Environmental Management Plan

Ayrburn Screen Hub

May 2025

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Appendices	
Appendix 1	Erosion and Sediment Control Plan Drawings
Appendix 2	Calculations for Erosion and Sediment Controls
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Emergency Contacts

Contact made with any of the following shall be undertaken with due consultation of the Environmental Representative or Project Manager.

Table 1: Emergency Contacts

Element	Emergency Contact	Details
Pollution incident	Otago Regional Council (ORC) Spill Hotline	0800 800 033 pollution@orc.govt.nz compliance@orc.govt.nz
Environmental complaint	Environmental Representative	TBC
Discovery of contaminated land	Environmental Representative	
Unexpected heritage finds	Environmental Representative	
Human remains	New Zealand Police	111
Fire including bushfire	Fire and Emergency New Zealand (FENZ)	111
Public utilities	Queenstown Lakes District Council (QLDC)	(03) 441 0499 rcmonitoring@qldc.govt.nz
Internal contacts	Project Manager	TBC
Internal contacts	Environmental Consultant	Lucy Cramp [redacted] Tom Grandiek [redacted] Enviroscope

1.0 INTRODUCTION

1.1 Purpose and Scope

On behalf of Waterfall Park Developments Ltd (WPDL), Enviroscope has prepared this Environmental Management Plan (EMP), for the earthworks associated with the development of a film production facility with associated accommodation and infrastructure, referred to as the Screen Hub, at Ayrburn, Arrowtown. This EMP aims to reduce the effects of the project's construction activities on the environment and sensitive receptors.

This EMP is prepared to accompany the substantive Fast Track application and is required to be prepared in accordance with the local Territorial Council, Queenstown Lakes District Council (QLDC) and Regional Council, Otago Regional Council (ORC) Guidelines. This document aligns with the objectives and policies of the (ORC) Regional Plan, specifically, section 14.5 – Earthworks for Residential Developments and with the (QLDC) objectives and policies of Chapter 26 – Earthworks, of the Proposed District Plan.

This EMP is also prepared in accordance with the ORC Residential Earthworks in Otago – A guide for developers, landowners, contractors and service providers, March 2023 (Guide — Residential Earthworks in Otago), as well as the QLDC Guidelines for Environmental Management Plans, June 2019 (EMP Guidelines). It is considered to have a 'High' environmental risk level as per the risk categories outlined in the QLDC EMP Guidelines.

The purpose of this EMP is to be an effective and practical reference manual for construction personnel that applies to all project activities during the construction phase and includes the following:

- Strategies to manage environmental aspects and risks, based on associated best practice.
- Provides for contingency planning.
- Provides a framework for monitoring, reporting, review and continual improvement.
- Defines roles and responsibilities.
- Procedures to investigate and resolve environmental non-conformances and initiate corrective and preventative actions.

An overview of the project and sequencing can be found in the construction methodology at **Section 2.0**.

1.2 Site Overview

The subject site is located within the wider Ayrburn property, outside of Arrowtown, and comprises part of Lot 4 DP 540788. The 23.7 ha site currently contains the Ayrburn depot, which includes several temporary buildings, a carpark, and a storage area. The remainder of the land is undeveloped. Access to the site is via a metal access road off Ayr Avenue. The Ayrburn hospitality precinct is located immediately to the east of the site, while the surrounding environment is characterised by a mix of rural lifestyle and rural land uses.

The site is predominantly located on a flat terrace elevated above the adjacent Ayrburn hospitality precinct to the east. To the north of the site, a hill rises steeply towards the Millbrook development. The terrace and hillside are mainly covered in grass. A windbreak of Douglas fir lines the southern boundary, and riparian indigenous plantings are present along Mill Creek. Both Mill Creek and an unnamed ephemeral waterway run adjacent to the site and are contributors to the Lake Hayes catchment.

This is shown in **Figure 1** below.

Figure 1: Location of the site, earthworks extent shown in red (Source: GIS)

1.2.1 Soils and Geotechnical Summary

A geotechnical report has been prepared by GeoSolve, dated January 2025, which details site investigations and reports on the geotechnical conditions including drainage potential. The report notes that:

"The subsurface materials observed during site investigations comprise surficial layers of topsoil, loess and colluvium overlying variably interbedded alluvial deposits which extend to considerable depth. The main geological units present on the top terrace surface are as follows:

- Topsoil comprises black, soft to firm organic SILT with organic rootlets.
- Loess comprises light brown, loose to medium dense silty SAND and soft to firm sandy SILT.
- Isolated colluvium deposits were observed within TP14a, TP6d, TP10d comprising light brown, medium dense, gravelly SAND and silty SAND and firm SILT with minor gravel.
- Alluvial deposits comprise interbedded layers of medium dense SAND and GRAVEL and firm to stiff SILT of varying thickness. A 0.7 m thick isolated layer of light brown, firm to stiff clayey SILT was observed within TP21a at 3.0 m bgl.

- Schist Bedrock was encountered within TP7d and TP10d located adjacent to the northern hill slope. Schist weathering was observed to be variable within the upper meters of the profile comprising; completely weathered (weak to extremely weak) schist within TP10d and slightly weathered (moderately strong) schist in TP7d."

Groundwater seepage was identified in TP16a, located on the upper terrace. Proposed cuts in this area are therefore likely to intercept this perched groundwater. The regional groundwater level was confirmed in borehole BH2, located on the lower terrace, at a depth of approximately 12-15 m below the ground level of the upper terrace. Soakage testing was undertaken onsite and returned the following unfactored soakage rates: 800 mm/hr for the gravelly SAND (SP1) soil profile, 30 mm/hr for sandy SILT (SP2), and 410 mm/hr for sandy GRAVEL (SP3).

1.2.2 Summary of Earthworks

Approximately 80,400 m^3 of material will be excavated, and 74,400 m^3 of fill will be used within the site. The total extent of earthworks will be undertaken over 84,150 m^2. As part of ongoing improvements to the water quality within the Mill Creek and Lake Hayes catchment, WPDL are proposing to construct an in-line sediment trap (50 m L x 12 m W x 2 m D) and permanent diversion channel within Mill Creek. Additionally, stormwater attenuation ponds will be constructed to capture and treat stormwater from the development before discharging to Mill Creek. The extent of earthworks is depicted on the Erosion and Sediment Control (ESCP) drawing in **Appendix 1**.

1.3 Associated Resource Consents

This EMP has been prepared in accordance with industry best practice to accompany the substantive fast-track resource consent application. Provided the activity is undertaken in accordance with this EMP, it will comply with the relevant conditions set within the associated resource consents. The resource consents associated with this project are given in **Table 2**.

Table 2: Associated resource consents

Resource Consent Number	Related Authority	Activity Description	Date of Decision Issue
TBC	Fast Track		TBC

1.4 Suitably Qualified and Experienced Professional

This EMP has been prepared by Lucy Cramp and reviewed by Tom Grandiek, both of Enviroscope Limited. Lucy is a certified Environmental Professional (CEnvP) and holds a holds a Masters in Environmental Management. She has over six years of experience in environmental consulting and has extensive experience in the preparation of environmental reporting for resource consent applications.

Tom is a certified Environmental Professional (CEnvP) and holds a Bachelor of Applied Sciences degree, majoring in Environmental Management. He spent five years working in RMA compliance with local government. Tom has extensive experience in the preparation and monitoring of EMPs and ESCPs.

Tom meets the criteria of a Suitably Qualified and Experienced Professional (SQEP) for the purposes of preparing this EMP and overseeing the environmental aspects of this project.

2.0 CONSTRUCTION METHODOLOGY

2.1 Sequencing of Works

The following sequencing will ensure the earthworks are undertaken efficiently while ensuring good environmental outcomes. This is a preliminary staging methodology and may be subject to change based on site conditions encountered during construction. This methodology shall be read in conjunction with the Erosion and Sediment Control Plan (ESCP) attached as **Appendix 1**.

Preliminary works and site establishment

- Ensure the current EMP and associated resource consents are available onsite.
- Complete site induction with Environmental Consultant.
- Establish site laydown at the existing hardstands.
- Construct stabilised site entranceways off Ayr Avenue and install coconut coir logs within the existing roadside swale.
- Install the upslope clean water diversion channel as shown in ESCP-002, sizing and dimensions are provided in **Appendix 2**.

Bulk Earthworks - Catchment A (ESCP-002)

- Install a super silt fence along the eastern boundary of the ephemeral waterway. Ensure returns are spaced at intervals of 10 m.
- Install Sediment Retention Ponds (SRP B and SRP C) and associated RADS units. Sizing and dimensions are provided in **Appendix 2**. Construct a pipe drop at the outlets of both SRPs to convey treated water to the existing roadside swale on Ayr Avenue. Pipe drop sizing and dimensions are provided in **Appendix 2**.
- Install Dirty Water Diversion Channels (DWDCs) as shown in ESCP-002, ensuring correct tie-in to each SRP inlet. Include check dams in DWDCs associated with SRP B – spacing is provided in ESCP-011.
- Commence fill works to form the Earth Mound landscape buffer. Progressively compact the fill to minimise dust generation and reduce erosion potential. Apply a temporary polymer stabiliser as needed.
- Once the earth mound is shaped to final design levels, immediately apply topsoil and seed. It is recommended that K-line irrigation be established to promote rapid grass strike.

Bulk Earthworks - Catchments B-C (ESCP-002)

- Install Dirty Water Diversion Channels (DWDCs) as shown in ESCP-002, ensuring correct tie-in to each SRP inlet. Include check dams in DWDCs associated with SRP B – spacing is provided in ESCP-011.
- Construct temporary culverts and trafficable swales across the DWDCs as shown on ESCP-002. Install silt socks downslope of the trafficable swale adjacent to the Ephemeral Waterway.
- Install silt fences as shown in ESCP-002.
- Commence cut-to-fill earthworks, ensuring all cut and fill batters are shaped in accordance with geotechnical recommendations. Apply erosion matting to stabilise completed batters in accordance with Geotech recommendations.
- Progressively form the road alignment. Once subgrade levels are achieved, lay and compact aggregate to complete the road surface.

- Carry out cut-to-fill to establish building platforms. Once at final design levels, cap with clean aggregate to stabilise and prevent erosion.
- Undertake service trenching works. Trenches are to be progressively backfilled and stabilised. Apply inlet protection to stormwater scruffy domes immediately upon installation. Once the road surface, swales and adjacent areas are appropriately stabilised, the northern roadside swale shall be tied into the existing Ayr Avenue clean water swale as per engineered design. Coconut logs shall remain in place as long as practically possible to capture any residual sediment retained within the swale.
- Excavate and install the stormwater attenuation ponds as per the detailed design.
- Topsoil and seed all remaining exposed surfaces progressively. Use K-line irrigation to assist with grass strike establishment.

Bulk Earthworks - Catchment D (ESCP-003)

- Install a culvert and drop-out pits upslope of the stabilised entrance.
- Redirect the existing stormwater swale from the Dry Pond towards Mill Creek, forming a compacted topsoil bund along the upslope side. Place coconut logs within the channel.
- Clear riparian vegetation as required and install a silt fence along the western length of Mill Creek, as well as along the northern length of the proposed drive.
- Upsize the existing treatment pond. This will act as a sediment retention pond (SRP D) for the duration of the earthworks. Minimum SRP dimensions for the catchment are provided in **Appendix 2**.
- Install a DWDC from the drop-out pits to the SRP inlet.
- Commence cut-to-fill earthworks, ensuring all cut and fill batters are shaped in accordance with geotechnical recommendations. Apply biodegradable erosion matting to stabilise completed batters and provide a growing medium as needed.
- Progressively form the road alignment. Once subgrade levels are achieved, lay and compact aggregate to complete the road surface.
- Progressively install the roadside DWDCs to engineer design, ensuring correct tie-in to the SRP D inlet. Include check dams in the roadside DWDCs – spacing is provided in ESCP-011.
- Carry out cut-to-fill to establish building platforms. Once at final design levels, cap with clean aggregate to prevent dust generation and reduce erosion.

Groundwater Management – Best Practice

Groundwater is unlikely to be encountered across the wider site, although perched groundwater may be encountered in the upper terrace (refer to the Geotech report summary in **Section 1.2.1**). In the event of encountering localised groundwater during earthworks, the contractor will ensure the following:

- Separate clean groundwater from exposed earthworks. Pipe drops shall be installed on a case-by-case basis to convey these flows beyond the extent of the works as required.
- On-site reuse of ground water unable to be diverted via pipe-drops is encouraged. Examples include dust suppression, assistance with compaction, re-injection or watering landscaped areas. Reused water must never be discharged in a manner that exceeds the capacity of sediment controls and/or generates run-off from the site.
- Groundwater should be appropriately treated and attenuated to ensure that it is not adversely affected by contaminants. Groundwater can be directed to the SRPs to be treated prior to discharging off site.
- Remain in the same catchment it is taken from, only be a non-consumptive take; and only occur for the time required to carry out the trenching works for the project.

Mill Creek Diversion (ESCP-004 – 006 and ESCP-022)

Mill Creek Diversion - Stage 1 (ESCP-004)

Temporary waterway diversions enable in-stream works to be undertaken without working in wet conditions and without moving sediment into the watercourse. These measures seek to divert all flow via a stabilised system around the area of works and discharge it back into the channel below the works to avoid scour of the channel bed and banks. This is to be completed using the methodology outlined below, which has been prepared in accordance with Section G4 of the GD05 best-practice methodology for works within a watercourse. Refer to the diversion schematic provided in ESCP-022 of **Appendix 1**.

- Works are to be undertaken when Mill Creek is at a low flow level and outside of key spawning periods.
- This phase of construction requires that Mill Creek be maintained through its current flow path and kept isolated from the new alignment.
- It should be noted that any fish disturbed or stranded during the reclamation works within Mill Creek must be rescued and returned or relocated to Mill Creek.
- Retain the silt fence in place and construct the new diversion channel alignment as per the engineer design. The diversion channel is to be sized to allow for a 5% AEP rain event. Maintain the existing Mill Creek flow path by retaining 'plugs' i.e. compacted earth bunds at the inlet and outlet of the diversion channel until fully stabilised.
- Install a silt fence on either side of the length of the newly formed diversion channel.
- The diversion channel should be lined with a woven geotextile cloth and should be anchored in place to the manufacturer's specifications, which will include trenching into the top of both sides of the diversion channel to ensure that the fabric does not rip out. Clean, rounded aggregate should be applied to the base of the temporary diversion to match the Mill Creek, wetted substrate.
- Place two coconut logs in the downstream portion of the diversion channel. These are to be placed here temporarily to capture excess sediment that could enter Mill Creek and reduce the velocity of the water within the channel when the plugs are released.
- Prior to dewatering and 'livening' the new temporary diversion channel, fish recovery and relocation must be undertaken by a SQEP. Captured fish/invertebrates are to be placed 100 m downstream of the diversion.

Mill Creek Diversion - Fish Relocation and Recovery

- Fish relocation should be completed using a combination of netting and electrofishing, where required, along the length of the proposed diversion.
- Fish Relocation Protocols will be followed for handling and transferring fish to appropriate alternative sites – typically a reach of similar habitat on the same stream. The fish recovery methods are grouped as three different methods:
    - Netting/trapping prior to dewatering.
    - Electro fishing recovery measures that can occur on the day that a stream is dewatered.
    - Where practical, and to minimise injury to fish, preference will be given to encouraging fish to voluntarily leave the watercourse section prior to netting and electrofishing.
- Allowing fish to passively vacate a stream during dewatering poses the least risk of injury to fish compared to other methods, but its effectiveness depends on the stream morphology, vegetation density and method of dewatering. Any pools remaining after dewatering will need to be actively fished.
- Once the diversion channel is stabilised and relocation is complete, open the downstream plug to allow water to flow up the channel, keeping some water within the channel to reduce problems when the upstream plug is excavated.

- Then, open the upstream plug, allowing water to flow from Mill Creek into the diversion channel.
- A non-erodible dam should be placed immediately at both the upstream and downstream ends of the existing Mill Creek channel. Form using a compacted earth bund, which must be stabilised with an appropriate geotextile pinned over the upper face and adjacent to the lower face for scour protection. This engages the diversion channel and isolates the section of Mill Creek within which to install the in-line sediment trap.

Mill Creek Diversion - Stage 2 (ESCP-005)

- The now isolated section of Mill Creek is subsequently drained by pumping, where the ponded water can be treated via the adjoining SRP, before it re-enters the live section of Mill Creek downstream.
- Excavate and construct the in-line sediment trap as per engineer design, approximately 50m L x 12m W x 2m D.
- Maintain the existing Mill Creek flow path down the diversion channel by retaining the non-erodible dams until the sediment trap is fully formed and stabilised.

Mill Creek Diversion - Stage 3 (ECSP-006)

- Once the sediment trap is stabilised, open the downstream plug to allow water to flow up the channel, keeping some water within the channel to reduce problems when the upstream plug is excavated. As soon as practically possible, place coconut logs in the downstream portion of the diversion channel, where the plug was. These will reduce residual sediment from entering Mill Creek during the diversion.
- Then open the upstream plug, allowing water to flow from Mill Creek into the diversion channel.
- The diversion channel is subsequently drained by pumping, where the ponded water can be treated before it re-enters the live section of the creek downstream.
- Ensure that fish salvage operations are undertaken prior to stream dewatering and diversions, in accordance with the steps provided above.

Mill Creek Diversion - Maintenance Measures

Any works within a watercourse require ongoing and vigilant maintenance to minimise sediment generation. To achieve this, identify and correct any signs that may indicate a potential problem. Take notice of the following signs and make repairs immediately:

- The geotextile lining ripping.
- Scour occurring where the flow re-enters the channel.
- Undercutting of the diversion lining.
- Document inspections and maintenance via inspection requirements outlined in **Section 3** of the EMP.

Mill Creek Diversion - Contingency Measures

In the event of high rainfall during the course of construction, or prior to leaving the site for more than a 48-hour period, the contractor will ensure the following:

- Additional geotextile/polythene will be kept on site at all times.
- Extended working hours (i.e. 12 – 14 hour days) will be considered if it is believed a significant benefit with regard to programme and environment impact is either required or possible.
- Any loose material that could enter a watercourse is to be removed.
- All existing and additional sediment control measures will be inspected and secured and maintained where required, should a significant rainfall event be imminent.
- The creek bed will be fully stabilised to ensure no flows create scour issues. It is expected that this will be

achieved through geotextile and the placement of rock as necessary. The geotextile will be appropriately trenched in at the head and toe of the area.

Landscaping and revegetation

- Undertake final landscaping and revegetation of any remaining exposed areas.

Decommissioning

- Remove erosion and sediment control devices once stabilisation has occurred across the entire site. This is generally defined as 80% vegetative cover, cleanfill aggregate capping, sealing of footpaths and roads and mulching/landscaping.

2.2 Hours of Operation

Construction activities and the associated hours of operation shall comply with *NZS 6803:1999 Acoustics - Construction Noise Guidelines*. Site works may be undertaken between 0730 and 1800 hours, Monday to Saturday. No works are to be undertaken on Sundays or Public Holidays. However, this does not preclude any emergency works or works required for incident investigation or response. Additional detail relating to noise-producing activities are to be undertaken in accordance with **Section 7.0** of this EMP.

3.0 EMP IMPLEMENTATION

3.1 Environmental Roles and Responsibilities

3.1.1 Project Manager

The Project Manager is responsible for the effective implementation of the EMP and has overall responsibility for the environmental performance of the project. Duties include:

- Ensuring adequate resources are in place to implement the EMP.
- Ensuring all staff and sub-contractors operate within the guidelines of the EMP.
- Ensuring that an EMP is prepared and that environmental standards, processes and procedures meet relevant resource consent conditions.
- Overseeing the successful implementation, monitoring and review of the EMP.
- Ensuring that inspections are carried out in accordance with the relevant EMP.
- Restricting or stopping any activity that has the potential to or has caused adverse environmental effects.
- Providing notification and reporting of Environmental Incidents to Council and other environmental reports as required by The Guidelines and/or conditions of resource consent.
- Delegating authority of the above responsibilities.

3.1.2 Environmental Representative

The Environmental Representative supports the Project Manager in the day-to-day implementation of the EMP. Duties include:

- Ensuring the installation of environmental controls as per the EMP.
- Undertaking environmental site inspections.
- Undertake water quality sampling during rainfall events.
- Overseeing the maintenance and improvement of defective environmental controls.
- Providing environmental inductions to all staff and sub-contractors.
- Assisting the project leadership in attending to Environmental Incidents and Complaints.

The Environmental Representative shall be familiar with environmental risks associated with the project, the EMP and best practice erosion and sediment control principles and practices.

3.1.3 Environmental Consultant

The Environmental Consultant (SQEP) will provide technical environmental management advice as required. Key tasks include delivering the Site Environmental Induction to core staff and providing as-built confirmation of erosion and sediment controls to Council. The Environmental Consultant shall undertake monthly monitoring of the site and submit Monthly Environmental Reports to QLDC and ORC.

3.1.4 All Staff and Sub-Contractors

All staff and sub-contractors have a responsibility to undertake all activities in accordance with the requirements of this EMP. This includes reporting any activity that has the potential to or has resulted in an Environmental Incident to the Project Manager or Environmental Representative.

3.2 Site Environmental Induction

All staff and subcontractors shall attend an Environmental Induction to ensure they are aware of the project's environmental risks as well as their responsibilities to help manage these risks. Prior to ground-disturbing activities, the Environmental Consultant will deliver the induction to core staff. During the project, the Environmental Representative will induct sub-contractors and new staff. The site induction handout is attached as **Appendix 3** and all persons inducted will be recorded on the Induction Register attached as **Appendix 4**.

3.3 Environmental Inspections

Table 3 outlines the regular environmental inspections to be undertaken.

***Table 3:** Environmental inspections*

Environmental Inspection	Timing	Purpose
Weekly Inspection	Every seven days	A comprehensive environmental inspection will: • Confirm that all environmental controls are present, functional, and adequate. • Identify any activities that may cause an environmental incident or actual or potential environmental effects. • Identify maintenance requirements for implemented management measures. All weekly inspections shall be recorded on the Weekly Site Inspection form attached as **Appendix 5**.
Pre-Event Inspection	Prior to a significant rain event[1]	To ensure that erosion and sediment controls are present, functional, and adequate for forecast rain event. This inspection will inform any preventative work required and may result in the Rapid Response Procedure being implemented (see **Section 4.8**).

[1] A significant rain event is defined as per the QLDC and ORC EMP Guidelines as any forecast/actual rain event of 20 mm within a 12-hour period or a rain event that can generate overland flow, noting that this varies seasonally.

Environmental Inspection	Timing	Purpose
Rain Event Monitoring	During a significant rain event	To ensure that: • Erosion and sediment control devices continue to function correctly and inform any necessary emergency responses. • Sediment retention devices are functioning effectively and have capacity available. • No dirty[2] water is crossing the boundary of the site. Observations and remediation measures taken will be recorded in a daily job diary.
Post-Event Inspection	Immediately following a significant rain event	Any observations and corrective actions should be recorded in a daily job diary.

3.4 Monthly Environmental Inspection and Reporting by SQEP

The Environmental Consultant (SQEP) will monitor the site monthly to ensure that the EMP is correctly implemented, identify any unforeseen issues arising and advise on alternative environmental solutions.

The Environmental Consultant (SQEP) will also submit a Monthly Environmental Report to QLDC and ORC within five working days of the end of each month. The report will include the following information:

- Updates to the EMP and the Erosion and Sediment Control Plan (ESCP) during the month.
- Number of weekly and pre and post-rain event site inspections completed.
- Summary of corrective actions undertaken.
- Positive environmental outcomes achieved and opportunities.

3.5 Environmental Incident Management

Environmental incidents shall be responded to as soon as the project team becomes aware of them occurring. The response will generally involve oversight by the Environmental Consultant and will involve:

- Immediate cessation of the activity that caused the incident.
- Investigation into the cause of the incident.
- Initial response to bring the incident under control.
- Implement any remediation works.

The Project Manager must notify QLDC and ORC of the details of any Environmental Incident within 12 hours of becoming aware of the incident. Notification will be through a phone call to Council monitoring staff (see Emergency

[2] 'Dirty water' is defined as water that exceeds the maximum allowable water quality value outlined in the Discharge Criteria at **Section 5.2.**

Contacts in **Table 1**). The Project Team shall provide an Environmental Incident Report within ten working days of the incident occurring. The Incident Report form is attached as **Appendix 6**.

3.6 Complaints Procedure

Any complaint received will be recorded and an investigation will be carried out. The complainant will be provided with a response acknowledging receipt of the complaint and outlining corrective actions to be implemented. After the investigation, any necessary corrective actions will be carried out and a follow-up of the original complaint is to be conducted to ensure the actions implemented have been effective. All complaints will be recorded on the Complaints Register attached as **Appendix 7**.

3.7 EMP Non-Conformance and Corrective Actions

EMP non-conformances found during site inspections, monitoring or as a result of environmental incidents or complaints shall be recorded in the EMP Non-Conformance Register. The non-conformance register attached as **Appendix 8** will detail when corrective actions are due, how they are to be carried out and the close out date. The non-conformance register ensures that issues do not escalate or are missed, as well as, providing a clear record of evidence that can be used to defend any potential complaint or formal enforcement action.

3.8 Records and Registers

The records listed below will be collated onsite. If a request is made by a QLDC and ORC official, the records shall be made available to the official within 24 hours of the request being made.

- Environmental Induction Register - **Appendix 4**.
- Weekly Environmental Inspection Form - **Appendix 5**.
- Environmental Incident Reports - **Appendix 6**.
- Complaints Register - **Appendix 7**.
- EMP Non-Conformance Register - **Appendix 8**.
- Water Quality Monitoring Results - **Appendix 9**.
- Rain event inspection observations.

3.9 EMP Updates

The EMP will be regularly reviewed throughout the project to ensure the document remains fit for purpose and to drive continual improvement. This may be initiated by:

- Significant changes to the construction methodology.
- Improvements identified as a result of an Environmental Incident or Corrective Action.
- Where directed by QLDC and/or ORC's Monitoring and Enforcement team.

