

Erosion and Sediment Control Plan

SH16 Safety Improvements – Stage 2

Prepared for Waka Kotahi NZ Transport Agency - Auckland

Prepared by Beca Group Ltd

25 October 2022



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Revision History

Revision N°	Prepared By	Description	Date
1	Curtis Blyth	Final for Stage 2 resource consent application	14 th December 2021
2	Curtis Blyth	Updated for resource consent following design changes	13 th September 2022
3	Curtis Blyth	Updated for resource consent following further review	25 th October 2022

Document Acceptance

Action	Name	Signed	Date
Prepared by	Curtis Blyth		25 th October 2022
Reviewed by	Raymond Chang		25 th October 2022
Approved by	Peter Burgess		25 th October 2022
on behalf of	Beca Limited		

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1 Introduction

1.1 Scope

Beca Limited (Beca) has prepared an Erosion and Sediment Control Plan (ESCP) for Waka Kotahi New Zealand Transport Agency (Waka Kotahi) to support a resource consent application for earthworks associated with Stage 2 of the State Highway 16 (SH16) Brigham Creek to Waimauku Project (the Project). The Project will provide shoulder widening, barrier improvements, a section of new lane construction, shared path construction and stormwater upgrades of SH16 between Brigham Creek Intersection and the Kumeū Town Centre.

This Project is split into two stages, Huapai to Waimauku Stage 1 (already consented under the existing Safe Roads Alliance, SRA) and Brigham Creek to Kumeū Stage 2. This ESCP has been prepared to address ESC principles for Stage 2, including specific plans appended for works at Brigham Creek and Kumeū No.1 Pedestrian Bridges.

Along with supporting the resource consent application, this document will provide a platform for contractors to develop more detailed erosion and sediment control plans for specific areas once a detailed design and construction methodology is finalised.

1.2 Purpose

This ESCP outlines the effects associated with the land disturbing activities undertaken during the Project and makes recommendations of the principles and practices necessary to mitigate the impact of these activities on receiving environments.

This document has been prepared as supporting documentation for the application for resource consent to perform earthworks along the SH16 alignment. Site specific ESCPs will be prepared once detailed design and construction methodology is finalised and a contractor selected. This ESCP does not contain specific plans of where retention or treatment devices may be found along the entire alignment except for the Brigham Creek and Kumeū No.1 Pedestrian Bridges as focal points for sediment discharge risk near these waterways. Locations of specific devices will be detailed in the site specific ESCPs once a contractor is involved and the detailed design has been finalised. This process will allow for the contractor's specific phasing, construction methodology and locations of laydowns/stockpiling to be considered in the plan.

2 Project Context and Description

This portion of SH16 has been earmarked as a key location for servicing growth areas and responding to future urban transport demands. The proposed works involve shoulder widening, barrier improvements and the construction of a shared path within the immediate border of the existing state highway.

The following works are proposed for each section of the corridor (**Figure 1**). Please note that the proposed works as presented in this ESCP are subject to minor changes through detailed design.

- **Section A** (Brigham Creek roundabout through to Coatesville-Riverhead Highway intersection) – provide two lanes in each direction with median safety barrier and behind the road shoulders;
- **Section B** (Coatesville-Riverhead Highway intersection) – convert the existing priority-controlled intersection to a roundabout with consideration to safe accesses to adjoining residential and commercial properties;
- **Section C** (Coatesville-Riverhead Highway intersection through to Taupaki Road / Old North Rd intersection) – provide two lanes in each direction with median safety barriers and behind the road shoulders;
- **Section D** (Taupaki Road / Old North Road intersection through to the posted speed limit change (80km/h and 60km/h) east of Old Railway Road intersection, Kumeū) – provide flush median markings; and

Stage 1 (already consented, not covered in this ESCP):

- **Section E** (from Station Road intersection, Huapai to the posted limit change (100 km/h and 70km/h) east of Wintour Road, Waimauku) - provide median safety barrier and behind the road shoulders with safe turnaround facilities.

These upgrades will provide safer road infrastructure for the public with the intention of lowering the number of traffic incidents that occur on this stretch of road.

The majority of works are within the existing Waka Kotahi designations. The Project area lies on generally flat ground with five watercourses being either bridged or culverted along the alignment. The proposed design also includes new stormwater infrastructure, including areas of treatment swales and piped outfalls to nearby watercourses. Due to the widening of the road only requiring works that are immediately adjacent to the existing road, sediment runoff will be predominantly controlled or treated with bunds, silt fences and erosion controls (stabilisation) along the road's shoulder. Works associated with the stormwater outfalls and nearby bridges will have more specific methodologies for erosion and sediment control, as detailed in this report.



