REPORT

Tonkin+Taylor

Ohiti Road (Omāhu) Flood Protection Stopbank Works

Summary of Design for Resource Consent Purposes

Prepared for
Hawke's Bay Regional Council
Prepared by
Tonkin & Taylor Ltd
Date
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Executive Summary

This report is to be used for resource consent application only.

This report outlines the preliminary design details for the proposed Ohiti Road (Omāhu) Flood Protection Stopbank Works. This project aims to reduce flood risks to the Ohiti and Omāhu settlements by constructing new stopbanks to provide additional protection from flows from the Okawa Stream and Ngaruroro River.

The stopbank design has been based on flood modelling developed by T+T for HBRC for the Okawa stream catchment. The stopbank is designed to contain a 100-year ARI event considering a RCP8.5 2050 climate change scenario for the Okawa Stream and present day 100-year ARI flood level for the Ngaruroro River. A freeboard of 700 mm has been considered above these levels to inform the stopbank crest levels, with localised exceptions and no allowance for long term settlement of the embankment.

Stopbanks have generally been designed with a 1V:2.5H batter, with the exception of the western section of the Chesterhope Upper stopbank which incorporates a steeper 1V:1.8H batter to fit within the existing easement. Stopbanks are to be constructed from material extracted from the nearby borrow site.

In order to accommodate the stopbanks both Ohiti Road and Taihape Road need to be raised locally to accommodate the stopbanks passing below. Some property accessways also need to be raised and realigned to accommodate the proposed works.

New stormwater infrastructure inclusive of new culverts and swales have been incorporated into the design to ensure adequate drainage exists around the dwellings and accessways.

1 Introduction

Tonkin & Taylor Ltd (T+T) was engaged by Hawke's Bay Regional Council (HBRC) to undertake design of the proposed Ohiti Road (Omāhu) Flood Protection Stopbank Works. This work has been carried out in accordance with the terms and conditions within our letter of engagement dated 27 June 2023[1] and variation order (VO3) dated 19 September 2024[2].

This report is to be used for resource application only. All other users should refer to the previously issued preliminary design report[3], which includes further considerations for constructors. The aim of this report is to summarise the preliminary design aspects of new stopbanks, stormwater infrastructure including new swales and culverts, roading realignment and associated infrastructure, and borrow site at Omāhu, Hastings, Hawkes Bay. Further work is required to develop designs suitable for contractor procurement. This report is intended to provide a high-level overview of the proposed works to support the resource consent and further technical details can be found in the associated reports:

1 Contaminated land preliminary and detailed site investigation[4]
2 Ecological opportunities and constraints[5]
3 Hydraulic flood model build[6]
4 Flood effects assessment[7]
5 Geotechnical factual report[8]
6 Geotechnical interpretive report[9]
7 Stormwater assessment[10]
8 Transportation design report[11]

1.1 Project aim and objective

T+T has been supporting HBRC with a variety of activities since Cyclone Gabrielle in February 2023. Part of this work has involved T+T undertaking a review of potential flood mitigation options for land previously categorised as 2C near the Omāhu area[12]. During Cyclone Gabrielle, out of channel flows from the Okawa Stream flooded the Omāhu and Ohiti Rd settlements. Further background, including a summary of the flood mechanisms are provided in our 2024 concept design report[13]. Figure 1.1

[1] Tonkin & Taylor Ltd (27 June 2023). Letter of Engagement. HBRC Land Categorisation - Proposal for technical support for mitigation options assessment. T+T Ref. 1017353.2301.
[2] Tonkin & Taylor Ltd (September 2021). Variation Order (V03) - HBRC Ohiti Road Stopbank – Variation Order 3- Design Scope. T+T ref: 1017353.2101.
[3] Tonkin & Taylor Ltd (24 July 2025). Ohiti Road (Omahu) Flood Protection Stopbank Works, Preliminary Design Report, T+T Job No: 1017353.2402.
[4] Tonkin & Taylor Ltd (July 2025). Ohiti Road Stopbanks, Preliminary and detailed site investigations, T+T Job No: 1017353.2402.
[5] Tonkin & Taylor Ltd (May 2025). Ecological Opportunities and Constraints Assessment, T+T Job No: 1017353.2402
[6] Tonkin & Taylor Ltd (July 2024). Okawa Stream Hydraulic Model Build, T+T Job No: 1017353.2402
[7] Tonkin & Taylor Ltd (July 2025). Consequential Flood Effects of the Omāhu Stopbanks, T+T Job No: 1017353.2402
[8] Tonkin & Taylor Ltd (June 2025). Ohiti and Taihape Stopbank, Factual Report, T+T Job No: 1017353.2402
[9] Tonkin & Taylor Ltd (July 2025). Ohiti Road (Omahu) Flood Protection Stopbank Works - Geotechnical Interpretive Report, T+T Job No: 1017353.2402
[10] Tonkin & Taylor Ltd (July 2025). 18/20 Ohiti Road, Flood Protection Works Drainage mitigation measures, T+T Job No: 1017353.2402
[11] Tonkin & Taylor Ltd (July 2025). Ohiti and Taihape Roads Stopbank, Preliminary Transport Design Report, T+T Job No: 1017353.2402
[12] HBRC Land Categorisation - Proposal for technical support for mitigation options assessment, 27 June 2023, T+T Job No: 1017353.2301.
[13] Tonkin & Taylor Ltd (26 January 2024). Omāhu Stopbank Concept Design Review, T+T Job No: 1017353.2301.

illustrates the flood water observation extents that were mapped by HBRC following the February 2023 Cyclone Gabrielle event[14].

Figure 1.1: Hawke's Bay flood observation extents for the February 2023 Cyclone Gabrielle event, as shown on the Hawke's Bay Regional Council website[14].

The project's aim is to provide 100-year Average Recurrence Interval (ARI) flood protection to the properties south of Taihape Road and within the Ohiti and Omāhu areas, as identified in Figure 2.2 below. This assessment has been completed considering a 2050 Representative Concentration Pathway (RCP) 8.5 climate change scenario for the Okawa Stream, and concurrent present day 100-year ARI for the Ngaruroro River (3,925 m^3/s at the Ngaruroro Fernhill flow recorder site), along with a 700 mm freeboard to inform the stopbank preliminary design. However, we understand that HBRC may propose some amendments to these, any changes will be reflected in the detailed design package once confirmed. This will move the community from provisional Category 2C – which demands community-level interventions for managing potential severe weather risks – to Category 1. Further details on the Land Categorisation process have been defined by multiple reports by HBRC and Pattle Delamore Partners (PDP).

The 2C portion of land has an area of 19 ha and includes the Ohiti Road subdivision, as shown below in Figure 2.1 and can be viewed in more detail on the Hastings District Council land categorisation maps[15]. Another smaller portion of Omāhu (single property north of Taihape Road (222 Taihape Road)) falls under Category 3 and sits outside of the proposed works. As such, the proposed mitigation measures will not address the future flood risks at this property.

[14] Hawke's Bay Regional Council, website: https://www.hbrc.govt.nz/our-council/cyclone-gabrielle-response/cyclone-gabrielle-flooding/

[15] https://www.hastingsdc.govt.nz/assets/Document-Library/Cyclone-Land-Categorisation-Hastings-and-Napier/Omahu-6-Nov-2023-1.pdf

2 Site location and description

Ohiti and Omāhu areas are located to the northwest of Hastings on the north (left) bank of the Ngaruroro River. The Ohiti settlement has been developed on a flat terrace located south of both Taihape Road and the Okawa Stream. The Omāhu settlement has been developed either side of Taihape Road and north of Okawa Stream. Most dwellings are located on a flat terrace feature, with a few properties located further north within the adjacent hills.

The Okawa stream headwaters are north of the subject site near Okawa homestead, before running south, crossing over Taihape Road twice upstream of the site. The Okawa stream has an overflow channel into Runanga Lake (northwest of the 2C area) before its confluence with the Ngaruroro River, southeast of both areas. The Ohiti and Omāhu areas are connected via the Taihape Road Bridge. The Okawa stream is also referred to as the Ohiwa stream in some historical information, although HBRC maps refer to the stream as the Okawa Stream. In this report it is referred to as Okawa stream, except where historical information is being directly quoted. Figure 2.1 below illustrates key water features along with the Okawa Stream flow path.

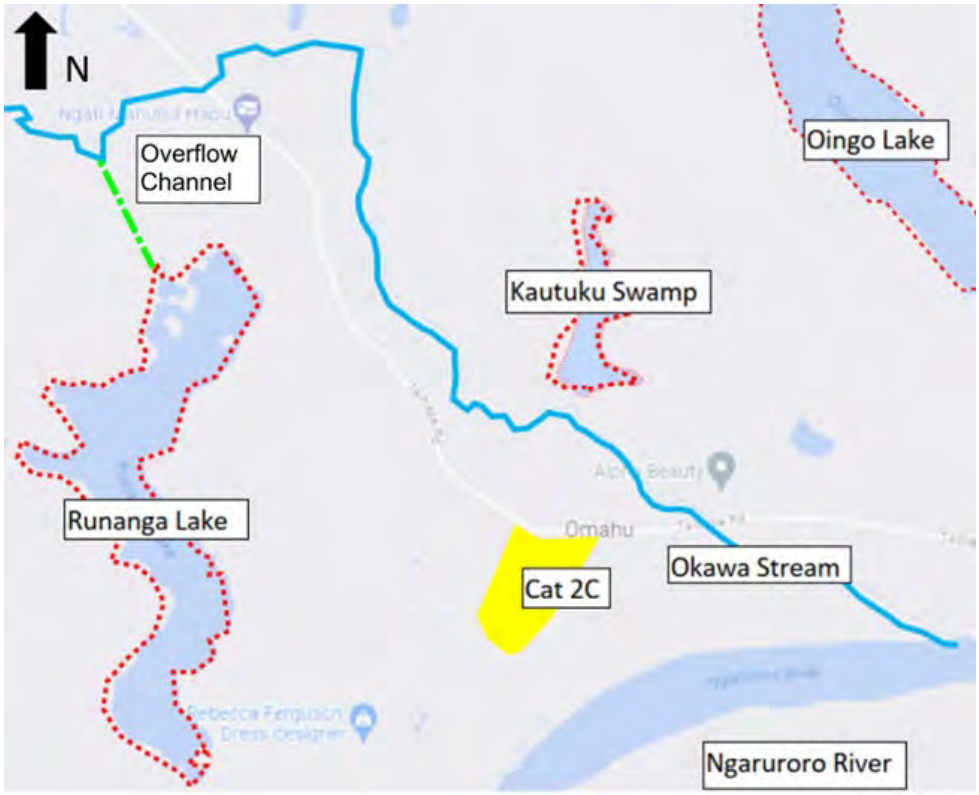


Figure 2.1: Okawa Stream flow path and nearby water bodies.

The Ngaruroro River flows west to east, south of both the Ohiti and Omāhu areas. The southern boundary of the Ohiti settlement sits behind a natural terrace feature that sits above the river, and an existing stopbank runs from Taihape Road south of the Omāhu settlement and along the banks of the Ngaruroro River further east.

A plan of the affected Ohiti and Omāhu areas with the key features marked out can be seen below in Figure 2.2 (refer also preliminary design drawings included in Appendix A).

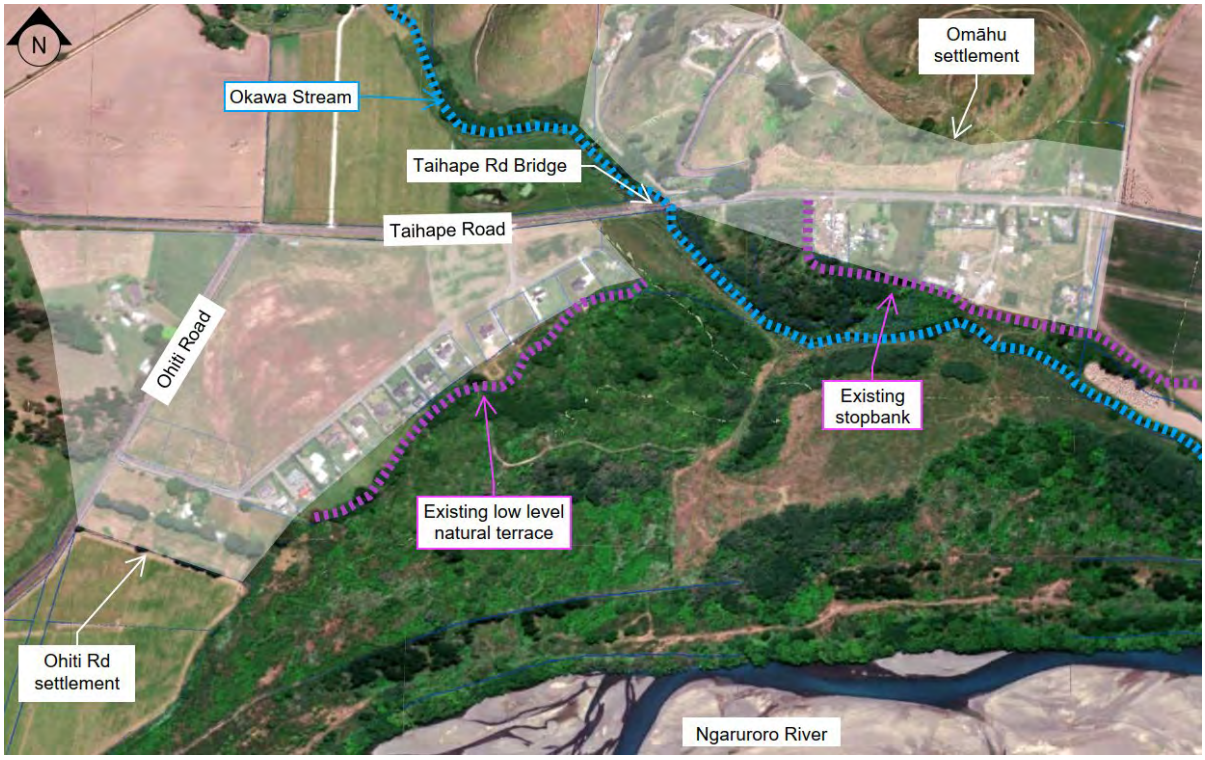


Figure 2.2: Ohiti and Omāhu areas along with key features.

2.1 Site history and background

The Ohiti and Omāhu areas have experienced many historical flooding events, with some notable recent events listed from oldest to most recent below[16].

- April 1897 North Island flooding - Flooding at Omāhu caused property damage, houses to be washed away, damage to crops and fences and three men drowned at Ohiti.
- June 1917 Hawke's Bay flooding - There was major flooding in Omāhu resulting in serious stock losses.
- March 1924 Hawke's Bay flooding - Omāhu flooded when the Ngaruroro River overflowed.
- April 1938 Gisborne and Hawkes Bay Flooding-Heavy rainfall reported but no historical notes of flooding in the catchment.
- April 1968 New Zealand ex-tropical Cyclone Giselle - Surface flooding occurred for some days in the Omāhu area.
- September 1988 North Island Cyclone Bola - There was a lot of surface flooding and scouring of the banks of the Okawa.

Stopbank schemes have been present on the Ngaruroro since the early 1900s. Much of the northwestern side of the Chesterhope Upper stopbanks were constructed in the 1960s, with some downstream areas, towards Omāhu township and SH50 being upgraded in the late 1980s and 1990s following the 1987 scheme review. Based on our understanding, there were no recent upgrade works to this section as part of the 1990s refurbishment programme.

[16] Niwa Historic Weather Events - https://niwa.co.nz/climate/our-services/obtaining-climate-data-from-niwa

2.1.1 Flood Levels during Cyclone Gabrielle

In total, 153 houses were affected by flooding during Cyclone Gabrielle in the wider Ohiti and Omāhu areas[17]. Some of these include houses damaged east of the subject site, due to stopbank breaches by the SH50 bridge at Fernhill. From discussions with community, it is understood the water levels on the Okawa stream during Cyclone Gabrielle were raised to just over deck level of Taihape Road bridge, which sits at approximately 29 metres RL. The houses affected by flooding shown in the red 2C box also sit at 29 metres RL. Houses located at 29.5 metres RL and higher were unaffected, as shown in Figure 2.3 below. We understand that properties within the Omāhu site area were impacted by floodwaters breaking out from Okawa Stream and flowing east, meeting the flows from the breach at SH50 bridge around Omāhu School.

Figure 2.3: Contour information based on 2020 LINZ LiDAR.

3 Design inputs and assumptions

3.1 Survey data

HBRC provided T+T with drone survey data collected for the Ohiti Road (Omāhu) Flood Protection Stopbank Works by 'The Surveying Company' in February 2024. All data provided to T+T was converted to the survey datum NZTM2000 for horizontal and NZVD2016 for vertical. These datums have been used on all drawings and models for the stopbank and stream design.

Various other infill survey have been completed by Civil Services (HB) Ltd on behalf of HBRC and provided to T+T for particular elements (culverts and stream banks etc).

3.2 Hydrology

T+T's hydrology assessment is summarised in the 2024 hydraulic model build report[6].

3.3 Existing infrastructure

Chorus (telecommunications) and Unison (electricity) have been provided draft plans showing where the proposed works may interfere with their assets. Chorus have indicated that their underground

[17]NZ Herald, 10 September 2023, Omāhu Marae to host temporary homes for cyclone-hit whānau, https://www.nzherald.co.nz/hawkes-bay-today/news/omahu-marae-to-host-temporary-homes-for-cyclone-hit-whanau/7ENDM6JIGJA7JOHCSZQVJTJBKY/#google_vignette.

fibre may need to be rerouted along the road raising of Taihape Road. Unison is yet to provide feedback. Integration of the utilities into the embankment and road design will be made at the detailed design stage. The existing utilities are shown on drawings 1017353.2402-TT-811 and 821.

The locations of private assets are not publicly available and are generally not expected to be encountered within the proposed works. This will be further reviewed at both the detailed design and pre-construction phases.

We understand that Hastings District Council will review roading requirements/Engineering Approvals as part of the consenting process. Provision will be required to ensure that road traffic can be accommodated during construction. This may require a temporary bypass (not shown on the attached drawings).

3.4 Scope of work

The scope of work can be categorised under the following sections:

3.4.1 Stopbank Design – overtopping considerations

Flood modelling has been undertaken to inform the design crest level of the stopbank. This has been undertaken by T+T using the Okawa stream model. The stopbank crest sits at a 700 mm freeboard level above the modelled 100-year ARI flood level considering a climate change RCP8.5 2050 scenario for the Okawa Stream and present day 100-year ARI for the Ngaruroro River. Final freeboard levels will be confirmed during detailed design but will not exceed these levels. It is anticipated that crest levels and freeboard will stay the same or be reduced at detailed design.

3.4.2 Stopbank Design – geotechnical aspects

The scope of the design work has included geotechnical analyses of liquefaction, stability and seepage under 100-year ARI design considerations, broadly consistent with HBRC's IRG (prior to Cyclone Gabrielle) project technical briefs (in lieu of a specific technical brief from the client).

Geometric design of the stopbank has been completed including earthworks levels, grades and cut/fill requirements.

3.4.3 Okawa Streamworks

HBRC commissioned T+T to complete the design of rock armour works under the Taihape Rd bridge in late 2024. The works were completed as a permitted activity under HBRC Rule 70. The works were completed in early to mid-2025, including rock revetments, cut to waste earthworks and vegetation clearance. Additionally, further works have been competed upstream of the Taihape Rd bridge, on the Okawa stream, including channel clearance, willow trimming, rock revetments and soft landscaping.

As these works are substantially complete at the time of writing, we have not referred to these any further. The hydraulic model created for the Ohiti Rd project considers the post streamworks channel geometry and roughness.

3.5 Consent framework

Regulatory relief in the form of Orders in Council (OiC) have been sought for the Ohiti Road (Omāhu) Flood Protection Stopbank Works Project and other flood mitigation projects in the land categorisation programme. These provide a controlled activity status for the works. The project currently spans land both in and outside of areas considered within the OiC. As such the project will be consented under a bespoke framework considering both the OiC (including agreed conditions) and the RMA. Further discussion on how these conditions are met is discussed further at Section 9. Stradegy Planning Limited (Stradegy) are preparing the consenting applications.

4 Stopbank preliminary design

T+T has previously issued an Omāhu Stopbank Concept Design Review report[13] and Okawa Stream Hydraulic Model Build report[6], which provide background and context to the current design solution. This report builds on the information presented in these reports, and as such they should be referenced for further background information.

The preliminary proposed Ohiti Road (Omāhu) Flood Protection Stopbank Works considered in this report are illustrated in Figure 4.1. The key design aspects for the development are summarised below, with the previously referenced technical reports. Works include:

- Stopbanking around Ohiti Rd to provide flood protection to the community in the Category 2 area (up to a 100-year ARI RCP8.5 2050 climate change scenario considering a 700 mm freeboard). As noted above final freeboard levels will be confirmed during detailed design but will not exceed these levels.
- Continuation of the stopbanks around the southern side of the properties to provide protection from the Ngaruroro River (up to a 100-year ARI level, with no climate change allowance and 700 mm freeboard).
- Raising of Ohiti Rd over the stopbank.
- Construction of a culvert and swale at the southwestern end of the site where overland flow paths will be captured and directed east to the Ngaruroro River.
- Various stormwater works, to facilitate local drainage.
- Rehabilitation and raising of the northern end of the Chesterhope Upper stopbank to achieve sufficient crest levels to mitigate the effects of the Ohiti Rd stopbanks (up to a 100-year ARI RCP8.5 2050 climate change scenario considering a 700 mm freeboard).
- Raising Taihape Rd over the extended and raised stopbanks.

The set of preliminary design drawings are presented within Appendix A.

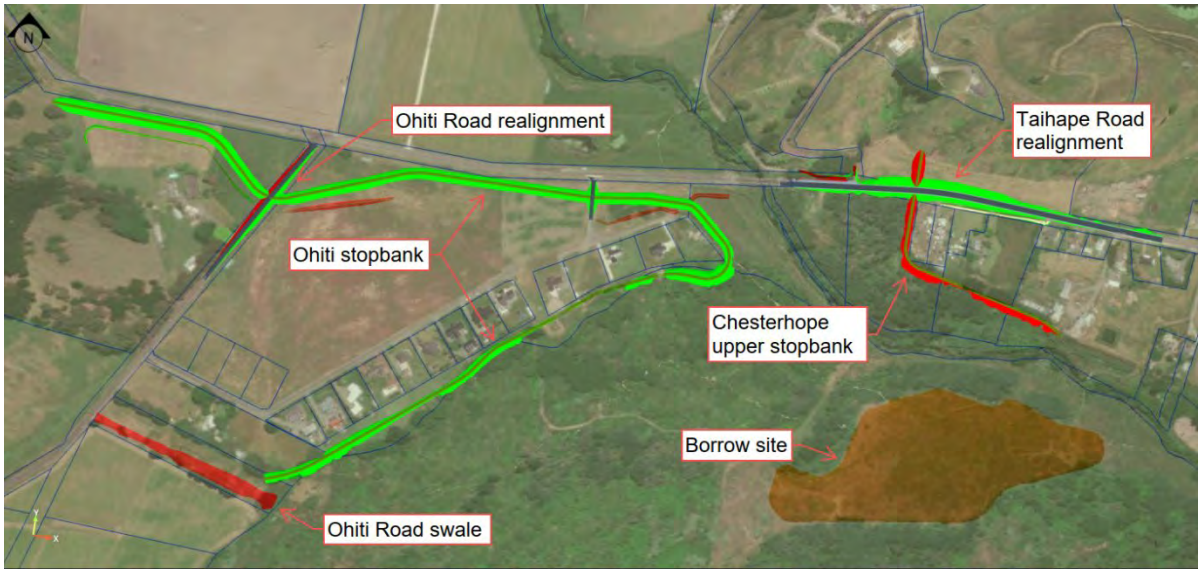


Figure 4.1: Preliminary design indicating key features of the Ohiti Road (Omāhu) Flood Protection Stopbank Works.

4.1 Flood model

The hydraulic model[6] and consequential flood effects[7] of the flood protection works have been presented within standalone reports, and should be referred to for the complete information on the flood model and associated effects considered within the preliminary design.

In summary, the project currently adopts a 100-year ARI RCP8.5 2050 climate change scenario for the flood modelling of Okawa Stream and present day 100-year ARI flood levels for the Ngaruroro River. A sensitivity assessment considering an estimated Cyclone Gabrielle event was also undertaken. A freeboard of 700 mm has been considered on both models to inform the stopbank crest levels.

Largely, the model remains unchanged from the original model build as presented in the model build report[6] except for changes following an external peer review and with newly available information being incorporated.

Flood hazard assessments were undertaken using the Okawa Stream hydraulic model, for several model scenarios, both with and without the proposed stopbanks. The model indications that water levels increase by up to 600 mm upstream of the stopbanks. Flood levels decrease within the subdivision at Ohiti Road and east along Taihape Road in both the 100-year ARI RCP8.5 2050 and estimated Cyclone Gabrielle event (tailwater level set by the estimated present day 100-year ARI flood levels for the Ngaruroro River).

The model indicates that the number of building footprints subject to flood hazard reduces significantly in the 100-year ARI with the RCP8.5 2050 climate event (tailwater level set by the estimated present day 100-year ARI flood levels for the Ngaruroro River). In the estimated Cyclone Gabrielle event, the reduction in the number of building footprints subject to hazard diminishes as the proposed stopbank is overtopped, resulting in similar flooding to the base case scenario.

4.2 Design functional requirements summary

At the direction of HBRC, the design includes 1V:2.5H batter slopes along the length of the proposed stopbanks, with the exception of Ch 0 to approximately Ch 140 along the Chesterhope Upper Stopbank, where due to a narrow easement allowance the batter is steepened to 1V:1.8H to limit encroachment on the surrounding private properties. The steeper batter section will need to additional reinforcement, such as DuraSlope Reinforced Soil System by Cirtex, to provide sufficient stability.

A crest width of 4 m has generally been considered along all of the stopbanks, again with the exception of Ch 0-140 of the Chesterhope Upper Stopbank where a reduced width of 2 m has been considered in order to meet the space constraints to fit within the existing easement. HBRC will need to consider maintenance requirements in this section, as it is unlikely to allow vehicle movement along this short length.

Proposed design levels suggest in some areas where stopbanks are already existing, that a nominal adjustment is required in order to meet new crest level requirements. Actual requirements will be refined at detailed design in order to identify whether additional fill will be required or if the current form is sufficient. Where the existing stopbank condition is insufficient a nominal depth may be proposed to be reconstructed to provide further resilience. The stopbank form will be optimised and clarified at detailed design.

During detailed design, the stopbank footprint will be reviewed for local features, such as boundary fencing, and set out points confirmed prior to construction works. Further detailing of the reinforcement will also be required. Permanent access points and maintenance requirements should be confirmed at detailed design.

5 Transport

A transport design report[11] has been prepared to address the transportation changes required to enable the stopbank works, specifically localised geometric adjustments of the existing alignments of Ohiti and Taihape Roads where the stopbank crosses their path.

The roading design includes the following key elements:

1 Ohiti Road vertical geometry adjustment over one section of the stopbank;
2 Taihape Road vertical geometry adjustment over one section of the stopbank;
3 Taihape Road Horizontal geometry curve realignment easing;
4 A separate access road to a number of properties along the southern side of Taihape Road;
5 Reconstruction of joint rural property access north of Taihape Road;
6 Accommodation for a known school bus collect / drop-off area; and
7 Pavement design.

The roading design was undertaken ensuring the design provided a safe facility for all road users and minimising the impact on affected landowners. The transport design report should be referred to for the complete assessment and analysis.

It is of note that the current design for access to the eastern dwellings of the Ohiti settlement retains the existing location and layout. We understand this is preferred by the residents as it retains the existing access point and only involves minor changes to the driveway crossing. We understand that driveway gradients may be undesirable from a headlight glare perspective, but we understand that this is acceptable by the residents and that the landscape architect will position planting to reduce impacts.

6 Geotechnical

Geotechnical investigations were carried out at the site over 2024 and 2025, the results of which are presented in the Ohiti and Taihape Stopbank Factual Report[8] which was initially issued in early 2024 and subsequently updated following additional investigations, with the latest issue dated June 2025. This report should be referred to for the factual presentation of the site investigation information.

This information has been used as the basis of the Ohiti Road (Omahu) Flood Protection Stopbank Works - Geotechnical Interpretive Report[9] which presents the geotechnical design information for the proposed works. This report should be referred to for the detailed geotechnical assessment and full considerations, however a summary of the report is provided below.

In summary, the foundation conditions generally consist of Holocene alluvial sediments, and two distinct geological zones have been identified across the project area:

- Zone one: Thick layer of Holocene alluvial sands, silts and clays overlying gravel and sand mixtures, with the Petane (limestone) Formation located beneath. This is generally located below the Ohiti stopbank, however, some isolated areas of Zone two soils also exist here as discussed below.
- Zone two: Thin layer of Holocene alluvial sands and silts overlying a thick sandy gravel layer. This is located below the Chesterhope Upper stopbank, and in two isolated locations to the east and southwest of the Ohiti stopbank. The geotechnical interpretive report should be referred to for further detail.

The stopbank performance was assessed in line with the required conditions specified by HBRC. The analyses indicates that:

- Stopbanks should be constructed from Unit 1A (silty sand) materials sourced from the borrow pit.
- The use of Unit 1B (gravel materials) is generally not suitable as stopbank fill in the current stopbank form. The use of this unit will be explored further at the detailed design stage if needed.
- Under static conditions the stopbank slopes generally have an adequate factor of safety.
- Insignificant to moderate liquefaction-induced damage is expected under ILS and ULS seismic loading. Liquefaction and lateral spreading are within HBRC design tolerances, and no ground improvement is proposed. No damage is expected under SLS shaking.
- Static consolidation settlements under a typical embankment load could be in the order of 0 to 150 mm over a 50 year time period. We expect that most of this would occur immediately following construction (i.e. within a matter of several days to weeks) but long-term settlement of up to 80 mm could occur over time. Static settlement is expected primarily in Zone 1, where softer soil layers (Units 2B and 2C) are present. The effect of settlement on the stopbank crest levels during and post construction will be considered further at detailed design.
- Between Chainage 80 – 140 at the Chesterhope Upper stopbank, batter slopes steepen to approximately 1V:1.8H. To mitigate erosion risks and promote vegetative growth on these steepened slopes, the use of reinforcement matting is recommended.

6.1 Borrow materials

The proposed stopbank fill material is to be sourced from the onsite borrow pit located approximately 400 m east of the proposed Ohiti Stopbank and 250 m south of the Chesterhope Upper stopbank and as indicated on Figure 4.1. The borrow material consists predominantly of silt and sand mixtures overlying sandy gravels with cobbles.

The borrow pit will be prepared by:

1 Stripping the topsoil and storing appropriately onsite;
2 Constructing a bund around the borrow pit extents to control runoff (other runoff measures may also be required, and management throughout the operations will need to be considered);
3 Material to be cut from the borrow area in sections to minimise the exposed soil;
4 Material to be carted to stopbanks for use in construction;
5 Once the full depth of soil extraction has been completed the contractor to move to next section. At completion of each section area to be retopsoiled. At completion of works, bunds to be constructed to encourage siltation and backfilling of pit.

6.2 Geotechnical considerations for construction

The following will need to be considered during the detailed design and construction phase of the project, with respect to geotechnical matters:

1 Borrow material extraction will need to be monitored to ensure materials are consistent with those assumed in design.
2 Foundation materials to be reviewed along the alignment to ensure they are consistent with that assumed in the design. During the detailed design process, the final extent of the undercutting works will need to be confirmed.
3 Generally, it is not expected that groundwater will be encountered during the stopbank foundation preparation. However, subject to weather conditions at the time area of higher groundwater may be encountered, during which time pumping and drainage measures may be necessary.
4 An earthworks specification will be prepared for the project, outlining the compaction requirements and treatment of foundation soils and stopbank fill.
5 Geotechnical oversight of foundation treatment and fill compaction will be required throughout the earthworks process.
6 Generally, the proposed fill and foundation soils are compatible. However, we recommend further assessment of the filter compatibility between some of the fill/foundation soil combinations are refined at detailed design.

7 Culverts, swales and stormwater management

The construction of the stopbanks will interrupt the existing stormwater flows across the site in various locations. A selection of new culverts and swales are proposed to manage stormwater flows inline with HBRC requirements. The flood protection works drainage mitigation measures report[10] outlines the effected areas and proposed solutions to mitigate any effects.

In summary, current stormwater runoff from a catchment west of 18/20 Ohiti Road historically flows north of Taihape Road to 222 Taihape Road and into the Okawa stream. The proposed stopbank south of Taihape Road will block this flow path and as a result increase the flood risk to this property. The flood protection works drainage mitigation measures report presents an alternative drainage solution to convey stormwater through a series of culverts and swales east of the property and into the Okawa stream.

South of the Ohiti settlement, stormwater flows will be channelled towards a new scruffy dome within the western road reserve of Ohiti Road and directed to a new swale that runs west to east and designed to intercept any other flows that are flowing towards the Ohiti settlement. The swale conveys intercepted water to the banks of the Ngaruroro River.

The culvert located below the existing driveway at 170 Taihape Road will be upgraded to provide drainage to the area between the shared driveway and the new stopbank, north of Taihape Rd. In this location, the ground levels are very flat and further survey will be required to establish ground levels east of the driveway. The preference from HBRC is to construct a culvert to outlet to the Okawa to the east of the site. However, this may require outletting through the recently completed rock revetment works. An alternative would be to run the culvert under Taihape Rd to the southwest, however, this will require confirmation with the landowners and potentially an easement and localised swale/shaping works. This will be confirmed at detailed design.

The proposed drainage works are illustrated in Figure 7.1, and the drainage mitigation measures report should be referred to for further details.

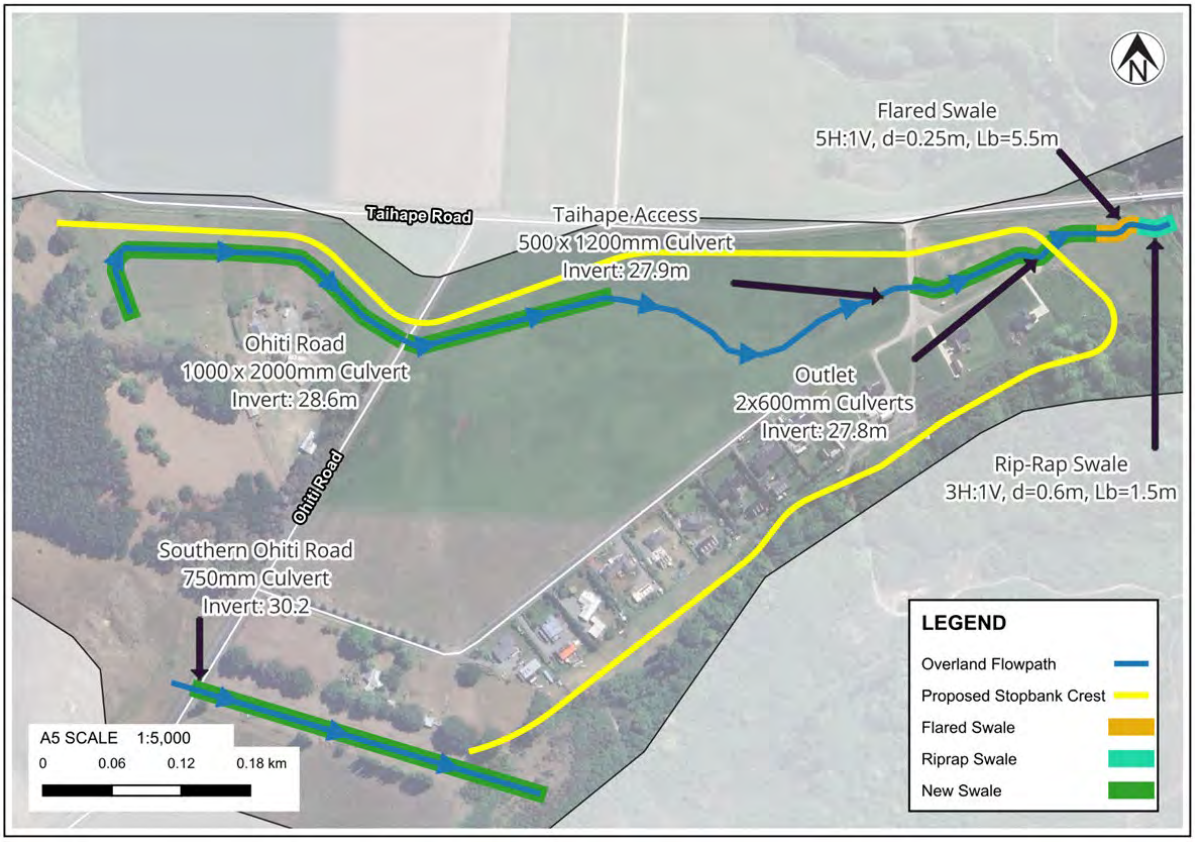


Figure 7.1: Approximate location of the Ohiti and Omāhu stopbanks, culverts and swales.

8 Erosion and sediment controls

Erosion and sediment controls will need to be confirmed by the contractor during the pre-construction process prior to works commencing. The contractor should consider:

1 Silt fencing around working areas and progressive stabilisation of stopbank faces and the borrow pit with topsoil and grass. It may be appropriate to limit the open areas of earthworks to limit the extent of exposed faces.

2 Erosion control devices should be considered where large open earthworks faces are proposed. This may include decanting earth bunds, clean and dirty water diversion bunds or sediment ponds.

3 Topsoil should be 'worked into' the stopbank face and track rolled with a bulldozer or similar. HBRC have a nominated subcontractor and grass mix for approved use on stopbank sites.

4 Dust suppression will need to be considered, due to the fine sand and silt soils within the river berms. Water carts, sprinkler systems or similar should be considered by the Contractor. However, in some cases it may be appropriate to cover exposed faces with topsoil or aggregate.

5 Haul roads should be stabilised with gravel to minimise dust and sediment generation.

6 Accessways to and from local roads should be managed to mitigate soil being transported onto roadways.

7 Consideration for ford or crossing details, if vehicles intend to haul from the borrow pit and cross the stream to the Chesterhope upper stopbanks.

Stormwater management during the works and management around the water bore at 170 Taihape Road (and any others).

9 Consenting

Included in Appendix B is a table describing the standardised OIC conditions of consent and the corresponding design intent proposed to meet the consent conditions.

10 Conclusions

The Ohiti Road (Omāhu) Flood Protection Stopbank Works aims to significantly reduce flood risks to the Ohiti and Omāhu settlements by constructing new stopbanks to provide additional protection from flows from the Okawa Stream and Ngaruroro River.

The stopbank design has been based on flood modelling developed by T+T for HBRC. The stopbank is designed to contain a 100-year ARI event considering a RCP8.5 2050 climate change scenario for the Okawa Stream and present day 100-year ARI flood level for the Ngaruroro River. A freeboard of 700 mm has been considered above these levels to inform the stopbank crest levels. We do understand that HBRC are reevaluating the design case and any updates will be captured within the detailed design stage of the project.

Stopbanks have generally been designed with 1V:2.5H batter slopes, with the exception of the northwestern end of the Chesterhope Upper stopbank which incorporates a steeper 1V:1.8H batter to fit within the existing easement. Stopbanks are to be constructed from material extracted from the nearby borrow site, with appropriate conditioning and with materials (gravels or silty sands) selected based on grain size and design requirements.