All EMP updates will be managed through the document control table on page one and shall be submitted to QLDC and ORC for acceptance.

4.0 EROSION AND SEDIMENT CONTROL MEASURES

4.1 Performance Criteria

Design, install and maintain erosion and sediment controls in accordance with industry best practices. Generally, this is:

- Erosion and Sediment Control Guidelines for Land Disturbing Activities in the Auckland Region 2016 (Auckland Council Guideline Document GD2016/005).
- QLDC Guidelines for Environmental Management Plans, June 2019 (The Guidelines).
- ORC Residential Earthworks in Otago – A guide for developers, landowners, contractors and service providers, March 2023 (Guide — Residential Earthworks in Otago).

4.2 Erosion and Sediment Control Principles

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

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

4.3 Guidance on Erosion and Sediment Control Devices

The effective control of surface water shall be achieved through the utilisation of carefully selected erosion and sediment control devices to achieve a specific purpose. These guidelines for the devices employed on this project shall be read in conjunction with the ESCP attached as **Appendix 1** of this document.

4.3.1 Site Definition

At the commencement of the project, the following components onsite will be clearly defined as detailed in **Table 4**.

Table 4: Site definition specifications

Site component	Method of Demarcation
Site boundaries	Temporary fencing or hoardings
Designated site access	Installation of stabilised access/signs
Internal 'no-go' areas (protected or sensitive areas)	Bunting or flagging tape with waratahs

4.4 Erosion Control Practices

4.4.1 Non-Structural Controls

Staging

Only by exposing those areas that are required for active earthworks, the duration of exposure and risk of erosion/sediment discharge can be minimised. 'Earthworks staging', where the site has earthworks undertaken in smaller units over time, limits erosion. This includes isolating work areas and completing them in manageable sections.

Timing of works

It is recommended that works are undertaken outside of significant or adverse weather events[3] e.g. during sustained periods of rainfall, or snow and ice, or dry and windy periods that are conducive to exacerbated rates of erosion and sedimentation.

Progressive rehabilitation

Disturbed areas will be progressively stabilised. Stabilisation methods will vary around the site due to differing gradients and growing mediums. Stabilisation and rehabilitation measures are outlined below:

4.4.2 Stabilisation Measures

Hydroseeding/Hydromulching

- Hydroseed and/or hydromulch is to be applied to all topsoiled surfaces.
  It is recommended that a diverse seed mix that provides both short and long-term stabilising properties is utilised. A seed mix consisting of rapidly establishing perennial ryegrass, with longer establishing fescues and Browntop would be suitable.

Manual broadcasting of grass seed mix

- In areas unable to be safely accessed by machinery, manual application of the selected grass seed mix should be adopted. Direct hand sowing in areas of difficult terrain should be undertaken.

[3] Significant or adverse weather events as referred to in the QLDC and ORC Earthworks and EMP Guidelines.

Erosion matting

- Erosion matting is to be installed on completed surfaces to prevent further erosion and to provide a growing medium for vegetation if appropriate. Where and when erosion matting is utilised needs to be undertaken per the direction of the Geotechnical Engineer and Environmental Consultant.

Temporary Stabilisation – Soil Binders

- Erosion control, soil binders or polymers may be utilised as a short-term ground protection agent (generally less than 6 months) on exposed surfaces prior to final shaping and treatment. Polymers help bind soil particles and produce a 'laminated' surface area, reducing susceptibility to erosion. A proven, environmentally safe product should be utilised under the direction of the project SQEP.
- Use of soil binders is not considered appropriate where the established soil crust is likely to be damaged, or within areas of concentrated flow or periodic inundation is likely to occur. It is also emphasised that use of soil binders does not constitute stabilisation of the site, but rather as a temporary mitigation measure against the potential effects of raindrop and/or windborne erosion.

Roading

- Stabilising roads should be considered a main priority, given that road surfaces contribute to the exposed earthworks surface area across the site. Aggregate should be applied progressively as the road surfaces are formed to subgrade design levels. This reduces the erosive potential of the road surface.

4.4.3 Stabilised Entranceway

The stabilised accessways will be located off Ayr Avenue, as indicated on ESCP-001 attached as **Appendix 1**. One of these will be temporary access to the sediment trap, and the other two will later be upgraded to form permanent vehicle crossings. The northern entranceway utilises the existing metalled haul road entrance. The stabilised entranceways will be constructed in accordance with the schematic diagram in ESCP-007 **Appendix 1** (complete guidelines on pages 60-65 of GD05).

4.4.4 "Clean Water" Diversion Channels

Clean water diversion channels will be used to capture and divert clean water from the undisturbed surfaces above the exposed works site. The purpose of these devices is to separate clean and dirty water and minimise the size of the contributing catchment.

Existing clean water swales will be utilised throughout the works to convey overland sheet flows from the upslope catchment around the works area and into either Mill Creek or the wider stormwater network. Swales along Ayr Avenue have been vegetated and culverted below accesses as part of previous consented works associated with the wider Ayrburn development.

In addition, two clean water diversion channels shall be installed on the hill upslope of the works area to ensure that clean water flows are conveyed around the extent of the earthworks. It is important that these diversions are installed close to the contour line and stabilised. Full calculations are included in **Appendix 2**. These devices shall be constructed in accordance with the specifications noted in the schematic diagram in ESCP-008, **Appendix 1** (complete guidelines on pages 38-42 of GD05).

4.4.5 Waterway Diversion Channel

A diversion channel will be constructed to convey Mill Creek around the in-line sediment trap when it needs to be cleared of sediment. While this will be a permanent feature, it will act as a temporary diversion channel while the sediment trap is constructed. The channel dimensions are subject to detailed design, but at a minimum, should be sized to allow for a 5% AEP rain event.

The diversion channel should be lined with a woven geotextile cloth and should be anchored in place to the manufacturer's specifications, which will include trenching into the top of both sides of the diversion channel to ensure that the fabric does not rip out. Clean, rounded aggregate should be applied to the base of the temporary diversion to match the Mill Creek, wetted substrate.

4.4.6 "Dirty Water" Diversion Channels

Dirty water diversion channels (DWDCs) will be installed to capture and carry sediment-laden stormwater to their respective sediment retention ponds (SRPs B, C and D). DWDCs within Catchment B shall include check dams to reduce the velocity of concentrated flows and will service SRP B, as depicted on ESCP-003, **Appendix 1**. Drop-out pits shall act as sumps joining the intersection channels, and a culvert shall be placed over the DWDC where it crosses the stabilised entrance.

DWDCs within Catchment C will service SRP C, as depicted on ESCP-003, **Appendix 1**. Trafficable swales shall be placed over the DWDCs where they cross the temporary haul road. DWDCs within Catchment D shall be formed on the proposed road alignment and will convey sediment-laden water to SRP D, as depicted on ESCP-003, **Appendix 1**.

These will also be lined with check dams and will later form permanent roadside swales within the future stormwater network. While detailed stormwater design has not yet been provided, it is anticipated that engineered swales will be incorporated in later design stages, in accordance with the QLDC Subdivision Code of Practice. On this premise, the roadside stormwater swales will act as DWDCs. Nonetheless, DWDC sizing and calculations have been provided, conservatively based on the assumption that no formal roadside swales are included. DWDCs will be constructed in accordance with the schematic diagram in ESCP-008, **Appendix 1** (complete guidelines on pages 43-46 of GD05). Full calculations are included in **Appendix 2**.

4.4.7 Check Dams

Rock check dams will be deployed primarily to reduce the velocity of concentrated flows in the DWDCs in Catchments B and D. They will also act to capture some coarse sediment. The check dams will be constructed in accordance with the schematic diagram in ESCP-011, **Appendix 1** (complete guidelines on pages 50-54 of GD05).

4.4.8 Drop-Out Pits

Drop-out pits will be used within the DWDCs:

- To allow the heavier coarse sediments to drop out, preventing them from entering the sediment retention devices, and reducing loads on these devices.
- To act as a sump joining two intersection channels.

Drop-out pits will be constructed in accordance with the image reference in ESCP-009, **Appendix 1** (complete guidelines on page 45 of GD05).

4.4.9 Pipe-Drop Structures

Pipe drop structures shall be used to transport treated water from SRP B and SRP C outlets to the roadside swale off Ayr Avenue without causing erosion of the surfaces below the pond outlets, as depicted in ESCP-003, **Appendix 1.** Regular inspections will check that this water is not causing any erosion, and rock riprap or geofabric lining should be installed at the outlets to avoid erosion. The pipe drop structure will be constructed in accordance with the schematic diagram in ESCP-010, **Appendix 1** (complete guidelines on pages 55-60 of GD05). Full calculations are included in **Appendix 2.**

4.4.10 Trafficable Swales

Trafficable swales will be used in some instances across the site to allow dirty water overland flows to cross haul roads without the need for culvert installation. Trafficable swales shall be constructed in accordance with the reference image in ESCP-009, **Appendix 1.**

4.4.11 Culverts

Permanent engineer designed culverts shall be installed onsite as part of the long-term stormwater infrastructure. Temporary culverts shall also be used onsite to transport dirty water from one side of the haul road alignments to the other. These culverts shall consist of a 250 mm PVC pipe. Calculations are provided in **Appendix 2** to demonstrate the culverts can accommodate the upslope run-on water. Geofabric and rock shall be placed at the outlet to prevent scour from the higher velocity water exiting the culvert. Culverts shall be constructed in accordance with the schematic diagram in ESCP-009, **Appendix 1.**

4.4.12 Temporary Stockpiles

Stockpiles will be formed as part of the earthworks. It is recognised that the location of stockpiles will change with the progress of the earthworks, however, it is recommended to keep them consolidated to the locations demarcated in the ESCP. Stockpiles shall be constructed in accordance with the schematic diagram in ESCP-021, **Appendix 1.**

4.4.13 Progressive Rehabilitation

Progressive stabilisation of earthworks is to occur promptly as areas are finished to minimise the area of exposed soil and thus the generation of sediment-laden water. Prior to final landscaping, this can comprise temporary grassing, turfing or clean aggregate.

4.5 Sediment Control Practices

4.5.1 Sediment Retention Ponds

Three sediment retention ponds (SRP) are to be used to manage the respective contributing catchments and efficiently settle out suspended sediments from the water column during earthworks.

SRP B will be located within Catchment B, will service an area of approximately 2.3 ha and will repurpose an existing treatment pond. The SRP location represents the most suitable option given the earthworks layout and site topography. It is, however, restricted in space. Due to these space constraints, a 2% GD05 sizing criteria has been applied. No soakage testing was undertaken in proximity to the SRP location. However, based on the nearest Test Pit (TP6) in the Geosolve report, the soils at the floor of the pond are likely to consist of Alluvial Gravel, specifically, sandy GRAVEL with minor silt and cobbles. Characteristically, these soil types have moderate to high drainage potential, meaning the actual capacity of SRP B may be significantly larger than the calculations state. A treatment train approach has also been proposed to mitigate erosion occurring in the contributing catchment and to promote sediment retention efficiency. As discussed in **Section 4.4.8**, a pipe drop will convey treated water from the outlet to the roadside swale off Ayr Avenue without causing erosion. Full design specifications based on GD05, including depth, width and length, are given in **Appendix 2**. The SRPs will be constructed in accordance with the schematic diagrams in ESCP-012-013, **Appendix 1** (complete guidelines on pages 91-105 of GD05). The SRP will be chemically treated, as discussed below in **Section 4.5.2**.

SRP C will be located within Catchment C and will service an area of approximately 4.1 ha. The SRP location represents the most suitable option given the earthworks layout and site topography. It is, however, restricted in space. Due to these space constraints, a 2% GD05 sizing criteria has been applied. Based on the nearest Test Pit (TP3), the soils at the floor of the pond are likely to consist of Alluvial Sand, specifically, gravelly sand with minor silt and gravel lenses. In addition, the nearest open pit soakage test (SP2) has a soakage rate of 30 mm/hr. This means that the actual capacity of the SRP may be slightly larger than the calculations state. Full design specifications based on GD05, including depth, width and length, are given in **Appendix 2**. The SRPs will be constructed in accordance with the schematic diagrams in ESCP-012-013, **Appendix 1** (complete guidelines on pages 91-105 of GD05). The SRP will be chemically treated, as discussed below in **Section 4.5.2**. As discussed in **Section 4.4.8**, a pipe drop will convey treated water from the outlet to the roadside swale off Ayr Avenue without causing erosion.

SRP D will be located within Catchment D and will service an area of approximately 1.3 ha. This SRP will repurpose an existing treatment pond, which will be upgraded to meet a 3% GD05 sizing criteria. The upgraded pond will later become a permanent component of the future Screen Hub stormwater infrastructure and will be designed to accommodate up to a 1% AEP design event, providing significant attenuation capacity during construction. While final dimensions have not yet been confirmed, the pond is expected to serve the entire upslope catchment, once completed, and as such will be more than sufficiently sized for the earthworks phase for sub-catchment D. Minimum required dimensions to meet GD05 specifications for the current contributing catchment have been provided in **Appendix 2**.

Full design specifications based on GD05, including depth, width and length, are given in **Appendix 2**. These calculations provide the minimum dimensions necessary for the sub-catchment during construction in accordance with GD05. The SRPs will be constructed in accordance with the schematic diagrams in ESCP-012-013, **Appendix 1** (complete guidelines on pages 91-105 of GD05). The SRP will be chemically treated, as discussed below in **Section 4.5.2**.

4.5.2 Chemical Treatment

Due to the proximity of Mill Creek and the sensitive nature of this waterbody, and SRPs B and C utilising a 2% GD05 sizing criteria, chemical treatment is proposed to be used in conjunction with the sediment retention ponds to improve sediment retention efficiency. This requires the addition of a small dose of coagulant and/or flocculant to facilitate high-efficiency sediment deposition to the required water quality prior to discharge offsite.

Bench testing will be undertaken to confirm chemical treatment requirements. This will ensure that the chemical, likely polyaluminium chloride (PAC), is dosed at appropriate rates to cause efficient flocculation and coagulation whilst avoiding potential contaminants in receiving waterways due to high levels of alum and low pH. Water quality criteria and management processes are prescribed in **Section 5.0** of this EMP. A Chemical Treatment Management Plan (CTMP) will be prepared in accordance with GD05 specifications and will be prepared and provided to the local authorities prior to construction. The SRPs will be treated via a rain activated dosing system (RADS). The reference images in ESCP-020, **Appendix 1** indicate a typical RADS unit. The associated CTMP will prescribe the RADS unit set-up.

4.5.3 Standard Silt Fence

Standard silt fences will be used to capture potential sheet flows from Catchments B - D, as depicted in ESCP-002-003, respectively. Silt fences shall also be used during the Mill Creek diversion, as depicted in ESCP-004-006. The silt fence will be installed in accordance with the schematic diagram in ESCP-018, **Appendix 1** (complete guidelines on pages 112-119 of GD05).

4.5.4 Super Silt Fence

A super silt fence will be used along the eastern length of the Ephemeral Waterway to capture potential sheet flows from Catchment A. This solution has been selected due to the larger catchment size (approximately 1 ha) and slope, dictates a super silt fence as an appropriate solution, as opposed to a standard silt fence.

Silt fence returns projecting upslope from the silt fence shall be installed to minimise the concentration of flows at one point along the face of the super silt fence. GD05 stipulates a spacing of 60 m for returns for the slope characteristics of the site. However, it is recommended that returns be installed every 10 m to mitigate the possibility of sediment entering the ephemeral waterway. The super silt fence will be installed in accordance with the schematic diagram in ESCP-020, **Appendix 1** (complete guidelines on pages 120-125 of GD05).

4.5.5 Silt Socks

Silt socks will be utilised to intercept runoff within the roadside swales downslope of the stabilised entrances. These devices are essentially mesh or fabric tubes filled with sand. Silt socks will be installed in accordance with the reference images in ESCP-021, **Appendix 1** (complete guidelines on pages 126-130 of GD05).

4.5.6 Coconut Coir Logs

Coconut coir logs are typically constructed using densely packed coir fibre mats rolled up and secured within coir mesh in a tube-like structure. Coir logs shall be placed within the existing roadside swales to aid in capturing suspended sediments that may enter flow paths throughout the project. These have been implemented successfully during earlier

stages of the Ayrburn development and will continue to be utilised in this capacity. Coir logs will be installed in accordance with the reference image in ESCP-021, **Appendix 1**.

4.5.7 Stormwater Inlet Protection

Stormwater inlet protection will be installed to provide the last line of defence for any material that leaves the boundary of the site. The method used will be a slip of permeable geofabric material placed under the inlet grate and locked in place. Stormwater inlet protection will be installed in accordance with the reference image in ESCP-021, **Appendix 1** (complete guidelines on pages 131-133 of GD05).

4.6 As-Built Verification

The Environmental Consultant will provide QLDC and ORC with as-built confirmation to verify that the erosion and sediment controls have been installed in accordance with the approved ESCP.

4.7 Maintenance of Erosion and Sediment Control Devices

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

- Clean out sediment of all ESC devices (e.g. SRP) as soon as 20% capacity has been reached and prior to any forecast storm event.
- Regular clean out of sediment from the silt fences to maintain operational functioning capacity (as soon as weather permits following rain event).
- Any cleaned-out sediment will be stockpiled dried and reused as planting media for revegetation where practicable.
- Eroded channels should be re-shaped and consult with SQEP to determine if additional measures may be required.
- Maintain chemical treatment units in accordance with manufacturer and Chemical Treatment Management Plan (CTMP) specifications.

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

- Silt fencing (remainder of roll)
- Waratahs (x10)
- Spare high tensile wire
- Novacoil pipe (at least 30m)
- Silt fence clips (x50)
- IBC of polyaluminium chloride (PAC)
- Rock rip rap for check dams and stabilised access
- Geofabric x 2 rolls
- Spare silt socks
- Spare coconut coir logs

4.8 Rapid Response Procedure for Significant/Adverse Weather

The Environmental Representative will stay vigilant of weather forecasts. If a significant rain event, snow or ice or strong winds are imminent, all works will cease in sufficient time for staff to inspect and maintain erosion and sediment

control devices and undertake any stabilisation required. Observations will continue through the adverse weather to ensure the functioning of erosion and sediment control devices.

4.9 Decommissioning and Removal

Erosion and sediment control devices will remain in place until 'stabilisation' of the site has been achieved. This is generally defined as 80% vegetative cover as depicted in **Figure 2**.

It is noted that the removal of controls may result in minor soil exposure. Any soils exposed during decommissioning will be stabilised with either grass, mulch or other appropriate erosion control.

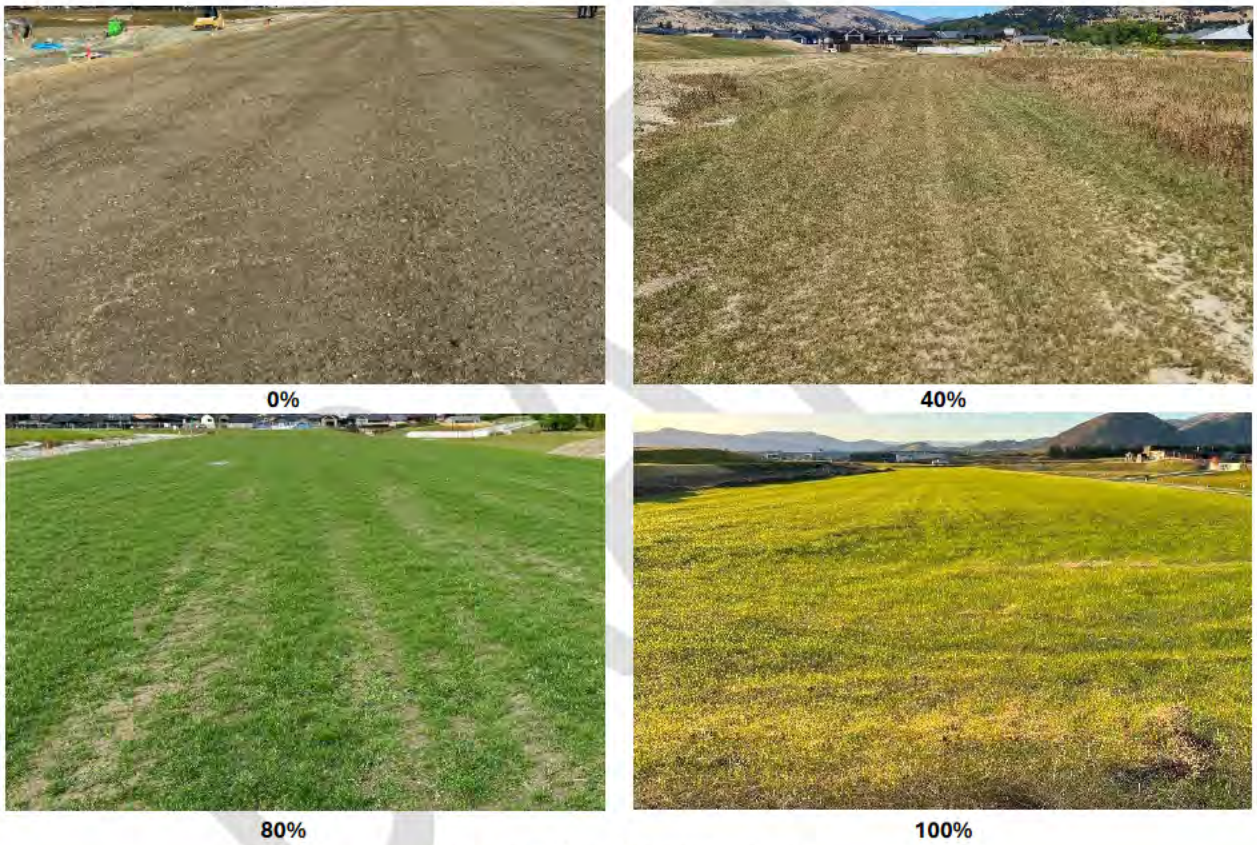


Figure 2: Visual cover estimation

4.10 Inspections and Monitoring

Details of inspections and monitoring are stated in **Section 3.3**.

4.11 Contingency Measures

The following contingency measures in **Table 5** shall be deployed as required.

Table 5: Erosion and sediment control contingency measures

Issue	Contingency Measure
Sediment-laden stormwater flowing across the site boundary	Undertake measures to stop the flow immediately. Ensure controls are installed according to the ESCP. Contact the Environmental Consultant (SQEP) who will initiate the incident response.
Controls do not appear to be working as intended	Contact Environmental Consultant (SQEP) to inspect, advise and revise ESCP as required.
The site is inappropriately exposed prior to imminent rain event	Cease works and shift effort to checking erosion and sediment controls and stabilisation via the Rapid Response Procedure outlined in **Section 4.8.**
Sediment retention devices are near capacity and more rain is forecast	Contact the Environmental Consultant (SQEP) immediately for advice.
Abatement notice issued by Council	Contact the Environmental Consultant (SQEP) immediately to advise on methods to meeting abatement notice requirements within the time stated by the abatement notice.

4.12 Erosion and Sediment Control Incident

An erosion or sediment control incident is considered to have occurred where the performance criteria outlined in **Section 4.1** is not met. The incident procedures outlined in **Section 3.5** shall commence.

5.0 WATER QUALITY MANAGEMENT

Surface water bodies (rivers, streams, lakes and wetlands) provide important habitats for many species of plants, fish, birds and animals, some of which are endemic and/or threatened. To protect these values, water quality must be safeguarded, and the natural flow of the watercourse maintained to the greatest possible extent. Where flow must be reduced or diverted, mitigation is required to ensure the values of the watercourse are not degraded.

5.1 Receiving Waterbodies

Two waterbodies are identified in proximity to the proposed works areas, and the site is located within the wider Lake Hayes catchment. These are shown in **Figure 3**. An Ecology Assessment has been prepared by SLR, dated February 2025, which describes the waterways onsite. This is summarised below:

Mill Creek

Mill Creek is a permanent waterway and a major tributary of Lake Hayes (located approximately 1.5 km downstream). It flows north-south through Ayrburn Domain and passes through the site in the south-east corner. The creek has a 55 km^2 catchment that is highly modified, with predominant land uses including agriculture, rural residential, and recreational developments.

Mill Creek is an important brown trout spawning tributary and has undergone extensive modification and ecological enhancement upstream through previous Ayrburn and Waterfall Park developments, including the installation of weirs, bridges, culverts, channel reshaping, and riparian planting.

Mean daily flows monitored downstream of the site have ranged from 0.16 to 3.46 m^3/s, with a long-term median of 0.383 m^3/s. Turbidity monitoring shows reduced intensity and frequency of spikes over time, with no consistent evidence of sediment input from the Waterfall Park construction site. Elevated turbidity events are likely attributed to upper catchment sources.

Ephemeral Waterway

An unnamed, ephemeral tributary of Mill Creek is located on the western side of the site. The channel flows north to south-east and joins Mill Creek at the site's downstream boundary. It is poorly defined, lacking distinct banks and only connects to Mill Creek during flood events. For most of its length, the waterway is open to stock and dominated by pasture grasses, with exotic vegetation present in the southeastern section. No flow was observed during Enviroscope's site visit in April 2025, though SLR estimates typical flows to range from 0–2 L/s, with a predicted 100-year ARI peak flow of 750–900 L/s.

Lake Hayes

Lake Hayes is recreationally and ecologically significant to the region. However, since catchment development and intensification in the 1960s, Lake Hayes has undergone progressive eutrophication (excessive plant and algal growth). Consequently, efforts have been made to better understand and improve the water quality of the lake, including the preparation of the 'Lake Hayes Restoration and Monitoring Plan'. Mill Creek catchment has been identified as a primary source of sediment to the lake.

Figure 3: Waterways within and in proximity to the site

5.2 Legislative Considerations

5.2.1 NPS-FM

The Otago Regional Council has proposed a progressive implementation plan for meeting the NPS-FM 2017 and this includes developing a new land and water plan and includes objectives and targets for FMUs in accordance with the requirements of the NPS-FM.

Given the industry best practice erosion and sediment control measures proposed, potential adverse effects on surface water bodies are considered to be appropriately managed and mitigated. Overall, the proposal is consistent with the objectives and policies of the NPS-FM.