Figure 1. SH16 Improvements – Brigham Creek to Waimauku Project Area

2.1 Proposed design

A description of the proposed design is provided in the *SH16 Brigham Creek to Waimauku Project - Stage 2 Brigham Creek to Kumeū Assessment of Effects on the Environment*.

Soil disturbance is limited to the existing road surface and shoulder of the road in areas of widening, barrier construction or shared path construction. The total volume of earthworks cut across the ~4.3 km Project site is ~14,348 m³, of which, where geotechnically suitable, will be reused onsite with an ~22,123 m³ of fill required for the design (i.e. Net fill of ~7,775 m³). Note these values are indicative only, pending completion of detailed design.

2.2 Project overview

The project overview is provided in the *SH16 Brigham Creek to Waimauku Project - Stage 2 Brigham Creek to Kumeū Assessment of Effects on the Environment*.

2.3 Site Description

The 4.3km length of safety improvements are predominantly within existing designations. Minor works outside of the designations are associated with newly constructed stormwater swales and outfalls, minor cut of neighbouring banks and newly constructed driveway entrances where applicable.

Only one *Public Open Space - Conservation Zone* lies adjacent to the road corridor as detailed in the Auckland Unitary Plan (AUP). This zone runs alongside Brigham Creek with only minor works occurring within the *Public Open Space - Conservation Zone* associated with the construction of a new pedestrian bridge, involving piling and retaining wall construction.

2.4 Receiving Environment Values

Several freshwater streams are bridged or culverted under the alignment of SH16 including Ngongetepara Stream (Brigham Creek), Ahukuramu Stream and two tributaries of the Kumeū River. The extent of works surrounding these areas is limited to new retaining walls, stormwater outfalls and riprap aprons. All works are removed from the stream flow paths with no in-stream works required.

A small section of the banks of the Ngongetepara Stream is overlain by the *Public Open Space - Conservation Zone* aforementioned which appears to hold a grove of developed native bush.

The Kumeū River runs through predominantly agricultural and horticultural land and does not have a high recreational value. Land, Air and Water Aotearoa has repeatedly recorded the macroinvertebrate community index (MCI) of the Kumeū River to be poor.

3 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 Guidance Document: 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 throughout the duration of works.
- **Protect Watercourses:** Map all water bodies and nearby stormwater outflows before works commence.
- **Stabilise exposed areas rapidly:** Sewing new seed or mulch cover where design does not include a finished hard surface (concrete or hard fill).
- **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.**

The following sections outline aspects of ESC that will be implemented by the contractor applicable to the Project area as a whole. Site specific plans have been produced for the Stage 2 bridge upgrades only, contained in **Appendix A**. It is envisioned that the contractor will prepare site specific ESCPs once construction methodology and detailed design are finalised for the rest of the alignment. The following sections are therefore based on the proposed construction methodology of removing the existing road shoulder and obtaining the desired grade for the widened road corridor followed by hard fill placement and stabilisation. Works are programmed to be completed section by section. This staging allows for safer control of the roadway and stabilisation of each road section as the works progress.

4 Erosion Controls

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

4.1 Timing of Earthworks

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 may be required to apply to the Auckland Council for permission to complete works through winter (this will be stipulated in a resource condition if determined applicable by Council).

Staging of earthworks will allow for both the duration of exposed soils to be minimised and planning around the construction of the roadway and stabilisation to follow. It is likely works will occur on a section-by-section basis, excavating in front of the construction activities and allowing the hard fill placement to continually stabilise exposed areas as works progress.

4.2 Site Access Points

Entranceways into the worked areas will be directly off SH16. Several laydown areas will also be accessible of SH16 that will be on existing gravel pits or off neighbouring roads. All entranceways will be required to be stabilised at points where site access is off public roads. This stabilised entrance will be built in accordance with GD05. The purpose of stabilised entranceways is to prevent the exit points of the site becoming a source of sediment and reduce the tracking of sediment onto SH16.

4.3 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/road construction will be undertaken, with as much existing ground cover being retained as possible. Staging of earthworks will also be implemented where practicable in order to stabilise areas after construction has been completed.

