

Appendices





Appendix 1: Revegetation

Appendix 2: Rehabilitation of Limestone Pavement

Appendix 1: Revegetation

1.1 Relevant conditions of consent include

Rehabilitation of disturbed areas

60. Prior to undertaking any construction activities, the Consent Holder shall engage a suitable qualified and experienced ecologist to undertake a survey of the vegetation in the areas which are to be disturbed for construction purposes as detailed in condition [61]. The results of this survey shall be provided to the Hurunui District Council.

61. Site areas disturbed for pre-construction geotechnical investigations and construction purposes, but not necessary for the ongoing wind farm operation, being the concrete batching area, laydown areas, spoil disposal areas, road batters, and parts of turbine platforms, shall be rehabilitated progressively, and in any event within 12 months of the completion of construction in accordance with the Construction Management Plan. The objective shall be to rehabilitate those areas to a similar condition to the condition identified in the pre-construction survey required by condition [60], or as otherwise agreed with the Hurunui District Council.

Planting for mitigation and remediation of cut and fill batters

108. Other than on cut limestone faces, cut and fill surfaces shall be rehabilitated in accordance with condition [61].

109. Locations for the establishment of woody plants and silver tussock within the wind farm site for visual mitigation shall be determined through consultation between landscape and ecology experts nominated by Hurunui District Council and the Consent Holder. The location of mitigation planting shall take into account the effects arising as a consequence of visibility from important public viewpoints agreed upon by the landscape experts.

1.2 Revegetation

110. The pattern of plantings undertaken for visual mitigation and remediation shall reflect natural patterns of plant distribution and association, as illustrated in the site landscape pattern book (see condition [102]).

111. The use of plants for mitigation and remediation of visual and landscape effects associated with cut and fill excavations shall be subject to conditions specified for habitat enhancement, ecological restoration and weed management."

Planting will be undertaken according to the current patterns that exist, and all plantings to be securely fenced from grazing stock and protected from rabbits and hares. Deer and goats are to be removed from the area. The fencing includes a farm fence with chicken wire for hare and rabbit control or plants individually protected.

Plants will be propagated by Mt Cass Wind Farm Ltd at least 18 months ahead of planting season.

Rehabilitation measures necessary to reduce landscape and visual impacts associated with roads, turbine platforms, building sites and disposal pits, to reinforce existing stands of vegetation, and to enhance the general amenity, shall take the form of:

- Broadleaf planting
- Tussock planting.
- Over-sowing with grass seed .
- Hydroseeding with grass seed (south side only).

Hydroseeding with native seeds and cuttings, and direct transfer of tussocks was not considered appropriate on the northern slopes given the drought like conditions on Mt Cass, but is to be considered on the moister southern slopes.

1.3 Location of Mitigation Re-vegetation

1.3.1 Relevant conditions of consent include

109. The location of mitigation planting shall take into account the effects arising as a consequence of visibility from important public viewpoints agreed upon by the landscape experts.

There are certain areas in the landscape where the roads and turbines will be more visible from locations off site. This is due both to the type of landscape in these areas, as well as the extent and nature of works required for the installation of the turbines. These areas are key areas for focussing mitigation planting treatment.

These key areas are graded in terms of visual impact into high, medium and low impact and shown on the Visibility Map in Section 1.5. In areas where the impact is most high, there is to be more targeted mitigation planting in order to lessen the visual impact for those off site.

1.4 Types of Vegetation



Fig. 62 Escarpment boulderfield vegetation.



Fig. 64 Tussock Land Vegetation.



Fig. 63 Dip slope vegetation.



Fig. 65 Limestone Pavement Vegetation.

1.5 Broadleaf Planting

The vegetation of the Mt Cass ridgeline comprises a complex mosaic of mixed angiosperm forest remnants, regenerating divaricating shrubland communities and grasslands.

