

This is the exhibit marked "A" referred to in the
annexed affidavit of Alison Deulin
sworn at ~~Dunedin~~ before me this 12 day of February
2021

.....
A Solicitor of the High Court of New Zealand

Our Reference: A1422378

Consent No. RM20.383.01

LAND USE CONSENT

Pursuant to Section 104C of the Resource Management Act 1991, the Otago Regional Council grants to:

Name: Orchard Road Holdings Limited
Address: Unit 2, 14 Teviot Street, Dunedin

To undertake earthworks for the purpose of residential development

For a term expiring 10 December 2022

Location: Approximately 150 metres southwest of the intersection of West Meadows Drive and Sapphire Spring Rise, Wanaka

Legal description: Lot 904 DP526882 (earthworks) and Lot 19 DP509888 (offsite disposal)

Map reference of centre point: NZTM2000 1292882E 5042186N (earthworks)
NZTM2000 1294675E 5040782N (offsite disposal)

Conditions Specific

1. The activities authorised by this consent must be carried out in accordance with the plans and all information submitted with the application, detailed below, and all referenced by the Consent Authority as application number RM20.383:
 - a) Consent Application dated 11 November 2020, lodged by Willowridge Developments Limited; and
 - b) Environmental Management Plan (Revision C) dated 25 November 2020, prepared by The Property Group.

If there are any inconsistencies between the above information and the conditions of this consent, the conditions of this consent will prevail.

2. This consent must be exercised in accordance with the Environmental Management Plan (Revision C) dated 25 November 2020, attached to the consent as Appendix I, or any subsequent versions that provide further avoidance or mitigation of potential or actual adverse effects.
3. a) The EMP and any subsequent versions must be prepared by a Suitably Qualified and Experienced Person and must contain sufficient detail to address the following matters:
 - i) Specific erosion and sediment control works (locations, dimensions, capacity etc);

- ii) Supporting calculations and design drawings;
 - iii) Catchment boundaries and contour information;
 - iv) Details of construction methods;
 - v) Timing and duration of construction and operation of control works;
 - vi) Details relating to the management of exposed areas; and
 - vii) Monitoring and maintenance requirements.
- b) The EMP must be updated when:
- i) The construction program moves from one Stage to another; or
 - ii) Any significant changes have been made to the construction methodology since the original plan was accepted for that Stage; or
 - iii) There has been an Environmental Incident and investigations have found that the management measures are inadequate.
- c) Any updated versions of the EMP must be submitted to the Consent Authority immediately for review and acceptance. Works on a new Stage must not commence until the Consent Authority has confirmed in writing that the updated EMP has been accepted. If no such confirmation has been received within 15 working days of the updated EMP being submitted, then it can be assumed that it has been accepted.
4. The Consent Holder must establish and implement document version control. The Consent Authority must be provided with an electronic copy of the most current and complete version of the EMP at all times.
5. Prior to the first exercise of this consent, the Consent Holder must nominate an Environmental Representative for the works programme and provide contact details to the Consent Authority.
6. Prior to commencing any work on site, the Consent Holder must ensure that all staff (including all sub-contractors) involved in, or supervising, works onsite have attended an Environmental Site Induction. A record of attendance must be maintained and made available to the Consent Authority upon request.
7. The Consent Holder must ensure that all personnel working on the site are made aware of, and have access at all times to:
- a) The contents of this document; and
 - b) The Environmental Management Plan.
- Copies of these documents must be present on-site at all time while the work authorised by this consent is being undertaken.
8. Prior to bulk earthworks operations for the initial stage or any subsequent new stage of works, the Consent Holder must install erosion and sediment controls in accordance with the EMP as well as provide As-Built Documentation for these controls prepared by a Suitably Qualified and Experienced Person. These measures must remain in place for the duration of the project, until all exposed areas of earth are permanently stabilised.

Performance Monitoring

9. a) The Consent Holder must undertake and document weekly and Pre and Post-Rain Event site inspections.

- b) A Rain Event is defined as any precipitation event that generates overland flow.
- c) Records of these inspections must be submitted along with the Monthly Environmental Report required by Condition 13.

10. The Consent Holder must engage a Suitably Qualified and Experienced Person to monitor the site monthly to;
- a) Ensure that the site is complying with the EMP; and
 - b) Identify any new environmental risks arising that could cause an environmental effect and suggest alternative solutions that will result in more effective and efficient management.

The outcome of these inspections must be included in the Monthly Environmental Report referred to in Condition 13 below.

11. The following standards apply to any discharge of stormwater or surface water runoff from the site:
- a) Total Suspended Sediment (TSS) - No increase in TSS from upstream of the site (where clean water is captured) to downstream of the site where that stormwater or surface flows beyond the site boundary.
 - b) pH - 6.5-8.5 (applicable when flocculants have been applied)
 - c) Hydrocarbons or tanins - no visible trace
 - d) Waste - no visible waste/litter

Samples must be collected and analysed for the parameters and at the frequencies specified in the current version of the Environmental Management Plan.

12. a) In the event of one or more of the limits set out in Condition 11 being exceeded, the Consent Holder must notify the Consent Authority within 12 hours of becoming aware of the incident, and, within one week of the exceedance being detected:
- i) Investigate the cause of the exceedance;
 - ii) Take remedial action to ensure that no further exceedances occur; and
 - iii) Complete and submit an Incident Report Form to the Consent Authority.
- b) Within one month of the exceedance being detected, the Consent Holder must update the EMP as necessary and provide a copy to the Consent Authority.
13. During the exercise of this consent, the Consent Holder must complete and submit reporting to the Consent Authority in the form of a Monthly Environmental Report. The Monthly Environmental Report must be submitted within 5 working days of the end of each month. The Monthly Environmental Report must include reporting and statements actively addressing but not limited to the following that occurred during the reporting month:
- a) Updates to the EMP;
 - b) Weekly Site Inspections – number of inspections completed, and summary of corrective actions undertaken;
 - c) Reporting on monitoring undertaken (including Pre- and Post-Rainfall Events and water quality sampling) and whether non-conforming results were obtained; and
 - d) Positive environmental outcomes achieved and opportunities identified by the consent holder.

General

14. The Consent Holder must, within 24 hours, inform the Consent Authority of any complaints received from any person about activities on the site associated with the consented works.
15. a) On completion of each stage of the earthworks, all earthworked areas must be top-soiled and revegetated or otherwise permanently stabilised.
b) The Consent Holder must notify the Consent Authority in writing of the completion of each stage of earthwork no less than 10 working days following the completion of works, and must provide photographs of the area/s where work has been undertaken. Photographs must be in colour and be in JPEG form.
16. Hours of operation for earthworks activities must be limited to Monday to Saturday (inclusive): 8.00am to 6.00pm, excluding public holidays.
17. In the event that an unidentified archaeological site is located during works, the following will apply;
 - a) Work must cease immediately at that place and within 20 metres around the site.
 - b) All machinery must be shut down, the area must be secured, and the Heritage New Zealand Pouhere Taonga Regional Archaeologist and the Consent Authority must be notified.
 - c) If the site is of Maori origin, the Consent Holder must also notify the appropriate iwi groups or kaitiaki representative of the discovery and ensure site access to enable appropriate cultural procedures and tikanga to be undertaken, as long as all statutory requirements under legislation are met (Heritage New Zealand Pouhere Taonga Act 2014, Protected Objects Act 1975).
 - d) If human remains (koiwi tangata) are uncovered the Consent Holder must advise the Heritage New Zealand Pouhere Taonga Regional Archaeologist, NZ Police, the Consent Authority and the appropriate iwi groups or kaitiaki representative and the above process under (c) will apply. Remains are not to be disturbed or moved until such time as iwi and Heritage New Zealand Pouhere Taonga have responded.
 - e) Works affecting the archaeological site and any human remains (koiwi tangata) must not resume until Heritage New Zealand Pouhere Taonga gives written approval for work to continue. Further assessment by an archaeologist may be required.
18. The Consent Authority may, in accordance with Sections 128 and 129 of the Resource Management Act 1991, serve notice on the Consent Holder of its intention to review the conditions of this consent during the period of three months either side of the date of granting of this consent each year, or within two months of any enforcement action taken by the Consent Authority in relation to the exercise of this consent, for the purpose of:
 - a) Determining whether the conditions of this consent are adequate to deal with any adverse effect on the environment that may arise from the exercise of the consent and is appropriate to deal with at a later stage, or which becomes evident after the date of commencement of the consent;

- b) Ensuring the conditions of this consent are consistent with any National Environmental Standards, relevant regional plans, and/or the Otago Regional Policy Statement;
- c) Reviewing the frequency of monitoring or reporting required under this consent;
- d) Amending the monitoring programme set out in accordance with Conditions 9, 10 and 11.

Notes to the Consent Holder

1. *Under the Heritage New Zealand Pouhere Taonga Act 2014 an archaeological site is defined as any place in New Zealand that was associated with human activity that occurred before 1900 and provides or may provide, through investigation by archaeological methods, evidence relating to the history of New Zealand (see Section 6). For pre-contact Maori sites this evidence may be in the form of Taonga (artefacts) such as tuki (adzes) or flake tools as well as bones, shells, charcoal, stones etc. In later sites of European/Chinese origin, artefacts such as bottle glass, crockery etc. may be found, or evidence of old foundations, wells, drains or similar structures. Pre-1900 buildings are also considered archaeological sites. Burials/koiwi tangata may be found from any historic period. Archaeological sites are legally protected under Sections 42(1) & (2) of the Heritage New Zealand Pouhere Taonga Act 2014. It is an offence under Section 87 of the Heritage New Zealand Pouhere Taonga Act 2014 to modify or destroy an archaeological site without an Authority from Heritage New Zealand Pouhere Taonga irrespective of whether the works are permitted, or a consent has been issued under the Resource Management Act 1993 or Building Act 1991.*
2. *If you require a replacement consent upon the expiry date of this consent, any new application should be lodged at least 6 months prior to the expiry date of this consent. Applying at least 6 months before the expiry date may enable you to continue to exercise this consent under section 124 of the Resource Management Act 1991 until a decision is made on the replacement application (and any appeals are determined).*
3. *The Consent Holder is responsible for obtaining all other necessary consents, permits, and licences, including those under the Building Act 2004, the Biosecurity Act 1993, the Conservation Act 1987, and the Heritage New Zealand Pouhere Taonga Act 2014. This consent does not remove the need to comply with all other applicable Acts (including the Property Law Act 2007 and the Health and Safety at Work Act 2015), regulations, relevant Bylaws, and rules of law. This consent does not constitute building consent approval. Please check whether a building consent is required under the Building Act 2004.*

4. *Where information is required to be provided to the Consent Authority, this must be provided in writing to compliance@orc.govt.nz. The email heading must reference this consent and the condition/s the information relates to.*

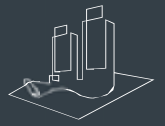
Issued at Dunedin this 10th day of December 2020



Joanna Gilroy
Manager Consents



STRATEGIC PROBLEM SOLVING FOR INNOVATIVE OUTCOMES



Environmental Management Plan



(Revision C)

Alpha Series Stage 4, Wanaka

Orchard Road Holdings Limited

November 2020

Document Control

Title	Alpha Series Stage 4 – Environmental Management Plan
Client	Orchard Road Holdings Limited
Our Ref.	716834
Prepared by	Quinn McIntyre (MSc, CEnvP, NZPI), Planning Manager – South Island  
Reviewed by	Tim McDougall (Paterson Pitts Group Limited) and Alison Devlin (Orchard Road Holdings Limited)

Revision Register

Rev	Rev Date	Rev Details	Prepared by	Reviewed by
A	07.10.20	Final for Construction	QM	TM
B	29.10.20	Revised following discussion with QLDC	QM	TM
C	25.11.20	Revised following discussion with ORC	QM	TM/AD

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EMERGENCY CONTACTS

Please contact the Environmental Representative prior to making contact with the following emergency contact list. Contact made with any of the following should be undertaken with due consultation of the Environmental Representative or Project Manager.

Element	Emergency Contact	Details
Pollution incident	Otago Regional Council (ORC) Spill Hotline	0800 800 033
Environmental Complaint	Environmental Representative	Tim McDougall – 020411 23020
Discovery of contaminated land	Environmental Representative	
Unexpected heritage finds	Environmental Representative	
Discovery of human remains	New Zealand Police	111
Fire including bushfire	Fire and Emergency New Zealand (FENZ)	111
Public utilities	Queenstown Lakes District Council	03 441 0499
Internal contacts	Project Manager	Brendan Fenn – 027 435 2133
Internal contacts	Site Engineer	Steve Dickey – 027 433 3058
Internal contacts	Environmental Consultant	Quinn McIntyre – 021 022 600 46

1.0 INTRODUCTION

1.1 Environmental Management Plan

On behalf Orchard Road Holdings Limited ('ORHL'), The Property Group ('TPG') has prepared this Environmental Management Plan ('EMP') to outline the mitigation measures to manage the environmental effects associated with construction phase of Alpha Series Stage 4.

The current project was consented under RM200689 and allows earthworks associated with the formation of a stormwater system, roads and future building areas.

This EMP will demonstrate how the best practice construction environmental management will be undertaken throughout the continuing project. This report will also provide technical guidance to the contractors working onsite for environmental management.

This EMP is prepared according to the *QLDC Guidelines for Environmental Management Plans, June 2019* ('The Guidelines'). This EMP is prepared according to the EMP Categories outlined in The Guidelines, this project is considered to have a 'High' environmental risk level and as such this EMP has been prepared on that basis.

The EMP is intended to be effective and practical. It provides a commitment to conforming to applicable environmental legislation (i.e. the *Resource Management Act, 1991* and relevant National Environmental Standards), regional and district planning documents and associated guidelines and standards along with continual improvement in environmental performance. It details how environmental safeguards outlined within relevant consents and specialist reports will be addressed. The principle purpose of the EMP is to be a reference manual for construction personnel, which contains mitigation measures to be implemented to manage the potential ongoing environmental effects of the construction works.

The Alpha Series Stage 4 Project requires that the Project Team continue to implement and develop the EMP requirements as defined in this document throughout the construction phase. This will ensure continual improvement and will account for:

- Changes to the construction program
- Improvements/changes to environmental management techniques
- Objectives and target review

1.2 Site Overview

The site is located approximately 1.5km from the Wanaka Town Centre. The land is surrounded by large rural and rural lifestyle blocks to the west, south-west and south, while to the north is the established Meadowstone residential area and to the east is the previous stages of Alpha Ridge, also an established residential area. To the south-east is the relatively recent West Meadows residential development and to the north-east is the Otago Fish and Game Council property containing the headwaters of Bullock Creek.

The stage 4 site is located on north-western side of the overall subdivision to the immediate south of the Oak Tree

Reserve. The original site topography comprises a north facing terrace slope which grades into sub-horizontal lowland in the northern part of the site. The hummocky surface of the terrace slope rings the southern and western boundaries of the site while the lowland is dissected by a series of minor dry channels and low-lying ridges trending north-east to south-west.

A water race exists at the north of the site and runs between the site and the Oak Tree Reserve before running into the wider Meadowstone stormwater system.



Figure 1: Aerial view of Stage 4 site and key environmentally sensitive locations and receptors

1.2 Project Overview

The scope of construction works generally involves:

- Installation of erosion and sediment controls
- Clearing of vegetation
- Earthworks (cut & fill) to bench site
- Construction of road and associated services
- Rehabilitation of disturbed areas.

1.3 Scope of the EMP

The EMP applies to all of the Project activities during construction phase of the earthworks and subdivision.

The aim is to reduce the environmental effects of the Project construction activities on the environment and stakeholders, whilst maintaining a high standard ensuring compliance to the approved resource consent conditions and the The Guidelines.

The EMP includes as a minimum the following:

- Identification of significant aspects and environmental risks
- Strategies to manage environmental aspects and risks
- Includes all mitigation measures committed to in the relevant Resource Consents and the Guidelines
- Evolves as mitigation measures are refined and site inspection results improve (driving continuous improvement)
- Includes contingency planning
- Provides a framework for impact monitoring, reporting, reviewing and improving
- Identified roles and responsibilities
- Includes procedures for investigating and resolving environmental non-conformances and initiating corrective and preventative actions
- Including a series of 'environmental operating procedures' for each environmental element according to The Guidelines

1.4 EMP Updates

To drive continual improvement of environmental management on the Project, the EMP will be regularly reviewed through ongoing monitoring of the site to ensure that the document remains fit for purpose.

Changes to the EMP may be implemented as a result of the following:

- The construction program moves from one stage to another
- Significant changes to the construction methodology
- To respond to improvements identified as a result of an Environmental Incident, management failure or corrective action
- Where directed by QLDC's Monitoring and Enforcement team.

All updates to the EMP shall be managed through document control procedures as recorded on page 2 of the EMP and shall be submitted to QLDC for acceptance at RCMonitoring@qldc.govt.nz.

1.5 Suitably Qualified and Experienced Professional

This EMP has been prepared by Quinn McIntyre of The Property Group. Quinn is a Certified Environmental Practitioner (CEnvP) which meets the qualifications criteria required by The Guidelines.

Quinn has worked in various environmental roles on a range of construction projects, including bulk earthworks in

New Zealand and Australia. His previous environmental roles included management of all environmental elements including erosion and sediment control and due to the sensitivity of that environment included monthly environmental audits undertaken by Quinn including auditing the erosion and sediment controls onsite.

It is considered that Quinn meets the criteria of a Suitably Qualified and Experienced Professional (SQEP) for the purposes of preparing this EMP and overseeing the environmental aspects of this project.

2.0 CONSTRUCTION METHODOLOGY

2.1 Sequencing of Works

Construction on this project will continue according to the following steps which will ensure that the remainder of the Project is constructed as efficiently as possible whilst achieving the environmental objectives outlined in this EMP. The staging order has been selected to ensure the earthworks undertaken onsite do not cause any sediment-laden water to leave the site through the natural overland flow channels, the water race or through the stormwater inlet at West Meadows Drive.

This methodology will need to be read in conjunction with the Erosion and Sediment Control Plan attached as **Appendix 1** and the erosion and sediment control device detail outlined in Section 4 of this EMP.

Preliminary Works

Step 1 – Install stabilised access to protect West Meadows Drive from mud-tracking onto road and stormwater drains.

Step 2 – Install demarcation fencing around dripline of oak tree copse. This is important to ensure that subsequent excavation of sediment basin does not encroach into dripline.

Stage 1 Works

Step 3 – Install clean water diversion bunds above Stage 1 works area as outlined on ESCP, including Novacoil pipes to water race.

Step 4 – Excavation, shaping and stabilisation of new sediment basin at north-eastern corner. Move Novacoil pipes away from works area during the working day and ensure these are reinstated back in the water race at days end. Care will be required to stay outside of the dripline area demarcated by the fencing. This includes underground work where undercutting of the fence will be avoided noting the internal batter shape of the sediment basin.

Step 5 – Working from the inlet of the new sediment basin inlet and progressing upslope, install dirty water diversion channel adjacent the sediment basin along with additional treatment train devices as outlined in section 4 below.

Step 6 – Undertake bulk earthworks. Including benching and final shaping.

Step 7 – Revegetate benched lot areas as soon as practicable. Keep Novacoil pipes carrying clean water to water race intact.

Stage 2 Works

Step 8 – Install clean water diversion bunds above Stage 1 works area as outlined on ESCP, including Novacoil pipes to water race.

Step 9 – Working from the inlet of the new sediment basin inlet and progressing upslope, install dirty water

diversion channel adjacent the sediment basin along with additional treatment train devices as outlined in section 4 below.

Step 10 – Undertake bulk earthworks. Including benching and final shaping.

Step 11 – Revegetate benched lot areas as soon as practicable. Keep Novacoil pipes carrying clean water to water race intact.

Triton Vault Installation

Step 12 – Excavate below sediment basin to install Triton Vault infrastructure. Move Novacoil pipes away from works area during the working day and ensure these are reinstated back in the water race at days end. Care will be required to stay outside of the dripline area demarcated by the fencing. Care also required to avoid damaging the form and function of the dirty water diversion channel adjacent the sediment basin. Use of temporary culverts may assist.

Road Construction

Step 13 – Construct road and install services.

Decommissioning

Step 14 – Remove erosion and sediment control devices once stabilisation has occurred across the entire site (i.e. 80% vegetative cover). All sediment to be removed from the sediment pond prior to commissioning of the Triton Vault.

2.2 Hours of Operation

From Monday to Saturday, site works will begin at 0730 hours to allow for set-up and pre-start checks. Noise producing plant, vehicles or activities may be undertaken between 0800 and 1800.

No works are to be undertaken from the site on Sunday or Public Holidays, however this does not limit emergency environmental management works or works required for incident investigation or response.

3.0 EMP IMPLEMENTATION

3.1 Environmental Roles and Responsibilities

Individual environmental responsibilities for the Project are detailed below:

Role	Environmental Responsibilities
<p>Project Manager</p> <p>Brendan Fenn – 027 435 2133</p>	<p>The Project Manager has responsibility for the effective implementation of the EMP and has overall responsibility for the environmental performance of the project.</p> <p>The Project Manager is primarily responsible for:</p> <ul style="list-style-type: none"> - Ensuring adequate resources are in place to implement the EMP - Ensuring that project objectives and targets are achieved in accordance with the relevant EMP - Ensuring Project Managers, Supervisors, Employees and Sub-Contractors operate within the guidelines of the EMP - Ensuring that an EMP is prepared and that environmental standard, processes and procedures meet relevant resource consent conditions - Overseeing the successful implementation, monitoring and review of the EMP - Providing reporting of environmental incidents to the QLDC and other periodic environmental reports to QLDC as required by The Guidelines - Ensuring that inspections and audits are carried out in accordance with the relevant EMP - Restrict or stop any activity on the Project that has the potential to or has caused environmental effects - Delegate authority of the above responsibilities.
<p>Site Supervisor</p> <p>TBC</p>	<p>The Site Supervisors are accountable to the Project Manager and responsible for:</p> <ul style="list-style-type: none"> - Ensuring they understand and comply with EMP - Ensuring that site employees and sub-contractors are working in compliance with environmental requirements and work activities are not impacting the environment - Coordinating the implementation of the EMP - Identifying resources required for the implementation of the EMP - Coordinating actions in emergency situations/rapid stabilisation of site and allocating appropriate resource for these activities - Restrict or stop any activity on the Project that has the potential to or has caused environmental effects - Ensuring that adequate instructions and information is provided to Operators which relate to environmental risks onsite

<p>Environmental Representative</p> <p>Tim McDougall 021 411 230 20</p>	<p>The Environmental Representative is accountable to the Project Manager and supports the Project Manager and Site Supervisor in the day to day implementation of the EMP. This is a key environmental role for the Project and includes the following responsibilities:</p> <p><i>Coordinate the Implementation of the EMP</i></p> <ul style="list-style-type: none"> - Ensure installation of environmental controls as per the EMP - Undertake environmental site inspections of the project including end-of-day inspections of controls during works - Oversee the maintenance and improvement of defective environmental controls - Undertake Environmental Incident reporting. <p><i>Communication</i></p> <ul style="list-style-type: none"> - Keep project leadership informed of environmental performance of the project - Inform staff of procedures and constraints applicable to managing specific environmental issues - May be responsible for providing environmental inductions to all staff and sub-contractors. <p><i>Complaints and Incidents</i></p> <ul style="list-style-type: none"> - Assist the project leadership in attending to Environmental Incidents and Complaints. <p><i>Familiarity</i></p> <p>The Environmental Representative will be familiar with:</p> <ul style="list-style-type: none"> - Environmental aspects of the project - Environmental Management Plan - Best practice erosion and sediment control from: <ul style="list-style-type: none"> • Guidance Document 2016/005: Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region (GD05); and/or, • Similar Regional Council guidelines from throughout New Zealand based on GD05 or internationally recognised best practice.
<p>Environmental Consultant (SQEP)</p> <p>Quinn McIntyre 021 022 600 46</p>	<p>The Environmental Consultant will oversee the environmental management of the site and provide technical environmental management advice as and when required. The Environmental Consultant will undertake monthly monitoring of the site in accordance with The Guidelines to ensure that the EMP continues to provide adequate environmental management for the Project.</p> <p>The Environmental Consultant will deliver the Site Environmental Induction to core staff and also prepare and submit monthly reporting to Council.</p>
<p>All staff</p>	<p>All Project staff have responsibility for their own environmental performance and the impact they have on Project environmental performance. In particular, all staff are required to:</p>

	<ul style="list-style-type: none"> - Undertake all activities in accordance with the requirements of the EMP - Ensure they are aware of the contact person related to environmental matters - Report to the Site Supervisor or Environmental Representative, any activity that has the potential to or has resulted in an Environmental Incident.
Subcontractors	<p>The Project has a responsibility to ensure that all persons involved with the Project, including Subcontractors/Suppliers/Consultants and their employees shall comply with relevant environmental requirements. All subcontractor personnel are considered equivalent to Alpha Series Project staff personnel. This includes all aspects of environmental management and control; their responsibilities will mirror that of Alpha Series Project staff.</p> <p>All subcontractors and their employees shall participate in the Site Environmental Induction prior to commencing works.</p>

3.2 Site Environmental Induction

All staff and subcontractors will attend a Site Environmental Induction to ensure they are aware of their environmental responsibilities. This will involve an induction session for all regular site staff prior to ground-disturbing activities with subcontractors to be inducted as they come onto the Project prior to undertaking work.

The Site Environmental Induction will include the following (document attached as **Appendix 3**):

- Basic roles and responsibilities for environmental management
- Specific locations within the site of environmental significance or risks, including Sensitive Environmental Receptors
- Scope and conditions of resource consents applicable to the works
- The limit of clearing and earthworks for each Stage of works
- Environmental management measures stipulated in the EMP
- Procedures of notifying of potential Environmental Incidents
- Procedures for managing storm events (wind and rain)

The induction will be delivered to core staff by the Environmental Consultant and then from that point on for subcontractors and new staff by the Environmental Representative (see section 3.1). This will ensure that core staff are appropriately familiar with the environmental management approach for the site and will also provide the Environmental Representative with an example of how to deliver inductions from that point on.

The Project will maintain a register of all persons inducted and the register is attached as **Appendix 4**.