5.2.1 Regional Plan: Water for Otago

Mill Creek is considered naturally significant under the Otago Regional Council Regional Plan:

- **Schedule 1A – Natural Values:** Mill Creek, located in the 'Lakes subregion', is characterised by a range of ecosystem values and is specifically recognised as providing significant habitat for the 'nationally endangered' roundhead galaxiid (a native fish species).

Lake Hayes is considered of natural and cultural significance under the Otago Regional Council Regional Plan:

- **Schedule 1A – Natural Values:** Lake Hayes, located in the 'Lakes subregion', is specifically recognised as providing habitat for eel and trout.
- **Schedule 1D – Kai Tahu Values:** Mana whenua interests identified as being associated with Lake Hayes include waahi taoka. Access and customary use interests associated with Lake Hayes include mahika kai (places where food is procured and produced).

5.3 Assessment of Effects

5.3.1 Effects on Waterbodies

Discharge During Earthworks

The actual and/or potential adverse effects on receiving waterbodies, as a result of the proposed works will be mitigated through the adoption and maintenance of best-practice erosion and sediment controls and environmental management measures that avoid the generation and discharge of contaminants associated with earthworks and general construction activities.

The migration of finer materials will be effectively managed through the adoption of a treatment train approach which places importance on erosion control. This involves check dams, drop-out pits, staging and progressive re-stabilisation. Additionally, sediment control practices such as sediment retention ponds, chemical treatment, coconut coir logs and silt fences are incorporated.

Within Catchment A, the super silt fence, in conjunction with progressive stabilisation and rehabilitation of the contributing catchment, will mitigate sediment from reaching the Ephemeral Waterway. Within Catchments B-D, all receiving runoff will be captured by SRPs. All three SRPs will be chemically treated, which is expected to improve the sediment retention efficiency of these devices.

The SRPs should only discharge when at capacity, during or following significant rainfall events. During such times, the flow in the receiving Mill Creek will also be elevated, relative to its base flow. Any resultant increases in water levels, turbidity or pH concentrations due to the discharge are anticipated to be both less than minor in magnitude and temporary in nature. At such times:

- **SRP B** discharge will be captured by a pipe drop and conveyed to the roadside swale on Ayr Avenue. This swale will discharge to Mill Creek approximately 120 m downstream.
- **SRP C** discharge will be captured by a pipe drop and conveyed to the roadside swale on Ayr Avenue. This swale will discharge to Mill Creek approximately 37 m downstream.
- **SRP D** will discharge directly to Mill Creek. It should be noted that because this SRP will later form a permanent feature in the future stormwater network, it will be over-designed for the contributing sub-catchment during the earthworks phase.

Sediment concentrations in the water discharged from the SRPs vary throughout a rainfall event. By design, SRPs discharge at or above specified discharge parameters at some stage, during significant rainfall events, but will, on average, be within the envelope of acceptable effects anticipated for the activity. Turbidity and clarity are well-understood proxies for water quality within sediment control devices and can be easily measured in real time along with the other site inspection and management activities that will occur during or immediately after a rainfall event.

The most important element of ensuring that sediment and other contaminant effects are acceptably minimised, is the diligent implementation of the ESCP, water quality management plan and supporting systems through staff inductions and device design, construction, maintenance and reporting.

The discharge limits proposed in the Performance Criteria in **Section 5.4** are consistent with parameters prescribed with GD05 and the Local Authority District and Regional Plans.

In-Line Sediment Trap in Mill Creek

The construction of the in-line sediment trap in Mill Creek will require the temporary diversion of Mill Creek. Potential effects will be mitigated through the implementation of a methodology developed in accordance with Section G4 of the GD05 best-practice guidelines for works within a watercourse, alongside the ongoing maintenance of erosion and sediment controls.

In their report, SLR determined that while the project will result in the direct loss of some spawning habitat and high-quality macroinvertebrate habitat, the sediment trap is expected to enhance downstream spawning sites and improve rearing conditions in Lake Hayes by reducing the accumulation of fine sediment. Moreover, sediment traps are known to often be used as pool refuges which provide low flow resting and feeding habitats for freshwater fish. The suitability for the sediment trap to provide fish habitat will also be enhanced by riparian plantings which provide shading and cover.

SLR was engaged to provide an assessment of ecological effects for the proposed works. Their report determined that, aassuming best-practice erosion and sediment controls and guidelines are followed during the development of the proposed stormwater management system, sediment retention ponds, and sediment trap, the effects of sediment discharges during construction on aquatic life will be no more than minor.

5.3.2 Cumulative Effects on Waterbodies

Except for SRP D and the in-line sediment trap (which will form part of the long-term stormwater network), the proposed works are a temporary activity and should not result in any significant pressure or change in the water quality or quantity of the receiving waterbodies.

There are likely to be concurrent earthworks activities within the wider Lake Hayes catchment that contribute to the same Mill Creek catchment during the proposed works. However, in their Ecological Assessment report, SLR state that there is no consistent evidence of sediment input from the Waterfall Park construction site upstream. In addition, as discussed above, the proposed erosion and sediment controls are to be maintained at all times and any resulting discharge is expected to be insignificant in magnitude and temporary in nature.

Improvements to the water quality of Mill Creek due to implementing the in-line sediment trap, stormwater attenuation ponds, and significant revegetation of indigenous plant communities within the Ayrburn Development will enhance the ecological biodiversity of the area, as well as improve the water quality originating from the catchment. These activities will result in positive long-term cumulative effects.

5.4 Performance Criteria

The water quality parameters recommended have been determined following assessment of the activity and receiving waterbodies to ensure potential effects are suitably mitigated. Any discharge from the sites' works areas, or erosion and sediment control devices will meet the criteria in **Table 6**.

***Table 6:** Water quality discharge criteria – Medium/High Water Quality Risk*

Parameter	Discharge Criteria
Visual Clarity (mm)	≥100 mm (As per GD05)
Turbidity[4]	≤ 100 NTU
Total Suspended Sediment (TSS)	≤ 50 mg/L
pH[5]	5.5 – 8.5
Hydrocarbons or tannins	No visible trace
Waste	No waste or litter is visible

5.5 Management Measures

Ensure that the construction and maintenance of the sediment trap within Mill Creek is undertaken in accordance with the recommendations outlined within the Ecology Assessment by SLR, dated February 2025, including:

- Carefully time any stream diversions to avoid key fish spawning periods (e.g., January to March), as dewatering can isolate spawning habitats and disrupt egg/larval development.
- Undertake fish salvage operations during stream dewatering and diversions.
- Following diversion and fish salvage, complete all disturbance of the isolated streambed under dry conditions to minimise sediment discharge to downstream environments.
- If a water intake pump is used, ensure the pump inlet is fitted with an appropriately designed fish screen to prevent ingress of small fish.
- Schedule bulk earthworks during spring and summer, when fine weather is more frequent, to reduce the risk of weather-related sediment runoff.
- Install best-practice erosion and sediment controls, including clean water diversion channels, dirty water diversion channels and sediment retention ponds.
- Monitor water quality at sediment pond outlets to ensure discharges to Mill Creek are not ecologically harmful.
- Weeds will be treated prior to disturbance of natural surfaces, with weed free topsoil retained for reuse.

In addition to the above, the following measures will be deployed to ensure the protection of water quality:

[4] Turbidity and or visual clarity can provide a practical, real-time measure on site that can be quickly assessed and analysed. If the specified turbidity or visual clarity value is not met, a water sample will be collected and sent for TSS laboratory testing.

[5] pH to be tested only when chemical treatment is undertaken.

- Erosion and sediment controls will be implemented and maintained in accordance with the Erosion and Sediment Control Measures in **Section 4.0.**
- Refuelling, servicing and storage of hydrocarbons will be in accordance with the relevant procedures in the Chemicals and Fuels Management in **Section 10.0.**
- All concrete washing is to be undertaken in the designated concrete wash-out pit as per the design specifications in ESCP-022, **Appendix 1.**
- All plant and equipment onsite will be inspected regularly to ensure they are of an acceptable standard.
- Stockpiling of any organic, erodible or hazardous material onsite is not to be placed within close proximity of a watercourse/major drainage line, unless appropriate controls are in place.

5.6 Monitoring

Water quality will be monitored in accordance with **Table 7.**

Table 7: *Water quality monitoring measures*

Sampling Scope	
Objective	To assess whether controlled and uncontrolled discharge, meets the Discharge Criteria referred to in **Section 5.4.**
Responsibility	On site water quality sampling is to be completed by the nominated Environmental Representative. Note: SQEP is available to provide training and guidance regarding on site sampling and can provide sampling services as required.
Spatial boundaries	Discharges from within the sites' work areas and/or erosion and sediment control devices.
Frequency	A significant rain event is defined as any forecast/actual rain event of 20 mm within a 12-hour period or a rain event that can generate overland flow, noting that this varies seasonally. Where a Significant Rain Event occurs through the night, monitoring shall be undertaken the following morning.
Sampling Design	
Water Quality Criteria	As outlined in the Discharge Criteria referred to in **Section 5.4.**
Sampling Locations	At boundaries of the site where any water is flowing, specifically the following point discharges: • SRP B outlet: 168.81096,-44.95707 • SRP C outlet: 168.81108,-44.95835 • SRP D outlet: 168.81180,-44.95819 • Mill Creek Upstream: 168.81188,-44.95795 • Mill Creek Downstream: 168.81135,-44.95954 • Ephemeral Waterway Upstream: 168.80669,-44.95640

Sampling Method	• TSS – Registered laboratory • Turbidity (NTU) – Nephelometer • pH – pH meter – only if utilising chemical treatment • Gross pollutants – visual observations • Tannins – visual observations (any unusual darkening of waters?) • Hydrocarbons – visual observations (is there any oily film[6] on surface or smell?)
Quality Control	Any water quality meter will be calibrated according to manufacturer instructions. All observations will be recorded and analysed.
Recording	
Recording Results	All results will be entered into a spreadsheet and kept onsite (form attached as **Appendix 9**).
Actions	
Non-conformances	Any exceedances observed will be reported to the Project Manager/ Environmental Consultant who will investigate and ensure appropriate corrective actions are implemented immediately.

5.7 Contingency Measures

The following contingency measures in **Table 8** shall be adopted if required.

***Table 8:** Water quality contingency measures*

Issue	Contingency Measure
Exceedance of water quality criteria	• Contact the Project Manager and Environmental Consultant (SQEP) immediately. • Works will cease or be modified to remove further risk of contamination. • QLDC and ORC will be verbally notified. • The Environmental Incident procedure will commence. • Remedial measures will be implemented and the Environmental Incident will be closed out by the Environmental Consultant (SQEP), with a copy of an Environmental Incident report to the Project Manager, QLDC and ORC.

5.8 Water Quality Incidents

A water quality incident is considered to have occurred where the water quality performance criteria outlined in **Section 5.4** is breached. The incident procedures outlined at **Section 3.5** shall commence.

[6] Some bacteria produce a naturally occurring film on the water surface. Bacteria films breaks apart in angular shapes when disturbed whereas hydrocarbon film separates as globules.

6.0 DUST MANAGEMENT

Dust from construction activities, vehicle movements and stockpiles can contribute to sediment runoff and create a nuisance to the public, neighbouring properties, adjoining roads and service infrastructure. The key risks associated with dust occur during the bulk earthworks phase of the project.

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

- General disturbance of soil (particularly during drier months).
- Inappropriate staging that does not seek to minimise the extent of exposed soil.
- Vehicle movements along haul roads.
- Sediment-tracking onto surrounding roads.
- Stockpiling of topsoil or subsoil.
- Slow or ineffective revegetation procedures.

6.1 Sensitive Receptors

Key sensitive environmental receptors include staff members working on the site, neighbouring properties, facilities within the Ayrburn Domain, Mill Creek, and the ephemeral waterway. The construction activities are expected to take approximately 5 years in total, with bulk earthworks occurring within the first 24 months, at which point wind-borne erosion is more likely to occur. The prevailing wind at the nearest aerodrome (Queenstown airport), conducive to dust generation in warmer months, is generally from the north-west[7]. However, the existing Douglas fir shelterbelt along the southern boundary is to remain in place and will provide some protection against dust dispersion.

It is recommended that the progressive rehabilitation measures discussed in **Section 4** of this EMP are utilised in conjunction with the management measures prescribed in **Section 6.3** below throughout construction. Given the proposed extent of earthworks and the proximity of the receiving receptors, the actual and potential effects associated with dust are expected to be less than minor.

6.2 Performance Criteria

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

6.3 Management Measures

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

- Stage works where possible to minimise soil exposure extents and timeframes.
- Revegetate disturbed areas progressively throughout construction.

[7] Macara, G.R. 2015. The climate and weather of Otago. NIWA Science and Technology Series 67, 44 pp.

- Dust suppression of exposed areas and stockpiles by water trucks or other methods (e.g., k-lines) approved by the Environmental Representative.[8]
- If dust activities cannot be controlled during high winds, works will cease until favourable conditions return.
- Only designated access points and haul routes are to be used.
- Site access to be constructed in accordance with GD05 (detail at **Section 4.4.3**).
- All site access and surrounding roads to be swept clean regularly.
- To avoid spillage risks, trucks will not be overloaded.
- All trucks must have tail gates up and swept or cleaned prior to exiting to external roads.
- Stockpile heights are to be minimised where possible (< two metres) unless they are covered (e.g. an erosion blanket, chemical sealant, temporary cover crop or mulched).
- Long-standing stockpiles (greater than four weeks) shall be temporarily stabilised.
- Within two weeks of completion, all earth worked areas will be sown out with grass, landscaped or otherwise stabilised by an appropriate erosion control.

6.4 Monitoring

Site staff will maintain continual vigilance for any increases in wind to ensure measures are deployed prior to dust crossing site boundaries. Weekly Environmental Inspections and the Monthly SQEP Environmental Inspections will also ensure that the management measures described above are sufficient and performing effectively.

6.5 Contingency Measures

The contingency measures in **Table 9** shall be adopted if required.

***Table 9:** Dust contingency measures*

Issue	Contingency Measure
Excessive dust creation from soil disturbance	• Increase frequency of water truck spraying or increase irrigation. • Spray down excavation areas and activities where excavator bucket is operating. • Cease excavation during high winds, particularly if wind direction is likely to impact sensitive receivers.
Excessive dust creation from hauling operations	• Reduce truck speeds. • Cover or spray down loads causing dust impacts. • Apply skim of aggregate over the haul road surface. • Install shakedown devices at entry and exit points.
Excessive dust creation from stockpiles	• Spray stockpiles with water or apply a temporary polymer. • Hydro-mulch, seed or stabilise stockpiles, cover stockpiles with geofabric. • Locate stockpiles further away from sensitive receptors.

[8] Ensure a consented water take permit is approved by the local authority. If taking water from lakes and or rivers, ensure that the permitted volume of water is taken.

Issue	Contingency Measure
Abatement notice issued by Council	Contact the Environmental Consultant (SQEP) immediately to advise on methods to meeting abatement notice requirements within the time stated by the abatement notice.

6.6 Dust Incident

A dust incident is considered to have occurred where:

- Dust is observed crossing the boundary into sensitive receptors or,
- A justified complaint is received regarding dust emissions across the boundary of the site.

The incident procedures outlined at **Section 3.5** shall commence.

7.0 NOISE AND VIBRATION MANAGEMENT

The following assessment and management measures are intended for standard construction equipment that is not expected to induce noise or vibration beyond the maximum limits in the QLDC District Plan. Where upper noise and vibration levels of district plans will be breached, an Acoustic Specialist may need to be engaged to assist with the management of these nuisance effects.

Potential noise and/or vibration effects may be generated by the following:

- Excavation and earth moving plant
- Light vehicles near sensitive receptors
- Ancillary plant and equipment
- Rock breaking.
- Compaction equipment
- Reversing alarms

7.1 Sensitive Receptors

Key sensitive environmental receptors include staff members working on the site, neighbouring properties, and facilities within the Ayrburn Domain. The construction activities are expected to take approximately 5 years in total, with bulk earthworks occurring within the first 24 months.

The site is underlain predominantly by colluvium and alluvial deposits (refer to **Section 1.2**), which generally provide favourable ground conditions. Schist bedrock was encountered in TP7d and TP10d, located on the northern hill slope. Fill is proposed in the vicinity of TP7d, while a cut to a maximum depth of 9.5 m is proposed around TP10d, where schist was encountered at a depth of 1.7 m. As such, rock breaking is expected in this area. However, the schist was described as completely weathered and extremely weak to weak.

The following management measures shall be adopted during construction to avoid actual and potential adverse effects on the identified receptors. Given the isolated nature of the schist onsite and its weak composition, the actual and potential effects of noise and vibration on sensitive environmental receptors are expected to be less than minor.

7.2 Performance Criteria

1. Construction activities shall meet relevant noise limits specified under Rule 36.5.13 of the Queenstown Lakes Proposed District Plan. This rule requires Construction sound at any point within the site must comply with the limits specified in Tables 2 and 3 of *NZS 6803:1999 Acoustics - Construction Noise*, when measured and assessed in accordance with that standard (see **Table 10** below).
2. Construction activities shall meet relevant vibration limits specified under Rule 36.5.10 of the Queenstown Lakes Proposed District Plan. This rule requires vibration from any activity must not exceed the guideline values given in *DIN 4150-3:1999 Effects of vibration on structures* on any structures or buildings on any other site (see **Table 11** below).
3. Construction activities shall be undertaken in accordance with the permitted hours of operation outlined at **Section 2.2** of this EMP.

Table 10: Upper limits in dB(A) for construction work noise in residential areas for more than 20 weeks

Time of Week	Time Period	$L_{Aeq(t)}$	L_{Afmax}
Weekdays	0630 – 0730	55 dB	75 dB
	0730 – 1800	70 dB	85 dB
	1800 – 2000	65 dB	80 dB
Saturdays	0630 – 0730	45 dB	75 dB
	0730 – 1800	70 dB	85 dB

Table 11: Vibration Thresholds for Structural Damage (PPV mm/s)

	Short Term				Long-Term
	At Foundation			Uppermost Floor	Uppermost Floor
Types of Structures	0 to 10 HZ	10 to 50 Hz	50 to 100 HZ	All Frequencies	All Frequencies
Commercial/Industrial	20	20 to 40	40 to 50	40	10
Residential	5	5 to 15	15 to 20	15	5
Sensitive/Historic	3	3 to 8	8 to 10	8	2.5

Note: When a range of velocities is given, the limit increases linearly over the frequency range.

7.3 Management Measures

The following measures will be deployed to ensure noise and/or vibration associated with the project are appropriately mitigated:

- Notify surrounding sensitive receptors prior to commencing particularly noisy or vibration inducing activities.
- Where practicable, select lower noise producing equipment or use lower noise generating alternatives.
- Regularly service equipment to ensure plant is running optimally.
- Revving of engines will be limited. All plant and vehicles will be turned off when not in use and if safe to do so.
- The use of audible alarms on mobile equipment will be limited, and two-way communication will be used.
- Undertake activities that may lead to noise or vibration effects, during reasonable and practical hours.

7.4 Monitoring

All earthworks activity will be closely monitored by the operator to ensure that noise and vibration remains within the required limits. If monitoring finds the activity cannot comply with performance criteria, an Acoustic Specialist may need to be engaged to assess the project and provide appropriate mitigation measures and monitoring. Weekly Environmental Inspections and Monthly SQEP Environmental Inspections shall include an assessment of the site to determine the effectiveness of noise and vibration management controls.

7.5 Contingency Measures

The following contingency measures in **Table 12** shall be adopted if required.

***Table 12:** Noise and vibration contingency measures*

Issue	Contingency Measure
Noise and/or vibration complaint received	Manage the complaint in accordance with the Environmental Complaints procedure in **Section 3.5**
Exceedance of performance requirement criteria	The Environmental Consultant (SQEP), in consultation with the Environmental Representative, will investigate and implement actions to reduce noise and/or vibration levels to below criteria levels.
Ongoing noise and/or vibration issues	Where noise or vibration emissions consistently exceed the performance criteria despite the site staff's best efforts, an Acoustic Specialist will be engaged to assist.
Abatement notice issued by Council	Contact the Environmental Consultant (SQEP) immediately to advise on methods to meeting abatement notice requirements within the time stated by the abatement notice.

7.6 Noise and Vibration Incident

A noise or vibration incident is considered to have occurred when a justified complaint is received and on investigation is found to exceed the performance criteria. The environmental incident procedures outlined in **Section 3.5** shall commence.

8.0 CULTURAL HERITAGE MANAGEMENT

The loss or damage of cultural heritage items could be caused by construction activities. The damage or loss of artefacts can lead to the loss of culturally or historically significant items and information.

Examples of cultural heritage items include:

- Koiwi tangata (human skeletal remains).
- Waahi taoka (resources of importance).
- Waahi tapu (places or features of special significance).
- Māori artefact material.
- A feature or archaeological material predating 1900.
- Unidentified archaeological or heritage site.

8.1 Location of Known Cultural Heritage Significance

A Heritage Memorandum regarding the project was prepared by Origin Heritage, dated January 2025. The Ayrburn Precinct (Lots 1-4 DP540788) is the location of Archaeological site F41/578, known as the Ayrburn Farmstead. This site is the location of a mid-19th century farmstead with a still standing early 20th century farmhouse and several pre-1900 outbuildings. Previous earthworks were carried out around the former homestead location under Archaeological Authority 2019/363, which has since been superseded by 2024/321.

The memorandum notes that the proposed works will involve a significant amount of cut and fill across an area located immediately east of the 19th century homestead but are expected to have a low chance of encountering additional archaeological deposits. If any archaeology is affected, the magnitude of impact is expected to be negligible.

8.2 Performance Criteria

- The protection of cultural heritage artefacts and places in accordance with the *Heritage New Zealand Pouhere Taonga Act, 2014*.
- Strict adherence to Heritage New Zealand's *Archaeological Discovery Protocol* (attached as **Appendix 10**) in the case of unexpected finds.

8.3 Management Measures

All works on this project will be undertaken in accordance with the obligations of the *Heritage New Zealand Pouhere Taonga Act*, 2014.

8.4 Monitoring

Weekly inspections shall include a visual assessment of the site to ensure that no new significant artefacts have been encountered. However, operators must remain vigilant for such encounters as they occur.

8.5 Accidental Finds

If any unknown artefacts are uncovered, the project will work to Heritage New Zealand's *Archaeological Discovery Protocol* (attached as **Appendix 10**). This will be undertaken with consultation of the Project Archaeologist.

9.0 VEGETATION MANAGEMENT

The terrace and northern hillside areas are predominantly grassed. A shelterbelt of Douglas firs lines the southern boundary, and sycamore trees follow the metalled haul road. The conifer trees are protected against removal unless agreed by the southern neighbours under RM171280.

Mature, mostly deciduous exotic species, including pines and poplars, are present along the east boundary, along with a small vineyard located on the slope between the terrace and Mill Creek. A portion of the site to the west of the ephemeral waterway has recently been planted in grapevines. It is proposed to continue this planting to give a landscape buffer.

The ephemeral channel is open and dominated by pasture grasses, though it becomes overgrown with willows and other exotic vegetation in the south-east section. Significant indigenous riparian planting has been undertaken along Mill Creek within the wider Ayrburn Domain, including cabbage trees, toetoe, rushes, and sedges. The surrounding grounds of the Ayrburn Domain have also been extensively landscaped.

Aside from the riparian planting along Mill Creek, no indigenous vegetation was observed onsite. A Landscape Assessment has been undertaken by Rough Milne Mitchell Landscape Architects Limited, dated February 2025, which corroborates this.

This is shown in **Figure 4**.

Native riparian planting along Mill Creek

Pasture grasses at the Ephemeral Channel, and grapevine planting in the background

Small vineyard close to Mill Creek

Douglas fir windbreak along the southern boundary

Pastureland extending up the northern hillside

Grassed area on the terrace

Figure 4: *Vegetation cover onsite*

9.1 Sensitive Receptors

A strip of riparian planting will be removed from Mill Creek to undertake the earthworks required for the sediment trap and diversion. This includes a mix of planted native species as well as mature exotics. Approximately 1,400 m^2 of vegetation will be removed.

Due to the relatively small area of vegetation being removed, the lack of rare native species, and the extensive indigenous riparian planting is proposed following the completion of works, the potential adverse effects associated with the earthworks are considered to be less than minor.

9.2 Performance Criteria

- Undertake disturbance within the consented earthworks extent.
- Avoid the spread of noxious weeds onsite or to other sites.

9.3 Management Measures

Remedial works and revegetation shall be undertaken in accordance with the 'Design Report' prepared by Winton in January 2025. This includes a strip of native riparian planting approximately 15 – 30 m wide along the ephemeral stream and native planting to the east of the site on the banks that border the Mill Creek floodplain. No detailed planting plan has been provided to date.

In addition to the above, the following measures will also be deployed to manage vegetation:

- Demarcate protected vegetation areas as no go zones.
- Treating weeds prior to disturbance of the natural surface.
- Weed free topsoil will be retained for reuse in site rehabilitation.

9.4 Monitoring

Weekly Environmental Inspections and Monthly SQEP Environmental Inspections shall include a visual assessment of the site to determine the effectiveness of vegetation management controls.

9.5 Vegetation Incident

A vegetation incident is considered to have occurred where:

- Protected vegetation is damaged or removed.
- A no-go zone is breached.

The environmental incident procedures outlined at **Section 3.5** shall commence.

10.0 CHEMICALS AND FUELS MANAGEMENT

Hazardous substances can endanger both human health and the environment. Used incorrectly they can cause catastrophic accidents, such as fires and explosions, and serious harm to people who are exposed to them.

10.1 Sensitive Receptors

Key sensitive environmental receptors include staff members working on the site, neighbouring properties, facilities within the Ayrburn Domain, Mill Creek, and the ephemeral waterway.

10.2 Performance Criteria

- Chemicals and fuels are stored and used in a manner that avoids contamination of site and surrounding environment.
- All spills are cleaned up immediately and the contaminated soils/waters disposed of appropriately.

10.3 Management Measures

The following measures will be deployed to ensure chemicals and fuels associated with the project are appropriately managed.

