

SOUTHLAND WIND FARM PROJECT

RIPARIAN OFFSETTING MANAGEMENT PLAN

***DRAFT FOR LODGEMENT WITH FAST-TRACK APPROVALS
ACT 2024 (FTAA) APPLICATION***

**Prepared by
Ruth Goldsmith & Greg Ryder**

Greg Ryder Consulting Ltd

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1. Introduction

This Riparian Offsetting Management Plan (**ROMP**) has been prepared for Contact Energy Limited's (**Contact**) Southland Wind Farm Project (the **Project**).

1.1 Purpose and objectives of the ROMP and what the ROMP covers

The ROMP has been prepared with the purpose of establishing riparian shading and enhancing native habitat as a means to address the residual adverse effects on freshwater ecology arising from the Project – specifically, the loss of stream habitat associated with the construction of stream crossings.

The objective of the ROMP is to offset residual adverse effects to result in no net loss of stream habitat. This will be achieved by establishing riparian planting along existing, already degraded stream lengths, and protecting that planting (physically and legally). That will result in improved habitat quality in the locations where riparian planting is to be undertaken.

This ROMP:

- Quantifies the total stream loss and modification of stream bed habitat arising from the Project.
- Describes the existing quality of the stream that is lost as a result of the Project.
- Identifies the existing areas and quality of stream length to be restored to offset that loss and modification in order to result in no net loss of stream habitat, applying the Stream Ecological Valuation (**SEV**) and Environmental Compensation Ratio (**ECR**) methodologies.
- Provides the methodology for the restoration measures, including riparian planting and physical and legal protection of that planting.
- Outlines how the proposed restoration will be maintained (including via pest plant and animal control after planting is completed), measured and monitored to ensure success.

This ROMP is a draft, to be updated and finalised after the consenting process.

1.2 Associated documents

1.2.1 Technical reports

As outlined above, this ROMP has been informed by the assessment of freshwater ecology effects and management measures outlined in the relevant technical reports supporting the ROMP for the Project including:

- Freshwater Ecology Assessment (prepared by Dr Greg Ryder and Dr Ruth Goldsmith); and
- Construction Effects Assessment (prepared by various authors from Riley Consultants).

1.3 Relevant RMA conditions

Table 1 identifies the specific resource consent conditions relevant to this ROMP and where they are addressed in the document. The conditions relating to the certification and post-certification amendment of management plans (MP1 – MP11) also apply to this ROMP.

Table 1. Consent conditions relevant to this ROMP [References are to conditions at time of lodgement of the FTAA application].

Condition No.	Condition
EC43A	The Consent Holder shall engage a Suitably Qualified and Experienced Person to prepare a Riparian Offsetting Management Plan (ROMP) for the loss of any stream habitat from within the Project Site. The objective of the ROMP is to offset residual adverse effects to result in no net loss of stream habitat.
EC43	<p>Where any instream works (including roading, crossings – culverts, bridges or other structures) authorised by this consent result in the loss of stream habitat from within the Project Site, the residual adverse effects arising from such loss shall be offset to result in no net loss of stream habitat. These measures shall be outlined in the ROMP and include the following:</p> <ul style="list-style-type: none"> a) Quantification of total stream loss and modification of stream bed arising from the detailed design of the Project, in general accordance with the application documents listed in Condition G1; b) An application of the Stream Ecological Valuation (SEV) and Environmental Compensation Ratio (ECR) methodologies to determine the required amount of riparian stream plantings of existing streambed elsewhere within the catchment; c) Identification of the areas identified for riparian plantings; d) Fencing to exclude stock and feral ungulates from the areas identified for riparian plantings; e) Control of pest animal species within the riparian planted areas, including possums, hares and rabbits, for three years following the completion of the planting; f) Control of pest plant species within the riparian planted areas for 10 years following the completion of the planting in order to enable canopy closure; and g) Monitoring, reporting and management requirements until canopy closure is confirmed.
EC45	Any riparian planting required in accordance with the ROMP shall be completed within one (1) year of the commissioning of the wind farm.
EC45A	<ul style="list-style-type: none"> a) Works within any stream authorised by these resource consents shall not commence until Southland Regional Council has been provided with written confirmation that the Consent Holder has entered into legal arrangements and/or holds other authorisations necessary to allow entry onto land to carry out, continue and maintain all offset and compensation measures required by the Riparian Offsetting Management Plan.

