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Whenuapai Redhills: Package 1 Project

Erosion and Sediment Control Plan (for Consent)

Prepared for Watercare Services Ltd
Prepared by Beca Limited

16 September 2022

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Sensitivity: General

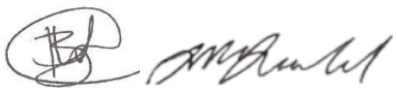
Contents

Appendices

Revision History

Revision Nº	Prepared By	Description	Date
1	Curtis Blyth	Draft	29 March 2022
2	Alex McDonald	Updated rising main alignment	16 September 2022

Document Acceptance

Action	Name	Signed	Date
Prepared by	Curtis Blyth Alex McDonald		16 September 2022
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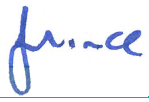
Approved by	Jenny Vince		16 September 2022
on behalf of	Beca Limited		

1 Introduction and Project Context

1.1 Scope and Purpose

This Erosion and Sediment Control Plan (ESCP) has been prepared on behalf of Watercare Services Limited (Watercare). The purpose of this document is to clearly describe how earthworks associated with The Whenuapai Redhills: Package 1 Project (The Project) can be effectively managed to mitigate any potential sediment discharge risk and avoid adverse impact on the environment from land disturbance activities during its construction.

This plan details the principles and practices of erosion and sediment control methodology with some commentary about what earthworks staging and sediment devices may be required in various areas of the site to support resource consent application for land disturbance activities.

It is envisioned that the resource consent will require the appointed contractor to prepare a site-specific ESCP (SSESCP) which will detail design specifications of erosion and sediment control devices aligned with the finalised design and Contractor's earthworks methodology.

1.2 Project Description

The Project aims to provide wastewater servicing capacity for approximately 10,240 dwellings, or 30,720 people, in the Whenuapai catchment. This growth is projected to occur by 2041. The Project includes the following five key components (see **Figure 1**):

1. A **Pump Station** at a point where the Whenuapai and Redhills Catchments meet at 23-27 Brigham Creek Road, with an emergency overflow outfall to Sinton Stream
2. A **Gravity Main Pipeline** (approximately 700m long and 375 – 475 mm in diameter) between Whenuapai Village Pump Station on Tamiro Road and the new pump station
3. A **Rising Main** (approximately 1.5km long and 500 mm in diameter) between the Pump Station and a proposed new break pressure chamber on Mamari Road (the boundary of Package 2)[1].
4. A **Culvert** (approximately 63m long including wing wall and rip rap) to provide access for the rising main across Sinton Stream.
5. A **Break Pressure Chamber** which connects to the Massey Connector rising main (proposed under Package 2).

The Project extends from the existing Whenuapai Village pump station site in Tamiro Road in the north, across Brigham Creek Road, to Spedding Road in the south.

[1] An extension of the rising main is part of 'Package 2' and will be designed to connect to the planned Northern Interceptor Phase 2 tunnel and deliver flows from the Whenuapai Catchment to the Rosedale Wastewater Treatment Plant for treatment. Package 2 is subject to a separate consent application.

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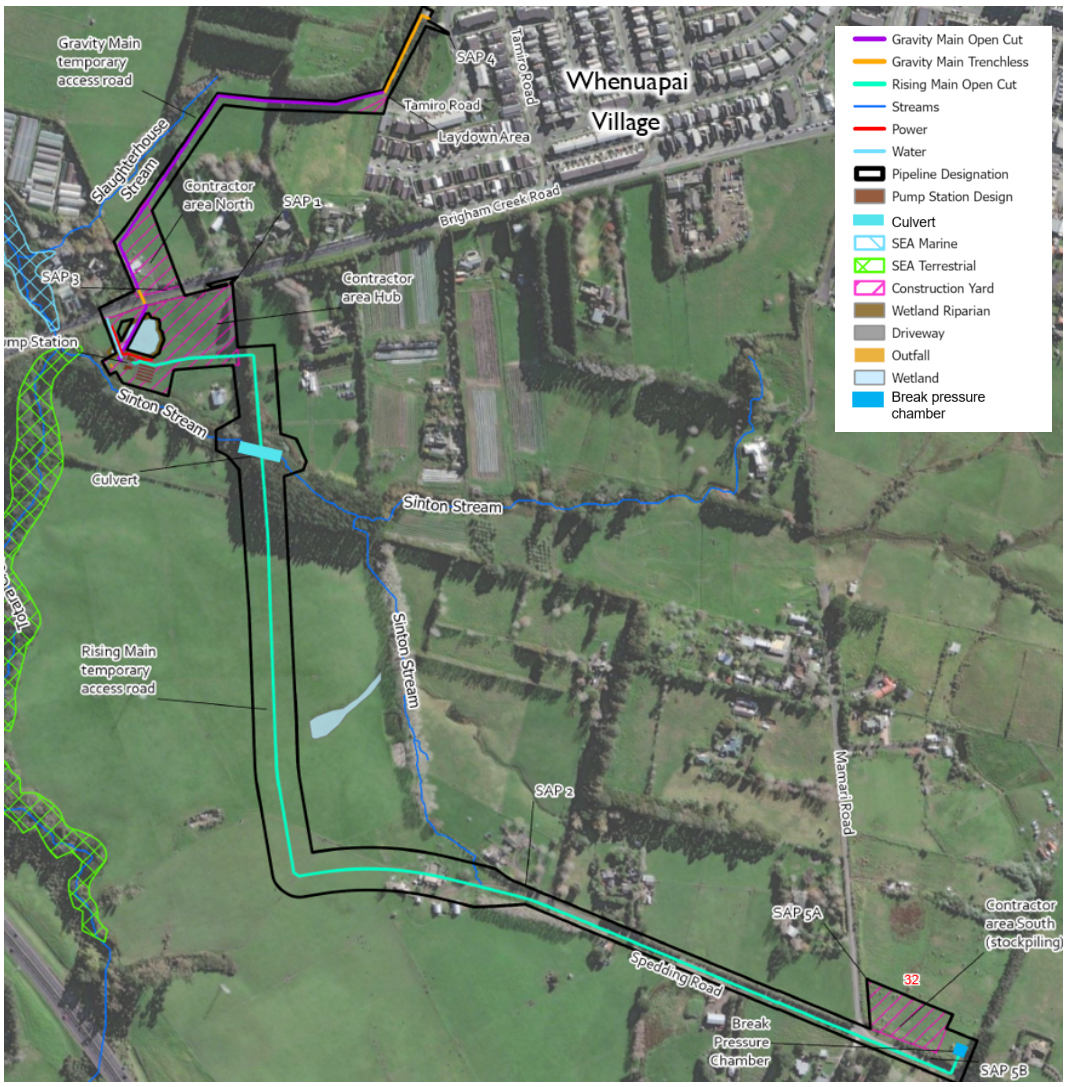

