Te Kaunihera o Te Hiku o te Ika
Far North District Council

Office Use Only
Application Number:

Application for resource consent or fast-track resource consent

(Or Associated Consent Pursuant to the Resource Management Act 1991 (RMA)) (If applying for a Resource Consent pursuant to Section 87AAC or 88 of the RMA, this form can be used to satisfy the requirements of Schedule 4). Prior to, and during, completion of this application form, please refer to Resource Consent Guidance Notes and Schedule of Fees and Charges — both available on the Council's web page.

1. Pre-Lodgement Meeting

Have you met with a council Resource Consent representative to discuss this application prior to lodgement? ◯ **Yes** ✔ **No**

2. Type of Consent being applied for

(more than one circle can be ticked):

- ✔ **Land Use**
- ◯ **Fast Track Land Use***
- ◯ **Subdivision**
- ◯ **Consent under National Environmental Standard** (e.g. Assessing and Managing Contaminants in Soil)
- ◯ **Discharge**
- ◯ **Change of Consent Notice (s.221(3))**
- ◯ **Extension of time (s.125)**
- ● **Other (please specify)** Outline Plan Approval

The fast track is for simple land use consents and is restricted to consents with a controlled activity status.

3. Would you like to opt out of the Fast Track Process?

✔ **Yes** ◯ **No**

4. Consultation

Have you consulted with Iwi/Hapū? ✔ **Yes** ◯ **No**

If yes, which groups have you consulted with?	Ngātikahu Ki Whangaroa
Who else have you consulted with?	

*For any questions or information regarding iwi/hapū consultation, please contact Te Hono at Far North District Council **tehonosupport@fndc.govt.nz***

5. Applicant Details

Name/s: Oruaiti School Board of Trustees

Email:

Phone number: Work | Home

Postal address:
(or alternative method of service under section 352 of the act)

Postcode

6. Address for Correspondence

Name and address for service and correspondence (if using an Agent write their details here)

Name/s: Melissa McGrath

Email: [redacted]

Phone number:

Postal address:
(or alternative method of service under section 352 of the act)

All correspondence will be sent by email in the first instance. Please advise us if you would prefer an alternative means of communication.

7. Details of Property Owner/s and Occupier/s

Name and Address of the Owner/Occupiers of the land to which this application relates (where there are multiple owners or occupiers please list on a separate sheet if required)

Name/s: Ministry of Education

Property Address/ Location: 2554 State Highway 10, Mangōnui

Postcode 0494

8. Application Site Details

Location and/or property street address of the proposed activity:

Name/s: Ministry of Education

Site Address/ Location: 2554 State Highway 10, Mangōnui

Postcode 0494

Legal Description: Part Allotment 18A Parish o **Val Number:**

Certificate of title: Gazette notice

Please remember to attach a copy of your Certificate of Title to the application, along with relevant consent notices and/or easements and encumbrances (search copy must be less than 6 months old)

Site visit requirements:

Is there a locked gate or security system restricting access by Council staff? ◯ **Yes** ✔ **No**

Is there a dog on the property? ◯ **Yes** ✔ **No**

Please provide details of any other entry restrictions that Council staff should be aware of, e.g. health and safety, caretaker's details. This is important to avoid a wasted trip and having to re-arrange a second visit.

Please contact school to organise access to the site due to health and safety protocols.

9. Description of the Proposal:

Please enter a brief description of the proposal here. Please refer to Chapter 4 of the District Plan, and Guidance Notes, for further details of information requirements.

Land use consent and outline plan of works to undertake works for entrance upgrade, carparking, pedestrian footpaths (internal), stormwater and wastewater upgrade and associated works.

If this is an application for a Change or Cancellation of Consent Notice conditions (s.221(3)), please quote relevant existing Resource Consents and Consent Notice identifiers and provide details of the change(s), with reasons for requesting them.

10. Would you like to request Public Notification?

◯ **Yes** ✔ **No**

11. Other Consent required/being applied for under different legislation

(more than one circle can be ticked):

- ◯ **Building Consent** Enter BC ref # here (if known)
- ✔ **Regional Council Consent (ref # if known)** Ref # here (if known)
- ◯ **National Environmental Standard consent** Consent here (if known)
- ◯ **Other (please specify)** Specify 'other' here

12. National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health:

The site and proposal may be subject to the above NES. In order to determine whether regard needs to be had to the NES please answer the following:

Is the piece of land currently being used or has it historically ever been used for an activity or industry on the Hazardous Industries and Activities List (HAIL) ◯ **Yes** ✔ **No** ◯ **Don't know**

Is the proposed activity an activity covered by the NES? Please tick if any of the following apply to your proposal, as the NESCS may apply as a result. ◯ **Yes** ✔ **No** ◯ **Don't know**

- ◯ **Subdividing land**
- ◯ **Changing the use of a piece of land**
- ◯ **Disturbing, removing or sampling soil**
- ◯ **Removing or replacing a fuel storage system**

13. Assessment of Environmental Effects:

Every application for resource consent must be accompanied by an Assessment of Environmental Effects (AEE). This is a requirement of Schedule 4 of the Resource Management Act 1991 and an application can be rejected if an adequate AEE is not provided. The information in an AEE must be specified in sufficient detail to satisfy the purpose for which it is required. Your AEE may include additional information such as Written Approvals from adjoining property owners, or affected parties.

Your AEE is attached to this application ✔ **Yes**

13. Draft Conditions:

Do you wish to see the draft conditions prior to the release of the resource consent decision? ● **Yes** ◯ **No**

If yes, do you agree to extend the processing timeframe pursuant to Section 37 of the Resource Management Act by 5 working days? ✔ **Yes** ◯ **No**

14. Billing Details:

This identifies the person or entity that will be responsible for paying any invoices or receiving any refunds associated with processing this resource consent. Please also refer to Council's Fees and Charges Schedule.

Name/s: (please write in full) Diane Bates, Oruaiti School

Email: [redacted]

Phone number:

Postal address:
(or alternative method of service under section 352 of the act)

Fees Information
An instalment fee for processing this application is payable at the time of lodgement and must accompany your application in order for it to be lodged. Please note that if the instalment fee is insufficient to cover the actual and reasonable costs of work undertaken to process the application you will be required to pay any additional costs. Invoiced amounts are payable by the 20th of the month following invoice date. You may also be required to make additional payments if your application requires notification.

Declaration concerning Payment of Fees
I/we understand that the Council may charge me/us for all costs actually and reasonably incurred in processing this application. Subject to my/our rights under Sections 357B and 358 of the RMA, to object to any costs, I/we undertake to pay all and future processing costs incurred by the Council. Without limiting the Far North District Council's legal rights if any steps (including the use of debt collection agencies) are necessary to recover unpaid processing costs I/we agree to pay all costs of recovering those processing costs. If this application is made on behalf of a trust (private or family), a society (incorporated or unincorporated) or a company in signing this application I/we are binding the trust, society or company to pay all the above costs and guaranteeing to pay all the above costs in my/our personal capacity.

Name: (please write in full) Diane Bates

Signature:
(signature of bill payer) [redacted]

Date 06.05.25

MANDATORY

15. Important Information:

Note to applicant
You must include all information required by this form. The information must be specified in sufficient detail to satisfy the purpose for which it is required.
You may apply for 2 or more resource consents that are needed for the same activity on the same form.
You must pay the charge payable to the consent authority for the resource consent application under the Resource Management Act 1991.

Fast-track application
Under the fast-track resource consent process, notice of the decision must be given within 10 working days after the date the application was first lodged with the authority, unless the applicant opts out of that process at the time of lodgement. A fast-track application may cease to be a fast-track application under section 87AAC(2) of the RMA.

Privacy Information:
Once this application is lodged with the Council it becomes public information. Please advise Council if there is sensitive information in the proposal. The information you have provided on this form is required so that your application for consent pursuant to the Resource Management Act 1991 can be processed under that Act. The information will be stored on a public register and held by the Far North District Council. The details of your application may also be made available to the public on the Council's website, www.fndc.govt.nz. These details are collected to inform the general public and community groups about all consents which have been issued through the Far North District Council.

15. Important information continued...

Declaration

The information I have supplied with this application is true and complete to the best of my knowledge.

Name: **(please write in full)** Melissa McGrath

Signature:

Date 28/02/2025

A signature is not required if the application is made by electronic means

Checklist (please tick if information is provided)

- [x] Payment (cheques payable to Far North District Council)
- [x] A current Certificate of Title (Search Copy not more than 6 months old)
- [x] Details of your consultation with Iwi and hapū
- [x] Copies of any listed encumbrances, easements and/or consent notices relevant to the application
- [x] Applicant / Agent / Property Owner / Bill Payer details provided
- [x] Location of property and description of proposal
- [x] Assessment of Environmental Effects
- [x] Written Approvals / correspondence from consulted parties
- [x] Reports from technical experts (if required)
- [ ] Copies of other relevant consents associated with this application
- [x] Location and Site plans (land use) AND/OR
- [ ] Location and Scheme Plan (subdivision)
- [ ] Elevations / Floor plans
- [x] Topographical / contour plans

Please refer to Chapter 4 of the District Plan for details of the information that must be provided with an application. Please also refer to the RC Checklist available on the Council's website. This contains more helpful hints as to what information needs to be shown on plans.

Oruaiti School Upgrade

Land Use Consent and Outline Plan Application

2554 State Highway 10, Mangōnui

Assessment of Environmental Effects and Statutory Analysis

8 May 2025

B&A
Urban & Environmental

Prepared for:
Ministry of Education

B&A Reference:

WNG25080

Status:

Final Revision

Date:

8 May 2025

Prepared by:

Melissa McGrath

Senior Associate, Barker & Associates Limited

Reviewed by:

Makarena Dalton

Senior Associate, Barker & Associates Limited

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Appendix 6: Ngātikahu Ki Whangaroa Approval Letter

Appendix 7: Correspondence with Waka Kotahi, New Zealand Transport Agency

1.0 Applicant and Property Details

To:	Far North District Council
Site Address:	2554 State Highway 10, Mangōnui
Applicant Name:	Ministry of Education (refer to **Appendix 2** confirming detail)
Address for Service:	Barker & Associates Ltd PO Box 37, Whangārei 0140 Level 1, 136 Bank Street Whangārei 0112 Attention: Melissa McGrath
Legal Description:	Part Allotment 18A Parish of Mangōnui East (refer to Gazette Notice as **Appendix 1**) Stopped Road Survey Office Plan 51928 State Highway
Site Area:	4.121ha
Site Owner:	Her Majesty the Queen
District Plan:	Operative Far North District Plan (**ODP**) Proposed Far North District Plan (**PDP**)
Zoning:	**ODP**: Rural Production Zone **PDP**: Rural Production Zone
Overlays & Controls:	**ODP**: NRC Flood Susceptible and Statutory Acknowledgement - Oruaiti River and its tributaries within the Ngātikahu ki Whangaroa area of interest as shown on OTS-116-19 **PDP**: Statutory Acknowledgement, Treaty Settlement Area of Interest, River Flood Hazard Zone 10- and 100-Year ARI Event, Coastal Flood Zones 1, 2 and 3.
Designations:	**ODP**: Minister of Education (ME57) and New Zealand Transport Agency (State Highway 10 designation). **PDP**: Minister of Education (MEDU57) and New Zealand Transport Agency (NZTA -2).
Additional Limitations:	Nil
Locality Diagram:	Refer to **Figure 1**

Brief Description of Proposal:	Entrance upgrade, carparking, pedestrian footpaths (internal), stormwater and wastewater upgrade and associated works.
Summary of Reasons for Consent:	**Outline Plan:** Required as proposal does not comply with ME57 conditions under the ODP. Outline Plan is required pursuant section 176A of the RMA. Works within the State Highway does not require Outline Plan approval. **Land Use Consent:** Required for stormwater pursuant to rule 8.6.2.1 and for access to State Highway pursuant to rule 15.1.6C.2, the application is a Discretionary Activity. **Northland Regional Council**: Resource consent is required under the Proposed Regional Plan for Northland (**PRP**) for non-compliances with various rules, this is being sought separately from Northland Regional Council, concurrently to this application to FNDC.

2.0 Background

This report has been prepared to support an application for an Outline Plan of Works (**OPW**) and land use consent by Ministry of Education (**MoE**) to provide for upgrade works to the existing Oruaiti School.

MoE is a requiring authority pursuant to Section 167 of the RMA and is specified as a requiring authority in Designations – Minister of Education – ME57 of the Operative Far North District Plan *(***ODP**). This OPW is compiled and lodged in accordance with section 176 and section 176A of the Resource Management Act 1991 (**RMA**). A letter from MoE is attached as **Appendix 2** that states Land Development Engineering (**LDE**) has the authority to act on their behalf.

Additionally, Land Use Consent is sought as proposed works will extend over land at the edge of State Highway which is owned and administered by New Zealand Transport Agency (**Waka Kotahi**).

The proposed school upgrades are being undertaken, to improve vehicle and pedestrian safety, as currently designed the school parking areas are gravelled and do not provide adequate safety measures for vehicles and the school children to cross safely. Further, the school's on-site wastewater system and stormwater management need upgrading.

Oruaiti School is a primary and intermediate school, catering for students from years' one to eight. The school currently has approximately >190 students and 15 staff members.

2.1 Pre-lodgement Consultation

Tangata Whenua

Ngātikahu Ki Whangaroa have a statutory acknowledgement over Oruaiti River and its tributaries within the Ngātikahu Ki Whangaroa Area of Interest.

Accordingly, engagement was undertaken and the result of that consultation with Ngātikahu Ki Whangaroa are enclosed at **Appendix 6**, confirming approval for the proposal.

Accordingly, we asked Council for the relevant hapū contact details and have sent an email outlining what is proposed and have asked for their feedback, written approval has been received from Ngātikahu Ki Whangaroa (refer to **Appendix 6**).

Waka Kotahi

With respect to Waka Kotahi, pre-lodgement engagement has been undertaken and approval indicated (refer to **Appendix 7**).

3.0 Site Context

3.1 Site Description and Locality

Oruaiti School is located at 2554 State Highway 10 and is legally described as Part Allotment 18A Parish of Mangōnui East (see **Figure 1** below), measuring 4.121ha. The site is zoned as Rural Production Zone and subject to designation ME57.

Figure 1: Locality plan, site highlighted purple. Source: Emap.

Access to the site is from an existing vehicle crossing, gravel driveway and parking area via State Highway 10. The site consists of multiple school buildings, various sheds, a swimming pool, retaining walls boundary fences, gravel driveways and parking areas. Vegetation comprises mainly grass and small-medium sized trees.

Proposed works will extend across a very small sliver of land owned and administered by Waka Kotahi, which is zoned as Rural Production Zone and located outside of the school designation.

Figure 2: Locality plan, adjacent site identified. Source: Emap.

To the north, east, south, and west the surrounding locality is also zoned as Rural Production Zone and is predominantly rural in nature, featuring single-storey dwellings, on large lots. To the south are large lots that are predominantly vacant.

4.0 Proposal

The scope of work proposed at Oruaiti School includes the following (see Civil and Structural Drawings in **Appendix 3**), an overall site layout is shown in **Figure 3** below:

- Upgraded vehicle crossing;
- A new asphalt parking area;
- Internal foot pathing;
- Traffic island;
- Internal pedestrian footpath connecting the two car parking areas;
- Retaining walls;
- An upgraded stormwater system; and
- Associated earthworks.

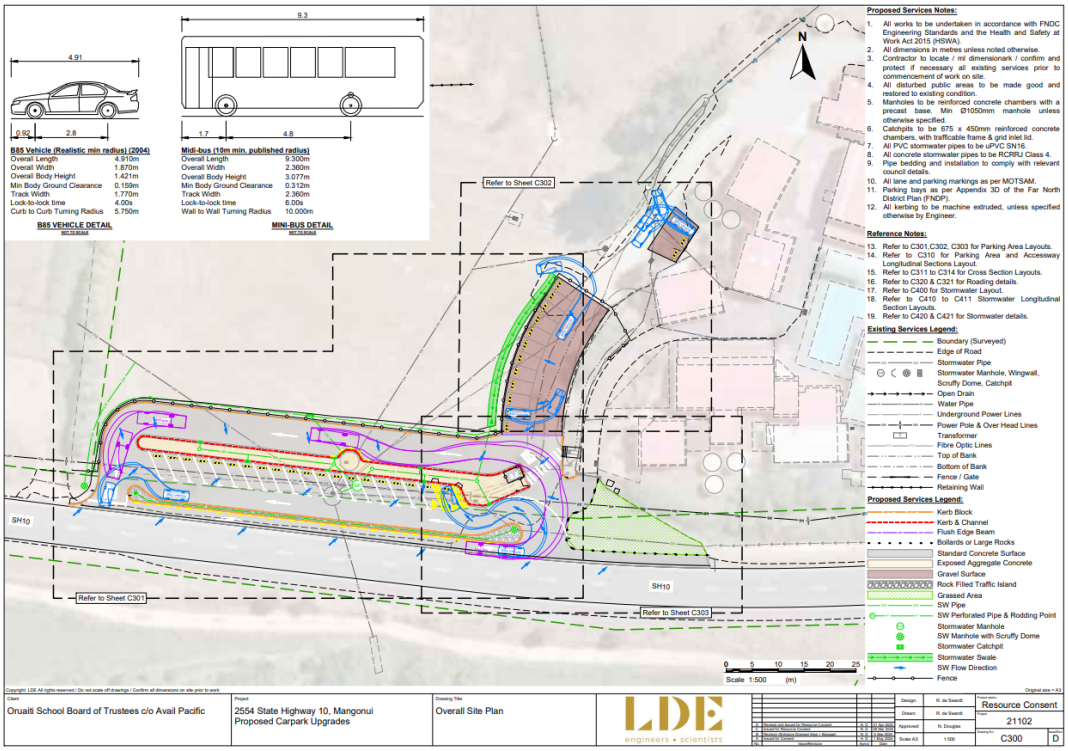


Figure 3: Overall site plan, source LDE.

The Applicant offers the following conditions of consent in accordance with consultation and approval from New Zealand Transport Agency:

Pre-construction Agreements

1. Prior to the commencement of any works on the vehicle crossing or within the state highway corridor, the consent holder must provide evidence of the following as approved by the New Zealand Transport Agency, or written confirmation from New Zealand Transport Agency that the approval is not required:

a. A 'Corridor Access Request' (CAR)

b. An 'Agreement as to Work on State Highway'

c. A 'Work access permit' (WAP) The application must include detailed construction drawings showing full details of the works, methodology and a Traffic Management Plan.

2. A formal licence to occupy / network licence (as advised by NZ Transport Agency) to occupy NZTA managed Crown land for the purposes of completing the proposed works shall be agreed to between the applicant and the NZ Transport Agency prior to commencement of any construction associated with this approval.

General Conditions

3. That the vehicle crossing, parking, manoeuvring and associated works be undertaken in general accordance with the plans referenced below and to the satisfaction of the New Zealand Transport Agency Network Manager:

a. 'Parking Area & Accessway Earthworks Layout" dated 1 May 2024 and referenced as 'C200', revision A, prepared by Land Development & Engineering.

b. 'Parking Area & Accessway Overall Site Plan' dated 1 May 2024 and referenced as 'C300', revision A, prepared by Land Development & Engineering.

c. 'Parking Area & Accessway Design Plan Sheet 1 of 2' dated 1 May 2024 and referenced as 'C301', revision A, prepared by Land Development & Engineering.

d. 'Parking Area & Accessway Design Plan Sheet 2 of 2' dated 1 May 2024 and referenced as 'C302', revision A, prepared by Land Development & Engineering.

e. 'Parking Area & Accessway Longitudinal Sections' dated 1 May 2024 and referenced as 'C310', revision A, prepared by Land Development & Engineering.

f. 'Parking Area & Accessway Stormwater Management Plan' dated 1 May 2024 and referenced as 'C400', revision A, prepared by Land Development & Engineering.

g. 'Parking Area & Accessway Stormwater Longitudinal Sections Sheet 1 of 2' dated 1 May 2024 and referenced as 'C410', revision A, prepared by Land Development & Engineering.

h. 'Parking Area & Accessway Stormwater Longitudinal Sections Sheet 1 of 2' dated 1 May 2024 and referenced as 'C411', revision A, prepared by Land Development & Engineering.

4. Consultation with the New Zealand Transport Agency shall be undertaken in the event changes are made from the plans initially submitted to the New Zealand Transport Agency (and referenced above). This consultation will confirm if the changes are in general accordance with the approved plans or confirm if additional approvals are required.

After construction

5. Prior to the use of the upgraded crossing and vehicle manoeuvring areas, the consent holder shall provide to Council, correspondence from New Zealand Transport Agency confirming that works to the state highway, including vehicle crossings, have been constructed to New Zealand Transport Agency standards or in general accordance with this approval.

Advice Notes:

- *The maintenance of all structures and infrastructure associated with the proposal is the responsibility of the applicant. These must be maintained in good order and condition, and otherwise to the satisfaction of NZTA, and subject to any directions and conditions stipulated*

by NZTA. This advice note may be superseded by a condition on a licence to occupy / network licence granted by the NZ Transport Agency.

- *The applicant should provide a copy of any resource consent application associated with the proposal to NZTA once lodged for s95E approval.*

5.0 Reasons for Application

5.1 Operative Far North District Plan

The site is subject to the provisions of the Operative Far District Plan Zoned Rural Production Zone and partially zoned Designation 'ME57' and State Highway 10 Designation.

Designation ME57

The purpose of designation ME57 is for 'Education Purposes'. The proposed works are clearly in accordance with the purpose of the designation.

Designation 'ME57' is subject to the following conditions all of which are complied with by the proposed upgrade:

Table 1: Summary of ME57 Conditions

ME57 Conditions	Compliance
1. Car Parking (all designations) Where new development increases the number of classrooms (or classroom equivalents) on a particular site, additional parking shall be provided at the rate of not less than two car parks per additional classroom or classroom equivalent, except where the Council accepts, on the basis of a specifically commissioned car parking study by an appropriately qualified engineer, that a lesser level is appropriate.	It is not proposed to construct additional classrooms or classroom equivalents.
2. Traffic Management	N/A – Oruaiti School is not listed under this condition.
3. Building Setbacks (all designations) New buildings or structures shall comply with the setback from boundaries for permitted activities for the applicable underlying zone provided that the setback can be reduced where the written consent to such a reduction has been obtained from the registered proprietor of the relevant adjacent land.	No buildings are proposed.

4. Conditions Relating to ME73 and ME97	N/A - Oruaiti School is ME57
5. Conditions Relating to ME97, ME11 and ME116	N/A - Oruaiti School is ME57
6. Outstanding Landscapes Conditions apply to ME52, ME86, ME102 and ME117, and apply to those parts of the sites identified by the Resource Maps as being within outstanding landscape notation	N/A - Oruaiti School is ME57 and does not contain any ONL over the site.
7. Coastal Hazard Condition relating to ME115	N/A - Oruaiti School is ME57
8. Flood Susceptible Areas The following condition applies to those designations numbered ME57, and applies only to those parts of the sites which fall within flood susceptible areas as identified on the Council's Hazard Register: (a) Any outline plan of works shall be accompanied by a report or certificate from a suitably qualified and experienced professional indicating that the sub-floor design is able to withstand, and that the floor levels are above, a 50-year return period flood.	Stormwater Neutrality Report has been provided by LDE and is included as **Appendix 4**.
9. Conditions Relating to ME251	N/A - Oruaiti School is ME57
10. Conditions relating to ME59 and Lot 2 DP 150885	N/A - Oruaiti School is ME57
11. Conditions Relating to ME252	N/A - Oruaiti School is ME57

The proposed upgrading to the vehicle entrance, driveway and car parking will require outline plan approval. MoE seek approval of an Outline Plan of Public Work approval pursuant to section 176A of the RMA.

Designation State Highway 10

Proposed upgrading works will extend to within the State Highway 10 designation, vehicle crossing, parking and stormwater fall within the purpose and scope of the designation. Waka Kotahi as Requiring Authority of the designation have issued written approval under Section 176A of the RMA.

Rural Production Zone

The proposed works will not result in buildings being located within the site outside the designations, however, proposed works will include parking, impervious surfaces, vehicle access etc being located within a small area of the site located outside of the designations and located within the Rural Production Zone.

- Rule 8.6.5.1.3 Stormwater- The proposed works will result in more than 15% of the gross site area covered by impervious areas and will also infringe the controlled activity limit of 20% of the gross site area covered by impervious areas under rule 8.6.2.1. Discretionary Activity under rule 8.6.5.4.

Transport Chapter

The proposed works will result in new vehicle access to State Highway 10 being located within a small area of the site located outside of the ME57 designation and zoned Rural Production Zone.

- Rule 15.1.6C.1.1 Private Accessway in All Zones – the proposed access is from State Highway 10. Discretionary Activity under rule 15.1.6C.2.

5.2 National Environmental Standard – Contaminated Soils

The Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES-CS) were gazetted on 13th October 2011 and took effect on 1st January 2012. The subject site is not identified as a HAIL site as such NEC-CS does not apply.

5.3 National Environmental Standard - Freshwater

The Resource Management (National Environmental Standards for Freshwater) Regulations 2020 (NES-F) were gazetted on 3rd August 2020 and took effect on 3rd September 2020. The standards apply to activities that may have an effect to freshwater, particularly wetlands.

The proposal does not seek to undertake earthworks, vegetation clearance or construction of structures within or within 10m of a wetland, however, the proposal does seek to manage stormwater within the school site which is located within 100m of the natural inland wetland located 30m south of the proposed works. The Wild Ecology assessment (Appendix 5) confirms that the proposal will not result in any drainage of the natural wetland.

The proposal does seek to discharge stormwater via the existing system within 100m of the natural inland wetland, Wild Ecology assessment (Appendix 5) confirms that:

> *"While the stormwater diversions associated with the site development will occur within a 100m setback from the identified wetland area and may have a hydrological connection with these areas, they will not change or are unlikely to change the water level range or hydrological function of the wetland"*
>
> *"While stormwater will be discharged to water and may have a hydrological connection to the wetland and will likely enter the wetland, the incremental increase in impervious surfaces and discharge (15L/s) associated with the car park development, the overall volume of water entering the aquatic features is not expected to increase to any detectable level. These discharges are not likely to change the water level range or hydrological function of the wetland areas."*

As such, the proposal does not require consent under the NES-F.

5.4 Land Use Activity Status

Overall, this application is for a discretionary activity.

6.0 Outline Plan Assessment

Pursuant to Section 176A of the Resource Management Act (the Act), the Outline Plan for the proposed works must show the following:

a) the height, shape, and bulk of the public work, project, or work; and

b) the location on the site of the public work, project, or work; and

c) the likely finished contour of the site; and

d) the vehicular access, circulation, and the provision for parking

e) the landscaping proposed; and

f) any other matters to avoid, remedy, or mitigate any adverse effects on the environment.

6.1 Height, Shape and Bulk of Work

The proposed works are largely civil site works to establish, parking, and stormwater management systems, no buildings are proposed.

6.2 The location on the Site of the Public Work, Project, or Work

The bulk of the works will occur to the north west of the existing school buildings, with earthworks and upgrading of the vehicle crossing and parking area. with pedestrian paths extending centrally to the school.

Stormwater upgrades are largely focused upon the parking areas being located underground; this will comprise a stormwater pipe extension, manholes, catchpits and a swale as illustrated in Appendix 3.

6.3 Likely Finished Contour of the Site

The contour of the subject site remains largely unchanged, as detailed in the earthworks cut/fill volume plans, works are limited to the parking areas and stormwater drain to establish access and flat parking areas as illustrated in Appendix 3.

6.4 Vehicular Access, Circulation, and the Provision for Parking

The proposed works seek to improve existing vehicle access, manoeuvring and increase onsite parking via the creation of the parking area. 35 car parking spaces will be provided onsite, which comply with the Far North District Council Environmental Engineering Standards.

6.5 Landscaping Proposed

No landscaping is proposed, all exposed areas of earthworks will be regressed.

6.6 Any Other Matters to Avoid, Remedy, or Mitigate any Adverse Effects on the Environment.

The proposed works have been designed to mitigate potential stormwater, flood risk and traffic effects as detailed further in this application.

7.0 Land Use Consent Public Notification Assessment (Sections 95A, 95C and 95D)

7.1 Assessment of Steps 1 to 4 (Sections 95A)

Section 95A specifies the steps the council is to follow to determine whether an application is to be publicly notified. These are addressed in statutory order below.

7.1.1 Step 1: Mandatory public notification is required in certain circumstances

Step 1 requires public notification where this is requested by the applicant; or the application is made jointly with an application to exchange of recreation reserved land under section 15AA of the Reserves Act 1977.

The above does not apply to the proposal.

7.1.2 Step 2: If not required by step 1, public notification precluded in certain circumstances

Step 2 describes that public notification is precluded where all applicable rules and national environmental standards preclude public notification; or where the application is for a controlled activity; or a restricted discretionary, discretionary or non-complying boundary activity.

In this case, the applicable rules do not preclude public notification, and the proposal is not a controlled activity or boundary activity. Therefore, public notification is not precluded.

7.1.3 Step 3: If not required by step 2, public notification required in certain circumstances

Step 3 describes that where public notification is not precluded by step 2, it is required if the applicable rules or national environmental standards require public notification, or if the activity is likely to have adverse effects on the environment that are more than minor.

As noted under step 2 above, public notification is not precluded, and an assessment in accordance with section 95A is required, which is set out in the sections below. As described below, it is considered that any adverse effects will be less than minor.

7.1.4 Step 4: Public notification in special circumstances

If an application is not required to be publicly notified as a result of any of the previous steps, then the council is required to determine whether special circumstances exist that warrant it being publicly notified.

Special circumstances are those that are:

- Exceptional or unusual, but something less than extraordinary; or
- Outside of the common run of applications of this nature; or
- Circumstances which make notification desirable, notwithstanding the conclusion that the adverse effects will be no more than minor.

It is considered that there is nothing noteworthy about the proposal. It is therefore considered that the application cannot be described as being out of the ordinary or giving rise to special circumstances.

7.2 Section 95D Statutory Matters

In determining whether to publicly notify an application, section 95D specifies a council must decide whether an activity will have, or is likely to have, adverse effects on the environment that are more than minor.

In determining whether adverse effects are more than minor:

- Adverse effects on persons who own or occupy the land within which the activity will occur, or any land adjacent to that land, must be disregarded.

  The land to be excluded from the assessment is listed in section 7.3 below.

- Adverse effects permitted by a rule in a plan or national environmental standard (the 'permitted baseline') may be disregarded.

  In this case, access from State Highway is not permitted therefore there is no relevant permitted baseline.

- Trade competition must be disregarded.

  This is not considered to be a relevant matter in this case.

- The adverse effects on those persons who have provided their written approval must be disregarded.

  No persons have provided their written approval for this proposal.

7.3 Land Excluded from the Assessment

In terms of the tests for public notification (but not for the purposes of limited notification or service of notice), the adjacent properties to be excluded from the assessment are shown in **Figure 4** below, and include:

- Allotment 25-26 and Part Allotment 10 Block VI Mangōnui Survey District;
- 2591 State Highway 10, Mangōnui; and
- Parcel 8270033.

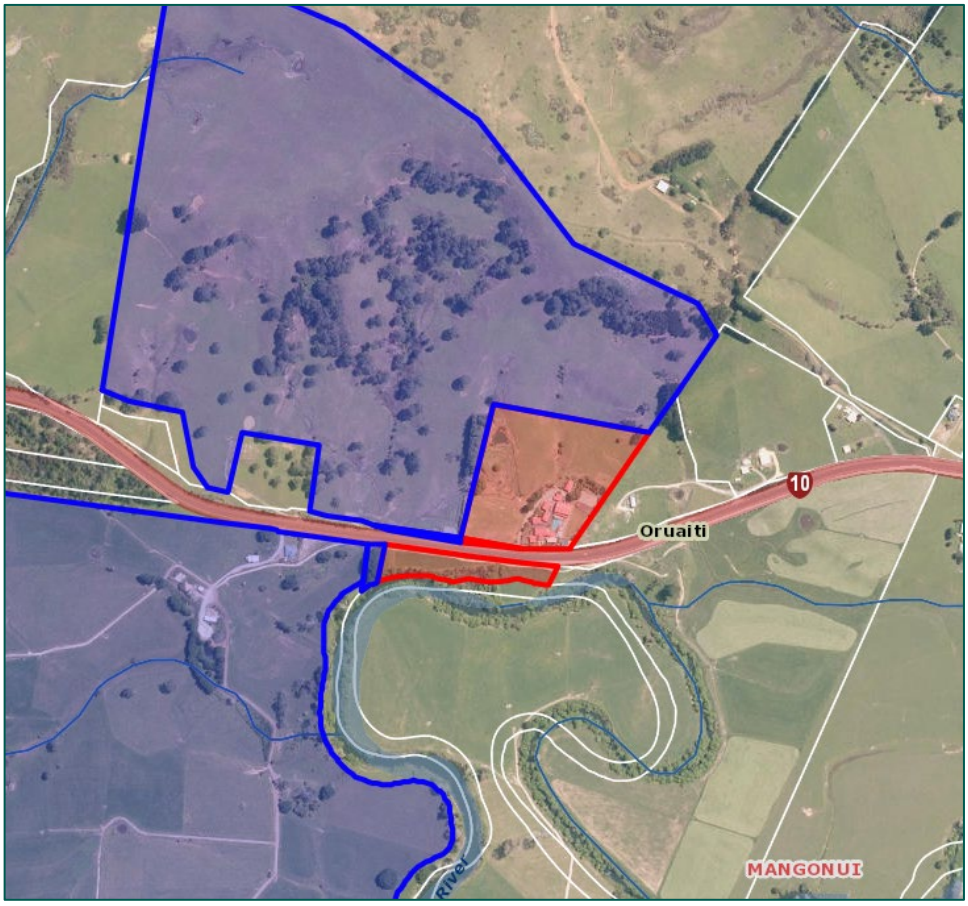


Figure 4: Adjacent properties (shown in blue) in relation to subject site. Source: Emaps.

7.4 Assessment of Effects on the Wider Environment

The following sections set out an assessment of wider effects of the proposal, and it is considered that effects in relation to the following matters are relevant:

- Flooding and stormwater management;
- Transportation;
- Construction activities; and
- Cultural effects.

These matters are set out and discussed below.

7.4.1 Flooding and stormwater management

The subject site is identified by NRC as subject to Priority River Flood Hazards, 10 year, 50 year and 100 year. The proposed development seeks to manage potential flood risk via the management of stormwater, as detailed in the Stormwater Neutrality Report prepared by LDE and attached as Appendix 4.

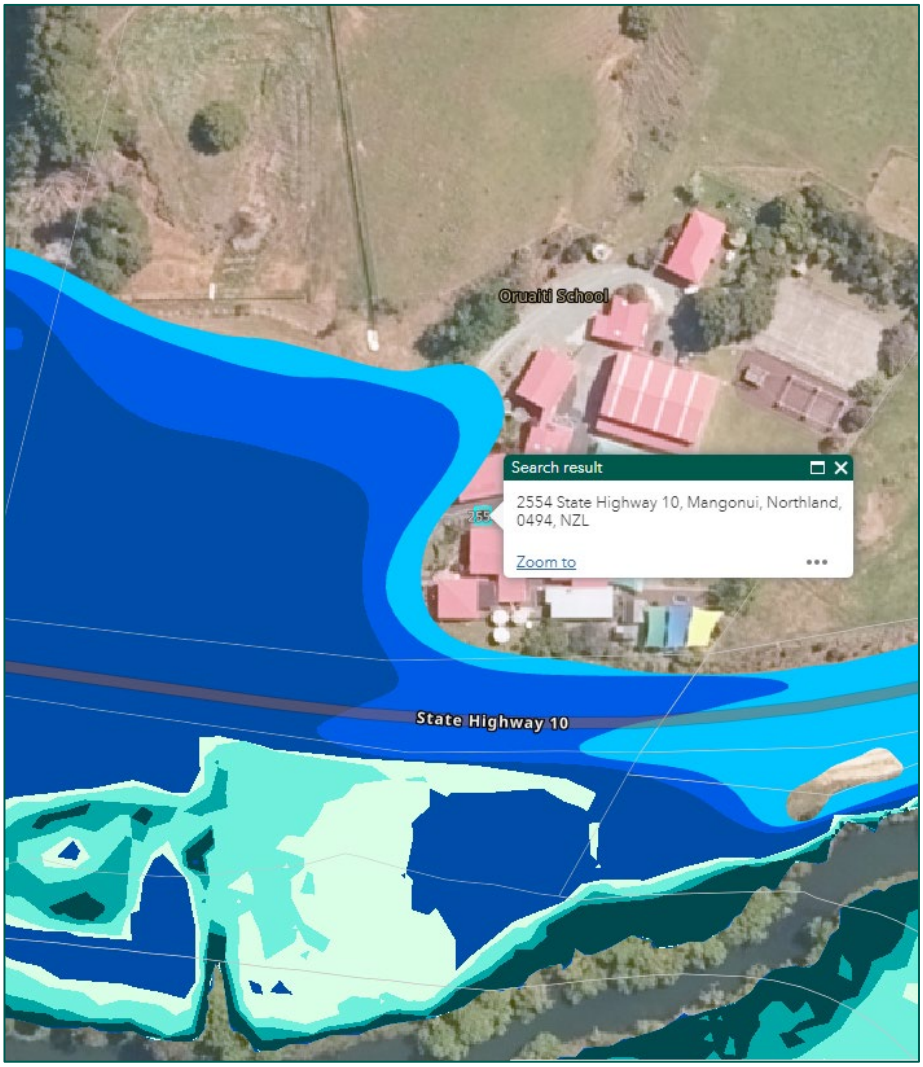


Figure 5: Natural Hazard Maps Source: NRC Website.

LDE concludes that the proposed stormwater management system will improve downstream flood risk. For these reasons, it is considered that the adverse effects on the wider environment are less than minor and acceptable.

7.4.2 Transportation

Traffic, access and parking matters have been considered in detailed design prepared by LDE (see Appendix 3). The proposal seeks to establish improved access, parking and manoeuvring to service the existing school, parking and access has been designed to comply with Far North Council's Environmental Engineering Standards. As a result of works in proximity to State Highway 10 written approval has been sought and obtained from Waka Kotahi. It is considered that, subject to implementation of suitable conditions of consent that any adverse effects with respect to transportation will be managed and acceptable.

7.4.3 Construction activities

Approximately 400m^3 of net fill (20m^3 cut and 460m^3 fill) across an area of 2,760m^2 of earthworks is proposed, to establish flat access and parking areas. This is outlined on the cut and fill plan prepared by LDE (see Appendix 3).

Due to the area that the proposed earthworks are undertaken, resource consent under the PRP is required and an application to NRC will be made concurrently with this application. Silt and sediment control measures are proposed to be implemented in accordance with the Erosion and Sediment Control Guidelines for Land Disturbing Activities in the Auckland Region (2016) for the duration of the activity.

On the basis of the above, it is considered that any adverse effects associated with silt and sediment runoff (and resulting effects on water quality) will be less than minor.

When having regard to the nature of the construction activities it is expected that the works will comply with the District Plan construction noise limits which specifically reference New Zealand Standard NZS 6803: 1999 "Acoustics - Construction Noise". Any adverse construction noise effects would be temporary in nature.

There is sufficient space on the subject site to provide parking for construction vehicles. It is considered that traffic and parking capacity effects of the construction period will be less than minor and temporary in nature.

As with other similarly sized projects, it is expected that site works will be managed in accordance with a construction management plan that will set measures to manage potential adverse effects associated with the construction phase of the project. A condition to this effect is offered as part of the application.

Overall, it is considered that any adverse construction effects will be less than minor and acceptable.

7.4.4 Cultural Effects

There are no sites of historic heritage including sites of significance to Maori identified on FNDC's GIS system and a search of ArchSite has confirmed that there are no archaeological sites in proximity to the proposed works.

Ngātikahu Ki Whangaroa have a statutory acknowledgement over Oruaiti Stream and its tributaries within the Ngātikahu Ki Whangaroa Area of Interest, as such the Applicant has undertaken consultation with Ngātikahu Ki Whangaroa and gained written approval in support of the application.

Therefore, the proposal will have no known adverse effects on cultural values, historic heritage or the surrounding environment.

7.4.5 Ecological Effects

The application site is currently used for existing educational purposes and does not contain any protected or significant vegetation. Stormwater from the proposed upgrades is proposed to be directed to the Oruaiti stream and wetland. Wild Ecology has completed a desktop assessment (Appendix 5) of the proposed works on the Oruaiti Stream and wetland area concluding:

"It is considered that proposed car park redevelopment works at Oruaiti School would result in negligible potential adverse ecological effect on the identified aquatic habitats. No adverse effect on the identified natural inland wetland area or Oruaiti Stream is anticipated – the nearest natural inland wetland area is located approximately 30m south of the works footprint. Any potential adverse ecological effects on natural inland wetland features associated with the proposal can be avoided, minimised or mitigated through applying appropriate construction and sediment/erosion

controls. Provided that they are implemented successfully, adverse effects on the environment would be negligible. It is considered that the construction of the car park associated with the proposal is not likely to change the water level range or hydrological function of the identified natural inland wetland area and will not result, or is not likely to result, in the complete or partial drainage of all or part of a natural inland wetland. Therefore, it is considered that the proposal does not require a consent under NES-FW (2020)"

For this reason, it is considered that the proposal will have less than minor and acceptable ecological effects.

7.5 Summary of Effects

Overall, it is considered that any adverse effects on the environment relating to this proposal will be no more than minor.

7.6 Public Notification Conclusion

Having undertaken the section 95A public notification tests, the following conclusions are reached:

- Under step 1, public notification is not mandatory;
- Under step 2, public notification is not precluded;
- Under step 3, public notification is not required as it is considered that the activity will result in no more than minor adverse effects; and
- Under step 4, there are no special circumstances.

Therefore, based on the conclusions reached under steps 3 and 4, it is recommended that this application be processed without public notification.

8.0 Land Use Consent Limited Notification Assessment (Sections 95B, 95E to 95G)

8.1 Assessment of Steps 1 to 4 (Sections 95B)

If the application is not publicly notified under section 95A, the council must follow the steps set out in section 95B to determine whether to limited notify the application. These steps are addressed in the statutory order below.

8.1.1 Step 1: Certain affected protected customary rights groups must be notified

Step 1 requires limited notification where there are any affected protected customary rights groups or customary marine title groups; or affected persons under a statutory acknowledgement affecting the land.

The above does not apply to this proposal.

8.1.2 Step 2: If not required by step 1, limited notification precluded in certain circumstances

Step 2 describes that limited notification is precluded where all applicable rules and national environmental standards preclude limited notification; or the application is for a controlled activity (other than the subdivision of land).

In this case, the applicable rules do not preclude limited notification and the proposal is not a controlled activity. Therefore, limited notification is not precluded.

8.1.3 Step 3: If not precluded by step 2, certain other affected persons must be notified

Step 3 requires that, where limited notification is not precluded under step 2 above, a determination must be made as to whether any of the following persons are affected persons:

- In the case of a boundary activity, an owner of an allotment with an infringed boundary;
- In the case of any other activity, a person affected in accordance with s95E.

The application is not for a boundary activity, and therefore an assessment in accordance with section 95E is required and is set out below.

Overall, it is considered that any adverse effects on persons will be less than minor, and accordingly, that no persons are adversely affected.

8.1.4 Step 4: Further notification in special circumstances

In addition to the findings of the previous steps, the council is also required to determine whether special circumstances exist in relation to the application that warrant notification of the application to any other persons not already determined as eligible for limited notification.

In this instance, having regard to the assessment in section 7.1.4 above, it is considered that special circumstances do not apply.

8.2 Section 95E Statutory Matters

If the application is not publicly notified, a council must decide if there are any affected persons and give limited notification to those persons. A person is affected if the effects of the activity on that person are minor or more than minor (but not less than minor).

In deciding who is an affected person under section 95E:

- Adverse effects permitted by a rule in a plan or national environmental standard (the 'permitted baseline') may be disregarded;
- Only those effects that relate to a matter of control or discretion can be considered (in the case of controlled or restricted discretionary activities); and
- The adverse effects on those persons who have provided their written approval must be disregarded.

These matters were addressed in section 7.2 above, and no written approvals have been obtained.

Having regard to the above provisions, an assessment is provided below.

8.3 Assessment of Effects on Persons

Wider effects, such as flood hazard and stormwater management, transportation, construction activities, cultural effects and ecology were considered in section 7.4 above, and considered to be no more than minor.

Adverse effects in relation to amenity and transportation effects on persons are considered below.

8.3.1 Allotment 25-26 and Part Allotment 10 Block VI Mangōnui Survey District

This site is a larger rural site located adjacent to the school. The proposed works will be adjacent to this site but will not result in a change to the existing school activity in proximity to this site. The improved access and safety of traffic manoeuvring to and from the school which will improve the amenity of this site. Therefore, the proposal is considered to have less than minor transport and amenity effects to this property.

8.3.2 2591 State Highway 10, Mangōnui and Parcel 8270033.

These sites are larger rural sites located on the southern side of State Highway 10. The proposed works will not be directly adjacent to these sites, the works will improve the access and manoeuvring to Oruaiti School which will, in turn, improve transport safety for these sites. Therefore, the proposal is considered to have less than minor amenity and transport effects on these properties.

8.3.3 Summary of Effects

Taking the above into account, it is considered that any adverse effects on persons at the aforementioned properties will be less than minor in relation to amenity and transport effects. Wider effects were assessed in section 7.4 above and are considered to be no more than minor.

It is considered, therefore, that there are no adversely affected persons in relation to this proposal.

8.4 Limited Notification Conclusion

Having undertaken the section 95B limited notification tests, the following conclusions are reached:

- Under step 1, limited notification is not mandatory;
- Under step 2, limited notification is not precluded;
- Under step 3, limited notification is not required as it is considered that the activity will not result in any adversely affected persons; and
- Under step 4, there are no special circumstances.

Therefore, it is recommended that this application be processed without limited notification.

9.0 Consideration of Applications (Section 104)

9.1 Statutory Matters

Subject to Part 2 of the Act, when considering an application for resource consent and any submissions received, a council must, in accordance with section 104(1) of the Act have regard to:

- Any actual and potential effects on the environment of allowing the activity;
- Any relevant provisions of a national environmental standard, other regulations, national policy statement, a New Zealand coastal policy statement, a regional policy statement or proposed regional policy statement; a plan or proposed plan; and
- Any other matter a council considers relevant and reasonably necessary to determine the application.

As a discretionary activity, section 104B of the Act states that a council:

(a) may grant or refuse the application; and

(b) if it grants the application, may impose conditions under section 108.

9.2 Weighting of Proposed Plan Changes: Proposed Far North District Plan

On the 27th July 2022 FNDC notified their PDP. At the time of preparing this AEE, only rules identified as having immediate legal effect have been considered. This will remain the case until FNDC releases a decision on the PDP (this will occur once hearings have been completed). As such, it is considered that significantly more weight should be placed on the ODP provisions.

10.0 Effects on the Environment (Section 104(1)(A))

Having regard to the actual and potential effects on the environment of the activity resulting from the proposal, it was concluded in the assessment above that any wider adverse effects relating to the proposal will be no more than minor and that no persons would be adversely affected by the proposal.

Further, it is considered that the proposal will also result in positive effects including, improved management of stormwater within the school site and increased pedestrian and vehicular safe and efficient access to the public school site.

Overall, it is considered that when taking into account the positive effects, any actual and potential adverse effects on the environment of allowing the activity are acceptable.

11.0 District Plan and Statutory Documents (Section 104(1)(B))

11.1 Objectives and Policies of the Far North District Plan (Operative)

Chapter 8.6 Rural Production Zone

The rural production zone applies to the majority of land within the district, and seeks to enable the continuation of a wide range of activities for existing and future activities that are compatible with the productive purpose of the zone.

The objectives and policies of the zone seek to provide for a wide range of activities, while managing the effects of activities that are incompatible with the rural production zone. The proposed works associated with an existing school is not considered to be incompatible, as it does not restrict existing activities or generate reverse sensitivity effects that may limit the rural productive purpose of the zone.

In conclusion, the proposed activity is considered to be consistent with the outcomes of the zone.

Chapter 12.4 Natural Hazards

The objectives and policies of the natural hazards chapter are contained within Chapter 12.4 of the ODP and seek to reduce the threat of natural hazards to life, property and the environment.

The proposed works does not introduce new vulnerable activities and is proposed to improve management of flood risk via stormwater management.

The proposal is considered consistent with the intent of the natural hazards chapter.

Chapter 15.1 Traffic, Parking and Access

The objectives and policies of this chapter seek to ensure that parking and access in association with land uses on private property are provided in a manner which encourages sustainable transportation. Seeking to minimise the adverse effects of traffic on the natural and physical environment.

The proposed works will improve parking, access and movement within the existing school site reducing adverse traffic effects.

The proposal is considered consistent with the intent of the traffic, parking and access chapter.

11.2 Objectives and Policies of the Proposed Far North Plan

The proposal results in works being undertaken within the Rural Production Zone. The proposal also interreacts with overlays that include the River Flood Hazard Zone – Priority Rivers and Regionwide Models. The proposal will

On this basis, the proposal is not considered to be contrary to, but is not entirely consistent with the anticipated outcomes of the PDP.

11.3 Regional Policy Statement for Northland (RPS)

The Northland Regional Policy Statement (RPS) covers the management of natural and physical resources across the Northland Region. The provisions within the RPS give guidance at a higher planning level in terms of the significant regional issues. As such it does not contain specific rules

that trigger the requirement for consent but rather give guidance to consent applications and the development of Plans on a regional level.

Objectives range from integrated catchment management, improvement of overall quality of Northland's water quality, maintaining ecological flows, protecting areas of significant indigenous ecosystems and biodiversity, sustainable management of natural and physical resources in a way that is attractive for business and investment that will improve the economic wellbeing. Enabling economic wellbeing, regional form, the role of tangata whenua kaitiaki role is recognised and provided for in decision making, risks and impacts of natural hazards are minimised, outstanding natural landscapes and features and historic heritage are protected from inappropriate subdivision, use and development.

Relevant policy has been identified and summarised as follows:

- Policy 4.2.1 seeks to improve the overall quality of Northland's water resources by, establishing freshwater objectives, reducing loads of sediment, nutrients and faecal matter to water and promoting and supporting the active management, enhancement and creation of vegetated riparian margins. The proposed development will manage effect of stormwater discharge on the fresh water of the Oruaiti Wetland and Stream.
- Policy 5.1.1 seeks to provide for subdivision, use and development that is located, designed and built in a planned and coordinated matter. The proposal will improve the functionality of an existing public school servicing the local community. With specific reference to 5.1.1(d) and (h), the proposal can be adequately serviced in terms of transportation, water, wastewater, and stormwater by existing and proposed infrastructure.
- According to Policy 7.1.1 subdivision, use and development of land will be managed to minimise risks of natural hazards. The proposed works seek to improve the management of stormwater within the school site to minimise the risk of natural hazards.
- Policy 8.1.2 requires the district council to recognise and provide for the relationship of tangata whenua and their culture and traditions, have particular regard to kaitiakitanga and take into account the principles of the Treaty of Waitangi including partnership when processing resource consents. No sites of cultural significance or heritage are identified within the subject site and written approval has been obtained from Ngātikahu Ki Whangaroa.

For these reasons, it is considered that the proposal is consistent with the relevant RPS provisions.

11.4 Summary

It is considered that the proposed development is generally in accordance with the objectives and policies of the ODP, PDP and RPS.

12.0 Part 2 Matters

Section 5 of Part 2 identifies the purpose of the RMA as being the sustainable management of natural and physical resources. This means managing the use, development and protection of natural and physical resources in a way that enables people and communities to provide for their social, cultural and economic well-being and health and safety while sustaining those resources for

future generations, protecting the life supporting capacity of ecosystems, and avoiding, remedying or mitigating adverse effects on the environment.

Section 6 of the Act sets out a number of matters of national importance including (but not limited to) the protection of outstanding natural features and landscapes and historic heritage from inappropriate subdivision, use and development.

Section 7 identifies a number of "other matters" to be given particular regard by Council and includes (but is not limited to) Kaitiakitanga, the efficient use of natural and physical resources, the maintenance and enhancement of amenity values, and maintenance and enhancement of the quality of the environment.

Section 8 requires Council to take into account the principles of the Treaty of Waitangi.

Overall, as the effects of the proposal are considered to be no more than minor, and the proposal accords with the relevant ODP, PDP and RPS objectives and policies, it is considered that the proposal will not offend against the general resource management principles set out in Part 2 of the Act.

13.0 Other Matters (Section 104(1)(C))

13.1 Record of Title Interests

The Record of Title for the site is not subject to any interests.

14.0 Conclusion

14.1 Outline Plan of Works

Overall, it is considered that pursuant to Section 176A of the Resource Management Act 1991, the proposal meets all applicable conditions for the designation and is consistent with the purpose of the designation.

14.2 Land Use Consent

The proposal involves works including entrance upgrade, carparking, pedestrian footpaths (internal), stormwater and wastewater upgrade for Oruaiti School at 2554 State Highway 10, Mangōnui within in the Far North District.

Based on the above report it is considered that:

- Public notification is not required as adverse effects in relation to stormwater, construction activities, transport, cultural effects and ecological are considered to be less than minor.
- There are also positive effects including improving stormwater management and improving pedestrian and vehicular safety and access to the school;
- Limited notification is not required as no persons are considered to be adversely affected by the proposal;
- The proposal accords with the relevant ODP, PDP and RPS objectives and policies; and

- The proposal is considered to be consistent with Part 2 of the Act.

It is therefore concluded that the proposal satisfies all matters the consent authority is required to assess, and that it can be granted on a non-notified basis.

Parcel: Part Allot 18A PSH OF Mangonui East

Summary

Appellation	Part Allot 18A PSH OF Mangonui East
Parcel Status	Current
Intent	DCDB
Associated Feature	-
Land District	North Auckland
Non Surveyed Definition	-
Parcel ID	4901722
Parcel Area	-
Total Area	5.3497 Ha

Survey Number	Land District	Survey Date
SO 11108	North Auckland	-

Statutory Actions

Statutory Action	**New Zealand Gazette 1904 p 1496**
Type	Gazette Notice
Recorded	4 April 2002
Action	Create
Status	Current
Statute	-
Purpose	School Reserve
Name	-
Comments	-

Rural Lands in Otago Land District open for Sale or Selection.

RANFURLY, Governor.

IN pursuance and exercise of the powers and authorities conferred upon me by the one-hundred-and-thirty-sixth section of "The Land Act, 1892," I, Uchter John Mark, Earl of Ranfurly, the Governor of the Colony of New Zealand, having received the report of the Surveyor General in this behalf, as in the said section is provided, do hereby declare that the rural lands described in the Schedule hereto shall be open for sale or selection on and after the twenty-fifth day of July, one thousand nine hundred and four: and also that the lands mentioned in the said Schedule may, at the option of the applicant, be purchased for cash, or be selected for occupation with right of purchase or on lease in perpetuity, or, in respect of any land containing or supposed to contain any metal, mineral, or valuable stone, be selected on lease in perpetuity only; and I do hereby also fix the prices at which the said lands shall be sold, occupied or leased, as mentioned in the said Schedule hereto, and do declare that the said lands shall be sold, occupied, or leased under and subject to the provisions of "The Land Act, 1892."

SCHEDULE.

OTAGO LAND DISTRICT.

County.	District.	Section.	Block.	Area.	Cash Price.		Occupation with Right of Purchase: Rent, 5 per Cent.		Lease in Perpetuity: Rent, 4 per Cent.	
					Per Acre.	Total Price.	Rent per Acre per Annum.	Half-yearly Rent.	Rent per Acre per Annum.	Half-yearly Rent.
				First-class Land.						
				A. R. P.	£ s. d.	£ s. d.	s. d.	£ s. d.	s. d.	£ s. d.
Maniototo	Upper Taieri	53	I.	391 1 0	1 0 10	391 0 0	1 0	9 15 6	0 9·6	7 16 5
Open, level, agricultural land, with soil of good quality; not well watered, but there is access to the Sowburn Stream.										
Maniototo	Upper Taieri	38	VII.	249 2 14	1 2 6	281 5 0	1 1·5	7 0 5	0 10·8	5 12 6
"	"	39	"	218 3 0	1 5 0	273 15 0	1 3	6 16 11	1 0	5 9 6
Open, level, agricultural land, with soil of good quality; suitable for orchards, if water obtainable. Distant about one mile and a half from Pateroa Township. Altitude, 1,300 ft.										
				Second-class Land.						
Maniototo	Upper Taieri	48	I.	554 1 24	1 0 0	554 0 0	1 0	13 17 0	0 9·6	11 1 7
		12	II.							
"	"	49	I.	684 1 30	1 0 0	684 0 0	1 0	17 2 0	0 9·6	13 13 7
		11	II.							
"	"	50	I.	354 1 30	0 12 6	221 5 0	0 7·5	5 10 8	0 6	4 8 6
Open, level, pastoral land, soil gravelly; though not well watered, Section 50 has access to the Sowburn Stream, and the other sections have access to this stream as well as to the Taieri River. Distant about three miles from Pateroa Township, by good road. Altitude, 1,300 ft.										
Maniototo	Upper Taieri	51	I.	382 0 32	0 15 0	286 10 0	0 9	7 3 3	0 7·2	5 14 7
Open, level, agricultural land, soil of fair quality; intersected by a water-race, and has access to the Sowburn Stream. Distant about two miles from Pateroa Township, by good road. Altitude, 1,300 ft.										
Maniototo	Upper Taieri	52	I.	388 2 24	0 17 6	340 7 6	0 10·5	8 10 2	0 8·4	6 16 2
Open, level, agricultural land, with soil of good quality; not well watered, but there is access to the Sowburn Stream.										
Maniototo	Upper Taieri	24	VI.	523 2 26	0 16 8	436 13 4	0 10	10 18 4	0 8	8 14 8
Open, level and undulating, pastoral land, soil of fair quality in parts; no water. Access by good road; distant about two miles from Pateroa Township. Altitude, 1,300 ft.										

As witness the hand of His Excellency the Governor, this sixth day of June, one thousand nine hundred and four.

J. CARROLL,
For Minister of Lands.

Lands permanently reserved.

RANFURLY, Governor.

WHEREAS by the two-hundred-and-thirty-fifth section of "The Land Act, 1892," it is enacted that the Governor may from time to time, either by general or particular description, and whether the same has been surveyed or not, reserve from sale temporarily, notwithstanding that the same may be then held under pastoral license, any Crown lands which in his opinion are required for any of the purposes in the said section mentioned:

And whereas by the two-hundred-and-thirty-sixth section of the said Act it is provided that land temporarily reserved under the said two-hundred-and-thirty-fifth section may, at the expiration of one month but not later than six months after the publication in the *Gazette* of notice of such temporary reservation, be permanently reserved, and that notice of such permanent reservation shall be published in the *Gazette*:

And whereas the lands specified in the first column of the Schedule hereto were, by the Warrants the dates of which are specified in the third column of the said Schedule, and the notifications of which were published in the *Gazettes* specified in the fourth column, temporarily reserved under the authority of the said Act for the purposes specified in the second column of the said Schedule:

Now, therefore, I, Uchter John Mark, Earl of Ranfurly, the Governor of the Colony of New Zealand, in pursuance and exercise of the power and authority vested in me by the said Act, do hereby permanently reserve the lands so temporarily reserved as aforesaid, and enumerated in the first column of the Schedule hereto, for the purposes specified in the second column of the said Schedule, being the same purposes for which the said lands were so temporarily reserved as aforesaid.

SCHEDULE.

First Column. Description of Reserves.					Second Column.	Third Column.	Fourth Column.
Land District.	Locality.	Section.	Block.	Area.	Purpose for which Land reserved.	Date of Warrant.	Gazette.
				A. R. P.		1904.	1904.
Auckland ..	Orahiri S.D.* ..	8	XV.	3 0 15	Railway	24 Feb.	No. 19, 3 Mar.
" ..	Waipu Parish ..	231A	..	5 0 0	Public-school site		
" ..	" ..	195A	..	21 0 0	Recreation	"	" "
" ..	Town of Paeroa ..	4	XXII.	0 1 0	Recreation ..	26 Mar.	No. 29, 7 Apr.
" ..	Ngaroto Parish ..	75A	..	121 0 0	Recreation	"	" "
" ..	Mangonui East Parish	18A	..	13 2 10	Public-school site	"	" "
" ..	Opotiki S.D.* (Waioeka Parish)	375	III.	8 0 9	Night-soil depot ..	"	" "
" ..	Tokatoka S.D.* ..	4	XI.	74 3 10	Preservation of kahikatea timber	"	" "
" ..	Maramarua Parish	55A	..	0 2 0	Public-hall site	7 April	No. 30, 14 Apr.
Taranaki ..	Town of New Plymouth	2348	..	0 0 4	Cemetery ..	26 Mar.	No. 29, 7 Apr.
Wellington	Rimutaka S.D.* ..	129	I.	0 1 24	Railway	"	" "
"	Tiffin S.D.* ..	..	I., II., V.	1285 0 0	Forest	"	" "
"	Koitiata S.D.* ..	192	I.	9 0 0	Travelling stock	11 April	No. 30, 14 Apr.
"	" ..	191	I.	85 2 0	Recreation		
						1903.	1903.
Westland ..	Kanieri S.D.* ..	Res. 356	V.	5 0 19	Recreation ..	9 Dec.	No. 95, 17 Dec.
Canterbury	Pukaki S.D.* ..	Res. 3701 (formerly part of Res. No. 182)	XIII.	176 0 0	Recreation		
						1904.	1904.
"	Pukaki West S.D.*	Res. 3702 (formerly part of Res. No. 183)	XV.	180 0 0	Recreation	15 April	No. 33, 21 Apr.
	Strachey S.D.*		III.				
Otago ..	Town of Hawksbury	14	XIII.	1 0 11	Public-school site ..	26 Mar.	No. 29, 7 Apr.
" ..	Town of Bastings ..	1, 2, 48, 49, 50	I.	1 1 14	Recreation ..	"	" "
Southland	Winton Hundred ..	76	VIII.	4 3 2	Rifle range	"	" "
"	" ..	77	VIII.	4 3 14	Rifle range	"	" "

* Survey District.

As witness the hand of His Excellency the Governor, this second day of June, one thousand nine hundred and four.

T. Y. DUNCAN,
Minister of Lands.

Arrangements for First Elections, &c., Collingwood County.

Colonial Secretary's Office,
Wellington, 2nd June, 1904.

HIS Excellency the Governor has been pleased to appoint

FREDERICK WEST

to be the person to make up electors' rolls for the Ridings of Aorere and Pakawau, in the County of Collingwood, as constituted by "The Counties Act, 1886," and "The Collingwood County Act, 1903"; also to be Returning Officer to conduct the first elections of members of the Council of the said county, and to be the Clerk of the Council of the said county for the purpose of presiding at the first meeting thereof.

J. G. WARD.

Rangers under the Animals Protection Acts, Mangonui-Whangaroa and Waitaki-Waimate Districts, appointed.

Colonial Secretary's Office,
Wellington, 2nd June, 1904.

HIS Excellency the Governor has been pleased to appoint the undermentioned persons to be Rangers under "The Animals Protection Act, 1880," and the Acts amending the same, for the districts set opposite their names respectively, viz.:—

Name.	District.
TEPANA MATHEWS	Mangonui-Whangaroa.
SAMUEL JOHN ADAMS ..	Waitaki-Waimate.

J. G. WARD.

Deputy Registrar of Marriages, &c., appointed.

Colonial Secretary's Office,
Wellington, 6th June, 1904.

HIS Excellency the Governor has been pleased to appoint

EAGLE D'ARCY HAMILTON

to be the Deputy of the Registrar of Marriages and of Births and Deaths for the District of Kawhia.

J. G. WARD.

Appointment of Vice-Consul for the Netherlands, at Dunedin, recognised.

Colonial Secretary's Office,
Wellington, 6th June, 1904.

HIS Excellency the Governor directs it to be notified that he has been instructed by His Majesty's Principal Secretary of State for the Colonies to recognise the appointment of

GEORGE RITCHIE, Esquire,

as Vice-Consul for the Netherlands, at Dunedin.

J. G. WARD.

Commissioner of Crown Lands appointed.

Department of Lands and Survey,
Wellington, 2nd June, 1904.

HIS Excellency the Governor has been pleased to appoint

JAMES MACKENZIE

to be Commissioner of Crown Lands for the Land District of Auckland, as from the 1st day of June, 1904, *vice* Gerhard John Mueller.

C. H. MILLS,
For Minister of Lands.

Chief Surveyor appointed.

Department of Lands and Survey,
Wellington, 2nd June, 1904.

HIS Excellency the Governor has been pleased to appoint

JAMES MACKENZIE

to be Chief Surveyor for the Land District of Auckland, as from the 1st day of June, 1904, *vice* Gerhard John Mueller.

C. H. MILLS,
For Minister of Lands.

B.251112.2 Gazette Notice (NZ Gazette 17 November 1983 No 192 page 4000) declaring part (275 m^2 and 184 m^2) adjoining State Highway No.10 to be stopped road and adding the land to Allotment 18A Parish of Mangonui to be held as a reserve for a public school site- 6.1.1984 at 10.15 o'c

A.L.R.

B.251112.3 Gazette Notice (NZ Gazette 17 November 1983 No 192 page 3999) declaring part (409 m^2 and 979 m^2) to be set apart for road- 6.1.1984 at 10.15 o'c

A.L.R.

10.15 06.JAN84 B 251112.1
PARTICULARS ENTERED IN REGISTER
LAND REGISTRY AUCKLAND
ASST. LAND REGISTRAR

No. 29

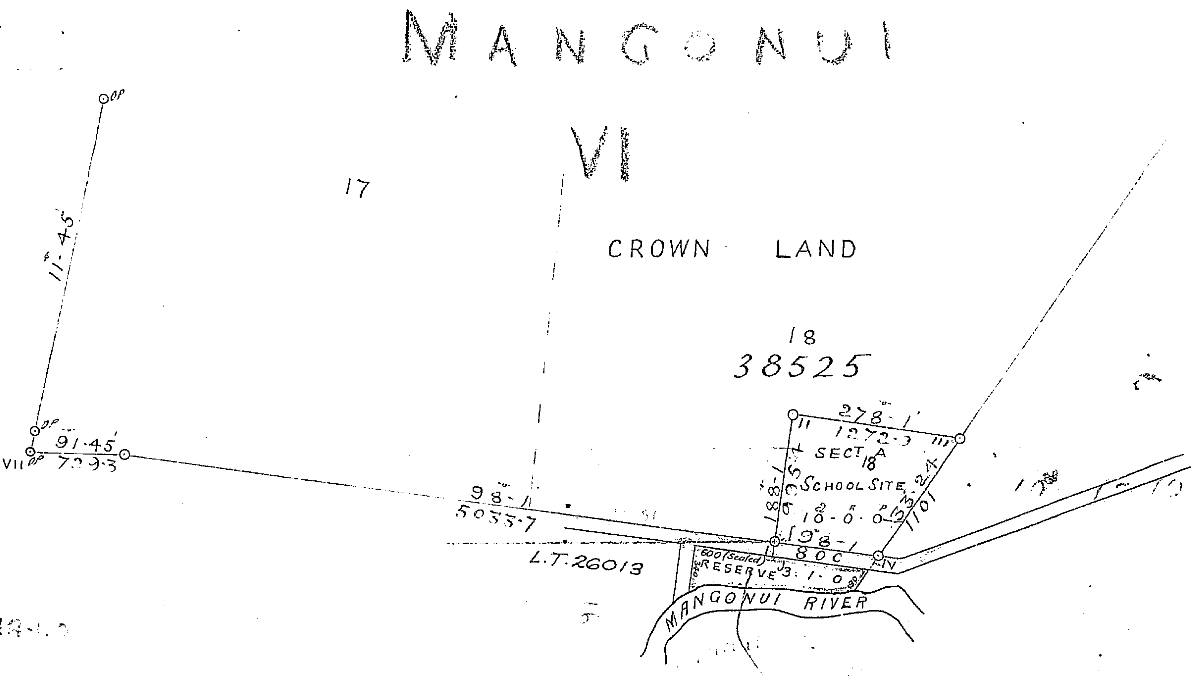
NORTH AUCKLAND, N.Z.

PLAN

OF SCHOOL SITE ORUAITI.
BLOCK VI.
PARISH of MANGONUI EAST.

Scale 10 Chains to an Inch

Surveyed by W. C. O'Neill Novr 1897
Mangonui.



Sec. 18A = 10.1.10
Res. = 3.1.0
13.2.10

[illegible]RED on Block VI Mangonui S.D
" " Record Map "
" " Index " "
" " Selection "
4.5.98

To Mr McKellar
14. 12. 97.

[illegible]LD BOOK
[illegible]V. REDTNS. AZ-199
[illegible]CEIVED 10 . 12 . 97
[illegible]XAMINED
[illegible]GISTERED 14 . 12 . 97

L&S. 2338 A / 252

8 - 11 - 97
Field Book No 5 page 30

1108

Parcel: Stopped Road Survey Office Plan 51928

Summary

Appellation	Stopped Road Survey Office Plan 51928
Parcel Status	Current
Intent	DCDB
Associated Feature	-
Land District	North Auckland
Non Surveyed Definition	-
Parcel ID	4907253
Parcel Area	0.0275 Ha (275 m^2)
Total Area	-

Survey Number	Land District	Survey Date
SO 51928	North Auckland	-

Statutory Actions

Statutory Action	**New Zealand Gazette 1983 p 4000**
Type	Gazette Notice
Recorded	4 April 2002
Action	Create
Status	Current
Statute	-
Purpose	School Reserve
Name	-
Comments	-

Dated at Wellington this 10th day of November 1983.

J. R. BATTERSBY,
for Minister of Works and Development.

(P.W. 72/10/1/0; Ak. D.O. 50/23/102/0)

16/1

Declaring Land Held for Defence Purposes to be Crown Land in Block III, Whangaroa Survey District, Whangaroa County

PURSUANT to section 42 of the Public Works Act 1981, the Minister of Works and Development declares the land described in the Schedule hereto to be Crown land, subject to the Land Act 1948.

SCHEDULE

NORTH AUCKLAND LAND DISTRICT

ALL that piece of land containing 6 acres, 2 roods, and 31 perches (2.7089 hectares), situated in Block III, Whangaroa Survey District, and being part Matakaraka B Block; as shown coloured yellow on S.O. Plan 33991 (P.W.D. 123691), deposited in the office of the Minister of Works and Development at Wellington. Part Proclamation No. 11879.

Dated at Wellington this 10th day of November 1983.

J. R. BATTERSBY,
for Minister of Works and Development.

(P.W. 23/646/1; Ak. D.O. 50/8/5)

16/1

Land Held for Buildings of the General Government Set Apart for Agricultural Purposes in the City of Wellington

PURSUANT to section 52 of the Public Works Act 1981, the Minister of Works and Development hereby declares the land described in the Schedule hereto to be set apart for agricultural purposes and shall remain vested in the Crown.

SCHEDULE

WELLINGTON LAND DISTRICT

ALL those pieces of land situated in the City of Wellington, described as follows:

A.	R.	P.	Being
0	0	10.22 (258 m²)	Subdivision 16A, Pipitea Pa. Part Proclamation 3472, Wellington Land Registry; excepting that portion of 0.34 perches, contained in certificate of title 16A/1459.
0	0	13.51 (341.5 m²)	Subdivision 17, 18, and part 28, Pipitea Pa. Part Proclamation 3472, Wellington Land Registry.

Dated at Wellington this 10th day of November 1983.

J. R. BATTERSBY,
for Minister of Works and Development.

(P.W. 24/1729; Wn. D.O. 45/42/19)

16/1

Declaring Crown Land to be Set Apart for State Housing Purposes in the City of New Plymouth

PURSUANT to section 52 of the Public Works Act 1981, the Minister of Works and Development declares the land described in the Schedule hereto to be set apart for State housing purposes.

SCHEDULE

TARANAKI LAND DISTRICT

ALL those pieces of land situated in the City of New Plymouth, described as follows:

Area m²	Being
610	Lot 18, D.P. 10428.
539	Lot 19, D.P. 10428.
559	Lot 20, D.P. 10428.
675	Lot 21, D.P. 10428.

Parts certificate of title, No. C3/143.

Dated at Wellington this 8th day of November 1983.

J. R. BATTERSBY,
for Minister of Works and Development.

(P.W. 104/114/0; Wg. D.O. 5/64/0/7)

16/1

Declaring Crown Land to be Set Apart for State Housing Purposes in the City of New Plymouth

PURSUANT to section 52 of the Public Works Act 1981, the Minister of Works and Development declares the land described in the Schedule hereto to be set apart for State housing purposes.

SCHEDULE

TARANAKI LAND DISTRICT

ALL that piece of land containing 1672 square metres, situated in the City of New Plymouth, being Lot 141, D.P. 9889. Part *Gazette* notice 269169 (*New Zealand Gazette*, 1980, page 1865).

Dated at Wellington this 8th day of November 1983.

J. R. BATTERSBY,
for Minister of Works and Development.

(P.W. 104/114/0; Wg. D.O. 5/64/0/7)

16/1

Declaring Land Held for State Housing Purposes to be Crown Land in the City of New Plymouth

PURSUANT to section 42 of the Public Works Act 1981, the Minister of Works and Development declares the land described in the Schedule hereto, subject to the building line restriction contained in memorandum of acceptance 229063.1, to be Crown land.

SCHEDULE

TARANAKI LAND DISTRICT

ALL those pieces of land situated in Blocks VIII and IX, Paritutu Survey District, described as follows:

Area ha	Being
8.2708	Lot 1, D.P. 10490. All certificate of title No. E1/1018.
8.2733	Lot 2, D.P. 10490. All certificate of title No. E1/1019.

Both being part Maori Reserve 2 (Ararepe), part Sections 67 and 832, Grey District.

Dated at Wellington this 8th day of November 1983.

J. R. BATTERSBY,
for Minister of Works and Development.

(P.W. 104/114/0; Wg. D.O. 5/64/0/7)

16/1

Amending a Notice Declaring a Leasehold Estate in Land Held for Police Purposes (Residence) to be Set Apart for the Transmission of Electricity (Housing) in the Borough of Stratford

PURSUANT to section 55 of the Public Works Act 1981, the Minister of Works and Development hereby amends the notice dated 6 September 1983, and published in *Gazette*, 15 September 1983, No. 150, at page 3067, declaring a leasehold estate in land held for police purposes (residence) to be set apart for the transmission of electricity (housing) in the Borough of Stratford, by deleting from line 5 of the body of the said notice the figure "18001" and substituting the figure "193949" therefor.

Dated at Wellington this 8th day of November 1983.

J. R. BATTERSBY,
for Minister of Works and Development.

(P.W. 92/16/35/6; Wg. D.O. 38/8/0)

18/1

Road Stopped in Block VI, Mangonui Survey District, Mangonui County, and Added to Land Held as a Reserve for a Public School Site

PURSUANT to sections 116 and 117 (7) of the Public Works Act 1981, the Minister of Works and Development hereby declares that the road described in the First Schedule hereto is hereby stopped and added to the land held as a reserve for a public school site in the Second Schedule hereto.

FIRST SCHEDULE

NORTH AUCKLAND LAND DISTRICT

ALL those pieces of road situated in Block VI, Mangonui Survey District, described as follows:

Area m²	Adjoining or passing through
275	Part Allotment 18A, Mangonui East Parish; marked "D" on plan.
184	Part Allotment 18A, Mangonui East Parish; marked "H" on plan.

As shown marked as above mentioned on S.O. Plan 51928, lodged in the office of the Chief Surveyor at Auckland.

SECOND SCHEDULE

NORTH AUCKLAND LAND DISTRICT

ALL that piece of land containing 13 acres, 2 roods, and 10 perches, situated in Block VI, Mangonui Survey District and being Allotment 18A, Mangonui East Parish.

Dated at Wellington this 10th day of November 1983.

J. R. BATTERSBY,
for Minister of Works and Development.

(P.W. 72/10/1/0; Ak. D.O. 50/23/102/0)

16/1

Amending a Notice Declaring Land to be Road and Road Stopped in Blocks I and V, Otanewainuku Survey District, Tauranga County

PURSUANT to section 55 of the Public Works Act 1981, the Minister of Works and Development, hereby amends the notice dated the 15th day of June 1983, published in *Gazette*, 23 June 1983, No. 88, page 1927, declaring land to be road and road stopped in Blocks I and V, Otanewainuku Survey District, Tauranga County, pursuant to Part VIII of the Public Works Act 1981, by omitting paragraph (b) (ii) thereto and substituting the following:

"(ii) The area marked "B" on plan, now known as Allotment 330, Parish of Te Papa, shall vest in Henry Gerard Van Den Broek, of Papamoa, carpenter and Moira Jean Van Den Broek, of Papamoa, bank officer, subject to memoranda of mortgage H.467524.4 and H.467524.5, South Auckland Land Registry."

Dated at Wellington this 10th day of November 1983.

J. R. BATTERSBY,
for Minister of Works and Development.

(P.W. 53/52/0; Hn. D.O. 24/0/212)

16/1

Land Declared to be Road in the Borough of Huntly

PURSUANT to Part VIII of the Public Works Act 1981, the Minister of Works and Development declares the land described in the Schedule hereto to be road and vested in The Huntly Borough Council.

SCHEDULE

SOUTH AUCKLAND LAND DISTRICT

ALL those pieces of land situated in the Borough of Huntly, described as follows:

Area m²	Being
3681	Lot 30, D.P. S. 25715. Part certificate of title No. 24A/239.
2972	Lot 268, D.P. S. 27897. All certificate of title No. 26A/358.
6843	Lot 269, D.P. S. 27896. All certificate of title No. 26A/351.
1591	Lot 50, D.P. S. 27898. All certificate of title No. 26A/374.
7025	Lot 118, D.P. S. 27895. All certificate of title No. 26A/334.
2225	Lot 270, D.P. S. 27894. All certificate of title No. 26A/316.
2151	Lot 271, D.P. S. 27893. All certificate of title No. 26A/299.
2706	Lot 272, D.P. S. 27893. All certificate of title No. 26A/300.
1699	Lot 278, D.P. S. 27892. All certificate of title No. 26A/279.
6262	Lot 277, D.P. S. 26175. All certificate of title No. 24B/799.
702	Lot 283, D.P. S. 26234. All certificate of title No. 24B/703.
1355	Lot 284, D.P. S. 26234. All certificate of title No. 24B/704.
752	Lot 285, D.P. S. 26234. All certificate of title No. 24B/705.
1900	Lot 18, D.P. S. 25714. Part certificate of title No. 24A/239.
3733	Lot 239, D.P. S. 25265. All certificate of title No. 25C/645.
2253	Lot 371, D.P. S. 26581. Part certificate of title No. 25A/1334.
2105	Lot 370, D.P. S. 26580. Part certificate of title No. 25A/1334.
2201	Lot 369, D.P. S. 26578. Part certificate of title No. 25A/1307.
3021	Lot 368, D.P. S. 26577. Part certificate of title No. 25A/1307.
2345	Lot 367, D.P. S. 26576. Part certificate of title No. 25A/1318.
5201	Lot 333, D.P. S. 25986. Part certificate of title No. 25C/649.
1429	Lot 85, D.P. S. 25984. Part certificate of title No. 25C/649.
828	Lot 148, D.P. S. 25986. Part certificate of title No. 25C/649.
4873	Lot 143, D.P. S. 27367. All certificate of title No. 25A/1377.
3930	Lot 110, D.P. S. 27368. All certificate of title No. 25A/1378.
1128	Lot 43, D.P. S. 25278. Part certificate of title No. 25A/1281.
1166	Lot 44, D.P. S. 25281. Part certificate of title No. 25A/1281.

Dated at Wellington this 10th day of November 1983.

J. R. BATTERSBY,
for Minister of Works and Development.

(P.W. 51/4892; Hn. D.O. 43/13/0)

16/1

Declaring Land to be Road in the Borough of Taupo

PURSUANT to section 114 of the Public Works Act 1981, the Minister of Works and Development declares the land described in the Schedule hereto to be road, which shall vest in The Taupo Borough Council.

SCHEDULE

SOUTH AUCKLAND LAND DISTRICT

ALL that piece of land containing 463 square metres, situated in Block XIII, Tatua Survey District, being part Rangatira No. 2 Block; as shown marked "A" on S.O. Plan 51479, lodged in the office of the Chief Surveyor at Hamilton.

Dated at Wellington this 10th day of November 1983.

J. R. BATTERSBY,
for Minister of Works and Development.

(P.W. 35/817; Hn. D.O. 43/20/0/41)

16/1

Declaring Land to be Road in Block IX, Mangaorongo Survey District, Otorohanga District

PURSUANT to section 114 of the Public Works Act 1981, the Minister of Works and Development declares the land described in the Schedule hereto to be road, which shall vest in The Otorohanga District Council.

SCHEDULE

SOUTH AUCKLAND LAND DISTRICT

ALL that piece of land containing 2928 square metres, situated in Block IX, Mangaorongo Survey District, being part Lot 1, D.P. 25337; as shown marked "A" on S.O. Plan 51917, lodged in the office of the Chief Surveyor at Hamilton.

Dated at Wellington this 10th day of November 1983.

J. R. BATTERSBY,
for Minister of Works and Development.

(P.W. 34/4593; Hn. D.O. 98/6/0/4)

16/1

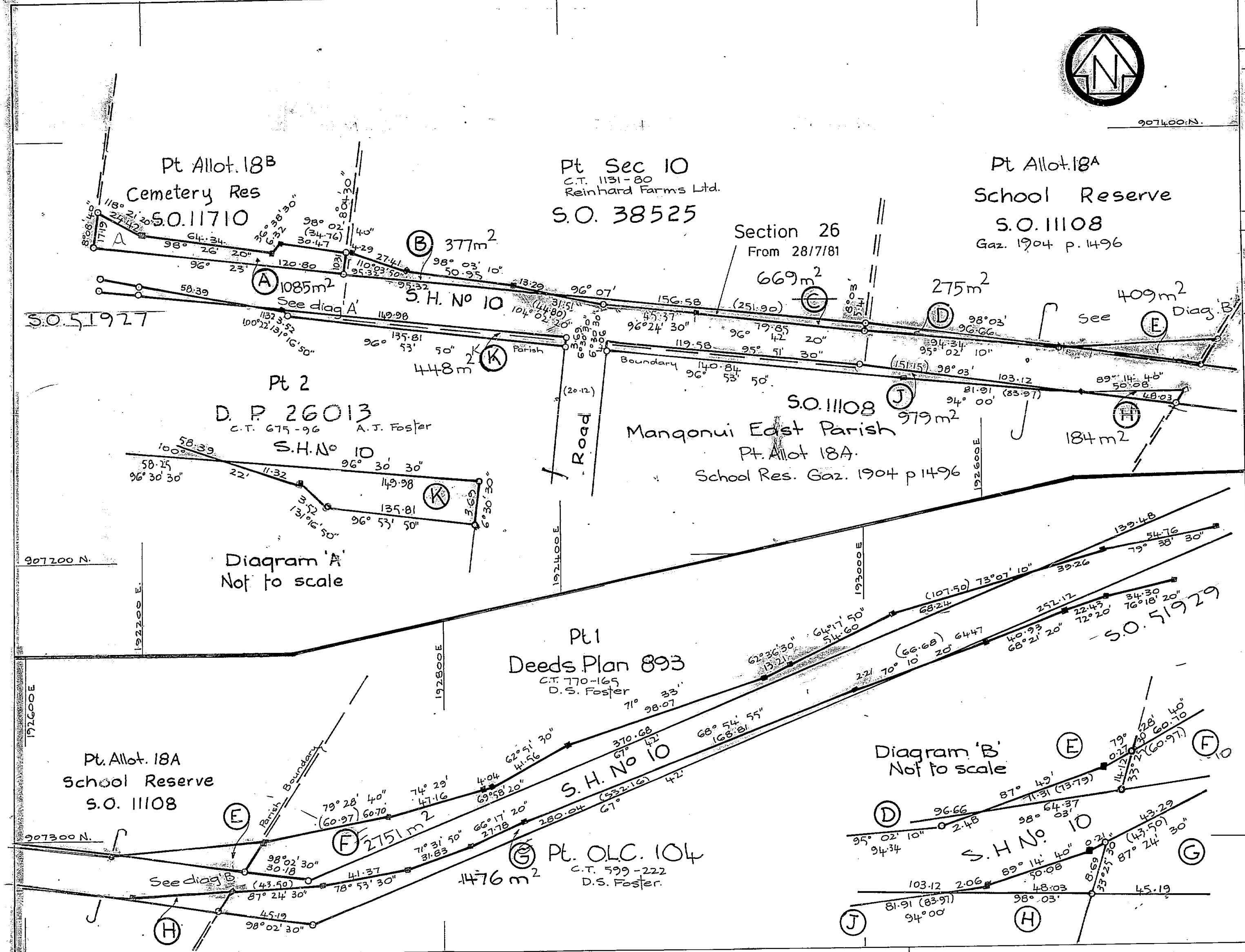
Leasehold Estate Acquired for the Purposes of a Road in Westland County

PURSUANT to section 20 of the Public Works Act 1981, the Minister of Works and Development declares that, an agreement to that effect having been entered into, the leasehold estate in the land described in the Schedule hereto held by Jeffrey David Sweney, of Lake Kaniere, contractor, and Eileen Denise Sweney, his wife, under and by virtue of renewable lease farm land No. 374, recorded in Volume 5A, folio 27, Westland Land Registry, is hereby acquired for the purposes of a road on the 17th day of November 1983.

SCHEDULE

WESTLAND LAND DISTRICT

ALL that piece of land containing 2383 square metres, situated in Block XII, Waitaha Survey District, being part Rural Section 5646; marked 'A' on S.O. Plan 9368, lodged in the office of the Chief Surveyor at Hokitika.



Approvals

ROADS SHOWN ARE LEGAL

Schedule of Areas

Land to be taken for Road

Land to be Taken	Shown	Area
Pt Allot. 18B	A	1085 m²
Pt Sec. 10.	B	377 m²
Pt Allot. 18A	E	409 m²
Pt Lot 1 Deeds Plan 893	F	2751 m²
Pt Allot. 18A.	J	979 m²
Pt 2 D.P. 26013	K	448 m²
Total Area.		6049 m²

Road to be closed.

Adjoining	Shown	Area
Pt Sec 10 Blk VI Mangonui S.D.	C	669 m²
Pt. Allot. 18 A.	D	275 m²
Pt. Allot 18 A.	H	184 m²
Pt O.L.C. 104 Blk VI Mangonui S.D.	G	1476 m²
Total Area.		2604 m²

This plan is concurrent with S.O.s 51918 - 51927 and S.O. 51929

Approved 23/5/1977. [signature]
for District Commissioner of Works.

Total Area 8653 m²

Comprised in

I, Robert Gilkison of Mangonui Registered Surveyor and holder of an annual practising certificate hereby certify that this plan has been made from Surveys executed by me or under my direction; that both plan and Survey are correct and have been made in accordance with the regulations under the Surveyors Act 1966

Dated at Kaitaia this 16th day of February 1977 Signature [signature]

Field Book p. Traverse Book p.

Reference Plans

Examined [signature] Correct [signature]

Approved as to Survey

26/5/78 [signature] Chief Surveyor

Deposited this day of 19

District Land Registrar

File Received 1 March 1977
Instructions

SO 51928

LAND DISTRICT NORTH AUCKLAND
SURVEY BLK. & DIST. VI MANGONUI
NZMS SHEET No.

Plan of land required for road and road to be closed and Section 26 Blk VI
Mangonui S.D.

LOCAL AUTHORITY MANGONUI COUNTY
Surveyed by Von Sturmer & Webster
Scale 1 : 1250 Date Sept 1976

L&S FORM N 93

Printed by ... W.S. Boyes, Surveyor-General, Department of Lands and Survey, Wellington

DATE OF PHOTOGRAPHY 14 AUG 1981

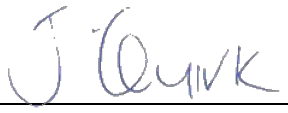
AGENT AUTHORISATION FORM

We, Oruaiti School Board *(the client),* legal property owner of 2554 State Highway 10, Mangonui 0494 give Hamish Gibson of LDE Ltd authorisation to act as the agent for our proposed applications with the Far North District Council.

We, the client will be responsible for the invoice payment for the consents and the council should contact Hamish as the preferred means of communication.

Signatories full name: Janene Quirk

Signatories role within school: Ministry of Education Property Adviser

Signature: 

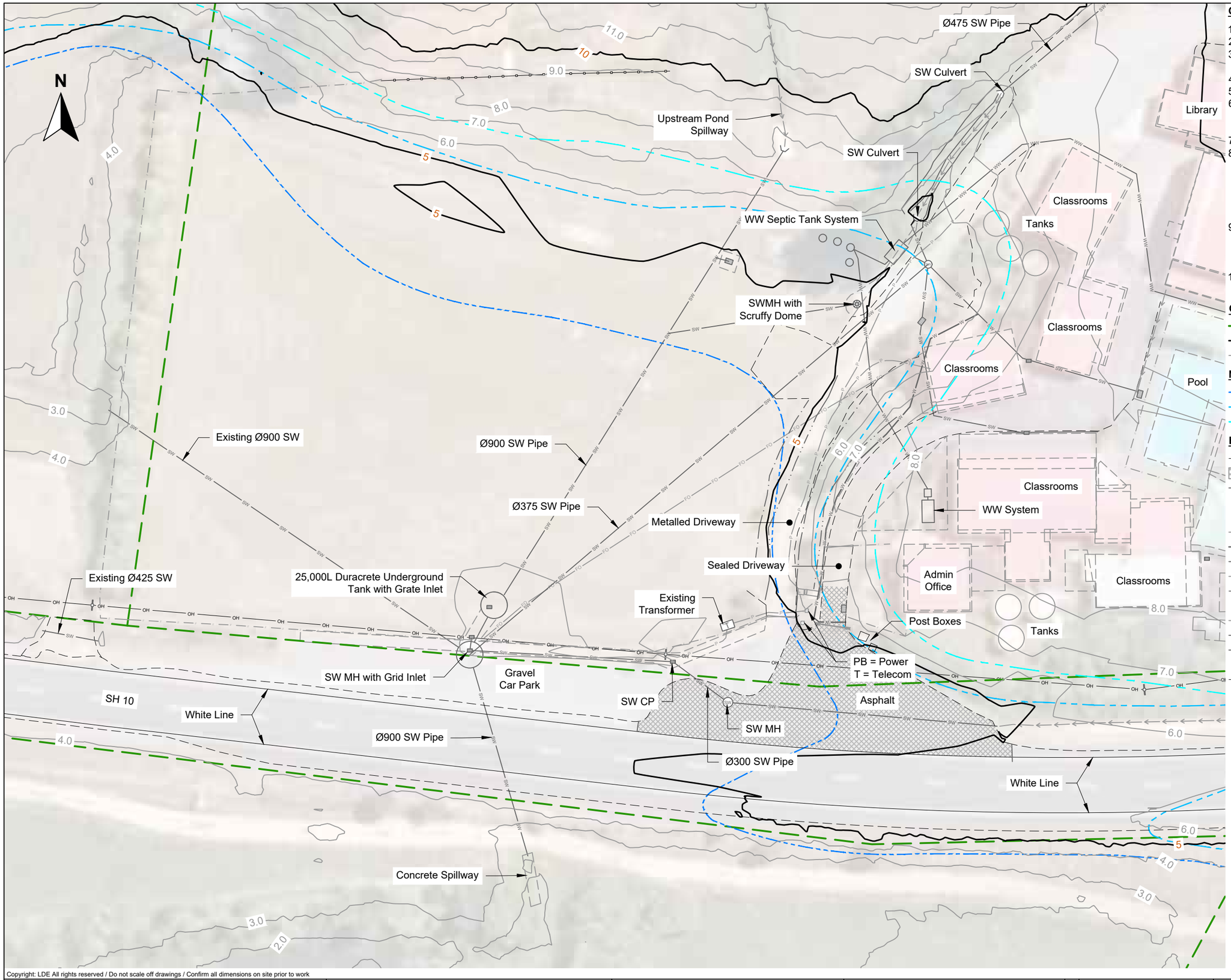
Dated: 03/04/2025

Project Number: 21102
Project Office: Warkworth
Project Manager: Riaan de Swardt
Issue Date: 1 April 2025

Drawing Status: Resource Consent

Proposed Carpark Upgrades
Oruaiti School Board of Trustees c/o Avail Pacific
2554 State Highway 10, Mangonui

Drawing Index			
Sheet	Description	Status	Revision
C001	Existing Site Plan	Resource Consent	C
C002	Demolition and Reinstatement Plan	Resource Consent	B
C100	Construction Staging Layout	Resource Consent	B
C200	Earthworks Layout	Resource Consent	C
C300	Overall Site Layout	Resource Consent	D
C301	Parking Area & Accessway Design Plan Sheet 1 of 3	Resource Consent	D
C302	Parking Area & Accessway Design Plan Sheet 2 of 3	Resource Consent	D
C303	Parking Area & Accessway Design Plan Sheet 3 of 3	Resource Consent	D
C304	Signage Layout	Resource Consent	A
C305	Concrete Saw-cuts Layout	Resource Consent	B
C310	Parking Area & Accessway Longitudinal Sections	Resource Consent	C
C311	Parking Area & Accessway Typical Cross Sections	Resource Consent	C
C312	Parking Area & Accessway 5m Interval Cross Sections Sheet 1 of 3	Resource Consent	C
C313	Parking Area & Accessway 5m Interval Cross Sections Sheet 2 of 3	Resource Consent	C
C314	Parking Area & Accessway 5m Interval Cross Sections Sheet 3 of 3	Resource Consent	C
C320	Parking Area & Accessway Typical Details Sheet 1 of 2	Resource Consent	D
C321	Parking Area & Accessway Typical Details Sheet 2 of 2	Resource Consent	B
C400	Parking Area & Accessway Stormwater Management Plan	Resource Consent	C
C410	Parking Area & Accessway Stormwater Longitudinal Sections Sheet 1 of 2	Resource Consent	C
C411	Parking Area & Accessway Stormwater Longitudinal Sections Sheet 2 of 2	Resource Consent	C
C420	Parking Area & Accessway Typical Stormwater Device Details	Resource Consent	C
C421	Parking Area & Accessway Typical Stormwater Details	Resource Consent	C



General Notes:

1. All dimensions in metres unless noted otherwise.
2. Coordinates are in terms of NZGD Mt Eden 2000.
3. All levels are in metres to NZVD2016. Origin of levels RCM XIII SO 50961 RL 11.81m.
4. Survey undertaken by Donaldsons; 25 July 2022.
5. Existing titles - Pt Allot 18A PSH OF Mangonui East
6. Boundaries and are approximate only and are subject to change. Final boundaries will be in accordance with city plan and LINZ requirements.
7. Boundaries not for building design purposes.
8. Existing building, roading, and services information may have been obtained from third party records and should be verified on site prior to the commencement of any works. LDE does not in any way guarantee the accuracy of any underground service shown on this plan.
9. Contractor to locate / mark / confirm and protect if necessary all existing services prior to commencement of work on site. Any discrepancies to be reported to the Engineer.
10. Flood extent extracted from NRC Natural Hazards and shown indicatively for information only.

General Legend:

- Boundary (Surveyed)
- Major Contour
- Minor Contour

NRC River Flood Hazard Zone - Regionwide Models

- 10 Year Exent
- 50 Year Extent
- 100 Year CC Extent

Existing Services Legend:

- Edge of Road
- Asphalt Surface
- Stormwater Pipe
- Stormwater Manhole, Wingwall, Scruffy Dome, Catchpit
- Open Drain
- Water Pipe
- Wastewater Pipe
- Underground Power Lines
- Power Pole & Over Head Lines
- Transformer
- Fibre Optic Lines
- Top of Bank
- Bottom of Bank
- Fence / Gate
- Retaining Wall

0 5 10 15 20 25

Scale 1:500 (m)

Original size = A3

Client	Oruaiti School Board of Trustees c/o Avail Pacific
Project	2554 State Highway 10, Mangonui Proposed Carpark Upgrades
Drawing Title	Existing Site Layout

engineers • scientists

No.	Issue/Revision	Aprvd	Date
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	J. S	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:500
Project status:	Resource Consent
Project:	21102
Drawing No:	C001
Issue/Rev	C

Demolition and Reinstatement Notes:

- This plan should be read in conjunction with the proposed plans included in the Detailed Design drawing set.
- Where it's stated to "re-use" or "replace", refer to the proposed plans for details.
- All works to be undertaken in accordance with FNDC Engineering Standards and the Health and Safety at Work Act 2015 (HSWA).
- Contractor to locate / ml dimensionark / confirm and protect if necessary all existing services prior to commencement of work on site.
- All disturbed public areas to be made good and restored to existing condition.
- All existing vegetation in the proposed works area to be removed and re-used.
- All topsoil removed is to be stockpiled and re-used for reinstatement works. Any excess topsoil to be used elsewhere on site as directed by the School's representatives.

