



ADAPTIVE MANAGEMENT PLAN

EARTHWORKS STAGES 14 - 17

MILLDALE

FULTON HOGAN LAND DEVELOPMENT LTD

AUGUST 2026

Document Control

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Approval	
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Statement of Qualifications and Experience

My full name is Zachery Woods.

I am an environmental consultant at SouthernSkies Environmental. I hold the qualifications of Post Grad Diploma in Environmental Science and a Bachelor of Science in Environmental Science and Earth and Ocean Science and have 10 years' professional experience in the field of erosion and sediment control. My experience includes authoring the Adaptive Management Plans for Milldale as well as the rainfall trigger event monitoring since 2017. I was the author of the Erosion and Sediment Control Assessment Report for the Waihi North Project and Maitahi Village projects approved under the FTAA. I have also prepared adaptive management plans for several other earthworks projects including the Drury Town Centre and Drury East Stages 4-7.

I have been engaged by Fulton Hogan Land Development Limited (FHLD) (the Applicant) to prepare an Adaptive Management Plan associated with the Milldale Stages 14-17 project and to prepare this report in support of the substantive application under the Fast-track Approvals Act 2024 (FTAA).

While this is not an Environment Court proceeding, I confirm that I have prepared this assessment in accordance with the applicable professional and ethical obligations of my profession and that the opinions expressed are within my area of expertise.

My full name is Campbell Stewart.

I am an environmental consultant and director of SouthernSkies Environmental. I hold the qualifications of Bachelor of Resource Studies and have 31 years' professional experience in the field of erosion and sediment control. My experience includes the lead technical author of the Auckland Council Guideline Document 05 'Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region' (GD05) 2016 and the 2026 update for the management of erosion and sediment associated with construction sites. I was the author of the Erosion and Sediment Control Assessment Reports for the Drury Quarry Expansion (the Sutton Block), the Takitimu North Link Project, the Waitaha Hydro Project applications approved under the FTAA. I have been involved with rainfall trigger event monitoring on the Milldale site since 2017.

I have been engaged by Fulton Hogan Land Development Limited (FHLD) (the Applicant) to review the Adaptive Management Plan associated with the Milldale Stages 14-17 project and to prepare this report in support of the substantive application under the Fast-track Approvals Act 2024 (FTAA).

While this is not an Environment Court proceeding, I confirm that I have prepared this assessment in accordance with the applicable professional and ethical obligations of my profession and that the opinions expressed are within my area of expertise.

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1. Introduction

This report has been prepared in support of the substantive application for the Milldale Stages 14-17 Project under the Fast-Track Approvals Act 2024 (FTAA).

The Project relates to approximately 231ha of land centred around Wainui Road in Wainui, Auckland. The proposal provides for a comprehensively planned urban development including residential neighbourhoods, a supporting commercial node, transport and servicing infrastructure, open space, wetland restoration, an ecological restoration area and associated enabling works.

The application seeks approvals necessary to facilitate the staged development of the Project, including a suite of resource consents required under the FTAA framework.

The substantive application is supported by a comprehensive set of technical assessments and plans addressing the environmental, servicing and infrastructure matters associated with the proposal. This report should be read alongside the Planning Report and the appended technical reports and drawings lodged in support of the substantive application.

Purpose and Scope of this Report

This report addresses matters relating to the erosion and sediment control and water quality monitoring associated with the Project proposal. It seeks to provide a robust management tool for the monitoring and management of the erosion and sediment control measures and associated water discharges to the receiving environment.

This report has been prepared having regard to the relevant statutory and technical framework applicable to the proposal, including the Auckland Council's *'Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region,'* June 2016 (GD05).

Site Description

The site comprises approximately 231ha of land held across various records of title at Milldale, Wainui ('the site', refer to the figure below). The site is located to the north of the existing and consented Milldale development. The site comprises two distinct areas:

- Residential subdivision area to the south of the Ōrewa River (shown in red in Figure 1), and
- Te Korowai o Maraeariki to the north of the Ōrewa River (shown in orange in Figure 1).

The proposed residential subdivision area is located within the Future Urban Zone under the Auckland Unitary Plan (AUP). This part of the site is characterised by gently undulating to rolling pasture, with several streams, natural wetlands, constructed ponds and artificial drains traversing the area.

Te Korowai o Maraeariki is located to the north of the Ōrewa river and is zoned Rural Production under the AUP. This area is characterised by more undulating to steep terrain, with a series of ridgelines separated by incised gullies extending from the Ōrewa River. The land is predominantly managed pasture interspersed with streams and natural wetlands, together with pine plantations, exotic vegetation and gorse scrub. Relatively large areas of indigenous vegetation are also present, including a Significant Ecological Area – Terrestrial Overlay in the north-western portion of the site.