Figure 1 Package 1 – 'the Project' overview

The majority of the works area involves open trenching and progressive stabilisation associated with the construction of the new pipes. The new Pump Station will involve longer duration earthworks within that specific area of the site (**Figure 2**). The principles and practices detailed in this ESCP will be applied to all work areas associated with Package 1.

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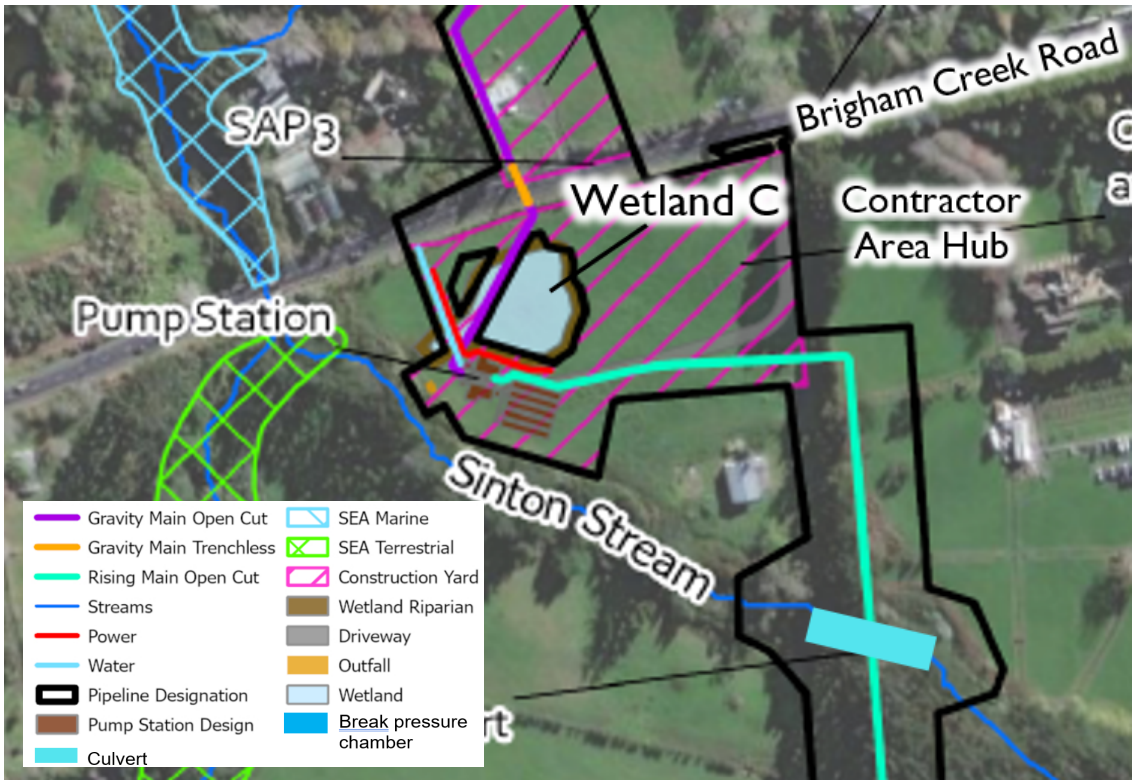

Figure 2. Approximate position of Package 1 Pump Station (*Whenuapai Wastewater Servicing Scheme Phase 1 Brigham Creek Road, Whenuapai: Whenuapai Package 1 Key Construction Activities; DWG GIS-4219201-5, Watercare*)

2 Proposed Design and Construction Methodology

The project involves four key construction elements (refer to AEE for more detail):

- The gravity main construction from Whenuapai Village Pump Station in the north to the Pump Station site, involving both open trenching and horizontal directional drilling (a.k.a. 'trenchless') methods.
- The Pump Station construction.
- The Spedding Road Rising Main from the Pump Station to the break-pressure chamber termination point on Spedding Road. This section involves open trenching and earthworks to construct the early form of the future Spedding Road and install the new pipe, as well as the installation of a new culvert for Sinton Stream to pass beneath future Spedding Road.
- The break pressure tank construction.

The pipeline installation is predominantly conventional open trench excavations with two short sections of horizontal directional drilling (HDD) (a.k.a. trenchless) proposed for beneath Brigham Creek Road (**Figure 2**) and the Tamiro Road stormwater pond bund. The Pump Station site will involve standard earthworks methodologies detailed below.

The proposed rising main alignment aligns with Spedding Road Extension Road proposed as part of the Oyster Capital Plan Change. Whilst it is intended that the two be constructed at a similar time to reduce construction effects (and subject to all necessary approvals being in place) for the purposes of this plan, the excavation and construction of a temporary access road extension has been included to allow the installation of the wastewater rising main at the correct level beneath the new road.

It is intended that this temporary access road will later be reworked and developed into the final Spedding Road Extension.

2.1 Temporary Road Access

Earthworks are required for establishing a trafficable access road along the pipeline alignment. This temporary access road will form the early alignment of the new Spedding Road Extension. A width of 6m has been allowed for to allow movement and operation of construction vehicles. **Figure 3** below details the proposed cross-section of the temporary access road.

