CIVIL INFRASTRUCTURE REPORT



132 Whangapouri Road
Karaka

Fast-Track Referral

CIVIL ENGINEERING • SURVEYING • LAND DEVELOPMENT

PROJECT INFORMATION

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DOCUMENT CONTROL

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1. OVERVIEW

1.1 Project

The purpose of this report is to provide an assessment of the infrastructure associated with the proposed Fast Track proposal in Karaka, known as 132 Whangapouri Road, which is a proposed residential development that will provide for the following:

1) 904 residential lots
2) A 11.9 Ha, 200-unit Retirement Village
3) A 0.7ha local centre in the northern portion of the development that provides opportunities for mixed use and employment activities; and
4) Associated infrastructure including upgrades and new transport, stormwater, wastewater, water supply, electricity and telecommunications infrastructure.

The proposed development is shown below in Figure 1, as an extract from the Masterplan prepared by Barker and Associates:



Figure 1: Development Masterplan

The information provided herein relates to stormwater, wastewater, stormwater, water supply, and other service infrastructure and the potential capacity to service the proposed development.

This report provides information in support of the Fast Track application, and further reporting and engineering design will be required before lodgement of a substantive application.

The calculations and assessments included in this report are 'desktop' analysis and are preliminary in nature based on information available at time of issue.

1.2 Legal Description

Applicant	132 Whangapouri Road LP
Legal Description	Lot 3 Deposited Plan 387516 and Lot 2 Deposited Plan 438393; Lot 2 Deposited Plan 464886
Record of Titles (RTs)	541326, 618030
Site Area	Lot 3 Deposited Plan 387516 and Lot 2 Deposited Plan 438393 (59.76 ha); Lot 2 Deposited Plan 464886 (26.055ha)

1.3 Site Description

The subject site is located on the eastern side of Whangapouri Road and is bordered by Karaka Road (State Highway 22) to the south, Oira Creek to the east and Arana Drive to the north. The total site area is 85.5 Ha. The location and extent of the site is shown below within Figure 2:



Figure 2: Site Locality Plan - Approximate Site Boundaries shown in yellow. Source: AC GEOMaps

The site is located within proximity to Drury and is located adjacent to Future Urban Zoned (FUZ) land to the east of Oria Creek and is adjacent to the Fisher and Paykel Private Plan Change on the other side of SH22.

The land contained within the development site currently supports agriculture / pastoral farming uses. There are several existing dwellings and building located within the site. Legal access to both properties is from the existing vehicle crossings from Whangapouri Road.

The site features gentle to moderately sloping contours. Heights range from RL 30m to RL 5m. There are steeper contours which exist around the streams and wetland features in the central part of the site, with the balance largely gently sloping and north and or north-east facing. The development site is split into two areas by a stream that runs largely west-east, of which is protected and the riparian margin is allowed for by the development.

There is known flooding in the streams and corridors, however, as the site largely discharges into the Coastal Marine Environment (CMA), downstream flooding is not of concern.

There are existing power and communications network present within or nearby. Counties Power owns the site to the southwest which adjoins the SH22 / Whangapouri Road intersection, which has been purchased for a future substation. The site is, however, not serviced by reticulated water, wastewater, or stormwater networks.

1.4 Proposed Development

132 Whangapouri Road is a regionally significant largely residential development which will provide for the following:

1) 904 residential lots
2) 200-unit Retirement Village
3) A 0.7ha local centre in the northern portion of the development that provides opportunities for mixed use and employment activities; and
4) Associated infrastructure including upgrades and new transport, stormwater, wastewater, water supply, electricity and telecommunications infrastructure.

Potable and non-potable water demand will be provided through a combination of bore and roof-caught water. A storage reservoir, treatment, and reticulated network will provide water supply to lots and firefighting supply within the roads. The network will be owned and operated by an infrastructure company.

Wastewater disposal will be via a private, centralised wastewater treatment plant (WWTP), with disposal of treated effluent over land to the CMA. GWE Consultant engineers have been engaged to provide specialist wastewater and water advice to the proposal, please refer to their memo for further detail.

There are no existing public stormwater networks within the site. A new stormwater network will be constructed, and this will accord as required with the requirements of the Stormwater Code of Practice and Region wide NDC (albeit we note that we are outside the extents, being rural zoned). Treatment and SMAF mitigation will be provided for all impervious areas.

A new public roading network will be provided within the site. Legal widths range from 16m-23m, and a proposed road connection is also provided in the existing paper road to connect the development tyo Oira Road to the east. Active modes are provided for; and the development will be accessed via a new

roundabout of SH22, please refer to the Traffic Impact Assessment prepared by Hughes Traffic and Transportation for further detail.

2. EARTHWORKS

2.1 General

Bulk earthworks will be required to form development areas consisting of the lots, roads and associated infrastuture. Draft earthwork drawings are appended to this memo within Appendix A, and this indicates likely volumes and future levels. We note that these are preliminary in nature and will be subject to further detailed design at future substantive stage.

All future building platforms will be elevated above and removed from the streams and/or identified overland flowpaths and flood hazards. This minimises sediment risk to the receiving catchments. Any future substantive application will need to be supported by sediment and erosion control drawings, which will demonstrate how the earthworks will be manged as to comply with GD05.

Resource consent will require that erosion and sediment control measures are implemented and maintained in accordance with the Engineering Drawings.

Silt control measures will need to be installed onsite prior to or during (as specified) earthworks commencement. All silt control measures will be checked and confirmed acceptable by the Engineer before relevant earthworks commence.

2.2 Geotech and Earthworks Design

Further Geotech reporting will be provided in support of any future substantive application. A review and assessment of the earthwork drawings and design will be undertaken by the Geotech engineer, and the final design will include any recommendations, including areas of ground improvements (if required).

Conditions of any consent granted will also require Geotech supervision and the provision of a Geotech Completion Report (GCR) at the completion of any stage of the development.

3. FLOODING AND OVERLAND FLOW

3.1 Overland Flowpaths ('OLFPs')

The overland flowpaths within the site are largely contained to the streams, gullies and associated margins. For the most part these are removed from the development areas and will be maintained as required by the future development, as per the Masterplan and engineering drawings prepared to date. The location of the existing OLFPs is shown below within Figure 3:



Figure 3: Existing OLFPs (site in red). Source: AC GEOMaps

All building platforms and future buildings will be provided with minimum floor levels that comply with the Stormwater Code of Practice and the New Zealand building code as required. Minor redirection of overland flowpaths will occur within the development areas, with OLFPs conveyed away from future building platforms, and within road corridors before discharge to the OLFPs and existing streams.

There are multiple existing culverts that cross the streams and/or overland flowpaths. These culverts will be upgraded and/or new culverts and bridges constructed over OLFPs and streams to support the new roading network. The culverts will be sized and constructed in accordance with best engineering practice, and the NES where possible. It is assumed that the connection to Oira Road, would be via way of a bridge.

3.2 Flooding

Flooding within the site and downstream are largely limited to the streams, gullies and riparian areas. There is ponding which occurs both upstream of Whangapouri Road and SH22. The lower lying areas of the site are also subject to flooding, based on available data from Auckland Council. The existing flood plains are indicated below, wihtin Figure 4.



Figure 4: Existing 1% AEP Flood Plain (site in blue). Source: AC GEOMaps

Given the location of the site, being at the bottom of the catchment, the risk of downstream effects from the intended urbanisation is reduced. However, in support of the Fast Track referral, Maven has built a catchment flood model using TUFLOW software and has undertaken pre and post development modelling for the 100-yr event.

This has helped set levels for building platforms, confirm that there are no offsite flooding effects, and was used to set the bridge level and design for the road connection back to Oira Road. A summary of the preliminary flood modelling and results are provided below but refer to the Flood Modelling Memorandum attached within Appendix B for further detail.

3.2.1 TUFLOW Flood Model and Results

The modelling has been undertaken in accordance with Auckland Council Stormwater Code of Practice approach referenced in Section 3.8 and Auckland Council's current 3.8°C climate change guidance.

The modelling confirms no upstream or downstream effects and has been used to confirm minimum FFLs and height of the bridge and culverts contained within the civil design. The model has been used to test all proposed development platform areas, and the results confirm that the proposal can proceed without creating adverse effects, with the design reducing flooding depths and improving resilience from that of the underlying pre-development conditons.

3.2.2 Consultation and Next Steps

The preliminary results of the model were shared and discussed with Auckland Council and Healthy Waters. Upon a successful referral, it has been agreed that Maven will further engage with Healthy Waters and will confirm the flood model parameters and outputs prior to the lodgement of any substantive application.

4. STORMWATER

The Auckland Council Stormwater Code of Practice sets out design and construction standards for stormwater and requires all land development projects to be provided with a means of stormwater disposal and treatment.

The site is not located within the Rural Urban Boundary (RUB) and thus, the site is not bound by the Region Wide Network Discharge Consent (NDC). Given that the proposal seeks to vest public roads, consideration of the Stormwater CoP V4 and suitable NDC drivers have directly influenced the civil design.

4.1 Existing Stormwater Reticulation

There is no existing stormwater network in the vicinity of the development area, aside from existing culverts which convey flows under Whangapouri and SH22. Stormwater discharge within the development site, is largely via sheet-flows to existing overland flowpaths and or streams. Buildings feature existing tanks with overflows as per a typical rural context.

4.2 Proposed Stormwater Reticulation

A new stormwater network will be constructed in support of the development. This will provide a means of disposal for all impervious areas including public roads, common accessways, driveways and buildings.

A new public stormwater network will be provided within the public roads, and this will provide a means of stormwater disposal for each lot created within the development. The pipe network will discharge into the various overland flowpaths, streams and wetlands within the site, and will largely accord with the existing catchments, with specific emphasis being placed on maintaining hydrology and flows to the wetlands which have been mapped by Viridis and shown on the appended Maven engineering drawings.

The network will be subject to future Engineering Plan Approval from Auckland Council and that the network will be vested to Auckland Council (Healthy Waters). We note that this will require further consultation around approach and future asset ownership as was discussed at the pre-application meeting and outlined wihtin the minutes received from Auckland Council.

Please refer to the appended Stormwater plans within Appendix A for further detail, including high-level overall pipe network design, treatment and outfall locations.

4.3 Stormwater Capacity

The proposed stormwater connections and private stormwater network will be subject to future Engineering Approval / Building Consent and will be designed to have capacity for the 10-year rainfall event, as is required for Auckland Council. The sizing will be undertaken as part of the developed design process.

Any public network associated with the public roads, will also be sized to convey 10-yr rainfall and will be designed to comply with Auckland Transport's TDM.

4.3.1 Stormwater Mitigation – SMAF

Even though the site is in part located adjacent to the CMA, the bulk of the discharges or via streams, OLFPs and/or wetlands. Maven has therefore assumed that SMAF mitigation is required to comply with the AUP, and best practice when comparing against the Region Wide NDC.

This will be provided through a combination of catchment raingardens, wetlands and treepits (public roads) and through a combination of wetlands, and tanks in support of the private accessways and lots. For private accessways, tanks will provide extended detention only.

4.3.2 Wetland – Hydrology Mitigation

Viridis have undertaken preliminary mapping of ecology features within the site and have identified wetlands which have been retained within the masterplan. To ensure post-development hydrology is maintained, the stormwater network will be designed to ensure retention of pre-development flows are achieved for the 2-year rainfall event, alongside SMAF mitigation. To achieve this, various raingardens and outfalls have been allowed for, and in some areas, direct discharge from clean lot water only will be required to ensure recharge of the wetlands.

The final design will be subject to detailed design at the substantive phase and will require further input from the project ecologist. Conceptual locations of the stormwater network and raingardens are included within the appended civil drawings (Appendix A).

4.3.3 Stream Hydrology and Erosion

Stream erosion concerns were highlighted by Healthy Waters as part of the pre-application meeting discussion. Further consideration will be undertaken in support of the substantive application, which will include hydrogeologist input, and may include planting and/or protection suggestions for the stream corridors. We note that the 2-yr and SMAF mitigation included in the underlying stormwater design will ensure that the development will not worsen any existing erosion issues.

4.4 Stormwater Quality

As the site is not bound by the NDC, treatment would instead be required by the AUP. Under the AUP, treatment would be required for any roads which carry more than 5000 vehicles per day, and/or when a carpark supports more than 30 spaces.

However, as the roads will be vested to Auckland Transport, and the stormwater network will be public, confirmation around whether treatment (as per Region Wide NDC) is desired will be sought from Auckland Council (Healthy Waters) and Auckland Transport. For the current stormwater design, Maven has taken the conservative approach, assuming treatment will be desired. Final confirmation will be confirmed via consultation with Council and AT before lodgement of the future substantive application.

4.4.1 Stormwater Treatment – Public Roads

Although the final design and arrangement of treatment will be subject to detailed design at the future substantive stage, treatment for public roads will be provided through a combination of the following solutions:

- Catchment Raingardens (road only)
- Wetland (central catchment, roads and lots)
- Treepits and/or raingardens within the roads

Auckland Transport have outlined within their preference towards catchment solutions from the pre-application meeting. The preliminary design proposed by Maven complies with this desired outcome.

4.4.2 Stormwater Treatment – Private Accessways and Lots

Although the final design and arrangement of treatment will be subject to detailed design at the future substantive stage, treatment for private accessways and lots will be provided through a combination of the following solutions:

- Wetland (for central catchment)
- Proprietary devices for JOALs and/or lots which are not serviced by catchment devices.

WASTEWATER

The Watercare Code of Practice sets out the design principles for wastewater drainage and requires any development project to be provided with a means of wastewater disposal.

4.5 Wastewater Overview

There is no existing reticulated wastewater network within the site, with the nearest public network consisting of the gravity network and associated pump stations within Bremner Road to the north-east. The site is in the rural zone, and thus, there are currently no long-term plans by Watercare to service the development site.

The Fast Track proposal will therefore be supported by a private, centralised wastewater treatment plant (WWTP), with disposal of treated effluent via land to the CMA (stream). GWE Consultant Engineers have been engaged to provide specialist wastewater and water advice to the proposal. Please refer to their memo for further detail. A summary of the key findings are outlined below

Consideration of the potential public connections and extensions are also outlined within Section 4.7.

4.6 Wastewater Treatment

As per the GWE memo, A Membrane Bioreactor (MBR) or hybrid Membrane Aerated Biofilm Reactor (MABR-MBR) system is recommended to provide treatment for the proposal.

A MBR or hybrid MABR/MBR system is scalable over time to encompass the staged development of proposal and activities within the site. This means the treatment and land application systems and/or discharge to water can be future proofed for the final design volume, with its modular technology matching the treatment technology required with actual demand for wastewater treatment.

The communal treatment and disposal methodology (which will likely include wetland and riprap outfall) will be subject to future design, inclusive of emergency storage, and disposal areas. This will be undertaken by GWE Consulting Engineers, and details will be provided in support of any future substantive application.

4.6.1 Wastewater Reticulation

At this stage, the preferred reticulation approach is not yet known. A decision will be made at the substantive phase and will likely be either a Low-Pressure Sewer (LPS) System or a conventional gravity network with wastewater pump stations.

Other options noted within GWE's reporting includes Vacuum Sewer System (as per Drury Crossing to the east of SH1) or a Septic Tank Effluent Pumping/Gravity (STEP/STEG).

The options will be evaluated in more detail at the concept design stage and once detailed development plans are available and on the following specific key factors that will include:

- Ease of Construction.
- Site topography.
- Operational Complexity.
- Reliability.
- Requirement for Separate Pumpstations.
- Potential for Infiltration and Inflow (I&I).

The appended C500 (wastewater plans) shows the preferred solution of gravity wastewater networks; alongside the pump station in the southern catchment required.

4.6.2 Wastewater Capacity and Design

GWE has estimated wastewater flows and loads by applying a suitable daily occupancy on a per lot/per unit basis. The water source for all buildings will be from either roof water, or from a pressurised network, supplied by a bore.

Based on the current concept masterplan, A preliminary wastewater flow assessment estimates an average daily flow (ADWF) of approximately 580 m3/day and a peak wet weather flow (PWWF) of 1,160 m3/day at full development, applying a peaking factor of two.

4.6.3 Wastewater Discharge

Following mechanical treatment, treated wastewater is proposed to pass through a constructed wetland polishing system prior to discharge to the Coastal Marine Area (CMA). The constructed wetland is intended to provide additional environmental polishing, nutrient attenuation, hydraulic buffering, ecological enhancement, and cultural restoration benefits prior to discharge.

Further investigations and assessments will be undertaken at the substantive application stage, including hydraulic design, ecological investigations, coastal receiving environment assessment, cultural assessment, geotechnical investigations, and detailed treatment process evaluation.

Subject to these further investigations and approvals, the proposed wastewater servicing strategy is considered capable of providing a practical, resilient, scalable, and environmentally responsible servicing solution for the Whangapouri Road development.

4.7 Public Wastewater Extensions and Connections

Whilst the site is not in the Rural Urban boundary (RUB), the site directly adjoins FUZ land to the east (Oira Road). As such, an extension to the development is possible, if this was desired by Watercare. This

would also build upon the network being proposed to support the Fisher and Paykel development on the eastern side of SH22.

Maven is aware of capacity issues in the public wastewater network, and that pump station upgrades are needed to service the Drury Stage 3 Future Urban Area (the FUA), which the proposal is located wihtin proximity to, but not located within.

Several bulk infrastructure pre-requisites are listed in the FDS for the nearby FUA, which are outlined within the Southern Auckland Wastewater Service Scheme, including, but not necessarily limited to, an upgrade of the Hingaia wastewater pump station and rising main; upgrades to the gravity pipes and wastewater pump station at Bremner Road, and the new Drury West transmission sewer.

The possibility of a future connection, and/or desire for possible public connection is an ongoing consultation piece with Watercare, however, the proposal is not reliant upon this possible outcome.

5. WATER SUPPLY

The Watercare code of Practice sets out the design principles for water supply and requires assessment against SNZPAS 4509:2008 NZ Fire Service Fire Fighting Water Supply Code of Practice.

5.1 Water Overview

The 1200mm Ø trunk main (Waikato 1 Watermain) is located to the north-east of the proposed development site in Great South Road. Watercare is currently undertaking works on the Waikato 1 Watermain near Quarry Road, which is known as the Bulk Supply Point (BSP). This provides a possible public connection point, as does the existing network in Bremner Road to the north.

However, as the site is rural zoned, there is no planned network extension, and any connection to this network would require Watercare approval.

As such, the development will be supported by a private water network which will be owned and operated by an infrastuture company. Bore water will be the primary means of water generation, and this will be supplemented as required by roof-caught water within the lots.

There will be raw and treated water storage, a series of pumps and a reticulated pipe network will be constructed within the roads to vest. Provision has been made within the masterplan for the required infrastuture, and three likely bore locations are also identified in the south, near the SH22 boundary. The bore locations have been confirmed by Earthtech who have been engaged to provide hydrology support and technical expertise to the project. Please refer to Earthtech's memo (Reference: PIK/L3750-1/cam) for more detail.

5.1.1 Water Demand

The daily water demand is provided wihtin GWE's Waster Servicing Memo (Ref: J8018), and a brief summary is provided for below: The total average daily potable water demand for the Project is estimated at approximately 498 m_3/day, consisting of the following average daily demands from each land use:

- Residential: 410 m_3/day.
- Local centre: 21 m_3/day.
- Retirement village: 68 m_3/day.

5.1.2 Bore Supply and Treatment

As detailed within Earthtech's report, Preliminary assessments indicate that groundwater is available in three aquifers within the site. This includes the Bombay-Drury Sand and Papakura Kaawa, the Pukekohe Kaawa and the Paerata Waitemata.

Earthtech has confirmed the desired location of the three bores, and these are shown on the appended C600 drawings in Appendix A. Earthtech's memo outlines various pathways to obtain suitable ground water to support the development, of which will require further drilling and testing before the lodgement of the substantive application.

Potable water supply is anticipated to be provided via communal bore water supply and treatment infrastructure, supplemented by roof water harvesting where appropriate. The spatial make up and infrastuture has been confirmed by GWE and provided for wihtin the appended C600 engineering drawings.

The proposed servicing approach is intended to support a staged residential and Retirement Village build out together with ancillary commercial activities.

The future design will need to follow the Drinking Water Quality Assurance Rules 2022 (DWQAR) - Networked supply category - large supply size. This allows for a total population more than 500 people.

This compliance pathway offers the possibility of providing drinking water by a centralised water treatment system to an unlimited number of buildings through a reticulated distribution network. By adopting this compliance pathway, the supply must demonstrate compliance against the General, Source S3, Treatment T3 and Distribution D3 rule modules of the DWQAR.

In addition, the preparation of a Water Safety Plan (WSP) and Source Water Risk Management Plan (SWRM) will also be required. Note that, to comply with the Distribution D3 rule module, residual disinfection will be required, therefore chlorination of the treated water will be necessary.

Further reporting would be provided in support of the substantive application; however, the bulk of the required reporting and compliance will only be required at the building consent stage.

5.1.3 Roof Caught Water

Roof caught water will likely supplement bore supply throughout the development. This will help reduce the need for ground water and to improve resilience and environmental benefits. This will likely result in increased reuse (retention) volumes within the lots above that expressly required under SMAF. The final volumes and design will be worked through based on lot sizes, available ground water demand and other factors, and will be confirmed at future detailed design phase.

5.2 Fire Fighting Supply

The minimum firefighting water supply classification for residential developments is FW2. Therefore, any future residential development must meet the following water supply requirements:

The New Zealand Fire Service Firefighting Water Supplies Code of Practice (SNZ PAS 4509:2008) states that 45m³ of water storage must be available within 90m from each dwelling for firefighting purposes within non-reticulated developments, with FW2 water supply classification. The 90m distance is measured from the point where the water supply is available rather than the water source itself (i.e. to the coupling or suction source).

At this stage, a reticulated fire network and hydrants will be provided in support of the proposal included to ensure compliance with SNZPAS 4509:2008. Flow testing and detailed design will require fire engineering input at substantive design stage. It is noted that if a reticulated network is not desired, that separate storage by way of tanks can be provided within each site; and this can also achieve compliance with SNZPAS 4509:2008.

5.3 Public Supply

The bulk supply point near Quarry Road or via the existing network within Bremner Road could provide a possible public connection point to the development. Confirmation of supply and capacity has been received for a nearby Plan Change proposal by Watercare. Theoretically, sufficient water supply does exist, putting aside the projects underlying rural zoning. Consultation to this effect is ongoing, but the proposal does not rely upon a public connection.

6. IWI CONSULTATION

A hui was held on-site with representatives from both Ngāti Tamaoho and Ngāi Tai ki Tāmaki. Feedback was received primarily on two matters, stormwater design (treatment, discharge etc) and the wastewater disposal methodology and means. The preference around stormwater was for treatment to be provided and for this to be done via raingardens on a preferred catchment-wide basis. For the disposal of treated effluent, the preference was for this to be done via an engineered raingarden, and for this to accord with the approved Karaka Village development. GWEs reporting and our concept design is consistent with this desired outcome. Further consultation will be undertaken with both iwi parties before a substantive application is lodged.

7. OTHER SERVICES

Telecommunications in the area are managed by Chorus, Power supply in the area is managed by Counties Power. It is understood that services are available, however, upgrades will be required to service the development. Underground services will be supplied to each lot.

A preliminary meeting has been held with Counties Power, who has confirmed existing capacity exists in their network, and that they held no concerns with the development being located next to their proposed substation site (corner of Whangapouri and SH22).

8. ROADING

8.1 Roading Overview

The development site is benefited by an existing roading network, including Whangapouri Road and SH22. Access to the site is via a new roundabout constructed from SH22. This leads into a 23m wide collector road. No upgrades are proposed or consider necessary within Whangapouri Road. A new road connection is also proposed to Oria Road to the east.

8.1.1 Local Roading Network

Legal road widths within the development range from 16m - 23m and includes a 20m wide road connection within the existing paper road to Oira Road to the east.

The collector road cross-section is shown below within Figure 5 and includes a cycle lane and footpath on the eastern side of the road, linking back to SH22 and to the road to Oira Road to the east.

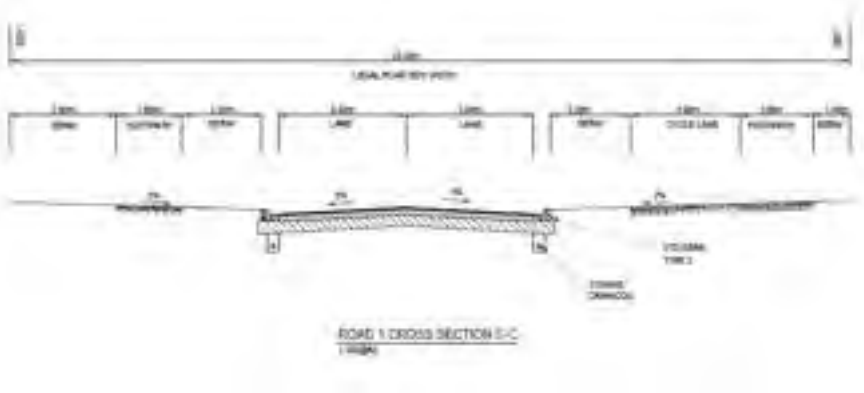


Figure 5: Road 1 (Collector Road) Cross-section

The remaining roads within the development will range from 16m-20m, with the principal 20m roads (both north-south) and to Oira Road and Whangapouri also supporting bicycle facilities. The connection to Oira Road will be undertaken by way of a bridge. The remaining cross-sections are shown below within Figures 6 and 7:

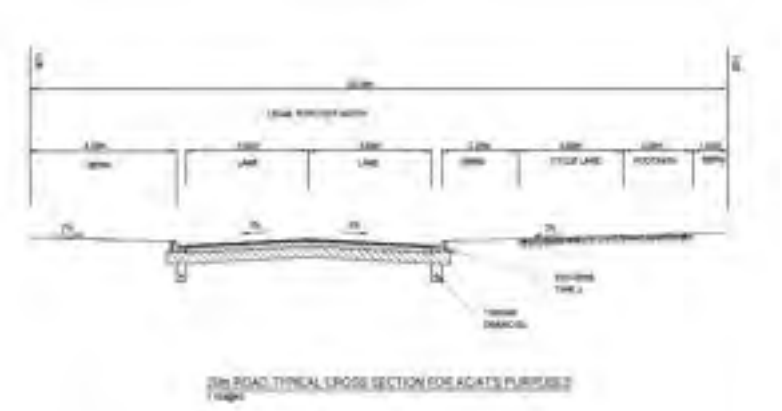


Figure 6: 20m local road with bike lane

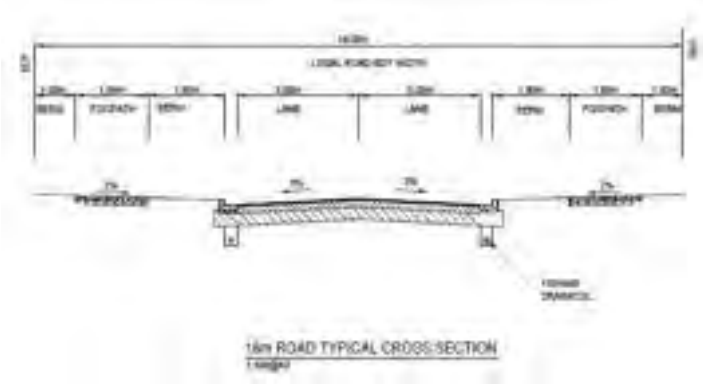


Figure 7: 16m Local Road Cross-section

Final design of the internal roads and intersection with SH22 will require further design at the substantive phase, alongside further consultation with NZTA and Auckland Transport. Please refer to the C300 (Roading) drawings within Appendix A for further detail.

9. CONCLUSIONS

The report outlines the high-level civil servicing strategy for the intended Fast Track development of 132 Whangapouri Road, Karaka.

The concept plans demonstrate that the development will deliver approximately 904 residential lots, 200-unit retirement village, and a small neighbourhood commercial area.

Earthworks will be required in support of any future proposal to allow for the construction of building platforms, accessways, roads and services. The final design will be subject to Geotech input, and stability assessment. Specific details relative to sediment and erosion control will be provided in support of any future substantive Fast Track application(s).

A new stormwater network will need to be constructed, and this will provide a means of stormwater conveyance for all impervious areas within the site. Although the site is not subject to the NDC, it is still considered that the bulk of the stormwater networks will be public and will be vested to Auckland Council (Healthy Waters).

Treatment although not strictly necessary under the AUP is being proposed, however, confirmation from Auckland Transport and Healthy Waters will be sought, before confirming the desired approach at substantive stage. Treatment will be via way of catchment raingardens and/or treepits within the public roads.

Although the site is located wihtin proximity to the CMA, the bulk of discharges are through wetlands and or streams. As such, SMAF mitigation will be provided in support of the development. Mitigation of the 2-yr pre-development flows will also be done for all catchments which discharge into the existing and retained wetlands.

Potable and non-potable water supply for all lots within the development will be provided primarily from bore water, which will be treated and reticulated through the development. The network will be owned and operated by an infrastuture company. This network will also provide the required fire hydrants to accord with the requirements of SNZPAS 4509:2008.

Roof caught water will likely supplement bore supply throughout the development. This will help reduce the need for ground water and to improve resilience and environmental benefits. This will likely result in increased reuse (retention) volumes within the lots above that expressly required under SMAF. The final volumes and design will be worked through based on lot sizes, available ground water demand and other factors, and will be confirmed at future detailed design phase.

There is known flooding and overland flowpaths within the development area, which are largely contained to the gullies and stream margins. All building platforms will be provided with freeboard in accordance with the NZBC and developable areas are removed from these hazards. Maven has developed a TUFLOW flood model which has confirmed that there are no upstream or downstream effects from the intended development.

Suitable wastewater disposal can be provided for the development. Wastewater reticulation will most likely be via a conventional gravity network, supported by pump stations. Wastewater will be treated by a private, centralised wastewater treatment plant (WWTP), with disposal of treated effluent via land to the CMA (stream).

A telecommunications, power and gas network are present in the surrounding area, and it is anticipated that service can be made available to the proposed development, subject to upgrades.

Roading upgrades will be provided in support of the development. A new roundabout will be provided from SH22, and a collection of roads ranging from 16-23m will be provided throughout the development site. A new road connection to Oria Road (via a bridge) is also proposed.

Information gathered to-date confirms the site is suitable for the proposed development from a civil engineering and infrastructure perspective.

10. APPENDICES

10.i APPENDIX A – ENGINEERING PLANS



NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000
3. LEVELS IN TERMS OF THE NEW ZEALAND VERTICAL DATUM 2016.
4. ORIGIN OF LEVELS = SM XXXX SO XXXX(XXXX) PUBLISHED RL=XX.XX, SOURCED FROM THE LINZ DIGITAL GEODETIC DATABASE.
5. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
6. THE CONTRACTOR SHALL COMPLY WITH ALL RELEVANT HEALTH AND SAFETY REQUIREMENTS.
7. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
8. SEDIMENT CONTROL SHALL BE INSTALLED AND OPERATIONAL BEFORE EARTHWORKS START ONSITE IN ACCORDANCE WITH COUNCIL STANDARDS.
9. CONTRACTOR SHALL PROVIDE AS-BUILT OF WORKING SEDIMENT CONTROL DEVICES AND CONFIRMATION OF POND/DECENT VOLUMES TO ENGINEER.
10. SEDIMENT CONTROL TO COMPLY WITH GD05 STANDARDS.