- All hazardous substances to be stored, transported and used according to the safety data sheet requirements.
- Storage of chemicals and fuels shall be located as far as practicably possible from waterways and concentrated flows.
- Refuelling of vehicles and plant onsite will occur in the designated refuelling bay as shown in ESCP-022, **Appendix 1**.
- All concrete washing is to be undertaken in the designated concrete wash-out pit as per the design specifications in ESCP-022, **Appendix 1**.
- One 240 L Oil and Hydrocarbon spill kit will be located in close proximity to the location of liquid hazardous materials storage and refuelling areas.
- The volumes of the hazardous substances listed in **Table 13** will not be exceeded.

***Table 13:** Maximum volumes of chemicals and fuels.*

Chemicals and Fuels	Maximum Volume	Storage Location
Diesel	2,500 L	Bunded fuel container or portable trailer
Unleaded Fuel	100 L	Jerry cans in lockable container
Oil	10 L	Packaging in lockable container
Lubricant (WD40 or similar)	Six Cans	Packaging in lockable container
Grease	5 L	Packaging in lockable container
Spot marking paint	2 L	Packaging in lockable container

10.4 Monitoring

Weekly Environmental Inspections and Monthly SQEP Environmental Inspections shall include a visual assessment of the site to determine the effectiveness of chemicals and fuels management.

10.5 Contingency Measures

The following contingency measures in **Table 14** shall be adopted if required.

***Table 14:** Chemicals and fuels contingency measures*

Issue	Contingency Measure
Spills response	• Stop works in proximity to the spill and assess the safety of all personnel. • Take immediate action to contain the spill to prevent discharge into stormwater drains or natural waterways. • Use spill kits to contain and treat the spill. • Notify Environmental Consultant to advise on next steps. • If necessary, notify the Regional Council spill response unit. • Remove contaminated material to a suitable contained location for remediation/disposal (require any necessary approvals/permits from ORC). • The spill kits shall be replaced by an approved supplier.
Inappropriate storage	• Upgrade facility. • Clean-up of storage area. • Notify and train staff.
Inappropriate handling/transport	• Notify and train staff through toolbox meetings on the appropriate handling and transport methods.
Inadequate spill kit materials	• Order more materials. • Investigate types of chemicals onsite and consult a supplier for advice on appropriate equipment. • Develop or revise spill material monitoring and ordering system.
Inappropriate disposal of chemicals or fuels	• Provide appropriate disposal facilities or service providers. • Notify and train staff.
Inaccurate or insufficient records	• Advise staff and update records. • Monitor through inspections.

10.6 Chemicals and Fuels Incident

A chemicals and fuels incident are considered to have occurred where:

- A spill more than five litres has occurred.

- A situation is discovered where a spill of more than five litres would likely have occurred before it happens where the management measures listed above have not been followed.

The environmental incident procedures outlined at **Section 3.5** shall commence.

11.0 WASTE MANAGEMENT

Waste from construction activities can create a nuisance to the public, neighbouring properties, and adversely affect flora and fauna.

11.1 Sensitive Receptors

Key sensitive environmental receptors include staff members working on the site, neighbouring properties, facilities within the Ayrburn Domain, Mill Creek, and the ephemeral waterway.

11.2 Performance Criteria

- Non-recyclable waste generation is minimised, and the site and surrounds are kept free from waste at all times.
- Wastes shall be stored safely and in an organised manner until recycling, reuse, or disposal.

11.3 Management Measures

The following measures will be deployed to ensure waste management associated with the project is appropriately mitigated:

- The Waste Management Hierarchy philosophy will be implemented, as illustrated in **Figure 5**.

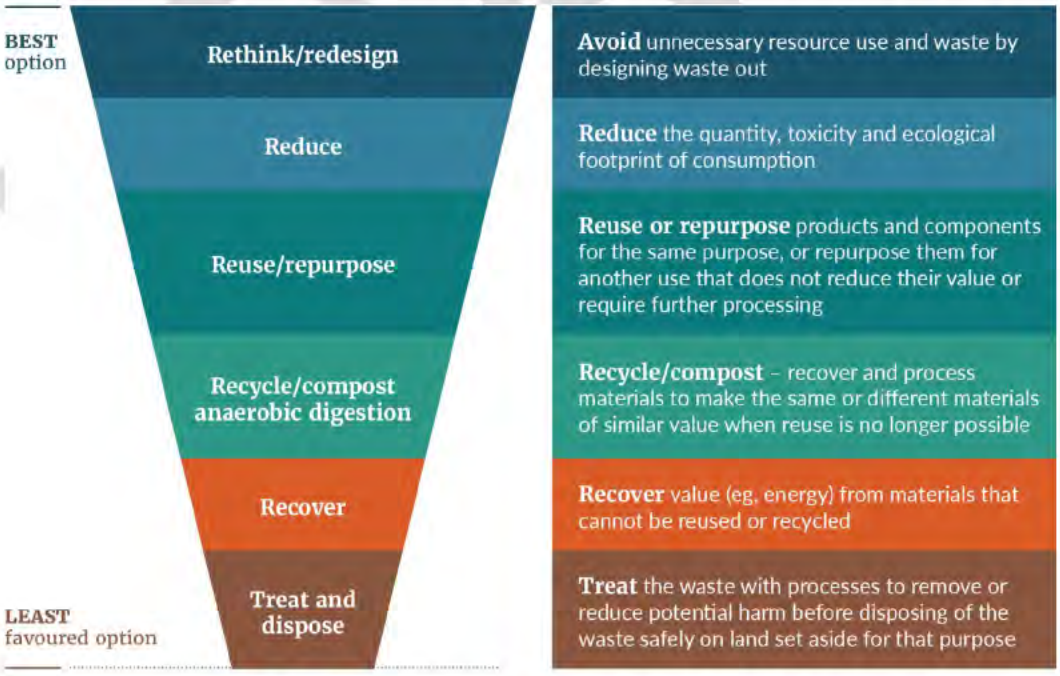


Figure 5: The Waste Hierarchy (Source: Ministry for the Environment).

- Measures will be implemented to ensure the site is maintained in a safe, clean and tidy state.

- Where possible, waste shall be segregated into labelled bins with lids: General, Hazardous and Recyclables.
- Wastes onsite shall be suitably contained and prevented from migrating offsite.
- The waste is to be contained so it doesn't contaminate soil, surface or ground water, create unpleasant odours or attract vermin.
- Any material dropped in or adjacent to open drains shall be recovered immediately after it occurs.
- Waste storage is not permitted in or near drainage paths.
- The burning of waste is strictly prohibited.
- No wastes shall be disposed of onsite.
- Wastes shall be removed from site regularly and at completion of works.

11.4 Monitoring

Site staff will be briefed on waste processes prior to works commencing and shall maintain continual vigilance for excess waste around the site and following appropriate disposal procedures. Weekly Environmental Inspections and Monthly SQEP Environmental Inspections shall include a visual assessment of the site to determine the effectiveness of waste management controls.

11.5 Contingency Measures

If waste items are accumulating or are stockpiled, the following contingency measures will be adopted:

- Arrange for collection by approved licensed contractor.
- Provide additional bins with lids if available.
- Remove waste offsite as soon as possible.

11.6 Waste Incident

A waste incident is considered to have occurred where:

- Waste from the site is found within a sensitive environment or where it may reasonably migrate to a sensitive environment,
- A complaint is received regarding inappropriate management of waste and on investigation is warranted.

The environmental incident procedures outlined at **Section 3.5** shall commence.

12.0 CONTAMINATED SITE MANAGEMENT

The land is part of Ayrburn Farm which operated from the 1860's and contained a sheep dip, woolshed and yards, a farm landfill and underground and above-ground fuel storage tanks.

A Preliminary Site Investigation (PSI) was undertaken by EC Otago in 2016 and covered the entire property identified as Ayrburn Farm and Waterfall Park (Lots 1 - 4 DP 540788). The PSI identified that the only areas of contamination were associated with areas outside of the subject site, which have since been remediated. Within the subject site, a possible landfill area was initially identified and is recorded on the HAIL database (HAIL.01692.05), but no evidence of landfilling was seen during the Detailed Site Investigation (DSI) undertaken in 2018 by EC Otago, and no soil contamination was found. This area of land has now been assigned a status of "Verified Non-HAIL".

In May 2020, an additional investigation was undertaken of the possible landfill area. No indications of buried materials, rubble or rubbish were uncovered, and contaminant levels were found to be consistent with natural background levels from the PSI. Based on these results, there was no evidence that this area was used as a landfill.

EC Otago prepared a Contamination Assessment, dated January 2025, which summarises the PSI, DSI and subsequent remediation work and investigations. They summarised that it is highly unlikely that the use of the land as a screen hub, including accommodation units, will present a risk to human health as a result of soil contamination.

12.1 Sensitive Receptors

Key sensitive environmental receptors include staff members working on the site, neighbouring properties, facilities within the Ayrburn Domain, Mill Creek, and the ephemeral waterway.

12.2 Performance Criteria

- Effectively identify and manage any sites where contaminants are found and ensure they do not contaminate beyond the location they are found (including offsite) or present a risk to human health.
- Undertake all earthworks activities in accordance with the recommendations made within the PSI and DSI by EC Otago.

12.3 Management Measures

The following measures will be deployed to ensure contaminated soil associated with the project is appropriately mitigated:

- If any evidence of contamination is noticed in the field, the personnel noting the contamination shall immediately notify the Environmental Representative.
- Any known contaminated soil to be removed must be undertaken wearing appropriate PPE.
- All imported fill material from off-site sources will be procured from a project-approved quarry/source. Records of quantity and location shall be managed by the Project Engineer.
- Many of the controls required to manage the potential for effects associated with low-level contaminated soil are based on best practice erosion and sediment control and dust management techniques. These are outlined in **Section 4.3** (Erosion and Sediment Controls) and **Section 6.4** (Dust Controls). Both sections cover management of stockpiles.

- All surplus fill material requiring removal shall meet the Ministry for Environment definition of clean fill, as specified in Section 2.2 of the report "A Guide to the Management of Cleanfills", prepared by *Beca Carter Hollings & Ferner Ltd for the Ministry for the Environment and dated January 2002.*
- If materials have been approved to be removed from site, materials will be transported to the approved disposal location.
- Trucks removing or transporting any soil from the site will be covered or sealed to prevent dust, leakage or loss of materials during transport.

12.4 Monitoring

Unless any higher-level contamination is accidentally found during earthworks, no specific monitoring of soil, groundwater or water quality will occur (other than what is detailed in the water quality criteria outlined in **Section 5.4**). If material is found, it is expected that monitoring may be required, but this shall be at the direction of the soil contamination expert.

12.5 Contingency Measures

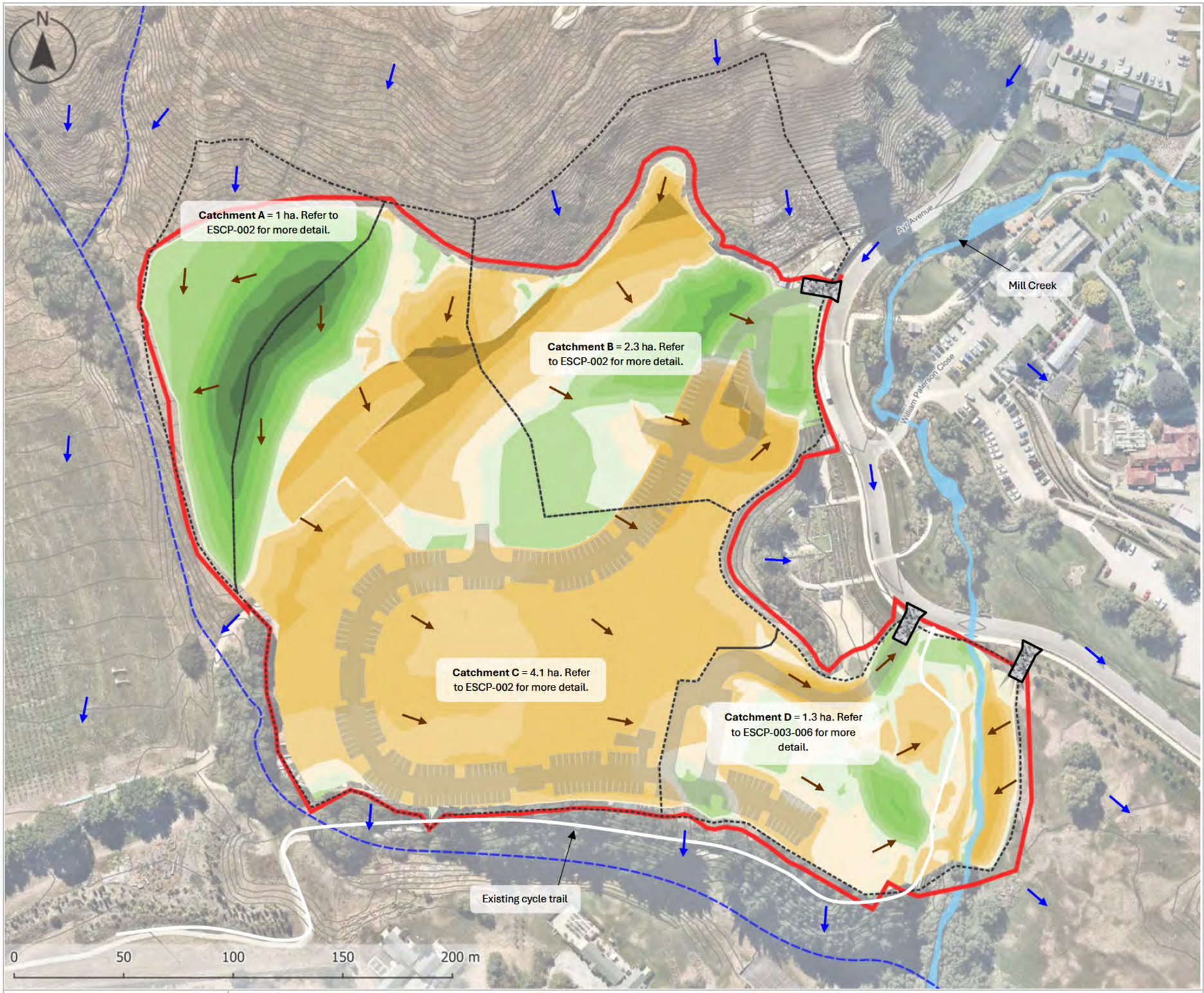
It is not expected that contaminated material will be encountered, however, this cannot be ruled out. If a potential contaminated site is identified (e.g., by landfilled waste, odour) during construction works, the following contingency measures will be undertaken:

- Immediately notify the Project Manager.
- Prevent spread of contamination by installation of silt fencing, covering material with plastic or geofabric material. This will be done wearing appropriate PPE as outlined in the Health and Safety Management Plan.
- Engage the Environmental Consultant who will advise on the engagement of a Contaminated Soil expert.
- EMP to be amended to manage any new contaminated soil encountered in coordination with the contaminated soil expert (if engaged).

12.6 Contamination Incident

An environmental incident is considered to have occurred where inspection finds that excavation or other work continues within contaminated soil without a report or remedial action. The environmental incident procedures outlined in **Section 3.5** shall be followed.

APPENDIX 1 Erosion and Sediment Control Plan Drawing



Legend

	Earthworks extent
	Sub-catchment boundaries
	Stabilised entranceway
	Clean water overland flow
	Dirty water overland flow
	Ephemeral Waterbody

Notes

- This plan is to be read in conjunction with the Environmental Management Plan document prepared by Enviroscope.
- All locations of erosion and sediment control (ESC) devices are indicative and exact placement to be confirmed onsite.
- ESC devices to be installed and maintained in accordance with Auckland Council's 'Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region (GD05) and manufacturer's instructions where relevant.
- All devices are to be inspected daily and pre and post-rain event to ensure they are fully functional.
- Scale 1:1800, earthworks plans provided by Pattersons.
- Refer to **Section 2.1** of the EMP for best practice temporary diversion methodology.

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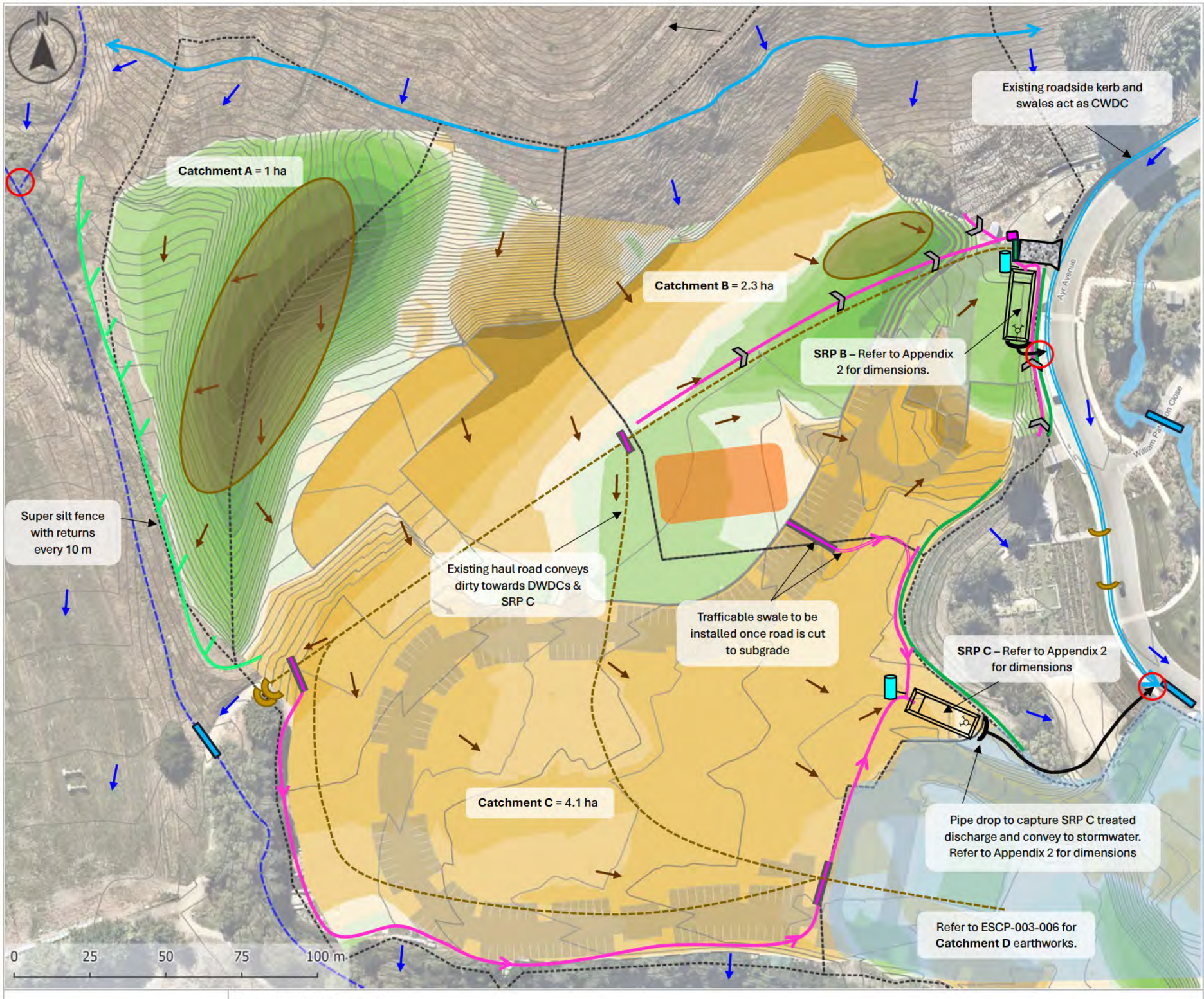
Project: Ayrburn Screen Hub

Description: Erosion and Sediment Control Plan Drawing - **Overview**

Drawn	Approved	Date	Drawing No.	Revision
LC	TG	23/05/2025	ESCP - 001	B



Legend

	Sub-catchment boundaries
	Existing metalled access
	Laydown area (existing hardstand)
	Existing metalled haul road
	Clean water overland flow
	Dirty water overland flow
	Existing swales acting as clean water diversion channels
	Clean water diversion channel
	Dirty water diversion channel
	Trafficable swale
	Temporary culvert
	Check dams
	Ephemeral Waterbody
	Existing culvert
	Standard silt fence
	Super silt fence
	Coconut coir logs
	Stockpile
	Sediment retention pond (SRP)
	Pipe drop
	Rain Activated Dosing System (RADS)
	Water quality sampling points

Notes

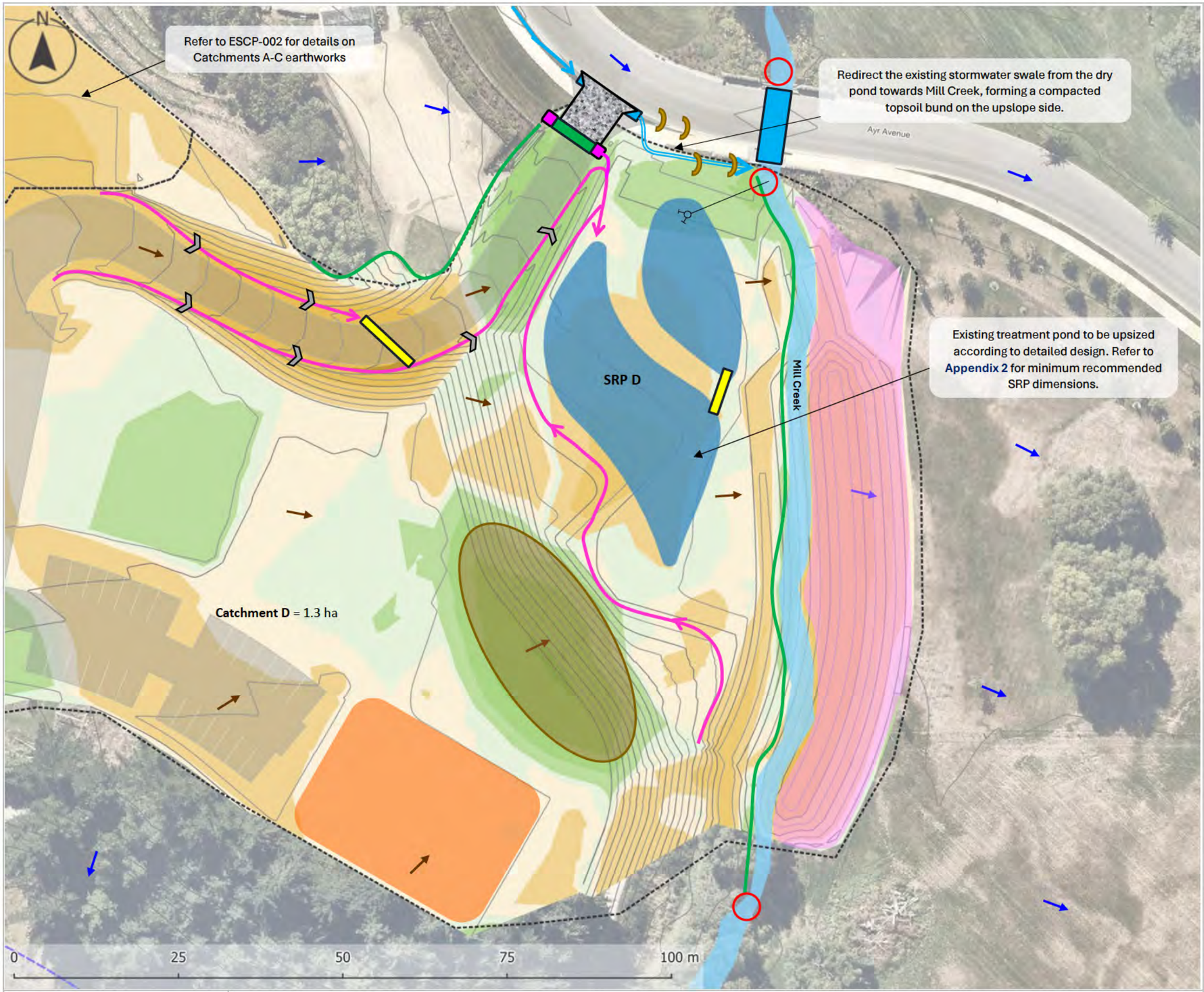
- This plan is to be read in conjunction with the Environmental Management Plan document prepared by Enviroscope.
- All locations of erosion and sediment control (ESC) devices are indicative and exact placement to be confirmed onsite.
- ESC devices to be installed and maintained in accordance with Auckland Council's 'Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region (GD05) and manufacturer's instructions where relevant.
- All devices are to be inspected daily and pre and post-rain event to ensure they are fully functional.
- Scale 1:1300, earthworks plans provided by Pattersons.
- Check dam spacing is indicative only. Refer to ESCP-011 for more details.

enviroscope

Project: Ayrburn Screen Hub

Description: Erosion and Sediment Control Plan Drawing – **Catchments A-C**

Drawn	Approved	Date	Drawing No.	Revision
LC	TG	23/05/2025	ESCP - 002	B



Legend

	Stabilised access
	Sub-catchment boundaries
	Laydown area
	Mill Creek diversion works
	Sediment retention pond (SRP)
	Water quality sampling points
	Clean water overland flow
	Dirty water overland flow
	Existing stormwater swales acting as CWDC
	Combined clean water diversion channel and bund
	Dirty water diversion channel
	Check dams
	Drop out pits
	Coconut coir logs
	Standard silt fence
	Engineer designed culvert
	Existing culverts
	Temporary culverts
	Stockpile

Notes

- This plan is to be read in conjunction with the Environmental Management Plan document prepared by Enviroscope.
- All locations of erosion and sediment control (ESC) devices are indicative and exact placement to be confirmed onsite.
- ESC devices to be installed and maintained in accordance with Auckland Council's 'Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region (GD05) and manufacturer's instructions where relevant.
- All devices are to be inspected daily and pre and post-rain event to ensure they are fully functional.
- Scale 1:600, earthworks plans provided by Pattersons.
- Check dam spacing is indicative only. Refer to ESCP-011 for more details.