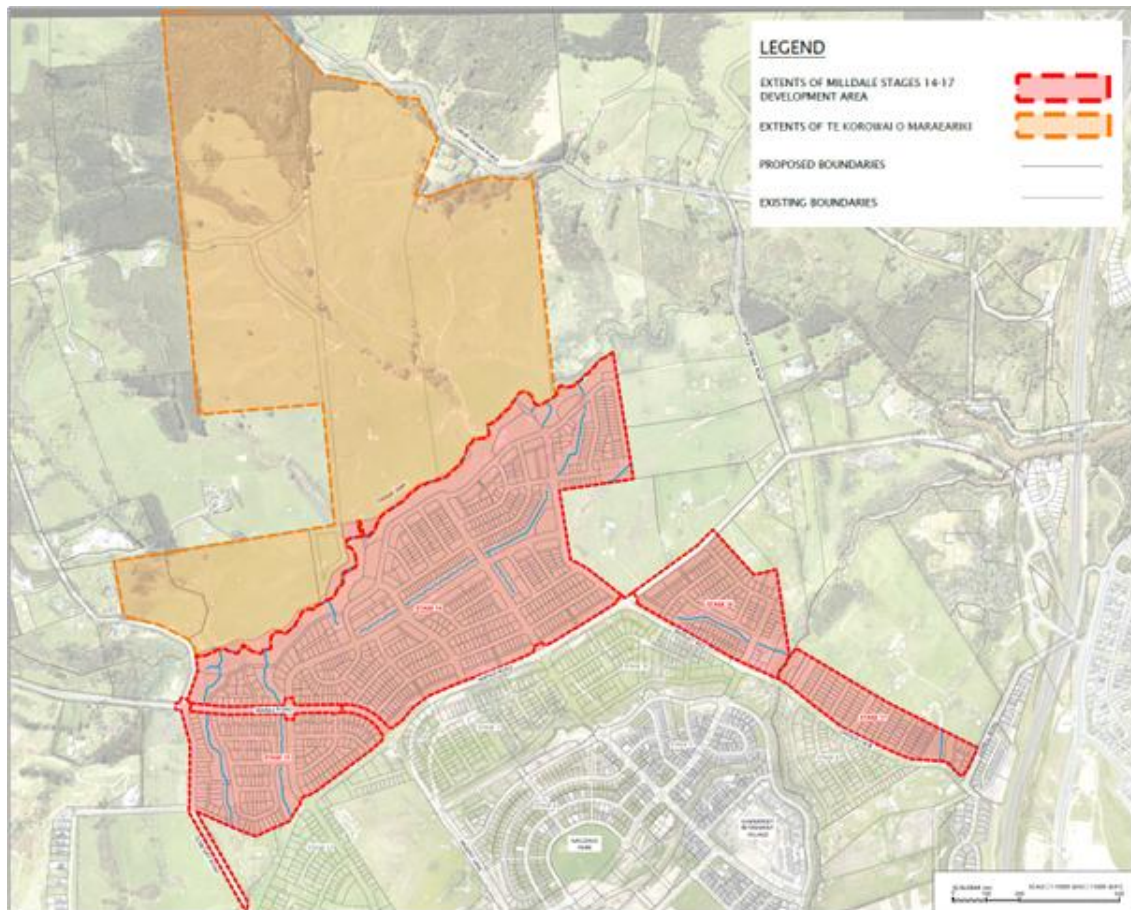


Figure 1: Site area and AUP zoning.

Description of the Proposal

The Milldale Stages 14-17 project seeks approvals for an urban development on the site. The proposal provides for up to 1,425 dwellings across a range of housing typologies and densities. In addition, the proposal includes provision for a small commercial area, transport infrastructure, servicing and stormwater infrastructure, subdivision, earthworks, stream works, and neighbourhood parks.

To the north of the Ōrewa river within Te Korowai o Maraeariki, the project includes private water and wastewater infrastructure if required, ecological restoration, as well as walking and cycling trails to enhance recreation and amenity.

Development of the Project will require a suite of approvals under the FTAA, including resource consents associated with subdivision, land use activities, bulk earthworks, infrastructure works, stream works, water take, diversion and discharge; along with NES for contamination and freshwater.

The aspects of the proposal relevant to this report include the earthworks, streamworks and associated erosion and sediment control measures.

A full description of the proposal is provided in the Planning Report and technical reports and drawings appended to the substantive application and should be read in conjunction with this report.

1.1. Adaptive Management

This Adaptive Management Plan (AMP) seeks to enable an adaptive environmental management approach that can evolve and adapt in response to measured data or best management practices.

