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)** _____

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?	
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: KABB Property Limited

Email: [redacted]

Phone number:

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

6. Address for Correspondence

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

Name/s: James Connon

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: Same as applicant

Property Address/ Location:

Postcode

8. Application Site Details

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

Name/s: KABB Property Ltd

Site Address/ Location: 18-20 Kahikatearoa Lane, Waipapa

Postcode

Legal Description: Lots 2 and 3 DP 567982 **Val Number:**

Certificate of title: RT 1019560 and RT 1019561

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.

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.

To establish a vehicle maintenance facility.

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):

- [x] **Building Consent** EBC-2025-729/0
- [x] **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**
- [x] **Changing the use of a piece of land**
- [x] **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) Brent Butler Kabb Prop Ltd.

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) Brent Butler

Signature:
(signature of bill payer) [redacted]

Date 6/6/25

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)** James Connon

Signature: Date 11-Jun-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)
- [ ] 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
- [ ] Written Approvals / correspondence from consulted parties
- [x] Reports from technical experts (if required)
- [x] 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
- [ ] 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.

Application for land use consent

KABB PROPERTY LIMITED

18-20 Kahikatearoa Lane, Waipapa

reyburn & bryant

PLANNERS • SURVEYORS

Application for land use consent

KABB PROPERTY LIMITED

18-20 Kahikatearoa Lane, Waipapa

Report prepared for:	KABB Property Limited
Author	James Connon, *Planner*
Reviewed by:	David Johnson, *Planner*
Consent Authority:	Far North District Council
Report reference:	18476
Report Status:	Final
Date:	June 2025

Reyburn and Bryant
P.O. Box 191
Whangarei 0140
Telephone: (09) 438 3563

FORM 9

APPLICATION FOR RESOURCE CONSENT UNDER SECTION 88 OF THE RESOURCE MANAGEMENT ACT 1991

To: **Far North District Council**

Private Bag 752

Kaikohe 0440

1. **KABB Property Limited** applies for land use consent to establish a vehicle maintenance facility (an Industrial Activity) on the sites.

2. The location of the sites and proposed activity is 18-20 Kahikatearoa Lane, Waipapa.

3. The legal descriptions and title references of the sites are Lots 2 and 3 DP 567982, RT 1019560 and RT 1019561 respectively.

4. The applicant is the owner of the sites.

5. There are no other activities that are part of the proposal to which this application relates.

6. Resource consent is also required from the Northland Regional Council (NRC) under the Proposed Regional Plan for Northland (PRP) to undertake earthworks within a flood hazard area and across an area exceeding 5,000m^2. A separate application has been lodged concurrently with the NRC.

7. We attach an assessment of effects on the environment that:

   (a) includes the information required by clause 6 of Schedule 4 of the Resource Management Act 1991; and

   (b) addresses the matters specified in clause 7 of Schedule 4 of the Resource Management Act 1991; and

   (c) includes such detail as corresponds with the scale and significance of the effects that the activity may have on the environment.

8. We attach an assessment of the proposed activity against the matters set out in Part 2 of the Resource Management Act 1991.

9. We attach an assessment of the proposed activity against any relevant provisions of a document referred to in section 104(1)(b) of the Resource Management Act 1991, including information required by clause 2(2) of Schedule 4 of that Act. Included is a check list of relevant Schedule 4 matters.

10. No other information is required to be included in the district or regional plan(s) or regulations.

.....

James Saxby Connon

11 June 2025

.....

Date

Address for service:	Reyburn and Bryant 1999 Ltd PO Box 191, Whangarei
Telephone:	(09) 438 3563
Email:	James@reyburnandbryant.co.nz
Contact person:	James Saxby Connon

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ABBREVIATIONS

AEE	Assessment of Environmental Effects
FFL	Finished Floor Level
FNDC	Far North District Council
GFA	Gross Floor Area
HAIL	Hazardous Activities and Industries List
HW	Haigh Workman
LIZ	Light Industrial Zone
NAS	Neo Architecture Studios
NES-CS	National Environmental Standard – Contaminated Soil
NRC	Northland Regional Council
OFNDP	Operative Far North District Plan
PFNDP	Proposed Far North District Plan
PIM	Project Information Memorandum
RMA	Resource Management Act, 1991

1. INTRODUCTION

1.1 Report basis

This report has been prepared for KABB Property Limited (the applicant) in support of an application to establish a vehicle maintenance facility (an Industrial Activity) at 18-20 Kahikatearoa Lane, Waipapa.

The application has been prepared by Section 88 and the Fourth Schedule of the Resource Management Act, 1991 (RMA). Section 88 of the RMA requires that resource consent applications be accompanied by an Assessment of Environmental Effects (AEE) in accordance with the Fourth Schedule.

The report also includes an analysis of the relevant provisions of the relevant regional and national planning documents that are pertinent to the assessment and decision required under s104 of the RMA.

1.2 Proposal summary

The applicants own two titles at 18-20 Kahikatearoa Lane in Waipapa. They are legally described as Lots 2 and 3 DP 567982, and have a combined area of 6,842m^2. They are zoned 'Industrial' under the Operative Far North District Plan (OFNDP). They are not subject to any Resource Areas.

Under the Proposed Far North District Plan (PFNDP) the sites are zoned 'Light Industrial' (LIZ). They are subject to the 100-year River Flood Hazard Zone.

The proposal is to establish a vehicle maintenance facility, an industrial activity, on the sites. It will consist of a 1,301.3m^2 Gross Floor Area (GFA) building[1] with a workshop and an office, a concrete car park, and a metalled yard. A new 32.1m wide vehicle crossing and a new 6m wide vehicle crossing[2] will provide access the sites.

[1] The building coverage is 1,535.39m^2 as it includes canopies.

[2] The vehicle crossing is 6m wide at the site boundary, 8m wide at the edge of the carriageway.

Neo Architecture Studio (NAS) has prepared plans of the proposed development. These are attached in **Appendix 1**.

NAS lodged a building consent application (EBC-2025-729/0) with the Far North District Council to establish the vehicle maintenance facility. On 4 April 2025 a letter was received from the FNDC advising that the proposed development infringed several rules of the OFNDP. A copy of that letter is attached in **Appendix 2**.

Overall, resource consent is required a **discretionary activity** from the FNDC due to the volume of the earthworks and the construction of 32.1m wide vehicle crossing. Several controlled and restricted discretionary activity consents are also required.

1.3 Property details

Applicant and Landowner:	KABB Property Limited
Site location:	18-20 Kahikatearoa Lane, Waipapa
Legal descriptions, records of title and site areas	Lot 2 DP 567982 – RT 1019560 – 3412m^2 Lot 3 DP 567982 – RT 1019561 – 3430m^2
District Plan	Far North District Plan (FNDP)
Operative District Plan Zone	Industrial Zone
Proposed District Plan Zone	Light Industrial Zone
Operative District Plan Notations	N/A
Proposed District Plan Notations	100-year River Flood Hazard Zone

***Table 1**: Property details.*

1.4 Resource consents sought

Operative Far North District Plan

The various rules of the OFNDP under which consent is sought are set out below:

- Rule 7.8.5.2.3 'Stormwater' – **controlled activity**. The stormwater disposal arrangements will not comply with Rule 7.8.5.1.9 as it will not be discharged

to an existing consented urban stormwater management plan or discharge consent. However, they will comply with the requirements of Rule 7.8.5.2.3.

- Rule 7.8.5.3.2 'Visual Amenity and Environmental Protection' – **restricted discretionary activity**. The screening is not proposed in accordance with the requirements of Rule 7.8.5.1.2.
- Rule 12.3.6.3 'Discretionary activities' - **discretionary activity**. The proposed earthworks do not comply with Rule 12.3.6.1.3 or Rule 12.3.6.2.2 as more than 500m^3 of earthworks are proposed.
- Rule 15.1.6A.3.1 'Traffic Intensity – **controlled activity**. Under Appendix 3A of the OFNDP the proposed development will generate 390 average daily one-way vehicle movements.
- 15.1.6C.1.2 'Discretionary activities' - **discretionary activity**. The proposed development does not comply with Rule 15.1.6C.1.2 as a 32.1m vehicle crossing will replace the two existing vehicle crossings.

Overall, the proposal is a **discretionary activity** under the OFNDP.

Proposed Far North District Plan

The various rules of the PFNDP under which consent is sought are set out below:

- LIZ-R1 'New buildings or structures, and extensions or alterations to existing buildings or structures' – **discretionary activity**. The proposal does not comply with LIZ-R1 for the following reasons:
  - The building has a GFA in excess of 450m^2.
  - Landscaping is not proposed on the road boundary in accordance with LIZ-S6.
  - Less than 10% of the site area will be planted in grass, vegetation, or landscaped with permeable material (LIZ-S8).
- NH-R3 'New buildings or structures' – **restricted discretionary activity**. The proposed building does not comply with the permitted activity criteria as it has a GFA larger than 10m^2.

- EW-R1 'Earthworks for buildings or structures, and extensions to existing buildings or structures' – **restricted discretionary activity**. The proposal does not comply with EW-R1 as it does not comply with the maximum earthworks thresholds in EW-S1 (200m^3 and 2,500m^2).

Overall, the proposal is a **discretionary activity** under the PFNDP.

1.5 Relevant titles and memorials

Lots 2 and 3 DP 567982 are held in two titles, RT 1019560 and RT 1019561 respectively. RT 1019560 and RT 1019561 are subject to a consent notice (12554072.4). The five conditions are addressed below:

- Condition i imposes a minimum floor level above the 100-year flood level. The proposed building will have a sufficiently elevated floor level (see Section 3.3 of this report).
- Condition ii requires the provision of a wastewater treatment and disposal system when a new building is proposed. The wastewater treatment and disposal arrangements are addressed in Section 3.7 of this report.
- Condition iii requires the provision of a design of stormwater management when a new building is proposed. The stormwater management arrangements are addressed in Section 3.6 of this report.
- Condition iv does not relate to Lots 2 and 3 DP 567982.
- Condition v requires the provision of an on-site firefighting water supply when a new building is constructed. A 25,000 litre water tank is proposed as a firefighting water supply (see the NAS plans).

The titles and the consent notice are attached in **Appendix 3**.

1.6 Other approvals

Resource consent is required from the Northland Regional Council (NRC) under the Proposed Regional Plan for Northland (PRP) to undertake earthworks within a flood hazard area and across an area exceeding 5,000m^2. A separate application has been lodged concurrently with the NRC.

Building consent EBC-2025-729/0 is on hold pending resource consent approval. Once this resource consent application is approved building consent EBC-2025-729/0 will also be approved.

No other approvals are required to give effect to this proposal.

1.7 Processing requests

Prior to the release of any decision for this application, please forward the draft conditions to the agent for review and comment.

1.8 Statutory context

Section 104B of the RMA sets out specific requirements for determining discretionary and non-complying activities.

Section 104(1) of the RMA sets out the matters that a consent authority must, subject to Part 2, have regard to when considering an application for resource consent.

- This report focuses on the relevant matters in s104(1), specifically:
- The actual and potential environmental effects (s104(1)(a).
- The relevant provisions of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health Regulations 2011 (NES-CS) (s104(1)(b)(i)).
- The relevant provisions of the FNDP (s104(1)(b)(vi)).

2. THE SITES AND SURROUNDING ENVIRONMENT

2.1 The sites

Location

The sites are located on the northern side of Kahikatearoa Lane in Waipapa, 400m west of State Highway 10 (SH10). The sites are shown in **Figure 1** below:

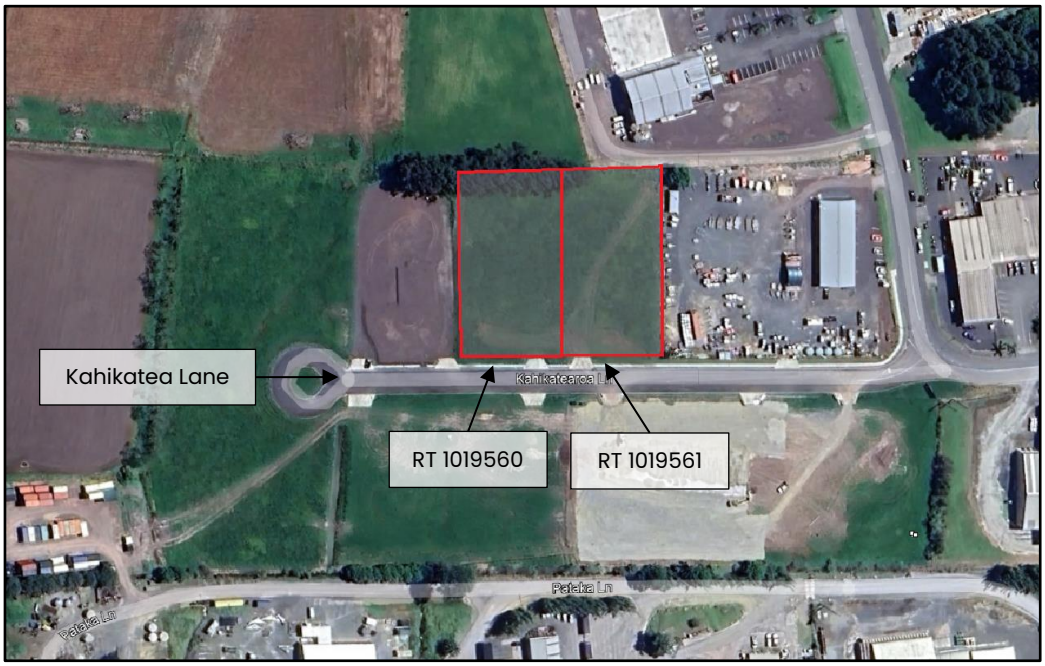


***Figure 1**: Aerial photograph of the site (Source: Google Earth).*

Built development

The sites are vacant.

Access

The sites are accessed via two existing crossings from Kahikatea Lane. The two vehicle crossings are shown in **Figure 2** below.

***Figure 2**: Existing access ways to the sites from Kahikatearoa Lane (Source: Google Earth).*

Topography

The sites are flat.

Haigh Workman (HW) has prepared a geotechnical investigation report for the proposed development (see **Appendix 4**) which determined that the existing raised level (RL) of the property is 78.8m.

Vegetation and ground cover

The sites are covered in grass. Some of the topsoil has been removed in preparation for the proposed building.

There is a row of trees on the northern boundary of the sites.

Natural hazards

The sites are subject to the 50-year and 100-year flood hazards mapped by the NRC (see **Figure 3** below). The flood levels vary from 78.8mRL on the northern boundary to 78.6 on the road boundary.

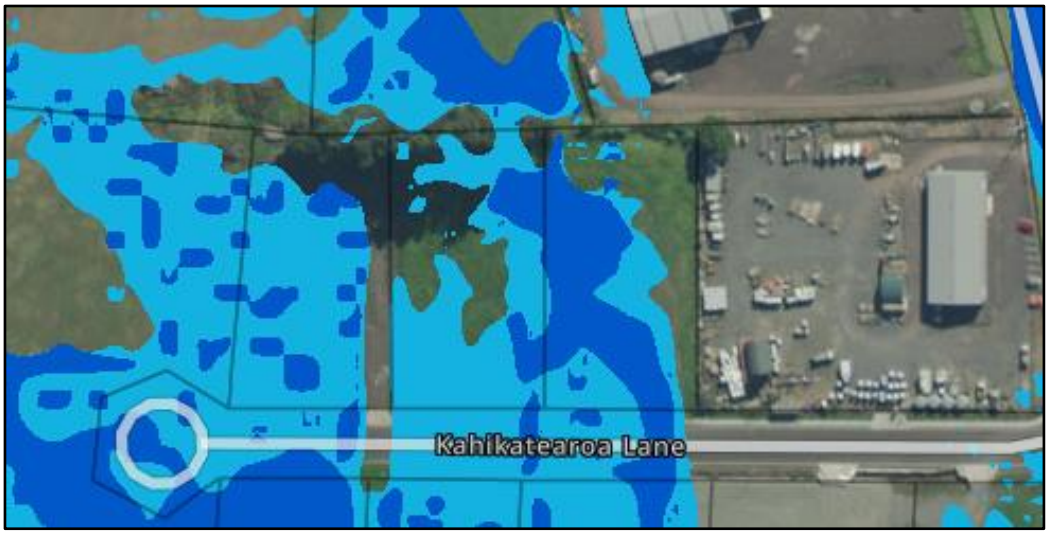


***Figure 3**: Priority Rivers Flood Hazard Mapping (Source NRC).*

2.2 The surrounding environment

The sites are located on Kahikatearoa Lane, a cul-de-sac within the industrial area of Waipapa 400m west of SH10. The properties on the southern side of Kahikatearoa Lane and further west are undeveloped. Industrial activities have been developed to the north, east, and south of Kahikatearoa Lane.

Kahikatearoa Lane is a new road recently vested with the FNDC. It has been designed to act as an overland flow path.

The nearest waterway is the Kerikeri River, mapped as a priority river by NRC. It is located 250m southwest of the sites (see **Figure 4** below).

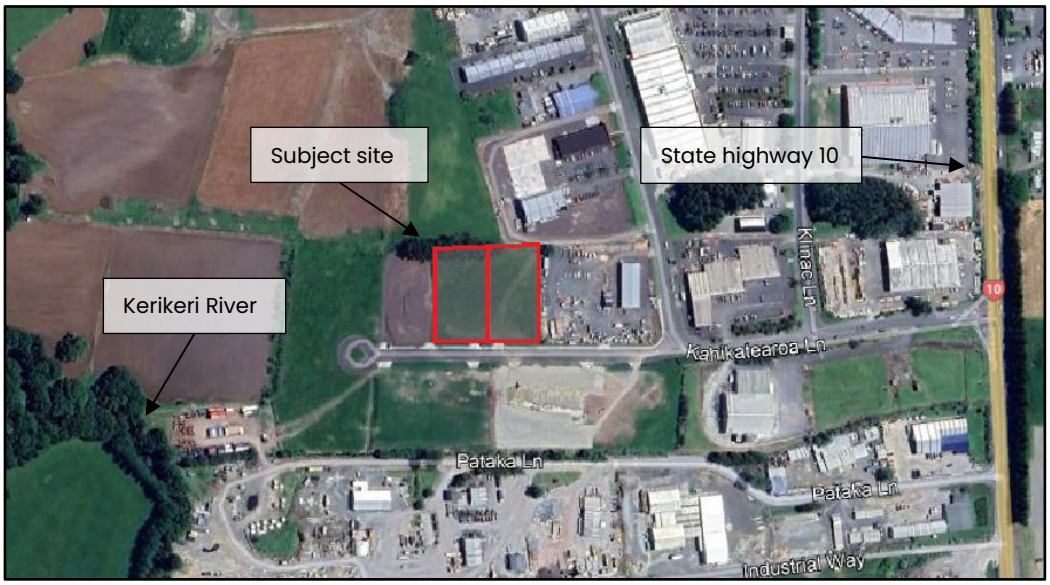


***Figure 4**: Surrounding environment (Source: Google Earth).*

3. THE PROPOSAL

3.1 General

It is proposed to construct a vehicle maintenance facility on the sites in accordance with the NAS plans (see **Appendix 1**). It will consist of a 1,301.3m^2 GFA building with a workshop and an office, a concrete car park (1,254.57m^2), and a metalled yard (3,721.92m^2).

3.2 Proposed building

The applicant will establish a vehicle maintenance facility on the sites, an 'Industrial Activity' under the OFNDP. The vehicle maintenance facility will be operated by 15 staff.

The proposed building will have a building coverage (including the canopies) of 1,535.39m^2 and a GFA of 1,301.3m^2. It will contain a 995.97m^2 workshop with 5 vehicle repair bays and a 305.33m^2 office. The office will include a showroom, an office, a meeting room, a lunchroom, toilets and a shower.

The total impervious area across the site will be 6,512.42m^2. This includes the proposed building, a 1,254.57m^2 concrete car park, and a 3,721.92m^2 metal yard.

The NAS site plan is copied in **Figure 5** below.

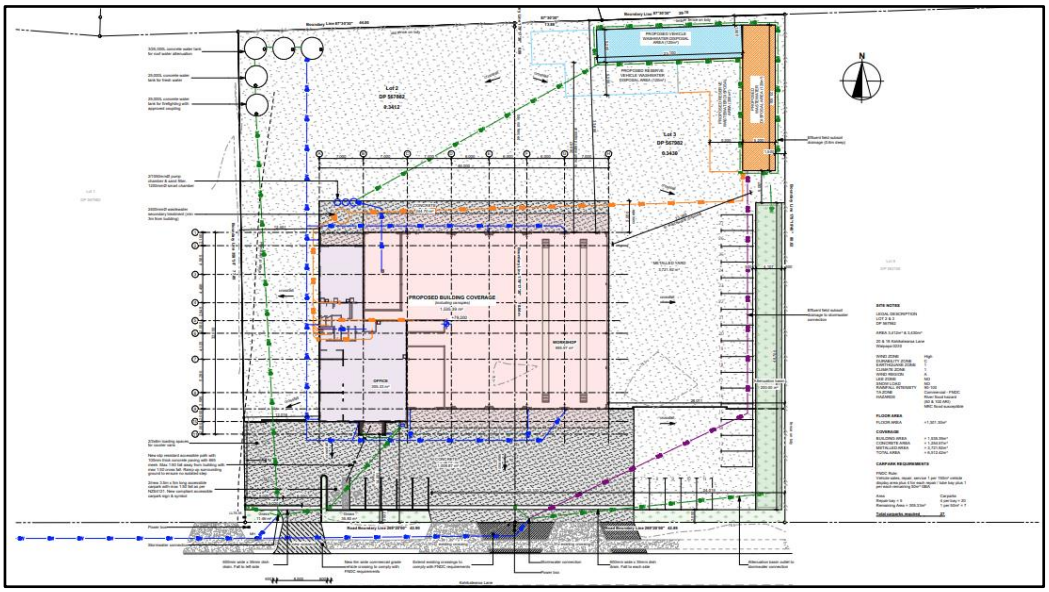


***Figure 5**: Proposed site plan*

3.3 Site suitability

The suitability of the sites for development has been assessed by HW in the following technical reports:

- The geotechnical investigation report (see **Appendix 4**); and
- The flood hazards assessment report (see **Appendix 5**).

The two reports set out recommendations to ensure that the sites are suitable for the proposed development. The HW flood hazards assessment report recommends a minimum floor level of 79.1m RL to ensure that the finished floor level is at least 300 mm above the 100-year flood event at 78.8m RL.

A hardfill platform will be established at 79.1m RL. The upper 300mm of soil will be removed and replaced with granular hardfill. The raised platform will be extended 4m from the face of all sides of the building.

Subject to compliance with the recommendations of the HW geotechnical investigation report and flood hazards assessment report the sites will be suitable for the proposed development.

3.4 Earthworks details

Earthworks are proposed across the property to construct a suitable building platform in accordance with the recommendations of the HW geotechnical investigation report and the HW flood hazards assessment report.

HW have prepared an earthworks report which sets out the volume and area of earthworks (see **Appendix 6**). Earthworks are proposed across the entire property (6,482m^2). The total volume of earthworks will be 2,481.5m^3. This consists of:

- 942.2m^3 topsoil strip.
- 824.6m^3 concrete/aggregate fill.
- 126.3m^3 of additional cut to achieve levels
- 588.4m^3 of additional fill to achieve levels.

HW has also prepared an Erosion and Sediment Control Plan (ESCP) for the proposed earthworks (see **Appendix 7**). The measures will be general accordance with AC GD05. They include a stormwater basin, a floating 'T' bar decant, and silt fencing.

3.5 Access, parking, and traffic generation

Access

The two existing vehicle crossings will be consolidated into a single 32.1m wide vehicle crossing to accommodate the types of vehicles anticipated to use the site.

Additionally, a new vehicle crossing is proposed at the southwestern corner of the site. This new crossing will be between 6m wide at the road boundary. This will maintain the same number of vehicle crossings.

Parking

Appendix 3C of the OFNDP provides specific guidance on the car parking requirements for the proposed activity. A summary of the car parking requirements is presented in **Table 2** below.

Car park requirements		
Area	**Rate**	**Required**
Repair bays (5 bays)	4 per bay	20
Remaining area (305.33 m²)	1 per 50 m²	7
Total Required: 27		

***Table 2**: Parking spaces required.*

In addition, to the regular car parks, Rule 15.1.6B.1.4 of the OFNDP requires a minimum of two accessible car parks where 21 – 50 car parking spaces are proposed.

The NAS site plan depicts 27 car parks, two of which are accessible. This ensures that the development fully complies with the requirements of Section 15.1.6B of the OFNDP.

Traffic generation

Appendix 3A of the OFNDP provides guidance on the traffic generated by different types of activities. For vehicle repair and service activities it specifies that there are 30 daily one-way vehicle movements per 100m^2 of Gross Building Area. The GFA of the building is 1,301.3m^2. Therefore, the proposed development is modelled to have 390 daily one-way vehicle movements under the OFNDP.

The applicant has advised that there will be 10 mechanics each generating 4 – 5 trips per day (100 daily one-way vehicle movements). There will also be 30 daily one-way vehicle movements from staff arriving to and leaving the sites. Therefore, there is expected to be 130 daily one-way vehicle movements.

3.6 Stormwater management

A stormwater management system is proposed to ensure that post-development runoff from the site does not exceed pre-development levels during a 10-year event as required by condition iii of CN 12554072.4.

HW has prepared a Stormwater Neutrality Report (SNR) (see **Appendix 8**) which includes the design and supporting analysis for the stormwater management system. The proposed stormwater system comprises three 25,000-litre roof water attenuation tanks located in the northwest corner of the site. An attenuation basin is also proposed along the eastern boundary of the site, with a direct outlet to the Council's stormwater network. This basin is designed to collect runoff from the yarding area on the eastern side of the building.

3.7 Wastewater disposal

HW has also prepared an on-site wastewater system assessment for the proposed development (see **Appendix 9**).

An on-site wastewater system is proposed on the property's northern boundary. HW has estimated that the proposed development will generate 600 litres of wastewater per day.[3]

A 120m^2 disposal field is proposed in the north-eastern corner of the property setback 1.5m from the site boundary. It includes a 100% reserve area as per condition ii of CN 12554072.4. To address issues with poor drainage, the risk of elevated groundwater conditions, and site constraints, HW has recommend that the disposal field is formed as a raised Wisconsin Mound system. The distribution pipes will be set in the raised mound at least 0.3 m above the existing ground level to separate them from the groundwater.

3.8 Water supply

A 25,000L concrete tank is proposed in the northwestern corner of the site to supply the proposed development with potable water.

Another 25,000L concrete tank is proposed next to the potable water tank as a firefighting water supply in accordance with Condition v of CN12554072.4. Fire and Emergency New Zealand have approved this arrangement (see **Appendix 10**).

3.9 Signage

One sign has been shown within NAS plans (see **Appendix 1**). The height and size of the sign are not provided but given that it is within the industrial zone, connected to the proposed building and is estimated to be less than 12m^2. It will therefore comply with Rule 16.6.1.2 of the OFNDP. The sign can be seen in **Figure 6** below.

[3] 15 staff with 40 litres of wastewater per person per day.

***Figure 6**: signage of proposed building (Source: NAS plans)*

4. ASSESSMENT OF ENVIRONMENTAL EFFECTS

4.1 Existing Environment

Section 104(1)(a) of the RMA requires consideration of any actual and potential effects associated with the proposed activity on the receiving environment. The existing environment is described in Section 2 of this report. It includes the two vacant titles with a ground level that is lower than the River Flood Hazard levels and the surrounding industrial development.

4.2 Permitted baseline

Section 104(2) of the RMA allows a consent authority to disregard an adverse effect of an activity on the environment if a plan permits an activity with that effect. This is commonly referred to as the permitted baseline.

In this case, the proposed development could feasibly be undertaken as a permitted activity under the OFNDP, where:

- At least 50% of the road boundary for a minimum of 6m from the boundary of the frontage is landscaped.
- The proposal was within an urban stormwater management plan.
- Only 200m^3 of earthworks was being undertaken.
- Less than 200 traffic movements are expected.
- Each proposed and existing crossing was 7m or less in width.

The assessment of the effects of the proposal should therefore be limited to the effects associated with the lack of landscaping, the stormwater arrangements, the additional earthworks, the traffic movements, and the width of vehicle crossings. Any other effects of the proposal can be disregarded as they fall within the permitted baseline.

4.3 Effects on amenity values

The effects of the proposed development are associated with the lack of landscaping along the road frontage.

The sites are located within an established industrial area characterized by functional, large-format industrial buildings. They typically have extensive metal or sealed yards with minimal landscaping. The adjacent property at 44 Klinac Lane contains a large industrial building, a car park fronting the street, and no landscaping (see **Figure 7**). This is typical of the surrounding environment.

***Figure 7**: Frontage of 44 Klinac Lane (Source: Google Maps)*

The proposed development aligns with the prevailing development pattern of the surrounding environment as it proposes a large-format industrial building with car parking on the front of the site. It is contextually appropriate, and therefore consistent with the character associated with the surrounding environment.

Overall, any adverse effects associated with the proposal on amenity values will be less than minor.

4.4 Stormwater effects

The HW SNR includes the design and supporting analysis for the stormwater management system. Stormwater will be attenuated using roof water detention tanks and an attenuation basin. This will ensure the stormwater is

attenuated in a 10-year event in accordance with condition iii of CN 12554072.4. The stormwater management system has been designed to avoid contaminants from leaving the site. Overall, any adverse effects associated with the stormwater management will be less than minor.

4.5 Traffic effects

As detailed previously in this report, the proposed development provides a sufficient number of car parks. Therefore, the adverse traffic effects are associated with the access arrangements and the traffic generation.

Access

Although there will be one additional vehicle crossing is proposed, there will be no more than two vehicle crossings to the property as the two existing vehicle crossings will be merged into a 32.1m wide vehicle crossing.

The 32.1m wide vehicle crossing is designed to safely accommodate the types of vehicles expected to access the site, including large trucks typically associated with vehicle repair service operations. Vehicle crossings of this scale are typical of other vehicle maintenance facilities across the Northland Region. **Figures 8** and **9** below show two a similar activity in the Whangarei District.

***Figure 8**: Commercial Diesel Ltd, 40 Gumdigger Place, Raumanga, Whangārei (Source: Google Maps)*

***Figure 9**: Keith Andrews Whangarei, 50 Rewa Rewa Road, Raumanga, Whangārei (Source: Google Maps).*

There are few pedestrians on Kahikatearoa Lane as many of the sites are undeveloped. There are also only two other properties between the sites and the end of the cul-de-sac. This limits the potential for further development and an increase in pedestrians. The sites are also located a significant distance from the commercial areas of Waipapa, limiting the potential for pedestrian activity. The predicted use of footpaths is anticipated to remain low.

Overall, the proposed access arrangements will facilitate safe and efficient access to the sites.

Traffic generation

The applicant has provided an estimated number of traffic movements which are detailed in Section 3.5 of this report. In total, there will be 130 daily one-way traffic movements. This figure is significantly lower than the estimated 390 daily traffic movements predicted by FNDC for vehicle repair service activities, and less than the maximum 200 daily one-way traffic movements required for a permitted activity. Therefore, any adverse effects will be less than minor.

Conclusion

Overall, any adverse traffic effects associated with the proposed development will be less than minor.

4.6 Earthworks effects

The earthworks will be carried out in accordance with best practice. This will include the implementation of erosion and sediment control measures in accordance with the HW ESCP (see **Appendix 7**). These measures are in general accordance with AC GD05.

The earthworks volumes will be spread across the entire site, ensuring the cut/fill heights are limited and well within the permitted limits. The vehicle maintenance facility will be constructed on the earthworks area once they are completed. This will completely screen the earthworks area. Accordingly, there will be no adverse effects post completion.

Overall, any adverse effects associated with the earthworks will be less than minor.

4.7 Natural hazard effects

The effects of natural hazards (most relevantly flooding) are addressed in the HW geotechnical investigation report and the HW flood hazards assessment report (see **Appendices 4** and **5**). Those reports recommend constructing a hardfill building platform at 79.1m RL, 300mm above the 100-year flood hazard level. The hardfill platform will be extended 4m from the face of building. Subject to the recommendations of their reports, HW conclude that the sites will be suitable for the proposed development.

Overall, any adverse effects associated with natural hazards will be less than minor.

4.8 Overall effects

Overall, any potential adverse effects associated with the proposed development will be appropriately managed. Taking into account the

proposed mitigation measures and the conclusions of the attached technical reports, the effects of the proposed development will be less than minor. No persons will be adversely affected by the development.

5. PLANNING ASSESSMENT

5.1 Overview

Section 104(1) of the RMA sets out the matters that a consent authority must, subject to Part 2, have regard to when considering all applications for resource consent.

Given the hierarchical nature of planning documents under the RMA, and the requirement for lower-order documents to "give effect to" higher-order documents, the relevant documents that require assessment under s104(1) of the RMA are the FNDP and the NES-CS.

5.2 Operative Far North District Plan objectives and policies assessment

Context

The objectives of the OFNDP are zone specific. There are also other provisions that relate to district wide matters. Given the nature of this application, the objectives and policies in the Industrial Zone (Chapter 7.8), Soils and Minerals Chapter (Chapter 12.3), and the Transport Chapter (15.1) are of the most relevance to the application. The proposal is assessed in the context of the relevant provisions below.

Assessment

Industrial Zone

The intention of the Industrial Zone is to enable a wide range of activities where their effects can be effectively managed. This is supported by the objectives and policies. The relevant objectives and policies are listed below.

Objective 7.8.3.1 *To avoid, remedy or mitigate adverse effects of new industrial activities on existing activities in the Industrial zone, and on activities on adjoining land, and on the natural and physical resources of the District.*

Policy 7.8.4.2 *That the range of activities provided for in the Industrial zone be limited only by the acceptability of the effects generated by the particular activity in relation to other activities in the zone.*

Objective 7.8.3.1 and Policy 7.8.4.2 enable a range of activities where the effects of that activity are acceptable to other activities within the surrounding environment.

This application proposes a vehicle maintenance facility, an Industrial Activity. This is commensurate with other activities within the surrounding environment. The assessment of effects in Section 4 of this report confirms that any adverse effects associated with the proposed activity will be less than minor.

The consistency of the proposed activity with other activities in the surrounding environment coupled with the limited adverse effects ensures that the proposal is consistent with Objective 7.8.3.1 and Policy 7.8.4.2.

Policy 7.8.4.3 *That standards be applied that protect visual and environmental amenity within the Industrial zone, and the amenity of adjacent zones.*

Policy 7.8.4.3 requires the protection of visual and environmental amenity within the surrounding environment. In this instance the majority of the sites within the surrounding environment have functional, large-format industrial buildings with extensive metal or sealed yards and minimal landscaping (see **Figure 7** of this report). The proposed development is entirely consistent with this character.

Policy 7.8.4.4 *All activities should provide for a stormwater disposal system incorporating Low Impact Design principles, particularly for car park and landscaped areas.*

Policy 7.8.4.5 *That stormwater disposal systems do not result in suspended solids, industrial by-products, oil, or other contaminated substance or waste entering the stormwater collection system in concentrations that are likely to pose an immediate or long term hazard to human health or the environment.*

Policies 7.8.4.4 and 7.8.4.5 relate to the stormwater management system. The HW SNR includes a design of a stormwater management system. It attenuates stormwater up to a 10-year event, consistent with condition iii of CN 12554072.4. It has also been designed to avoid contaminants leaving the site.

Overall, the proposal is consistent with the objectives and policies of the Industrial Zone.

Soils and Minerals Chapter

The objectives and policies of this chapter aim to ensure that soil excavation, filling, and mineral extraction activities are managed in a way that avoids, remedies, or mitigates adverse effects on both people and the environment. Key concerns include controlling soil erosion and ensuring that earthworks are appropriately designed, constructed, and operated to minimise environmental impacts.

Objective 12.3.3.1 *To achieve an integrated approach to the responsibilities of the Northland Regional Council and Far North District Council in respect to the management of adverse effects arising from soil excavation and filling, and minerals extraction.*

Objective 12.3.3.3 *To avoid, remedy or mitigate adverse effects associated with soil excavation or filling.*

Policy 12.3.4.1 *That the adverse effects of soil erosion are avoided, remedied or mitigated*

Policy 12.3.4.4 *That soil excavation and filling, and mineral extraction activities be designed, constructed and operated to avoid, remedy or mitigate adverse effects on people and the environment.*

As detailed in Section 4.6 of this report, erosion and sediment controls will be implemented in accordance with the HW ESCP (see **Appendix 7**). These were prepared in accordance with AC GD05. The vehicle maintenance facility will completed screen the earthworks post completion.

Overall, the proposal is consistent with the objectives and policies of the Soils and Minerals Chapter.

Transportation Chapter

The objectives and policies in Chapter 15 focus on minimising the adverse effects of traffic by promoting safe and efficient movement for all users. This includes providing appropriate accesses and parking arrangements.

Objective 15.1.3.1 *To minimise the adverse effects of traffic on the natural and physical environment.*

Objective 15.1.3.2 *To provide sufficient parking spaces to meet seasonal demand in tourist destinations.*

Objective 15.1.3.4 *To ensure that appropriate and efficient provision is made for loading and access for activities.*

Objective 15.1.3.5 *To promote safe and efficient movement and circulation of vehicular, cycle and pedestrian traffic, including for those with disabilities.*

Policy 15.1.4.1 *That the traffic effects of activities be evaluated in making decisions on resource consent applications.*

Policy 15.1.4.3 *That parking spaces be provided at a location and scale which enables the efficient use of parking spaces and handling of traffic generation by the adjacent roading network.*

Policy 15.1.4.6 *That the number, size, gradient and placement of vehicle access points be regulated to assist traffic safety and control, taking into consideration the requirements of both the New Zealand Transport Agency and the Far North District Council.*

Policy 15.1.4.7 *That the needs and effects of cycle and pedestrian traffic be taken into account in assessing development proposals.*

The adverse traffic effects are assessed in Section 4.5 of this report, and were determined to be less than minor, consistent with Objective 1.3.1 and Policy 15.1.4.1.

With respect to the provisions that relate to access, the proposed development retains the same number of vehicle crossings. The enlarged vehicle crossing will not result in adverse effects on the surrounding transport network as pedestrian and traffic volumes are low. The enlarged vehicle crossing is also consistent with similar activities across Northland.

With respect to parking, the proposed development proposes a sufficient number of car parks to meet the permitted activity criteria in the OFNDP.

With respect to the provisions that relate to traffic generation, the applicant has confirmed that the actual number of daily one-way traffic movements will be 130, well within the permitted activity criteria in the OFNDP.

Overall, the proposal is consistent with the objectives and policies of the Transportation Chapter.

Conclusion

The assessment above confirms that the proposal is consistent with the policy direction of the OFNDP.

5.3 Proposed Far North District Plan objectives and policies assessment

Context

The PFNDP was publicly notified on 27 July 2022. The submission period closed on 21 October 2022, and the further submission period closed on 4 September 2023. Given the stage of the process and pursuant to s86B(1)(c) of the RMA, the rules of the Plan Changes do not have legal effect (except for those specifically identified). Nevertheless, an assessment to determine the activity status that this proposal would have under the PFNDP provisions has been made in Section 1.4 of this report. While the majority of the rules do not have legal effect, the objectives and policies are a relevant consideration under s104(1)(b)(vi) of the RMA.

Weighting

With regards to weighting, the plan changes are in the early stages, with submissions and further submissions having closed (on 21 October 2022 and 4 September 2023 respectively). Little weight should therefore be applied to the PFNDP when considering the application. Nonetheless, an assessment of the objectives and policies is provided below for completeness.

Assessment

The objectives and policies of the PFNDP are zone specific. There are also other provisions that relate to district wide matters. This assessment considers the relevant objectives and policies in the LIZ and the district wide Natural Hazard, Earthworks, and Transportation Chapters.

Light Industrial Zone

The objectives and policies of the LIZ are focused providing for the efficient operation of light industrial activities where they avoid compromising future light industrial activities and manage the adverse effects, particularly at the zone boundaries.

The proposal enables the establishment of an Industrial Activity in accordance with the purpose of the LIZ. The form of the building, site layout, location of the car parking areas, and lack of landscaping are consistent with other industrial activities in the surrounding environment. The proposal will be in keeping with other activities in the surrounding environment and with the intent of the LIZ.

Overall, the proposal is consistent with the objectives and policies of the LIZ.

Natural Hazards Chapter

The objectives and policies of the Natural Hazards Chapter are focused on managing the risks from natural hazards, on people, infrastructure, and property.

Natural hazards are addressed in the HW geotechnical investigation report and the HW flood hazards assessment report (see **Appendices 4** and **5**). HW recommend constructing a hardfill building platform at 79.1m RL, 300mm above the 100-year flood hazard level. The hardfill platform will be extended 4m from the face of building. Subject to the recommendations of their reports, HW conclude that the sites will be suitable for the proposed development.

Overall, the proposal is consistent with the objectives and policies of the Natural Hazards Chapter.

Earthworks Chapter

The objectives and policies of the Earthworks Chapter seek to provide for earthworks while ensuring that the associated adverse effects are managed appropriately.

As detailed in Section 4.6 of this report, erosion and sediment controls will be implemented in accordance with the HW ESCP (see **Appendix 7**). These were

prepared in accordance with AC GD05. The vehicle maintenance facility will completed screen the earthworks post completion.

Overall, the proposal is consistent with the objectives and policies of the Earthworks Chapter.

Transportation Chapter

The objectives and policies of the TRAN Chapter seek to ensure that all access and parking arrangements are designed and established to ensure a safe and efficient transport network.

The proposed development retains the same number of vehicle crossings. The enlarged vehicle crossing will not compromise the safety of the surrounding transport network as pedestrian and traffic volumes on Kahikatearoa Lane.

The proposed development proposes a sufficient number of car parks to meet the permitted activity criteria in the PFNDP.

Overall, the proposal is consistent with the objectives and policies of the Transportation Chapter.

Conclusion

The assessment provided above confirms the proposal is consistent with the policy direction of the PFNDP.

5.4 National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health Regulations 2011

All applications that involve subdivision, an activity that changes the use of a piece of land, or earthworks are subject to the provisions of the NES-CS. The regulation sets out the requirements for considering the potential for soil contamination, based on the HAIL (Hazardous Activities and Industries List) and the risk that this may pose to human health as a result of the proposed land use.

Based on an analysis of aerial photography, and a review of the Northland Regional Councils 'selected land use sites' database, there is no evidence to suggest that the site has ever accommodated an activity from the HAIL. This is demonstrated in **Figure 9** below.

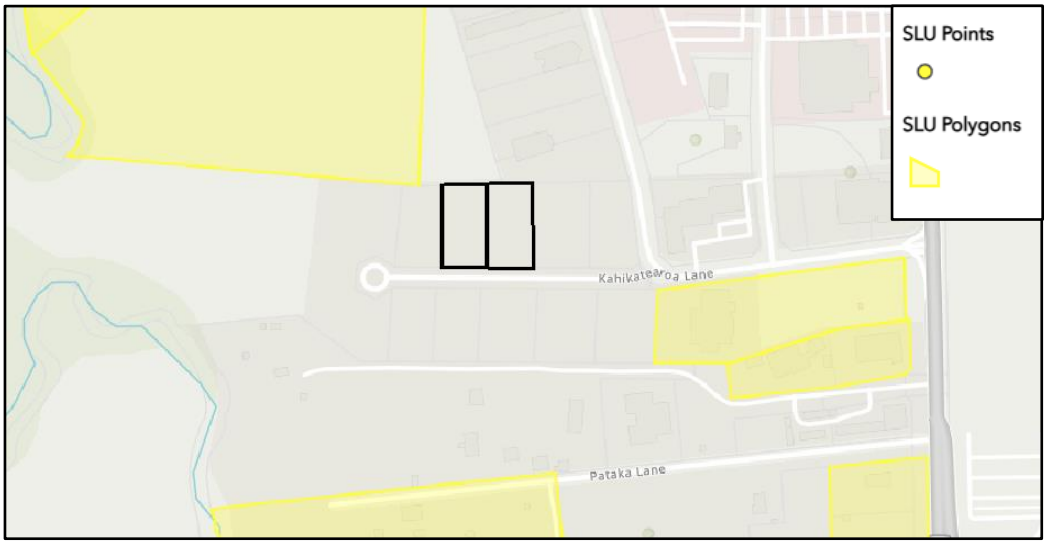


***Figure 10**: The SLU points of the site and surrounding area (Source: NRC land-use register, GIS).*

Therefore, the sites are not a piece of land described in clause 5(7) or (8) of the NES-CS. Therefore, the NES-CS has no relevance to this application.

5.5 Part 2 Assessment

An assessment of Part 2 matters is not required unless there are issues of invalidity, incomplete coverage, or uncertainty in the planning provisions.[4] Notwithstanding this, for completeness the following comments are made:

1. The proposed development facilitates the efficient use of resources by enabling the development of the sites in general accordance with the relevant intentions of the OFNDP and the PFNDP.
2. The proposal will provide for the social, economic and cultural well-being of the community.
3. The proposal will not increase the risk of natural hazards.
4. There are no adverse effects on human health associated with the proposal.

[4] *R J Davidson Family Trust the Marlborough District Council* [2018] NZCA 316

The proposal does not offend any matters of national importance in Section 6, or any of the other matters set out in Section 7 and 8 of the RMA.

6. NOTIFICATION

6.1 Public notification

Pursuant to s95A of the RMA, any adverse effects associated with the proposal on the wider environment will be avoided, remedied or mitigated to be less than minor as detailed in section 4 of this report. The application can therefore proceed without public notification.

6.2 Limited notification

Pursuant to s95B and having considered the requirements of s95E-G of the RMA, there are no adversely affected parties as detailed in section 4 of this report. The application can therefore proceed without limited notification.

6.3 Notification conclusion

The application can be processed on a non-notified basis.

7. CONCLUSION

This application has been prepared for KABB Property Limited in support of the establishment of a vehicle maintenance facility at 18-20 Kahikatearoa Lane, Waipapa.

The environmental effects associated with the proposal have been assessed in section 4 of this report. Based on the consistency of the proposed activity with development in the surrounding environment and the conclusions made in the HW reports, any adverse effects associated with the proposal will be less than minor. The assessment of environmental effects gives appropriate regard to s104(1)(a) of the RMA.

Section 5 considers the application in the context of the relevant planning provisions. The proposal is consistent with the policy direction of the OFNDP, particularly the relevant objectives and policies of the Industrial Zone, Soil and Minerals Chapter, and the Transportation Chapter. It is also consistent with the policy direction of the PFNDP. Section 5.4 of this report confirms that the NES-CS is not relevant to this application. Accordingly, appropriate regard has been given to s104(1)(b)(i) and s104(1)(b)(vi) of the RMA.

Having regard to the relevant matters in s104(1) and s104B of the RMA, the proposal can be approved subject to appropriate conditions of consent.

APPENDIX 1

NEO ARCHITECTURE STUDIOS PLANS

Boundary Line 87°30'30" 44.00

Boundary Line 179°17'30" 0.60

87°30'30" 13.88

Boundary Line 87°30'30" 29.10

timber fence on bdy

old fence on bdy

3/25,000L concrete water tank for roof water attenuation

25,000L concrete water tank for fresh water

25,000L concrete water tank for firefighting with approved coupling

2/1050mmØ pump chamber & sand filter. 1200mmØ smart chamber

2400mmØ wastewater secondary treatment (min 3m from building)

Lot 1
DP 567982

Lot 2
DP 567982
0.3412

Lot 3
DP 567982
0.3430

PROPOSED VEHICLE WASHWATER DISPOSAL AREA (120m²)

PROPOSED RESERVE VEHICLE WASHWATER DISPOSAL AREA (120m²)

PROPOSED RESERVE WASTEWATER DISPOSAL AREA (200m²)

PROPOSED WASTEWATER DISPOSAL AREA (120m²)

Effluent field subsoil drainage (0.6m deep)

bdy not fenced

to wastewater disposal

crossfall

CONCRETE
244.70 m²

CONCRETE
1,009.87 m²

METALLED YARD
3,721.92 m²

PROPOSED BUILDING COVERAGE
(including canopies)
1,535.39 m²

WORKSHOP
995.97 m²

OFFICE
305.33 m²

+79,200

Boundary Line 358°30' 77.85

Boundary Line 179°17'30" 78.64m

Boundary Line 179°19'40" 80.62

edge of old metal

Attenuation basin
200.00 m²

Effluent field subsoil drainage to stormwater connection

fence on bdy

2/3x6m loading spaces for courier vans

New slip resistant accessible path with 100mm thick concrete paving with 665 mesh. Max 1:50 fall away from building with max 1:50 cross fall. Ramp up surrounding ground to ensure no isolated step

2/new 3.5m x 5m long accessible carpark with max 1:50 fall as per NZS4121. New compliant accessible carpark sign & symbol

Grass
11.46 m²

Grass
35.80 m²

Power box

Stormwater connection

MH

LL78.36

Road Boundary Line 269°20'00" 42.90

Road Boundary Line 269°20'00" 42.89

new crossing

existing crossing

existing crossing

600mm wide x 35mm dish drain. Fall to left side

New 6m wide commercial grade vehicle crossing to comply with FNDC requirements

Extend existing crossings to comply with FNDC requirements

Stormwater connection

Power box

600mm wide x 35mm dish drain. Fall to each side

Attenuation basin outlet to stormwater connection

Kahikatearoa Lane

Lot 9
DP 363106

SITE NOTES

LEGAL DESCRIPTION
LOT 2 & 3
DP 567982

AREA 3,412m² & 3,430m²

20 & 18 Kahikatearoa Lane
Waipapa 0230

WIND ZONE	High
DURABILITY ZONE	C
EARTHQUAKE ZONE	1
CLIMATE ZONE	1
WIND REGION	A
LEE ZONE	NO
SNOW LOAD	NO
RAINFALL INTENSITY	90-100
TA ZONE	Commercial - FNDC
HAZARDS	River flood hazard (50 & 100 ARI) NRC flood susceptible

FLOOR AREA

FLOOR AREA	=1,301.30m²

COVERAGE

BUILDING AREA	= 1,535.39m²
CONCRETE AREA	= 1,254.57m²
METALLED AREA	= 3,721.92m²
TOTAL AREA	= 6,512.42m²

CARPARK REQUIREMENTS

FNDC Rule:
Vehicle sales, repair, service 1 per 150m² vehicle display area plus 4 for each repair / lube bay plus 1 per each remaining 50m² GBA

Area	Carparks
Repair bay = 5	4 per bay = 20
Remaining Area = 305.33m²	1 per 50m² = 7
Total carparks required	**27**

NEO ARCHITECTURE STUDIO

CONTACT
P 021 182 0261
E admin@neoas.co.nz
W www.neoas.co.nz

CLIENT
SMARTSTEEL BUILDINGS

PROJECT
Commercial Diesel Development
20 & 18 Kahikatearoa Lane
Waipapa 0230

NOTES
CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK - DO NOT SCALE PLANS
ALL BUILDING WORK IS TO BE CARRIED OUT AS PER BEST PRACTICE FOR ALL TRADES
DRAWINGS ARE TO BE READ IN CONJUNCTION WITH NEO ARCHITECTURE STUDIO DRAWINGS, SPECIFICATION & HFC Structure Ltd ENGINEERING
IF IN ANY DOUBT OVER BUILDING WORK CHECK WITH DESIGNER

ALL DRAWINGS TO BE PRINTED IN COLOUR

RevID	Transmittal Set Name	Date
BC - 01	BUILDING CONSENT	5/03/2025
RFI - 01 - WIP	BUILDING CONSENT	Work in Progress

ISSUE: BUILDING CONSENT

For consent & construction purposes only. Destroy all non stamped building consent or construction plans.

Work in Progress

DRAWN: DANE ALLISON
CHECKED: NEO AS LTD
ENGINEER: HFC Structure Ltd

SHEET TITLE: **SITE PLAN**

DATE: **30/04/2025**
SCALE @ A1: **1:200**
JOB NUMBER: **2408**
REVISION: **RFI - 01**
SHEET NO: **A102**

APPENDIX 2

FNDC PIM LETTER

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

4 April 2025

KABB Property Limited
2 Gumfield Drive
Warkworth 0910

Dear Sir / Madam,

Building consent number: EBC-2025-729/0
Property ID: 3364040
Address: 18-20 Kahikatearoa Lane, Waipapa 0230
Description: New commercial development over lot 2 & 3 with new vehicle crossing

Requirement for Resource Consent

PIM Assessment of your application has highlighted the need for Resource Consent that must be granted prior to any building works or earthworks commencing.

NB: As of 27th July 2022, some rules and standards in the Far North District Council Proposed District Plan took legal effect and compliance with these rules applies to your building consent. Please visit our website to see these rules
Far North Proposed District Plan (isoplan.co.nz)

The site is zoned **Industrial** under the Operative District Plan and Resource Consent is required for breach of the following:

Rule:	7.8.5.1.2 VISUAL AMENITY AND ENVIRONMENTAL PROTECTION – part (b) At least 50% of that part of the site between the road boundary and a parallel line 6m therefrom, where it is not occupied by buildings, shall be landscaped.
Reason:	Plans demonstrate the required landscaping cannot be achieved.

Rule:	7.8.5.1.9 STORMWATER The disposal of collected stormwater from the roof of all new buildings and new impervious surfaces provided that the activity is within an existing consented urban stormwater management plan or discharge consent.
Reason:	The site is not within an existing consented urban stormwater management plan or discharge consent area.

Rule:	12.3.6.1.3 EXCAVATION AND/OR FILLING, EXCLUDING MINING AND QUARRYING, IN THE RESIDENTIAL, INDUSTRIAL, HORTICULTURAL PROCESSING, COASTAL RESIDENTIAL AND RUSSELL TOWNSHIP ZONES Excavation and/or filling, excluding mining and quarrying, on any site in the Residential, Industrial, Horticultural Processing, Coastal Residential or Russell Township Zones is permitted, provided that: (a) it does not exceed 200m3 in any 12month period per site.
Reason:	Proposed earthworks volumes not demonstrated to assess compliance.

Rule:	15.1.6A.2.1 TRAFFIC INTENSITY
Reason:	New activities proposed on this site exceed the permitted 200 daily one way traffic movements.

Rule:	15.1.6B.1.4 ACCESSIBLE CAR PARKING SPACES
Reason:	Two accessible car parking spaces are required for this project. Plans only demonstrate 1 accessible carparking space with access route at the closest building entrance.

Rule:	15.1.6C.1.2 PRIVATE ACCESSWAYS IN URBAN ZONES (b)(ii)
Reason:	Plans demonstrate two existing crossings and a proposed New crossing to the west of the building. Plans do not demonstrate if the existing crossings and the proposed crossings are a one-way or two-way operations. The new crossing width is stated at 8m which exceeds the 7m width permitted for a two-way operation.

Rule:	15.1.6C.1.4 ACCESS OVER FOOTPATHS
Reason:	(a) Breaches - Plans demonstrate two existing crossings and proposes an additional New crossing which exceeds the permitted two crossings per site threshold. (b) Breaches - Proposed new crossing width stated as 8m exceeds the permitted 6m maximum width threshold.

Rule:	15.1.6C.1.6 VEHICLE CROSSING STANDARDS IN URBAN ZONES (a) Private access off streets in the urban zones the vehicle crossing is to be constructed in accordance with Council's "Engineering Standards and Guidelines" (June 2004 – Revised 2009).
Reason:	Unable to comply.

Rule:	2019 Proposed Regional Plan for Northland – C.8.3.1 Flood hazard area 100 cubic metres of moved or placed earth in any 12- month period.
Reason:	Proposed earthworks volumes not demonstrated to assess compliance.

There is a consent notice registered on the Record of Titles for these sites and compliance is not demonstrated for the following condition:

Consent Notice:	Consent Notice 12554072.4 condition v. In conjunction with the construction of any building, and in addition to a potable water supply, a water collection system with sufficient supply for firefighting purposes is to be provided by way of tank or other approved means and to be positioned so that it is safely accessible for this purpose. These provisions will be in accordance with the New Zealand Fire Fighting Water Supply Code of Practice SNZ PAS 4509.
Reason:	5 x 25,000L water tanks demonstrated on Plans. SNZ PAS 4509:2008 Table 1 and Table 2 it appears this building proposed as a single fire cell will require specific Fire Engineering Assessment for calculating the required firefighting water supply.

Please note there may be other rule breaches found during the Resource Consent process. It is your responsibility to ensure the Resource Consent approved plans match the Consented approved plans.

The application form can be downloaded from www.fndc.govt.nz and submitted to Council's (Planning Department) with the appropriate documentation and instalment fee.

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

If you have any queries, please contact the Duty Planner on Duty.Planner@fndc.govt.nz or 0800 920 029.

Yours faithfully

Lysigna Mare
PIM Officer
Delivery and Operations

Emailed to: dane@neoas.co.nz

FORM 4
Certificate attached to
PROJECT INFORMATION MEMORANDUM

Section 37, Building Act 2004

Building Consent Number: EBC-2025-729/0

RESTRICTIONS ON COMMENCING BUILDING WORK UNDER RESOURCE MANAGEMENT ACT 1991

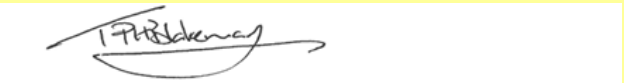
The building work referred to in the attached Project Information Memorandum is also required to have the following **Resource Consent**(s) under the Resource Management Act 1991:

- **Resource Consent – REQUIRED**
- **Discharge Consent** - **REQUIRED**

As the above Resource Consent(s) will affect the building work to which the Project Information Memorandum relates, until this has been granted no building work may proceed.

As the above Discharge Consent will affect the building work to which the Project Information Memorandum relates, until this has been granted no building work may proceed.

Failure to comply with the requirements of this notice may result in legal action being taken against you under the Resource Management Act 1991.

