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Earthworks Methodology Report

Milldale Earthworks 10-13
168 Argent Lane, Upper Orewa
Fulton Hogan Land Development Ltd
19/03/2025
For Resource Consent

DOCUMENT CONTROL

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Reviewer	Hannah O'Kane – Associate Planner
Approval	Jamie Whyte - Principal
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STATEMENT OF QUALIFICATIONS AND EXPERIENCE

Originator: Brandon Olver - Senior Associate Engineer

I am a Senior Associate Engineer at Wood & Partners Consultants Ltd. Wood & Partners Consultants Ltd is a multi-disciplinary consultancy specialising in planning, urban design, civil engineering, water infrastructure and surveying. I have been employed at Wood & Partners Consultants Ltd since December, 2014.

I hold the qualifications of Bachelor of Engineering Technology (Civil Engineering) from Open Polytechnic, which I completed in 2016. I am a Chartered Professional Engineer member of the Engineering New Zealand.

I have 19 years of professional experience in the Civil Engineering field, including roles such as Contract Engineer at Downer Group and Engineering Technician at Opus International Consultants Ltd. My experience includes design, construction supervision and contract management of land development projects. Projects I have worked on include Milldale earthworks, Milldale civil works, Wiri North Quarry filling and redevelopment, Equidae Estate development, and 75 Valley Road subdivision

I confirm that, in my capacity as author of this report, I have read and abide by the Environment Court of New Zealand's Code of Conduct for Expert Witnesses Practice Note 2023.

Reviewer: Hannah O'Kane – Associate Planner

I am an Associate Planner at Wood & Partners Consultants Ltd (Woods). Woods is a multi-disciplinary consultancy specialising in planning, urban design, engineering, water infrastructure, and surveying. I have been employed at Woods since May 2024.

I hold a Bachelor of Planning (Hons) from the University of Auckland | Waipapa Taumata Rau, completed in 2012.

I have over 13 years of professional experience in resource management planning, spanning both the public and private sectors.

I confirm that, in my capacity as a reviewer of parts of this substantive application, I have read and abide by the Environment Court of New Zealand's Code of Conduct for Expert Witnesses Practice Note 2023.

Approval: Jamie Whyte – Principal

I am a Principal at Wood & Partners Consultants Ltd. Wood & Partners Consultants Ltd is a multi-disciplinary consultancy specialising in planning, urban design, civil engineering, water infrastructure and surveying. I have been employed at Wood & Partners Consultants Ltd since January 2004.

I hold the qualifications of a Bachelor of Surveying from the University of Otago (BSurv), which I completed in 2003. I hold a professional qualification as a Register Professional Surveyor (RPSurv). I am a Full (voting) Member of Survey and Spatial New Zealand.

I have 20 years of professional experience in Subdivision Engineering and the Land Development industry. I have extensive knowledge in the design, construction and delivery of large-scale land development projects. My experience includes major roles on some of New Zealand's largest subdivision projects including Stonefields, Long Bay, Millwater and Milldale.

I confirm that, in my capacity as reviewer of this report, I have read and abide by the Environment Court of New Zealand's Code of Conduct for Expert Witnesses Practice Note 2023.

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APPENDICES

1. INTRODUCTION

1.1. Background

This report has been prepared in support of the application by Fulton Hogan Land Development (FHLD) for a resource consent to the Environmental Protection Authority (EPA) under the Fast-Track Approvals Act 2024 (FTAA).

Resource consent is required for bulk earthworks, subdivision, streamworks, water permits and discharge consents for the development of 623 residential lots, 27 residential super lots, jointly owned access lots (JOALS) and roads to vest, reserves to vest, and all associated works, landscaping and infrastructure.

The purpose of this report is to provide an overview of the proposed earthworks methodology, including the proposed development landform, staging of works, sediment and erosion control management, streamworks methodology, and geotechnical implementation.

The focus of this report will be limited to the earthworks required to prepare the sites for civil works and subsequent subdivision for residential development.

1.2. Site Description

1.2.1. Site Location

The site subject to this application is located within the Milldale development and referred to as the Milldale Stages 10 – 13 subdivision areas (the Site). The site consists of Land covered by LOT 9006 DP 602895; Lot 9007 DP 602895; Lot 3 DP 151229; Lot 1 DP 147739; Lot 1 DP 488814; Lot 2 DP 488814; Lot 3 DP 488814; and Lot 2 DP 147739. Stages 10 – 13 are located within the northern and western extents of the Milldale development and comprise the remaining undeveloped greenfield stages of Milldale.

Overall, the Site covers a total area of approximately 71 ha. The Site is bordered by Wainui Road to the north, Lysnar Road to the north-east, and Cemetery Road to the west. Previously consented Milldale stages are located to the south of the Site including Stages 5 – 8 and the Milldale Town Centre.

A full description of the Site and surrounds is provided in the application AEE.

The site location is shown below in Figure 1, and a site location plan is provided with the application drawing set – drawing P24-128-00-0001-GE, located in Appendix A.

Note that this report will not cover the works in Stages 4C and at the temporary wastewater treatment plant.

