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MP 41289 ACCESS ARRANGEMENT APPLICATION – SIGNIFICANCE ASSESSMENT FOR PUBLIC NOTIFICATION UNDER 61C(2) OF THE CMA 1991

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1.0 Purpose and relevant considerations

1. Rangitira Development Ltd (RDL) have applied for an Access Arrangement (AA) to access 12 hectares (ha) of public conservation land within Mining Permit (MP) 41289 in order to undertake open cast coal mining. The purpose of this report is to provide the relevant information necessary for the decision maker (in this case the Minister of Conservation) to decide whether the application is to be considered significant pursuant to section 61C(2) of the Crown Minerals Act 1991 (the Act). The decision on significance will determine whether or not the application will be publicly notified pursuant to s 61C of the Act and in accordance with s 49 of the Conservation Act 1987.

2. MP 41289 is a Tier 2 permit, as per s 2B and Schedule 5 of the Act, and the appropriate Minister (by virtue of s 61(1)(a) being the Minister of Conservation) must decide whether the application is significant for the purposes of public notification. The relevant matters to be considered in making this decision are set out in s 61C(2) of the Act:

> *The Minister of Conservation must determine whether or not the proposed activities are significant mining activities and, in doing so, must have regard to—*
>
> *(a) the effects the activities are likely to have on conservation values for the land concerned; and*
> *(b) the effects the activities are likely to have on other activities on the land; and*
> *(c) the activities' net impact on the land, either while the activities are taking place or after their completion; and*
> *(d) any other matters that the appropriate Minister considers relevant to achieving the purpose of this Act.*

3. Section 61C(2)(d) refers to the purpose of the Act, that being the purpose of the Act set out in s1A:

> *(1) The purpose of this Act is to promote prospecting for, exploration for, and mining of Crown owned minerals for the benefit of New Zealand.*
>
> *(2) To this end, this Act provides for—*
>
> *(a) the efficient allocation of rights to prospect for, explore for, and mine Crown owned minerals; and*
> *(b) the effective management and regulation of the exercise of those rights; and*
> *(c) the carrying out, in accordance with good industry practice, of activities in respect of those rights; and*
> *(d) a fair financial return to the Crown for its minerals.*

4. This report considers the proposed mining activities within the 12 ha access area (AA area), the key conservation values of the public conservation land (PCL) concerned, the potential impacts of the proposed activities on those values and assesses them with regard to the above matters. It also outlines any other matters that the Department considers may be considered relevant, by the Minister's delegate, to achieving the purpose of the Act in relation to this application.

2.0 Applicant, context and background of the Access Arrangement application

5. The Applicant, RDL, has requested that the following company structure information be recorded and noted for clarity; Te Kuha Limited Partnership (TKLP) is the owner of Rangitira Developments Limited (RDL) who is the holder of MP 41289. TKLP is a joint venture between Stevenson Group Limited and Wi Pere Holdings Limited. Stevenson Group Limited, as the project operator, has overall responsibility for obtaining all necessary project approvals for the Te Kuha Mine proposal, including land access agreements and resource consents.

6. The 12 ha AA area forms part of a larger open cast mine that RDL are proposing to construct and operate on the slopes and ridgeline of Mt Te Kuha above the lower Buller Gorge near Westport. The total footprint of the mine would be approximately 109 ha, with an additional 9 km long access road. The access road would run from a processing plant on private land at Te Kuha near the Buller River up to the mine site located at about 600 - 650 metres above sea level (a.s.l). The mine is planned to produce approximately four million tonnes of coal over a 16 year period with a further 10 year period anticipated for rehabilitation and aftercare of the site.

7. The 12 ha AA area is located at the very top of the planned mine site along the Mt Te Kuha ridgeline and lies within Mt Rochfort Conservation Area. The AA application therefore relates only to 12 ha of the 109 ha mine footprint, or approximately 11% of the planned open cast mine pit.

8. As a whole the proposal is located over three different land parcels/tenures; public conservation land administered by the Department as Stewardship land, land managed by the Buller District Council (BDC) under the Reserves Act 1977 as Westport Water Conservation Reserve, and private land:

Public conservation land

Approximately 12 ha of the proposal lies within the Mt Rochfort Conservation Area and is within the mining permit. This area makes up the AA application. Approximately 1.6 ha of the proposed access road is within the Ballarat Conservation Area but is outside of the mining permit. RDL have proposed a land exchange for this area, offering to exchange approximately 8 ha of their privately owned land adjacent to the Lower Buller Gorge Scenic Reserve for 1.6 ha of the Ballarat Conservation Area. Should a land exchange not be completed RDL would require a Concession from the Department (under the Conservation Act) to use the 1.6 ha area.

Westport Water Conservation Reserve

Approximately 97 ha of the mine footprint and a majority of the 9km access road lies within Westport Water Conservation Reserve, vested in the BDC for the purpose of water conservation.

Private land

The coal processing plant and a small section of the access road would be located on private land adjacent to the railway line at Te Kuha.

9. See Figures 1, 2 and 3 for the location of the proposal and PCL boundaries.

10. Regulatory approvals for land access and land use would therefore need to include the following (note that this excludes any mine operating and health and safety approval requirements under the *Health and Safety in Employment (Mining Operations and Quarrying Operations) Regulations 2013*):

    - An AA from the Department under the Crown Minerals Act 1991 for the 12 ha of PCL within the MP;
    - A completed land exchange for the area required for the section of the access road [currently] located within Ballarat Conservation Area and outside of the MP. Or, failing the completion of a land exchange, a Concession with the Department under the Conservation Act 1987 for the same area;
    - An AA from the BDC for access to the Westport Water Conservation Reserve (WWCR) for approximately 97 ha of the open cast coal mine and majority of the access road. The WWCR is held, on trust, by the BDC and BDC would be the decision maker on any AA application in relation to the WWCR. RDL have lodged an application for access to the WWCR with the BDC;
    - Resource consents for the entire project under the Resource Management Act 1991 (RMA). No formal resource consent application have been lodged with either the BDC or West Coast Regional Council (WCRC) at this time;
    - Building consents (as required) for mine infrastructure and/or coal processing facility;

- A Wildlife Act Authority for the disturbance/killing of wildlife under the Wildlife Act 1953 (WA); and
- A Historic Places Act authority should any historic sites be disturbed.

11. The Department has received both the AA application and a land exchange proposal. A Concession application for a 1.59km section of the original access road was being assessed by the Department but has been superseded by a revised access route and proposed land exchange.

12. As of the time of writing this report RDL have lodged an application for access to the WWCR with the BDC but have not submitted resource consent applications to the BDC and WCRC. Other approvals such as a Wildlife Act Authority or Historic Places Act authority could also be required, but have not been determined at this point.

13. RDL, under different ownership than Te Kuha Limited Partnership, applied for an open cast coal mine on Mt Te Kuha within MP 41289 in the period from 1996 – 2002. The approval process included:

    - Resource consents application in 1996 – initially declined by the Councils but the decision was appealed to the Environment Court. The case was scheduled to be heard in 2002 but didn't reach the hearing because, despite apparently reaching a set of satisfactory conditions, RDL withdrew the application due to a lack of financial resources
    - An application to the BDC for access to the WWRC. This application was turned down by the Council in 2002, in part due to opposition of the potential approval by the Department
    - An access arrangement application to the Department for approximately 13 ha of PCL. This reached draft report stage in 2002 but did not reach a decision, presumably because of withdrawal for the same reasons noted for the consent application

3.0 Location and land status

14. MP 41289 covers approximately 860 hectares (ha) approximately 12 kilometres (km) east of Westport and 2 km north of the Buller River, at an elevation ranging from 600 to 800 metres above sea level. The location of the permit, mine proposal (as a whole) and Access Arrangement area are shown in Figures 1, 2 and 3 below.

15. The 12 ha AA area overlays Crown land held by the Department as Mt Rochfort Conservation Area. The land is held for conservation purposes and managed under section 25 of the Conservation Act (CA). Section 25 states that a stewardship area shall '…be so managed that its natural and historic resources are protected'.

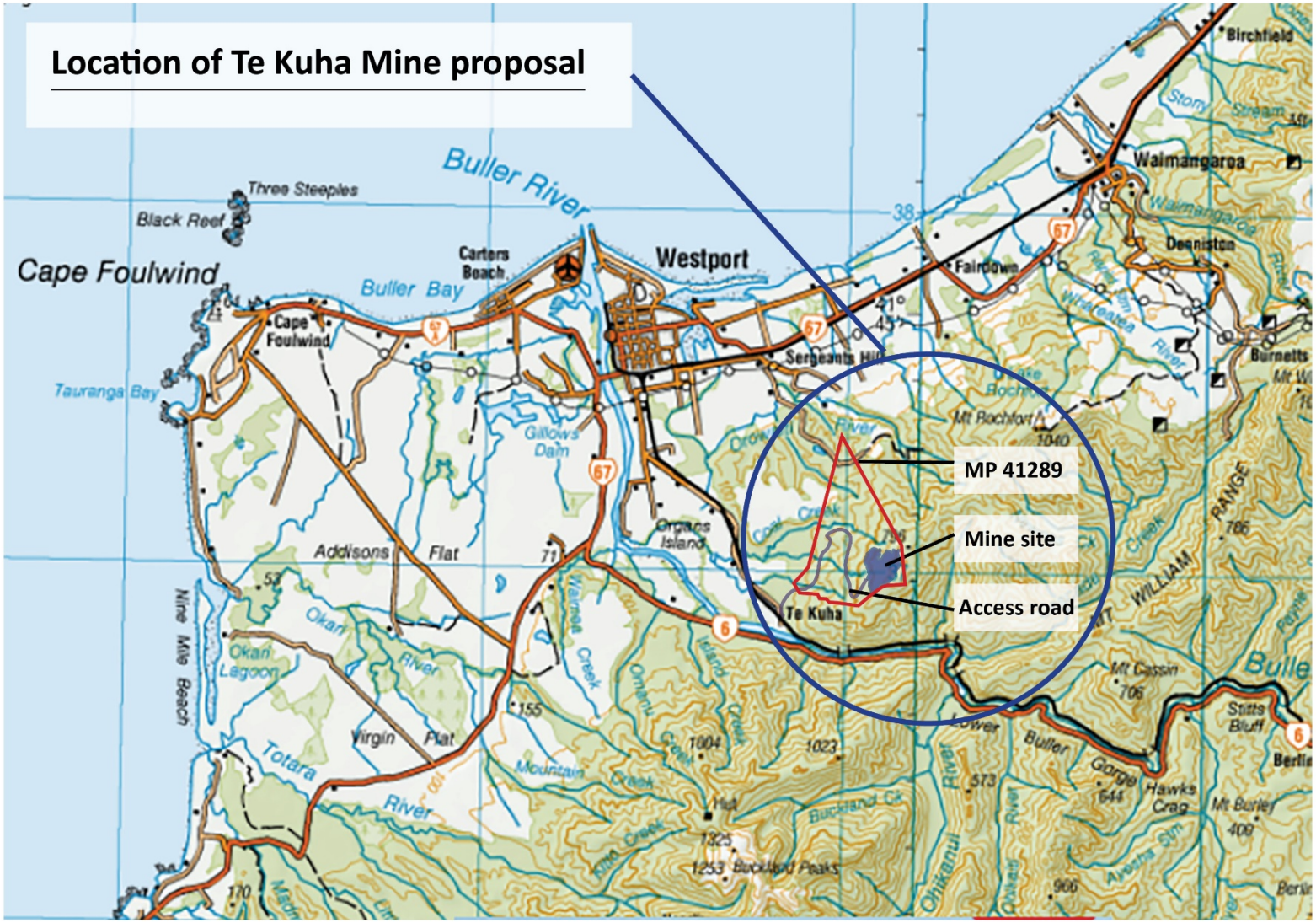

Figure 1: Location of Te Kuha Mine proposal

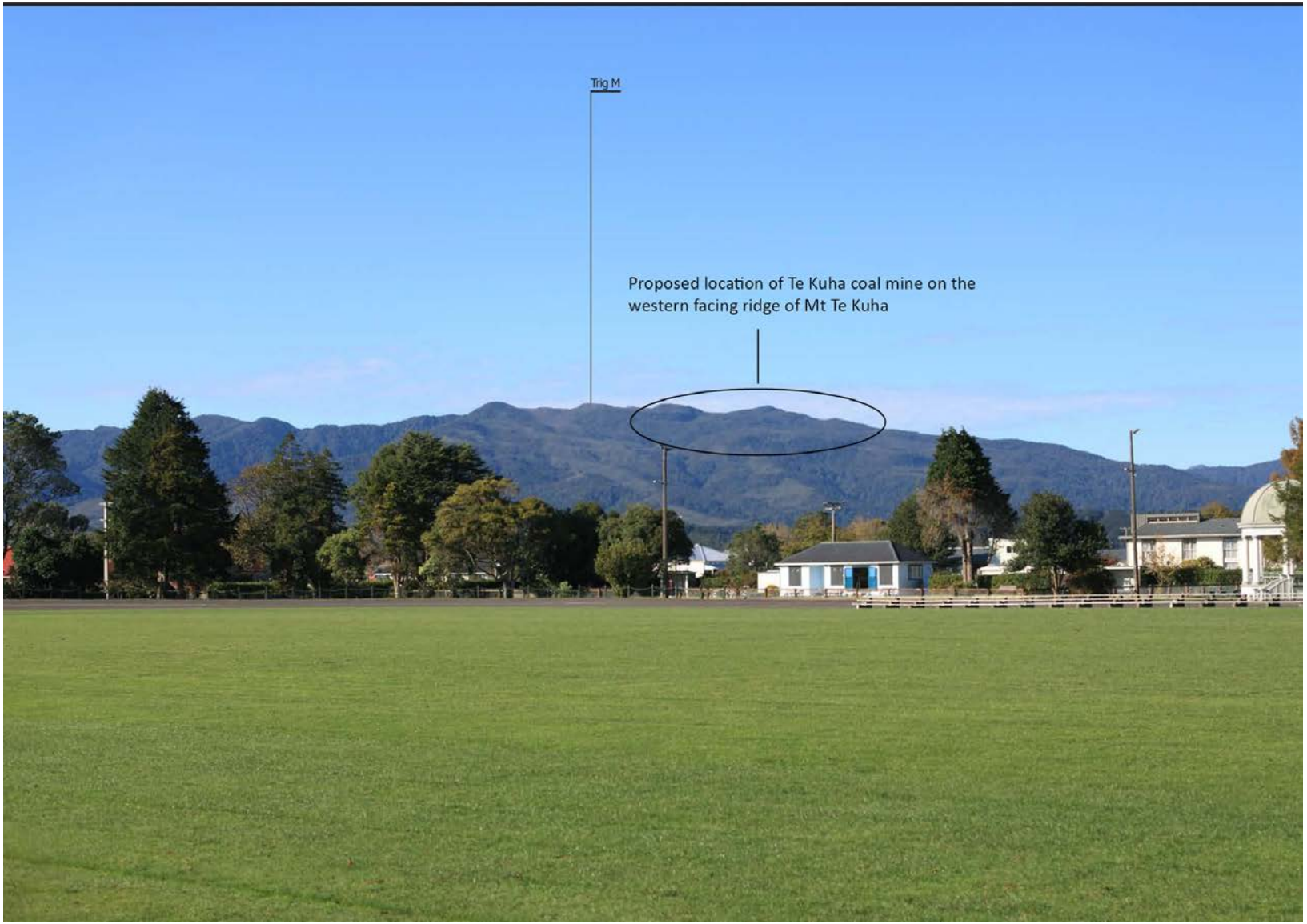

Figure 2: Location of the Te Kuha mine, as viewed from Victoria Square in Westport.