Rev	Description	By	Date
A	FOR INFORMATION	JAW	05/2026

	By	Date
Survey	1m LIDAR	2024
Design	JAW	05/2026
Drawn	JAW	05/2026
Checked	AC	05/2026

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Project

DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title

PROPOSED EARTHWOTKS PLAN OVERVIEW

Project no.	135053		
Scale	1:8000 @ A3		
Cad file	135053-C200.DWG		
Drawing no.	C200-1	Rev	A

DATE: 9/26 FILEPATH: P:\MAVEN PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA NLDW\DWG\135053-C200.DWG



Rev	Description	By	Date
A	FOR INFORMATION	JAW	05/2026

	By	Date
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DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title

PROPOSED EARTHWORKS PLAN NORTHERN

Project no.	135053		
Scale	1:4000 @ A3		
Cad file	135053-C200.DWG		
Drawing no.	C200-2	Rev	A

NOTES REFER TO C200-1

LEGEND

- EX BDY
- PROP BDY
- EX MAJOR CONTOUR
- EX MINOR CONTOUR
- PR MAJOR CONTOUR
- PR MINOR CONTOUR
- PROP EXTENT WORK
- EX WETLAND
- 10m BUFFER FROM WETLAND / STREAM

Rev	Description	By	Date
A	FOR INFORMATION	JAW	05/2026

	By	Date
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Project

DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

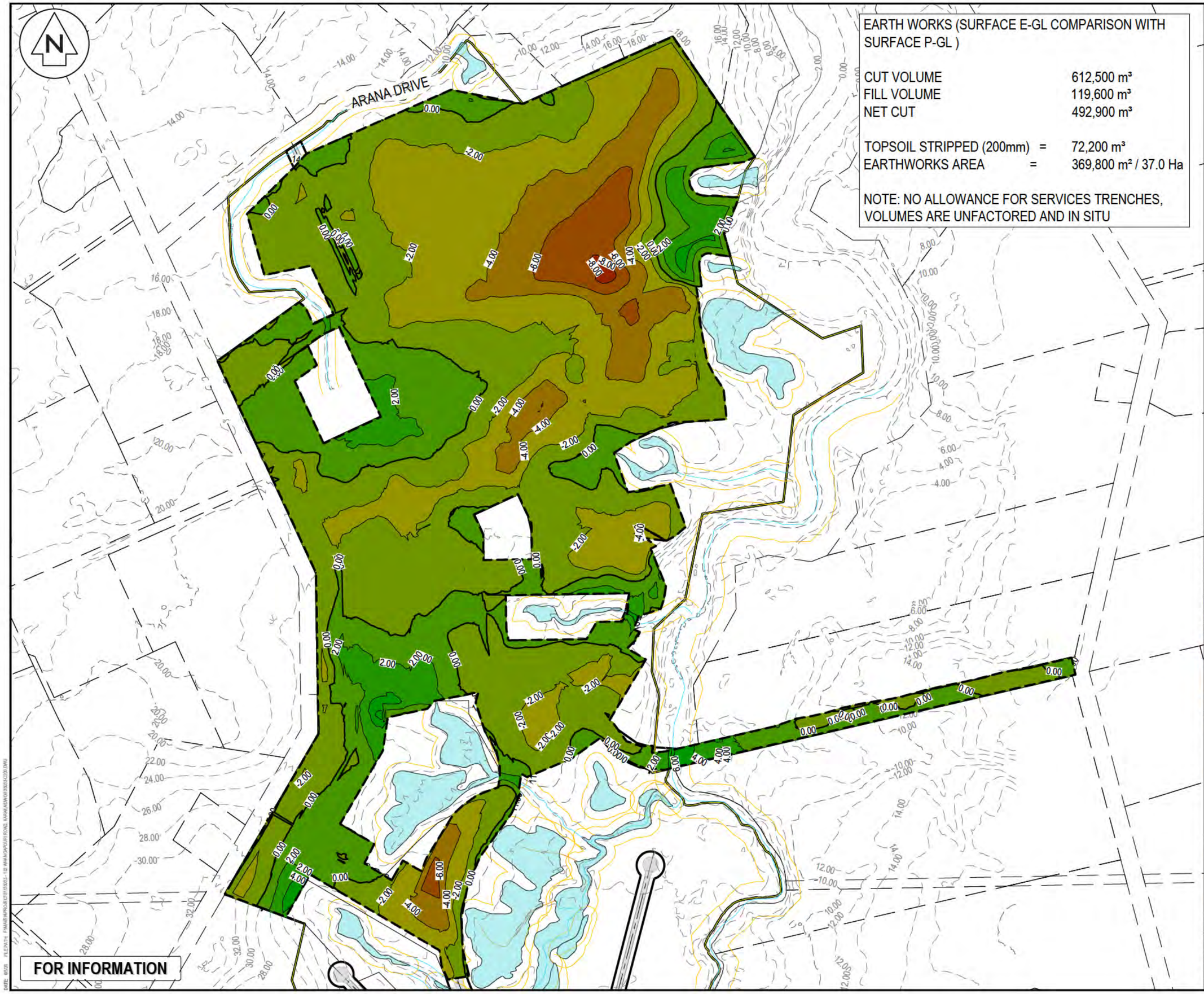
Title

PROPOSED EARTHWORKS PLAN PLAN SOUTHERN

Project no.	135053		
Scale	1:4000 @ A3		
Cad file	135053-C200.DWG		
Drawing no.	C200-3	Rev	A

FOR INFORMATION

DATE: 05/26 FILEPATH: F:\MAVEN\PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA\CAD\135053-C200.DWG



NOTES REFER TO C200-1

LEGEND

- EX BDY
- PROP BDY
- EX MAJOR CONTOUR
- EX MINOR CONTOUR
- PR MAJOR CONTOUR
- PR MINOR CONTOUR
- PROP EXTENT WORK
- EX WETLAND
- 10m BUFFER FROM WETLAND / STREAM

Cut/Fill Table			
Number #	Minimum Elevation	Maximum Elevation	Color
1	-10.000	-8.000	
2	-8.000	-6.000	
3	-6.000	-4.000	
4	-4.000	-2.000	
5	-2.000	0.000	
6	0.000	2.000	
7	2.000	4.000	
8	4.000	6.000	
9	6.000	8.000	

Rev	Description	By	Date
A	FOR INFORMATION	JAW	05/2026

	By	Date
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Design	JAW	05/2026
Drawn	JAW	05/2026
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Project
DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title
PROPOSED CUT & FILL PLAN NORTHERN

Project no.	135053		
Scale	1:4000 @ A3		
Cad file	135053-C200.DWG		
Drawing no.	C220-1	Rev	A

DATE: 05/26 FILEPATH: P:\MAVEN PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA\CAD\135053-C200.DWG

EARTH WORKS (SURFACE E-GL COMPARISON WITH SURFACE P-GL)

CUT VOLUME	316,800 m³
FILL VOLUME	733,300 m³
NET CUT	416,500 m³
TOPSOIL STRIPPED (200mm) =	74,400m³
EARTHWORKS AREA =	372,800m² / 37.3Ha

NOTE: NO ALLOWANCE FOR SERVICES TRENCHES, VOLUMES ARE UNFACTORED AND IN SITU

NOTES REFER TO C200-1

LEGEND

- EX BDY
- PROP BDY
- EX MAJOR CONTOUR
- EX MINOR CONTOUR
- PR MAJOR CONTOUR
- PR MINOR CONTOUR
- PROP EXTENT WORK
- EX WETLAND
- 10m BUFFER FROM WETLAND / STREAM

Cut/Fill Table

Number #	Minimum Elevation	Maximum Elevation	Color
1	-12.000	-10.000	
2	-10.000	-8.000	
3	-8.000	-6.000	
4	-6.000	-4.000	
5	-4.000	-2.000	
6	-2.000	0.000	
7	0.000	2.000	
8	2.000	4.000	
9	4.000	6.000	
10	6.000	8.000	
11	8.000	10.000	

Rev	Description	By	Date
A	FOR INFORMATION	JAW	05/2026

	By	Date
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Project
DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title
PROPOSED CUT & FILL PLAN NORTHERN

Project no.	135053		
Scale	1:4000 @ A3		
Cad file	135053-C200.DWG		
Drawing no.	C220-2	Rev	A

FOR INFORMATION

DATE: 05/26 FILEPATH: P:\MAVEN\PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA\CAD\135053-C200.DWG



10. PRAM CROSSINGS ARE TO BE FLUSH TO THE CHANNEL WITH NO LIP.
11. ALL KERB AND CHANNEL TO HAVE SAW CUTS AT MAX. 3M CENTRES. ALL SAW CUTS TO COINCIDE WITH FOOTPATH JOINTS.
12. ALL SIGNAGE AND PAVEMENT MARKINGS TO BE IN ACCORDANCE WITH NZTA MOTSAM STANDARDS AND THE ATCOP TDM.
13. ALL STREET NAME SIGNS SHALL FOLLOW ATCOP GUIDELINES IN TERMS OF LAYOUT, CLEARANCES, AND CONSTRUCTION DETAILS.
14. ALL LINE MARKINGS TO BE REFLECTORISED IN ACCORDANCE WITH MOTSAM STANDARDS.
15. THE MINIMUM VERTICAL AND LATERAL CLEARANCES FOR SIGNAGE SHALL BE IN ACCORDANCE WITH MOTSAM STANDARDS.
16. STREET LIGHTING SHALL BE DESIGNED IN ACCORDANCE WITH ALL APPLICABLE NEW ZEALAND STANDARDS INCLUDING BUT NOT RESTRICTED TO THE CURRENT VERSION OF AS/NZS 1158 LIGHTING FOR ROADS AND PUBLIC SPACES SERIES OF STANDARDS.
17. ALL NEW, MODIFIED OR UPGRADED PRAM CROSSINGS MUST BE IN ACCORDANCE WITH RTS 14 GUIDELINES FOR FACILITIES FOR BLIND AND VISION-IMPAIRED PEDESTRIANS AND NZS/AS 1428.4 AND MUST COMPLY WITH THE DETAILS PROVIDED IN AT'S STANDARD PLAN NO.FP006.

NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
2. CONTRACTOR IS TO AVOID USING GPS FOR SET OUT OF THE KERB LEVELS WHERE GRADIENTS ARE LESS THAN 1%.
3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
4. THE CONTRACTOR SHALL COMPLY WITH ALL RELEVANT HEALTH AND SAFETY REQUIREMENTS.
5. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
6. FINAL PAVEMENT DESIGN SUBJECT TO CBR/BEAM TESTS ON SUBGRADE MATERIAL.
7. SETOUT SCHEDULE WITH COORDINATES OF CHAINAGE POINTS ALONG ROAD CENTRELINE TO BE SUPPLIED TO THE CONTRACTOR PRIOR TO CONSTRUCTION.
8. REFER TO LONG SECTION FOR FINISHED CENTRELINE LEVELS. REFER TO TYPICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LOCATIONS.
9. ALL DUCTS SHALL HAVE LOCATIONS MARKED ON KERB LINES IN ACCORDANCE WITH SPECIFICATION.

LEGEND
- EX BDY
- PROP BDY
- EX WETLAND
- PR RAINGARDEN

Rev	Description	By	Date
A	FOR INFORMATION	JAW	05/2026

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Project
DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title
PROPOSED ROADING PLAN OVERVIEW

Project no.	135053
Scale	1:8000 @ A3
Cad file	135053-C300.DWG
Drawing no.	C300-1 Rev A

DATE: 9/2/26 FILE PATH: P:\MAVEN PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA\DWG\135053-C300.DWG

N

LOT 4 DP 135482

LOT 12 DP 135482

LOT 1 DP 496846

P 135482

ARANA DRIVE

RG 1

RG 2

RG 3

RG 4

RG 5

RG 21

RG 22

CH 692
CH 680
CH 660
CH 640
CH 620
CH 600
CH 580
CH 56
CH 54

ROAD 17

CH 520
CH 500
CH 480
CH 460
CH 440
CH 420
CH 400
CH 380
CH 360
CH 340
CH 320
CH 300
CH 280
CH 260
CH 240
CH 220
CH 200
CH 180
CH 160
CH 140
CH 120
CH 100
CH 80
CH 60
CH 40
CH 20
CH 0

ROAD 15

CH 780
CH 760
CH 740
CH 720
CH 700
CH 680
CH 660
CH 640
CH 620
CH 600
CH 580
CH 560
CH 540
CH 520
CH 500

ROAD 25

CH 447
CH 440
CH 420
CH 400
CH 380
CH 360
CH 340
CH 320
CH 300
CH 280
CH 260
CH 240
CH 220
CH 200
CH 180
CH 160
CH 140
CH 120
CH 100
CH 80
CH 60
CH 40
CH 20
CH 0

ROAD 26

CH 400
CH 380
CH 360
CH 340
CH 320
CH 300
CH 280
CH 260
CH 240
CH 220
CH 200
CH 180
CH 160
CH 140
CH 120
CH 100
CH 80
CH 60
CH 40
CH 20
CH 0

ROAD 24

CH 340
CH 320
CH 300
CH 280
CH 260
CH 240
CH 220
CH 200
CH 180
CH 160
CH 140
CH 120
CH 100

ROAD 27

CH 537
CH 520
CH 500
CH 480
CH 460
CH 440
CH 420
CH 400
CH 380
CH 360
CH 340
CH 320
CH 300
CH 280
CH 260
CH 240
CH 220
CH 200
CH 180
CH 160
CH 140
CH 120
CH 100
CH 80
CH 60
CH 40
CH 20
CH 0

ROAD 23

CH 240
CH 220
CH 200
CH 180
CH 160
CH 140
CH 120
CH 100
CH 80
CH 60

LOT 1 DP 438393

P 208099

FOR INFORMATION

NOTES: REFER TO C300-1

LEGEND

- EX BDY
- PROP BDY
- EX WETLAND
- PR RAINGARDEN

Rev	Description	By	Date
A	FOR INFORMATION	JAW	05/2026

	By	Date
Survey	1m LIDAR	2024
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Checked	AC	05/2026

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Project

DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title

PROPOSED ROADING PLAN

Project no.	135053
Scale	1:2000 @ A3
Cad file	135053-C300.DWG
Drawing no.	C300-2
Rev	A

DATE: 05/26 FILEPATH: F:\MAVEN PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA\CAD\135053-C300.DWG

NOTES: REFER TO C300-1

LEGEND
- EX BDY
- PROP BDY
- EX WETLAND
- PR RAINGARDEN

LOT 1 DP 345847

LOT 1 DP 149351

LOT 1 DP 374275

ROAD 15 ROAD 16 ROAD 17 ROAD 18 ROAD 19 ROAD 20 ROAD 21 ROAD 22 ROAD 23 ROAD 24 ROAD 1 ROAD 13

RG 7 RG 8 RG 9 RG 10 RG 11 RG 12 RG 24 RG 29 RG 31 RG 32

WHANGAPOURI ROAD

FOR INFORMATION

Rev	Description	By	Date
A	FOR INFORMATION	JAW	05/2026

	By	Date
Survey	1m LIDAR	2024
Design	JAW	05/2026
Drawn	JAW	05/2026
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Project
DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title
PROPOSED ROADING PLAN

Project no.	135053		
Scale	1:2000 @ A3		
Cad file	135053-C300.DWG		
Drawing no.	C300-3	Rev	A

NOTES: REFER TO C300-1

LOT 3 DP 107835

LOT 4 DP 107835

ALLOT 112 PARISH OF KARAKA

ALLOT 112 PARISH OF KARAKA

LOT 2 DP 356811

ROAD 23

ROAD 21

ROAD 18

ROAD 13

ORIA ROAD

REFER TO C300-10

RG 9

RG 29

RG 32

RG 24

LEGEND

- EX BDY
- PROP BDY
- EX WETLAND
- PR RAINGARDEN

Rev	Description	By	Date
A	FOR INFORMATION	JAW	05/2026

	By	Date
Survey	1m LIDAR	2024
Design	JAW	05/2026
Drawn	JAW	05/2026
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Project
DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title
PROPOSED ROADING PLAN

Project no.	135053		
Scale	1:2000 @ A3		
Cad file	135053-C300.DWG		
Drawing no.	C300-4	Rev	A

FOR INFORMATION

DATE: 05/26 FILE PATH: P:\MAVEN\PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA\CAD\135053-C300.DWG



NOTES REFER TO C300-1

LEGEND

- EX BDY
- PROP BDY
- EX WETLAND
- PR RAINGARDEN

Rev	Description	By	Date
A	FOR INFORMATION	JAW	05/2026

	By	Date
Survey	1m LIDAR	2024
Design	JAW	05/2026
Drawn	JAW	05/2026
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Project

DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title

PROPOSED ROADING PLAN

Project no.	135053
Scale	1:2000 @ A3
Cad file	135053-C300.DWG
Drawing no.	C300-5
Rev	A

N

2 DP 128301

LOT 1 DP 472268

LOT 2 DP 472268
30460

LOT 1 DP 473807

LOT 2 DP 473807

LOT 1 DP 160127
4798

LOT 1 DP 464886

PT LOT 1 DP 83246

LOT 2 DP 109620
23500

RG 17

RG 18

JOAL 1

ROAD 2

ROAD 3

ROAD 1

ROAD 7

ROAD 9-1

ROAD 10

ROAD 9-2

ROAD 9

ROAD 5

ROAD 4

ROAD 6-1

ROAD 6

JOAL 2

ROAD 5

WHANGAPOURI ROAD

KARAKA ROAD

KARAKA ROAD

KARAKA ROAD

SH 22

COLLECTOR ROAD
23.0 m WIDTH

PROPOSED ROUNDABOUT

C-C
C320-2

A-A
C320-1

B-B
C320-1

NOTES REFER TO C300-1

LEGEND
- EX BDY
- PROP BDY
- EX WETLAND
- PR RAINGARDEN

Rev	Description	By	Date
A	FOR INFORMATION	JAW	05/2026

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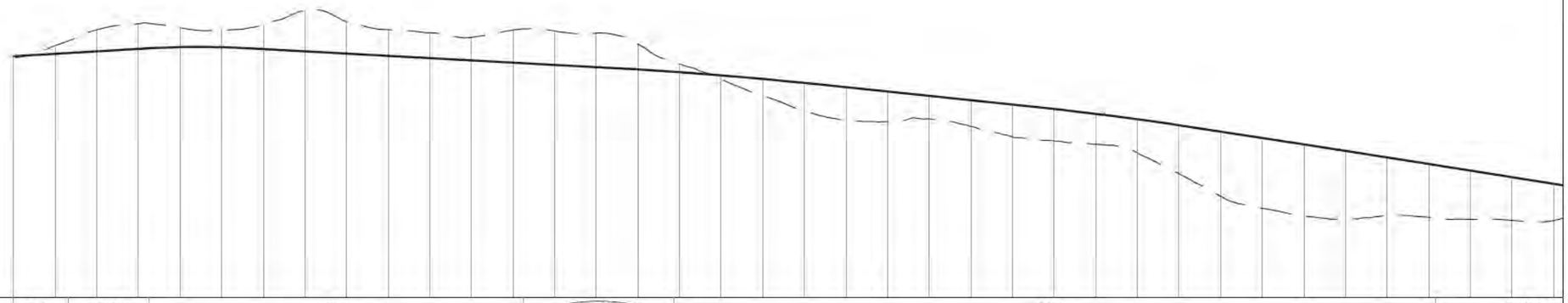
Project
DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title
PROPOSED ROADING PLAN

Project no.	135053		
Scale	1:2000 @ A3		
Cad file	135053-C300.DWG		
Drawing no.	C300-6	Rev	A

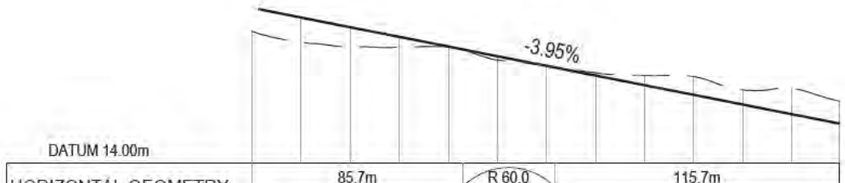
FOR INFORMATION

DATE: 8/5/26 FILE PATH: P:\MAVEN\135053\135053 - 132 WHANGAPOURI ROAD, KARAKA\CAD\135053-C300.DWG



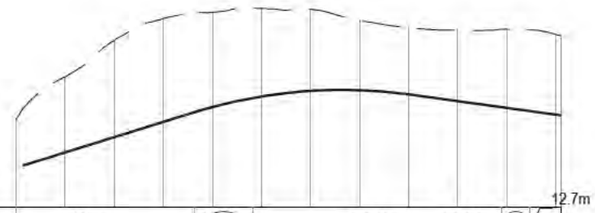
DATUM 4.00m

| | | |



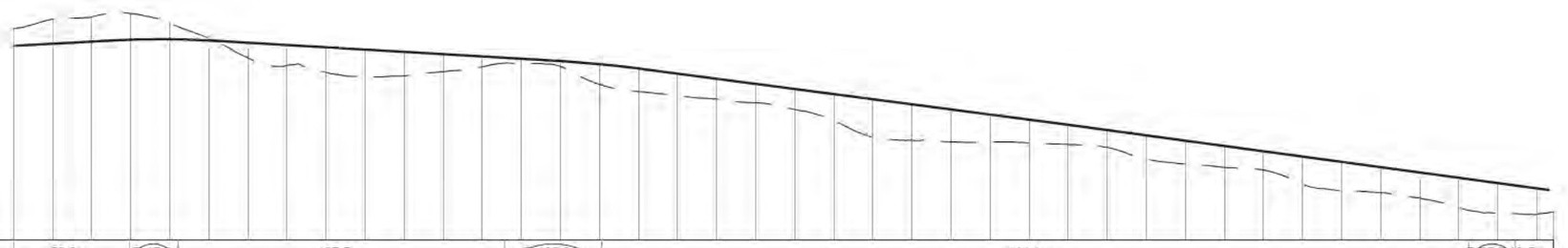
DATUM 14.00m															
HORIZONTAL GEOMETRY		85.7m				R 60.0 A 37.8		115.7m							
VERTICAL GEOMETRY		236.4 -3.9%													
EXISTING LEVELS	24.72	23.81	23.44	23.40	23.45	22.36	21.91	21.32	21.11	21.02	19.93	20.06	19.02		
DESIGN LEVELS		25.84	25.05	24.26	23.47	22.68	21.89	21.10	20.31	19.52	18.73	17.94			
CUT/FILL		2.02	1.61	0.85	0.02	0.32	-0.02	-0.22	-0.80	-1.50	-1.20	-2.12			
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	239.23		

ROAD 2 LONG SECTION
SCALE: HORI 1:500 VERT 1:100

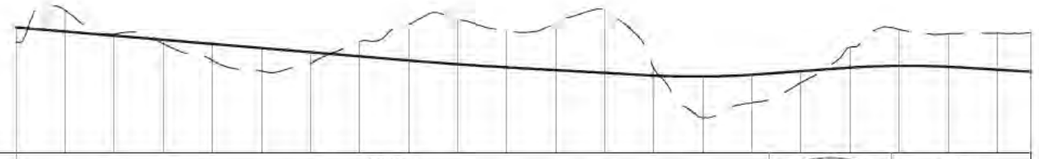


DATUM 16.00m															12.7m
HORIZONTAL GEOMETRY		72.9m			R 15.0 A 23.5			101.8m			R 28.0 A 11.3				
VERTICAL GEOMETRY		67.6 6.2%			VC 90.0 K 10.0						71.3 -2.8%				
EXISTING LEVELS	23.17	26.60	29.58	31.34	31.85	32.17	32.09	31.23	30.61	30.40	30.47	30.28			
DESIGN LEVELS		20.44	21.69	22.93	24.13	24.99	25.45	25.50	25.16	24.61	24.06	23.63			
CUT/FILL		-6.16	-7.90	-8.41	-7.72	-7.18	-6.65	-5.73	-5.45	-5.79	-6.41	-6.65			
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.00	215.64			

ROAD 4 LONG SECTION
SCALE: HORI 1:500 VERT 1:100



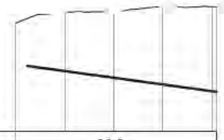
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DATUM 12.00m

HORIZONTAL GEOMETRY		307.2m																		R 100.0 A 49.6			57.0m		
VERTICAL GEOMETRY		162.2 -1.7%										VC 50.0 K 92.1		52.9 -1.1%		VC 50.0 K 18.9		30.3 1.5%		VC 50.0 K 18.3		28.4 -1.2%			
EXISTING LEVELS	21.10	23.65	21.70	20.93	19.56	18.69	19.23	21.11	22.47	22.90	21.94	22.62	23.64	18.91	14.89	16.09	17.73	20.64	22.09	21.73	21.77	21.81			
DESIGN LEVELS	22.24	21.90	21.56	21.22	20.89	20.55	20.21	19.87	19.54	19.24	18.99	18.76	18.53	18.31	18.24	18.38	18.68	18.97	19.11	19.03	18.79				
CUT/FILL	1.14	-1.75	-0.14	0.29	1.32	1.86	0.98	-1.24	-2.93	-3.66	-2.95	-3.86	-5.11	-0.61	3.35	2.29	0.94	-1.67	-2.98	-2.69	-2.97				
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	300.00	320.00	340.00	360.00	380.00	400.00	413.80			

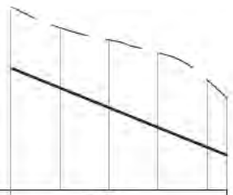
ROAD 5 LONG SECTION
SCALE: HORI 1:500 VERT 1:100



DATUM 22.00m

HORIZONTAL GEOMETRY		82.0m				
VERTICAL GEOMETRY		78.0 -2.7%				
EXISTING LEVELS	30.77	31.68	31.74	32.16	32.13	32.10
DESIGN LEVELS		26.88	26.33	25.78	25.24	25.18
CUT/FILL		-4.80	-5.40	-6.37	-6.90	-6.91
CHAINAGE	0.00	20.00	40.00	60.00	80.00	82.00

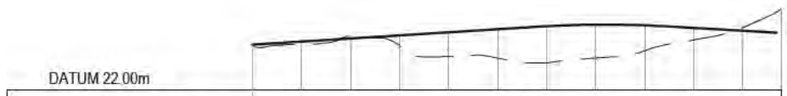
ROAD 6 LONG SECTION
SCALE: HORI 1:500 VERT 1:100



DATUM 16.00m

HORIZONTAL GEOMETRY		87.8m				
VERTICAL GEOMETRY		106.2 -8.1%				
EXISTING LEVELS	30.94	29.23	28.23	27.19	24.98	23.52
DESIGN LEVELS	25.95	24.33	22.72	21.10	19.49	18.86
CUT/FILL	-5.00	-4.90	-5.51	-6.08	-5.49	-4.66
CHAINAGE	0.00	20.00	40.00	60.00	80.00	87.84

ROAD 6-1 LONG SECTION
SCALE: HORI 1:500 VERT 1:100



DATUM 22.00m

HORIZONTAL GEOMETRY		215.5m																							
VERTICAL GEOMETRY		117.9 1.2%													VC 50.0 K 20.8					45.8 -1.1%					
EXISTING LEVELS	25.72	25.80	26.46	25.60	24.77	24.63	24.25	24.63	25.22	26.12	27.12	28.61													
DESIGN LEVELS	25.72	25.97	26.22	26.47	26.72	26.97	27.22	27.36	27.30	27.08	26.85														
CUT/FILL	0.00	0.17	-0.23	0.88	1.95	2.34	2.97	2.73	2.07	0.97	-0.26														
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.00	215.53													

ROAD 7 LONG SECTION
SCALE: HORI 1:500 VERT 1:100

FOR INFORMATION

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Rev	Description	By	Date
A	FOR INFORMATION	JAW	05/2026

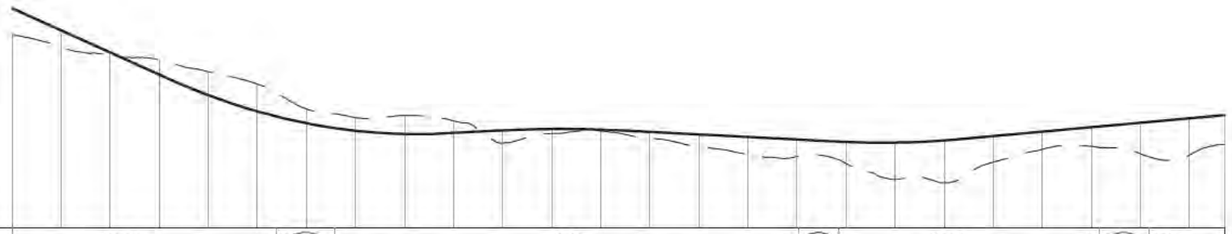
	By	Date
Survey	1m LIDAR	2024
Design	JAW	05/2026
Drawn	JAW	05/2026
Checked	AC	05/2026

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Project
DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

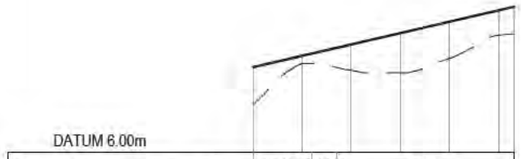
Title
PROPOSED ROADING LOONG SECTIONS

Project no.	135053		
Scale	1:2500 @ A3		
Cad file	135053-C300.DWG		
Drawing no.	C310-3	Rev	A



DATUM 6.00m

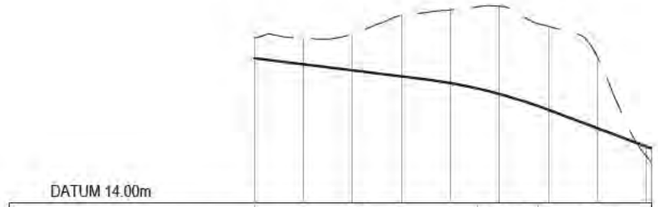
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DATUM 6.00m

HORIZONTAL GEOMETRY		23.8m	R 15.0 A 10.1	72.5m				
VERTICAL GEOMETRY		108.9 4.6%						
EXISTING LEVELS	9.92	13.25	12.68	12.49	13.66	15.54	15.64	
DESIGN LEVELS	12.95	13.87	14.80	15.72	16.65	17.57	17.87	
CUT/FILL	3.02	0.62	2.12	3.23	2.99	2.03	2.23	
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	106.47	

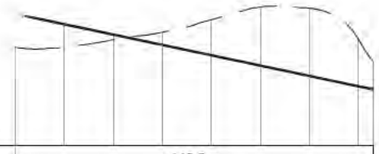
ROAD 8-4 LONG SECTION
SCALE: HORI 1:500 VERT 1:100



DATUM 14.00m

HORIZONTAL GEOMETRY		90.9m			R 50.0 A 24.9	46.0m				
VERTICAL GEOMETRY		116.4 -2.5%			VC 50.0 K 10.0	49.7 -7.5%				
EXISTING LEVELS	27.45	27.42	27.73	29.28	29.73	30.02	28.39	25.85	17.76	17.31
DESIGN LEVELS	25.80	25.31	24.81	24.31	23.77	22.88	21.58	20.08	18.58	18.45
CUT/FILL	-1.64	-2.12	-2.92	-4.96	-5.96	-7.14	-6.80	-5.76	0.82	1.14
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	161.80

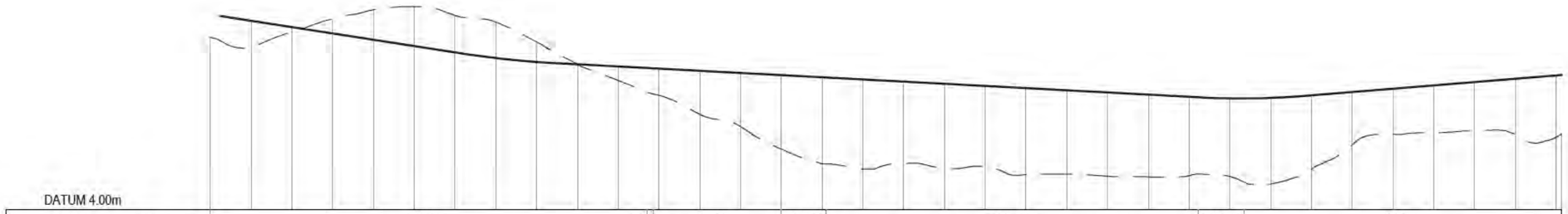
ROAD 9 LONG SCTION
SCALE: HORI 1:500 VERT 1:100



DATUM 14.00m

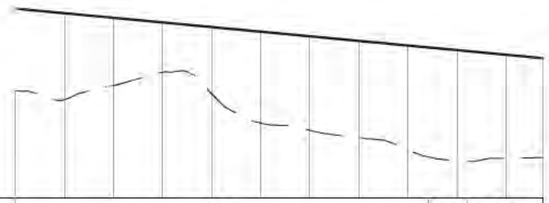
HORIZONTAL GEOMETRY		146.0m							
VERTICAL GEOMETRY		169.3 -4.2%							
EXISTING LEVELS	21.96	21.96	22.60	23.19	24.21	25.25	25.14	22.64	20.84
DESIGN LEVELS		23.84	23.00	22.16	21.32	20.48	19.64	18.80	18.54
CUT/FILL		1.89	0.40	-1.03	-2.89	-4.77	-5.51	-3.84	-2.30
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	145.99

ROAD 9-2 LONG SECTION
SCALE: HORI 1:500 VERT 1:100



DATUM 4.00m

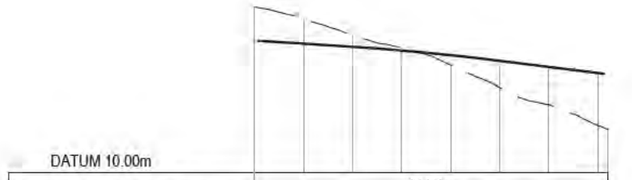
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DATUM 4.00m

HORIZONTAL GEOMETRY		168.2m									R 30.0 A 16.1	30.6m		
VERTICAL GEOMETRY		223.8 -1.9%												
EXISTING LEVELS	12.76	12.05	13.20	14.29	12.51	10.14	9.55	8.95	7.93	7.03		7.26		7.32
DESIGN LEVELS		19.08	18.71	18.33	17.96	17.58	17.20	16.83	16.45	16.08		15.70		15.42
CUT/FILL		7.04	5.51	4.04	5.44	7.44	7.65	7.87	8.52	9.04		8.44		8.10
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00		200.00		214.97

ROAD 11 LONG SECTION
SCALE: HORI 1:500 VERT 1:100



DATUM 10.00m

HORIZONTAL GEOMETRY		144.0m							
VERTICAL GEOMETRY		41.4 -1.3%		VC 50.0 K 43.6			49.6 -2.4%		
EXISTING LEVELS	23.50	22.55	21.18	20.18	18.75	16.93	15.52	13.83	13.52
DESIGN LEVELS		20.49	20.24	19.94	19.56	19.09	18.61	18.12	
CUT/FILL		-2.06	-0.95	-0.23	0.81	2.16	3.09	4.29	
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	143.99

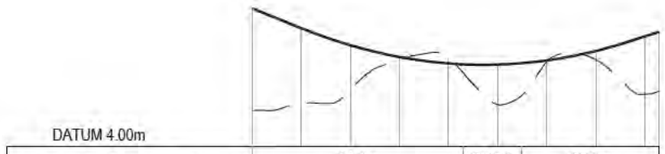
ROAD 11-1 LONG SECTION
SCALE: HORI 1:500 VERT 1:100



DATUM 6.00m

HORIZONTAL GEOMETRY		96.9m					R 23.0 A 20.9	131.3m						
VERTICAL GEOMETRY		115.9 -3.0%						VC 50.0 K 35.8		96.5 -1.6%				
EXISTING LEVELS	11.54	11.40	11.26	11.25	9.50	8.44	10.41	9.11	8.35	9.58	11.26	10.17	8.55	8.30
DESIGN LEVELS		15.59	14.99	14.40	13.81	13.22	12.63	12.12	11.71	11.39	11.08	10.77	10.46	10.32
CUT/FILL		4.18	3.73	3.15	4.31	4.79	2.22	3.00	3.36	1.81	-0.18	0.60	1.91	2.01
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	249.10