3.3 Environmental Inspections

Regular environmental inspections will be undertaken of the site to confirm that the environmental management of the site is capable of preventing environmental effects of the construction activity. Details of the specific environmental inspections to be undertaken by the Environmental Representative are outlined in the following

table:

Environmental Inspection	Timing	Purpose
Weekly Inspection	Every 7 days	<p>A comprehensive environmental inspection of the site to verify that:</p> <ul style="list-style-type: none"> - The management measures prescribed in the EMP for all environmental elements are present, functional and adequate - Identify any activities that may cause an environmental incident or actual or potential environmental effects - Identify maintenance requirements for implemented management measures. <p>All weekly inspections will be recorded on the Weekly Site Inspection proforma (attached as Appendix 5).</p>
End-of-Day Inspection	End of each working day during days when earth is disturbed or any overland flow channels are changed by the construction program	<p>To ensure that:</p> <ul style="list-style-type: none"> - Erosion and sediment controls are present, functional and adequate - Identify any activities that may cause an environmental incident or actual or potential environmental effects. <p>This inspection will inform any improvement work required for the following day unless an issue is identified that presents risk of a potential environmental incident occurring overnight. This would warrant immediate remediation.</p> <p>Observations and remediation measures taken will be recorded in a daily job diary. This will be by exception only.</p>
Pre-Event Inspection	Prior to Significant Rain Event ¹	<p>To ensure that:</p> <ul style="list-style-type: none"> - Erosion and sediment controls are present, functional and adequate to perform in the upcoming event based upon the forecast accumulation of rainfall. <p>This inspection will inform any preventative work required prior to the event and may also result in escalation of the Rapid Response Procedure (see section 4.4).</p> <p>Observations and preventative measures taken will be recorded in a daily job</p>

¹ For the purposes of this EMP a significant rain event is defined as any rain event that is capable of generating overland flow.

		diary.
Post-Event Inspection	Immediately following a Significant Rain Event	<p>To identify any failures of the erosion and sediment control devices that require remediation and if required if any environmental incidents have occurred that require notification to QLDC/ORC.</p> <p>Observations and remedial actions shall be recorded in a daily job diary.</p> <p>Any environmental incidents shall result in the completion of an Environmental Incident Report being completed and submitted to QLDC within 10 working days of the incident occurring.</p>

3.4 Monthly Monitoring by SQEP

The site will be monitored by the Environmental Consultant (SQEP) to ensure that the EMP is being implemented such that potential or actual environmental effects are appropriately managed. This monitoring will identify any unforeseen issues that may be arising and will advise on alternative environmental solutions that will result in more effective environmental management. Where these situations arise the SQEP will update the EMP accordingly and submit to QLDC for acceptance. Any updates will be managed through document control. As the Environmental Consultant who is also a SQEP will be working with close supervision of the site, no independent environmental audits are considered necessary.

3.5 Monthly Environmental Reporting

The project will complete and submit exception reporting to QLDC in the form of a monthly environmental report within 5 working days of the end of each month.

The monthly environmental report will include the following information:

- Updates to the EMP and the Erosion and Sediment Control Plan ('ESCP') made during the month
- Number of weekly and pre and post rain event site inspections completed, and summary of corrective actions undertaken
- Summary of monitoring observations by SQEP and where any corrective actions were advised and whether they have been completed
- Positive environmental outcomes achieved and opportunities.

This reporting will be completed and submitted to Council by the Environmental Consultant (SQEP).

3.6 Environmental Incident Management

3.6.1 Environmental Incident Response

Environmental incidents shall be responded to immediately as the Project team becomes aware of them. This will involve:

- Immediate cessation of the activity that caused the incident
- Investigation into the cause of the incident
- Contact Environmental Consultant for advice where site staff are unsure of how to control (to be engaged by the Project Manager)
- Formulation of a solution to bring the incident under control or remediate any environmental damage
- Implement any remediation works.

3.6.2 Notification of Environmental Incidents

The Project Manager shall notify QLDC and/or ORC of the details of any Environmental Incident within 12 hours of becoming aware of the incident. This will be through a phone call to Council Monitoring and Enforcement staff.

3.6.3 Environmental Incident Reporting

The Project Manager shall provide an Environmental Incident Report within 10 working days of the incident occurring. The Incident Report proforma is attached as **Appendix 6**.

3.7 Records and Registers

The following records will be collated onsite and shall be available to QLDC on request within 24 hours of a request being made by a QLDC official. These records will include the following:

- Environmental Induction attendance register
- Environmental Incident reports and associated corrective actions undertaken
- Complaints register and associated corrective actions undertaken
- Daily diary entries (including any end-of-day inspection observations)
- Post-Rain event inspection observations and corrective actions
- Weekly Site Inspection checklists
- Monitoring results (e.g. water quality)
- EMP Non-conformance register (based on weekly inspection results or otherwise identified) and associated corrective actions taken

All records will be kept in an organised central location and will be managed by the Project Manager. All records will be uploaded or amended by the Environmental Representative and Environmental Consultant as inspections, monitoring, corrective actions, etc are completed. The Environmental Consultant will audit the records monthly to ensure they are being carried out noting that these records will be required by the Environmental Consultant for monthly reporting to QLDC.

3.8 Complaints Procedure

ORHL aims to conduct its business activities in a professional manner with minimal to no impact on others not directly involved with the works being undertaken.

In the event that a complaint is lodged directly or indirectly, the complaint is to be recorded and an investigation

is to be carried out. Upon notification the Project Manager is to be informed of the complaint. A response shall be provided to the complainant, acknowledging receipt of the complaint and outlined proposed controls that are to be implemented. At the completion of the investigation, all corrective actions are to be closed out and a follow up of the original complaint is to be conducted to ensure the actions implemented have been effective.

Any complaint when investigated was found to be warranted shall be recorded as an environmental incident and shall be managed in accordance with the procedure outlined in section 3.6 above.

All complaints will be recorded on the Complaints Register (proforma attached as **Appendix 7**).

3.9 EMP Non-Conformance and Corrective Actions

Any non-conformances found during site inspections, various monitoring or as a result of incidents or complaints shall be recorded in the EMP Non-Conformance Register. This will detail when corrective actions are due by, how they were to be carried out and date when they were closed-out and shall be reported upon in the Monthly Environmental Report to QLDC. The EMP Non-Conformance Register is attached as **Appendix 8**.

This measure is to ensure that no issues slip through the gaps or escalate into much larger issues. It will also provide a clear record of evidence that can be used to defend any potential complaint or formal enforcement action.

4.0 EROSION AND SEDIMENT CONTROL MEASURES

4.1 Performance Criteria

To avoid the discharge of any sediment-laden water (defined as over 50mg/L Total Suspended Sediment) into the water race, Council stormwater networks or across the boundary of the site.

4.2 Management Measures

4.2.1 Erosion and Sediment Control Principles

Erosion and sediment control ('ESC') devices shall be installed, maintained and decommissioned in accordance with the following principles:

- a) Erosion and sediment controls are integrated with construction planning
- b) A 'treatment train' approach so that the sediment retention devices operate as efficiently and effectively as possible
- c) Separation of 'clean' and 'dirty water' with clean water to be diverted around the site to minimise the volume of dirty water needing management onsite
- d) The extent and duration of soil exposure is minimised
- e) Soil erosion is minimised as far as reasonable and practical
- f) Controls are maintained in proper working order at all times
- g) The site is monitored, and ESC practices adjusted to maintain the required performance standard
- h) Avoidance of sediment discharge off site
- i) Progressively stabilise and revegetate disturbed or completed areas.

4.2.2 Objectives of the ESCP

This ESCP is based upon the following key objectives to be achieved during the life of the construction program:

- The avoidance of sediment-laden water into Council's stormwater network is paramount
- A treatment train approach will be employed to ensure the sediment retention devices can function as efficiently as possible during the construction-phase

4.2.3 As-built verification

Once the ESC devices and treatment train has been constructed, as-built documentation will be signed off to verify that the controls have been installed in accordance with the approved ESCP.

4.2.4 Inspections

There are several types of inspections/monitoring to be undertaken throughout the construction project to ensure that the Project understands the site's level of exposure at critical times:

- Daily inspections of ESC devices to ensure all devices are installed correctly, fully functional, provide for at least 80% capacity and identification for any new erosion opening onsite that was not anticipated by the

ESCP or the ESCP is not adequately controlling the issue. This will be undertaken immediately prior to the end of each working day on days that have involved any disturbance of earth or to overland flow paths.

- Pre-storm event inspections to ensure the same outcomes as the daily inspections and inform the rapid response procedure.
- Storm event monitoring to ensure the ESC devices continue to function correctly and inform any necessary emergency responses. Much of this monitoring will focus on the functioning and capacity of the SRPs and also check that no errant stormwater is crossing the boundary of the site. Stormwater inlets along the downstream roading network are to be monitored during the event.
- Post-storm event inspections to ensure the same outcomes as the daily inspections, specifically to identify any necessary maintenance work or new controls.
- Weekly Environmental Inspections by the Environmental Representative will ensure that the site is functioning in accordance with the ESCP
- Monthly Environmental Inspections from the SQEP will ensure that the ESCP is still fit for purpose.

4.2.5 Guidance on Erosion and Sediment Control Devices

The effective control of surface water will be achieved through the utilisation of carefully selected ESC devices to achieve a certain purpose. These guidelines to the devices employed on this project should be read in conjunction with the ESCP attached as **Appendix 1** of this document.

Erosion and sediment control measures will be installed in general accordance with *Guidance Document 2016/005: Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region* (GD05).

4.2.5.1 Clean water diversion bunds

Clean-water runoff diversion bunds will be utilised onsite to divert clean water from above the earthworks extents from entering the contributing catchment. The diversion bunds will be placed to funnel clean water to the drop-pipe structures. These shall be constructed as per **Figure 2** below (complete guidelines on pages 38-42 of GD05):

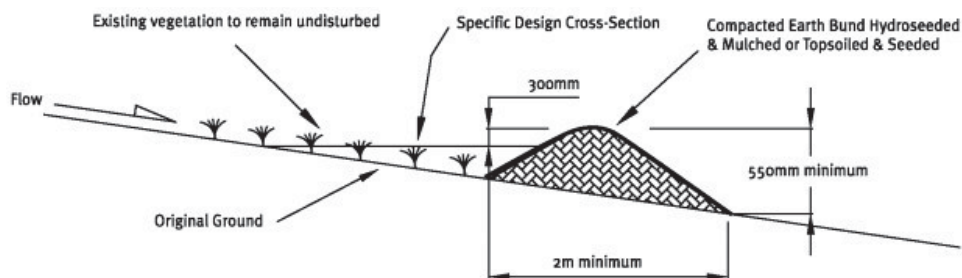


Figure 2: Clean Water Diversion Bund (Source: GD05)

4.2.5.2 Pipe-drop structures

Four pipe-drop structures shall be utilised to transport concentrated flows of clean water from the top of the slope directly to the water race via 150mm unpunched Novacoil pipe. This will ensure that the clean and dirty water remain completely separated.

Pipe drop structures shall be utilised and constructed in accordance with **Figures 3-4** below ignoring detail associated with flumes (complete guidelines on pages 55-59 of GD05):

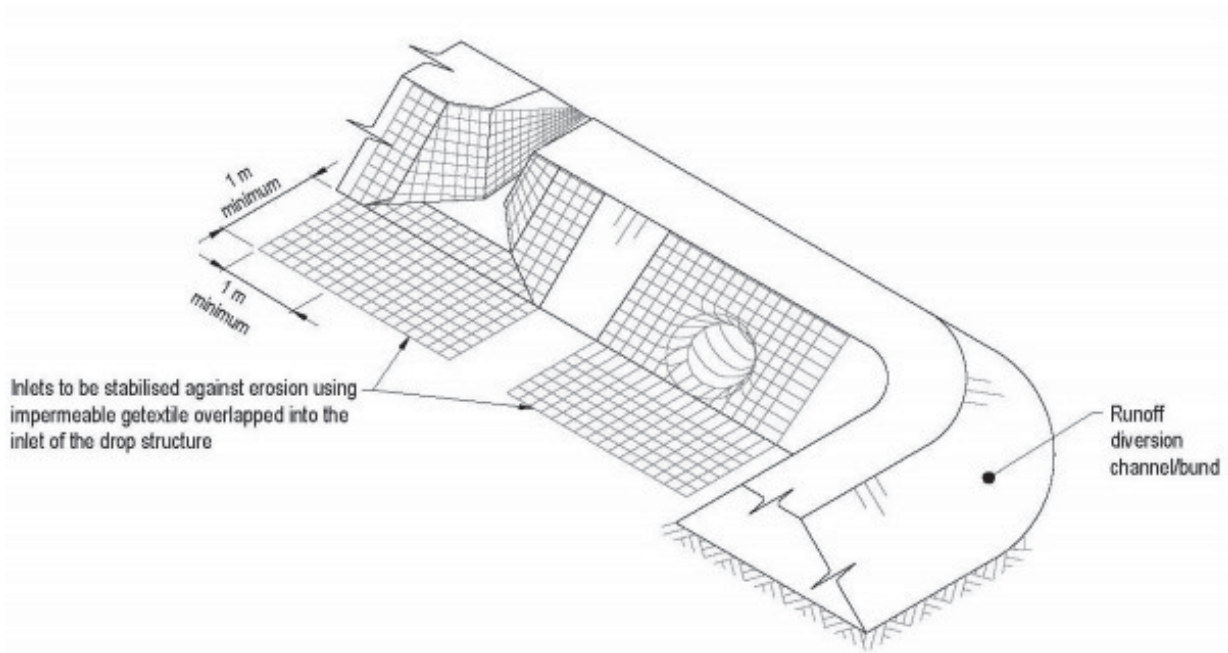


Figure 3: Pipe-drop structure schematic (inlet detail) *ignore flume detail* (Source: GD05)

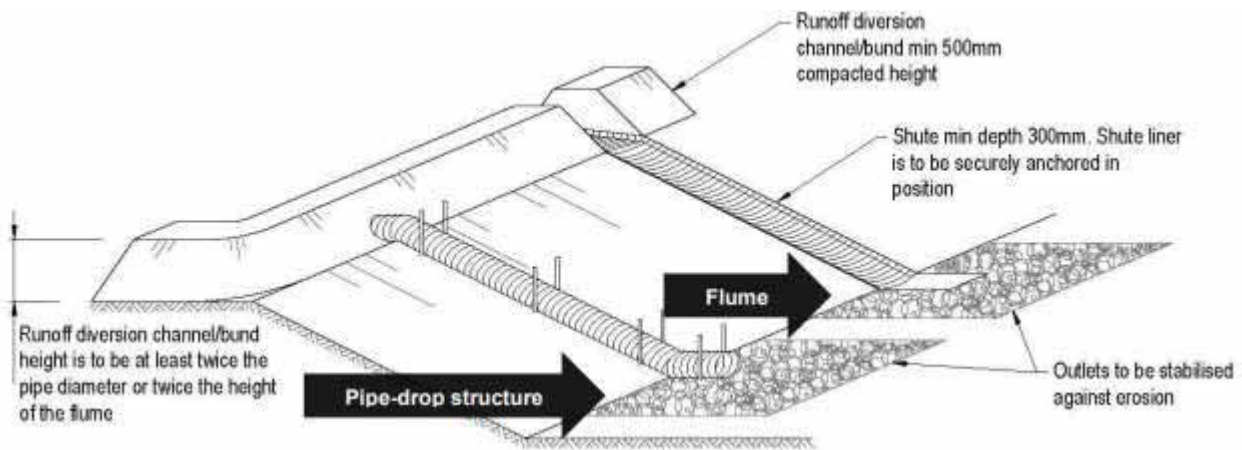


Figure 4: Pipe-drop structure schematic (outlet detail) *ignore flume detail* (Source: GD05)

It is noted that the Novacoil pipes will need to span across the sediment basin. This can be achieved via a range of methods including:

- Transition from Novacoil into a 100mm PVC pipe to utilise the benefits of the rigidity of the pipe
- Use posts and timber to construct a bridge similar to the system depicted in **Figure 5** below.



Figure 5: Example of Novacoil supported by timber bridge span (Source: Author's collection)

4.2.5.3 Dirty water diversion channels

Dirty water diversion channels will be installed to capture and carry sediment-laden stormwater from the bottom of the site to the sediment basin at the north-eastern corner.

The two channels are indicated on the ESCP at **Appendix 1**. These have been calculated to capture and carry water to the sediment basin for the 5% Annual Exceedance Probability (AEP) event. Calculations are provided at **Appendix 2**.

Check dams will be included in the dirty water diversion channels as part of a treatment train approach to slow water velocities and therefore their erosive material. Drop-out pits will also be utilised to capture coarse sediments.

4.2.5.4 Sediment basins

A sediment basin already exists on site and is currently taking water from previous Alpha Series stages and a small volume of the existing site (approximately 3,400m²). This basin and its contributing catchment have already been consented as part of Stage 3 of Alpha Series.

In terms of dealing with stormwater on the subject site once operational, PPG has designed a final treatment system that is based on two elements being a large attenuation pond with a Triton Vault beneath the pond floor. Naturally, this is located at the low point of the site being the north-eastern corner of the site, adjacent the copse

of oak trees.

Stormwater management during the construction phase will take advantage of the large 970m³ pond. According to NIWA's HIRDS Version 4, this site experiences 47.8mm of rainfall over the 6-hour, 5% AEP which equates to a total volume of 640m³ over the 1.35 ha contributing catchment. Therefore, the 970m³ pond will provide ample storage to handle the entire design event, including 34% of storage buffer.

Early in the construction phase, the pond will be excavated and formed as a dry basin (based upon IECA *Best Practice Erosion and Sediment Control* Type C Basin) for two reasons. Firstly, due to the very large size of the basin, the design event will be easily accommodated within the pond. Secondly, due to the sensitive downstream environment, no treated water from the dirty water contributing catchment will be discharged across the boundary of this site. Rather, once water has sufficiently cleared to 100mg/L or less, a floating submersible pump will be utilised to 'skim off' and empty the pond. This water will be pumped into a series of water carts (20,000L capacity) and discharged to highly permeable flat land (in pasture) on another site owned by the developer. This will be undertaken during dry weather so as not to cause runoff from the receiving site. Based on the plant currently held by the contractor, 480m³ of capacity can be restored to the pond within a 12-hour period.

The high-pressure pump will be capable of filling the water cart quickly in approximately 20 minutes (i.e. a minimum flow rate of 1,000L/min) and will take only 10 minutes to empty. Taking in the round trip, the water cart could discharge approximately one tank per hour and with two of these (or the equivalent volume) operating simultaneously, the contractor could safely pump 480m³ within 12 hours. This is approximately 50% of the total volume of the pond and 75% of the design event which is considered to be appropriate. It is noted that additional water carts could be deployed if required. All pumping will need to be continually supervised through regular monitoring to ensure it continues to meet water quality criteria.

If and where appropriate, the pumped water may be utilised for dust suppression (irrigation) purposes when longer periods of dry weather are forecast.

As a contingency, if 'stacked' large rain events transpire, the pond can be chemically treated with an off-the-shelf enviro-friendly flocculant product to increase attenuation and settle out the basin more quickly prior to pumping. If required, flocculant dosing will need to be appropriately calculated. This will need to be carefully monitored to ensure it is meeting water quality criteria. This situation will be continually assessed through the duration of the project in consultation with the Environmental Consultant

4.2.5.5 Check dams

Rock or sand-bag check dams will be deployed primarily to reduce velocity of water in the diversion channels. They will also act to capture some coarse sediment; however, this will be limited due to the rock sizing and that job will be mainly undertaken by the drop-out pits.

Due to the varied slope along the site, the spacings between the rock checks will vary in accordance with **Figure 6:**

Slope of site (%)	Spacing (m) between dams with a 450 mm centre height	Spacing (m) between dams with a 600 mm centre height
Less than 2%	24	30
2 - 4%	12	15
4 - 7%	8	11
7 - 10%	5	6
>10%	Unsuitable - use stabilised channel or specific engineered design	Unsuitable - use stabilised channel or specific engineered design

Figure 6: Spacing requirements for rock check dams (Source: GD05)

Any sections of the diversion channel at a grade greater than 10% will be lined with geofabric material or will utilise rock already on the site as lining. The design of the check dam shall be in accordance with **Figure 7** (complete guidelines on pages 50-54 of GD05):

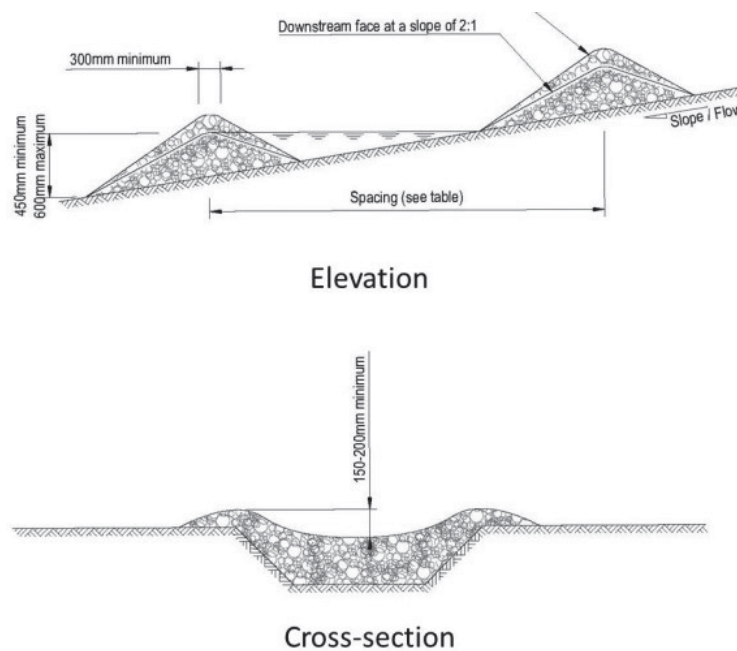


Figure 7: Rock check dam cross sections (Source: GD05)

4.2.5.6 Drop-out pits

Drop-out pits will be utilised within the dirty water diversion channels to allow the heavier coarse sediments to drop out, preventing them from entering the sediment retention devices, reducing loads on these devices. These will be up to 1m deep where possible and 1m wide squares (essentially a medium-sized bucket width). These are much easier to clean and muck out than the sediment retention devices.

Drop-out pits will be spaced a maximum distance of 25m apart along the length of the dirty water diversion channels and just before any floc sock installations.



Figure 8: Drop-out pit (Source: GD05)

4.2.5.7 Stockpiles

Generally, any temporary stockpiles required will be a maximum height of 2m to mitigate wind effects and to preserve the quality of the topsoil as future planting media for revegetation. However, this can be extended to a maximum height of 4m where additional controls such as wetting by irrigation or cover by erosion blankets or temporary cover crops are deployed.

A perimeter bank (clean water diversion bund) will be installed upslope of the stockpile to direct runoff in a controlled manner around the stockpile. A silt fence may also need to be installed on the downslope of the stockpile. Stockpiles will be constructed as follows (perimeter banks and silt fences only where necessary):

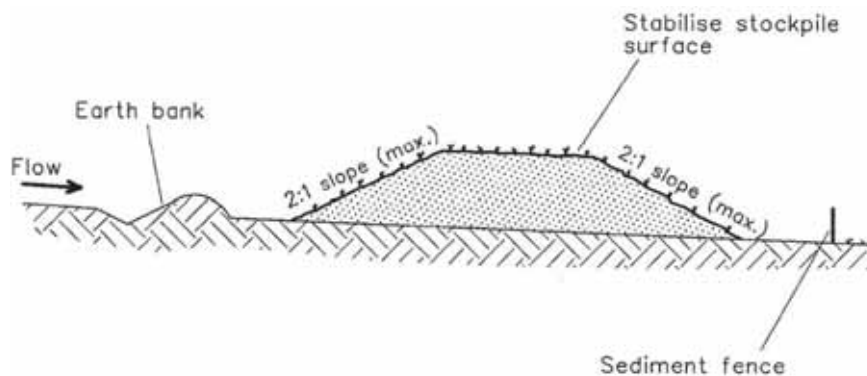


Figure 9: Stockpile design (Source: GD05)

4.2.5.8 Standard silt fence

Standard silt fences will be utilised downslope of the stockpile.

