ENVELOPE

EARTHWORKS AND CONSTRUCTION MANAGEMENT PLAN

77 AND 109 KAPITI ROAD AND 1 BRETT AMBLER WAY, PARAPARAUMU

DOCUMENT CONTROL RECORD

CLIENT	New Central Park Limited
PROJECT	77 Kapiti Road
PROJECT NO.	1942-01
DOCUMENT TYPE	R004-v5-1942-01 ECMP
DATE ISSUED	22 October 2026
ADDRESS FOR SERVICE	Envelope Engineering Limited Level 1, 65 Cuba Street, Te Aro, Wellington
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ISSUE AND REVISION RECORD

DATE OF ISSUE	22 October 2026
STATUS	Final for Substantive Application
ORIGINATOR	Andrew Jackson – Director
REVIEWED	Louis Freeland – Wellington Civil Manager, CPEng
APPROVED FOR ISSUE	Louis Freeland – Wellington Civil Manager, CPEng

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1.0 PURPOSE AND SCOPE OF THE PLAN

This draft Earthworks Construction Management Plan (ECMP) has been prepared for the earthworks associated with the proposed development comprising the properties at 77 and 109 Kapiti Road, together with KCDC properties at 1 Brett Ambler Way and the adjoining land (Lot 4 DP 470759 and Lot 7 DP 342714) hereafter known collectively as "the site".

This plan is intended to provide the information required to establish a framework for the safe and environmentally conscious completion of earthworks and civil construction proposed to be undertaken for the project.

The intention of this document is to set out the key parameters and likely site conditions that are required to be considered to assist the contractor in preparing their site-specific Earthworks and Construction Management Plan, for which they will be contractually responsible. This could either be prepared as an addendum to this report, or an entirely separate report.

It is not intended to be prescriptive, and the contractor will be free to propose alternative measures if they meet the minimum performance standards as outlined in this document and in accordance with the GWRC document "Erosion and Sediment Control Guide for Land Disturbing Activities in the Wellington Region – Issued Feb 2021" and if compliance is still achieved with the relevant conditions of consent.

This plan has been prepared by Envelope with the input of various parties including Contractors and Bioresearches (the Project Ecologist), on relevant aspects.

2.0 RELATIONSHIP WITH OTHER MANAGEMENT PLANS

This plan should be read in conjunction with the following plans prepared by the civil works contractor, the Consent Holder or other project team experts (prior to works commencing on site):

- Site Specific Earthworks and Construction Management Plan.
- Construction Traffic Management Plan.
- Temporary Stream Diversion Plan (for road crossings), which could form part of the Contractor's Site Specific Earthworks and Construction Management Plan.
- Native Fish Recovery and Relocation Plan.
- Environmental Management Plan
- Offset and Residual Plan (Wetlands)

3.0 ROLES AND RESPONSIBILITIES

POSITION	CONTACT DETAILS	RESPONSIBILITIES
Project Manager (Contractor)	To be confirmed – Contractor nominated person as per their overall CMP	Contractor Coordinator Community Liaison Complaints Recording After Hours Contact
Site Engineer	Site Specific. See stage specific addendums	ECMP Implementation
Civil Engineer	Envelope Engineering Contact to be confirmed per stage.	Civil works design and construction monitoring

POSITION	CONTACT DETAILS	RESPONSIBILITIES
		ECMP Compliance and Review ESCP Compliance Inspections
Geotechnical Engineer	Torlesse Contact to be confirmed per stage.	Earthworks Monitoring Fill Certification Soil Validation Reports
Ecologist	Bioresearches Contact to be confirmed per stage.	Environmental monitoring
Environmental Advisor	To be confirmed – Contractor nominated person as per their overall CMP	ESCP Implementation
Traffic Management	Stantec Contact to be confirmed per stage.	Traffic Management Planning Traffic Engineering Transportation Stakeholder Engagement

4.0 COMMUNICATION AND COMPLAINTS PROCEDURE

The following communication and complaints procedure shall be in place for adjoining property owners/occupiers, or the general public.

Complaints may be referred to the Project by Kapiti Coast District Council (KCDC), Greater Wellington Regional Council (GWRC), or members of the public. It is the responsibility of the Project Manager to respond to and follow up all complaints.

The Project Manager is responsible for ensuring suitably trained, experienced, and qualified personnel are always available to respond to complaints including after hours and on weekends when complaints could be received.

On-call staff will be notified of the complaint by the Project Manager. The on-call staff will respond by visiting the area in question and then implementing mitigation and corrective measures where it is deemed necessary and in accordance with direction from the Project Manager. The on-call staff will provide regular updates regarding the situation to the Project Manager. The Project Manager will in turn provide an update to KCDC and/or GWRC.

If the site receives a complaint alleging adverse effects from or related to the exercise of this consent the relevant authority will be notified within 48 hours of receiving the Complaint.

A register of all complaints will be maintained by the Contractor. The Register will identify the following information:

- A unique number for each complaint.
- Date and time the complaint was originally made.
- Name and contact details of the person to whom the complaint was originally made.
- Name and contact details of the person(s) making the complaint.
- A description of the complaint.

- Date and time the complaint was received by a member of the Project team.
- Name and contact details of the person(s) tasked by the Project Manager with addressing the complaint.
- A description of the corrective actions assigned and the time frame for addressing the actions.
- Date and time the corrective actions were completed.
- Date and time the person(s) making the complaint were notified of the completion of the corrective actions.