Condition No.	Condition
	<p>b) The written confirmation provided under clause (a) shall describe all the specific legal arrangements and the land to which they apply, being land purchase, agreement providing for covenanting or similar registered title instruments that have been entered into to provide the planted and retired areas to be retained in perpetuity.</p>
EC46	<p>All plant material shall be sourced from the rohe in which it is to be planted or be otherwise ecosourced from the Local Ecological District, except, where it is not practicable to do so, in which case the Riparian Offsetting Management Plan shall set out a process of consultation with Te Ao Marama Inc. (on behalf of Ngā Rūnaka Ki Murihiku) and the Regional Council to confirm an alternative source.</p>

2 Relevant values and effects: stream habitat

2.1 Introduction

The freshwater ecology values of the Project Site and immediate surrounds, and the effects of the Project on freshwater ecology values, are described in detail in the technical reports listed in Section 1.3.1.

The values and effects relevant to this ROMP are the habitat values associated with the locations where stream crossings are proposed, and where those crossings will result in the alteration or loss of stream habitat. The effects arise from the earthworks required to construct roading, crossings, culverts, bridges and other structures within the Project Site.

2.2 Summary of overall freshwater ecology values

A summary of freshwater ecological values at the Project Site is provided in Table 2.

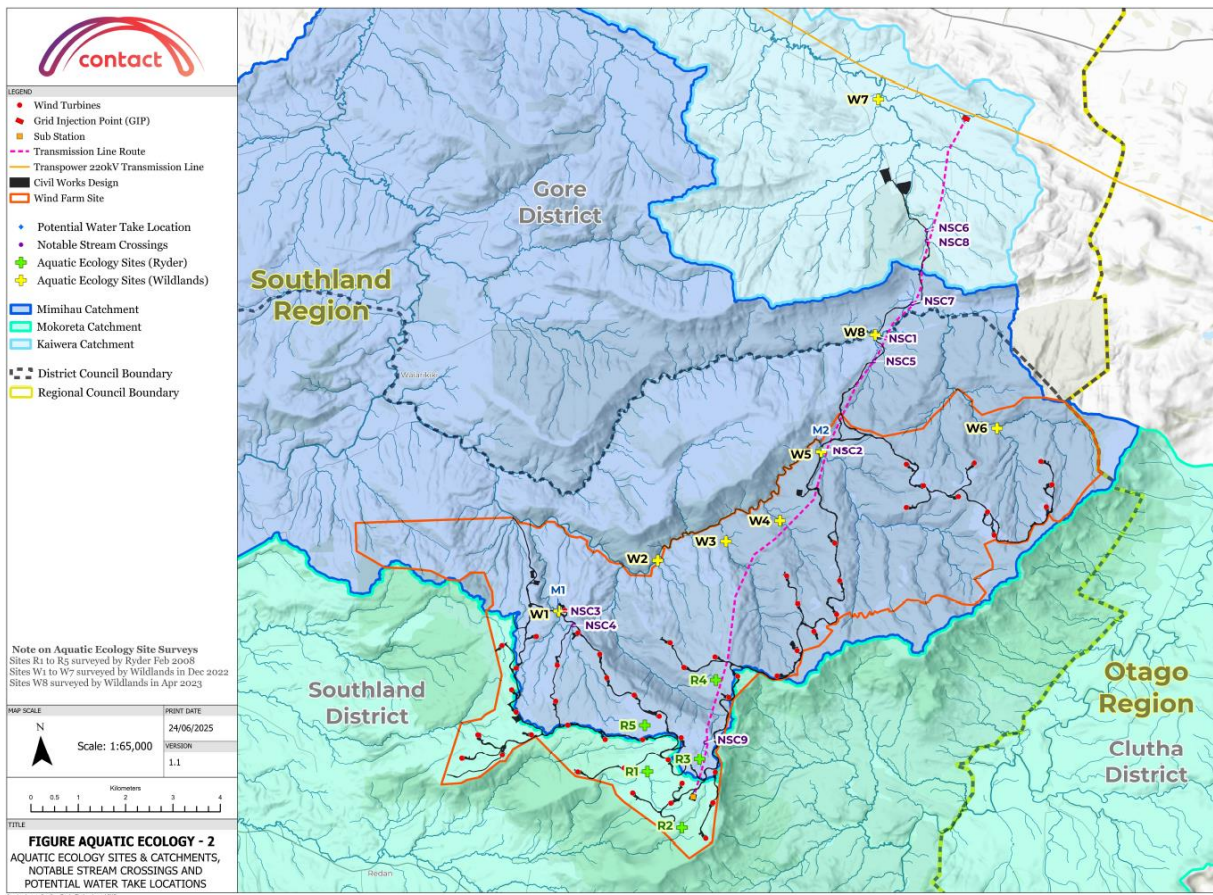
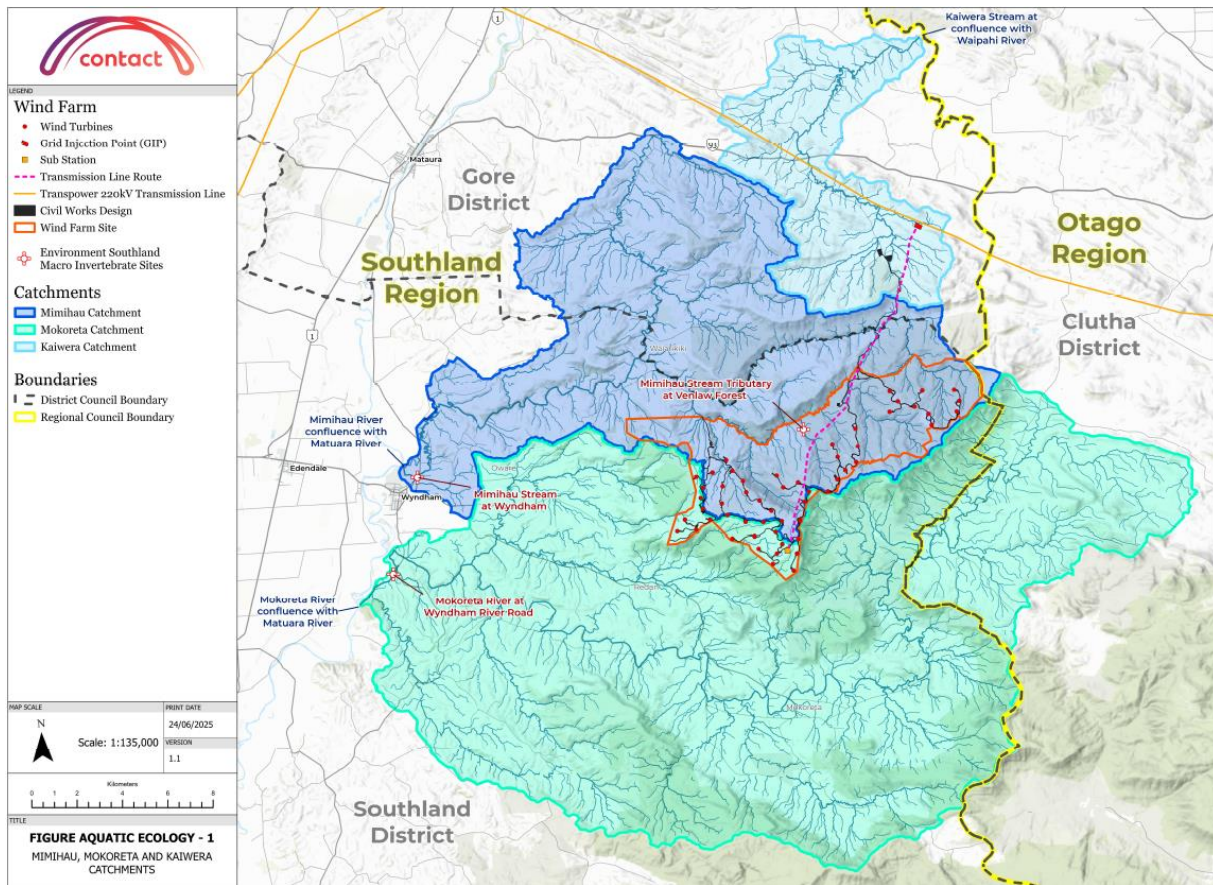
Figures 1 and 2 show the Project Site, relevant streams and catchments, and key Project features in relation to aquatic ecology. *These are Figures Aquatic Ecology-1 and Aquatic Ecology-2 in Part G of the overall FTAA application.*

Table 2. Summary of freshwater ecology values.