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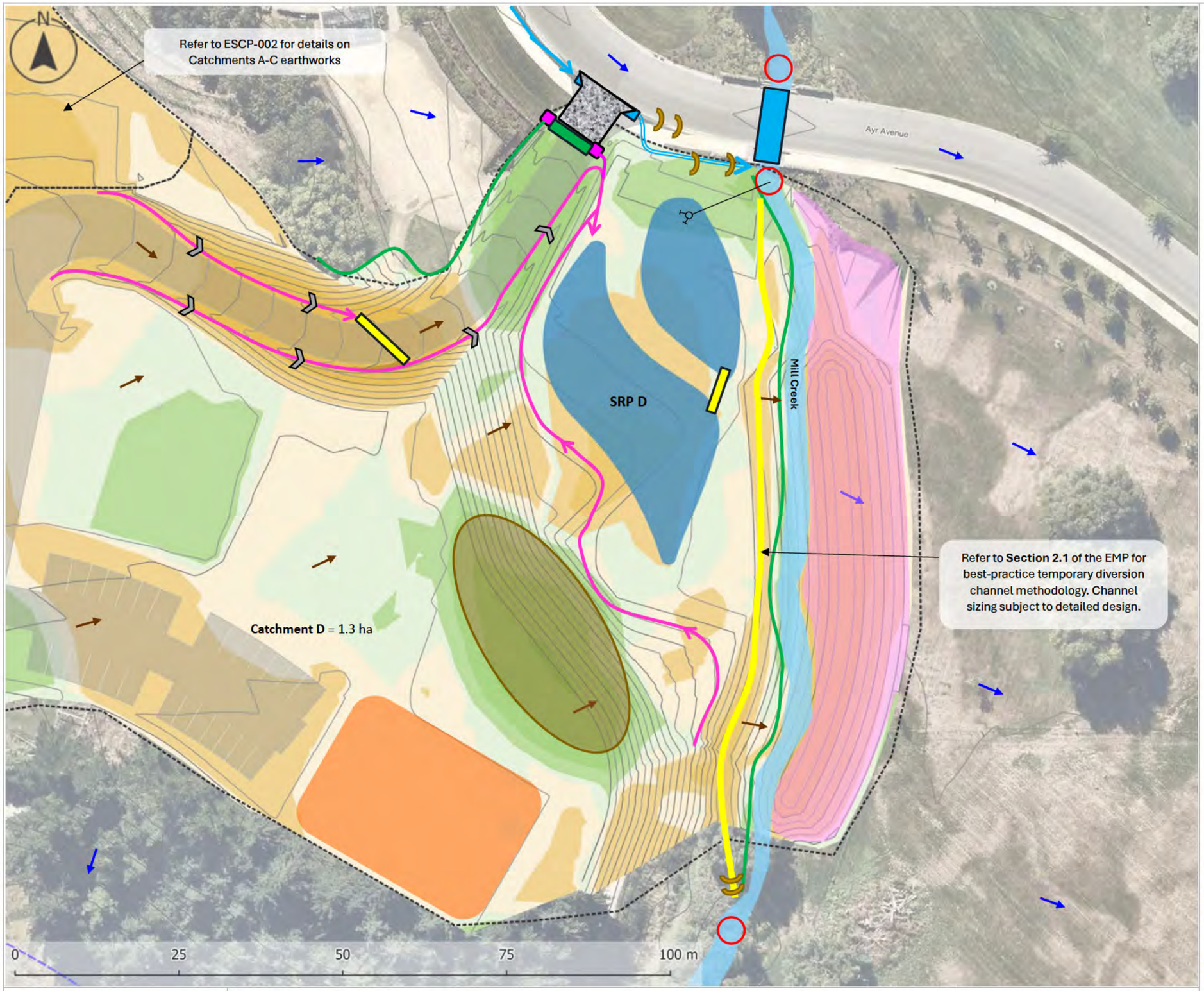
Project: Ayrburn Screen Hub

Description: Erosion and Sediment Control Plan Drawing – **Catchment D**

Drawn	Approved	Date	Drawing No.	Revision
LC	TG	23/05/2025	ESCP - 003	B



Legend

	Stabilised access
	Sub-catchment boundaries
	Laydown area
	Mill Creek diversion works
	Sediment retention pond (SRP)
	Water quality sampling point
	Temporary diversion channel
	Clean water overland flow
	Dirty water overland flow
	Existing stormwater swales acting as CWDC
	Combined clean water diversion channel and bund
	Dirty water diversion channel
	Check dams
	Drop out pits
	Coconut coir logs
	Standard silt fence
	Engineer designed culverts
	Existing culverts
	Temporary culverts
	Stockpile

Notes

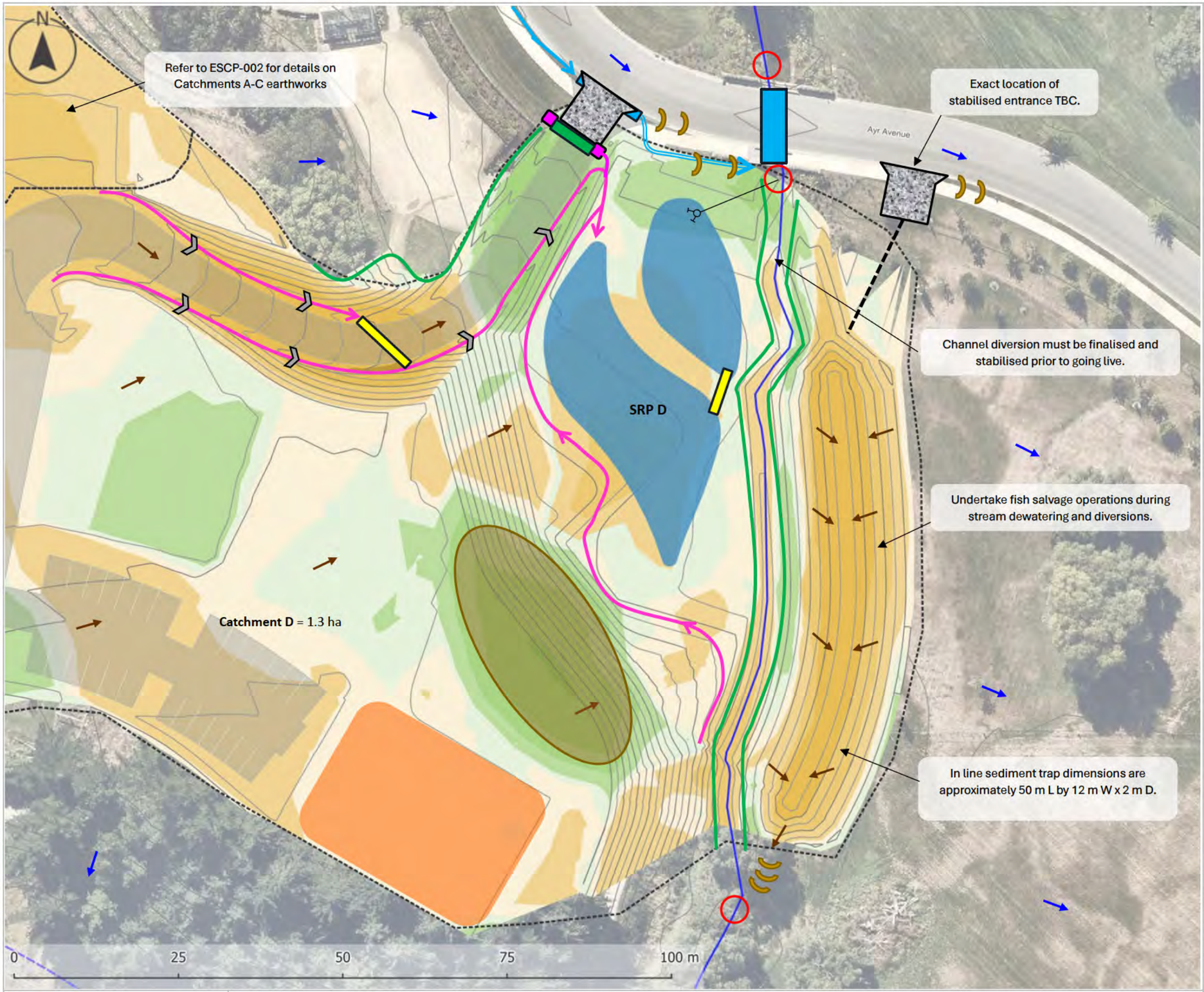
- This plan is to be read in conjunction with the Environmental Management Plan document prepared by Enviroscope.
- All locations of erosion and sediment control (ESC) devices are indicative and exact placement to be confirmed onsite.
- ESC devices to be installed and maintained in accordance with Auckland Council's 'Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region (GD05) and manufacturer's instructions where relevant.
- All devices are to be inspected daily and pre and post-rain event to ensure they are fully functional.
- Scale 1:600, earthworks plans provided by Pattersons
- Refer to **Section 2.1** of the EMP for best practice temporary diversion methodology.
- Check dam spacing is indicative only. Refer to ESCP-011 for more details.

enviroscope

Project: Ayrburn Screen Hub

Description: Erosion and Sediment Control Plan Drawing – **Mill Creek Diversion (Stage 1)**

Drawn	Approved	Date	Drawing No.	Revision
LC	TG	23/05/2025	ESCP - 004	B



Legend

	Stabilised access
	Sub-catchment boundaries
	Laydown area
	Sediment retention pond (SRP)
	Water quality sampling points
	Clean water overland flow
	Dirty water overland flow
	Existing stormwater swales acting as CWDC
	Combined clean water diversion channel and bund
	Dirty water diversion channel
	Check dams
	Drop out pits
	Coconut logs
	Standard silt fence
	Engineer designed culverts
	Existing culverts
	Temporary culverts
	Temporary access
	Stockpile

Notes

- This plan is to be read in conjunction with the Environmental Management Plan document prepared by Enviroscope.
- All locations of erosion and sediment control (ESC) devices are indicative and exact placement to be confirmed onsite.
- ESC devices to be installed and maintained in accordance with Auckland Council's 'Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region (GD05) and manufacturer's instructions where relevant.
- All devices are to be inspected daily and pre and post-rain event to ensure they are fully functional.
- Scale 1:600, earthworks plans provided by Pattersons.
- Refer to **Section 2.1** of the EMP for best practice temporary diversion methodology.
- Check dam spacing is indicative only. Refer to ESCP-011 for more details.

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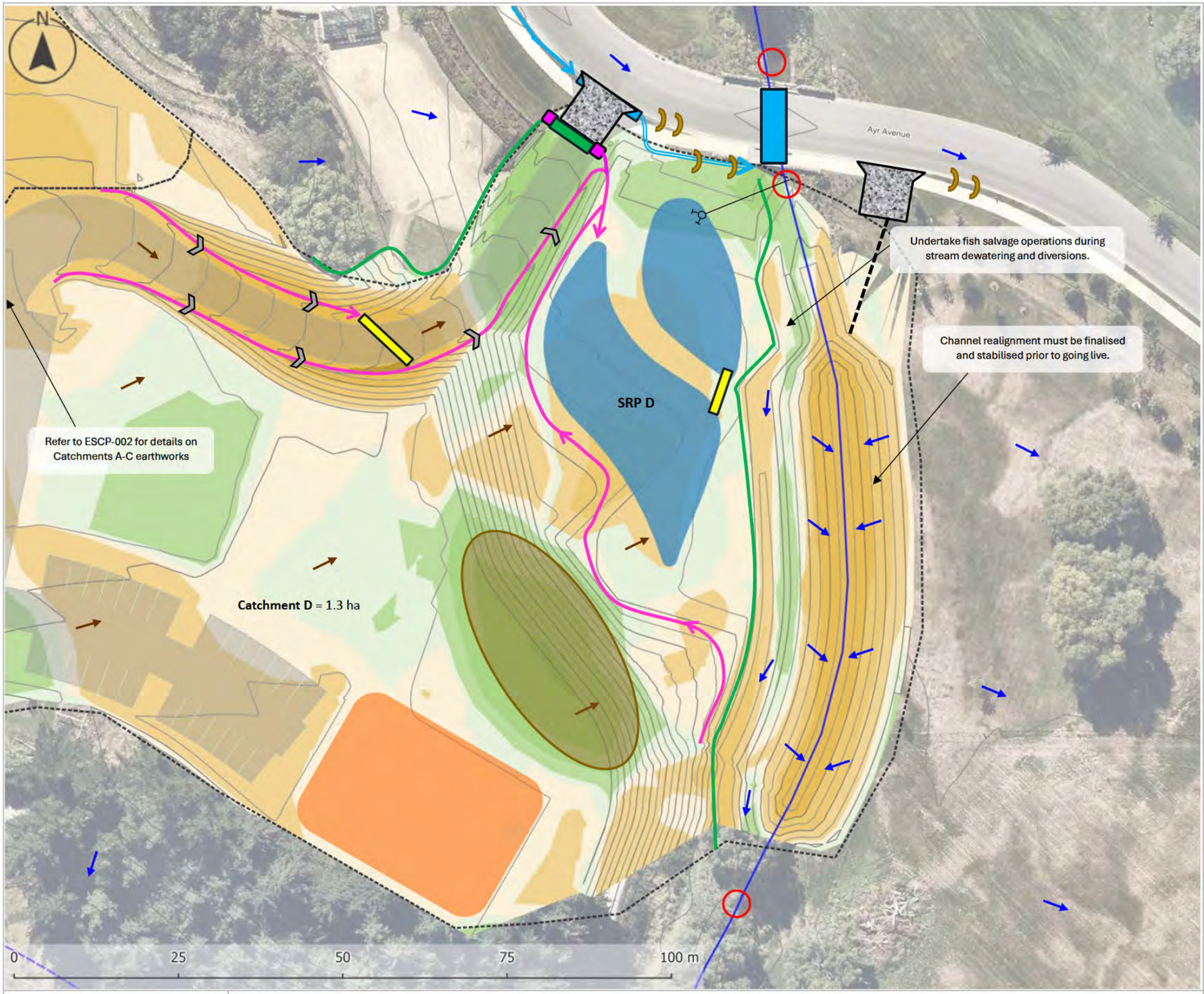
Project: Ayrburn Screen Hub

Description: Erosion and Sediment Control Plan Drawing – **Mill Creek Diversion (Stage 2)**

Drawn	Approved	Date	Drawing No.	Revision
LC	TG	23/05/2025	ESCP - 005	B



Legend

	Stabilised access
	Sub-catchment boundaries
	Laydown area
	Sediment retention pond (SRP)
	Water sampling points
	Clean water overland flow
	Dirty water overland flow
	Existing stormwater swales acting as CWDC
	Combined clean water diversion channel and bund
	Dirty water diversion channel
	Check dams
	Drop out pits
	Coconut logs
	Standard silt fence
	Engineer designed culverts
	Existing culverts
	Temporary culverts
	Temporary accessway
	Stockpile

Notes

- This plan is to be read in conjunction with the Environmental Management Plan document prepared by Enviroscope.
- All locations of erosion and sediment control (ESC) devices are indicative and exact placement to be confirmed onsite.
- ESC devices to be installed and maintained in accordance with Auckland Council's 'Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region (GD05) and manufacturer's instructions where relevant.
- All devices are to be inspected daily and pre and post-rain event to ensure they are fully functional.
- Scale 1:600, earthworks plans provided by Pattersons.
- Refer to **Section 2.1** of the EMP for best practice temporary diversion methodology.
- Check dam spacing is indicative only. Refer to ESCP-011 for more details.

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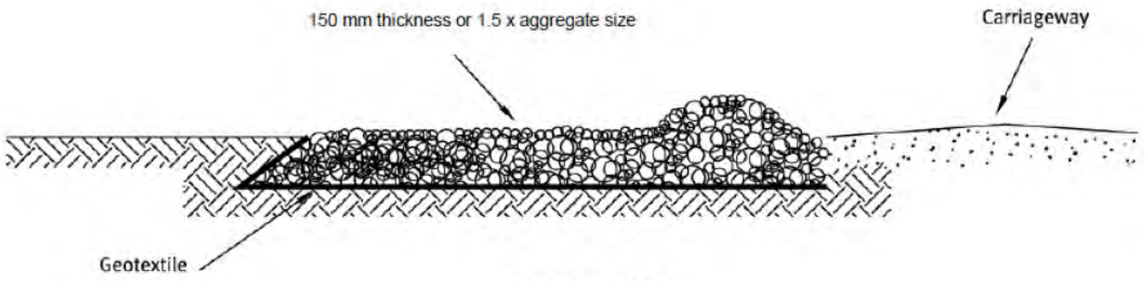
Project: Ayrburn Screen Hub

Description: Erosion and Sediment Control Plan Drawing – **Mill Creek Diversion (Stage 3)**

Drawn	Approved	Date	Drawing No.	Revision
LC	TG	23/05/2025	ESCP - 006	B

STABILISED ACCESS

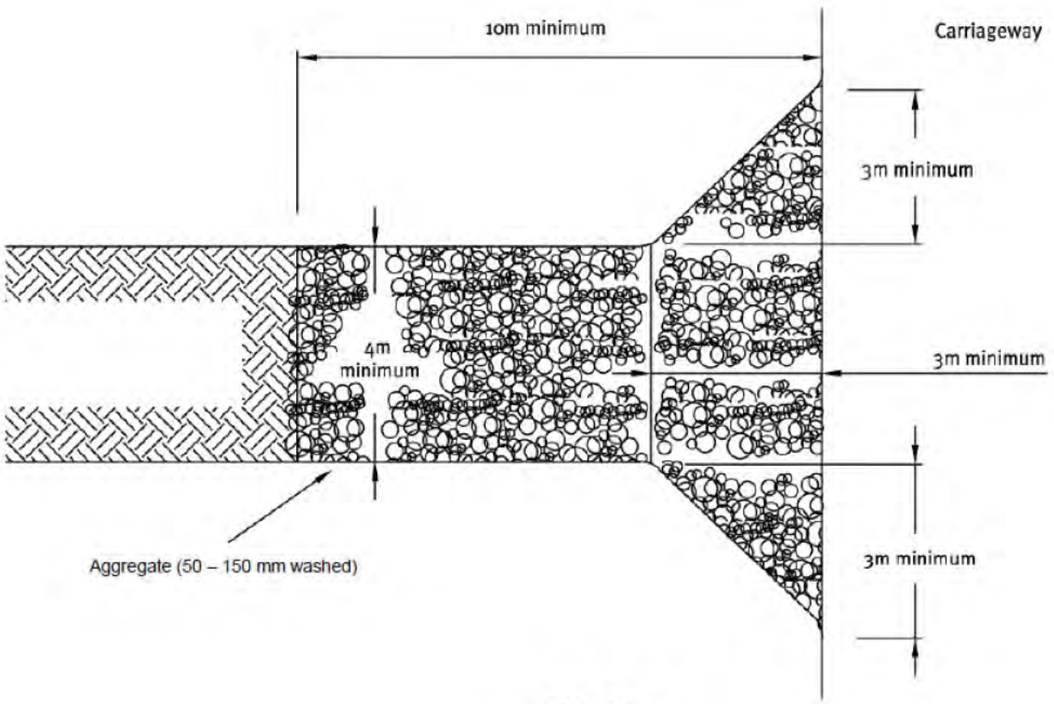
(Page 60 from GD05)



Side Elevation

Design Parameter	Specification
Aggregate size	50-150 mm washed aggregate
Minimum thickness	150 mm
Minimum length	10 m
Minimum width	4 m

- Additional aggregate may need to be added to the stabilised entranceway throughout the project to maintain the thickness.
- Any sediment that has been tracked onto the surrounding roads must be swept away at regular intervals.

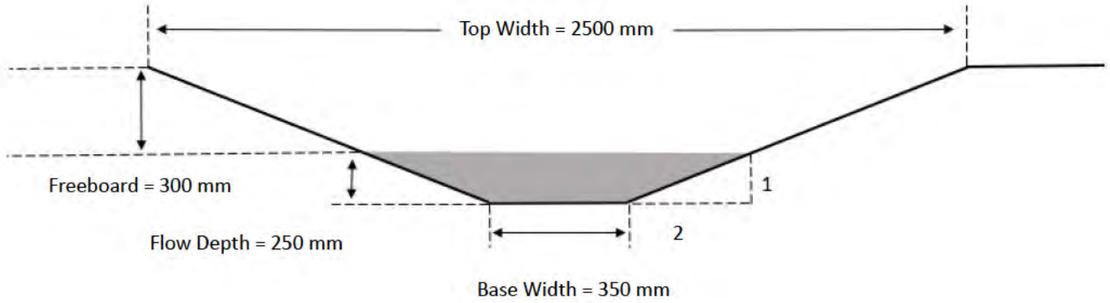


Plan View

enviroscope	**Project:** Ayrburn Screen Hub **Description:** Erosion and Sediment Control Plan - Schematics				
	Drawn	**Approved**	**Date**	**Drawing Number**	**Revision**
	LC	TG	23/05/2025	ESCP - 007	B

DIRTY WATER DIVERSION CHANNELS

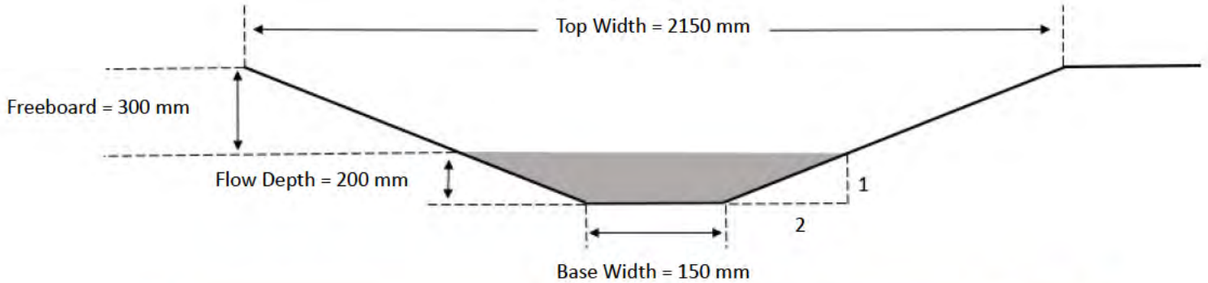
(Pages 43-46 from GD05)



- These has been designed to convey up to a 5% AEP design event.
- Check dams required in Catchment B & D DWDCs.
- Trapezoidal shape.
- Full calculations are included in **Appendix 2**.

CLEAN WATER DIVERSION CHANNELS

(Pages 38-43 from GD05)



- Trapezoidal shape.
- Full calculations are included in **Appendix 2**.
- These has been designed to convey up to a 5% AEP design event.

enviroscope	**Project:** Ayrburn Screen Hub **Description:** Erosion and Sediment Control Plan - Schematics				
Drawn	**Approved**	**Date**	**Drawing Number**	**Revision**	
LC	TG	23/05/2025	ESCP - 008	B	

DROP-OUT PIT

Page 45 from GD05

- Drop out pits should be one metre deep by one-metre-wide cube.
- As a contingency measure, drop out pits can be increased in size and lined to prevent any scour of the pit.

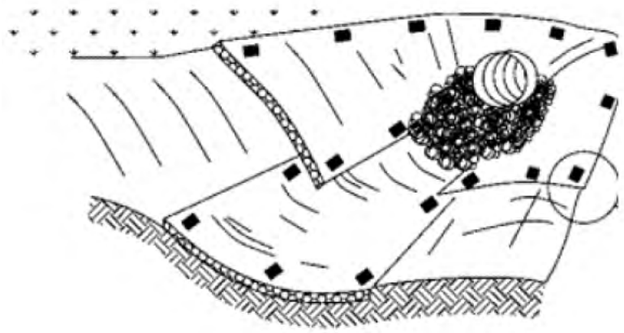
TRAFFICABLE SWALE

Image from Enviroscope

- Trafficable swales should be constructed by mounding and compacting soil diagonally across the road to direct water in the direction required.
- Vehicles should be able to cross trafficable swales often.
- Rock-lining may need to be added if the swale structure is continuing to degrade by trafficking.