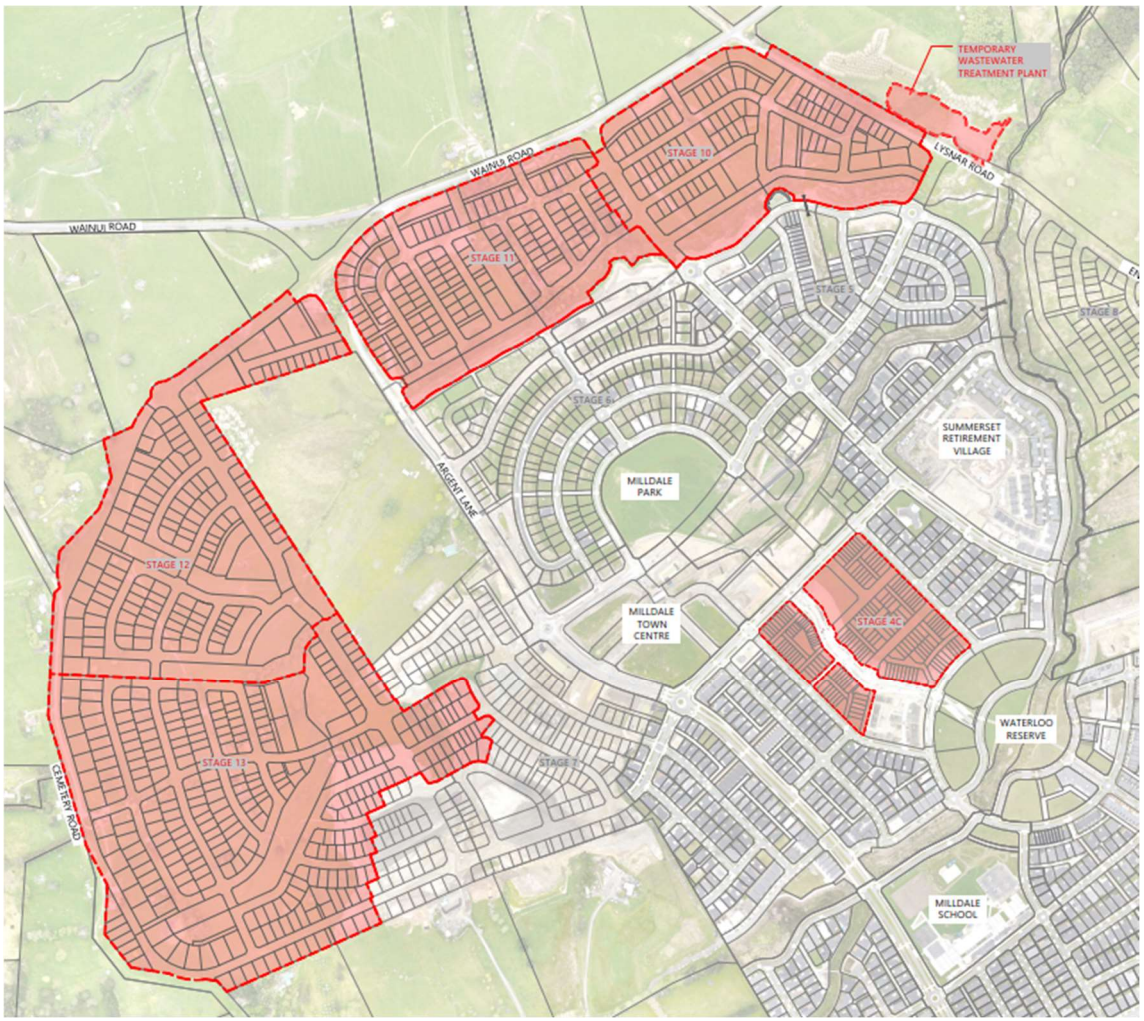

Image 1: Site Location Plan

1.3. Project Description

FHLD are proposing the subdivision and development of the site into a medium density residential development. The proposal will result in the development of the site into 617 residential lots, 27 residential super lots, jointly owned access lots (JOALS) and roads to vest, esplanade and reserves to vest, and all associated works, landscaping and infrastructure.

The development will require land and stream modification works to facilitate Stages 10-13 of the Milldale Fast Track application. This includes bulk earthworks across the site to refine the site to the required finished levels.

The proposed works comprises of the following:

- Earthworks 10 - 11 (EW10 and EW11) will involve approximately of:
  - 248,872 m3 of cut;
  - 213,850 m3 of fill;
  - over a total area of approximately 23.1 hectares; and
  - 35,025 m3 excess cut to be carted to EW12 and EW13.
- Earthworks 12 - 13 (EW12 and EW13) will involve approximately of:
  - 485,175 m3 of cut;
  - 735,913 m3 of fill;
  - over a total area of approximately 45.2 hectares;
  - 62,830 m3 fill material to be imported from EW10 and EW11; and
  - 250,738 m3 deficit fill material to be imported from excess material from adjacent earthworks projects in Milldale, including EW 10 & 11, Argent Lane / Wainui Road upgrade, Stage 8 surplus material, Earthworks 7 surplus material.
- Ancillary areas in addition to the extents of the bulk earthworks are also proposed. These areas include staging sites for site compounds and temporary stockpiling areas which are located

offline of the cut to fill operations. These areas are shown on drawings P24-128-00-1200 to 1203-EW-Cut Fill Plans and on P24-128-00-1901 to 1905-EW-Indicative Staging Plans.

- The proposed earthworks involve cut depths of up to 11m and fill depths of up to 9m. The proposed Contour and Earthworks Extents plans are provided with the application drawing set, drawings P24-128-00-1100-EW to 1103-EW, located in **Appendix A**.
- Streamworks, involving stream removal, stream diversions, culvert removal, and culvert installations.
- Geotechnical stabilisation works;
- Construction of retaining walls and reinforced slopes;
- All associated erosion and sediment controls;
- Stabilising the site on completion of earthworks in preparation for civil works; and

The associated drawing set for this consent application is provided in **Appendix A**.

Due to the scale of the works, it is anticipated the bulk earthworks will be carried out over three construction seasons.

2. LANDFORM DESIGN

Stage 10 -13 Milldale is situated on the most difficult terrain within the Wainui Precinct. The existing topography is considered steep within the context of the wider development. The site also includes several existing watercourses with steep terrain on the surrounding adjacent land to these watercourses.

The site has a low level of 12m RL at the lower extents of the Milldale Stream towards Lysnar Road, and a high level of 82m RL at the western extents along Cemetery Road.

The lower levels of the site are generally set by Stream 21, which is the main stream extending from Lysnar Road, along the southern edge of Stages 10 & 11, then through into the eastern area of Stages 12 & 13. The higher levels are set by the ridgeline roads of Wainui Road and Cemetery Road. The general structure of the subdivision and the landform design, sets out to work with this steep pre-development contour. This is achieved with the majority of streets running with the contour (contour roads) and including mid-block retaining features absorbing height differential up the slope.

The subdivision design has also responded to the Wainui Precinct Plan as closely as possibly while having consideration for the other constraining features, namely streams, steep contour and respecting levels at neighbouring property boundaries. Priority is placed on conformance of key precinct plan roads, such as the collector roads and the stream edge roads.

When considering all the site constraints on this difficult terrain, it is proposed to remove and realign a number of streams to make development within these stages feasible. These streamworks enable better alignment of the watercourses with the structure of the precinct plan and create a logical urban form that will provide a balance between urban design and ecological outcomes.

Overall it is considered the landform design of Stages 10 to 13, responds well to the existing topography of the site while achieving compliant road gradients across the steep terrain. The use of midblock retaining features, allows for relatively flat sites, that will minimise the amount of secondary earthworks once builders establish on these sites. The earthworks design strikes a balance between working with the existing landform, conforming to key roads identified on the Wainui Precinct Plan, providing a well-connected urban structure and retention of the main waterways within each stage.

2.1. Stage 10 & 11 Landform

The landform of Stage 10 & 11 is largely defined by the adjacent roads of Wainui Road to the north, Lysnar Road to the east, and Argent Lane to the west. A proposed extension of Waiwai Drive (Collector Road) as defined on the Wainui Precinct Plan, defines levels through the centre of the site. Stream 21 defines the southern edge.

Stream 21 varies in levels from 12m RL at the eastern downstream end, rising to 23m RL at the western upstream end at Argent Lane. The site then steeply climbs to the north with Wainui Road defining the ridgeline. Wainui Road has levels of 36m RL at the intersection with Lysnar Road, and 43m RL at the intersection with Argent Lane.

Running parallel with the Stream 21 is the stream edge road. This extends from Argent Lane at the west of the site to Milldale Drive at the eastern end. This road is set back from Stream 21 to allow sufficient space for riparian margins and is elevated above the stream to ensure clearance from the 100 year flood plain. The local road structure then links these key roads together with consideration for the Precinct Plan, compliant road gradients and stream retention.

Where possible, the local road structure within Stage 10 & 11 sets out to respond to this steep environment by minimising steep roads climbing against the contour and maximising contour roads, running parallel with the natural contour of the site. Mid-block retaining features are designed into the blocks of lots to absorb height differential up the slope.

Stage 10 provides a stronger example of this with local roads running in parallel with Wainui Road and the stream edge road.

Achieving this road layout in Stage 11 was more difficult due to the irregular shape of the Stage 11 extents. As a result this stage has more steeper roads that run against the contour, all of which remain compliant with maximum gradients as defined by Auckland Transport – Transport Design Manual (TDM).

