



EROSION AND SEDIMENT CONTROL MANAGEMENT PLAN

**MACRAES PHASE 4 PROJECT
MACRAES OPERATION**

OCEANA GOLD (NEW ZEALAND) LIMITED

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1. INTRODUCTION

The purpose of this Erosion and Sediment Control Management Plan (ESCMP) is to detail the erosion and sediment control (ESC) management and monitoring systems that will be implemented for the duration of the site preparatory earthworks activities associated with Oceana Gold (New Zealand) Limited (OGL) Macraes Phase 4 (MP4) project.

The ESCMP includes details of process and procedures that will be followed and confirms how the ESC management and monitoring will be undertaken to ensure that effects and performances are managed appropriately.

The ESCMP covers:

- Concepts that inform the development of the Site-Specific Erosion and Sediment Control Plans (SSESCPs).
- Site management structures, practices, and procedures
- Weather Monitoring
- Erosion and Sediment Control Monitoring
 - Scheduled site visits, pre and post rain event monitoring and water sampling.
 - Rainfall event triggered water clarity and pH monitoring.
- Reporting
 - Rainfall trigger event reporting following a rainfall trigger event.
 - Recommendations of changes that need to be implemented onsite and modifications to any ESC will also be included.

Most of the MP4 works are located within or adjacent to the existing Macraes mining disturbance footprint. From an ESC perspective, the main areas requiring further consideration are those where new disturbance may drain externally toward natural drainage paths, wetlands or existing receiving environments, and those where existing ESC infrastructure may need to be upgraded to accommodate revised catchments or flow paths. These areas of disturbance should also be covered by a SSESCP.

The ongoing monitoring and reporting that is proposed in this plan creates a continuous feedback loop of the performance of the Project ESC site and device management. This plan provides the approaches to be followed regarding ESC maintenance, monitoring, and reporting.

Reference Plans / Reports

- MP4 - Erosion and Sediment Control Report, Rev 0, dated 21 August 2026 prepared by Engineering Geology Limited. (ESCR).
- Auckland Council's Guideline Document GD05 '*Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region*', Version 2, June 2026 (GD05).
- Otago Regional Council's '*Residential Earthworks in Otago*', Version 2, June 2026.

1.1. Erosion and Sediment Control Design

Otago Regional Council's 'Residential Earthworks in Otago' provides guidance for residential earthworks¹. Therefore, the ESC design for the MP4 Project will be based on the guidance and principles of Auckland Council's Guideline Document '*Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region*,' Guideline Document GD05, Version 2, June 2026 (GD05).

As a result of the scale and nature of the works proposed, deviations from that 'standard' will be required. Alternative approaches will be detailed in the corresponding SSES CPs and will be designed to achieve the same or better outcome than an approach that is completely consistent with GD05.

Permanent or more permanent than the temporary ESC Sediment Retention Ponds, referred to as 'Silt Ponds' will be sized as per details provided in the EGL ESC Report (ESCR)².

The ESCP follows an overall Best Practical Option (BPO) approach to the earthworks activities which combines the minimum design standard with appropriate staging and other controls, based on the characteristics of the individual component areas.

The ESC design approach is illustrated in Figure 1. It is intended that the ESCR and this ESCMP are assessed and become approved documents under the Fast Track Approvals Act 2024 (FTAA).

The consent conditions in conjunction with the relevant design standards inform the development of the SSES CPs. This is typically based on an overarching ESC framework, provided through the ESCR and ESCMP. The SSES CPs focus on the management of specific sites and activities throughout the project construction phase. This approach enables specific areas of high construction complexity to be identified, stated and successfully managed. Each SSES CP will be submitted to ORC for certification prior to the commencement of earthworks within a given area / site.

¹ Residential development is defined in the Regional Plan: Water for Otago as: "... the preparation of land for, and construction of, development infrastructure and buildings (including additions and alterations) for residential activities and includes retirement villages. It excludes camping grounds, motor parks, hotels, motels, backpacker accommodation, bunkhouses, lodges and timeshares. The terms development infrastructure, residential activity, and retirement village are defined in the National Planning Standards."