In order to accommodate the stopbanks both Ohiti Road and Taihape Road need to be raised locally to accommodate the stopbanks passing below. Property accessways also need to be raised and realigned to accommodate the proposed works.

New stormwater infrastructure inclusive of new culverts and swales have been incorporated into the design to ensure adequate drainage exists around the settlements and accessways.

11 Applicability

This report has been prepared for the exclusive use of our client Hawke's Bay Regional Council, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

Tonkin & Taylor Ltd
Environmental and Engineering Consultants

Report prepared by:

.....

Regan King
Senior Geotechnical Engineer

Authorised for Tonkin & Taylor Ltd by:

.....

Tim Morris
Project Director

Report reviewed by:

.....

Jamie Yule
Project Manager

\\ttgroup.local\corporate\wellington\tt projects\1017353\1017353.2402\issueddocuments\20250903 summary of design for resource consent purposes\1017353.2402-rpt-gg-orfps-009 summary of design for resource consent purposes.docx

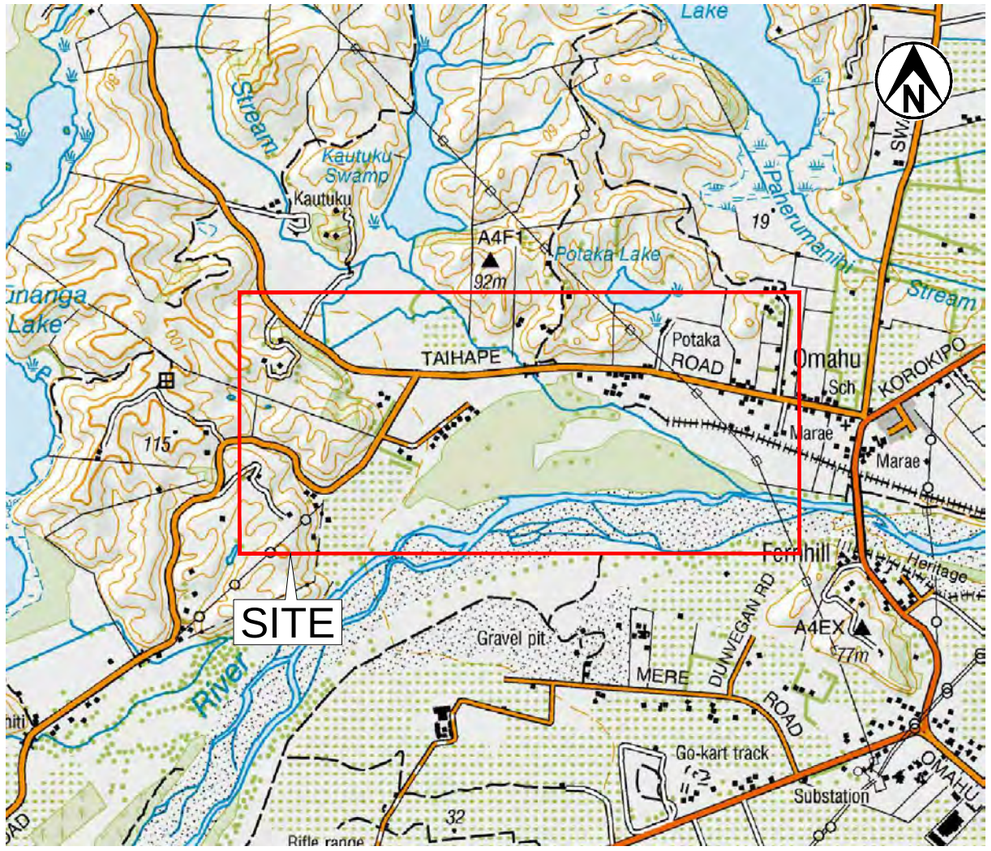
Appendix A Preliminary Design Drawings

C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-001.dwg 2025-Aug-22 4:28:06 pm Plotted By: MLE

DRAWING LIST

		DRAWING NUMBER	REV	TITLE
		GENERAL		
1	ü	1017353.2402-TT-001	4	DRAWING LIST AND LOCATION PLAN
		PLAN		
2	ü	1017353.2402-TT-010	4	OVERALL PLAN
3	ü	1017353.2402-TT-011	4	OHITI ROAD AND STOPBANK - LAYOUT PLAN
4	ü	1017353.2402-TT-012	4	OHITI ROAD AND STOPBANK - CUT AND FILL
5	ü	1017353.2402-TT-013	2	OHITI ROAD AND STOPBANK - DESIGN CONTOURS
6	ü	1017353.2402-TT-021	4	TAIHAPE ROAD AND STOPBANK - LAYOUT PLAN
7	ü	1017353.2402-TT-022	4	TAIHAPE ROAD AND STOPBANK - CUT AND FILL
8	ü	1017353.2402-TT-023	2	TAIHAPE ROAD AND STOPBANK - DESIGN CONTOURS
9	ü	1017353.2402-TT-027	2	BORROW AREA SITE PLAN
		ROADING SECTIONS		
10	ü	1017353.2402-TT-031	4	OHITI ROAD ALIGNMENT LONG SECTION
11	ü	1017353.2402-TT-033	4	OHITI ROAD CROSS SECTIONS - SHEET 1
12	ü	1017353.2402-TT-034	4	OHITI ROAD CROSS SECTIONS - SHEET 2
13	ü	1017353.2402-TT-041	4	TAIHAPE ROAD ALIGNMENT LONG SECTION - SHEET 1
14	ü	1017353.2402-TT-042	4	TAIHAPE ROAD ALIGNMENT LONG SECTION - SHEET 2
15	ü	1017353.2402-TT-043	4	TAIHAPE ROAD CROSS SECTION - SHEET 1
16	ü	1017353.2402-TT-044	4	TAIHAPE ROAD CROSS SECTION - SHEET 2
17	ü	1017353.2402-TT-045	4	TAIHAPE ROAD CROSS SECTION - SHEET 3
18	ü	1017353.2402-TT-046	4	TAIHAPE ROAD CROSS SECTION - SHEET 4
19	ü	1017353.2402-TT-048	2	ACCESS ROAD SECTION
20	ü	1017353.2402-TT-051	4	TYPICAL SECTIONS - SHEET 1
21	ü	1017353.2402-TT-052	4	TYPICAL SECTIONS - SHEET 2
		STOPBANK SECTIONS		
22	ü	1017353.2402-TT-071	4	OHITI STOPBANK LONG SECTION - SHEET 1
23	ü	1017353.2402-TT-072	4	OHITI STOPBANK LONG SECTION - SHEET 2
24	ü	1017353.2402-TT-073	4	OHITI STOPBANK LONG SECTION - SHEET 3
25	ü	1017353.2402-TT-074	4	OHITI STOPBANK CROSS SECTION - SHEET 1
26	ü	1017353.2402-TT-075	4	OHITI STOPBANK CROSS SECTION - SHEET 2
27	ü	1017353.2402-TT-076	4	OHITI STOPBANK CROSS SECTION - SHEET 3
28	ü	1017353.2402-TT-077	4	OHITI STOPBANK CROSS SECTION - SHEET 4
29	ü	1017353.2402-TT-078	4	OHITI STOPBANK CROSS SECTION - SHEET 5
30	ü	1017353.2402-TT-081	4	CHESTERHOPE UPPER STOPBANK LONG SECTION
31	ü	1017353.2402-TT-082	4	CHESTERHOPE UPPER STOPBANK CROSS SECTION - SHEET 1
32	ü	1017353.2402-TT-083	4	CHESTERHOPE UPPER STOPBANK CROSS SECTION - SHEET 2
33	ü	1017353.2402-TT-091	2	TYPICAL CROSS SECTIONS - CHESTERHOPE
34	ü	1017353.2402-TT-092	2	TYPICAL SECTION - OHITI

		DRAWING NUMBER	REV	TITLE
		ROADING AND TRANSPORT		
35	ü	1017353.2402-TT-541	2	SIGNAGE AND ROAD MARKINGS PLAN - SHEET 1
36	ü	1017353.2402-TT-542	2	SIGNAGE AND ROAD MARKINGS PLAN - SHEET 2
37	ü	1017353.2402-TT-543	2	SIGNAGE AND ROAD MARKINGS PLAN - SHEET 3
38	ü	1017353.2402-TT-551	4	TAIHAPE ROAD - VEHICLE TRACKING PLAN
39	ü	1017353.2402-TT-571	4	TAIHAPE ROAD - SIGHT DISTANCE PLAN
		STORMWATER		
40	ü	1017353.2402-TT-611	2	CULVERT LAYOUT PLAN - OHITI ROAD
41	ü	1017353.2402-TT-621	2	CULVERT LAYOUT PLAN - TAIHAPE ROAD
42	ü	1017353.2402-TT-631	2	CULVERT LAYOUT PLAN - SMITH PROPERTY
43	ü	1017353.2402-TT-651	2	CULVERT - LONG SECTIONS
44	ü	1017353.2402-TT-661	2	SMITH PROPERTY CULVERT / SWALE LONG SECTION
45	ü	1017353.2402-TT-671	2	TAIHAPE ROAD ACCESS TRACK SECTION
		UTILITIES		
46	ü	1017353.2402-TT-811	2	UTILITIES PLAN - OHITI ROAD
47	ü	1017353.2402-TT-821	2	UTILITIES PLAN - TAIHAPE ROAD
	ü	DENOTES DRAWINGS IN THIS ISSUE: 19/08/2025		



NOTE: TOPOMAP SOURCED LINZ DATA SERVICE, <https://data.linz.govt.nz/layer/50767-nz-topo50-maps/ >, LICENSED BY LINZ FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL

LOCALITY PLAN

SCALE (A1) N.T.S.
SCALE (A3) N.T.S.

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25
2	PRELIMINARY DRAFT	ALPO	TIBR	18.03.25
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	TIBR	Jan.25	DRAWING STATUS
DRAWN	ALPO	Jan.25	PRELIMINARY
DESIGN CHECKED	JWY	21.08.25	PROJECT PHASE
DRAWING CHECKED	WYHU	21.08.25	PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED

APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

TITLE GENERAL
DRAWING LIST AND LOCATION PLAN

SCALE (A1) N.T.S. DWG No. 1017353.2402-TT-001 REV 4

C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-010.dwg 2025-Aug-22 4:28:54 pm Plotted By: MLE

NOTES

1. COORDINATE DATUM: NZGD2000, NEW ZEALAND TRANSVERSE MERCATOR (NZTM2000).
2. AERIAL PHOTO SOURCED FROM LAND INFORMATION NEW ZEALAND DATA (CROWN COPYRIGHT RESERVED).
3. PROPERTY BOUNDARIES SUPPLIED BY The Surveying Company Limited, REF "243082-TP-01.DWG" DATED 29/02/2024. EXISTING CONTOUR DERIVED FROM 20240301 UAV DATA, REF "HBRC Omahu Filtered.las".
4. FINAL LEVELS TO BE REFINED AT DETAILED DESIGN TO ACCOMMODATE FINAL FLOOD MODELLING, LOCAL TOPOGRAPHY AND DESIGN REQUIREMENTS.
5. NORTHERN EXTENT OF OHITI STOPBANK CREST LEVELS ARE CURRENTLY DESIGNED TO THE PREVIOUS 100-YEAR ARI 2075 RCP8.5 PLUS 700mm LEVELS. UPDATE TO 2050 LEVELS WILL SHOW AN APPROXIMATELY 300mm CREST LOWERING TO THE WEST AND 300mm CREST RAISING TO THE EAST. TO BE UPDATED AT DETAILED DESIGN.
6. EXISTING SERVICES SOURCED BY T+T FROM TRANSPOWER LTD, HASTINGS DISTRICT COUNCIL AND HAWKES BAY REGIONAL COUNCIL OPEN GIS DATA ON 10/07/2025.
7. ALL DRAWINGS ARE PRELIMINARY ONLY AND NOT ALL REQUIRED DETAILS ARE YET INCLUDED. FINAL LEVELS, EXTENTS AND LAYOUT SUBJECT TO CHANGE BASED ON FINALISED DESIGN CASE. TO BE CONFIRMED BY HRBC FOR DETAILED DESIGN.

LEGEND

- PROPERTY BOUNDARY
- 30 EXISTING MAJOR CONTOUR (10m INTERVAL)
- EXISTING MINOR CONTOUR (5m INTERVAL)
- OH/HV EXISTING OVERHEAD POWER LINES
- HAWKES BAY REGIONAL COUNCIL PROVISIONAL LAND CATEGORY 2C AREA
- HAWKES BAY REGIONAL COUNCIL OIC AREA
- HAWKES BAY REGIONAL COUNCIL EASEMENTS
- PROPOSED STOPBANK
- PROPOSED SWALE
- PROPOSED CULVERT
- PROPOSED HAUL ROAD

REFER DRAWINGS 1017353.2402-TT-011, 012 & 013

REFER DRAWINGS 1017353.2402-TT-021, 022 & 023

TAIHAPE ROAD

PROPOSED TAIHAPE ROAD NEW ROAD LAYOUT

PROPOSED OHITI ROAD NEW ROAD LAYOUT

OHITI ROAD

OKAWA STREAM

PROPOSED CHESTERHOPE UPPER STOPBANK

PROPOSED HAUL ROAD CONTRACTOR TO REVIEW OVERHEAD LINE RESTRICTIONS ON THIS ROUTE

PROPOSED HAUL ROAD

PROPOSED OHITI STOPBANK

PROPOSED HAUL ROAD

PROPOSED BORROW PIT

NGARURORO RIVER

0 62.5 125 m

1:2500 (A1)
1:5000 (A3)

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1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25
2	PRELIMINARY DRAFT	ALPO	TIBR	18.03.25
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	TIBR	Jan.25
DRAWN	ALPO	Jan.25
DESIGN CHECKED	JWY	21.08.25
DRAWING CHECKED	WYHU	21.08.25

DRAWING STATUS: PRELIMINARY

PROJECT PHASE: PRELIMINARY DESIGN

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APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

TITLE PLAN
OVERALL PLAN

SCALE (A1) 1:2500 DWG No. 1017353.2402-TT-010 REV 4

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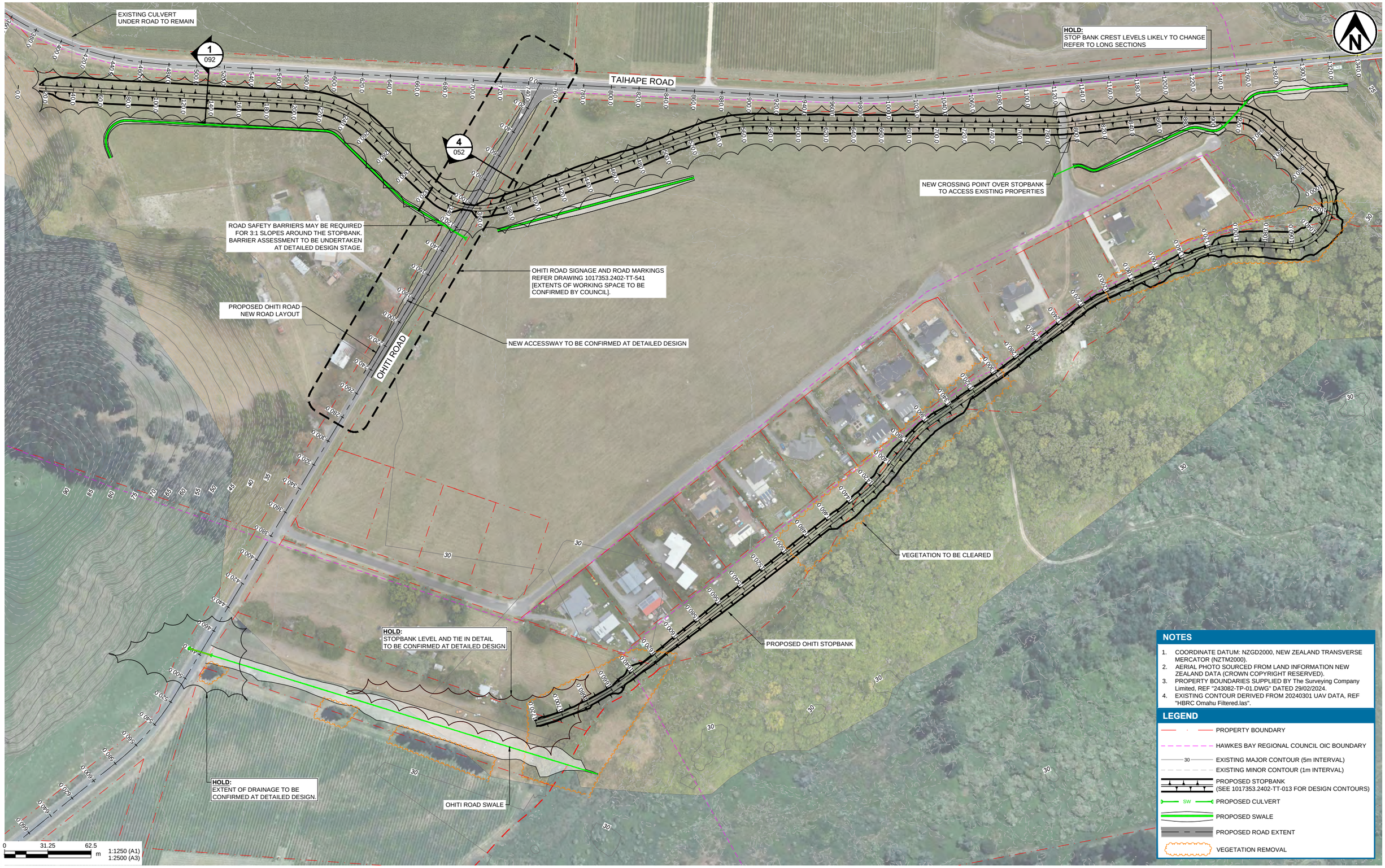

NOTES

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4. EXISTING CONTOUR DERIVED FROM 20240301 UAV DATA, REF "HBRC Omahu Filtered.las".

LEGEND

- PROPERTY BOUNDARY
- HAWKES BAY REGIONAL COUNCIL OIC BOUNDARY
- EXISTING MAJOR CONTOUR (5m INTERVAL)
- EXISTING MINOR CONTOUR (1m INTERVAL)
- PROPOSED STOPBANK (SEE 1017353.2402-TT-013 FOR DESIGN CONTOURS)
- SW PROPOSED CULVERT
- PROPOSED SWALE
- PROPOSED ROAD EXTENT
- VEGETATION REMOVAL

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REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE
1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25		
2	PRELIMINARY DRAFT	ALPO	TIBR	18.03.25		
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25		
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25		

DESIGNED	TIBR	Jan.25
DRAWN	ALPO	Jan.25
DESIGN CHECKED	JWY	21.08.25
DRAWING CHECKED	WYHU	21.08.25

DRAWING STATUS: PRELIMINARY

PROJECT PHASE: PRELIMINARY DESIGN

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CLIENT: HAWKES BAY REGIONAL COUNCIL

PROJECT: OHITI ROAD FLOOD PROTECTION STOPBANK WORKS

TITLE: PLAN
OHITI ROAD AND STOPBANK - LAYOUT PLAN

SCALE (A1) 1:1250 DWG No. 1017353.2402-TT-011 REV 4

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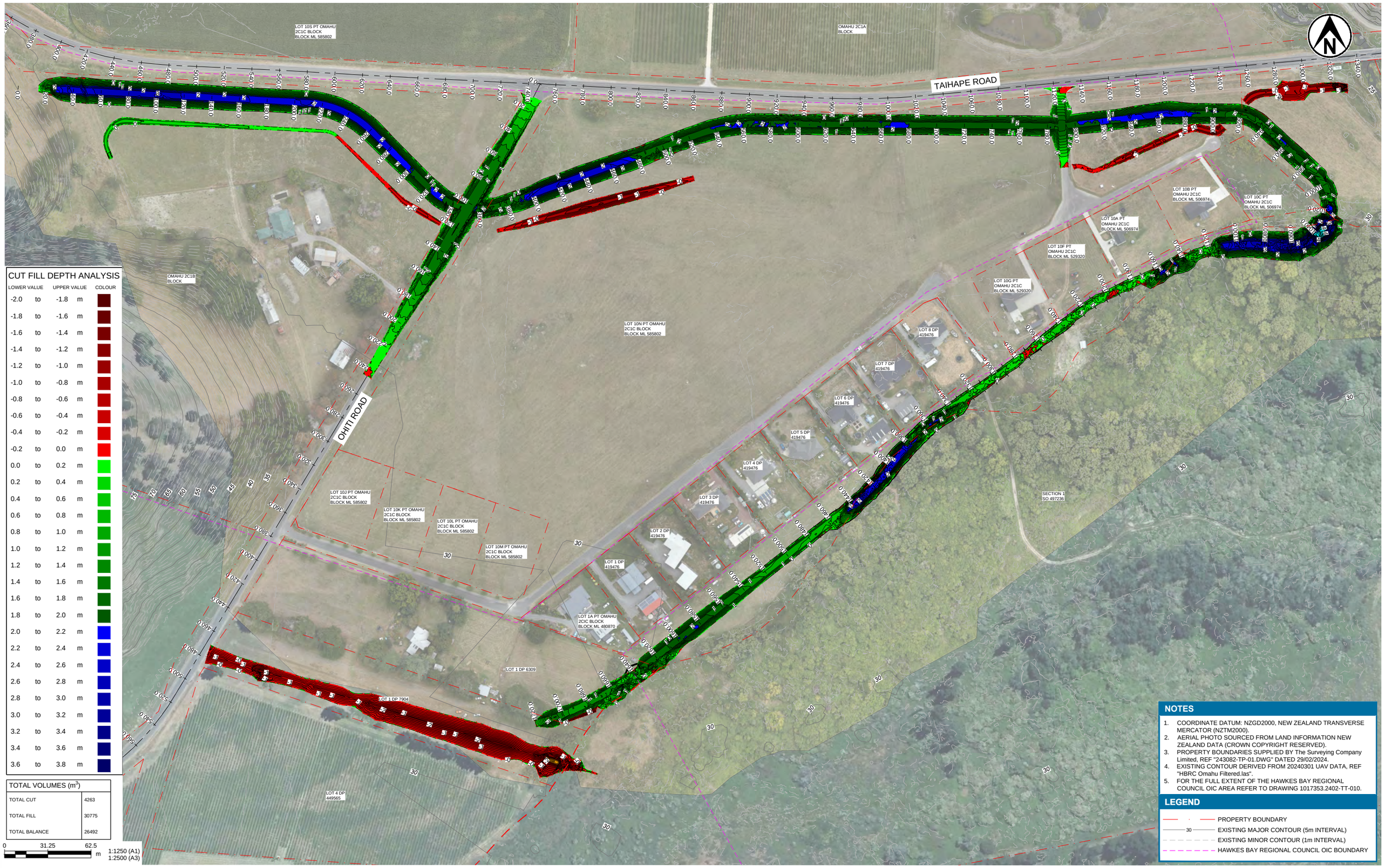

CUT FILL DEPTH ANALYSIS

LOWER VALUE		UPPER VALUE		COLOUR
-2.0	to	-1.8	m	
-1.8	to	-1.6	m	
-1.6	to	-1.4	m	
-1.4	to	-1.2	m	
-1.2	to	-1.0	m	
-1.0	to	-0.8	m	
-0.8	to	-0.6	m	
-0.6	to	-0.4	m	
-0.4	to	-0.2	m	
-0.2	to	0.0	m	
0.0	to	0.2	m	
0.2	to	0.4	m	
0.4	to	0.6	m	
0.6	to	0.8	m	
0.8	to	1.0	m	
1.0	to	1.2	m	
1.2	to	1.4	m	
1.4	to	1.6	m	
1.6	to	1.8	m	
1.8	to	2.0	m	
2.0	to	2.2	m	
2.2	to	2.4	m	
2.4	to	2.6	m	
2.6	to	2.8	m	
2.8	to	3.0	m	
3.0	to	3.2	m	
3.2	to	3.4	m	
3.4	to	3.6	m	
3.6	to	3.8	m	

TOTAL VOLUMES (m^3)	
TOTAL CUT	4263
TOTAL FILL	30775
TOTAL BALANCE	26492

0 31.25 62.5 m

1:1250 (A1)
1:2500 (A3)

NOTES

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4. EXISTING CONTOUR DERIVED FROM 20240301 UAV DATA, REF "HBRC Omahu Filtered.las".
5. FOR THE FULL EXTENT OF THE HAWKES BAY REGIONAL COUNCIL OIC AREA REFER TO DRAWING 1017353.2402-TT-010.

LEGEND

- PROPERTY BOUNDARY
- EXISTING MAJOR CONTOUR (5m INTERVAL)
- EXISTING MINOR CONTOUR (1m INTERVAL)
- HAWKES BAY REGIONAL COUNCIL OIC BOUNDARY

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT	ALPO	TIBR	18.03.25
2	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
3	PRELIMINARY DESIGN ISSUE OIC AND LAND DATA	ALPO	JWY	08.08.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	STLP	Feb.25	DRAWING STATUS
DRAWN	ALPO	Feb.25	PRELIMINARY
DESIGN CHECKED	JWY	21.08.25	PROJECT PHASE
DRAWING CHECKED	WYHU	21.08.25	PRELIMINARY DESIGN

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APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

TITLE PLAN
OHITI ROAD AND STOPBANK - CUT AND FILL

SCALE (A1) 1:1250 DWG No. 1017353.2402-TT-012 REV 4

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NOTES

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4. EXISTING CONTOUR DERIVED FROM 20240301 UAV DATA, REF "HBRC Omahu Filtered.las".

LEGEND

- PROPERTY BOUNDARY
- HAWKES BAY REGIONAL COUNCIL OIC BOUNDARY
- EXISTING MAJOR CONTOUR (5m INTERVAL)
- EXISTING MINOR CONTOUR (1m INTERVAL)
- PROPOSED MAJOR CONTOUR (1m INTERVAL)
- PROPOSED MINOR CONTOUR (0.5m INTERVAL)
- PROPOSED STOPBANK
- PROPOSED CULVERT (SW)
- PROPOSED SWALE

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
2	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	STLP	Jul.25	DRAWING STATUS
DRAWN	ALPO	Jul.25	PRELIMINARY
DESIGN CHECKED	JWY	21.08.25	PROJECT PHASE
DRAWING CHECKED	WYHU	21.08.25	PRELIMINARY DESIGN

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APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

TITLE PLAN
OHITI ROAD AND STOPBANK - DESIGN CONTOURS

SCALE (A1) 1:1250 DWG No. 1017353.2402-TT-013 REV 2

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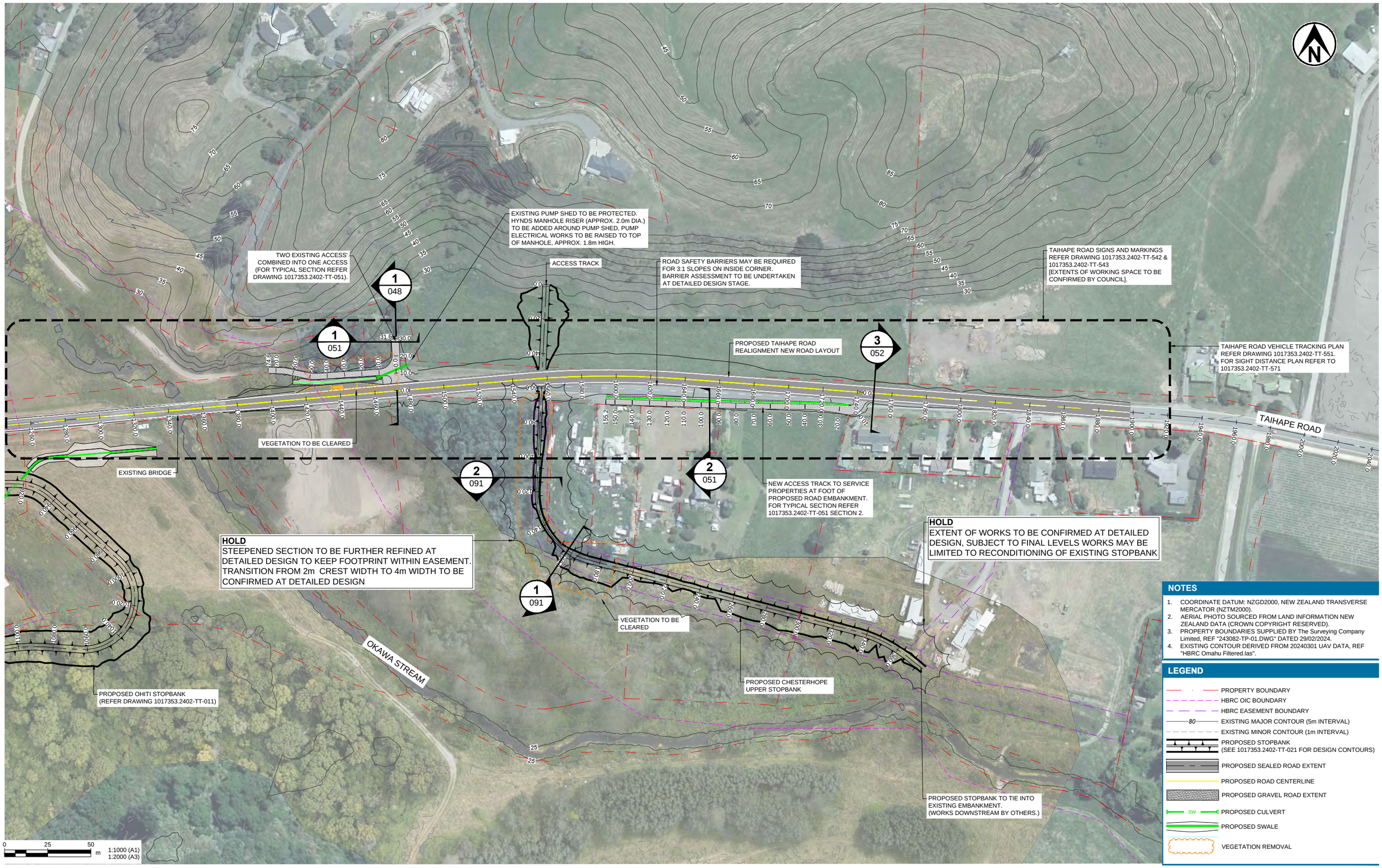

NOTES

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4. EXISTING CONTOUR DERIVED FROM 20240301 UAV DATA, REF "HBRC Omahu Filtered.las".

LEGEND

- PROPERTY BOUNDARY
- HBRC OIC BOUNDARY
- HBRC EASEMENT BOUNDARY
- EXISTING MAJOR CONTOUR (5m INTERVAL)
- EXISTING MINOR CONTOUR (1m INTERVAL)
- PROPOSED STOPBANK (SEE 1017353.2402-TT-021 FOR DESIGN CONTOURS)
- PROPOSED SEALED ROAD EXTENT
- PROPOSED ROAD CENTERLINE
- PROPOSED GRAVEL ROAD EXTENT
- SW PROPOSED CULVERT
- PROPOSED SWALE
- VEGETATION REMOVAL

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REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE
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4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25		

DESIGNED	TIBR	Jan.25	DRAWING STATUS
DRAWN	ALPO	Jan.25	PRELIMINARY
DESIGN CHECKED	JWY	21.08.25	PROJECT PHASE
DRAWING CHECKED	WYHU	21.08.25	PRELIMINARY DESIGN

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CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

TITLE PLAN
TAIHAPE ROAD AND STOPBANK - LAYOUT PLAN

SCALE (A1) 1:1000 DWG No. 1017353.2402-TT-021 REV 4

C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-022.dwg 2025-Aug-22 4:36:37 pm Plotted By: MLE

CUT FILL DEPTH ANALYSIS

LOWER VALUE		UPPER VALUE		COLOUR
-2.0	to	-1.8	m	
-1.8	to	-1.6	m	
-1.6	to	-1.4	m	
-1.4	to	-1.2	m	
-1.2	to	-1.0	m	
-1.0	to	-0.8	m	
-0.8	to	-0.6	m	
-0.6	to	-0.4	m	
-0.4	to	-0.2	m	
-0.2	to	0.0	m	
0.0	to	0.2	m	
0.2	to	0.4	m	
0.4	to	0.6	m	
0.6	to	0.8	m	
0.8	to	1.0	m	
1.0	to	1.2	m	
1.2	to	1.4	m	
1.4	to	1.6	m	
1.6	to	1.8	m	
1.8	to	2.0	m	
2.0	to	2.2	m	
2.2	to	2.4	m	
2.4	to	2.6	m	
2.6	to	2.8	m	
2.8	to	3.0	m	
3.0	to	3.2	m	
3.2	to	3.4	m	
3.4	to	3.6	m	
3.6	to	3.8	m	

TOTAL VOLUMES (m^3)	
TOTAL CUT	162
TOTAL FILL	10990
TOTAL BALANCE	10828

0 25 50 m

1:1000 (A1)
1:2000 (A3)

NOTES

1. COORDINATE DATUM: NZGD2000, NEW ZEALAND TRANSVERSE MERCATOR (NZTM2000).
2. AERIAL PHOTO SOURCED FROM LAND INFORMATION NEW ZEALAND DATA (CROWN COPYRIGHT RESERVED).
3. PROPERTY BOUNDARIES SUPPLIED BY The Surveying Company Limited, REF "243082-TP-01.DWG" DATED 29/02/2024.
4. EXISTING CONTOUR DERIVED FROM 20240301 UAV DATA, REF "HBRC Omahu Filtered.las".
5. FOR THE FULL EXTENT OF THE HAWKES BAY REGIONAL COUNCIL OIC AREA REFER TO DRAWING 1017353.2402-TT-010.

LEGEND

- PROPERTY BOUNDARY
- 30 EXISTING MAJOR CONTOUR (5m INTERVAL)
- EXISTING MINOR CONTOUR (1m INTERVAL)
- HAWKES BAY REGIONAL COUNCIL OIC BOUNDARY

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DESIGN	ALPO	TIBR	18.03.25
2	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
3	PRELIMINARY DESIGN ISSUE OIC AND LAND DATA	ALPO	JWY	08.08.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	JWY	Feb.25
DRAWN	ALPO	Feb.25
DESIGN CHECKED	JWY	21.08.25
DRAWING CHECKED	WYHU	21.08.25

DRAWING STATUS: PRELIMINARY

PROJECT PHASE: PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED

APPROVED DATE

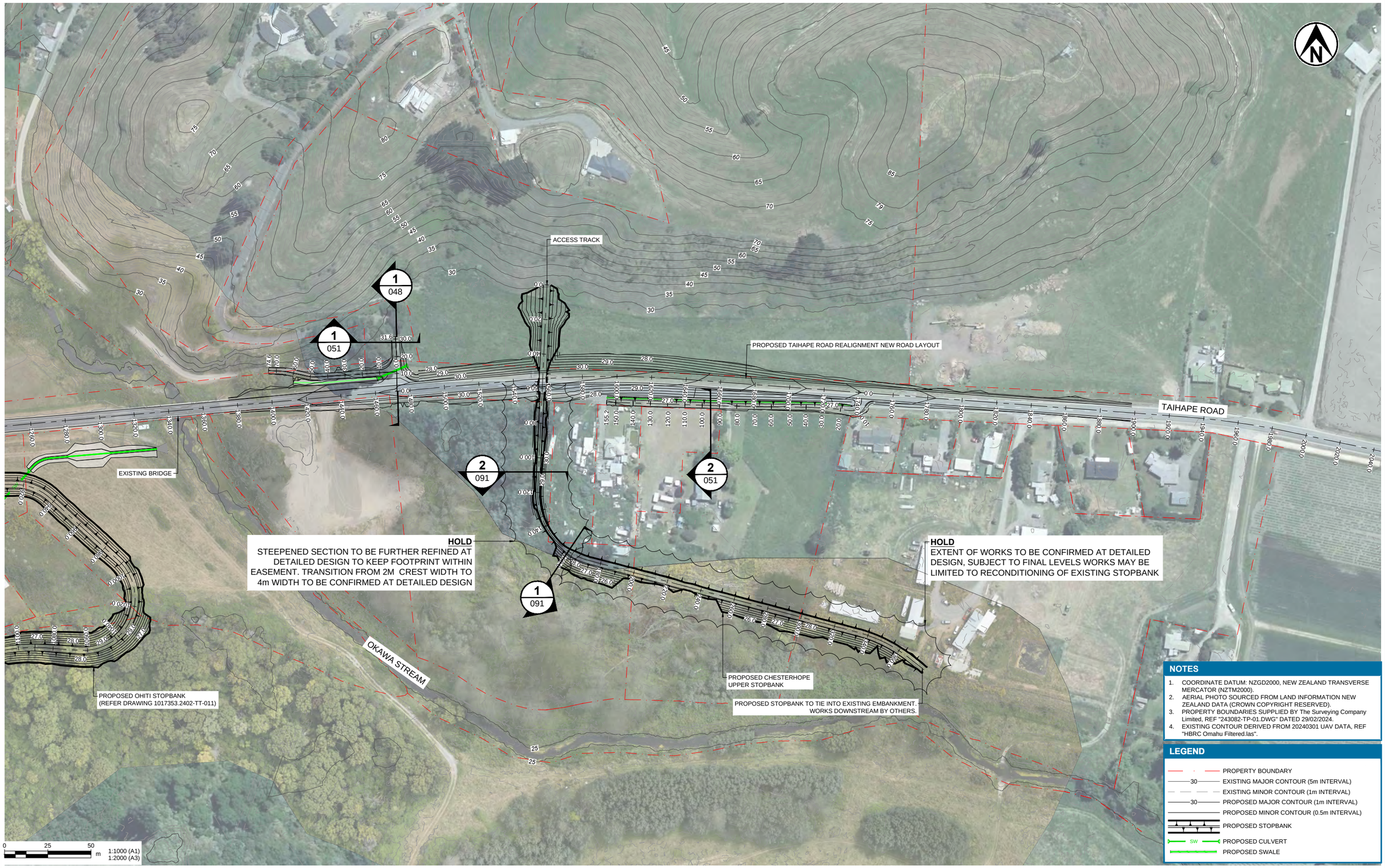
CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

TITLE PLAN
TAIHAPE ROAD AND STOPBANK - CUT AND FILL

SCALE (A1) 1:1000 DWG No. 1017353.2402-TT-022 REV 4

C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-023.dwg 2025-Aug-22 5:27:34 pm Plotted By: MLE



NOTES

1. COORDINATE DATUM: NZGD2000, NEW ZEALAND TRANSVERSE MERCATOR (NZTM2000).
2. AERIAL PHOTO SOURCED FROM LAND INFORMATION NEW ZEALAND DATA (CROWN COPYRIGHT RESERVED).
3. PROPERTY BOUNDARIES SUPPLIED BY The Surveying Company Limited, REF "243082-TP-01.DWG" DATED 29/02/2024.
4. EXISTING CONTOUR DERIVED FROM 20240301 UAV DATA, REF "HBRC Omahu Filtered.las".