There are three main stream tributaries to the Milldale Stream within Stages 10 & 11. These are proposed to be retained within future drainage reserves on diverted alignments. These realignments are necessary to allow the streams to coexist with a coherent urban structure for Stage 10 & 11.

The resulting landform is represented with the proposed contour plans. Refer to drawings 1101-EW & 1102-EW.

2.2.Stage 12 & 13 Landform

The landform of Stage 12 & 13 is defined by Cemetery Road to the west, an existing paper road (referred to as the Cemetery Road Link) to the north, 147 Argent Lane and the consented Stage 7 to the east, and the future urban boundary to the south.

There is a key collector road as identified on the Precinct Plan the runs north-south through the site, linking Stage 7 to the Cemetery Road Link. A second collector road identified on the Precinct Plan as an extension of Stage 7 up to Cemetery Road, cannot be formed as a collector road due to excessively steep gradients. It is therefore proposed to complete this road as a local road, providing the same connection, but to a local road standard.

Stream 21 extends into the eastern edge of Stage 12 & 13 via 147 Argent Lane. The Milldale Stream enters the site at 48m RL. The topography of the site then climbs steeply to the west to reach elevations of 72m to 82m RL along Cemetery Road.

The local road structure within Stage 12 & 13 sets out to respond to this steep environment by minimising steep roads climbing against the contour and maximising contour roads, running parallel with the natural contour of the site. Mid-block retaining features are designed into the blocks of lots to absorb height differential up the slope.

The mid-block retaining features vary in both typology and height. There is a graduated transition of retaining features as the gradients on the site get steeper towards Cemetery Road. Where mid-block retaining features are less than 3.0m, mid-block retaining walls are adopted. As these mid-block retaining features increase in height beyond 3.0m, Reinforced Earth Slopes (RE Slopes) are adopted. These are 1 vertical to 2 horizontal (1V:2V) planted slopes, with protective vegetation covenants proposed on the survey scheme plan. This provides a softer design feature for the larger retaining structures greater than 3.0m in height.

There are three main stream tributaries to the Milldale Stream within Stages 12 & 13. These are proposed to be retained within future drainage reserves on diverted alignments in the upper reaches and existing alignments retained on the lower reaches. These realignments are necessary to allow the streams to coexist with a coherent urban structure for Stage 12 & 13.

The resulting landform is represented with the proposed contour plans. Refer to drawings 1102-EW & 1103-EW.

2.3.Stream and Wetland Removal

As shown on the Streamworks Drawings, P24-128-00-1450 to 1453-EW, there are several reaches of intermittent streams and wetlands that will be reclaimed and offset as part of this consent application.

The existing stream and wetland features have been classified as per the Viridis Ecological Impact Assessment for Milldale Stages 10 – 13.

Due to the natural contour of the site and the constraints of stream and wetland retention, a holistic approach has been taken to balancing ecology outcomes with urban design outcomes. This has involved identifying keys streams on site for retention, realignment and enhancement, with the net stream loss and wetland loss proposed for offset mitigation.

This approach enables the best practical outcomes for both the urban design of Stages 10 – 13, while providing for net ecological gain with both the onsite and offsite stream and wetland enhancement proposals. The retention and realignment of key streams allows for a logical urban layout to be designed around those realigned streams.

The proposed streamworks and wetland removal enables improved compliance with the Wainui Precinct plan, which could not be achieved if all ecology features on site were to be retained.

The realignment of the upper reaches of streams enables opportunities for geotechnical ground improvement works. This involves the removal of unsuitable ground conditions flanking the upper reaches of the key streams, which would be replaced with engineered fill. This engineered fill will buttress the stepper ground above the streams.

Stream recharge has been considered within the stormwater design for Stages 10 – 13. This is achieved with post development stormwater catchments directed to outlet at the stream heads of the retained intermittent streams. Underfill drainage networks, associated with geotechnical ground works, will be directed to stream heads to re-route groundwater diversion as another form of stream base flow.

The proposed design will ensure a balancing of best practical options for both urban design and ecological outcomes resulting from the development of Stages 10 – 13. The removal of low value streams and wetlands, and the realignment, enhancement and protection of the six retained tributaries to Stream 21, will ensure a functional urban layout can be delivered in general accordance with the Wainui Precinct Plan. This ensures a good urban design outcome for Milldale Stages 10 – 13, while still enhancing the retained ecology features on site, and provide a net ecological gain overall with the wider stream and wetland offset proposal.

3. STAGING OF WORKS

Due to the scale of the proposed works, the bulk earthworks will be staged over 3 seasons of earthworks. During each earthworks season it is anticipated to have 30 hectares of bulk earthworks area open and active at any given time. This area of bulk earthworks will exclude any open areas associated with civil works stages.

As each season of works is completed, the works still will be stabilised and made available for a subsequent civil works stage.

To assist with accessing the civil works areas, it is proposed that there can be two active earthworks fronts – one in Stages 10 & 11 and another in Stages 12 & 13 working simultaneously within the earthworks season.

Ahead of each earthworks season it is proposed to provide a works plan that defines the extent of work to be undertaken within that earthworks season. This plan will be accompanied with a staging plan and a sediment and erosion control plan for the scope of the planned works for the season.

These plans will be adaptive alongside the Adaptive Management Plan.

It is proposed for the first season of bulk earthworks to commence in October 2025, and continue for each of the next two earthworks seasons until the bulk earthworks is complete in April 2028.

Indicative Staging Plans have been provided in the engineering drawing set, P24-128-00-1500 to 1503-EW. These plans are indicative only and will be refined as part of the pre-construction conditions ahead of each earthworks season.

Works within each season will be undertaken in accordance with the general earthworks methodology below:

3.1. Phase 1 – Enable Sediment and Erosion Controls

- Pre-construction documents completed to address pre-works conditions of consent.
- Pre-construction meeting held.
- Clearing works undertaken. Existing dwellings, sheds and farming related structures cleared. Vegetation protected where required, and remaining vegetation cleared and removed or mulched.
- Install 'Last Line of Defence' Super Silt Fence along riparian margins to be retained.
- Install clean water cut off drains.
- Once associated temporary controls are in place (including any silt fences and / or Decanting Earth Bunds), progressively construct Sediment Retention Ponds (SRPs) as required to enable bulk earthworks.
- As-built and certify all sediment and erosion controls.

3.2. Phase 2 – Bulk Earthworks Commencement

- Strip topsoil within catchments with certified sediment and erosion controls and stockpile topsoil clear of the works. Drawings included in Appendix A indicate possible lay down areas. Topsoil stockpiles will be placed within the extent of work.
- Enable streamworks as required under Phase 3 below.
- Undertake necessary geotechnical remediation works in fill areas prior to placement of fill.
- Commence bulk cut to fill operations.

