VERSION 2

Residential Earthworks in Otago

A guide for developers, landowners, contractors, and service providers

Otago Regional Council

Version	Date	Author / Editor	Contributors	Description of Change	Approved By
1	March 2023	Melanie Heather, Senior Environmental Officer	ORC Compliance, Consents, Policy and Science teams Queenstown Lakes District Council Compliance & Enforcement team Morphum Environmental	N/A	Tami Sargeant
2	June 2026	Melanie Heather, Principal Compliance Specialist Tim O'Grady, SLR (Chapter 7)	ORC Compliance, Consents, Science, Natural Hazards and Policy teams Queenstown Lakes District Council Monitoring, Enforcement and Environmental team Enviroscope Landpro Environment Canterbury	Policy, legislation, disclaimer and SQEP definition updates Addition of sections 1.4.4.5, 6.6, 6.7 Addition of Chapter 7	Simon Wilson

The comprehensive information in the document is endorsed by the following councils:

'The comprehensive information in the document is endorsed by Clutha District Council. It will help ensure that landowners, developers and contractors understand their responsibilities and compliance obligations to control sediment and erosion, thereby protecting water and sensitive environments from inappropriate land use. The guide draws an important distinction between compliance with Regional Council and District Council rules. In authorising resource consents that incorporate earthworks or soil disturbing activity CDC will ensure that the developers are advised of the need for compliance with this document.' CLUTHA DISTRICT COUNCIL

'A practical resource to help landowners, developers, and contractors undertake earthworks responsibly, minimising environmental impacts and risks. It promotes good practice and reinforces the importance of understanding responsibilities and meeting all relevant regional and district council requirements.' CENTRAL OTAGO DISTRICT COUNCIL

Disclaimer:
Otago Regional Council does not give any warranty whatsoever and expressly disclaims (to the maximum extent permitted in law) all liability for any damage or loss resulting from your use of, or reliance on the Guide or the information and data provided within the Guide.

For the avoidance of doubt:

- This Guide is intended to provide general guidance only.
- **For site-specific solutions, we recommend that you engage your own professional advice.**
- The references to GD05 within the Guide are accurate at the time of the Guide's release. However, GD05 is subject to change by the Auckland Council.
- The Guide does not constrain the Council when performing its functions, duties and powers under:
  (1) the Resource Management Act 1991 ("RMA"), including (but not limited to) decisions under part 6 of the RMA or enforcement powers under part 12 of the RMA or
  (2) any legislation that replaces the RMA.

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1. INTRODUCTION

Earthworks are a necessary part of preparing land for residential development, but if the right practices aren't used, soil can be lost to waterbodies and soil infiltration capabilities affected. Sediments are a natural part of a stream, lake or river but if sediment levels get too high, it can be detrimental to aquatic ecosystems. Fine sediments are the most common cause of contamination in New Zealand's rivers and estuaries.[1] Sediment can have a range of negative impacts on water quality and ecosystems. Soil can be contaminated, or soil loss can cause stability issues. Water run-off with lots of sediment can also be a nuisance to neighbouring landowners. Infiltration capacities of soils can be lost through rework and compaction reducing groundwater recharge and increasing runoff, exacerbating downstream erosion.

An excess of sediment can affect water depths, water coverage, the type of sediment found on the stream bed (for example the size of the particles) and the clarity of the water. When an excess of sediment enters the stream network, it can be suspended in the water, reducing light by affecting water clarity and turbidity (the amount of suspended material in the water) and can carry nutrients. Such environmental changes can affect ecosystems, including changes to vegetation, be detrimental to fish habitats, damage fish gills, degrade spawning areas and deplete invertebrate populations. Such adverse effects can also lead to a loss in cultural and recreational values such as the degradation of mahika kai and drinking water quality.

Rules in the Regional Plan: Water for Otago ("RPW") mean discharges of sediment from earthworks associated with residential development need to be avoided as a first priority, then best practice methods need to be used to minimise sediment loss if avoidance is not achievable.

Effectively using erosion and sediment control (ESC) measures can save you time and money by reducing downtime that comes with resolving mistakes or non-compliances, construction delays and compliance costs. Poor use of ESC tools can carry reputational or compliance risks which can include the issue of an abatement notice or infringement fines or the commencement of legal proceedings. An abatement notice could include a direction from Otago Regional Council (ORC) to stop works or to take action.

1.1. PURPOSE

This Guide provides context to ORC residential earthworks provisions, consenting information and on-going consent compliance requirements. This includes content required for any Environmental Management Plans (EMPs) and Erosion and Sediment Control Plans (ESCPs) which are necessary for (1) medium and high-risk sites (as determined by the ORC), and (2) for the majority of resource consents granted by the ORC under the RPW. The ORC assigned risk category may be different to those used by a District or City Councils. Refer to Section 1.5 for ORC's definition.

The Consent Holder will, if required by ORC, need to develop, implement, and maintain an EMP and ESCP that is consistent with this Guide for the duration of any works approved by resource consent. This process may be managed by the Principal Contractor and some aspects will need to be prepared by a Suitably Qualified and Experienced Person (SQEP). Refer to **Appendix 1** for the

[1] https://www.landcareresearch.co.nz/news/getting-smarter-about-sediment-control/

requirements needed to meet the definition of an SQEP.

Please read this guide in conjunction with **Auckland Council's Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region Guidelines Document 2016/005 (GD05)**[2] and the applicable resource consent if and when granted. GD05 is used by ORC because it is the most comprehensive erosion and sediment control guide in NZ with a long history (TP90 predates GD05) and 'reputation' including recognised experts that developed the guide. If any deviation to GD05 is proposed, see Section 1.4.2 of the Guide which outlines what is required for an SQEP recommendation to deviate from GD05.

This Guide has drawn on Queenstown Lakes District Council's ("QLDC") Guidelines for Environmental Management Plans 2019 and Environment Canterbury's ("ECan") Erosions and Sediment Toolbox. ORC acknowledges in particular QLDC's and ECan's permission to utilise information from its Guidelines and Toolbox as well as Auckland Council, Greater Wellington Regional Council and Waikato Regional Council for their assistance with as-built certification forms.

1.2. BACKGROUND

1.2.1. REGIONAL PLAN: WATER FOR OTAGO

Earthworks provisions in ORC's RPW, introduced by Plan Change 8 ("PC8") became operative on 3 September 2022, enabling ORC to strengthen its management of discharges to water, including sediment from earthworks associated with residential developments.

The purpose of residential earthworks provisions is stated in Policy 7.D.10 of the RPW: "The loss or discharge of sediment from earthworks is avoided or, where avoidance is not achievable, best practice guidelines for minimising sediment loss are implemented."

The provisions enable ORC to have better oversight on the management of earthworks from residential development, to proactively manage sediment from earthworks and ensure there is a robust process to ensure compliance with the RPW. While there are detailed rules in place in some District and City Council Plans, it is important that ORC fulfils its water quality management role, and the earthworks rules provide an important opportunity to more actively manage any sediment discharges which may enter water.

1.3. WHAT QUALIFIES AS RESIDENTIAL EARTHWORKS

The regional provisions for residential earthworks are applied in a broad sense and are not 'bound' by any underlying District Plan zoning as 'residential' or any definitions of 'residential activity' or 'residential development' in any District Plans.

Residential development is defined in the RPW as: *"... the preparation of land for, and*

[2] https://www.aucklanddesignmanual.co.nz/content/dam/adm/adm-website/developing-infrastructure/infrastructure-technical-guides/gd05-erosion-and-sediment-control/GD05.pdf

construction of, development infrastructure and buildings (including additions and alterations) for residential activities and includes retirement villages. It excludes camping grounds, motor parks, hotels, motels, backpacker' accommodation, bunkhouses, lodges and timeshares. The terms development infrastructure, residential activity, and retirement village are defined in the National Planning Standards."

1.4. DO YOU NEED AN ORC EARTHWORKS/ DISCHARGE CONSENT?

The provisions have been developed to manage the discharge of sediment from earthworks resulting in adverse effects on water quality. Rules 14.5.1.1 and 14.5.2.1 of the RPW set out the specific requirements for earthworks. You will need a resource consent if you are unable to meet any of the conditions of permitted activity rule 14.5.1.1:

a) The area of exposed earth is no more than 2,500 m^2 in any consecutive 12-month period per landholding; and
b) Earthworks do not occur within 10 metres of a waterbody, a drain, a water race, or the coastal marine area (excluding earthworks for riparian planting); and
c) Exposed earth is stabilised upon completion of the earthworks to minimise erosion and avoid slope failure; and
d) Earthworks do not occur on contaminated or potentially contaminated land; and
e) Soil or debris from earthworks is not placed where it can enter a waterbody, a drain, a race or the coastal marine area; and
f) Earthworks do not result in flooding, erosion, land instability, subsidence or property damage at or beyond the boundary of the property where the earthworks occur; and
g) The discharge of sediment does not result in any of the following effects in receiving waters, after reasonable mixing:
    i. The production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials; or
    ii. Any change in the colour or visual clarity; or
    iii. Any emission of objectionable odour; or
    iv. The rendering of fresh water unsuitable for consumption by farm animals; or
    v. Any significant adverse effects on aquatic life.

If you cannot meet one or more of these permitted activity criteria, you will need both a **regional land use consent** under section 9(2) RMA and a **discharge consent** under s15 RMA. Both land use and discharge consents are required for all residential earthworks irrespective of the likelihood of a discharge.

Examples where residential earthworks provisions do apply:

- When earthworks are undertaken to establish a building platform for a residential dwelling in any zone.
- When earthworks are undertaken to establish a driveway that gives access to a residential dwelling in any zone.
- When earthworks are undertaken to establish infrastructure that is specifically designed to directly accommodate residential activity in any zone (e.g. installation of a local road to a new subdivision, connection of site onto stormwater reticulation systems).
- When earthworks are undertaken to establish a subdivision for residential activity.

Examples of where residential earthworks provisions do not apply:

- When earthworks are undertaken to establish or maintain farm tracks.
- When earthworks are undertaken to establish a commercial or industrial building, even if that building is being established in a residential zone.
- When earthworks are undertaken to establish infrastructure in any zone, including residential zone, if the infrastructure is not directly associated with the residential activity on/in the vicinity of the site (e.g. installation of railway tracks or a cycle trail).
- When earthworks are associated with plantation forestry, construction of dams or quarrying.

These examples are not an exhaustive list. Please contact ORC to confirm whether you will need to apply for consent for your earthworks project. A District or City Council earthworks related resource consent may be required, please consult with your local District or City Council.

1.4.1. IF YOU DO NEED CONSENT, WE'LL NEED TO KNOW

If you cannot meet all the conditions of the permitted activity rule criteria, Rule 14.5.2.1 of the RPW outlines the matters over which ORC has discretion when considering any resource consent under this rule:

a) Any erosion, land instability, sedimentation or property damage resulting from the activities; and
b) Effectiveness of the proposed erosion and sediment control measures in reducing discharges of sediment to water or to land where it may enter water; and
c) The extent to which the activity complies with GD05; and
d) Any adverse effect on water quality, including cumulative effects, and consideration of trends in the quality of the receiving waterbody; and
e) Any adverse effect on:
    i. Kāi Tahu cultural and spiritual beliefs, values and uses;
    ii. Any natural or human use value;
    iii. Use of waterbodies or the coastal marine area for contact recreation and food gathering;
    iv. and measures to avoid, remedy or mitigate these adverse effects

Any application for resource consent to ORC should include, but is not limited to, the following information:

- Where and how much land, area and volume, will be exposed.
- What you will do to minimise the risk of sediment loss.
- What are the underlying soil types on the earthworks area.
- The extent to which your proposal complies with GD05. These guidelines contain a comprehensive set of potential measures that can be used to avoid sediment loss from your site and/or into water. Refer to Section 1.4.2 of the Guide, which outlines what is required for an SQEP recommendation to deviate from GD05.
- Whether there will be adverse effects on waterbodies, ecological values, other properties, human use or Kāi Tahu values.

Note: If a proposal includes a discharge into a District or City Council network, such as stormwater and/or sewer lines, affected party approval may be required from that Council as part of your resource consent application with ORC. It is also noted that you are likely to require resource consent for the earthworks from the District or City Council as well.

In addition to an Assessment of Environmental Effects (AEE) ORC will need to know how an application stacks up with the objectives and policies of relevant planning documents. There is an application form on ORC's website (**Form 28**[3]) that provides more detail on application requirements.

1.4.2. HOW CAN YOU MINIMISE THE RISK OF EROSION AND SEDIMENT LOSS

The best measures to manage the effects of earthworks depend on the type and scale of the activity and site characteristics that affect the risk associated with an activity. Factors influencing the amount of soil loss from earthworks sites are:

- Soil type and characteristics
- Topography of the area of earthworks (e.g. slope or upslope catchment area)
- Proximity to sensitive receivers, such as receiving waters to any sediment run-off
- Area of works
- Slope of works
- Land stability
- Duration of soil exposure
- Effectiveness of the infrastructure used (i.e. sediment ponds)
- Weather and climate (including rainfall (intensity, magnitude and duration), snow melt, season, etc.). Freezing and freeze thaw action can affect overland flow, ground infiltration and chemical treatment.
- The type of machinery, the methodologies and on-site practices used

Types of mitigation measures include:

- Erosion controls which are the primary measure. Try to stop erosion occurring in the first place and then deal with sediment movement that wasn't preventable:
    - Soil stabilisation (including battering, engineered structures, revegetation, waterproof covers, staging with progressive stabilisation)
    - Limiting works during wetter months/days or during freezing conditions. Poor environmental management and forward planning during winter often result in sediment discharges. You must have contingency plan/measures during wetter/ colder months etc.
    - Limiting the time bare soil is exposed
    - Reducing the length of slopes
    - Reducing clean water entering the site (clean water diversions)
- GD05 sediment controls, including chemical treatment
- Methodological controls
- Monitoring during works assessing whether measures are working properly, adapt if necessary and feed back in to the EMP and ESCP
- Preparation of the ESCP by an SQEP who is involved in the supervision of earthworks

Regional Council Guides across the country outline erosion and sediment control principles and methods. Please refer to GD05 for further information on erosion and sediment control measures:

> Erosion and sediment control guide for land disturbing activities in the Auckland region. Auckland Council Guideline Document GD2016/005, 2016.

[3] https://www.orc.govt.nz/media/16053/form-28-application-for-residential-earthworks.pdf

Other guides can be used to assist with a general understanding of erosion and sediment control but GD05 is the guide that must be adhered to in Otago:

> Erosion and Sediment Control Guide for Land Disturbing Activities in the Wellington Region, 2021.[4]
> Erosion and Sediment Control Toolbox, Environment Canterbury.[5]

It is encouraged that management plans (such as ESCPs) are submitted at time of lodgement of an application so ORC can ensure that the best options to control sediment run-off are used. These should be prepared by an SQEP.

1.4.2.1. Deviation from GD05

Any deviation from GD05 needs to be clearly justified, assessed and agreed upon with ORC during the consent application process.

Deviations from GD05 may be considered by ORC provided that there is sufficient information and evidence submitted by an SQEP which demonstrates that the deviation would achieve erosion and sediment control to an equivalent standard. This must be demonstrated with appropriate supporting evidence through the application.

For example, in areas where ground conditions allow, soakage may be an appropriate method for treating sediment-laden runoff. The design of the soakage device would need to be able to address the flows associated with the 5% Annual Exceedance Probability (AEP), 24-hour duration, rainfall event. This would need to be supported with percolation testing of the soils and demonstration of the groundwater levels in this location.

Clear justification as to why any deviations from GD05 is appropriate must be supplied. General statements regarding the differences in the climate, soil and weather patterns in the Auckland and Otago Regions will not be accepted as sufficient justification.

1.4.3. WHAT IS A RIVER

In the past many waterbodies have not locally been recognised as 'rivers', especially where rivers and streams have been straightened or modified, or the 'river' is very small, or has little flowing water. Some waterbodies that we would commonly think of as drains, can also be legally considered as rivers.[6]

It is important to understand how to identify a 'river' and ensure that you get appropriate consents for works in and around waterbodies or meet applicable permitted activity rules.

The definition of a river in the RMA and ORC's RPW is:

"...a continually or intermittently flowing body of fresh water; and includes a stream and modified watercourse; but does not include any artificial watercourse (including an irrigation canal, water supply race, canal for the supply of water for electricity power generation and farm drainage canal)."

[4] https://www.gw.govt.nz/document/17047/erosion-and-sediment-control-guideline-for-land-disturbing-activities-in-the-wellington-region

[5] https://esccanterbury.co.nz/

[6] https://www.orc.govt.nz/media/boxl4kgx/reg-what-is-a-river-fact-sheet-march-2025.pdf

If any of the factors in **Figure 1** are checked, the waterbody may be considered a river. If in doubt, get in touch with ORC's Compliance Team.

Figure 1: Is it a river checklist

Determining the status of a waterway	Check these factors			
This checklist covers factors that legal authorities will refer to when making a decision. Checking these factors will help you decide the status of waterways on your property. All factors are considered, but not all factors need to be present to determine if a waterway is a river. In some cases, only one of the factors may be needed.	Does the water flow all or part of the time?		Does the watercourse have a defined 'bed' (i.e. a defined pathway)?	
	Is the source of the watercourse from hills/ range/mountains etc?		Does the watercourse support aquatic life?	
	Is it fed from a spring, snow melt or from rain (received from upper catchment) or other natural sources?		Is the watercourse 'named' or does it go by a local name?	
	Is the watercourse in an original natural channel?		Is the watercourse shown on a topographic map?	
	Does the topography of the watercourse follow a 'u' shape, meander etc?		Are there historic structures or bridges over the watercourse?	

1.4.4. OTHER RESOURCE CONSENTS THAT MAY BE REQUIRED

Depending on its nature and location an application involving earthworks for residential development may require other resource consents, for example:

- Diversion and discharges of contaminated water, or water in general to for example, divert springs to do work.
- Reclamation of river (and associated diversion)
- Dust — air discharges
- Groundwater/surface water takes associated with the control of dust during earthworks (filling water carts), including a land use consent for the bore
- Groundwater take associated with dewatering
- Disturbance and/or deposition of contaminated land
- Coastal consent (where outfall installed for discharge of sediment/stormwater to the coast)
- Defence against water (for example, where earth bunds are proposed to mitigate sediment run-off or having a building platform to a certain height to avoid flooding) (refer to **Glossary**). A water permit to divert flood flows would also be required). You may also need bylaw approval from ORC for this.
- Vegetation clearance and/ or disturbance of a natural inland wetland (refer to **NES-FW**)[7]
- District/City Council consents: Earthworks are managed by District and City Councils as

[7] https://www.legislation.govt.nz/regulation/public/2020/0174/latest/LMS364099.html

well as ORC. You will need to check whether your earthworks also require resource consent from your District or City Council.