LEGEND

- PROPERTY BOUNDARY
- EXISTING MAJOR CONTOUR (5m INTERVAL)
- EXISTING MINOR CONTOUR (1m INTERVAL)
- PROPOSED MAJOR CONTOUR (1m INTERVAL)
- PROPOSED MINOR CONTOUR (0.5m INTERVAL)
- PROPOSED STOPBANK
- PROPOSED CULVERT
- PROPOSED SWALE

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
2	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	STLP	Jul.25	DRAWING STATUS
DRAWN	ALPO	Jul.25	PRELIMINARY
DESIGN CHECKED	JWY	21.08.25	PROJECT PHASE
DRAWING CHECKED	WYHU	21.08.25	PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED

APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

TITLE PLAN

TAIHAPE ROAD AND STOPBANK - DESIGN CONTOURS

SCALE (A1) 1:1000 DWG No. 1017353.2402-TT-023 REV 2

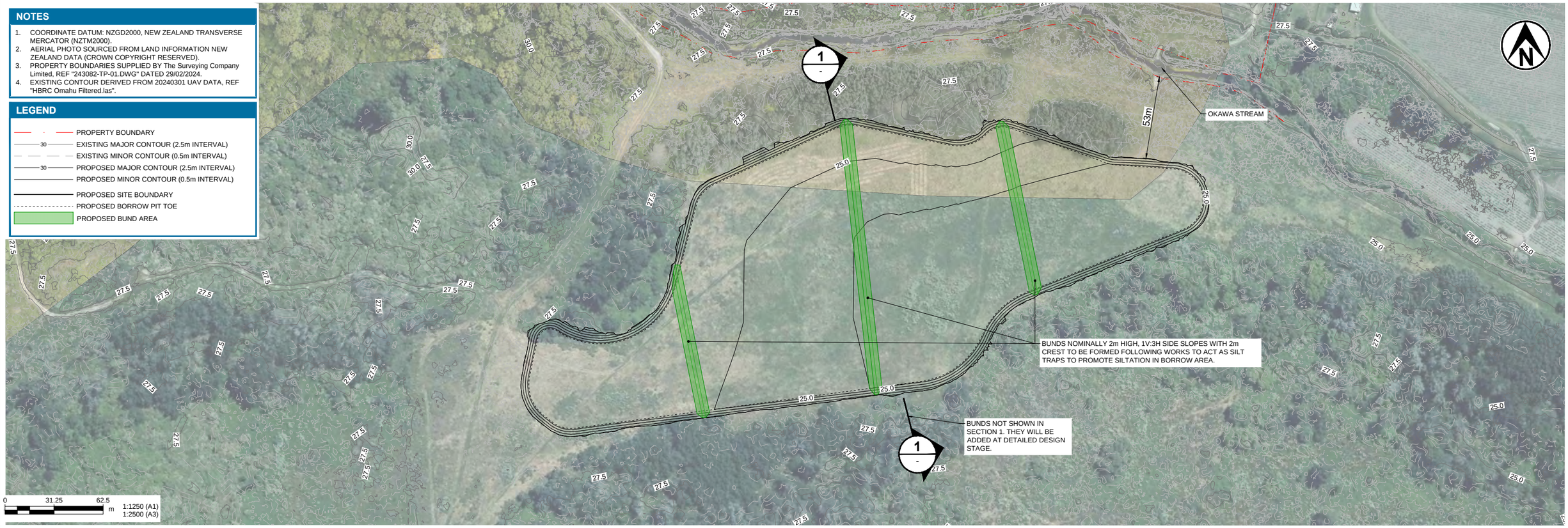
C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-027.dwg 2025-Aug-22 4:40:05 pm Plotted By: MLE

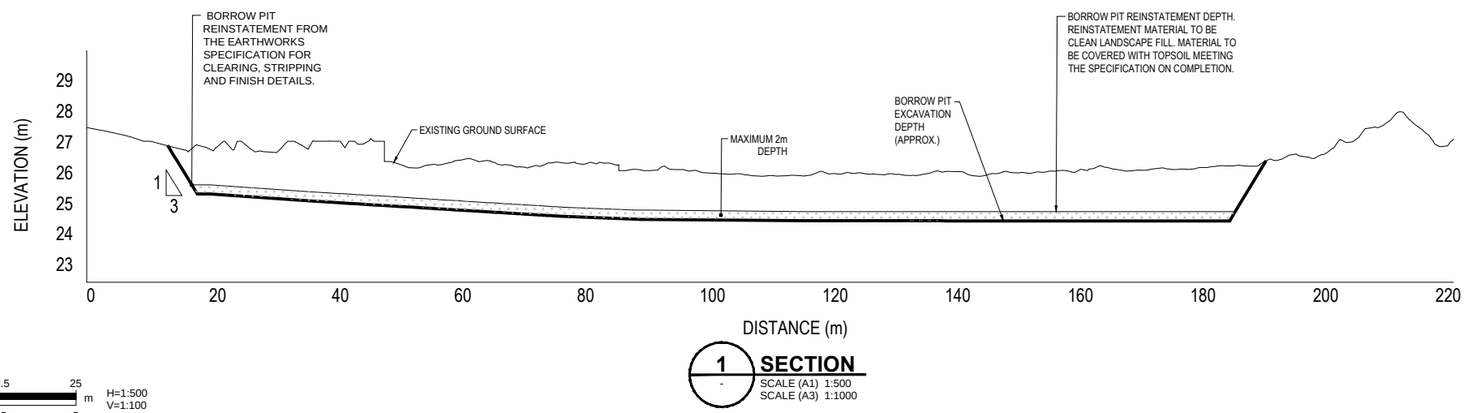
NOTES

1. COORDINATE DATUM: NZGD2000, NEW ZEALAND TRANSVERSE MERCATOR (NZTM2000).
2. AERIAL PHOTO SOURCED FROM LAND INFORMATION NEW ZEALAND DATA (CROWN COPYRIGHT RESERVED).
3. PROPERTY BOUNDARIES SUPPLIED BY The Surveying Company Limited, REF "2430382-TP-01.DWG" DATED 29/02/2024.
4. EXISTING CONTOUR DERIVED FROM 20240301 UAV DATA, REF "HBRC Omahu Filtered.las".

LEGEND

- PROPERTY BOUNDARY
- EXISTING MAJOR CONTOUR (2.5m INTERVAL)
- EXISTING MINOR CONTOUR (0.5m INTERVAL)
- PROPOSED MAJOR CONTOUR (2.5m INTERVAL)
- PROPOSED MINOR CONTOUR (0.5m INTERVAL)
- PROPOSED SITE BOUNDARY
- PROPOSED BORROW PIT TOE
- PROPOSED BUND AREA





1 - **SECTION**
SCALE (A1) 1:500
SCALE (A3) 1:1000

LAYOUT PLAN
SCALE (A1) 1:7500
SCALE (A3) 1:15000

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
2	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	STLP	May.25	DRAWING STATUS
DRAWN	STLP	May.25	PRELIMINARY
DESIGN CHECKED	JWY	21.08.25	PROJECT PHASE
DRAWING CHECKED	WYHU	21.08.25	PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED

APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

TITLE PLAN
BORROW AREA SITE PLAN

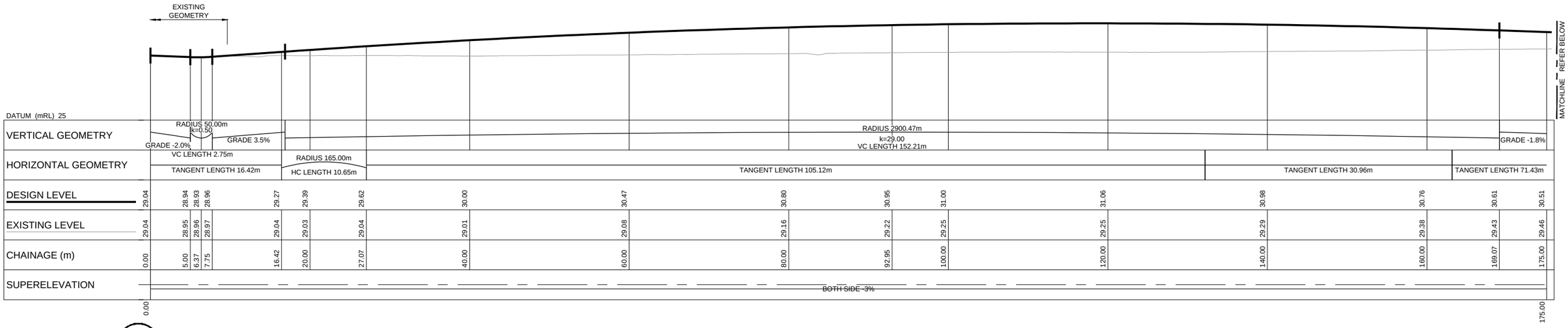
SCALE (A1) AS SHOWN DWG No. 1017353.2402-TT-027 REV 2

PLANTITLE

C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-031.dwg 2025-Aug-22 4:41:33 pm Plotted By: MLE

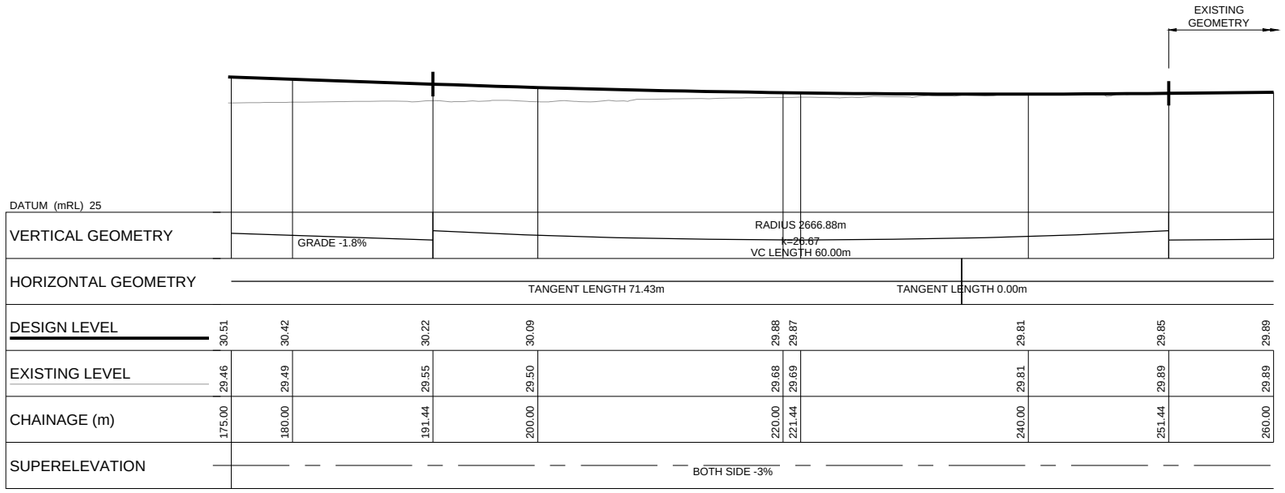
NOTES

1. ALL DIMENSIONS IN METRES UNLESS STATED OTHERWISE.
2. LEVEL DATUM: NZVD 2016.
3. FINAL LEVELS TO BE REFINED AT DETAILED DESIGN TO ACCOMMODATE FINAL FLOOD MODELLING, LOCAL TOPOGRAPHY AND DESIGN REQUIREMENTS.



1 - LONG SECTION: OHITI ROAD - CHAINAGE 0 TO 175

SCALE (A1) 1:250 (HORIZ), 1:125 (VERT)
SCALE (A3) 1:500 (HORIZ), 1:250 (VERT)



1 - LONG SECTION: OHITI ROAD - CHAINAGE 175 TO 260

SCALE (A1) 1:250 (HORIZ), 1:125 (VERT)
SCALE (A3) 1:500 (HORIZ), 1:250 (VERT)

0 6.25 12.5 m H=1:250 V=1:125
0 3.125 6.25

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25
2	FOR REVIEW	ALPO	TIBR	18.03.25
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	SIDP	Jan.25	DRAWING STATUS
DRAWN	ALPO	Jan.25	PRELIMINARY
DESIGN CHECKED	TIBR	21.08.25	PROJECT PHASE
DRAWING CHECKED	WYHU	21.08.25	PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

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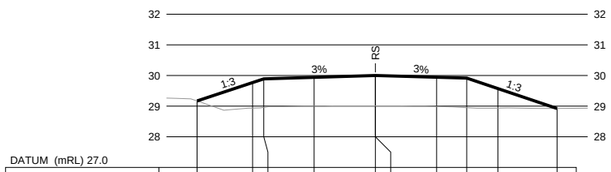
APPROVED DATE

CLIENT HAWKES BAY REGIONAL COUNCIL
PROJECT OHITI ROAD FLOOD PROTECTION STOPBANK WORKS
TITLE ROADING SECTIONS
OHITI ROAD ALIGNMENT LONG SECTION
SCALE (A1) AS SHOWN DWG No. 1017353.2402-TT-031 REV 4

C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-033.dwg 2025-Aug-22 4:41:52 pm Plotted By: MLE

NOTES

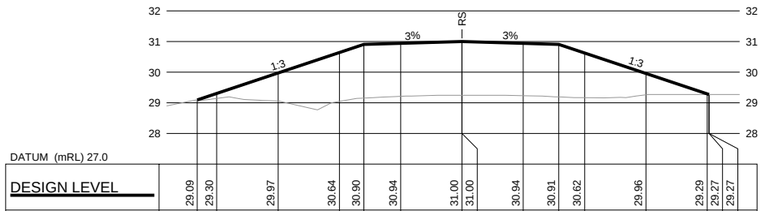
1. ALL DIMENSIONS IN METRES UNLESS STATED OTHERWISE.
2. LEVEL DATUM: NZVD 2016.
3. FINAL LEVELS TO BE REFINED AT DETAILED DESIGN TO ACCOMMODATE FINAL FLOOD MODELLING, LOCAL TOPOGRAPHY AND DESIGN REQUIREMENTS.



DATUM (mRL) 27.0

DESIGN LEVEL	29.17	29.77	29.89	29.94	30.00	30.00	29.94	29.91	29.57	28.93	
EXISTING LEVEL	29.17	28.93	28.96	29.00	29.01	29.01	28.99	28.95	28.94	28.93	
OFFSET	-5.81	-4.00	-3.64	-2.00	0.00	0.00	2.00	2.98	4.00	5.93	

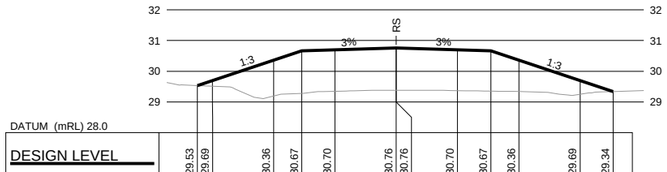
CHAINAGE 40



DATUM (mRL) 27.0

DESIGN LEVEL	29.09	29.30	29.97	30.64	30.90	30.94	31.00	31.00	30.94	30.91	30.62	29.96	29.29	29.27	29.27
EXISTING LEVEL	29.09	29.14	29.06	29.05	29.15	29.21	29.25	29.25	29.23	29.19	29.17	29.26	29.27	29.27	29.27
OFFSET	-8.63	-8.00	-6.00	-4.00	-3.20	-2.00	0.00	0.00	2.00	3.16	4.00	6.00	8.00	8.06	8.06

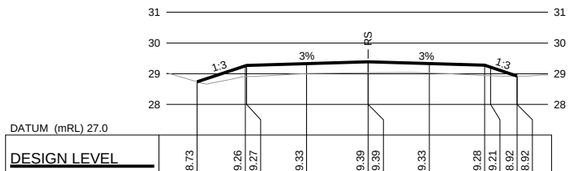
CHAINAGE 100



DATUM (mRL) 28.0

DESIGN LEVEL	29.53	29.69	30.36	30.67	30.70	30.76	30.76	30.70	30.67	30.36	29.69	29.34
EXISTING LEVEL	29.53	29.51	29.19	29.28	29.35	29.38	29.38	29.37	29.35	29.34	29.25	29.34
OFFSET	-6.49	-6.00	-4.00	-3.08	-2.00	0.00	0.00	2.00	3.09	4.00	6.00	7.08

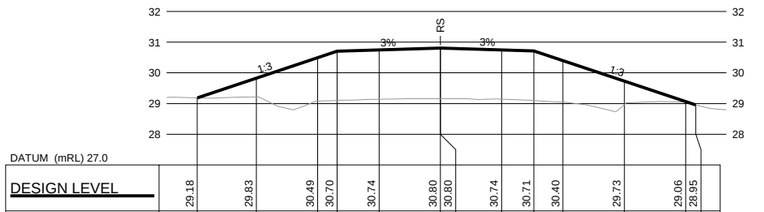
CHAINAGE 160



DATUM (mRL) 27.0

DESIGN LEVEL	28.73	29.26	29.27	29.33	29.39	29.39	29.33	29.28	29.21	28.92	28.92
EXISTING LEVEL	28.73	28.91	28.91	29.00	29.03	29.03	29.02	28.94	28.93	28.92	28.92
OFFSET	-5.58	-4.00	-3.96	-2.00	0.00	0.00	2.00	3.81	4.00	4.87	4.87

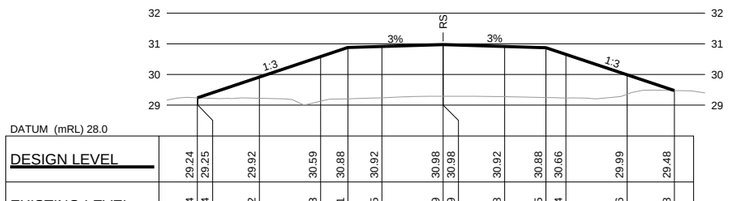
CHAINAGE 20



DATUM (mRL) 27.0

DESIGN LEVEL	29.18	29.83	30.49	30.70	30.74	30.80	30.80	30.74	30.71	30.40	29.73	29.06	28.95		
EXISTING LEVEL	29.18	29.22	29.08	29.10	29.14	29.16	29.16	29.14	29.10	29.04	28.97	29.04	28.95		
OFFSET	-7.93	-6.00	-4.00	-3.37	-2.00	0.00	0.00	2.00	3.05	4.00	6.00	8.00	8.33		

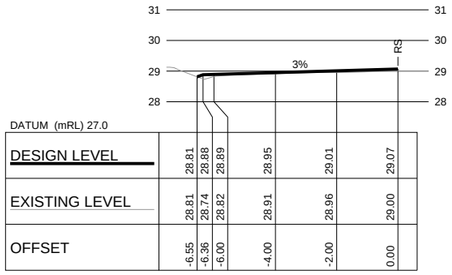
CHAINAGE 80



DATUM (mRL) 28.0

DESIGN LEVEL	29.24	29.25	29.92	30.59	30.88	30.92	30.98	30.98	30.92	30.88	30.66	29.99	29.48		
EXISTING LEVEL	29.24	29.24	29.22	29.13	29.21	29.25	29.29	29.29	29.28	29.25	29.24	29.36	29.48		
OFFSET	-8.02	-8.00	-6.00	-4.00	-3.11	-2.00	0.00	0.00	2.00	3.35	4.00	6.00	7.54		

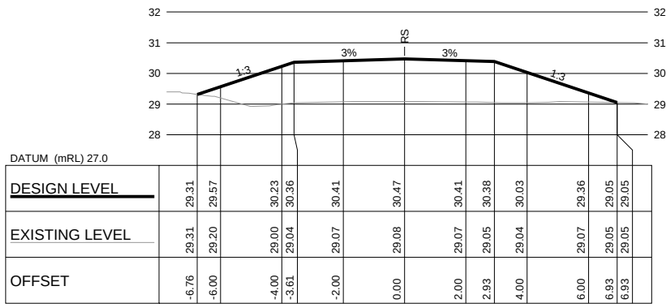
CHAINAGE 140



DATUM (mRL) 27.0

DESIGN LEVEL	28.81	28.88	28.89	28.95	29.01	29.07
EXISTING LEVEL	28.81	28.74	28.82	28.91	28.96	29.00
OFFSET	-6.55	-6.36	-6.00	-4.00	-2.00	0.00

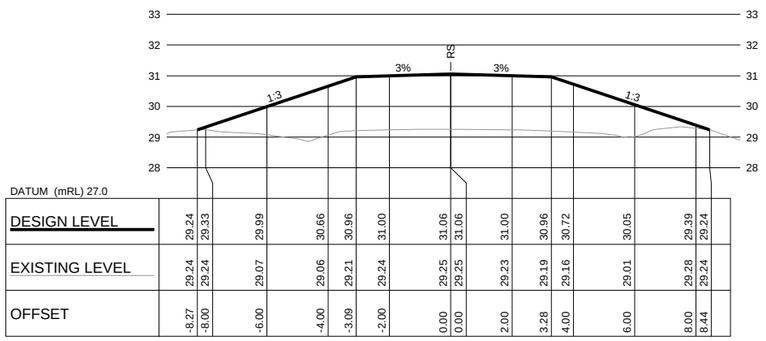
CHAINAGE 10.69



DATUM (mRL) 27.0

DESIGN LEVEL	29.31	29.57	30.23	30.36	30.41	30.47	30.41	30.38	30.03	29.36	29.05	29.05
EXISTING LEVEL	29.31	29.20	29.00	29.04	29.07	29.08	29.07	29.05	29.04	29.07	29.05	29.05
OFFSET	-6.76	-6.00	-4.00	-3.61	-2.00	0.00	2.00	2.93	4.00	6.00	6.93	6.93

CHAINAGE 60



DATUM (mRL) 27.0

DESIGN LEVEL	29.24	29.33	29.99	30.66	30.96	31.00	31.06	31.06	31.00	30.96	30.72	30.05	29.39	29.24	
EXISTING LEVEL	29.24	29.24	29.07	29.06	29.21	29.24	29.25	29.25	29.23	29.19	29.16	29.01	29.28	29.24	
OFFSET	-8.27	-8.00	-6.00	-4.00	-3.09	-2.00	0.00	0.00	2.00	3.28	4.00	6.00	8.00	8.44	

CHAINAGE 120

0 2.5 5 m
1:100 (A1)
1:200 (A3)

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25
2	FOR REVIEW	ALPO	TIBR	18.03.25
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	SIDP	Jan.25	DRAWING STATUS
DRAWN	ALPO	Jan.25	PRELIMINARY
DESIGN CHECKED	TIBR	21.08.25	PROJECT PHASE
DRAWING CHECKED	WYHU	21.08.25	PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED

APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

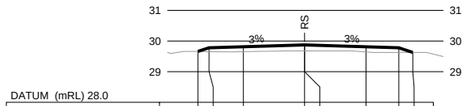
TITLE ROADING SECTIONS
OHITI ROAD CROSS SECTIONS - SHEET 1

SCALE (A1) 1:100 DWG No. 1017353.2402-TT-033 REV 4

C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-034.dwg 2025-Aug-22 4:42:11 pm Plotted By: MLE

NOTES

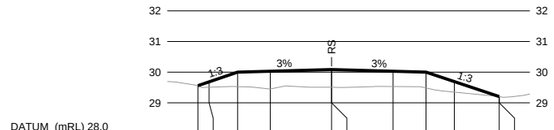
1. ALL DIMENSIONS IN METRES UNLESS STATED OTHERWISE.
2. LEVEL DATUM: NZVD 2016.
3. FINAL LEVELS TO BE REFINED AT DETAILED DESIGN TO ACCOMMODATE FINAL FLOOD MODELLING, LOCAL TOPOGRAPHY AND DESIGN REQUIREMENTS.



DATUM (mRL) 28.0

DESIGN LEVEL	29.66	29.78	29.82	29.88	29.88	29.82	29.78	29.63
EXISTING LEVEL	29.66	29.65	29.65	29.68	29.68	29.65	29.63	29.63
OFFSET	-3.48	-3.12	-2.00	0.00	0.00	2.00	3.07	3.53

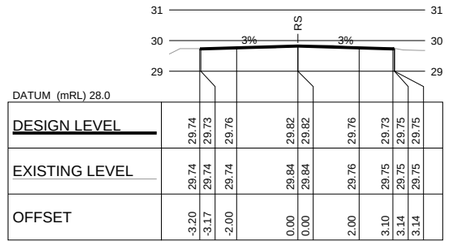
CHAINAGE 220



DATUM (mRL) 28.0

DESIGN LEVEL	29.56	29.68	29.99	30.03	30.09	30.09	30.03	29.99	29.69	29.20	29.20
EXISTING LEVEL	29.56	29.51	29.53	29.45	29.50	29.50	29.53	29.48	29.35	29.20	29.20
OFFSET	-4.36	-4.00	-3.07	-2.00	0.00	0.00	2.00	3.08	4.00	5.47	5.47

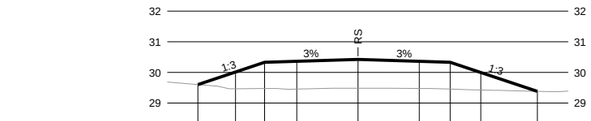
CHAINAGE 200



DATUM (mRL) 28.0

DESIGN LEVEL	29.74	29.73	29.76	29.82	29.82	29.76	29.73	29.75	29.75
EXISTING LEVEL	29.74	29.74	29.74	29.84	29.84	29.76	29.75	29.75	29.75
OFFSET	-3.20	-3.17	-2.00	0.00	0.00	2.00	3.10	3.14	3.14

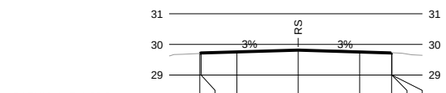
CHAINAGE 245



DATUM (mRL) 28.0

DESIGN LEVEL	29.61	30.02	30.33	30.36	30.42	30.36	30.33	30.00	29.38
EXISTING LEVEL	29.61	29.47	29.47	29.46	29.49	29.48	29.46	29.43	29.38
OFFSET	-5.23	-4.00	-3.05	-2.00	0.00	2.00	3.00	4.00	5.85

CHAINAGE 180



DATUM (mRL) 28.0

DESIGN LEVEL	29.70	29.72	29.75	29.81	29.75	29.72	29.73	29.73	
EXISTING LEVEL	29.70	29.71	29.74	29.81	29.78	29.73	29.73	29.73	
OFFSET	-3.22	-3.17	-2.00	0.00	2.00	3.05	3.05	3.05	

CHAINAGE 240

0 2.5 5 m
1:100 (A1)
1:200 (A3)

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25
2	FOR REVIEW	ALPO	TIBR	18.03.25
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	SIDP	Jan.25	DRAWING STATUS
DRAWN	ALPO	Jan.25	PRELIMINARY
DESIGN CHECKED	TIBR	21.08.25	PROJECT PHASE
DRAWING CHECKED	WYHU	21.08.25	PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED

APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

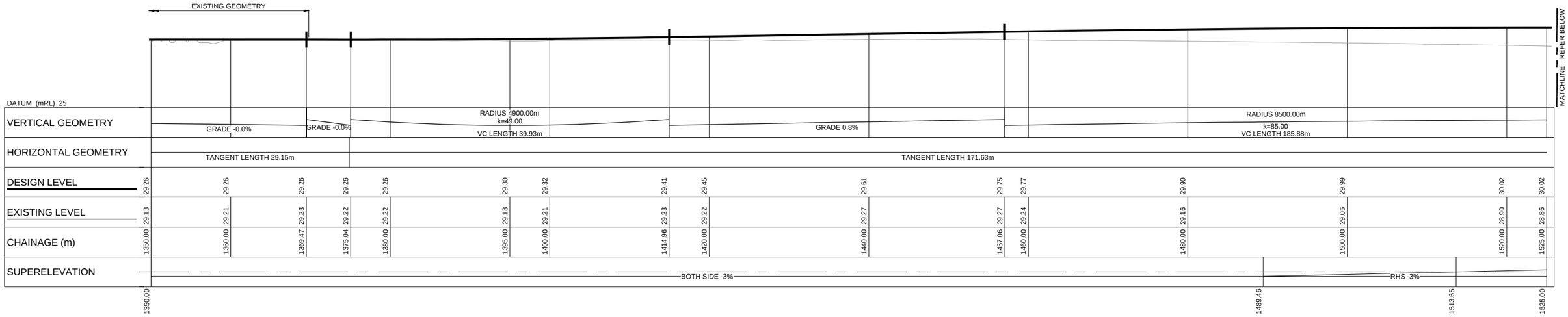
TITLE ROADING SECTIONS
OHITI ROAD CROSS SECTIONS - SHEET 2

SCALE (A1) 1:100 DWG No. 1017353.2402-TT-034 REV 4

C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-041.dwg 2025-Aug-22 4:42:35 pm Plotted By: MLE

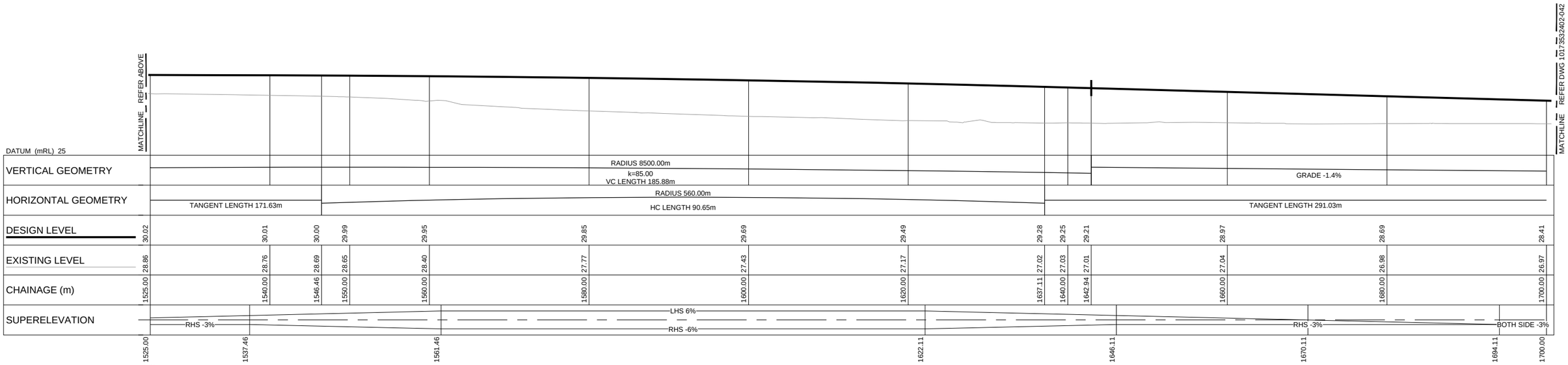
NOTES

1. ALL DIMENSIONS IN METRES UNLESS STATED OTHERWISE.
2. LEVEL DATUM: NZVD 2016.
3. FINAL LEVELS TO BE REFINED AT DETAILED DESIGN TO ACCOMMODATE FINAL FLOOD MODELLING, LOCAL TOPOGRAPHY AND DESIGN REQUIREMENTS.



1 LONG SECTION: TAIHAPE ROAD - PART ONE

SCALE (A1) 1:250 (HORIZ), 1:125 (VERT)
SCALE (A3) 1:500 (HORIZ), 1:250 (VERT)



1 LONG SECTION: TAIHAPE ROAD - PART TWO

SCALE (A1) 1:250 (HORIZ), 1:125 (VERT)
SCALE (A3) 1:500 (HORIZ), 1:250 (VERT)

0 6.25 12.5 m
0 3.125 6.25
H=1:250
V=1:125

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25
2	FOR REVIEW	ALPO	TIBR	18.03.25
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	SIDP	Jan.25	DRAWING STATUS
DRAWN	ALPO	Jan.25	PRELIMINARY
DESIGN CHECKED	TIBR	21.08.25	PROJECT PHASE
DRAWING CHECKED	WYHU	21.08.25	PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED

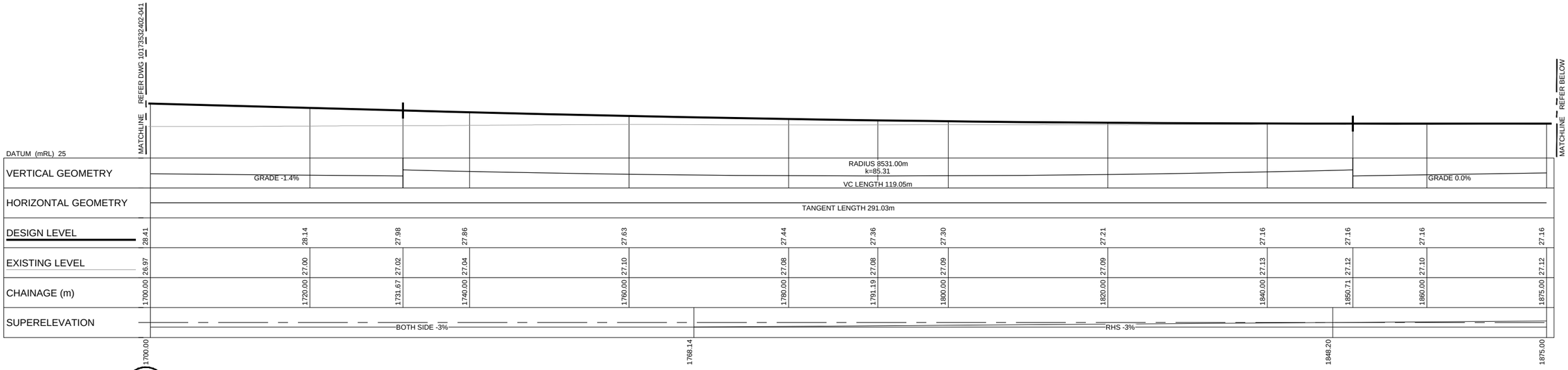
APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**
PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**
TITLE ROADING SECTIONS
TAIHAPE ROAD ALIGNMENT LONG SECTION - SHEET 1
SCALE (A1) AS SHOWN DWG No. 1017353.2402-TT-041 REV 4

C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-042.dwg 2025-Aug-22 4:42:58 pm Plotted By: MLE

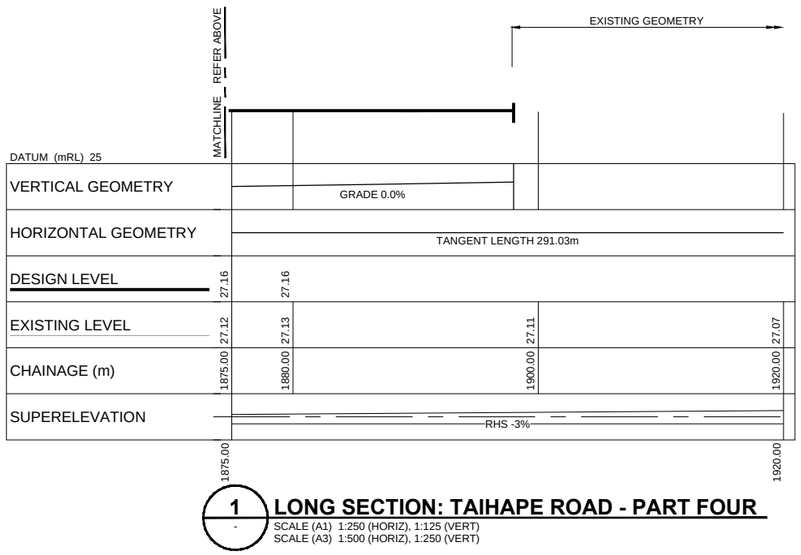
NOTES

1. ALL DIMENSIONS IN METRES UNLESS STATED OTHERWISE.
2. LEVEL DATUM: NZVD 2016.
3. FINAL LEVELS TO BE REFINED AT DETAILED DESIGN TO ACCOMMODATE FINAL FLOOD MODELLING, LOCAL TOPOGRAPHY AND DESIGN REQUIREMENTS.



1 - LONG SECTION: TAIHAPE ROAD - PART THREE

SCALE (A1) 1:250 (HORIZ), 1:125 (VERT)
SCALE (A3) 1:500 (HORIZ), 1:250 (VERT)



1 - LONG SECTION: TAIHAPE ROAD - PART FOUR

SCALE (A1) 1:250 (HORIZ), 1:125 (VERT)
SCALE (A3) 1:500 (HORIZ), 1:250 (VERT)

0 6.25 12.5 m H=1:250
0 3.125 6.25 V=1:125

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25
2	FOR REVIEW	ALPO	TIBR	18.03.25
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	SIDP	Jan.25
DRAWN	ALPO	Jan.25
DESIGN CHECKED	TIBR	21.08.25
DRAWING CHECKED	WYHU	21.08.25

DRAWING STATUS: PRELIMINARY
PROJECT PHASE: PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED

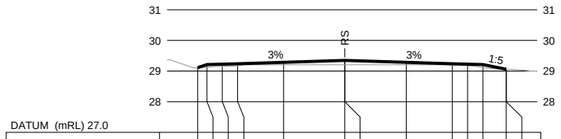
APPROVED DATE

CLIENT: HAWKES BAY REGIONAL COUNCIL
PROJECT: OHITI ROAD FLOOD PROTECTION STOPBANK WORKS
TITLE: ROADING SECTIONS
TAIHAPE ROAD ALIGNMENT LONG SECTION - SHEET 2
SCALE (A1): AS SHOWN DWG No. 1017353.2402-TT-042 REV 4

C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-043.dwg 2025-Aug-22 4:43:21 pm Plotted By: MLE

NOTES

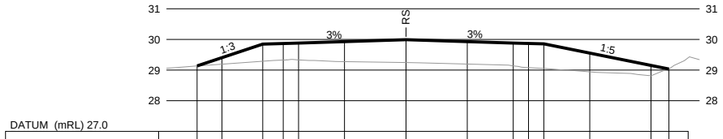
1. ALL DIMENSIONS IN METRES UNLESS STATED OTHERWISE.
2. LEVEL DATUM: NZVD 2016.
3. FINAL LEVELS TO BE REFINED AT DETAILED DESIGN TO ACCOMMODATE FINAL FLOOD MODELLING, LOCAL TOPOGRAPHY AND DESIGN REQUIREMENTS.