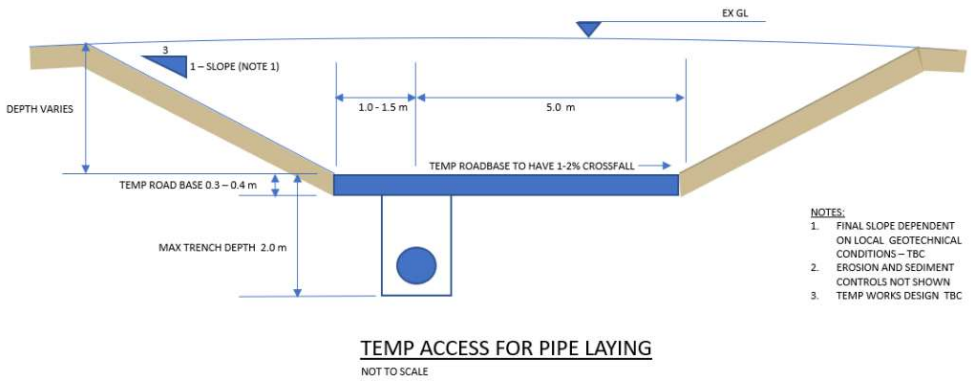

Figure 3. Temporary Access Road cross section for Rising Main section (Construction Methodology Report)

The area of access road construction is ~17,100m^2 (including batter slopes) with an estimated 10,000m^3 of earthworks to obtain m cover above the new pipe. All cut spoil will be temporarily stockpiled in the Southern Laydown area prior to being removed to an approved fill disposal facility.

One important design element of the temporary access road relevant to erosion and sediment control is the stabilisation of the road base with imported hardfill, effectively stabilising a large portion of the catchment.

2.2 Open Trenching

Approximately 2100m of new pipe will be installed by conventional trenched construction through both the gravity main section and rising main section. Trenched construction will consist of the following stages:

- Establish site access and set-out
- Excavation and construction of the temporary access road or haul road (where required)
- Excavation of the trench and trench shoring (if required)
- Bedding material placement and compaction, followed by pipe laying in sections
- Back filling and reinstatement to surface

Along the length of the gravity main and rising main are manholes which will require larger areas to allow for installation. The rising main length has additional scour chambers and air valve chambers which will also be constructed and backfilled with progress.

Excavation is to be carried out with a 20T excavator or similar. Spoil excavated will be loaded into 6-wheel trucks for temporary stockpiling in the Southern Laydown Area, prior to transport offsite to an approved fill disposal facility. Trenches are expected to range between 2.0 – 3.5m deep and 1.4 - 1.8m wide.

Trench benching is expected to be provide a safe working area, however, if required, trench shoring will be installed with the main objective being wall stabilisation and safety. Bedding material consisting of a granular material such as GAP20 or similar will be placed and compacted prior to pipe lengths being placed into position within the trench.

Backfilling of the trench and pipe will comprise GAP20 material being brought up in layers and compacted. After 150mm of GAP20 cover has been achieved the pipe trench will be backfilled with site-sourced fill, compacted and stabilised to match the existing surface (in most part, grassed, or GAP65 and road surface).

2.3 Horizontal Directional Drilling (HDD)

Two short sections of pipe are proposed to be installed via HDD beneath Brigham Creek Road (**Figure 2**) and through the bund of Tamiro Road stormwater bund. This process will require the establishment of two work zones each side of the proposed trenchless sections to allow the drilling process and pipe jacking. Industry practice is to bore a hole larger than the diameter of the product pipe in order to reduce friction during pull though. Mud pump systems flush out spoil, apply internal pressure to the open bore, lubricate the product pipe during pull through and solidify around the pipe once works are complete and recirculation has ceased. The HDD process can be summarised in these steps:

- Mobilisation and demobilisation of all necessary HDD subcontractor equipment, materials, consumables and human resources to the HDD access points
- Stringing and welding (inc. pre-installation testing) of product pipe into multiple strings to be installed into the completed/enlarged bore hole
- HDD for the installation of permanent product pipeline, and
- Remediation and restoration of construction areas.

These work areas do not require large areas of exposed soil so emphasis on sediment and dewatering management is prioritised.

2.4 Pump Station

The Pump Station off Brigham Creek Road will be an area of longer-duration earthworks that requires considerable earthworks to install the pump station infrastructure and pipe connections (**Figure 4**). This area of the site is also proposed to be the main Contractors Hub, detailed further in Section 2.6 below.

The Pump Station involves an underground intake and wet well system, as well as five large underground storage tanks. The main wet well infrastructure will involve excavations of up to 9.5m below ground level

(bgl) with the storage tanks and valve chambers being up to 6m bgl. Cut spoil will be removed from site with progress to the Central and Southern Laydown site for later removal to an approved offsite disposal facility. Once design grade is obtained the site will become stabilised with construction progress with the importation of hardfill and associated pump station infrastructure. Dewatering will be required given the depths of excavation.

An emergency outlet from the wet well is required involving the construction of a new outlet headwall to Sinton Stream. This outlet is situated out of the stream. Controls associated with this work are detailed in Section 8.

Near completion, the Pump Station will also have new service connections, a permanent accessway constructed off the new Spedding Road Extension (should the Oyster Capital plan change be approved, or, off Brigham Creek Road) and security fencing installed.