ROAD 11-2 LONG SECTION
SCALE: HORI 1:500 VERT 1:100



DATUM 4.00m

HORIZONTAL GEOMETRY		86.1m					R 15.0 A 23.6	55.9m			
VERTICAL GEOMETRY		20.0 -8.1%			VC 135.3 K 9.3					10.6 6.5%	
EXISTING LEVELS	6.92	7.49	8.65	11.05	11.21	7.40	10.89	11.07		8.24	8.48
DESIGN LEVELS	15.24	13.62	12.24	11.28	10.76	10.66	11.00	11.77	11.77	12.96	13.32
CUT/FILL	8.32	6.13	3.59	0.23	-0.46	3.27	0.11	0.70		4.71	4.83
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00		160.00	165.57

ROAD 11-3 LONG SECTION
SCALE: HORI 1:500 VERT 1:100

FOR INFORMATION

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P-GL

Rev	Description	By	Date
A	FOR INFORMATION	JAW	05/2026

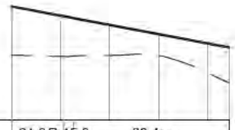
	By	Date
Survey	1m LIDAR	2024
Design	JAW	05/2026
Drawn	JAW	05/2026
Checked	AC	05/2026

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Project
DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title
PROPOSED ROADING LOONG SECTIONS

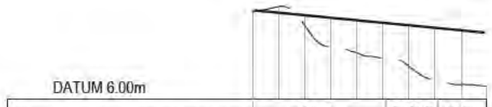
Project no.	135053
Scale	1:2500 @ A3
Cad file	135053-C300.DWG
Drawing no.	C310-6
Rev	A



DATUM 6.00m

HORIZONTAL GEOMETRY		21.6m	R 15.0 A 3.7	63.4m			
VERTICAL GEOMETRY		88.7 -3.8%					
EXISTING LEVELS	11.25	11.16	11.22	11.22	9.83	9.00	
DESIGN LEVELS	15.22	14.47	13.71	12.96	12.21	11.88	
CUT/FILL	3.97	3.31	2.49	1.74	2.38	2.89	
CHAINAGE	0.00	20.00	40.00	60.00	80.00	88.67	

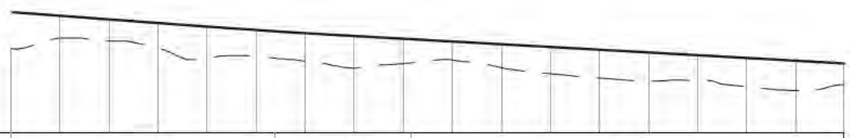
ROAD 11-4 LONG SECTION
SCALE: HORI 1:500 VERT 1:100



DATUM 6.00m

HORIZONTAL GEOMETRY		102.7m						R 75.7 A 39.9	37.0m				
VERTICAL GEOMETRY		175.9 -1.9%											
EXISTING LEVELS	19.40	20.23	17.33	13.99	13.17	12.35	11.10	8.86	8.25	8.02			
DESIGN LEVELS		19.32	18.93	18.54	18.15	17.77	17.38	16.99	16.60				
CUT/FILL		-0.92	1.60	4.55	4.99	5.41	6.28	8.13	8.36				
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	179.63			

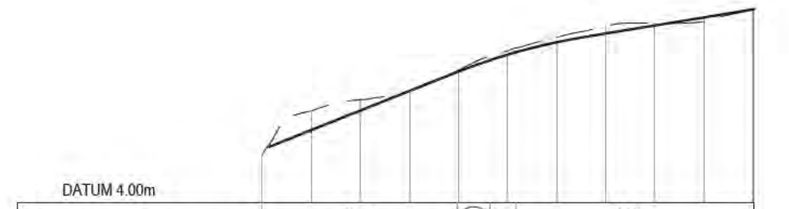
ROAD 12 LONG SECTION
SCALE: HORI 1:500 VERT 1:100



DATUM 2.00m

HORIZONTAL GEOMETRY		107.8m					R 64.0 A 55.4											176.5m	
VERTICAL GEOMETRY		76.9 -1.5%				VC 50.0 K 139.2										216.4 -1.1%			
EXISTING LEVELS	8.88	9.75	9.50	8.93	8.07	8.27	7.88	7.30	7.66	7.96	7.34	6.83	6.49	6.25	6.31	5.78	5.47	5.97	
DESIGN LEVELS		11.57	11.27	10.98	10.68	10.40	10.15	9.93	9.70	9.48	9.25	9.03	8.80	8.58	8.35	8.13	7.90	7.68	
CUT/FILL		1.82	1.77	2.04	2.61	2.13	2.27	2.63	2.04	1.52	1.91	2.19	2.31	2.33	2.05	2.35	2.43	1.72	
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	300.00	320.00	339.76	

ROAD 13 LONG SECTION
SCALE: HORI 1:500 VERT 1:100



DATUM 4.00m

HORIZONTAL GEOMETRY		79.5m			R 151.7m A 13.4			96.9m							
VERTICAL GEOMETRY		74.4 8.0%			VC 53.3 K 11.4			70.0 3.3%							
EXISTING LEVELS	7.94	11.45	12.35	13.10	14.76	16.34	17.42	18.34	18.60	18.72	19.69	19.72			
DESIGN LEVELS		9.88	11.47	13.06	14.65	16.02	17.03	17.74	18.39	19.05	19.70	19.72			
CUT/FILL		-1.57	-0.87	-0.03	-0.11	-0.32	-0.39	-0.61	-0.21	0.33	0.01	0.00			
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.00	200.45			

ROAD 14 LONG SECTION
SCALE: HORI 1:500 VERT 1:100

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Rev	Description	By	Date
A	FOR INFORMATION	JAW	05/2026

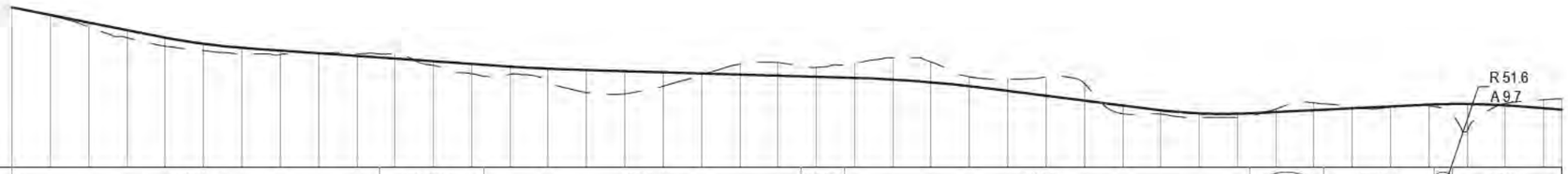
	By	Date
Survey	1m LIDAR	2024
Design	JAW	05/2026
Drawn	JAW	05/2026
Checked	AC	05/2026

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Project
DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

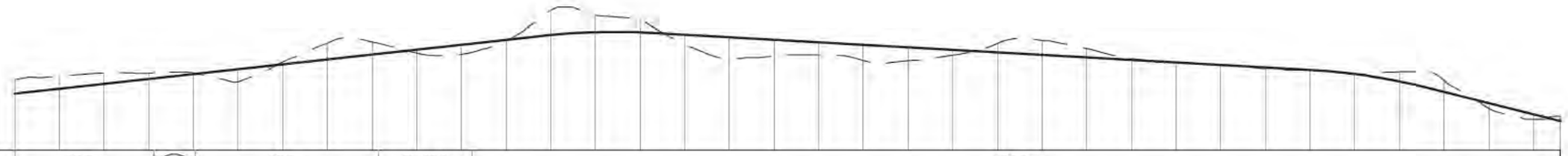
Title
PROPOSED ROADING LOONG SECTIONS

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Scale	1:2500 @ A3		
Cad file	135053-C300.DWG		
Drawing no.	C310-7	Rev	A



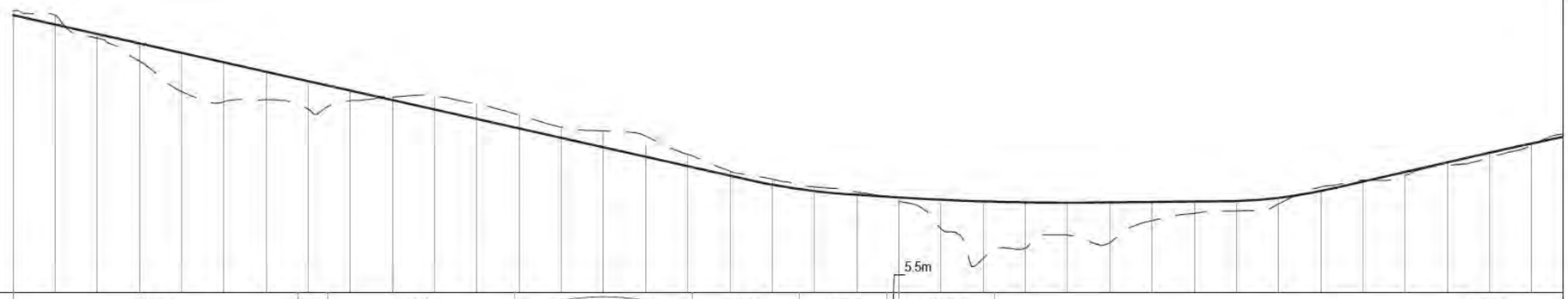
DATUM 12.00m

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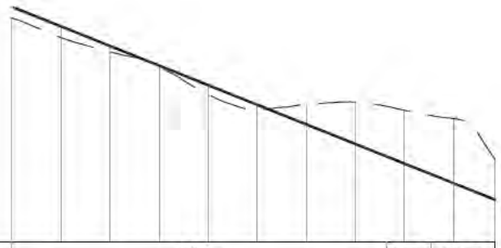
DATUM 10.00m

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DATUM -2.00m

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DATUM 6.00m

HORIZONTAL GEOMETRY		152.6m								R 50.0 A 18.2	26.1m		
VERTICAL GEOMETRY		196.7 -8.0%											
EXISTING LEVELS	24.27	22.66	21.48	20.30	18.03	16.79	17.24	17.39	16.73		16.05		12.72
DESIGN LEVELS		23.55	21.96	20.36	18.77	17.17	15.58	13.98	12.38		10.79		9.44
CUT/FILL		0.89	0.48	0.06	0.73	0.38	-1.67	-3.41	-4.35		-5.26		-3.28
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00		180.00		196.95

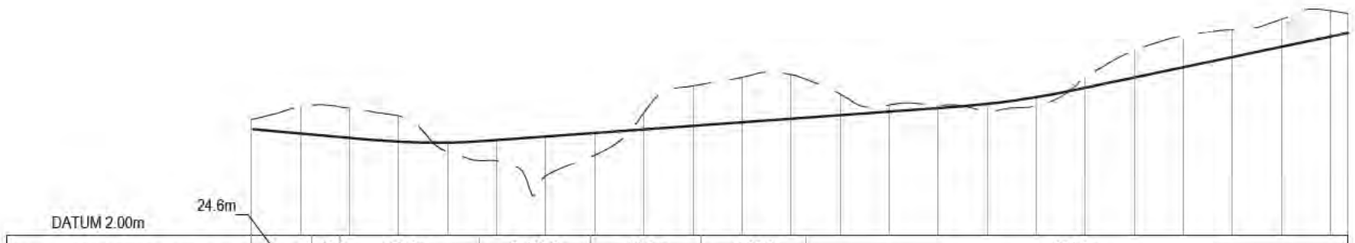
ROAD 19 LONG SECTION
SCALE: HORI 1:500 VERT 1:100



DATUM 12.00m

HORIZONTAL GEOMETRY		65.7m			R 50.0 A 20.9			165.9m							
VERTICAL GEOMETRY		122.9 2.4%					VC 50.0 K 33.9			74.6 0.9%					
EXISTING LEVELS	14.60	15.13	16.24	17.90	17.81	18.39	19.35	21.80	23.50	22.26	21.16	19.85	19.11	19.09	
DESIGN LEVELS		15.27	15.74	16.22	16.70	17.17	17.65	18.10	18.43	18.65	18.83	19.02	19.20		
CUT/FILL		0.13	-0.50	-1.69	-1.12	-1.22	-1.70	-3.70	-5.07	-3.61	-2.33	-0.84	0.09		
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	252.52	

ROAD 20 LONG SECTION
SCALE: HORI 1:500 VERT 1:100



DATUM 2.00m

24.6m

HORIZONTAL GEOMETRY		R 48.0 A 11.4		56.9m			R 100.0 A 45.5		44.9m			R 82.0 A 42.7												221.0m												
VERTICAL GEOMETRY		47.2 -1.8%			VC 50.0 K 15.5																																
EXISTING LEVELS	11.44	12.50	12.35	11.73	8.77	8.06	6.81	8.51	11.98	14.16	14.86	15.08	13.50	12.60	12.58	12.04	12.55	14.87	17.06	18.22	18.71	19.58	20.29	20.05											
DESIGN LEVELS		10.29	9.93	9.62	9.55	9.74	10.03	10.32	10.61	10.90	11.19	11.48	11.77	12.06	12.35	12.69	13.24	14.01	14.84	15.68	16.52	17.35	18.19	18.48											
CUT/FILL		-2.21	-2.42	-2.11	0.78	1.68	3.21	1.80	-1.37	-3.26	-3.67	-3.60	-1.73	-0.54	-0.23	0.65	0.69	-0.86	-2.22	-2.54	-2.19	-2.23	-2.10	-1.57											
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	300.00	320.00	340.00	360.00	380.00	400.00	420.00	440.00	447.04											

ROAD 21 LONG SECTION
SCALE: HORI 1:500 VERT 1:100

FOR INFORMATION

LEGEND

E-GL

P-GL

Rev	Description	By	Date
A	FOR INFORMATION	JAW	05/2026

	By	Date
Survey	1m LIDAR	2024
Design	JAW	05/2026
Drawn	JAW	05/2026
Checked	AC	05/2026

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Project
DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title
PROPOSED ROADING LOONG SECTIONS

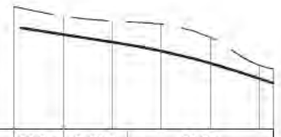
Project no.	135053
Scale	1:2500 @ A3
Cad file	135053-C300.DWG
Drawing no.	C310-10
Rev	A



DATUM 6.00m

HORIZONTAL GEOMETRY		184.5m										
VERTICAL GEOMETRY		184.0 -4.2%										
EXISTING LEVELS	18.16	17.83	16.73	14.85	14.89	14.06	11.47	10.21	9.43	9.53	9.47	
DESIGN LEVELS		17.23	16.38	15.54	14.70	13.85	13.01	12.17	11.32	10.48	10.29	
CUT/FILL		-0.60	-0.34	0.69	-0.20	-0.20	1.54	1.96	1.89	0.95	0.82	
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	184.53	

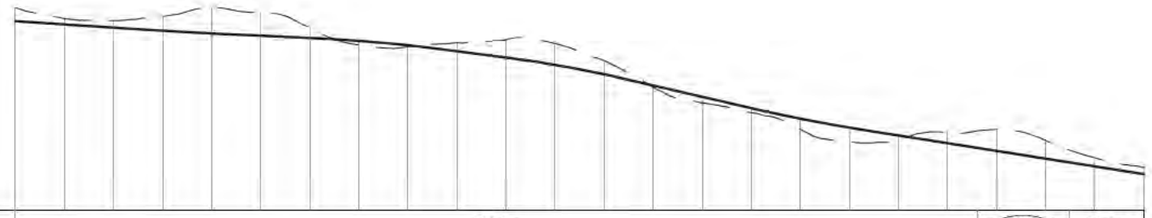
ROAD 22 LONG SECTION
SCALE: HORI 1:500 VERT 1:100



DATUM 8.00m

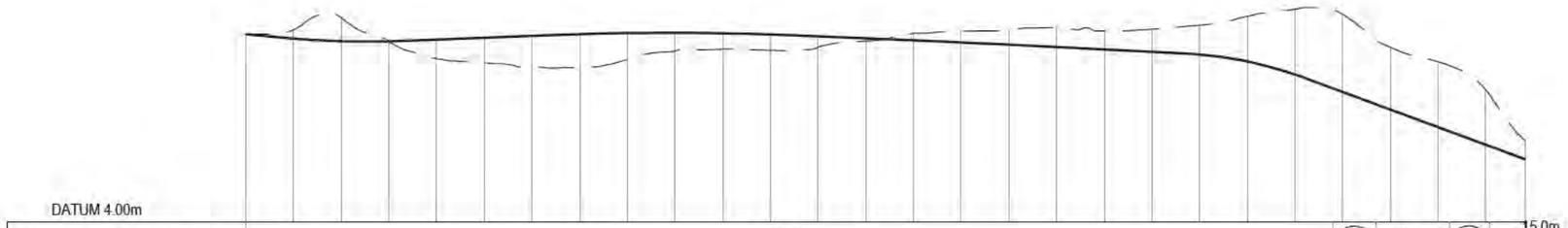
HORIZONTAL GEOMETRY		20.0m	R 62.6 A 26.2	59.5m				
VERTICAL GEOMETRY		39.4 -3.1%		VC 50.0 K 14.7		13.7 -6.5%		
EXISTING LEVELS	17.96	17.20	16.78	16.56	15.45	13.20	12.89	
DESIGN LEVELS		15.69	15.07	14.35	13.35	12.10	11.73	
CUT/FILL		-1.51	-1.70	-2.21	-2.10	-1.10	-1.16	
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	105.65	

ROAD 23 LONG SECTION
SCALE: HORI 1:500 VERT 1:100



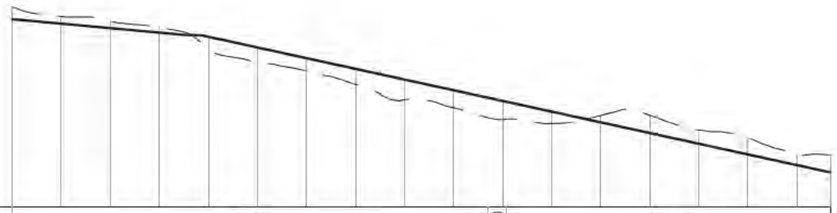
DATUM 6.00m

| | | | | | | | | | | | |



DATUM 4.00m

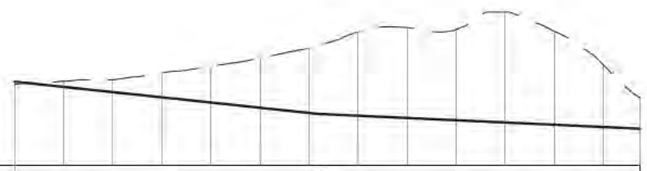
| | | |



DATUM 12.00m

HORIZONTAL GEOMETRY		194.1m										R 15.0 A 7.5			132.0m							
VERTICAL GEOMETRY		70.7 -1.8%			6.0 -0.0%							259.1 -4.4%										
EXISTING LEVELS	28.34	27.56	27.16	26.67	24.91	23.85	23.11	22.01	20.77	20.12	19.16	18.83	19.49	19.50	18.30	17.68	16.32	16.27				
DESIGN LEVELS	27.34	26.98	26.61	26.24	25.91	25.03	24.16	23.29	22.42	21.55	20.68	19.81	18.94	18.07	17.20	16.32	15.45	14.86				
CUT/FILL	-1.00	-0.58	-0.55	-0.42	1.00	1.19	1.05	1.28	1.65	1.43	1.52	0.97	-0.55	-1.43	-1.10	-1.35	-0.86	-1.40				
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	300.00	320.00	333.61				

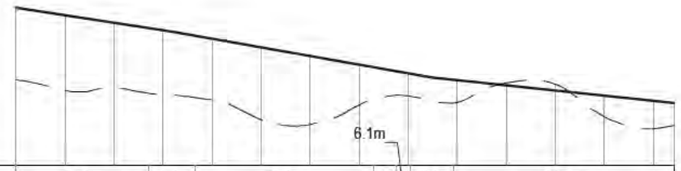
JOAL 1 LONG SECTION
SCALE: HORI 1:500 VERT 1:100



DATUM 22.00m

HORIZONTAL GEOMETRY		255.0m																				
VERTICAL GEOMETRY		124.1 -2.1%							132.9 -0.9%													
EXISTING LEVELS	29.61	28.88	29.00	29.57	30.10	30.73	31.59	32.91	33.26	33.10	34.50	32.95	30.21	27.53								
DESIGN LEVELS	28.85	28.42	28.00	27.57	27.15	26.72	26.30	26.07	25.89	25.71	25.52	25.34	25.16	25.02								
CUT/FILL	0.24	-0.46	-1.00	-2.00	-2.95	-4.01	-5.29	-6.84	-7.37	-7.40	-9.98	-7.61	-5.05	-2.51								
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	255.00								

JOAL 2 LONG SECTION
SCALE: HORI 1:500 VERT 1:100



DATUM 6.00m

HORIZONTAL GEOMETRY		54.3m		18.6m		72.9m					R 10.0 A 9.2	17.2m		90.1m								
VERTICAL GEOMETRY		81.9 -3.1%				105.5 -3.5%							131.0 -2.1%									
EXISTING LEVELS	12.99	12.12	12.25	11.80	11.36	9.73	9.34	10.93	11.66	11.15	12.74	12.62	9.97	9.01	9.26							
DESIGN LEVELS	18.87	18.25	17.64	17.02	16.33	15.63	14.93	14.22	13.52	12.96	12.54	12.12	11.70	11.28	11.10							
CUT/FILL	5.88	6.13	5.38	5.22	4.97	5.90	5.59	3.29	1.86	1.82	-0.20	-0.50	1.73	2.27	1.84							
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	268.42							

JOAL 3 LONG SECTION
SCALE: HORI 1:500 VERT 1:100

FOR INFORMATION

LEGEND

E-GL

P-GL

Rev	Description	By	Date
A	FOR INFORMATION	JAW	05/2026

	By	Date
Survey	1m LIDAR	2024
Design	JAW	05/2026
Drawn	JAW	05/2026
Checked	AC	05/2026

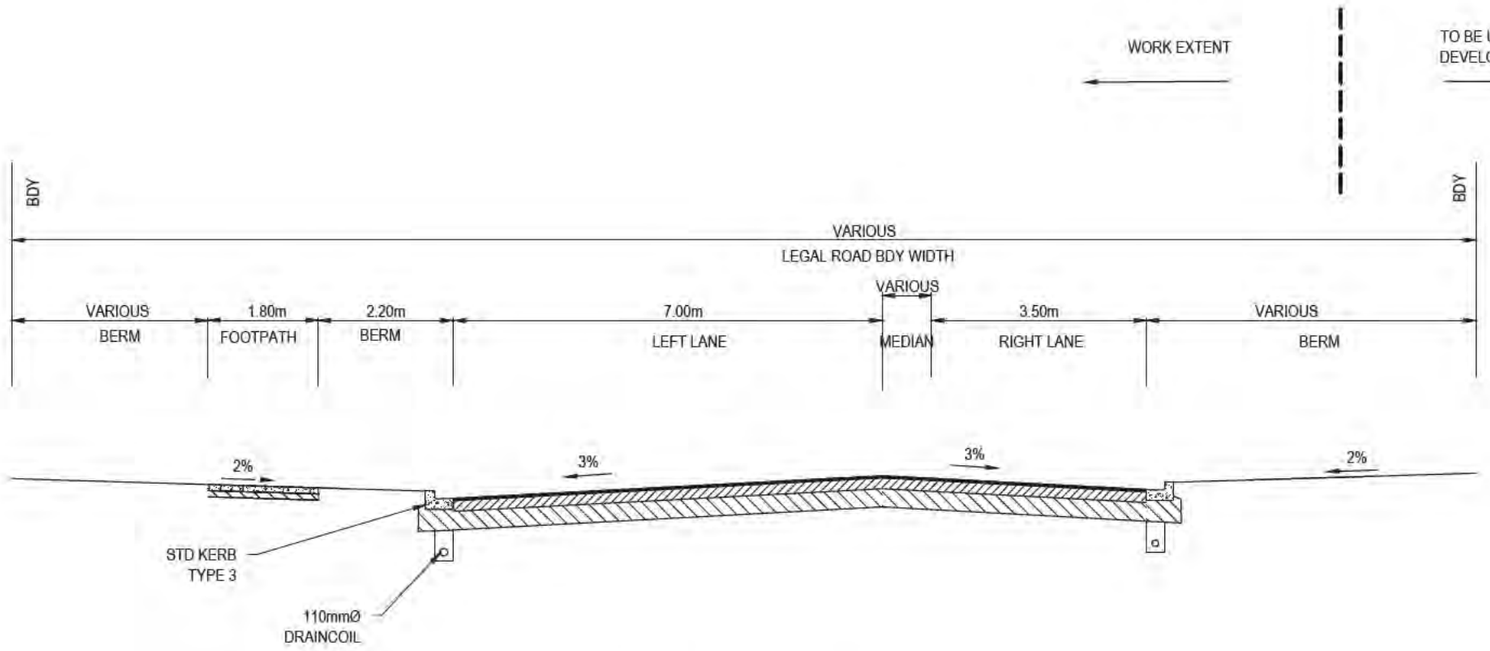
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Project
DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title
PROPOSED ROADING LOONG SECTIONS

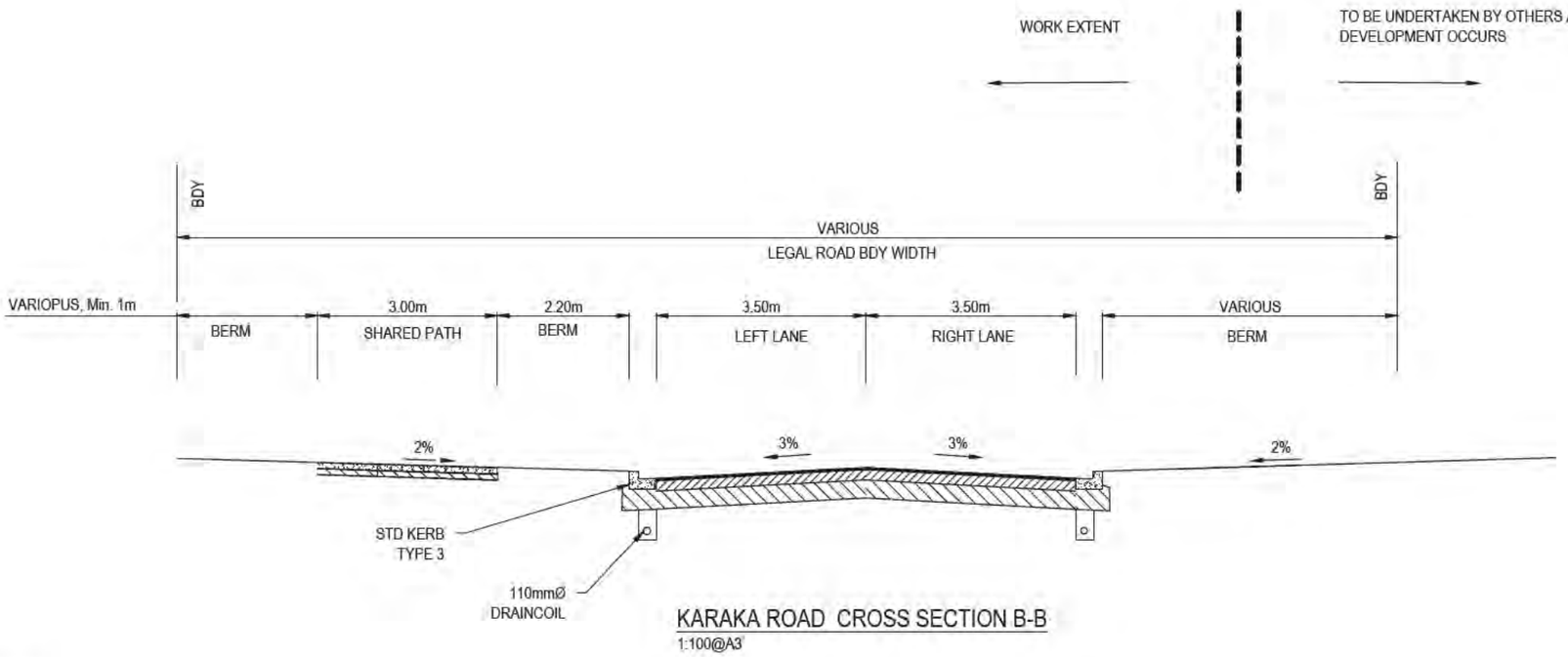
Project no.	135053		
Scale	1:2500 @ A3		
Cad file	135053-C300.DWG		
Drawing no.	C310-13	Rev	A

DATE: 2026 PLOTTED: 5 May 2026 - 2:50 PM



KARAKA ROAD CROSS SECTION A-A

1:100@A3



KARAKA ROAD CROSS SECTION B-B

1:100@A3

FOR INFORMATION

Rev	Description	By	Date
A	FOR INFORMATION	JAW	05/2026

	By	Date
Survey	1m LIDAR	2024
Design	JAW	05/2026
Drawn	JAW	05/2026
Checked	AC	05/2026

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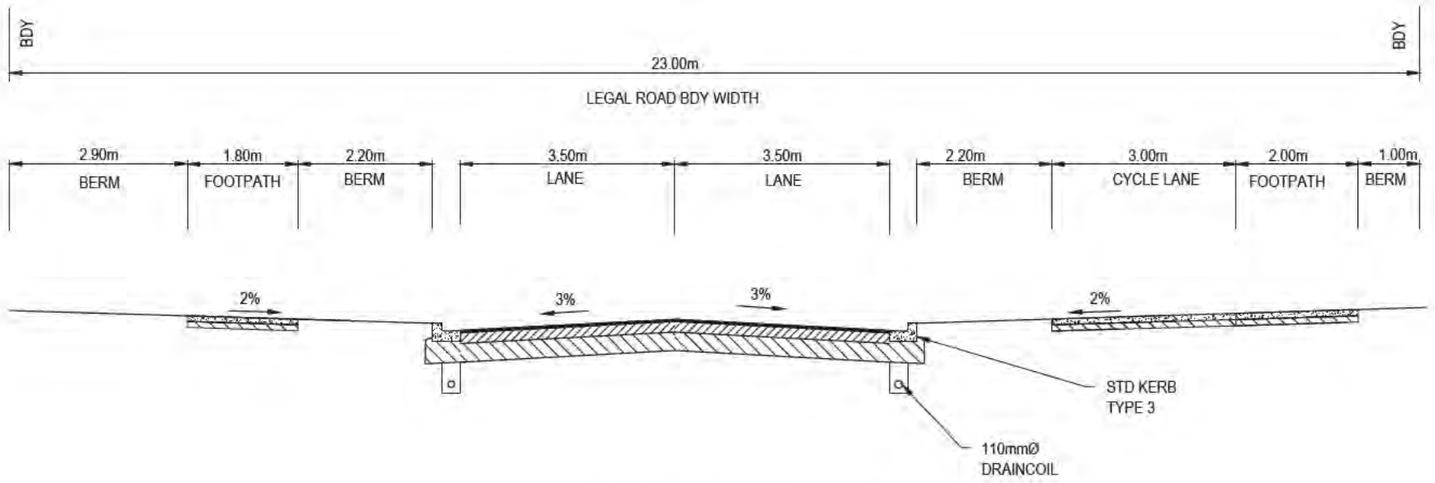
Project

DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

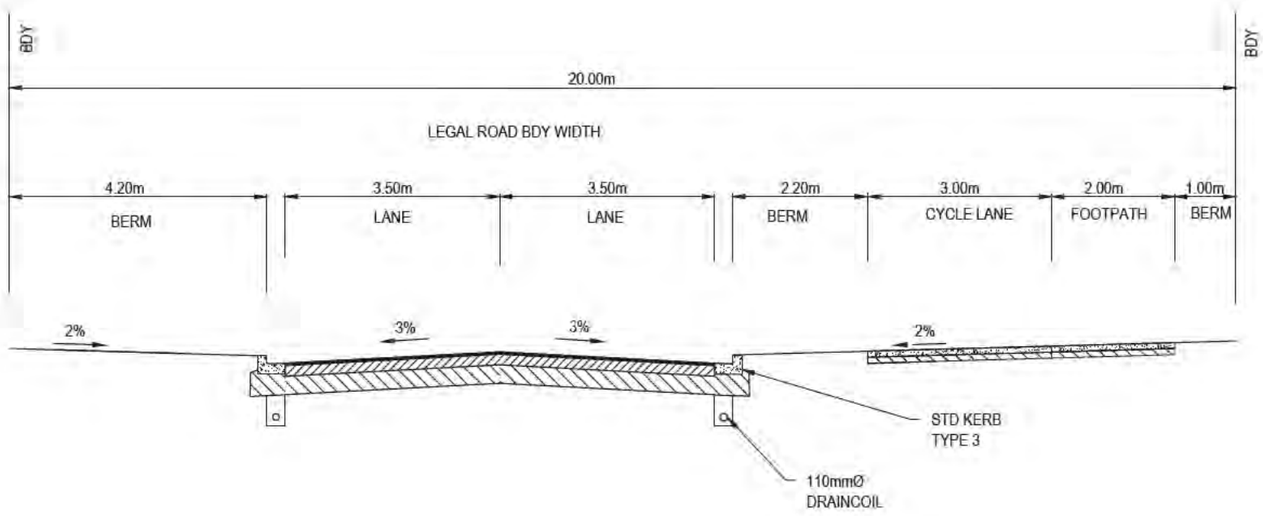
Title

PROPOSED ROADING CROSS SECTION

Project no.	135053		
Scale	CUSTOM @ A3		
Cad file	135053-C300.DWG		
Drawing no.	C320-1	Rev	A