1.4.4.1. Dewatering

Dewatering is often encountered on site but sometimes not anticipated in the residential earthworks consent application phase. Dewatering is the removal of water from excavations, tunnelling, trenches and sediment control devices. It may be the removal of either surface water or groundwater and is generally undertaken by pumping[8] and is made up of three activities (Ministry for the Environment, 2021):

- Pumping the groundwater (to lower groundwater levels, or dewater excavations)
- Treatment and removal of silt
- Discharge of clean water

Dewatering can generate fine textured material that is difficult to treat and retain on site. The other potential effects of dewatering include (Ministry for the Environment, 2021):

- Sediment generation
- Discharge of contaminants
- Drawdown effect
- Mortality of freshwater life
- Indirectly affects the hydrology of wetlands where the groundwater is connected to a nearby wetland

There is no permitted activity rule for the construction of a bore/well. It is important that this RPW rule is understood:

RPW Rule 14.1.1.1 provides *"The excavation, drilling or other disturbance of land, other than in the bed of any lake or river, for the purpose of creating a bore, is a controlled activity."* A controlled activity requires a resource consent before it can be carried out.

A bore is defined in the RPW as *"Every device or means, including any well or pit, which is drilled or constructed for the purpose of taking groundwater, or which results in groundwater being taken, other than piezometers or other monitoring devices used for water sampling purposes only."*

A land use consent to construct a bore is required for earthworks applications where it is anticipated that groundwater will be encountered. If groundwater is encountered during earthworks that was not anticipated, please advise the Compliance Team and make contact with the Consents Team to apply for an appropriate resource consent.

There are no specific permitted activity rules for a 'dewatering' activity; however, there are a number of permitted activity rules that apply to the use of groundwater (e.g. 12.2.2.2, 12.2.2.4, 12.2.2.5, 12.2.2.6) and the diversion (of surface water) for land drainage (e.g. rule 12.3.2.2). A water permit to take and use groundwater may be required if permitted activity rules can't be met.

1.4.4.2. Flood Management Protection Bylaw 2022

The ORC Flood Protection Management Bylaw has been put in place to manage, regulate and

[8] Dewatering can also occur without the use of pumps, by 'cutting' into groundwater creating an artesian waterflow.

protect the effective operation and integrity of flood protection works owned by or under the control of ORC. The Bylaw controls activities that may affect the integrity or operation of flood protection works.

Rules in the Bylaw relevant to earthworks include:

Clause 3.2(i) No person shall, without the prior approval of the Council —

- Carry out any earthworks
    i. in, on, through or under any defence against water, or
    ii. within 20 metres of the landward side of any defence against water unless the earthworks relate to cultivation, or
    iii. between the bank of any river and associated defence against water, or
    iv. within any excavation-sensitive area, if the earthworks involve excavation.

Clause 3.3.
No person shall, without the prior approval of the Council —

Construct or put any structure

- in, on, over, through or under any floodway; or

- Carry out any earthworks in any floodway, excluding maintenance of drains.

Clause 3.4.
No person shall, without the prior approval of the Council –

- Construct or put any structure
    i. in, on, over, through or under any groyne, cross-bank or training line, or
    ii. within seven metres of any groyne, cross-bank or training line; or

- Carry out any earthworks
    i. in, on, through or under any groyne, cross-bank or training line, or
    ii. within fifty metres of any groyne, cross-bank or training line unless the earthworks relate to cultivation, or
    iii. between the bank of any river and associated groyne, cross-bank or training line.

The ORC website contains maps to show these areas for which Bylaw approval will be required for earthworks
https://maps.orc.govt.nz/portal/home/item.html?id=0cbd050c39904694a745f8180cda0160

Bylaw approval is managed by ORC's Engineering Unit.

1.4.4.3. Dust Suppression / Filling of Water Carts

Water is often needed on earthwork sites to manage dust while works are occurring. Some Territorial Authorities ("TLA")[9] have restricted the filing of water carts from their drinking water network to improve the protection of public health. This is resulting in contractors seeking alternate means of filling water carts for dust suppression. Potential options for taking water are from an existing bore or from nearby surface water (lakes or rivers, including irrigation races).

[9] means a City or District council – section 2 Local Government Act 2002

Consent is required to take and use surface and groundwater if permitted activity rules cannot be met. In some catchments and aquifers, all available water has been allocated therefore only permitted activity rules can be relied on. These rules are found in Chapter 12 of the RPW. For rule 12.1.2.4, water for dust suppression purposes does not constitute irrigation and therefore this rule can be used.

1.4.4.4. Other

There are other activities that may involve earthworks that are subject to other plan provisions and consent requirements and are not covered by the residential earthworks provisions:

- Earthworks related to stream clearances
- Construction of a dam
- Land disturbance activities associated with plantation forestry
- Quarrying
- Reclamation (coastal or streams)

More information about our resource consent process is available by calling 0800 474 082, emailing customerservices@orc.govt.nz / consent.enquiries@orc.govt.nz or by going to ORC's website: https://www.orc.govt.nz/consents-and-compliance/do-i-need-a-consent/.

1.4.4.5. Stacking of Permitted Activity Rule and Consents

A resource consent applicant cannot rely on the permitted activity (PA) rule to do works in advance of consent being granted if the first 2,500m^2 are an inextricable part of the activity in relation to which the applicant seeks consent.

1.4.5. WORKING WITH TERRITORIAL LOCAL AUTHORITIES

Under section 31(1) of the RMA, TLAs have responsibility for managing the effects of the use, development or protection of land and associated natural and physical resources of the district as well as the control of any actual or potential effects of the use, development or protection of land. This provides for TLAs to manage the effects of land use from earthworks, such as stability of neighbouring sites, amenity effects including noise and vibration from construction earthworks, visual landscape effects, or sediment run-off that affects persons and public pipe systems (such as resulting in blockages etc.).

Most District or City Plans contain setback requirements from waterways, and some (such as in Queenstown Lakes and Dunedin City) include requirements for implementation of sediment control practices to prevent sediment entering waterbodies.

To reduce cost and complexity for applicants and consent holders, ORC staff (Consents and Compliance) work together where possible while appreciating that TLAs and Regional Councils have different areas of focus and requirements.

Please be aware that you should always check with ORC directly if permitted rules will be met or if consent is required. Do not rely on the advice of TLAs, nor statements in TLA consents that imply ORC permitted activity rules are met unless this was explicitly advised to the TLA by the ORC.

If you need to contact a TLA in Otago, please refer to contact details in **Table 1** below.

Table 1: TLA contact details

TLA	Phone	Email
Queenstown Lakes District Council	03 441 0499	General: Services@qldc.govt.nz Compliance monitoring: RCMonitoring@qldc.govt.nz Planning & consents: dutyplanner@qldc.govt.nz
Central Otago District Council	03 440 0056	General: info@codc.govt.nz
Dunedin City Council	03 477 4000	General: dcc@dcc.govt.nz
Waitaki District Council	03 433 0300 0800 108 081	General: service@waitaki.govt.nz
Clutha District Council	03 419 0200 0800 801 350	General: help.desk@cluthadc.govt.nz

1.5. TECHNICAL AUDIT

In some cases, the ORC's Consents Team will refer a consent application to a suitably qualified person to assist the Consents Team in assessing the effects of the earthworks and appropriate mitigation measures to manage their effects. ORC has an internal risk matrix, which is considered alongside other factors, for residential earthworks to provide guidance to determine whether technical input is required. All applications in the Lake Hayes catchment require a technical audit.

The 'risk' that your site poses is determined at the consent application stage and will continue through to compliance monitoring. Compliance Officers generally provide input into the assessment of the application and have a role to play to ensure your activity's risk is assigned appropriately.

Table 2 overleaf sets out some of the factors which the Consents Team will consider when assigning the risk. Please note that this table is not exhaustive and does not include all risk factors which may be considered by the ORC. TLAs may apply a risk category differently to ORC, therefore it is important to also contact your local TLA for advice.

Table 2: Environmental risk for EMP category

ENVIRONMENTAL RISK FOR EMP CATEGORY	CHARACTERISTICS OF RISK LEVEL
LOW	**Projects with some of the following characteristics:** • Small scale, simple, no staging & low complexity • Site is significant distance from waterbodies • Not on contaminated land • No Scheduled Values • No ecological, cultural or recreational values that will potentially be adversely affected • Flat area of works • No known site instability concerns • No potentially affected parties • Any other factors considered relevant
MEDIUM	**Projects with some of the following characteristics:** • Medium scale, possible staging • Some sensitive receivers in the general vicinity of the works • May affect Scheduled Values • Some ecological, cultural or recreational values that will potentially be adversely affected • Sloping area of works, known instability concerns or soil type prone to erosion • Several potentially affected parties • Any other factors considered relevant
HIGH	**Projects with some of the following characteristics:** • Large scale, complex, may involve staging • Close proximity to sensitive receivers, including waterbodies • Many Scheduled Values identified • High cultural, recreational and ecological values that will potentially be adversely affected • Sloping area of works, known instability concerns or soil type prone to erosion • Many potentially affected parties, of interest to wider public • Any other factors considered relevant

2. COMPLIANCE MONITORING

2.1. COMPLIANCE MONITORING — WHAT TO EXPECT

ORC is responsible for regulating activities affecting water, air, land and the coast to promote the sustainable management of our environment. ORC's Compliance Team helps our community meet our rules and regulations through compliance monitoring, education, advice, investigations and enforcement.

ORC applies a proactive, responsive, and risk-based approach to our regulatory functions. Residential earthworks fall within ORC's Compliance Plan 2023 – 2026 Priority 1 category.[10]

After resource consents are issued, ORC monitors the consent to ensure compliance with consent conditions.

The consent is likely to be charged a fixed compliance performance monitoring fee which covers costs associated with the provision of plans, samples, notifications and other 'paperwork' or administration. For full details of these fees see the ORC's Annual Plan at https://www.orc.govt.nz/your-council/plans-and-strategies/annual-plans/.

The consent may be audited by the Compliance Team. This work includes travel time, site inspections, meetings with Consent Holders (or their representatives), taking samples, having the samples analysed in a laboratory or on-site, writing up an audit report or site notes and having further communications with the Consent Holder or their representatives. The costs for performing an audit are recoverable from the Consent Holders. Invoices for the audit charges are sent once the audit work is completed by either ORC staff or its authorised contractors. For further details of the fees payable by Consent Holders — refer to ORC's Annual Plan.

Where non-compliance with the resource consent (including all conditions) is identified, the actual and reasonable costs and expenses incurred by the ORC in responding may be recovered from the Consent Holder regardless of whether any enforcement action is taken or not.

2.1.1. SITE INSPECTIONS INCLUDING WEATHER EVENTS

The notification of your project starting is an important requirement as it alerts the Compliance Team to your intentions to begin works. The prestart notification requirement period will be specified in your consent, which is usually 10 working days prior to the commencement of works.

A Compliance Officer will generally schedule an inspection immediately after the erosion and sediment controls have been installed on site. This is a good opportunity to check the controls are installed as per the accepted ESCP (refer to Section 3), meet your project team and outline expectations. If your site is considered a High-Risk site, you can expect to see a Compliance Officer on site a number of times per stage. Inspections such as these will generally be pre-arranged with the SQEP or Environmental Representative. Consider inviting the ORC Compliance

[10] https://www.orc.govt.nz/your-council/plans-and-strategies/compliance-plans-and-policies/

Officer out at key stages during your project such as: pre-start (for large complex sites), post-ESC measures being installed, moving from one stage to another, during contaminated land remediation work and prior to ESC measures being decommissioned. ORC encourages a 'no surprises' approach.

During significant weather events Compliance Officers may turn up at your site unannounced. This is to ensure your erosion and sediment controls are coping with the weather and to sample any discharges from your sediment control devices such as sediment retention ponds (SRPs), decanting earth bunds (DEBs) and any uncontrolled discharges that leave your site.

ORC Compliance Officers may carry out joint site inspections with TLA compliance staff from time to time to ensure your project team are not unnecessarily doubling up on time spent with Council staff.

The Consent Holder, and/or their representatives will receive a **Compliance Inspection Report** after the site inspection.

ORC's compliance audit grading is based on the Ministry for Environment *'Best Practice Guidelines for Compliance, Monitoring and Enforcement under the Resource Management Act 1991'*[11] (**Table 3**).

***Table 3:** MfE compliance grading*

	Compliance Grade
1	**FULL COMPLIANCE** with all relevant consent conditions, plan rules, regulations and national environmental standards.
2	**LOW RISK NON-COMPLIANCE.** Compliance with most of the relevant consent conditions, plan rules, regulations and national environmental standards. Non-compliance carries a low-risk of adverse environmental effects or is technical in nature (e.g. failure to submit a monthly report).
3	**MODERATE RISK NON-COMPLIANCE.** Non-compliance with some of the relevant consent conditions, plan rules, regulations and national environmental standards, where there are some environmental consequences and/or there is a moderate risk of adverse environmental effects.
4	**SIGNIFICANT RISK NON-COMPLIANCE.** Non-compliance with many of the relevant consent conditions, plan rules, regulations and national environmental standards, where there are significant environmental consequences and/or there is a high-risk of adverse environmental effects.

The Compliance Inspection Report may include required corrective actions, with a set date in which to comply by. It is important these corrective actions are taken seriously. Ensure that the Compliance Officer assigned to your site (and compliance@orc.govt.nz) is notified when you have completed all corrective actions and include photographs where applicable.

Non-compliance may result in enforcement action being taken in accordance with ORC's **RMA Compliance and Enforcement Policy.**[12] This includes when there is Moderate or Significant Risk

[11] https://environment.govt.nz/publications/best-practice-guidelines-for-compliance-monitoring-and-enforcement-under-the-resource-management-act-1991/

[12] https://www.orc.govt.nz/your-council/plans-and-strategies/compliance-plans-and-policies

Non-Compliances or if corrective actions have not been addressed by the Consent Holder or their representatives. This may include an Abatement Notice to stop a particular activity.

The Resource Management (Infringement Offences) Regulations 1999 sets out the offences under the RMA for which an infringement notice can be issued. In August 2025, these Regulations were amended for the first time since 1999 to update both the offences and the associated fees. The changes ensure that infringement penalties remain a meaningful and effective deterrent to non-compliance.

Changes include, but not limited to:

- Increasing the fees for infringement offences committed by individuals and introducing new higher fees for companies.
- Separating the existing land use infringement offence into two different offences, with different fees.
- Updating the summary of rights in the statutory forms for infringement and reminder notices to more clearly state the potential outcomes of seeking a court hearing to contest an infringement notice
- Enabling regulators to take account of a person's compliance history;
    - Compliance history can be considered for new consent applications or transfers
    - Council can review consent conditions when conditions not complied with
    - The Environment Court can revoke or suspend a consent to ongoing or repeated significant non-compliances
- Prohibiting insurance against fines for offending
- Reducing the maximum term of imprisonment from 2 years to 18 months
- To dis-enable offenders from electing trial by jury

More information is available in the Resource Management (Infringement Offences) Amendment Regulations 2025.

2.1.2. PERFORMANCE MONITORING

All performance monitoring records (such as monthly reports, start of works notifications and all Plans) can be emailed to compliance@orc.govt.nz. Please quote the **resource consent number(s)** and the condition to which the information applies in the email title and within the report or information being provided. The Compliance Officer assigned to your resource consents will review the information provided and may be in touch requesting further information. For more complex reviews, an external technical reviewer may be engaged. ORC's ability to charge for the technical review is provided for in Council's Long-Term Plan 2024-34 and section 36 of the Resource Management Act 1991.

Consent Holders will get charged an annual performance monitoring fee. This is based on the number of performance monitoring requirements held within your consent. You may have finished all of your earthworks, have a fully stabilised site and met all of the conditions of your consent where your consent is no longer required but your consent may not expire for a number of years. In this instance, you may consider surrendering your consent to negate on-going unnecessary costs for a completed project and site. The **Form 20** Surrender of Resource Consent can be downloaded from ORC's website.[13]

[13] https://www.orc.govt.nz/media/04khsjq2/form-20-surrender-a-consent-may-26.pdf

The Compliance Team triage site inspections based on the risk a site may pose to the environment. Section 1.5 **Table 2** provides high-level guidance as to how a site may be classified by the Compliance Team.

3. PLANS

The purpose of this section is to provide guidance to Consent Holders and their contractors and consultants about what information, administrative and operational measures must be outlined in EMPs, ESCPs and Chemical Treatment Management Plan (CTMPs) that are to be submitted either during the consent application stage, and/or, finalised plans for acceptance by ORC's Compliance Team once consent is granted. The Guide will not prescribe onsite technical measures directly but will reference guidance and other best practice documents which will provide this detail.

3.1. ENVIRONMENTAL MANAGEMENT PLAN

3.1.1. EMP INTRODUCTION

The EMP must address:

- Administrative requirements, and
- Operational requirements

During the preparation of EMPs (or during subsequent construction), Consent Holders are encouraged to consult with stakeholders such as Iwi and local community environmental groups to obtain their specific knowledge regarding environmental management and specific issues associated with relevant receiving environments.

The EMP (including ESCP) for medium to high-risk sites must be prepared by an SQEP. The plans are to be submitted to ORC's Compliance Team (compliance@orc.govt.nz) at least 15 working days (or otherwise specified in the consent) prior to the commencement of earthworks activity. The EMP and ESCP must be based on the draft plans submitted as part of the consent application.

3.1.2. EMP UPDATES

The Consent Holder (or nominated Contractor) must develop and document a process of periodically reviewing the EMP. This process will focus on identifying opportunities for continual improvement of on-site processes and practices to ensure that the EMP is relevant to the work under the resource consent.

The process needs to address how environmental incident corrective actions, or legislative changes will be addressed via an update of the EMP. The Consent Holder (or nominated Contractor) must establish and implement document version control.

Updates to the EMP must be undertaken by the Consent Holder (or nominated Contractor) when:

- The construction program moves from one Stage to another; or
- Any significant changes have been made to the construction methodology since the original plan was accepted for that Stage; or
- There has been an Environmental Incident and investigations have found that the management measures are inadequate; or
- There has been a material change to the project (e.g. increased area of disturbance, encountering high risk soils or design alterations) that could affect the effectiveness of erosion and sediment controls (as the effects from the change may have the potential

to materially increase adverse effects that were not previously considered) or introduce activities that require additional resource consent(s); or
- Directed by ORC's Compliance Team.

Where undertaken, updates to the EMP shall be submitted to ORC for acceptance by emailing compliance@orc.govt.nz and the site ORC Compliance Officer. This is only applicable if provided for by the consent, otherwise a s127[14] variation to the resource consent may be required. Works implementing the updated EMP/ESCP must not commence until it has been accepted by ORC. All works must be undertaken in accordance with the most current EMP/ESCP accepted by ORC at all times.

3.1.3. ORC REVIEW

Consent conditions will require that all EMP revisions (including the first EMP) are accepted by ORC's Compliance Team. Usually, a consent condition will require you to submit the Plan **15 working days** prior to starting works or implementing that Plan or revision to ORC's Compliance Team. The ORC review period starts from the submission of the plan(s) and AFTER the issuing of consent, as a decision hasn't been made prior.

It is important that Consent Holders and their representatives **allow appropriate time within the project schedule to accommodate these reviews** as works cannot proceed without ORC's acceptance of the plans. The Plans submitted with the consent application need to be resubmitted to ORC's Compliance Team once consent is granted.