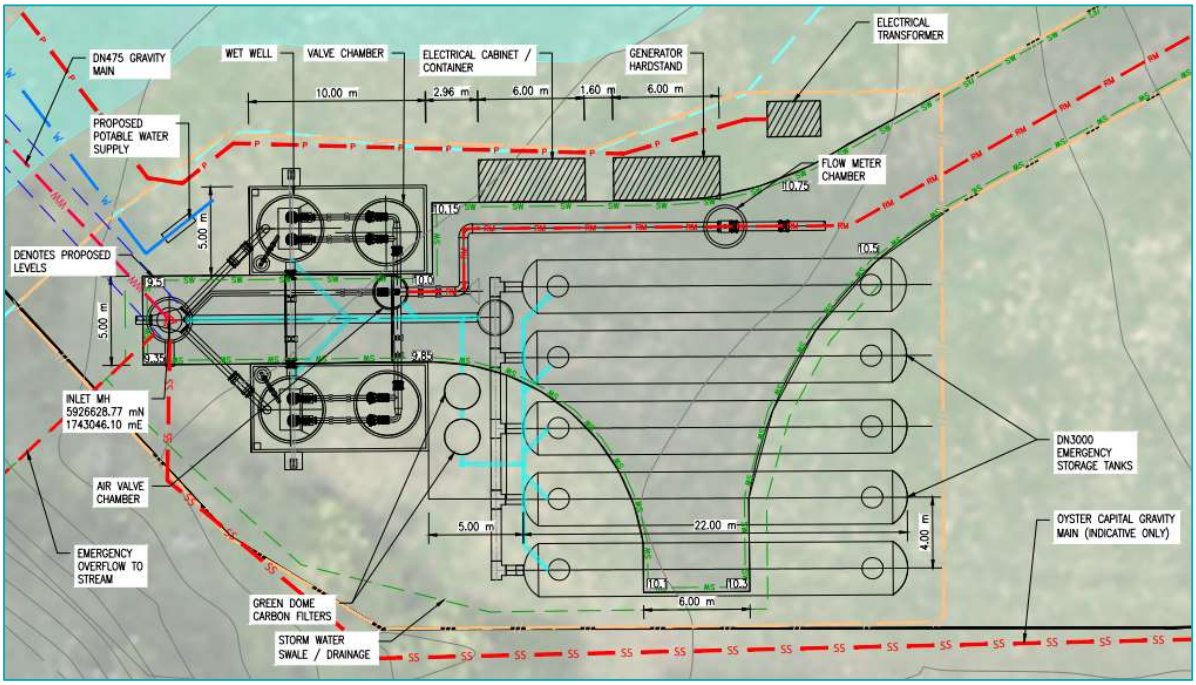

Figure 4. Brigham Creek Road Pump Station detail (*Preliminary Design DWG 2013646.004; WSP, GHD, Watercare*)

2.5 Sinton Stream Culvert

The rising main section of the project passes over Sinton Stream following the alignment of the proposed Spedding Road Extension (**Figure 5**). The pipe will cross Sinton Stream via a culvert, which is being consented as part of the Project.

The culvert is a 43.1m long, 3.5m high x 3.5m wide box culvert, with 5m long wing walls and 5m of rip rap either side. A maximum of 3m fill is required upon the culvert to obtain the design level of the future Spedding Road, with 3:1 batter slopes each side of the road alignment sloping down to the Stream.

Cleanwater diversion methodology associated with the construction of this culvert is provided in Section 8 of this report.

An existing culverted bridge crossing is already present for construction traffic to utilise in this area temporarily, prior to the culvert becoming trafficable. This existing bridge will likely be disestablished once the new culvert crossing is in place.

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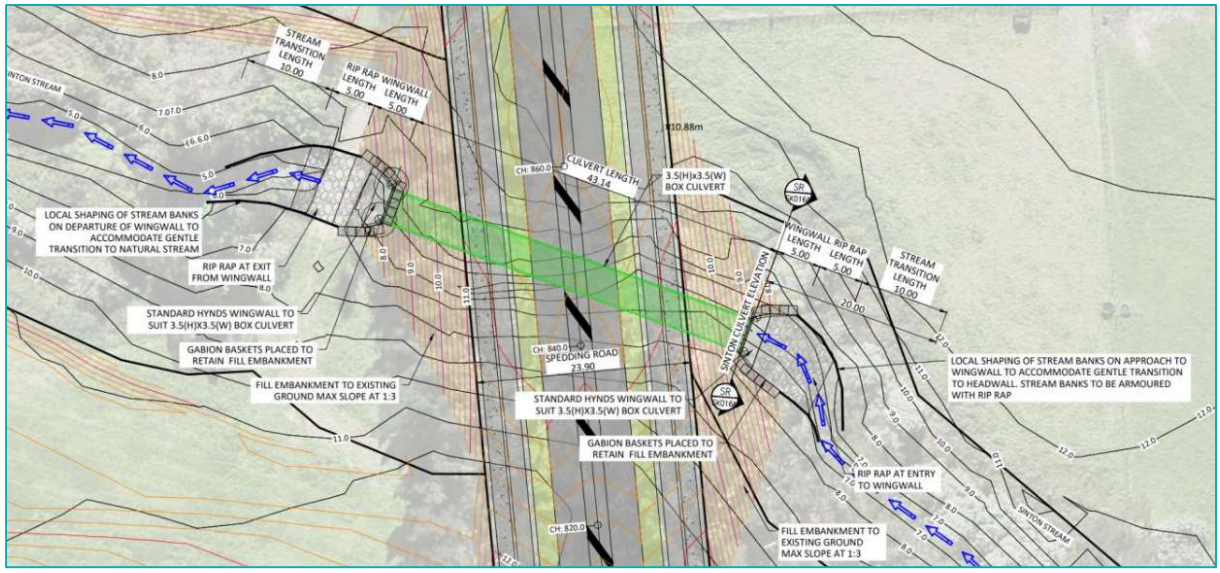


Figure 5. Rising main to be installed within new Spedding Road, requires installation of a new culvert within Sinton Stream (*Draft Sinton Stream Culvert Plan and Longsection; Crang Civil Ltd; DWG-SK016; Rev4; September 2020*)

2.6 Laydown Areas

Package 1 will require a minimum three laydown areas associated with the stockpiling of fill, storage of equipment and material, and to establish site muster points for each section of the project. These laydown areas are dependent on landowner negotiations but will likely be positioned:

- Central Laydown Area (Primary Site Offices / Hub):
  - Off Brigham Creek Road, adjacent the Pump Station Site.
- Northern Laydown Area:
  - Off Brigham Creek Road, opposite the Central Hub entrance.
- Southern Laydown Area:
  - Within 32 Mamari Road, providing access to Spedding Road and southern end of site.

All three laydown areas will involve a topsoil strip and bunding, prior to the stabilisation with geofabric and compacted aggregate (GAP65) to create a clean running surface. This stabilisation has been factored into what potential sediment controls may be required for each of these sites which is further detailed in this report and the plans appended.

3 Site Description

The existing land use of the proposed construction footprint is predominantly agricultural or within the existing road corridor of Spedding Road.