DATUM (mRL) 27.0

DESIGN LEVEL	29.11	29.21	29.23	29.24	29.29	29.35	29.35	29.29	29.24	29.23	29.21	29.06	29.06
EXISTING LEVEL	29.11	29.13	29.15	29.18	29.21	29.21	29.21	29.21	29.20	29.17	29.12	29.06	29.06
OFFSET	-4.80	-4.50	-4.00	-3.50	-2.00	0.00	0.00	2.00	3.50	4.00	4.50	5.27	5.27

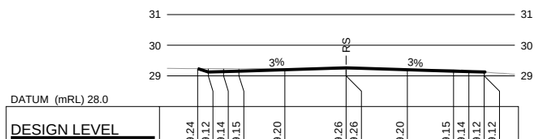
CHAINAGE 1400



DATUM (mRL) 27.0

DESIGN LEVEL	29.13	29.40	29.85	29.87	29.88	29.93	29.99	29.93	29.88	29.87	29.85	29.55	29.15	29.04
EXISTING LEVEL	29.13	29.19	29.29	29.33	29.33	29.27	29.24	29.19	29.14	29.08	29.05	28.94	28.82	29.04
OFFSET	-6.81	-6.00	-4.67	-4.00	-3.50	-2.00	0.00	2.00	3.50	4.00	4.50	6.00	8.00	8.58

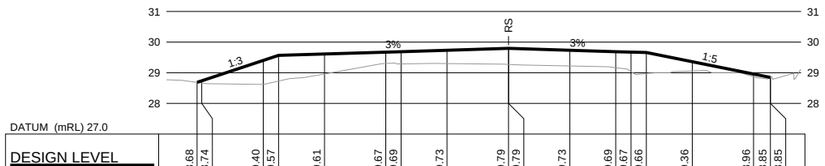
CHAINAGE 1460



DATUM (mRL) 28.0

DESIGN LEVEL	29.24	29.12	29.14	29.15	29.20	29.26	29.26	29.20	29.15	29.14	29.12	29.12
EXISTING LEVEL	29.24	29.24	29.24	29.23	29.23	29.22	29.22	29.21	29.20	29.17	29.12	29.12
OFFSET	-4.84	-4.50	-4.00	-3.50	-2.00	0.00	0.00	2.00	3.50	4.00	4.50	4.50

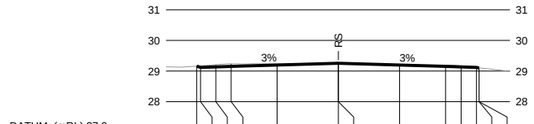
CHAINAGE 1380



DATUM (mRL) 27.0

DESIGN LEVEL	28.68	28.74	29.40	29.57	29.61	29.67	29.69	29.73	29.79	29.79	29.73	29.69	29.67	29.66	29.36	28.96	28.85	28.85
EXISTING LEVEL	28.68	28.66	28.62	28.73	28.96	29.31	29.29	29.30	29.27	29.27	29.22	29.16	29.04	28.97	29.06	28.88	28.85	28.85
OFFSET	-10.16	-10.00	-8.00	-7.50	-6.00	-4.00	-3.50	-2.00	0.00	0.00	2.00	3.50	4.00	4.50	6.00	8.00	8.55	8.55

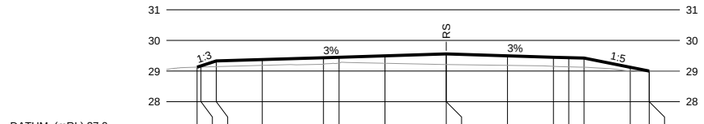
CHAINAGE 1440



DATUM (mRL) 27.0

DESIGN LEVEL	29.16	29.12	29.14	29.15	29.20	29.26	29.26	29.20	29.15	29.14	29.12	29.10	29.10
EXISTING LEVEL	29.16	29.17	29.21	29.24	29.23	29.22	29.22	29.20	29.19	29.17	29.11	29.10	29.10
OFFSET	-4.62	-4.50	-4.00	-3.50	-2.00	0.00	0.00	2.00	3.50	4.00	4.50	4.59	4.59

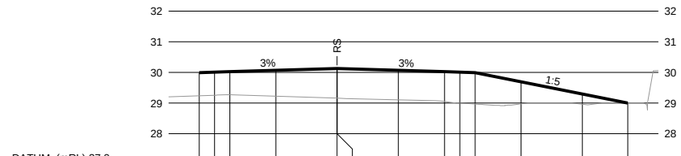
CHAINAGE 1375



DATUM (mRL) 27.0

DESIGN LEVEL	29.13	29.17	29.33	29.38	29.44	29.45	29.50	29.56	29.56	29.50	29.45	29.44	29.42	29.12	29.00	29.00	29.00
EXISTING LEVEL	29.13	29.13	29.14	29.19	29.23	29.26	29.26	29.22	29.22	29.19	29.16	29.14	29.13	29.00	29.00	29.00	29.00
OFFSET	-8.13	-8.00	-7.50	-6.00	-4.00	-3.50	-2.00	0.00	0.00	2.00	3.50	4.00	4.50	6.00	6.62	6.62	6.62

CHAINAGE 1420



DATUM (mRL) 27.0

DESIGN LEVEL	30.00	30.01	30.03	30.07	30.13	30.13	30.07	30.03	30.01	30.00	29.70	29.30	29.00
EXISTING LEVEL	29.24	29.25	29.27	29.22	29.16	29.16	29.11	29.05	29.00	28.97	28.97	28.96	29.00
OFFSET	-4.50	-4.00	-3.50	-2.00	0.00	0.00	2.00	3.50	4.00	4.50	6.00	8.00	9.48

CHAINAGE 1480

0 2.5 5 m
1:100 (A1)
1:200 (A3)

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25
2	FOR REVIEW	ALPO	TIBR	18.03.25
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	SIDP	Jan.25
DRAWN	ALPO	Jan.25
DESIGN CHECKED	TIBR	21.08.25
DRAWING CHECKED	WYHU	21.08.25

DRAWING STATUS: PRELIMINARY
PROJECT PHASE: PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

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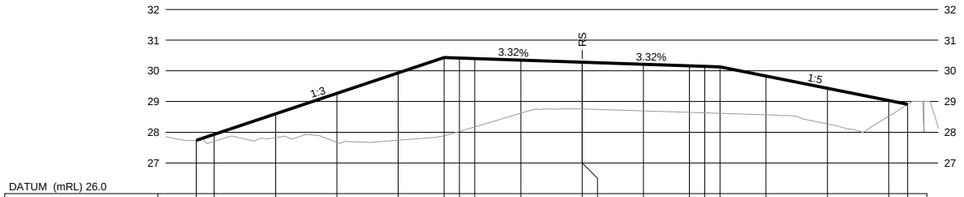
APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**
PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**
TITLE ROADING SECTIONS
TAIHAPE ROAD CROSS SECTION - SHEET 1
SCALE (A1) 1:100 DWG No. 1017353.2402-TT-043 REV 4

C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-044.dwg 2025-Aug-22 4:43:42 pm Plotted By: MLE

NOTES

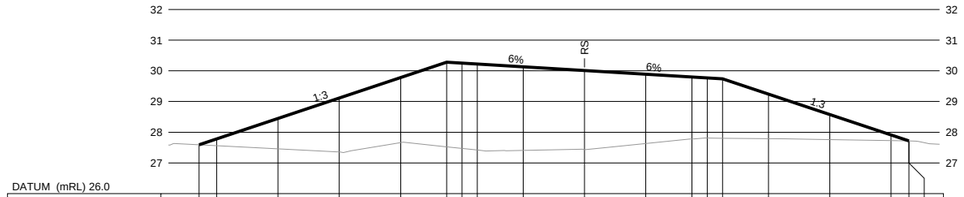
1. ALL DIMENSIONS IN METRES UNLESS STATED OTHERWISE.
2. LEVEL DATUM: NZVD 2016.
3. FINAL LEVELS TO BE REFINED AT DETAILED DESIGN TO ACCOMMODATE FINAL FLOOD MODELLING, LOCAL TOPOGRAPHY AND DESIGN REQUIREMENTS.



DATUM (mRL) 26.0

DESIGN LEVEL	27.74	27.93	28.60	29.26	29.93	30.43	30.41	30.40	30.35	30.28	30.28	30.22	30.17	30.15	30.13	29.83	29.43	29.03	28.91				
EXISTING LEVEL	27.74	27.71	27.82	27.66	27.74	27.88	28.03	28.17	28.62	28.76	28.76	28.69	28.65	28.63	28.61	28.57	28.27	28.52	28.91				
OFFSET	-12.59	-12.00	-10.00	-8.00	-6.00	-4.50	-4.00	-3.50	-2.00	0.00	0.00	2.00	3.50	4.00	4.50	6.00	8.00	10.00	10.62				

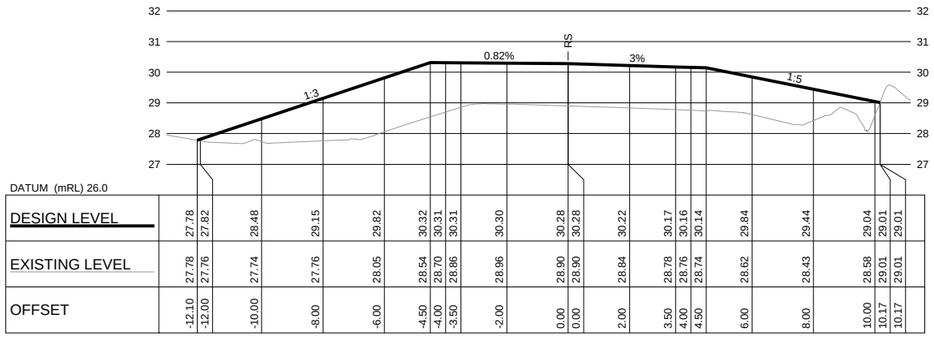
CHAINAGE 1540



DATUM (mRL) 26.0

DESIGN LEVEL	27.59	27.78	28.45	29.11	29.78	30.28	30.25	30.22	30.13	30.01	29.89	29.80	29.77	29.74	29.24	28.57	27.91	27.71	27.71				
EXISTING LEVEL	27.59	27.56	27.46	27.36	27.66	27.52	27.47	27.42	27.41	27.43	27.63	27.78	27.81	27.80	27.79	27.76	27.72	27.71	27.71				
OFFSET	-12.57	-12.00	-10.00	-8.00	-6.00	-4.50	-4.00	-3.50	-2.00	0.00	2.00	3.50	4.00	4.50	6.00	8.00	10.00	10.58	10.58				

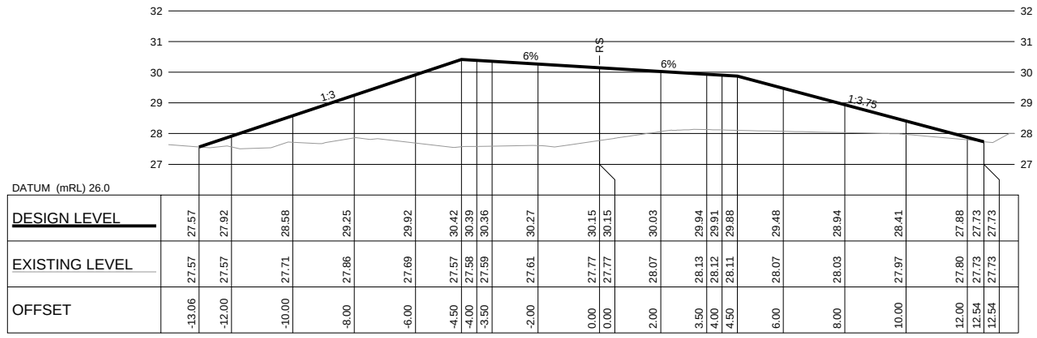
CHAINAGE 1600



DATUM (mRL) 26.0

DESIGN LEVEL	27.78	27.82	28.48	29.15	29.82	30.32	30.31	30.31	30.30	30.28	30.28	30.22	30.17	30.16	30.14	29.84	29.44	29.04	29.01	29.01			
EXISTING LEVEL	27.78	27.76	27.74	27.76	28.05	28.54	28.70	28.86	28.96	28.90	28.90	28.84	28.78	28.76	28.74	28.62	28.43	28.58	29.01	29.01			
OFFSET	-12.10	-12.00	-10.00	-8.00	-6.00	-4.50	-4.00	-3.50	-2.00	0.00	0.00	2.00	3.50	4.00	4.50	6.00	8.00	10.00	10.17	10.17			

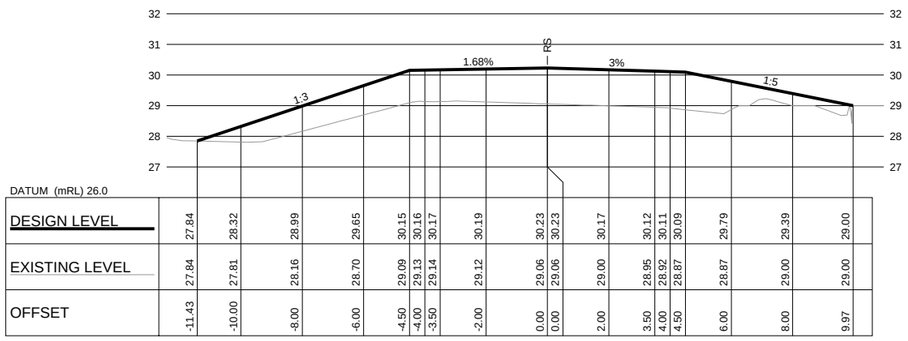
CHAINAGE 1520



DATUM (mRL) 26.0

DESIGN LEVEL	27.57	27.92	28.58	29.25	29.92	30.42	30.39	30.36	30.27	30.15	30.15	30.03	29.94	29.91	29.88	29.48	28.94	28.41	27.88	27.73	27.73		
EXISTING LEVEL	27.57	27.57	27.71	27.86	27.69	27.57	27.58	27.59	27.61	27.77	27.77	28.07	28.13	28.12	28.11	28.07	28.03	27.97	27.80	27.73	27.73		
OFFSET	-13.06	-12.00	-10.00	-8.00	-6.00	-4.50	-4.00	-3.50	-2.00	0.00	0.00	2.00	3.50	4.00	4.50	6.00	8.00	10.00	12.00	12.54	12.54		

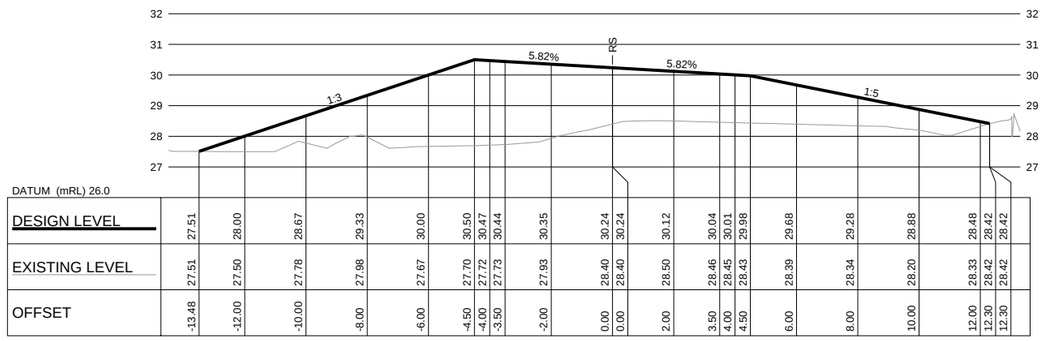
CHAINAGE 1580



DATUM (mRL) 26.0

DESIGN LEVEL	27.84	28.32	28.99	29.65	30.15	30.16	30.17	30.19	30.23	30.23	30.17	30.12	30.11	30.09	29.79	29.39	29.00						
EXISTING LEVEL	27.84	27.81	28.16	28.70	29.09	29.13	29.14	29.12	29.06	29.06	29.00	28.95	28.92	28.87	28.87	29.00	29.00						
OFFSET	-11.43	-10.00	-8.00	-6.00	-4.50	-4.00	-3.50	-2.00	0.00	0.00	2.00	3.50	4.00	4.50	6.00	8.00	9.97						

CHAINAGE 1500



DATUM (mRL) 26.0

DESIGN LEVEL	27.51	28.00	28.67	29.33	30.00	30.50	30.47	30.44	30.35	30.24	30.24	30.12	30.04	30.01	29.98	29.68	29.28	28.88	28.48	28.42	28.42		
EXISTING LEVEL	27.51	27.50	27.78	27.98	27.67	27.70	27.72	27.73	27.93	28.40	28.40	28.50	28.46	28.45	28.43	28.39	28.34	28.20	28.33	28.42	28.42		
OFFSET	-13.48	-12.00	-10.00	-8.00	-6.00	-4.50	-4.00	-3.50	-2.00	0.00	0.00	2.00	3.50	4.00	4.50	6.00	8.00	10.00	12.00	12.30	12.30		

CHAINAGE 1560

0 2.5 5 m
1:100 (A1)
1:200 (A3)

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25
2	FOR REVIEW	ALPO	TIBR	18.03.25
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	SIDP	Jan.25
DRAWN	ALPO	Jan.25
DESIGN CHECKED	TIBR	21.08.25
DRAWING CHECKED	WYHU	21.08.25

DRAWING STATUS: PRELIMINARY
PROJECT PHASE: PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED

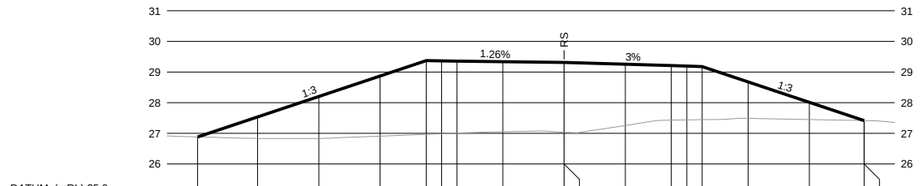
APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**
PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**
TITLE ROADING SECTIONS
TAIHAPE ROAD CROSS SECTION - SHEET 2
SCALE (A1) 1:100 DWG No. 1017353.2402-TT-044 REV 4

C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-045.dwg 2025-Aug-22 4:44:01 pm Plotted By: MLE

NOTES

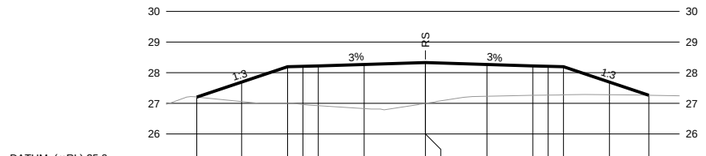
1. ALL DIMENSIONS IN METRES UNLESS STATED OTHERWISE.
2. LEVEL DATUM: NZVD 2016.
3. FINAL LEVELS TO BE REFINED AT DETAILED DESIGN TO ACCOMMODATE FINAL FLOOD MODELLING, LOCAL TOPOGRAPHY AND DESIGN REQUIREMENTS.



DATUM (mRL) 25.0

DESIGN LEVEL	26.89	27.54	28.20	28.87	29.37	29.36	29.36	29.34	29.31	29.31	29.25	29.21	29.19	29.18	28.68	28.01	27.42	27.42
EXISTING LEVEL	26.89	26.83	26.83	26.91	26.97	26.99	27.01	27.05	27.04	27.04	27.26	27.43	27.44	27.45	27.49	27.45	27.42	27.42
OFFSET	-11.96	-10.00	-8.00	-6.00	-4.50	-4.00	-3.50	-2.00	0.00	0.00	2.00	3.50	4.00	4.50	6.00	8.00	9.79	9.79

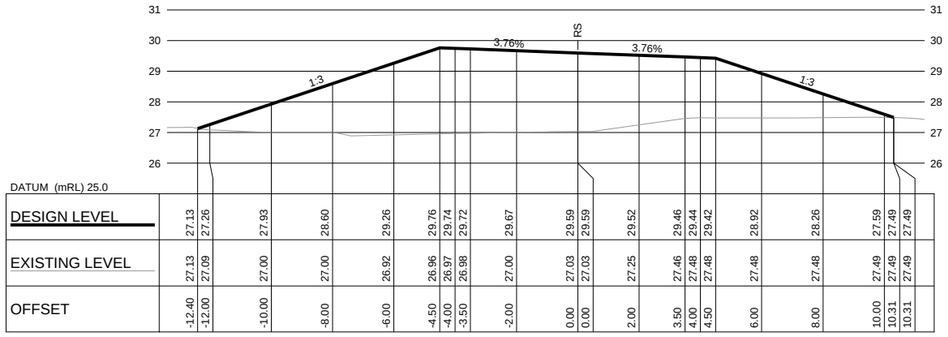
CHAINAGE 1660



DATUM (mRL) 25.0

DESIGN LEVEL	27.21	27.69	28.19	28.21	28.22	28.27	28.33	28.33	28.27	28.22	28.21	28.19	27.69	27.27
EXISTING LEVEL	27.21	27.06	27.00	26.97	26.93	26.83	27.00	27.00	27.23	27.26	27.27	27.28	27.28	27.27
OFFSET	-7.46	-6.00	-4.50	-4.00	-3.50	-2.00	0.00	0.00	2.00	3.50	4.00	4.50	6.00	7.29

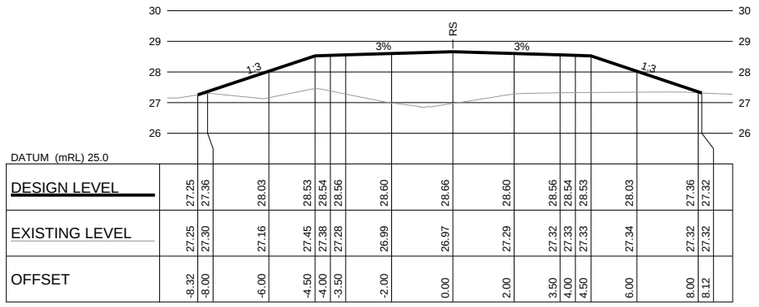
CHAINAGE 1720



DATUM (mRL) 25.0

DESIGN LEVEL	27.13	27.26	27.93	28.60	29.26	29.76	29.74	29.72	29.67	29.59	29.59	29.52	29.46	29.44	29.42	28.92	28.26	27.59	27.49	27.49
EXISTING LEVEL	27.13	27.09	27.00	27.00	26.92	26.96	26.97	26.98	27.00	27.03	27.03	27.25	27.46	27.48	27.48	27.48	27.48	27.49	27.49	27.49
OFFSET	-12.40	-12.00	-10.00	-8.00	-6.00	-4.50	-4.00	-3.50	-2.00	0.00	0.00	2.00	3.50	4.00	4.50	6.00	8.00	10.00	10.31	10.31

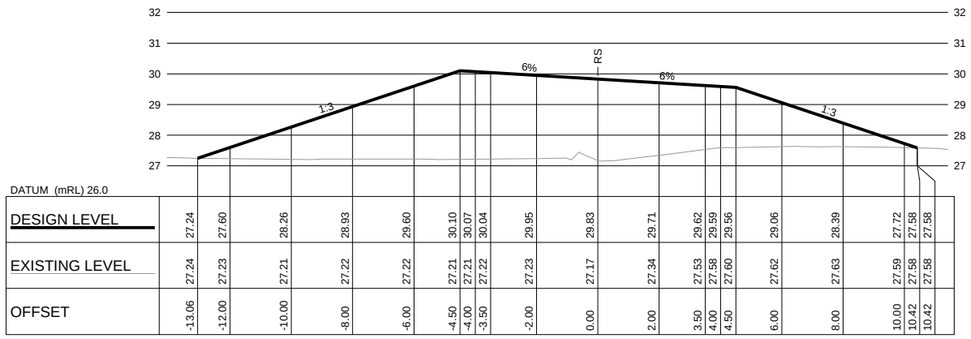
CHAINAGE 1640



DATUM (mRL) 25.0

DESIGN LEVEL	27.25	27.36	28.03	28.53	28.54	28.56	28.60	28.66	28.60	28.56	28.54	28.53	28.03	27.36	27.32	
EXISTING LEVEL	27.25	27.30	27.16	27.45	27.38	27.28	26.99	26.97	27.29	27.32	27.33	27.33	27.34	27.32	27.32	
OFFSET	-8.32	-8.00	-6.00	-4.50	-4.00	-3.50	-2.00	0.00	2.00	3.50	4.00	4.50	6.00	8.00	8.12	

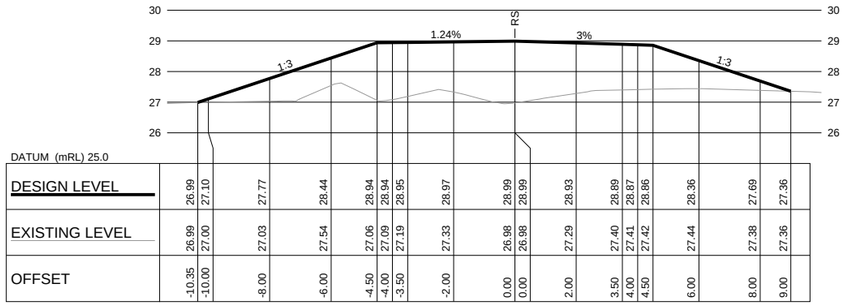
CHAINAGE 1700



DATUM (mRL) 26.0

DESIGN LEVEL	27.24	27.60	28.26	28.93	29.60	30.10	30.07	30.04	29.95	29.83	29.71	29.62	29.59	29.56	29.06	28.39	27.72	27.58	27.58
EXISTING LEVEL	27.24	27.23	27.21	27.22	27.22	27.21	27.21	27.22	27.23	27.17	27.34	27.53	27.58	27.60	27.62	27.63	27.59	27.58	27.58
OFFSET	-13.06	-12.00	-10.00	-8.00	-6.00	-4.50	-4.00	-3.50	-2.00	0.00	2.00	3.50	4.00	4.50	6.00	8.00	10.00	10.42	10.42

CHAINAGE 1620



DATUM (mRL) 25.0

DESIGN LEVEL	26.99	27.10	27.77	28.44	28.94	28.94	28.95	28.97	28.99	28.99	28.93	28.89	28.87	28.86	28.36	27.69	27.36	
EXISTING LEVEL	26.99	27.00	27.03	27.54	27.06	27.09	27.19	27.33	26.98	26.98	27.29	27.40	27.41	27.42	27.44	27.38	27.36	
OFFSET	-10.35	-10.00	-8.00	-6.00	-4.50	-4.00	-3.50	-2.00	0.00	0.00	2.00	3.50	4.00	4.50	6.00	8.00	9.00	

CHAINAGE 1680

0 2.5 5 m
1:100 (A1)
1:200 (A3)

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25
2	FOR REVIEW	ALPO	TIBR	18.03.25
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	SIDP	Jan.25	DRAWING STATUS
DRAWN	ALPO	Jan.25	PRELIMINARY
DESIGN CHECKED	TIBR	21.08.25	PROJECT PHASE
DRAWING CHECKED	WYHU	21.08.25	PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED

APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**

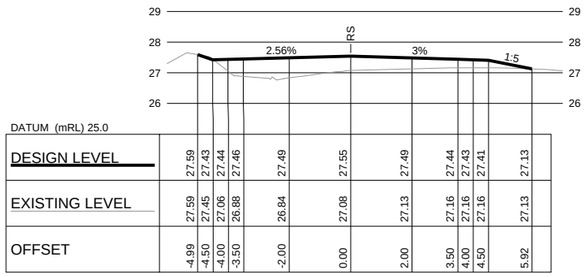
PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

TITLE ROADING SECTIONS
TAIHAPE ROAD CROSS SECTION - SHEET 3

SCALE (A1) 1:100 DWG No. 1017353.2402-TT-045 REV 4

NOTES

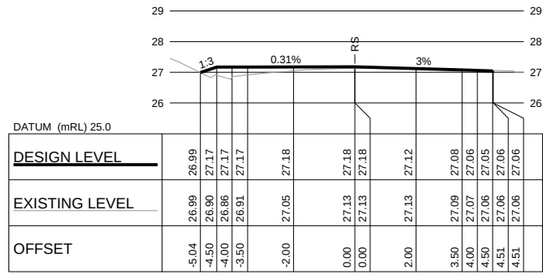
1. ALL DIMENSIONS IN METRES UNLESS STATED OTHERWISE.
2. LEVEL DATUM: NZVD 2016.
3. FINAL LEVELS TO BE REFINED AT DETAILED DESIGN TO ACCOMMODATE FINAL FLOOD MODELLING, LOCAL TOPOGRAPHY AND DESIGN REQUIREMENTS.



DATUM (mRL) 25.0

DESIGN LEVEL	27.59	27.43	27.44	27.46	27.49	27.55	27.49	27.44	27.43	27.41	27.13
EXISTING LEVEL	27.59	27.45	27.06	26.88	26.84	27.08	27.13	27.16	27.16	27.16	27.13
OFFSET	-4.99	-4.50	-4.00	-3.50	-2.00	0.00	2.00	3.50	4.00	4.50	5.92

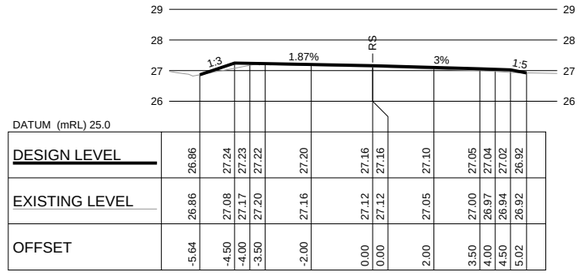
CHAINAGE 1780



DATUM (mRL) 25.0

DESIGN LEVEL	26.99	27.17	27.17	27.17	27.18	27.18	27.18	27.12	27.08	27.06	27.05	27.06	27.06
EXISTING LEVEL	26.99	26.90	26.86	26.91	27.05	27.13	27.13	27.13	27.09	27.07	27.06	27.06	27.06
OFFSET	-5.04	-4.50	-4.00	-3.50	-2.00	0.00	0.00	2.00	3.50	4.00	4.50	4.51	4.51

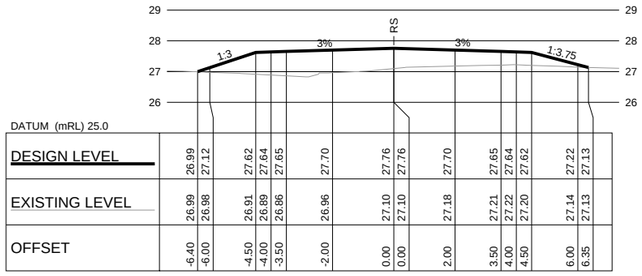
CHAINAGE 1840



DATUM (mRL) 25.0

DESIGN LEVEL	26.86	27.24	27.23	27.22	27.20	27.16	27.16	27.10	27.05	27.04	27.02	26.92
EXISTING LEVEL	26.86	27.08	27.17	27.20	27.16	27.12	27.12	27.05	27.00	26.97	26.94	26.92
OFFSET	-5.64	-4.50	-4.00	-3.50	-2.00	0.00	0.00	2.00	3.50	4.00	4.50	5.02

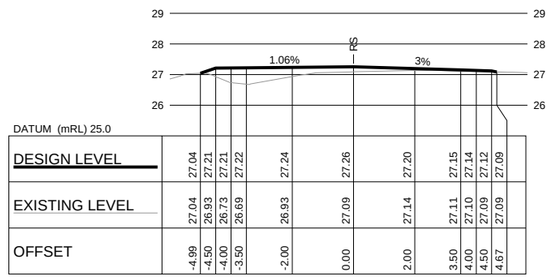
CHAINAGE 1897.99



DATUM (mRL) 25.0

DESIGN LEVEL	26.99	27.12	27.62	27.64	27.65	27.70	27.76	27.76	27.70	27.65	27.64	27.62	27.22	27.13
EXISTING LEVEL	26.99	26.98	26.91	26.89	26.86	26.96	27.10	27.10	27.18	27.21	27.22	27.20	27.14	27.13
OFFSET	-6.40	-6.00	-4.50	-4.00	-3.50	-2.00	0.00	0.00	2.00	3.50	4.00	4.50	6.00	6.35

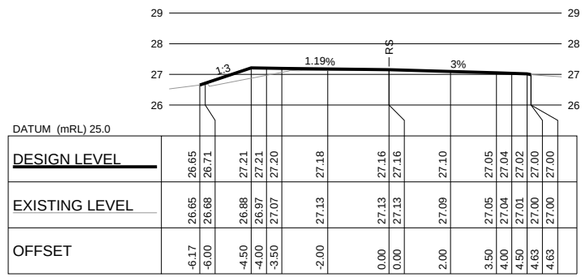
CHAINAGE 1760



DATUM (mRL) 25.0

DESIGN LEVEL	27.04	27.21	27.21	27.22	27.24	27.26	27.20	27.15	27.14	27.12	27.09
EXISTING LEVEL	27.04	26.93	26.73	26.69	26.93	27.09	27.14	27.11	27.10	27.09	27.09
OFFSET	-4.99	-4.50	-4.00	-3.50	-2.00	0.00	2.00	3.50	4.00	4.50	4.67

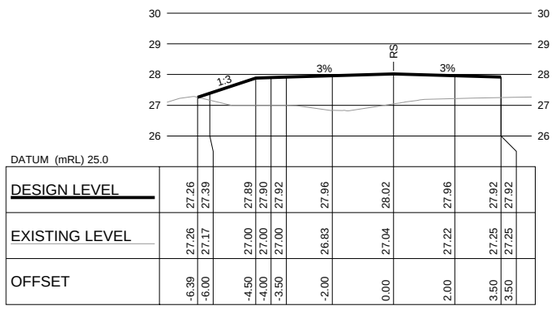
CHAINAGE 1820



DATUM (mRL) 25.0

DESIGN LEVEL	26.65	26.71	27.21	27.21	27.20	27.18	27.16	27.16	27.10	27.05	27.04	27.02	27.00	27.00
EXISTING LEVEL	26.65	26.68	26.88	26.97	27.07	27.13	27.13	27.13	27.09	27.05	27.04	27.01	27.00	27.00
OFFSET	-6.17	-6.00	-4.50	-4.00	-3.50	-2.00	0.00	0.00	2.00	3.50	4.00	4.50	4.63	4.63

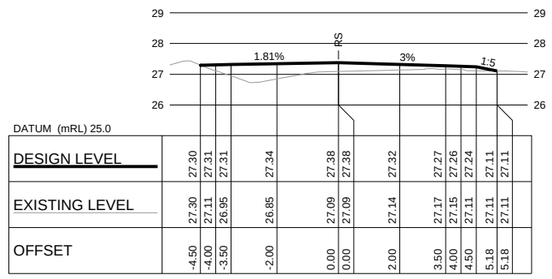
CHAINAGE 1880



DATUM (mRL) 25.0

DESIGN LEVEL	27.26	27.39	27.89	27.90	27.92	27.96	28.02	27.96	27.92	27.92
EXISTING LEVEL	27.26	27.17	27.00	27.00	27.00	26.83	27.04	27.22	27.25	27.25
OFFSET	-6.39	-6.00	-4.50	-4.00	-3.50	-2.00	0.00	2.00	3.50	3.50

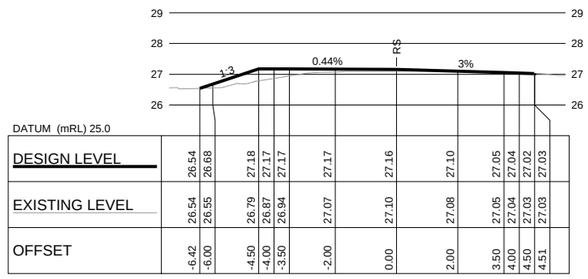
CHAINAGE 1740



DATUM (mRL) 25.0

DESIGN LEVEL	27.30	27.31	27.31	27.34	27.38	27.38	27.32	27.27	27.26	27.24	27.11	27.11
EXISTING LEVEL	27.30	27.11	26.95	26.85	27.09	27.09	27.14	27.17	27.15	27.11	27.11	27.11
OFFSET	-4.50	-4.00	-3.50	-2.00	0.00	0.00	2.00	3.50	4.00	4.50	5.18	5.18

CHAINAGE 1800



DATUM (mRL) 25.0

DESIGN LEVEL	26.54	26.68	27.18	27.17	27.17	27.17	27.16	27.10	27.05	27.04	27.02	27.03
EXISTING LEVEL	26.54	26.55	26.79	26.87	26.94	27.07	27.10	27.08	27.05	27.04	27.03	27.03
OFFSET	-6.42	-6.00	-4.50	-4.00	-3.50	-2.00	0.00	2.00	3.50	4.00	4.50	4.51

CHAINAGE 1860

0 2.5 5 m
1:100 (A1)
1:200 (A3)

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25
2	FOR REVIEW	ALPO	TIBR	18.03.25
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	SIDP	Jan.25	DRAWING STATUS	PRELIMINARY
DRAWN	ALPO	Jan.25		
DESIGN CHECKED	TIBR	21.08.25	PROJECT PHASE	PRELIMINARY DESIGN
DRAWING CHECKED	WYHU	21.08.25		

NOT FOR CONSTRUCTION

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED

APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

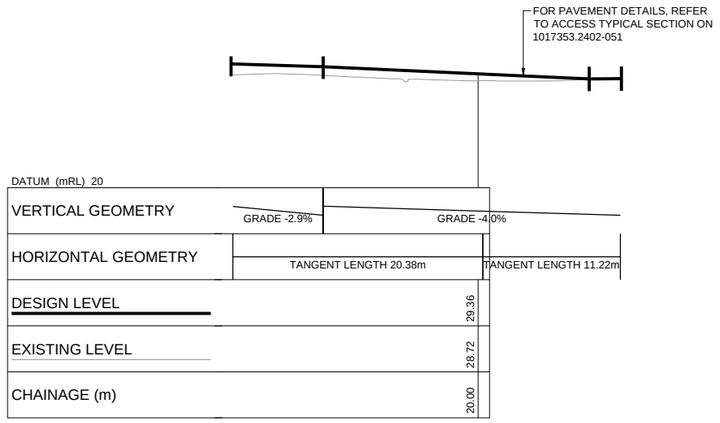
TITLE ROADING SECTIONS
TAIHAPE ROAD CROSS SECTION - SHEET 4

SCALE (A1) 1:100 DWG No. 1017353.2402-TT-046 REV 4

C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-048.dwg 2025-Aug-22 4:44:37 pm Plotted By: MLE

NOTES

1. ALL DIMENSIONS IN METRES UNLESS STATED OTHERWISE.
2. LEVEL DATUM: NZVD 2016.
3. FINAL LEVELS TO BE REFINED AT DETAILED DESIGN TO ACCOMMODATE FINAL FLOOD MODELLING, LOCAL TOPOGRAPHY AND DESIGN REQUIREMENTS.