TEMPORARY CULVERT

(Diagram from TP90 – now GD05)

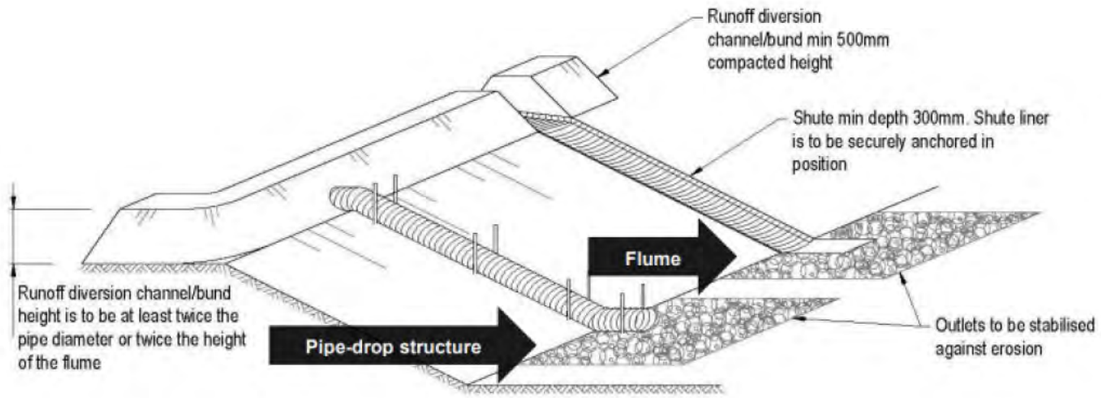


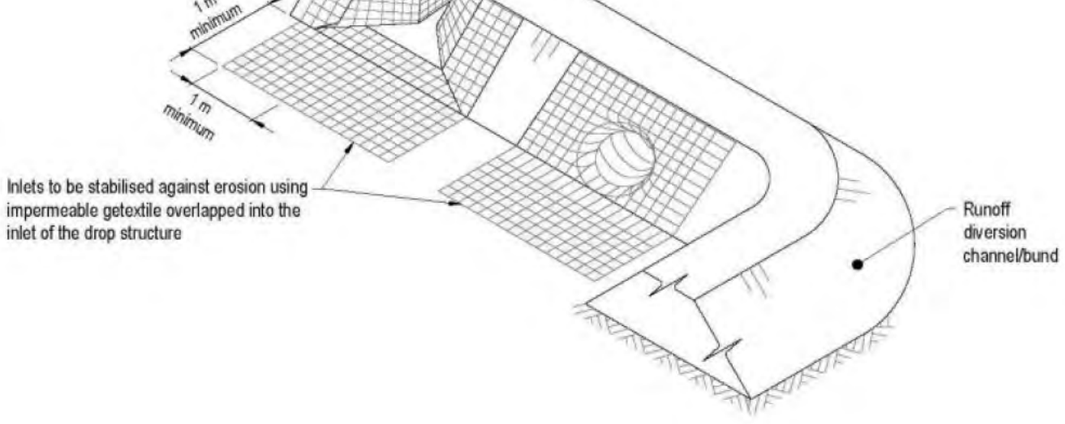
- The culverts should consist of a 250 mm PVC culvert to allow for heavy haul vehicles to traffic over.
- Geofabric and rock should be placed at the outlet to prevent scour from the higher velocity water exiting the culvert.
- Full calculations are included in **Appendix 2**.

enviroscope	**Project:** Ayrburn Screen Hub **Description:** Erosion and Sediment Control Plan - Schematics				
	Drawn	**Approved**	**Date**	**Drawing Number**	**Revision**
	LC	TG	23/05/2025	ESCP - 009	B

PIPE DROP STRUCTURE

Page 55-60 from GD05





- The pipe drops are to be attached to SRPs B and C primary outlets and will convey the treated water to Ayr Avenue.
- The pipe drops are to match the SRP primary outlet in diameter.
- The pipe will be unpunched and ensure all connections are water tight.
- The inlet to the pipe will have a one metre long stabilised apron on a 3% grade.
- The flume will be pinned every four metres to anchor it. There will be no less than two anchors equally spaced along the length of the pipe.
- Ensure the slope the flume directs flows down is steeper than 3:1.
- Ensure the pipe extends beyond the toe of the slope and the outlet is stabilised with geofabric or rock rip rap to avoid downslope scouring.
- The pipe drop structure will be monitored and maintained regularly to ensure it operates effectively.
- See **Appendix 2** for full calculations.

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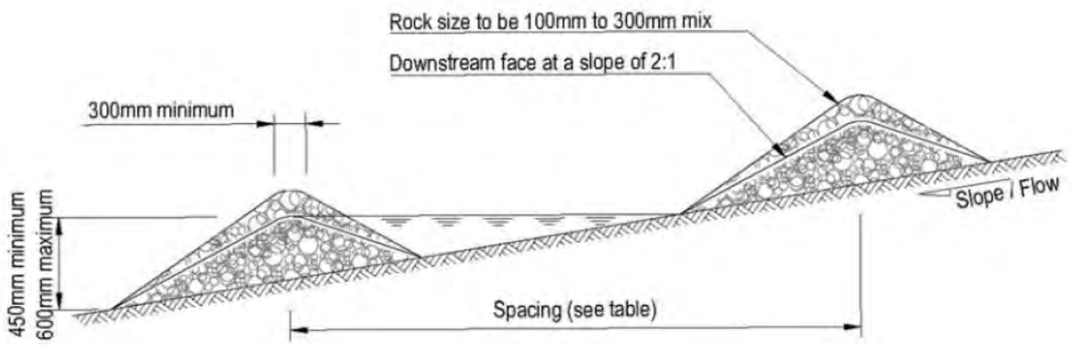
Project: Ayrburn Screen Hub

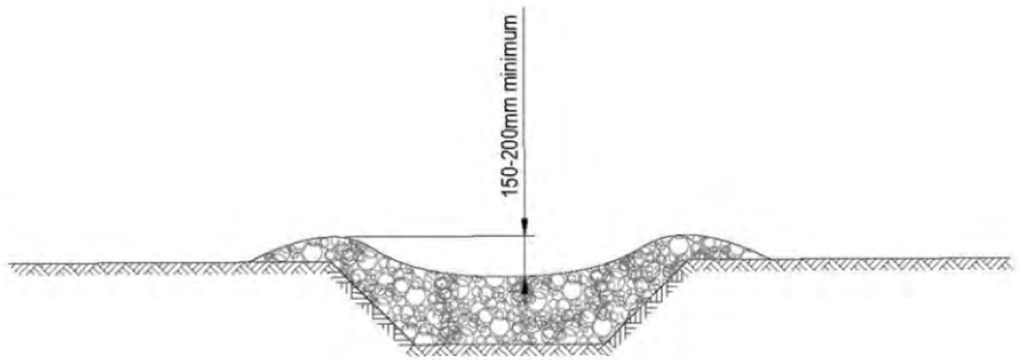
Description: Erosion and Sediment Control Plan - Schematics

Drawn	Approved	Date	Drawing Number	Revision
LC	TG	23/05/2025	ESCP - 010	B

CHECK DAMS

(Page 50-54 from GD05)





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

- Check dams will be constructed out of 100 – 300 mm mix rock or sandbags.
- The centre of the check dam should be 50-100 mm lower than the outside edges of the DWDC to form a spillway.
- Check dams should be placed every as per the table above.

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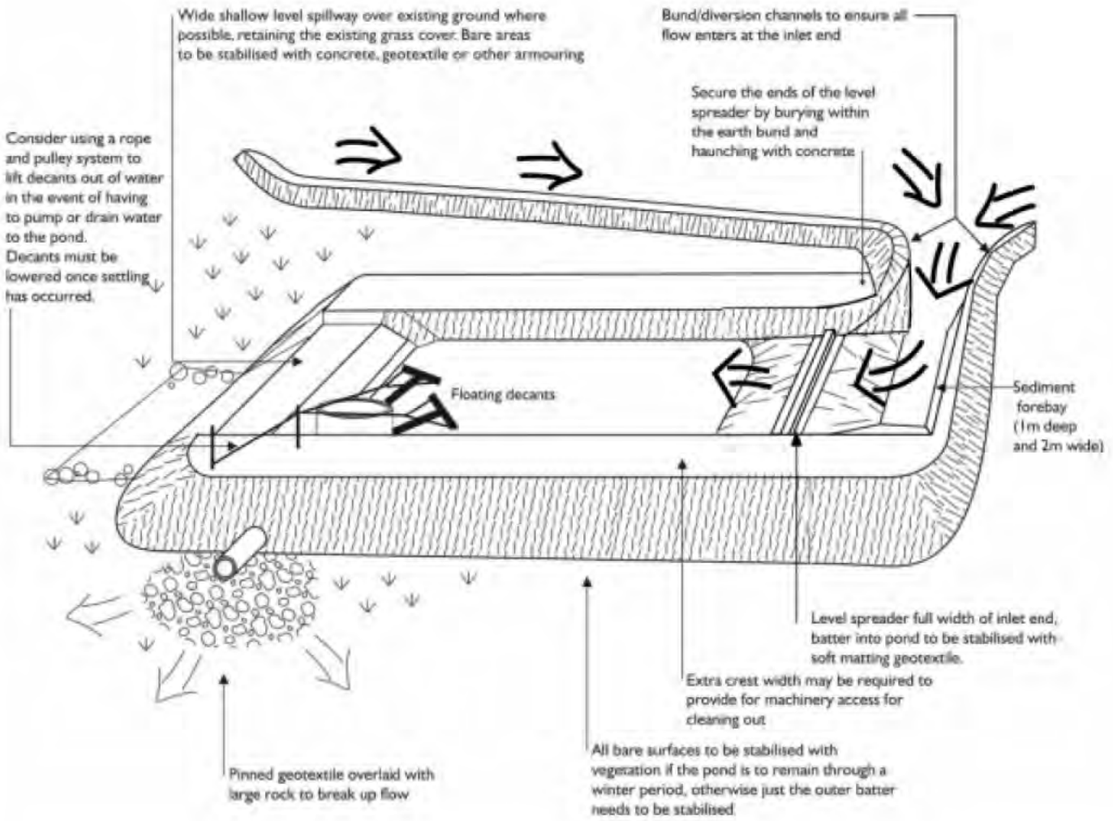
Project: Ayrburn Screen Hub

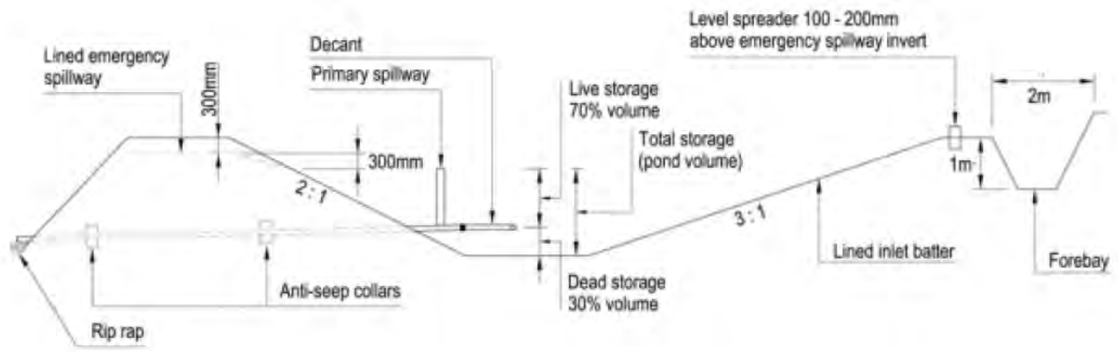
Description: Erosion and Sediment Control Plan - Schematics

Drawn	Approved	Date	Drawing Number	Revision
LC	TG	23/05/2025	ESCP - 011	B

SEDIMENT RENTENTION POND

Page 91-105 from GD05

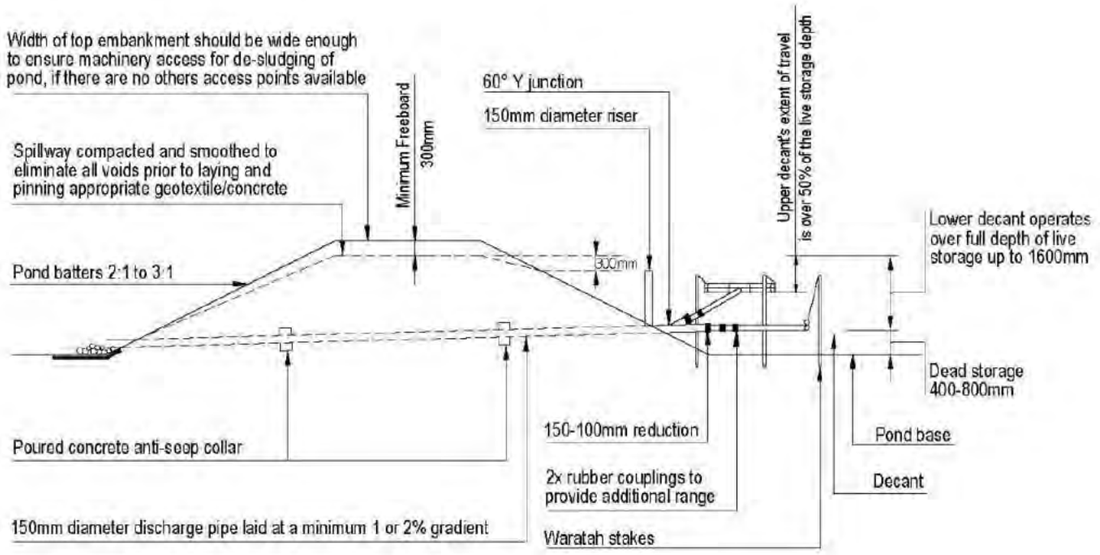


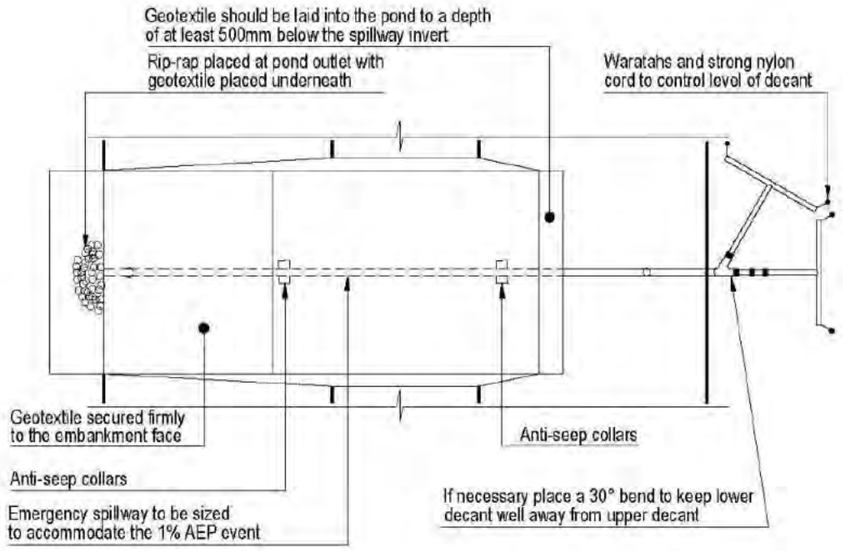


enviroscope	**Project:** Ayrburn Screen Hub **Description:** Erosion and Sediment Control Plan - Schematics				
	Drawn	**Approved**	**Date**	**Drawing Number**	**Revision**
	LC	TG	23/05/2025	ESCP - 012	B

SEDIMENT RENTENTION POND

Page 91-105 from GD05





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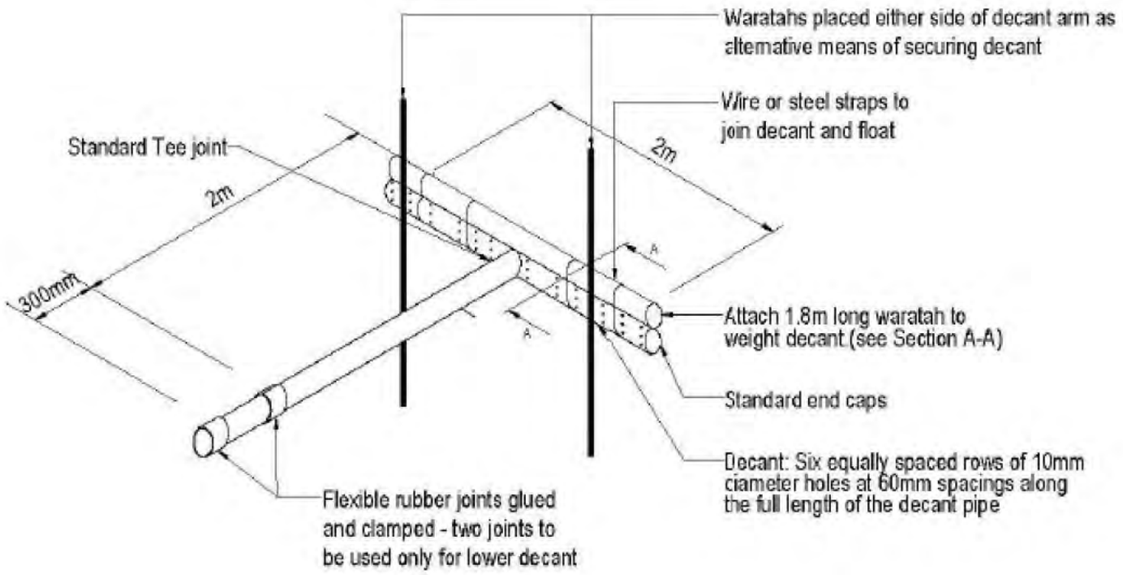
Project: Ayrburn Screen Hub

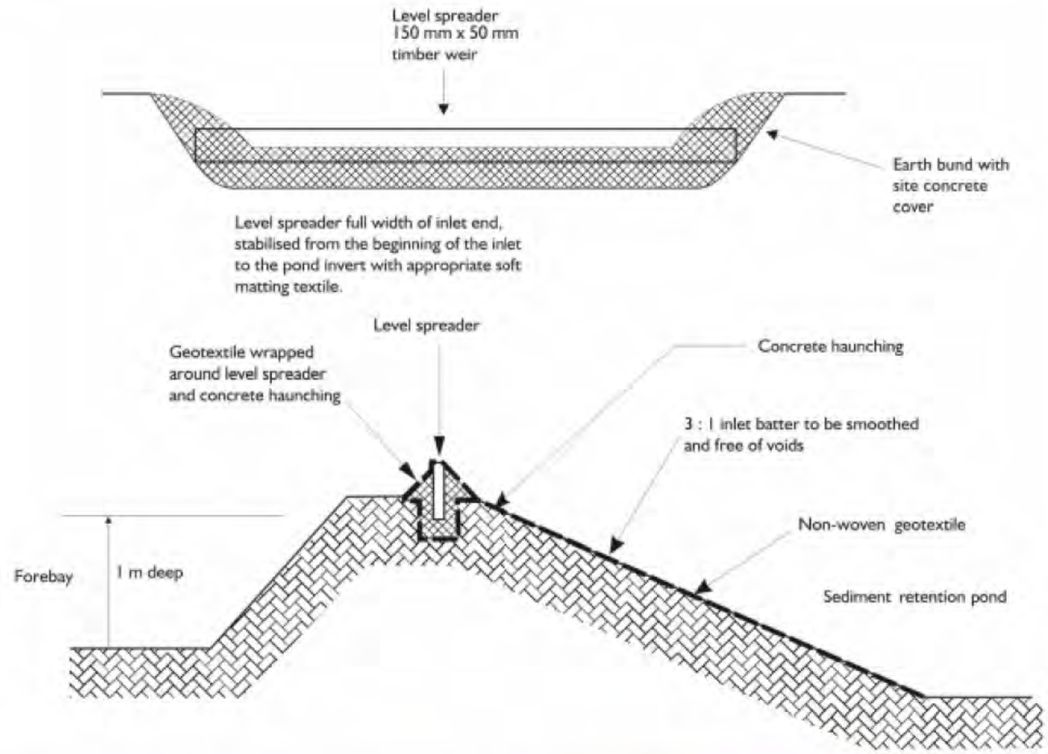
Description: Erosion and Sediment Control Plan - Schematics

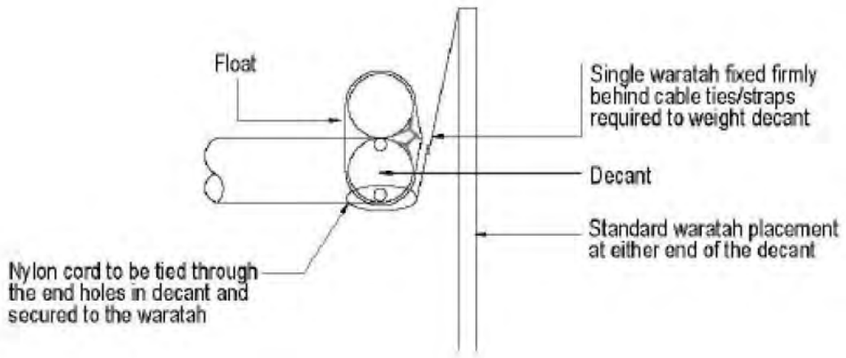
Drawn	Approved	Date	Drawing Number	Revision
LC	TG	23/05/2025	ESCP - 013	B

SEDIMENT RENTENTION POND

Page 91-105 from GD05





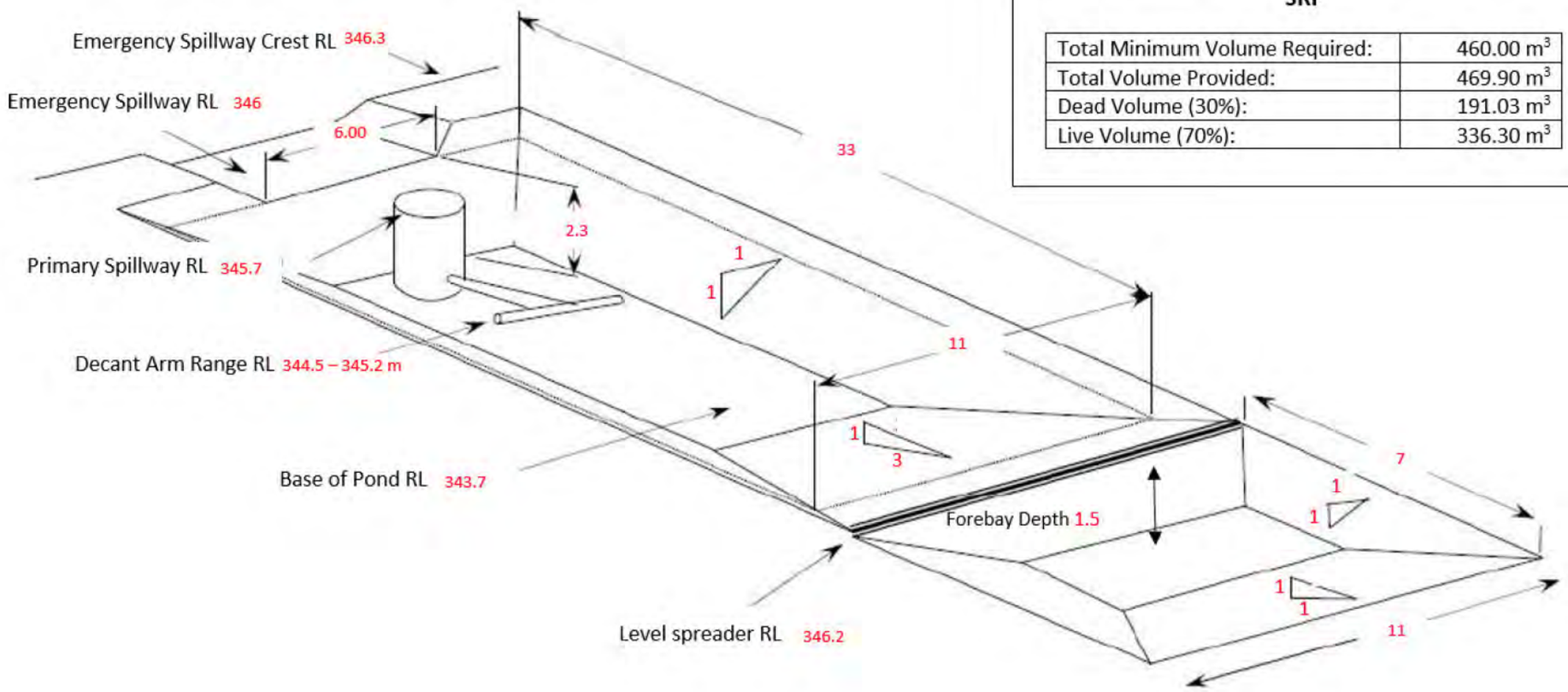


enviroscope	**Project:** Ayrburn Screen Hub **Description:** Erosion and Sediment Control Plan - Schematics				
	Drawn	**Approved**	**Date**	**Drawing Number**	**Revision**
	LC	TG	23/05/2025	ESCP - 014	B

SEDIMENT RENTENTION POND B

SRP

Total Minimum Volume Required:	460.00 m^3
Total Volume Provided:	469.90 m^3
Dead Volume (30%):	191.03 m^3
Live Volume (70%):	336.30 m^3



- See **Appendix 2** for full calculations.
- Storage sizing has been calculated using a 2% percentage volume factor.
- A pipe drop will convey treated water from the outlet to the roadside swale off Ayr Avenue.

enviroscope

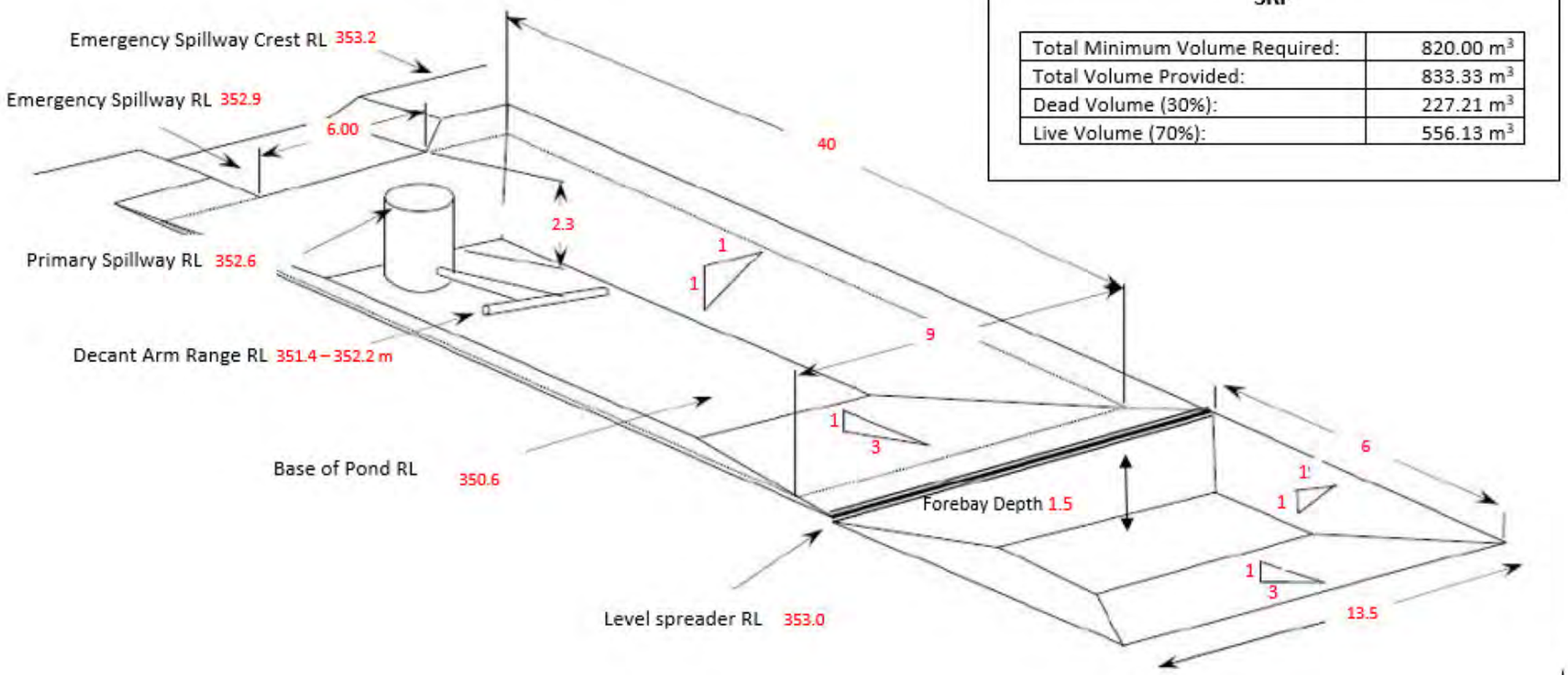
Project: Ayrburn Screen Hub

Description: Erosion and Sediment Control Plan - Schematics

Drawn	Approved	Date	Drawing Number	Revision
LC	TG	23/05/2025	ESCP - 015	B

SEDIMENT RENTENTION POND C

Page 91-105 from GD05



SRP

Total Minimum Volume Required:	820.00 m^3
Total Volume Provided:	833.33 m^3
Dead Volume (30%):	227.21 m^3
Live Volume (70%):	556.13 m^3

- See **Appendix 2** for full calculations.
- Storage sizing has been calculated using a 2% percentage volume.
- A pipe drop will convey treated water from the outlet to the roadside swale off Ayr Avenue.

