https://www.slrconsulting.com/en/feedback>. We recognise the value of your time and we will make a \$10 donation to our Charity Partner - Lifeline, for every completed form.





# **Appendix A    General Arrangement of Proposed Solar Farm**

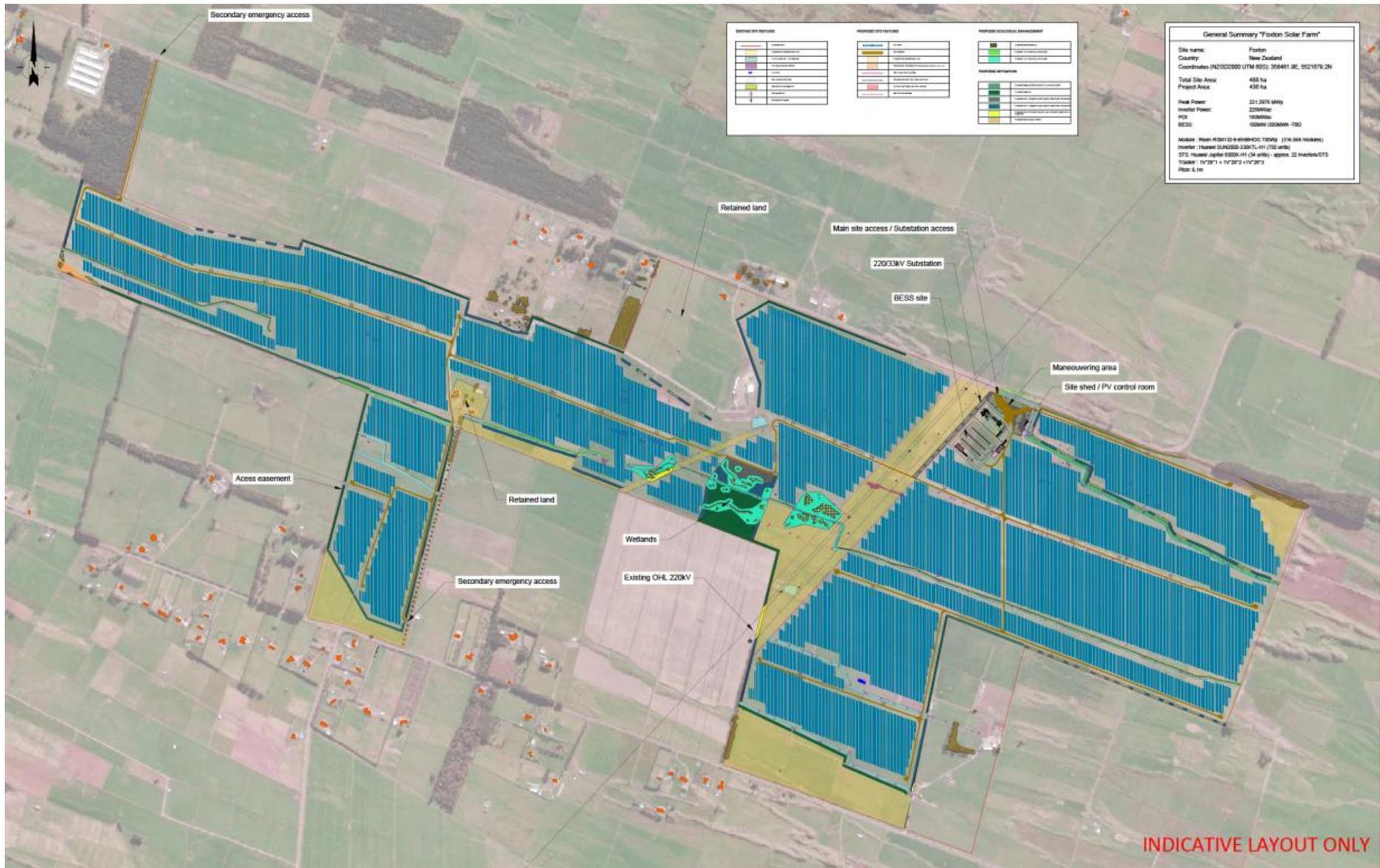
## **Ecological Impact Assessment**

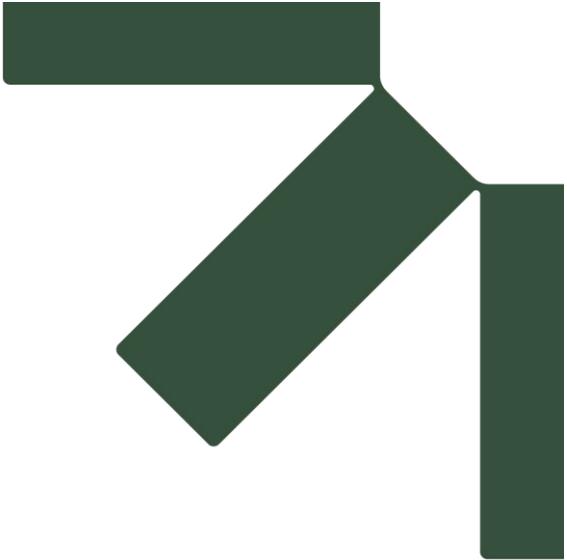
**Foxton Solar Farm – Fast Track Approvals Act Application**

**Genesis Energy Limited**

Client Reference: Foxton Solar Farm

10 December 2025





# **Appendix B    Wetland Delineation Data and Photographs**

## **Ecological Impact Assessment**

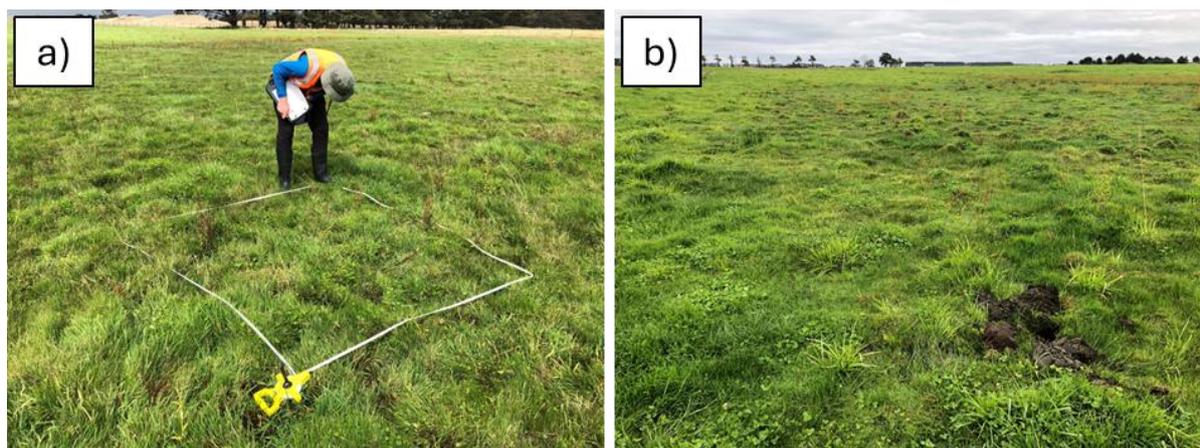
**Foxton Solar Farm – Fast Track Approvals Act Application**