1 LONG SECTION
021
SCALE (A1) 1:500
SCALE (A3) 1:1000

0 12.5 25 m
1:500 (A1)
1:1000 (A3)

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
2	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	SIDP	Jul,25	DRAWING STATUS
DRAWN	ALPO	Jul.25	PRELIMINARY
DESIGN CHECKED	TIBR	21.08.25	PROJECT PHASE
DRAWING CHECKED	WYHU	21.08.25	PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

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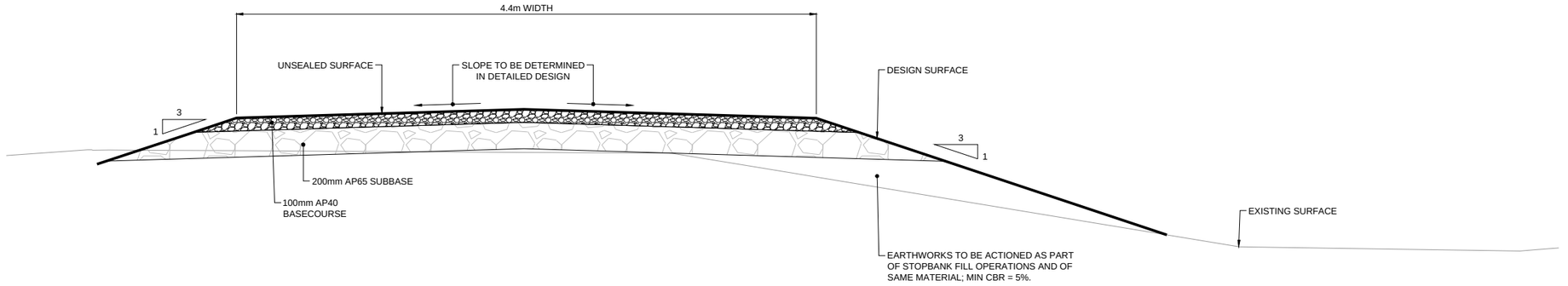
APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**
PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**
TITLE ROADING SECTIONS
ACCESS ROAD SECTION
SCALE (A1) 1:500 DWG No. 1017353.2402-TT-048 REV 2

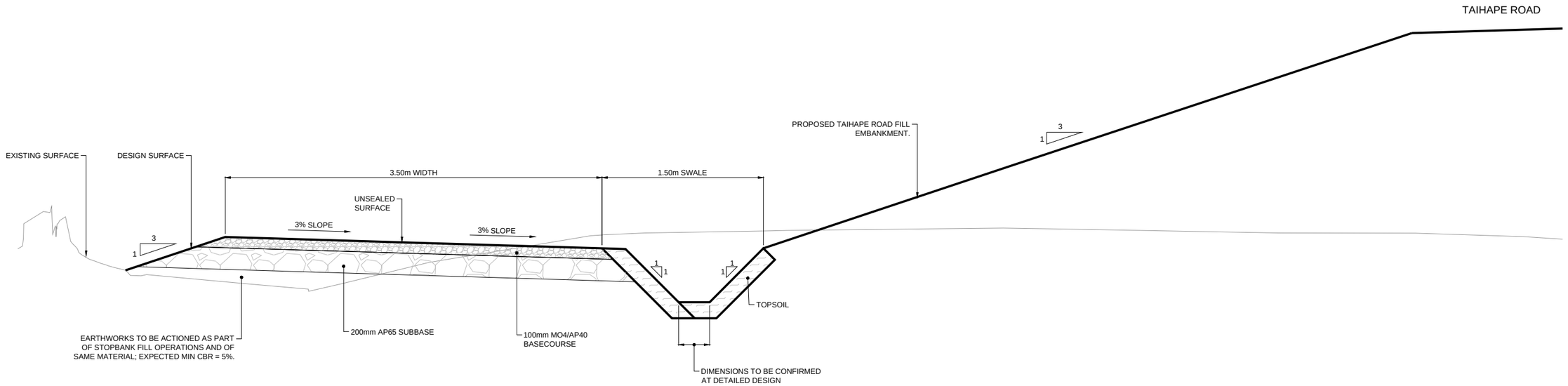
C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-051.dwg 2025-Aug-22 5:28:28 pm Plotted By: MLE

NOTES

1. ALL DIMENSIONS IN METRES UNLESS STATED OTHERWISE.
2. LEVEL DATUM: NZVD 2016.



1 / 021 ACCESS TYPICAL SECTION
SCALE (A1) 1:20
SCALE (A3) 1:40



2 / 021 2 / 023 ACCESS ROAD TYPICAL SECTION
SCALE (A1) 1:20
SCALE (A3) 1:40

0 0.5 1 m
1:20 (A1)
1:40 (A3)

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25
2	FOR REVIEW	ALPO	TIBR	18.03.25
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	SIDP	Jan.25	DRAWING STATUS
DRAWN	ALPO	Jan.25	PRELIMINARY
DESIGN CHECKED	TIBR	21.08.25	PROJECT PHASE
DRAWING CHECKED	WYHU	21.08.25	PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

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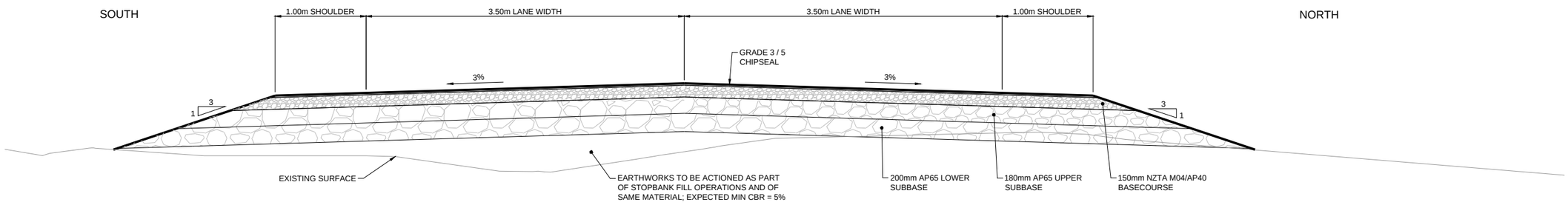
APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**
PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**
TITLE ROADING SECTIONS
TYPICAL SECTIONS - SHEET 1
SCALE (A1) 1:20 DWG No. 1017353.2402-TT-051 REV 4

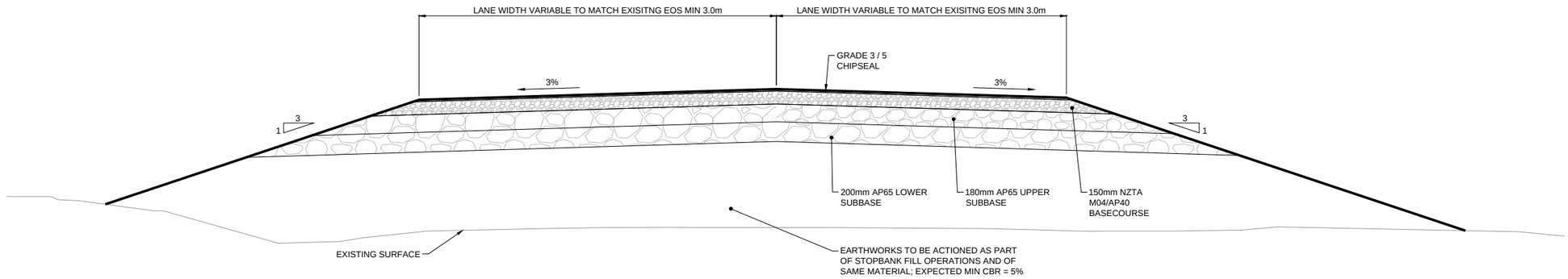
C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-052.dwg 2025-Aug-22 4:45:21 pm Plotted By: MLE

NOTES

1. ALL DIMENSIONS IN METRES UNLESS STATED OTHERWISE.
2. LEVEL DATUM: NZVD 2016.



3 / 021 TAIHAPE ROAD TYPICAL SECTION
SCALE (A1) 1:25
SCALE (A3) 1:50



4 / 011 OHITI ROAD TYPICAL SECTION
SCALE (A1) 1:25
SCALE (A3) 1:50

0 0.625 1.25 m
1:25 (A1)
1:50 (A3)

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25
2	FOR REVIEW	ALPO	TIBR	18.03.25
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	SIDP	Jan.25
DRAWN	ALPO	Jan.25
DESIGN CHECKED	TIBR	21.08.25
DRAWING CHECKED	WYHU	21.08.25

DRAWING STATUS: PRELIMINARY
PROJECT PHASE: PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED

APPROVED DATE

CLIENT: HAWKES BAY REGIONAL COUNCIL
PROJECT: OHITI ROAD FLOOD PROTECTION STOPBANK WORKS
TITLE: ROADING SECTIONS
TYPICAL SECTIONS - SHEET 2
SCALE (A1) 1:25 DWG No. 1017353.2402-TT-052 REV 4

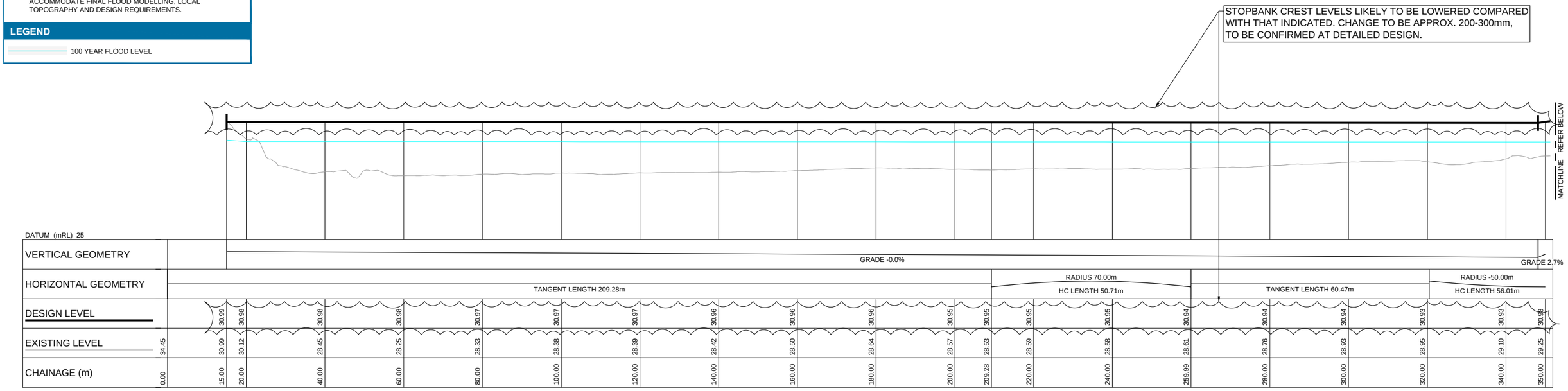
C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-071.dwg 2025-Aug-22 4:45:43 pm Plotted By: MLE

NOTES

1. ALL DIMENSIONS IN METRES UNLESS STATED OTHERWISE.
2. LEVEL DATUM: NZVD 2016
3. FINAL LEVELS TO BE REFINED AT DETAILED DESIGN TO ACCOMMODATE FINAL FLOOD MODELLING, LOCAL TOPOGRAPHY AND DESIGN REQUIREMENTS.

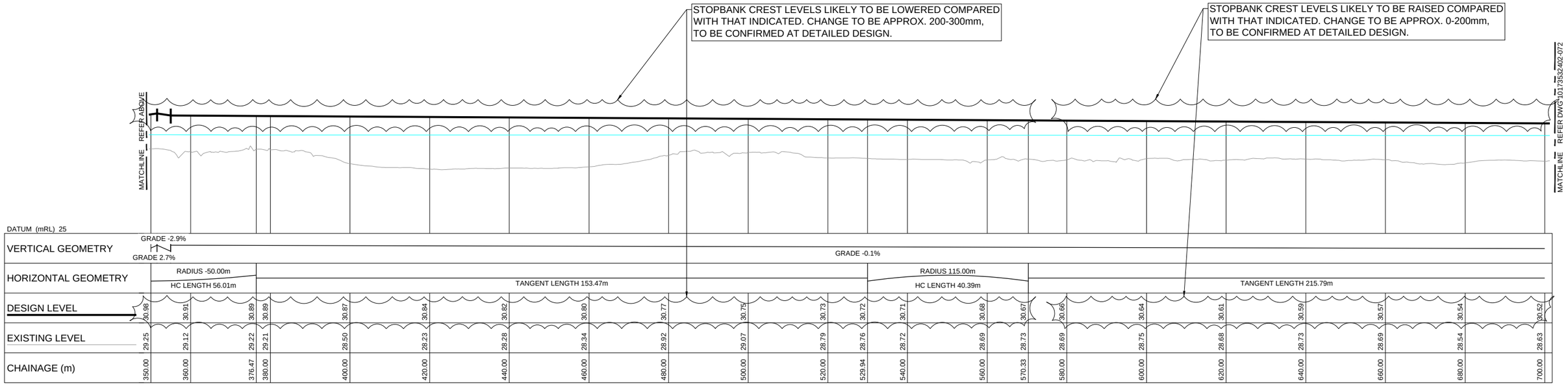
LEGEND

100 YEAR FLOOD LEVEL



1 LONG SECTION: OHITI STOPBANK - CH 0 TO CH 350

SCALE (A1) 1:500 (HORIZ), 1:100 (VERT)
SCALE (A3) 1:1000 (HORIZ), 1:200 (VERT)



1 LONG SECTION: OHITI STOPBANK - CH 350 TO CH 700

SCALE (A1) 1:500 (HORIZ), 1:100 (VERT)
SCALE (A3) 1:1000 (HORIZ), 1:200 (VERT)

0 12.5 25 m
0 2.5 5
H=1:500
V=1:100

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REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE
1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25		
2	FOR REVIEW	ALPO	TIBR	18.03.25		
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25		
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25		

DESIGNED	TIBR	Jan.25	DRAWING STATUS
DRAWN	ALPO	Jan.25	PRELIMINARY
DESIGN CHECKED	JWY	21.08.25	PROJECT PHASE
DRAWING CHECKED	WYHU	21.08.25	PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED

CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

TITLE STOPBANK SECTIONS
OHITI STOPBANK LONG SECTION - SHEET 1

SCALE (A1) AS SHOWN DWG No. 1017353.2402-TT-071 REV 4

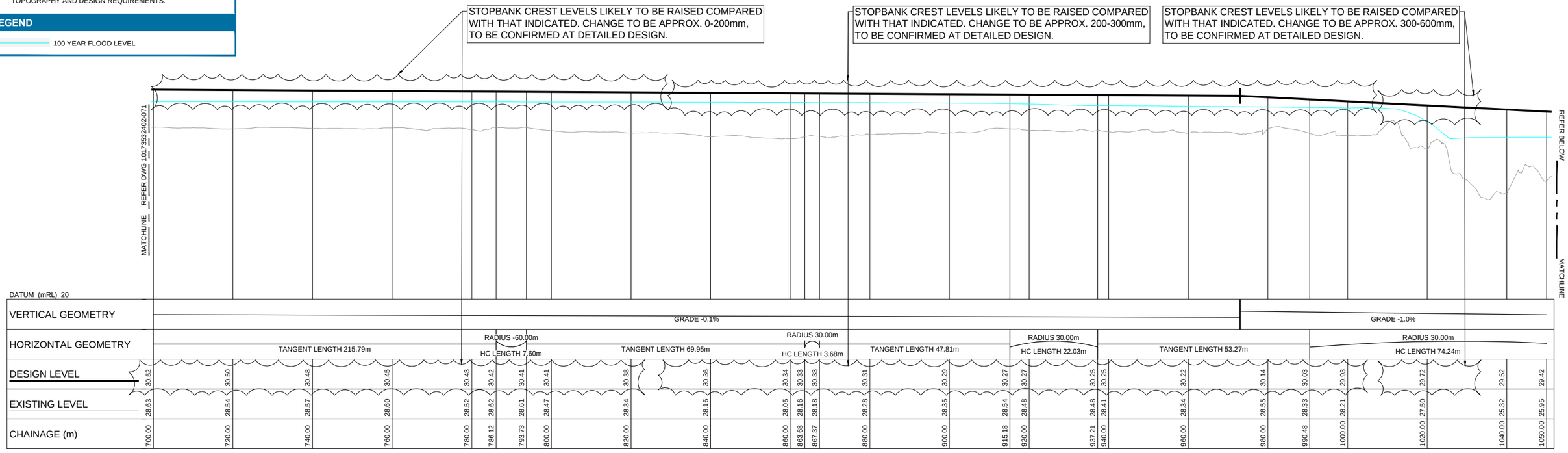
C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-072.dwg 2025-Aug-22 4:46:05 pm Plotted By: MLE

NOTES

1. ALL DIMENSIONS IN METRES UNLESS STATED OTHERWISE.
2. LEVEL DATUM: NZVD 2016
3. FINAL LEVELS TO BE REFINED AT DETAILED DESIGN TO ACCOMMODATE FINAL FLOOD MODELLING, LOCAL TOPOGRAPHY AND DESIGN REQUIREMENTS.

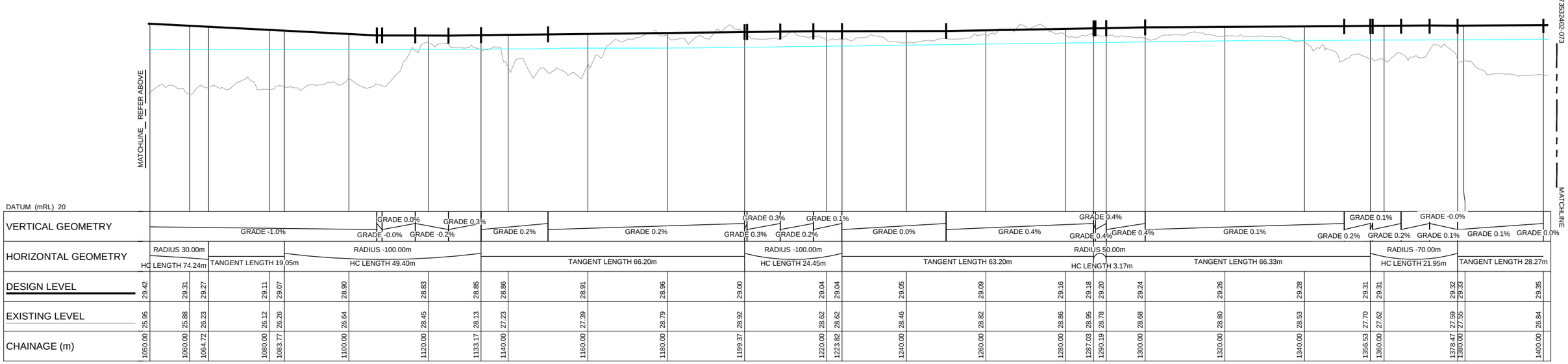
LEGEND

100 YEAR FLOOD LEVEL



1 - LONG SECTION: OHITI STOPBANK - CH 700 TO CH 1050

SCALE (A1) 1:500 (HORIZ), 1:100 (VERT)
SCALE (A3) 1:1000 (HORIZ), 1:200 (VERT)



1 - LONG SECTION: OHITI STOPBANK - CH 1050 TO CH 1400

SCALE (A1) 1:500 (HORIZ), 1:100 (VERT)
SCALE (A3) 1:1000 (HORIZ), 1:200 (VERT)

0 12.5 25 m H=1:500 V=1:100
0 2.5 5

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25
2	FOR REVIEW	ALPO	TIBR	18.03.25
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	TIBR	Jan.25
DRAWN	ALPO	Jan.25
DESIGN CHECKED	JWY	21.08.25
DRAWING CHECKED	WYHU	21.08.25

DRAWING STATUS: PRELIMINARY
PROJECT PHASE: PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED

APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**
PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**
TITLE STOPBANK SECTIONS
OHITI STOPBANK LONG SECTION - SHEET 2
SCALE (A1) AS SHOWN DWG No. 1017353.2402-TT-072 REV 4

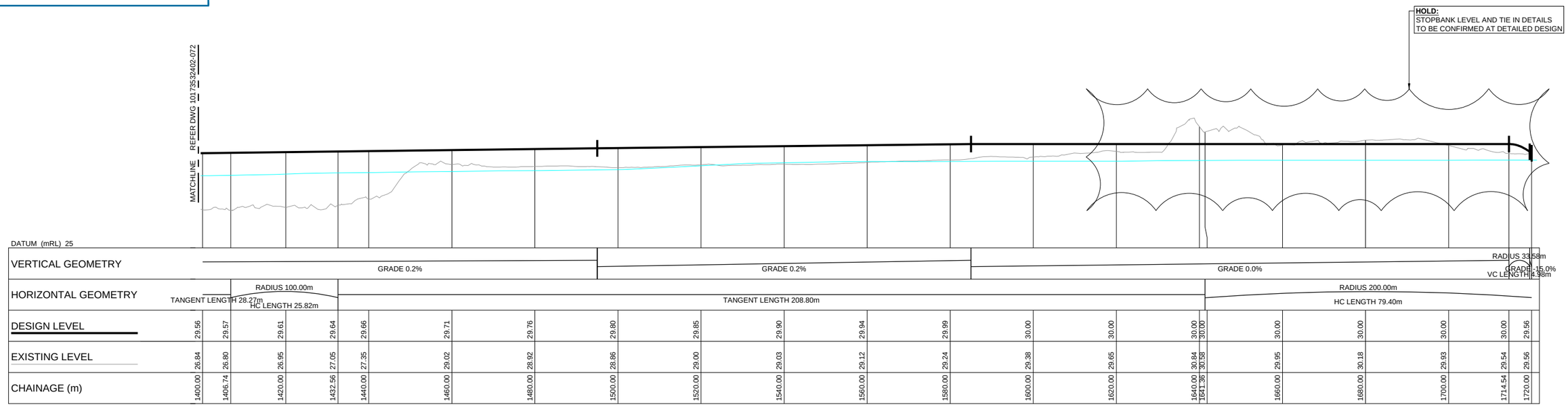
C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-073.dwg 2025-Aug-22 4:46:23 pm Plotted By: MLE

NOTES

1. ALL DIMENSIONS IN METRES UNLESS STATED OTHERWISE.
2. LEVEL DATUM: NZVD 2016
3. NORTHERN EXTENT OF OHITI STOPBANK CREST LEVELS ARE CURRENTLY DESIGNED TO THE PREVIOUS 100-YEAR ARI 2075 RCP8.5 PLUS 700mm LEVELS. UPDATE TO 2050 LEVELS WILL SHOW AN APPROXIMATELY 300mm CREST LOWERING TO THE WEST AND 300mm CREST RAISING TO THE EAST. TO BE UPDATED AT DETAILED DESIGN.
4. FINAL LEVELS TO BE REFINED AT DETAILED DESIGN TO ACCOMMODATE FINAL FLOOD MODELLING, LOCAL TOPOGRAPHY AND DESIGN REQUIREMENTS.

LEGEND

100 YEAR FLOOD LEVEL



1 LONG SECTION: OHITI STOPBANK - CH 1400 TO CH 1720

SCALE (A1) 1:500 (HORIZ), 1:100 (VERT)
SCALE (A3) 1:1000 (HORIZ), 1:200 (VERT)

0 12.5 25 m H=1:500
0 2.5 5 V=1:100

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25
2	FOR REVIEW	ALPO	TIBR	18.03.25
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	TIBR	Jan.25
DRAWN	ALPO	Jan.25
DESIGN CHECKED	JWY	21.08.25
DRAWING CHECKED	WYHU	21.08.25

APPROVED DATE

DRAWING STATUS: PRELIMINARY
PROJECT PHASE: PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED

CLIENT **HAWKES BAY REGIONAL COUNCIL**
PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**
TITLE STOPBANK SECTIONS
OHITI STOPBANK LONG SECTION - SHEET 3
SCALE (A1) AS SHOWN DWG No. 1017353.2402-TT-073 REV 4

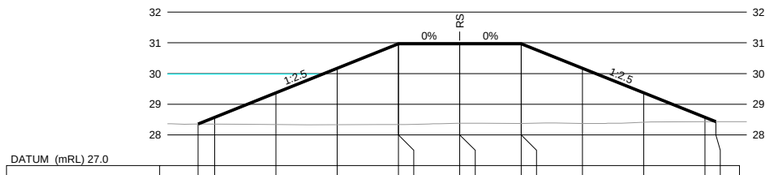
C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-074.dwg 2025-Aug-22 4:46:42 pm Plotted By: MLE

NOTES

1. ALL DIMENSIONS IN METRES UNLESS STATED OTHERWISE.
2. LEVEL DATUM: NZVD 2016.
3. NORTHERN EXTENT OF OHITI STOPBANK CREST LEVELS ARE CURRENTLY DESIGNED TO THE PREVIOUS 100-YEAR ARI 2075 RCP8.5 PLUS 700mm LEVELS. UPDATE TO 2050 LEVELS WILL SHOW AN APPROXIMATELY 300mm CREST LOWERING TO THE WEST AND 300mm CREST RAISING TO THE EAST. TO BE UPDATED AT DETAILED DESIGN.
4. FINAL LEVELS TO BE REFINED AT DETAILED DESIGN TO ACCOMMODATE FINAL FLOOD MODELLING, LOCAL TOPOGRAPHY AND DESIGN REQUIREMENTS.

LEGEND

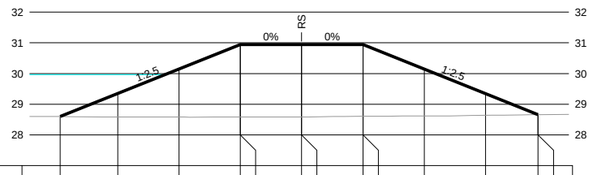
100 YEAR FLOOD LEVEL



DATUM (mRL) 27.0

DESIGN LEVEL	28.36	28.57	29.37	30.17	30.97	30.97	30.97	30.97	30.97	30.97	30.17	29.37	28.57	28.43
EXISTING LEVEL	28.36	28.35	28.33	28.33	28.34	28.34	28.38	28.38	28.37	28.37	28.37	28.41	28.43	28.43
OFFSET	-8.54	-8.00	-6.00	-4.00	-2.00	-2.00	0.00	0.00	2.00	2.00	4.00	6.00	8.00	8.36

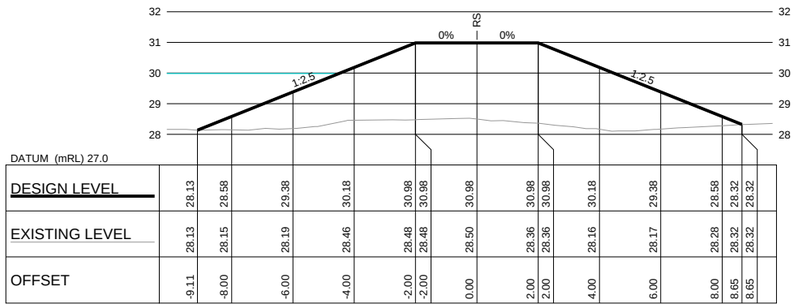
CHAINAGE 100



DATUM (mRL) 27.0

DESIGN LEVEL	28.60	29.35	30.15	30.95	30.95	30.95	30.95	30.95	30.95	30.15	29.35	28.66	28.66
EXISTING LEVEL	28.60	28.58	28.58	28.58	28.58	28.58	28.58	28.61	28.61	28.62	28.64	28.66	28.66
OFFSET	-7.87	-6.00	-4.00	-2.00	-2.00	0.00	0.00	2.00	2.00	4.00	6.00	7.71	7.71

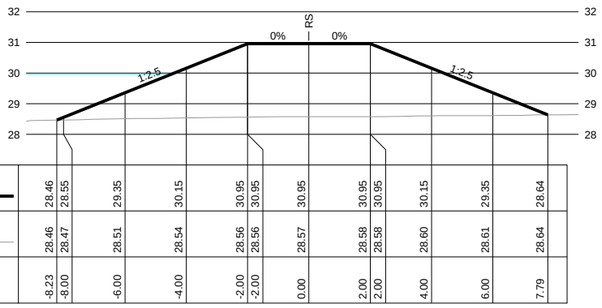
CHAINAGE 250



DATUM (mRL) 27.0

DESIGN LEVEL	28.13	28.58	29.38	30.18	30.98	30.98	30.98	30.98	30.98	30.18	29.38	28.58	28.32	28.32
EXISTING LEVEL	28.13	28.15	28.19	28.46	28.48	28.48	28.50	28.36	28.36	28.16	28.17	28.28	28.32	28.32
OFFSET	-9.11	-8.00	-6.00	-4.00	-2.00	-2.00	0.00	2.00	2.00	4.00	6.00	8.00	8.65	8.65

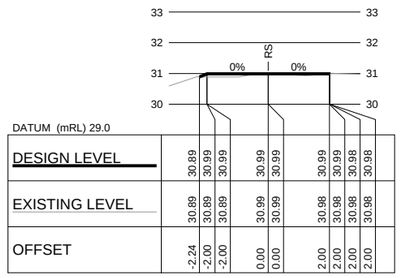
CHAINAGE 50



DATUM (mRL) 27.0

DESIGN LEVEL	28.46	28.55	29.35	30.15	30.95	30.95	30.95	30.95	30.95	30.15	29.35	28.64		
EXISTING LEVEL	28.46	28.47	28.51	28.54	28.56	28.56	28.57	28.58	28.58	28.60	28.61	28.64		
OFFSET	-8.23	-8.00	-6.00	-4.00	-2.00	-2.00	0.00	2.00	2.00	4.00	6.00	7.79		

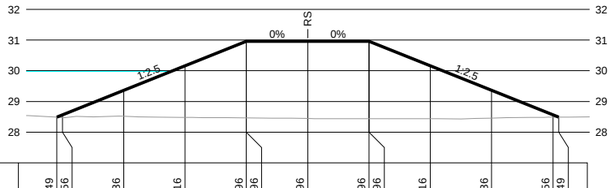
CHAINAGE 200



DATUM (mRL) 29.0

DESIGN LEVEL	30.89	30.99	30.99	30.99	30.99	30.99	30.99	30.98	30.98
EXISTING LEVEL	30.89	30.89	30.89	30.99	30.99	30.98	30.98	30.98	30.98
OFFSET	-2.24	-2.00	-2.00	0.00	0.00	2.00	2.00	2.00	2.00

CHAINAGE 15



DATUM (mRL) 27.0

DESIGN LEVEL	28.49	28.56	29.36	30.16	30.96	30.96	30.96	30.96	30.96	30.16	29.36	28.56	28.49	
EXISTING LEVEL	28.49	28.48	28.52	28.48	28.46	28.46	28.44	28.44	28.44	28.44	28.46	28.48	28.49	
OFFSET	-8.19	-8.00	-6.00	-4.00	-2.00	-2.00	0.00	2.00	2.00	4.00	6.00	8.00	8.19	

CHAINAGE 150

0 2.5 5 m

1:100 (A1)
1:200 (A3)

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25
2	FOR REVIEW	ALPO	TIBR	18.03.25
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	TIBR	Jan.25	DRAWING STATUS
DRAWN	ALPO	Jan.25	PRELIMINARY
DESIGN CHECKED	JWY	21.08.25	PROJECT PHASE
DRAWING CHECKED	WYHU	21.08.25	PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

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APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

TITLE STOPBANK SECTIONS
OHITI STOPBANK CROSS SECTION - SHEET 1

SCALE (A1) 1:100 DWG No. 1017353.2402-TT-074 REV 4

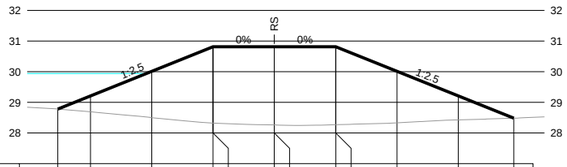
C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-075.dwg 2025-Aug-22 4:47:00 pm Plotted By: MLE

NOTES

1. ALL DIMENSIONS IN METRES UNLESS STATED OTHERWISE.
2. LEVEL DATUM: NZVD 2016.
3. NORTHERN EXTENT OF OHITI STOPBANK CREST LEVELS ARE CURRENTLY DESIGNED TO THE PREVIOUS 100-YEAR ARI 2075 RCP8.5 PLUS 700mm LEVELS. UPDATE TO 2050 LEVELS WILL SHOW AN APPROXIMATELY 300mm CREST LOWERING TO THE WEST AND 300mm CREST RAISING TO THE EAST. TO BE UPDATED AT DETAILED DESIGN.
4. FINAL LEVELS TO BE REFINED AT DETAILED DESIGN TO ACCOMMODATE FINAL FLOOD MODELLING, LOCAL TOPOGRAPHY AND DESIGN REQUIREMENTS.

LEGEND

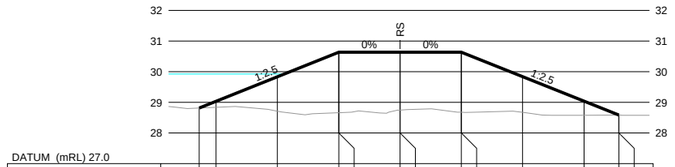
100 YEAR FLOOD LEVEL



DATUM (mRL) 27.0

DESIGN LEVEL	28.78	29.21	30.01	30.81	30.81	30.81	30.81	30.81	30.81	30.01	29.21	28.48
EXISTING LEVEL	28.78	28.69	28.50	28.33	28.33	28.26	28.26	28.27	28.27	28.33	28.43	28.48
OFFSET	-7.06	-6.00	-4.00	-2.00	-2.00	0.00	0.00	2.00	2.00	4.00	6.00	7.81

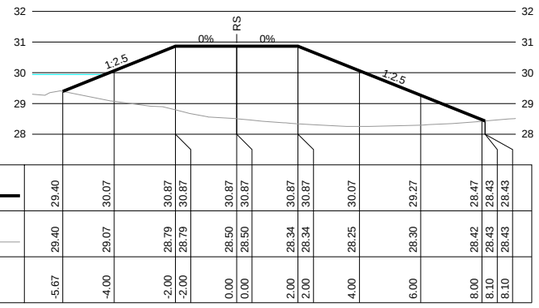
CHAINAGE 450



DATUM (mRL) 27.0

DESIGN LEVEL	28.82	29.04	29.84	30.64	30.64	30.64	30.64	30.64	30.64	29.84	29.04	28.58	28.58
EXISTING LEVEL	28.82	28.84	28.71	28.66	28.66	28.75	28.75	28.68	28.68	28.67	28.58	28.58	28.58
OFFSET	-6.56	-6.00	-4.00	-2.00	-2.00	0.00	0.00	2.00	2.00	4.00	6.00	7.13	7.13

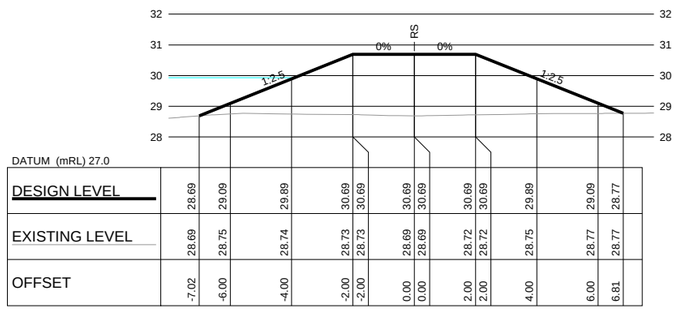
CHAINAGE 600



DATUM (mRL) 27.0

DESIGN LEVEL	29.40	30.07	30.87	30.87	30.87	30.87	30.87	30.87	30.07	29.27	28.47	28.43	28.43
EXISTING LEVEL	29.40	29.07	28.79	28.79	28.50	28.50	28.34	28.34	28.25	28.30	28.42	28.43	28.43
OFFSET	-5.67	-4.00	-2.00	-2.00	0.00	0.00	2.00	2.00	4.00	6.00	8.00	8.10	8.10

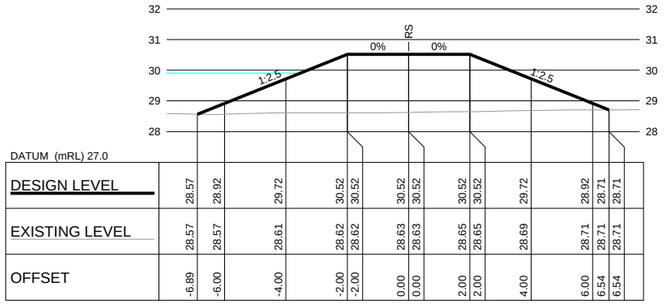
CHAINAGE 400



DATUM (mRL) 27.0

DESIGN LEVEL	28.69	29.09	29.89	30.69	30.69	30.69	30.69	30.69	30.69	29.89	29.09	28.77
EXISTING LEVEL	28.69	28.75	28.74	28.73	28.73	28.69	28.69	28.72	28.72	28.75	28.77	28.77
OFFSET	-7.02	-6.00	-4.00	-2.00	-2.00	0.00	0.00	2.00	2.00	4.00	6.00	6.81

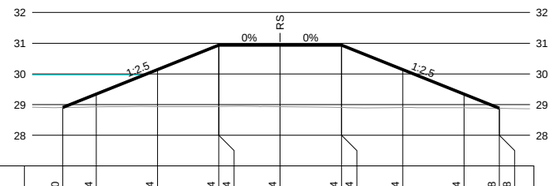
CHAINAGE 550



DATUM (mRL) 27.0

DESIGN LEVEL	28.57	28.92	29.72	30.52	30.52	30.52	30.52	30.52	30.52	29.72	28.92	28.71	28.71
EXISTING LEVEL	28.57	28.57	28.61	28.62	28.62	28.63	28.63	28.65	28.65	28.69	28.71	28.71	28.71
OFFSET	-6.89	-6.00	-4.00	-2.00	-2.00	0.00	0.00	2.00	2.00	4.00	6.00	6.54	6.54

CHAINAGE 700



DATUM (mRL) 27.0

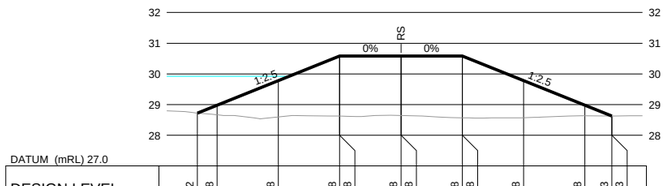
DESIGN LEVEL	28.90	29.34	30.14	30.94	30.94	30.94	30.94	30.94	30.14	29.34	28.88	28.88
EXISTING LEVEL	28.90	28.92	28.93	28.94	28.94	28.93	28.90	28.90	28.90	28.89	28.88	28.88
OFFSET	-7.09	-6.00	-4.00	-2.00	-2.00	0.00	2.00	2.00	4.00	6.00	7.15	7.15

CHAINAGE 300

DATUM (mRL) 27.0

DESIGN LEVEL	28.94	29.15	29.95	30.75	30.75	30.75	30.75	30.75	29.95	29.15	28.83	28.83
EXISTING LEVEL	28.94	28.99	29.01	29.05	29.05	29.07	29.07	28.85	28.85	28.89	28.79	28.83	28.83
OFFSET	-6.53	-6.00	-4.00	-2.00	-2.00	0.00	0.00	2.00	2.00	4.00	6.00	6.80	6.80

CHAINAGE 500



DATUM (mRL) 27.0

DESIGN LEVEL	28.72	28.98	29.78	30.58	30.58	30.58	30.58	30.58	30.58	29.78	28.98	28.63	28.63
EXISTING LEVEL	28.72	28.67	28.59	28.62	28.62	28.64	28.64	28.57	28.57	28.57	28.63	28.63	28.63
OFFSET	-6.64	-6.00	-4.00	-2.00	-2.00	0.00	0.00	2.00	2.00	4.00	6.00	6.88	6.88

CHAINAGE 650

0 2.5 5 m
1:100 (A1)
1:200 (A3)

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25
2	FOR REVIEW	ALPO	TIBR	18.03.25
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	TIBR	Jan.25
DRAWN	ALPO	Jan.25
DESIGN CHECKED	JWY	21.08.25
DRAWING CHECKED	WYHU	21.08.25

DRAWING STATUS: PRELIMINARY
PROJECT PHASE: PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED

APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

TITLE STOPBANK SECTIONS
OHITI STOPBANK CROSS SECTION - SHEET 2

SCALE (A1) 1:100 DWG No. 1017353.2402-TT-075 REV 4

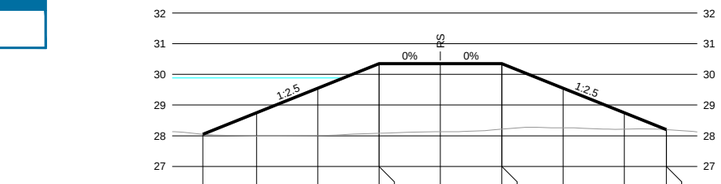
C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-076.dwg 2025-Aug-22 4:47:25 pm Plotted By: MLE

NOTES

1. ALL DIMENSIONS IN METRES UNLESS STATED OTHERWISE.
2. LEVEL DATUM: NZVD 2016.
3. NORTHERN EXTENT OF OHITI STOPBANK CREST LEVELS ARE CURRENTLY DESIGNED TO THE PREVIOUS 100-YEAR ARI 2075 RCP8.5 PLUS 700mm LEVELS. UPDATE TO 2050 LEVELS WILL SHOW AN APPROXIMATELY 300mm CREST LOWERING TO THE WEST AND 300mm CREST RAISING TO THE EAST. TO BE UPDATED AT DETAILED DESIGN.
4. FINAL LEVELS TO BE REFINED AT DETAILED DESIGN TO ACCOMMODATE FINAL FLOOD MODELLING, LOCAL TOPOGRAPHY AND DESIGN REQUIREMENTS.