² Erosion and Sediment Control Report, prepared by Engineering Geology Limited.

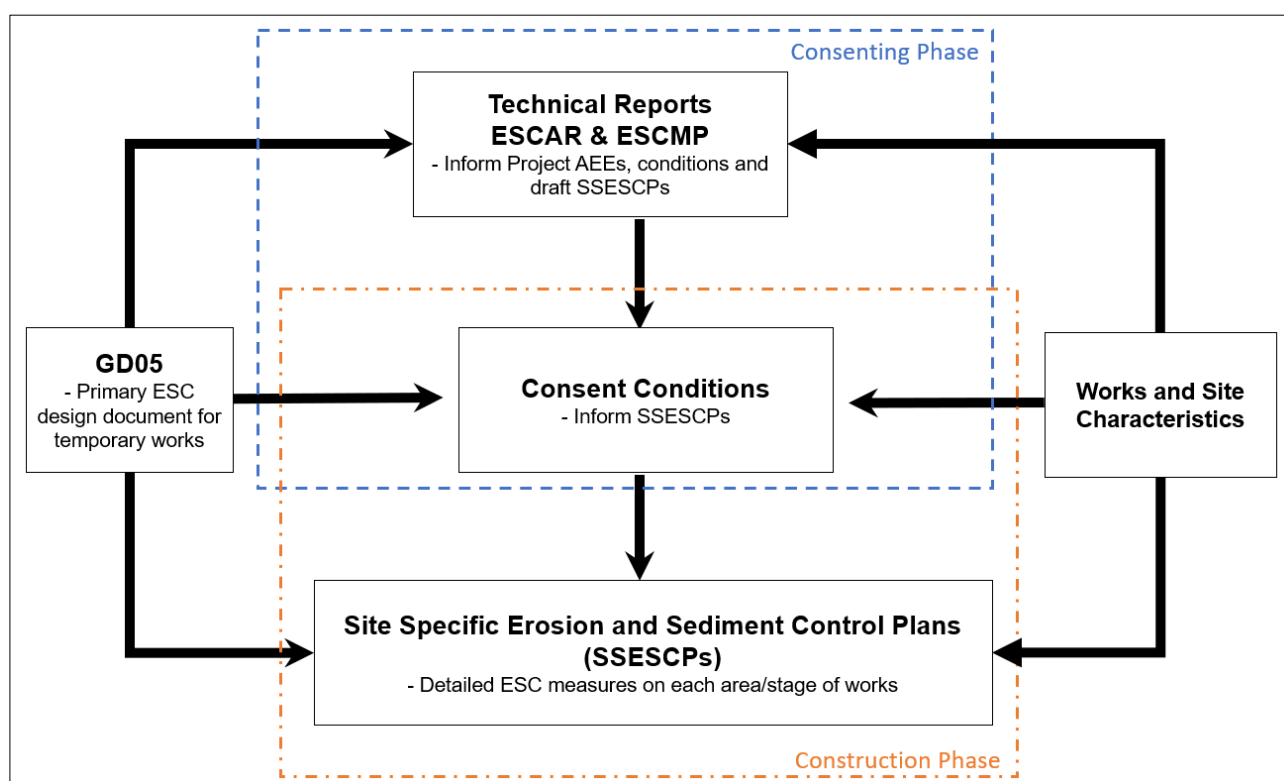


Figure 1: Erosion and sediment control design process.

2. SITE SPECIFIC EROSION AND SEDIMENT CONTROL PLANS

A SSESCP is required and will be developed prior to earthworks commencing within a new earthworks area associated with the MP4 Project. A SSESCP will be prepared by a Suitably Qualified and Experienced Practitioner (SQEP) in ESC.

The criteria for a SSESCP includes:

1. A new earthworks or construction area that will drain directly to the receiving environment and is outside of the existing disturbed mine areas and controls.
2. An existing earthworks or mining area but the operation will expand outside of the previously designed water controls.
 - a. Note, a brief SSESCP may be required for an existing area with existing water controls where the footprint will expand. In this case the SSESCP will confirm that the existing controls are adequate for the expansion or additional activities.
3. Streamworks or work associated with streams, wetlands and overland flow paths, including installation of culverts.