N

Replace existing Scruffy Dome

Tree stumps to be removed where new parking is proposed

Gate to remain

Concrete staircase to be demolished and reconstructed

Gate to be removed and re-used

Power and Telecom Boxes to remain and protected during construction

Transformer to remain and protected during construction

Waharoa to remain and protected during construction

Post Boxes to remain and protected during construction

Power Pole to remain and protected during construction

Underground SW Tank to remain and grate replaced

Concrete footpath to be demolished and disposed off site

SWCP to be demolished and pipe connection to be capped off or removed

Fence to be salvaged for re-used. Care to be taken during removal, as fence to be reinstalled as per proposed plans. Existing posts to be salvaged for the school. New posts to be installed

Existing timber wheel stops to be salvaged and handed over to the school

Underground SW Tank to remain and grate replaced

SWCP Grate to be removed and replaced

SWMH Lid to be removed and replaced

Asphalt to by removed and disposed off site

0 3 6 9 12 15

Scale 1:300 (m)

Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific	Project: 2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Drawing Title: Demolition and Reinstatement Plan	LDE engineers • scientists	B	Revised and Issued for Resource Consent	N. D	Apr 2025	Design: R. de Swardt	Project status: Resource Consent
				A	Issued for Resource Consent	N. D	28 Mar 2025	Drawn: R. de Swardt	Project: 21102
				No.	Issue/Revision	Aprvd	Date	Approved: N. Douglas	Drawing No: C002 / Issue/Rev: B
								Scale A3: 1:500	

N

Staging Notes:

- Contractor's Site Office shown indicatively. Exact area to be confirmed prior to construction.
- The contractor is fully responsible for Health and Safety measures during the construction phase.
- Appropriate fencing, signage, etc. to be installed prior top the start of works.
- Contractor is to allow for all safety fencing for the during of the proposed works.
- The Staging Areas is to be confirmed prior to be commencement of construction.
- Contractor to obtain and maintain all traffic management requirements as per NZTA standards.

Contractor's Site Office Location indicatively shown as 600m^2. Area to be fenced to prevent unauthorised access.

Stage 1

Stage 1

Stage 2

Stabilised Site Office Access

Stage 3

SH10

SH10

Access to Stage 1 Parking is to remain available to the School throughout construction. Contractor to make provision for this within the shown staging area with signage and fencing.

0 5 10 15 20 25

Scale 1:500 (m) Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific	Project: 2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Drawing Title: Construction Staging Plan	LDE engineers • scientists			Design: R. de Swardt	Project status: Resource Consent
						Drawn: R. de Swardt	Project: 21102
						Approved: N. Douglas	Drawing No: C100
						Scale A3: 1:500	Issue/Rev: B

No.	Issue/Revision	Aprvd	Date
	Revised and Issued for Resource Consent	N. D	01 Apr 2025
A	Issued for Resource Consent	N. D	28 Mar 2025

Surface Analysis: Elevation Ranges			
Number	Color	Minimum Elevation (m)	Maximum Elevation (m)
1		-0.244	0.000
2		0.000	0.200
3		0.200	0.400
4		0.400	0.600
5		0.600	0.900

General Notes:

1. All dimensions in metres unless noted otherwise.
2. Coordinates are in terms of NZGD Mt Eden 2000.
3. All levels are in metres to NZVD2016. Origin of levels RCM XIII SO 50961 RL 11.81m.
4. Survey undertaken by Donaldsons; 25 July 2022.
5. Existing titles - Pt Allot 18A PSH OF Mangonui East
6. Boundaries and are approximate only and are subject to change. Final boundaries will be in accordance with city plan and LINZ requirements.
7. Boundaries not for building design purposes.
8. Existing building, roading, and services information may have been obtained from third party records and should be verified on site prior to the commencement of any works. LDE does not in any way guarantee the accuracy of any underground service shown on this plan.
9. Contractor to locate / mark / confirm and protect if necessary all existing services prior to commencement of work on site. Any discrepancies to be reported to the Engineer.
10. Flood extent extracted from NRC Natural Hazards and shown indicatively for information only.

General Legend:

Earthworks Notes:

- All works to be undertaken in accordance with FNDC Engineering Standards, GD05 Guidelines and the Health and Safety at Work Act 2015 (HSWA).
- All disturbed public areas to be made good and restored to previous condition.
- All earthworks to be undertaken during periods of fine weather.
- Earthworks are to be undertaken and completed in within the minimum possible time frame.
- The area is to be progressively finished as areas are brought to grade.
- The earthworks volumes shown is a solid measure.
- The earthworks volumes has been calculated in relation to the existing and final ground levels.
- Topsoil removal volumes is excluded in the total earthworks volumes.
- Additional box cut volumes has not been included in the earthworks volumes.

Erosion and Sediment Control Notes:

- The contractor is solely responsible for ensuring the the site has effective erosion control and sediment retention measures operating at all times.
- All erosion and sediment control measures must be operational prior to any other works commencing on site.
- All sediment control measure are to comply with GD05 and FNDC requirements.

Earthworks Cut / Fill Volumes	
Site Area	41,210m²
Earthworks Area	2,760m²
Cut Volume	20m³
Fill Volume	460m³
Net Fill Volume	440m³

0 5 10 15 20 25

Scale 1:500 (m)

Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific

Project: 2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

Drawing Title: Earthworks Layout

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No.	Issue/Revision	Aprvd	Date
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:500

Project status: Resource Consent

Project: 21102

Drawing No: C200

Issue/Rev: C

B85 Vehicle (Realistic min radius) (2004)

Overall Length	4.910m
Overall Width	1.870m
Overall Body Height	1.421m
Min Body Ground Clearance	0.159m
Track Width	1.770m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	5.750m

B85 VEHICLE DETAIL
NOT TO SCALE

Midi-bus (10m min. published radius)

Overall Length	9.300m
Overall Width	2.360m
Overall Body Height	3.077m
Min Body Ground Clearance	0.312m
Track Width	2.360m
Lock-to-lock time	6.00s
Wall to Wall Turning Radius	10.000m

MINI-BUS DETAIL
NOT TO SCALE

Proposed Services Notes:

1. All works to be undertaken in accordance with FNDC Engineering Standards and the Health and Safety at Work Act 2015 (HSWA).
2. All dimensions in metres unless noted otherwise.
3. Contractor to locate / ml dimensionark / confirm and protect if necessary all existing services prior to commencement of work on site.
4. All disturbed public areas to be made good and restored to existing condition.
5. Manholes to be reinforced concrete chambers with a precast base. Min Ø1050mm manhole unless otherwise specified.
6. Catchpits to be 675 x 450mm reinforced concrete chambers, with trafficable frame & grid inlet lid.
7. All PVC stormwater pipes to be uPVC SN16.
8. All concrete stormwater pipes to be RCRRJ Class 4.
9. Pipe bedding and installation to comply with relevant council details.
10. All lane and parking markings as per MOTSAM.
11. Parking bays as per Appendix 3D of the Far North District Plan (FNDP).
12. All kerbing to be machine extruded, unless specified otherwise by Engineer.

Reference Notes:

13. Refer to C301,C302, C303 for Parking Area Layouts.
14. Refer to C310 for Parking Area and Accessway Longitudinal Sections Layout.
15. Refer to C311 to C314 for Cross Section Layouts.
16. Refer to C320 & C321 for Roading details.
17. Refer to C400 for Stormwater Layout.
18. Refer to C410 to C411 Stormwater Longitudinal Section Layouts.
19. Refer to C420 & C421 for Stormwater details.

Existing Services Legend:

- Boundary (Surveyed)
- Edge of Road
- Stormwater Pipe
- Stormwater Manhole, Wingwall, Scruffy Dome, Catchpit
- Open Drain
- Water Pipe
- Underground Power Lines
- Power Pole & Over Head Lines
- Transformer
- Fibre Optic Lines
- Top of Bank
- Bottom of Bank
- Fence / Gate
- Retaining Wall

Proposed Services Legend:

- Kerb Block
- Kerb & Channel
- Flush Edge Beam
- Bollards or Large Rocks
- Standard Concrete Surface
- Exposed Aggregate Concrete
- Gravel Surface
- Rock Filled Traffic Island
- Grassed Area
- SW Pipe
- SW Perforated Pipe & Rodding Point
- Stormwater Manhole
- SW Manhole with Scruffy Dome
- Stormwater Catchpit
- Stormwater Swale
- SW Flow Direction
- Fence

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

Drawing Title
Overall Site Plan

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No.	Issue/Revision	Aprvd	Date
D	Revised and Issued for Resource Consent	N. D	01 Apr 2025
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:500

Project status: Resource Consent
Project: 21102
Drawing No: C300
Issue/Rev: D

Proposed Services Notes:

- All works to be undertaken in accordance with FNDC Engineering Standards and the Health and Safety at Work Act 2015 (HSWA).
- All dimensions in metres unless noted otherwise.
- Contractor to locate / ml dimensionark / confirm and protect if necessary all existing services prior to commencement of work on site.
- All disturbed public areas to be made good and restored to existing condition.
- Manholes to be reinforced concrete chambers with a precast base. Min Ø1050mm manhole unless otherwise specified.
- Catchpits to be 675 x 450mm reinforced concrete chambers, with trafficable frame & grid inlet lid.
- All lane and parking markings as per MOTSAM.
- Parking bays as per Appendix 3D of the FNDP.
- All kerbing to be machine extruded, unless specified otherwise by Engineer.

Existing Services Legend:

- Boundary (Surveyed)
- Edge of Road
- Stormwater Pipe
- Stormwater Manhole, Wingwall, Scruffy Dome, Catchpit
- Open Drain
- Water Pipe
- Underground Power Lines
- Power Pole & Over Head Lines
- Transformer
- Fibre Optic Lines
- Top of Bank
- Bottom of Bank
- Fence / Gate
- Retaining Wall

Proposed Services Legend:

- Prop. Kerb Block
- Prop. Kerb & Channel
- Prop. Flush Edge Beam
- Standard Concrete Surface
- Exposed Aggregate Concrete
- Gravel Surface
- Rock Filled Traffic Island
- Grassed Area
- SW Perforated Pipe & Rodding Point
- SW Manhole
- SW Manhole with Scruffy Dome
- SW Catchpit
- SW Swale
- Fence

Road Marking Legend:

- White Zebra Crossing 2.0m Long x 0,3m Wide, 0.6m Gap
- White Stop Sign
- White Bus Sign
- White Straight Arrow
- White Left-Turn Arrow
- White Parking Delineation Line 100mm Wide
- Yellow No-Stop Lines 1.0m Long x 1.0m Gap

Road Marking Legend:

- 1650mm Rubber Wheel Stop
- Yellow Disabled Parking Sign
- Yellow No-Parking Island

N

01 C310

03 C311

04 C311

05 C311

Re-used existing fence or similar approved

Exposed Concrete Surface

Concrete Surface with Broom Finish

Gravel Parking Area

1650mm Rubber Wheel Stop

1650mm Rubber Wheel Stop (Installed in Accordance with Supplier Specifications)

100mm Parking Line (White)

Accessible Crossing as per FNDC Sheet 17

See note on C400

Concrete Surface with Broom Finish

Existing Power Pole to Remain

Left-Turn Lane

500mm Hotmix Transition between existing asphalt and proposed concrete

SH10

SH10

0 2.5 5 7.5 10 12.5

Scale 1:250 (m)

Original size = A3

Client	Oruaiti School Board of Trustees c/o Avail Pacific	Design:	R. de Swardt
Project	2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Drawn:	R. de Swardt
Drawing Title	Parking Area & Accessway Design Plan Sheet 1 of 3	Approved:	N. Douglas
		Scale A3:	1:250
		Project status:	Resource Consent
		Project:	21102
		Drawing No:	C301
		Issue/Rev:	D

No.	Issue/Revision	Aprvd	Date
D	Revised and Issued for Resource Consent	N. D	01 Apr 2025
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

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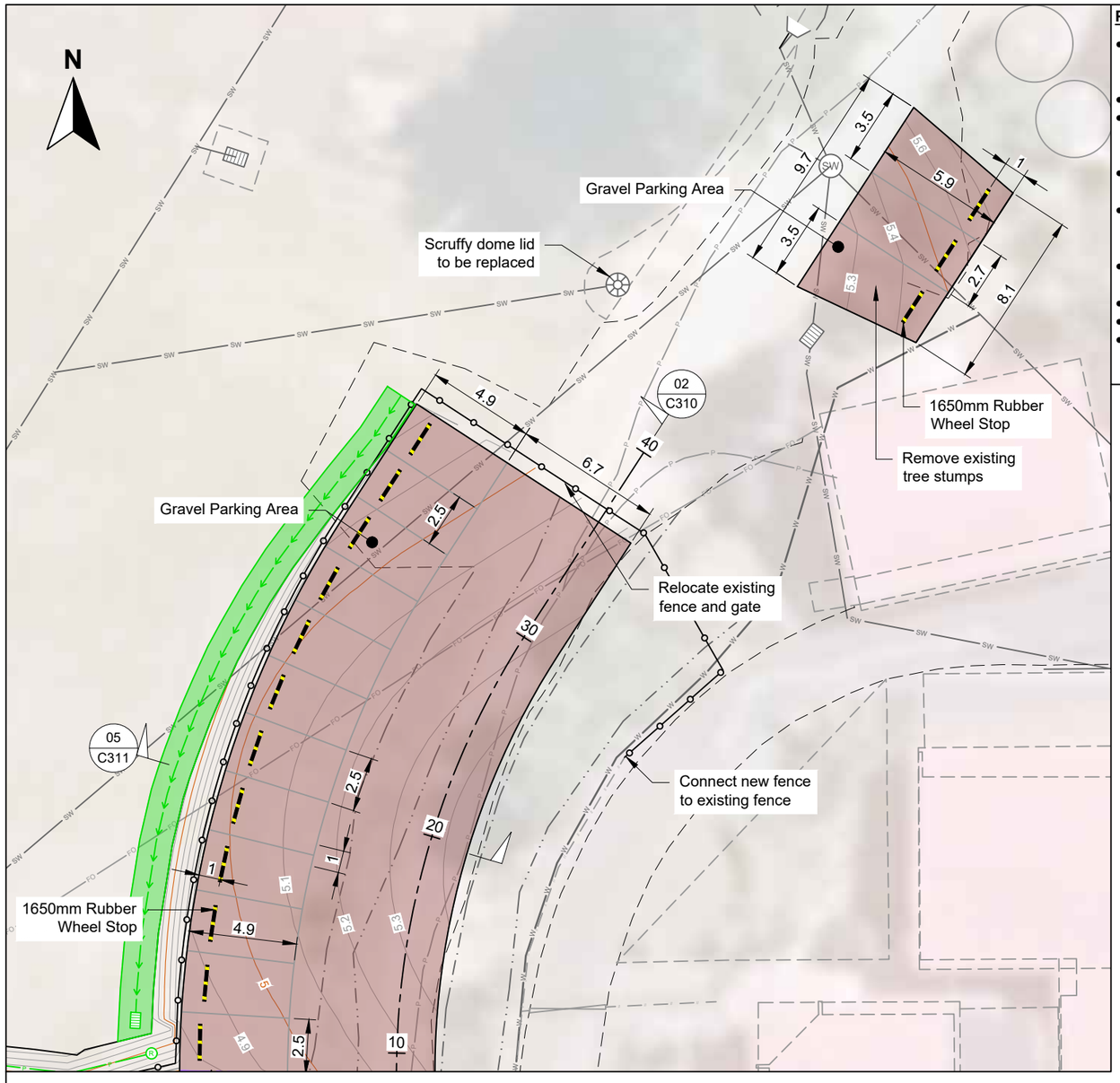

Proposed Services Notes:

- All works to be undertaken in accordance with FNDC Engineering Standards and the Health and Safety at Work Act 2015 (HSWA).
- All dimensions in metres unless noted otherwise.
- Contractor to locate / ml dimensionark / confirm and protect if necessary all existing services prior to commencement of work on site.
- All disturbed public areas to be made good and restored to existing condition.
- Manholes to be reinforced concrete chambers with a precast base. Min Ø1050mm manhole unless otherwise specified.
- Catchpits to be 675 x 450mm reinforced concrete chambers, with trafficable frame & grid inlet lid.
- All lane and parking markings as per MOTSAM.
- Parking bays as per Appendix 3D of the FNDP.
- All kerbing to be machine extruded, unless specified otherwise by Engineer.

Existing Services Legend:

- Boundary (Surveyed)
- Edge of Road
- Stormwater Pipe
- Stormwater Manhole, Wingwall, Scruffy Dome, Catchpit
- Open Drain
- Water Pipe
- Underground Power Lines
- Power Pole & Over Head Lines
- Transformer
- Fibre Optic Lines
- Top of Bank
- Bottom of Bank
- Fence / Gate
- Retaining Wall

Proposed Services Legend:

- Prop. Kerb Block
- Prop. Kerb & Channel
- Prop. Flush Edge Beam
- Standard Concrete Surface
- Exposed Aggregate Concrete
- Gravel Surface
- Rock Filled Traffic Island
- Grassed Area
- SW Perforated Pipe & Rodding Point
- SW Manhole
- SW Manhole with Scruffy Dome
- SW Catchpit
- SW Swale
- Fence

0 2.5 5 7.5 10 12.5

Scale 1:250 (m) Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific

Project: 2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

Drawing Title: Parking Area & Accessway
Design Plan Sheet 2 of 3

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No.	Issue/Revision	Aprvd	Date
D	Revised and Issued for Resource Consent	N. D	01 Apr 2025
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:250

Project status: Resource Consent
Project: 21102
Drawing No: C302
Issue/Rev: D

Proposed Services Notes:

- All works to be undertaken in accordance with FNDC Engineering Standards and the Health and Safety at Work Act 2015 (HSWA).
- All dimensions in metres unless noted otherwise.
- Contractor to locate / ml dimensionark / confirm and protect if necessary all existing services prior to commencement of work on site.
- All disturbed public areas to be made good and restored to existing condition.
- Manholes to be reinforced concrete chambers with a precast base. Min Ø1050mm manhole unless otherwise specified.
- Catchpits to be 675 x 450mm reinforced concrete chambers, with trafficable frame & grid inlet lid.
- All lane and parking markings as per MOTSAM.
- Parking bays as per Appendix 3D of the FNDP.
- All kerbing to be machine extruded, unless specified otherwise by Engineer.

Existing Services Legend:

- Boundary (Surveyed)
- Edge of Road
- Stormwater Pipe
- Stormwater Manhole, Wingwall, Scruffy Dome, Catchpit
- Open Drain
- Water Pipe
- Underground Power Lines
- Power Pole & Over Head Lines
- Transformer
- Fibre Optic Lines
- Top of Bank
- Bottom of Bank
- Fence / Gate
- Retaining Wall

Proposed Services Legend:

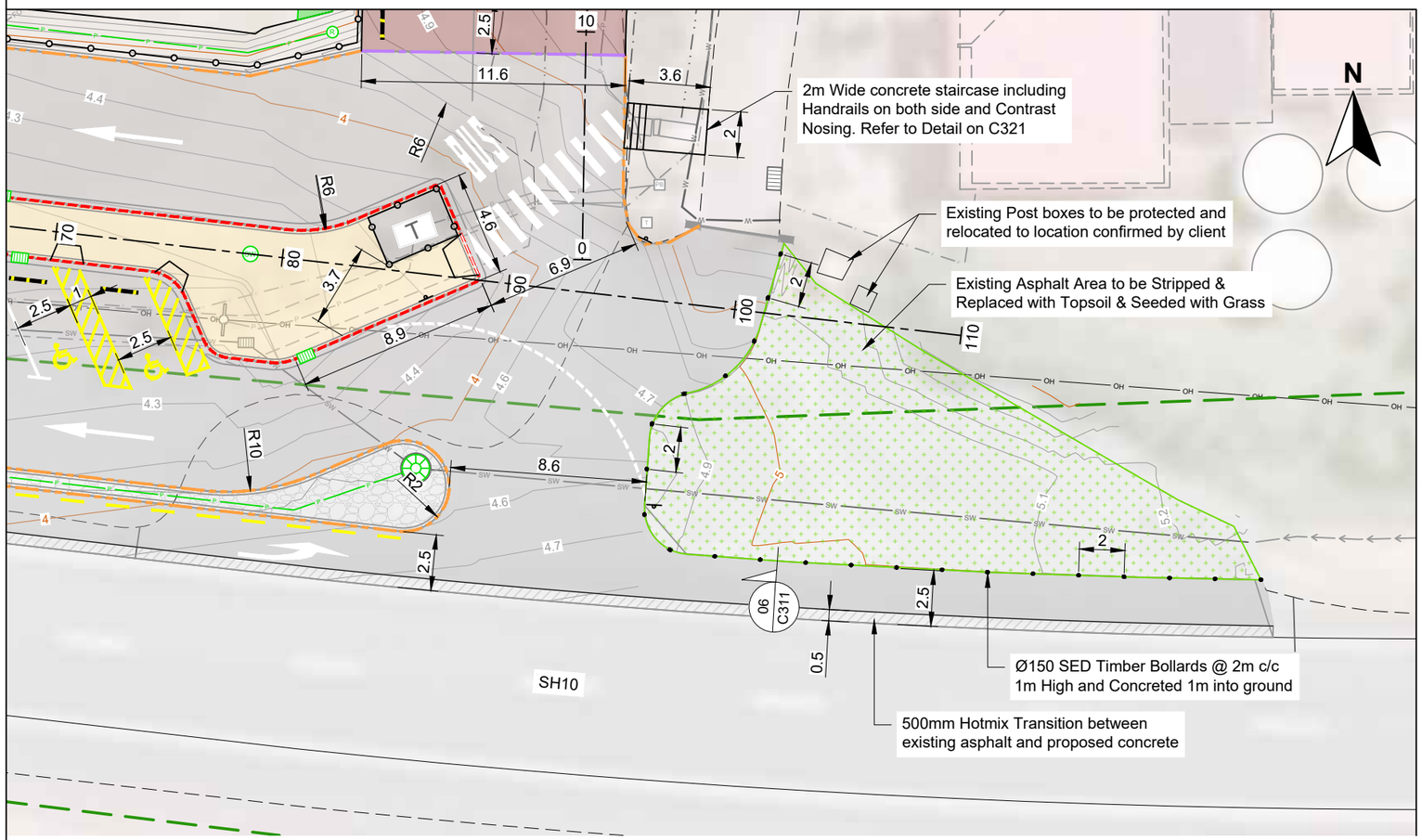
- Prop. Kerb Block
- Prop. Kerb & Channel
- Prop. Flush Edge Beam
- Standard Concrete Surface
- Exposed Aggregate Concrete
- Gravel Surface
- Rock Filled Traffic Island
- Grassed Area
- SW Perforated Pipe & Rodding Point
- SW Manhole
- SW Manhole with Scruffy Dome
- SW Catchpit
- SW Swale
- Fence

Road Marking Legend:

- White Zebra Crossing 2.0m Long x 0,3m Wide, 0.6m Gap
- White Stop Sign
- White Bus Sign
- White Straight Arrow
- White Left-Turn Arrow
- White Parking Delineation Line 100mm Wide
- Yellow No-Stop Lines 1.0m Long x 1.0m Gap

Road Marking Legend:

- 1650mm Rubber Wheel Stop
- Yellow Disabled Parking Sign
- Yellow No-Parking Island



0 2.5 5 7.5 10 12.5

Scale 1:250 (m) Original size = A3

Client	Oruaiti School Board of Trustees c/o Avail Pacific
Project	2554 State Highway 10, Mangonui Proposed Carpark Upgrades
Drawing Title	Parking Area & Accessway Design Plan Sheet 3 of 3

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No.	Issue/Revision	Aprvd	Date
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:250
Project status:	Resource Consent
Project:	21102
Drawing No:	C303
Issue/Rev:	C

Proposed Services Notes:

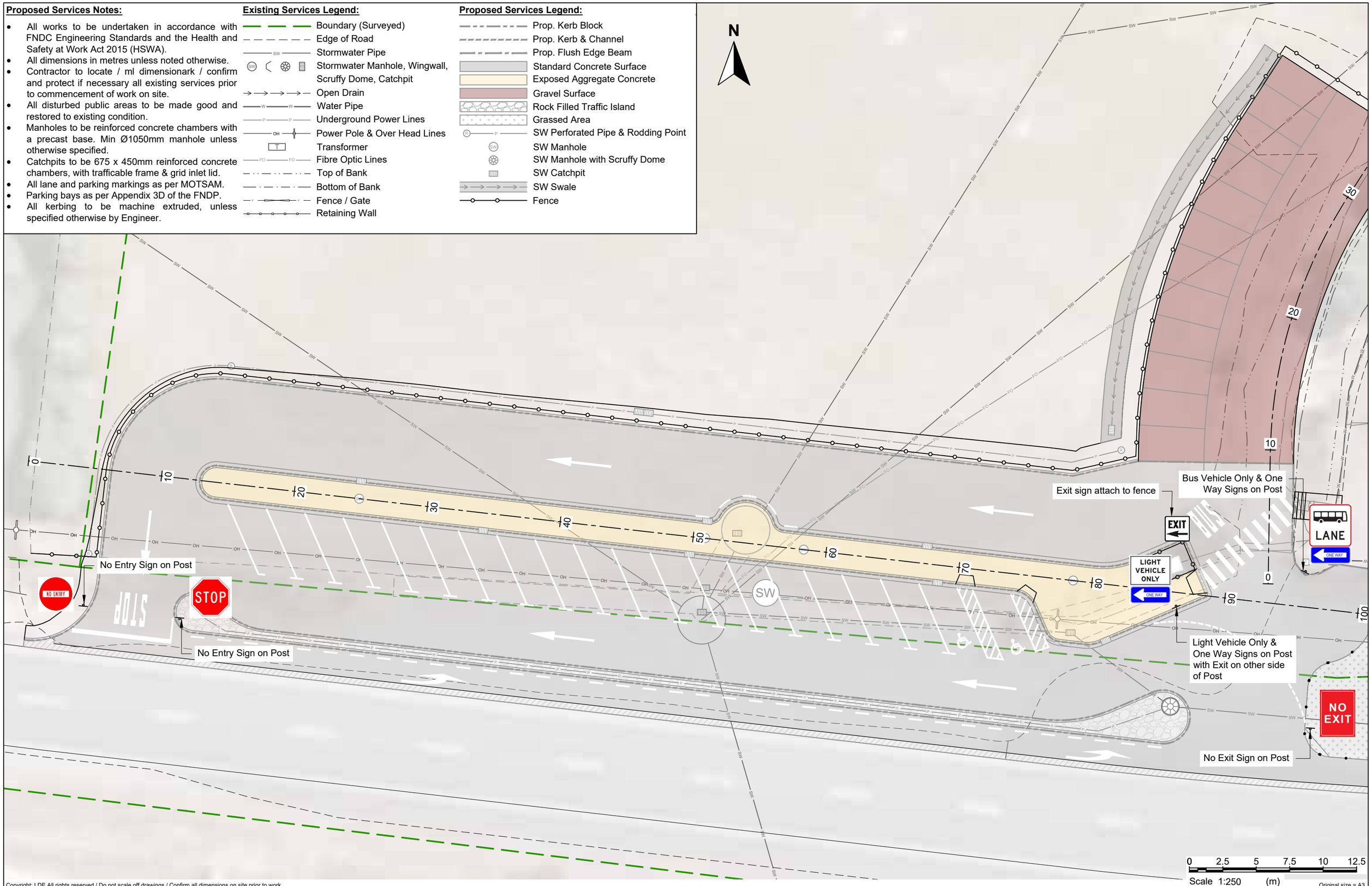
- All works to be undertaken in accordance with FNDC Engineering Standards and the Health and Safety at Work Act 2015 (HSWA).
- All dimensions in metres unless noted otherwise.
- Contractor to locate / ml dimensionark / confirm and protect if necessary all existing services prior to commencement of work on site.
- All disturbed public areas to be made good and restored to existing condition.
- Manholes to be reinforced concrete chambers with a precast base. Min Ø1050mm manhole unless otherwise specified.
- Catchpits to be 675 x 450mm reinforced concrete chambers, with trafficable frame & grid inlet lid.
- All lane and parking markings as per MOTSAM.
- Parking bays as per Appendix 3D of the FNDP.
- All kerbing to be machine extruded, unless specified otherwise by Engineer.

Existing Services Legend:

- Boundary (Surveyed)
- Edge of Road
- Stormwater Pipe
- Stormwater Manhole, Wingwall, Scruffy Dome, Catchpit
- Open Drain
- Water Pipe
- Underground Power Lines
- Power Pole & Over Head Lines
- Transformer
- Fibre Optic Lines
- Top of Bank
- Bottom of Bank
- Fence / Gate
- Retaining Wall

Proposed Services Legend:

- Prop. Kerb Block
- Prop. Kerb & Channel
- Prop. Flush Edge Beam
- Standard Concrete Surface
- Exposed Aggregate Concrete
- Gravel Surface
- Rock Filled Traffic Island
- Grassed Area
- SW Perforated Pipe & Rodding Point
- SW Manhole
- SW Manhole with Scruffy Dome
- SW Catchpit
- SW Swale
- Fence



Client	Oruaiti School Board of Trustees c/o Avail Pacific	Design:	R. de Swardt
Project	2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Drawn:	R. de Swardt
Drawing Title	Signage Layout	Approved:	N. Douglas
		Scale A3:	1:250
		Project status:	Resource Consent
		Project:	21102
		Drawing No:	C304
		Issue/Rev	A

No.	Issue/Revision	Aprvd	Date
A	Issued for Resource Consent	N. D	28 Mar 2025

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Notes:

- Saw-cuts are shown indicatively only and is to be confirmed by Contractor and Engineer on site prior to commencement of works.
- Saw-cuts depth to be typical 1/3 of concrete thickness.
- Saw-cuts shown at 3m centres.
- The concrete contractor is to increase the saw-cut offsets only once confirmed by the Engineer on site.
- The concrete contractor is to determine if additional cuts are required.
- Construction joint to be included at maximum 24m centres.
- The contractor is responsible to allow for sectional pouring as required and placing construction joints as required.

Proposed Services Legend:

- Prop. Kerb Block
- Prop. Kerb & Channel
- Prop. Flush Edge Beam
- Standard Concrete Surface
- Exposed Aggregate Concrete
- Gravel Surface
- Rock Filled Traffic Island
- Grassed Area

N

Saw-cut Joint

Saw-cut Joint

Saw-cut Joint

500mm Hotmix Transition

500mm Hotmix Transition

0 2.5 5 7.5 10 12.5

Scale 1:250 (m)

Original size = A3

Client	Oruaiti School Board of Trustees c/o Avail Pacific	Design:	R. de Swardt
Project	2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Drawn:	R. de Swardt
Drawing Title	Concrete Saw-cuts Layout	Approved:	N. Douglas
		Scale A3:	1:250

engineers • scientists

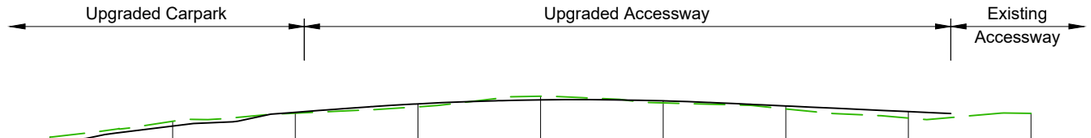
No.	Issue/Revision	Aprvd	Date
B	Revised and Issued for Resource Consent	N. D	01 Apr 2025
A	Issued for Resource Consent	N. D	28 Mar 2025

Project status: Resource Consent

Project: 21102

Drawing No: C305

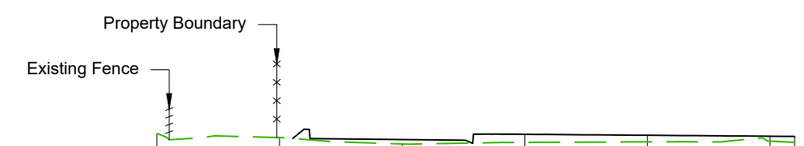
Issue/Rev: B



Vertical Exaggeration: 2.5
Datum: 0.0

Design Levels	4.95	5.17	5.31	5.37	5.36	5.27	5.18	
Existing Levels	5.02	5.16	5.26	5.43	5.32	5.22	5.08	
Cut/Fill Depth	-0.08	0.01	0.05	-0.06	0.03	0.05	0.10	
Chainage	5.00	10.00	15.00	20.00	25.00	30.00	35.00	

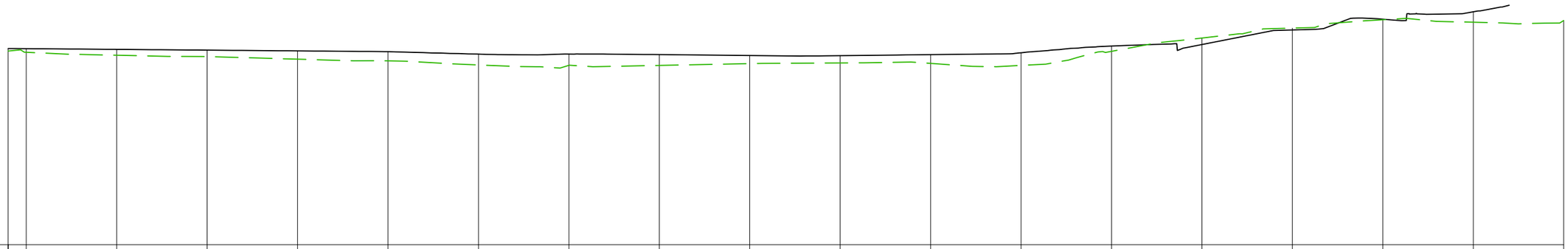
Long Section (ACCESSWAY CL)



Vertical Exaggeration: 2.5
Datum: 0.0

Design Levels		4.29	4.37	4.36	4.34
Existing Levels	4.32	4.21	4.24	4.25	4.26
Cut/Fill Depth		0.07	0.13	0.11	0.08
Chainage	5.00	10.00	15.00	20.00	25.00

Long Section (PARKING AREA CL)
Chainage 0m to 25m



Vertical Exaggeration: 2.5
Datum: 0.0

Design Levels	4.34	4.32	4.31	4.29	4.27	4.22	4.22	4.21	4.19	4.18	4.21	4.25	4.40	4.43	4.75	4.99	5.16
Existing Levels	4.26	4.19	4.17	4.11	4.07	3.98	3.97	3.97	4.01	4.02	4.01	3.97	4.28	4.57	4.79	4.98	4.92
Cut/Fill Depth	0.08	0.13	0.14	0.18	0.20	0.24	0.25	0.24	0.18	0.16	0.19	0.28	0.12	-0.14	-0.04	0.01	0.23
Chainage	25.00	30.00	35.00	40.00	45.00	50.00	55.00	60.00	65.00	70.00	75.00	80.00	85.00	90.00	95.00	100.00	105.00

Long Section (PARKING AREA CL)
Chainage 25m to End

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

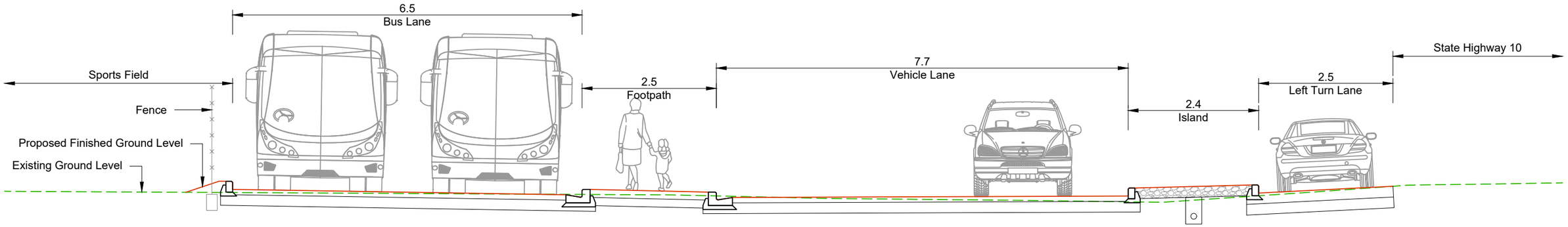
Drawing Title
Parking Area & Accessway
Longitudinal Sections

engineers • scientists

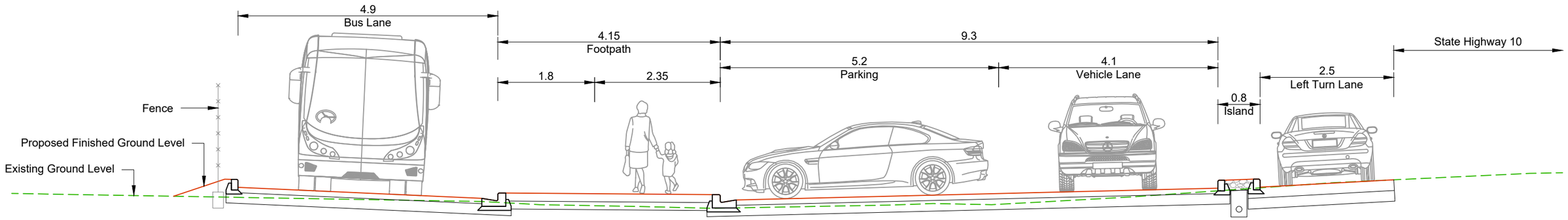
No.	Issue/Revision	Aprvd	Date
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:250

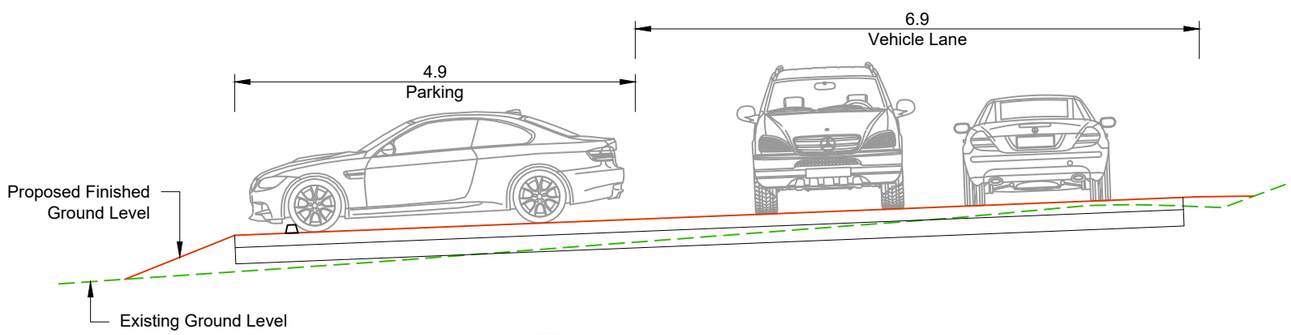
Project status: Resource Consent
Project: 21102
Drawing No: C310
Issue/Rev: C



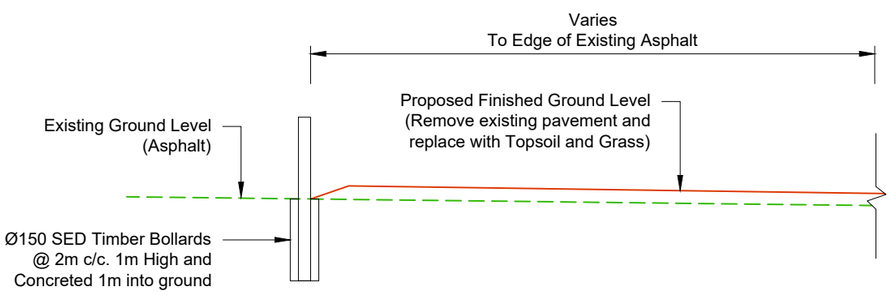
03 / 311 **Cross Section @ Parking Area CH 10m**
Scale 1:75



04 / 311 **Cross Section @ Parking Area CH 50m**
Scale 1:75



05 / 311 **Cross Section @ Accessway CH 20m**
Scale 1:75



06 / 311 **Cross Section @ Grassed Area**
Scale 1:75

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

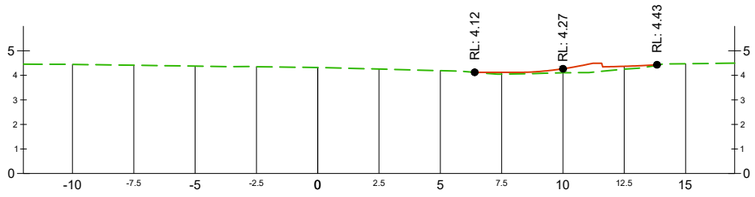
Drawing Title
Parking Area & Accessway
Typical Cross Sections

engineers • scientists

No.	Issue/Revision	Aprvd	Date
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:75

Project status: Resource Consent
Project: 21102
Drawing No: C311
Issue/Rev: C



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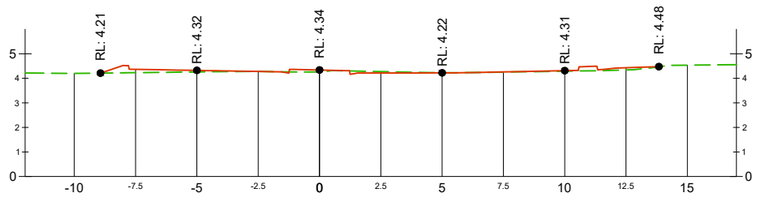

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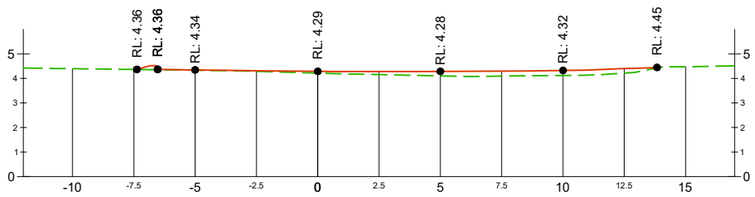

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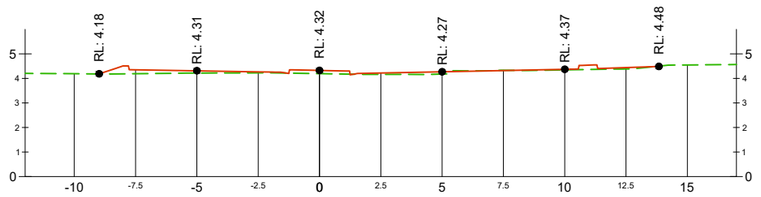

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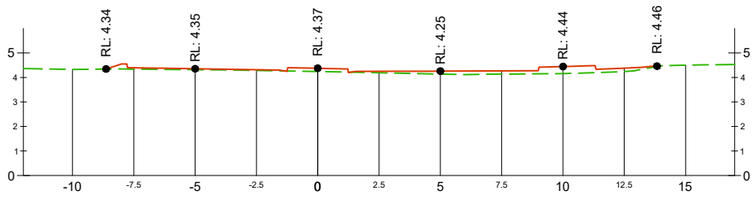

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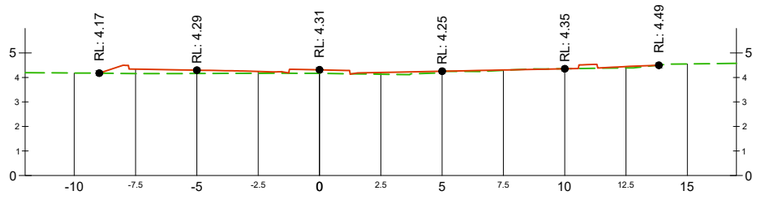

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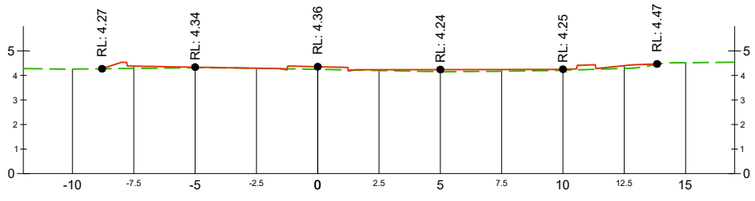

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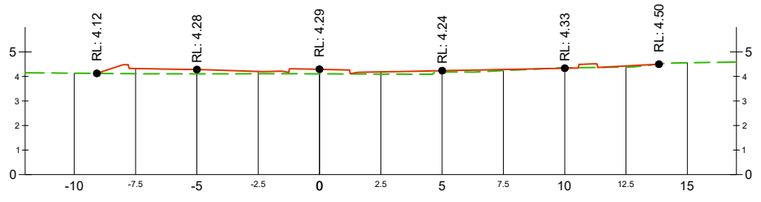

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Datum: 0.0

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

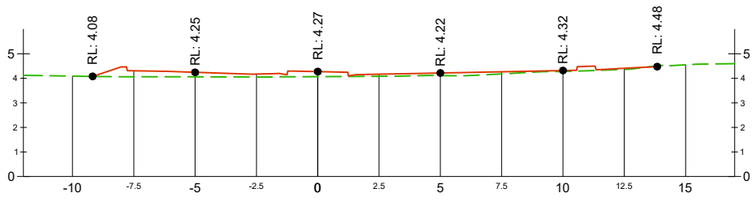
Drawing Title
Parking Area & Accessway
5m Inteval Cross Sections
Sheet 1 of 3

engineers • scientists

No.	Issue/Revision	Aprvd	Date
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:250

Project status: Resource Consent
Project: 21102
Drawing No: C312
Issue/Rev: C



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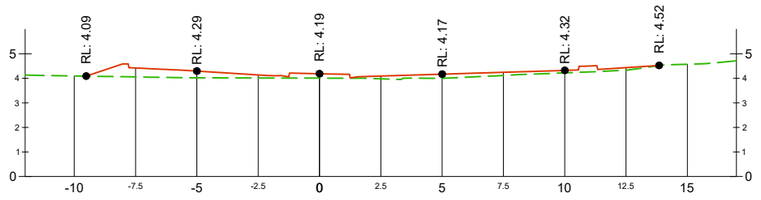

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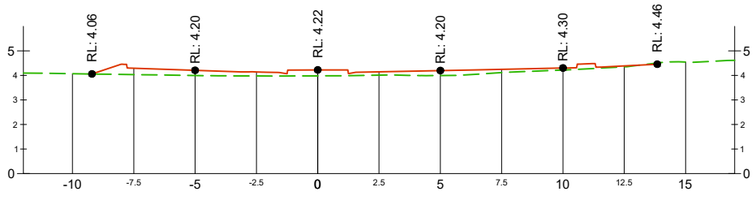

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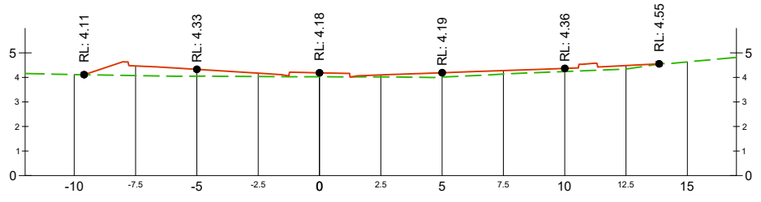

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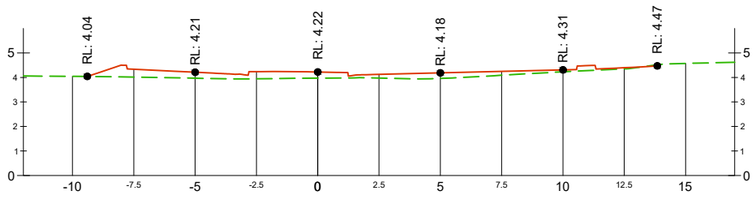

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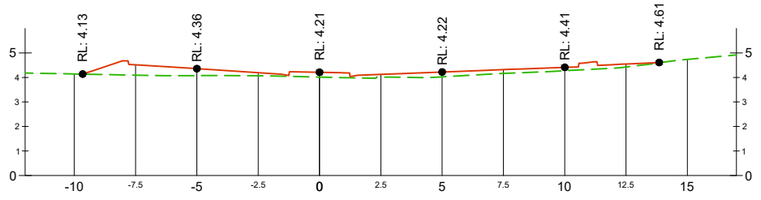

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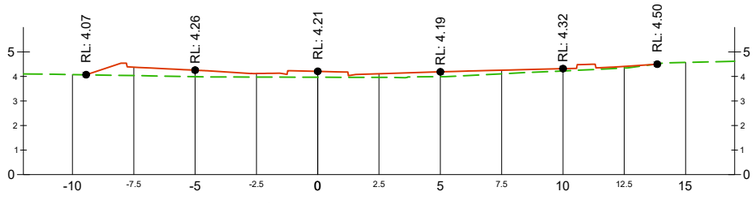

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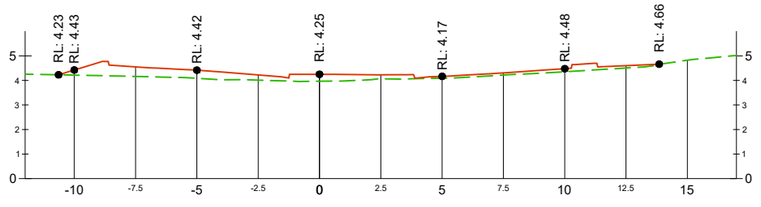

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Datum: 0.0

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

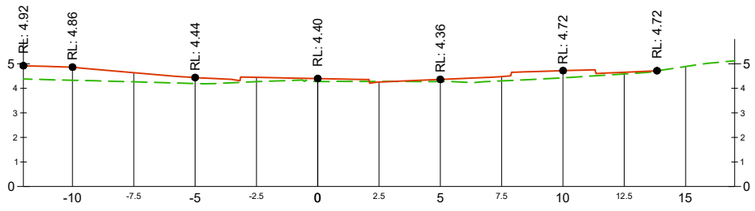
Drawing Title
Parking Area & Accessway
5m Inteval Cross Sections
Sheet 2 of 3

engineers • scientists

No.	Issue/Revision	Aprvd	Date
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:250

Project status: Resource Consent
Project: 21102
Drawing No: C313
Issue/Rev: C



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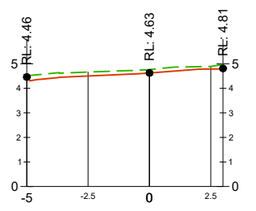

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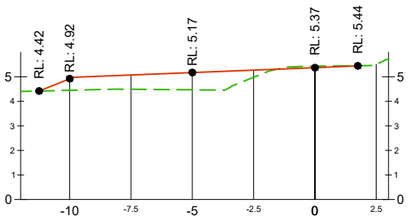

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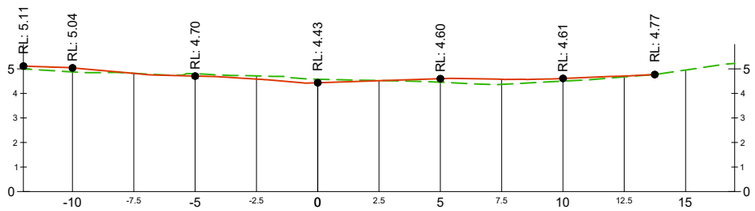

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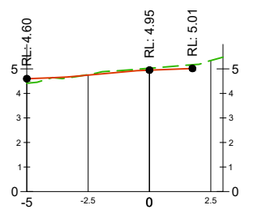

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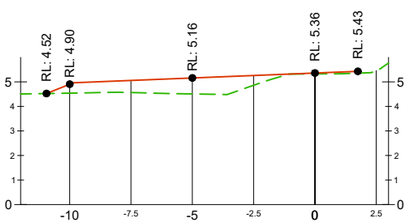

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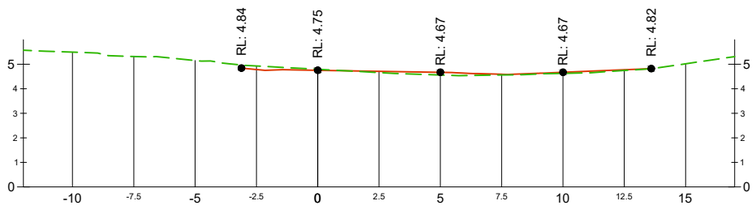

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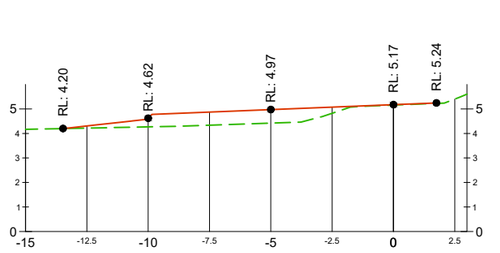

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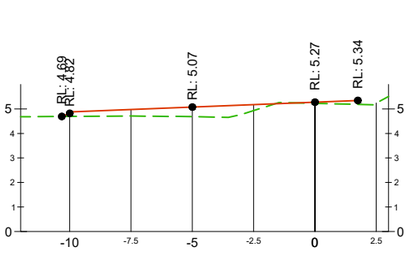

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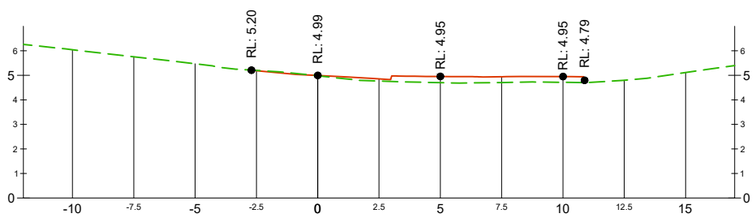

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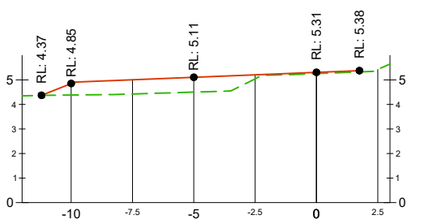

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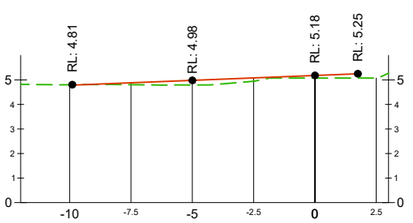


Chainage 35.0
Datum: 0.0

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

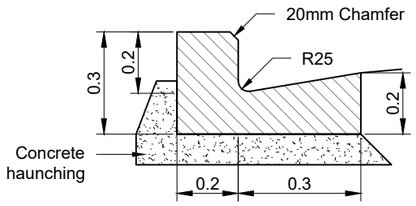
Drawing Title
Parking Area & Accessway
5m Inteval Cross Sections
Sheet 3 of 3

engineers • scientists

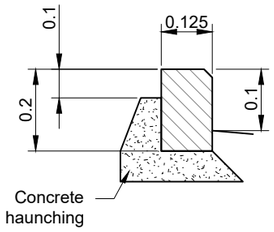
No.	Issue/Revision	Aprvd	Date
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:250

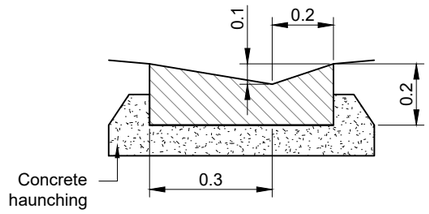
Project status: Resource Consent
Project: 21102
Drawing No: C314
Issue/Rev: C



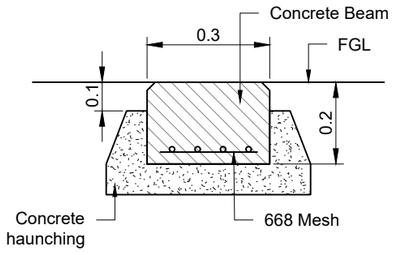
Extruded Kerb & Channel
Scale 1:15



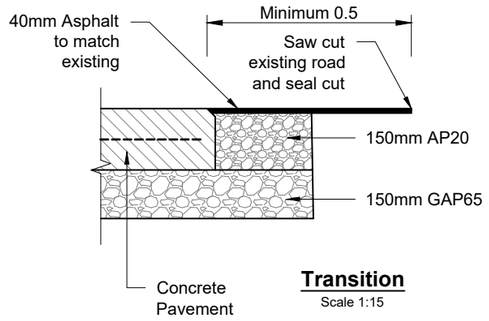
Extruded Kerb Block / Barrier Kerb
Scale 1:15



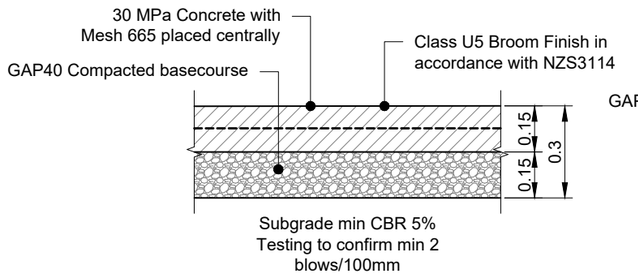
Pram Crossing
Scale 1:15



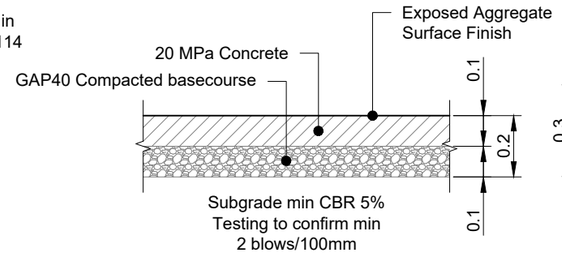
Flush Edge Beam
Scale 1:15



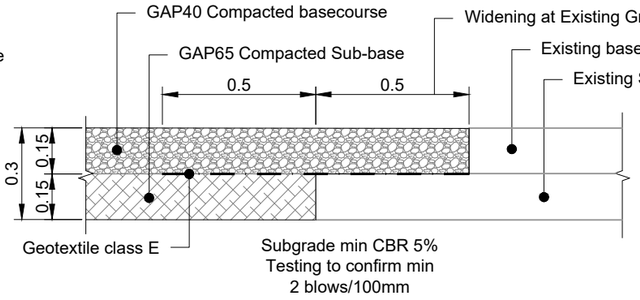
Transition
Scale 1:15



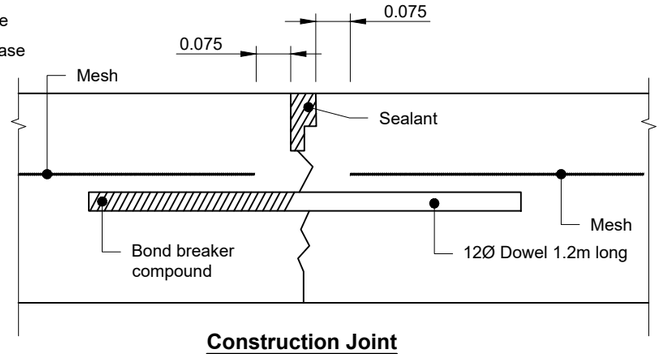
Layerworks
Concrete Parking Area
Scale 1:50



Layerworks
Concrete Footpath
Not to Scale

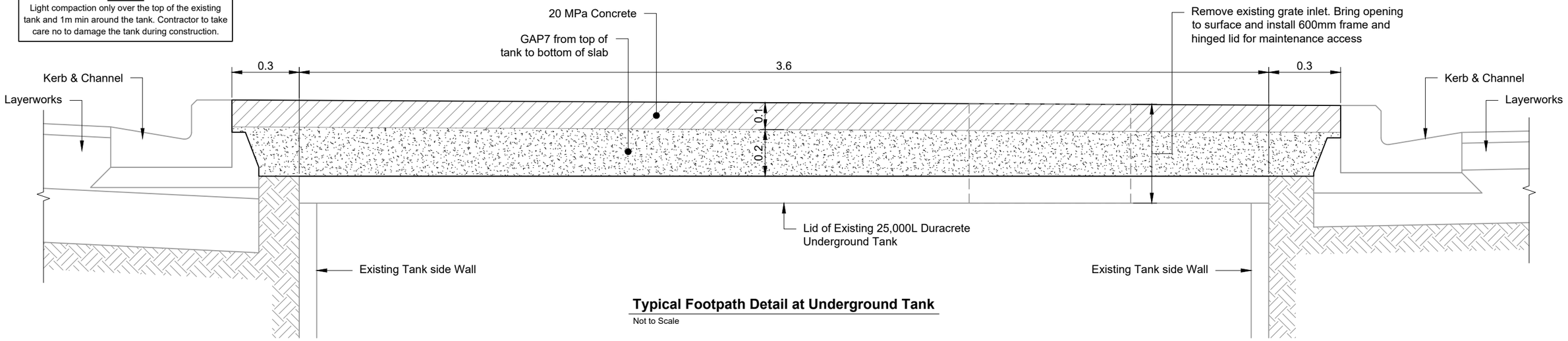


Layerworks
Gravel Pavement
Not to Scale



Construction Joint
Scale Not to Scale

Note:
Light compaction only over the top of the existing tank and 1m min around the tank. Contractor to take care no to damage the tank during construction.



Typical Footpath Detail at Underground Tank
Not to Scale

Original size = A3

Client	Oruaiti School Board of Trustees c/o Avail Pacific
Project	2554 State Highway 10, Mangonui Proposed Carpark Upgrades
Drawing Title	Parking Area & Accessway Typical Details Sheet 1 of 2

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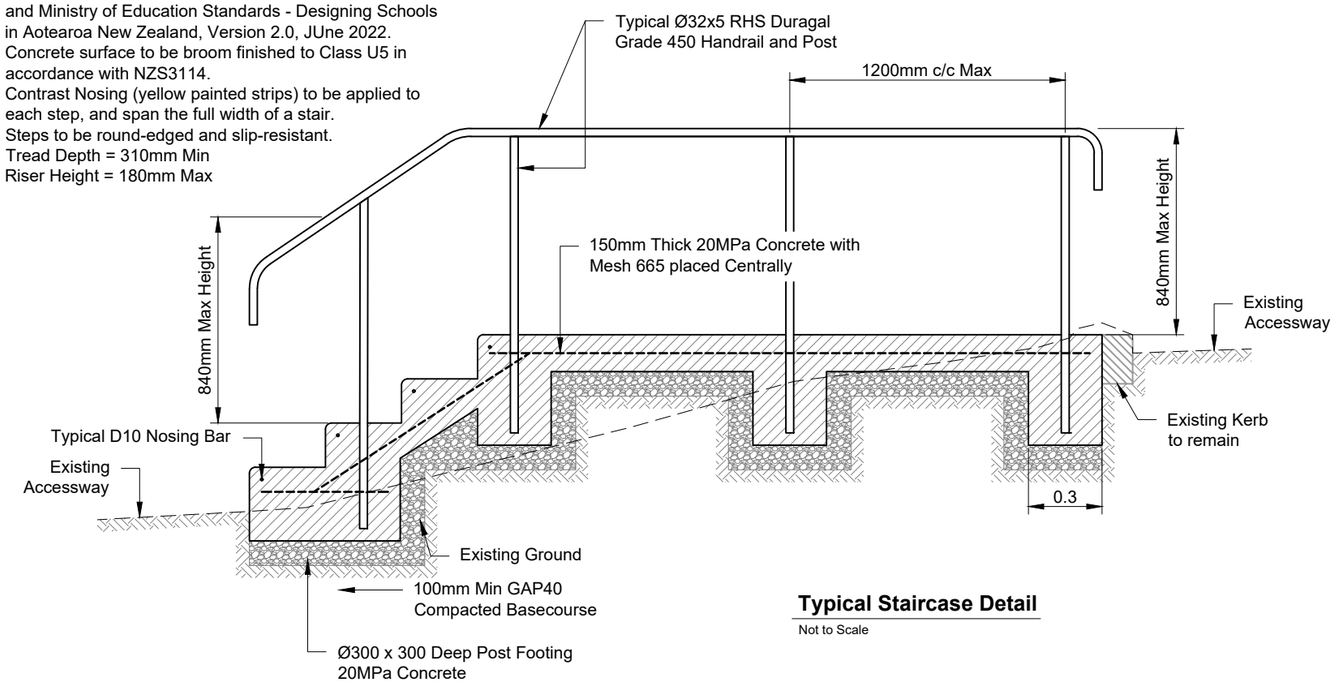
No.	Issue/Revision	Aprvd	Date
D	Revised and Issued for Resource Consent	N. D	01 Apr 2025
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	As Shown

Project status: Resource Consent
Project: D
Drawing No: C320
Issue/Rev: B

Note:

- The staircase is to be constructed in accordance with NZS3604, NZS4121, NZS3109, NZS3114, AS/NZS4671, and Ministry of Education Standards - Designing Schools in Aotearoa New Zealand, Version 2.0, JUne 2022.
- Concrete surface to be broom finished to Class U5 in accordance with NZS3114.
- Contrast Nosing (yellow painted strips) to be applied to each step, and span the full width of a stair.
- Steps to be round-edged and slip-resistant.
- Tread Depth = 310mm Min
- Riser Height = 180mm Max



Typical Staircase Detail

Not to Scale

Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific	Project: 2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Drawing Title: Parking Area & Accessway Typical Details Sheet 2 of 2	LDE engineers • scientists

No.	Issue/Revision	Aprvd	Date
B	Revised and Issued for Resource Consent	N. D	01 Apr 2025
A	Issued for Resource Consent	N. D	28 Mar 2025

Design:	R. de Swardt	Project status:	Resource Consent
Drawn:	R. de Swardt	Project:	21102
Approved:	N. Douglas	Drawing No:	C321
Scale A3:	As Shown	Issue/Rev:	B

Stormwater Services Notes:

1. All works to be undertaken in accordance with FNDC Engineering Standards and the Health and Safety at Work Act 2015 (HSWA).
2. All stormwater infrastructure to be installed as per the FNDC Engineering Standards (ES).
3. All stormwater infrastructure to adhere to the NZ Standards as stated in the FNDC ES.
4. All dimensions in metres unless noted otherwise.
5. Contractor to locate / ml dimensionark / confirm and protect if necessary all existing services prior to commencement of work on site.
6. All disturbed public areas to be made good and restored to existing condition.
7. Manholes to be reinforced concrete chambers with a precast base. Min Ø1050mm manhole unless otherwise specified.
8. Catchpits to be 675 x 450mm reinforced concrete chambers, with trafficable frame & grid inlet lid.

Stormwater Services Notes:

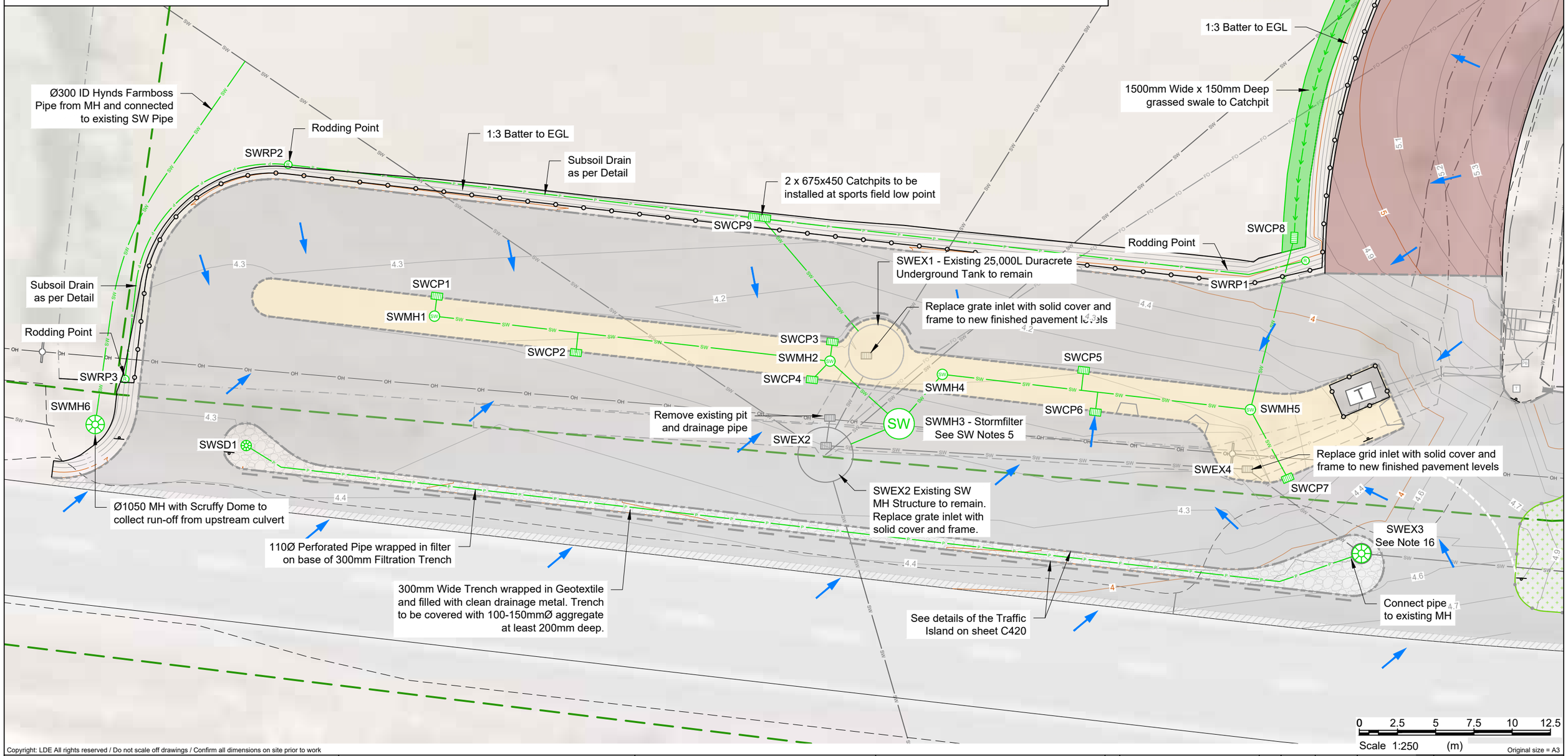
9. All PVC stormwater pipes to be uPVC SN16.
10. All concrete stormwater pipes to be RCRRJ Class 4.
11. Pipe bedding and installation to comply with relevant council details.
12. All catchpits to have a min. sump depth of 300mm.
13. All catchpits to have 150Ø uPVC SN16 outlet pipe.
14. All catchpits to be fitted with a "*Stormwater360 Litta Trap*", installed as per supplier specification.
15. SWMH3 to be 1800mmØ x 1500mm Deep MH fitted with "*Stormwater360 StormFilter Cartridge Filtration System*" and installed as per supplier specification.
16. SWEX3 existing Lid and Frame to be removed and replace with a Scruffy Dome, which will be located in the Traffic Island.
17. Refer to C421 for Catchpit and Manhole Details.

Existing Services Legend:

- Boundary (Surveyed)
- Edge of Road
- Stormwater Pipe
- Stormwater Manhole, Wingwall, Scruffy Dome, Catchpit
- Open Drain
- Water Pipe
- Underground Power Lines
- Power Pole & Over Head Lines
- Transformer
- Fibre Optic Lines
- Top of Bank
- Bottom of Bank
- Fence / Gate
- Retaining Wall

Proposed Services Legend:

- Prop. Kerb Block
- Prop. Kerb & Channel
- Prop. Flush Edge Beam
- Standard Concrete Surface
- Exposed Aggregate Concrete
- Gravel Surface
- Rock Filled Traffic Island
- Grassed Area
- SW Pipe
- SW Perforated Pipe & Rodding Point
- SW Manhole
- SW Manhole with Scruffy Dome
- SW Catchpit
- SW Swale
- SW Flow Direction



Client	Project	Drawing Title	
Oruaiti School Board of Trustees c/o Avail Pacific	2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Parking Area & Accessway Stormwater Management Plan	LDE engineers • scientists

No.	Issue/Revision	Aprvd	Date
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

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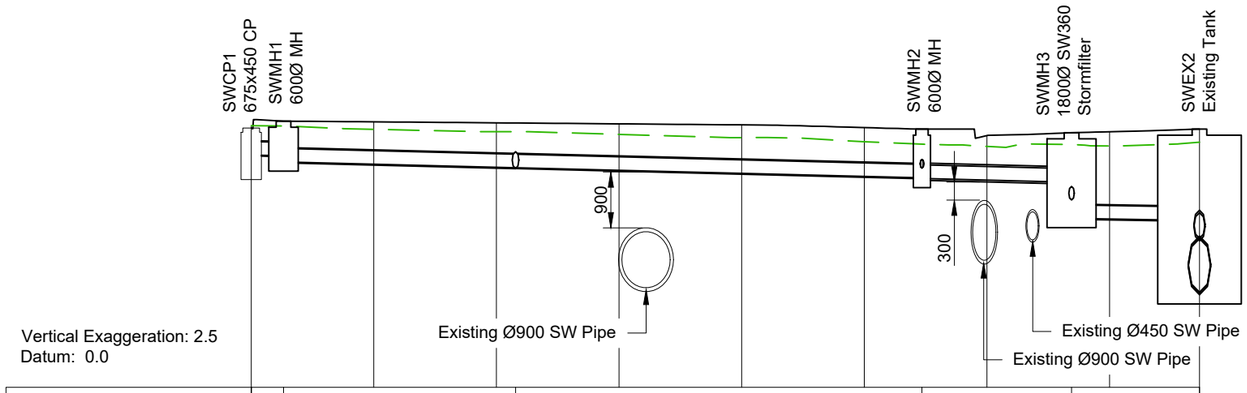
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:250

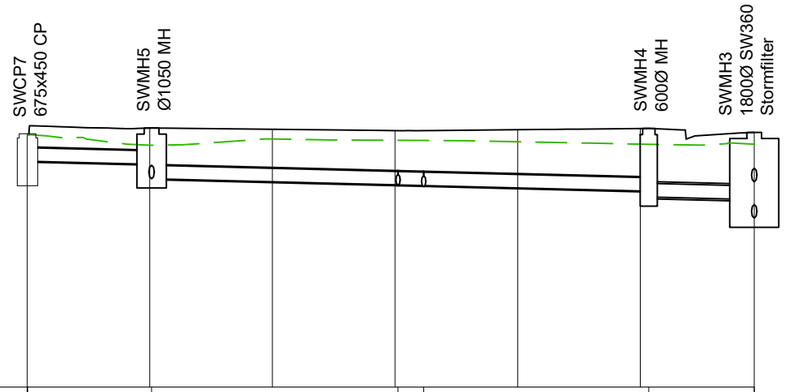
Project status: Resource Consent
Project: 21102
Drawing No: C400
Issue/Rev: C



Vertical Exaggeration: 2.5
Datum: 0.0

Ground Level	4.23	4.34		4.29		4.21		4.15		4.21		
Invert Level		3.79 3.77	3.67		3.58 3.58		3.41 3.40		3.34 2.75		2.72	
Depth to Invert	0.74	0.67		0.61		0.81		1.40		2.70		
Pipe Details	225Ø uPVC SN16		Ø225 uPVC SN16		Ø225 uPVC SN16			Ø225 RCRRJ CLASS 4		Ø225 UPVC SN16		
Pipe Slope Pipe Length	1.00% (1:100) 0.46m		1.00% (1:100) 8.94m		1.00% (1:100) 16.27m			1.00% (1:100) 4.90m		0.66% (1:151) 2.79m		

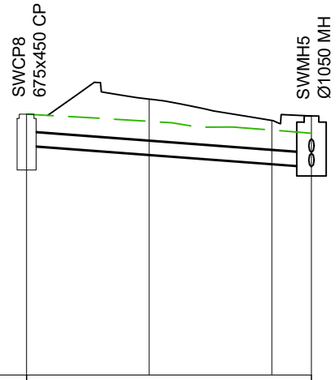
Long Section (SWCP1 TO SWMH3)



Vertical Exaggeration: 2.5
Datum: 0.0

Ground Level	4.13	4.22		4.16	3.46	4.17		4.21		4.15		
Invert Level		3.68	3.63	3.39		3.29	3.28 3.28	3.28		3.19	3.10	3.05
Depth to Invert	0.75	0.83		0.85	1.40	0.89		1.12		1.40		
Pipe Details	225Ø uPVC SN16		Ø225 uPVC SN16			Ø225 uPVC SN16	Ø225 uPVC SN16			Ø225 RCRRJ CLASS 4		
Pipe Slope Pipe Length	1.00% (1:100) 4.23m		1.00% (1:100) 9.53m			1.00% (1:100) 1.05m	1.00% (1:100) 8.88m			1.00% (1:100) 3.10m		

Long Section (SWCP7 TO SWMH3)



Vertical Exaggeration: 2.5
Datum: 0.0

Ground Level	4.25		4.22
Invert Level		3.74	3.39
Depth to Invert	0.81		0.83
Pipe Details	225Ø uPVC SN16		
Pipe Slope Pipe Length	3.00% (1:33) 10.87m		

Long Section (SWCP8 TO SWMH5)

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

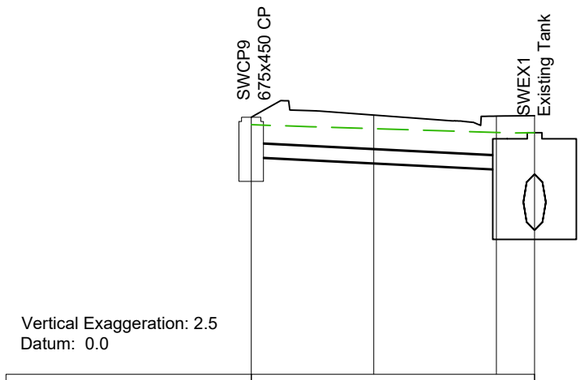
Drawing Title
Parking Area & Accessway
Stormwater Longitudinal Sections
Sheet 1 of 2

engineers • scientists

No.	Issue/Revision	Aprvd	Date
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:250

Project status: Resource Consent
Project: 21102
Drawing No: C410
Issue/Rev: C



Vertical Exaggeration: 2.5
Datum: 0.0

Ground Level	4.19	3.94
Invert Level	3.54	3.31
Depth to Invert	0.95	1.59
Pipe Details	225Ø uPVC SN16	
Pipe Slope Pipe Length	2.00% (1:50) 9.69m	

Long Section (SPORTS FIELD CATCHPIT TO TANK)

Vertical Exaggeration: 2.5
Datum: 0.0

Ground Level	4.47	4.44	4.46	4.70	4.70	
Invert Level	3.86	3.85	3.85	3.68	3.68	3.52	3.52	3.49
Depth to Invert	0.91	0.59	0.78	1.18	1.23
Pipe Details	Ø100 Perf. Pipe	Ø100 Perforated Pipe	Ø100 Perforated Pipe	Ø100 Perforated Pipe
Pipe Slope Pipe Length	0.50% (1:200) 2.39m	0.50% (1:200) 33.97m	0.50% (1:200) 31.75m	0.50% (1:200) 5.15m

Long Section (DRAINAGE TRENCH)

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

Drawing Title
Parking Area & Accessway
Stormwater Longitudinal Sections
Sheet 2 of 2

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No.	Issue/Revision	Aprvd	Date
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
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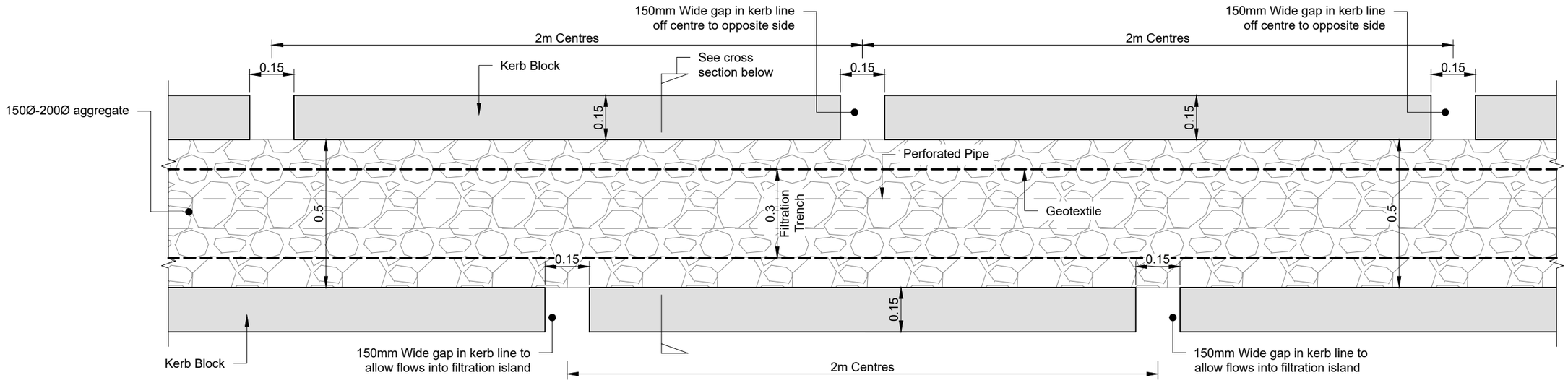
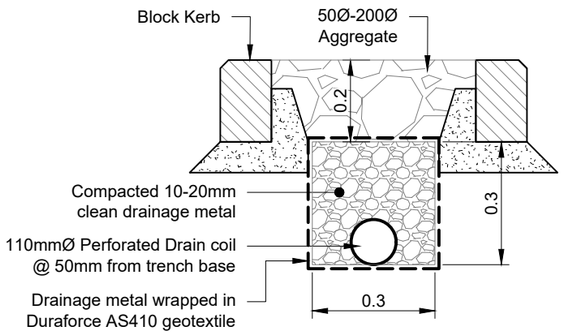
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:250

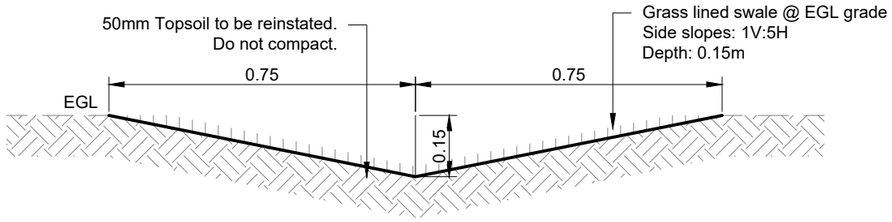
Project status: Resource Consent
Project: 21102
Drawing No: C411
Issue/Rev: C



Typical Traffic Island Plan View

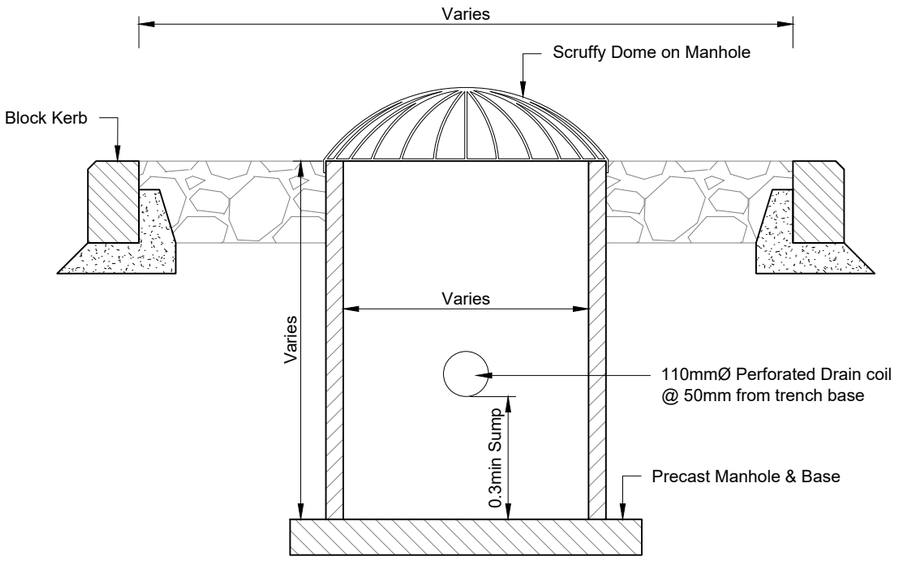
Not to Scale





Typical Grassed Swale Detail

Not to Scale

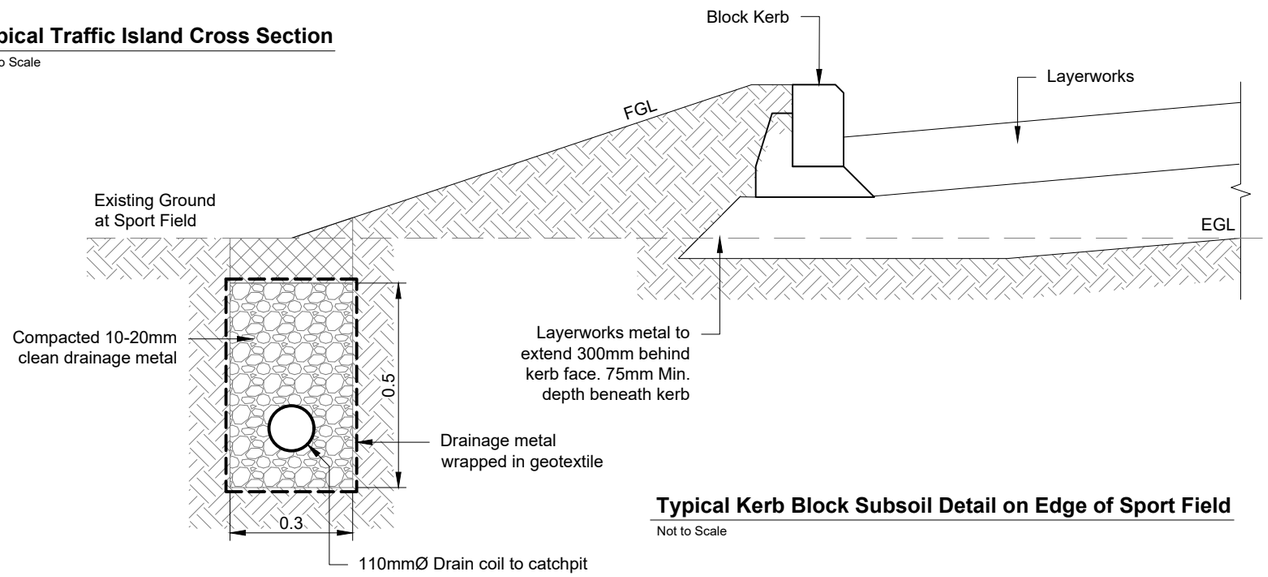


Typical Traffic Island Cross Section with Scruffy Dome

Not to Scale

Typical Traffic Island Cross Section

Not to Scale



Typical Kerb Block Subsoil Detail on Edge of Sport Field

Not to Scale

Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific	Project: 2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Drawing Title: Parking Area & Accessway Typical Stormwater Device Details	LDE engineers • scientists

No.	Issue/Revision	Aprvd	Date
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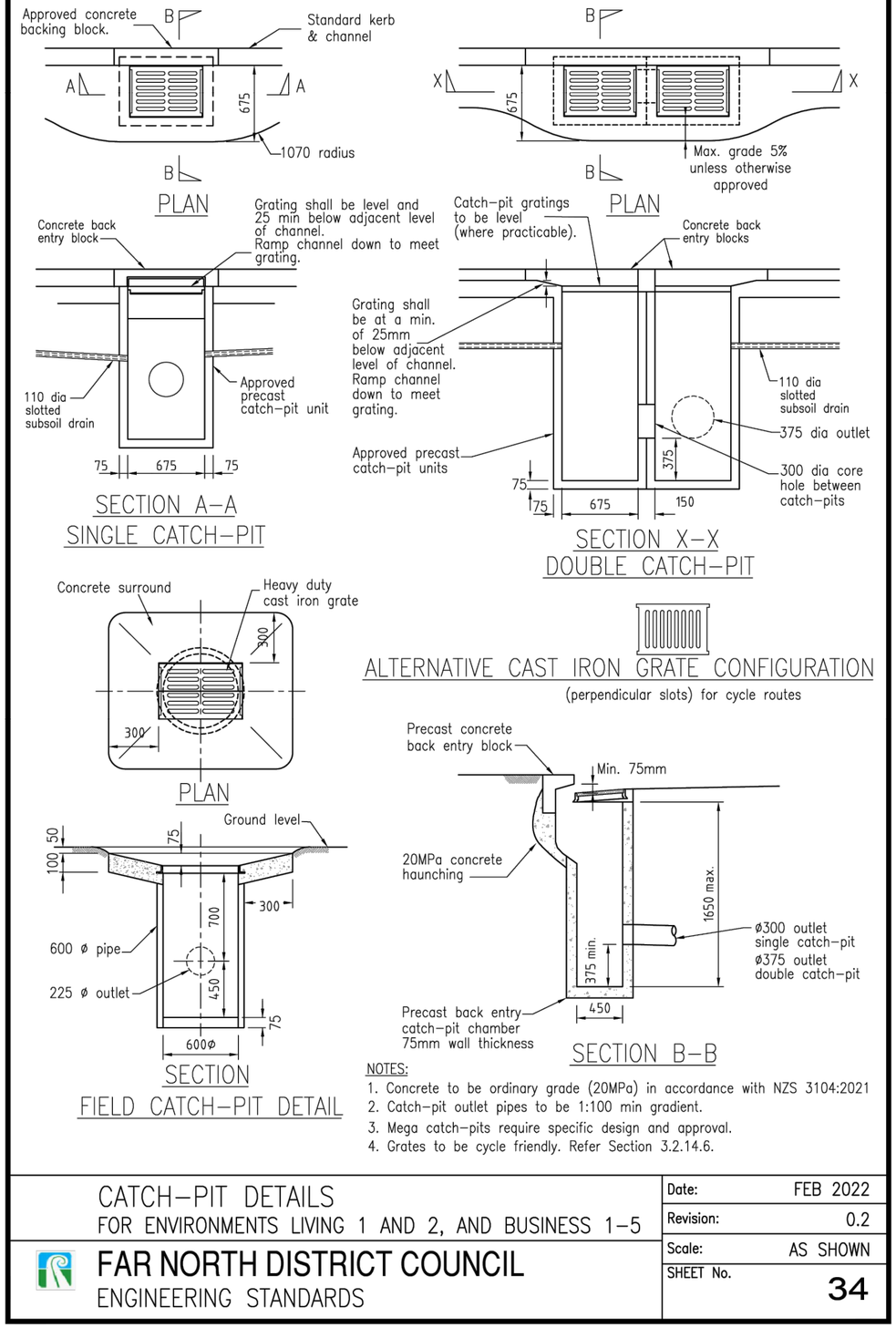
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	As Shown

Project status: Resource Consent
Project: 21102
Drawing No: C420
Issue/Rev: C

Sheet 34 Catch-Pit Details

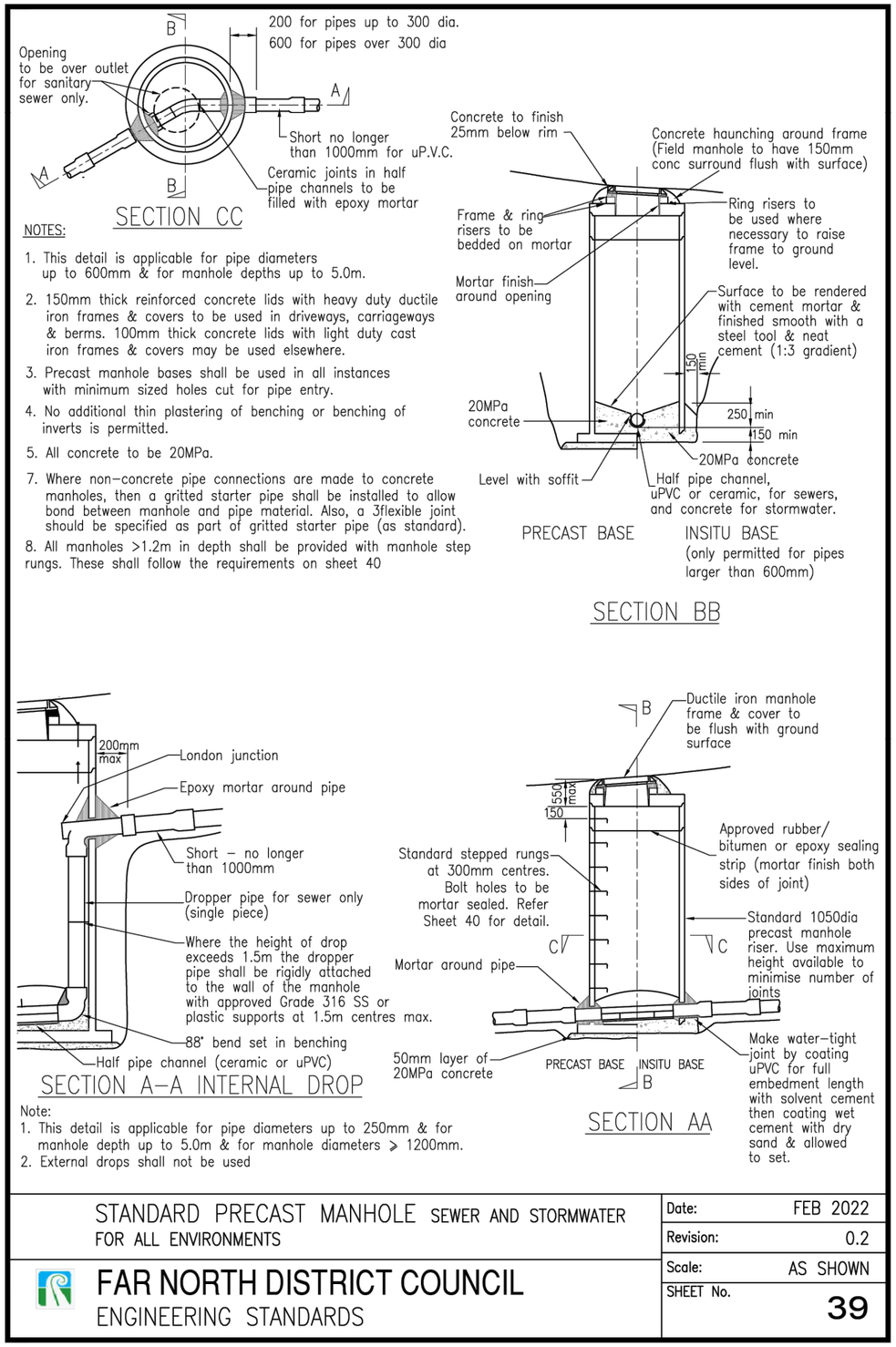


NOTES:

1. Concrete to be ordinary grade (20MPa) in accordance with NZS 3104:2021
2. Catch-pit outlet pipes to be 1:100 min gradient.
3. Mega catch-pits require specific design and approval.
4. Grates to be cycle friendly. Refer Section 3.2.14.6.

CATCH-PIT DETAILS FOR ENVIRONMENTS LIVING 1 AND 2, AND BUSINESS 1-5	Date: FEB 2022 Revision: 0.2 Scale: AS SHOWN SHEET No. 34
FAR NORTH DISTRICT COUNCIL ENGINEERING STANDARDS	

Sheet 39 Standard Precast Manhole



NOTES:

1. This detail is applicable for pipe diameters up to 600mm & for manhole depths up to 5.0m.
2. 150mm thick reinforced concrete lids with heavy duty ductile iron frames & covers to be used in driveways, carriageways & berms. 100mm thick concrete lids with light duty cast iron frames & covers may be used elsewhere.
3. Precast manhole bases shall be used in all instances with minimum sized holes cut for pipe entry.
4. No additional thin plastering of benching or benching of inverts is permitted.
5. All concrete to be 20MPa.
7. Where non-concrete pipe connections are made to concrete manholes, then a gritted starter pipe shall be installed to allow bond between manhole and pipe material. Also, a 3flexible joint should be specified as part of gritted starter pipe (as standard).
8. All manholes >1.2m in depth shall be provided with manhole step rungs. These shall follow the requirements on sheet 40

Note:

1. This detail is applicable for pipe diameters up to 250mm & for manhole depth up to 5.0m & for manhole diameters ⩾ 1200mm.
2. External drops shall not be used

STANDARD PRECAST MANHOLE SEWER AND STORMWATER FOR ALL ENVIRONMENTS	Date: FEB 2022 Revision: 0.2 Scale: AS SHOWN SHEET No. 39
FAR NORTH DISTRICT COUNCIL ENGINEERING STANDARDS	

Original size = A3

Client	Project	Drawing Title
Oruaiti School Board of Trustees c/o Avail Pacific	2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Parking Area & Accessway Typical Stormwater Details

LDE engineers • scientists

No.	Issue/Revision	Aprvd	Date
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Drawn:	R. de Swardt	Project:	21102
Approved:	N. Douglas	Drawing No:	C421
Scale A3:	As Shown	Issue/Rev:	C

Oruaiti School Board of Trustees c/o Avail Pacific

CIVIL TECHNICAL SPECIFICATION

2554 State Highway 10, Mangonui (Oruaiti School)

Project Reference: 21102
April 1, 2025

DOCUMENT CONTROL

Version	Date	Comments
A	2 May 2024	Issued for Tender and Construction
B	1 April 2025	Revised and Re-issued

Version	Issued For	Prepared By	Reviewed & Authorised By
B	Issued for Construction	 Riaan De Swardt Senior Designer Engineer *MEngNZ*	 Neil Douglas Civil Manager – Rodney / Kaipara / Northland *MEngNZ*

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1 GENERAL

1.1 Extent of Works

This specification is to be read in conjunction with the supplied documents and drawings. The works detailed herein are to construct a new carpark, accessway and associated stormwater infrastructure.

