

Summary of Approach to Management of Ecological Effects at a Solar Farm Near Twizel

Contract Report No. 7414e

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Project Team:

Vikki Smith – Report author

Prepared for:

Nova Energy Ltd

Reviewed and approved for release by:



Des Smith
Director, Senior Principal Ecologist, South Island Regional Manager
Wildland Consultants Ltd
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Christchurch Office

238 Annex Road, Middleton, P.O. Box 9276, Tower Junction, Ph 03 338 4005

Head Office

99 Sala Street, P.O. Box 7137, Te Ngae, Rotorua, Ph 07 343 9017, Email rotorua@wildlands.co.nz

www.wildlands.co.nz



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1.0 Introduction

Nova Energy Ltd. (Nova) is submitting an application under the Fast Track Approvals Act (FTAA) for a solar farm on a large property near Twizel in the Mackenzie Country.

Nova commissioned Wildland Consultants Ltd. (Wildlands) to undertake an Assessment of Ecological Effects (AEE; Wildland Consultants, 2026a). Preliminary field assessments identified the need for further surveys, which were undertaken (Wildland Consultants, 2024a, 2024b). Ecological values found are summarised in Section 3 of this report.

Wildlands experts consider that, without appropriate effects management, the Twizel Solar Farm has the potential to have detrimental impacts on ecological values that have been identified (summarised in Section 4). Effects management has been detailed in the AEE (Wildland Consultants, 2026a) and five management plans (Wildland Consultants, 2026d, 2026e, 2026c, 2026b, 2026f; Section 2). To aid in applying effects management, this document brings together all effects management that has been prescribed, and links it together for clarity and efficiency.

2.0 Summary of Work So Far

Ecological work undertaken by Wildlands so far is summarised in Table 1.

Table 1 – Ecological reports and surveys carried out so far by Wildlands.

Report Details	Abbreviation	Surveys Conducted			
		Birds	Lizards	Terrestrial Invertebrates	Vegetation
Wildland Consultants (2026). <i>Assessment of Potential Ecological Effects of the Proposed Nova Energy Solar Farm Near Twizel</i> . Wildland Consultants Ltd Contract Report No. 6620a. Prepared for Nova Energy. 98pp.	Assessment of Ecological Effects/AEE	✓	✓	✓	✓
Wildland Consultants (2023). <i>Pest Management Plan – Nova Energy, Twizel</i> . Wildland Consultants Contract Report No. 6905. Prepared for Nova Energy Whakatane. 27pp. Updated in March 2026.	Pest mammal management plan/PMMP	X	X	X	X
Wildland Consultants (2024). <i>Additional Lizard, Vegetation, and Invertebrate Surveys of a Proposed Twizel Solar Farm</i> . Wildland Consultants Contract Report No. 6986. Prepared for Nova Energy. 36pp.	Additional surveys report	X	✓	✓	✓
Wildland Consultants (2024). <i>Tekapo Ground Wētā Tracking Tunnel Survey</i> . Wildland Consultants Contract Report No. 6986b. Prepared for Nova Energy. 4pp.	Ground wētā memo	X	X	✓	X



Report Details	Abbreviation	Surveys Conducted			
		Birds	Lizards	Terrestrial Invertebrates	Vegetation
Wildland Consultants (2026). <i>Draft Terrestrial Invertebrate Management Plan for Proposed Nova Energy Twizel Solar Farm</i> . Wildland Consultants Contract Report No. 7414a. Prepared for Nova Energy. 28pp.	Terrestrial invertebrate management plan/TIMP	X	X	✓	X
Wildland Consultants (2026). <i>Draft Lizard Management Plan for Proposed Nova Energy Twizel Solar Farm</i> . Wildland Consultants Contract Report No. 7414b. Prepared for Nova Energy. 39pp.	Lizard management plan/LMP	X	✓	X	X
Wildland Consultants (2026). <i>Draft Avifauna Management Plan for Proposed Nova Energy Twizel Solar Farm</i> . Wildland Consultants Contract Report No. 7414c. Prepared for Nova Energy. 24pp.	Avifauna management plan/AMP	✓	X	X	X
Wildland Consultants (2026). <i>Biosecurity and Vegetation Management Plan for Twizel Solar Farm</i> . Wildland Consultants Contract Report No. 7414d. Prepared for Nova Energy 95. 17pp.	Biosecurity and vegetation anagement plan/BVMP	X	X	X	✓

Each of the reports in Table 1 is integrated into the whole project and should be interpreted within the context of the other relevant reports. Figure 1 shows how the project has evolved over time, and the relationships between the reports and fieldwork associated with the project.