**Genesis Energy Limited**

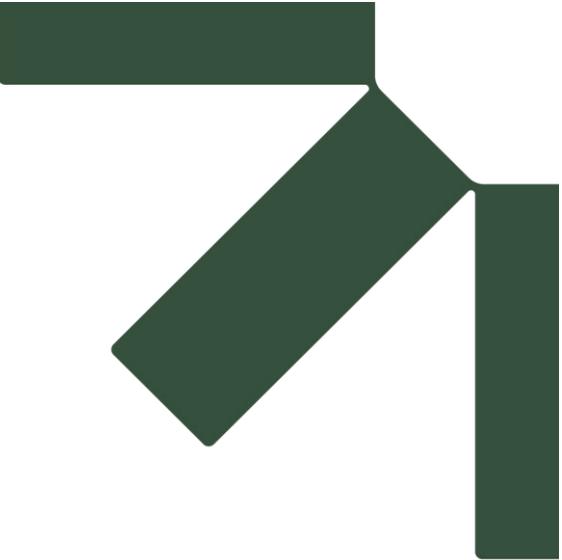
Client Reference: Foxton Solar Farm

10 December 2025

Plot No.	Coordinates		Plot Results
	NZTM	DMS	
WP01	1796229 E, 5520774 N	40°26'25.95"S, 175°18'49.25"E	Non – Wetland
WP02	1795832 E, 5520900 N	40°26'22.22"S, 175°18'32.30"E	Non – Wetland
WP03	1795672 E, 5520894 N	40°26'22.56"S, 175°18'25.51"E	Non – Wetland
WP04	1797926 E, 5520044 N	40°26'48.16"S, 175°20'2.06"E	Wetland
WP05	1796995 E, 5519854 N	40°26'55.12"S, 175°19'22.80"E	Wetland
WP06	1799819 E, 5519670 N	40°26'58.66"S, 175°21'22.80"E	Wetland
WP07	1799411 E, 5520249 N	40°26'40.24"S, 175°21'4.80"E	Non – Wetland



**Photo 9: a) An example 2mx2m vegetation plot undertaken within potential wetland habitat. In this case the plot comprised >50% pasture grasses and was therefore non-wetland. b) An example of a soil sample excavated from a separate wetland area on site, which comprised orange mottles (i.e. hydric features).**



# **Appendix C    Wetland Overview Map with Lables**

## **Ecological Impact Assessment**

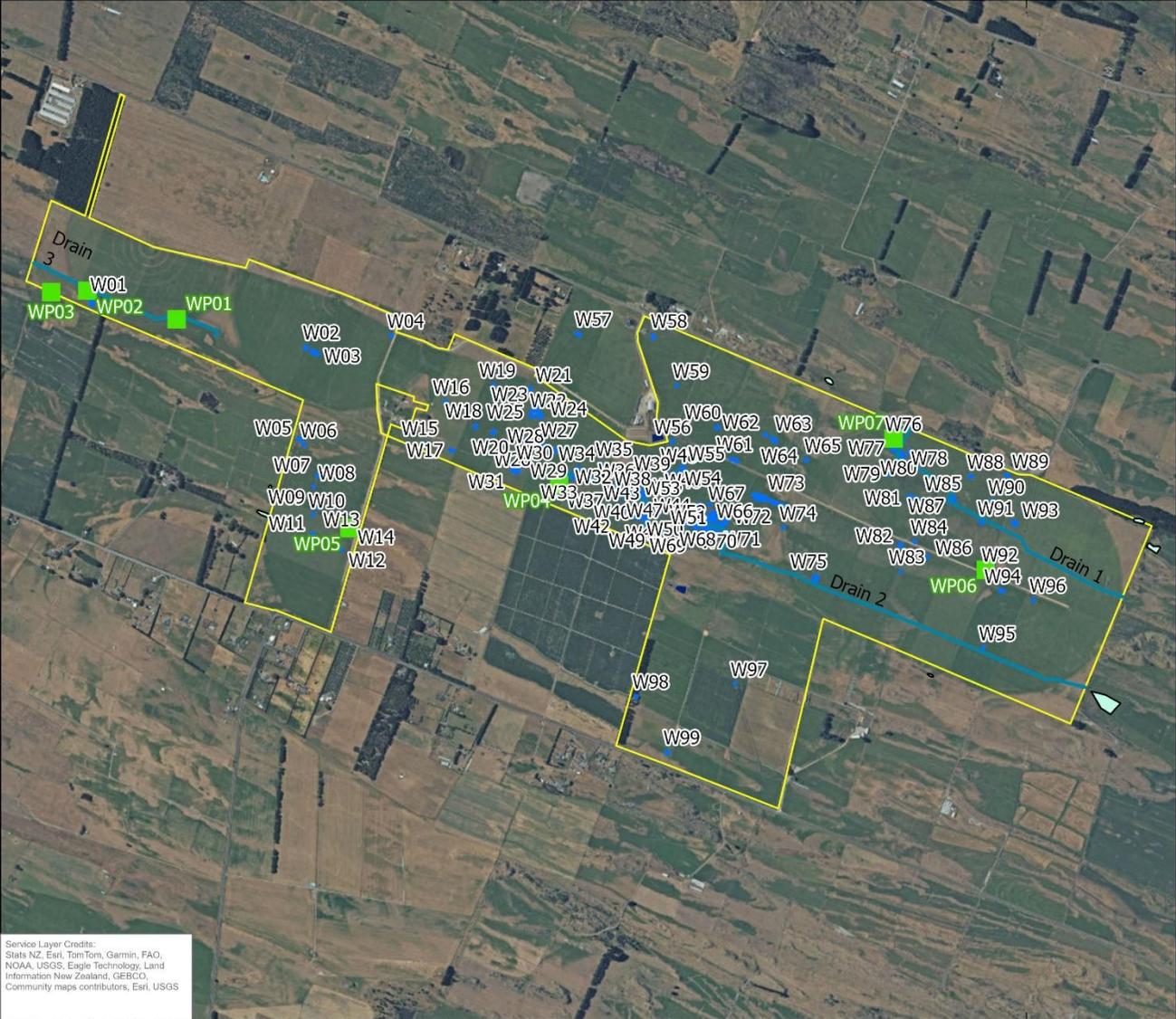
**Foxton Solar Farm – Fast Track Approvals Act Application**