Signature: 

Trent Blakeman

Position: Manager - Building Services

On behalf of: Far North District Council (Building Consent Authority)

Date: 4 April 2025

APPENDIX 3

RECORDS OF TITLES AND ASSOCIATED MEMORIALS

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier **1019560**
Land Registration District **North Auckland**
Date Issued 04 October 2022

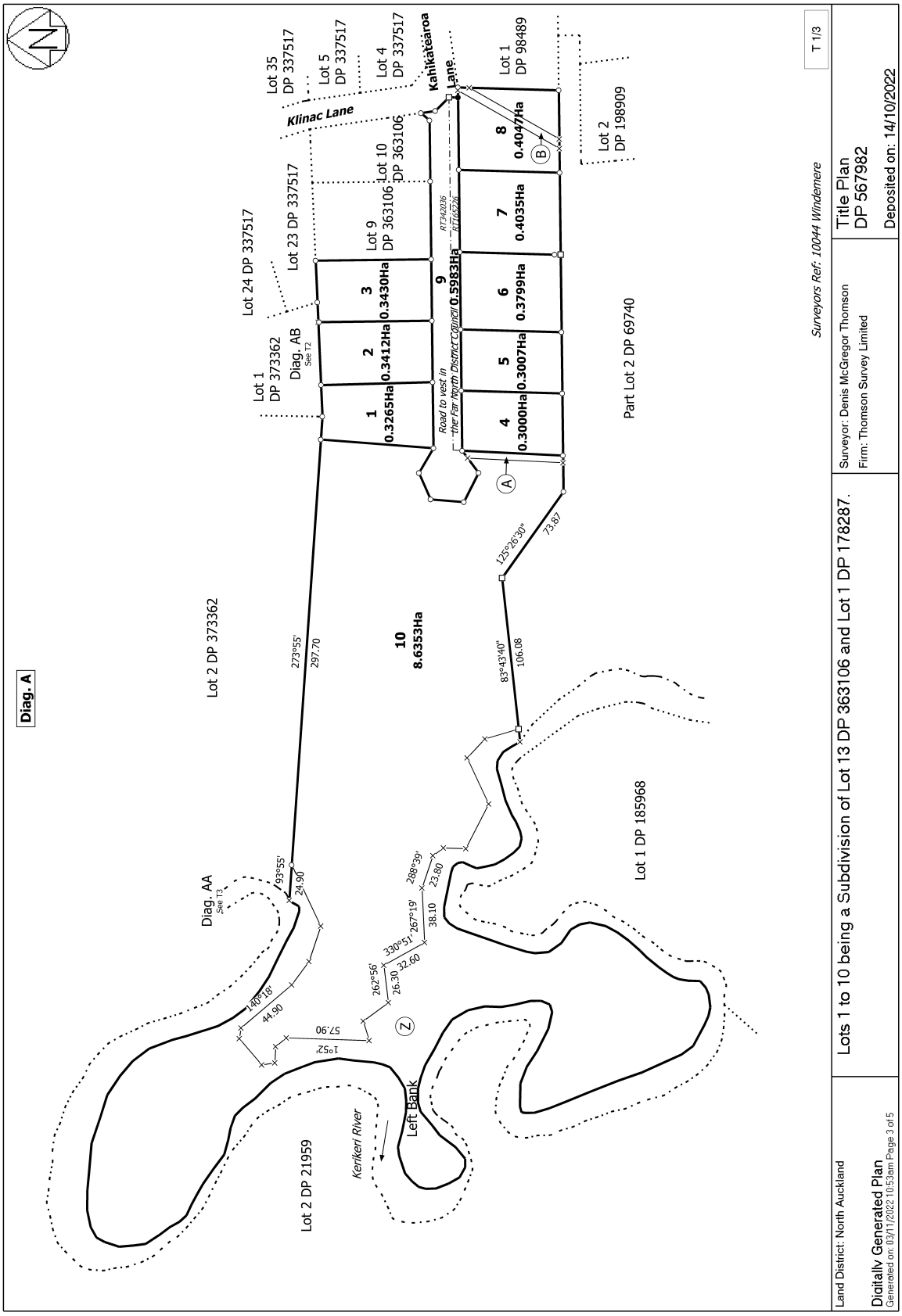
Prior References
342036

Estate Fee Simple
Area 3412 square metres more or less
Legal Description Lot 2 Deposited Plan 567982
Registered Owners
KABB Property Limited

Interests

12554072.4 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 4.10.2022 at 8:57 am

12605204.2 Mortgage to Westpac New Zealand Limited - 19.12.2022 at 4:43 pm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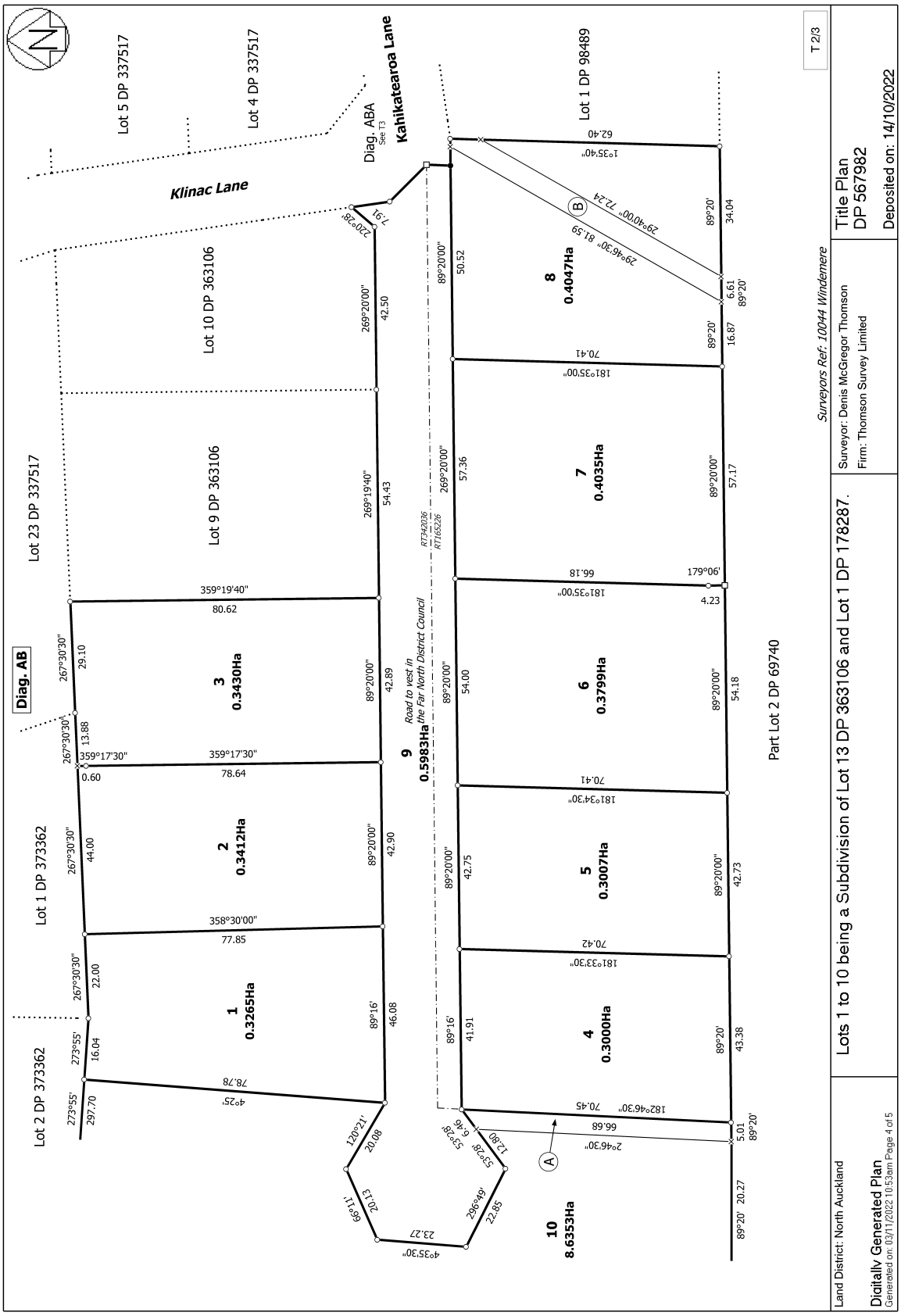
Lot 2 DP 373362
Lot 1 DP 373362
Diag. AB
See T2
Lot 24 DP 337517
Lot 23 DP 337517
Lot 35 DP 337517
Lot 5 DP 337517
Lot 4 DP 337517
Klinac Lane
Kahikatearoa Lane
Lot 10 DP 363106
Lot 9 DP 363106
Lot 1 DP 98489
Lot 2 DP 198909
Part Lot 2 DP 69740
Road to vest in The Far North Dstrct Council
RT342036
RT165236
1 0.3265Ha
2 0.3412Ha
3 0.3430Ha
4 0.3000Ha
5 0.3007Ha
6 0.3799Ha
7 0.4035Ha
8 0.4047Ha
9 0.5983Ha
10 8.6353Ha
273°55'
297.70
93°55'
24.90
140°18'
44.90
57.90
195?
262°56'
26.30
330°51'
32.60
267°19'
38.10
288°39'
23.80
83°43'40"
106.08
125°26'30"
73.87
Diag. AA
See T3
Lot 2 DP 21959
Keri Keri River
Left Bank
Lot 1 DP 185968
Surveyors Ref: 10044 Windemere
T 1/3
Land District: North Auckland
Digitally Generated Plan
Generated on: 03/11/2022 10:53am Page 3 of 5
Lots 1 to 10 being a Subdivision of Lot 13 DP 363106 and Lot 1 DP 178287.
Surveyor: Denis McGregor Thomson
Firm: Thomson Survey Limited
Title Plan
DP 567982
Deposited on: 14/10/2022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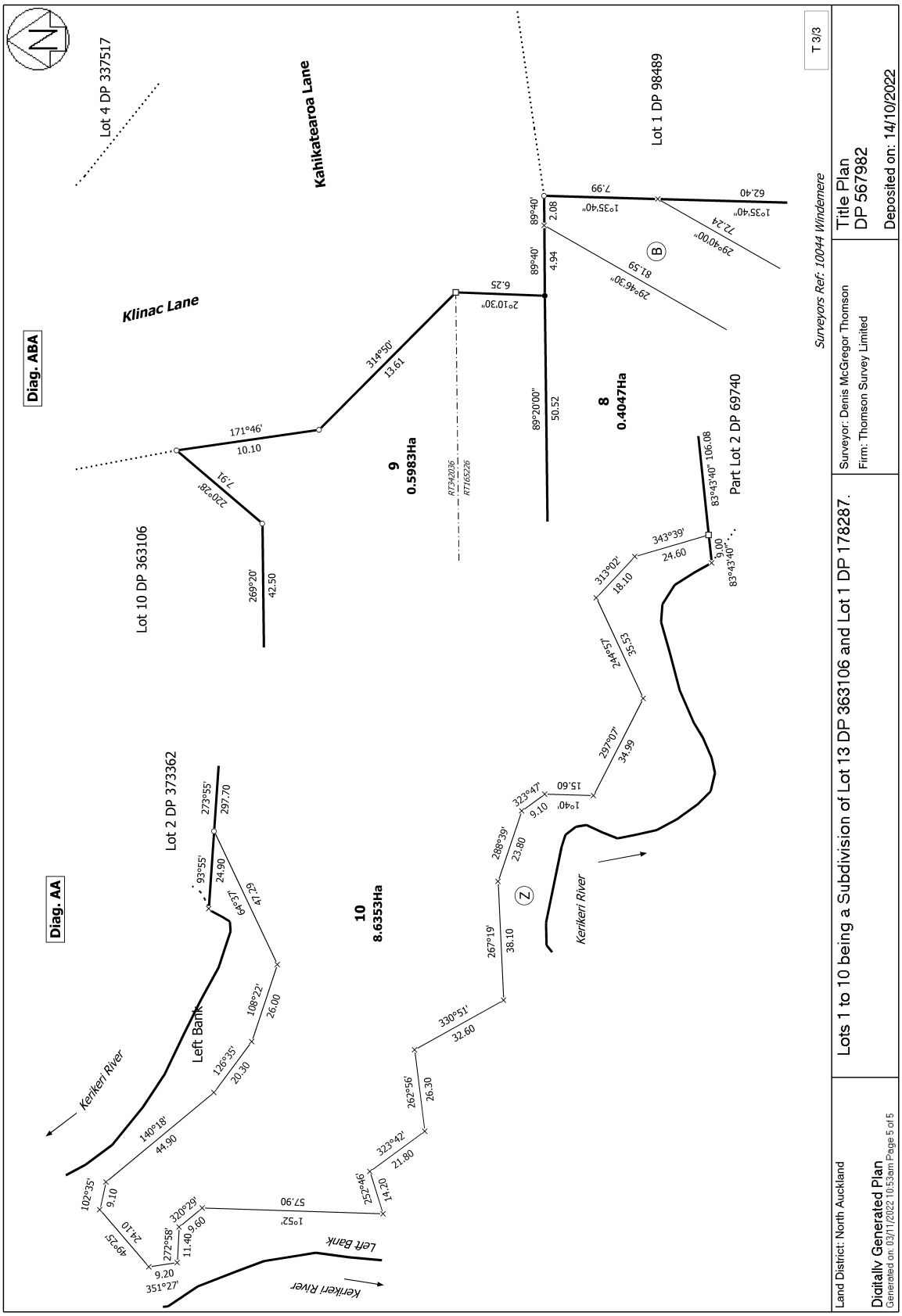
Lot 4 DP 337517
Klinac Lane
Diag. ABA
Set T3
Kahikatearoa Lane
Lot 1 DP 98489
T 2/3
Lot 10 DP 363106
Lot 23 DP 337517
Lot 9 DP 363106
Diag. AB
Lot 1 DP 373362
Lot 2 DP 373362
Road to vest in the Far North District Council
RT342036
RT165226
Part Lot 2 DP 69740
Surveyors Ref: 10044 Windemere
Lots 1 to 10 being a Subdivision of Lot 13 DP 363106 and Lot 1 DP 178287.
Title Plan DP 567982
Deposited on: 14/10/2022
Surveyor: Denis McGregor Thomson
Firm: Thomson Survey Limited
Land District: North Auckland
Digitally Generated Plan
Generated on: 03/11/2022 10:53am Page 4 of 5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Kahikatearoa Lane
Lot 1 DP 98489
Klinac Lane
Diag. ABA
Lot 10 DP 363106
Lot 2 DP 373362
Part Lot 2 DP 69740
Diag. AA
Left Bank
Kerikeri River
Left Bank
Kerikeri River
9
0.5983Ha
8
0.4047Ha
10
8.6353Ha
RT342036
RT165226
T 3/3
Surveyors Ref: 10044 Windemere
Surveyor: Denis McGregor Thomson
Firm: Thomson Survey Limited
Title Plan
DP 567982
Deposited on: 14/10/2022
Lots 1 to 10 being a Subdivision of Lot 13 DP 363106 and Lot 1 DP 178287.
Land District: North Auckland
Digitally Generated Plan
Generated on: 03/11/2022 10:53am Page 5 of 5

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier **1019561**
Land Registration District **North Auckland**
Date Issued 04 October 2022

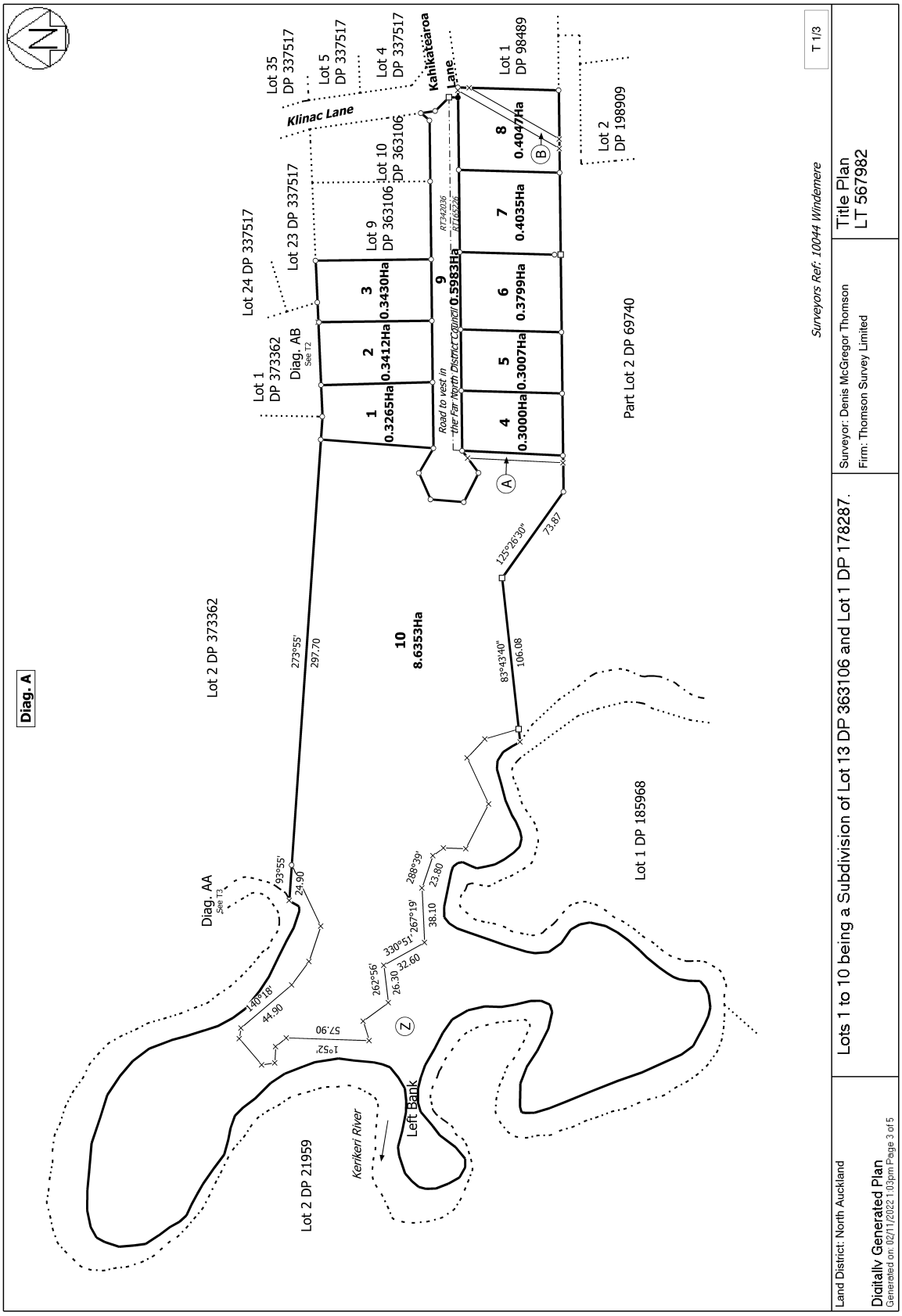
Prior References
342036

Estate Fee Simple
Area 3430 square metres more or less
Legal Description Lot 3 Deposited Plan 567982
Registered Owners
KABB Property Limited

Interests

12554072.4 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 4.10.2022 at 8:57 am

12605204.2 Mortgage to Westpac New Zealand Limited - 19.12.2022 at 4:43 pm


Diag. A
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Lot 35 DP 337517
Lot 5 DP 337517
Lot 4 DP 337517
Klinac Lane
Kahikatearoa Lane
Lot 10 DP 363106
Lot 9 DP 363106
Lot 1 DP 98489
Lot 2 DP 198909
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Road to vest in The Far North Dstrct Council
RT342036
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9 0.5983Ha
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93°55'
24.90
140°18'
44.90
195?
57.90
262°56'
26.30
330°51'
32.60
267°19'
38.10
288°39'
23.80
83°43'40"
106.08
125°26'30"
73.87
Diag. AA
See T3
Lot 2 DP 21959
Keri Keri River
Left Bank
Lot 1 DP 185968
Surveyors Ref: 10044 Windemere
T 1/3
Land District: North Auckland
Digitally Generated Plan
Generated on: 02/11/2022 1:03pm Page 3 of 5
Lots 1 to 10 being a Subdivision of Lot 13 DP 363106 and Lot 1 DP 178287.
Surveyor: Denis McGregor Thomson
Firm: Thomson Survey Limited
Title Plan
LT 567982

View Instrument Details

Instrument No	12554072.4
Status	Registered
Date & Time Lodged	04 October 2022 08:57
Lodged By	Thompson, Emma Jane
Instrument Type	Consent Notice under s221(4)(a) Resource Management Act 1991

Affected Records of Title	Land District
1019559	North Auckland
1019560	North Auckland
1019561	North Auckland
1019562	North Auckland
1019563	North Auckland
1019564	North Auckland
1019565	North Auckland
1019566	North Auckland
1019567	North Auckland

Annexure Schedule Contains 2 Pages.

Signature

Signed by Emma Jane Thompson as Territorial Authority Representative on 28/09/2022 02:09 PM

***** End of Report *****

Far North District Council

[illegible]

THE RESOURCE MANAGEMENT ACT 1991

SECTION 221: CONSENT NOTICE

REGARDING **RC 2160324 RMAVAR/B**
Being the Subdivision of Lot 13 DP 363106 and Lot 1 DP 178287
North Auckland Registry

PURSUANT to Section 221 and for the purpose of Section 224 (c) (ii) of the Resource Management Act 1991, this Consent Notice is issued by the **FAR NORTH DISTRICT COUNCIL** to the effect that conditions described in the schedule below are to be complied with on a continuing basis by the subdividing owner and the subsequent owners after the deposit of the survey plan, and these are to be registered on the titles of the allotments specified below.

SCHEDULE

Lots 1 to 8 – DP 567982

i. Any building erected on the lot shall have foundations specifically designed by a suitably qualified chartered professional engineer. The minimum floor level for which will be set above the 1 in 100 year flood level and in accordance with the recommendations contained in the Engineers Report prepared by Haigh Workman Civil and Structural Engineers Ltd and submitted with Resource Consent 2160324. The details of design shall be submitted in conjunction with the Building Consent application.

ii. In conjunction with the construction of any building which includes a wastewater treatment & effluent disposal system the applicant shall submit for Council approval a TP58 Report prepared by a Chartered Professional Engineer or an approved TP58 Report Writer. The report shall be prepared generally in accordance with the recommendations in the Engineers Report prepared by Haigh Workman Civil and Structural Engineers Ltd and submitted with Resource Consent 2160324. It shall identify a suitable method of wastewater treatment for the proposed development along with an identified effluent disposal area plus a 100% reserve disposal area. The report shall confirm that all of the treatment & disposal system can be fully contained within the lot boundary and comply with the Regional Water & Soil Plan Permitted Activity Standards.

iii. Provide, at the time of lodging a building consent application for Lots 1 - 8, a specific design for stormwater management, prepared by a suitably qualified Chartered Professional Engineer, which addresses both stormwater quality and quantity such that the volume of stormwater discharged is attenuated to a 1 in 10 year rainfall,

Far North District Council

[illegible]

(being the design capacity of the stormwater reticulation) for rainfall event up to those with a 2% AEP. The stormwater quality standard shall comply with section 4.4.2 of the Councils Engineering Standards (2009) or for a lower level of contaminant where required by an NRC Stormwater Discharge Consent.

Any stormwater discharged into the Council's stormwater system is to comply with the requirements and conditions of the Far North District Council's stormwater discharge consent.

Lot 10 – DP 567982

iv. The owner shall preserve the indigenous trees and bush contained within the Protected Natural Area by Bush Covenant, and shall not without the prior written consent of the Council and then only in strict compliance with any conditions imposed by the Council, cut down, damage or destroy any of such trees or bush. The owner shall maintain and upgrade where necessary a stock fence, which excludes the intrusion of grazing stock into the Covenanted area. The owner shall be deemed to be not in breach of this prohibition if any of such trees or bush shall die from natural causes not attributable to any act or default by or on behalf of the owner or for which the owner is responsible.

All Lots – DP 567982

v. In conjunction with the construction of any building, and in addition to a potable water supply, a water collection system with sufficient supply for fire fighting purposes is to be provided by way of tank or other approved means and to be positioned so that it is safely accessible for this purpose. These provisions will be in accordance with the New Zealand Fire Fighting Water Supply Code of Practice SNZ PAS 4509.

vi.

SIGNED: P J Killalea.

Mr Patrick John Killalea - Authorised Officer
By the FAR NORTH DISTRICT COUNCIL
Under delegated authority:
PRINCIPAL PLANNER – RESOURCE MANAGEMENT

DATED at **KERIKERI** this 23rd day of September 2022

APPENDIX 4

HAIGH WORKMAN GEOTECHNICAL INVESTIGATION REPORT MEMORIAL

Geotechnical Investigation Report
Proposed Industrial Development
Lots 2 & 3 Klinac Lane, Waipapa
For
Smart Steel Buildings

Haigh Workman reference 24 043

March 2024

Phone: +64 9 407 8327 • Fax: +64 9 407 8378 • info@haighworkman.co.nz • www.haighworkman.co.nz

PO Box 89 • 6 Fairway Drive • Kerikeri 0245 • New Zealand

Revision History

Revision №	Issued By	Description	Date
A	Wayne Thorburn	First Issue	1 March 2024

Prepared By

Wayne Thorburn

Senior Geotechnical Engineer
CPEng, CMEngNZ

Approved By

John Papesch

Senior Civil / Geotechnical Engineer, Director
CPEng, CMEngNZ

TABLE OF CONTENTS

TABLES

FIGURES

Executive Summary

Haigh Workman Ltd. (Haigh Workman) has been commissioned by Smart Steel Buildings (the Client) to undertake a geotechnical investigation for a proposed commercial development at Lots 2 & 3 Klinac Lane, Waipapa.

Subsoil ground investigations were carried out and supervised by Haigh Workman, comprising five hand augered boreholes and eleven cone penetration tests (CPTs). Soil samples were taken for laboratory testing to assess the engineering behaviour of the soil. Investigation logs are presented in Appendix B and laboratory testing results in Appendix C. Subsoil conditions encountered during the geotechnical investigations encountered Tauranga Group alluvial soils underlying the site with variable strength. A stiffer crustal layer was encountered at all test locations, with the upper 1.0 m typically comprising stiff soils, underlying the crustal layer were firm to soft soils to approximately 6.5 mbgl, further underlain by Kerikeri Volcanic Group. A dense layer was typically encountered at approximately 3.5 mbgl, with CPT11 penetrating this layer and refusing at 6.5 m. A plot of the interpreted undrained shear strengths from the CPT soundings is presented in Figure 3. Based on the soil profile, we consider the site seismic subsoil class to be 'Class D' (Deep or soft soil sites) in accordance with NZS1170.5:2004. For geotechnical design purposes, Site Class C (shallow soil site) has been adopted as it provides a more conservative assessment for peak ground acceleration estimates (PGA) and is more aligned to the MBIE geotechnical guidance, Module 1.

The site is subject to a flood hazard according to the Northland Regional Council (NRC), with a river flood hazard existing for 100-year return period event. The Far North District Council (FNDC) require floor levels to be a minimum 300 mm above the flood hazard level for a non-habitable building. The flood level varies from 78.8 mRL at the northern boundary and 78.6 mRL at the road boundary, we have adopted a minimum floor level of 79.1mRL. Based on the existing site levels, the RL is typically 78.8 mRL across the site and minimal fill is expected to raise the ground level so base of slab. However, to achieve positive stormwater flow across the site additional earthworks may be required.

An assessment of settlement potential has been undertaken based the proposed building and filling to raise the FFL 300 mm above flood level. We recommend a preload surcharge is applied to replicate the fill and building loads and settlement monitoring be undertaken using settlement plates over a period of at least 1 month (based on results from adjacent settlement trials, i.e., settlement is expected to be rapid due to the limited groundwater flow depths).

Geotechnical risk has been evaluated and is considered minor, provided the recommendations detailed within this report are followed. A summary of the geotechnical risks are as follows:

- Undercuts across the site may be required to remove unsuitable material. This includes the possibility of old field drains and non-certified filling.
- Groundwater level across the site is shallow. We recommend excavations be kept to a minimum and should not go any deeper than the groundwater level to the risk of collapse and to reduce the risk of

any groundwater drawdown induced settlements. The proposed truck pits are likely to encounter groundwater level.

- Bearing capacity has been assessed in accordance with the methods presented in the New Zealand Building Code (B1/VM4). Recommended ulti mate bearing capacity is 150 kPa (based on thickening the crustal layer and preloading the soils), provided the footings are limited to 2.0 x 2.0 m pads and 1.0 m wide strip footings. If pad foundations are reduced to 1.5 m x 1.5 m and strip footings to 0.75 m width, an ultimate bearing capacity of 200 kPa can be adopted. The values are appropriate for vertical loads only, and do not allow for any imposed horizontal shear or moment actions. A geotechnical strength reduction factor of 0.5 can be adopted for limit state design.

- Settlement – Foundation dimensions and final ground levels had not been finalised at this stage of reporting. Short and long term loads were provided by the structural engineer based on preliminary estimates giving a maximum uniformly distributed load (UDL) of 13.1 kPa over a total area of 1288 m^2. Filling across the site will be required to raise the ground level from 78.8 mRL to 79.1 mRL. Settlement estimates from 300 mm of fill is in the order of 25 mm, and settlement from building UDL is approximately an additional 50 mm of settlement at the centre of the proposed building, 20 mm at edge, and 10 mm at corner, giving angular distortion of 1:675 and is expected to be within building tolerance levels. Based on adjacent settlement preload trials, the settlement is expected to be immediate, we recommend the proposed fill and building UDL be applied as a preload and monitored for at least 1 month to confirm (preload surcharge comprising 300 mm of site fill + 700 mm of preload surcharge to replicate building load). Section 4 presents the settlement estimates based on the loads provided. Provided the settlement preload is undertaken to remove the initial elastic settlement, foundation design can adopt the recommendations given in Section 4.

- Floor/slab loadings should not exceed 15 kPa unless ground improvements are undertaken (including weight of building and slab).

- Liquefaction – the material encountered is considered too plastic to liquefy. The low seismic activity and the age of the deposits also reduce the liquefaction risk and any associated effects, e.g., lateral spreading and ejecta. A liquefaction assessment was undertaken, indicating liquefaction risk is less than minor and damage is unlikely.

- Expansivity – The subsoils at this site are considered moderately expansive. Foundations should be designed under AS 2870 expansive site class of M (moderately) and adopting the recent Building Code revisions (B1/AS1) for surface movement. Strip and pad foundations shall be embedded a minimum 600 mm below finished ground level.

- Floor Slab design – Modulus of Subgrade Reaction values for floor slab design and spread footing design are provided in Section 4.4 of this report. Stiffened raft slab design should adopt non-linear springs across the slab.

- The upper 300 mm of soil across the site should be removed and reinstated with granular hardfill. This includes beneath the slab for conventional spread foundations where the pads and strips are founded below the granular hardfill.
- Concentrated stormwater flows – Must be collected and carried in sealed pipes to an approved outfall or other means of disposal and must not be allowed to saturate the subgrade soils to ensure the stability of the foundations is maintained.
- A design CBR of 2.0% should be adopted for pavement design purposes. Localised soft zones are expected and will need to be undercut and removed during construction. A minimum undrained shear strength of 50 kPa in the upper 1.0 m is required for pavement design. We recommend a geotextile and geogrid is installed between subgrade and pavement to minimise the ingress of fines into the pavement from dynamic loading.

1 Introduction

1.1 Project Brief and Scope

Haigh Workman Ltd. (Haigh Workman) has been commissioned by Smart Steel Buildings (the Client) to undertake a geotechnical investigation for a proposed commercial development at Lots 2 & 3 Klinac Lane, Waipapa. This report presents the information gathered during the site investigation, interpretation of data obtained and site-specific geotechnical recommendations relevant to the site.

The scope of this report encompasses the geotechnical suitability in the context of the proposed development as defined in the Short Form Agreement dated 27 February 2024. This appraisal has been designed to assess the subsoil conditions for foundation design and identify geotechnical constraints for the proposed development.

This report provides the following:

- A summary of the published geology with reference to the geotechnical investigations undertaken.
- Analysis of the data obtained from site investigations and a geological ground model.
- Foundation recommendations.
- Identification of any additional geotechnical risks and/or hazards.

1.2 Proposed Development

We understand that the Client intends to develop the site for with the construction of a commercial building. Concept plans by Smart Steel Buildings indicate the proposed building will be spread over Lot 2 and 3. Vehicle access points in each Lot are shown, with carparking located along the southern boundary, parallel to Kahikatearoa Lane, and down the eastern boundary of Lot 3. The northern portion of both Lots will be used services e.g., wastewater field and potable water supply.

Should the proposed development vary from the proposals described above and/or be relocated outside of the investigated area, further investigation and/or amendments to the recommendations made in this report may be required.

1.3 Site Description

The subject property forms part of an industrial subdivision of Lots 1 DP 178287 and Lot 13 DP 363106. Access to the site is off the newly constructed Kahikatearoa Lane extension that extends east from the existing Kahikatearoa Lane and the southern extent of Klinac Lane. The subject Lots will be parcel Lots 2 to 3, with a total land area of approximately 6842 m^2. Lots 2 and 3 are located on the northern side of the Kahikatearoa Lane extension. At the time of our investigations the lots were vacant. A row of trees runs along the northern boundary of the subject lots.

The approximate proposed building development locations are shown in Figure 1. The ground surface across the site is generally flat. A filled trench extends along the western boundary of Lot 2, which has been recently mucked out and replaced with granular hardfill, certified by Haigh Workman in April 2022. The site is generally flat, with little change of elevation across both lots.

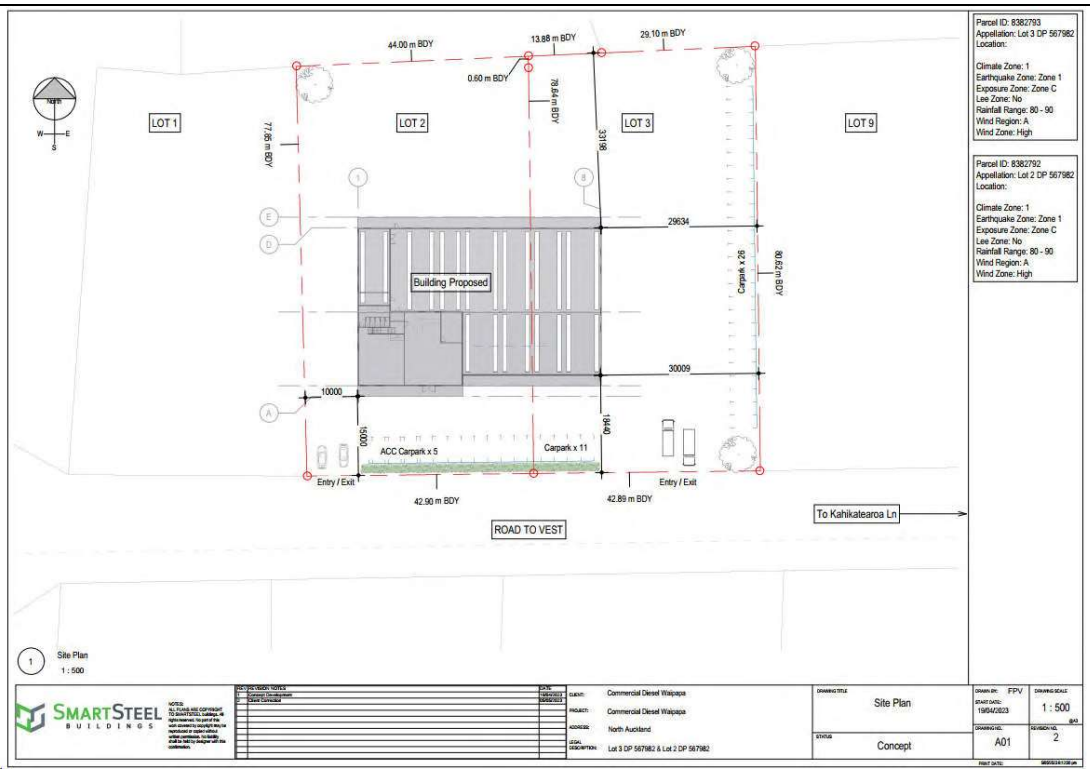


Figure 1 - Site Location

2 Geology

2.1 Published Geology

Sources of Information:

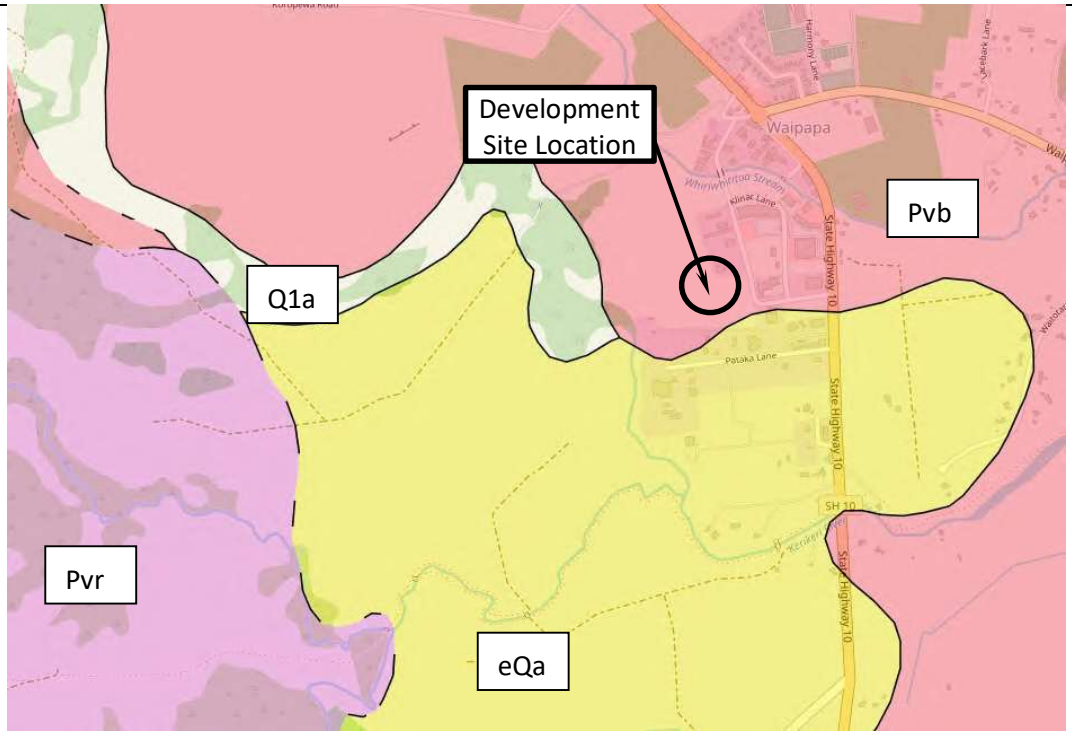
- Institute of Geological & Nuclear Sciences 1:250,000 Geological Map 2, 2009: "*Geology of the Whangarei area*"
- NZMS 290 Sheet P04/05, 1: 100,000 scale, 1982: *"Rock types map of the Whangaroa - Kaikohe area"*
- NZMS 290 Sheet P04/05, 1: 100,000 scale, 1980: *"Soil map of the Whangaroa - Kaikohe area"*

The site is within the bounds of the GNS Geological Map 2 "Geology of the Whangarei area", 1:250,000 scale*. The published geology shows the site to be located near a geological boundary of Kerikeri Volcanic Group and Tauranga Group alluvial soils. The Waipapa area, although mapped as Kerikeri Volcanic Group, typically is overlain by recent alluvial soils exhibiting variable strength. Further reference to the published New Zealand land inventory maps (Whangaroa-Kaikohe 1980) also indicates the site is underlain by alluvium ($A1_2$), forming riverbed and flood plain deposits, in places forming a thin veneer (1-3m) over rugged surfaces of lava flows.

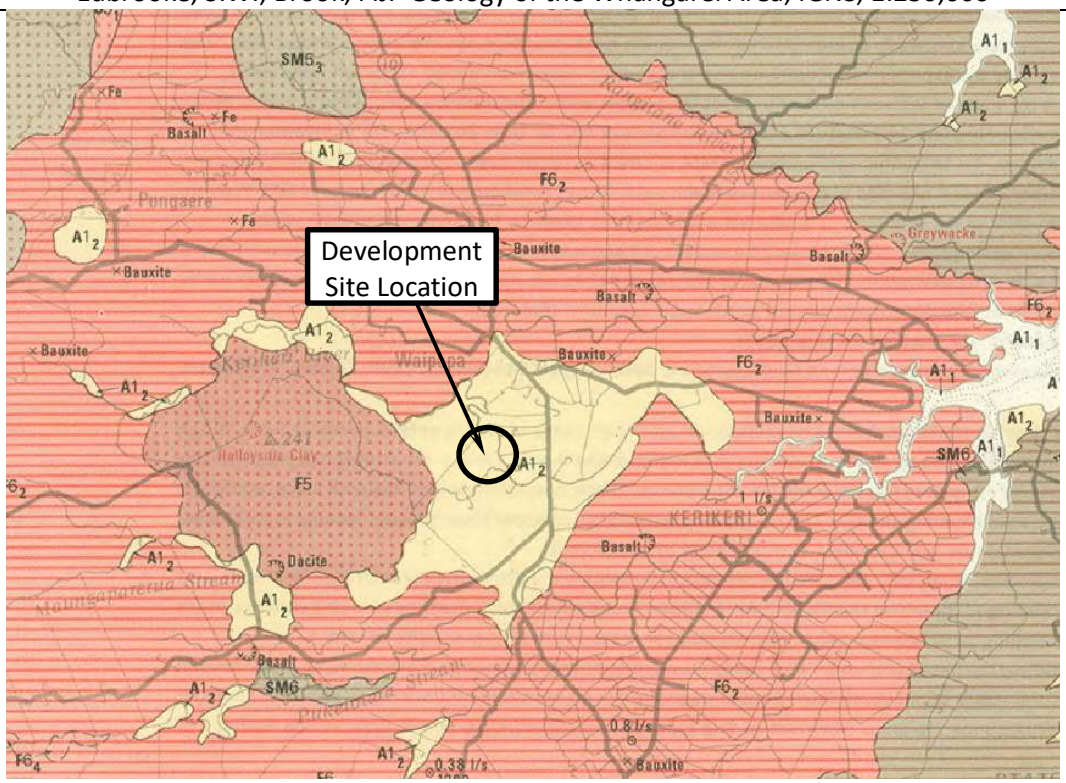
Table 1 - Geological Legend

Symbol	Unit Name	Description
Q1a / $A1_2$	Tauranga Group (Holocene)	Unconsolidated to poorly consolidated mud, sand, gravel, and peat deposits of alluvial, colluvial and lacustrine origins. Holocene river deposits.
eQa	Tauranga Group (Early to middle Pleistocene)	Partly consolidated mud, sand, gravel and peat or lignite of alluvial, colluvial, lacustrine, swamp and estuarine origins. Early Pleistocene – Middle Pleistocene estuary, river, and swamp deposits.
Pvb / $F6_2$	Kerikeri Volcanic Group (Late Miocene to early Pliocene)	Basalt lava, volcanic plugs, and minor tuff. Kerikeri Volcanic Group Late Miocene basalt of Kaikohe – Bay of Islands Volcanic Field.
Pvr / F5	Kerikeri Volcanic Group (Late Miocene to early Pliocene)	Alkaline and peralkaline rhyolite domes with some obsidian.

* Edbrooke, S.W; Brook, F.J. (compilers) 2009. Geology of the Whangarei area.



Edbrooke, S.W.; Brook, F.J. Geology of the Whangarei Area, IGNS, 1:250,000



Kermode, L.O. 1982: Whangaroa – Kaikohe, NZMS 290, Sheet P04/05, 1:100,000

Figure 2 – Published geological maps

3 Ground Investigations

3.1 Subsurface Investigations

Haigh Workman undertook geotechnical investigations on 22 February 2021. The investigations comprised nine cone penetration tests (CPT01 to CPT09) undertaken by Underground Investigation Ltd, and five hand augered boreholes and six Scala penetrometer tests by Haigh Workman Ltd. Cone penetration testing was undertaken till refusal, anchor pull-out, or excessive tilt. A maximum depth of 6.98 m was achieved at CPT11 location. Underground Investigation Ltd provided a cone penetration rig attached to a rubber tracked machine to test and record ground information. CPT soundings are presented in Appendix B.

3.2 Ground Conditions

Based on the results of the geotechnical investigation conducted by Haigh Workman and review of published geological maps, it is considered that the surface soils directly underlying the site comprise Tauranga Group alluvial soils, underlain by Kerikeri Volcanic Group. Subsoil conditions on the site have been interpolated between the boreholes, therefore some variation between test positions is likely. Table 2 below summarises the materials encountered, with depth to base of each unit provided.

Table 2 - Summary of Borehole Results

Test I.D.	Fill (mbgl)	Tauranga Group alluvial soils (mbgl)	Kerikeri Volcanic Group basalt – inferred only (mbgl)	Groundwater level (mbgl)
HA01	NE	2.75	>2.75	0.6
HA02	1.2	>4.4	NE	1.2
HA03	NE	>2.0	NE	0.6
HA04	NE	>2.8	NE	0.55
HA05	NE	>2.5	NE	0.8
CPT01	NT	3.5	>3.51	Collapsed
CPT02	NT	3.27	>3.27	1.1
CPT03	NT	3.19	>3.19	0.8
CPT04	NT	4.07	>4.07	1.2
CPT05	NT	2.64	>2.64	0.8
CPT06	NT	1.80	>1.80	0.85
CPT07	NT	4.62	>4.62	1.5
CPT08	NT	4.62	>4.62	1.3
CPT09	NT	2.91	>2.91	1.6
CPT10	NT	3.22	>3.22	1.2
CPT11	NT	6.91	>6.91	1.5

NE Not Encountered
NT Not Tested
* Groundwater level measured from within test hole

3.2.1 *Fill*

Fill was encountered within borehole HA02. HA02 was located within an old open trenched farm drain that aligns with the western boundary of the development (Lot 2). The trench was filled with site-won fill during the construction of the road; the fill was not placed to an engineered standard at the time. Following the works, the trench fill has been removed and reinstated with granular hardfill, compacted to an engineered standard. The fill material encountered within HA02 no longer exists onsite.

3.2.2 *Tauranga Group Alluvium*

Alluvial soils were encountered at all locations. The alluvial soils were encountered to a maximum depth of 6.91 m in CPT11 location. Sudden refusal was typically encountered which has been inferred as top of weathered Kerikeri Volcanic Group basalt rock.

CPT soundings and vane shear testing within the hand augers indicate the alluvial soils as consistent in undrained shear strength, with slightly stiff material encountered in the upper 1.0 m across the site.

3.2.3 *Kerikeri Volcanic Group*

Kerikeri Volcanic Group basalt has been inferred based on the CPT soundings and results of nearby geotechnical investigations. The basalt thickness is expected to be variable across the site.

3.2.4 *Groundwater*

Groundwater level also measured within the test holes at the completion of testing, which typically indicated groundwater within 1.0 m. No further groundwater monitoring has been undertaken. Groundwater levels can and do fluctuate and higher groundwater levels may be encountered following periods of prolonged or heavy rainfall.

4 Geotechnical Assessment

4.1 General

Based on our site observations, geological appraisal, and the findings of our recent field investigations, we consider that the subject site is generally suitable for the proposed development. The site is subject to a flood hazard according to the Northland Regional Council (NRC), with a river flood hazard existing for 100-year return period event. The Far North District Council (FNDC) require floor levels to be a minimum 300 mm above the flood hazard level for a non-habitable building.

4.2 Geotechnical Design Parameters

Geotechnical design parameters recommended in this report are based on in-situ test results, empirical relationships, and local experience. Refer Table 3 for recommended design parameters.

Table 3 – Geotechnical Design Parameters

Soil Unit	Depth (m)	Bulk Unit Weight - γ (kN/m^3)	Peak undrained shear strength - S_u (kPa)	Effective cohesion – c' (kPa)	Effective friction angle - φ' (degrees)	Coefficient of volume compressibility - m_v (m^2/MN)
Tauranga Group – Stiff Crust	0 to 1.0	17	60	3	26	0.1
Tauranga Group – Soft to Firm	1.0 to 6.5	15	20	1	26	0.5
Kerikeri Volcanic Group – Basalt	>6.5	20	5000	50	35	N/A

4.3 CPT Undrained Shear Strength

The undrained shear strength has been assessed using the in-situ CPT data and vane shear strength, corrected using a Bjerrum correction factor of 0.7. Data plots are presented in Figure 3.

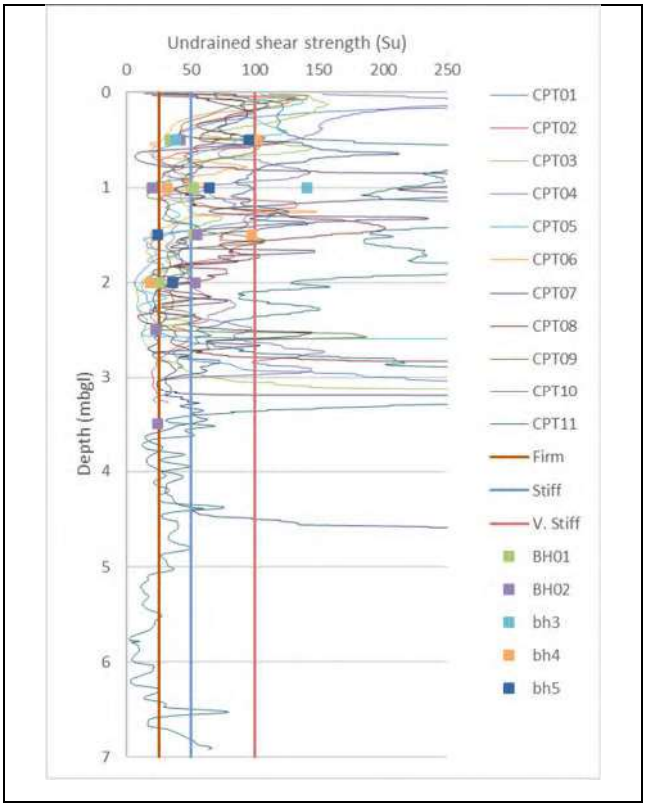


Figure 3 – Estimated CPT Plots (undrained shear strength)

4.4 Settlement Analysis

The natural ground conditions across the site were generally consistent across the site, with refusal typically encountered at 3.0 mbgl. The locations with shallow refusal have been inferred as encountering top of basalt rock and have been included within the ground model to represent an incompressible layer. The proposed development comprises a single warehouse building located across Lots 2 and 3. Based on concept plans provided by Smart Steel Buildings, the building will be approximately 46.0 m x 30 m, comprising a large workshop area, wash bay, storeroom, ablution block, showroom, and office space. A mezzanine floor is shown above the showroom and storeroom is. Structural loads have been provided by the structural engineer (HFC Structures Ltd) and are included in Appendix D.

The existing site is level, with a change in elevation across the site in the order of 200 mm. The 1% AEP (including climate change) at the northern boundary of the Lots is 78.8 mRL, and 78.6 mRL at the road boundary. The finished floor level (FFL) for a commercial building needs to be 300 mm above the flood hazard level, therefore we have assumed a FFL of 79.1 mRL. Due to the variability of the surface soils, we recommend that the upper 300 mm is removed from the underside of the foundation slab and replaced with granular hardfill, with a geogrid and geotextile layer installed at the base of the hardfill. Based on the existing contour data available at the time of preparing this report, fill will need to be imported to raise the ground level to the underside of the foundation slab, approximately 78.95 mRL (assuming a 150 mm thick floor slab).

Table 4 - Settlement prediction results

Loading Condition	Total Max. settlement (mm)
Raise ground level with granular fill to FFL (max. 350 mm additional fill, approx. 8 kPa)	25
UDL Floor Loading – 15 kPa	50

Based on the preliminary settlement assessment, a settlement preload is recommended to mitigate the settlement risk to the site. To mitigate the settlement risk across the site a preload across the building platform (extending 2.0 m beyond the platform) is recommended and should include the 15 kPa building.

A separate analysis was undertaken where the structural loads are supported on individual pad foundations following preloading the site. The available bearing capacity is dependent on the foundation dimensions due to the change in effective stress in the underlying soils, i.e., the soil strength below the crustal layer are soft to firm, foundation sizes and applied load will need to consider these effects. A summary of the available bearing capacity against different foundation sizes is given in Table 5.

Table 5 - Spread footing bearing capacity

Foundation sizes	Ultimate bearing capacity
1.5 x 1.5 m pad footings **0.45 m width strip footing**	300 kPa
1.5 x 1.5 m pad footings **0.75 m width strip footing**	200 kPa
2.0 x 2.0 m pad footings **1.0 m width strip footing**	150 kPa
3.0 x 3.0 m pad footings **1.75 m width strip footing**	100 kPa

Of greater importance to the overall performance to the slab is the differential settlement and angular distortion across the slab. The results indicate differential settlement from the centre to the edge in the order of 15 to 30 mm (depending on final load arrangement). A maximum UDL of 15 kPa is recommended for the slab design (including weight of slab and building), if the load exceeds this amount, then additional preload surcharge will be required to compensate the final load arrangement.

We have assumed a fully flexible foundation system; if detailed structural design adopts a non-linear spring response model, then the load distributions on the slab should be provided to the geotechnical engineer for further analysis if necessary. Based on the estimated settlement and pressures, we recommend the following spring values are adopted for the initial analysis for a stiffened slab foundation system, on the assumption that the load will be distributed evenly across the slab through detailed design, i.e., the slab will be stiffened to spread load more evenly (a fully flexible foundation system will have a linear modulus of subgrade reaction value of 330 kN/m^2/m):

- Centre of raft = 330 kN/m^2/m

- Edge of raft = 750 kN/m^2/m
- Corner of raft = 1500 kN/m^2/m

4.5 Bearing Capacity

An ultimate bearing capacity of 200 kPa can be adopted for preliminary design purposes of shallow spread foundations, and is vertical loads only, i.e., horizontal shear or moment actions have not been assessed and will require specific analyses. A geotechnical strength reduction factor of 0.5 shall be applied for limit state design. Reference to Table 5 for different foundation sizes and recommended bearing capacity values to limit displacement.

4.6 Shrink Swell Soil Characteristics

The New Zealand Building Code Clause (B1) outlines expansive soils are those with a liquid limit greater than 50% and a linear shrinkage greater than 15%. Atterberg limits test results on the sample collected during the site investigation are presented in Table 6 below.

Table 6 – Atterberg Limits and Linear Shrinkage Test Results

Sample I.D.	Depth (m)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	Linear Shrinkage (%)
BH01	0.50 – 0.80	55.6	78	46	32	14

Based on the laboratory results, it is our opinion that the site would be classified as Class M, moderately expansive (in accordance with the New Zealand Building Code. Results are plotted on the Casagrande Chart in Figure 4 below, with the sample plotting below the A-Line.

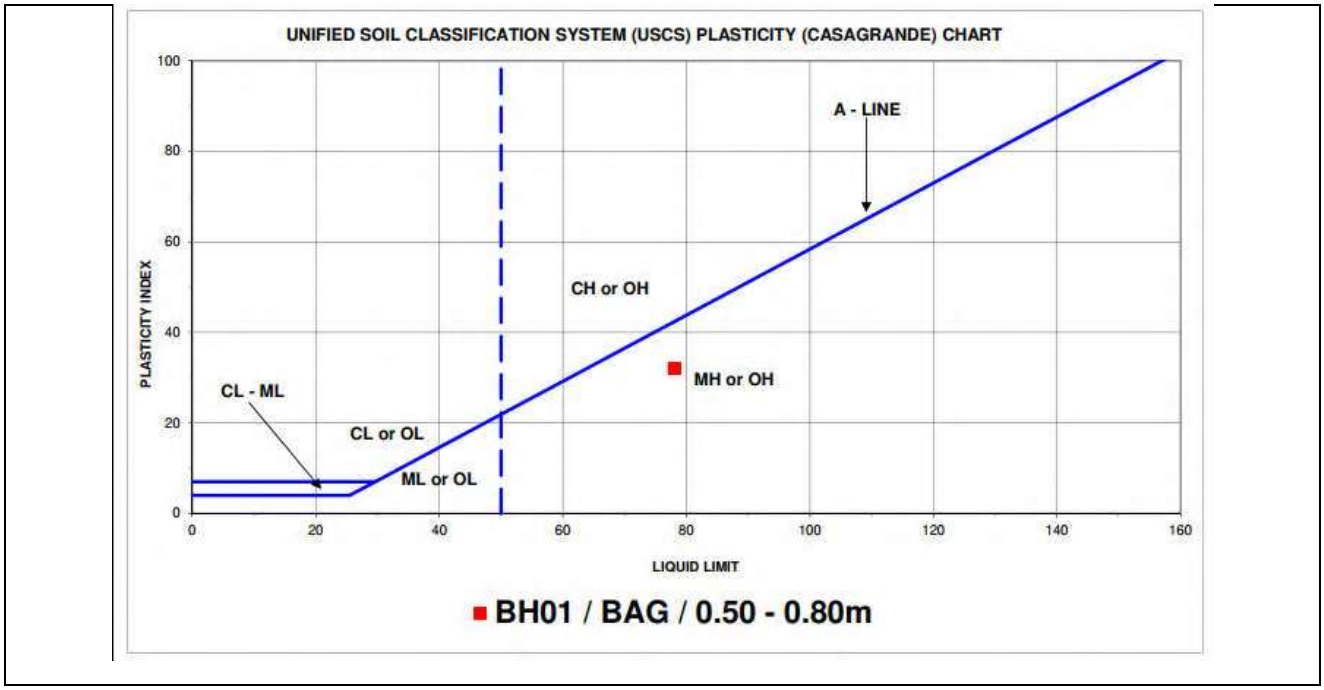


Figure 4 – Casagrande Chart

4.7 Seismic Site Subsoil Category

The site conditions have been assessed to be consistent with seismic subsoil Class D (Deep or soft soil sites) in accordance with NZS1170.5:2004. For geotechnical design purposes, Site Class C (shallow soil site) has been adopted as it provides a more conservative assessment for peak ground acceleration estimates (PGA) and is more aligned to the MBIE geotechnical guidance, Module 1.

4.8 Liquefaction Potential

The site geology is recent alluvium overlying volcanic deposits. A liquefaction analysis has been undertaken due to the recent soils and the high groundwater level encountered during the investigations. The underlying soils comprised fine grained soils which are considered not susceptible to liquefaction, with a plasticity index of 32 in the upper soil column, which is considered not susceptible to liquefaction (Module 3: Identification, assessment, and mitigation of liquefaction hazards, NZGS & MBIE).

The liquefaction risk assessment for the identification, assessment and mitigation of liquefaction hazard has been conducted based on the recommendations of the New Zealand Geotechnical Society Inc. stated in Module 1- and Module 3. The liquefaction potential assessment has been carried out with computer software (GeoLogismiki, CLiq v. 2.2.1.7) using Boulanger and Idriss (2014) for liquefaction triggering.

The seismic coefficients for design are based on the NZTA Bridge Manual (NZBM), calculated based on the following formula:

$$PGA = C0.1000 * \frac{Ru}{1.3} * f * g$$

Un-weighted PGA coefficient for Class A/B	Return Period Factor (Ru = 1/500, Rs = 1/25)	Site subsoil class factor
$C_{0,1000}$ = 0.13	R_u = 1.0; R_s = 0.25	f = 1.33

Peak ground acceleration (PGA) for the site is as follows:

- ULS – 0.13 g, Mw 5.8 earthquake.
- Lower bound ULS – 0.19 g, Mw 6.5 earthquake [used in analysis to assess step change behaviour in accordance with Module 1 – NZGS and MBIE].

Results are summarised in Table 7, with detailed results presented in Appendix D. The liquefaction severity number has been used to indicate the potential for surface manifestation, with all tests recording a LSN less than 10 (little to no expression of liquefaction, i.e., low risk site).

Table 7 Summary of results

Test data	Liquefiable Zone (mbgl)	Estimated total vertical free field settlement (mm) - ULS	Liquefaction Severity Number (LSN) – ULS	Liquefaction Potential Index
CPT01	2.9-3.1	<5	<1	Low Risk
CPT02	1.1-1.4	<5	3	Low Risk
CPT03	3.0-3.1	<5	<1	Low Risk
CPT04	2.2-2.8	20	8	Low Risk
CPT05	n/a	<5	<1	Low Risk
CPT06	n/a	<5	<1	Low Risk
CPT07	1.0-1.4	15	9	Low Risk
CPT08	1.2-1.5	10	6	Low Risk
CPT09	2.55-2.6	<5	<1	Low Risk
CPT10	1.3-1.4	<5	2	Low Risk
CPT11	2.0-3.0 & 5.6-6.2	15	7	Low Risk

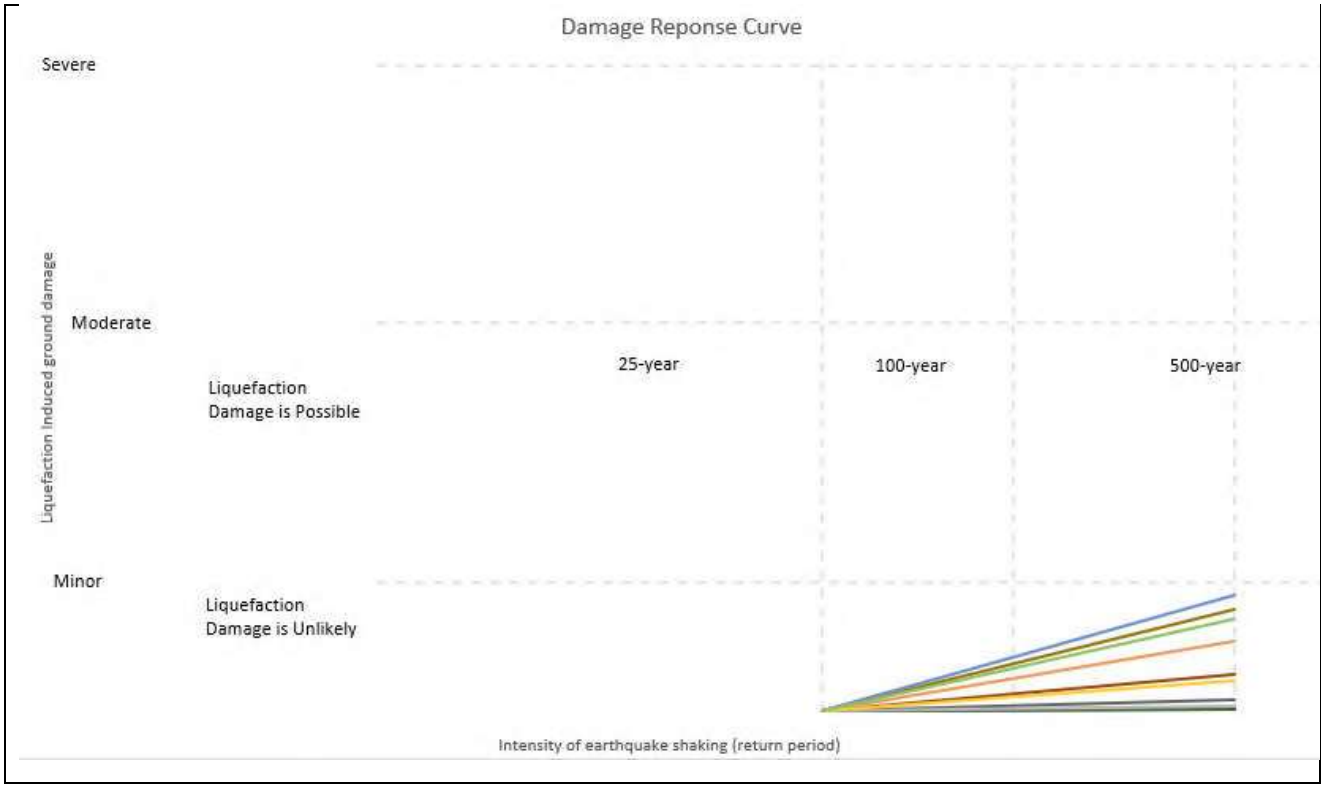


Figure 5 - Liquefaction Damage Response Curve

Lenses of liquefiable material are predicted outside what is presented in the above table, with the estimated vertical settlement, LSN and LPI taking these lenses into consideration. Data collected from the laboratory testing confirms the upper fine-grained soils being too plastic to liquefy with plasticity index greater than 12. Based on the results, we consider liquefaction damage across the site, e.g., surface manifestation / sand boils, is less than minor and liquefaction damage is unlikely based on 'Planning and engineering guidance for potentially liquefaction-prone land, MBIE, September 2017).

5 Foundation Recommendations

5.1 General

Concept plans by Smart Steel Buildings indicate the proposed building will be spread over Lot 2 and 3. Vehicle access points in each Lot are shown, with carparking located along the southern boundary, parallel to Kahikatearoa Lane, and down the eastern boundary of Lot 3. The northern portion of both Lots will be used services e.g., wastewater field and potable water supply.