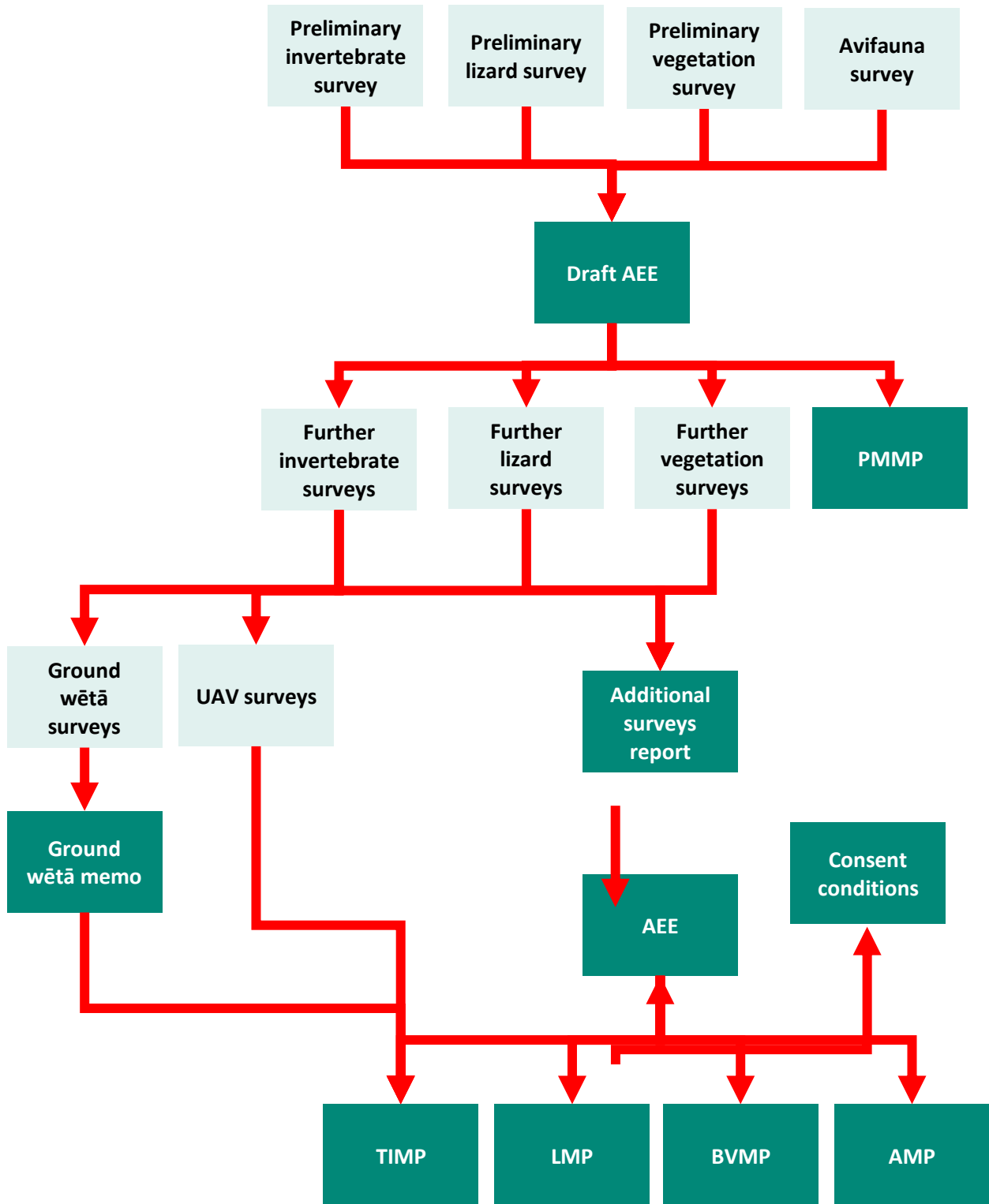


Figure 1: Diagram showing interlinked relationships between ecological surveys and reports for the Nova Twizel solar farm.