4.1 COMPLAINT INITIAL ACTION

Actions to be taken as soon as possible by the staff member responding to the complaint on behalf of the Project Manager:

- Fill out a complaint form.
- Note the time, date, identity and contact details of complainant. Wind direction and strength and weather conditions are recorded. Note if complainant has been referred from a consent authority.
- Ask the complainant to describe the nature of the complaint; whether it is a constant or an intermittent problem; how long has it been going on for; if it is worse at any time of day, does it come from an identifiable source.
- As soon as possible after receipt of a complaint undertake a site inspection. Note all noise, dust or vibration (nuisance) producing activities taking place, which staff member(s) or sub-contractor(s) are responsible for the mitigation methods that are being used.
- If complaint was related to an event in the recent past, note any nuisance producing activities that were underway at that time, if possible.
- As soon as practical (preferably within 30 minutes) visit the area from where the complaint originated to ascertain if the nuisance is still a problem.
- If it becomes apparent that there may be a source of nuisance other than activities on the Project causing complaint it is important to verify this. Photograph and document the source and emissions. Take measurements wherever possible.
- Take remedial actions where possible. These may be temporary fixes in the interim while long-term solutions are organised.
- As soon as possible after the initial investigations have been completed contact the complainant to explain any problems found and remedial actions taken.
- Implement long-term solutions if these are required.
- If necessary, update any relevant procedures to prevent any recurrence of problems.
- Complete complaint form and file on complaint register.

4.2 FOLLOW UP ACTIONS

The Project Manager will advise KCDC and GWRC as soon as practical that a complaint has been received, what the findings of the investigation were, and any remedial actions taken. Following that the Project Manager will advise Project staff and sub-contractors that a complaint has been received, what the findings of the investigation were, and the remedial actions taken.

5.0 SITE SIGNAGE

Site signage should be placed in prominent locations at the entrances to all work sites, including separate stages. The signage must be placed at the boundary of the site so that members of public are able to see it.

The signage should include:

- The Contractor's name.
- A contact name and phone number for any complaints.
- Health and Safety information for the site. Note that this could be a direction for people to sign in or report to a different location.

6.0 CONSTRUCTION HOURS

The proposed hours for construction are:

- Monday to Friday 7:30 am to 6:00 pm for general site works.
- Monday to Friday from 6:30 am for quiet setting up of site (not including running any machinery).
- Saturday from 7:30 am to 5:00 pm for general site works.
- Saturday from 7:00 am for quiet setting up of site (not including running any machinery).
- No works on Sundays or public holidays.
- Works outside of these hours may be required to complete certain construction tasks. However, these will require prior approval from the KCDC compliance officer prior to commencement.

Complaints around work undertaken outside of these hours will be dealt with under the complaints process outlined in Section 4.0.

7.0 EARTHWORKS METHODOLOGY

The specific earthworks methodology for various activities on site shall be coordinated with the contractor with the intent of reducing the area of earthworks open at any given time and the prompt reinstatement of stabilised materials. This is a general methodology which has been prepared with input from selected contractors. However, alternative methodologies proposed should be accepted provided they comply with this plan and the Resource Consent conditions.

7.1 INITIAL CLEARING AND ESTABLISHMMENT WORKS

The Contractor will establish on site with site sheds and construct fencing and hoardings to secure the site. Clearance works including removal of vegetation and site features (power poles, fences, buildings etc.) will also commence. Vegetation clearance will be allowed prior to the erection of erosion and sediment controls provided this does not disturb the underlying ground.

The Contractor will prepare and submit management plans to KCDC and GRWC for their approval.

The anticipated duration of this stage will be 2 – 4 weeks.

7.2 BULK EARTHWORKS – STAGE ONE

Upon approval of the management plans, or as otherwise agreed with KCDC and GWRC, the Contractor will begin establishing the initial Erosion and Sediment Controls. The purpose of these controls is to allow the initial stripping and stockpiling of the sand dunes to allow their removal and prepare the site for the undercutting of unsuitable materials.

Sediment Retention Ponds and dirty water diversion bunds will be created as shown on our plans to control the runoff from the earthworked areas. Existing redundant drains will be progressively decommissioned and filled to ensure surface water is directed towards the designed sediment control devices. The topsoil will be stripped gradually and stockpiled in a nominated area of the site and bunded to prevent runoff. The topsoil stockpile will be progressively stabilised as works progress.

Both sand dunes will be earthworked progressively from the northern side, which will keep the southern side stabilised and mean that sediment laden water is confined to one side of the dune. This simplifies the management of dirty water and reduces the areas left unstabilised.

The clean sand material will be shifted to a specified stockpile location in the northeast portion of the site. Shallow peat will be excavated from this location at the direction of the geotechnical engineer prior to the material being stockpiled. The material will be stabilised with a tackifier which will prevent wind and waterborne erosion. A bund will be constructed around this stockpile area to delineate this area and further reduce the risk of erosion.

The anticipated duration of this stage will be 1 – 2 months.

7.3 BULK EARTHWORKS – STAGE TWO

The wetland offset area will be incrementally cut to design levels. This will be done from the downstream (western) side, as this will create an impounded lower area where any water from subsequent excavation will fall towards. Due to the sandy material expected, these self-bunded excavations are expected to allow sand particles to fall rapidly out of suspension (this will be confirmed by Bench Testing required within Section 9.12). This will allow clean water to either soak into the ground, be pumped into either a sediment device or directly to land/water. It may be required to over-excavate an area of the site to allow for more efficient pumping. Additionally, some undercut maybe carried out to ensure an earthworks balance is achieved.

The excavated wetland area will be progressively stabilised. Depending on the timing and availability of plants, this could involve temporary stabilisation with geotextile or permanent stabilisation with biodegradable erosion control matting and planting. To limit risk, a maximum of 2 ha of unstabilised area is recommended for the excavation immediately adjacent to the Wharemauku Stream.

Within the wetland offset area, the proposed culvert and embankment will also be formed to design levels and stabilised. Other culverts will be installed as early as possible within the earthworks phase.