Ecological aspect	Ecological values
Water quality	<ul style="list-style-type: none">Physical and chemical water quality is measured monthly at two sites in the Mimiha Stream catchment and one site in the Mokoreta River catchment by Environment Southland.Water quality monitoring within the Mimiha Stream South Branch (2013-2023) shows phosphorus, nitrogen and faecal bacteria concentrations are increasing and water clarity is decreasing, suggesting that water quality is degrading, and sediment inputs have been increasing over time.Water quality monitoring at the Mimiha Stream mainstem at Wyndham (2011-2021) and Mokoreta River at Wyndham River Road (2013-2023) sites indicate that water quality is generally improving, although faecal bacteria concentrations are high.
Periphyton	<ul style="list-style-type: none">There is no regular monitoring of periphyton (algae) at the Project Site.A 2008 survey found that periphyton cover levels were very low throughout all sites, likely due to the high cover of riparian vegetation reducing light reaching the stream bed.
Benthic macroinvertebrates	<ul style="list-style-type: none">Benthic macroinvertebrates can indicate the quality of the environment, as they respond to changes in water quality, hydrological patterns and/or habitat.

	<ul style="list-style-type: none"> • Benthic macroinvertebrate communities are surveyed annually at two sites in the Mimiha Stream catchment and one site in the Mokoreta River catchment. • At all three sites, recent ten-year trends suggest the health of the communities is degrading, which reflects the declining water quality in these catchments over time.
Fish	<ul style="list-style-type: none"> • In total, six 'At Risk – Declining', 'Threatened – Nationally vulnerable' or 'Threatened - Nationally critical' species have been recorded in the Mimiha Stream, Kaiwera Stream or Mokoreta River catchments from the New Zealand Freshwater Fish Database. These species are Longfin eel (<i>Anguilla dieffenbachii</i>), Giant kōkopu (<i>Galaxias argenteus</i>), Gollum galaxias (<i>Galaxias gollumoides</i>), Clutha flathead galaxias (<i>Galaxias</i> species D), Southern flathead galaxias (<i>Galaxias</i> species S) and Lamprey (<i>Geotria australis</i>).
Freshwater crayfish (kōura)	<ul style="list-style-type: none"> • Freshwater crayfish (<i>Paranephrops zealandicus</i>), which are 'At risk – Declining', are present in most of the small headwater streams within the wind farm site area and possibly also in the wider Project Site.

Figures 1 and 2.



2.3 Habitat loss and modification: details, and effects

An estimation of stream length impacted by earthworks has been undertaken by Roaring40s Wind Power Ltd. The calculation has been undertaken using the NZ Rivers 1:50k topographic river network database.

This stream network database has some inaccuracies, which are particularly evident when viewed at small scale, whereby the identified stream channels do not always follow the actual stream channel that is visible in aerial photography. As such, before any analysis was undertaken, the alignment of the stream channels in the vicinity of the civil design was checked and stream channel alignments adjusted where necessary. This was done using a combination of Google Earth, 2014 orthorectified aerial imagery, and contours generated from the DEM for the site (based on highly accurate LIDAR data).

Following the edits made to the stream channel database, the Intersection Geoprocessing Tool in QGIS was used on the stream channel file and the civil works design file (as produced by Riley) to identify and extract the sections of the streams that are intersected by the civil works design. The estimate of total stream length potentially impacted by civil works using this method is 769 m. The stream areas affected by civil works associated with the Project construction are presented in Figures 1 and 2 above.

A portion of this estimated length range that would be impacted by construction activities is already culverted (13 culverts in total, with 7 of these being located on the existing road through the Port Blakey Forest). These culverts will need to be replaced and probably extended in length, however, the actual impact of stream length due to the wind farm civil construction works will be lower than the estimated range above, potentially by as much as 200 m.

[To be updated based on final design: to include a calculation of values of the relevant sites / locations applying the SEV / ECR methodology, to in turn enable the necessary offset to be calculated]

3 Required offset: stream length and location

3.1 Identified / target site(s) for riparian offsetting

Watercourses in the vicinity of the Project Site have been visited and considered for suitability for riparian offsetting. A number of tributaries of the Mimiha Stream South Branch are potentially suitable for enhancement and could be considered by Contact for offsetting purposes. Most of the tributaries observed are currently open to stock access, and show obvious signs of bank erosion, pugging and a general lack of riparian cover.

Based on the quality of the stream length affected (i.e., much less than 1 km), and likely state of the streams to be restored, something in the order of 1-2 km of stream length will likely need to be restored in order to offset, and there appears to be sufficient stream length available to meet that. It may well be that the Jedburgh Station site itself contains sufficient stream length for the riparian offset, and Contact has had initial discussions with the owner of Jedburgh Station about the use of streams onsite for riparian offsetting.