3.0 Summary of Ecological Values

Table 2 summarises ecological values that have been found at the site during surveys, including avifauna identified as possibly on site.

Table 2 – Ecological values found site during surveys, including avifauna identified as possibly on site. Common names of birds confirmed during site visits are marked in **bold**.

Scientific Name	Common Name	Threat Status	Protection Status (Wildlife Act 1953)
Vegetation (De Lange et al., 2024)			
<i>Convolvulus verecundus</i> f. <i>verecundus</i>	Tussock bindweed	At Risk – Declining	Not protected
<i>Carex kaloides</i>		At Risk – Declining	Not protected
<i>Carmichaelia petriei</i>	Desert broom	At Risk – Declining	Not protected
<i>Carmichaelia vexillata</i>	Dwarf broom	At Risk – Declining	Not protected
<i>Pimelia sericeovillosa</i> subsp. <i>pulvinaris</i>		Threatened – Nationally Vulnerable	Not protected
<i>Raoulia australis</i>	Common mat daisy	At Risk – Declining	Not protected
<i>Rytudisperma exiguum</i>		At Risk - Declining	Not protected
Lizards (Hitchmough et al., 2021)			
<i>Oligosoma maccanni</i>	McCann’s skink	Not Threatened	Protected
<i>Oligosoma</i> aff. <i>polychroma</i> Clade 5	Southern grass skink	At Risk – Declining	Protected
<i>Woodworthia</i> “Southern Alps”	Southern Alps gecko	At Risk – Declining	Protected
Terrestrial invertebrates (Trewick et al., 2012)			
<i>Sigauss minutus</i>	Minute grasshopper	Threatened – Nationally Vulnerable	Not protected
<i>Hemiandrus</i> “furoviarius”	Tekapo ground wētā	Threatened – Nationally Endangered	Not protected
<i>Phaulacridium otagoense</i>	Otago short-horned grasshopper	At Risk – Declining	Not protected
<i>Zizina oxleyi</i>	New Zealand blue butterfly	Not assessed but believed to be declining	Not protected
Birds (Robertson et al., 2021)			
<i>Himantopus novaeseelandiae</i>	Kākī/black stilt	Threatened – Nationally Critical	Protected
<i>Ardea alba modesta</i>	Kotuku/white heron	Threatened – Nationally Critical	Protected
<i>Chlidonias albostrigatus</i>	Tarapirohe/black-fronted tern	Threatened – Nationally Endangered	Protected
<i>Falco novaeseelandiae</i> <i>novaeseelandiae</i>	Kārearea/eastern falcon	Threatened – Nationally Vulnerable	Protected