**Genesis Energy Limited**

Client Reference: Foxton Solar Farm

10 December 2025

1,800,000

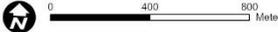


**PROPOSED FOXTON SOLAR FARM**  
**WETLANDS OVERVIEW MAP**

**FIGURE I**

- LEGEND**
- Vegetation Plots
  - Primary Drains
  - Wetlands
  - Artificial Ponds
  - Wetlands within 100m
  - Project Area Foxton

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding the data's accuracy or reliability for any purpose.

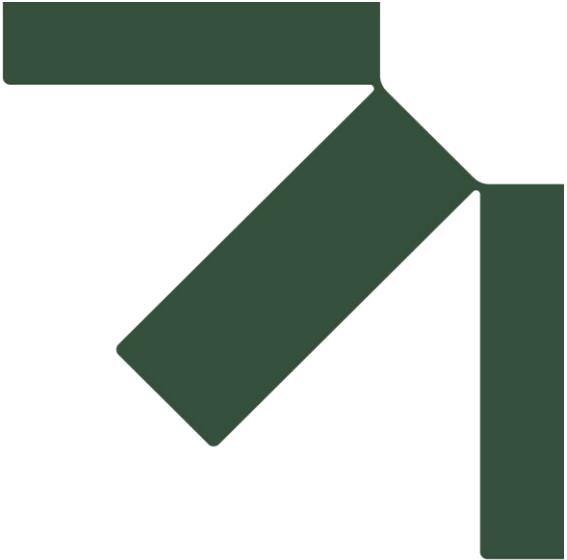


Coordinate System: NZGD 2000 NZTM  
 Scale: 1:23,000 at A4  
 Project Number: 810.V14848.00004  
 Date Drawn: 6/05/2025  
 Drawn by: ANDREW BRIGGS

Service Layer Credits:  
 State NZ, Esri, TomTom, Garmin, FAO,  
 NOAA, USGS, Eagle Technology, Land  
 Information New Zealand, GEBCO,  
 Community maps contributors, Esri, USGS

Path: C:\Users\AndrewBriggs\OneDrive - SLR Consulting\2024 Projects\14848 - Foxton solar farm\Ecology\GIS\ArcMaps\Foxton Solar Farm\_Wetlands Overview.aprx\I\_A4\_L1





# Appendix D Individual Wetland Characteristics Table

## Ecological Impact Assessment

Foxton Solar Farm – Fast Track Approvals Act Application

Genesis Energy Limited

Client Reference: Foxton Solar Farm

10 December 2025

Wetland Identifier	Hydrosystem	Class	Form	Primary Vegetation Structure	Composition and Description	Area (m <sup>2</sup> )	Plot	Rapid Test	Dominance Test	Prevalence Test	Natural Inland Wetland (as defined in the NPS-FM)	Planned Works
W01	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>Agrostis stolonifera</i> – ( <i>Juncus articulatus</i> ) – ( <i>Panicum hydropiper</i> ) – [ <i>Ranunculus repens</i> ] grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture. Standing water and bare mud also present.	303.45	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W02	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>Glyceria declinata</i> – <i>A. stolonifera</i> – ( <i>J. articulatus</i> ) grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	95.22	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W03	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>G. declinata</i> – <i>A. stolonifera</i> – ( <i>J. articulatus</i> ) grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	276.96	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W04	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> grass marsh. Small wetland area dominated by grasses within a low-lying area, surrounded by pasture. Vehicular and stock disturbance evidenced by exposed mud.	38.74	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	No Works Proposed – Unaffected
W05	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>Juncus effusus</i> grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	78.84	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	No Works Proposed – Unaffected
W06	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> grass marsh. Small wetland area dominated by grasses within a low-lying area, surrounded by pasture.	39.51	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	No Works Proposed – Unaffected
W07	Palustrine	Marsh	Basin	Herbfield	<i>P. hydropiper</i> – <i>A. stolonifera</i> herb marsh. Small wetland dominated by herbaceous vegetation within a low-lying area, surrounded by pasture.	48.31	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W08	Palustrine	Marsh	Basin	Herbfield	<i>P. hydropiper</i> – <i>A. stolonifera</i> – <i>G. declinata</i> – <i>Paspalum distichum</i> herb marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	21.97	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect

Wetland Identifier	Hydrosystem	Class	Form	Primary Vegetation Structure	Composition and Description	Area (m <sup>2</sup> )	Plot	Rapid Test	Dominance Test	Prevalence Test	Natural Inland Wetland (as defined in the NPS-FM)	Planned Works
W09	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – <i>P. hydropiper</i> grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	165.78	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	No Works Proposed – Unaffected
W10	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – <i>P. hydropiper</i> grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	21.01	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	No Works Proposed – Unaffected
W11	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – <i>P. hydropiper</i> grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	73.86	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W12	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – <i>P. hydropiper</i> grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	129.17	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W13	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – ( <i>J. effusus</i> ) – ( <i>P. hydropiper</i> ) grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	47.40	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W14	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>G. declinata</i> – <i>A. stolonifera</i> – ( <i>P. hydropiper</i> ) grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	74.79	Yes	Maybe	Pass	Pass	Yes	Under Panels / Very Low Level of Effect
W15	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – ( <i>Lolium perenne</i> ) grass marsh. Small wetland area dominated by grasses within a low-lying area, surrounded by pasture.	43.90	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	General Native Vegetation Planting
W16	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – ( <i>L. perenne</i> ) – ( <i>P. hydropiper</i> ) grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	32.72	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect

Wetland Identifier	Hydrosystem	Class	Form	Primary Vegetation Structure	Composition and Description	Area (m <sup>2</sup> )	Plot	Rapid Test	Dominance Test	Prevalence Test	Natural Inland Wetland (as defined in the NPS-FM)	Planned Works
W17	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – ( <i>L. perenne</i> ) – ( <i>Holcus lanatus</i> ) – ( <i>Trifolium repens</i> ) grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture. Stock disturbance evidenced by exposed mud.	67.18	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	General Native Vegetation Planting
W18	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – ( <i>P. hydro Piper</i> ) – [ <i>Rumex</i> sp.] – [ <i>T. repens</i> ] grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	60.60	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W19	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> grass marsh. Small wetland area dominated by grasses within a low-lying area, surrounded by pasture.	27.89	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W20	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – ( <i>T. repens</i> ) – [ <i>P. hydro Piper</i> ] – [ <i>J. articulatus</i> ] grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	110.25	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W21	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – [ <i>L. perenne</i> ] grass marsh. Small wetland area dominated by grasses within a low-lying area, surrounded by pasture.	79.19	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W22	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – [ <i>T. repens</i> ] – [ <i>P. hydro Piper</i> ] grass marsh. Small wetland area dominated by grasses within a low-lying area, surrounded by pasture.	76.58	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W23	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – [ <i>T. repens</i> ] – [ <i>P. hydro Piper</i> ] grass marsh. Wetland area dominated by grasses within a low-lying area, surrounded by pasture.	402.20	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W24	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – [ <i>T. repens</i> ] – [ <i>P. hydro Piper</i> ] grass marsh. Wetland area dominated by grasses within a low-lying area, surrounded by pasture.	115.86	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W25	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>P. hydro Piper</i> – [ <i>T. repens</i> ] – [ <i>P. distichum</i> ] grass marsh.	1098.87	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect

Wetland Identifier	Hydrosystem	Class	Form	Primary Vegetation Structure	Composition and Description	Area (m <sup>2</sup> )	Plot	Rapid Test	Dominance Test	Prevalence Test	Natural Inland Wetland (as defined in the NPS-FM)	Planned Works
					Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.							
W26	Palustrine	Marsh	Valley Floor	Hygrophilous Grassland	<i>A. stolonifera</i> – [ <i>G. declinata</i> ] – [ <i>T. repens</i> ] – [ <i>L. perenne</i> ] grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a minor valley floor area, surrounded by pasture.	973.46	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W27	Palustrine	Marsh	Valley Floor	Hygrophilous Grassland	<i>G. declinata</i> – <i>J. articulatus</i> – ( <i>A. stolonifera</i> ) grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a minor valley floor area, surrounded by pasture.	39.23	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W28	Palustrine	Marsh	Valley Floor	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>Alopecurus geniculatus</i> – ( <i>G. declinata</i> ) grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a minor valley floor area, surrounded by pasture.	172.80	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W29	Palustrine	Marsh	Valley Floor	Hygrophilous Grassland	<i>G. declinata</i> – <i>A. stolonifera</i> – ( <i>J. articulatus</i> ) – ( <i>P. hydropiper</i> ) grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a minor valley floor area, surrounded by pasture.	601.93	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W30	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – [ <i>L. perenne</i> ] – [ <i>T. repens</i> ] – [ <i>J. articulatus</i> ] grass marsh. Small elongated wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	65.74	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Drain Bank Planting
W31	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – [ <i>T. repens</i> ] – [ <i>J. articulatus</i> ] grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	582.65	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W32	Palustrine	Marsh	Basin	Low Rushland	<i>J. articulatus</i> – ( <i>T. repens</i> ) – [ <i>A. stolonifera</i> ] – [ <i>G. declinata</i> ] rush marsh. Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture	1154.67	Yes	Maybe	Pass	Pass	Yes	Wetland Restoration

Wetland Identifier	Hydrosystem	Class	Form	Primary Vegetation Structure	Composition and Description	Area (m <sup>2</sup> )	Plot	Rapid Test	Dominance Test	Prevalence Test	Natural Inland Wetland (as defined in the NPS-FM)	Planned Works
W33	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – ( <i>P. hydropiper</i> ) grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	72.51	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Wetland Restoration
W34	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>G. declinata</i> – <i>P. distichum</i> – ( <i>P. hydropiper</i> ) grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	72.12	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Wetland Restoration
W35	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>G. declinata</i> – [ <i>P. hydropiper</i> ] – [ <i>L. perenne</i> ] grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	25.05	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	No Works Proposed – Unaffected
W36	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – ( <i>P. hydropiper</i> ) grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	44.55	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Wetland Restoration
W37	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – ( <i>P. hydropiper</i> ) grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	65.91	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Wetland Restoration
W38	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – [ <i>P. hydropiper</i> ] – [ <i>J. effusus</i> ] grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	59.72	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Wetland Restoration
W39	Palustrine	Marsh	Valley Floor	Hygrophilous Grassland	<i>G. declinata</i> – <i>A. stolonifera</i> – ( <i>P. hydropiper</i> ) – [ <i>J. effusus</i> ] grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a minor valley floor area, surrounded by pasture. Standing water throughout.	1006.00	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Wetland Restoration
W40	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – ( <i>P. hydropiper</i> ) grass marsh.	79.77	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Wetland Restoration