The works include the following:

1. Earthworks to form all new hardstand areas and drainage.
2. The removal of existing concrete, asphalt, and gravel in preparation for the construction of the new concrete carpark and accessway.
3. All necessary works to form concrete surfaced carparks, gravel accessway and a concrete footpath.
4. Stormwater drainage to service the new and existing hardstand areas as shown on the drawings, including the supply of all materials and labour.
5. The installation of stormwater treatment solutions including the supply of all materials and labour.
6. Remediation, topsoiling and grassing of all disturbed surfaces upon completion.

All temporary works and traffic management shall be included in the Contractor's tender documents.

Due consideration shall be made to allow the occupants of the neighbouring properties access to their property with minimal disturbance and inconvenience. The contractor shall be responsible for liaising with the occupants and advisement of the timing of works which may affect them.

1.2 Compliance

All works are to comply with the relevant Council Engineering Standards.

All work and operations are to comply with all respects of any Resource Consent and Building Consent issued for the work at all times.

Consent to work within the Road Reserves are to be obtained from the Council by the Contractor where required.

All internal quality assurance, control and testing are to be undertaken by the Contractor in accordance with the supplied documents.

The Contractor is to advise the Engineer and/or the Council (where necessary), a minimum of 24-48 hours prior to an inspection or testing required and allow for adequate time for inspection purposes in his programme.

Where any inspection and/or testing does not comply with the Specification, then the cost of re-inspection and/or testing shall be borne by the Contractor including any costs incurred by the Engineer or the Principal.

Upon completion of the works a Producer Statement will be required for all civil works including Earthworks, Drainage and Pavements stating that all the works have been constructed in accordance with all the requirements of the supplied documents. The Producer Statement is to be supported by all test data, engineering inspections etc as required by this Specification.

1.3 Set Out

The works shall be set out on site by the Contractor from control points supplied and confirmed by a Surveyor on site. Once the initial set out has been undertaken, it shall be the responsibility of the Contractor to protect and maintain any set out pegs. Set out pegs shall be maintained throughout the course of the works as reference points.

In the event that the Contractor desires to fix alternative and/or additional pegs for ease of setting out, he shall do so at his own expense. The Contractor shall be entirely responsible for ensuring and checking the accuracy of such additional pegs.

1.4 Protection of Property & Services

The Contractor shall take all necessary measures to protect all private and public property and services from damage during the course of the proposed works.

Any damage caused by the Contractor shall be reinstated at the Contractor's expense.

1.5 Materials

These sections of the specification detail the materials required for the works, and the quality assurance requirements for the verification of materials supplied. All sampling and testing of materials shall be undertaken in accordance with the relevant standards and specifications. All materials utilised in the works are to comply with the relevant standards and specifications. Any materials not covered by a standard or specification shall be of the best quality available.

The Contractor shall take samples and carry out pre-acceptance testing where required by the Engineer. The Engineer reserves the right to collect additional samples from the source of supply themselves. Copies of all test results are to be forwarded to the Engineer upon receipt by the Contractor.

1.6 Sediment & Erosion

Sediment and erosion control shall be implemented where required prior to undertaking any work. These methods should comply with the relevant regional and district council standards. Suitable methods for controlling sediment loss and erosion on earthworks sites can be found in Auckland Councils GD05 Erosion and Sediment Control Guidelines. Where no other relevant council standards are available these shall apply.

The Contractor is responsible for organising inspections where required with the relevant district and regional council representatives and shall maintain sediment controls for the entire duration of the works to the required standards. Immediately upon completion of the works sediment controls shall be removed and the site shall be reinstated to fully vegetated condition as directed by the Engineer, construction plans and any council representative.

The Contractor can prepare an erosion and sediment control plan based on anticipated staging of work. These will be submitted and discussed with Council on site prior to commencement of physical works. Alternatively, the appointed Engineer can prepare these plans on the Contractor's behalf. Any changes or adjustments to the approved plans will be discussed with Councils monitoring officer prior to implementation on site.

Maintenance of all controls and devices is the responsibility of the Contractor.

1.7 Archaeological

In the event that any Koiwi (human remains) or artefacts which may be of historic or cultural importance are discovered, all work in the vicinity shall cease immediately and tangata whenua, the New Zealand Historic Places Trust and the relevant District Council shall be immediately notified to determine any necessary protection, remediation, or mitigation.

1.8 As-Built Plans

As-built plans will be required and should meet the requirements of the relevant Council authority where necessary.

An electronic copy of the as-built plans is required. As-built survey is to be in terms of the same control as the set-out for the works. The Contractor is responsible to notify the Surveyor to capture relevant information as and when required on site.

2 DEMOLITION AND REMOVAL

Refer to drawing sheer 21102-C002 for the Demolition and Reinstatement Plan.

2.1 General

The extent of all structures/features requiring demolition and removal from site are shown on the drawings and are to be confirmed on site with the Engineer and School Principal/Representatives.

Unless instructed by the Engineer and School Principal/Representatives, all material is to be removed from the site and disposed off-site at an appropriate location depending on the material type.

2.2 Existing Concrete

The Contractor will account for the removal of the existing concrete with the disposal of all excess material off-site to a suitable location.

Where required, removal may involve saw cutting to allow for the construction of the new structures as shown on the drawings.

Saw cuts shall be made with a power saw and the cut is to extend through the full thickness of the surface layer in clean straight parallel lines.

2.3 Trees and Stumps

Where required, trees and stumps are to be removed and disposed of off-site to a suitable location. All stumps and root systems within the new carpark and access way are to be fully removed during the excavation. Stumps within proposed grassed/lawn areas shall be cut off at 150mm below the finished surface level.

3 EARTHWORKS

3.1 General

Earthworks will be required to form the levels shown in the construction drawings. Earthworks include the stripping and disposal off-site of vegetation, soil, or material within the extent of the earthworks, the stripping and stockpiling of any topsoil for reuse, and the excavation of the working bench to the specified lines and levels.

The earthworks are to be carried out in general accordance with NZS4431:2022 Engineered Fill Construction for Lightweight Structures.

If any non-engineered fill or contaminated material is encountered during the work, the Contractor shall notify the Engineer, Client, and any other relevant authority.

3.2 Scope

Earthworks include the stripping and disposal off-site of vegetation within the extent of the earthworks. Bulk earthworks will involve the cut to waste as show on the drawings that is to be disposed of off-site.

The Contractor shall carry out the earthworks on the site in accordance with the requirements detailed below and in conjunction with the requirements of the drawings and the various standards.

The cut slopes are not to exceed the parameters outlined in the drawings.

Work included in this specification:

- Excavation, load and dispose of material removed to form level ground.
- Preparation of any area to be filled including benching and subsoil drainage as required.
- Excavate, load, cart, spreading and drying if required, placement, stabilising if required and compaction of engineered fill material.
- Preparation and protection of all works until vegetation is re-established.
- Re-form the grassed area on the edge as shown in the design drawings.

3.3 Standards

The Standards to be used shall include, but not be limited to:

- NZS 4431: 2022 Engineered fill construction for lightweight structures
- NZS 4402: 1988 Methods for Testing Soils for Civil Engineering Purposes.
- NZS 4404: 2004 Land Development and Subdivision Engineering.

The documents listed above and cited in this section are deemed to form part of this specification. However, this specification takes precedence in the event of it being of a higher standard than the cited documents.

3.4 Drainage Control

All earthworks shall be carried out during extended periods of fine weather and in fully drained conditions with no free water on the working surfaces. All preparatory excavation work and subsequent excavations in cut areas or areas to be filled shall be kept effectively drained at all times. Cut and fill areas shall be sloped and graded adequately at all times so that they do not pond water.

Any fill or final excavation surface materials which have been allowed to become too wet or soft shall be removed and dried or replaced.

The Contractor shall dig such trenches and provide such other facilities as may be required to ensure that stormwater will drain quickly off the exposed areas. These must be constructed so as not to flood or damage any property and shall be filled in or removed on completion of the works.

The surface of fill material shall be temporally compacted and shaped to allow water runoff with appropriate plant when rain is impending.

3.5 Clearing and Removal of Vegetation

The Contractor shall remove all vegetation and topsoil from the area of earthworks and shall clear all obstructions and rubbish from the area of the works except those specifically identified by the Engineer as remaining.

All vegetation and rubbish are to be disposed of at a suitable location as directed by the Client or Engineer.

The maximum recovery of topsoil is essential to be able to satisfactorily reinstate the disturbed areas on completion of the earthworks. Topsoil should be stockpiled for later use.

The earthworks profiles shall generally be trimmed to match and blend with adjacent undisturbed existing ground.

3.6 Tolerances

All earthworks shall be carried out to the lines, levels and grades shown on the Construction Drawings or as otherwise instructed by the Engineer. Tolerances shall be as follows:

- Finished levels ± 15mm

3.7 Inspections and Approvals

Before fill is placed in any area the Engineer shall be notified so that he can inspect the stripped surface and instruct whether further excavation and/or undercutting and backfilling is required or other works such as drainage are necessary. No fill shall be undertaken in an area until such inspections of the stripped surface, and any other works that may be required below the stripped surface have been made and the Engineer has approved the commencement of installation of fill.

3.8 Cut to Fill

The cut and fill areas are shown on the drawings.

Fill materials shall be sourced from areas of cut and installed where required in layers. The Contractor shall take all precautions and maintain a tidy operation. The Contractor shall also ensure that all fill is free of organic matter or other unsuitable materials.

3.9 Cut to Waste

The Contractor is responsible for finding a suitable disposal site for the excess material and placing and compacting the material in a suitable manner to not cause any land instability or erosion.

The Contractor shall determine a safe method to form and maintain stable cut slopes during construction.

3.10 Materials (site won suitable for re-use)

The fill material shall only contain suitable material i.e. free from any organic material or soft plastic clays. It is anticipated that material stockpiled during the excavation may be reused, subject to the approval of the Engineer.

In case there is not enough material suitable for reuse, GAP65 or similar engineered aggregate will be used.

3.11 Completion of Earthworks

The finished surface shall be shaped so it sheds surface water. Any exposed slopes shall be track rolled as detailed in Auckland Councils ARC GD05 erosion and sediment control guidelines, to reduce the risk of erosion. The exposed surface is to be stabilised immediately following the completion of work. All exposed soil areas are to be mulched and seeded immediately following the completion of the works and are to achieve a minimum grass strike of 75% or more within 6 weeks.

Work shall not be deemed complete until passed by the Engineer and the local Territorial Authority if required.

4 PAVEMENT

Pavement for the carparks and accessway shall be constructed to the following specifications.

The Contractor will organise the testing and inspection with certifying Engineer prior to any backfilling commences. When work is to be undertaken over multiple days and stages, schedule of inspections will be discussed with Engineer.

4.1 Concrete

4.1.1 Subgrade

The subgrade shall have any soft spots dug out, backfilled and thoroughly compacted. The subgrade shall be free of any surface water, shall be trimmed accurately to shape and roll, to ensure a tight well shaped surface which will not pond or absorb water. Camber should be as shown in the design plans.

4.1.2 Basecourse

When placing a basecourse, watering to achieve optimum water content is often critical. However, over watering and over rolling can be more damaging than underwatering and rolling and the critical point can be reached very quickly. Compaction should generally consist of 5 to 8 passes with a small steel wheel roller on GAP40 material.

Only use a vibrator roller for compacting the upper layers of basecourse sparingly as it crushes the aggregate creating more fines and making the basecourse more susceptible to plastic failure in the presence of water.

4.1.3 Form Work

Form work shall be straight and true and set out in a "pleasing to the eye" manner. Curves shall be curvilinear with a smooth transition to the adjoining straights or other curves.

Form work shall be well secured so as not to dislodge under induced working loads from poured concrete etc.

Unless otherwise approved, form work shall be well oiled and maintained in good order.

4.1.4 Concrete Surface

Concrete work shall be carried out in general accordance with NZS 3109:1997 Concrete Construction, and the General Requirements of the relevant Council Engineering Standards.

Concrete shall have a 28-day compressive strength of not less than 20 MPa, a slump of 100 mm, and aggregate size of approximately 19 mm maximum and shall be from an approved matching plant delivered by a ready-mix truck. The concrete aggregate shall be reasonably free of silt and clay particles sized fines as these can contribute to shrink /swell and associated cracking. The Client will confirm preferred concrete finish prior to construction.

The footpath shall be cast as 100 mm thick concrete slab. The concrete should have crossfall as noted on the drawings. The concrete footpath shall have an exposed aggregate finished surface.

The carpark shall be cast as 150 mm thick concrete slab, with 665 Mesh placed centrally. The concrete should have a crossfall as noted on the drawings. The concrete carpark shall have a Class U5 Broomed finish in accordance with NZS 3114:1987.

Prior to concreting, the subgrade aggregate shall be moistened to reduce moisture draw out from the concrete.

Any potential cold joints between pours shall be squared off to provide control joints as per Schedule of Quantities comments.

4.1.4.1 Protection and Curing

Steps must be taken to protect the new surface from the effects of heavy rain, pedestrian, and other traffic. During hot weather, or at other times as required, curing of the concrete is to be affected by means of covering with damp hessian, sand, curing membrane or other means.

4.1.4.2 Crack Control

Crack control joints (saw-cuts) shall be formed as shown in the drawings at max 3 metre centres (as per Schedule of Quantities). Saw-cuts depths shall be 1/3 of the concrete thickness. Any deviations shall be discussed and confirmed by the Engineer prior to the commencement of works.

4.1.5 Kerb and Channel

Concrete kerb and channel are to be installed as specified in the engineering drawings. Saw cuts are to be installed at maximum 3m centres, in line with footpath saw-cuts if possible. In-situ concrete shall have a 28-day compressive strength of not less than 20 MPa.

4.1.6 Hotmix Transition

A 500mm Hotmix Transition shall be installed between the edge of the SH10's existing asphalt and the proposed concrete carpark in accordance with the relevant Council standards.

4.2 Testing and Frequency

The Contractor is responsible for carrying out the testing. The Engineer shall carry out random testing in addition to the Contractor's regular test records to confirm that the required compaction is being achieved.

Testing is to be carried out as denoted in Table 2 below.

Material	Test	Frequency	Target
Subgrade	Shear Vane (for cohesive material)	1 test every 50m², every 3 lifts (max 0.6m)	100kPa/good ground
	Scala Penetrometer (for non-cohesive material)	1 test every 50m²	Average 2 blows/100mm
Basecourse for concrete carpark	Clegg impact test	1 test every 50m²	CIV≥15
Basecourse for footpath	Clegg impact test	1 test every 50m²	CIV≥15

Table 2 – Testing and Frequency for new pavement.

4.3 Pavement Marking

On completion of the final seal coat, the contractor shall undertake the markings that are required as part of this contract.

All materials, equipment and procedures shall be in accordance with the current requirements of MOTSAM Manual of Traffic Signs & Markings.

All paint for markings shall conform to NZTA Specification M07 Notes and be to the specific line width and spacing as set out in the manual.

5 Stormwater Drainage

5.1 General

This section includes the supply of materials, excavation for, installation of and backfilling and completion of all stormwater and subsoil drainage.

All pipework and subsoil drains are to be laid to the lines and levels as detailed on the plans. All materials used and all work shall meet the relevant standards including but not limited to those covered in NZS, NZ Building Code and relevant Council Standards.

5.2 Standards

The Standards to be used shall include but not be limited to:

NZS 3107:1978	Specification for pre-cast concrete drainage and pressure pipes
AS/NZS 5065:2005	Polyethylene and polypropylene pipes and fittings for drainage and sewerage applications
NZS/AS 3725:1989	Loads on buried concrete pipes
AS/NZS1260:2003	PVC-U pipes and fittings for drain, waste, and vent application
AS/NZS 3500.2:2003	Sanitary plumbing and drainage
AS/NZS 3500.3:2003	Stormwater drainage
TNZ F/2	Specification for pipe subsoil drain construction
TNZ F/6	Specification for geotextile wrapped aggregate subsoil drain construction
TNZ F/7	Specification for geotextiles
CPAA TN-01	Installing small diameter concrete pipe under roads (Nov 2010)

The latest version shall be used unless indicated otherwise.

5.3 Existing Services

All existing services to be located and protected at all times during construction. Any damage and remediation to existing services shall be the responsibility of the Contractor.

5.4 Excavation

Excavation for all drains as necessary to provide the required cover, bedding depth and trench width.

All pipes to be laid to the levels and grades as shown on the plans.

All excavated excess material to be disposed off-site unless instructed otherwise by Client or Engineer.

5.5 Materials

All materials shall comply with the Standards above and be as detailed on the design drawings.

5.5.1 Bedding and Backfill

Bedding material shall be 7-20mm clean, free draining drainage metal.

All engineered backfill is to be compacted to 95% of NZS Standard Density. Care is to be taken to ensure good compaction is achieved along the sides of the pipes, especially under the new pavement.

5.6 Minimum Cover During Construction

All pipework to have a minimum 600mm of compacted cover prior to loading with construction vehicles, unless noted otherwise.

5.7 Manholes

All manholes are to be Ø1050mm precast concrete chambers, and depth in accordance with design drawings and longitudinal sections, unless noted otherwise. Chambers shall be with a precast base. A trafficable frame and lid will be used for the areas with vehicle loading.

5.8 Inspection Chambers

Inspection chambers are to be Ø675mm precast concrete chambers, and depth in accordance with design drawings and longitudinal sections. Chambers shall be fit with a precast base. A trafficable frame and lid will be used for the areas with vehicle loading.

5.9 Catchpits

All catchpits to be precast concrete 450x675mm internal dimensions, fitted with trafficable frame and grated lid. Sump depth to be min 300mm below invert of the outfall pipe, or in accordance with the design drawings.

All catchpits to be fitted with a “Stormwater360 Litta Trap” and installed as per supplier specifications.

5.10 Drainage Pipes

Stormwater drainage pipe materials and sizes shall be as detailed on the engineering drawing. Any changes will be discussed and approved by the Engineer prior to ordering and installing the alternative product.

5.11 Pipe Fittings

Pipe fittings are to be jointed and compatible with the pipe used.

5.12 Subsoil Pipes

Subsoil pipes are to be HDPE corrugated perforated pipe to the requirements of TNZ F/2.

5.13 Rock Filled Traffic Island

The rock filled filtration island shall be fitted with 100-150mm diameter rocks to a depth of at least 200mm.

5.14 Filtration & Subsoil Trenches

Filtration trenches to be constructed in accordance with the design drawings and. Trenches to be filled will clean drainage metal and wrapped in a filter cloth.

5.15 Minimum Cover

Minimum cover to pipes is to comply with table below.

Location	Depth
Areas not subject to traffic loading	600mm
Areas under carriageway	900mm
Areas under concrete footpath	300mm

Where minimum cover cannot be achieved then reinforced concrete capping is to be provided.

All stormwater pipes are to have a minimum 900mm of compacted cover prior to loading with construction vehicles. Alternatively, temporary protection should be provided in instances where this is not possible.

5.16 Backfill

Any trench located in an area subject to vehicle loading is to be backfilled to the underside of the basecourse layer with GAP65 aggregate compacted in layers not exceeding 200mm loose depth to achieve at least 95% MDD.

Backfill in lawn areas is to be with suitable ordinary fill gained from the excavation and should extend to min 100mm below finished ground level. The top of the trench should be topsoiled and grassed.

5.17 Concrete Capping

Where the required minimum cover cannot be achieved then the pipe shall be capped to provide additional protection, in accordance with the relevant Council Engineering Standards.

Capping shall consist of a 100mm thick 20MPa concrete slab with 688 mesh placed central. The underside of the slab shall be at the top of the bedding/haunching material, i.e. at least 100mm above the top of the pipe, and shall extend the full width of the trench. Any capping required shall be discussed with the Engineer prior to implementation.

5.18 StormFilter

All treatment devices to be ordered and installed as per the design and supplier specifications.

6 Compliance Deliverables

The Contractor must deliver reports of regular checks for construction, including but not limited to:

1. Successful set out of coordinates achieved.
2. Successful demolition/removal of existing structures, pavement etc.
3. Successful installation of stormwater drainage.
4. Successful excavation to design subgrade levels.
5. Successful placement and compaction of basecourse.
6. Successful access way construction achieved.
7. Successful footpath construction achieved.
8. Successful installation of the membrane seal.
9. As-Built drawings (pdf and dwg) - the Contractor shall provide a stamped and signed set of as-built drawings within 5 working days of construction being completed. The as-built drawings shall show exact details of constructed items, levels and any changes to the designed details that have been made during construction. Contractor is also required to provide a PS3 (Producer Statement Construction) to accompany the As-Built drawings.

7 Hold Points and Engineer Inspections

The following schedule defines the hold points at which times the work covered by this specification shall not proceed until the Engineer has been given the opportunity to inspect the works and/or has been provided the specified information and has approved such. Within 24 hours the Engineer will notify the Contractor if construction may proceed. Hold points will occur:

1. Pre Construction Meeting
2. To confirm set out coordinates are accurately identified.
3. To confirm all demolition/removal has been completed.
4. During the installation of drainage to confirm all pipes and manholes have sealed connections are in place and prior to backfilling.

5. After installation of stormwater drainage confirming pipe grades and inverts have been achieved.
6. During the installation of subsoil drains and connections to catchpits.
7. During excavation for carparking and access ways to design subgrade levels including testing.
8. Upon completion of placement and compaction of basecourse material for access and footpaths.
9. Upon placement of kerbing.
10. Upon placement of the membrane seal.
11. Final walkover and inspection for defects after completion of the works.

At least 48-24h notice will be given to Engineer prior to required site testing and inspection.
Through duration of the construction certifying Engineer will confirm if any other inspections might be required.

8 Completion of Works

Upon completion all surplus materials and debris are to be removed leaving the whole site in an attractive, tidy, and safe condition to the satisfaction of the Engineer. All existing surfaces which have been disturbed shall be reinstated to at least their original condition. All exposed areas shall be topsoiled, mulched, and seeded where required.

Oruaiti School Board of Trustees c/o Avail Pacific

STORMWATER NEUTRALITY REPORT

2554 State Highway 10, Mangonui (Oruaiti School)

Project Reference: 21102
April 1, 2025

DOCUMENT CONTROL

Version	Date	Comments
A	1 May 2024	Issued for Consent
B	10 June 2024	Compliance Assessment Included – Issued for Consent
C	1 April 2025	Updated Drawing Set

Version	Issued For	Prepared By	Reviewed & Authorised By
C	Issued for Consent	 Riaan De Swardt Senior Design Engineer *MEngNZ*	 Neil Douglas Civil Manager – Rodney / Kaipara / Northland *MEngNZ*

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APPENDIX A: HEC-HMS MODEL AND RESULTS
APPENDIX B: ENGINEERING DRAWINGS
APPENDIX C: SUPPLIER INFORMATION AND TECHNICAL DRAWINGS

1 PROJECT DESCRIPTION

LDE Ltd was engaged by Avail Pacific on behalf of the Oruaiti School Board of Trustees to undertake a stormwater neutrality design related to upgrade of the existing carpark located at 2554 State Highway 10, Mangonui.

The purpose of this report is to determine appropriate stormwater management devices and treatment of the first flush relating to the upgrades. This report has been prepared to support a resource and building consent application.

Figure 1: Site location in relation to the surrounding Mangonui suburbs. Aerial sourced from NRC Hazard Maps

2 SITE DESCRIPTION

Oruaiti School is a primary and intermediate school, catering for student from year one to year eight, and is located at 2554 State Highway 10, Mangonui. The legal description of the site is Pt Allot 18A PSH OF Mangonui East with an area of 41,600 m^2. The site is located approximately 8km east of the Mangonui township.

The school site contains an admin office, classrooms, a gym, playground, and pool, with existing gravel and asphalt accessways. An existing carpark is located along the frontage of the school on the northern side of the SH10. The school currently has approximately >190 students and 15 staff members. The students are dropped off and picked-up from the carpark by busses and parents in vehicles. See figure 2 below.

Figure 2: Aerial photo of the subject site (indicative boundary in red) sourced from NRC Hazards Maps showing the school and parking area, Oruaiti River, and State Highway 10.

3 PROPOSED DEVELOPMENT

The school's carpark currently faces numerous health and safety risk for anyone visiting the school. The carpark is located along the frontage of the school and SH10. Vehicles leaving the carpark are at times forced to back into the state highway with traffic approaching from the east and west at speeds of around 100km/h.

The development proposal as discussed and agreed to by the school, is to upgrade the carpark in order to make it safer for vehicles and pedestrians. The design approach is to provide a dedicated entrance to the school and exit from the school, with a separate dedicated lane for cars and busses. There will also be a turning lane incorporated for vehicles coming from the west and turning left into the carpark.

There is currently some existing stormwater pipes and structures collecting and conveying runoff to the south via a 900Ø concrete pipe culvert, discharging into the Oruaiti School Environmental Wetlands.

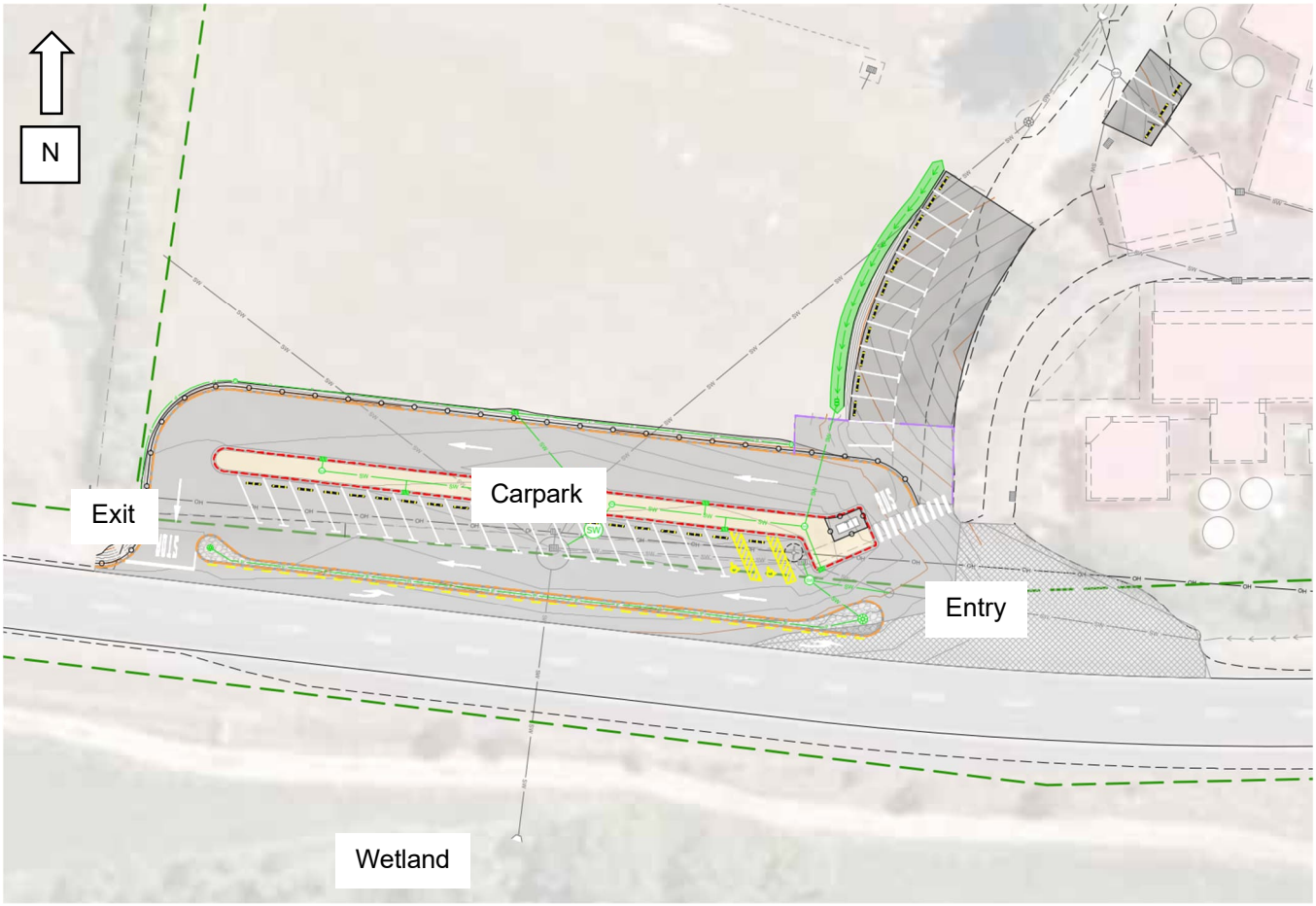


Figure 3: Proposed layout of upgraded carpark and wetland location. Source: LDE Drawings

4 Existing Flow Regime & Downstream Flooding

A desktop study was undertaken to determine and identify a catchment area of approximately 10ha, flowing from the north towards the south. 3D Modelling software was used to process LINZ DEM data and build an existing ground surface to determine approximate flow paths as indicated below. By utilizing the existing surface data and aerial imaging it was determined that the existing flows are conveyed by both natural and man-made channels throughout the catchment area. The channels connect into pipe culverts at various locations around the perimeter of the school, where the flows are conveyed to the discharge point.

During a site walkover undertaken by an Engineer from LDE in December 2023, some of the existing inlet structures and pipe culvert were identified. It appears that most of the over land flows are captured and conveyed to the discharge point via 2 x existing pipe culverts underneath the school's sport field. One Ø375mm PVC pipe culvert could be identified on site where it starts at a scruffy dome manhole and flows from the north-east towards the south-west. The second culvert's exact location and size is unknown, but from survey and historic site information, it is estimated that a Ø900mm concrete pipe originates from the neighbouring property to the west of the school and flows towards the south-east.

The culvert from the north-east connects into a concrete tank located in the southern edge of the sports field. Information from a drainlayer who installed the tank say that it is a 25,000L Underground Duracrete Tank. From here the tank is fitted with what is assumed to be a Ø900mm concrete outlet pipe, which connects to a second large underground structure directly downstream of the tank. The exact size and depth of this structure is unknown, but it is assumed that it is also a 25,000L underground tank. The second culvert from the north-west, connects into this second tank. From this tank it is assumed that a Ø900mm concrete pipe culvert crosses the State Highway and discharges into a downstream wetland, which continues to flow into the into the tidal zone of the Oruaiti River.

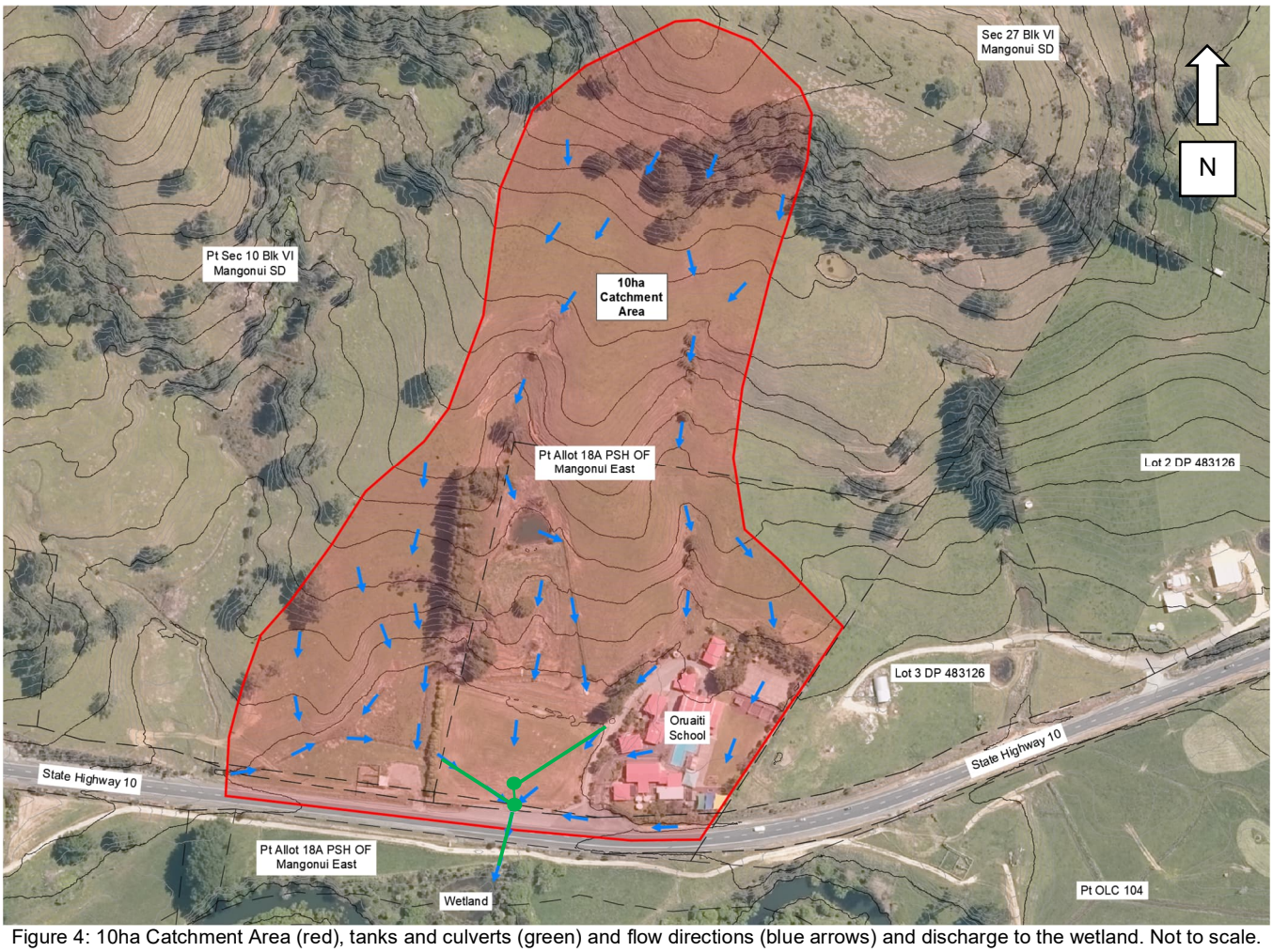


Figure 4: 10ha Catchment Area (red), tanks and culverts (green) and flow directions (blue arrows) and discharge to the wetland. Not to scale.

Photo 1: Scruffy dome and pipe culvert flowing from the north-east. (LDE Site Photo)

Photo 2: First underground concrete tank with inlet from the north-east cuvlvert. (LDE Site Photo)

Photo 3: First underground concrete tank flowing into second underground structure. (LDE Site Photo)

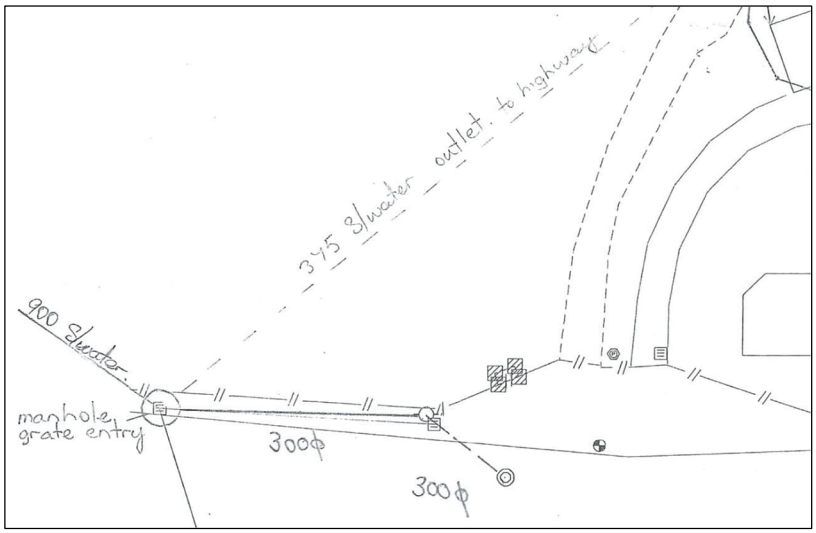


Figure 5: Historic site data indicating both culvert sizes. (Provided by the school)

As per Northland Regional Council Hazard Maps, the risk and extent of the river and coastal flooding is shown to occur downstream of the subject catchment area. The flooding maps can be seen in the figures below.

Figure 6: 10-Year, 50-Year and 100-Year River Flood Hazard Zones – Regionwide Models. (NRC Hazards Maps)

Figure 7: Current, 50 Years, 100Years and 100 Years + Rapid Sea Level Rise Scenario Coastal Flood Hazard Zones. (NRC Hazards Maps)

5 ATTENUATION REQUIREMENT

Due to the discharge of stormwater occurring into the tidal zone of the Oruaiti River (<RL 2.0m), the FNDC Engineering Standards; Dated May 2023, Table 4-1 of the standards is shown below and states that "*If the proposed stormwater discharge is into a tidal zone, then no attenuation is required.*"

Far North District Council Engineering Standards — Chapter 4: Stormwater and Drainage

Criteria	Design Parameter	When required
Flood Control (1% AEP event)	Detention required, limiting the post-development 1% AEP event flow rates to 80% of the pre-development 1% AEP event flow rates.	Where downstream flooding hazard has been identified. Where there is no CMP or site-specific SMP: 1. Refer to Flood Hazard Areas in the District Plan and any known downstream restrictions causing flooding.
Flow attenuation (Attenuation of the 50% and 20% AEP events)	Limit the post-development 50% and 20% AEP event flow rates to 80% of the pre-development flows through controlled attenuation and release.	Where there is no CMP or site-specific SMP: Catchment location dependent. Typically, always required in the upper catchment and sometimes not required where development site is located in proximity to the catchment outlet, discharging to a watercourse with sufficient network capacity, and where flow attenuation may worsen flooding hazards due to relative timing of peak flows. This is subject to assessment demonstrating no negative impacts would occur. If the proposed stormwater discharge is into a tidal zone, then no attenuation is required.

Figure 8: Extract from Table 4-1 of the FNDC Engineering Standards 2023

We have utilised HEC-HMS software to analyse the pre- and post-development runoff flows generated from the catchment area to determine if the existing Ø900mm concrete culvert under the road discharging into the wetland area has sufficient capacity to accommodate the increase in impervious area generated from the carpark upgrades. It was assumed that 10% of the upstream catchment area is impervious and 90% is pervious, as shown in Table 1 below. The impervious allocation includes the upgraded carpark areas in.

Table 1: Pre- and Post Development catchment areas and peak run-off flow rates

Pre-Development Catchment Assessment		
	Drainage Area (ha)	**Peak Discharge (m^3/s)**
Pervious	9.0	0.909
Impervious	1.0	0.151
Total	10.0	1.059
Post-Development Catchment Assessment		
	Drainage Area (ha)	**Peak Discharge (m^3/s)**
Pervious	9.0	1.175
Impervious	1.0	0.181
Total	10.0	1.356

Table below shows the parameters used in the HEC-HMS hydrological model of the catchment area using a 24-hr duration rainfall event with a SCS Type 1A storm profile and 20% Climate Change factor applied. A hydrological soil group, Class C, was adopted for the HEC-HMS model. The hydrological soil group was inferred based on the parameters set out in the FNDC engineering standards Table 4-3, with a time of concentration of 10 minutes.

Table 2: HEC-HMS model parameters

Land use, group C soils	**Runoff curve Number**	**Initial rainfall abstraction (mm)**
Permeable (Grass/Garden)	74	5
Impervious Pavement Area	98	0

The pre- and post-development peak runoff rate for a 1% AEP rainfall event amounts to 1.059 m^3/s and 1.356 m^3/s respectively for the entire catchment area, as shown in the HEC-HMS outputs in the Appendix. Hydraflow Express software was used to calculate the capacity of the existing culvert. The calculation parameters used was for a concrete pipe with an n-value or 0.013, laid at a grade of 0.75%, and flow rates of 1.059 m^3/s and 1.356m^3/s.

The results illustrate that the existing culvert has a pre-development flow depth of approximately 540mm, and a post-development flow depth of approximately 620mm, which results in an increased flow depth of 80mm. This indicates that the existing culvert will have sufficient capacity during a post-development 1% AEP rainfall event. Analyses results in the Appendix.

We consider that there are no downstream effects on other buildings or property as the flows are shown to be able to be entirely conveyed by the pipe network in the 1% AEP storm event. Therefore, there will be no effect from the increase in impermeable areas on the State Highway. Once flows reach the main river, the 15L/s increase is

negligible compared to the expected overall flows from the river catchment. Accordingly, we consider that no attenuation of new impermeable areas is required.

6 STORMWATER

6.1 Stormwater Analysis

We have utilised HEC-HMS software to analyse both the pre- and post-development scenarios. As stated in section 5 above, stormwater attenuation for the increase in impervious areas is not a requirement and therefore only stormwater treatment devices will be considered to minimise any increased adverse effects on the downstream wetland.

6.2 Analysis Parameters

The pre-development rainfall depths used in the stormwater analysis have been taken from the historical data from NIWA HIRDS V4. For post-development the rainfall has been increased by 20% to take climate change into account.

Table 3: NIWA HIRDS V4 Rainfall Data

Rainfall depths (mm):									
ARI	**AEP**	**10m**	**20m**	**30m**	**1h**	**2h**	**6h**	**12h**	**24h**
1.58	0.633	8.71	13.4	16.9	24.5	34.4	54.8	70.4	87.4
2	0.5	9.54	14.6	18.5	26.9	37.7	60.2	77.3	96
5	0.2	12.4	19	24.1	35	49.2	78.7	101	126
10	0.1	14.5	22.3	28.2	41.1	57.8	92.5	119	148
20	0.05	16.7	25.7	32.5	47.3	66.7	107	138	172
30	0.033	18	27.7	35.1	51.1	72	116	149	186
40	0.025	18.9	29.1	36.9	53.8	75.9	122	157	196
50	0.02	19.6	30.3	38.4	56	78.9	127	163	204
60	0.017	20.3	31.2	39.5	57.7	81.4	131	169	210
80	0.013	21.2	32.7	41.4	60.5	85.3	137	177	221
100	0.01	22	33.8	42.9	62.7	88.4	142	184	229
250	0.004	25	38.6	49	71.6	101	163	210	263

The pre- and post-development rainfall parameters used in HEC-HMS is shown in the table below.

Table 4: Rainfall Parameters

Rainfall Event	**Pre-development Rainfall (mm)**	**Post-development Rainfall**
50% AEP 24-hour	96	115.2
20% AEP 24-hour	126	151.2
1% AEP 24-hour	229	274.8

The table below shows the parameters used in the HEC-HMS hydrological model of the site. A hydrological soil group, Class C, was adopted for the HEC-HMS model. The hydrological soil group was inferred based on the parameters set out in the FNDC ES Table 4-3, with a time of concentration of 10 minutes.

Table 5: HEC-HMS model parameters

Land use, group C soils	Runoff curve Number	Initial rainfall abstraction (mm)
Permeable (Grass/Garden)	74	5
Impervious Pavement Area	98	0

A summary of pervious and impervious areas for the pre- and post- development scenarios relevant to the modelling are shown below.

Table 6: Impervious & Permeable Areas

Description	Pre-development	Post-development
Pervious Area	1240m^2	110m^2
Impervious Area	1860m^2	2990m^2
Total Analyzed Area	3100m^2	

6.3 Pre-development Peak Runoff

Using the parameters above and 24-hr duration rainfall event with a SCS Type 1A storm profile, the peak discharges are calculated as follows.

Table 7: Pre-development peak runoff flow rates for the 50%, 20% and 1% AEP rainfall events

50% AEP (L/s)	20% AEP (L/s)	1% AEP (L/s)
14.8	20.3	40.6

6.4 Post-development Peak Runoff

Using the parameters above for the development of new carpark, a 24-hr duration rainfall event with 20% increase allowance for climate change and SCS Type 1A storm profile, the peak discharges are calculated as follows.

Table 8: Post-development peak runoff flow rates for the 50%, 20% and 1% AEP rainfall events

50% AEP (L/s)	20% AEP (L/s)	1% AEP (L/s)
22.9	30.3	55.7

6.5 Analysis Results

Table below shows a summary of the pre- and post-development peak flow rates and difference generated by the proposed development. The full output tables from the HEC-HMS modelling are attached in Appendix A.

Table 9: Peak runoff flow rates for the 50%, 20% and 1% AEP rainfall events

AEP Rainfall Event	Pre-development (L/s)	Post-development (L/s)	Increase (L/s)
50% AEP	14.8	22.9	8.1
20% AEP	20.3	30.3	10.0
1% AEP	40.6	55.7	15.1

The post-development flow results shown, are then input into the capacity assessment of the existing Ø900mm concrete culvert outlet from the site to the wetland. The results show that the culvert will be 77% full in the 1% AEP event and has sufficient capacity to convey the peak flows from the proposed development.

If impermeable areas greater than those analysed in this design are proposed, then a revision of the design outlined in this report will be required and we should be contacted.

6.6 Stormwater Treatment Devices Recommendation

6.6.1 Sheet Flows from State Highway – New Traffic Island

Some of the stormwater runoff from the state highway, will be captured and pass through a new traffic island constructed to serve as delineation between the school carpark and the turning lane for vehicles traveling from the west and entering the carpark.

It is proposed that the island be constructed with 150mm high block kerbs, with 0.5m wide gaps formed at 3.0m spacings. This will allow runoff to sheet flow into the island area. The Island is intended to be filled with Ø100-150mm aggregate at a depth of 300mm. Underneath this a 300mm wide x 500mm min deep subsoil drain trench will be constructed. The trench will be filled with clean drainage metal, wrapped in geotextile with a Ø110mm perforated drain coil. At both ends of the island a Ø675mm x 1.0m deep chamber with a scruffy dome will be installed and serve as a connection point for the drain coil. The chamber will be connected to the proposed stormwater system.

This will serve as a collection device for the runoff from the state highway. See the appended Engineering Drawings for details.

6.6.2 Stormwater Catchpits

To serve as a gross pollutant trap, the Stormwater 360 LittaTrap is to be installed in all catchpits for the collection of litter, leaves, debris, and other sediment from the carpark areas. Refer to the operation manual appended to this report.

6.6.3 Stormwater Filtration System

It is intended that stormwater runoff from the carpark will sheet flow towards low points and be collected via catchpits. From here all run-off will flow via a pipe network and it will be connected to the existing outlet structure, before discharging downstream into the wetland.

A Stormwater 360 Stormfilter is a cartridge filtration system that will be installed upstream of the connection point to the existing outlet structure. This passive filtration system consists of a precast concrete manhole with cartridges installed to provide treatment of the 'first flush' through filtration media to effectively remove contaminants generated by the movement of vehicles through the carpark. Refer to the supplier information and LDE engineering drawings appended to this report.

7 Compliance Assessment

The Northland Regional Council's Proposed Regional Plan for Northland; Dated February 2024, has rules in relation to wetlands. Section C.4.1.9 Land drainage and flood control general conditions, and Section C.6.4.2 Other stormwater discharges, has been assessed to determine if it is a permitted activity.

The design intent for the proposed works was to introduce treatment devices to improve the existing conditions, with a less than minor increase in adverse effects. The treatment devices selected provides a reasonable amount of treatment to mitigate the effects on the receiving environment.

"*General conditions apply to activities when referred to in the rules of C.4.1 Land drainage and floor control.*"

Section C.4.1.9 Land drainage and flood control general conditions		
1	There are no adverse flooding, erosion or over-drainage effects on other property.	Refer to Planning Assessment and/or Ecological Memo
2	The activity does not alter the course of a lake or continually or intermittently flowing river.	Refer to Planning Assessment and/or Ecological Memo
3	New land drainage does not occur within 50 metres of any natural wetland.	Refer to Planning Assessment and/or Ecological Memo
4	Drainage does not cause any change to the seasonal or annual range in water level of a natural wetland to an extent that may adversely affect the wetland's natural ecosystem.	Refer to Planning Assessment and/or Ecological Memo
5	No vegetation, soil or other debris generated from the activity is placed in a position where it may be carried into a river or natural wetland, lake or the coastal marine area.	Refer to Planning Assessment and/or Ecological Memo

6	There is no damage to a flood defence or any other authorised structure.	n/a
7	Fish passage is maintained, unless an existing authorisation provides otherwise, or temporary works to enable repair and replacement works are being carried out.	Refer to Planning Assessment and/or Ecological Memo
8	Eels, fish (other than pest fish), kōura (freshwater crayfish) and kākahi (freshwater mussels) unintentionally removed during mechanical clearing of drainage channels are returned to the drainage channel as soon as practicable, but no later than one hour after their removal.	Refer to Planning Assessment and/or Ecological Memo
9	Refuelling of machinery does not take place in the bed of a river or lake.	n/a
10	Any discharge of drainage water does not contain concentrations of contaminants which have or are likely to have significant adverse effects on aquatic life in any river, wetland, or the coastal marine area.	Refer to Planning Assessment and/or Ecological Memo
11	The discharge to the water body or coastal marine area does not, beyond the zone of reasonable mixing:	
a)	result in any conspicuous oil or grease films, scums or foams, or floatable or suspended material except where caused by natural events in the receiving water, and	LittaTraps shall be installed in all catchpits, and each catchpit shall have a 300mm min sump which will remove gross pollutants from stormwater flows. A Stormfilter device shall be installed within the proposed carpark. The stormfilter is effective at removing 80% TSS as well as oil and grease which meets water quality requirements. The stormfilter operates like a siphon through engineered media, so these pollutants will remain trapped inside the treatment chamber. The chamber will be subject to maintenance at intervals as directed by the manufacturer. Therefore, with the treatment train provided, we consider that there will be no increase in contaminants discharged from the proposed carpark construction.
b)	cause the pH of the receiving water to fall outside the range of 6.5 to 9.0 (except where caused by natural events, or when natural background levels fall outside that range), and	The site is being used as a school carpark, and is not expected to have any significant impact on runoff PH levels.
c)	cause any emission of objectionable odour in the receiving water, and	The site use being a school carpark is not expected to have any contaminants which would cause objectionable odour of stormwater runoff.
d)	cause any conspicuous change in colour or visual clarity of the receiving water, and	The carpark is proposed to be sealed reducing the likelihood of suspended sediments. All runoff from the proposed carpark is treated prior to discharge to further remove suspended solids so we consider there to be no change to the colour or clarity of stormwater runoff from the subject area.

e)	cause the natural temperature of the receiving water body to be changed by more than three degrees Celsius, except in an Outstanding Freshwater Body where it must not be changed by more than one degree Celsius, and	It is not anticipated that the proposed works will have an effect on the temperature of the receiving water due to the short time of concentration being less than 10 minutes.
f)	cause contamination which may render freshwater taken from a mapped priority drinking water abstraction point (refer I Maps | Ngā mahere matawhenua) unsuitable for human consumption after existing treatment.	According to NRC Proposed Regional Plan Maps, the closest drinking water abstraction point is located approximately 6km "as the crow flies" from the area of proposed works. This point is also located inland with a radius of approximately 600m to the closest body of water. See Figure below.
12	Any discharge of sediment associated with repair and maintenance activities does not occur for more than five consecutive days and must not occur for more than 12 hours on any one day.	n/a
13	Where in-river works involve bed disturbance from mechanical vegetation clearance or sediment removal:	
a)	if undertaken between 1 August and 31 December, a visual inspection of the works area must be undertaken, immediately prior to in-river work starting. If a shoal of whitebait is present, no in-river works shall be undertaken until the shoal passes; and	n/a
b)	the works shall not occur more than once in any area between 1 August and 31 December of any year.	n/a
14	Riverbank disturbance is limited to one side of the waterway, at any one time.	Refer to Planning Assessment and/or Ecological Memo
15	When mechanically clearing aquatic vegetation, a weed bucket shall be used with a curved flat base and a slatted back.	n/a
16	The activity does not take place in an īnanga spawning site between 1 March and 30 September.	Refer to Planning Assessment and/or Ecological Memo

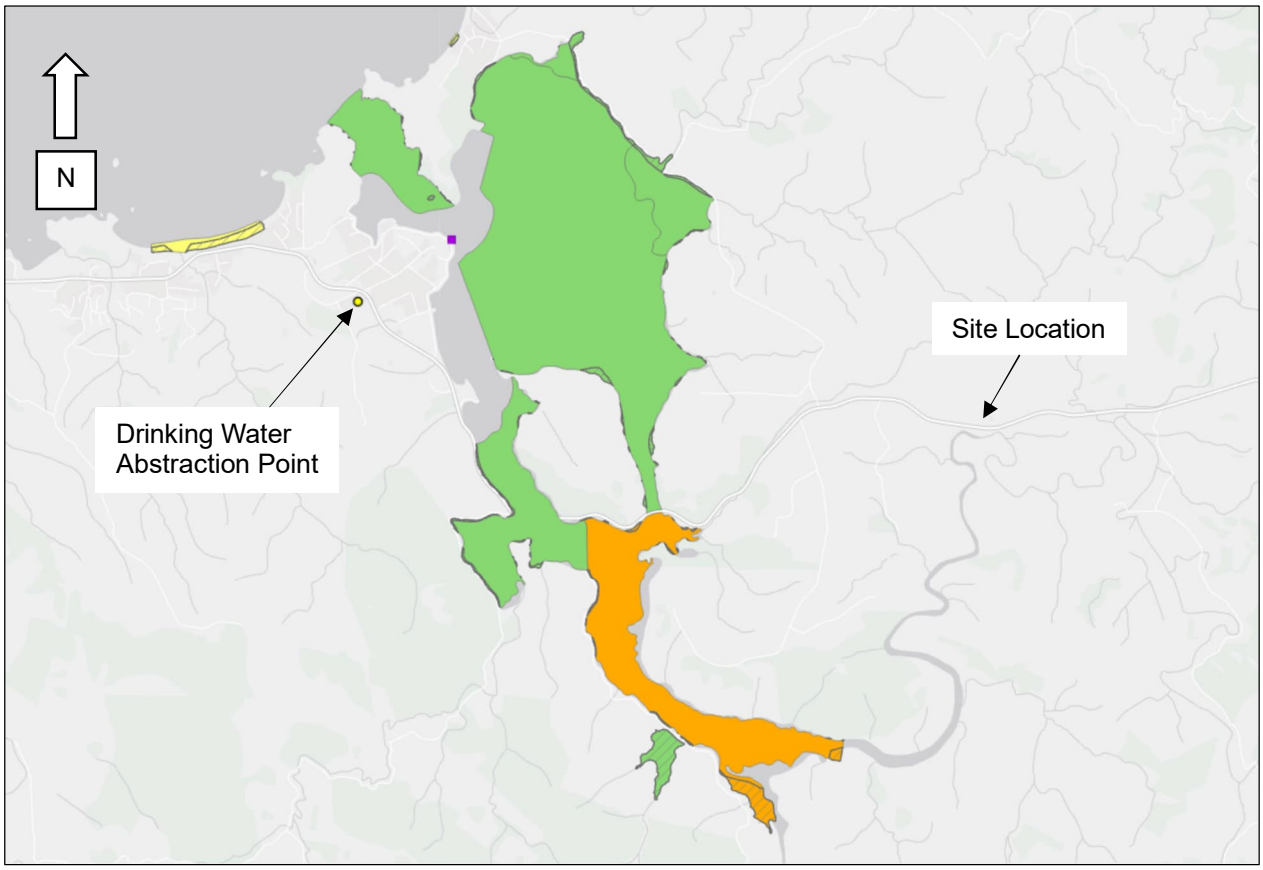


Figure 9: Subject Site and Nearest Drinking Water Abstraction Point (NRC Proposed Regional Plan Maps)

"*The diversion and discharge of stormwater into water of onto or into land where it may enter water from an impervious area or by way of a stormwater collection system, is a permitted activity, provided:*"

Section C.6.4.2 Other stormwater discharges		
1	the discharge or diversion is not from:	
a)	a public stormwater network, or	n/a
b)	a high-risk industrial or trade premises, and	n/a
2	the diversion and discharge does not cause or increase flooding of land on another property in a storm event of up to and including a 10 percent annual exceedance probability, or flooding of buildings on another property in a storm event of up to and including a one percent annual exceedance probability, and	Refer to Planning Assessment and/or Ecological Memo
3	where the diversion or discharge is from a hazardous substance storage or handling area:	
a)	the stormwater collection system is designed and operated to prevent hazardous substances stored or used on the site from entering the stormwater system, or	n/a

b)	there is a secondary containment system in place to intercept any spillage of hazardous substances and either discharges that spillage to a trade waste system or stores it for removal and treatment, or	n/a
c)	if the stormwater contains oil contaminants, the stormwater is passed through a stormwater treatment system designed in accordance with the Environmental Guidelines for Water Discharges from Petroleum Industry Sites in New Zealand (Ministry for the Environment, 1998) prior to discharge, and	n/a
4	where the diversion or discharge is from an industrial or trade premises:	
a)	the stormwater collection system is designed and operated to prevent any contaminants stored or used on the site, other than those already controlled by condition 3) above, from entering stormwater unless the stormwater is discharged through a stormwater treatment system, and	n/a
b)	any process water or liquid waste stream on the site is bunded, or otherwise contained, within an area of sufficient capacity to provide secondary containment equivalent to 100 percent of the quantity of any process water or liquid waste that has the potential to spill into a stormwater collection system, in order to prevent trade waste entering the stormwater collection system, and	n/a
5	the diversion or discharge is not into potentially contaminated land, or onto potentially contaminated land that is not covered by an impervious area, and	The discharge is to the existing road culvert which then discharges to the watercourse. No change to the flow regime is proposed as part of this development.
6	the diversion and discharge does not cause permanent scouring or erosion of the bed of a water body at the point of discharge, and	The proposed works will slightly increase the pre-development flows by 15l/s during a 1% AEP storm event, with increases of 8.1l/s and 10l/s for the 50%- and 20% AEP events. It is not anticipated that this will cause scouring or erosion to the receiving bed of water as the existing culvert is shown to be capable of discharging these flows as existing so there will be no increase in risk of erosion and scour.
7	the discharge does not contain more than 15 milligrams per litre of total petroleum hydrocarbons, and	High volumes of hydrocarbons are not expected from the carpark area. Any hydrocarbons that are collected in stormwater runoff will generally be trapped in the stormfilter device due to its syphonic function. Information received from the supplier of the Stormfilter Treatment device, states that the device can achieve greater than 80% TSS removal and meet water quality requirements. It is therefore anticipated that the Stormfilter, in conjunction with other treatment methods, will provide sufficient treatment of the run-off from the existing and proposed work.

8	the discharge does not cause any of the following effects in the receiving waters beyond the zone of reasonable mixing:	
a)	the production of conspicuous oil or grease films, scums or foams, of floatable or suspended materials, or	LittaTraps shall be installed in all catchpits, and each catchpit shall have a 300mm min sump which will remove gross pollutants from stormwater flows. A Stormfilter device shall be installed within the proposed carpark. The stormfilter is effective at removing 80% TSS as well as oil and grease which meets water quality requirements. The stormfilter operates like a siphon through engineered media, so these pollutants will remain trapped inside the treatment chamber. The chamber will be subject to maintenance at intervals as directed by the manufacturer. Therefore, with the treatment train provided, we consider that there will be no increase in contaminants discharged from the proposed carpark construction.
b)	a conspicuous change in the colour or visual clarity, or	The carpark is proposed to be sealed reducing the likelihood of suspended sediments. All runoff from the proposed carpark is treated prior to discharge to further remove suspended solids so we consider there to be no change to the colour or clarity of stormwater runoff from the subject area.
c)	an emission of objectionable odour, or	The site use being a school carpark is not expected to have any contaminants which would cause objectionable odour of stormwater runoff.
d)	the rendering of freshwater unsuitable for consumption by farm animals, or	Run-off from the existing and proposed impervious areas will be collected in catchpits with a 300mm min sump, from where it will be treated by the Stormfilter device, prior to discharging into an existing structure. From this structure the run-off will discharge into a wetland where further treatment will take place, before discharging into the Oruaiti River, from where farm animals would have access to the freshwater for consumption. The proposed works have been designed to mitigate this and enhance the existing conditions.
e)	the rendering of freshwater taken from a mapped priority drinking water abstraction point (refer I Maps | Ngā mahere matawhenua) unsuitable for human consumption after existing treatment.	According to NRC Proposed Regional Plan Maps, the closest drinking water abstraction point is located approximately 6km “as the crow flies” from the area of proposed works. This point is also located inland with a radius of approximately 600m to the closest body of water.

8 LIMITATIONS

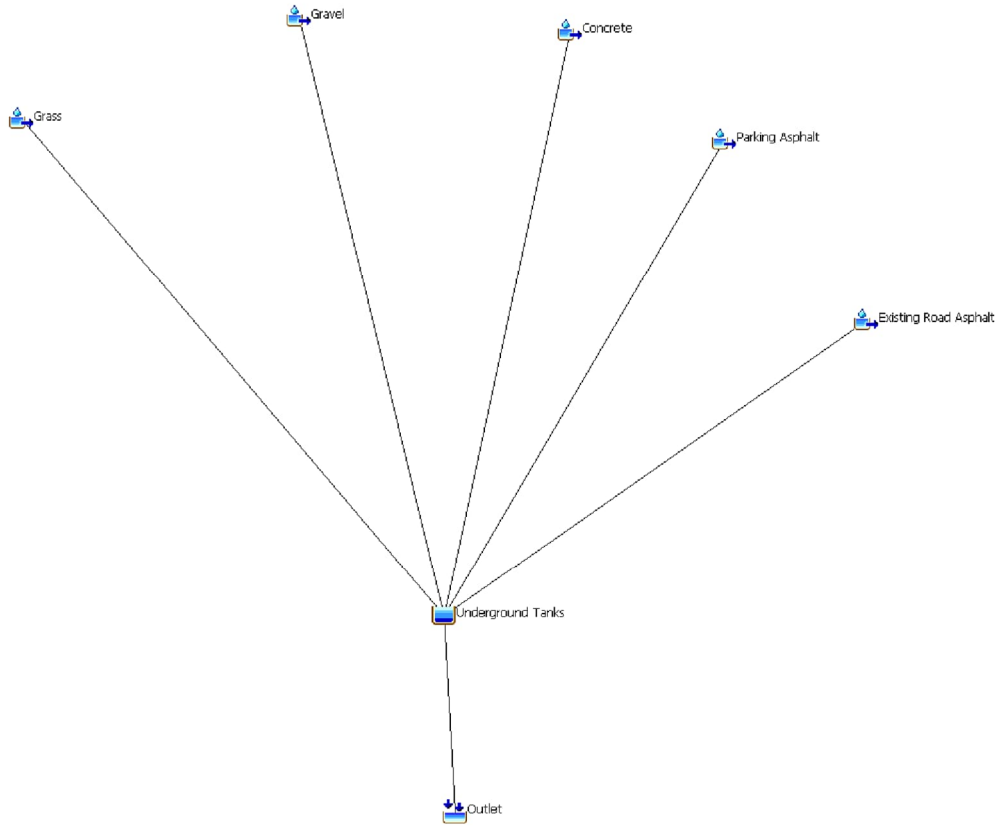
This report should be read and reproduced in its entirety including the limitations to understand the context of the opinions and recommendations given.

This report has been prepared exclusively for Oruaiti School Board of Trustees c/o Avail Pacific in accordance with the brief given to us or the agreed scope and they will be deemed the exclusive owner on full and final payment of the invoice. Information, opinions, and recommendations contained within this report can only be used for the purposes with which it was intended. LDE accepts no liability or responsibility whatsoever for any use or reliance on the report by any party other than the owner or parties working for or on behalf of the owner, such as local authorities, and for purposes beyond those for which it was intended.

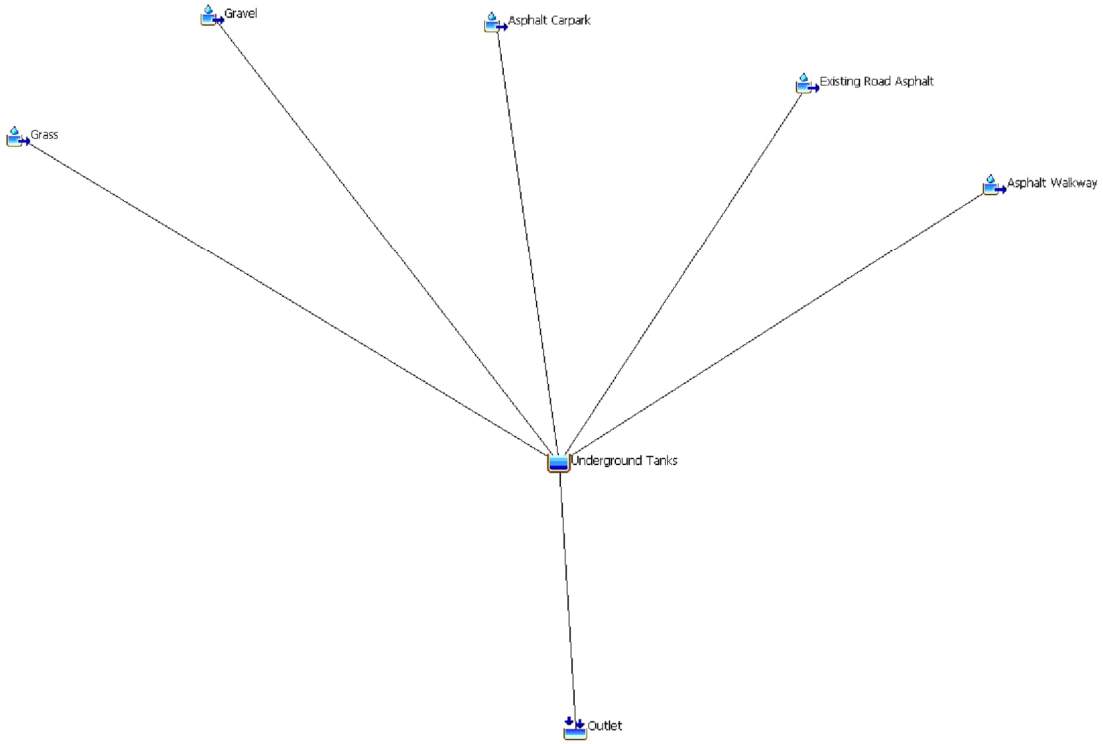
This report was prepared in general accordance with current standards, codes, and best practice at the time of this report. These may be subject to change.

APPENDIX A
HEC-HMS MODEL AND RESULTS

PRE-DEVELOPMENT SCHEMATIC



POST-DEVELOPMENT SCHEMATIC



PRE-DEVELOPMENT CATCHMENT ASSESSMENT

Project: 21102 - Carpark Stormwater Simulation Run: Catchment 100-Year Pre

Start of Run: 01Jan2000, 00:00
End of Run: 02Jan2000, 00:00
Compute Time: 01May2024, 16:22:06

Basin Model: Catchment Pre
Meteorologic Model: 100-Year Pre
Control Specifications: Control

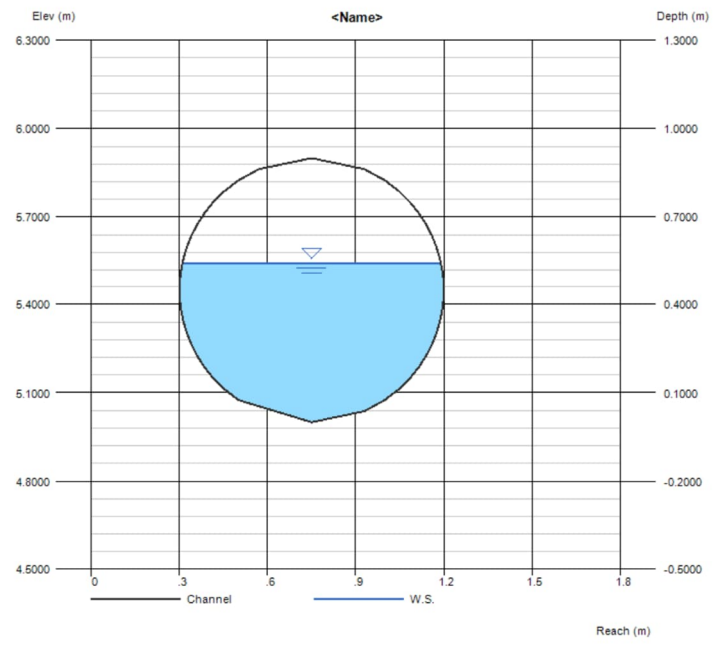
Show Elements: All Elements Volume Units: MM 1000 M3 Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (1000 M3)
Grass Area	0.0900	0.9085	1 January 2000, 08...	13.3053
Impervious	0.0100	0.1507	1 January 2000, 07...	2.2330
Outlet	0.1000	1.0587	1 January 2000, 08...	15.5382

EXISTING CULVERT PRE-DEVELOPMENT CAPACITY ASSESSMENT

Item	Input
Section Type =	Circular
Btm Width (m)	-0-
Side Slope, z:1 =	-0-
Diameter(m) =	0.9000
Inv Elev(m) =	5.0000
Slope (%) =	0.7500
n-value =	0.013
Compute by =	Known Q
Q (cms) =	1.0587

Run



Depth	Q	Area	Veloc	
(m)	(cms)	(sqm)	(m/s)	
0.5425	1.059	0.402	2.6363	

POST-DEVELOPMENT CATCHMENT ASSESSMENT

Project: 21102 - Carpark Stormwater Simulation Run: Catchment 100-Year Post

Start of Run: 01Jan2000, 00:00
End of Run: 02Jan2000, 00:00
Compute Time: 01May2024, 16:22:06

Basin Model: Catchment +CC
Meteorologic Model: 100-Year Post
Control Specifications: Control

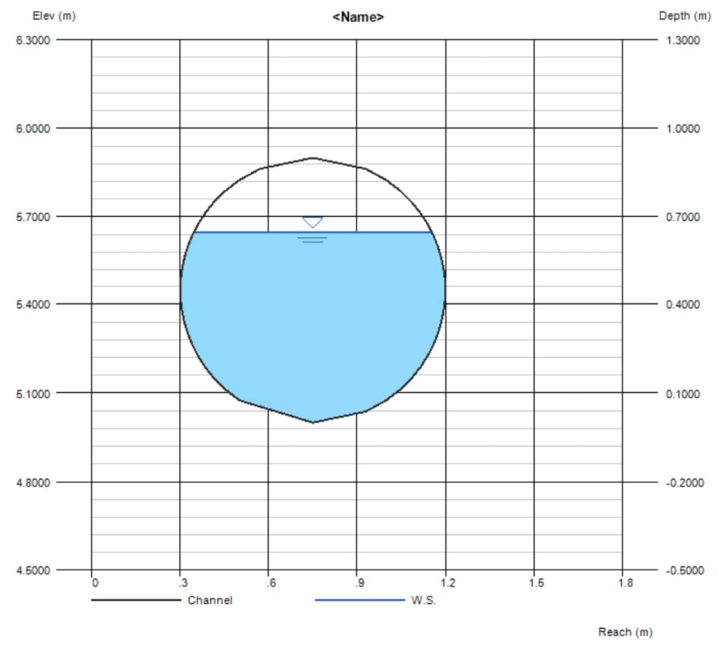
Show Elements: All Elements Volume Units: MM 1000 M3 Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (1000 M3)
Grass Area	0.0900	1.1753	1 January 2000, 08...	17.0019
Impervious	0.0100	0.1810	1 January 2000, 07...	2.6895
Outlet	0.1000	1.3557	1 January 2000, 08...	19.6914

EXISTING CULVERT POST-DEVELOPMENT CAPACITY ASSESSMENT

Item	Input
Section Type =	Circular
Btm Width (m)	-0-
Side Slope, z:1 =	-0-
Diameter(m) =	0.9000
Inv Elev(m) =	5.0000
Slope (%) =	0.7500
n-value =	0.013
Compute by =	Known Q
Q (cms) =	1.3560

Run



Depth	Q	Area	Veloc	
(m)	(cms)	(sqm)	(m/s)	
0.6462	1.356	0.490	2.7679	

PRE-DEVELOPMENT PEAK RUN-OFF – 50% AEP

Project: 21102 - Carpark Stormwater Simulation Run: 2-Year Pre

Start of Run: 01Jan2000, 00:00
End of Run: 02Jan2000, 00:00
Compute Time: 01May2024, 16:22:09
Basin Model: PreDev
Meteorologic Model: 2-Year Pre
Control Specifications: Control

Show Elements: All Elements Volume Units: MM 1000 M3 Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (1000 M3)
Grass	0.0012	0.0031	1 January 2000, 08...	0.0498
Gravel	0.0008	0.0050	1 January 2000, 07...	0.0727
Parking Asphalt	0.0005	0.0029	1 January 2000, 07...	0.0427
Existing Road Asphalt	0.0005	0.0029	1 January 2000, 07...	0.0427
Concrete	0.0001	0.0007	1 January 2000, 07...	0.0109
Underground Tanks	0.0031	0.0148	1 January 2000, 07...	0.2608
Outlet	0.0031	0.0148	1 January 2000, 07...	0.2608

PRE-DEVELOPMENT PEAK RUN-OFF – 20% AEP

Project: 21102 - Carpark Stormwater Simulation Run: 5-Year Pre

Start of Run: 01Jan2000, 00:00
End of Run: 02Jan2000, 00:00
Compute Time: 01May2024, 16:22:11
Basin Model: PreDev
Meteorologic Model: 5-Year Pre
Control Specifications: Control

Show Elements: All Elements Volume Units: MM 1000 M3 Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (1000 M3)
Grass	0.0012	0.0049	1 January 2000, 08...	0.0769
Gravel	0.0008	0.0066	1 January 2000, 07...	0.0965
Parking Asphalt	0.0005	0.0039	1 January 2000, 07...	0.0567
Existing Road Asphalt	0.0005	0.0039	1 January 2000, 07...	0.0567
Concrete	0.0001	0.0010	1 January 2000, 07...	0.0145
Underground Tanks	0.0031	0.0203	1 January 2000, 08...	0.3355
Outlet	0.0031	0.0203	1 January 2000, 08...	0.3355

PRE-DEVELOPMENT PEAK RUN-OFF – 1% AEP

Project: 21102 - Carpark Stormwater Simulation Run: 100-Year Pre

Start of Run: 01Jan2000, 00:00
End of Run: 02Jan2000, 00:00
Compute Time: 01May2024, 16:22:07
Basin Model: PreDev
Meteorologic Model: 100-Year Pre
Control Specifications: Control

Show Elements: All Elements Volume Units: MM 1000 M3 Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (1000 M3)
Grass	0.0012	0.0125	1 January 2000, 08...	0.1833
Gravel	0.0008	0.0121	1 January 2000, 07...	0.1786
Parking Asphalt	0.0005	0.0071	1 January 2000, 07...	0.1049
Existing Road Asphalt	0.0005	0.0071	1 January 2000, 07...	0.1049
Concrete	0.0001	0.0018	1 January 2000, 07...	0.0268
Underground Tanks	0.0031	0.0406	1 January 2000, 07...	0.6198
Outlet	0.0031	0.0406	1 January 2000, 07...	0.6198

POST-DEVELOPMENT PEAK RUN-OFF – 50% AEP

Project: 21102 - Carpark Stormwater Simulation Run: 2-Year Post

Start of Run: 01Jan2000, 00:00
End of Run: 02Jan2000, 00:00
Compute Time: 01May2024, 16:22:09
Basin Model: PostDev
Meteorologic Model: 2-Year Post
Control Specifications: Control

Show Elements: All Elements Volume Units: MM 1000 M3 Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (1000 M3)
Asphalt Carpark	0.0020	0.0150	1 January 2000, 07...	0.2198
Existing Road Asphalt	0.0005	0.0035	1 January 2000, 07...	0.0517
Gravel	0.0003	0.0024	1 January 2000, 07...	0.0352
Asphalt Walkway	0.0002	0.0015	1 January 2000, 07...	0.0220
Grass	0.0001	0.0004	1 January 2000, 08...	0.0059
Underground Tanks	0.0031	0.0229	1 January 2000, 07...	0.3579
Outlet	0.0031	0.0229	1 January 2000, 07...	0.3579

POST-DEVELOPMENT PEAK RUN-OFF – 20% AEP

Project: 21102 - Carpark Stormwater Simulation Run: 5-Year Post

Start of Run: 01Jan2000, 00:00
End of Run: 02Jan2000, 00:00
Compute Time: 01May2024, 16:22:10
Basin Model: PostDev
Meteorologic Model: 5-Year Post
Control Specifications: Control

Show Elements: All Elements Volume Units: MM 1000 M3 Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (1000 M3)
Asphalt Carpark	0.0020	0.0198	1 January 2000, 07...	0.2915
Existing Road Asphalt	0.0005	0.0047	1 January 2000, 07...	0.0685
Gravel	0.0003	0.0032	1 January 2000, 07...	0.0466
Asphalt Walkway	0.0002	0.0020	1 January 2000, 07...	0.0292
Grass	0.0001	0.0006	1 January 2000, 08...	0.0090
Underground Tanks	0.0031	0.0303	1 January 2000, 07...	0.4641
Outlet	0.0031	0.0303	1 January 2000, 07...	0.4641

POST-DEVELOPMENT PEAK RUN-OFF – 1% AEP

Project: 21102 - Carpark Stormwater Simulation Run: 100-Year Post

Start of Run: 01Jan2000, 00:00
End of Run: 02Jan2000, 00:00
Compute Time: 01May2024, 16:22:06
Basin Model: PostDev
Meteorologic Model: 100-Year Post
Control Specifications: Control

Show Elements: All Elements Volume Units: MM 1000 M3 Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (1000 M3)
Asphalt Carpark	0.0020	0.0362	1 January 2000, 07...	0.5379
Existing Road Asphalt	0.0005	0.0085	1 January 2000, 07...	0.1264
Gravel	0.0003	0.0058	1 January 2000, 07...	0.0861
Asphalt Walkway	0.0002	0.0036	1 January 2000, 07...	0.0538
Grass	0.0001	0.0014	1 January 2000, 08...	0.0208
Underground Tanks	0.0031	0.0557	1 January 2000, 07...	0.8406
Outlet	0.0031	0.0557	1 January 2000, 07...	0.8406

APPENDIX B

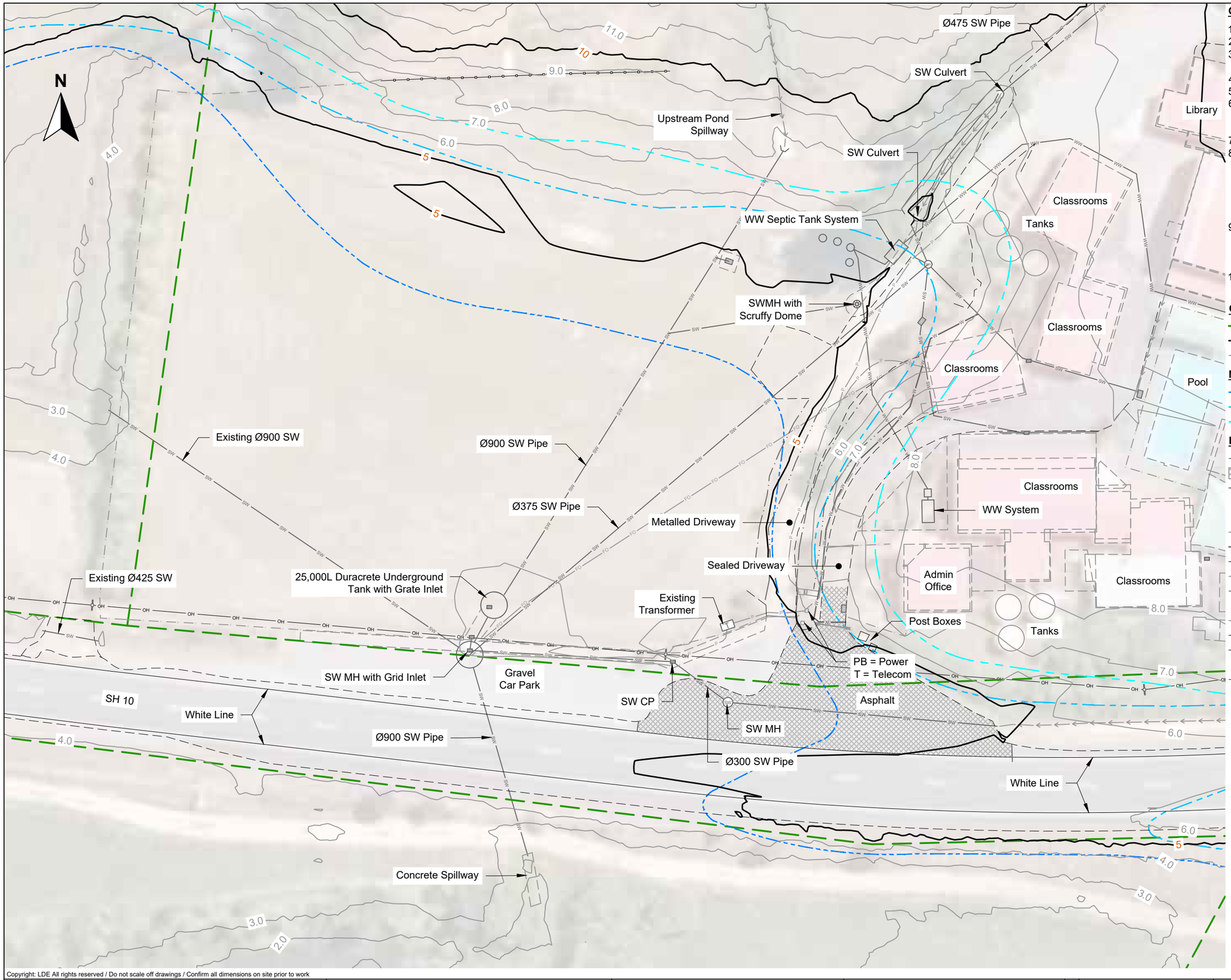
ENGINEERING DRAWINGS

Project Number: 21102
Project Office: Warkworth
Project Manager: Riaan de Swardt
Issue Date: 1 April 2025

Drawing Status: Resource Consent

Proposed Carpark Upgrades
Oruaiti School Board of Trustees c/o Avail Pacific
2554 State Highway 10, Mangonui

Drawing Index			
Sheet	Description	Status	Revision
C001	Existing Site Plan	Resource Consent	C
C002	Demolition and Reinstatement Plan	Resource Consent	B
C100	Construction Staging Layout	Resource Consent	B
C200	Earthworks Layout	Resource Consent	C
C300	Overall Site Layout	Resource Consent	D
C301	Parking Area & Accessway Design Plan Sheet 1 of 3	Resource Consent	D
C302	Parking Area & Accessway Design Plan Sheet 2 of 3	Resource Consent	D
C303	Parking Area & Accessway Design Plan Sheet 3 of 3	Resource Consent	D
C304	Signage Layout	Resource Consent	A
C305	Concrete Saw-cuts Layout	Resource Consent	B
C310	Parking Area & Accessway Longitudinal Sections	Resource Consent	C
C311	Parking Area & Accessway Typical Cross Sections	Resource Consent	C
C312	Parking Area & Accessway 5m Interval Cross Sections Sheet 1 of 3	Resource Consent	C
C313	Parking Area & Accessway 5m Interval Cross Sections Sheet 2 of 3	Resource Consent	C
C314	Parking Area & Accessway 5m Interval Cross Sections Sheet 3 of 3	Resource Consent	C
C320	Parking Area & Accessway Typical Details Sheet 1 of 2	Resource Consent	D
C321	Parking Area & Accessway Typical Details Sheet 2 of 2	Resource Consent	B
C400	Parking Area & Accessway Stormwater Management Plan	Resource Consent	C
C410	Parking Area & Accessway Stormwater Longitudinal Sections Sheet 1 of 2	Resource Consent	C
C411	Parking Area & Accessway Stormwater Longitudinal Sections Sheet 2 of 2	Resource Consent	C
C420	Parking Area & Accessway Typical Stormwater Device Details	Resource Consent	C
C421	Parking Area & Accessway Typical Stormwater Details	Resource Consent	C



General Notes:

1. All dimensions in metres unless noted otherwise.
2. Coordinates are in terms of NZGD Mt Eden 2000.
3. All levels are in metres to NZVD2016. Origin of levels RCM XIII SO 50961 RL 11.81m.
4. Survey undertaken by Donaldsons; 25 July 2022.
5. Existing titles - Pt Allot 18A PSH OF Mangonui East
6. Boundaries and are approximate only and are subject to change. Final boundaries will be in accordance with city plan and LINZ requirements.
7. Boundaries not for building design purposes.
8. Existing building, roading, and services information may have been obtained from third party records and should be verified on site prior to the commencement of any works. LDE does not in any way guarantee the accuracy of any underground service shown on this plan.
9. Contractor to locate / mark / confirm and protect if necessary all existing services prior to commencement of work on site. Any discrepancies to be reported to the Engineer.
10. Flood extent extracted from NRC Natural Hazards and shown indicatively for information only.

General Legend:

- Boundary (Surveyed)
- Major Contour
- Minor Contour

NRC River Flood Hazard Zone - Regionwide Models

- 10 Year Exent
- 50 Year Extent
- 100 Year CC Extent

Existing Services Legend:

- Edge of Road
- Asphalt Surface
- Stormwater Pipe
- Stormwater Manhole, Wingwall, Scruffy Dome, Catchpit
- Open Drain
- Water Pipe
- Wastewater Pipe
- Underground Power Lines
- Power Pole & Over Head Lines
- Transformer
- Fibre Optic Lines
- Top of Bank
- Bottom of Bank
- Fence / Gate
- Retaining Wall

0 5 10 15 20 25

Scale 1:500 (m)

Original size = A3

Client	Oruaiti School Board of Trustees c/o Avail Pacific
Project	2554 State Highway 10, Mangonui Proposed Carpark Upgrades
Drawing Title	Existing Site Layout

engineers • scientists

No.	Issue/Revision	Aprvd	Date
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	J. S	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:500
Project status:	Resource Consent
Project:	21102
Drawing No:	C001
Issue/Rev	C

Demolition and Reinstatement Notes:

- This plan should be read in conjunction with the proposed plans included in the Detailed Design drawing set.
- Where it's stated to "re-use" or "replace", refer to the proposed plans for details.
- All works to be undertaken in accordance with FNDC Engineering Standards and the Health and Safety at Work Act 2015 (HSWA).
- Contractor to locate / ml dimensionark / confirm and protect if necessary all existing services prior to commencement of work on site.
- All disturbed public areas to be made good and restored to existing condition.
- All existing vegetation in the proposed works area to be removed and re-used.
- All topsoil removed is to be stockpiled and re-used for reinstatement works. Any excess topsoil to be used elsewhere on site as directed by the School's representatives.

N

Replace existing Scruffy Dome

Tree stumps to be removed where new parking is proposed

Gate to remain

Concrete staircase to be demolished and reconstructed

Gate to be removed and re-used

Power and Telecom Boxes to remain and protected during construction

Transformer to remain and protected during construction

Waharoa to remain and protected during construction

Post Boxes to remain and protected during construction

Power Pole to remain and protected during construction

Underground SW Tank to remain and grate replaced

Concrete footpath to be demolished and disposed off site

SWCP to be demolished and pipe connection to be capped off or removed

Fence to be salvaged for re-used. Care to be taken during removal, as fence to be reinstalled as per proposed plans. Existing posts to be salvaged for the school. New posts to be installed

Existing timber wheel stops to be salvaged and handed over to the school

Underground SW Tank to remain and grate replaced

SWCP Grate to be removed and replaced

SWMH Lid to be removed and replaced

Asphalt to by removed and disposed off site

0 3 6 9 12 15

Scale 1:300 (m)

Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific	Project: 2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Drawing Title: Demolition and Reinstatement Plan	LDE engineers • scientists	B	Revised and Issued for Resource Consent	N. D	Apr 2025	Design: R. de Swardt	Project status: Resource Consent
				A	Issued for Resource Consent	N. D	28 Mar 2025	Drawn: R. de Swardt	Project: 21102
				No.	Issue/Revision	Aprvd	Date	Approved: N. Douglas	Drawing No: C002 / Issue/Rev: B
								Scale A3: 1:500	

N

Staging Notes:

- Contractor's Site Office shown indicatively. Exact area to be confirmed prior to construction.
- The contractor is fully responsible for Health and Safety measures during the construction phase.
- Appropriate fencing, signage, etc. to be installed prior top the start of works.
- Contractor is to allow for all safety fencing for the during of the proposed works.
- The Staging Areas is to be confirmed prior to be commencement of construction.
- Contractor to obtain and maintain all traffic management requirements as per NZTA standards.

Contractor's Site Office Location indicatively shown as 600m^2. Area to be fenced to prevent unauthorised access.

Stage 1

Stage 1

Stage 2

Stabilised Site Office Access

Stage 3

SH10

SH10

Access to Stage 1 Parking is to remain available to the School throughout construction. Contractor to make provision for this within the shown staging area with signage and fencing.

0 5 10 15 20 25

Scale 1:500 (m) Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific	Project: 2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Drawing Title: Construction Staging Plan	LDE engineers • scientists			Design: R. de Swardt	Project status: Resource Consent
						Drawn: R. de Swardt	Project: 21102
						Approved: N. Douglas	Drawing No: C100
						Scale A3: 1:500	Issue/Rev: B

No.	Issue/Revision	Aprvd	Date
	Revised and Issued for Resource Consent	N. D	01 Apr 2025
A	Issued for Resource Consent	N. D	28 Mar 2025

Surface Analysis: Elevation Ranges			
Number	Color	Minimum Elevation (m)	Maximum Elevation (m)
1		-0.244	0.000
2		0.000	0.200
3		0.200	0.400
4		0.400	0.600
5		0.600	0.900

General Notes:

1. All dimensions in metres unless noted otherwise.
2. Coordinates are in terms of NZGD Mt Eden 2000.
3. All levels are in metres to NZVD2016. Origin of levels RCM XIII SO 50961 RL 11.81m.
4. Survey undertaken by Donaldsons; 25 July 2022.
5. Existing titles - Pt Allot 18A PSH OF Mangonui East
6. Boundaries and are approximate only and are subject to change. Final boundaries will be in accordance with city plan and LINZ requirements.
7. Boundaries not for building design purposes.
8. Existing building, roading, and services information may have been obtained from third party records and should be verified on site prior to the commencement of any works. LDE does not in any way guarantee the accuracy of any underground service shown on this plan.
9. Contractor to locate / mark / confirm and protect if necessary all existing services prior to commencement of work on site. Any discrepancies to be reported to the Engineer.
10. Flood extent extracted from NRC Natural Hazards and shown indicatively for information only.

General Legend:

Earthworks Notes:

- All works to be undertaken in accordance with FNDC Engineering Standards, GD05 Guidelines and the Health and Safety at Work Act 2015 (HSWA).
- All disturbed public areas to be made good and restored to previous condition.
- All earthworks to be undertaken during periods of fine weather.
- Earthworks are to be undertaken and completed in within the minimum possible time frame.
- The area is to be progressively finished as areas are brought to grade.
- The earthworks volumes shown is a solid measure.
- The earthworks volumes has been calculated in relation to the existing and final ground levels.
- Topsoil removal volumes is excluded in the total earthworks volumes.
- Additional box cut volumes has not been included in the earthworks volumes.

Erosion and Sediment Control Notes:

- The contractor is solely responsible for ensuring the the site has effective erosion control and sediment retention measures operating at all times.
- All erosion and sediment control measures must be operational prior to any other works commencing on site.
- All sediment control measure are to comply with GD05 and FNDC requirements.

Earthworks Cut / Fill Volumes	
Site Area	41,210m²
Earthworks Area	2,760m²
Cut Volume	20m³
Fill Volume	460m³
Net Fill Volume	440m³

0 5 10 15 20 25

Scale 1:500 (m)

Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific

Project: 2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

Drawing Title: Earthworks Layout

LDE engineers • scientists

No.	Issue/Revision	Aprvd	Date
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:500

Project status: Resource Consent

Project: 21102

Drawing No: C200

Issue/Rev: C

B85 Vehicle (Realistic min radius) (2004)

Overall Length	4.910m
Overall Width	1.870m
Overall Body Height	1.421m
Min Body Ground Clearance	0.159m
Track Width	1.770m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	5.750m

B85 VEHICLE DETAIL
NOT TO SCALE

Midi-bus (10m min. published radius)

Overall Length	9.300m
Overall Width	2.360m
Overall Body Height	3.077m
Min Body Ground Clearance	0.312m
Track Width	2.360m
Lock-to-lock time	6.00s
Wall to Wall Turning Radius	10.000m

MINI-BUS DETAIL
NOT TO SCALE

Proposed Services Notes:

1. All works to be undertaken in accordance with FNDC Engineering Standards and the Health and Safety at Work Act 2015 (HSWA).
2. All dimensions in metres unless noted otherwise.
3. Contractor to locate / ml dimensionark / confirm and protect if necessary all existing services prior to commencement of work on site.
4. All disturbed public areas to be made good and restored to existing condition.
5. Manholes to be reinforced concrete chambers with a precast base. Min Ø1050mm manhole unless otherwise specified.
6. Catchpits to be 675 x 450mm reinforced concrete chambers, with trafficable frame & grid inlet lid.
7. All PVC stormwater pipes to be uPVC SN16.
8. All concrete stormwater pipes to be RCRRJ Class 4.
9. Pipe bedding and installation to comply with relevant council details.
10. All lane and parking markings as per MOTSAM.
11. Parking bays as per Appendix 3D of the Far North District Plan (FNDP).
12. All kerbing to be machine extruded, unless specified otherwise by Engineer.

Reference Notes:

13. Refer to C301,C302, C303 for Parking Area Layouts.
14. Refer to C310 for Parking Area and Accessway Longitudinal Sections Layout.
15. Refer to C311 to C314 for Cross Section Layouts.
16. Refer to C320 & C321 for Roading details.
17. Refer to C400 for Stormwater Layout.
18. Refer to C410 to C411 Stormwater Longitudinal Section Layouts.
19. Refer to C420 & C421 for Stormwater details.

Existing Services Legend:

- Boundary (Surveyed)
- Edge of Road
- Stormwater Pipe
- Stormwater Manhole, Wingwall, Scruffy Dome, Catchpit
- Open Drain
- Water Pipe
- Underground Power Lines
- Power Pole & Over Head Lines
- Transformer
- Fibre Optic Lines
- Top of Bank
- Bottom of Bank
- Fence / Gate
- Retaining Wall

Proposed Services Legend:

- Kerb Block
- Kerb & Channel
- Flush Edge Beam
- Bollards or Large Rocks
- Standard Concrete Surface
- Exposed Aggregate Concrete
- Gravel Surface
- Rock Filled Traffic Island
- Grassed Area
- SW Pipe
- SW Perforated Pipe & Rodding Point
- Stormwater Manhole
- SW Manhole with Scruffy Dome
- Stormwater Catchpit
- Stormwater Swale
- SW Flow Direction
- Fence

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

Drawing Title
Overall Site Plan

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No.	Issue/Revision	Aprvd	Date
D	Revised and Issued for Resource Consent	N. D	01 Apr 2025
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:500

Project status: Resource Consent
Project: 21102
Drawing No: C300
Issue/Rev: D

Proposed Services Notes:

- All works to be undertaken in accordance with FNDC Engineering Standards and the Health and Safety at Work Act 2015 (HSWA).
- All dimensions in metres unless noted otherwise.
- Contractor to locate / ml dimensionark / confirm and protect if necessary all existing services prior to commencement of work on site.
- All disturbed public areas to be made good and restored to existing condition.
- Manholes to be reinforced concrete chambers with a precast base. Min Ø1050mm manhole unless otherwise specified.
- Catchpits to be 675 x 450mm reinforced concrete chambers, with trafficable frame & grid inlet lid.
- All lane and parking markings as per MOTSAM.
- Parking bays as per Appendix 3D of the FNDP.
- All kerbing to be machine extruded, unless specified otherwise by Engineer.