Very little soil will be exposed given the site works will be confined to the road shoulder directly adjacent to the existing road. The works will therefore be confined to a long narrow stretch of earthworks of either side of the road. This narrow design allows for easier control of sediment runoff and erosion protection as the majority of works are within the berm of the road, channelling stormwater flow.

4.4 Limiting Site Length

Exposure of long slopes increases the potential for water traveling over the site to cause erosion and generate increases in sediment loss. Contour bunds or check dams will be required along the length of the excavation should sustained heavy rainfall be forecast while an excavation over a long section of the pathway is open. Alternatively, excavations could be temporarily stabilised with geofabric or hay mulch.

4.5 Stabilisation and Reinstatement

A large portion of the worked area will be stabilised with hard fill systematically given the road design involves the widening of the road surface.

Exposed soil surrounding these finished surfaces will be progressively stabilised when earthworks are completed to reduce erosion on these surfaces. Stabilisation will be in accordance with GD05 and be dependent on the slope and surface. This progressive stabilisation will include top soiling and grass seeding

for all areas within two weeks of having earthworks and pathway construction completed on them. Cut banks can be stabilised temporarily with geofabric where practical.

4.6 Dust Control

Dust will be controlled by water spray as required. Water for dust control purposes will be sourced from public supply or local boreholes applied for at the time of construction. Dust management will need to comply with Permitted Activity conditions.

Additional stockpile management may be needed for identified contaminated sites, detailed in the Project's Contaminated Soils Management Plan (CSMP).

4.7 Stockpiling

Stockpiling of soil will be kept to a minimum where possible. Stockpiled soils will be covered by appropriate material or stabilised to prevent ingress of rainfall and the generation of dust. Management of stockpiles will be detailed in the contractor's site specific ESCP.

4.8 Watercourse Protection

No machinery is to enter watercourses, except for authorised works in watercourses. These works will need to be authorised prior to the mobilisation of machinery in this area and will be in accordance with GD05. Construction of the pedestrian bridges in Stage 2 at Brigham Creek and Kumeū No.1 Bridge will not require works within the watercourse. ESC measures for these areas are provided in Section 6. Use of coffer dams, sheet piling or silt curtains may be required pending detailed design in the vicinity of nearby watercourses.

5 Sediment Controls

Not all sediment retention devices will be present throughout the entire development works. Instead, sediment control devices will be installed based on the staging of earthworks and anticipated earthworks catchments. Erosion control measures and silt fences will be used prior to the construction of certain sediment retention devices as required.

5.1 Clean Water Diversion

A key measure applied in these works will be to ensure clean water is diverted away from exposed soils with perimeter controls. Clean water diversions will be constructed upgradient of all earthworks to ensure clean water does not mix with sediment laden water. Clean water is likely to be diverted onto neighbouring land, waterways or to stormwater catch pits.

The contractor will be required to assess each specific works area for clean water flowing into the works area, particularly where surface water may be discharging from upgradient road surfaces.

5.2 Dam and Divert Methodology

All culvert replacements will incorporate general dam and divert methodology. This methodology creates a dry area for works to be undertaken within the watercourse. Prior to works commencing, all ecological assessments or approvals will be undertaken in accordance with the relevant construction or ecological management plan. In the first instance, culvert replacements will be undertaken during a dry weather window to avoid potential periods of high flow from rainfall events. Additionally, seasonal timing will be considered for all intermittent watercourses which will allow works to be undertaken when the watercourse is likely dry. Dam and divert methodology will include:

- Construction of a dam upgradient of site works via either a driven steel sheet, sandbags or earth bund upon geofabric.
- Implementation of a pump with the ability to convey water around the works area through pipe, or, implementation of a gravity pipe from the dam (if site gradient allows so).
 - The pump inlet will either be placed within a pumping eye or floated to avoid sediment being sucked into the pump.
 - The discharge point of any discharged water may require stabilisation with pinned geofabric should scour be observed.
- Pumping or diversion of water will continue until water can be rediverted through the new culvert.

Storm response contingency involves the removal of all equipment and material from the watercourse flow path and the pinning of geofabric over exposed soils.

5.3 Slope Protection

Slopes have the potential to generate significant sediment discharges and must be protected from excessive erosion. There will be several steep cut surfaces along the length of construction where the road shoulder requires cut of a nearby bank to widen the corridor. These areas that require soil exposure of steep surfaces will require temporary stabilisation via soil stabilisers or geotextile if the final desired stabilisation cannot be obtained during works. Several retaining walls are required along the length of the alignment which will require slope protection during their construction.