1.5.1 Vegetation Communities

1. Pasture and tussock grassland (*Poa cita*)
2. Grey shrubland (mingi mingi)
3. Forest scrub (mingi mingi, five finger, kohuhu)
4. Kowhai forest (kowhai, broadleaf)
5. Mahoe – raukawa- fuchsia forest
6. Broadleaf forest (broadleaf, five finger)
7. Mahoe – Broadleaf forest (broadleaf, lemonwood)
8. Mahoe – kaikomako- ribbonwood forest
9. Totara forest (totara, fivefinger, mahoe)
10. Totara - kowhai forest (totara, matai, kowhai, mahoe)
11. Matagouri shrubland

Suitable plant species are to be propagated from the site and Tiromoana Bush area and include:

Species	Southern Slope	Ridge and Crest
<i>Griselinia littoralis</i>	✓	✓
<i>Coprosma crassifolia</i>		✓
<i>Coprosma propinqua</i>		✓
<i>Coprosma virescens</i>	✓	✓
<i>Coprosma robusta</i>	✓	
<i>Pittosporum tenuifolium</i>	✓	
<i>Hebe salicifolia</i>	✓	
<i>Sophora microphylla</i>	✓	
<i>Pittosporum eugenioides</i>	✓	
<i>Plagianthus regius</i>	✓	
<i>Myoporum laetum</i>	✓	
<i>Olearia avicenniaefolia</i>		✓
<i>Poa cita</i>		✓
<i>Podocarpus totara</i>		✓

The planting shall take place on cuts and fills of the road alignment, crevices and ledges where the planting pockets are large enough, ramp roads, open ground where broadleaf species are found adjacent to the site, adjacent to limestone pavement (turbines 8-10).

1.6 Tussock Grassland

1.6.1 Relevant Conditions of Consent Include

92. Where silver tussock is disturbed for pre-construction geotechnical investigations or construction purposes, but not necessary for the ongoing wind farm operation it shall be rehabilitated in accordance with condition [61] Rehabilitation of the area shall be to the standard identified in the preconstruction survey.

93. Where areas of silver tussock of a median greater than 10% density as identified on Golders Associates Plan CG241 dated 17 November 2010 are permanently removed as a result of wind farm development, an equivalent quantity of silver tussock shall be established and maintained on the wind farm site using direct vegetation transfer, planting, or other appropriate method."

Silver Tussock planting will be undertaken where roading alignments and turbine platforms will create impacts and disturb the existing tussock cover. This occurs more at turbine 3 and the associated road, NTR adjacent to turbines A12, 17, 18 and 19.

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1.6.2 Effects of Activities in this Landscape

Hydroseeding is to occur on the moister southern sites. Hydroseeding with NZ Browntop, fescue and ryegrass seed is to be applied to cuts as a wet mix comprising soil, cow manure at a ratio of 2:1 with seeds and a wetting and bonding agent. The aim is that this occurs occur on the ramp road cuts.

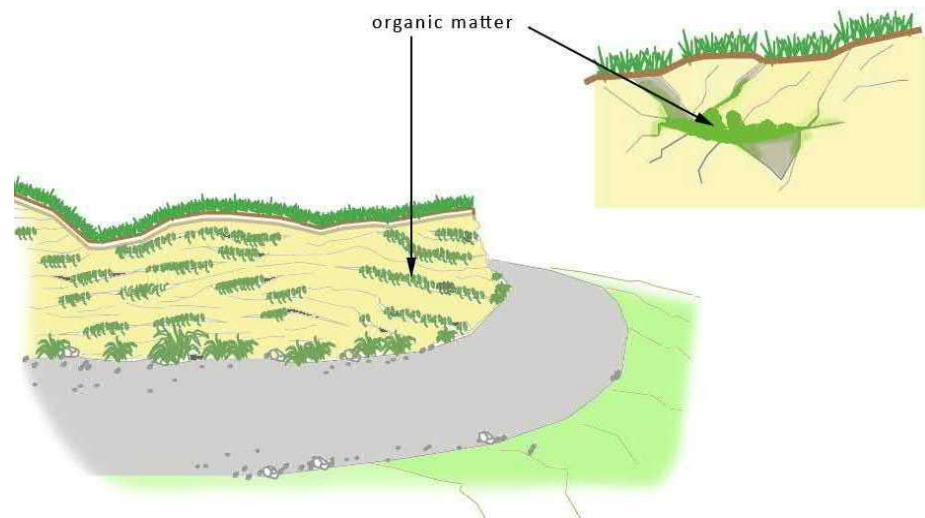


Fig. 66 Hydroseeding of cuts on the moister southern sites.

1.7 Over-sowing

Over-sowing of the batter slopes will take place in the existing pasture areas on the SAR and NTR (turbine A1, below A5, A6, A7, A8, A9, A10, A11, A12 and A13, A20, A21, A22).