Existing Services Legend:

- Boundary (Surveyed)
- Edge of Road
- Stormwater Pipe
- Stormwater Manhole, Wingwall, Scruffy Dome, Catchpit
- Open Drain
- Water Pipe
- Underground Power Lines
- Power Pole & Over Head Lines
- Transformer
- Fibre Optic Lines
- Top of Bank
- Bottom of Bank
- Fence / Gate
- Retaining Wall

Proposed Services Legend:

- Prop. Kerb Block
- Prop. Kerb & Channel
- Prop. Flush Edge Beam
- Standard Concrete Surface
- Exposed Aggregate Concrete
- Gravel Surface
- Rock Filled Traffic Island
- Grassed Area
- SW Perforated Pipe & Rodding Point
- SW Manhole
- SW Manhole with Scruffy Dome
- SW Catchpit
- SW Swale
- Fence

Road Marking Legend:

- White Zebra Crossing 2.0m Long x 0,3m Wide, 0.6m Gap
- White Stop Sign
- White Bus Sign
- White Straight Arrow
- White Left-Turn Arrow
- White Parking Delineation Line 100mm Wide
- Yellow No-Stop Lines 1.0m Long x 1.0m Gap

Road Marking Legend:

- 1650mm Rubber Wheel Stop
- Yellow Disabled Parking Sign
- Yellow No-Parking Island

N

01 C310

03 C311

04 C311

05 C311

Re-used existing fence or similar approved

Exposed Concrete Surface

Concrete Surface with Broom Finish

Gravel Parking Area

1650mm Rubber Wheel Stop

1650mm Rubber Wheel Stop (Installed in Accordance with Supplier Specifications)

100mm Parking Line (White)

Accessible Crossing as per FNDC Sheet 17

See note on C400

Concrete Surface with Broom Finish

Existing Power Pole to Remain

Left-Turn Lane

500mm Hotmix Transition between existing asphalt and proposed concrete

SH10

SH10

0 2.5 5 7.5 10 12.5

Scale 1:250 (m)

Original size = A3

Client	Oruaiti School Board of Trustees c/o Avail Pacific	Design:	R. de Swardt
Project	2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Drawn:	R. de Swardt
Drawing Title	Parking Area & Accessway Design Plan Sheet 1 of 3	Approved:	N. Douglas
		Scale A3:	1:250
		Project status:	Resource Consent
		Project:	21102
		Drawing No:	C301
		Issue/Rev:	D

No.	Issue/Revision	Aprvd	Date
D	Revised and Issued for Resource Consent	N. D	01 Apr 2025
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

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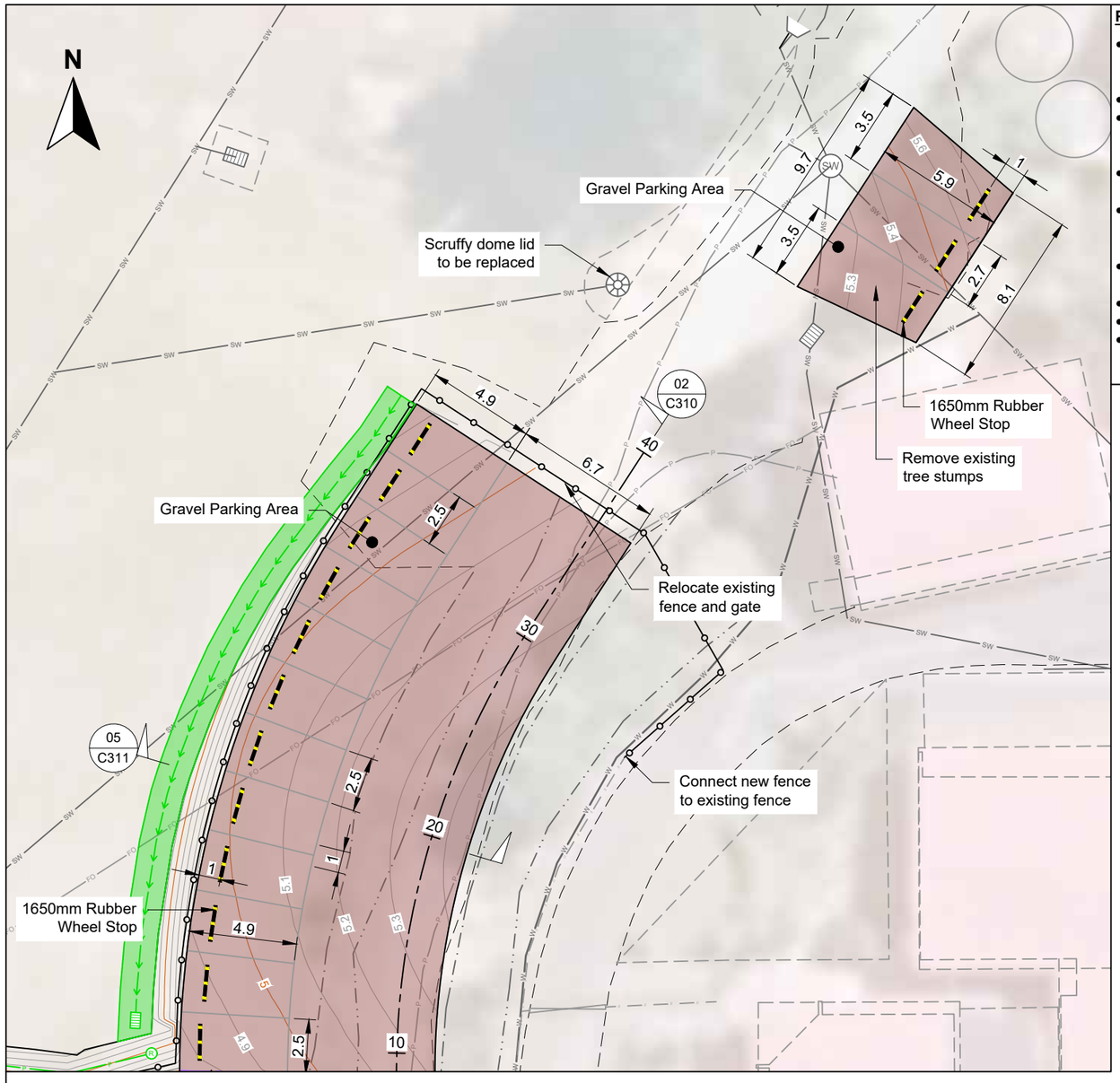

Proposed Services Notes:

- All works to be undertaken in accordance with FNDC Engineering Standards and the Health and Safety at Work Act 2015 (HSWA).
- All dimensions in metres unless noted otherwise.
- Contractor to locate / ml dimensionark / confirm and protect if necessary all existing services prior to commencement of work on site.
- All disturbed public areas to be made good and restored to existing condition.
- Manholes to be reinforced concrete chambers with a precast base. Min Ø1050mm manhole unless otherwise specified.
- Catchpits to be 675 x 450mm reinforced concrete chambers, with trafficable frame & grid inlet lid.
- All lane and parking markings as per MOTSAM.
- Parking bays as per Appendix 3D of the FNDP.
- All kerbing to be machine extruded, unless specified otherwise by Engineer.

Existing Services Legend:

- Boundary (Surveyed)
- Edge of Road
- Stormwater Pipe
- Stormwater Manhole, Wingwall, Scruffy Dome, Catchpit
- Open Drain
- Water Pipe
- Underground Power Lines
- Power Pole & Over Head Lines
- Transformer
- Fibre Optic Lines
- Top of Bank
- Bottom of Bank
- Fence / Gate
- Retaining Wall

Proposed Services Legend:

- Prop. Kerb Block
- Prop. Kerb & Channel
- Prop. Flush Edge Beam
- Standard Concrete Surface
- Exposed Aggregate Concrete
- Gravel Surface
- Rock Filled Traffic Island
- Grassed Area
- SW Perforated Pipe & Rodding Point
- SW Manhole
- SW Manhole with Scruffy Dome
- SW Catchpit
- SW Swale
- Fence

0 2.5 5 7.5 10 12.5

Scale 1:250 (m) Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific

Project: 2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

Drawing Title: Parking Area & Accessway
Design Plan Sheet 2 of 3

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No.	Issue/Revision	Aprvd	Date
D	Revised and Issued for Resource Consent	N. D	01 Apr 2025
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:250

Project status: Resource Consent
Project: 21102
Drawing No: C302
Issue/Rev: D

Proposed Services Notes:

- All works to be undertaken in accordance with FNDC Engineering Standards and the Health and Safety at Work Act 2015 (HSWA).
- All dimensions in metres unless noted otherwise.
- Contractor to locate / ml dimensionark / confirm and protect if necessary all existing services prior to commencement of work on site.
- All disturbed public areas to be made good and restored to existing condition.
- Manholes to be reinforced concrete chambers with a precast base. Min Ø1050mm manhole unless otherwise specified.
- Catchpits to be 675 x 450mm reinforced concrete chambers, with trafficable frame & grid inlet lid.
- All lane and parking markings as per MOTSAM.
- Parking bays as per Appendix 3D of the FNDP.
- All kerbing to be machine extruded, unless specified otherwise by Engineer.

Existing Services Legend:

- Boundary (Surveyed)
- Edge of Road
- Stormwater Pipe
- Stormwater Manhole, Wingwall, Scruffy Dome, Catchpit
- Open Drain
- Water Pipe
- Underground Power Lines
- Power Pole & Over Head Lines
- Transformer
- Fibre Optic Lines
- Top of Bank
- Bottom of Bank
- Fence / Gate
- Retaining Wall

Proposed Services Legend:

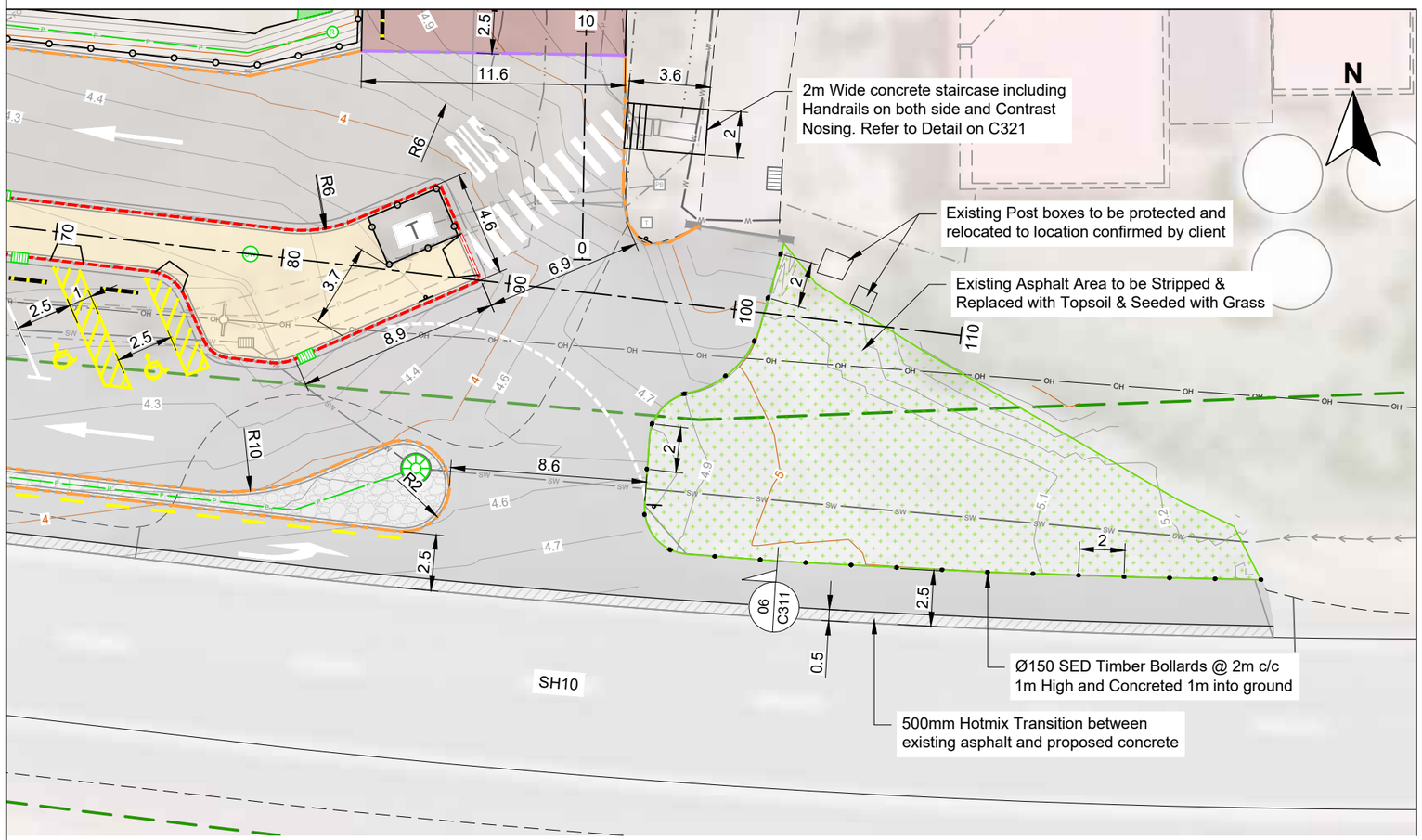
- Prop. Kerb Block
- Prop. Kerb & Channel
- Prop. Flush Edge Beam
- Standard Concrete Surface
- Exposed Aggregate Concrete
- Gravel Surface
- Rock Filled Traffic Island
- Grassed Area
- SW Perforated Pipe & Rodding Point
- SW Manhole
- SW Manhole with Scruffy Dome
- SW Catchpit
- SW Swale
- Fence

Road Marking Legend:

- White Zebra Crossing 2.0m Long x 0,3m Wide, 0.6m Gap
- White Stop Sign
- White Bus Sign
- White Straight Arrow
- White Left-Turn Arrow
- White Parking Delineation Line 100mm Wide
- Yellow No-Stop Lines 1.0m Long x 1.0m Gap

Road Marking Legend:

- 1650mm Rubber Wheel Stop
- Yellow Disabled Parking Sign
- Yellow No-Parking Island



0 2.5 5 7.5 10 12.5

Scale 1:250 (m) Original size = A3

Client	Oruaiti School Board of Trustees c/o Avail Pacific
Project	2554 State Highway 10, Mangonui Proposed Carpark Upgrades
Drawing Title	Parking Area & Accessway Design Plan Sheet 3 of 3

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No.	Issue/Revision	Aprvd	Date
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:250
Project status:	Resource Consent
Project:	21102
Drawing No:	C303
Issue/Rev:	C

Proposed Services Notes:

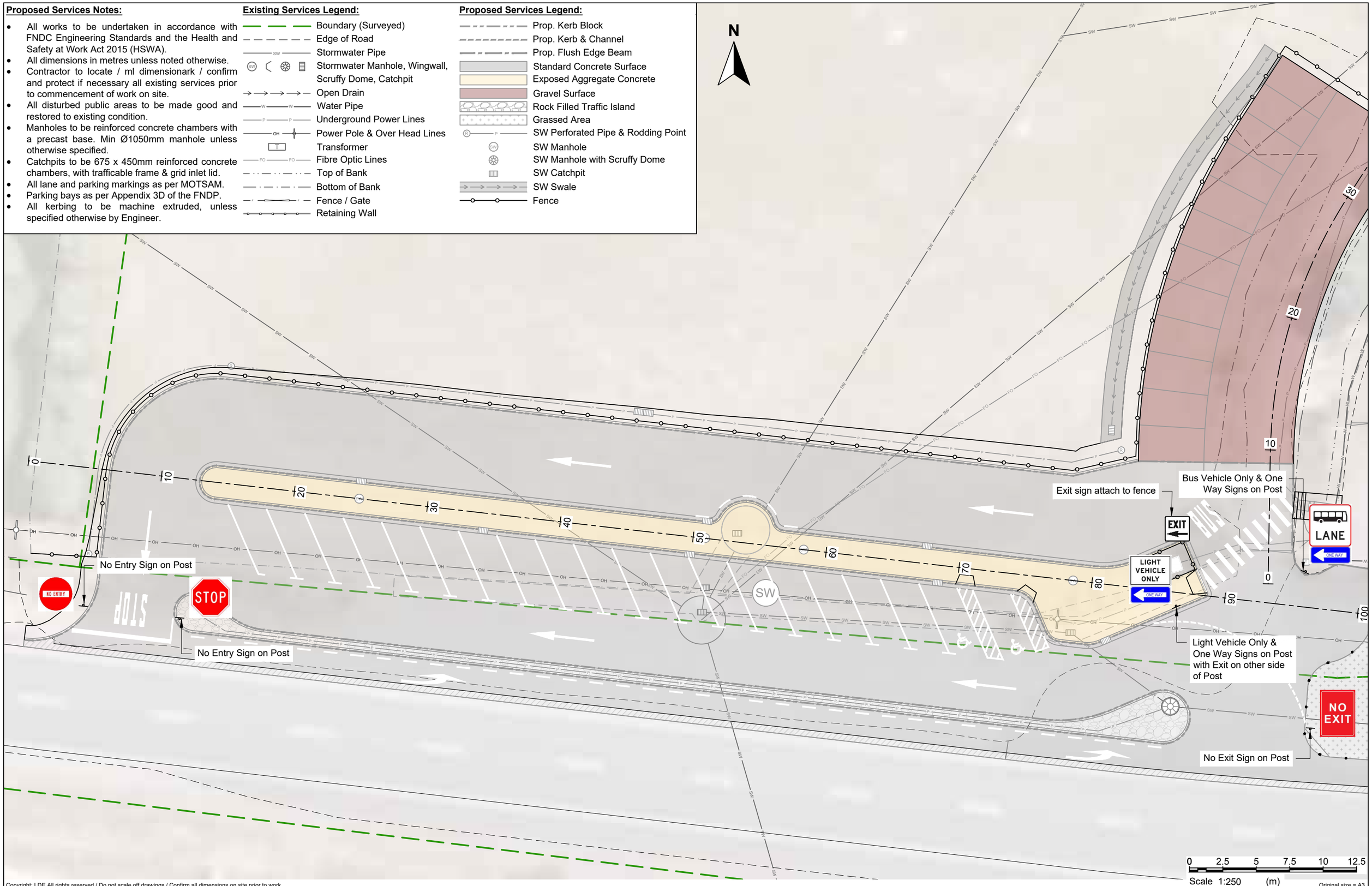
- All works to be undertaken in accordance with FNDC Engineering Standards and the Health and Safety at Work Act 2015 (HSWA).
- All dimensions in metres unless noted otherwise.
- Contractor to locate / ml dimensionark / confirm and protect if necessary all existing services prior to commencement of work on site.
- All disturbed public areas to be made good and restored to existing condition.
- Manholes to be reinforced concrete chambers with a precast base. Min Ø1050mm manhole unless otherwise specified.
- Catchpits to be 675 x 450mm reinforced concrete chambers, with trafficable frame & grid inlet lid.
- All lane and parking markings as per MOTSAM.
- Parking bays as per Appendix 3D of the FNDP.
- All kerbing to be machine extruded, unless specified otherwise by Engineer.

Existing Services Legend:

- Boundary (Surveyed)
- Edge of Road
- Stormwater Pipe
- Stormwater Manhole, Wingwall, Scruffy Dome, Catchpit
- Open Drain
- Water Pipe
- Underground Power Lines
- Power Pole & Over Head Lines
- Transformer
- Fibre Optic Lines
- Top of Bank
- Bottom of Bank
- Fence / Gate
- Retaining Wall

Proposed Services Legend:

- Prop. Kerb Block
- Prop. Kerb & Channel
- Prop. Flush Edge Beam
- Standard Concrete Surface
- Exposed Aggregate Concrete
- Gravel Surface
- Rock Filled Traffic Island
- Grassed Area
- SW Perforated Pipe & Rodding Point
- SW Manhole
- SW Manhole with Scruffy Dome
- SW Catchpit
- SW Swale
- Fence



Client	Oruaiti School Board of Trustees c/o Avail Pacific	Design:	R. de Swardt
Project	2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Drawn:	R. de Swardt
Drawing Title	Signage Layout	Approved:	N. Douglas
		Scale A3:	1:250
		Project status:	Resource Consent
		Project:	21102
		Drawing No:	C304
		Issue/Rev	A

No.	Issue/Revision	Aprvd	Date
A	Issued for Resource Consent	N. D	28 Mar 2025

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Notes:

- Saw-cuts are shown indicatively only and is to be confirmed by Contractor and Engineer on site prior to commencement of works.
- Saw-cuts depth to be typical 1/3 of concrete thickness.
- Saw-cuts shown at 3m centres.
- The concrete contractor is to increase the saw-cut offsets only once confirmed by the Engineer on site.
- The concrete contractor is to determine if additional cuts are required.
- Construction joint to be included at maximum 24m centres.
- The contractor is responsible to allow for sectional pouring as required and placing construction joints as required.

Proposed Services Legend:

- Prop. Kerb Block
- Prop. Kerb & Channel
- Prop. Flush Edge Beam
- Standard Concrete Surface
- Exposed Aggregate Concrete
- Gravel Surface
- Rock Filled Traffic Island
- Grassed Area

N

Saw-cut Joint

Saw-cut Joint

Saw-cut Joint

500mm Hotmix Transition

500mm Hotmix Transition

0 2.5 5 7.5 10 12.5

Scale 1:250 (m)

Original size = A3

Client	Oruaiti School Board of Trustees c/o Avail Pacific	Design:	R. de Swardt
Project	2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Drawn:	R. de Swardt
Drawing Title	Concrete Saw-cuts Layout	Approved:	N. Douglas
		Scale A3:	1:250

engineers • scientists

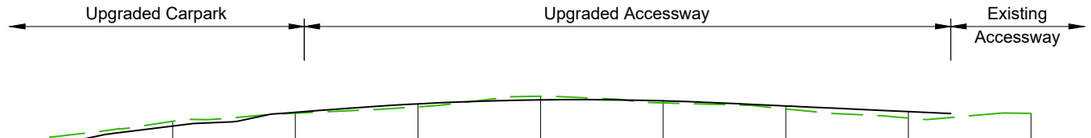
No.	Issue/Revision	Aprvd	Date
B	Revised and Issued for Resource Consent	N. D	01 Apr 2025
A	Issued for Resource Consent	N. D	28 Mar 2025

Project status: Resource Consent

Project: 21102

Drawing No: C305

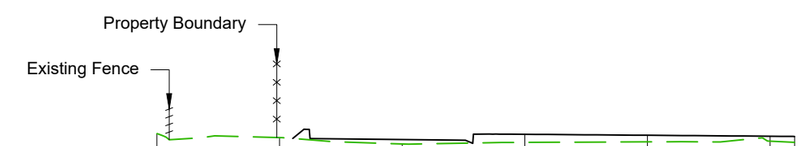
Issue/Rev: B



Vertical Exaggeration: 2.5
Datum: 0.0

Design Levels	4.95	5.17	5.31	5.37	5.36	5.27	5.18	
Existing Levels	5.02	5.16	5.26	5.43	5.32	5.22	5.08	
Cut/Fill Depth	-0.08	0.01	0.05	-0.06	0.03	0.05	0.10	
Chainage	5.00	10.00	15.00	20.00	25.00	30.00	35.00	

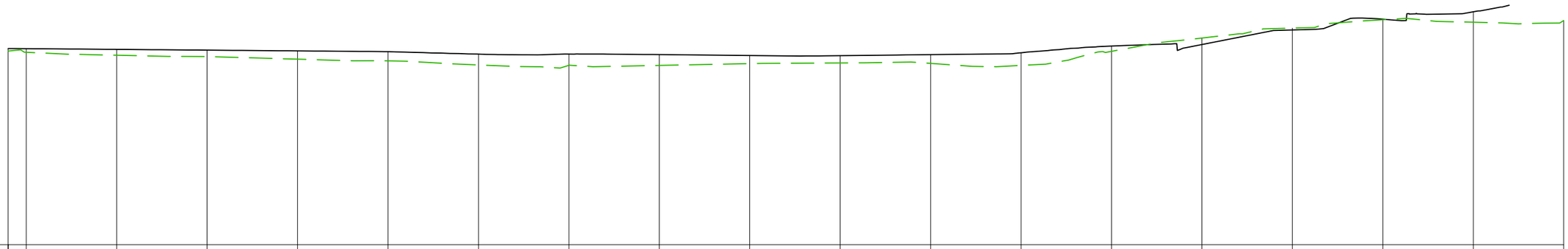
Long Section (ACCESSWAY CL)



Vertical Exaggeration: 2.5
Datum: 0.0

Design Levels		4.29	4.37	4.36	4.34
Existing Levels	4.32	4.21	4.24	4.25	4.26
Cut/Fill Depth		0.07	0.13	0.11	0.08
Chainage	5.00	10.00	15.00	20.00	25.00

Long Section (PARKING AREA CL)
Chainage 0m to 25m



Vertical Exaggeration: 2.5
Datum: 0.0

Design Levels	4.34	4.32	4.31	4.29	4.27	4.22	4.22	4.21	4.19	4.18	4.21	4.25	4.40	4.43	4.75	4.99	5.16
Existing Levels	4.26	4.19	4.17	4.11	4.07	3.98	3.97	3.97	4.01	4.02	4.01	3.97	4.28	4.57	4.79	4.98	4.92
Cut/Fill Depth	0.08	0.13	0.14	0.18	0.20	0.24	0.25	0.24	0.18	0.16	0.19	0.28	0.12	-0.14	-0.04	0.01	0.23
Chainage	25.00	30.00	35.00	40.00	45.00	50.00	55.00	60.00	65.00	70.00	75.00	80.00	85.00	90.00	95.00	100.00	105.00

Long Section (PARKING AREA CL)
Chainage 25m to End

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

Drawing Title
Parking Area & Accessway
Longitudinal Sections

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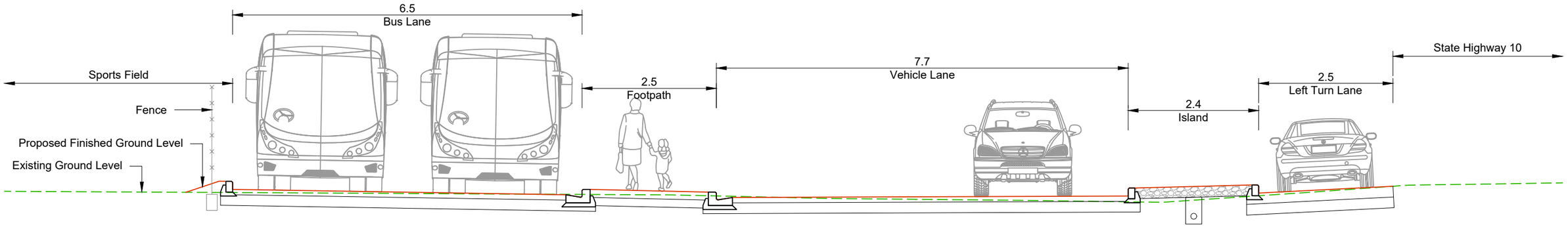
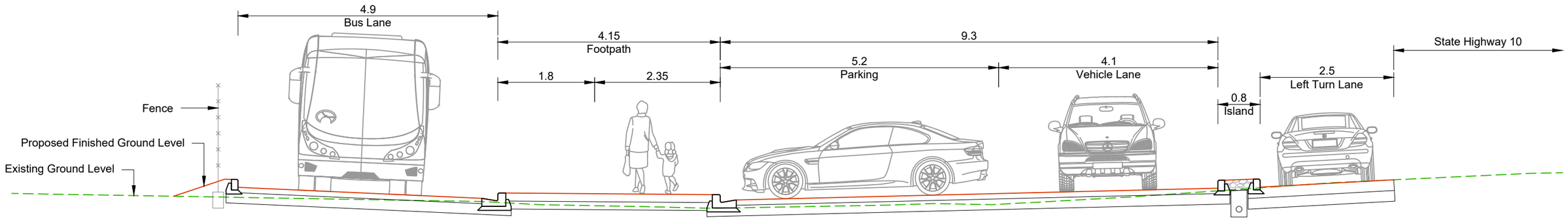
No.	Issue/Revision	Aprvd	Date
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:250

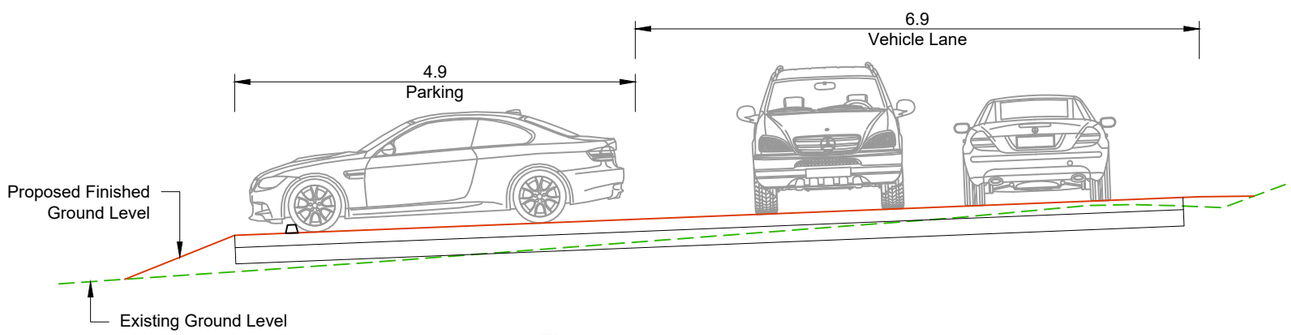
Project status: Resource Consent
Project: 21102
Drawing No: C310
Issue/Rev: C



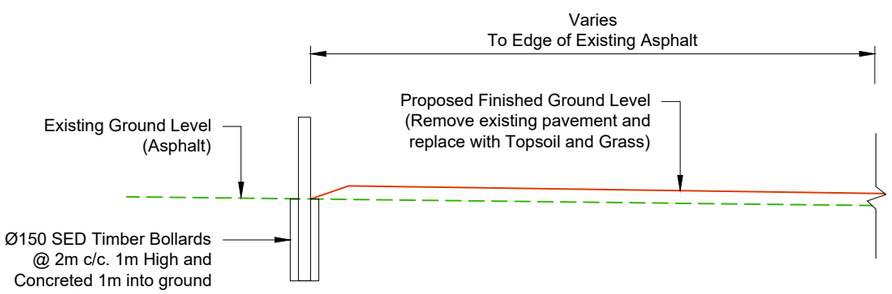
03 / 311 **Cross Section @ Parking Area CH 10m**
Scale 1:75



04 / 311 **Cross Section @ Parking Area CH 50m**
Scale 1:75



05 / 311 **Cross Section @ Accessway CH 20m**
Scale 1:75



06 / 311 **Cross Section @ Grassed Area**
Scale 1:75

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

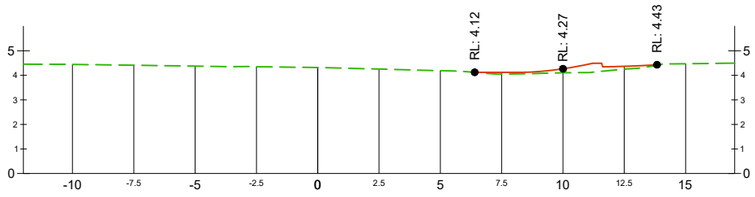
Drawing Title
Parking Area & Accessway
Typical Cross Sections

engineers • scientists

No.	Issue/Revision	Aprvd	Date
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:75

Project status: Resource Consent
Project: 21102
Drawing No: C311
Issue/Rev: C



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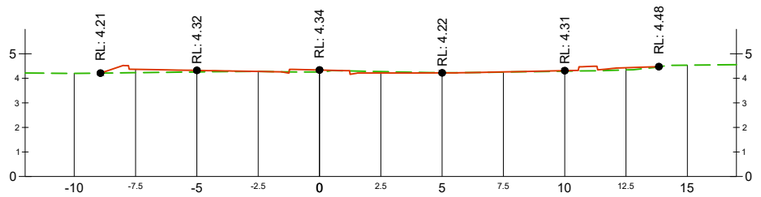

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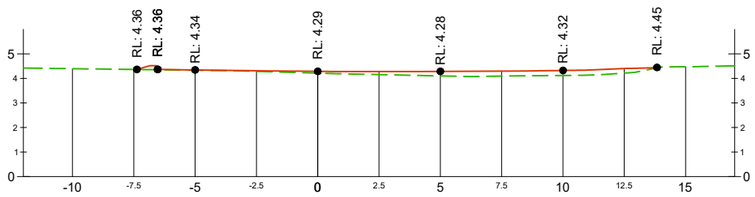

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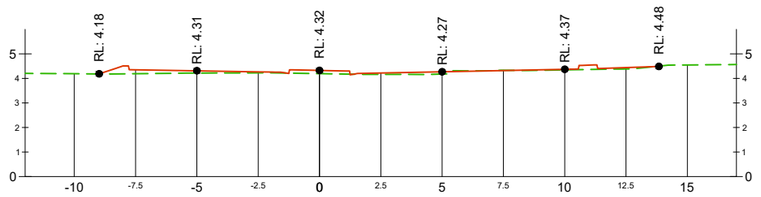

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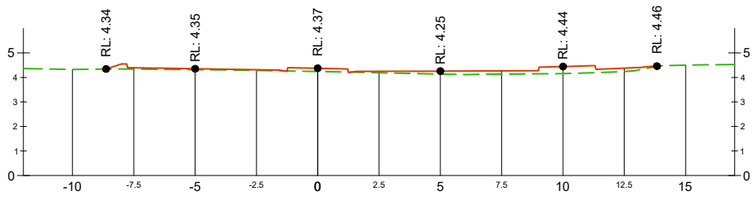

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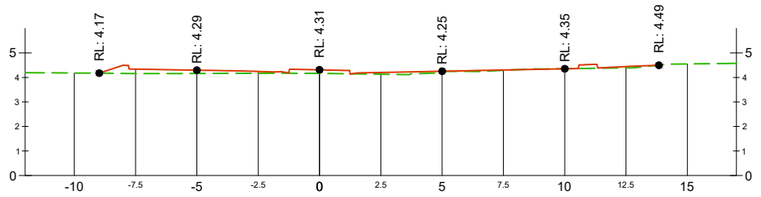

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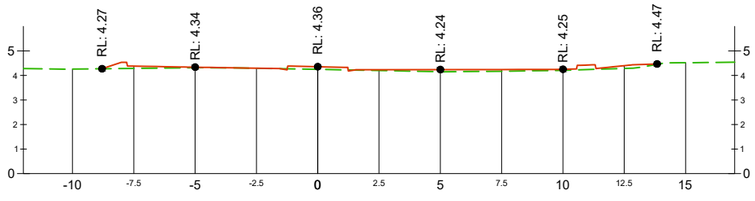

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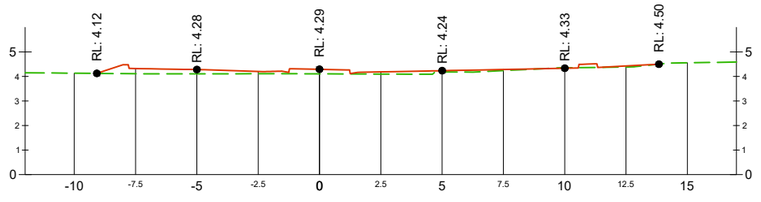


Chainage 40.0
Datum: 0.0

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

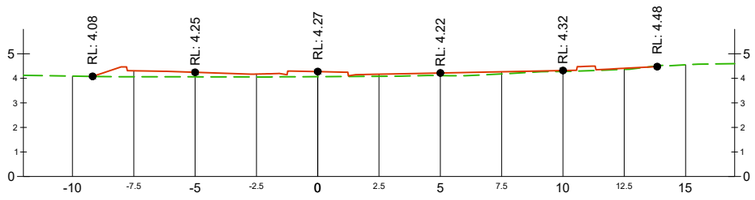
Drawing Title
Parking Area & Accessway
5m Inteval Cross Sections
Sheet 1 of 3

engineers • scientists

No.	Issue/Revision	Aprvd	Date
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:250

Project status: Resource Consent
Project: 21102
Drawing No: C312
Issue/Rev: C



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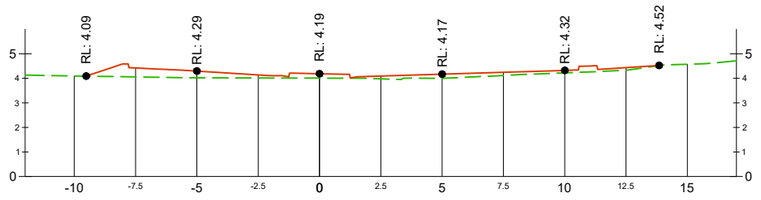

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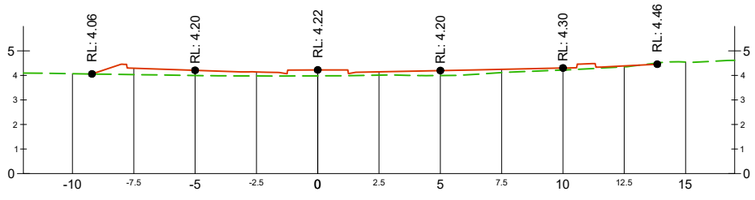

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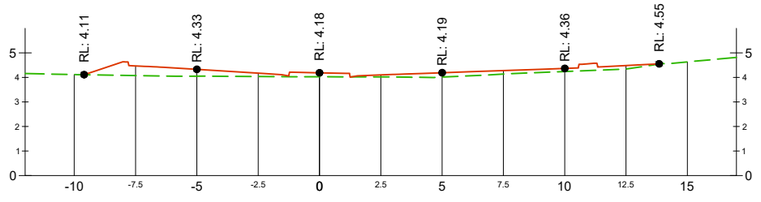

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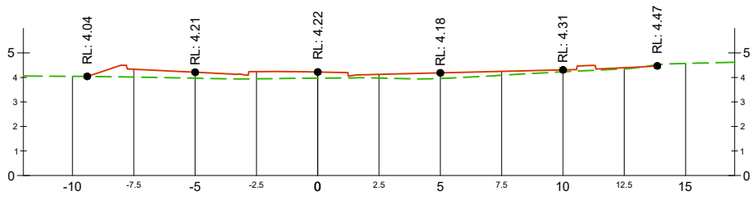

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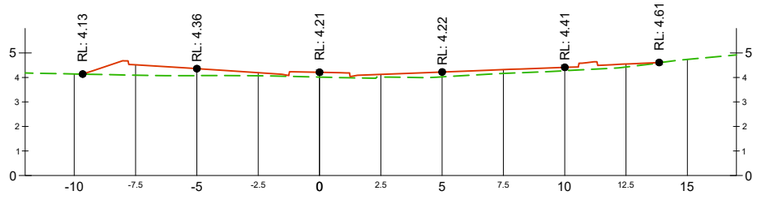

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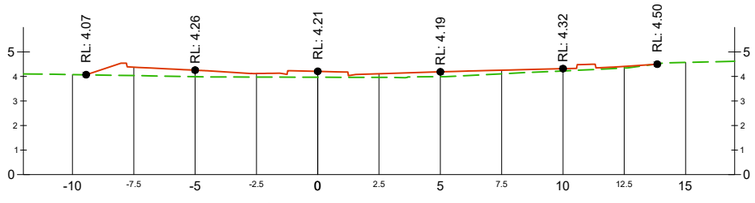

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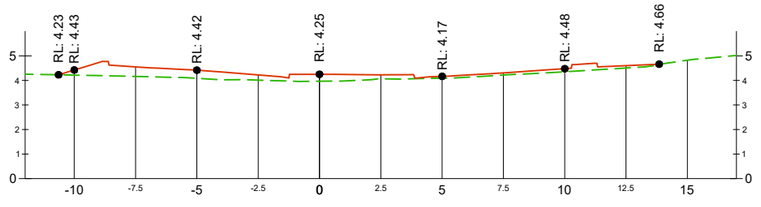

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Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

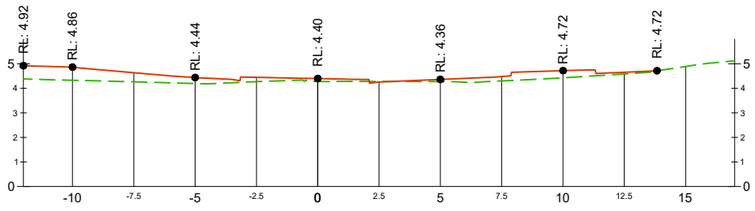
Drawing Title
Parking Area & Accessway
5m Inteval Cross Sections
Sheet 2 of 3

engineers • scientists

No.	Issue/Revision	Aprvd	Date
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:250

Project status: Resource Consent
Project: 21102
Drawing No: C313
Issue/Rev: C



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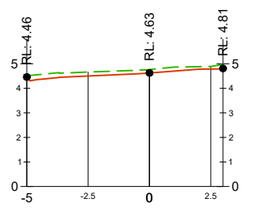

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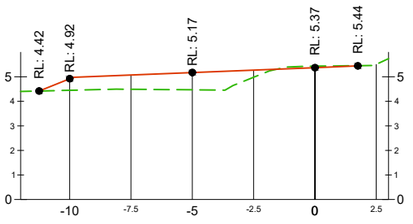

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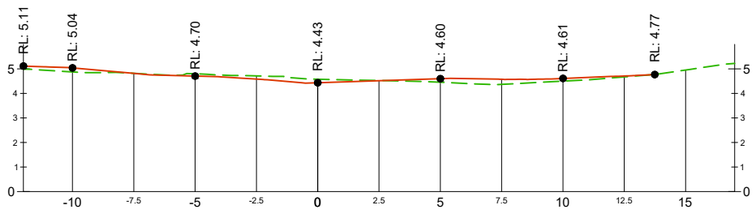

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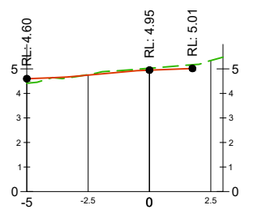

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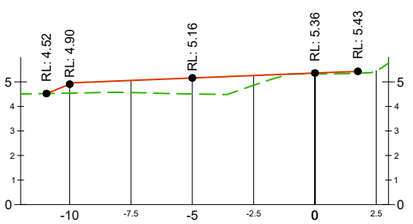

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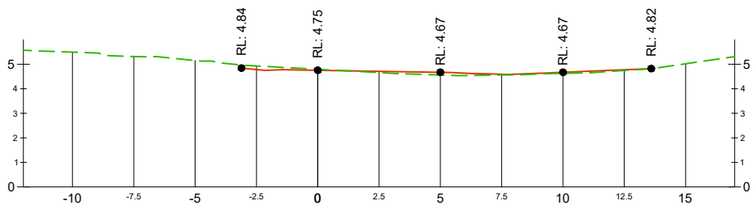

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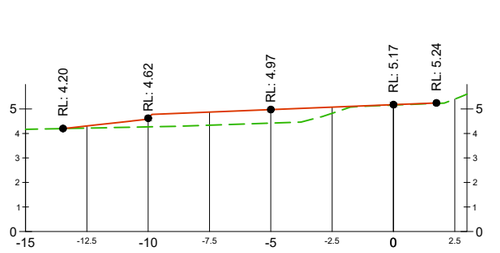

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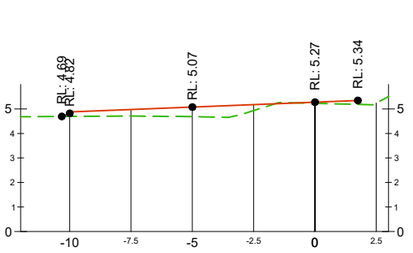

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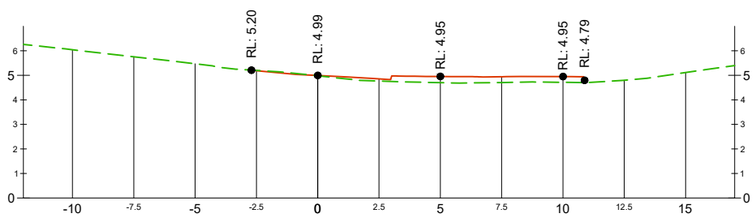

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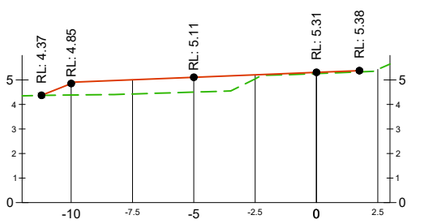

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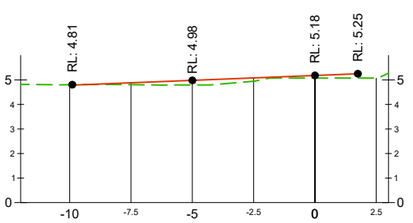


Chainage 35.0
Datum: 0.0

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

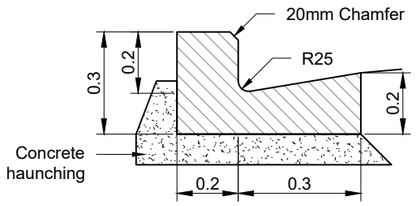
Drawing Title
Parking Area & Accessway
5m Inteval Cross Sections
Sheet 3 of 3

engineers • scientists

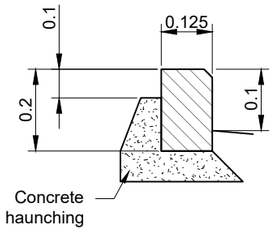
No.	Issue/Revision	Aprvd	Date
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:250

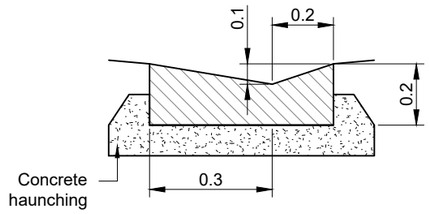
Project status: Resource Consent
Project: 21102
Drawing No: C314
Issue/Rev: C



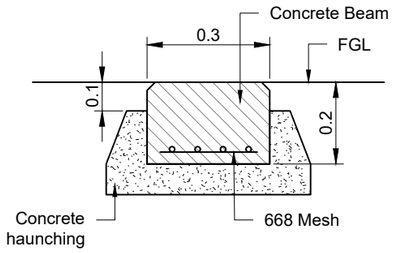
Extruded Kerb & Channel
Scale 1:15



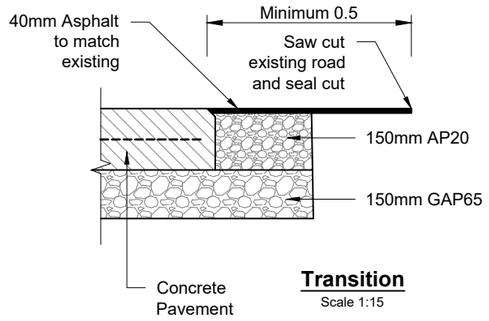
Extruded Kerb Block / Barrier Kerb
Scale 1:15



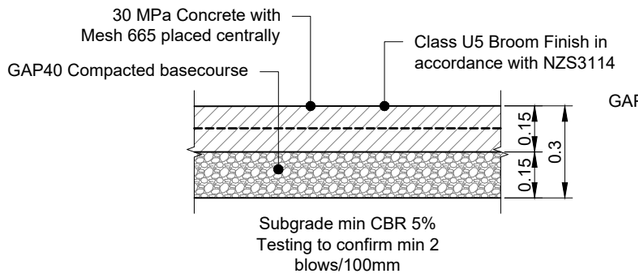
Pram Crossing
Scale 1:15



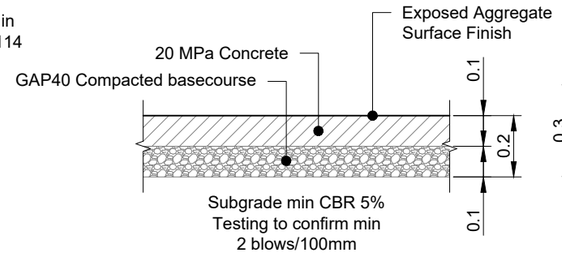
Flush Edge Beam
Scale 1:15



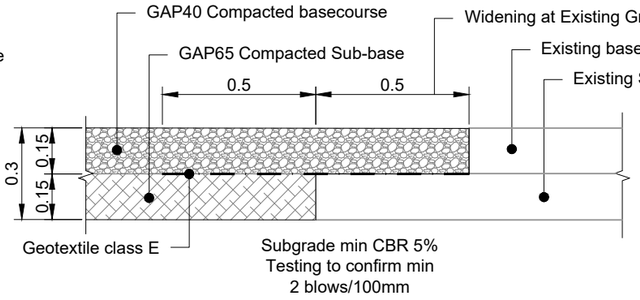
Transition
Scale 1:15



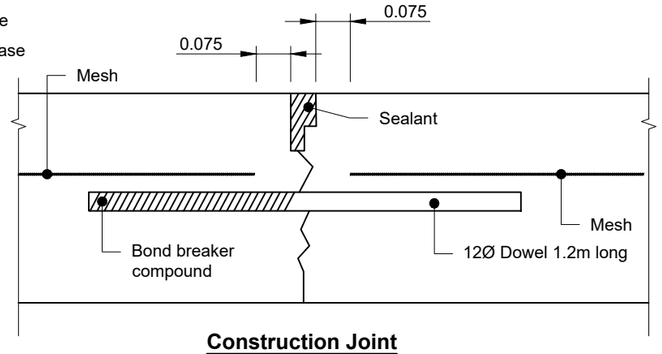
Layerworks
Concrete Parking Area
Scale 1:50



Layerworks
Concrete Footpath
Not to Scale

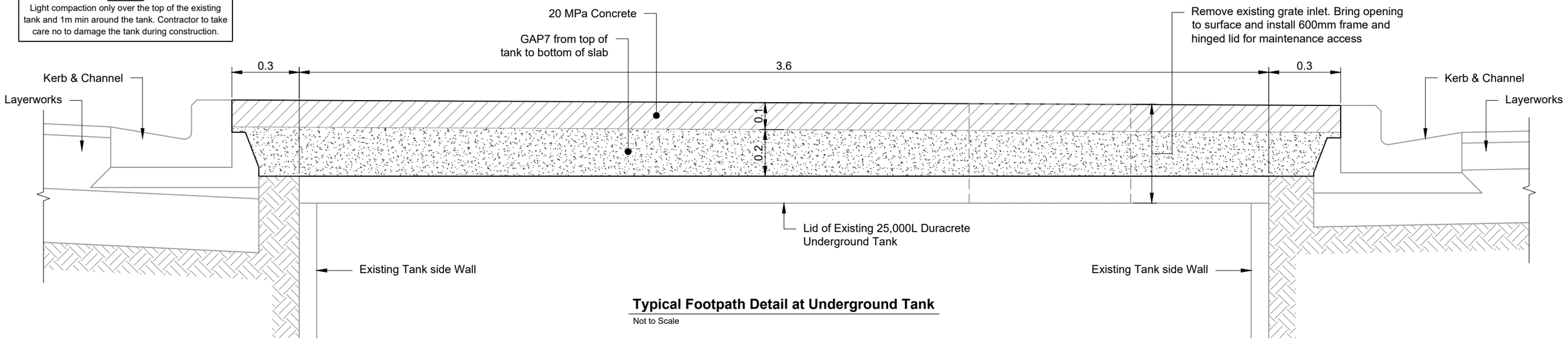


Layerworks
Gravel Pavement
Not to Scale



Construction Joint
Scale Not to Scale

Note:
Light compaction only over the top of the existing tank and 1m min around the tank. Contractor to take care no to damage the tank during construction.



Typical Footpath Detail at Underground Tank
Not to Scale

Original size = A3

Client	Oruaiti School Board of Trustees c/o Avail Pacific
Project	2554 State Highway 10, Mangonui Proposed Carpark Upgrades
Drawing Title	Parking Area & Accessway Typical Details Sheet 1 of 2

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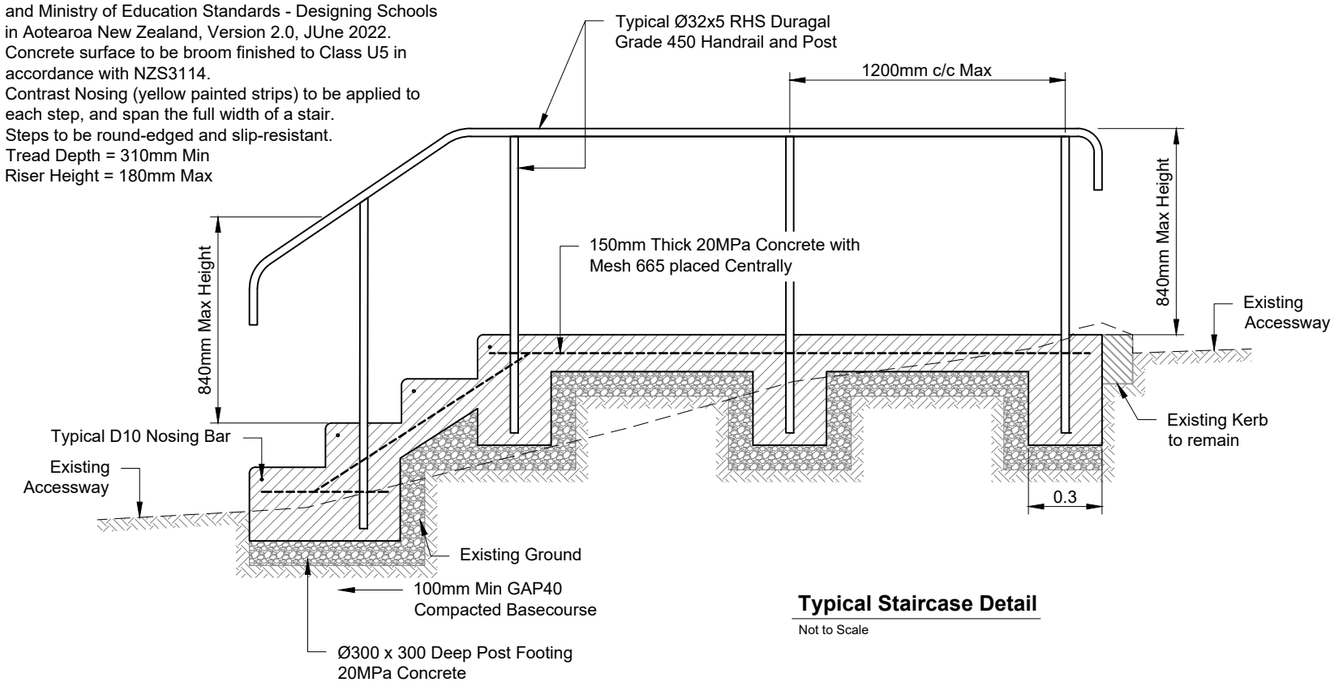
No.	Issue/Revision	Aprvd	Date
D	Revised and Issued for Resource Consent	N. D	01 Apr 2025
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	As Shown

Project status: Resource Consent
Project: D
Drawing No: C320
Issue/Rev: B

Note:

- The staircase is to be constructed in accordance with NZS3604, NZS4121, NZS3109, NZS3114, AS/NZS4671, and Ministry of Education Standards - Designing Schools in Aotearoa New Zealand, Version 2.0, JUne 2022.
- Concrete surface to be broom finished to Class U5 in accordance with NZS3114.
- Contrast Nosing (yellow painted strips) to be applied to each step, and span the full width of a stair.
- Steps to be round-edged and slip-resistant.
- Tread Depth = 310mm Min
- Riser Height = 180mm Max



Typical Staircase Detail

Not to Scale

Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific	Project: 2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Drawing Title: Parking Area & Accessway Typical Details Sheet 2 of 2	LDE engineers • scientists

No.	Issue/Revision	Aprvd	Date
B	Revised and Issued for Resource Consent	N. D	01 Apr 2025
A	Issued for Resource Consent	N. D	28 Mar 2025

Design:	R. de Swardt	Project status:	Resource Consent
Drawn:	R. de Swardt	Project:	21102
Approved:	N. Douglas	Drawing No:	C321
Scale A3:	As Shown	Issue/Rev:	B

Stormwater Services Notes:

1. All works to be undertaken in accordance with FNDC Engineering Standards and the Health and Safety at Work Act 2015 (HSWA).
2. All stormwater infrastructure to be installed as per the FNDC Engineering Standards (ES).
3. All stormwater infrastructure to adhere to the NZ Standards as stated in the FNDC ES.
4. All dimensions in metres unless noted otherwise.
5. Contractor to locate / ml dimensionark / confirm and protect if necessary all existing services prior to commencement of work on site.
6. All disturbed public areas to be made good and restored to existing condition.
7. Manholes to be reinforced concrete chambers with a precast base. Min Ø1050mm manhole unless otherwise specified.
8. Catchpits to be 675 x 450mm reinforced concrete chambers, with trafficable frame & grid inlet lid.

Stormwater Services Notes:

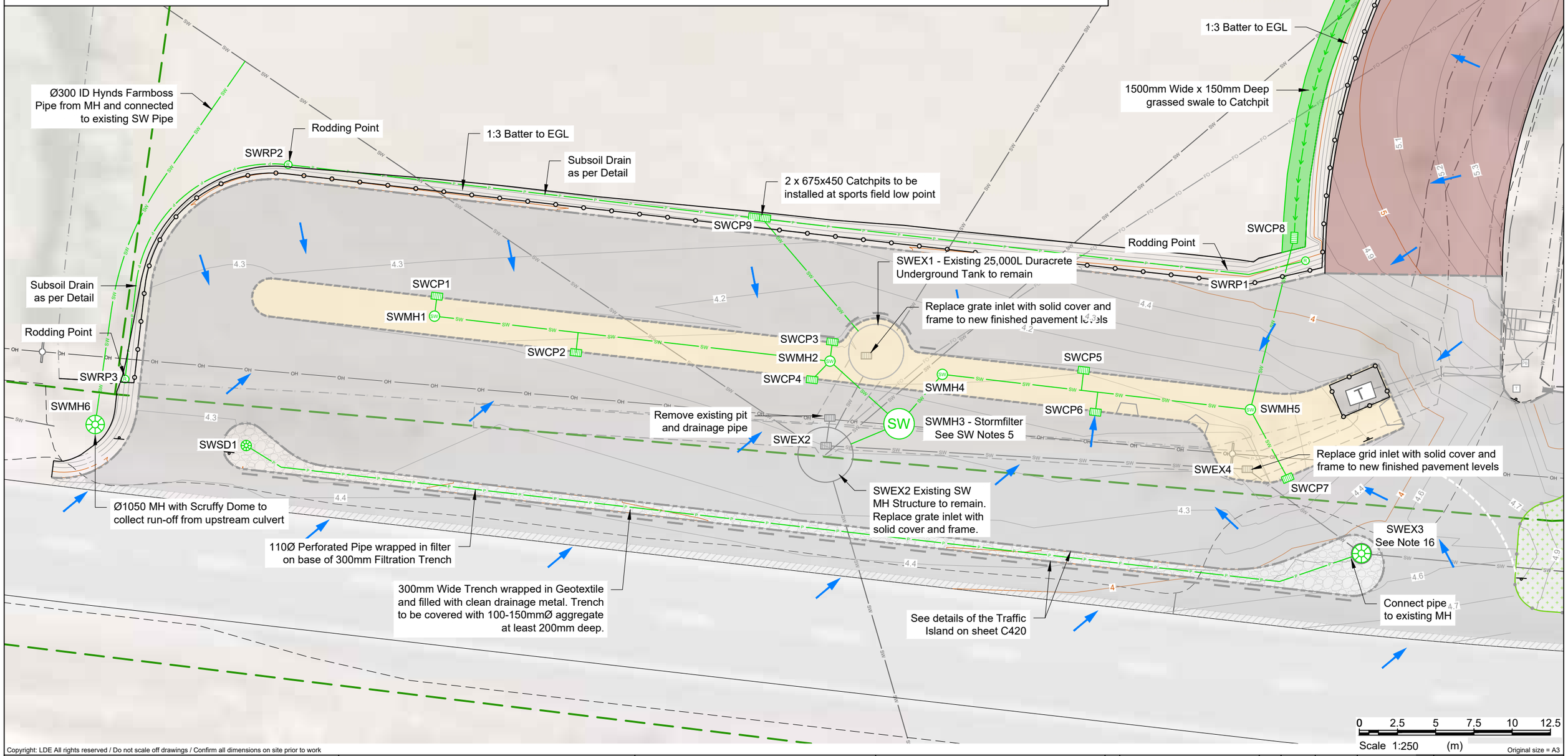
9. All PVC stormwater pipes to be uPVC SN16.
10. All concrete stormwater pipes to be RCRRJ Class 4.
11. Pipe bedding and installation to comply with relevant council details.
12. All catchpits to have a min. sump depth of 300mm.
13. All catchpits to have 150Ø uPVC SN16 outlet pipe.
14. All catchpits to be fitted with a "*Stormwater360 Litta Trap*", installed as per supplier specification.
15. SWMH3 to be 1800mmØ x 1500mm Deep MH fitted with "*Stormwater360 StormFilter Cartridge Filtration System*" and installed as per supplier specification.
16. SWEX3 existing Lid and Frame to be removed and replace with a Scruffy Dome, which will be located in the Traffic Island.
17. Refer to C421 for Catchpit and Manhole Details.

Existing Services Legend:

- Boundary (Surveyed)
- Edge of Road
- Stormwater Pipe
- Stormwater Manhole, Wingwall, Scruffy Dome, Catchpit
- Open Drain
- Water Pipe
- Underground Power Lines
- Power Pole & Over Head Lines
- Transformer
- Fibre Optic Lines
- Top of Bank
- Bottom of Bank
- Fence / Gate
- Retaining Wall

Proposed Services Legend:

- Prop. Kerb Block
- Prop. Kerb & Channel
- Prop. Flush Edge Beam
- Standard Concrete Surface
- Exposed Aggregate Concrete
- Gravel Surface
- Rock Filled Traffic Island
- Grassed Area
- SW Pipe
- SW Perforated Pipe & Rodding Point
- SW Manhole
- SW Manhole with Scruffy Dome
- SW Catchpit
- SW Swale
- SW Flow Direction

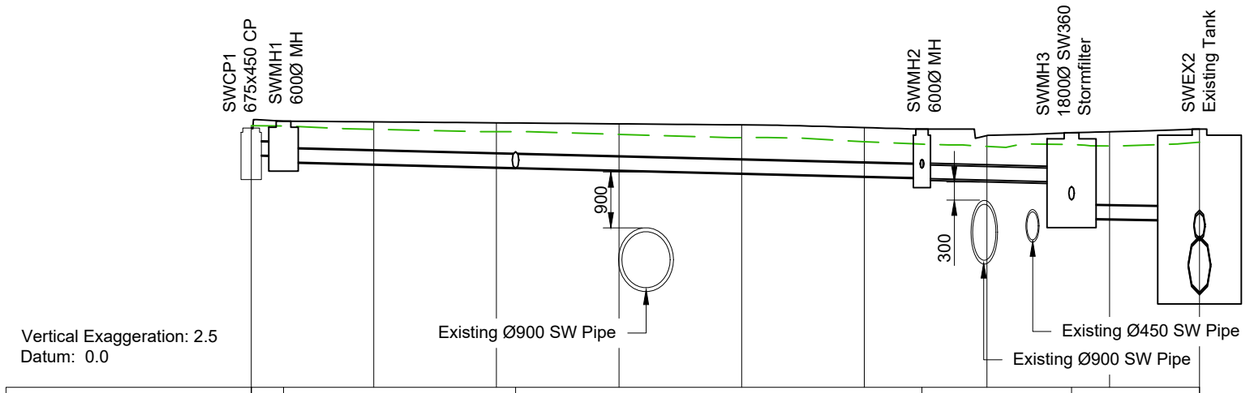


Client	Project	Drawing Title	
Oruaiti School Board of Trustees c/o Avail Pacific	2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Parking Area & Accessway Stormwater Management Plan	LDE engineers • scientists

No.	Issue/Revision	Aprvd	Date
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:250

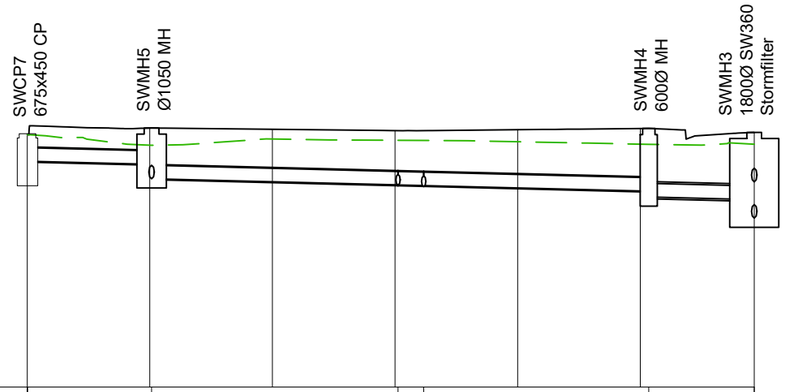
Project status: Resource Consent
Project: 21102
Drawing No: C400
Issue/Rev: C



Vertical Exaggeration: 2.5
Datum: 0.0

Ground Level	4.23	4.34		4.29		4.21		4.15		4.21		
Invert Level		3.79 3.77	3.67		3.58 3.58		3.41 3.40		3.34 2.75		2.72	
Depth to Invert	0.74	0.67		0.61		0.81		1.40		2.70		
Pipe Details	225Ø uPVC SN16		Ø225 uPVC SN16		Ø225 uPVC SN16			Ø225 RCRRJ CLASS 4		Ø225 UPVC SN16		
Pipe Slope Pipe Length	1.00% (1:100) 0.46m		1.00% (1:100) 8.94m		1.00% (1:100) 16.27m			1.00% (1:100) 4.90m		0.66% (1:151) 2.79m		

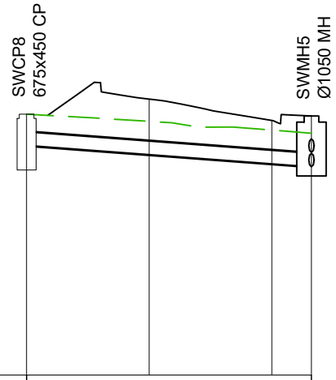
Long Section (SWCP1 TO SWMH3)



Vertical Exaggeration: 2.5
Datum: 0.0

Ground Level	4.13	4.22		4.16	3.46	4.17		4.21		4.15		
Invert Level		3.68	3.63	3.39		3.29	3.28 3.28	3.28		3.19	3.10	3.05
Depth to Invert	0.75	0.83		0.85	1.40	0.89		1.12		1.40		
Pipe Details	225Ø uPVC SN16		Ø225 uPVC SN16			Ø225 uPVC SN16	Ø225 uPVC SN16			Ø225 RCRRJ CLASS 4		
Pipe Slope Pipe Length	1.00% (1:100) 4.23m		1.00% (1:100) 9.53m			1.00% (1:100) 1.05m	1.00% (1:100) 8.88m			1.00% (1:100) 3.10m		

Long Section (SWCP7 TO SWMH3)



Vertical Exaggeration: 2.5
Datum: 0.0

Ground Level	4.25		4.22
Invert Level		3.74	3.39
Depth to Invert	0.81		0.83
Pipe Details	225Ø uPVC SN16		
Pipe Slope Pipe Length	3.00% (1:33) 10.87m		

Long Section (SWCP8 TO SWMH5)

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

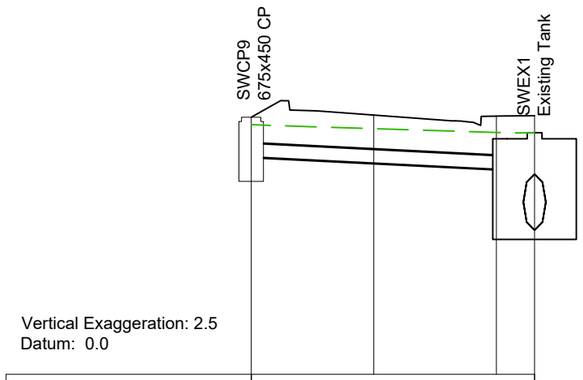
Drawing Title
Parking Area & Accessway
Stormwater Longitudinal Sections
Sheet 1 of 2

engineers • scientists

No.	Issue/Revision	Aprvd	Date
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:250

Project status: Resource Consent
Project: 21102
Drawing No: C410
Issue/Rev: C



Vertical Exaggeration: 2.5
Datum: 0.0

Ground Level	4.19	3.94
Invert Level	3.54	3.31
Depth to Invert	0.95	1.59
Pipe Details	225Ø uPVC SN16	
Pipe Slope Pipe Length	2.00% (1:50) 9.69m	

Long Section (SPORTS FIELD CATCHPIT TO TANK)

Vertical Exaggeration: 2.5
Datum: 0.0

Ground Level	4.47	4.44	4.46	4.70	4.70	
Invert Level	3.86	3.85	3.85	3.68	3.68	3.52	3.52	3.49
Depth to Invert	0.91	0.59	0.78	1.18	1.23
Pipe Details	Ø100 Perf. Pipe	Ø100 Perforated Pipe	Ø100 Perforated Pipe	Ø100 Perforated Pipe
Pipe Slope Pipe Length	0.50% (1:200) 2.39m	0.50% (1:200) 33.97m	0.50% (1:200) 31.75m	0.50% (1:200) 5.15m

Long Section (DRAINAGE TRENCH)

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

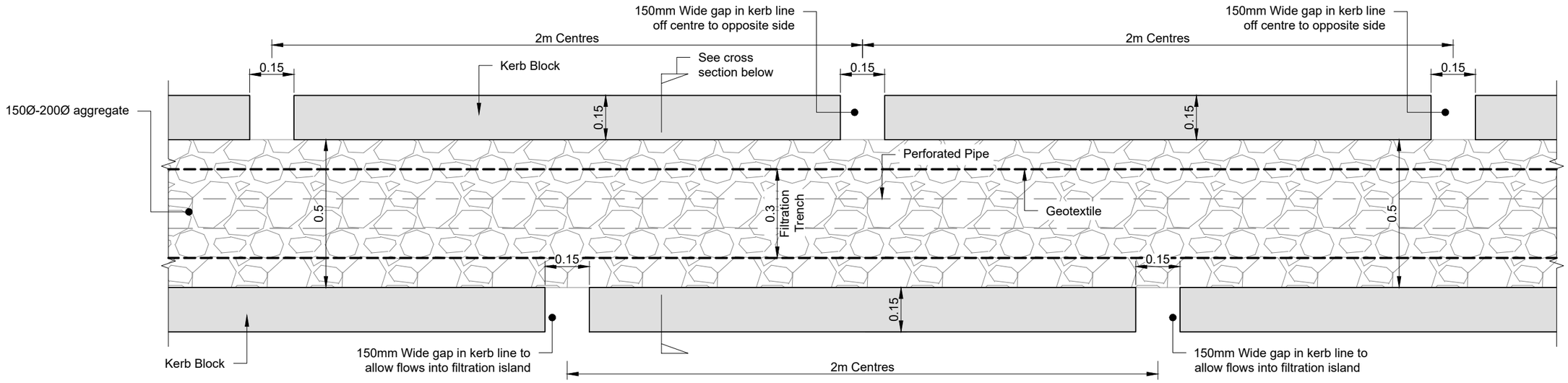
Drawing Title
Parking Area & Accessway
Stormwater Longitudinal Sections
Sheet 2 of 2

LDE engineers • scientists

No.	Issue/Revision	Aprvd	Date
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

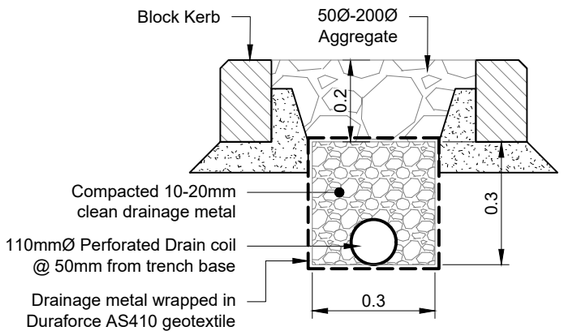
Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:250

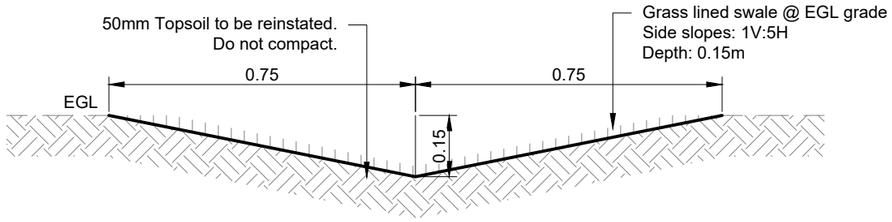
Project status: Resource Consent
Project: 21102
Drawing No: C411
Issue/Rev: C



Typical Traffic Island Plan View

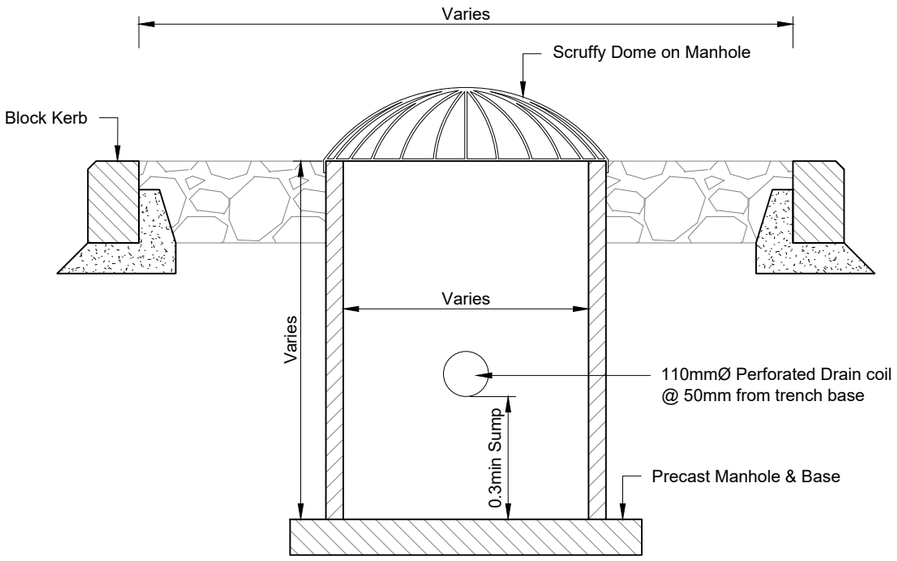
Not to Scale





Typical Grassed Swale Detail

Not to Scale

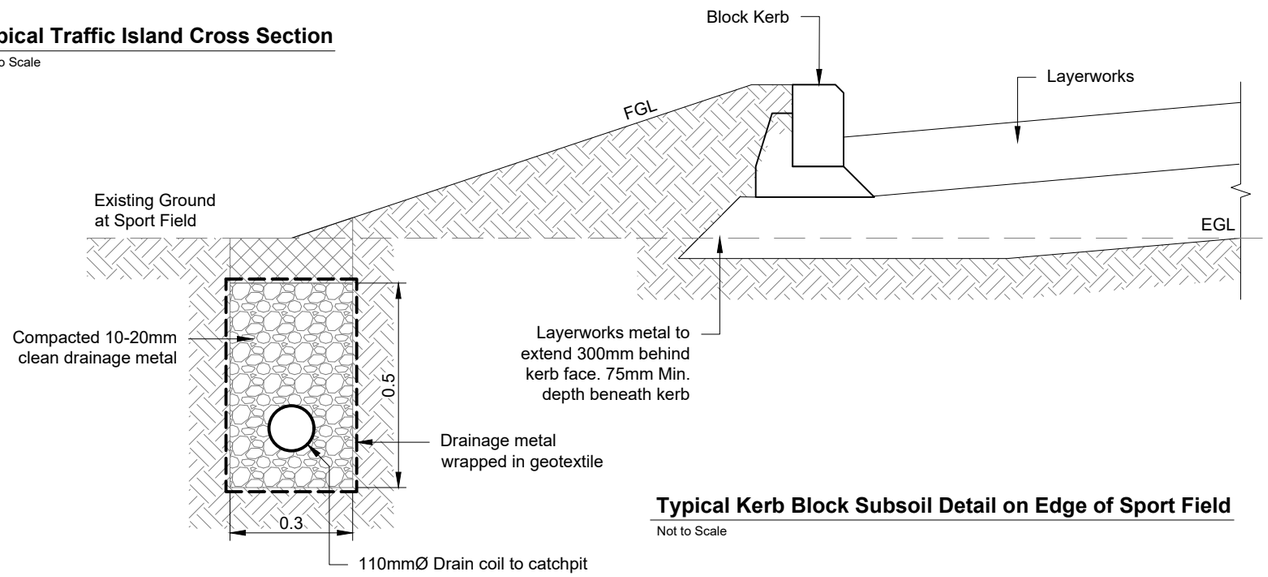


Typical Traffic Island Cross Section with Scruffy Dome

Not to Scale

Typical Traffic Island Cross Section

Not to Scale



Typical Kerb Block Subsoil Detail on Edge of Sport Field

Not to Scale

Original size = A3

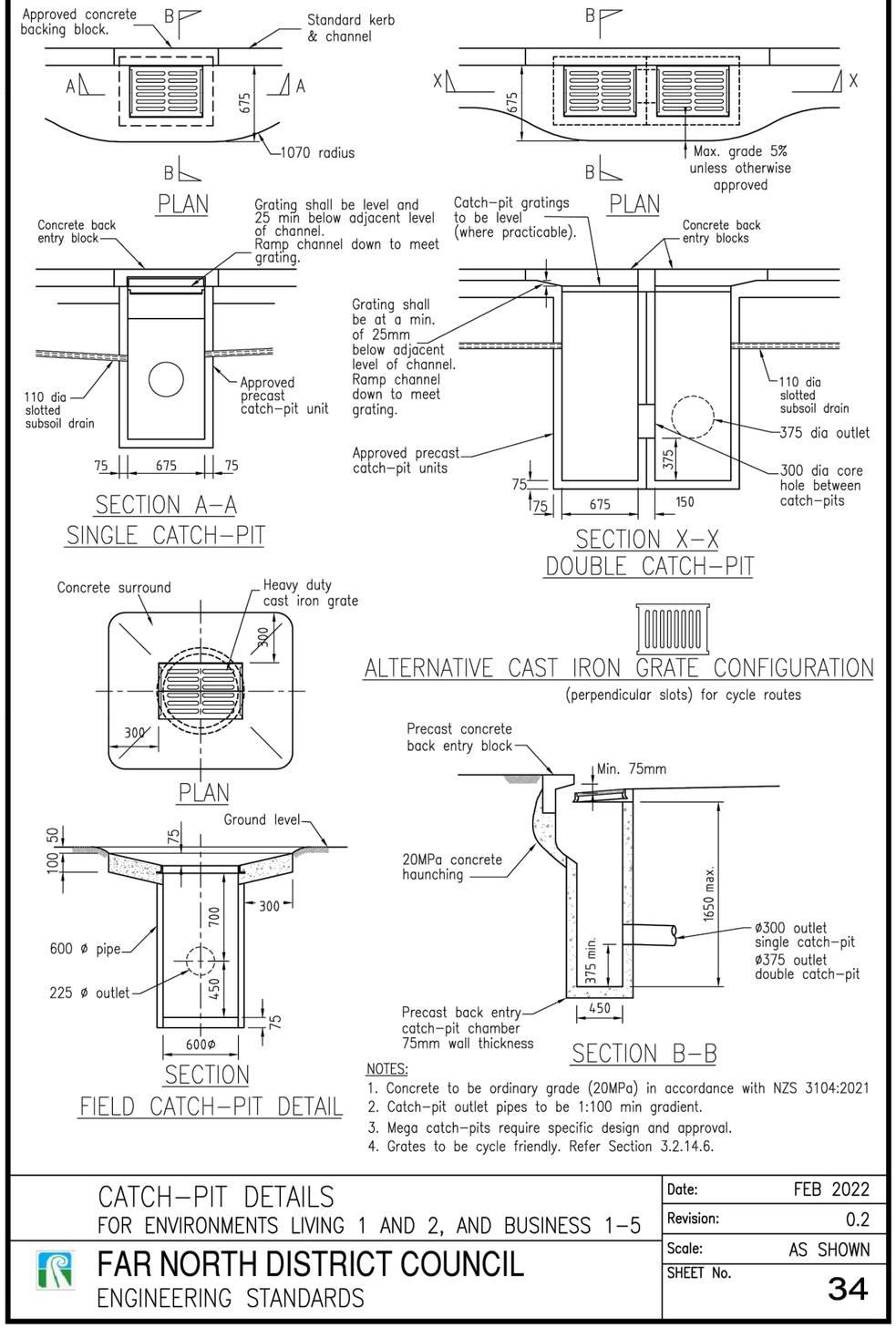
Client: Oruaiti School Board of Trustees c/o Avail Pacific	Project: 2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Drawing Title: Parking Area & Accessway Typical Stormwater Device Details	LDE engineers • scientists

No.	Issue/Revision	Aprvd	Date
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	As Shown

Project status: Resource Consent
Project: 21102
Drawing No: C420
Issue/Rev: C

Sheet 34 Catch-Pit Details

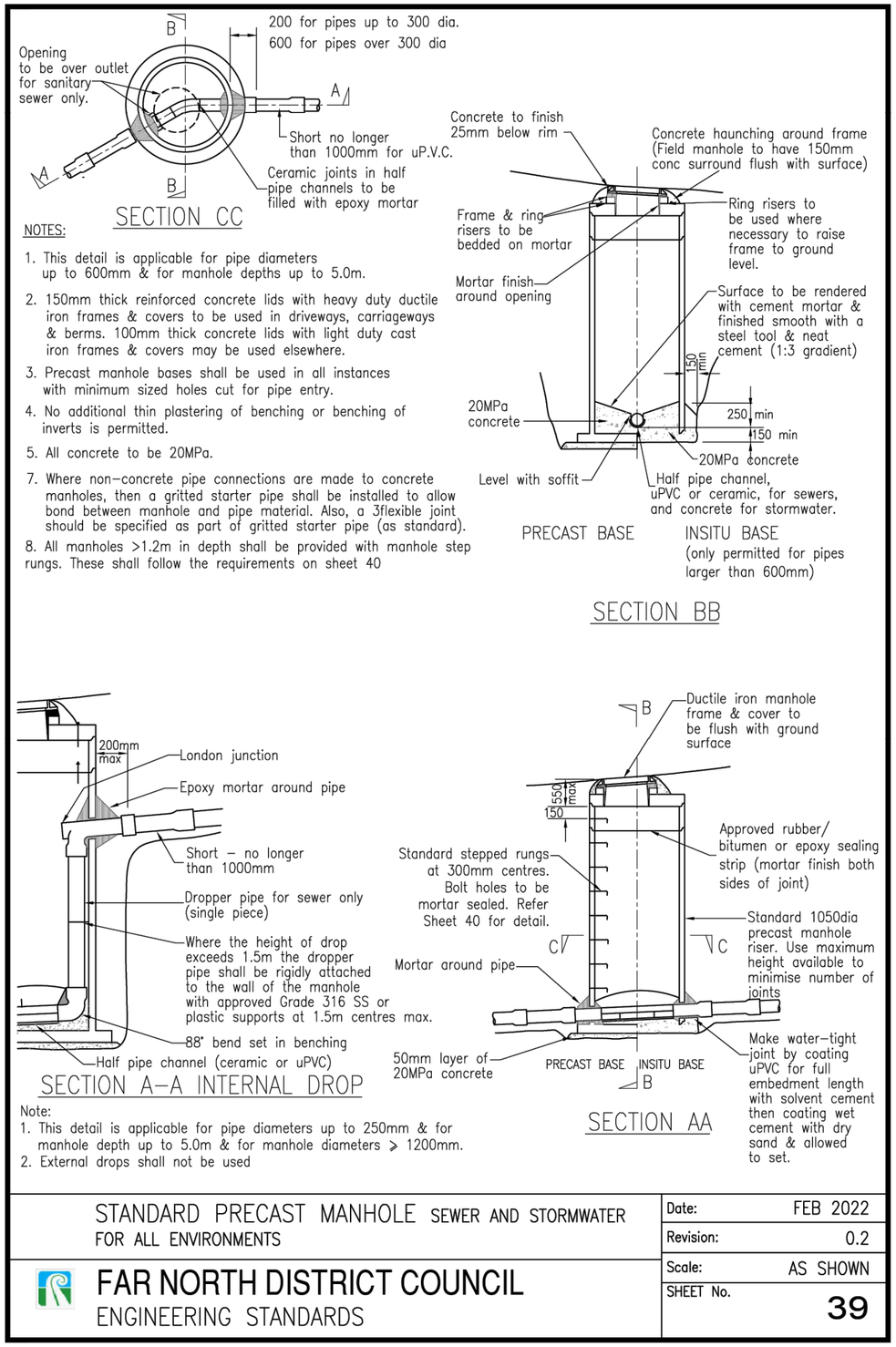


NOTES:

1. Concrete to be ordinary grade (20MPa) in accordance with NZS 3104:2021
2. Catch-pit outlet pipes to be 1:100 min gradient.
3. Mega catch-pits require specific design and approval.
4. Grates to be cycle friendly. Refer Section 3.2.14.6.

CATCH-PIT DETAILS FOR ENVIRONMENTS LIVING 1 AND 2, AND BUSINESS 1-5	Date: FEB 2022 Revision: 0.2 Scale: AS SHOWN SHEET No. 34
FAR NORTH DISTRICT COUNCIL ENGINEERING STANDARDS	

Sheet 39 Standard Precast Manhole



NOTES:

1. This detail is applicable for pipe diameters up to 600mm & for manhole depths up to 5.0m.
2. 150mm thick reinforced concrete lids with heavy duty ductile iron frames & covers to be used in driveways, carriageways & berms. 100mm thick concrete lids with light duty cast iron frames & covers may be used elsewhere.
3. Precast manhole bases shall be used in all instances with minimum sized holes cut for pipe entry.
4. No additional thin plastering of benching or benching of inverts is permitted.
5. All concrete to be 20MPa.
7. Where non-concrete pipe connections are made to concrete manholes, then a gritted starter pipe shall be installed to allow bond between manhole and pipe material. Also, a 3flexible joint should be specified as part of gritted starter pipe (as standard).
8. All manholes >1.2m in depth shall be provided with manhole step rungs. These shall follow the requirements on sheet 40

Note:

1. This detail is applicable for pipe diameters up to 250mm & for manhole depth up to 5.0m & for manhole diameters ⩾ 1200mm.
2. External drops shall not be used

STANDARD PRECAST MANHOLE SEWER AND STORMWATER FOR ALL ENVIRONMENTS	Date: FEB 2022 Revision: 0.2 Scale: AS SHOWN SHEET No. 39
FAR NORTH DISTRICT COUNCIL ENGINEERING STANDARDS	

Original size = A3

Client	Project	Drawing Title
Oruaiti School Board of Trustees c/o Avail Pacific	2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Parking Area & Accessway Typical Stormwater Details

LDE engineers • scientists

No.	Issue/Revision	Aprvd	Date
C	Issued for Resource Consent	N. D	28 Mar 2025
B	Revision (Entrance Grassed Area + Signage)	N. D	5 Sep 2024
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt	Project status:	Resource Consent
Drawn:	R. de Swardt	Project:	21102
Approved:	N. Douglas	Drawing No:	C421
Scale A3:	As Shown	Issue/Rev:	C

APPENDIX C

SUPPLIER INFORMATION AND TECHNICAL DRAWINGS

LITTATRAP™

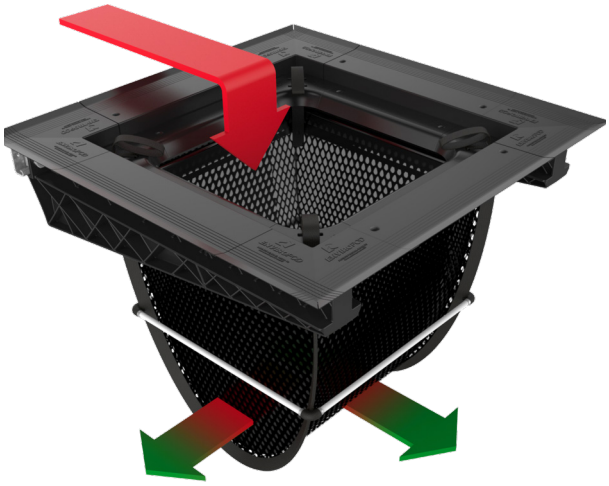
Low-cost catchpit insert for removal of litter and gross pollutants from run-off

Litter, leaves and other gross pollutants such as cigarette butts wash into our storm drains daily, and are responsible for degradation of our streams, rivers, lakes and beaches. Stormwater runoff from existing drainage network largely flows untreated into our marine environment and negatively effects the water quality, land value and marine life. LittaTrap is a low-cost solution to remove these pollutants.

The LittaTrap is an award-winning catchpit insert designed to be easily retrofitted into new and existing stormwater catchpits to specifically target litter, leaves and gross pollutants, capturing them at source and preventing them from accumulating in our waterways.

The LittaTrap is very cost effective and easy to maintain. Simply lift the filterbag out of the catchpit, empty and then replace back into the frame. This efficient solution captures and removes plastics and other pollutants before they reach the stormwater outfall.

The LittaTrap is also effective as a pre-treatment device for use in a treatment train with hydrodynamic separators, filtration devices, ponds and wetlands. In many cases, it is often the most practical solution for retrofits.



HOW DOES IT WORK?

As stormwater enters a storm grate or catchpit, it passes through the filterbag. Litter, debris, and other pollutants larger than the filterbag aperture are captured and retained.

If the filterbag is full or during high flows, the overflow is released through the overflow apertures in the frame assembly.

DESIGN AND OPERATION

The LittaTrap is fixed by brackets to the catchpit precast concrete wall below the inlet grate allowing the filter insert to be easily lifted out by hand for maintenance. Consisting of a structural bracket assembly with flow diverter seal and a removable filterbag insert which allows for high flow bypass, the LittaTrap is simple to install and remove.

Once the filter insert has been removed, open access to the base of the catchpit and outlet pipe means any accumulated sediment in the pit can easily be removed by inductor truck if required.

Standard sizes fit the common precast concrete regular and curb entry catchpits. Custom designs may be fabricated for non-standard catchpits.

CAPABILITIES

- Captures litter, leaves, debris and gross pollutants before they enter the drainage system
- Fits a range of catchpit sizes – ideal for retrofits
- Easy access - maintenance friendly design, can be hand maintained
- Bypasses high flows with no moveable parts
- Adjustable flow diverter allows fine-tuning during installation for a perfect fit
- Third party tested at Auckland University

BENEFITS

- Can be used to target high litter areas
- No construction means low capital costs
- Ideal pre-treatment device for filters, ponds, wetlands or other stormwater management and WSD practices
- A range of filterbag sizes to target gross pollutants
- Hand maintainable
- No confined space entry

EASY MAINTENANCE

The LittaTrap is very cost-effective and easy to maintain as the filterbag can be simply picked up and emptied by hand. As the LittaTrap is hand maintainable, it can be easily cleaned by site owners or maintenance crew without the need for vacuum inductor trucks or heavy lifting equipment. The pits can be visually inspected and accessed from grade, so there is no requirement for confined space entry, reducing maintenance costs.

LittaTrap filters should be inspected periodically to determine maintenance frequency. The frequency of maintenance services should be reviewed at the completion of each clean and modified if pollutant loadings deem this necessary. At the required maintenance interval the contaminants need to be removed from the filterbags and disposed of appropriately.

The maintenance crew is responsible for the disposal of debris in accordance with all applicable regulations and is responsible for following all Health and Safety requirements.

Contact the Stormwater360 maintenance department at **maintenance@Stormwater360.co.nz** for more information.

HAND MAINTENANCE IS AS EASY AS 'LIFT, TIP, REPLACE'

1. Lift LittaTrap out of pit using handles
3. Tip contents out of LittaTrap into suitable receptacle for contents
2. Replace LittaTrap securely back into surrounding frame and seal


Captured gross pollutant


LittaTrap Catchpit

CONTACT DETAILS

Stormwater360

FREEPHONE:
0800 STORMWATER
(0800 786769)

www.stormwater360.co.nz

Stormwater360®
BETWEEN SKY AND SEA

STORMFILTER™

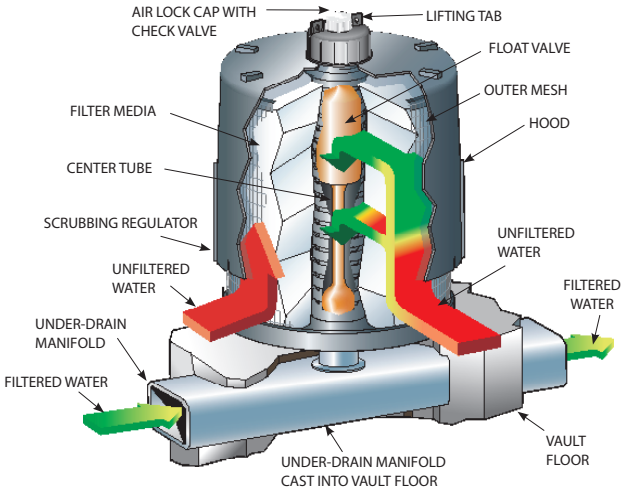
High efficiency / low maintenance stormwater filter.

SIPHON-ACTUATED FILTRATION The stormwater management StormFilter™ cleans stormwater through a patented passive filtration system, effectively removing pollutants to meet the most stringent regulatory requirements. Highly reliable, easy to install and maintain, and proven performance over time, StormFilter™ products are recognised as a versatile BMP for removing a variety of pollutants, such as sediments, oil and grease, metals, organics, and nutrients. These systems come in variable configurations to match local conditions and come with prolonged maintenance periods to ensure long-term performance and reduce operating costs.

HOW DOES IT WORK?

During a storm, runoff passes through the filtration media and starts filling the cartridge center tube. Air below the hood is purged through a one-way check valve as the water rises. When water reaches the top of the float, buoyant forces pull the float free and allow filtered water to drain.
After the storm, the water level in the structure starts falling. A hanging water column remains under the cartridge hood until the water level reaches the scrubbing regulators. Air then rushes through the regulators releasing water and creating air bubbles that agitate the surface of the filter media, causing accumulated sediment to drop to the vault floor. This patented surface-cleaning mechanism helps restore the filter's permeability between storm events.

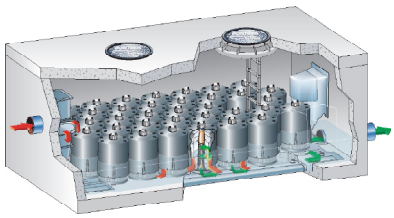
STORMFILTER™ CARTRIDGE



PROVEN PERFORMANCE

- First independently verified filter by Washington Department of Ecology, New Jersey Department of Environmental Protection and USEPA's Environmental Technology Verification program
- Approved and accepted by most regulatory bodies across New Zealand
- Over 16,800 x StormFilter's™ cartridges installed throughout New Zealand
- Continual innovation Design refined and perfected over two decades of research and experience

STORMFILTER™ VAULT



STORMFILTER BENEFITS

UNDERGROUND SYSTEMS MAXIMISE PROFITABILITY

- Save land space allowing denser developments reducing sprawl
- Add parking spaces and increase building size, increasing profitability
- Compact design reduces construction and installation costs by limiting excavation

RELIABLE LONGEVITY & LOWER MAINTENANCE COSTS

- Self cleaning hood prevents surface blinding, ensures use of all media and prolongs cartridge life
- 1-3 year maintenance cycles
- 20 years maintenance experience
- Minimal or no standing water. Lower disposal costs

CONTACT DETAILS

Stormwater360

FREEPHONE:
0800 STORMWATER
(0800 786769)

www.stormwater360.co.nz

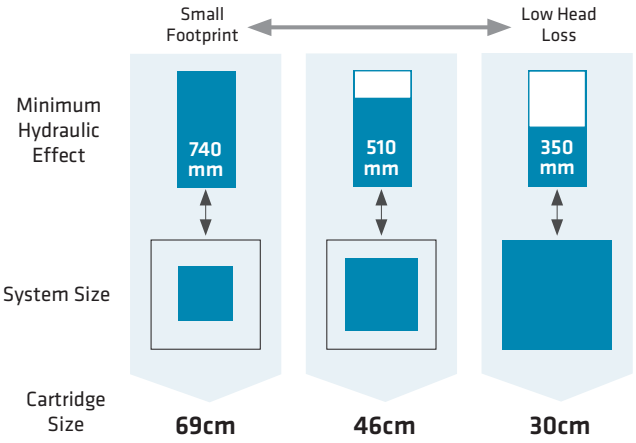
Stormwater360®
BETWEEN SKY AND SEA

www.stormwater360.co.nz

BETWEEN SKY AND SEA

SUPERIOR HYDRAULICS

Multiple cartridge heights gives design solutions for site restraints.