5.2 Shallow Foundations

The subsoils comprised fine-grained alluvial soils, moderately susceptible to seasonal shrink-swell behaviour. The site is located within/near a flood hazard zone and minor earthworks are required to raise to provide an FFL of 79.1 mRL. Consolidation settlement has been analysed based slab on grade construction with a uniformly distributed load of 15 kPa and raising the site prior to building. Based on the ground conditions, we consider concrete slab on grade foundations will be appropriate provided the site is subject to a monitored settlement preload.

If a raft foundation type is adopted, we recommend that the upper 300 mm across the site is removed and reinstated with granular hardfill, with a geotextile and geogrid (minimum 40 kN) placed at the interface of the soil and granular hardfill.

For conventional spread foundation design, we recommend embedment for spread footings be 600 mm below finished ground level. The soils are variable across the site and adopting conventional spread foundations may encounter unsuitable ground conditions and high groundwater level. We recommend the following maximum dimensions to support concentrated loads, with an ultimate bearing capacity of 200 kPa (geotechnical strength reduction factor of 0.5 for limit state design) available upon completion of the settlement preload, refer Table 5 for further information:

- Pad Foundations = 1500 x 1500 mm
- Continuous strip footing width = 750 mm

Larger foundation area can be adopted to spread the load (Table 5). However, this will result in the pressure bulb deepening, reducing the ultimate bearing capacity and will require a detailed settlement analysis to predict settlement under the given loading scenario. The parameters given in Table 3 and Figure 3 can be adopted for settlement analyses.

Settlement analyses are based on the site being raised to underside of slab level and preloaded with the 15 kPa UDL across the building platform. Based on nearby settlement trials, we anticipate the rate of consolidation settlement will be rapid and a nominal period of 1 month is recommended prior to preparing the building platform for foundations. The settlement preload should be done in advance of building consent where possible and will mitigate against any potential differential settlement across the building. Settlement predictions are subject to change based on building and floor loadings, and the required final level of the site. A settlement preload design will be required once the final building layout has been determined.

Confirmation of the stripped subgrade is recommended prior to preparing foundations to ensure all unsuitable material, e.g., topsoil or non-certified fill, has been removed. Where filling is required, compaction testing will be required to confirm the hardfill has been compacted to an engineered standard.

- Ultimate bearing capacity of 200kPa (based on the limiting foundation sizes as detailed within Section 4.4 and summarised in Table 5, and settlement preload being undertaken in advance).

- Geotechnical strength reduction factor – 0.5.
- Soil expansivity class – Site Class M (moderately reactive soils).
- Seismic class – Site Class D (deep or soft soil site).

Bearing capacity values included in this report are for vertical loads only and do not consider horizontal shear or moment.

Where foundation excavations expose soft/weak or otherwise unsuitable ground these materials should be undercut and replaced with GAP40 compacted to an engineered standard.

6 Construction

6.1 Earthworks Operation and Compaction Control

We have not yet been supplied with any drawings showing the likely scope of earthworks associated with the development, however, given the size of the warehouse building, we anticipate that earthworks will be required to create a level building platform and to raise the site above the flood level, we have assumed approximately 350 mm for our assessments. Prior to the placement of any filling, it will be necessary to strip all topsoil.

All filling across the site should be done at the same time. A typical construction sequence is as follows:

- Strip the site of topsoil – [Subgrade check by Geotechnical Engineer]
- Geotextile – BIDIM A39 across the subgrade prior to filling
- Settlement monitoring pins to be added across the building platform.
- Import fill and start running in layer (200 mm loose for granular fill). Building platforms to be done first and overfilled a minimum 2.0 m from all edges of building. Fill up to FFL level.
- Surcharge the building platforms with fill to replicate the proposed building loads. Settlement to be monitored.
- Once approved by the Engineer, surcharge fill can be removed and spread over other areas of the site to achieve the desired levels.

6.2 Earthworks

6.2.1 *Subgrade Preparation*

Due to the soil sensitivity at the site, site concrete or gravel surface protection is recommended under all perimeter or pad footings to provide a suitable working base when preparing foundations, this is particularly important if preparing foundations in wet weather or during winter, or during summer where exposure to the

sun and heat will result in the soils becoming desiccated. Slab preparation should also be protected by granular hardfill as soon as possible the subgrade degrading due to exposure. The existing granular fill on the site should remain in-situ if possible, however is subject to compaction testing prior to foundation preparation.

6.2.2 *Filling*

The site can be raised with granular fill, subject to approval by the Engineer and preload monitoring. Our recommended control criteria are as follows:

Table 8 - Maximum dry density for granular fill

	Dy Density Percentage of N.Z. Standard Compaction Test	Water Content Allow variations from Optimum
GAP65/GAP40	95%	6% to 8%

Table 9 - Clegg Impact Value (CIV) testing on granular fill

Clegg Impact Value – 4.5kg Clegg	
Average value	25
Maximum single value	20

Note: Average value shall be determined over ten consecutive tests.

Table 10 - Proof roll testing on granular hardfill

Proof rolling observations	
Target elastic settlement beneath a fully loaded six-wheel truck or 10 tonne smooth drum roller	<5 mm

All filling shall be compacted in thin layers, approximately 200 mm loose, with compaction testing completed at every second layer by a CPEng (Geotechnical).

6.2.3 *Groundwater Control*

Groundwater level across the site is shallow and service installation will need to be aware of this during construction. The site will need to be built up as part of the site preparation and should be done well in advance of preparing the site for service installation. Where possible, all services should be installed during summer.

6.3 Subgrade Protection

We recommend that trafficking of the building platform and carparking areas are minimised and that subgrades are only trimmed to final levels immediately prior to covering with granular hardfill. The site should be shaped to avoid water ponding during rain, thereby limiting the need for additional undercutting and hard filling. Areas of trimmed subgrade shall not be left exposed to allow the ingress of water, nor should subgrade areas be trafficked prior to drying out after rain.

6.4 Stormwater Disposal

Stormwater from paved areas, roofs, driveways, and water storage tanks should be collected in sealed, flexible pipes and discharged in such a manner to not cause any instability or erosion. It is essential for the long-term stability of this site, that all storm water be piped away from any proposed building platform to avoid over saturation of the underlying natural soils.

Stormwater shall be piped away from any proposed building platform to avoid over saturation of the subsoils and to maintain stability across the site. All stormwater overflow drainages should be channelled away from the development platform and discharged in a controlled manner.

Uncontrolled stormwater discharges onto the ground surface can cause erosion and should not be permitted under any circumstances where stability could be compromised.

6.5 Services

At the time of writing, no known underground services cross beneath the proposed development area. Where it is intended for the installation of underground services, we recommend that all services are installed prior to foundation excavations and construction and that all services are designed to be outside the influence of foundation excavations. We recommend that any new services are accurately located on site and the depth to invert be determined prior to the commencement of foundation excavations.

6.6 Pavement Design

Based on the fill material encountered in the proposed carpark area, a design CBR of 2.0% should be adopted for pavement design purposes. Localised soft zones are expected and will need to be undercut and removed during construction. A minimum undrained shear strength of 50 kPa in the upper 1.0 m is required for pavement design. We recommend the carpark pavement is reinforced with geogrid to confine the subbase material, alternatively a retaining wall can be constructed to remove the free face. A geotextile (BIDIM A29 or equivalent) should be installed between subgrade and pavement to minimise the ingress of fines into the pavement during dynamic loading.

6.7 Geotechnical Review

Haigh Workman Limited have only been provided with concept design drawings for the site. We therefore would like to be given the opportunity of reviewing the final civil and structural drawings for this development prior to Building Consent application to ensure that our recommendations relating to site works and foundation design have been interpreted as intended. Our involvement in the detailed design process is recommended.

6.8 Construction Observations

We consider the following specific items will need to be observed at the time of construction to ensure the foundation soils are consistent with the assumptions made in this geotechnical report:

1. Geotechnical drawing review to confirm the foundation design is as per the geotechnical recommendations.
2. Observe subgrade exposure prior to covering with hardfill protection.
3. Observe fill placement and confirmation fill has been placed to an engineered standard.
4. Review settlement monitoring results. Engineer to confirm removal of surcharge.
5. Observe all foundation excavations and exposure of foundation soils.
6. Observe pavement construction and testing at regular intervals.

Provision should be allowed for modifying the foundation solution at this time should unforeseen ground conditions be encountered.

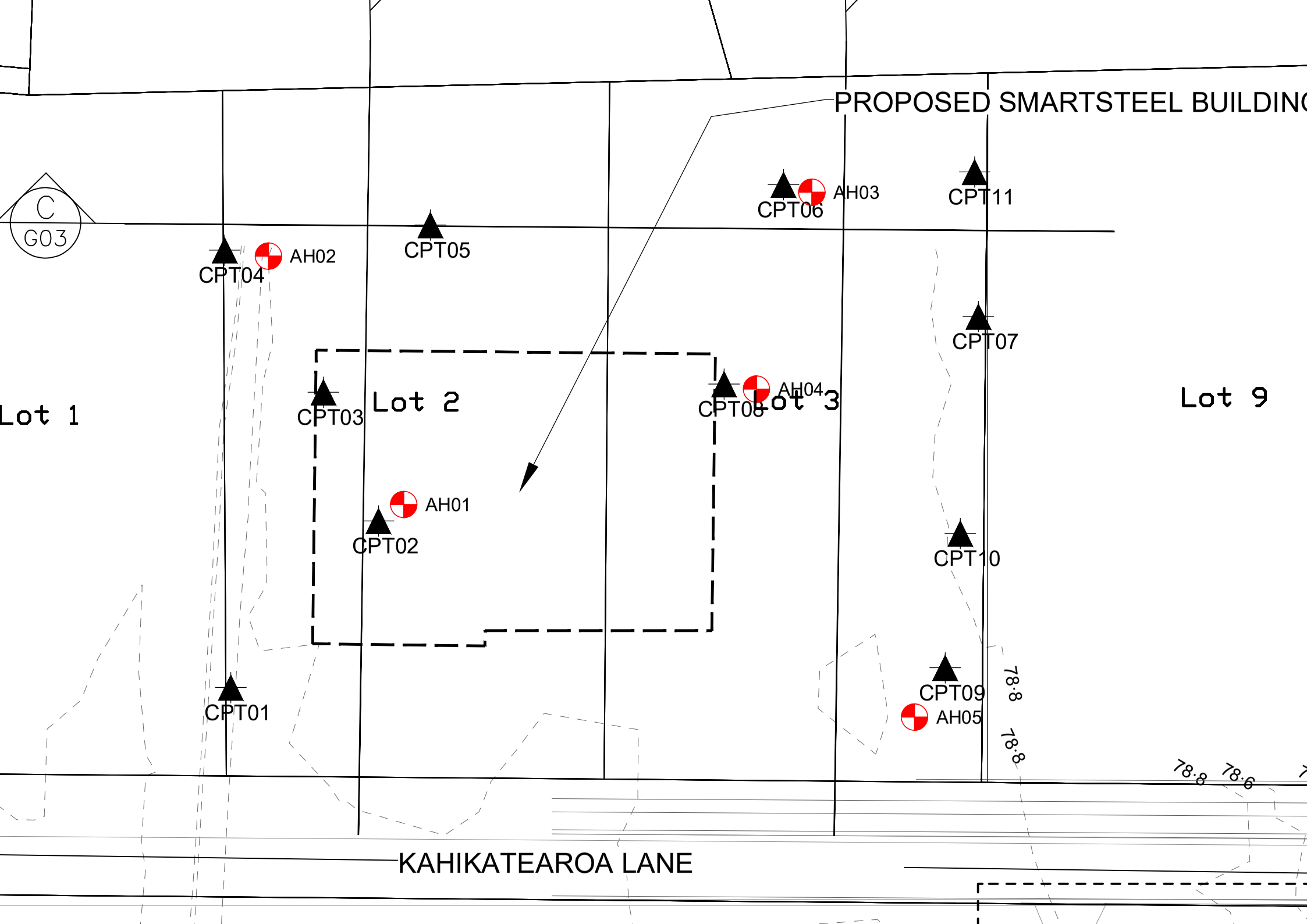
7 Limitations

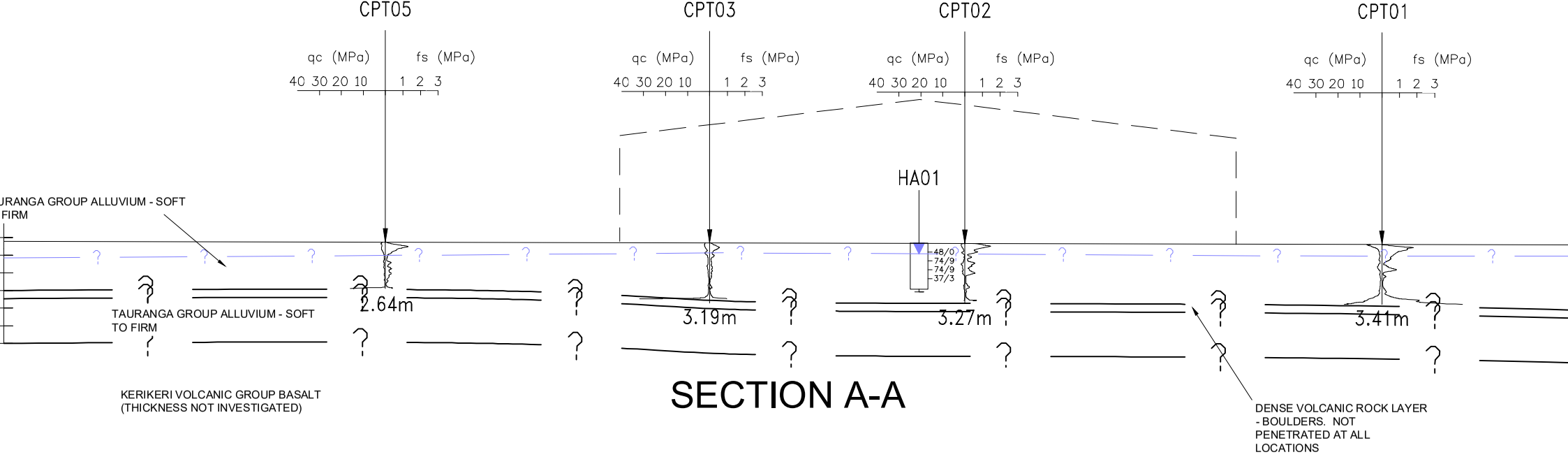
This report has been prepared for the use of Smart Steel Buildings with respect to the brief outlined to us. This report is to be used by our Client and their Consultants and may be relied upon when considering geotechnical advice. Furthermore, this report may be utilised in the preparation of building and/or resource consent applications with local authorities. The information and opinions contained within this report shall not be used in other context for any other purpose without prior review and agreement by Haigh Workman Ltd.

The recommendations given in this report are based on site data from discrete locations. Inferences about the subsoil conditions away from the test locations have been made but cannot be guaranteed. We have inferred an appropriate geotechnical model that can be applied for our analyses. However, variations in ground conditions from those described in this report could exist across the site. Should conditions encountered differ to those outlined in this report we ask that we be given the opportunity to review the continued applicability of our recommendations.

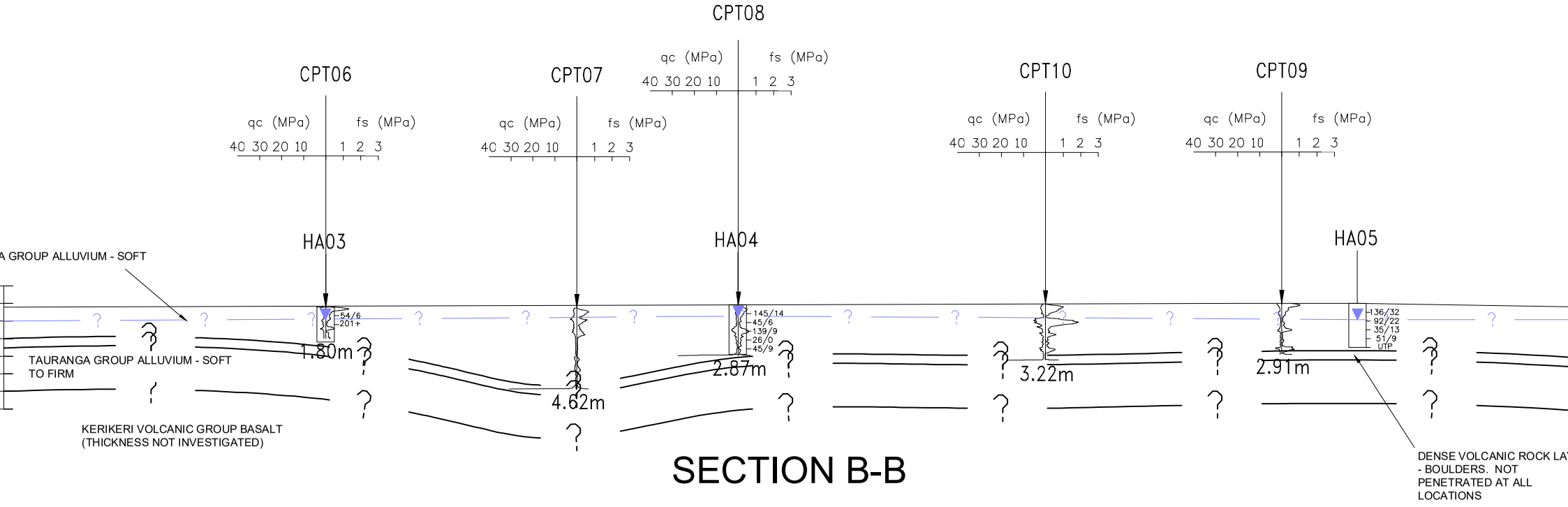
Appendix A – Drawings

Drawing No.	Title
24 043/G01	Site Investigation Plan
24 043/G02	Geological Section A-A and B-B
24 043/G03	Geological Section C-C

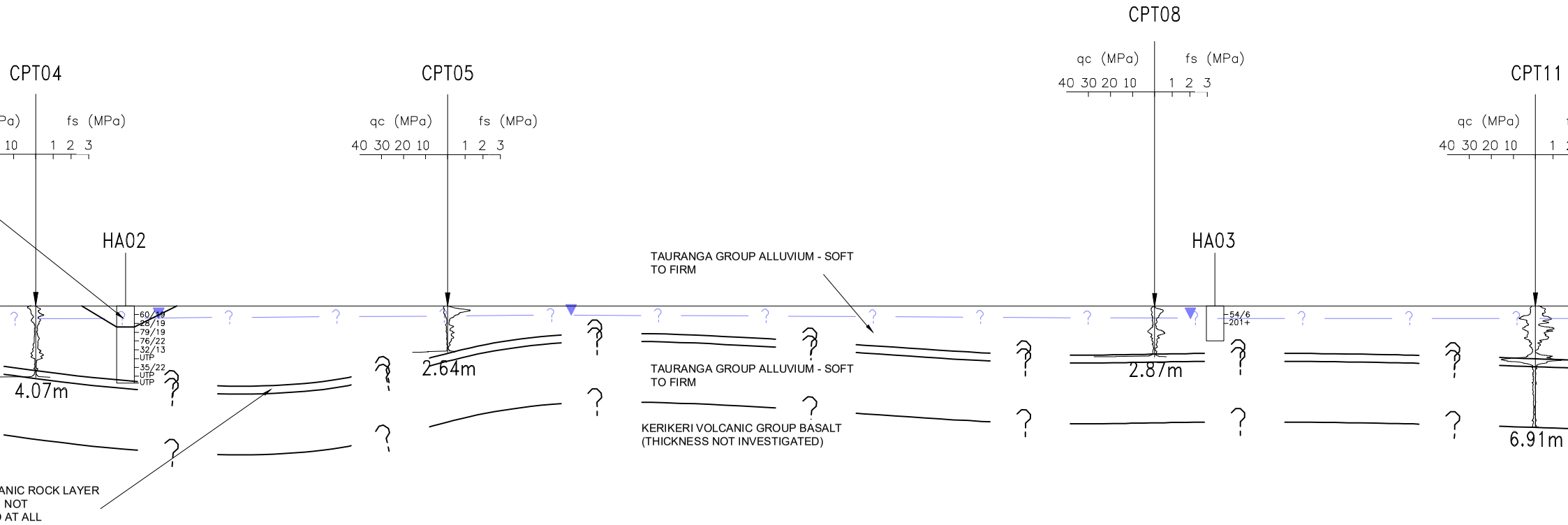

PROPOSED SMARTSTEEL BUILDING
C
G03
CPT01
CPT02
CPT03
CPT04
CPT05
CPT06
CPT07
CPT08
CPT09
CPT10
CPT11
AH01
AH02
AH03
AH04
AH05
Lot 1
Lot 2
Lot 3
Lot 9
78·8
78·8
78·8
78·6
KAHIKATEAROA LANE



SECTION A-A



SECTION B-B


CPT04
fs (MPa)
1 2 3
HA02
60/19
28/19
79/19
76/22
32/13
UTP
35/22
UTP
UTP
4.07m
ANIC ROCK LAYER
NOT
AT ALL
CPT05
qc (MPa)
40 30 20 10
fs (MPa)
1 2 3
2.64m
TAURANGA GROUP ALLUVIUM - SOFT
TO FIRM
TAURANGA GROUP ALLUVIUM - SOFT
TO FIRM
KERIKERI VOLCANIC GROUP BASALT
(THICKNESS NOT INVESTIGATED)
CPT08
qc (MPa)
40 30 20 10
fs (MPa)
1 2 3
HA03
54/6
201+
2.87m
CPT11
qc (MPa)
40 30 20 10
6.91m

SECTION C-C

Appendix B – Site Investigation Logs

CPT Client Engagement / Quote Request

Project Details		Date	21/02/2022
Project Name	Proposed Development	Job Identifier	HW Hayphill Investments
Project Address	Klinac Lane, Waipapa		
Engineering Consultant Company Name	Haigh Workman	Engineering Project Manager	Wayne Thorburn
Email		Mobile	
Client Name		Client Contact Details	

Test Requirements - CPT		Preferred Job Completion Date	
Target No of CPT Tests Required	9	Maximum Test Depth Required	Refusal
No of CPT Tests Required Through Pavement or Other Hard Surface		Type and Thickness of Hard Surface	
Other Requirements Outside Standard Greenfield Testing	more cpts if time allows		

Please note: Service clearance is to be provided by the client or their agents and details are to be provided to the CPT operator prior to Underground Investigation Ltd commencing work. Any delays due to service clearance or H&S approvals will be at the clients expense and may reduce the amount of testing being able to be completed in the working day.

Test Requirements - Dissipation Testing		Please List Test No and Approximate Target Depth of Dissipation	
Test No	Depth	Test No	Depth

Please note: In order to provide useful dissipation data, UIL recommends carrying out at least one CPT prior to carrying out dissipation in order to select appropriate depths for testing. It is preferred if the Geotechnical Engineer for the project discusses this with the CPT operator after completion of the initial testing.

Any Other Site Requirements

UNDERGROUND INVESTIGATION

CPT Equipment Information

CPT Rig Type	Geotech AB - Georig 220	Maximum Push Capacity	200kN
Any Deviations From Common Setup		Reaction Restraint	Screw Anchors
Cone Penetrometer	Nova Cone 100MPa With Memory	Cone Penetrometer Type	TE2
Manufacturer	Geotech AB	Load Cell Configuration	Compresion
Tip Area	10cm	Pore Pressure Type	U_2
Full Scale Output of Sensors	q_c : 100 MPa	f_s : 1 MPa	u_2 : 2 MPa
Calibration Test Class	ISO 1	Saturation Method	Pump Saturation With Secondary Vacuum
Temprature Sensor	No	Data Interval	10mm
Temprature Conditioning	Cone Warmer set to 20° C	Typical Cone Temprature at Start of Test	16-20° C
Any Deviations From Above			

UNDERGROUND INVESTIGATION

CPT Test Information

Test Hole Number	CPT01	Job Identifier	HW Hayphill Investments
Test Date	22/02/2022	Operator	Craig Greenfield
Cone Serial Number	5655	Battery Voltage Start	6
Cone Area Ratio	0.838	Start Recording	10:27:00 AM
Probe Radius	0.0179	Finish Recording	10:36:00 AM
Date of First Push Current Calibration	5/10/2021	Measured Ground Water Depth	collapsed at 0.4
Metres To Next Calibration	283	Total Penetration Depth (m)	3.415
Depth of Predrill	0	Test ended due to:	☑ High Tilt ☐ High Tip Pressure ☐ High Friction ☐ High Pore Pressure ☐ High Total load ☐ Danger of Rods Buckling ☐ Target Depth ☑ Anchor Failure
Depth at Start of Test	0		
Anchor Depth (Left)	2.5		
Anchor Depth (Right)	2.5		

Zero Value Change % FSO

	Point Resistance	Pore Pressure	Sleeve Friction
Zero Shift Since First Push Since Last Calibration	0.01%	0.01%	0.38%
End of test with tip loosened	0.02%	0.02%	0.06%

Dissipation Testing

Test No	Depth (m)	Duration (secs)	Comments

Notes and Comments

Data loss (typically at rod change points). Either deleted or averaged	qc	fs	u

CPT Test Information

Test Hole Number	CPT02	Job Identifier	HW Hayphill Investments
Test Date	22/02/2022	Operator	Craig Greenfield
Cone Serial Number	5708	Battery Voltage Start	5.97
Cone Area Ratio	0.834	Start Recording	11:09 AM
Probe Radius	0.018	Finish Recording	11:21 AM
Date of First Push Current Calibration	2/12/2021	Measured Ground Water Depth	1.1
Metres To Next Calibration	904	Total Penetration Depth (m)	3.397
Depth of Predrill	0	Test ended due to:	☑ High Tilt ☑ High Tip Pressure ☐ High Friction ☐ High Pore Pressure ☐ High Total load ☐ Danger of Rods Buckling ☐ Target Depth ☐ Anchor Failure
Depth at Start of Test	0		
Anchor Depth (Left)	1.5		
Anchor Depth (Right)	1.5		

Zero Value Change % FSO

	Point Resistance	Pore Pressure	Sleeve Friction
Zero Shift Since First Push Current Calibration	0.02%	0.05%	0.44%
End of test with tip loosened	0.06%	0.02%	0.28%

Dissipation Testing

Test No	Depth (m)	Duration (secs)	Comments

Notes and Comments

Data loss (typically at rod change points). Either deleted or averaged	qc	fs	u

UNDERGROUND INVESTIGATION

CPT Test Information

Test Hole Number	CPT03	Job Identifier	HW Hayphill Investments
Test Date	22/02/2022	Operator	Craig Greenfield
Cone Serial Number	5446	Battery Voltage Start	5.94
Cone Area Ratio	0.854	Start Recording	11:45:00 AM
Probe Radius	0.0179	Finish Recording	11:54:00 AM
Date of First Push Current Calibration	10/01/2022	Measured Ground Water Depth	0.8
Metres To Next Calibration	1113	Total Penetration Depth (m)	3.192
Depth of Predrill	0	Test ended due to:	☐ High Tilt
Depth at Start of Test	0		☐ High Tip Pressure
Anchor Depth (Left)	1.5		☐ High Friction
Anchor Depth (Right)	1.5		☐ High Pore Pressure
			☐ High Total load
			☐ Danger of Rods Buckling
			☐ Target Depth
			☑ Anchor Failure

Zero Value Change % FSO

	Point Resistance	Pore Pressure	Sleeve Friction
Zero Shift Since First Push Current Calibration	0.03%	0.01%	0.16%
End of test with tip loosened	0.06%	0.00%	0.32%

Dissipation Testing

Test No	Depth (m)	Duration (secs)	Comments

Notes and Comments

Data loss (typically at rod change points). Either deleted or averaged	qc	fs	u

UNDERGROUND INVESTIGATION

CPT Test Information

Test Hole Number	CPT04	Job Identifier	HW Hayphill Investments
Test Date	22/02/2022	Operator	Craig Greenfield
Cone Serial Number	5325	Battery Voltage Start	5.94
Cone Area Ratio	0.856	Start Recording	1:02:00 PM
Probe Radius	0.0179	Finish Recording	1:13:00 PM
Date of First Push Current Calibration	24/01/2022	Measured Ground Water Depth	1.2
Metres To Next Calibration	1368	Total Penetration Depth (m)	4.1
Depth of Predrill	0	Test ended due to:	☐ High Tilt ☐ High Tip Pressure ☐ High Friction ☐ High Pore Pressure ☐ High Total load ☐ Danger of Rods Buckling ☐ Target Depth ☑ Anchor Failure
Depth at Start of Test	0		
Anchor Depth (Left)	1.5		
Anchor Depth (Right)	1.5		

Zero Value Change % FSO

	Point Resistance	Pore Pressure	Sleeve Friction
Zero Shift Since First Push Current Calibration	0.02%	0.08%	0.28%
End of test with tip loosened	0.04%	0.03%	0.38%

Dissipation Testing

Test No	Depth (m)	Duration (secs)	Comments

Notes and Comments

Data loss (typically at rod change points). Either deleted or averaged	qc	fs	u

CPT Test Information

Test Hole Number	CPT05	Job Identifier	HW Hayphill Investments
Test Date	22/02/2022	Operator	Craig Greenfield
Cone Serial Number	5655	Battery Voltage Start	5.89
Cone Area Ratio	0.838	Start Recording	1:40:00 PM
Probe Radius	0.0179	Finish Recording	1:50:00 PM
Date of First Push Current Calibration	5/10/2021	Measured Ground Water Depth	0.8
Metres To Next Calibration	279	Total Penetration Depth (m)	2.657
Depth of Predrill	0	Test ended due to:	☑ High Tilt ☐ High Tip Pressure ☐ High Friction ☐ High Pore Pressure ☐ High Total load ☐ Danger of Rods Buckling ☐ Target Depth ☑ Anchor Failure
Depth at Start of Test	0		
Anchor Depth (Left)	1.5		
Anchor Depth (Right)	1.5		

Zero Value Change % FSO

	Point Resistance	Pore Pressure	Sleeve Friction
Zero Shift Since First Push Current Calibration	0.03%	0.00%	0.68%
End of test with tip loosened	0.02%	0.02%	0.02%

Dissipation Testing

Test No	Depth (m)	Duration (secs)	Comments

Notes and Comments

Data loss (typically at rod change points). Either deleted or averaged	qc	fs	u

UNDERGROUND INVESTIGATION

CPT Test Information

Test Hole Number	CPT06	Job Identifier	HW Hayphill Investments
Test Date	22/02/2022	Operator	Craig Greenfield
Cone Serial Number	5708	Battery Voltage Start	5.9
Cone Area Ratio	0.834	Start Recording	2:16:00 PM
Probe Radius	0.018	Finish Recording	2:25:00 PM
Date of First Push Current Calibration	2/12/2021	Measured Ground Water Depth	0.85
Metres To Next Calibration	900.00	Total Penetration Depth (m)	1.89
Depth of Predrill	0	Test ended due to:	☑ High Tilt ☑ High Tip Pressure ☐ High Friction ☐ High Pore Pressure ☐ High Total load ☐ Danger of Rods Buckling ☐ Target Depth ☑ Anchor Failure
Depth at Start of Test	0		
Anchor Depth (Left)	1.5		
Anchor Depth (Right)	1.5		

Zero Value Change % FSO

	Point Resistance	Pore Pressure	Sleeve Friction
Zero Shift Since First Push Current Calibration	0.03%	0.07%	0.14%
End of test with tip loosened	0.06%	0.02%	0.52%

Dissipation Testing

Test No	Depth (m)	Duration (secs)	Comments

Notes and Comments

Data loss (typically at rod change points). Either deleted or averaged	qc	fs	u

UNDERGROUND INVESTIGATION

CPT Test Information

Test Hole Number	CPT07	Job Identifier	HW Hayphill Investments
Test Date	22/02/2022	Operator	Craig Greenfield
Cone Serial Number	5446	Battery Voltage Start	5.88
Cone Area Ratio	0.854	Start Recording	3:01:00 PM
Probe Radius	0.0179	Finish Recording	3:13:00 PM
Date of First Push Current Calibration	10/01/2022	Measured Ground Water Depth	1.5
Metres To Next Calibration	1110	Total Penetration Depth (m)	4.622
Depth of Predrill	0	Test ended due to:	☐ High Tilt ☑ High Tip Pressure ☐ High Friction ☐ High Pore Pressure ☐ High Total load ☐ Danger of Rods Buckling ☐ Target Depth ☑ Anchor Failure
Depth at Start of Test	0		
Anchor Depth (Left)	1.5		
Anchor Depth (Right)	1.5		

Zero Value Change % FSO

	Point Resistance	Pore Pressure	Sleeve Friction
Zero Shift Since First Push Current Calibration	0.03%	0.00%	0.08%
End of test with tip loosened	0.06%	0.01%	0.50%

Dissipation Testing

Test No	Depth (m)	Duration (secs)	Comments

Notes and Comments

Data loss (typically at rod change points). Either deleted or averaged	qc 2.05	fs	u 2.04 2.05

UNDERGROUND INVESTIGATION

CPT Test Information

Test Hole Number	CPT08	Job Identifier	HW Hayphill Investments
Test Date	22/02/2022	Operator	Craig Greenfield
Cone Serial Number	5325	Battery Voltage Start	5.86
Cone Area Ratio	0.856	Start Recording	3:36:00 PM
Probe Radius	0.0179	Finish Recording	3:48:00 PM
Date of First Push Current Calibration	24/01/2022	Measured Ground Water Depth	1.3
Metres To Next Calibration	1364.00	Total Penetration Depth (m)	2.87
Depth of Predrill	0	Test ended due to:	☐ High Tilt ☐ High Tip Pressure ☐ High Friction ☐ High Pore Pressure ☐ High Total load ☐ Danger of Rods Buckling ☐ Target Depth ☑ Anchor Failure
Depth at Start of Test	0		
Anchor Depth (Left)	1.5		
Anchor Depth (Right)	1.5		

Zero Value Change % FSO

	Point Resistance	Pore Pressure	Sleeve Friction
Zero Shift Since First Push Current Calibration	0.03%	0.07%	0.50%
End of test with tip loosened	0.03%	0.01%	0.10%

Dissipation Testing

Test No	Depth (m)	Duration (secs)	Comments

Notes and Comments

Data loss (typically at rod change points). Either deleted or averaged	qc	fs	u

UNDERGROUND INVESTIGATION

CPT Test Information

Test Hole Number	CPT09	Job Identifier	HW Hayphill Investments
Test Date	22/02/2022	Operator	Craig Greenfield
Cone Serial Number	5655	Battery Voltage Start	5.84
Cone Area Ratio	0.838	Start Recording	4:05:00 PM
Probe Radius	0.0179	Finish Recording	4:15:00 PM
Date of First Push Current Calibration	5/10/2021	Measured Ground Water Depth	1.6
Metres To Next Calibration	277.00	Total Penetration Depth (m)	3.032
Depth of Predrill	0	Test ended due to:	☐ High Tilt ☑ High Tip Pressure ☐ High Friction ☐ High Pore Pressure ☐ High Total load ☐ Danger of Rods Buckling ☐ Target Depth ☑ Anchor Failure
Depth at Start of Test	0		
Anchor Depth (Left)	1.5		
Anchor Depth (Right)	1.5		

Zero Value Change % FSO

	Point Resistance	Pore Pressure	Sleeve Friction
Zero Shift Since First Push Current Calibration	0.01%	0.01%	0.32%
End of test with tip loosened	0.05%	0.00%	0.40%

Dissipation Testing

Test No	Depth (m)	Duration (secs)	Comments

Notes and Comments

Data loss (typically at rod change points). Either deleted or averaged	qc	fs	u

UNDERGROUND INVESTIGATION

CPT Test Information

Test Hole Number	CPT10	Job Identifier	HW Hayphill Investments
Test Date	22/02/2022	Operator	Craig Greenfield
Cone Serial Number	5708	Battery Voltage Start	5.84
Cone Area Ratio	0.834	Start Recording	4:36:00 PM
Probe Radius	0.018	Finish Recording	4:45:00 PM
Date of First Push Current Calibration	2/12/2021	Measured Ground Water Depth	1.2
Metres To Next Calibration	898.00	Total Penetration Depth (m)	3.25
Depth of Predrill	0	Test ended due to:	☐ High Tilt ☑ High Tip Pressure ☐ High Friction ☐ High Pore Pressure ☐ High Total load ☐ Danger of Rods Buckling ☐ Target Depth ☑ Anchor Failure
Depth at Start of Test	0		
Anchor Depth (Left)	1.5		
Anchor Depth (Right)	1.5		

Zero Value Change % FSO

	Point Resistance	Pore Pressure	Sleeve Friction
Zero Shift Since First Push Current Calibration	0.00%	0.12%	0.46%
End of test with tip loosened	0.03%	0.01%	0.20%

Dissipation Testing

Test No	Depth (m)	Duration (secs)	Comments

Notes and Comments

Data loss (typically at rod change points). Either deleted or averaged	qc	fs	u

CPT Test Information

Test Hole Number	CPT11	Job Identifier	HW Hayphill Investments
Test Date	22/02/2022	Operator	Craig Greenfield
Cone Serial Number	5325	Battery Voltage Start	5.85
Cone Area Ratio	0.856	Start Recording	5:19:00 PM
Probe Radius	0.0179	Finish Recording	5:37:00 PM
Date of First Push Current Calibration	24/01/2022	Measured Ground Water Depth	1.5
Metres To Next Calibration	1361.00	Total Penetration Depth (m)	6.987
Depth of Predrill	0	Test ended due to:	☑ High Tilt ☑ High Tip Pressure ☐ High Friction ☐ High Pore Pressure ☐ High Total load ☐ Danger of Rods Buckling ☐ Target Depth ☐ Anchor Failure
Depth at Start of Test	0		
Anchor Depth (Left)	1.5		
Anchor Depth (Right)	1.5		

Zero Value Change % FSO

	Point Resistance	Pore Pressure	Sleeve Friction
Zero Shift Since First Push Current Calibration	0.03%	0.04%	0.28%
End of test with tip loosened	0.07%	0.03%	0.44%

Dissipation Testing

Test No	Depth (m)	Duration (secs)	Comments

Notes and Comments

Data loss (typically at rod change points). Either deleted or averaged	qc	fs	u

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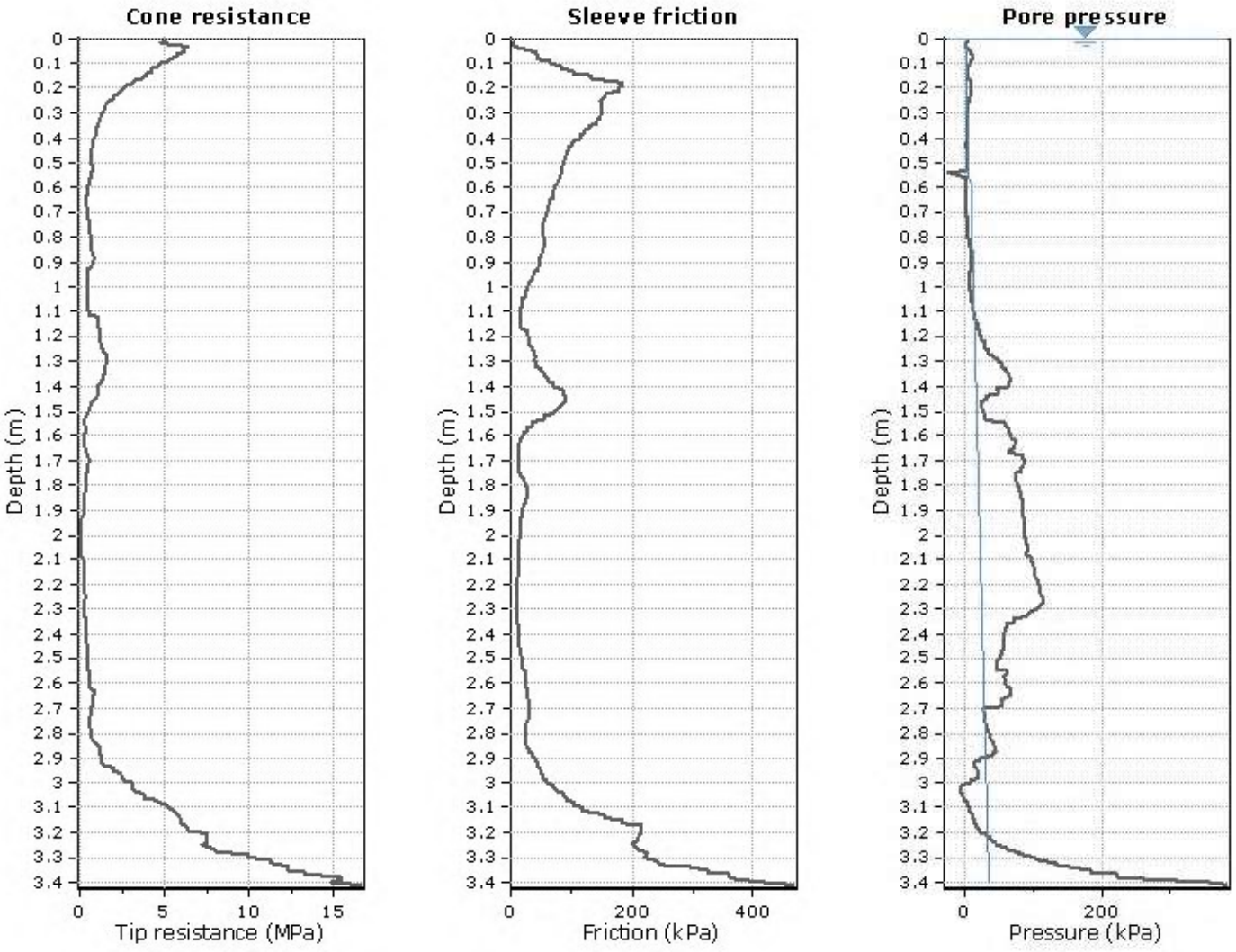
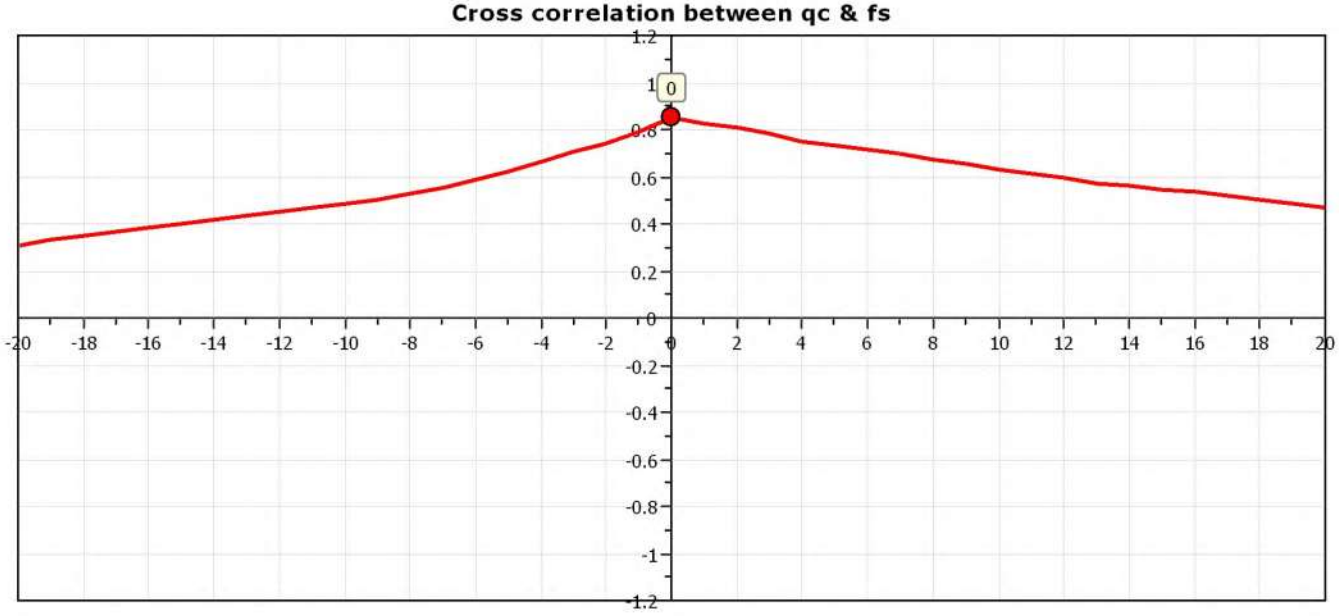
CPT: CPT01
Total depth: 3.41 m, Date: 23/02/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Hayphil Investments Ltd**
Location: **Waipapa**



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



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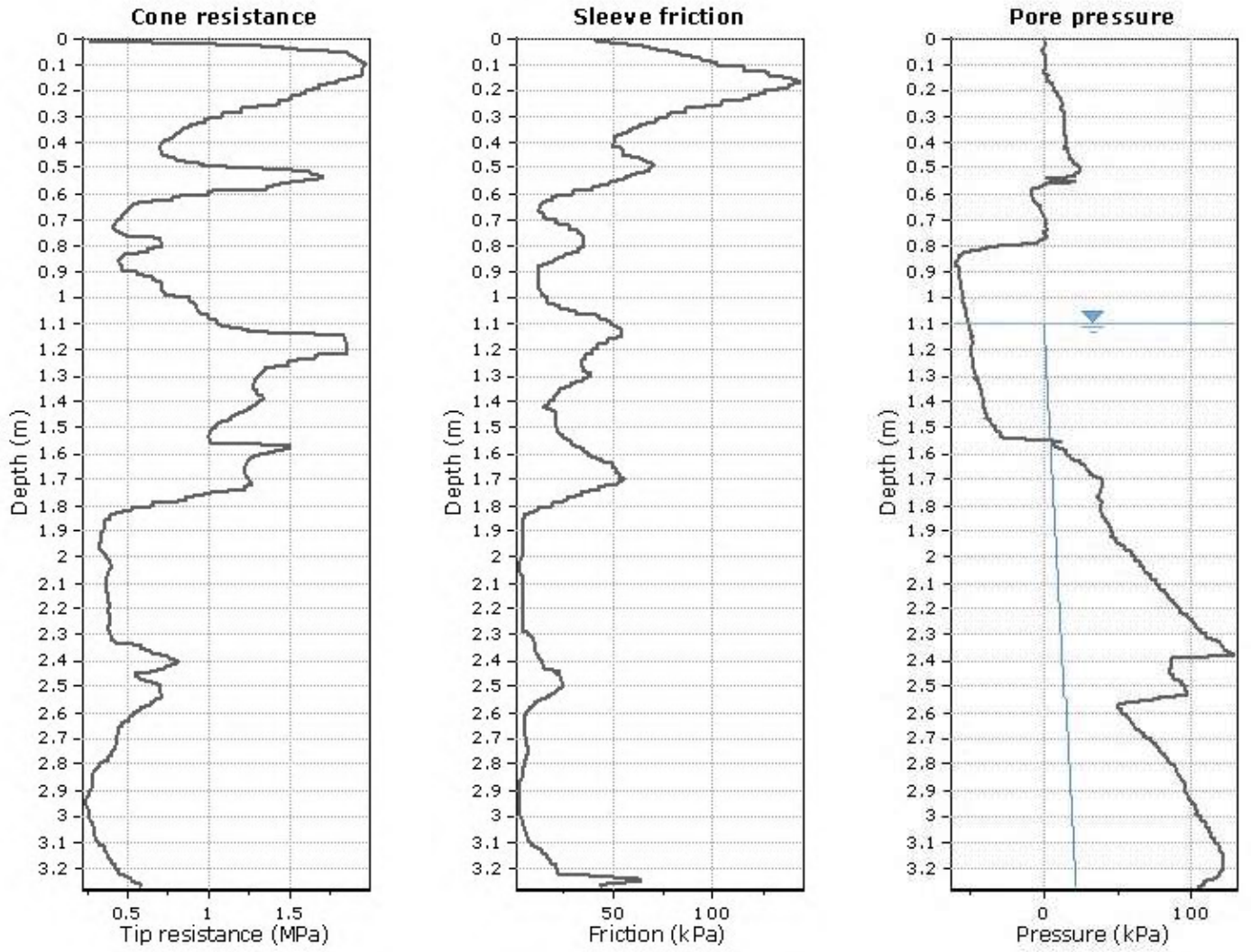
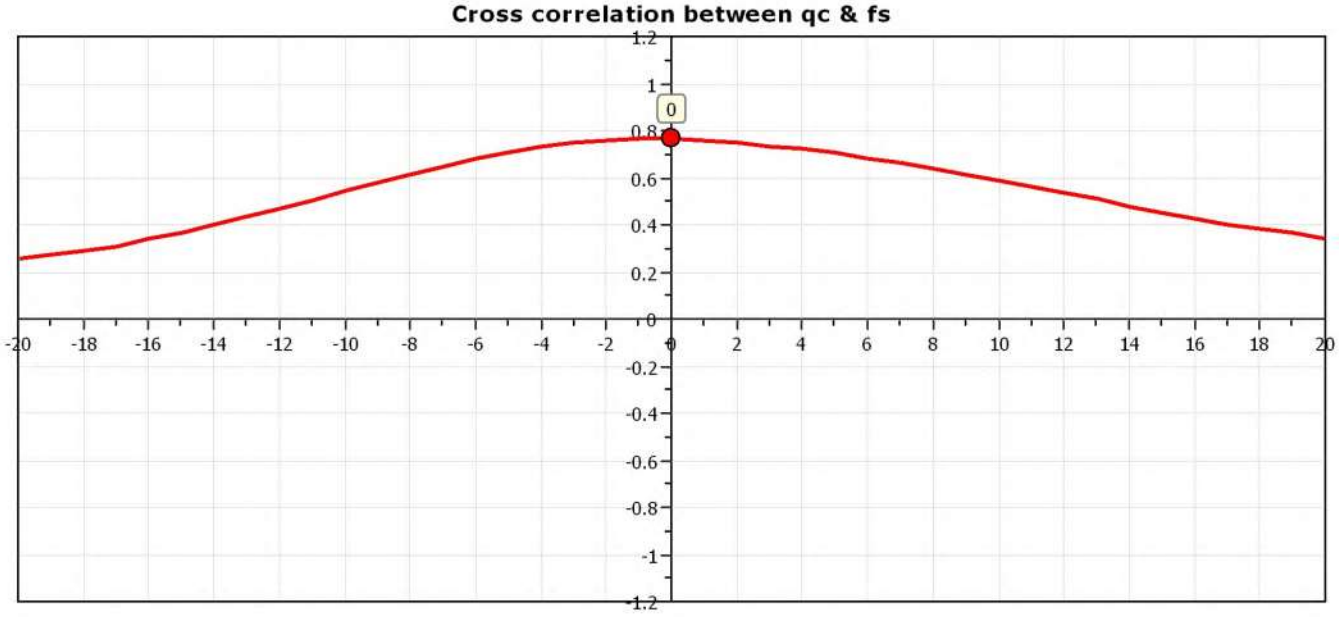
CPT: CPT02
Total depth: 3.27 m, Date: 23/02/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Hayphil Investments Ltd**
Location: **Waipapa**



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



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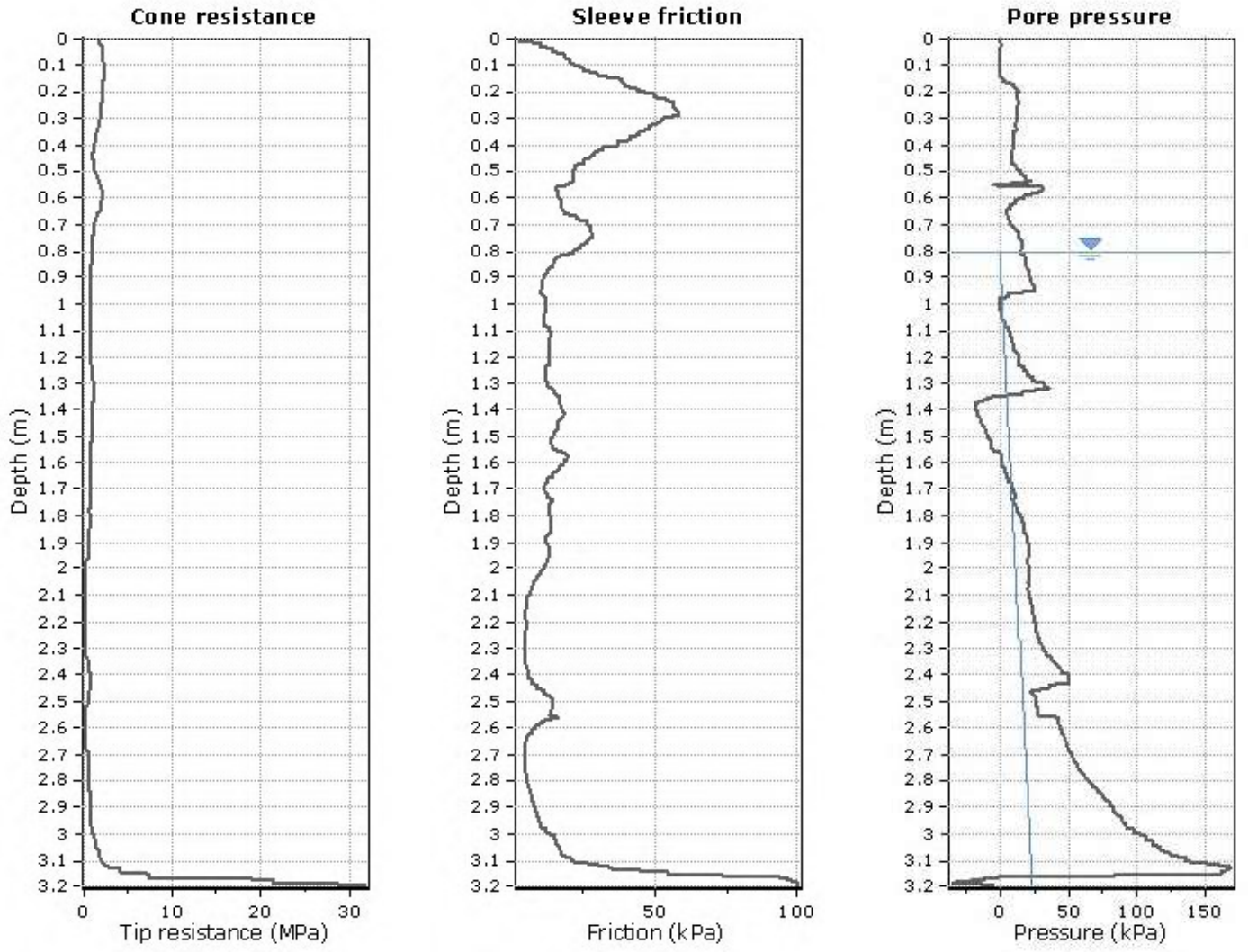
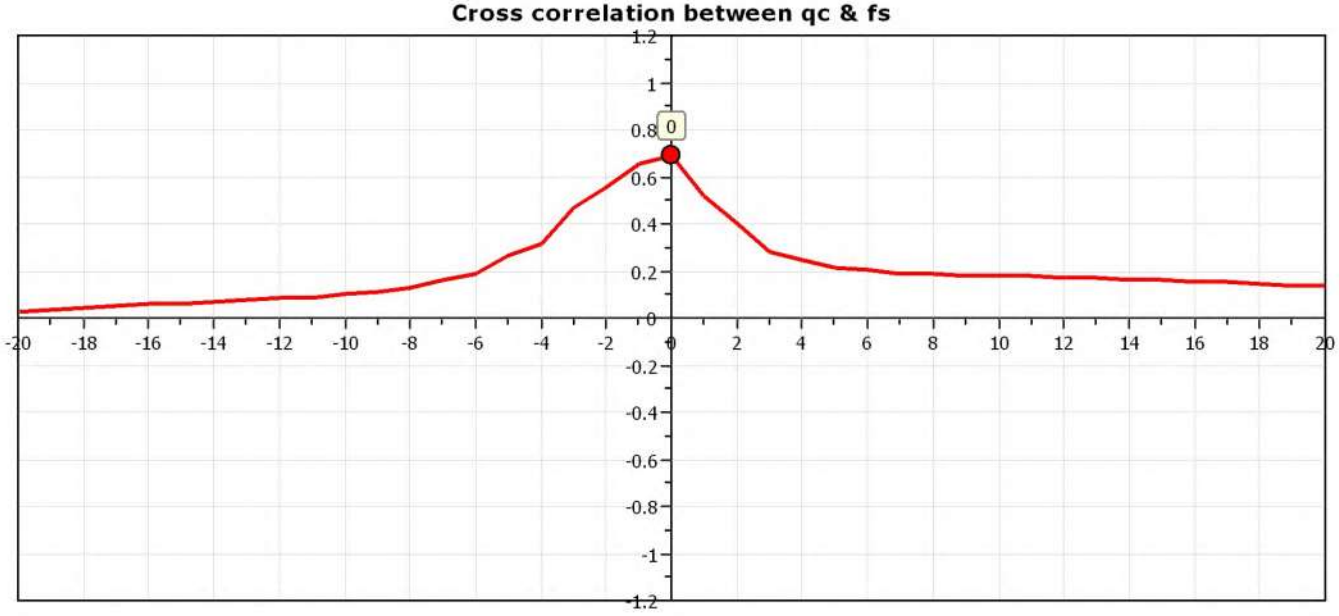
CPT: CPT03
Total depth: 3.19 m, Date: 23/02/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Hayphil Investments Ltd**
Location: **Waipapa**



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



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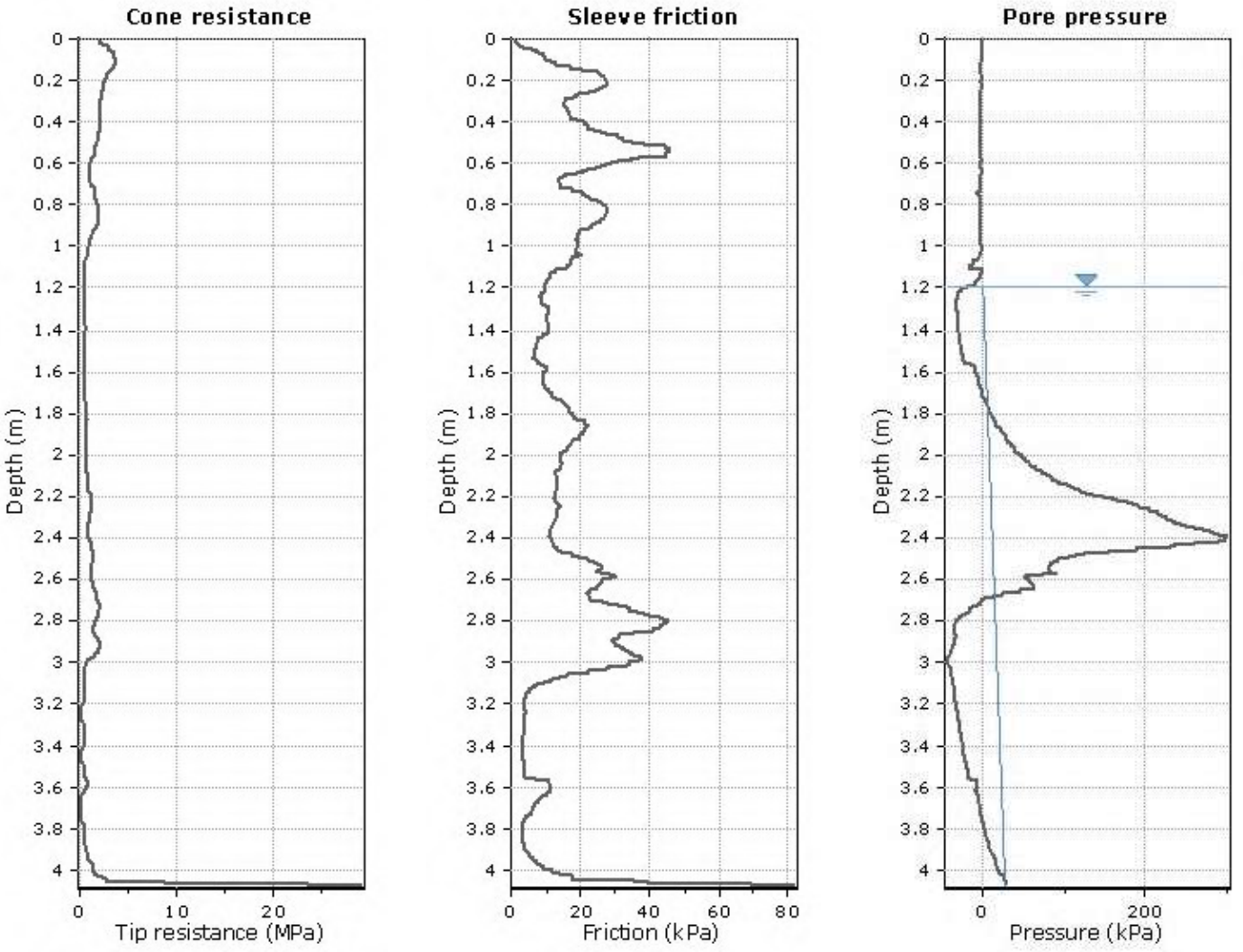
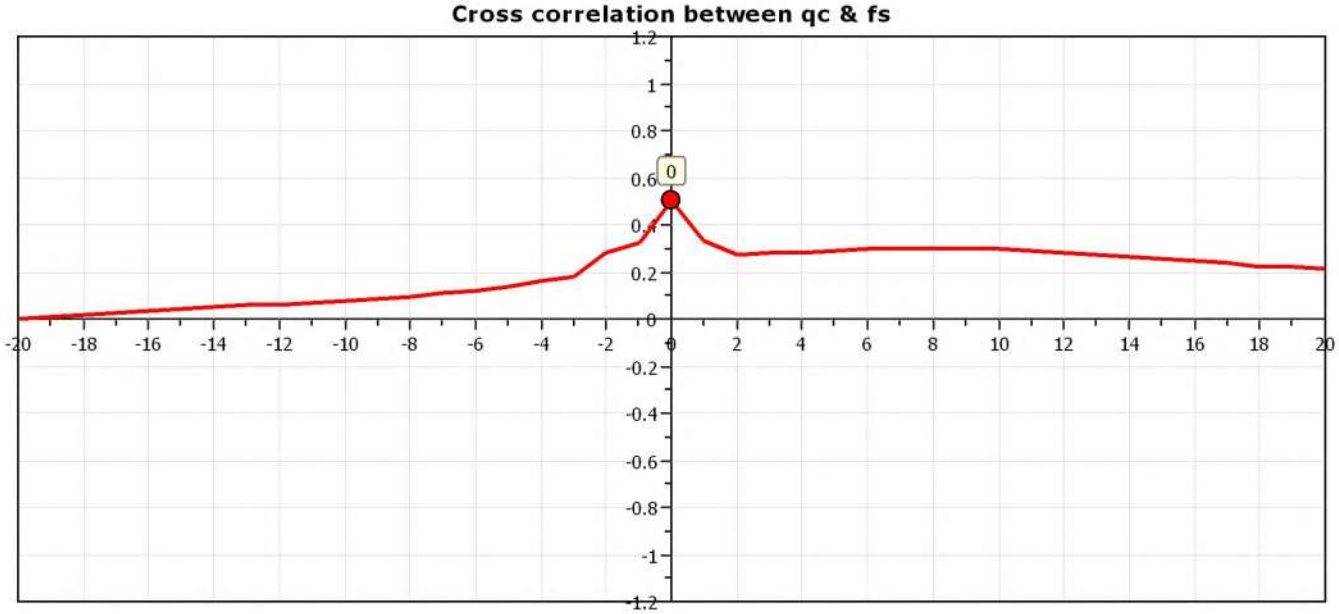
CPT: CPT04
Total depth: 4.07 m, Date: 23/02/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Hayphil Investments Ltd**
Location: **Waipapa**