5.4 Decanting Earth Bunds or Sediment Retention Ponds

Decanting earth bunds (DEBs) or sediment retention ponds (SRPs) will be installed to provide retention and treatment of sediment laden water dependent on the size of the earthworks catchment. Given the narrow

earthwork areas and construction methodology of the roadway widening it is unlikely SRPs will be required. DEBs will be installed in larger earthwork catchments (<3000m²) that cannot be treated by silt fences and where site constraints do not restrict their construction.

These retention devices will be installed at the base of a long slope by the contractor in a position such that they are treating the greatest volume of sediment laden water. All DEBs will be designed and sized according to the GD05 guidelines with a minimum 2% volume of the earthworks and installed with a floating T-bar dewatering device.

Given the site is largely restricted to the shoulder of the road, DEBs will only be required in larger areas of cut or fill that are not suitable for silt fences. DEB placement will be adjacent to the road, collecting discharge from soil disturbance areas along the worked shoulder, where required.

5.5 Dewatering

Dewatering of excavations may need to occur after rainfall events.

Dewatering can occur from excavations to either a retention device onsite or a temporary silt trap (e.g. turkeys nest, baffled skip bin or dewatering silt bag). The use of flocculation in batch doses could be employed for dewatering devices to obtain faster settlement of suspended sediment. Specifics on the chosen dewatering device, if required, will be detailed in the contractor's site specific ESCP.

5.6 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. Silt fences will be used where it is not practical to collect runoff and divert it to a SRP or DEB. It is likely silt fences and super silt fences will be the primary treatment device implemented along the length of the road construction where required due to the constraints of the alignment and limited earthworks area on the shoulder of each side of the road. The contractor will detail areas of site that require silt fence construction in the site specific ESCP.

Silt fences and super silt fences will be installed in accordance with GD05, following the design criteria outlined in **Table 1 and 2** respectively. Silt fences and super silt fences will remain in place until at least 80% stabilisation is achieved at the completion of works.

Table 1: GD05 sizing guidelines for **silt fences**.

Slope Steepness (%)	Slope Length (m) (Maximum)	Spacing of Returns (m)	Silt Fence Length (m) (Maximum)
Flatter than 2%	Unlimited	N/A	Unlimited
2 – 10%	40	60	300
10 – 20%	30	50	230
20 – 33%	20	40	150
33 – 50%	15	30	75
> 50%	6	20	40

Table 2: GD05 sizing guidelines for **super silt fences**.

Slope Steepness (%)	Slope Length (m) (Maximum)	Spacing of Returns (m)	Silt Fence Length (m) (Maximum)
0 – 10%	Unlimited	60	Unlimited
10 – 20%	60	50	450
20 – 33%	30	40	300
33 – 50%	30	30	150
> 50%	NA	20	NA

5.7 Stormwater Protection

All stormwater catch pits in the immediate area of earthworks will be protected by geotextile filter cloth, silt socks or silt fences (if in grassed areas). These must be installed correctly following the GD05 guidelines. These should be assessed regularly and replaced when significant volumes of sediment have accumulated. Catch pit protection will be necessary for this project along the entire length of upgrade works where stormwater outlets are identified near or within the worked area.

6 Specific Areas of Construction

6.1 Brigham Creek Pedestrian Bridge

A site-specific ESCP for Brigham Creek Pedestrian Bridge is provided in **Appendix A**.

The pedestrian bridge to be constructed alongside Brigham Creek bridge does not require a large volume of earthworks. This area requires piling for the bridge foundations and ground anchors, and construction of a new retaining wall abutments. As such, silt fences will suffice in treating any small volumes of sediment runoff produced from this area of works given its confined nature. It is anticipated the majority of machinery movements for these works will be undertaken from the existing stabilised surface of the state highway with smaller areas stabilised with hardfill progressively. Piling works are generally undertaken on flat, stabilised platforms. This method will largely reduce the need for a sediment control device like a silt fence, especially if it is not practical to install a silt fence in this tight area.

New retaining walls alongside the existing bridges northern side should be undertaken with a stabilised catchment. There may be a need to install a silt fence downgradient of these retaining wall areas, if possible.

Stormwater outfall installation works are also required adjacent this site which will need to be programmed around the bridge works. The outfalls and aprons will be undertaken as per the method detailed in Section 6.3.

6.2 Kumeū No.1 Pedestrian Bridge

A site-specific ESCP for Kumeū No.1 Pedestrian Bridge is provided in **Appendix A**.