Other hydraulic benefits

- Hydraulic effect as low as 350mm head loss
- Zero surcharge of inlet pipe unlike upward flowing filters
- Can be designed for tail water e.g tidal conditions
- Online and offline configurations can limit hydraulic effects

MEDIA CHOICES

Our filtration products can be customised using different filter media to target site-specific pollutants. A combination of media is often recommended to maximise pollutant removal effectiveness.

Perlite is naturally occurring puffed volcanic ash. Effective for removing TSS, oil and grease.

ZPG™ is a multi-purpose media option approved for highly trafficked sites or sites with high metal loadings. ZPG is a mixture of Zeolite, Perlite and GAC (granular activated carbon). ZPG is ideal for removing soluble metals, TSS, oils and grease, organics and ammonium.

Zeolite is a naturally occurring mineral used to remove soluble metals, ammonium and some organics.

GAC (Granular Activated Carbon) has a micro-porous structure with an extensive surface area to provide high levels of adsorption. It is primarily used to remove oil and grease and organics such as PAHs and phthalates.

CONFIGURATION

Stormfilter's can be configured in any drainage structure. Please contact SW360 for a customised design.

PRECAST VAULT

- Treats medium sized sites
- Simple installation – arrives on-site fully assembled
- Plug and play solution

PRECAST MANHOLE

- Provides a low drop, point-of-entry configuration
- Uses drop from the curb inlet to the conveyance pipe to drive the passive filtration cartridges
- No crane required (Hi-AB lifting for most sizes)
- 1050-2400mm diameter sizes available

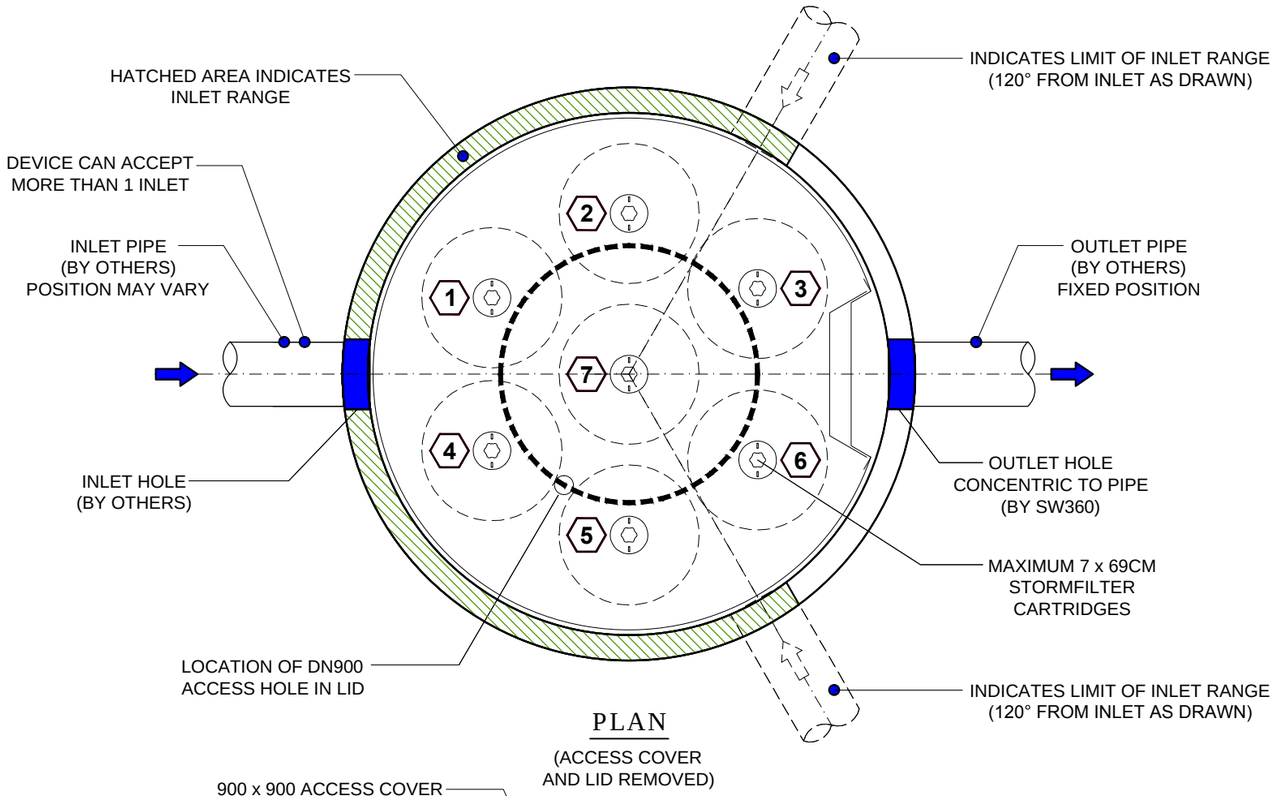
HIGH FLOW

- Treats flows from large sites
- Consists of large, precast components designed for easy assembly on-site
- Several configurations available, including: Panel Vault, Box Culvert, or Cast-In-Place

PEAK DIVERSION

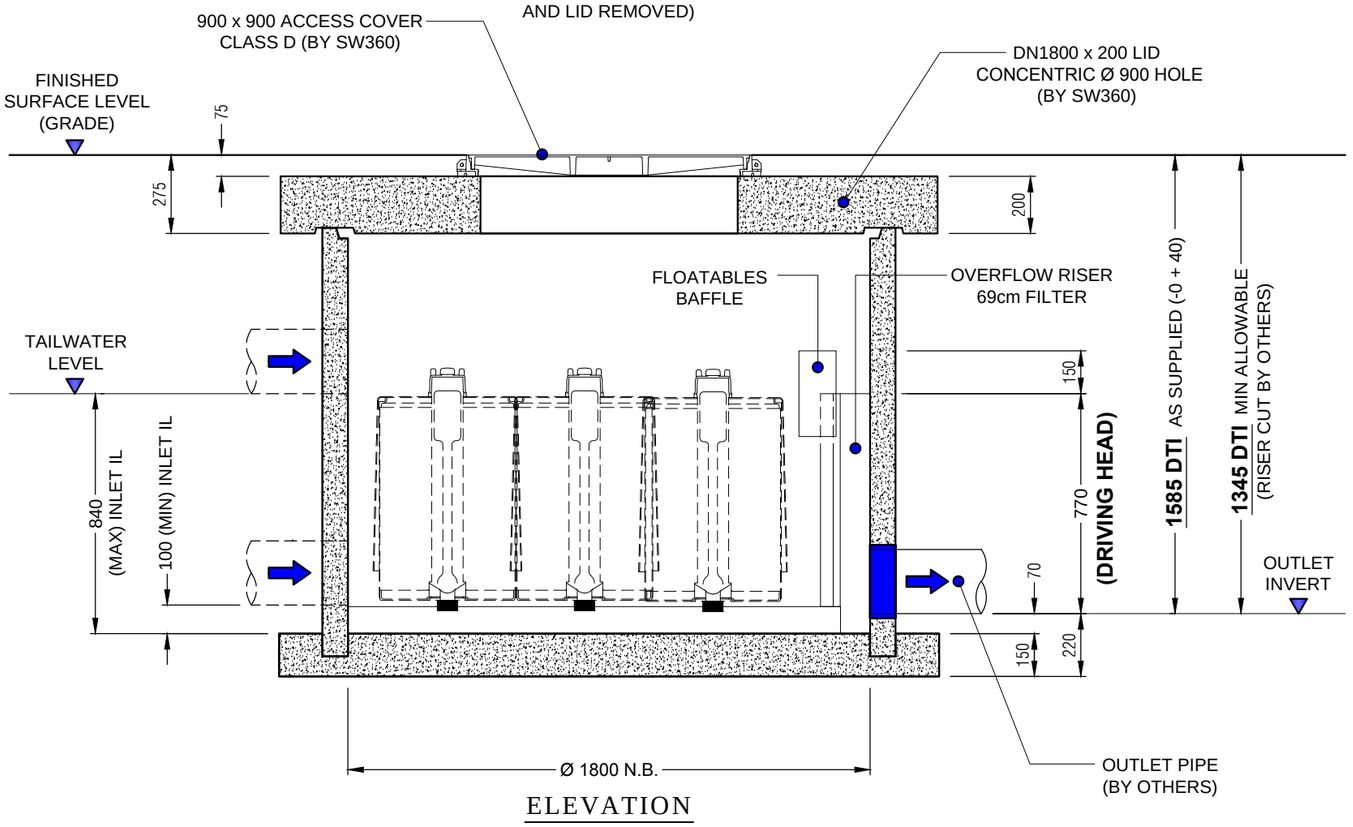
- Combines off-line bypass and StormFilter™ pollutant removal into one structure
- Internal weir allows high peak flows with low hydraulic head losses
- Approved and accepted as offline configuration by councils around NZ
- Eliminates cost of additional structures to bypass peak flows
- Reduces the overall footprint of the treatment system

Stormwater360®
BETWEEN SKY AND SEA



PLAN

(ACCESS COVER AND LID REMOVED)



ELEVATION

TO BE COMPLETED BY CUSTOMER / CONTRACTOR

COMPANY :					P.O. NUMBER :	
SITE ADDRESS :						
SITE CONTACT & PHONE :						
PREFERRED DELIVERY DATE (TBC SW360) :						
STORMFILTER REFERENCE (IF APPLICABLE) :						
OUTLET HOLE Ø (CIRCLE) : *(TYPICAL PIPE MATERIAL)*	**Ø 275** *(DN225 PVC)*	**Ø 300** *(DN225 RRJ)*	**Ø 350** *(DN300 PVC)*	**Ø 400** *(DN300 RRJ)*	**Ø 500** *(DN375 RRJ)*	**Ø 600** *(DN450 RRJ)*
LID LEVEL (RL) :		OUTLET PIPE (IL) :			DTI :	
COMPLETED BY :		SIGNED :			DATE :	

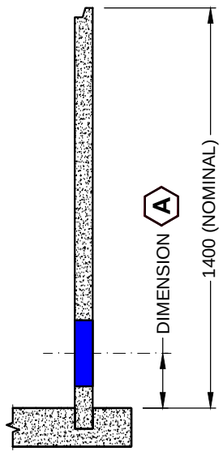
TO BE COMPLETED BY SW360

SW360 PRODUCT CODE :				
MEDIA TYPE (CIRCLE ONE) :	PERLITE	ZPG	OTHER :	
CARTRIDGE QTY (STATE) :			PRE-INSTALLATION (Y/N) :	
SP FLOW RATE (CIRCLE ONE) :	FULL (Ø 27.6 ID) BLACK/MUSTARD	3 QTR (Ø 24.0 ID) WHITE/OPAL	HALF (Ø 19.7 ID) GREEN	OTHER :
ACCESS COVER (CIRCLE ONE) :	900 x 900 WEB-FORGE / CLASS D		OTHER :	
COMPLETED BY :	SIGNED :		DATE :	

SW360 PRODUCTION DATA

OUTLET HOLE DETAILS :

(CIRCLE REQUIREMENT)



OUTLET HOLE Ø	DIM (A)
275	190
300	180
350	220
400	225
500	260
600	315

DWG ISSUE No. :

REQUIRED DATE :

NOTES

1. MANHOLE UNIT FITTED WITH SWIFTLIFT ANCHOR POINTS (QTY 2). DO NOT EXCEED 60 DEGREE LIFT ANGLE. CONCRETE LID FITTED WITH SWIFTLIFT ANCHOR POINTS (QTY 4).
2. UNIT SUPPLIED WITH OUTLET CORE DRILLED. INLET/S CORE DRILLED ON SITE BY OTHERS WITHIN RANGE SHOWN ON DRAWING.
3. SEALING / GROUTING OF MANHOLE COMPONENTS AND PIPES BY CONTRACTOR. ENSURING LOCAL CODES AND REGULATIONS ARE COMPLIED WITH.
4. ANY RISERS REQUIRED TO INCREASE THE DEPTH TO INVERT (DTI) FROM THAT AS DRAWN TO BE SUPPLIED BY THE CONTRACTOR.
5. FOR A DTI EXCEEDING 5m PLEASE CONTACT **0800STORMWATER**.
6. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION RELATED EROSION RUNOFF.
7. BACKFILL, BEDDING AND BUOYANCY DESIGN BY ENGINEER OF RECORD
8. QTY OF CARTRIDGES BY ENGINEER OF RECORD.
9. CONCRETE MANHOLE RISERS ARE DESIGNED AND MANUFACTURED IN ACCORDANCE WITH AS/NZS 4058 : 2007
10. CONCRETE MANHOLE BASES ARE DESIGNED AND MANUFACTURED IN ACCORDANCE WITH NZS 3101 : 2006 & NZS 3109 : 1997
11. CONCRETE LID DESIGNED AND MANUFACTURED TO HN-HO-72
12. FOR REQUIREMENTS OUTSIDE OF DRAWING SPECIFICATIONS PLEASE CONTACT **0800STORMWATER**.

APPROX WEIGHTS

MANHOLE SECTION INCLUDING CARTRIDGES : **4050 Kg**
(AS DELIVERED, BASED ON QTY 7 ZPG CARTS)
LID WEIGHT : **1850 Kg**

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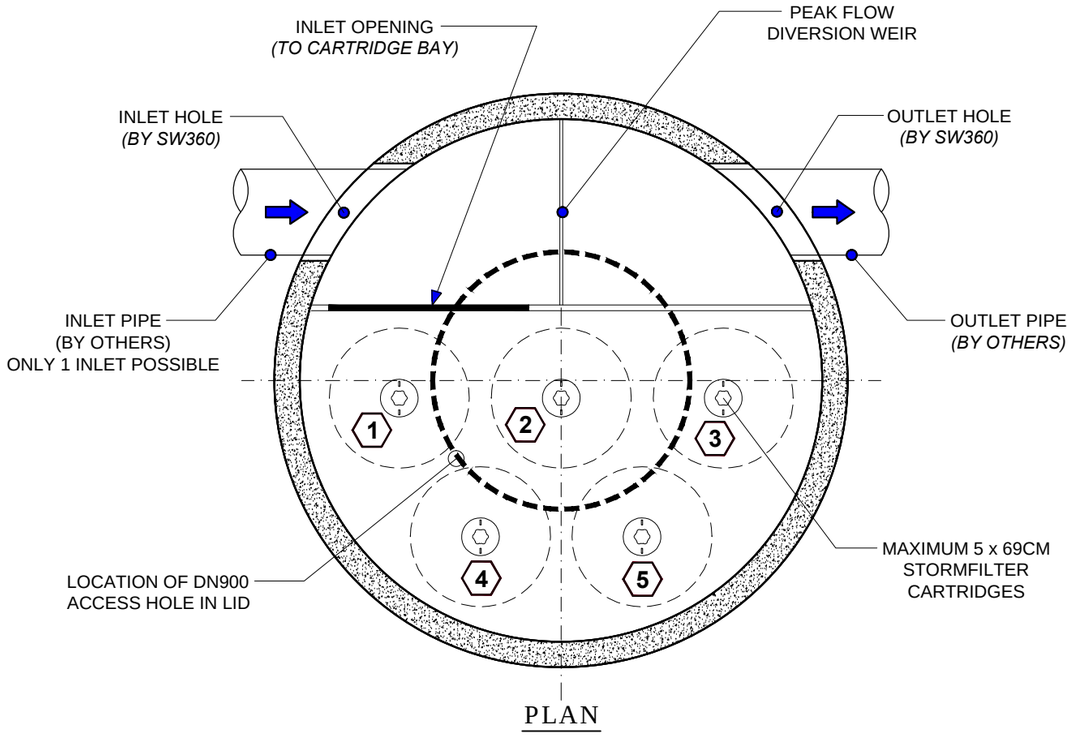
STORMFILTER®
CARTRIDGE FILTRATION SYSTEM
69cm CART / DN1800 x 1500 MH - TRAFFICABLE
GENERAL ARRANGEMENT

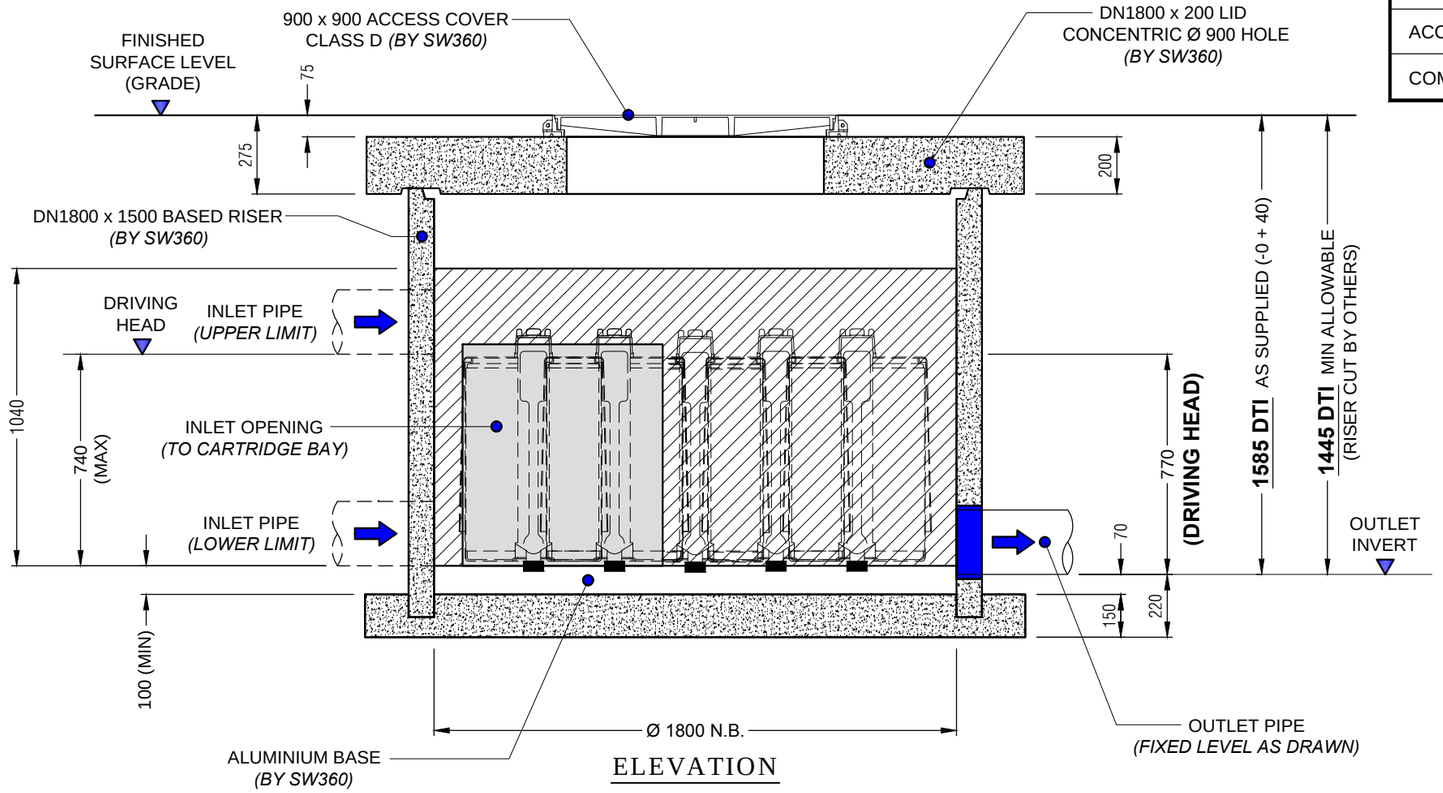
SCALE : NTS | DRG No : SF-MH-69-1800-T-20 | REV : 1 | DATE : 01.03.19

JOB NO :				REV	REVISION DETAIL	DATE
PROJECT :				0	APPROVED	01.03.19
				1	MARK-UPS	09.04.19
DRN :	R.P.	01.03.19				
CKD :	G.S.	G.Y.	01.03.19			



PLAN

(ACCESS COVER AND LID REMOVED)



ELEVATION

TO BE COMPLETED BY CUSTOMER / CONTRACTOR

COMPANY :		P.O. NUMBER :	
SITE ADDRESS :			
SITE CONTACT & PHONE :			
PREFERRED DELIVERY DATE (TBC SW360) :			
STORMFILTER REFERENCE (IF APPLICABLE) :			
INLET PIPE Ø : *DN300 RCRRJ - MAX* *DN375 PVC - MAX*	PIPE MATERIAL : *(PVC OR RCRRJ)*	CORE DRILL Ø :	INLET (IL) :
OUTLET PIPE Ø : *DN300 RCRRJ - MAX* *DN375 PVC - MAX*	PIPE MATERIAL : *(PVC OR RCRRJ)*	CORE DRILL Ø :	OUTLET (IL) :
LID LEVEL (RL) :	DTI :	ORIENTATION : 180° *(AS DRAWN)* / 90° / 135°	
COMPLETED BY :		SIGNED :	DATE :

TO BE COMPLETED BY SW360

SW360 PRODUCT CODE :				
MEDIA TYPE (CIRCLE ONE) :	PERLITE	ZPG	OTHER :	
CARTRIDGE QTY (STATE) :			PRE-INSTALLATION (Y/N) :	
SP FLOW RATE (CIRCLE ONE) :	FULL (Ø 27.6 ID) BLACK/MUSTARD	3 QTR (Ø 24.0 ID) WHITE/OPAL	HALF (Ø 19.7 ID) GREEN	OTHER :
ACCESS COVER (CIRCLE ONE) :	900 x 900 WEB-FORGE / CLASS D		OTHER :	
COMPLETED BY :	SIGNED :		DATE :	

NOTES

1. MANHOLE UNIT FITTED WITH 2 SWIFTLIFT ANCHOR POINTS. DO NOT EXCEED 60 DEGREE LIFT ANGLE. CONCRETE LID FITTED WITH 4 SWIFTLIFT ANCHOR POINTS.
2. UNIT SUPPLIED WITH INLET & OUTLET CORE DRILLED.
3. SEALING / GROUTING OF MANHOLE COMPONENTS AND PIPES BY CONTRACTOR. ENSURING LOCAL CODES AND REGULATIONS ARE COMPLIED WITH.
4. ANY RISERS REQUIRED TO INCREASE THE DEPTH TO INVERT (DTI) FROM THAT AS DRAWN TO BE SUPPLIED BY THE CONTRACTOR.
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6. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION RELATED EROSION RUNOFF.
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8. QTY OF CARTRIDGES BY ENGINEER OF RECORD.
9. CONCRETE MANHOLE RISERS ARE DESIGNED AND MANUFACTURED IN ACCORDANCE WITH AS/NZS 4058 : 2007
10. CONCRETE MANHOLE BASES ARE DESIGNED AND MANUFACTURED IN ACCORDANCE WITH NZS 3101 : 2006 & NZS 3109 : 1997
11. CONCRETE LID DESIGNED AND MANUFACTURED TO HN-HO-72
12. FOR REQUIREMENTS OUTSIDE OF DRAWING SPECIFICATIONS PLEASE CONTACT **0800STORMWATER**.

APPROX WEIGHTS

MANHOLE SECTION INCLUDING CARTRIDGES : **3900 Kg**
(AS DELIVERED, BASED ON QTY 5 ZPG CARTS)
LID WEIGHT : **1800 Kg**

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GENERAL ARRANGEMENT

SCALE : N.T.S. | DRG No : SF-MHPD-69-1800-T-20 | REV : 0 | DATE : 22.05.19

JOB NO :			REV	REVISION DETAIL	DATE
PROJECT :			A	FOR APPROVAL	22.05.19
			0	APPROVED	23.05.19
DRN :	R.P.	22.05.19			
CKD :	G.S.	22.05.19			

CSF 0054; StormFilter Flow-Based Sizing - Other

Stormwater360

Project Name	Oruaiti School Parking area & Access way	**Location**	Mangonui 2554 State Highway 10,		
Job #	8021 **Device #** SWMH 2	**Option #**	A	**Revision #**	RA
Author	[Choose Designer]	**Date**	11 April 2024		

CALCULATIONS - Please Read Instructions First

1.0 Water Quality Design Storm Peak Runoff Flowrate (RATIONAL METHOD)

1.1 Runoff Co-efficients

Coefficient of Impervious Roof (**Croof**)	0.90
Coefficient of Impervious Road (**Croad**)	0.85
Coefficient of Pervious Area (**Cper**)	0.25

1.2 Catchment Areas

Area Impervious Roof (**Aroof**)	0 m^2
Area Impervious Road (**Aroad**)	3000 m^2
Area Pervious Area (**Aper**)	0 m^2
Area Total Catchment (**Acatch**)	3000 m^2
Product of Area & Coefficients (**CA**)	2550 m^2

1.3 Rainfall Intensity

Water Quality Rainfall Intensity (**iWQ**)	10 mm/hr

1.4 Water Quality Design Storm Peak Runoff Flowrate

Design Water Quality Treatment Flowrate (**Qwq**)	7.083 L/s

2.0 StormFilter Peak Treatment Flowrate

2.1 Preliminary

Cartridge Media (**Media**)	Perlite
Cartridge Height (**Hcart**)	69 cm
Diameter Disc Orifice (**d**)	27.6 mm
Internal bypass weir height (**Hweir**)	0.79 m
Priming depth (**Hprime**)	0.66 m
Area of a Cartridge (**Acart**)	0.181 m^2

2.2 StormFilter Cartridge Peak Treatment Flowrate

StormFilter cartridge stage-discharge equation	$=0.111d^{2.06}\Delta h^{0.5}$ L/min
Peak treatment flowrate at internal bypass per cartridge (**Qcart**)	1.420 L/s/cart
Number (actual) of StormFilter cartridges required	4.988 cart(s)
Number (rounded) of StormFilter cartridges required	5 cart(s)
Design StormFilter Treatment Flowrate (**QSF**)	7.100 L/s

3.0 Estimate Sediment Mass Loading

3.1 StormFilter Manhole/Vault Dimensions

Length Cartridge Bay (**Lbay**)	1.000 m
Width Cartridge Bay (**Wbay**)	2.440 m
Area Cartridge Bay (**Abay**)	2.440 m^2
Total area of Cartridges (**Acarts**)	0.905 m^2
Area Lower Volume (**Alow**)	1.535 m^2
Volume Lower Volume (**Vlow**)	1059 L
Area Upper Volume (**Aupp**)	2.440 m^2
Volume Upper Volume (**Vupp**)	244 L
Live storage volume at internal bypass (**Vstor**)	1303 L

3.2 Catchment Sediment Loading

Estimated TSS Concentration Impervious Roof (**TSSroof**)	100 kg/ha/year
Estimated TSS Concentration Impervious Road (**TSSroad**)	300 kg/ha/year
Estimated TSS Concentration Pervious Area (**TSSper**)	200 kg/ha/year
Estimated Total TSS Load (**TSSload**)	90 kg/year

3.3 Treatment Efficiencies

Pre-treatment Efficiency (**EFFpre**)	50 %
System Efficiency (**EFFsys**)	75 %

3.4 Maintenance Requirements

Estimated number of cleans per annum (**nCleans**)	0.28
Estimated Maintenance Frequency (**Mfreq**)	42.857 months

4.0 Design Summary

Design Water Quality Treatment Flowrate (**Qwq**)	7.083 L/s
StormFilter Design WQ Treatment flowrate (**QSF**)	7.100 L/s
StormFilter Design flowrate at internal bypass (**Qbypass**)	7.642 L/s
Number of StormFilter Cartridges required (**nTOTAL**)	5ea x 69cm Perlite cart(s)
Treatment Flux per cartridge (**FLUX**)	1.4 L/s/m^2
Restrictor Disc Size (**d**)	27.600 mm
Maximum Hydraulic Effect (**hmax**)	0.930 m
Estimated Maintenance Frequency (**Mfreq**)	43 months

INSTRUCTIONS

1.0. Use the rational method to compute the water quality design storm peak runoff flow rate. Values with blue text require user input. Values in red text are automatically calculated. Values with black text remain constant.

1.1 Input the appropriate runoff co-efficient for each sub-catchment.

Use C=0.9 for imperious roof surfaces runoff co-efficient from NZBC E1/VM1: Table 1

Use C=0.85 for imperious paved surfaces runoff co-efficient from NZBC E1/VM1: Table 1

Use C=0.25 for pervious grassed/landscaped surfaces runoff co-efficient from NZBC E1/VM1: Table 1

1.2 Input the appropriate catchment area for each sub-catchment.

Enter impervious roof surface catchment area

Enter impervious paved surfaces catchment area

Enter pervious grassed/landscaped surfaces catchment area

Total catchment area *i.e. Acatch = Aroof + Aroad + Aper*

Product of catchment areas & runoff co-efficients *i.e. CA = (Croof x Aroof) + (Croad x Aroad) + (Cper x Aper)*

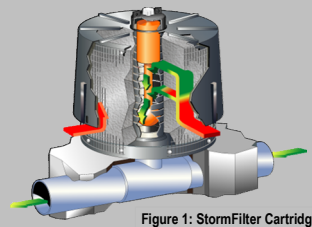


Figure 1: StormFilter Cartridge

1.3 Input rainfall intensity

The 90th percentile rainfall intensity is recommended to be used for calculating the water quality flow. Where no statistical analysis of historical storm events has been undertaken, we recommend iwq=10mm/hr is used. Alternative values can be checked against HIRDs or intensity tables in the local council Code of Practice

1.4 Compute the water quality design storm peak runoff flow rate via Rational Method

i.e. Q = f.C.i.A

$$Q = 0.111 d^{2.06} \Delta h^{0.5}$$

$[Q]$=L min^{-1}; $[d]$=mm; $[h]$=m

Figure 2: StormFilter Stage Discharge Equation [1]

2.0. Use the stormfilter stage-discharge equation to calculate the StormFilter peak treatment flowrate.

Enter cartridge filtration media *i.e. Perlite or ZPG*

Enter cartridge height *i.e. 69cm / 46cm / 30cm*

Enter restrictor disc size, refer table below for max disc diameter

Cart Height (cm)	Actual Height (m)	Priming Depth (m)	Max Disc Diam. (mm)	Max. Design Q (L/s)	Filter Bed Area (m^2)	Flow Rate (L/s/m^2)	Bed Depth (mm)	Media Volume (m^3)	Flow Rate (L/s/m^3)
30	0.305	0.27	22.70	0.63	0.460	1.37	175	0.052	12.0
46	0.457	0.43	25.00	0.95	0.689	1.38	175	0.078	12.1
69	0.686	0.66	27.60	1.42	1.034	1.37	175	0.118	12.1

Table 1. StormFilter Cartridge Specifics [2]

Compute the Stormfilter peak treatment flowrate at internal bypass per cartridge via the StormFilter stage-discharge equation

Compute the number of actual StormFilter cartridges required i.e. CEILING(B35,1) = QWQ / QCART

Compute the number (rounded up to whole number) of StormFilter cartridges required

Compute the Stormfilter peak treatment flowrate at internal bypass via the StormFilter stage-discharge equation

3.0 Estimate sediment mass loading (Refer sheet '2. Mass Load Calcs' for more details)

3.1 Use tables 2 & 3 below to fill in StormFilter Dimensions based on number of cartridges as calculated in cl 2.2 above

3.2 Use table 3 below to fill in estimated TSS concentration. For roads with ≥25,000vpd, use minimum 600kg/ha/yr

3.3 Use 0% pretreatment for vaults/manholes with no forebay. Use 10-15% pretreatmnet for vaults/manholes with forebays. Use 50% pretreatment for upstream GPT ie EnviroPod. Use 75%-90% system efficiency

Std Manhole Dimensions	Without forebay				With forebay			
	Cart Bay Length (m)	Cart Bay Width (m)	Cart Bay Area (m^2)	Max Number Carts	Cart Bay Length (m)	Cart Bay Width (m)	Cart Bay Area (m^2)	Max Number Carts
1050	1.00	0.77	0.77	1	1.00	N/A	N/A	N/A
1200	1.00	1.03	1.03	3	1.00	0.76	0.76	2
1500	1.00	1.67	1.67	4	1.00	1.39	1.39	3
1800	1.00	2.44	2.44	7	1.00	1.83	1.83	5
2050	1.00	3.20	3.20	9	1.00	2.80	2.80	7

Table 2: Standard Stormwater360 Manhole Dimensions

Std Vault Dimensions	Without forebay				With forebay			
	Cart Bay Length (m)	Cart Bay Width (m)	Cart Bay Area (m^2)	Max Number Carts	Cart Bay Length (m)	Cart Bay Width (m)	Cart Bay Area (m^2)	Max Number Carts
3.4 L x 1.5 W x 1.8 D	2.85	1.50	4.28	11	2.30	1.80	4.14	8
4.5 L x 1.5 W x 1.8 D	3.95	1.50	5.93	17	3.40	1.50	5.10	14
4.2 L x 2.0 W x 1.8 D	3.95	1.95	7.70	23	3.40	2.10	7.14	18
5.6 L x 2.0 W x 1.8 D	5.05	1.95	9.85	31	4.50	2.10	9.45	26
5.6 L x 2.4 W x 1.8 D	5.05	2.40	12.12	39	4.50	2.10	9.45	27
6.2 L x 2.4 W x 1.8 D	5.60	2.40	13.44	44	4.50	2.40	10.80	33

Table 3: Standard Stormwater360 Vault Dimensions

Land Use	TSS (kg/ha/yr)
Road	281 - 723
Commercial	242 - 1369
Residential (low)	60 - 340
Residential (high)	97 - 547
Terraced	133 - 755
Bush	26 - 146
Grass	80 - 588
Roof	50-110 *(1)*
Pasture	103 - 583

Table 4: Suggested TSS loads [3]

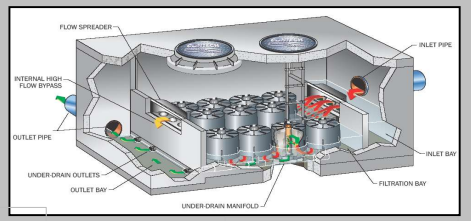


Figure 3: StormFilter Vault Cutaway

References

1. Derived from Stormwater Management Inc., Technical Publication PD-04-002.0
2. Contech Stormwater Solutions, StormFilter Product Design Manual.
3. Table 4-4, Technical Publication 10, 2nd Edition, May 2003, Auckland Regional Council

LDE
engineers • scientists

MEMORANDUM

To:	Waka Kotahi New Zealand Transport Agency
From:	Riaan de Swardt
Copy:	Neil Douglas; Sven Wright c/o Avail Pacific
Subject:	Flooding Volume Assessment in Relation to the Oruaiti School Carpark Upgrades
Date:	5/11/2024
Project Ref:	21102
Document ID:	531680
Revision Status:	01
Reviewer:	Neil Douglas

1 BACKGROUND

It is proposed to undertake various upgrades to the existing carpark at Oruaiti School, which is located at 2554 State Highway 10, Mangonui. The upgrades are proposed to provide additional carparks, a dedicated bus lane to facilitate the safe drop off and pick up of children from the school, and to address various safety concerns of the existing carpark. It is intended to not only upgrade the carpark, but to improve the existing stormwater system by introducing devices that will treat stormwater run-off prior to discharge into the lower laying Oruaiti School Environmental Wetlands and Oruaiti River.

This memorandum has been prepared to address concerns from Waka Kotahi New Zealand Transport Agency (WK NZTA) about the increase in stormwater run-off volume from the increased impervious area which will be created as part of the carpark upgrades. These concerns are required to be addressed, prior to WK NZTA issuing a license to occupy, due to a portion of the proposed works being within their property boundaries. The site is located within the 10-Year, 50-Year, and 100-Year flood hazard zones. WK has indicated that they are concerned about the increase in stormwater run-off volume being generated, and how this will affect the flood levels during the various storm events mentioned above.

WK NZTA have requested an assessment of the effects of the increased impervious area on flood depths, in particular if the increase in flood depth across the State Highway corridor is negligible or if there is a significant adverse impact.

In addition to the information that will be provided below, this memorandum should be read in conjunction with all other relevant documents relating to the proposed carpark upgrades. These include, but is not limited to:

- Stormwater Neutrality Report by LDE Ltd
- Detailed Design Set of Engineering Drawings by LDE Ltd

2 SITE LOCATION

Oruaiti School is a primary and intermediate school, catering for students from year one to year eight, and is located at 2554 State Highway 10, Mangonui. The legal description of the site is Pt Allot 18A PSH OF Mangonui East with an area of 41,600 m2. The site is located approximately 8km east of the Mangonui township. See figures below.

Figure 1: Aerial photo of the subject site (indicative boundary in red) sourced from NRC Hazards Maps showing the school and parking area, Oruaiti River, and State Highway 10.

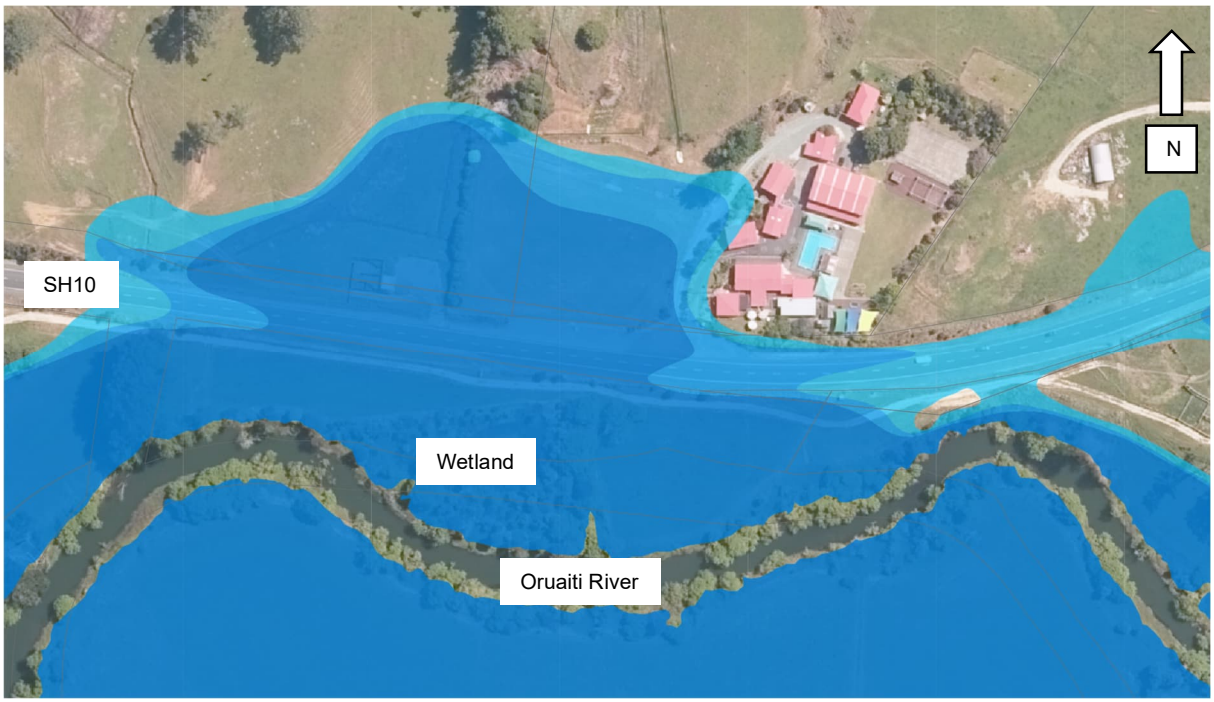


Figure 2: 10-Year, 50-Year and 100-Year River Flood Hazard Zones – Regionwide Models. (NRC Hazards Maps)

3 PROPOSED DEVELOPEMENT

The school's carpark currently faces numerous health and safety risk for anyone visiting the school. The carpark is located along the frontage of the school and SH10. Vehicles leaving the carpark are at times forced to back into the state highway with traffic approaching from the east and west at speeds of around 100km/h.

The development proposal, as discussed and agreed to by the school, is to upgrade the carpark in order to make it safer for vehicles and pedestrians. The design approach is to provide a dedicated entrance to and exit from the school, with a separate dedicated lane for cars and busses. There will also be a turning lane incorporated for vehicles coming from the west and turning left off SH10 into the carpark.

Stormwater run-off from the school is currently collected and conveyed to the south via a series of existing pipes and structures prior to discharge to the 900Ø concrete pipe culvert beneath SH10. This culvert then discharges into the Oruaiti School Environmental Wetlands.

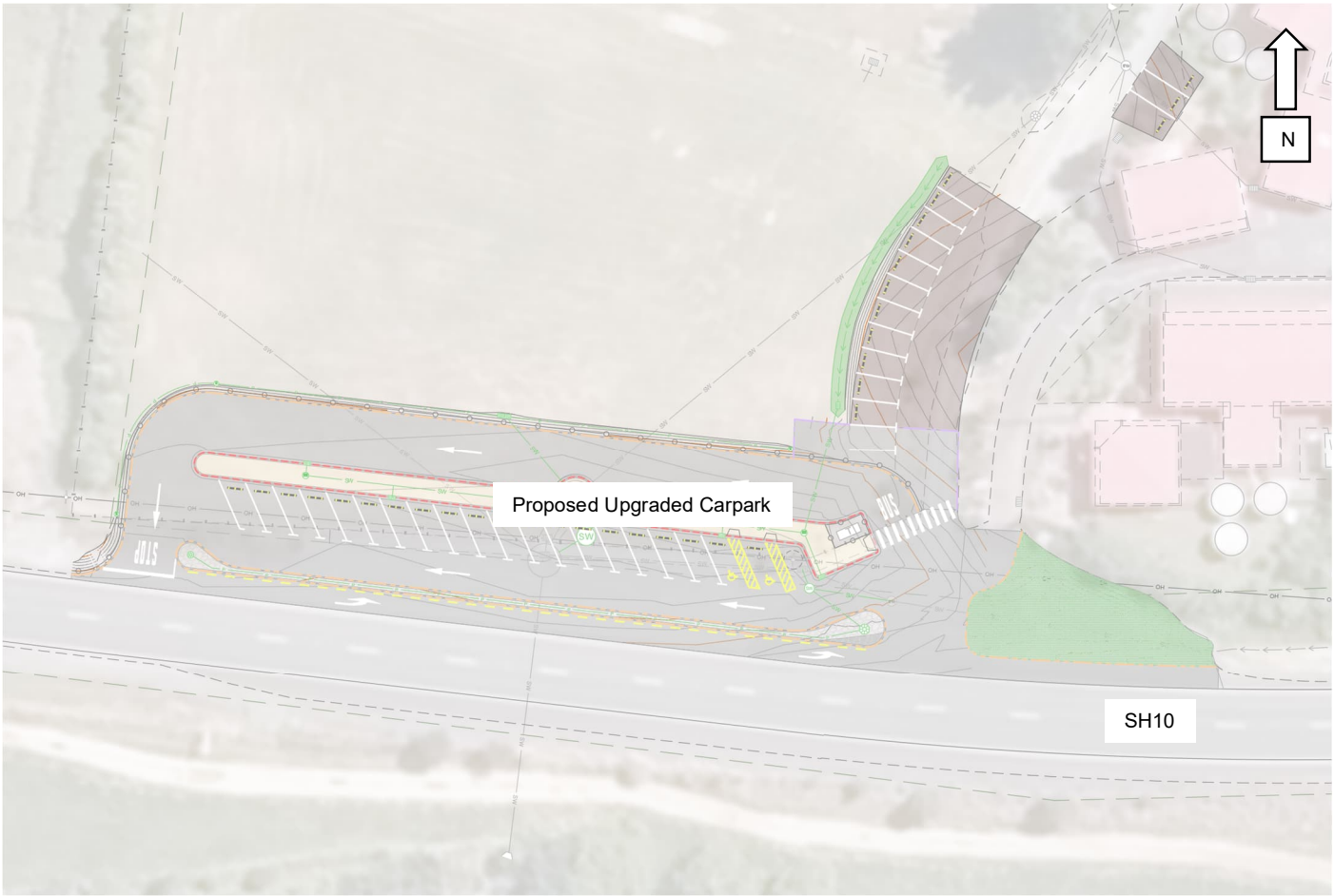


Figure 1: Proposed layout of upgraded carpark and wetland location. Source: LDE Drawings

4 DESKTOP STUDY SUMMARY

4.1 Existing Flood Levels and Flow Depths

At the request of WK NZTA we have undertaken additional assessment of the flooding within the State Highway corridor outside of Oruaiti School. The desired result of the flooding volume assessment will be to determine the potential flood level increase during a 10-Year storm event, due to the increased stormwater run-off volume being generated from the proposed upgrades.

Prior to undertaking this assessment, the level and depth information for the different flood scenarios were sourced from Northland Regional Council's (NRC) River and Natural Hazards department. A flood level report was issued by the NRC, which provided the flood levels for during 10-Year, 50-Year, and 100-Year storm events. A summary of the levels is provided below, with the detailed report appended to this memo.

- 10-Year: RL 4.93m
- 50-Year: RL 5.99m
- 100-Year: RL 7.38m

The flood level information was used and incorporated into LDE's modelling software in order to generate a cross section through the site to determine the potential flow depths during each storm event. The results are shown below and are also appended to this memo.

- 10-Year Flow Depth: 270mm
- 50-Year Flow Depth: 1330mm
- 100-Year Flow Depth: 2720mm

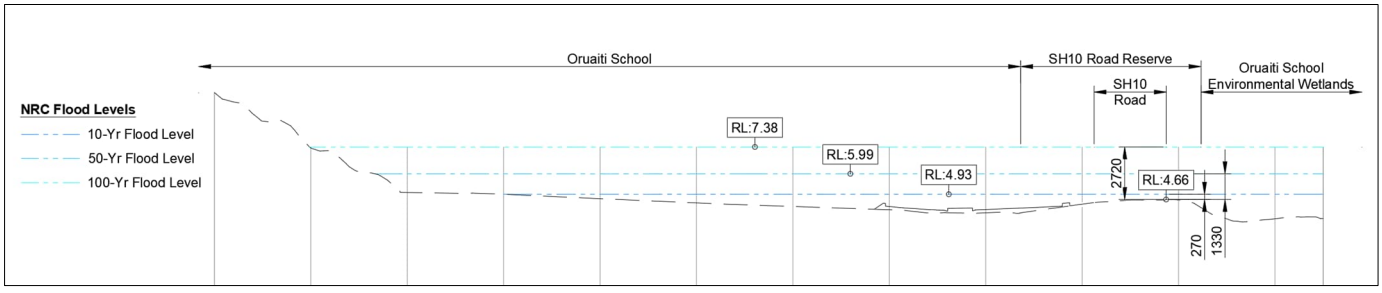


Figure 4: Cross Sectional Elevation showing the EGL, FGL, and Flood Levels. Source: LDE Drawings

4.2 Proposed Flood Levels and Flow Depth Post Development

The appended Stormwater Neutrality Report by LDE Ltd, outlines the pre- and post-development peak run-off volume analysis for the entire catchment area, as well as flow volumes form the proposed development. A summary of these volumes is provided below.

Table 1: Pre- and Post Development catchment areas and peak run-off flow rates

Catchment Assessment				
Storm Event	**Drainage Area (ha)**	**Pre-Development Peak Discharge (m^3/s)**	**Post-Development Peak Discharge (m^3/s)**	**Increase (m^3/s)**
10-Year*	10.0	0.563	0.738	0.175
100-Year	10.0	1.058	1.355	0.277

**Additional modelling was undertaken to determine the 10-Year flows using HEC-HMS software.*

It is important to note that the above-mentioned flow volumes are relative to the entire 10ha catchment area, including a 20% climate change factor, and not just the increase in flows form the upgraded carpark. The volumes were determined by conservatively estimating pervious and impervious areas within the catchment to be 90% pervious and 10% impervious. Of the total catchment, only 3% (0.3ha) is impervious area associated with the proposed carpark. Therefore, it is considered that the extended carparks contribution to the flows is negligible, and that any affect will be less than minor.

In order to determine the potential change in flow depth during the 10-Year and 100-Year storm events within the SH10 corridor itself. As a result of the significant size of the flood hazard zone, a conservative area up to the southern boundary of SH10 adjacent to the school has been selected to calculate the depth.

Given the size of the flood zone and the proximity to the Oruaiti River, we have assumed that once floodwaters breach SH10 any additional water entering the 'system' from the upstream catchment will immediately disperse downstream as there are no natural or man-made features to prevent it from doing so.

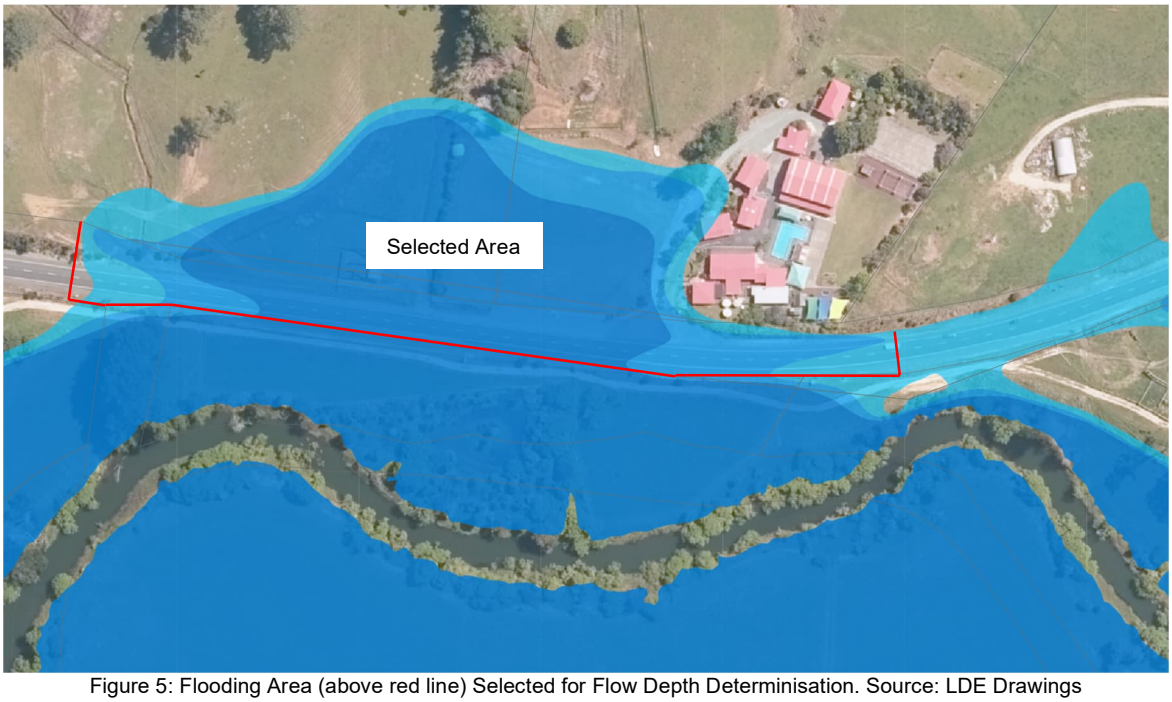


Figure 5: Flooding Area (above red line) Selected for Flow Depth Determinisation. Source: LDE Drawings

In order to determine the level increase of flood water, we have taken the additional volume of run-off within the flood plain as a result of the development (and climate change) and divided by the area of the flood plain.

- 10-Year: $175m^3 \div 12{,}800m^2$ = **13.6 mm ≈ 14mm**
- 100-Year: $277m^3 \div 21{,}400m^2$ = **12.9 mm ≈ 13mm**

In summary, the potential change in flow depth during a 10-Year storm event for the entire catchment area (conservatively assumed to be bounded by SH10) including climate change factors, is only **14mm**. If a larger catchment area was utilised, the depth of flooding would be even less significant. With the additional 14mm included on top of the existing flow depth determined by the NRC, the total flow depth will be **284mm**. At our most recent meeting on the 4th October 2024, WK NZTA stated that provided the depth of floodwater during the 10-year event did not increase above **300mm** that the proposal would be supported and deemed acceptable.

In conclusion, it is the opinion of LDE Ltd that the proposed development and increase in flow depth is negligible and in accordance with what was deemed acceptable by WK NZTA.

5 LIMITATIONS

This report should be read and reproduced in its entirety including the limitations to understand the context of the opinions and recommendations given.

This report has been prepared exclusively for Oruaiti School Board of Trustees c/o Avail Pacific in accordance with the brief given to us or the agreed scope and they will be deemed the exclusive owner on full and final payment of the invoice. Information, opinions, and recommendations contained within this report can only be used for the purposes with which it was intended. LDE accepts no liability or responsibility whatsoever for any use or reliance on the report by any party other than the owner or parties working for or on behalf of the owner, such as local authorities, and for purposes beyond those for which it was intended.

This report was prepared in general accordance with current standards, codes and best practice at the time of this report. These may be subject to change.

For and on Behalf of Land Development and Engineering Ltd

Prepared by:

Riaan de Swardt

Civil Designer

Reviewed by:

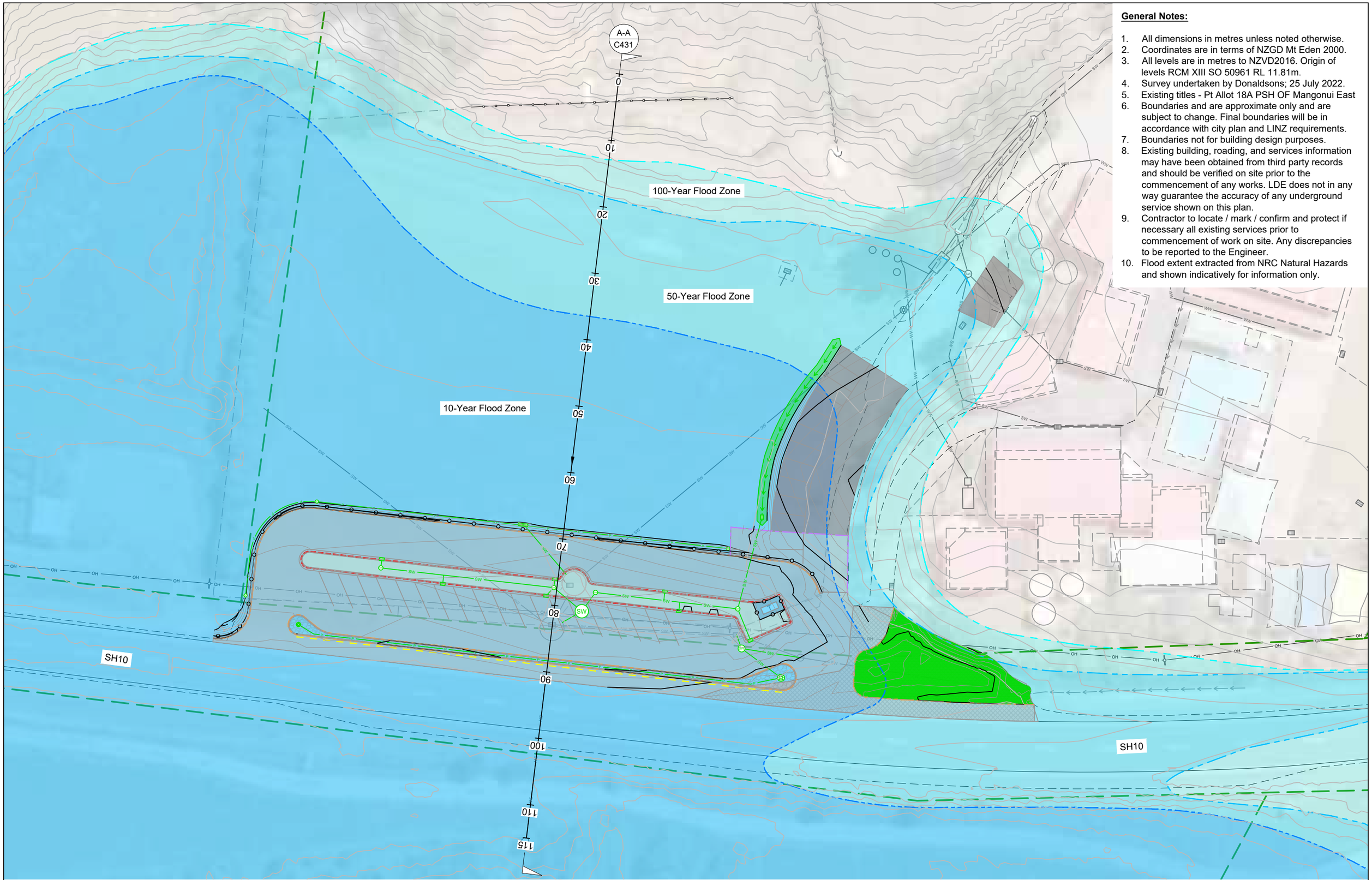
Neil Douglas

Civil Manager – Rodney/Kaipara/Northland

APPENDICES

APPENDIX A: LDE ENGINEERING DRAWINGS
APPENDIX B: NRC FLOOD REPORT (REGIONWIDE MODEL)
APPENDIX C: LDE STORMWATER REPORT

APPENDIX A
LDE ENGINEERING DRAWINGS



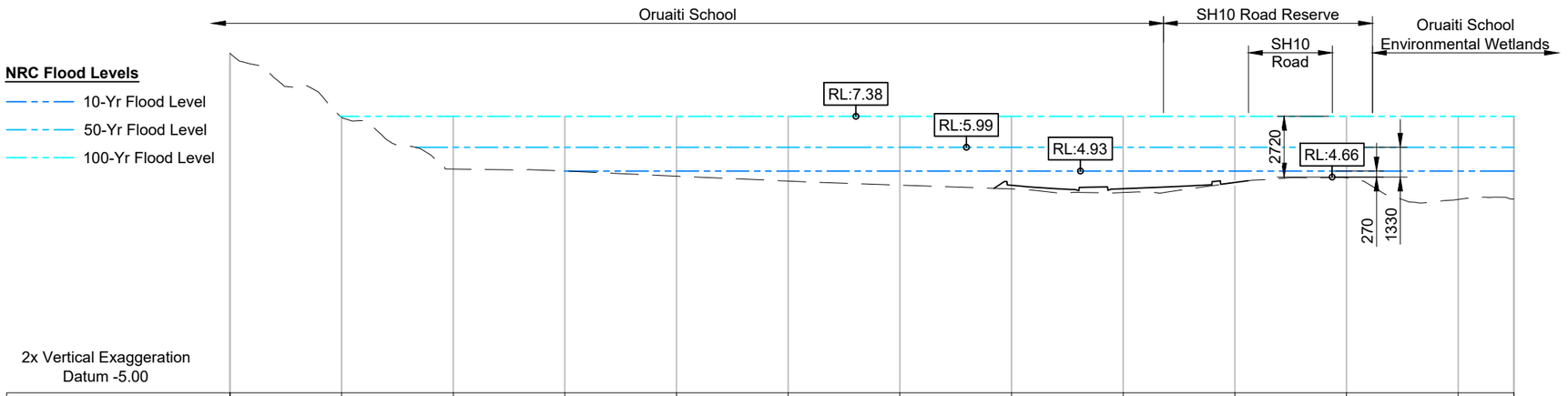
General Notes:

1. All dimensions in metres unless noted otherwise.
2. Coordinates are in terms of NZGD Mt Eden 2000.
3. All levels are in metres to NZVD2016. Origin of levels RCM XIII SO 50961 RL 11.81m.
4. Survey undertaken by Donaldsons; 25 July 2022.
5. Existing titles - Pt Allot 18A PSH OF Mangonui East
6. Boundaries and are approximate only and are subject to change. Final boundaries will be in accordance with city plan and LINZ requirements.
7. Boundaries not for building design purposes.
8. Existing building, roading, and services information may have been obtained from third party records and should be verified on site prior to the commencement of any works. LDE does not in any way guarantee the accuracy of any underground service shown on this plan.
9. Contractor to locate / mark / confirm and protect if necessary all existing services prior to commencement of work on site. Any discrepancies to be reported to the Engineer.
10. Flood extent extracted from NRC Natural Hazards and shown indicatively for information only.

Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific	Project: 2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Drawing Title: Stormwater Flooding Assessment	LDE engineers • scientists	Design: R. de Swardt	Project status: For Consent	
				Drawn: R. de Swardt	Project: 21102	
				Approved: N. Douglas	Drawing No: C430	Issue/Rev: A
				Scale A3: 1:500		

No.	Issue/Revision	Aprvd	Date
A	Issued with Memorandum	H. D	1 Nov 2024



Existing Levels	7.38	7.38	7.38	7.38	7.38	7.38	7.38	7.38	7.38	7.38	7.38	7.38
Chainage 0.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	100.00	110.00	115.00

Long Section - FLOODING SECTION A-A

Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific

Project: 2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

Drawing Title: Flooding Section

engineers • scientists

No.	Issue/Revision	Aprvd	Date
A	Issued with Memorandum	H. D	1 Nov 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	N. Douglas
Scale A3:	1:500

Project status: For Consent
Project: 21102
Drawing No: C430
Issue/Rev: A

APPENDIX B
NRC FLOOD REPORT (REGIONWIDE MODEL)

Flood Level Report

Northland REGIONAL COUNCIL
Te Kaunihera ā rohe o Te Taitokerau

Parcel ID: 4901722

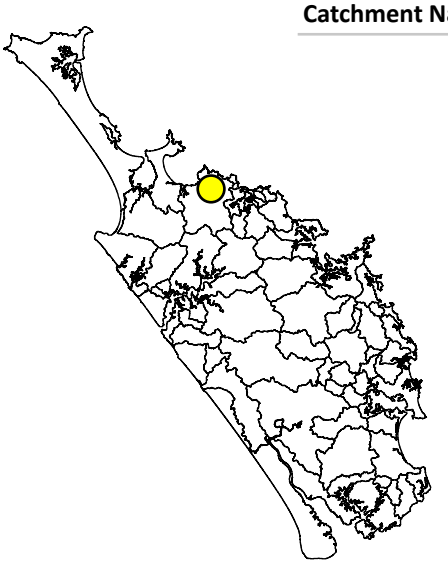
Title:

Appellation: Part Allot 18A PSH OF Mangonui East

Survey Area: 53,497 m²

Catchment Name(s)

Oruru



Date Exported: 10/10/2024

Report Reference: 20241010_084716

Useful Flood Information Definitions

Annual Exceedance Probability (AEP) - The probability of a flood event of a given size occurring in any one year, usually expressed as a percentage annual chance.

1% AEP - A flood of this size or larger has a 1 in 100 chance or a 1% probability of occurring in any year.
2% AEP - A flood of this size or larger has a 1 in 50 chance or a 2% probability of occurring in any year.
5% AEP - A flood of this size or larger has a 1 in 20 chance or a 5% probability of occurring in any year.
10% AEP - A flood of this size or larger has a 1 in 10 chance or a 10% probability of occurring in any year.

NZVD2016 - New Zealand Vertical Datum - The reference level used in our flood models to define ground level.
Flood Levels - Flood levels are used from our modelled flood level rasters. The flood levels are calculated above NZVD 2016 Datum.
Climate Change (CC) - NZCPS (2010) requires that the identification of coastal hazards includes consideration of sea level rise over at least a 100-year planning period. Climate change impacts, such as increased rain intensity, have been included in the flood scenarios. You can read more about the Climate Change forecasts included in each flood model in the technical reports on the NRC website.
Mean high water spring (MHWS) - describes the highest level that spring tides reach, on average.

Coastal Flood Hazard Zones (CFHZ)

Coastal flood hazard zones are derived using a range of data including tide gauge analysis, wind and wave data and models, and use empirical calculations to estimate extreme water levels around the coastline. The calculations include projected sea level rise scenarios based on the latest Ministry for the Environment guidance.

CFHZ 0 Coastal Flood Hazard Zone 0 - area currently susceptible to coastal inundation (flooding by the sea) in a 1-in-100 year storm event
CFHZ 1 Coastal Flood Hazard Zone 1 - an area susceptible to coastal inundation (flooding by the sea) in a 1-in-50 year storm event, taking into account a projected sea-level rise of 0.6m over the next 50 years
CFHZ 2 Coastal Flood Hazard Zone 2 - an area susceptible to coastal inundation (flooding by the sea) in a 1-in-100 year storm event, taking into account a projected sea-level rise of 1.2m over the next 100 years
CFHZ 3 Coastal Flood Hazard Zone 3 - an area susceptible to coastal inundation (flooding by the sea) in a 1-in-100 year storm event, taking into account a projected sea-level rise of 1.5m over the next 100 years (rapid sea level rise scenario)

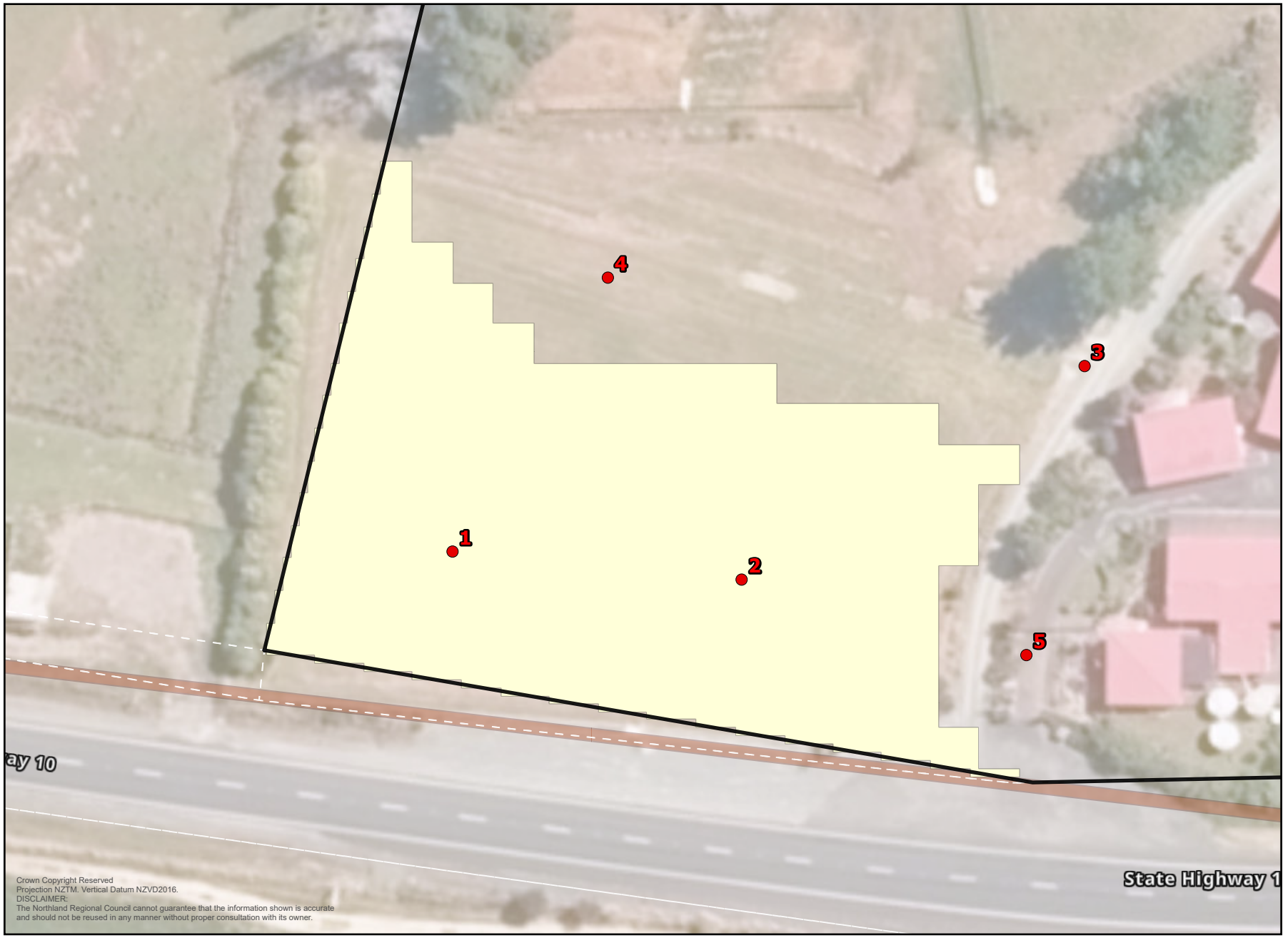
REGIONWIDE and PRIORITY - RIVER FLOOD HAZARD ZONES (RFHZ)

River flood hazard zones are created to raise awareness of where flood hazard areas are identified, inform decision-making and to support the minimisation of the impacts of flooding in our region. The river flood hazard zones have been created using an assessment of best current available information, engaging national and international experts in the field, using national standards and guidelines and has been peer reviewed. This will provide a good indication of the areas at potential risk of flooding from a regional perspective. However, flood mapping is a complex process which involves some approximation of the natural features and processes associated with flooding.

River Flood Hazard Zone 1 – 10% AEP flood extent: an area with a 10% chance of flooding annually
River Flood Hazard Zone 2 – 2% AEP flood extent: an area with a 2% chance of flooding annually
River Flood Hazard Zone 3 – 1% AEP flood extent: an area with a 1% chance of flooding annually with the inclusion of potential Climate Change (CC) impact

River Flooding

10 Year



Maximum	Minimum
4.98 m	4.93 m

Max Min flood levels are for the raster extent shown on the map

10 Year

m NZVD

4.78 - 4.98

Parcel

Flood Level Point

Label	Level
1	4.93 m
2	4.93 m
3	0 m
4	0 m
5	0 m

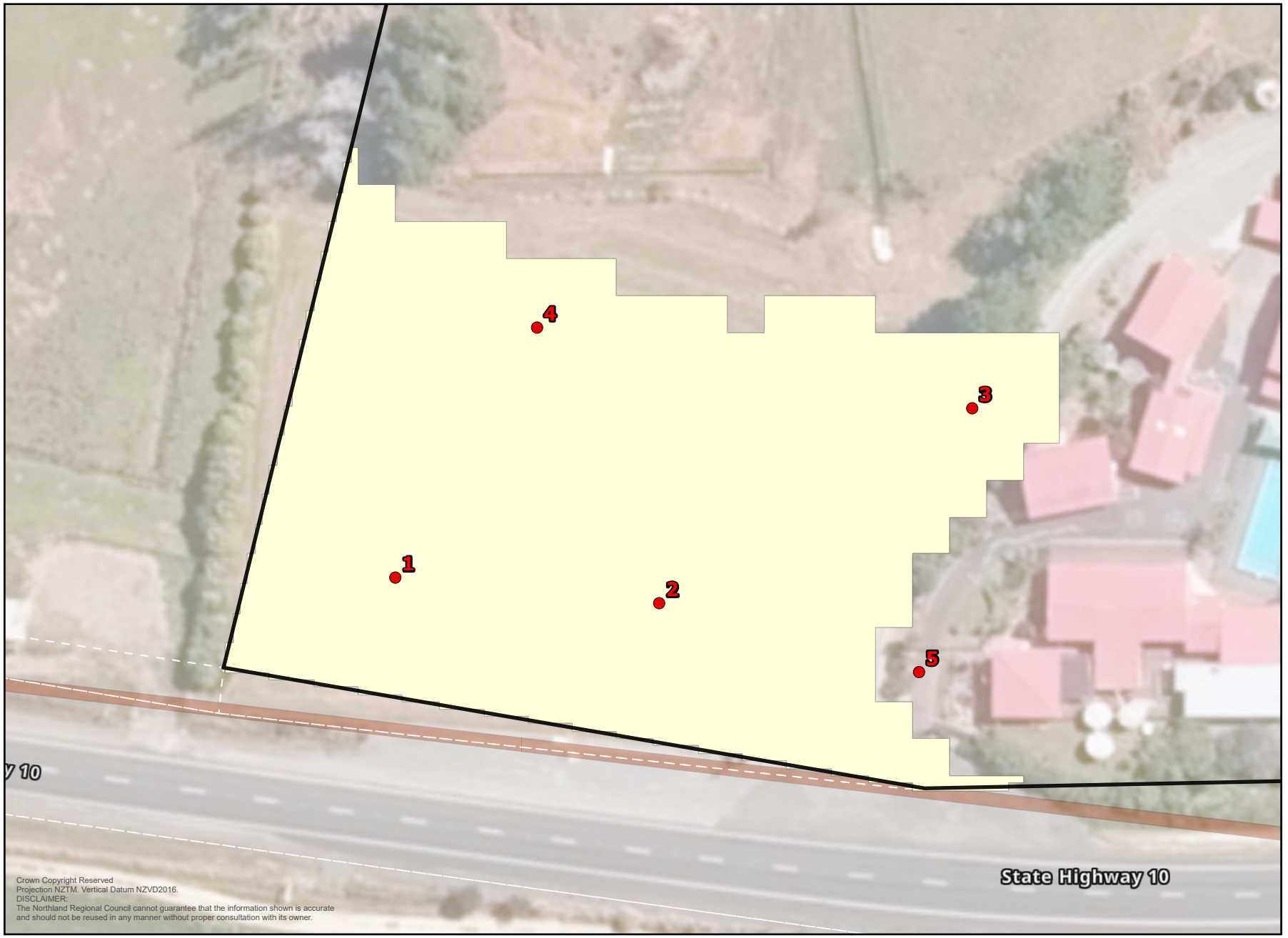
N

0 12.5 25 50 75 m

Report Reference: 20241010_085014

River Flooding

50 Year



Maximum	Minimum
6.12 m	5.99 m

Max Min flood levels are for raster extent shown on the map

50 Year

m NZVD

5.92 - 6.12

Parcel

Flood Level Point

Label	Level
1	5.99 m
2	5.99 m
3	5.99 m
4	5.99 m
5	0 m

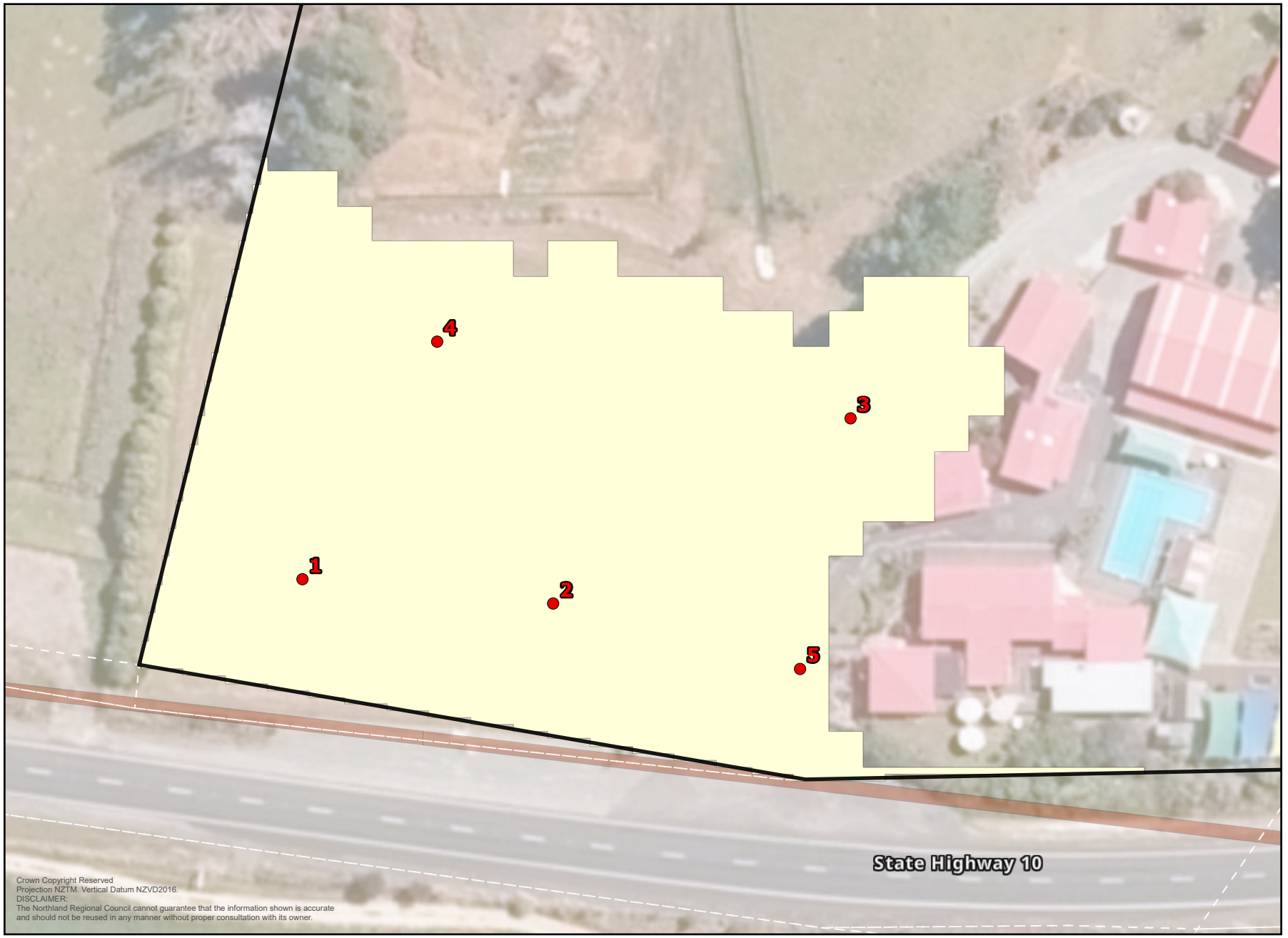
N

0 12.5 25 50 75 m

Report Reference: 20241010_085014

River Flooding

100 Year + CC



Maximum	Minimum
7.55 m	7.38 m

Max Min flood levels are for raster extent shown on the map

100 Year + CC

m NZVD

7.35 - 7.55

Parcel

Flood Level Point

Label	Level
1	7.38 m
2	7.38 m
3	7.38 m
4	7.38 m
5	7.38 m

N

0 12.5 25 50 75 m

Report Reference: 20241010_085014

Disclaimers

Our modelling disclaimers are linked below:
https://www.nrc.govt.nz/media/ko2dkgxn/coastal-hazard-maps-disclaimer-june-2017.pdf
https://www.nrc.govt.nz/media/cqnnw12y/flood-map-disclaimer-2021.pdf

Our regionwide modelling reports are linked below:
https://www.nrc.govt.nz/environment/river-flooding-and-coastal-hazards/river-flooding/river-flood-hazard-maps/regionwide-river-catchments-analysis-technical-reports

ARE YOU FLOOD READY?

01

Know your risk

Check what potential flood risks and other hazards that may impact your property.

The Natural Hazards Portal is a great place to start. It's a 'one-stop-shop' of information related to natural hazards within our region: www.nrc.govt.nz/environment/natural-hazards-portal

The Environmental Data Hub provides river level and flow data, as well as warning levels, rainfall data, water quality, and more: www.nrc.govt.nz/environment/environmental-data/environmental-data-hub

02

Have a plan

Make sure you have an evacuation plan, emergency kit and important phone numbers ready. Check out: https://getready.govt.nz/en/prepared/ for tips on how to get ready.

03

Stay up to date

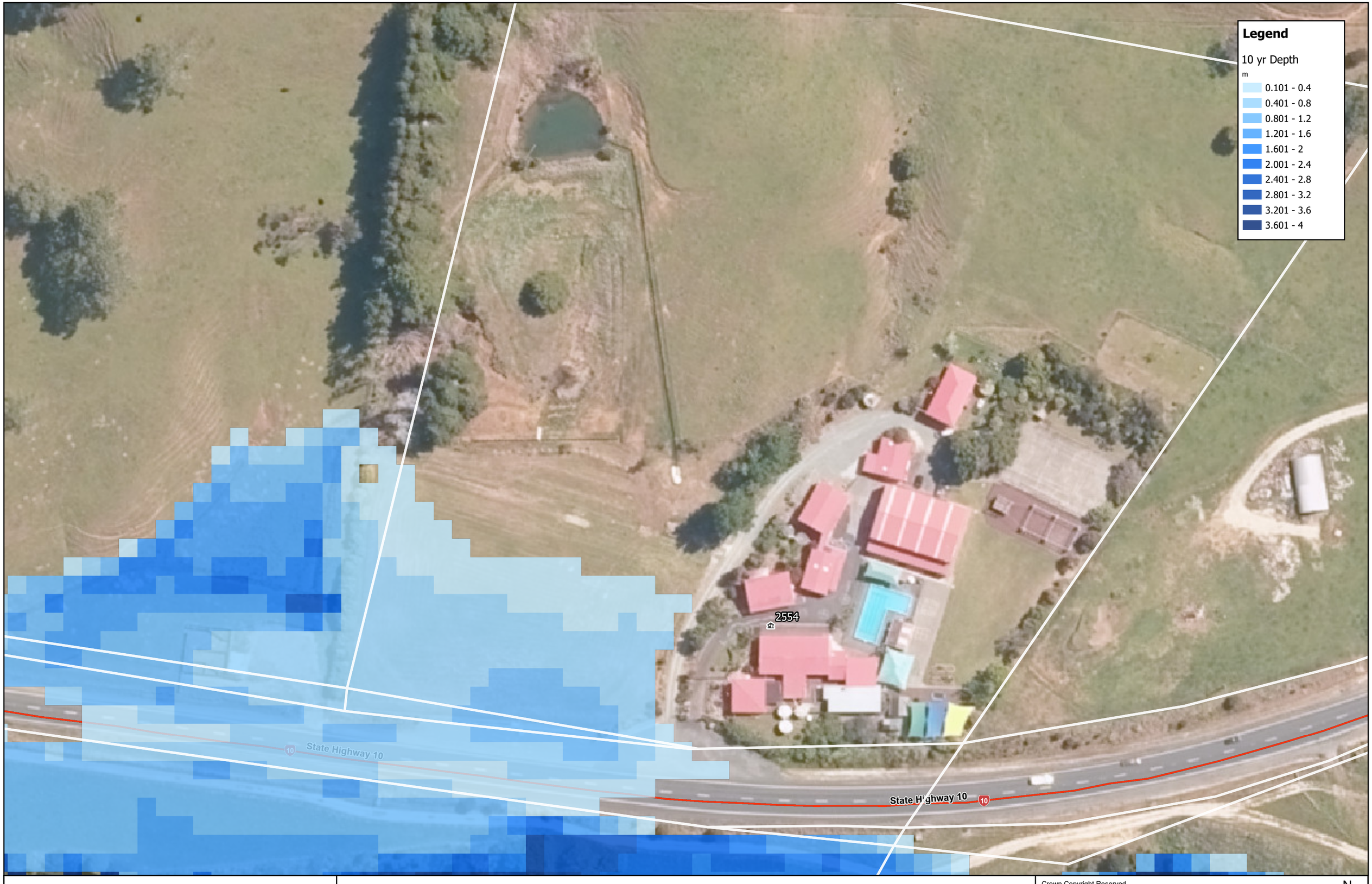
In a civil defence emergency situation, follow the updates on the Northland CDEM Group's Facebook page: www.facebook.com/civildefencenorthland

Or follow updates from the embedded feed on the regional council website: www.nrc.govt.nz/civildefence

04

In an emergency

Remember, if life is threatened dial 111 to contact emergency services.



Northland REGIONAL COUNCIL
Te Kaunihera ā rohe o Te Taitokerau

2554 State Highway 10, Mangonui

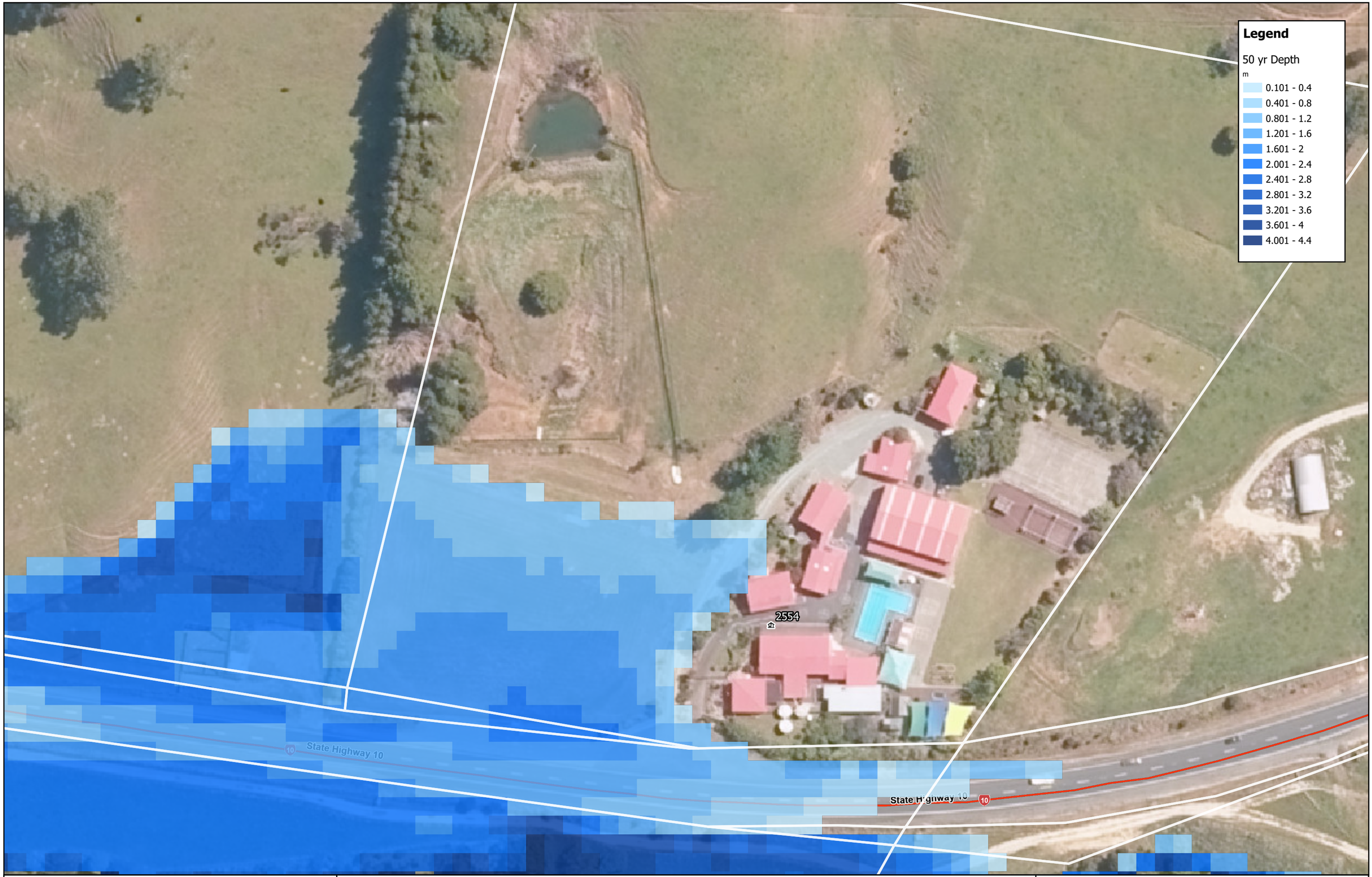
10 Year River Flood (Regionwide Model) Depth Results in 0.4m intervals
Scale: 1:900

Projection NZTM. Datum NZTM2000.
DISCLAIMER:
The Northland Regional Council cannot guarantee that the information shown is accurate and should not be reused in any manner without proper consultation with its owner.

N

0 17.5 35 70
Meters

October 14 2024



Northland REGIONAL COUNCIL
Te Kaunihera ā rohe o Te Taitokerau

2554 State Highway 10, Mangonui

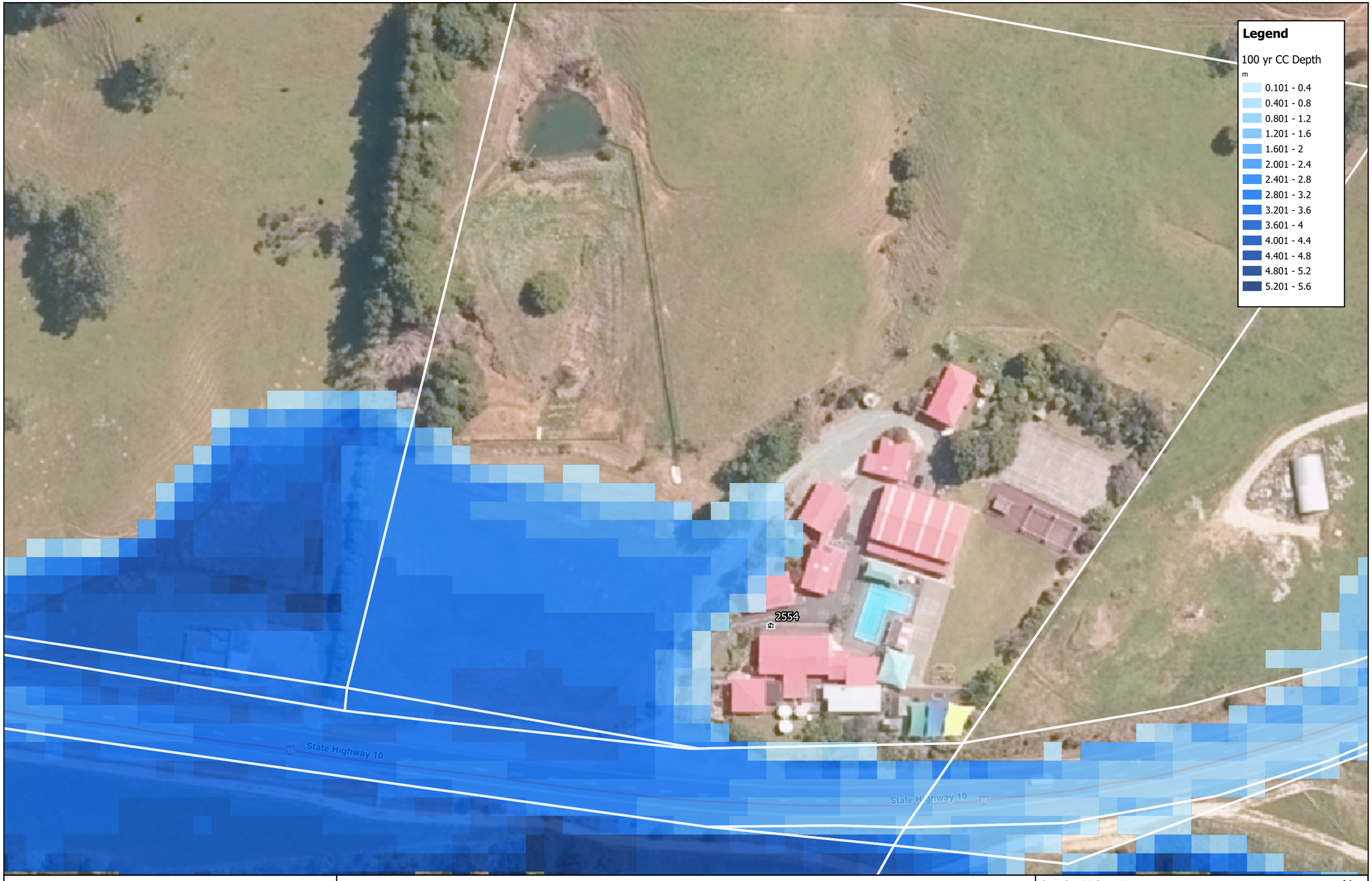
50 Year River Flood (Regionwide Model) Depth Results in 0.4m intervals
Scale: 1:900

Projection NZTM. Datum NZTM2000.
DISCLAIMER:
The Northland Regional Council cannot guarantee that the information shown is accurate and should not be reused in any manner without proper consultation with its owner.

N

0 17.5 35 70 Meters

October 14 2024



Northland REGIONAL COUNCIL
Te Kaunihera ā rohe o Te Taitokerau

2554 State Highway 10, Mangonui

100 Year CC River Flood (Regionwide Model) Depth Results in 0.4m intervals
Scale: 1:900

Projection NZTM. Datum NZTM2000.
DISCLAIMER:
The Northland Regional Council cannot guarantee that the information shown is accurate and should not be reused in any manner without proper consultation with its owner.

N

0 17.5 35 70 Meters

October 14 2024

APPENDIX C
LDE STORMWATER REPORT

Oruaiti School Board of Trustees c/o Avail Pacific

STORMWATER NEUTRALITY REPORT

2554 State Highway 10, Mangonui

Project Reference: 21102
June 10, 2024

DOCUMENT CONTROL

Version	Date	Comments
A	1 May 2024	Issued for Consent
B	10 June 2024	Compliance Assessment Included – Issued for Consent

Version	Issued For	Prepared By	Reviewed & Authorised By
B	Issued for Consent	 Riaan De Swardt Civil Designer *MEngNZ*	 Helena Dubinko Senior Civil Engineer *MEng (Civil), MEngNZ*

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APPENDIX A: HEC-HMS MODEL AND RESULTS
APPENDIX B: ENGINEERING DRAWINGS
APPENDIX C: SUPPLIER INFORMATION AND TECHNICAL DRAWINGS

1 PROJECT DESCRIPTION

LDE Ltd was engaged by Avail Pacific on behalf of the Oruaiti School Board of Trustees to undertake a stormwater neutrality design related to upgrade of the existing carpark located at 2554 State Highway 10, Mangonui.

The purpose of this report is to determine appropriate stormwater management devices and treatment of the first flush relating to the upgrades. This report has been prepared to support a resource and building consent application.

Figure 1: Site location in relation to the surrounding Mangonui suburbs. Aerial sourced from NRC Hazard Maps

2 SITE DESCRIPTION

Oruaiti School is a primary and intermediate school, catering for student from year one to year eight, and is located at 2554 State Highway 10, Mangonui. The legal description of the site is Pt Allot 18A PSH OF Mangonui East with an area of 41,600 m^2. The site is located approximately 8km east of the Mangonui township.

The school site contains an admin office, classrooms, a gym, playground, and pool, with existing gravel and asphalt accessways. An existing carpark is located along the frontage of the school on the northern side of the SH10. The school currently has approximately >190 students and 15 staff members. The students are dropped off and picked-up from the carpark by busses and parents in vehicles. See figure 2 below.

Figure 2: Aerial photo of the subject site (indicative boundary in red) sourced from NRC Hazards Maps showing the school and parking area, Oruaiti River, and State Highway 10.

3 PROPOSED DEVELOPMENT

The school's carpark currently faces numerous health and safety risk for anyone visiting the school. The carpark is located along the frontage of the school and SH10. Vehicles leaving the carpark are at times forced to back into the state highway with traffic approaching from the east and west at speeds of around 100km/h.

The development proposal as discussed and agreed to by the school, is to upgrade the carpark in order to make it safer for vehicles and pedestrians. The design approach is to provide a dedicated entrance to the school and exit from the school, with a separate dedicated lane for cars and busses. There will also be a turning lane incorporated for vehicles coming from the west and turning left into the carpark.

There is currently some existing stormwater pipes and structures collecting and conveying runoff to the south via a 900Ø concrete pipe culvert, discharging into the Oruaiti School Environmental Wetlands.