A buffer zone will be left in place between the wetland area and the Wharemauku Stream to ensure that that the Wharemauku Stream is buffered from the wetland works. The extent of the buffer strip will be confirmed on site by the Geotechnical Engineer.

Unsuitable material excavated from the site will be dried and placed in the proposed new hill landform along the western boundary as shown on our plans. Based on contractor feedback based on a similar earthworks operation in the Kapiti region, the unsuitable material will require conditioning (e.g with lime) to allow for successful planting. The conditioning required for the unsuitable material will be dictated by soils tests conducted prior to earthworks beginning.

Excavation of unsuitable material will also occur in other areas of site, with these areas incrementally excavated and replaced with compacted site-won sand in a singular progression. The excavations will create an impounded lower area where water from the excavation will fall towards. Earthworked areas will require rapid stabilisation to prevent dust issues. This will be achieved with the measures outlined within this ECMP. The material for replacement of unsuitable undercuts will be sourced from the stockpile or eastern dune as it suits the Contractor's methodology and staging.

The anticipated duration of this stage will be approximately 4 – 6 months, which will be partially concurrent with Stage 1 works.

7.4 BULK EARTHWORKS – STAGE THREE

The updated design no longer requires permanent re-alignment of the Wharemauku Stream. Instead, temporary diversions will be required to install culverts for the proposed road crossings. In these instances the works will be subject to the provisions of this ECMP covering stream diversions.

The temporary diversion channel will be removed once the culverts are installed.

Excavation of unsuitable material will also occur in the final areas of site, with these areas incrementally excavated and replaced with compacted site-won sand in a singular progression. The excavations will



create an impounded lower area where water from the excavation will fall towards. Earthworked areas will require rapid stabilisation to prevent dust issues. This will be achieved with the measures outlined within this ECMP. The material for replacement of unsuitable undercuts will be sourced from the stockpile or eastern dune as it suits the Contractor's methodology and staging.

The anticipated duration of this stage will be approximately 2 – 3 months, which will be partially concurrent with Stage 2 works.

7.5 POST BULK EARTHWORKS

After bulk earthworks have been completed across the site, remaining erosion and sediment controls can be removed once this has been approved by GWRC. Remaining works on the site will comprise of civil infrastructure (three waters and utilities) installation, pavement works and landscaping which will be undertaken in accordance with GWRC best practice guidelines.

7.6 EXCESS MATERIAL

Excess material from the bulk earthworks within a stage will be dealt with in two ways:

- Suitable materials e.g. sands, will be placed as additional fill in the proposed lot areas.
- Unsuitable materials will be excavated and taken off site. Other options such as screening the materials and using it as topsoil could also be considered to minimise the amount of material leaving the site. This is only intended to apply if excess unsuitable materials are encountered. The earthworks are being designed to retain all soils on-site.
- For future use as fill in a designated stockpile area or will be removed from site. As noted above, we expect that minimal material in total will need to be removed from the site.

7.7 WINTER WORKS

Winter works is recommended for the proposed development at the site as it will have numerous benefits to the project, with negative effects being mitigated by the measures outlined within this ECMP. Pertinent factors for approval of winter works include:

- The material is sandy and is less erodible than clayey materials.
- There will likely be elevated rainfall in the winter works period. However, this will significantly reduce the dust generation at the site, which provides a positive effect.
- The site is largely flat, and this limits the mobilisation of sediment.
- Areas of the site will be progressively stabilised as works continue, and this will gradually reduce the amount of the site that is exposed.

In requesting winter works, we acknowledge GWRC's concerns around the potential for overtopping of the Wharemauku Stream into the bunded earthworks area and the potential for adverse environmental effects.

This will be mitigated in various ways:

- The material within the bunded area will be sandy and this is expected to rapidly fall out of suspension.
- Any overflow into the bunded area would be by gradual overtopping rather than a concentrated flow path which would be less likely to entrain sediment in the water.
- The velocity within the bunded area is expected to be low, which is less likely to entrain sediments.
- The bunded area will be progressively stabilised as outlined in Section 7.3, which will limit the amount of sediment that can be mobilised.

- The bunded area will provide a significant amount of storage volume (approximately 150,000m^3 when fully excavated) and this will buffer flows before a potential discharge could occur.

These measures will adequately mitigate the risks associated with undertaking these earthworks within the existing mapped flood plain area.

7.8 EARTHWORKS ADJACENT TO KAPITI EXPRESSWAY

Earthworks are proposed adjacent to the Kapiti Expressway. No earthworks are proposed nor required within the NZTA land adjacent to the site. A geotechnical engineer will be retained throughout the detailed design and construction phase to monitor the earthworks and will ensure that any earthworks carried out do not reduce the stability of the land supporting the Expressway.

8.0 DUST, NOISE AND VIBRATION MANAGEMENT

8.1 DUST CONTROL

The peat overlaying the site is less likely to be mobilised by wind than the sandy materials underlying it. However, erosion by wind is possible at the site, especially within the sandy layers as these will be more prone to erosion. Management of dust at the site will be achieved by a range of methods:

- Keeping exposed areas of earthworks minimised to limit the amount of dust generation.
- Use of work methodologies that limit the ability for dust to form e.g. use of defined haul routes, limiting vehicle speed when dry and windy conditions are expected etc.
- Consent is sought to undertake earthworks in the winter as the higher rainfall will be beneficial for the sandy materials on site. This is discussed in detail in Section 7.7.
- Application of water from watercarts as required. Consent is sought to construct a temporary bore to provide water for construction purposes. This is discussed in detail in Section 8.2.
- Stabilisation of stockpiles and other areas through the use of temporary stabilisation measures e.g. tackifiers, or permanent measures e.g. topsoiling and hydroseeding.
- Use of structural solutions e.g. dust fences, as required. These would be used in specific circumstances e.g. when there is a sensitive receiving environment close to the dust source.