The pedestrian bridge to be constructed alongside Kumeū No.1 bridge does not require a large volume of earthworks, being restricted to the new embankments each side of the bridge. Being similar to Brigham Creek Pedestrian Bridge, this area requires piling for the bridge foundations and ground anchors, and construction of new retaining wall abutments. As such, silt fences will suffice in treating any small volumes of sediment runoff produced from this area of works given its linear and confined nature. It is anticipated the majority of machinery movements for these works will be undertaken from the existing stabilised surface of the state highway with smaller areas stabilised with hardfill progressively.

6.3 Stormwater Outfalls

A number of new outfalls are required along the project length that will be in close proximity to waterways. These areas of work will not require in-stream works, however will need to consider earthworks in close proximity to the watercourses, and potential stormwater management. These areas, listed below, will incorporate dam and divert methodology if needed (Section 5.2), a staged construction approach, cut and cover methodology and potential use of isolated silt fences where required.

The main stormwater upgrades which will require additional ESC management are located at:

- CH191900 – involving the decommissioning of existing and construction of new stormwater infrastructure connecting a private stormwater pond to an existing drain outfall.
- CH192560 – involving new stormwater outfalls and riprap aprons near a tributary drain of the Kumeū River.
- CH192960 – involving the construction of an ~200m treatment swale from the state highway to Kumeū River. Construction of this swale will be undertaken offline and stabilised prior to connection to the new stormwater infrastructure. Given its limited catchment size, this swale will be adequately controlled with bunds and silt fences. The final methodology used in this area it to be confirmed by the contractor.
- CH193650 – involving a new stormwater pipe and outfall/apron along the boundary of the BP service station, discharging to Kumeū River.

- CH194000 – involving two new stormwater outfalls to Kumeū River.

7 ESCP Monitoring and Maintenance

The following monitoring and maintenance activities shown in **Table 3** are recommended to be reviewed and finalised in the contractor's site specific ESCP. This table provides several aspects of ESC that the site manager or site foreman will assess regularly to ensure ESC measures are optimised.

Table 3: Monitoring and maintenance activities

Control Type	Inspection and Maintenance Requirements	Frequency
Weather Forecast	Check Metservice New Zealand for rainfall forecasts	Daily
Silt fence and super silt fence	Check that silt fences are toed in correctly. Check for tears and other damage. Any areas of collapse, decomposition or ineffectiveness are to be replaced immediately. Remove silt build ups when bulges develop or when deposition reaches 50% of the silt fence height.	Daily Daily As required As required
Decanting Earth Bunds (where required)	Inspect the bund and clean out if excess material has accumulated. Check the embankment for signs of erosion. Check the inlet structure. Check the outlet structure and pipe (e.g. signs of seeping, blockages).	Daily
Sediment Retention Ponds (where required)	Inspect the pond and clean out if excess material has accumulated. Check the embankment for signs of erosion. Check the inlet structure. Check the outlet structure and pipe (e.g. signs of seeping, blockages) Check flocculent levels and that the flocculation system is working correctly. Check pH of SRP water with litmus paper to assess the effects of flocculation if being undertaken.	Daily
Monitoring of Sediment Discharge	Check whether erosion and sediment devices are operating as designed. 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.	During rainfall events
Stabilised Entranceways	Inspect any structure used to trap sediment from the stabilised entranceways.	After each rainfall.
Stabilising Areas	Check that all stabilised areas have 80% cover. Identify areas that require stabilisation.	As works progress (a minimum of once per week).
Stormwater Catch pits	Check for build-up of sediment and ensure all dirty water will be filtered through geotextile	Weekly and after major rain events

8 Conclusions

The SH16 improvements involve standard road construction methodology of excavating areas to be widened, laying basecourse (hard fill) and paving. Works will be staged to avoid having a large area of exposed soil open at one given time. The sequencing of works will allow for the stabilisation and subsequent erosion protection of soils with the placement of hard fill following the excavation of soils or existing roadway. Once hardfill is placed, the erosion potential of the worked areas will be minimal.

Emphasis on erosion and sediment control along the alignment will be placed on stormwater inlet protection, diverting clean water flows away from works, managing sediment on impervious surfaces and protection of laydown areas. Silt fences will be the primary treatment device along the side of the works where required, particularly where any upgrade works are to occur for stormwater infrastructure. DEBs may be required at the base of long lengths of exposed soil if planned to remain open for a period of time.