A SSESCP is not required for existing mine areas that have existing ponds or water management systems. I.e. these would already have existing operational approvals.

It is expected that a SSESCP will be required for (but may not be limited to):

- Extensions to existing open pits within the Golden Bar, Coronation, Coronation North and Innes Mills group of pits. Note, this may be a simple SSESCP that confirms that the existing controls are sized correctly or have sufficient capacity for the expansion(s).
- Waste rock storage in or near open pits or existing rock stacks at Coronation, Coronation North, Innes Mills, Golden Bar, Golden Point, Frasers and Back Road.
- New waste rock stack (WRS), including Trimbells, Coronation North and Golden Bar.

- Construction of new haul roads / access tracks (includes the construction of heavy vehicle and light vehicle roads/tracks).
- Realignment of Macraes and Golden Bar Roads.

Prior to earthworks commencing in each area, the corresponding SSESCP will be submitted to the Otago Regional Council (ORC) for certification as required by the conditions of consent.

The SSESCPs will include (but not limited to):

- i. the specific construction activity to be undertaken and methodologies for construction;
- ii. the area, volume and location of earthworks and streamworks,
- iii. If streamworks are required, the nature of the streamworks at specific locations,
- iv. Identification of the downstream receiving environment;
- v. Methods for managing construction water effects for specific activities, including design details for the proposed ESC measures;
- vi. Supporting calculations and design drawings;
- vii. Catchment boundaries and contour information;
- viii. The duration of the earthworks and/or streamworks;
- ix. The time of the year that the works are to be undertaken, and where applicable, the measures to be implemented to respond to any heightened weather risks at that time;
- x. Stabilisation methods and timing to reduce the open area at key locations to assist with a reduction in sediment generation; and
- xi. Chemical treatment (flocculation) of SRPs.

3. EROSION AND SEDIMENT CONTROL IMPLEMENTATION

ESC is implemented by the following personnel:

- **Open Pit Mine Manager** – overall responsibility for the site and effectiveness of the sediment controls. Authorises any significant modification or maintenance requirements.
- **Open Pit Production Supervisors** – responsible for ensuring works undertaken are in accordance with the design and principles of the Erosion Sediment Control Plan.
- **Senior Mine Engineer** – responsible for reviewing the Erosion Sediment Control Plan and updating as required.
- **Environmental Officer/Civil Works Technician** – responsible for completing inspections at the required frequency.
- **Environmental Officer** – responsible for water quality testing, rainfall monitoring and reporting.

The construction of all ESC's will be managed as follows:

- A SQEP in ESC will prepare the SSESCP in conjunction with the relevant construction site personnel for a specific work area, which may be a site (e.g. Trimbells WRS), or a state of a site.
- Each SSESCP will be approved by the Environmental staff and then submitted to ORC for certification.
- Once certified, the Environmental staff will issue the certified SSESCP to the Project Manager (or nominated staff member) responsible for the implementation.
- A pre-construction meeting will be held by the Environmental staff with the Project Manager (or nominated staff member) before the works commence. ORC will be invited to attend the

pre-construction meeting The pre-construction meeting will include discussion on the ESC's to be built and specific direction provided on construction of those ESC.

- The location of the ESC's and requirements of the relevant SSESCP will be confirmed on site with the construction team and the Environmental staff
- The construction of the controls will be overseen by the Environmental staff and / or the SQEP in ESC/ designated representative
 - Hold points for construction will be established for each control whereby the Environmental staff (or SQEP in ESC) will inspect the work completed, for example the installation of anti-seep collars or the installation of the primary outlet.
- Each control will be 'as built' certified by the Environmental staff (or SQEP in ESC) to confirm compliance with the certified SSESCP prior to bulk earthworks commencing in the catchment of the device(s). Works within the catchment of an ESC device will not commence until the as-built document for the device (or devices) has been certified by a SQEP in ESC.
- Copies of the 'as-built' certifications will be provided to ORC on request.
- Ongoing monitoring and maintenance will be undertaken. Refer to Sections 4-6.
- Decommissioning of an ESC measure will only be undertaken when the contributing catchment is stabilised, or the catchment is controlled by an alternative appropriate and approved water control measure.