Figure 6 displays the contour of the surrounding land. In summary:

- The gravity main portion of the project north of Brigham Creek Road is flat.
- The Pump Station area of the project between Brigham Creek Road and Sinton Stream has a slight gradient west, towards the stream.
- Over Sinton Stream the site predominantly runs up an even gradient to Spedding Road. The Spedding Road section of the site is flat.

Figure 6. Contour information with overland flow paths – approximate site alignment shown as red line (Auckland Council Geomaps)

3.1 Receiving Environment

The immediate receiving environment from these project works is Sinton Stream for works south of Brigham Creek Road, or a tributary of Totara Creek for works north of Brigham Creek Road. As the site is largely agricultural, site discharges, if any, are expected to discharge to these environs via overland flow paths.

All site discharges from exposed areas will either be directed to a sediment control device or through a dewatering mechanism.

All receiving aquatic environments have the potential to be affected by sediment runoff during construction works. Sediment suspended in water can clog fish gills within the stream or limit light penetration, effecting various plant or algal species. Once settled, additional sediment loading can smother benthic organisms or coat plant leaves.

4 Principles of Erosion and Sediment Control

The key principles to be employed for an ESCP are to undertake land disturbing activities in a manner that reduces the potential for erosion of bare soils to occur (erosion control) and, to employ treatment devices to treat all sediment laden water prior to discharging from the site (sediment control). The 10 basic principles of erosion and sediment control taken from Auckland Council's Guidance Document 005: Erosion and Sediment Control ('GD05', 2016) will be applied to each of the defined scenarios (as applicable) and are outlined for completeness as follows:

- Minimise Disturbance: Only work those areas required for construction to take place.
- Stage Construction: Carefully plan works to minimise the area of disturbance at any one time.
- Protect steep slopes: Where steep slopes exist within the works area, ensure that these are protected as steep slopes are prone to erosion.
- Protect Watercourses: Map all water bodies before works commence.
- Stabilise exposed areas rapidly with sewing new seed or mulch cover.
- Install perimeter controls: Divert clean water away from areas of disturbance and divert runoff from areas disturbed to sediment control measures.
- Employ detention devices: Treat runoff by methods that allow sediment to settle out.
- Make sure the ESCP evolves: As construction progresses and the nature of land disturbing activities change, the ESCP needs to be modified to reflect the changing conditions on the site.
- Assess and adjust: Inspect, monitor and maintain control measures.
- Use trained and experienced contractors

Any Site-Specific Erosion and Sediment Control Plan (SSESCP) prepared by the Contractor or their delegate as a requirement of any future conditions of consent will be developed and maintained in accordance with GD05.

5 Erosion Controls

A number of considerations regarding the control of erosion within areas of disturbance are outlined below which will be applied to all areas of construction.

5.1 Timing of Earthworks and Staging

The contractor shall endeavour to complete earthworks during the Auckland Council's earthwork season (1st October – 30th April). Should earthworks be required outside this period the contractor will apply to Auckland Council for permission to complete works outside this time period following the standard winter works approval process. It is likely this project will be undertaken over the winter months.

Indicative staging is given in the Construction Methodology Report which details open areas of trenching being limited to lengths that allow the safe management of the site. This staging will allow for the installation and backfilling of the pipeline trench, thus stabilising the site and keeping a 'moving face' of the works area with progress, limiting the open area of earthworks.

5.2 Site Access Points

Stabilised entranceways will be installed at points where the site is accessed from public roads, namely off Spedding Road, Brigham Creek Road, Mamari Road and Tamiro Road. These stabilised entrances will be built and maintained in accordance with GD05.

Any sediment lossess to the road surface during works will be removed as required.

5.3 Minimise Exposed Areas

A number of best practice measures will be employed to minimise the area of land exposed to erosive forces at any one time. Vegetation clearance will be limited to those areas where soil disturbance will be undertaken, with as much existing ground cover being retained as possible. Staging of earthworks and progressive stabiilsation of the site will also be undertaken to ensure effective management of the open earthwork area. Temporary stabilisation with the use of pinned geofabrics, hay mulch or soil stabilisers will also be used for small isolated areas where required.

5.4 Limiting Site Length

Exposure of long slopes increases the potential for water travelling over the site to cause erosion and generate increases in sediment loss. Therefore, limiting the length of a slope exposed is an effective way of further reducing the amount of sediment generated by earthworks.

5.5 Stabilisation and Reinstatement

Exposed soil will be progressively stabilised when earthworks are completed to reduce erosion of these surfaces. Stabilisation will be dependent on the specific area of site, with the majority of the pipeline excavation being stabilised with either the reinstatement of topsoil, mulch and grass seed with progress or aggregate cover. The pump station site will be stabilised once designed grade is obtained with compacted hardfill or concrete surfaces. Once covered in hardfill, the area is considered erosion resistant.

Progressive stabilisation of fringe areas of works will include top soiling, hydro-seeding or seed and mulch application where required. These areas will require mulch application until 80% vegetation reinstatement has been achieved.

Use of pinned geofabrics, soil stabilisers, aggregates or hay mulch, may be required for isolated areas throughout construction.

5.6 Dust Control

Dust will be controlled by water spray as required. Water for dust control purposes will be sourced from public supply applied for at the time of construction. Dust management will need to comply with Permitted Activity conditions of the Auckland Unitary Plan. Given the linear nature of these works and use of imported hardfills it is unlikely these works will become a source of dust.

5.7 Stockpiling

Stockpiling of topsoil will be undertaken for reuse on site, where appropriate. Temporary spoil stockpiles are proposed to be located in the Southern Laydown site and Central Laydown site and will be removed progressively offsite to an approved fill facility. Minor stockpiling is also actipcated in the Northern Laydown site. Any longer duration stockpiled soils will be covered by appropriate material or stabilised to prevent erosion and the generation of dust.

All laydown areas are proposed to be utilised for the storage of backfill material (e.g. GAP20, GAP65, SAP7 etc), however these are unlikely to become a source of sediment runoff.

6 Sediment Controls

Emphasis on mitigating erosion of the site should be considered foremost as opposed to the reliance on sediment control devices. Notwithstanding this, the following sediment control mechanisms will be implemented throughout the site to provide treatment capacity of sediment laden discharge from the site.