Wetland Identifier	Hydrosystem	Class	Form	Primary Vegetation Structure	Composition and Description	Area (m <sup>2</sup> )	Plot	Rapid Test	Dominance Test	Prevalence Test	Natural Inland Wetland (as defined in the NPS-FM)	Planned Works
					Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.							
W41	Palustrine	Marsh	Valley Floor	Hygrophilous Grassland	<i>G. declinata</i> – <i>P. hydropiper</i> grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a minor valley floor area, surrounded by pasture. Appears to follow an historic preferential flow path.	1105.94	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Wetland Restoration
W42	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – [ <i>J. effusus</i> ] – [ <i>P. hydropiper</i> ] grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	86.70	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Wetland Restoration
W43	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	64.14	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Wetland Restoration
W44	Palustrine	Marsh	Valley Floor	Hygrophilous Grassland	<i>G. declinata</i> – <i>A. stolonifera</i> – ( <i>P. hydropiper</i> ) grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a minor valley floor area, surrounded by pasture.	302.02	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Wetland Restoration
W45	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>G. declinata</i> – <i>J. articulatus</i> – ( <i>P. hydropiper</i> ) grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	73.50	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Wetland Restoration
W46	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>G. declinata</i> – <i>A. stolonifera</i> – [ <i>P. hydropiper</i> ] – [ <i>T. repens</i> ] grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	407.17	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Wetland Restoration
W47	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – <i>P. hydropiper</i> grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	63.89	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Wetland Restoration
W48	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>G. declinata</i> – <i>A. stolonifera</i> – [ <i>A. geniculatus</i> ] – [ <i>L. perenne</i> ] grass marsh.	39.22	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect

Wetland Identifier	Hydrosystem	Class	Form	Primary Vegetation Structure	Composition and Description	Area (m <sup>2</sup> )	Plot	Rapid Test	Dominance Test	Prevalence Test	Natural Inland Wetland (as defined in the NPS-FM)	Planned Works
					Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture. Vehicular disturbance evidenced by exposed mud.							
W49	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – [ <i>P. hydropper</i> ] – [ <i>A. geniculatus</i> ] – [ <i>L. perenne</i> ] grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	82.89	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Wetland Restoration
W50	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>G. declinata</i> – <i>A. stolonifera</i> – [ <i>P. hydropper</i> ] – [ <i>L. perenne</i> ] – [ <i>J. effusus</i> ] grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture. Vehicular disturbance evidenced by exposed mud.	217.93	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Wetland Restoration
W51	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>G. declinata</i> – <i>P. hydropper</i> grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	28.46	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	No Works Proposed – Unaffected
W52	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – [ <i>P. hydropper</i> ] grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	64.11	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Wetland Restoration
W53	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – [ <i>P. hydropper</i> ] grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	23.19	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	No Works Proposed – Unaffected
W54	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>G. declinata</i> grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	10.88	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W55	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	152.74	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W56	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>G. declinata</i> grass marsh.	49.73	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	No Works Proposed – Unaffected

Wetland Identifier	Hydrosystem	Class	Form	Primary Vegetation Structure	Composition and Description	Area (m <sup>2</sup> )	Plot	Rapid Test	Dominance Test	Prevalence Test	Natural Inland Wetland (as defined in the NPS-FM)	Planned Works
					Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture. Vehicular and stock disturbance evidenced by exposed mud.							
W57	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>P. hydropiper</i> grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	76.59	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	No Works Proposed – Unaffected
W58	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>G. declinata</i> – <i>A. stolonifera</i> – <i>P. hydropiper</i> grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	93.47	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Site Boundary Planting
W59	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>G. declinata</i> – <i>A. stolonifera</i> – <i>P. hydropiper</i> grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	22.31	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W60	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>P. hydropiper</i> – <i>P. distichum</i> – <i>G. declinata</i> grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	78.54	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W61	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	155.35	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	No Works Proposed – Unaffected
W62	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	36.46	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W63	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – <i>P. hydropiper</i> grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	32.50	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W64	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – <i>J. effusus</i> grass marsh.	108.10	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect

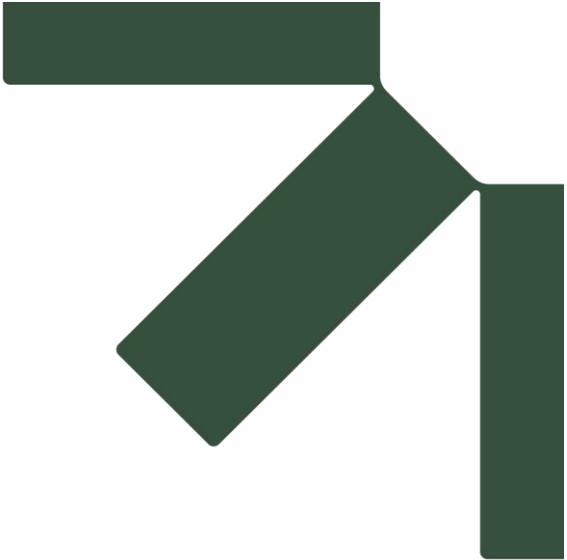
Wetland Identifier	Hydrosystem	Class	Form	Primary Vegetation Structure	Composition and Description	Area (m <sup>2</sup> )	Plot	Rapid Test	Dominance Test	Prevalence Test	Natural Inland Wetland (as defined in the NPS-FM)	Planned Works
					Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.							
W65	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – <i>P. hydropiper</i> grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	57.52	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	No Works Proposed – Unaffected
W66	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>G. declinata</i> – <i>A. stolonifera</i> – <i>P. hydropiper</i> grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	30.19	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Wetland Restoration
W67	Palustrine	Marsh	Valley Floor	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – <i>P. hydropiper</i> – ( <i>J. effusus</i> ) grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a minor valley floor area, surrounded by pasture.	959.89	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Wetland Restoration
W68	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – ( <i>L. perenne</i> ) – ( <i>P. hydropiper</i> ) grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	107.15	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Wetland Restoration
W69	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – ( <i>L. perenne</i> ) – ( <i>J. effusus</i> ) grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	78.78	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Wetland Restoration
W70	Palustrine	Marsh	Valley Floor	Hygrophilous Grassland	<i>A. stolonifera</i> – ( <i>P. hydropiper</i> ) – ( <i>J. effusus</i> ) grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a minor valley floor area, surrounded by pasture.	651.22	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Wetland Restoration
W71	Palustrine	Marsh	Valley Floor	Hygrophilous Grassland	<i>A. stolonifera</i> – ( <i>P. hydropiper</i> ) – ( <i>J. effusus</i> ) grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a minor valley floor area, surrounded by pasture.	1057.12	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Wetland Restoration