Scientific Name	Common Name	Threat Status	Protection Status (Wildlife Act 1953)
<i>Anas superciliosa</i>	Pāraera/grey duck	Threatened – Nationally Vulnerable	Protected but can be hunted
<i>Podiceps cristatus australis</i>	Pūteketeke/Australasian crested grebe ¹	Threatened – Nationally Vulnerable	Protected
<i>Hydroprogne caspia</i>	Taranui/Caspian tern	Threatened – Nationally Vulnerable	Protected
<i>Anarhynchus frontalis</i>	Ngutu pare/wrybill	Threatened – Nationally Increasing	Protected
<i>Zapornia pusilla affinis</i>	Kotoreke/marsh crake	At Risk – Declining	Protected
<i>Anthus novaeseelandiae novaeseelandiae</i>	Pihoihoi/New Zealand pipit	At Risk – Declining	Protected
<i>Charadrius bicinctus bicinctus</i>	Pohowera/banded dotterel	At Risk – Declining	Protected
<i>Chroicocephalus bulleri</i>	Tarāpuka/black-billed gull	At Risk – Declining	Protected
<i>Haematopus finschi</i>	Tōrea/South Island pied oystercatcher	At Risk – Declining	Protected
<i>Microcarbo melanoleucos brevirostris</i>	Kawaupaka/little shag	At Risk – Relict	Protected but can be hunted
<i>Phalacrocorax carbo novaehollandiae</i>	Māpunga/black shag	At Risk – Relict	Protected but can be hunted
<i>Fulica atra australis</i>	Australian coot	At Risk – Naturally Uncommon	Protected
<i>Phalacrocorax sulcirostris</i>	Kawau tūi/little black shag ¹	At Risk – Naturally Uncommon	Protected
<i>Anas superciliosa × platyrhynchos</i>	Grey duck – mallard hybrid	Not Threatened	Protected but can be hunted
<i>Circus approximans</i>	Kāhu/swamp harrier	Not Threatened	Protected but can be hunted
<i>Cygnus atratus</i>	Kakānau/black swan	Not Threatened	Protected but can be hunted
<i>Larus dominicanus dominicanus</i>	Karoro/southern black-backed gull	Not Threatened	Not protected
<i>Anthornis melanura melanura</i>	Korimako/bellbird	Not Threatened	Protected
<i>Todiramphus sanctus vagans</i>	Kotare/New Zealand kingfisher	Not Threatened	Protected
<i>Spatula rhynchotis</i>	Kuruwhengi/Australasian shoveler	Not Threatened	Protected but can be hunted
<i>Egretta novaehollandiae</i>	Matuku moana/white-faced heron	Not Threatened	Protected
<i>Petroica macrocephala macrocephala</i>	Ngirungiru/South Island tomtit ¹	Not Threatened	Protected
<i>Aythya novaeseelandiae</i>	Pāpango/New Zealand scaup	Not Threatened	Protected
<i>Himantopus himantopus novaeseelandiae</i>	Pied stilt - black stilt hybrid	Not Threatened	Protected

¹ Found nearby during desktop surveys but considered highly unlikely to be on-site.



Scientific Name	Common Name	Threat Status	Protection Status (Wildlife Act 1953)
<i>Chrysococcyx lucidus lucidus</i>	Pīpīwharau/roa/shining cuckoo	Not Threatened	Protected
<i>Rhipidura fuliginosa fuliginosa</i>	Pīwakawaka/South Island fantail	Not Threatened	Protected
<i>Himantopus himantopus leucocephalus</i>	Poaka/pied stilt	Not Threatened	Protected
<i>Porphyrio melanotus melanotus</i>	Pūkeko/pukeko	Not Threatened	Protected but can be hunted
<i>Tadorna variegata</i>	Pūtangitangi/paradise shelduck	Not Threatened	Protected but can be hunted
<i>Gerygone igata</i>	Riroriro/grey warbler	Not Threatened	Protected
<i>Vanellus miles novaehollandiae</i>	Spur-winged plover	Not Threatened	Not protected
<i>Zosterops lateralis lateralis</i>	Tauhou/silvereeye	Not Threatened	Partially protected
<i>Anas gracilis</i>	Tētē-moroiti/grey teal	Not Threatened	Protected but can be hunted
<i>Prothemadera novaeseelandiae novaeseelandiae</i>	Tūi/tui ¹	Not Threatened	Protected
<i>Hirundo neoxena neoxena</i>	Warou/welcome swallow	Not Threatened	Protected
<i>Chlidonias leucopterus</i>	White-winged black tern ¹	Non-resident Native – Migrant	Protected
<i>Anas sp.</i>	Anas sp.	-	
<i>Gymnorhina tibicen</i>	Australian magpie	Introduced and Naturalised	Not protected
<i>Callipepla californica</i>	California quail	Introduced and Naturalised	Not protected
<i>Branta canadensis</i>	Canada goose	Introduced and Naturalised	Not protected
<i>Fringilla coelebs</i>	Chaffinch	Introduced and Naturalised	Not protected
<i>Acanthis flammea</i>	Common redpoll	Introduced and Naturalised	Not protected
<i>Prunella modularis</i>	Dunnock	Introduced and Naturalised	Not protected
<i>Turdus merula</i>	Eurasian blackbird	Introduced and Naturalised	Not protected
<i>Chloris chloris</i>	Greenfinch	Introduced and Naturalised	Not protected
<i>Carduelis carduelis</i>	Goldfinch	Introduced and Naturalised	Not protected
<i>Passer domesticus</i>	House sparrow	Introduced and Naturalised	Not protected
<i>Anas platyrhynchos</i>	Mallard	Introduced and Naturalised	Protected but can be hunted