The following sites (Plates 1 to 3), in descending order of preference (although subject to change following detailed investigation), are considered suitable sites for stream-riparian restoration. The approximate location of each site is shown in Plate 4.



Plate 1. Potential offsetting site - Mimiha Stream South Branch tributary. (photo: G Ryder, 18 April 2024).



Plate 2. Potential offsetting site - Mimiha Stream South Branch tributary. Note stock pugging in channel. (photo: G Ryder, 18 April 2024).



Plate 3. Potential offsetting site - Mimiha Stream South Branch tributary. (photo: G Ryder, 18 April 2024).

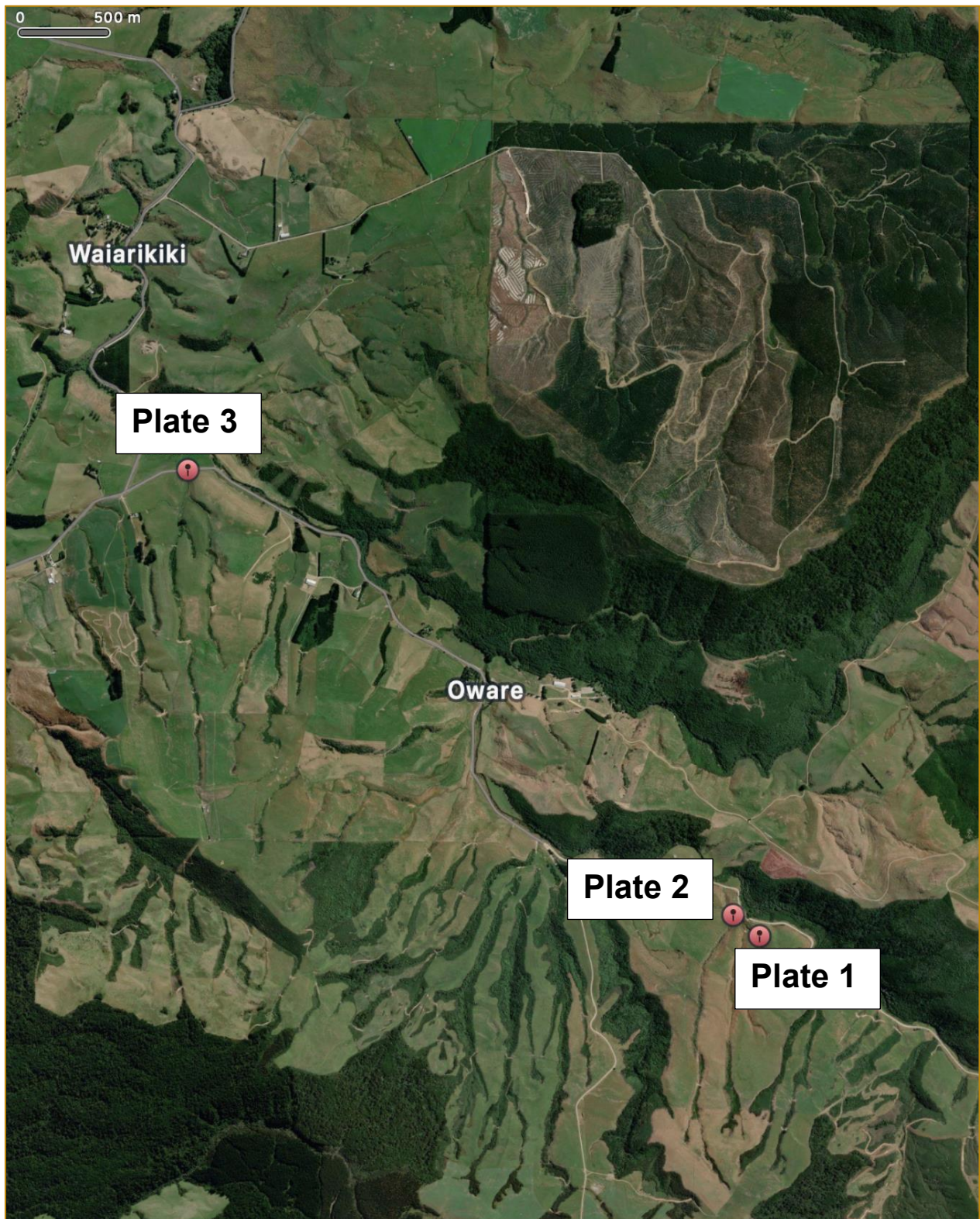


Plate 4. Potential offsetting site locations in the Mimihau Stream South Branch tributary.