LEGEND

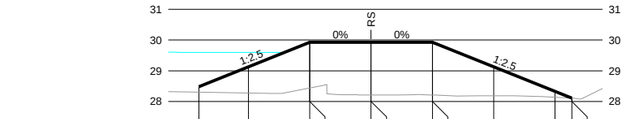
100 YEAR FLOOD LEVEL



DATUM (mRL) 26.0

DESIGN LEVEL	28.05	28.75	29.55	30.35	30.35	30.35	30.35	30.35	29.55	28.75	28.20	28.20
EXISTING LEVEL	28.05	27.99	28.00	28.08	28.08	28.13	28.21	28.21	28.26	28.22	28.20	28.20
OFFSET	-7.75	-6.00	-4.00	-2.00	-2.00	0.00	2.00	2.00	4.00	6.00	7.37	7.37

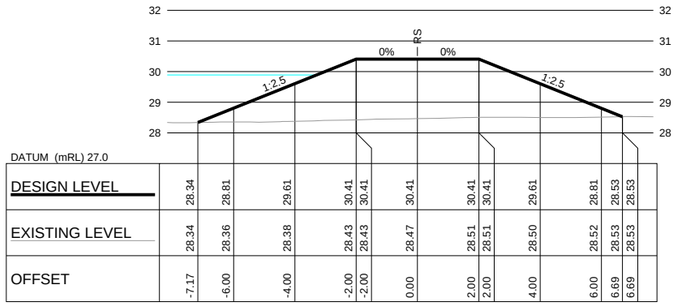
CHAINAGE 850



DATUM (mRL) 27.0

DESIGN LEVEL	28.48	29.13	29.93	29.93	29.93	29.93	29.93	29.93	29.13	28.33	28.11	28.11
EXISTING LEVEL	28.30	28.27	28.44	28.44	28.21	28.21	28.21	28.21	28.18	28.14	28.11	28.11
OFFSET	-5.62	-4.00	-2.00	-2.00	0.00	0.00	2.00	2.00	4.00	6.00	6.55	6.55

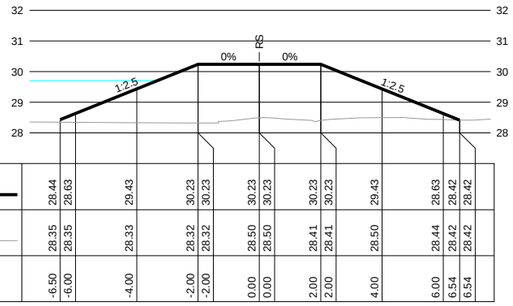
CHAINAGE 1000



DATUM (mRL) 27.0

DESIGN LEVEL	28.34	28.81	29.61	30.41	30.41	30.41	30.41	30.41	29.61	28.81	28.53	28.53
EXISTING LEVEL	28.34	28.36	28.38	28.43	28.43	28.47	28.51	28.51	28.50	28.52	28.53	28.53
OFFSET	-7.17	-6.00	-4.00	-2.00	-2.00	0.00	2.00	2.00	4.00	6.00	6.69	6.69

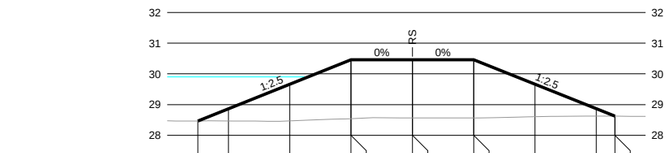
CHAINAGE 800



DATUM (mRL) 27.0

DESIGN LEVEL	28.44	28.63	29.43	30.23	30.23	30.23	30.23	30.23	30.23	29.43	28.63	28.42	28.42
EXISTING LEVEL	28.35	28.35	28.33	28.32	28.32	28.50	28.50	28.41	28.41	28.50	28.44	28.42	28.42
OFFSET	-6.50	-6.00	-4.00	-2.00	-2.00	0.00	0.00	2.00	2.00	4.00	6.00	6.54	6.54

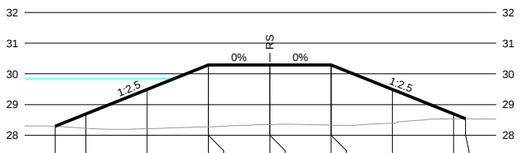
CHAINAGE 950



DATUM (mRL) 27.0

DESIGN LEVEL	28.46	28.86	29.66	30.46	30.46	30.46	30.46	30.46	29.66	28.86	28.62	28.62
EXISTING LEVEL	28.46	28.47	28.47	28.54	28.54	28.56	28.56	28.56	28.60	28.62	28.62	28.62
OFFSET	-7.00	-6.00	-4.00	-2.00	-2.00	0.00	0.00	2.00	2.00	4.00	6.00	6.60	6.60

CHAINAGE 750



DATUM (mRL) 27.0

DESIGN LEVEL	28.29	28.69	29.49	30.29	30.29	30.29	30.29	30.29	30.29	29.49	28.69	28.54
EXISTING LEVEL	28.29	28.22	28.21	28.27	28.27	28.35	28.35	28.33	28.33	28.39	28.53	28.54
OFFSET	-7.00	-6.00	-4.00	-2.00	-2.00	0.00	0.00	2.00	2.00	4.00	6.00	6.39

CHAINAGE 900

0 2.5 5 m

1:100 (A1)
1:200 (A3)

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25
2	FOR REVIEW	ALPO	TIBR	18.03.25
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	TIBR	Jan.25	DRAWING STATUS
DRAWN	ALPO	Jan.25	PRELIMINARY
DESIGN CHECKED	JWY	21.08.25	PROJECT PHASE
DRAWING CHECKED	WYHU	21.08.25	PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

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APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

TITLE STOPBANK SECTIONS
OHITI STOPBANK CROSS SECTION - SHEET 3

SCALE (A1) 1:100 DWG No. 1017353.2402-TT-076 REV 4

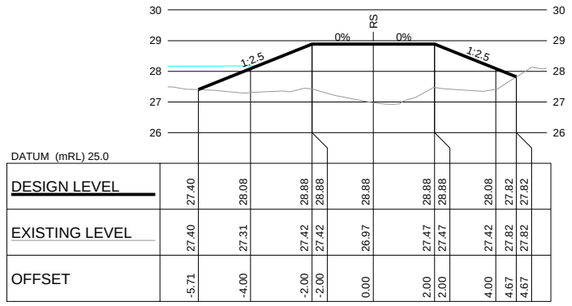
C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-077.dwg 2025-Aug-22 4:47:49 pm Plotted By: MLE

NOTES

1. ALL DIMENSIONS IN METRES UNLESS STATED OTHERWISE.
2. LEVEL DATUM: NZVD 2016.
3. NORTHERN EXTENT OF OHITI STOPBANK CREST LEVELS ARE CURRENTLY DESIGNED TO THE PREVIOUS 100-YEAR ARI 2075 RCP8.5 PLUS 700mm LEVELS. UPDATE TO 2050 LEVELS WILL SHOW AN APPROXIMATELY 300mm CREST LOWERING TO THE WEST AND 300mm CREST RAISING TO THE EAST. TO BE UPDATED AT DETAILED DESIGN.
4. FINAL LEVELS TO BE REFINED AT DETAILED DESIGN TO ACCOMMODATE FINAL FLOOD MODELLING, LOCAL TOPOGRAPHY AND DESIGN REQUIREMENTS.

LEGEND

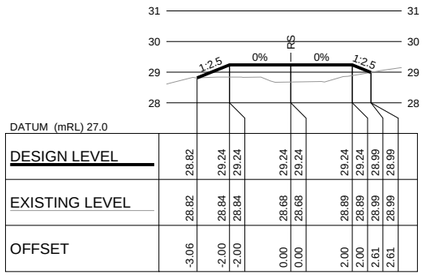
100 YEAR FLOOD LEVEL



DATUM (mRL) 25.0

DESIGN LEVEL	27.40	28.08	28.88	28.88	28.88	28.88	28.88	28.08	27.82	27.82
EXISTING LEVEL	27.40	27.31	27.42	27.42	26.97	27.47	27.47	27.42	27.82	27.82
OFFSET	-5.71	-4.00	-2.00	-2.00	0.00	2.00	2.00	4.00	4.67	4.67

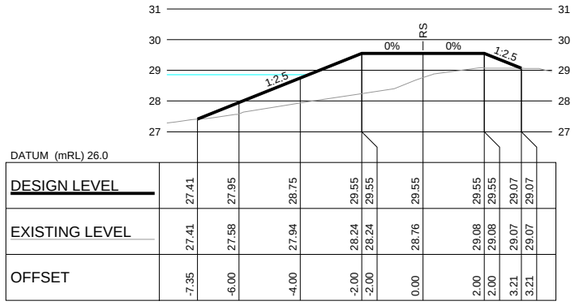
CHAINAGE 1150



DATUM (mRL) 27.0

DESIGN LEVEL	28.82	29.24	29.24	29.24	29.24	29.24	29.24	28.99	28.99
EXISTING LEVEL	28.82	28.84	28.84	28.68	28.68	28.89	28.89	28.99	28.99
OFFSET	-3.06	-2.00	-2.00	0.00	0.00	2.00	2.00	2.61	2.61

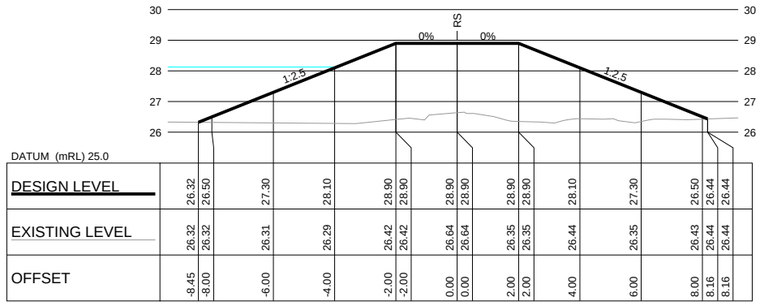
CHAINAGE 1300



DATUM (mRL) 26.0

DESIGN LEVEL	27.41	27.95	28.75	29.55	29.55	29.55	29.55	29.07	29.07
EXISTING LEVEL	27.41	27.58	27.94	28.24	28.24	28.76	29.08	29.07	29.07
OFFSET	-7.35	-6.00	-4.00	-2.00	-2.00	0.00	2.00	3.21	3.21

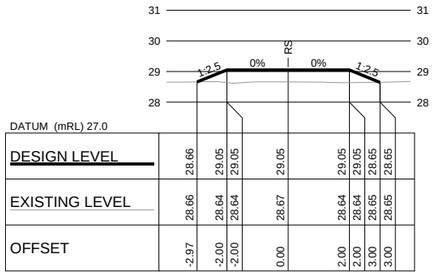
CHAINAGE 1450



DATUM (mRL) 25.0

DESIGN LEVEL	26.32	26.50	27.30	28.10	28.90	28.90	28.90	28.90	28.90	28.90	28.90	28.10	27.30	26.50	26.44	26.44
EXISTING LEVEL	26.32	26.32	26.31	26.29	26.42	26.42	26.64	26.64	26.35	26.35	26.44	26.35	26.43	26.44	26.44
OFFSET	-8.45	-8.00	-6.00	-4.00	-2.00	-2.00	0.00	0.00	2.00	2.00	4.00	6.00	8.00	8.16	8.16

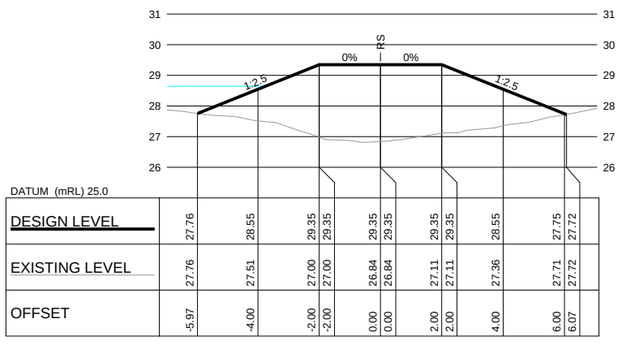
CHAINAGE 1100



DATUM (mRL) 27.0

DESIGN LEVEL	28.66	29.05	29.05	29.05	29.05	29.05	28.65	28.65	28.65
EXISTING LEVEL	28.66	28.64	28.64	28.67	28.64	28.64	28.65	28.65	28.65
OFFSET	-2.97	-2.00	-2.00	0.00	2.00	2.00	3.00	3.00	3.00

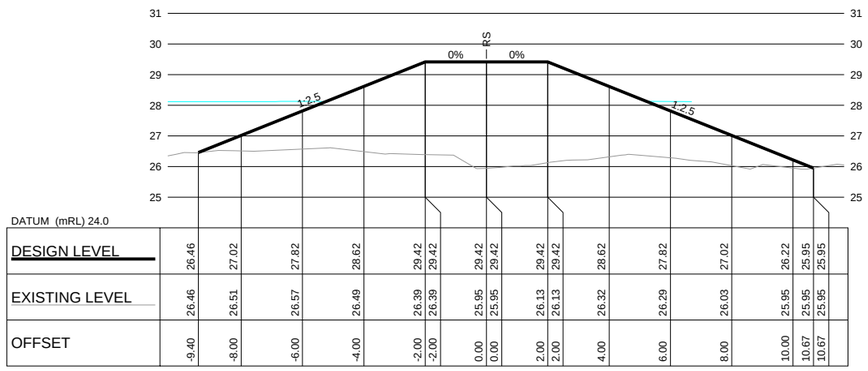
CHAINAGE 1250



DATUM (mRL) 25.0

DESIGN LEVEL	27.76	28.55	29.35	29.35	29.35	29.35	29.35	29.35	28.55	27.75	27.72
EXISTING LEVEL	27.76	27.51	27.00	27.00	26.84	26.84	27.11	27.11	27.36	27.71	27.72
OFFSET	-5.97	-4.00	-2.00	-2.00	0.00	0.00	2.00	2.00	4.00	6.00	6.07

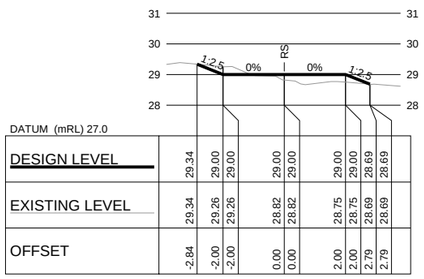
CHAINAGE 1400



DATUM (mRL) 24.0

DESIGN LEVEL	26.46	27.02	27.82	28.62	29.42	29.42	29.42	29.42	29.42	29.42	28.62	27.82	27.02	26.22	25.95	25.95
EXISTING LEVEL	26.46	26.51	26.57	26.49	26.39	26.39	25.95	25.95	26.13	26.13	26.32	26.29	26.03	25.95	25.95	25.95
OFFSET	-9.40	-8.00	-6.00	-4.00	-2.00	-2.00	0.00	0.00	2.00	2.00	4.00	6.00	8.00	10.00	10.67	10.67

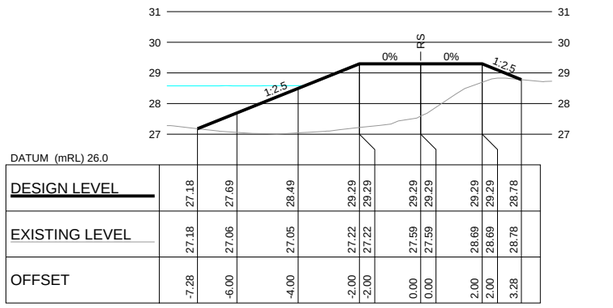
CHAINAGE 1050



DATUM (mRL) 27.0

DESIGN LEVEL	29.34	29.00	29.00	29.00	29.00	29.00	28.69	28.69	28.69
EXISTING LEVEL	29.34	29.26	29.26	28.82	28.82	28.75	28.75	28.69	28.69
OFFSET	-2.84	-2.00	-2.00	0.00	0.00	2.00	2.00	2.79	2.79

CHAINAGE 1200



DATUM (mRL) 26.0

DESIGN LEVEL	27.18	27.69	28.49	29.29	29.29	29.29	29.29	29.29	28.78
EXISTING LEVEL	27.18	27.06	27.05	27.22	27.22	27.59	27.59	28.69	28.78
OFFSET	-7.28	-6.00	-4.00	-2.00	-2.00	0.00	0.00	2.00	3.28

CHAINAGE 1350

0 2.5 5 m

1:100 (A1)
1:200 (A3)

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25
2	FOR REVIEW	ALPO	TIBR	18.03.25
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	TIBR	Jan.25	DRAWING STATUS
DRAWN	ALPO	Jan.25	PRELIMINARY
DESIGN CHECKED	JWY	21.08.25	PROJECT PHASE
DRAWING CHECKED	WYHU	21.08.25	PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED

APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

TITLE STOPBANK SECTIONS
OHITI STOPBANK CROSS SECTION - SHEET 4

SCALE (A1) 1:100 DWG No. 1017353.2402-TT-077 REV 4

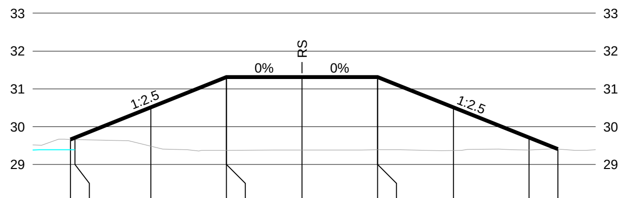
C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-078.dwg 2025-Aug-22 4:48:12 pm Plotted By: MLE

NOTES

1. ALL DIMENSIONS IN METRES UNLESS STATED OTHERWISE.
2. LEVEL DATUM: NZVD 2016.
3. NORTHERN EXTENT OF OHITI STOPBANK CREST LEVELS ARE CURRENTLY DESIGNED TO THE PREVIOUS 100-YEAR ARI 2075 RCP8.5 PLUS 700mm LEVELS. UPDATE TO 2050 LEVELS WILL SHOW AN APPROXIMATELY 300mm CREST LOWERING TO THE WEST AND 300mm CREST RAISING TO THE EAST. TO BE UPDATED AT DETAILED DESIGN.
4. FINAL LEVELS TO BE REFINED AT DETAILED DESIGN TO ACCOMMODATE FINAL FLOOD MODELLING, LOCAL TOPOGRAPHY AND DESIGN REQUIREMENTS.

LEGEND

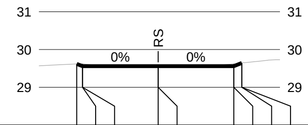
100 YEAR FLOOD LEVEL



DATUM (mRL) 28.0

DESIGN LEVEL	29.66	29.71	30.51	31.31	31.31	31.31	31.31	31.31	30.51	29.71	29.40
EXISTING LEVEL	29.66	29.66	29.48	29.37	29.37	29.38	29.39	29.39	29.37	29.38	29.40
OFFSET	-6.12	-6.00	-4.00	-2.00	-2.00	0.00	2.00	2.00	4.00	6.00	6.76

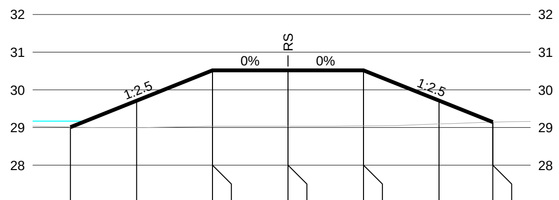
CHAINAGE 1600



DATUM (mRL) 28.0

DESIGN LEVEL	29.62	29.56	29.56	29.56	29.56	29.56	29.56	29.64	29.64
EXISTING LEVEL	29.62	29.62	29.62	29.56	29.56	29.62	29.62	29.64	29.64
OFFSET	-2.15	-2.00	-2.00	0.00	0.00	2.00	2.00	2.21	2.21

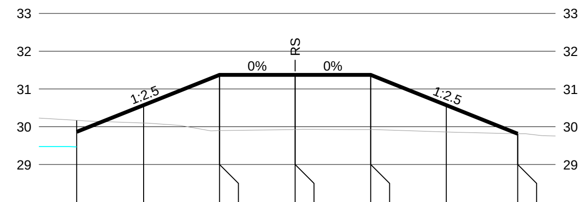
CHAINAGE 1720



DATUM (mRL) 27.0

DESIGN LEVEL	29.01	29.71	30.51	30.51	30.51	30.51	30.51	30.51	29.71	29.14	29.14
EXISTING LEVEL	29.01	29.00	29.03	29.03	29.03	29.03	29.04	29.04	29.09	29.14	29.14
OFFSET	-5.76	-4.00	-2.00	-2.00	0.00	0.00	2.00	2.00	4.00	5.42	5.42

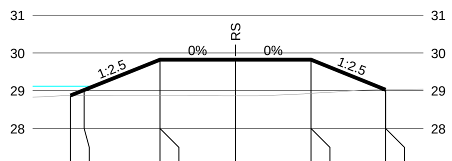
CHAINAGE 1550



DATUM (mRL) 28.0

DESIGN LEVEL	29.86	30.57	31.37	31.37	31.37	31.37	31.37	31.37	30.57	29.82	29.82
EXISTING LEVEL	30.17	30.10	29.90	29.90	29.93	29.93	29.92	29.92	29.87	29.82	29.82
OFFSET	-5.77	-4.00	-2.00	-2.00	0.00	0.00	2.00	2.00	4.00	5.89	5.89

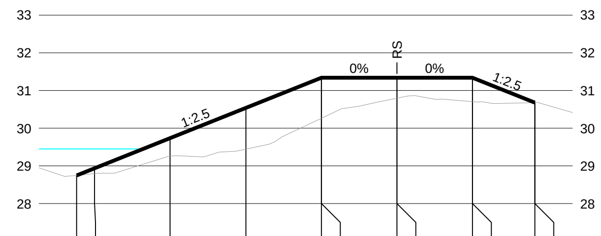
CHAINAGE 1700



DATUM (mRL) 27.0

DESIGN LEVEL	28.87	29.02	29.82	29.82	29.82	29.82	29.82	29.03	29.03
EXISTING LEVEL	28.87	28.87	28.88	28.88	28.86	28.93	28.93	29.03	29.03
OFFSET	-4.37	-4.00	-2.00	-2.00	0.00	2.00	2.00	3.97	3.97

CHAINAGE 1500



DATUM (mRL) 27.0

DESIGN LEVEL	28.75	28.94	29.74	30.54	31.34	31.34	31.34	31.34	31.34	31.34	30.68	30.68
EXISTING LEVEL	28.75	28.80	29.26	29.44	30.27	30.27	30.80	30.80	30.70	30.70	30.68	30.68
OFFSET	-8.47	-8.00	-6.00	-4.00	-2.00	-2.00	0.00	0.00	2.00	2.00	3.65	3.65

CHAINAGE 1650

0 2.5 5 m 1:100 (A1) 1:200 (A3)

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25
2	FOR REVIEW	ALPO	TIBR	18.03.25
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	TIBR	Jan.25
DRAWN	ALPO	Jan.25
DESIGN CHECKED	JWY	21.08.25
DRAWING CHECKED	WYHU	21.08.25

NOT FOR CONSTRUCTION

APPROVED DATE

DRAWING STATUS PRELIMINARY

PROJECT PHASE PRELIMINARY DESIGN

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED

CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

TITLE STOPBANK SECTIONS
OHITI STOPBANK CROSS SECTION - SHEET 5

SCALE (A1) 1:100 DWG No. 1017353.2402-TT-078 REV 4

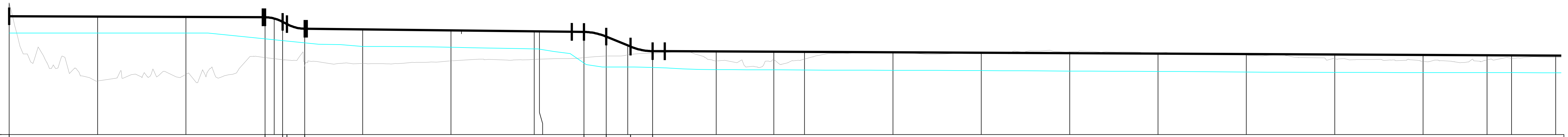
C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-081.dwg 2025-Aug-22 4:48:32 pm Plotted By: MLE

NOTES

1. ALL DIMENSIONS IN METRES UNLESS STATED OTHERWISE.
2. LEVEL DATUM: NZVD 2016.
3. FINAL LEVELS TO BE REFINED AT DETAILED DESIGN TO ACCOMMODATE FINAL FLOOD MODELLING, LOCAL TOPOGRAPHY AND DESIGN REQUIREMENTS.

LEGEND

100 YEAR FLOOD LEVEL



DATUM (mRL) 25

VERTICAL GEOMETRY: GRADE -0.1% | RADIUS 38.99m | GRADE -10.3% | VC LENGTH 4.00m | RADIUS 39.58m | GRADE -0.2% | RADIUS 62.53m | VC LENGTH 5.00m | GRADE -8.2% | RADIUS 61.53m | VC LENGTH 5.00m | GRADE -0.1%

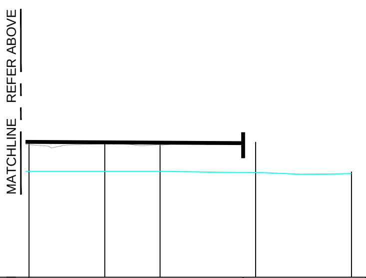
HORIZONTAL GEOMETRY: TANGENT LENGTH 118.84m | RADIUS -40.00m | HC LENGTH 54.20m | TANGENT LENGTH 161.43m | RADIUS 80.00m | HC LENGTH 32.89m

CHAINAGE (m)	DESIGN LEVEL	EXISTING LEVEL
0.00	30.37	30.98
20.00	30.35	27.43
40.00	30.34	27.73
57.89	30.32	28.50
60.00	30.26	28.44
61.89	30.11	28.40
66.86	29.80	28.10
80.00	29.77	28.22
100.00	29.73	28.35
118.84	29.68	28.41
120.00	29.68	28.42
130.10	29.66	28.49
135.10	29.45	28.56
140.00	29.04	28.63
145.61	28.78	28.69
160.00	28.77	28.34
173.05	28.76	28.40
180.00	28.75	28.42
200.00	28.73	28.70
220.00	28.71	28.67
240.00	28.69	28.75
260.00	28.67	28.71
280.00	28.65	28.61
300.00	28.63	28.45
320.00	28.61	28.32
334.47	28.60	28.39
340.00	28.59	28.47
350.00	28.58	28.51

1 / -

LONG SECTION: CHESTERHOPE UPPER STOPBANK - CH 0 TO CH 350

SCALE (A1) 1:500 (HORIZ), 1:100(VERT)
SCALE (A3) 1:1000 (HORIZ), 1:200 (VERT)



DATUM (mRL) 25

VERTICAL GEOMETRY: GRADE -0.1%

HORIZONTAL GEOMETRY: RADIUS 80.00m | HC LENGTH 32.89m | TANGENT LENGTH 25.35m

CHAINAGE (m)	DESIGN LEVEL	EXISTING LEVEL
350.00	28.58	28.51
360.00	28.57	28.53
367.36	28.56	28.50
380.00		28.58
392.72		27.80

1 / -

LONG SECTION: CHESTERHOPE UPPER STOPBANK - CH 350 TO CH 393

SCALE (A1) 1:500 (HORIZ), 1:100(VERT)
SCALE (A3) 1:1000 (HORIZ), 1:200 (VERT)

0 12.5 25 m
0 2.5 5
H=1:500
V=1:100

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25
2	FOR REVIEW	ALPO	TIBR	18.03.25
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	TIBR	Jan.25
DRAWN	ALPO	Jan.25
DESIGN CHECKED	JWY	21.08.25
DRAWING CHECKED	WYHU	21.08.25

NOT FOR CONSTRUCTION
APPROVED DATE

DRAWING STATUS: PRELIMINARY
PROJECT PHASE: PRELIMINARY DESIGN

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED

CLIENT **HAWKES BAY REGIONAL COUNCIL**
PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**
TITLE STOPBANK SECTIONS
CHESTERHOPE UPPER STOPBANK LONG SECTION
SCALE (A1) AS SHOWN DWG No. 1017353.2402-TT-081 REV 4

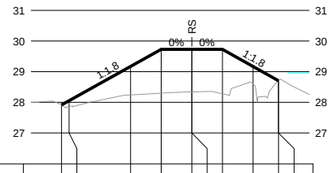
C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-082.dwg 2025-Aug-22 4:48:50 pm Plotted By: MLE

NOTES

1. ALL DIMENSIONS IN METRES UNLESS STATED OTHERWISE.
2. LEVEL DATUM: NZVD 2016.
3. FINAL LEVELS TO BE REFINED AT DETAILED DESIGN TO ACCOMMODATE FINAL FLOOD MODELLING, LOCAL TOPOGRAPHY AND DESIGN REQUIREMENTS.

LEGEND

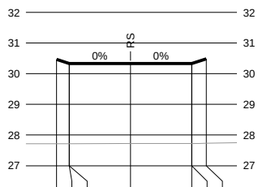
100 YEAR FLOOD LEVEL



DATUM (mRL) 26.0

DESIGN LEVEL	27.92	28.06	29.17	29.73	29.73	29.73	29.73	29.17	28.71	28.71	
EXISTING LEVEL	27.92	27.87	28.24	28.30	28.35	28.35	28.28	28.61	28.71	28.71	
OFFSET	-4.25	-4.00	-2.00	-1.00	0.00	0.00	1.00	2.00	2.83	2.83	

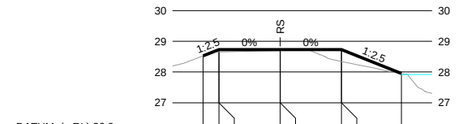
CHAINAGE 100



DATUM (mRL) 26.0

DESIGN LEVEL	30.47	30.33	30.33	30.33	30.33	30.33	30.49
EXISTING LEVEL	27.72	27.72	27.72	27.72	27.72	27.72	27.73
OFFSET	-2.41	-2.00	-2.00	0.00	2.00	2.00	2.47

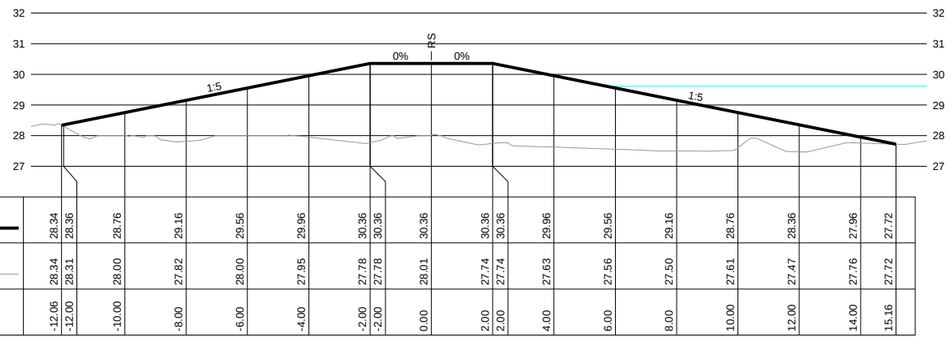
CHAINAGE 50



DATUM (mRL) 26.0

DESIGN LEVEL	28.53	28.73	28.73	28.73	28.73	28.73	27.95
EXISTING LEVEL	28.53	28.66	28.66	28.70	28.70	28.34	28.34	27.95
OFFSET	-2.51	-2.00	-2.00	0.00	0.00	2.00	2.00	3.95

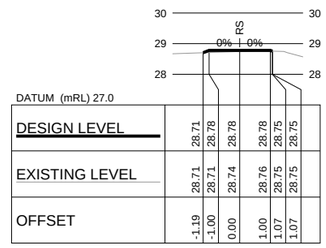
CHAINAGE 200



DATUM (mRL) 26.0

DESIGN LEVEL	28.34	28.36	28.76	29.16	29.56	29.96	30.36	30.36	30.36	30.36	30.36	29.96	29.56	29.16	28.76	28.36	27.96	27.72
EXISTING LEVEL	28.34	28.31	28.00	27.82	28.00	27.95	27.78	27.78	28.01	27.74	27.74	27.63	27.56	27.50	27.61	27.47	27.76	27.72
OFFSET	-12.06	-12.00	-10.00	-8.00	-6.00	-4.00	-2.00	-2.00	0.00	2.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	15.16

CHAINAGE 15



DATUM (mRL) 27.0

DESIGN LEVEL	28.71	28.78	28.78	28.78	28.75	28.75
EXISTING LEVEL	28.71	28.71	28.74	28.76	28.75	28.75
OFFSET	-1.19	-1.00	0.00	1.00	1.07	1.07

CHAINAGE 150

0 2.5 5 m
1:100 (A1)
1:200 (A3)

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25
2	FOR REVIEW	ALPO	TIBR	18.03.25
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	TIBR	Jan.25
DRAWN	ALPO	Jan.25
DESIGN CHECKED	JWY	21.08.25
DRAWING CHECKED	WYHU	21.08.25

DRAWING STATUS: PRELIMINARY
PROJECT PHASE: PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED

APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

TITLE STOPBANK SECTIONS
CHESTERHOPE UPPER STOPBANK CROSS SECTION - SHEET 1

SCALE (A1) 1:100 DWG No. 1017353.2402-TT-082 REV 4

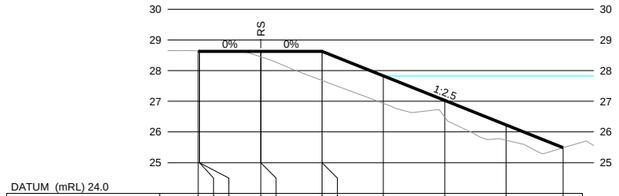
C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-083.dwg 2025-Aug-22 4:49:08 pm Plotted By: MLE

NOTES

1. ALL DIMENSIONS IN METRES UNLESS STATED OTHERWISE.
2. LEVEL DATUM: NZVD 2016.
3. FINAL LEVELS TO BE REFINED AT DETAILED DESIGN TO ACCOMMODATE FINAL FLOOD MODELLING, LOCAL TOPOGRAPHY AND DESIGN REQUIREMENTS.

LEGEND

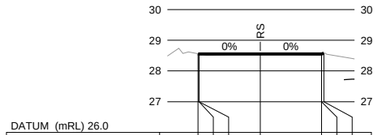
100 YEAR FLOOD LEVEL



DATUM (mRL) 24.0

DESIGN LEVEL	28.64	28.63	28.63	28.63	28.63	28.63	27.83	27.03	26.23	25.48
EXISTING LEVEL	28.64	28.64	28.64	28.45	28.45	27.68	27.68	26.93	26.49	25.73	25.48
OFFSET	-2.04	-2.00	-2.00	0.00	0.00	2.00	2.00	4.00	6.00	8.00	9.87

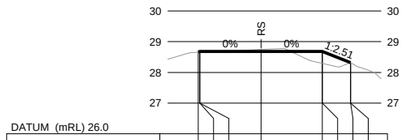
CHAINAGE 300



DATUM (mRL) 26.0

DESIGN LEVEL	28.56	28.55	28.55	28.55	28.55	28.55	28.58
EXISTING LEVEL	28.56	28.56	28.56	28.57	28.57	28.57	28.58
OFFSET	-2.03	-2.00	-2.00	0.00	2.00	2.00	2.08

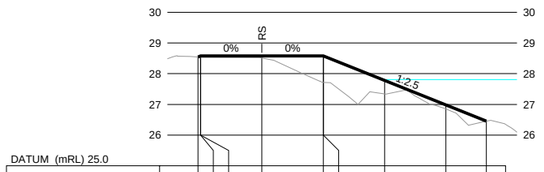
CHAINAGE 376.36



DATUM (mRL) 26.0

DESIGN LEVEL	28.66	28.68	28.68	28.68	28.68	28.68	28.31	28.31
EXISTING LEVEL	28.66	28.66	28.66	28.75	28.29	28.29	28.31	28.31
OFFSET	-2.05	-2.00	-2.00	0.00	2.00	2.00	2.92	2.92

CHAINAGE 250



DATUM (mRL) 25.0

DESIGN LEVEL	28.55	28.58	28.58	28.58	28.58	28.58	26.98	26.45
EXISTING LEVEL	28.55	28.54	28.54	28.51	27.71	27.71	26.85	26.45
OFFSET	-2.09	-2.00	-2.00	0.00	2.00	2.00	6.00	7.32

CHAINAGE 350

0 2.5 5 m
1:100 (A1)
1:200 (A3)

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT	ALPO	MGM	24.01.25
2	FOR REVIEW	ALPO	TIBR	18.03.25
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	TIBR	Jan.25
DRAWN	ALPO	Jan.25
DESIGN CHECKED	JWY	21.08.25
DRAWING CHECKED	WYHU	21.08.25

DRAWING STATUS: PRELIMINARY
PROJECT PHASE: PRELIMINARY DESIGN

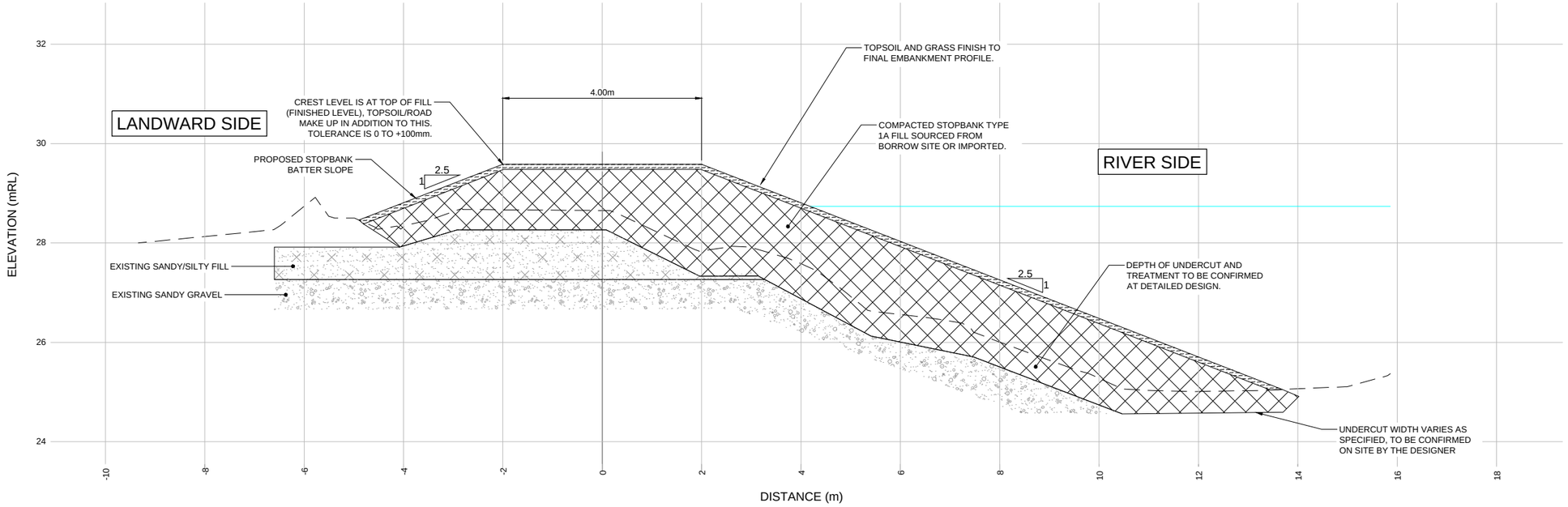
NOT FOR CONSTRUCTION

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED

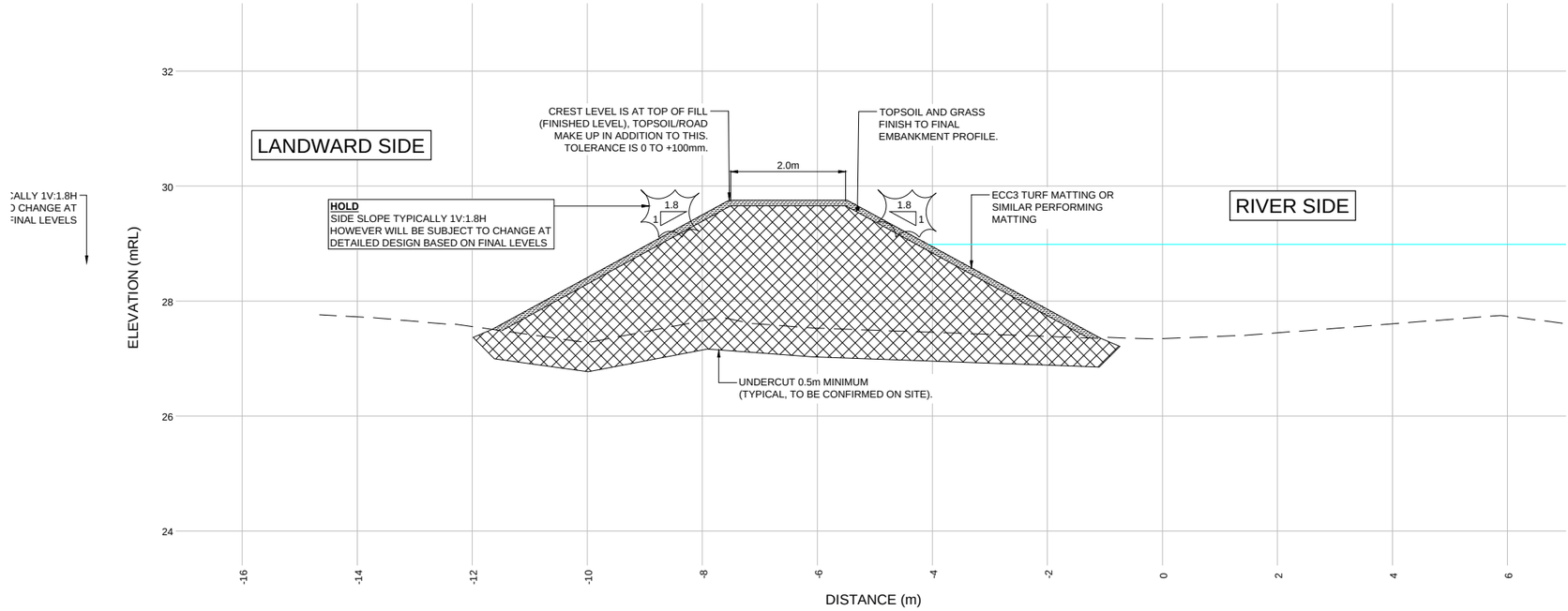
APPROVED DATE

CLIENT: HAWKES BAY REGIONAL COUNCIL
PROJECT: OHITI ROAD FLOOD PROTECTION STOPBANK WORKS
TITLE: STOPBANK SECTIONS
CHESTERHOPE UPPER STOPBANK CROSS SECTION - SHEET 2
SCALE (A1) 1:100 DWG No. 1017353.2402-TT-083 REV 4

C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-091.dwg 2025-Aug-22 4:49:28 pm Plotted By: MLE



1/021 – 1/023 EMBANKMENT DETAIL: CHESTERHOPE UPPER STOPBANK TYPICAL SOUTHERN SECTION
SCALE (A1) 1:50
SCALE (A3) 1:100



2/021 – 2/023 EMBANKMENT DETAIL: CHESTERHOPE UPPER STOPBANK TYPICAL WESTERN SECTION
SCALE (A1) 1:50
SCALE (A3) 1:100

0 1.25 2.5 m
1:50 (A1)
1:100 (A3)

NOTES

1. ALL DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. TOPO SURVEY SUPPLIED BY THE SURVEYING COMPANY, REF "232589-Topo-3D.dwg" DATED 28 NOV 2023.