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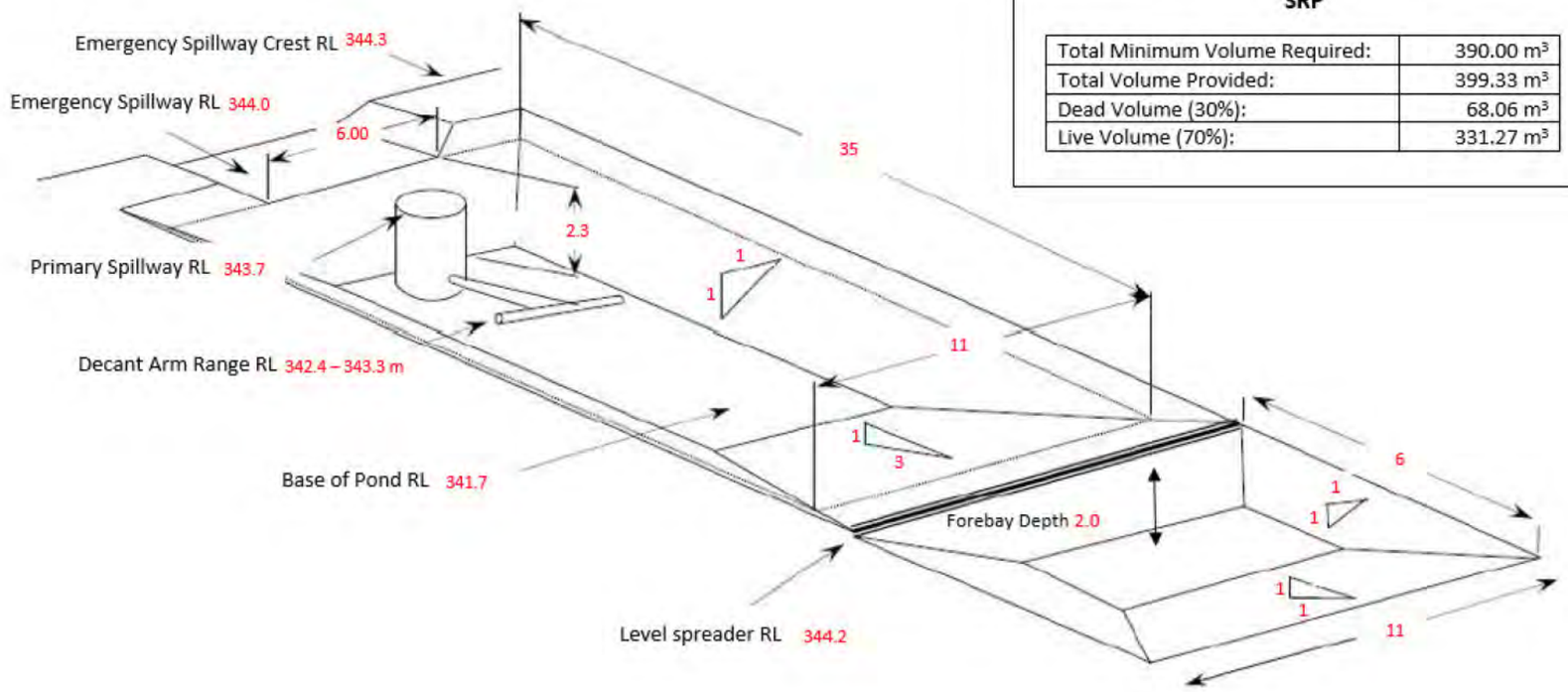
Project: Ayrburn Screen Hub

Description: Erosion and Sediment Control Plan - Schematics

Drawn	Approved	Date	Drawing Number	Revision
LC	TG	23/05/2025	ESCP - 016	B

SEDIMENT RENTENTION POND D

Page 91-105 from GD05



SRP

Total Minimum Volume Required:	390.00 m³
Total Volume Provided:	399.33 m³
Dead Volume (30%):	68.06 m³
Live Volume (70%):	331.27 m³

- See **Appendix 2** for full calculations. These are minimum sizing requirements based off GD05 during construction.
- The pond will later become a permanent component of the future Screen Hub stormwater infrastructure.

enviroscope

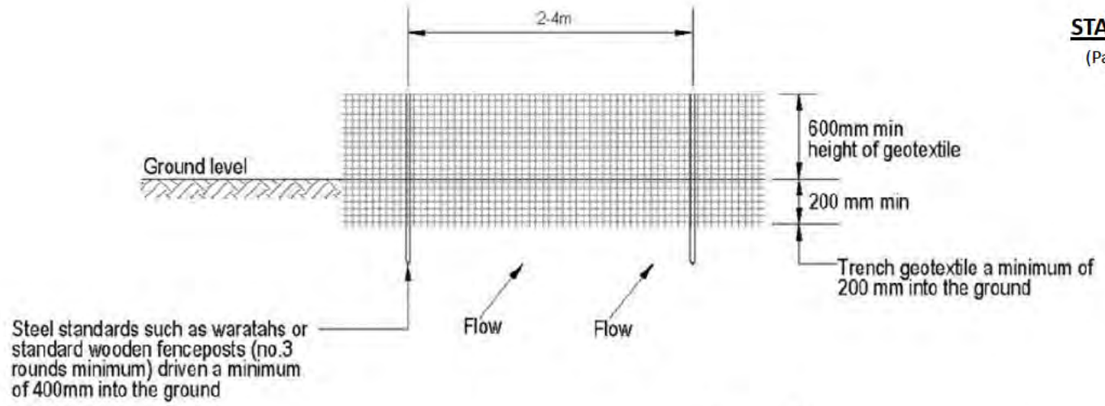
Project: Ayrburn Screen Hub

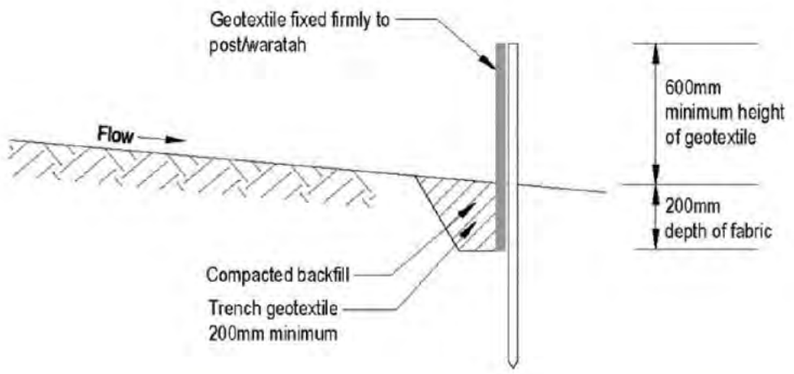
Description: Erosion and Sediment Control Plan - Schematics

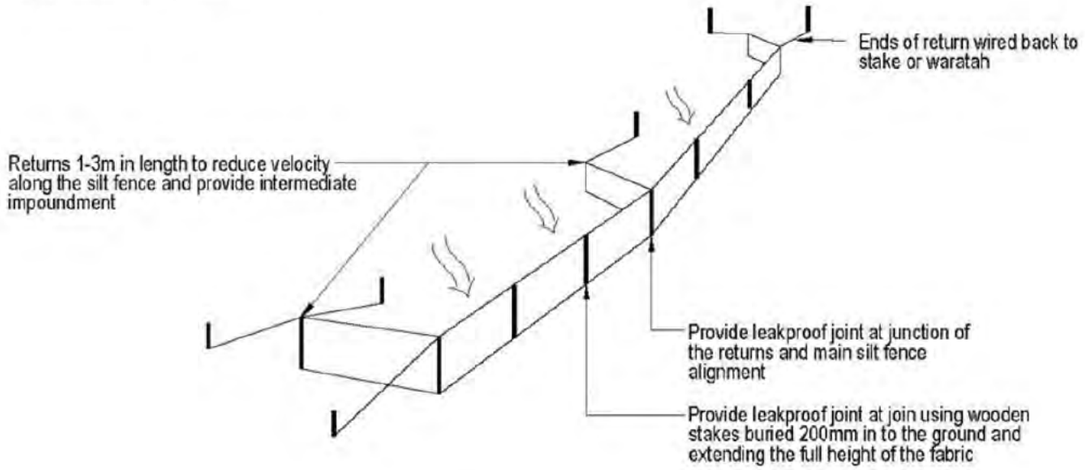
Drawn	Approved	Date	Drawing Number	Revision
LC	TG	23/05/2025	ESCP - 017	B

STANDARD SILT FENCE

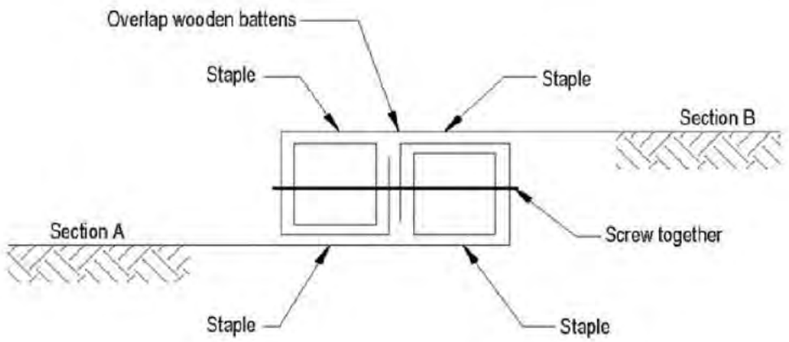
(Page 112-119 from GD05)







Slope steepness (%)	Slope length (m) (maximum)	Spacing of returns (m)	Silt fence length (m) (maximum)
Less than 2%	Unlimited	N/A	Unlimited
2- 10%	40	60	300
10- 20%	30	50	230
20- 33%	20	40	150
33- 50%	15	30	75
Greater than 50%	6	20	40



- Ensure the silt fence is 'keyed' into the ground to form a good seal at ground level to capture water and avoid undermining.
- Silt fences should be 600 mm above ground level and 200 mm below ground level.
- Supporting waratahs should be placed at 2-4 m intervals.
- Returns should be formed at either end facing upslope to contain flows.
- It is also important that silt fences are installed along the contour of the slope to prevent ponding of water in a concentrated area of the fence.
- To be mucked out once 20% capacity reached.

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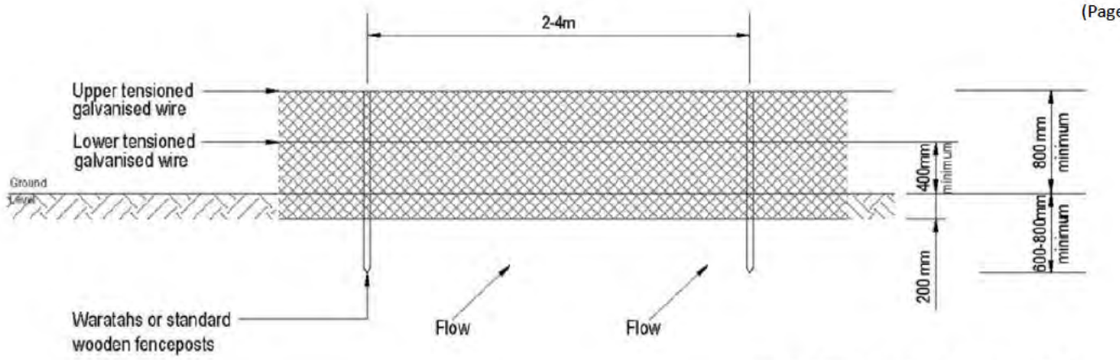
Project: Ayrburn Screen Hub

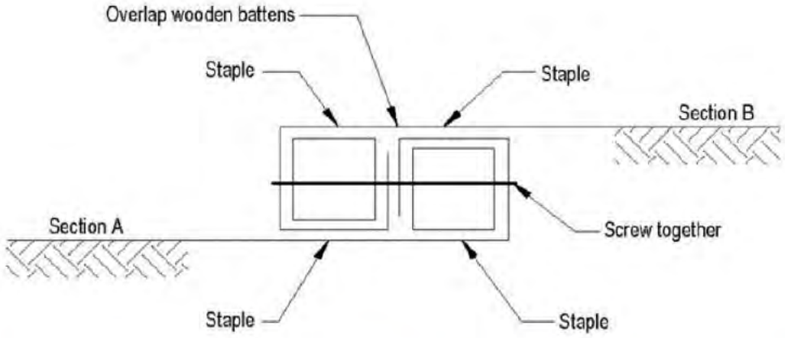
Description: Erosion and Sediment Control Plan - Schematics

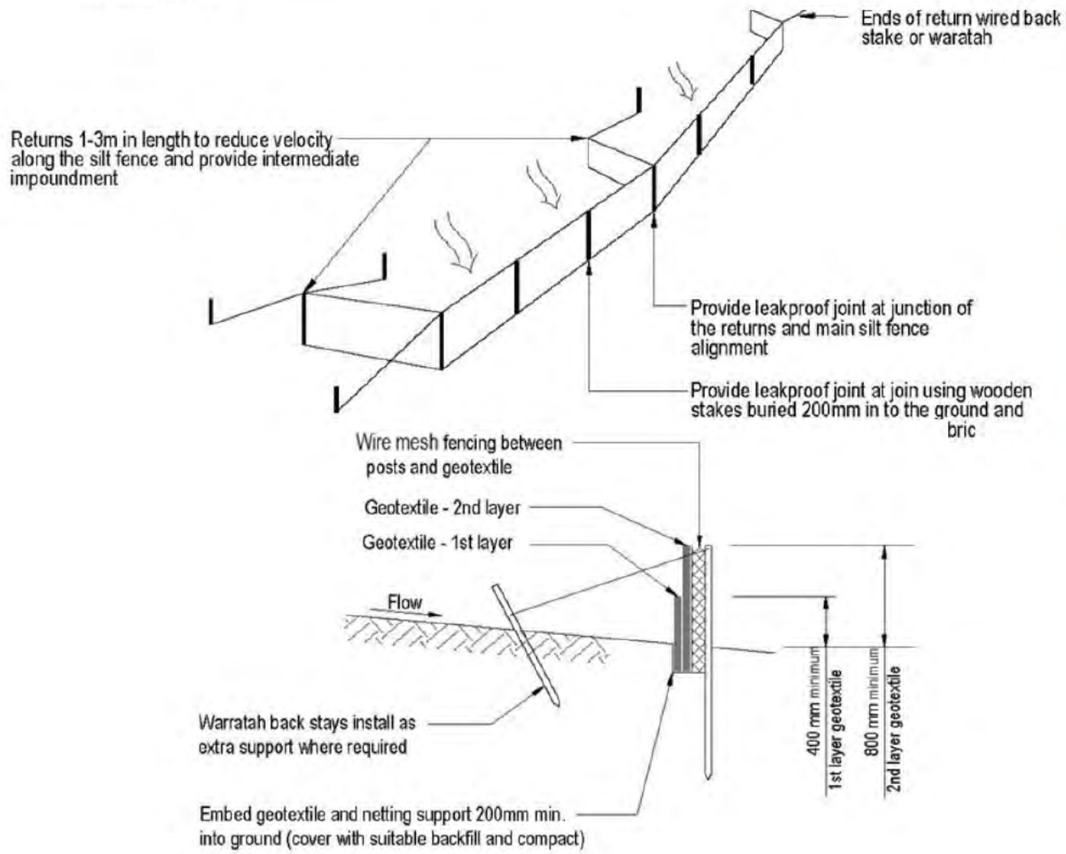
Drawn	Approved	Date	Drawing Number	Revision
LC	TG	23/05/2025	ESCP - 018	B

SUPER SILT FENCE

(Page 120-125 from GD05)







Slope steepness (%)	Slope length (m) (maximum)	Spacing of returns (m)	Silt fence length (m) (maximum)
0- 10%	Unlimited	60	Unlimited
10- 20%	60	50	450
20- 33%	30	40	300
33- 50%	30	30	150
Greater than 50%	15	20	75

- The super silt fence should be 800 mm above ground level and a minimum of 200 mm below ground level.
- The anchoring of the silt fence should ensure stability and the double layered geotextile should provide for drop-out prior to any water filtering through the upper portions of the fabric.
- It is imperative that the front face of the fence follows the contour as close as possible to ensure the designed holding capacity is achieved and to avoid creating pressure points on the fence.
- Supporting waratahs should be placed at 2-4 m intervals.
- Returns will be installed very ten metres along the silt fence.
- Stays to be installed with silt fence to provide additional structural support.

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Project: Ayrburn Screen Hub

Description: Erosion and Sediment Control Plan - Schematics

Drawn	Approved	Date	Drawing Number	Revision
LC	TG	23/05/2025	ESCP - 019	B

EROSION MATTING

Image from Enviroscope

- Coconut coir erosion matting can be applied to exposed slopes where directed by the geotechnical engineer and environmental consultant.
- Hydroseed or landscape planting can be applied to the surface prior to laying the coconut matting to provide long term stabilisation.

CHEMICAL DOSING UNIT (RADS)

Image from Enviroscope

- A Chemical Treatment Management Plan (CTMP) shall be prepared prior to construction commencing to provide sizing and dimensions of the RADS units and soil bench testing results.
- A RADS shall be provided for the SRPs.

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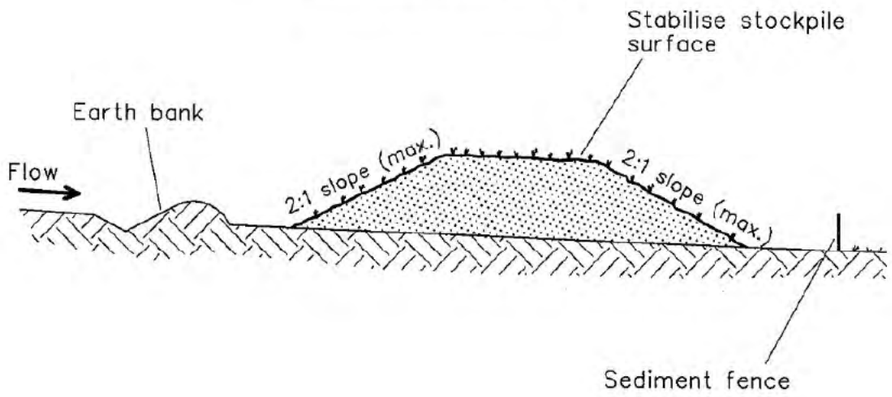
Project: Ayrburn Screen Hub

Description: Erosion and Sediment Control Plan - Schematics

Drawn	Approved	Date	Drawing Number	Revision
LC	TG	23/05/2025	ESCP - 020	B

TEMPORARY STOCKPILES



- Temporary stockpiles should be a maximum height of two metres to mitigate wind effects and to preserve the quality of the topsoil as future planting media for revegetation.
- If the stockpile is to be left insitu for a period of 4 weeks or more it shall be seeded with grass or erosion control matting to provide erosion and dust protection.
- A silt fence should be installed on the downslope of the stockpile.

STORMWATER INLET PROTECTION

Image from Enviroscope

- Inlet protection should simply consist of geofabric material placed in the grate as a filtering device.
- These should be monitored and cleaned out weekly and material should be replaced as soon as filtering capacity is lost.

SILT SOCKS

Page 126-130 from GD05

- It is important that the silt socks are secured flush with the ground to prevent sediment from undercutting the sock.
- Ensure silt socks are placed along the contour of a site.

COCONUT COIR LOGS

Image from Enviroscope

- Coir logs are typically constructed using densely packed coir fibre matts rolled up and secured within coir mesh in a tube-like structure.
- Coir logs should be placed within clean water flow paths to reduce flow velocity within channels and allow the capture of any residual sediment that infiltrates into clean water flows.
- Ensure coir logs are secured with waratahs so that logs make firm contact with ground level, preventing water from flowing underneath.

enviroscope	**Project:** Ayrburn Screen Hub **Description:** Erosion and Sediment Control Plan - Schematics				
	Drawn	**Approved**	**Date**	**Drawing Number**	**Revision**
	LC	TG	23/05/2025	ESCP - 021	B

REFUELING BAY

- Locate the hardstand as far as practicably possible from waterways and concentrated flows.
- Ensure spill kit is located nearby.

SPILL KITS

- Spill kits should be located in the laydown area.

CONCRETE WASHOUT PIT

- The concrete wash out pit consists of a plastic-lined bunded pit constructed with fill or straw bales.
- After concrete washout any water shall be left to evaporate.
- Cured concrete is to be disposed of within the plastic sheet to a licensed facility.

WASTE

- Where possible, waste shall be segregated into labelled bins.
- Wastes on site will be suitably contained and prevented from escaping off site. This may include covering skip bins during high winds.
- Waste storage is not permitted in or near drainage paths.
- Wastes will be removed from site when bin is full.

enviroscope	**Project:** Ayrburn Screen Hub **Description:** Erosion and Sediment Control Plan - Schematics				
	Drawn	**Approved**	**Date**	**Drawing Number**	**Revision**
	LC	TG	23/05/2025	ESCP - 022	B

WATERCOURSE DIVERSION

(Source: GD05)

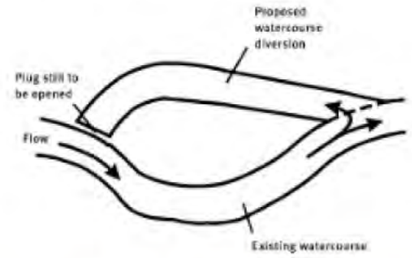


Figure 118: Diversion channel prior to plug removal

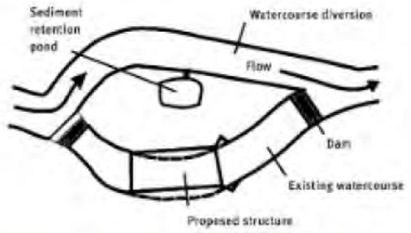


Figure 119: Dewatering construction area into a sediment pond

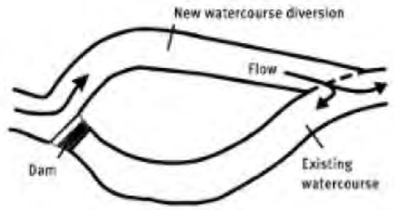
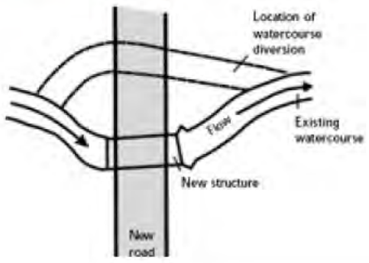


Figure 120: Opening up bypass channel and closing off existing one



enviroscope	**Project:** Ayrburn Screen Hub **Description:** Erosion and Sediment Control Plan - Schematics				
	Drawn	**Approved**	**Date**	**Drawing Number**	**Revision**
	LC	TG	23/05/2025	ESCP - 023	B

APPENDIX 2 Calculations for Erosion and Sediment Controls

CLEAN WATER DIVERSION CHANNEL - CALCULATIONS - AYRBURN SCREEN HUB - REVISION A

Specifications	Value 5	Units	Reference/Notes
Site Details			
Contributing catchment	1.4	ha	GIS - Upslope catchment
Design rainfall event	0.05	AEP	5% AEP as required by GD05
Time of Concentration			
Overland sheet flow path length (L)	111	m	Taken from furthest point to outlet of catchment
Hortons roughness value (n)	0.3		Steep pasture
Slope of surface (S)	20.0	%	Rise over run from furthest point to outlet of catchment
Time of Concentration (Tc)	8.0	minutes	
Rounded Tc to align with HIRDS	10	minutes	
Rational Method: Q = (C*I*A)/360			
Area ground cover	Grass		
Proportion of catchment	1		
Runoff coefficient (C)	0.7		Manning's Roughness Coefficient (n) High C value applied due to steep slope.
Rainfall intensity (I)	39.9	mm	NIWA HIRDS, 10 min (Tc), 5% AEP
Catchment Area (A)	1.40	ha	
Qp (Peak runoff flow)	0.1086	m3/s	Rational Method: Q = CIA
Total Qp (Peak runoff flow)	0.1086		
Channel Design			Manning's Formula Uniform Trapezoidal Channel Flow
Bottom Width	150	mm	
Batter ratio= 1 to	2	ratio	
Manning's roughness coefficient of channel (n)	0.2		Lined channel.
Channel slope	1.41	%	
Flow depth	200	mm	
Channel depth	500	mm	300 mm freeboard provided
Flow (Q)	0.1165	m3/s	
Buffer	0	%	
Top width	2150	mm	