3.2 Applying the SEV / ECR methodologies to determine the required quantum / stream length

The quantum of planting and enhancement required at offset sites is determined using the SEV and ECR methodologies. The SEV is used to describe the existing habitat values of the watercourse in a quantifiable way and ensure that enhancement offsets the watercourse crossing disturbance by increasing habitat values elsewhere by a similar extent to that lost.

As a minimum, a similar length of watercourse will be enhanced through fencing and planting to prevent stock access, restore stream shade, and reduce sediment and nutrients inputs via surface run-off. The actual length of enhancement is calculated using the SEV methodology¹. This method calculates the ECR for offsetting the adverse effects of piping or modifications of streams, in terms of the length / area of existing streams in the vicinity of the Project Site that will be restored via riparian fencing and planting.

The ECR has the underlying principle of "no net loss" and is based upon "no net loss of area-weight stream function." The formula to calculate the ECR for a stream is:

$$ECR = \frac{\text{Predicted loss of function}}{\text{Predicted gain through restoration}} \times 1.5 \text{ delay factor}^2$$

In cases where a stream can be restored in a short period of time, a theoretical ECR close to 1:1 may be appropriate. However, where the stream reach to be restored is lower in overall ecological value than the stream reach being degraded, the ECR will need to be set at a higher level³, and could be 3 times or more the area of actual loss through civil works.

[To be added post-consenting: the precise application of the SEV / ECR methodology to determine required stream length in this case]

In summary, the SEV model has calculated that restoration (fencing and planting) of [Insert] square metres of stream will be necessary to offset those impacts. This equates to approximately [Insert] lineal metres of stream length (the streams affected have an average width of [Insert]). This equates to approx. [Insert] terrestrial riparian margin required. At the completion of vegetation clearance and culvert installation the SEV calculation will be redone to ensure the terrestrial riparian margin is adequate.

A summary of each catchment, the area of streambed impacted and the proposed quantum of offset is provided in Table 3.

¹ Storey, R.G., Neale, M.W., Rowe, D.K., Collier, K.J., Hatton, C., Joy, M.K., Maxted, J.R., Moore, S., Parkyn, S.M., Phillips, N. and Quinn, J.M. 2011. *Stream Ecological Valuation (SEV): a method for assessing the ecological function of Auckland streams*. Auckland Council Technical Report 2011/009.

² A factor of 1.5 is applied to allow for time delays before benefits of rehabilitation are realised.

³ Storey, R.G., Neale, M.W., Rowe, D.K., Collier, K.J., Hatton, C., Joy, M.K., Maxted, J.R., Moore, S., Parkyn, S.M., Phillips, N. and Quinn, J.M. 2011. *Stream Ecological Valuation (SEV): a method for assessing the ecological function of Auckland streams*. Auckland Council Technical Report 2011/009.

Table 3. Summary of streambed area impacted and proposed offset for each catchment.

Catchment	Streambed area impacted (m ²) ('loss')	Proposed offset measures ('gain')
Catchment 1 (Mimihau)	X	X m ² streambed enhancement via riparian planting
Catchment 2 (Kaiwera)	X	X m ² streambed enhancement via riparian planting

4 Riparian planting methodology and specifications

The riparian planting and enhancement actions will include the following key features to improve aquatic ecosystem function:

- [Insert]
- Planted riparian margins to up to [X] m on each bank;
- Plants to be eco-sourced, with selection of appropriate plant species mixes and exclusion measures.
- Fencing for stock exclusion; and
- Legal protection.

4.1 Planting requirements including timing

The intended restoration outcome for the offsetting is for streams to be mostly or fully shaded, with a range of [insert plant species chosen].

Stream plantings are focussed on fast growing, moisture tolerant species designed to shade the stream as soon as possible and reduce weed invasion. Riparian planting will consist of planting a [X]m buffer (on average) on each side of the channel and fencing off the stream and buffer plantings from livestock. None of the streams under consideration are currently fenced.

The whakapapa of plants established on this site is culturally important to Ngā Rūnaka ki Murihiku. All plants must be able to be traced back to the Local Ecological District. This ensures propagation material used for rehabilitation, restorative planting and plant establishment is genetically suitable for the local environment.