Scientific Name	Common Name	Threat Status	Protection Status (Wildlife Act 1953)
<i>Passeriformes sp.</i>	Passerine sp.	Introduced and Naturalised	
<i>Columba livia</i>	Rock pigeon	Introduced and Naturalised	Not protected
<i>Turdus philomelos</i>	Song thrush	Introduced and Naturalised	Not protected
<i>Alauda arvensis</i>	Skylark	Introduced and Naturalised	Not protected
<i>Sturnus vulgaris</i>	Starling	Introduced and Naturalised	Not protected
<i>Emberiza citrinella</i>	Yellowhammer	Introduced and Naturalised	Not protected

4.0 Summary of Effects

Table 3 summarises potential ecological effects without management for each taxon found at the site during surveys.

Table 3 – Effects of the proposed solar farm in Twizel, without management.

Effect	Level of Adverse Effect Without Management				
	Vegetation	Lizards	Terrestrial Invertebrates	Avifauna	Freshwater
Loss of indigenous vegetation	More than minor				
Microclimatic changes beneath solar panels, resulting in changes to vegetation.	Minor	Minor	More than minor		
Modification of wetland habitat	Less than minor				
Loss of At Risk, Threatened, and rare plants	Minor				
Risk of introduction of pest plants	Minor to more than minor				
Habitat modification or loss (other than through shading)		More than minor	Minor	Minor	
Displacement of breeding fauna		Less than minor		More than minor	
Death, displacement or injury during construction		More than minor	Minor	More than minor	



Effect	Level of Adverse Effect Without Management				
	Vegetation	Lizards	Terrestrial Invertebrates	Avifauna	Freshwater
Ongoing/operational disturbance		Minor		More than minor	
Risk of bird strike				More than minor	
Fragmentation of lizard habitat		Minor			
Sedimentation of nearby rivers					More than minor

5.0 Integrated Summary of Effects Management

Effects management below is taken from the AEE (Wildland Consultants, 2026a). The purpose of this section is to summarise all effects management in one place for reference and clarify how it fits together. For more detail on each management recommendation, refer to the documents cited in the table.

Table 4 summarises potential ecological effects management for each taxon found at the site during surveys.



Table 4 – Effects management for the proposed solar farm in Twizel. Management actions are sorted approximately into categories within the effects management hierarchy, but each management action may fit into several categories.

Management Action	Biodiversity Type					Timing	References
	Vegetation	Lizards	Terrestrial Invertebrates	Birds	Freshwater		
Avoidance							
Setbacks and avoidance of important areas	✓	✓	✓	✓	✓	Before construction	AEE Section 13.1; LMP Section 7.2; TIMP Section 5.3.1
Setbacks for nesting birds	X	X	X	✓	X	Before and during construction	AMP Section 6.3
Avoidance of bird breeding season (July-March)	X	X	X	✓	X	Before and during construction	AMP Section 6.1
Avoidance of creating large areas of bare ground	X	X	X	✓	X	Before and during construction	AMP Section 6.4
Minimisation							
Panel layout and design	X	X	X	✓	X	Pre-construction	AEE Section 13.2; AMP Section 6.6
Noise and vibration management	X	X	✓	✓	X	Before and during construction	AMP Section 6.5
Dust management	X	✓	✓	X	X	Before and during construction	TIMP Section 5.3.1
Salvage and translocation of invertebrates	X	X	✓	X	X	Pre-construction	Salvage and translocation of invertebrates
Incidental discovery protocol	X	✓	✓	✓	X	During construction	Incidental discovery protocol
Minimisation of disturbance and collision with birds nesting on the tracks	X	X	X	✓	X	Before and during construction	AMP Section 6.9
Bird deterrence and screening	X	X	X	✓	X	During construction	AMP Section 6.4
Monitoring of flora, fauna, pest plants and pest mammals ¹	✓	✓	✓	✓	X	Before (baseline survey), during and after construction	

¹ Monitoring and adaptive management can be considered both minimisation and remediation.