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



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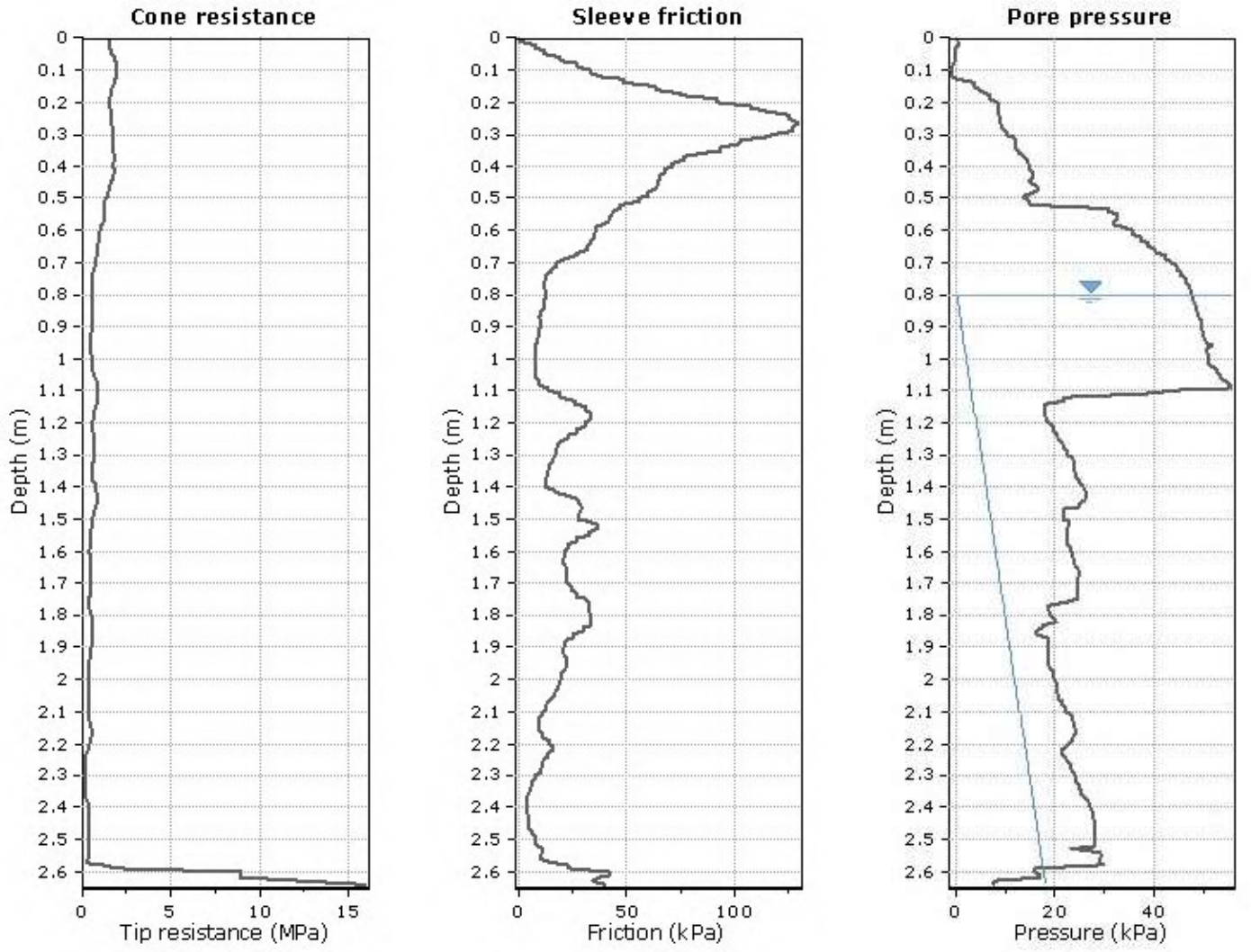
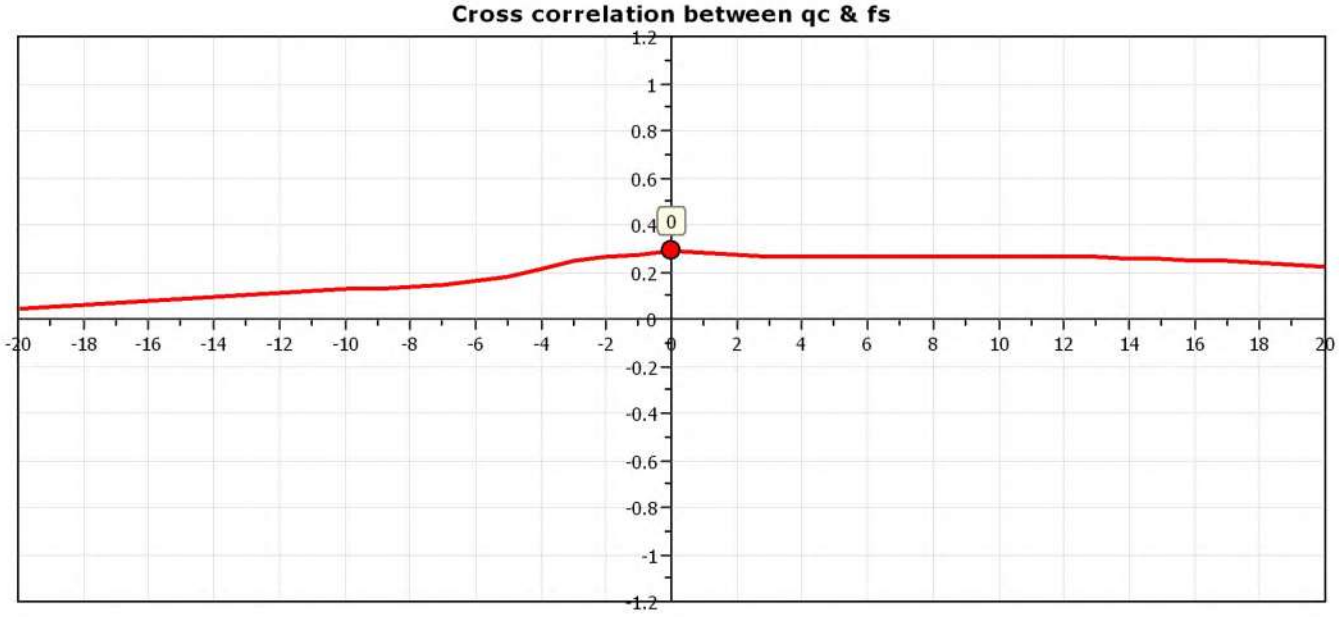
CPT: CPT05
Total depth: 2.64 m, Date: 23/02/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Hayphil Investments Ltd**
Location: **Waipapa**



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



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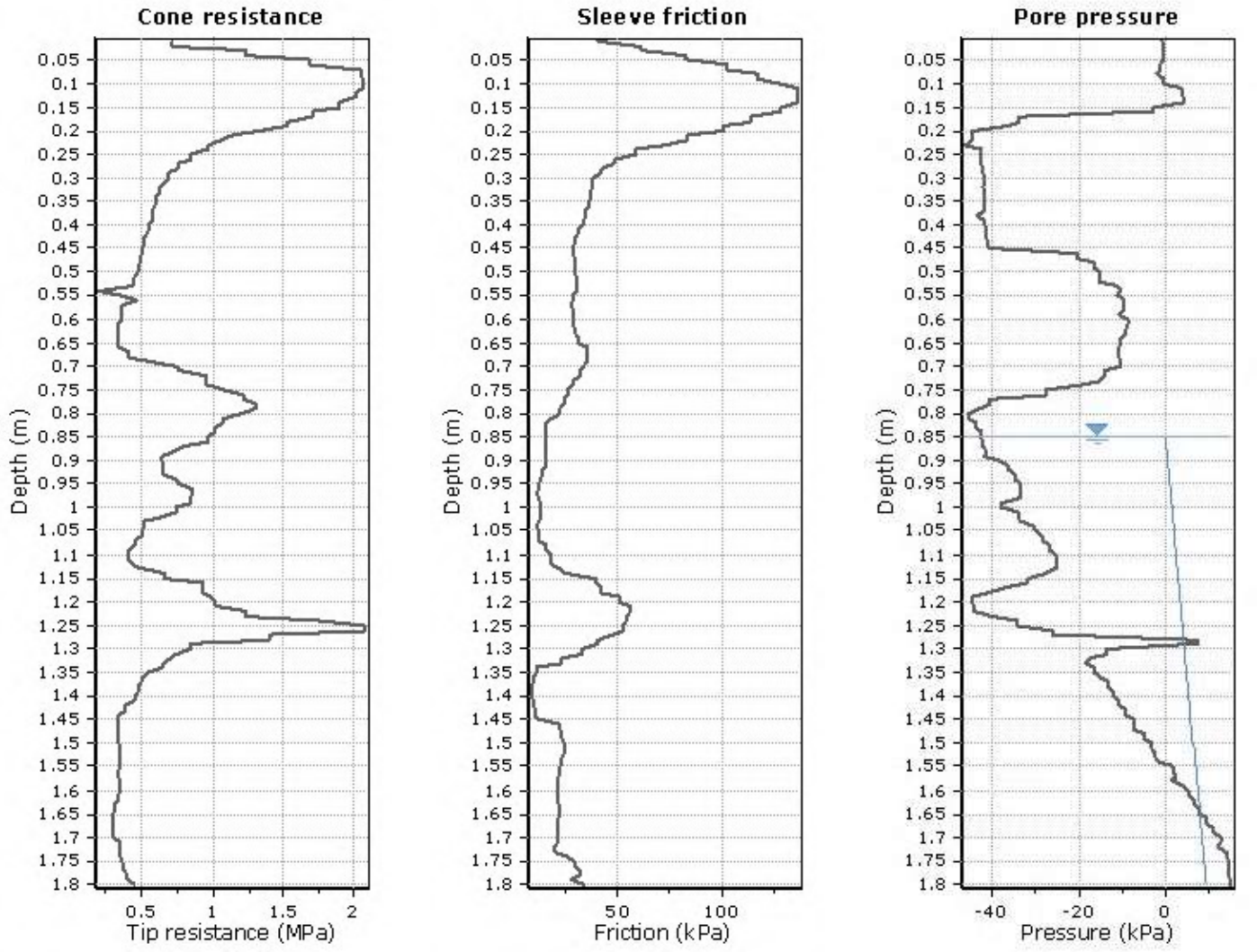
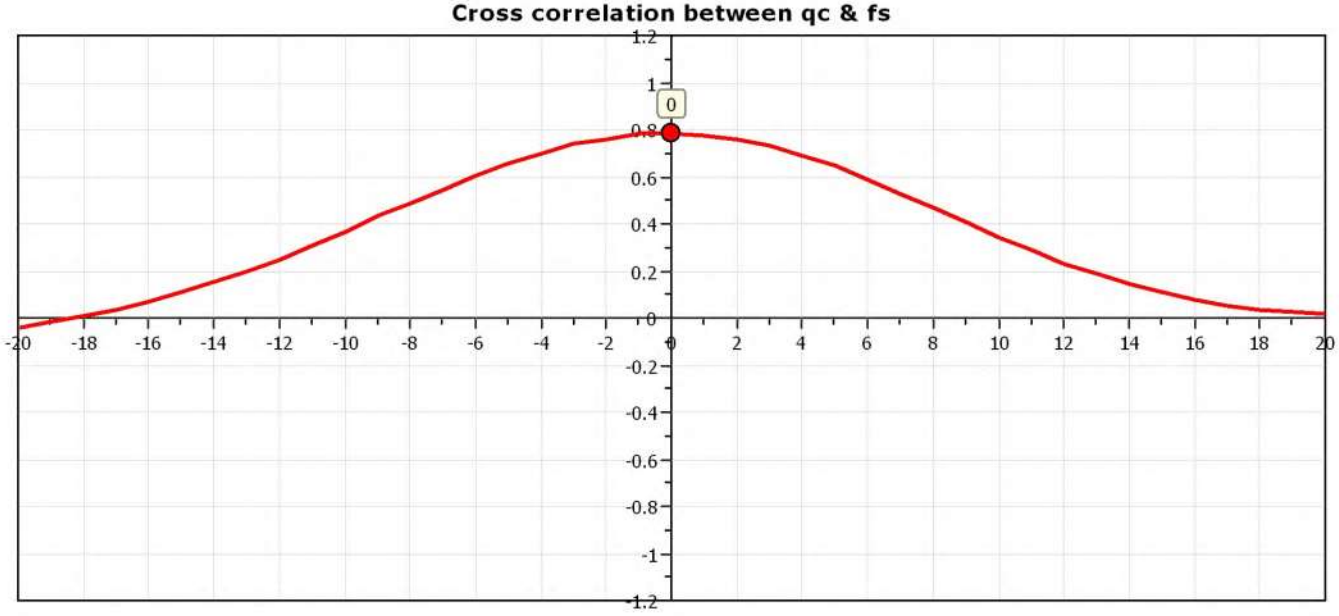
CPT: CPT06
Total depth: 1.80 m, Date: 23/02/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Hayphil Investments Ltd**
Location: **Waipapa**



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



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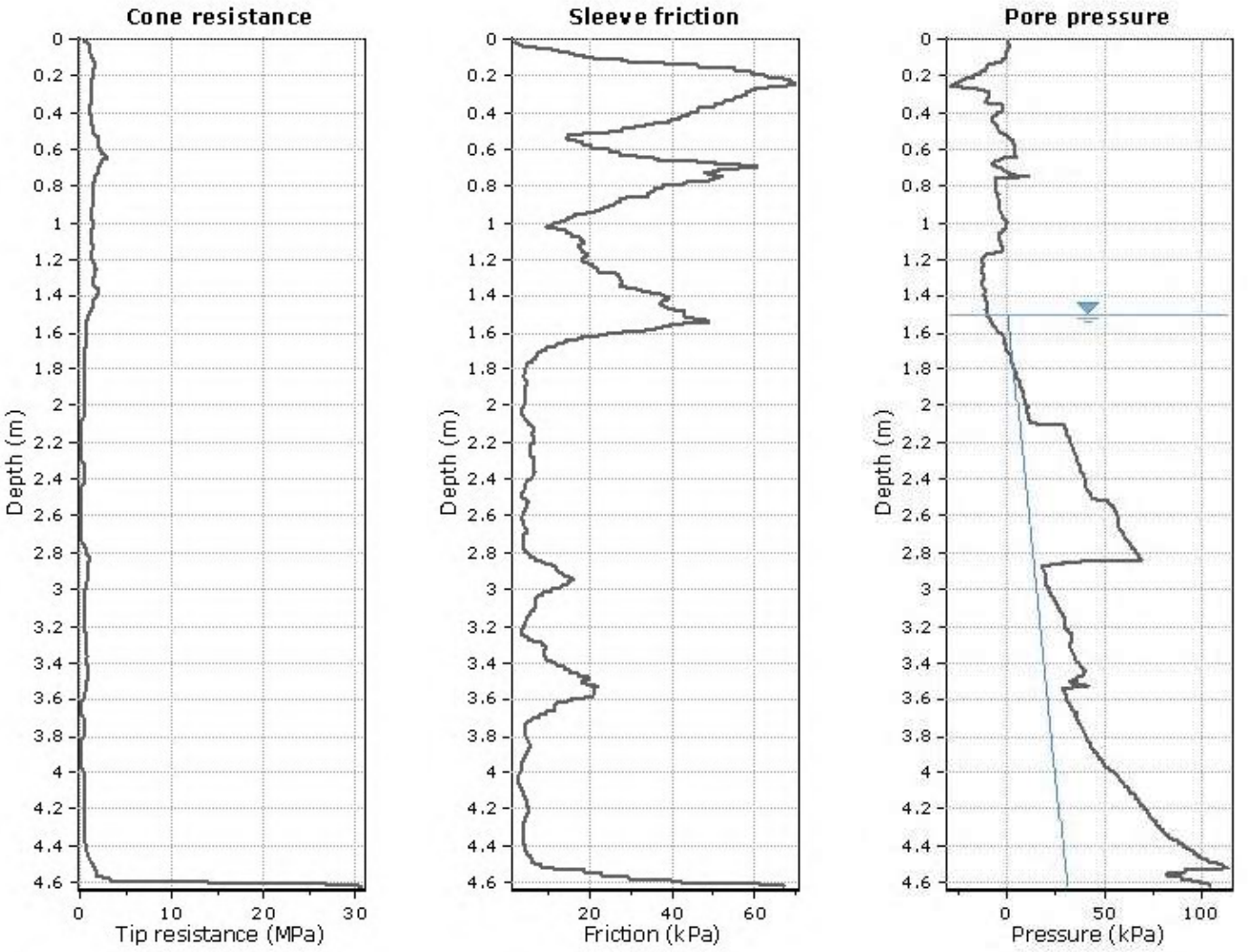
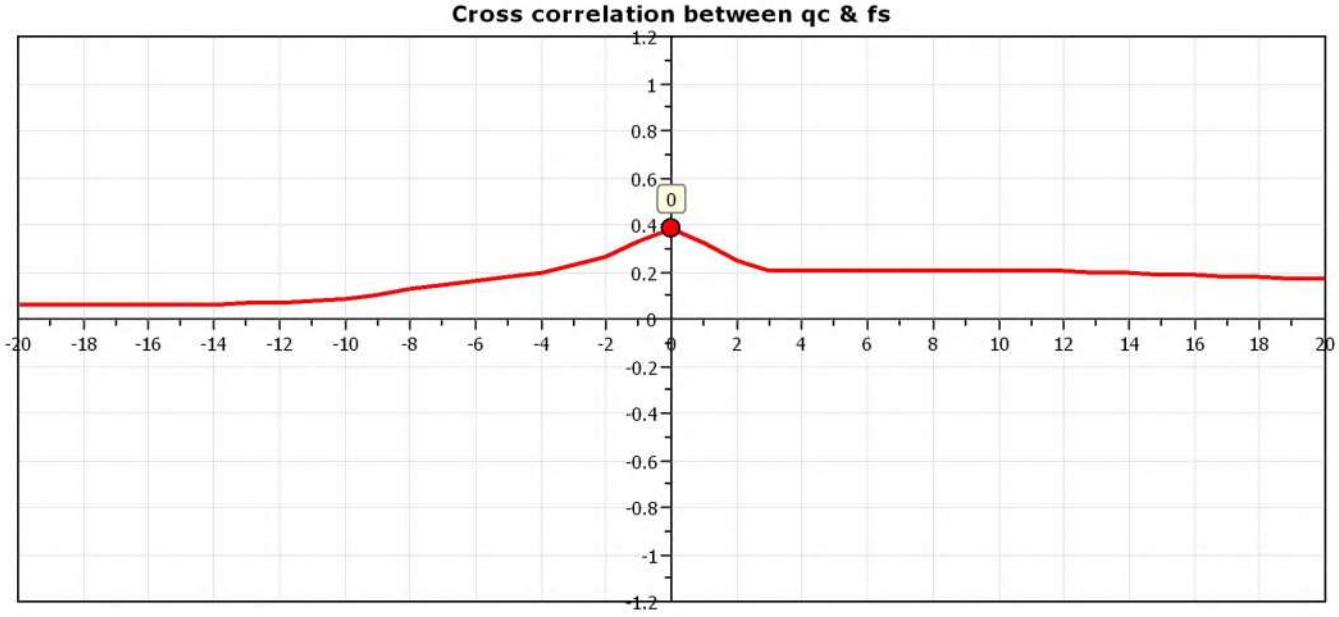
CPT: CPT07
Total depth: 4.62 m, Date: 23/02/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Hayphil Investments Ltd**
Location: **Waipapa**



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



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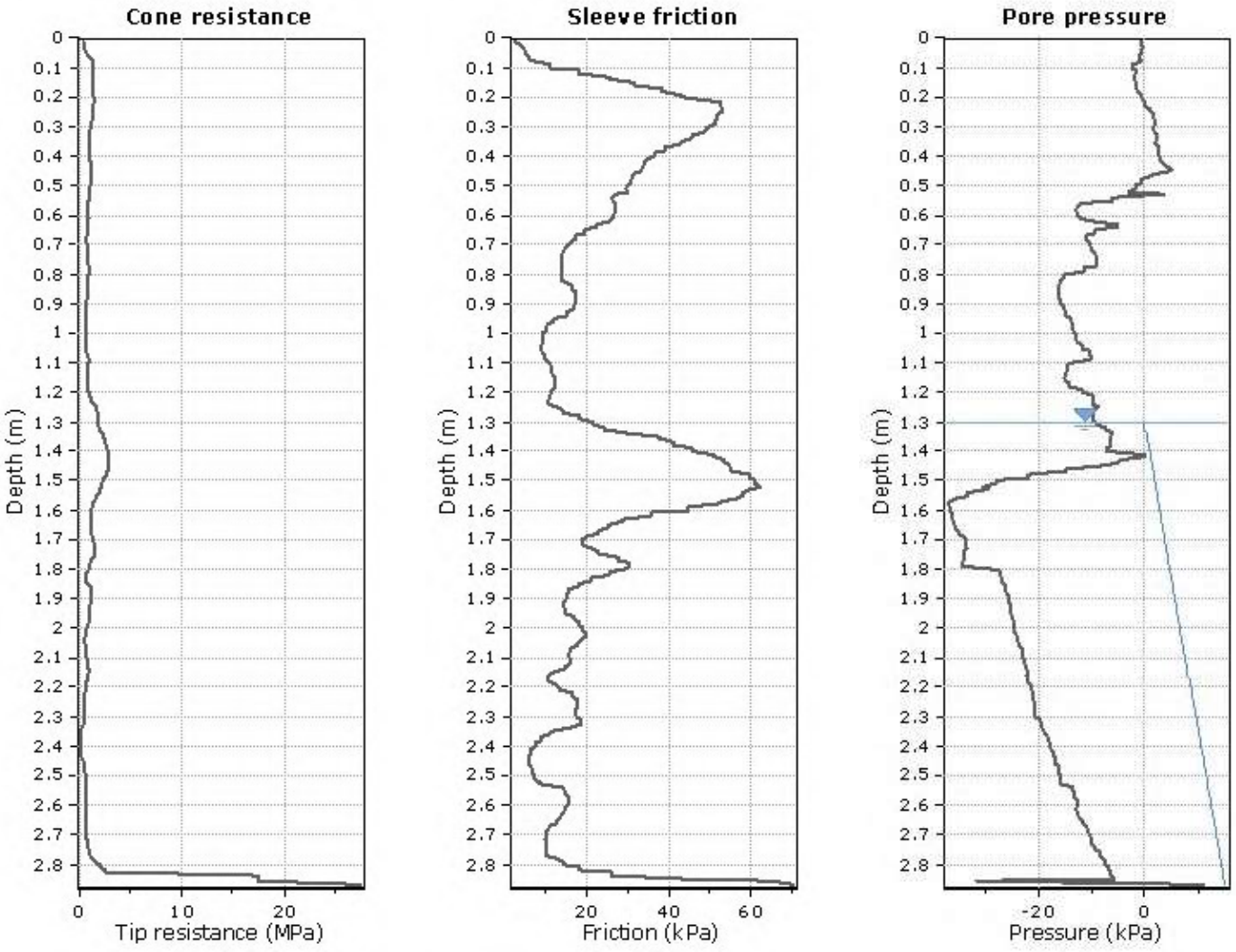
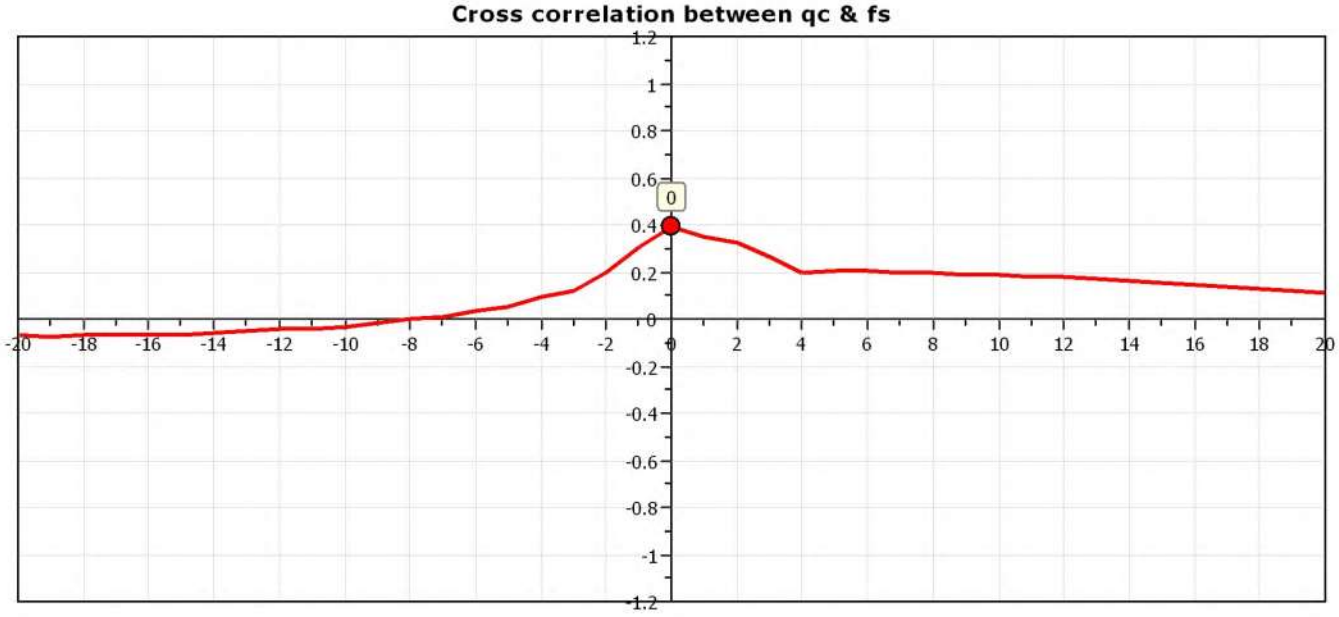
CPT: CPT08
Total depth: 2.87 m, Date: 23/02/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Hayphil Investments Ltd**
Location: **Waipapa**



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



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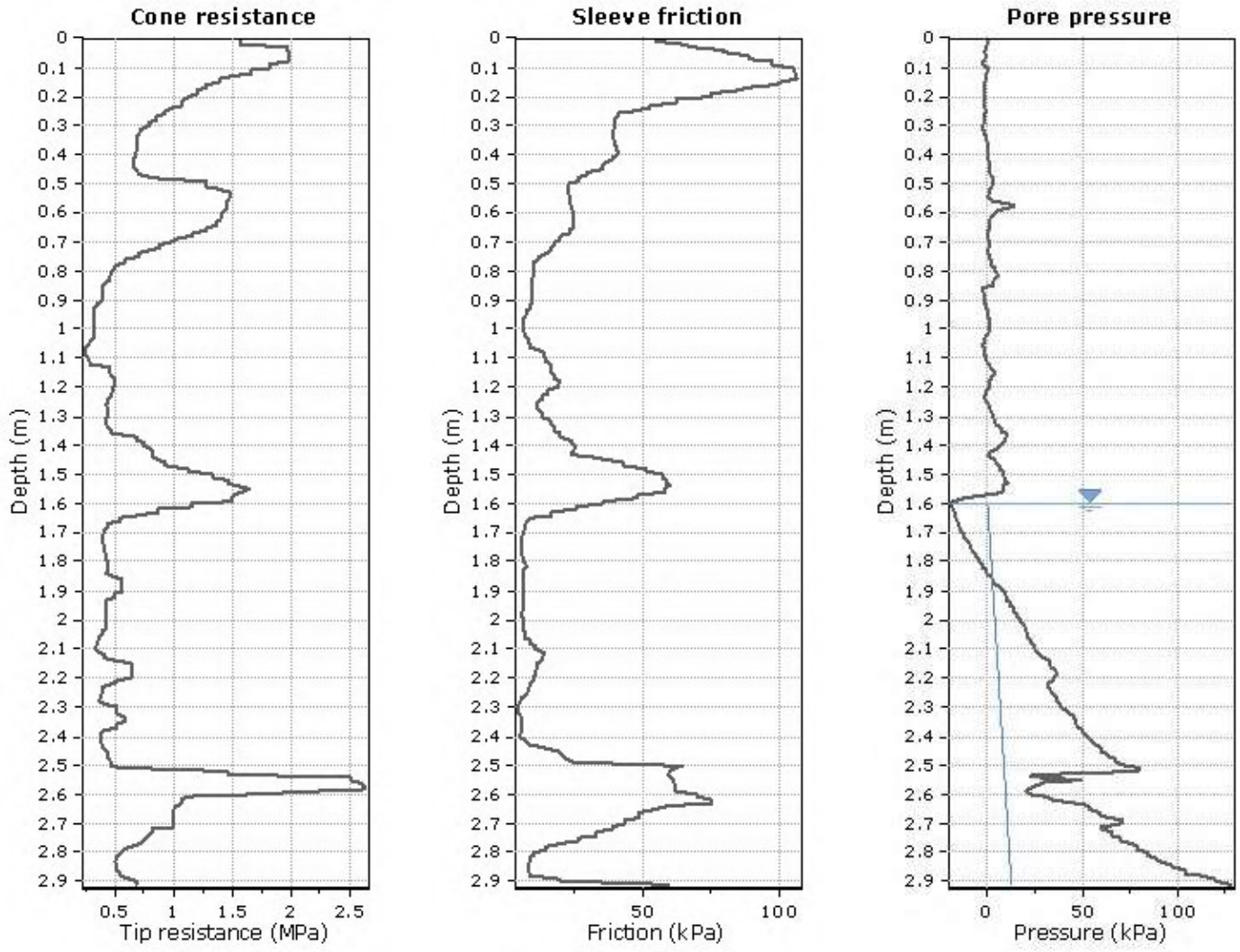
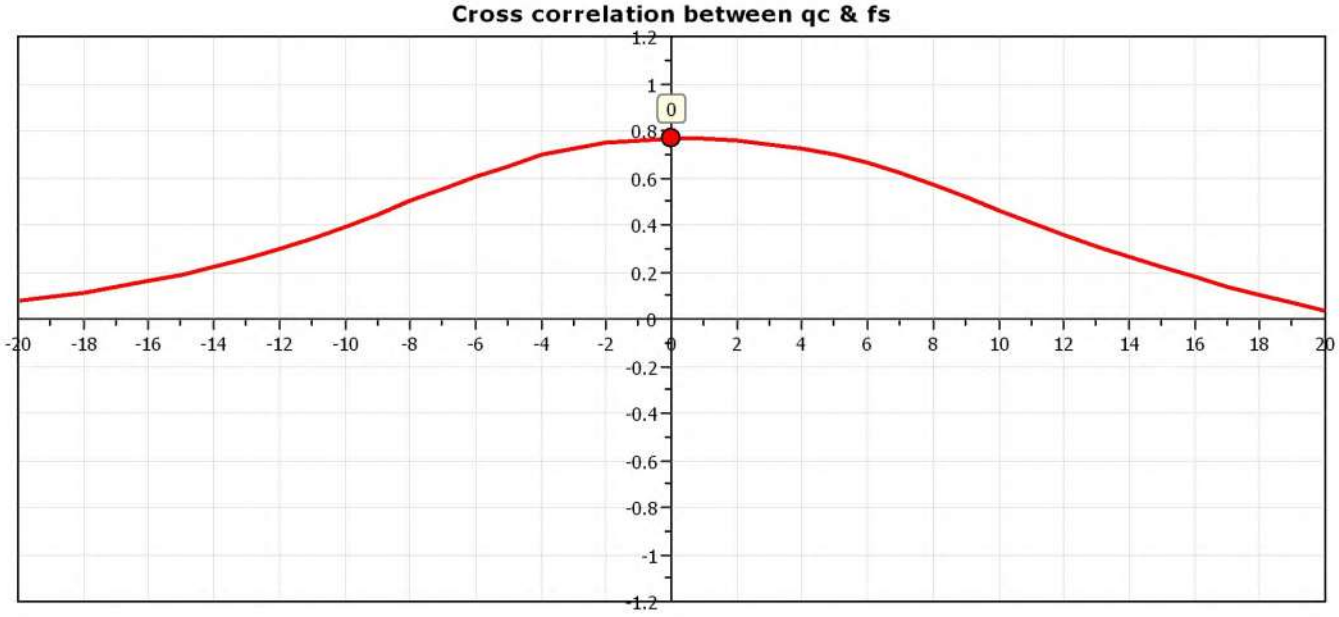
CPT: CPT09
Total depth: 2.91 m, Date: 23/02/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Hayphil Investments Ltd**
Location: **Waipapa**



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



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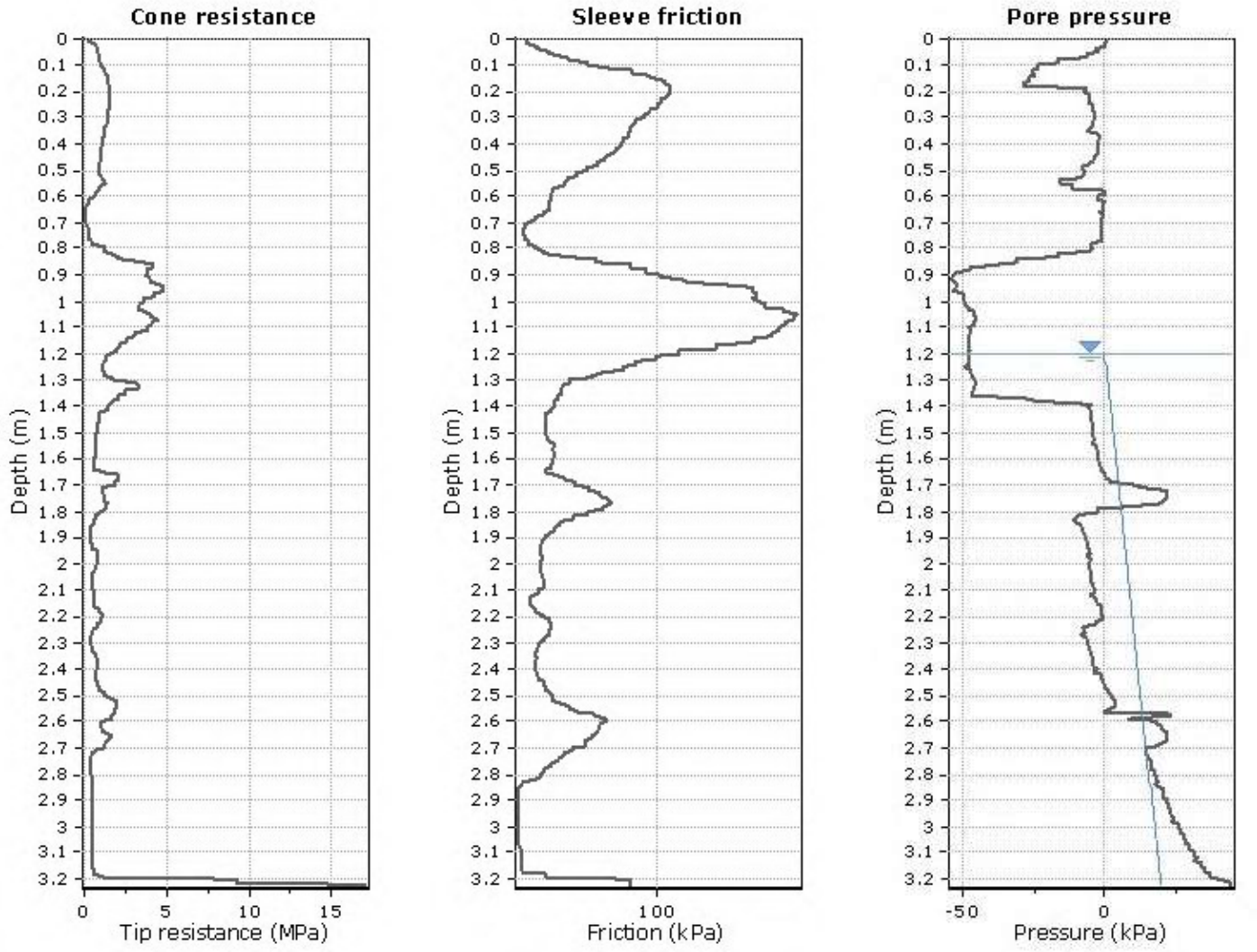
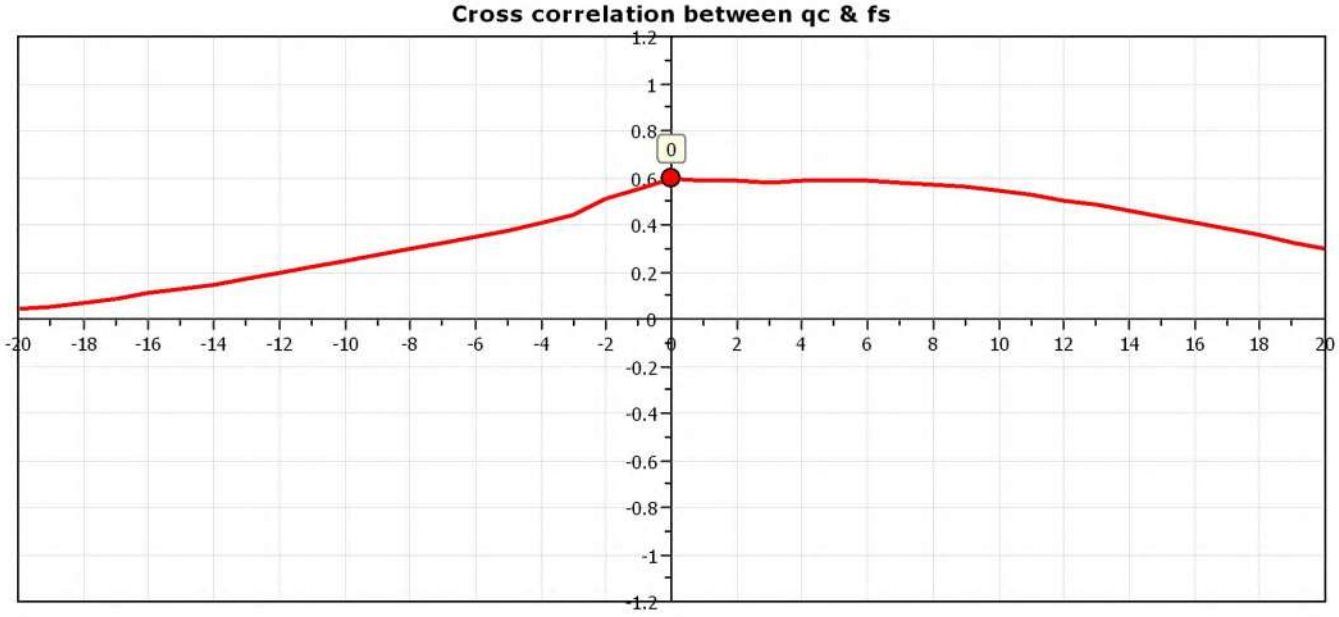
CPT: CPT10
Total depth: 3.22 m, Date: 23/02/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Hayphil Investments Ltd**
Location: **Waipapa**



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



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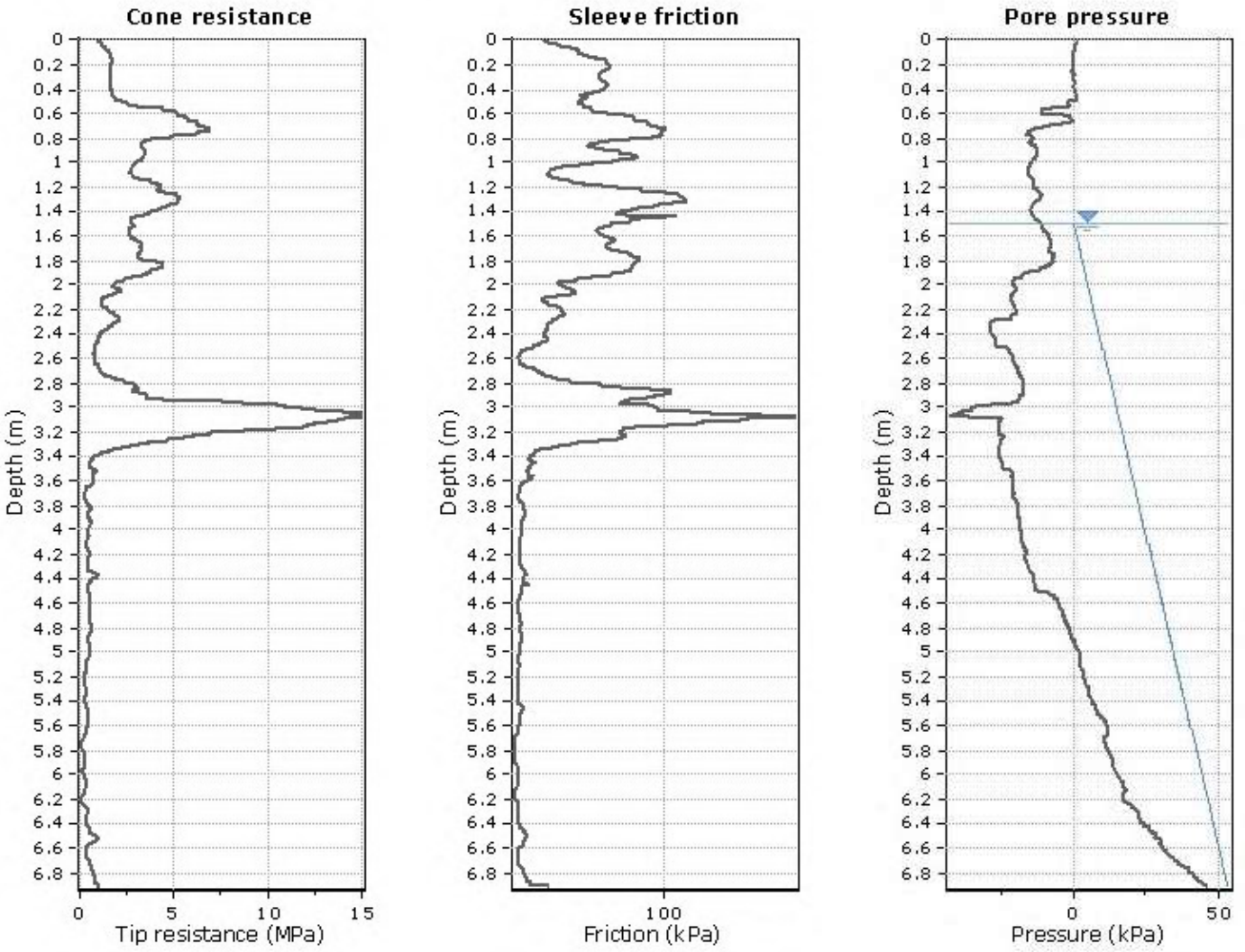
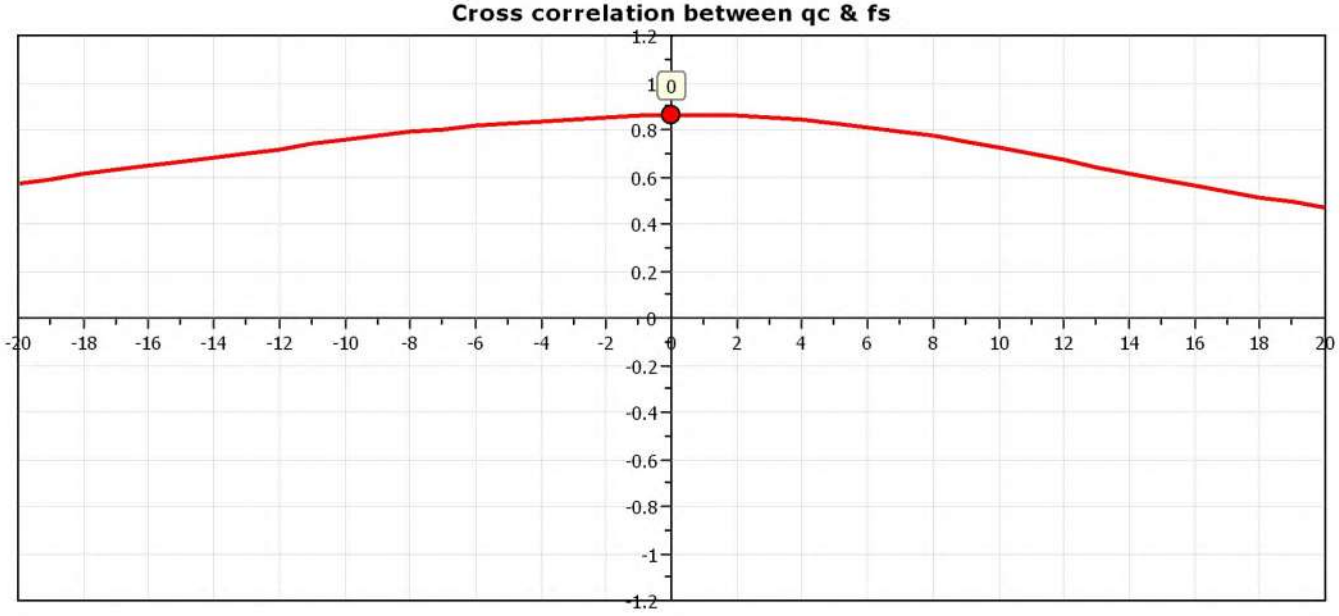
CPT: CPT11
Total depth: 6.91 m, Date: 23/02/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Hayphil Investments Ltd**
Location: **Waipapa**



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



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Borehole Log - BH01

Hole Location: Refer to Site Plan

JOB No. 22 045

CLIENT:	Hayphil Investments Ltd	**SITE:**	Lots 2 & 3 Klinac Lane, Waipapa (Lot 13 DP 363106)		
Date Started:	22/02/2022	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	CN
Date Completed:	22/02/2022	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	WT

Soil Description

Based on NZGS Logging Guidelines 2005

SILT, minor clay; greyish brown. Stiff, moist, low plasticity.

SILT, some clay; greyish brown. Firm to stiff, moist, medium plasticity.

Fine to medium sandy **SILT**, minor amorphous organics, trace coarse sand to fine gravel; greyish brown to light brown. Firm, wet, low plasticity.

SILT, minor fine sand, trace clay, trace medium to coarse sand; greyish brown. Firm, saturated, low plasticity.

From 1.0m: Becomes grey to brownish grey. Saturated.

SILT, minor fine sand, trace medium to coarse sand, trace clay; light greyish brown. Firm, saturated, low plasticity.

From 1.5m: Becomes trace fine sand.
From 1.6m: Becomes bluish grey.

SILT, minor fine to coarse sand; bluish grey. Soft, saturated, low plasticity.

NOTE: No retrieval from 1.9m

End of hole at 2.6m (No Retrieval)

Depth (m): 0.0, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5

Geology: TAURANGA GROUP

Graphic Log

Water Level: Groundwater Encountered at 0.6 mbgl

Sensitivity: 9, 9, 1 3

Vane Shear and Remoulded Vane Shear Strengths (kPa): 0, 48; 9, 74; 9, 74; 3, 37

Scala Penetrometer (blows/100mm): 0 5 10 15 20

NOTE: 1 blow / 150mm, then bouncing at 2.75m.

LEGEND

TOPSOIL | CLAY | SILT | SAND | GRAVEL | FILL

Corrected shear vane reading
Remoulded shear vane reading
Scala Penetrometer

Note: UTP = Unable to penetrate. T.S. = Topsoil.
Hand Held Shear Vane S/N: 2220
Scala penetrometer testing undertaken from base of borehole to 2.75m.

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Borehole Log - BH02

Hole Location: Refer Site Plan

JOB No. 22 045

CLIENT:	Hayphil Investments Ltd.	**SITE:**	Lot 2 & Lot 3 (Lot 13 DP 363106), Klinac Lane, Waipapa		
Date Started:	22/02/2022	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	JP
Date Completed:	22/02/2022	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	WT

Soil Description (Based on NZGS Logging Guidelines 2005)	Depth (m)	Geology	Graphic Log	Water Level	Sensitivity	Vane Shear and Remoulded Vane Shear Strengths (kPa)	Scala Penetrometer (blows/100mm)
Clayey **SILT**, trace fine to medium gravel, trace fibrous organics; light brown, brown, orange and grey intermixed. Stiff, dry to moist, low plasticity. [Fill]	0.0	FILL		Groundwater Encountered at 1.2mbgl.			
From 0.4m: Becomes brown and greyish brown, mottled orange. Moist. From 0.5m: From 0.5m: Becomes firm.	0.5				3	60 / 19	
SILT, some clay, trace fine gravel; light grey and light brown intermixed, mottled orange. Firm, moist, low plasticity.	1.0				2	28 / 19	
SILT, some fine gravel, some clay, minor fine to coarse sand; light grey and light brownish grey, streaked bluish grey and light orange. Stiff, moist to wet, low plasticity. [Tauranga Group]		TAURANGA GROUP			4	79 / 19	
SILT, some clay; grey to light grey, mottled light yellowish brown. Stiff, moist to wet, low plasticity.	1.5				3	76 / 22	
From 2.2m: Becomes dark bluish grey, streaked orange and light brown. Firm. From 2.4m: Becomes light grey and dark bluish grey, streaked orange.	2.0				3	32 / 13	
SILT, some fine to medium gravel, minor coarse sand; greenish grey to grey, streaked light grey. Firm to stiff, wet, low plasticity. Gravel: weakly cemented. From 3.2m: Becomes dark green and light grey.	2.5 / 3.0				UTP		
SILT, some clay, minor fine gravel; light grey, streaked dark greenish grey. Stiff, wet, low plasticity. Gravel: weakly cemented. From 3.9m: Becomes very stiff.	3.5 / 4.0				2	35 / 22	
SILT, minor clay, trace fine gravel, trace coarse sand; light green to greenish grey, streaked dark green and light grey. Very stiff, wet, low plasticity.					UTP		
End of Hole at 4.4m (Unable To Penetrate)	4.5				UTP		

LEGEND

TOPSOIL | CLAY | SILT | SAND | GRAVEL | FILL

Corrected shear vane reading
Remoulded shear vane reading
Scala Penetrometer

Note: UTP = Unable to penetrate.
Hand Held Shear Vane S/N: DR1617. Groundwater encountered at 1.2mbgl completion of drilling.
Scala penetrometer testing not undertaken.

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Borehole Log - BH03

Hole Location: Refer to Site Plan

JOB No. 22 045

CLIENT:	Hayphil Investments Ltd	**SITE:**	Lots 2 & 3 Klinac Lane, Waipapa (Lot 13 DP 363106)		
Date Started:	22/02/2022	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	CN
Date Completed:	22/02/2022	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	WT

Soil Description (Based on NZGS Logging Guidelines 2005)	Depth (m)	Geology	Graphic Log	Water Level	Sensitivity	Vane Shear and Remoulded Vane Shear Strengths (kPa)	Scala Penetrometer (blows/100mm)
SILT, minor clay; greyish brown. Stiff, moist, low to medium plasticity.	0.0	TAURANGA GROUP		Groundwater Encountered at 0.6 mbgl	1 0	54 / 6	0 5 10 15 20
SILT, some clay; brown to greyish brown. Stiff, moist, low to medium plasticity. From 0.3m: Trace medium to coarse sand.							
SILT, minor clay, minor medium to coarse sand; light greyish brown. Firm, moist to wet, low plasticity. From 0.5m: Trace medium sand. From 0.7m: Minor medium to coarse sand.	0.5						
Silty fine to coarse **SAND**; brown to greyish brown. Loose, saturated, no to low plasticity.							
Silty fine to medium **SAND**; orange. Medium dense, saturated, no plasticity.	1.0					201	
SILT, some fine sand; bluish grey. Soft, saturated, low plasticity. **NOTE**: No retrieval from 1.2m to 1.8m	1.5						
SILT, minor fine sand, trace medium sand; bluish grey. Soft, saturated, low plasticity.							
End of hole at 2.0m (Unable To Penetrate)	2.0						
	2.5						
	3.0						
	3.5						
	4.0						
	4.5						

LEGEND

TOPSOIL | CLAY | SILT | SAND | GRAVEL | FILL

Corrected shear vane reading
Remoulded shear vane reading
Scala Penetrometer

Note: UTP = Unable to penetrate. T.S. = Topsoil.
Hand Held Shear Vane S/N: 2220
Scala penetrometer testing not undertaken.

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Borehole Log - BH04

Hole Location: Refer to Site Plan

JOB No. 22 045

CLIENT:	Hayphil Investments Ltd	**SITE:**	Lots 2 & 3 Klinac Lane, Waipapa (Lot 13 DP 363106)		
Date Started:	22/02/2022	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	CN
Date Completed:	22/02/2022	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	WT

Soil Description

Based on NZGS Logging Guidelines 2005

Depth (m)	Soil Description
0.0	**SILT**, some clay; brown to greyish brown. Very stiff, moist, low to medium plasticity.
	From 0.3m: Trace fine gravel.
	SILT, minor fine sand, trace coarse sand to fine gravel; light greyish brown, mottled orange. Very stiff, moist to wet, low plasticity.
0.5	From 0.7m: Minor coarse sand. Firm.
	From 0.9m: Becomes saturated.
1.0	Fine Sandy **SILT**, trace medium to coarse sand; grey, mottled light brown. Firm, saturated, low plasticity.
	SILT, minor fine sand; grey to brownish grey, mottled orange. Stiff, saturated, low plasticity.
1.5	Silty fine to medioum SAND; orange. Very stiff, saturated, no plasticity.
	SILT, some fine to medium sand, trace coarse sand to fine gravel; orange, mottled greyish brown. Soft to firm, saturated, low plasticity.
2.0	Fine to medium sandy **SILT**; dark bluish grey. Soft, saturated, low plasticity.
	SILT, trace fine sand; bluish grey. Soft, saturated, no to low plasticity.
2.5	**SILT**, minor fine sand; bluish grey. Firm, saturated, low plasticity.
	End of hole at 2.8m (Unable To Penetrate)
3.0	
3.5	
4.0	
4.5	

Geology: TAURANGA GROUP

Water Level: Groundwater Encountered at 0.55 mbgl

Depth (m)	Sensitivity	Vane Shear (kPa)	Remoulded Vane Shear (kPa)
0.0	1 0	145	14
0.5	8	45	6
1.0	1 6	139	9
1.5		26	0
2.0	5	45	9

Scala Penetrometer (blows/100mm): 0 5 10 15 20

LEGEND

TOPSOIL | CLAY | SILT | SAND | GRAVEL | FILL

Corrected shear vane reading
Remoulded shear vane reading
Scala Penetrometer

Note: UTP = Unable to penetrate. T.S. = Topsoil.
Hand Held Shear Vane S/N: 2220
Scala penetrometer testing not undertaken.

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Borehole Log - BH05

Hole Location: Refer Site Plan

JOB No. 22 045

CLIENT:	Hayphil Investments Ltd.	**SITE:**	Lot 2 & Lot 3 (Lot 13 DP 363106), Klinac Lane, Waipapa		
Date Started:	22/02/2022	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	JP
Date Completed:	22/02/2022	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	WT

Soil Description

Based on NZGS Logging Guidelines 2005

SILT, trace clay; light brown to brown, mottled orange. Stiff, moist, low plasticity. Rootlets. [Topsoil]

SILT, some clay, trace fine gravel; brown, mottled orange. Very stiff, moist, low plasticity. [Tauranga Group]

From 0.7m: Becomes brown and light brown, mottled orange. Wet.

SILT, minor fine to coarse sand, minor clay; light grey and light brown, streaked orange, mottled light brownish orange. Stiff, wet to saturated, no to low plasticity.

From 1.3m: Becomes light grey to grey, streaked light orange.

SILT, trace fine gravel; light grey to light bluish grey, mottled light yellowish orange. Firm, saturated, no plasticity.

SILT, trace coarse sand, trace fine gravel; dark greenish grey and grey, mottled light brownish orange. Firm to stiff, saturated, no plasticity. Gravel: weakly cemented.

From 2.1m: Becomes light grey, mottled dark greenish grey.

End of Hole at 2.5m (Unable To Penetrate/Obstruction)

Depth (m): 0.0, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5

Geology: TOPSOIL; TAURANGA GROUP

Water Level: Groundwater Encountered at 0.8m.

Sensitivity: 4, 4, 3, 5

Vane Shear and Remoulded Vane Shear Strengths (kPa): 136, 32; 92, 22; 35, 13; 51, 9; UTP

Scala Penetrometer (blows/100mm): 0, 5, 10, 15

LEGEND

TOPSOIL | CLAY | SILT | SAND | GRAVEL | FILL

Corrected shear vane reading
Remoulded shear vane reading
Scala Penetrometer

Note: UTP = Unable to penetrate.
Hand Held Shear Vane S/N: DR1617. Groundwater encountered at 0.8mbgl at completion of drilling.
Scala penetrometer testing not undertaken.