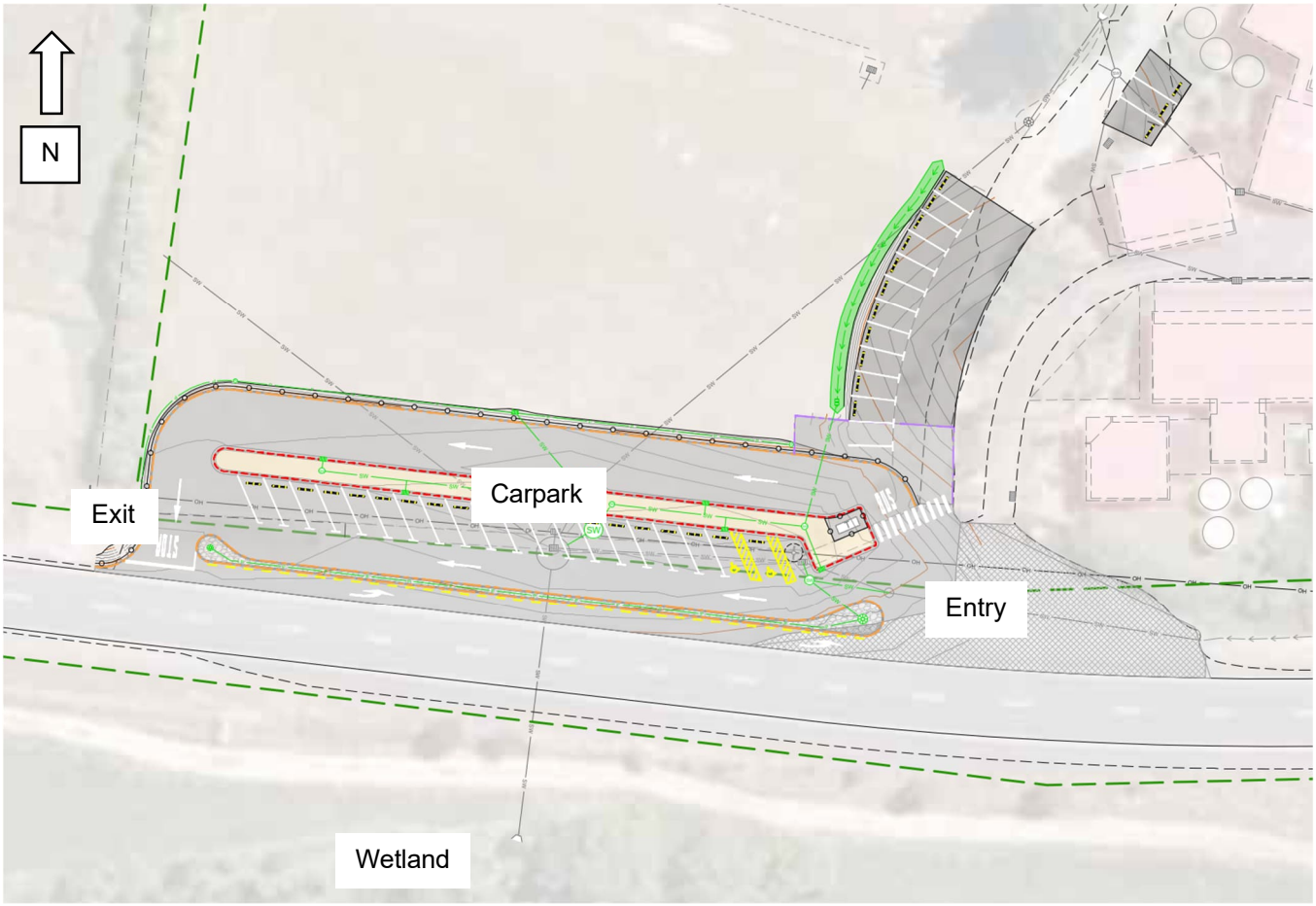


Figure 3: Proposed layout of upgraded carpark and wetland location. Source: LDE Drawings

4 Existing Flow Regime & Downstream Flooding

A desktop study was undertaken to determine and identify a catchment area of approximately 10ha, flowing from the north towards the south. 3D Modelling software was used to process LINZ DEM data and build an existing ground surface to determine approximate flow paths as indicated below. By utilizing the existing surface data and aerial imaging it was determined that the existing flows are conveyed by both natural and man-made channels throughout the catchment area. The channels connect into pipe culverts at various locations around the perimeter of the school, where the flows are conveyed to the discharge point.

During a site walkover undertaken by an Engineer from LDE in December 2023, some of the existing inlet structures and pipe culvert were identified. It appears that most of the over land flows are captured and conveyed to the discharge point via 2 x existing pipe culverts underneath the school's sport field. One Ø375mm PVC pipe culvert could be identified on site where it starts at a scruffy dome manhole and flows from the north-east towards the south-west. The second culvert's exact location and size is unknown, but from survey and historic site information, it is estimated that a Ø900mm concrete pipe originates from the neighbouring property to the west of the school and flows towards the south-east.

The culvert from the north-east connects into a concrete tank located in the southern edge of the sports field. Information from a drainlayer who installed the tank say that it is a 25,000L Underground Duracrete Tank. From here the tank is fitted with what is assumed to be a Ø900mm concrete outlet pipe, which connects to a second large underground structure directly downstream of the tank. The exact size and depth of this structure is unknown, but it is assumed that it is also a 25,000L underground tank. The second culvert from the north-west, connects into this second tank. From this tank it is assumed that a Ø900mm concrete pipe culvert crosses the State Highway and discharges into a downstream wetland, which continues to flow into the into the tidal zone of the Oruaiti River.

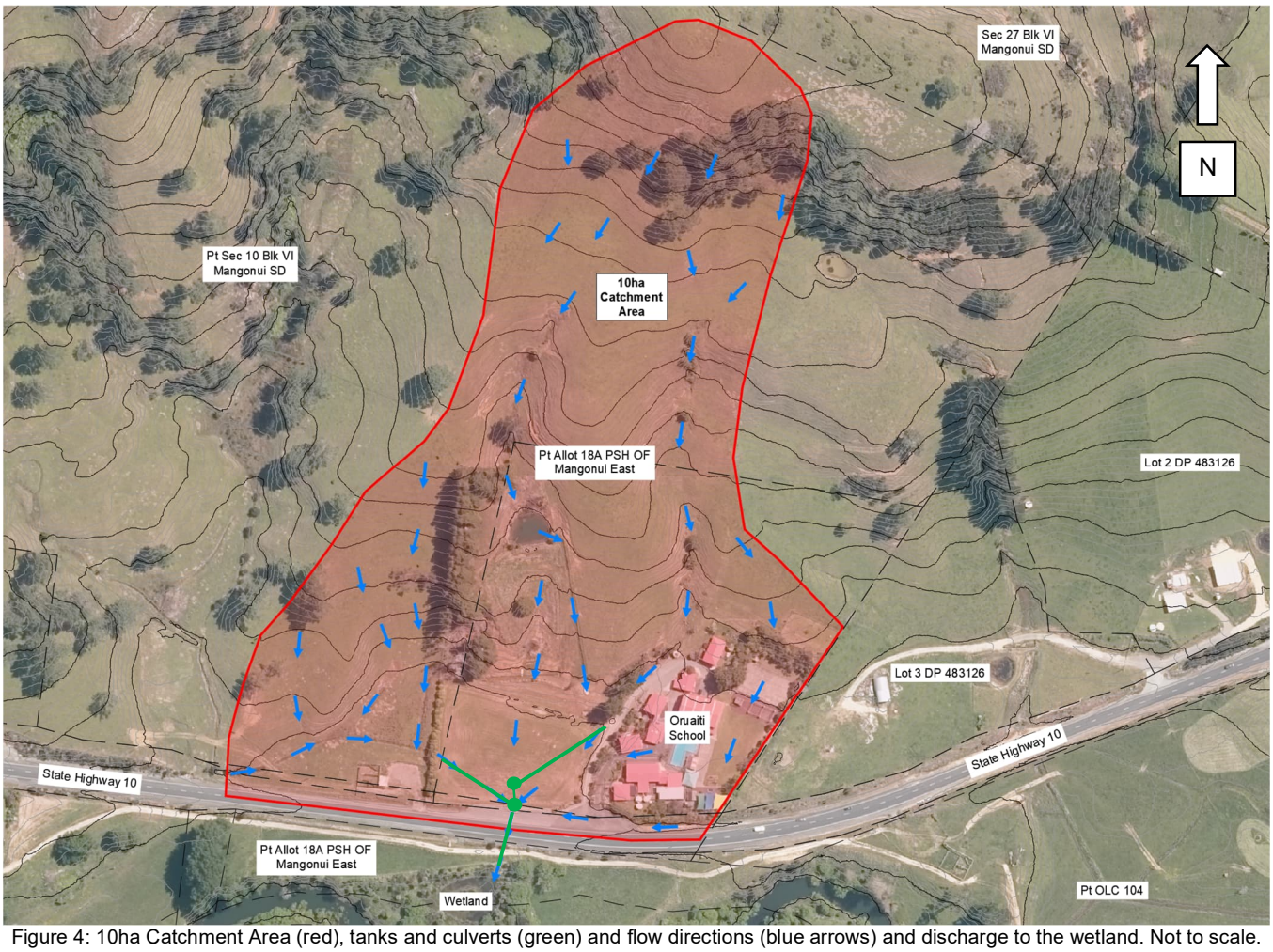


Figure 4: 10ha Catchment Area (red), tanks and culverts (green) and flow directions (blue arrows) and discharge to the wetland. Not to scale.

Photo 1: Scruffy dome and pipe culvert flowing from the north-east. (LDE Site Photo)

Photo 2: First underground concrete tank with inlet from the north-east cuvlvert. (LDE Site Photo)

Photo 3: First underground concrete tank flowing into second underground structure. (LDE Site Photo)

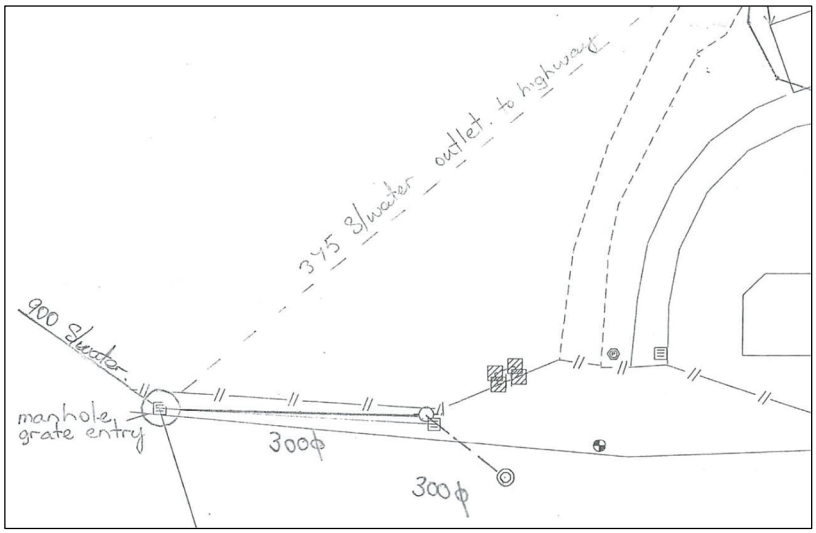


Figure 5: Historic site data indicating both culvert sizes. (Provided by the school)

As per Northland Regional Council Hazard Maps, the risk and extent of the river and coastal flooding is shown to occur downstream of the subject catchment area. The flooding maps can be seen in the figures below.

Figure 6: 10-Year, 50-Year and 100-Year River Flood Hazard Zones – Regionwide Models. (NRC Hazards Maps)

Figure 7: Current, 50 Years, 100Years and 100 Years + Rapid Sea Level Rise Scenario Coastal Flood Hazard Zones. (NRC Hazards Maps)

5 ATTENUATION REQUIREMENT

Due to the discharge of stormwater occurring into the tidal zone of the Oruaiti River (<RL 2.0m), the FNDC Engineering Standards; Dated May 2023, Table 4-1 of the standards is shown below and states that "*If the proposed stormwater discharge is into a tidal zone, then no attenuation is required.*"

Far North District Council Engineering Standards — Chapter 4: Stormwater and Drainage

Criteria	Design Parameter	When required
Flood Control (1% AEP event)	Detention required, limiting the post-development 1% AEP event flow rates to 80% of the pre-development 1% AEP event flow rates.	Where downstream flooding hazard has been identified. Where there is no CMP or site-specific SMP· 1. Refer to Flood Hazard Areas in the District Plan and any known downstream restrictions causing flooding.
Flow attenuation (Attenuation of the 50% and 20% AEP events)	Limit the post-development 50% and 20% AEP event flow rates to 80% of the pre-development flows through controlled attenuation and release.	Where there is no CMP or site-specific SMP· Catchment location dependent. Typically, always required in the upper catchment and sometimes not required where development site is located in proximity to the catchment outlet, discharging to a watercourse with sufficient network capacity, and where flow attenuation may worsen flooding hazards due to relative timing of peak flows. This is subject to assessment demonstrating no negative impacts would occur. If the proposed stormwater discharge is into a tidal zone, then no attenuation is required.

Figure 8: Extract from Table 4-1 of the FNDC Engineering Standards 2023

We have utilised HEC-HMS software to analyse the pre- and post-development runoff flows generated from the catchment area to determine if the existing Ø900mm concrete culvert under the road discharging into the wetland area has sufficient capacity to accommodate the increase in impervious area generated from the carpark upgrades. It was assumed that 10% of the upstream catchment area is impervious and 90% is pervious, as shown in Table 1 below. The impervious allocation includes the upgraded carpark areas in.

Table 1: Pre- and Post Development catchment areas and peak run-off flow rates

Pre-Development Catchment Assessment		
	Drainage Area (ha)	**Peak Discharge (m^3/s)**
Pervious	9.0	0.909
Impervious	1.0	0.151
Total	10.0	1.059
Post-Development Catchment Assessment		
	Drainage Area (ha)	**Peak Discharge (m^3/s)**
Pervious	9.0	1.175
Impervious	1.0	0.181
Total	10.0	1.356

Table below shows the parameters used in the HEC-HMS hydrological model of the catchment area using a 24-hr duration rainfall event with a SCS Type 1A storm profile and 20% Climate Change factor applied. A hydrological soil group, Class C, was adopted for the HEC-HMS model. The hydrological soil group was inferred based on the parameters set out in the FNDC engineering standards Table 4-3, with a time of concentration of 10 minutes.

Table 2: HEC-HMS model parameters

Land use, group C soils	**Runoff curve Number**	**Initial rainfall abstraction (mm)**
Permeable (Grass/Garden)	74	5
Impervious Pavement Area	98	0

The pre- and post-development peak runoff rate for a 1% AEP rainfall event amounts to 1.059 m^3/s and 1.356 m^3/s respectively for the entire catchment area, as shown in the HEC-HMS outputs in the Appendix. Hydraflow Express software was used to calculate the capacity of the existing culvert. The calculation parameters used was for a concrete pipe with an n-value or 0.013, laid at a grade of 0.75%, and flow rates of 1.059 m^3/s and 1.356m^3/s.

The results illustrate that the existing culvert has a pre-development flow depth of approximately 540mm, and a post-development flow depth of approximately 620mm, which results in an increased flow depth of 80mm. This indicates that the existing culvert will have sufficient capacity during a post-development 1% AEP rainfall event. Analyses results in the Appendix.

We consider that there are no downstream effects on other buildings or property as the flows are shown to be able to be entirely conveyed by the pipe network in the 1% AEP storm event. Therefore, there will be no effect from the increase in impermeable areas on the State Highway. Once flows reach the main river, the 15L/s increase is

negligible compared to the expected overall flows from the river catchment. Accordingly, we consider that no attenuation of new impermeable areas is required.

6 STORMWATER

6.1 Stormwater Analysis

We have utilised HEC-HMS software to analyse both the pre- and post-development scenarios. As stated in section 5 above, stormwater attenuation for the increase in impervious areas is not a requirement and therefore only stormwater treatment devices will be considered to minimise any increased adverse effects on the downstream wetland.

6.2 Analysis Parameters

The pre-development rainfall depths used in the stormwater analysis have been taken from the historical data from NIWA HIRDS V4. For post-development the rainfall has been increased by 20% to take climate change into account.

Table 3: NIWA HIRDS V4 Rainfall Data

Rainfall depths (mm):									
ARI	**AEP**	**10m**	**20m**	**30m**	**1h**	**2h**	**6h**	**12h**	**24h**
1.58	0.633	8.71	13.4	16.9	24.5	34.4	54.8	70.4	87.4
2	0.5	9.54	14.6	18.5	26.9	37.7	60.2	77.3	96
5	0.2	12.4	19	24.1	35	49.2	78.7	101	126
10	0.1	14.5	22.3	28.2	41.1	57.8	92.5	119	148
20	0.05	16.7	25.7	32.5	47.3	66.7	107	138	172
30	0.033	18	27.7	35.1	51.1	72	116	149	186
40	0.025	18.9	29.1	36.9	53.8	75.9	122	157	196
50	0.02	19.6	30.3	38.4	56	78.9	127	163	204
60	0.017	20.3	31.2	39.5	57.7	81.4	131	169	210
80	0.013	21.2	32.7	41.4	60.5	85.3	137	177	221
100	0.01	22	33.8	42.9	62.7	88.4	142	184	229
250	0.004	25	38.6	49	71.6	101	163	210	263

The pre- and post-development rainfall parameters used in HEC-HMS is shown in the table below.

Table 4: Rainfall Parameters

Rainfall Event	**Pre-development Rainfall (mm)**	**Post-development Rainfall**
50% AEP 24-hour	96	115.2
20% AEP 24-hour	126	151.2
1% AEP 24-hour	229	274.8

The table below shows the parameters used in the HEC-HMS hydrological model of the site. A hydrological soil group, Class C, was adopted for the HEC-HMS model. The hydrological soil group was inferred based on the parameters set out in the FNDC ES Table 4-3, with a time of concentration of 10 minutes.

Table 5: HEC-HMS model parameters

Land use, group C soils	Runoff curve Number	Initial rainfall abstraction (mm)
Permeable (Grass/Garden)	74	5
Impervious Pavement Area	98	0

A summary of pervious and impervious areas for the pre- and post- development scenarios relevant to the modelling are shown below.

Table 6: Impervious & Permeable Areas

Description	Pre-development	Post-development
Pervious Area	1240m^2	110m^2
Impervious Area	1860m^2	2990m^2
Total Analyzed Area	3100m^2	

6.3 Pre-development Peak Runoff

Using the parameters above and 24-hr duration rainfall event with a SCS Type 1A storm profile, the peak discharges are calculated as follows.

Table 7: Pre-development peak runoff flow rates for the 50%, 20% and 1% AEP rainfall events

50% AEP (L/s)	20% AEP (L/s)	1% AEP (L/s)
14.8	20.3	40.6

6.4 Post-development Peak Runoff

Using the parameters above for the development of new carpark, a 24-hr duration rainfall event with 20% increase allowance for climate change and SCS Type 1A storm profile, the peak discharges are calculated as follows.

Table 8: Post-development peak runoff flow rates for the 50%, 20% and 1% AEP rainfall events

50% AEP (L/s)	20% AEP (L/s)	1% AEP (L/s)
22.9	30.3	55.7

6.5 Analysis Results

Table below shows a summary of the pre- and post-development peak flow rates and difference generated by the proposed development. The full output tables from the HEC-HMS modelling are attached in Appendix A.

Table 9: Peak runoff flow rates for the 50%, 20% and 1% AEP rainfall events

AEP Rainfall Event	Pre-development (L/s)	Post-development (L/s)	Increase (L/s)
50% AEP	14.8	22.9	8.1
20% AEP	20.3	30.3	10.0
1% AEP	40.6	55.7	15.1

The post-development flow results shown, are then input into the capacity assessment of the existing Ø900mm concrete culvert outlet from the site to the wetland. The results show that the culvert will be 77% full in the 1% AEP event and has sufficient capacity to convey the peak flows from the proposed development.

If impermeable areas greater than those analysed in this design are proposed, then a revision of the design outlined in this report will be required and we should be contacted.

6.6 Stormwater Treatment Devices Recommendation

6.6.1 Sheet Flows from State Highway – New Traffic Island

Some of the stormwater runoff from the state highway, will be captured and pass through a new traffic island constructed to serve as delineation between the school carpark and the turning lane for vehicles traveling from the west and entering the carpark.

It is proposed that the island be constructed with 150mm high block kerbs, with 0.5m wide gaps formed at 3.0m spacings. This will allow runoff to sheet flow into the island area. The Island is intended to be filled with Ø100-150mm aggregate at a depth of 300mm. Underneath this a 300mm wide x 500mm min deep subsoil drain trench will be constructed. The trench will be filled with clean drainage metal, wrapped in geotextile with a Ø110mm perforated drain coil. At both ends of the island a Ø675mm x 1.0m deep chamber with a scruffy dome will be installed and serve as a connection point for the drain coil. The chamber will be connected to the proposed stormwater system.

This will serve as a collection device for the runoff from the state highway. See the appended Engineering Drawings for details.

6.6.2 Stormwater Catchpits

To serve as a gross pollutant trap, the Stormwater 360 LittaTrap is to be installed in all catchpits for the collection of litter, leaves, debris, and other sediment from the carpark areas. Refer to the operation manual appended to this report.

6.6.3 Stormwater Filtration System

It is intended that stormwater runoff from the carpark will sheet flow towards low points and be collected via catchpits. From here all run-off will flow via a pipe network and it will be connected to the existing outlet structure, before discharging downstream into the wetland.

A Stormwater 360 Stormfilter is a cartridge filtration system that will be installed upstream of the connection point to the existing outlet structure. This passive filtration system consists of a precast concrete manhole with cartridges installed to provide treatment of the 'first flush' through filtration media to effectively remove contaminants generated by the movement of vehicles through the carpark. Refer to the supplier information and LDE engineering drawings appended to this report.

7 Compliance Assessment

The Northland Regional Council's Proposed Regional Plan for Northland; Dated February 2024, has rules in relation to wetlands. Section C.4.1.9 Land drainage and flood control general conditions, and Section C.6.4.2 Other stormwater discharges, has been assessed to determine if it is a permitted activity.

The design intent for the proposed works was to introduce treatment devices to improve the existing conditions, with a less than minor increase in adverse effects. The treatment devices selected provides a reasonable amount of treatment to mitigate the effects on the receiving environment.

"*General conditions apply to activities when referred to in the rules of C.4.1 Land drainage and floor control.*"

Section C.4.1.9 Land drainage and flood control general conditions		
1	There are no adverse flooding, erosion or over-drainage effects on other property.	Refer to Planning Assessment and/or Ecological Memo
2	The activity does not alter the course of a lake or continually or intermittently flowing river.	Refer to Planning Assessment and/or Ecological Memo
3	New land drainage does not occur within 50 metres of any natural wetland.	Refer to Planning Assessment and/or Ecological Memo
4	Drainage does not cause any change to the seasonal or annual range in water level of a natural wetland to an extent that may adversely affect the wetland's natural ecosystem.	Refer to Planning Assessment and/or Ecological Memo
5	No vegetation, soil or other debris generated from the activity is placed in a position where it may be carried into a river or natural wetland, lake or the coastal marine area.	Refer to Planning Assessment and/or Ecological Memo

6	There is no damage to a flood defence or any other authorised structure.	n/a
7	Fish passage is maintained, unless an existing authorisation provides otherwise, or temporary works to enable repair and replacement works are being carried out.	Refer to Planning Assessment and/or Ecological Memo
8	Eels, fish (other than pest fish), kōura (freshwater crayfish) and kākahi (freshwater mussels) unintentionally removed during mechanical clearing of drainage channels are returned to the drainage channel as soon as practicable, but no later than one hour after their removal.	Refer to Planning Assessment and/or Ecological Memo
9	Refuelling of machinery does not take place in the bed of a river or lake.	n/a
10	Any discharge of drainage water does not contain concentrations of contaminants which have or are likely to have significant adverse effects on aquatic life in any river, wetland, or the coastal marine area.	Refer to Planning Assessment and/or Ecological Memo
11	The discharge to the water body or coastal marine area does not, beyond the zone of reasonable mixing:	
a)	result in any conspicuous oil or grease films, scums or foams, or floatable or suspended material except where caused by natural events in the receiving water, and	LittaTraps shall be installed in all catchpits, and each catchpit shall have a 300mm min sump which will remove gross pollutants from stormwater flows. A Stormfilter device shall be installed within the proposed carpark. The stormfilter is effective at removing 80% TSS as well as oil and grease which meets water quality requirements. The stormfilter operates like a siphon through engineered media, so these pollutants will remain trapped inside the treatment chamber. The chamber will be subject to maintenance at intervals as directed by the manufacturer. Therefore, with the treatment train provided, we consider that there will be no increase in contaminants discharged from the proposed carpark construction.
b)	cause the pH of the receiving water to fall outside the range of 6.5 to 9.0 (except where caused by natural events, or when natural background levels fall outside that range), and	The site is being used as a school carpark, and is not expected to have any significant impact on runoff PH levels.
c)	cause any emission of objectionable odour in the receiving water, and	The site use being a school carpark is not expected to have any contaminants which would cause objectionable odour of stormwater runoff.
d)	cause any conspicuous change in colour or visual clarity of the receiving water, and	The carpark is proposed to be sealed reducing the likelihood of suspended sediments. All runoff from the proposed carpark is treated prior to discharge to further remove suspended solids so we consider there to be no change to the colour or clarity of stormwater runoff from the subject area.

e)	cause the natural temperature of the receiving water body to be changed by more than three degrees Celsius, except in an Outstanding Freshwater Body where it must not be changed by more than one degree Celsius, and	It is not anticipated that the proposed works will have an effect on the temperature of the receiving water due to the short time of concentration being less than 10 minutes.
f)	cause contamination which may render freshwater taken from a mapped priority drinking water abstraction point (refer I Maps | Ngā mahere matawhenua) unsuitable for human consumption after existing treatment.	According to NRC Proposed Regional Plan Maps, the closest drinking water abstraction point is located approximately 6km "as the crow flies" from the area of proposed works. This point is also located inland with a radius of approximately 600m to the closest body of water. See Figure below.
12	Any discharge of sediment associated with repair and maintenance activities does not occur for more than five consecutive days and must not occur for more than 12 hours on any one day.	n/a
13	Where in-river works involve bed disturbance from mechanical vegetation clearance or sediment removal:	
a)	if undertaken between 1 August and 31 December, a visual inspection of the works area must be undertaken, immediately prior to in-river work starting. If a shoal of whitebait is present, no in-river works shall be undertaken until the shoal passes; and	n/a
b)	the works shall not occur more than once in any area between 1 August and 31 December of any year.	n/a
14	Riverbank disturbance is limited to one side of the waterway, at any one time.	Refer to Planning Assessment and/or Ecological Memo
15	When mechanically clearing aquatic vegetation, a weed bucket shall be used with a curved flat base and a slatted back.	n/a
16	The activity does not take place in an īnanga spawning site between 1 March and 30 September.	Refer to Planning Assessment and/or Ecological Memo

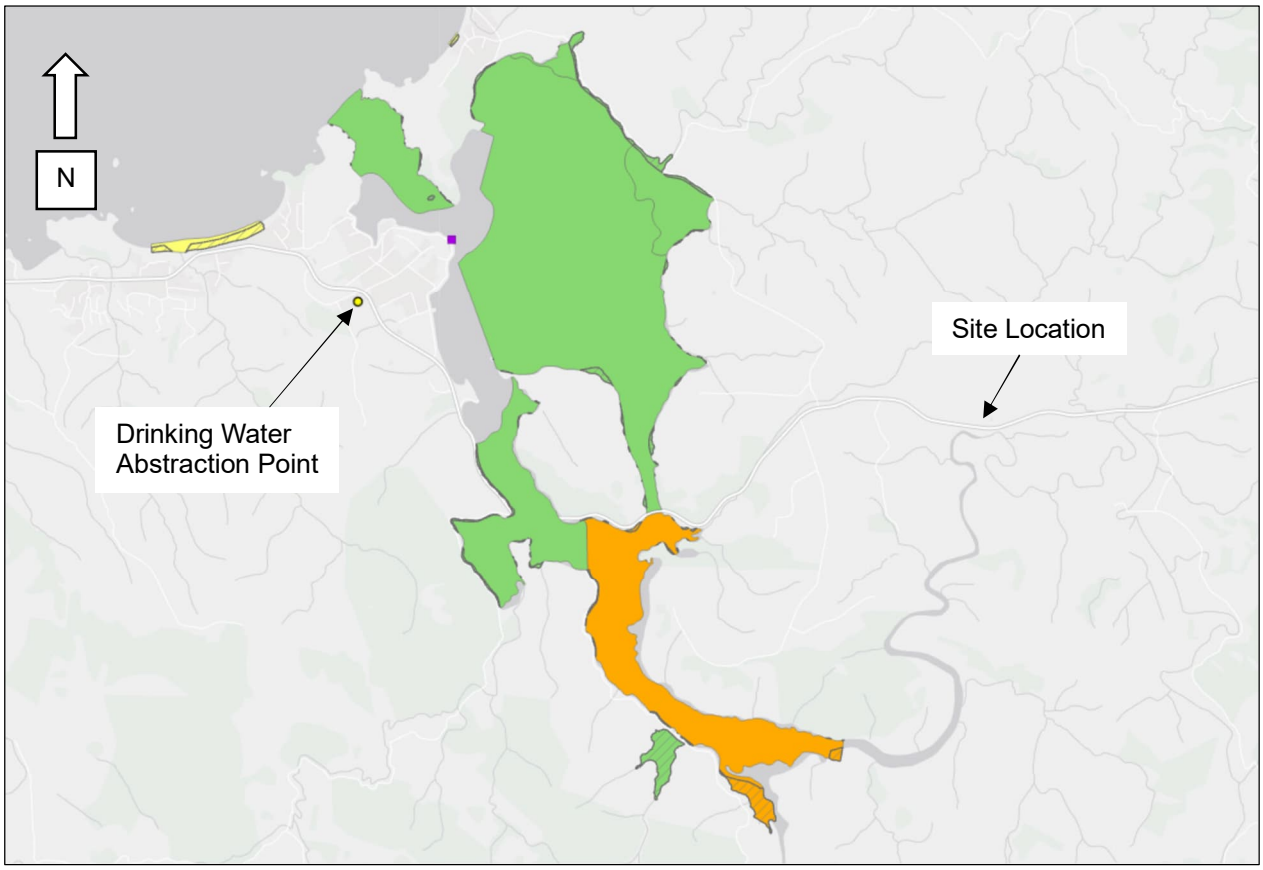


Figure 9: Subject Site and Nearest Drinking Water Abstraction Point (NRC Proposed Regional Plan Maps)

"*The diversion and discharge of stormwater into water of onto or into land where it may enter water from an impervious area or by way of a stormwater collection system, is a permitted activity, provided:*"

Section C.6.4.2 Other stormwater discharges		
1	the discharge or diversion is not from:	
a)	a public stormwater network, or	n/a
b)	a high-risk industrial or trade premises, and	n/a
2	the diversion and discharge does not cause or increase flooding of land on another property in a storm event of up to and including a 10 percent annual exceedance probability, or flooding of buildings on another property in a storm event of up to and including a one percent annual exceedance probability, and	Refer to Planning Assessment and/or Ecological Memo
3	where the diversion or discharge is from a hazardous substance storage or handling area:	
a)	the stormwater collection system is designed and operated to prevent hazardous substances stored or used on the site from entering the stormwater system, or	n/a

b)	there is a secondary containment system in place to intercept any spillage of hazardous substances and either discharges that spillage to a trade waste system or stores it for removal and treatment, or	n/a
c)	if the stormwater contains oil contaminants, the stormwater is passed through a stormwater treatment system designed in accordance with the Environmental Guidelines for Water Discharges from Petroleum Industry Sites in New Zealand (Ministry for the Environment, 1998) prior to discharge, and	n/a
4	where the diversion or discharge is from an industrial or trade premises:	
a)	the stormwater collection system is designed and operated to prevent any contaminants stored or used on the site, other than those already controlled by condition 3) above, from entering stormwater unless the stormwater is discharged through a stormwater treatment system, and	n/a
b)	any process water or liquid waste stream on the site is bunded, or otherwise contained, within an area of sufficient capacity to provide secondary containment equivalent to 100 percent of the quantity of any process water or liquid waste that has the potential to spill into a stormwater collection system, in order to prevent trade waste entering the stormwater collection system, and	n/a
5	the diversion or discharge is not into potentially contaminated land, or onto potentially contaminated land that is not covered by an impervious area, and	The discharge is to the existing road culvert which then discharges to the watercourse. No change to the flow regime is proposed as part of this development.
6	the diversion and discharge does not cause permanent scouring or erosion of the bed of a water body at the point of discharge, and	The proposed works will slightly increase the pre-development flows by 15l/s during a 1% AEP storm event, with increases of 8.1l/s and 10l/s for the 50%- and 20% AEP events. It is not anticipated that this will cause scouring or erosion to the receiving bed of water as the existing culvert is shown to be capable of discharging these flows as existing so there will be no increase in risk of erosion and scour.
7	the discharge does not contain more than 15 milligrams per litre of total petroleum hydrocarbons, and	High volumes of hydrocarbons are not expected from the carpark area. Any hydrocarbons that are collected in stormwater runoff will generally be trapped in the stormfilter device due to its syphonic function. Information received from the supplier of the Stormfilter Treatment device, states that the device can achieve greater than 80% TSS removal and meet water quality requirements. It is therefore anticipated that the Stormfilter, in conjunction with other treatment methods, will provide sufficient treatment of the run-off from the existing and proposed work.

8	the discharge does not cause any of the following effects in the receiving waters beyond the zone of reasonable mixing:	
a)	the production of conspicuous oil or grease films, scums or foams, of floatable or suspended materials, or	LittaTraps shall be installed in all catchpits, and each catchpit shall have a 300mm min sump which will remove gross pollutants from stormwater flows. A Stormfilter device shall be installed within the proposed carpark. The stormfilter is effective at removing 80% TSS as well as oil and grease which meets water quality requirements. The stormfilter operates like a siphon through engineered media, so these pollutants will remain trapped inside the treatment chamber. The chamber will be subject to maintenance at intervals as directed by the manufacturer. Therefore, with the treatment train provided, we consider that there will be no increase in contaminants discharged from the proposed carpark construction.
b)	a conspicuous change in the colour or visual clarity, or	The carpark is proposed to be sealed reducing the likelihood of suspended sediments. All runoff from the proposed carpark is treated prior to discharge to further remove suspended solids so we consider there to be no change to the colour or clarity of stormwater runoff from the subject area.
c)	an emission of objectionable odour, or	The site use being a school carpark is not expected to have any contaminants which would cause objectionable odour of stormwater runoff.
d)	the rendering of freshwater unsuitable for consumption by farm animals, or	Run-off from the existing and proposed impervious areas will be collected in catchpits with a 300mm min sump, from where it will be treated by the Stormfilter device, prior to discharging into an existing structure. From this structure the run-off will discharge into a wetland where further treatment will take place, before discharging into the Oruaiti River, from where farm animals would have access to the freshwater for consumption. The proposed works have been designed to mitigate this and enhance the existing conditions.
e)	the rendering of freshwater taken from a mapped priority drinking water abstraction point (refer I Maps | Ngā mahere matawhenua) unsuitable for human consumption after existing treatment.	According to NRC Proposed Regional Plan Maps, the closest drinking water abstraction point is located approximately 6km “as the crow flies” from the area of proposed works. This point is also located inland with a radius of approximately 600m to the closest body of water.

8 LIMITATIONS

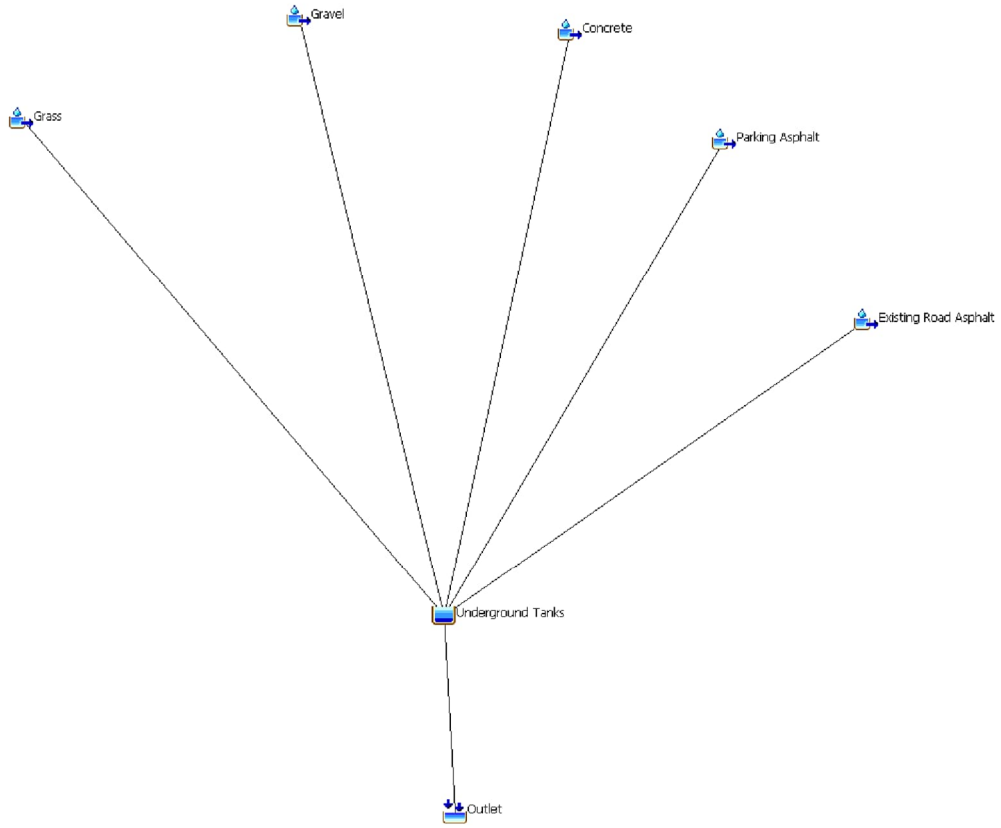
This report should be read and reproduced in its entirety including the limitations to understand the context of the opinions and recommendations given.

This report has been prepared exclusively for Oruaiti School Board of Trustees c/o Avail Pacific in accordance with the brief given to us or the agreed scope and they will be deemed the exclusive owner on full and final payment of the invoice. Information, opinions, and recommendations contained within this report can only be used for the purposes with which it was intended. LDE accepts no liability or responsibility whatsoever for any use or reliance on the report by any party other than the owner or parties working for or on behalf of the owner, such as local authorities, and for purposes beyond those for which it was intended.

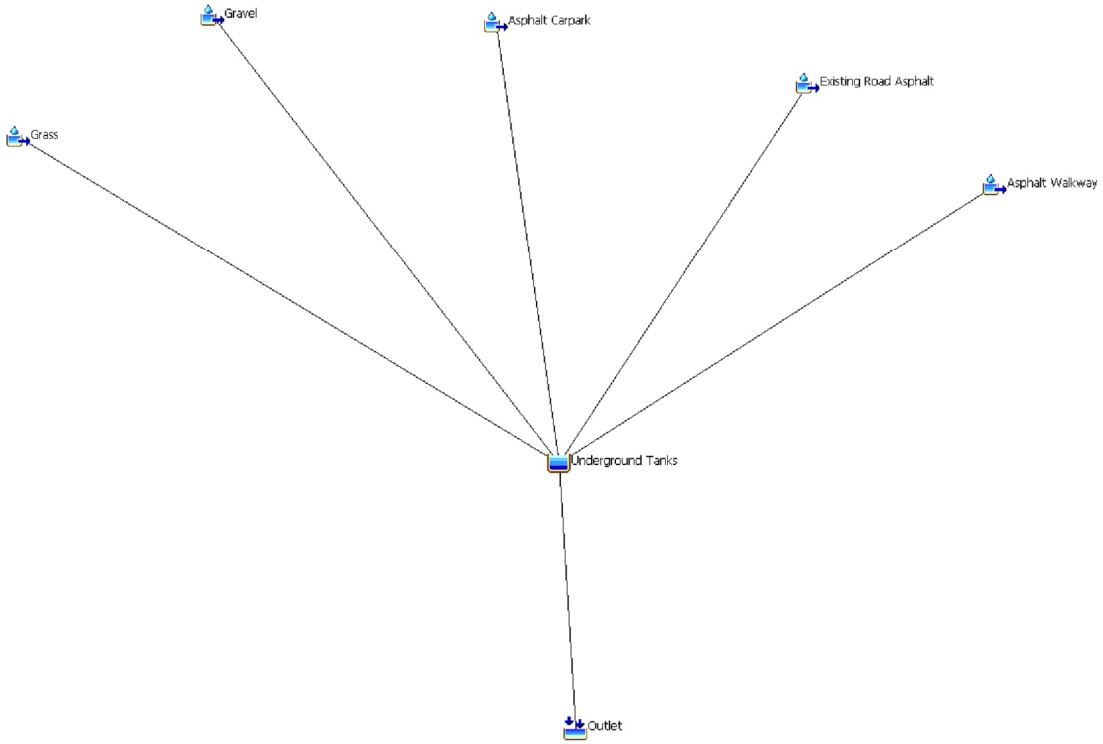
This report was prepared in general accordance with current standards, codes, and best practice at the time of this report. These may be subject to change.

APPENDIX A
HEC-HMS MODEL AND RESULTS

PRE-DEVELOPMENT SCHEMATIC



POST-DEVELOPMENT SCHEMATIC



PRE-DEVELOPMENT CATCHMENT ASSESSMENT

Project: 21102 - Carpark Stormwater Simulation Run: Catchment 100-Year Pre

Start of Run: 01Jan2000, 00:00
End of Run: 02Jan2000, 00:00
Compute Time: 01May2024, 16:22:06

Basin Model: Catchment Pre
Meteorologic Model: 100-Year Pre
Control Specifications: Control

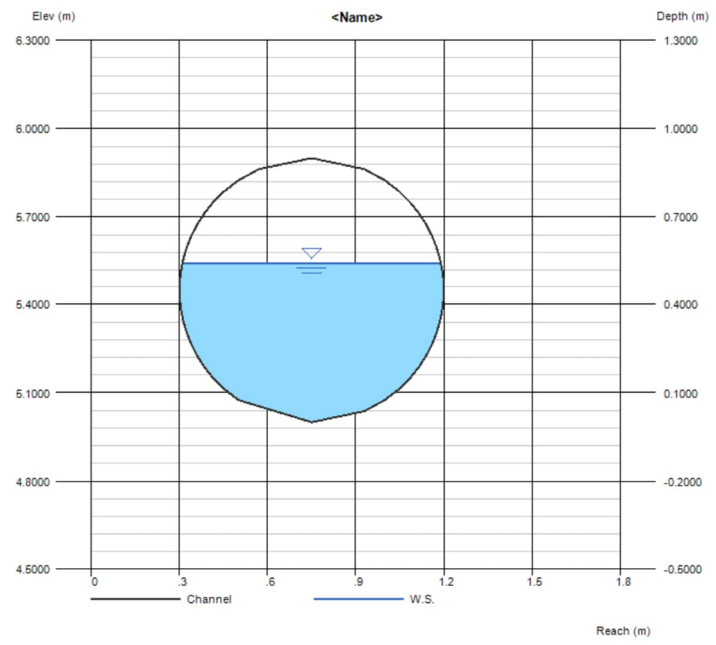
Show Elements: All Elements Volume Units: ○ MM ◉ 1000 M3 Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (1000 M3)
Grass Area	0.0900	0.9085	1 January 2000, 08...	13.3053
Impervious	0.0100	0.1507	1 January 2000, 07...	2.2330
Outlet	0.1000	1.0587	1 January 2000, 08...	15.5382

EXISTING CULVERT PRE-DEVELOPMENT CAPACITY ASSESSMENT

Item	Input
Section Type =	Circular
Btm Width (m)	-0-
Side Slope, z:1 =	-0-
Diameter(m) =	0.9000
Inv Elev(m) =	5.0000
Slope (%) =	0.7500
n-value =	0.013
Compute by =	Known Q
Q (cms) =	1.0587

Run



Depth	Q	Area	Veloc
(m)	(cms)	(sqm)	(m/s)
0.5425	1.059	0.402	2.6363

POST-DEVELOPMENT CATCHMENT ASSESSMENT

Project: 21102 - Carpark Stormwater Simulation Run: Catchment 100-Year Post

Start of Run: 01Jan2000, 00:00
End of Run: 02Jan2000, 00:00
Compute Time: 01May2024, 16:22:06

Basin Model: Catchment +CC
Meteorologic Model: 100-Year Post
Control Specifications: Control

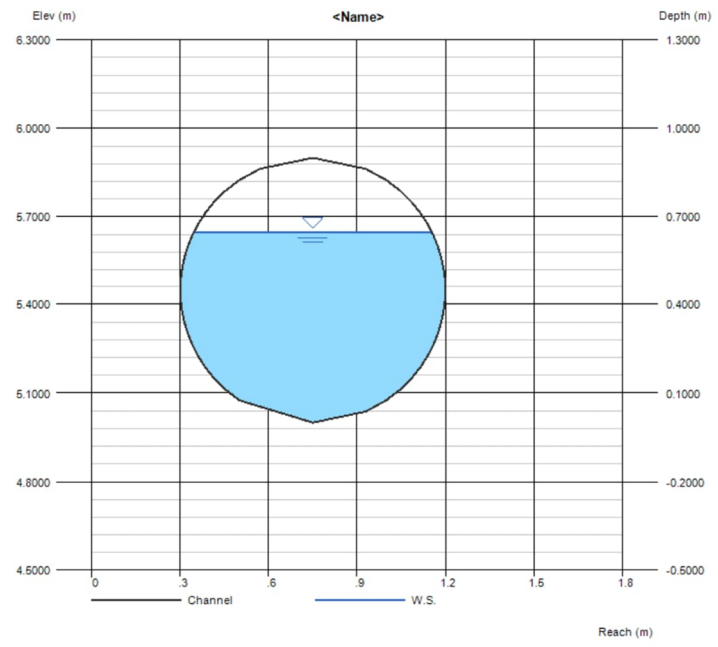
Show Elements: All Elements Volume Units: MM 1000 M3 Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (1000 M3)
Grass Area	0.0900	1.1753	1 January 2000, 08...	17.0019
Impervious	0.0100	0.1810	1 January 2000, 07...	2.6895
Outlet	0.1000	1.3557	1 January 2000, 08...	19.6914

EXISTING CULVERT POST-DEVELOPMENT CAPACITY ASSESSMENT

Item	Input
Section Type =	Circular
Btm Width (m)	-0-
Side Slope, z:1 =	-0-
Diameter(m) =	0.9000
Inv Elev(m) =	5.0000
Slope (%) =	0.7500
n-value =	0.013
Compute by =	Known Q
Q (cms) =	1.3560

Run



Depth	Q	Area	Veloc	
(m)	(cms)	(sqm)	(m/s)	
0.6462	1.356	0.490	2.7679	

PRE-DEVELOPMENT PEAK RUN-OFF – 50% AEP

Project: 21102 - Carpark Stormwater Simulation Run: 2-Year Pre

Start of Run: 01Jan2000, 00:00
End of Run: 02Jan2000, 00:00
Compute Time: 01May2024, 16:22:09

Basin Model: PreDev
Meteorologic Model: 2-Year Pre
Control Specifications: Control

Show Elements: All Elements Volume Units: MM 1000 M3 Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (1000 M3)
Grass	0.0012	0.0031	1 January 2000, 08...	0.0498
Gravel	0.0008	0.0050	1 January 2000, 07...	0.0727
Parking Asphalt	0.0005	0.0029	1 January 2000, 07...	0.0427
Existing Road Asphalt	0.0005	0.0029	1 January 2000, 07...	0.0427
Concrete	0.0001	0.0007	1 January 2000, 07...	0.0109
Underground Tanks	0.0031	0.0148	1 January 2000, 07...	0.2608
Outlet	0.0031	0.0148	1 January 2000, 07...	0.2608

PRE-DEVELOPMENT PEAK RUN-OFF – 20% AEP

Project: 21102 - Carpark Stormwater Simulation Run: 5-Year Pre

Start of Run: 01Jan2000, 00:00
End of Run: 02Jan2000, 00:00
Compute Time: 01May2024, 16:22:11

Basin Model: PreDev
Meteorologic Model: 5-Year Pre
Control Specifications: Control

Show Elements: All Elements Volume Units: MM 1000 M3 Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (1000 M3)
Grass	0.0012	0.0049	1 January 2000, 08...	0.0769
Gravel	0.0008	0.0066	1 January 2000, 07...	0.0965
Parking Asphalt	0.0005	0.0039	1 January 2000, 07...	0.0567
Existing Road Asphalt	0.0005	0.0039	1 January 2000, 07...	0.0567
Concrete	0.0001	0.0010	1 January 2000, 07...	0.0145
Underground Tanks	0.0031	0.0203	1 January 2000, 08...	0.3355
Outlet	0.0031	0.0203	1 January 2000, 08...	0.3355

PRE-DEVELOPMENT PEAK RUN-OFF – 1% AEP

Project: 21102 - Carpark Stormwater Simulation Run: 100-Year Pre

Start of Run: 01Jan2000, 00:00
End of Run: 02Jan2000, 00:00
Compute Time: 01May2024, 16:22:07

Basin Model: PreDev
Meteorologic Model: 100-Year Pre
Control Specifications: Control

Show Elements: All Elements Volume Units: MM 1000 M3 Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (1000 M3)
Grass	0.0012	0.0125	1 January 2000, 08...	0.1833
Gravel	0.0008	0.0121	1 January 2000, 07...	0.1786
Parking Asphalt	0.0005	0.0071	1 January 2000, 07...	0.1049
Existing Road Asphalt	0.0005	0.0071	1 January 2000, 07...	0.1049
Concrete	0.0001	0.0018	1 January 2000, 07...	0.0268
Underground Tanks	0.0031	0.0406	1 January 2000, 07...	0.6198
Outlet	0.0031	0.0406	1 January 2000, 07...	0.6198

POST-DEVELOPMENT PEAK RUN-OFF – 50% AEP

Project: 21102 - Carpark Stormwater Simulation Run: 2-Year Post

Start of Run: 01Jan2000, 00:00
End of Run: 02Jan2000, 00:00
Compute Time: 01May2024, 16:22:09
Basin Model: PostDev
Meteorologic Model: 2-Year Post
Control Specifications: Control

Show Elements: All Elements Volume Units: ○ MM ◉ 1000 M3 Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (1000 M3)
Asphalt Carpark	0.0020	0.0150	1 January 2000, 07...	0.2198
Existing Road Asphalt	0.0005	0.0035	1 January 2000, 07...	0.0517
Gravel	0.0003	0.0024	1 January 2000, 07...	0.0352
Asphalt Walkway	0.0002	0.0015	1 January 2000, 07...	0.0220
Grass	0.0001	0.0004	1 January 2000, 08...	0.0059
Underground Tanks	0.0031	0.0229	1 January 2000, 07...	0.3579
Outlet	0.0031	0.0229	1 January 2000, 07...	0.3579

POST-DEVELOPMENT PEAK RUN-OFF – 20% AEP

Project: 21102 - Carpark Stormwater Simulation Run: 5-Year Post

Start of Run: 01Jan2000, 00:00
End of Run: 02Jan2000, 00:00
Compute Time: 01May2024, 16:22:10
Basin Model: PostDev
Meteorologic Model: 5-Year Post
Control Specifications: Control

Show Elements: All Elements Volume Units: ○ MM ◉ 1000 M3 Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (1000 M3)
Asphalt Carpark	0.0020	0.0198	1 January 2000, 07...	0.2915
Existing Road Asphalt	0.0005	0.0047	1 January 2000, 07...	0.0685
Gravel	0.0003	0.0032	1 January 2000, 07...	0.0466
Asphalt Walkway	0.0002	0.0020	1 January 2000, 07...	0.0292
Grass	0.0001	0.0006	1 January 2000, 08...	0.0090
Underground Tanks	0.0031	0.0303	1 January 2000, 07...	0.4641
Outlet	0.0031	0.0303	1 January 2000, 07...	0.4641

POST-DEVELOPMENT PEAK RUN-OFF – 1% AEP

Project: 21102 - Carpark Stormwater Simulation Run: 100-Year Post

Start of Run: 01Jan2000, 00:00
End of Run: 02Jan2000, 00:00
Compute Time: 01May2024, 16:22:06
Basin Model: PostDev
Meteorologic Model: 100-Year Post
Control Specifications: Control

Show Elements: All Elements Volume Units: ○ MM ◉ 1000 M3 Sorting: Watershed Explorer

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (1000 M3)
Asphalt Carpark	0.0020	0.0362	1 January 2000, 07...	0.5379
Existing Road Asphalt	0.0005	0.0085	1 January 2000, 07...	0.1264
Gravel	0.0003	0.0058	1 January 2000, 07...	0.0861
Asphalt Walkway	0.0002	0.0036	1 January 2000, 07...	0.0538
Grass	0.0001	0.0014	1 January 2000, 08...	0.0208
Underground Tanks	0.0031	0.0557	1 January 2000, 07...	0.8406
Outlet	0.0031	0.0557	1 January 2000, 07...	0.8406

APPENDIX B

ENGINEERING DRAWINGS

Project Number: 21102
Project Office: Warkworth
Project Manager: Riaan de Swardt
Issue Date: 1 May 2024

Drawing Status: For Consent

Oruaiti School Board of Trustees c/o Avail Pacific
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

Drawing Index

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C311	Parking Area & Accessway Typical Cross Sections	For Consent	A
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C314	Parking Area & Accessway 5m Interval Cross Sections Sheet 3 of 3	For Consent	A
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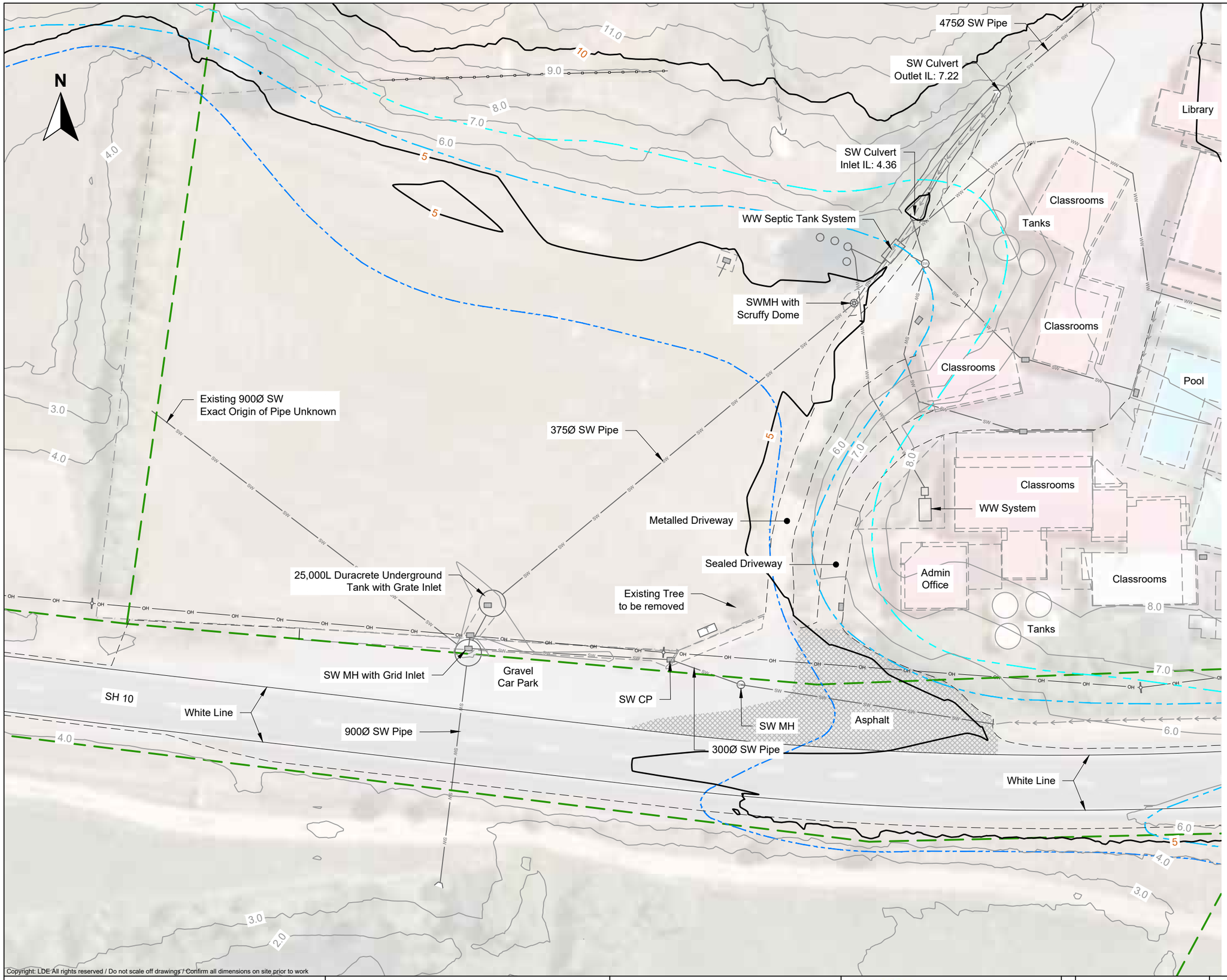
C421	Parking Area & Accessway Typical Stormwater Details	For Consent	A



General Notes:

1. All dimensions in metres unless noted otherwise.
2. Coordinates are in terms of NZGD Mt Eden 2000.
3. All levels are in metres to NZVD2016. Origin of levels RCM XIII SO 50961 RL 11.81m.
4. Survey undertaken by Donaldsons; 25 July 2022.
5. Existing titles - Pt Allot 18A PSH OF Mangonui East
6. Boundaries and are approximate only and are subject to change. Final boundaries will be in accordance with city plan and LINZ requirements.
7. Boundaries not for building design purposes.
8. Existing building, roading, and services information may have been obtained from third party records and should be verified on site prior to the commencement of any works. LDE does not in any way guarantee the accuracy of any underground service shown on this plan.
9. Contractor to locate / mark / confirm and protect if necessary all existing services prior to commencement of work on site. Any discrepancies to be reported to the Engineer.
10. Flood extent extracted from NRC Natural Hazards and shown indicatively for information only.

General Legend:

- Boundary (Surveyed)
- 1m Major Contour
- 5m Minor Contour

NRC River Flood Hazard Zone - Regionwide Models

- 10 Year Exent
- 50 Year Extent
- 100 Year CC Extent

Existing Services Legend:

- Edge of Road
- Asphalt Surface
- Stormwater Pipe
- Stormwater Manhole, Wingwall, Scruffy Dome, Catchpit
- Open Drain
- Wastewater Pipe
- Power Pole & Over Head Lines
- Transformer
- Fence
- Retaining Wall

0 5 10 15 20 25

Scale 1:500 (m) Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific

Project: 2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

Drawing Title: Existing Site Layout

LDE LAND DEVELOPMENT & ENGINEERING

No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	J. S	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	J. Simson
Scale A3:	1:500

Project status: For Consent
Project: 21102
Drawing No: C001
Issue/Rev: A

Surface Analysis: Elevation Ranges			
Number	Color	Minimum Elevation (m)	Maximum Elevation (m)
1		-0.223	0.000
2		0.000	0.150
3		0.150	0.300
4		0.300	0.450
5		0.450	0.600

General Notes:

1. All dimensions in metres unless noted otherwise.
2. Coordinates are in terms of NZGD Mt Eden 2000.
3. All levels are in metres to NZVD2016. Origin of levels RCM XIII SO 50961 RL 11.81m.
4. Survey undertaken by Donaldsons; 25 July 2022.
5. Existing titles - Pt Allot 18A PSH OF Mangonui East
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7. Boundaries not for building design purposes.
8. Existing building, roading, and services information may have been obtained from third party records and should be verified on site prior to the commencement of any works. LDE does not in any way guarantee the accuracy of any underground service shown on this plan.
9. Contractor to locate / mark / confirm and protect if necessary all existing services prior to commencement of work on site. Any discrepancies to be reported to the Engineer.
10. Flood extent extracted from NRC Natural Hazards and shown indicatively for information only.

Earthworks Notes:

- All works to be undertaken in accordance with FNDC Engineering Standards, GD05 Guidelines and the Health and Safety at Work Act 2015 (HSWA).
- All disturbed public areas to be made good and restored to previous condition.
- All earthworks to be undertaken during periods of fine weather.
- Earthworks are to be undertaken and completed in within the minimum possible time frame.
- The area is to be progressively finished as areas are brought to grade.
- The earthworks volumes shown is a solid measure.
- The earthworks volumes has been calculated in relation to the existing and final ground levels.
- Topsoil removal volumes is excluded in the total earthworks volumes.
- Additional box cut volumes has not been included in the earthworks volumes.

Erosion and Sediment Control Notes:

- The contractor is solely responsible for ensuring the the site has effective erosion control and sediment retention measures operating at all times.
- All erosion and sediment control measures must be operational prior to any other works commencing on site.
- All sediment control measure are to comply with GD05 and FNDC requirements.

Earthworks Cut / Fill Volumes	
Site Area	41,210m²
Earthworks Area	2,525m²
Cut Volume	18m³
Fill Volume	230m³
Net Fill Volume	212m³

0 5 10 15 20 25

Scale 1:500 (m) Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific

Project: 2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

Drawing Title: Parking Area & Accessway
Earthworks Layout

LDE LAND DEVELOPMENT & ENGINEERING

No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	1:500

Project status: For Consent
Project: 21102
Drawing No: C200
Issue/Rev: A

B85 Vehicle (Realistic min radius) (2004)

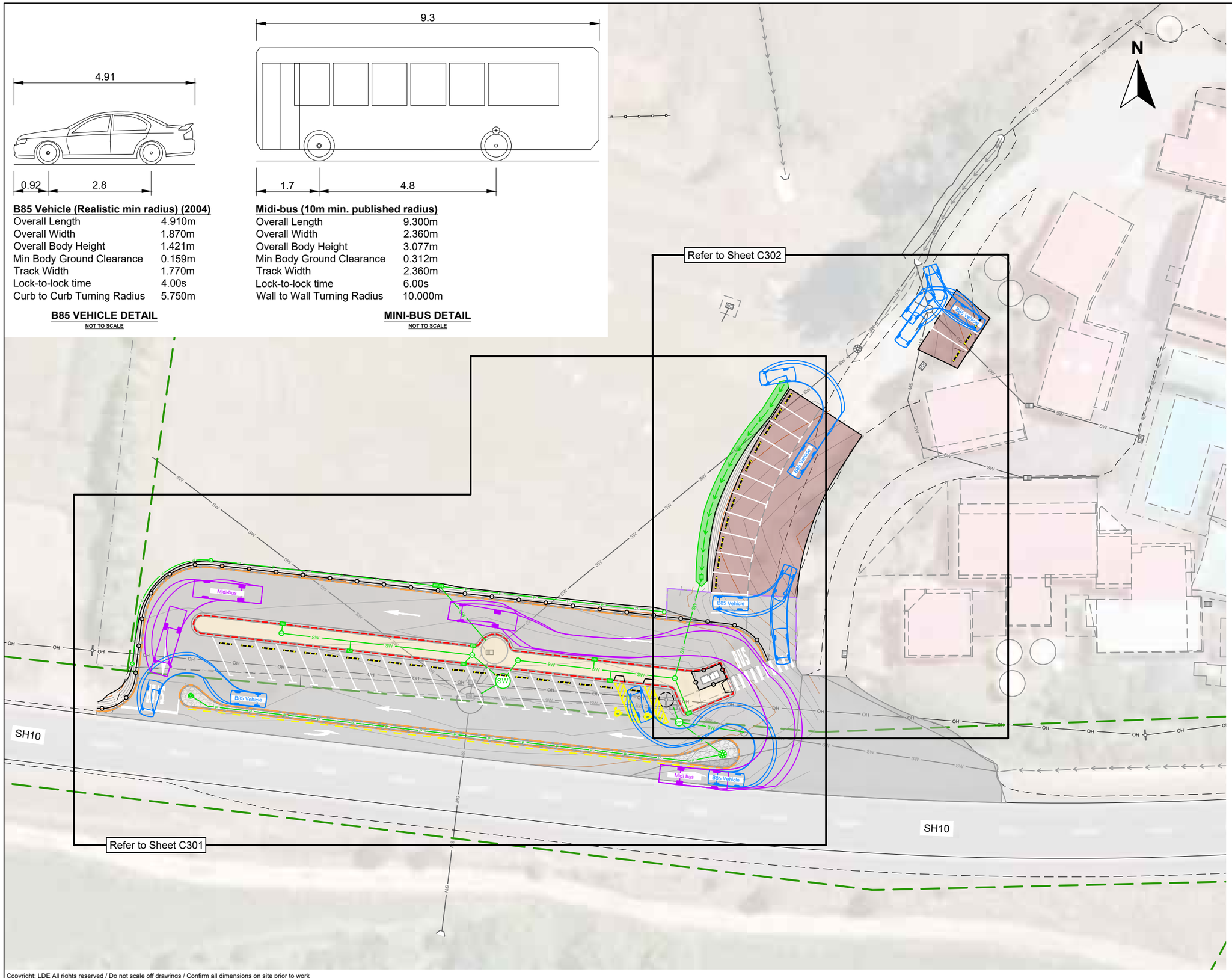
Overall Length	4.910m
Overall Width	1.870m
Overall Body Height	1.421m
Min Body Ground Clearance	0.159m
Track Width	1.770m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	5.750m

B85 VEHICLE DETAIL
NOT TO SCALE

Midi-bus (10m min. published radius)

Overall Length	9.300m
Overall Width	2.360m
Overall Body Height	3.077m
Min Body Ground Clearance	0.312m
Track Width	2.360m
Lock-to-lock time	6.00s
Wall to Wall Turning Radius	10.000m

MINI-BUS DETAIL
NOT TO SCALE



Proposed Services Notes:

1. All works to be undertaken in accordance with FNDC Engineering Standards and the Health and Safety at Work Act 2015 (HSWA).
2. All dimensions in metres unless noted otherwise.
3. Contractor to locate / ml dimensionark / confirm and protect if necessary all existing services prior to commencement of work on site.
4. All disturbed public areas to be made good and restored to existing condition.
5. Manholes to be reinforced concrete chambers with a precast base. Min Ø1050mm manhole unless otherwise specified.
6. Catchpits to be 675 x 450mm reinforced concrete chambers, with trafficable frame & grid inlet lid.
7. All PVC stormwater pipes to be uPVC SN16.
8. All concrete stormwater pipes to be RCRRJ Class 4.
9. Pipe bedding and installation to comply with relevant council details.
10. All lane and parking markings as per MOTSAM.
11. Parking bays as per Appendix 3D of the Far North District Plan (FNDP).

Reference Notes:

- Refer to C301 & C302 for Parking Area Layouts.
- Refer to C310 for Parking Area and Accessway Longitudinal Sections Layout.
- Refer to C311 to C314 for Cross Section Layouts.
- Refer to C320 for Roading details.
- Refer to C400 for Stormwater Layout.
- Refer to C410 to C411 Stormwater Longitudinal Section Layouts.
- Refer to C420 & C421 for Stormwater details.

Existing Services Legend:

- Boundary (Surveyed)
- Edge of Road
- Stormwater Pipe
- Stormwater Manhole, Wingwall, Scruffy Dome, Catchpit
- Open Drain
- Power Pole & Over Head Lines
- Transformer
- Fence
- Retaining Wall

Proposed (Prop.) Services Legend:

- 0.5m Major Contour
- 0.1m Major Contour
- Kerb Block
- Kerb & Channel
- Flush Edge Beam
- Asphalt Surface
- Proposed Concrete Surface
- Proposed Gravel Surface
- Rock Filled Traffic Island
- Stormwater Pipe
- Stormwater Perforated Pipe
- Stormwater Manhole
- SW Manhole with Scruffy Dome
- Stormwater Catchpit
- Stormwater Rodding Point
- Stormwater Swale
- Fence

0 5 10 15 20 25

Scale 1:500 (m) Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific	Project: 2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Drawing Title: Parking Area & Accessway Overall Site Plan	LDE LAND DEVELOPMENT & ENGINEERING

No.	Issue/Revision	Aprvd	Date
A.	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	1:500

Project status: For Consent
Project: 21102
Drawing No: C300
Issue/Rev: A

Proposed Services Notes:

- All works to be undertaken in accordance with FNDC Engineering Standards and the Health and Safety at Work Act 2015 (HSWA).
- All dimensions in metres unless noted otherwise.
- Contractor to locate / ml dimensionark / confirm and protect if necessary all existing services prior to commencement of work on site.
- All disturbed public areas to be made good and restored to existing condition.
- Manholes to be reinforced concrete chambers with a precast base. Min Ø1050mm manhole unless otherwise specified.
- Catchpits to be 675 x 450mm reinforced concrete chambers, with trafficable frame & grid inlet lid.
- All lane and parking markings as per MOTSAM.
- Parking bays as per Appendix 3D of the Far North District Plan (FNDP).

Existing Services Legend:

- Boundary (Surveyed)
- Edge of Road
- Stormwater Pipe
- Stormwater Manhole, Wingwall, Scruffy Dome, Catchpit
- Open Drain
- Power Pole & Over Head Lines
- Transformer
- Fence

Proposed Services Legend:

- 0.5m Major Contour
- 0.1m Major Contour
- Prop. Kerb Block
- Prop. Kerb & Channel
- Prop. Flush Edge Beam

Proposed Services Legend:

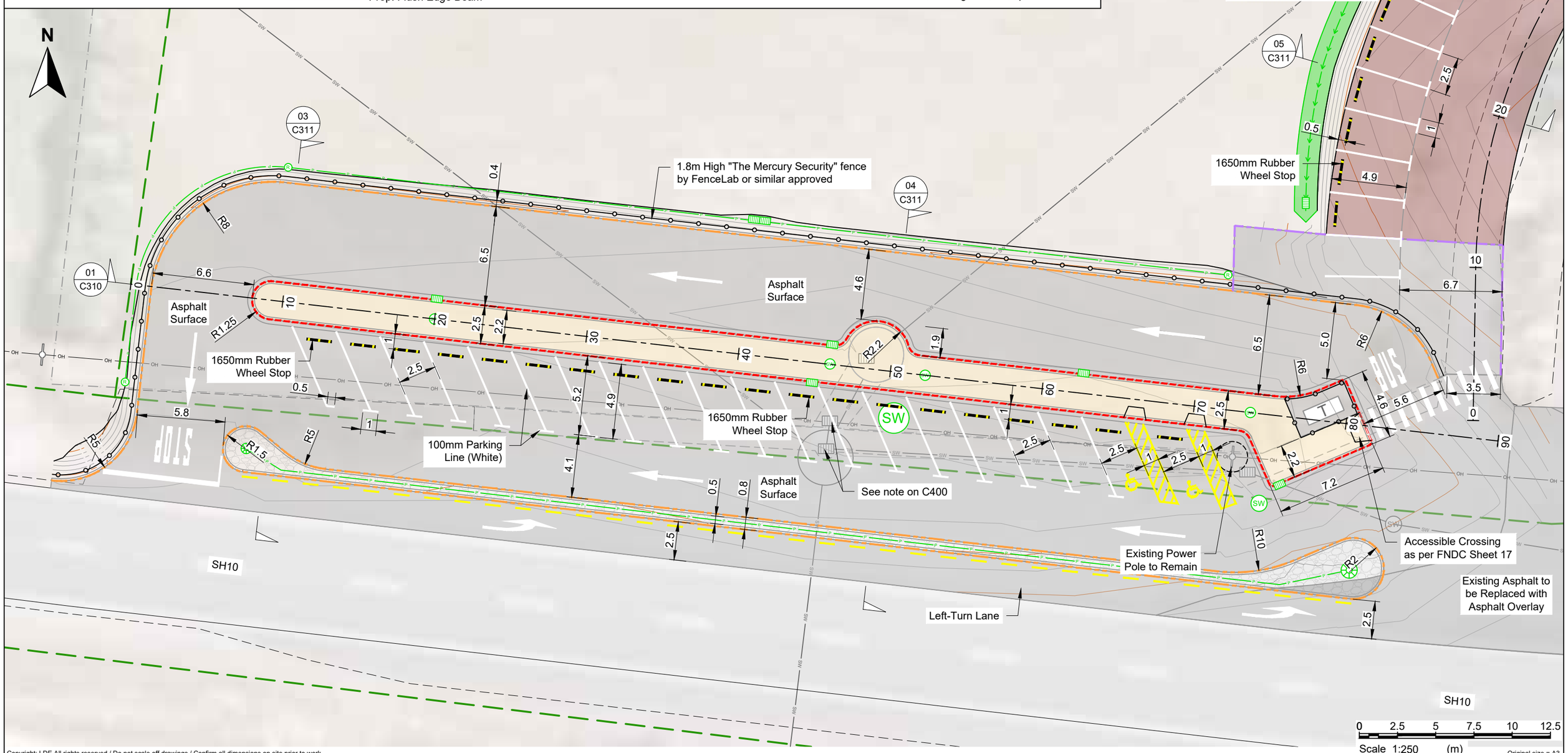
- Asphalt Surface
- Proposed Concrete Surface
- Proposed Gravel Surface
- Rock Filled Traffic Island
- Stormwater Perforated Pipe
- Stormwater Manhole
- SW Manhole with Scruffy Dome
- Stormwater Catchpit
- Stormwater Rodding Point
- Stormwater Swale
- Fence

Road Marking Legend:

- White Zebra Crossing 2.0m Long x 0,3m Wide, 0.6m Gap
- White Stop Sign
- White Bus Sign
- White Straight Arrow
- White Left-Turn Arrow
- White Parking Delineation Line 100mm Wide
- Yellow No-Stop Lines 1.0m Long x 1.0m Gap

Road Marking Legend:

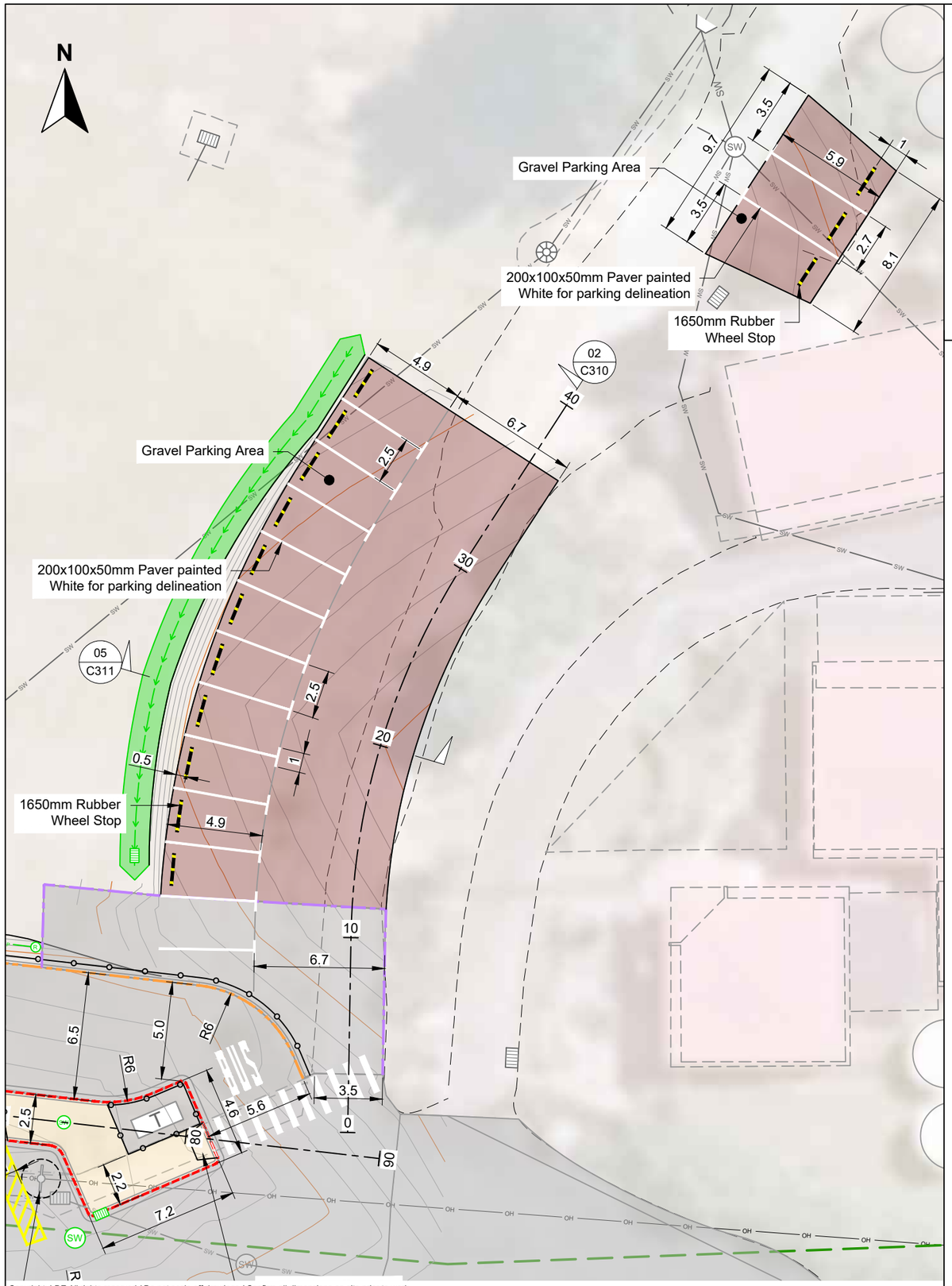
- 1650mm Rubber Wheel Stop
- Yellow Disabled Parking Sign
- Yellow No-Parking Island



Client: Oruaiti School Board of Trustees c/o Avail Pacific	Project: 2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Drawing Title: Parking Area & Accessway Design Plan Sheet 1 of 2	LDE LAND DEVELOPMENT & ENGINEERING

No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	1:250
Project status:	For Consent
Project:	21102
Drawing No:	C301
Issue/Rev	A



Proposed Services Notes:

- All works to be undertaken in accordance with FNDC Engineering Standards and the Health and Safety at Work Act 2015 (HSWA).
- All dimensions in metres unless noted otherwise.
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- All lane and parking markings as per MOTSAM.
- Parking bays as per Appendix 3D of the Far North District Plan (FNDP).

Existing Services Legend:

- Boundary (Surveyed)
- Edge of Road
- Stormwater Pipe
- Stormwater Manhole, Wingwall, Scruffy Dome, Catchpit
- Open Drain
- Power Pole & Over Head Lines
- Transformer
- Fence

Proposed Services Legend:

- 0.5m Major Contour
- 0.1m Major Contour
- Prop. Kerb Block
- Prop. Kerb & Channel
- Prop. Flush Edge Beam

Proposed Services Legend:

- Asphalt Surface
- Proposed Concrete Surface
- Proposed Gravel Surface
- Rock Filled Traffic Island
- Stormwater Perforated Pipe
- Stormwater Manhole
- SW Manhole with Scruffy Dome
- Stormwater Catchpit
- Stormwater Rodding Point
- Stormwater Swale
- Fence

Road Marking Legend:

- White Zebra Crossing 2.0m Long x 0,3m Wide, 0.6m Gap
- White Stop Sign
- White Bus Sign
- White Straight Arrow
- White Left-Turn Arrow
- White Parking Delineation Line 100mm Wide
- Yellow No-Stop Lines 1.0m Long x 1.0m Gap

Road Marking Legend:

- 1650mm Rubber Wheel Stop
- Yellow Disabled Parking Sign
- Yellow No-Parking Island

0 2.5 5 7.5 10 12.5

Scale 1:250 (m) Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific

Project: 2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

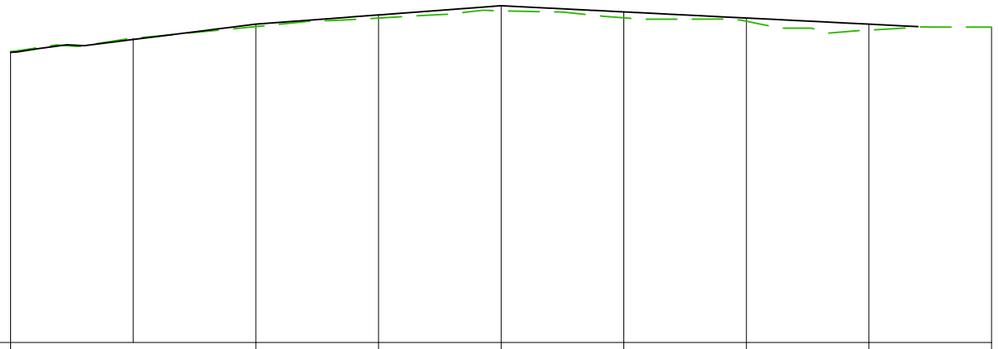
Drawing Title: Parking Area & Accessway
Design Plan Sheet 2 of 2

LDE LAND DEVELOPMENT & ENGINEERING

No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	1:250

Project status: For Consent
Project: 21102
Drawing No: C302
Issue/Rev: A



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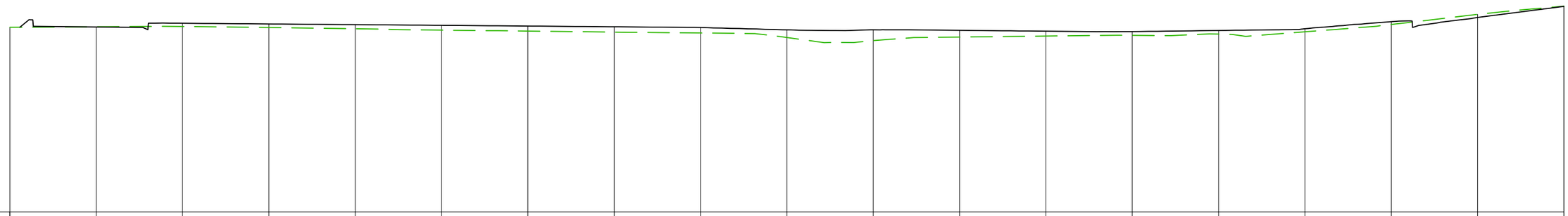
Cut/Fill Depth	0.04	0.05	0.08	0.10	0.05	0.10	
Chainage	10.00	15.00	20.00	25.00	30.00	35.00	

Long Section (ACCESSWAY CL)



Vertical Exaggeration: 2.5
Datum: 0.0

Design Levels	4.29	4.30	4.27	4.25	4.21	4.19	4.17	4.15	4.04	3.97	4.05	4.08	4.09	4.12	4.17	4.35	4.58	4.77
Existing Levels	4.29	4.30	4.27	4.25	4.21	4.19	4.17	4.15	4.04	3.97	4.05	4.08	4.09	4.12	4.17	4.35	4.58	4.77
Cut/Fill Depth	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chainage	5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00	55.00	60.00	65.00	70.00	75.00	80.00	85.00	90.00

Long Section (PARKING AREA CL)

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

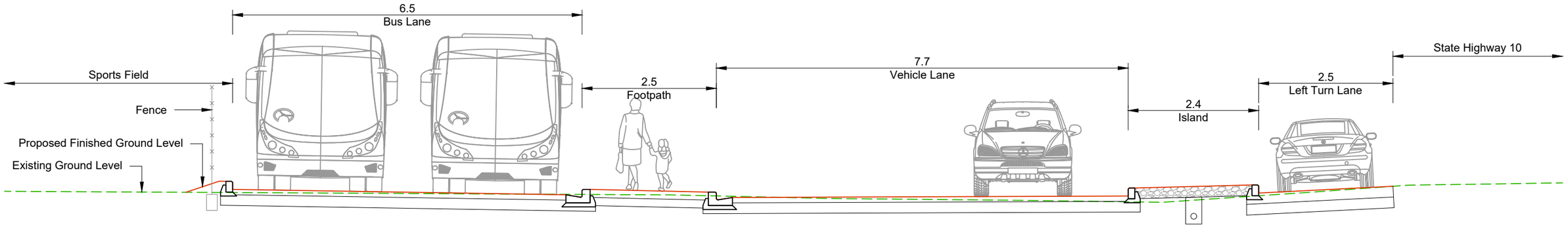
Drawing Title
Parking Area & Accessway
Longitudinal Sections

LDE LAND DEVELOPMENT & ENGINEERING

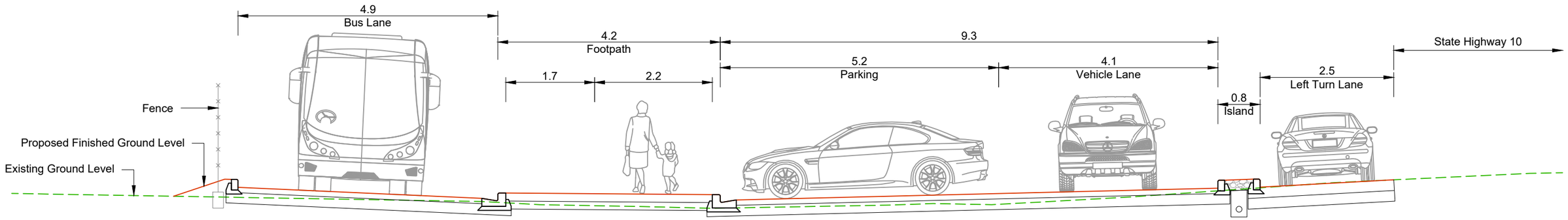
No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	1:250

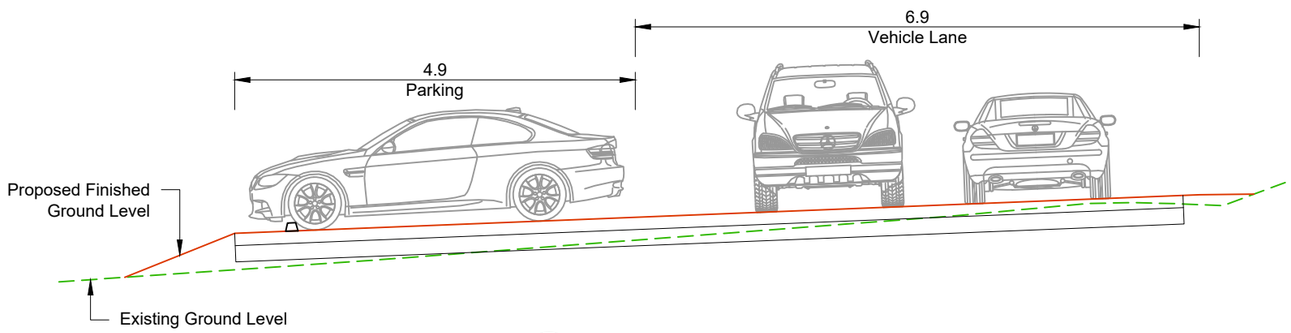
Project status: For Consent
Project: 21102
Drawing No: C310
Issue/Rev: A



03 / 311 **Cross Section @ Parking Area CH 10m**
Scale 1:75



04 / 311 **Cross Section @ Parking Area CH 50m**
Scale 1:75



05 / 311 **Cross Section @ Accessway CH 20m**
Scale 1:75

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

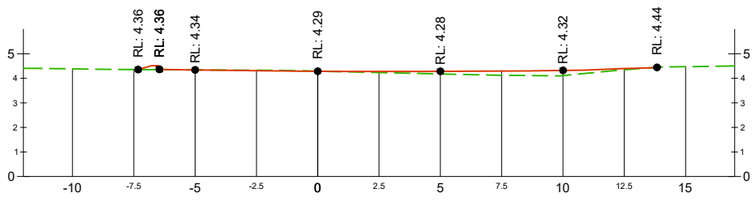
Drawing Title
Parking Area & Accessway
Typical Cross Sections

LDE LAND DEVELOPMENT & ENGINEERING

No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	1:75

Project status: For Consent
Project: 21102
Drawing No: C311
Issue/Rev: A



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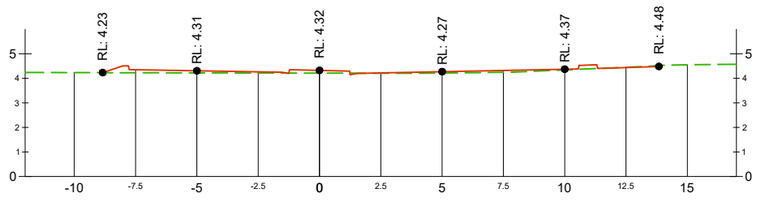

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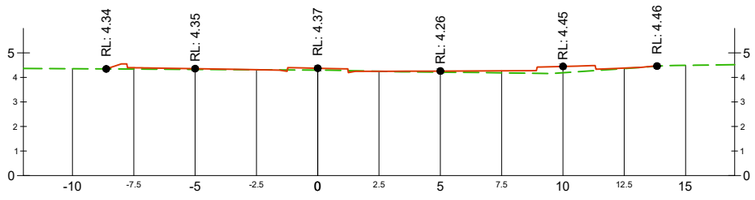

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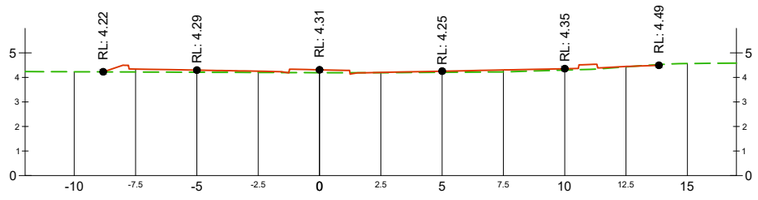

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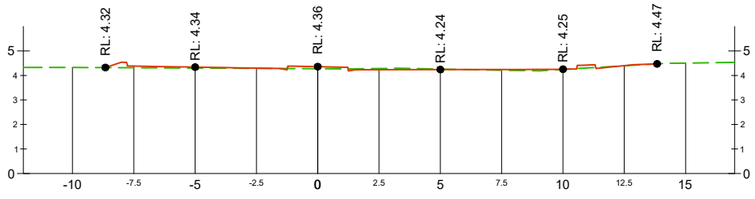

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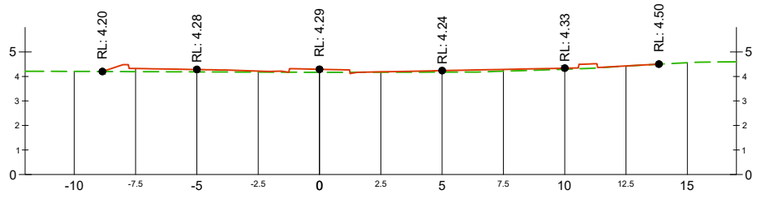

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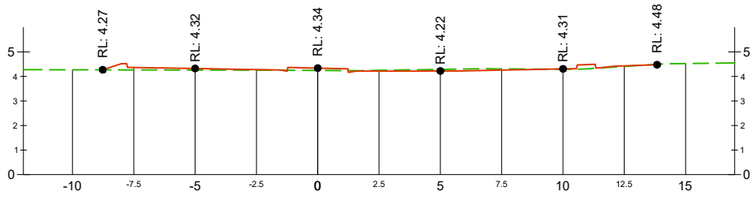

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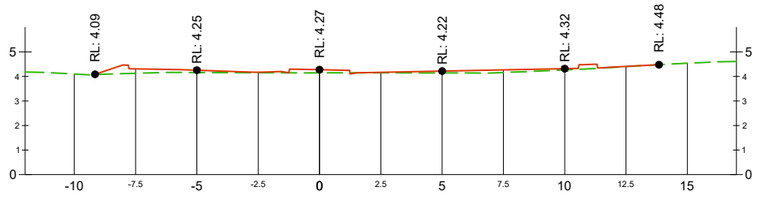


Chainage 40.0
Datum: 0.0

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

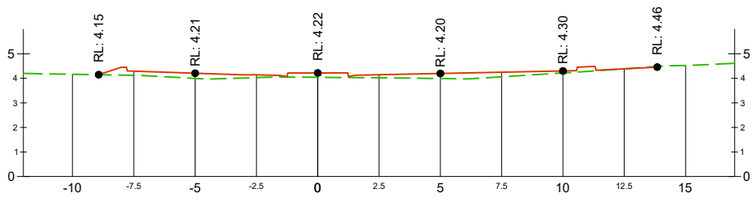
Drawing Title
Parking Area & Accessway
5m Inteval Cross Sections
Sheet 1 of 3

LDE LAND DEVELOPMENT & ENGINEERING

No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	1:250

Project status: For Consent
Project: 21102
Drawing No: C312
Issue/Rev: A



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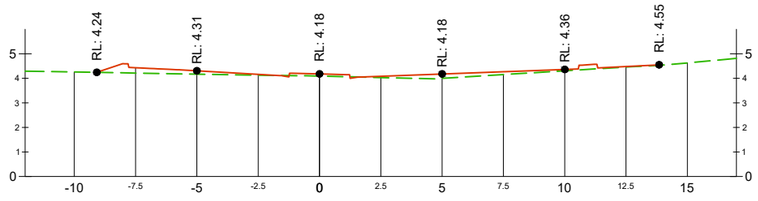

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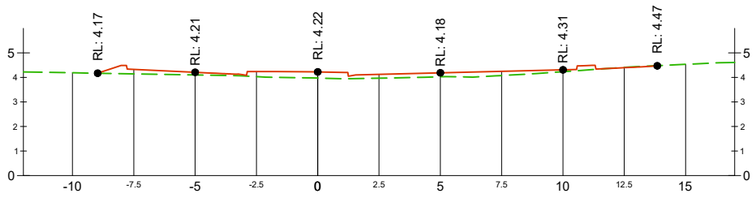

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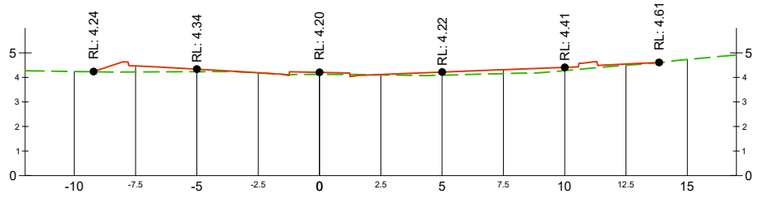

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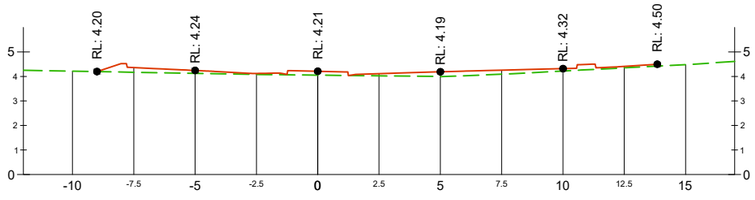

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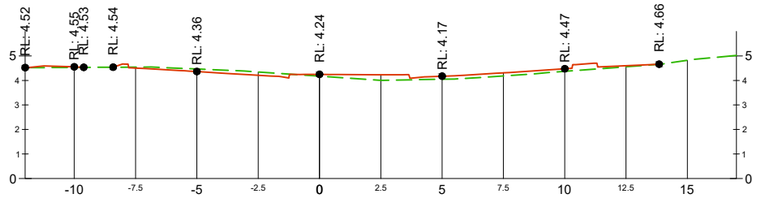

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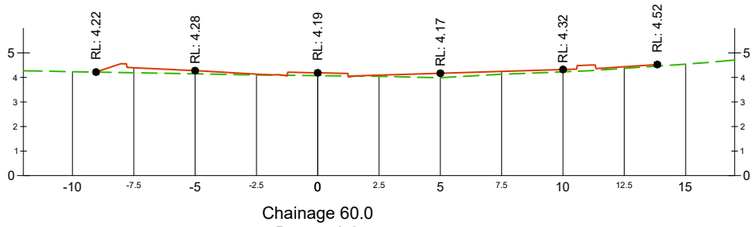

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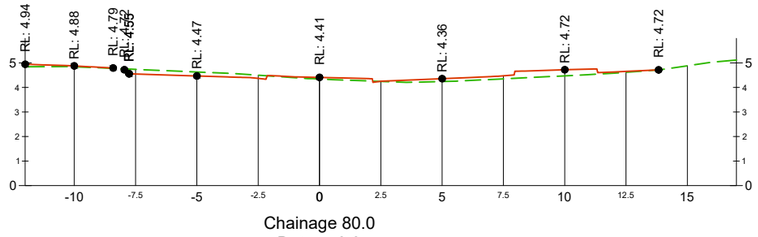


Chainage 80.0
Datum: 0.0

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

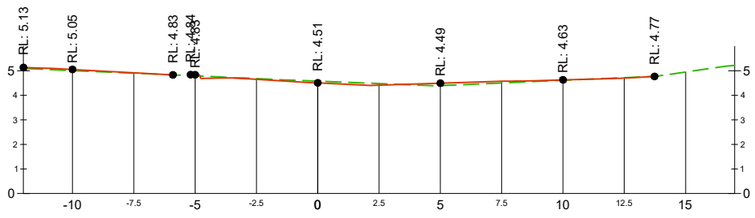
Drawing Title
Parking Area & Accessway
5m Inteval Cross Sections
Sheet 2 of 3

LDE LAND DEVELOPMENT & ENGINEERING

No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	1:250

Project status: For Consent
Project: 21102
Drawing No: C313
Issue/Rev: A



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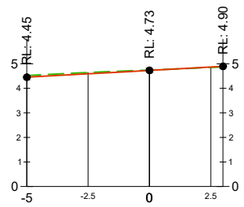

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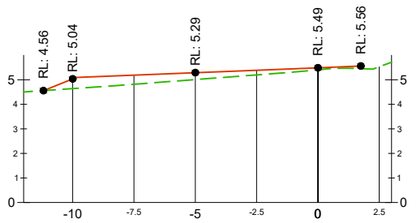

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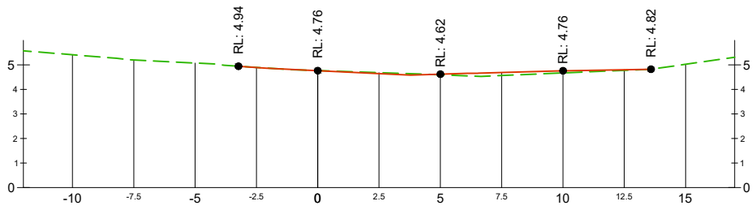

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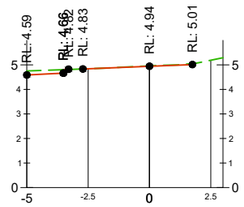

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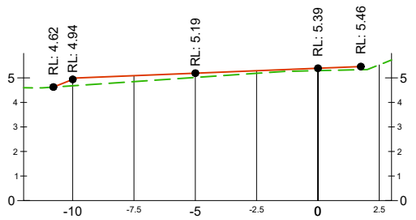

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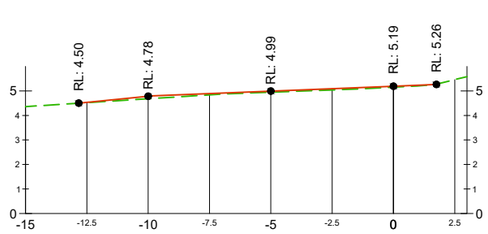

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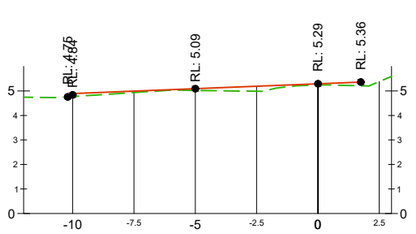

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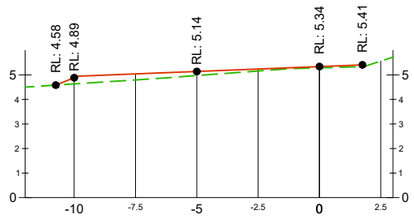

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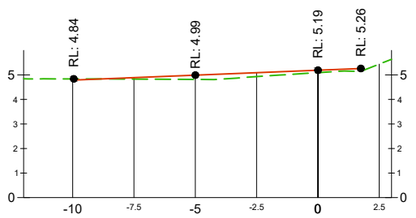


Chainage 35.0
Datum: 0.0

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

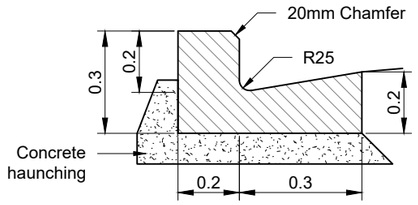
Drawing Title
Parking Area & Accessway
5m Inteval Cross Sections
Sheet 3 of 3

LDE LAND DEVELOPMENT & ENGINEERING

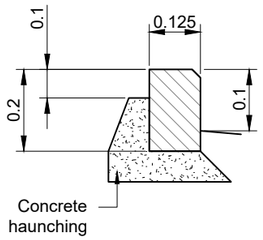
No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	1:250

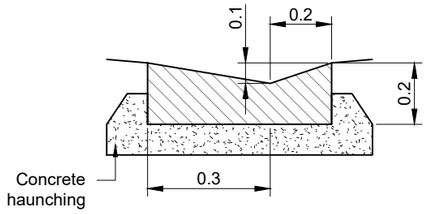
Project status: For Consent
Project: 21102
Drawing No: C314
Issue/Rev: A



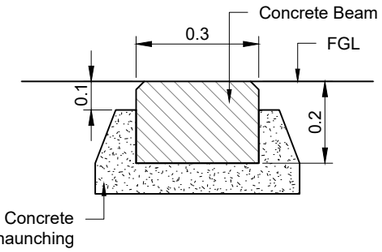
Kerb & Channel
Scale 1:15



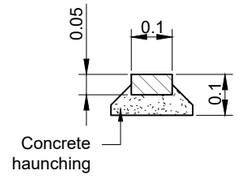
Kerb Block / Barrier Kerb
Scale 1:15



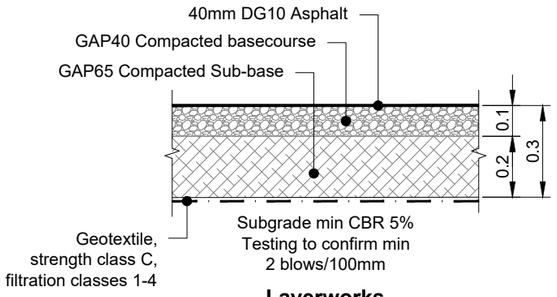
Pram Crossing
Scale 1:15



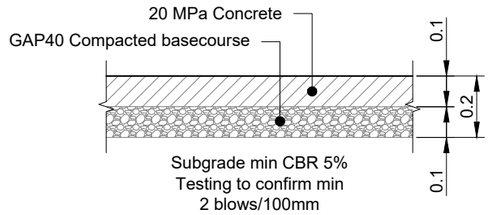
Flush Edge Beam
Scale 1:15



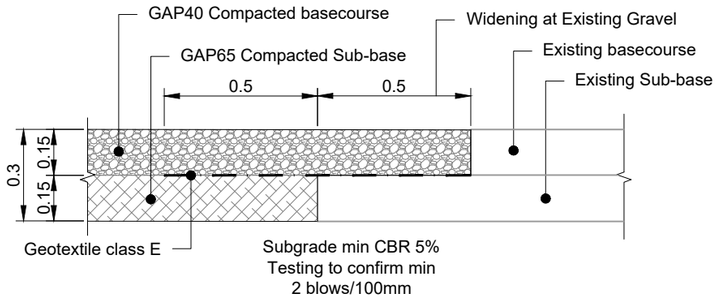
Parking Delineation Paver
Scale 1:15



Layerworks
Asphalt Parking Area
Not to Scale

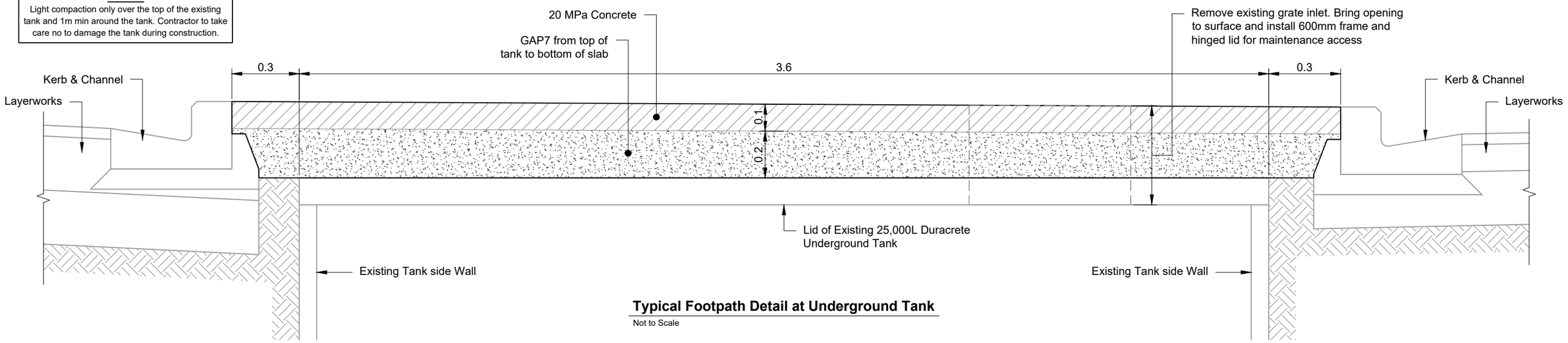


Layerworks
Concrete Footpath
Not to Scale



Layerworks
Gravel Pavement
Not to Scale

Note:
Light compaction only over the top of the existing tank and 1m min around the tank. Contractor to take care no to damage the tank during construction.