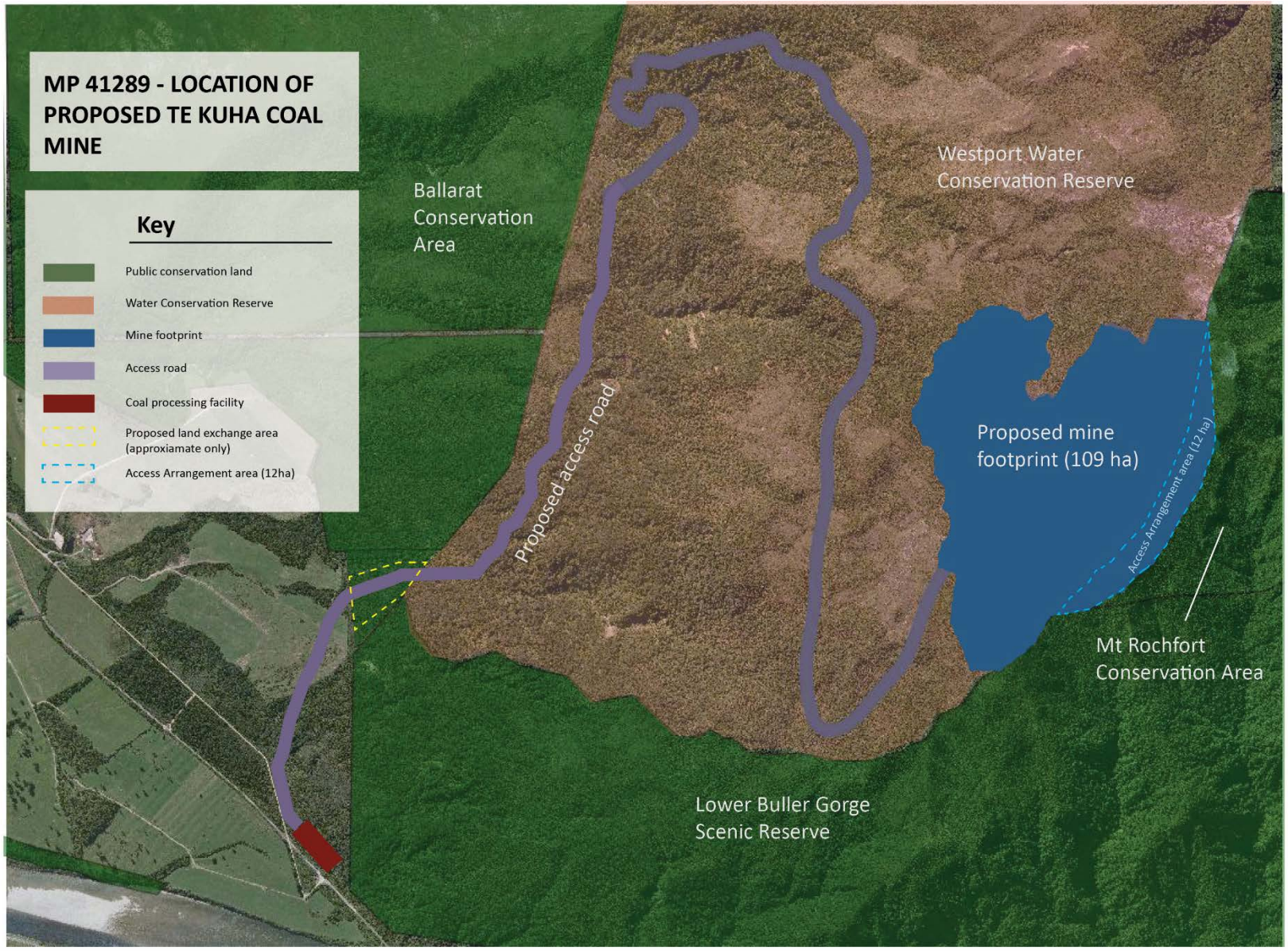

Figure 3: Location of Te Kuha Mine proposal and Access Arrangement area

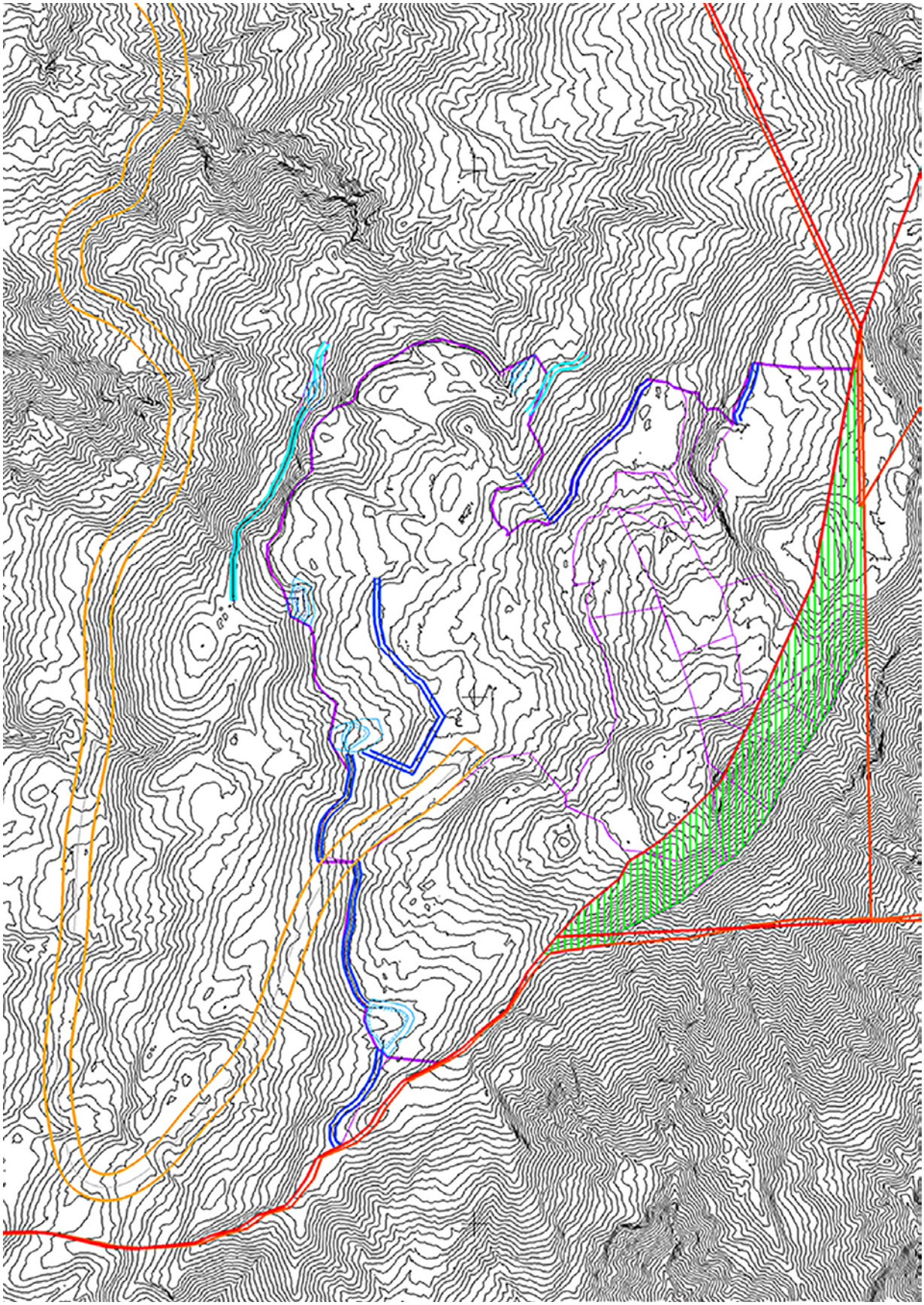

Figure 4: Topography and contours of the proposed footprint (purple) and AA area (shaded green)

4.0 Identifying relevant effects

16. As discussed above the 12 ha AA area is one geographical part of a larger proposal. However, given the MP and administrative land boundaries the 12 ha area must be considered under the appropriate statutory process, in this case an AA under the CMA. The current interpretation under the CMA is that only those effects stemming from the proposed activities on the land (in this case 12 ha), or occurring on adjacent PCL as a direct result of the activities are relevant to be considered in the decision making process for an AA. For this application only the effects of the activities proposed to be undertaken within the 12 ha AA area and effects occurring on adjacent PCL as a direct result of these activities are therefore relevant.

17. The AA application includes a large body of baseline and supplementary information relating to the overall mine proposal in order to provide appropriate context and ecological baseline data. In order to gain an overall understanding of the project and to be most efficient in terms of potential RMA and Conservation Act processes Department reviewers have looked at the project as a whole, rather than just the AA area or separately between the several distinct land tenure areas. It should be noted that delineating the 12 ha AA area from the overall mine footprint does pose some issues in terms of defining or 'ring fencing' the potential effects for the AA area itself.

18. In terms of the conservation values and potential effects on conservation values the delineation is not particularly difficult but does lead to some 'greying' of the detail. For example, exact specie population numbers were not extrapolated for the 12 ha AA area as the analysis would be more problematic than the benefits of having the data. Where appropriate however, correlations that are considered 'about right' have been included.

19. The apportionment of economic and social benefits is a little more difficult. A direct correlation of total mine footprint vs AA area footprint would conclude that the AA area would contribute an equivalent of 11% of the total economic benefits. However, this approach is not necessarily robust or accurate. For example, the extraction of the coal resource may be

hindered by more than 11% by excluding the AA area from pit designs as it may restrict pit depth and increase the amount of benching and stability works required, further minimising access to the coal resource. Moreover, it is possible that, should access to the 12 ha area be declined, the project would cease to be economically viable. In which case none of the economic benefits would be realised. It would also seem inappropriate to consider all of the economic benefits of the proposed 109ha mine for the purposes of the 12 ha AA area application, just as the adverse ecological effects for the whole project are not considered relevant.

20. The above issues should be noted when reading through the following sections. While they do 'muddy the waters' a little their importance for the decision on significance for the purpose of public notification is not considered high. They are potentially more of an issue for any final decision on the AA and may well require further clarification and/or calculation in the analysis for the final decision for access.

5.0 Conservation values of the Access Arrangement area

21. The following is a summary of conservation values and potential effects for the AA area and does not necessarily reflect the values of the larger proposal as a whole. There is a large body of detailed ecological information both in the application and generated by Department experts in their initial reviews of the proposal. A summary of this information is provided in Appendices 1 and 2 for reference and to provide context for the AA area discussion. However, it was not feasible nor appropriate to duplicate all the detail here. The following summary does however cover the key values, effects and issues as it relates to the 12 ha AA area. Where issues 'crossover' the administrative boundaries these are described as best as possible without drawing in irrelevant information (for the purposes of the decision on significance).

22. It should be noted that the initial application information and Department reviews were based on an 86 ha mine footprint and 10.4 ha AA area. Both of these figures have since been revised and increased based on initial Department feedback and critique. The increases are mainly

related to allowing adequate provision for water management infrastructure in and around the mine pits.

23. The up to date figures are a mine footprint of 109 ha and an AA area of 12 ha. While further analysis will be required (and is already underway) for the final analysis and decision on whether to grant access the slightly larger AA area is not considered to have any material bearing on whether the proposal is to be considered significant for the purposes of public notification.

Coal Measure habitat and Naturally Rare Ecosystems

24. A large proportion of the 12 ha of habitat within the AA area is elevated coal measure habitat recognised as nationally and internationally unique and for having very high ecological and conservation value. While the larger mine footprint contains both Paparoa and Brunner coal measures the coal measure habitat within the 12 ha AA area is primarily Brunner Coal Measure ecosystems. Brunner Coal Measure ecosystems are limited in extent, covering approximately 26,585 ha in total, 10,311 ha of which is located on the Stockton and Denniston Plateaux. Elevated Brunner Coal Measure habitat is even more restricted and is limited to the Ngakawau Ecological District. The Te Kuha site (including the AA area) is described as being one of two of the most intact remaining examples of this habitat type, the other area being Mt William. The AA area includes sections of exposed sandstone pavement and several bluffs, scarps and tors which are, in Department experts' opinions are Naturally Uncommon Ecosystems.

25. There is some disagreement whether the exposed sandstone at Te Kuha is in fact a Naturally Uncommon Ecosystem. RDL do not consider this habitat to be 'sandstone erosion pavement' (a Naturally Uncommon Ecosystem) due to its limited size and [too steep] slope angle. However, Department reviewers have debated this interpretation and suggest that at least some of it would qualify as sandstone erosion pavement and therefore qualify as a Naturally Uncommon Ecosystem.

Flora

26. Please refer to Appendix 1 for a full description of the flora values of the wider Mt Te Kuha site.

27. The 12 ha AA area is located at the top and along the ridgeline of Mt Te Kuha and forms part of the intact sequence of vegetation that runs from the lower slopes of Mt Te Kuha up to the ridgeline. The vegetation associations in the AA area primarily include manuka Dracophllyum rockland, manuka shrubland, yellow silver pine – manuka scrub and rimu hard beech forest vegetation types. Overall the unmodified and intact nature of the area means the flora values present are of high conservation value.

28. There is one Nationally Vulnerable (threatened with extinction) and two Naturally Uncommon (at risk of extinction) vascular plant species confirmed within the mine footprint. A further four are noted as possible/likely to be present. The application indicates that Te Kuha is also a significant site for [non-vascular] bryophytes and shows that a number of notable moss and liverwort species occur within the mining permit area, both inside and outside the proposed mine footprint. Five species are either Nationally Vulnerable (threatened with extinction) or Naturally Uncommon (at risk of extinction) and another nine species are notable for their taxonomic peculiarities. The site is also noted for the lack of any adventive bryophytes, acknowledged as an outstanding ecological feature in the application. A full list of Threatened/At Risk flora is shown in Table 1 below:

Table 1: At Risk/Threatened flora likely present within the AA area

Specie name	**Vascular/Non vascular**	**Threat ranking**	**Threat classification**
Confirmed			
Euphrasia wettsteiniana	Vascular	Threatened with Extinction	Nationally Vulnerable
Saccogynidium decurvum	Non-vascular	Threatened with Extinction	Nationally Vulnerable
Herzogianthus sanguineus	Non-vascular	At Risk of Extinction	Naturally uncommon
Riccardia multicorpora	Non-vascular	At Risk of Extinction	Naturally uncommon
Riccardia furtiva	Non-vascular	At Risk of Extinction	Naturally uncommon
Zoopsis bicruris	Non-vascular	At Risk of Extinction	Naturally uncommon
Dracophyllum densum	Vascular	At Risk of Extinction	In decline
Possible			

Peraxilla colensoi	Vascular	At Risk of Extinction	In decline
Carex carsei	Vascular	At Risk of Extinction	Naturally uncommon
Carex dallii	Vascular	At Risk of Extinction	Naturally uncommon
Calochilus paludosus	Vascular	At Risk of Extinction	Naturally uncommon

29. The information provided in the AA application and by Department experts suggests that the vegetation at Mt Te Kuha and within the AA area is ecologically significant, particularly the Brunner Coal Measure associations. The Department botanist working on the application, Dr Jane Marshall, noted that her own site visit reinforced the conclusion that the vegetation patterns reveal a complex set of influences, interactions and ecological gradients, and the resultant mosaic provides a diversity of habitats for locally, regionally and nationally important flora and fauna. Both the application and Dr Marshall emphasize the intact nature of the vegetation. Dr Marhsall makes specific comment that the Mt William and Mt Te Kuha areas are distinguished from all other parts of the Brunner Coal Measure systems because they are the only discrete parts of the systems that are intact with no notable disruption to ecological patterns and processes.

30. The significance of the vegetation at Te Kuha is also recognized by the Protected Natural Areas Programme ("PNAP") that was completed to recommended areas for protection ("RAPs") in order to protect the full range of natural heritage within the ecological district (refer Overmars *et al.* 1998). RAP 7 (of the Ngakawau Ecological District) includes the Te Kuha site and surrounds, covering 764 ha. Overmars et al. considered that RAP 7 was "of particular significance because of the absence of recent fire and the degree of intactness" as well as its location at the southern-most extreme of the coal plateau.

Fauna

31. Please refer to Appendix 1 for a full description of the fauna values of the wider Mt Te Kuha site. Fauna values within the AA area are considered to be largely contiguous with the larger mine site, except for those species restricted to tarn or pakihi habitats which are not present in the AA area.

32. Fauna values at the wider Te Kuha site are considered high due to the presence of At Risk/Threatened invertebrates, invertebrates of scientific interest, At Risk/Threatened lizard species (particularly West Coast Green Gecko) and several species of At Risk/Threatened birds. Threatened or At Risk birds likely to be resident within the AA area include Great spotted kiwi (Nationally Vulnerable), South Island fernbird (At Risk-Declining) and New Zealand pipit (At Risk-Declining). Lizards within the AA area include speckled skink *Oligosoma infrapunctatum* (At Risk Declining) and forest gecko *Mokopirirakau granulatus* (At Risk-Declining), West Coast green gecko *Naultinus tuberculatus* (Nationally Vulnerable) and [likely but unconfirmed] common gecko *Woodworthia maculata* and common skink Clade 4 *Oligosoma polychrome*.

33. A large number of invertebrates were surveyed at the Te Kuha site and within the AA area, including species noted as ecologically significant. The more prominent species include:

    - Species endemic to the northwest South Island, for example an unidentified stick insect in the genus *Micrarchus*.
    - A number of large-bodied flightless species, for example the Helm's stag beetle *Geodorcus helmsi*.
    - At Risk species, for example forest ringlet butterfly *Dodonidia helmsi*, At Risk-Relict.
    - Widespread but distinctive Main Divide upland species, for example the zig-zag moth.

34. Please refer to Appendix 1 for a further discussion and list of invertebrates for the wider Te Kuha site.

Aquatic

35. There are no notable streams or headwaters within the AA area itself as it is located toward the very top of the ridge. However there is likely to be small headwater flows that filter down into the lower catchment. None of the tarns within the mine footprint are located within the

AA area. Overall, the aquatic values in the area are limited. Koura, an indigenous fauna species, are likely present in the AA area but only in low numbers due to limited aquatic habitat.

Landscape

36. The AA area is prominent from a landscape perspective as it sits at the very top of the ridgeline that is part of a predominantly unbroken forest covered mountainous skyline that typifies and distinguishes the West Coast region and Buller District. The site is acknowledged as an integral component of this landscape and for having very high to pristine natural values and very high visual amenity values. Importantly, the AA area also forms part of the ridgeline that is visible from within the lower Buller Gorge. Overall the landscape values of the AA area are considered high, particularly as it relates to the lower Buller Gorge that is considered to have Outstanding Natural Landscape values. Note however that the BDC has not yet completed its Outstanding Natural Landscape process and the gorge is not formally recognized as an Outstanding Natural Landscape under the Buller District Plan at this time. See Appendix 1 for further discussion of landscape values at the wider Te Kuha site.

