



CLC
CONSULTING

Draft Earthworks Management Plan

Prepared for Ngāti Whātua Ōrākei Whai Rawa Ltd

The Point
Mission Bay

Job No. 22064
17th November 2025

| Issue | Description | Author | Date |
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| B | For Resource Consent | David Hope | 7/11/2025 |
| C | For Resource Consent | David Hope | 17/11/2025 |
| | | | |

Document Acceptance

| Action | Signed | Author | Date |
|--------------|--------|--------------------------|------------|
| Prepared By | | David Hope | 17/11/2025 |
| Reviewed by | | Raunak Chand | 17/11/2025 |
| Approved by | | Kurt Atkins | 17/11/2025 |
| On behalf of | | CLC Consulting Group Ltd | |



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1. Introduction

1.1 Purpose of Report

CLC Consulting Group Limited (CLC) has been engaged by Ngāti Whātua Ōrākei Whai Rawa Ltd and Generus Living Group to prepare a draft Earthworks Management Plan (EMP) for the proposed retirement village development referred to as The Point, Mission Bay.

The purpose of this report is to outline suitable erosion and sediment control measures during all earthworks to ensure that all stormwater runoff from the Site is managed and controlled so that no silt, sediment or water containing silt or sediment is discharged into stormwater pipes, drains, or channels.

It is intended that this draft EMP will form the basis for a final EMP, which will be required to be developed, certified and implemented as a condition of resource consent for The Point Mission Bay.

A final EMP will be prepared once a contractor has been appointed to under the works.

2. Site Details

The site comprises an overall site area of over 2.4Ha.

The site is generally bounded by Kupe Street to the west, Takaparawhau/Michael Joseph Savage Memorial Park to the north, and residential properties to the east and south. Access to the site is afforded from Kupe Street, Te Arawa Street, Rukutai Street and Aotea Street.

The western portion of the site is developed with an existing multi storey aged care facility (to be retained), which includes administration, reception areas, kitchen and dining facilities and other communal areas. The middle portion of the site is vacant where previous buildings have been demolished, and the eastern portion of the site contains two multi-storey retirement living apartment blocks (to be demolished).

A site location plan is shown in **Figure 1** below



Figure 1: Site Location Plan (GeoMaps, October 2024)

2.1 Proposed Development

The proposed development consists of circa 260 new retirement living units across five new buildings (Buildings 1 – 5, ranging 5-8 storeys high), supplemented with associated amenities. The existing aged care facility building in the western portion of the site will remain.

The development includes the formation of new internal accessways, carparks and footpaths to service the development.

An extract of the concept masterplan prepared by Warren & Mahoney Architects is shown in Figure 2 below.



Figure 2: Extract showing proposed development (Warren & Mahoney Architects)

2.2 Proposed Development Staging

It is proposed to stage the construction over a number of years.

The indicative staging for the proposed development is summarised below:

| Stage | Indicative Scope of Works |
|---------|--|
| Stage 1 | <ul style="list-style-type: none"> Construction of basement and podium level for Building 2 and 3. Construction of Building 2 Construction of restaurant |
| Stage 2 | <ul style="list-style-type: none"> Construction of basement and podium for Building 3. Construction of Building 3. Demolition of Aotea Street Apartment blocks Construction of Basement to B1 and Entry Pavilion (finished at podium level) Construction of restaurant on podium between Buildings 3 & 4. |
| Stage 3 | <ul style="list-style-type: none"> Construction of Building 1. |
| Stage 4 | <ul style="list-style-type: none"> Construction of Building 4 and basement Construction of remaining L2 basement Amenity space on podium |

Stages 1 to 5 earthworks are predominantly 'cut' to create the basement carpark. These cuts will be supported by temporary inground retaining (sheet piles or bored piles) along the site's northern boundary and by temporary batters where site constraints allow. Temporary shoring will also be used to isolate the excavation relating to the existing Aotea Street apartment blocks, which will be occupied until the end of Stage 2 of the development.

As described in Section 4 (Sediment and Erosion Control Measure), deep excavations associated with Stages 1 to 5 will create low points within the site, which will act as temporary sediment ponds, and will be dewatered with mobile sump pumps. These will pump the sediment laden water to a mobile clarifier unit, which in turn will gravity feed the clean treated water to the stormwater network.

The Erosion and Sediment Control Drawings included in Appendix A show the proposed erosion and sediment control measures for each Stage in accordance with the principles outlined in Section 4.2 of this report.

3. Earthworks

3.1 Stage 1

Stage 1 includes the construction of Building 2 and the basement carpark and podium which link Building 2 and Building 3 (to be constructed in Stage 2).

Figure 3 below is an extract of CLC Drawing C922 and shows earthworks associated with Stage 1.

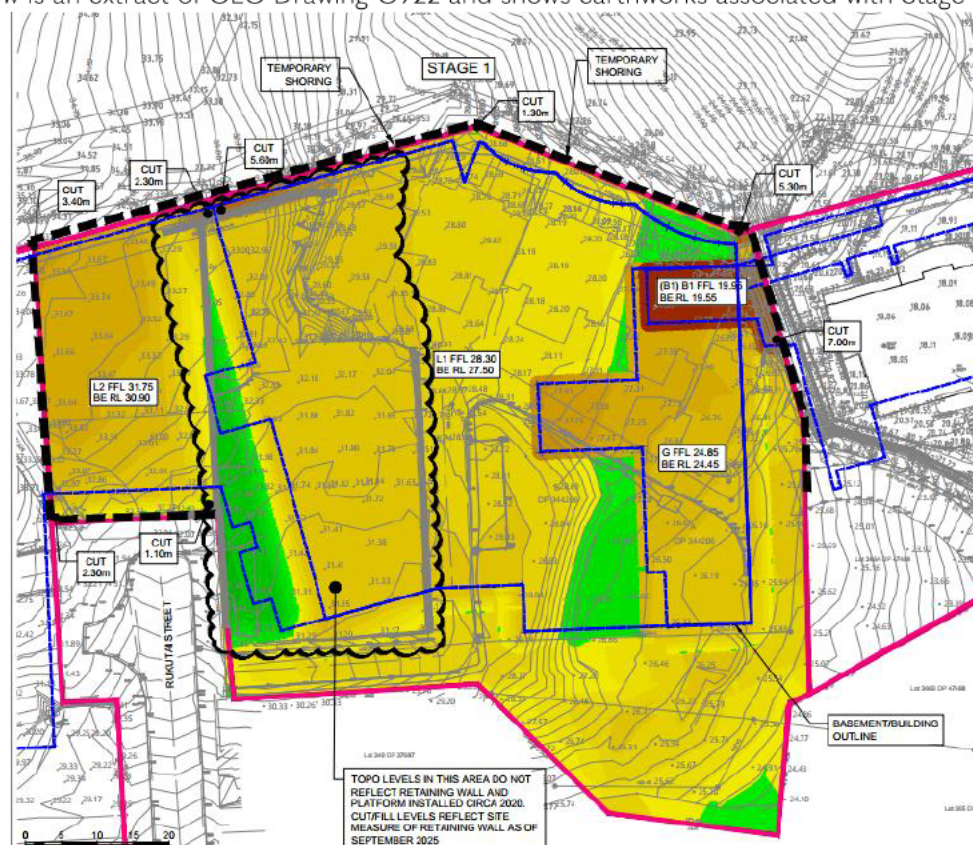


Figure 3: Stage 1 Earthworks

The estimated area and volume of the Stage 1 earthworks are as follows:

Earthworks Area: 7,325 m²

Cut Volume 10,900 m³

Fill Volume 550 m³

Balance (Cut) Volume 10,350 m³

3.2 Stage 2

Stage 2 includes the construction of Building 3 and associated portion of basement carpark, as well as the construction of the basement for Building 1 and the entry pavilion (finished at podium level).

This stage also includes the demolition of the two existing Aotea Street apartment blocks.

Figure 4 is an extract of CLC Drawing C923 (Appendix A) and shows earthworks associated with Stage 2.

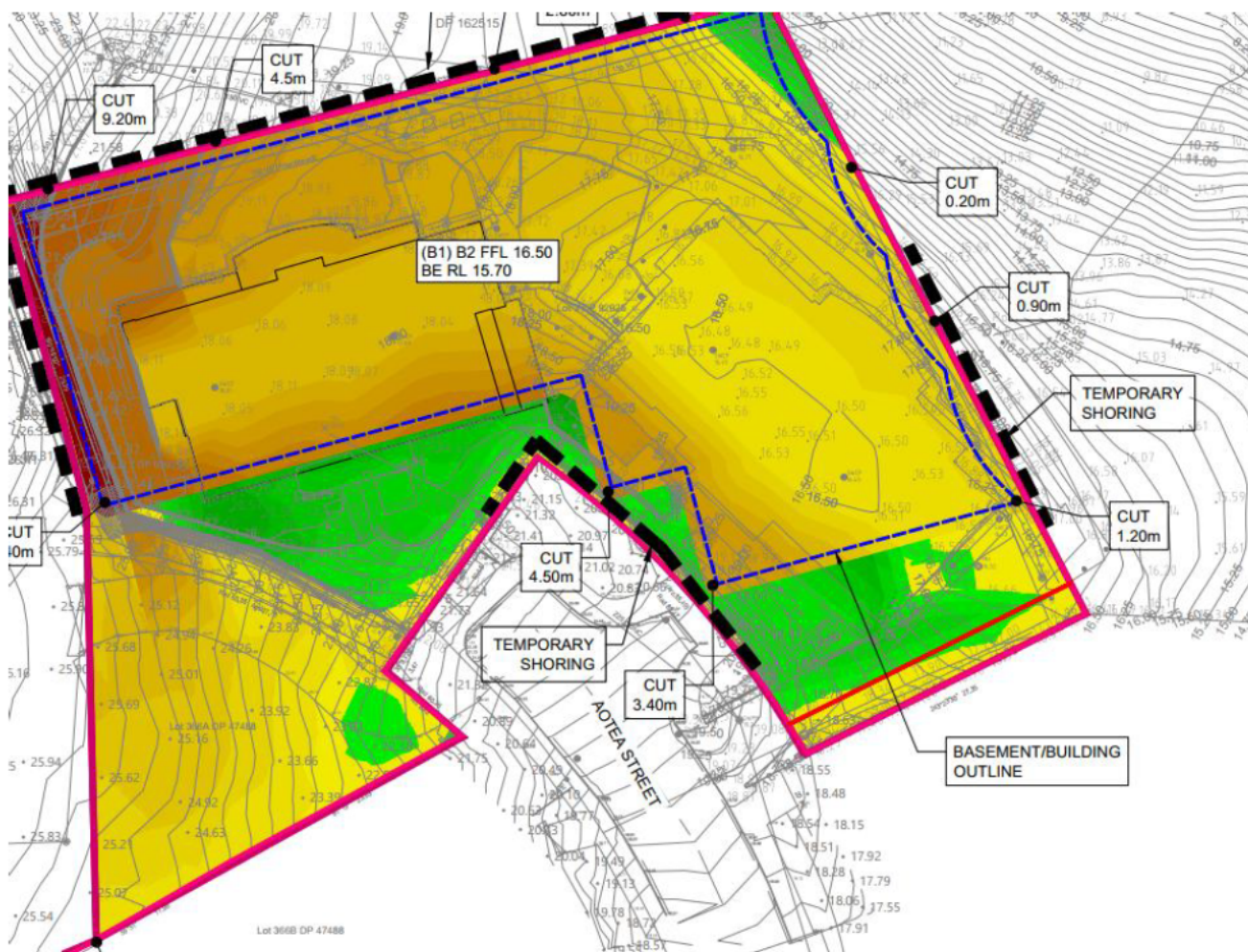


Figure 4 Stage 2 Earthworks

The estimated area and volume of the Stage 2 earthworks are as follows:

Earthworks Area: 4,327 m²

Cut Volume 7,800 m³

Fill Volume 660 m³

Balance (Cut) Volume 7,140 m³

3.3 Stage 3

Stage 3 includes the construction of Building 1 and no earthworks are required as the ground work were completed under Stage 2.

3.4 Stage 4

Stage 4 includes the construction of Building 4 and associated basement for both Buildings 4 and 5 and the podium area and landscaping.

Figure 5 below is an extract of CLC Drawing C925 (Appendix A) and shows earthworks associated with Stage 4.