Over-sowing shall also occur elsewhere on the ramp roads, especially on gentle batter slopes of less than 1v:3h surrounded by existing pasture. The sites will be graded, top soiled and over-sown with a grass seed mix of short rye, Fescue and NZ Browntop.

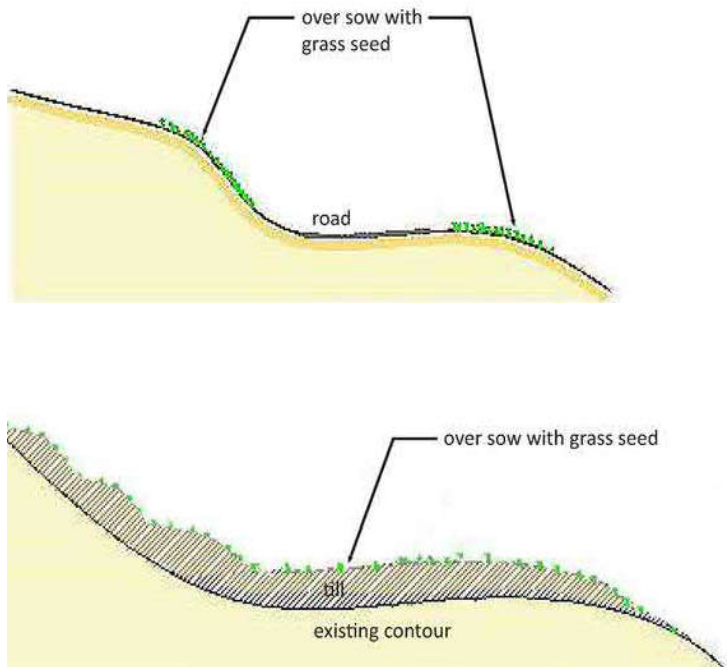


Fig. 67 Oversowing of grass seed