ROAD 1 CROSS SECTION C-C
1:100@A3



20m ROAD TYPICAL CROSS SECTION FOR AC/AT'S PURPOSES
1:100@A3

FOR INFORMATION

Rev	Description	By	Date
A	FOR INFORMATION	JAW	05/2026

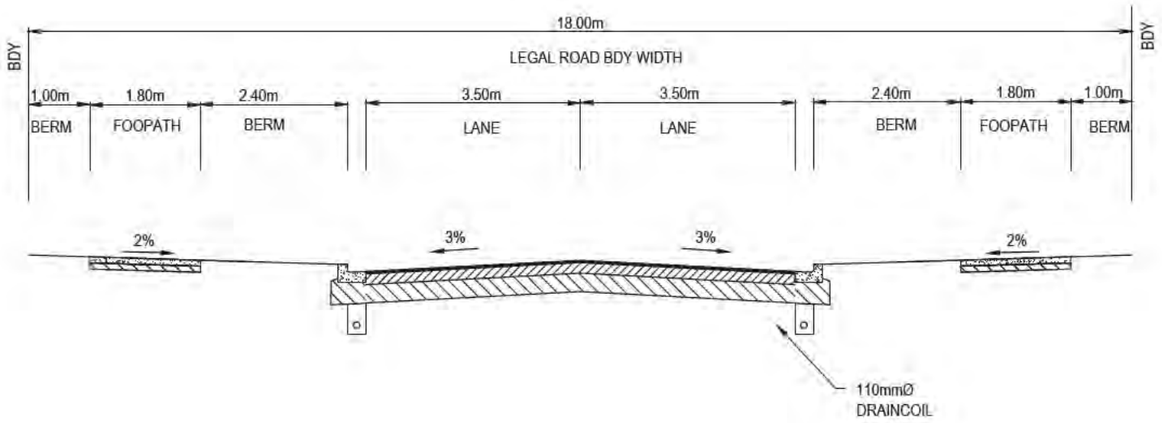
	By	Date
Survey	1m LIDAR	2024
Design	JAW	05/2026
Drawn	JAW	05/2026
Checked	AC	05/2026

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Project
DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

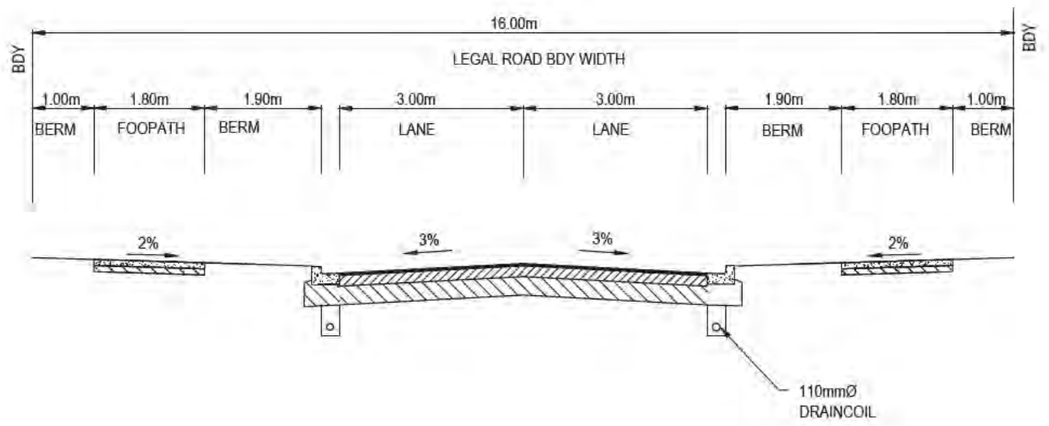
Title
PROPOSED ROADING CROSS SECTION

Project no.	135053		
Scale	CUSTOM @ A3		
Cad file	135053-C300.DWG		
Drawing no.	C320-2	Rev	A



18m ROAD TYPICAL CROSS SECTION (FOR WASTEWATER TREATMENT SITE)

1:100@A3



16m ROAD TYPICAL CROSS SECTION

1:100@A3

FOR INFORMATION

Rev	Description	By	Date
A	FOR INFORMATION	JAW	05/2026

	By	Date
Survey	1m LIDAR	2024
Design	JAW	05/2026
Drawn	JAW	05/2026
Checked	AC	05/2026

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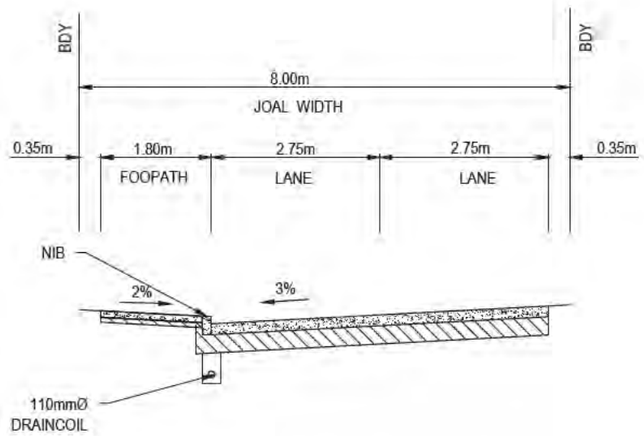
Project

DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title

PROPOSED ROADING CROSS SECTION

Project no.	135053		
Scale	CUSTOM @ A3		
Cad file	135053-C300.DWG		
Drawing no.	C320-3	Rev	A



8m JOAL TYPICAL CROSS SECTION

1:100@A3

FOR INFORMATION

Rev	Description	By	Date
A	FOR INFORMATION	JAW	05/2026

	By	Date
Survey	1m LIDAR	2024
Design	JAW	05/2026
Drawn	JAW	05/2026
Checked	AC	05/2026

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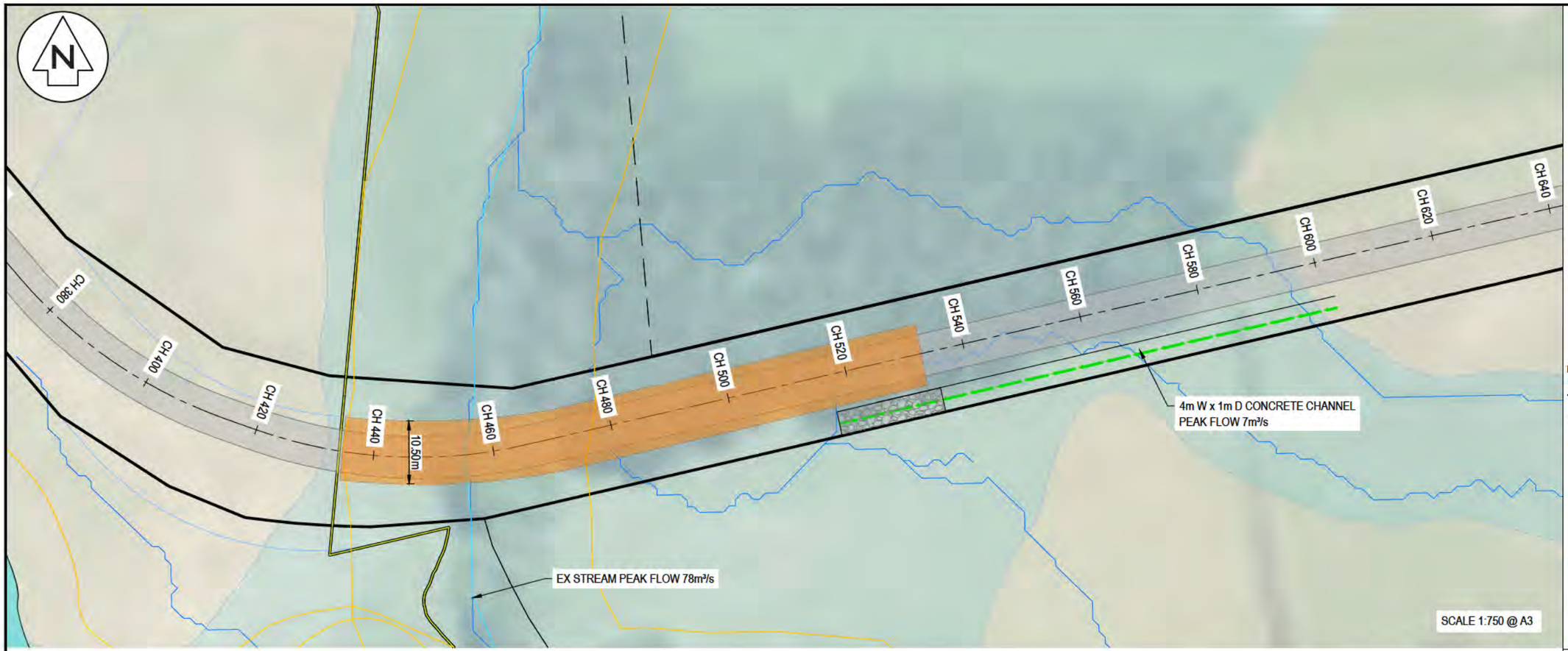
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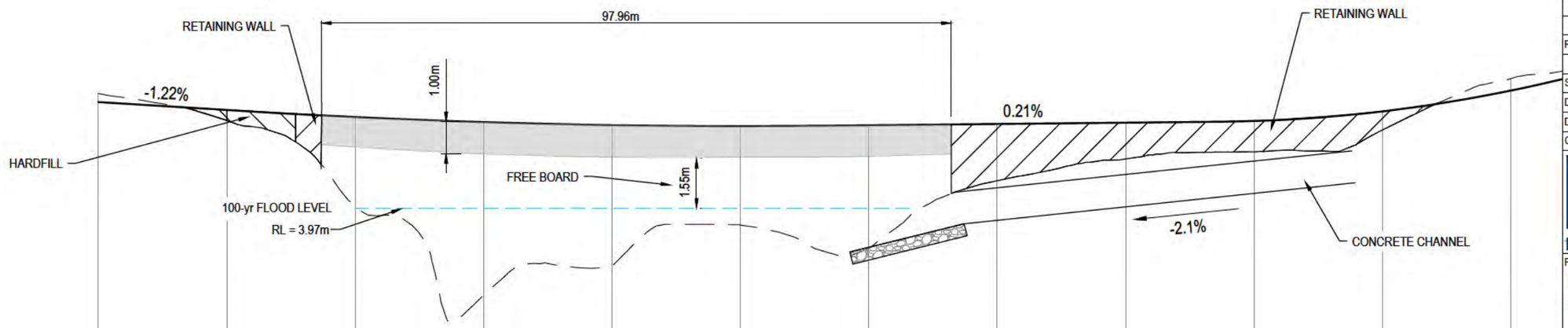
DEVELOPMENT OF
132 WHANGAPOURI ROAD
KARAKA

Title

PROPOSED
ROADING
CROSS SECTION

Project no.	135053		
Scale	###### @ A3		
Cad file	135053-C300.DWG		
Drawing no.	C320-4	Rev	A





DATUM -2.00m

EXISTING LEVELS	7.56	6.73	4.07	1.29	2.23	3.47	2.74	4.85	5.53	5.75	6.43	8.03
DESIGN LEVELS	7.29	7.05	6.83	6.67	6.58	6.55	6.58	6.62	6.66	6.71	7.01	7.66
CUT/FILL	-0.27	0.32	2.76	5.38	4.35	3.07	3.83	1.77	1.13	0.96	0.57	-0.37
CHAINAGE	400.00	420.00	440.00	460.00	480.00	500.00	520.00	540.00	560.00	580.00	600.00	620.00

BRIDGE 1 LONG SECTION
SCALE: HORI 1:750 VERT 1:150

FOR INFORMATION

NOTES: REFER TO C300-1

LEGEND
- EX BDY
- PROP BDY
- EX FLOOD PLAIN
- EX OLFP
- BRIDGE

Rev	Description	By	Date
A	FOR INFORMATION	JAW	05/2026

	By	Date
Survey	1m LIDAR	2024
Design	JAW	05/2026
Drawn	JAW	05/2026
Checked	AC	05/2026

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Project
DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title
PROPOSED BRIDGE 1 PLAN AND LONG SECTION

Project no.	135053		
Scale	AS SHOWN		
Cad file	135053-C350-10 - BRIDGE.DWG		
Drawing no.	C350-1	Rev	A

DATE: 6/5/26 FILE PATH: F:\MAVEN\JOBS\135053 - 132 WHANGAPOURI ROAD, KARAKA\WORKING\135053-C350-10 - BRIDGE.DWG



FOR INFORMATION

NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE NEW ZEALAND VERTICAL DATUM 2016.
3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
4. PIPE BEDDING: 0 - 10% GRANULAR BEDDING,10 - 20% WEAK CONCRETE BEDDING.GREATER THAN 20% WEAK CONCRETE BEDDING (7MPA PLUS ANTI SCOUR BLOCKS AT 6M CRS).
5. EACH CONNECTION SHALL BE MARKED BY A 50MMX50MM TREATED PINE STAKE EXTENDING 600MM ABOVE GROUND LEVEL WITH THE TOP PAINTED. THIS MARKER POST SHALL BE PLACED ALONGSIDE A TIMBER MARKER INSTALLED AT THE TIME OF PIPELAYING AND EXTENDING FROM THE CONNECTION TO 150MM BELOW FINISHED GROUND LEVEL. CONNECTIONS SHALL BE ACCURATELY INDICATED ON "AS BUILT" PLANS.
6. APPROVED HARDFILL IS TO BE USED IN BACKFILLING OF ALL ROAD CROSSINGS AND VEHICLE CROSSINGS TO COUNCIL STANDARDS.
7. HEAVY DUTY MANHOLE LIDS AND FRAMES TO BE USED IN TRAFFICKED AREAS.
8. ALL MANHOLES ARE TO BE 1050MMØ PRECAST CONCRETE UNLESS SHOWN OTHERWISE.
9. ALL CATCHPIT LEADS SHALL HAVE MIN COVER 1.0M.
10. ALL LINES TO BE ABANDONED SHALL BE SEALED AT EACH END. TIMING OF ALL SEALING TO BE COORDINATED WITH COUNCIL STAFF.
11. ALL LOT CONNECTION TO BE MIN 100mm uPVC SN16 UNLESS SHOWN OTHERWISE.

LEGEND

- EX BDY
- PROP BDY
- EX STORMWATER
- PR STORMWATER
- EX/PROP SWMH
- PROP SWCP SINGLE
- PROP SWCP DOUBLE
- PR LOT CONNECTION

Rev	Description	By	Date
A	FOR INFORMATION	EZ	05/2026

	By	Date
Survey	1m LIDAR	2024
Design	EZ	05/2026
Drawn	EZ	05/2026
Checked	AC	05/2026

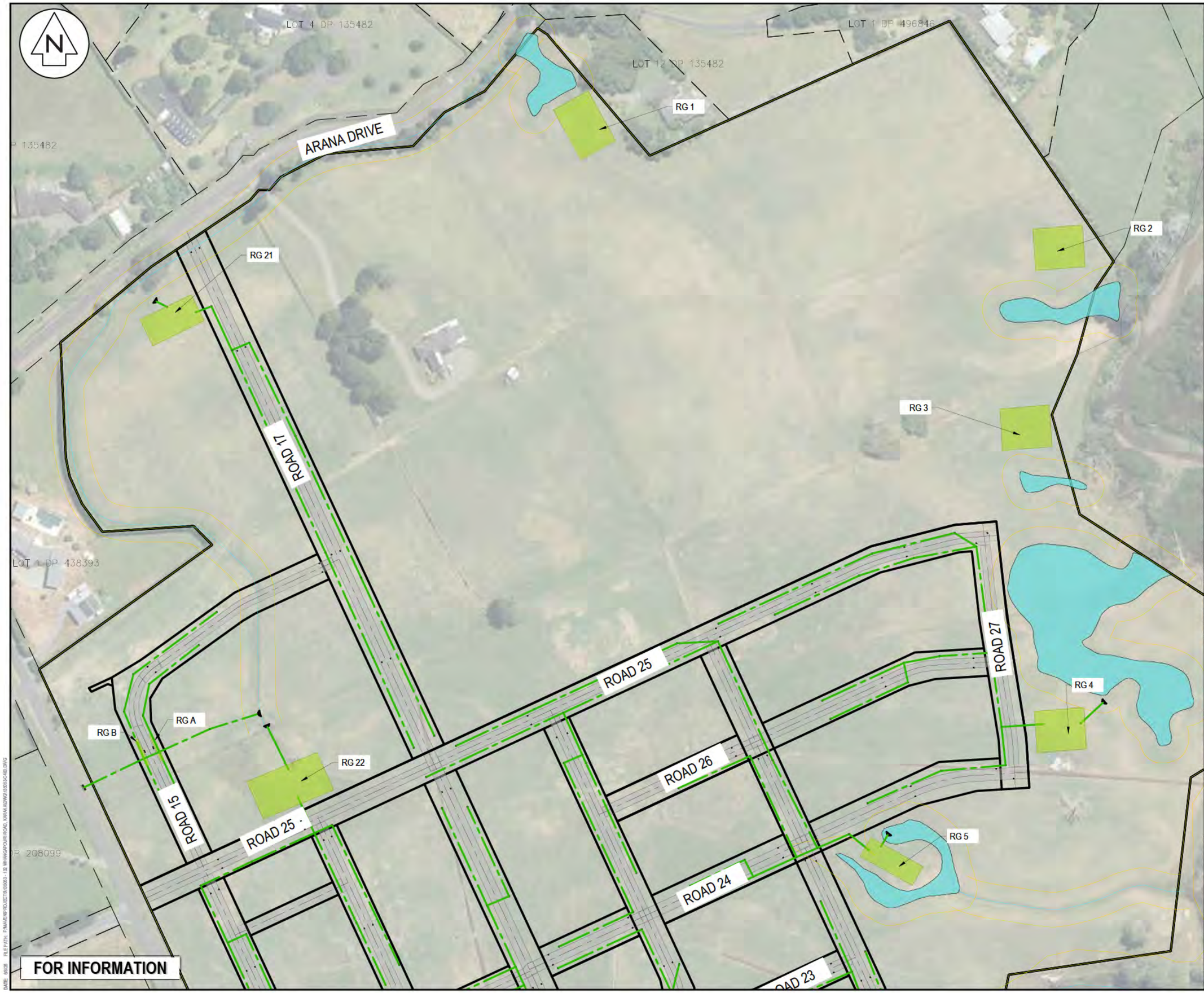
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Project
DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title
PROPOSED STORMWATER DRAINAGE OVERALL PLAN

Project no.	135053
Scale	1:8000 @ A3
Cad file	135053-C400.DWG
Drawing no.	C400-1 Rev A

DATE: 08/26 FILE PATH: F:\MAVEN\PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA\DWGS\135053-C400.DWG



NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE NEW ZEALAND VERTICAL DATUM 2016.
3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
4. PIPE BEDDING: 0 - 10% GRANULAR BEDDING,10 - 20% WEAK CONCRETE BEDDING.GREATER THAN 20% WEAK CONCRETE BEDDING (7MPA PLUS ANTI SCOUR BLOCKS AT 6M CRS).
5. EACH CONNECTION SHALL BE MARKED BY A 50MMX50MM TREATED PINE STAKE EXTENDING 600MM ABOVE GROUND LEVEL WITH THE TOP PAINTED. THIS MARKER POST SHALL BE PLACED ALONGSIDE A TIMBER MARKER INSTALLED AT THE TIME OF PIPELAYING AND EXTENDING FROM THE CONNECTION TO 150MM BELOW FINISHED GROUND LEVEL. CONNECTIONS SHALL BE ACCURATELY INDICATED ON "AS BUILT" PLANS.
6. APPROVED HARDFILL IS TO BE USED IN BACKFILLING OF ALL ROAD CROSSINGS AND VEHICLE CROSSINGS TO COUNCIL STANDARDS.
7. HEAVY DUTY MANHOLE LIDS AND FRAMES TO BE USED IN TRAFFICKED AREAS.
8. ALL MANHOLES ARE TO BE 1050MMØ PRECAST CONCRETE UNLESS SHOWN OTHERWISE.
9. ALL CATCHPIT LEADS SHALL HAVE MIN COVER 1.0M.
10. ALL LINES TO BE ABANDONED SHALL BE SEALED AT EACH END. TIMING OF ALL SEALING TO BE COORDINATED WITH COUNCIL STAFF.
11. ALL LOT CONNECTION TO BE MIN 100mm uPVC SN16 UNLESS SHOWN OTHERWISE.

LEGEND

- EX BDY
- PROP BDY
- EX STORMWATER
- PR STORMWATER
- EX/PROP SWMH
- PROP SWCP SINGLE
- PROP SWCP DOUBLE
- PR LOT CONNECTION

Rev	Description	By	Date
A	FOR INFORMATION	EZ	05/2026

	By	Date
Survey	1m LIDAR	2024
Design	EZ	05/2026
Drawn	EZ	05/2026
Checked	AC	05/2026

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Project

DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title

PROPOSED STORMWATER DRAINAGE PLAN

Project no.	135053
Scale	1:2000 @ A3
Cad file	135053-C400.DWG
Drawing no.	C400-2 Rev A

DATE: 05/26 FILE PATH: F:\MAVEN\PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA\DWG\135053-C400.DWG



NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE NEW ZEALAND VERTICAL DATUM 2016.
3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
4. PIPE BEDDING: 0 - 10% GRANULAR BEDDING,10 - 20% WEAK CONCRETE BEDDING.GREATER THAN 20% WEAK CONCRETE BEDDING (7MPA PLUS ANTI SCOUR BLOCKS AT 6M CRS).
5. EACH CONNECTION SHALL BE MARKED BY A 50MMX50MM TREATED PINE STAKE EXTENDING 600MM ABOVE GROUND LEVEL WITH THE TOP PAINTED. THIS MARKER POST SHALL BE PLACED ALONGSIDE A TIMBER MARKER INSTALLED AT THE TIME OF PIPELAYING AND EXTENDING FROM THE CONNECTION TO 150MM BELOW FINISHED GROUND LEVEL. CONNECTIONS SHALL BE ACCURATELY INDICATED ON "AS BUILT" PLANS.
6. APPROVED HARDFILL IS TO BE USED IN BACKFILLING OF ALL ROAD CROSSINGS AND VEHICLE CROSSINGS TO COUNCIL STANDARDS.
7. HEAVY DUTY MANHOLE LIDS AND FRAMES TO BE USED IN TRAFFICKED AREAS.
8. ALL MANHOLES ARE TO BE 1050MMØ PRECAST CONCRETE UNLESS SHOWN OTHERWISE.
9. ALL CATCHPIT LEADS SHALL HAVE MIN COVER 1.0M.
10. ALL LINES TO BE ABANDONED SHALL BE SEALED AT EACH END. TIMING OF ALL SEALING TO BE COORDINATED WITH COUNCIL STAFF.
11. ALL LOT CONNECTION TO BE MIN 100mm uPVC SN16 UNLESS SHOWN OTHERWISE.

LEGEND

- EX BDY
- PROP BDY
- EX STORMWATER
- PR STORMWATER
- EX/PROP SWMH
- PROP SWCP SINGLE
- PROP SWCP DOUBLE
- PR LOT CONNECTION

Rev	Description	By	Date
A	FOR INFORMATION	EZ	05/2026

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Project
DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title
PROPOSED STORMWATER DRAINAGE PLAN

Project no.	135053		
Scale	1:2000 @ A3		
Cad file	135053-C400.DWG		
Drawing no.	C400-3	Rev	A

DATE: 05/26 FILE PATH: F:\MAVEN\PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA\DWG\135053-C400.DWG



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- PROP BDY
- EX STORMWATER
- PR STORMWATER
- EX/PROP SWMH
- PROP SWCP SINGLE
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- PR LOT CONNECTION

Rev	Description	By	Date
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Project

DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title

PROPOSED STORMWATER DRAINAGE PLAN

Project no.	135053		
Scale	1:2000 @ A3		
Cad file	135053-C400.DWG		
Drawing no.	C400-4	Rev	A

DATE: 6/5/26 FILEPATH: F:\MAVEN\PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA\DWGS\135053-C400.DWG



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- PROP BDY
- EX STORMWATER
- PR STORMWATER
- EX/PROP SWMH
- PROP SWCP SINGLE
- PROP SWCP DOUBLE
- PR LOT CONNECTION

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DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title

PROPOSED STORMWATER DRAINAGE PLAN

Project no.	135053
Scale	1:2000 @ A3
Cad file	135053-C400.DWG
Drawing no.	C400-5
Rev	A

DATE: 08/26 FILEPATH: P:\MAVEN PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA\DWG\135053-C400.DWG



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- EX BDY
- PROP BDY
- EX STORMWATER
- PR STORMWATER
- EX/PROP SWMH
- PROP SWCP SINGLE
- PROP SWCP DOUBLE
- PR LOT CONNECTION

Rev	Description	By	Date
A	FOR INFORMATION	EZ	05/2026

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Checked	AC	05/2026

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Project

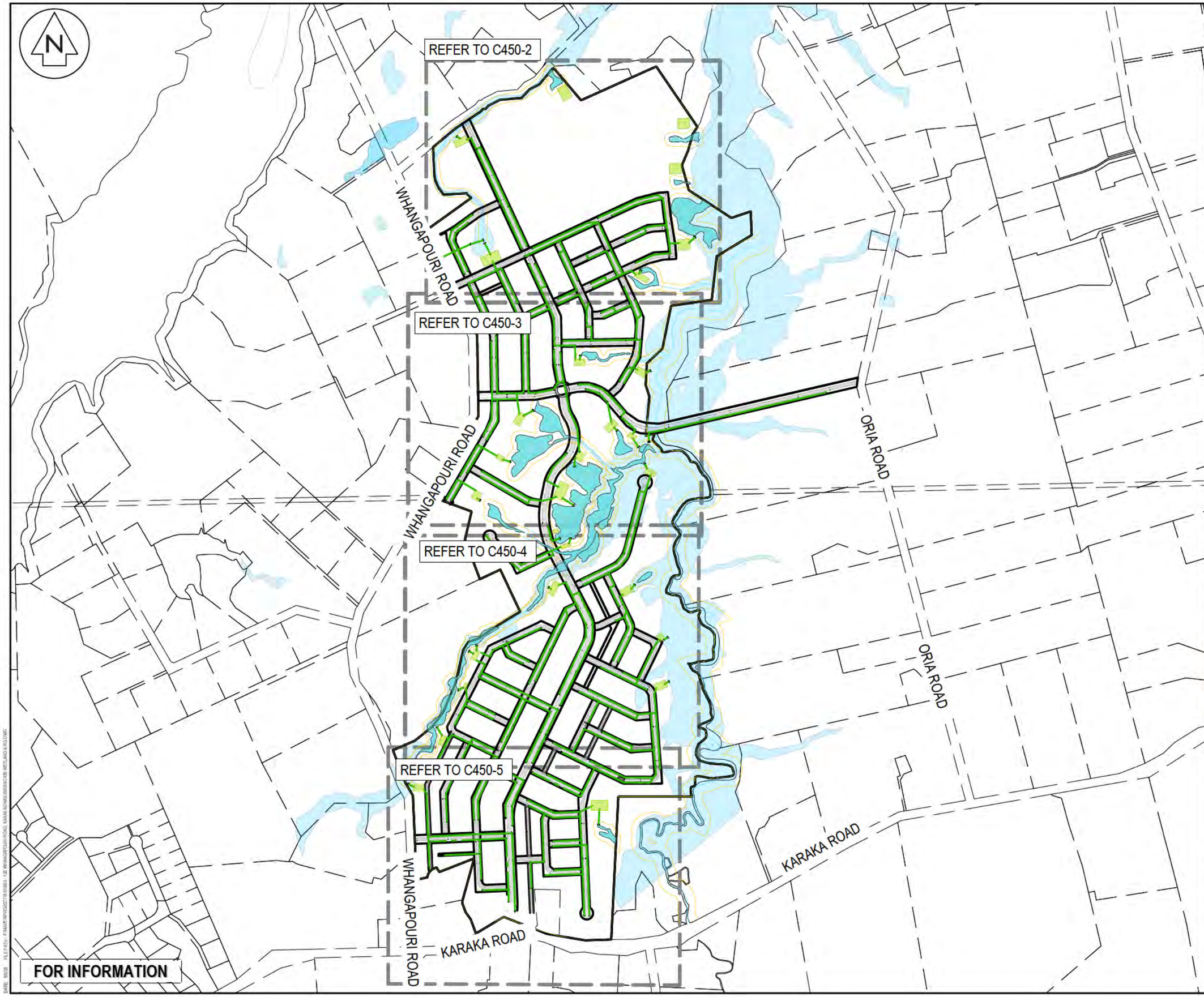
DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title

PROPOSED STORMWATER DRAINAGE PLAN

Project no.	135053		
Scale	1:2000 @ A3		
Cad file	135053-C400.DWG		
Drawing no.	C400-6	Rev	A

DATE: 08/26 FILEPATH: F:\MAVEN\PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA\DWGS\135053-C400.DWG



NOTES

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11. ALL LOT CONNECTION TO BE MIN 100mm uPVC SN16 UNLESS SHOWN OTHERWISE.