Typical Footpath Detail at Underground Tank
Not to Scale

Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific	Project: 2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Drawing Title: Parking Area & Accessway Typical Details	LDE LAND DEVELOPMENT & ENGINEERING	A Issued for Consent — H. D — 1 May 2024	Design: R. de Swardt	Project status: For Consent	
					Drawn: R. de Swardt	Project: 21102	
					Approved: H. Dubinko	Drawing No: C320	Issue/Rev: A
					Scale A3: As Shown		

Stormwater Services Notes:

1. All works to be undertaken in accordance with FNDC Engineering Standards and the Health and Safety at Work Act 2015 (HSWA).
2. All stormwater infrastructure to be installed as per the FNDC Engineering Standards (ES).
3. All stormwater infrastructure to adhere to the NZ Standards as stated in the FNDC ES.
4. All dimensions in metres unless noted otherwise.
5. Contractor to locate / ml dimensionark / confirm and protect if necessary all existing services prior to commencement of work on site.
6. All disturbed public areas to be made good and restored to existing condition.
7. Manholes to be reinforced concrete chambers with a precast base. Min Ø1050mm manhole unless otherwise specified.
8. Catchpits to be 675 x 450mm reinforced concrete chambers, with trafficable frame & grid inlet lid.

Stormwater Services Notes:

9. All PVC stormwater pipes to be uPVC SN16.
10. All concrete stormwater pipes to be RCRRJ Class 4.
11. Pipe bedding and installation to comply with relevant council details.
12. All catchpits to have a min. sump depth of 300mm.
13. All catchpits to have 150Ø uPVC SN16 outlet pipe.
14. All catchpits to be fitted with a "*Stormwater360 Litta Trap*", installed as per supplier specification.
15. SWMH3 to be 1800mmØ x 1500mm Deep MH fitted with "*Stormwater360 StormFilter Cartridge Filtration System*" and installed as per supplier specification.
16. SWMH6 - Should the existing pipe from SWEX3 to SWEX4 be in the way of the new SWCP7, the pipe is to be re-laid to SWMH6 and connected to SWEX4. Existing grades and pipe sizes to be used.
17. Refer to C421 for Catchpit and Manhole Details.

Existing Services Legend:

- Boundary (Surveyed)
- Edge of Road
- Stormwater Pipe
- Stormwater Manhole, Wingwall, Scruffy Dome, Catchpit
- Open Drain
- Power Pole & Over Head Lines
- Transformer
- Fence

Proposed Services Legend:

- 0.5m Major Contour
- 0.1m Major Contour
- Prop. Kerb Block
- Prop. Kerb & Channel
- Prop. Flush Edge Beam

Proposed Services Legend:

- Asphalt Surface
- Proposed Concrete Surface
- Proposed Gravel Surface
- Rock Filled Traffic Island
- Stormwater Pipe
- Stormwater Perforated Pipe
- Stormwater Manhole
- SW Manhole with Scruffy Dome
- Stormwater Catchpit
- Stormwater Rodding Point
- Stormwater Swale
- Fence

N

1:3 Batter to EGL

1500mm Wide x 150mm Deep grassed swale to Catchpit

SWCP8

Rodding Point

SWRP2

1:3 Batter to EGL

Subsoil Drain as per Detail

2 x 675x450 Catchpits to be installed at sports field low point

SWCP9

SWEX1 - Existing 25,000L Duracrete Underground Tank to remain

SWRP1

Subsoil Drain as per Detail

SWCP1

SWMH1

Rodding Point

SWCP3

SWCP2

SWMH2

Replace grate inlet with solid cover and frame to new finished pavement levels

SWCP5

SWRP3

SWCP4

SWMH4

SWCP6

SWMH5

Remove existing pit and drainage pipe

SWEX2

SWMH3 - Stormfilter See SW Notes 5

SWEX4

Replace grid inlet with solid cover and frame to new finished pavement levels

SWCP7

SWSD1

SWEX2 Existing SW MH Structure to remain. Replace grate inlet with solid cover and frame.

SWMH6 - See SW Notes 16

SWEX3

110Ø Perforated Pipe wrapped in filter on base of 300mm Filtration Trench

300mm Wide Trench wrapped in Geotextile and filled with clean drainage metal. Trench to be covered with 100-150mmØ aggregate at least 200mm deep.

SWSD2

See details of the Traffic Island on sheet C420

0 2.5 5 7.5 10 12.5

Scale 1:250 (m)

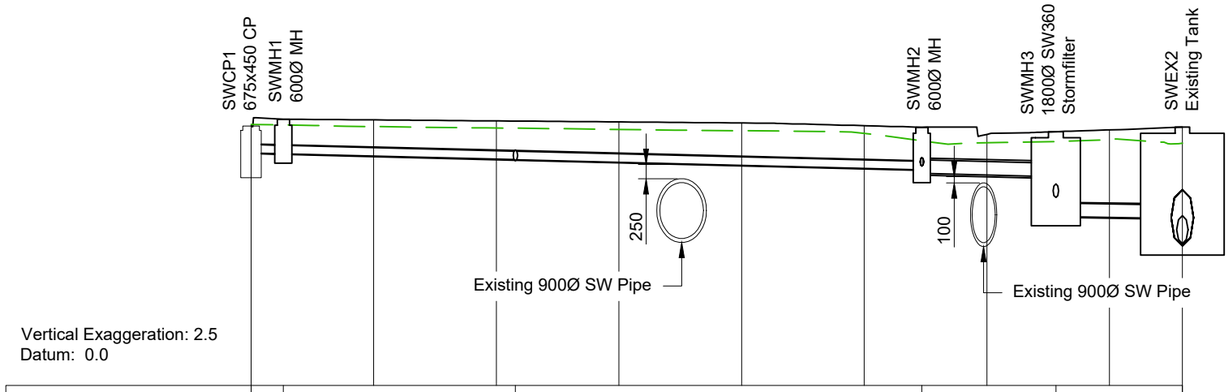
Original size = A3

Client	Project	Drawing Title	
Oruaiti School Board of Trustees c/o Avail Pacific	2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Parking Area & Accessway Stormwater Management Plan	LDE LAND DEVELOPMENT & ENGINEERING

No.	Issue/Revision		Date
A	Issued for Consent	H. D Aprvd	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	1:250

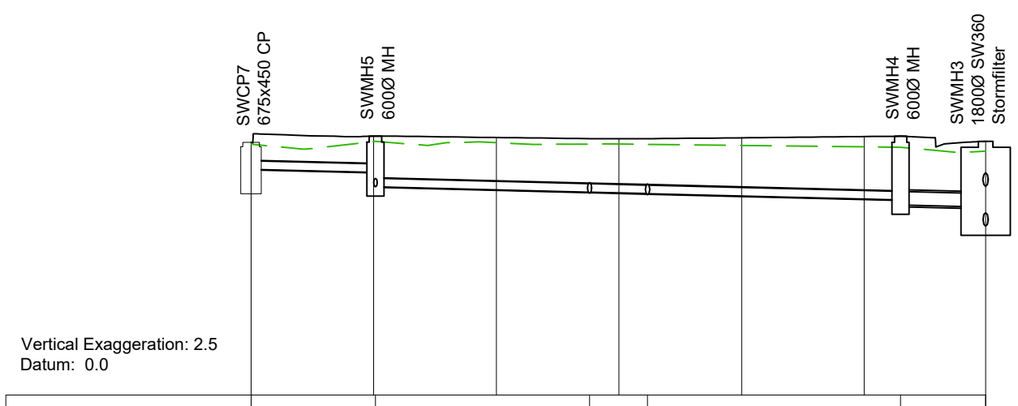
Project status:	For Consent
Project:	21102
Drawing No:	C400
Issue/Rev:	A



Vertical Exaggeration: 2.5
Datum: 0.0

Ground Level	4.23	4.34		4.29		4.21		4.14		4.21			
Invert Level		3.79	3.77		3.68		3.51		3.40		2.75		2.72
Depth to Invert	0.74	0.57		0.61		0.75		1.38		1.94			
Pipe Details	Ø150 UPVC SN16		Ø150 UPVC SN16		Ø150 UPVC SN16			Ø225 RCRRJ CLASS 4		Ø225 UPVC SN16			
Pipe Slope Pipe Length	1.00% (1:100) 0.68m		1.00% (1:100) 9.16m		1.00% (1:100) 16.27m			1.00% (1:100) 4.27m		0.67% (1:149) 2.73m			

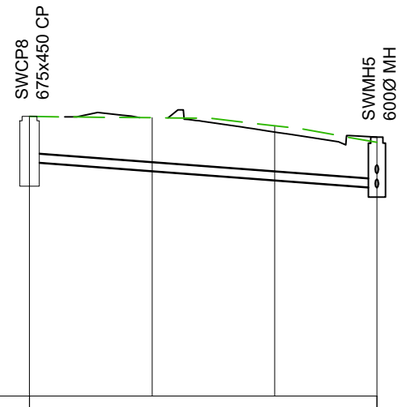
Long Section (SWCP1 TO SWMH3)



Vertical Exaggeration: 2.5
Datum: 0.0

Ground Level	4.12		4.22		4.16	4.17			4.22		4.14		
Invert Level		3.68	3.63	3.39	3.31	3.31	3.28	3.28	3.18	3.10	3.06		
Depth to Invert	0.74		0.83		0.85	0.89			1.12		1.38		
Pipe Details		Ø150 UPVC SN16		Ø150 UPVC SN16		Ø150 UPVC SN16		Ø150 UPVC SN16			Ø225 RCRRJ CLASS 4		
Pipe Slope Pipe Length		1.00% (1:100) 4.44m		1.00% (1:100) 8.43m		1.00% (1:100) 2.37m		1.00% (1:100) 10.02m			1.00% (1:100) 2.27m		

Long Section (SWCP7 TO SWMH3)



Vertical Exaggeration: 2.5
Datum: 0.0

Ground Level	4.56		4.22	
Invert Level		3.82		3.39
Depth to Invert	1.04		0.83	
Pipe Details	Ø150 UPVC SN16			
Pipe Slope Pipe Length	3.00% (1:33) 13.64m			

Long Section (SWCP8 TO SWMH5)

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

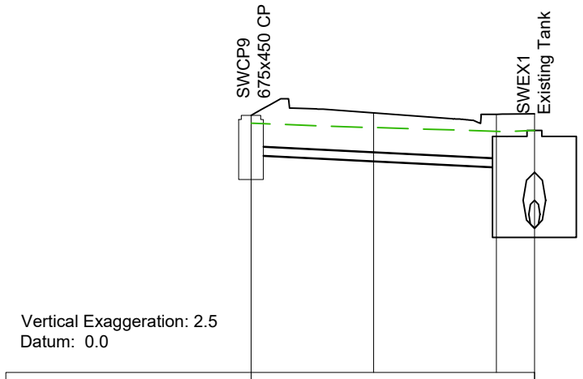
Drawing Title
Parking Area & Accessway
Stormwater Longitudinal Sections
Sheet 1 of 2

LDE LAND DEVELOPMENT & ENGINEERING

No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	1:250

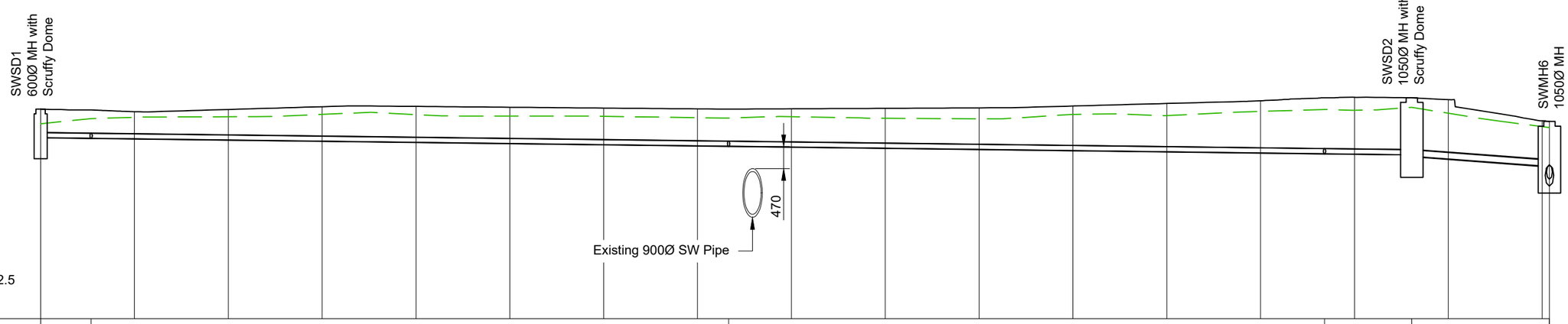
Project status: For Consent
Project: 21102
Drawing No: C410
Issue/Rev: A



Vertical Exaggeration: 2.5
Datum: 0.0

Ground Level	4.19	3.95
Invert Level	3.54	3.31
Depth to Invert	0.95	1.60
Pipe Details	Ø150 UPVC SN16	
Pipe Slope Pipe Length	2.00% (1:50) 9.69m	

Long Section (SPORTS FIELD CATCHPIT TO TANK)



Vertical Exaggeration: 2.5
Datum: 0.0

Ground Level	4.47	4.44	4.46	4.70	4.71	4.21		
Invert Level	3.86	3.85	3.85	3.68	3.68	3.52	3.52	3.50	3.46	3.24
Depth to Invert	0.91	0.59	0.78	1.18	1.55	1.38		
Pipe Details	Ø100 Perf. Pipe	Ø100 Perforated Pipe	Ø100 Perforated Pipe	Ø100 Perforated Pipe	Ø150 UPVC SN16			
Pipe Slope Pipe Length	0.50% (1:200) 2.39m	0.50% (1:200) 33.97m	0.50% (1:200) 31.75m	0.50% (1:200) 4.13m	3.00% (1:33) 6.29m			

Long Section (DRAINAGE TRENCH)

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

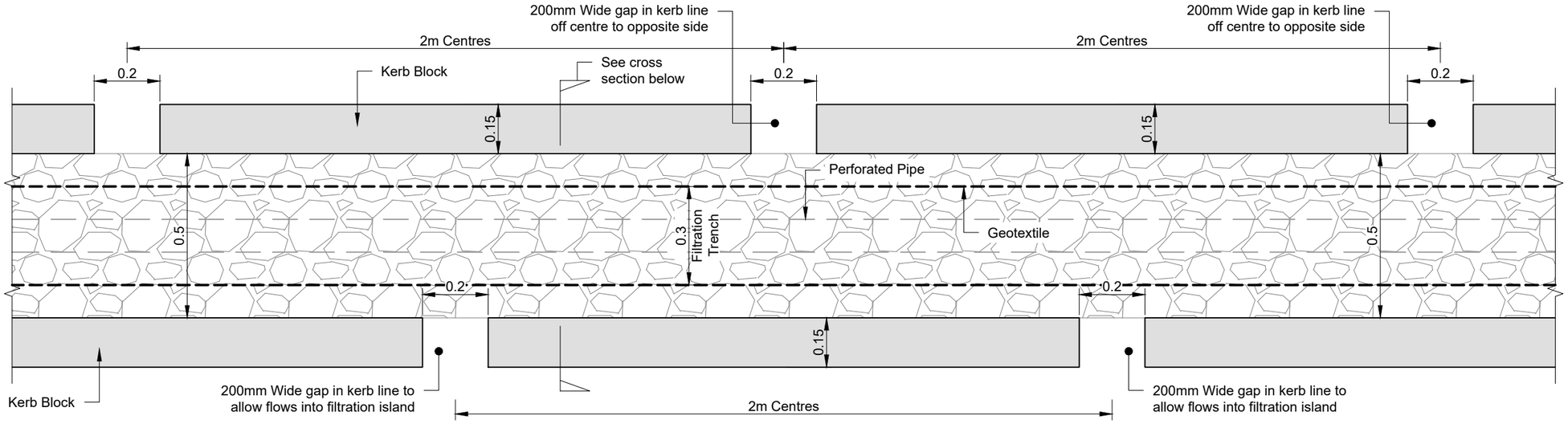
Drawing Title
Parking Area & Accessway
Stormwater Longitudinal Sections
Sheet 2 of 2

LDE LAND DEVELOPMENT & ENGINEERING

No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	H. D	1 May 2024

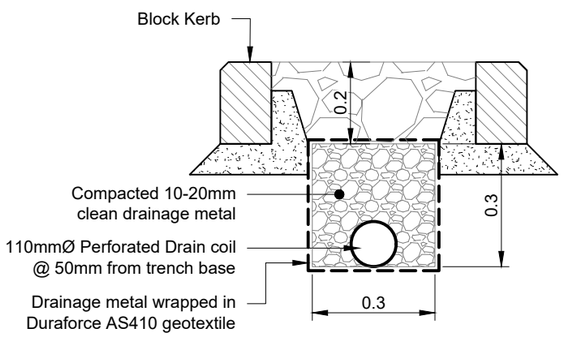
Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	1:250

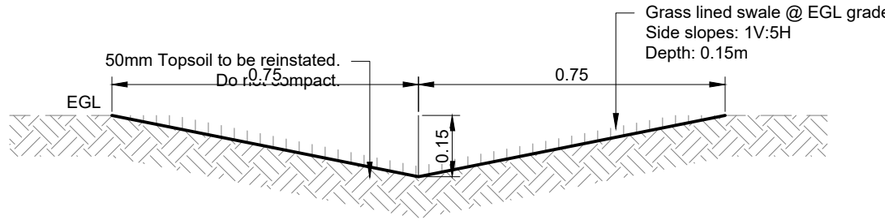
Project status: For Consent
Project: 21102
Drawing No: C411
Issue/Rev: A



Typical Traffic Island Plan View

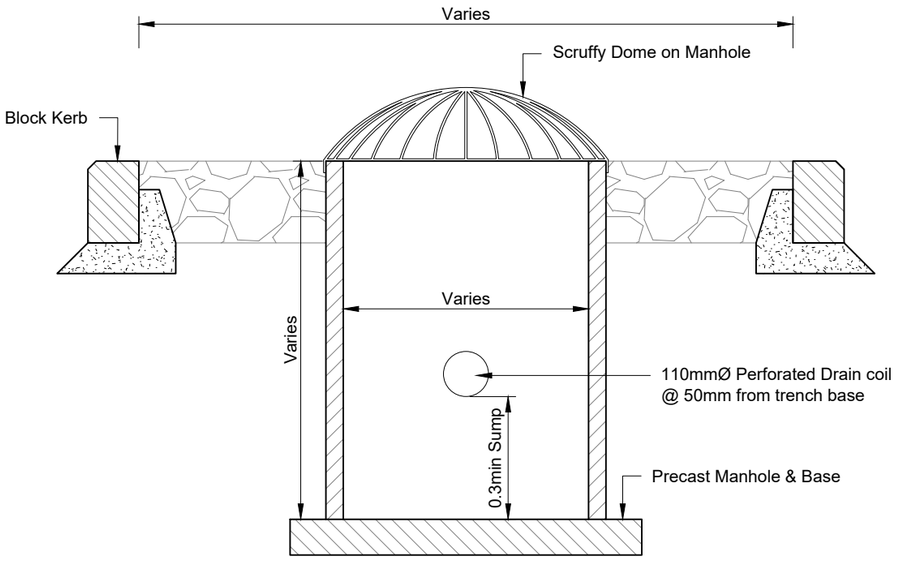
Not to Scale





Typical Grassed Swale Detail

Not to Scale

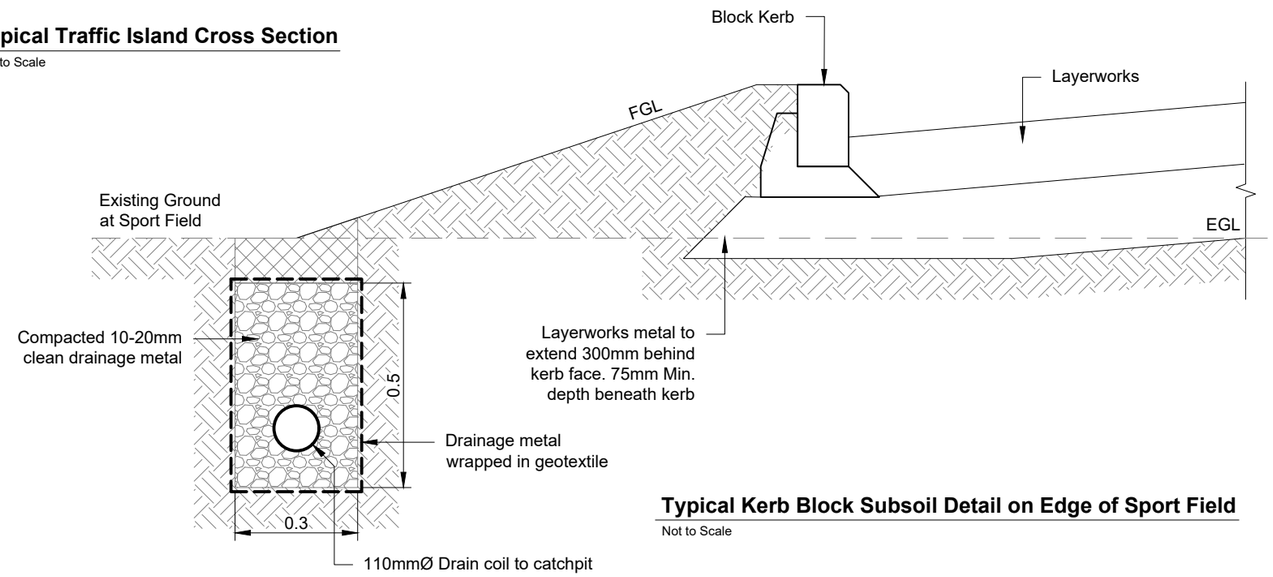


Typical Traffic Island Cross Section with Scruffy Dome

Not to Scale

Typical Traffic Island Cross Section

Not to Scale



Typical Kerb Block Subsoil Detail on Edge of Sport Field

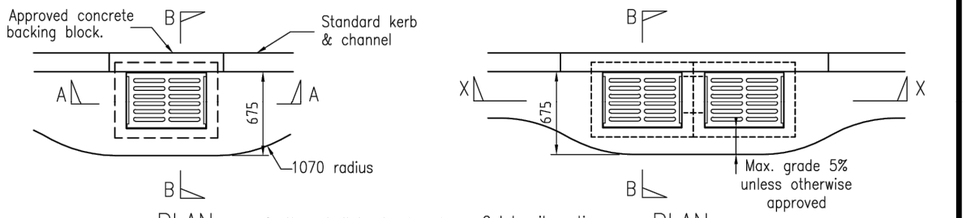
Not to Scale

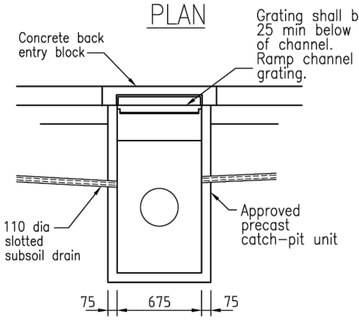
Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific	Project: 2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Drawing Title: Parking Area & Accessway Typical Stormwater Device Details	LDE LAND DEVELOPMENT & ENGINEERING	Design: R. de Swardt Drawn: R. de Swardt Approved: H. Dubinko Scale A3: As Shown	Project status: For Consent Project: 21102 Drawing No: C420 Issue/Rev: A

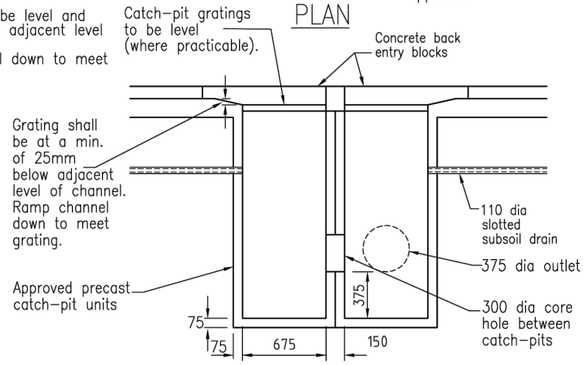
No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	H. D	1 May 2024

Sheet 34 Catch-Pit Details

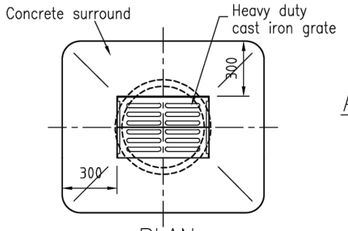




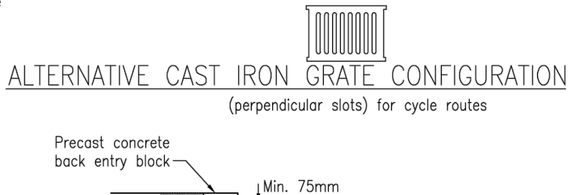
SECTION A–A
SINGLE CATCH–PIT



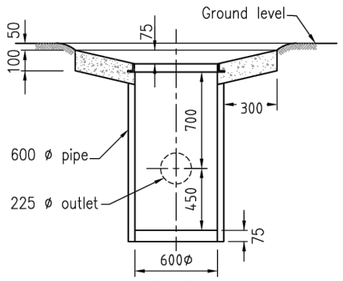
SECTION X–X
DOUBLE CATCH–PIT



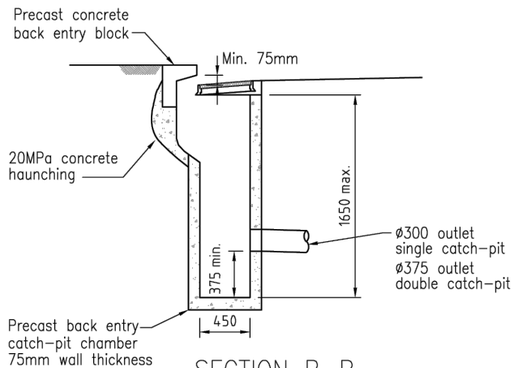
PLAN



ALTERNATIVE CAST IRON GRATE CONFIGURATION
(perpendicular slots) for cycle routes



SECTION
FIELD CATCH–PIT DETAIL

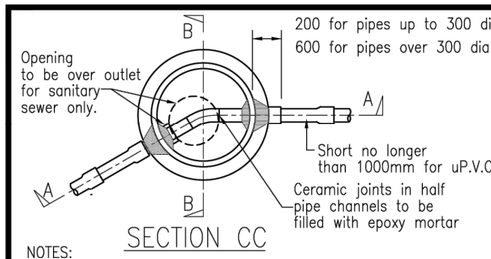


SECTION B–B

NOTES:
1. Concrete to be ordinary grade (20MPa) in accordance with NZS 3104:2021
2. Catch–pit outlet pipes to be 1:100 min gradient.
3. Mega catch–pits require specific design and approval.
4. Grates to be cycle friendly. Refer Section 3.2.14.6.

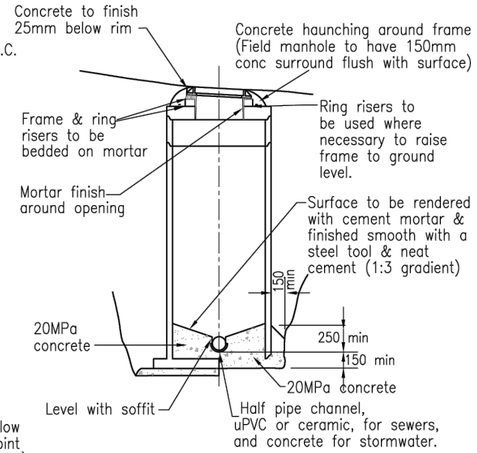
CATCH–PIT DETAILS FOR ENVIRONMENTS LIVING 1 AND 2, AND BUSINESS 1–5	Date: FEB 2022 Revision: 0.2 Scale: AS SHOWN SHEET No. 34
FAR NORTH DISTRICT COUNCIL ENGINEERING STANDARDS	

Sheet 39 Standard Precast Manhole

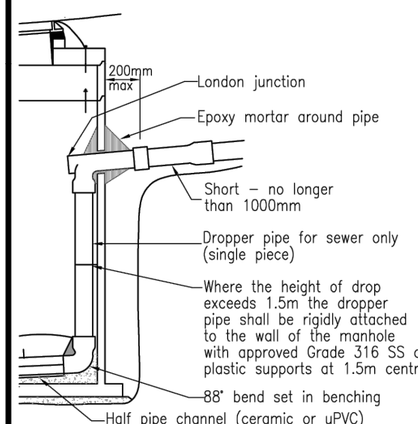


SECTION CC

NOTES:
1. This detail is applicable for pipe diameters up to 600mm & for manhole depths up to 5.0m.
2. 150mm thick reinforced concrete lids with heavy duty ductile iron frames & covers to be used in driveways, carriageways & berms. 100mm thick concrete lids with light duty cast iron frames & covers may be used elsewhere.
3. Precast manhole bases shall be used in all instances with minimum sized holes cut for pipe entry.
4. No additional thin plastering of benching or benching of inverts is permitted.
5. All concrete to be 20MPa.
7. Where non–concrete pipe connections are made to concrete manholes, then a gritted starter pipe shall be installed to allow bond between manhole and pipe material. Also, a 3flexible joint should be specified as part of gritted starter pipe (as standard).
8. All manholes >1.2m in depth shall be provided with manhole step rungs. These shall follow the requirements on sheet 40

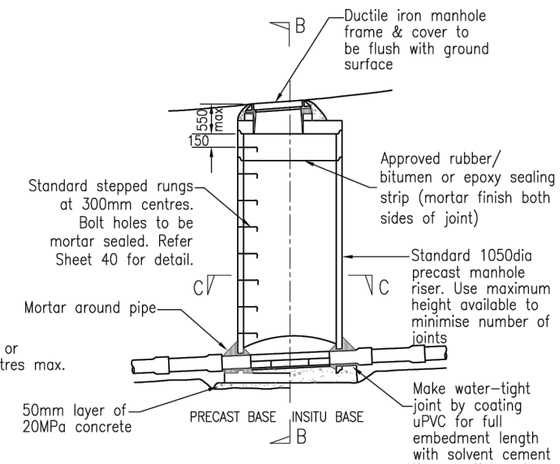


SECTION BB



SECTION A–A INTERNAL DROP

Note:
1. This detail is applicable for pipe diameters up to 250mm & for manhole depth up to 5.0m & for manhole diameters ⩾ 1200mm.
2. External drops shall not be used



SECTION AA

STANDARD PRECAST MANHOLE SEWER AND STORMWATER FOR ALL ENVIRONMENTS	Date: FEB 2022 Revision: 0.2 Scale: AS SHOWN SHEET No. 39
FAR NORTH DISTRICT COUNCIL ENGINEERING STANDARDS	

Original size = A3

Client	Project	Drawing Title
Oruaiti School Board of Trustees c/o Avail Pacific	2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Parking Area & Accessway Typical Stormwater Details

LDE LAND DEVELOPMENT & ENGINEERING

No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	As Shown

Project status:	For Consent
Project:	21102
Drawing No:	C421
Issue/Rev:	A

APPENDIX C

SUPPLIER INFORMATION AND TECHNICAL DRAWINGS

LITTATRAP™

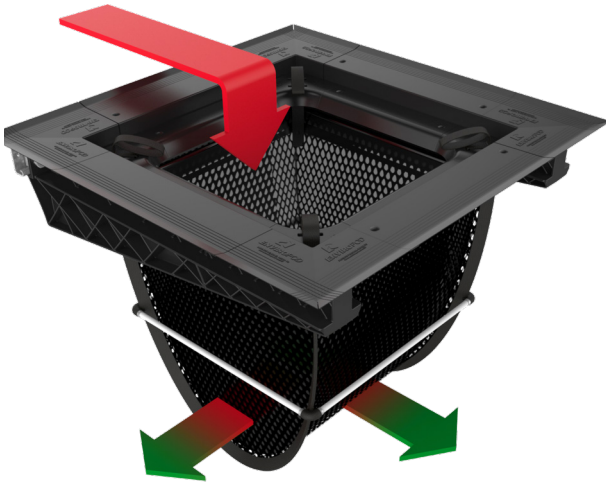
Low-cost catchpit insert for removal of litter and gross pollutants from run-off

Litter, leaves and other gross pollutants such as cigarette butts wash into our storm drains daily, and are responsible for degradation of our streams, rivers, lakes and beaches. Stormwater runoff from existing drainage network largely flows untreated into our marine environment and negatively effects the water quality, land value and marine life. LittaTrap is a low-cost solution to remove these pollutants.

The LittaTrap is an award-winning catchpit insert designed to be easily retrofitted into new and existing stormwater catchpits to specifically target litter, leaves and gross pollutants, capturing them at source and preventing them from accumulating in our waterways.

The LittaTrap is very cost effective and easy to maintain. Simply lift the filterbag out of the catchpit, empty and then replace back into the frame. This efficient solution captures and removes plastics and other pollutants before they reach the stormwater outfall.

The LittaTrap is also effective as a pre-treatment device for use in a treatment train with hydrodynamic separators, filtration devices, ponds and wetlands. In many cases, it is often the most practical solution for retrofits.



HOW DOES IT WORK?

As stormwater enters a storm grate or catchpit, it passes through the filterbag. Litter, debris, and other pollutants larger than the filterbag aperture are captured and retained.

If the filterbag is full or during high flows, the overflow is released through the overflow apertures in the frame assembly.

DESIGN AND OPERATION

The LittaTrap is fixed by brackets to the catchpit precast concrete wall below the inlet grate allowing the filter insert to be easily lifted out by hand for maintenance. Consisting of a structural bracket assembly with flow diverter seal and a removable filterbag insert which allows for high flow bypass, the LittaTrap is simple to install and remove.

Once the filter insert has been removed, open access to the base of the catchpit and outlet pipe means any accumulated sediment in the pit can easily be removed by inductor truck if required.

Standard sizes fit the common precast concrete regular and curb entry catchpits. Custom designs may be fabricated for non-standard catchpits.

CAPABILITIES

- Captures litter, leaves, debris and gross pollutants before they enter the drainage system
- Fits a range of catchpit sizes – ideal for retrofits
- Easy access - maintenance friendly design, can be hand maintained
- Bypasses high flows with no moveable parts
- Adjustable flow diverter allows fine-tuning during installation for a perfect fit
- Third party tested at Auckland University

BENEFITS

- Can be used to target high litter areas
- No construction means low capital costs
- Ideal pre-treatment device for filters, ponds, wetlands or other stormwater management and WSD practices
- A range of filterbag sizes to target gross pollutants
- Hand maintainable
- No confined space entry

EASY MAINTENANCE

The LittaTrap is very cost-effective and easy to maintain as the filterbag can be simply picked up and emptied by hand. As the LittaTrap is hand maintainable, it can be easily cleaned by site owners or maintenance crew without the need for vacuum inductor trucks or heavy lifting equipment. The pits can be visually inspected and accessed from grade, so there is no requirement for confined space entry, reducing maintenance costs.

LittaTrap filters should be inspected periodically to determine maintenance frequency. The frequency of maintenance services should be reviewed at the completion of each clean and modified if pollutant loadings deem this necessary. At the required maintenance interval the contaminants need to be removed from the filterbags and disposed of appropriately.

The maintenance crew is responsible for the disposal of debris in accordance with all applicable regulations and is responsible for following all Health and Safety requirements.

Contact the Stormwater360 maintenance department at **maintenance@Stormwater360.co.nz** for more information.

HAND MAINTENANCE IS AS EASY AS 'LIFT, TIP, REPLACE'

1. Lift LittaTrap out of pit using handles
3. Tip contents out of LittaTrap into suitable receptacle for contents
2. Replace LittaTrap securely back into surrounding frame and seal


Captured gross pollutant


LittaTrap Catchpit

CONTACT DETAILS

Stormwater360

FREEPHONE:
0800 STORMWATER
(0800 786769)

www.stormwater360.co.nz

Stormwater360®
BETWEEN SKY AND SEA

STORMFILTER™

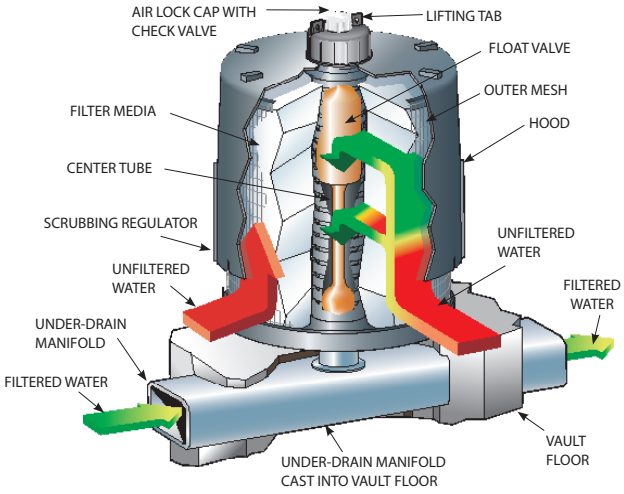
High efficiency / low maintenance stormwater filter.

SIPHON-ACTUATED FILTRATION The stormwater management StormFilter™ cleans stormwater through a patented passive filtration system, effectively removing pollutants to meet the most stringent regulatory requirements. Highly reliable, easy to install and maintain, and proven performance over time, StormFilter™ products are recognised as a versatile BMP for removing a variety of pollutants, such as sediments, oil and grease, metals, organics, and nutrients. These systems come in variable configurations to match local conditions and come with prolonged maintenance periods to ensure long-term performance and reduce operating costs.

HOW DOES IT WORK?

During a storm, runoff passes through the filtration media and starts filling the cartridge center tube. Air below the hood is purged through a one-way check valve as the water rises. When water reaches the top of the float, buoyant forces pull the float free and allow filtered water to drain.
After the storm, the water level in the structure starts falling. A hanging water column remains under the cartridge hood until the water level reaches the scrubbing regulators. Air then rushes through the regulators releasing water and creating air bubbles that agitate the surface of the filter media, causing accumulated sediment to drop to the vault floor. This patented surface-cleaning mechanism helps restore the filter's permeability between storm events.

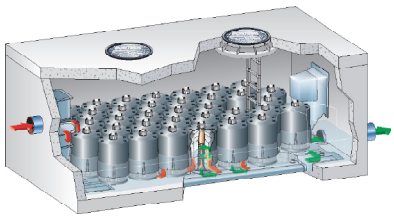
STORMFILTER™ CARTRIDGE



PROVEN PERFORMANCE

- First independently verified filter by Washington Department of Ecology, New Jersey Department of Environmental Protection and USEPA's Environmental Technology Verification program
- Approved and accepted by most regulatory bodies across New Zealand
- Over 16,800 x StormFilter's™ cartridges installed throughout New Zealand
- Continual innovation Design refined and perfected over two decades of research and experience

STORMFILTER™ VAULT



STORMFILTER BENEFITS

UNDERGROUND SYSTEMS MAXIMISE PROFITABILITY

- Save land space allowing denser developments reducing sprawl
- Add parking spaces and increase building size, increasing profitability
- Compact design reduces construction and installation costs by limiting excavation

RELIABLE LONGEVITY & LOWER MAINTENANCE COSTS

- Self cleaning hood prevents surface blinding, ensures use of all media and prolongs cartridge life
- 1-3 year maintenance cycles
- 20 years maintenance experience
- Minimal or no standing water. Lower disposal costs

CONTACT DETAILS

Stormwater360

FREEPHONE:
0800 STORMWATER
(0800 786769)

www.stormwater360.co.nz

Stormwater360®
BETWEEN SKY AND SEA

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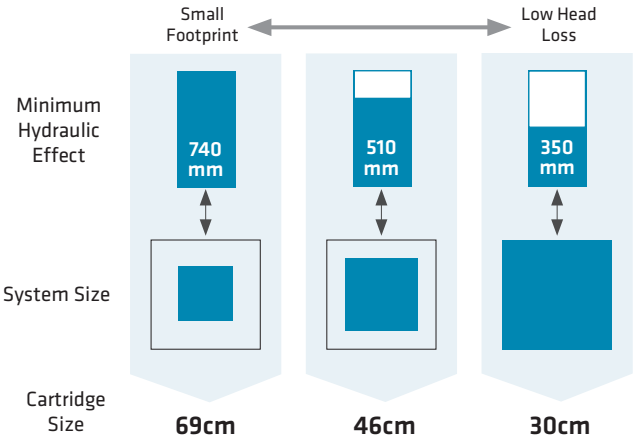
BETWEEN SKY AND SEA

SUPERIOR HYDRAULICS

Multiple cartridge heights gives design solutions for site restraints.



Other hydraulic benefits

- Hydraulic effect as low as 350mm head loss
- Zero surcharge of inlet pipe unlike upward flowing filters
- Can be designed for tail water e.g tidal conditions
- Online and offline configurations can limit hydraulic effects

MEDIA CHOICES

Our filtration products can be customised using different filter media to target site-specific pollutants. A combination of media is often recommended to maximise pollutant removal effectiveness.

Perlite is naturally occurring puffed volcanic ash. Effective for removing TSS, oil and grease.

ZPG™ is a multi-purpose media option approved for highly trafficked sites or sites with high metal loadings. ZPG is a mixture of Zeolite, Perlite and GAC (granular activated carbon). ZPG is ideal for removing soluble metals, TSS, oils and grease, organics and ammonium.

Zeolite is a naturally occurring mineral used to remove soluble metals, ammonium and some organics.

GAC (Granular Activated Carbon) has a micro-porous structure with an extensive surface area to provide high levels of adsorption. It is primarily used to remove oil and grease and organics such as PAHs and phthalates.

CONFIGURATION

Stormfilter's can be configured in any drainage structure. Please contact SW360 for a customised design.

PRECAST VAULT

- Treats medium sized sites
- Simple installation – arrives on-site fully assembled
- Plug and play solution

PRECAST MANHOLE

- Provides a low drop, point-of-entry configuration
- Uses drop from the curb inlet to the conveyance pipe to drive the passive filtration cartridges
- No crane required (Hi-AB lifting for most sizes)
- 1050-2400mm diameter sizes available

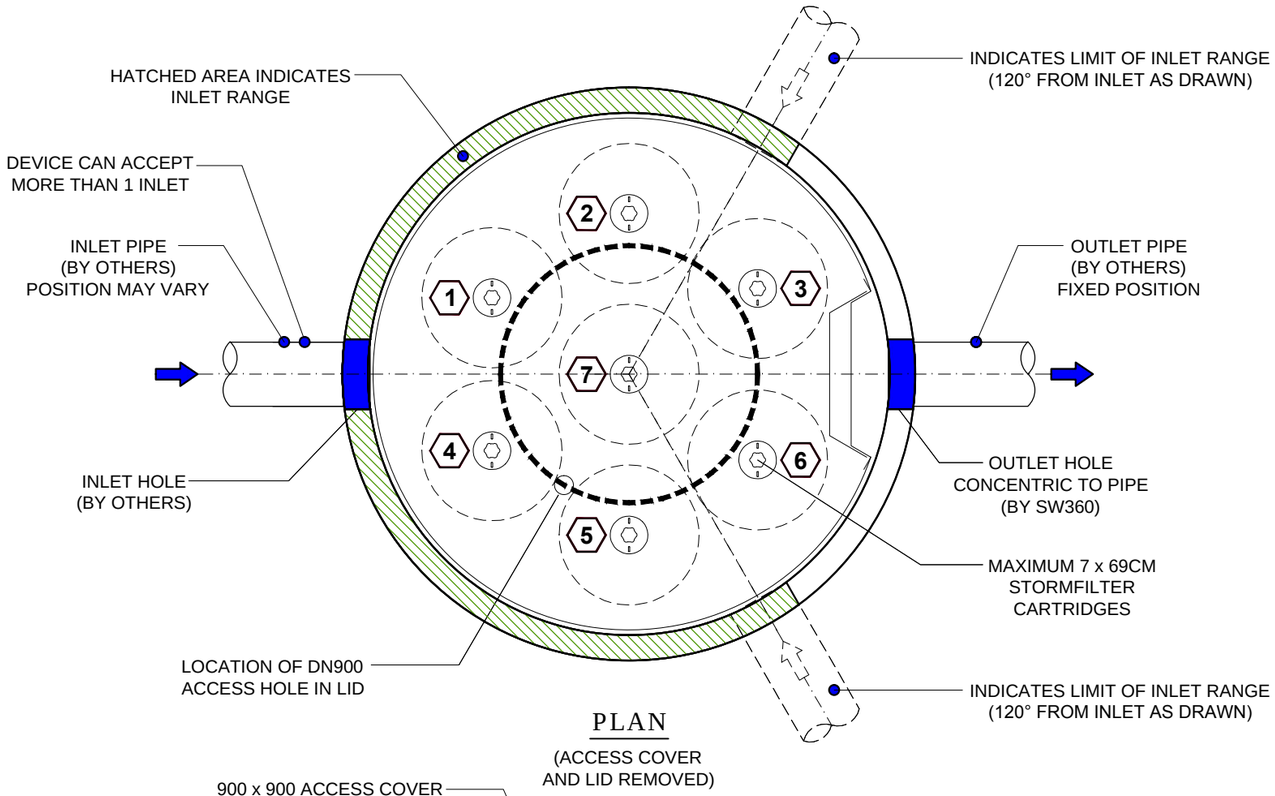
HIGH FLOW

- Treats flows from large sites
- Consists of large, precast components designed for easy assembly on-site
- Several configurations available, including: Panel Vault, Box Culvert, or Cast-In-Place

PEAK DIVERSION

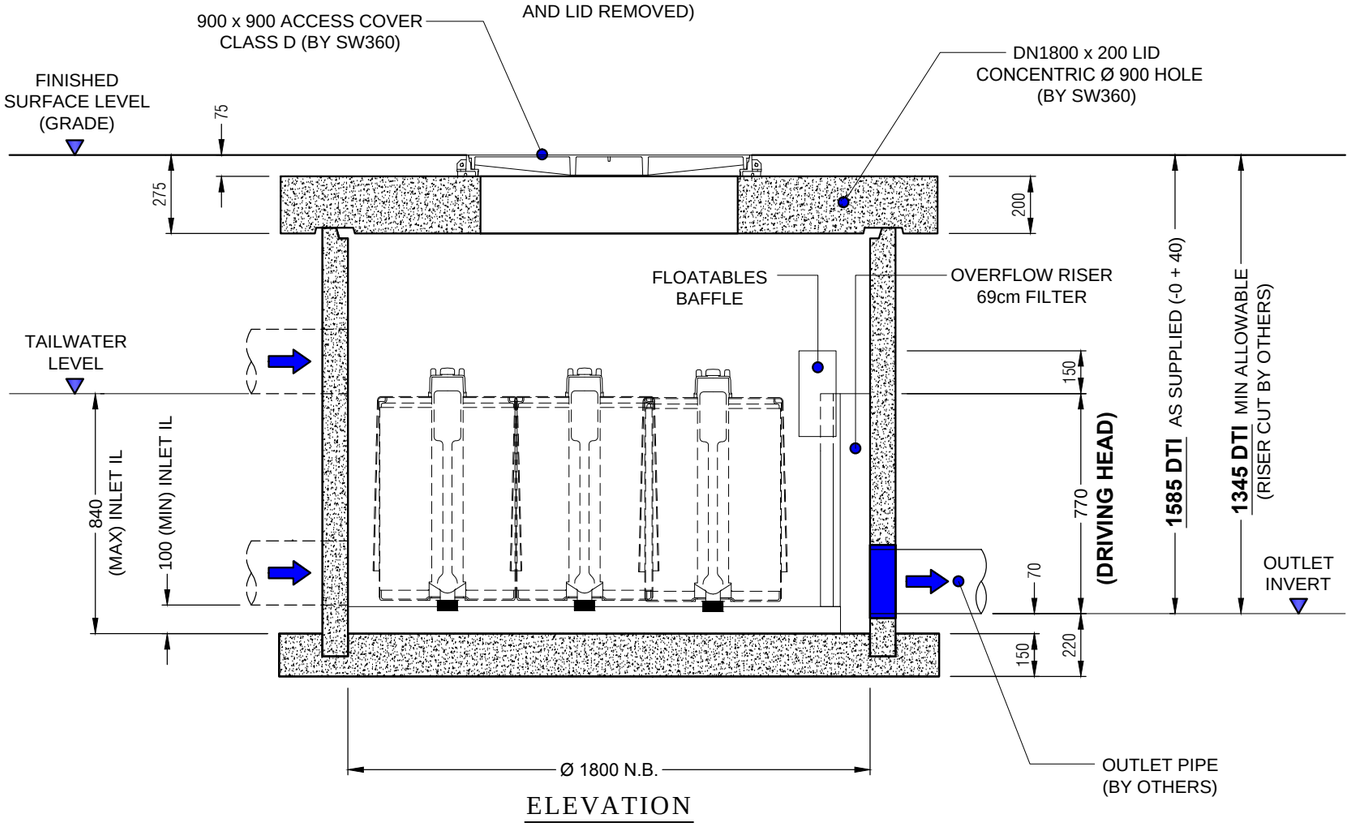
- Combines off-line bypass and StormFilter™ pollutant removal into one structure
- Internal weir allows high peak flows with low hydraulic head losses
- Approved and accepted as offline configuration by councils around NZ
- Eliminates cost of additional structures to bypass peak flows
- Reduces the overall footprint of the treatment system

Stormwater360®
BETWEEN SKY AND SEA



PLAN

(ACCESS COVER AND LID REMOVED)



ELEVATION

TO BE COMPLETED BY CUSTOMER / CONTRACTOR

COMPANY :					P.O. NUMBER :	
SITE ADDRESS :						
SITE CONTACT & PHONE :						
PREFERRED DELIVERY DATE (TBC SW360) :						
STORMFILTER REFERENCE (IF APPLICABLE) :						
OUTLET HOLE Ø (CIRCLE) : *(TYPICAL PIPE MATERIAL)*	**Ø 275** *(DN225 PVC)*	**Ø 300** *(DN225 RRJ)*	**Ø 350** *(DN300 PVC)*	**Ø 400** *(DN300 RRJ)*	**Ø 500** *(DN375 RRJ)*	**Ø 600** *(DN450 RRJ)*
LID LEVEL (RL) :		OUTLET PIPE (IL) :			DTI :	
COMPLETED BY :		SIGNED :			DATE :	

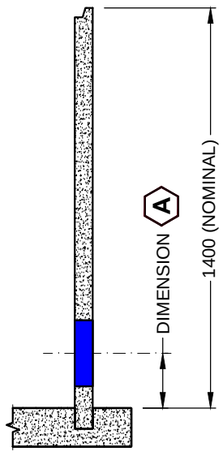
TO BE COMPLETED BY SW360

SW360 PRODUCT CODE :				
MEDIA TYPE (CIRCLE ONE) :	PERLITE	ZPG	OTHER :	
CARTRIDGE QTY (STATE) :			PRE-INSTALLATION (Y/N) :	
SP FLOW RATE (CIRCLE ONE) :	FULL (Ø 27.6 ID) BLACK/MUSTARD	3 QTR (Ø 24.0 ID) WHITE/OPAL	HALF (Ø 19.7 ID) GREEN	OTHER :
ACCESS COVER (CIRCLE ONE) :	900 x 900 WEB-FORGE / CLASS D		OTHER :	
COMPLETED BY :	SIGNED :		DATE :	

SW360 PRODUCTION DATA

OUTLET HOLE DETAILS :

(CIRCLE REQUIREMENT)



OUTLET HOLE Ø	DIM (A)
275	190
300	180
350	220
400	225
500	260
600	315

DWG ISSUE No. :

REQUIRED DATE :

NOTES

1. MANHOLE UNIT FITTED WITH SWIFTLIFT ANCHOR POINTS (QTY 2). DO NOT EXCEED 60 DEGREE LIFT ANGLE. CONCRETE LID FITTED WITH SWIFTLIFT ANCHOR POINTS (QTY 4).
2. UNIT SUPPLIED WITH OUTLET CORE DRILLED. INLET/S CORE DRILLED ON SITE BY OTHERS WITHIN RANGE SHOWN ON DRAWING.
3. SEALING / GROUTING OF MANHOLE COMPONENTS AND PIPES BY CONTRACTOR. ENSURING LOCAL CODES AND REGULATIONS ARE COMPLIED WITH.
4. ANY RISERS REQUIRED TO INCREASE THE DEPTH TO INVERT (DTI) FROM THAT AS DRAWN TO BE SUPPLIED BY THE CONTRACTOR.
5. FOR A DTI EXCEEDING 5m PLEASE CONTACT **0800STORMWATER**.
6. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION RELATED EROSION RUNOFF.
7. BACKFILL, BEDDING AND BUOYANCY DESIGN BY ENGINEER OF RECORD
8. QTY OF CARTRIDGES BY ENGINEER OF RECORD.
9. CONCRETE MANHOLE RISERS ARE DESIGNED AND MANUFACTURED IN ACCORDANCE WITH AS/NZS 4058 : 2007
10. CONCRETE MANHOLE BASES ARE DESIGNED AND MANUFACTURED IN ACCORDANCE WITH NZS 3101 : 2006 & NZS 3109 : 1997
11. CONCRETE LID DESIGNED AND MANUFACTURED TO HN-HO-72
12. FOR REQUIREMENTS OUTSIDE OF DRAWING SPECIFICATIONS PLEASE CONTACT **0800STORMWATER**.

APPROX WEIGHTS

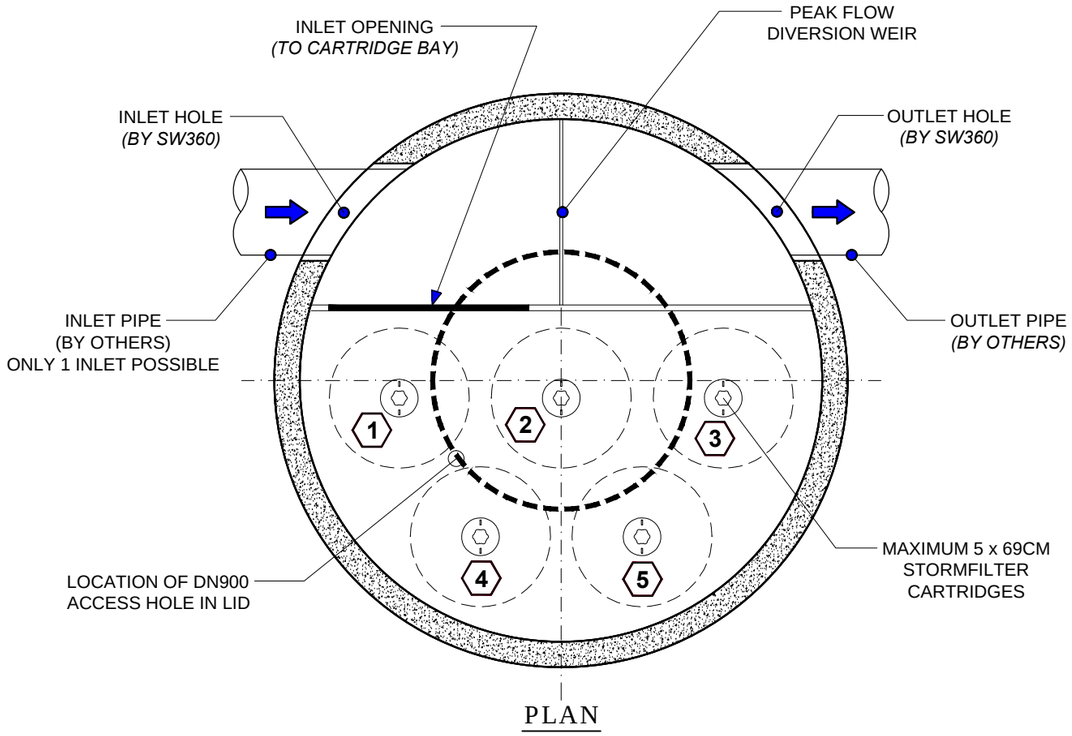
MANHOLE SECTION INCLUDING CARTRIDGES : **4050 Kg**
(AS DELIVERED, BASED ON QTY 7 ZPG CARTS)
LID WEIGHT : **1850 Kg**

Stormwater360
BETWEEN SKY AND SEA
0800 STORMWATER
sales@stormwater360.co.nz
www.stormwater360.co.nz

STORMFILTER®
CARTRIDGE FILTRATION SYSTEM
69cm CART / DN1800 x 1500 MH - TRAFFICABLE
GENERAL ARRANGEMENT

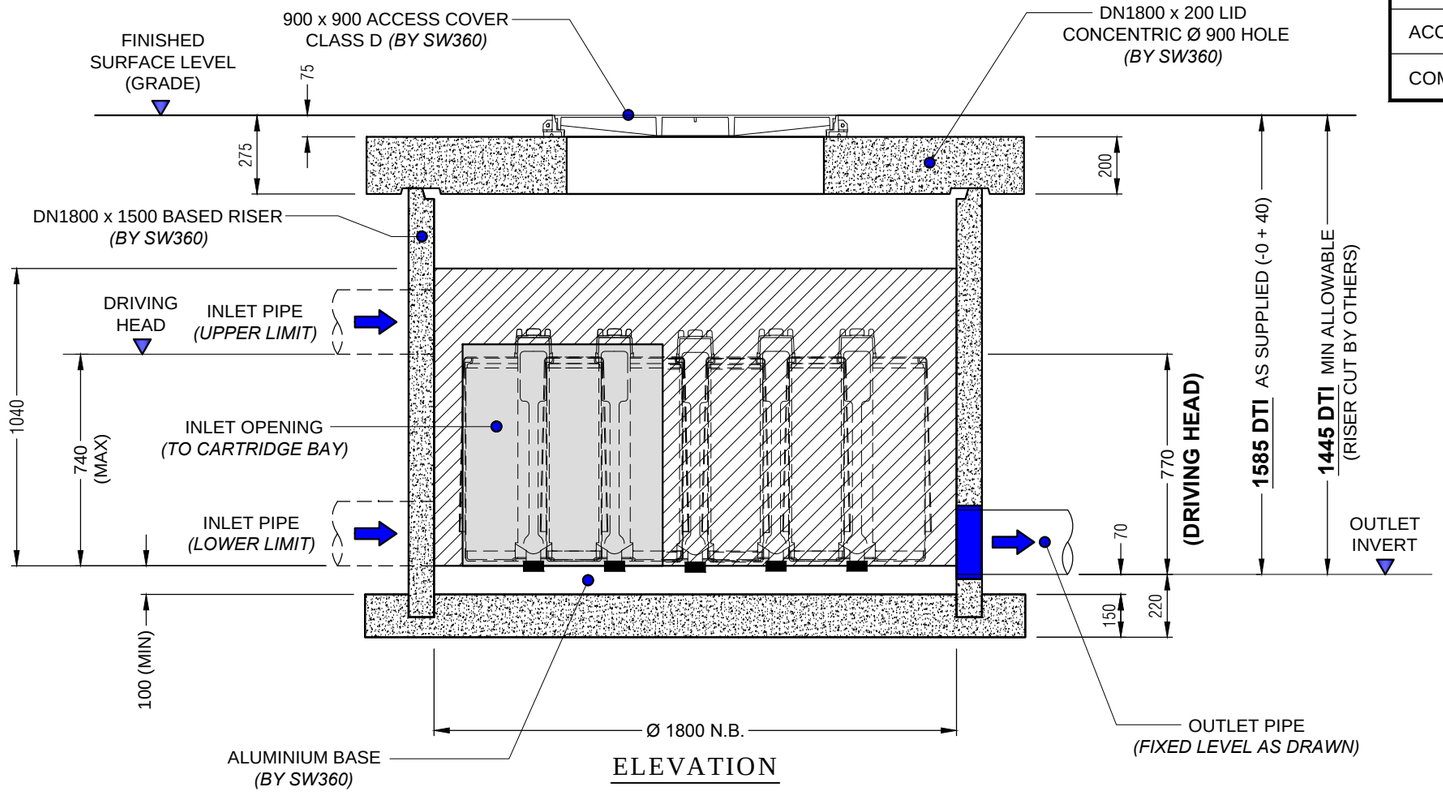
SCALE : NTS | DRG No : SF-MH-69-1800-T-20 | REV : 1 | DATE : 01.03.19

JOB NO :				REV	REVISION DETAIL	DATE
PROJECT :				0	APPROVED	01.03.19
				1	MARK-UPS	09.04.19
DRN :	R.P.	01.03.19				
CKD :	G.S.	G.Y.	01.03.19			



PLAN

(ACCESS COVER AND LID REMOVED)



ELEVATION

TO BE COMPLETED BY CUSTOMER / CONTRACTOR

COMPANY :		P.O. NUMBER :	
SITE ADDRESS :			
SITE CONTACT & PHONE :			
PREFERRED DELIVERY DATE (TBC SW360) :			
STORMFILTER REFERENCE (IF APPLICABLE) :			
INLET PIPE Ø : *DN300 RCRRJ - MAX* *DN375 PVC - MAX*	PIPE MATERIAL : *(PVC OR RCRRJ)*	CORE DRILL Ø :	INLET (IL) :
OUTLET PIPE Ø : *DN300 RCRRJ - MAX* *DN375 PVC - MAX*	PIPE MATERIAL : *(PVC OR RCRRJ)*	CORE DRILL Ø :	OUTLET (IL) :
LID LEVEL (RL) :	DTI :	ORIENTATION : 180° *(AS DRAWN)* / 90° / 135°	
COMPLETED BY :		SIGNED :	DATE :

TO BE COMPLETED BY SW360

SW360 PRODUCT CODE :				
MEDIA TYPE (CIRCLE ONE) :	PERLITE	ZPG	OTHER :	
CARTRIDGE QTY (STATE) :			PRE-INSTALLATION (Y/N) :	
SP FLOW RATE (CIRCLE ONE) :	FULL (Ø 27.6 ID) BLACK/MUSTARD	3 QTR (Ø 24.0 ID) WHITE/OPAL	HALF (Ø 19.7 ID) GREEN	OTHER :
ACCESS COVER (CIRCLE ONE) :	900 x 900 WEB-FORGE / CLASS D		OTHER :	
COMPLETED BY :	SIGNED :		DATE :	

NOTES

1. MANHOLE UNIT FITTED WITH 2 SWIFTLIFT ANCHOR POINTS. DO NOT EXCEED 60 DEGREE LIFT ANGLE. CONCRETE LID FITTED WITH 4 SWIFTLIFT ANCHOR POINTS.
2. UNIT SUPPLIED WITH INLET & OUTLET CORE DRILLED.
3. SEALING / GROUTING OF MANHOLE COMPONENTS AND PIPES BY CONTRACTOR. ENSURING LOCAL CODES AND REGULATIONS ARE COMPLIED WITH.
4. ANY RISERS REQUIRED TO INCREASE THE DEPTH TO INVERT (DTI) FROM THAT AS DRAWN TO BE SUPPLIED BY THE CONTRACTOR.
5. FOR A DTI EXCEEDING 5m PLEASE CONTACT **0800STORMWATER**.
6. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION RELATED EROSION RUNOFF.
7. BACKFILL, BEDDING AND BUOYANCY DESIGN BY ENGINEER OF RECORD
8. QTY OF CARTRIDGES BY ENGINEER OF RECORD.
9. CONCRETE MANHOLE RISERS ARE DESIGNED AND MANUFACTURED IN ACCORDANCE WITH AS/NZS 4058 : 2007
10. CONCRETE MANHOLE BASES ARE DESIGNED AND MANUFACTURED IN ACCORDANCE WITH NZS 3101 : 2006 & NZS 3109 : 1997
11. CONCRETE LID DESIGNED AND MANUFACTURED TO HN-HO-72
12. FOR REQUIREMENTS OUTSIDE OF DRAWING SPECIFICATIONS PLEASE CONTACT **0800STORMWATER**.

APPROX WEIGHTS

MANHOLE SECTION INCLUDING CARTRIDGES : **3900 Kg**
(AS DELIVERED, BASED ON QTY 5 ZPG CARTS)
LID WEIGHT : **1800 Kg**

Stormwater360
BETWEEN SKY AND SEA

0800 STORMWATER
sales@stormwater360.co.nz
www.stormwater360.co.nz

STORMFILTER® PEAK DIVERSION
OFF - LINE CARTRIDGE FILTRATION SYSTEM
69cm CART / DN1800 x 1500 MH - TRAFFICABLE
GENERAL ARRANGEMENT

SCALE : N.T.S. | DRG No : SF-MHPD-69-1800-T-20 | REV : 0 | DATE : 22.05.19

JOB NO :			REV	REVISION DETAIL	DATE
PROJECT :			A	FOR APPROVAL	22.05.19
			0	APPROVED	23.05.19
DRN :	R.P.	22.05.19			
CKD :	G.S.	22.05.19			

CSF 0054; StormFilter Flow-Based Sizing - Other

Stormwater360

Project Name	Oruaiti School Parking area & Access way	**Location**	Mangonui 2554 State Highway 10,		
Job #	8021 **Device #** SWMH 2	**Option #**	A	**Revision #**	RA
Author	[Choose Designer]	**Date**	11 April 2024		

CALCULATIONS - Please Read Instructions First

1.0 Water Quality Design Storm Peak Runoff Flowrate (RATIONAL METHOD)

1.1 Runoff Co-efficients

Coefficient of Impervious Roof (**Croof**)	0.90
Coefficient of Impervious Road (**Croad**)	0.85
Coefficient of Pervious Area (**Cper**)	0.25

1.2 Catchment Areas

Area Impervious Roof (**Aroof**)	0 m^2
Area Impervious Road (**Aroad**)	3000 m^2
Area Pervious Area (**Aper**)	0 m^2
Area Total Catchment (**Acatch**)	3000 m^2
Product of Area & Coefficients (**CA**)	2550 m^2

1.3 Rainfall Intensity

Water Quality Rainfall Intensity (**iWQ**)	10 mm/hr

1.4 Water Quality Design Storm Peak Runoff Flowrate

Design Water Quality Treatment Flowrate (**Qwq**)	7.083 L/s

2.0 StormFilter Peak Treatment Flowrate

2.1 Preliminary

Cartridge Media (**Media**)	Perlite
Cartridge Height (**Hcart**)	69 cm
Diameter Disc Orifice (**d**)	27.6 mm
Internal bypass weir height (**Hweir**)	0.79 m
Priming depth (**Hprime**)	0.66 m
Area of a Cartridge (**Acart**)	0.181 m^2

2.2 StormFilter Cartridge Peak Treatment Flowrate

StormFilter cartridge stage-discharge equation	$=0.111d^{2.06}\Delta h^{0.5}$ L/min
Peak treatment flowrate at internal bypass per cartridge (**Qcart**)	1.420 L/s/cart
Number (actual) of StormFilter cartridges required	4.988 cart(s)
Number (rounded) of StormFilter cartridges required	5 cart(s)
Design StormFilter Treatment Flowrate (**QSF**)	7.100 L/s

3.0 Estimate Sediment Mass Loading

3.1 StormFilter Manhole/Vault Dimensions

Length Cartridge Bay (**Lbay**)	1.000 m
Width Cartridge Bay (**Wbay**)	2.440 m
Area Cartridge Bay (**Abay**)	2.440 m^2
Total area of Cartridges (**Acarts**)	0.905 m^2
Area Lower Volume (**Alow**)	1.535 m^2
Volume Lower Volume (**Vlow**)	1059 L
Area Upper Volume (**Aupp**)	2.440 m^2
Volume Upper Volume (**Vupp**)	244 L
Live storage volume at internal bypass (**Vstor**)	1303 L

3.2 Catchment Sediment Loading

Estimated TSS Concentration Impervious Roof (**TSSroof**)	100 kg/ha/year
Estimated TSS Concentration Impervious Road (**TSSroad**)	300 kg/ha/year
Estimated TSS Concentration Pervious Area (**TSSper**)	200 kg/ha/year
Estimated Total TSS Load (**TSSload**)	90 kg/year

3.3 Treatment Efficiencies

Pre-treatment Efficiency (**EFFpre**)	50 %
System Efficiency (**EFFsys**)	75 %

3.4 Maintenance Requirements

Estimated number of cleans per annum (**nCleans**)	0.28
Estimated Maintenance Frequency (**Mfreq**)	42.857 months

4.0 Design Summary

Design Water Quality Treatment Flowrate (**Qwq**)	7.083 L/s
StormFilter Design WQ Treatment flowrate (**QSF**)	7.100 L/s
StormFilter Design flowrate at internal bypass (**Qbypass**)	7.642 L/s
Number of StormFilter Cartridges required (**nTOTAL**)	5ea x 69cm Perlite cart(s)
Treatment Flux per cartridge (**FLUX**)	1.4 L/s/m^2
Restrictor Disc Size (**d**)	27.600 mm
Maximum Hydraulic Effect (**hmax**)	0.930 m
Estimated Maintenance Frequency (**Mfreq**)	43 months

INSTRUCTIONS

1.0. Use the rational method to compute the water quality design storm peak runoff flow rate. Values with blue text require user input. Values in red text are automatically calculated. Values with black text remain constant.

1.1 Input the appropriate runoff co-efficient for each sub-catchment.

Use C=0.9 for imperious roof surfaces runoff co-efficient from NZBC E1/VM1: Table 1

Use C=0.85 for imperious paved surfaces runoff co-efficient from NZBC E1/VM1: Table 1

Use C=0.25 for pervious grassed/landscaped surfaces runoff co-efficient from NZBC E1/VM1: Table 1

1.2 Input the appropriate catchment area for each sub-catchment.

Enter impervious roof surface catchment area

Enter impervious paved surfaces catchment area

Enter pervious grassed/landscaped surfaces catchment area

Total catchment area *i.e. Acatch = Aroof + Aroad + Aper*

Product of catchment areas & runoff co-efficients *i.e. CA = (Croof x Aroof) + (Croad x Aroad) + (Cper x Aper)*

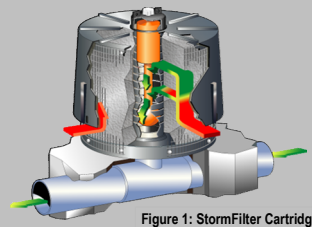


Figure 1: StormFilter Cartridge

1.3 Input rainfall intensity

The 90th percentile rainfall intensity is recommended to be used for calculating the water quality flow. Where no statistical analysis of historical storm events has been undertaken, we recommend iwq=10mm/hr is used. Alternative values can be checked against HIRDs or intensity tables in the local council Code of Practice

1.4 Compute the water quality design storm peak runoff flow rate via Rational Method

i.e. Q = f.C.i.A

$$Q = 0.111 d^{2.06} \Delta h^{0.5}$$

$[Q]$=L min^{-1}; $[d]$=mm; $[h]$=m

Figure 2: StormFilter Stage Discharge Equation [1]

2.0. Use the stormfilter stage-discharge equation to calculate the StormFilter peak treatment flowrate.

Enter cartridge filtration media *i.e. Perlite or ZPG*

Enter cartridge height *i.e. 69cm / 46cm / 30cm*

Enter restrictor disc size, refer table below for max disc diameter

Cart Height (cm)	Actual Height (m)	Priming Depth (m)	Max Disc Diam. (mm)	Max. Design Q (L/s)	Filter Bed Area (m^2)	Flow Rate (L/s/m^2)	Bed Depth (mm)	Media Volume (m^3)	Flow Rate (L/s/m^3)
30	0.305	0.27	22.70	0.63	0.460	1.37	175	0.052	12.0
46	0.457	0.43	25.00	0.95	0.689	1.38	175	0.078	12.1
69	0.686	0.66	27.60	1.42	1.034	1.37	175	0.118	12.1

Table 1. StormFilter Cartridge Specifics [2]

Compute the Stormfilter peak treatment flowrate at internal bypass per cartridge via the StormFilter stage-discharge equation

Compute the number of actual StormFilter cartridges required i.e. CEILING(B35,1) = QWQ / QCART

Compute the number (rounded up to whole number) of StormFilter cartridges required

Compute the Stormfilter peak treatment flowrate at internal bypass via the StormFilter stage-discharge equation

3.0 Estimate sediment mass loading (Refer sheet '2. Mass Load Calcs' for more details)

3.1 Use tables 2 & 3 below to fill in StormFilter Dimensions based on number of cartridges as calculated in cl 2.2 above

3.2 Use table 3 below to fill in estimated TSS concentration. For roads with ≥25,000vpd, use minimum 600kg/ha/yr

3.3 Use 0% pretreatment for vaults/manholes with no forebay. Use 10-15% pretreatmnet for vaults/manholes with forebays. Use 50% pretreatment for upstream GPT ie EnviroPod. Use 75%-90% system efficiency

Std Manhole Dimensions	Without forebay				With forebay			
	Cart Bay Length (m)	Cart Bay Width (m)	Cart Bay Area (m^2)	Max Number Carts	Cart Bay Length (m)	Cart Bay Width (m)	Cart Bay Area (m^2)	Max Number Carts
1050	1.00	0.77	0.77	1	1.00	N/A	N/A	N/A
1200	1.00	1.03	1.03	3	1.00	0.76	0.76	2
1500	1.00	1.67	1.67	4	1.00	1.39	1.39	3
1800	1.00	2.44	2.44	7	1.00	1.83	1.83	5
2050	1.00	3.20	3.20	9	1.00	2.80	2.80	7

Table 2: Standard Stormwater360 Manhole Dimensions

Std Vault Dimensions	Without forebay				With forebay			
	Cart Bay Length (m)	Cart Bay Width (m)	Cart Bay Area (m^2)	Max Number Carts	Cart Bay Length (m)	Cart Bay Width (m)	Cart Bay Area (m^2)	Max Number Carts
3.4 L x 1.5 W x 1.8 D	2.85	1.50	4.28	11	2.30	1.80	4.14	8
4.5 L x 1.5 W x 1.8 D	3.95	1.50	5.93	17	3.40	1.50	5.10	14
4.2 L x 2.0 W x 1.8 D	3.95	1.95	7.70	23	3.40	2.10	7.14	18
5.6 L x 2.0 W x 1.8 D	5.05	1.95	9.85	31	4.50	2.10	9.45	26
5.6 L x 2.4 W x 1.8 D	5.05	2.40	12.12	39	4.50	2.10	9.45	27
6.2 L x 2.4 W x 1.8 D	5.60	2.40	13.44	44	4.50	2.40	10.80	33

Table 3: Standard Stormwater360 Vault Dimensions

Land Use	TSS (kg/ha/yr)
Road	281 - 723
Commercial	242 - 1369
Residential (low)	60 - 340
Residential (high)	97 - 547
Terraced	133 - 755
Bush	26 - 146
Grass	80 - 588
Roof	50-110 *(1)*
Pasture	103 - 583

Table 4: Suggested TSS loads [3]

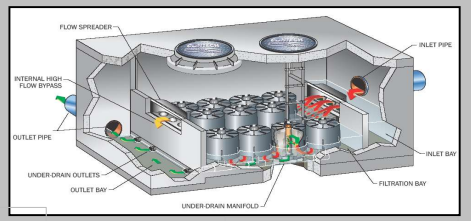


Figure 3: StormFilter Vault Cutaway

References

1. Derived from Stormwater Management Inc., Technical Publication PD-04-002.0
2. Contech Stormwater Solutions, StormFilter Product Design Manual.
3. Table 4-4, Technical Publication 10, 2nd Edition, May 2003, Auckland Regional Council

Project	Ecological Memo regarding proposed Oruaiti School Car Park Redevelopment
Matters addressed	Ecology
Date issued	05/06/2024
Attention of	Riaan De Swardt

BACKGROUND

Wild Ecology were engaged by Land Development and Engineering (LDE) to provide ecological input relating to the proposed Oruaiti School Car Park Redevelopment. It is understood that the required car park redevelopment work will take place within a 100m setback from a natural inland wetland (as defined under National Policy Statement for Freshwater Management (NPS-FM 2020) and therefore the works require consideration under National Environmental Standards for Freshwater (NES-FW (2020).

A desktop study was completed which included a review of relevant information relating to the ecological features contained within the development footprint and immediate surrounds, including a review of ecological considerations under operative Far North District Plan (oFNDP), Northland Regional Council (NRC) ecological overlays, National Policy Statement for Freshwater Management (NPS-FM 2020), National Environmental Standards for Freshwater (NES-FW 2020) followed by a review of google aerial imagery, and LIDAR data (NRC 2020).

SITE DESCRIPTION

The proposed car park redevelopment works are to take place at Ouraiti School as shown under Figure 1. The ecological baseline of the site and wider surrounds is that formed of Ouraiti River and its riparian margins. Under NRC Flood Hazard Maps the area has been mapped as being subject to 10-Year, 50-Year and 100-Year River Flood Hazard Zones. A small natural inland wetland area is located approximately 30m south of the proposed new car park area separated by State Highway 10.

It is understood that the existing flow direction is largely from north to south via overland flow paths and through a series of existing culverts. LDE Stormwater Neutrality Report states that it is assumed that a Ø900mm concrete pipe culvert crosses State Highway 10 and discharges into a downstream wetland, which continues to flow into the tidal zone of the Oruaiti River.

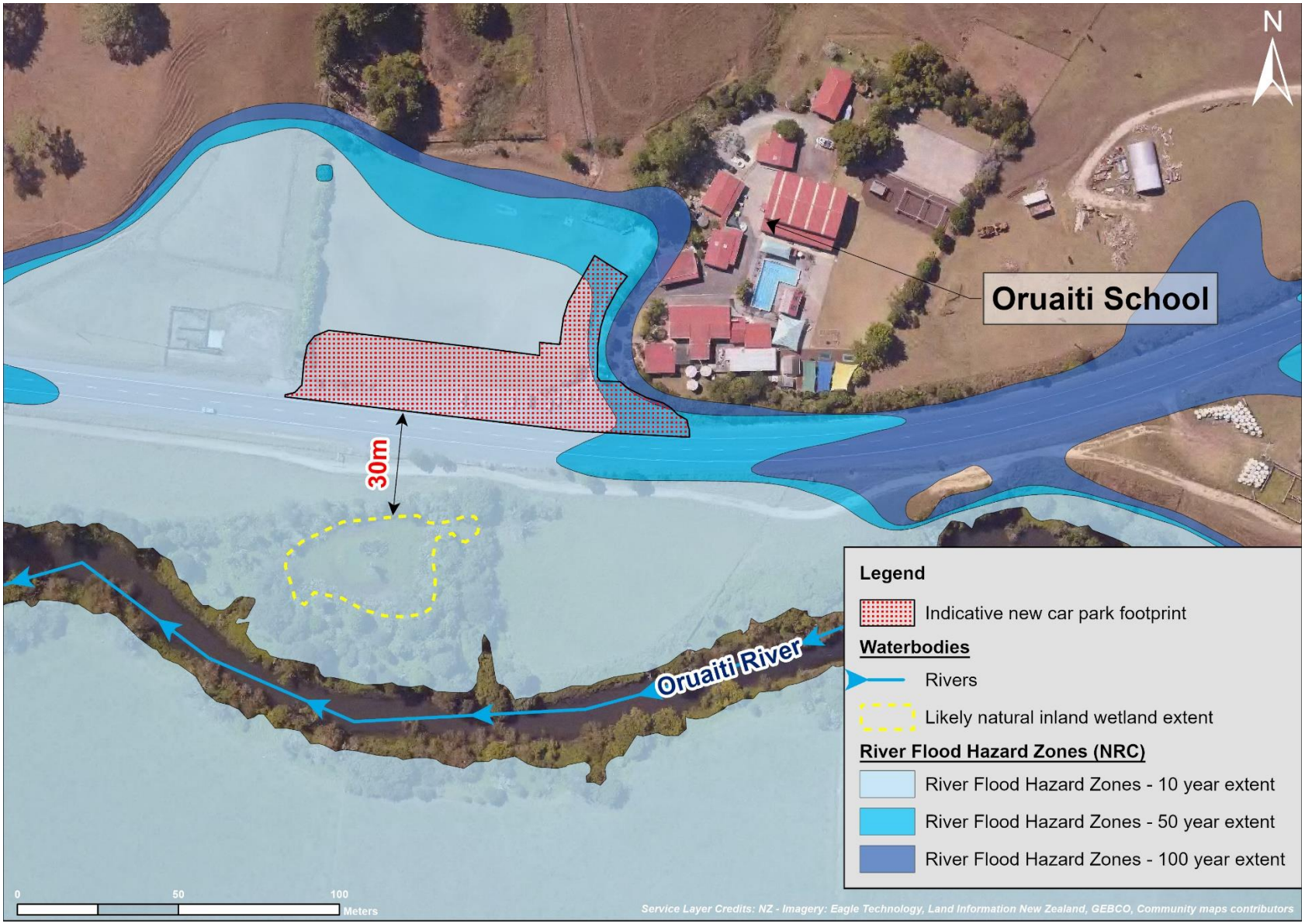


Figure 1: Showing the location of Oruaiti School, the location for the proposed new car park footprint, natural inland wetland area extent and NRC River Flood Hazard Zones – Regionwide Models

NES-FW (2020) CONSIDERATIONS

It is understood that the proposed car park construction will involve stormwater discharges to the stormwater catchpit which has hydrological connectivity to the mapped natural inland wetland area. According to LDE reporting the proposal would result in 15L/s increase is discharge which has been assessed as negligible compared to the expected overall flows from the river catchment. The proposal will not require for the existing culvert structure to be replaced as it has sufficient capacity to accommodate for the proposed increased discharges. It is understood that the proposal will not require for any earthworks or vegetation clearance to take place within a 10m setback of the identified natural inland wetland area.

Earthworks will occur a minimum 30m north of the mapped natural inland wetland area and stormwater discharged will occur within 100m setback of the wetland. A basic assessment in relation to consenting obligations under NES-FW (2020) is briefly discussed under Table 1 below.

Table 1: Assessment of NES-FW consenting obligations

NES-FW (2020) Regulation	Comment/assessment
Drainage of natural wetlands 52 Non-complying activities (1) Earthworks outside, but within a 100 m setback from, a natural inland wetland is a non-complying activity if it— (a) results, or is likely to result, in the complete or partial drainage of all or part of a natural inland wetland; and (b) does not have another status under any of regulations 38 to 51.	Consent under condition 52(1) is not required/applicable. While earthworks associated with the car park re-development will take place within a 100m setback of the identified natural inland wetland area located approximately 30m south of the works footprint, it will not result or is not likely to result in complete or partial drainage of the natural inland wetland feature should appropriate erosion and sediment control measures are constructed and maintained in accordance with the principles outlined in relevant expert reporting prepared for the proposal and best practice. Site earthworks should be undertaken during suitable weather conditions and dry periods when the wetland area and watercourses are likely to be naturally dry to avoid any potential residual risk to aquatic organisms during the construction of the accessway. All sediment and erosion controls to be installed as per GD05 and associated technical reporting prepared for the site development.
52(2) The taking, use, damming, diversion, or discharge of water outside, but within a 100 m setback from, a natural wetland is a non-complying activity if it—	Consent under Regulation 52(2) is not required/applicable. The diversion of water and discharge of water outside but within a 100m setback from the natural inland wetland area associated with stormwater discharges and diversions as part of site development will not result or are not likely to result in complete or partial drainage of the natural inland wetland features identified.

(a) results, or is likely to result, in the complete or partial drainage of all or part of a natural wetland; and (b) does not have another status under any of regulations 38 to 51.	Due to the incremental increase in impervious surface associated with the site's development, the overall volume of water entering the aquatic features is not expected to increase to a detectable level. These discharges are not likely to change the water level range or hydrological function of the wetland area.
Other activities Regulation 54 amended (Non-complying activities) 54(a) vegetation clearance within, or within a 10 m setback from, a natural inland wetland:	Consent under Regulation 54(a) is not required/applicable as the proposal will not require for any vegetation clearance to take place within a 10m setback from the identified natural inland wetland area.
54(b) earthworks within, or within a 10 m setback from, a natural inland wetland	Consent under Regulation 54(b) is not required/applicable as the proposal will not require for any earthworks to take place within a 10m setback from the identified natural inland wetland area.
54(c) the taking, use, damming, or diversion of water within, or within a 100 m setback from, a natural inland wetland if— (i) there is a hydrological connection between the taking, use, damming, or diversion and the wetland; and (ii) the taking, use, damming, or diversion will change, or is likely to change, the water level range or hydrological function of the wetland.	Consent under Reg 54(c) is not required/applicable. While the stormwater diversions associated with the site development will occur within a 100m setback from the identified wetland area and may have a hydrological connection with these areas, they will not change or are unlikely to change the water level range or hydrological function of the wetland.
54(d) the discharge of water into water within, or within a 100 m setback from, a natural inland wetland if— (i) there is a hydrological connection between the discharge and the wetland; and	Consent under Reg 54(d) is not required/applicable. While stormwater will be discharged to water and may have a hydrological connection to the wetland and will likely enter the wetland, the incremental increase in impervious surfaces and discharge (15L/s) associated with the car park development, the overall volume of water entering the aquatic features is not expected to increase to any detectable level. These discharges are not likely to change the water level range or hydrological function of the wetland areas.

(ii) the discharge will enter the wetland; and (iii) the discharge will change, or is likely to change, the water level range or hydrological function of the wetland	

PRPN (FEBRUARY 2024) CONSIDERATIONS

It is considered that Proposed Regional Plan for Northland (PRPN) February 2024)) C.4.1.9 Land drainage and flood control general conditions are applicable. Table 2 below outlines the relevant conditions with a brief ecological comment provided, where applicable. In respect to stormwater discharges, the discharge is in or from the same catchment in which the water would naturally flow, and the discharge is not within the catchment of an Outstanding Lake or a dune lake with outstanding or high ecological value.

Table 2: Assessment of C.4.1.9 Land drainage and flood control general conditions

Condition	Comment
1) There is no adverse flooding, erosion or over-drainage effects on other property	None anticipated – this has been addressed under LDE Stormwater Neutrality Report.
2) The activity does not alter the course of a lake or continually or intermittently flowing river.	None anticipated - no works within a river or wetland proposed.
3) New land drainage does not occur within 50 metres of any natural wetland.	No new land drainage proposed – upgrade to an existing stormwater system.
4) Drainage does not cause any change to the seasonal or annual range in water level of a natural wetland to an extent that may adversely affect the wetland's natural ecosystem	No drainage has been proposed – stormwater discharges from the upgraded car park are unlikely to change the water level range or hydrological function of the wetland area, not adversely affect the wetland's natural ecosystem.
5) No vegetation, soil or other debris generated from the activity is placed in a position where it may be carried into a river or natural wetland, lake or the coastal marine area.	To be managed through standard erosion and sediment best practice during construction. All earthworks are to take place a minimum 30m from any identified waterbody (including rivers and wetlands).
6) There is no damage to a flood defence or any other authorised structure.	Not an ecological matter -to be managed through standard erosion and sediment best practice during construction.
7) Fish passage is maintained, unless an existing authorisation provides otherwise, or temporary works to enable repair and replacement works are being carried out.	Fish passage shall not be altered from the baseline (current) setting.

8) Eels, fish (other than pest fish), kōura (freshwater crayfish) and kākahi (freshwater mussels) unintentionally removed during mechanical clearing of drainage channels are returned to the drainage channel as soon as practicable, but no later than one hour after their removal.	No mechanical clearing of any waterbodies is required.
9) Refuelling of machinery does not take place in the bed of a river or lake.	None anticipated. All earthworks are to take place a minimum 30m from any identified waterbody (including rivers and wetlands).
10) Any discharge of drainage water does not contain concentrations of contaminants which have or are likely to have significant adverse effects on aquatic life in any river, wetland, or the coastal marine area.	LDE Stormwater Neutrality Report states that a Stormwater 360 Stormfilter is a cartridge filtration system that will be installed upstream of the connection point to the existing outlet structure. This passive filtration system consists of a precast concrete manhole with cartridges installed to provide treatment of the 'first flush' through filtration media to effectively remove contaminants generated by the movement of vehicles through the carpark.
11) The discharge to the water body or coastal marine area does not, beyond the zone of reasonable mixing: a) result in any conspicuous oil or grease films, scums or foams, or floatable or suspended material except where caused by natural events in the receiving water, and	Not anticipated.
b) cause the pH of the receiving water to fall outside the range of 6.5 to 9.0 (except where caused by natural events, or when natural background levels fall outside that range), and	Not anticipated.
c) cause any emission of objectionable odour in the receiving water, and	Not anticipated.
d) cause any conspicuous change in colour or visual clarity of the receiving water, and	Not anticipated.
e) cause the natural temperature of the receiving water body to be changed by more than three degrees Celsius, except in an Outstanding Freshwater Body where it must not be changed by more than one degree Celsius, and	Not anticipated.
f) cause contamination which may render freshwater taken from a mapped priority drinking water abstraction point (refer I Maps	Not anticipated.

| Ngā mahere matawhenua) unsuitable for human consumption after existing treatment.	
12) Any discharge of sediment associated with repair and maintenance activities does not occur for more than five consecutive days and must not occur for more than 12 hours on any one day.	Not anticipated.
13) Where in-river works involve bed disturbance from mechanical vegetation clearance or sediment removal:	No in-river works proposed.
a) if undertaken between 1 August and 31 December, a visual inspection of the works area must be undertaken, immediately prior to in-river work starting. If a shoal of whitebait is present, no inriver works shall be undertaken until the shoal passes; and	No in-river works proposed.
b) the works shall not occur more than once in any area between 1 August and 31 December of any year	Noted.
14) River bank disturbance is limited to one side of the waterway, at any one time.	No river bank disturbance proposed.
15) When mechanically clearing aquatic vegetation, a weed bucket shall be used with a curved flat base and a slatted back.	No mechanical clearance of aquatic vegetation proposed.
16) The activity does not take place in an īnanga spawning site between 1 March and 30 September.	Activity will not take place within an īnanga spawning site.