Historic

37. No historic sites or values were identified in the application. Likewise local Buller Department staff were unaware of any historic features or sites within the wider mine proposal site or AA area. Unlike the Stockton and Denniston Plateaux the Mt Te Kuha area has not been subject to previous mining nor any notable anthropogenic activity.

Cultural

38. No sites/values relating to Maori culture, traditions, ancestral lands, water, waahi tapu or taonga have been identified in the AA area by the applicant or by local Department staff. However, the surrounding water resource and creeks may be of interest to local iwi Te Rünanga o Ngäti Waewae (Ngäti Waewae) with impacts on water quality a potential concern if not effectively mitigated.

6.0 Mitigation measures and potential effects

39. RDL are proposing a range of mitigation and rehabilitation measures to help minimise the potential effects of the overall mine proposal. Mitigation and rehabilitation for the wider mine proposal are discussed in detail in Appendix 2 and would be applied within the AA area where relevant. The reader is encouraged to refer to the information in Appendix 2 as context for the below summary and conclusions made in section 8 of this report.

40. Described simply, RDL's mitigation and rehabilitation approach is to minimise the footprint of the mine, directly transfer high value ecosystems where possible, actively manage the surrounding habitat to ensure genetic resources for recolonization (i.e. maintain or improve current populations of flora and fauna) and recreate conditions on the engineered landform that, post-mining and into the future, would promote the re-establishment of vegetation and habitat as close to that existing pre-disturbance.

41. Some of the Brunner Coal Measure habitat within the AA area could be directly transferred as part of rehabilitation effort which would reduce the impact of mining in the area. However, a majority of the vegetation within the AA Area would be cleared and stockpiled alongside weed free topsoils. The sections of exposed sandstone pavement, bluffs, scarps and tors are likely to be permanently lost and/or altered by the proposed mining even after rehabilitation efforts. The final landform in the AA area is planned to be slightly higher than the existing ridge and would exhibit a more homogenous topography lacking the assortment of rocky bluffs and tors currently present that would in turn result in a corresponding reduction in species and habitat diversity.

42. With regard to the loss of sandstone pavement RDL have noted that while the Department considers the permanent loss of sandstone pavement a notable adverse effect they do not feel it is a major issue because the loss would be only 27% (4.3ha of 15.7ha) of the total present within the local coal measures.

43. The long term outcomes for the AA area are likely to be consistent with the conclusions noted in Appendix 2 for the larger mine site, i.e. that it would be ecologically different, likely demonstrating an altered mosaic of vegetation associations. The rehabilitated habitat would lack natural complexity and a full cover of native species for many decades. According to Department ecologists it would likely take many centuries to establish a similar age profile in vegetation as that present today. The likelihood of weed incursion and an increase in invasive introduced species is essentially unavoidable. The reduction of intactness is of particular concern to Department reviewers, especially as the site is one the last remaining discrete areas of unmodified Brunner Coal Measure Ecosystems.

44. RDL have noted that Government is exploring avenues to secure permanent protection of areas of coal measures habitat in and around the Denniston and Stockton Plateau with various stakeholders (commonly referred to as "the plateau strategy"). If implemented any such protection would allow a more definitive assessment of what effect any further loss of the habitat type would have on its ongoing ecological viability. However, at this point in time there has been no formal agreement or announcement on a mechanism to achieve permanent protection so the Department can only base its opinions on the current context, that being that large areas of coal measure habitat are within existing mining permits, outside of Schedule 4 land, and therefore open to further mining and/or other land uses proposals and the potential further disturbance and/or destruction.

45. The proposed mining activities would result in a notable area of Brunner Coal Measure habitat being lost from the AA area, along with seepages, bluffs and tors located there. Brunner Coal Measure habitat supports a range of distinctive vegetation associations and also provides habitat for lizards and invertebrates of ecological and conservation significance. While areas of coal measures on Mt Te Kuha would remain undisturbed by the proposal the potential loss within the AA area is still considered by Department experts to be a notable loss of conservation value.

46. While the larger mine proposal would have some notable potential effects, the proposed activities within the AA area should not have a significant impact on aquatic values. They

would however have a small contribution to the dewatering of the downstream catchments and associated effects on aquatic habitat and fauna. The risks around Acid Mine Drainage (AMD) are not considered to be high at the Te Kuha site due to the geochemistry of the coal and overburden. As for any open cast mine the potential for erosion, sedimentation and other water management issues exists and would need to be carefully managed. However, within the AA area itself there are few watercourses and water related issues directly related to the AA area should be relatively small.

47. The potential impacts on landscape values are considered to be high throughout the course of mining, and potentially several decades afterwards until a full vegetative cover is re-established. Of particular note is the potential to impact upon views from the lower Buller Gorge. Landscape impacts would be greatest during the construction and operation of the mine, particularly while the pits are open and visible. Impacts would then lessen over time as the site rehabilitated and vegetation became re-established. The final landform would slightly raise the Te Kuha ridgeline and create a more homogenous vista compared to that present today.

48. No notable impacts on historic values have been identified.

7.0 Treaty of Waitangi considerations

49. All persons exercising functions and powers under the Crown Minerals Act, including under s 61C, are required to have regard to the principles of the Treaty of Waitangi. Any sites/values relating to Maori culture, traditions, ancestral lands, water, waahi tapu or taonga should therefore be acknowledged accordingly. No sites/values relating to Maori culture, traditions, ancestral lands, water, waahi tapu or taonga have been identified in the application or by local Department staff. However, the water resource and creeks may be of interest to local iwi Te Rünanga o Ngäti Waewae (Ngäti Waewae) with the potential to affect water quality a potential concern if not effectively mitigated. The Department has provided Ngäti Waewae with copies of the application and this report and encouraged them to provide input and comments for the

final analysis and assessments for the decision on access. They also, should they wish to, have the opportunity to submit in the public notification process should the application be notified. RDL have been in contact with Ngäti Waewae representatives and have indicated they will continue this consultation process in the first quarter of 2016.

8.0 Relevant matters under section 61C(2)

50. The relevant matters to have regard to when considering if an application is significant for the purposes of s 61C(2) are:

(a) the effects the activities are likely to have on conservation values for the land concerned; and
(b) the effects the activities are likely to have on other activities on the land; and
(c) the activities' net impact on the land, either while the activities are taking place or after their completion; and
(d) any other matters that the Minister considers relevant to achieving the purpose of this Act.

51. These considerations are discussed in turn below with regard to the AA application for MP 41289.

(a) the effects the activities are likely to have on conservation values for the land concerned

52. The effects of the proposed activities are likely to have on the conservation values of the land concerned (the 12 ha AA area) are:

- Clearance/destruction of exposed sandstone pavement, seepages, bluffs, scarps and tors within the AA area;

- Clearance of a majority of the Brunner Coal Measure ecosystems within the AA area;
- Excavation and disturbance of a majority of soils within the AA area;
- Create an anthropogenic disturbance on the Te Kuha ridgeline that would be visible from several viewpoints in and around Westport and from within the lower Buller Gorge during the course of mining;
- Remove/destroy all aquatic habitat in the AA area during the course of mining; and
- Form part of an overall mine site that has the potential to increase sedimentation and affect water quality if not adequately managed.

(b) the effects the activities are likely to have on other activities on the land

53. The proposal is unlikely to have any notable impact on other activities of the land as it is largely inaccessible except by helicopter and there is no noted or visible signs of recreational use.

(c) the activities' net impact on the land, either while the activities are taking place or after their completion

54. The net impact of the proposed activities on the land after all proposed mitigation has been undertaken are likely to be:

- A permanent loss of exposed sandstone pavement, seepages, bluffs, scarps and tors within the AA area;
- An overall reduction in elevated Brunner Coal Measure ecosystems within the AA area, including a loss of intactness;
- Contribute to an overall reduction of Brunner Coal Measures Ecosystems and further erode the opportunity to adequately protect a representative sample of the habitat type for biodiversity conservation purposes;

- Permanently alter the structural sequence and hydrology of soils in affected areas resulting in a fragmentation of existing natural ecological processes and long term changes to vegetation;
- Create a anthropogenic disturbance on the Te Kuha ridgeline that would be visible from several viewpoints in and around Westport and from within the lower Buller Gorge during the course of mining and potentially several decades after; and
- Have a small contribution to the dewatering of the downstream catchments and associated effects on aquatic habitat and fauna;

(d) any other matters that the Minister considers relevant to achieving the purpose of this Act

Appropriate matters to consider under s 61C(2)(d)

55. While "any other matters" is a relatively broad term it is important that any matters taken into consideration are relevant to the purpose of the Act. Matters not relevant to the purpose of the Act should not be considered. In this case there is one matter related to the purpose of the Act that is considered to be an appropriate "other matter"; economic and social benefits.

Economic and social benefits

56. RDL provided an assessment of potential economic benefits in support of the application in late 2014. The assessment and Department's review of the assessment were based on coal prices and forecasts (2014 data) that are now out of date. The Department's review of the economic information in 2014 indicated that, at the time, the mine was financially viable and could deliver the economic benefits suggested, but that it was a reasonably tight margin and the mine would be sensitive to fluctuations in coal prices going forward.

57. It was not considered sensible or appropriate to re-assess the economic benefits of the proposal specifically for the purposes of public notification (i.e. in late 2015) because the timeframes

required to conclude the notification process would have once more made any further assessment out of date. The 2014 assessments do provide a baseline from which further assessments can be compared and have been included in this report for reference and context. A revised assessment will need to be made as part of the final analysis and assessments for the decision on access, likely in the second quarter of 2016 but dependent on application processing timeframes going forward.

58. The late 2014 assessment resulted in the following summary and conclusions:

> Over the 16 year operating life of mine, and based on the coking coal price forecasts, the proposal as a whole would likely generate the following economic and social benefits:
>
> - For the Buller District, annual direct impacts would be $20 million, 64 full-time equivalent employees (FTE) and $4.4 million of wages. Indirect impacts would increase these figures by $12.3 million, to 82 FTE and $6.5 million respectively
> - For the West Coast Region the annual impacts would be $18.9 million, 90 FTE and $6.7 million in wages.
> - During the construction and rehabilitation phases there would be economic impacts corresponding to the activities taking place. A 12 month construction period employing 64 FTE on a $4.2 million payroll. Construction costs of $40 million. At the conclusion of the operation there would be a land rehabilitation lasting 1 to 2 years employing 6 FTE.
> - Additionally, the Buller District Council and the Crown would receive access/compensation payments for those parts of the mine within the WWCR and Mt Rochfort Conservation Area.
> - The project would pay appropriately $8 million of royalties to the Crown

59. The projected benefits, particularly the large number of FTEs, would be undoubtedly significant for the Buller District and West Coast Region, particularly given the current

downturn in employment and economic activity due to the downsizing of the Stockton Mine, phasing out of the Holcim cement works, slow start up of the Escarpment Mine and reduced mining activity in the Grey District. RDL have made it clear to the Department that they would encourage a locally based staff pool rather than a 'fly in, fly out' situation in order to generate the most sustained benefit for the Westport and Buller communities. Likewise they have noted that the mine schedule (five days per week/daytime only schedules) is not necessarily the fastest extraction possible but designed for sustained employment over a longer period. The project would also provide notable royalties to the Crown over the course of the mine.

60. RDL have also noted that since the initial reviews in 2014 they have undertaken further analysis of the coal at Te Kuha and found that the resource is of an even higher quality than previously thought. According to RDL the coal has more valuable applications than just for steel making (i.e. as coking coal) and could be used for specialist uses such as activated carbon, for which RDL is looking at the possibility of establishing an activated carbon plant in Westport. If this was to be the case it would likely add to the potential economic benefits of the project, particularly for the Buller District. However, a revised economic analysis will need to be completed prior to the final assessments and decision on access to clarify the potential economic and social effects.

61. As discussed earlier in this report attributing the proportion of economic benefit to the 12 ha AA area is a little troublesome. A direct correlation based on hectare proportion would result in the AA area being apportioned approximately 11% of these benefits.

62. However, these figures are likely too simplistic. What is clear is that the AA area is an integral part of the mine plan and as such is important for the project's ability to deliver the potential economic benefits, which based on the 2014 data, are of undoubted local and regional significance. It is also possible that without the 12 ha AA area the project would cease to be viable, in which case none of the economic benefits would be realised.

9.0 Summary and Conclusions

63. Based on the review of the application by the author and various Department experts the following key conclusions have been made:

    1. The proposal, based on 2014 data, would have notable economic and social benefits for the Buller District and West Coast Region over the planned 16 year mine life. However, the contribution of the 12 ha AA area to this overall benefit is difficult to define;
    2. The proposal would have a notable adverse effect on the unique coal measure ecosystems found within the AA area. The loss of this habitat would be ecologically significant and further reduce the opportunity to adequately protect a representative sample of the habitat types for biodiversity conservation purposes;
    3. There would be a permanent loss of exposed sandstone pavement, seepages, bluffs, scarps and tors from within the AA area and a permanent alteration of the sequence and hydrology of soils in affected areas resulting in a fragmentation of existing natural ecological processes and long term changes to vegetation; and
    4. The proposal would have a significant adverse effect on the landscape values of the site, particularly relating to the lower Buller Gorge.

64. Given the above it is evident the proposal has the potential to have significant adverse effects on the conservation values of the land, including some values that are nationally significant. It is therefore appropriate and recommended that the application is considered significant under s61C(2) of the Act and subject to public notification subject to section 49 of the Conservation Act.

Decision

1. The application is considered significant under the relevant matters set out in section 61C(2) of the CMA 1991 and will be subject to public notification subject to section 49 of the Conservation Act:

Yes / No

Decision maker comments:

Signed: J Brennan Date: 18 December 2015

Judi Brennan – SLM and Permissions Manager
Hokitika Shared Service Centre

APPENDIX 1: Summary assessment of the existing environment and ecological values for the Te Kuha mine proposal site.

Notes:

1. Department reviewers have taken the approach of reviewing the initial Te Kuha mine proposal information as a whole in order to gain an overall understanding of the conservation values and potential effects. The goal of this approach is to establish a broad understanding of the proposal so that, if required, the Department can effectively contribute to any of the several potential statutory processes that could eventuate for the proposal. Therefore the commentary and assessments below are based on the proposal as a whole, not just for the smaller AA Area, and are provided as reference and background material for the AA application assessment.
2. The initial reviews and summary below were based on a proposed mine of 86 hectares. The mine plan has since been revised to include provision for further water management infrastructure. The revised footprint has increased to 109 hectares. While the core values, species and ecological context remain the same some of the habitat, species and population estimates in the below text will be out of date and will be reviewed prior to the final analysis and report for the decision on access. They do still however help 'paint a picture' of the ecological context and potential effects of the proposal.
3. The initial AA area was 10.4 ha but this has been revised up to 12 ha based on the latest mine plan. The initial proposal had 1.59km (approximately 3.84 ha footprint) of the access road located within Ballarat Conservation Area. The route has since been revised to minimise the intrusion on public conservation land. Approximately 600m of the revised route still lies over the Ballarat Conservation Area and is the subject of a proposed land exchange.

EXISTING ENVIRONMENT AND ECOLOGICAL VALUES

Soils and geology

1. The RDL application provides the following description on the soils and geology of the Te Kuha area:

> "**2.2. Soils**
>
> On the Coastal Hillslopes, soils are primarily podzols that have formed on the sandstones of the Brunner Coal Measures and are very infertile, acidic and tend to be extremely poorly drained.
>
> At high altitudes, the soils become skeletal and, in many places, unweathered parent rock is exposed on the surface. At the Te Kuha Coal Project site, outcrops of bare sandstone rock are evident along the ridge crest and also on northwest-facing slopes below the ridge. Generally, the ground is very rocky and broken with large sandstone boulders present. The dominant soils found in the Ngakawau Ecological District comprise Eocene quartz sandstone, grit and conglomerate with coal seams."

2. And;

> **2.3. Geology**
> Coal occurs in both Paparoa and Brunner Coal measures at Te Kuha. Paparoa Coal Measures have not previously been identified north of the Buller River, so their discovery at Te Kuha is geologically interesting. Brunner Coal Measures are the same sequence of rocks that host coal on the Denniston and Stockton Plateaus north of Te Kuha. Paparoa Coal Measures are Late Cretaceous (>66Ma) age and were deposited in lacustrine or river valley environments. Commonly Paparoa Coal Measures are uncomfortably overlain by Brunner Coal Measures (as at Te Kuha). Brunner Coal Measures are Eocene (~30-50Ma) age and were deposited in an estuarine environment.
>
> These different sets of coal bearing rocks have different coal quality parameters and different environmental implications when disturbed by mining. The coal quality differences relate to ash content, sulphur content and the coke making properties of the coal, both types of coal have properties that make them high value commodities."
>
> BTW, 2014, pp 14-15

3. A key feature of the geology at Te Kuha are the areas of exposed sandstone on the higher slopes, including parts of the proposed mine footprint. The RDL application does not consider this habitat to be 'sandstone erosion pavement', a naturally uncommon ecosystem, due to its limited size and [too steep] slope angle. However, Department reviewers have debated this interpretation and suggest that at least some of it would qualify as sandstone erosion pavement according to the Landcare Research type description:

> "Erosion pavements are areas of flat to gentle slope that have been bared of any topsoil formed through chemical weathering, often from erosion of the topsoil or peat. They mostly have very little sand or gravel (as distinct from gravel fields or sand plains) and depending on the rock type, and they may or may not have large cracks and fissures that do not support gravel or colluvium. Ponding of rainwater may result in seepage areas supporting montane and subalpine bog species. Erosion pavements occur on ridges, mountain tops and plateaus rather than on tors or rock stacks. They do not include coastal turfs, even where these occur on coastal erosion pavements. Erosion pavements range in size from small inter-tussock spaces to patches many metres across. Plants are found almost exclusively in the cracks and range from herbs such as *Celmisia dubia* and *Pentachondra pumila*, grasses such as carpet grass (*Chionochloa australis*) to low shrubs, often of manuka (*Leptospermum scoparium*) or *Dracophyllum* spp. Examples of this system have previously been described as *Chionochloa australis* rockland (Nicol 2008)."