4. WEATHER MONITORING

4.1. Rain Forecast

Rain forecasts relevant to the site will be checked daily using the MetService / MetVuw online / Earth Sciences NZ forecasting systems. Close monitoring of the rain forecast will be necessary to ensure the appropriate site works can be implemented prior to rainfall trigger events.

During working days, daily weather forecast checks will be forwarded to all Project Engineers and recorded in the daily prestart job sheets.

If the forecasts show more than 35mm of rainfall over a 24-hour period, then this will trigger the pre-rain event inspections (rain event with forecast >35mm over 24 hours), refer to Section 5.1 for further details. The purpose of these inspections is to check that the ESC devices and controls are set-up and ready for the rain event. This is in addition to the routine pre-rain event inspections undertaken by Project Engineers.

4.2. Rain Gauges

Rainfall will be recorded at the existing weather station located Golden Point Road. The Environmental Manager will monitor rainfall recorded at that site. Rainfall trigger responses will be based on recorded events at that location, which is sufficiently close to the various earthworks packages to be undertaken during the MP4 Project.

5. EROSION AND SEDIMENT CONTROL MONITORING

The Environmental Manager or nominated environmental staff will conduct routine inspections of the MP4 Project. These inspections will take place with adequate time allocated and will be thorough and systematic.

Representatives of the project construction team including the Project Engineer, will accompany the Environmental Manager or SQEP in ESC on these inspections so that the Environmental Manager or SQEP in ESC can better understand the work occurring at that time and that programmed to take

place. It is also useful for the Project Engineers to be reminded of their ESC obligations and for both parties to recognise good performance and outcomes, and where performance has not been to the standard expected or required by consents. This is particularly relevant in identifying how communication between personnel can be improved to avoid a recurrence of an issue.

Communication is critical to the successful implementation of SSES CPs. Internal inspections will cover all areas of the MP4 Project, even those that may have been dormant for some time, to ensure that the erosion and sediment controls are still operating properly. These internal inspections will be captured in writing and will include actions and timeframes for close out.

5.1. Site Inspections

5.1.1. Internal Site Inspections

Routine inspections are undertaken during and post instalment of ESC devices. During construction, certain stages are identified for inspection, such as during the installation of anti-seep collars, level spreaders, and T-bars.

Post construction monitoring is undertaken once a sediment retention device is operational, and if chemical treatment is used, the rainfall activated chemical treatment system is operational for the first time. Monitoring will take place as soon as practicable following the first rainfall event that generates runoff to the ESC device. This is to assess the performance of the device and chemical treatment system and the resulting quality of treated water being discharged from the site.

The site will be inspected weekly as a minimum by the Environmental Manager (or nominated person) and / or SQEP in ESC during the course of the works. These inspections will ensure that all ESC devices are installed correctly and then operate effectively throughout the duration of the works. This inspection programme will provide certainty to all parties that appropriate measures are being undertaken to ensure compliance with conditions of consent and the certified SSES CPs. The inspection regime will keep ESC management at the forefront of works on site. Any potential problems will be identified immediately, and remedial works will be promptly carried out.

The inspection programme shall consist of:

- **Weekly site walkovers** involving the environmental team to inspect all ESC measures, identify any maintenance or corrective actions necessary, assign timeframes for completion, and identify any devices that are not performing as anticipated through the certified SSES CP. Any maintenance actions will be undertaken that day where practical. Actions will be recorded and issued to the Environmental Manager with specific actions required and closeout timeframes. Once completed, the Environmental Manager will inspect the works and close-out the item.
- **Pre-rain event:** Prior to all forecast rainfall events, checks will be made of ESC devices, to ensure that they are fully functioning in preparation for the forecast event. These will be undertaken by the Project Engineers, Site Supervisors or Environmental Team.
- **Pre-rain event with forecast >35mm over 24 hours:** These inspections are additional to the 'business as usual' pre-rain inspections. They must be undertaken by the Environmental Manager or nominated and sufficiently experienced person. Prior to forecast rainfall "trigger" events, specific site inspections will be undertaken, targeted at any additional ESC measures that are required to be installed to ensure that the sites ESC management system performs effectively during an expected larger event.
- **Rainfall Trigger Inspections:** During or immediately after a rainfall trigger event of >35mm rainfall over any 24-hour period (subject to health and safety restrictions) inspections will be made of all discharging SRP's and the following actions taken:

- Water clarity of the water within the device adjacent to the decant outlet, or taken from the outlet pipe will be measured using either a clarity tube or black disc indicator.
- pH testing of the inlet and outlet flows undertaken along with a general inspection of the sediment control devices.
- The rainfall trigger alerts will be monitored by the Environmental Manager.
- Any issues identified will be remedied as soon as practicable, and remedial measures will be recorded.

The purpose of these inspections is to confirm the performance of devices under the stress of heavy rainfall and obtain a spot check efficiency of the device.

- **Post-rain event:** Following all rainfall events including rainfall trigger events, inspections will be made of all ESC measures to ensure that all controls have performed as expected and to identify any maintenance requirements. Any remedial works will be documented during these monitoring inspections and immediately addressed where practical.

5.1.2. External (Regional Council) Site Inspections

The Environmental Manager or Project Manager will accompany the ORC compliance officer in all programmed ORC audits. All ESC maintenance actions identified by the ORC compliance officer will be recorded and issued to the Project Manager for actioning, based on ORC instruction. The Project Manager will report back the completion of those actions to the Environmental Manager who will inspect the works and confirm that those actions have been completed. Confirmation will be emailed to the ORC compliance officer.

5.2. Water Quality Monitoring

Water quality monitoring will be undertaken during rainfall trigger event (>35mm of rain within a 24-hour period) site walkovers to provide a snapshot of the ESC performance.

Water quality will be monitored by:

- Clarity (measured at the outlet end of all discharging SRPs)
- pH (measured at the inflow and outflow of each chemically treated device)

Chemical treatment will be monitored in accordance with the Project's Chemical Treatment Management Plan.

The following water quality targets apply to the site's ESCs and will be measured during/after each rainfall trigger event (>35mm in a 24 hours period):

- Clarity of at least 100mm; and
- pH between 6.0 and 8.5 of a chemically treated device.

If either of the targets identified are not achieved, then the management actions identified within Section 6.3 will be implemented.

6. MANAGEMENT RESPONSES

6.1. Regular Monitoring Responses

The key to successful implementation of ESC measures and minimising sediment yield will be through the weekly visual monitoring of the site and maintenance of controls. The responses to that monitoring will be as follows.

- A checklist record will be made of each device inspected and its conditions, noting any maintenance requirements and timeframes of that to be undertaken. Maintenance will be based on ensuring compliance with GD05 requirements.
- Ensuring all sediment retention devices are cleaned out before they reach 20% full of sediment.
- Completion of maintenance actions as soon as possible, and typically within 24 hours for standard issues and 8 hours for urgent issues.
- Emphasis on maintenance necessary prior to forecast rain.
- Sign-off of all completed maintenance and reporting to the Environmental Manager.

6.2. Incident Responses

If one (or both) of the following occurs:

- i. A failure of an erosion and/or sediment control (e.g. perimeter control, SRP or DEB) that results in visible discharge of sediment to a stream or wetland.
- ii. Slumping / mass movement or erosion associated with the works, but which is outside the catchment of a sediment control device or has resulted in a device being over-topped by sediment, where that sediment has discharged to a stream or wetland.