8.2 TEMPORARY WATER TAKE

Using a coverage rate of 5 mm/m^2/day the daily water usage for dust control would be around 1400 m^3/day assuming that dust control is required across the site (a very conservative assumption) as a water source through the construction period. Where possible, this water will be sourced from the sediment control devices or from dewatering which are expected to supply most of the construction water needs.

To minimise the need to take from Council Potable water supply, it is proposed to construct a temporary shallow water bore. The position of this will be confirmed by the contractor to suit their proposed methodology, however it will be centrally located to mitigate any potential effects on surrounding properties.

There are some bores shown in the surrounding area by GWRC maps (Figure 1). However, the majority of these are either assumed to be redundant (due to drilling dates or location under recently constructed expressway) or were temporary bores for geotechnical testing. There are typically no bores within 300 – 500 m of the likely bore location.

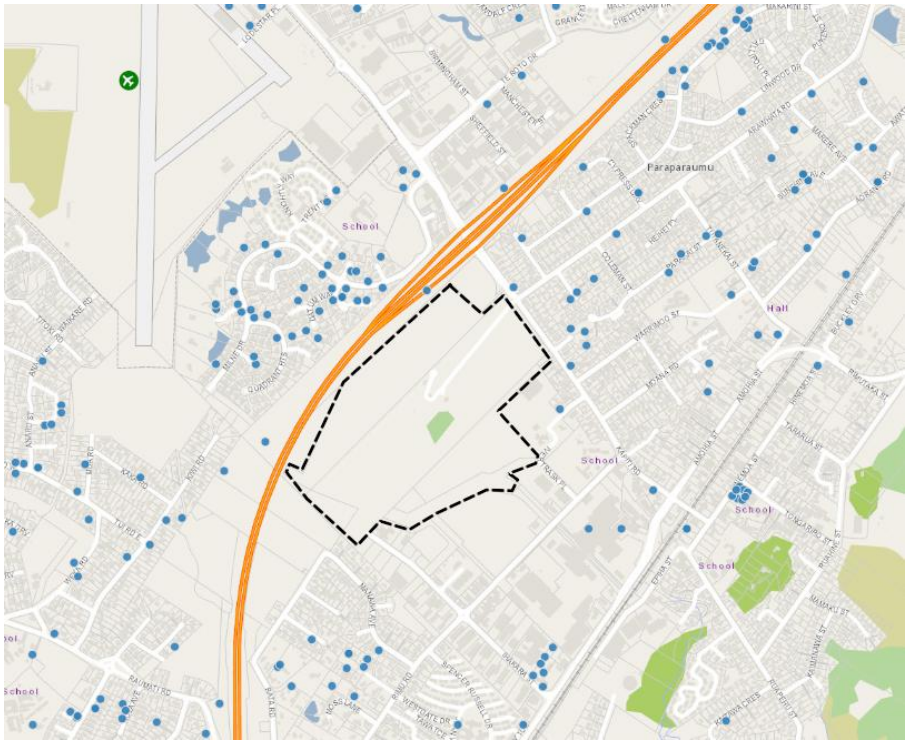


Figure 1. GWRC mapped bores (blue) in the vicinity of the site.

The bore will be constructed in accordance with NZS 4411:2001 Environmental Standard for Drilling of Soil and Rock. Upon completion of the earthworks, the bore will be decommissioned.

Assuming that dust control is required on a 5 ha site at any one time, and half of this area is supplied by other sources, likely maximum extraction rates will be in the order of 1 L/s to achieve adequate supply. This will only be used when other sources are not available. Tanks or other storage methods should be used to buffer water supply and prioritise the supply from sources such as dewatering.

8.3 NOISE AND VIBRATION

The contractor for each stage will be required to have a Construction Noise and Vibration Management Plan (CNVMP) prepared by a suitably qualified and experienced person, for submission at least 10 working days prior to construction commencing. The plan must include specific reference to the contractor's proposed methodology and their intended plant performance characteristics for noise and vibration, along with mitigation measures as well as details of:

1. The area affected by the work.
2. The times and days when the noise and vibration is likely to be generated.
3. A contact name and number of the works supervisor who can be contacted if any issues arise.
4. How noise and vibration complaints will be managed and responded to.

9.0 EROSION AND SEDIMENT CONTROL

9.1 CONSENTING AUTHORITIES

KCDC and GWRC both have compliance interests in monitoring the earthworks and proposed Erosion and Sediment Controls. However, to ensure simplicity and ensure there is a single point of contact for erosion and sediment control, it is proposed to have GWRC leading the compliance of earthworks and controls at the site. KCDC will be notified in the event of any non-compliance events.

9.2 CONTROL OF SEDIMENT AND DEBRIS ON PUBLIC ROADS

All site entrances shall utilise stabilized construction entrances in accordance with Greater Wellington Regional Council's compliance document – Erosion and Sediment Control Guideline for Land Disturbing Activities in the Wellington Region. The effectiveness of these will be monitored during construction and where these are not functioning correctly, other options e.g. wheel washes, can be implemented.

Where sediment is tracked onto the roadway, street sweepers and water trucks will be used to clean the roadway. The contractor will have a responsibility to ensure that any debris tracked onto public roads as a result of the proposed construction works are cleared within a reasonable timeframe.

9.3 EROSION AND SEDIMENT CONTROL OBJECTIVES

All siteworks are to be carried out in a manner that minimises potential adverse effects on the environment.

The main objective of sediment and erosion control is to reduce the rate of erosion and minimise the amount of sediment discharged from bare earth surfaces, while providing practical measures to reduce the total amount of sediment leaving the site.