Source: http://www.landcareresearch.co.nz/publications/factsheets/rare-ecosystems/inland-and-alpine/sandstone-erosion-pavements

4. Department experts note that a small size of exposed pavement does not disqualify it, and the slope angles vary greatly throughout the Te Kuha site meaning that at least some of habitat would be flat-gentle and within a disqualifying slope threshold. Unless further discussion resolves this differing interpretation it seems prudently precautionary to assume that at least some of the exposed sandstone would qualify as 'sandstone erosion pavement' and therefore as a Naturally Uncommon Ecosystem.

5. The RDL application provides the hydrogeology and climate of the Te Kuha area:

> **"2.4. Existing Hydrogeology**
> **2.4.1 Surface Water**
> The two main water courses within the mining area are Coal and West Creeks as well as a tarn located North West of the mining site and several small tarn located within the mine site. Four streams or tributaries drain off the top of the ridge down to the northwest. The northern most stream is Coal Creek. The two streams immediately south of Coal Creek join with each other and with a smaller stream at the bottom of the ridge to form a tributary of Coal Creek. The fourth stream on the ridge line, West Creek, flows in a predominantly westerly direction off the ridge to join Coal Creek downstream of the other tributaries. Coal Creek then flows to join the Buller River. In addition to the streams, there is a small ephemeral tarn near the top of the ridge that has no surface outlet.
>
> Each tributary displays patterns of increased flow rate further downstream which is likely due to the additional runoff collected and groundwater inputs. The large tarn within the permit area would be excluded from any mining activity. It is located west of the proposed mining areas and has a 100m radius exclusion zone around its perimeter. Other streams drain off the ridgeline to the south, east and north. However, because the proposed mining activities will be limited to the northwest, these streams are unlikely to be affected so were not subject to sampling undertaken in 2013. The streams within the proposed mine site are small, clean and weakly acidic streams. The streams are largely unmodified. However, due to the acidic nature of the aquatic environment, instream fauna is relatively limited in terms of species diversity but abundant in terms of species counts.
>
> A water sampling programme was undertaken between 11 – 13 March 2013 across the water courses that are in, or close to, the permit area. The streams included hilltop sites which are characterised by full or partial shade environments with gradients rising from flat mountain tops down to the terraces at the bottom of the mountain and streams at lower altitudes (below 200m a.s.l) which are characterised by gentler gradients, with pool, riffle and run habitats common. When sampling was undertaken in these streams, they were either dry or in very

low flow condition due to a prolonged period without rain and appeared to support macro invertebrate populations only. The sampling results observed are therefore not likely to be fully reflective of typical stream habitats within the area.

There is currently a programme of monthly sampling at the lowland stream sites and continuous monitoring of physio-chemistry at one of the low land sites.
Macro invertebrate sampling was undertaken at thirteen sites during the programme which characterised the natural community of aquatic invertebrates and indications of environmental quality as ranging from good to pristine. Eleven fish species were either captured or observed across the thirteen sites but sampling was varied, with no fish species found in the upper mountain sites, likely a result of steeper instream gradients making fish passage difficult. All identified species were found in the lower stream sites. Both types of sampling streams had juveniles present and the fish at the lower altitude sites were diadromous (migratory) species.

The Coal Creek site along the haul road route exhibited some of the lowest indicator scores and there was a discernible difference between the lower altitude sampling sites and the upper mountain sampling sites. At the small tarn site within the permit area, there was a reasonably abundant population of Koura.

Surface water quality was also sampled and, in general, upstream locations typically exhibited lower pH water compared to downstream locations. The increase in pH downstream may be due to dissolution of carbonate minerals present in the lithologies underlying the coal seam measures. Because the upstream locations drain coal seam measures, which contain sulphides, this contributes to acidic drainage and hence higher pH in the downstream sampling points. In support of this likelihood, calcium concentrations in the water increased as sampling sites moved downstream which is evidenced in the CRL report appended as Attachment B (Table 1 from CRL report, pg 8). In general, net acidity in the headwaters of the streams is neutralised resulting in net alkalinity downstream.

The sampling programmes enable establishment of a baseline water quality framework against which the monitoring and mitigation conditions of both the regional council and district council consents can be measured during and post mining activities.

2.4.2 Groundwater

The data collected to date suggests that there are two groundwater systems in the study area. The first is a discontinuous, perched, rainfall-driven, shallow system and the second is also rainfall-driven but is a deeper, more extensive system.

The deep groundwater system is estimated to be between 30 and 80 metres below the land surface with a directional groundwater flow to the northwest. Groundwater intersects surface water at approximately the 600 m contour coinciding generally with the location of streams evident on the topographical map of the area. This suggests that groundwater may discharge to the surface at around this elevation.

Within the deep groundwater system, primary permeability through the strata is less than secondary permeability through fractures in the rocks. The hydraulic connectivity is

estimated to be between 0.21 and 3.48 m/d, based on recovery rate tests from a single borehole. The groundwater system has natural rainfall recharge.

The shallow groundwater system appears to have a discontinuous surface for an ephemeral perched groundwater system resulting from the fracture bound expanses of sandstone and areas associated with mass movements. These mass movements of slumps have created depressions which occasionally retain precipitation, such as the tarn and surface water bore hole. This groundwater system is rain-fed although is likely to have water storage in the humic soil layer, or sediments close to the surface, that sustains flow between rainfall events.

2.5. Climate

The Coastal Hillslopes within the Ngakawau Ecological District lie in an area characterised by a steeply rising rainfall gradient as one moves away from the coast. Rainfall at the Te Kuha Coal Project site averages between 3,500 mm and 4,000 mm per year.
For more than half the time rain is falling, it is generally of low intensity and manifests as long periods of mist and drizzle. Dry periods are relatively uncommon and, in general, wind speeds are low, with infrequent, high velocity gusts.

Westport, despite anecdotal evidence, has one of the mildest climates in New Zealand. The Westport region has a high annual quota of sunshine hours and, with the effect of the prevailing westerly winds coming from the Tasman Ocean, generally high rainfall. Typically, summer temperatures reach average highs of 20˚C and average lows of 12˚C, with winter temperatures ranging between 5˚ and 15˚ C. Annually, Westport receives about 2,200 mm of rain (according to NIWA Climate Data).This is evident through rainfall records at the Westport airport between 1961 and 2010 that give a mean annual rainfall of 2,158 mm and an average monthly rainfall of 183 mm. The longest period without rain at Westport airport is recorded as 14 days.

The nearest meteorological station is located at the Westport airport, approximately 12 km northwest of the proposed mine site. The airport is located near the coast, west of Westport town, adjoining Carters Beach Township. It is climatically different to the mine site which is located inland on the Papahau Range.

NIWA provides climate data on the Water Resources Database for virtual weather stations. The annual rainfall calculated for the closest virtual station to the mine (Agent number 18934) between 1 January 1972 and 8 March 2013 was 2,500 mm. The virtual station is located at an elevation approximately 450 m a.s.l and 2.5 km to the southwest of the proposed mining area.

CRL Energy Ltd (CRL) has been employed to operate a meteorological station on the elevated terrain in the vicinity of the proposed coal mine since 1 January 2013. The station is located at an elevation of 460 m.a.s.l on a small ridge in an area that is free of tall vegetation and relatively clear of topographical influences. This station will record windspeed and direction as well as rainfall and will provide baseline climatic data for the mine site."

BTW, 2014, pp 16-19

Note: The revised mine plan information provided by RDL now includes the removal and reconstruction/relocation of the Tarn within the footprint prior to mining operations starting.

Brunner Coal Measure Ecosystems

6. The habitats on the higher parts of Mt Te Kuha are part of the Brunner Coal Measure Ecosystems, recognized for their unique characteristics and as having high ecological and conservation value. The ecosystems are limited in extent, covering approximately 26,585 ha in total, 10,311 ha of which is located on the Stockton and Denniston Plateaux.

7. The application provides the following summary/description of coal measures vegetation:

> The Ngakawau Ecological District includes the distinctive coal-measures vegetation and exposed sandstone pavement which characterise the Stockton and Denniston Plateaux as well as large areas of pakihi, shrubland and forest and much smaller areas of tussockland, herbfield, boulderfield and wetland. The term "coal measures" refers to geological sediments laid down in a depositional environment in which coal can form (Overmars *et al.* 1998). Coal measures may, or may not, contain coal.
>
> There are three coal measure formations on the West Coast: Paparoa Coal Measures (present in the Greymouth coalfield), Brunner Coal Measures (at Stockton and Denniston) and Rotokohu Coal Measures (near Reefton). Coal measures parent material develops naturally acidic and infertile soils.
>
> The approximate extent of Brunner Coal Measures near Te Kuha is shown in Figure 4. The Brunner coal measures shown in Figure 3 were retrieved as a GIS map layer from the QMAP series of geological maps produced by GNS Science available at http://www.gnx.cri.nz/static/datadict/

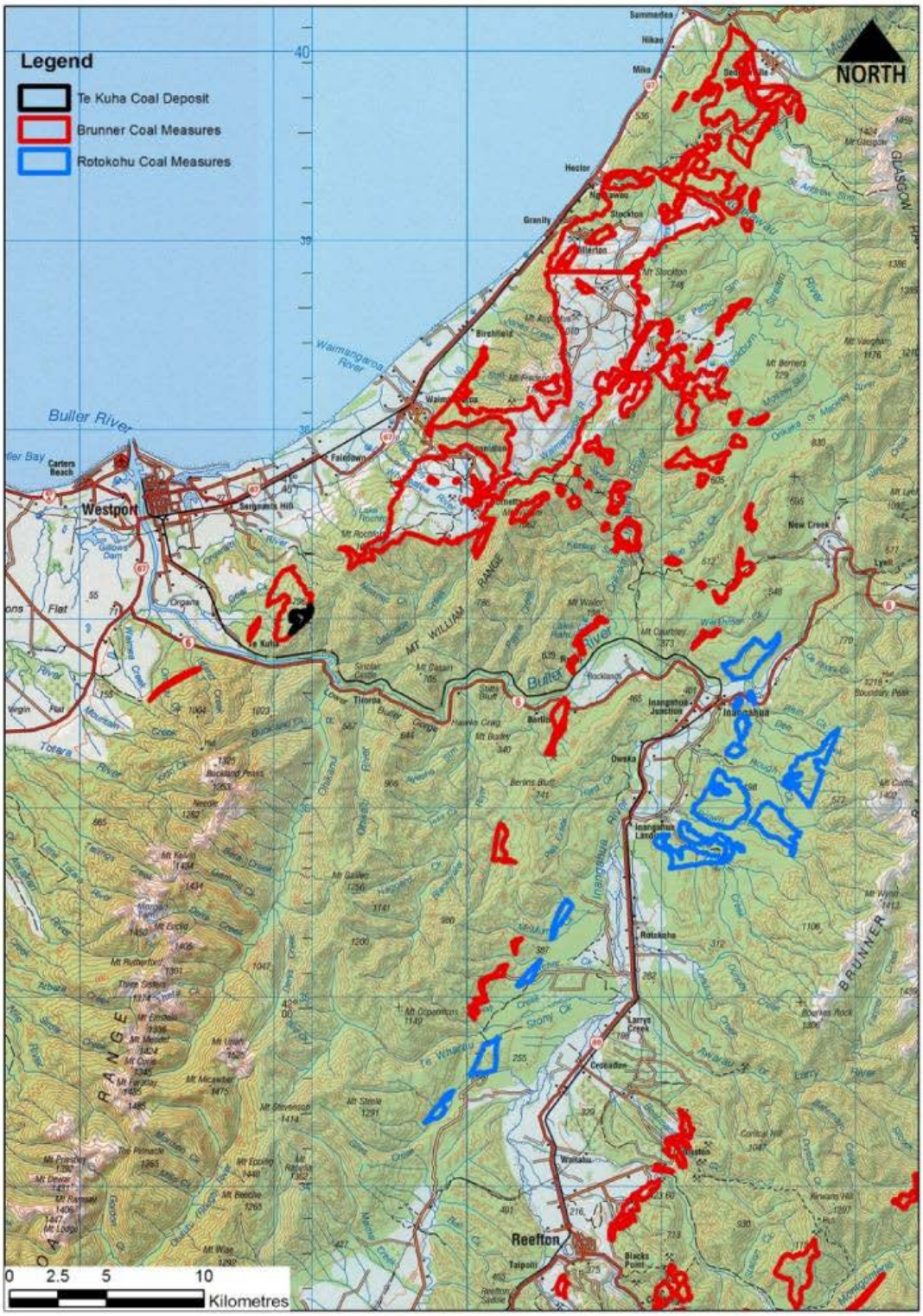

Figure 4: Location of Coal Measures Geology near Westport.

> Brunner Coal Measures occupies an area of 26,585 ha on the northern West Coast of the South Island between Golden Bay and Ross and extending as far east as the Gordon Range (north of St Arnaud). The largest concentration of Brunner Coal Measures occurs on the Stockton and Denniston Plateaux, where the acidic geology combines with poor drainage in a cool, wet, and windy environment to create distinctive vegetation communities and exposed gently sloping rock pavements. Brunner Coal Measures cover around 10,311 ha at Stockton and Denniston where the most extensive vegetation communities on the exposed gently sloping rock pavements are dominated by prostrate shrub and tussock communities. Forests and shrublands comprising species adapted to infertile environments develop in more sheltered locations, or those with deeper soils, such as hill slopes and deeply incised gorges. Coal measures at Te Kuha comprise 490 ha in two discrete patches. The larger patch (471 ha) includes around 77.4 ha which would be affected by the current proposal. The coal measures vegetation present at Te Kuha includes low growing shrublands
> and forest."
>
> (BTW, 2014, Appendix C, pp 10-11)

8. The coal measure ecosystems at Te Kuha total 490 ha, 77.4 ha of which would be within the mine footprint (BTW, 2014). Marshall (2015) suggests that the coal measure habitat on Mt Te Kuha are part of the even more limited 'elevated Brunner Coal Measure Ecosystems', i.e. those that occur at or above 600 m a.s.l and subsequently exhibit distinctive characteristics. Elevated Brunner Coal Measure Ecosystems occur only within the Ngakawau Ecological District and are considered internationally unique. Marshall (2015) also notes that the elevated Brunner Coal Measure habitats at Te Kuha should be afforded particular significance because they, along with those located at Mt William, are the only discrete parts of the system that are intact with no significant disruption to ecological patterns and processes and they represent the best example of coastal hillslope forest remaining on elevated Brunner coal measures. Likewise they are the only two areas currently not subject to ongoing disturbance and fragmentation through current coal mining or consented for future coal mining (Marshall, 2015).

9. On request by the Department RDL commissioned further geochemical assessments of the Te Kuha site over the course of 2015 to help better understand the characteristics of the coal and overburden, particularly in light of the potential to produce acid and acid

drainage. As a result of these assessments RDL have found that there are large areas of the site that are actually Paparoa coal measures, rather than Brunner coal measures. Less is known of the ecological characteristics and conservation values of Paparoa coal measure habitat and further investigation will be required into the ecological and conservation values attached to them going forward. What is evident is that they are even more restricted in extent than the Brunner coal measures and that the Te Kuha site may be the most northerly occurrence of their type.

Naturally Uncommon Ecosystems

10. Marshall (2015) notes that there are four naturally uncommon ecosystems within the proposed footprint; pakihi, seepages, cushion bog and cliffs and tors. As noted above, there is some disagreement as to whether the exposed sandstone along the higher areas of Mt Te Kuha classify as a Naturally Uncommon Ecosystem type (erosion sandstone pavement). However, unless further discussion resolves this differing interpretation it seems prudently precautionary to assume that some of the exposed sandstone would qualify making a total of five.

Flora of Te Kuha

11. The application identifies ten vegetation associations present between Waterworks Road and the slopes above the lower Buller River (i.e. the wider Te Kuha area), eight of which are within the proposed footprint of the mine and access road. These ten types are listed below and their extent shown in the vegetation map (Figure 6).