LEGEND

- EXISTING GROUND LEVEL
- 100 YEAR FLOOD LEVEL
- PROPOSED STOPBANK FILL
- TOPSOIL AND GRASS
- EXISTING SANDY/SILT FILL
- EXISTING SANDY GRAVEL
- ECC3 TURF MATTING

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REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE
1	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25		
2	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25		

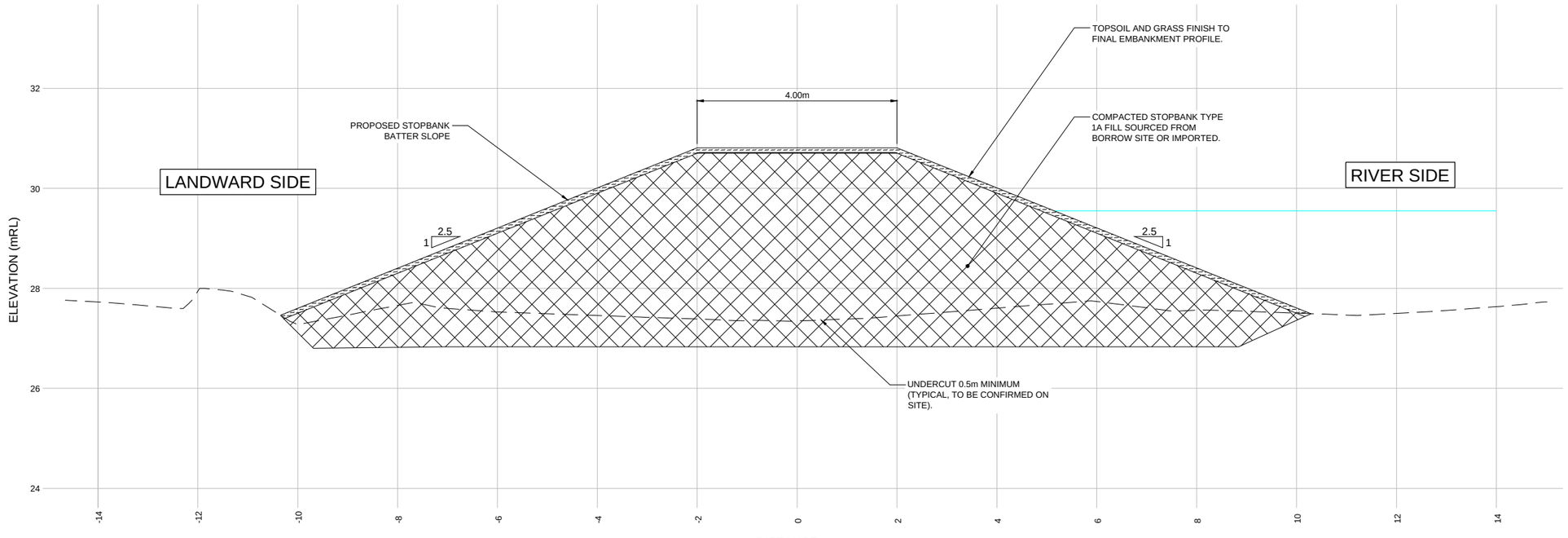
DESIGNED	PELE	April.25	DRAWING STATUS: PRELIMINARY
DRAWN	STLP	April.25	
DESIGN CHECKED	JWY	21.08.25	PROJECT PHASE: PRELIMINARY DESIGN
DRAWING CHECKED	WYHU	21.08.25	

NOT FOR CONSTRUCTION

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED

CLIENT **HAWKES BAY REGIONAL COUNCIL**
PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**
TITLE STOPBANK SECTIONS
TYPICAL CROSS SECTIONS - CHESTERHOPE
SCALE (A1) 1:50 DWG No. 1017353.2402-TT-091 REV 2

C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-092.dwg 2025-Aug-22 4:49:52 pm Plotted By: MLE



1 EMBANKMENT DETAIL: OHITI STOPBANK TYPICAL SECTION

1 / 011

SCALE (A1) 1:50
SCALE (A3) 1:100

0 1.25 2.5 m
1:50 (A1)
1:100 (A3)

NOTES

1. ALL DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. TOPO SURVEY SUPPLIED BY THE SURVEYING COMPANY, REF "232589-Topo-3D.dwg" DATED 28 NOV 2023.

LEGEND

- EXISTING GROUND LEVEL
- 100 YEAR FLOOD LEVEL
- PROPOSED STOPBANK FILL
- TOPSOIL AND GRASS

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
2	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	REKI	Jun.25	DRAWING STATUS: PRELIMINARY
DRAWN	ALPO	Jun..25	
DESIGN CHECKED	JWY	21.08.25	PROJECT PHASE: PRELIMINARY DESIGN
DRAWING CHECKED	WYHU	21.08.25	

NOT FOR CONSTRUCTION

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APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

TITLE STOPBANK SECTIONS
TYPICAL SECTION - OHITI

SCALE (A1) 1:50 DWG No. 1017353.2402-TT-092 REV 2

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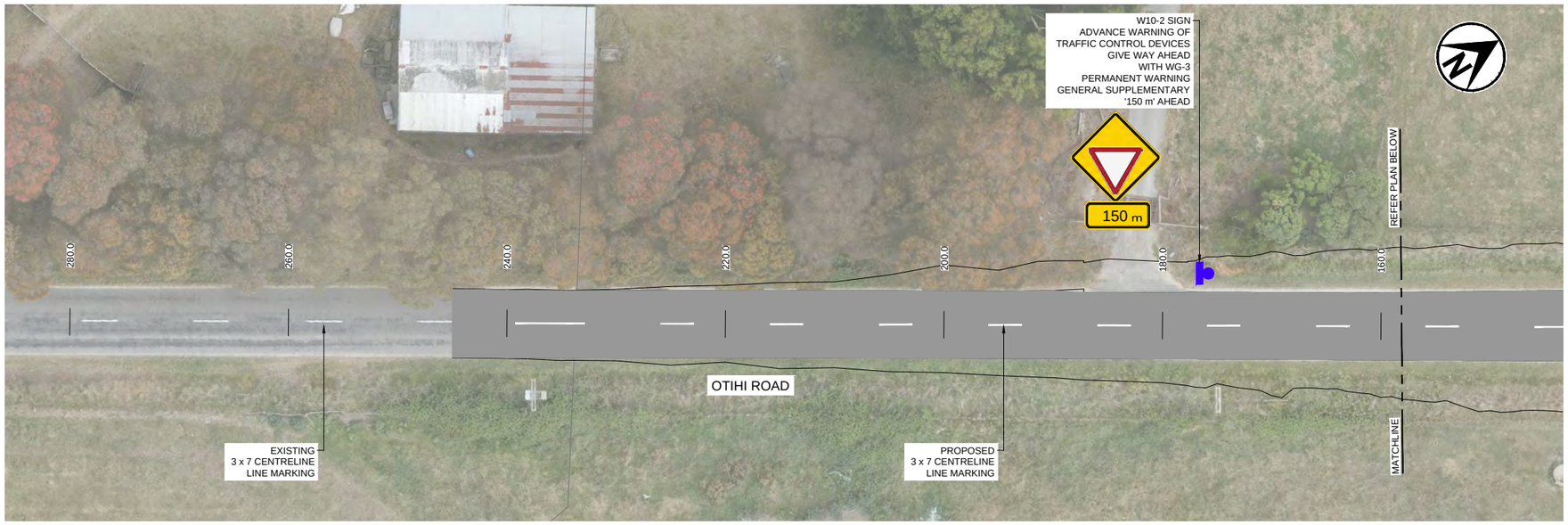
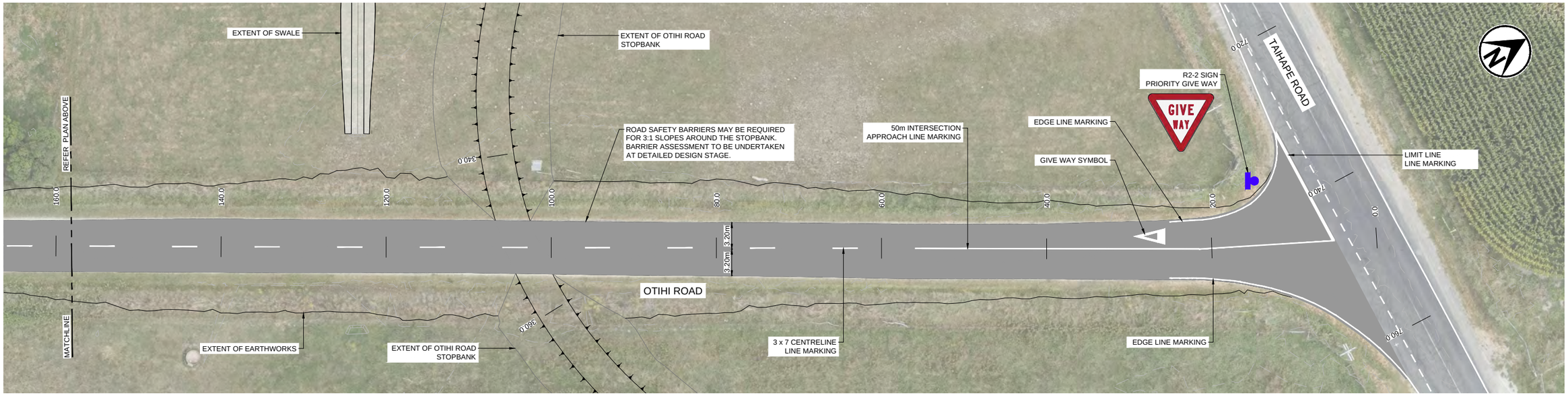
NOTES

1. COORDINATE DATUM: NZGD2000, NEW ZEALAND TRANSVERSE MERCATOR (NZTM2000).
2. AERIAL PHOTO SOURCED FROM LAND INFORMATION NEW ZEALAND DATA (CROWN COPYRIGHT RESERVED).
3. PROPERTY BOUNDARIES SUPPLIED BY The Surveying Company Limited, REF "243082-TP-01.DWG" DATED 29/02/2024.
4. EXISTING CONTOUR DERIVED FROM 20240301 UAV DATA, REF "HBRC Omahu Filtered.las".



OHITI ROAD PLAN - CH 160 TO CH 240

SCALE (A1) 1:250
SCALE (A3) 1:500



OHITI ROAD PLAN - CH 0 TO CH 160

SCALE (A1) 1:250
SCALE (A3) 1:500

0 6.25 12.5 m
1:250 (A1)
1:500 (A3)

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
2	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	SIDP	Jul.25	DRAWING STATUS
DRAWN	ALPO	Jul.25	PRELIMINARY
DESIGN CHECKED	TIBR	21.08.25	PROJECT PHASE
DRAWING CHECKED	WYHU	21.08.25	PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

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APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

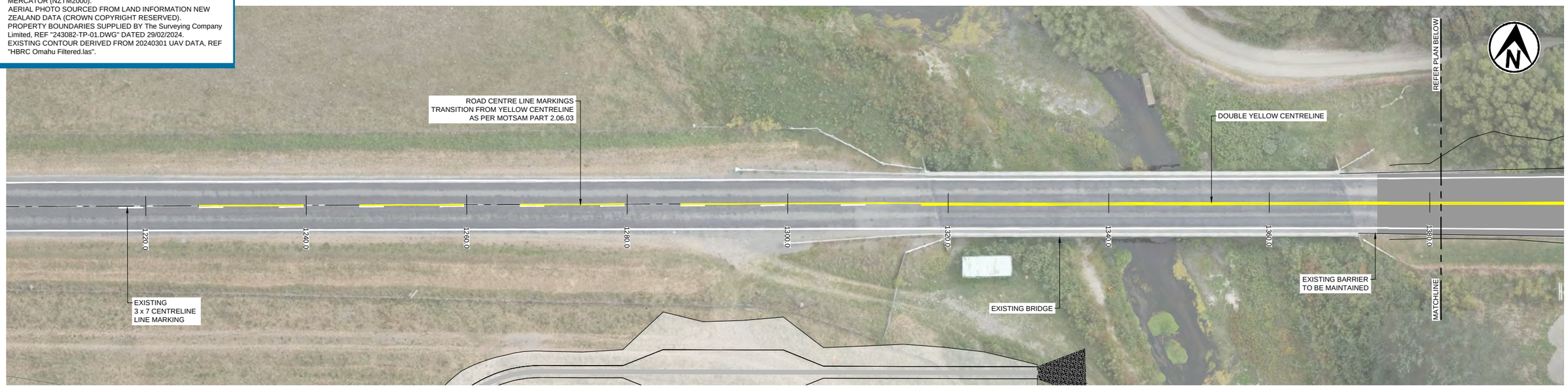
TITLE ROADING AND TRANSPORT
SIGNAGE AND ROAD MARKINGS PLAN - SHEET 1

SCALE (A1) 1:250 DWG No. 1017353.2402-TT-541 REV 2

C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-542.dwg 2025-Aug-22 4:51:48 pm Plotted By: MLE

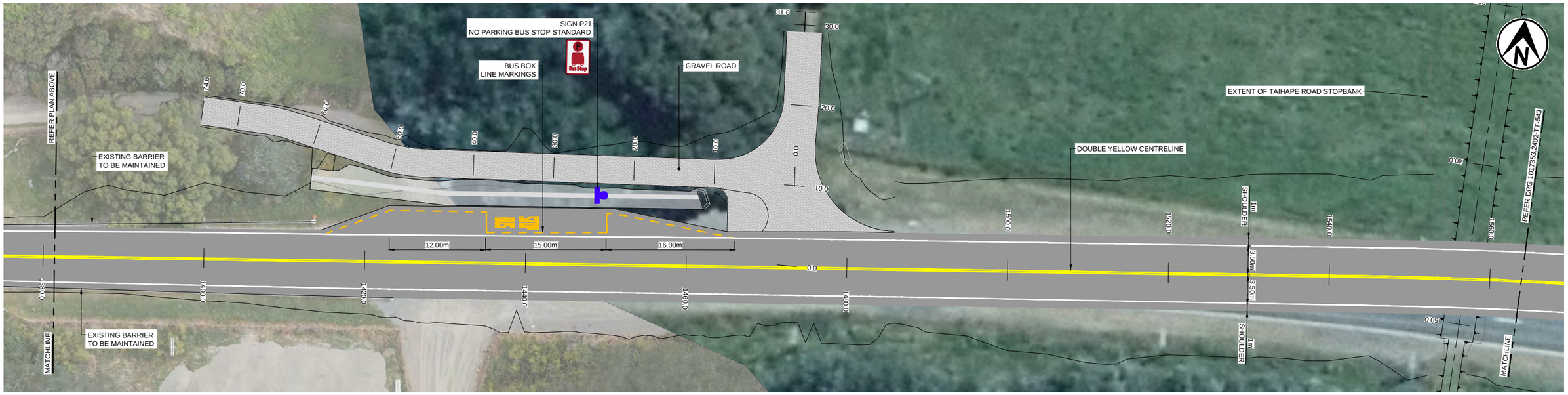
NOTES

1. COORDINATE DATUM: NZGD2000, NEW ZEALAND TRANSVERSE MERCATOR (NZTM2000).
2. AERIAL PHOTO SOURCED FROM LAND INFORMATION NEW ZEALAND DATA (CROWN COPYRIGHT RESERVED).
3. PROPERTY BOUNDARIES SUPPLIED BY The Surveying Company Limited, REF "243082-TP-01.DWG" DATED 29/02/2024.
4. EXISTING CONTOUR DERIVED FROM 20240301 UAV DATA, REF "HBRC Omahu Filtered.las".



TAIHAPE ROAD PLAN - CH 1220 TO CH 1380

SCALE (A1) 1:250
SCALE (A3) 1:500



TAIHAPE ROAD PLAN - CH 1380 TO CH 1560

SCALE (A1) 1:250
SCALE (A3) 1:500

0 6.25 12.5 m
1:250 (A1)
1:500 (A3)

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
2	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	SIDP	Jul.25	DRAWING STATUS
DRAWN	ALPO	Jul.25	PRELIMINARY
DESIGN CHECKED	TIBR	21.08.25	PROJECT PHASE
DRAWING CHECKED	WYHU	21.08.25	PRELIMINARY DESIGN

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APPROVED DATE

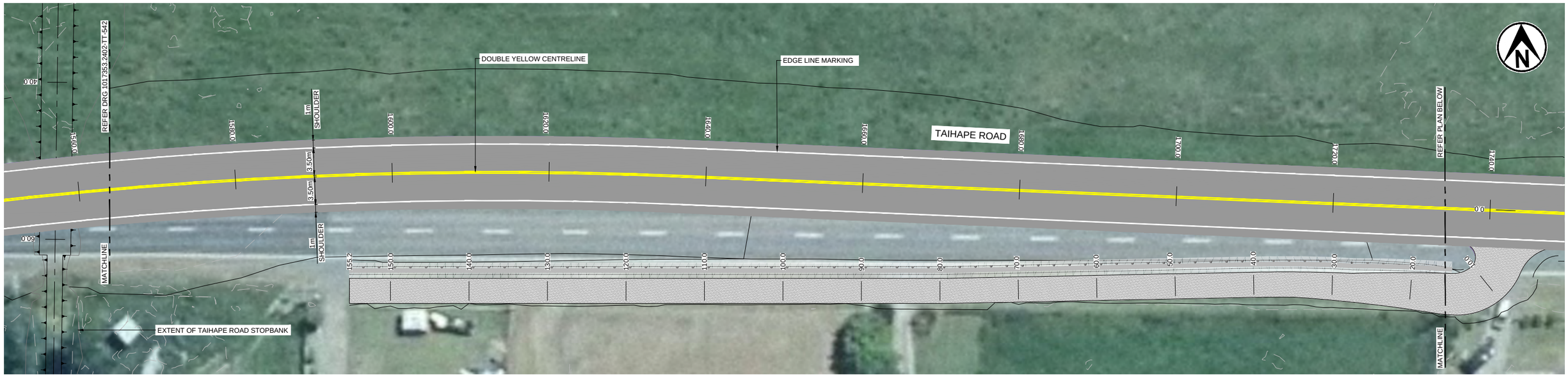
CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD AND TAIHAPE ROAD STOPBANK**

TITLE ROADING AND TRANSPORT
SIGNAGE AND ROAD MARKINGS PLAN - SHEET 2

SCALE (A1) 1:250 DWG No. 1017353.2402-TT-542 REV 2

C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-543.dwg 2025-Aug-22 4:53:06 pm Plotted By: MLE



TAIHAPE ROAD PLAN - CH 1560 TO CH 1710

SCALE (A1) 1:250
SCALE (A3) 1:500

TAIHAPE ROAD PLAN - CH 1710 TO CH 1900

SCALE (A1) 1:250
SCALE (A3) 1:500

0 6.25 12.5 m
1:250 (A1)
1:500 (A3)

NOTES

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2. AERIAL PHOTO SOURCED FROM LAND INFORMATION NEW ZEALAND DATA (CROWN COPYRIGHT RESERVED).
3. PROPERTY BOUNDARIES SUPPLIED BY The Surveying Company Limited, REF "243082-TP-01.DWG" DATED 29/02/2024.
4. EXISTING CONTOUR DERIVED FROM 20240301 UAV DATA, REF "HBRC Omahu Filtered.las".

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
2	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	SIDP	Jul.25
DRAWN	ALPO	Jul.25
DESIGN CHECKED	TIBR	21.08.25
DRAWING CHECKED	WYHU	21.08.25

DRAWING STATUS: PRELIMINARY
PROJECT PHASE: PRELIMINARY DESIGN

NOT FOR CONSTRUCTION
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APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**
PROJECT **OHITI ROAD AND TAIHAPE ROAD STOPBANK**
TITLE ROADING AND TRANSPORT SIGNAGE AND ROAD MARKINGS PLAN - SHEET 3
SCALE (A1) 1:250 DWG No. 1017353.2402-TT-543 REV 2

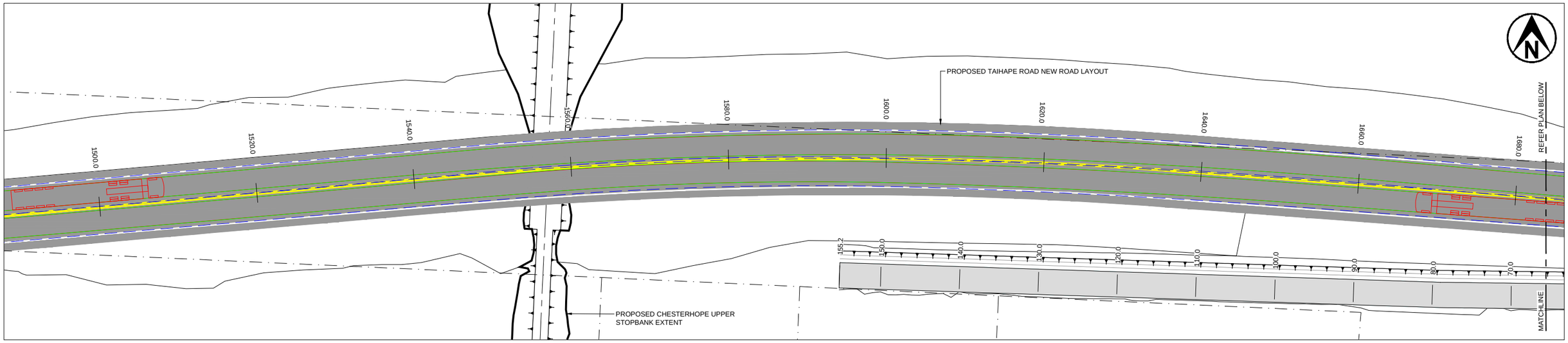
C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-551.dwg 2025-Aug-22 4:53:47 pm Plotted By: MLE

NOTES

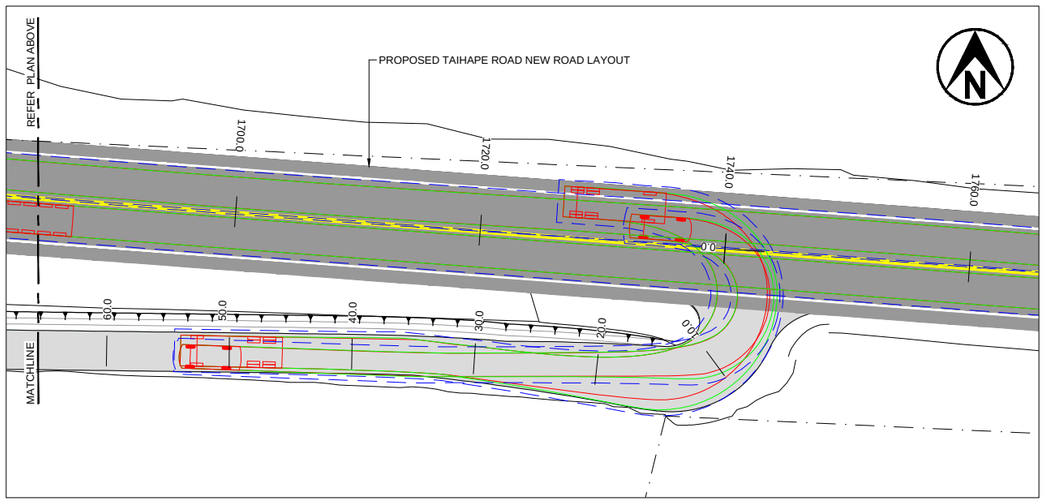
1. COORDINATE DATUM: NZGD2000, NEW ZEALAND TRANSVERSE MERCATOR (NZTM2000).
2. PROPERTY BOUNDARIES SUPPLIED BY The Surveying Company Limited, REF "243082-TP-01.DWG" DATED 29/02/2024.

LEGEND

- PROPERTY BOUNDARY
- PROPOSED STOPBANK
- PROPOSED ROAD EXTENT
- 500mm ADDITIONAL CLEARANCE
- VEHICLE BODY ENVELOPE
- WHEEL PATH

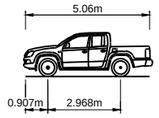


PLAN 01
SCALE (A1) 1:250
SCALE (A3) 1:500

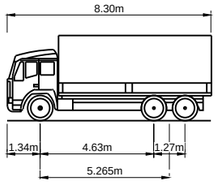


PLAN 02
SCALE (A1) 1:250
SCALE (A3) 1:500

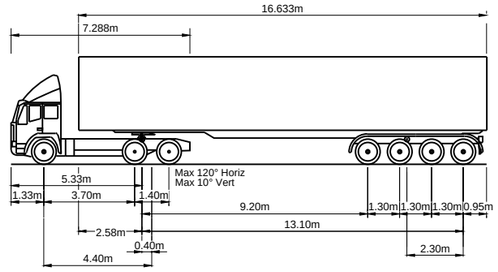
0 6.25 12.5 m
1:250 (A1)
1:500 (A3)



AT - 95TH - CAR	
OVERALL LENGTH	5.060m
OVERALL WIDTH	1.923m
OVERALL BODY HEIGHT	1.784m
MIN BODY GROUND CLEARANCE	0.231m
MAX TRACK WIDTH	1.888m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	6.450m



AT - TRUCK - 8.3m TRUCK	
OVERALL LENGTH	8.300m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	3.471m
MIN BODY GROUND CLEARANCE	0.373m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
MAX STEERING ANGLE (VIRTUAL)	40.20°



AT - TRUCK - HPMV - 19.45\m SEMI-TRAILER (REAR STEER)	
OVERALL LENGTH	19.380m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.386m
MIN BODY GROUND CLEARANCE	0.311m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
WALL TO WALL TURNING RADIUS	12.500m

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT (AS DRG 1017353.2402-TT-025)	ALPO	MGM	24.01.25
2	PRELIMINARY DESIGN (AS DRG 1017353.2402-TT-025)	ALPO	TIBR	18.03.25
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	SIDP	Jan.25
DRAWN	ALPO	Jan.25
DESIGN CHECKED	TIBR	21.08.25
DRAWING CHECKED	WYHU	21.08.25

DRAWING STATUS: PRELIMINARY
PROJECT PHASE: PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

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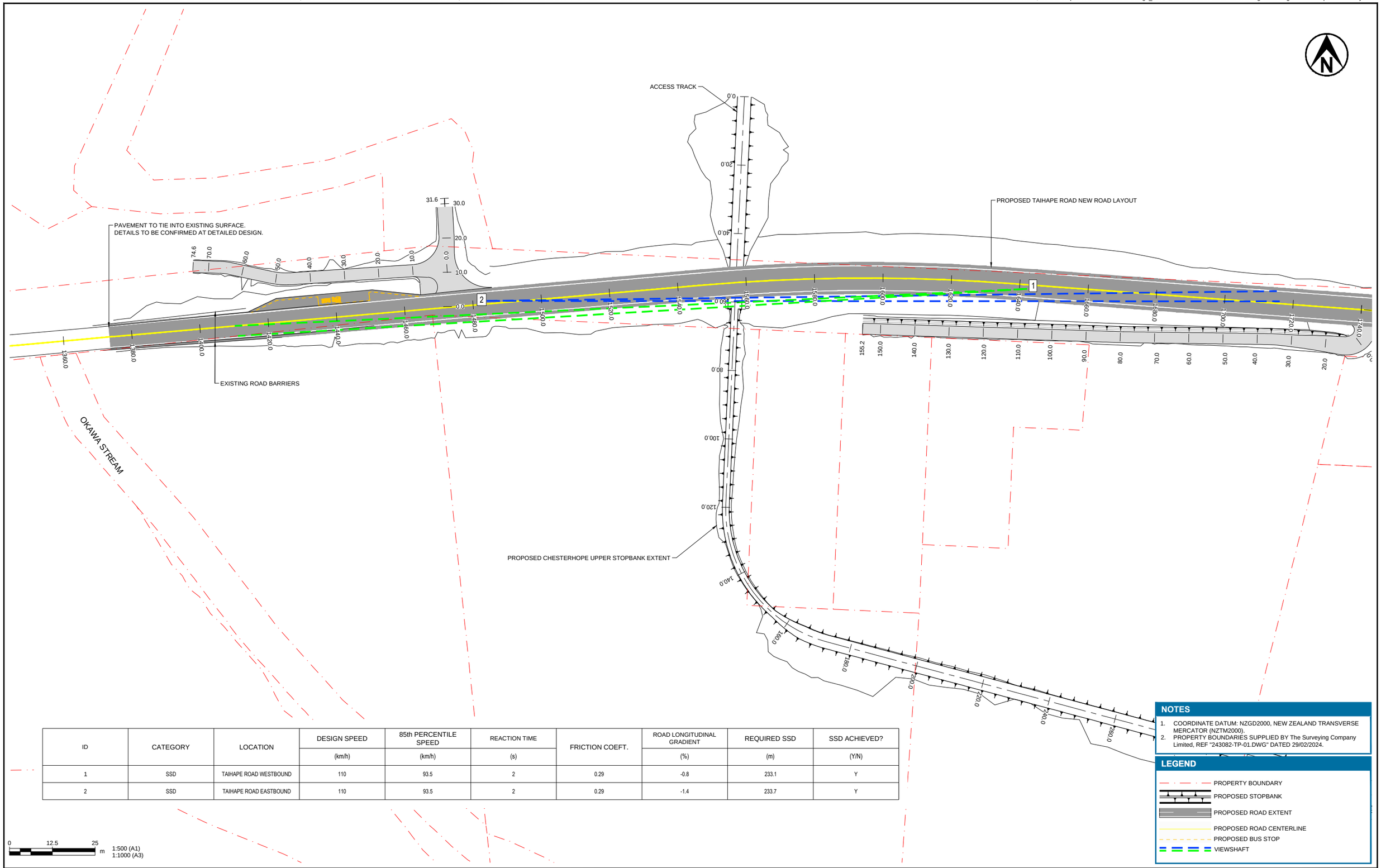
APPROVED DATE

CLIENT **HAWKES BAY REGIONAL COUNCIL**
PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**
TITLE ROADING AND TRANSPORT
TAIHAPE ROAD - VEHICLE TRACKING PLAN
SCALE (A1) 1:250 DWG No. 1017353.2402-TT-551 REV 4

C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-571.dwg 2025-Aug-22 4:54:12 pm Plotted By: MLE



ID	CATEGORY	LOCATION	DESIGN SPEED	85th PERCENTILE SPEED	REACTION TIME	FRICTION COEFT.	ROAD LONGITUDINAL GRADIENT	REQUIRED SSD	SSD ACHIEVED?
			(km/h)	(km/h)	(s)		(%)	(m)	(Y/N)
1	SSD	TAIHAPE ROAD WESTBOUND	110	93.5	2	0.29	-0.8	233.1	Y
2	SSD	TAIHAPE ROAD EASTBOUND	110	93.5	2	0.29	-1.4	233.7	Y

0 12.5 25 m
1:500 (A1)
1:1000 (A3)

NOTES

1. COORDINATE DATUM: NZGD2000, NEW ZEALAND TRANSVERSE MERCATOR (NZTM2000).
2. PROPERTY BOUNDARIES SUPPLIED BY The Surveying Company Limited, REF "243082-TP-01.DWG" DATED 29/02/2024.

LEGEND

- PROPERTY BOUNDARY
- PROPOSED STOPBANK
- PROPOSED ROAD EXTENT
- PROPOSED ROAD CENTERLINE
- PROPOSED BUS STOP
- VIEWSHAFT

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REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE
1	PRELIMINARY DRAFT (AS DRG 1017353.2402-TT-026)	ALPO	MGM	24.01.25		
2	PRELIMINARY DESIGN (AS DRG 1017353.2402-TT-026)	ALPO	TIBR	18.03.25		
3	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25		
4	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25		

DESIGNED	SIDP	Jan.25	DRAWING STATUS
DRAWN	ALPO	Jan.25	PRELIMINARY
DESIGN CHECKED	TIBR	21.08.25	PROJECT PHASE
DRAWING CHECKED	WYHU	21.08.25	PRELIMINARY DESIGN

NOT FOR CONSTRUCTION

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CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

TITLE ROADING AND TRANSPORT
TAIHAPE ROAD - SIGHT DISTANCE PLAN

SCALE (A1) 1:500 DWG No. 1017353.2402-TT-571 REV 4

C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-611.dwg 2025-Aug-22 4:55:15 pm Plotted By: MLE

NOTES

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4. EXISTING CONTOUR DERIVED FROM 20240301 UAV DATA, REF "HBRC Omahu Filtered.las".

LEGEND

- PROPERTY BOUNDARY
- EXISTING MAJOR CONTOUR (5m INTERVAL)
- EXISTING MINOR CONTOUR (1m INTERVAL)
- PROPOSED MAJOR CONTOUR (1m INTERVAL)
- PROPOSED MINOR CONTOUR (0.5m INTERVAL)
- PROPOSED STOPBANK
- PROPOSED ROAD EXTENT
- PROPOSED ROAD MARKING - 100mm WIDE WHITE CONTINUOUS LINE
- PROPOSED ROAD MARKING - 100mm WIDE WHITE CENTERLINE (3m STRIPE, 7m GAP)
- EXISTING ROAD MARKING - 100mm WIDE WHITE CENTERLINE (3m STRIPE, 7m GAP)
- SW PROPOSED CULVERT

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REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE
1	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25		
2	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25		

DESIGNED	THWA	Jul,25	DRAWING STATUS
DRAWN	ALPO	Jul.25	PRELIMINARY
DESIGN CHECKED	JWY	21.08.25	PROJECT PHASE
DRAWING CHECKED	WYHU	21.08.25	PRELIMINARY DESIGN

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CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

TITLE STORMWATER
CULVERT LAYOUT PLAN - OHITI ROAD

SCALE (A1) 1:1250 DWG No. 1017353.2402-TT-611 REV 2

C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-621.dwg 2025-Aug-22 4:56:34 pm Plotted By: MLE

CULVERT OUTLET CHANNEL TO BE LOCALLY REGRADED TO STREAM AND VEGETATION CLEARED, TO BE CONFIRMED AT DETAILED DESIGN

CULVERT INLET TO BE LOCALLY REGRADED, TO BE CONFIRMED AT DETAILED DESIGN

DN525 RCRRJ CULVERT TO BE INSTALLED TO DRAIN AREA BETWEEN DRIVE AND STOPBANK. FURTHER SURVEY TO BE COMPLETED TO CONFIRM LEVELS AT DETAILED DESIGN.

HOLD: STORMWATER DESIGN, INC. DISCHARGE OF SWALE TO BE FINALISED AT DETAILED DESIGN

TAIHAPE ROAD

2x600mm CULVERTS
INVERT: 27.8m
(REFER SECTION 3 ON DRG 651)

PE FLAPGATE FROM TORRENT FLOODGATES BOLTED TO HEADWALL

HOLD: SWALE OUTLET TO BE FINALISED AT DETAILED DESIGN

A SWALE 4 DETAIL

SCALE (A1) 1:500
SCALE (A3) 1:1000

0 12.5 25 m
1:500 (A1)
1:1000 (A3)

0 25 50 m
1:1000 (A1)
1:2000 (A3)

CULVERT LAYOUT PLAN - TAIHAPE ROAD

SCALE (A1) 1:1000
SCALE (A3) 1:2000

NOTES

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3. PROPERTY BOUNDARIES SUPPLIED BY The Surveying Company Limited, REF "243082-TP-01.DWG" DATED 29/02/2024.
4. EXISTING CONTOUR DERIVED FROM 20240301 UAV DATA, REF "HBRC Omahu Filtered.las".