Principles of Erosion and Sediment control that will be applied include:

- Minimise disturbance – Minimise the extent of earthworks as much as is practicable.
- Stage construction – Minimise the amount of area open at one time and the time that these areas are left un-stabilised.
- Protect receiving environments – Apply additional protection (e.g. silt fences) and work methodologies around sensitive receiving environments (near stream corridors etc).
- Rapid stabilisation – Progressive stabilisation of disturbed areas as soon as practicable.
- Perimeter controls – Installation of perimeter controls for the diversion of clean water around the earthworks extent and separate this from sediment-laden water within the site.
- Employ sediment retention devices – Install treatment devices to maximise the efficiency of sediment removal within treatment devices.
- Review – Review and revise the effectiveness of erosion and sediment controls on a regular basis to ensure that they are still effective and applicable to the current site conditions.

The location and detail of the above proposed measures are shown on plans (Appendix 1) and discussed in further detail below. The area / catchments for the sediment control devices are illustrated on plans (Appendix 1) and have been designed to ensure compliance with GWRC guidelines and to provide strict control over the extent of areas to be treated and to limit the potential for clean water to run across the site.

9.4 EROSION CONTROL

To avoid erosion and sediment-laden stormwater generation on the site, the following erosion control measures will be implemented:

- The Stabilised Construction Entrance will limit the transfer of sediments from the site onto the local road environment.
- Temporary Surface Roughening and Contour Drains will be used across the extent of the earthworks area as required to minimise the erosion effects of rainfall and surface water scouring and in order to control the movement of silt to the proposed bunds and pond areas.
- Stormwater flow management will be reviewed as works progress and applicable methods applied as required in consultation with the Supervising Engineer and GWRC staff.

9.5 SEDIMENT CONTROL

Diversion channels and/or earth bunds will intercept sediment laden runoff, diverting flow to the sediment control devices including Decanting Earth Bunds (DEBs) and Silt Retention Pond (SRPs). DEBs and SRPs will discharge to land before entering stabilised artificial watercourses, reticulated stormwater systems or channelised stormwater systems. Emergency discharges are possible, with standard designs for these devices incorporating a stabilised emergency spillway (with erosion protection) in the event of large storm events. These are designed for 1% AEP (1 in 100-year storms), and although the discharge may not be fully treated, the provision of protection such as silt fences required around the perimeter of the site will significantly reduce any discharge of silt.

Clear water diversions are required to ensure that clean, external runoff does not run across the earth worked areas and is not contaminated by exposed soil on the site, and these have been designed in accordance with the GWRC guidelines. Where grades are steeper than 2% the diversions will be lined with filter fabric and have rock check-dams installed to control water velocity.

Silt fences will be constructed to contain silt laden runoff within the earthworks area. These will be used in sensitive areas, e.g. adjacent to water courses, to provide additional redundancy to the controls. They are designed to both filter out larger soil particles and to slow the runoff to enable finer particles to settle before discharging.

Stormwater inlet protection such as silt socks, sandbags, silt fences and catchpit filters will provide a barrier across/around catchpits to intercept and filter sediment laden runoff before it enters the stormwater system thereby preventing sediment-laden flows from entering receiving environments. These protections will be applied to the proposed catchpits within the development during bulk earthworks and roading upgrades, and during later stages of building construction including new stormwater services installations.

Our plans (Appendix 1), illustrate the proposed locations of all erosion and sediment control devices as well as typical details for all these devices.

9.6 SITE STABILISATION

The standard of compaction and method of determination will be set out in NZS4431 and NZS4402 or as otherwise specified by the Geotechnical Engineer.

The Contractor will be required to arrange regular control tests to ensure that adequate compaction has been attained over the entire area where fill materials are placed in accordance with the relevant project standards or specifications.

On completion of subgrade formation, an inspection will be carried out by the Supervising Engineer and Geotechnical Engineer to determine compliance for shape, grade, strength and uniformity.

Site stabilisation will be by topsoiling and grass seed/hydroseeding or by other means of achieving stabilisation e.g. placement of metal aggregate.

Stabilisation will occur as soon as is reasonably practicable upon completion of works. Areas of the site may be left un-stabilised for longer periods if this is agreed with the monitoring officer.

9.7 SIZING OF SEDIMENT CONTROLS, DEB AND SRP

Sediment Retention Ponds (SRPs) are proposed to control and treat sediment-laden water from large catchment areas (typically 0.3 – 5.0 ha). The SRPs have been sized in accordance with the GWRC guidelines. The catchment area for each SRP is calculated using 2% of the earthworks area. A 2% slope was used due to the flat nature of the site.

Decanting Earth Bunds (DEBs) are proposed to control and treat sediment-laden water from smaller catchment areas (typically less than 0.3 ha). These will be used where it is not possible to direct the flow to a SRP, or the catchment area is sufficiently small that the use of one is justified. The SRPs have been sized in accordance with the GWRC guidelines. The catchment area for each SRP is calculated using 2% of the earthworks area.

The SRPs and DEBs are expected to have good sediment removal efficiency due to the coarse nature of soils at the site (sands and gravels) which lose suspension more readily than finer grained materials e.g. clayey soils.

9.8 TEMPORARY CULVERTS

Temporary culverts may be required during the various stages of construction to maintain access across different parts of the site. These will be sized based on the upstream catchment flows. Where possible, these will be sized to convey the 10-year storm event. Where this will not be practical, culverts will be sized to convey lesser storm events, with overflow bypassing the culvert by means of a controlled and stabilised spillway over the top of the culvert. The culvert overflow location will need to be properly stabilised against scour during overtopping, which could be achieved by the placement of compacted basecourse, geotextile or concrete. When placing the culverts, fish passage will need to be maintained.