LEGEND

- EX BDY
- PROP BDY
- PR SW
- EX/PR SWMH
- SWCP SINGLE
- EX WETLAND
- PR RAINGARDEN
- EX FLOOD PLAIN
- EX OLFP

Rev	Description	By	Date
A	FOR INFORMATION	JAW	05/2026

	By	Date
Survey	1m LIDAR	2024
Design	JAW	05/2026
Drawn	JAW	05/2026
Checked	AC	05/2026

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Project

DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title

WETLAND AND RAINGARDEN PLAN OVERVIEW

Project no.	135053		
Scale	1:8000 @ A3		
Cad file	135053-C450 WETLAND & RG.DWG		
Drawing no.	C450-1	Rev	A

DATE: 05/26 FILEPATH: P:\MAVEN PROJECTS\135053 132 WHANGAPOURI ROAD, KARAKA\WORKING\135053-C3D WETLAND & RG.DWG

LOT 4 DP 135482

LOT 1 DP 496846

LOT 2 DP 438393

LOT 1 DP 438393

DP 208099

ARANA DRIVE

ROAD 17

ROAD 15

ROAD 25

ROAD 26

ROAD 27

ROAD 24

ROAD 23

WETLAND 1
CATCHMENT : 20970 m2
2-yr FLOW 71 l/s

RG 1

RG 21

15.08

EL:15.50

EL:14.09

17.90

18.45

18.64

17.71

RG A

RG B

EL:16.50

RG 22

19.55

19.62

EACH LOT TO PROVIDE SMAF 1 RETENTION AND DETENTION ON SITE RAINGARDEN TO PROVIDE SAMF 1 RETENTION AND DETENTION FOR ROAD SURFACE. LOCATION AND SIZE TBC

RG 2

WETLAND 2
CATCHMENT : 17520 m2
2-yr FLOW 65 l/s

RG 3

WETLAND 3
CATCHMENT : 11756 m2
2-yr FLOW 44 l/s

EL:7.29

WETLAND 4-1
CATCHMENT : 7852 m2
2-yr FLOW 28 l/s

WETLAND 4-2
CATCHMENT : 20769 m2
2-yr FLOW 77 l/s

EL:3.77

RG 4

EL:4.50

8.65

EL:9.85

WETLAND 5
CATCHMENT : 19470 m2
2-yr FLOW 66 l/s

RG 5

EL:9.00

11.01

12.95

EL:10.00

WETLAND 6
CATCHMENT : 22084 m2
2-yr FLOW 84 l/s

FOR INFORMATION

NOTES: REFER TO C450-1

LEGEND

- EX BDY
- PROP BDY
- PR SW
- EX/PR SWMH
- SWCP SINGLE
- EX WETLAND
- PR RAINGARDEN
- EX FLOOD PLAIN
- EX OLFP

Rev	Description	By	Date
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Project
DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title
WETLAND AND RAINGARDEN PLAN

Project no.	135053
Scale	1:2000 @ A3
Cad file	135053-C450 WETLAND & RG.DWG
Drawing no.	C450-2 Rev A

DATE: 6/5/26 FILEPATH: F:\MAVEN\PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA KLOWG\135053-C450 WETLAND & RG.DWG

N

EACH LOT TO PROVIDE SMAF 1 RETENTION AND DETENTION ON SITE
RAINGARDEN TO PROVIDE SAMF 1 RETENTION AND DETENTION FOR ROAD SURFACE. LOCATION AND SIZE TBC

NOTES: REFER TO C450-1

WETLAND 6
CATCHMENT : 22084 m2
2-yr FLOW 84 l/s

WETLAND 7
CATCHMENT : 43320 m2
2-yr FLOW 150 l/s

WETLAND 8
CATCHMENT : 46440 m2
2-yr FLOW 160 l/s

WETLAND 9
CATCHMENT : 17520 m2
2-yr FLOW 65 l/s

WETLAND 10
CATCHMENT : 31802 m2
2-yr FLOW 100 l/s

WETLAND 11
CATCHMENT : 9733 m2
2-yr FLOW 36 l/s

WETLAND 12
CATCHMENT : 28929 m2
2-yr FLOW 101 l/s

WETLAND 13
CATCHMENT : 20377 m2
2-yr FLOW 67 l/s

WETLAND 14
CATCHMENT : 5667 m2
2-yr FLOW 19 l/s

ROAD 15
ROAD 16
ROAD 17
ROAD 18
ROAD 19
ROAD 20
ROAD 21
ROAD 22
ROAD 23
ROAD 24
ROAD 1
ROAD 13
TAUHINU ROAD
WHANGAPOURI ROAD

LOT 1 DP 345847
LOT 3 DP 3875
LOT 1 DP 149351
LOT 1 DP 374275

RG 6
RG 7
RG 8
RG 8
RG 9
RG 10
RG 11
RG 12
RG 24
RG 29
RG 31
RG 32

EL:12.99
EL:11.00
EL:14.50
EL:17.00
EL:7.68
EL:7.04
EL:6.00
EL:9.00
EL:19.88
EL:14.39
EL:8.70
EL:9.77
EL:20.34
EL:16.63

16.44
9.94
20.07
8.37
24.08
10.91
10.22
26.52
12.26

LEGEND
EX BDY
PROP BDY
PR SW
EX/PR SWMH
SWCP SINGLE
EX WETLAND
PR RAINGARDEN
EX FLOOD PLAIN
EX OLFP

Rev	Description	By	Date
A	FOR INFORMATION	JAW	05/2026

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Project
DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title
WETLAND AND RAINGARDEN PLAN

Project no.	135053
Scale	1:2000 @ A3
Cad file	135053-C450 WETLAND & RG.DWG
Drawing no.	C450-3 Rev A

FOR INFORMATION

DATE: 8/5/26 FILEPATH: F:\MAVEN\PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA\DWGS\135053-C450 WETLAND & RG.DWG



NOTES REFER TO C450-1

LEGEND

- EX BDY
- PROP BDY
- PR SW
- EX/PR SWMH
- SWCP SINGLE
- EX WETLAND
- PR RAINGARDEN
- EX FLOOD PLAIN
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Title
WETLAND AND RAINGARDEN PLAN

Project no.	135053
Scale	1:2000 @ A3
Cad file	135053-C450 WETLAND & RG.DWG
Drawing no.	C450-4 Rev A

DATE: 18/05 FILEPATH: P:\MAVEN PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA\DWG\135053-C450 WETLAND & RG.DWG

N

2 DP 128301

WETLAND 17
CATCHMENT : 63872 m2
2-yr FLOW 140 l/s

EL:15.53

EL:17.21

21.55

RG 17

LOT 1 DP 472268

LOT 2 DP 472268
30460

WHANGAPOURI ROAD

JOAL 1

ROAD 2

ROAD 3

ROAD 1

ROAD 9-1

ROAD 10

ROAD 9-2

ROAD 9

ROAD 7

ROAD 6

ROAD 4

ROAD 6-1

JOAL 2

ROAD 5

LOT 2 DP 464886

EL:16.51

18.52

RG 18

EL:12.02

WETLAND 18
CATCHMENT : 24202 m2
2-yr FLOW 69 l/s

EACH LOT TO PROVIDE SMAF 1 RETENTION AND DETENTION ON SITE RAINGARDEN TO PROVIDE SAMF 1 RETENTION AND DETENTION FOR ROAD SURFACE. LOCATION AND SIZE TBC

LOT 1 DP 473807

LOT 2 DP 473807

LOT 1 DP 160127
4798

LOT 1 DP 464886

KARAKA ROAD

KARAKA ROAD

KARAKA ROAD

PT LOT 1 DP 83246
18103

LOT 2 DP 109620
23500

FOR INFORMATION

NOTES REFER TO C450-1

LEGEND

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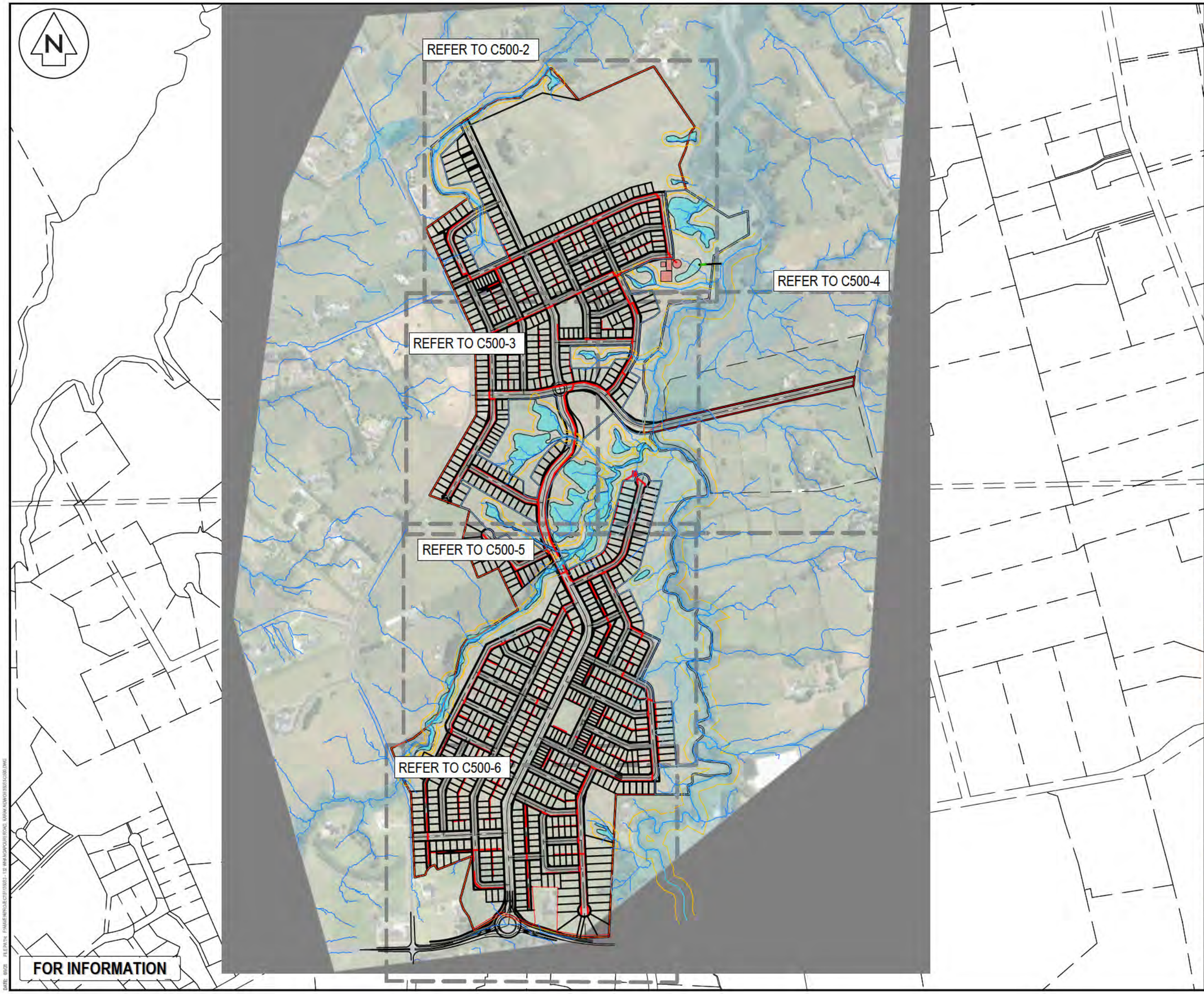
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Drawing no.	C450-5 Rev A

DATE: 05/26 PLEPATH: P:\MAVEN\PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA\DWGS\135053-C450 WETLAND & RG.DWG



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8. ALL MANHOLES ARE TO BE 1050MMØ PRE CAST CONCRETE UNLESS SHOWN OTHERWISE.
9. ALL LINES ARE TO BE MIN. 150MMØ PVC CLASS SN16 UNLESS SHOWN OTHERWISE.
10. ALL LOT CONNECTION TO BE MIN. 100mmØ PVC CLASS SN16 UNLESS SHOWN OTHERWISE.
11. 150MMØ PIPES THAT DO NOT TERMINATE IN A MANHOLE MUST BE TERMINATED WITH A 100MMØ ON A 150MMØ LUNDEN JUNCTION AND BLANK CAP.
12. ALL LINES TO BE ABANDONED SHALL BE SEALED AT EACH END. TIMING OF ALL SEALING TO BE COORDINATED WITH COUNCIL STAFF.

LEGEND

- EX BDY
- PROP BDY
- EX WASTEWATER
- PROP WASTEWATER
- EX/PROP WWMH
- PR WW LOT CON

Rev	Description	By	Date
A	FOR INFORMATION	TY	05/2026

	By	Date
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Project

DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title

PROPOSED WASTEWATER DRAINAGE OVERALL PLAN

Project no.	135053		
Scale	1:8000 @ A3		
Cad file	135053-C500.DWG		
Drawing no.	C500-1	Rev	A

DATE: 6/5/26 FILE PATH: P:\MAVEN\PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA\CAD\135053-C500.DWG



NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE NEW ZEALAND VERTICAL DATUM 2016.
3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
4. PIPE BEDDING: 0 - 10% GRANULAR BEDDING,10 - 20% WEAK CONCRETE BEDDING.GREATER THAN 20% WEAK CONCRETE BEDDING (7MPA PLUS ANTI SCOUR BLOCKS AT 6M CRS).
5. EACH CONNECTION SHALL BE MARKED BY A 50MMX50MM TREATED PINE STAKE EXTENDING 600MM ABOVE GROUND LEVEL WITH THE TOP PAINTED. THIS MARKER POST SHALL BE PLACED ALONGSIDE A TIMBER MARKER INSTALLED AT THE TIME OF PIPELAYING AND EXTENDING FROM THE CONNECTION TO 150MM BELOW FINISHED GROUND LEVEL. CONNECTIONS SHALL BE ACCURATELY INDICATED ON "AS BUILT" PLANS.
6. APPROVED HARDFILL IS TO BE USED IN BACKFILLING OF ALL ROAD CROSSINGS AND VEHICLE CROSSINGS TO COUNCIL STANDARDS.
7. HEAVY DUTY MANHOLE LIDS AND FRAMES TO BE USED IN TRAFFICKED AREAS, ALL MANHOLES SHALL HAVE STAINLESS GRATES INSTALLED.
8. ALL MANHOLES ARE TO BE 1050MMØ PRE CAST CONCRETE UNLESS SHOWN OTHERWISE.
9. ALL LINES ARE TO BE MIN. 150MMØ PVC CLASS SN16 UNLESS SHOWN OTHERWISE.
10. ALL LOT CONNECTION TO BE MIN. 100mmØ PVC CLASS SN16 UNLESS SHOWN OTHERWISE.
11. 150MMØ PIPES THAT DO NOT TERMINATE IN A MANHOLE MUST BE TERMINATED WITH A 100MMØ ON A 150MMØ LUNDEN JUNCTION AND BLANK CAP.
12. ALL LINES TO BE ABANDONED SHALL BE SEALED AT EACH END. TIMING OF ALL SEALING TO BE COORDINATED WITH COUNCIL STAFF.

LEGEND

- EX BDY
- PROP BDY
- EX WASTEWATER
- PROP WASTEWATER
- EX/PROP WWMH
- PR WW LOT CON

Rev	Description	By	Date
A	FOR INFORMATION	TY	05/2026

	By	Date
Survey	1m LIDAR	2024
Design	TY	05/2026
Drawn	TY	05/2026
Checked	AC	05/2026

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Project

DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title

PROPOSED WASTEWATER DRAINAGE PLAN

Project no.	135053		
Scale	1:2000 @ A3		
Cad file	135053-C500.DWG		
Drawing no.	C500-2	Rev	A

DATE: 05/26 FILEPATH: P:\MAVEN\PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA\CAD\135053-C500.DWG



NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE NEW ZEALAND VERTICAL DATUM 2016.
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4. PIPE BEDDING: 0 - 10% GRANULAR BEDDING,10 - 20% WEAK CONCRETE BEDDING.GREATER THAN 20% WEAK CONCRETE BEDDING (7MPA PLUS ANTI SCOUR BLOCKS AT 6M CRS).
5. EACH CONNECTION SHALL BE MARKED BY A 50MMX50MM TREATED PINE STAKE EXTENDING 600MM ABOVE GROUND LEVEL WITH THE TOP PAINTED. THIS MARKER POST SHALL BE PLACED ALONGSIDE A TIMBER MARKER INSTALLED AT THE TIME OF PIPELAYING AND EXTENDING FROM THE CONNECTION TO 150MM BELOW FINISHED GROUND LEVEL. CONNECTIONS SHALL BE ACCURATELY INDICATED ON "AS BUILT" PLANS.
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12. ALL LINES TO BE ABANDONED SHALL BE SEALED AT EACH END. TIMING OF ALL SEALING TO BE COORDINATED WITH COUNCIL STAFF.

LEGEND

- EX BDY
- PROP BDY
- EX WASTEWATER
- PROP WASTEWATER
- EX/PROP WWMH
- PR WW LOT CON

Rev	Description	By	Date
A	FOR INFORMATION	TY	05/2026

	By	Date
Survey	1m LIDAR	2024
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Drawn	TY	05/2026
Checked	AC	05/2026

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Project

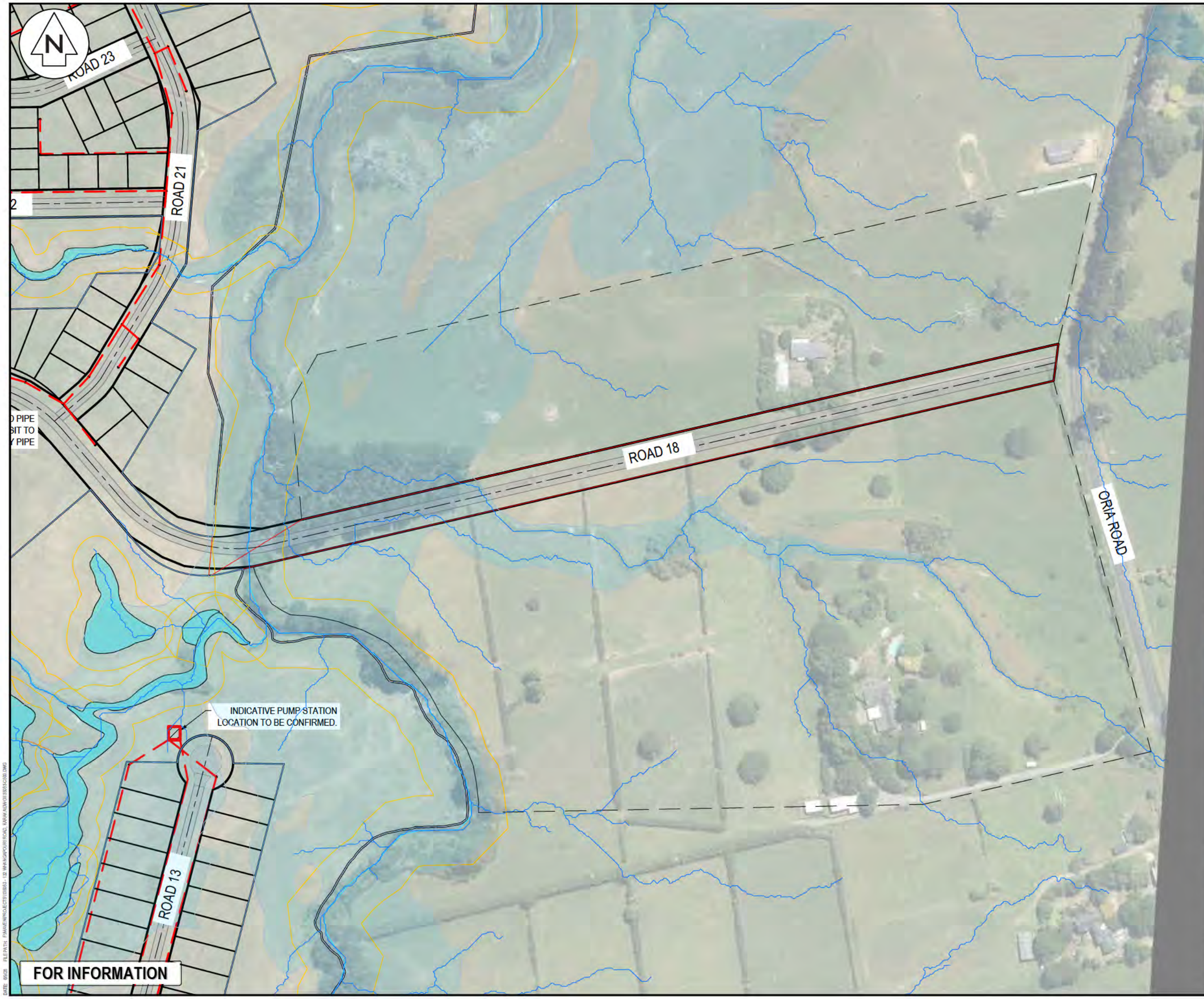
DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title

PROPOSED WASTEWATER DRAINAGE PLAN

Project no.	135053		
Scale	1:2000 @ A3		
Cad file	135053-C500.DWG		
Drawing no.	C500-3	Rev	A

DATE: 6/5/26 FILEPATH: P:\MAVEN\PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA\DWG\135053-C500.DWG



NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
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5. EACH CONNECTION SHALL BE MARKED BY A 50MMX50MM TREATED PINE STAKE EXTENDING 600MM ABOVE GROUND LEVEL WITH THE TOP PAINTED. THIS MARKER POST SHALL BE PLACED ALONGSIDE A TIMBER MARKER INSTALLED AT THE TIME OF PIPELAYING AND EXTENDING FROM THE CONNECTION TO 150MM BELOW FINISHED GROUND LEVEL. CONNECTIONS SHALL BE ACCURATELY INDICATED ON "AS BUILT" PLANS.
6. APPROVED HARDFILL IS TO BE USED IN BACKFILLING OF ALL ROAD CROSSINGS AND VEHICLE CROSSINGS TO COUNCIL STANDARDS.
7. HEAVY DUTY MANHOLE LIDS AND FRAMES TO BE USED IN TRAFFICKED AREAS, ALL MANHOLES SHALL HAVE STAINLESS GRATES INSTALLED.
8. ALL MANHOLES ARE TO BE 1050MMØ PRE CAST CONCRETE UNLESS SHOWN OTHERWISE.
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12. ALL LINES TO BE ABANDONED SHALL BE SEALED AT EACH END. TIMING OF ALL SEALING TO BE COORDINATED WITH COUNCIL STAFF.

LEGEND

- EX BDY
- PROP BDY
- EX WASTEWATER
- PROP WASTEWATER
- EX/PROP WWMH
- PR WW LOT CON

Rev	Description	By	Date
A	FOR INFORMATION	TY	05/2026

	By	Date
Survey	1m LIDAR	2024
Design	TY	05/2026
Drawn	TY	05/2026
Checked	AC	05/2026

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Project
DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title
PROPOSED WASTEWATER DRAINAGE PLAN

Project no.	135053		
Scale	1:2000 @ A3		
Cad file	135053-C500.DWG		
Drawing no.	C500-4	Rev	A

DATE: 05/26 FILE PATH: P:\MAVEN\PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA\DWG\135053-C500.DWG



NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
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LEGEND

- EX BDY
- PROP BDY
- EX WASTEWATER
- PROP WASTEWATER
- EX/PROP WWMH
- PR WW LOT CON

Rev	Description	By	Date
A	FOR INFORMATION	TY	05/2026

	By	Date
Survey	1m LIDAR	2024
Design	TY	05/2026
Drawn	TY	05/2026
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Project

DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title

PROPOSED WASTEWATER DRAINAGE PLAN

Project no.	135053		
Scale	1:2000 @ A3		
Cad file	135053-C500.DWG		
Drawing no.	C500-5	Rev	A

DATE: 05/26 FILEPATH: P:\MAVEN\PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA\CAD\135053-C500.DWG



NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
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LEGEND

- EX BDY
- PROP BDY
- EX WASTEWATER
- PROP WASTEWATER
- EX/PROP WWMH
- PR WW LOT CON

Rev	Description	By	Date
A	FOR INFORMATION	TY	05/2026

	By	Date
Survey	1m LIDAR	2024
Design	TY	05/2026
Drawn	TY	05/2026
Checked	AC	05/2026

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Project

DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

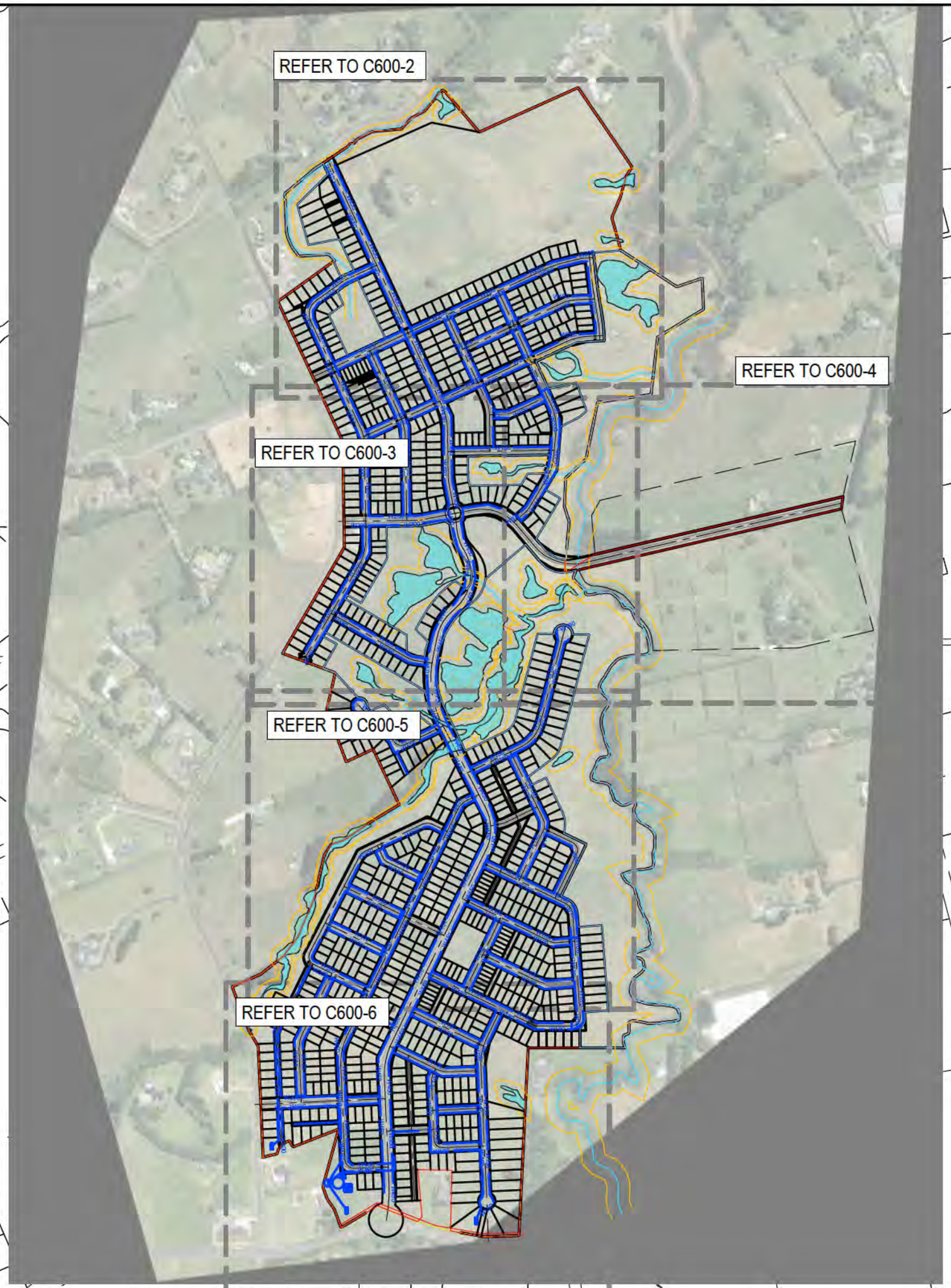
Title

PROPOSED WASTEWATER DRAINAGE PLAN

Project no.	135053		
Scale	1:2000 @ A3		
Cad file	135053-C500.DWG		
Drawing no.	C500-6	Rev	A

FOR INFORMATION

DATE: 05/26 FILEPATH: F:\MAVEN PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA\CAD\135053-C500.DWG



FOR INFORMATION

NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
2. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ANY UNDERGROUND SERVICES PRIOR TO THE COMMENCEMENT OF WORKS.
3. MINIMUM COVER SHALL BE:
   - ROADS AND FRONT1M OF BERM: 900MM
   - BERMS 600MM
   - SERVICE CONNECTIONS: 450MM
4. WATERMAINS LAID ACROSS ROADS SHALL BE BACKFILLED WITH HARDFILL COMPACTED IN 200MM LAYERS ABOVE THE EMBEDMENT MATERIAL.
5. ALL UPVC PIPE SHALL BE PN12 MINIMUM PRESSURE RATED WITH SPIGNOT AND SOCKET RUBBER RING JOINTS.
6. ALL PE PIPE SHALL BE PN12.5 MINIMUM PRESSURE RATED WITH BUTT-WELDED. WELD BEADS SHALL BE REMOVED TO PROVIDE A SMOOTH BORE.
7. ALL NON-METALIC PIPES ARE TO HAVE TRACER WIRE FITTED TO COUNCIL STANDARDS.
8. PIPES SHALL BE BEDDED AND SURROUNDED TO 150MM ABOVE THE PIPE SOFFIT WITH SAND OR AP20.
9. METAL DETECTOR TAPE PRINTED WITH 'WATER PIPE BELOW' SHALL BE LAID 150MM ABOVE ALL WATERMAINS.
10. A YELLOW ISOSCELES TRIANGLE WITH CATS EYE POINTING TO FH SHALL BE PAINTED IN THE CENTRE OF ALL SEALED ROADS.
11. ALL VALVES TO BE MARKED WITH SAWCUT KERB AND BLUE PAINT.
12. ALL FLANGE JOINTS TO BE PROTECTED WITH DENSO TAPE OR SIMILAR APPROVED BY THE ENGINEER.

LEGEND

- EX BDY
- PROP BDY
- EX WATERMAIN
- PROP WATERMAIN
- PR WATER PRIVATE
- EX/PROP HYDRANT
- EX/PROP METER
- EX SLUICE VALVE
- EX PEET VALVE
- PROP SLUICE VALVE
- PROP PEET VALVE

Rev	Description	By	Date
A	FOR INFORMATION	TY	05/2026

	By	Date
Survey	1m LIDAR	2024
Design	TY	05/2026
Drawn	TY	05/2026
Checked	AC	05/2026

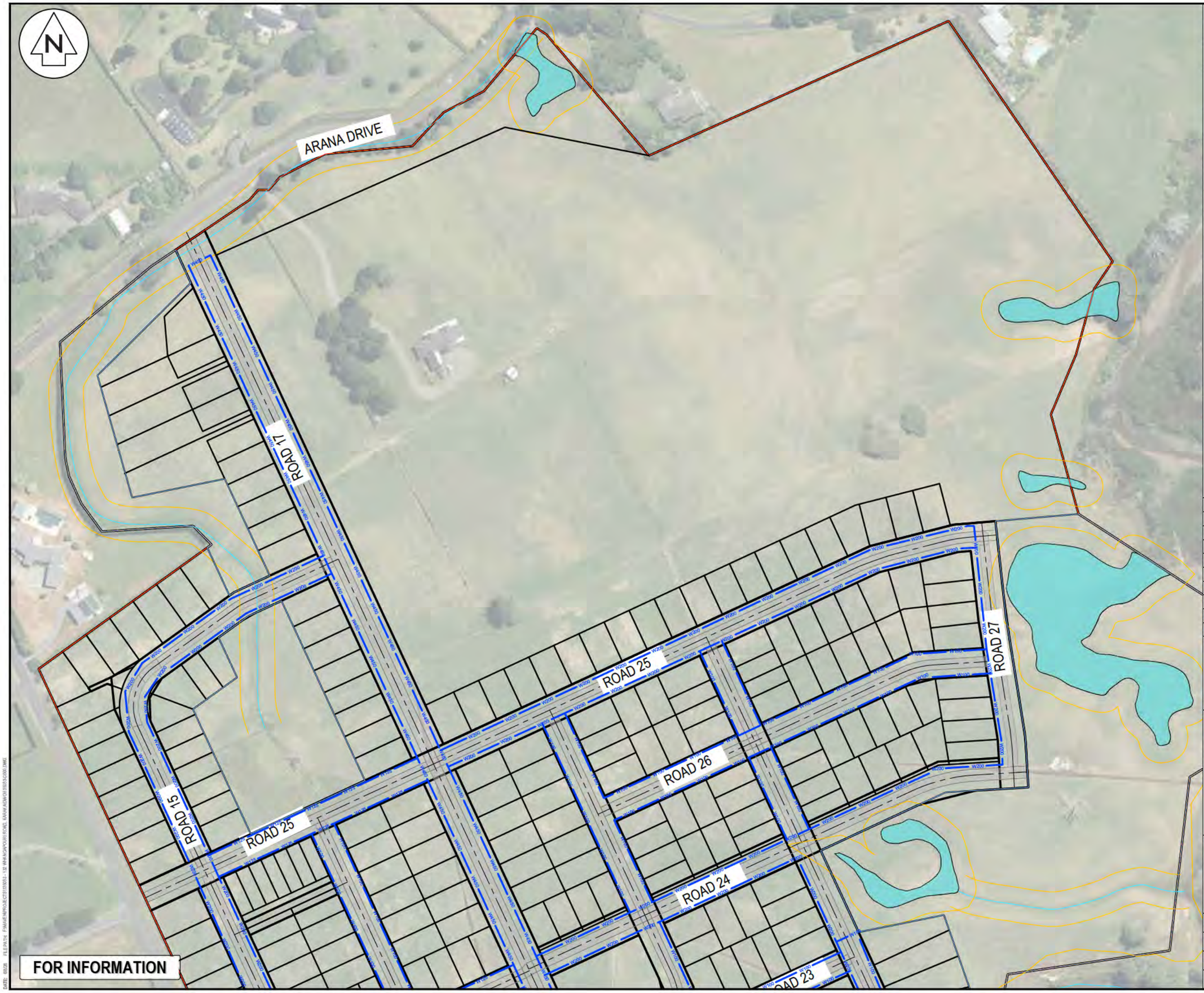
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Project
DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title
PROPOSED WATER SUPPLY OVERALL PLAN

Project no.	135053		
Scale	1:8000 @ A3		
Cad file	135053-C600.DWG		
Drawing no.	C600-1	Rev	A

DATE: 05/26 FILEPATH: P:\MAVEN PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA ACM\20135053-C600.DWG



NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
2. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ANY UNDERGROUND SERVICES PRIOR TO THE COMMENCEMENT OF WORKS.
3. MINIMUM COVER SHALL BE:

ROADS AND FRONT1M OF BERM:	900MM
BERMS	600MM
SERVICE CONNECTIONS:	450MM

4. WATERMAINS LAID ACROSS ROADS SHALL BE BACKFILLED WITH HARDFILL COMPACTED IN 200MM LAYERS ABOVE THE EMBEDMENT MATERIAL.
5. ALL UPVC PIPE SHALL BE PN12 MINIMUM PRESSURE RATED WITH SPIGNOT AND SOCKET RUBBER RING JOINTS.
6. ALL PE PIPE SHALL BE PN12.5 MINIMUM PRESSURE RATED WITH BUTT-WELDED. WELD BEADS SHALL BE REMOVED TO PROVIDE A SMOOTH BORE.
7. ALL NON-METALIC PIPES ARE TO HAVE TRACER WIRE FITTED TO COUNCIL STANDARDS.
8. PIPES SHALL BE BEDDED AND SURROUNDED TO 150MM ABOVE THE PIPE SOFFIT WITH SAND OR AP20.
9. METAL DETECTOR TAPE PRINTED WITH 'WATER PIPE BELOW' SHALL BE LAID 150MM ABOVE ALL WATERMAINS.
10. A YELLOW ISOSCELES TRIANGLE WITH CATS EYE POINTING TO FH SHALL BE PAINTED IN THE CENTRE OF ALL SEALED ROADS.
11. ALL VALVES TO BE MARKED WITH SAWCUT KERB AND BLUE PAINT.
12. ALL FLANGE JOINTS TO BE PROTECTED WITH DENSO TAPE OR SIMILAR APPROVED BY THE ENGINEER.