6.1 Clean Water Diversions

Diverting clean water minimises the erosion of worked areas and allows sediment retention devices to specifically retain dirty water thus increasing efficiency.

Given the proposed staged construction methodology, sections of clean water diversions may not be required if the site is stabilised prior to a rainfall event. For areas or sections of pipeline construction that are proposed to open for a longer duration of time a clean water diversion will be required.

The proposed stream diversion methodology for Sinton Stream culvert is provided in **Section 8**.

6.2 Dirty Water Bunds

Dirty water bunds act in preventing offsite dirty water discharges and conveying dirty water to retention devices for impounded or treatment. Dirty water bunds can be stabilised on their outer face to form a clean water diversion in some instances. Dirty water bunds will be constructed in accordance with GD05 and generally form the perimeter of the extent of works in catchments relying on dirty water impoundment.

6.3 Sediment Retention Ponds and Decanting Earth Bunds

Sediment retention ponds (SRPs) or decanting earth bunds (DEBs) can be installed to provide treatment of larger earthwork areas that may be open for a longer duration. The localised, linear nature of the trenching operations and progressive stabilisation proposed will mean some areas of the project will not require sediment treatment devices.

Should either retention device be proposed in the Contractor's SSESCP, they will be designed in accordance with GD05, with a minimum volume equivalent to 2% of the contributing catchment area, include floating T-Bar decants and stabilised emergency spillways and discharge points. All final design detail of SRPs or DEBs will be provided in the Contractor's SSESCP.

6.3.1 Flocculation

Chemical flocculation will be used in all SRPs and DEBs, if constructed, to improve their sediment removal efficiency. This flocculation will be with a rain activated dosing system.

All flocculation methodology and dosing rates will be detailed in a Flocculation Management Plan (FMP), as required by condition of consent. This approach will allow the appointed contractor to size their flocculation devices specifically to their constructed devices, as detailed in their SSESCP.

6.4 Silt Fences and Super Silt Fences

Silt fences or super silt fences will be installed across the contour to slow sheet flow and impound sediment from small catchment areas. Any silt fence will be installed in accordance with GD05 and will remain in place until 80% stabilisation is achieved within their contributing catchment.

Heavy machinery operation and earthworks will not occur on the downhill side of silt fences unless it is undertaken following a strict cut and cover methodology for small work areas only.

7 Dewatering

It is likely that areas throughout the construction zone will become inundated with stormwater and groundwater and will require dewatering, particularly within the deep excavations of the Pump Station.

Clean water (>150mm clarity measured with a Secchi or Black Disk) may be discharged offsite directly, under close management. Any dirty water dewatering will be passed through a dewatering treatment device such as a dewatering bag, turkey's nest, baffled bin, or lamella clarifier (e.g. 'Silt Buster'). This device will be set up in an area that allows the passive discharge of treated water to a nearby watercourse. Alternatively, dewatering can be directed to an established sediment retention device onsite to enable sedimentation and passive discharge through the device's constructed outlet. Examples of these dewatering devices are provided in **Figure 7** below, with the likely device being a lamella clarifier shown in **Figure 8**. Any dewatering undertaken will be closely monitored to ensure no excess sediment is being discharged out of the site.

Given the volumes of dewatering required from the Pump Station site the specific dewatering methodology and device used will be detailed in the Contractor's SSESCP or specific Dewatering Management Plan.

Figure 7. Example dewatering devices (source: Auckland Council Guideline Document 005)

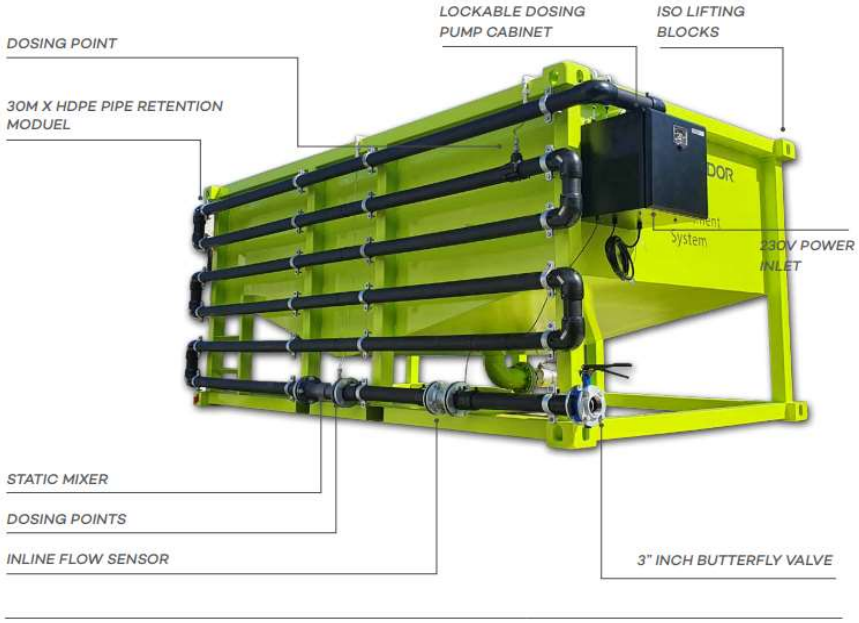


Figure 8. Example lamella clarifier dewatering device

8 Specific Area ESC Summary

The entire project area has been split into the following areas to allow better summary regarding the methodology and controls within each area. Refer to **Appendix A** for the ESC Plans detailing the controls referenced in this section.

Gravity Main Area (Tamiro Rd Stormwater Pond to Brigham Creek Road)

- This section requires shallow trench excavations up to 3m deep to enable the installation of the pipeline. This area is proposed to be staged, with only manageable sections of trench open at one time. The haul road following this section of alignment is proposed to be stabilised in clean hardfill. The site will be stabilised following installation of the pipe with mulch and seed. Given the linear nature of the works within this flat area of the site it is unlikely the works will become a source of sediment runoff.
- The two trenchless sections proposed in this area of the site, as well as the staged open-trench, may require temporary dewatering through construction.
- The Northern Laydown Area of this site will be topsoil stripped and stabilised with clean-running aggregate.
- A small accessway to the trenchless receiving pit will be constructed using a cut and cover methodology and is to be fully stabilised with clean-running aggregate.
- No sediment controls are proposed for this section.