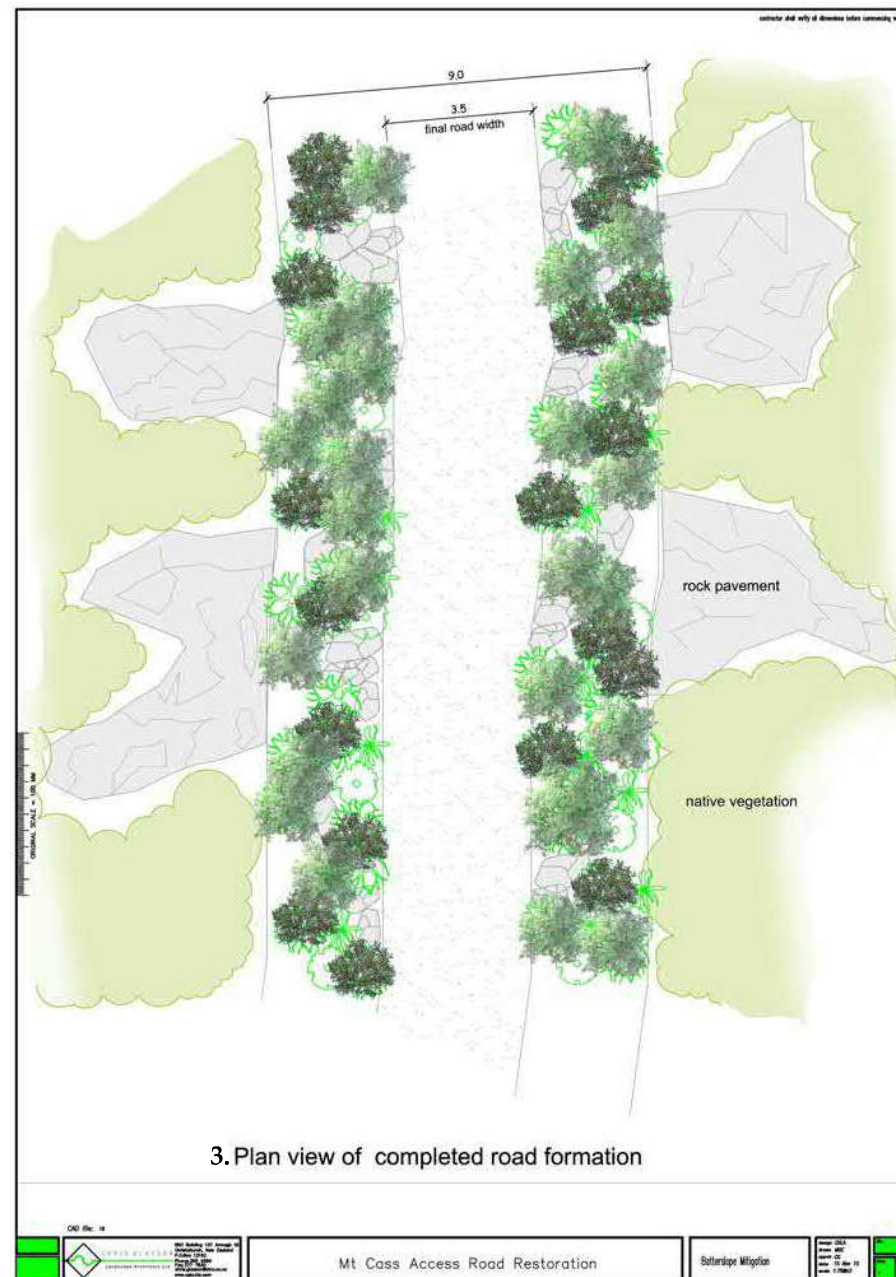
1.8 Livestock and Pest Management

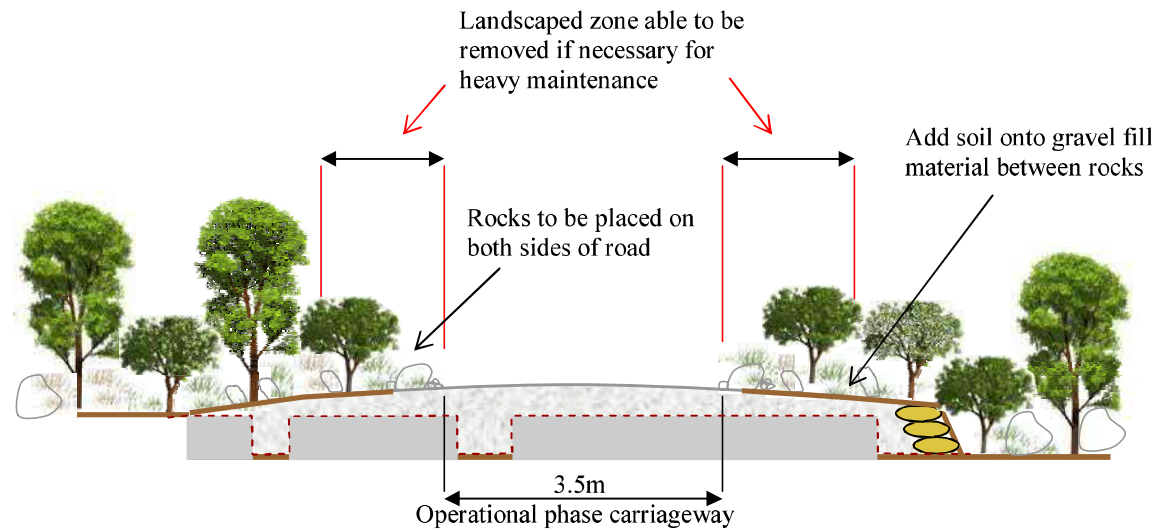
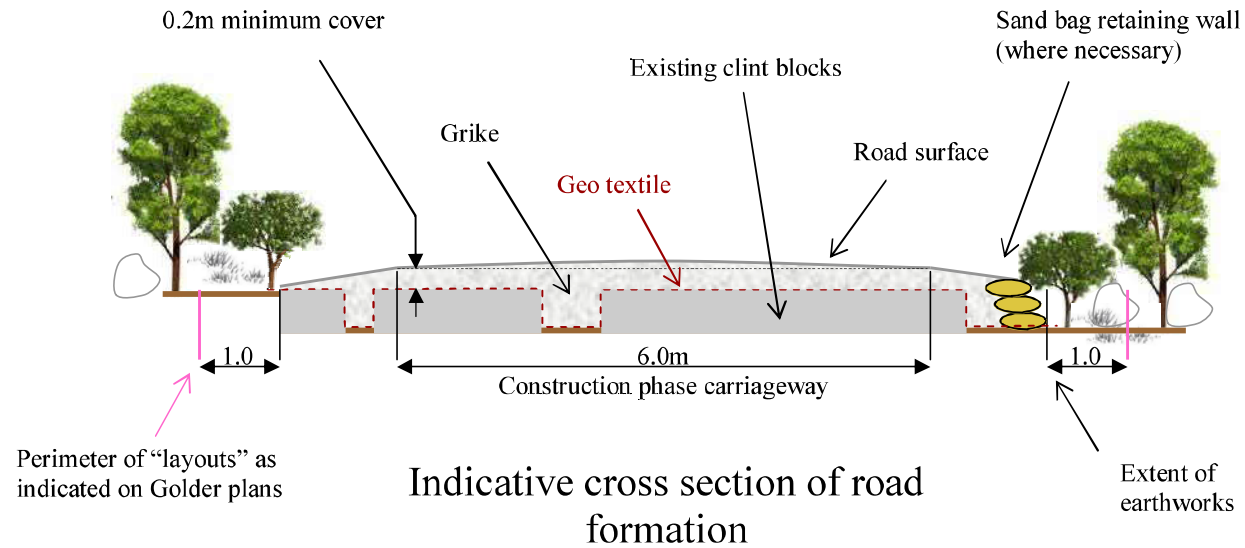
All areas of new planting require livestock and pest removal. This includes cattle and sheep grazing, deer, goats, pigs, possums, stoats, rabbits and hares.