Adaptive management requires a 'plan-do-check-act' approach to be undertaken whereby the ongoing monitoring and reporting that is proposed creates a continuous feedback loop from the effects being created.

This AMP provides support for the bulk earthworks Stages 14-17 to be undertaken as part of the Milldale development. The earthworks will be completed over an area of approximately 97.27 ha. The overall earthworks volumes for the residential areas will require approximately 610,534 m³ of cut and 798,578 m³ of fill.

Separately, to the north of the Orewa River, within Te Korowai o Maraeariki, the earthworks required for the private water and wastewater infrastructure and if required, ecological restoration includes approximately 131,256 m³ of cut and 44,386 m³ of fill over an area of approximately 11.65 ha.

This AMP identifies the practices and processes for the monitoring of event related sediment discharges to the receiving environment and the performance of the erosion and sediment control (ESC) measures adopted throughout the project's duration. The monitoring proposed as part of this AMP incorporates the currently consented earthworks areas. Civil works areas are not proposed to be monitored as part of the AMP.

Trigger levels can be used to trigger action if a specified limit is exceeded. Trigger levels are outlined in Section **Error! Reference source not found.** Notification to Auckland Council will be required if trigger levels are exceeded, outlining the management response undertaken after an event.

Any changes to this document will be agreed upon by all parties involved, with appropriate authorisation by Auckland Council.

This AMP will cover:

Construction Monitoring

Weather Monitoring

Prior to commencement of construction works an automated tipping bucket rainfall recorder will be installed on-site. The rainfall data will be recorded and utilised in accordance with Section 3.1.

Erosion and Sediment Control Monitoring

ESC monitoring will include scheduled site visits, pre and post rain event monitoring and water sampling.

All chemical treatment will be monitored in accordance with the Chemical Treatment Management Plan (ChTMP).

During a rainfall trigger event (as defined in Section 2.1) water discharge monitoring will be undertaken on all sediment retention ponds (SRPs) that are discharging during the event.

Reporting

An Adaptive Management Response Report (AMRR) will be produced following each rainfall trigger event and provided to Auckland Council. The AMRR will detail the extent of the rainfall event, provide details of how the ESC devices operated. If any trigger level exceedances (as defined in Section **Error! Reference source not found.** and 2.2) are exceeded the report will include the causes and effects. Recommendations of changes that need to be implemented on-site and modifications to any ESC will also be included.

2. Construction Monitoring

2.1. Weather Monitoring

Rain Forecast

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

If the monitoring suggests >20mm over 24 hours of rainfall, then this will trigger the pre-rain event inspections as outlined in Section 2.2.

Rain Gauges

An automatic onsite rainfall monitoring station which will give email/text notifications of rainfall triggers will be located onsite.

This station will measure the following parameters:

- Rainfall intensity
- Rainfall volume

The rainfall event trigger that will initiate additional monitoring is:

- >25mm rainfall over any 24-hour period.

Rainfall data will be provided within the AMRR for all rainfall trigger events.

2.2. Erosion and Sediment Control Device Monitoring

Site inspections

The site will be regularly inspected during the works. The aim of these inspections is to 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 Auckland Council Guideline Document 2016/005 *Erosion and Sediment Control Guideline for Land Disturbing Activities in the Auckland Region* (GD05). 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 will consist of:

- **Weekly** site walkovers by the contractor and/or engineer to the contract to inspect and determine the effectiveness of all ESC devices installed on site;
- **Pre-rain event:** Prior to all forecast rainfall events irrespective of projected intensity, additional inspections will be made of ESC devices to ensure that they are fully functioning (i.e. not damaged) in preparation for the forecast event. Furthermore, checks will be carried out on all monitoring devices to ensure they are in good working order. These walkovers will be undertaken by the contractor and/or the engineer to the contract;
- **Pre-Forecasts > 20mm over 24 hours:** Prior to forecast heavy rainfall events the site will be inspected by the contractor and if required, an Erosion and Sediment Control Specialist. The aim of the inspection will be targeted at additional ESC that are required to be installed to ensure that the sites ESC devices perform effectively;
- **Rainfall Trigger Inspections** During rainfall trigger events the ESC devices will be inspected by an Erosion and Sediment Control Specialist in conjunction with the contractor, subject to health and safety restrictions, for example inspections will not be undertaken at night.

The rainfall trigger event site audits will be undertaken as close to the trigger as possible and within 24hrs of the event, excluding Sundays and Public Holidays. Where a trigger event falls on a Sunday or Public holiday, the ESC specialist will visit the site on the next working day to complete the monitoring.

Note, this does not negate day-to-day monitoring and maintenance to be completed by the Contractor.