ESC measures provided in the site-specific ESCPs appended to this report take into consideration the site's contour and catchment size to provide the most effective treatment.

Site specific plans will be required for works on a case-by-case basis. These sites are limited and any potential discharge effects will likely be mitigated with the implementation of silt fences to prevent discharge to the nearby waterways. Other considerations will be necessary should works need to occur within the watercourse.

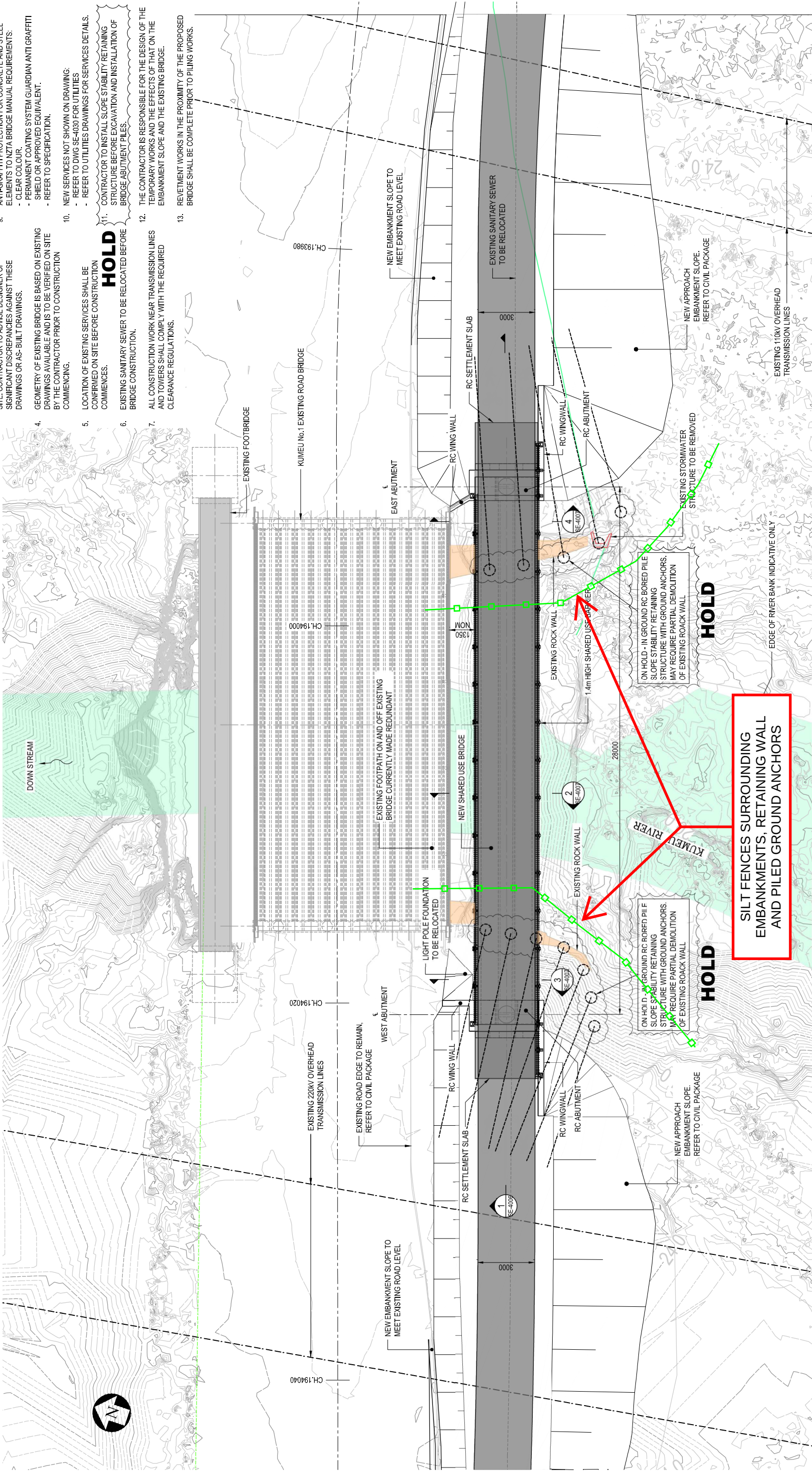
The measures outlined in this ESCP will be effective in mitigating any potential effect on the nearby receiving environment from sediment discharge. All devices detailed in this ESCP will be constructed to GD05 recommended criteria.