ORC will work in conjunction with QLDC, where appropriate, in the review of EMPs and ESCPs in the Queenstown Lakes area. This practice is encouraged in other TLA districts.

3.1.4. ADMINISTRATIVE REQUIREMENTS

The following administrative elements must be included where specified within the resource consent. The requirements for each administrative element are outlined in detail below.

Medium and High-Risk level projects will usually require the following:
- Site Environmental Induction
- Management of sub-contractors
- Notification and management of Environmental Incidents
- Environmental roles and responsibilities of key personnel, including nomination of principal contractor
- Records and registers
- Weekly and Pre-Rain and Post-Rain Event inspections including water quality and discharge monitoring
- Monthly environmental inspection reporting by an SQEP. The report should include water quality monitoring records, fuels/chemical storage and construction progress.

Low risk sites may require all of the elements above, with the exception of monthly monitoring and reporting.

[14] section 127 of the RMA – Change or cancellation of consent condition on application by consent holder

3.1.4.1. Environmental Site Induction

The purpose of the Environmental Site Induction is to ensure that all staff and subcontractors onsite are aware of their environmental responsibilities. Confirmation of a completed site induction must be submitted to ORC as a requirement of consent. A template is available in **Appendix 2**.

Prior to commencing ground-disturbing activities, the Consent Holder (or nominated Contractor) must ensure that all staff involved in, or supervising, works onsite have attended an Environmental Site Induction. This includes at a minimum, all site management staff, employees and subcontractors working on activities which disturb the ground surface.

The Consent Holder (or nominated Contractor) should prepare and deliver a project specific site induction to all persons upon entering the site. The Consent Holder (or nominated Contractor) must maintain a register signed by those inducted. The register must contain but not be limited to the name of the inductee, date inducted, and the name of the induction facilitator.

A copy of the Consent Holder's (or nominated Contractor's) Environmental Site Induction must be included in the EMP. The induction must include but not be limited to:

a) Basic roles, responsibilities, and required trainings/qualifications for environmental management
b) Specific locations within the site of environmental significance or risks, including receiving waterbodies, ephemeral creeks and wetlands. These should be visited as part of the induction
c) Scope and conditions of resource consents applicable to the works
d) The area of earthworks for each Stage of works and timeframes for key stages
e) Environmental management measures stipulated in the EMP
f) ESCP
g) CTMP, if chemical treatment is to occur
h) Procedures of notifying of potential/actual Environmental Incidents, including ORC's pollution hotline number 0800 800 033
i) Procedures for managing significant weather events (wind, snow, freezing conditions and rain)
j) Procedures in the event of an uncontrolled collapse or instability affecting the site or adversely affecting any neighbouring property
k) Where to locate a copy of the resource consents, EMP, ESCP and CTMP on site, and contaminated land related plans where applicable

All sub-contractors should attend the site-specific Environmental Induction and must be recorded on the site environmental induction register. The Consent Holder (or nominated Contractor) must ensure that all sub-contractors comply with the EMP at all times.

3.1.4.2. Notification and Management of Environmental Incidents

The Consent Holder (or nominated Contractor) is encouraged to notify ORC of details of any environmental incident where the EMP, ESCP, CTMP or controls on site have failed leading to any adverse environmental effects offsite beyond the boundary or on the receiving environment within the site (including nuisance effects associated with dust that breach ORC's Air Plan permitted activity rules as well as spills of fuels, grout, concrete products and chemicals to ground onsite).

Concrete contamination is a reoccurring theme, it is important your site manages concrete products and activities correctly and avoid a discharge to a waterbody, wetland or stormwater. Keep sediment and cement out of waterbodies, wetlands and drains.

We encourage notification of all environmental incidents to ORC within **12 hours** of becoming aware of the incident (to the contacts within **Table 4**). A resource consent may stipulate that this (or a similar reporting requirement) is mandatory.

***Table 4:** ORC contact details in the event of an incident or compliance related matters*

Type	Contact
Environmental incident	1. pollution@orc.govt.nz/0800 800 033 *and* 2. Your site's ORC Compliance Officer 3. Your site's TLA Compliance Officer
Compliance-related matters	1. compliance@orc.govt.nz/0800 474 082 *and* 2. Your site's ORC Compliance Officer

An **Environmental Incident Report (Appendix 3)** should be submitted **within 10 working days** of the incident occurring.

3.1.4.2.1. Oil and Chemical Spill

If an oil or chemical spill occurs whereby, it enters a waterbody, wetland or stormwater drain, the Consent Holder (or nominated Contractor) should notify ORC **immediately** as per **Table 4**.

The following information must be provided within an Environmental Incident Report:

a) the date, time, location and estimated volume of the spill;
b) the cause of the spill;
c) clean up procedures undertaken;
d) details of the steps taken to control and remediate the effects of the spill on the receiving environment;
e) as assessment of any potential effects of the spill; and
f) measures to be undertaken to prevent a recurrence.

An **Environmental Incident Report (Appendix 3)** should be submitted **within 10 working days** of the incident occurring.

3.1.4.2.2. Environmental Incident Management

The Consent Holder (or nominated Contractor) must undertake immediate remedial actions to mitigate adverse environmental effects. Immediate response actions should not be delayed.

Under section 17 of the RMA, every person has a duty to avoid, remedy, or mitigate any adverse effect on the environment arising from an activity carried on or on behalf of the person, whether or not the activity is carried on in accordance with the resource consent.

Once the immediate risk from the Environmental Incident is alleviated, the Consent Holder (or

nominated Contractor) should investigate the cause of the breach and/or adverse environmental effects, then identify and implement corrective actions as soon as practicable.

Where any sediment (or other) discharge incident beyond the property boundary, or, within a waterbody on site caused by residential earthworks has led to a discharge to water, the Consent Holder (or nominated Contractor) must submit an Environmental Incident Report detailing:

- The nature of the Environmental Incident
- What management measures were in place to prevent the incident from occurring
- Probable causes of the incident
- What corrective actions have been undertaken to prevent incidents reoccurring

If a sediment retention device volume has been exceeded, provide detail and demonstrate all effort has been taken to mitigate this by following good practice and remedying the situation with additional measures or other methods.

The Consent Holder (or nominated Contractor) may utilise the Environmental Incident Report template or use their own template where the information is the same, where deemed suitable by ORC.

Please ensure that you read the **Advice Note** on the Environmental Incident Report Form in **Appendix 3**.

3.1.4.3. Environmental Roles and Responsibilities of Personnel

The Consent Holder's (or nominated Contractor's) EMP should document all environmental-specific roles and responsibilities, qualifications/trainings of personnel. This needs to include email address and mobile phone numbers for each key role. At a minimum, this will include:

- Project Manager
- Site Supervisor
- Environmental Representative
- Environmental Advisor/Manager ("SQEP")

SQEP

Careful consideration should be given to the 'location' of your SQEP (definition in **Appendix 1**). Considerable challenges can arise for you and your site if your SQEP is located outside of the site's district, particularly where an immediate response is required to address environmental, erosion and sediment control related matters.

Your SQEP must be accepted by ORC before you begin physical works or submit your EMP to the Compliance Team. Applicants will need to provide evidence that their nominated SQEP meets the definition set out in **Appendix 1** and should allow sufficient time for this process.

3.1.4.4. Environmental Representative

The EMP should identify an Environmental Representative for the site and outline their role. This is required for medium and high-risk sites.

Prior to the commencement date of earthworks, notify ORC's Compliance Team (compliance@orc.govt.nz) of the name and contact details for the project Environmental Representative. This role should actively support the project leadership (Project Manager and/or Supervisor) with the day-

to-day implementation of environmental controls and administrative activities. In particular, the role involves:

Implementation of environmental management

- Undertake thorough environmental site inductions
- Ensure installation of environmental controls as per the EMP and ESCP
- Undertake environmental site inspections of the project and controls, particularly within 12 hours after a rain event
- Oversee the maintenance and improvement of defective environmental controls
- Undertake Environmental Incident reporting
- Undertake environmental monitoring where appropriately trained
- Ensure chemical treatment system is operating correctly where appropriately trained or supervised by an SQEP

Communication

- 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
- Where it is identified that erosion and sediment control measure have become ineffective and maintenance is required, the erosion and sediment control measures must be reinstated to be effective, to the satisfaction of ORC

Complaints and Incidents

- Assist the project leadership in attending to Environmental Incidents and Complaints

Familiarity

The Environmental Representative should be familiar with:

- Environmental aspects of the project, including specific locations within the site of environmental significance or risks, including wetlands and ephemeral creeks
- Applicable plans; EMP, ESCP, CTMP, and contaminated land related plans
- Best practice erosion and sediment control from:

a) Guidance Document 2016/005: Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region (GD05); and,
b) Erosion and Sediment Control Toolbox for Canterbury on Environment Canterbury website.

3.1.4.5. Records and Registers

Environmental records are to be collated onsite and should be made available to ORC upon request, **immediately** if the request is made by an ORC Compliance Officer **onsite** and **within 24 hours** if requested by an ORC officer **offsite**.

Records and registers to be managed onsite for medium and high-risk sites must include the following:

a) Environmental Induction attendance register
b) Environmental Incident reports and associated corrective actions undertaken
c) Complaints register and associated corrective actions undertaken
d) Post-Rain event inspection observations and corrective actions

e) Weekly Site Inspection checklists
f) Water quality monitoring results
g) EMP non-conformance register (based on weekly inspection results or otherwise identified) and associated corrective actions taken

3.1.4.5.1. Complaints register

The complaints register needs to include, but not limited to:

a) The date, time, location and nature of the complaint;
b) The name, phone number, and address of the complainant, unless the complainant elects not to supply this information;
c) Action taken by Consent Holder to remedy the situation and any policies or methods put in place to avoid or mitigate the problem occurring again.

For medium and high-risk sites, a record of the complaints must be submitted to the ORC in the Monthly Environmental Report, or, the consent may specify that the Consent Holder is to notify ORC within 24 hours of receiving a complaint from any person about activities on the site associated with the consented works.

3.1.4.6. Weekly and Pre-Rain and Post Rain Event Site Inspections

Where an EMP is required, the EMP must state that the Consent Holder's (or nominated Contractor's) Environmental Representative must undertake and document weekly and Pre-rain and Post-rain event Site Inspections for the purpose of monitoring the following:

- Verifying that the management measures prescribed in the EMP are present, functional and adequate
- Observe the site for actual or potential adverse environmental effects
- Identify maintenance requirements for implemented management measures, and
- Verifying preparedness for adverse weather conditions where rain and/or wind or freezing conditions is forecast

These inspections are not limited to rain and include snow or freezing conditions that could compromise controls on site.

In some situations such as at high-risk sites, during sensitive phases in the construction methodology, or following Environmental Incidents, weekly inspections may need to be undertaken by an SQEP.

The Consent Holder (or nominated Contractor) will need to undertake corrective actions to rectify issues identified by the site inspections. Each weekly inspection must be recorded including date, observations and any corrective actions.

The Weekly and Pre-Rain and Post-Rain Event Site Inspection records must be made available to ORC within 12 hours of a request being made and within the Monthly Environmental Report.

3.1.4.7. Monthly Reporting by SQEP

For medium and high-risk sites, an SQEP must monitor the site monthly to ensure that the site is complying with its EMP, ESCP (and CTMP where applicable), 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 should be reported and included in the Monthly Environmental Report referred to in the section below.

3.1.4.8. Monthly Environmental Reporting

For medium and high-risk sites, the Consent Holder (or nominated Contractor) must complete and submit a monthly Environmental Report if required by the resource consent. The monthly Environmental Report should be submitted to ORC's Compliance Team within five working days of the end of each month (refer to **Appendix 1** for working days definition).

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, ESCP (and CTMP where applicable)
b) Weekly Site Inspections — number of inspections completed, and summary of corrective actions undertaken
c) Monitoring reporting — summary of monitoring and whether non-conforming results were obtained
d) Document all SQEP recommendations, monitor progress against them, and record any corrective actions implemented. Corrective actions identified by the SQEP must be addressed promptly and with urgency.
e) Reporting on monitoring undertaken — including pre-rain and post-rain events
f) Positive environmental outcomes achieved, and opportunities identified by the Consent Holder (or nominated Contractor)
g) Complaints received
h) Water quality monitoring results of any discharges (controlled and/or uncontrolled) from the discharge point or any waters crossing the boundary and/or the receiving environment
i) Any material change to the project (e.g. increased area of disturbance, encountering high risk soils or design alterations) that could affect the effectiveness of erosion and sediment controls (as the effects from the change may have the potential to materially increase adverse effects that were not previously considered) or introduce activities that require additional resource consent(s). This could trigger a review of the EMP.

It is good practice to append copies of the weekly inspection reports and pre-rain and post-rain inspections to the monthly report.

Where reporting demonstrates repeated or multiple non-conformances of the same issue, ORC may instruct the Consent Holder to undertake a review of the adequacy of management measures outlined in the EMP/ESCP and provide response back to ORC within a specified time frame, either confirming and justifying the suitability of the existing EMP/ESCP or notifying of updates to the EMP and the justification.

3.1.4.9. Training and Development

Staff and contractors who are well trained and experienced in environmental management and ESC practices will save your project time and money by proactive construction and maintenance of ESC measures.

Experience shows that team members who are engaged in ESC, enhance the delivery of projects on time, to budget, while achieving positive environmental results. Encouraging team members to

become involved in ESC will develop their experience and help your project. The more technically demanding the site and its ESC measures, the greater the supervision and project management required for ESC.

Consider having your SQEP provide environmental awareness training to your project's Environmental Representative and/or Site Supervisor. This will improve environmental awareness and could lead to reduced down-time with less incidents. If you do this, let your ORC Compliance Officer know. We will keep this on record that your team has been proactive in training.

3.1.5. OPERATIONAL REQUIREMENTS

The Consent Holder (or nominated Contractor) needs to select mitigation measures which effectively mitigate or avoid adverse effects on the environment and meet the requirements of the resource consent(s). A brief justification of the suitability of the management measures based on the risk assessed must be provided in the EMP.

3.1.5.1. Erosion and Sediment Control (including ESCP)

The recommendations set out below should not be inferred to preclude innovative or alternative solutions that provide improved value for money or environmental outcomes that meet the intent and principles of this Guide.

The Consent Holder (or nominated Contractor) is responsible for temporary erosion and sediment control and for ensuring that controls are adequately designed, installed, adapted, maintained and decommissioned.

3.1.5.1.1. Erosion and sediment control principles

Erosion and Sediment Controls for all projects needs to be designed, installed, maintained and decommissioned in accordance with the following principles:

a) **Minimise disturbance:** The extent and duration of soil exposure is minimised and **staged** accordingly.
b) Soil erosion is minimised as far as reasonable and practical (to the satisfaction of ORC), including **slope protection**.
c) Protect receiving environment:
    a Avoidance of discharges, especially sediment off site.
    b Sediment retention on site is maximised and must meet the discharge limits set out in the Discharge resource consent
d) **Rapidly stabilise exposed areas:** Disturbed areas are promptly stabilised.
e) **Consider the weather:** Otago's weather is variable across the region. Central Otago can experience long windows of fine weather but all parts of Otago can experience severe intense storms at any time of the year, so you need to have appropriate measures in place.
f) **Install perimeter controls and diversions:** Water movement through the site is controlled — in particular clean water is diverted around the site and 'dirty' and 'clean' water is kept separated as far as practicably possible.
g) **Employ sediment retention control devices:** Erosion and sediment controls are integrated with construction planning and consistent with **GD05** where appropriate given local conditions. Refer to Section 1.4.2.1. which outlines what is required for an SQEP recommendation to deviate from GD05.

h) Adjust the ESC Plan as needed and assess and adjust your ESC measures: The site is monitored, and erosion and sediment practices are adjusted to maintain the required performance standard.
i) Effective and flexible erosion and sediment control plans are developed based on soil, site slope, weather, construction conditions and the receiving environment.
j) **Monitor:** Controls are maintained in proper working order at all times.

Requirements of the ESCP are outlined in the following section.

3.2 EROSION AND SEDIMENT CONTROL PLAN

One of the first steps in setting up a residential earthworks project is creating an initial ESCP. This is needed for a resource consent application. This plan can be developed further into a fully detailed ESCP.

3.2.1. ESC PLAN REQUIREMENTS

3.2.1.1. Initial ESCP

The initial ESCP for the consent application needs to have enough detail for ORC consent planners to understand what you are proposing to do, its scale and significance so that they can inform their assessment under s92 and s104 of the RMA. Thoroughly assess the effects of you proposed activity and explain your mitigation measures and why these are an acceptable level of effort.

When preparing the ESCP, remember:

- The plan needs to be detailed enough that consent planners and Compliance Officers will see that you genuinely understand the risks of wind and water erosion for your particular project and site, and have outlined tools and mitigations that should work.
- Provide conceptual construction — e.g. a locality plan and where will the discharge go? This includes clearly identifying if a discharge to a TLA stormwater networks is planned, who may in turn may require consent to discharge sediment from their piped network.
- The consent planner doesn't need to see finalised and detailed design plans, but does need to be able to assess your proposed activity against rules in the RPW. Include a description of the nature, scale, timing and duration of activities.
- The planner will expect your approach to be in line with **GD05**, or to give clear explanations if other options are suggested. Your plan should have enough details that you can show the planner the measures and tools that you anticipate will be used to achieve best practice, including the contributing catchments. Details may change, but you should be able to show the general layout, erosion control measures proposed for exposed surfaces and the potential location of sediment retention devices.
- Include monitoring and maintenance procedures. Demonstrate how you will continue to ensure the overall performance of the ESCP and controls on site.
- Understand the range of risk factors that affect your project across its stages. This will help you build the detail of your plan.

- Weather (including seasonal conditions)
- Ground cover
- Soil type and characteristics
- Local hydrology and drainage affecting the work site (including temporary and overland flow, groundwater table level which can affect soakage ability of ponds)
- Topography (particularly slope)
- Duration of soil exposure
- Rainfall intensity, including heavy rainfall or adverse weather events response and contingency measures

3.2.1.2. Final ESCP

Once consent is granted the following may apply.

3.2.1.2.1. Low-risk sites

Low-risk sites may not require an EMP and ESCP. In those instances, the Consent Holder (or nominated Contractor) must ensure that all practical measures are taken to:

a) divert clean run-off away from disturbed ground;
b) control and contain stormwater run-off;
c) avoid sediment laden run-off from the site.

All earthworks for residential development should be carried out in accordance with GD05 unless Section 1.4.2.1 applies. Section 1.4.2 outlines what is required for an SQEP recommendation to deviate from GD05.

3.2.1.2.2. Medium to high-risk sites

As per the conditions of the resource consent, at least 15 working days prior to commencement of earthworks activity (or any other Stage), the Consent Holder (or nominated Contractor) must submit for review and acceptance, an EMP and ESCP to ORC's Compliance Team.

An ESCP would have been submitted as part of the consent application but will need to be reviewed and accepted by the Compliance Team given the Consents Team can only comment on matters within its discretion during the application process. This may cause frustration for Consent Holders, but this is an important step and can work to the Consent Holder's advantage by providing flexibility in fine tuning the EMP and ESCP once a contractor has been engaged. The Compliance Team will assess the ESCP from an operational and monitoring perspective.