    1. Mountain beech/yellow silver pine - pink forest
    2. Yellow silver pine – manuka shrubland
    3. Manuka shrubland
    4. Herbfield
    5. Manuka – *Dracophyllum* rockland
    6. Rimu/hard beech forest
    7. Rimu - red beech – silver beech forest
    8. Pakihi

9. Regenerating shrubland
10. Pasture

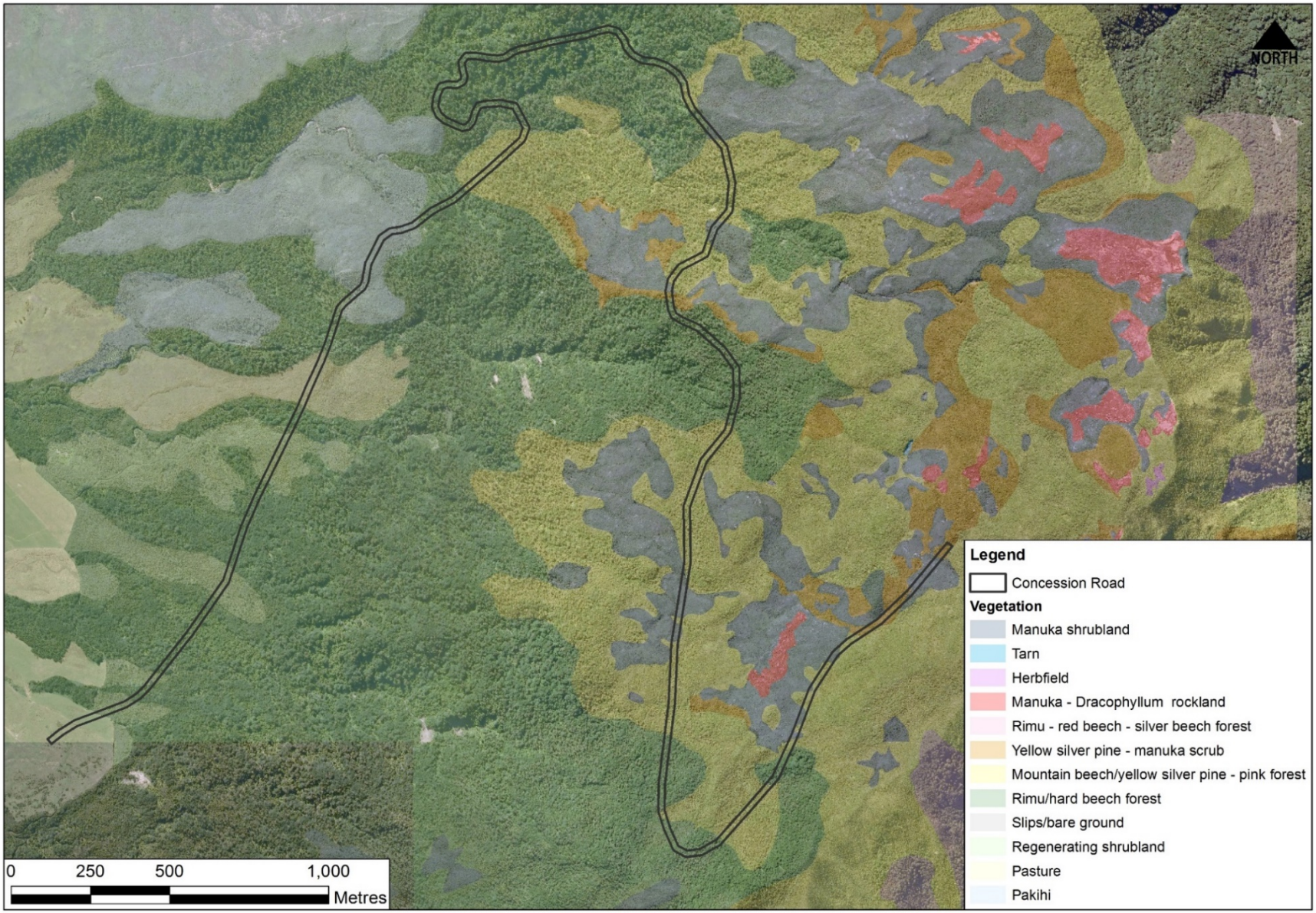

Figure 6: Vegetation map for the Te Kuha area

12. Descriptions of six the associations are provided in BTW (2014, Appendix C, pp. 27 – 42). Department reviewer, Dr Jane Marshall, notes that alongside the information in the application five other reports have described the vegetation of the area. Four of these are referenced in the application with another internal Department report in circulation. Dr Marshall generally agrees with the descriptions and associations outlined in the application but notes that there is some discrepancy between the various classifications, adding the following commentary:

> "The ecology report briefly describes the area of herbfield just south of the Trig as relatively large and irregularly shaped and lists a number of species present including the little known and Threatened native eyebright, *Euphrasia wettsteiniana* (incorrectly identified as At Risk by the ecology report). Mitchells and Landcare (2001) describe an equivalent association as prostrate manuka-herbfield 'cushion' vegetation. Reignier (1986) also notes this area and describes it as cushion plant vegetation with significant amounts of wetland cushion bog plants *Donatia novae-zelandia* and *Centrolepis* sp. Other wetland areas are spread through the "non cushion field" associations in the higher altitudes, as evidenced by the descriptions of manuka-dominated scrub and shrubland vegetation mapped by Mitchells and Landcare (2001) including *D. novae-zelandia* in another area south of the Trig and the presence of bog pine, sundews and *Actinotus* on peaty ground around the old water treatment and soil storage areas of the initial proposal (Reigner 1986).
>
> The herbfield/cushion vegetation area described above grades into what the ecology report defines as Manuka-Dracophyllum rockland, Mitchells and Landcare (2001) describe it as Manuka Dracophyllum vegetation amongst areas of sandstone outcrops, and Knightbridge (2001) as Manuka-Dracophyllum politum/wire rush shrubland. Species identified in all reports reflect a saturated substrate, such as the native wetland lily *Herpolirion novae-zelandia*, *Oreobolous* species, and the peat forming wire rush.
>
> The pakihi present on the vegetation map of the ecology report is not described in the ecology report, but the MP appears to just cross the eastern edge of the pakihi wetland ecosystem on German Terrace (visible in the ecology reports Manuka Shrubland photo). Areas

between Coal Creek and its northern most sub- tributary have been identified by DOC as the same ecosystem as the German Terrace pakihi, and are included for management in DOCs Intermediate Outcome 1 priority ecosystem management list. These areas are described by Mitchells and Landcare (2001) as manuka dominated scrub and shrubland and/or manuka tanglefern shrubland, and include several species of interest including three sundew species, an inconspicuous herb *Actinotus novae-zelandia* and a small regionally endemic daisy *Celmisia dubia*: these areas will be affected by the proposed access road. Mitchells and Landcare (2001) also describe one of their plots (1) as Pakihi with sparse manuka, which is likely very close to the proposed pit. It is my impression that many of these areas should potentially be included in the West Coast Regional Councils Assessment of Significant Wetlands.

Mitchell Partnerships and Landcare (2001) describe two areas which appear to be in the Coal Deposit footprint as diverse forest and understory which are parts of the lower stature vegetation at the edge of the taller southern rata-yellow silver pine-mountain beech forest. The area around the pit is described as having broken and rocky ground with a diverse combination of species in the canopy including bog pine (incorrectly identified as *Halocarpus biformis* by the ecology report), Quintinnia, *Dracophyllum* spp., totara, rimu and lancewoods. The vegetation west of the ridgeline and south of the Trig is also diverse and contains an interesting conifer rich community which includes bog pine, pink pine, yellow silver pine (YSP), pygmey pine, native cedar, and rimu.

The proposed footprint to the east of the ridgeline, within the Mount Rochfort Conservation Area appears to be amongst steep rocky scarps and bluffs, which support the southern rata – YSP-mountain beech association and rimu-red beech-silver beech forest. This area is not described by the ecology report, nor does it appear to have been surveyed in any report, but the PNA report notes that these scarps and bluffs provide distinctive habitats which are inaccessible to introduced browsing animals, and lists a number of palatable species present which occur in no other associations in the survey area, and characteristic bluff species. It is possible that these species also occur in the proposed mine footprint."

13. There is one Nationally Vulnerable (threatened with extinction) and two Naturally Uncommom (at risk of extinction) vascular plant species confirmed within the mine footprint. A further four are noted as possible/likely to be present (Marshall, 2015). The application indicates that Te Kuha is also a significant site for [non-vascular] bryophytes and shows that a number of notable moss and liverwort species occur within the mining permit area, both inside and outside the proposed mine footprint. Five species are either Nationally Vulnerable (threatened with extinction) or Naturally Uncommom (at risk of extinction) and another nine species are notable for their taxonomic peculiarities. The site is also noted for the lack of any adventives bryophytes, acknowledged as an outstanding ecological feature in the application (Marshall, 2015). A full list of Threatened/At Risk flora is shown in Table 1 below:

Table 1: Threatened/At Risk flora of the Te Kuha site

Specie name	**Vascular/Non vascular**	**Threat ranking**	**Threat classification**
Confirmed			
Euphrasia wettsteiniana	Vascular	Threatened with Extinction	Nationally Vulnerable
Saccogynidium decurvum	Non-vascular	Threatened with Extinction	Nationally Vulnerable
Herzogianthus sanguineus	Non-vascular	At Risk of Extinction	Naturally uncommon
Riccardia multicorpora	Non-vascular	At Risk of Extinction	Naturally uncommon
Riccardia furtiva	Non-vascular	At Risk of Extinction	Naturally uncommon
Zoopsis bicruris	Non-vascular	At Risk of Extinction	Naturally uncommon
Dracophyllum densum	Vascular	At Risk of Extinction	In decline
Possible			
Peraxilla colensoi	Vascular	At Risk of Extinction	In decline
Carex carsei	Vascular	At Risk of Extinction	Naturally uncommon
Carex dallii	Vascular	At Risk of Extinction	Naturally uncommon
Calochilus paludosus	Vascular	At Risk of Extinction	Naturally uncommon

14. The information available suggests that the vegetation at Te Kuha is ecologically significant. Both the application and Dr Marshall acknowledge its ecological importance, particularly the Brunner Coal Measure associations. Dr Marshall notes that her own site

visit reinforced the conclusion that the vegetation patterns reveal a complex set of influences, interactions and ecological gradients, and the resultant mosaic provides a diversity of habitats for locally, regionally and nationally important flora and fauna. Both the application and Dr Marshall emphasize the intact nature of the vegetation. Dr Marhsall makes specific comment that the Mt William and Mt Te Kuha areas are distinguished from all other parts of the Brunner Coal Measure systems because they are the only discrete parts of the systems that are intact with no notable disruption to ecological patterns and processes.

15. The significance of the vegetation at Te Kuha is also recognized by the Protected Natural Areas Programme ("PNAP") that was completed to recommended areas for protection ("RAPs") in order to protect the full range of natural heritage within the ecological district (refer Overmars *et al.* 1998). RAP 7 (of the Ngakawau Ecological District) includes the Te Kuha site and surrounds, covering 764 ha. Overmars et al. considered that RAP 7 was "of particular significance because of the absence of recent fire and the degree of intactness" as well as its location at the southern-most extreme of the coal plateau.

Fauna

Avifauna

16. The application provides avifauna survey results for a large area that includes the entire mining permit (MP 41289) area and a bulk of the WWCR. 39 species were recorded in the area, 33 of which are within the area covered by MP 41289, and 12 recorded within the mine footprint itself. These species are listed below:

Native species
[Common Name - Scientific Name - Conservation Ranking]

Great spotted kiwi * - *Apteryx haastii* - Nationally vulnerable
Paradise shelduck # - *Tadorna variegata* - Not threatened
Grey duck # - *Anas superciliosa* - Nationally critical
Black shag # - *Phalacrocorax carbo novaehollandiae* - Naturally uncommon

Australasian bittern - *Botaurus poiciloptilus* - Nationally endangered

Swamp harrier *+ - *Circus approximans* - Not threatened

New Zealand falcon * - *Falco novaeseelandiae* - Nationally vulnerable

Western weka *+ - *Gallirallus australis australis* - Declining

Pukeko # - *Porphyrio melanotus melanotus* - Not threatened

South Island pied oystercatcher # - *Haematopus finschi* - Declining

Spur-winged plover # - *Vanellus miles novaehollandiae* - Not threatened

Southern black-backed gull * - *Larus dominicanus dominicanus* - Not threatened

New Zealand pigeon (kereru)* - *Hemiphaga novaeseelandiae* - Not threatened

New Zealand pipit - *Anthus novaeseelandiae novaeseelandiae* - At Risk-Declining

South Island kaka - *Nestor meridionalis meridionalis* - Nationally endangered

Kea - *Nestor notabilis* - Naturally uncommon

Yellow-crowned parakeet (kakariki) * - *Cyanoramphus auriceps* - Not threatened

Shining cuckoo * - *Chrysococcyx lucidus lucidus* - Not threatened

Long-tailed cuckoo * - *Eudynamys taitensis* - Naturally uncommon

Morepork * - *Ninox novaeseelandiae novaeseelandiae* - Not threatened

New Zealand kingfisher * - *Todiramphus sanctus vagans* - Not threatened

South Island rifleman *+ - *Acanthisitta chloris chloris* - Declining

Grey warbler *+ - *Gerygone igata* - Not threatened

Bellbird *+ - *Anthornis melanura melanura* - Not threatened

Tui * - *Prosthemadera n. novaeseelandiae* - Not threatened

Brown creeper *+ - *Mohoua novaeseelandiae* - Not threatened

South Island fantail *+ - *Rhipidura fuliginosa fuliginosa* - Not threatened

South Island tomtit *+ - *Petroica m. macrocephala* - Not threatened

South Island robin *+ - *Petroica australis australis* - Not threatened

South Island fernbird *+ - *Bowdleria punctata punctata* - Declining

Silvereye *+ - *Zosterops lateralis lateralis* - Not threatened

Welcome swallow * - *Hirundo neoxena neoxena* - Not threatened

Introduced and Naturalised species

Mallard * - *Anas platyrhynchos platyrhynchos*

Skylark * - *Alauda arvensis*

Eurasian blackbird * - *Turdus merula merula*

Song thrush * - *Turdus philomelos*

New Zealand pipit * - *Anthus novaeseelandiae*

Dunnock * - *Prunella modularis*

Chaffinch * - *Fringilla coelebs*

European greenfinch * - *Carduelis chloris*

European goldfinch * - *Carduelis carduelis britannica*

Common redpoll * - *Carduelis flammea*

Yellowhammer * - *Emberiza citronella*

*denotes species found in the survey area

# denotes species found in the mining permit area

+ denotes species found in the mine footprint

17. Threatened and At Risk species known to, or that may, be resident within the haul road and proposed mine site are:

- Great spotted kiwi (Nationally Vulnerable). Present throughout affected area, may be higher densities at higher altitudes.
- South Island fernbird (At Risk-Declining). Likely to be limited to *c.*22 ha of shrubland habitat within the mine footprint.
- New Zealand pipit (At Risk-Declining). Likely to be limited to less than 5 ha of open habitat within the mine footprint.
- Bush falcon (Nationally Vulnerable);
- Kea (Nationally Endangered);
- South Island kākā (Nationally Vulnerable);
- Long-tailed cuckoo (At Risk-Naturally Uncommon).

18. Wildlands Consulting Ltd peer reviewed the application information and provided the following comments on these species:

> "Threatened and At Risk species known to be resident within the haul road and proposed mine site are:
>
> - Great spotted kiwi (Nationally Vulnerable). Present throughout affected area, may be higher densities at higher altitudes.
> - South Island fernbird (At Risk-Declining). Likely to be limited to *c.*22 ha of shrubland habitat within the mine footprint.
> - New Zealand pipit (At Risk-Declining). Likely to be limited to less than 5 ha of open habitat within the mine footprint.
>
> This list does not include western weka and South Island rifleman (included in the ecology report) as they are no longer considered to be in decline.
>
> The Te Kuha populations of these three species are not significant within the Ngakawau Ecological District, all being found in significant numbers elsewhere within the district. However, the Mt William Range-Orikaka great spotted kiwi population, of which the Te Kuha kiwi are part of, has been recognised as being regionally and nationally important (Kingett Mitchell and Landcare Research 1997). The Mt William Range-Orikaka population is the only population of note between Karamea and the Buller Rivers, and mean call rates have been found to some of the highest in the region, and higher than the national average (Kingett Mitchell and Landcare Research 1997). The Te Kuha mine footprint is only likely to support a very small proportion of this population, which is estimated to comprise 1,800 individuals assuming a density of 2.0-2.5 pairs per 100 ha.
>
> Threatened and At Risk species that may use the proposed haul road and mine site are:
>
> - Bush falcon (Nationally Vulnerable);
> - Kea (Nationally Endangered);
> - South Island kākā (Nationally Vulnerable);
> - Long-tailed cuckoo (At Risk-Naturally Uncommon).
>
> Populations of these species within Te Kuha are unlikely to be significant."
>
> Wildlands, 2014, pp. 8-9.

<u>Herpetafauna (lizards)</u>

19. 1999 and 2013 surveys have confirmed the presence of speckled skink *Oligosoma infrapunctatum* (At Risk Declining) and forest gecko *Mokopirirakau granulatus* (At Risk-Declining) within the mine footprint. West Coast green gecko *Naultinus tuberculatus* (Nationally Vulnerable) is also almost certain to be present. Wildlands (2014) also believe it likely that both common gecko *Woodworthia maculata* and common skink Clade 4 *Oligosoma polychrome* would be present at the site.