Wetland Identifier	Hydrosystem	Class	Form	Primary Vegetation Structure	Composition and Description	Area (m <sup>2</sup> )	Plot	Rapid Test	Dominance Test	Prevalence Test	Natural Inland Wetland (as defined in the NPS-FM)	Planned Works
W72	Palustrine	Marsh	Valley Floor	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – <i>P. hydropiper</i> – ( <i>J. effusus</i> ) grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a minor valley floor area, surrounded by pasture.	2455.23	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Wetland Restoration
W73	Palustrine	Marsh	Valley Floor	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – <i>P. hydropiper</i> – grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a minor valley floor area, surrounded by pasture. Appears to follow an historic preferential flow path.	1416.09	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	No Works Proposed – Unaffected
W74	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – ( <i>L. perenne</i> ) grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	22.50	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W75	Palustrine	Marsh	Basin	Herbfield	<i>P. hydropiper</i> – ( <i>L. perenne</i> ) herb marsh. Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	339.19	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W76	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>P. hydropiper</i> grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	91.70	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	General Native Vegetation Planting
W77	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – <i>J. effusus</i> – <i>P. hydropiper</i> grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	238.51	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	General Native Vegetation Planting
W78	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – <i>P. hydropiper</i> grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture. Vehicular disturbance evidenced by exposed mud.	200.61	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	General Native Vegetation Planting
W79	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – <i>P. hydropiper</i> – <i>J. articulatus</i> grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	147.12	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect

Wetland Identifier	Hydrosystem	Class	Form	Primary Vegetation Structure	Composition and Description	Area (m <sup>2</sup> )	Plot	Rapid Test	Dominance Test	Prevalence Test	Natural Inland Wetland (as defined in the NPS-FM)	Planned Works
W80	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – <i>P. hydropiper</i> grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	144.71	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W81	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>G. declinata</i> – <i>A. stolonifera</i> – <i>P. hydropiper</i> grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	334.20	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W82	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – <i>P. hydropiper</i> grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	128.94	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W83	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>G. declinata</i> – <i>P. hydropiper</i> grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	16.63	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W84	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	35.22	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	No Works Proposed – Unaffected
W85	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – <i>P. hydropiper</i> grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	201.02	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	No Works Proposed – Unaffected
W86	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – <i>P. hydropiper</i> grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	24.31	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W87	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – <i>P. hydropiper</i> – <i>J. effusus</i> grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	189.78	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	General Native Vegetation Planting

Wetland Identifier	Hydrosystem	Class	Form	Primary Vegetation Structure	Composition and Description	Area (m <sup>2</sup> )	Plot	Rapid Test	Dominance Test	Prevalence Test	Natural Inland Wetland (as defined in the NPS-FM)	Planned Works
W88	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>P. hydropiper</i> grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	61.33	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W89	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – <i>J. effusus</i> grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	87.75	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W90	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>G. declinata</i> – <i>A. stolonifera</i> grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	198.66	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W91	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – <i>P. hydropiper</i> grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	74.37	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W92	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – <i>L. perenne</i> grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture. Stock disturbance evidenced by exposed mud.	140.08	Yes	Maybe	Pass	Pass	Yes	No Works Proposed – Unaffected
W93	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>G. declinata</i> – [ <i>L. perenne</i> ] – [ <i>T. repens</i> ] – [ <i>Paspalum dilatatum</i> ] grass marsh. Wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	242.24	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W94	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – [ <i>L. perenne</i> ] – [ <i>T. repens</i> ] – [ <i>P. hydropiper</i> ] grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	94.22	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W95	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – [ <i>L. perenne</i> ] – [ <i>P. hydropiper</i> ] grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	25.94	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	No Works Proposed – Unaffected

Wetland Identifier	Hydrosystem	Class	Form	Primary Vegetation Structure	Composition and Description	Area (m <sup>2</sup> )	Plot	Rapid Test	Dominance Test	Prevalence Test	Natural Inland Wetland (as defined in the NPS-FM)	Planned Works
W96	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>G. declinata</i> – [ <i>A. stolonifera</i> ] – [ <i>L. perenne</i> ] – [ <i>P. hydropiper</i> ] grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	30.90	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Under Panels / Very Low Level of Effect
W97	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>P. distichum</i> – <i>P. hydropiper</i> grass marsh. Very small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	4.20	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	No Works Proposed – Unaffected
W98	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> – <i>P. distichum</i> grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	36.63	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	Site Boundary Planting
W99	Palustrine	Marsh	Basin	Hygrophilous Grassland	<i>A. stolonifera</i> grass marsh. Small wetland area dominated by grasses and herbaceous vegetation within a low-lying area, surrounded by pasture.	77.65	No	Pass	Pass (from cover estimates)	Pass (from cover estimates)	Yes	No Works Proposed – Unaffected