Appendix A – Erosion and Sediment Control Plans – Bridge Sites

NOTES

1. REFER SE-4001 TO SE-4004 FOR GENERAL NOTES.
2. REFER TO CIVIL PACKAGE FOR GEOMETRIC, SERVICES AND DRAWINGS.
3. ALL DIMENSIONS & SETTING OUT TO BE CONFIRMED ON SITE. CONTRACTOR TO ADVISE DESIGNER OF SIGNIFICANT DISCREPANCIES AGAINST THESE DRAWINGS OR AS-BUILT DRAWINGS.
4. GEOMETRY OF EXISTING BRIDGE IS BASED ON EXISTING DRAWINGS AVAILABLE AND IS TO BE VERIFIED ON SITE BY THE CONTRACTOR PRIOR TO CONSTRUCTION COMMENCING.
5. LOCATION OF EXISTING SERVICES SHALL BE CONFIRMED ON SITE BEFORE CONSTRUCTION COMMENCES.
6. EXISTING SANITARY SEWER TO BE RELOCATED BEFORE BRIDGE CONSTRUCTION.
7. ALL CONSTRUCTION WORK NEAR TRANSMISSION LINES AND TOWERS SHALL COMPLY WITH THE REQUIRED CLEARANCE REGULATIONS.
8. THE CONTRACTOR SHALL ENSURE ANY CONSTRUCTION AND EXCAVATION WORK WILL NOT ADVERSELY AFFECT THE EXISTING BRIDGE, EXISTING SERVICE FOUNDATION AND OTHER EXISTING STRUCTURES. TEMPORARY WORKS TO BE DESIGNED BY THE CONTRACTOR.
9. ANTI-GRAFFITI PROTECTION FOR CONCRETE AND STEEL ELEMENTS TO NZTA BRIDGE MANUAL REQUIREMENTS:
 - CLEAR COLOUR.
 - PERMANENT COATING SYSTEM GUARDIAN ANTI GRAFFITI SHIELD OR APPROVED EQUIVALENT.
 - REFER TO SPECIFICATION.
10. NEW SERVICES NOT SHOWN ON DRAWING:
 - REFER TO DWG SE-4030 FOR UTILITIES.
 - REFER TO UTILITIES DRAWINGS FOR SERVICES DETAILS.
11. **HOLD**
CONTRACTOR TO INSTALL SLOPE STABILITY RETAINING STRUCTURE BEFORE EXCAVATION AND INSTALLATION OF BRIDGE ABUTMENT PILES.
12. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF THE TEMPORARY WORKS AND THE EFFECTS OF THAT ON THE EMBANKMENT SLOPE AND THE EXISTING BRIDGE.
13. REVETMENT WORKS IN THE PROXIMITY OF THE PROPOSED BRIDGE SHALL BE COMPLETE PRIOR TO PILING WORKS.



EROSION AND SEDIMENT CONTROL PLAN -
STAGE 2 - KUMEU NO.1 PEDESTRIAN BRIDGE
(OVERLAIN ON DETAILED DESIGN DWG 3235084-SE-4005)

A PLAN
1:100 (A1), 1:200 (A3)

ORIGINAL DRAWING
IN COLOUR

DETAILED DESIGN
NOT FOR CONSTRUCTION

Revision										Drawing No.		Revision	
No.	By	CHK	App'd	Date	Issued For	Design	Drawn	Checked	Approved For				
D		TC	GC	26.08.22	ISSUED FOR DRAFT DETAILED DESIGN	MMORELLI	19.01.22	19.01.22	Approved For Construction*	Client:  WAKA KOTAHI NZ TRANSPORT AGENCY		Project: SH16 - SAFETY IMPROVEMENTS STAGE 2 BRIGHAM CREEK TO KUMEU	
C		TZ	DS	23.03.22	PEER REVIEW 30% DESIGN	T.ZHU	19.01.22	19.01.22					
B		TZ	DS	19.07.22	ISSUED FOR DRAFT DETAILED DESIGN								
A		PN	TC	26.03.21	PRELIMINARY DESIGN	D.SHINNICK	19.01.22	19.01.22				Discipline: STRUCTURAL ENGINEERING Drawing No. 3235084-SE-4005	
* Refer to Revision 1 for Original Signature													