[Contact will consult with Te Ao Marama on behalf of Ngā Rūnaka ki Murihiku in respect of an alternative where sourcing plants from the Local Ecological District is not practicable. The process for any such consultation, if required, will be set out here.]

All riparian planting shall be completed within one (1) year of the commissioning of the wind farm.

4.2 Fencing for stock and feral ungulate exclusion

The entire planted area will be fenced, to prevent access to the planted area by stock and feral ungulates.

4.3 Legal protection

Before commencing works within any stream authorised by the resource consents for the Project, Contact will provide Southland Regional Council with written confirmation that it has entered into legal arrangements and/or holds other authorisations necessary to allow entry onto land to carry out, continue and maintain all offset and compensation measures required by the ROMP.

The written confirmation will describe all the specific legal arrangements and the land to which they apply, being land purchase, agreement providing for covenanting or similar registered title instruments that have been entered into to provide the planting to be retained in perpetuity.

4.4 Plant establishment performance measures

Successful planting establishment performance measures are outlined in Table 4 below.

Post-planting monitoring will be undertaken at the end of year 1, 3, 5 and 10 until replacement planting meets the specified performance measures. Monitoring in years 1, 3, and 5 will allow assessment of progress of the plantings towards the year 10 measures, which are ultimately the key performance measures for planting to be assessed against.

Table 4. Intended restoration outcomes and performance measures from Year 1 to Year 10.

Restoration Outcome	Outcome performance measures			
	End of Year 1	End of Year 3	End of Year 5	End of Year 10
Streams will be mostly or full shaded.	<ul style="list-style-type: none"> 75% survival Invasive weeds absent or at low levels Animal browse has no significant impact 	<ul style="list-style-type: none"> 75% survival 80% of original diversity Canopy beginning to close Invasive weeds absent or at low levels 	<ul style="list-style-type: none"> Starting crop FTG Weeds under control and not spreading Animal browse has no significant impact on planting Canopy cover around 60% Natural regeneration occurring Enrichment species 80% of original diversity Enrichment 75% survival 	<ul style="list-style-type: none"> Starting crop have formed 100% canopy Grass and weeds are now suppressed Enrichment species are well established in the understory and subcanopy A clear trajectory towards the outcome state described for this vegetation type.

5 Maintenance Regime

The maintenance period of riparian plantings will be for ten years. Maintenance shall be carried out every year after planting to provide optimal conditions for plant growth. This will include the control and removal of unwanted exotic plant species, releasing and removing competing growth around desirable plants and identifying failed plants or disease threats.

If 100% canopy cover is not met then replacement planting and maintenance will continue beyond year 10 until this performance target is achieved.

5.1 Livestock and ungulate pest animal exclusion

All farm livestock (including cattle, horses, sheep and domestic pigs) will be permanently removed and excluded from planting sites before planting commences at each site.

Invasive weed species may rapidly occupy open grass areas when grazing pressure is removed. However, removing grazing should not be delayed, but rather linked to immediate weed management. Allowing early establishment of weed species allows these to be controlled and the weed burden to be reduced prior to planting. Controlled use of herbicides is more straightforward before new plants are present.

A concerted and regular weed management programme will need to be undertaken until all planting is concluded and invasive weeds no longer present a risk to establishment (Section 5.3).

Permanent stock-proof fencing shall be erected where necessary to exclude stock and ungulate pest animals from riparian planting sites. At a minimum this fence will be 7-wire post and batten with 5 m post spacing.

5.2 Pest animal control

Pest animal species – specifically possums, hares and rabbits – will be controlled within the planted area for three years following the completion of the planting.

Possums are less likely to cause any major damage to newly planted seedlings. Rabbits or hares can occasionally be problematic when new plantings occur. They have the habit of pulling out or ring barking small seedlings and large populations can damage many hundreds of seedlings over a few days if given the opportunity.

Pest management protocols will be implemented for a minimum of three years following the completion of the riparian planting. [Insert pest management protocols - to be developed after the FTAA consenting process].

5.3 Pest plant management

The objective of pest plant management effort is to control pest plant species within the riparian planted areas. Pest plants are defined by those listed as such within the Southland Regional Pest Management Plan 2019-2029, or those considered by the Project Ecologist (or designated suitably qualified ecologist)

as capable of inhibiting replacement plantings, wetland restoration and the regeneration of any retirement areas.

Pest plant management will be required in all planted areas for 10 years following the completion of the planting in order to enable canopy closure of 100%. If monitoring shows that 100% cover has not been achieved after [X] years of maintenance, the maintenance period shall be extended until that is achieved.