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DYNAMIC CONE PENEROMETER
(Scala Penetrometer)

Project No:	22 045	Date: 22/02/2022	**Test No. DCP 1&2**
Project:	Industrial subdivision	Operated by: CN	
Location:	Lots 2 and 3 Klinac Lane, Waipapa	Logged by: CN	**Sheet 1**
RL:	Exisiting ground level	Checked by: WT	**of 3**

Test Method used: NZS 4402:1998 Test 6.5.2 Dynamic Cone Penetrometer

Test ID	DCP1	DCP2	
Depth (mm)	No. of Blows	No. of Blows	No. of Blows
0	0	0	
100	3	2	
200	2	2	
300	2	2	
400	2	2	
500	3	2	
600	2	3	
700	4	1	
800	2	2	
900	1	0	
1000	3	1	
1100	3	2	
1200	3	4	
1300	4	3	
1400	2	3	
1500	1	2	
1600	2	2	
1700	1	2	
1800	1	1	
1900	1	1	
2000			
2100			
2200			
2300			
2400			
2500			
2600			
2700			
2800			
2900			
3000			
3100			
3200			
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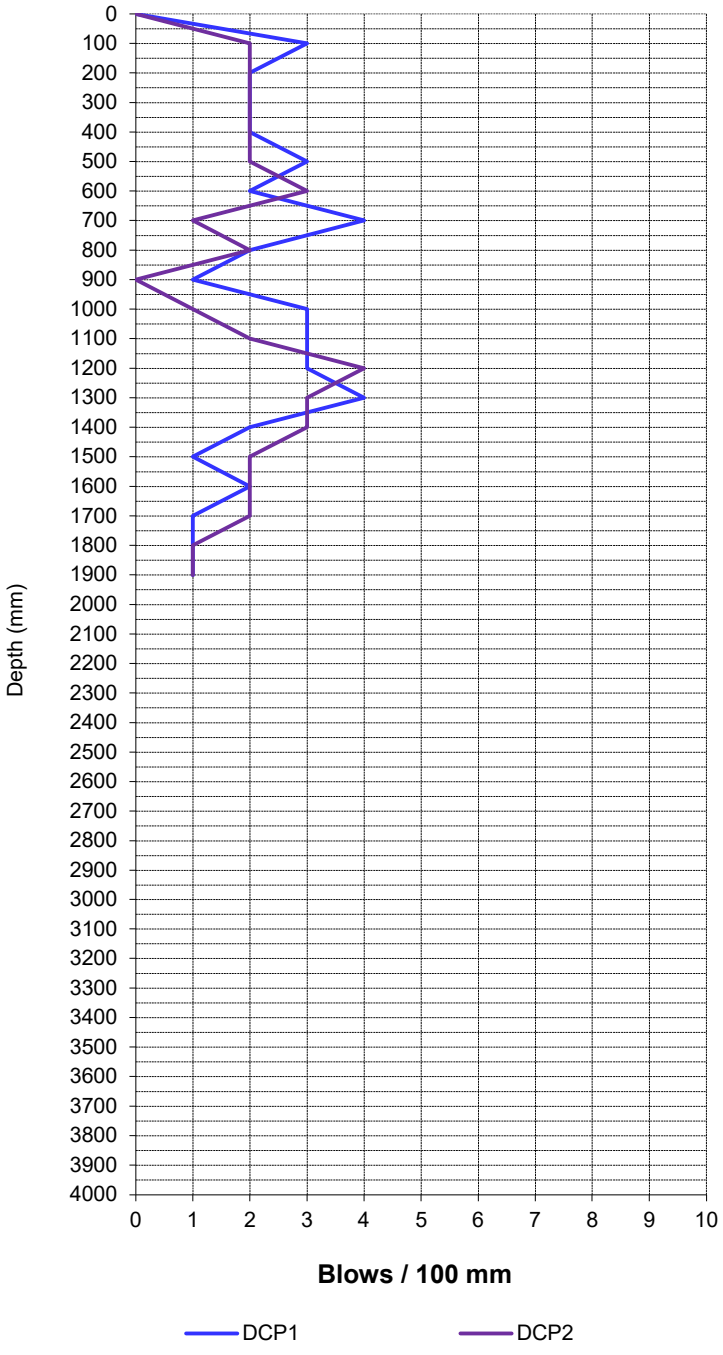
3600			
3700			
3800			
3900			
4000			



DENSITY INDEX (RELATIVE DENSITY) TERMS

Descriptive Term	Density Index (R_D)	SPT "N" value (blows / 300 mm)	Dynamic Cone (blows / 100 mm)
Very dense	> 85	> 50	> 17
Dense	65 – 85	30 – 50	7 – 17
Medium dense	35 – 65	10 – 30	3 – 7
Loose	15 – 35	4 – 10	1 – 3
Very loose	< 15	< 4	0 – 2

Note: • No correlation is implied between Standard Penetration Test (SPT) and Dynamic Cone Test values.
• SPT "N" values are uncorrected. • Dynamic Cone Penetrometer (Scala)

HAIGH WORKMAN LTD
Civil & Structural Engineers

DYNAMIC CONE PENEROMETER
(Scala Penetrometer)

Project No:	22 045	Date: 22/02/2022	**Test No. DCP 3&4**
Project:	Industrial subdivision	Operated by: CN	
Location:	Lots 2 and 3 Klinac Lane, Waipapa	Logged by: CN	**Sheet 2**
RL:	Exisiting ground level	Checked by: WT	**of 3**

Test Method used: NZS 4402:1998 Test 6.5.2 Dynamic Cone Penetrometer

Test ID	DCP3	DCP4	
Depth (mm)	No. of Blows	No. of Blows	No. of Blows
0	0	0	
100	2	1	
200	2	2	
300	2	1	
400	2	2	
500	3	2	
600	4	2	
700	2	1	
800	1	2	
900	3	4	
1000	2	2	
1100	4	4	
1200	3	4	
1300	2	4	
1400	2	2	
1500	1	2	
1600	2	1	
1700	1	2	
1800	1	2	
1900	2	2	
2000			
2100			
2200			
2300			
2400			
2500			
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3100			
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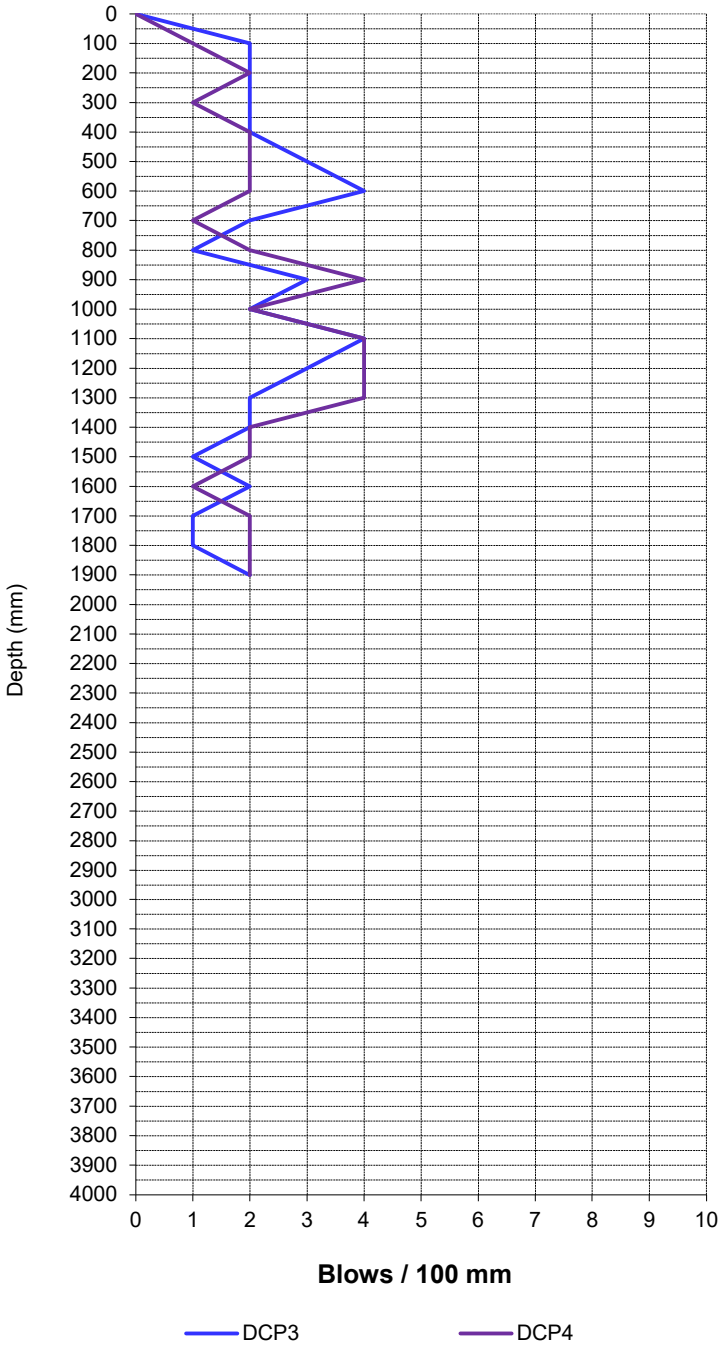
3600			
3700			
3800			
3900			
4000			



DENSITY INDEX (RELATIVE DENSITY) TERMS

Descriptive Term	Density Index (R_D)	SPT "N" value (blows / 300 mm)	Dynamic Cone (blows / 100 mm)
Very dense	> 85	> 50	> 17
Dense	65 – 85	30 – 50	7 – 17
Medium dense	35 – 65	10 – 30	3 – 7
Loose	15 – 35	4 – 10	1 – 3
Very loose	< 15	< 4	0 – 2

Note: • No correlation is implied between Standard Penetration Test (SPT) and Dynamic Cone Test values.
• SPT "N" values are uncorrected. • Dynamic Cone Penetrometer (Scala)

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DYNAMIC CONE PENEROMETER
(Scala Penetrometer)

Project No:	22 045	Date: 22/02/2022	**Test No.** DCP 5&6
Project:	Industrial subdivision	Operated by: CN	
Location:	Lots 2 and 3 Klinac Lane, Waipapa	Logged by: CN	**Sheet** 3
RL:	Exisiting ground level	Checked by: WT	**of** 3

Test Method used: NZS 4402:1998 Test 6.5.2 Dynamic Cone Penetrometer

Test ID	DCP5	DCP6	
Depth (mm)	No. of Blows	No. of Blows	No. of Blows
0	0	0	
100	1	1	
200	3	1	
300	2	2	
400	2	1	
500	1	3	
600	2	3	
700	2	1	
800	2	2	
900	1	2	
1000	2	2	
1100	4	2	
1200	4	4	
1300	4	3	
1400	2	2	
1500	3	2	
1600	1	3	
1700	1	1	
1800	1	2	
1900	1	2	
2000			
2100			
2200			
2300			
2400			
2500			
2600			
2700			
2800			
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3000			
3100			
3200			
3300			
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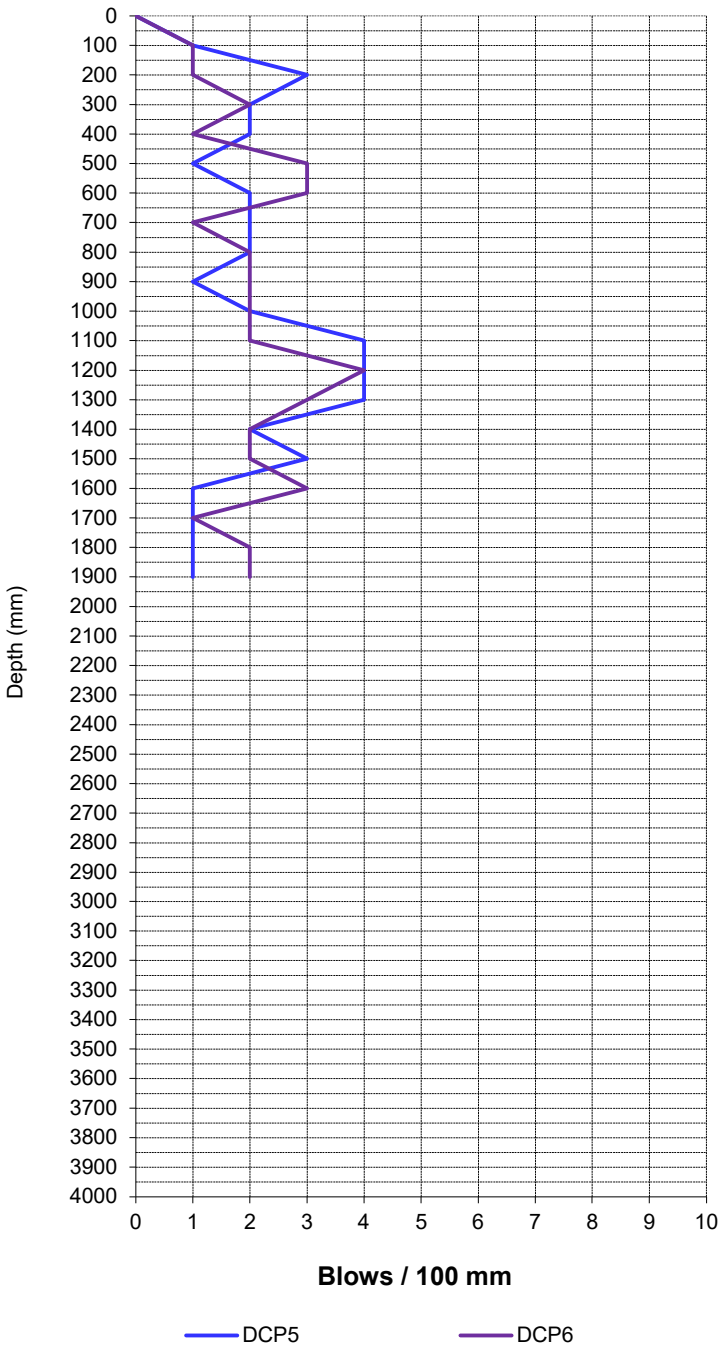
3600			
3700			
3800			
3900			
4000			



DENSITY INDEX (RELATIVE DENSITY) TERMS

Descriptive Term	Density Index (R_D)	SPT "N" value (blows / 300 mm)	Dynamic Cone (blows / 100 mm)
Very dense	> 85	> 50	> 17
Dense	65 – 85	30 – 50	7 – 17
Medium dense	35 – 65	10 – 30	3 – 7
Loose	15 – 35	4 – 10	1 – 3
Very loose	< 15	< 4	0 – 2

Note: • No correlation is implied between Standard Penetration Test (SPT) and Dynamic Cone Test values.
• SPT "N" values are uncorrected. • Dynamic Cone Penetrometer (Scala)

Appendix C – Laboratory Test Results

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Please reply to: W.E. Campton

Haigh Workman Ltd.
PO Box 89
Kerikeri 0245

Attention: **JOHN POWER**

Job Number: 63632#L
BGL Registration Number: 2828
Checked by: WEC

23rd March 2022

ATTERBERG LIMITS & LINEAR SHRINKAGE TESTING

Dear Sir,

Re: LOTS 2 & 3, KLINAC LANE, WAIPAPA

Your Reference: Job # 22 045
Report Number: 63632#L/AL Lots 2 & 3, Klinac

The following report presents the results of Atterberg Limits & Linear Shrinkage testing at BGL of a soil sample delivered to this laboratory on the 28th of February 2022. Test results are summarised below, with page 3 showing where the sample plots on the Unified Soil Classification System (Casagrande) Chart. Test standards used were:

Water Content:	NZS4402:1986:Test 2.1
Liquid Limit:	NZS4402:1986:Test 2.2
Plastic Limit:	NZS4402:1986:Test 2.3
Plasticity Index:	NZS4402:1986:Test 2.4
Linear Shrinkage:	NZS4402:1986:Test 2.6

Borehole Number	Sample Number	Depth (m)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	Linear Shrinkage (%)*
BH01	BAG	0.50 – 0.80	55.6	78	46	32	14

**The amount of shrinkage of the sample as a percentage of the original sample length.*

The whole soil was used for the water content test (the soil was in a natural state), and the soil fraction passing a 0.425mm sieve was used for the liquid limit, plastic limit and linear shrinkage tests. The soil was wet up and dried where required for the liquid limit, plastic limit and linear shrinkage tests.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. Test 2.2: liquid limit, test 2.3: plastic limit, and test 2.6: linear shrinkage are reported to the nearest whole number.

Please note that the test results relate only to the sample as-received, and relate only to the sample under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Justin Franklin
Signatory (Assistant Laboratory Manager)
Babbage Geotechnical Laboratory

ACCREDITED
IANZ
TESTING LABORATORY
№ 126

Babbage Geotechnical Laboratory	Job Number: 63632#L	Sheet 1 of 1	Page 3 of 3
	Reg. Number: 2828	Version No:	6
	Report No: 63632#L/AL Lots 2 & 3, Klinac	Version Date:	September 2018
	Project:	**LOTS 2 & 3, KLINAC LANE, WAIPAPA**	

DETERMINATION OF THE LIQUID LIMIT, PLASTIC LIMIT & THE PLASTICITY INDEX

Test Methods: NZS4402: 1986: Test 2.2, Test 2.3 and Test 2.4

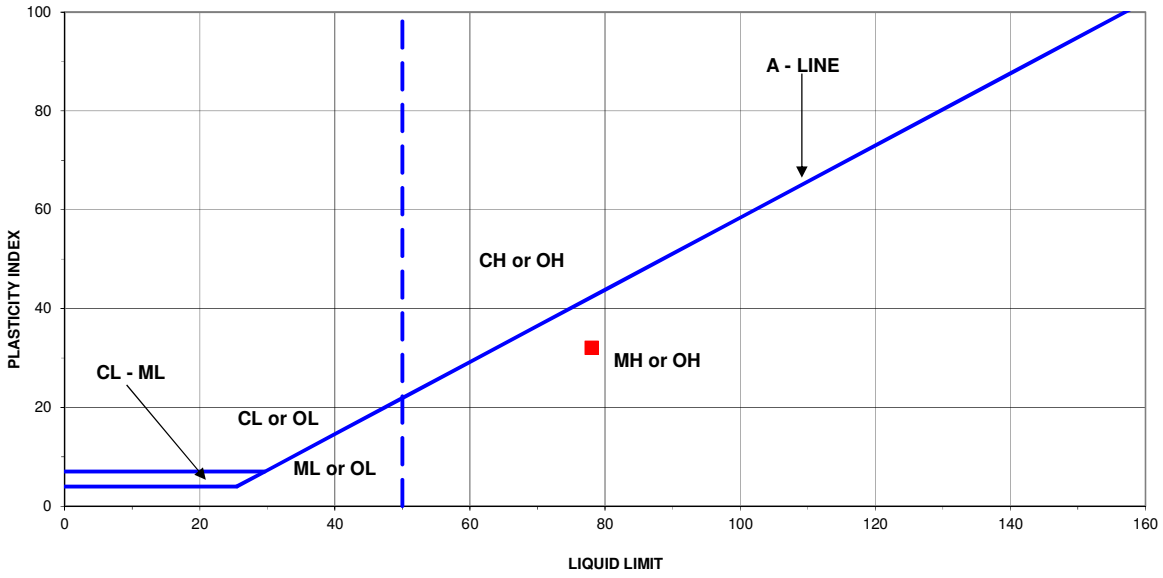
Tested By:	JW	March 2022
Compiled By:	JF	23/03/2022
Checked By:	JF	23/03/2022

SUMMARY OF TESTING

Borehole Number	Sample Number	Depth (m)	Liquid Limit	Plastic Limit	Plasticity Index	Soil Classification Based on USCS Chart Below
BH01	**BAG**	**0.50 - 0.80**	78	46	**32**	MH

The chart below & soil classification terminology is taken from ASTM D2487-17^{e1} "Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)", April 2020, & is based on the classification scheme developed by A. Casagrande in the 1940's (Casagrande, A., 1948: Classification and identification of soil. Transactions of the American Society of Civil Engineers, v. 113, p. 901-930). The chart below & the soil classification given in the table above are included for your information only, and are not included in the IANZ endorsement for this report.

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) PLASTICITY (CASAGRANDE) CHART



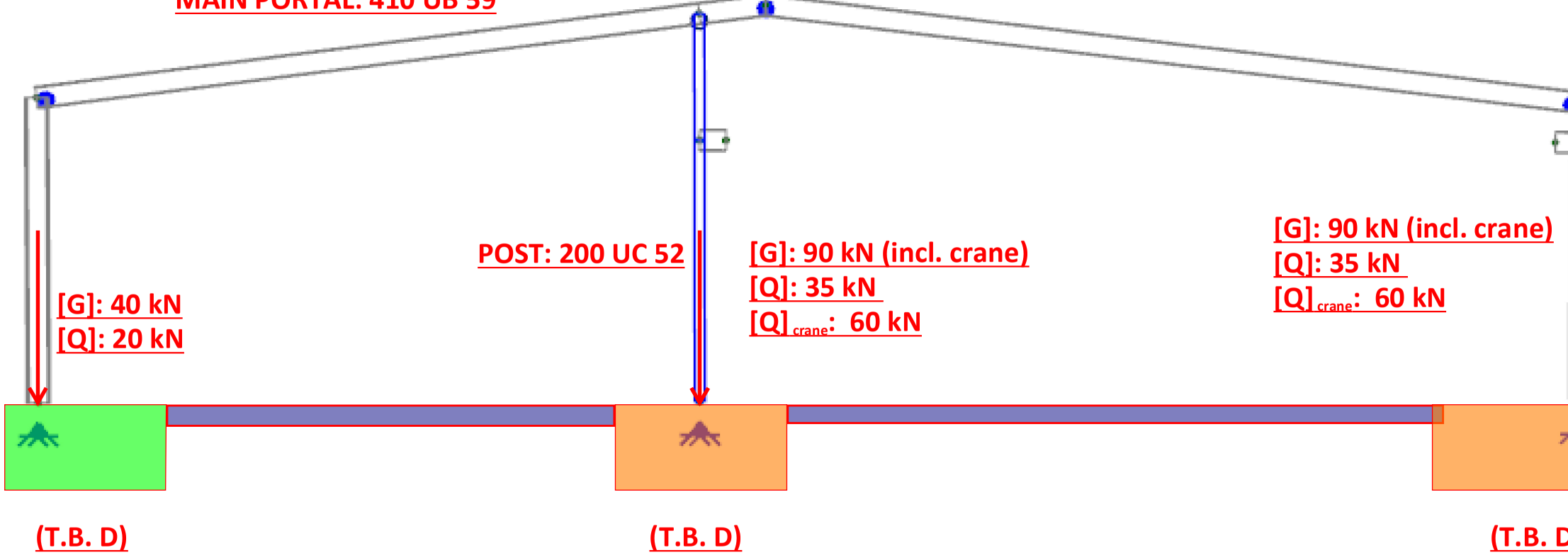
■ **BH01 / BAG / 0.50 - 0.80m**

CHART LEGEND

CL = CLAY, low plasticity ('lean' clay)
OL = ORGANIC CLAY or ORGANIC SILT, low liquid limit
ML = SILT, low liquid limit
CL - ML = SILTY CLAY
CH = CLAY, high plasticity ('fat' clay)
OH = ORGANIC CLAY or ORGANIC SILT, high liquid limit
MH = SILT, high liquid limit ('elastic silt')

Appendix D – Settle 3D Analysis and Liquefaction Assessment Results


Steel Wall Full height
Steel Wall Full height
Steel Wall Full height
Bathroom
Lunch Room
Suspended Ceiling at 3mt
1200 x 1800
1200 x 1800
1200 x 1800
1200 x 1800
1200 x 1800
1200 x 1800
15940
1800
3600
1800
3600
1800
1400
950 1800 950 1800 950 1800
11750
200
8510
90
11000
200
46000
150mm
Steel Fl



MAIN LEG LOADINGS

BUILDING WEIGHT

23014	Loads						Reduction factor	Short-term factor	Long-term factor			Short Term	Long Term
	[G] (KPa)	[Q] (KPa)	Length (m)	Width/Height (m)	[G] (kN)	[Q] (kN)	ψ_a	ψ_s	ψ_l	$[Q]\psi_a\psi_s$ (kN)	$[Q]\psi_a\psi_l$ (kN)	$[G]+[Q]\psi_a\psi_s$ (kN)	$[G]+[Q]\psi_a\psi_l$ (kN)
Roof (incl. Cranes)	0.6	0.25	46	30	828.0	345.0	1.0	0.7	0	241.5	0.0	1069.5	828.0
Canopy	0.6	0.25	46	4	110.4	46.0	1.0	0.7	0	32.2	0.0	142.6	110.4
Walls	0.6	0	219	7	919.8	0.0	1.0	1.0	1.0	0.0	0.0	919.8	919.8
Mezz.	1	3	15	6	90.0	270.0	0.6	1	0.6	166.4	99.8	256.4	189.8
Slab (150mm thk.)	3.75	5	46	28	4830.0	6440.0	0.5	1	0.6	3220.0	1932.0	8050.0	6762.0
Foundations	0	0	0	0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0
Perimeter Footing	14.4	0	219	0.6	1892.2	0.0	1.0	1.0	1.0	0.0	0.0	1892.2	1892.2
Finger Beams	0	0	0	0.8	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0
Pads (Assumed 3mx3mx0.8m)	19.2	0	78	3	4492.8	0.0	1.0	1.0	1.0	0.0	0.0	4492.8	4492.8
											Sum	16823.2	15195.0
											Slab Area (m^2)	1288	1288
											UDL (KPa)	**13.1**	**11.8**

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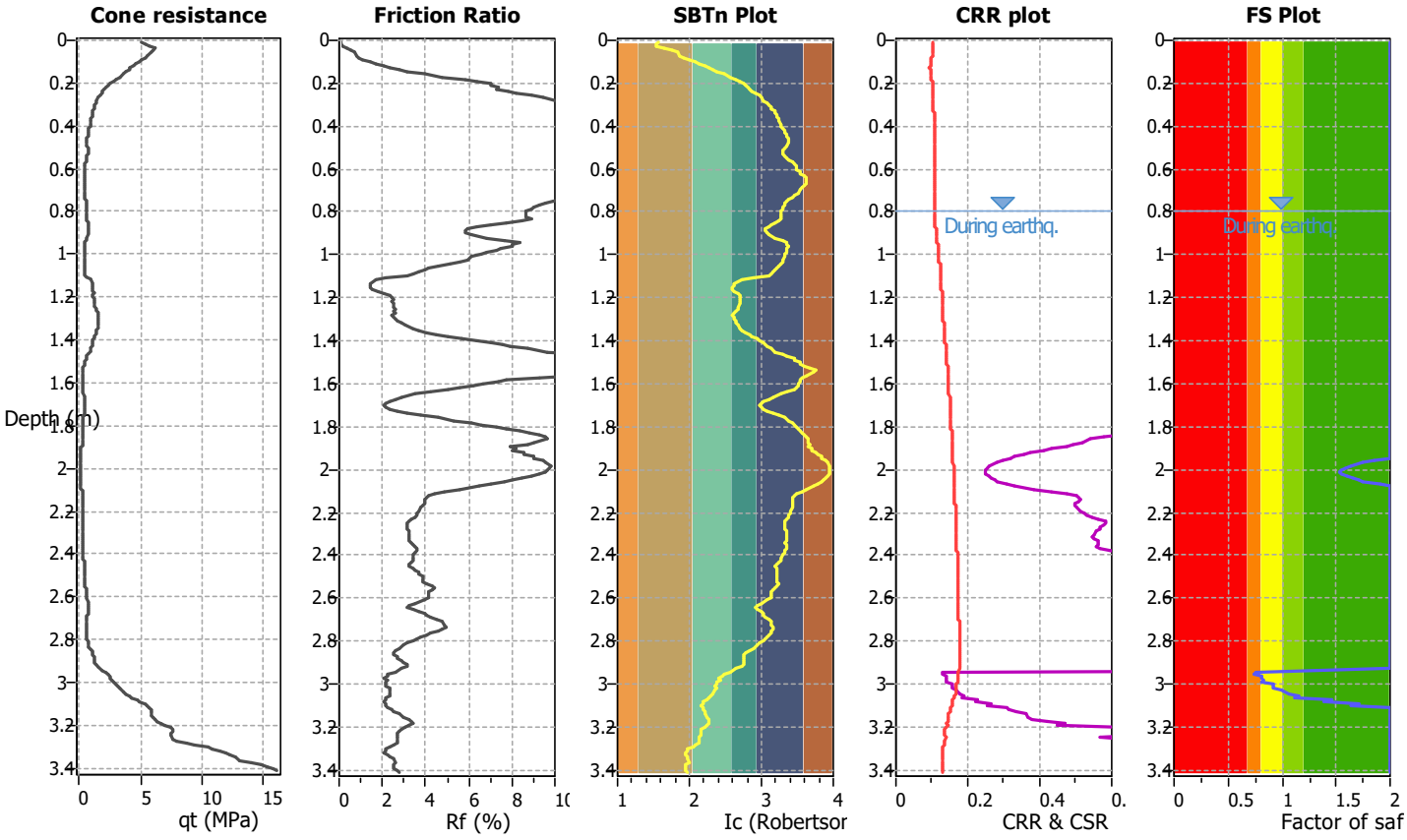
LIQUEFACTION ANALYSIS REPORT

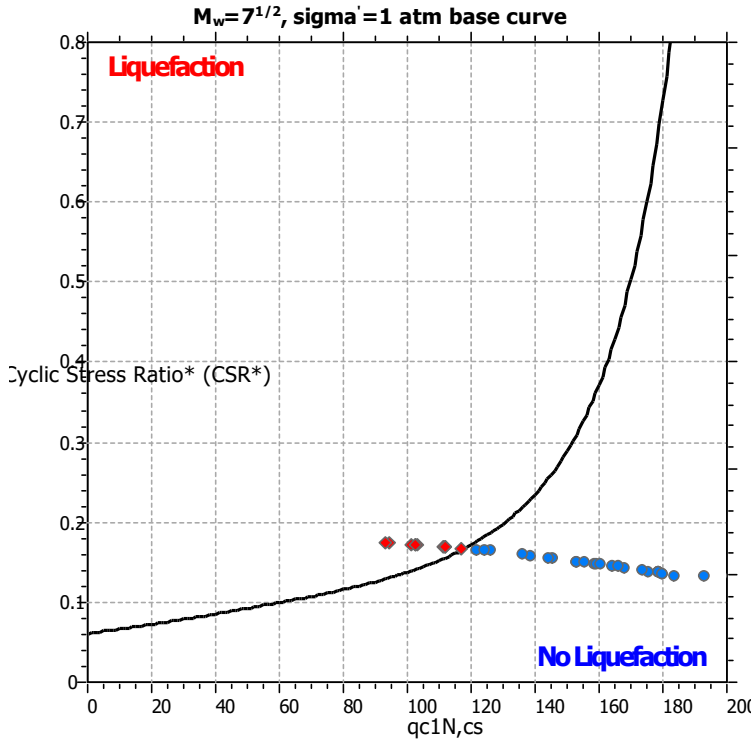
Project title : Hayphil Investments Ltd **Location : Waipapa**

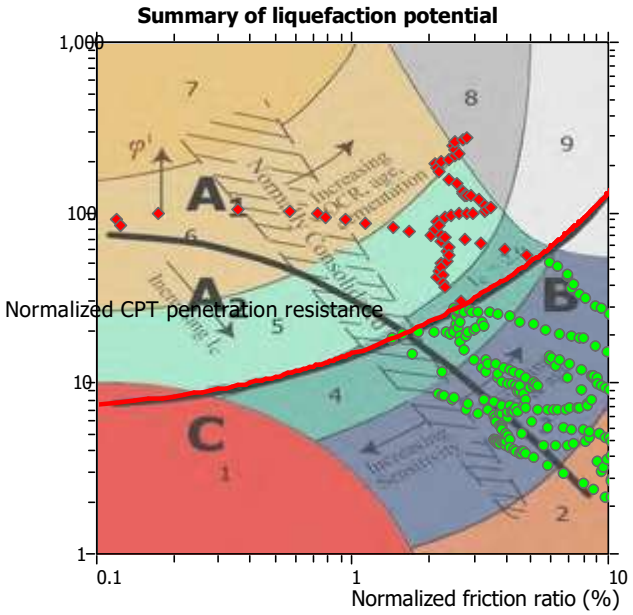
CPT file : CPT01

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.80 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.80 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	20.00 m
Earthquake magnitude M_w:	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		







Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

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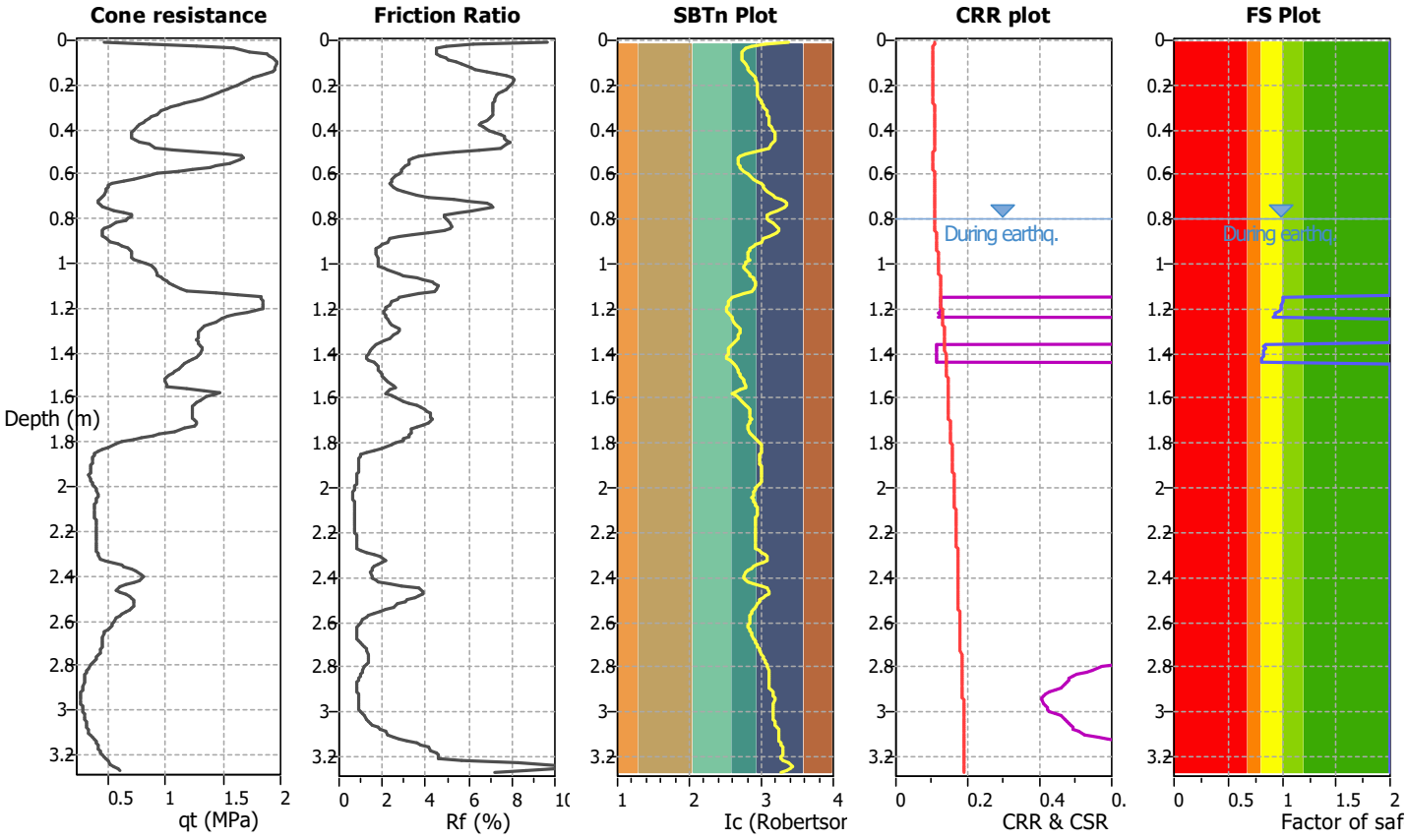
LIQUEFACTION ANALYSIS REPORT

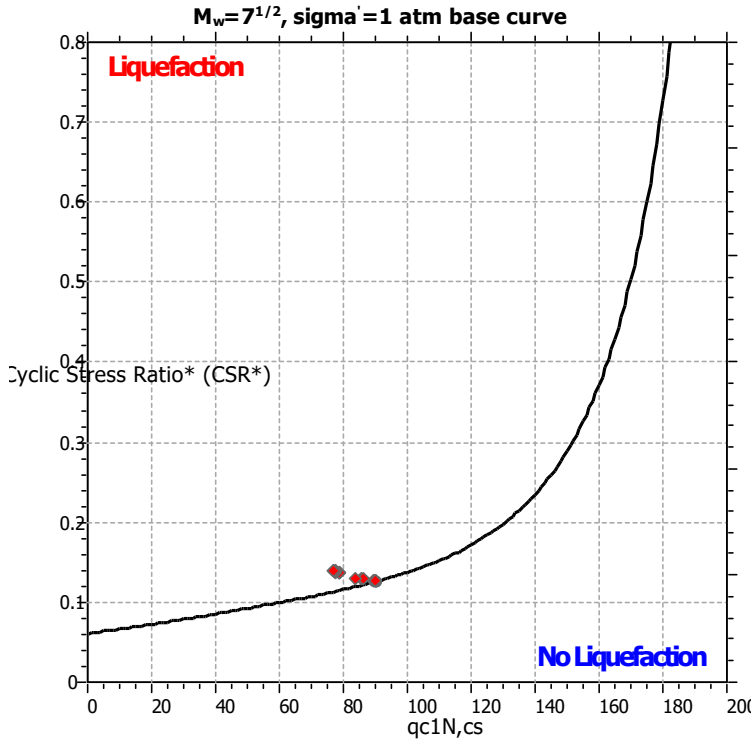
Project title : Hayphil Investments Ltd **Location : Waipapa**

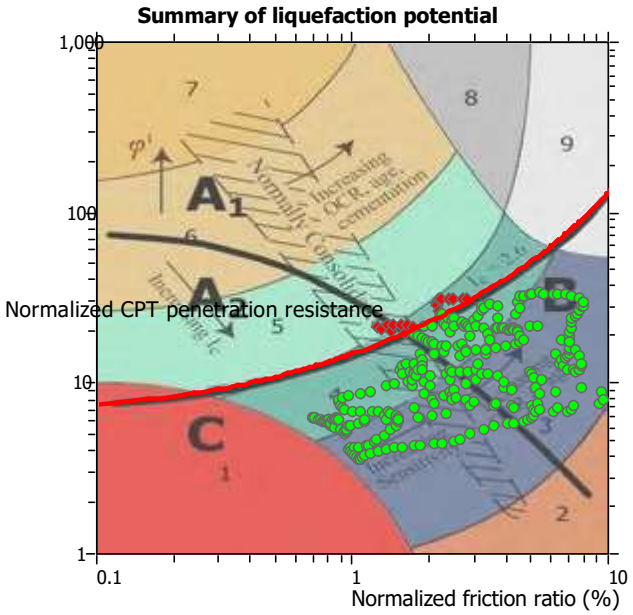
CPT file : CPT02

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.80 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.80 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	20.00 m
Earthquake magnitude M_w:	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		







Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

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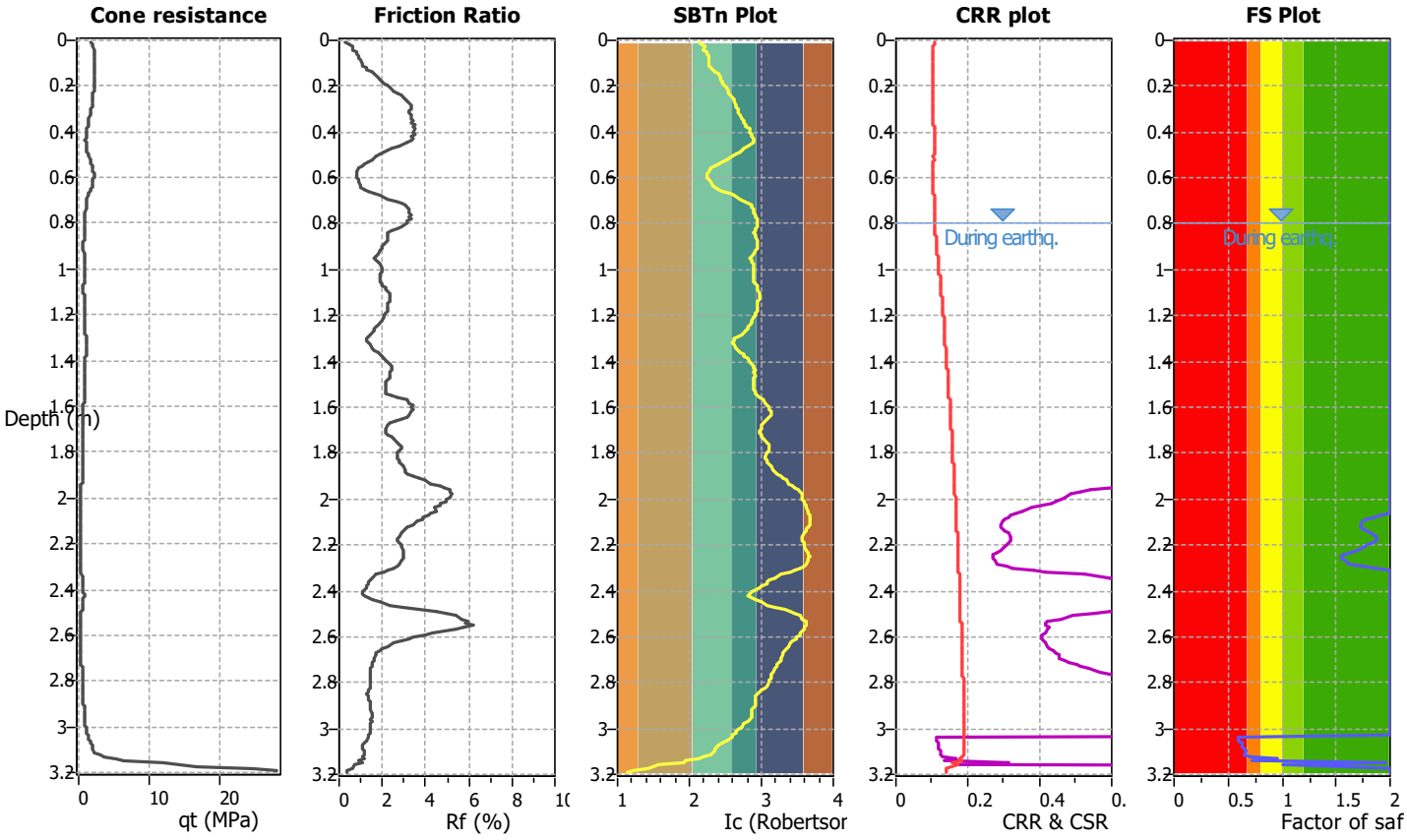
LIQUEFACTION ANALYSIS REPORT

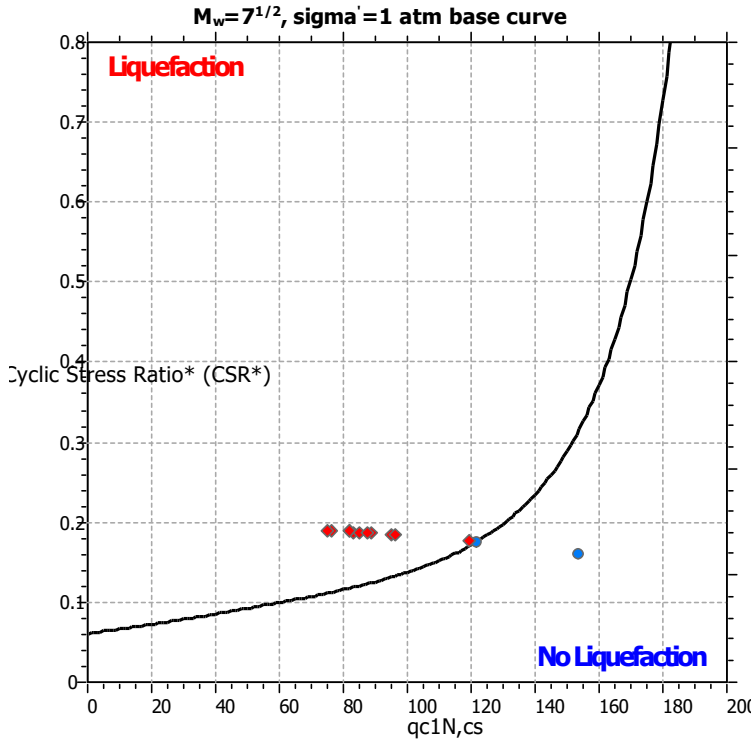
Project title : Hayphil Investments Ltd **Location : Waipapa**

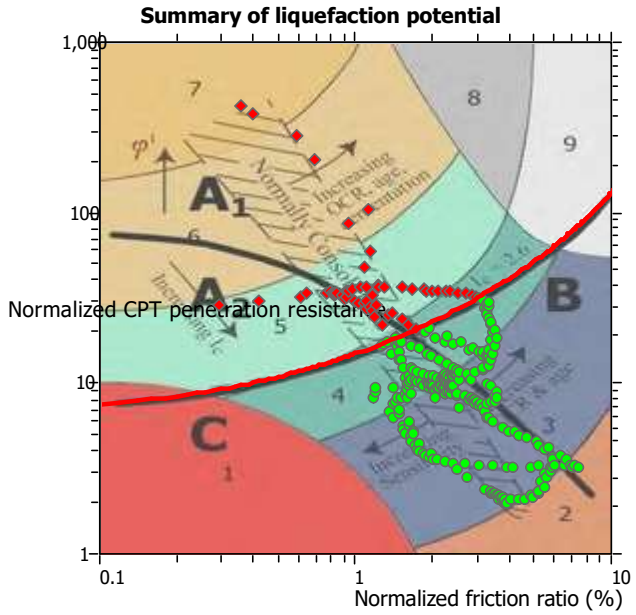
CPT file : CPT03

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.80 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.80 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	20.00 m
Earthquake magnitude M_w:	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		







Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

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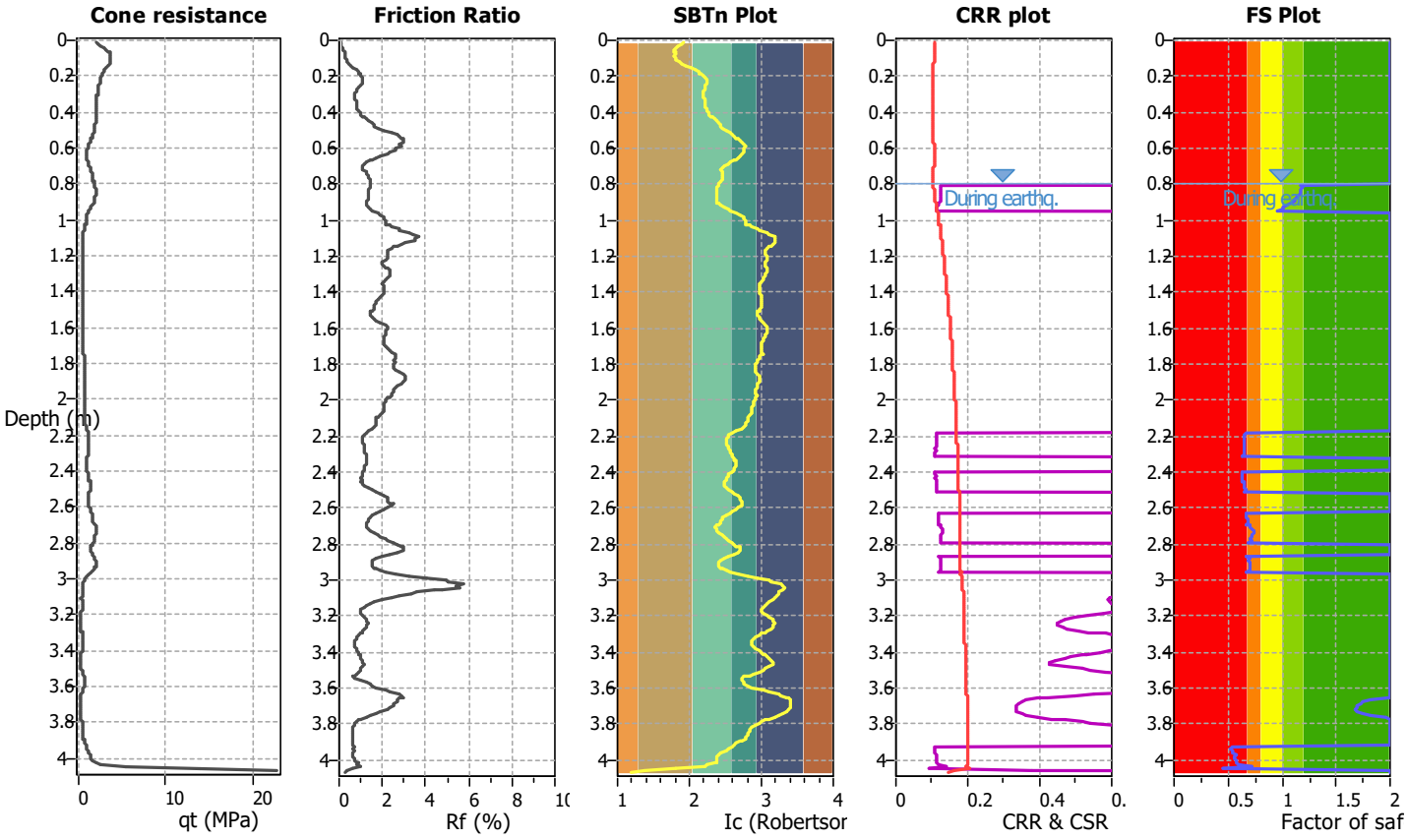
LIQUEFACTION ANALYSIS REPORT

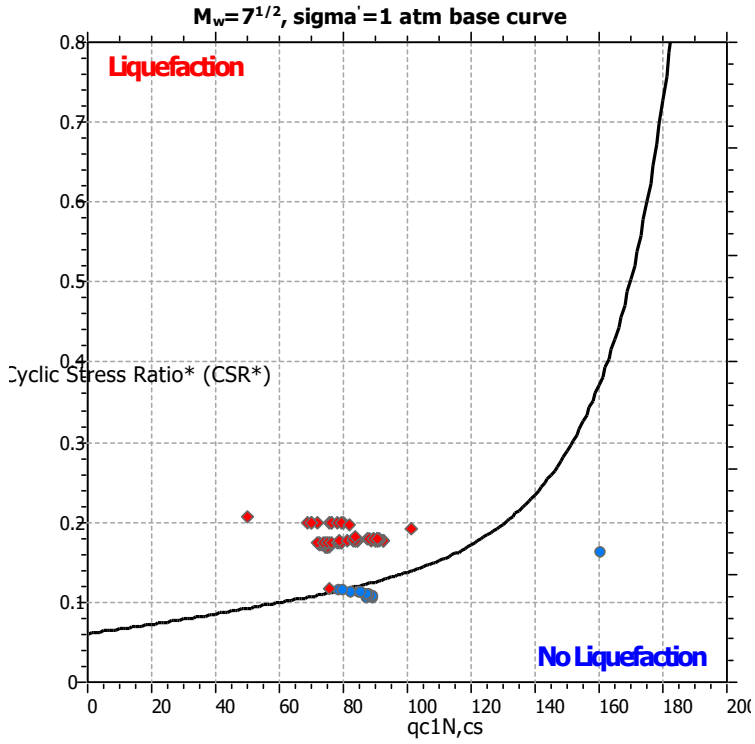
Project title : Hayphil Investments Ltd **Location : Waipapa**

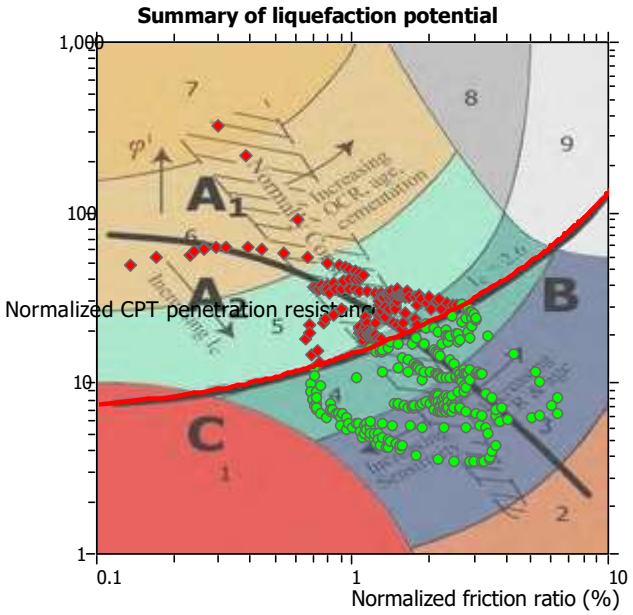
CPT file : CPT04

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.80 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.80 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	20.00 m
Earthquake magnitude M_w:	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		







Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

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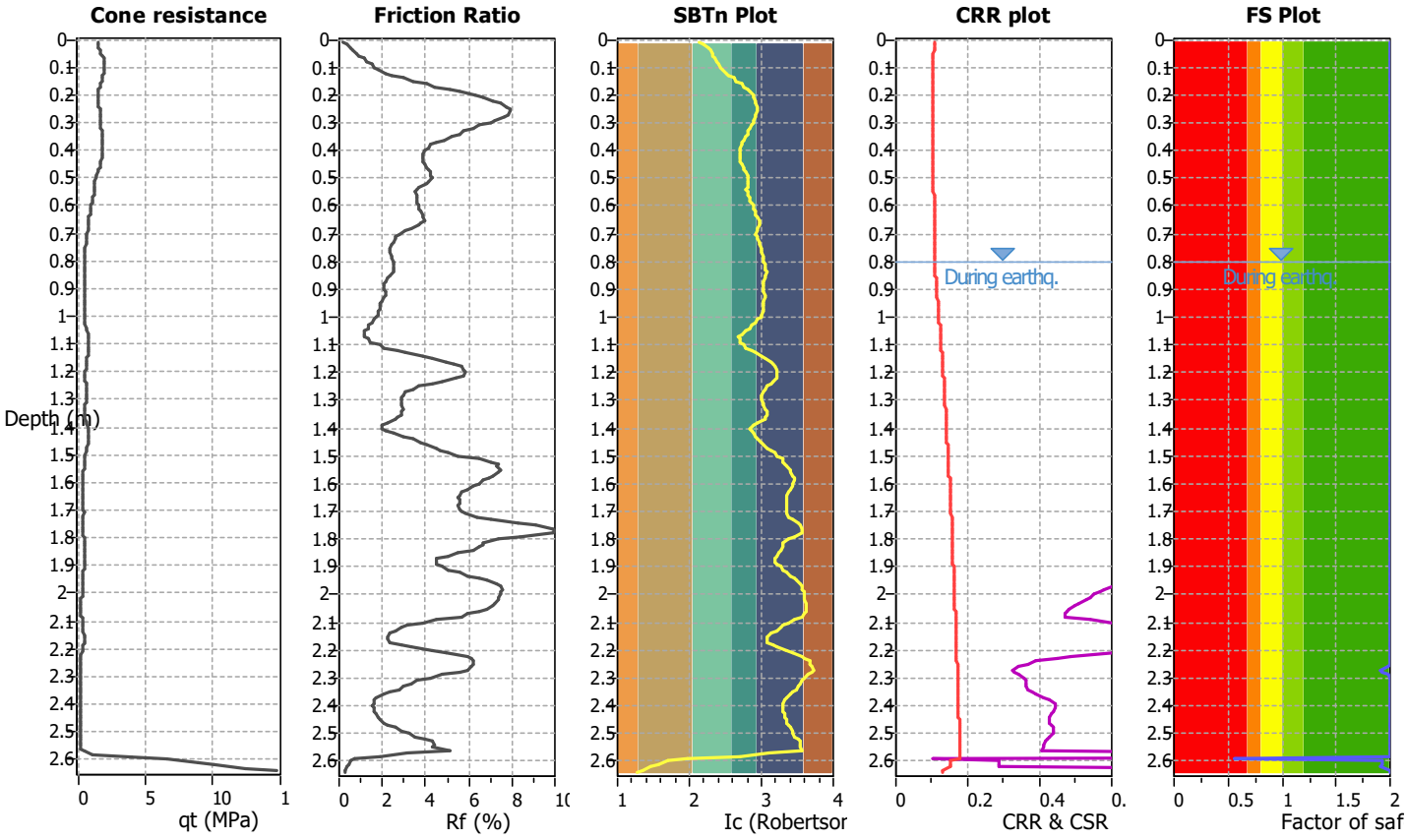
LIQUEFACTION ANALYSIS REPORT

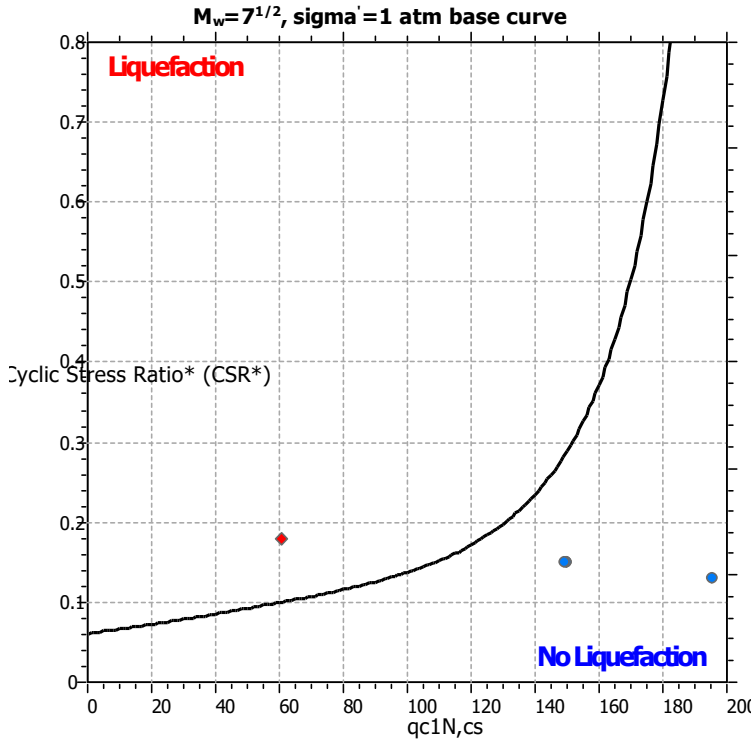
Project title : Hayphil Investments Ltd **Location : Waipapa**

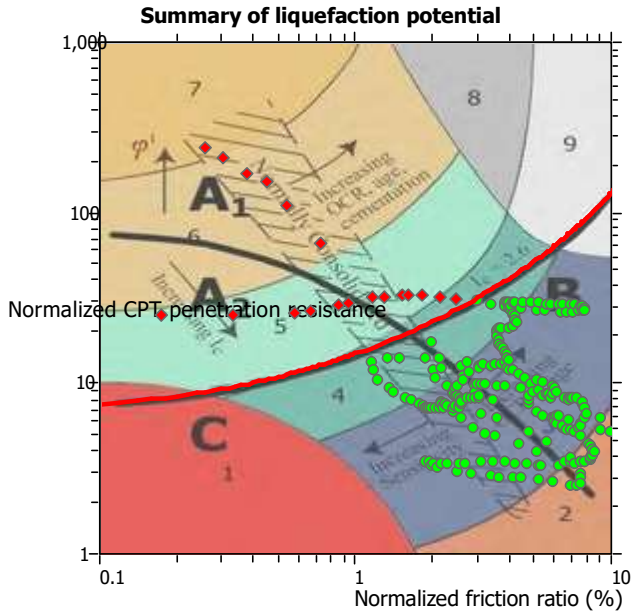
CPT file : CPT05

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.80 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.80 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	20.00 m
Earthquake magnitude M_w:	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		







Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

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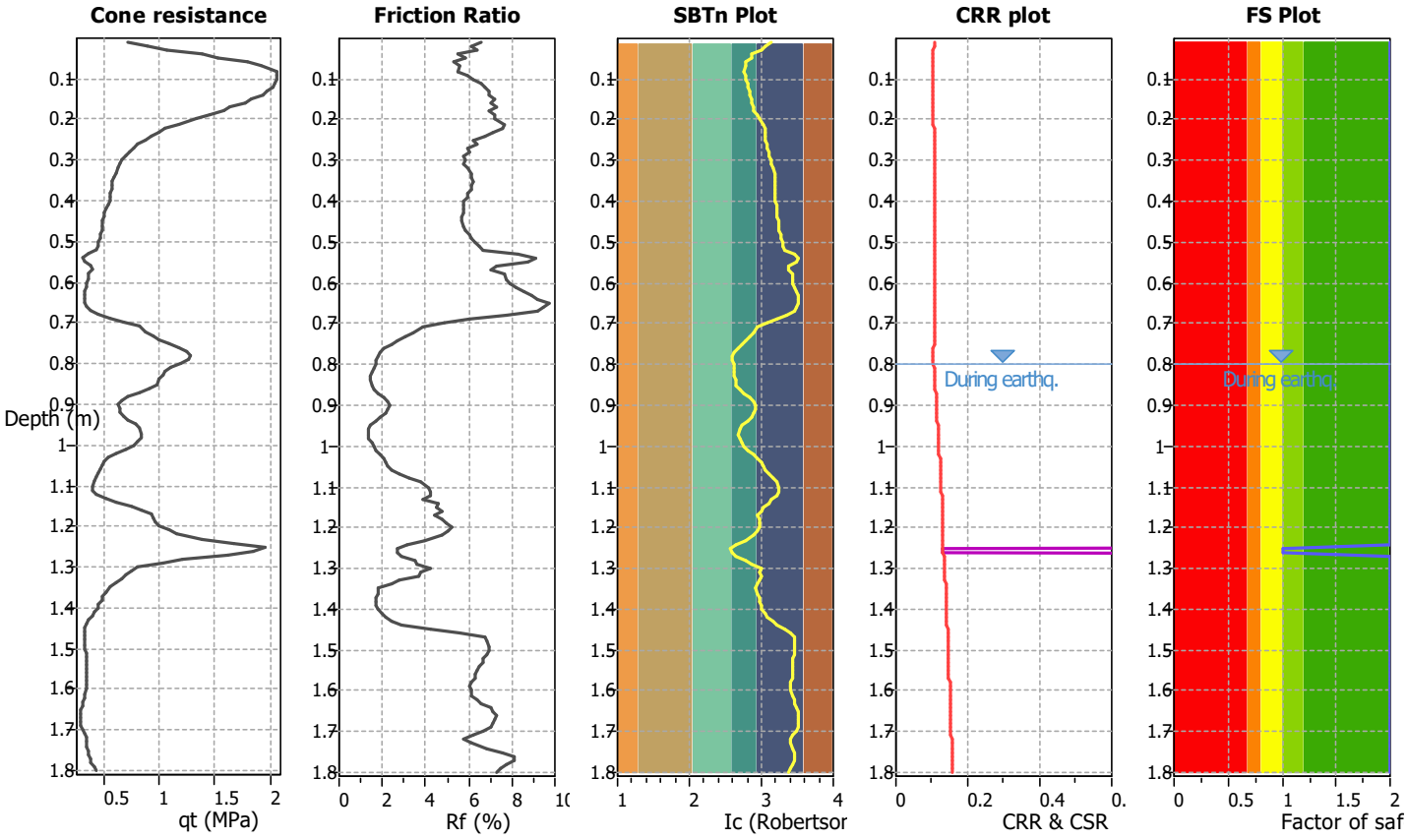
LIQUEFACTION ANALYSIS REPORT