LEGEND

- EX BDY
- PROP BDY
- EX WATERMAIN
- PROP WATERMAIN
- PR WATER PRIVATE
- FH EX/PROP HYDRANT
- WM EX/PROP METER
- EX SLUICE VALVE
- EX PEET VALVE
- PROP SLUICE VALVE
- PROP PEET VALVE

Rev	Description	By	Date
A	FOR INFORMATION	TY	05/2026

	By	Date
Survey	1m LIDAR	2024
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Project

DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title

PROPOSED WATER SUPPLY PLAN

Project no.	135053		
Scale	1:2000 @ A3		
Cad file	135053-C600.DWG		
Drawing no.	C600-2	Rev	A

DATE: 05/26 FILEPATH: P:\MAVEN\PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA\CAD\135053-C600.DWG



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LEGEND

- EX BDY
- PROP BDY
- EX WATERMAIN
- PROP WATERMAIN
- PR WATER PRIVATE
- EX/PROP HYDRANT
- EX/PROP METER
- EX SLUICE VALVE
- EX PEET VALVE
- PROP SLUICE VALVE
- PROP PEET VALVE

Rev	Description	By	Date
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Project
DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title
PROPOSED WATER SUPPLY PLAN

Project no.	135053		
Scale	1:2000 @ A3		
Cad file	135053-C600.DWG		
Drawing no.	C600-3	Rev	A

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BERMS	600MM
SERVICE CONNECTIONS:	450MM

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9. METAL DETECTOR TAPE PRINTED WITH 'WATER PIPE BELOW' SHALL BE LAID 150MM ABOVE ALL WATERMAINS.
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LEGEND

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- PROP BDY
- EX WATERMAIN
- PROP WATERMAIN
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- EX/PROP HYDRANT
- EX/PROP METER
- EX SLUICE VALVE
- EX PEET VALVE
- PROP SLUICE VALVE
- PROP PEET VALVE

Rev	Description	By	Date
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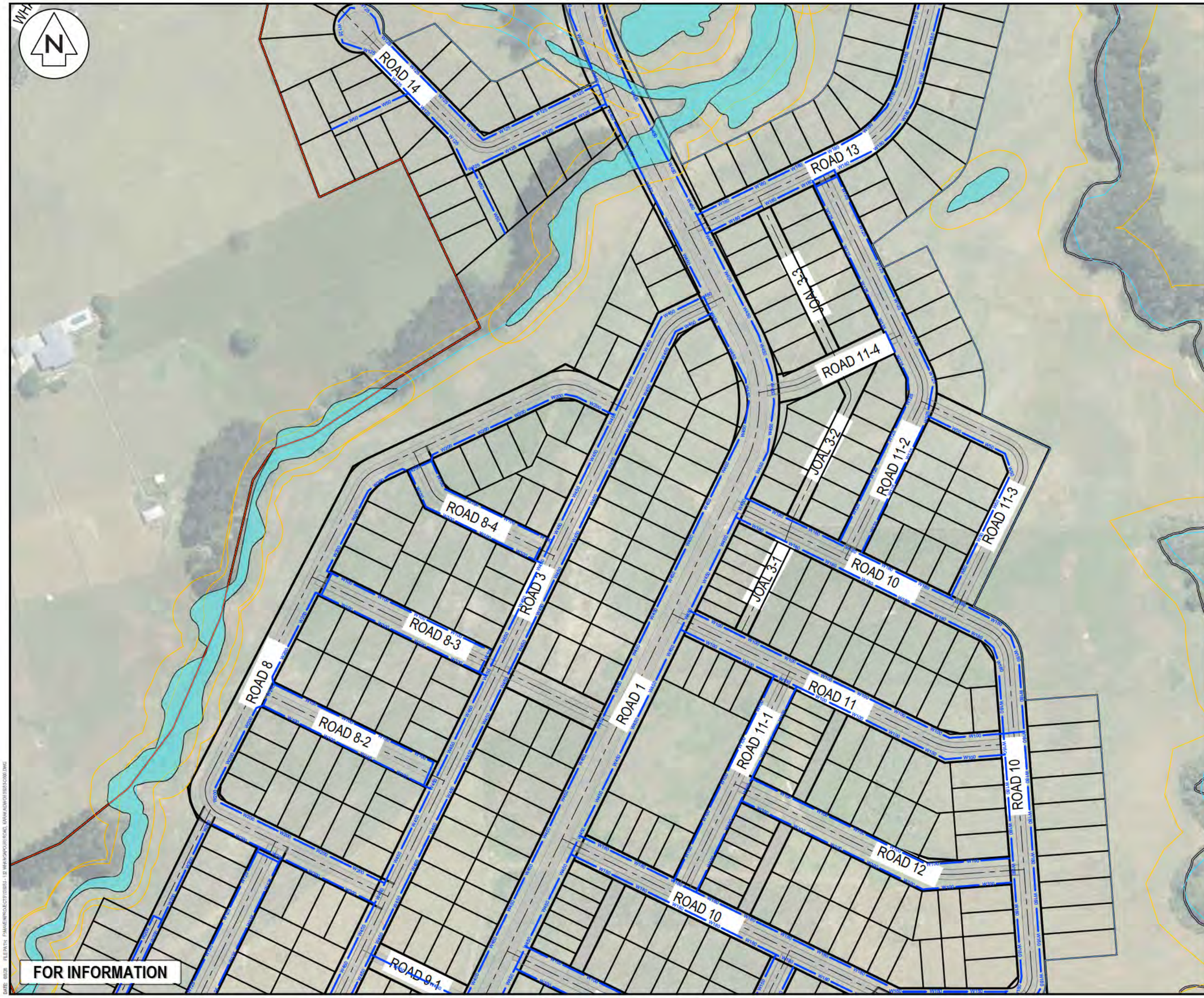
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Project
DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title
PROPOSED WATER SUPPLY PLAN

Project no.	135053		
Scale	1:2000 @ A3		
Cad file	135053-C600.DWG		
Drawing no.	C600-4	Rev	A

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FOR INFORMATION

NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
2. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ANY UNDERGROUND SERVICES PRIOR TO THE COMMENCEMENT OF WORKS.
3. MINIMUM COVER SHALL BE:
   - ROADS AND FRONT1M OF BERM: 900MM
   - BERMS 600MM
   - SERVICE CONNECTIONS: 450MM
4. WATERMAINS LAID ACROSS ROADS SHALL BE BACKFILLED WITH HARDFILL COMPACTED IN 200MM LAYERS ABOVE THE EMBEDMENT MATERIAL.
5. ALL UPVC PIPE SHALL BE PN12 MINIMUM PRESSURE RATED WITH SPIGNOT AND SOCKET RUBBER RING JOINTS.
6. ALL PE PIPE SHALL BE PN12.5 MINIMUM PRESSURE RATED WITH BUTT-WELDED. WELD BEADS SHALL BE REMOVED TO PROVIDE A SMOOTH BORE.
7. ALL NON-METALIC PIPES ARE TO HAVE TRACER WIRE FITTED TO COUNCIL STANDARDS.
8. PIPES SHALL BE BEDDED AND SURROUNDED TO 150MM ABOVE THE PIPE SOFFIT WITH SAND OR AP20.
9. METAL DETECTOR TAPE PRINTED WITH 'WATER PIPE BELOW' SHALL BE LAID 150MM ABOVE ALL WATERMAINS.
10. A YELLOW ISOSCELES TRIANGLE WITH CATS EYE POINTING TO FH SHALL BE PAINTED IN THE CENTRE OF ALL SEALED ROADS.
11. ALL VALVES TO BE MARKED WITH SAWCUT KERB AND BLUE PAINT.
12. ALL FLANGE JOINTS TO BE PROTECTED WITH DENSO TAPE OR SIMILAR APPROVED BY THE ENGINEER.

LEGEND

- EX BDY
- PROP BDY
- EX WATERMAIN
- PROP WATERMAIN
- PR WATER PRIVATE
- FH EX/PROP HYDRANT
- WM EX/PROP METER
- EX SLUICE VALVE
- EX PEET VALVE
- PROP SLUICE VALVE
- PROP PEET VALVE

Rev	Description	By	Date
A	FOR INFORMATION	TY	05/2026

	By	Date
Survey	1m LIDAR	2024
Design	TY	05/2026
Drawn	TY	05/2026
Checked	AC	05/2026

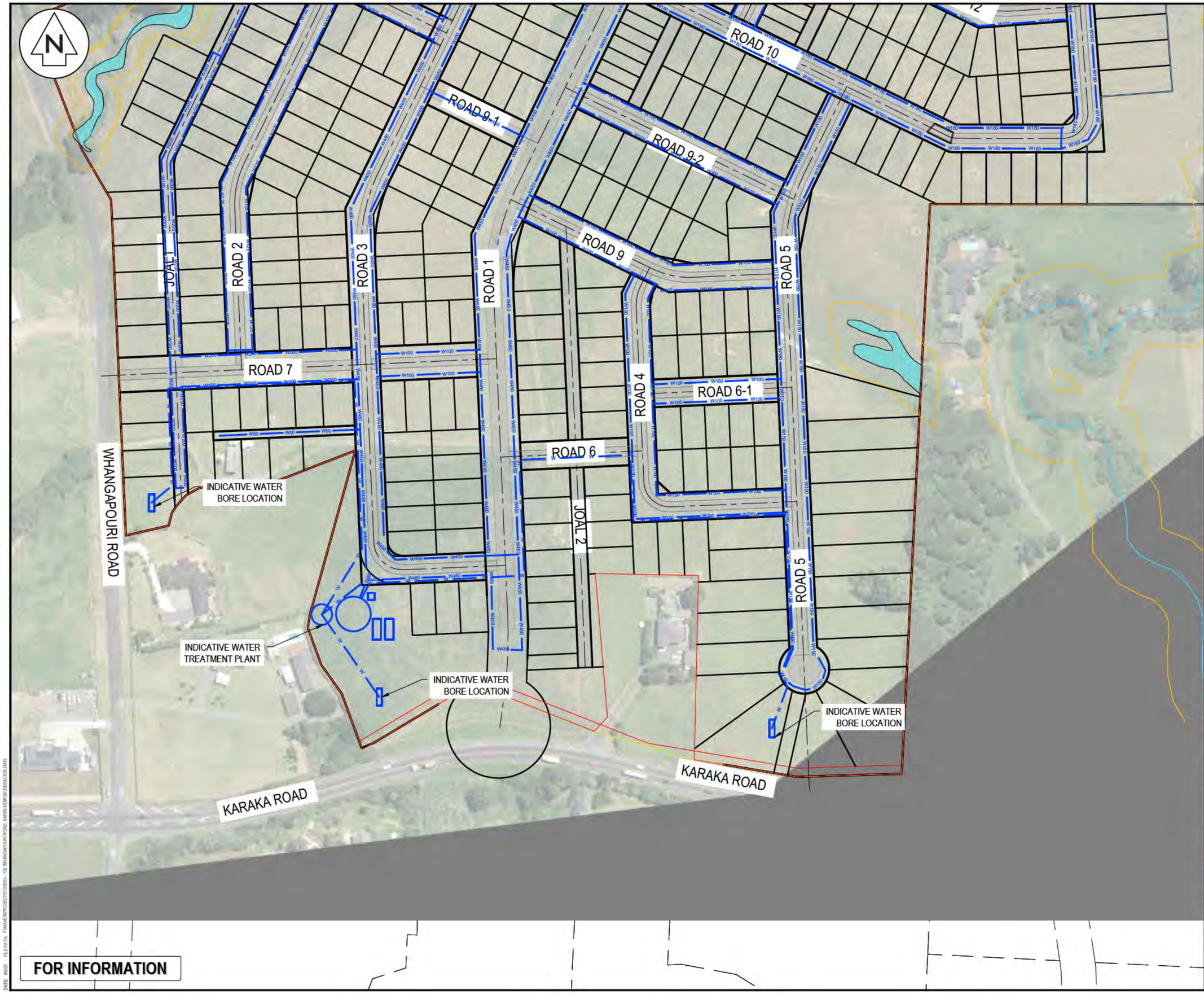
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5 Owens Road, Epsom
Auckland 1023

Project
DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title
PROPOSED WATER SUPPLY PLAN

Project no.	135053		
Scale	1:2000 @ A3		
Cad file	135053-C600.DWG		
Drawing no.	C600-5	Rev	A

DATE: 05/26 FILEPATH: P:\MAVEN\PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA\CAD\135053-C600.DWG



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- PROP BDY
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- PROP WATERMAIN
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- FH EX/PROP HYDRANT
- WM EX/PROP METER
- EX SLUICE VALVE
- EX PEET VALVE
- PROP SLUICE VALVE
- PROP PEET VALVE

Rev	Description	By	Date
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Survey	1m LIDAR	2024
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Checked	AC	05/2026

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Auckland 1023

Project

DEVELOPMENT OF 132 WHANGAPOURI ROAD KARAKA

Title

PROPOSED WATER SUPPLY PLAN

Project no.	135053
Scale	1:2000 @ A3
Cad file	135053-C600.DWG
Drawing no.	C600-6 Rev A

FOR INFORMATION

DATE: 05/26 FILE PATH: F:\MAVEN PROJECTS\135053 - 132 WHANGAPOURI ROAD, KARAKA\ACAD\135053-C600.DWG

10.ii APPENDIX B – FLOOD MODELLING MEMORANDUM

Flood Modelling Memorandum

DATE: 06 June 2026

SUBJECT: Preliminary Flood Assessment – 132 Whangapouri Road, Karaka

1 PURPOSE AND SCOPE

This memorandum presents a preliminary flood assessment for the proposed development at 132 Whangapouri Road, Karaka. The purpose of the assessment is to investigate potential upgrade options for the existing culvert along Whangapouri Road, assess the feasibility of a new bridge crossing over the stream connection toward Oira Road, and evaluate opportunities to raise development areas within the floodplain to habitable levels. These investigations are undertaken with a focus on maintaining or improving flood resilience both on-site and within the wider catchment.

This memorandum forms part of the supporting technical documentation for the Fast Track referral application, and will be expanded on to support any future substantive proposal.



Figure 1 Site Location Plan

The assessment investigates a Preliminary Proposed Surface scenario, comparing 100-year (1% AEP) flood events, with allowances for future climate change, against the existing terrain.

2 EXISTING FLOOD HAZARD

Auckland Council GeoMaps (Figure 2) indicates that the site is subject to floodplain and overland flow path hazards.



Figure 2 Geomaps Flood Hazards

2.1 Council Flood Plain

Auckland Council Geomaps indicates that the floodplain shown within the site has been derived from the Council's Oira Creek and Ngakoroa Creek RFHA Model (Build Report 18/10/2017). The floodplain extends over a small portion of the subject site, traversing the middle stream and flows along the eastern boundary in align with OLFP A. Only a minor depression is observed within the site.

2.2 Council Overland Flow Paths

Auckland Council Geomaps show two significant overland flow paths conveyed through the site, as shown in Figure 2.

<u>OLFP A:</u>

The upstream catchment has an area of approximately 14.67 km^2, with a peak 1% AEP flow (including climate change allowance) of 60.7 m^3/s. The flow conveyed by this overland flow path traverses along the eastern boundary of the site from south the north, which is primarily confined within Oira Creek stream.

OLFP B:

The upstream catchment has an area of approximately 1.2 km^2, with a peak 1% AEP flow (including climate change allowance) of 15.8 m^3/s. Flow conveyed by this overland flow path enters the site via an existing culvert beneath Whangapouri Road and also overtops the roadway during 1% AEP rainfall events. It then merges with OLFP A at the eastern boundary of the site.

3 METHODOLOGY AND DATA SOURCES

3.1 Hydraulic Software (TUFLOW)

The assessment was undertaken using TUFLOW hydraulic modelling software. This industry-standard 2D engine allows investigation of existing site flood hazards and possible proposed solutions.

3.2 Terrain Model Build

The hydraulic model terrain was constructed using a composite of the following data sources:

- Base Terrain: Auckland Council 2024 LiDAR DEM (0.5m resolution).
- Development: The "Preliminary Proposed Surface" grading for the development platforms.

3.3 Land Cover and Roughness Parameters

Land cover spatial data were derived from the Auckland Council 2017 Land Cover Database, with manual delineation updates applied based on more recent aerial photography to reflect current site conditions.

The hydraulic roughness (Manning's n) values applied are:

Buildings:	0.50
Grass / Pervious:	0.04
Impervious Paving & Roads:	0.02
Scrub:	0.05
High Vegetation:	0.12
Water / Ponds:	0.04
Parcels (General):	0.10

3.4 Infiltration Parameters (SCS Method)

Infiltration has been modelled using the Soil Conservation Service (SCS) Curve Number (CN) method. The adopted parameters are consistent with Auckland Council Technical Publication TP108 and reflect Hydrologic Soil Group C conditions, which are representative of the project

area. In accordance with TP108 guidance, the initial abstraction (Ia) has been defined based on standard relationships with potential maximum retention.

For the pre-development scenario, infiltration characteristics have been derived from land use defined by the Auckland Unitary Plan (AUP) zoning maps. Impervious surface coverage has been assigned in accordance with the Auckland Council Stormwater Modelling Specifications (December 2023, Final Issue 1). To better represent actual site conditions, AC Land Cover 2017 dataset has been incorporated into the model to define the specific land cover areas across the site. This provides a realistic representation of existing hydrological behaviour by refining the zoning-based assumptions with observed land cover.

For the post-development scenario, infiltration of the proposed ground surface has been modelled assuming Maximum Potential Development (MPD) with 70% impervious coverage. This approach provides a conservative estimate of runoff generation and ensures that the stormwater system is assessed under a worst-case development condition.

- Impervious Areas: CN 98 (Ia = 0 mm)
- Pervious Areas: CN 74 (Ia = 5 mm)
- Proposed Site Areas: CN 90.8 (70% MPD, Weighted Ia = 1.5mm)

3.5 Coastal Boundary Conditions

The downstream model boundary at the Māngere Inlet was defined using coastal water-level data sourced from Auckland Council GeoMaps and the NIWA (2023) report *Coastal inundation from sea-level rise in the Auckland Region*. The following tailwater conditions were adopted:

• Existing climate scenario: MHWS10 level of 1.94 mRL (NZVD2016).

• Climate change scenario: A sea-level rise (SLR) allowance of +1.0 m, resulting in a tailwater level of 2.94 mRL (NZVD2016).

3.6 Rainfall Events

Rainfall events for the hydraulic modelling were defined in accordance with Auckland Council's Stormwater Code of Practice (SWCoP) Version 4.0. Design rainfall depths were sourced from NIWA HIRDS for the site location, and climate change allowances were applied in accordance with SWCoP V4, using a 3.8°C increase for the 1% AEP event. The temporal distribution of rainfall was based on the TP108 Normalised 24-hour Temporal Rainfall Intensity Profile to generate the storm hyetographs used in the model. A special variable rainfall distribution is applied across the entire catchment according to TP108 rainfall maps.

3.7 Blockage Factors for 1% AEP Event (SWCoP V4 Compliance)

Blockage factors for the 1% AEP storm event have been applied in accordance with Auckland Council's Stormwater Code of Practice (SWCoP) Version 4.0 (July 2025). The following assumptions have been adopted for the purposes of secondary flow path assessment:

- Standard Pipelines: In accordance with Section 4.3.5.6, all pipelines up to and including DN600 are assumed to be 100% blocked.
- Culverts: As defined in Section 4.3.9.8(h), all culverts less than DN1500 are assumed to be 100% blocked, while culverts greater than or equal to DN1500 are modelled with a 50% blockage.

3.8 Modelled Scenarios

A total of two modelling scenarios were assessed, as summarised in below table. The scenarios consider combinations of rainfall event, climate-change allowance, terrain condition (existing and proposed), culvert blockage condition, and downstream tidal level.

Scenario	Rainfall Event	Climate Change	Terrain	Culvert Blockage	Tidal Level
1	1% AEP	3.8CC	Existing Ground Level	Blocked (SWCoP V4)	2.94 mRL
2	1% AEP	3.8CC	Proposed Ground Level	Blocked (SWCoP V4)	2.94 mRL

4 PROPOSED MITIGATION STRATEGY

To facilitate development and enhance catchment resilience, the following interventions are proposed:

4.1 Culvert Upgrade (Whangapouri Road)

The existing undersized culvert (DN1100) on Whangapouri Road is proposed to be replaced with twin box culverts (2.5 m width × 1.5 m height). The upgrade is intended to improve conveyance, reduce upstream flood levels, and achieve dry access along Whangapouri Road during the 1% AEP rainfall event.

Modelling results indicate a localised reduction in flood levels of approximately 800–900 mm upstream of the culvert, and 150–300 mm downstream, demonstrating a significant improvement in upstream conveyance with minor downstream benefit.

4.2 Strategic Infill and Habitable Floor Levels

Proposed earthworks include localised raising of development platforms currently located within the floodplain. Any loss of floodplain storage associated with infill is offset by increased channel storage within OLFP 2. No adverse impact is observed on OLFP 1, given the significant difference between its peak flow and the relatively minor increase contributed from OLFP 2, along with the delay in peak flows resulting from culvert attenuation.

Minimum Finished Floor Levels (FFLs) are set at 500 mm above the 1% AEP flood level (including climate change), ensuring compliance with Building Code requirements and providing an appropriate margin of safety against flooding.

4.3 New Bridge Crossing (Oira Road Connection)

A new bridge crossing is proposed to connect the site to Oira Road across the existing floodplain. The soffit will be set a freeboard of 500mm above the 1% AEP level to complaint with AT requirements. Two design options have been assessed to evaluate hydraulic impacts:

Option 1: Full-span bridge (≈170 m)

A clear-span structure across the entire floodplain with no encroachment into the overland flow path. This option maintains existing flow conveyance and is expected to result in negligible hydraulic impact.

Option 2: Partial-span bridge (≈90 m) with diversion channel

A shorter bridge crossing the primary floodplain, combined with a 3 m wide open channel along the upgraded road to intercept and convey overland flow. This option modifies the flow path and may introduce localised afflux, with performance dependent on the capacity of the diversion channel.

Both options have been modelled to compare flood levels, flow paths, and overall floodplain behaviour.

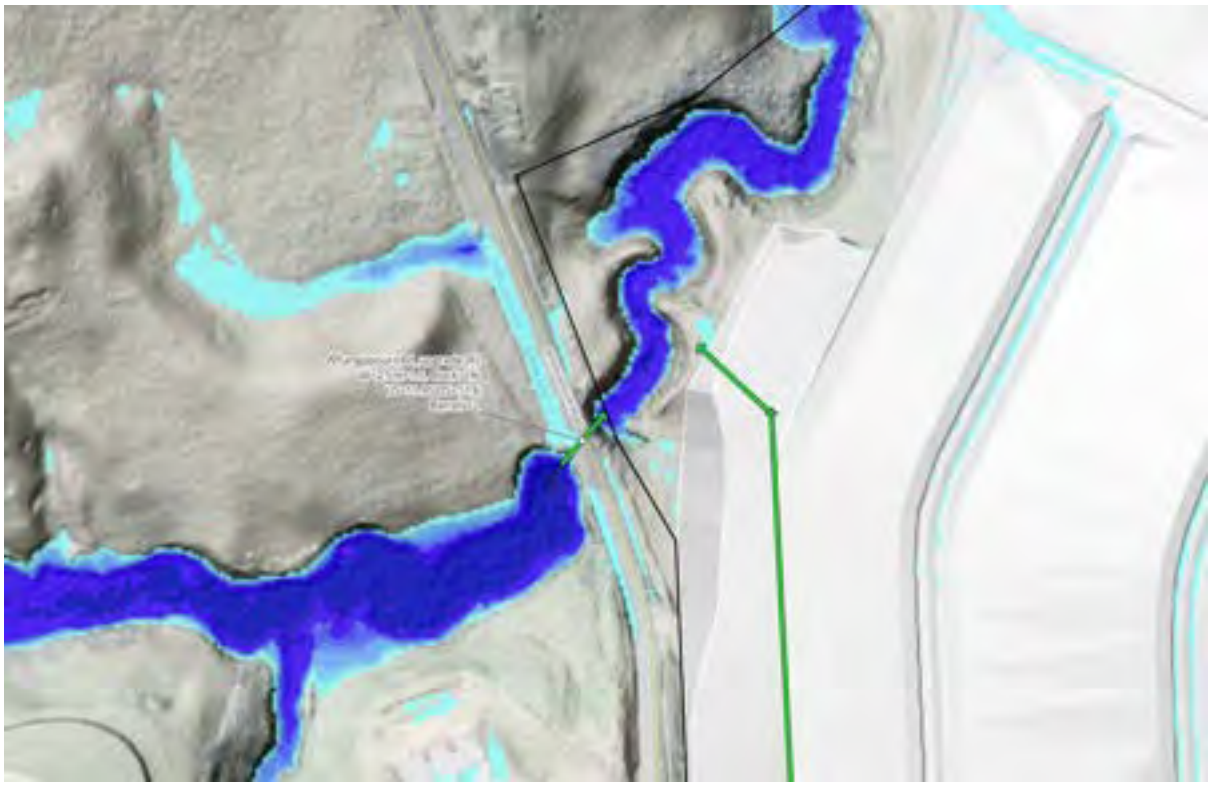


Figure 3 Proposed Whangapouri Road Culvert Upgrade

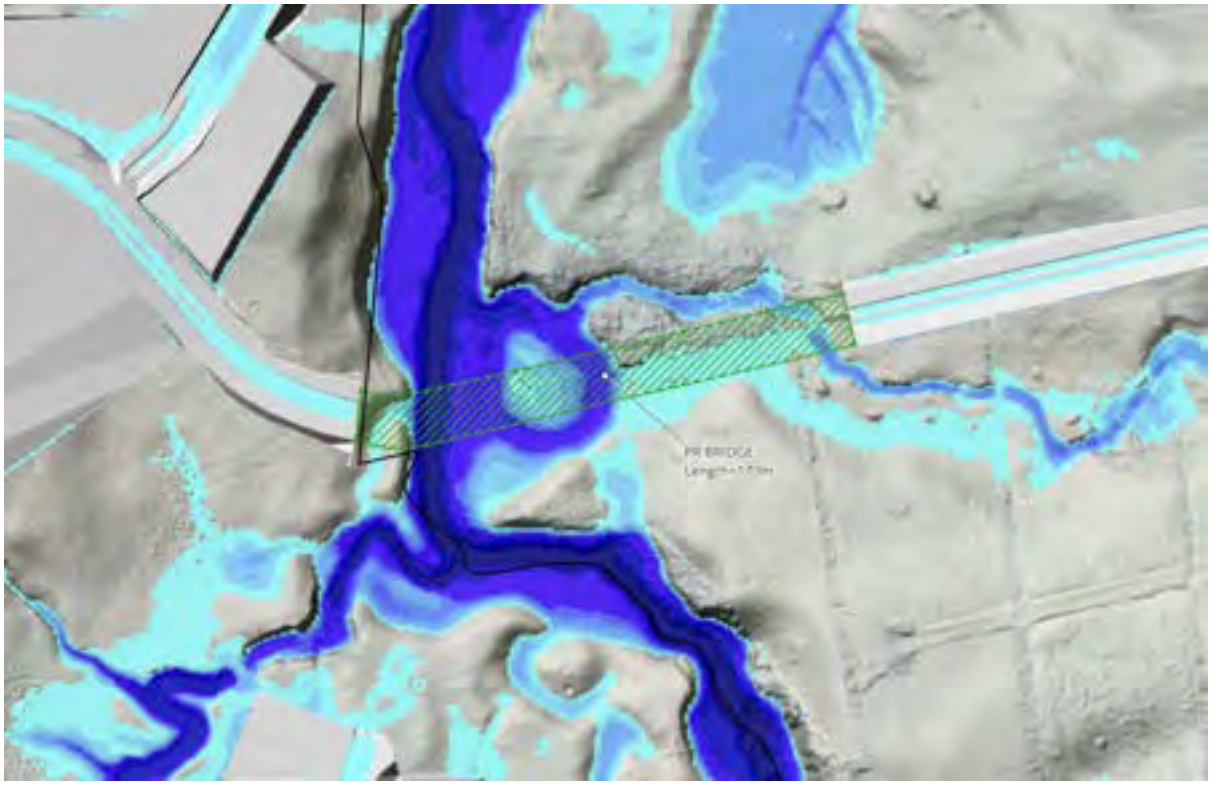


Figure 4 Proposed Bridge Option 1

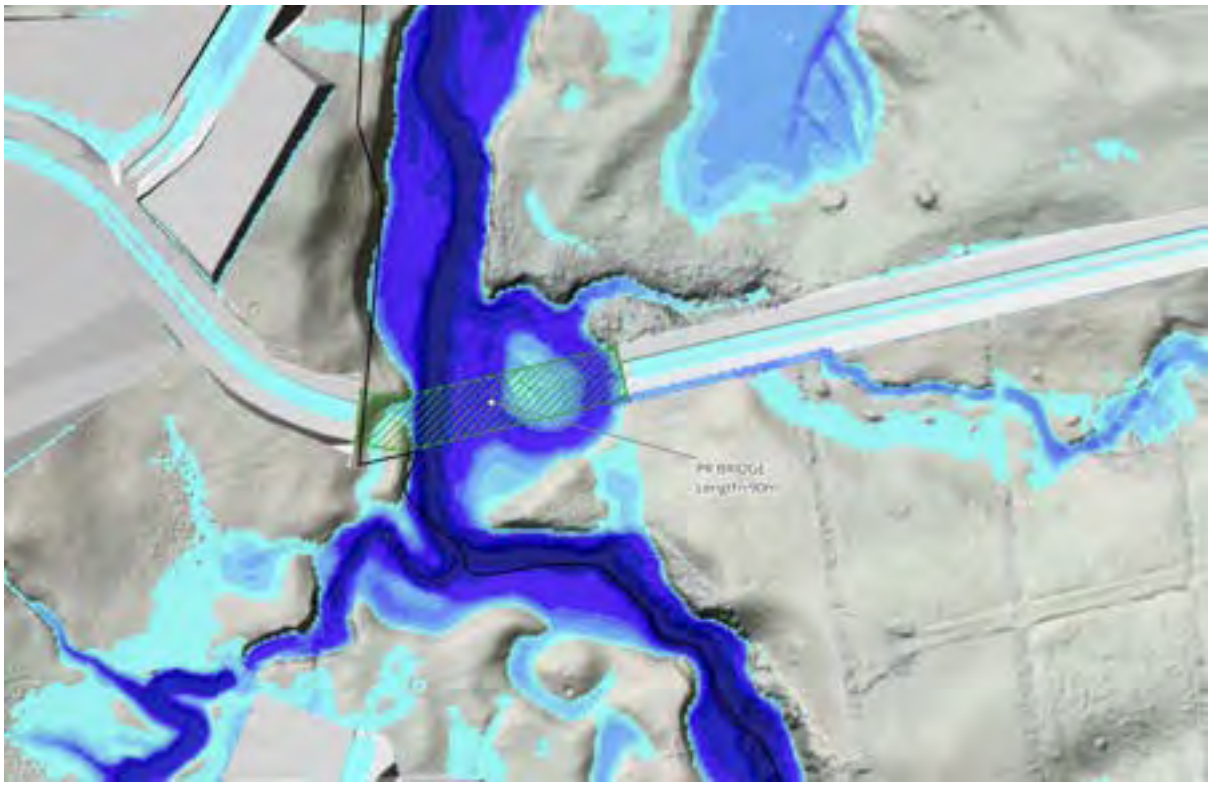


Figure 5 Proposed Bridge Option 2

5 CONCLUSION AND NEXT STEPS

Preliminary modelling confirms that the proposed development can be safely achieved without increasing flood risk to downstream properties. Detailed flood hazard assessments (FHA) and sensitivity analysis will be completed to support the final Fast Track application package.

Please do not hesitate to contact us if you require further clarification.

Kind regards,





Prepared by
Hao Wu
Civil Engineer
MAVEN ASSOCIATES LIMITED

Review by
Toby Mandeno
Principal
MAVEN ASSOCIATES LIMITED

Appendices

Appendix A– Flood Modelling Results

NOTES
1. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE NEW ZEALAND VERTICAL DATUM 2016.
2. THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT. MAVEN ASSOCIATES ACCEPTS NO LIABILITY OR RESPONSIBILITY FOR ANY USE OR RELIANCE ON THIS REPORT BY ANY THIRD PARTY.
3. WHERE GROUND LEVELS DIFFER FROM THE DATE OF SURVEY. THE MODEL IS BASED ON 2024 LIDAR DATA SUPPLIED BY AUCKLAND COUNCIL WITH A VERTICAL ACCURACY OF +/- 0.02M AND HORIZONTAL ACCURACY OF +/- 0.10 M.
4. FLOOD DEPTHS LESS THAN 50MM HAVE BEEN FILTERED OUT FOR CLARITY AND ARE NOT SHOWN.