Manual monitoring of all inlets and outlets of discharging SRPs will be conducted using the portable Pro DSS turbidity monitoring device; and

- **Post-rain event:** Following all rainfall events including rainfall trigger events, inspections will be made of ESC measures to ensure that all controls have performed as expected and to identify any

maintenance requirements. This will be undertaken by the contractor and/or the engineer to the contract.

Any remedial works will be documented during these monitoring inspections and immediately attended to.

When the rainfall trigger (>25mm rainfall over any 24-hour period) is exceeded, the following will occur:

- Within 24hrs of a rainfall trigger, carry out and record in writing a full audit of the condition of all ESC within the earthworks;
- Remedy any causes on site that may have contributed to a threshold exceedance as soon as practicable, and record what remedial measures were undertaken;
- Notify the Auckland Council – Team Leader Northern Monitoring by email within one (1) working day if any threshold exceedance;
- Record an assessment of the success of each remedial work in reducing ongoing sediment discharge; and
- Prepare an Adaptive Management Response Report, within 10 working days.

Sediment Discharge Monitoring

Manual Monitoring

Manual turbidity monitoring will be undertaken during rainfall trigger event site walkovers to provide a snapshot of the ESC performance. Manual turbidity monitoring will be undertaken using a handheld ProDSS water quality field instrument used to measure both inflow and outflow turbidity of discharging SRPs.

A treatment efficiency benchmark for the SRPs will be set at an average 90% efficiency. If this threshold is exceeded as a result of monitoring during a rainfall trigger event, then the following will occur:

- Within 24hrs of a threshold exceedance, carry out and record in writing a full audit of the condition of all ESC within the earthworks;
- Remedy any causes on site that may have contributed to a threshold exceedance as soon as practicable, and record what remedial measures were undertaken;
- Notify the Auckland Council – Compliance Monitoring by email within one (1) working day of a threshold exceedance;
- Record an assessment of the success of each remedial work in reducing ongoing sediment discharge; and
- Prepare an Adaptive Management Response Report within 10 working days.

The treatment efficiency trigger will also be used to identify catchments that are deemed higher risk. If efficiency triggers are breached, 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 >20mm/24 hrs) to ensure that repeat breaches do not occur.

Data Interpretation

All data will be compiled for the analysis of sediment runoff in relation to rainfall, earthworks area and ESC performance. This analysis will provide evidence of efficiency of the ESC system within each SRP catchment. This will also inform potential for modification of site ESC practices to improve sediment retention within the site.

3. Reporting

Adaptive Management Response Report (AMRR)

Following every trigger event an AMRR will be generated to summarise the conditions during and after the event. If any triggers are exceeded, then an exceedance notification will be generated. This will outline what exceedance occurred, the extent of the exceedance, any actions taken to mitigate the effects of the event, and a proposed management response if required.

The Auckland Council – Team Leader Northern Monitoring will be notified by email within one working day of any threshold breach. A report will be provided within 10 days of the threshold breach.

4. Management Actions

Management responses/actions will be identified when a trigger event occurs. These responses are additional to general site management and maintenance.

In some instances, the adaptive responses will be discussed and agreed with the relevant stakeholders to ensure the most appropriate outcomes are achieved. General actions to be undertaken during trigger events are as follows:

- Investigate whether the triggers have been exceeded as a result of a natural process;
- Investigate whether there have been any significant events or failures that could have caused the discharge;
- Ensure all site controls are operating in accordance with approved plans and best practice;
- Determine if the discharge is an isolated case or is likely to be repeated; and
- Investigate and implement modifications, including:
 - Investigate ESC measures to determine whether there has been a discharge from the devices;
 - Make alterations to ESC measures and methodologies;
 - Consider additional ESC;
 - Refinement of chemical treatment systems;
 - Progressive stabilisation in sub catchments;
 - Increase maintenance of controls;
 - Amendments to methodologies and sequencing of works and refinement of controls necessary; and
 - Reduce the open area limits of earthworks.

If any rain event results a high-risk SRP not meeting the efficiency benchmark, then the default position will be to reduce the contributing catchment unless the reporting and investigations could demonstrate that there were other / better solutions than a catchment shut down, and there was agreement with the Auckland Council.

5. Recommendations

Based on the assessment undertaken in this report, the following recommendations are made to avoid, remedy or mitigate potential adverse effects associated with the proposal and to support the appropriate implementation of the development.

- Undertake the earthworks in accordance with the Adaptive Management Plan.
- Within 10 working days of a rainfall trigger event, an Adaptive Management Response Report will be provided to the Council to summarise the conditions during and after the event. This will outline what exceedance occurred, the extent of the exceedance, any actions taken to mitigate the effects of the event, and a proposed management response if required.

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- An updates or changes to the Adaptive Management Plan are provided to the Council for certification prior to the changes being implemented on site.