The ESCP and As-Builts need to be clear, concise and easy to follow. The ESCP **must be prepared (and updated) by an SQEP**. An ESCP must be prepared for all areas prior to disturbance including but not limited to bulk earthworks, stockpile and storage areas, and access and haulage tracks.

The final ESCP must include the following **written** information:

- Site description: describe the whole site and soil types present. Photographs and plans are helpful.
- Programme of works, including:

  - Dates and time frames for all stages of the project
  - The area of proposed earthworks
  - Description of methodologies of each phase
  - Cut/fill volume details
  - Details of construction methods
- Specific erosion and sediment control measures for each stage (locations, dimensions, capacity, etc.) including:
  - Supporting calculations and design drawings
  - Catchment boundaries and contour information
  - Staging details for disturbed areas
  - The total area of bare ground on site (cumulative total through the development period) and the area of disturbance during each stage. Include details relating to the management of exposed areas.
  - Location and volume details of any stockpiles
  - Measures to avoid silt and/or sediment tracking onto roads and then to water for the duration of the earthworks
  - Timeframes and methods for achieving stabilisation of all disturbed areas
- Details of the receiving environment that the project drains into and the pathways and distance to these. Detail discharge points or flow paths across the site boundary.
- Processes in place if unexpected contaminated land is encountered
- Monitoring and maintenance requirements as outlined in EMP, including water quality monitoring and sampling locations (include coordinates in NZTM)
- Contingency measures for adverse weather events including snow and/or frost events (including in relation to chemical treatment) and how winter works will be managed
- Dust management
- Cultural heritage
- Chemical and fuel management, including emergency procedures
- Has the installation of a site weather station been considered? This is an excellent low-cost addition to your site that can assist the SQEP in assessing weather risk across many sites and triage accordingly.

Advice: Ground truth area before writing the ESCP
Consider inviting an ORC Compliance Officer — they can advise of risks and make it clear what is expected in terms of compliance.

The final ESCP should include the following **visual** information on drawings:

- A title, date, drawing reference number, north arrow, scale and legend
- A unique identifier for each ESC control structure
- The areal extent of soil disturbance (earthworks' footprint)
- The location of ESC devices, including volumes and dimensions where relevant
- The location of topsoil stockpiles
- Contributing catchments for each ESC device
- Identification of any 'no go' or buffer areas to maintain on the site
- Clearly marked areas of cut and fill (e.g. zero cut to fill line), including any soil disposal areas

- Arrows depicting the general flow path/direction of water within each catchment
- All waterbodies and/or overland flow paths
- Historical/cultural/natural heritage sites
- Site entrance ways
- Dimensions on the sediment controls (including physical dimensions, retention volume and dead/live storage, the location of any outlets)
- The site boundaries
- Contour lines — both within and around the site, pre and post works
- Staging (if applicable)
- High-risk areas (if applicable)
- Sampling locations
- Aerial image (if available and clear without affecting readability of drawing)

As specified by conditions of resource consent, works must not start until the EMP, ESCP (and CTMP where applicable) is accepted by ORC and erosion and sediment control devices are installed in accordance with the ESCP.

For large sites, multiple ESCP drawing sheets may be required, i.e. one for each Stage.

3.2.1.3. Implementation and Revision of Plan

The Consent Holder (or nominated Contractor) via their SQEP needs to ensure erosion and sediment controls are designed, installed and maintained in accordance with best practice erosion and sediment control principles and standards,[15] as well as manufacturer's specifications.

For medium and high-risk sites, the SQEP, on behalf of the Consent Holder (or nominated Contractor), must:

a) Provide and implement As-Built plans for the ESC devices to ORC, within 10 working days of their construction
b) Monitor the continued effectiveness of the ESCP during the works
c) Update, and have re-certified, the ESCP where necessary

The plans must be updated when:

- The construction program moves from one Stage to the next; or
- Any significant changes have been made to the construction methodology since the original plan was accepted for that Stage; or
- There has been an Environmental Incident and investigations have found that the management measures are inadequate; or
- Directed by ORC's Compliance Team

Bulk earthworks may not commence until the following has been completed in order to satisfy as required by conditions of the resource consent:

- The updated ESCP is submitted and deemed acceptable by ORC in conjunction with the overarching EMP;
- The erosion and sediment control devices are installed correctly; and

[15] Best practice erosion and sediment control from:
- o Guidance Document 2016/005: Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region (GD05); and/or,
- o Erosion and Sediment Control Toolbox for Canterbury on Environment Canterbury website

- As-Built plans have been provided and you have received an acknowledgement that they are acceptable to ORC.

3.2.1.3.1. Installation

As soon as practicable and prior to bulk earthworks operations for any Stage of works, the Consent Holder (or nominated Contractor) must install erosion and sediment controls as per the accepted ESCP.

Advice: Contractors — Ground truth before implementing the ESCP and 'breaking dirt'

3.2.1.3.2. As-Built certification

The installed ESC measures will need to be certified by an SQEP prior to commencement of earthworks. This certification will confirm that ESC measures have been installed as per the approved ESCP. Refer to **Appendix 4** for an As-Built Certification Form that must be completed for the certification of SRPs.

3.2.1.3.3. Operation and maintenance

The Consent Holder (or nominated Contractor) must maintain all erosion and sediment controls in effective working order at all times until the site is permanently stabilised against erosion. A record of any maintenance work must be kept and be supplied to ORC on request.

Re-use of water collected in sediment retention devices for dust suppression and appropriate construction works is preferred over release into the environment. Where water is being stored for dust suppression the required design capacity of the sediment retention devices must be retained to provide sediment control (noting that depending on site constraints, retention of water for dust suppression may not always be practical).

Sediment removed from sediment retention devices such as SRPs, DEBs and silt fences must be placed on stable ground where it cannot re-enter the device or be washed into a waterbody.

Sediment retention devices and other sediment controls must be operated and maintained in a manner that minimises the risk of adverse environmental effects. Releases from site must not cause scour at the area of discharge. Water must only be released at the Discharge Point nominated within the ESCP and as deemed acceptable by ORC. Any modification to Discharge Point must be accepted by ORC. We draw particular attention to the need for these devices to have a stabilised outlet. Discharges onto another sediment control (i.e. a silt fence) is not appropriate.

The Consent Holder's (or nominated Contractor's) erosion and sediment controls must be sufficient to achieve the water quality limits set out in the Discharge Resource Consent for the earthwork's activity.

3.2.1.4. Decommissioning and Removal

Within 10 working days following completion or abandonment of earthworks, the Consent Holder (or nominated Contractor) is to permanently stabilise the site against erosion. The Consent Holder (or nominated Contractor) must remove temporary controls when permanent measures are in place and/or site permanently stabilised against erosion (in accordance with GD05) and defined as at least 80% revegetation cover. Alternatives may be appropriate depending on the end use, such as pavement, aggregate for roads and degradable erosion matting. For medium and high-risk sites this will require your SQEP to confirm that ESC measures can be decommissioned in accordance with the approved ESCP.

Dispose of any remaining sediment in the ESCs appropriately and be careful that it does not discharge into any waterway or stormwater network.

Removing ESCs may require approval by the Compliance Team.

3.2.1.5. Sustainable Project

Consider environmental sustainability when undertaking earthworks projects, including product choice. Consider not using plastic products close to waterbodies. For example, coconut matting used to be reinforced by plastic but now there are options on the market that are reinforced with jute. More information can be found in GD05 Section C1.8 table 3.

If you would like to trial a new product, technologies and techniques please get in touch with your ORC Compliance Officer to discuss.

3.3 CHEMICAL TREATMENT MANAGEMENT PLAN

3.3.1. CTMP INTRODUCTION

Chemical treatment requires the addition of flocculants/coagulants (reagents) to sediment-laden run-off to increase the settlement rate of soil particles. **Preference should be given to reagents that have the least effect on the receiving environment.** The effects of sediment are covered in detail in Section 5.

GD05 highlights that chemical treatment, via a rainfall activated system, is current industry best practice as it ensures that the sediment removal efficiency of SRPs and DEBs are maximised. A consent application will need to advise whether chemical treatment is required. If not, evidence such as bench test to demonstrate that it is not effective would be required to accompany the consent application.

All SRPs and DEBs that chemically treat water with a reagent must be chemically treated in accordance with a CTMP. All measures required by the CTMP must be put in place prior to commencement of the residential earthworks activity and be maintained for the duration of the residential earthworks.

Much of the technical information supporting GD05 (TP227) is based on the Auckland context. Alternative methods or reagents, supported by applicable information, may be considered in the Otago region. Please considered discussing alternatives with ORC's Compliance Team.

3.3.2. CTMP REQUIREMENTS

The CTMP must be prepared by an SQEP or by a suitably experienced company supplying the product, in accordance with **GD05** (Section F2). The CTMP must be submitted to ORC's Compliance Team for review and acceptance if required by consent. No earthwork activities are to commence until acceptance in writing is provided by ORC's Compliance Team that the CTMP meets the requirements of suitably mitigating/avoiding adverse effects.

The CTMP must include the following **written** information as a minimum:

a) Specific design details of chemical treatment system based on a rainfall activated dosing methodology for the site's SRPs and DEBs
b) Batch dosing of devices methodology. This should only be used as a contingency measure and not as a primary means of dosing.
c) Monitoring, maintenance (including post-rain event) and contingency programme (including a record sheet)
d) Details of optimum dosage (including assumptions)
e) Results of initial chemical treatment trial (i.e. bench testing), including pH, visual clarity and temperature results and what compliance is being assessed against
f) A spill contingency plan
g) Contingency measures for snow and/or frost events
h) Details of the person delegated by the Consent Holder that will hold responsibility for long-term operation and maintenance of the chemical treatment system and the organisational structure which will support this system
i) Product chosen and why, including Material Data Safety Sheet
j) Ongoing pH testing (if aluminium product used) of devices being chemically treated, and receiving environment testing if overdosing occurs and pH drops to below 5.5 or above 8.5 within a discharge to a waterbody or flow path that can enter a waterbody
k) What is considered a 'compliant' sample, i.e. 50 mg/L Total Suspended Solids (TSS). The resource consent will stipulate any discharge limits.
l) Storage and handling of chemicals

The CTMP must include the following **visual** information:

a) Provide photographs of bench test jars at different concentrations and time intervals
b) Bench test photograph with the following information: reagent, date of test, concentration of reagent added (and units)/dosage rate and time since reagent addition

3.3.3. CTMP LIMITATIONS AND CONSIDERATIONS

It is important to identify the existing pH of the soil and receiving environment and if this is already below a pH of 5.5 or above 8.5. If this is the case, consider testing the receiving waterbody's pH to assess if it is also naturally low, or high. Most sites use an aluminium-based product, but you may need to consider alternative non-metal based reagents or alternative methods for the disposal of water such as carting off site to land.

3.3.4. CTMP IMPLEMENTATION

All measures required by the CTMP must be put in place prior to commencement of the residential earthworks activity and be maintained for the duration of the works that require chemical treatment.

Treatment should only be implemented under the supervision of an SQEP given the limitations identified in Section F2.1.6 of GD05:

- pH must be tested with a calibrated pH meter as part of the bench testing methodology (refer to Appendix F1 of GD05) and should be used as a control baseline. Whatever flocculant is being used must not change that baseline from a pH beyond +/-1 and must not fall outside of the range of 5.5–8.5, as measured from the primary spillway
- Treatment should cease when the above pH limits cannot be met (when using PAC)
- Treatment requires a high degree of monitoring and maintenance
- Spills of reagents can have significant adverse effects on the receiving environment
- In significant rainfall events, the rate of use needs to be carefully monitored so that the system does not run out of reagent.

Where reagents are used to treat sediment-laden run-off, they must not cause adverse environmental effects to the receiving waters of the environment. Monitoring of pH within the sediment control device is a very important task. Overdosing with an aluminium based product could result in a toxic form of aluminium being discharged to the receiving environment.

If monitoring by the Consent Holder (or nominated Contractor) or ORC indicates adverse environmental effects may be occurring, chemical treatment must cease until changes are made to the chemical treatment process to prevent the adverse environmental effects.

ORC may put limits on your discharge consent for the discharge of chemicals (i.e. dissolved aluminium) potentially entering waterways due to an unexpected overflow from a device.

3.4. ADAPTIVE MANAGEMENT PLAN

An Adaptive Management Plan (AMP) may be a condition of consent for a large-scale earthworks site (medium to high-risk) which may require significant refinement of erosion and sediment control management and baseline monitoring of parameters, and refinement of erosion and sediment control management in response to any observed trends in that monitoring. An AMP may be considered necessary if any of the following are triggered:

- Earthworks exceeding 5ha;
- Earthworks proposed to be undertaken over multiple stages;
- Anticipated duration of the residential earthworks programme is extensive;
- Proximity of sensitive and/or complex ecological systems/receiving environments including, but not limited to streams and wetlands;
- Slope of earthworks area and proximity to sensitive and/or complex ecological systems/ receiving environments.

The AMP is to be submitted to ORC's Compliance Team within 20 working days (unless otherwise specified in your consent) prior to the commencement of earthworks. Many of the elements of the AMP may be covered within the EMP. The AMP will usually require the following matters as a minimum:

- erosion and sediment control plan implementation;
- receiving environment monitoring;
- weather monitoring;
- erosion and sediment control device performance and discharge monitoring;
- time-bound monitoring of attributes of the receiving environment sensitive to sediment discharges

- data interpretation;
- trigger thresholds (rainfall/wind/snowmelt/frost events and monitoring parameters);
- management responses;
- reporting.

Refer to Auckland Council's *'Erosion and Sediment Control Adaptive Management Plan Guidance Document, July 2020'* for further information.[16] Adaptive management should not mask what is simply best practice site management that is required to maintain consistency with GD05; nor should the AMP become the primary mechanism for implementing and monitoring site management.

3.4.1. IMPLEMENTATION AND REVISION OF PLAN

Upon request, the Consent Holder (or nominated Contractor) must make available any monitoring results and data records taken in accordance with the AMP. ORC's Compliance Team may consider it necessary for the Consent Holder (or nominated Contractor) to update the AMP as a result of observed inappropriate controls or inefficiencies. If this occurs, a revised plan is to be submitted to the ORC within five working days.

If the Consent Holder (or nominated Contractor) wishes to update the AMP, this must be submitted to ORC's Compliance Team 10 working days prior to formalising and implementing the revision. The following may be requested:

- the results of all monitoring within that period;
- a summary of receiving environment effects, including any ecological changes and subsequent ecological response;
- a summary of any event trigger levels exceedance that occurred and any subsequent change of the AMP.

[16] https://www.aucklanddesignmanual.co.nz/content/dam/adm/adm-website/aup-hub/unitary-plan-practice-and-guidance-notes/RC_3.2.22_Erosion_and_Sediment_Control_Adaptive_Management_Plan_Discussion_Document_and_Exemplar.pdf

4. CONTAMINATED LAND

4.1. BACKGROUND

The past use and storage of hazardous substances have left a legacy of soil contamination throughout New Zealand. This contamination has been largely caused by historic practices in which chemicals were manufactured, used, stored and disposed of in ways that are considered unacceptable by today's standards. Contaminated sites are often associated with industrial activities, but commercial, agricultural and residential land uses or activities can also result in contamination. Land uses that have the potential to contaminate land are outlined in the Ministry for the Environment's Hazardous Activities and Industries List (HAIL).[17]

As per the ORC Waste Plan https://www.orc.govt.nz/plans-policies-reports/regional-plans-and-policies/waste, a contaminated site is a site at which hazardous substances occur at concentrations above background levels and where assessment indicates it poses, or is likely to pose an immediate or long-term hazard to human health or the environment. Generally, this assessment will be a soil investigation report prepared by an SQEP with specific contaminated land expertise. Refer to **Appendix 1** for a **CL-SQEP** definition.

In order to assess the immediate or long-term hazard to human health or the environment, your environmental advisor (CL-SQEP) would need to assess the contamination levels on the site against the relevant human health and ecological health guideline values. The outcome of this assessment informs any remediation or management actions required.

Once a property is remediated, you must provide the ORC with a site validation report prepared by a CL-SQEP. This report must demonstrate that all contaminants have been reduced to the relevant guideline values for a specific land use scenario.

Your property generally cannot be completely removed from the Selected Land Use Sites (SLUS) register or Hazardous Activities and Industries List (HAIL) register, even after successful remediation, since the register serves as a permanent historical record of past hazardous land use; however, the ORC can officially document that the contamination risk has been eliminated and that the land is safe for its current and intended use.

Residential earthworks land use and discharge resource consents do not authorise works on a contaminated site. Works on a contaminated site require consent under the National Environmental Standard for Contaminants in Soil (NES-CS) and **Rule 5.6.1** of the ORC Waste Plan, which relates to the disturbance of land or discharge of hazardous waste into water, air or onto land. A separate resource consent may also be required from the relevant TLA.

4.1.1. ORC HAIL Database

The ORC maintains a register of properties where information is recorded about current or historical land uses and activities that may have caused contamination. These land uses are identified in the Ministry for the Environment's Hazardous Activities and Industries List (HAIL). The register is continually updated by ORC staff as additional information regarding site history

[17] https://environment.govt.nz/publications/hazardous-activities-and-industries-list-hail/

and contamination status becomes available.

The HAIL Database, which is also referred to as the Selected Land Use Sites (SLUS) register, can be accessed at: https://experience.arcgis.com/experience/7f3719181fba451a8d256ffad11edb10

This database is free to the public and the mapping resource is quick and easy to use. You can find out if ORC has records of your site being listed as a contaminated or potentially contaminated site.[18]

A Selected Land Use Sites Register is best described as a regulated screening and tracking system which enables councils, developers, and regulators to identify potentially contaminated land early in planning processes, ensuring compliance, environmental protection, and public health safeguards under the RMA and NES-CS.

Where an investigation has been completed, results have been compared to relevant human health and ecological soil guideline values. The database is continually under development and should not be regarded as a complete record of all properties in Otago.

The absence of available information does not necessarily mean that the property is uncontaminated; rather, no information exists in the database at the time of the enquiry. You may also wish to examine the property file at the relevant City or District Council to check if there is any evidence that activities occurring in the HAIL have taken place.

Further resources, such as site investigations relating to a specific property, can be accessed by contacting the ORC contaminated land inbox. To make an enquiry about a specific property or piece of land, or to understand the reasoning behind the properties listing on our database, please email contaminated.land@orc.govt.nz quoting the site's HAIL number as displayed in the online map.

4.2 EMP REQUIREMENTS FOR THE DISCOVERY OF CONTAMINATED MATERIAL

If unexpected contamination is discovered by sight or odour during excavation or by land disturbance works, the Consent Holder (or nominated Contractor) should:

- Cease all earthworks in the area of the contamination immediately.
- **ORC must be notified** within **24 hours** of the discovery.
- Employ an SQEP with specific contaminated land expertise (CL-SQEP) to perform an assessment of the discovery.

Appropriate remediation and/or disposal options for the discovered contaminated soils must occur.

The EMP must outline what steps are taken if unexpected contaminated material is discovered on site, including notifying ORC and outlining and following an Accidental Discovery Procedure. This may require the engagement of a CL-SQEP if contaminated material is discovered.