9.9 MAINTENANCE OF ESC DEVICES

Monitoring Type	Monitoring By	Frequency	Recording
Set-up of site ESC	Engineer, GWRC, KCDC	Prior to commencement of earthworks.	Engineer's written site inspection record. GWRC and KCDC inspection notes.
Daily Inspection	Contractor	At the start and end of each working day.	Contractor's site diary to be retained on site and reviewed at weekly meetings.
Routine Weekly Inspection	Engineer/Contractor	Weekly (prior to site meeting).	Contractor's inspection notes. Engineer's inspection notes.
During heavy rain events.	Contractor	During or immediately after heavy rain events.	Contractor's inspection record to be provided to the Engineer within 48 hours of the rainfall event.
Routine Compliance Inspection	Engineer, GWRC	As determined by GWRC.	GWRC inspection notes.
Prior to removal of ESC devices.	Engineer, GWRC	Prior to removal of any ESC device.	Engineer's written site inspection record. GWRC and KCDC inspection notes.

The Engineer will inspect ESC devices and certify that they have been correctly installed prior to the commencement of bulk earthworks. GWRC and KCDC will be invited to attend inspections of the ESC devices, prior to earthworks commencing on site. The contractor will be responsible for completion of as-built information for SRPs and DEBs as well as preparation of checklists as required.

9.10 SITE AUDITS

The Contractor will be responsible for undertaking weekly site inspections. These will be undertaken by an experienced practitioner which could include an experienced contractor, engineer, or environmental consultant. The site audits will be sent to the Compliance Officer for GWRC on a weekly basis, unless a reduced frequency is agreed, until the site is stabilised to the satisfaction of GWRC.

9.11 EXCEEDANCES AND FAILURES

Rainfall trigger levels and requirements are suggested to be greater than 7mm in one hour or 20mm in 24 hours as measured at the local GWRC monitoring site. Upon these specified levels being triggered, the Contractor (or their representative) shall:

- Undertake a site inspection and inspect all erosion and sediment controls.



- Where sediment control devices (i.e. SRPs) have discharged, undertake sampling of the water as specified by GWRC. This would involve testing of pH (where flocculant is used) and Turbidity at the inlet and outlet of the SRP.
- In the event that:
    - The rainfall triggered monitoring indicates that, at the outflow of the device, the NTU value is 170 NTU or greater, and/or (for any chemically-treated device) the pH is at or below 5.5 or above 8.5, or
    - There is a failure of any erosion and sediment control measure, or discharge from any non- stabilised area that is not treated by an erosion and sediment control measure, where any contaminants (including sediment) or material are released and enter any water body.

  The Contractor (on behalf of the consent holder), shall:

  i. Notify the Monitoring Officer of the issue.

  ii. Undertake onsite investigations to determine the cause and what changes can be made to prevent reoccurrence.

  iii. Reestablish control measures as soon as practicable where these have failed.

  iv. Supply a report summarising the items above including site notes and photos, as well as identifying any non-compliances or items requiring remediation.

  v. The report shall be provided to GWRC within 5 working days of the rainfall event, or longer as required where test results are not available.

9.12 PEAT STAINING

Groundwater from peat excavation areas may impart a "tea" like staining on the water, due to the tannins within the water. This may lead to reduced water clarity in the receiving environment.

It is recommended that the Contractor develops a management plan to address this which should be implemented during excavation of peat materials.

It is noted that the existing water course has some natural staining, and the strategy will be around ensuring that the level of staining does not substantially increase rather than removing all peat staining from water. Practically speaking, this can be achieved by letting water flow over undisturbed land e.g. grasses, so that natural settling and adsorption can occur. We suggest implementing a condition based on Hazen Colour Change to monitor this.

9.13 CHEMICAL FLOCCULANT

Before commencement, the contractor will be required to engage an approved consultant to carry out bench testing of soil samples from the site. If testing shows that adequate treatment is achievable without chemical flocculant, then the contractor may proceed on this basis with monitoring of the devices carried out on a weekly basis.

If the results of the site bench testing are poor then the contractor will be required to have prepared a flocculation management plan (FMP) to document the setup, operation, and maintenance of a flocculation system for the site. Flocculation would likely involve the use of Flocculation Sheds on larger SRP devices and Flocc Socks on smaller devices e.g. DEBs.

The FMP must include as a minimum:

- Specific design details of the chemical treatment dosing system, based on a rainfall activated methodology for the decanting earth bunds (DEBs) or sediment retention ponds (SRPs).
- Monitoring, maintenance (including post-storm) and contingency programme (including a record sheet).



- Details of optimum dosage (including assumptions).
- Results of initial chemical treatment trial.
- A spill contingency plan.
- Details of the person or bodies that are responsible for long-term operation and maintenance of the chemical treatment system and the organisational structure that will support this system.

Due the coarse-grained nature (sands) expected on site, which naturally fall out of suspension, large scale flocculation is not anticipated. It is likely that flocculation will only be required if pockets of finer grained materials (silts and clays) are encountered during earthworks.

10.0 STREAM WORKS

10.1 CONTROLS ADJACENT TO WATERWAYS

The are various works proposed adjacent to the waterways on site. Due to the proximity of these works to adjacent stormwater channels, it is important to have a well-established sequence of construction for these works, for example:

1. Works adjacent to the stormwater channel will be conducted in small increments, so that only a small earthworks area is left exposed at one time.
2. A silt fence or super silt fence will be installed at the proposed toe of excavations with returns at regular intervals.
3. Earthworks can proceed, with the controls regularly checked at the start and end of works each day to ensure ongoing compliance.
4. Upon completion of earthworks, the area should be immediately stabilised and planted (as per the approved landscaping plans). Immediate stabilisation could be achieved using hay, mulch or biodegradable matting.
5. The silt fence should be left in place until the vegetation is suitably established and/or the area is stabilised.