Silt fencing shall be installed as demonstrated in the **Figure 10** below (complete guidelines on pages 112-119 of GD05):

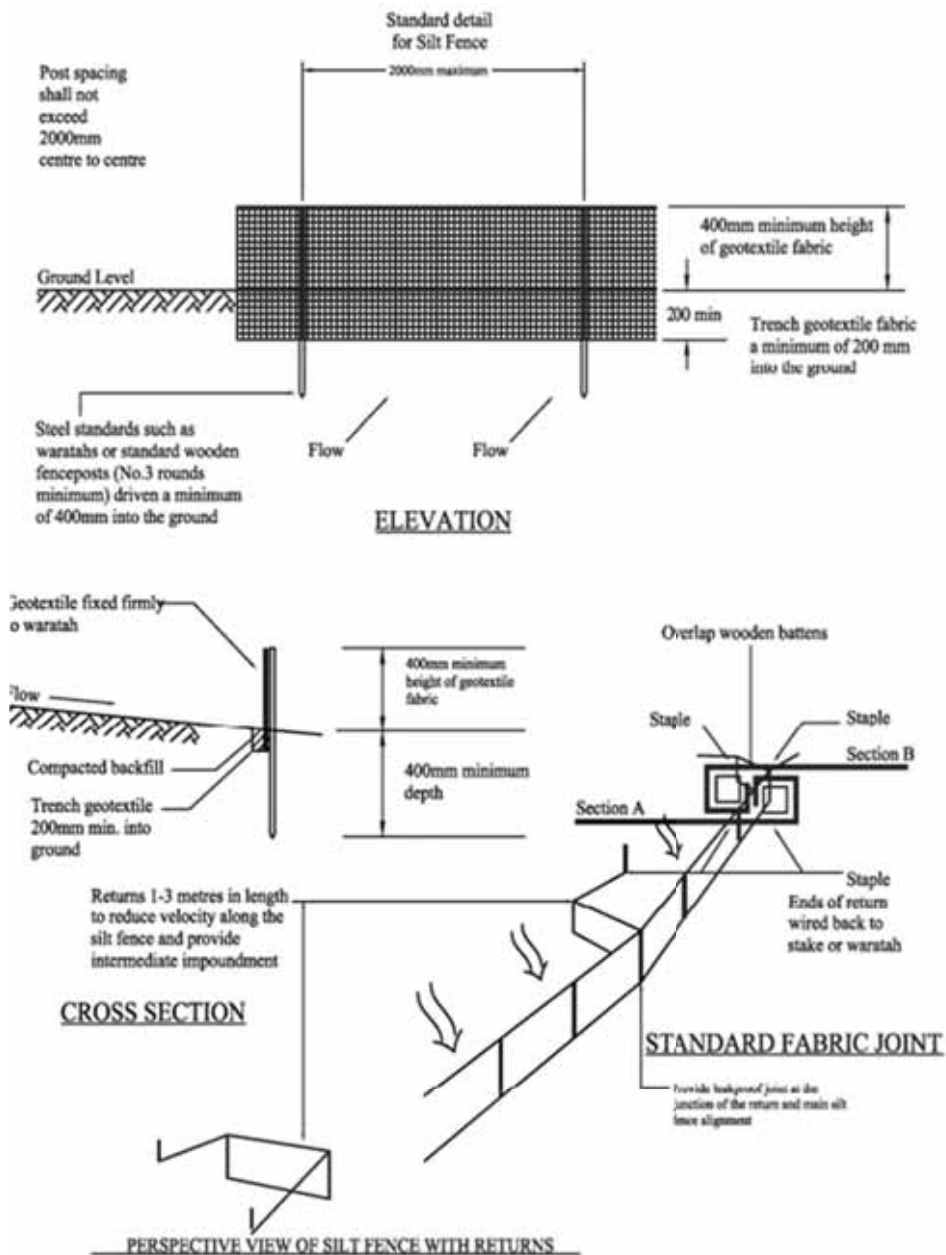


Figure 10: Standard silt fence detail (Source: GD05)

4.3 Maintenance of Erosion and Sediment Control Devices

Ongoing maintenance of the site shall be undertaken according to the ESCP as follows:

- Clean out sediment of all ESC devices (e.g. behind check dams, out of drop and silt fences) as soon as 20% capacity has been reached and prior to any forecast storm event.
- Brush down sediment stains on sediment fencing material
- Regular clean out of sediment from the sediment basin to maintain operational functioning capacity (as soon as weather permits following rain event)

- Regular checking of the floc socks to ensure they still contain reagent to perform effectively and removed any caked sediment (particularly following rain events).

Any mucked-out sediment will be stockpiled dried and reused as planting media for revegetation.

Spare erosion and sediment control products will be stored onsite at all times including but not limited to:

- Geofabric material (at least one roll)
- Pins for geofabric material or plastic (x 100)
- Silt fencing (one roll for emergency/rapid response)
- Waratahs (x 10)
- Silt fence clips (x 24)
- Novacoil pipe (at least 30m)
- Novacoil pipe coupling or tape
- Floc socks (x 3)
- Floc Sock reagent (in dry flake form at enough volume to replace all floc socks deployed onsite)
- Black plastic sheeting for rapid response of stockpiles or exposed channels (x 1 large roll)

4.4 Rapid Response Procedure for Significant Rain Events

The Site Manager will ensure that forecast weather is observed and understood at all times. If a significant storm is forecast, all works will cease in sufficient time for site staff to inspect ESC devices and undertake any maintenance or upgrading necessary to stabilise the site. Observations will continue through the storm event to ensure the functioning of ESC devices, in particular the function and capacity of the sediment basins, pipe-drop structures, drop-out pits and check dams.

4.5 Decommissioning and Removal

Erosion and sediment control devices will remain in place until 'stabilisation' of the site has been achieved. This is defined as vegetative cover (i.e. grass) reaching 80% coverage across the site (refer to **Figure 11** below). This will be undertaken in consultation with the SQEP during monthly inspections.

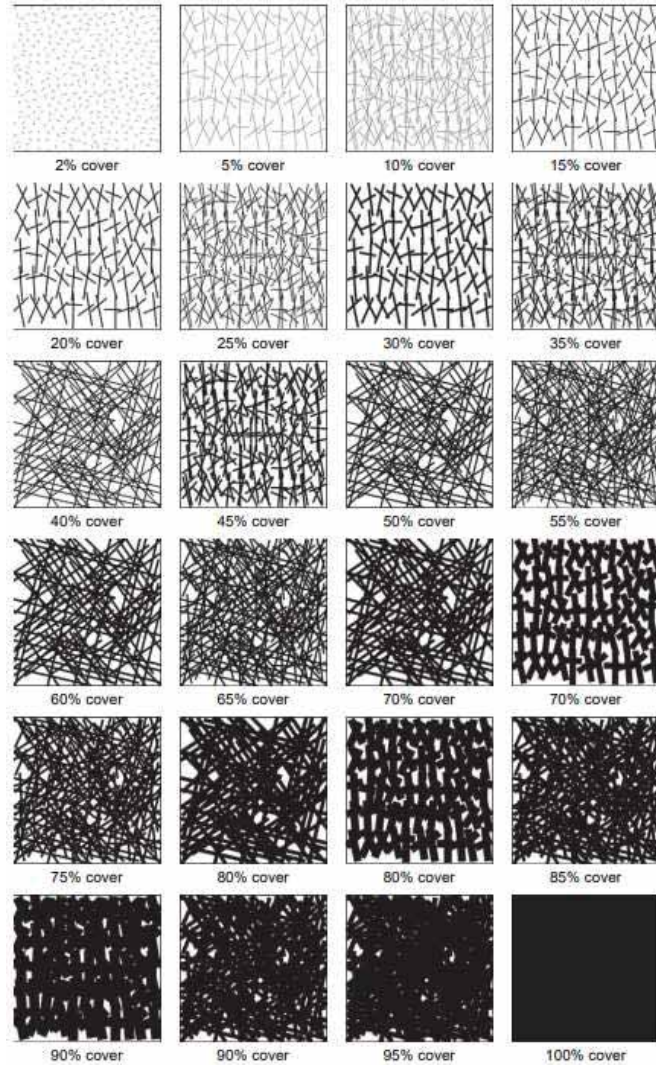


Figure 11: Visual Cover Estimation (Source Catchments & Creeks Pty Ltd)

All geofabric material, silt fence material and battens, rock material from accesses, drains and inlets and any armoured outlets shall be removed from the site.

It is noted that some controls such as clean water diversion bunds will need to be removed (or spread out carefully) which will result in exposed soil. Any soils exposed as part of this process will need to be stabilised with either grass, mulch or other biodegradable erosion matting.

4.6 Protection of Council Infrastructure

This project includes the installation of Triton Vaults for permanent stormwater management which will be installed beneath sediment basin adjacent the oak copse. It is imperative the project ensures that the Triton Vault and associated infrastructure does not have sediment-laden stormwater entering these while the site is still exposed to erosion, which risks the infrastructure being clogged with sediment before it is vested to Council.

Therefore, until such time as this infrastructure is operational, the Triton Vault and inlet to the Vault will be blocked off to avoid ingress of stormwater.

Notwithstanding section 4.5 above, the permanent stormwater will not be brought into commission until all upstream surfacing has achieved at least 90% vegetative cover and all sediment is removed from the floor of the pond.

5.0 DUST MANAGEMENT

5.1 Performance Requirements

The project must ensure that reasonable and practical measures are taken to avoid dust moving across the boundaries of the site at all times.

5.2 Dust-generating Activities

There are a range of activities that will produce dust onsite including:

- General disturbance of soil (particularly during drier months)
- Vehicle movements along haul roads
- Stockpiling of topsoil
- Mud-tracking onto roads or spillage from overloaded haulage vehicles if poorly managed

5.3 Sensitive Receptors and Prevailing Winds

Key sensitive receptors to protect from the effects of dust include the residential dwellings to the north, east and south-east of the site, particularly along Meadowstone Drive and West Meadows Drive. The prevailing wind is a northerly off Lake Wanaka however, due to the topography of the surrounding area the wind direction can be unpredictable. The project will need to ensure the site is prepared appropriately to manage potential dust effects.

5.4 Management Measures

The following measures will be deployed to ensure dust generation onsite is minimised:

- Dust suppression of haul roads, unsealed roads, stockpiles and work areas will be achieved primarily using recycled water (from sediment basins) or Council supply² (if sediment basins are empty) by water trucks or other methods (e.g. k-lines) approved by the Site Supervisor.
- A speed limit will be posted as 20/km/hr, unless deemed otherwise by the Site Supervisor.
- Only designated access points and haul routes are to be used.
- To avoid spillage risks, trucks will not be overloaded.
- All trucks must have tail gates up and swept or cleaned prior to entering external roads.
- Rumble grids and/or wheel washes will be provided at exits where required to reduce tracking of soil onto external roads. This is an adaptive measure and will only be utilised when the need arises.
- All material spilt onto external roads will be cleaned and removed.
- If dust activities cannot be controlled due to high winds, works will need to cease until favourable conditions return (generally once dust has potential to cross the boundaries of the site)
- Stockpiles heights are to be minimised as much as possible (<2m) unless they are covered (e.g. an erosion

² As per Advice Note 2 of Resource Consent RM200689, the use of Council supply for dust suppression purposes will require prior approval from QLDC via a Temporary Water Take and will include the use of a backflow prevention device to prevent contamination of Council's potable water supply.

blanket, chemical sealant, temporary cover crop or mulched).

- Long-standing stockpiles (greater than 12 weeks) shall be seeded or mulched to provide both wind and erosion protection.

5.5 Monitoring

Site staff will maintain continual vigilance for any increases in wind to ensure measures are deployed prior to dust crossing site boundaries. Also, weekly inspections will ensure that the management measures described above are sufficient and performing effectively.

6.0 WATER QUALITY MANAGEMENT

6.1 Performance Criteria

Waters released from the site will meet conditions of relevant resource consents and the comply with requirements of The Otago Regional Council Water Plan. Specific Project Water Quality Criteria for the water quality of all discharges crossing the site boundary are outlined in section 6.3 below.

6.2 Management Measures

The following table outlines the Project specific activities that have the potential to release contaminants into waterbodies and how they will be managed during the Project:

Activity	Environmental Effect/Issue	Management measures
Vegetation clearance	Exposed soil prone to erosion with potential for sediment to enter waterbodies.	See Erosion and Sediment Control (section 4)
Disturbance of exposed soil	Disturbed soil prone to erosion with potential for sediment to enter waterbodies.	See Erosion and Sediment Control (section 4)
Refuelling and servicing plant	Chemical spills entering waterbodies	See Chemicals and Fuels Management (section 11)
Vehicle washdown	Pollutants such as soil, grease and noxious weeds entering waterbodies	<ul style="list-style-type: none"> A wash down bay will be installed where 'sticky' soil is encountered and the stabilised access found to be not preventing mud tracking out onto surrounding roads. This will be an adaptive measure and only utilised if and when the need arises.
Stockpiling vegetative waste	Tannins and acetic acid entering waterbodies	<ul style="list-style-type: none"> Vegetation or mulch stockpiles shall be located away from overland flow paths Where stockpiling vegetation/mulch for extended periods or during rain events, construct small earth bund around stockpile to capture runoff Where practical, turn material regularly to allow composting to occur.
Hydro-mulching	Fertiliser, nutrients and seeds entering waterbodies.	<ul style="list-style-type: none"> Do not spray within waterbody Do not spray within ephemeral path when a Significant Rain Event is forecast in the next 3 days.
Flocculant	Overdosed stormwater in sediment retention basins	<ul style="list-style-type: none"> 'Environmentally-friendly' products selected Flocculants are stored, dosed and monitored according to best practice erosion and sediment controls

	causes pollution when discharged into waterbody	<ul style="list-style-type: none"> • Removal of sludge shall be in accordance with manufacturer's advice/instructions • Any use of flocculation and observations shall be recorded in the daily job diary.
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6.3 Project Water Quality Criteria

Dirty Water (Contributing Catchment)

No water (even if settled or treated) is to be discharged from the dirty water contributing catchment (i.e. from the sediment basin). This water is to be settled to 100mg/L before pumping to water carts and disposed and an appropriate location offsite.

Clean water

Overland flow from the clean water catchment into the existing water race that flows across the pasture beneath the oak copse and into the QLDC stormwater network at Garnet Grove must meet the following criteria:

Parameter	Discharge Criteria
Total Suspended solids	No increase in TSS from upstream of the site (where clean water is captured) to downstream of the site where clean water passes the boundary of the site.
pH	6.5 – 8.5
Hydrocarbons or tannins	No visible trace
Waste	No waste or litter visible

6.4 Stormwater reuse

To conserve water onsite, stormwater that has been captured and treated within the sediment basin will be utilised for dust suppression purposes where possible.

6.5 Water Quality Monitoring Program

To define the scope, this Water Quality Monitoring Program focuses on discharges of any liquid, soluble or material flows prior to entry into water bodies within the site or ephemeral courses, overland flow across the site boundary.

Water Quality Monitoring Program – Alpha Series Stage 4	
Sampling Scope	
Objective:	To test water quality of all stormwater that runs off from the site to confirm whether or not the discharge meets the water quality criteria referred to in section 6.3 above.
Spatial boundaries:	This monitoring program is designed to test the accumulated discharge of all water that enters or passes through the site from rain or overland flow.
Frequency:	At the time water is discharged across the boundary of the site. Where a Significant Rain Event occurs through the night, monitoring shall be undertaken the following morning. Weekly Environmental Inspections will also undertake visual monitoring of sediment retention devices within the site.
Sampling Design	
Water Quality Criteria:	The parameters of turbidity, pH, gross pollutants (waste/litter), tannins and oils and petrochemicals
Sampling Locations:	<i>Dirty water contributing catchment (to be pumped to water cart and disposed offsite):</i> From the top of the water column in the sediment basin prior to pumping. <i>Clean water catchment:</i> Upslope of site: Immediately upstream of the pipe-drop structure inlet (overland flow sample to be caught in a clean jar or bucket). Downslope of site: At the low point where clean water runs across the site boundary (i.e. at Garnet Grove from the location of the Oak Copse).

Sampling Method:	<p>Turbidity (NTU)³ – water quality meter (with nephelometer probe)</p> <p>pH - water quality meter (with pH probe) only when flocculant other than use of floc socks is added.</p> <p>Gross pollutants – visual observations (is there any litter present?)</p> <p>Tannins – visual observations (is there any unusual yellowing or darkening of waters?)</p> <p>Oils/Petrochemicals – visual observations (is any oily film⁴ on surface or smell?)</p>
Quality Control:	<p>Any water quality meter will be calibrated according to manufacturer instructions.</p> <p>All observations will be recorded and analysed.</p>
Recording and Reporting	
Recording Results:	All results will be entered into a spreadsheet and kept onsite (proforma attached as Appendix 9).
Reporting Results:	A summary of the monitoring results will be reported in the Monthly Environmental Report to QLDC.
Actions	
Non-conformances:	Any exceedances observed in monitoring data will be reported to the Project Manager who will ensure that the matter is investigated, and corrective actions are implemented immediately.
Environmental Incidents:	<p>The following shall be classified as Environmental Incidents (for actions required refer to section 3.6):</p> <ul style="list-style-type: none"> - Any discharge of stormwater from the sediment basin across the boundaries of the site.

³ Rather than measure Total Suspended Solids through the laboratory which causes delays in getting information back to site, turbidity will be expressed as Nepelometric Turbidity (NTU) as determined by laboratory analysis by correlating turbidity with the suspended solid criteria for the site. This will require a linear regression to determine what the comparative mg/L is expressed in NTU.

⁴ Note that some bacteria produce a naturally occurring film on the surface. The way to tell the difference between hydrocarbons is that the bacteria films breaks apart on the water surface in blocky and angular shapes whereas hydrocarbon film separates as globules.

	- Any discharge from the clean water catchment that represents an increase in NTU.
--	--

7.0 CULTURAL HERITAGE MANAGEMENT

7.1 Performance Criteria

The protection of cultural heritage artefacts and places in accordance with the *Heritage New Zealand Pouhere Taonga Act, 2014*.

7.2 Management Measures

A search of Council's database indicates there are no known items of cultural or heritage significance on the site. However, this does not mean that an item of significance may be 'accidentally' found during ground-disturbing activities. All works on this Project will be undertaken in accordance with the obligations of the *Heritage New Zealand Pouhere Taonga Act, 2014* (HNZPTA).

7.2.1 Accidental Finds

As such the Project will work to Heritage New Zealand's Archaeological Discovery Protocol (attached as **Appendix 10**).

7.3 Monitoring

Daily inspections shall include a visual assessment of the site to ensure that no new significant artefacts have been encountered. However, it is important that Operators remain vigilant for such encounters as they occur.

8.0 NOISE AND VIBRATION MANAGEMENT

8.1 Performance Criteria

Construction sound must comply with the recommended upper limits in Tables 2 and 3 of New Zealand Standard *NZS 6803*.

Construction sound must be managed in accordance with New Zealand Standard *NZS 6803*.

Vibration will comply with *DIN 4150-3:1999 Effects of vibration on structures*.

No warranted complaints received from sensitive receptors regarding noise and vibration from the Project.

8.2 Activities with Potential to Generate Noise

Noise and vibration generated during construction has the potential to impact noise sensitive receivers by reducing comfort and impeding communication.

Potential noise effects may be generated by the following:

- Excavation and earth moving plant
- Excavators
- Bulldozers
- Haul trucks
- Reversing beepers
- Light vehicles
- Ancillary plant and equipment

8.3 Activities with Potential to Generate Vibration

Vibration has the potential to cause cosmetic or structural damage to buildings. During the upgrade on the current access road there may be some vibrational works involved but these will be by standard road construction plant and will comply with *DIN 4150-3:1999 Effects of vibration on structures*.

8.4 Identification of Sensitive Receptors

Neighbouring residential sites are located to the north, east and south-east of the site, particularly along Meadowstone Drive and West Meadows Drive.

8.5 Management Measures

8.5.1 Noise

The following noise management measures will be implemented on the Project:

- Daytime works (see hours of operation within section 2.2)
- Plan particularly noisy activities for times when most people are at work i.e. in middle of day.
- Silencing/noise dampening
- Servicing or replacement of faulty machinery

- Advising the neighbouring community of particularly construction noise within 200m of the site. Although unlikely to be any out of the ordinary noisy works
- Implementation of alternative practices where practical.

8.5.2 Vibration

Although it is unlikely that the project will generate vibration that can be felt offsite, the project team will remain vigilant for any complaints received about vibration and put management measures in place if it is found the complaint is warranted. If vibration activities are found to be required during construction additional measures will be deployed and these will be updated as a new revision of the EMP. This may require consultation and direction from an acoustic expert.

8.6 Monitoring

Daily and weekly site inspections shall be undertaken to assess noise and vibration management strategies to verify their condition and effectiveness.

9.0 CONTAMINATED SITE MANAGEMENT

There are no known contaminated sites within the current limit of works. If a potential contaminated site is identified (e.g. by landfilled waste, odour) during construction works, the following contingency measures will be undertaken:

- Immediately notify the Project Manager
- Prevent spread of contamination
- Engage the Environmental Consultant to ensure that the site can be managed in accordance with statutory requirements (i.e. National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health)
- EMP to be amended to manage any new contaminated land encountered.

10.0 VEGETATION MANAGEMENT

The site is dominated by pasture grasses being formally farmland however to the immediate north-east corner of the site there is a copse of English Oaks that are afforded heritage protection under the District Plan (Heritage Item 599). As such the resource consent includes a condition to protect this stand of trees and the land they are located within

The Project will implement measures to control the spread of weed species encountered onsite.

10.1 Performance Criteria

Protect the ongoing well-being of the adjacent English Oak trees.

Avoid bringing contaminated soil onsite that contains noxious weeds and avoid clearing Kanuka and other indigenous vegetative cover.

10.2 Limit of Clearing

No trees are required for removal and to protect the English Oaks from any damage, an exclusion area will be established around the dripline of the trees as depicted on the ESCP attached as **Appendix 1**.

The larger sediment basin has been shaped with the drip line of the trees in mind.

10.3 Management Measures

10.3.1 Protection of Oak trees

The copse of English Oaks will be protected through the establishment of a clear exclusion area around the drip line of the trees. This will consist of a temporary fence of high visibility plastic netting installed around the drip line of the oaks and will remain in place until decommissioning of Stage 4 works.

10.3.2 Noxious weeds

Any noxious weeds within the site shall be managed by preventing their spreading on and off the site. This is an important consideration with the environmentally sensitive Otago Fish and Game Reserve and the headwaters of Bullock Creek are located approximately 400m downstream via the Alpha Series stormwater system.

It is noted that there are no noxious weed infestations currently present onsite. However, care will need to be taken to ensure noxious weed seed does not establish and spread to the reserve or Bullock Creek and outcompete the native species in these locations.

This shall be done through the following:

- Treating infestations prior to disturbance of the natural surface
- Chemical control methods for plant species
- Weed free topsoil will be retained for reuse in site rehabilitation
- Any mulch stockpiles (if required) shall be separated from drainage lines and water bodies to avoid transportation of weed seeds during rain events
- All vehicles, plant and equipment working in infested areas shall be inspected for weeds and cleaned prior

to demobilisation.

10.4 Monitoring

Daily and weekly site inspections shall include a visual assessment of the site to determine the effectiveness of waste management control

11.0 CHEMICALS AND FUELS MANAGEMENT

11.1 Performance Criteria

No contamination of land or water from Project activities.

11.2 Management Measures

11.2.1 Storage of Fuels and Chemicals Onsite

Product	Maximum Quantity	Storage Location
Diesel	200L	Job trucks/ site container (lockable)
Unleaded	50L	Job trucks/ site container (lockable)
Oil	10L	Job trucks/ site container (lockable)
Lubricant (WD40 or similar)	1.4kg (4 cans)	Job trucks/ site container (lockable)
Grease	5L	Job trucks/ site container (lockable)
Spot marking paint	2L	Job trucks/ site container (lockable)
Herbicide	5L	Job trucks/ site container (lockable)

Safety Data Sheets (SDS) will be held at the point of storage for all fuels and chemicals.

11.2.2 Refuelling and Maintenance of Plant

All refuelling and maintenance shall be undertaken at the main laydown area at the top of the site where possible. Management measures for refuelling and maintenance shall include:

- All refuelling and maintenance shall occur at least 30m from a waterbody or ephemeral stream
- Refuelling activity to be supervised at all times
- Hoses to be fitted with a stop valve at the nozzle end
- All plant shall be regularly maintained to minimise the leakage of oil, fuel, and hydraulic and other fluids
- During refuelling and maintenance, measures shall be taken to capture and contain oils, fuels, hydraulic and other fluids (i.e. a drip tray)
- Any spills shall be remediated to the satisfaction of the Environmental Consultant.

Bulk chemical storage locations will include bunding to prevent any spills contaminating soil or water.

11.2.3 Spill Contingency Response

A significant or major spill is defined as one that may have widespread or long-term impacts on the environment. Any spillage of hazardous materials shall be immediately contained, and appropriate measures taken to prevent further contamination or risk to personnel.

11.2.3.1 Spill Kits

The following materials will be stored in the storage container within the main laydown area:

Spill Kit Material Type	Quantity	Location
240L Oil and Hydrocarbon Spill Kit	1	Main laydown area
240L Chemical Spill Kit	1	Main laydown area
30L Mobile General-Purpose Spill Kit	2	Plant

The supplier of the spill response equipment shall provide a guideline for the usage of the kits.

11.2.3.2 Response

In the event of any spill, the Project Manager shall be notified, and the area controlled using the spill kits on site until made safe. Clean-up of all spillage and any contaminated ground shall be removed to a licensed waste containment facility, using an appropriately lined vessel.

11.3 Monitoring

Daily and weekly site inspections shall include a visual assessment of the site to determine the effectiveness of waste management controls

12.0 WASTE MANAGEMENT

12.1 Performance Criteria

Non-recyclable waste generation through the Project is minimised and the site is kept free from waste at all times.

12.2 Management Measures

The Project is committed to the Waste Management Hierarchy philosophy which will be implemented onsite throughout the life of the Project.