Works in the area affected by contamination can only recommence once any required consents are obtained. Additional consent(s) may be required if material other than cleanfill is proposed to be

[18] https://www.orc.govt.nz/managing-our-environment/waste-and-hazardous-substances/contaminated-land

used on site. Further information can be obtained from ORC by emailing consent.enquiries@orc.govt.nz.

4.3. NATIONAL ENVIRONMENTAL STANDARD FOR CONTAMINANTS IN SOIL (NES-CS)

The National Environmental Standard for Contaminants in Soil (NES-CS) is a national framework for planning controls and soil contaminant standards for managing human health risks around land use and development (including subdivision) and soil disturbance.

You will need to apply for a resource consent from your TLA if your activity on a HAIL site falls into one of the following categories after a site investigation:

- Non-compliance with Permitted Activity conditions: the NES-CS sets out specific conditions for each activity to be classified as "permitted" (meaning no consent is needed). If you cannot meet any of these conditions, a consent becomes necessary.
- Contamination poses a risk: if site soil investigations indicate that contaminants are present at levels that pose a risk to human health, and this risk cannot be managed as a permitted activity, then a resource consent is required.
- Large-scale earthworks: resource consent is specifically required if the volume of soil to be disturbed exceeds certain thresholds, for example, more than 25m³ per 500m² of disturbed area, or more than 5m³ of soil removed per 500m² of disturbed area.
- Uncertainty of risk for subdivision/change of use: for subdivision or changing the use of the land, a resource consent is necessary if a preliminary site investigation (PSI) cannot confirm it is highly unlikely the new use will pose a risk to human health.
- Specific activity status: if the activity is classified under the NES-CS regulations as a Controlled, Restricted Discretionary, or Discretionary activity, you must apply for a resource consent.

Clause 8(3) of the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES(CS)) specifies the conditions under which small-scale soil disturbance on a HAIL site is a permitted activity. If these conditions are met, no resource consent is required from the district council.

***Table 5:** Triggers for Regional or District Consents*

	Site meets HAIL site definition only	**Site meets HAIL site definition plus Waste Plan 'contaminated site' definition**
Meets clause 8(3) of the NES(CS)	No TLA consent required	Regional Council consent required
Does not meet clause 8(3) of the NES	TLA consent required	Both the Regional Council and TLA consent are required

You will need to engage a CL-SQEP to determine the concentrations of contaminants and whether the NES-CS applies to your site, which will require an investigation of soils at the site.

The NES-CS requires all site investigations to be completed in accordance with the Contaminated Land Management Guideline documents (CLMGs), which are administered by the Ministry for the Environment. The key CLMG documents can all be found on the Ministry for the Environment website, and are titled:

- Contaminated land management guidelines No 1: Reporting on contaminated sites in New Zealand (revised 2021)
- Contaminated land management guidelines No 2: Hierarchy and application in New Zealand of environmental guideline values (revised 2011)
- Contaminated land management guidelines No 5: Site Investigation and Analysis of Soils (revised 2021)

Depending on the concentration of contaminants and the future land use of your site, the site may require remediation and validation that it will be acceptable for the proposed land use. Results of any investigation (regardless of whether supplying results is a requirement of your ORC consent) should be provided to ORC, as we will use this information to update the HAIL database accordingly.

Please note the HAIL Database is also referred to by local authorities as a register of Listed land Uses or Selected Land Use Sites.

4.4 ASBESTOS DISCOVERY

Asbestos is a health hazard driven by fibres in the air. Any site with asbestos-contaminated soil is treated as a contaminated site under the ORC Waste Plan, RMA and NES-CS. Controls and processes (including an Asbestos Management Plan) must be applied on sites with asbestos-contaminated soil to comply with the Health and Safety at Work Act 2015, Health and Safety at Work (Asbestos) Regulations 2016 and to manage health risks associated with contaminated soil.

The Building Research Association New Zealand (BRANZ) BRANZ lead the development of the New Zealand Guidelines for Assessing and Managing Asbestos in Soil (2017), and is a great resource which takes New Zealand industry step by step through the process of identifying, assessing and managing asbestos in soil.

Initially, if asbestos is discovered in soils on a site, all works in the area must cease and a representative sample(s) of the impacted soil will need to be collected and sent to a suitably licensed laboratory for assessment of either:

- presence/absence of asbestos fibres (a less expensive option if you are unsure whether asbestos is actually present), or
- concentration of asbestos in weight-for-weight (w/w) dry weight.

The table below is the BRANZ soil guideline values for asbestos in New Zealand, depending on land use. Further investigation by a CL-SQEP is required for any sites with concentrations of asbestos containing material (ACM), fibrous asbestos (FA) and/or asbestos fines (AF) above those in the table (depending on land use).

Form of asbestos		Soil guideline values for asbestos (w/w)			
		Residential[1]	High-density residential[2]	Recreational[3]	Commercial and industrial[4]
ACM (bonded)		0.01%	0.04%	0.02%	0.05%
FA and/or AF[5]		0.001%			
All forms of asbestos – surface		No visible asbestos on surface soil[6]			
Capping requirements for residual contamination above selected soil guideline value					
Depth[7]	Hard cap	No depth limitation, no controls – except for long-term management			
	Soft cap	≥0.5 m			≥0.2 m

The BRANZ guidelines contain information on the types of controls needed to keep workers safe during removal of asbestos contaminated soil, as well as remediation and validation options.

These guidelines also outline whether the removal of soil will need to be undertaken as licensed or unlicensed work, depending on the concentration of asbestos in soil.

It should be noted that contaminated soil doesn't always have to be removed and limiting the use of the land or hard or soft capping on the contaminated soil may be options. If soil is needed to be removed as licensed work, you will need to engage a licensed removal specialist to do. The Worksafe website has a list of certified asbestos removers.[19] Class A (friable asbestos) and Class B (non-friable asbestos) removal licences permit businesses to remove different types of asbestos depending on the type of project. Information on the requirements for removal is contained within the BRANZ guidelines.

Once the site has been remediated and validation sampling has been completed which demonstrates that the soil complies with BRANZ guidelines (depending on the land use as per the table above), you should present any results and updates to ORC so we can update our HAIL database accordingly.

[19] https://www.worksafe.govt.nz/the-toolshed/registers/asbestos-licence-holder-register/

5. WATER QUALITY & MONITORING

5.1. EFFECTS OF EARTHWORKS ON WATER QUALITY

5.1.1. GENERAL ENVIRONMENTAL EFFECTS OF EARTHWORKS

Development and construction activities require the removal of vegetation and breaking ground. This exposes the underlying soils, which can lead to increased sediments entering waterbodies. Development drastically changes the landscape and can lead to an increase in sediments and contaminants entering a waterbody through development of roads and infrastructure, and by surface and storm-water run-off.

Some sites require chemical treatment to remove sediment from an earthworks site run-off prior to discharge to water, or to land in a manner where it may enter water. Some reagents are aluminium based, and if not actively managed, can become toxic to aquatic life in the receiving environment.

Earthworks related discharges (including sediment and chemicals (i.e. fuel, flocculants/ coagulants, waste, etc.) can cause adverse impacts on water quality and aquatic values, both small infrequent high-magnitude and frequent small magnitude.

5.1.1.1. Potential impacts of sediment on water quality and aquatic values

The following are potential impacts of sediment on water quality and aquatic values:

- Changes to the benthic (bottom) structure of the stream/riverbed. Coarse substrates such as gravels and boulders are replaced or smothered by sand and silt.
- Armouring of the stream bed caused by the sediment infilling of the interstitial spaces. This leads to the displacement of mayfly, stonefly and caddisfly and a decrease in the numbers of invertebrates due to sediment smothering habitat.
- Decreased algal food supply at the base of food chain. This is because sediments can scour algae from rocks, make algae unpalatable, or reduce light to levels where algae cannot grow, because plants need light to photosynthesise.
- An effect to the body condition of the fish making them more susceptible to cysts, and white spot and with females the potential of reduced fecundity.
- A reduction in spawning opportunities due to excessive sediment which may prevent access of fish to the underside of rocks.
- Increased sediment loading into a stream that will decrease water clarity and reduce visibility for fish seeking food or places to live.
- Damage to fish gills and filter feeding apparatus of invertebrates.
- The transport of pollutants attached to sediment such as nutrients, bacteria and toxic chemicals into waterbodies. These nutrients (particularly phosphorus) can be released from the sediment into the water column in downstream waterbodies such as estuaries.

5.1.1.2. Potential impacts of aluminium (from aluminium based flocculants) on aquatic values

This section highlights the impacts of aluminium (given the common use of aluminium based products), however there are a number of other products on the market that could have similar or different effects.

Aluminium is considered a non-essential metal because fish and other aquatic life don't need it to function.

- Elevated levels of aluminium can affect some species ability to regulate ions, like salts, and inhibit respiratory functions, like breathing. Aluminium can accumulate on the surface of a fish's gill, leading to respiratory dysfunction, and possibly death.
- **Aluminium's bioavailability depends on pH, total hardness, and dissolved organic carbon (DOC)**. A low pH generally makes it easier for aluminium to be dissolved, and therefore more bioavailable. At higher pH, aluminium speciation changes make it more bioavailable. Generally, a higher hardness means there are more ions present. These ions compete with aluminium and make aluminium less bioavailable. As aluminium is bound to DOC, a higher DOC reduces bioavailability.
- Most studies of the toxicity of heavy metals to fish and other aquatic organisms have shown that the free (hydrated) metal ion is the most toxic form, and that toxicity is related to the activity of the free (dissolved) metal ion.

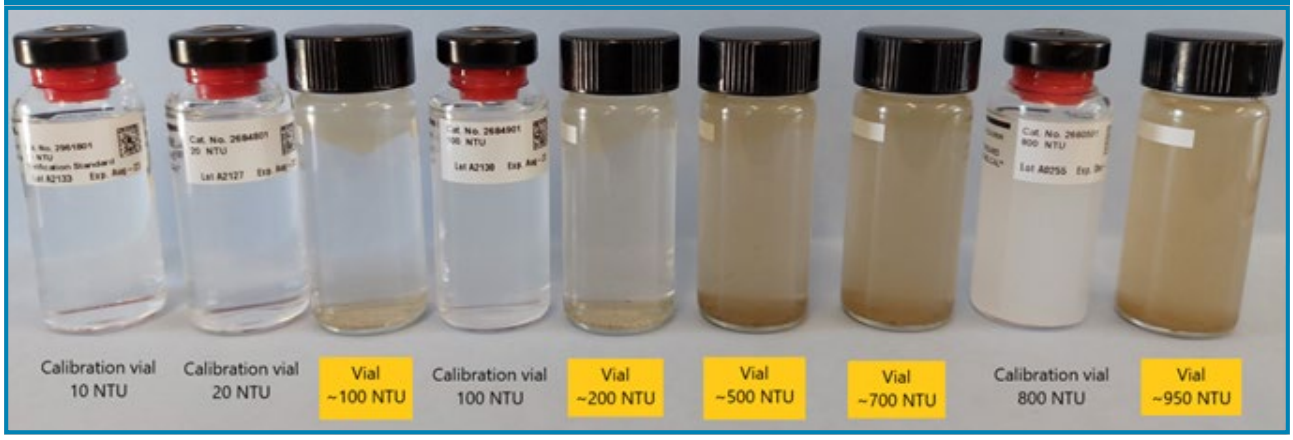
5.2 MONITORING

5.2.1. DISCHARGE CONSENT LIMITS & PARAMETERS

It is expected for medium to high-risk sites that your discharge to land/water resource consent application will propose discharge limits for any contaminants that may leave your site. pH limits are set in GD05 as 5.5–8.5. Other contaminants such as turbidity, total suspended solids (TSS) and in some cases, dissolved aluminium, will be assessed on a case-by-case basis and will be relevant to the receiving environment.

There needs to be careful consideration of proposed discharge limits by applicants for the Upper Lakes area. The clarity of water in the Upper Lakes is extremely high, and therefore it is unlikely that a 100mm visual clarity limit (as specified in the GD05) will be accepted by the ORC. Careful consideration must be given to turbidity and TSS limit setting, particularly where pristine waters are present. **Figure 2** shows different turbidity results.

***Figure 2:** Visual guide to turbidity*



For sites in the immediate vicinity of, or that have stormwater conduits to, a pristine waterbody such as spring fed creeks, you should expect that the discharge limit for contaminants crossing (or within) your site boundary to be zero. Consider how you will remove contaminants off site, such as water carting, to ensure sediment is not discharged across your site boundary in those circumstances.

You are to avoid the discharge of sediment across your site boundary. Your discharge consent water quality limits are exactly that, and not a target.

The following sections should be considered for dewatering practices and discharges also.

5.2.1.1. Why is Monitoring Important

Sampling the discharge, and where applicable the receiving environment water quality, is an important part of your inspection and monitoring programme. It enables you to:

- Understand what is happening upstream of your project (if applicable).
- Understand the effects of your project on water quality at and downstream of the point of discharge (if applicable).
- Show Compliance Officers that you are monitoring performance and the effects of your project on the waterbody.
- Look for opportunities to improve ESC by knowing how erosion and sediment control measures are performing and adjusting or improving them.

Monitoring could be done by an external professional such as your SQEP. However, there are many benefits to working with your own staff, including staff "buy in" to erosion and sediment control and improved project performance. If your discharge consent requires sampling to be taken, this must be done in accordance with the consent conditions. Sites with sample requirements must have the necessary sampling equipment available on site, and sufficient staff members should be trained to carry out sampling. The unavailability of your SQEP is not a valid reason for failing to comply with consent requirements.

Consider training staff (and include refresher training) so they are competent to do the sampling. Refer to Environment Canterbury's Erosion and Sediment Toolbox for excellent videos which demonstrate the basics of water sampling techniques.

5.2.1.2. pH

pH is a measure of how acidic or basic (alkaline) a soil or water is. The range goes from 0 to 14, with 7 being neutral (i.e. pure water). pH is a very important indicator of water or soil changing chemically.

pH can be tested with easy-to-use **litmus paper or 'test strips'**. It is recommended that these are stored in a zip lock bag or similar, so they don't get wet when not in use. A disadvantage of using test strips is that they only test to the nearest whole unit, i.e. 6, and are prone to user error (they require the human eye to assess colour which can be subjective).

pH meters provide a more precise result, i.e. 6.5, but require regular calibration, degrade over time, take time to stabilise when testing, require maintenance and sensors can break.

Laboratory analysis provides the most accurate results for pH but is not always practical for getting an immediate indication of pH.

ORC recommends the use of pH meters and that the user knows how to operate, maintain and calibrate the sensor.

The most common products used in NZ for dosing SRPs and reducing sediment loads in water are aluminium based products that can cause a decrease in pH. Control of water pH is critical prior to any discharge. It is important that you test your pond/DEB pH prior to discharge to any receiving environment to ensure it meets the 5.5 to 8.5 requirement.

Environment Canterbury provide a good video guide on how to test for pH[20].

If the pond dead-storage water is exceptionally clear or blue, this could indicate that the device has been overdosed. As per GD05, samples must be taken from the pond for pH and residual chemical analysis. The dosing regime should be adjusted depending on the outcome of these results. If in doubt, contact your SQEP immediately to advise on adjustments and assist with correcting pH so the sediment control device water can be safely discharged.

Photograph showing the milky, turquoise-blue appearance of an SRP, indicating a likely chemical overdose.

5.2.1.3. Suspended Sediment

Suspended fine sediment can severely affect values around water, particularly around ecosystem health. High concentrations of suspended sediment have a *'high impact on instream biota and ecological communities are significantly altered and sensitive fish and macroinvertebrate species are lost or at high-risk of being lost'* (NPS-FM, 2020). Suspended fine sediment can be monitored by **clarity** or **turbidity** measurements. Your consent may require the testing of turbidity and/or visual clarity within the receiving environment. Methods of measuring visual clarity are outlined overleaf.

[20] youtube.com/watch?v=vVuCC98xjTY&feature=youtu.be

5.2.1.3.1. Clarity

Clarity refers to light transmission through water and has two important aspects: visual clarity and light penetration. Visual clarity can decrease depending on how much sediment is in the water.[21]

GD05 has a clarity limit of 100mm measured within a pond or DEB prior to discharge from a device. Note that this limit may not be an appropriate limit for some receiving environments in Otago, particularly for the Upper Lakes area.

This on-site measure is typically undertaken using a secchi disc or clarity tube. **If an applicant is to propose a visual clarity discharge limit from a device, or within a receiving environment, ORC is more likely to consider this as a measurement if visual clarity is correlated to a proposed TSS or turbidity limit.**

The contractor may choose to measure the clarity within a sediment control device for operational purposes or as part of the site's CTMP (or EMP if a CTMP is not deemed appropriate). The disc is lowered vertically into the water near the pond outlet until it disappears and is then moved towards the surface until it is just visible. The depth of reappearance in millimetres is recorded as the clarity of the water.

Clarity Tube
This can also be referred to as a SHMAK tube. It is 1m long, 50mm diameter clear acrylic tube that is graduated along its length in centimetres. The tube has a black magnetic slider which is moved through the tube away from the eye until it cannot be seen anymore. The clearer the water, the further away the slider can be seen.

A limitation with this method is that it **cannot be used in darkness or poor/low light**. It can be considered subjective and not a precise reading. Further information on its use can be found on NIWA's[22] and Environment Canterbury's[23] websites.

Secchi Disc
This is a disk with alternating white and black quadrants that is attached to a tape measure. The disc is lowered into the water until it disappears; this depth is noted from the tape measure. The disc is lowered a little further and then slowly raised until it reappears, this depth is noted. The average of the two readings is the final Secchi depth visibility depth.

A limitation with this method is that it **cannot be used in darkness or poor/low light**.

[21] https://www.lawa.org.nz/

[22] https://niwa.co.nz/videos/shmak-water-quality-%E2%80%93-visual-clarity

[23] https://esccanterbury.co.nz/monitoring-performance-and-sampling/

Clarity tube

Secchi disc

Some reagent providers have field test kits

5.2.1.3.2. Turbidity

Turbidity is a measure of cloudiness of water and measures how light is scattered by fine particles in waterbodies. Turbidity is an alternative measurement for suspended sediment and/or visual clarity and is measured in nephelometric turbidity units (NTU) or formazin nephelometric units (FNU).

NTU is a unit of measure that is best used to represent turbidity readings captured using a white light at a 90-degree detection angle, and FNU is best used when the data is measured using an 860 nm light (near IR) with a 90-degree detection angle (ISO7027 compliant).

It is commonly used in monitoring water quality discharging from earthworks sites. It can be used as a proxy for the potential amount of sediment that is discharged but it is not representative of that unless calibrated against TSS.

There is a significant advantage to using a turbidimeter, if used correctly. The results are numeric, accurate and can be used to analyse water samples in the dark. A simple handheld meter such as the one to the right can be used.

It is very important that these turbidimeters are calibrated as per the manufacturer's recommendations.

Samples can be sent to an accredited laboratory for turbidity analysis also.