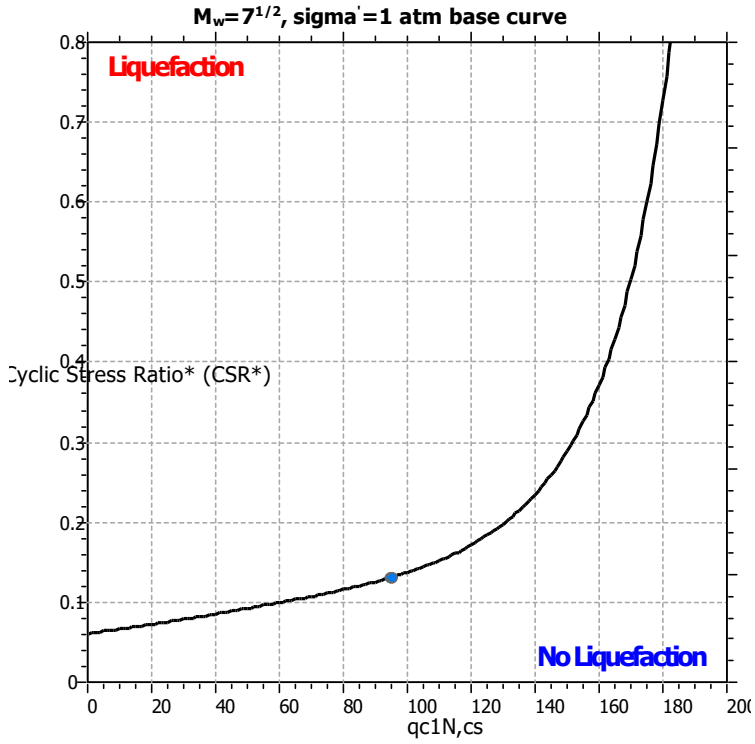
Project title : Hayphil Investments Ltd **Location : Waipapa**

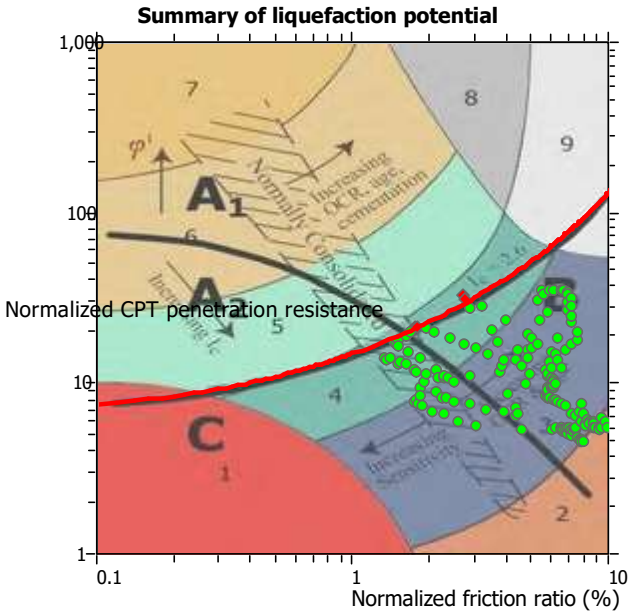
CPT file : CPT06

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.80 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.80 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	20.00 m
Earthquake magnitude M_w:	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		







Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

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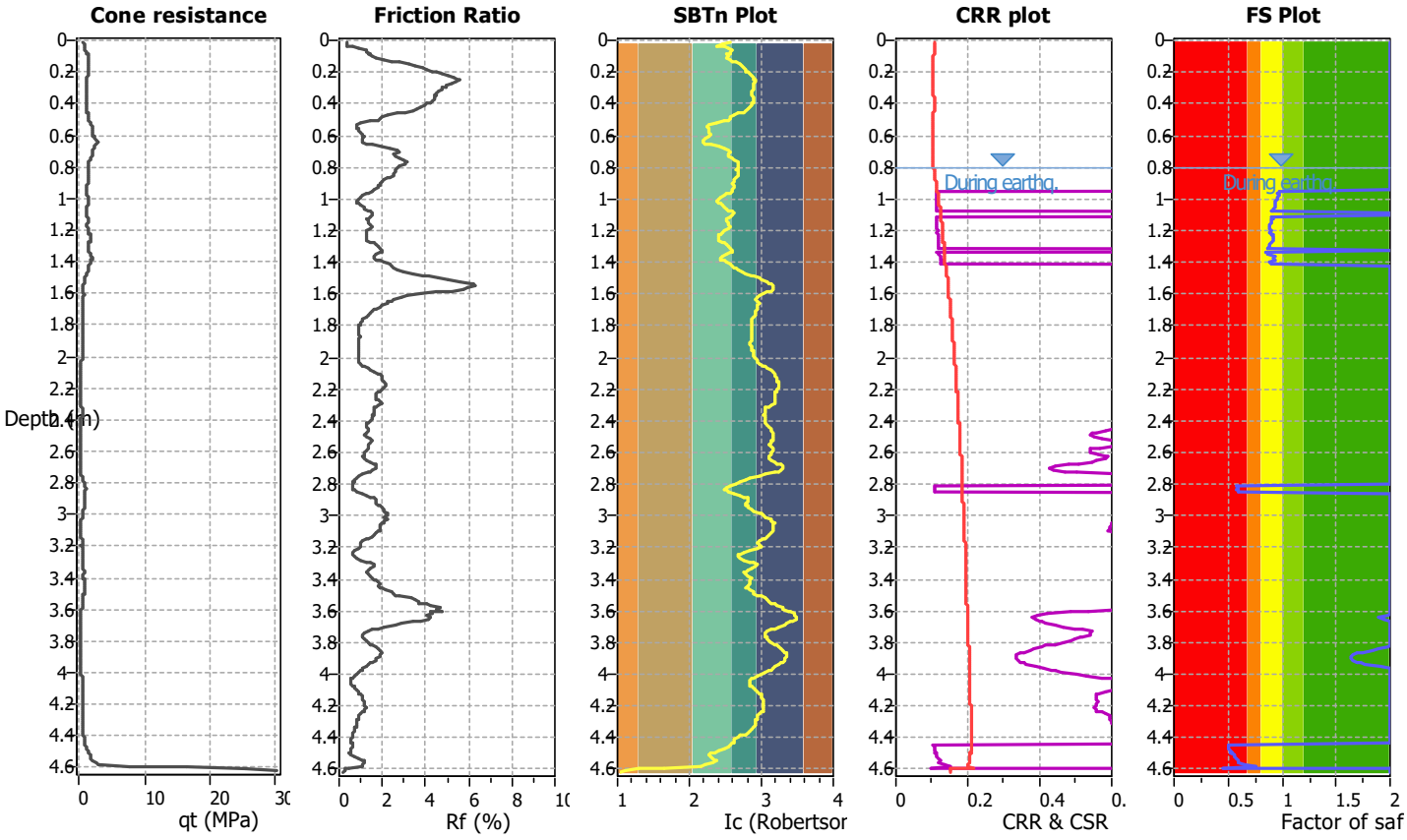
LIQUEFACTION ANALYSIS REPORT

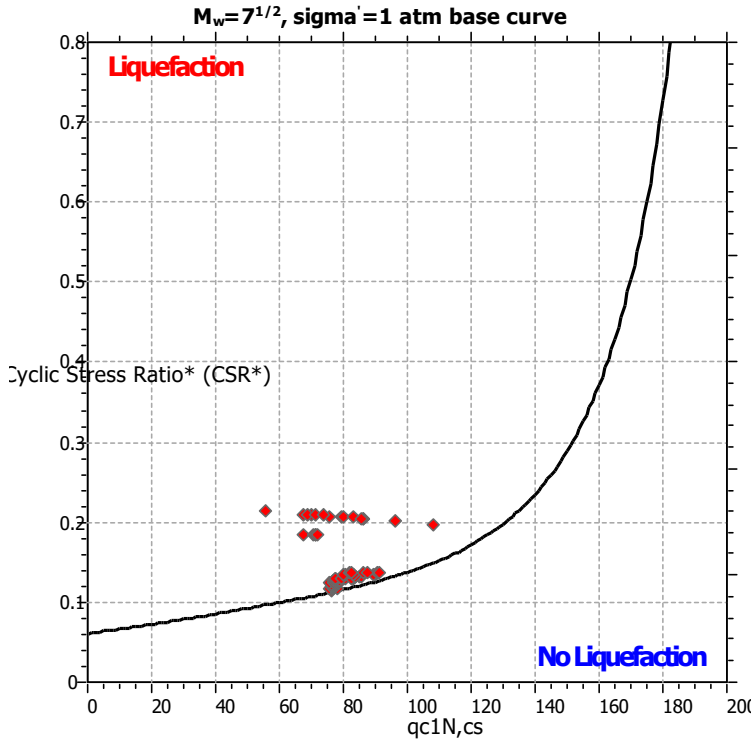
Project title : Hayphil Investments Ltd **Location : Waipapa**

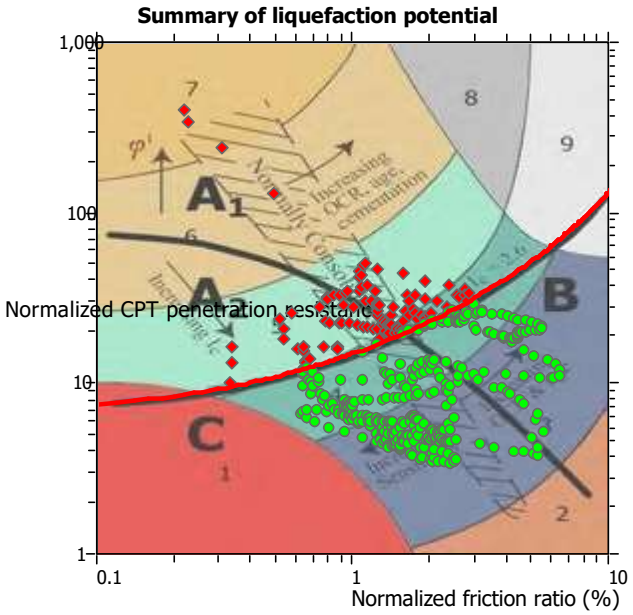
CPT file : CPT07

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.80 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.80 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	20.00 m
Earthquake magnitude M_w:	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		







Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

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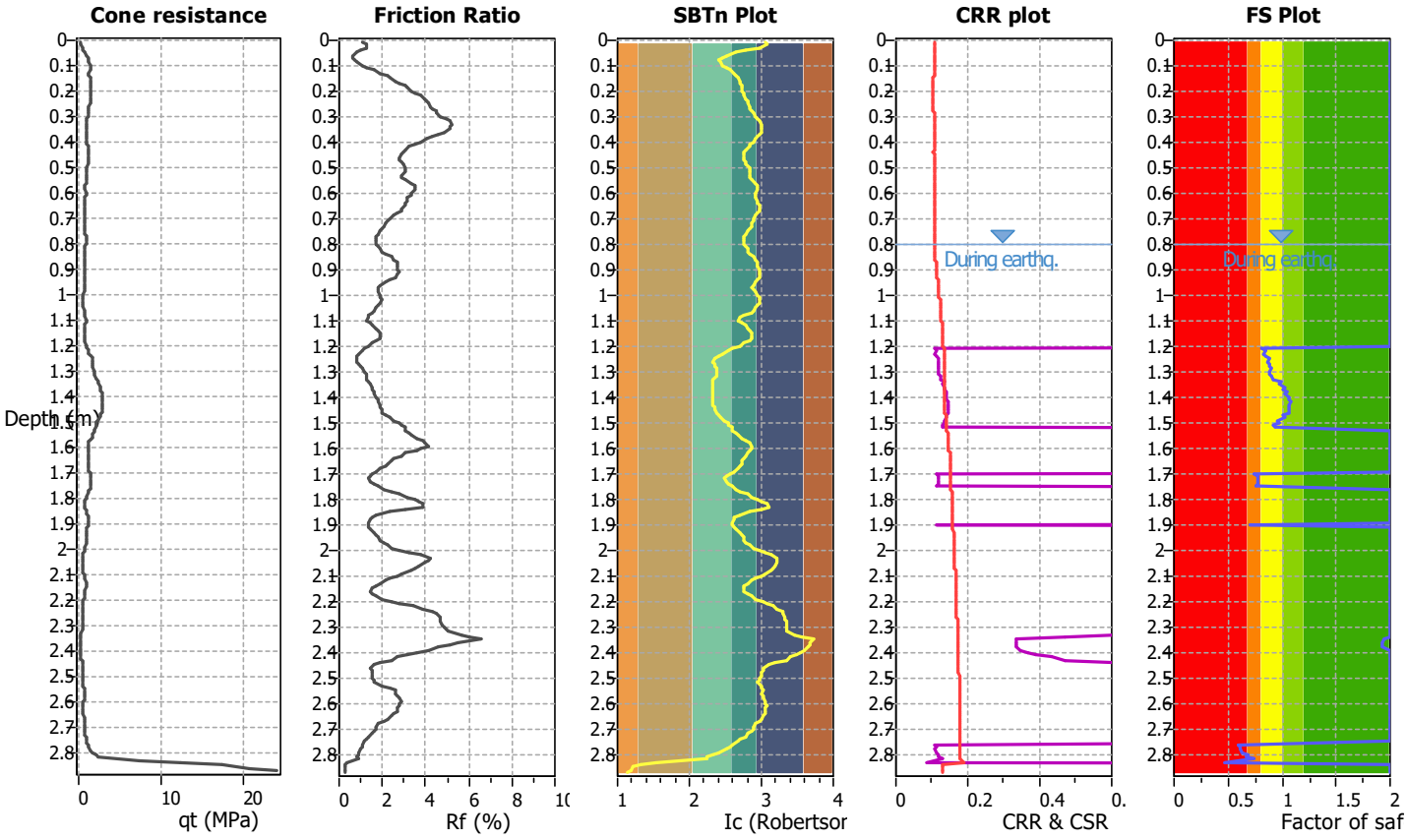
LIQUEFACTION ANALYSIS REPORT

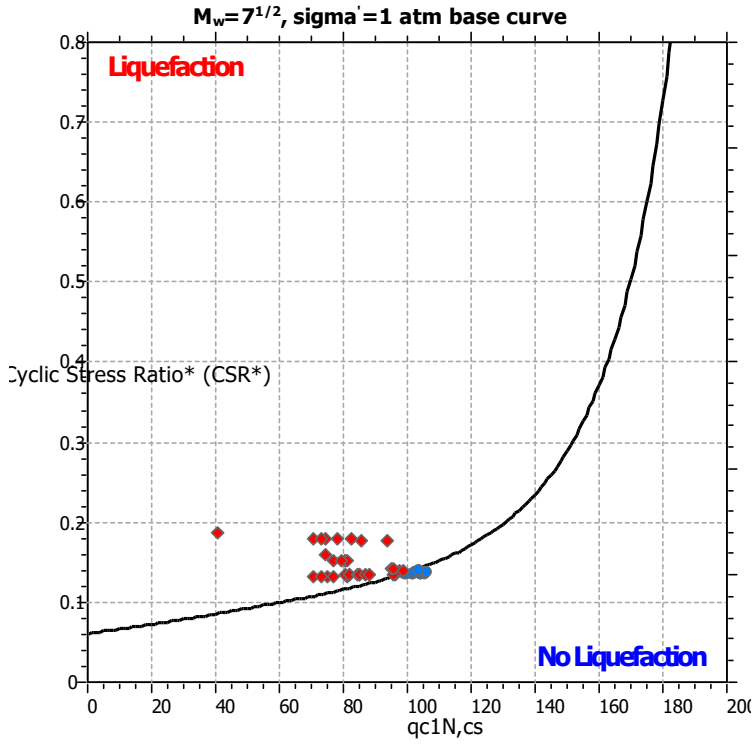
Project title : Hayphil Investments Ltd **Location : Waipapa**

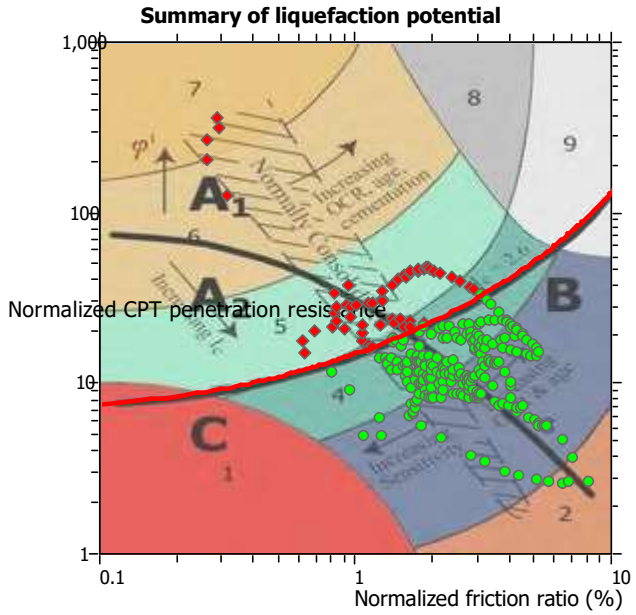
CPT file : CPT08

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.80 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.80 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	20.00 m
Earthquake magnitude M_w:	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		







Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

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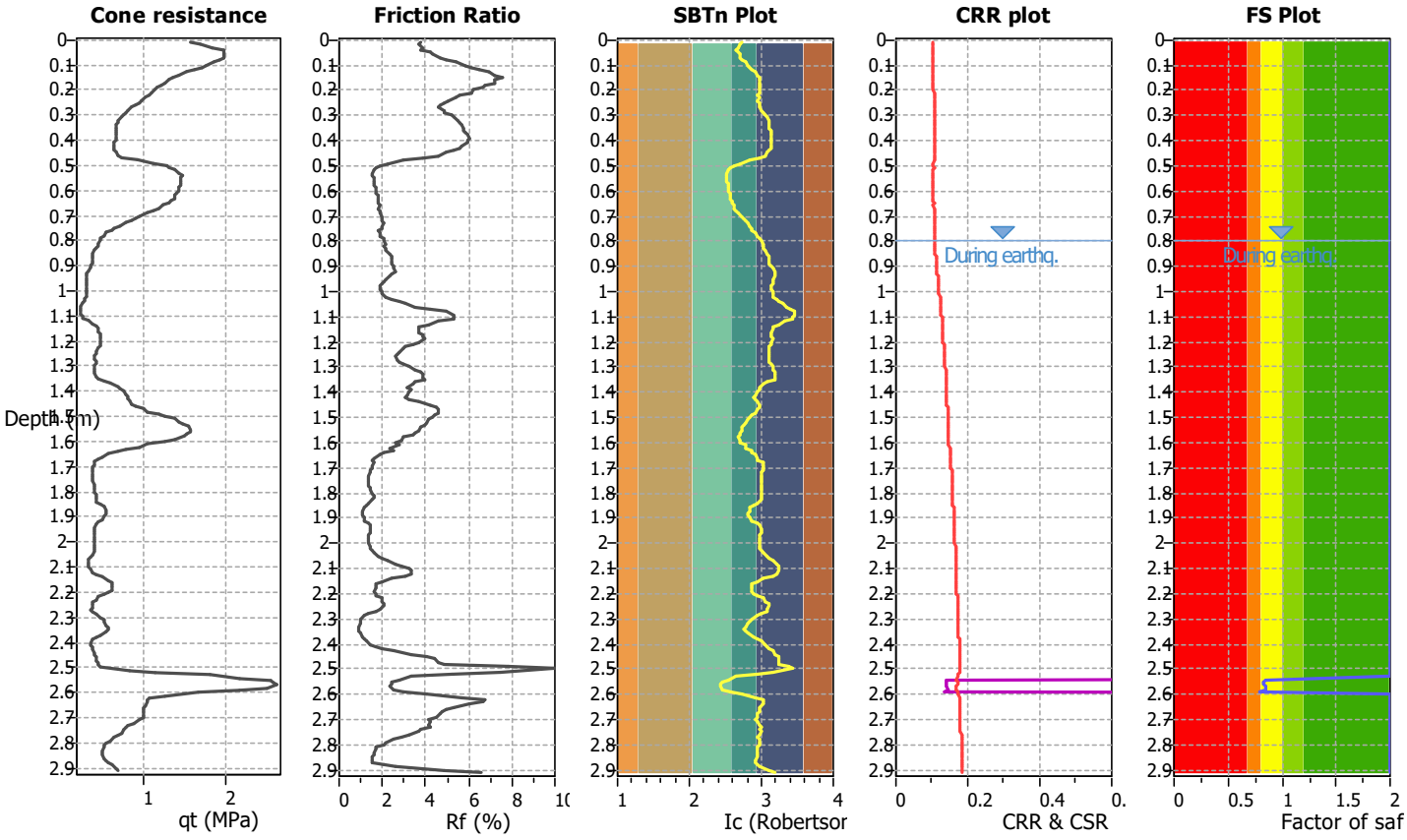
LIQUEFACTION ANALYSIS REPORT

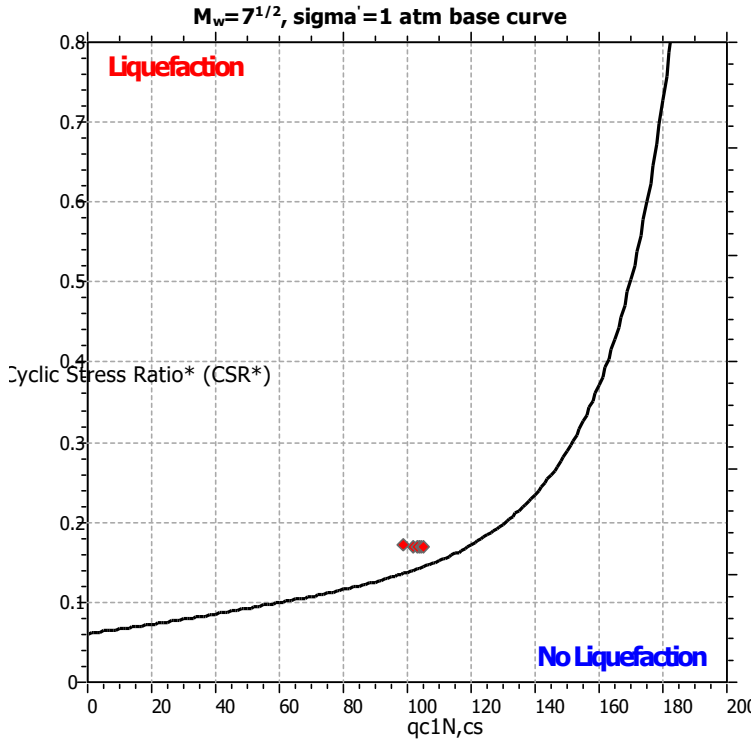
Project title : Hayphil Investments Ltd **Location : Waipapa**

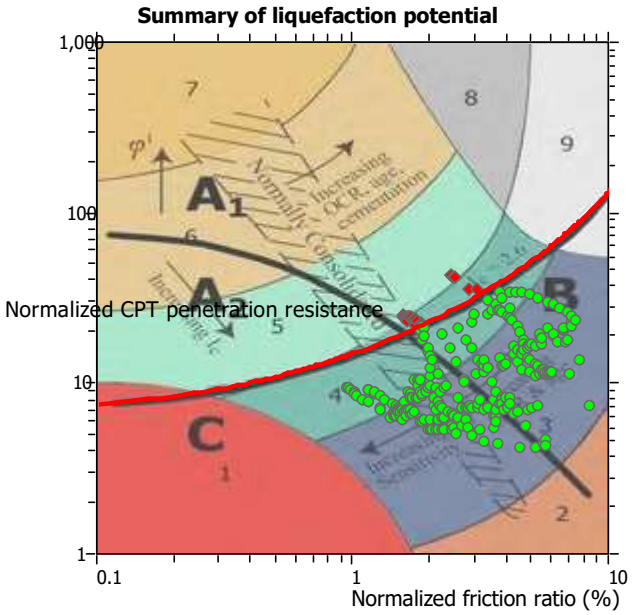
CPT file : CPT09

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.80 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.80 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	20.00 m
Earthquake magnitude M_w:	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		







Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

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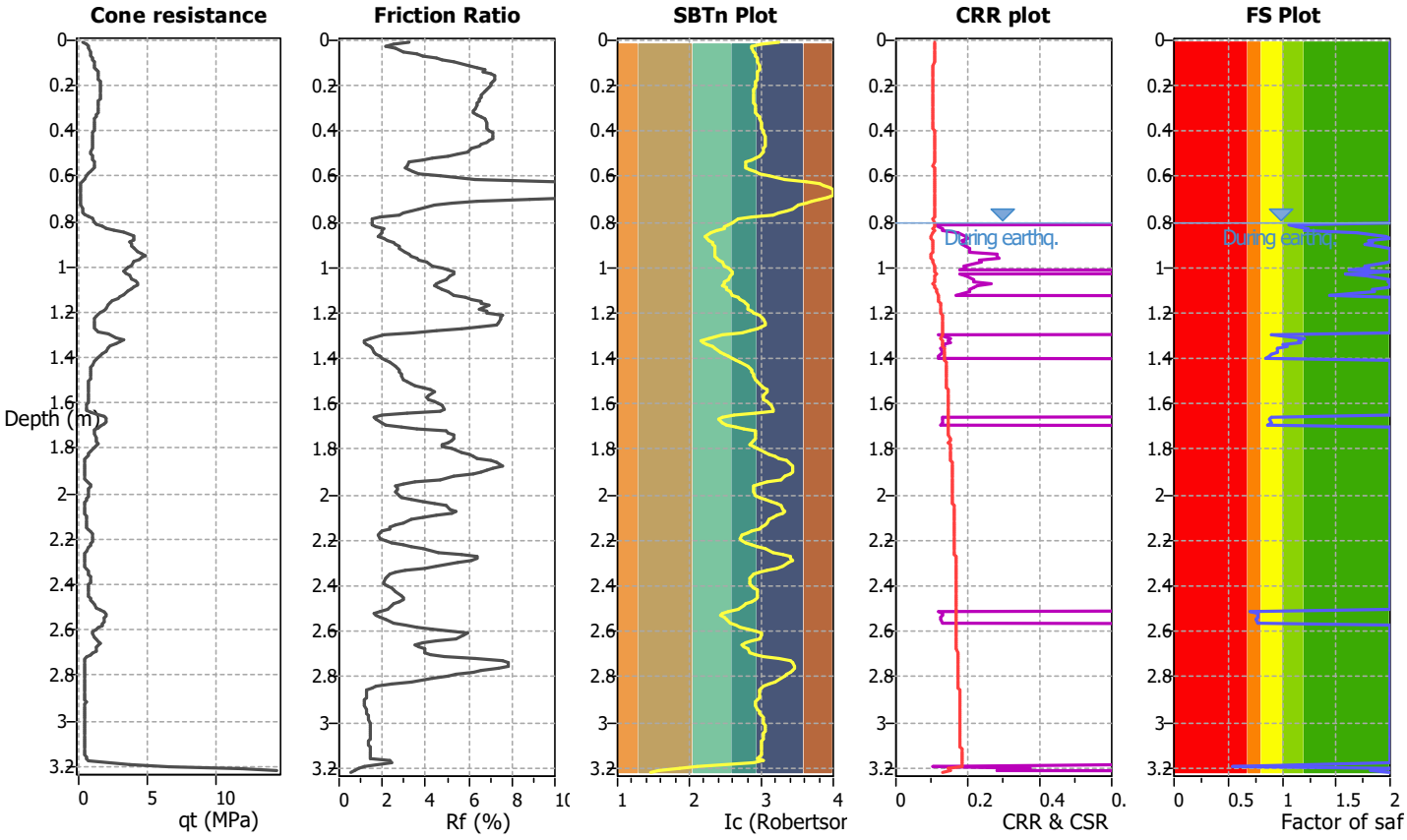
LIQUEFACTION ANALYSIS REPORT

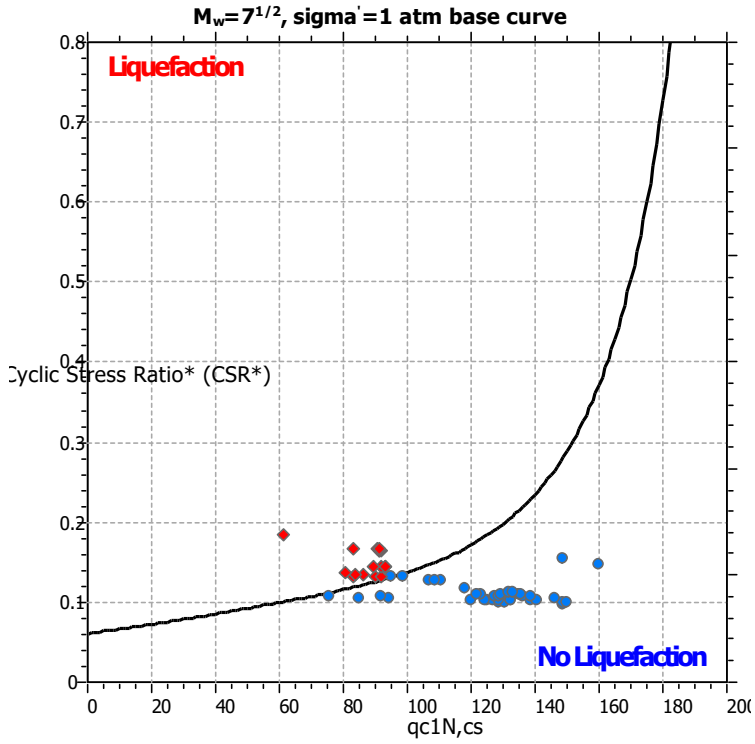
Project title : Hayphil Investments Ltd **Location : Waipapa**

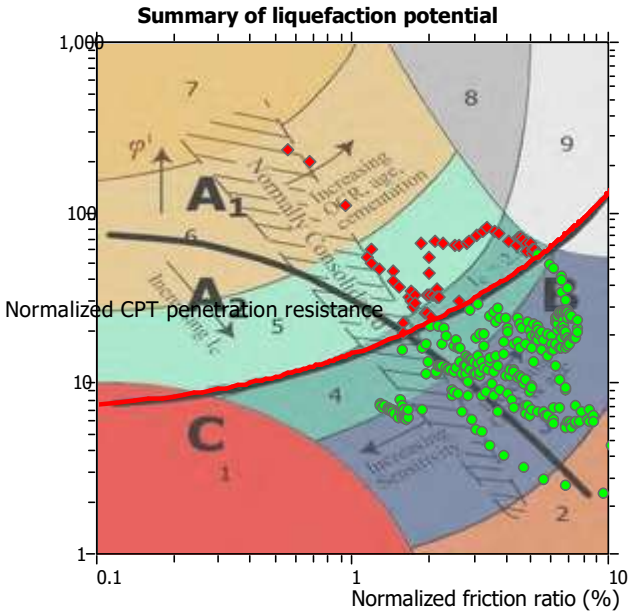
CPT file : CPT10

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.80 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.80 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	20.00 m
Earthquake magnitude M_w:	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		







Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

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Cone Penetration Testing
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+64211473249

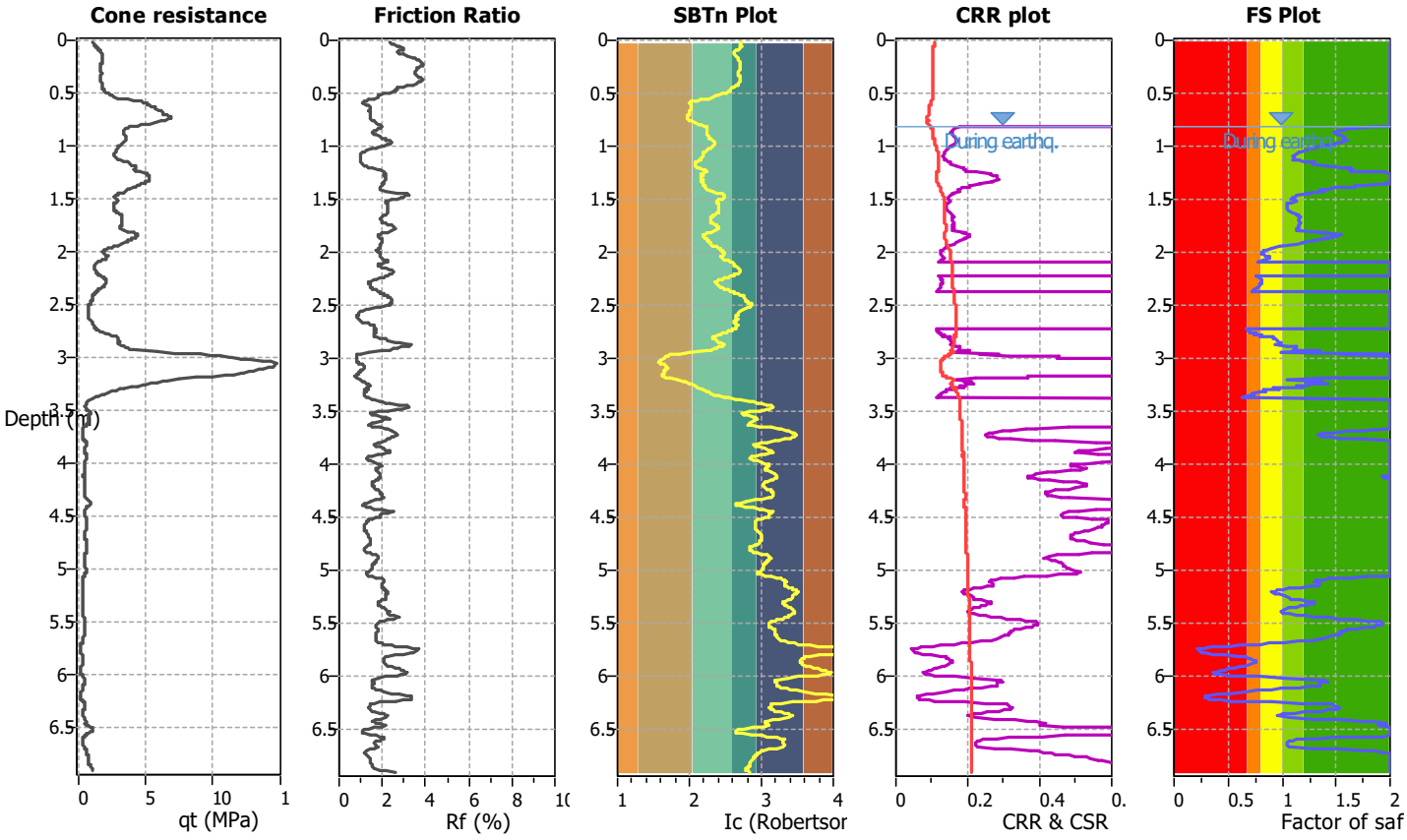
LIQUEFACTION ANALYSIS REPORT

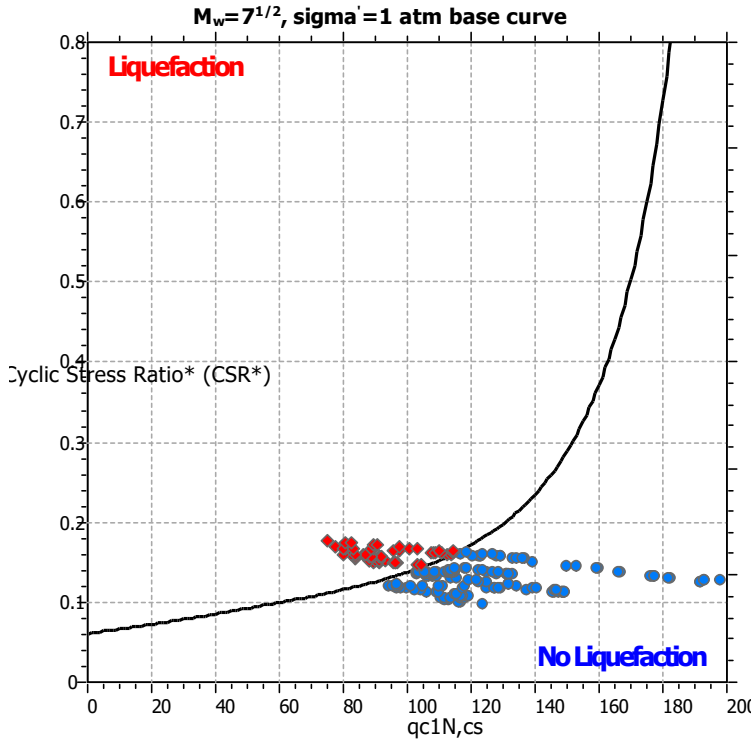
Project title : Hayphil Investments Ltd **Location : Waipapa**

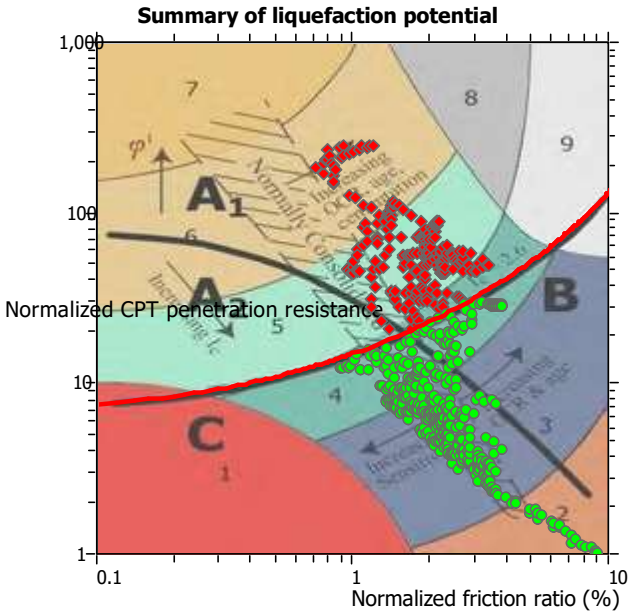
CPT file : CPT11

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.80 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.80 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	20.00 m
Earthquake magnitude M_w:	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.19	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		







Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

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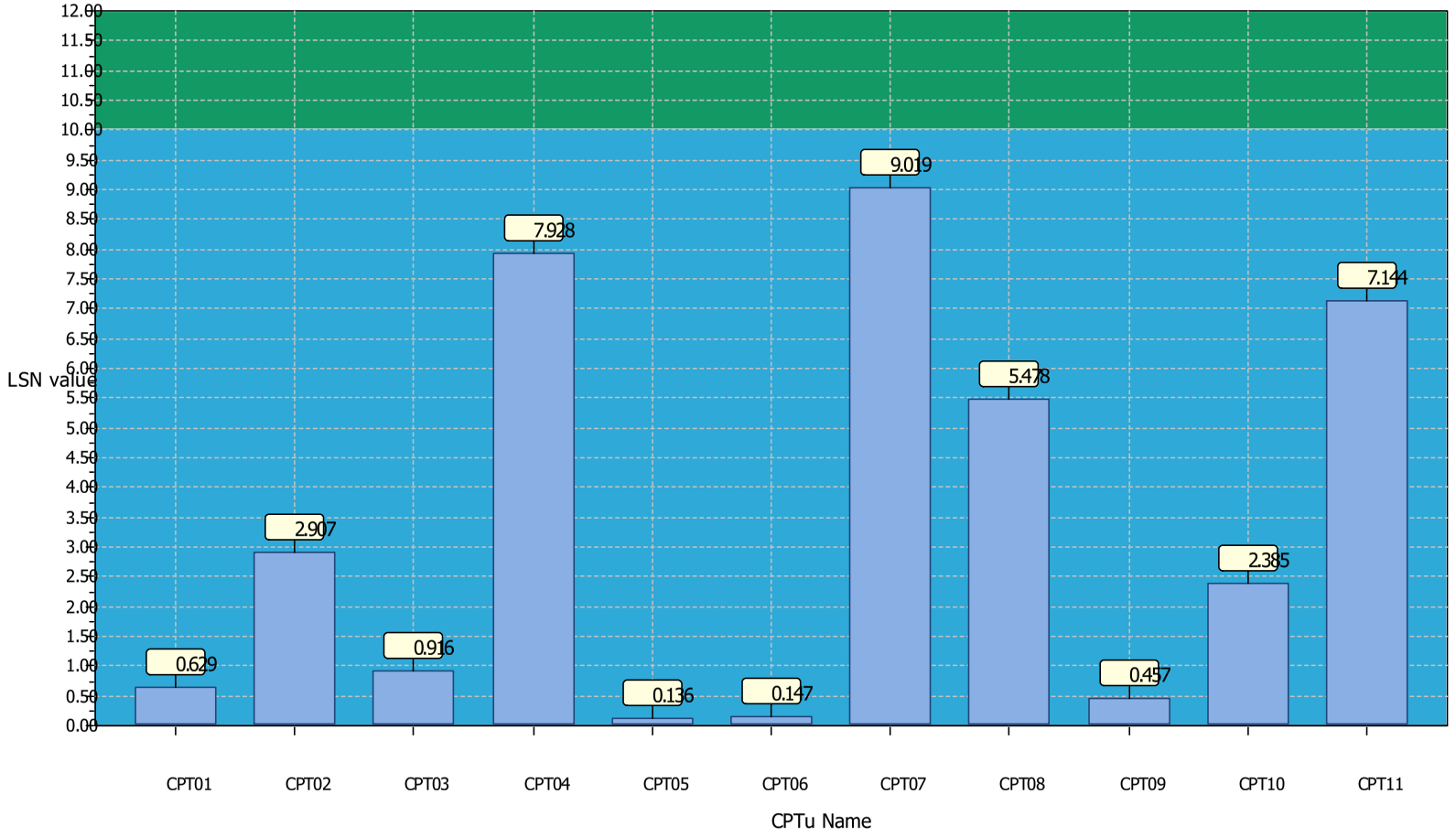
Project title : Hayphil Investments Ltd

Location : Waipapa

Overall Liquefaction Severity Number report



LSN color scheme

- Severe damage
- Major expression of liquefaction
- Moderate to severe exp. of liquefaction
- Moderate expression of liquefaction
- Minor expression of liquefaction
- Little to no expression of liquefaction

Basic statistics

Total CPT number: 11

100.00% little liquefaction

0.00% minnor liquefaction

0.00% moderate liquefaction

0.00% moderate to major liquefaction

0.00% major liquefaction

0.00% severe liquefaction

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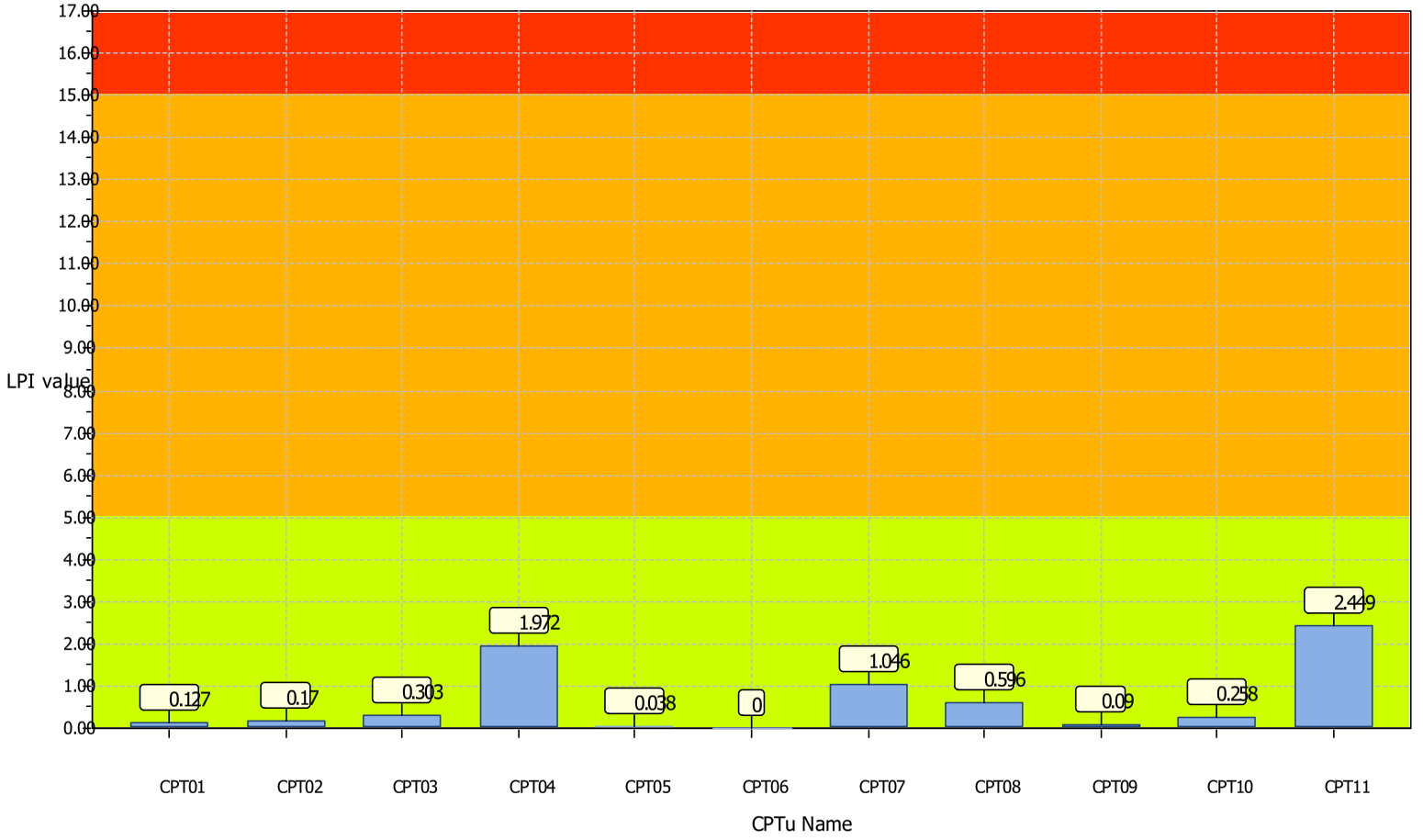
Project title : Hayphil Investments Ltd

Location : Waipapa

Overall Liquefaction Potential Index report



LPI color scheme

- Very high risk
- High risk
- Low risk

Basic statistics

Total CPT number: 11
100.00% low risk
0.00% high risk
0.00% very high risk

Settle3 Analysis Information

Smart Steel Buildings

Project Settings

Document Name	UDL preload
Project Title	Smart Steel Buildings
Analysis	Preload and UDL
Author	W. Thorburn
Company	Haigh Workman Ltd
Date Created	28/02/2024
Last saved with Settle3 version	5.020
Stress Computation Method	Boussinesq
Stress Units	Metric, stress as kPa
Settlement Units	millimeters

Advanced Settings

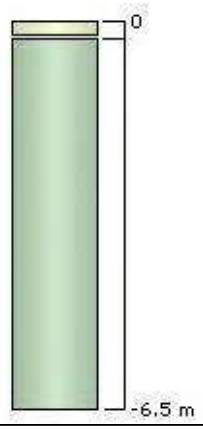
Calculate settlement with mean stress	
Start of secondary consolidation (% of primary)	95
Min. stress for secondary consolidation (% of initial)	1
Reset time when load changes for secondary consolidation	No
Minimum settlement ratio for subgrade modulus	0.9
Use average poisson's ratio to calculate layered stresses	
Update Cv in each time step (improves consolidation accuracy)	
Ignore negative effective stresses in settlement calculations	
Add field points to load edges	

Soil Profile

Layer Option	Horizontal Soil Layers
Vertical Axis	Elevation
Ground Elevation (m)	0

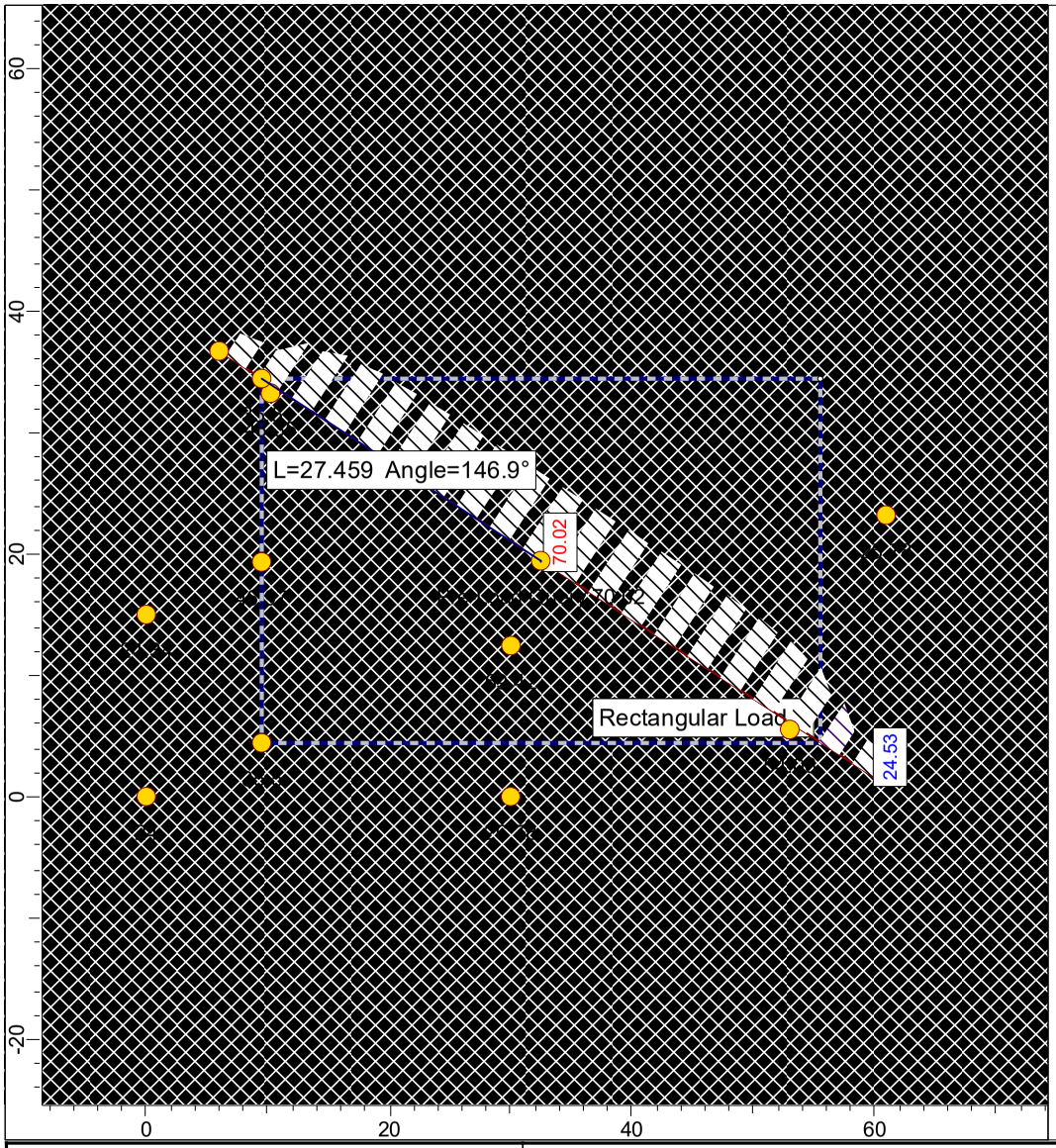
Soil Layers

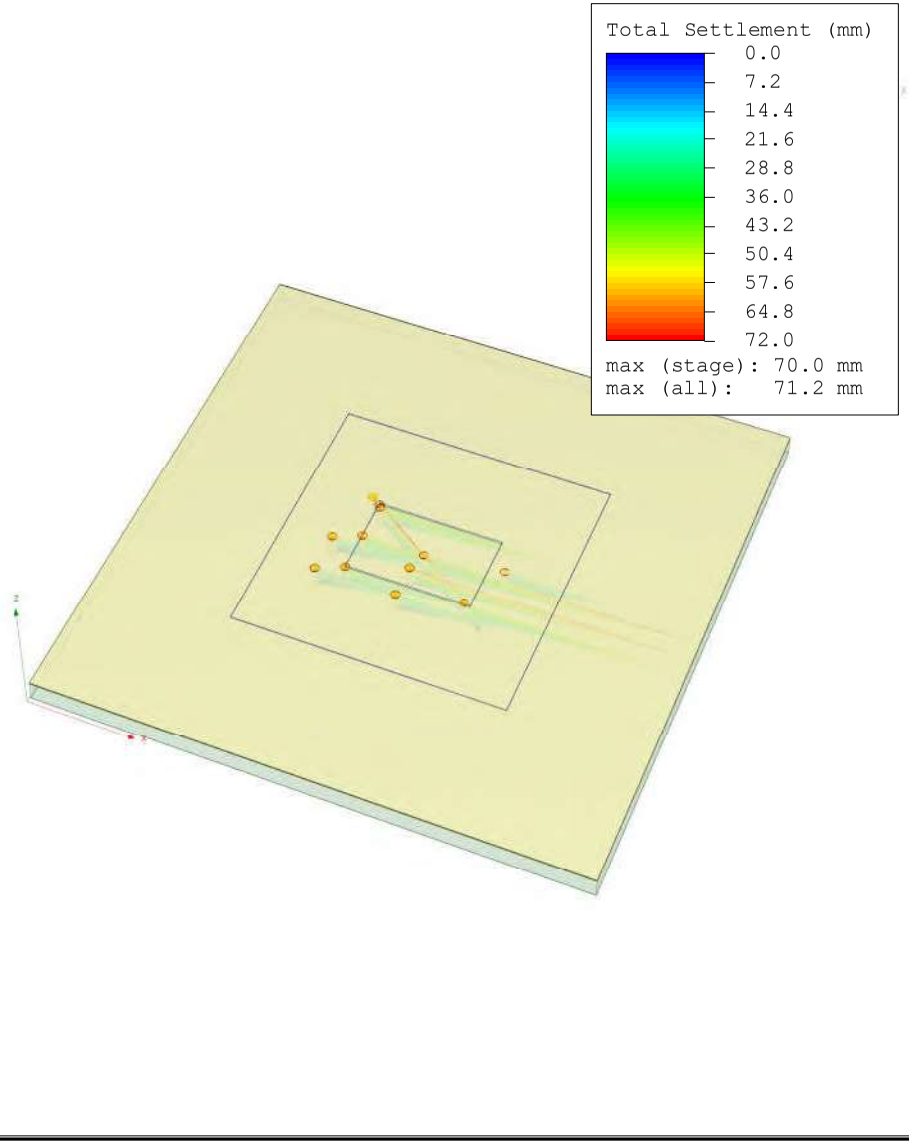
Layer #	Type	Thickness [m]	Elevation [m]
1	Gravel	0.3	0
2	Alluvium	6.2	-0.3



Soil Properties

Property	Gravel	Alluvium
Color		
Unit Weight [kN/m3]	20	16
Saturated Unit Weight [kN/m3]	20	16
Poisson's Ratio	0.2	0.3
K0	1	0.6
Immediate Settlement	Enabled	Disabled
E [kPa]	50000	-
Eur [kPa]	50000	-
Primary Consolidation	Disabled	Enabled
Material Type		Linear
mv [m2/kN]	-	0.0005
mvur [m2/kN]	-	0.0005
Undrained Su A [kN/m2]	0	0
Undrained Su S	0.2	0.2
Undrained Su m	0.8	0.8
Piezo Line ID	0	0





rocscience

SETTLE3 5.020

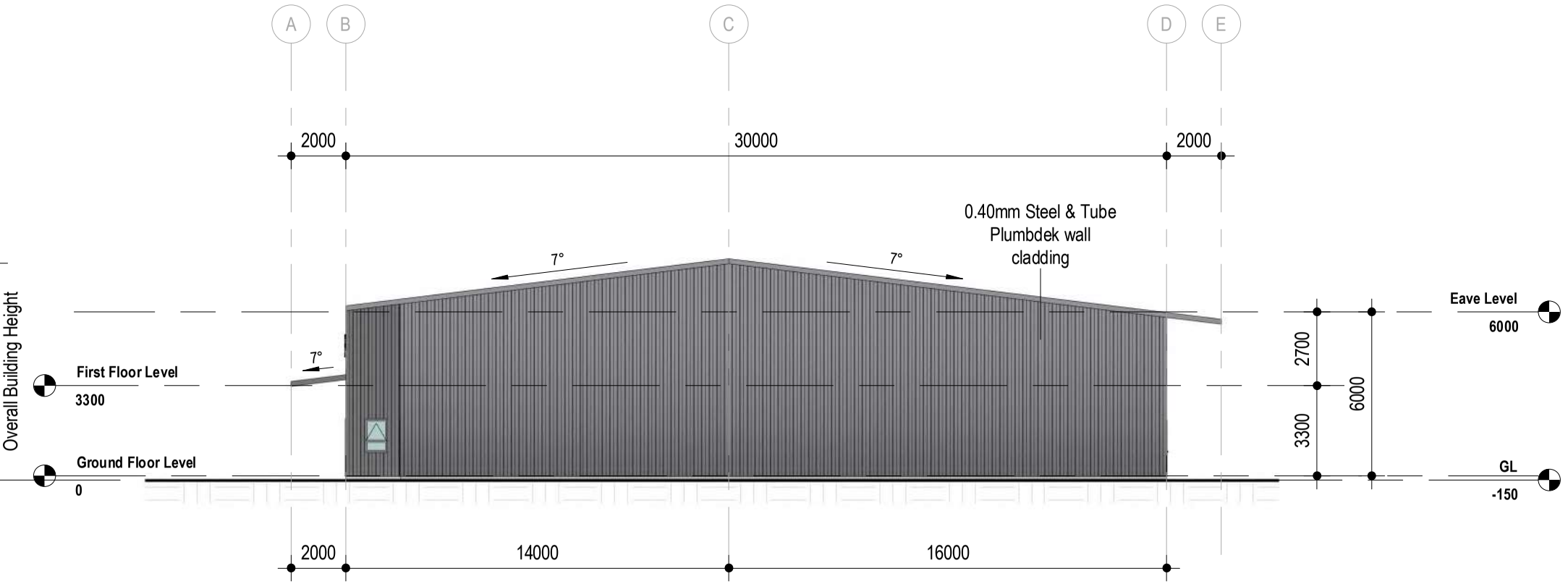
Project	Smart Steel Buildings		
Analysis Description	Preload and UDL		
Drawn By	W. Thorburn	*Company*	Haigh Workman Ltd
Date	28/02/2024	*File Name*	UDL preload.s3z

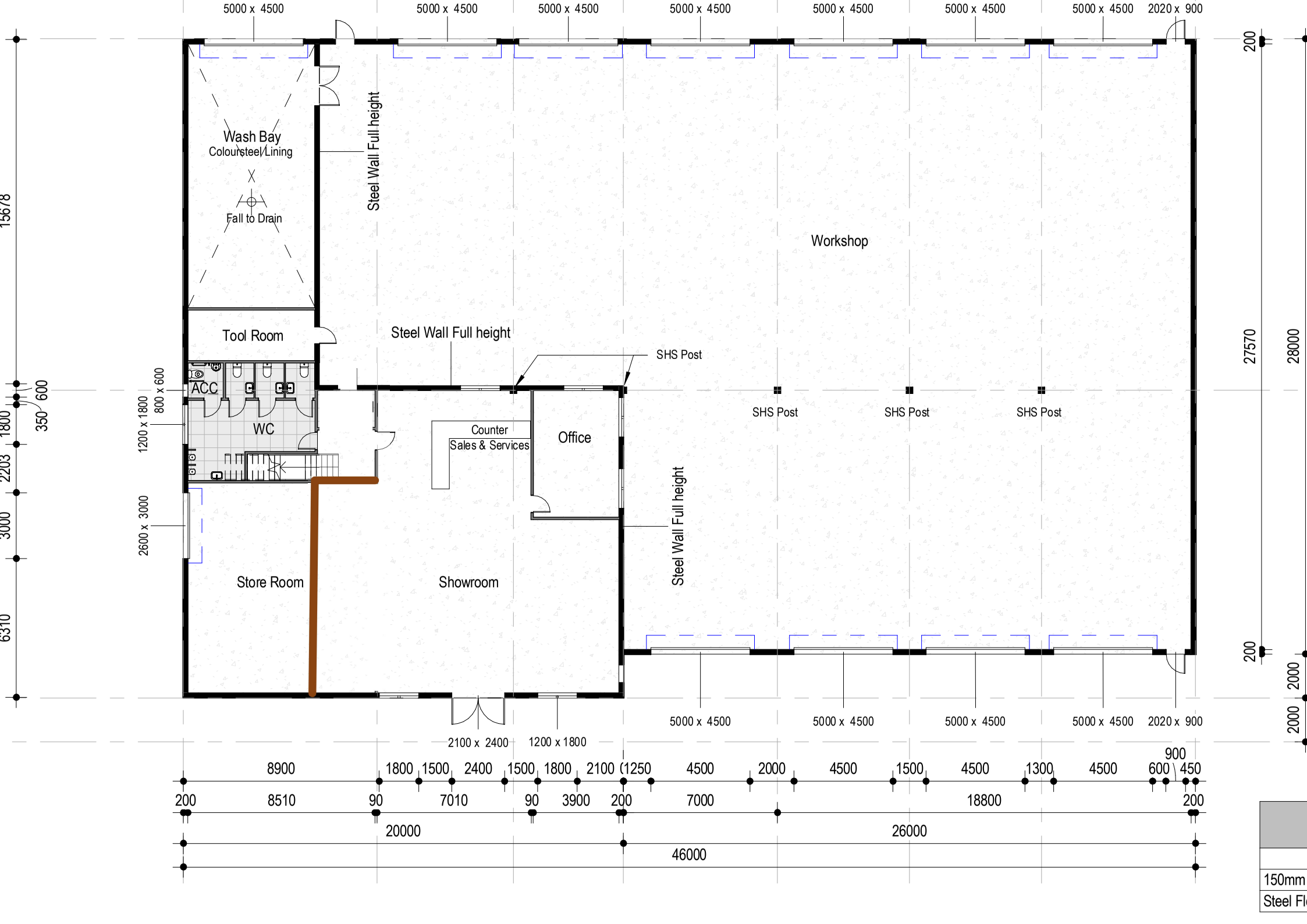
Appendix E – Provided Development Drawings