Pump Station and Central Laydown Area (Brigham Creek Road to Sinton Stream)

- Site access will be achieved from Brigham Creek Road via the construction of a stabilised accessway into the Laydown Area.
- The Central Laydown Area portion of this site will be topsoil stripped and stabilised with clean-running aggregate to establish the site offices and carparking. This area will have a clean water bund constructed downgradient to direct clean stormwater runoff to the wetland feature in this site.
- A portion of the site is also proposed to be used for temporary spoil stockpiling which will require treatment with the use of an SRP (SRP2).
- The wetland area will have a security fence installed so that no works are undertaken in this area, other than the proposed cut and cover pipe installation through its centre.
- The Pump Station site involves deep excavations that will form an impoundment area for localised stormwater runoff. A key consideration for this area is therefore to divert stormwater upgradient of this excavation site to be impounded in the SRP nearby with the use of perimeter dirty water bunds. SRP2 will be sized conservatively to retain and treat stormwater from the stockpile area upgradient of it. This SRP will also provide a dewatering settlement area for the nearby dewatering operations of the Pump Station excavation. Specifications of SRP2 are provided in **Appendix A**.
- Brigham Creek Road's roadside swale and the existing access way to this site act as clean water diversions.
- The emergency outlet from the Pump Station is positioned outside the stream zone and can be constructed with the implementation of a silt fence or bund, and constructed during a dry weather window. No stream works methodologies are required for this outlet.

Sinton Stream Culvert Area

The future Spedding Road culvert requires a stream diversion methodology to isolate the culvert works from the stream flow. The proposed methodology has been provided by Crang Civil Ltd and is included in **Appendix A**. In summary:

- A stabilised stream diversion channel will be constructed around the extent of work.
- Upgradient and downgradient stabilised clay bunds will be constructed within Sinton Stream.

- These bunds will be connected via three Ø150mm novacoil pipes which will allow for the discharge of the stream baseflow through the site.
- The stream diversion channel will be utilised when required, mainly during increased flow rates during storm events.
- Dewatering from the work zone will be from a pumping eye established in the low point of the works area and directed to a dewatering device (**Section 7**).
- Once the culvert, headwalls and riprap is constructed, the diversion bunds and piping will be removed to liven the culvert. The diversion channel will be decomissioned.
- Isolated areas of disturbance around the stream will be stabilised with mulch and grass seed where required.
- A super silt fence will then be constructed around the low point of each headwall and extent of fill required for each 3:1 batter.
- Each lift in fill will have the outside face stabilised with geofabric or the permanent designed surface to minimise erosion.
- The super silt fences will remain in place untill each batter slope and the wider catchment assoicated with this area is stabilised.

Rising Main Open Trench Area (Sinton Stream to Spedding Road termination point)

- The bulk earthworks in this section of the site are associated with the construction of the temporary access road. The plan provided as **Appendix A** demonstrates the cut required.
- An existing access track over Sinton Stream will be utilised temporarily during the construction of the new culvert. This access track will require additional stabilisation with aggregate and may require small isolated silt fences if it becomes a source of sediment.
- The temporary access road involves the cut into an even slope all the way to Spedding Road, essentially creating an isolated channel which will direct all stormwater to the base of the slope. The alignment of the access road is positioned on an even gradient or ridge, therefore no clean water diversions will be required.
- It is proposed to construct a SRP (SRP1) at the base of the temporary access road near Sinton Stream which will adequately treat all stormwater sourced from within the isolated access road catchment.
- SRP1 will be sized for the entire temporary access road catchment. This sizing is considered conservative given the majority of the catchment will be stabilised with compacted aggregate associated with base of the access road. The batter slopes are not proposed to be stabilised.
- Trenching works within the road alignment will therefore be undertaken within the catchment of the SRP and the SRP can be utilised for a dewatering treatment device, if required.
- SRP1 specifications are provided in **Appendix A** which are based on the 17,100m^2 catchment and a 2% retention capacity.
- Spoil from the road and open trenching will be loaded directly on to trucks and removed to the Southern Laydown Area.
- The Southern Laydown Area portion of this site will be topsoil stripped and stabilised with clean-running aggregate to establish the site offices and carparking.
- Isolated works associated with the break-pressure chamber involve only a small volume of earthworks and will be protected with isolated bunding and stabilisation.

9 ESCP Monitoring and Maintenance

The following monitoring and maintenance activities shown in **Table 1** are recommended as a minimum for the site. This table provides several aspects of ESC that the Site Manager will assess regularly so that the ESC measures are optimised. Final maintenance and monitoring will be detailed in the Contractor's SSESCP.

Table 1. General Inspection and Maintenance Requirements

Control Type	Inspection and Maintenance Requirements	Frequency
Weather Forecast	• Check forecast provider for rainfall forecasts – Undertake a pre-check of the site controls prior to any large rainfall events.	Daily during operations
Silt fence	• Check that silt fences are toed in correctly. • Check for tears and other damage – fix if required. • Any areas of collapse, decomposition or ineffectiveness are to be replaced immediately. • Remove silt build ups when bulges develop or when deposition reaches 30% of the silt fence height.	Weekly
Sediment Retention Ponds and Decanting Earth Bunds	• Check T-bar levels are maintained at correct heights. • Check discharge outlet for erosion and stabilise if required. • Maintain forebay volume via removing sediment buildups – 80% volume to be retained as a minimum. • Check flocculation and inlet – as detailed in the site Flocculation Management Plan.	Weekly
Monitoring of Sediment Discharge	• Check whether erosion and sediment devices are operating as designed via checking water clarity in devices and/or receiving waterways. • Inspect areas of earthworks and identify whether additional erosion and sediment control measures are necessary. • Determine whether excessive sediment is discharging to roadways, land, or watercourses and remediate immediately.	Prior and during rainfall events and weekly
Stabilised Entranceway	• Inspect the stabilised accessway and top up with clean aggregate if required. • Inspect surfaces at exit points are not having sediment tracked onto them – sweep if required. • Inspect any structure used to trap sediment from the stabilised entranceway.	Daily during operations
Stabilising Areas	• Check that all stabilised areas have at least 80% cover before removing control devices. • Identify areas that require stabilisation and remedy.	Daily during operations.