# Appendix E Full Bird Species List

## Ecological Impact Assessment

Foxton Solar Farm – Fast Track Approvals Act Application

Genesis Energy Limited

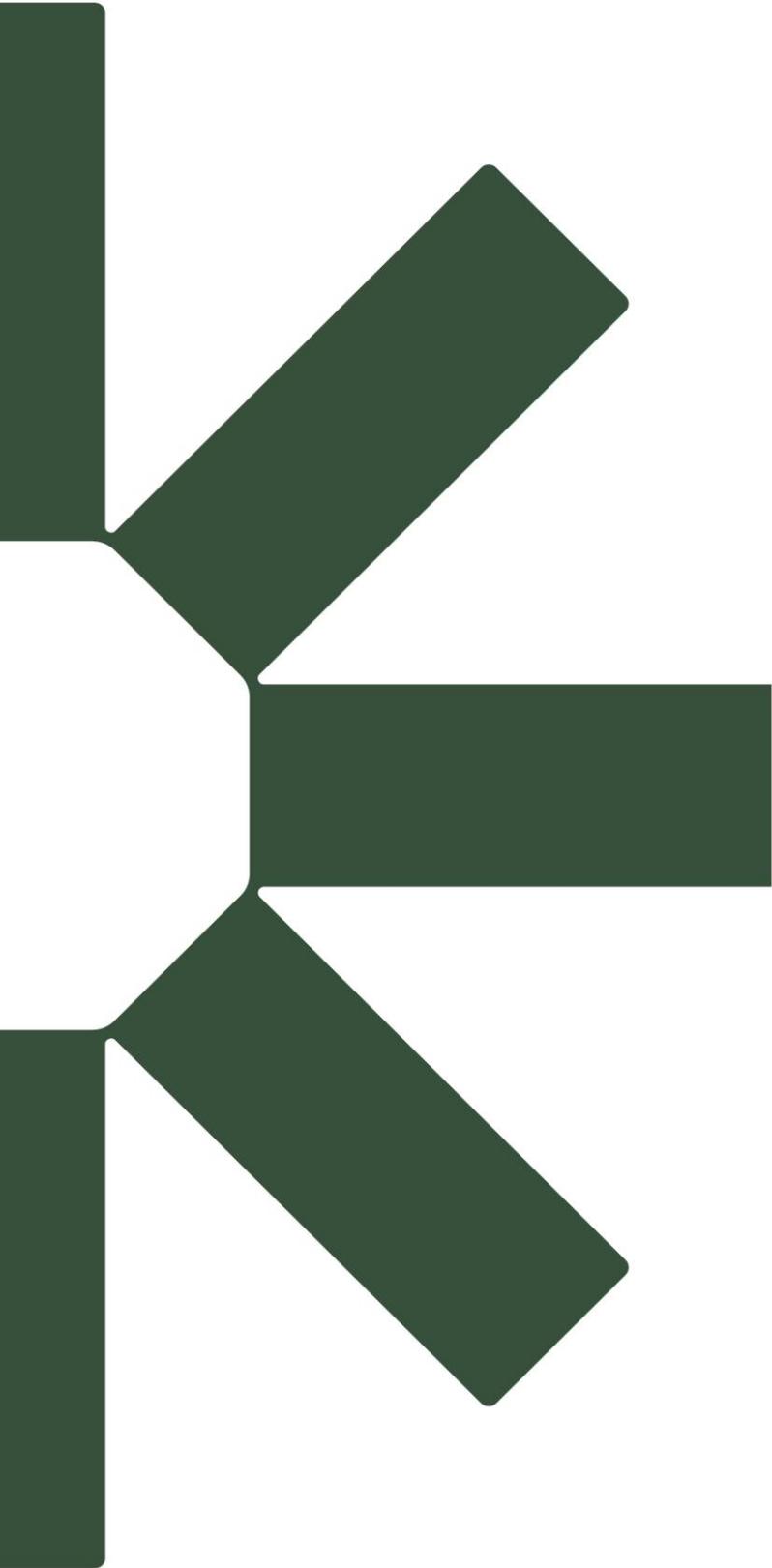
Client Reference: Foxton Solar Farm

10 December 2025

Common Name	Scientific Name	Threat Status (Robertson et al. 2021)	Nearby Records		
			eBird (within 10km)	Site Observations	eDNA Sample (14 <sup>th</sup> March 2023)
Lesser redpoll	<i>Acanthis cabaret</i>	Introduced: Naturalised	✓		
Common Myna	<i>Acridotheres tristis</i>	Introduced: Naturalised	✓	✓	
Eurasian skylark	<i>Alauda arvensis</i>	Introduced: Naturalised	✓	✓	
Banded dotterel	<i>Anarhynchus bicinctus</i>	At Risk: Declining	✓		
Wrybill	<i>Anarhynchus frontalis</i>	Threatened: Nationally Increasing	✓		
Grey teal	<i>Anas gracilis</i>	Not Threatened	✓		
Mallard	<i>Anas platyrhynchos</i>	Introduced: Naturalised	✓		✓
Grey duck	<i>Anas superciliosa</i>	Threatened: Nationally Vulnerable	✓		
Greylag goose	<i>Anser anser</i>	Introduced: Naturalised	✓		
Bellbird	<i>Anthornis melanura melanura</i>	Not Threatened	✓		
New Zealand pipit	<i>Anthus novaeseelandiae</i>	At Risk: Naturally Uncommon	✓		
White heron	<i>Ardea alba</i>	Threatened: Nationally Critical	✓		
Sooty shearwater	<i>Ardenna grisea</i>	At Risk: Declining	✓		
Ruddy turnstone	<i>Arenaria interpres</i>	Non-resident Native: Migrant	✓		
New Zealand scaup	<i>Aythya novaeseelandiae</i>	Not Threatened	✓		
Australasian Bittern	<i>Botaurus poiciloptilus</i>	Threatened: Nationally Critical	✓		
Canada goose	<i>Branta canadensis</i>	Introduced: Naturalised	✓		
Cattle egret	<i>Bubulcus ibis</i>	Non-resident Native: Migrant	✓		
Sharp-tailed sandpiper	<i>Calidris acuminata</i>	Non-resident Native: Migrant	✓		
Red knot	<i>Calidris canutus</i>	At Risk: Declining	✓		
Curlew sandpiper	<i>Calidris ferruginea</i>	Non-resident Native: Vagrant	✓		
Pectoral sandpiper	<i>Calidris melanotos</i>	Non-resident Native: Vagrant	✓		
Red-necked stint	<i>Calidris ruficollis</i>	Non-resident Native: Migrant	✓		
California quail	<i>Callipepla californica</i>	Introduced: Naturalised	✓		
European Goldfinch	<i>Carduelis carduelis</i>	Introduced: Naturalised	✓	✓	
New Zealand dotterel	<i>Charadrius obscurus</i>	At Risk: Recovering	✓		
Black-fronted tern	<i>Chlidonias albostratus</i>	Threatened: Nationally Endangered	✓		
White-winged black tern	<i>Chlidonias leucopterus</i>	Non-resident Native: Migrant	✓		
European Greenfinch	<i>Chloris chloris</i>	Introduced: Naturalised	✓		
Black-billed Gull	<i>Chroicocephalus bulleri</i>	At Risk: Declining	✓		
Red-billed Gull	<i>Chroicocephalus novaehollandiae</i>	At Risk: Declining	✓		
Shining Cuckoo	<i>Chrysococcyx lucidus</i>	Not Threatened	✓		
Swamp Harrier	<i>Circus approximans</i>	Not Threatened	✓	✓	
Rock Pigeon	<i>Columba livia</i>	Introduced: Naturalised	✓	✓	
Rook	<i>Corvus frugilegus</i>	Introduced: Naturalised	✓		
Black swan	<i>Cygnus atratus</i>	Not Threatened	✓		