10.2 STREAM DIVERSION WORKS

Several stream diversions will be required as part of the construction works, including temporary realignments of the Wharemauku Stream. For these alignments, a general methodology has been developed with input from the project Ecologist.

1. The temporary or permanent diversion will be formed, separate to the online channel.
2. The diversion channel will be sized for either the temporary or permanent flows.
3. The diversion will be stabilised. For temporary diversions this will be geotextile, to prevent scour. For permanent diversions, the banks and base will be formed to the final alignment and levels, with sides planted and stabilised with an approved erosion control measure e.g. biodegradable coconut or jute matting, which will provide interim stabilisation while planting establishes.
4. Once the diversion has been stabilised, the online channel will be connected to the diversion. The diversion should be conducted at low flows to reduce the potential for scouring.
5. The diversion and old channel should be left open at the same time for a period of 2-3 days. After this period, the old channel will be closed off at the upstream end of the channel. The bank should be stabilised to prevent scour.
6. The old channel should be left open at the downstream end of the channel for 2-3 days to allow any remnant fish to naturally migrate into the new stream alignment. Once this timeframe has passed, the lower end of the channel can be closed off. The contractor should inspect the old

channel for signs of remnant fish, and if required native fish recovery will be carried out in accordance with the Native Fish Recovery and Relocation Plan.

For smaller areas of diversion and connection, it may be more appropriate to use other methods such as coffer dams with pumping. The contractor will be responsible for preparing specific details for these diversions as part of a Stream Diversion Plan, which could form part of the Contractor's Earthworks and Construction Management Plan. This will require review from the Project Ecologist.

10.3 CONSTRUCTION WATER QUALITY MONITORING – WHAREMAUKŪ STREAM

Water quality monitoring will be undertaken during construction to identify and manage potential sediment-related effects on the Wharemauku Stream associated with earthworks and stream works.

The monitoring programme will include:

- **Baseline monitoring:** Establish upstream and downstream monitoring locations within the Wharemauku Stream and undertake baseline turbidity measurements prior to commencement of earthworks and stream works to establish background conditions.
- **Routine monitoring:** Undertake turbidity monitoring upstream and downstream of active works at least weekly during earthworks and streamworks where there is a potential discharge pathway to the stream.
- **Rainfall monitoring:** Undertake additional visual inspections and turbidity measurements during and following significant rainfall events, where safe and practicable, particularly where erosion and sediment control devices are discharging to the stream.
- **Visual inspections:** Inspect the receiving environment and construction discharge points for sediment plumes, changes in water clarity, discolouration or other visible contamination.
- **Additional parameters:** Monitor pH during concrete works or other activities with the potential to generate alkaline discharges. Undertake TSS sampling where necessary to investigate elevated turbidity.
- **Trigger levels:** Adopt GWRC NRP turbidity trigger levels based on upstream background conditions, with downstream measurements compared against concurrent upstream measurements to distinguish construction-related effects from existing catchment conditions.
- **Response procedures:** Where monitoring identifies elevated turbidity or visible sediment discharges attributable to construction activities, investigate the source, inspect relevant erosion and sediment control measures and implement corrective actions. Works contributing to the discharge will be modified or temporarily suspended where necessary until appropriate controls are established.
- **Record keeping:** Maintain records of monitoring locations, results, rainfall conditions, observations, exceedances and corrective actions undertaken.
- **Duration:** Continue monitoring during relevant earthworks and stream works until disturbed areas have been stabilised and construction-related sediment discharge risks have been appropriately managed.

The monitoring locations and procedures will be reviewed as construction progresses to reflect the location and nature of active works. Monitoring will be undertaken by suitably trained personnel, with oversight from the Site Environmental Manager.

11.0 DEWATERING

11.1 GROUNDWATER LEVELS

The Geotechnical Assessment Report (Torlesse Ltd, Oct 2026) outlines that, based on investigations across the site, groundwater depth varies significantly across the site. This reaffirmed previous investigations by Engeo (2023).

Due to the variable ground water table, a contractor was previously engaged to conduct test pits across the site with an aim to understand dewatering rates and whether dewatering was feasible. The

dewatering trial was conducted on 28 July 2023, by Bryce O'Sullivan Contracting with attendance from Envelope Engineering and Engeo. There was light to moderate rain during and in the days preceding the testing. Standpipes left in the ground from pervious testing showed water at or near the ground surface (perched), and there was standing water in areas of the site. Tests were conducted in a range of locations across the site as outlined within the Engeo report. Additional test pits were undertaken in 2026 with Torlesse and Everiss Civil. From the dewatering trials the following conclusions were made:

- The permanent groundwater level is approximately the boundary of the brown silt-sand mixture and the grey sands underlying this.
- At this level, water slowly flows laterally into the open excavation. This gradually fills up the excavation with a combination of groundwater and hole collapse (caused by the sides eroding).
- The contractor's feedback on observing the excavations, was that construction and associated dewatering was feasible at the site and that the requirements for this would be minimised by careful working methodology such as excavating strips of the site and backfilling these immediately.
- Groundwater would be left to flow towards a bunded collection area and then this can be managed, either through soakage, re-use for dust control, or pumping to land or water (subject to clarity requirements).
- The majority of the peat and unsuitable material across the site is above the water table, which means large scale dewatering is not anticipated to be required.

WWLA have estimated a dewatering rate of between 0.25 – 0.95 L/s/ha, dependent on seasonality. The exact amount of dewatering will be dependent on the amount of open excavation and contractor's final methodology.