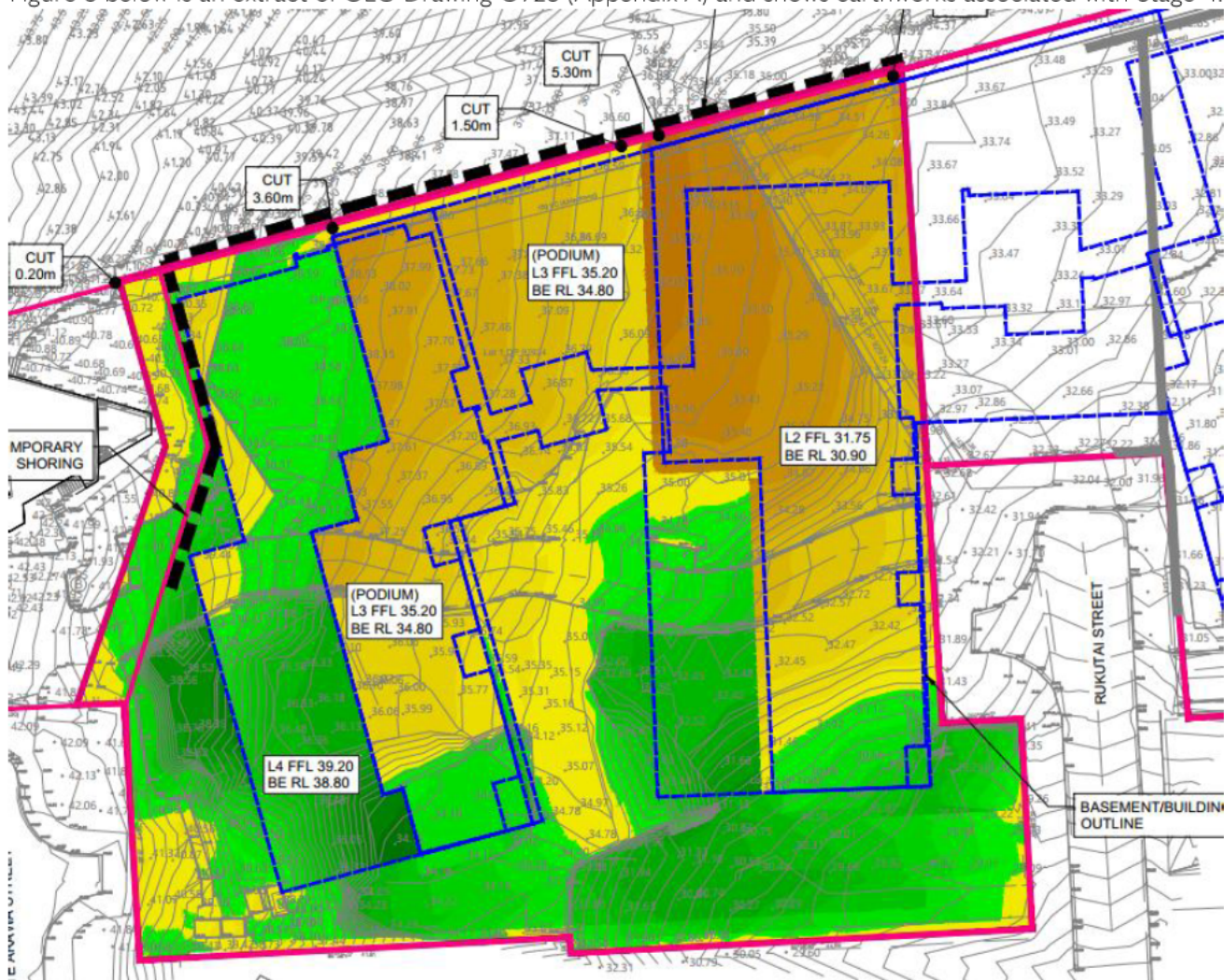


Figure 5: Stage 4 Earthworks

The estimated area and volume of the Stage 4 earthworks are as follows:

Earthworks Area: 5,937 m²

Cut Volume 6,450 m³

Fill Volume 3,480m³

Balance (Cut) Volume 2,970 m³

3.5 Stage 5

Stage 5 includes the construction of Building 5 and no earthworks are required as the ground works were completed under Stage 4.

4. Sediment and Erosion Control Measures

4.1 Sediment and Erosion Control Principles

The following outlines the management methods that are proposed to mitigate the effects of the proposed land disturbance activities and recommends specific devices based on the proposed stages of the works.

The general principles proposed to be adopted during the earthworks phasing are as follows:

- Minimise the disturbance area due to earthwork activities as much as practically possible, while satisfying requirements for the site development.
- Progressively stabilise exposed areas following completion of each stage.
- Divert clean water runoff away from the site, thus reducing the contributing catchment to the exposed earthwork areas.
- Intercept and divert sediment-laden runoff from exposed areas to specifically designed treatment devices prior to discharging into the downstream environment.
- Implement measures to prevent construction traffic exiting the construction area onto public roads with sediment on the tyres.
- Regularly inspect the erosion and sediment control measures and undertake necessary maintenance to maximise the potential retention of sediment on the site.
- In the event of forecast heavy rain, stabilise the site as far as practically possible and close works down.
- Ongoing assessment of the erosion and sediment control measures and, if required, adjust as the work progresses.
- Ensure site staff are aware of the requirements of the Erosion and Sediment Control Plan and the relevant Resource Consent conditions prior to the works commencing.

These principles are consistent with the Auckland Council Guidance Document Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region – June 2016/005 (GD05), Incorporating Amendment 3 Reprinted August 2023.

4.2 Sediment and Erosion Control Measures

The following techniques are proposed to be used by the contractor to control sediment-laden runoff and to prevent erosion of exposed ground. These measures and devices shall be constructed in accordance with GD05 or manufacturers specifications where not discussed in GD05.

4.2.1 Stabilised Construction Entrance

During the various stages of construction, the site will be accessed from Te Arawa Street, Rukutai Street and Aotea Street. These access points have concrete driveways/vehicle crossing which will be utilised for construction traffic. In addition, to the concrete hardstand areas provided by the driveways, a stabilised construction entrance will be installed as per GD005 to ensure no sediment is tracked offsite. This will prevent

the access becoming a sediment source, minimising dust generation and the tracking of soil onto the public roads.

4.2.2 Silt Fences and Silt Sock Contour Drains

These will be used around the perimeter of the site and at various locations and at times within the site to isolate areas (e.g. temporary stockpile) during construction.

The silt fences (and silt socks) will detain flows from the construction area so deposition of transported sediment can occur through settlement and filtration. The design and implementation of these silt fences and silt socks will be in accordance with GD05.

4.2.3 Contour Drains

Contour drains will be utilised within the earthworks area to direct runoff to localised low areas where mobile sump and pumps will pump sediment-laden water to the mobile filtration device.

4.2.4 Clean Water Diversion Channels and Bunds

These would be used to intercept and convey clean water from upstream catchments away from the works area. Where gradients exceed 2%, the necessity for channel stabilisation will be determined and carried out if required.

4.2.5 Dirty Water Diversion Channels and Bunds

These will be used within the earthworks area to divert sediment-laden water to an appropriate sediment retention device and or a low point within the excavation where a sump pump will be used to pump sediment laden water to the mobile filtration devices.

4.2.6 Mobile Filtration Device – Lamella Clarifier

A mobile filtration device is proposed to enable sediment-laden water to be treated prior to discharge to the public stormwater network. The proposed treatment device is a Lamella Clarifier such as a Silt Stopper

Figure 6 below is an example of a portable Lamella Clarifier.



Figure 6: Mobile Lamella Clarifier

The Lamella Clarifier is proposed as the primary means of removing sediment from sediment-laden water generated from rainfall or groundwater within the earthworks area. One key advantage of these devices is the small footprint and ability to relocate them around the site to suit the earthworks staging.

The clarifier will be inspected daily and cleaned as required by the contractor. The proposed location of the lamella clarifier is shown on the attached plans, however, the portability of the device means it can be easily re located within the site as required.

The clarifier can comfortably treat 25-30 m³/hr and to further increase the treatment efficiency, chemical treatment can be added to the inflows to the clarifier if necessary.

A draft Chemical Treatment Management Plan (CTMP) has been prepared by Erosion Control NZ and is included in Appendix B. The draft CTMP provide recommendations for the dosing of sediment laden water. This information will be used if chemical dosing is required to optimise the Mobile Filtration Device.

4.2.7 Inlet Protection

Inlet protection of existing public and private catchpits will be in accordance with Section F1.6 of GD05.

4.2.8 Hydroseeding or Mulching

Hydroseeding or mulching would be used to provide protection of exposed soils where earthworks require immediate stabilisation. These would be mechanically applied to ensure even spread and appropriate application. The hydroseed or mulch would protect exposed soils from the erosive forces of raindrop impact and overland flow.

4.2.9 Dust Control

Exposed earthwork areas will be maintained to minimise the release of dust into the atmosphere. In the event of dust generation becoming obvious through earthwork activities, appropriate measures to reduce the dust release to acceptable levels would be undertaken. Methods to be adopted for dust control are as follows:

- Ensure the exposed earthwork areas remain in a damp condition, utilising water trucks as necessary, until surfaces have been stabilised.
- Limit site traffic speed to a level to reduce the production of dust.
- Stage earthworks during construction in order to isolate and reduce the area of exposed earthworks.
- Stabilised entrance at the entry/exit points of the site.
- If necessary, earthwork activities may be limited in specific areas during periods of high wind.

4.2.10 Management and Maintenance of Sediment Control Measures

As part of the earthworks contract, the contractor will be responsible for providing adequate sediment and erosion control measures in accordance with the Erosion and Sediment Control Plan to protect downstream environments from excessive sedimentation and water quality degradation.

Regular maintenance will be carried out during the operational life of the sediment, dust, and erosion control devices by the contractor. Inspections will be carried out by the contractor after every significant rainfall event and during periods of prolonged rainfall.

The contractor will inspect the site boundaries when weather conditions are dry and windy in order to monitor the levels of dust emission from the site. If there are signs of unacceptable levels of dust emission, the contractor would carry out suitable measures to reduce dust generation.

5. Conclusions & Recommendations

CLC Consulting Group Ltd have been engaged by Ngāti Whātua Ōrākei Whai Rawa Ltd and Generus Living Group to prepare a draft EMP for the proposed retirement village development.

The proposed development consists of five new multi storey buildings with associated communal amenities. The development also includes formation of new internal accessways, carparks and footpaths to service the development.

Suitable erosion and sediment controls are proposed in accordance with GD05 and will be established before any earthworks commence on-site. These will be maintained for the duration of the earthwork's operations.

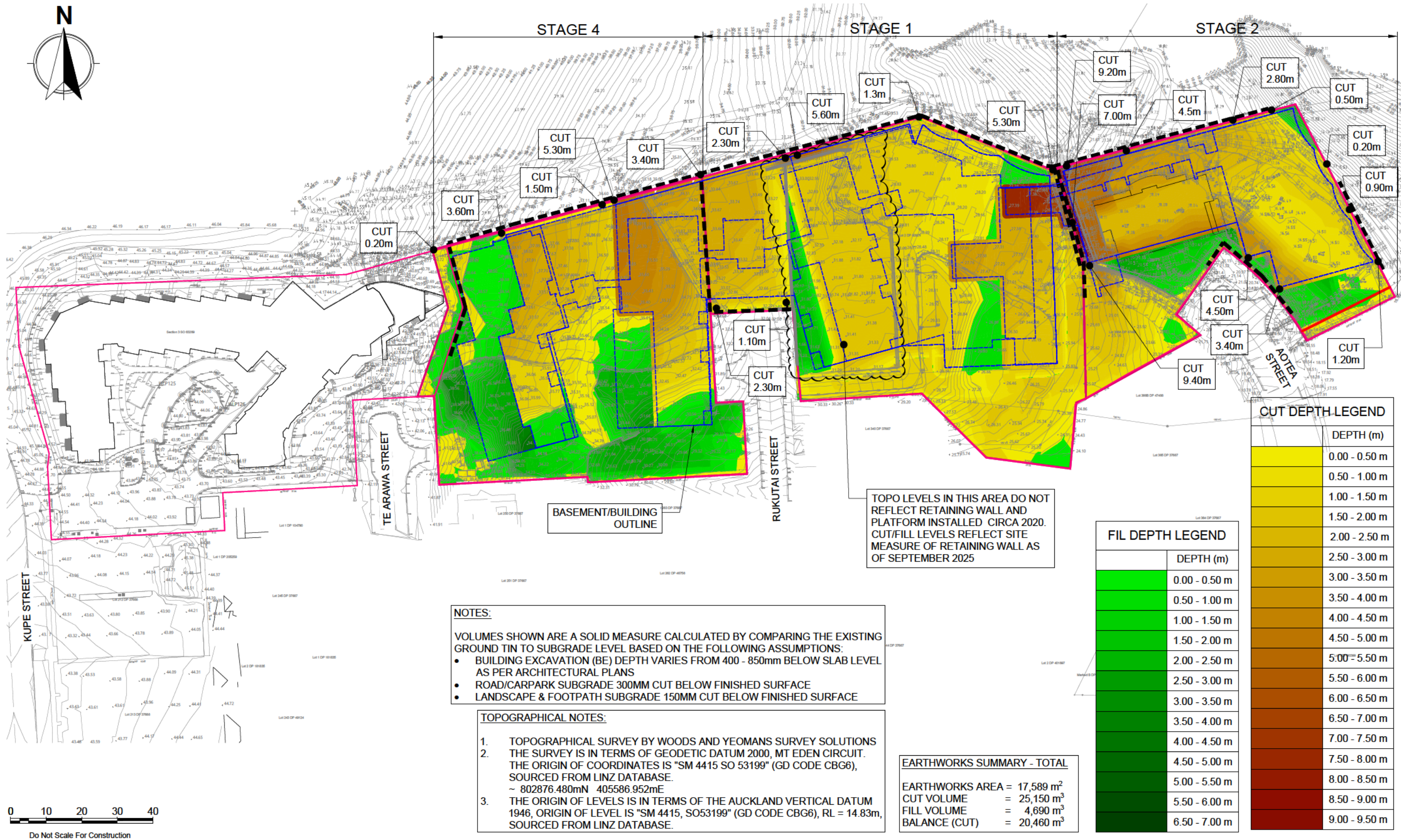
It is intended that this draft EMP will form the basis for a final EMP, which will be required to be developed, certified and implemented as a condition of resource consent for The Point, Mission Bay.

A final EMP will be prepared once a contractor has been appointed to undertake the works.

6. Limitations

This management plan has been prepared for our clients Ngāti Whātua Ōrākei Whai Rawa Ltd and Generus Living Group Ltd relation to the proposed development at The Point, 217 Kupe Street, Mission Bay and specifically to support a fast-track resource consent application to the Ministry for the Environment.