Turbidimeter

Turbidity and clarity can be affected by dissolved contaminants such as tannins leached from peat soils which adversely impact water clarity but do not cause elevated sediment loads.[24]

5.2.1.3.3. Total Suspended Solids

Total suspended solids (TSS) are solids in water that can be trapped by a filter. TSS is the actual physical particles in water (sediment), while turbidity is the effect on light caused by those

[24] http://content.aucklanddesignmanual.co.nz/regulations/practice-notes/Documents/RC%203.2.22%20Erosion%20and%20Sediment%20Control%20Adaptive%20Management%20Plan%20Discussion%20Document%20and%20Exemplar.pdf

particles. Reduced turbidity and clarity of water can be caused by TSS.

TSS can be calibrated against turbidity to establish a relationship for estimating sediment load. However, variability in soil characteristics across the site, through soil horizons, and throughout the duration of an earthworks project significantly limits the applicability of such a relationship.

There are companies that can provide in-situ continuous TSS and turbidity meters. These may be applicable for large sites with sensitive receiving environments. In most cases, sites will send samples to a certified ISO accredited laboratory for analysis.

We recommended that site monitoring required by an EMP be based on turbidity, and a correlated clarity limit. However, there may be an overarching TSS limit on the Discharge Consent which the site and Consent Holder will need to adhere to.

5.2.1.3.4. Looking after your equipment & records

Looking after your monitoring equipment is essential. Consider:

- Calibrating equipment regularly and keep a record of this. ORC's Compliance Officers may ask to see records during a site inspection and may ask your staff to demonstrate how to calibrate the device and take a reading.
- Ensuring your clarity tube is stored in its sleeve and is not scratched.
- Including equipment maintenance into your site schedule, so that the sampling equipment is kept clean and stored appropriately so will give reliable results.
- Storing sampling records in a suitable and easily accessible place, so that any member of the team can see how the project is performing and contribute ideas for improvement.

5.2.2. SAMPLING LOCATIONS AND FREQUENCY

For medium and high-risk sites your resource consent and/or EMP will outline where sampling is to occur, by what method, and the frequency. Always collect samples in the same location which will be marked on the site's ESCP or similar.

There are two methods of sampling: grab sampling and continuous sampling. In general, sites will use the grab sample method unless another method is required in the resource consent or by the EMP. Continuous or automated grab monitoring is the most reliable for determining sediment-discharge and water quality attributes, while manual grab sampling is only considered a 'snapshot' in time. At a minimum, take a discharge sample on (1) discovery of the discharge, (2) at the peak of the event or, (3) if it occurs overnight, by 8am the following morning. Ideally, many samples are taken through the event, given that the discharge may be highly variable.

GD05 compliant SRPs comprise floating decants, a primary spillway (upstand pipe) and an emergency spillway (stabilised flow path over the wall of the SRP). Efficiencies progressively drop as each of those discharge components are activated. Noting that emergency spillways are not part of the water quality component of an SRP and if activated could cause significant non-compliance.

Whether it is sampling of an on-site device, or a receiving waterbody, the health and safety of your staff and contractors is paramount.

If sampling and analysis is required by your consent, all samples must be sent to a laboratory immediately for analysis. Do not "hold" samples in the expectation that ORC may not follow up.

5.2.2.1. Sampling from a Device

If you are sampling an SRP or DEB, bearing health and safety needs in mind, take samples from either the outfall, or as close as possible to the decant outlet (floating decant, perforated snorkel, spillway, etc.), before it goes into a receiving waterbody.

5.2.2.2. Sampling a Receiving Environment or a Discharge Across a Boundary

You may be required as part of your resource consent and/or EMP to sample the receiving environment or any uncontrolled non-point source discharge of sediment across your boundary.

For sampling a receiving waterbody, providing a long reach sampling pole and appropriate PPE will assist in keeping staff and contractors safe. Refer to the Environment Canterbury Erosion and Sediment Control Toolbox TSS sampling video.[25]

- The water sample should ideally be collected mid-channel, if you are collecting from a waterbody, but this may not always be possible.
- Upstream of the point where treated water from your project is released. This should be the cleanest point with respect to water quality, and done first. However, you might be at the head of the catchment so discharge from your project may be the first water to go into the stream.
- Downstream of the point of discharge. Your consent or EMP may specify how far down, or that it is beyond the mixing zone.

5.2.3. RECORDING RESULTS

Environmental water quality results must be recorded. This can include the discharge sampling and receiving environment sampling results as specified in your EMP or Discharge Consent. The results must be reported in the Monthly Report or supplied immediately if requested by an ORC Compliance Officer on site. An example sampling results form is in **Figure 3**.

If monitoring of a receiving environment, including stormwater, is a part of your monitoring programme, please include an aerial image with locations and GPS locations marked. If you are monitoring from a TLA stormwater network, ensure you include an asset ID number if available. These can often be found on a publicly accessible TLA GIS system.

[25] https://www.youtube.com/watch?v=DSSNyBSjDP0

Figure 3: Example of a sampling report sheet

Consent Number	Sampling Date & Time	Sampling Location Coordinates	Observed Property ID	Result Value	Result Unit	Comments (e.g. location description, conditions, issues with sampling)
			pH		s.u.	
			Turbidity		NTU	
			TSS		mg/L	
			Clarity		mm	
			Weather		Text	
			Rainfall		mm	
			pH		s.u.	
			Turbidity		NTU	
			Clarity		mm	
			Weather		Text	
			Rainfall		mm	

5.2.4. COMPLIANCE

The ORC Compliance Officer may take samples if there are discharges from devices or uncontrolled releases of sediment or other contaminants across the boundary. The Officer may have a handheld turbidimeter, and or pH strips/pH meter and will likely take samples for laboratory analysis if there is concern with the discharge. Results will be assessed against your Discharge Consent and/or EMP water quality limits.

Aluminium

If there is a discharge, where the Compliance Officer believes that the chemical treatment system failed, or a device was overdosed, ORC may test for dissolved aluminium, hardness and TOC of the discharge and the receiving environmental upstream and downstream of the discharge point even if an aluminium limit is not set out in your Discharge Consent. ORC will assess aluminium levels against the ANZECC (2000) guidelines.[26]

[26] https://knowledgeauckland.org.nz/media/1099/dp2019-004-developing-auckland-specific-ecosystem-health-attributes-cu-zn.pdf

6. GOOD ENVIRONMENTAL PRACTICE

6.1 CHEMICALS AND FUEL MANAGEMENT

The Consent Holder (or nominated Contractor) is responsible for the management of chemicals and fuels with the site so as not to cause adverse environmental effects.

All machinery associated with the earthworks activity must be operated in a way, which ensures that spillages of hazardous substances such as fuel, oil, grout, concrete products and any other contaminants are prevented. Refuelling of machinery should conform to the following requirements:

- No refuelling of machinery or equipment (or storage of fuel) must occur in the CMA/river and ideally occur at least 30m from a waterbody, where practicable. If not achievable, appropriate measures must be installed to mitigate potential effects.
- Fuelling activity to be supervised at all times.
- Hoses to be fitted with a stop valve at the nozzle end.

Machinery and fuel storage tanks must be maintained to minimise the leak of oil, fuel, hydraulics and other fuel.

Keep fuel within a bowser, ideally appropriately bunded or at designated laydown and hardstand area.

An oil and hydrocarbon spill kit, that is capable of absorbing the quantity of oil and petroleum products that may leak or be spilt should be kept on-site at all times.

Chemicals should be securely and lawfully stored. A chemical spill kit should also be on site for any chemical related incidents. Material Data Safety Sheets (MSDS) should be kept on site for all chemicals used and stored on site. Only appropriately trained personnel should use these chemicals.

Free draining soils and gravels exist in many areas of Otago. These provide a route for chemical or fuel (if spilt or discharged) to enter groundwater quickly which can have a significant impact on water quality and any groundwater sourced drinking water supplies nearby.

If a spill kit is used, notify the site Environmental Representative immediately so that replacement equipment can be arranged.

It is expected that an SQEP includes a visual assessment of fuel and chemical management controls as part of the monthly inspection.

6.2. CEMENT AND CONCRETE

Concrete and cement are considered contaminants and any concrete or cement incidents should be reported to ORC under the Environmental Incident procedure. [27]

[27] www.orc.govt.nz/media/1enhilc5/concrete-wash-preventing-stormwater-pollution-2024-web.pdf

Ensure concrete and cement wash down (wastewater) does not enter your sediment control device, stormwater, coastal marine area or a waterbody. It must be collected for correct disposal or diverted to unsealed ground.

Lime is a major component of cement and is found in concrete products. When dissolved in water, cement produces an alkaline solution with elevated pH that can kill fish, insects and plants. It is not possible to filter alkalinity from concrete wastewater. The filtered water will still have an elevated pH and be extremely harmful, even if it looks clear. Dilution only increases the size of the problem. It takes 100,000 litres of clean water to neutralise a litre of concrete slurry to a neutral pH of 7. It is important to reduce the amount of water being used for clean-up.

It is important to properly manage concrete and cement on site. Auckland Council's ***"Builders Enviro Guide"***[28] sets out good practice, including designating a wash-down area.

If there is a spill, **act immediately**. Do not wash the spill into a stormwater drain or waterbody.

6.2.1. CONCRETE CUTTING

Make sure all dust is collected so that it is not washed into the stormwater system where it can cause environmental harm or air quality issues. If wet cutting, use as little water as possible. Ensure you put slurry controls in place before you begin work to prevent discharges to the stormwater system. Make sure all concrete slurry has been diverted to unsealed ground or removed from the cutting site.

6.2.2. SLURRY CONTROLS

If you are cutting concrete, exposing aggregate, or undertaking lime stabilisation, you must have slurry/wastewater controls.

6.2.3. LAYING CONCRETE AND EXPOSING AGGREGATE

Check the weather — don't lay concrete if rain is forecast, as the rainwater may become contaminated and wet concrete will elevate the pH of rainwater runoff. Put slurry controls in place before you start work, particularly if exposing aggregate. Check if the controls you have in place can handle the amount of concrete wastewater produced. For small sites, wash equipment on unsealed areas — but not in tree drip lines. Do not wash any equipment where concrete wastewater may flow into streams or stormwater drains.

6.3. TRACKING OFF SITE

To prevent site access points from becoming sediment sources that lead to sediment laden water entering waterways from an access road or track, the consent holder must ensure that all ingress and egress points to the site are Stabilised Construction Entrances. These entrances need to be maintained to ensure they remain effective, and all construction traffic must be limited to these entrances only.

[28] https://www.aucklandcouncil.govt.nz/content/dam/ac/docs/environment/builders-enviro-guide.pdf

If tracking of sediment occurs, it must be cleaned up immediately and the cause of the tracking rectified. For example, a ballast entrance may need to be cleaned out or replaced to ensure effective containment of sediment on site.

6.4. ALL SITES

Low risk sites may not require an EMP. However, it is important to emphasise that all persons, when carrying out any earthworks directly adjacent to a riverbed, lake, wetland, or race, should adopt the following standard:

- Keep work areas outside flowing water to the extent practicable;
- Minimise the overall non-stabilised earthworks footprint;
- Progressively stabilise completed areas of earthworks as soon as practicable;
- Divert clean run-off away from non-stabilised earthworks areas;
- Use the best practicable option to design and install a variety of perimeter controls for the management of flows of water and sediment and sediment retention; and
- If a heavy rainfall event is forecast, undertake pre-event inspections and any maintenance that is required and postpone work as required.
- In the event that a discharge occurs, works must cease immediately, and the discharge must be mitigated and/or rectified to the satisfaction of ORC.

Small building sites, such as individual house lots developed after bulk earthworks, may seem minor in scale but the combined effects of poor practice across many sites can have a big impact on waterways, infrastructure, and neighbouring properties.

Builders should refer to the excellent resources provided by councils across the motu. These guides offer practical advice and best practice recommendations for erosion and sediment control (ESC) on small earthworks sites, such as residential builds. Key resources include:

- Environment Canterbury's **Erosion and Sediment Control Toolbox**[29] and **Builders Pocket Guide**[30]
- Auckland Council's **Builders Enviro Guide**[31] and YouTube channel[32].

6.5. BACKFLOW RISK

Sites may require water on site for a number of reasons, including for dust suppression (filling of water carts) or hosing down areas. If water is being sourced from a:

a) TLA drinking water network via a standpipe; or
b) A waterbody such as a lake, river, stream or groundwater

It is important that:

a) An appropriate temporary water connection has been authorised by a TLA if water is being taken from TLA drinking water network, and
b) The water abstractor has considered any applicable backflow prevention policies of TLAs,

[29] https://esccanterbury.co.nz/project/small-sites/

[30] https://www.orc.govt.nz/media/cyjf1inx/reg-builders-pocket-guide-edition-4-jan-2026-web-260126.pdf

[31] https://www.aucklandcouncil.govt.nz/content/dam/ac/docs/environment/builders-enviro-guide.pdf

[32] https://www.youtube.com/watch?v=ppUD8QJal_o

such as QLDC's version,[33] and/or

c) Water abstracted from a waterbody meets the relevant permitted activity requirements in RPW or an appropriate resource consent is in place. Please consider the rate of take and volume limits where applicable.
d) Backflow prevention is in place to stop contaminants syphoning back into the network or waterbody causing contamination.

6.6. WORKING IN WATERWAYS

Your earthworks may involve activities within or near rivers, such as installing culverts or constructing crossings. **IMPORTANT - Before commencing any instream works, ensure that you can comply with all conditions of the permitted activity rule you wish to operate under, or obtain the appropriate resource consent(s) for the work.** If you are unsure, contact ORC's Consents or Compliance team for guidance and refer to ORC's Water Plan[34].

To protect water quality and/or aquatic species, and maintain dry working conditions, it is essential to manage water flow effectively. Diversion methods help redirect flow around the work area, reducing sediment discharge and environmental impact. For further guidance, see Environment Canterbury's online *Erosion and Sediment Control Toolbox* under **Specific Tasks: Diversions**.[35]

6.6.1. MAINTAINING DIVERSIONS

All diversion works within waterways require regular monitoring, maintaining fish passage for aquatic species (where required), and maintenance to prevent sediment discharge. Watch for early signs of failure and address them promptly. Key indicators include:

- Damage or tearing of synthetic linings
- Scour and/or sediment suspension at the point where diverted flow re-enters the channel
- Undercutting beneath the diversion lining

6.6.2. COMMON DIVERSION TECHNIQUES

6.6.2.1. Dam and Pump / Dam and Divert

Temporary dams upstream of the worksite hold back flow, which is then pumped or diverted around the site to downstream of the activity. Best suited for short duration works or where the site can be stabilised daily so that flow can continue through the stream channel. Pumps must be sized appropriately and monitored to avoid overflow, overtopping of the dam, or fuel issues.

6.6.2.2. Temporary Diversion Channels

A stabilised channel is excavated alongside the work area to carry flow around it. The channel must be sized for expected rainfall events and lined with erosion-resistant materials to prevent sediment generation. Flow is redirected once the channel is fully stabilised.

[33] https://www.qldc.govt.nz/media/xb4psfln/5a-qldc-backflow-prevention-policy_final-draft.pdf

[34] https://www.orc.govt.nz/your-council/plans-and-strategies/water-plans-and-policies/regional-plan-water-for-otago/

[35] https://esccanterbury.co.nz/diversions/

Examples of temporary diversion channels in Otago

6.6.2.3. Coffer Dams

Used for partial diversions, especially for constructing outfalls or retaining structures. These are built within the waterbody using non-erodible materials and dewatered to create a dry workspace. All sediment-laden water must be treated before discharge.

Coffer dam in place to allow construction of a stormwater outlet (left), with dewatered water treated in a settlement tank before being discharged back to the lake (right)

6.6.3. ENVIRONMENTAL CONSIDERATIONS

- All diversion works must be carefully maintained to prevent sediment release.
- Fish and eels must be safely relocated to suitable habitat by qualified and experienced professional before dewatering.
- Energy dissipaters (e.g. riprap or pinned geotextile) should be used at discharge points to prevent scour.
- If pumps are used (with a drip pad or containment bund), install a suitable fish screen.

6.7. DEWATERING — MANAGING WATER DURING EARTHWORKS

Dewatering involves removing water, either surface or groundwater, generally from excavations, trenches or stream diversions, typically using pumps. It is a critical part of many earthworks projects, but if not managed carefully, it can result in sediment-laden discharges that harm waterways and breach water quality rules. In Otago, dewatering is often carried out using dewatering bores or spears. These must be properly sealed to prevent contaminants from entering groundwater through direct pathways.

IMPORTANT — Before commencing any dewatering works, ensure that you can comply with all conditions of the permitted activity rule you wish to operate under, or obtain the appropriate resource consent(s) for the work.

If you are unsure, contact ORC's Consents or Compliance team for guidance and refer to ORC's Water Plan.[36] There is no permitted activity rule for the construction of a bore/well, refer to Chapter 1.4.4.1 for further information.

6.7.1. KEY CONSIDERATIONS

- **Sediment Risk**: Dewatering often stirs up fine sediments, especially at the start and end of pumping. These sediments are difficult to capture and can easily breach discharge limits.
- **Bores**: If you are using a bore to dewater a site, ensure the borehead is suitably sealed to prevent contaminants entering groundwater and has appropriate backflow prevention as per ORC's **Bore Specification in Otago** guide[37].
- **Monitoring:** Closely supervise all pumping activities. Use float intakes to avoid drawing in sediment from the bottom of excavations.
- **Treatment Options:**
    - Small volumes may be discharged to land (well away from surface waterbodies) or filtered through dewatering bags or pipe socks.
    - Larger volumes should be directed to SRPs, decanting earth bunds, or settlement tanks.
    - Flocculants may be used to improve sediment removal, but dosing must be carefully managed.
- **Contaminated Sites**: If your site is listed as contaminated or potentially contaminated, seek expert advice before dewatering. If you unexpectedly encounter contaminated land, stop works immediately and seek advice from a suitably qualified and experienced professional.
- **Fish:** Before dewatering a waterway section, ensure fish, eels, and freshwater kōura are safely relocated by a suitably qualified and experienced person.
- **Stormwater Network:** Always get permission before discharging into a stormwater system. Be prepared to pause discharges during rain events to avoid flooding.

[36] https://www.orc.govt.nz/your-council/plans-and-strategies/water-plans-and-policies/regional-plan-water-for-otago/

[37] https://www.orc.govt.nz/media/l0jatbkz/bore-specifications-in-otago-a-guide-for-drillers-and-services-providers-may-2024.pdf

These dewatering bores are not suitably sealed. Contaminants can easily enter the groundwater and aquifer below, putting human health and the environment at risk. Ensure bores are appropriately sealed to prevent contaminants entering the aquifer.

Suitably sealed "spears" and bore for dewatering purposes.

6.7.2. Best Practice Tips

- Plan ahead – many excavation projects will require dewatering, and may require resource consent for the activity.
- Minimise volumes by staging works (e.g. trench and backfill in sections).
- Reuse clean water onsite where possible (e.g. for dust suppression).
- Stabilise discharge areas and use energy dissipaters to prevent erosion.
- Ensure all treatment devices are properly sized, located, and securely connected.
- Suitably seal dewatering bores.