10 Recommended Conditions of Consent

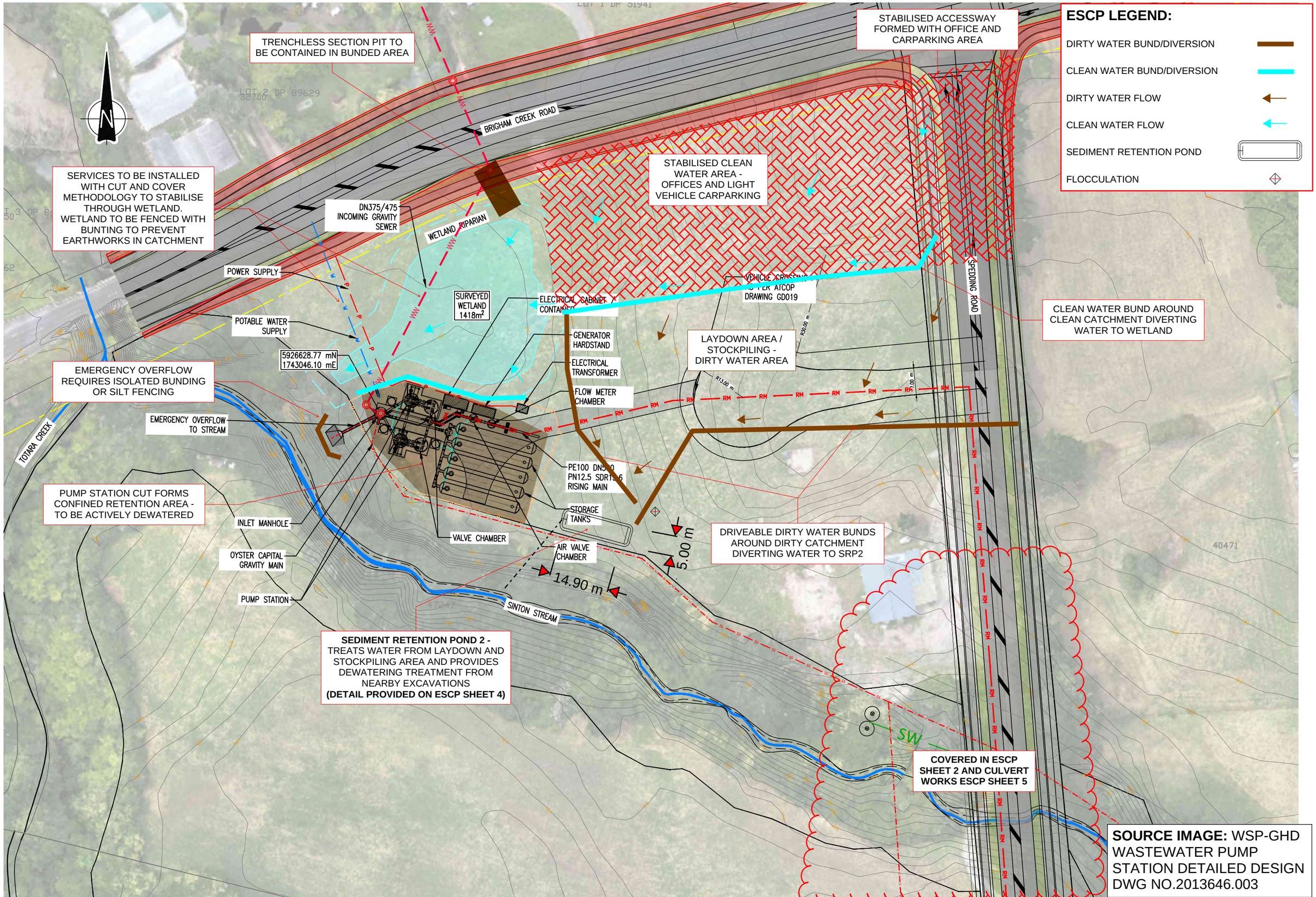
The measures outlined in this ESCP will provide for the effective prevention of erosion and control of sediment runoff from land disturbance activities associated with the construction of the project. The measures outlined in this ESCP can be adopted by the appointed Contractor, with details of sediment device design associated with their earthworks methodology and staging to be detailed in a Site-Specific Erosion and Sediment Control Plan. All environmental controls will follow the general specifications provided in Auckland Council's Guideline Document 005, "GD05".

The following standard conditions relating to erosion and sediment control are recommended for the project consent:

- A finalised Site-Specific Erosion and Sediment Control Plan (SSESCP) shall be prepared and submitted to the Team Leader Northern Monitoring, Compliance, Auckland Council, prior to the commencement of earthworks activity on the subject site. No earthworks shall commence until Council provide confirmation that the final SSESCP is satisfactory.
- Erosion and sediment control measures shall be constructed and maintained in accordance with Auckland Council Guideline Document GD2016/005 ('GD05') and any amendments to this document, except where a higher standard is detailed in the approved SSESCP, in which case the higher standard shall apply.
- The operational effectiveness and efficiency of all erosion and sediment control measures specifically required as a condition of resource consent or by the approved SSESCP shall be maintained throughout the duration of earthworks activity, or until the site is permanently stabilised against erosion.

A

Appendix A – Erosion and Sediment Control Plans and Detail



No.	Revision	By	Chk	Appd	Date
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* Refer to Revision 1 for Original Signature

Client: WATERCARE SERVICES LIMITED

Project: WHENUAPAI - REDHILLS WASTEWATER SERVICING PACKAGE ONE

Title: EROSION AND SEDIMENT CONTROL PLAN - SHEET 1 - INTERIM PUMP STATION AREA

Discipline: ENVIRONMENTAL

Drawing No.: -

Rev.: 1

DO NOT SCALE

IF IN DOUBT ASK.

BLUEBEAM