Appendix A – Erosion and Sediment Control and Earthworks Drawings



Revision History:

| Rev | Description |
|-----|----------------------|
| A | FOR RESOURCE CONSENT |
| B | FOR RESOURCE CONSENT |

| Drawn | Designed | Approved | Date |
|-------|----------|----------|------------|
| VK | DH | KA | 22-08-2025 |
| VK | DH | KA | 07-11-2025 |



Client:

GENERUS LIVING GROUP LTD

Project:

THE POINT, 217 KUPE STREET
MISSION BAY, AUCKLAND

Drawing Title:

BULK EARTHWORKS PLAN
OVERALL

Issue:

RESOURCE CONSENT

Scale @ A3:

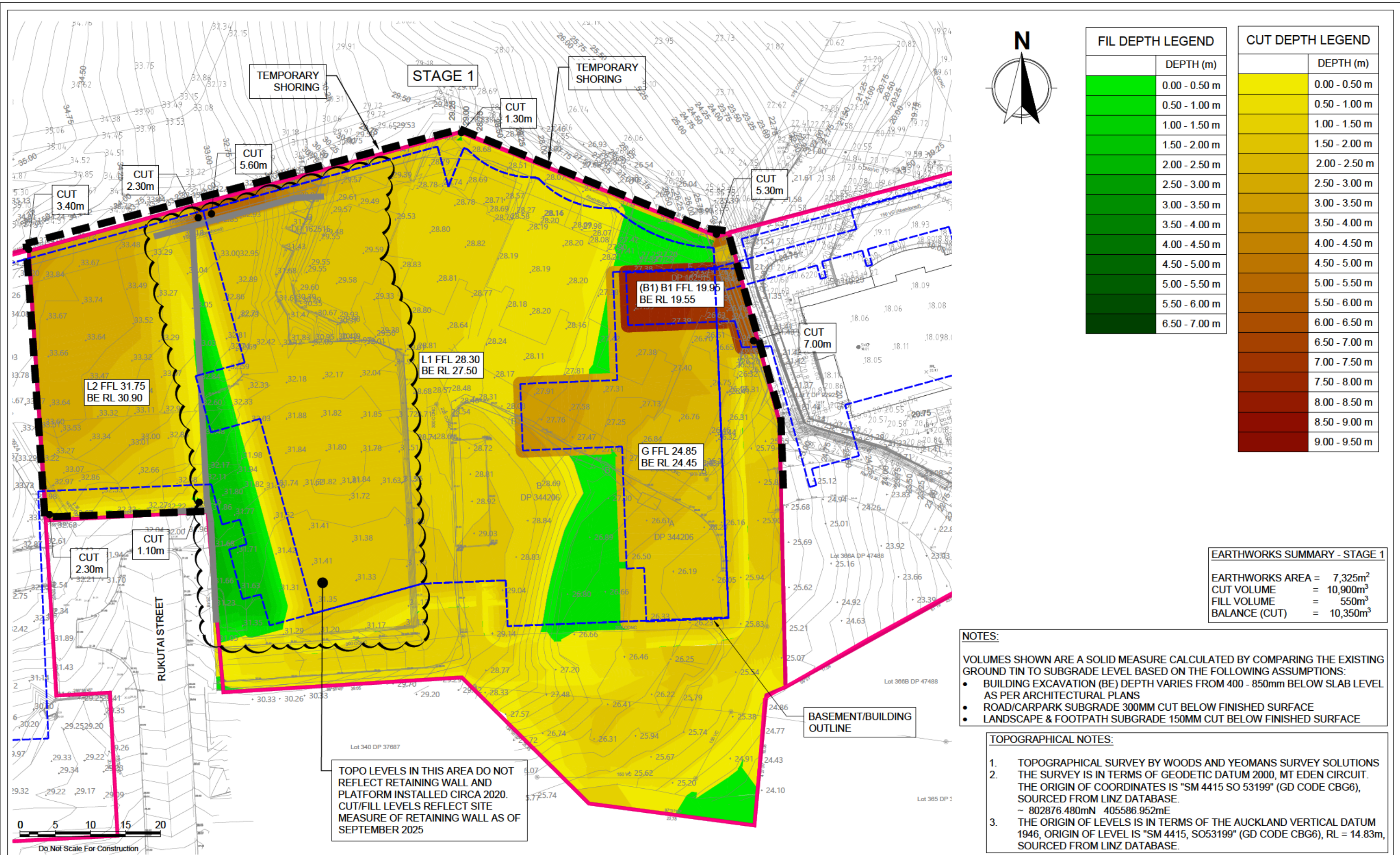
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Dwg No:

22064-C921

Rev:

B



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| EARTHWORKS SUMMARY - STAGE 1 | |
|------------------------------|----------------------|
| EARTHWORKS AREA = | 7,325m ² |
| CUT VOLUME = | 10,900m ³ |
| FILL VOLUME = | 550m ³ |
| BALANCE (CUT) = | 10,350m ³ |

- NOTES:
- VOLUMES SHOWN ARE A SOLID MEASURE CALCULATED BY COMPARING THE EXISTING GROUND TIN TO SUBGRADE LEVEL BASED ON THE FOLLOWING ASSUMPTIONS:
- BUILDING EXCAVATION (BE) DEPTH VARIES FROM 400 - 850mm BELOW SLAB LEVEL AS PER ARCHITECTURAL PLANS
 - ROAD/CARPARK SUBGRADE 300MM CUT BELOW FINISHED SURFACE
 - LANDSCAPE & FOOTPATH SUBGRADE 150MM CUT BELOW FINISHED SURFACE

- TOPOGRAPHICAL NOTES:
- TOPOGRAPHICAL SURVEY BY WOODS AND YEOMANS SURVEY SOLUTIONS
 - THE SURVEY IS IN TERMS OF GEODETIC DATUM 2000, MT EDEN CIRCUIT. THE ORIGIN OF COORDINATES IS "SM 4415 SO 53199" (GD CODE CBG6), SOURCED FROM LINZ DATABASE. ~ 802876.480mN 405586.952mE
 - THE ORIGIN OF LEVELS IS IN TERMS OF THE AUCKLAND VERTICAL DATUM 1946, ORIGIN OF LEVEL IS "SM 4415, SO53199" (GD CODE CBG6), RL = 14.83m, SOURCED FROM LINZ DATABASE.



| Revision History: | | Drawn | Designed | Approved | Date |
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| Rev | Description | | | | |
| A | FOR RESOURCE CONSENT | VK | DH | KA | 22-08-2025 |
| B | FOR RESOURCE CONSENT | VK | DH | KA | 07-11-2025 |



Client:
GENERUS LIVING GROUP LTD

Project:
**THE POINT, 217 KUPE STREET
MISSION BAY, AUCKLAND**

Drawing Title:
**BULK EARTHWORKS PLAN
STAGE 1**

Issue:
RESOURCE CONSENT

Scale @ A3:
1:500

Dwg No:
22064-C922

Rev:
B



| FIL DEPTH LEGEND | |
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| CUT DEPTH LEGEND | |
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EARTHWORKS SUMMARY - STAGE 2

EARTHWORKS AREA = 4,327 m²
CUT VOLUME = 7,800 m³
FILL VOLUME = 660 m³
BALANCE (CUT) = 7,140 m³

NOTES:

VOLUMES SHOWN ARE A SOLID MEASURE CALCULATED BY COMPARING THE EXISTING GROUND TIN TO SUBGRADE LEVEL BASED ON THE FOLLOWING ASSUMPTIONS:

- BUILDING EXCAVATION (BE) DEPTH VARIES FROM 400 - 850mm BELOW SLAB LEVEL AS PER ARCHITECTURAL PLANS
- ROAD/CARPARK SUBGRADE 300MM CUT BELOW FINISHED SURFACE
- LANDSCAPE & FOOTPATH SUBGRADE 150MM CUT BELOW FINISHED SURFACE

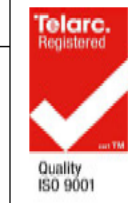
TOPOGRAPHICAL NOTES:

- TOPOGRAPHICAL SURVEY BY WOODS AND YEOMANS SURVEY SOLUTIONS
- THE SURVEY IS IN TERMS OF GEODETIC DATUM 2000, MT EDEN CIRCUIT. THE ORIGIN OF COORDINATES IS "SM 4415 SO 53199" (GD CODE CBG6), SOURCED FROM LINZ DATABASE. ~ 802876.480mN 405586.952mE
- THE ORIGIN OF LEVELS IS IN TERMS OF THE AUCKLAND VERTICAL DATUM 1946, ORIGIN OF LEVEL IS "SM 4415, SO53199" (GD CODE CBG6), RL = 14.83m, SOURCED FROM LINZ DATABASE.



Revision History:

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| A | FOR RESOURCE CONSENT | VK | DH | KA | 22-08-2025 |
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Client:

GENERUS LIVING GROUP LTD

Project:

THE POINT, 217 KUPE STREET
MISSION BAY, AUCKLAND

Drawing Title:

BULK EARTHWORKS PLAN
STAGE 2

Issue:

RESOURCE CONSENT

Scale @ A3:

1:500

Dwg No:

22064-C923

Rev:

B



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| CUT DEPTH LEGEND | |
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| | 9.00 - 9.50 m |

EARTHWORKS SUMMARY - STAGE 4

EARTHWORKS AREA = 5,937 m²
CUT VOLUME = 6,450 m³
FILL VOLUME = 3,480 m³
BALANCE (CUT) = 2,970 m³

NOTES:

VOLUMES SHOWN ARE A SOLID MEASURE CALCULATED BY COMPARING THE EXISTING GROUND TIN TO SUBGRADE LEVEL BASED ON THE FOLLOWING ASSUMPTIONS:

- BUILDING EXCAVATION (BE) DEPTH VARIES FROM 400 - 850mm BELOW SLAB LEVEL AS PER ARCHITECTURAL PLANS
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- LANDSCAPE & FOOTPATH SUBGRADE 150MM CUT BELOW FINISHED SURFACE

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| VK | DH | KA | 22-08-2025 |
| VK | DH | KA | 07-11-2025 |



Client:

GENERUS LIVING GROUP LTD

Project:

THE POINT, 217 KUPE STREET
MISSION BAY, AUCKLAND

Drawing Title:

BULK EARTHWORKS PLAN
STAGE 4

Issue:

RESOURCE CONSENT

Scale @ A3:

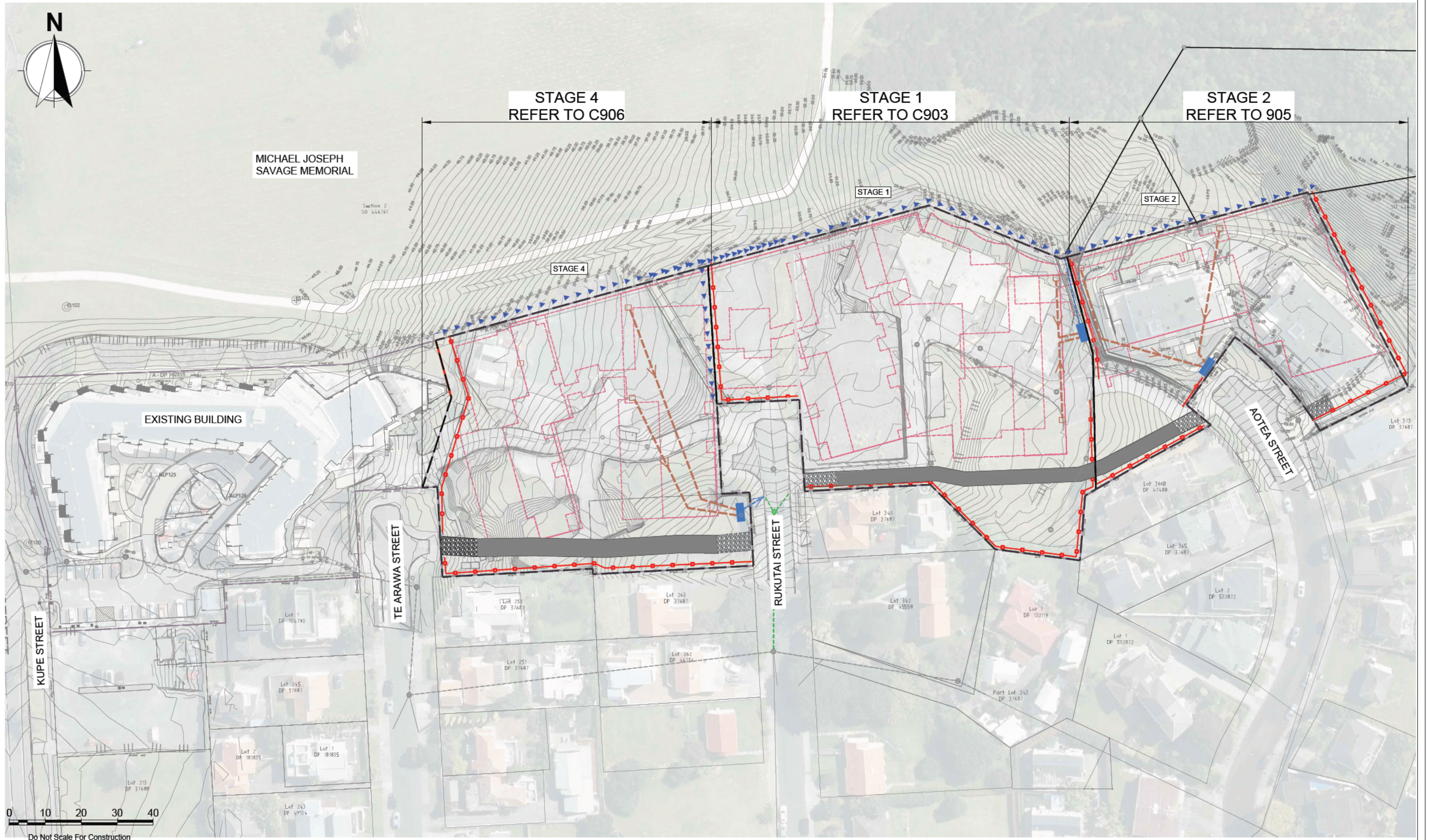
1:500

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22064-C925

Rev:

B



Revision History:

| Rev | Description |
|-----|------------------|
| A | RESOURCE CONSENT |
| B | RESOURCE CONSENT |
| C | RESOURCE CONSENT |

| Drawn | Designed | Approved | Date |
|-------|----------|----------|------------|
| VK | RC | KA | 28-08-2025 |
| VK | RC | KA | 07-11-2025 |
| VK | RC | KA | 13-11-2025 |



Client:
GENERUS LIVING GROUP LTD

Project:
**THE POINT, 217 KUPE STREET
MISSION BAY, AUCKLAND**

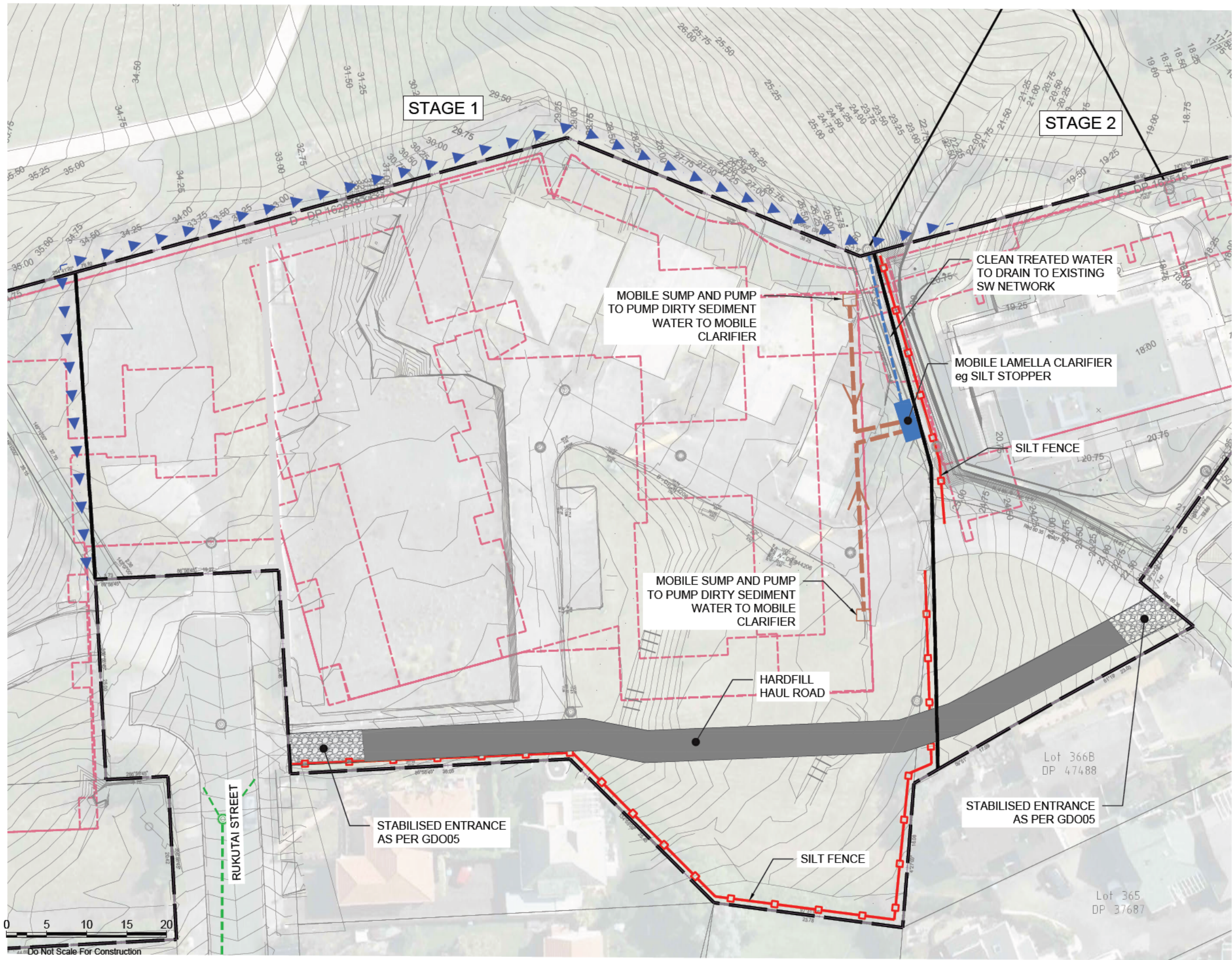
Drawing Title:
**EROSION AND SEDIMENT
CONTROL PLAN
OVERALL**

Issue:
RESOURCE CONSENT

Scale @ A3:
1:1000

Dwg No:
22064-C902

Rev:
C



| LEGEND | |
|--|--|
| STAGING AREA | |
| PROPOSED BUILDINGS | |
| PROPOSED PRIVATE SW | |
| PROPOSED PUBLIC SW | |
| PROPOSED SILT FENCE | |
| PROPOSED CLEAN WATER DIVERSION BUND | |
| PROPOSED DIRTY WATER DIVERSION BUND | |
| PROPOSED STABILISED CONSTRUCTION ENTRANCE | |
| MOBILE LAMELLA CLARIFIER EG SILT STOPPER (3.8m LONG x 2.0m WIDE x 2.4m HIGH) | |
| TREATED CLEAN WATER FROM CLARIFIER TO DRAIN TO SW NETWORK | |
| MOBILE SUMP AND PUMP TO PUMP DIRTY SEDIMENT LADEN WATER TO MOBILE CLARIFIER | |



Revision History:

| Rev | Description | Drawn | Designed | Approved | Date |
|-----|------------------|-------|----------|----------|------------|
| A | RESOURCE CONSENT | VK | RC | KA | 28-08-2025 |
| B | RESOURCE CONSENT | VK | RC | KA | 07-11-2025 |
| C | RESOURCE CONSENT | VK | RC | KA | 13-11-2025 |



Client:
GENERUS LIVING GROUP LTD

Project:
**THE POINT, 217 KUPE STREET
MISSION BAY, AUCKLAND**

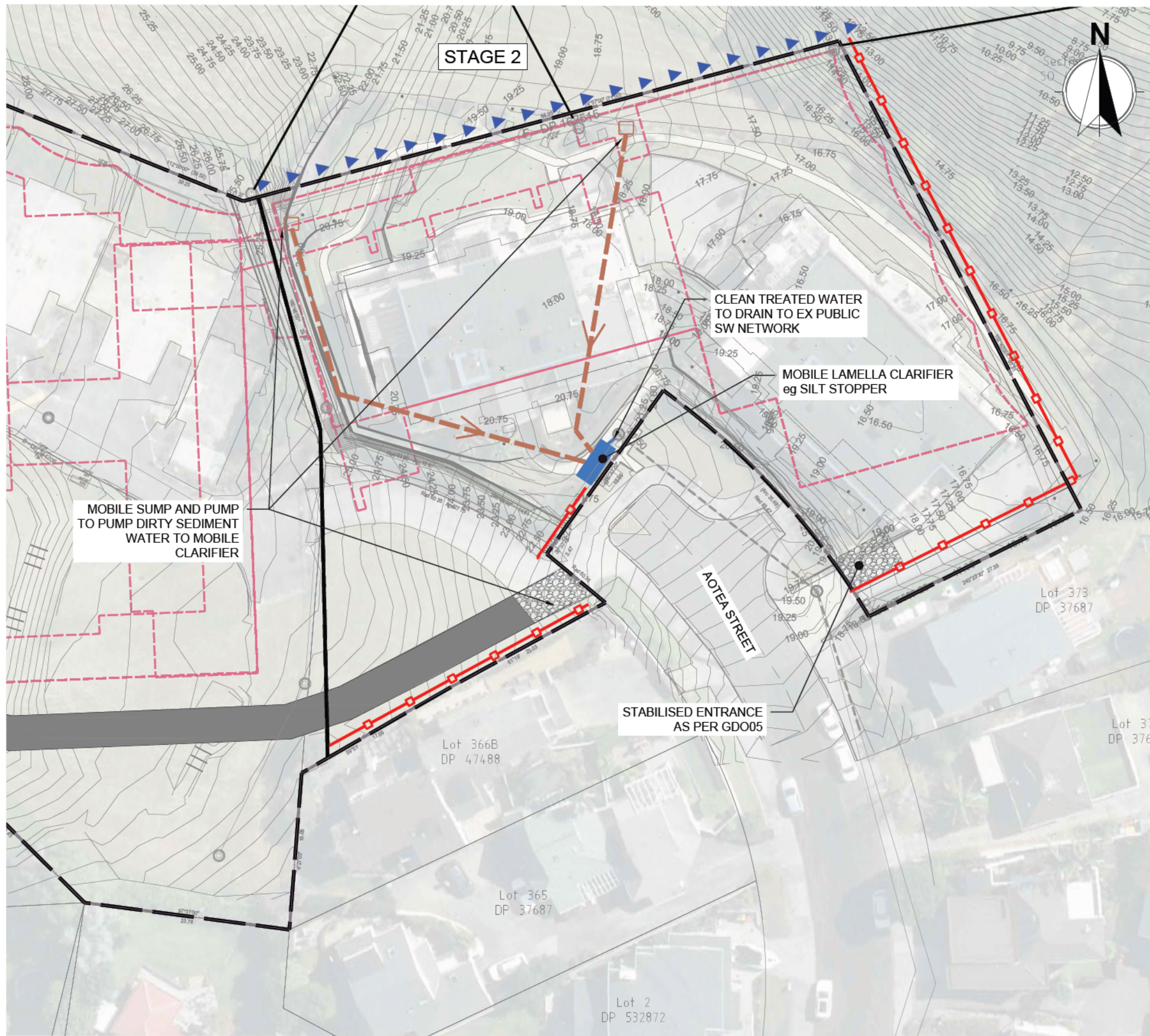
Drawing Title:
**EROSION AND SEDIMENT
CONTROL PLAN
STAGE 1**

Issue:
RESOURCE CONSENT

Scale @ A3:
1:500

Dwg No:
22064-C903

Rev:
C



0 5 10 15 20
Do Not Scale For Construction

| LEGEND | |
|--|--|
| STAGING AREA | |
| PROPOSED BUILDINGS | |
| PROPOSED PRIVATE SW | |
| PROPOSED PUBLIC SW | |
| PROPOSED SILT FENCE | |
| PROPOSED CLEAN WATER DIVERSION BUND | |
| PROPOSED DIRTY WATER DIVERSION BUND | |
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Revision History:

| Rev | Description | Drawn | Designed | Approved | Date |
|-----|------------------|-------|----------|----------|------------|
| A | RESOURCE CONSENT | VK | RC | KA | 28-08-2025 |
| B | RESOURCE CONSENT | VK | RC | KA | 07-11-2025 |
| C | RESOURCE CONSENT | VK | RC | KA | 13-11-2025 |



Client:
GENERUS LIVING GROUP LTD

Project:
**THE POINT, 217 KUPE STREET
MISSION BAY, AUCKLAND**

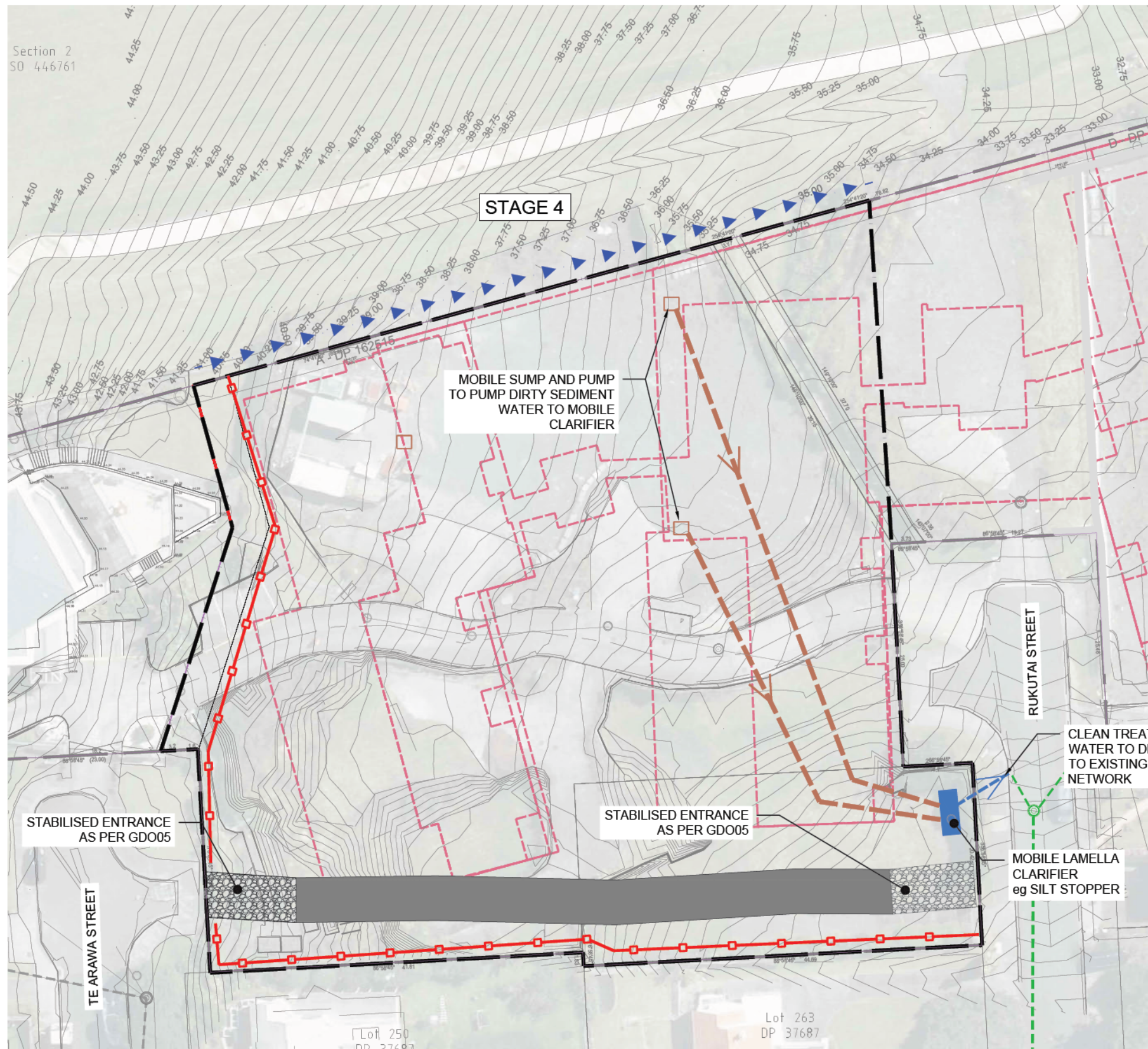
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**EROSION AND SEDIMENT
CONTROL PLAN
STAGE 2**