3.3. Phase 3 – Enable Streamworks

- All streamworks pre-construction conditions satisfied.
- All streamworks management plans approved by Council.
- All necessary sediment and erosion control devices installed and approved by Council.
- Where possible establish and stabilise new stream diversion on proposed alignment ahead of streamworks under Phase 2 above.
- Undertake fish capture and relocation in accordance with the approved Native Fish Capture and Relocation Plan.
- Dewater streams and ponds in accordance with the approved Native Fish Capture and Relocation Plan.
- Establish flow bypass controls where required.
- Strip topsoil and organic material from streams to be removed / diverted / realigned.
- Carry out streamworks including culvert daylighting, culvert installations, stream removal and stream diversions.
- Install instream enhancements – root wads, lunkers, pools, etc, as recommended in ecological reporting.
- Seek ecological certification prior to completion.
- Stabilise works sites upon completion.
- Remove bypass controls and liven new streams / culverts.

3.4. Phase 4 – Bulk Earthworks Commencement

- Strip topsoil within catchments of SRPs and other controls and stockpile clear of the works. Drawings included in Appendix A indicate possible lay down areas. Topsoil stockpiles will be placed within the extent of work.
- Undertake necessary geotechnical remediation works in fill areas prior to placement of fill.
- Commence bulk cut to fill operations.

3.5. Phase 5 – Bulk Earthworks Completion

- Progressively complete bulk earthworks.
- Install retaining features – retaining walls and reinforced earth slopes (RE Slopes)
- Trim to subgrade levels.
- Survey subgrade and provide to engineer for approval.
- Progressively place topsoil to depth outlined within specifications.
- Stabilise topsoil areas and completed stockpiles with straw mulch (and seed / fertilise if required) or sew grass and monitor for suitable grass strike.

- Stabilised areas will be diverted away from SRPs and other controls using Clean Water Drains (CWD).
- Install clean water upstands at top of batters and bunded off areas to divert clean water and minimise ponding.

3.6. Phase 6 – Removal of Controls

- Once areas have been mulched or suitable grass strike has been obtained, seek approval from AC Monitoring Officer for removal of any controls that will be considered redundant for use with any future works.
- Install SSF or DEB for removal of SRPs.
- Remove structures within SRP.
- Undertake cut to fill operation within SRP area.
- Prepare for and topsoil area, then stabilise.

Note - Where possible, sediment and erosion control devices to be retained and reutilised for the subsequent civil works stages.

4. EROSION & SEDIMENT CONTROL METHODOLOGY

4.1. Overview

A best practice management strategy will be implemented for the proposed earthworks. This will involve the application of best practice from Auckland Council Guidance Document 2016/005 (GD05), Amendment 3. It is noted that the adaptive management approach has been and is being undertaken on adjacent earthworks sites. This assesses the performance of the sediment and erosion control network and then adapts in response to any non-conforming performance or sediment discharges should they occur.

The primary sediment controls for the site will be sediment retention ponds (SRP). Secondary controls include decanting earth bunds (DEB) for smaller areas not captured within SRP catchments, silt fences, and / or super silt fences. There will also be a strong focus on erosion prevention prior to rain events.

Under this consent there is 71 hectares of earthworks area, of which it is proposed to have a maximum of 30 hectares open at any one time.

The earthworks cut to fill volumes within the proposal will require three seasons of earthworks (October to April) and will be progressively stabilised as areas are completed and prior to winter.

The works will be staged as the Contractor expands the scale of their operation into the height of summer. The methodology is to gradually extend the area open to earthworks, complete the works and progressively stabilise completed areas. Emphasis will be placed on getting areas cut / filled to grade as quickly as possible and then immediately stabilised.

4.2. Team Approach

The team approach ensures that adequate resources, commitment, and expertise are provided to support the Erosion and Sediment Control Methodology from start to finish. This team will undertake pre and post storm surveys, discuss Erosion and Sediment Control Methodology at weekly site meetings. At all times the team will utilise a significant resource and "expertise base" to ensure appropriate and technically sound decisions are made. Stakeholders involved in the project will include:

4.2.1. Principal – Fulton Hogan Land Development Ltd

Fulton Hogan Land Development Limited is committed to development of their landholdings at Milldale, Wainui East in an environmentally responsible manner. The Principal has an environmental policy in which they are committed to protecting the environment from damage and minimising nuisance from its operations and activities through effective planning and site management and controls.

The Principal has an excellent track record in managing environmental effects. They are prepared to invest in additional measures that will enable robust systems to be utilised in the effective management of environmental risks.

4.2.2. Civil Engineering, Planning & Surveying – Woods

Woods have been engaged by FHLDL to provide civil engineering, planning and surveying services associated with development in Milldale. Woods will act as the lead consultant on the project and liaise with the Principal, all other members of the project team, and statutory authorities and will supervise the Contractor as Engineer to the Contract (under NZ3910). Woods will review as-built data provided by the Contractor and will undertake and submit compliance documents.

Woods has an excellent track record in managing large residential projects and has a wealth of in-house knowledge to prepare and administer effective sediment and erosion control plans.

Woods will prepare contract documents with a significant allocated budget to allow Contractors to implement sediment and erosion controls and manage the site for the duration of works. Contract allowances will provide sufficient scope for adjusting sediment and erosion control as required in advance of rain events.

4.2.3. Independent Expertise and Oversight – Southern Skies

Southern Skies have been engaged by FHLDL to provide technical expertise as specialists in sediment and erosion control and are the author of the Adaptive Management Plan for Milldale (AMP). Southern Skies have been involved with the Milldale project in this capacity for six years and have a strong understanding of how the site operates during earthworks construction.

As set out in the AMP, Southern Skies monitor water turbidity within key waterways as a marker of the sites performance during rain events. Southern Skies undertake site walkovers following rain fall trigger events, report of the sites performance managing those rain events and provide recommendations under the adaptive management of the site.

These recommendations are then implemented under the contract works.

4.2.4. Earthworks Contractor – TBA

The Principal will appoint a suitably experienced earthmoving Contractor with experience in large earthmoving projects. This Contractor will have experience with many of the commonly used erosion and sediment control practices detailed in GD05 as well as a history of implementing other innovative measures to improve erosion control and discharged water quality. The Contractor will be responsible for implementation, management and maintenance of erosion and sediment control measures. The Contractor will liaise with the site engineer, erosion and sediment control consultant and statutory authorities to ensure all erosion and sediment control measures are operating effectively.

Prior to the pre-construction meeting the Contractor shall produce all pre-construction documentation including:

- Construction Management Plan (CMP);
- Updated Sediment and Erosion Control Plan (SECP);
- Chemical Treatment Management Plan (CTMP);
- Dust Management Plan (DMP); and
- Any other plans and documentation required to address the pre-construction conditions of resource consent.

As we have experienced in previous stages of bulk earthworks, the Contractor plays a critical role in the successful performance of the sediment and erosion control network. There will be a strong emphasis on the Contractor's sediment and erosion control track record when tendering for the works. Only Contractors with an excellent record will be considered when awarding works that fall under this consent.

4.2.5. Statutory Authorities – Auckland Council (AC)

The Principal, Engineer and Contractor will liaise with representatives of AC to ensure that erosion and sediment control measures are implemented, maintained and monitored in accordance with consents granted. Weekly inspections undertaken with AC's representative will be utilised for discussion of site variables as works progress.

4.3. Erosion and Sediment Control Measures

The primary sediment controls for the site will be sediment retention ponds (SRP). Secondary controls include decanting earth bunds (DEB) for small areas that fall outside of the SRP catchments, silt fences

and super silt fences will also be utilised. There will also be a strong focus on erosion prevention prior to rain events.