Pest plants will be controlled to ensure replacement plantings are not inhibited, and performance targets are met. Therefore:

- All pest plants and those likely to compete with the newly planted riparian plants will be controlled to zero-density with herbicide or mechanically removed prior to planting. Herbicides that are likely to be harmful to adjacent existing native plant species, or those that contain a residual factor that may be harmful to natives, will not be used. Manual or mechanical removal of weed species will occur if it is unsafe to use herbicides;
- All planted seedlings will be released from weed competition for ten years following planting. Dead plants will be replaced (blanking) annually throughout the ten-year period to achieve offsetting targets; and
- For staff undertaking works in or around waterways, all equipment and gear (including waders) shall be checked for plant material, cleaned, and dried before and after accessing waterways.

6 Monitoring and reporting requirements

6.1 Monitoring of performance outcomes

Monitoring of performance outcomes should occur regularly to determine whether 100% canopy closure has been achieved or is progressing to being achieved within the 10 year performance target.

Monitoring will involve a combination of:

- Qualitative assessment: this will involve inspection to assess issues of weed or stock presence etc;
- Survival and diversity assessment through standard sample counts and or bounded plots; and
- Assessment of canopy cover through techniques such as bounded plots or drone photogrammetry.

6.1.1 Timing

Frequent inspections will be required through the first year of establishment and these will reduce as plantings develop.

Where survival and growth assessments are undertaken, these should be completed in autumn, following any losses through summer drought. This allows any planning for replacement in winter planting.

6.1.2 Level

Monitoring will be at a level that allows for the performance measures to be measured to an acceptable precision.

6.2 Reporting requirements

6.2.1 Compliance confirmation report

A compliance confirmation report will be submitted to Environment Southland within 30 days of completion of the restoration and enhancement activities to confirm that all enhancement and restoration planting activities have been completed in accordance with this ROMP. The report shall include, but not be limited to, confirmation of:

- Planting species matrix and number of plants planted;
- Areal extent and location of plantings; and
- Stock exclusion fencing locations.

6.2.2 Incident based reporting

In the event of an incident occurring during the construction of the Southland Wind Farm that causes, or is likely to cause, a non-compliance with any condition(s) of these resource consents or any unanticipated adverse environmental effects, the following shall occur:

- a) The relevant District or Regional Council and Te Ao Marama Inc. (on behalf of Ngā Rūnaka ki Murihiku) shall be notified by email as soon as practicable and no later than within twenty-four (24) hours of the Consent Holder becoming aware of the incident:
 - a. Southland Regional Council – insert email
 - b. Southland District Council – insert email
 - c. Gore District Council – insert email
 - d. Te Ao Marama Inc. – insert email
- b) An incident report shall be prepared by a Suitably Qualified and Experienced Person in environmental compliance and provided to the relevant District or Regional Council and Te Ao Marama Inc. (on behalf of Ngā Rūnaka ki Murihiku) within ten (10) working days of the incident occurring, providing the following details:
 - a. A description of the nature, timing and cause of the incident;
 - b. An assessment of any adverse effects of the incident on the environment; and
 - c. A description of any remedial and/or mitigation measures that have been, or will be, implemented as a result of the incident to prevent the incident reoccurring in the future.

Remedial action and/or mitigation measures described in the incident report shall be implemented as soon as practicable and commenced within ten (10) working days of the incident report being provided to the relevant District or Regional Council.

6.2.3 Compliance monitoring report

Annual inspection surveys shall be undertaken during normal conditions (i.e. not during flooding events) to monitor the following:

- Identify weeds;
- Identify pest animal damage;
- Estimate planting survival and densities of facultative wetland species in wetlands and all terrestrial plants within compensation sites; and
- Estimate canopy coverage.

Findings will inform the types of weed and pest animal management requirements for the next subsequent year.

Compliance monitoring reports will be submitted to Southland Regional Council every second year from the initial planting establishment until closure, i.e. once all plantings are 10 years in age and canopy closure targets have been met. The monitoring report shall include:

- Representative photos showing progress of terrestrial, riparian and wetland revegetation, including photos of sites where plantings are 5 years in age and 60% canopy closure has been achieved (where applicable);
- Information/data on plant survival, infill planting, and progress towards 100% canopy closure targets and weed and animal pest management requirements; and
- Information on incidents and adaptive management responses.