CONCLUSION

Based on desktop analysis of relevant ecological data and information provided by LDE, it is considered that proposed car park redevelopment works at Oruaiti School would result in negligible potential adverse ecological effect on the identified aquatic habitats. No adverse effect on the identified natural inland wetland area or Oruaiti Stream is anticipated – the nearest natural inland wetland area is located approximately 30m south of the works footprint. Any potential adverse ecological effects on natural inland wetland features associated with the proposal can be avoided, minimised or mitigated through applying appropriate construction and sediment/erosion controls. Provided that they are implemented successfully, adverse effects on the environment would be negligible.

It is considered that the construction of the car park associated with the proposal is not likely to change the water level range or hydrological function of the identified natural inland wetland area and will not result, or is not likely to result, in the complete or partial drainage of all or part of a natural inland wetland. Therefore, it is considered that the proposal does not require a consent under NES-FW (2020).

Having reviewed the reporting prepared by LDE for the proposal, it is deemed that it complies with C.4.1.9 Land drainage and flood control general conditions under PRPN (February 2024).

WILD ECOLOGY

Madara Vilde

Principal Ecologist

Wild Ecology

027 579 0624

maddy@wildecology.co.nz

wildecology.co.nz

MVilde

05.06.2024

Kahukuraariki Trust Board

24 June 2024

Barker & Associates
PO Box 37
Whangarei, 0112

Outline Plan and Resource Consent Application – Oruaiti School

Tēnā koe,

The Kahukuraariki Trust is the post settlement governance entity for the Iwi of Ngatikāhu ki Whangaroa. Our rohe encompasses the Oruaiti River running south to Otangaroa and Waihapa, over to Waitaruke, inclusive of the western arm of the Whangaroa Harbour and the coastline back around to Taipa – including Taupo Bay.in Te Taitokerau.

Please accept this letter in support of the school's endeavours to upgrade, enhance and/or expand Oruaiti School.

We wish the project well and if there is anything further, we can do to assist, please let us know.

Noho ora mai,

Geraldine Baker
General Manager

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44 Bowen Street
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Wellington 6141
New Zealand
T 0800 699 000
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NZ Transport Agency Waka Kotahi Reference: Application-2024-0690

4 March 2025

Oruaiti School Board of Trustees c/o Avail Pacific / B&A Urban & Environmental
2554 State Highway 10
Mangonui
Northland 0494
New Zealand

Sent via: MelissaM@barker.co.nz & r.deswardt@lde.co.nz

Dear Riaan and Melissa,

Proposed upgrade to Oruaiti School entrance/car park – 2554 State Highway 10, Mangonui – Board of Trustees c/o Avail Pacific

Thank you for your request dated 30 May 2024 for the written consent of the NZ Transport Agency Waka Kotahi (NZTA) pursuant to s176(1)(b) of the Resource Management Act 1991 (RMA) to undertake work within the following NZTA designation.

District plan:	Operative Far North District Plan	Proposed Far North District Plan
Designation reference:	5262201	NZTA-2
Designation purpose:	To give public notice of the existence of the work and of the nature and extent of activities permitted pursuant to the designation	To construct, operate, maintain, and improve a state highway, cycleway and/or shared path and associated infrastructure

Your proposal has been considered as follows:

Proposal

The following activity is proposed:

- To upgrade the existing vehicle crossing/entrance, creating a one-way entry/exit system for all vehicles and establish formalised sealed parking and one-way manoeuvring areas at Oruaiti School in Mangonui.
- The proposal includes internal pedestrian pathways, stormwater infrastructure to serve the proposed impervious area and associated works.
- Stormwater runoff will be directed to a culvert within the state highway corridor that discharge south of the state highway near a stream (on the opposite side of the road from the school). The proposal includes stormwater treatment.

These activities are described in detail in:

- The plans titled “Oruaiti School Board of Trustees c/o Avail Pacific Proposed Carpark Upgrades 2554 State Highway 10, Mangonui” dated 1 May 2024 and referenced as’ project number 21102’, Revision A, prepared by Land Development & Engineering.

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- The "STORMWATER NEUTRALITY REPORT" dated 2 May 2024, and referenced as 'project reference 21102', Version A, prepared by Land Development & Engineering.
- The memorandum titled 'Flooding Volume Assessment in Relation to the Oruaiti School Carpark Upgrades' dated 5 November 2024, and referenced as project ref. 21102, Revision 01, prepared by Land Development & Engineering.

Assessment

In assessing the proposed activity, NZTA notes the following:

- The proposal will improve safety outcomes for the site by:
    - formalising use of the metalled area adjacent to the formed state highway as parking, separated from the carriageway by a traffic island
    - providing a left-in "slip bay" where vehicles may slow as they approach the entrance to the site
    - increasing sight distances to and from right-turning traffic exiting the site by establishing a one-way system with an exit located ~70m further west than the existing crossing, away from a bend on the east side, where a raised and vegetated berm currently reduces sight distances.
    - providing a separated pick up / drop off area for buses separated from light vehicle movements
    - enabling forward entry and exit to and from the site
- Northland Regional Council maps indicate this section of state highway is subject to flooding, however specialist assessment notes this is the result of downstream flooding and future sea level rise scenarios. A variety of options have been considered for the potential mitigation of stormwater discharge; however they would ultimately have little effect on the predicted flood scenario and associated effects. The increase in flood levels is considered no different from the effects of modelled predevelopment flood scenarios. The relevant interested parties within NZTA concur that the additional discharge to the state highway can be accepted in this particular case.

Conditions

NZTA considers that Oruaiti School Board of Trustees c/o Avail Pacific can undertake the proposed access and parking upgrades and associated stormwater discharge within 5262201 without preventing or hindering the work to which the designation relates subject to these conditions: The legal name of NZTA is the **New Zealand Transport Agency**; therefore our full legal name is referred to in the conditions and approval.

Conditions:

Pre-construction Agreements

1. Prior to the commencement of any works on the vehicle crossing or within the state highway corridor, the consent holder must provide evidence of the following as approved by the New Zealand Transport Agency, or written confirmation from New Zealand Transport Agency that the approval is not required:
    a. A 'Corridor Access Request' (CAR)
    b. An 'Agreement as to Work on State Highway'
    c. A 'Work access permit' (WAP)

    The application must include detailed construction drawings showing full details of the works, methodology and a Traffic Management Plan.

www.nzta.govt.nz

44 Bowen Street
Pipitea, Wellington 6011
Private Bag 6995
Wellington 6141
New Zealand
T 0800 699 000
www.nzta.govt.nz

2. A formal licence to occupy / network licence (as advised by NZ Transport Agency) to occupy NZTA managed Crown land for the purposes of completing the proposed works shall be agreed to between the applicant and the NZ Transport Agency prior to commencement of any construction associated with this approval.

General Conditions

3. That the vehicle crossing, parking, manoeuvring and associated works be undertaken in general accordance with the plans referenced below and to the satisfaction of the New Zealand Transport Agency Network Manager:
    a. 'Parking Area & Accessway Earthworks Layout" dated 1 May 2024 and referenced as 'C200', revision A, prepared by Land Development & Engineering.
    b. 'Parking Area & Accessway Overall Site Plan' dated 1 May 2024 and referenced as 'C300', revision A, prepared by Land Development & Engineering.
    c. 'Parking Area & Accessway Design Plan Sheet 1 of 2' dated 1 May 2024 and referenced as 'C301', revision A, prepared by Land Development & Engineering.
    d. 'Parking Area & Accessway Design Plan Sheet 2 of 2' dated 1 May 2024 and referenced as 'C302', revision A, prepared by Land Development & Engineering.
    e. 'Parking Area & Accessway Longitudinal Sections' dated 1 May 2024 and referenced as 'C310', revision A, prepared by Land Development & Engineering.
    f. 'Parking Area & Accessway Stormwater Management Plan' dated 1 May 2024 and referenced as 'C400', revision A, prepared by Land Development & Engineering.
    g. 'Parking Area & Accessway Stormwater Longitudinal Sections Sheet 1 of 2' dated 1 May 2024 and referenced as 'C410', revision A, prepared by Land Development & Engineering.
    h. 'Parking Area & Accessway Stormwater Longitudinal Sections Sheet 1 of 2' dated 1 May 2024 and referenced as 'C411', revision A, prepared by Land Development & Engineering.
2. Consultation with the New Zealand Transport Agency shall be undertaken in the event changes are made from the plans initially submitted to the New Zealand Transport Agency (and referenced above). This consultation will confirm if the changes are in general accordance with the approved plans or confirm if additional approvals are required.

After construction

3. Prior to the use of the upgraded crossing and vehicle manoeuvring areas, the consent holder shall provide to Council, correspondence from New Zealand Transport Agency confirming that works to the state highway, including vehicle crossings, have been constructed to New Zealand Transport Agency standards or in general accordance with this approval.

Advice Notes:

- *The maintenance of all structures and infrastructure associated with the proposal is the responsibility of the applicant. These must be maintained in good order and condition, and otherwise to the satisfaction of NZTA, and subject to any directions and conditions stipulated by NZTA. This advice note may be superseded by a condition on a licence to occupy / network licence granted by the NZ Transport Agency.*
- *The applicant should provide a copy of any resource consent application associated with the proposal to NZTA once lodged for s95E approval.*

Determination

On the basis of the above assessment of the proposed activity, and the conditions volunteered by the applicant, the New Zealand Transport Agency grants Oruaiti School Board of Trustees c/o Avail Pacific written approval under section 176(1)(b) of the RMA for the proposed access and parking upgrades and associated stormwater discharge to occur.

In addition, before you undertake any physical work on the state highway, including the formation of any vehicle crossing, you are required to apply to NZTA for a Corridor Access Request (CAR) and for that request to be approved.

www.nzta.govt.nz

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Private Bag 6995
Wellington 6141
New Zealand
T 0800 699 000
www.nzta.govt.nz

Before you undertake any physical work on the state highway, including the formation or change to any vehicle crossing, you are legally required to apply to the New Zealand Transport Agency for a Corridor Access Request (CAR) and for that request to be approved. A CAR is submitted online via www.submitica.com a minimum of fourteen working days prior to the commencement of any works on the state highway; longer is advised for complex works.

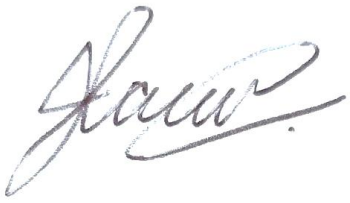
Please notify NZTA if changes to the application or volunteered conditions occur.

Expiry of this approval

Unless resource consent has been obtained this approval will expire two years from the date of this approval letter. This approval will lapse at that date unless prior agreement has been obtained from The New Zealand Transport Agency.

If you have any queries regarding the above or wish to discuss matters further, please feel free to contact the Environmental Planning team at environmentalplanning@nzta.govt.nz.

Yours sincerely,



Jordan Pauw
Planner
Poutiaki Taiao / Environmental Planning, System Design, on behalf of NZ Transport Agency Waka Kotahi.
cc: aran.arietta@nzta.govt.nz

Enclosed:

- Attachment 1: Proposed Site Plan

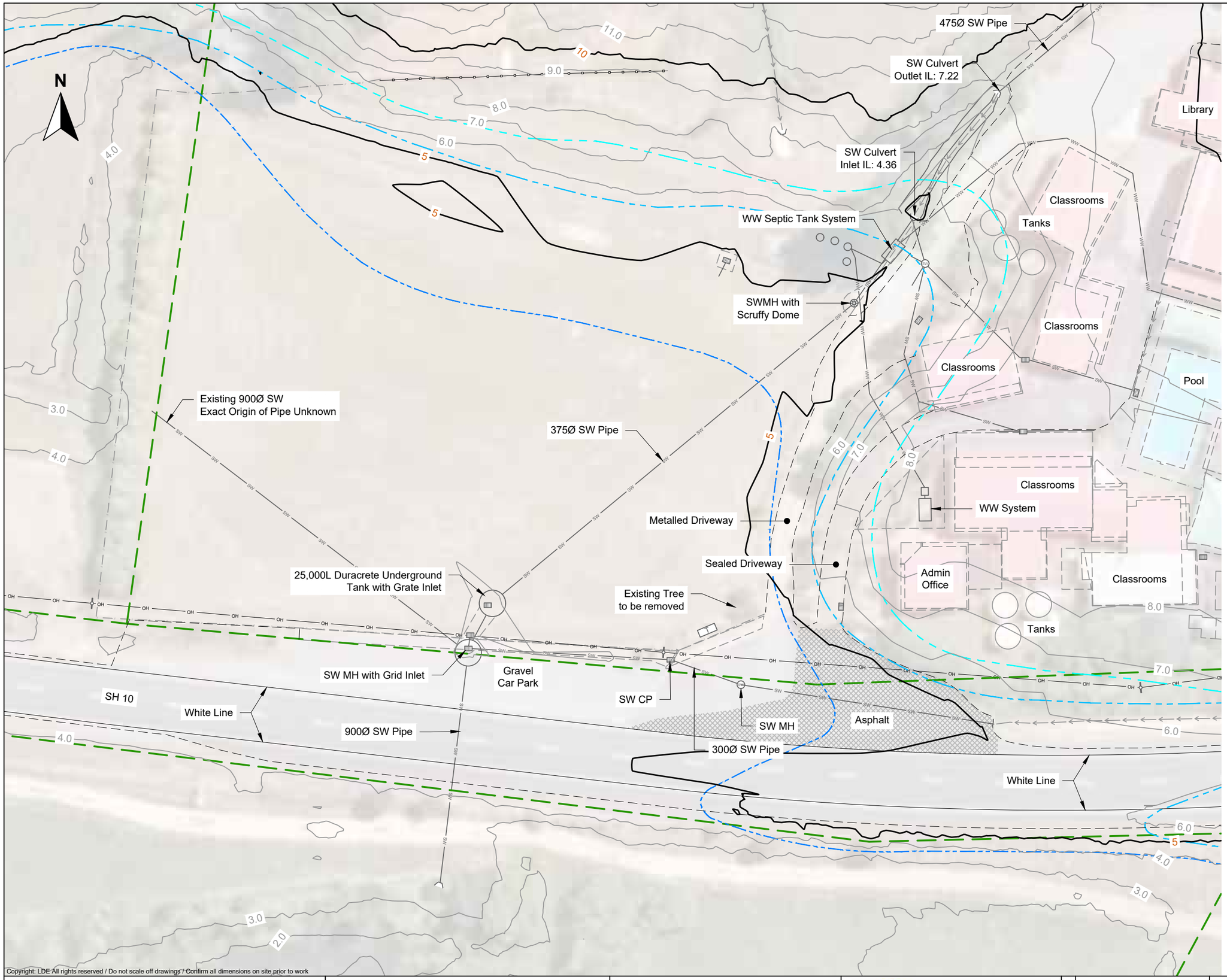
Project Number: 21102
Project Office: Warkworth
Project Manager: Riaan de Swardt
Issue Date: 1 May 2024

Drawing Status: For Consent

Oruaiti School Board of Trustees c/o Avail Pacific
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

Drawing Index

Sheet	Description	Status	Revision / Issue
C001	Existing Site Plan	For Consent	A
C200	Earthworks Layout	For Consent	A
C300	Overall Site Layout	For Consent	A
C301	Parking Area & Accessway Design Plan Sheet 1 of 2	For Consent	A
C302	Parking Area & Accessway Design Plan Sheet 2 of 2	For Consent	A
C310	Parking Area & Accessway Longitudinal Sections	For Consent	A
C311	Parking Area & Accessway Typical Cross Sections	For Consent	A
C312	Parking Area & Accessway 5m Interval Cross Sections Sheet 1 of 3	For Consent	A
C313	Parking Area & Accessway 5m Interval Cross Sections Sheet 2 of 3	For Consent	A
C314	Parking Area & Accessway 5m Interval Cross Sections Sheet 3 of 3	For Consent	A
C320	Parking Area & Accessway Typical Details	For Consent	A
C400	Parking Area & Accessway Stormwater Management Plan	For Consent	A
C410	Parking Area & Accessway Stormwater Longitudinal Sections Sheet 1 of 2	For Consent	A
C411	Parking Area & Accessway Stormwater Longitudinal Sections Sheet 2 of 2	For Consent	A
C420	Parking Area & Accessway Typical Stormwater Device Details	For Consent	A
C421	Parking Area & Accessway Typical Stormwater Details	For Consent	A



General Notes:

1. All dimensions in metres unless noted otherwise.
2. Coordinates are in terms of NZGD Mt Eden 2000.
3. All levels are in metres to NZVD2016. Origin of levels RCM XIII SO 50961 RL 11.81m.
4. Survey undertaken by Donaldsons; 25 July 2022.
5. Existing titles - Pt Allot 18A PSH OF Mangonui East
6. Boundaries and are approximate only and are subject to change. Final boundaries will be in accordance with city plan and LINZ requirements.
7. Boundaries not for building design purposes.
8. Existing building, roading, and services information may have been obtained from third party records and should be verified on site prior to the commencement of any works. LDE does not in any way guarantee the accuracy of any underground service shown on this plan.
9. Contractor to locate / mark / confirm and protect if necessary all existing services prior to commencement of work on site. Any discrepancies to be reported to the Engineer.
10. Flood extent extracted from NRC Natural Hazards and shown indicatively for information only.

General Legend:

- Boundary (Surveyed)
- 1m Major Contour
- 5m Minor Contour

NRC River Flood Hazard Zone - Regionwide Models

- 10 Year Exent
- 50 Year Extent
- 100 Year CC Extent

Existing Services Legend:

- Edge of Road
- Asphalt Surface
- Stormwater Pipe
- Stormwater Manhole, Wingwall, Scruffy Dome, Catchpit
- Open Drain
- Wastewater Pipe
- Power Pole & Over Head Lines
- Transformer
- Fence
- Retaining Wall

0 5 10 15 20 25

Scale 1:500 (m) Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific

Project: 2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

Drawing Title: Existing Site Layout

LDE LAND DEVELOPMENT & ENGINEERING

No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	J. S	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	J. Simson
Scale A3:	1:500

Project status: For Consent
Project: 21102
Drawing No: C001
Issue/Rev: A

Surface Analysis: Elevation Ranges			
Number	Color	Minimum Elevation (m)	Maximum Elevation (m)
1		-0.223	0.000
2		0.000	0.150
3		0.150	0.300
4		0.300	0.450
5		0.450	0.600

General Notes:

1. All dimensions in metres unless noted otherwise.
2. Coordinates are in terms of NZGD Mt Eden 2000.
3. All levels are in metres to NZVD2016. Origin of levels RCM XIII SO 50961 RL 11.81m.
4. Survey undertaken by Donaldsons; 25 July 2022.
5. Existing titles - Pt Allot 18A PSH OF Mangonui East
6. Boundaries and are approximate only and are subject to change. Final boundaries will be in accordance with city plan and LINZ requirements.
7. Boundaries not for building design purposes.
8. Existing building, roading, and services information may have been obtained from third party records and should be verified on site prior to the commencement of any works. LDE does not in any way guarantee the accuracy of any underground service shown on this plan.
9. Contractor to locate / mark / confirm and protect if necessary all existing services prior to commencement of work on site. Any discrepancies to be reported to the Engineer.
10. Flood extent extracted from NRC Natural Hazards and shown indicatively for information only.

Earthworks Notes:

- All works to be undertaken in accordance with FNDC Engineering Standards, GD05 Guidelines and the Health and Safety at Work Act 2015 (HSWA).
- All disturbed public areas to be made good and restored to previous condition.
- All earthworks to be undertaken during periods of fine weather.
- Earthworks are to be undertaken and completed in within the minimum possible time frame.
- The area is to be progressively finished as areas are brought to grade.
- The earthworks volumes shown is a solid measure.
- The earthworks volumes has been calculated in relation to the existing and final ground levels.
- Topsoil removal volumes is excluded in the total earthworks volumes.
- Additional box cut volumes has not been included in the earthworks volumes.

Erosion and Sediment Control Notes:

- The contractor is solely responsible for ensuring the the site has effective erosion control and sediment retention measures operating at all times.
- All erosion and sediment control measures must be operational prior to any other works commencing on site.
- All sediment control measure are to comply with GD05 and FNDC requirements.

Earthworks Cut / Fill Volumes	
Site Area	41,210m²
Earthworks Area	2,525m²
Cut Volume	18m³
Fill Volume	230m³
Net Fill Volume	212m³

0 5 10 15 20 25

Scale 1:500 (m) Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific

Project: 2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

Drawing Title: Parking Area & Accessway
Earthworks Layout

LDE LAND DEVELOPMENT & ENGINEERING

No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	1:500

Project status: For Consent
Project: 21102
Drawing No: C200
Issue/Rev: A

B85 Vehicle (Realistic min radius) (2004)

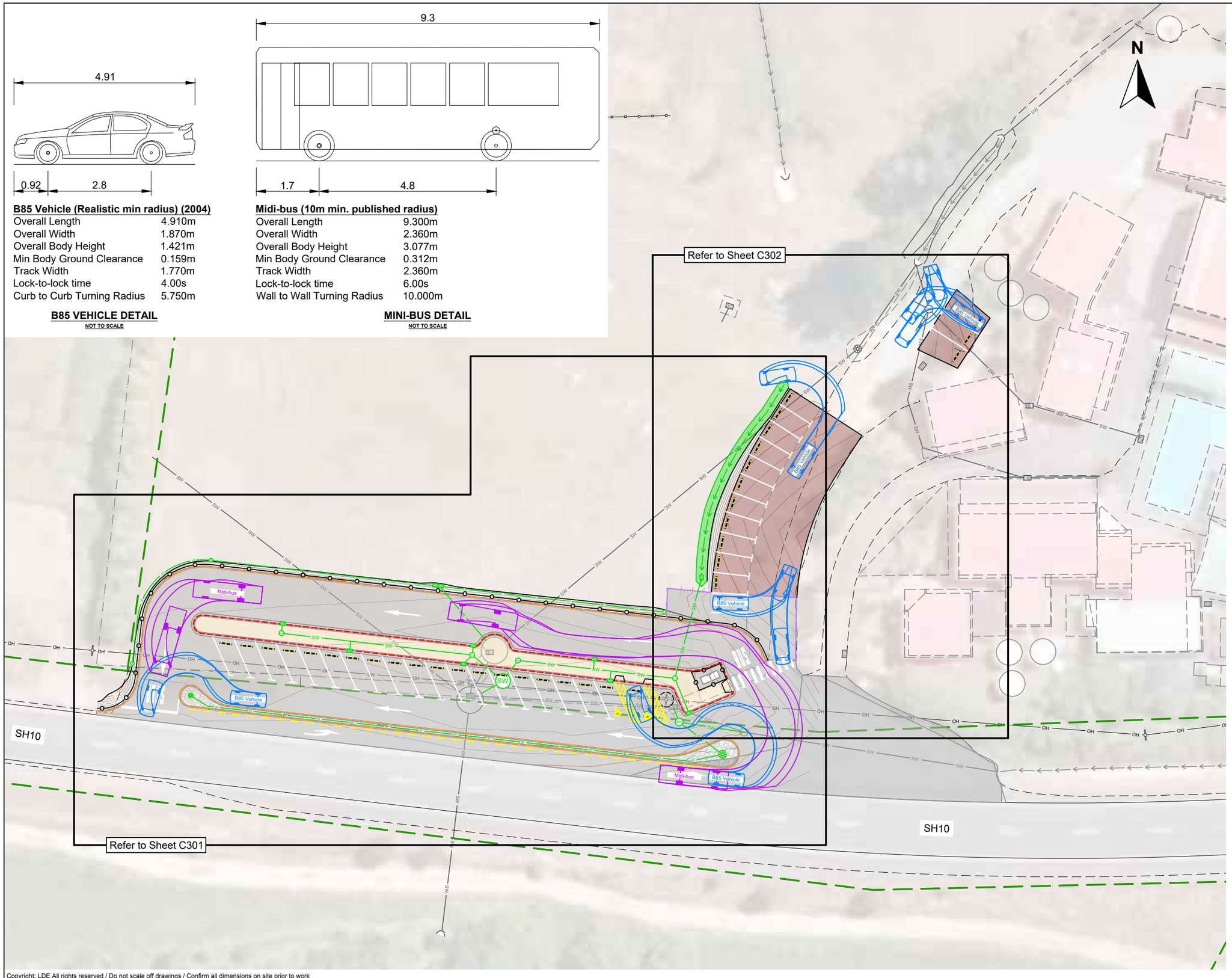
Overall Length	4.910m
Overall Width	1.870m
Overall Body Height	1.421m
Min Body Ground Clearance	0.159m
Track Width	1.770m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	5.750m

B85 VEHICLE DETAIL
NOT TO SCALE

Midi-bus (10m min. published radius)

Overall Length	9.300m
Overall Width	2.360m
Overall Body Height	3.077m
Min Body Ground Clearance	0.312m
Track Width	2.360m
Lock-to-lock time	6.00s
Wall to Wall Turning Radius	10.000m

MINI-BUS DETAIL
NOT TO SCALE



Proposed Services Notes:

1. All works to be undertaken in accordance with FNDC Engineering Standards and the Health and Safety at Work Act 2015 (HSWA).
2. All dimensions in metres unless noted otherwise.
3. Contractor to locate / ml dimensionark / confirm and protect if necessary all existing services prior to commencement of work on site.
4. All disturbed public areas to be made good and restored to existing condition.
5. Manholes to be reinforced concrete chambers with a precast base. Min Ø1050mm manhole unless otherwise specified.
6. Catchpits to be 675 x 450mm reinforced concrete chambers, with trafficable frame & grid inlet lid.
7. All PVC stormwater pipes to be uPVC SN16.
8. All concrete stormwater pipes to be RCRRJ Class 4.
9. Pipe bedding and installation to comply with relevant council details.
10. All lane and parking markings as per MOTSAM.
11. Parking bays as per Appendix 3D of the Far North District Plan (FNDP).

Reference Notes:

- Refer to C301 & C302 for Parking Area Layouts.
- Refer to C310 for Parking Area and Accessway Longitudinal Sections Layout.
- Refer to C311 to C314 for Cross Section Layouts.
- Refer to C320 for Roading details.
- Refer to C400 for Stormwater Layout.
- Refer to C410 to C411 Stormwater Longitudinal Section Layouts.
- Refer to C420 & C421 for Stormwater details.

Existing Services Legend:

- Boundary (Surveyed)
- Edge of Road
- Stormwater Pipe
- Stormwater Manhole, Wingwall, Scruffy Dome, Catchpit
- Open Drain
- Power Pole & Over Head Lines
- Transformer
- Fence
- Retaining Wall

Proposed (Prop.) Services Legend:

- 0.5m Major Contour
- 0.1m Major Contour
- Kerb Block
- Kerb & Channel
- Flush Edge Beam
- Asphalt Surface
- Proposed Concrete Surface
- Proposed Gravel Surface
- Rock Filled Traffic Island
- Stormwater Pipe
- Stormwater Perforated Pipe
- Stormwater Manhole
- SW Manhole with Scruffy Dome
- Stormwater Catchpit
- Stormwater Rodding Point
- Stormwater Swale
- Fence

0 5 10 15 20 25

Scale 1:500 (m) Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific	Project: 2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Drawing Title: Parking Area & Accessway Overall Site Plan	LDE LAND DEVELOPMENT & ENGINEERING

No.	Issue/Revision	Aprvd	Date
A.	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	1:500

Project status: For Consent
Project: 21102
Drawing No: C300
Issue/Rev: A

Proposed Services Notes:

- All works to be undertaken in accordance with FNDC Engineering Standards and the Health and Safety at Work Act 2015 (HSWA).
- All dimensions in metres unless noted otherwise.
- Contractor to locate / ml dimensionark / confirm and protect if necessary all existing services prior to commencement of work on site.
- All disturbed public areas to be made good and restored to existing condition.
- Manholes to be reinforced concrete chambers with a precast base. Min Ø1050mm manhole unless otherwise specified.
- Catchpits to be 675 x 450mm reinforced concrete chambers, with trafficable frame & grid inlet lid.
- All lane and parking markings as per MOTSAM.
- Parking bays as per Appendix 3D of the Far North District Plan (FNDP).

Existing Services Legend:

- Boundary (Surveyed)
- Edge of Road
- Stormwater Pipe
- Stormwater Manhole, Wingwall, Scruffy Dome, Catchpit
- Open Drain
- Power Pole & Over Head Lines
- Transformer
- Fence

Proposed Services Legend:

- 0.5m Major Contour
- 0.1m Major Contour
- Prop. Kerb Block
- Prop. Kerb & Channel
- Prop. Flush Edge Beam

Proposed Services Legend:

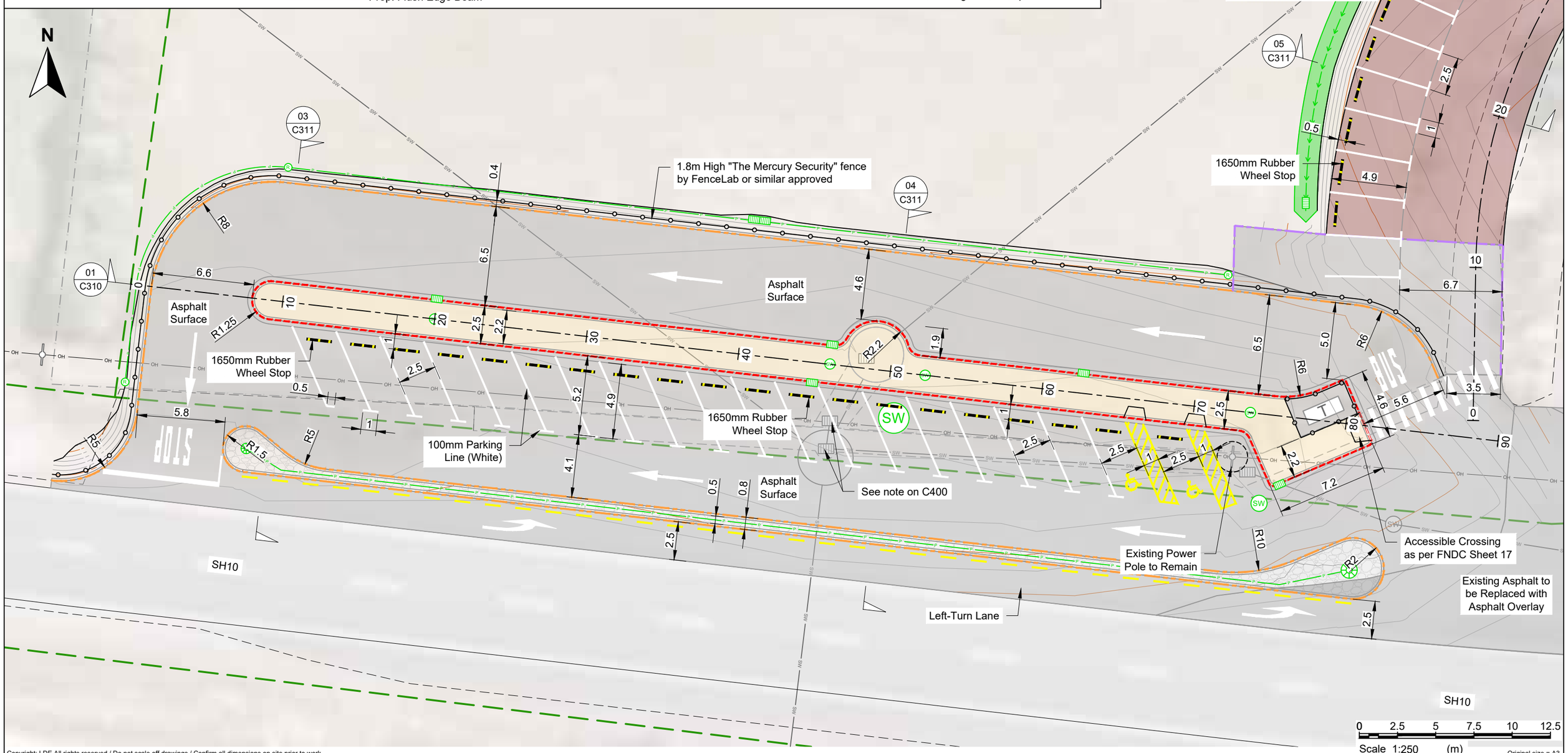
- Asphalt Surface
- Proposed Concrete Surface
- Proposed Gravel Surface
- Rock Filled Traffic Island
- Stormwater Perforated Pipe
- Stormwater Manhole
- SW Manhole with Scruffy Dome
- Stormwater Catchpit
- Stormwater Rodding Point
- Stormwater Swale
- Fence

Road Marking Legend:

- White Zebra Crossing 2.0m Long x 0,3m Wide, 0.6m Gap
- White Stop Sign
- White Bus Sign
- White Straight Arrow
- White Left-Turn Arrow
- White Parking Delineation Line 100mm Wide
- Yellow No-Stop Lines 1.0m Long x 1.0m Gap

Road Marking Legend:

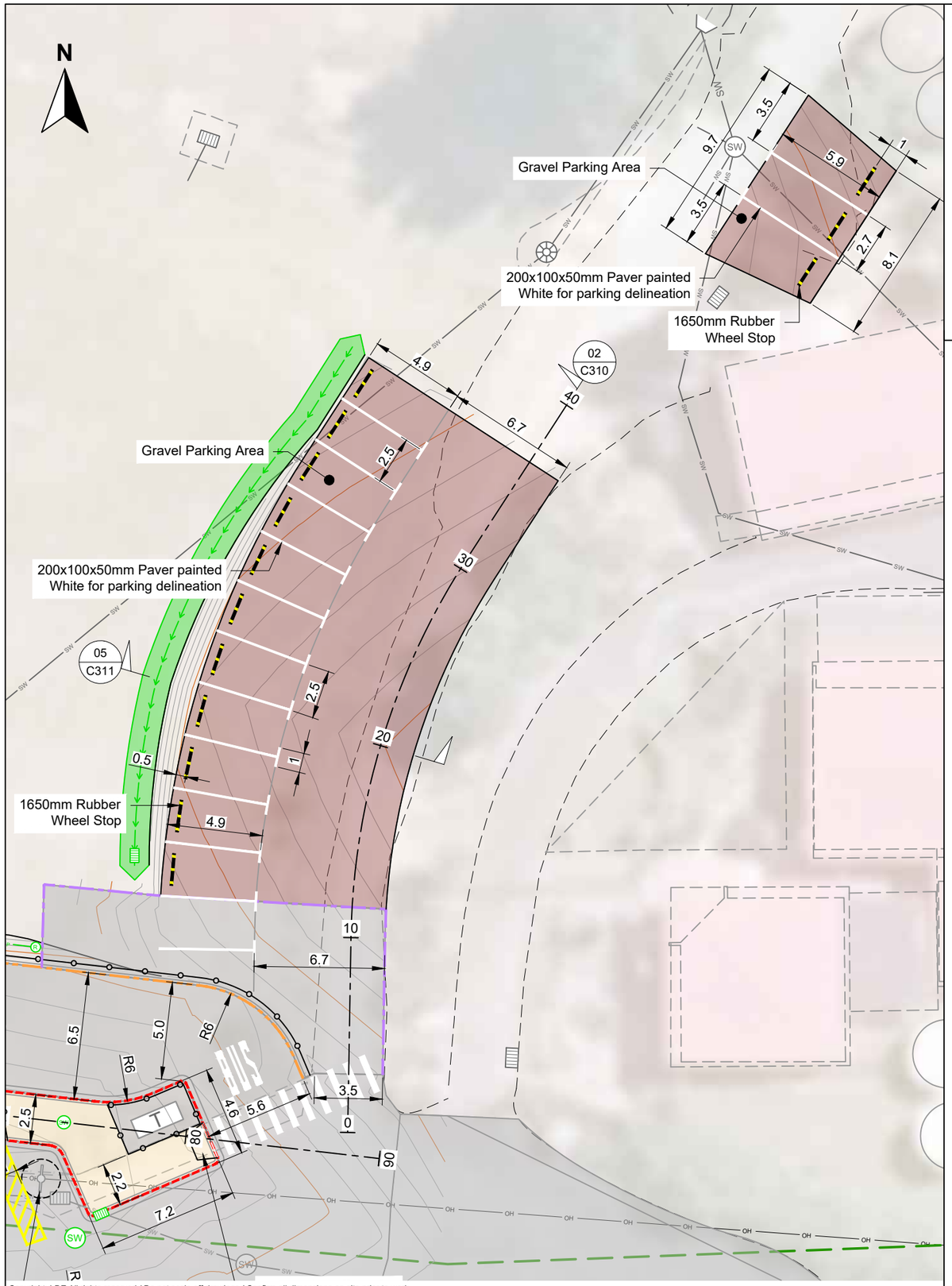
- 1650mm Rubber Wheel Stop
- Yellow Disabled Parking Sign
- Yellow No-Parking Island



Client: Oruaiti School Board of Trustees c/o Avail Pacific	Project: 2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Drawing Title: Parking Area & Accessway Design Plan Sheet 1 of 2	LDE LAND DEVELOPMENT & ENGINEERING

No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	1:250
Project status:	For Consent
Project:	21102
Drawing No:	C301
Issue/Rev	A



Proposed Services Notes:

- All works to be undertaken in accordance with FNDC Engineering Standards and the Health and Safety at Work Act 2015 (HSWA).
- All dimensions in metres unless noted otherwise.
- Contractor to locate / ml dimensionark / confirm and protect if necessary all existing services prior to commencement of work on site.
- All disturbed public areas to be made good and restored to existing condition.
- Manholes to be reinforced concrete chambers with a precast base. Min Ø1050mm manhole unless otherwise specified.
- Catchpits to be 675 x 450mm reinforced concrete chambers, with trafficable frame & grid inlet lid.
- All lane and parking markings as per MOTSAM.
- Parking bays as per Appendix 3D of the Far North District Plan (FNDP).

Existing Services Legend:

- Boundary (Surveyed)
- Edge of Road
- Stormwater Pipe
- Stormwater Manhole, Wingwall, Scruffy Dome, Catchpit
- Open Drain
- Power Pole & Over Head Lines
- Transformer
- Fence

Proposed Services Legend:

- 0.5m Major Contour
- 0.1m Major Contour
- Prop. Kerb Block
- Prop. Kerb & Channel
- Prop. Flush Edge Beam

Proposed Services Legend:

- Asphalt Surface
- Proposed Concrete Surface
- Proposed Gravel Surface
- Rock Filled Traffic Island
- Stormwater Perforated Pipe
- Stormwater Manhole
- SW Manhole with Scruffy Dome
- Stormwater Catchpit
- Stormwater Rodding Point
- Stormwater Swale
- Fence

Road Marking Legend:

- White Zebra Crossing 2.0m Long x 0,3m Wide, 0.6m Gap
- White Stop Sign
- White Bus Sign
- White Straight Arrow
- White Left-Turn Arrow
- White Parking Delineation Line 100mm Wide
- Yellow No-Stop Lines 1.0m Long x 1.0m Gap

Road Marking Legend:

- 1650mm Rubber Wheel Stop
- Yellow Disabled Parking Sign
- Yellow No-Parking Island

0 2.5 5 7.5 10 12.5

Scale 1:250 (m) Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific

Project: 2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

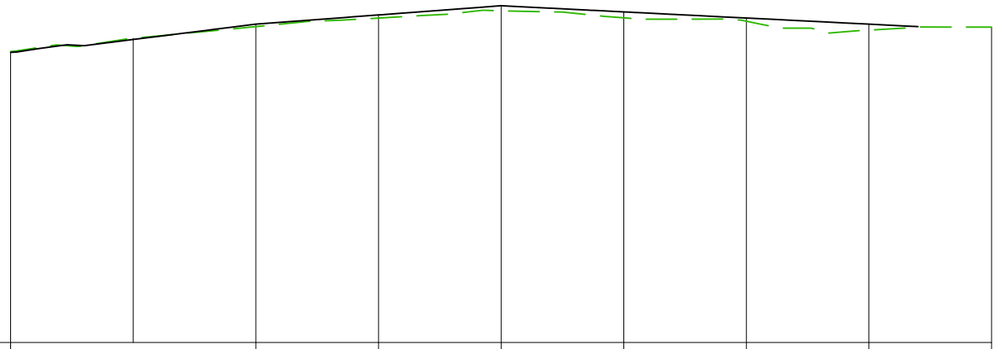
Drawing Title: Parking Area & Accessway
Design Plan Sheet 2 of 2

LDE LAND DEVELOPMENT & ENGINEERING

No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	1:250

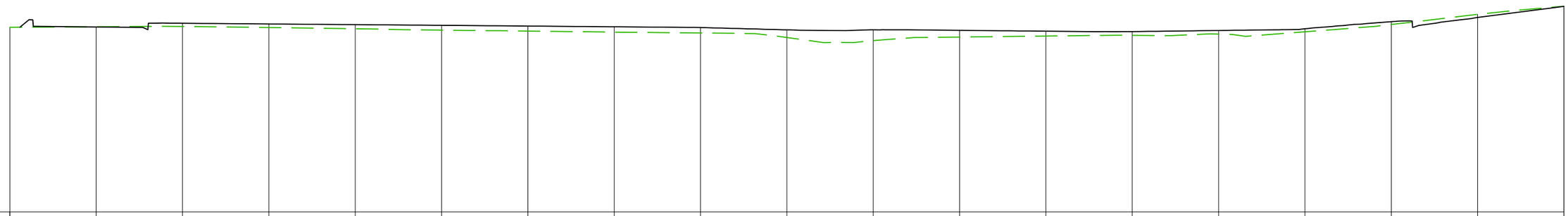
Project status: For Consent
Project: 21102
Drawing No: C302
Issue/Rev: A



Vertical Exaggeration: 2.5
Datum: 0.0

Design Levels	5.19	5.34	5.49	5.39	5.29	5.19	
Existing Levels	4.96	5.15	5.29	5.41	5.29	5.24	5.09
Cut/Fill Depth	0.04	0.05	0.08	0.10	0.05	0.10	
Chainage	10.00	15.00	20.00	25.00	30.00	35.00	

Long Section (ACCESSWAY CL)



Vertical Exaggeration: 2.5
Datum: 0.0

Design Levels	4.29	4.30	4.27	4.25	4.21	4.19	4.17	4.15	4.04	3.97	4.05	4.08	4.09	4.12	4.17	4.35	4.58	4.77
Existing Levels	4.29	4.30	4.27	4.25	4.21	4.19	4.17	4.15	4.04	3.97	4.05	4.08	4.09	4.12	4.17	4.35	4.58	4.77
Cut/Fill Depth	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chainage	5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00	55.00	60.00	65.00	70.00	75.00	80.00	85.00	90.00

Long Section (PARKING AREA CL)

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

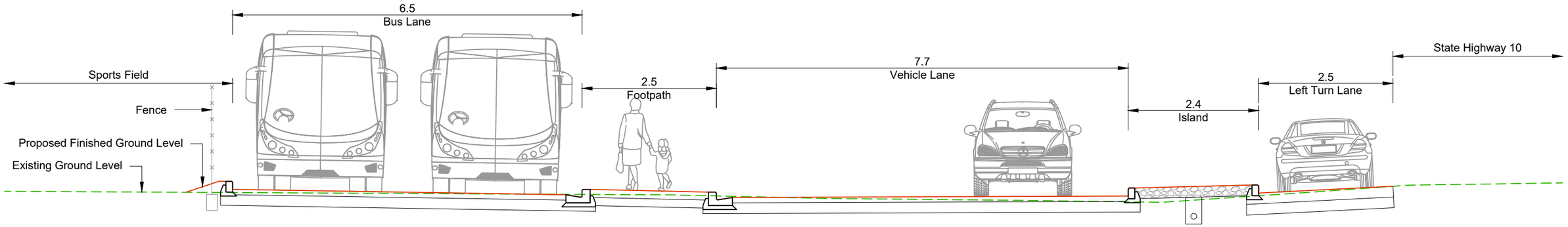
Drawing Title
Parking Area & Accessway
Longitudinal Sections

LDE LAND DEVELOPMENT & ENGINEERING

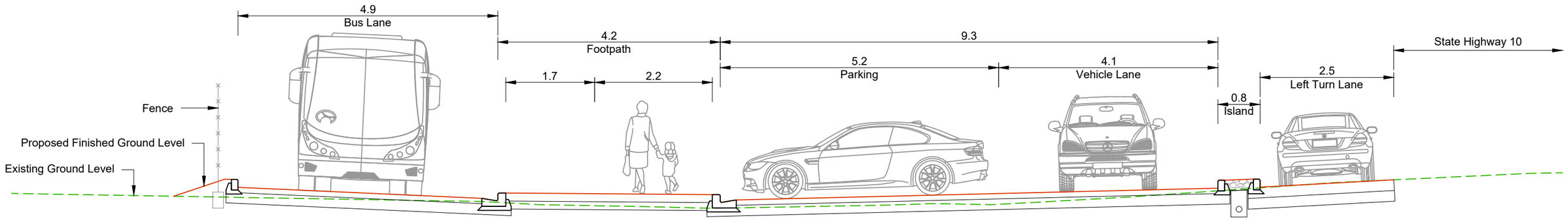
No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	1:250

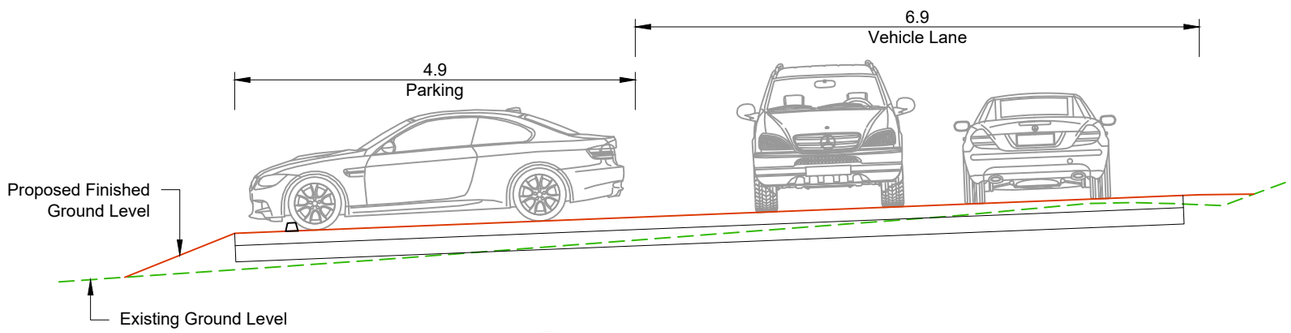
Project status: For Consent
Project: 21102
Drawing No: C310
Issue/Rev: A



03 / 311 **Cross Section @ Parking Area CH 10m**
Scale 1:75



04 / 311 **Cross Section @ Parking Area CH 50m**
Scale 1:75



05 / 311 **Cross Section @ Accessway CH 20m**
Scale 1:75

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

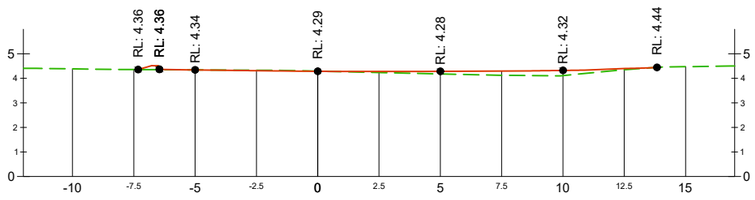
Drawing Title
Parking Area & Accessway
Typical Cross Sections

LDE LAND DEVELOPMENT & ENGINEERING

No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	1:75

Project status: For Consent
Project: 21102
Drawing No: C311
Issue/Rev: A



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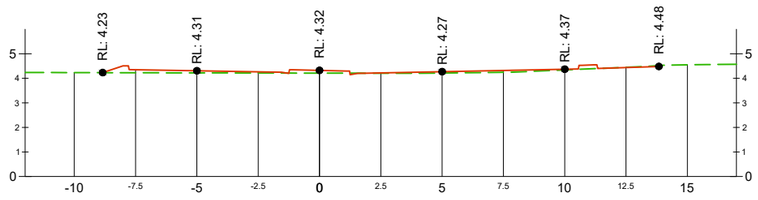

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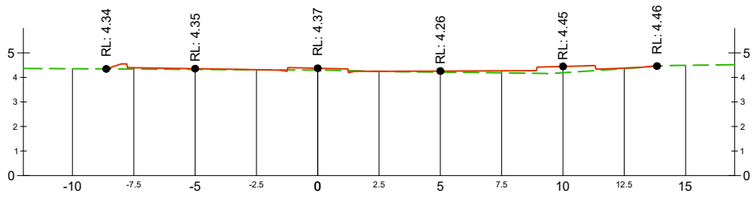

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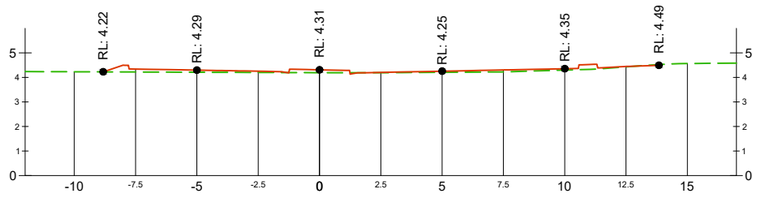

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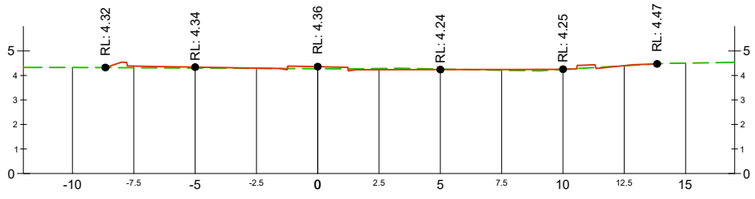

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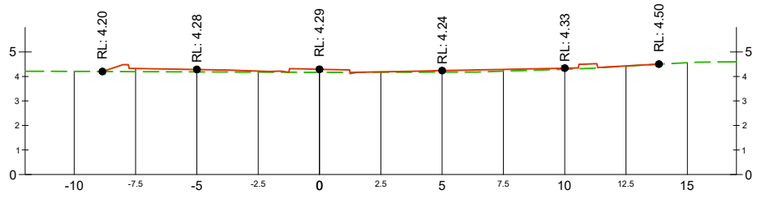

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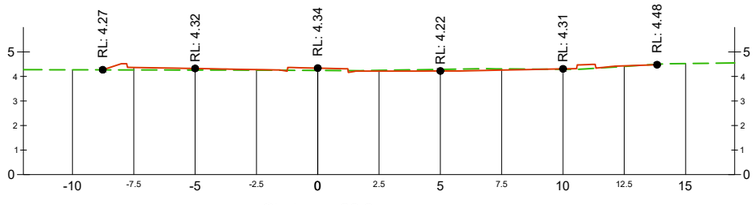

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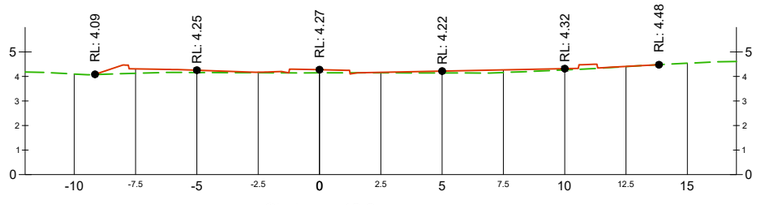

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Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

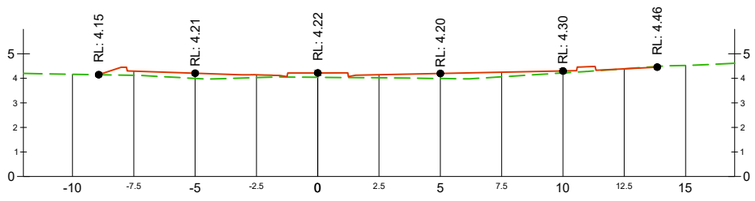
Drawing Title
Parking Area & Accessway
5m Inteval Cross Sections
Sheet 1 of 3

LDE LAND DEVELOPMENT & ENGINEERING

No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	1:250

Project status: For Consent
Project: 21102
Drawing No: C312
Issue/Rev: A



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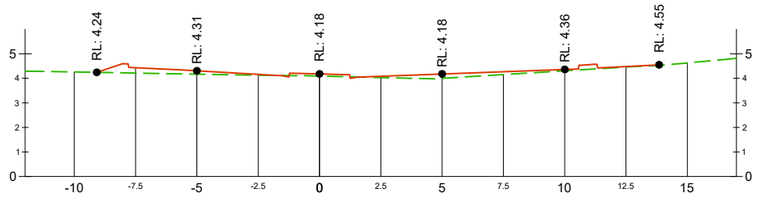

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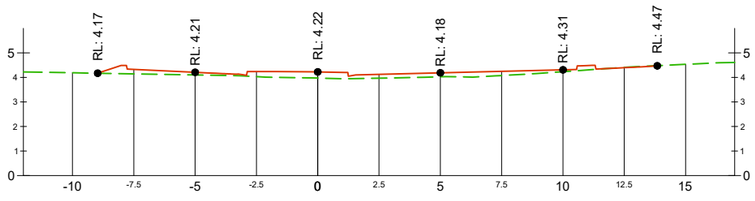

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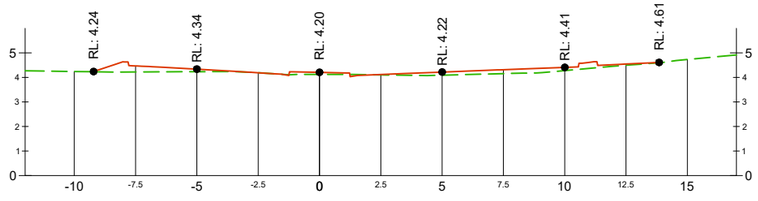

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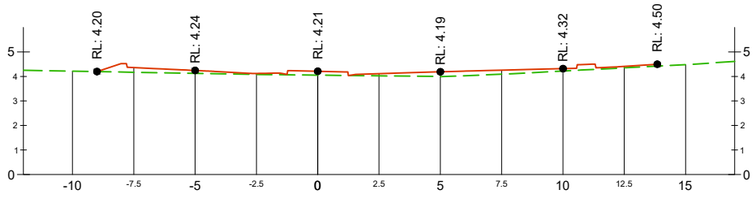

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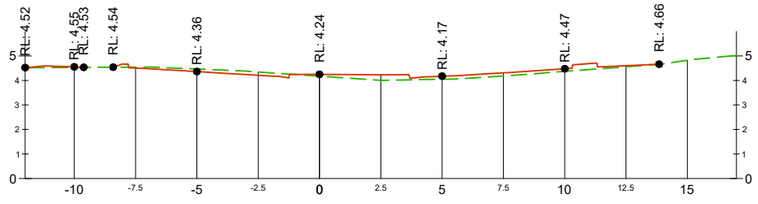

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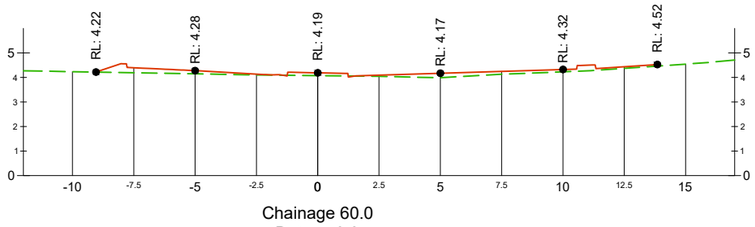

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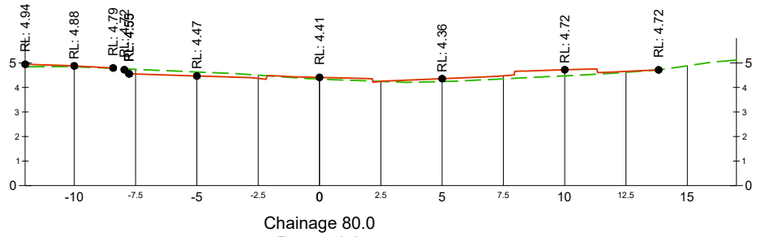

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Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

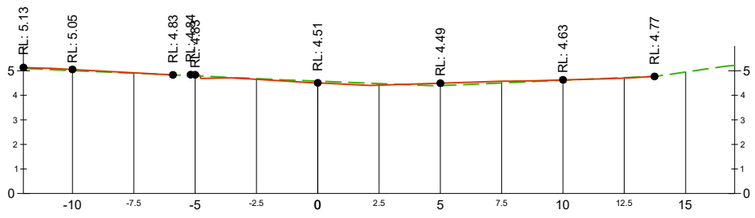
Drawing Title
Parking Area & Accessway
5m Inteval Cross Sections
Sheet 2 of 3

LDE LAND DEVELOPMENT & ENGINEERING

No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	1:250

Project status: For Consent
Project: 21102
Drawing No: C313
Issue/Rev: A



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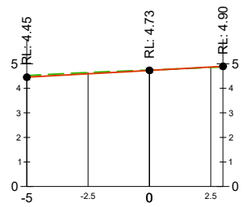

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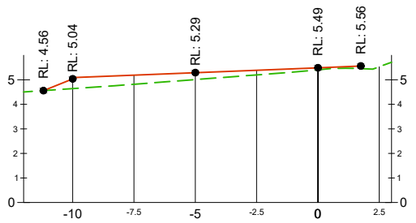

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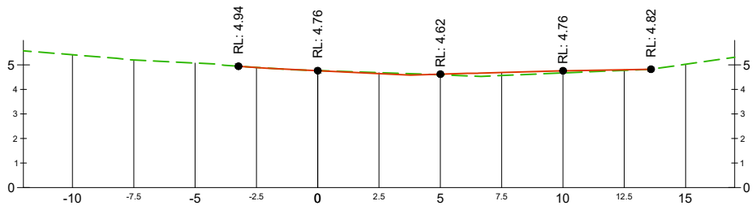

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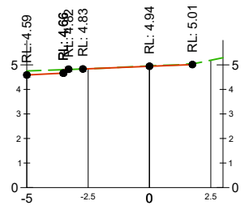

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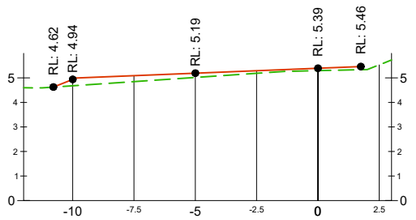

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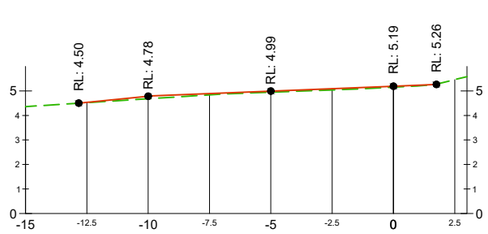

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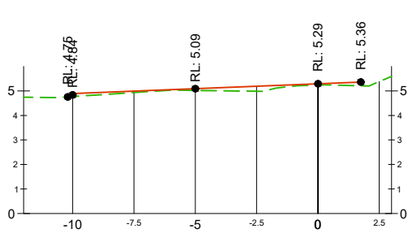

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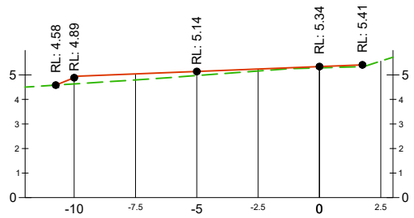

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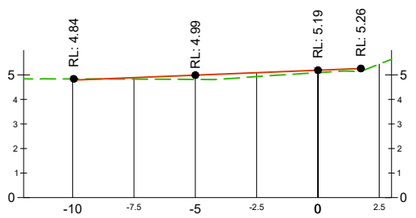


Chainage 35.0
Datum: 0.0

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

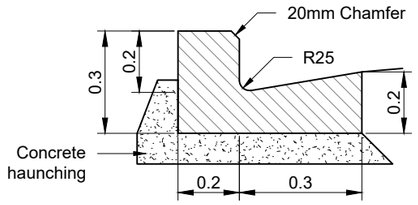
Drawing Title
Parking Area & Accessway
5m Inteval Cross Sections
Sheet 3 of 3

LDE LAND DEVELOPMENT & ENGINEERING

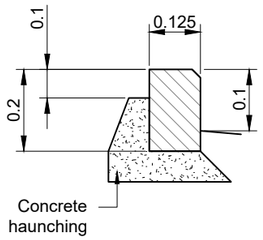
No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	1:250

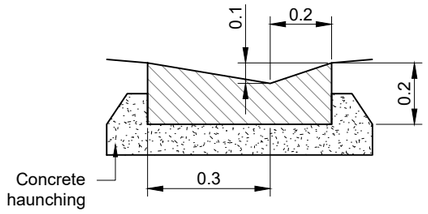
Project status: For Consent
Project: 21102
Drawing No: C314
Issue/Rev: A



Kerb & Channel
Scale 1:15



Kerb Block / Barrier Kerb
Scale 1:15



Pram Crossing
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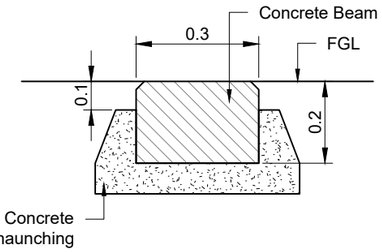
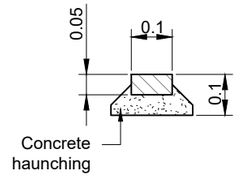
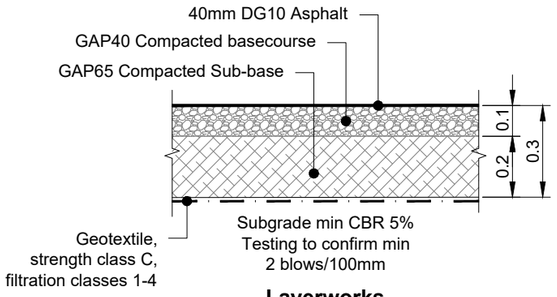


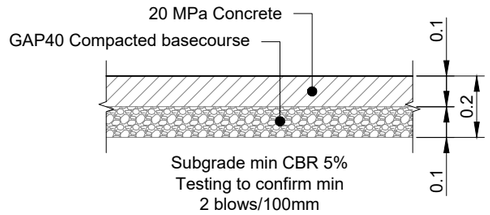
Flush Edge Beam
Scale 1:15



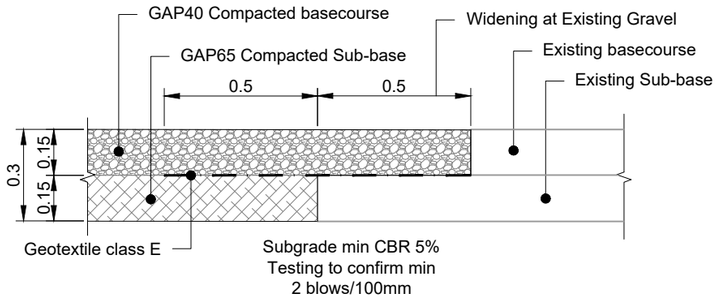
Parking Delineation Paver
Scale 1:15



Layerworks
Asphalt Parking Area
Not to Scale

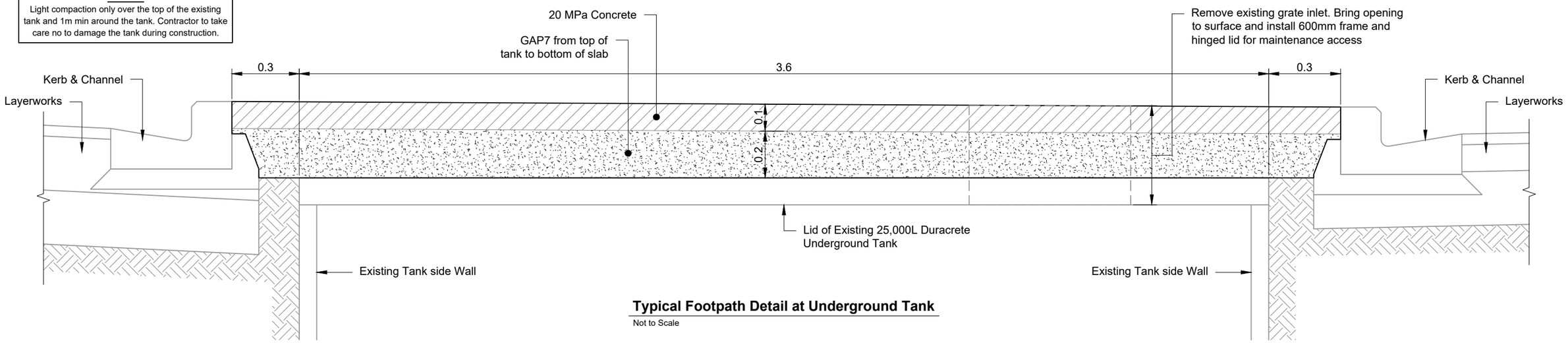


Layerworks
Concrete Footpath
Not to Scale



Layerworks
Gravel Pavement
Not to Scale

Note:
Light compaction only over the top of the existing tank and 1m min around the tank. Contractor to take care no to damage the tank during construction.



Typical Footpath Detail at Underground Tank
Not to Scale

Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific	Project: 2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Drawing Title: Parking Area & Accessway Typical Details	LDE LAND DEVELOPMENT & ENGINEERING	A Issued for Consent — H. D — 1 May 2024	Design: R. de Swardt	Project status: For Consent	
					Drawn: R. de Swardt	Project: 21102	
					Approved: H. Dubinko	Drawing No: C320	Issue/Rev: A
					Scale A3: As Shown		

Stormwater Services Notes:

1. All works to be undertaken in accordance with FNDC Engineering Standards and the Health and Safety at Work Act 2015 (HSWA).
2. All stormwater infrastructure to be installed as per the FNDC Engineering Standards (ES).
3. All stormwater infrastructure to adhere to the NZ Standards as stated in the FNDC ES.
4. All dimensions in metres unless noted otherwise.
5. Contractor to locate / ml dimensionark / confirm and protect if necessary all existing services prior to commencement of work on site.
6. All disturbed public areas to be made good and restored to existing condition.
7. Manholes to be reinforced concrete chambers with a precast base. Min Ø1050mm manhole unless otherwise specified.
8. Catchpits to be 675 x 450mm reinforced concrete chambers, with trafficable frame & grid inlet lid.

Stormwater Services Notes:

9. All PVC stormwater pipes to be uPVC SN16.
10. All concrete stormwater pipes to be RCRRJ Class 4.
11. Pipe bedding and installation to comply with relevant council details.
12. All catchpits to have a min. sump depth of 300mm.
13. All catchpits to have 150Ø uPVC SN16 outlet pipe.
14. All catchpits to be fitted with a "*Stormwater360 Litta Trap*", installed as per supplier specification.
15. SWMH3 to be 1800mmØ x 1500mm Deep MH fitted with "*Stormwater360 StormFilter Cartridge Filtration System*" and installed as per supplier specification.
16. SWMH6 - Should the existing pipe from SWEX3 to SWEX4 be in the way of the new SWCP7, the pipe is to be re-laid to SWMH6 and connected to SWEX4. Existing grades and pipe sizes to be used.
17. Refer to C421 for Catchpit and Manhole Details.

Existing Services Legend:

- Boundary (Surveyed)
- Edge of Road
- Stormwater Pipe
- Stormwater Manhole, Wingwall, Scruffy Dome, Catchpit
- Open Drain
- Power Pole & Over Head Lines
- Transformer
- Fence

Proposed Services Legend:

- 0.5m Major Contour
- 0.1m Major Contour
- Prop. Kerb Block
- Prop. Kerb & Channel
- Prop. Flush Edge Beam

Proposed Services Legend:

- Asphalt Surface
- Proposed Concrete Surface
- Proposed Gravel Surface
- Rock Filled Traffic Island
- Stormwater Pipe
- Stormwater Perforated Pipe
- Stormwater Manhole
- SW Manhole with Scruffy Dome
- Stormwater Catchpit
- Stormwater Rodding Point
- Stormwater Swale
- Fence

N

1:3 Batter to EGL

1500mm Wide x 150mm Deep grassed swale to Catchpit

SWCP8

Rodding Point

SWRP2

1:3 Batter to EGL

Subsoil Drain as per Detail

2 x 675x450 Catchpits to be installed at sports field low point

SWCP9

SWEX1 - Existing 25,000L Duracrete Underground Tank to remain

SWRP1

Subsoil Drain as per Detail

SWCP1

SWMH1

Rodding Point

SWCP3

SWCP2

SWMH2

Replace grate inlet with solid cover and frame to new finished pavement levels

SWCP5

SWRP3

SWCP4

SWMH4

SWCP6

SWMH5

Remove existing pit and drainage pipe

SWEX2

SWMH3 - Stormfilter See SW Notes 5

SWEX4

Replace grid inlet with solid cover and frame to new finished pavement levels

SWCP7

SWSD1

SWEX2 Existing SW MH Structure to remain. Replace grate inlet with solid cover and frame.

SWMH6 - See SW Notes 16

SWEX3

110Ø Perforated Pipe wrapped in filter on base of 300mm Filtration Trench

300mm Wide Trench wrapped in Geotextile and filled with clean drainage metal. Trench to be covered with 100-150mmØ aggregate at least 200mm deep.

SWSD2

See details of the Traffic Island on sheet C420

0 2.5 5 7.5 10 12.5

Scale 1:250 (m)

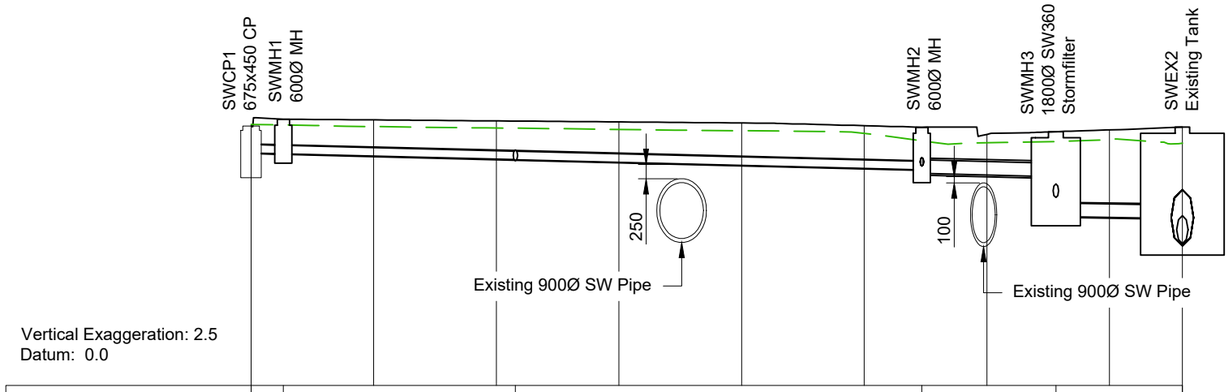
Original size = A3

Client	Project	Drawing Title	
Oruaiti School Board of Trustees c/o Avail Pacific	2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Parking Area & Accessway Stormwater Management Plan	LDE LAND DEVELOPMENT & ENGINEERING

No.	Issue/Revision		Date
A	Issued for Consent	H. D Aprvd	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	1:250

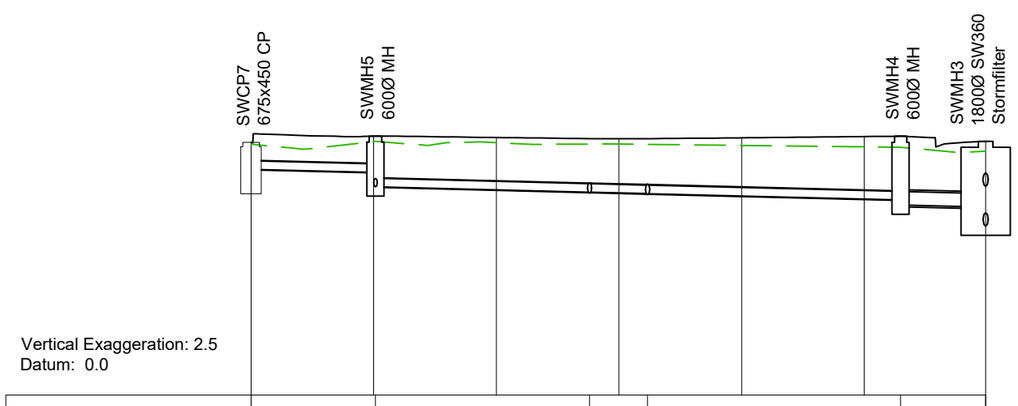
Project status:	For Consent
Project:	21102
Drawing No:	C400
Issue/Rev:	A



Vertical Exaggeration: 2.5
Datum: 0.0

Ground Level	4.23	4.34		4.29		4.21		4.14		4.21			
Invert Level		3.79	3.77		3.68		3.51		3.40		2.75		2.72
Depth to Invert	0.74	0.57		0.61		0.75		1.38		1.94			
Pipe Details	Ø150 UPVC SN16		Ø150 UPVC SN16		Ø150 UPVC SN16			Ø225 RCRRJ CLASS 4		Ø225 UPVC SN16			
Pipe Slope Pipe Length	1.00% (1:100) 0.68m		1.00% (1:100) 9.16m		1.00% (1:100) 16.27m			1.00% (1:100) 4.27m		0.67% (1:149) 2.73m			

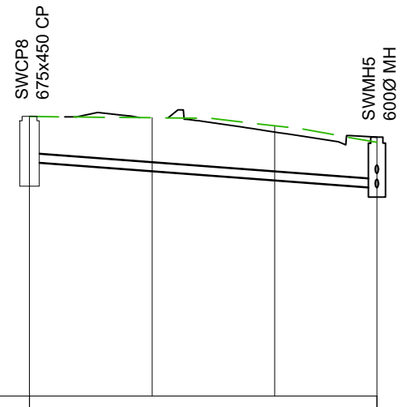
Long Section (SWCP1 TO SWMH3)



Vertical Exaggeration: 2.5
Datum: 0.0

Ground Level	4.12		4.22		4.16	4.17			4.22		4.14		
Invert Level		3.68	3.63	3.39	3.31	3.31	3.28	3.28	3.18	3.10	3.06		
Depth to Invert	0.74		0.83		0.85	0.89			1.12		1.38		
Pipe Details		Ø150 UPVC SN16		Ø150 UPVC SN16		Ø150 UPVC SN16		Ø150 UPVC SN16			Ø225 RCRRJ CLASS 4		
Pipe Slope Pipe Length		1.00% (1:100) 4.44m		1.00% (1:100) 8.43m		1.00% (1:100) 2.37m		1.00% (1:100) 10.02m			1.00% (1:100) 2.27m		

Long Section (SWCP7 TO SWMH3)



Vertical Exaggeration: 2.5
Datum: 0.0

Ground Level	4.56		4.22	
Invert Level		3.82		3.39
Depth to Invert	1.04		0.83	
Pipe Details	Ø150 UPVC SN16			
Pipe Slope Pipe Length	3.00% (1:33) 13.64m			

Long Section (SWCP8 TO SWMH5)

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

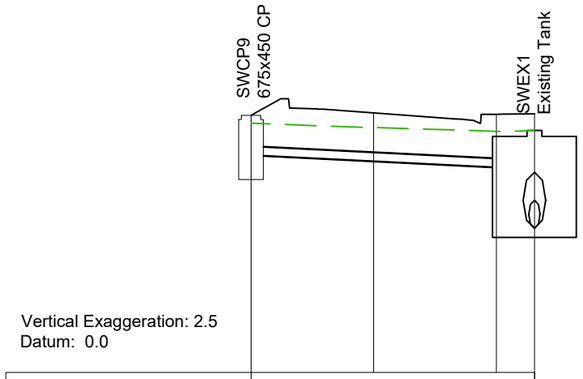
Drawing Title
Parking Area & Accessway
Stormwater Longitudinal Sections
Sheet 1 of 2

LDE LAND DEVELOPMENT & ENGINEERING

No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	H. D	1 May 2024

Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	1:250

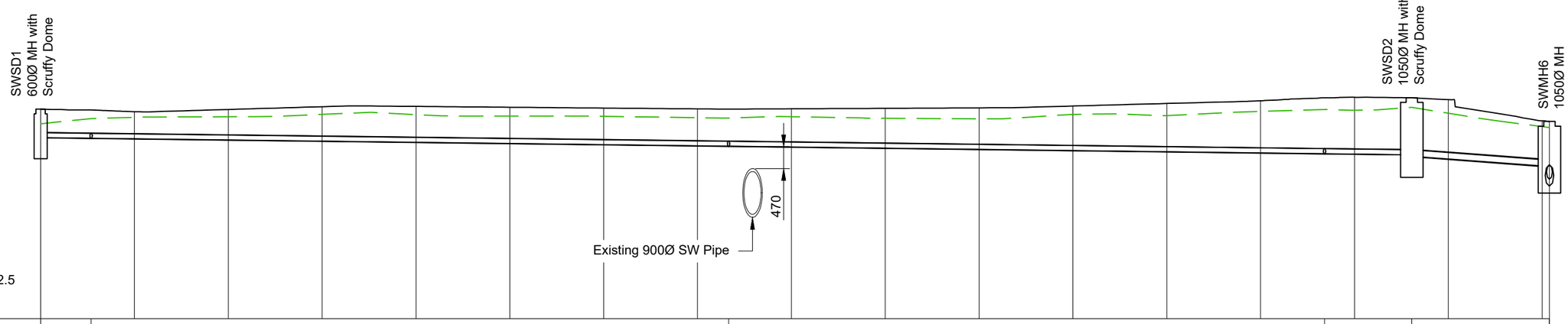
Project status: For Consent
Project: 21102
Drawing No: C410
Issue/Rev: A



Vertical Exaggeration: 2.5
Datum: 0.0

Ground Level	4.19	3.95
Invert Level	3.54	3.31
Depth to Invert	0.95	1.60
Pipe Details	Ø150 UPVC SN16	
Pipe Slope Pipe Length	2.00% (1:50) 9.69m	

Long Section (SPORTS FIELD CATCHPIT TO TANK)



Vertical Exaggeration: 2.5
Datum: 0.0

Ground Level	4.47	4.44	4.46	4.70	4.71	4.21		
Invert Level	3.86	3.85	3.85	3.68	3.68	3.52	3.52	3.50	3.46	3.24
Depth to Invert	0.91	0.59	0.78	1.18	1.55	1.38		
Pipe Details	Ø100 Perf. Pipe	Ø100 Perforated Pipe	Ø100 Perforated Pipe	Ø100 Perforated Pipe	Ø150 UPVC SN16			
Pipe Slope Pipe Length	0.50% (1:200) 2.39m	0.50% (1:200) 33.97m	0.50% (1:200) 31.75m	0.50% (1:200) 4.13m	3.00% (1:33) 6.29m			

Long Section (DRAINAGE TRENCH)

Original size = A3

Client
Oruaiti School Board of Trustees c/o Avail Pacific

Project
2554 State Highway 10, Mangonui
Proposed Carpark Upgrades

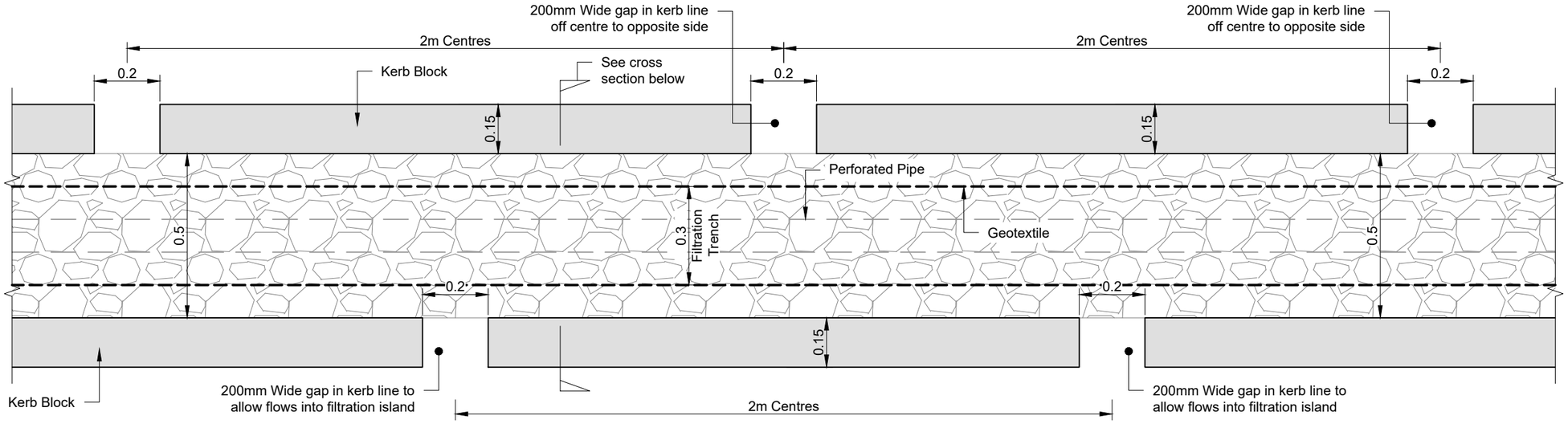
Drawing Title
Parking Area & Accessway
Stormwater Longitudinal Sections
Sheet 2 of 2

LDE LAND DEVELOPMENT & ENGINEERING

No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	H. D	1 May 2024

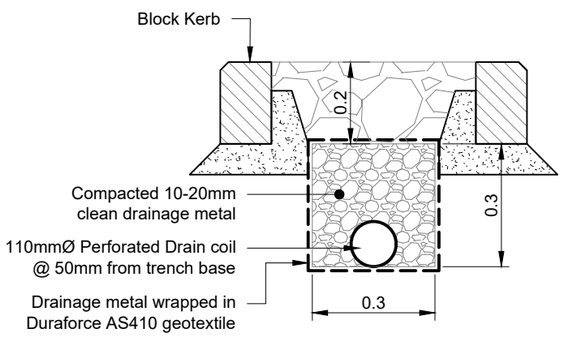
Design:	R. de Swardt
Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	1:250

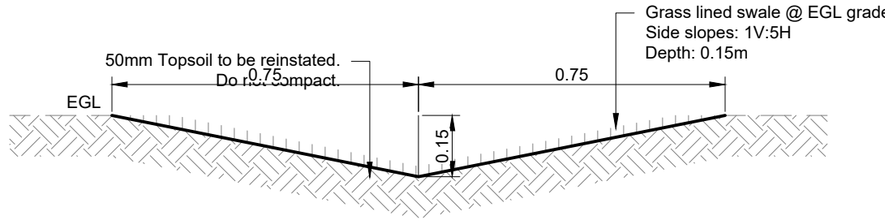
Project status: For Consent
Project: 21102
Drawing No: C411
Issue/Rev: A



Typical Traffic Island Plan View

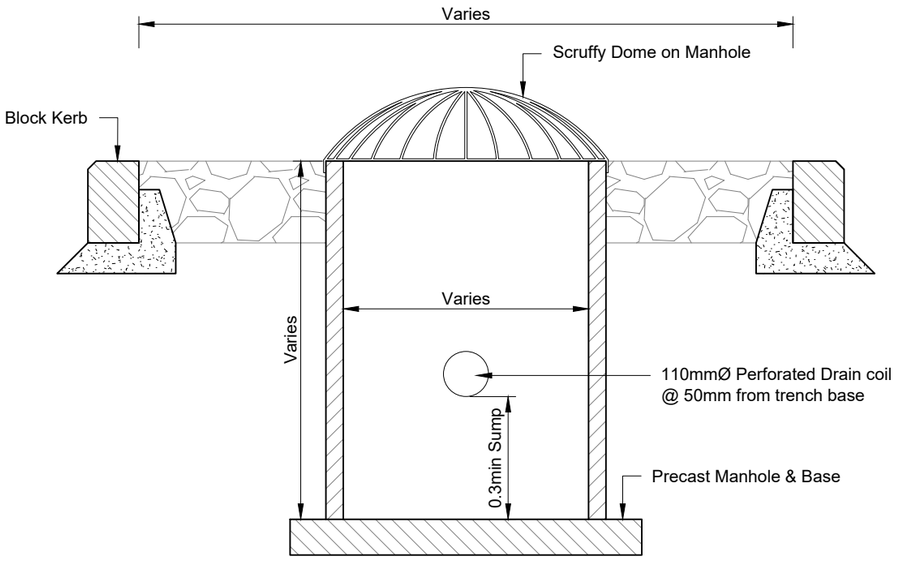
Not to Scale





Typical Grassed Swale Detail

Not to Scale

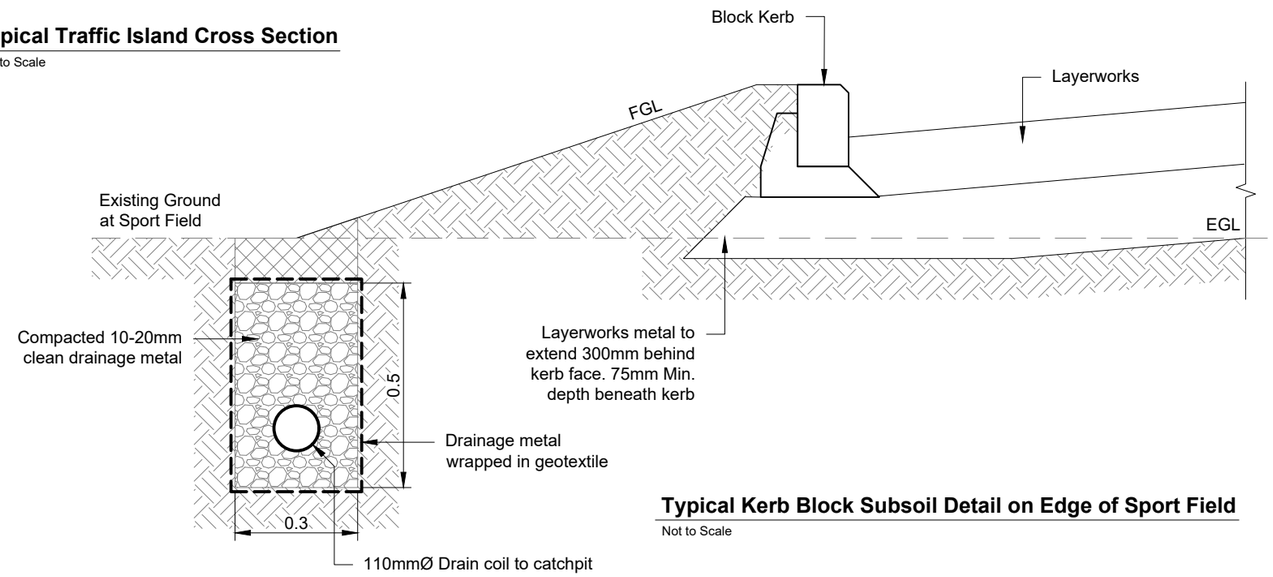


Typical Traffic Island Cross Section with Scruffy Dome

Not to Scale

Typical Traffic Island Cross Section

Not to Scale



Typical Kerb Block Subsoil Detail on Edge of Sport Field

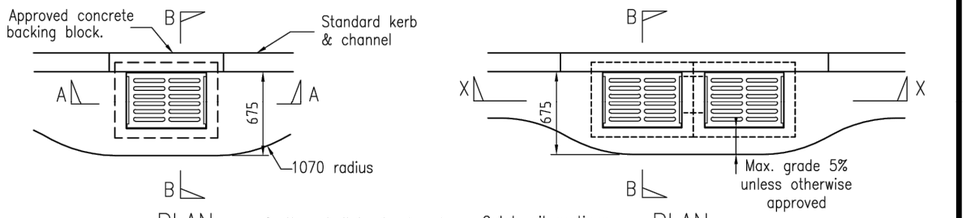
Not to Scale

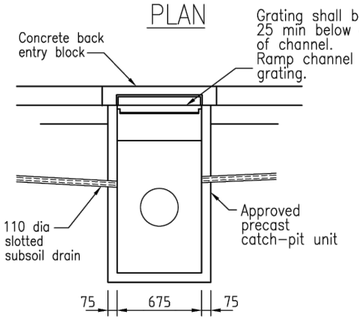
Original size = A3

Client: Oruaiti School Board of Trustees c/o Avail Pacific	Project: 2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Drawing Title: Parking Area & Accessway Typical Stormwater Device Details	LDE LAND DEVELOPMENT & ENGINEERING	Design: R. de Swardt Drawn: R. de Swardt Approved: H. Dubinko Scale A3: As Shown	Project status: For Consent Project: 21102 Drawing No: C420 Issue/Rev: A

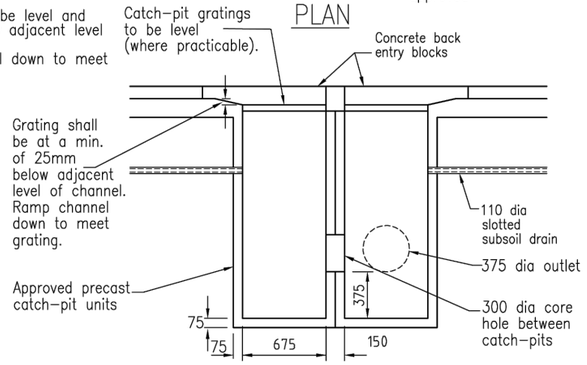
No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	H. D	1 May 2024

Sheet 34 Catch-Pit Details

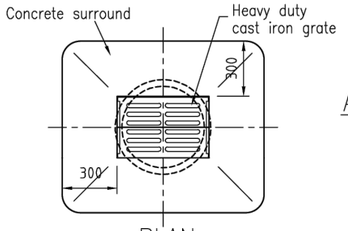




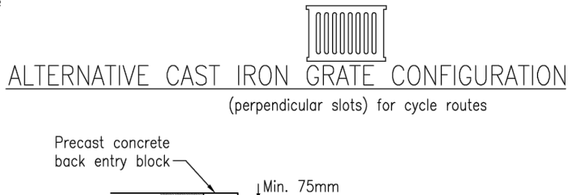
SECTION A–A
SINGLE CATCH–PIT



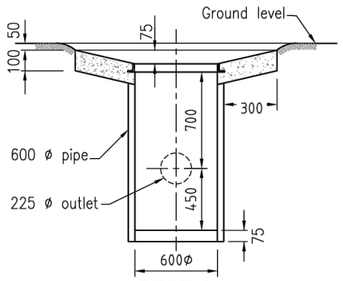
SECTION X–X
DOUBLE CATCH–PIT



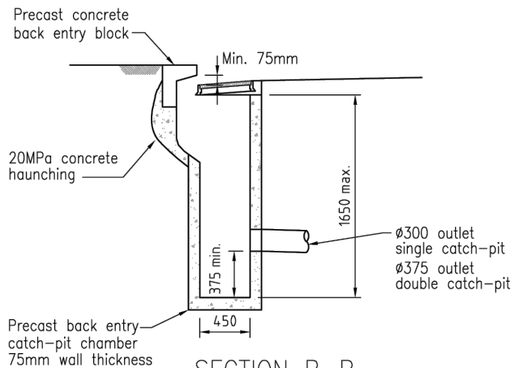
PLAN



ALTERNATIVE CAST IRON GRATE CONFIGURATION
(perpendicular slots) for cycle routes



SECTION
FIELD CATCH–PIT DETAIL

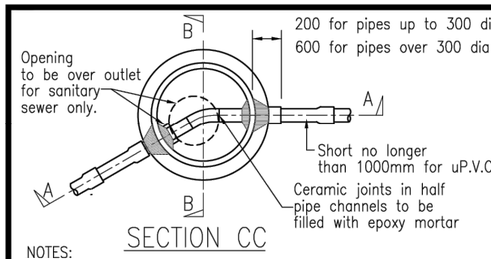


SECTION B–B

NOTES:
1. Concrete to be ordinary grade (20MPa) in accordance with NZS 3104:2021
2. Catch–pit outlet pipes to be 1:100 min gradient.
3. Mega catch–pits require specific design and approval.
4. Grates to be cycle friendly. Refer Section 3.2.14.6.

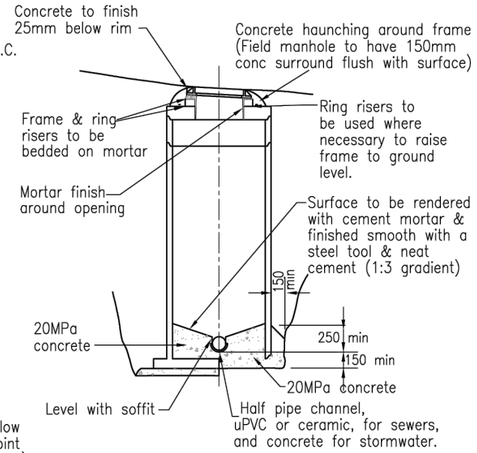
CATCH–PIT DETAILS FOR ENVIRONMENTS LIVING 1 AND 2, AND BUSINESS 1–5	Date: FEB 2022 Revision: 0.2 Scale: AS SHOWN SHEET No. 34
FAR NORTH DISTRICT COUNCIL ENGINEERING STANDARDS	

Sheet 39 Standard Precast Manhole

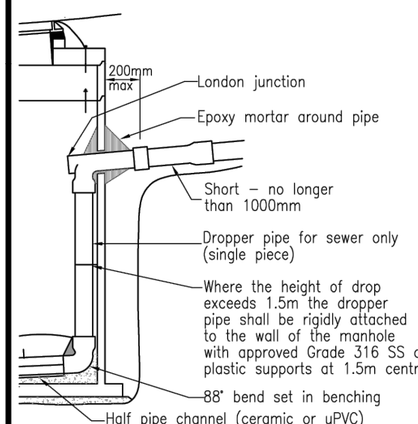


SECTION CC

NOTES:
1. This detail is applicable for pipe diameters up to 600mm & for manhole depths up to 5.0m.
2. 150mm thick reinforced concrete lids with heavy duty ductile iron frames & covers to be used in driveways, carriageways & berms. 100mm thick concrete lids with light duty cast iron frames & covers may be used elsewhere.
3. Precast manhole bases shall be used in all instances with minimum sized holes cut for pipe entry.
4. No additional thin plastering of benching or benching of inverts is permitted.
5. All concrete to be 20MPa.
7. Where non–concrete pipe connections are made to concrete manholes, then a gritted starter pipe shall be installed to allow bond between manhole and pipe material. Also, a 3flexible joint should be specified as part of gritted starter pipe (as standard).
8. All manholes >1.2m in depth shall be provided with manhole step rungs. These shall follow the requirements on sheet 40

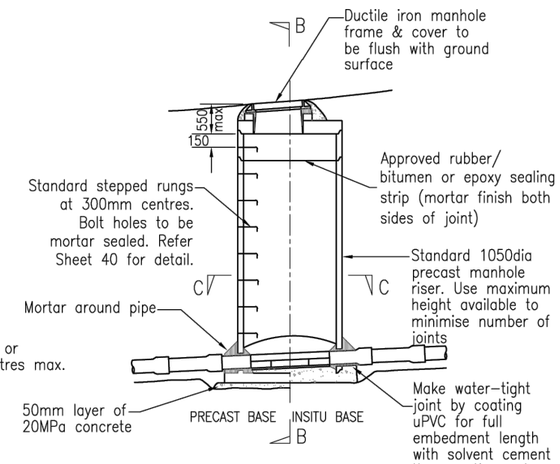


SECTION BB



SECTION A–A INTERNAL DROP

Note:
1. This detail is applicable for pipe diameters up to 250mm & for manhole depth up to 5.0m & for manhole diameters ⩾ 1200mm.
2. External drops shall not be used



SECTION AA

STANDARD PRECAST MANHOLE SEWER AND STORMWATER FOR ALL ENVIRONMENTS	Date: FEB 2022 Revision: 0.2 Scale: AS SHOWN SHEET No. 39
FAR NORTH DISTRICT COUNCIL ENGINEERING STANDARDS	

Original size = A3

Client	Project	Drawing Title
Oruaiti School Board of Trustees c/o Avail Pacific	2554 State Highway 10, Mangonui Proposed Carpark Upgrades	Parking Area & Accessway Typical Stormwater Details

LDE LAND DEVELOPMENT & ENGINEERING

No.	Issue/Revision	Aprvd	Date
A	Issued for Consent	H. D	1 May 2024

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Drawn:	R. de Swardt
Approved:	H. Dubinko
Scale A3:	As Shown

Project status:	For Consent
Project:	21102
Drawing No:	C421
Issue/Rev:	A