Sediment and Erosion Control plans have been prepared for the layout of devices and the associated catchments (as shown on drawings P24-128 -1500-EW to P24-128 -1503-EW). The controls will be established at the start of the earthworks season in preparation for the works.

Upon completion of erosion and sediment controls within each catchment as-built plans will be provided, and a site inspection held with Auckland Council seeking approval to proceed with the associated bulk earthworks.

All controls are to be designed, constructed and operated in accordance with GD05.

One of the most significant learnings from previous earthwork projects was for the need to maintain the primary and secondary sediment retention devices following rain events. Monitoring undertaken by Southern Skies for the adaptive management of Earthworks 2 (EW2) showed that SRP efficiencies were excellent when operated in accordance with GD05 and ready achieved the documented 90% sediment removal efficiency.

A Chemical Treatment Management Plan (CTMP) will be submitted by the Contractor with pre-construction documents. The CTMP with detail the proposed flocculant treatment for the primary devices. The application of Chemical Treatment will be via rainfall activated treatment systems and shall be undertaken in accordance with GD05 and the Contractors approved CTMP.

Other devices which may be installed during the course of the works due to operational decisions are:

- Clean Water Diversion Drains;
- Stabilised access roads;
- Contour Drains;
- Super Silt fences located along all the margins of watercourses;
- Silt Fences;
- Hay Bales;
- Grass Filter Strips; and
- Other controls if areas can no longer be serviced by the proposed devices.

4.4. Last Line of Defence

The ‘last line of defence’ approach will be implemented as a backup to the primary controls.

The aforementioned SRPs and DEBs form the primary erosion and sediment control measures used to minimise the discharge of the sediment to the receiving environment. Beyond these primary controls, an extra line of defence is proposed. Super silt fences will provide a backup protection during the initial setup of primary controls and for any small catchments around the extents of the site that may bypass the primary devices.

It is proposed to erect a super silt fence (SSF) immediately beyond the extent of earthworks as a ‘last line of defence’ along both sides of all retained watercourses around the extents of the site.

These SSFs will be regularly monitored during weekly site inspections, and before and after each significant rainfall event. Any damage or maintenance work shall be attended to immediately after discovery.

4.5. Site Inspections

The site will be regularly inspected during the course of the works.

The aim of these inspections is to ensure that all erosion and sediment control devices are installed correctly and are operating 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 the conditions of consent and GD05. The inspection regime will keep sediment and erosion control management at the forefront of works on site. Any potential problems will be swiftly identified, and remedial works shall be promptly carried out.

The inspection programme shall consist of:

Weekly site walkovers involving all stakeholders to inspect and determine the effectiveness of all erosion and sediment control devices installed on site;

Pre-rain event monitoring involving all stakeholders to inspect and confirm all devices are operational for the predicted rain event and assess the site for any further controls that may need to be established prior to the rain event; and

Post-rain event inspections will also be carried out to assess the effectiveness of devices and the performance of the sediment and erosion control network as a whole.

Any remedial works shall be documented during these monitoring inspections and immediately attended too.

4.6. Streamworks Management & Culvert Installation

Streamworks and culvert works are necessary to enable the land suitable for urban development.

Streamworks and culvert works will be carefully managed to ensure these activities to not generate sediment discharges into watercourse.

These works will be carefully planned with the contractor on site ahead of each earthworks season. This will be done in accordance with the 'staging of works' methodology in section 3 above. Particular emphasis will be placed on ensuring best practice sediment and erosion control measures are implemented with stream and culvert works.

4.7. Dust Management

A Dust Management Plan (DMP) is included within Appendix D of this Report. This is a preliminary DMP prepared by Southern Skies.

The Contractor will need to prepare a site specific DMP for each new season of earthworks and submit this as part of their pre-construction documentation prior to works commencing. This plan will identify appropriate dust mitigation strategies for the site.

The site specific DMP will have an allowance for a dedicated water cart resource, dust fences and daily management strategies to avoid dust nuisance to neighbouring properties.

While the Contractor's Dust Management Plan will ultimately provide the management regime for dust nuisance mitigation, the following measures will be expected as part of an effective dust mitigation strategy for this site. Allowance will be made in the construction contract for implementation of these dust control measures.

- The Contractor shall prepare a site specific DMP in accordance with Southern Skies, Milldale Dust Management Plan (included in Appendix D)
- The Contractor is to monitor dust emissions daily and implement appropriate measures as necessary;
- The Contractor shall provide sufficient water carts and / or sprinklers that are capable to ensure that the exposed areas of the site are appropriately moistened to avoid dust nuisance towards neighbouring properties. Particular attention shall be given to those sensitive receivers identified in the Southern Skies DMP;
- On site traffic management, including specific traffic control measures in areas that are sensitive to dust generation;
- The site is to be watered at the end of each working day when it is considered that a dust nuisance may exist following the close of works for that day. (unless there is sufficient rain or showers, falling or forecasted);
- The site is to be watered if strong winds are forecast, and these coincide with dry ground conditions to avoid dust nuisance towards neighbouring properties;
- Adjoining owners will be informed with a pre-construction communication which will include a 24-hour contact telephone number to call the site Contractor for dust and other complaints;
- The Contractor is to promptly implement additional dust control measures when a complaint is received, and they are to note the complaint, outcomes, and actions;
- A record of dust events and complaints are to be recorded in weekly site meetings;
- Earthworks on site are to be staged to allow for progressive stabilisation. Once areas of works are completed to finished ground, progressive revegetation to pasture is to be undertaken over these areas. Monitoring of this revegetation is to be undertaken to ensure good uptake until stabilisation is achieved;
- A 3m high dust fence can be erected along the boundary of a neighbouring property where an actual dust nuisance has arisen;
- Stockpiles to be stabilised if not in use;

- When loading / unloading trucks, materials are to be dropped from as low a height as practicable;
- Removal of sediment or dust generating materials from the access roads, haul roads, and public roads with a suction sweeper; and
- Use of a wheel wash facility that also has capabilities to wash dust from vehicles.
- Dust monitoring procedures in accordance with the Southern Skies DMP;
- Complaint response procedures in accordance with the Southern Skies DMP.

5. GEOTECHNICAL WORKS

CMW Geosciences have been engaged to undertaken geotechnical investigations of the site and have prepared a Geotechnical Investigation Report (GIR), which is provided separately.

All earthworks and geotechnical remediation works will be undertaken in accordance with this GIR.

All earthworks and geotechnical remediation works will be supervised by a suitable qualified geotechnical engineer.

At the completion of works a Geotechnical Completion Report will be prepared.

6. CONCLUSION

Fulton Hogan Land Development Ltd (the Applicant) is seeking a resource consent approval under the Fast Track Approvals Bill for Earthworks 10-13, Milldale.

The EW10 and EW11 works will involve approximately 248,872m^3 of cut and 213,847m^3 of fill over a total area of approximately 23.1 Ha.

The EW12 and EW13 works will involve approximately 485,175m^3 of cut and 735,913m^3 of fill over a total area of approximately 45.2 Ha.

The earthworks will be carried out over three seasons of earthworks with a staged approach to each season. During each earthworks season it is anticipated to have 30 hectares of bulk earthworks area open and active at any given time.

All bulk earthworks activities will be managed under the Adaptive Management Plan for Stages 10 – 13, prepared by Southern Skies.