Management Action	Biodiversity Type					Timing	References
	Vegetation	Lizards	Terrestrial Invertebrates	Birds	Freshwater		
Adaptive management	✓	✓	✓	✓	X	Throughout the life of the project	
Remediation							
Eco-sourcing plants	✓	✓	✓	X	X	Pre-construction	AEE Section 13.3; LMP Section 7.3
Planning lizard corridors	X	✓	X	X	X	Pre-construction	LMP Section 7.3; TIMP Section 5.3.2
Habitat enhancement planting	✓	✓	✓	X	X	Before and during construction	LMP Section 7.3; TIMP Section 5.3.2
Rock pile creation	X	✓	✓	X	X	During construction	LMP Section 7.3
Pest plant control	✓	✓	✓	X	X	One year after construction starts, then every three years throughout the life of the project	BVMP Section 4
Pest mammal control	✓	✓	✓	✓	X	Before and during construction, and throughout the life of the project, reviewed every five years	PMMP
Monitoring of flora, fauna, pest plants and pest mammals	✓	✓	✓	✓	X	Before (baseline survey), during and after construction	AMP Section 6.12-6.14; LMP Section 9; TIMP Section 5.3.3; BVMP Section 5
Adaptive management	✓	✓	✓	✓	X	Throughout the life of the project	LMP Section 9.6; TIMP Section 5.3.3
Compensation							
Research funding	X	X	✓	X	X	If needed at any time during the project	TIMP Section 5.3.4
Avifauna compensation funding	X	X	X	✓	X		



6.0 Summary of Effects After Management is Applied

Effect levels below are taken from the AEE (Wildland Consultants, 2026a). Table 5 summarises likely ecological effects levels after management actions are applied as prescribed in the AEE and management plans.

Table 5– Effects of the proposed solar farm in Twizel, after management is applied.

Effect	Level of Adverse Effect Without Management	Effects Management and Management Plan Provisions	Expected Level of Adverse Effect With Management
Loss of indigenous vegetation	More than minor	<ul style="list-style-type: none"> Panel array avoids significant and/or indigenous vegetation with a 10–35-metre setback. 	Less than minor
Microclimatic changes beneath solar panels, resulting in changes to vegetation.	Minor	<ul style="list-style-type: none"> Indigenous vegetation is avoided within the panel area. Controlled grazing under the panels. 	Less than minor
Modifications to wetland habitat	Less than minor	<ul style="list-style-type: none"> 100-metre buffer between development and wetlands at the site and outside the site. 	Negligible
Loss of At Risk, Threatened, and rare plants	Minor	<ul style="list-style-type: none"> Panel array avoids At Risk, Threatened and rare plants. Minimum setback of 10-35 metres between solar panels and habitats which support Threatened and At Risk plants. Regular monitoring of indigenous plants. Adaptive management will be undertaken if a decline is observed during regular monitoring. Management in the event of a decline could include changes to pest plant and animal control or grazing regime. If the cause of a decline is not obvious, further investigation may be appropriate. 	Less than minor
Risk of introduction of pest plants	Minor to more than minor	<ul style="list-style-type: none"> Regular control and monitoring of pest plants. Biosecurity protocols. 	Less than minor
Avifauna habitat modification or loss	Minor	<ul style="list-style-type: none"> Boundary setback areas will provide habitat. Pest mammal management. 	Less than minor