Dewatering bags as a method to treat water before returning it back to a waterbody.

7. EARTHWORKS IN OTAGO

7.1. INTRODUCTION

While the ORC references GD05 as the primary technical standard for ESC, applying this guidance without adaptation can be insufficient in Otago.

The region presents a unique set of constraints driven by soil geology, topography, and extreme climate variability. Unlike the cohesive clay soils often found in the Auckland region, some of Otago's soils (such as glacial tills and loess) are often dispersive and lack structure making them highly prone to erosion. Combined with steep topography, this creates a high-risk environment where standard controls can struggle, and treatment efficiencies drop significantly.

Conditions in Otago can shift rapidly from dry, dusty environments to short, intense rainfall events. Consequently, sites must be capable of pivoting from dust suppression to managing heavy sediment-laden runoff immediately. GD05 must be viewed as a baseline "recipe book"— users must select and adapt ingredients to suit the specific and often unique constraints of the Otago environment.

7.2. EARTHWORKS IN OTAGO CHECKLIST

To assist in identifying risks early, the 5-Point High-Risk Checklist overleaf outlines specific triggers that can elevate a project from a standard earthworks site to one requiring specialised design and higher vigilance. This checklist is intended as a supporting risk-screening guidance tool to be used by practitioners (including designers preparing ESC plans, contractors managing sites, and consent holders) when planning and implementing earthworks, as well as ORC compliance staff when assessing site risk.

This checklist, in conjunction with **Table 2** of these Guidelines (*Environmental risk for EMP category*), is used to assess environmental risk arising from local geological, climatic, and site-specific factors. It does not replace professional judgement. As detailed in the table **overleaf**, identifying these risks early ensures that appropriate management practices and specialised designs are integrated into the project prior to the commencement of works.

Consider adding this high-risk checklist to your resource consent application for residential earthworks and including it in your EMP.

High-Risk Checklist

Risk	Question	Yes/No (checklist)	Why This Matters
Soils	Does your site contain erosion prone soils such as glacial tills (often silty, poorly structured), loess (wind-blown silt), or highly erodible schist-derived soils? See **Section 7.3** for guidance.		These soils lack the cohesive bonds found in clays. When saturated, they lose structural integrity immediately, turning into a slurry. This leads to rapid batter collapse in unlined ponds, severe scouring in unlined channels and extensive rilling in exposed soils.
Topography	Is your site on a steep slope (e.g., >15% or 1-in-6) or in a "mountainous" setting?		Water velocity increases exponentially on slopes. Standard controls designed for flatter grades will be undermined or overtopped by high-velocity flows, and are more likely to fail. High energy runoff mobilises larger sediment particles, overwhelming ESCs.
Climate	Is the site prone to intense, short-duration rainfall events following extended dry periods? Is there a likelihood of freezing conditions?		Frozen ground acts like concrete, reducing infiltration to near zero increasing runoff and putting more pressure on ESCs. Conversely, high-intensity rain on dry, crusted soils results in rapid runoff peaks that can overwhelm standard controls.
Scale and Catchment Size	Will your site have large open areas (>0.5ha) open at one time, and is there minimal or no staging?		Limiting the catchment size reduces the volume of dirty water generated. Smaller, controlled catchments are easier to manage and ensure that erosion and sediment controls can function effectively within their design limits.
Receiving Environment	Does your site's runoff drain directly to a sensitive waterway, the stormwater network or a wetland?		Discharges in these zones have immediate consequences, particularly in catchments feeding lakes, wetlands, streams and the stormwater network where suspended sediment plumes are highly visible and ecologically damaging.

A spotlight on climate and winter conditions – it can freeze in Otago.

Consider if there is risk of freezing if your works progress through winter.

A frozen diversion channel.

SRPs have frozen in harsh Central Otago winters.

Snow and freezing can impact chemical treatment.

Snow melt immediately following a rain event can cause pressure on sediment retention devices.

7.3. A VISUAL GUIDE TO PROBLEMATIC SOILS

7.3.1. Problematic Soils in Otago

7.3.1.1. Glacial Till and River Alluvial Soils

Glacial till is an unsorted, unstratified mix of materials deposited directly by ice, ranging from clay to boulders. Its highly variable grain sizes and lack of layering make it prone to erosion and difficult to predict under loading.

Alluvial soils form when running water sorts and deposits sediments into stratified layers of gravel, sand, silt, and clay. On floodplains they are relatively flat, but on terraces and fans their slope can amplify erosion risk.

Glacial till follows the historic extents of Otago's major glaciers, with thick accumulations around Wānaka and some around Queenstown. Alluvial soils are widespread throughout the region associated with active floodplains of the major rivers (Clutha, Taieri, and Waitaki rivers), as well as terraces and alluvial fans in inland valleys.

Identification Methods

- Consult the GNS 1:250,000 geological map (Qmap) or data.gns.cri.nz/geology/ (1:250k Geology layer) to flag likely glacial till extents.
- Perform borehole logging or trench exposures: look for mixed, matrix-supported deposits for till; and for alluvial soils look for well-sorted, layered beds for sediment. You may need assistance from a geologist or geotechnical engineer to undertake this process.
- Reviewing test pit logs from geotechnical assessments undertaken for the subdivision and other larger-scale developments.

7.3.1.2. Loess Soils

Loess is windblown fine sediment particles from glacial outwash plains and riverbeds, accumulating in thick, homogenous mantles. These are often dense and can have impermeable layers which reduce drainage capacity and encourage tunnel gully formation. Typically dominated by sand and silt with <20 % clay, loess lacks the clay particles that impart tensile strength via their high binding capacity, making it prone to slaking and wind erosion.

Extensive loess deposits occur in the coastal Otago hills of the Clutha District and North Otago with some pockets in Central Otago.

Localised pockets occur where prevailing westerly winds deposited silt against hill toes and gully heads.

Identification Methods

- Review the Land Resource Information System (LRIS) 'Rock' layer for the "Lo" category to map loess extents.
- Validate with hand-auger sampling: look for uniform, silty material with rapid collapsibility when wetted.
- Reviewing test pit logs from geotechnical assessments undertaken for the subdivision and other larger-scale developments.

7.3.2. Visual On-Site Assessment

Identifying problematic soils early prevents costly rework. Desktop assessments using S-Maps, GNS geology maps, or geotechnical investigations are essential first steps. However, ground-truthing via field tests provides immediate, actionable data.

7.3.2.1. The Clumping Test

Take a handful of moist soil and squeeze it firmly.

- Does the soil clump together (indicating clay/organic content), or does it crumble and turn to powder?
- Crumbling soils typically indicate Glacial Tills or Loess. Because these soils lack cohesion, they cannot hold a steep batter and are highly susceptible to "piping" (internal erosion) and scour. Standard earth bunds made of this material may fail structurally.
- Note that soil samples should be taken from representative depths, reflecting the depths to which earthworks will be undertaken. Most earthworks involve a "site strip", which removes the topsoil layer (typically around 200-300 mm depth) — so samples are best taken below the topsoil horizon.

The photographs below show the clumping test undertaken on subsoil samples taken within the Wānaka area. The clumping test also provides an opportunity to examine the composition of the soil within your site, and the relative ratios of sand, silt and clay. In general, more sand and/or silt means a greater risk of erosion.

Photograph shows a glacial till soil with limited capacity to clump and is not "sticky" (which would indicate presence of clays).

Photograph shows a different soil found in Wānaka that clumps and is sticky.

7.3.2.2. Visual Cues on Site

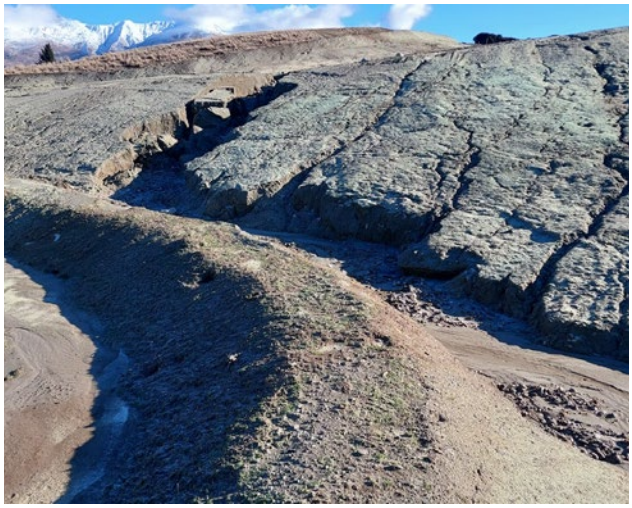
- Slumping
- Rilling and Tunnelling
  - Look for small channels ("rills") forming on exposed banks or "tunnel gullies" where water erodes the subsoil while the top layer remains intact.
  - Rilling transforms sheet flow into concentrated flow, which has vastly higher erosive power. This mobilises sediment at a rate that can overwhelm ESCs in hours rather than days.

Significant rilling through glacial till on a large site which has turned sheet flow in to highly erosive concentrated flow

Rilling of a stockpile.

Areial image of rilling on a large site

Slumping



Rilling and slumping

Advice: If in doubt about soil conditions, speak with your SQEP, a geologist or geotechnical engineer

- Dust

While dust discharges are regulated under the Otago Air Plan, visible dust is a key indicator of low-cohesion, highly erodible soil. It should be viewed as an early warning sign that the site is vulnerable to sediment runoff.

Dust storms in Queenstown and Wānaka. Dust generation from exposed fine soils indicates low cohesion and high erosion risk once wetted.

7.4. OTAGO BEST PRACTICE

7.4.1. Plan and Integrate

ESC should be costed and integrated into the programme design before project tender.

- Retrofitting ESC into a confirmed site plan is often impossible due to space constraints. Decisions regarding access routes, spoil stockpiling, and construction sequencing define the environmental risk profile. If ESC is an afterthought, the project will struggle to remain compliant during adverse weather.

7.4.2. Control the Erosion

Prioritise limiting erosion and keeping soil in place (stabilisation/diversion) over trying to catch it after it moves.

- Sediment removal efficiency drops significantly as particle size decreases and erosion increases. Otago's fine glacial soils are incredibly difficult to remove once suspended in water. It is far more efficient, and cheaper, to divert clean water around the site and stabilise exposed areas than to treat massive volumes of dirty water.

7.4.3. Minimise Catchment

Reduce environmental risk by limiting the contributing catchments and area of exposed soil at any one time.

- Compliance with GD05 sizing does not guarantee performance during major storm events, particularly for large catchments. To reduce the risk of failure:
  - Keep catchments small: This ensures controls function within their hydraulic design limits.
  - Add buffer storage: Whenever possible, include storage capacity above the design minimum to handle excess runoff.

7.4.4. Progressive Stabilisation

Do not wait until the end of the project. Stabilise completed areas immediately.

- This removes the area from the active catchment, effectively "closing" that portion of risk.

Erosion and Sediment Control Best Practice

Device	Common Failure	Otago Best Practice
Sediment Retention Ponds (SRP)	The SRP is built with embankments partially or completely above natural ground in problematic soils. Glacial till embankments are prone to failure. Scour at the inlet (where energy is highest) is common without armour.	Construct in-ground. Line forebays and inlet batters with impermeable liner. The liner could still fail — monitor closely and prepare for an alternative. Consider using a filter collar/drain instead of an anti-seep collar to prevent tunnelling along the pipe. Consider consulting an engineer.
Dirty Water Diversion Channels	Channels cut at grades that are too steep for local soils, leading to heavy scour and erosion. Unlined channels in loess/till will erode more deeply with every rain event or undergo extensive batter scour, becoming a source of sediment release.	Use more conservative, flatter grades. Where space is tight, use "stepped" swales with rock check dams to reduce velocity and scour. Line channels >2% with PE/geotextile/rock or stabilise with hydroseed immediately after construction.
Silt Fences	On steep slopes, water runs along the fence, gathering volume and velocity until it overtops or undermines the fabric. Returns break this flow. In rocky ground, you cannot achieve the required trench depth.	Install on contour with frequent returns, consider super silt fence material. Avoid using in rocky ground.
Drop Out Pits	Lack of dropout pits to capture coarse solids early, reduce the efficiency of the sediment retention devices and fill the forebay up bulk sediments.	Install drop out pits before the main sediment retention devices to capture coarse sediment, preserving main storage volume for fine particulates. Over-size dropout pits to the extent possible, as on erosion-prone sites they fill up quickly.
Stabilisation	Growing seasons/windows are limited in Alpine and Otago's temperate climate. Traditional straw mulch often provides limited benefit as it can easily be displaced by strong winds and offers minimal surface contact on fine-textured "floury" soils. Certain hydromulch products may also struggle to achieve adequate adhesion on these low-cohesion surfaces unless specifically formulated for them.	Hay mulch (may be more suitable than straw in Otago) may require re-application after strong winds or rain. Amend nutrient-deficient soils common in Central Otago (e.g. with compost, slow-release fertiliser, or organic matter) to enhance vegetation establishment and root development. Consider temporary binding agents or tackifiers to provide temporary stabilisation when working on exposed soils.
Sustainability	Consider using biodegradable erosion controls where possible (e.g. wool/jute). Plastic-based meshes degrade into microplastics, particularly in high-UV alpine environments. Natural fibres integrate into the soil profile or degrade harmlessly. Dye can be added to products such as hydroseed. Where used, the dye should be biodegradable and non-toxic.	

SRPs and dirty water diversion channels — consider the soils

An SRP outlet batter constructed above ground in glacial tills has failed due to backward erosion along the outlet pipe.

An SRP constructed in ground in glacial till soils reduces risk of batter failure.

An SRP inlet batter lined with geotextile material getting significantly eroded in glacial till soils.

An impervious liner in the forebay and inlet batter or an inground SRP constructed in glacial till soils.

✗ *Significant damage to a dirty water diversion channel constructed in glacial till soils.*

✓ *More conservative, flatter grade dirty water diversion channel with step downs protected with rip rap.*

✗ *Not all mulch products are suitable. Practitioners should be well informed before selecting a product and confirm its suitability for the soil type and required application method.*

✓ *Hydromulch applied to bare ground. Undertake sealing and revegetation works within appropriate seasonal windows, to increase the likelihood of germination and successful establishment.*

Polymer — long-term stockpile option with polymered stockpile with the surrounding area hydroseeded. Polymers form chemical or physical bonds with soil/plastic particles, creating a cohesive mass or a protective layer.

Use a dense hay mulch layer, watered in, to provide superior ground coverage, anchoring, and moisture retention compared to straw or lightweight hydromulches, particularly on erosion prone soils.

Alternative or Additional Methods

The industry is constantly changing and that innovation often drives better results. While the adoption of new products and practices is encouraged where appropriate, they must be applied correctly to be effective. Always reach out to an SQEP or ORC compliance staff to discuss the likely benefits and compliance implications before relying on methods outside standard guidance.

A sediment basin may be proposed as an alternative to an SRP for gravelly ground with high infiltration rates. Provide evidence of high infiltration rates and continue to monitor this — as infiltration can decrease over time as silty fines accumulate in between pores.

Water treatment system / settlement tank as part of the treatment train

Large offline storage pond constructed to manage extreme rain events, in addition to multiple SRPs across this large earthwork site, providing resilience during calamity situations.

7.5. PROJECT MANAGEMENT ESSENTIALS

Successful management in Otago requires acknowledging that “standard” conditions rarely exist.

7.5.1. Site Management and Progressive Stabilisation

A critical failure on many sites is leaving large areas exposed for extended periods. “Rapid stabilisation” in the Otago context implies:

- **Immediate Action:** stabilisation should be initiated immediately when construction activity ceases.
- **Risk Reduction:** the longer soil remains bare, the statistical probability of a high-intensity rain event occurring on that exposed soil increases. Immediate stabilisation resets this probability to near zero for that area.
- **Winter and Alpine Management**
  - **Freeze-Thaw Cycles:** when ground freezes, soil moisture expands, breaking soil bonds. Upon thawing, this surface layer turns into a cohesionless sludge that erodes instantly with snowmelt.
  - **Infiltration Failure:** frozen ground is impervious. Soakage pits and infiltration trenches will fail in winter, converting all precipitation into surface runoff.
  - **Shutdowns:** winter conditions often render earthworks non-compliant regardless of effort. Scheduled shutdowns avoid the cost of fighting nature and the risk of enforcement.
- **Growing season:** schedule completion of bulk earthworks to coincide with the growing season (roughly September to April), to enable grass establishment. Stabilising exposed soils outside of the growing season means alternative methods (mulching, covering, etc.) will need to be employed.
- **Managing laydown areas**: laydown and staging areas are essential for construction logistics, storage, and operations. To prevent them from increasing the site's active catchment and generating sediment, use:
  - **Active Stabilisation:** ensure laydown areas are promptly and actively stabilised rather than left exposed.
  - **Aggregate:** applying a layer of aggregate (such as AP40) is an effective, practical method to reduce erosion and sediment generation, improve site trafficability, and support overall site management and compliance.

7.5.2. Weather Monitoring

Otago is subject to intense rainfall events that are difficult to predict seasonally (**figures 4 and 5**).

- **Rapid Shifts:** Sites must be prepared for conditions to move from dry/dusty to heavy rain in hours.
- **Snowmelt**: Rain-on-snow events are the highest risk scenario in Otago. The warm rain melts the snowpack, releasing stored water and rainfall simultaneously, resulting in runoff volumes that far exceed standard design storms.
- **Mandatory Checks:** Daily checks of the weather forecast allow the site team to “button up” the site (cover exposed areas, check pond levels) before the rain arrives. Upcoming weather should be discussed and documented at least weekly, during project team meetings.

Historical rain gage data shows that large rainfall events can occur during any month of the year

throughout the Otago Region. Comparison of **figures 4 and 5** indicate that both coastal and inland areas have experienced large rainfall events throughout the year, and that coastal areas more likely to experience events exceeding 40mm.