20. As is the norm it is very difficult to estimate total lizard populations based on survey results because lizards are notoriously difficult to survey for. Suitable habitat is therefore often used as a proxy for indicating the likely presence of lizard populations. In this case there is good quality intact habitat throughout the footprint and gives weight to the site in terms of herpetafauna values. The very likely presence of West Coast green gecko, in particular, is significant as the species is limited in extent and ranked as Nationally vulnerable. Forest gecko and speckled skink are also protected species under the Wildlife Act and are ranked At Risk-Declining.

Bats

21. RDL's bat surveys did not record bats within the Te Kuha area. However, long-tailed bats *Chalinolobus tuberculatus* (Nationally Critical) do occur within the Ngakawau Ecological District, have been recorded in the Mokihinui River catchment 40 km north of Te Kuha (the Mokihinui population is considered regionally and nationally significant) and have large range spans. Wildlands (2014) suggest that while the presence of short-tailed bats *Mystacina tuberculata* (Threatened-Nationally Endangered) is very unlikely, the Te Kuha area does provide suitable long-tailed bat habitat and the potential for long-tailed bats to use the area, while unlikely, cannot be discounted. Should long-tailed bats be recorded at the site it would be of notable value and appropriate to be considered in avoidance and mitigation strategies.

Invertebrates

22. Initial invertebrate surveys by RDL found the following range of invertebrates within the mine footprint:

Table 2: Invertebrate survey results by group

Invertebrate Group	Number of Species	New Species	Unidentified species
Snails	3	1?	3
Millipedes	1		0
Spiders & relatives	3		2
Bugs	3		2
Beetles	7		4
Flies	48+		19+
Moths	18		0
Wasps, bees and ants	15		8
Weta and cricket	6		2
Stick insects	2		2
Total Species*	**106**	**1?**	**42 (40%)**

23. However, the results were considered by Wildlands (2014) to be somewhat difficult to interpret for the purpose of gaining a meaningful summary of invertebrate values at the site. Wildlands subsequently visited the site and undertook an entomological survey that resulted in the following summary:

> "A brief entomological inspection of the proposed Te Kuha mine site showed the site to support a wide range of indigenous invertebrates. The suite of species found indicates that the mine footprint is ecologically significant as it supports sustainable populations of all of the following:
>
> - Species endemic to the northwest South Island, e.g. an unidentified stick insect in the genus *Micrarchus*.
> - A number of large-bodied flightless species, e.g. Helm's stag beetle *Geodorcus helmsi*.
> - At Risk species, e.g. forest ringlet butterfly *Dodonidia helmsi*, At Risk-Relict.
> - Widespread but distinctive Main Divide upland species, e.g. zig-zag moth.
>
> At least four unnamed species, e.g. the leaf-veined slug and *Rhytida*-like snail described by Mitchell Partnerships 2013,
> and the large spider and stick insect from this site survey.
> Notably, no exotic invertebrate species were found either as adults or larval damage.

> The prominence of the group of large-bodied flightless invertebrate species probably indicates the intact character of the site, its remoteness, a relatively low introduced predator population, and an overall high degree of naturalness.
>
> Overall, given the suite of indigenous species present, their relationships and life histories, and the high degree of naturalness of the habitat, this site is significant for indigenous invertebrates in regional and national contexts."
>
> Wildlands, 2014b, pp. 2-3.

Aquatic

24. Several named and unnamed creeks drain the mining permit area including German Gully, Ballarat, Jones, Coal and West Creeks. The headwaters of Coal and West Creeks are within the proposed mine footprint and merge and drain to the Buller River. Other streams drain to the Orowaiti River. There are several small tarns located within the proposed mine footprint and one large tarn that has been excluded from the footprint and therefore lies outside of it. The proposed access road crosses Coal and West Creeks and several smaller unnamed creeks. The aquatic environment can essentially be split between an upper section, typified by smaller headwaters and tarns, and a lower section containing the more prominent creek bodies.

> *Note: The revised mine plan information provided by RDL now includes the removal and reconstruction/relocation of the Tarn within the footprint prior to mining operations starting.*

25. RDL has surveyed the creeks and one of the tarns for fish, koura and macroinvertebrates and also undertaken water and geochemical testing to determine baseline water quality and the potential for AMD. Eleven fish species were recorded in the creeks, all in the lower section. No fish were recorded in creeks in the upper section or in the tarn. The species recorded were:

> [Fish species - Common name - Threat status]

Anguilla australis - Shortfin eel - Not threatened
Anguilla dieffenbachii - Longfin eel - Declining
Cheimarrichthys fosteri - Torrentfish - Declining
Galaxias maculatus - Inanga Site - Declining
Galaxias brevipinnis - Koaro - Declining
Galaxias fasciatus - Banded kokopu - Not threatened
Galaxias postvectis - Shortjaw kokopu - Declining
Gobiomorphus cotidianus - Common bully - Not threatened
Gobiomorphus hubbsi - Bluegill bully - Declining
Gobiomorphus huttoni - Redfin bully - Declining
Salmo trutta - Brown trout - Introduced

26. Six sites were sampled along the proposed access road route. Fish were present at all six sites and consisted of longfin eel, redfin bully, koaro, banded kokopu, and shortjaw kokopu. Koura (in decline) were recorded at all sites surveyed, including the tarn in the upper section, and are presumed to occupy all notable waterways and tarns in the upper and lower sections. Grey Ducks (*nationally critical*) have been observed on nearby water reservoirs and it is considered that they may occupy parts of the small creeks within MP 41289 in low numbers (Streamlined, 2014). Bryophytes were evident in the mountain sites. Macrophytes were absent from all sites. In general, most sites surveyed reported an abundance and diversity of macroinvertebrate fauna that were indicative of healthy aquatic environments. Mountain/upper sites appeared to be of lesser quality than lower sites, possibly reflecting the naturally acidic and metal-enriched water quality, as well as the steepness of the terrain (Streamlined, 2014).

27. Water quality data was collected at a range of sites. PH ranged from acidic to near neutral, with more acidic streams in the upper section and throughout West Creek. Elevated conductivity was recorded at some sites in the lower section. Elevated metal concentrations (especially aluminum) and low pH values were typical of most waterbodies surveyed. Water chemistry was found to differ between upland and lowland streams, with upland streams being characterized by lower pH and elevated

dissolved metals (BTW, 2014, Appendix D). As discussed earlier in this report, despite some raised pH in creeks in the upper section preliminary geochemistry results indicate that the potential risk for AMD is relatively low.

28. Overall the aquatic habitats within the mine and access road footprint are noted as having considerable value for their naturalness and presence of fish and invertebrate species of conservation significance (Streamlined, 2014). Five indigenous fish species and koura, all ranked as being in decline, were recorded in water bodies either within the proposed mine footprint or affected by the access road route. Tarns (present within the proposed mine footprint) are acknowledged as historically rare ecosystems (Williams et al., 2007) and therefore have notable value for conservation.

Landscape

29. Both BTW (2014) and the application's full landscape assessment (BTW, 2014, Appendix E) provide detailed descriptions of the natural environment, landscape context and visual amenity values of the Te Kuha site. The proposed mine and [a majority of] the access road would be situated on forested Coastal Hillslopes that form the backdrop to the Buller District and the town of Westport. Mt Te Kuha forms part of a predominantly unbroken forest covered mountainous skyline that typifies and distinguishes the West Coast region and Buller District. The Te Kuha site is acknowledged as an integral component of this landscape and for having very high to pristine natural values and very high visual amenity values (BTW, 2014, Appendix E). The Department's landscape reviewer (Isthmus, 2015) concurs with this assessment and also emphasizes several noteworthy biophysical features at the site, particularly the rocky outcrops, sandstone pavement and boulder fields near the top along the ridgeline. The wider landscape is also acknowledged as an important tourist attraction and recreation asset in the Buller District Plan (section 4.9.2) (Isthmus, 2014).

30. The proposed mine site is located above and directly west of the Lower Buller Gorge which is recognized as being an Outstanding Natural Landscape (ONL) (Isthmus, 2015), although not officially classified as such because the BDC process for establishing ONL's is not yet complete. Part of the lower Buller gorge is also held as the Lower Buller Gorge

Scenic Reserve under the RA. This context and the site's ranking in terms of natural and biophysical values and visual amenity lead to the conclusion that it is undoubtedly significant in terms of landscape values. Notably, any potential impacts on the values of the Lower Buller Gorge is most likely a matter of national importance under section 6 of the RMA due to the ONL values. The potential effects on landscape values are covered in more detail later in this report.

Historic values

31. No historic sites or values were identified in the application. Likewise local Buller Department staff were unaware of any historic features or sites within the mine and access road footprint. Unlike the Stockton and Denniston Plateaux the Te Kuha area has not been subject to previous mining nor any notable anthropogenic activity. Te Kuha itself, located on the flat beside the Buller River, is known historically for having a punt and passenger train service to Westport, neither of which are still in service. The rail line however is still in service, mainly used for the transport of coal and would be utilized for this purpose by RDL should the proposal go ahead (BTW, 2014).

Cultural values

32. No sites/values relating to Maori culture, traditions, ancestral lands, water, waahi tapu or taonga have been identified in the application or by local Department staff. However, the water resource and creeks may be of interest to local iwi Te Rünanga o Ngäti Waewae (Ngäti Waewae) with the potential to affect water quality a potential concern if not effectively mitigated. RDL have been in contact with a Ngäti Waewae representative in early 2015 and have indicated they will continue this consultation process in the first quarter of 2016. The Department has provided Ngäti Waewae with copies of the application and key information.

Buller District Plan (RMA) significance criteria

33. The Te Kuha area is located within the Buller District and West Coast Region. The significant resource management issues, objectives and policies, including criteria for determining significant indigenous vegetation and significant habitats of indigenous fauna in the district are outlined in Section 4 of the Buller District Plan, which became operative 25 May 2009. Policy 4.8.7.4 of the district plan sets out the criteria to be used as guidelines to identify areas of significant indigenous vegetation and significant habitats of indigenous fauna for the purposes of Section 6(c) of the Resource Management Act 1991. The criteria are:

1. **Representativeness**: The area is one of the best examples of an association of species which is typical of the ecological district.

2. **Distinctiveness**: The area has indigenous species or an association of indigenous species which is unusual or rare in the ecological district, or endemic, or reaches its distribution limit.

3. **Intactness**: The area has a cover of predominantly indigenous vegetation, is little modified by human activity, and is not affected in a major way by weed or pest species.

4. **Size**: The area of indigenous vegetation or habitat is 5 ha or more in size or together with adjacent indigenous habitat is larger than 5 ha; or in the case of natural wetlands is larger than 1 ha in size.

5. **Protected Status**: The area has been set aside by statute or covenant for protection or preservation.

6. **Connectivity**: The area is connected to one or more other significant areas in a way (through ecological processes) which make a major contribution to the overall functioning of those areas.

7. **Threat**: The area supports an indigenous species or community of species which is threatened within the ecological district or ecological region or threatened nationally.

8. **Migratory Habitat**: The area is important as habitat for significant migratory species or for feeding, breeding or other vulnerable stages of indigenous species, including indigenous freshwater fish.

9. **Scientific or Cultural Value**: The area is a scientific reference area, is listed as a geopreservation site, or has significant amenity value.

34. Table 3 summarises the assessment of significance [by both RDL and the Department] for these criteria:

Table 3: Buller District Council significance criteria assessment

Criteria	RDL opinion	DOC opinion	Comments
Representativeness	Moderate-High	High	Both Wildlands (2014) and Marshall (2015) feel that RDL misinterpreted this criteria and that the site clearly ranks high in terms of representativeness
Distinctiveness	Moderate-High	High	
Intactness	High	High	
Size	Meets criteria	Meets criteria	
Protected Status	Meets criteria	Meets criteria	
Connectivity	High	High	
Threat	Moderate - High	High	Wildlands (2014) note that the inclusion of the West Coast Green Gecko gives the site a 'high' ranking for Threat
Migratory Habitat	Moderate - Low	Low	
Scientific or Cultural Value	Unsure	High	Wildlands (2014b) confirms the presence of several species of invertebrate of scientific interest therefore triggering this criterion. Marshall (2015) also notes that scientific interest is high due to the presence of plants at their distribution limits.

35. Department experts conclude that the site meets eight of the nine significance criteria, while the information in the application indicates that RDL conclude it meets seven of the nine with one criterion being uncertain.

References

BTW. 2014. *Application for Access to Undertake Opencast Coal Mining and Related Activities on Public Conservation Land*. BTW South Ltd, 10 October, 2014.

Isthmus. 2014. *Te Kuha Coal Mine Landscape and Visual Preliminary Review.* Isthmus, 26 June, 2014.

Isthmus. 2015. *Te Kuha Coal Mine Landscape and Visual Review.* Isthmus, 24 February, 2015.

Marshall, J. 2015. *Te Kuha Coal Mine Review*. Department internal expert review, 12 March, 2014.

Mitchell Partnerships and Landcare Research. 2001. *Vegetation and Fauna of the Proposed Te Kuha Mine Site*, August, 2001.

Streamlined. 2014. *Te Kuha Mine Application Review*. Streamlined Environmental Ltd, 21 November, 2014.

Wildlands. 2014. *R3470: Review of Fauna Components of An Access Application for the Te Kuha Open Cast Coal Mine, Buller*. Wildlands Consultants Ltd, 29 July, 2014.

Wildlands. 2014a. *R3470a: Invertebrate Addendum to Wildlands Report R3470 on the Proposed Te Kuha Mine, Buller*. Wildlands Consultants Ltd, 19 November, 2014.

Wildlands. 2014b. *R3470b: Addendum to the Wildlands Report R3470 on the Proposed Te Kuha Mine, Buller*. Wildlands Consultants Ltd, 19 November, 2014.

APPENDIX 2: Summary assessment of proposed rehabilitation, mitigation and potential effects of the Te Kuha mine proposal.

Notes:

1. Department reviewers have taken the approach of reviewing the initial Te Kuha mine proposal information as a whole in order to gain an overall understanding of the conservation values and potential effects. The goal of this approach is to establish a broad understanding of the proposal so that, if required, the Department can effectively contribute to any of the several potential statutory processes that could eventuate for the proposal. Therefore the commentary and assessments below are based on the proposal as a whole, not just for the smaller AA Area, and are provided as reference and background material for the AA application assessment.
2. The initial reviews and summary below were based on a proposed mine of 86 hectares. The mine plan has since been revised to include provision for further water management infrastructure. The revised footprint has increased to 109 hectares. While the core values, species and ecological context remain the same some of the habitat, species and population estimates in the below text will be out of date and will be reviewed prior to the final analysis and report for the decision on access. They do still however help 'paint a picture' of the ecological context and potential effects of the proposal.
3. The initial AA area was 10.4 ha but this has been revised up to 12 ha based on the latest mine plan. The initial proposal had 1.59km (approximately 3.84 ha footprint) of the access road located within Ballarat Conservation Area. The route has since been revised to minimise the intrusion on public conservation land. Approximately 600m of the revised route still lies over the Ballarat Conservation Area and is the subject of a proposed land exchange.
4. The economics assessment in the text below is now out of date and will be reviewed prior to the final analysis and report for the decision on access. However, it does provide a baseline from which further assessments can be referenced. It was not considered sensible to re-assess this aspect of the proposal for the purposes of public notification. The timeframes required to conclude the notification process would have made any further assessment out of date once more.

PROPOSED REHABILITATION

1. BTW (2014) and the application's full ecology report (BTW, 2014, Appendix C) provide detailed and comprehensive information on proposed rehabilitation and mitigation strategies. The discussion below is a summary only and the reader is encouraged to consult the application documents for further detail as required.

2. The overarching rehabilitation approach for the Te Kuha proposal is to:

    - minimise the disturbance footprint,;
    - undertake vegetation direct transfer (VDT) of as much of the highest value ecosystems as possible;

- establish a stable and erosion resistant surface as quickly as possible;
- progressively rehabilitate (via re-spreading of top soil/stockpiled material and planting) the remaining affected areas; and
- control invasive weeds where possible.

3. The final landform would aim to reinstate existing catchments and drainage patterns and to abut and be sympathetic with the surrounding landform. The long term goal would be to achieve a stable surface with root zones and erosion resistant surfaces on which self-sustaining native vegetation can develop into a mosaic of associations resistant to weeds, fire and pests. Rehabilitation would also aim to conserve the existing vegetation associations and species, particularly those considered at risk or under threat (BTW, 2014).

4. As with all operating mines there would be a tension between rehabilitation efforts and available space to place, handle and store rehabilitation material. Rehabilitation at the Te Kuha mine would be progressive and is planned to occur each year throughout the life of mine, essentially rehabilitating areas where possible following pit construction and backfill. Progressive rehabilitation would aid sediment and erosion control during the life of mine. However, approximately 40% of these progressively rehabilitated areas would need to be re-handled toward the end of mining to allow material to be recovered to fill the final pit void and create the final landform. Therefore a significant proportion of the final rehabilitation undertaken at the site would not occur until after the backfilling of the pits is completed (i.e in years 15-16 of the mine plan). It is estimated that 53 ha of the total 85.97ha would need to be rehabilitated after coal production has ceased (West Circle, 2014).