Effect	Level of Adverse Effect Without Management	Effects Management and Management Plan Provisions	Expected Level of Adverse Effect With Management
Displacement of breeding fauna	More than minor	<ul style="list-style-type: none"> Avoidance of construction during the breeding season. Habitat enhancement. 	Less than minor
Death or injury of avifauna during construction	More than minor	<ul style="list-style-type: none"> Avoidance of construction during the avifauna breeding season. Predator management and offsite habitat enhancement. Avifauna surveys during the breeding season and prior to construction. Incidental Discovery Protocol. 	Less than minor
Ongoing disturbance of avifauna	More than minor	<ul style="list-style-type: none"> Panel and site design has minimised the risk. Drive slowly, reduce noise, and remain on designated access roads. 	Minor
Risk of bird strike	More than minor	<ul style="list-style-type: none"> Site design (five to six metre gaps between solar arrays and setbacks from rivers) has reduced the risk. Panel design (anti-reflective panel coatings, tracking arrays) will aid in the reduction of risk. Monitoring to detect the presence and behaviour of Threatened and At Risk avifauna species and inform management to proactively reduce bird strike risk, as described in the AMP. Carcass monitoring, as described in the AMP. Adaptive management, as described in the AMP. This includes changes to on-site management measures and, if required, potential compensation for high-value species. 	Less than minor
Injury/death/displacement of lizards	More than minor	<ul style="list-style-type: none"> Lizard corridors and nodes. Incidental Discovery Protocol. Habitat enhancement. Pest mammal management. 	Less than minor
Loss of lizard habitat	More than minor	<ul style="list-style-type: none"> Lizard corridors and nodes. Habitat enhancement. Pest mammal management. Avoidance of high-quality lizard habitat. 	Less than minor



Effect	Level of Adverse Effect Without Management	Effects Management and Management Plan Provisions	Expected Level of Adverse Effect With Management
Fragmentation of lizard habitat	Minor	<ul style="list-style-type: none"> Lizard corridors and nodes. Habitat enhancement. Pest mammal management. Avoidance of high-quality lizard habitat. 	Less than minor
Reduction of lizard habitat quality (shading from panels)	Minor	<ul style="list-style-type: none"> Lizard corridors and nodes. Habitat enhancement. Setbacks from prime lizard habitat. Pest mammal management. Avoidance of high-quality lizard habitat. 	Less than minor
Operational disturbance to lizards	Minor	<ul style="list-style-type: none"> Habitat enhancement. Avoidance of high-quality lizard habitat. Pest mammal management. 	Less than minor
Disturbance to lizards during earthworks	Minor	<ul style="list-style-type: none"> Incidental Discovery Protocol. Habitat enhancement. Avoidance of high-quality lizard habitat. 	Less than minor
Breeding failure/displacement of lizards	Less than minor	<ul style="list-style-type: none"> Habitat enhancement. Lizard corridors and nodes. Avoidance of high-quality lizard habitat. 	Less than minor
Reduction in invertebrate habitat	Minor	<ul style="list-style-type: none"> Avoidance of quality habitat. Habitat enhancement. Pest mammal management. Monitoring and adaptive management. 	Less than minor
Mortality and disturbance to invertebrates	Minor	<ul style="list-style-type: none"> Avoidance of quality habitat. Habitat enhancement. Use grasshopper-friendly weed control. Dust management. Pest mammal management. Salvage and translocation. 	Negligible
Reduction in invertebrate habitat quality due to shading	More than minor	<ul style="list-style-type: none"> Avoidance of quality habitat. Setbacks from high quality habitat. Habitat enhancement. Pest mammal management. Monitoring and adaptive management. 	Minor
Sedimentation of nearby rivers	More than minor	<ul style="list-style-type: none"> Sediment management plan. Setbacks from river edge. 	Less than minor



Effect	Level of Adverse Effect Without Management	Effects Management and Management Plan Provisions	Expected Level of Adverse Effect With Management
Contamination of nearby rivers	More than minor	<ul style="list-style-type: none"> • Setbacks from river edge. • Spill response plan. 	Negligible
Risk of introduction of pest plants	More than minor	<ul style="list-style-type: none"> • Weed and pest plant management to follow protocols in BVMP. 	Less than minor