The Project maintains an ongoing commitment to protecting the environment through management of waste material on project sites and recycling however it is inevitable that some non-recyclable waste (largely domestic waste) will occur. This shall be managed as follows:

- Implementation of the Waste Management Hierarchy
- The site is kept free of litter whilst ensuring that no litter crosses the boundary of the site or enters any of the waterbodies within the site
- Provide clearly identified and appropriately segregated and sized waste receptacles at work areas
- Vegetation waste that is free from noxious weeds shall be mulched and used for erosion and sediment control purposes. Vegetation/mulch stockpiles shall be indicated on the SMP
- Wastes will be removed from site regularly and at completion of works
- Mulch stockpiles shall be separated from drainage lines and water bodies to avoid transportation

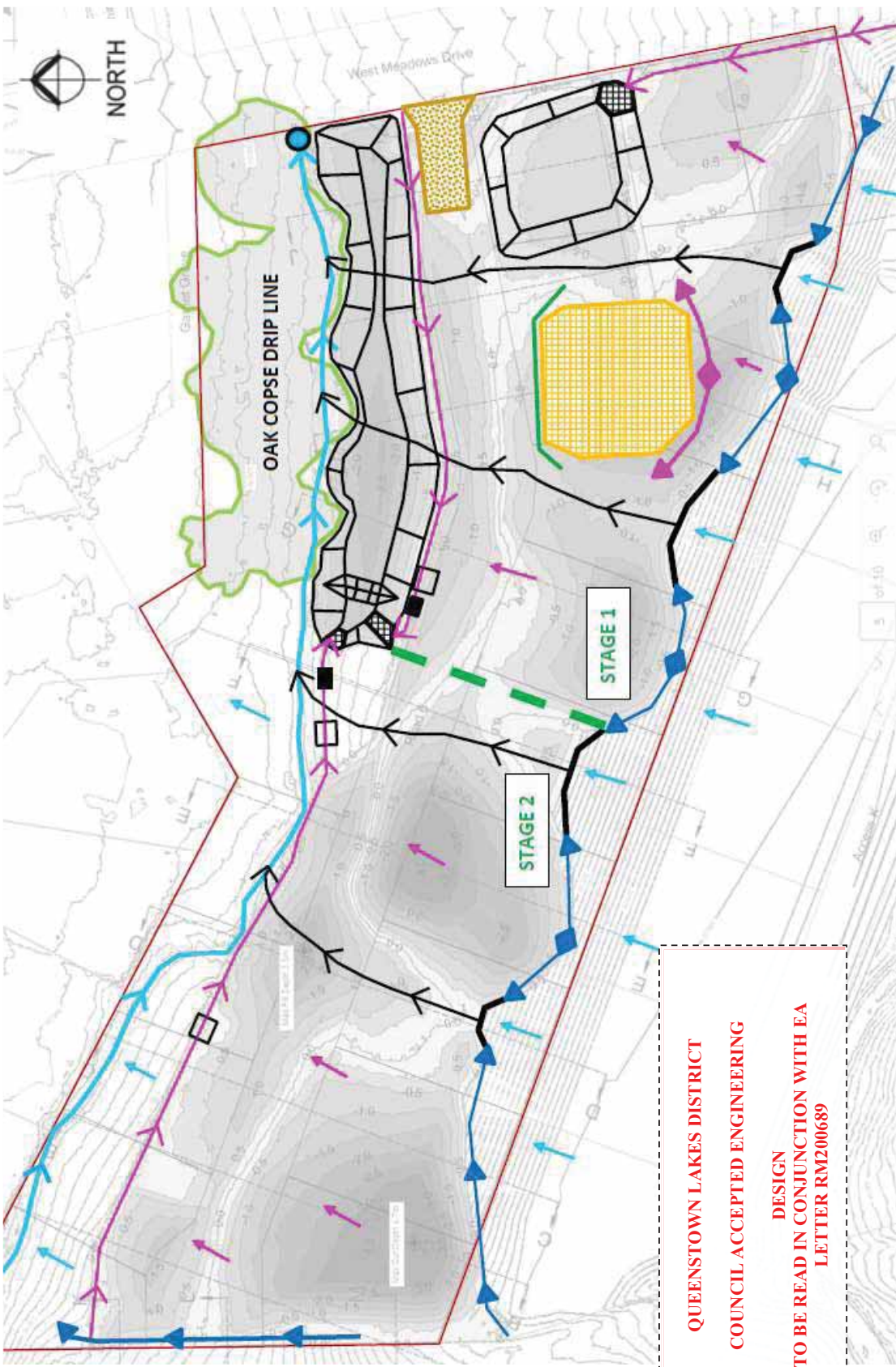
of weed seeds during rain events

- Mulch will not be stockpiled and will be immediately spread over the site. in the event that mulch does need to be stockpiled this will be restricted to 2.5m high to reduce leachate release and risk of fire. The EMP will also be updated to indicate locations of any long-term stockpiles (i.e. longer than 2 weeks)
- When air temperature exceeds 30°C, they shall be no higher than 1.5m and monitored regularly for excess leachate and heat
- No waste shall be burnt onsite.

12.3 Monitoring

Daily and weekly site inspections shall include a visual assessment of the site to determine the effectiveness of waste management controls

APPENDIX 1 Erosion and Sediment Control Plan Drawing



Legend:

	Existing water race
	English Oak Copse
	Stabilised access
	Clean water overland flow
	Dirty water overland flow
	Clean water diversion bund
	Pipe-drop structure
	Dirty water diversion channel
	Dirty water diversion bund
	Drop out pit
	Floc sock
	Outlet to Alpha Series stormwater system

Notes:

General

- This plan is to be read in conjunction with the Environmental Management Plan document prepared by The Property Group.
- All locations of erosion and sediment control (ESC) devices are indicative and exact placement to be confirmed onsite.
- ESC devices to be installed and maintained in accordance with Auckland Council's 'Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region (GD05)' and manufacturer's instructions where relevant.
- Check dams are not indicated on this plan however the check dams shall be placed in accordance with the table on page 24 of the EWP.
- Clean water from sediment basin to be pumped via floating submersible pump to the outlet indicated at the end of the water race.
- All devices are to be inspected daily and pre and post-rain event to ensure they are fully functional.
- Smaller sediment basin associated with control of stormwater from previous Alpha Series stage.

	Project: Alpha Series Stage 4 Description: Erosion and Sediment Control Plan Drawing	Date: 28/10/2020	Drawing No.: ECSP - 001	Revision: B
	Drawn: QM Approved: TM			

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APPENDIX 2

Calculations for Dirty Water Diversion Channels

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Dirty Water Diversion Channel Sizing

Channel 1 (on western end, adjacent water race):

Hydrology Calculations:

Catchment Area	1.34	ha	
Flow path length	160	m	
Fall	2	m	
Slope	1.3	%	
Runoff coefficient	0.6	Uncultivated bare soil	Table 1 from NZBE E1/Vm1
Time of concentration	15	min	SEEC Method, V5.3
Event duration	0.25	hrs	

Intensity Calculations:

Latitude:	-44.70800		
Longitude:	169.12247		
Duration	0.25	hrs	
AEP	0.20		
Rainfall intensity	27.95	mm/hr	for 5% AEP, 15 min design storm

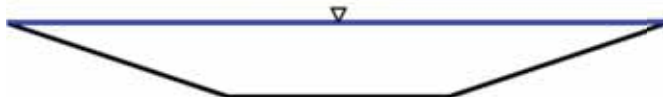
Peak runoff (Rational Method):

C (Runoff coefficient)	0.6		
I (Rainfall Intensity)	27.95	mm/hr	
A (Catchment Area)	1.34	ha	
Qp (Peak runoff flow)	0.062421667	m ³ /s	Rational Method

Manning Formula Uniform Trapezoidal Channel Flow:

Inputs			Results	
Bottom width	0.3	m	Flow area	0.0600 m ²
Side slope 1 (horiz./vert.)	3		Wetted perimeter	0.9325 m
Side slope 2 (horiz./vert.)	3		Hydraulic radius	0.0643 m
Manning roughness, n?	0.022		Velocity, v	1.6321 m/s
Channel slope	0.05	rise/run	Flow, Q	0.0979 m ³ /s
Flow depth	0.1	m	Velocity head, h _v	0.1358 m
			Top width, T	0.9000 m

> Design accommodates peak flow of 0.06242 m³/s



Reference: <http://www.hawsedc.com/engcalcs/Manning-Trip.php>

Note: depth of channel is 100mm + 300mm freeboard on downstream bund (refer GD05)

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Runoff coefficient	0.6	Uncultivated bare soil	Table 1 from NZBE E1/Vm1
Time of concentration	15	min	SEEC Method, V5.3
Event duration	0.25	hrs	

Intensity Calculations:

Latitude:	-44.70800		
Longitude:	169.12247		
Duration	0.25	hrs	
AEP	0.20		
Rainfall intensity	27.95	mm/hr	for 5% AEP, 15 min design storm

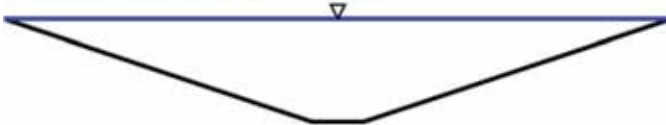
Peak runoff (Rational Method):

C (Runoff coefficient)	0.6		
I (Rainfall Intensity)	27.95	mm/hr	
A (Catchment Area)	0.35	ha	
Qp (Peak runoff flow)	0.016304167	m ³ /s	Rational Method

Manning Formula Uniform Trapezoidal Channel Flow:

Inputs			Results	
Bottom width	0.05	m	Flow area	0.0350 m ²
Side slope 1 (horiz./vert.)	3		Wetted perimeter	0.6825 m
Side slope 2 (horiz./vert.)	3		Hydraulic radius	0.0513 m
Manning roughness, n ?	0.022		Velocity, v	1.4030 m/s
Channel slope	0.05	rise/run	Flow, Q	0.0491 m ³ /s
Flow depth	0.1	m	Velocity head, h _v	0.1004 m
			Top width, T	0.6500 m

> Design accomodates peak flow of 0.0163 m³/s



Reference: <http://www.hawsedc.com/engcalcs/Manning-Trip.php>

Note: depth of channel is 100mm + 300mm freeboard on downstream bund (refer GD05)

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APPENDIX 3

Site Environmental Induction Handout

Site Environmental Induction – Alpha Series Stage 4

1. Key Roles and Responsibilities for Environmental Management

Environmental Responsibilities	
Role	
Site Supervisor TBC	<ul style="list-style-type: none"> - Ensures staff and sub-contractors are working in compliance with environmental requirements and work activities are not impacting the environment - Coordinating the implementation of the EMP - Identifying resources required for the implementation of the EMP - Coordinating actions in emergency situations/rapid stabilisation of site and allocating appropriate resource for these activities - Restrict or stop any activity on the Project that has the potential to or has caused environmental effects - Ensuring that adequate instructions and information is provided to Operators which relate to environmental risks onsite
Environmental Representative Tim McDougall 021 411 230 20	<ul style="list-style-type: none"> - Coordinate the implementation of the EMP ensuring all environmental controls are in place as per the EMP - Undertake Environmental inspections including end-of-day inspections of controls, and ensure the maintenance and improvement of these controls - Maintain communication and provide leadership to ensure all staff and sub-contractors are aware of environmental requirements - Ensure all contractors and sub-contractors are appropriately inducted when coming onto site - Assist the project leadership in managing and investigating Environmental complaints - Familiar with the environmental aspects of the project and how they are managed onsite regarding the EMP and the Erosion and sediment controls present - Aware of the appropriate guidelines found in GDO5 and the local Council requirements
Environmental Consultant Quinn McIntyre 021 022 600 46	<ul style="list-style-type: none"> - Oversee the environmental management onsite and provide technical knowledge - Monthly monitoring onsite to ensure all the EMP continues to provide adequate environmental management for the project - Undertake Environmental reporting - Deliver site environmental inductions to key staff - Prepare and submit monthly reporting to Council

2. Key Environmentally Significant Locations

Environmentally sensitive areas:

- English Oak Copse: a collection of 13 protected oak trees at the north-eastern corner of the site. The drip line of this area is to be fenced off at all times and there shall be no disturbance within the drip zone of these trees during the construction program.
- Water race: located at the north of the boundary. In heavy storm events this may overtop at the lowpoint through the oak copse and continue as sheet flow onto Garnet Grove. It is critical that only clean water enters the race (caught in the pipe-drop structures upslope) and avoids contact with the dirty water contributing catchment.
- ***Environmentally sensitive receptors:***
 - Neighbouring residential sites are located immediately to the north in the Meadowstone development as well as dwellings to the east in earlier stages of the Alpha Series development. Based on the distance, the site will need to constantly be aware of effects associated with dust, noise and vibration.

3. Key Resource Consent Conditions

Condition 6 of Resource Consent RM180980 requires the installation of controls to manage dust, silt run-off and sedimentation that may occur and stay in place until the site is permanently stabilised.

The site **EMP provides direction** for how this is to be achieved.

4. Limits of Clearing and Importance of Staging

The staging and sequencing of works is a key component to ensure that environmental effects of construction are appropriately managed. It is imperative that the sequencing outlined in section 2.1 of the EMP is followed so that the site is stabilised in the most efficient manner. All staff should be familiar with this sequence.

Any potential changes to that sequence need to be approved by the Site Supervisor which will be discussed first with the Environmental Consultant.

5. Key Environmental Management Measures in EMP

Erosion and Sediment Control (section 4 of EMP):

- Direction provided in **Erosion and Sediment Control Plan (ESCP)** in Appendix 1 of EMP

- **Separation of clean and dirty water** is the most important principle to ensure that the contributing catchment of dirty water that needs to be treated is as small as possible.

- **Progressive stabilisation (revegetation) of disturbed areas** will ensure that the extent and duration of exposed soil is minimised. **Keep it covered!**

- All controls to be checked immediately before storm events to ensure they are in good-working order

- Erosion and sediment control devices to remain in place until site is stabilised (defined as 80% vegetative cover).

Any works that disturb the controls outlined on the ESCP must be reinstated before moving to the next task.

Dust Management (Section 5 of EMP)

- Dust suppression should occur on any exposed soil on unsealed roads, this can be done using the water caught in the sediment basin

- **Avoid all unnecessary vegetation clearing** that exposes soil and work should be conducted in stages as this can increase the impact from dust in the event of strong winds

- **During high wind** events and when dust suppression is becoming difficult **works must cease** until more favourable weather conditions.

- **Constant vigilance** should be maintained onsite to ensure that dust is appropriately managed and weekly monitoring should be completed to ensure that management measures are effective.

Water Quality Management (section 6 of EMP):

- Any water caught in the sediment basin to be re-used in dust suppression

- **No water from the sediment pond is to flow or be pumped into the water race or into the Alpha Series stormwater network**

- Any observations of dirty water running into the water race or offsite to be reported directly to the Site Supervisor immediately.

Cultural Heritage Management (section 7 of EMP):

- No known archaeological sites are listed on this site. However, staff must be vigilant for other unknown artefacts. If any artefacts are found works must stop within 20 meters of the discovery and the Site Supervisor notified immediately who will contact the Project Archaeologist

- The Site Supervisor must then secure the area and notify the Heritage New Zealand Regional Archaeologist, who will advise when works can begin again.

Noise and Vibration Management (Section 8 of EMP)

- Noise producing works only be undertaken during the hours of **0730-1800** from Monday-Saturday and no works to be completed on Sundays or public holidays

- Particularly noisy work should be completed during the **middle of the day** during business hours
- **Noise dampening** should occur when possible
- Daily and weekly site inspections should be undertaken by the Environmental Representative to ensure the strategies in place are effective.

Contaminated Site Management (Section 9 of EMP)

- If a potential contaminated site is identified onsite the Site Supervisor must be notified and appropriate action taken in accordance with the EMP.

Chemicals and Fuel Management (Section 11 of EMP)

- Maximum quantities of chemicals and fuels to be stored onsite can be found within **section 11** of the EMP
- All staff should be familiar with the location of spill kits which can be found within the **EMP**
- If a spill occurs the Project Manager must be notified and the area controlled until the site can be made safe
- Daily and weekly site inspections must occur to ensure effectiveness of controls in place.

Waste Management (Section 12 of EMP)

- The site should be **litter free** with no litter to cross the boundary of the site or enter the water race
- Waste receptacles must be **well labelled** and **appropriately sized**
- Waste must be removed from the site regularly to ensure receptacles do not become overly full and the Project Manager should be notified when receptacles are reaching capacity
- Visual monitoring onsite should occur daily and weekly to ensure controls are working effectively.

6. Environmental Incidents

The procedure for managing environmental incidents is outlined in section 3.6 of the EMP, however these can be summarised as follows:

- **Environmental incidents** must be reported as soon as they occur, and the Project team must respond immediately to mitigate further environmental impacts
- Investigation into the cause of the incident should be completed and a solution should be constructed to remediate the Environmental damage
- The Project Manager must then notify the **QLDC and/or the ORC of the details of the incident within 12 hours** of being made aware of the incident.

7. Rapid Response for Storm Events

The procedure for rapid response to storm events is outlined in section 4.4 of the EMP, however these can be summarised as follows:

- The Site Supervisor will observe and understand the **weather forecast** throughout the project to ensure appropriate preparation onsite
- If a **significant storm** event is forecast all works should stop within an appropriate amount of time to inspect ESC devices and undertake any maintenance or site stabilisation required
- The pump should be refuelled and checked to ensure it is working and ready for deployment if needed
- During the storm event the site should be monitored to ensure the functioning of the ESC devices and maintained if required.

When storms are forecast, it is crucial that tools are downed in time for the rapid response procedure to be implemented. This will help avoid environmental incidents, potential enforcement action and site shutdown.

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Alpha Series Stage 4
Weekly Environmental Inspection

Date:	
Site Environmental Representative:	
Site Supervisor:	
Weather Description:	

Item	Response	Comments: Any observations and list any corrective actions or improvements required	Timeframe: When actions are to be completed (immediate, 24 hours etc)						
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; text-align: center;">✓</td> <td style="width: 33%; text-align: center;">C</td> <td style="width: 33%; text-align: center;">NC</td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> <td></td> </tr> </table>	✓	C	NC	X				
✓	C	NC							
X									
General									
Is a hard copy of the EMP available onsite? Provide details on the location		<div style="border: 2px dashed red; padding: 10px; margin: 0 auto; width: 80%;"> <p style="text-align: center; color: red; font-weight: bold; margin: 0;">QUEENSTOWN LAKES DISTRICT COUNCIL ACCEPTED ENGINEERING DESIGN TO BE READ IN CONJUNCTION WITH EA LETTER RM200689</p> </div>							
Have any environmental incidents occurred during the week? If so, provide details									
Are 'no-go zones' (Oak copse) clearly marked?									

Water Quality

<p>Is there visual evidence of sediment from the construction site entering water race/stormwater inlet?</p> <p>Are daily visual inspections of the water race being conducted and recorded by the site supervisor?</p>						<p>QUEENSTOWN LAKES DISTRICT COUNCIL ACCEPTED ENGINEERING DESIGN TO BE READ IN CONJUNCTION WITH EA LETTER RM200689</p>	
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Erosion and Sediment Control

<p>Has the extent of exposed soil been minimized and is the staging sequence outlined in the EMP being followed?</p>						
<p>Are completed areas being progressively stabilized?</p>						
<p>Is there any evidence that new erosion has opened up?</p>						
<p>Are E&S controls installed as per the ESCP and are in good order with minimal sediment build up?</p>						
<p>Have stockpiles been stabilised to prevent erosion from both wet/windy conditions?</p>						

Is contaminated or sediment laden water being discharged into waterways prior to testing?					<p style="text-align: center;">QUEENSTOWN LAKES DISTRICT COUNCIL ACCEPTED ENGINEERING DESIGN TO BE READ IN CONJUNCTION WITH EA LETTER RM200689</p>	
Is any mud being tracked onto surrounding roads?						
Cultural Heritage						
Have any finds of cultural significance been found throughout the week?						
Have any exclusion zones been identified and clearly marked?						
Noise and Vibration						
Have any complaints been received during the week?						
Has noise or vibration monitoring been conducted onsite as a result of a complaint? If yes provide details.						

Have works been staged near residents to minimise impacts?					
Dust					
Have any complaints been received during the week?					
Are stockpiles compacted or covered to minimise dust?					
At time of inspection, were loads on spoil trucks covered upon entry and exiting the site?					
Is there any evidence of dust observed indicating that measures are not adequate?					
Contaminated Land					
Have construction activities uncovered any contaminated material or spoil? If yes, provide details of type of material found and action taken.					
Vegetation					
Where relevant, has the 'exclusion zones' around the					

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Does anyone based at location conduct work to ensure they are visible to site personnel?
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vegetation on **LETTER RM200689**
week?

Has the drip line zone below the oak copse been appropriately avoided?

Have weeds been identified and treated/removed prior to stripping?

Chemicals and Fuels

Are chemicals and fuels stored in accordance with the EMP?

Are the storage areas placed away from waterways and drainage lines?

Is refueling of vehicles occurring at least 30 m away from waterways/drainage lines?

Are materials safety data sheets located within the area where materials are stored?

Is there an adequate supply of spill kits onsite? Have any used materials been replaced?				
Are spill kits clearly labelled?				
Are spill kits stored where chemicals/fuels/oils located?				<p style="text-align: center;">QUEENSTOWN LAKES DISTRICT COUNCIL ACCEPTED ENGINEERING DESIGN TO BE READ IN CONJUNCTION WITH EA LETTER RM200689</p>
Have any spills occurred during the week? If so, provide details.				

Note: Actions resulting from this inspection must be forwarded to the Site Supervisor.

<p>Additional Comments:</p>	
<p>Name and Signatures of inspections attendees:</p>	

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Environmental Incident Form

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QLDC

Consent Number (if applicable): RM180980

Brief Project Description: Earthworks associated with subdivision.

Instructions

Complete this form for all environmental incident that cause contaminants (including sediment) or environmental nuisance to leave the site. Be succinct, stick to known facts and do not make assumptions. Once completed submit to the Regulatory team at Queenstown Lakes District Council at RCMonitoring@qldc.govt.nz. Call the Regulatory team immediately on 03 441 0499 for any serious or ongoing incidents that cannot be brought under immediate control.

Date and Time	Date: XX/XX/XXX Time: XX:XX hours
Description? Provide a brief and factual description of what happened during the incident, include relevant details such as: <ul style="list-style-type: none"> - The activity being undertaken when the incident occurred - The estimated distance to nearest waterway (include stormwater and dry courses) - The estimated distance to the nearest sensitive receiver Sketches/diagrams/photos may be referenced and appended to this report to aid in the description of the incident.	
Exact Location of the incident? Include address, landmarks, features, nearest stree, etc. Maps and plans can be attached.	
Quantity or volume of material escaped or causing incident? (provide and estimate quantity)	
Who identified the incident?	Contractor <input type="checkbox"/> Council <input type="checkbox"/> Community <input type="checkbox"/> Other <input type="checkbox"/>

What immediate actions/control measures were taken to rectify or contain the incident?

What initial corrective action will be taken to prevent similar incidents recurring in the near future?

Has the Otago Regional Council been notified? Yes No Will be notified

Approvals:

Environmental Representative/person making report:	
Name.....	Signature.....
Organisation.....	Date.....
Mobile phone number.....	
Site Supervisor:	
Name.....	Signature.....
Organisation.....	Date.....
Mobile phone number.....	

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APPENDIX 7

Environmental Complaints Register

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APPENDIX 8

EMP Non-Conformance

Register

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APPENDIX 9

Water Quality Monitoring Results Proforma

Water Quality Monitoring Results						
Date:		Monitoring trigger:				
	Location 1	Location 2	Location 3	Location 4	Location 5	Location 6
Location Description:						
Insitu or Lab Results:						
Turbidity						
pH						
Visible Observations:						
Hydrocarbons						
Tannins						
Waste						
Description of any Non-compliance and actions required:						

The above will be collated in an Excel Spreadsheet on the project management system with each date having its own Sheet tab.

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APPENDIX 10 Archaeological Discovery Protocol



Heritage New Zealand Pouhere Taonga Archaeological Discovery Protocol

Under the Heritage New Zealand Pouhere Taonga Act (2014) an archaeological site is defined as any place in New Zealand that was associated with human activity that occurred before 1900 and provides or may provide, through investigation by archaeological methods, evidence relating to the history of New Zealand. For pre-contact Maori sites this evidence may be in the form of bones, shells, charcoal, stones etc. In later sites of European/Chinese origin, artefacts such as bottle glass, crockery etc. may be found, or evidence of old foundations, wells, drains or similar structures. Burials/koiwi tangata may be found from any historic period.

In the event that an unidentified archaeological site is located during works, the following applies;

1. Work shall cease immediately at that place and within 20m around the site.
2. The contractor must shut down all machinery, secure the area, and advise the Site Manager.
3. The Site Manager shall secure the site and notify the Heritage New Zealand Regional Archaeologist. Further assessment by an archaeologist may be required.
4. If the site is of Maori origin, the Site Manager shall notify the Heritage New Zealand Regional Archaeologist and the appropriate iwi groups or kaitiaki representative of the discovery and ensure site access to enable appropriate cultural procedures and tikanga to be undertaken, as long as all statutory requirements under legislation are met (*Heritage New Zealand Pouhere Taonga Act, Protected Objects Act*).
5. If human remains (koiwi tangata) are uncovered the Site Manager shall advise the Heritage New Zealand Regional Archaeologist, NZ Police and the appropriate iwi groups or kaitiaki representative and the above process under 4 shall apply. Remains are not to be moved until such time as iwi and Heritage New Zealand have responded.
6. Works affecting the archaeological site and any human remains (koiwi tangata) shall not resume until Heritage New Zealand gives written approval for work to continue. Further assessment by an archaeologist may be required.
7. Where iwi so request, any information recorded as the result of the find such as a description of location and content, is to be provided for their records.
8. Heritage New Zealand will determine if an archaeological authority under the *Heritage New Zealand Pouhere Taonga Act 2014* is required for works to continue.

It is an offence under S87 of the *Heritage New Zealand Pouhere Taonga Act 2014* to modify or destroy an archaeological site without an authority from Heritage New Zealand irrespective of

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whether the works are permitted or a consent has been issued under the Resource Management Act.

Heritage New Zealand Regional archaeologist contact

details: Dr Matthew Schmidt
Regional Archaeologist Otago/Southland
Heritage New
Zealand PO Box
5467
Dunedin
Ph. +64 3 470 2364, mobile 027 240 8715
Fax. +64 3 4773893
mschmidt@heritage.org.nz

Our Reference: A1422340

RM20.385.01

LAND USE CONSENT

Pursuant to Section 104C of the Resource Management Act 1991, the Otago Regional Council grants to:

Name: Orchard Road Holdings Limited

Address: Unit 2, 14 Teviot Street, Dunedin

To undertake earthworks for the purpose of residential development

For a term expiring: 10 December 2023

Location: Approximately 600 metres southwest of the intersection of Ballantyne Road and Enterprise Drive, Wanaka

Legal description: Lot 999 DP535926

Map reference of centre point: NZTM2000 1294793E 5041773N

Conditions Specific

1. The activities authorised by this consent must be carried out in accordance with the plans and all information submitted with the application, detailed below, and all referenced by the Consent Authority as application number RM20.385:
 - a) Consent Application dated 16 November 2020, lodged by Willowridge Developments Limited; and
 - b) Alpine Meadows Stage 1 Bulk Earthworks - Environmental Management Plan (Revision B), The Property Group, 2 July 2020.If there are any inconsistencies between the above information and the conditions of this consent, the conditions of this consent will prevail.
2. This consent must be exercised in accordance with the Alpine Meadows Stage 1 Bulk Earthworks - Environmental Management Plan (Revision B), The Property Group, 2 July 2020, attached to the consent as Appendix 1, or any subsequent versions that provide further avoidance or mitigation of potential or actual adverse effects.
3. a) The EMP and any subsequent versions must be prepared by a Suitably Qualified and Experienced Person and must contain sufficient detail to address the following matters:
 - i) Specific erosion and sediment control works (locations, dimensions, capacity etc);
 - ii) Supporting calculations and design drawings;

- iii) Catchment boundaries and contour information;
 - iv) Details of construction methods;
 - v) Timing and duration of construction and operation of control works;
 - vi) Details relating to the management of exposed areas; and
 - vii) Monitoring and maintenance requirements.
- b) The EMP must be updated when:
- i) The construction program moves from one Stage to another; or
 - ii) Any significant changes have been made to the construction methodology since the original plan was accepted for that Stage; or
 - iii) There has been an Environmental Incident and investigations have found that the management measures are inadequate.
- c) Any updated versions of the EMP must be submitted to the Consent Authority immediately for review and acceptance. Works on a new Stage must not commence until the Consent Authority has confirmed in writing that the updated EMP has been accepted. If no such confirmation has been received within 15 working days of the updated EMP being submitted, then it can be assumed that it has been accepted.
4. The Consent Holder must establish and implement document version control. The Consent Authority must be provided with an electronic copy of the most current and complete version of the EMP at all times.
5. Prior to the first exercise of this consent, the Consent Holder must nominate an Environmental Representative for the works programme and provide contact details to the Consent Authority.
6. Prior to commencing any work on site, the Consent Holder must ensure that all staff (including all sub-contractors) involved in, or supervising, works onsite have attended an Environmental Site Induction. A record of attendance must be maintained and made available to the Consent Authority upon request.
7. The Consent Holder must ensure that all personnel working on the site are made aware of, and have access at all times to:
- a) The contents of this document; and
 - b) The Environmental Management Plan.
- Copies of these documents must be present on-site at all time while the work authorised by this consent is being undertaken.
8. Prior to bulk earthworks operations for the initial stage, or any subsequent new stage of works, the Consent Holder must install erosion and sediment controls in accordance with the EMP as well as provide As-Built Documentation for these controls prepared by a Suitably Qualified and Experienced Person. These measures must remain in place for the duration of the project, until all exposed areas of earth are permanently stabilised.