DIRTY WATER DIVERSION CHANNEL CALCULATIONS - AYRBURN SCREEN HUB - REVISION A

Specifications	Value 5	Units	Reference/Notes
Site Details			
Contributing catchment	4.1	ha	GIS - Conservatively calculated for the largest and steepest catchment (Catchment C)
Design rainfall event	0.05	AEP	5% AEP as required by GD05
Time of Concentration			
Overland sheet flow path length (L)	330	m	Taken from furthest point to outlet of catchment
Hortons roughness value (n)	0.06		Bare soil
Slope of surface (S)	10.6	%	On average
Time of Concentration (Tc)	7.6	minutes	
Rounded Tc to align with HIRDS	10	minutes	
Rational Method: Q = (C*I*A)/360			
Area ground cover	Bare soil		
Proportion of catchment	1		
Runoff coefficient (C)	0.4		Manning's Roughness Coefficient (n): sloping silty soils
Rainfall intensity (I)	39.8	mm	NIWA HIRDS, 10 min (Tc), 5% AEP
Catchment Area (A)	4.10	ha	
Qp (Peak runoff flow)	0.1813	m3/s	Rational Method: Q = CIA
Total Qp (Peak runoff flow)	0.2770		
Channel Design			Manning's Formula Uniform Trapezoidal Channel Flow
Bottom Width	350	mm	
Batter ratio= 1 to	2	ratio	
Manning's roughness coefficient of channel (n)	0.025		Gravelly earth channel
Channel slope	1.5	%	Average slope
Flow depth	250	mm	
Channel depth	550	mm	300 mm as per GD05
Flow (Q)	0.287	m3/s	
Buffer	4	%	
Top width	2500	mm	
Additional Controls			
Drop out pit	Yes		
Check dams	Yes		
Geofabric lining	No		

DIRTY WATER DIVERSION CHANNEL - TEMPORARY CULVERT CALCULATIONS - AYRBURN SCREEN HUB - REVISION A

Specifications	Value	Units	Reference/Notes
Pipe diameter	250	mm	
Pipe material	Drainage coil	/ flexi flume	
Pipe length	7	m	
Drop	1	m	
Flow velocity	6.75	m/s	
Flow discharge	0.29	m3/s	Hazen-Williams Equation
Flow discharge in L/s	290	L/s	
Buffer	5	%	

SEDIMENT RETENTION POND B - CALCULATIONS - AYRBURN SCREEN HUB - REVISION A

Specification	Value	Value 2	Value 3	Units	Source / Notes / Reference
Site details					
Contributing catchment			2.30	ha	GIS
Percentage volume factor			2.0	%	2% sizing criteria selected due to space constraints and site soil characteristics.
GD05 theoretical SRP volume required			460.00	m3	
SRP Design Specifications	Total Storage	Dead Storage (30%)	Live Storage (70%)		
Top length (A)	33.00	28.20	33.00	m	
Top width (B)	11.00	8.60	11.00	m	
Base length (a)	25.00	25.00	28.20	m	
Base width (b)	7.00	7.00	8.60	m	
Depth (h)	2.00	0.80	1.20	m	Measured from primary spillway down
Internal batter ratio= 1 to	1	1	1	ratio	Batters should be compacted and must be lined with geofabric
Actual volume (v)	527.33	166.33	361.01	m3	
Width to length ratio	3:1	3.3:1	3:1	ratio	
Buffer	14.64%			%	
Percentage of total SRP	100.00%	31.54%	68.46%	%	
External batter ratio= 1 to	2	2	2	ratio	Batters should be compacted and must be lined with geofabric
Forebay details		Reduced Level (RL)			
Forebay volume requirement (+/- 3%)			52.73	m3	10% of SRP volume
Forebay length			7.00	m	
Forebay width			11.00	m	
Forebay depth		344.7	1.50	m	Exact R.Ls TBC on site with surveyor
Forebay internal batter ratio = 1 to			1.0	ratio	Line internal batters
Approximate forebay volume			59.25	m3	
Level spreader details		Reduced Level (RL)			
RL of level spreader		346.2		m	0.1-0.2 m higher than emergency spillway invert
Width of level spreader			11.00	m	Spans the full width of SRP
Inlet batter steepness= 1 to			3	ratio	
T-bar/ Decant details		Reduced Level (RL)			
RL at base of pond		343.7		m	
Base of lower decanting arm range		344.5	0.80	m	
Base of upper decanting arm range		345.1	1.40	m	
T-bar diameter			100.00	mm	
Decant arm length			2.00	m	
Decant rate			10.35	L/sec	4.5 L/sec/per hectare
Number of holes on lower T-bar			200	Holes	Standard order T-Bar with no holes covered.
Number of holes on upper T-bar			107	Holes	Cover holes on standard order T-bar to achieve this number of 10 mm diameter holes
Primary spillway details		Reduced Level (RL)			
RL at primary spillway		345.7		m	0.3 m lower than emergency spillway invert and 0.6 m lower than emergency spillway crest
Outlet pipe diameter			150.00	mm	Pipe drop to match the primary SRP outlet diameter. Approxiamtely 7 m length required
Emergency spillway		Reduced Level (RL)			
RL at emergency spillway invert		346.0		m	Exact RL's to be determined onsite with surveyor.
RL at emergency spillway crest		346.3		m	0.3 m higher than emergency spillway invert
Spillway width at invert			6.00	m	
Treatment train additions					
Drop out pit			Yes		
RADS unit			Yes		
Baffles			No		
Check dams			Yes		

SEDIMENT RETENTION POND C - CALCULATIONS - AYRBURN SCREEN HUB - REVISION A

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Specification	Value	Value2	Value3	Units	Source / Notes / Reference
Site details					
Contributing catchment			4.10	ha	
Percentage volume factor			2.00	%	2% sizing criteria selected due to space constraints and site soil characteristics.
GD05 theoretical SRP volume required			820.00	m3	
SRP Design Specifications	Total Storage	Dead Storage (30%)	Live Storage (70%)		
Top length (A)	40.00	34.80	40.00	m	
Top width (B)	13.50	10.90	13.50	m	
Base length (a)	32.00	32.00	34.80	m	
Base width (b)	9.50	9.50	10.90	m	
Depth (h)	2.00	0.70	1.30	m	Measured from primary spillway down
Internal batter ratio= 1 to	1	1	1	ratio	Batters should be compacted and must be lined with geofabric
Actual volume (v)	833.33	238.70	594.63	m3	
Width to length ratio	3:1	3.2:1	3:1	ratio	
Buffer	1.63%			%	
Percentage of total SRP	100.00%	28.64%	71.36%	%	
External batter ratio= 1 to	2	2	2	ratio	Batters should be compacted and must be lined with geofabric
Forebay details		Reduced Level (RL)			
Forebay volume requirement (+/- 3%)			83.33	m3	10% of SRP volume
Forebay length			6.00	m	
Forebay width			13.50	m	
Forebay depth		351.5	1.50	m	
Forebay internal batter ratio = 1 to			0.5	ratio	Line internal batters
Approximate forebay volume			86.63	m3	
Level spreader details		Reduced Level (RL)			
RL of level spreader		353.0		m	0.1-0.2 m higher than emergency spillway invert
Width of level spreader			13.50	m	Spans the full width of SRP
Inlet batter steepness= 1 to			3	ratio	
T-bar/ Decant details		Reduced Level (RL)			
RL at base of pond		350.6		m	
Base of lower decanting arm range		351.3	0.70	m	
Base of middle decanting arm range		351.7	1.13	m	
Base of upper decanting arm range		352.2	1.57	m	
Top decanting arm range		352.2	1.60	m	
T-bar diameter			150.00	mm	
Decant arm length			2.00	m	
Decant rate			18.45	L/sec	4.5 L/sec/per hectare
Number of holes on lower T-bar			200	Holes	Standard order T-Bar with no holes covered.
Number of holes on middle T-bar			200	Holes	Standard order T-Bar with no holes covered.
Number of holes on upper T-bar			147	Holes	Cover holes or drill holes on standard order T-bar to achieve this number of 10 mm diameter holes
Primary spillway details		Reduced Level (RL)			
RL at primary spillway		352.6		m	Pipe drop to match the primary SRP outlet diameter. 1-2% gradient with anti seep collars
Primary spillway pipe diameter			1,050.00	mm	Concrete riser to be used.
Emergency spillway		Reduced Level (RL)			
RL at emergency spillway invert		352.9		m	
RL at emergency spillway crest		353.2		m	0.3 m higher than emergency spillway invert
Spillway width at invert			6.00	m	
Treatment train additions					
Drop out pit			No		
RADS unit			Yes		
Baffles			No		
Check dams			Yes		

SEDIMENT RETENTION POND D - CALCULATIONS - AYRBURN SCREEN HUB - REVISION A

Specification	Value	Value 2	Value 3	Units	Source / Notes / Reference
Site details					
Contributing catchment			1.30	ha	GIS
Percentage volume factor			3.0	%	Greater space and proximity fo Mill Creek allows for 3% sizing criteria to be achieved.
GD05 theoretical SRP volume required			390.00	m3	Note that SRP D will be engineer designed to form part of the permanent stormwater infrastructure onsite. These calculations provide the minimum dimensions necessary for the sub-catchment during construction in accordance with GD05.
SRP Design Specifications	Total Storage	Dead Storage (30%)	Live Storage (70%)		
Top length (A)	35.00	24.60	35.00	m	
Top width (B)	11.00	5.80	11.00	m	
Base length (a)	19.00	19.00	24.60	m	
Base width (b)	3.00	3.00	5.80	m	
Depth (h)	2.00	0.70	1.30	m	
Internal batter ratio= 1 to	2	2	2	ratio	Batters should be compacted and must be lined with geofabric
Actual volume (v)	399.33	68.06	331.27	m3	
Width to length ratio	3.2:1	4.2:1	3.2:1	ratio	
Buffer	2.39%			%	
Percentage of total SRP	100.00%	17.04%	82.96%	%	
External batter ratio= 1 to	2	2	2	ratio	Batters should be compacted and must be lined with geofabric
Forebay details		Reduced Level (RL)			
Forebay volume requirement (+/- 3%)			39.93	m3	10% of SRP volume
Forebay length			6.00	m	
Forebay width			11.00	m	
Forebay depth		342.4	1.80	m	
Forebay internal batter ratio = 1 to			1.0	ratio	Line internal batters
Approximate forebay volume			43.63	m3	
Level spreader details		Reduced Level (RL)			
RL of level spreader		344.2		m	0.1-0.2 m higher than emergency spillway invert
Width of level spreader			11.00	m	Spans the full width of SRP
Inlet batter steepness= 1 to			3	ratio	Batters should be compacted and must be lined with geofabric
T-bar/ Decant details		Reduced Level (RL)			
RL at base of pond		341.7		m	
Base of lower decanting arm range		342.4	0.70	m	
Top decanting arm range		343.3	1.60	m	
T-bar diameter			150.00	mm	
Decant arm length			2.00	m	
Decant rate			5.85	L/sec	4.5 L/sec/per hectare
Number of holes on lower T-bar			200	Holes	Standard order T-Bar with no holes covered.
Primary spillway details		Reduced Level (RL)			
RL at primary spillway		343.7		m	0.3 m lower than emergency spillway invert and 0.6 m lower than emergency spillway crest
Primary spillway pipe diameter			150.00	mm	
Outlet pipe diameter			150.00	mm	Pipe drop to match the primary SRP outlet diameter. 1-2% gradient with anti seep collars
Emergency spillway		Reduced Level (RL)			
RL at emergency spillway invert		344.0		m	
RL at emergency spillway crest		344.3		m	0.3 m higher than emergency spillway invert
Spillway width at invert			6.00	m	
Treatment train additions					
Drop out pit			Yes		
RADS unit			Yes		
Baffles			No		
Check dams			Yes		

APPENDIX 3 Environmental Site Induction Handout

ENVIRONMENTAL SITE INDUCTION HANDOUT

Key Roles and Responsibilities

Role	Responsibilities
Project Manager	The Project Manager is responsible for the effective implementation of the EMP and has overall responsibility for the environmental performance of the project. Duties include: • Ensuring adequate resources are in place to implement the EMP. • Ensuring all staff and sub-contractors operate within the guidelines of the EMP. • Ensuring that an EMP is prepared, and that environmental standards, processes and procedures meet relevant resource consent conditions. • Overseeing the successful implementation, monitoring and review of the EMP. • Ensuring that inspections are carried out in accordance with the relevant EMP. • Restricting or stopping any activity that has the potential to or has caused adverse environmental effects. • Providing notification and reporting of Environmental Incidents to Council and other environmental reports as required by The Guidelines. • Delegating authority of the above responsibilities.
Environmental Representative	The Environmental Representative supports the Project Manager in the day-to-day implementation of the EMP. Duties include: • Ensuring the installation of environmental controls as per the EMP. • Undertaking environmental site inspections. • Overseeing the maintenance and improvement of defective environmental controls. • Providing environmental inductions to all staff and sub-contractors. • Assisting the project leadership in attending to Environmental Incidents and Complaints. The Environmental Representative shall be familiar with environmental risks associated with the project, the EMP and best practice erosion and sediment control principles and practices.
All staff and sub-contractors	All staff and sub-contractors have a responsibility to undertake all activities in accordance with the requirements of this EMP. This includes reporting any activity that has the potential to or has resulted in an Environmental Incident to the Project Manager or Environmental Representative.

Key Environmental Locations

Environmentally sensitive receptors: Nearby residential dwellings, staff working onsite, Ayrburn Domain, Mill Creek, Ephemeral Waterway.

Key Resource Consent Conditions

TBC.

Limits of Clearing and Importance of Staging

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

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

Key Environmental Management Measures in EMP

Erosion and Sediment Control (Section 4 of EMP)

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

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

Water Quality Management (Section 5 of EMP)

- Any observations of dirty water running offsite to be reported directly to the Environmental representative.
- All works relating to the diversion of Mill Creek must be undertaken in adherence with the construction methodology in Section 2.1 of the EMP.
- Water quality testing to be undertaken in accordance with section 5.0 of the EMP.

Dust Management (Section 6 of EMP)

- Dust suppression should occur on any exposed soil on unsealed roads, this can be done using the water caught in the retention ponds.
- Avoid all unnecessary vegetation clearing that exposes soil and work should be conducted in stages as this can increase the impact from dust in the event of strong winds.
- During high wind events and dust suppression is becoming difficult works must cease until more favourable weather conditions.
- Constant vigilance should be maintained onsite to ensure that dust is appropriately managed and weekly monitoring should be completed to ensure that management measures are effective.

Noise and Vibration Management (Section 7 of EMP)

- Noise producing works only be undertaken during the hours of 0730-1800 from Monday-Saturday and no works to be completed on Sundays or public holidays.
- Particularly noisy work should be completed during the middle of the day during business hours.
- Noise dampening should occur when possible.
- Weekly site inspections should be undertaken by the Environmental Representative to ensure the strategies in place are effective.

Cultural Heritage Management (Section 8 of EMP)

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

Vegetation Management (Section 9 of EMP)

- Maintain vegetated surfaces as far as reasonably possible.
- Maintain protected or indigenous vegetation.
- Complete all landscaping and or ecological restoration in accordance with approved plans.

Chemicals and Fuel Management (Section 10 of EMP)

- Chemicals and fuels are stored and used so not to cause contamination of works areas and the surrounding environment.

Waste Management (Section 11 of EMP)

- Waste management on site will ensure wastes are stored safely and in an organised manner until recycling, reuse or disposal.

Contaminated Land Management (Section 12 of EMP)

- Prevent the spread of contamination.
- Follow discovery procedures outlined in Section 12 of the EMP if contaminated material is uncovered during earthworks.
- Engage the Environmental Consultant (SQEP) to ensure that the site can be managed in accordance with statuary requirements (i.e., National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health).

Environmental Incidents

The procedure for managing environmental incidents is outlined in **Section 3.5** of the EMP, however these can be summarised as follows:

- Environmental incidents must be reported as soon as they occur, and the Project team must respond immediately to mitigate further environmental impacts.

- Investigation into the cause of the incident should be completed and a solution should be constructed to remediate the Environmental damage.
- The Project Manager must then notify the QLDC and/or the ORC of the details of the incident within 12 hours of being made aware of the incident.

Rapid Response for Storm Events

The procedure for rapid response to storm events is outlined in **Section 4.6** of the EMP, however these can be summarised as follows:

- The Project Manager will observe and understand the **weather forecast** throughout the project to ensure appropriate preparation onsite.
- If a **significant or adverse weather** is forecast all works should stop within an appropriate amount of time to inspect ESC devices and undertake any maintenance or site stabilisation required.
- The sediment controls should be in operating condition and fully functional.
- During the storm event the site should be monitored to sure the functioning of the ESC devices and maintained if required.

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

APPENDIX 4 Environmental Site Induction Register

Ayrburn Screen Hub

ENVIRONMENTAL SITE INDUCTION REGISTER

Name	Organisation	Date Inducted	Induction Delivered by	Signature

APPENDIX 5 Weekly Environmental Site Inspection Form

Ayrburn Screen Hub

WEEKLY ENVIRONMENTAL SITE INSPECTION FORM

Environmental Representative: Date:

Item	Yes	No	Comment
General			
Is the EMP available onsite?	☐	☐	
Have any environmental incidents occurred during the week? If so, provide details	☐	☐	*If yes, complete environmental incident report.
Complete description of weather for upcoming week – circle applicable			

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
						

Are there any rain events forecasted for the coming week?	☐	☐	
Have pre rain event inspections been completed?	☐	☐	
Have post rain event inspections been completed?	☐	☐	
Water Quality			
Is water quality monitoring occurring when water is flowing across the site boundaries?	☐	☐	*If yes, complete water quality monitoring form
Is there visual evidence of sediment from the construction site entering Mill Creek or the Ephemeral Waterway?	☐	☐	
Does water in sediment retention devices meet water quality criteria before being discharged?	☐	☐	
Are daily visual inspections of waterways being conducted and recorded by the Project Manager?	☐	☐	
Erosion and Sediment Control			
Are works contained within the current stage and site boundaries?	☐	☐	
Are completed areas being progressively stabilised?	☐	☐	
Is there any new evidence of erosion?	☐	☐	
Are erosion and sediment controls installed as per the ESCP?	☐	☐	

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Item	Yes	No	Comment
Is dirty water entering dirty water diversion channels during rain events?	☐	☐	
Do sediment controls have over 80% capacity?	☐	☐	
Cultural Heritage			
Have any finds of cultural significance been found?	☐	☐	
Noise and Vibration			
Have any complaints been received during the week?	☐	☐	*If yes, complete Complaints Register
Are nearby sensitive receptors being notified before significant noise and/or vibration causing activities?	☐	☐	
Are works only occurring within the hours of operation?	☐	☐	
Dust			
Have any complaints been received during the week?	☐	☐	*If yes, complete Complaints Register
Are works being staged to minimise soil exposure?	☐	☐	
Have completed areas been revegetated or stabilised?	☐	☐	
Is dust suppression of disturbed work areas and stockpiles occurring?	☐	☐	
Are works ceasing during high winds?	☐	☐	
Are only designated access points and haul routes being used?	☐	☐	
Is the site access and surrounding roads swept clean of sediment?	☐	☐	
Vegetation			
Are vegetated surfaces being maintained as far as reasonably possible?	☐	☐	
Contaminated Soils			
Have any contaminants been uncovered during excavations?	☐	☐	
Chemicals and Fuels			
Are all hazardous substances on site stored, transported and used according to the safety data sheet requirements?	☐	☐	
Are vehicles and plant being refuelled in the refuelling bay?	☐	☐	

Item	Yes	No	Comment
Is concrete washing being undertaken in the concrete wash-out pit?	☐	☐	
Is there an adequate supply of spill kits onsite? Have any used materials been replaced?	☐	☐	
Waste			
Is the site in a safe, clean and tidy state?	☐	☐	
Are wastes segregated into labelled bins with lids?	☐	☐	
Are skip bins not overfilled?	☐	☐	
Is waste removed from open drains and drainage paths?	☐	☐	

Actions resulting from this inspection must be forwarded to the Project Manager any actions should be recorded in the Non-Conformance Register – **Appendix 8**.

Additional Comments:

Names and Signatures of inspection attendees:

APPENDIX 6 Environmental Incident Report Form

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ENVIRONMENTAL INCIDENT REPORT FORM

Project Address:	**Consent Number:**
Brief Project Description:	

Instructions- Complete this form for all environmental incident that cause contaminants (including sediment) or environmental nuisance to leave the site. Be succinct, stick to known facts and do not make assumptions. Once completed submit to Queenstown Lakes District Council at RCMonitoring@qldc.govt.nz and Otago Regional Council at pollution@orc.govt and compliance@orc.govt.nz. Call the QLDC Regulatory team immediately on 03 441 0499 and ORC's Pollution Hotline on 0800 800 033 for any serious or ongoing incidents that cannot be brought under immediate control.

Date and Time	Date: XX/XX/XXX Time: XX:XX hours
Description? Provide a brief and factual description of what happened during the incident, include relevant details such as: - The activity being undertaken when the incident occurred - The estimated distance to nearest waterway (include stormwater and dry courses) - The estimated distance to the nearest sensitive receiver Sketches/diagrams/photos may be referenced and appended to this report to aid in the description of the incident.	
Exact Location of the incident? Include address, landmarks, features, nearest tree, etc. Maps and plans can be attached.	
Quantity or volume of material escaped or causing incident? (provide and estimate quantity)	
Who identified the incident?	Contractor ☐ Council ☐ Community ☐ Other ☐

What immediate actions/control measures were taken to rectify or contain the incident?
What initial corrective action will be taken to prevent similar incidents recurring in the near future?
Has the Queenstown Lakes District Council been notified? Yes ☐ No ☐ Will be notified ☐ **Has the Otago Regional Council been notified?** Yes ☐ No ☐ Will be notified ☐

Role of person making report: Project Manager / Site Supervisor / Environmental Representative / SQEP Name..... Signature..... Organisation..... Date..... Mobile phone number.....

APPENDIX 7 Environmental Complaints Register

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ENVIRONMENTAL COMPLAINTS REGISTER

Complaint #	Date and Time Received	Complainant details (name, address, phone number)	Details of Complaint	Investigation and Findings	Outcome	Close out Date

APPENDIX 8 Environmental Non-Conformance Register

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ENVIRONMENTAL NON-CONFORMANCE REGISTER

Ref Number	Date Observed	Found via (e.g., inspection, monitoring, complaint?)	Details of Non-conformance	Corrective Actions	Updated by	Close out Date

APPENDIX 9 Water Quality Monitoring Results Form

WATER QUALITY MONITORING RESULTS FORM

Date		Monitoring Trigger		Location Description	
			Yes	No	Measurement
Is turbidity < 100 NTU?			☐	☐	NTU
Is the clarity of the water more than 100 mm?			☐	☐	____ mm
Is the pH of the water between 5.5-8.5?*			☐	☐	pH ____
Are total suspended solids less than 50 mg/L?*			☐	☐	____ mg/L
Are hydrocarbons visible?			☐	☐	
Are tannins visible in the water?			☐	☐	
Is there any waste in the water?			☐	☐	
Description of any non-conformance and actions required: •					
Include images of sampling location:					

HOW TO: WATER QUALITY SAMPLING

1. Select a Sampling Location

Sampling a discharge

Collect sample where water crosses the site boundary or enters a sensitive receptor from a retention device. Always photograph the location you sample from.

Sampling a waterway

Collect sample from the centre of the flow and the top third of the water column where possible.

Sampling a from a Sediment Retention Device

Collect sample from the discharge location, this is either near the decanting arms, spillway, hose or the outlet pipe.

2. Collect a Water Sample

Taking a Water Sample

- ➔ Label container with site name, sampling location, date and time taken.
- ➔ Fill the container with water from the surface of your sampling location.

If you wade into the water to collect the sample, always collect the sample 'upstream' of where you're standing to avoid contamination by disturbed sediment.

Always ensure your meters are calibrated regularly to ensure accurate sampling results.

3. Measure and Record Turbidity, Clarity, and pH

Measuring Turbidity using a Turbidity Meter

- ➔ Fill the turbidity pottle with the sampled water. Wipe away any moisture on the outside of the pottle and insert it into the meter. Turn the meter on and once the standby value appears press read. Record the turbidity value.

Measuring Clarity using a field testing seechi disc

- ➔ Lower the seechi disc into the water sample until you can no longer see the disc. Then lift the seechi disc back up until the disc is just visible. Record the number where the water level sits.

Measuring pH using a pH Meter

- ➔ Submerge the probe of the pH meter into the water sample. Keep the probe in the water until the value on the meter is fixed. Swirling the probe can help the value fix faster. Record the pH value.

APPENDIX 10 Archaeological Discovery Protocol

HERITAGE NEW ZEALAND
POUHERE TAONGA

Heritage New Zealand Pouhere Taonga Archaeological Discovery Protocol

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

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

1. Work shall cease immediately at that place and within 20m around the site.

2. The contractor must shut down all machinery, secure the area, and advise the Site Manager.

3. The Site Manager shall secure the site and notify the Heritage New Zealand Regional Archaeologist. Further assessment by an archaeologist may be required.

4 If the site is of Maori origin, the Site Manager shall notify the Heritage New Zealand Regional Archaeologist and the appropriate iwi groups or kaitiaki representative of the discovery and ensure site access to enable appropriate cultural procedures and tikanga to be undertaken, as long as all statutory requirements under legislation are met (*Heritage New Zealand Pouhere Taonga Act*, *Protected Objects Act*).

5. If human remains (koiwi tangata) are uncovered the Site Manager shall advise the Heritage New Zealand Regional Archaeologist, NZ Police and the appropriate iwi groups or kaitiaki representative and the above process under 4 shall apply. Remains are not to be moved until such time as iwi and Heritage New Zealand have responded.

6. Works affecting the archaeological site and any human remains (koiwi tangata) shall not resume until Heritage New Zealand gives written approval for work to continue. Further assessment by an archaeologist may be required.

7. Where iwi so request, any information recorded as the result of the find such as a description of location and content, is to be provided for their records.

8. Heritage New Zealand will determine if an archaeological authority under the *Heritage New Zealand Pouhere Taonga Act* 2014 is required for works to continue.

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

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

Heritage New Zealand Regional archaeologist contact details:

Dr Matthew Schmidt
Regional Archaeologist Otago/Southland
Heritage New Zealand
PO Box 5467
Dunedin
[redacted]