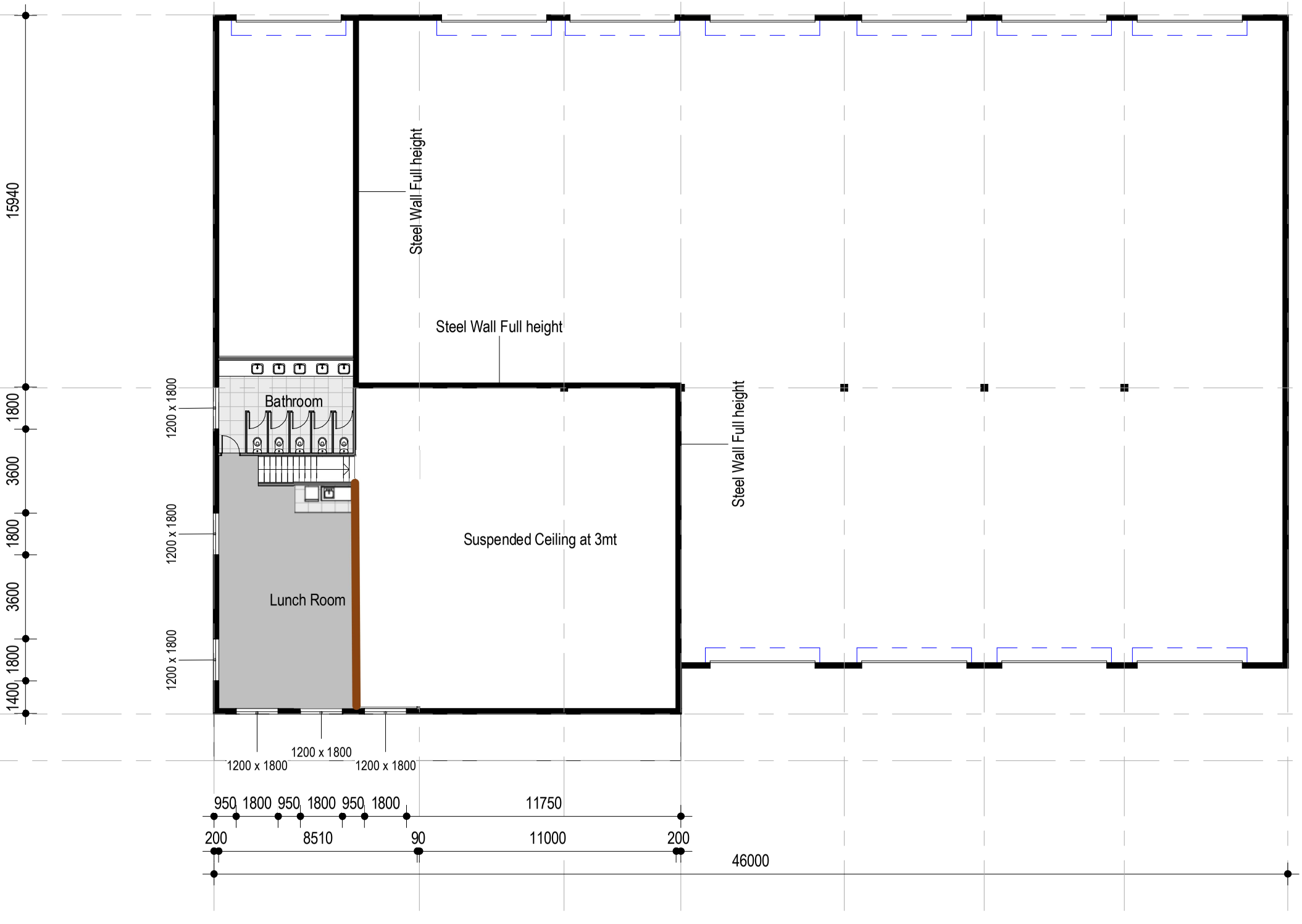
A03	First Floo
A04	Elevation
A05	Elevation
A06	Area Pla
A07	3D Views
A08	3D Views
A09	3D Views
A10	3D Views

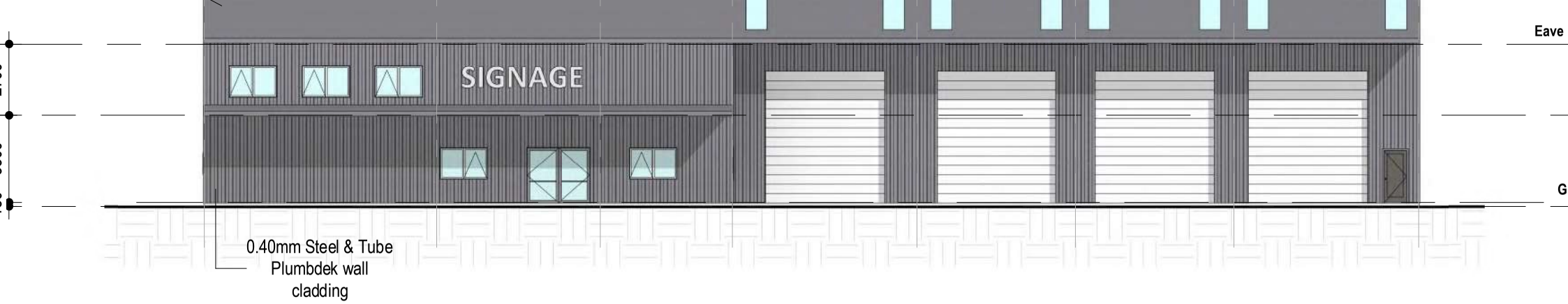

LOT 1
LOT 2
LOT 3
LOT 9
77.85 m BDY
33198
1
8
E
D
A
Building Proposed
29634
30009
80.62 m BDY
Carpark x 26
10000
15000
18440
ACC Carpark x 5
Carpark x 11
Entry / Exit
Entry / Exit
42.90 m BDY
42.89 m BDY
To Kahikatearoa Ln
ROAD TO VEST

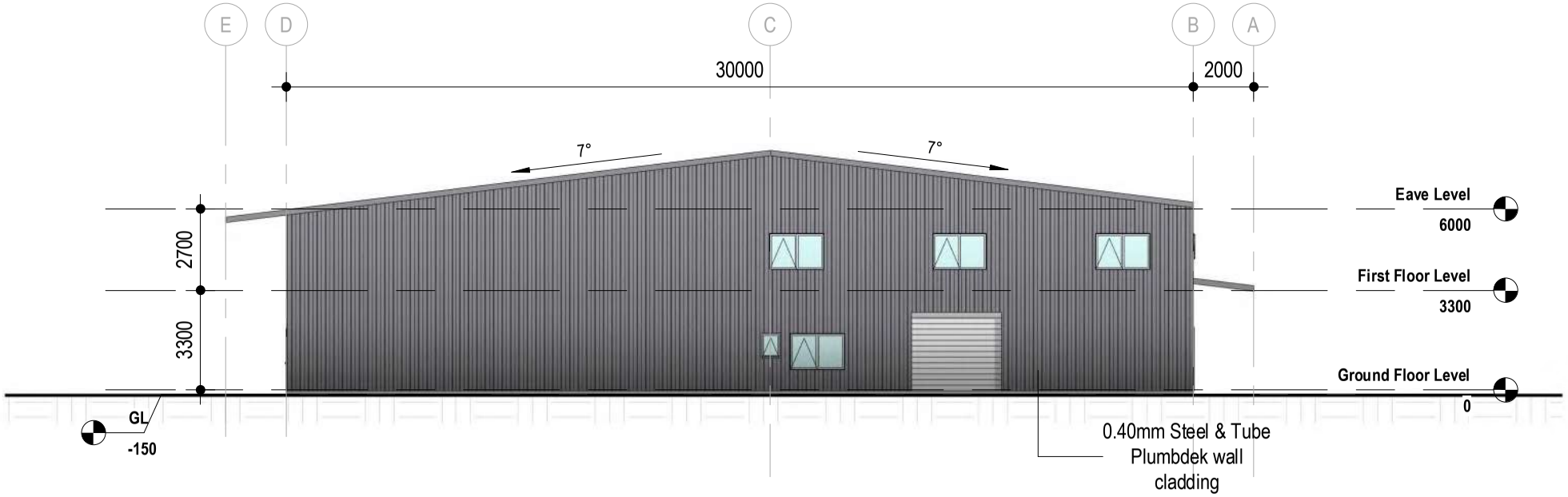

2700
3300
150
First Floor Le
Ground Floor Le
0.40mm Steel & Tube
Plumbdek wall
cladding

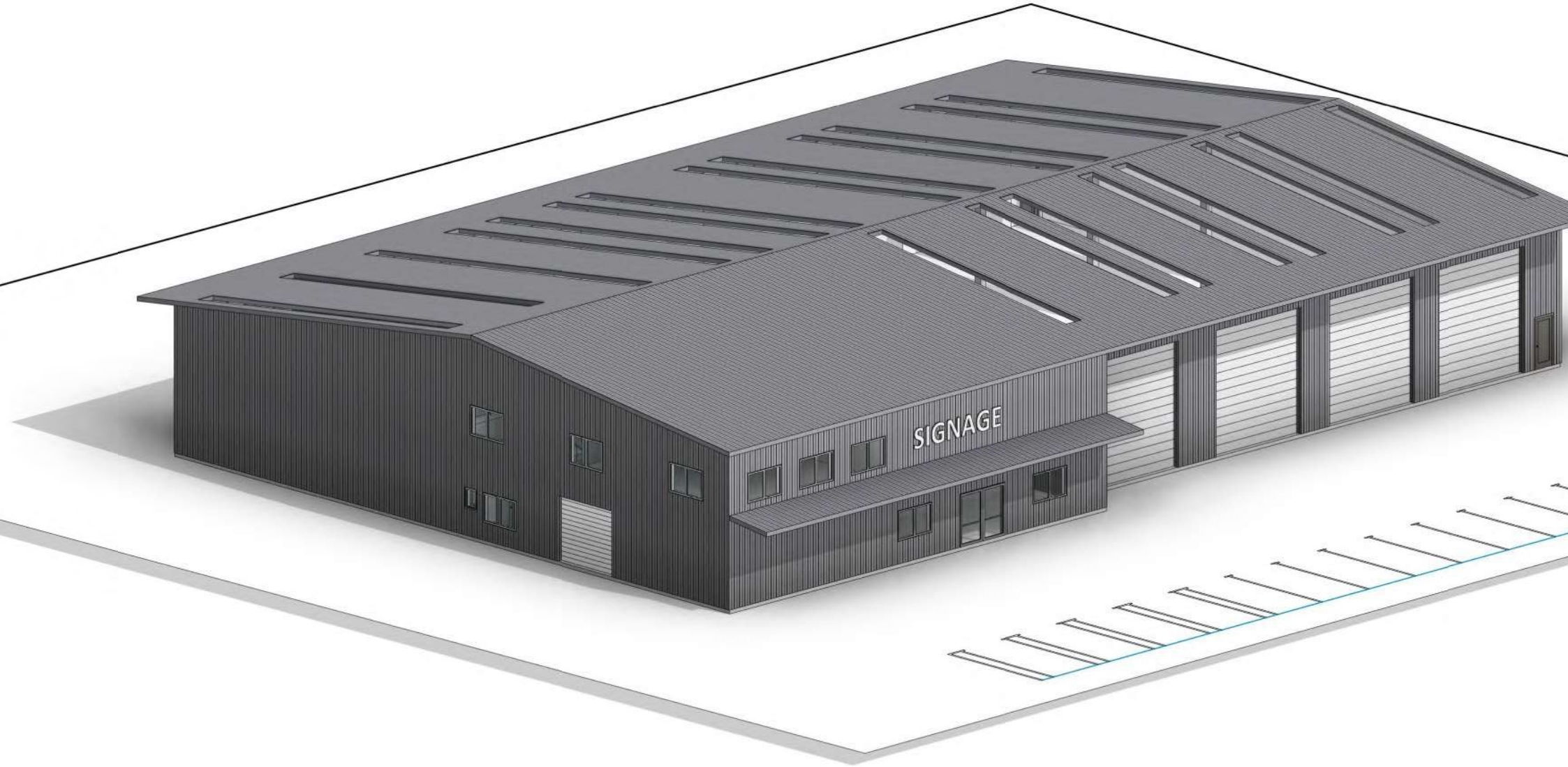

A
B
C
D
E
2000
30000
2000
0.40mm Steel & Tube
Plumbdek wall
cladding
7°
7°
7°
Overall Building Height
First Floor Level
3300
Ground Floor Level
0
Eave Level
6000
GL
-150
2700
3300
6000
2000
14000
16000

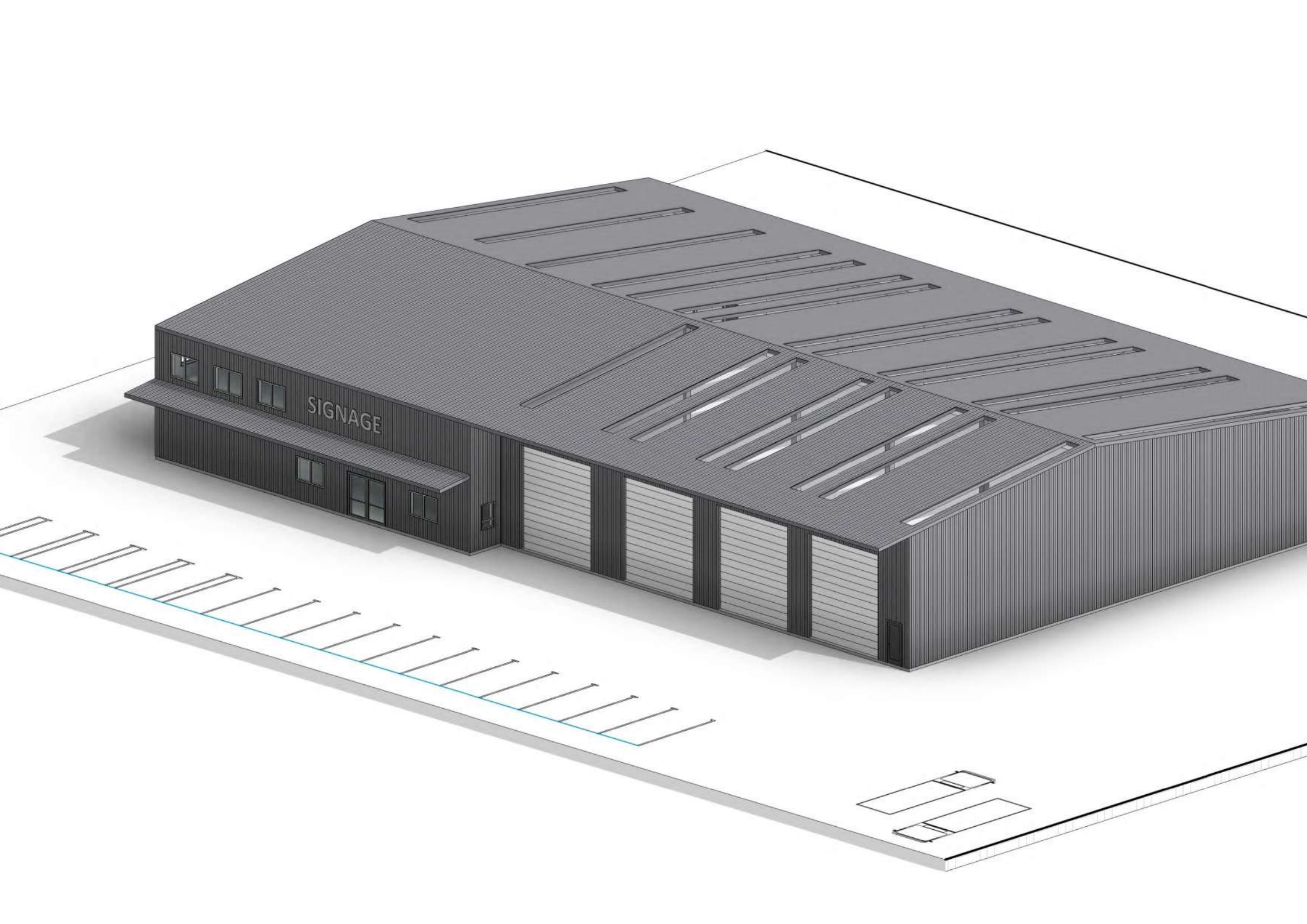

5000 x 4500
5000 x 4500
5000 x 4500
5000 x 4500
5000 x 4500
5000 x 4500
5000 x 4500
2020 x 900
Wash Bay
Colourstee/ Lining
Fall to Drain
Steel Wall Full height
Workshop
Tool Room
Steel Wall Full height
SHS Post
ACC
WC
1200 x 1800
800 x 600
Counter
Sales & Services
Office
SHS Post
SHS Post
SHS Post
2600 x 3000
Store Room
Showroom
Steel Wall Full height
5000 x 4500
5000 x 4500
5000 x 4500
5000 x 4500
2020 x 900
2100 x 2400
1200 x 1800
15678
350
600
1800
2203
3000
6310
200
27570
28000
200
2000
2000
8900
1800
1500
2400
1500
1800
2100
1250
4500
2000
4500
1500
4500
1300
4500
900
600
450
200
8510
90
7010
90
3900
200
7000
18800
200
20000
26000
46000
150mm
Steel Fl


Steel Wall Full height
Steel Wall Full height
Steel Wall Full height
Bathroom
Lunch Room
Suspended Ceiling at 3mt
1200 x 1800
1200 x 1800
1200 x 1800
1200 x 1800
1200 x 1800
1200 x 1800
15940
1800
3600
1800
3600
1800
1400
950 1800 950 1800 950 1800
11750
200
8510
90
11000
200
46000
150mm
Steel Fl


SIGNAGE
Eave
G
0.40mm Steel & Tube
Plumbdek wall
cladding


E
D
C
B
A
30000
2000
7°
7°
2700
3300
Eave Level
6000
First Floor Level
3300
Ground Floor Level
0
GL
-150
0.40mm Steel & Tube
Plumbdek wall
cladding


SIGNAGE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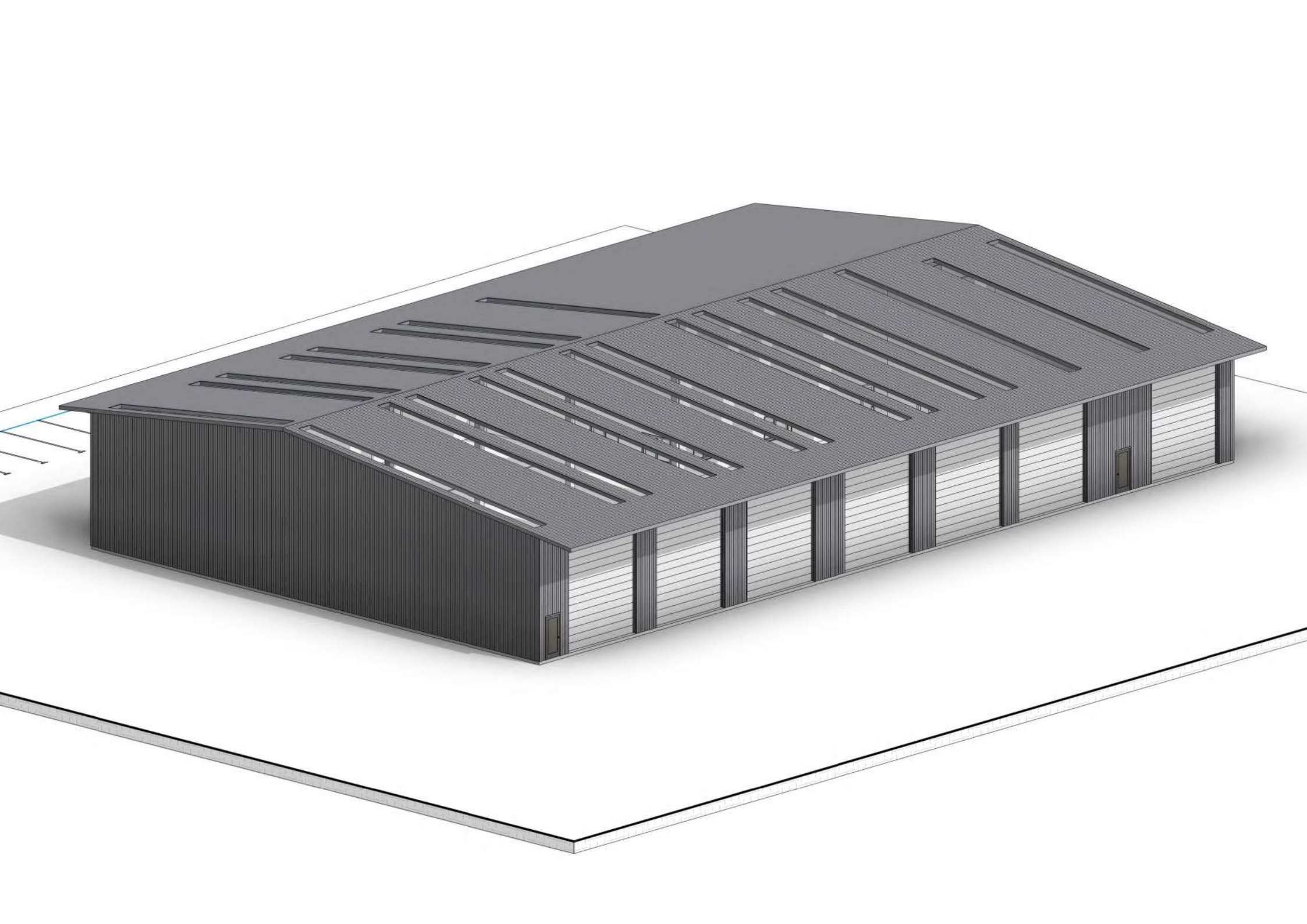
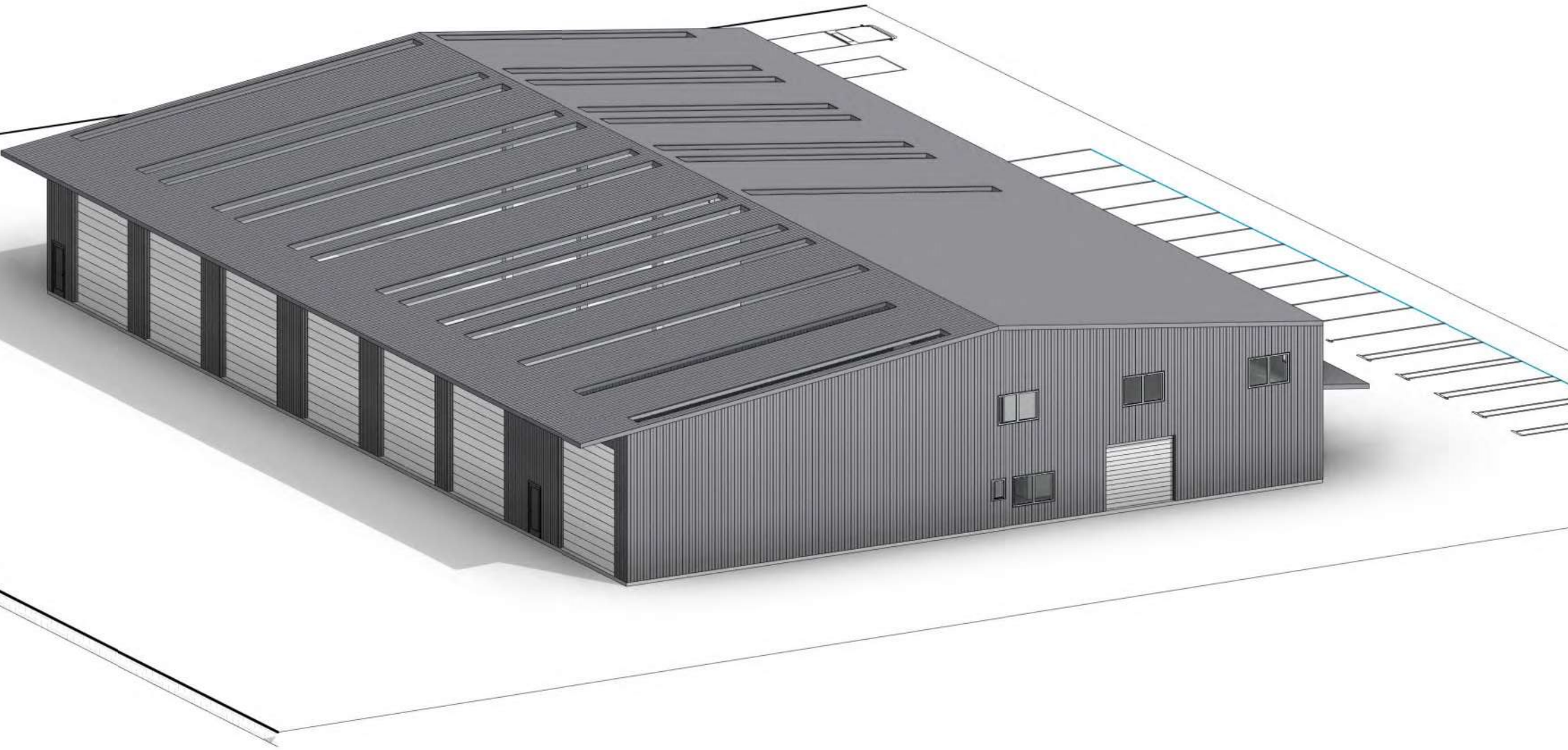




APPENDIX 5

HAIGH WORKMAN FLOOD HAZARD

ASSESSMENT REPORT

Flood Hazard Assessment

18 – 20 Kahikatearoa Lane, Waipapa
(Lots 2 & 3 DP 567982)

SmartSteel Buildings Limited

Haigh Workman reference: 24 243

Rev A

24 January 2025

Phone: 0800 424 447 • info@haighworkman.co.nz • www.haighworkman.co.nz
Kerikeri • Whangarei • Warkworth

Revision History

Revision №	Issued By	Description	Date
A	Aaron Thorburn	For Consent	24 January 2025

Prepared By

Aaron Thorburn
Senior Environmental Advisor
BAppSc (Env), CEnvP

Approved By

John Papesch
Senior Civil Engineer / Director
BE (Civil), CMEngNZ, CPEng

Table of Contents

Appendices

Executive Summary

Haigh Workman Limited was commissioned by SmartSteel Buildings Limited to undertake a flood hazard assessment for proposed development at 18 – 20 Kahikatearoa Lane, Waipapa.

The client is proposing to develop the subject site with a commercial / industrial development on concrete slab foundations. This report presents an assessment of the flood hazards as well as measures to adequately mitigate the risk.

The site is accessed via Kahikatearoa Lane to the south of the site in Waipapa. The ground contour appears generally flat with a slight incline towards the north. The site is currently vacant with commercial / industrial land-use in the immediate vicinity.

The site is mapped as being subject to river flooding (ponding). To guard against the risk of localised ponding occurring, proposed floor levels for the proposed structure should be based on achieving freeboard from the Priority Rivers Flood model (100-year event).

For the proposed commercial / industrial structure on concrete slab foundations, we recommend the following with respect to the mapped natural flooding hazard information:

- Building work / structures be set on a hardfill platform not less than 79.1 m New Zealand Vertical Datum,
- The raised building platform to extend for a distance of not less than 4 m from the building face on all sides,
- To avoid Council registering a hazard notice under Section 73 of the Building Act against the title, the land intimately connected to the structure, being the proposed structure platform, carpark, driveway and washwater and wastewater fields be raised above 100-year flood hazard level of 78.8 m New Zealand Vertical Datum, and
- The building floor level be established on site at time of building consent by a Registered Surveyor familiar with this report.

1 Introduction

Haigh Workman Limited (Haigh Workman) was commissioned by SmartSteel Buildings Limited (the client) to undertake a flood hazard assessment for proposed development at 18 – 20 Kahikatearoa Lane, Waipapa (the site).

The client is proposing to develop the subject site with a commercial / industrial development on concrete slab foundations. This report presents an assessment of the flood hazards as well as measures to adequately mitigate the risk.

The site is located on near-level ground immediately in Waipapa, the site is currently vacant, immediately surrounded by other vacant properties with commercial / industrial development in the surrounding area.

1.1 Applicability

This report has been prepared for the use of SmartSteel Buildings Limited with respect to the particular brief outlined to us. This report is to be used by our client and their consultants and may be relied upon when considering flood hazard advice. Furthermore, this report may be utilised in the preparation of building and / or resource consent applications with local authorities. The information and opinions contained within this report shall not be used in other context for any other purpose without prior review and agreement by Haigh Workman.

The comments and opinions presented in this report are based on the findings of the desk study and information available from reference documents, namely Northland Regional Council (NRC). There may be other facts prevailing for the site which have not been revealed by this investigation and which have not been considered by this report. As well as that, studies relating to this report are driven by climate change which is subject to change. The estimates presented in this report are based on information available at the time of writing. Responsibility cannot be accepted for any conditions not revealed by this investigation. Any diagram or opinion on the possible configuration of strata or other spatially variable features between or beyond investigation positions is conjectural and given for guidance only.

2 Site Description

Site Address:	18-20 Kahikatearoa Lane, Waipapa
Legal Description:	Lot 2 & 3 DP 567982
Lot Area:	6,842 m^2 (Lot 2 – 3,412 m^2 & Lot 3 – 3,430 m^2)
Council Zoning:	Industrial

The site is a square shaped parcel (more or less) positioned in a commercial / industrial setting in Waipapa, the site is currently vacant (grassed) and is accessed via Kahikatearoa Lane to the south of the site. The site and surrounding area are near-level. The nearest surface water feature is the Waipekakoura River located approximately 250m southwest of the site.

Ground level contours range from 78.5 m – 79.0 m on the proposed development site and between 76 m – 82 m New Zealand Vertical Datum (NZVD 2016) in the nearby surrounding area. The site has a natural slight decline towards the south to Kahikatearoa Lane.

Kahikatearoa Lane is a new road recently vested with Far North District Council (FNDC). The road level has been set specifically low so that it acts as an overland flow path for flood waters, site runoff from the site will flow naturally to the south into Kahikatearoa Lane and will avoid flood water spilling through the subject site onto neighbouring properties.

The Site Location Plan is shown in Figure 1 below and provided in **Appendix A**.

Figure 1: Site Location *(Source: Far North District Council GIS Webmaps)*

2.1 Proposed Development

We understand that Commercial Diesel Limited intends to develop the site with the construction of a new Vehicle Maintenance Facility as per drawings provided by Smart Steel Buildings Limited. The proposed building works are situated more in the southern portion of the property with a structure and a concrete carpark, the balance of the site will be a metalled yard with proposed vehicle washwater and wastewater disposal areas along the northern boundary of the site.

The Proposed Development Plan is provided in **Appendix A**.

3 Flood Hazard Assessment

3.1 River Flood Hazard Zones

The site is situated near the Waipekakoura River (approximately 250 m southwest of the site) which is mapped by the NRC as a priority river. The priority river flood models for the 50-year (2% Annual Exceedance Probability [AEP]) & 100-year + climate change (1% AEP) extent are presented in Figures 2 & 3 below.

A full copy of the NRC Flood Level Report is provided in **Appendix B**.

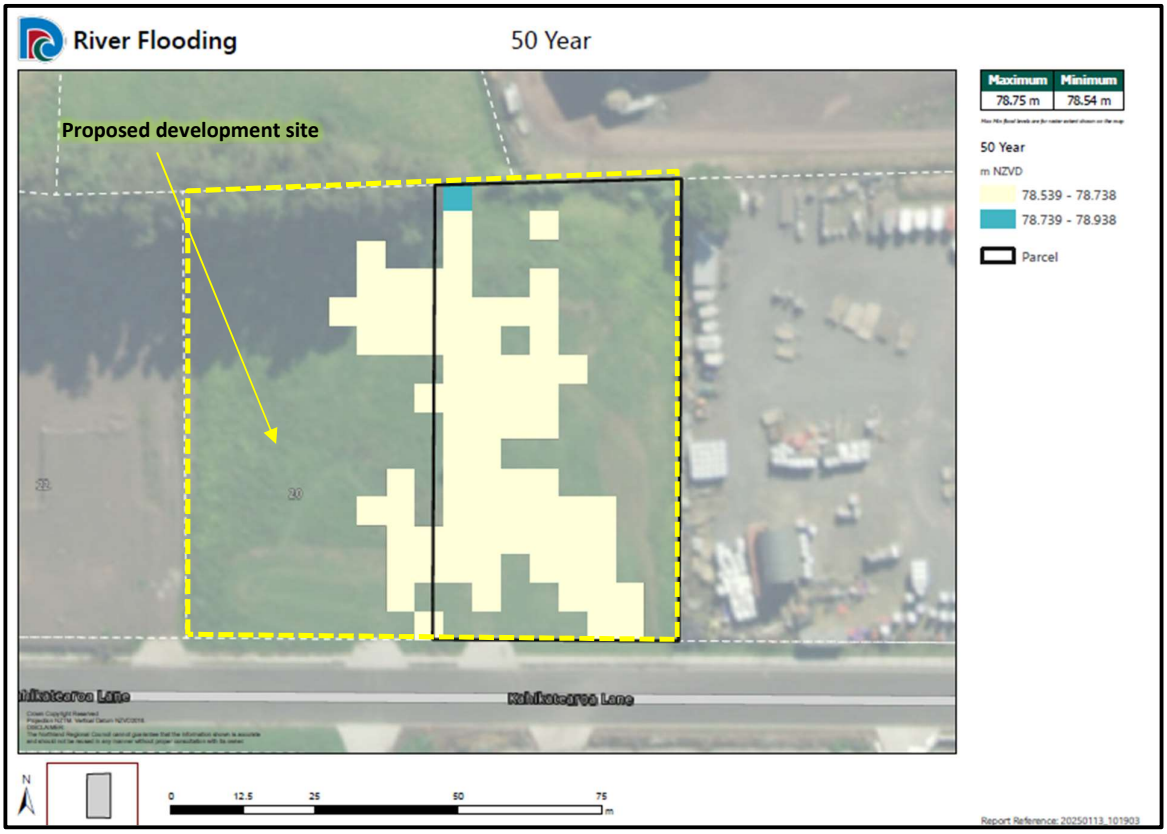


Figure 2: River Flood Hazard Zone 50-year (Priority Rivers) *(Source: Northland Regional Council)*

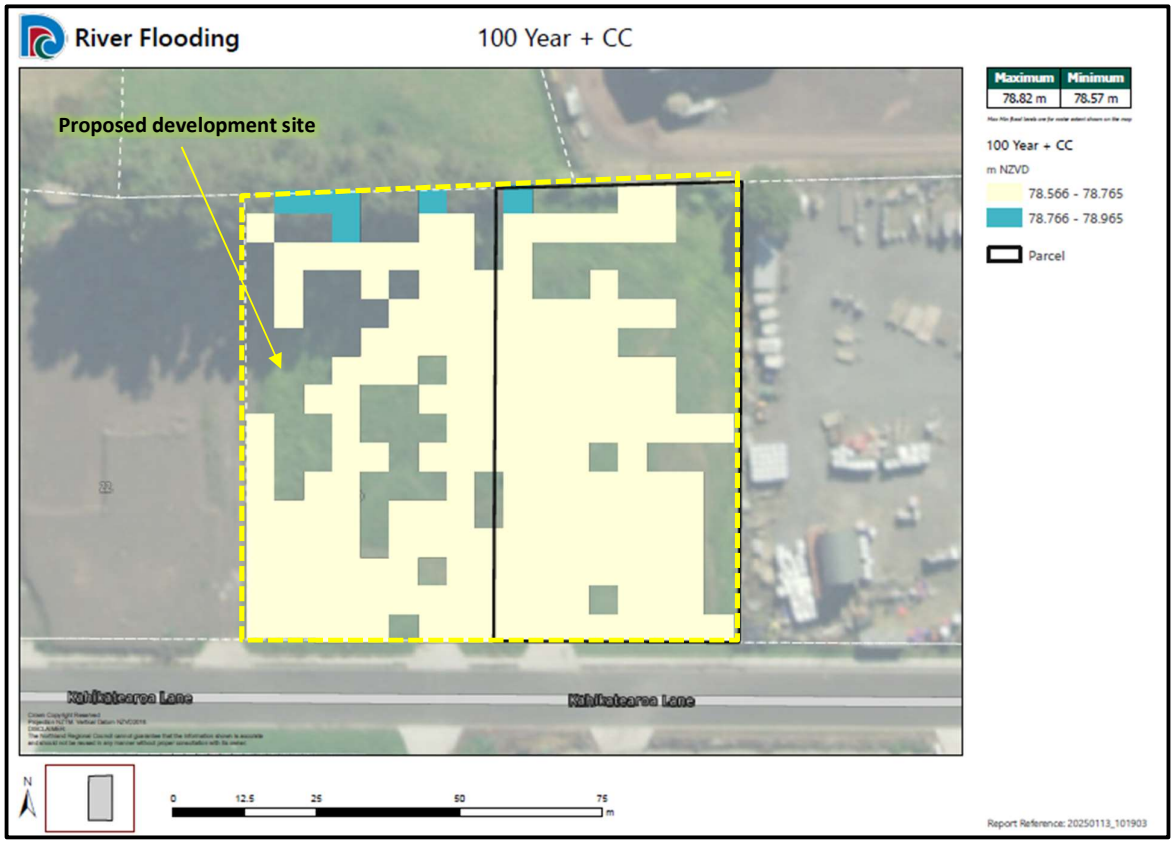


Figure 3: River Flood Hazard Zone 100-year (Priority Rivers) *(Source: Northland Regional Council)*

3.2 Flood Depths for the Site

The topographical survey for the site shows the levels typically vary from RL 78.7 m NZVD in the north to RL 78.6 m NZVD in the south, with some shallow undulations.

The existing site is modelled to be potentially affected by river flooding 50-year (RL 78.75 m NZVD) and 100-year plus climate change (RL 78.82 m NZVD). Flood depths for 100-year plus climate change (RL 78.82 m NZVD) are assessed and provided in Table 1 and Figure 4 below.

Table 1: Flood Depth Summary

Location	Ground Level (NZVD)	Flood Elevation (100 year + CC) (NZVD)	Site Flooding (m acgl)	Comment
Proposed building site	78.6 – 78.7 m	78.82 m	0.1 – 0.2 m	Raise slab above (100-year + CC) flood level and include freeboard for industrial structures (0.3 m)
Concrete Carpark	78.6 m		0.2 m	Construct above (100-year + CC) flood level
Washwater disposal field	78.7 m		0.1 m	Construct above (100-year + CC) flood level
Wastewater disposal field	78.8 – 79.1 m		0.1 m	Construct above (100-year + CC) flood level
Driveway	78.6 m		0.2 m	TBC

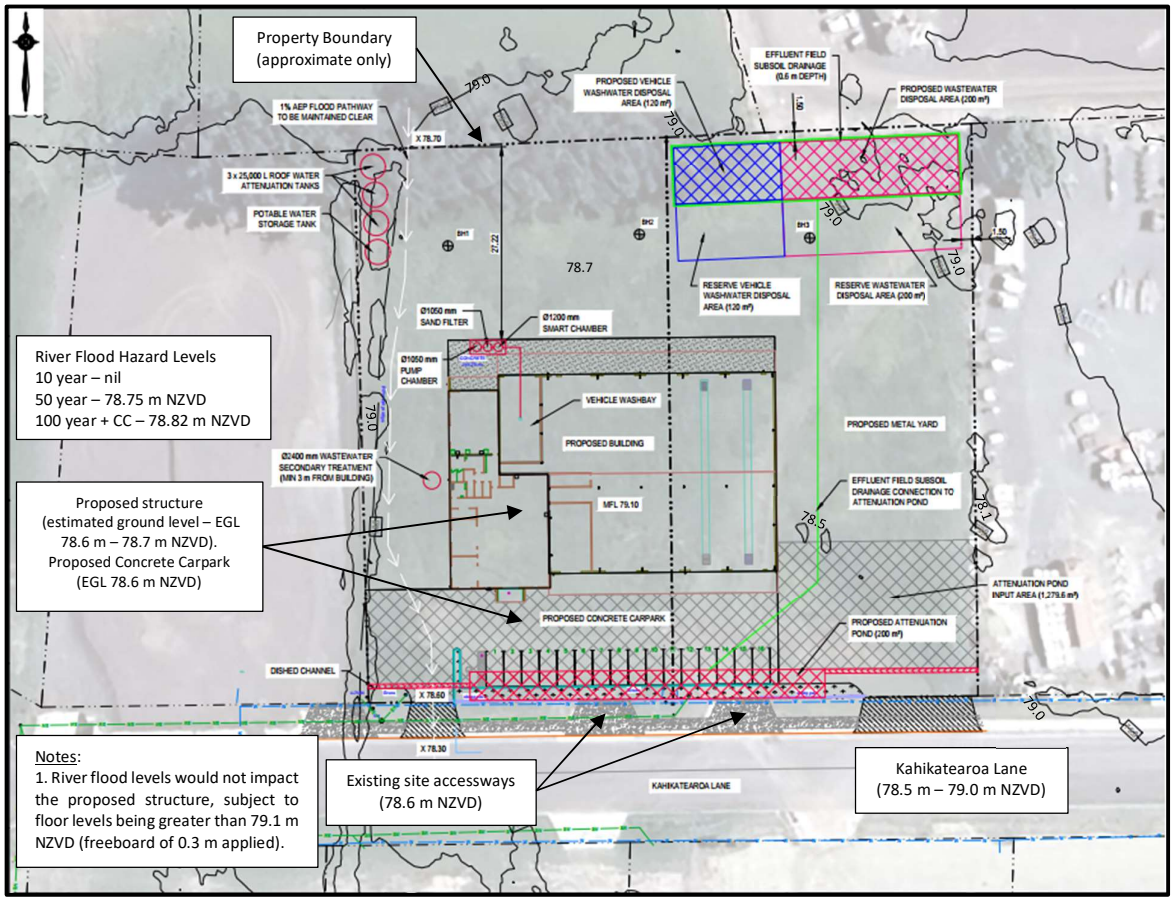


Figure 4: NRC LiDAR Ground Level Contours with Proposed Development Superimposed *(Source: Haigh Workman Limited)*

4 Regulatory Framework

The following regulations relating to flood assessment have been considered:

- Far North District Council (FNDC) (Operative) District Plan (2009),
- FNDC Engineering Standards (2023),
- New Zealand Standards 4404: 2010 Land Development and Subdivision Engineering (NZS4404:2010),
- New Zealand Building Code (E1 – Surface Water) (2004), and
- Northland Regional Policy Statement (2016).

4.1 FNDC Engineering Standards

Section 4.3.10.7 – Freeboard

The structure shall be set above the 1% Annual Exceedance Probability (AEP) (100-year event) or lesser event plus 0.3m (commercial and industrial buildings).

Minimum floor levels shall be identified on the proposed development site where flood risks are for 1% AEP (100-year event) or lesser event. This assessment considers flooding caused by different sources including:

- Rivers.

4.2 NZS 4404:2010 'Land Development and Subdivision Engineering'

The New Zealand Standards 4404:2010 Land Development and Subdivision Engineering document states:

> **4.3.5.2 Freeboard**
>
> The minimum freeboard height additional to the computed top water flood level of the 1% AEP (100-year event) design storm should be as follows or as specified in the district or regional plan:
>
> | **Freeboard** | **Minimum height** |
> |---|---|
> | Habitable dwellings (including attached garages) | 0.5 m |
> | Commercial and industrial buildings | 0.3 m |
> | Non-habitable residential buildings and detached garages | 0.2 m |
>
> The minimum freeboard shall be measured from the top water level to the building platform level or the underside of the floor joists or underside of the floor slab, whichever is applicable.

4.3 Building Code (E1 Surface Water)

New Zealand Building Code Clause E1 Surface Water: E1.3.2 specifies that, 'surface water, resulting from an event having a 2% AEP (50-year event), shall not enter buildings'. The Code notes that this Performance Measure applies only to housing, communal residential and communal non-residential buildings. It does not apply to commercial or industrial buildings.

4.4 Northland Regional Policy Statement

Under the Northland Regional Policy Statement (NRPS) Section 7.1.2 – Policy – New subdivision and land-use within 10-year and 100-year flood hazard areas, a new subdivision, built development (including wastewater treatment and disposal systems), and land-use change may be appropriate within 10-year and 100-year flood hazard areas provided the following are met:

(a) Hazardous substances will not be inundated during a 100-year flood event, and
(d) Commercial and industrial buildings are constructed so as to not be subject to material damage in a 100-year flood event.

4.5 Minimum Floor Level for the Proposed Development

FNDC Engineering Standards and NZS 4404:2010 specify that commercial and industrial structures shall be set above the 100-year return period flood level plus 0.3m.

On this basis we recommend a minimum floor level of not less than 79.1m NZVD (100 year + CC – 78.8m plus 0.3m freeboard) for the proposed commercial structure. This would place the floor level between 0.4m and 0.5m above the existing ground level.

As the site is near flat, the floor level may need to be greater than that specified in order to achieve positive drainage for the site. Final site levels, floor levels and drainage will need to be evaluated as part of the civil engineering design.

5 Building Act (2004)

Sections 71 and 72 of the Building Act (2004) and the Natural Hazard Provisions Guidance (MBIE, 2023) were assessed for the site in regard to land development where natural hazards have been considered.

Buildings under the Act, 8(1)(a) building means:

- *a temporary or permanent movable or immovable structure (including a structure intended for occupation by people, animals, machinery, or chattels).*

5.1 Building Act – Section 71

Building on Land Subject to Natural Hazards

Under Section 71(1) of the Building Act 2004, A building consent authority must refuse to grant a building consent for construction of a building, or major alterations to a building, if:

a) the land on which the building work is to be carried out is subject or is likely to be subject to 1 or more natural hazards, or

b) the building work is likely to accelerate, worsen, or result in a natural hazard on that land or any other property.

However, under Section 71(2), the Section 71(1) restriction does not apply if the Building Consent Authority is satisfied that adequate provision has been made, or will be made to:

(a) protect the land, building work, or other property referred to in that subsection from the natural hazard or hazards, or

(b) restore any damage to that land or other property as a result of the building work.

The potential hazard at this site is the proposed commercial / industrial structure development in an area modelled within the 50-year (5% AEP) and 100-year (1% AEP) River Flooding Hazard Zone susceptible to ponding.

A building can be protected from inundation with the safe floor level provided by this report (refer Section 4.6 above). We consider that a Building Consent can be issued with the conditions that the minimum floor levels are based on recommended freeboard above the 1% AEP published flood levels.

The proposed buildings will not accelerate, worsen, or result in a natural hazard on the property or any other properties.

Our assessment of Section 71(2)(a) for "adequate provision" as listed in the FNDC Natural Hazards Guidance Notes, is provided in Table 1 below:

Table 2: Section 71(2)a - Assessment Criteria

Assessment criterion	Assessment
Confirmation that suitable mitigation of the relevant natural hazards has been or will be achieved on the site.	To guard against localised ponding, floor level for the proposed building shall be set in accordance with FNDC Engineering requirements being 0.3 m above the 100-year river flood hazard zone. The site has a natural slight decline towards the south to Kahikatearoa Lane. The road level has been set specifically low so that it acts as an overland flow path for flood waters, the development of the structure and associated infrastructure will not dam and divert floodwater, site runoff from the site will flow naturally to the south into Kahikatearoa Lane and will avoid flood water spilling through the subject site onto neighbouring properties.
Confirmation that the proposed design incorporates appropriate protection of the land, the building work, or other property and / or that any damage to the land or other property will be restored.	The building shall be designed with minimum 0.3m freeboard above the 100-year + CC flood levels. The proposed structure will not exacerbate natural hazards on other properties.
Producer Statement (PS1) certification of the design.	A Registered Surveyor's certificate should form part of the building consent conditions, to certify the floor levels satisfy the minimum requirements of this report
Assessment of compliance with the New Zealand Building Code 2004.	The FNDC Engineering Standards are more stringent than the performance requirement of the Building Code Clause E1 with regard to return period. Therefore, the floor level complies with a factor of safety. We have adopted the MBIE 2023 guidance notes as a method of considering compliance.

5.2 Building Act 2004 – Section 72

Building consent for building on land subject to natural hazards must be granted in certain cases

Despite Section 71, a building consent authority that is a territorial authority must grant a building consent if the building consent authority considers that:

a) the building work to which an application for a building consent relates will not accelerate, worsen, or result in a natural hazard on the land on which the building work is to be carried out or any other property, and

b) the land is subject or is likely to be subject to 1 or more natural hazards, and

c) it is reasonable to grant a waiver or modification of the building code in respect of the natural hazard concerned.

In the situation of the Council considering land on which a building is placed to be subject or likely to be subject to a natural hazard a Section 72 notice is registered on the title. A Section 72 notice may affect the owner's ability to obtain appropriate insurance cover. This report recommends engineered fill under the building platform in order to achieve the desired floor level, if this is undertaken, we consider Section 72 notice on the title is not warranted.

5.3 MBIE Natural Hazards Provisions

Reference is made to the Building Performance Guidance Version 1 October 2023. The purpose of the guidance is to support the understanding on compliance with the natural hazard provisions in Sections 71 to 74 of the Building Act 2004.

5.3.1 Land Intimately Connected

This is the land that is 'intimately connected', or closely associated, with the building work (refer to Figure 5 below). Land 'intimately' connected may include:

- the accessway to the building from the road or other public, or private, access point,
- the accessway to and around ancillary buildings associated with the principal building,
- the access to amenity features such as detached garages and swimming pools, and
- septic tank systems and their drainage fields.

If the right protective measures are put in place (freeboard above 100-year + CC levels) to protect land intimately connected, then a building consent can be granted and section 72 of the Building Act does not need to be considered.

If only the building work is protected (freeboard above 100-year + CC levels) without consideration for land intimately connected, then a building consent can be granted under section 72 with a section 73 conditions.

5.3.2 Adequate Provision to Protect the Building Work

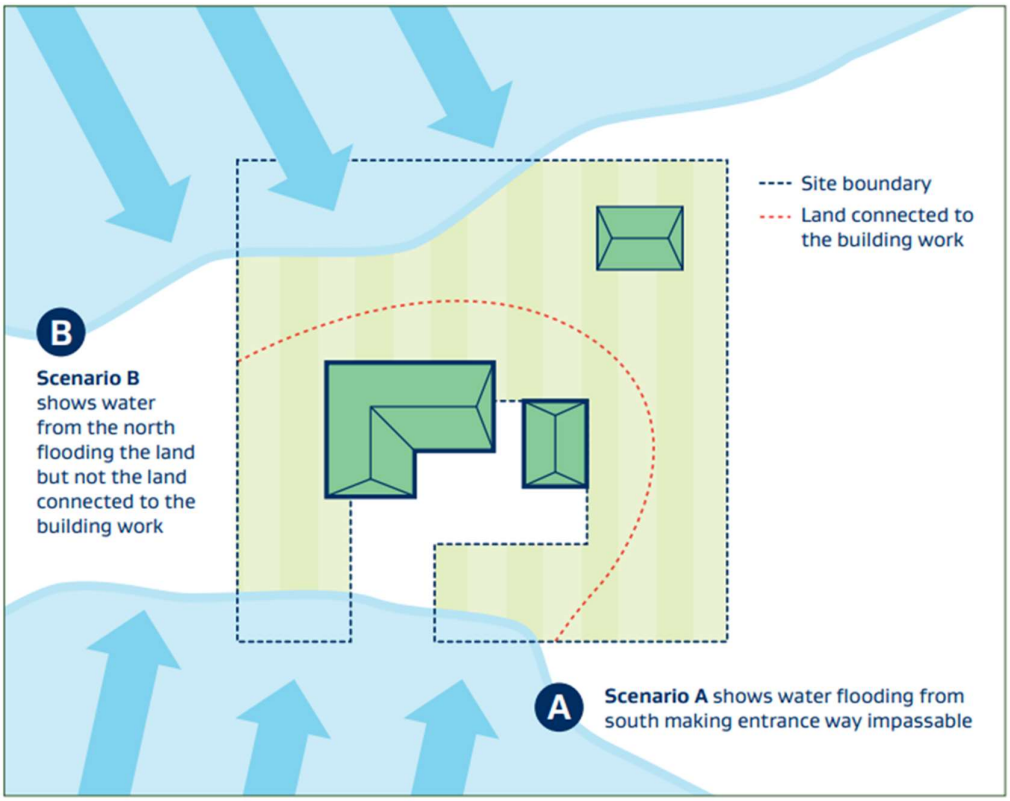


Figure 5: Adequate provision to protect the land (land intimately connected) *(Source: MBIE)*

The guidance tells us that building consent can be granted if adequate provision has been made to protect the land, building work and other property. Adequate provision does not require the elimination of all risk and a council can be expected to take a pragmatic and measured common-sense approach to the level of protection on a case-by-case basis.

5.4 Discussion

For the proposed commercial / industrial structure, this would mean raising the ground level between 0.4 m and 0.5 m. The raised platform would need to extend for a distance of not less than 4 m from the building face on all sides.

Associated with the proposed development is carparking, driveways and washwater and wastewater fields, to ensure these are protected as land intimately connected, it is recommended that these areas be raised to the 100-year + CC flood levels.

It should be noted that raising the building platform will not guarantee access as the 50-year and 100-year + CC river flooding hazard zones are mapped as ponding Kahikatearoa Lane east and west of the site. Refer Figure 6 below.

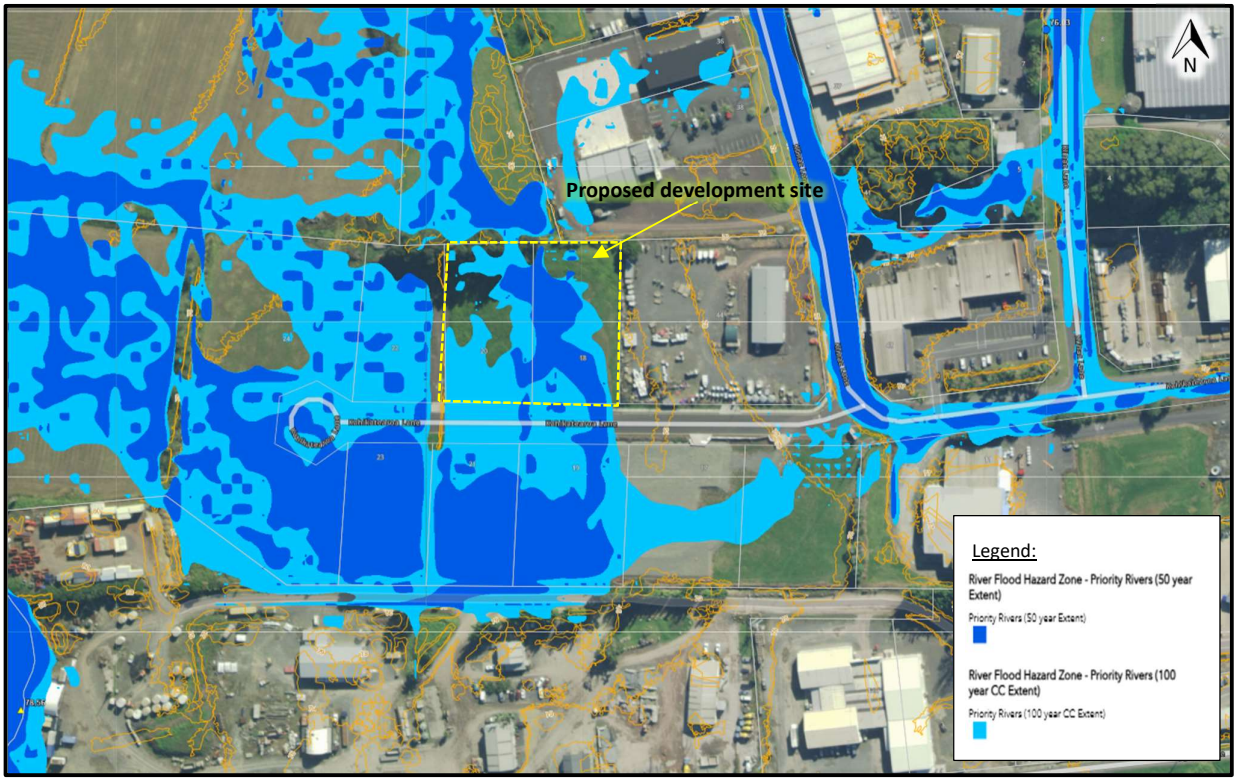


Figure 6: River Flooding of Surrounding Area (Source NRC Priority Rivers 50-year and 100-year + CC events)

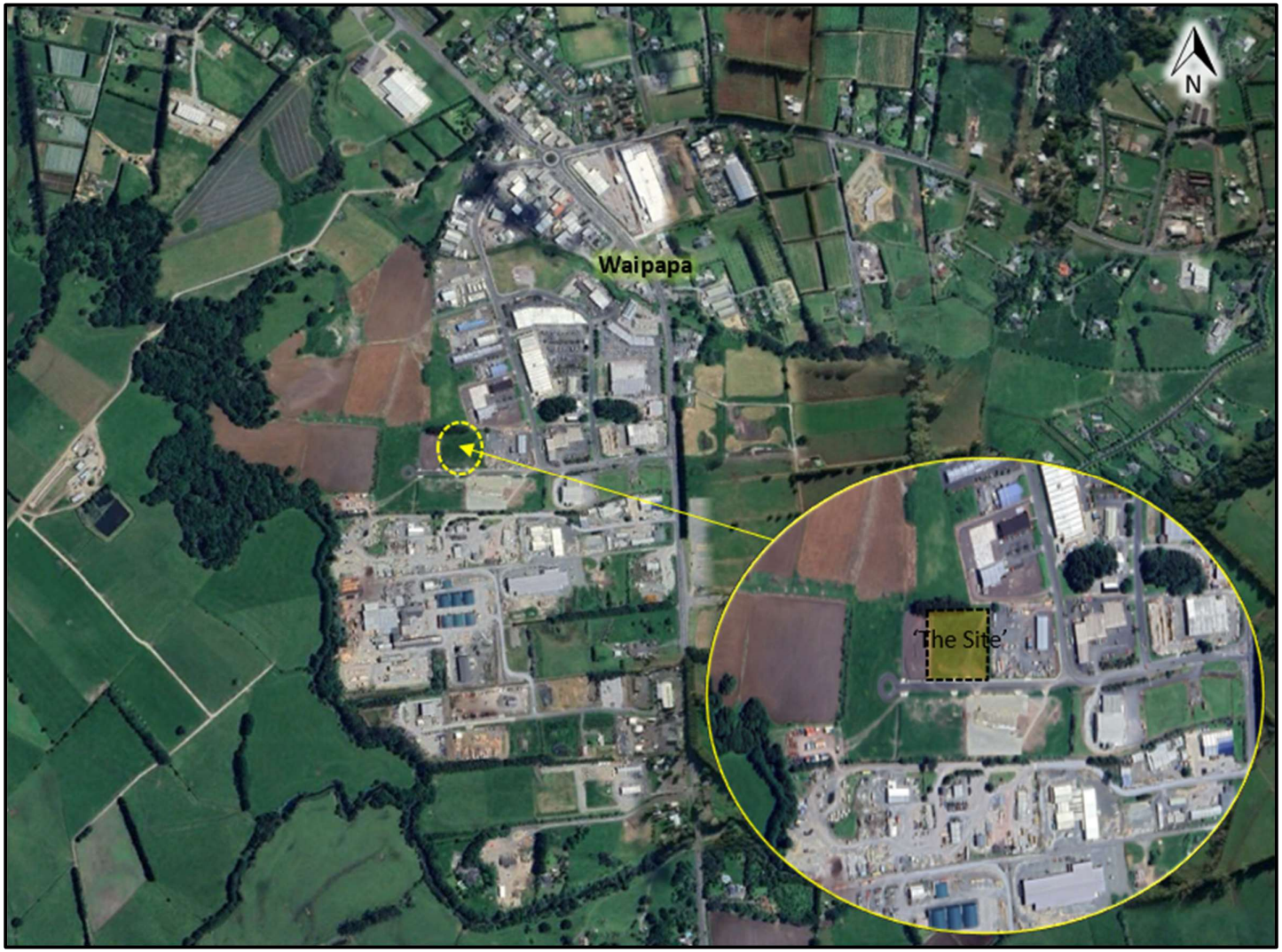
6 Recommendations

For the proposed commercial / industrial development of the site we recommend the following with respect to the mapped natural river flooding hazards:

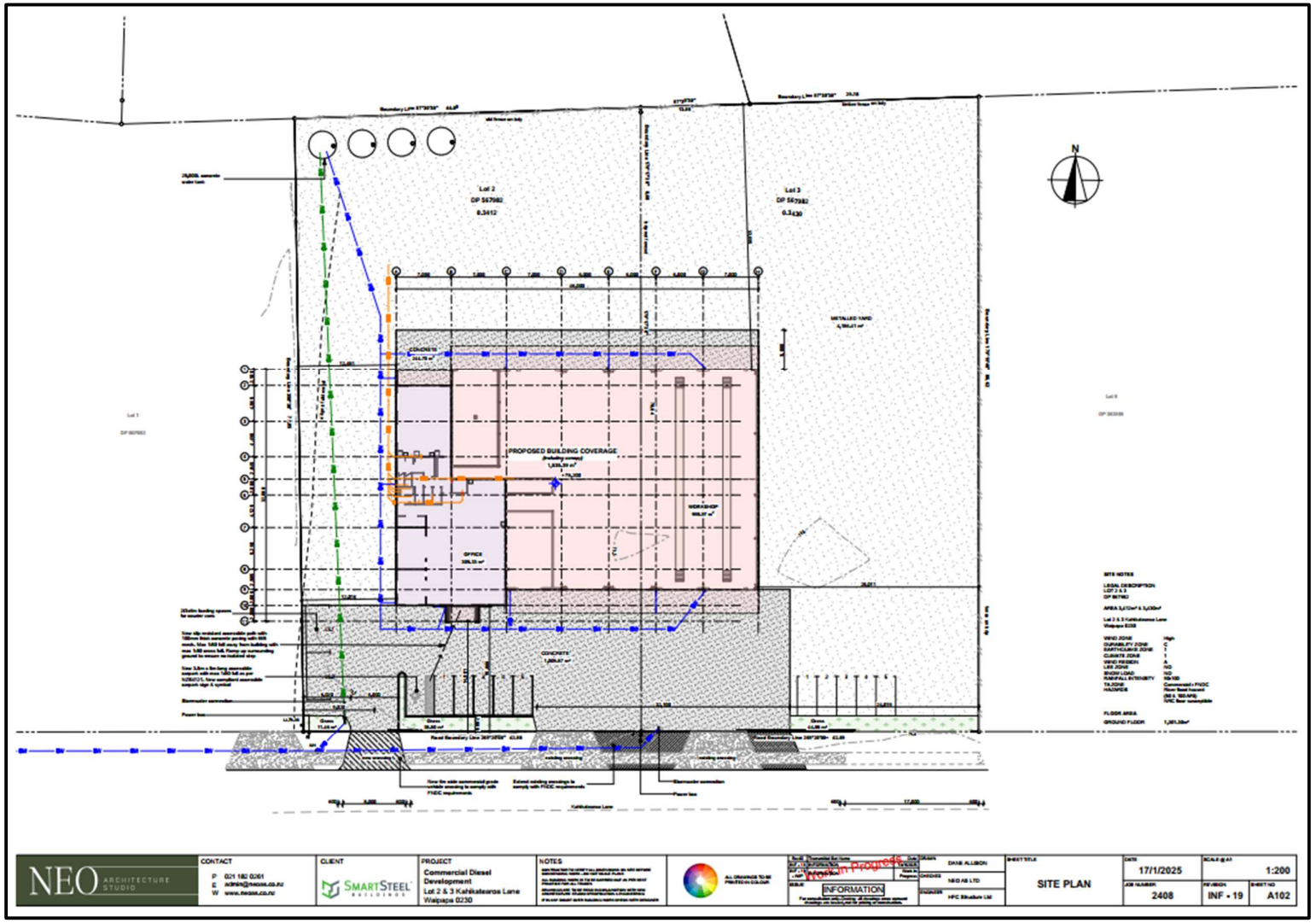
- Building work / structures be set on a hardfill platform not less than 79.1 m New Zealand Vertical Datum,
- The raised building platform to extend for a distance of not less than 4 m from the building face on all sides,
- To avoid Council registering a hazard notice under Section 73 of the Building Act against the title, the land intimately connected to the structure, being the proposed structure platform, carpark, driveway and washwater and wastewater fields be raised above 100-year flood hazard level of 78.8 m NZVD, and
- The building floor level be established on site at time of building consent by a Registered Surveyor familiar with this report.