Performance Monitoring

9. a) The Consent Holder must undertake and document weekly and Pre and Post-Rain Event site inspections.
- b) A Rain Event is defined as any precipitation event that generates overland flow.

c) Records of these inspections must be submitted along with the Monthly Environmental Report required by Condition 13.

10. The Consent Holder must engage a Suitably Qualified and Experienced Person to monitor the site monthly to;
- Ensure that the site is complying with the EMP; and
 - Identify any new environmental risks arising that could cause an environmental effect and suggest alternative solutions that will result in more effective and efficient management.

The outcome of these inspections must be included in the Monthly Environmental Report referred to in Condition 13 below.

11. The following standards apply to any discharge of stormwater or surface water runoff from the site:
- Total Suspended Sediment (TSS) - No increase in TSS from upstream of the site (where clean water is captured) to downstream of the site where that stormwater or surface flows beyond the site boundary.
 - pH - 6.5-8.5 (applicable when flocculants have been applied)
 - Hydrocarbons or tanins - no visible trace
 - Waste - no visible waste/litter

Samples must be collected and analysed for the parameters and at the frequencies specified in the current version of the Environmental Management Plan.

12. a) In the event of one or more of the limits set out in Condition 11 being exceeded, the Consent Holder must notify the Consent Authority within 12 hours of becoming aware of the incident, and, within one week of the exceedance being detected:
- Investigate the cause of the exceedance;
 - Take remedial action to ensure that no further exceedances occur; and
 - Complete and submit an Incident Report Form to the Consent Authority.
- b) Within one month of the exceedance being detected, the Consent Holder must update the EMP as necessary and provide a copy to the Consent Authority.
13. During the exercise of this consent, the Consent Holder must complete and submit reporting to the Consent Authority in the form of a Monthly Environmental Report. The Monthly Environmental Report must be submitted within 5 working days of the end of each month. The Monthly Environmental Report must include reporting and statements actively addressing but not limited to the following that occurred during the reporting month:
- Updates to the EMP;
 - Weekly Site Inspections – number of inspections completed, and summary of corrective actions undertaken;

- c) Reporting on monitoring undertaken (including Pre- and Post-Rainfall Events and water quality sampling) and whether non-conforming results were obtained; and
- d) Positive environmental outcomes achieved and opportunities identified by the consent holder.

General

14. The Consent Holder must, within 24 hours, inform the Consent Authority of any complaints received from any person about activities on the site associated with the consented works.

15. a) On completion of each stage of the earthworks, all earthworked areas must be top-soiled and revegetated or otherwise permanently stabilised.
b) The Consent Holder must notify the Consent Authority in writing of the completion of each stage of earthwork no less than 10 working days following the completion of works, and must provide photographs of the area/s where work has been undertaken. Photographs must be in colour and be in JPEG form.

16. Hours of operation for earthworks activities must be limited to Monday to Saturday (inclusive): 8.00am to 6.00pm, excluding public holidays.

17. In the event that an unidentified archaeological site is located during works, the following will apply;
 - a) Work must cease immediately at that place and within 20 metres around the site.
 - b) All machinery must be shut down, the area must be secured, and the Heritage New Zealand Pouhere Taonga Regional Archaeologist and the Consent Authority must be notified.
 - c) If the site is of Maori origin, the Consent Holder must also notify the appropriate iwi groups or kaitiaki representative of the discovery and ensure site access to enable appropriate cultural procedures and tikanga to be undertaken, as long as all statutory requirements under legislation are met (Heritage New Zealand Pouhere Taonga Act 2014, Protected Objects Act 1975).
 - d) If human remains (koiwi tangata) are uncovered the Consent Holder must advise the Heritage New Zealand Pouhere Taonga Regional Archaeologist, NZ Police, the Consent Authority and the appropriate iwi groups or kaitiaki representative and the above process under (c) will apply. Remains are not to be disturbed or moved until such time as iwi and Heritage New Zealand Pouhere Taonga have responded.
 - e) Works affecting the archaeological site and any human remains (koiwi tangata) must not resume until Heritage New Zealand Pouhere Taonga gives written approval for work to continue. Further assessment by an archaeologist may be required.

18. The Consent Authority may, in accordance with Sections 128 and 129 of the Resource Management Act 1991, serve notice on the Consent Holder of its intention to review the conditions of this consent during the period of three months either side of the date of granting of this consent each year, or within two months of any enforcement action taken by the Consent Authority in relation to the exercise of this consent, for the purpose of:
- a) Determining whether the conditions of this consent are adequate to deal with any adverse effect on the environment that may arise from the exercise of the consent and is appropriate to deal with at a later stage, or which becomes evident after the date of commencement of the consent;
 - b) Ensuring the conditions of this consent are consistent with any National Environmental Standards, relevant regional plans, and/or the Otago Regional Policy Statement;
 - c) Reviewing the frequency of monitoring or reporting required under this consent;
 - d) Amending the monitoring programme set out in accordance with Conditions 9, 10 and 11.

Notes to the Consent Holder

1. *Under the Heritage New Zealand Pouhere Taonga Act 2014 an archaeological site is defined as any place in New Zealand that was associated with human activity that occurred before 1900 and provides or may provide, through investigation by archaeological methods, evidence relating to the history of New Zealand (see Section 6). For pre-contact Maori sites this evidence may be in the form of Taonga (artefacts) such as tiki (adzes) or flake tools as well as bones, shells, charcoal, stones etc. In later sites of European/Chinese origin, artefacts such as bottle glass, crockery etc. may be found, or evidence of old foundations, wells, drains or similar structures. Pre-1900 buildings are also considered archaeological sites. Burials/koiwi tangata may be found from any historic period. Archaeological sites are legally protected under Sections 42(1) & (2) of the Heritage New Zealand Pouhere Taonga Act 2014. It is an offence under Section 87 of the Heritage New Zealand Pouhere Taonga Act 2014 to modify or destroy an archaeological site without an Authority from Heritage New Zealand Pouhere Taonga irrespective of whether the works are permitted, or a consent has been issued under the Resource Management Act 1993 or Building Act 1991.*
2. *If you require a replacement consent upon the expiry date of this consent, any new application should be lodged at least 6 months prior to the expiry date of this consent. Applying at least 6 months before the expiry date may enable you to continue to exercise this consent under section 124 of the Resource Management Act 1991 until a decision is made on the replacement application (and any appeals are determined).*
3. *The Consent Holder is responsible for obtaining all other necessary consents, permits, and licences, including those under the Building Act 2004, the Biosecurity Act 1993, the Conservation Act 1987, and the Heritage New Zealand Pouhere Taonga Act 2014.*

4. *This consent does not remove the need to comply with all other applicable Acts (including the Property Law Act 2007 and the Health and Safety at Work Act 2015), regulations, relevant Bylaws, and rules of law. This consent does not constitute building consent approval. Please check whether a building consent is required under the Building Act 2004.*

5. *Where information is required to be provided to the Consent Authority, this must be provided in writing to compliance@orc.govt.nz. The email heading must reference this consent and the condition/s the information relates to.*

Issued at Dunedin this 10th day of December 2020



Joanna Gilroy
Manager Consents

Attachment 1 - Alpine Meadows Stage 1 Bulk Earthworks - Environmental Management Plan
(Revision B), The Property Group, 2 July 2020

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RM191334

09 July 2020



STRATEGIC PROBLEM SOLVING FOR INNOVATIVE OUTCOMES

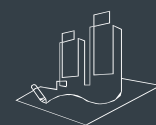
Environmental Management Plan

Alpine Meadows Stage 1 Bulk Earthworks

Orchard Road, Wanaka

Orchard Road Holdings Limited

May 2020



09 July 2020

Document Control

Title	Alpine Meadows Stage 1 Bulk Earthworks – Environmental Management Plan
Client	Orchard Road Holdings Limited
Our Ref.	716333
Prepared by	Quinn McIntyre (MSc, CEnvP, NZPI), Planning Manager – South Island  
Reviewed by	Quinn McIntyre - The Property Group

Revision Register

Rev	Rev Date	Rev Details	Approved by
A	26/05/20	EMP for Construction	Project Manager
B	02/07/20	EMP for Construction (minor revisions)	Project Manager

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- Appendix 9** Incident Report Proforma
- Appendix 10** EMP Non-Conformance Register
- Appendix 11** Archaeological Discovery Protocol

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EMERGENCY CONTACTS

Please contact the Alpine Meadows Stage 1 Environmental Representative prior to making contact with the following emergency contact list. Contact made with any of the following should be undertaken with due consultation of the Environmental Representative or Project Manager.

Element	Emergency Contact	Details
Pollution incident	Otago Regional Council (ORC) Spill Hotline	0800 800 033
Environmental Complaint	Environmental Representative	Tim McDougall – 020411 23020
Discovery of contaminated land	Environmental Representative	Tim McDougall – 020411 23020
Unexpected heritage finds	Environmental Representative	Tim McDougall – 020411 23020
Discovery of human remains	New Zealand Police	111
Fire including bushfire	Fire and Emergency New Zealand (FENZ)	111
Public utilities	Queenstown Lakes District Council	03 441 0499
Internal contacts	Project Manager	Brendan Fenn – 027 435 2133
Internal contacts	Site Engineer	Steve Dickey – 027 433 3058
Internal contacts	Environmental Consultant	Quinn McIntyre – 021 022 600 46

1.1 Environmental Management Plan

On behalf of Orchard Road Holdings Limited ('ORHL'), The Property Group ('TPG') has prepared this Environmental Management Plan ('EMP') to outline the mitigation measures to manage the environmental effects associated with the bulk earthworks phase of the Alpine Meadows Stage 1 Subdivision at Orchard Road, Wanaka.

The current project was consented under RM191334 and allows earthworks to prepare the site for future subdivision construction. This EMP responds to the environmental management related conditions of RM191334, specifically conditions 16-30.

This EMP will be used primarily to demonstrate how the best practice Environmental Management will be used to mitigate any Environmental concerns onsite. However, this report will also provide the technical guidance associated with environmental management to the contractor.

This EMP has been prepared according to *QLDC Guidelines for Environmental Management Plans, June 2019* ('The Guidelines'). According to the EMP Categories outlined in The Guidelines, this project is considered to have a 'High' environmental risk level and as such this EMP has been prepared on that basis.

The EMP is intended to be effective and practical. It provides a commitment to conforming to applicable environmental legislation (i.e. the *Resource Management Act, 1991* and relevant National Environmental Standards), regional and district planning documents and associated guidelines and standards along with continual improvement in environmental performance. It details how environmental safeguards outlined within relevant consents and specialist reports will be addressed. The principle purpose of the EMP is to be a reference manual for Alpine Meadows construction personnel, which contains mitigation measures to be implemented to manage the potential environmental effects of the construction works.

The Alpine Meadows project requires that the Project Team will continue to implement and develop the EMP requirements as defined in this document throughout the construction phase. This will ensure continual improvement and will account for:

- Changes to the construction program
- Improvements/changes to environmental management techniques
- Objectives and target review

1.2 Project Overview

The scope of construction works generally involves:

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- Clearing of pasture vegetation.
- Installation of erosion and sediment controls
- Bulk earthworks (cut & fill)
- Stockpiling of topsoil and fill material for future use
- Installation of drainage channels and culverts
- Rehabilitation of disturbed areas.

1.3 Scope of the EMP

The EMP applies to all the Projects activities during the bulk earthworks.

The aim is to reduce the environmental effects of the Project construction activities on the environment and stakeholders, whilst maintaining a high standard ensuring compliance to the approved resource consent conditions and The Guidelines.

The EMP includes as a minimum the following:

- Identification of significant aspects and environmental risks
- Strategies to manage environmental aspects and risks
- Includes all mitigation measures committed to in the relevant Resource Consent (RM191334)
- Evolves as mitigation measures are refined and site inspection results improve (driving continuous improvement)
- Includes contingency planning
- Provides a framework for impact monitoring, reporting, reviewing and improving
- Identified roles and responsibilities
- Includes procedures for investigating and resolving environmental non-conformances and initiating corrective and preventative actions
- Including a series of 'environmental operating procedures' for each environmental element according to The Guidelines

1.4 EMP Updates

To drive continual improvement of environmental management on the Project, the EMP will be regularly reviewed through ongoing monitoring of the site to ensure that the document remains fit for purpose.

Changes to the EMP may be implemented as a result of the following:

- The construction program moves from one stage to another
- Significant changes to the construction methodology
- To respond to improvements identified as a result of an Environmental Incident, management failure or corrective action
- Where directed by QLDC's Monitoring and Enforcement team.

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All updates to the EMP shall be managed through document control procedures as recorded on page 2 of the EMP and shall be submitted to QLDC for acceptance at RCMonitoring@qldc.govt.nz.

1.5 Suitably Qualified and Experienced Professional

This EMP has been prepared by Quinn McIntyre of The Property Group. Quinn is a Certified Environmental Practitioner (CEnvP) which meets the qualifications criteria required by The Guidelines.

Quinn has worked in various environmental roles on a range of construction projects, including bulk earthworks in New Zealand and Australia. His previous environmental roles included management of all environmental elements including erosion and sediment control and due to the sensitivity of that environment included monthly environmental audits undertaken by Quinn including auditing the erosion and sediment controls onsite.

Quinn has also prepared a number of EMPs and Erosion and Sediment Control Plans (ESCP) for Medium and High-Risk sites in the Queenstown Lakes District which have been accepted by QLDC on review of The Guidelines.

It is considered that Quinn meets the criteria of a Suitably Qualified and Experienced Professional (SQEP) for the purposes of preparing this EMP and overseeing the environmental aspects of this project.

2.1 Sequencing of Works

Construction on this project will continue according to the following steps which will ensure that the Project is constructed as efficiently as possible whilst achieving the environmental objectives outlined in this EMP. The staging order has been selected to ensure the earthworks undertaken onsite do not cause any sediment-laden water to leave the site through the natural overland flow channels or via overland sheet flow.

The Zones outlined in the Paterson Pitts Group drawing '*Site Management Plan Construction Zones Overview*' and '*Site Management Plan Cut / Fill Areas*' attached as **Appendix 3** outlines the various 'Zones' and 'Cut and Fill' areas described below. The se together form the staging of this project.

This methodology will need to be read in conjunction with the Erosion and Sediment Control Plan attached as **Appendix 1** and the erosion and sediment control device detail outlined in Section 4 of this EMP:

Establishment works

Step 1 – Install sediment retention pond (SRP) and connect to attenuation pond downstream.

Step 2 – Install dirty water diversion channel along northern boundary of works extent, installing check dams and drop out pits as works progress.

Step 3 – Starting from Orchard Road install stabilised access, haul road, clean water diversion bund, dirty water diversion channel, culverts and finally the level spreader.

Step 4 – Install super silt fences and drop pipe structures in centre of site.

Step 5 – Install laydown and stockpile area.

Step 6 – Starting from the SRP construct bund and dirty water channel along eastern boundary.

Zone 1 cut and Upper Zone 3 fill

Step 7 – Working from the northern end of Zone 1 and moving south strip topsoil and commence cut and fill in Zone 3. Install sediment fence and contour drains as necessary as part of treatment train in combination with the dirty water diversion channels on the north and east extents of the works site.

Prepare finished surface subgrade prior to re-spreading of topsoil.

Spread topsoil, seed and apply any long-term stabilisation polymer (Enviroloc or similar) as works progress to provide for stabilisation as quickly as possible. Once stabilisation is achieved (i.e. 80% vegetative cover) this completed area can be diverted past the SRP directly to the attenuation pond as clean water. This

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should be undertaken at the direction of the Site Engineer.

Zone 2 cut and Lower Zone 3 fill

Step 8 – Repeat Step 7 above between Zone 2 and Lower Zone 3.

Any excess fill to be stockpiled in accordance with the requirements for stockpiles outlined in section 4.2.5.12 of this EMP.

Zone 4 cut and fill

Step 9 – Starting at the northern extent of Zone 4, commence stripping of topsoil, cutting and filling (i.e. to Fill 4 and 5 areas) with any excess fill to be deposited at the stockpile site.

A silt fence will be required at the toe of Fill 5.

As with previous stages commence topsoil, seed and apply any long-term polymers as soon as practicable to achieve early stabilisation. Once stabilisation is achieved (i.e. 80% vegetative cover) this completed area can be diverted past the SRP directly to the attenuation pond as clean water.

Zone 5 cut and fill

Step 10 – Starting at the northern extent of Zone 5, commence stripping, cutting and filling (ie. to Fill 4 and 5 areas) with any excess fill to be deposited at stockpile. Once structural earthworks are complete, spread topsoil, seed and apply any long-term polymers. Once stabilisation is achieved (i.e. 80% vegetative cover) this completed area can be diverted past the SRP directly to the attenuation pond as clean water. sited at the stockpile site regrassing as works progress.

Decommissioning

Step 11 – As soon as Zone 5 has reached stabilisation (i.e. 80% vegetative cover) and all areas have been re-routed past the SRP and directly to the attenuation pond, erosion and sediment controls can be removed unless they will be utilised for Stage 2 e.g. bunds, SRP, stockpile protection.

2.2 Hours of Operation

From Monday to Friday, site works will begin at 0700 hours to allow for set-up and pre-start checks.

Noise producing plant, vehicles or other earthworks activities may be undertaken between 0800 and 1700 from Monday to Friday.

No works are to be undertaken on Weekends or Public Holidays.

The above does not include emergency works or works required for incident investigation or response

3.1 Environmental Roles and Responsibilities

Individual environmental responsibilities for the Project are detailed below:

Role	Environmental Responsibilities
<p>Project Manager</p> <p>Brendan Fenn – 027 435 2133</p>	<p>The Project Manager has responsibility for the effective implementation of the EMP and has overall responsibility for the environmental performance of the project.</p> <p>The Project Manager is primarily responsible for:</p> <ul style="list-style-type: none"> - Ensuring adequate resources are in place to implement the EMP - Ensuring that project objectives and targets are achieved in accordance with the relevant EMP - Ensuring Project Managers, Supervisors, Employees and Sub-Contractors operate within the guidelines of the EMP - Ensuring that an EMP is prepared and that environmental standard, processes and procedures meet relevant resource consent conditions - Overseeing the successful implementation, monitoring and review of the EMP - Providing reporting of environmental incidents to the QLDC and other periodic environmental reports to QLDC as required by The Guidelines - Ensuring that inspections and audits are carried out in accordance with the relevant EMP - Restrict or stop any activity on the Project that has the potential to or has caused environmental effects - Delegate authority of the above responsibilities.
<p>Site Supervisor</p> <p>TBC</p>	<p>The Site Supervisors are accountable to the Project Manager and responsible for:</p> <ul style="list-style-type: none"> - Ensuring they understand and comply with EMP - Ensuring that site employees and sub-contractors are working in compliance with environmental requirements and work activities are not impacting the environment - Coordinating the implementation of the EMP - Identifying resources required for the implementation of the EMP - Coordinating actions in emergency situations/rapid stabilisation of site and

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	<p>allocating appropriate resource for these activities</p> <ul style="list-style-type: none"> - Restrict or stop any activity on the Project that has the potential to or has caused environmental effects - Ensuring that adequate instructions and information is provided to Operators which relate to environmental risks onsite
<p>Environmental Representative</p> <p>Tim McDougall 021 411 230 20</p>	<p>The Environmental Representative is accountable to the Project Manager and supports the Project Manager and Site Supervisor in the day to day implementation of the EMP. This is a key environmental role for the Project and includes the following responsibilities:</p> <p><i>Coordinate the Implementation of the EMP</i></p> <ul style="list-style-type: none"> - Ensure installation of environmental controls as per the EMP - Undertake environmental site inspections of the project including end-of-day inspections of controls - Oversee the maintenance and improvement of defective environmental controls - Undertake Environmental Incident reporting. <p><i>Communication</i></p> <ul style="list-style-type: none"> - Keep project leadership informed of environmental performance of the project - Inform staff of procedures and constraints applicable to managing specific environmental issues - May be responsible for providing environmental inductions to all staff and sub-contractors. <p><i>Complaints and Incidents</i></p> <ul style="list-style-type: none"> - Assist the project leadership in attending to Environmental Incidents and Complaints. <p><i>Familiarity</i></p> <p>The Environmental Representative will be familiar with:</p> <ul style="list-style-type: none"> - Environmental aspects of the project - Environmental Management Plan - Best practice erosion and sediment control from:

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	<ul style="list-style-type: none"> Guidance Document 2016/005: Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region (GD05); and/or, Similar Regional Council guidelines from throughout New Zealand based on GD05 or internationally recognised best practice.
<p>Environmental Consultant (SQEP)</p> <p>Quinn McIntyre 021 022 600 46</p>	<p>The Environmental Consultant will oversee the environmental management of the site and provide technical environmental management advice as and when required. The Environmental Consultant will undertake monthly monitoring of the site in accordance with The Guidelines to ensure that the EMP continues to provide adequate environmental management for the Project.</p> <p>The Environmental Consultant will deliver the Site Environmental Induction to core staff and also prepare and submit monthly reporting to Council.</p>
<p>All staff</p>	<p>All Project staff have responsibility for their own environmental performance and the impact they have on Project environmental performance. In particular, all staff are required to:</p> <ul style="list-style-type: none"> - Undertake all activities in accordance with the requirements of the EMP - Ensure they are aware of the contact person related to environmental matters - Report to the Site Supervisor or Environmental Representative, any activity that has the potential to or has resulted in an Environmental Incident.
<p>Subcontractors</p>	<p>The Project has a responsibility to ensure that all persons involved with the Project, including Subcontractors/Suppliers/Consultants and their employees shall comply with relevant environmental requirements. All subcontractor personnel are considered equivalent to staff personnel in all aspects of environmental management and control and their responsibilities mirror that of staff.</p> <p>All subcontractors and their employees shall participate in the Site Environmental Induction prior to commencing works.</p>

3.2 Site Environmental Induction

All staff and subcontractors will attend a site environmental induction to ensure they are aware of their environmental responsibilities. This will involve an induction session for all regular site staff prior to ground-disturbing activities with subcontractors to be inducted as they come onto the Project prior to undertaking work.

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A copy of the Site Environmental Induction material includes the following (document attached as **Appendix 4**):

- Basic roles and responsibilities for environmental management
- Specific locations within the site of environmental significance or risks, including Sensitive Environmental Receptors
- Scope and conditions of resource consents applicable to the works
- The limit of clearing and earthworks for each Stage of works
- Environmental management measures stipulated in the EMP
- Procedures of notifying of potential Environmental Incidents
- Procedures for managing storm events (wind and rain)

The induction will be delivered to core staff by the Environmental Consultant and then from that point on for sub-contractors and new staff by the Environmental Representative (see section 3.1). This will ensure that core staff are appropriately familiar with the environmental management approach for the site and will also provide the Environmental Representative with an example of how to deliver inductions from that point on.

The Project will maintain a register of all persons inducted and the register is attached as **Appendix 5**.

3.3 Environmental Inspections

Regular environmental inspections will be undertaken of the site to confirm that the environmental management of the site is capable of preventing environmental effects of the construction activity. Details of the specific environmental inspections to be undertaken by the Environmental Representative are outlined in the following table:

Environmental Inspection	Timing	Purpose
Weekly Inspection	Every 7 days	A comprehensive environmental inspection of the site to verify that: <ul style="list-style-type: none">- The management measures prescribed in the EMP for all environmental elements are present, functional and adequate- Identify any activities that may cause an environmental incident or actual or potential environmental effects- Identify maintenance requirements for implemented management measures.

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		All weekly inspections will be recorded on the Weekly Site Inspection proforma attached as Appendix 6 .
End-of-Day Inspection¹	End of each working day	<p>To ensure that:</p> <ul style="list-style-type: none"> - Erosion and sediment controls are present, functional and adequate - Identify any activities that may cause an environmental incident or actual or potential environmental effects. <p>This inspection will inform any improvement work required for the following day unless an issue is identified that presents risk of a potential environmental incident occurring overnight. This would warrant immediate remediation.</p> <p>Observations and remediation measures taken will be recorded in a daily job diary.</p>
Pre-Event Inspection	Prior to Significant Rain Event ²	<p>To ensure that:</p> <ul style="list-style-type: none"> - Erosion and sediment controls are present, functional and adequate to perform in the upcoming event based upon the forecast accumulation of rainfall. <p>This inspection will inform any preventative work required prior to the event and may also result in escalation of the Rapid Response Procedure (see section 4.4).</p> <p>Observations and preventative measures taken will be recorded in a daily job diary.</p>
Post-Event	Immediately following a	To identify any failures of the erosion and sediment control devices that require remediation and if required if any environmental

¹ While The Guidelines require daily pre-start inspections, it is considered more appropriate for this site based on the inherent risks that the daily inspection occurs immediately prior to site shut-down each day so that any imminent environmental incidents can be remediated immediately.

² For the purposes of this EMP a significant rain event is defined as any rain event that is capable of generating overland flow.

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Inspection	Significant	incidents have occurred that require notification to QLDC/ORC.
	Rain Event	Observations and remedial actions shall be recorded in a daily job diary. Any environmental incidents shall result in the completion of an Environmental Incident Report being completed and submitted to QLDC within 10 working days of the incident occurring.