NOTES

1. REFER TO DRAWINGS SE-4101 TO SE-4104 FOR GENERAL NOTES.
2. REFER TO DRAWING SERIES SE-4200 FOR BARRIER BEAM DETAILS.
3. REFER TO CIVIL PACKAGE FOR GEOMETRIC, STORMWATER AND SERVICES DRAWINGS.
4. REFER TO RETAINING WALL PACKAGE FOR RETAINING WALL DETAILS.
5. ALL DIMENSIONS & SETTING OUT TO BE CONFIRMED ON SITE. CONTRACTOR TO ADVISE DESIGNER OF SIGNIFICANT DISCREPANCIES AGAINST THESE DRAWINGS OR AS-BUILT DRAWINGS.
6. GEOMETRY OF EXISTING CULVERT SHALL BE VERIFIED ON SITE BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
7. THE CONTRACTOR SHALL LOCATE EXISTING SERVICES ON SITE PRIOR TO CONSTRUCTION.
8. EXISTING OVERHEAD LINES TO BE RELOCATED BEFORE BRIDGE CONSTRUCTION COMMENCES.
9. NEW SERVICES UNDER THE SHARED USE BRIDGE NOT SHOWN ON THIS DRAWING FOR CLARITY:
 - REFER TO DRG SE-4130 FOR SERVICE SUPPORT DETAIL.
 - REFER TO CIVIL UTILITIES DRAWINGS FOR FURTHER SERVICES APPROACH TRENCH DETAILS.
10. THE CONTRACTOR TO INSTALL SLOPE STABILITY RETAINING STRUCTURE BEFORE EXCAVATION AND BEFORE THE INSTALLATION OF BRIDGE ABUTMENT PILES OR BARRIER BEAM PILES.
11. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF THE TEMPORARY WORKS AND ITS EFFECTS ON THE EMBANKMENT SLOPE AND THE EXISTING CULVERT.
12. ANTI-GRAFFITI PROTECTION FOR CONCRETE AND STEEL ELEMENTS TO NZTA BRIDGE MANUAL REQUIREMENTS:
 - CLEAR COLOUR.
 - PERMANENT COATING SYSTEM GUARDIAN ANTI GRAFFITI SHIELD OR APPROVED EQUIVALENT.
 - REFER TO SPECIFICATION.

HOLD

RETAINING WALL ON DOWSTREAM SIDE -
RETAIN STABILISED CATCHMENT OR SILT
FENCE IF POSSIBLE

SILT FENCES OR BUNDS
SURROUNDING RETAINING
WALL AND PILED GROUND
ANCHORS, IF REQUIRED

HOLD

HOLD

EROSION AND SEDIMENT CONTROL PLAN -
STAGE 2 - BRIGHAM CREEK PEDESTRIAN BRIDGE
(OVERLAIN ON DETAILED DESIGN DWG 3235084-SE-4105)

STORMWATER OUTFALL AND APRONS TO BE
STAGED, CUT AND COVER METHODOLOGY AND
POTENTIAL DAM/DIVERT METHODOLOGY IF NEEDED

A PLAN
1:100 (A1), 1:200 (A3)

ORIGINAL DRAWING
IN COLOUR

DETAILED DESIGN
NOT FOR CONSTRUCTION

No.	Revision	By	CHK	App'd	Date
D	ISSUED FOR DRAFT DETAILED DESIGN	PN	TC	GC	26.08.22
C	PEER REVIEW 30% DESIGN	TZ	DS	GC	23.03.22
B	ISSUED FOR DRAFT DETAILED DESIGN	TZ	DS	GC	19.07.22
A	PRELIMINARY DESIGN	PN	TC	NL	26.03.21



Original Scale (A1)	Design	Drawn	Design	Drawn	Design	Drawn	Design	Drawn	Design	Drawn
1:100	T.ZHU	19.01.22	J.CHEN	19.01.22	T.ZHU	19.01.22	J.CHEN	19.01.22	T.ZHU	19.01.22
1:200	D.SHANNICK	19.01.22	D.SHANNICK	19.01.22	D.SHANNICK	19.01.22	D.SHANNICK	19.01.22	D.SHANNICK	19.01.22

* Refer to Revision 1 for Original Signatures



Project: SH16 - SAFETY IMPROVEMENTS
STAGE 2
BRIGHAM CREEK TO KUMEU

Title: BRIGHAM CREEK
SHARED USE BRIDGE
GENERAL ARRANGEMENT - PLAN

Discipline: STRUCTURAL ENGINEERING
Drawing No.: 3235084-SE-4105
Rev: D