The Applicant has an excellent track record on similar scale earthworks operations within the region and is committed to undertaking these works in an environmentally responsible manner.

Through the implementation of the management strategies and methodologies outlined in this report, we consider that Earthworks 10-13, Milldale can be successfully managed with no more than minor effects.

APPENDIX A -

MILLDALE STAGES 10 TO 13 - ENGINEERING PLANS (BOUND SEPARATELY)

APPENDIX B –

MILLDALE – CONSTRUCTION MANAGEMENT PLAN

Milldale Construction Management Plan Requirements (CMP)

Date: 26 March 2025

Status: Draft - Subject to Contractor Construction Methodology

This document provides and preliminary outline of the content expected within CMPs required as preconstruction conditions to each season of earthworks or stage of subdivision works with the Milldale Fast Track works.

After each contract is awarded for the various stages of earthworks and subdivision construction works, the awarded contractor shall prepare a site specific CMP.

These CMPs shall include but not be limited to the following information:

1. Project Description

Details of the Project Description will to be provided for each earthworks construction season and each sub-stage of civil construction.

Project Description will be contract and stage specific and include the following details:

a) Site location
b) General scope of works
c) Specific construction elements to be undertaken, ie Earthworks, drainage works, retaining, landscaping, etc.
d) Project deliverable, ie completed subdivision, Stage number.
e) Timeframes for key stages of works

2. Project Management

Details of Project Manager(s) to be provided for each earthworks construction season and each sub-stage of civil construction.

Project Manager(s) will be contract and stage specific. The CMP shall include the following details:

a) Site Supervisor – name and contact information
b) Project Engineer – name and contact information
c) Project Manager - name and contact information
d) Project Director - name and contact information

3. Health and Safety Plan

Health and Safety Plans shall be prepared specifically for each earthworks construction season and each sub-stage of civil construction.

The contractor shall take responsibility for preparing an appropriately detailed Health and Safety Report and implement the Health and Safety Plan for the duration of the works.

The Health and Safety plan shall include but not be limited to the following information:

a) Site specific health and safety managers and contact details. Identify roles and responsibilities
b) Site specific health and safety risks
c) Identification of hazards and risks specific to the project
d) Risk Assessment and management controls
e) Procedures for undertaking High Risk Activities
f) Site layout of Health and Safety inventory on site
g) Sign in procedures for visitor management
h) Emergency management response
i) Health and Wellbeing procedures
j) Incident Reporting and investigation procedures
k) Required Personal Protective Equipment (PPE)
l) Monitoring and review procedures

4. Working Hours

The hours of construction work are to be identified in the plan and are to be in accordance with the approved Resource Consent conditions. The proposed condition in the application is:

All construction works authorised by this consent must only take place between 7.00am and 6.00pm, Monday to Saturday, with no works undertaken at any time on Sundays, or on public holidays. Heavy plant must not be operated within 130m of any occupied building before 7.30am.

5. Site Access

Details of Site Access will to be provided for each earthworks construction season and each sub-stage of civil construction.

Site Access will be contract and stage specific and include the following details:

a) A plan showing the stage of works, including street / road names
b) Site ingress and egress locations
c) Site compound and site office locations.
d) Location of signage and hazard boards.
e) Extent of security fencing
f) Location of wash down facilities at egress locations
g) Location of first aid and health and safety equipment.

6. Construction Traffic Management Plan

Construction Traffic Management Plan (CTMP) outlines measures to ensure the safe and efficient movement of vehicles, pedestrians, and cyclists in and around the construction site. The plan shall include details around the access to the site to comply with the Code of Practice for Temporary Traffic Management (CoPTTM) and all relevant local and national regulations.

Details of Construction Traffic Management will to be provided for each earthworks construction season and each sub-stage of civil construction.

Within Milldale Construction Traffic will be managed in a way to minimise any distribution to residents within the development and to users on the surrounding road network.

Construction Traffic Management will be contract and stage specific and include the following details:

a) Provide a parking management plan for construction traffic.
b) Address the transportation and parking of oversize vehicles (if any).
c) Provide appropriate loading / working areas to minimise disruption to traffic.
d) Provide cleaning facilities within the site to thoroughly clean all vehicles prior to exit to prevent mud or other excavated material from being dropped on the road. In the event that material is dropped on the road, resources should be on hand to clean-up as soon as possible.
e) Provide traffic management plans in compliance with the latest edition of the NZTA "Code of Practice for Temporary Traffic Management" (COPTTM) document.
f) Ensure the site access point shall be clearly signposted.
g) Include measures that are to be adopted to ensure that pedestrian access on the adjacent public footpaths in the vicinity of the site is safe during construction works.
h) Detail how the works will be undertaken to maintain access to properties adjacent to the work site during construction and address the duration time frame for sites with no-vehicle access during the works.
i) Identify proposed numbers and timing of heavy vehicle movements throughout the day.
j) Identify the location of vehicle and construction machinery access during the period of site works.
k) Identify the storage and loading areas for materials and vehicles.
l) For each construction phase, identify the location and duration of any road or lane closures, division of road closures into segments, duration of works in each closure, indication of detour routes for each closure and assessment of the effects on the Auckland Transport Road network of any road closures and a plan to mitigate these effects.
m) Detail how communication with drivers that they should divert, be done and how it would be monitored to ensure that the expected level of diversion is achieved.
n) Identify the relevant Auckland Transport approvals.

It is the responsibility of the applicant to apply for the Traffic Management Plan from Auckland Transport.

7. Site Notice Board

A large and visible notice board will be located at the entrance points on site and be clearly visible to any construction traffic prior to entering the site. The notice board will include site hazards along with contact details for the Site Manager. Example of the site notice boards;

450mm x 600mm

450mm x 600mm

DINES **THINK SAFETY**

HEAD PROTECTION · HIGH VIZ CLOTHING · SAFETY FOOTWEAR
Personal protective equipment must be worn on this site

HAZARD	CONTROL	DATE ADDED	PERSON RESPONSIBLE

8. Environmental Management

Details of Environmental Management shall be provided for each season of earthworks or stage of subdivision works.

Environment plans prepared within the CMP shall be in accordance with the requirements of the resource consent conditions.