3.4 Monthly Monitoring by SQEP

The site will be monitored by a SQEP to ensure that the EMP is being implemented such that potential or actual environmental effects are appropriately managed. This monitoring will identify any unforeseen issues that may be arising and will advise on alternative environmental solutions that will result in more effective environmental management. Where these situations arise the SQEP will update the EMP accordingly and submit to QLDC for acceptance. Any updates will be managed through document control.

As the Environmental Consultant who is also a SQEP will be working with close supervision of the site, no independent environmental audits are considered necessary.

3.5 Monthly Environmental Reporting

The project will complete and submit exception reporting to QLDC in the form of a monthly environmental report within 5 working days of the end of each month.

The monthly environmental report will include the following information:

- Updates to the EMP and the Erosion and Sediment Control Plan ('ESCP') made during the month
- Number of weekly and pre and post rain event site inspections completed, and summary of corrective actions undertaken
- Summary of monitoring observations by SQEP and where any corrective actions were advised and whether they have been completed
- Positive environmental outcomes achieved and opportunities.

This reporting will be completed and submitted to Council by the Environmental Consultant (SQEP).

3.6 Environmental Incident Management

3.6.1 Environmental Incident Response

Environmental incidents shall be responded to immediately as the Project team becomes aware of them. This will involve:

- Immediate cessation of the activity that caused the incident

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- Investigation into the cause of the incident
- Contact Environmental Consultant for advice where site staff are unsure of how to control (to be engaged by the Project Manager)
- Formulation of a solution to bring the incident under control or remediate any environmental damage
- Implement any remediation works.

3.6.2 Notification of Environmental Incidents

The Project Manager shall notify QLDC and/or ORC of the details of any Environmental Incident within 12 hours of becoming aware of the incident. This will be through a phone call to Council Monitoring and Enforcement staff.

3.6.3 Environmental Incident Reporting

The Project Manager shall provide an Environmental Incident Report within 10 working days of the incident occurring. The Incident Report proforma is attached as **Appendix 9**.

3.7 Records and Registers

The following records will be collated onsite and shall be available to QLDC on request within 24 hours of a request being made by a QLDC official. These records will include the following:

- Environmental Induction attendance register
- Environmental Incident reports and associated corrective actions undertaken
- Complaints register and associated corrective actions undertaken
- Daily diary entries (including pre-start inspection observations)
- Post-Rain event inspection observations and corrective actions
- Weekly Site Inspection checklists
- Monitoring results (e.g. water quality)
- EMP Non-conformance register (based on weekly inspection results or otherwise identified) and associated corrective actions taken

All records will be kept in an organised central location onsite and will be managed by the Project Manager.

3.8 Complaints Procedure

ORHL aims to conduct its business activities in a professional manner with minimal to no impact on others not directly involved with the works being undertaken.

In the event that a complaint is lodged directly or indirectly, the complaint is to be recorded, and an investigation is to be carried out. Upon notification the Project Manager are to be informed of the complaint. A response shall be provided to the complainant, acknowledging receipt of the complaint and

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outlined proposed controls that are to be implemented. At the completion of the investigation, all corrective actions are to be closed out and a follow up of the original complaint is to be conducted to ensure the actions implemented have been effective.

Any complaint when investigated was found to be warranted shall be recorded as an environmental incident and shall be managed in accordance with the procedure outlined in section 3.6 above.

All complaints will be recorded on the Complaints Register (proforma attached as **Appendix 8**).

3.9 EMP Non-Conformance and Corrective Actions

Any non-conformances found during site inspections, various monitoring or as a result of incidents or complaints shall be recorded in the EMP Non-Conformance Register. This will detail when corrective actions are due by, how they were to be carried out and date when they were closed-out and shall be reported upon in the Monthly Environmental Report to QLDC. The EMP Non-Conformance Register is attached as **Appendix 10**.

This measure is to ensure that no issues slip through the gaps or escalate into much larger issues. It will also provide a clear record of evidence that can be used to defend any potential complaint or formal enforcement action.

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4.0 EROSION AND SEDIMENT CONTROL MEASURES

4.1 Performance Criteria

To avoid the discharge of any sediment-laden water (defined as over 50mg/L Total Suspended Sediment) into the Council stormwater networks, across the boundary of the site or into any waterways located within or adjacent the site.

4.2 Management Measures

4.2.1 Erosion and Sediment Control Principles

Erosion and sediment control ('ESC') devices shall be installed, maintained and decommissioned in accordance with the following principles:

- a) Erosion and sediment controls are integrated with construction planning
- b) A 'treatment train' approach so that the super silt fences ('SSF') operate as efficiently and effectively as possible
- c) Separation of 'clean' and 'dirty water' with clean water to be diverted around the site to minimise the volume of dirty water needing management onsite
- d) The extent and duration of soil exposure is minimised
- e) Soil erosion is minimised as far as reasonable and practical
- f) Controls are maintained in proper working order at all times
- g) The site is monitored, and ESC practices adjusted to maintain the required performance standard
- h) Avoidance of sediment discharge off site
- i) Progressively stabilise and revegetate disturbed or completed areas.

4.2.2 Objectives of the ESCP

This ESCP is based upon the following key objectives to be achieved during the life of the construction program:

- The avoidance of sediment-laden water into waterbodies within and adjacent to the site as well as Council's stormwater network is paramount
- The avoidance of sediment-laden water passing across the southern boundary to residential properties and roads
- A treatment train approach will be employed to ensure the SSFs can function as efficiently as possible during the construction-phase

4.2.3 As-built verification

Once the ESC devices and treatment train has been constructed, as-built documentation will be signed off to verify that the controls have been installed in accordance with the approved ESCP.

There are four streams of inspections/monitoring to be undertaken throughout the construction project:

- Daily inspections of ESC devices to ensure all devices are installed correctly, fully functional, provide for at least 80% capacity and identification for any new erosion opening up onsite that was not anticipated by the ESCP or the ESCP is not adequately controlling the issue. This will be undertaken immediately prior to the end of each working day.
- Pre-storm event inspections to ensure the same outcomes as the daily inspections and inform the rapid response procedure.
- Storm event monitoring to ensure the ESC devices continue to function correctly and inform any necessary emergency responses. Much of this monitoring will focus on the functioning and capacity of the SRP and also check that no errant stormwater is crossing the boundary of the site. Stormwater inlets along the downstream roading network are to be monitored during the event.
- Post-storm event inspections to ensure the same outcomes as the daily inspections, specifically to identify any necessary maintenance work or new controls.

4.2.5 Guidance on Erosion and Sediment Control Devices

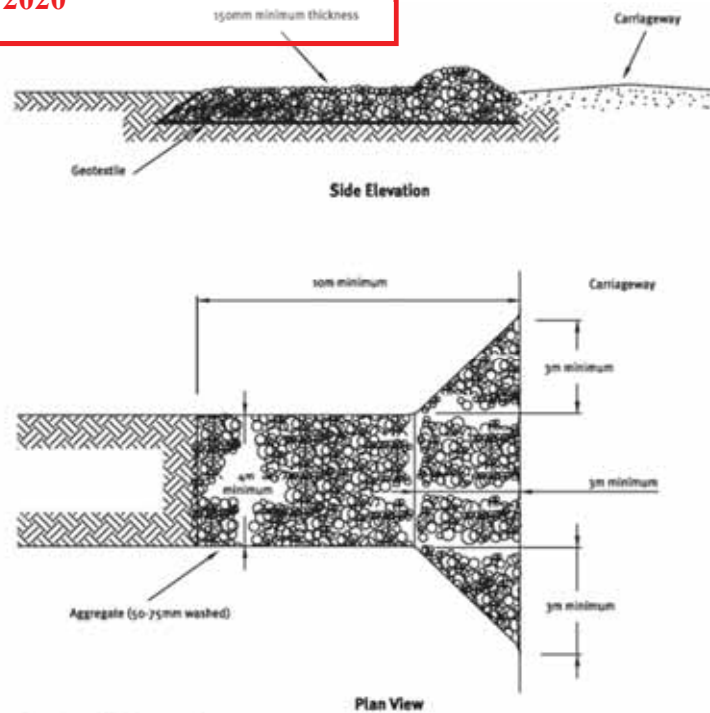
The effective control of surface water will be achieved through the utilisation of carefully selected ESC devices to achieve a certain purpose. These guidelines to the devices employed on this project should be read in conjunction with the ESCP attached as **Appendix 1** of this document.

Erosion and sediment control measures will be installed in general accordance with *Guidance Document 2016/005: Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region* (GD05).

4.2.5.1 Stabilised Access

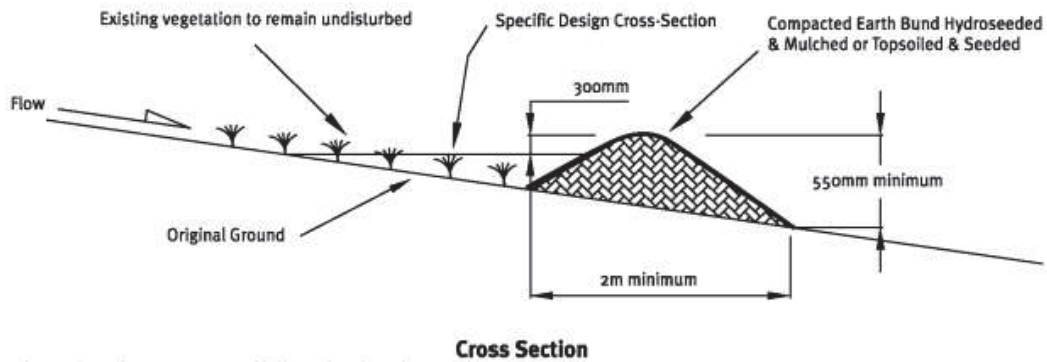
The stabilised access will be located off Orchard Road. Rock will be placed at the entrance in accordance with GD05 and extend 20m into the site. This will be constructed as follows:

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4.2.5.2 Clean water runoff diversion bunds and channels

Clean-water runoff diversion bunds will be utilised onsite to divert clean water from entering the works site (or the contributing catchment). These shall be constructed as follows (complete guidelines on pages 38-42 of GD05):



Clean water diversion channels will also be required to divert recently completed stages past the dirty water diversion channels and the SRP. These will be included as revisions to the ESCP as works progress. This is crucial to ensure that the contributing catchment of the un-exposed catchment of the works area does not enter and overwhelm the SRP.

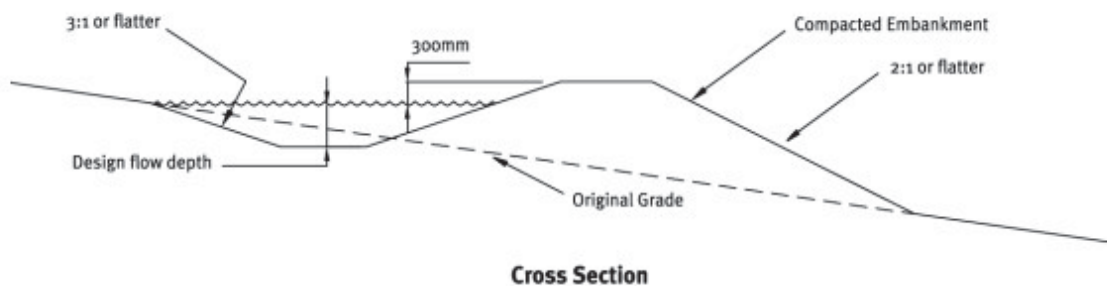
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4.2.5.3 Dirty water diversion channels and contour drains (cut-offs)

Dirty water diversion channels and contour drains will be installed to capture and carry dirty stormwater through the site in a contained manner. These will be used for two purposes:

- a. To periodically break overland flow across disturbed areas to limit slope length and thus the erosive potential of runoff and direct it to appropriate controls or stable outlets (in this case the SSFs)
- b. To transport sediment-laden water captured along the road alignment

The main dirty water diversion channels will be of a trapezoidal design that meets the requirements of GD05 i.e. sufficient capacity to carry 5% AEP storm event plus a freeboard of 300mm (calculations provided in **Appendix 2**). Drop-out pits and rock check dams will also be included in the dirty water diversion channels as part of a treatment train approach. The dirty water diversion channels will be built as follows (complete guidelines on pages 43-46 of GD05):



Contour drains will be constructed as works commence and exact placement will be decided upon by the Site Engineer overseeing the work. These will be informally designed to a depth of 500mm and will be of a U-shaped cross-section. No contour drain will have more than 0.5 ha draining to it (complete guidelines on pages 47-50 of GD05).

4.2.5.4 Combined clean water diversion bunds and dirty water diversion channels

Due to the flat nature of the site and the fact that the separation of clean and dirty water needs to occur at the haul routes, a combined clean and dirty water channel will be deployed. This simply utilises the same principles of the previous two sections on clean and dirty water channels, however the channels are side by side and the fill won from the dirty water excavation will be utilised for the clean water diversion bund. It is crucial that the bund be appropriately compacted to ensure there is no mixing between these two.

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Schematically the combined channels will be the inverse of the dirty water diversion drain as follows:



4.2.5.5 Drop-out pits

Drop-out pits shall be utilised to allow heavier sediment particles to drop out before they reach the sediment retention devices as these are much easier to clean out and will also take the load of the devices and together will act as a 'primary' pond in smaller events. These shall be 500mm to 1,000mm deep and 1,000mm wide.

4.2.5.6 Check dams

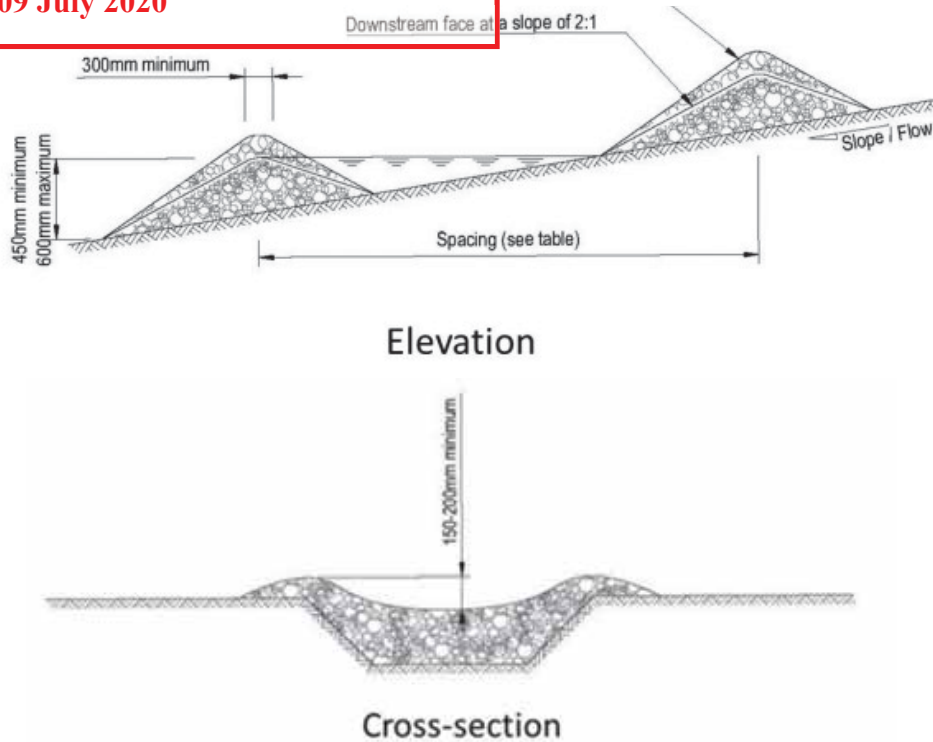
Rock check dams will be deployed primarily to reduce velocity of water in the diversion channels. They will also act to capture some coarse sediment; however, this will be limited due to the rock sizing and that job will be mainly undertaken by the drop-out pits.

The site is generally flat so check dams will be spaced at intervals of every 25m. However, in the few areas where slope does vary the rock checks will vary in accordance with the following table taken from GD05:

Slope of site (%)	Spacing (m) between dams with a 450 mm centre height	Spacing (m) between dams with a 600 mm centre height
Less than 2%	24	30
2 - 4%	12	15
4 - 7%	8	11
7 - 10%	5	6
>10%	Unsuitable - use stabilised channel or specific engineered design	Unsuitable - use stabilised channel or specific engineered design

The design of the check dam shall be in accordance with the following diagram taken from GD05:

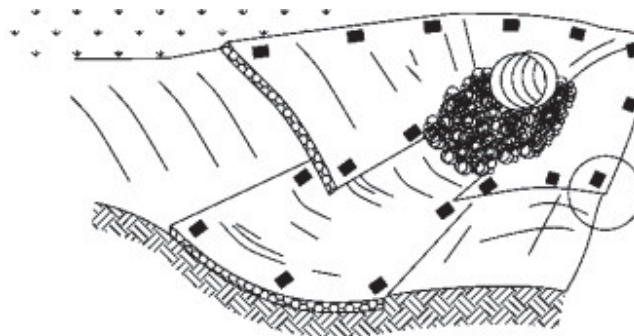
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4.2.5.7 Temporary culvert

Culverts will be required to transport dirty water from one side of the haul road alignment to the other.

Culverts will consist of agricultural pipe size large enough to fit with the swale depth beneath the access. Geofabric and rock will need to be placed at the outlet to prevent scour from the higher velocity water exiting the culvert.



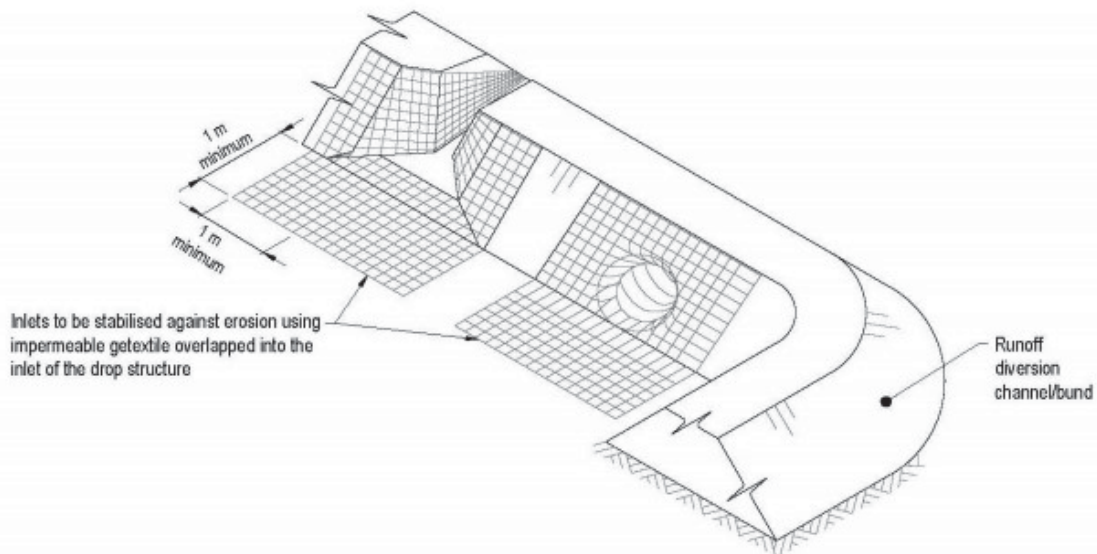
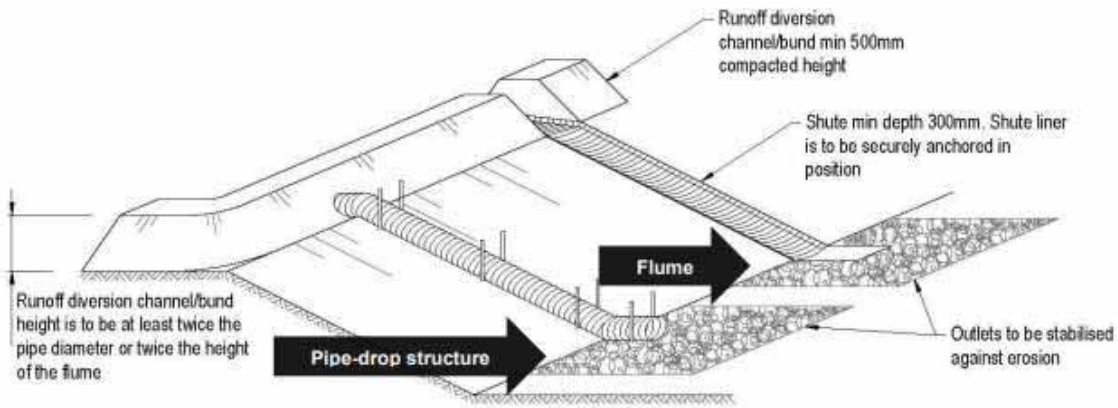
4.2.5.8 Pipe-drop structures

A pipe drop structure shall be utilised to transport concentrated clean water flow from the southern area of the site to the large gully without eroding the adjacent stockpile and dirty water works area. The diversion channels shall direct clean or dirty water to the inlet of these structures and transport the water via a 300mm Novacoil pipe to the gully. This will discharge onto a rip-rap pad to reduce velocity and help

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spread the concentrated flow to dissipate energy before it flows into rank grass. The pipe drop structure shall be constructed as follows ignoring detail associated with flumes (complete guidelines on pages 55-59 of GD05):



4.2.5.9 Level Spreader

A level spreader shall be used to dissipate the velocity from the dirty water diversion channel near the site laydown area. this will ensure that the dirty water running off the haul road track enters the remainder of the contributing catchment in a way that does not cause any scour of the exposed surface. It is expected that the majority of this stormwater will infiltrate at the top end of the worksite near the laydown area.

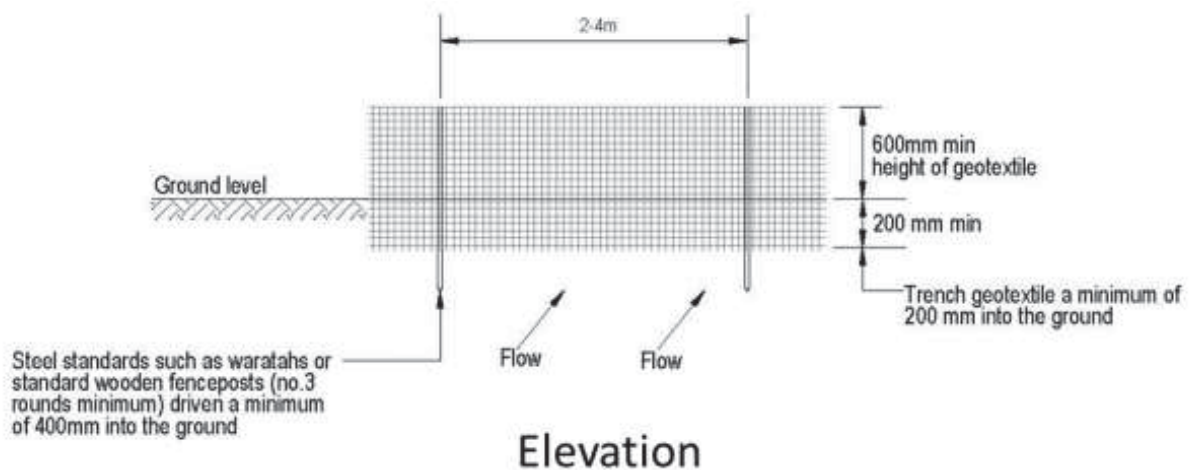
The level spreader will follow the same principle of a forebay to a sediment retention pond and will consist of a sump with a timber levelled into the ground which water will flow over. This will need to be concreted in.

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4.2.5.10 Standard silt fence

Standard silt fences will be located in the centre of the site to stabilise the large central stockpile and to help attenuate clean water into the overland flow gully. The implementation of the silt fence at the stockpile is considered best practice while the silt fence as an attenuation device is a practical method to ensure that clean water that enters the gully and flows across the eastern boundary is commensurate with predevelopment flow levels. Due to the flat topography upstream of the fence coupled with the rank grass onsite, it is not expected that the silt fence will collect a large volume of stormwater however during early storm events this device will be monitored for performance and can be quickly upgraded to a super silt fence if it is observed to be struggling to contain the volume of water that makes its way to the gully. The silt fence will be installed according to GD05 as follows (complete guidelines on pages 120-125 of GD05):



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4.2.5.11 Sediment retention pond

A sediment retention pond ('SRP') will be installed at the Ballantyne Road end of the site and will process sediment-laden water captured from the dirty water diversion channels. The staging of construction as outlined in section 2.1 will ensure that the pond only deals with a maximum exposed area of 5ha at any one time.

Due to the slope length being greater than 200m in length GD05 requires that the SRP would need to accommodate a minimum volume of 3% of the contributing catchment area (300m³ for each hectare of contributing catchment). However, it is considered that 2% of the contributing catchment is considered appropriate in this case due to a combination of factors, being:

- the very flat slope grade (<1%) over the extent of the slope length,
- presence of free-draining sandy gravels and gravelly sand,
- the use of check dams in dirty water diversion drains,
- use of chemical treatment to speed up settlement,
- the presence of a large existing attenuation pond if required as emergency that can easily be brought online.

The site has been broken down into construction zones (or stages) to ensure that the maximum area of exposed soil is never more than 5ha. Therefore require a minimum of 1,000m³ of storage (being the volume between the floor of the SRP and the primary spillway).

Details are outlined in the ESCP drawing attached as **Appendix 1** and calculations outlined at **Appendix 2** with complete guidelines on SRPs outlined on pages 91-99 of GD05.

A floc box (or similar) will be utilised on the SRP with products carefully chosen off the shelf from reputable stockists.

The clean water that discharges from the SRP will run into the attenuation pond downstream from the SRP.