LEGEND

- SW Catchment
- Site Boundary
- Culvert

Level Change Areas

- Was Wet Now Dry
- > 200 mm Lower
- 100 ~ 200 mm Lower
- 50 ~ 100 mm Lower
- 20 ~ 50 mm Lower
- 5 ~ 20 mm Lower
- +/- 5 mm
- 5 ~ 20 mm Higher
- 20 ~ 50 mm Higher
- 50 ~ 100 mm Higher
- 100 ~ 300 mm Higher
- > 300 mm Higher
- Was Dry Now Wet

ZOOM 01
ZOOM 02
ZOOM 03
PR BRIDGE
Length≈170m
WERI ROAD
KAHUI PARADE
BREMNER ROAD
AURANGA DRIVE
WALTERS ROAD
ARAINA DRIVE
LEAMY WAY
JESMOND ROAD
BURBERRY ROAD
OIRA ROAD
WHANGAPOURI ROAD
MUIR ROAD
MANUWAI LANE
BLACKBRIDGE ROAD
KARAKA ROAD
BURTT ROAD
BYCROFT ROAD
WOODLYN DRIVE

Revision Details		BY	Date	Survey		135053 - 132 WHANGAPOURI ROAD	Maven Associates 09 571 0050 5 Owens Road, Epsom Auckland 1023	100YR CC BLOCKED (OPTION 1) - FLOOD LEVEL COMPARISON - POST VS PRE		STATUS	FOR INFORMATION	Rev
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				Draft	HW							
				Review	YW					SHEET	135053-FL001	

NOTES
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- 50 ~ 100 mm Higher
- 100 ~ 300 mm Higher
- > 300 mm Higher
- Was Dry Now Wet

ZOOM 01
ZOOM 02
ZOOM 03
PR BRIDGE
Length≈90m
WERI ROAD
KAHUI PARADE
BREMNER ROAD
AURANGA DRIVE
WALTERS ROAD
ARAINA DRIVE
LEAMY WAY
JESMOND ROAD
BURBERRY ROAD
OIRA ROAD
WHANGAPOURI ROAD
MUIR ROAD
MANUWAI LANE
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KARAKA ROAD
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				Review	YW					SHEET	135053-FL002	

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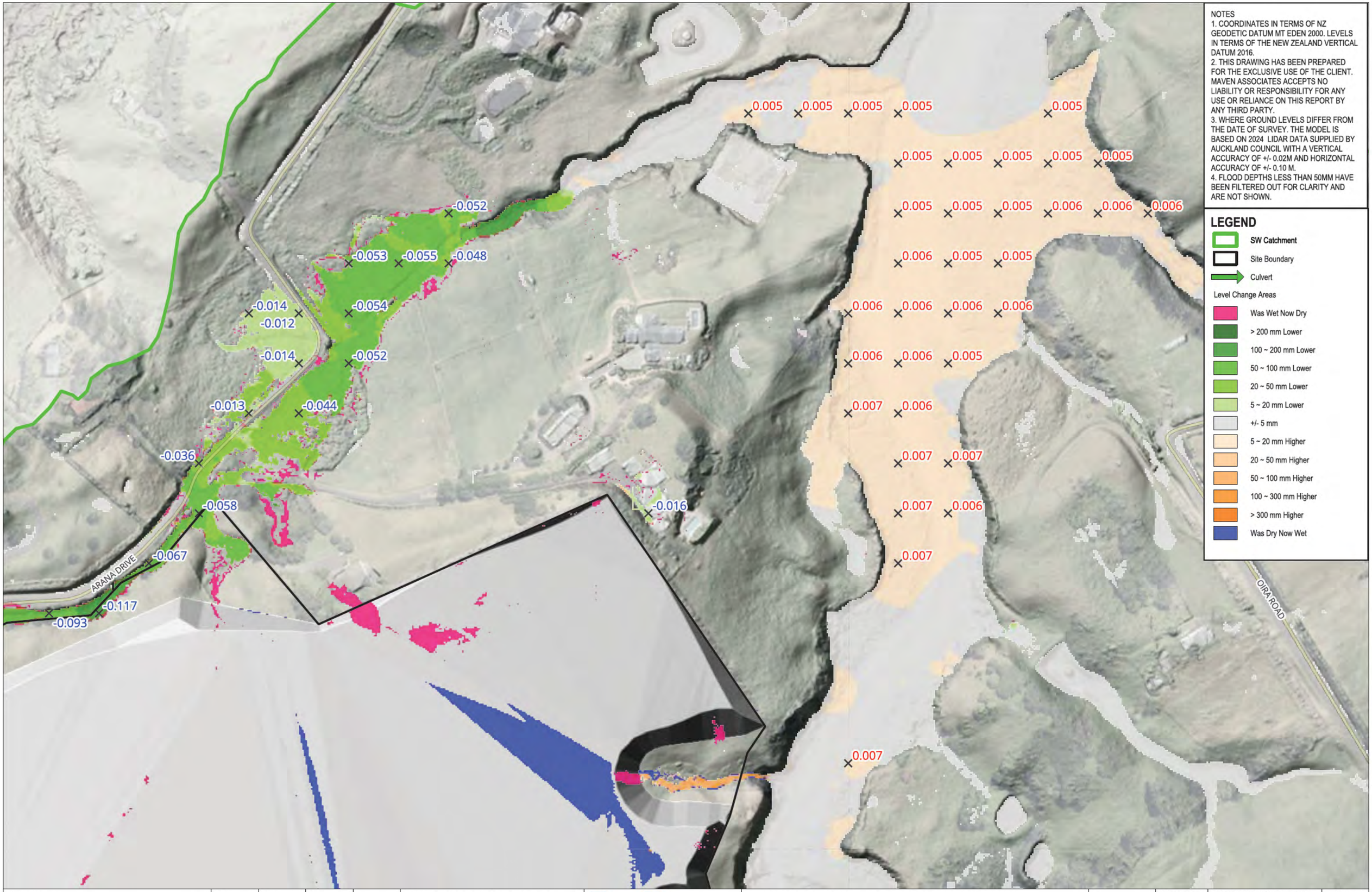
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- Culvert

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- 5 ~ 20 mm Lower
- +/- 5 mm
- 5 ~ 20 mm Higher
- 20 ~ 50 mm Higher
- 50 ~ 100 mm Higher
- 100 ~ 300 mm Higher
- > 300 mm Higher
- Was Dry Now Wet

ARANA DRIVE
OIRA ROAD

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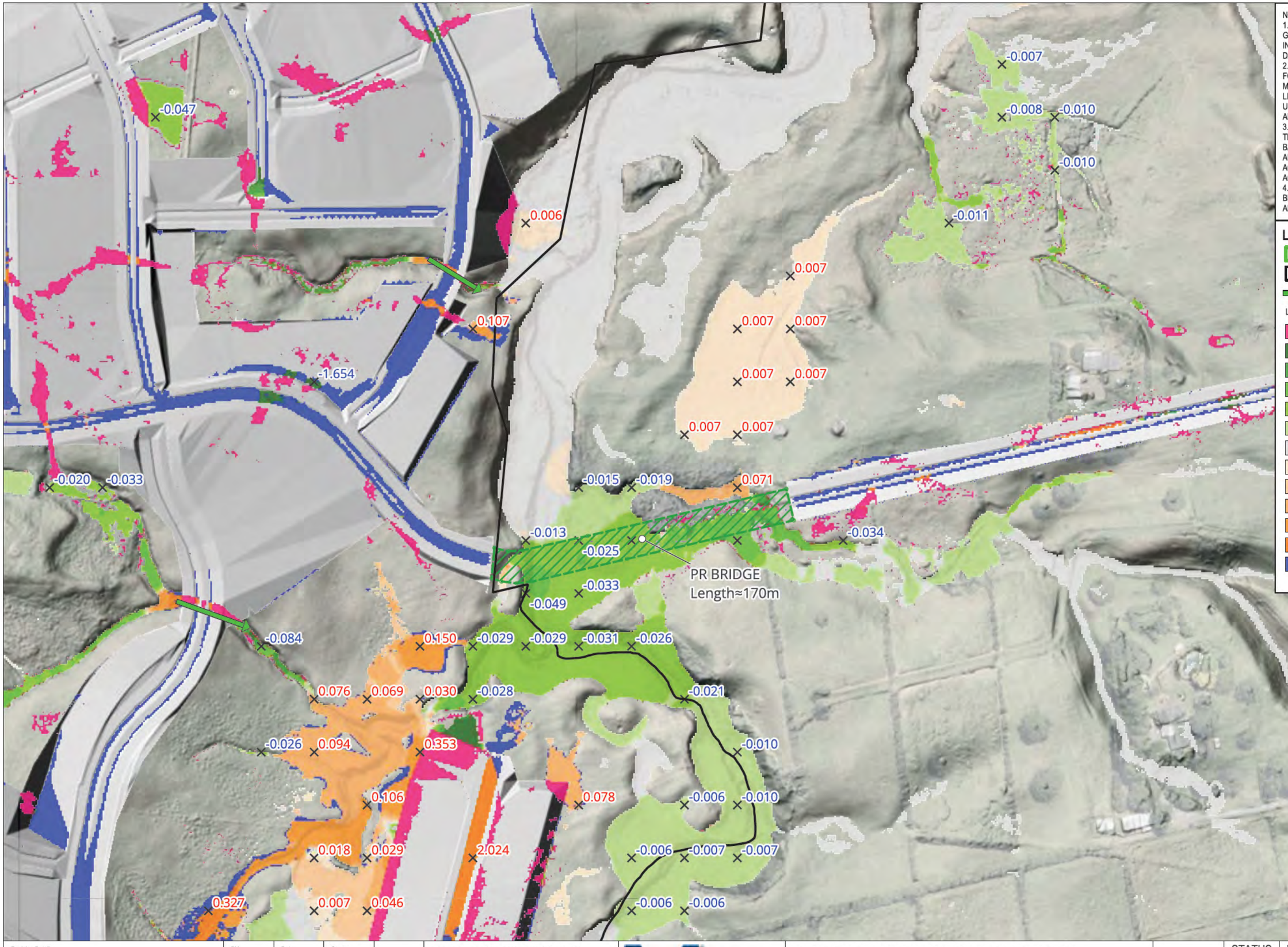
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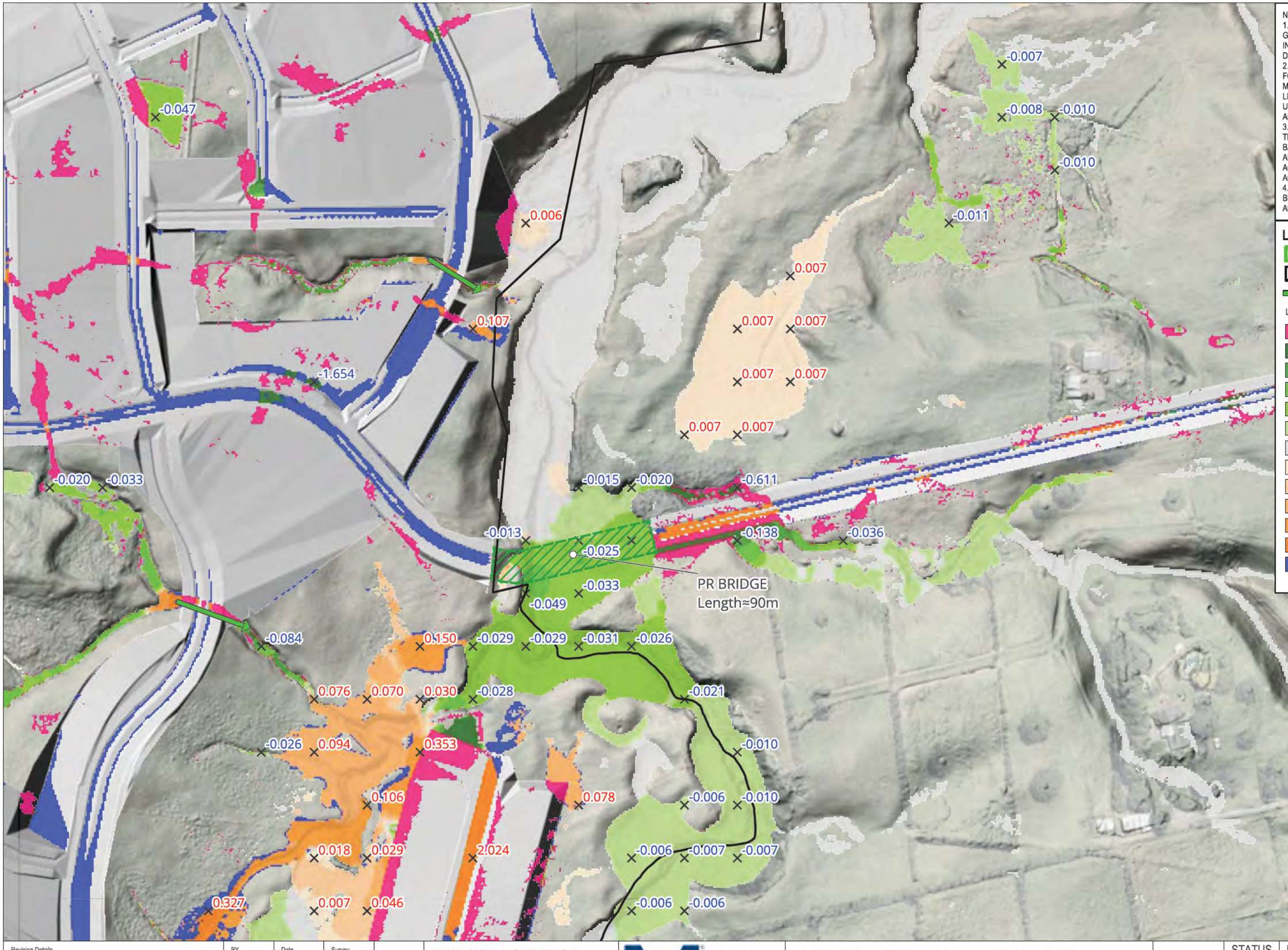
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Revision Details		BY	Date	Survey		135053 - 132 WHANGAPOURI ROAD	Maven Associates 09 571 0050 office@maven.co.nz www.maven.co.nz 5 Oneida Road, Epsom Auckland 1023	100YR CC BLOCKED (OPTION 1) - FLOOD LEVEL COMPARISON - POST VS PRE - ZOOM 02		STATUS	FOR INFORMATION	Rev
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4. FLOOD DEPTHS LESS THAN 50MM HAVE BEEN FILTERED OUT FOR CLARITY AND ARE NOT SHOWN.

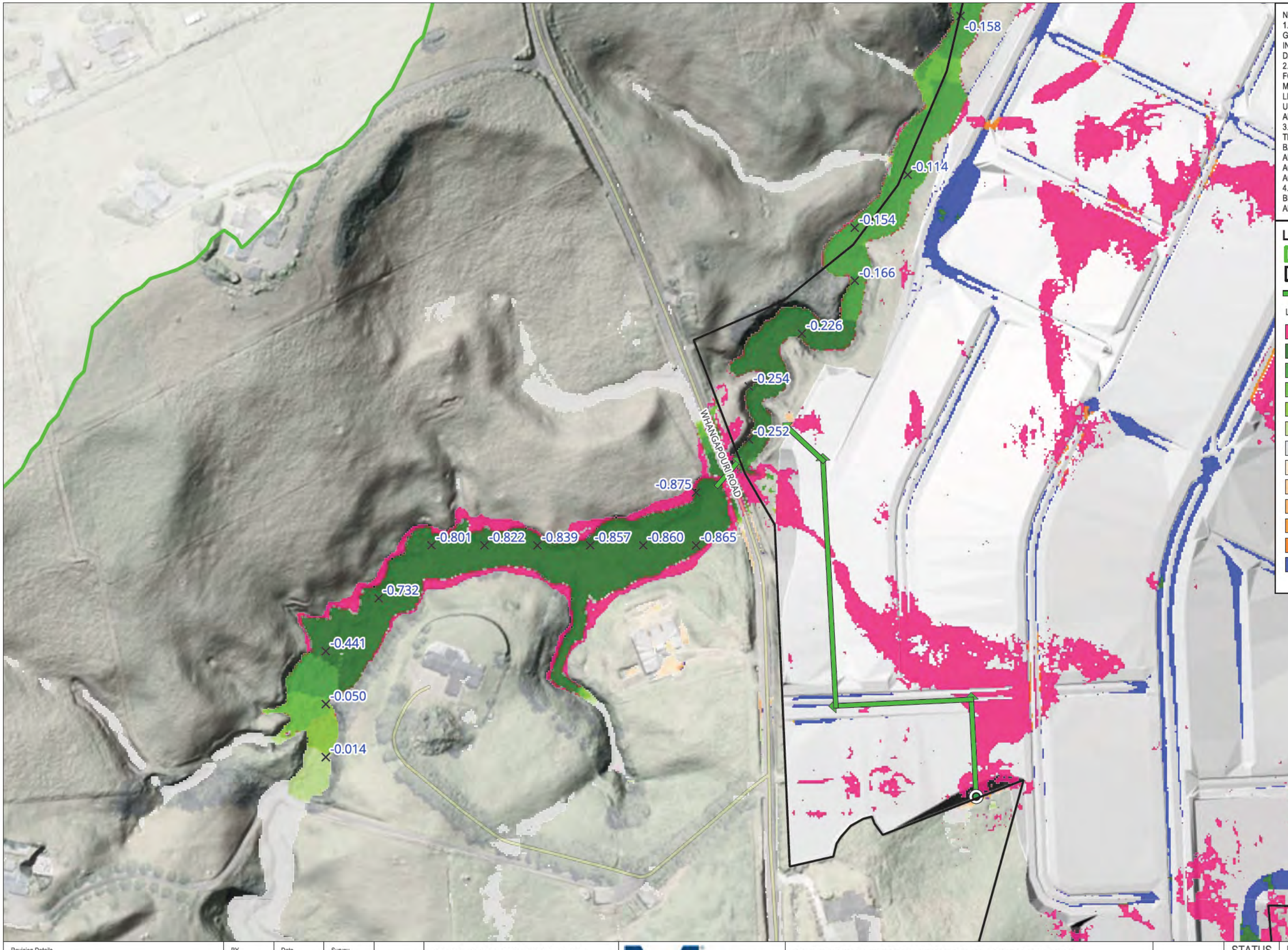
LEGEND

- SW Catchment
- Site Boundary
- Culvert

Level Change Areas

- Was Wet Now Dry
- > 200 mm Lower
- 100 ~ 200 mm Lower
- 50 ~ 100 mm Lower
- 20 ~ 50 mm Lower
- 5 ~ 20 mm Lower
- +/- 5 mm
- 5 ~ 20 mm Higher
- 20 ~ 50 mm Higher
- 50 ~ 100 mm Higher
- 100 ~ 300 mm Higher
- > 300 mm Higher
- Was Dry Now Wet

Revision Details		BY	Date	Survey		135053 - 132 WHANGAPOURI ROAD	Maven Associates 09 571 0050 info@maven.co.nz www.maven.co.nz 5 Owens Road, Epsom Auckland 1023	100YR CC BLOCKED (OPTION 2) - FLOOD LEVEL COMPARISON - POST VS PRE - ZOOM 02		STATUS	FOR INFORMATION	Rev
A	Preliminary Catchment Study	HW	29/05/2026	Model	HW					SCALE	1:2,000 (A3)	A
				Draft	HW							
				Review	YW					SHEET	135053-FL002-02	



NOTES
1. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE NEW ZEALAND VERTICAL DATUM 2016.
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3. WHERE GROUND LEVELS DIFFER FROM THE DATE OF SURVEY. THE MODEL IS BASED ON 2024 LIDAR DATA SUPPLIED BY AUCKLAND COUNCIL WITH A VERTICAL ACCURACY OF +/- 0.02M AND HORIZONTAL ACCURACY OF +/- 0.10 M.
4. FLOOD DEPTHS LESS THAN 50MM HAVE BEEN FILTERED OUT FOR CLARITY AND ARE NOT SHOWN.

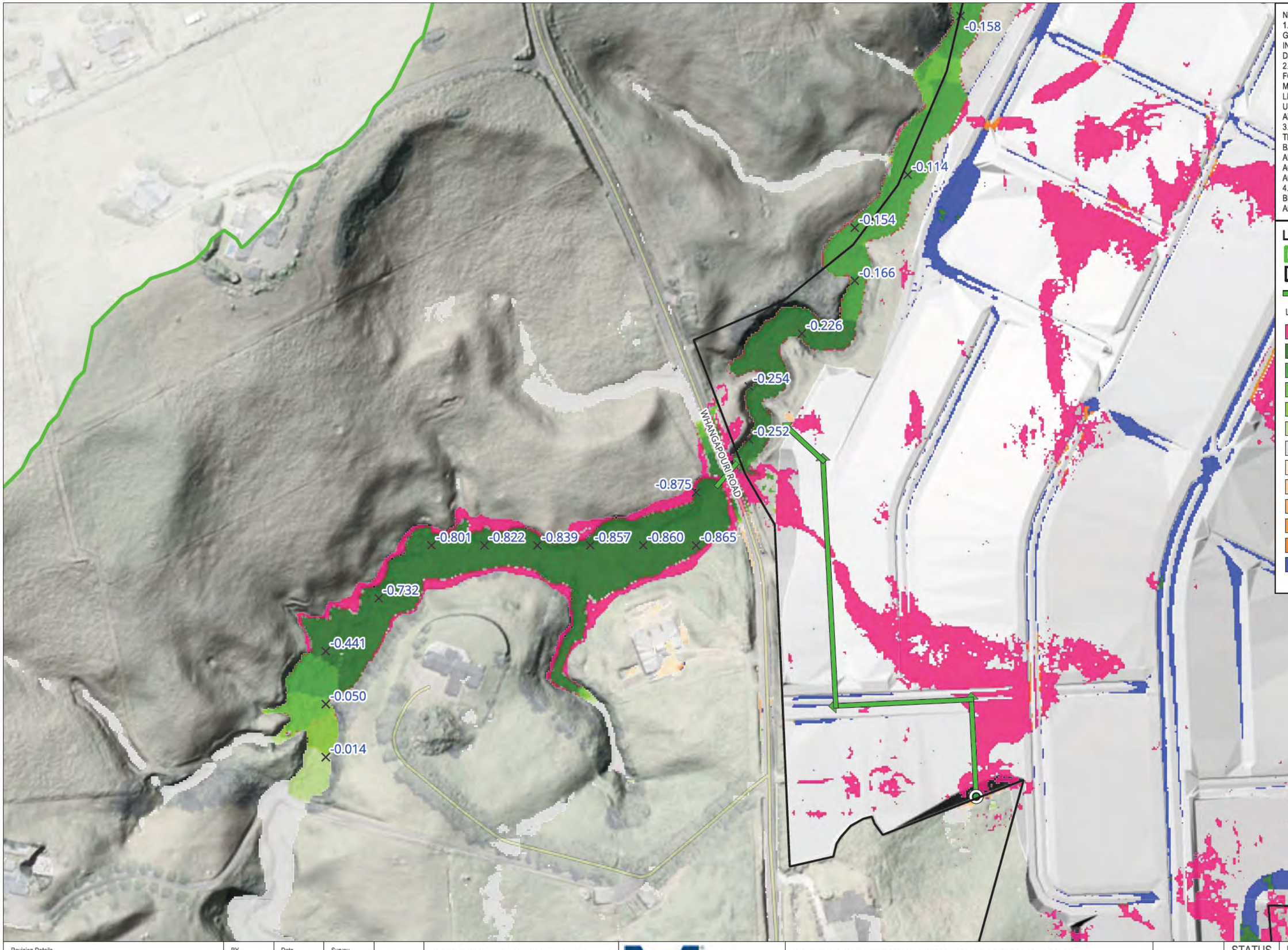
LEGEND

- SW Catchment
- Site Boundary
- Culvert

Level Change Areas

- Was Wet Now Dry
- > 200 mm Lower
- 100 ~ 200 mm Lower
- 50 ~ 100 mm Lower
- 20 ~ 50 mm Lower
- 5 ~ 20 mm Lower
- +/- 5 mm
- 5 ~ 20 mm Higher
- 20 ~ 50 mm Higher
- 50 ~ 100 mm Higher
- 100 ~ 300 mm Higher
- > 300 mm Higher
- Was Dry Now Wet

Revision Details		BY	Date	Survey		135053 - 132 WHANGAPOURI ROAD	Maven Associates	100YR CC BLOCKED (OPTION 1) - FLOOD LEVEL COMPARISON - POST VS PRE - ZOOM 03		STATUS	FOR INFORMATION	Rev
A	Preliminary Catchment Study	HW	29/05/2026	Model	HW					SCALE	1:2,000 (A3)	A
				Draft	HW							
				Review	YW					SHEET	135053-FL001-03	



NOTES
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4. FLOOD DEPTHS LESS THAN 50MM HAVE BEEN FILTERED OUT FOR CLARITY AND ARE NOT SHOWN.

LEGEND

- SW Catchment
- Site Boundary
- Culvert

Level Change Areas

- Was Wet Now Dry
- > 200 mm Lower
- 100 ~ 200 mm Lower
- 50 ~ 100 mm Lower
- 20 ~ 50 mm Lower
- 5 ~ 20 mm Lower
- +/- 5 mm
- 5 ~ 20 mm Higher
- 20 ~ 50 mm Higher
- 50 ~ 100 mm Higher
- 100 ~ 300 mm Higher
- > 300 mm Higher
- Was Dry Now Wet

Revision Details		BY	Date	Survey		135053 - 132 WHANGAPOURI ROAD	Maven Associates	100YR CC BLOCKED (OPTION 2) - FLOOD LEVEL COMPARISON - POST VS PRE - ZOOM 03		STATUS	FOR INFORMATION	Rev
A	Preliminary Catchment Study	HW	29/05/2026	Model	HW					SCALE	1:2,000 (A3)	A
				Draft	HW							
				Review	YW					SHEET	135053-FL002-03	

NOTES
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4. FLOOD DEPTHS LESS THAN 50MM HAVE BEEN FILTERED OUT FOR CLARITY AND ARE NOT SHOWN.

LEGEND

- SW Catchment
- Site Boundary
- Culvert

Flood Depth (m)

- 0.05 - 0.30
- 0.30 - 0.50
- 0.50 - 0.80
- 0.80 - 1.00
- 1.00 - 1.20
- 1.20 - 2.00
- 2.00 - 3.00
- > 3.00

ZOOM 01
ZOOM 02
ZOOM 03
Whangapouri_Rd [C]
D=1.1, Block=S%
US=11.95 DS=11.6
Barrels=1
WERI ROAD
KAHUI PARADE
BREMNER ROAD
AURANGA DRIVE
WALTERS ROAD
ARAINA DRIVE
LEAMY WAY
JESMOND ROAD
BURBERRY ROAD
OIRA ROAD
WHANGAPOURI ROAD
MUIR ROAD
MANUWAI LANE
BLACKBRIDGE ROAD
PITT ROAD
PARK LANE
KARAKA ROAD
BURTT ROAD
BYCROFT ROAD
WOODLYN DRIVE

Revision Details		BY	Date	Survey		135053 - 132 WHANGAPOURI ROAD	Maven Associates 09 571 0852 info@maven.co.nz www.maven.co.nz 5 Oxford Road, Epsom Auckland 1023	EX 100YR CC BLOCKED - FLOOD PLAINS MAP		STATUS	FOR INFORMATION	Rev
A	Preliminary Catchment Study	HW	29/05/2026	Model	HW					SCALE	1:12,000 (A3)	A
				Draft	HW							
				Review	YW					SHEET	135053-FL101	

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4. FLOOD DEPTHS LESS THAN 50MM HAVE BEEN FILTERED OUT FOR CLARITY AND ARE NOT SHOWN.

LEGEND

- SW Catchment
- Site Boundary
- Culvert

Flood Depth (m)

- 0.05 - 0.30
- 0.30 - 0.50
- 0.50 - 0.80
- 0.80 - 1.00
- 1.00 - 1.20
- 1.20 - 2.00
- 2.00 - 3.00
- > 3.00

ZOOM 01
ZOOM 02
ZOOM 03
PR BRIDGE
Length≈170m
WERI ROAD
KAHUI PARADE
BREMNER ROAD
AURANGA DRIVE
WALTERS ROAD
ARAINA DRIVE
LEAMY WAY
JESMOND ROAD
BURBERRY ROAD
OIRA ROAD
WHANGAPOURI ROAD
MUIR ROAD
PITT ROAD
PARK LANE
MANUWAI LANE
BLACKBRIDGE ROAD
KARAKA ROAD
BURTT ROAD
BYCROFT ROAD
WOODLYN DRIVE

Revision Details		BY	Date	Survey		135053 - 132 WHANGAPOURI ROAD	Maven Associates 09 571 0050 info@maven.co.nz www.maven.co.nz 5 Owens Road, Epsom Auckland 1023	PR 100YR CC BLOCKED (OPTION 1) - FLOOD PLAINS MAP		STATUS	FOR INFORMATION	Rev
A	Preliminary Catchment Study	HW	29/05/2026	Model	HW					SCALE	1:12,000 (A3)	A
				Draft	HW							
				Review	YW					SHEET	135053-FL102	

NOTES
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4. FLOOD DEPTHS LESS THAN 50MM HAVE BEEN FILTERED OUT FOR CLARITY AND ARE NOT SHOWN.

LEGEND

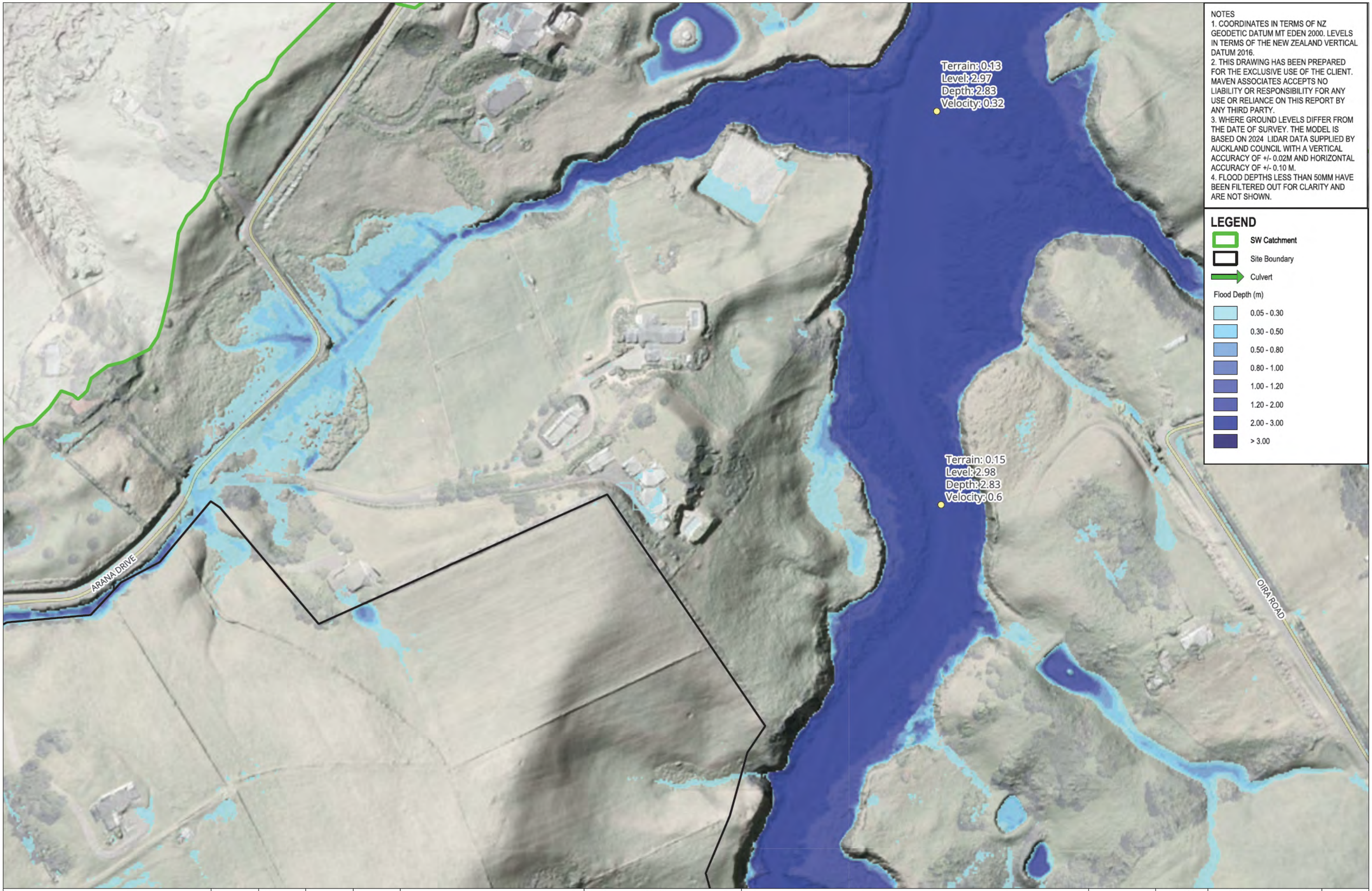
- SW Catchment
- Site Boundary
- Culvert

Flood Depth (m)

- 0.05 - 0.30
- 0.30 - 0.50
- 0.50 - 0.80
- 0.80 - 1.00
- 1.00 - 1.20
- 1.20 - 2.00
- 2.00 - 3.00
- > 3.00

ZOOM 01
ZOOM 02
ZOOM 03
PR BRIDGE
Length≈90m
WERI ROAD
KAHUI PARADE
BREMNER ROAD
AURANGA DRIVE
WALTERS ROAD
ARAINA DRIVE
LEAMY WAY
JESMOND ROAD
BURBERRY ROAD
OIRA ROAD
WHANGAPOURI ROAD
MUIR ROAD
MANUWAI LANE
BLACKBRIDGE ROAD
PITT ROAD
PARK LANE
KARAKA ROAD
BURTT ROAD
BYCROFT ROAD
WOODLYN DRIVE

Revision Details		BY	Date	Survey		135053 - 132 WHANGAPOURI ROAD	Maven Associates 09 571 0050 info@maven.co.nz www.maven.co.nz 5 Owens Road, Epsom Auckland 1023	PR 100YR CC BLOCKED (OPTION 2) - FLOOD PLAINS MAP		STATUS	FOR INFORMATION	Rev
A	Preliminary Catchment Study	HW	29/05/2026	Model	HW					SCALE	1:12,000 (A3)	A
				Draft	HW							
				Review	YW					SHEET	135053-FL103	



NOTES
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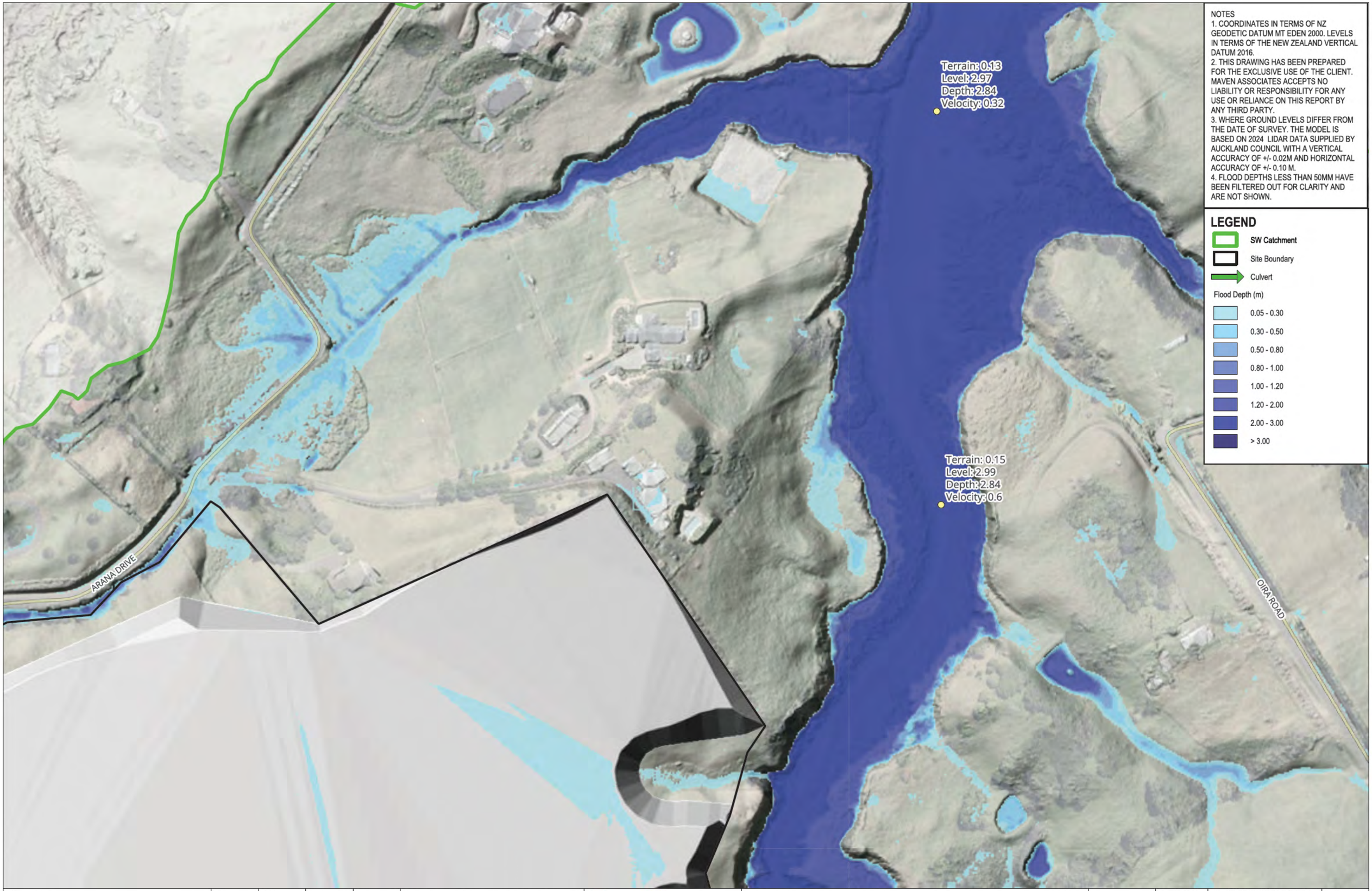
LEGEND