Issue:
RESOURCE CONSENT

Scale @ A3:
1:500

Dwg No:
22064-C905

Rev:
C



0 5 10 15 20
Do Not Scale For Construction

| LEGEND | |
|---|-----|
| STAGING AREA | --- |
| PROPOSED BUILDINGS | --- |
| PROPOSED PRIVATE SW | --- |
| PROPOSED PUBLIC SW | --- |
| PROPOSED SILT FENCE | --- |
| PROPOSED CLEAN WATER DIVERSION BUND | --- |
| PROPOSED DIRTY WATER DIVERSION BUND | --- |
| PROPOSED STABILISED CONSTRUCTION ENTRANCE | --- |
| MOBILE LAMELLA CLARIFIER EG SILT STOPPER (3.8m LONG x 2.0m WIDE x 2.4m HIGH) | --- |
| TREATED CLEAN WATER FROM CLARIFIER TO DRAIN TO SW NETWORK | --- |
| MOBILE SUMP AND PUMP TO PUMP DIRTY SEDIMENT LADEN WATER TO MOBILE CLARIFIER | --- |



Revision History:

| Rev | Description | Drawn | Designed | Approved | Date |
|-----|------------------|-------|----------|----------|------------|
| A | RESOURCE CONSENT | VK | RC | KA | 28-08-2025 |
| B | RESOURCE CONSENT | VK | RC | KA | 07-11-2025 |
| C | RESOURCE CONSENT | VK | RC | KA | 13-11-2025 |



Client:
GENERUS LIVING GROUP LTD

Project:
**THE POINT, 217 KUPE STREET
MISSION BAY, AUCKLAND**

Drawing Title:
**EROSION AND SEDIMENT
CONTROL PLAN
STAGE 4**

Issue:
RESOURCE CONSENT

Scale @ A3:
1:500

Dwg No:
22064-C906

Rev:
C

Appendix B – Draft Chemical Treatment Management Plan

CLC Consulting
The Point
Mission Bay

Chemical Treatment Management Plan
(CTMP)

Prepared by Erosion Control Co. Ltd

7th August 2025

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1. Introduction

Erosion Control Co Ltd have been engaged by CLC Consulting to prepare a Chemical Treatment Management Plan for the site located at, The Point, Mission Bay.

- The report outlines bench test results using water treatment chemicals including coagulants and flocculants.
- The dosing methodology and system for this site.
- Responsibilities for the management, monitoring, maintenance, and reporting of chemical dosing.
- A spill contingency plan.

Bench testing conducted in this plan is to the standards of Auckland Council GD05 Earthwork, Erosion and Sediment Control guide and ASTM standard D2035-13.

The design and implementation of the proposed CTMP will be in accordance with the Auckland Council GD05 and TP227 guidelines.

2. Bench Testing

Bench testing has been carried out using soil samples deemed to best represent the site once the land has been stripped of topsoil. The soil samples were mixed in a 20 L bucket with rainwater. The runoff sample was then added to six 1 L jars and treatment chemicals added at the following concentrations:

| | Jar 1 | Jar 2 | Jar 3 | Jar 4 | Jar 5 | Jar 6 |
|--|-------|-------------------|-------------------|-------------------|-------------------|-------------------|
| CHEMICAL Chemiclear 100 | BLANK | Chemiclear 100 | Chemiclear 100 | Chemiclear 100 | Chemiclear 100 | Chemiclear 100 |
| Product Concentration (ml/m ³) | 0 | 31 | 62 | 93 | 124 | 155 |

- Clarity was then recorded after 5 minutes, 10 minutes and 30 minutes to identify optimum dose rates to meet and achieve best discharge requirements.
- Final pH is also recorded to ensure council guidelines are met.

CLC Consulting (The Point, Mission Bay)

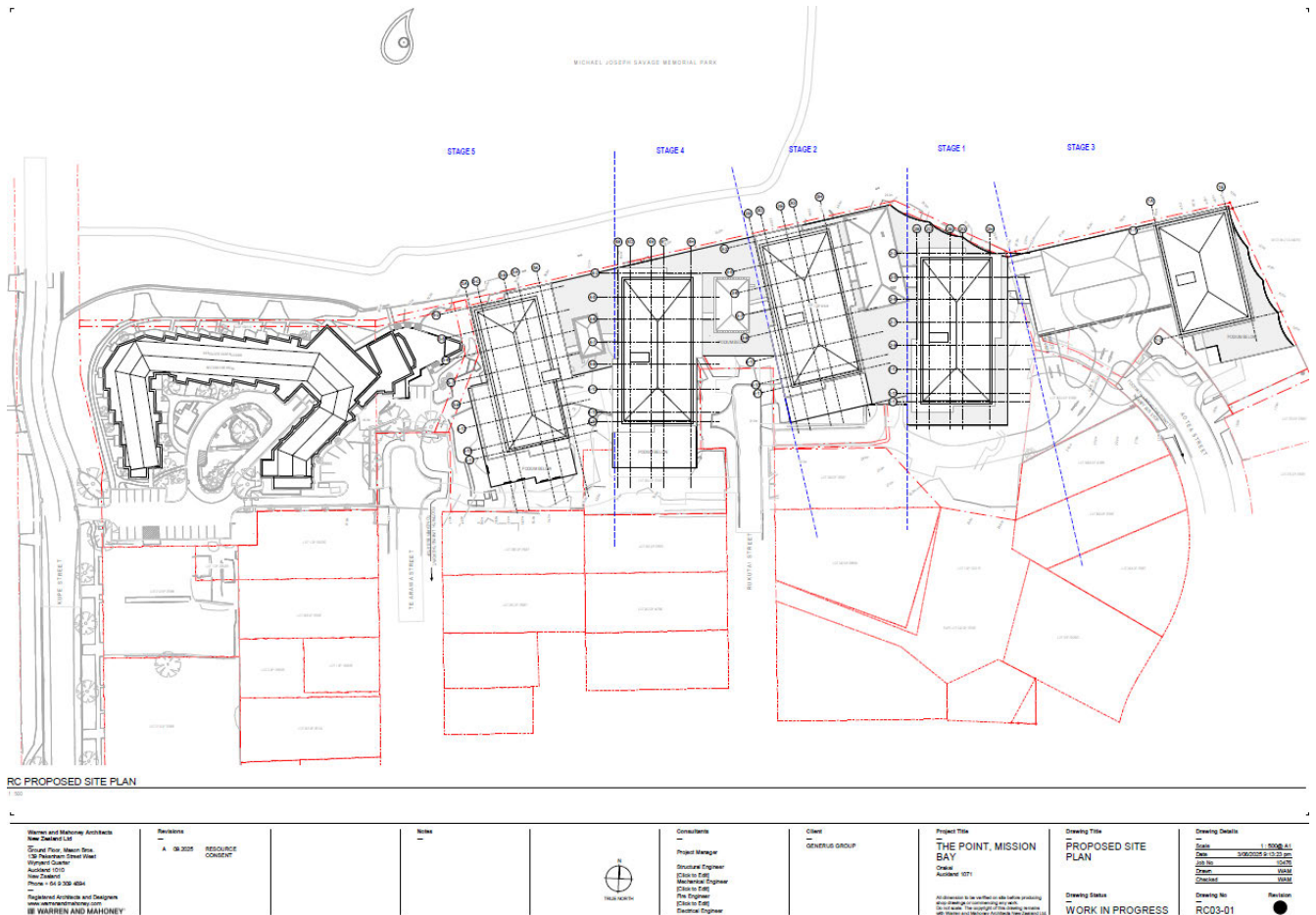
3. Soil Sample



CLC Consulting (The Point, Mission Bay)

4. Erosion & Sediment Control Plan

ESCP to be confirmed



5. Test Results and Discussion



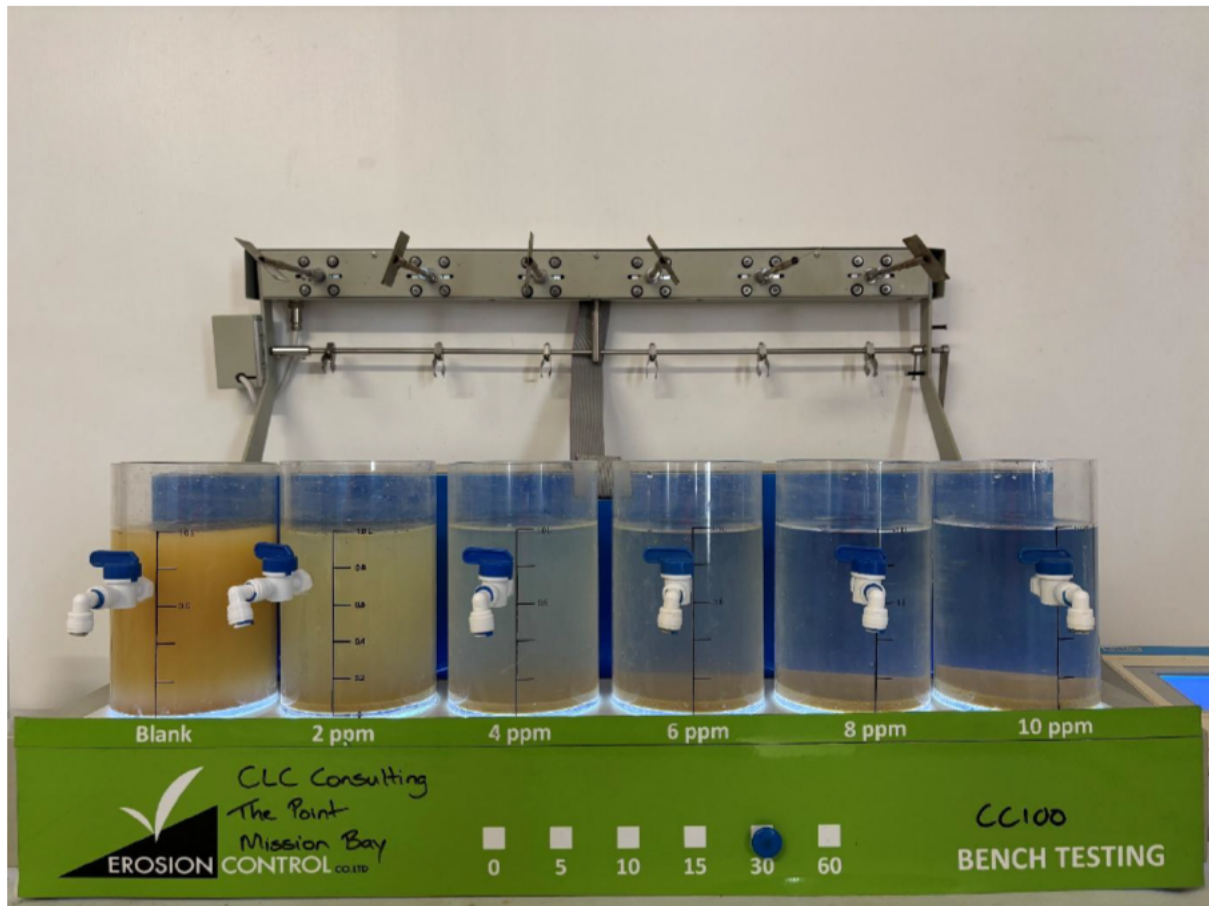
CATCHMENT SAMPLE: Chemiclear 101 on the Soil Sample after 60 minutes settling.

Catchment Sample Dosed with Chemiclear 101 - Water Clarity & pH

| Chemical | Product Dose (ml/m ³) | Clarity (mm) 5 Mins | Clarity (mm) 30 Mins | Clarity (mm) 60 Mins | Final pH | Final Turbidity (NTU) | Notes |
|----------------|-----------------------------------|---------------------|----------------------|----------------------|----------|-----------------------|-------------|
| Blank | 0 | <60 | <60 | <60 | 6.45 | 1,000 +++ | |
| Chemiclear 101 | 31 | >100 | >100 | >100 | 6.41 | 41.3 | Recommended |
| Chemiclear 101 | 62 | >100 | >100 | >100 | 6.38 | 23.4 | |
| Chemiclear 101 | 93 | >100 | >100 | >100 | 6.29 | 10.2 | |
| Chemiclear 101 | 124 | >100 | >100 | >100 | 6.17 | 7.15 | |
| Chemiclear 101 | 155 | >100 | >100 | >100 | 6.09 | 10.2 | |

Chemiclear 101 (PAC / PolyDADMAC blend) is the recommended chemical for this application based on testing of the received soil. The recommended dosage for the site is shown below.

| Chemical | Dose Rate | Volume water treated by 1 litre of chemical |
|----------------|----------------------------------|---|
| Chemiclear 101 | 31ml/m ³ (as product) | 32.26 m ³ |



CATCHMENT SAMPLE: Chemiclear 100 on the Soil Sample after 60 minutes settling.