9. Sediment and Erosion Control Plan

Prior to the commencement of each earthworks construction season and each sub-stage of civil construction on the subject site, finalised Erosion and Sediment Control Plans must be prepared in general accordance with the application documents referenced in condition 1 and in general accordance with Auckland Council Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region, June 2016, Incorporating Amendment 2 (GD05), and submitted to the Council. No earthworks activity on the subject site must commence until the Council has confirmed that that the ESCP(s) satisfactorily meets the requirements of GD05. The plans must contain sufficient details to address the following matters:

a) specific erosion and sediment control measures for the earthworks stages (location, dimensions, capacity) including the location of any sediment retention ponds and decanting earth bunds, super silt fences, clean and dirty water diversion bunds and stabilised construction entrances, in general accordance with GD05;
b) supporting calculations and design drawings as necessary;
c) details of construction methods;
d) monitoring and maintenance requirements;
e) catchment boundaries and contour information as necessary;

f) confirmation of any erosion and sediment control measures associated with construction of pedestrian bridges and culvert installation; and
g) details relating to the management of exposed areas (e.g. grassing, mulching).
h) Outline conformance measures to ensure compliance with the approved Adaptive Management Plan (AMP)
i) Site inspection procedures including timings for regular inspections and specific inspections for rainfall trigger events as detailed in the AMP.
j) Streamworks management and detailed methodologies for in stream works, such as culvert installation

10. Chemical Treatment Management Plan

Prior to the commencement of earthworks activity on the subject site, a Chemical Treatment Management Plan (ChTMP) must be prepared in general accordance with Auckland Council Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region, June 2016, Incorporating Amendment 2 (GD05), and submitted to the Council. No earthwork activities must commence until confirmation is provided by the Council that the ChTMP, meets the requirements of GD05, and the measures referred to in that plan for the sediment retention ponds and / or decanting earth bunds have been put in place. The plan must include as a minimum:

a) Specific design details of a chemical treatment system based on a rainfall activated methodology for the site's sediment retention ponds, decanting earth bunds or any other approved impoundment devices;
b) Monitoring, maintenance (including post storm) and contingency programme (including a record sheet);
c) Details of optimum dosage (including assumptions);
d) Results of initial chemical treatment trial;
e) A spill contingency plan; and
f) Details of the person or bodies that will hold responsibility for long term operation and maintenance of the chemical treatment system and the organisational structure which will support this system.

11. Dust Management Plan

The Contractor will need to prepare a site specific Dust Management Plan (DMP) for each new season of earthworks and submit this as part of their pre-construction documentation prior to works commencing. This plan will identify appropriate dust mitigation strategies for the site.

The site specific DMP will have an allowance for a dedicated water cart resource, dust fences and daily management strategies to avoid dust nuisance to neighbouring properties.

While the Contractor's Dust Management Plan will ultimately provide the management regime for dust nuisance mitigation, the following measures will be expected as part of an effective dust mitigation strategy for this site. Allowance will be made in the construction contract for implementation of these dust control measures.

- The Contractor shall prepare a site specific DMP in accordance with Southern Skies, Milldale Dust Management Plan (included in Appendix D of the Earthworks Methodology Report)

- The Contractor is to monitor dust emissions daily and implement appropriate measures as necessary;
- The Contractor shall provide sufficient water carts and / or sprinklers that are capable to ensure that the exposed areas of the site are appropriately moistened to avoid dust nuisance towards neighbouring properties. Particular attention shall be given to those sensitive receivers identified in the Southern Skies DMP;
- On site traffic management, including specific traffic control measures in areas that are sensitive to dust generation;
- The site is to be watered at the end of each working day when it is considered that a dust nuisance may exist following the close of works for that day. (unless there is sufficient rain or showers, falling or forecasted);
- The site is to be watered if strong winds are forecast, and these coincide with dry ground conditions to avoid dust nuisance towards neighbouring properties;
- Adjoining owners will be informed with a pre-construction communication which will include a 24-hour contact telephone number to call the site Contractor for dust and other complaints;
- The Contractor is to promptly implement additional dust control measures when a complaint is received, and they are to note the complaint, outcomes, and actions;
- A record of dust events and complaints are to be recorded in weekly site meetings;
- Earthworks on site are to be staged to allow for progressive stabilisation. Once areas of works are completed to finished ground, progressive revegetation to pasture is to be undertaken over these areas. Monitoring of this revegetation is to be undertaken to ensure good uptake until stabilisation is achieved;
- A 3m high dust fence can be erected along the boundary of a neighbouring property where an actual dust nuisance has arisen;
- Stockpiles to be stabilised if not in use;
- When loading / unloading trucks, materials are to be dropped from as low a height as practicable;
- Removal of sediment or dust generating materials from the access roads, haul roads, and public roads with a suction sweeper; and
- Use of a wheel wash facility that also has capabilities to wash dust from vehicles.
- Dust monitoring procedures in accordance with the Southern Skies DMP;
- Complaint response procedures in accordance with the Southern Skies DMP.

12. Construction Staging Methodology

For each earthworks construction season and each sub-stage of civil construction, a site specific construction staging will be necessary to enable the site to be constructed in a methodical, safe and timely manner.

A Construction Staging Methodology Plan shall include the following items:

- Site Establishment
- Sediment and Erosion Control implementation
- Spatial staging of works across the site
- Detailed programme of the construction works tasks
    - Earthworks
    - Geotechnical works

    - Streamworks
    - Retaining works
    - Drainage works
    - Roading works
    - Services
    - Landscaping
- Stabilisation of the site
- Removal of Sediment and Erosion Control devices
- Demobilisation and site presentation
- Final walkovers and site certifications

APPENDIX C –

MILLDALE STAGES 10-13 – ADAPTIVE MANAGEMENT PLAN (BOUND SEPARATELY)

APPENDIX D –

MILLDALE – DUST MANAGEMENT PLAN

SOUTHERNSKIES ENVIRONMENTAL

Dust Management Plan

Milldale
Stages 4C, 10-13
Wastewater Treatment Plant

March 2025

Prepared By: Zac Woods
SouthernSkies Environmental

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Revision: A
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TABLE OF CONTENTS

1.0 SCOPE

The following Dust Management Plan (DMP) shall be adopted for the earthworks phase of works associated with the Milldale development, Stages 4C, 10-13 and the temporary wastewater treatment plant.

This report has been prepared to support the application by Fulton Hogan Land Development (FHLD) for a resource consent to the Environmental Protection Agency (EPA) under the Fast-Track Approvals Act 2024 (FTAA). The purpose of this DMP is to outline the potential causes and effects of dust that could be generated during the earthworks phase of the development and to outline the mitigation measures that could be incorporated by the nominated contractor to avoid objectionable or nuisance emission of dust beyond the site boundary.

Stage 4C covers a total area of approximately 5.13ha. Stage 4C is located within the centre of the Milldale development, immediately to the south of the Local Centre, boarded by Parish Drive to the north, Papakiri Road to the west, Karapapa Road to the east and Dendro Ring Road to the south.

Stages 10-13 covers a total area of approximately 71ha, bordered by Wainui Road to the north, incorporates Lysnar Road to the north-east, and undeveloped land to the west. Previously consented Milldale stages are located to the south.

The Wastewater Treatment Plant site is located within Lot 4 DP 353309 which has a total area of 10.45 ha. The site is on the northern side of Lysnar Road, Wainui and is located directly adjacent to the Milldale development and just outside the Wainui Precinct.

It is intended that this DMP is updated with the nominated contractor prior to the commencement of earthworks on each stage to incorporate their management regime for dust nuisance mitigation.

2.0 DESCRIPTION OF PROPOSED WORK

Fulton Hogan Land Development proposes to undertake bulk earthworks within Stages 10-13, secondary earthworks predominately associated with civil works within Stage 4C, and minor earthworks associated with the wastewater treatment plant. The works will involve cut to fill earthworks, ground stabilisation, construction of retaining walls and reinforced slopes.

The expected timeframes include:

- Stages 10-13 is expected to be completed over three earthworks season.
- Stage 4C will be completed in multiple civil stages over one to two years.
- The Wastewater Treatment Plant earthworks programme will cover approximately four months.

Due to the size and volume of earthworks proposed, Stages 10-13 is considered the highest risk in terms of dust nuisance. This DMP is largely focused on Stages 10-13.