LEGEND

- PROPERTY BOUNDARY
- EXISTING MAJOR CONTOUR (5m INTERVAL)
- EXISTING MINOR CONTOUR (1m INTERVAL)
- PROPOSED MAJOR CONTOUR (1m INTERVAL)
- PROPOSED MINOR CONTOUR (0.5m INTERVAL)
- PROPOSED STOPBANK
- SW PROPOSED CULVERT
- PROPOSED SWALE

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
2	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25

DESIGNED	THWA	Jul,25
DRAWN	ALPO	Jul.25
DESIGN CHECKED	JWY	21.08.25
DRAWING CHECKED	WYHU	21.08.25

DRAWING STATUS: PRELIMINARY
PROJECT PHASE: PRELIMINARY DESIGN

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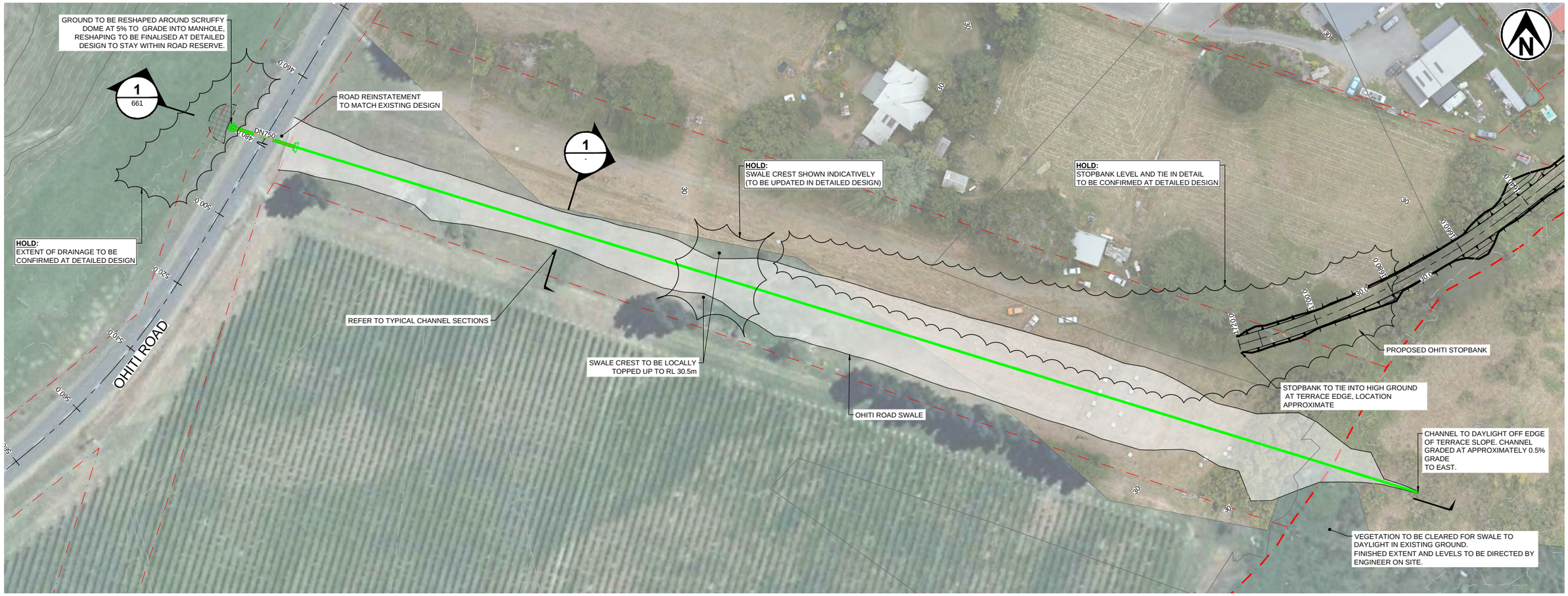
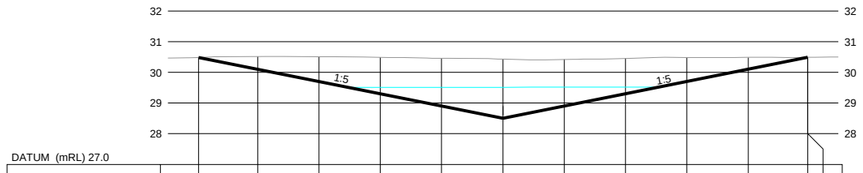
CLIENT **HAWKES BAY REGIONAL COUNCIL**
PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**
TITLE STORMWATER
CULVERT LAYOUT PLAN - TAIHAPE ROAD
SCALE (A1) AS SHOWN DWG No. 1017353.2402-TT-621 REV 2

C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-631.dwg 2025-Aug-22 4:57:56 pm Plotted By: MLE



CULVERT LAYOUT PLAN - SMITH PROPERTY

SCALE (A1) 1:500
SCALE (A3) 1:1000



DATUM (mRL) 27.0												
DESIGN LEVEL	30.49	30.10	29.70	29.30	28.90	28.50	28.90	29.30	29.70	30.10	30.49	30.49
EXISTING LEVEL	30.49	30.51	30.51	30.49	30.46	30.43	30.42	30.45	30.49	30.49	30.49	30.49
OFFSET	-9.93	-8.00	-6.00	-4.00	-2.00	0.00	2.00	4.00	6.00	8.00	9.94	9.94

1 - TYPICAL CHANNEL CROSS SECTION

SCALE (A1) 1:250
SCALE (A3) 500

0 5 10 m 1:200 (A1) 1:400 (A3)

0 6.25 12.5 m 1:250 (A1) 1:500 (A3)

0 12.5 25 m 1:500 (A1) 1:1000 (A3)

NOTES

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4. EXISTING CONTOUR DERIVED FROM 20240301 UAV DATA, REF "HBRC Omahu Filtered.las".

LEGEND

- PROPERTY BOUNDARY
- 30 EXISTING MAJOR CONTOUR (5m INTERVAL)
- EXISTING MINOR CONTOUR (1m INTERVAL)
- 30 PROPOSED MAJOR CONTOUR (1m INTERVAL)
- PROPOSED MINOR CONTOUR (0.5m INTERVAL)
- PROPOSED STOPBANK
- CHANNEL
- SW PROPOSED CULVERT
- 100 YEAR FLOOD LEVEL

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REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE
1	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25		
2	REVISED PRELIMINARY DESIGN	MLE	JWY	22.08.25		

DESIGNED	STLP	Jul,25	DRAWING STATUS: PRELIMINARY
DRAWN	ALPO	Jul.25	
DESIGN CHECKED	JWY	21.08.25	PROJECT PHASE: PRELIMINARY DESIGN
DRAWING CHECKED	WYHU	21.08.25	

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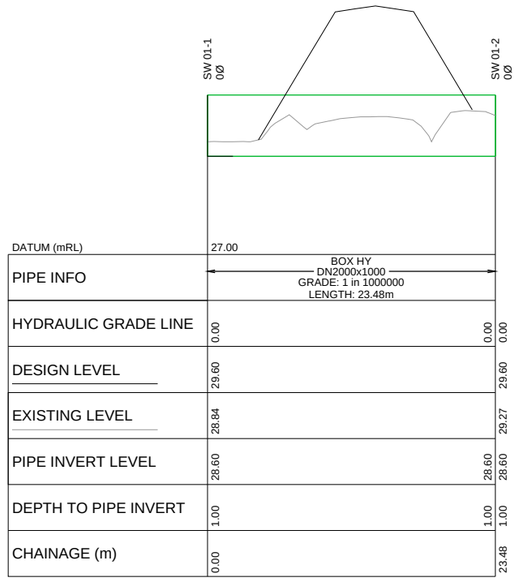
CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

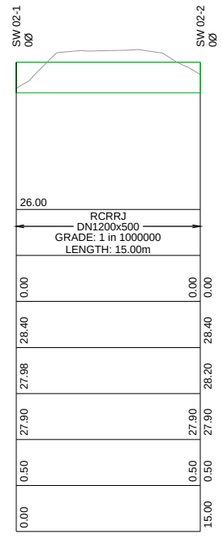
TITLE STORMWATER
CULVERT LAYOUT PLAN - SMITH PROPERTY

SCALE (A1) AS SHOWN DWG No. 1017353.2402-TT-631 REV 2

C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-651.dwg 2025-Aug-22 4:58:37 pm Plotted By: MLE



1 611 **LINE SW 01**
SCALE (A1) 1:500 (H), 1:100 (V)
SCALE (A3) 1:1000 (H), 1:2000 (V)



2 611 **LINE SW 02**
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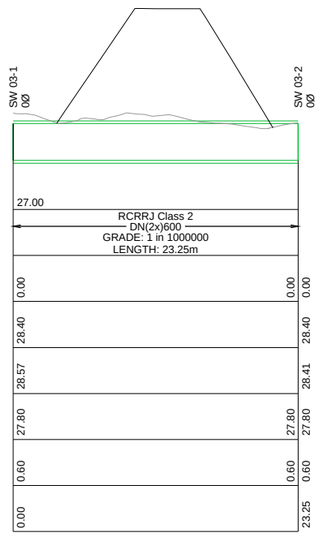

3 611 **LINE SW 03**
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0 12.5 25 m H=1:500 V=1:100
0 2.5 5

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1	PRELIMINARY DESIGN ISSUE	ALPO	JWY	24.07.25
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DESIGNED	STLP	Jul,25	DRAWING STATUS
DRAWN	ALPO	Jul.25	PRELIMINARY
DESIGN CHECKED	JWY	21.08.25	PROJECT PHASE
DRAWING CHECKED	WYHU	21.08.25	PRELIMINARY DESIGN

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CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

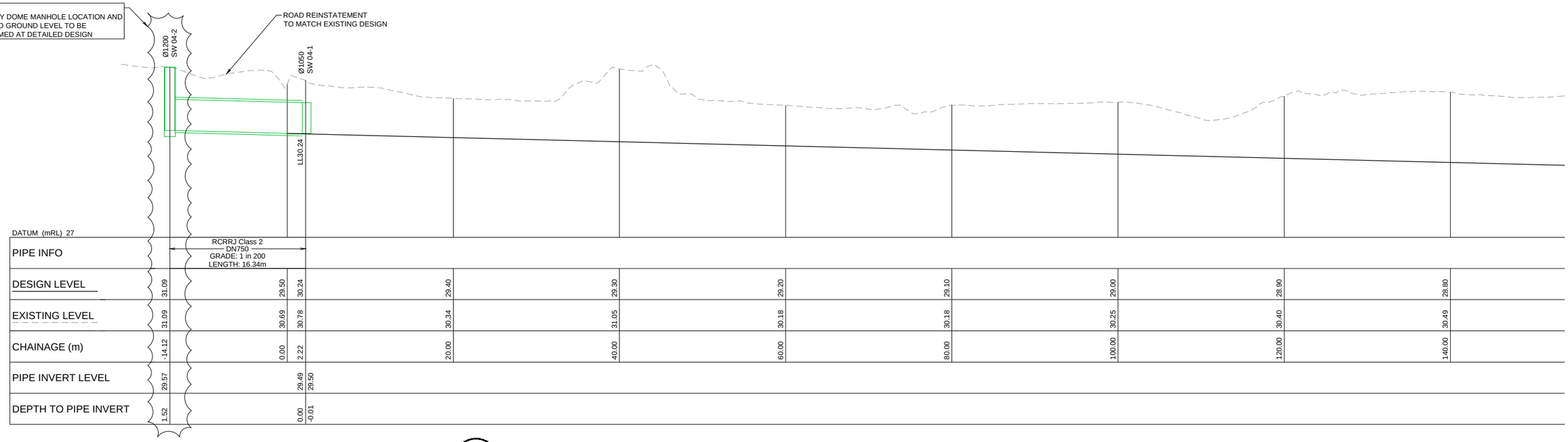
TITLE STORMWATER
CULVERT - LONG SECTIONS

SCALE (A1) 1:500 DWG No. 1017353.2402-TT-651 REV 2

0 0.05 0.1 m 1:2 (A1)

C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-661.dwg 2025-Aug-22 4:59:00 pm Plotted By: MLE

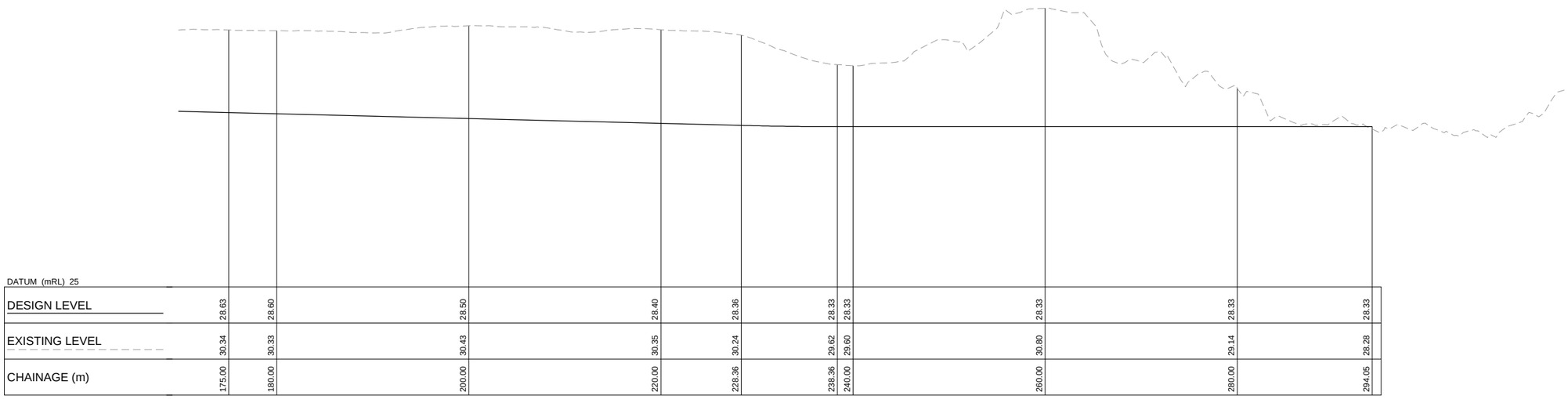
HOLD:
SCRUFFY DOME MANHOLE LOCATION AND FINISHED GROUND LEVEL TO BE CONFIRMED AT DETAILED DESIGN



1 CULVERT / SWALE LONG SECTION - CH -14.1 TO CH 170

631

SCALE (A1) 1:250 (H), 1:50 (V)
SCALE (A3) 1:500 (H), 1:100 (V)



1 CULVERT / SWALE LONG SECTION - CH 170 TO CH 295

631

SCALE (A1) 1:250 (H), 1:50 (V)
SCALE (A3) 1:500 (H), 1:100 (V)

0 6.25 12.5 m
0 0.5 1
H=1:250
V=1:50 (A1)

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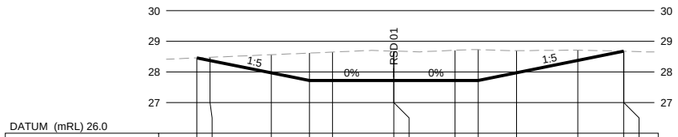
CLIENT HAWKES BAY REGIONAL COUNCIL
PROJECT OHITI ROAD FLOOD PROTECTION STOPBANK WORKS
TITLE STORMWATER
SMITH PROPERTY CULVERT / SWALE LONG SECTION
SCALE (A1) 1:500 DWG No. 1017353.2402-TT-661 REV 2

C:\12dS\data\ALBTCAD\Ohiti Road, Omahu Stopbank & Streamworks Design_1562\CAD\DWG\1017353.2402-671.dwg 2025-Aug-22 4:59:24 pm Plotted By: MLE



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EXISTING LEVEL	28.46	28.48	28.56	28.62	28.65	28.68	28.68	28.71	28.73	28.70	28.71	28.68	28.68
OFFSET	-6.43	-6.00	-4.00	-2.75	-2.00	0.00	0.00	2.00	2.75	4.00	6.00	7.50	7.50

1 TAIHAPE ROAD ACCESS TRACK CROSS SECTION (CHAINAGE 960)

621

SCALE (A1) 1:500
SCALE (A3) 1:1000

0 12.5 25 m
1:500 (A1)
1:1000 (A3)

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DRAWING CHECKED	WYHU	21.08.25	PRELIMINARY DESIGN

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PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

TITLE STORMWATER
TAIHAPE ROAD ACCESS TRACK SECTION

SCALE (A1) 1:500 DWG No. 1017353.2402-TT-671 REV 2

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NOTES

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4. EXISTING CONTOUR DERIVED FROM 20240301 UAV DATA, REF "HBRC Omahu Filtered.las".
5. EXISTING SERVICES SOURCED BY T+T FROM TRANSPOWER LTD, HASTINGS DISTRICT COUNCIL AND HAWKES BAY REGIONAL COUNCIL OPEN GIS DATA ON 10/07/2025.

LEGEND

- PROPERTY BOUNDARY
- EXISTING MAJOR CONTOUR (10m INTERVAL)
- EXISTING MINOR CONTOUR (5m INTERVAL)
- PROPOSED STOPBANK
- EXISTING UNISON HIGH VOLTAGE OVERHEAD LINE
- EXISTING UNISON LOW VOLTAGE OVERHEAD LINE
- EXISTING TRANSPOWER TRANSLINE
- EXISTING HBRC DRAINS AND WELLS

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CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

TITLE UTILITIES
UTILITIES PLAN - OHITI ROAD

SCALE (A1) 1:1250 DWG No. 1017353.2402-TT-811 REV 2

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4. EXISTING CONTOUR DERIVED FROM 20240301 UAV DATA, REF "HBRC Omahu Filtered.las".
5. EXISTING SERVICES SOURCED BY T+T FROM TRANSPOWER LTD, HASTINGS DISTRICT COUNCIL AND HAWKES BAY REGIONAL COUNCIL OPEN GIS DATA ON 10/07/2025.

LEGEND

- PROPERTY BOUNDARY
- 30 EXISTING MAJOR CONTOUR (10m INTERVAL)
- EXISTING MINOR CONTOUR (5m INTERVAL)
- PROPOSED STOPBANK
- PROPOSED ROAD EXTENT
- SHARED DRIVEWAY
- OH/HV EXISTING UNISON HIGH VOLTAGE OVERHEAD LINE
- OH/LV EXISTING UNISON LOW VOLTAGE OVERHEAD LINE
- OH/HV EXISTING TRANSPOWER TRANSLINE
- EXISTING HBRC DRAINS AND WELLS
- EXISTING UG NETWORK
- P DISTRIBUTION PILLAR
- P CHORUS POLE

TAIHAPE ROAD

OKAWA STREAM

0 25 50 m 1:1000 (A1) 1:2000 (A3)

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REV	DESCRIPTION	CAD	CHK	DATE
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CLIENT **HAWKES BAY REGIONAL COUNCIL**

PROJECT **OHITI ROAD FLOOD PROTECTION STOPBANK WORKS**

TITLE UTILITIES

UTILITIES PLAN - TAIHAPE ROAD

SCALE (A1) 1:1000 DWG No. 1017353.2402-TT-821 REV 2

Appendix B Consent conditions

Table Appendix B.1: Consent condition review summary

Number	Standardised conditions and proposed changes	Corresponding actions taken/design intent
12	Earthworks principles 1 The consent holder must carry out all works in a manner that— a) minimises the volume, area, and duration of the proposed earthworks required through methodologies, including the design of batter slopes, appropriate to expected soil types and geology; and b) maximises the effectiveness of erosion and sediment control measures associated with earthworks by minimising potential for sediment generation and sediment yield; and c) avoids if practicable, or minimises so far as practicable, adverse effects on freshwater and marine water environments within or beyond the works boundary, with particular regard to reducing opportunities for the works to generate sediment; and d) avoids if practicable, or minimises so far as practicable, adverse effects on outstanding natural features, outstanding natural landscapes, and areas of outstanding natural character (as specified in a regional plan or policy statement for the relevant area); and e) avoids if practicable, or minimises so far as practicable, adverse effects on culturally significant land; and f) stabilises disturbed land as soon as reasonably practicable in accordance with an ESCP. 2 The consent holder must, as far as practicable, ensure that earthworks are carried out in accordance with the ecology principles.	The proposed design includes modest batter slopes (1V:2.5H to 1V:3H), to help minimise effects of scour in potential overtopping events. The footprint of the stopbank is largely dictated by the flood level relative to existing ground levels and existing easements or property considerations. Steeper sections of batters will be stabilised with specialist matting and all stopbank sections will be topsoiled to mitigate against erosion. The extent of the stopbank has largely been dictated by minimising effects on adjacent landowners and agreeing a land acquisition strategy. This has however resulted in a need to reduce stopbank footprints where possible and work within existing easements. We understand that HBRC have engaged others to review cultural and natural character impacts. Further details on how the earthworks and ecological principles will be implemented will be detailed in the CEMP and ESCP.
14	**Erosion and sediment control plan** 3 The consent holder must prepare 1 or more erosion and sediment control plans for the works to identify how the earthworks principles will be applied. 4 The consent holder must engage a suitably qualified and experienced person to prepare an ESCP. 5 An ESCP must specify the following matters: *General* a) how the works will be carried out in accordance with the ecology principles: b) structural and non-structural erosion and sediment control measures (including chemical treatment where necessary) to be in place before and during all construction works, including earthworks, coastal works, and works within watercourses: c) key environmental risks, particularly in relation to topography, soil type and form, and the receiving environment, including proximity to any sensitive receivers (for example, watercourses): d) procedures for ensuring advance warning of a rainfall event: e) procedures for decommissioning the erosion and sediment control measures: f) procedures for determining the staging and sequencing of earthworks: g) methods adopted, for the purpose of reducing sediment loss and erosion, to stabilise— i. any excavated area; and ii. (any watercourse bed; and iii. (any banks of a watercourse that have been disturbed by the works: h) details of maintenance, including actions and frequency: i) supporting information about the size of erosion and sediment control devices: j) methods for amending and updating the ESCP as required: *Erosion and Sediment Control Manager and staff* a) the name and contact details of the Erosion and Sediment Control Manager: b) the names and contact details of other staff appointed to assist with the management of erosion and sediment control (see clause 13(4) of this schedule): *Incident management* a) the process for detecting, investigating, and recording, and for notifying the consent authority of, incidents that result in the discharge of contaminants or material into any watercourse due to the structural failure of any erosion and sediment control measures: *Monitoring* a) procedures for— i. ongoing visual inspection, and where necessary quantitative monitoring, of all erosion and sediment control measures; and ii. detailed analysis of trends in erosion and sediment control effectiveness and performance; and iii. amendments to any ESCP resulting from the activities under subparagraphs (i) and (ii): *Reporting to consent authority* a) details (including timing) of reporting to the consent authority on the outcomes of, and compliance with, the ESCP. 6 The level of detail and the measures proposed in the ESCP must correspond to the nature and scale of the relevant works. 7 The ESCP must include a site-specific risk-based approach that allows for the Erosion and Sediment Control Manager to determine the level of information and design that must be provided for specific activities. 8 For works in or adjacent to a watercourse, an ESCP must, so far as is practicable, be consistent with the HBRC Erosion and Sediment Guidelines. 9 The consent holder must implement an ESCP for the duration of the flood protection works. 10 The consent holder must, for the duration of the construction works,— a) keep an ESCP; and b) make it readily available to the consent authority.	ESCP Plan is to be developed by the contractor based on the proposed design and construction methodology. The ESCP will need to detail the following matters. • Erosion and sediment controls associated with stockpiling and stockpile management. Such matters could include options to mitigate dust and runoff (i.e. covering or stabilising of stockpiles). • Management of the borrow site and treatment of any water to be discharged from the borrow pit prior to stabilising. • Stabilising access roads for truck traffic coming into the site. It is likely that haul roads will need to be stabilised with gravel to mitigate dust. • Keep clean water clear of the construction site by diverting it around the perimeter of the site, including runoff down from stopbank crests. This may need to be staged to manage runoff while the stopbank is built. For example, culverts and swales through the stopbank site may need to be constructed early in the programme to provide conveyance of clean water through the site. • Any stormwater entering the stopbank earthworks site up to design level events will be treated as dirty water and will be diverted to a treatment device or bunded off to avoid discharge to watercourses. • Treated water will most likely discharge to ground via soakage (as the underlying soils are very permeable), any runoff in larger events will be discharged (once treated) into appropriate devices as specified by the contractor. • Specific mention will need to be made of management of erosion and sediment controls associated with works adjacent to the Okawa stream.

Number	Standardised conditions and proposed changes	Corresponding actions taken/design intent
16	**Dust Management** The consent holder must, as far as practicable, ensure that dust arising from construction works (including earthworks and related activities) does not spread beyond the boundary of the work sites.	Dust management details will be confirmed by the Contractor but should generally include: • Dust controls should be developed in accordance with the Ministry for the Environment Good Practice Guide for Assessing and Managing the Environmental Effects of Dust Emissions (MfE, 2016). • A watercart for dust control should be used to wet excavation works or work areas where necessary. • Site access roads are to be stabilised with aggregate. • Daily forecast wind speed, wind direction and soil conditions will be reviewed before commencing activities with high dust generation potential. Works should be monitored during strong winds and ceased temporarily if dust becomes a nuisance. • The area of surfaces covered with fine materials will be minimised and exposed surfaces will be temporarily tracked rolled to seal off or stabilised with geofabric wherever practicable. • If required, dust shielding (such as shelter cloth on fences) could be installed where practicable.
17	**Works on contaminated land** 1 This clause applies if the consent holder undertakes earthworks or any other soil disturbance on contaminated land. 2 The consent holder must ensure that any soil and other materials that are removed from the site and identified as being contaminated are taken to a facility legally authorised to receive soil and materials of that kind. 3 The consent holder must take all practicable measures to— a) prevent the discharge of soil and stormwater from contaminated land to watercourses; and b) maintain the integrity of any structure designed to contain contaminated soil or other contaminated materials; and c) replace the soil to an erosion-resistant state at the completion of the relevant works. **Matters of control** Contaminated land (human health) a) Potential adverse effects on human health from disturbance or use of contaminated soil. b) Measures to avoid, remedy, or mitigate those effects, including— i. posed by contaminants; and ii. timing of remediation; and iii. standard of remediation on completion of works.	A Detailed Site Investigation (DSI) and Contamination Site Management Plan (CSMP) has been prepared to address the requirements of Condition 17 and manage potential adverse effects on human health and the environment during and on completion of the stopbank construction. Condition 7(3) (e (ii)) requires that procedures for the management of hazards from the discharge of any contaminant are included in the Construction Environmental Management Plan (CEMP), which is required by Condition 10 of the OiC. Therefore, we recommend that the CSMP forms an appendix to the CEMP.
18	**Works and structures in beds of rivers** 1 This clause and clauses 19 and 20 of this schedule apply to all construction works carried out in, or adjacent to, the bed of a river. 2 The consent holder must ensure that construction works are, so far as practicable, carried out in accordance with— a) an applicable ESCP; and b) the ecology principles; and c) the earthworks principles; and d) any guidance provided under clause 4(3)(b) of this schedule (see clause 5 of this schedule) relating to relevant cultural indicators. 3 Flood protection works that might affect fish passage in a river must, so far as practicable, be carried out outside peak times for migration and spawning of species of fish identified, in the ecological scoping survey conducted under clause 27 of this schedule, as being present in the river. 4 Permanent works in or adjacent to the bed of a river that are completed as a part of the construction phase of the flood protection works (for example, sediment and debris removal, bank protection, and capacity increase) must— a) be designed and installed in a way that is, so far as practicable, consistent with the ecology principles; and b) be designed by an engineer and an ecologist who are suitably qualified and experienced so as to provide for ongoing fish passage in the river; and c) manage stream loss, where threatened or at-risk species are present, in accordance with the effects management hierarchy; and d) provide for the maintenance of the river for flood management purposes. 5 The design of a permanent culvert in the bed of a river must— a) allow for the relevant design flood flow event; and b) address the risks of non-performance (including blockage), taking into account the risk of the flow of soil or debris. 6 A permanent spillway or weir must ensure that— a) a secondary flow path is available in the event of a blockage of the watercourse; and b) discharge from the secondary flow path does not exacerbate flooding of neighbouring or downstream properties. 7 All works and structures in, or adjacent to, rivers must, so far as practicable, incorporate energy dissipation measures and erosion and sediment control measures (for example, revegetation of worked sites) to minimise bed scouring and bank erosion in receiving environments	• There may be a requirement to cross the Okawa stream as part of earthworks haulage routes. This should be confirmed by the Contractor and details for temporary crossings should comply with the HBRC Working in Waterways Guidance, 2009.
19	Further requirements at watercourses 1 This clause applies if clause 18 of this schedule applies.	• There may be a requirement to cross the Okawa stream as part of earthworks haulage routes. This should be confirmed by the Contractor and details for

Number	Standardised conditions and proposed changes	Corresponding actions taken/design intent
	2 Despite clause 18(4)(b) of this schedule, fish passage need not be provided and maintained on all permanent culverts if the Project Ecologist decides, after considering all relevant matters, that it is unnecessary. 3 Instead, the consent holder must— a) give the consent authority appropriate data and reasons (supported by relevant design drawings) for not complying with clause 18(4)(b) of this schedule; and b) if culverts that do not provide fish passage are necessary, notify the Department of Conservation. 4 For the purposes of clause 18 of this schedule, the consent holder must, at least 10 working days before starting permanent works within a watercourse, give to the consent authority— a) hard copies of the design drawings for permanent culverts (including fish passage), bridges, and permanent stream diversions; and b) a statement of how those designs comply with clause 18 of this schedule. 5 All permanent works in the bed of a river must be carried out in accordance with the designs given to the consent authority under subclause (4). 6 The consent holder must ensure that any machinery or equipment used in the activities authorised by the consent is not stored in or on the bed or banks of the watercourse. 7 The consent holder must ensure all of the following: a) no machinery leaking fuel, lubricants, hydraulic fluids, or solvents is operated within or near a watercourse in circumstances where run-off might enter water: b) no vehicles, machinery, or equipment are refuelled within the bed of a watercourse or in any other location where spills might enter water: c) the storage of fuel or contaminants adjacent to a watercourse does not result in any fuel or contaminants entering water: d) other fuels and lubricants are not released into water: e) the Ministry for Primary Industries' requirements and clean dry protocols relating to didymo and freshwater pests are followed in relation to all equipment: f) machinery is operated in a way that minimises the transfer of organisms or pest plants from one catchment to another: g) the use of wet concrete is avoided in flowing water. 8 The consent holder, on becoming aware that any contaminant has been discharged into a watercourse in a way that contravenes the conditions of the resource consent, must immediately— a) take all necessary steps to stop or contain the discharge; and b) notify— i. the Manager Compliance; and ii. the Department of Conservation, if there is imminent risk of the discharge adversely affecting any at-risk or threatened species; and c) take all practicable steps to remedy or mitigate any ongoing adverse effects of the discharge on the environment. 9 The consent holder must take the actions set out in subclause (10) in relation to construction material, demolition material, and any materials from repair and maintenance activities that are— a) authorised by the consent; and b) no longer required as part of the construction works. 10 The consent holder must ensure that the materials are— a) removed on completion of the construction works; and b) reused, repurposed, or disposed of in an appropriate manner and in a place where they will not affect surface water levels and watercourses. 11 The consent holder must comply with all notices and guidelines issued by Biosecurity New Zealand that relate to the ongoing prevention of the spread of freshwater pests.	temporary crossings should comply with the HBRC Working in Waterways Guidance, 2009.
21	**Stormwater discharge** 1 The consent holder must, not later than 3 months after the completion of the construction works,— a) document the requirements for the effective operation and maintenance of all stormwater treatment devices (including sediment traps, if practicable); and b) submit the documents to the consent authority. 2 The consent holder must design any new permanent culvert to ensure that any headwater ponding upstream in the relevant design event does not have any significant adverse effect in that area. 3 The consent holder must ensure that stormwater discharge from construction works does not cause erosion or scouring of the bed or any bank of any downstream watercourse or receiving drain. 4 The consent holder must ensure that the design of culverts and stormwater detention devices is, so far as practicable, in accordance with the HBRC Stormwater Management Guidelines.	• (2) Culverts are sized to cater to a 100-year ARI event (due to the lack of a secondary flowpath and requirements of HDC Code of Practise). Accordingly, there are no adverse effects in a 100-year event, assuming the culvert can discharge. We note that in extreme flood events, the time of concentration of the Ohiti culverts are likely to be significantly shorter than that of the Okawa Stream catchment. • (3) Erosion protection measures have been included on stormwater outlets, where they discharge into the Okawa, including rip rap aprons. These have been sized in accordance with HBRC Stormwater management guidelines. Further details will be clarified at detailed design. • (4) Culverts have been designed to HBRC Stormwater Management Guidelines

Appendix C Risk Register

Project Name	Ohiti Road (Omāhu) Flood Protection Stopbank Works
Project Number	1017353.24
Phase	Preliminary Design
Prepared by:	REKI
Reviewed by:	TGM
Date :	23/07/2025

Ref ID #	Threat/ Opportunity	Risk Name	Risk Description	Risk Category (edit on Reference Tab)	Existing Control(s) (if any)	Risk Assessment (with Existing Controls)			Possible treatment/mitigation	Risk Assessment (after treatment)			Risk Owner
						Likelihood	Consequence	Risk Rating		Likelihood	Consequence	Risk Rating	
1	Threat	Uncertainty with flood level estimates	Uncertainty leads to overtopping of stopbanks in flood events.	Safety	HBRC to provide clear expectations on flood design cases and levels of performance. T+T to provide clear limitations of flood modelling data.	Possible	Major	Moderate	Contingency in design aligns with uncertainty of flood models.	Unlikely	Major	Moderate	HBRC
2	Threat	Insufficient borrow material	Insufficent borrow material to complete contract works, leads to delays and associated costs with contractor stand down.	Construction	Geotechnical investigations completed. Contractor to review earthworks volumes to ensure proposed methodology manages materials appropriately.	Unlikely	Major	Moderate	Contractor to monitor volumes throughout the construct and update project team on material supply.	Unlikely	Major	Moderate	HBRC/Contractor
3	Threat	Unsuitable material more than estimated	Unsuitable material is greater than estimated leading to additional borrow material being required.	Construction	Test pits and geotechnical investigations through the stopbank have been undertaken	Unlikely	Moderate	Moderate	Review during construction. HBRC to allow contingency in contract for remedial works.	Unlikely	Minor	Low	HBRC
4	Threat	Poor quality material from borrow area.	Material extracted from borrow area does not comply with project specification.	Construction	Geotechnical investigations undertaken.	Possible	Moderate	Moderate	Contingent allowance to import material or blend to meet specification requirements.	Unlikely	Moderate	Moderate	HBRC/Designer
5	Threat	Weather	Poor weather leading to contract delays and material too wet to compact and achieve specification.	Environmental	Programme to make allowance for wet weather.	Likely	Moderate	Moderate	Cover works areas to minimise moisture ingress and saturatation of embankments. Erosion and sediment control to minimise ponding of water and additional measures to be included before significant wet weather periods.	Likely	Moderate	Moderate	HBRC/Contractor
6	Threat	Flooding	Flooding leading to disruption of site works and potential scour of worksites/open faces.	Environmental	Specification requirements to include emergency procedures for flooding.	Possible	Major	Moderate	Contractor to manage site and have preparation and layout down areas above stopbank. Forecast to be monitored and a working procedure if flooding arises to be developed and managed on site. Minimise open faces to prevent scour or protect works areas prior to floodwaters arise. Erosion and sediment control plan to consider this risk.	Possible	Minor	Moderate	Contractor and HBRC
7	Threat	Scour and erosion	Heavy rainfall leading to scour of existing open faces during works	Construction	Minimise open faces and plans works with non-erosive material where possible.	Likely	Minor	Moderate	Contractor to manage slope and grade away from working area. Contractor to stabilise areas where necessary to protect erosion.	Possible	Moderate	Moderate	Contractor
8	Threat	Dust	Excessive dust caused by project works, leading to complaints and enforcement action.	Environmental	Works schedule to be undertaken in stages to minimise open faces.	Possible	Moderate	Moderate	Contractor to prepare ESCP and maintain operation effectiveness of devices. Water usage from river as dust suppression.	Unlikely	Minor	Low	Contractor
9	Threat	Erosion controls	Erosion and sediment control failures, leading to environmental discharge and enforcement.	Environmental	ESCP requirements to be defined by HBRC as part of tender documents.	Possible	Major	Moderate	Contractor to prepare ESCP and maintain operation effectiveness of devices.	Unlikely	Minor	Low	Contractor
10	Threat	Contamination	Contaminated soils identified during contract works. Leads to additional costs for disposal, delays and additional management on site.	Environmental	Contaminated soil investigations undertaken.	Unlikely	Major	Moderate	Include contingency for unlikely event of contamination.	Unlikely	Minor	Low	HBRC
11	Threat	Programme delays and coordiantion with stakeholders	Programme delays and associated costs due to delays in coordinating with neighbouring sites.	Stakeholder	HBRC have liaised with stakeholders.	Possible	Moderate	Moderate	Coordinate works around stakeholder key working windows.	Unlikely	Minor	Low	HBRC
12	Threat	Procurement of materials	Delays to project due to prourement contraints from suppliers.	Stakeholder	Materials are relatively limited (i.e. culverts)	Possible	Minor	Moderate	Programme works around long lead time items	Unlikely	Minor	Low	Contractor
13	Threat	Earthworks quality assurance and control	QA/QC testing delayed or not provided to designer with sufficent notice to review. Reworks to remediate areas identified.	Engineering/Design	QA requirements in specification clearly laid out.	Unlikely	Minor	Low	Contractor to provide quality management plan to ensure clear QA/QC testing requirements and hold periods.	Rare	Minor	Low	Contractor
14	Threat	Stopbank preparation and backfill material placement	Insufficient fill placement preparation, or poor in-situ soils, and improper compaction of stopbank fill leading to deficiencies.	Engineering/Design	QA requirements in specification clearly laid out.	Possible	Major	Moderate	QA/QC during construction. Contractor to address in quality management plan.	Unlikely	Minor	Low	Contractor
15	Threat	Culvert bedding and backfill	Insufficient compaction on bedding surrounding, leading to deficiencies	Engineering/Design	QA requirements in specification clearly laid out.	Possible	Major	Moderate	QA/QC during construction. Contractor to address in quality management plan.	Unlikely	Minor	Low	Contractor
16	Threat	Consenting requirements	Works delayed due to requirements for consents or permits (for example water abstraction or fill import).	Consenting	HBRC to manage perimit requirements and clearly lay out in the tender documents.	Possible	Minor	Moderate	HBRC to confirm consent requirements ahead of works commencement and manage permit requirements to assist contractor. Contractor to comply with consent requirements and notifications.	Unlikely	Minor	Low	HBRC/Contractor
17	Threat	Working near waterways	Works not following requirements for working near waterways, impacts on environment.	Construction	HBRC to manage perimit requirements and clearly lay out in the tender documents.	Possible	Minor	Moderate	Contractor to have safe work method statements in place and followed appropriately.	Unlikely	Minor	Low	HBRC/Contractor
18	Threat	Working around slopes and water - hazards to workers	Slope and water hazards to workers.	Construction	HBRC to clearly lay out H&S requirements in the tender documents.	Possible	Major	Moderate	Contractor to have safe work method statements in place and followed appropriately.	Unlikely	Minor	Low	Contractor
19	Threat	Constructor expertise and/or experience.	Constructor does not undertake works in an efficient manner ot to the expected standard.	Construction	HBRC to provide clear expectations and requirements in the tender documents.	Possible	Moderate	Moderate	Contractor to provide clear work method statements and QA/QC processes.	Unlikely	Minor	Low	HBRC/Contractor
20	Threat	Traffic management	Vehicle access around site, driving on slopes and interface with public roadways and driveways. Traffic management and public access during the raising of Ohiti and Taihape roads.	Construction	HBRC to clearly lay out H&S and traffic managemnet requirements in the tender documents.	Possible	Minor	Moderate	Contractor to have safe work method statements and traffic management plans in place and followed appropriately.	Unlikely	Minor	Low	Contractor

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