Catchment Sample Dosed with Chemiclear 100 - Water Clarity & pH

| Chemical | Product Dose (ml/m ³) | Clarity (mm) 5 Mins | Clarity (mm) 30 Mins | Clarity (mm) 60 Mins | Final pH | Final Turbidity (NTU) | Notes |
|----------------|-----------------------------------|---------------------|----------------------|----------------------|----------|-----------------------|-------------|
| Blank | 0 | <60 | <60 | <60 | 6.45 | 1,000 +++ | |
| Chemiclear 100 | 31 | <60 | <80 | <80 | 6.36 | 303 | |
| Chemiclear 100 | 62 | <60 | <80 | <80 | 6.28 | 80.2 | |
| Chemiclear 100 | 93 | <80 | >100 | >100 | 6.16 | 35.2 | Recommended |
| Chemiclear 100 | 124 | >100 | >100 | >100 | 6.02 | 13.6 | |
| Chemiclear 100 | 155 | >100 | >100 | >100 | 5.89 | 12.1 | |

Chemiclear 100 (Polyaluminium Chloride PAC) is the recommended chemical for this application based on testing of the received soil. The recommended dosage for the site is shown below.

| Chemical | Dose Rate | Volume water treated by 1 litre of chemical |
|----------------|---|---|
| Chemiclear 100 | 6 ppm (as Al) 93ml/m ³ (as product) | 10.75 m ³ |

6. Floc Box Set up Calculations

Site: The Point, Mission Bay.

| Catchment & Area | Product | Floc Box Size | Catchment Tray area | Header Tank Low Flow Hole (Ø3 mm)* | Header Tank High Flow Hole (Ø10 mm)* | Estimated rainfall before chemical refilling |
|-------------------------|---------|---------------|---------------------|------------------------------------|--------------------------------------|--|
| Details to be confirmed | | | | | | |

*Low and high flow heights in mm are based on the recommended Floc Box header tank.

The catchment tray area is determined by the chemical dose rate and the area of exposed earthworks within the catchment. If the area of catchment or exposed area changes then the catchment tray and header tank need to be adjusted accordingly.

Stabilisation processes such as hay mulching will also greatly reduce the volume of sediment laden water and should be accounted for with the variation of catchment tray and header tank.

The header tank is designed to allow for 12 mm of rain to fall before chemical dosing is initiated. This is deemed to best represent the volume of rain required to initiate overland flow and runoff tracking to the sediment pond.

In periods of high intensity rainfall, the header tank will back up to the high flow which will increase the volume of chemical being dose. This will then ultimately track down to the low flow as rainfall decreases or stops. This ensures that dosing continues after the rainfall event has ended allowing for the time lag for surface flow in the catchment to travel to the sediment pond.

The Auckland Council erosion and sediment control guidelines recommend the management of storage water in the header tank as follows:

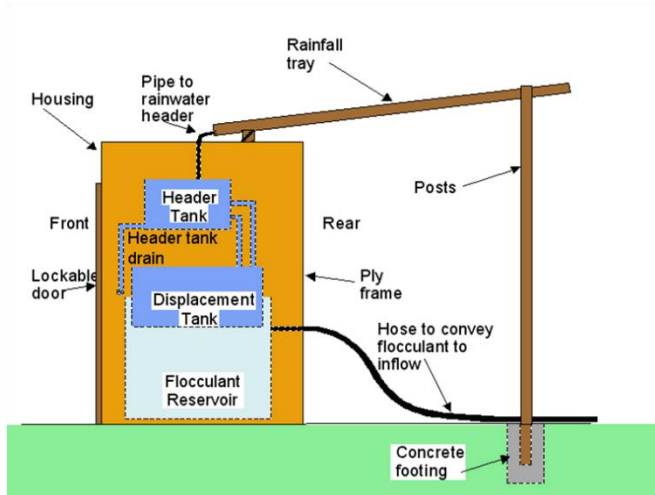
- After 3 days without rain – remove 50%
- After 6 days without rain – remove 100%

Ultimately, the volume of water stored in the sediment retention pond (SRP) and the clarity of the stored water should be considered when managing header tank volumes and further dosing requirements.

While all care has been taken in the testing and preparation of this chemical treatment management plan, Erosion Control cannot guarantee that the same results will be achieved in the sediment retention ponds. The scale up of the test results are affected by many parameters that can alter the dose rate and results.

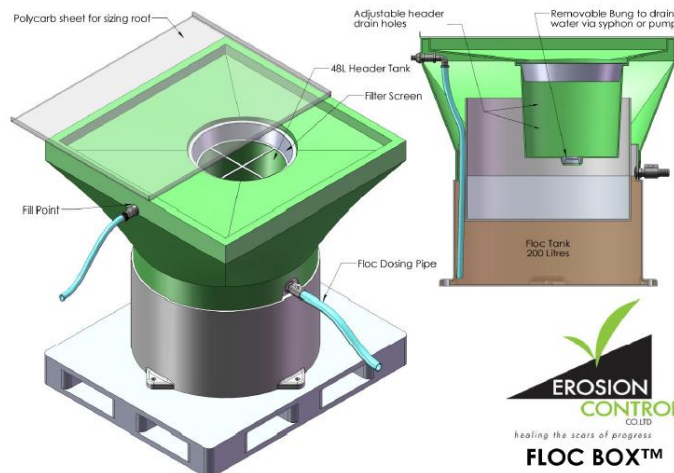
The results and plan presented above should not be replicated or changed without prior approval from Erosion Control Co.

7. The GD05 Rainfall Activated Dosing System



The traditional rainfall activated dosing system utilizes a catchment tray with the trays size being determined by the applicable dose rate and catchment size of the area. Rainfall is captured on the roof and is collect in a header tank. The rainwater then drains into a displacement tank which floats inside the chemical tank. Chemical displaced by the increased weight of the displacement tank is transferred via a dosing hose to the channel leading to the forebay of the sediment pond. The header tank is designed to capture and hold the first 12 mm of rainfall during dry conditions preventing dosing when no runoff

is occurring and to release the water into the displacement tank at a controlled rate.



The Floc Box is a rainfall activated dosing system which has been streamlined to allow easier and more efficient installation and maintenance. The units come in 75, 200 and 400 L versions and have adjustable catchment trays allowing for rainfall capture from 0.25 – 5.0 m². Units can be supplied with catchment trays and header tanks pre-sized for site catchments and correct dose rates as outlined in the CTMP.

8. Set Up and Installation

The rainfall activated dosing device should be set up on a level area so that the dosing point can be located 5-10 m metres up the entrance channel prior to the fore bay.



Consideration should be given to the ease of access for maintenance, storage of chemical drums and any further earthworks activity that needs to be carried out around the location. Once the unit is set up in situ the chemical storage tank should be filled until chemical visibly discharges from the dosing hose.



The positioning of "filter socks" or similar provide helps ensure a concentrated flow at the dose point to promote chemical mixing and ensures dosing into runoff during lower flows. Consideration should also be given to lining the channel at this point to avoid scouring of the channel floor. The dose point should not become submerged during heavy rainfall.

9. Batch Dosing of SRPs & Decanting Earth Bunds

Batch dosing should not be used as the primary dosing option but can be used to treat water prior to the installation of a rainfall activated system or when adequate clarity of >100 mm (see later notes on monitoring) has not been achieved. **It is important to note that pH should be measured and recorded both prior to and after batch dosing to ensure that it stays within 5.5 and 8.5 as set in the GD05 guidelines.**

To ensure optimal results from batch dosing it is necessary to ensure as even distribution as possible across the pond surface. Applying via a sprayer around the edges of the pond is the preferred methodology. Alternatively, the CHEMICLEAR 100 can be diluted in 1 L increments in a 20 L bucket and thrown onto the pond surface with an effort to achieve as much distribution as possible. Clarity should begin to improve within the first 1-2 hours after dosing with maximum effect over 24 hrs. Clarity, volume of chemical added, and pH should be recorded 24 hrs after each application.

Once clarity >100 mm has been achieved then the water can be discharged so long as pH is within the limits set above.

Recommended Batch Dosing

Number of SRPs / DEBs TBC

Chemiclear 101 should be dosed at 31 ml per m³ of DEB volume.

The chemical volume should be calculated using an estimate of the actual SRP/DEB volume on the day of batch dosing. Actual SRP/DEB volume is a variable.

| | |
|--------------------------------|--------------------------------|
| Chemical | CC101 (PAC / PolyDADMAC blend) |
| Dose rate in ml/m ³ | 31 ml/m ³ |
| Volume of water treated by 1L | 32.26 |

| Volume of storm water in SRP (m ³) | 100% Batch dose rate (L) | 50% Batch dose rate (L) |
|--|--------------------------|-------------------------|
| 10 | 0.31 | 0.155 |
| 20 | 0.62 | 0.31 |
| 30 | 0.93 | 0.465 |
| 40 | 1.24 | 0.62 |
| 50 | 1.55 | 0.775 |
| 60 | 1.86 | 0.93 |
| 70 | 2.17 | 1.085 |
| 80 | 2.48 | 1.24 |
| 90 | 2.79 | 1.395 |
| 100 | 3.1 | 1.55 |

Chemiclear 100 should be dosed at 93 ml per m³ of DEB volume.

The chemical volume should be calculated using an estimate of the actual SRP/DEB volume on the day of batch dosing. Actual SRP/DEB volume is a variable.

| | |
|--------------------------------|----------------------|
| Chemical | CC100 (PAC) |
| Dose rate in ppm | 6ppm Al |
| Dose rate in ml/m ³ | 93 ml/m ³ |
| Volume of water treated by 1L | 10.75 |

| Volume of storm water in SRP (m ³) | 100% Batch dose rate (L) | 50% Batch dose rate (L) |
|--|--------------------------|-------------------------|
| 10 | 0.93 | 0.465 |
| 20 | 1.86 | 0.93 |
| 30 | 2.79 | 1.395 |
| 40 | 3.72 | 1.86 |
| 50 | 4.65 | 2.325 |
| 60 | 5.58 | 2.79 |
| 70 | 6.51 | 3.255 |
| 80 | 7.44 | 3.72 |
| 90 | 8.37 | 4.185 |
| 100 | 9.3 | 4.65 |

10. Monitoring and Maintenance

10.1. Monitoring and Maintenance requirements

The monitoring of the chemical dose system will be undertaken by the site foreman with regular checks being made by the site engineer to ensure compliance.

Monitoring of the system will be undertaken each day following rain and at least once per week if no rain. All monitoring results are to be recorded, with an example provided in table 2.

10.2. Routine monitoring and maintenance

Instructions for routine monitoring and maintenance of the chemical treatment system will be summarised in a table, a copy of which should be placed in the chemical treatment box inside a waterproof zip lock bag.

Routine weekly attendance should be undertaken for monitoring and recording of each pond and the rainfall activated dosing system status. This can be undertaken by Erosion Control Co.

The clarity of the water in the retention ponds will be monitored using the black disc method. This will consist of a 50-80mm diameter black painted disc attached to the bottom of a 1 m long wooden ruler with a centimetre scale starting at the end to which the disc is attached. The disc is lowered vertically into the water near the pond outlet until it disappears and is then moved towards the surface until it is just visible. The depth of reappearance in mm is recorded as the clarity of the water.

After moderate or heavy rain, the dosing points should be checked to ensure that the chemical is being delivered into the stormwater flow during low flow conditions.

10.3. Contingency Management

A plan must be put in place to manage contingent events in accordance with site environmental management plans. Contingencies could include poor performance of the treatment system, vandalism, stormwater damage or effects of other influences on stormwater quality.

If the treated water in any of the ponds is consistently very clear to depths >100 mm it could indicate overdosing and the possibility of a lowered pH which can present a risk to the receiving waters as a result of elevated free aluminium concentration in the discharge. If the treated water is consistently clear, the pH of the water in any pond should be retested.

Contingencies such as poor treatment performance or consistently very clear treated water should be dealt with by consultation with the appropriate organisation or its representative.

The header tank should be drained by half after 3 days of no rain and emptied after 6 days of no rain.

A treatment chemical spill contingency plan is provided.

10.4. Record keeping and reporting to monitoring council or its representative

A copy of the monitoring records will be available on file and updated as required.

The integrity of the treatment system will be checked weekly during both dry and wet weather. This check will include a quick check of the plumbing, a check that the header tank hoses are clear and a check of the dosing point to ensure that the chemical would drop into the stormwater flow from the site.

Erosion Control can provide the weekly monitoring visit records as well as other monitoring and these can be compiled into a monthly summary report.

10.5. Storage of chemical on site

Bulk chemical supplied by the manufacturer in 200 L polyethylene drums will be kept in secure storage if on the site. Chemical drums will be stored on end with the screw caps uppermost.

Topping up of chemical will be made weekly as part of the regular inspection regime.

Empty drums should be washed out with water, and the wash water poured onto dry soil well away from any watercourse. Drums will be properly disposed of.

10.6. Procedure for transportation of PAC or alternative flocculation chemicals

The transport of water treatment chemicals to and from the project will be undertaken by commercial carriers in accordance with current Hazardous Goods, Traffic & Transport regulation. PAC weighs about 250 kg in 200 L drums and is most easily moved within the site in a loader bucket. Drum lifting chains can be supplied by Erosion Control Co if required. The use of these or any other chemical must be done in accordance with the site Health & Safety Plan.