11.2 DEWATERING METHODOLOGY

Dewatering devices may be required in the following instances:

- Dewatering of earthworks excavations. This will be done in strips to control the flow of groundwater to a bunded area.
- To dewater trenches, excavations including for the construction of:
    - Foundations
    - Stormwater quality devices (i.e. tree pits and rain gardens)
    - Stormwater attenuation devices and ponds.
    - Wastewater pump stations.
- To dewater sediment control devices for maintenance, or at the decommissioning stage.

Dewatering guidelines are provided in the GWRC compliance document – Erosion and Sediment Control Guide for Land Disturbing Activities in the Wellington Region.

During the Bulk Earthworks stage, when associated ESCP devices are installed, any dewatering required be undertaken would typically discharge into the devices provided or into diversion channels or bunds that will ultimately convey the water to a treatment device.

Where there are no suitable sediment devices on site and the water is not meeting clarity requirements, there are a variety of options for dewatering treatment, including settling tanks/ skip bins (refer GWRC Figure 8.9.2.1), dewatering bags (refer GWRC Figure 8.9.2.2) and turkey nests (refer GWRC Figure 8.9.2.3). The selection of these will be done by the contractor to suit the work being undertaken.

Due to the nature of the works and subsurface materials (large scale excavations are to excavate the peat materials and the perched water table is typically below this level), the extent of dewatering will be minimised. The likely measures would be limited to:

- Sump Pumping, either with suction or submersible pumps.
- Well point pumping.



Specific guidance on each of these is included in the GWRC Guidelines.

11.3 DEWATERING MONITORING

Monitoring of the discharge will be undertaken to ensure the pumped discharge always meets the required discharge standards.

The outflow from an unfiltered pump sump will be monitored by taking samples of water and checking the proportion of fines being transported. If fines are being continuously recovered or there are indications of potential excavation instability, the excavation will be backfilled, and a different dewatering method considered.

Where ESCP devices are being used for sediment control, of pumped discharge, the monitoring requirements of these devices, and the monitoring conditions that will be imposed on the consent, must be followed, including pH sampling and Flocculation controls where applicable.

12.0 MEASURES TO ENSURE A TIDY SITE

The importance of maintaining a tidy site shall be encouraged through site meetings, toolbox meetings and site inspections. During inspections, the general tidiness and condition of site will be noted. Significant trip hazards and non-compliances will be raised on site and followed up with an email, with minor recommendations raised in site meetings or by email.

Skip bins shall be used to collect and dispose of general site rubbish and waste. Rubbish or material generated from demolition works or earthworks may be loaded directly onto trucks as required.

Some materials designated for recycling or reuse within the development may be stored in an appropriate location on site.

Larger deliveries of materials to site will be unloaded in an identified lay down area with materials stored there until required at their specific sites. Smaller deliveries of materials specific to a stage may be delivered directly to the appropriate site area, a specific laydown location will be identified in the stage specific addendum as required. The specified location may change as works proceed based on phasing and staging.

13.0 LOCATION OF WORKER'S CONVENIENCES

The site offices shall be in a portable site shed which will be established on site. This will include facilities such as toilets, a kitchen, meeting rooms and offices. Additional facilities such as separate site sheds, lunchrooms and portaloos shall be in proximity to specific stages and activities, with their type and location determined by the contractor.

14.0 STORAGE OF FUEL AND OTHER HAZARDOUS MATERIALS

A designated fuel and hazardous fuel store shall be established on site in a location agreed between the engineer and the contractor. This storage area shall be constructed and fenced in accordance with relevant guidelines. Fuel storage to be secured against theft and vandalism.

The fuel storage area shall be located away from sources of combustion and shall be self-bunded or otherwise suitably contained. Fuel should be stored away from sensitive receiving environments e.g. stormwater channels and streams.

Spill kits shall always be available on site and these should be suitably sized for the potential spill hazard. The kits shall be placed in locations adjacent activities with a moderate risk of spills.

15.0 TRAFFIC MANAGEMENT

All controls and measures in place to mitigate the effects of construction traffic is to be detailed in the Construction Traffic Management Plan (CTMP) which will be submitted to KCDC prior to the commencement of works.

The contractor will be responsible for the preparation of the CTMP in conjunction with the project's Traffic Engineer. The contractor will be responsible for the preparation of site-specific Traffic Management Plans (TMP). The TMPs will cover the specific works and proposed traffic controls for works undertaken in the road corridor.

16.0 RESTRICTIONS TO PUBLIC ACCESS

Public access will be restricted to certain public areas of site (or adjacent to the site) at various points through the construction of the project. The specific location and duration of these restrictions will be determined for the various development stages.

Active works areas, such as demolition or building construction sites, will be restricted with site hoarding and fencing in a manor agreed between the engineer and the contractor.

Restrictions of public access to the roadway, berms and other areas e.g. Wharemauku walking path, will be outlined within the Construction Traffic Management Plan (CTMP).

Long term restrictions will be communicated to the public through signage and site maps on the information boards. Short term restrictions shall be communicated to the public in the appropriate manor, signage, barriers, spotters etc.

17.0 MONITORING AND COMPLIANCE REGIME

A copy of the ECMP and site-specific ECMP shall be always kept on site. Compliance to the plan shall be reviewed by the engineer on a regular basis, with non-conformances recorded in a register.

At significant milestones in the project, such as the commencing of a new development stage, the plan shall be reviewed. Should significant changes be required, the plan shall be revised, reviewed, and resubmitted to the KCDC Council Compliance Officer and GWRC Monitoring and Enforcement Officer. Should minor changes or additional details be required, a stage specific addendum may be prepared and submitted to KCDC and GWRC.

APPENDICES

APPENDIX 1 DRAWINGS

(Refer plans with substantive application)