Common Name	Scientific Name	Threat Status (Robertson et al. 2021)	Nearby Records		
			eBird (within 10km)	Site Observations	eDNA Sample (14 <sup>th</sup> March 2023)
Little egret	<i>Egretta garzetta</i>	Non-resident Native: Vagrant	✓		
White-faced heron	<i>Egretta novaehollandiae</i>	Not Threatened	✓	✓	
Black-fronted dotterel	<i>Elseya melanops</i>	At Risk: Naturally Uncommon	✓		
Yellowhammer	<i>Emberiza citrinella</i>	Introduced: Naturalised	✓		
New Zealand falcon	<i>Falco novaeseelandiae</i>	At Risk: Recovering	✓		
Chaffinch	<i>Fringilla coelebs</i>	Introduced: Naturalised	✓		
Australian coot	<i>Fulica atra</i>	At Risk: Naturally Uncommon	✓		
Gull-billed tern	<i>Gelochelidon nilotica</i>	Non-resident Native: Coloniser	✓		
Grey warbler	<i>Gerygone igata</i>	Not Threatened	✓	✓	
Australian magpie	<i>Gymnorhina tibicen</i>	Introduced: Naturalised	✓	✓	
South Island pied oystercatcher	<i>Haematopus finschi</i>	At Risk: Declining	✓		
Variable oystercatcher	<i>Haematopus unicolor</i>	At Risk: Recovering	✓		
Kererū	<i>Hemiphaga novaeseelandiae</i>	Not Threatened	✓		
Pied stilt	<i>Himantopus himantopus</i>	Not Threatened	✓	✓	
Welcome swallow	<i>Hirundo neoxena neoxena</i>	Not Threatened	✓	✓	
Caspian tern	<i>Hydroprogne caspia</i>	Threatened: Nationally Vulnerable	✓		
Southern black-backed gull	<i>Larus dominicanus</i>	Not Threatened	✓	✓	
Hudsonian godwit	<i>Limosa haemastica</i>	Non-resident Native: Vagrant	✓		
Bar-tailed godwit	<i>Limosa lapponica</i>	At Risk: Declining	✓		
Northern giant petrel	<i>Macronectes halli</i>	At Risk: Recovering	✓		
Wild turkey	<i>Meleagris gallopavo</i>	Introduced: Naturalised	✓		
Little shag	<i>Microcarbo melanoleucos</i>	At Risk: Relict	✓		
Australasian gannet	<i>Morus serrator</i>	Not Threatened	✓		
Eurasian whimbrel	<i>Numenius phaeopus</i>	Non-resident Native: Migrant	✓		
Fairy prion	<i>Pachyptila turtur</i>	At Risk: Relict	✓		
House Sparrow	<i>Passer domesticus</i>	Introduced: Naturalised	✓	✓	
Peafowl	<i>Pavo cristatus</i>	Introduced: Naturalised	✓		
Tomtit	<i>Petroica macrocephala</i>	Not Threatened	✓		
Black shag	<i>Phalacrocorax carbo novaehollandiae</i>	At Risk: Relict	✓		
Spotted shag	<i>Phalacrocorax punctatus</i>	Threatened: Nationally Vulnerable	✓		
Little black shag	<i>Phalacrocorax sulcirostris</i>	At Risk: Naturally Uncommon	✓		
Pied shag	<i>Phalacrocorax varius</i>	At Risk: Recovering	✓		
Common pheasant	<i>Phasianus colchicus</i>	Introduced: Naturalised	✓		
Royal spoonbill	<i>Platalea regia</i>	At Risk: Naturally Uncommon	✓		
Eastern rosella	<i>Platycercus eximius</i>	Introduced: Naturalised	✓		
Glossy ibis	<i>Plegadis falcinellus</i>	Non-resident Native: Coloniser	✓		

Common Name	Scientific Name	Threat Status (Robertson et al. 2021)	Nearby Records		
			eBird (within 10km)	Site Observations	eDNA Sample (14 <sup>th</sup> March 2023)
Pacific golden plover	<i>Pluvialis fulva</i>	Non-resident Native: Migrant	✓		
New Zealand grebe	<i>Poliiocephalus rufopectus</i>	Threatened: Nationally Increasing	✓		
New Zealand fernbird	<i>Poodytes punctatus</i>	At Risk: Declining	✓		
Pūkeko	<i>Porphyrio melanotus</i>	Not Threatened	✓	✓	✓
Tūī	<i>Prosthemadera novaeseelandiae novaeseelandiae</i>	Not Threatened	✓		
Dunnock	<i>Prunella modularis</i>	Introduced: Naturalised	✓		
Fluttering shearwater	<i>Puffinus gavia</i>	At Risk: Relict	✓		
New Zealand fantail	<i>Rhipidura fuliginosa</i>	Not Threatened	✓		
Australasian shoveler	<i>Spatula rhynchotis</i>	Not Threatened	✓		
Spotted Dove	<i>Spilopelia chinensis</i>	Introduced: Naturalised	✓		
Subantarctic skua	<i>Stercorarius antarcticus</i>	Threatened: Nationally Vulnerable	✓		
Arctic skua	<i>Stercorarius parasiticus</i>	Non-resident Native: Migrant	✓		
Pomarine skua	<i>Stercorarius pomarinus</i>	Non-resident Native: Migrant	✓		
Common tern	<i>Sterna hirundo</i>	Non-resident Native: Vagrant	✓		
White-fronted tern	<i>Sterna striata</i>	At Risk: Declining	✓		
Little tern	<i>Sternula albifrons</i>	Non-resident Native: Migrant	✓		
Fairy tern	<i>Sternula nereis</i>	Threatened: Nationally Critical	✓		
Barbary dove	<i>Streptopelia risoria</i>	Introduced: Naturalised	✓		
Common starling	<i>Sturnus vulgaris</i>	Introduced: Naturalised	✓	✓	
Paradise shelduck	<i>Tadorna variegata</i>	Not Threatened	✓	✓	
New Zealand kingfisher	<i>Todiramphus sanctus</i>	Not Threatened	✓		
Eurasian blackbird	<i>Turdus merula</i>	Introduced: Naturalised	✓		
Song Thrush	<i>Turdus philomelos</i>	Introduced: Naturalised	✓		
Spur-winged plover	<i>Vanellus miles novaehollandiae</i>	Not Threatened	✓	✓	
Terek sandpiper	<i>Xenus cinereus</i>	Non-resident Native: Vagrant	✓		
Spotless crane	<i>Zapornia tabuensis</i>	At Risk: Declining	✓		
Silvereye	<i>Zosterops lateralis</i>	Not Threatened	✓	✓	



Making Sustainability Happen