10.7. Chemical spill contingency plan

If there is a spill of PAC or alternative water treatment chemical onto the ground, it will be immediately contained using earth bunds to prevent it from entering water. The spilt PAC should be recovered if possible and placed in polyethylene containers. If the spilt PAC cannot be recovered, it should be mixed with a volume of soil equal to at least ten times the volume of spilt PAC and buried in dry soil.

If there is a spill of PAC or alternative flocculation chemicals into pond water, discharge from the pond to natural water should be prevented. Contact the Council or its representative for advice on appropriate action.

If there is a spill of PAC or other chemical into flowing water:

1. The regional council should be advised immediately.
2. If possible, the water and the split PAC should be pumped into a bund or pond until all the split PAC has been removed from the watercourse.
3. If the PAC cannot be removed from the watercourse any downstream users should be identified and advised. Contact the Local Council or its representative qualified to advise on appropriate action.

10.8. Chain of responsibility for monitoring and maintaining the chemical treatment systems on site

The earthworks contractor shall have primary responsibility for maintenance and monitoring the effectiveness of the chemical treatment system on the site.

A service may be subcontracted to Erosion Control Co to provide regular monitoring of the ponds, servicing of the Floc Boxes and assembly of the monitoring reports if required.

10.9. Training of person responsible for monitoring and maintenance of chemical treatment systems

Erosion Control Co can provide regular monitoring and servicing of the flocculation system or can undertake regular training of site personnel to carry out the routine monitoring and maintenance of the chemical treatment system, and the required record keeping.

10.10. Responsibility

While all care has been taken in preparing this CTMP, it is based on the information provided by the contractor and results may vary during the course of this development.

It is the responsibility of the contractor to ensure compliance with all aspects of the appropriate regulations pertaining to these works.

Erosion Control Co would recommend that testing be repeated every 6 months during the development to ensure dosing and Floc Box design are providing best results, as soil type may change through the development phase.

This information is not to be used for any other purpose, without prior consultation and the written consent from Erosion Control Ltd and no liability is accepted for misuse of this information.

10.11. Instructions for Maintenance of Flocculation Chemical Treatment Systems

10.11.1. Reducing the header tank volume:

The header tank is used to avoid dosing during the initial stages of rainfall when site conditions are dry, and no runoff is to be expected.

After 3 days without rain – reduce volume to 50%

After 6 days without rain – reduce volume to empty (level at lowest outlet)

10.11.2. Refilling the reservoir:

The reservoir tank should be refilled when the displacement tank is half full, or sooner if heavy rain is predicted. The level of chemical in the device needs to be sufficient to treat a 100-year event should one occur. Refilling is done by first emptying the displacement tank and then refilling the reservoir tank until the chemical level is at the lower edge of the outlet.

10.11.3. Observation of water quality in pond:

The pond water quality will be observed at least weekly, and the clarity determined using a black disc and recorded on the monitoring sheet. pH shall be recorded once the pond has filled up to ensure that dosing does not have an unacceptable effect.

10.11.4. Periodic system checks:

Check the lower hose with the small tube outlet, from the header tank to the displacement tank is not blocked with leaves or other foreign debris.

10.11.5. Monitoring records:

A separate sheet is provided for monitoring records for each month. The information to be recorded is as follows:

Visual check:

Check the tray for leaks, the plumbing, and the hoses from the header tank. Record "ok" or if maintenance is required write "M" and note requirement in notes column.

% Header full:

This is the volume between the lowest and middle outlets. After rain this should be either 100% after 12mm or more rain, or between 1-100% after less than 12mm rain; in summer: 50% when lowered after 3 dry days, 0% when emptied after 6 dry days.

% Depth in Displacement Tank:

Measure depth of water in cm. Reduces to 0 when emptied.

Chemical Volume added:

Record chemical volume added. 1 drum PAC = 200L, 9cm in PAC 200l drum = 20L. Can be calculated from change in water level in displacement tank where 1cm change = 4 litres of PAC.

Pond Clarity:

Record using black disc near pond outlet. (Refer above).

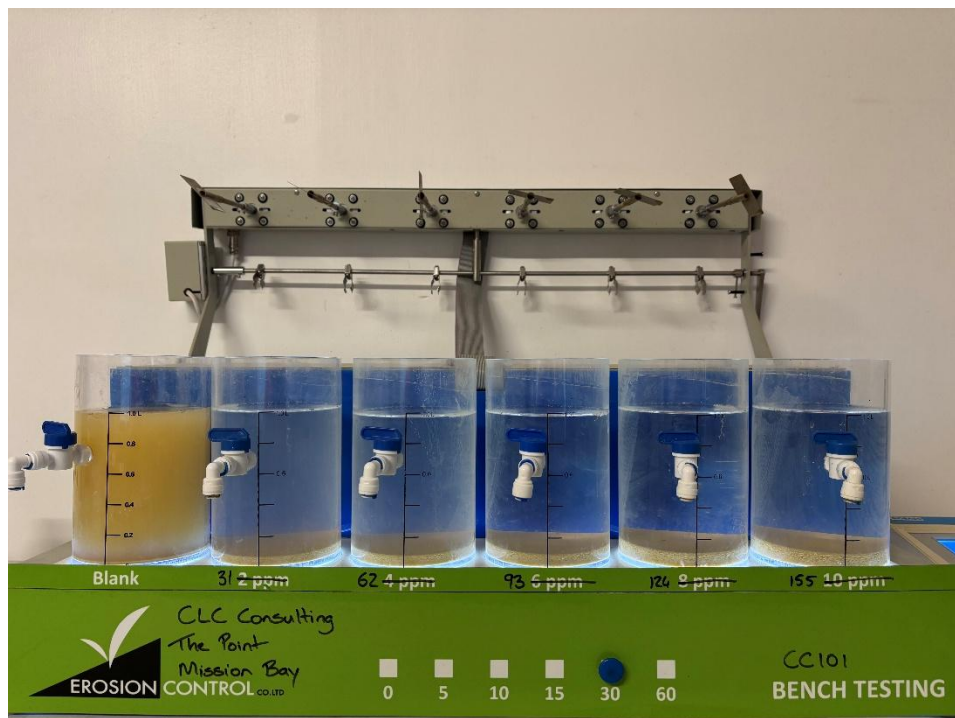
11. Floc Box setup confirmation

| | | | |
|--|--------------------------------|----------------|-------|
| Contractor | | | |
| Site | The Point, Mission Bay | | |
| Installed by | | | |
| Chemical Recommended | CC101 (PAC / PolyDADMAC blend) | | |
| Dose rate | 31ml/m ³ | | |
| Catchment | Area (ha) | Recommendation | Check |
| | | | |
| | | | |
| | | | |
| | | | |
| <p>I hereby state that the above methodology has been followed and prepared in accordance with the chemical treatment management plan.</p> | | | |
| Signature: | | Date: | |

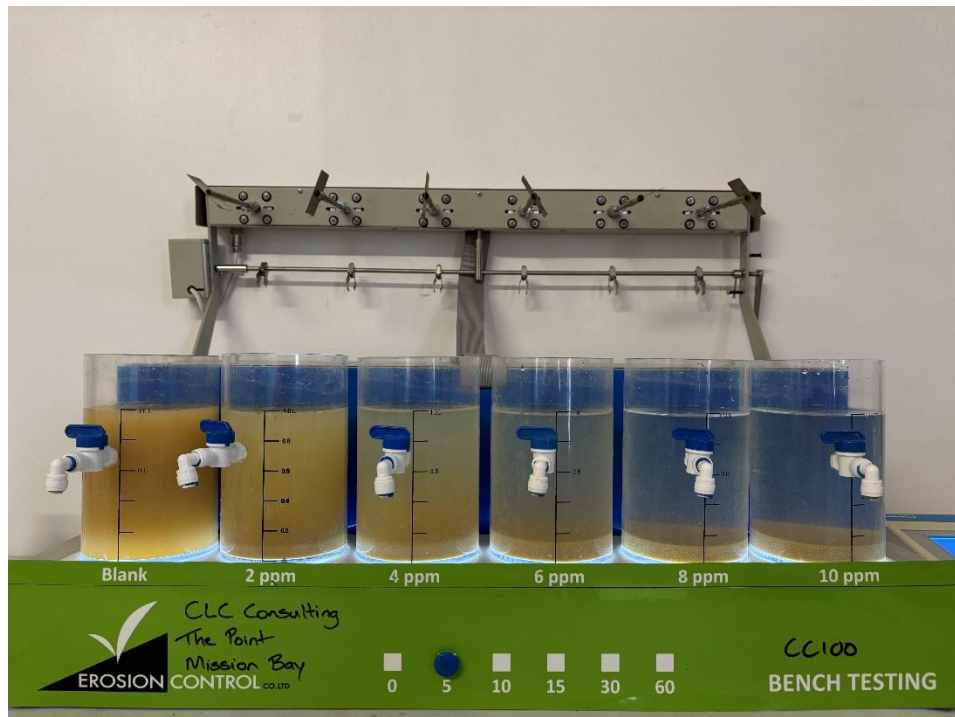
12. Appendix



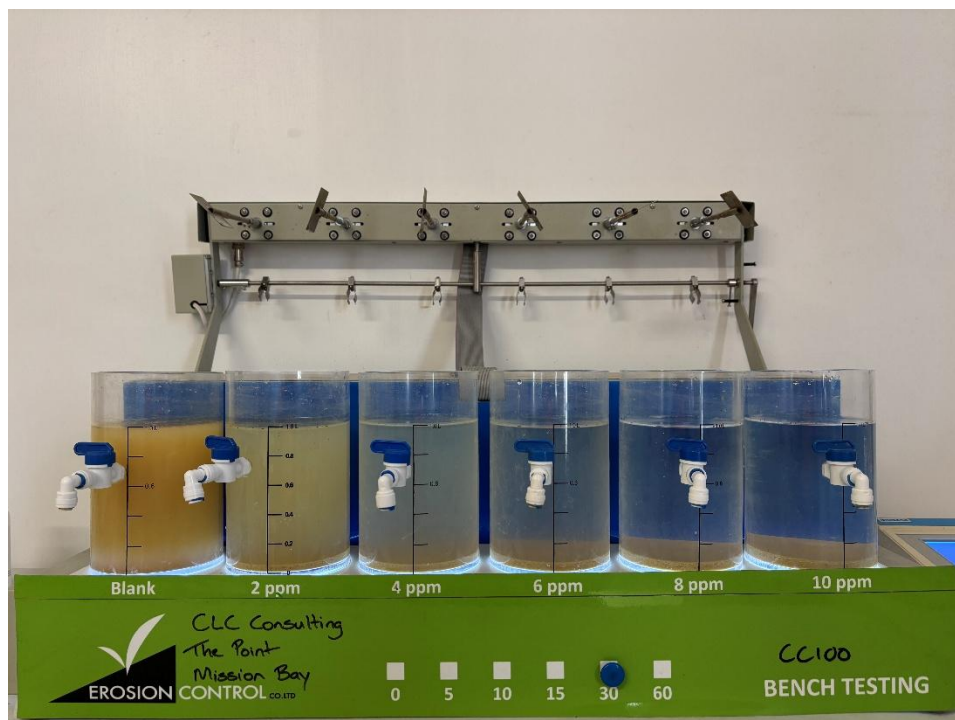
CATCHMENT SAMPLE: Test Results of Chemiclear 101 after 5 minutes settling



CATCHMENT SAMPLE: Test Results of Chemiclear 101 after 30 minutes settling



CATCHMENT SAMPLE: Test Results of Chemiclear 100 after 5 minutes settling



CATCHMENT SAMPLE: Test Results of Chemiclear 100 after 30 minutes settling

13. Floc box Inspection and Test Record

Storm water PAC chemical treatment system monitoring and maintenance record

| | |
|----------------------------------|---------------------------------------|
| Location: The Point, Mission Bay | Floc Box size: TBC |
| Client: CLC Consulting | Dose Rate: 31 ml/m ³ CC101 |
| Catchment Area: TBC ha | Roof Tray area: TBC m ² |

[illegible]

Material Safety Data Sheet

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

PRODUCT NAME: CHEMICLEAR 101

OTHER NAMES: PAC blend

ADDITIONAL INFO: PAC/PolyDADMAC blend

Cationic polymer in aqueous solution

Typical use: Coagulant for water treatment.

NZ Supplier: Erosion Control Co Ltd, Silverdale, Auckland

Telephone: 09 426 8292

Fax: 09 426 8293

Emergency No: NZ Poisons Centre 0800 764 766

Email: info@erosioncontrol.co.nz

2. HAZARDS IDENTIFICATION

Not classified as a Dangerous Goods under NZS 5433:2012 Transport of Dangerous Goods on Land.

Classified as Hazardous according to criteria in the HS (Minimum Degrees of Hazard) Regulations 2001.

Signal Word – WARNING



Subclasses:

6.1 Category D Substances which are acutely toxic

6.3 Category A Substances irritating to the skin

6.4 Category A Substances irritating to the eye

Hazard Statements:

H302 Harmful if swallowed

H315 Causes skin irritation

H319 Causes serious eye irritation

H332 Harmful if inhaled

Prevention Statements

P102 Keep out of reach of children

P103 Read label before use

P104 Read Safety data sheet before use

P264 Wash hands and any exposed skin thoroughly after handling

P270 Do not eat, drink or smoke when using this product

P280 Wear protective clothing, gloves and eye/face protection

Response Statements

P101 If medical advice is needed, have product container or label at hand.

P301+P312 IF SWALLOWED: Call a poison center or doctor/physician if you feel unwell.

P302+P352 IF ON SKIN: wash with plenty of soap and water.