5. The application includes an assessment of the vegetation at the site including an assessment of ‘high value ecosystems’ that would benefit from VDT. The high value ecosystems include: herb fields, yellow-silver pine and manuka shrublands and some rock field areas (BTW, 2014, Appendix C). The opportunity for VDT at the site would be limited by existing topography and vegetation and mine scheduling. The application indicates that between approximately 10 and 20% of the overall footprint is potentially

VDT-able. In the opinion of the Department's reviewers even 10 - 20% (approximately 8.5 ha – 17 ha) of VDT may be difficult to achieve due to operational factors such as suitable habitat, recovery rates and relocation scheduling. Further careful planning/investigation would be required to integrate VDT source areas with mine scheduling to give more confidence to these estimates.

6. Rehabilitation of the access road would follow the same approach noted above, with a small amount of VDT possible and a bulk of the final rehabilitation occurring after the completion of mining/operation of the road. RDL intend to reinstate the road to existing contours to help avoid lasting visual effects and retain drainage patterns where possible. RDL has suggested that the road could be fully decommissioned upon completion of the project or left in place (or part of it left in place) should the Department see benefit in it as a recreational facility. In the absence of any final opinion from West Coast Department staff, at this stage the default position is that full decommissioning/rehabilitation of the road is to be undertaken/required. Note also that a majority of the road would be within the Westport Water Conservation Reserve managed by the Buller District Council (BDC) so the BDC would have an interest in the final outcome/use of the access road corridor. The Department may wish to consider consulting with the BDC on this issue if/when RDL submit resource consent applications for the project.

7. In terms of rehabilitation outcomes the application concludes that in the medium to long term the vegetation that develops on the final landform is likely to be typical of existing vegetation [in the area] with better-drainage and deeper rooting zones. However, they note that overall is likely to be somewhat different in species composition of existing vegetation. The extent of 'high value ecosystems' would be reduced despite being prioritized for VDT, acknowledging that existing peaty topsoils with high organic matter and water-holding attributes that support a majority of the 'high value ecosystems' would take a very long time to restore, potentially hundreds of years, if not subject to VDT. The application also highlights that edge effects would result in impacts on habitat at the edge of the mine and along the road corridor.

8. RDL has made it clear that it is open to ongoing discussion/consultation with the Department (and BDC/WCRC) on rehabilitation effort and approaches for the project. Experience with other medium/large mines suggests that final mitigation and rehabilitation planning is a 'devil in the detail' exercise that would not be fully developed until the management plan development phase of the project. However, the information provided by RDL to date allows a reasonable estimate of potential outcomes to be made. Further discussion on final outcomes is included in the assessments below.

MITIGATION AND POTENTIAL EFFECTS OF THE TE KUHA MINE PROPOSAL

Habitat loss

Assessment of proposed mitigation for habitat loss

9. One of RDL's key mitigation strategies is to minimise the footprint of the mine. Minimising the footprint of an open cast mine is usually a tradeoff between with the efficiency of mineral extraction and the space to store and undertake rehabilitation. The mine planning information provided by RDL suggests that they are designing the mine within a relatively discrete area and minimizing unnecessary disturbance, albeit while still ensuring access to both the desired coal seams and coal resource. Despite this however, a majority of the mine would need to be 'open' for at least 1-2 years of the operational mine life due to the depth of the coal seams and pit depth/pit scheduling. A majority of the site would therefore need to be rehandled prior to the completion of the mine resulting in limited opportunities for progressive final rehabilitation.

10. RDL aim to directly transfer as much of the high value ecosystems within the footprint as possible prior to disturbance. The goal, based on initial mine plans, would be to directly transfer 7-10 ha of habitat and a minimum of 10% of the total footprint (BTW, 2014, Appendix C). Vegetation associations targeted for VDT, and potential areas of each that

are suitable for VDT, are noted in the application as follows (note that these figures were based on the initial mine plan and are therefore indicative):

Table 4: Target vegetation for vegetation direct transfer

Target vegetation association	**VDT priority**	**Potential area for VDT**
yellow silver pine – manuka scrub	High	4 ha out of 8 ha present
herbfield – *Euphrasia wettsteiniana*	High	0.04 ha out of 0.04 ha present
open manuka shrubland	High	7.8 ha out of 13 ha present
mountain beech/yellow silver pine – pink pine forest	Moderate	25.5ha out of 51 ha present
Manuka – dracophyllum rockland	Moderate	2 ha out of 4 ha present

11. Based on 2014 mine planning information the maximum theoretical area that could be available to VDT onto is 24.7 ha (West Circle, 2014) at Year 11 of the mine plan, or just under 29% of the total disturbed area. It would therefore be theoretically possible (based on these figures) to achieve 7-10 ha of VDT. However, there are a number of variables that affect VDT potential and VDT success, particularly recovery rates and mine scheduling that allows 'receiving space' and 'VDT'able habitat' to be available at the same time. In this case Department reviewers are somewhat cautious of the figures being proposed for VDT primarily because their own site visit indicated a large proportion of broken and jumbled habitat that would restrict recovery rates. There has also been a general tendency for VDT rates at operational mines to be less than initially mooted in rehabilitation planning and prior to the commencement of mining due to the operational challenges of the exercise. On the whole the information at hand suggests that it should be possible for RDL to VDT at least some of the higher value ecosystems, but at this stage Department experts feel that the actual proportion is best described as uncertain.

12. Another mitigation strategy being proposed by RDL is an effort to maintain genetic diversity within the post-mining habitat and buffer key genetic resources against weed incursion. This would be achieved via the use of VDT for higher value/rare ecosystems (see above discussion), propagation of plants from on-site sources, and placing VDT with buffers in place. The two key vegetation associations noted for this mitigation are manuka-Dracophyllum rockland and herbfield. If successful this mitigation would help preserve

27% and 100% of the genetic resource in the Te Kuha area respectively that would otherwise be lost (BTW, 2014, Appendix C). Note that while the herbfield is likely to be easily VDT'd, the general limitations noted for VDT above would apply to the manuka-Dracophyllum rockland.

13. RDL are proposing to reinstate streams and recreate tarn and in stream habitat upon the final landform. While Department reviewers are encouraging of the enterprise there is some uncertainty expressed around the likely level of success due to the lack of detailed design and research/evidence to show how effective the approaches may be. The final landform should be able to be designed to reinstate a similar catchment regime, but the recreation of tarn and stream/riparian habitat (particularly instream habitat) is seen as a more uncertain. This uncertainty casts a shadow over the final result for aquatic habitat and its recolonization by aquatic invertebrates, and outcomes within recreated tarns.

Wider ecosystem management

14. RDL are proposing to undertake wider ecosystem/habitat management in an area surrounding and/or adjacent to the site. The intention is to protect surrounding habitat and help ensure that local species persist in adjacent areas until the completion of mining (so they are available to recolonize rehabilitated areas) and, beyond mine life, to provide for the buffering and persistence of flora and fauna. The application notes biodiversity management being undertaken in nearby sites related to the Escarpment and Stockton mines and opportunities to extend and compliment these efforts. Existing programs largely target possums and deer. RDL however suggest that they would promote the control of all introduced mammals in the surrounding area. Two potential areas are mooted for this work. One being an additional 9,500 ha north of the Buller River aimed at linking up existing programs over coal measure habitat and "creating a meaningful coal measures reserve and contribute to maintaining coal measures flora and fauna over the longer term" (BTW, 2014, Appendix C, p 102). The second area is the Orikaka Ecological Area which lies to the east of the Stockton and Denniston Plateaux.

15. The approach is conceptual only at this stage. A specific management plan is mooted, and that would need to be developed in consultation with the Department. Initial discussions with Department staff suggest that the Department would look to integrate any such project with existing programs (and those of the Animal Health Board) that primarily consist of the aerial application of 1080 supported by localised trapping and monitoring programs. Overall current programs have demonstrated benefits for indigenous biodiversity by reducing mammalian predators and the predation of indigenous birds and enhancing indigenous vegetation. Department staff have noted that the Animal Health Board undertake control of the high altitude areas (including Mt Te Kuha) and at first glance would see more benefit (in a broader ecosystem management context) in extending biodiversity enhancement into the Orikaka area.

16. The wider ecosystem management being proposed would provide some protection for adjacent habitat and populations and in the long term would aid the recolonization of rehabilitated areas. However, much of the work would be undertaken outside of the areas immediately surrounding the Te Kuha site and would not directly address the adverse effects occurring at affected areas. As such it is only in part a mitigation measure. The remainder of the effort (over the areas not immediately adjacent to the site) is more comfortably described as compensation (or 'environmental compensation') and could be considered as such for the residual effects of the project. Both Concessions and Access Arrangements with the Department are structured to allow for and/or require compensation and this type of project funding could, and be would likely to be part of any final Access Arrangement document.

17. Biodiversity offsetting, although not being proposed by RDL at this stage, is another avenue that could be explored with regard to addressing residual effects of the proposal. Given the unique characteristics of coal measure ecosystems and their limited abundance the opportunities for a viable offset may be limited for this habitat type. The lowland forest habitats of the lower slopes may offer more potential for achieving a viable offset however.

<u>Potential effects on habitat</u>

18. The loss and degradation of currently intact, highly natural and, in parts, nationally significant habitat is perhaps the most significant impact of the proposed mine and access road. It seems unavoidable that, despite the mitigation and rehabilitation being proposed, the post-mining habitat would be quite different from an ecological perspective to that existing today. Some habitat would be lost permanently (for example the loss of sandstone pavement, seepages, scarps and tors) while changes to soils and hydrology would mean the resulting vegetation would re-establish along different successional pathways and take decades and in some cases centuries to achieve similar age profiles. There is also uncertainty as to whether tarn and instream habitat would be successfully recreated.

19. Marshall (2015) notes that the post-mining [terrestrial] habitat would be ecologically different, likely demonstrating an altered mosaic of vegetation associations. The rehabilitated habitat would also lack natural complexity and a full cover of native species for many decades, and it would take many centuries to establish a similar age profile in vegetation as that present today (Marshall, 2015). The likelihood of weed incursion and an increase in invasive introduced species is essentially unavoidable. The reduction of intactness is of particular concern to Department reviewers, especially as the site is one the last remaining discrete areas of unmodified Brunner Coal Measure Ecosystems. A notable area of Brunner Coal Measure habitat would be lost, along with several tarns, seepages and bluffs and tors. Brunner Coal Measure habitat supports a range of distinctive vegetation associations and also provides habitat for lizards and invertebrates of ecological and conservation significance. Any loss of tarns and instream habitat would reduce the habitat for koura and other aquatic invertebrates. Overall the loss of habitat would be ecologically significant and a notable loss of conservation value.

20. The access road would contribute less habitat loss than the mine itself and contribute a smaller impact on Brunner Coal Measure Ecosystems. However, it would create a disturbance corridor through the middle of an intact vegetation sequence from German Terrace up to the Mt Te Kuha ridgeline.

21. The 10.4 ha area of the mine footprint that makes up the Access Arrangement application is located along the top of the Te Kuha ridge along the eastern boundary of the mine site. The area is primarily Brunner Coal Measure habitat made up of manuka Dracophllyum rockland, manuka shrubland, yellow silver pine – manuka scrub, rimu hard beech forest vegetation types. The area includes sections of sandstone pavement and several bluffs, scarps and tors. A majority of this habitat is likely to be permanently lost and/or altered by the proposed mining even after rehabilitation efforts. The final landform in this area is planned to be slightly higher and would exhibit a more homogenous topography lacking the assortment of rocky bluffs and tors currently present that would in turn result in a corresponding reduction in species and habitat diversity.

Flora

22. As discussed above Dr Marshall (Marshall, 2015) notes that the post-mining habitat would be ecologically different, likely demonstrating an altered mosaic of vegetation associations. 7-10 ha of existing habitat may be VDT'd largely preserving the flora values therein. However, vegetation over the remainder of the footprint would be cleared and stockpiled for rehabilitation material. RDL would then re-plant the final landform with selected species and/or individuals transplanted prior to the commencement of mining.

23. The five locally endemic species within the footprint (*Dracophyllum densum, E. wettsteiniana, Celmisia dubia, Actinotus novae-zelandiae* and *Metrosideros parkinsonii)* would be targeted for VDT. RDL also propose to transplant *Dracophyllum densum* and *E. wettsteiniana* individuals and then return them onto the final landform. RDL consider that the three other species would have suitable local populations and seed dispersal mechanisms to readily recolonize the site post-mining. Based on this mitigation RDL conclude that at a population level all five species would be protected. Department reviewer, Dr Marshall, feels while translocation of *Dracophyllum densum* may prove successful there is uncertainty around similar success for *E. wettsteiniana*. Dr Marshall also points out that while impacts may not threaten the viability of any specie at a population level any impact on populations ranked as at risk or threatened is a loss of conservation value that should not be ignored. (Marhsall, pers comm).

24. Of the remaining flora, a majority of the vegetation associations to be cleared would be yellow silver pine – manuka scrub, mountain beech/yellow silver pine – pink pine forest, Rimu/hard beech forest and Rimu - red beech – silver beech forest. Marshall (2015) concludes that the re-establishment of vegetation on the post-mining landform would take many decades, and for some values, many centuries and that the final outcome would be different in terms of species composition and structure. Both RDL and Marshall also highlight that an increase in weeds is essentially unavoidable and would need ongoing management to help minimize. A key driver of the compositional change would be alteration of the hydrology of soils on the final landform that are expected to be better draining. It is agreed that the viability/sustainability of these associations at a population level would not be affected, however the changes would occur within an area noted as the best and most intact remaining example of Brunner Coal Measure habitat.

25. The application provides the following on the potential effects on Bryophytes:

> "It is believed that approximately 10 hectares of land that contains bryophyte vegetation will be affected by the proposed mine. However, due to the abundance of bryophytes outside of the proposed mine footprint, there will be significant opportunities to relocate species during rehabilitation. The transfer of bryophytes will maximize the retention of this population at the site and ensure any adverse effects are only temporary in nature and duration."

26. In response to this conclusion Dr Marshall notes that there would still be a net loss of Bryophyte habitat and that any impact on *Saccogynidium decurvum* ranked as Nationally vulnerable would contribute a loss of conservation value. Dr Marshall also points out that the translocation/relocation of bryophytes is unproven and therefore there is a risk in the assumptions made for the proposed mitigation.

27. Overall, the information from RDL and Dr Marshall suggests that while individual species may not be affected at a population scale the final result at the site for vegetation would likely be notably different from an ecological perspective and include an overall loss of flora value due to an increase in weeds and loss of complexity/mosaic structure within an area noted as the best and most intact remaining example of elevated Brunner Coal Measure habitat.

Fauna

28. Three lizard species of conservation significance would be affected by the proposal; speckled skink *Oligosoma infrapunctatum* (At Risk Declining), forest gecko *Mokopirirakau granulatus* (At Risk-Declining) and West Coast green gecko *Naultinus tuberculatus* (Nationally Vulnerable). It should be noted that green gecko were not recorded on site but that experts from RDL and the Department agree that it is most likely that they would occur in the area. Therefore green gecko are assumed to be present for the purposes of this assessment.

29. Wildlands (2014) notes that no lizard recovery is specifically proposed by RDL in advance mining so mitigation, at this stage, would be limited to rehabilitation efforts to re-establish lizard habitat on the post-mining landform and provide protection for lizard populations in adjacent habitat. Therefore most, if not all, of the lizards within construction footprint would be killed by construction activities. It is not possible to estimate the total number of individuals, however any loss of individuals acknowledged as at risk, declining or vulnerable is notable. Lizard recovery efforts at nearby Escarpment Mine however have proved quite successful so it possible/likely that lizard recovery would form part of the Department's AA and Concession conditions should they be granted. If this were the case then some individuals may be salvaged and translocated out of harms way, albeit into habitat already occupied by resident lizards.

30. The RDL application suggests that providing suitable habitat and protection for populations in adjacent habitat would help promote lizard recolonization. In assessing the

viability of this approach Wildlands (2014) point out that there is no evidence to suggest whether, or to what degree, this would be successful. Wildlands also highlight the opportunity, should the mine go ahead, for research into this issue to aid the assessment and undertaking of future proposals. Most of the mine and road footprint is potentially lizard habitat so the assumption is that in the short term there would be a loss of 89 ha and 3.84 ha of habitat respectively. With regard to longer term results for lizards (see also above discussion on habitat loss) Wildlands (2014) are of opinion that it would take a concerted effort over a long period to reestablish suitable lizard habitat via pest control and revegetation. Even given this effort the permanent loss of sandstone pavement and other rocky habitat on the upper slopes would be a permanent loss of lizard habitat.

31. Wildlands (2014) suggest that they most significant impact of the proposal on lizards would be its contribution to the cumulative degradation (via habitat loss and habitat fragmentation) of the stronghold of the West Coast green gecko, alongside other consented mines in the north Buller area. Little is known about the thresholds for the species and at what point continued habitat loss would begin threatening its ability to maintain a viable population.