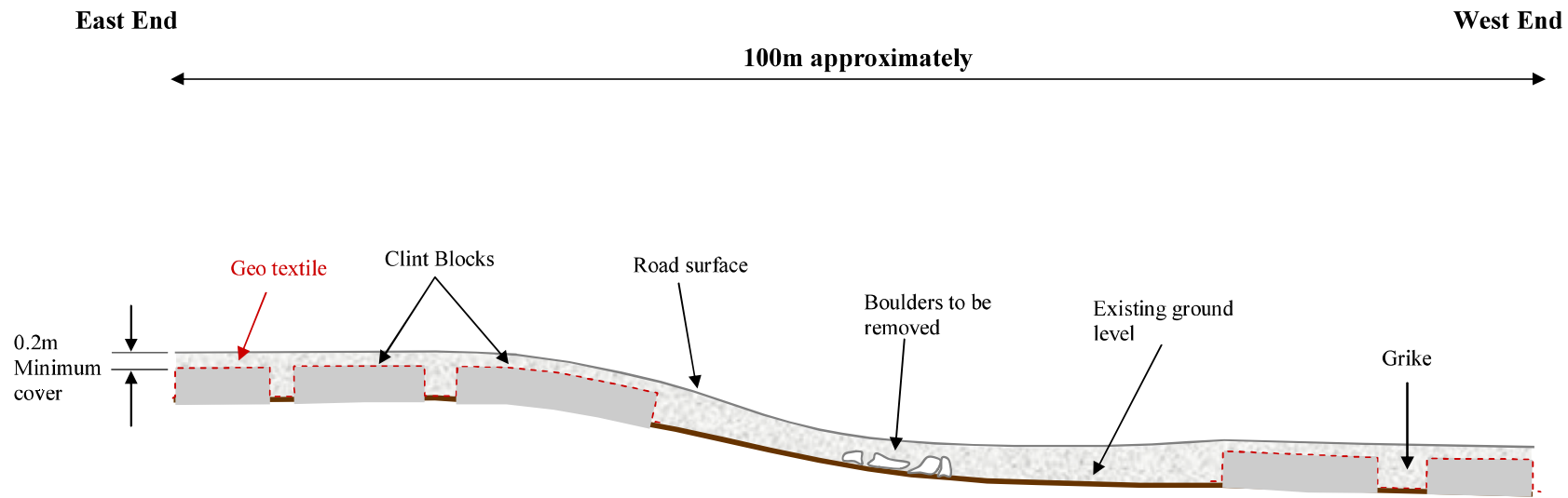
Appropriate fencing and combi guards shall exclude such animals and pests, and this is to include a farm fence with chicken mesh covering the wires as well as burying the mesh footing to prevent burrowing pests.

Appendix 2: Rehabilitation of Limestone Pavement

2.1 Rehabilitation of Limestone Pavement







Indicative long-section of road formation

Long-section showing road crossing over limestone pavement between station 800 to 950

24 July 2011



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