The earthworks associated with Stages 10-13 is expected to be undertaken over three earthworks seasons with up to 30ha of open area at any one time. This area of bulk earthworks will exclude any open area associated with civil works stages.

As each season of works is completed, the works still will be stabilised and made available for a subsequent civil works stage.

To assist with accessing the civil works areas, it is proposed that there can be two active earthworks fronts – one in Stages 10 & 11 and another in Stages 12 & 13 working simultaneously within the earthworks season.

The works will be staged as the Contractor expands the scale of their operation into the height of summer. The methodology is to gradually extend the area open to earthworks, complete the works and progressively stabilise completed areas. Emphasis will be placed on getting areas cut / filled to grade as quickly as possible and then immediately stabilised.

Access to Stages 10 and 11 will be from Wainui Road and Stages 12 and 13 from Argent Lane.

Access to the Wastewater Treatment Plan will be via Lysnar Road. The first 100m of Lysnar Road is deteriorating asphalt, the remainder of the road is metal.

Stage 4C will be accessed via completed and vested roads. Dust is not expected to be an issue.

All construction entranceways and access points will be stabilised with additional aggregate, where required to prevent the generation of sediment and dust.

3.0 SENSITIVE RECEIVERS

Stage 4C is bordered recently developed, or developing lots. There is potential for sensitive receivers to be situated around the full boundary of this Stage. With the bulk earthworks completed in this stage, the remaining earthworks will be limited to roading, drainage and services which has minimal risk of producing dust. If roading construction requires lime stabilisation then careful consideration to the timing and conditions must be taken to ensure that lime dust does not drift over the stage boundary.

The identified most sensitive receivers to Stage 10 and 11 will be to the south if Stages 5 and 6 have been developed.

Private residential properties are located along to the west of the Stage 12 and 13 and to the south of Stage 13. In particular, the following properties are adjacent the western boundary.

- 51 Cemetery Road
- 68 Cemetery Road
- 104 Cemetery Road
- 107 Cemetery Road

- 142 Young Access

The eastern boundary of Stage 13 is currently under construction. There is potential for sensitive receivers to be situated along this boundary during the earthworks phase.
Adjoining owners will be informed with a pre-construction communication which will include a 24-hour contact telephone number to call the site Contractor for dust and other complaints.
The Contractor is to promptly implement additional dust control measures when a complaint is received, and they are to note the complaint, outcomes, and actions. A record of dust events and complaints are to be recorded in weekly site meetings. Section 7 provides further information on the complaint's response procedures.

4.0 DUST MANAGEMENT

The nominated contractor will ultimately hold responsibility for the dust management regime and will confirm the appropriate dust mitigation strategies for the site.

The avoidance of adverse dust effects could be achieved through the following.

4.1 Minimising Disturbance

During the summer months (earthworks season), the maximum open area will be limited to no more than 30ha at any one time. Progressive stabilisation will be undertaken throughout the duration of works. As an area is completed, such as the lots, they will be progressively topsoiled and stabilised to reduce the chance of dust generation. The roads will be sheeted with aggregate.

During the earthworks exposed areas will be actively scraped 'clean' of fine powdered soil and materials that could be entrained by wind.

Stockpiles that are not to be worked for more than eight weeks will be stabilised (e.g. with grass seed and mulch).

Completed areas that are reshaped will be topsoiled and stabilised with grass. This may also require the use of mulch to ensure that the open area limits are maintained.

4.2 Managing Traffic Effects

Within site vehicle movements will be limited to 30kph which is the general safe operating speed for plant and vehicles on site. Contractors will introduce localised restrictions to 10kph around site compounds where light vehicle activity is prevalent. Localised restrictions are also introduced around areas, either on or adjacent to the site, that are sensitive to safety and/or dust generation.

On public roads, normally the speed limit will apply, unless specific areas are under traffic management.

The aggregate surface of the site access and haul road will be maintained to minimise fines that could result in generation of dust.

4.3 Dust Suppression

The Contractor shall provide sufficient water cart(s) and / or sprinklers that are capable to ensure the exposed areas of the site are appropriately moistened to avoid dust nuisance towards the neighbouring properties.

The site is to be watered at the end of each working day when it is considered that a dust nuisance may exist following the close of works for that day (unless there is sufficient rain or showers, falling or forecasted).

The site is to be watered if strong winds are forecast, and these coincide with dry ground conditions to avoid dust nuisance towards neighbouring properties.

The water application rate will be managed to avoid surface water runoff occurring.

If active dust suppression on site fails to be effective, or where an actual dust nuisance has arisen, then a 3m dust fence can be erected along the boundary of a neighbouring property.

4.4 Water Supply

Water carts can be filled from the sediment retention ponds which have a dead storage capacity that can be used, subject to dry weather evaporative loses.

Other water courses will likely be required. These will be confirmed by the Contractor prior to commencing works and updated in the DMP.

5.0 WEATHER MONITORING

The Contractor will monitor forecasts. If higher-risk wind strength and direction is forecast (from active earthwork areas towards neighbouring properties), works on site may be minimised, or avoided, especially close to the stage boundary.

6.0 DUST MONITORING PROCEDURES

Monitoring of dust effects will be the responsibility of the consent holder and contractor. Overall responsibility will lie with the consent holder as part of the environmental management system.

Monitoring of dust effects shall be undertaken continuously, as site conditions can change through the day. Education of site staff on potential dust sources, effects (including locations of sensitive receivers) and management requirements shall form part of the site induction procedures required to be undertaken by all staff working at the site.

Dust monitoring shall predominantly rely on visual observation. Indicators of potential dust problems include:

- Dust particles rising higher than 0.5m above ground surface level in still wind conditions due to movement of machinery.
- Dust being picked up off the ground surface by wind without disturbance from moving machinery, particularly if wind direction is towards neighbouring properties.

Neighbour liaison is also an important part of the monitoring of dust effects. If dust discharges have occurred, there is potential for neighbours to sustain negative effects such as exterior of house becoming dirty.

The consent holder shall maintain a log in which dust conditions are recorded daily. The log shall record the following as a minimum:

- Date.
- Wind strength (nil, light, medium, strong, very strong).
- Wind direction.
- Open area being actively worked (m^3) and ground conditions (wet, damp, optimum, dry, very dry).
- Whether dust is being discharged beyond the site boundary (nominally Maclaurin Road).
- Any dust suppression undertaken (area and volume of water).
- Any complaints received and the response to complaints.

7.0 COMPLAINT RESPONSE PROCEDURES

It is the core principle of the Dust Management Plan that off-site dust effects are avoided. If dust complaints are received, the matters raised shall be investigated and responded to as quickly as possible. The standard procedure for responding to any complaints received will be as follows:

1. Dust complaint received.
2. The consent holder will liaise directly with the complainant and visit the complainant's property to confirm/assess the issue and effects.
3. The consent holder shall liaise directly with the site contractor to implement dust control measures on site immediately to prevent any ongoing effects should they be occurring or are assessed as likely to have occurred (e.g. ceasing works, deploying additional water application, closing up areas, maintenance of haul roads).
4. The consent holder shall inspect the affected property with the complainant to determine the need for any specific mitigation requirements.
5. The consent holder shall record the complaint and response.
6. Close out the incident.