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Appendix 1

Implementation timeline

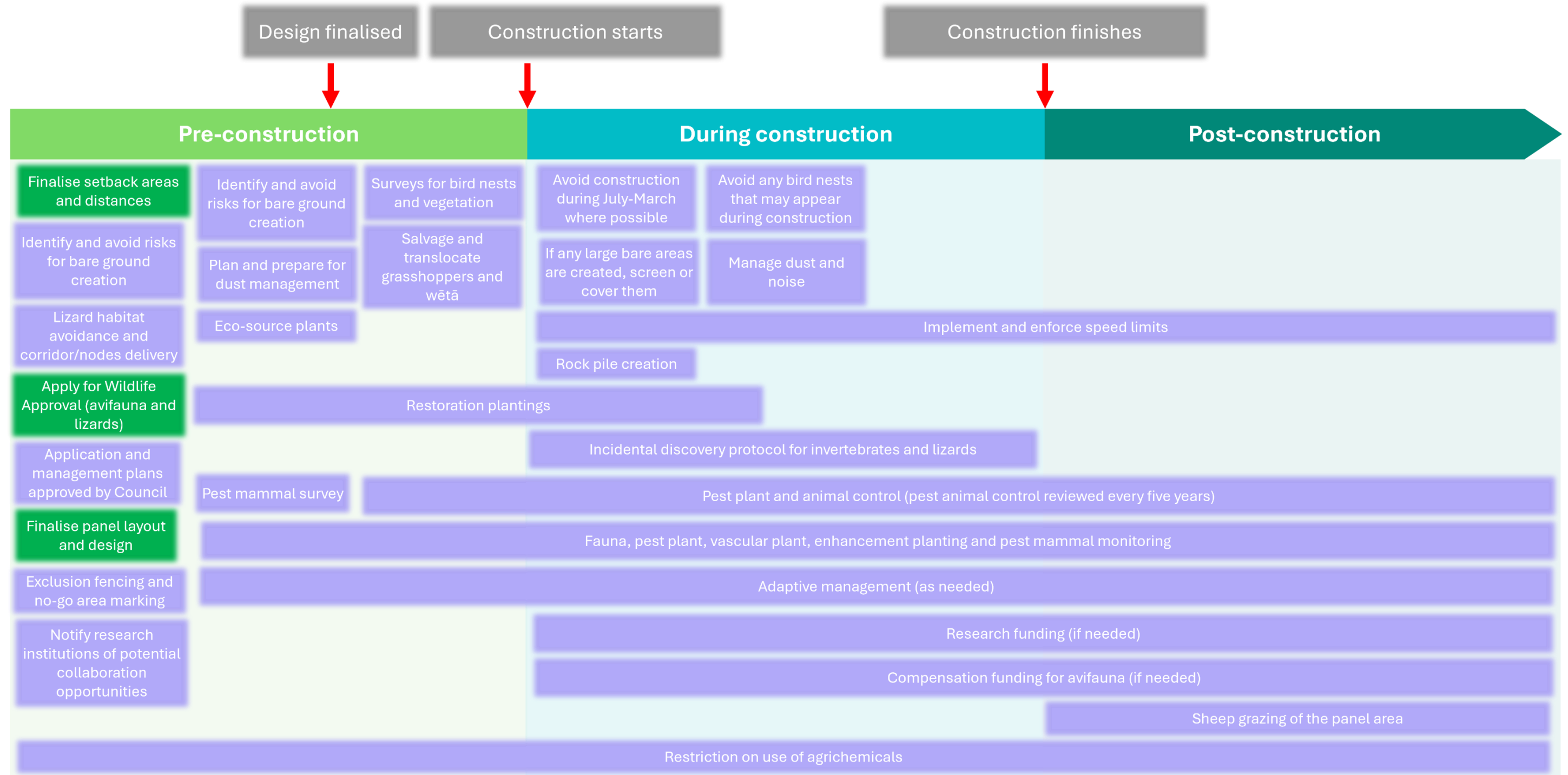


Figure 2 – Timeline showing implementation of the project over an approximate timescale. Boxes are colour-coded: green – completed; purple – still to complete.



Call Free 0508 WILDNZ
Ph +64 7 343 9017
ecology@wildlands.co.nz

99 Sala Street, Whakarewarewa, Rotorua 3010
PO Box 7137, Te Ngae, Rotorua 3042
New Zealand

Regional Offices located in Auckland, Christchurch,
Dunedin, Hamilton, Invercargill, Queenstown, Tauranga,
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