

4 November 2018

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Ref: 6-XH019.00

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## Lake Dunstan Cycle Trail

Dear Sir

Further to your recent request and our initial Peer Review report dated 11 July 2018 we have now completed a further review of the additional provided information supporting the above Resource Consent Application.

Our previous review of supplied submissions and reports (produced by Geoconsulting Ltd) identified the following key recommendations:

- 1) It is recommended that Geoconsulting review their risk assessment process and complete a qualitative risk assessment of critical sites in order to develop a true appraisal of rockfall risk to the trail construction (including structures), trail users, trail maintenance and operations to be established.
- 2) It is recommended that more detailed inspections and assessments of identified critical sites be undertaken to enable future maintenance and operations requirements to be better evaluated.
- 3) It is recommended that detailed site inspection/investigations are completed at the locations of proposed critical structures in order to ensure their feasibility and design.
- 4) It is recommended that the trail construction plans are compiled and reviewed in terms of potential cut/fill slope profiles and the need for retaining structures. Specific site slope stability analysis may be required to demonstrate a minimum level of acceptable stability exists.
- 5) Trail construction should account for trail surface water drainage and ensure that surface ponding does not occur.
- 6) That all proposed retaining structures and embankments or slope cuttings are assessed by a suitably qualified and experienced geo-professional for both temporary and long term stability.

Subsequent to this initial review Geoconsulting Ltd provided a subsequent Geotechnical Risk Assessment. Our review of the provided report has concluded that:

- The risk assessment report considers the risks posed to cyclists from rockfall along the full length of the trail as opposed to risks from individual sites. This is considered appropriate for consent purposes and considers the overall risks posed to users.

- The conclusion of the report is that risks posed to trail users are close to intolerable. We would agree with this assessment as it is highly likely that some sections of the trail carry a very high risk to users which would be intolerable.
- The report identifies the fact that rockfall risk has the potential to cause significant harm or injury (even fatality). We agree with this and this would concur with Mr Royden Thomsons previous concerns.
- The report concludes that the risks posed to trail users can “to a degree” be managed by BOTH signage and remedial management actions completed either during construction or post a natural event (heavy rainstorm or EQ), eg scaling and rockfall mitigation.
- Geoconsulting Ltd identify key areas requiring scaling and further mitigation as being the areas below steep/overhanging cliffs and in close proximity to important structures (bridges). We would agree with this statement.

As per our previous review we consider that the trail passes through some areas that are particularly high risk in terms of rockfall potential and will require a level of mitigation and enabling works to reduce the potential for rockfall as part of the construction process.

On this basis our opinion would be:

- 1) The construction of the trail is feasible, subject to adequate design and installation of appropriate mitigation measures to afford protection to construction works, trail users and adjoining land.
- 2) The proposed trail route may require some minor deviations to avoid areas of extreme risk but only if detailed inspections reveal that scaling and/or other forms of passive mitigation are not feasible or cannot lower the perceived risk far enough to acceptable levels.
- 3) The trail will be a potentially high risk trail in terms of personal safety and risk tolerance.
- 4) A plan of proposed remedial works (scaling, meshing, bolting) and the location of works should be supplied prior to construction as part of the trail consent conditions.
- 5) A monitoring and management plan is required for the trail ensuring that emerging risks are suitably managed and that rockfall risk is proactively managed.
- 6) Signage and hazard warning boards form part of the trail signage and that signs be submitted to the approving body prior to construction for review and approval.
- 7) Annual inspection of the known rockfall sections be completed to ensure that rockfall risks can be managed pro-actively combined with an annual maintenance programme of risk reduction activities if deemed necessary.
- 8) Any rock bolting, rock meshing or barriers to be adopted are designed and signed off by a suitably qualified CPENG geotechnical engineer.
- 9) Detailed records and observations of inspections and any remedial scaling, rock removal works are maintained as part of the management plan for the trail.
- 10) That any embankment or constructed slope shall be appropriately designed by a suitably qualified and experienced geo professional.
- 11) Any retaining structure over 1.00m in height shall be designed to an appropriate standard by a suitably qualified and experienced engineer.

We trust the above is sufficient for your present requirements and provides sufficient detail to enable you to compile appropriate conditions for the consent application.

Should you require any additional information or clarification of any point please do not hesitate to contact us.

Regards

A handwritten signature in blue ink, appearing to read 'Rob Bond', is positioned below the 'Regards' text.

Rob Bond CPENG (Geotechnical)  
Principal Geotechnical Engineer  
Work Group Manager Geotechnical and Environmental