P330 Rinse mouth.

P331 Do NOT induce vomiting.

P332+P313 If skin irritation occurs. Get medical advice/attention.

P362 Take off contaminated clothing and wash before re-use.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P337+P313 If eye irritation persists: Get medical advice/attention.

3. COMPOSITION/INFOMRATION ON INGREDIANTS

| Ingredient | Concentration | CAS No. | Hazard Code |
|---|---------------|------------|------------------|
| Polyaluminium chloride | ≥ 20 % | 1327-41-9 | H302; H319; H315 |
| Polydiallyldimethylammonium chloride (PolyDADMAC) | 1-10 % | 26062-79-3 | |
| Water | ≤ 80 % | 7732-18-5 | |

4. FIRST AID MEASURES

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Remove contact lenses, if present. Get medical attention if eye irritation persists.

Skin: In case of contact, immediately flush skin with copious quantities of water for at least 15 minutes while removing contaminated clothing and shoes. If swelling, redness, blistering or irritation occurs seek medical assistance. Wash clothing before re-use.

Inhalation: Remove victim to fresh air. Remove any contaminated clothing and loosen remaining clothing. Allow patient to assume a comfortable position and keep warm. If not breathing, give artificial respiration. If breathing is difficult give oxygen. Call a doctor/physician if effects persist.

Ingestion: Do NOT induce vomiting. Rinse mouth out with water and get medical/attention immediately.

5. FIRE-FIGHTING MEASURES

Extinguishing media: Foam, dry powder, carbon dioxide and sand
Special protective equipment: As for all fires involving chemicals.
For firefighters: Chemical protection suit, suitable gloves and boots, and self-contained breathing apparatus.

Specific hazards arising from substance or mixture:

- Non-combustible material
- May decompose on heating emitting fumes including hydrogen chloride

6. ACCIDENTAL RELEASE MEASURES

Personal precautions Use personal protective equipment/effective to prevent skin & eye contact & inhalation of dust

De-contamination procedures Residues or small spillages shall be rubbed by cloth and washed with clean water & soap.

Environmental precautions Clear area of all unprotected personnel.
Absorb spills with sand, earth or non-combustible absorbent material, sweep up & collect in suitable containers for disposal.
If contamination of sewers or waterways occurs, advise local emergency services.

7. HANDLING AND STORAGE

Handling precautions: Wear PVC or other plastic material gloves/rubber gloves for hand protection and wear goggles for eye protection. Do not eat or drink whilst handling the product.

Package: CHEMICLEAR 101 comes as a liquid in either 20, 200 or 1000 L vessels.

Storage conditions Avoid wet, damp and humid conditions.
Keep in a dry, cool place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering measures to reduce exposure: Ensure adequate ventilation. Use local exhaust if misting occurs. Natural ventilation is adequate in absence of mists.
HTP(8h)=2mg/M3 (Al) Finland
TVL=2mg/M3 (Al) (TWA) USA
MAK=6(F)mg/M3 (Al) Germany

Personal protection equipment

| | |
|-------------------------|--|
| Respiratory Protection: | In case of insufficient ventilation wear suitable respiratory equipment. |
| Hand Protection: | PVC or other plastic material gloves. |
| Eye Protection: | Safety glasses with side-shields. Do not wear contact lenses. |
| Skin & body protection: | Chemical resistant apron or protective suits if splashing or repeated contact with solution is likely. |
| Hygiene measures: | Wash hands and face before breaks and immediately after handling the product. When using do not eat drink or smoke. Handle in accordance with good industrial hygiene and safety practice. |

9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|----------------------------------|--------------------------------|
| Form: | Clear or pale yellow liquid |
| Al ₂ O ₃ : | 6.2% min. |
| Water Insolubles: | 0.6% max. |
| pH: | 3.5-5.0 (10% aqueous solution) |
| Specific Gravity (sg) | 1.15 @ 20°C |
| Boiling point: | above 100°C |
| Freezing Point/Range (°C) | -10-14°C (approx) |
| Decomposition Point | >150°C |
| Flash Point | Non-combustible |

10. STABILITY AND REACTIVITY

| | |
|-------------------------|---|
| Stability | Stable at ambient temperatures |
| Materials to avoid | Acids, strong alkalis, calcium hypochlorite, metals |
| Hazardous decomposition | No decomposition if stored and applied as directed |

11. TOXICOLOGICAL INFORMATION

No adverse health effects are expected if the product is handled in accordance with this safety Data sheet and the product label. Symptoms or effects may arise if the product is mishandled and overexposure occurs.

Acute toxicity:

-Oral: The product is not expected to be toxic

-Inhalation: The product is not expected to be toxic.

Irritation

- Skin: Prolonged skin contact may cause skin irritation.

- Eyes: May cause eye irritation.

Sensitization: No data available.

12. ECOLOGICAL INFORMATION

Low acute LC50 to fish, but not expected to cause long term adverse effects to aquatic environment as the product is quickly bound to naturally occurring dissolved organic carbon and particulate material.

LC50/96 hour/algae 1.5-2 mg/L (Al-Cl)

Toxicity to bacteria 12 mg/L (Al-Cl)

Lc50/48 hour/ daphnia 3.9 mg/L (Al-Cl)

13. DISPOSAL CONSIDERATIONS

Waste from residues/unused: Dispose of as special waste in compliance with local and national regulations.

Contaminated packaging: Dispose of as special waste in compliances with local and national regulations.

14. TRANSPORTATION INFORMATION

Road & Rail Transport:

Not classified as a Dangerous Good under NZS5433:2012 Transport of Dangerous Good on Land.

Marine Transport:

Not classified as Dangerous Goods by the International Maritime Dangerous Goods Code (IMDG Code) for Transport by Sea. Non-dangerous goods.

Air Transport:

Not classified as Dangerous Goods by the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by Air. Non-dangerous goods.

15. REGULATORY INFORMATION

The product is not a hazardous article and need not to be labeled according to EC-Directives as amended.

16. OTHER INFORMATION

Notes: The information contained in this safety data sheet is given in good faith. It is accurate to the best of our knowledge and belief and represents the most up to date information. The information given in this data sheet does not constitute or replace the user's own assessment of workplace risk as required by other health and safety legislation.

No liability will be accepted for injury, loss or damage resulting from failures to take consideration of information or advice contained in the SDS.

Material Safety Data Sheet

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

PRODUCT NAME: CHEMICLEAR 100

OTHER NAMES: PAC, Poly Aluminium Chloride Solution

ADDITIONAL INFO:

Typical use: Coagulant for water treatment.

NZ Supplier: Erosion Control Co Ltd, Silverdale, Auckland

Telephone: 09 426 8292

Fax: 09 426 8293

Emergency No: NZ Poisons Centre 0800 764 766

Email: info@erosioncontrol.co.nz

2. HAZARDS IDENTIFICATION

Not classified as a Dangerous Goods under NZS 5433:2012 Transport of Dangerous Goods on Land.

Classified as Hazardous according to criteria in the HS (Minimum Degrees of Hazard) Regulations 2001.

Signal Word – WARNING



Subclasses:

6.1 Category D Substances which are acutely toxic (medium hazard)

6.3 Category A Substances irritating to the skin (high hazard)

6.4 Category A Substances irritating to the eye

Hazard Statements:

H302 Harmful if swallowed

H315 Causes skin irritation

H319 Causes serious eye irritation

H332 Harmful if inhaled

Prevention Statements

P102 Keep out of reach of children

P103 Read label before use

P104 Read Safety data sheet before use

P264 Wash hands and any exposed skin thoroughly after handling

P270 Do not eat, drink or smoke when using this product

P280 Wear protective clothing, gloves and eye/face protection

Response Statements

P101 If medical advice is needed, have product container or label at hand.

P301+P312 IF SWALLOWED: Call a poison centre or doctor/physician if you feel unwell.

P302+P352 IF ON SKIN: wash with plenty of soap and water.

P330 Rinse mouth.

P331 Do NOT induce vomiting.

P332+P313 If skin irritation occurs. Get medical advice/attention.

P362 Take off contaminated clothing and wash before re-use.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P337+P313 If eye irritation persists: Get medical advice/attention.

3. COMPOSITION/INFORMATION ON INGREDIENTS

| Ingredient | Concentration | CAS No. | Hazard Code |
|------------------------|---------------|-----------|------------------|
| Polyaluminium chloride | ≥ 30 % | 1327-41-9 | H302; H319; H315 |
| Water | ≤ 60 % | 7732-18-5 | |

4. FIRST AID MEASURES

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Remove contact lenses, if present. Get medical attention if eye irritation persists.

Skin: In case of contact, immediately flush skin with copious quantities of water for at least 15 minutes while removing contaminated clothing and shoes. If swelling, redness, blistering or irritation occurs seek medical assistance. Wash clothing before re-use.

Inhalation: Remove victim to fresh air. Remove any contaminated clothing and loosen remaining clothing. Allow patient to assume a comfortable position and keep warm. If not breathing, give artificial respiration. If breathing is difficult give oxygen. Call a doctor/physician if effects persist.

Ingestion: Do NOT induce vomiting. Rinse mouth out with water and get medical/attention immediately.

5. FIRE-FIGHTING MEASURES

Extinguishing media: Foam, dry powder, carbon dioxide and sand

Special protective equipment: As for all fires involving chemicals.

For firefighters: Chemical protection suit, suitable gloves and boots, and self-contained breathing apparatus.

Specific hazards arising from substance or mixture:

- Non-combustible material
- May decompose on heating emitting fumes including hydrogen chloride

6. ACCIDENTAL RELEASE MEASURES

| | |
|-----------------------------|---|
| Personal precautions | Use personal protective equipment/effective to prevent skin & eye contact & inhalation of dust |
| De-contamination Procedures | Residues or small spillages shall be rubbed by cloth and washed with clean water & soap. |
| Environmental precautions | Clear area of all unprotected personnel. Absorb spills with sand, earth or non-combustible absorbent material, sweep up & collect in suitable containers for disposal. If contamination of sewers or waterways occurs, advise local emergency services. |

7. HANDLING AND STORAGE

| | |
|-----------------------|--|
| Handling precautions: | Wear PVC or other plastic material gloves/rubber gloves for hand protection and wear goggles for eye protection. Do not eat or drink whilst handling the product. |
| Package: | Solid PAC is packed in inner plastic bags and furtherly in polypropylene woven bags, with each bag containing 25kg. Liquid PAC is packed in PE plastic drum and our company will provide special tanks for transportation and storage for the liquid product to the users. |
| Storage conditions | Avoid wet, damp and humid conditions. Keep in a dry, cool place. |

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering measures to reduce exposure: Ensure adequate ventilation. Use local exhaust if misting occurs. Natural ventilation is adequate in absence of mists.
HTP(8h)=2mg/M3 (Al) Finland
TVL=2mg/M3 (Al) (TWA) USA
MAK=6(F)mg/M3 (Al) Germany

Personal protection equipment

Respiratory Protection: In case of insufficient ventilation wear suitable respiratory equipment.

Hand Protection: PVC or other plastic material gloves.

Eye Protection: Safety glasses with side-shields. Do not wear contact lenses.

Skin & body protection: Chemical resistant apron or protective suits if splashing or repeated contact with solution is likely.

Hygiene measures: Wash hands and face before breaks and immediately after handling the product. When using do not eat drink or smoke. Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form: Clear or pale yellow liquid

Al₂O₃: 10.1% min.

Water Insolubles: 0.6% max.

pH: 3.5-5.0 (10% aqueous solution)

Specific Gravity (sg) 1.20 @ 20°C

Boiling point: above 100°C

Freezing Point/Range (°C) -10-14°C (approx)

Decomposition Point >150°C

Flash Point Non combustible

10. STABILITY AND REACTIVITY

Stability Stable at ambient temperatures

Materials to avoid Acids, strong alkalis, calcium hypochlorite, metals

Hazardous decomposition No decomposition if stored and applied as directed

11. TOXICOLOGICAL INFORMATION

No adverse health effects are expected if the product is handled in accordance with this safety Data sheet and the product label. Symptoms or effects may arise if the product is mishandled and overexposure occurs.

Acute toxicity:

-Oral: The product is not expected to be toxic

-Inhalation: The product is not expected to be toxic.

Irritation

- Skin: Prolonged skin contact may cause skin irritation.

- Eyes: May cause eye irritation with susceptible persons.

Sensitization: No data available.

12. ECOLOGICAL INFORMATION

Ecotoxicity: LC50/96h/algae=1.5-2mg/l (Al-Cl)

Toxicity to bacteria: 12mg/l (Al-Cl)

LC50/48h/daphnia: 3.9mg/l (Al-Cl)

13. DISPOSAL CONSIDERATIONS

Waste from residues/unused: Dispose of as special waste in compliance with local and national regulations.

Contaminated packaging: Dispose of as special waste in compliances with local and national regulations.

14. TRANSPORTATION INFORMATION

Road & Rail Transport:

Not classified as a Dangerous Good under NZS5433:2012 Transport of Dangerous Good on Land.

Marine Transport:

Not classified as Dangerous Goods by the International Maritime Dangerous Goods Code (IMDG Code) for Transport by Sea. Non-dangerous goods.

Air Transport:

Not classified as Dangerous Goods by the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by Air. Non-dangerous goods.

15. REGULATORY INFORMATION

The product is not a hazardous article and need not to be labeled according to EC-Directives as amended.

16. OTHER INFORMATION

Notes: The information contained in this safety data sheet is given in good faith. It is accurate to the best of our knowledge and belief and represents the most up to date information. The information given in this data sheet does not constitute or replace the user's own assessment of workplace risk as required by other health and safety legislation.

No liability will be accepted for injury, loss or damage resulting from failures to take consideration of information or advice contained in the SDS.