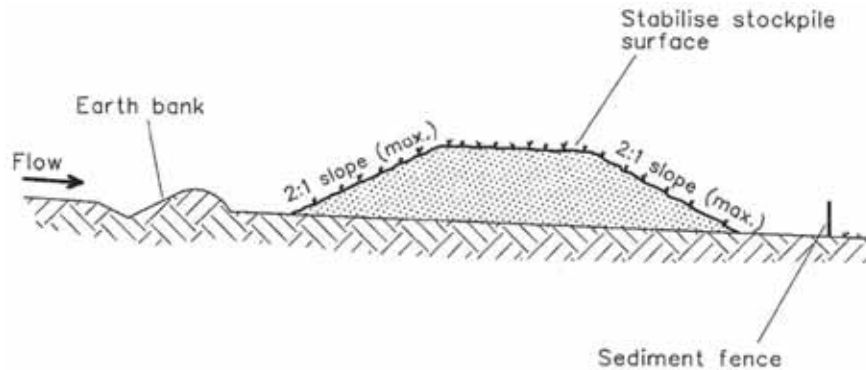
4.2.5.12 Stockpiles

Any uncovered stockpiles will be limited to a maximum height of 2m to mitigate wind effects and to preserve the quality of the topsoil as future planting media for revegetation. However, where this is not possible stockpiles may be constructed high provided they are progressively stabilised (e.g. with a cover crop, erosion blanket or polymer).

A perimeter bank will be installed upslope of the stockpile to direct runoff in a controlled manner around the stockpile. A sediment fence may also need to be installed on the downslope of the stockpile. Stockpiles

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will be constructed as follows (perimeter banks and sediment fences only where necessary):



4.3 Maintenance of Erosion and Sediment Control Devices

Ongoing maintenance of the site shall be undertaken according to the ESCP as follows:

- Clean out sediment of all ESC devices (e.g. behind check dams and sediment fences) as soon as 20% capacity has been reached and prior to any forecast storm event.
- Brush down sediment stains on sediment fencing material (SSFs and regular sediment fence)
- Regular clean out of sediment from SRPs, SSFs and sediment fences (as soon as weather permits following rain event).
-

Any mucked-out sediment will be stockpiled dried and reused as planting media for re-grassing.

Spare erosion and sediment control products will be stored onsite at all times including but not limited to:

- Geofabric material (at least one roll)
- Pins for geofabric material or plastic (x 100)
- Silt fencing (remainder of roll)
- Waratahs (x 10)
- Silt fence clips (x 24)
- Novacoil pipe (at least 30m)
- Novacoil pipe coupling or tape
- Additional flocculant (enough to last for 1 week of continual use)
- Black plastic sheeting for rapid response of stockpiles or exposed channels (x 1 large roll)

4.4 Rapid Response Procedure for Significant Rain Events

The Site Manager will ensure that forecast weather is observed and understood at all times. If a significant storm is forecast, all works will cease in sufficient time for site staff to inspect ESC devices and undertake any maintenance or upgrading necessary to stabilise the site. Observations will continue through the storm event to ensure the functioning of ESC devices, in particular the function and capacity of the SRP,

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silt fences, dirty water diversion channels and pipe-drop structures.

To provide for additional reserve capacity in the event of any short-circuiting of the SRP or any other unforeseen event, the adjacent large attenuation pond currently located can be brought in line during storm events where it is practical to do so. This will require clean water from the SRP to be diverted past the attenuation pond.

4.5 Decommissioning and Removal

Erosion and sediment control devices will remain in place until 'stabilisation' of the site has been achieved. This is defined as vegetative cover (i.e. grass) reaching 80% coverage across the site. This will be undertaken in consultation with the SQEP during monthly inspections.

All geofabric material, sediment fence material and battens, rock material from accesses, drains and inlets and any armoured outlets shall be removed from the site.

All permanent stormwater system inlets shall remain 'capped-off' until such time as the site reaches stabilisation. Any permanent related stormwater infrastructure (such as pipes, scruffy domes, attenuation devices, etc) shall be cleaned prior to them being brought into commission as designed. This is to protect Council's stormwater network and avoid any offsite discharge of sediment through this recently constructed infrastructure.

5.1 Performance Requirements

The project must ensure that reasonable and practical measures are taken to avoid dust moving across the boundaries of the site at all times or into waterways that run through the site.

5.2 Dust-generating Activities

There are a range of activities that will produce dust onsite including:

- General disturbance of soil (particularly during drier months)
- Vehicle movements along haul roads
- Stockpiling of topsoil
- Mud-tracking onto roads or spillage from overloaded haulage vehicles if poorly managed

5.3 Sensitive Receptors and Prevailing Winds

Key sensitive receptors to protect from the effects of dust include the residential dwellings to the west and south-east of the site. The prevailing wind is a northerly that combined with the exposed nature of the site the Project has the potential to experience high-velocity wind conditions. The project will need to ensure the site is prepared appropriately to manage potential dust effects.

5.4 Management Measures

The following measures will be deployed to ensure dust generation onsite is minimised:

- Dust suppression of haul roads, unsealed roads, stockpiles and work areas will be achieved primarily using recycled water (from sediment retention devices) or Council supply (if devices are empty) by water trucks or other methods (e.g. k-lines) approved by the Site Manager.
- A speed limit will be posted as 20/km/hr, unless deemed otherwise by the Site Manager.
- Only designated access points and haul routes are to be used.
- To avoid spillage risks, trucks will not be overloaded.
- All trucks must have tail gates up and swept or cleaned prior to entering external roads.
- Rumble grids and/or wheel washes will be provided at exits where required to reduce tracking of soil onto external roads. This is an adaptive measure and will only be utilised when the need arises.
- All material spilt onto external roads will be cleaned and removed.
- If dust activities cannot be controlled due to high winds, works will need to cease until favourable conditions return (generally once dust has potential to cross the boundaries of the site)
- Stockpiles heights are to be minimised as much as possible (<2m) unless they are covered (e.g. an erosion blanket, chemical sealant, temporary cover crop or mulched).
- Long-standing stockpiles (greater than 12 weeks) shall be seeded or mulched to provide both wind

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and erosion protection.

5.5 Monitoring

Site staff will maintain continual vigilance for any increases in wind to ensure measures are deployed prior to dust crossing site boundaries. Also, weekly inspections will ensure that the management measures described above are sufficient and performing effectively.

Water quality is a key environmental element that needs to be managed on the Project.

6.1 Waterbodies within and adjacent the site

There are no waterways or ephemeral streams within the subject site with the Cardrona River being located approximately 850m to the east of the site.

There is one larger gully at the south east corner of the site which will collect overland flow during heavy storm events. This currently runs across the boundary onto the eastern neighbours property and this EMP has been designed to ensure that overland flow remains clean and does not exceed predevelopment flow volumes.

All overland flow paths are depicted on the ESCP attached as **Appendix 1**.

6.2 Performance Criteria

Waters released from the site will meet conditions of relevant resource consents and the comply with requirements of The Otago Regional Council Water Plan. Specific Project Water Quality Criteria for the water quality of all discharges crossing the site boundary are outlined in section 6.4 below.

6.3 Management Measures

The following table outlines the Project specific activities that have the potential to release contaminants into waterbodies and how they will be managed during the Project:

Activity	Environmental Effect/Issue	Management measures
Vegetation clearance	Exposed soil prone to erosion with potential for sediment to enter waterbodies.	See Erosion and Sediment Control (section 4)
Disturbance of exposed soil	Disturbed soil prone to erosion with potential for sediment to enter waterbodies.	See Erosion and Sediment Control (section 4)
Refuelling and servicing plant	Chemical spills entering waterbodies	See Chemicals and Fuels Management (section 10)

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Vehicle washdown	Pollutants such as soil, grease and noxious weeds entering waterbodies	<ul style="list-style-type: none"> • A wash down bay will be installed where 'sticky' soil is encountered and the stabilised access found to be not preventing mud tracking out onto surrounding roads. This will be an adaptive measure and only utilised if and when the need arises.
Stockpiling vegetative waste	Tannins and acetic acid entering waterbodies	<ul style="list-style-type: none"> • Vegetation or mulch stockpiles shall be located away from overland flow paths • Where stockpiling vegetation/mulch for extended periods or during rain events, construct small earth bund around stockpile to capture runoff • Where practical, turn material regularly to allow composting to occur.
Hydro-mulching	Fertiliser, nutrients and seeds entering waterbodies.	<ul style="list-style-type: none"> • Do not spray within waterbody • Do not spray within ephemeral path when a Significant Rain Event is forecast in the next 3 days.
Flocculant	Overdosed stormwater in sediment retention basins causes pollution when discharged into waterbody	<ul style="list-style-type: none"> • 'Environmentally-friendly' products selected • Flocculants are stored, dosed and monitored according to best practice erosion and sediment controls • Removal of sludge shall be in accordance with manufacturer's advice/instructions • Any use of flocculation and observations shall be recorded in the daily job diary.

6.4 Project Water Quality Criteria

Any waters exiting the boundary of the site must meet the following criteria:

Parameter	Discharge Criteria
Suspended solids	< 50mg/L Total Suspended Solids
pH	6.5 – 8.5
Hydrocarbons or tannins	No visible trace

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Waste	No waste or litter visible
-------	----------------------------

Condition 30 of resource consent RM191334 requires a water quality of 25mg/L. This is considered to be unreasonably onerous particularly given the distance from the Cardrona River. Therefore 50mg/L (which is the usual water quality criteria applied for suspended solids) is considered appropriate for this site with 100mg/L as the Environmental Incident trigger (refer section 6.6 below). The below image provides a comparison of what different criteria look like:



6.5 Stormwater reuse

To conserve water onsite, stormwater that has been captured and treated within the sediment retention devices will be utilised for dust suppression purposes.

6.6 Water Quality Monitoring Program

To define the scope, this Water Quality Monitoring Program focuses on discharges of any liquid, soluble or material flows prior to entry overland flow across the site boundary.

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Water Quality Monitoring Program – Alpine Meadows Stage 1 Bulk Earthworks	
Sampling Scope	
Objective:	To test water quality of all stormwater discharged across the boundary of the site (both controlled or uncontrolled) from sediment retention devices to confirm whether or not the discharge meets the water quality criteria referred to in section 6.4 above.
Spatial boundaries:	This monitoring program is designed to test the accumulated discharge of all water that enters the site from rain or overland flow.
Frequency:	<p>At the immediate cessation of rain events where discharge crosses the boundary of the site.</p> <p>Where a Significant Rain Event occurs through the night, monitoring shall be undertaken the following morning.</p> <p>Weekly Environmental Inspections will also undertake visual monitoring of sediment retention devices and the gully within the site.</p>
Sampling Design	
Water Quality Criteria:	The parameters of turbidity, pH, gross pollutants (waste/litter), tannins and oils and petrochemicals.
Sampling Locations:	<p>Where concentrated clean or treated stormwater flows across the boundary:</p> <ul style="list-style-type: none"> - Downstream of the SRP/attenuation pond - at the site boundary concentrated flow path into the neighbouring site to the east

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Sampling Method:	<p>Turbidity (NTU)³ – water quality meter (with nephelometer probe) or reference jar of known 50mg/L of soil taken from site</p> <p>pH – water quality meter (with pH probe)</p> <p>Gross pollutants – visual observations (any litter present?)</p> <p>Tannins – visual observations (any unusual yellowing or darkening of waters?)</p> <p>Oils/Petrochemicals – visual observations (any oily film⁴ on surface or smell?)</p>
Quality Control:	<p>Any water quality meter will be calibrated according to manufacturer instructions.</p> <p>All observations will be recorded and analysed.</p>
Recording and Reporting	
Recording Results:	All results will be entered into a spreadsheet (attached as Appendix 7) and kept onsite.
Reporting Results:	A summary of the monitoring results will be reported in the Monthly Environmental Report to QLDC.
Actions	
Non-conformances:	Any exceedances observed in monitoring data will be reported to the Project Manager who will ensure that the matter is investigated, and corrective actions are implemented immediately.
Environmental	The following shall be classified as Environmental Incidents (for actions

³ Rather than measure Total Suspended Solids through the laboratory which causes delays in getting information back to site, turbidity will be expressed as Nepelometric Turbidity (NTU) as determined by laboratory analysis by correlating turbidity with the suspended solid criteria for the site. this provides an instant reading onsite through the use of a nephelometer.

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Incidents:	required refer to section 3.6):
	<ul style="list-style-type: none">- Any discharge of Total Suspended Solid more than 100 mg/L or equivalent NTU- Any chemical or hydrocarbon that crosses the boundary of the site- Any chemical or hydrocarbon within the site over a volume of 5 litres or more.

7.1 Performance Criteria

The protection of cultural heritage artefacts and places in accordance with the *Heritage New Zealand Pouhere Taonga Act, 2014*.

7.2 Management Measures

A search of Council's database indicates there are no known items of cultural or heritage significance on the site. However, this does not mean that an item of significance may be 'accidentally' found during ground-disturbing activities. All works on this Project will be undertaken in accordance with the obligations of the *Heritage New Zealand Pouhere Taonga Act, 2014* (HNZPTA).

7.2.1 Accidental Finds

As such the Project will work to Heritage New Zealand's Archaeological Discovery Protocol (attached as **Appendix 11**).

7.3 Monitoring

Daily inspections shall include a visual assessment of the site to ensure that no new significant artefacts have been encountered. However, it is important that Operators remain vigilant for such encounters as they occur.

8.1 Performance Criteria

Construction sound must comply with the recommended upper limits in Tables 2 and 3 of New Zealand Standard *NZS 6803*.

Construction sound must be managed in accordance with New Zealand Standard *NZS 6803*.

No warranted complaints received from sensitive receptors regarding noise and vibration from the Project.

8.2 Activities with Potential to Generate Noise

Noise and vibration generated during construction has the potential to impact noise sensitive receivers by reducing comfort and impeding communication. Vibration also has the added potential to cause cosmetic or structural damage to buildings.

Potential noise effects may be generated by the following:

- Vegetation clearance
- Excavation and earth moving plant
- Excavators
- Bulldozers
- Haul trucks
- Reversing beepers
- Light vehicles
- Ancillary plant and equipment

8.3 Activities with Potential to Generate Vibration

The use of rollers and compactors are to be used only in area's that will not impact any of the surrounding sensitive receptors.

8.4 Identification of Sensitive Receptors

Due to the large size of the site there will be a number of properties that are sensitive to noise and vibration. The most acutely affected will be the properties that bound the site to the east and south.

8.5 Management Measures

8.5.1 Noise

The following noise management measures will be implemented on the Project:

- Daytime works (see hours of operation within section 2.2)
- Plan particularly noisy activities for times when most people are at work i.e. in middle of day.
- Silencing/noise dampening

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- Servicing or replacement of faulty machinery
- Advising the neighbouring community of particularly construction noise within 200m of the site
- Implementation of alternative practices where practical

8.5.2 Vibration

Although it is unlikely that the project will generate vibration that can be felt offsite, the project team will remain vigilant for any complaints received about vibration and put management measures in place if it is found the complaint is warranted. If vibration activities are found to be required during construction additional measures will be deployed and these will be updated as a new revision of the EMP. This may require consultation and direction from an acoustic expert.

8.6 Monitoring

Daily and weekly site inspections shall be undertaken to assess noise and vibration management strategies to verify their condition and effectiveness.

There are no known contaminated sites within the current limit of works. If a potential contaminated site is identified (e.g. by landfilled waste, odour) during construction works, the following contingency measures will be undertaken:

- Immediately notify the Project Manager
- Prevent spread of contamination
- Engage the Environmental Consultant to ensure that the site can be managed in accordance with statutory requirements (i.e. National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health).

There are no protected trees, significant indigenous vegetation or Significant Natural Areas within the site which consists almost entirely of exotic pasture species. The site is tidy and there are few weeds present onsite.

The Project will implement measures to control the spread of weed species encountered onsite.

10.1 Performance Criteria

Avoid the spread of noxious weed seed offsite.

10.2 Limit of Clearing

Although the site only contains exotics trees, a clear limit for clearing is an important management tool for erosion and sediment control.

10.3 Management Measures

All noxious weeds within the site shall be managed by preventing their spreading on and off the site. This shall be done through the following:

- Treating any infestations prior to disturbance of the natural surface
- Chemical control methods for plant species
- Weed free topsoil will be retained for reuse in site rehabilitation
- Mulch stockpiles shall be separated from drainage lines and water bodies to avoid transportation of weed seeds during rain events
- All vehicles, plant and equipment working in infested areas shall be inspected for weeds and cleaned prior to demobilisation.

10.4 Monitoring

Daily and weekly site inspections shall include a visual assessment of the site to determine the effectiveness of waste management control

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11.0 CHEMICALS AND FUELS MANAGEMENT

11.1 Performance Criteria

No contamination of land or water from Project activities.

11.2 Management Measures

11.2.1 Storage of Fuels and Chemicals Onsite

Product	Maximum Quantity	Storage Location
Diesel	200L	Job trucks/ site container (lockable)
Unleaded	50L	Job trucks/ site container (lockable)
Oil	10L	Job trucks/ site container (lockable)
Lubricant (WD40 or similar)	2.1kg (6 cans)	Job trucks/ site container (lockable)
Grease	5L	Job trucks/ site container (lockable)
Spot marking paint	2L	Job trucks/ site container (lockable)
Flocculant chemical liquid	200L Drum	Beside Flocbox

Safety Data Sheets (SDS) will be held at the point of storage for all fuels and chemicals.

11.2.2 Refuelling and Maintenance of Plant

All refuelling and maintenance shall be undertaken at the main laydown area where possible. Management measures for refuelling and maintenance shall include:

- All refuelling and maintenance shall occur at least 30m from concentrated overland flow path
- Refuelling activity to be supervised at all times
- Hoses to be fitted with a stop valve at the nozzle end
- All plant shall be regularly maintained to minimise the leakage of oil, fuel, and hydraulic and other fuels
- During refuelling and maintenance, measures shall be taken to capture and contain oils, fuels, hydraulic and other fluids (i.e. a drip tray)
- Servicing areas shall be remediated to the satisfaction of the Environmental Consultant.

Bulk chemical storage locations will include bunding to prevent any spills contaminating soil or water.

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11.2.3 Spill Contingency Response

A significant or major spill is defined as one that may have widespread or long-term impacts on the environment. Any spillage of hazardous materials shall be immediately contained, and appropriate measures taken to prevent further contamination or risk to personnel.

11.2.3.1 Spill Kits

The following materials will be stored in the storage container within the main laydown area:

Spill Kit Material Type	Quantity	Location
240L Oil and Hydrocarbon Spill Kit	1	Main laydown area
240L Chemical Spill Kit	1	Main laydown area
30L Mobile General-Purpose Spill Kit	3	Plant

The supplier of the spill response equipment shall provide a guideline for the usage of the kits.

11.2.3.2 Response

In the event of any spill, the Project Manager shall be notified, and the area controlled using the spill kits on site until made safe. Clean-up of all spillage and any contaminated ground shall be removed to a licensed waste containment facility, using an appropriately lined vessel.

11.3 Monitoring

Daily and weekly site inspections shall include a visual assessment of the site to determine the effectiveness of waste management controls

12.1 Performance Criteria

Non-recyclable waste generation through the Project is minimised and the site is kept free from waste at all times.

12.2 Management Measures

The Project is committed to the Waste Management Hierarchy philosophy which will be implemented onsite throughout the life of the Project.



ORHL maintains an ongoing commitment to protecting the environment through management of waste material on project sites and recycling however it is inevitable that some non-recyclable waste (largely domestic waste) will occur. This shall be managed as follows:

- Implementation of the Waste Management Hierarchy
- The site is kept free of litter whilst ensuring that no litter crosses the boundary of the site or enters any of the waterbodies within the site
- Provide clearly identified and appropriately segregated and sized waste receptacles at work areas
- Vegetation waste that is free from noxious weeds shall be mulched and used for erosion and sediment control purposes.
- Wastes will be removed from site regularly and at completion of works
- Mulch stockpiles shall be separated from drainage lines and water bodies to avoid transportation

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of weed seeds during rain events

- Any mulch used will not be stockpiled and will be immediately spread over the site. In the event that mulch does need to be stockpiled this will be restricted to 2.5m high to reduce leachate release and risk of fire. The EMP will also be updated to indicate locations of any long-term stockpiles (i.e. longer than 2 weeks)
- When air temperature exceeds 30°C, mulch shall be no higher than 1.5m and monitored regularly for excess leachate and heat
- No waste shall be burnt onsite.

12.3 Monitoring

Daily and weekly site inspections shall include a visual assessment of the site to determine the effectiveness of waste management controls

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APPENDIX 1

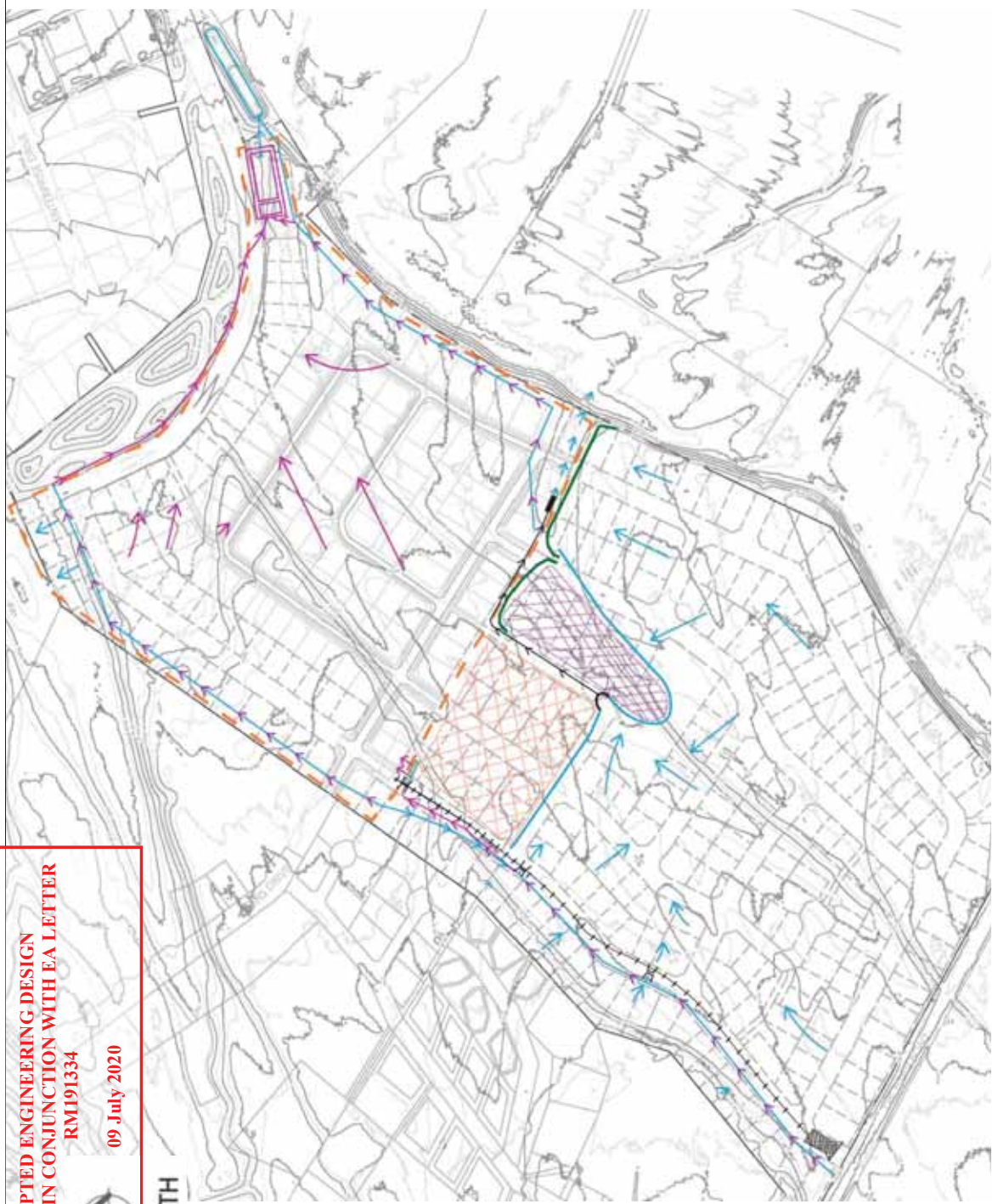
Erosion and Sediment Control Plan Drawing

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NORTH



Legend:

	Clean water flow
	Dirty water flow
	Dirty water contour drain (unlined) with check dams (rock)
	Clean water diversion channel (geofabric-lined)
	Clean water diversion bund and dirty water diversion channel
	Sediment retention pond
	Standard sediment fence
	Haul road
	Stabilised access
	Laydown area (site office, parking, storage, refuelling, maintenance)
	Stockpile locations (as required)
	Earthworks boundary
	Dirty water level spreader
	Pipe Drop structure

Notes:

General

- This plan is to be read in conjunction with the Environmental Management Plan document prepared by the Property Group and the Cut/Fill Areas and Construction Zones Overview plans prepared by Paterson Pits Group (Appendix 3 of EMP package).
- All location of erosion and sediment control (ESC) devices are indicative and exact placement to be confirmed onsite.
- ESC devices to be installed and maintained in accordance with Auckland Regional Council 'Erosion and Sediment Control Guide for Land Development in the Auckland Region' (GD025)
- Drop out pits and check dams are not indicated on this plan however the drop out pits should be placed every 50m and check dams in accordance with the table on page 25 of the EMP.
- Temporary contour drains to be installed within each construction zone as works progress to connect with dirty water diversion channels at the direction of the site engineer and in accordance with the detail on page 25 of the EMP.
- All devices are to be inspected daily and pre and post rain event to ensure they are fully functional.
- Stockpiles to be no higher than 2.0 m to protect quality of topsoil and mitigate dust.