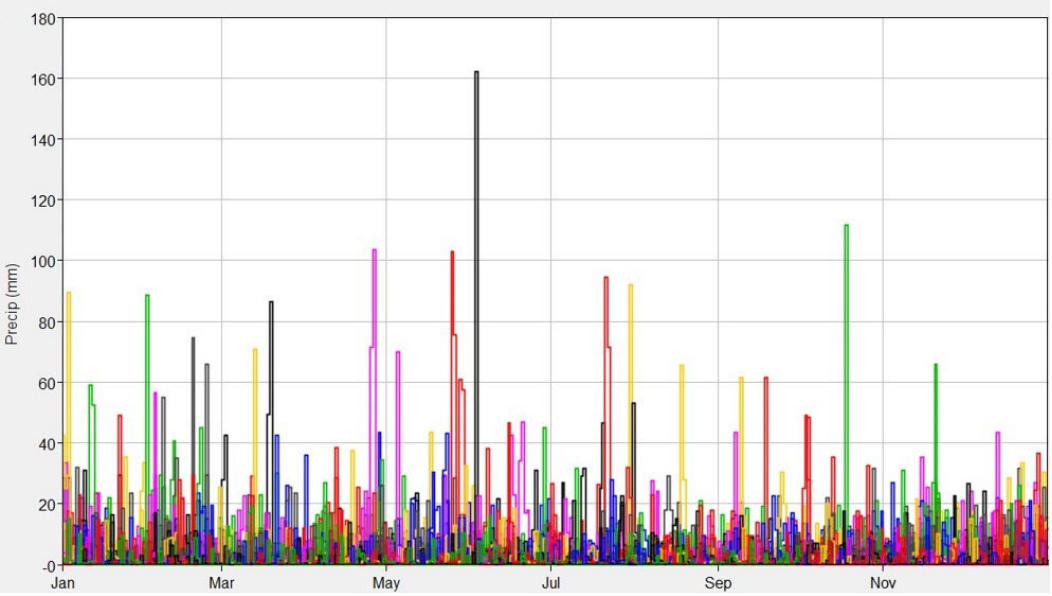


***Figure 4:** A snapshot of Coastal Otago rainfall — EM317 — Taieri Depot from 1988*

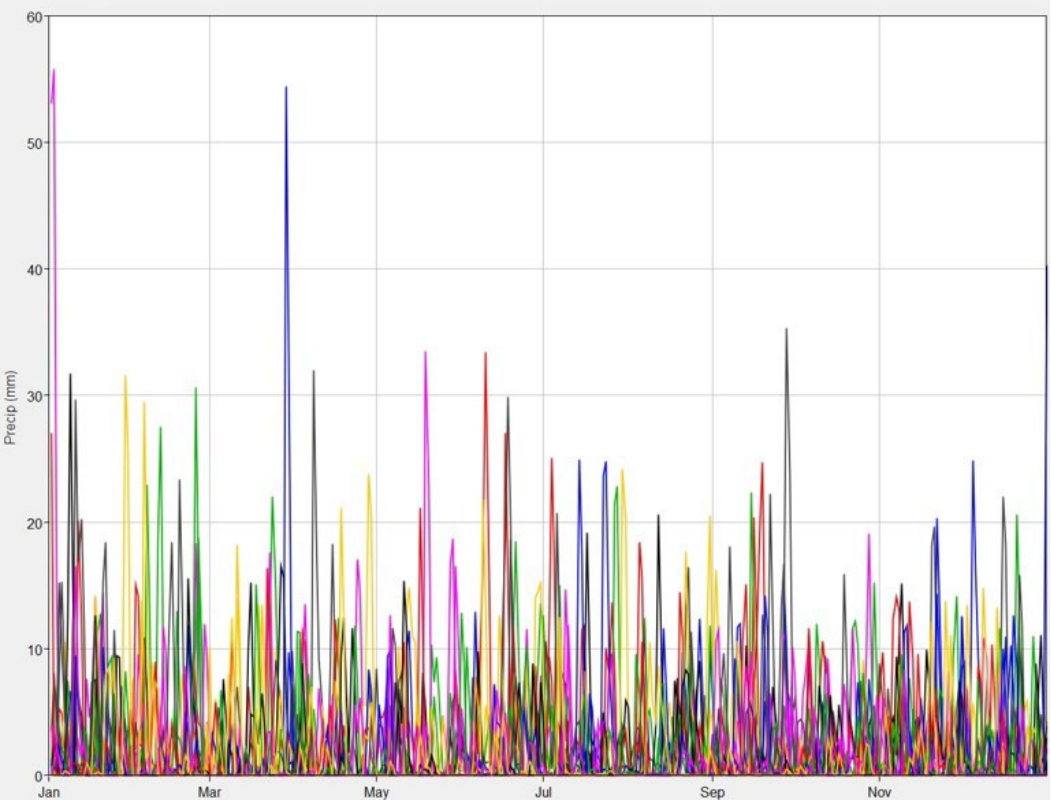


***Figure 5:** A snapshot of Central Otago rainfall – EM711 – Wanaka Airport 1992 - 2021*

APPENDICES

APPENDIX 1 — DEFINITIONS

These definitions are from ORC's Water Plan, The Planning Standards, or the MfE.

TERM	EXPLANATION
ACCIDENTAL DISCOVERY	When an archaeological site (defined as a place associated with pre-1900 human activity, where there may be evidence relating to the history of New Zealand), regardless of cultural association, is discovered during construction. Works onsite must cease immediately and the accidental discovery protocol followed.
ADVERSE EFFECT	A detrimental effect.
AS BUILT	A set of drawings that show how ESC measures were actually built versus the way it was originally designed. If plans have changed from the original design this would require an update to the EMP/ESCP and an explanation from the SQEP.
AVERAGE RECURRENCE INTERVAL (ARI)	The average or expected value of the periods between exceedances of a given rainfall total accumulated over a given duration. For example, a 100-year ARI event will occur on average once every 100 years. It is implicit in this definition that the periods between exceedances are generally random.
BACKFLOW	The return of water to the source waterbody, through the device used to take water, including back-siphoning.
BORE	Every device or means, including any well or pit, which is drilled or constructed for the purpose of taking groundwater, or which results in groundwater being taken, other than piezometers or other monitoring devices used for water sampling purposes only.
COASTAL MARINE AREA (CMA)	Means the foreshore, seabed, and coastal water, and the air space above the water (a) Of which the seaward boundary is the outer limits of the territorial sea: (b) Of which the landward boundary is the line of mean high water springs, except that where that line crosses a river, the landward boundary at that point shall be whichever is the lesser of - (i) One kilometre upstream from the mouth of the river; or (ii) The point upstream that is calculated by multiplying the width of the river mouth by 5.
CONDITIONS	In relation to plans and resource consents including terms, standards, restrictions, and prohibitions.
CONSENT AUTHORITY	Means a regional council, a territorial authority, or a local authority that is both a regional and a territorial authority, whose permission is required to carry out an activity for which a resource consent is required under the RMA 1991.
CONSENT HOLDER	The holder of the resource consent that has been issued. It is noted that generally the consent holder delegates functions and duties to the Principal Contractor tasked with delivery of construction activity. However, the ultimate responsibility for ensuring compliance with resource consents, will continue to be with the resource consent holder.

TERM	EXPLANATION
CONSPICUOUS CHANGE IN COLOUR OR CLARITY	A visual change in water clarity of more than 40%.
COMPLAINT	A verbal or written complaint from a member any person regarding the works and the effect upon their person or property.
CONTAMINANT	Includes any substance (including gases, odorous compounds, liquids, solids, and micro-organisms) or energy (excluding noise) or heat, that either by itself or in combination with the same, similar, or other substances, energy or heat — (a) When discharged into water, changes or is likely to change the physical, chemical, or biological condition of water; or (b) When discharged onto or into land or into air, changes or is likely to change the physical, chemical, or biological condition of the land or air onto or into which it is discharged.
CONTAMINATED SITE — REGIONAL PLAN: WASTE	A site at which hazardous substances occur at concentrations above background levels and where assessment indicates it poses, or is likely to pose, an immediate or long term hazard to human health or the environment.
CONTAMINATED LAND (RMA)	Contaminated land means land that has a hazardous substance in or on it that— (a) has significant adverse effects on the environment; or (b) is reasonably likely to have significant adverse effects on the environment.
DEFENCE AGAINST WATER	Any dam, weir, bank, carriageway, groyne, or reservoir, and any structure or appliance of any kind which has or may have the effect of stopping, diverting, controlling, restricting, or otherwise regulating the flow or spread or subsidence, in or out of a waterbody, of water including flood waters, which is specifically established for the purpose of flood hazard mitigation.
DISCHARGE	Includes emit, deposit, and allow to escape.
EARTHWORKS	The alteration or disturbance of land, including by moving, removing, placing, blading, cutting, contouring, filling or excavation of earth (or any matter constituting the land including soil, clay, sand and rock). This excludes gardening, cultivation, and disturbance of land for the installation of fence posts.[38]
EFFECT	In the Resource Management Act 1991, unless the context otherwise requires, the term effect includes - (a) Any positive or adverse effect; and (b) Any temporary or permanent effect; and (c) Any past, present, or future effect; and (d) Any cumulative effect which arises over time or in combination with other effects - regardless of the scale, intensity, duration, or frequency of the effect, and also includes - (e) Any potential effect of high probability; and (f) Any potential effect of low probability which has a high potential impact.

[38] Ministry for the Environment. 2019. *2I Definitions Standard – Recommendations on Submissions Report for the first set of National Planning Standards.* Wellington: Ministry for the Environment.

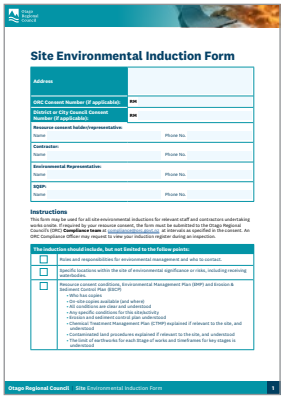
TERM	EXPLANATION
ENVIRONMENT	Includes - (a) Ecosystems and their constituent parts, including people and communities; and (b) All natural and physical resources; and (c) Amenity values; and (d) The social, economic, aesthetic, and cultural conditions which affect the matters stated in paragraphs (a) to (c) of this definition or which are affected by those matters.
ENVIRONMENTAL MANAGEMENT PLAN (EMP)	An Environmental Management Plan is a specialised document prepared and implemented to avoid, remedy and mitigate adverse environmental effects associated with land use activities.
ENVIRONMENTAL NUISANCE	The emission, discharge, depositing or disturbance of a pollutant that unreasonably interferes with, or is likely to unreasonably interfere with, a person's enjoyment of the environment or unhealthy, offensive or unsightly conditions caused by contamination or a pollutant. Also includes nuisance associated with noise and vibration.
ENVIRONMENTAL INCIDENT	The occurrence of a breach of the relevant legislation, Regional Plan, NES, the resource consent and/or the EMP.
EROSION	The processes of the wearing away of the land surface (including the land that forms the bed of a lake or river) by natural agents and the transport of the material that results.
EXCLUSION ZONE	An area not to be entered by a person or machine for the duration of the works or otherwise designated period of time or restricted access for authorised persons.
GD05	Auckland Council Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region https://www.aucklandcouncil.govt.nz/UnitaryPlanDocuments/mir-erosion-sediment-control-guide-auckland-region.pdf
HAIL	Defined in regulation 3 of the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 as: The current edition of the Hazardous Activities and Industries List, Wellington, Ministry for the Environment.
HAZARDOUS SUBSTANCE	This includes, but is not limited to, any substance defined in section 2 of the Hazardous Substances and New Organisms Act, 1996, as a hazardous substance.
LANDHOLDING	For land subject to the Land Transfer Act 1952, land in: (i) A single certificate of title; or (ii) Two or more adjoining certificates of title, with a common occupier. For land not subject to the Land Transfer Act 1952, all contiguous land last acquired under one instrument of conveyance and occupied by a common occupier.
NON-POINT SOURCE DISCHARGE	A discharge of water or contaminant that enters a waterbody from a diffuse source, such as land run-off or infiltration.
OPERATIVE	In relation to a policy statement or plan, or a provision of a policy statement or plan, means that the policy statement, plan, or provision- (a) Has become operative - (i) In terms of clause 20 of Schedule 1 of the Resource Management Act 1991; or (ii) Under Section 86F of the Act; and (b) Has not ceased to be operative.
RAIN EVENT	Any precipitation event that is capable of, or generates, overland flow.

TERM	EXPLANATION
RESOURCE CONSENT	A consent for an activity as set out in Section 87 of the Resource Management Act 1991; and includes all conditions to which the consent is subject.
STABILISED	Measures to stabilise against erosion may include: i. the use of mulching ii. top-soiling and grassing of otherwise bare areas of earth iii. aggregate or vegetative cover that has obtained a density of more than 80% of a normal pasture sward iv. Alternatives may be appropriate depending on the end use, such as pavement, aggregate for roads and degradable erosion matting. "Non-stabilised" areas are those which do not meet the definition of "stabilised".
STAGE	A discrete sub-area of works within the overall site. The boundaries of each stage should be clearly identified in the resource consent application and/or the EMP.
STORMWATER	The water running off from any impervious surface such as roads, carparks, roofs, and sealed runways.
SUITABLY QUALIFIED AND EXPERIENCED PERSON (SQEP)	1. A senior or principal practitioner with a tertiary qualification in one or more of the following disciplines: Environmental Engineering, Civil Engineering, Geotechnical Engineering, Environmental Science, Earth Science, Soil Science, Natural Resource Management, Environmental Management, or another closely related discipline approved by ORC; and has at least three years of experience in preparing, implementing and managing EMPs and ESCPs for construction sites. This must include experience of onsite management and/or oversight of construction environmental management including erosion and sediment control. 2. Belonging to a recognised professional body that assesses and certifies environmental professionals in competency criteria of training, experience, professional conduct and ethical behaviour will be considered eligible in conjunction with erosion and sediment related work outlined above while specifically holding one (or more) of the following current professional certifications: - - Certified Practitioner in Erosion and Sediment Control (CPESC) administered by EnviroCert International, Inc.; or - Chartered Professional Engineer (CPEng) in Environmental or Civil Engineering, registered under Engineering New Zealand; or, - Certified Environmental Practitioner (CEnvP), administered by the Certified Environmental Practitioner Scheme; or, - Registered Soil Practitioner – Erosion and Sediment Control (RSP-ESC), administered by IECA Australasia; or, ***Note:*** *The practitioner must maintain active certification with the relevant professional body. If that certification is surrendered, suspended, revoked, or lapses, the practitioner must notify ORC immediately. Their SQEP status will then be subject to reassessment.* 3. SQEPs are required for most ORC consented sites unless otherwise approved by ORC's Compliance Team. In that instance, ORC will decide whether the nominated person qualifies as an SQEP based on the inherent risks of the project. OR 4. Any person that ORC approves outside of the above three SQEP categories must provide evidence to ORC that they have the necessary skills and experience to provide experience erosion and sediment control, and environmental advice. It is ORC's discretion to accept or not accept an SQEP. Approval may be granted on such terms and conditions as ORC thinks fit. ORC reserves the right to reassess and revoke a practitioner's SQEP status at any time based on non-compliance or changes in professional standing.

TERM	EXPLANATION
CONTAMINATED LAND SUITABLY QUALIFIED AND EXPERIENCED PERSON (CL-SQEP)[39]	1. A person undertaking a preliminary site investigation should have relevant experience relating to possible hazardous activities or industries. In addition, the person should be qualified to make an independent assessment of the likelihood of the site having become contaminated and assess the risk to human health for the proposed land use. 2. A person undertaking a detailed site investigation (supervised) should have at least tertiary education in environmental science or engineering or a related field with 1 or more years of professional experience in environmental investigations and risk assessment or is an investigation manager as described below. 3. An investigation manager should have tertiary education (as above) and at least 5 years or more of related experience (as above). 4. The person certifying the report on behalf of their company would be expected to be a senior or principal scientist/engineer with a relevant tertiary education and with at least 10 years of related experience. It is anticipated that the certifier would belong to a recognised professional body that assesses and certifies environmental professionals in competency criteria of training, experience, professional conduct and ethical behaviour will be considered eligible: - Chartered Professional Engineer (CPEng) in Environmental or Civil Engineering; or, - Certified Environmental Practitioner – Site Contamination Specialist (CEnvP-SC). OR 5. Anyone that ORC approves outside of the above four CL-SQEP categories must provide evidence to ORC that they have the necessary skills and experience to provide contaminated land advice. It is ORC's discretion to accept or not accept a CL-SQEP.
TERRITORIAL LOCAL AUTHORITY	A term that collectively describes city councils and district councils, but not regional councils.
WATERBODY	Fresh water or geothermal water in a river, lake, stream, pond, wetland, or aquifer, or any part thereof, that is not located within the coastal marine area.

[39] Ministry for the Environment. 2012. *Users' Guide National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health*

APPENDIX 2 — SITE ENVIRONMENTAL INDUCTION FORM



Site Environmental Induction Form

Address

ORC Consent Number (if applicable):

District or City Council Consent Number (if applicable):

Resource consent holder/representative:

Name Phone No.

Contractor:

Name Phone No.

Environmental Representative:

Name Phone No.

SQEP:

Name Phone No.

Instructions

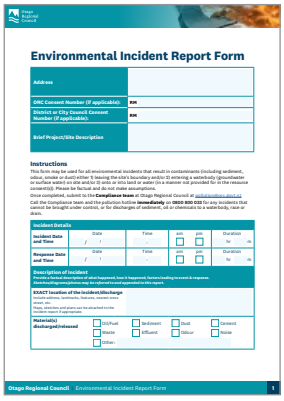
The induction should include, but not limited to the follow points:

- Roles and responsibilities for environmental management and who to contact.
- Specific locations within the site of environmental significance or risks, including receiving waterbodies.
- Resource consent conditions, Environmental Management Plan (EMP) and Erosion & Sediment Control Plan (ESCP)
  - Who has copies
  - On-site copies available (and where)
  - All conditions are clear and understood
  - Any specific conditions for this site/activity
  - Any monitoring requirements understood
- Chemical Treatment Management Plan (CTMP) explained if relevant to the site, and understood
- Contaminated land procedures explained if relevant to the site, and understood
- The limit of earthworks for each Stage of works and timeframes for key stages is understood

Otago Regional Council Site Environmental Induction Form 1

[Go to Site Environmental Induction Form]

APPENDIX 3 — ENVIRONMENTAL INCIDENT REPORT FORM



Environmental Incident Report Form

Address

ORC Consent Number (if applicable):

District or City Council Consent Number (if applicable):

Brief Project/Site Description

Instructions

Incident Details

Incident Date and Time

Response Date and Time

Description of Incident

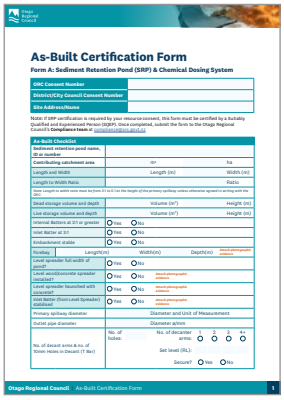
EXACT Location of the Incident/Discharge

Material(s) discharged/released

Otago Regional Council Environmental Incident Report Form 1

[Go to Environmental Incident Form]

APPENDIX 4 — AS-BUILT CERTIFICATION FORM (Form A: Sediment Retention Pond (SRP) & Chemical Dosing System)



As-Built Certification Form

Form A: Sediment Retention Pond (SRP) & Chemical Dosing System

ORC Consent Number

District/City Council Consent Number

Site Address/Name

As-Built Checklist

Sediment retention pond name, ID or number

Contributing catchment area

Length and Width

Length (m) Width (m)

Length to Width Ratio

Dead storage volume and depth

Volume (m³) Height (m)

Live storage volume and depth

Volume (m³) Height (m)

Internal Batters at 3:1 or greater

Inlet Batter at 3:1

Embankment stable

Forebay Length(m) Width(m) Depth(m)

Level spreader full width of pond?

Level weir/concrete spreader installed?

Level spreader launched with concrete?

Inlet Batter (from Level Spreader) stabilised

Primary spillway diameter

Diameter and Unit of Measurement

Outlet pipe diameter

Diameter e/mm

No. of holes:

No. of decanter arms:

Set level (RL):

Secured?

Otago Regional Council As-Built Certification Form 1

[Go to As-Built Certification Form]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