32. Seven notable bird species would be affected by the proposal via disturbance from construction and mining activities, habitat loss and fragmentation and in some cases possibly death:

- Great spotted kiwi (Nationally Vulnerable);
- South Island fernbird (At Risk-Declining). Likely to be limited to *c.*22 ha of shrubland habitat within the mine footprint;
- New Zealand pipit (At Risk-Declining). Likely to be limited to less than 5 ha of open habitat within the mine footprint;
- Bush falcon (Nationally Vulnerable);
- Kea (Nationally Endangered);
- South Island kākā (Nationally Vulnerable); and
- Long-tailed cuckoo (At Risk-Naturally Uncommon)

33. Most mobile individuals (i.e. adults, excluding potentially some adult pipit, weka, and fernbird) would relocate out of the mine and road footprint into adjacent habitat during construction and/or commencement of habitat disturbance. In these cases there would be a loss of fitness due to increased population pressure in receiving territories. Less mobile juveniles, chicks and eggs would likely be killed when habitat was disturbed and/or cleared by mining. Great spotted kiwi in particular are known to easily abandon nests when disturbed leading to the death of abandoned eggs and chicks. Wildlands (2014) note that kiwi, fernbird and pipit living outside of the mine itself may also be affected by noise and vibrations from the mine, although the distance and scale of this disturbance is unknown.

34. Direct mitigation for birds (other than great spotted kiwi) would include rehabilitation efforts to re-establish suitable bird habitat on the post-mining landform and protection for birds populations in adjacent habitat via ecosystem management. For great spotted kiwi any Concession, AA and Wildlife Act Authority granted for the proposal would include requirements to search for, and if found relocate out of harms way, kiwi within the planned disturbance footprint. This is a standard requirement for other mines in the area.

35. The number of individuals (for some species) potentially lost due to the proposal are estimated by RDL as weka – 720, fernbird – 360, pipit – 180 and great spotted kiwi – 4. These figures can only be treated as indicative however and there is some uncertainty around their accuracy. Wildlands (2014) suggests that the numbers for weka, fernbird and pipit are probably a little generous while the figure for kiwi may be a little conservative.

36. Overall it is clear that some mortality of individual birds would result during the proposed mining and construction of the access road, but that the impacts at a population scale would not be significant for any of the species impacted. Most species are likely to reestablish in post-mining habitat within 30 years. Kiwi may take longer and it may be a century before the effects of the disturbance abated for this species (Wildlands, 2014).

Aquatic – AMD potential

37. RDL are proposing the following mitigation to minimize potential effects on aquatic ecosystems and values:

- Reinstatement of streams and catchments on the post-mining landform and replanting of riparian margins.
- Recreate/relocate the large tarn within the footprint prior to disturbance and recreate smaller tarns on the post-mining landform.
- On site water management and erosion control including the use of settling ponds, toe dams, sumps and pumps, surge ponds, diversion and cut off drains, control of maximum flood runoff, watering of road surfaces to control dust and the use of flocculants
- Minimise water quality/AMD issues via targeted management of overburden and potentially acid forming material and on site water treatment as required. AMD management would include overburden characterization, capping/encapsulation of potentially acid forming material and treatment of acid influenced discharge as required. The management of AMD would be highly dependent on the effective design and construction of the final landform.
- Establishment of management plans including Site Operation Plan, Water Management Plan, Acid Mine Drainage Plan, Sediment and Erosion Control Plan and Rehabilitation Plan.
- Capture and translocation of koura from waterways within the mine footprint
- Establishment a water and geochemistry/overburden characterization monitoring programs
- Construction of bridges and culverts for streams along access road route
- Measures to minimize sedimentation from the operation of the access raod

38. Modifying and reducing water quality of affected catchments is noted by both the RDL and Streamlined (2014) as a key potential effect on aquatic values. Reducing flow regimes,

particularly for West and Coal Creeks, has the potential to impact resident fish and invertebrate populations, while any reduction in water quality would have an inherent effect on all aquatic habitats affected. The headwaters of all streams within the mine footprint would be lost during the course of mining leading to a direct loss of that habitat and dewatering and reduction of flow regimes in the catchments. Therefore some adverse effects on downstream habitats can be expected and may include a reduction in fish and invertebrate numbers and a reduction in suitable habitat.

39. Sedimentation and erosion issues are always a risk with open cast mine sites. RDL's water management information (CRL, 2014) notes that total suspended solids (TSS) is a critical water management issue for the Te Kuha mine. To address this they are proposing stormwater controls for a one in two year flood event, the use of a Flow Max sediment removal technology and the use of flocculents (West Circle, 2014). The conceptual planning for water management is appropriate at this stage and suggests that best practice water management at the site is possible. Further detailed design and planning work would be required should the proposal go ahead (West Circle, 2014).

40. In terms of water quality and AMD, the potential for AMD is considered relatively low but still remains (West Circle, 2014). Streamlined (2014) note that water quality from leachate tests were outside the range of existing water quality so without treatment there would be the potential for adverse effects on receiving aquatic environments. To address the residual risk of AMD RDL indicate that water treatment would be undertaken as required. They likewise point to the imposition of appropriate water quality parameters in resource consents. Overall the likelihood of significant impacts from AMD seems reasonably small for the Te Kuha project. However, there is will always be unknowns and some AMD risk no matter how intensively managed so ongoing diligence would be required should the project proceed.

41. One of the potential impacts highlighted by Department aquatic reviewer (Streamlined, 2014) is the loss of koura. It is acknowledged that some of the koura population would be killed during the construction of the mine. To minimize mortality RDL are proposing to

capture and translocate koura out of the footprint. However, the information provided to date does not give Streamlined confidence that the approach would be successful. There is little evidence to assess what survival rates for translocated koura are likely to be. Also, there would be impacts on any receiving environment in regard to population pressure, fitness etcetera that have not been assessed. As such, Streamlined recommend that more research or investigation is undertaken to help better gauge the potential impacts on koura. If significant numbers of koura were lost during the construction of the mine or via failed translocation it would be a notable loss of conservation value.

42. Several small tarns, noted as a historically rare ecosystem, would be destroyed during the construction of the mine. RDL are proposing to recreate tarn habitat on the final landform. As with the recreation of headwater streams, however, the Department reviewer (Streamlined, 2014) remains unconvinced about the effectiveness of this approach and therefore is cautious about ignoring the impacts of this loss. If unsuccessful the loss of tarns has to be considered notable due to the historically rare ecosystem context.

43. RDL propose to reinstate existing headwaters on the post mining landform. RDL suggest that neighbouring adjacent invertebrate populations would recolonize the constructed habitat and likewise would, while more slowly, less mobile species such as koura. Streamlined (2014) are uncertain as to the likely success of this approach indicating a lack of baseline surveys and/or detail on how the streambeds would be constructed. Information related to the nearby Escarpment Mine indicates that invertebrate recolonization of reconstructed streams is feasible but that it may be a slow process and reliant on the construction of very good instream and riparian habitat. Overall, there would be a complete loss of stream habitat within the footprint in the short term, while the long terms effects remain somewhat unclear.

44. The access road would require the construction and operation of bridges and culverts for West Creek, Coal Creek and three tributaries of Coal Creek and several unnamed streams. Coal Creek would be the most affected due the highest number of crossings. There would be unavoidable disturbance of riparian and instream habitat and increased sedimentation

and erosion during the construction of bridges and culverts. However, this would be short term only. The impacts of the operation of the road over the course of mining would be longer lasting and potentially include an increase in sedimentation and contaminants via runoff (West Circle, 2014, Streamlined, 2014). RDL note that sediment would be managed by soak pits and cut off/stormwater drains and that high deposition would likely occur only in high rainfall events when sediment would be 'flushed out' in the high flows. Overall it is expected that a small increase in sedimentation would occur but that a majority of runoff could be managed via sediment traps, cut off drains and soak pits.

45. Another issue for the access road is the maintenance of fish passage. The inclusion of bridges and culverts, if appropriately constructed, should provide for continued fish passage for migratory species.

46. Streamlined (2014) note that the effects of the access road would be exacerbated by upstream impacts from the mine itself. The dewatering of catchments would, for example, increase the susceptibility of downstream waterways to sedimentation as lower flows would reduce 'flushing' and increase streambed deposition. Streamlined note that no baseline data has been collected on deposited sediment, and that this potential effect is largely unknown.

47. Overall, the most prominent potential adverse effects on aquatic values stem from the loss of headwaters during mining (and the associated changes to flow regimes), loss of tarns and loss of koura. The loss of headwaters during the life of mine is unavoidable. For the two former issues there is uncertainty around the likely success of the mitigation being proposed and as such the potential for adverse effects cannot be ignored. Should the proposed mitigation prove highly unsuccessful for koura and recreation of tarns the impacts could be significant.

Economic

48. An assessment of the potential economic impacts of the proposal were provided by the applicant by way of an Economic Impact Analysis (Copeland, 2014). This information was peer reviewed for the Department by Ian Dickson and Associates (Dickson, 2014) who also provided a commercial feasibility assessment.

49. The key economic effects proposed for the mine are:

- that over the 16 year operating life of the Mine project:
  - For the Buller District, annual direct impacts would be $20 million, 64 full-time equivalent employees (FTE) and $4.4 million of wages. Indirect impacts would increase these figures by $12.3 million, to 82 FTE and $6.5 million respectively
  - For the West Coast Region the annual impacts would be $18.9 million, 90 FTE and $6.7 million in wages.

- During the construction and rehabilitation phases there would be economic impacts corresponding to the activities taking place. A 12 month construction period employing 64 FTE on a $4.2 million payroll. Construction costs of $40 million. At the conclusion of the operation there would be a land rehabilitation lasting 1 to 2 years employing 6 FTE.
- Additionally, the Buller District Council and the Crown would receive access/compensation payments for those parts of the mine within the WWCR and Mt Rochfort Conservation Area.
- The project would pay $8 million of royalties to the Crown

50. Dickson (2014) is happy, based on the information provided, assumptions therein and current coking coal price forecasts, that the project could deliver these benefits. Likewise the project is considered, under current forecasts, to be commercially feasible and has a positive NPV in the range of $92 -107 million at an 8% discount rate, meeting Treasury's target efficiency threshold. However, Dickson (2014) does include a caveat that the future path of coal prices is critical, i.e. should coking coal prices and forecasts decline the

project's commercial viability could easily come into question. It is worth noting here that RDL are now suggesting that the coal could be used for other purposes than coking coal. As discussed elsewhere the economic benefits of the proposal will need to be reviewed anew prior to the final assessments and decision on access.

51. The projected benefits, particularly the projected FTEs, would be undoubtedly significant for the Buller District and West Coast Region, particularly given the current downturn in employment and economic activity due to the downsizing of Solid Energy's Stockton Mine, phasing out of the Holcim cement works, slow start up of the Escarpment Mine and reduced mining activity in the Grey District. RDL have made it clear to the Department that they would encourage a locally based staff pool rather than a 'fly in, fly out' situation in order to generate the most sustained benefit for the Westport and Buller communities. Likewise they have noted that the mine schedule (five days per week/daytime only schedules) is not necessarily the fasted extraction possible but designed for sustained employment over a longer period. The project would also provide notable royalties to the Crown over the course of the mine.

52. RDL have also noted that since the initial reviews in 2014 they have undertaken further analysis of the coal at Te Kuha and found that the resource is of an even higher quality than previously thought. According to RDL the coal has more valuable applications than just for steel making (i.e. as coking coal) and could be used for specialist uses such as activated carbon, for which RDL is looking at the possibility of setting up an activated carbon plant in Westport. If this was to be the case it would likely add to the potential economic benefits of the project, particularly for the Buller district. However, a revised economic analysis will need to be completed prior to the final assessments and decision on access to clarify the potential effects of such a plant.

Landscape

53. Proposed mitigation for landscape effects include a plan for progressive mining and rehabilitation which include stockpiling overburden, backfilling, contouring, and re-vegetating mined areas, alignment and design of the haul road and incidental matters such as the colour of the loading facility (Isthmus, 2015). Essentially these reflect the overall approach for the mine:

- Minimize disturbance footprint
- Progressively rehabilitate where possible, including the use of VDT and recreating the large tarn prior to disturbance
- Recontour final landform to be sympathetic to surrounding topography
- Promote the revegetation of indigenous vegetation

54. Isthmus (2015) notes that from a landscape perspective it is reasonable to conclude that the proposed mitigation would go some way towards mitigating [reducing the severity] of landscape effects (both visual and biophysical). However, Isthmus also agrees with the applicant's landscape assessment that it would "not be possible to fully restore the site's existing qualities and characteristics. The surface topography features and their vegetation associations will be lost, to be replaced by a more generic landform and vegetation cover (and which I understand will consequently also affect ecological communities). While VDT will be possible in part of the site, other areas will require replanting with pioneer species, so that it will be a long time before a mature cover is re-established. The exposure, poor soil and acid conditions mean plant re-establishment will be slow." (Isthmus, 2015, pp. 9-10).

55. The applicant has provided a thorough photosimulation of mine development from various view points in and around Westport including the Lower Buller Gorge. The reader is encouraged to review the photosimulations to gain perspective on the potential visual effects (see updated visual photosimulations, 26 August 2014)

56. The applicant's landscape assessment and Isthmus (2015) are in agreement on the following conclusions on visual effects:

a) All open cast mines have unavoidable visual effects;

b) Unlike most mines on the West Coast, the proposal will be visible from Westport and the Buller Gorge;

c) During mining the proposal will have moderate visual effects from Westport and other locations on the coastal plain, but will have substantial visual effects from some places closer to the site and within the Buller Gorge;

d) Following mining and rehabilitation of the landform, the effects will reduce over time as the site is re-vegetated. However, the landform (including the skyline ridge) will be permanently altered and the difference between the revegetated site and surrounding vegetation will persist for a reasonably long time.

57. Neither the applicant's landscape assessment nor Isthmus (2015) put much weight on the potential impact of the access road on landscape values. Isthmus concludes that for the most part the road could be constructed in a visually unobtrusive manner (subject to detailed design and the proposed mitigation methods).

58. The visual effects from viewpoints in Westport are considered moderate and from other viewpoints in the District (for example Cape Foulwind) as moderate to low. It is worth noting however that there is likely to be a varied response to any visual effect. Isthmus (2015) notes that some people may find the imposition of a coal mine on an otherwise natural landscape very detracting while others may find it sympathetic to the coal mining context within which Westport has historically been developed.

59. The loss of immediate features such as areas of sandstone pavement, rocky outcrops and tors is noted as a substantial effect on the biophysical values at the site. Isthmus (2015) notes that all features would be lost during the course of mining and, while the site would be restored there would be a residual effect [as features would not be recreated].

60. Of most concern to Isthmus (2015) is the potential substantial effects on the Lower Buller Gorge. The current mine plan requires the removal of the existing ridgeline in order to excavate pits and access the desired coal resource. The height of the ridge would be reduced during mining and a modified and un-natural notched effect would be visible upon the ridge from the Lower Buller Gorge. The final landform would likely raise the ridgeline slightly and form a more homogenous topography lacking the existing bluffs and tors and prominent secondary peak.

    Note: while acknowledging there will be a sense of modification along the ridgeline RDL do not feel that the ridgeline would demonstrate an "un-natural notched effect" as described by the department's landscape expert.

61. The ridgeline is visible from a 2 km section of the Lower Buller Gorge and is considered by Isthmus (2015) to be an integral part of the visual experience (for those travelling west down the gorge). As such the effects from the Lower Buller Gorge would be substantial (Isthmus, 2015) and would form a focal point [in the sections where visible] for west bound travelers through the gorge. Isthmus concludes that there would be significant and inappropriate effects on the Lower Buller Gorge as an Outstanding Natural Landscape.

62. Landscape effects in this area would also have implications for the Lower Buller Gorge Scenic Reserve which runs from the Buller River up to the Mt Te Kuha ridgeline and abuts the south eastern boundary of the proposed mine footprint. Any visual and/or aesthetic impacts on the scenic reserve should be avoided. Buffers/setbacks from the scenic reserve boundary (most likely required in any Access Arrangement) could help reduce issues with wind throw and edge effects and largely minimise direct impacts on the scenic reserve. However, they would not negate the visual imposition of the mine on the ridgeline during construction which may reduce the scenic values of the area generally including those of the scenic reserve.

Historic

63. There are no known historic sites in the proposed footprint of the mine or access road. Therefore no impacts on historic features, values or archaeological sites are expected. Standard conditions in any Concession or Access Arrangement would provide for accidental discovery protocol and reporting of any historic feature encountered in the course of construction and operation of the project.

References

BTW. 2014. *Application for Access to Undertake Opencast Coal Mining and Related Activities on Public Conservation Land*. BTW South Ltd, 10 October, 2014.

Copeland. 2014. *Assessment of the Economic Effects of the Te Kuha Coal Mine Project*. Brown, Copeland and Co Ltd, 14 April, 2014.

CRL. 2014. *Te Kuha Mine - Water Management Plan - Information Report*. CRL Energy Ltd, 26 August 2014.

Dickson, 2014. *Te Kuha Mine: Peer Review of Economic Benefit Assessment.* Ian Dickson & Associates, 29 September, 2014.

Isthmus. 2015. *Te Kuha Coal Mine Landscape and Visual Review.* Isthmus, 24 February, 2015.

Marshall, J. 2015. *Te Kuha Coal Mine Review*. Department internal expert review, 12 March, 2014.

Streamlined. 2014. *Te Kuha Mine Application Review*. Streamlined Environmental Ltd, 21 November, 2014.

West Circle. 2014. *Te Kuha Mine – Application Review,* West Circle Ltd, 22 December, 2014.

Wildlands. 2014. *R3470: Review of Fauna Components of An Access Application for the Te Kuha Open Cast Coal Mine, Buller*. Wildlands Consultants Ltd, 29 July, 2014.

APPENDIX 3: Access Arrangement Application and Supporting Information