Project: Alpine Meadows, Stage One	Date:	Revision:
	02/07/2020	B
Description: Erosion and Sediment Control Plan	Drawing No.:	Name:
	ECS-001	QM
Drawn: QM	Amendments:	Date:
	Additional Minor Notes	02/07/2020
Approved: TM		



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APPENDIX 2

Calculations for Diversion Drain Channels and Sediment

Retention Pond

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Dirty Water Diversion Channel Sizing

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Hydrology Calculations:

Catchment Area	5	ha	
Flow path length	800	m	
Fall	4	m	
Slope	0.5	%	
Runoff coefficient	0.6	Uncultivated bare soil	Table 1 from NZBE E1/Vm1
Time of concentration	15	min	SEEC Method, V5.3
Event duration	0.25	hrs	

Intensity Calculations:

Latitude:	-44.71200		
Longitude:	169.14800		
Duration	0.25	hrs	
AEP	0.20		
Rainfall intensity	18.75	mm/hr	for 5% AEP, 15 min design storm

Peak runoff (Rational Method):

C (Runoff coefficient)	0.6		
I (Rainfall Intensity)	18.75	mm/hr	
A (Catchment Area)	5	ha	
Qp (Peak runoff flow)	0.15625	m ³ /s	Rational Method

Manning Formula Uniform Trapezoidal Channel Flow:

Inputs			Results		
Bottom width	1	m	Flow area	0.1300	m ²
Side slope 1 (horiz./vert.)	3		Wetted perimeter	1.6325	m
Side slope 2 (horiz./vert.)	3		Hydraulic radius	0.0796	m
Manning roughness, n ?	0.022		Velocity, v	1.8813	m/s
Channel slope	0.05	rise/run	Flow, Q	0.2446	m ³ /s
Flow depth	0.1	m	Velocity head, h _v	0.1805	m
			Top width, T	1.6000	m

> Design accomodates peak flow of 0.15625 m³/s



Reference: <http://www.hawsedc.com/engcalcs/Manning-Trap.php>

Note: depth of channel is 100mm + 300mm freeboard on downstream bund (refer GD05)

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Sediment Retention Pond calculations (for 3 to 5ha)

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Site details:				SRP volumes required:				Indicative inside dimensions (TBC by surveyor):					
Contributing catchment		50000	m2	Max contributing catchment for SRP under GD05									
Slope gradient (%)		5	ha										
Slope length		<1	%										
% volume factor (2% if <18% & <200m length, otherwise 3%)		800	m	Max length 800m during final stages but generally significantly less than that.									
SRP volume required		2	%	2% considered appropriate due to flat nature of site, presence of check dams, ability of well-drained soil for infiltration and presence of attenuation pond as reserve storage.									
Volume with buffer		1000.0	m3										
% buffer		1122.2	m3										
		12.22	%										
Shape and size detail:													
Legth-to-width within 3:1 to 5:1 (at height of primary spillway)	Yes	3.0:1											
Live storage up to 1.6m	Yes	1.15	m	Live Storage:									
Dead storage 0.4-0.8m	Yes	0.85	m	Area of SRP	675.00	m2	Width	15.00	m				
Dead storage 30% of total storage (+/- 3%)	Yes	30.83	%	Volume of Live Storage	776.25	m3	Length	45.00	m				
Live storage 70% of total storage? (+/- 3%)	Yes	69.17	%					Depth	1.15	m			
Pond depth (base of pond to primary spillway) 2m max?	Yes	2.00	m										
				Dead Storage:									
Forebay depth (1m min)	Yes	1.00	m	Area of SRP	407	m2	Width	11.00	m				
Forebay length (2m min and full width of pond)	Yes	2.00	m	Volume of Dead Storage	345.95	m3	Length	37.00	m				
								Depth	0.85	m			
				Total SRP storage	1122.20	m3							
Level spreader details:													
100-200mm above the invert of the emergency spillway	Yes	0.10	m										
Spans the full width of SRP	Yes												
Inlet batter downstream no steeper than 3:1	Yes												
T-bar/ Decant details:													
T-bar diameter		0.15	m										
Decant arm length 2m	Yes	2.00	m										
Decant rate (< 1.5ha = 3L/sec; > 1.5ha = 4.5L/sec)		3	L/sec/ha										
Number of holes on each of the three T-bars (10mm dia holes)		217	holes										
Outlet pipe diameter		300.00	mm										
Primary spillway details:													
Minimum 600mm lower than top of SRP embankment	Yes	0.60	m										
Minimum 300mm lower than emergency spillway crest	Yes	0.30	m										
Emergency spillway:													
Minimum freeboard of 300mm	Yes	0.30	m										
Embankment details:													
Height of embankment above surrounding G.L.		TBC	m	by site engineer and approved by SQEP									
Embankment depth at top		TBC	m	by site engineer and approved by SQEP									
Embankment depth at G.L. (batters @ 2:1 inside and outside)		TBC	m	by site engineer and approved by SQEP									
Treatment train additions:													
Drop-out pits	No												
Floc Sock	No												
Treatment shed	No												
Floc Box	Yes												

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APPENDIX 3 Cut and Fill Plan / Construction Zones (Staging)

CUT / FILL AREAS

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FILL 2	RM191334	41,400m ³
FILL 3		400m ³
FILL 4	09 July 2020	4,200m ³
FILL 5		4,500m ³
CUT 1		53,500m ³
CUT 2		41,500m ³



For Resource Consent

LEGEND

Subdivision Scheme Boundaries

Subject Site Boundaries

Cut / Fill Area Boundaries

CUT

- 0.0m
- 0.2m to 0.5m
- 0.5m to 1.0m
- 1.0m to 1.5m
- 1.5m to 2.0m
- 2.0m to 2.5m
- 2.5m to 3.0m

FILL

- 0.0m
- 0.2m to 0.5m
- 0.5m to 1.0m
- 1.0m to 1.5m
- 1.5m to 2.0m
- 2.0m to 2.5m
- 2.5m to 3.0m

Surveyor	TKM	Original Size	Scale
Designer	TKM	A3	1:2500 @ A3
Checked by	SJD	Sheet No.	DO NOT SCALE
Approved by	W5620	Day No.	102
Job No.	006	Revision	0
		Date created	06/11/2019

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Project & Drawing Title:

Site Management Plan Cut / Fill Areas

Client & Location:

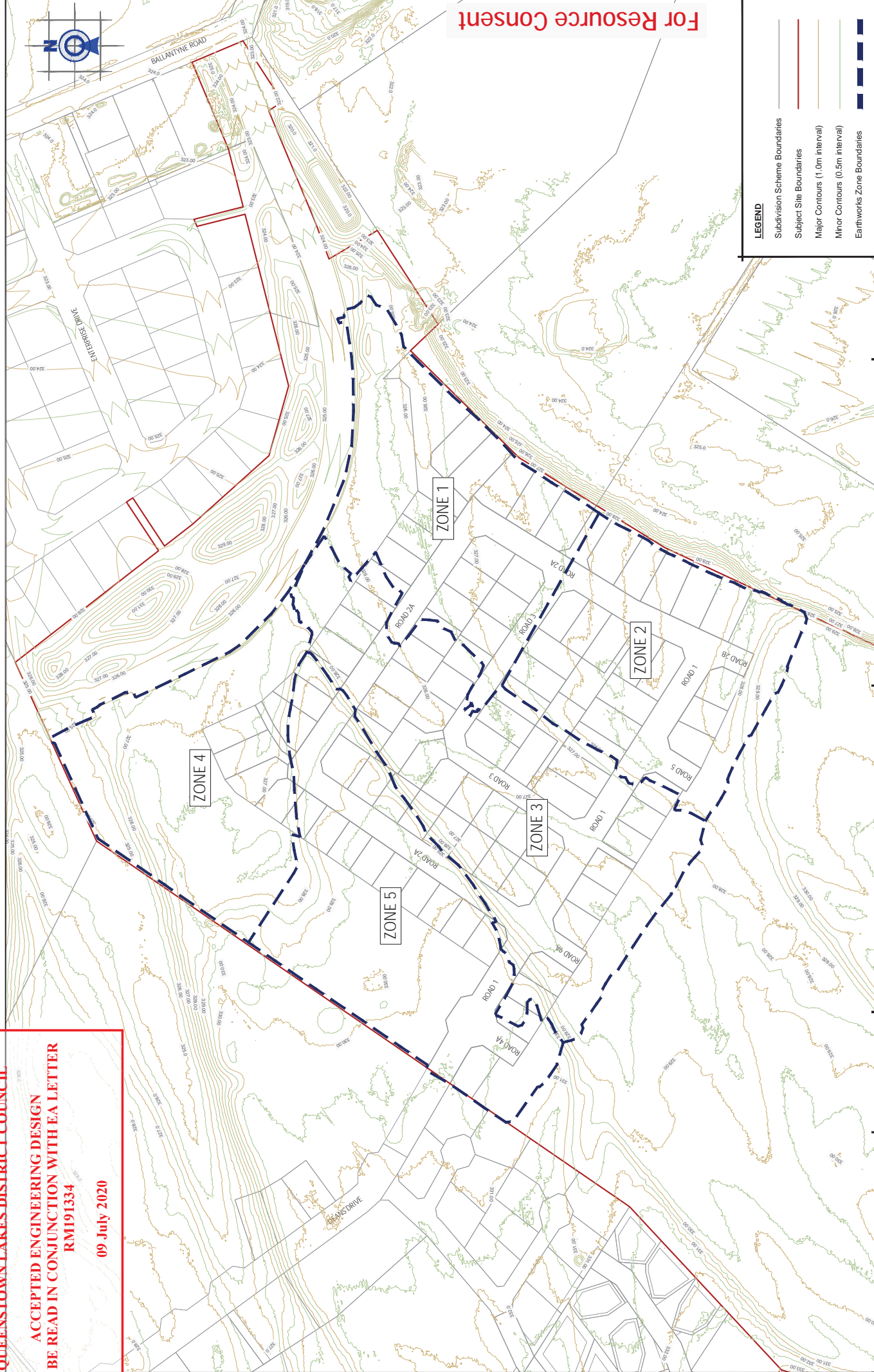
Orchard Road Holdings Ltd
Alpine Meadows Stage 1
Wanaka

WANAKA BRANCH
19 Reece Crescent
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09 July 2020



For Resource Consent

LEGEND

- Subdivision Scheme Boundaries
- Subject Site Boundaries
- Major Contours (1.0m interval)
- Minor Contours (0.5m interval)
- Earthworks Zone Boundaries

Surveyor:	TKM	Original Size:	Scale:
Design:	TKM	Sheet No:	A3
Drawn:	TKM	Revision:	DO NOT SCALE
Checked:	SJT	Date created:	06/11/2019
Approved:	SJT	Revision:	0
Job No:	W5620	Day No:	103
	006		

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Project & Drawing Title:
Site Management Plan
Construction Zones Overview

Client & Location:
Orchard Road Holdings Ltd
Alpine Meadows Stage 1
Wanaka

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APPENDIX 4 Site Induction Handout

1. Key Role ~~and~~ Responsibilities for Environmental Management

Role	Environmental Responsibilities
Site Supervisor TBC	<ul style="list-style-type: none">- Ensures staff and sub-contractors are working in compliance with environmental requirements and work activities are not impacting the environment- Coordinating the implementation of the EMP- Identifying resources required for the implementation of the EMP- Coordinating actions in emergency situations/rapid stabilisation of site and allocating appropriate resource for these activities- Restrict or stop any activity on the Project that has the potential to or has caused environmental effects- Ensuring that adequate instructions and information is provided to Operators which relate to environmental risks onsite
Environmental Representative Tim McDougall – 021 411 230 20	<ul style="list-style-type: none">- Coordinate the implementation of the EMP ensuring all environmental controls are in place as per the EMP- Undertake Environmental inspections including end-of-day inspections of controls, and ensure the maintenance and improvement of these controls- Undertake Environmental reporting- Maintain communication and provide leadership to ensure all staff and subcontractors are aware of environmental requirements- Ensure all contractors and sub-contractors are appropriately inducted when coming onto site- Assist the project leadership in managing and investigating Environmental complaints- Familiar with the environmental aspects of the project and how they are managed onsite regarding the EMP and the Erosion and sediment controls present- Aware of the appropriate guidelines found in GDO5 and the local Council requirements
Environmental Consultant Quinn McIntyre - 02102260046	<ul style="list-style-type: none">- Oversee the environmental management onsite and provide technical knowledge- Monthly monitoring onsite to ensure all the EMP continues to provide adequate environmental management for the project- Deliver site environmental inductions to key staff- Prepare and submit monthly reporting to Council

- Cardrona River: the Cardrona River is located approximately 800m to the east of the site. Stormwater will follow overland flow paths from the attenuation pond adjacent Ballantyne Road as well as the gully that runs from the south-east corner of the site into the neighbouring site.
- **Environmentally sensitive receptors:**
- Neighbouring residential sites to the west and east. These sites are particularly sensitive to dust, sediment laden water and noise/vibration. A key component will be to ensure water from the south-east gully where it flows naturally into the site to the east is clean at all times.

3. Key Resource Consent Conditions

Conditions 16-30 of Resource Consent RM191334 requires a detailed Environmental Management Plan. All works must be undertaken in accordance with the latest version. This shall include weekly environmental inspections and recording. There are also specific incident response and reporting procedures. Any complaints must be notified to and recorded by the Site Supervisor.

The site **EMP provides direction** for how this is to be achieved.

4. Limits of Clearing and Importance of Staging

The staging and sequencing of works is a key component to ensure that environmental effects of construction are appropriately managed. It is imperative that the sequencing outlined in section 2.1 of the EMP is followed so that the site is stabilised in the most efficient manner.

The site has been broken down into several zones to reduce the area of exposed soil at any one time. This will be managed by the control measures outlined within the **EMP** and the **Erosion and Sediment Control Plan** (ESCP).

All staff should be familiar with this sequence. Any potential changes to that sequence need to be approved by the Site Supervisor which will be discussed first with the Environmental Consultant.

5. Key Environmental Management Measures in EMP

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TO BE RE-APPROVED AND SUBMITTED WITH FEEDBACK TO THE ENGINEERING DESIGN TEAM (SECTION 4 OF EMP) RM191334

- Direction provided in Erosion and Sediment Control Plan (ESCP) in Appendix 1 of EMP
- Separation of clean and dirty water is the most important principle to ensure that the contributing catchment of dirty water that needs to be treated is as small as possible.
- **Progressive stabilisation (revegetation) of disturbed areas** will ensure that the extent and duration of exposed soil is minimised. **Keep it covered!**
- All controls to be checked immediately before storm events to ensure they are in good-working order
- Erosion and sediment control devices to remain in place until site is stabilised (defined as 80% vegetative cover)

Any works that disturb the controls outlined on the ESCP must be reinstated before moving to the next task.

Dust Management (Section 5 of EMP)

- Dust suppression should occur on any exposed soil on unsealed roads, this can be done using the water caught in SRP
- **Avoid all unnecessary vegetation clearing** that exposes soil and work should be conducted in stages as this can increase the impact from dust in the event of strong winds
- Keep speeds below **20/km/hr**
- **During high wind** events and dust suppression is becoming difficult **works must cease** until more favourable weather conditions.
- Stockpile heights must not exceed **2 meters** unless covered to prevent erosion and dust
- **Constant vigilance** should be maintained onsite to ensure that dust is appropriately managed and weekly monitoring should be completed to ensure that management measures are effective

Water Quality Management (section 6 of EMP):

- Any water caught in the SRP to be re-used in dust suppression
- Any observations of dirty water running out of the sediment retention pond, super sediment fence, standard sediment fence, into waterbodies or offsite to be reported directly to the Site Supervisor

Cultural Heritage Management (section 7 of EMP):

- If any artefacts are found works must stop within 20 meters of the discovery and the site manager notified immediately
- The site manager must then secure the area and notify the Heritage New Zealand Regional Archaeologist, who will advise when works within the area can begin again

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Noise and Vibration Management (Section 8 of EMP)

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TO BE READ IN CONJUNCTION WITH THE EMP

Particulars RM181334k should be completed during the hours of 0800-1700 from Monday-Friday and no works to be completed on weekends or public holidays during the middle of the day during business hours

- Noise dampening should occur when possible
- Daily and weekly site inspections should be undertaken by the Environmental representative to ensure the strategies in place are effective

Contaminated Site Management (Section 9 of EMP)

- If a potential contaminated site is identified onsite the Project Manager must be notified and appropriate action taken in accordance with the EMP

Chemicals and Fuel Management (Section 11 of EMP)

- Maximum quantities of chemicals and fuels to be stored onsite can be found within **section 11** of the EMP
- Refuelling and maintenance of vehicles should be completed only at the laydown area which is located at the top of the site
- All staff should be familiar with the location of spill kits which can be found within the **EMP**
- If a spill occurs the Project Manager must be notified and the area controlled until the site can be made safe
- Daily and weekly site inspections must occur to ensure effectiveness of controls in place

Waste Management (Section 12 of EMP)

- The site should be **litter free** with no litter to cross the boundary of the site
- Waste receptacles must be **well labelled** and **appropriately sized**
- Waste must be removed from the site regularly to ensure receptacles do not become overly full and the Project Manager should be notified when receptacles are reaching capacity
- Visual monitoring onsite should occur daily and weekly to ensure controls are working effectively

6. Environmental Incidents

The procedure for managing environmental incidents is outlined in section 3.6 of the EMP, however these can be summarised as follows:

- **Environmental incidents** must be reported as soon as they occur, and the Project team must respond immediately to mitigate further environmental impacts
- Investigation into the cause of the incident should be completed and a solution should be constructed to remediate the Environmental damage
- The Project Manager must then notify the **QLDC and/or the ORC of the details of the incident within 12** hours of being made aware of the incident

The procedure for rapid response to storm events is outlined in section 4.4 of the EMP, however these can be summarised as follows:

- ~~The Site Supervisor will observe and understand the~~ **weather forecast** throughout the project to ensure appropriate preparation onsite
- If a **significant storm** event is forecast all works should stop within an appropriate amount of time to inspect ESC devices and undertake any maintenance or site stabilisation required
- During the storm event the site should be monitored to sure the functioning of the ESC devices and maintained if required

When storms are forecast it is crucial that tools are downed in time for the rapid response procedure to be implemented. This will help avoid environmental incidents, potential enforcement action and site shutdown.

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APPENDIX 5 Site Induction Register

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APPENDIX 6 Weekly Site Inspection Proforma

Site Inspection Checklist
TO BE READ IN CONJUNCTION WITH EA LETTER

RM191334

Date: **09 July 2020**

Site Environmental Representative:

Site Supervisor:

Weather Description:

Item	Response	Comments:	Timeframe:			
	<input checked="" type="checkbox"/> X	Any observations and list any corrective actions or improvements required	When actions are to be completed (immediate, 24 hours etc)			
General	<table border="1"> <tr> <td data-bbox="823 1664 906 1731">NA</td> <td data-bbox="823 1592 906 1664">C</td> <td data-bbox="823 1527 906 1592">NC</td> </tr> </table>	NA	C	NC		
NA	C	NC				
Is a hard copy of the EMP available onsite? Provide details on the location						
Have any environmental incidents occurred during the week? If so, provide details						
Are 'no-go zones' clearly marked?						

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Water Quality
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 Is there visual evidence of sediment from the construction site entering waterways/drainage lines?
APP 1334
09 July 2020

Are daily visual inspections of waterways being conducted and recorded by the site supervisor?				
Erosion and Sediment Control				
Has the extent of exposed soil minimized and is the staging sequence outlined in the EMP being followed?				
Are completed areas being progressively stabilized?				
Is there any evidence that new erosion has opened up?				
Are E&S controls installed as per the ESCP and are in good order with minimal sediment build up?				
Are stockpiles and any storage areas located at least 30m away from waterways/drainage lines?				

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<p>Have stockpiles been stabilised to prevent erosion from both wet/windy conditions? ACCEPTED ENGINEERING DESIGN TO BE READ IN CONJUNCTION WITH EA LETTER RM1191334</p>		
<p>Is contaminated or laden 09 July 2020 water being discharged into waterways prior to testing?</p>		
<p>Is any mud being tracked onto surrounding roads?</p>		
<p>Cultural Heritage</p>		
<p>Have any finds of cultural significance been found throughout the week?</p>		
<p>Have exclusion zones been identified and clearly marked?</p>		
<p>Noise and Vibration</p>		
<p>Have any complaints been received during the week?</p>		
<p>Has noise or vibration monitoring been conducted onsite as a result of a</p>		

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complaint? If yes provide details
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Have works been staged near residents to minimise noise?
 09 July 2020

Air Quality

Have any complaints been received during the week?

Are stockpiles compacted or covered to minimise dust?

At time of inspection, were loads on spoil trucks covered upon entry and exiting the site?

Is there any evidence of dust observed indicating that measures are not adequate?

Contaminated Land

Have construction activities uncovered any contaminated material or spoil? If yes, provide details of type of material found and action taken.

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Vegetation	
<p>ACCEPTED ENGINEERING DESIGN</p> <p>TO BE READ IN CONJUNCTION WITH EA LETTER</p> <p>zones' been clearly RMH01B34 ensure they are visible to site personnel? 09 July 2020</p>	
Has any unnecessary clearing or vegetation occurred during the week?	
Is cleared vegetation mulched and stockpiled for reuse?	
Have weeds been identified and treated/removed prior to stripping?	
Chemicals and Fuels	
Are chemicals and fuels stored in accordance with the EMP?	
Are the storage areas placed away from waterways and drainage lines?	
Is refueling of vehicles occurring at least 30 m away from waterways/drainage lines?	

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<p>Are materials, safety data sheets located within the area where materials are stored RM191334</p> <p>ACCEPTED ENGINEERING DESIGN TO BE READ IN CONJUNCTION WITH EA LETTER</p>		
<p>Is there an adequate spill kits onsite? Have any used materials been replaced?</p>		
<p>Are spill kits clearly labelled?</p>		
<p>Are spill kits stored where chemicals/fuels/oils located?</p>		
<p>Have any spills occurred during the week? If so, provide details.</p>		

Note: Actions resulting from this inspection must be forwarded to the Site Supervisor.

<p>Additional Comments:</p>
<p>Name and Signatures of inspections attendees:</p>

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APPENDIX 7

Water Quality Monitoring Results Proforma

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Water Quality Monitoring Results						
Date:	09 July 2020					
Monitoring trigger:						
	Location 1	Location 2	Location 3	Location 4	Location 5	Location 6
Location Description:						
In situ or Lab Results:						
Turbidity						
pH						
Visible Observations:						
Hydrocarbons						
Tannins						
Waste						
Description of any Non-compliance and actions required:						

The above will be collated in an Excel Spreadsheet on the project management system with each date having its own Sheet tab.

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APPENDIX 8 Complaints Register

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APPENDIX 9 Incident Report Proforma

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Environmental Incident Report Form

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RM191334

QLDC Consent Number (if applicable):

RM191334

Brief Project Description: 09 July 2020 The Meadows Stage 1 - Subdivision and associated earthworks

Instructions

Complete this form for all environmental incident that cause contaminants (including sediment) or environmental nuisance to leave the site. Be succinct, stick to known facts and do not make assumptions. Once completed submit to the Regulatory team at Queenstown Lakes District Council at RCMonitoring@qldc.govt.nz. Call the Regulatory team immediately on 03 441 0499 for any serious or ongoing incidents that cannot be brought under immediate control.

Incident details

Date and Time	Date: xx/xx/xx Time: xx:xx am <input type="checkbox"/> pm <input type="checkbox"/>
Description Provide a brief and factual description of what happened during the incident, include relevant details such as: - The estimated distance to the nearest waterway (including stormwater and dry courses) - The estimated distance to the nearest sensitive receiver - The activity being undertaken when the incident occurred Sketches/diagrams/photos may be reference and appended to this report to aid in the description of the incident.	
EXACT location of the incident Include address, landmarks, features, nearest cross street, etc. Maps and plans can be attached to the incident report if appropriate	
Quantity or volume of material escaped or causing incident (provide and estimate if quantity unknown)	
Who identified the incident?	<input type="checkbox"/> Contractor <input type="checkbox"/> Council <input type="checkbox"/> Community <input type="checkbox"/> Other

What immediate actions/control measures were taken to rectify or contain the incident?

What initial corrective action will be taken to prevent similar incidents recurring in the near future?

Has the Otago Regional Council been notified? Yes No Will be notified

Approvals:

Environmental Representative/Person making report
 Name..... Signature.....
 Organisation..... Date.....
 Mobile phone number.....

Site Supervisor
 Name..... Signature.....
 Organisation..... Date.....
 Mobile phone number.....

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09 July 2020

APPENDIX 10 EMP Non-Conformance Register

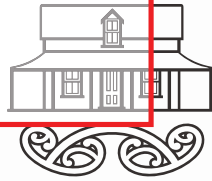
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09 July 2020

APPENDIX 11 Archaeological Discovery Protocol

09 July 2020



HERITAGE NEW ZEALAND
POUHERE TAONGA

Heritage New Zealand Pouhere Taonga Archaeological Discovery Protocol

Under the Heritage New Zealand Pouhere Taonga Act (2014) an archaeological site is defined as any place in New Zealand that was associated with human activity that occurred before 1900 and provides or may provide, through investigation by archaeological methods, evidence relating to the history of New Zealand. For pre-contact Maori sites this evidence may be in the form of bones, shells, charcoal, stones etc. In later sites of European/Chinese origin, artefacts such as bottle glass, crockery etc. may be found, or evidence of old foundations, wells, drains or similar structures. Burials/koiwi tangata may be found from any historic period.

In the event that an unidentified archaeological site is located during works, the following applies:

1. Work shall cease immediately at that place and within 20m around the site.
2. The contractor must shut down all machinery, secure the area, and advise the Site Manager.
3. The Site Manager shall secure the site and notify the Heritage New Zealand Regional Archaeologist. Further assessment by an archaeologist may be required.
4. If the site is of Maori origin, the Site Manager shall notify the Heritage New Zealand Regional Archaeologist and the appropriate iwi groups or kaitiaki representative of the discovery and ensure site access to enable appropriate cultural procedures and tikanga to be undertaken, as long as all statutory requirements under legislation are met (*Heritage New Zealand Pouhere Taonga Act, Protected Objects Act*).
5. If human remains (koiwi tangata) are uncovered the Site Manager shall advise the Heritage New Zealand Regional Archaeologist, NZ Police and the appropriate iwi groups or kaitiaki representative and the above process under 4 shall apply. Remains are not to be moved until such time as iwi and Heritage New Zealand have responded.
6. Works affecting the archaeological site and any human remains (koiwi tangata) shall not resume until Heritage New Zealand gives written approval for work to continue. Further assessment by an archaeologist may be required.
7. Where iwi so request, any information recorded as the result of the find such as a description of location and content, is to be provided for their records.
8. Heritage New Zealand will determine if an archaeological authority under the *Heritage New Zealand Pouhere Taonga Act 2014* is required for works to continue.

It is an offence under S87 of the *Heritage New Zealand Pouhere Taonga Act 2014* to modify or destroy an archaeological site without an authority from Heritage New Zealand irrespective of

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whether the works are permitted or a consent has been issued under the Resource Management Act.

**RM191334
09 July 2020**

~~Heritage New Zealand Regional archaeologist contact details:~~

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Regional Archaeologist Otago/Southland
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Fax. +64 3 4773893
mschmidt@heritage.org.nz