- SW Catchment
- Site Boundary
- Culvert

Flood Depth (m)

- 0.05 - 0.30
- 0.30 - 0.50
- 0.50 - 0.80
- 0.80 - 1.00
- 1.00 - 1.20
- 1.20 - 2.00
- 2.00 - 3.00
- > 3.00

Revision Details		BY	Date	Survey		135053 - 132 WHANGAPOURI ROAD	Maven Associates 09 571 0050 info@maven.co.nz www.maven.co.nz 5 Onslow Road, Epsom Auckland 1023	EX 100YR CC BLOCKED - FLOOD PLAINS MAP - ZOOM 01		STATUS	FOR INFORMATION	Rev
A	Preliminary Catchment Study	HW	29/05/2026	Model	HW					SCALE	1:2,000 (A3)	A
				Draft	HW							
				Review	YW					SHEET	135053-FL101-01	



NOTES
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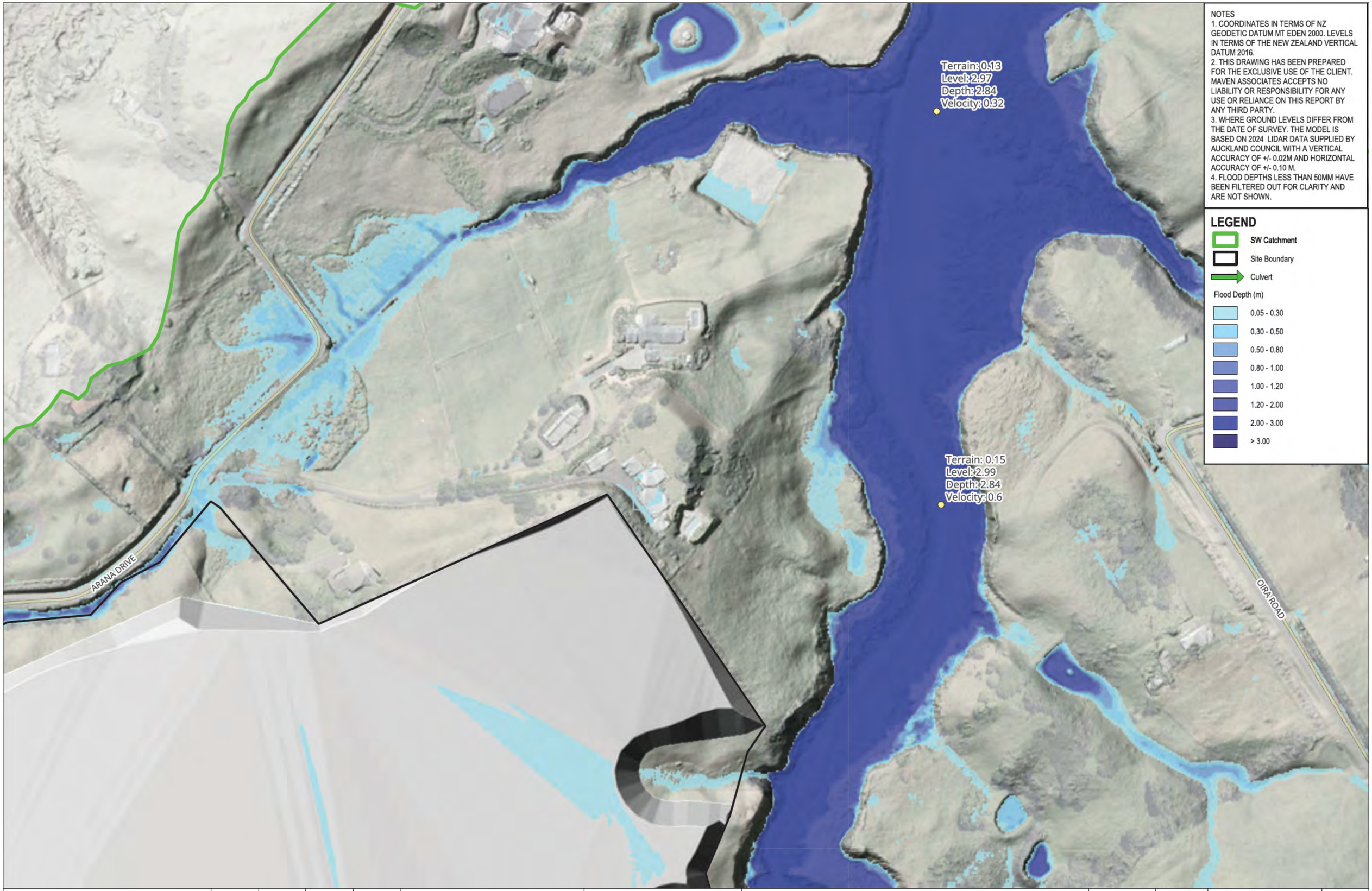
LEGEND

- SW Catchment
- Site Boundary
- Culvert

Flood Depth (m)

- 0.05 - 0.30
- 0.30 - 0.50
- 0.50 - 0.80
- 0.80 - 1.00
- 1.00 - 1.20
- 1.20 - 2.00
- 2.00 - 3.00
- > 3.00

Revision Details		BY	Date	Survey		135053 - 132 WHANGAPOURI ROAD	Maven Associates 09 571 0050 info@maven.co.nz www.maven.co.nz 5 Onslow Road, Epsom Auckland 1023	PR 100YR CC BLOCKED (OPTION 1) - FLOOD PLAINS MAP - ZOOM 01		STATUS	FOR INFORMATION	Rev
A	Preliminary Catchment Study	HW	29/05/2026	Model	HW					SCALE	1:2,000 (A3)	A
				Draft	HW							
				Review	YW					SHEET	135053-FL102-01	



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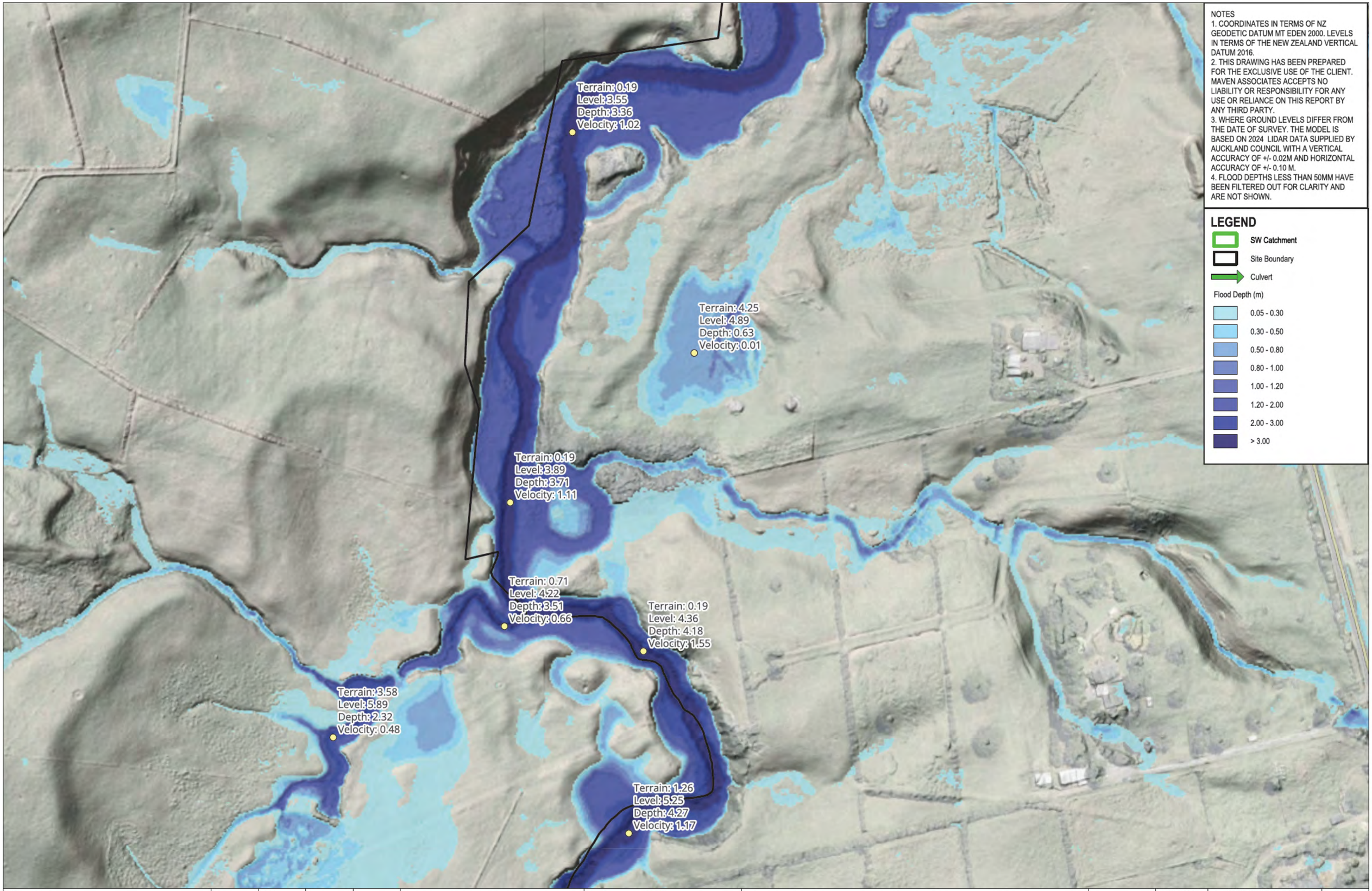
LEGEND

- SW Catchment
- Site Boundary
- Culvert

Flood Depth (m)

- 0.05 - 0.30
- 0.30 - 0.50
- 0.50 - 0.80
- 0.80 - 1.00
- 1.00 - 1.20
- 1.20 - 2.00
- 2.00 - 3.00
- > 3.00

Revision Details		BY	Date	Survey		135053 - 132 WHANGAPOURI ROAD	Maven Associates 09 571 0050 info@maven.co.nz www.maven.co.nz 5 Onslow Road, Epsom Auckland 1023	PR 100YR CC BLOCKED (OPTION 2) - FLOOD PLAINS MAP - ZOOM 01		STATUS	FOR INFORMATION	Rev
A	Preliminary Catchment Study	HW	29/05/2026	Model	HW					SCALE	1:2,000 (A3)	A
				Draft	HW							
				Review	YW					SHEET	135053-FL103-01	



NOTES
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4. FLOOD DEPTHS LESS THAN 50MM HAVE BEEN FILTERED OUT FOR CLARITY AND ARE NOT SHOWN.

LEGEND

- SW Catchment
- Site Boundary
- Culvert

Flood Depth (m)

- 0.05 - 0.30
- 0.30 - 0.50
- 0.50 - 0.80
- 0.80 - 1.00
- 1.00 - 1.20
- 1.20 - 2.00
- 2.00 - 3.00
- > 3.00

Revision Details		BY	Date	Survey		135053 - 132 WHANGAPOURI ROAD	Maven Associates 09 571 0850 info@maven.co.nz www.maven.co.nz 5 Owens Road, Epsom Auckland 1023	EX 100YR CC BLOCKED - FLOOD PLAINS MAP - ZOOM 02		STATUS	FOR INFORMATION	Rev
A	Preliminary Catchment Study	HW	29/05/2026	Model	HW					SCALE	1:2,000 (A3)	A
				Draft	HW							
				Review	YW					SHEET	135053-FL101-02	

NOTES
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4. FLOOD DEPTHS LESS THAN 50MM HAVE BEEN FILTERED OUT FOR CLARITY AND ARE NOT SHOWN.

LEGEND

- SW Catchment
- Site Boundary
- Culvert

Flood Depth (m)

- 0.05 - 0.30
- 0.30 - 0.50
- 0.50 - 0.80
- 0.80 - 1.00
- 1.00 - 1.20
- 1.20 - 2.00
- 2.00 - 3.00
- > 3.00

Terrain: 0.19
Level: 3.55
Depth: 3.37
Velocity: 1.02

Terrain: 4.25
Level: 4.9
Depth: 0.64
Velocity: 0.01

Terrain: 0.19
Level: 3.89
Depth: 3.7
Velocity: 1.17

PR BRIDGE
Length≈170m

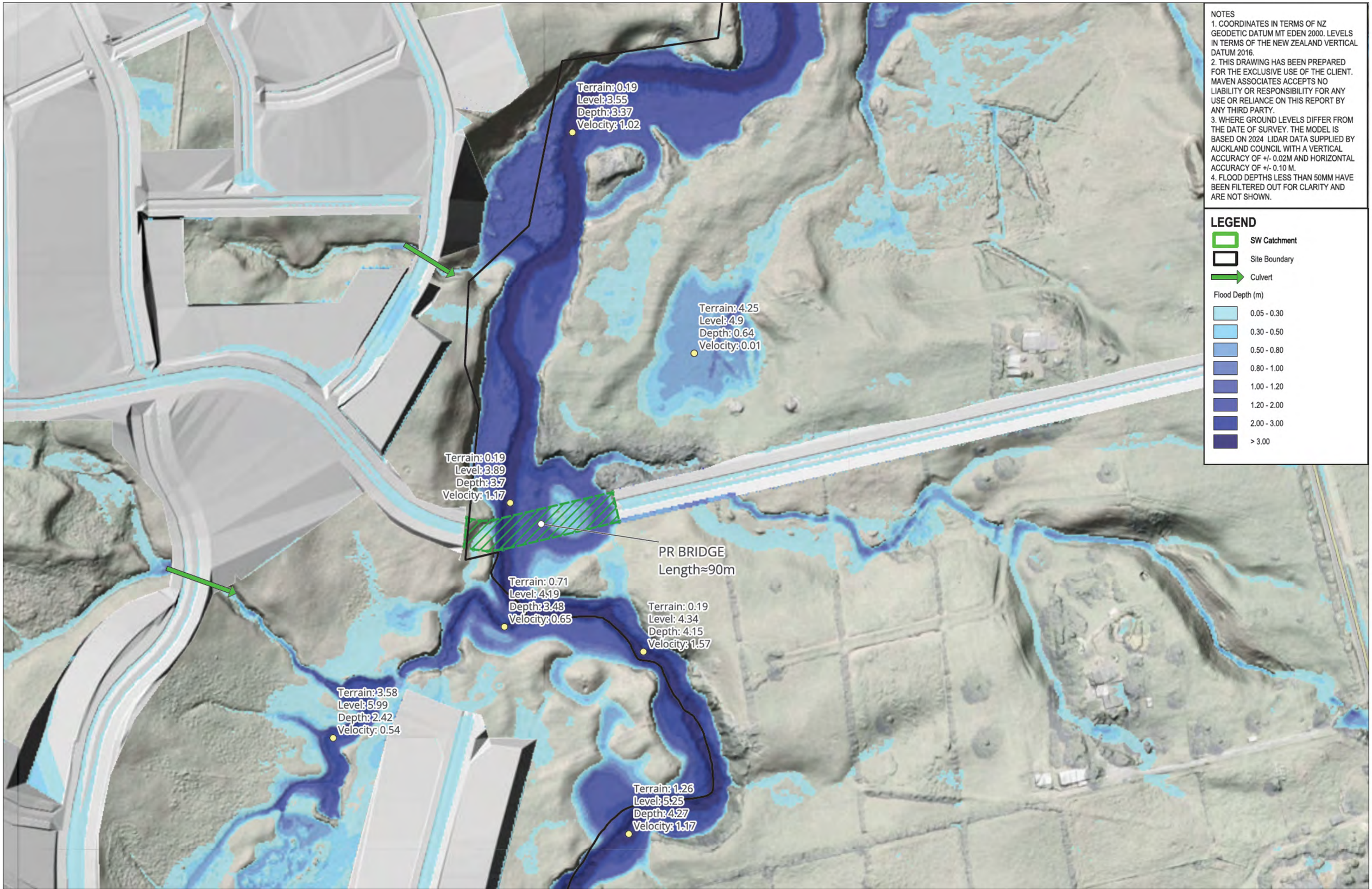
Terrain: 0.71
Level: 4.19
Depth: 3.48
Velocity: 0.66

Terrain: 0.19
Level: 4.34
Depth: 4.15
Velocity: 1.57

Terrain: 3.58
Level: 5.99
Depth: 2.41
Velocity: 0.54

Terrain: 1.26
Level: 5.25
Depth: 4.27
Velocity: 1.17

Revision Details		BY	Date	Survey		135053 - 132 WHANGAPOURI ROAD	Maven Associates	PR 100YR CC BLOCKED (OPTION 1) - FLOOD PLAINS MAP - ZOOM 02		STATUS	FOR INFORMATION	Rev
A	Preliminary Catchment Study	HW	29/05/2026	Model	HW					SCALE	1:2,000 (A3)	A
				Draft	HW							
				Review	YW					SHEET	135053-FL102-02	



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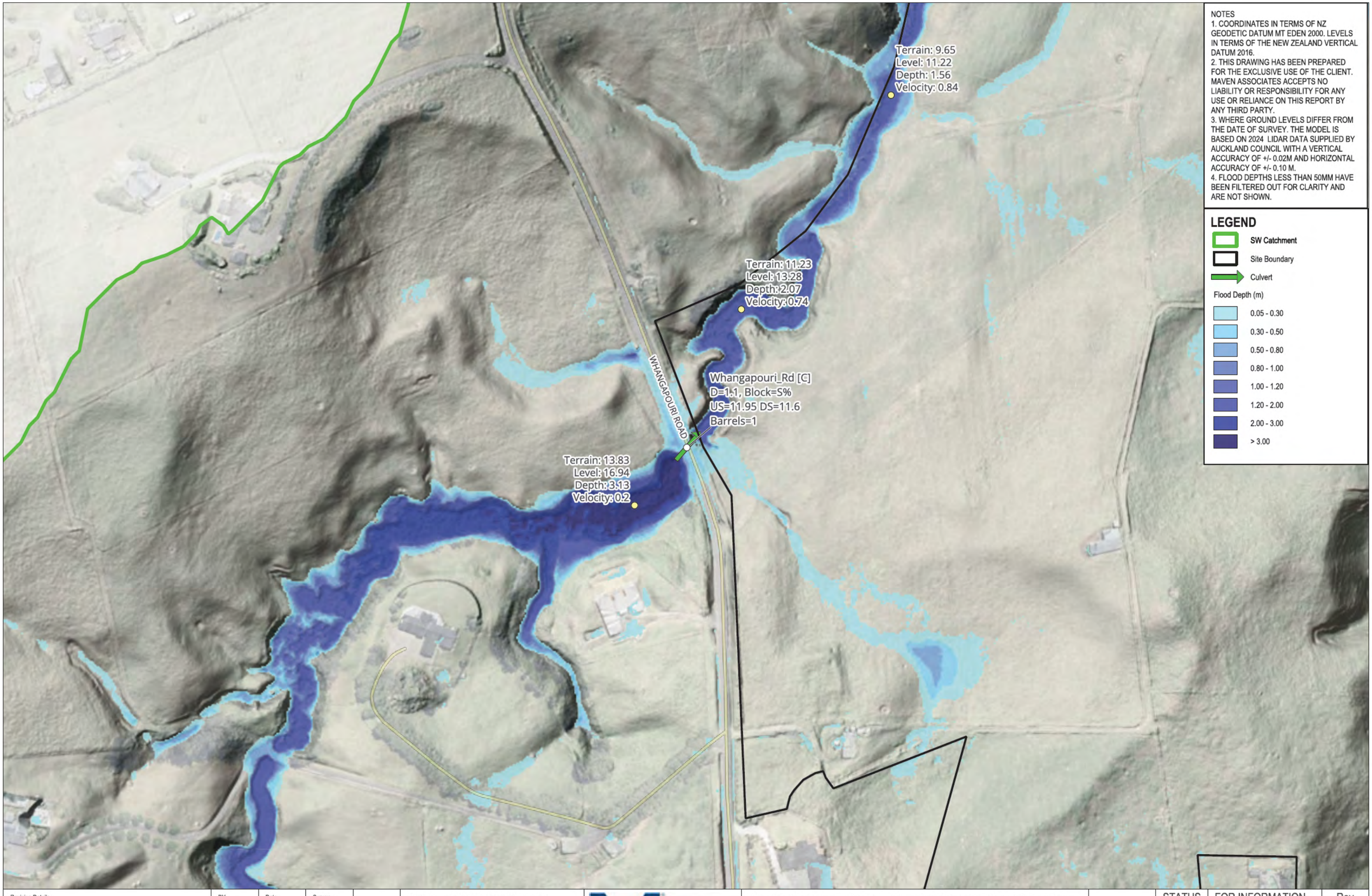
LEGEND

- SW Catchment
- Site Boundary
- Culvert

Flood Depth (m)

- 0.05 - 0.30
- 0.30 - 0.50
- 0.50 - 0.80
- 0.80 - 1.00
- 1.00 - 1.20
- 1.20 - 2.00
- 2.00 - 3.00
- > 3.00

Revision Details		BY	Date	Survey		135053 - 132 WHANGAPOURI ROAD	Maven Associates 09 571 0050 info@maven.co.nz www.maven.co.nz 5 Onslow Road, Epsom Auckland 1023	PR 100YR CC BLOCKED (OPTION 2) - FLOOD PLAINS MAP - ZOOM 02		STATUS	FOR INFORMATION	Rev
A	Preliminary Catchment Study	HW	29/05/2026	Model	HW					SCALE	1:2,000 (A3)	A
				Draft	HW							
				Review	YW					SHEET	135053-FL103-02	



NOTES
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4. FLOOD DEPTHS LESS THAN 50MM HAVE BEEN FILTERED OUT FOR CLARITY AND ARE NOT SHOWN.

LEGEND

- SW Catchment
- Site Boundary
- Culvert

Flood Depth (m)

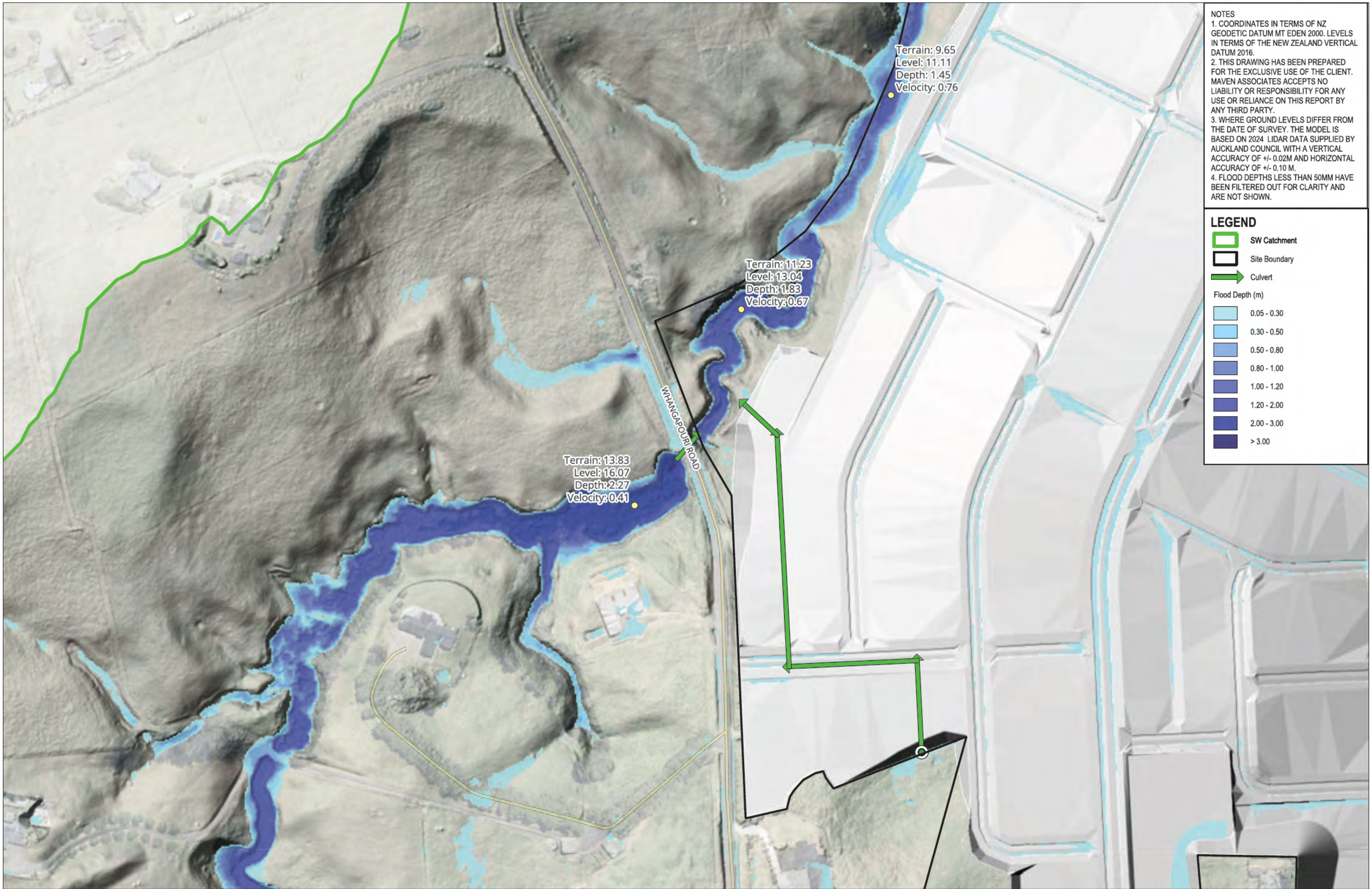
- 0.05 - 0.30
- 0.30 - 0.50
- 0.50 - 0.80
- 0.80 - 1.00
- 1.00 - 1.20
- 1.20 - 2.00
- 2.00 - 3.00
- > 3.00

Revision Details		BY	Date	Survey		135053 - 132 WHANGAPOURI ROAD
A	Preliminary Catchment Study	HW	29/05/2026	Model	HW	
				Draft	HW	
				Review	YW	

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www.maven.co.nz
5 Owens Road, Epsom
Auckland 1023

EX 100YR CC BLOCKED - FLOOD PLAINS MAP - ZOOM 03

STATUS	FOR INFORMATION	Rev
SCALE	1:2,000 (A3)	A
SHEET	135053-FL101-03	



NOTES
1. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE NEW ZEALAND VERTICAL DATUM 2016.
2. THIS DRAWING HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT. MAVEN ASSOCIATES ACCEPTS NO LIABILITY OR RESPONSIBILITY FOR ANY USE OR RELIANCE ON THIS REPORT BY ANY THIRD PARTY.
3. WHERE GROUND LEVELS DIFFER FROM THE DATE OF SURVEY. THE MODEL IS BASED ON 2024 LIDAR DATA SUPPLIED BY AUCKLAND COUNCIL WITH A VERTICAL ACCURACY OF +/- 0.02M AND HORIZONTAL ACCURACY OF +/- 0.10 M.
4. FLOOD DEPTHS LESS THAN 50MM HAVE BEEN FILTERED OUT FOR CLARITY AND ARE NOT SHOWN.

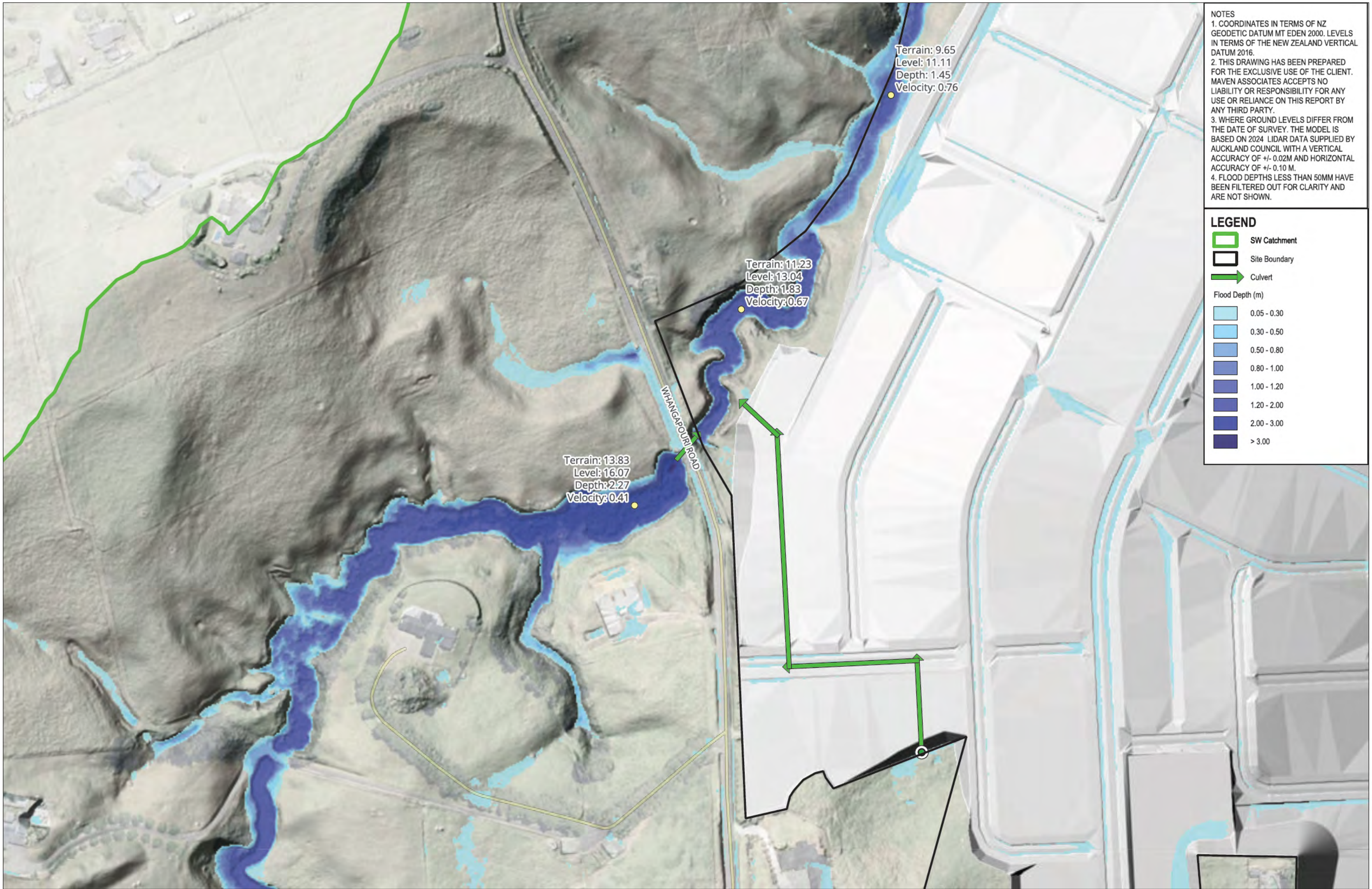
LEGEND

- SW Catchment
- Site Boundary
- Culvert

Flood Depth (m)

- 0.05 - 0.30
- 0.30 - 0.50
- 0.50 - 0.80
- 0.80 - 1.00
- 1.00 - 1.20
- 1.20 - 2.00
- 2.00 - 3.00
- > 3.00

Revision Details		BY	Date	Survey		135053 - 132 WHANGAPOURI ROAD	Maven Associates 09 571 0050 info@maven.co.nz www.maven.co.nz 5 Onslow Road, Epsom Auckland 1023	PR 100YR CC BLOCKED (OPTION 1) - FLOOD PLAINS MAP - ZOOM 03		STATUS	FOR INFORMATION	Rev
A	Preliminary Catchment Study	HW	29/05/2026	Model	HW					SCALE	1:2,000 (A3)	A
				Draft	HW							
				Review	YW					SHEET	135053-FL102-03	



NOTES
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- > 3.00

Revision Details		BY	Date	Survey		135053 - 132 WHANGAPOURI ROAD	Maven Associates 09 571 0050 info@maven.co.nz www.maven.co.nz 5 Onslow Road, Epsom Auckland 1023	PR 100YR CC BLOCKED (OPTION 2) - FLOOD PLAINS MAP - ZOOM 03		STATUS	FOR INFORMATION	Rev
A	Preliminary Catchment Study	HW	29/05/2026	Model	HW					SCALE	1:2,000 (A3)	A
				Draft	HW							
				Review	YW					SHEET	135053-FL103-03	