The responses will be:

- Inform ORC (within 24 hours).
- Remedy the failure or event to prevent further uncontrolled discharges.
- Determine if the discharge is an isolated case or is likely to be repeated; and
- Investigate and implement modifications. Modifications could include:
 - Make alterations to erosion and sediment control measures and methodologies;
 - Consider additional ESC;
 - Refinement of chemical treatment systems;
 - Progressive stabilisation in sub catchments;
 - Increase maintenance of controls; and
 - Amendments to methodologies and sequencing of works and refinement of controls necessary.
- Within 5 days provide ORC written notification including an explanation of the cause of the non-compliance, the steps taken to remedy the situation and steps taken to mitigate any future occurrence of the non-compliance.

6.3. Target Exceedance Responses

If either of the water quality targets detailed in Section 5.2 are not met the following management responses will occur.

- Within 24hrs of a target exceedance, a full audit of the condition of the control device and its contributing catchment will be carried out by the Environmental Manager and recorded in writing.
- Remedy and record any obvious causes on site that may have contributed to a threshold exceedance as soon as practicable.
- Identify any additional reasons for the exceedance and opportunities to modify the management of the site to improve overall performance which may include:
 - Consider additional ESC;

- Refinement of chemical treatment systems (if used); and
- Increase maintenance of controls.

If either of the targets are not achieved, then that SRP will be deemed to be 'high risk' for the next rainfall trigger event.

High risk SRPs will be subjected to additional scrutiny during pre-forecast inspections (forecasts of >35mm/24 hrs) to ensure that repeat breaches do not occur.

pH exceedance

Typically, chemical treatment of sediment control devices will slightly lower pH. If pH is recorded to be below 6.0, the following actions will occur:

- The catchment area of the treatment device will be checked against the area assumed when the chemical dosing rate was set. The area and / or dose rate will be adjusted as needed.
- The dose rate will be checked. Additional bench testing and adjustment of the dose rate will be made if required.
- The material exposed within the catchment of the device will be checked. If that incorporates PAF, all runoff from that catchment will be diverted to the treatment plant.
- The chemical treatment system will be reviewed and if necessary.

SRP discharge clarity

If the water clarity recorded at the outlet is less than 100mm, a review of the controls and catchment of the controls will be made. Generally, any maintenance requirements will have been identified during regular monitoring. Additional considerations will include the measures noted above i.e.:

- The current catchment area of the treatment device will be checked against the device's as-built catchment area to ensure that the device had adequate storage volumes for the current catchment area.
- Check the accumulated sediment volume in the main pond and in the forebay. Accumulated sediment will be cleaned out if required.
- Check that the T-bars (or dewatering device) is operating as per the design and discharging the top cleanest water within the device.
- Check that the appropriate erosion control was installed prior to the rain event (e.g. drop out pits, contour drains, dirty water diversions, etc).
- If chemical treatment is being used:
 - The catchment area of the treatment device will be checked against the area assumed when the chemical dosing rate was set. The area and / or dose rate will be adjusted as needed.
 - The dose rate will be checked. Additional bench testing and adjustment of the dose rate will be made if required.
 - The material exposed within the catchment of the device will be checked. If that incorporates material that differs to what was completed during bench testing, then additional soil sample(s) will be taken and bench testing completed to confirm the dose rate.
 - The chemical treatment system will be reviewed and if necessary.

Additional response measures may include:

- Increased frequency of desilting of device(s).
- Reducing the contributing catchment area by temporary stabilisation or by constructing additional control(s).
- Installation of additional erosion controls, e.g. more contour drains, drop out pits etc.

- Increasing forebay ponding areas within the site.

7. REPORTING

7.1. Rainfall Trigger Event Report

Following a rainfall trigger event (>35mm in a 24hr period), a summary report of the performance of SRPs, and overall ESC system observed during the rainfall event report will be prepared by the Environmental Manager.

The report will include:

- A summary of the rainfall (total and intensity)
- A summary of the manual monitoring undertaken and comparison of manual monitoring results to previously recorded results.
- A summary of the site performance against the performance targets.
- A record of any other matters which may have compromised the overall ESC performance during the rain event and the identified mitigation, maintenance, and management response.

The Rainfall Trigger Event Report will be made available to ORC, if requested within 10 working days of the rainfall trigger event.