End of Report – Appendices to follow.

Appendix A – Site Plans



24 243 / 1 – Site Location Plan



24 243 / 2 – Proposed Development Plan

Appendix B – NRC Flood Maps

Flood Level Report

Northland Regional Council
Te Kaunihera ā rohe o Te Taitokerau

Parcel ID: 8382793

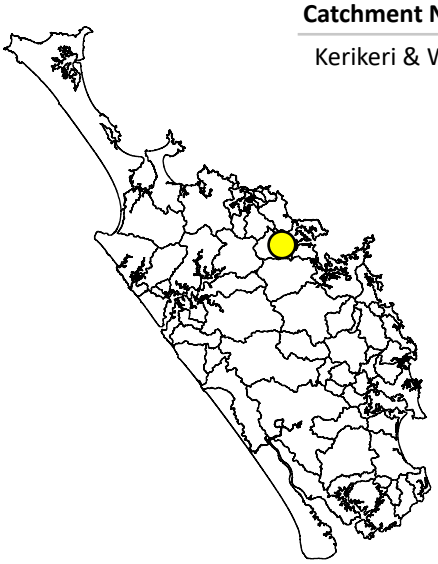
Title: 1019561

Appellation: Lot 3 DP 567982

Survey Area: 3,430 m²

Catchment Name(s)

Kerikeri & Waipapa



Date Exported: 13/01/2025

Report Reference: 20250113_100230

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

50 Year

Maximum	Minimum
78.75 m	78.54 m

Max Min flood levels are for raster extent shown on the map

50 Year

m NZVD

78.539 - 78.738

78.739 - 78.938

Parcel

N

0 12.5 25 50 75 m

Report Reference: 20250113_101903

River Flooding

100 Year + CC

Maximum	Minimum
78.82 m	78.57 m

Max Min flood levels are for raster extent shown on the map

100 Year + CC

m NZVD

78.566 - 78.765

78.766 - 78.965

Parcel

N

0 12.5 25 50 75 m

Report Reference: 20250113_101903

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.

APPENDIX 6

HAIGH WORKMAN EARTHWORKS

REPORT

HAIGH WORKMAN LTD
Civil & Structural Engineers

24 243

12th May 2025

Smart Steel
21a Saleyards Road,
Kauri,
Whangarei

By email: Haemish@smartsteelbuildings.co.nz

Attention Haemish Reid

Dear Haemish,

EBC-2025-729/0: New commercial development at 18-20 Kahikatearoa Lane, Waipapa 0230
We refer to Council Request for Further Information dated 4th April 2025.

District Plan Rule 12.3.6.1.3 Excavation and/or filling in the Industrial Zone.
The estimated volume of earthworks is given in the table below. The site was considered as five areas plus the proposed stormwater basin and mounded effluent disposal fields. Refer sketch plan and typical cross sections attached. Earthworks are defined/measured differently under the District and Regional Plans.

District Plan
We interpret earthworks to include roading metal/basecourse and count cut and fill separately. Drainage, trenching and building foundations are not included. Total volume is 2,481m^3.

Component	Area (m^2)	Existing GL range (m)	Proposed FGL range (m)	Topsoil strip (m3)	Conc/agg fill (m3)	Additional cut to achieve levels (m3)	Additional fill to achieve levels (m3)
Concrete yard	1126.6	78.8 to 78.6	79.1 to 78.6	169.0	281.7	56.3	0.0
Building floor area (slab & aggregate foundations not counted)	1535.4	78.8	79.1	230.3	0.0	0.0	230.3
Metalled yard east (excludes basin)	1076.5	78.8 to 78.6	78.95 to 78.6	161.5	161.5	0.0	80.7
Metalled yard northeast (excludes wastewater & washdown disposal mounds)	1041.5	79.0	79.0	156.2	156.2	0.0	0.0
Metalled yard west & northwest	1501.4	78.8 to 78.65	78.95 to 78.65	225.2	225.2	0.0	150.1
Wastewater & washdown disposal mounds	240.0	79.0	79.5	0.0	0.0	0.0	127.2
Detention basin	200.0	78.6	78.3	0.0	0.0	70.0	0.0
Grass	120.6	78.6	78.6	0.0	0.0	0.0	0.0
Totals	6842.0			942.2	824.6	126.3	588.4
Total cut + fill							2481.5

Assumptions
- Building slab 150mm thick concrete on 150mm aggregate (but building foundation so not counted)
- Concrete parking 150mm concrete on 100mm basecourse
- Gravel yard 150mm thick basecourse
- Topsoil strip 150mm deep

Proposed Regional Plan for Northland
We interpret earthworks not to include roading metal/basecourse. Cut and fill is not counted separately. Drainage/ trenching is included. Total volume is 942 + 126 = 1,068m^3.
The earthworks are within a mapped flood area as mapped under Priority Rivers 100-yr. + Climate Change.

Continued:

Disclaimer

This report has been prepared for the sole use of our Client SmartSteel Buildings Limited with respect to the particular brief outlined to us. It may not be used or relied on (in whole or part) by anyone else, or for any other purpose or in any other contexts, without our prior written agreement. This report may not be read or reproduced except in its entirety.

Prepared & issued by:

Tom Adcock
Senior engineer
BE (Civil Eng),
MEngNZ

Encl.: Haigh Workman Sketch plan dated 12 May 2025
Haigh Workman typical cross sections dated 12 May 2025

Cc: Dane Allison, Neo Architecture Studio Ltd, by email: dane@neoas.co.nz

HAIGH WORKMAN LTD
Civil & Structural Engineers
0800 424 447 (0800 HAIGHS)
E: info@haighworkman.co.nz
Kerikeri • Whangarei • Warkworth • Takapuna

Job Title

Smart Steel
Waipapa
Earthworks Quantities
Typical Cross-Sections

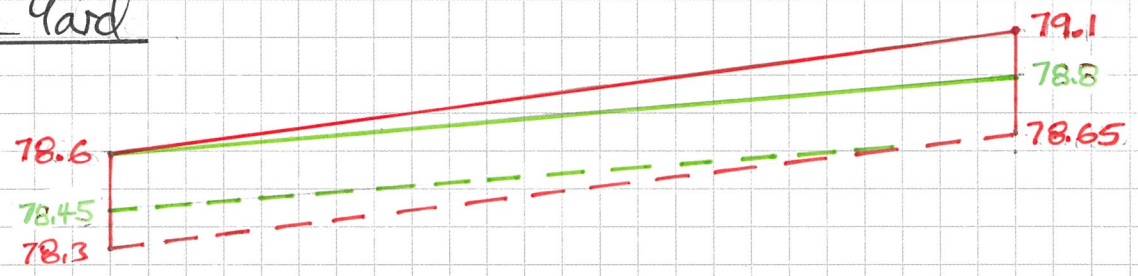
Page 1/1

Job No. 24 243

Designer

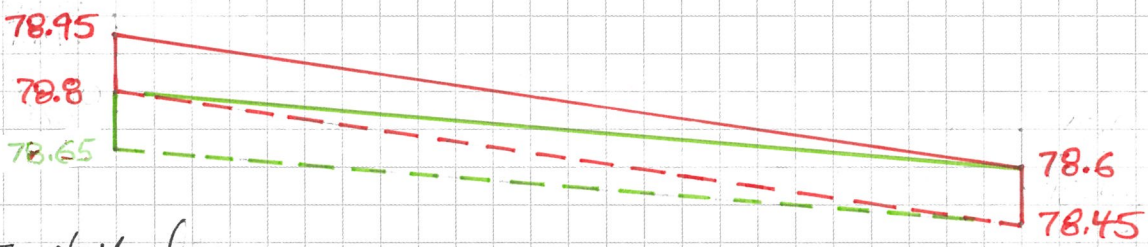
Date 06/05/25

Concrete Yard

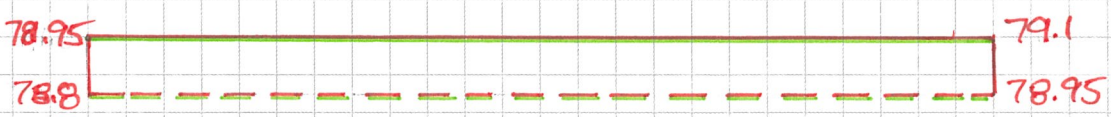


Building Slab

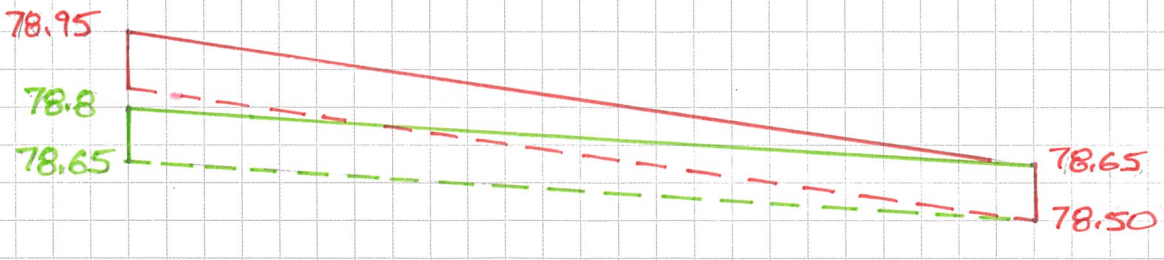
East Yard



North East Yard



West & Northwest Yard



POTABLE WATER STORAGE TANK

FIREFIGHTING

1% AEP FLOOD PATHWAY TO BE MAINTAINED CLEAR

RESERVE VEHICLE WASHWATER DISPOSAL AREA (120 m²)

PROPOSED VEHICLE WASHDOWN DISPOSAL FIELD (120m²)

Disposal fields

SUBSOIL DRAINAGE (0.6 m DEPTH)

3 x 25,000 L ROOF WATER ATTENUATION TANKS

Ø1050 mm PUMP CHAMBER

Ø1050 mm SAND FILTER

Ø1200 mm SMART CHAMBER

BH1

BH2

BH3

PROPOSED WASTEWATER DISPOSAL AREA (120 m²)

RESERVE WASTEWATER DISPOSAL AREA (120 m²)

VEHICLE WASHDOWN WATER PIPE

WASTEWATER SECONDARY TREATMENT (MIN 3 m FROM BUILDING)

VEHICLE WASHBAY

PROPOSED BUILDING 1535.4m²

MFL 79.10

PROPOSED METAL YARD

PROPOSED ATTENUATION BASIN (200 m² AT THE BOTTOM) REFER SHEET P02 FOR DETAILS

SUBSOIL DRAINAGE CONNECTION TO STORMWATER CONNECTION

YARDING AREA DRAINING TO BASIN

PROPOSED CONCRETE CARPARK

DISH CHANNEL

SWMH (FNDC)
RL Lid 78.37 (OTP)
RL Inv 77.60 Outlet (OTP)
RL Inv 77.59 Inlet (OTP)

SWMH (FNDC)
RL Lid 78.59 (OTP)
RL Inv 77.74 Outlet (OTP)

KAHIKATEAROA LANE

Hard west & northwest

Building Slab

East northeast

Basin

Yard east

Concrete yard

Locality Plan (NTS)

GENERAL NOTES:

1. All features are taken from Site plan by Neo Architecture Studio dated Nov 2024, aerial image and site walkover by HWL on 22/11/2024
2. 0.5m Lidar 2018-2020 Contours

SITE INFORMATION:

Legal Description: Lot 2 and 3 DP 567982
Area: 3,412m² and 3,430m²
Zone: Industrial (FNDC)

LEGEND

- Property Boundaries
- Adjacent Boundaries
- FNDC Water Supply
- Stormwater Pipe
- Wastewater Pipe
- BH1 Borehole

MINIMUM SECONDARY TREATMENT PLANT SETBACKS:

- INVERT LEVEL AT INLET - NOT LESS THAN 0.5m BELOW FLOOR LEVEL
- BUILDINGS - 3 m
- BOUNDARIES - 1.5m
- EASILY ACCESSIBLE FOR MAINTANACE.

CHECK ALL DIMENSION ON SITE.

SPECIFIC WASTEWATER DESIGN:

MINIMUM EFFLUENT DISPOSAL SETBACKS:

- BOUNDARIES - 1.5m
- BUILDINGS AND RETAINING WALLS - 3m
- SURFACE WATER - 15m (SECONDARY)
- COAST, RIVERS, LAKES - 30m

CHECK ALL DIMENSION ON SITE.

Earthworks Areas

12.05.2025

Rev	Date	Description	By	Checked
A	20/01/2025	FOR CONSENT	JM	JP

DWG Stormwater and Wastewater Plan

A3 Scale 1: 500 (0 10 25)

Date 19/02/2025

Drawn JM | Checked TMA | Approved JP

File T:\CLIENTS\SMART STEEL BUILDINGS\JOBS\24 243 LOT 2 & 3 KAHIKATEAROA LANE WAIPAPA\ENGINEERING\DRAWINGS\24 243_20250219_WW+SW PLAN.DWG

HAIGH WORKMAN Ltd
Civil & Structural Engineers
6 Fairway Drive
Kerikeri, BOI
T: 09 407 8327
F: 09 407 8378
E: info@haighworkman.co.nz

Project: Proposed Vehicle Maintenance Facility
18-20 Kahikatearoa Lane, Waipapa (Lot 2 & 3 DP 567982)

Client: SmartSteel Buildings Limited

Project No. 24 243

RC no.

Stage

Dwg No. P01

Sheet No.

A

APPENDIX 7

HAIGH WORKMAN EROSION AND SEDIMENT CONTROL PLAN

PROPOSED WATER TANKS

PROPOSED EFFLUENT FIELD
RAISED MOUNDS

TEMPORARY
STOCK PILE
(INDICATIVE)

1% AEP FLOOD PATHWAY
TO BE MAINTAINED CLEAR

DIRTY RUNOFF TO BE
DIRECTED TO BASIN
WHERE PRACTICABLE

PROPOSED BUILDING

STORMWATER BASIN
SEE DRAWINGS P01 AND P02
FOR DETAILS

SUBSOIL DRAINAGE
CONNECTION TO
STORMWATER CONNECTION

FLOATING 'T' BAR DECANT
2m LONG WITH 3 ROWS OF
10mmØ HOLES DRILLED AT
60mm SPACING

PROPOSED CONCRETE CARPARK

SILT FENCE

SILT FENCE

SILT FENCE

SILT FENCE

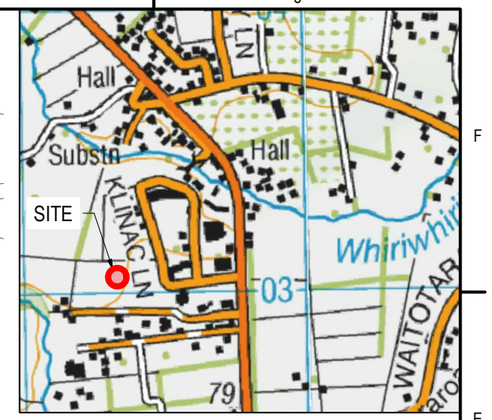
SILT SOCK

SILT SOCK

STABILISED ENTRANCE

STABILISED ENTRANCE

ROAD KERB & CHANNEL
DIRECTION OF FLOW



Locality Plan (NTS)

GENERAL NOTES:

1. All features are taken from Site plan by Neo Architecture Studio dated Nov 2024, aerial image and site walkover by HWL on 22/11/2024
2. 0.5m Lidar 2018-2020 Contours

NOTES:

1. PROVIDE SILT FENCING AT ALL STORMWATER INLETS DURING EARTHWORKS. ONCE CONCRETE YARDING HAS BEEN LAID SWITCH TO SILT SOCKS.
2. OVERLAND FLOWPATH ALONG WESTERN SIDE OF SITE TO BE MAINTAINED CLEAR AT ALL TIMES
3. BARE EARTHWORKS AREAS TO BE STABILISED AT EARLIEST OPPORTUNITY USING CLEAN METAL.
4. ALL CONTROLS TO REMAIN IN PLACE AND BE MAINTAINED UNTIL SITE STABILISED.
5. BASIN MAX. STORAGE 200m² x 0.35m DEEP = 70m³ AS PER GD05 MAX. DISTURBED RUNOFF AREA 70/2%=3,500m² STAGE WORKS TO LIMIT DISTURBED AREA NOT GREATER THAN 3,500m² I.E. HALF THE SIZE.

LEGEND

- Property Boundaries
- Adjacent Boundaries
- FNDC Water Supply
- Stormwater Pipe
- Wastewater Pipe
- Standard Silt Fence
- Existing flow path (clean water)
- Building Platform
- Stabilised Entrance
- Decanting Earth Bund (Catchment area less than 0.3ha)

Rev	Date	Description	By	Checked
A	12/05/2025	FOR CONSENT	LP	TMA

DWG EROSION AND SEDIMENT CONTROL PLAN

A3 Scale 1: 500 (0 10 25) Date 12/05/2025

Drawn JM Checked TMA Approved TMA

File T:\CLIENTS\SMART STEEL BUILDINGS\JOBS\24 243 LOT 2 & 3 KAHIKATEAROA LANE WAIPAPA\ENGINEERING\DRAWINGS\24 243_20250508_ESP.DWG

HAIGH WORKMAN LTD
Civil & Structural Engineers
6 Fairway Drive
Kerikeri, BOI
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E: info@haighworkman.co.nz

Project: Proposed Vehicle Maintenance Facility
18-20 Kahikatearoa Lane, Waipapa (Lot 2 & 3 DP 567982)

Client: SmartSteel Buildings Limited

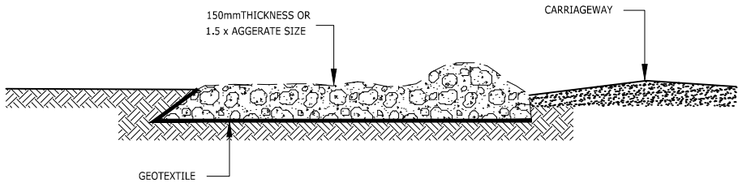
Project No. 24 243

RC no.

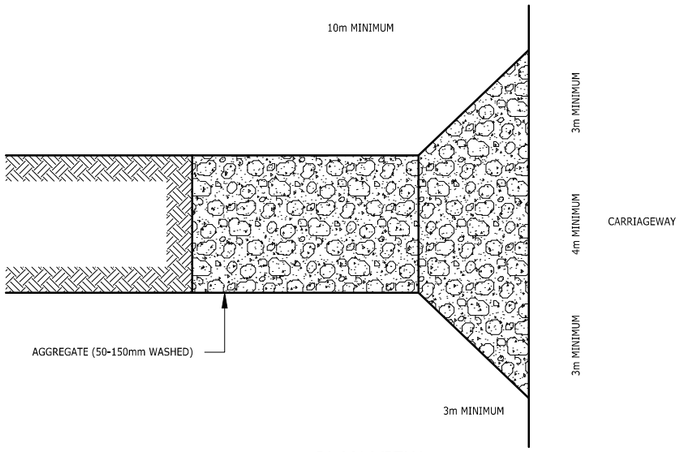
Stage

Dwg No. ES01

Sheet No.



SIDE ELEVATION



PLAN VIEW

STABILISED CONSTRUCTION ENTRANCE

STABILISED CONSTRUCTION ENTRANCE - SPECIFICATIONS:

APPLICATION

USE A STABILISED CONSTRUCTION ENTRANCE AT ALL POINTS OF CONSTRUCTION SITE INGRESS AND EGRESS WITH A CONSTRUCTION PLAN LIMITING TRAFFIC TO THESE ENTRANCES ONLY.

DESIGN:

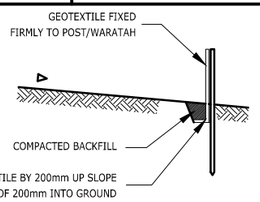
1. CLEAR THE ENTRANCE AND EXIT AREA OF ALL VEGETATION, ROOTS AND OTHER UNSUITABLE MATERIAL AND PROPERLY GRADE IT.
2. LAY WOVEN GEOTEXTILE; PIN DOWN EDGES AND OVERLAP JOINS;
3 PROVIDE DRAINAGE TO CARRY RUNOFF FROM THE STABILISED CONSTRUCTION ENTRANCE TO A SEDIMENT CONTROL MEASURE.
4. PLACE AGGREGATE TO THE SPECIFICATIONS BELOW AND SMOOTH IT.

STABILISED CONSTRUCTION ENTRANCE AGGREGATE SPECIFICATIONS:

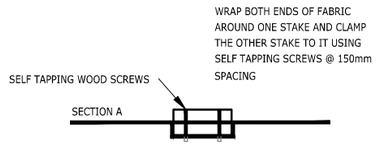
AGGREGATE SIZE	50-150mm WASHED AGGREGATE
THICKNESS	150mm MINIMUM OR 1.5 x AGGREGATE SIZE
LENGTH	10m MINIMUM LENGTH RECOMMENDED
WIDTH	4m MINIMUM

MAINTENANCE

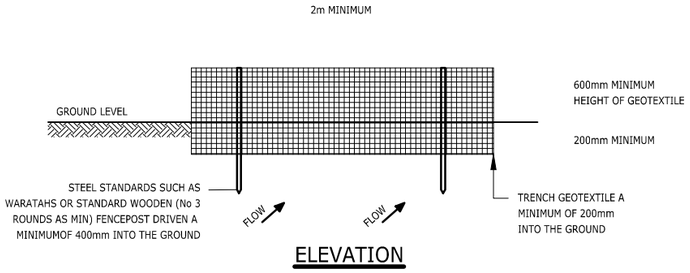
1. MAINTAIN THE STABILISED CONSTRUCTION ENTRANCE IN A CONDITION TO PREVENT SEDIMENT FROM LEAVING THE CONSTRUCTION SITE. AFTER EACH RAINFALL INSPECT ANY STRUCTURE USED TO TRAP SEDIMENT FROM THE STABILISED CONSTRUCTION ENTRANCE AND CLEAN OUT AS NECESSARY.
2. WHEN WHEEL WASHING IS ALSO REQUIRED, ENSURE THIS IS DONE ON AN AREA STABILISED WITH AGGREGATE WHICH DRAINS TO AN APPROVED SEDIMENT RETENTION FACILITY.



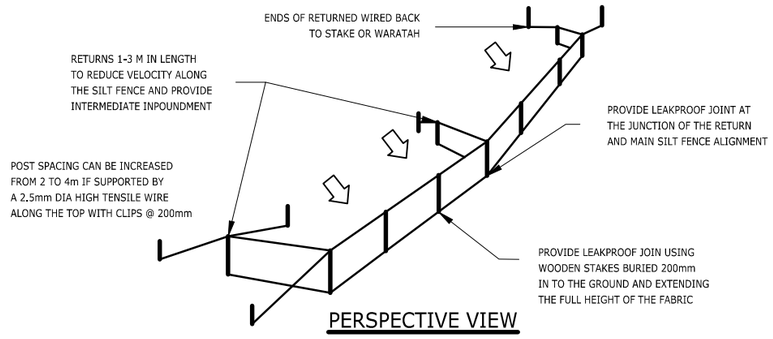
CROSS SECTION



STANDARD FABRIC JOINT

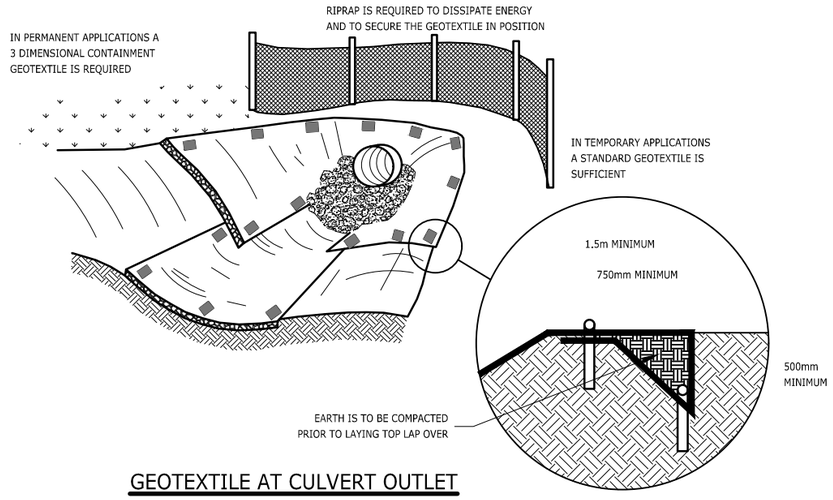


ELEVATION

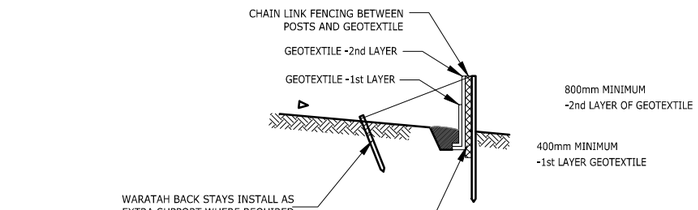


PERSPECTIVE VIEW

SILT FENCE CONSTRUCTION



GEOTEXTILE AT CULVERT OUTLET



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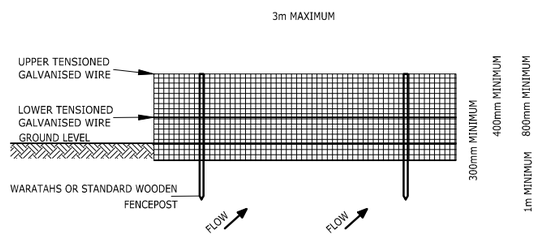
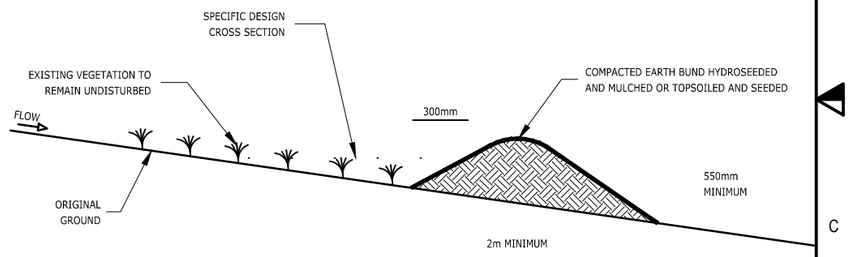
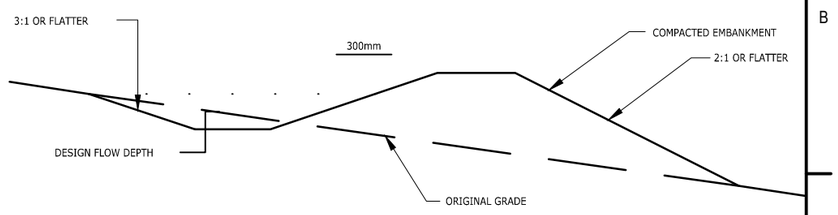


ELEVATION

SUPER SILT FENCE CONSTRUCTION



CLEANWATER RUNOFF DIVERSION BUND - CROSS SECTION (1)



RUNOFF DIVERSION BUND - CROSS SECTION

Rev	Date	Description	By	Checked
A	12/05/2025	FOR CONSENT	LP	TMA

DWG EROSION AND SEDIMENT CONTROL DETAILS SHEET 1 OF 2

A3 Scale 1: 100 (0, 2, 5) Date 12/05/2025

Drawn JM | Checked TMA | Approved TMA

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Client: SmartSteel Buildings Limited

Project No. 24 243

RC no.

Stage

Dwg No. ES02

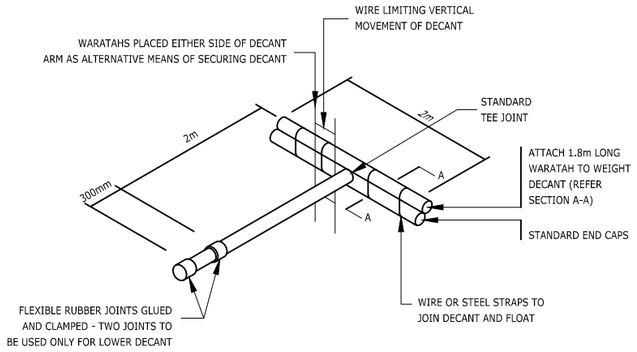
Sheet No.

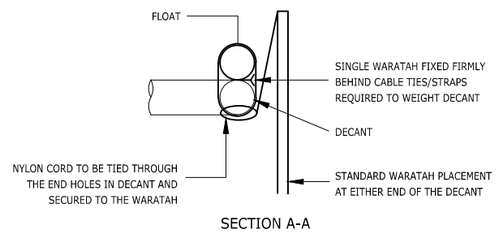
DECANT EARTH BUND - SECTION

SILT FENCE AROUND CATCHPIT - DETAIL

NUMBER OF DECANTS FOR EACH POND SHALL BE AS FOLLOWS:

I) UP TO 1.5HA CATCHMENT - 1 DECANT
II) 1.5-3.0HA CATCHMENT - 2 DECANTS
III) 3 TO 5 HA CATCHMENT - 3 DECANTS





SECTION A-A

DECANT EARTH BUND - DETAIL

Rev	Date	Description	By	Checked
A	12/05/2025	FOR CONSENT	LP	TMA

DWG EROSION AND SEDIMENT CONTROL DETAILS
SHEET 2 OF 2

A3 Scale 1: 100 (0, 2, 5) Date 12/05/2025

Drawn JM | Checked TMA | Approved TMA

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Client: SmartSteel Buildings Limited

Project No. 24 243 | RC no.

Stage

Dwg No. ES03

Sheet No.

APPENDIX 8

HAIGH WORKMAN STORMWATER

NEUTRALITY REPORT

Stormwater Neutrality Report

18 – 20 Kahikatearoa Lane, Waipapa

(Lots 2 & 3 DP 567982)

SmartSteel Buildings Limited

Haigh Workman reference: 24 243

February 2025

Revision History

Revision №	Issued By	Description	Date
A	Tom Adcock	For Resource and Building Consents	26 February 2025

Prepared by	Reviewed by	Approved by
Joshua McNulty	**Tom Adcock**	**John Papesch**
Engineering Technician	Senior engineer	Senior civil engineer
	BE (Civil Eng),	BE (Civil Eng),
	MEngNZ	CMEngNZ, CPEng

TABLE OF CONTENTS

TABLES

FIGURES

Executive Summary

It is proposed to undertake a light industrial development for Commercial Diesel Limited at Lots 2 & 3 of Kahikatearoa Lane, Waipapa. The proposed development is within a newly formed subdivision that was recently pasture.

The site has an area of 6,842 m^2. The proposed development will consist of a building for vehicle maintenance with concrete carparking and a metalled yard area.

This report presents a stormwater neutrality design to comply with resource consent 2160324-RMAVAR/B Consent Notice [condition 4(h)(iv)], including compliance with permitted activity rules in the District Plan and Regional Plan regarding stormwater management.

Proposed Stormwater Management

To comply with the District and Regional Plan rules and the subdivision consent notice, a stormwater system has been designed to attenuate runoff from the site to no greater than pre-development for the 10% Annual Exceedance Probability (AEP). The system will comprise three 25,000 litre tanks to reduce peak runoff from the roof, plus a 55 m^3 attenuation basin to reduce runoff from the metal yarding area. Drawings showing the proposed attenuation devices are appended.

It is important to note that detailed design of the finished site levels and drainage is required to ensure it achieves the design objectives of this report.

Lots 2 and 3 drain westward to the Kerikeri River. Unlike other parts of the Waipapa Industrial area, the site is not within an existing consented urban stormwater management plan area or discharge consent, thus, the activity requires a resource consent in accordance with District Plan Rule 7.8.5.1.9.

1 Introduction

Haigh Workman Limited (Haigh Workman) was commissioned by SmartSteel Buildings Limited (the client) to undertake a range of engineering services at Lots 2 & 3 Kahikatearoa Lane, Waipapa (the "site") for the development of a Vehicle Maintenance Facility commissioned by Commercial Diesel Limited.

This report presents stormwater neutrality recommendations to mitigate adverse effects of stormwater on the surrounding environment.

1.1 Objective and Scope

The objectives of this investigation were to:

- Size a stormwater neutrality system to comply with resource consent 2160324-RMAVAR/B Consent Notice [condition 4(h)(iv)], including compliance with permitted activity rules in the District Plan and Regional Plan regarding stormwater management.
- Provide a report to accompany resource and building consent applications regarding stormwater management on the site.

To achieve this, the scope of works conducted by Haigh Workman includes:

- Review of architectural drawings and public stormwater service plans
- Review of relevant planning rules and specific development conditions
- Sizing of stormwater neutrality devices to ensure compliance with development conditions
- Presentation of neutrality recommendations

1.2 Applicability

This report has been prepared for the use of SmartSteel Buildings Limited with respect to the particular brief outlined to us. This report is to be used by our Client and their Consultants and may be relied upon by Northland Regional Council (NRC) and Far North District Council (FNDC) when considering resource and building consent applications for the proposed development. The information and opinions contained within this report shall not be used in any other context for any other purpose without prior review and agreement with Haigh Workman Limited.

2 Site Details and Description

2.1 Site Details

2.1.1 Proposed Development Site

Site Address:	Lots 2 & 3 Kahikatearoa Lane, Waipapa
Legal Description:	Lots 2 & 3 DP 567982 (subdivision consent 2160324-RMAVAR/B)
Title:	1019560, 1019561
Zoning:	Industrial
Area:	6,842 m^2 (Lot 2 - 3,412 m^2 & Lot 3 - 3,430 m^2)
Owner:	Commercial Diesel Limited

2.1.2 FNDC Zoning

The site is zoned 'Industrial' in the Far North District Plan.

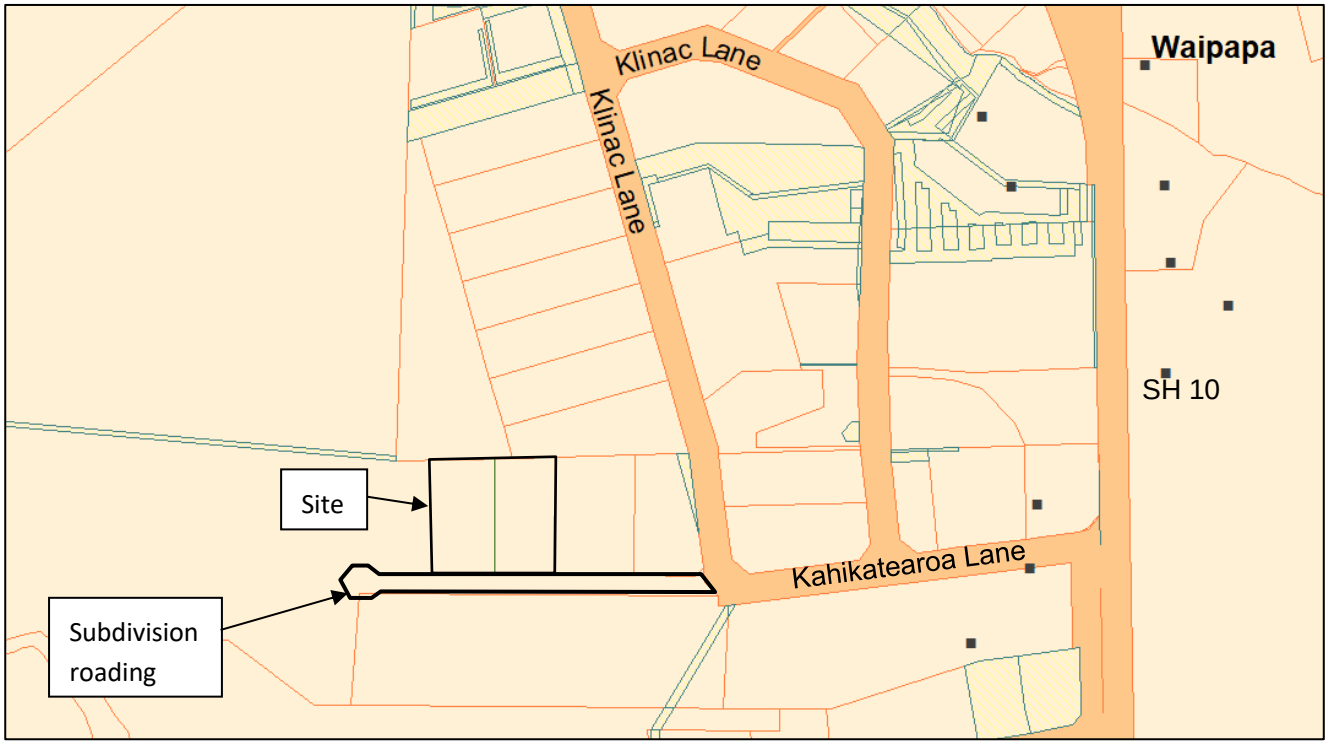


Figure 1 - Site location plan (source: Quickmap)

2.2 Site Description

The existing site comprises two parcels of undeveloped land situated within a newly established industrial subdivision on the edge of the Waipapa industrial estate on the northern side of the road. The site is roughly rectangular in shape with a combined area of 6,842 m^2, a road frontage width of approximately 83m, and a ground level varying between 78.5 and 79.0m NZVD. A site location plan is presented as Figure 1.

The site is bordered to the north by farmland, to the west by an undeveloped site within the same subdivision, to the east a developed light industrial lot, and to the south by a public road to be vested with Council. The other lots within the subdivision are anticipated to be populated by light industrial end-users.

Topographically the property is generally flat with little change in elevation. The gradient of the land is in the order of less than 1 degree. The property comprises a surface covering of rough, unmaintained grass and minimal vegetation, and topsoil has been stripped from an area at the southern portion of the site and aggregate placed for preloading the building platform. A shelterbelt of mature trees exists on the northern boundary of the site.

Kahikatearoa Lane is a new road recently vested with Far North District Council (FNDC). The road level has been set specifically low so that it acts as an overland flow path for flood waters. The road does include a vested water main and hydrants for fire fighting, however the water reticulation network is not available for site supply.

The site has been developed for light industrial end-use, with stormwater reticulation serving the site.

The site forms part of the Kerikeri River floodplain.

2.3 Proposed Development

We understand that Commercial Diesel Limited intends to develop the site with the construction of a new Vehicle Maintenance Facility as per drawings provided by SmartSteel Buildings Limited. The proposed building works are situated more in the southern portion of the property with the proposed disposal fields sited along the northern boundary.
The proposed development consists of:

- An industrial building with a roof area of 1,535.4 m^2
- Concrete carparking and accessways
- Grassed and planted on-site wastewater and vehicle washdown disposal fields
- Minor landscaping and grassed areas
- Storage tanks for roof runoff attenuation and potable water supply
- Attenuation basin
- Metalled yarding for vehicle manoeuvring and parking

Proposed development plans are appended.

3 Hydrological Setting

Published environmental data relating to the site has been reviewed. A summary of relevant information is provided below and drawings within Appendix A of this report.

Haigh Workman issued a Flood Hazard Assessment dated 11 January 2025 *(Ref. 24 243, Flood Hazard Assessment – 18-20 Kahikatearoa Lane, Waipapa, January 2025)* that provided recommendations for the directing floodwater within the proposed development site. The design involves directing flood water via natural fall through the subject site to Kahikatearoa Lane located immediately south of the site.

3.1 Flooding and Watercourses

A summary of available information pertaining to hydrology and hydrogeology is presented in Table 1. An examination of Northland Regional Council (NRC) online GIS databases is included below.

Table 1 - Surface Water Features & Flooding

	Presence/Location	Comments
Surface Water Features	Drainage channels	The subdivision stormwater reticulation discharges to an open channel drain on the southwestern side of the subdivision. This drains to a larger channel that flows to the Kerikeri River.
Watercourses (within 500m)	Kerikeri River approximately 300m west of the site	Kerikeri River winds to the west of the site. Published flood modelling indicates potential for the river to spill on to the site.
Flood Risk Status	Subject to inundation	NRC GIS mapping indicates the majority of the site is subject to shallow inundation in the 100-year ARI storm event.

4 Stormwater Management

4.1 Regulatory Framework

4.1.1 Far North District Plan

The Site is zoned 'Industrial' and is governed by the following rules regarding stormwater.

7.8.5.1 PERMITTED ACTIVITIES
An activity is a permitted activity in the Industrial Zone if:
(a) it complies with the standards for permitted activities set out in ***Rules 7.8.5.1.1*** to ***7.8.5.1.10*** below; and
(b) it complies with the relevant standards for permitted activities set out in ***Part 3 of the Plan - District Wide Provisions***. Particular attention is drawn to ***Section 12.8 Hazardous Substances***

7.8.5.1.9 STORMWATER
The disposal of collected stormwater from the roof of all new buildings and new impervious surfaces provided that the activity is within an existing consented urban stormwater management plan or discharge consent.

Lots 2 and 3 drain westward to Kerikeri River. As the site is not within an existing consented urban stormwater management plan area or discharge consent (unlike other parts of the Waipapa Industrial area), the activity requires a resource consent.

7.8.5.2 CONTROLLED ACTIVITIES
An activity is a controlled activity in the Industrial Zone if:
(a) it complies with all of the standards for permitted activities except for any one of the following **Rules 7.8.5.1.1 Sunlight**, **7.8.5.1.4 Transportation and 7.8.5.1.9 Stormwater** above; and
(b) it complies with Rules 7.8.5.2.1 Sunlight, 7.8.5.2.2 Transportation and 7.8.5.2.3 Stormwater below; and
(c) it complies with the relevant standards for permitted or controlled activities set out in Part 3 of the Plan - District Wide Provisions.

The Council must approve an application for a land use consent for a controlled activity, but it may impose conditions on that consent.

7.8.5.2.3 STORMWATER
The disposal of collected stormwater from the roof of all new buildings and new impervious surfaces provided that:
(a) where the means of disposal of collected stormwater will be by the way of piping to an approved outfall, each allotment shall be provided with a piped connection to the outfall laid at least 600mm into the net area of the allotment. This includes land allocated on a cross-lease; and
(b) the stormwater collection system shall be designed to avoid any contaminants stored or used on the site from being entrained in any stormwater discharge unless that stormwater is discharged through a stormwater interceptor system; and
(c) the site is managed such that the concentration of contaminants in stormwater leaving the site do not pose an immediate or long-term hazard to human health or the environment.

The proposed stormwater system complies with the standards for it to be considered a controlled activity.

4.1.2 Proposed Regional Plan for Northland

Rule C.6.4.2 of the Proposed Regional Plan for Northland is the operative criteria for determining if a stormwater discharge not from a public network is a permitted activity. The criteria are assessed in Appendix B.

4.2 Consent Notice

Resource consent 2160324-RMAVAR/B includes a Consent Notice applying to all subdivision lots (condition 4(h)(iv):

Provide, at the time of lodging a building consent application for Lots 1 - 8, a specific design for stormwater management, prepared by a suitably qualified Chartered Professional Engineer, which addresses both stormwater quality and quantity such that the volume of stormwater discharged is attenuated to a 1 in 10 year rainfall, (being the design capacity of the stormwater reticulation) for rainfall event up to those with a 2% AEP. The stormwater quality standard shall comply with section 4.4.2 of the Councils Engineering Standards (2009) or for a lower level of contaminant where required by an NRC Stormwater Discharge Consent.

The proposed stormwater management solution complies with this condition.

4.3 Design Rainfall

Design rainfall intensity curves for Northland for use with the Rational Method are provided by The National Institute of Water and Atmospheric Research (NIWA) High Intensity Rainfall Design System (HIRDS). For design rainfall intensities we have adopted HIRDS V4 rainfall estimates from historical data (not adjusted for climate change).

The USDA Soil Conservation Service TR-55 Type 1A - 24-hour storm profile (fixed duration, variable profile) is acceptable by the 2023 Engineering Standards for determining peak flow and runoff volumes.

The minimum time of concentration for surface runoff will be 24 hours. Design rainfall intensities for historical 24-hour durations are 163 mm for the 10% AEP rainfall event, 222 mm for the 2% AEP rainfall event, and 248 mm for the 1% AEP rainfall event.

4.4 Avoiding Adverse Effects Downstream

4.4.1 Stormwater Quantity

Regional Plan for Northland Rule C.6.4.2 provides for the diversion and discharge of stormwater from outside a public stormwater network provided (amongst other conditions) 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% annual exceedance probability, or flooding of buildings on another property in a storm event of up to and including a 1% annual exceedance probability.

The Regional Plan permitted activity rule does not specifically require attenuation to pre-development levels, provided there is no increase in downstream flooding for the 10% AEP event.

To avoid any adverse effects downstream normal practice is to attenuate the 10% AEP runoff to pre-development levels.

The NRC 1% MPD flood model allows for 100% impermeable surfaces on land zoned “Industrial”, so the degree of proposed development is provided for.

The stormwater reticulation system serving the site has been designed for the 10% AEP rainfall event. Thus, providing attenuation for the 10% AEP rainfall event ensures the stormwater reticulation design intent is met.

4.4.2 Stormwater Quality

The stormwater collection system has been designed to avoid contaminants from entering stormwater. A vehicle washdown with a proprietary hydrocarbon and sediment separator has been specified for the Building workshop. Refer separate design report by Haigh Workman.

Yarding and parking are not expected to generate excessive levels of contaminates. All cesspits shall incorporate proprietary filters as per Council Engineering Standards Section 4.3.18.c. The attenuation basin will be grassed and in this way capture contaminates. Auckland Council GD01 - Stormwater Management Devices in the Auckland Region contains numerous references in the use of grass as a means of contaminant removal. We recommend that the grass be kept well maintained and mowed regularly.

4.5 Design Concept

Stormwater from the site will be piped to the stormwater reticulation constructed as part of the subdivision road to vest. Roof water will be collected in storage tanks with an overflow to the reticulated system; runoff from the eastern yard area will be collected into an attenuation basin and piped to the reticulated system.

The proposed secondary system comprises an overland flowpath through the site along the western boundary flowing to the road south of the site.

Proposed surface coverage for the site is shown in Table 2 below.

Table 2 - Proposed surface coverage for the site

Component	Coverage (m^2)
Roof Area	1,535
Concreted accessway and carparks	1,029 (areas under building eaves not included)
Unsealed aggregate surfaces	3,484
Disposal fields and landscaping	320 + 130 = 450
Attenuation basin	200 + side batters = 303
Attenuation tanks	40
Site area	**6,842**

The proposed basin layout is shown on the site drainage plan appended.

The following parameters were used to calculate runoff. Curve numbers refer to a system developed by the Soil Conservation Service (SCS) for estimating direct runoff from rainfall. They represent the integrated effects of infiltration, storage, evaporation, natural retention, interception etc., which all affect the time distribution and peak rate of run-off. The factors required to determine a value of a curve number are surface type characteristics topography and land use. Curve numbers were obtained for Hydrological Class 'C' soils as recommended by 2023 Engineering Standards for typical far north district conditions. Table 2 presents the factors adopted for the curve numbers.

Table 3 - Curve Numbers

Component	Curve Number (SCS Method)

Roof	98
Concrete	98
Metal aggregate	91
Grass	75
Basin (dry)*	75

*The basin will be 'dry' i.e. does permanently hold water; the earth base can be expected to absorb water during rainfall

4.6 Stormwater Runoff

Stormwater runoff and attenuation design was modelled using HydroCAD. A summary of programme input and results is appended. Table 4 provides a summary of the component surfaces.

Table 4 - Component Surfaces

Component	Surface Type	Curve Number	Coverage (m^2)
Predevelopment grass (45S)	Grass	75	6,842
Roof (43S)	Steel	98	1,535
Basin catchment (49S)	Concrete (not including area under eaves) Metal aggregate Grass (disposal mounds & boundary setback) Basin (including side batters)	98 91 75 75	30 1,866 399 303
Remaining surfaces (51S)	Concrete Tanks Metal aggregate Grass (landscaping)	98 98 91 75	495 + 504 = 999 40 1,618 51

The Time of Concentration was 10 minutes.

The predevelopment grass (45S) represents the site before development with only grass cover.

For the developed stage:

The roof (43S) consists of the building coverage, including the eaves which partially cover the concreted areas. All roof runoff is directed to the detention tanks.

The basin runoff area (49S) are those areas on the eastern side that drain to the attenuation basin.

The remaining impermeable surfaces (51S) are those on the western side that drain directly to the Council stormwater system.

Refer to the site drainage plan appended for more details.

Table 5 provides a summary of the stormwater runoff for the 10% AEP design rainfall event.

Table 5 - Site Runoff

Component	Coverage (m^2)	Curve Number	Runoff (L/s)
Predevelopment			
Grass (45S)	6,842	75	42.6
Post Development			
Roof (43S)	1,535	98	16.4
Basin catchment (49S)	2,598	87*	23.5
Remaining surfaces (51S)	2,708	93*	27.4
Total (Post Development)	**6,841**		**67.3**
Attenuation required to achieve Consent Notice requirements			**24.7**

*Composite curve numbers automatically calculated for catchments comprising more than one surface type.

Stormwater attenuation of 24.7 L/s is required to limit the 10% AEP runoff to no more than predevelopment of 42.6 L/s.

4.7 Design Solution

Stormwater will be attenuated using roof water detention tanks and a basin collecting ground surface runoff.

4.7.1 Attenuation Tank Design

Three 25,000 L roof water attenuation tanks will be located in the northwest corner of the site.

The tanks have been modelled with a diameter of 3.5 m and an available storage height of 2.4 m providing 25,000L of storage. Due to the flat gradients on site, the minimum pipe diameter connecting the roof connecting and tanks shall be 225 mm. The three tanks shall be linked together using either twin 150 mm or a single 225 mm pipes, and share a common 225mm overflow placed at the 2.4 m mark.

A single 37 mm diameter orifice shall be located at the base of the downstream tank. Refer attenuation tank details appended.

Figure 4 shows the performance of the three 25,000 L detention tanks. Roof runoff is reduced from 16.4 to 3.9 L/s for the modelled 10% AEP event, providing 12.5 L/s of flow retention.

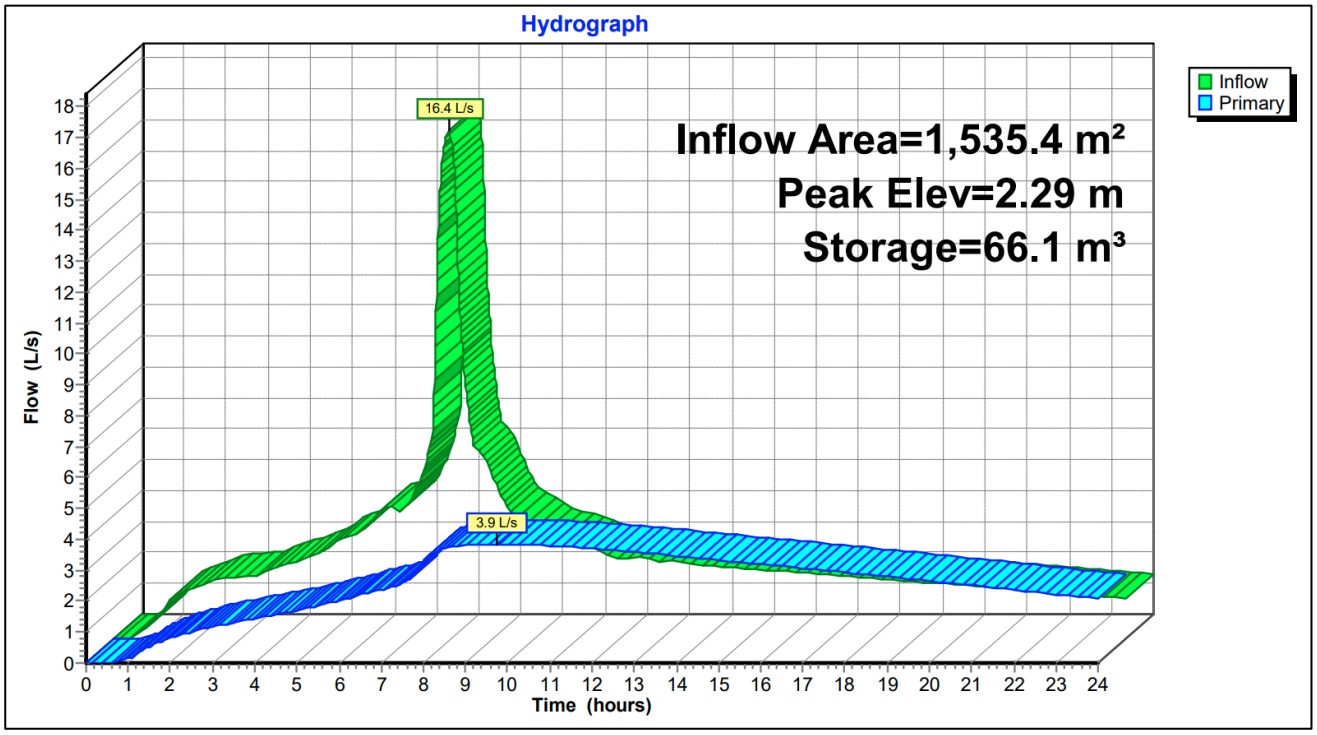


Figure 2 - 3 x 25,000L Tank Attenuation Hydrograph)

The maximum height the water reaches in the tanks is 2.29 m which is lower than the storage height of the tanks. The hydrograph shows inflow reaching a maximum rate at 7.94 hours and release at a 3.9 L/s into the stormwater reticulation system over an extended period of time until the tanks are empty.

4.7.2 Attenuation Basin Design

The attenuation basin will be located along the eastern boundary of the site with a direct outlet to the Council stormwater system. The basin will collect runoff from the yarding on the eastern side of the building which will be shaped to have a nominal fall towards the basin.

Kerb and channels or dished channels, should these be used shall have an absolute minimum fall of 0.4%, as per FNDC Engineering Standards. Kerb if installed shall have cut outs at nominal 10 m spacings to allow water to drain directly into the basin.

The basin will have a base area of 200 m^2, side slopes battered at 1 in 2 and a minimum storage capacity of 55 m^3. The maximum storage depth is 0.25m. The outlet shall be a 600 mm concrete chamber with a 100 mm orifice with a top level of 0.25 m matching the water height and a 225mm outlet to the Council system.

The basin shall have a minimum depth of 0.35 m which provides 0.1m freeboard for the outlet chamber to double as an emergency overflow. The ground level at the lowest point at the southern end of the site is approximately RL 78.6m, giving an outlet IL of 78.6 – 0.35 = 78.25 m. The Council manhole SW 1000319 IL is 77.74m. Using a 225 mm pipe the minimum required fall is 1.1%. Detailed design will be required to ensure this minimum fall is achieved.

vegetated

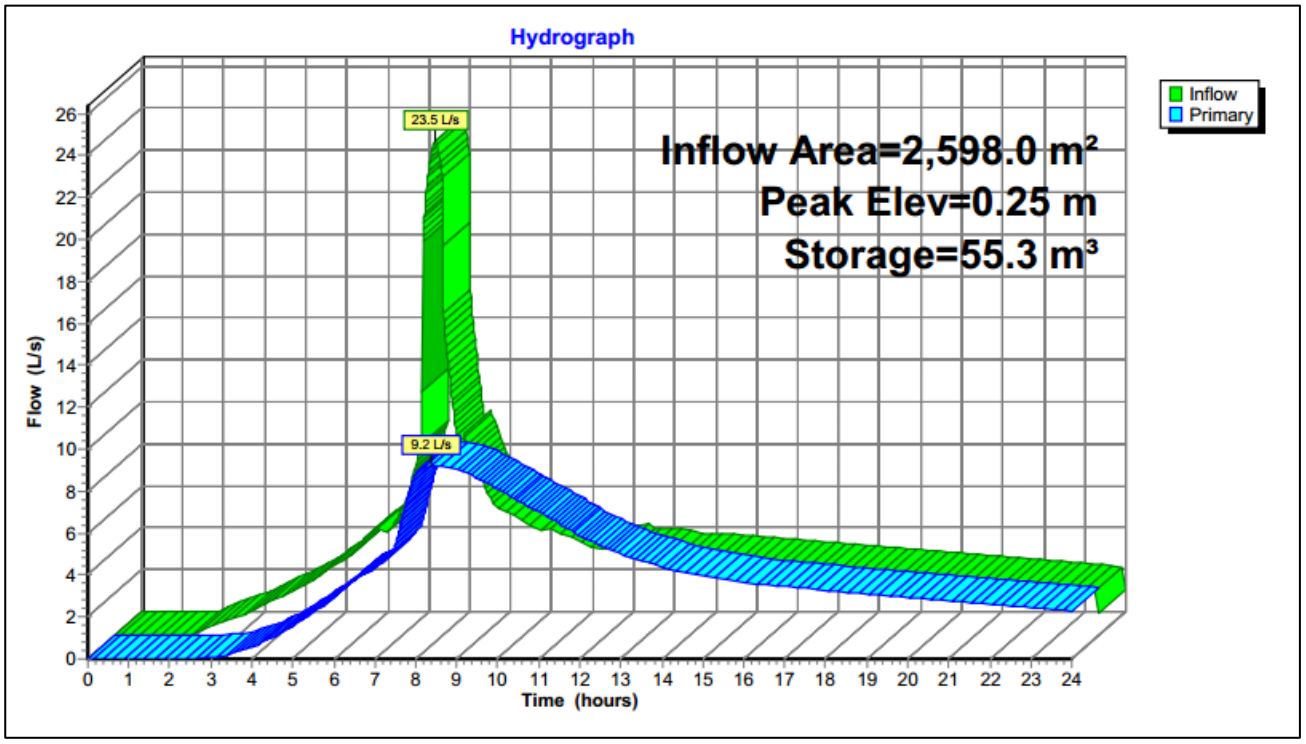


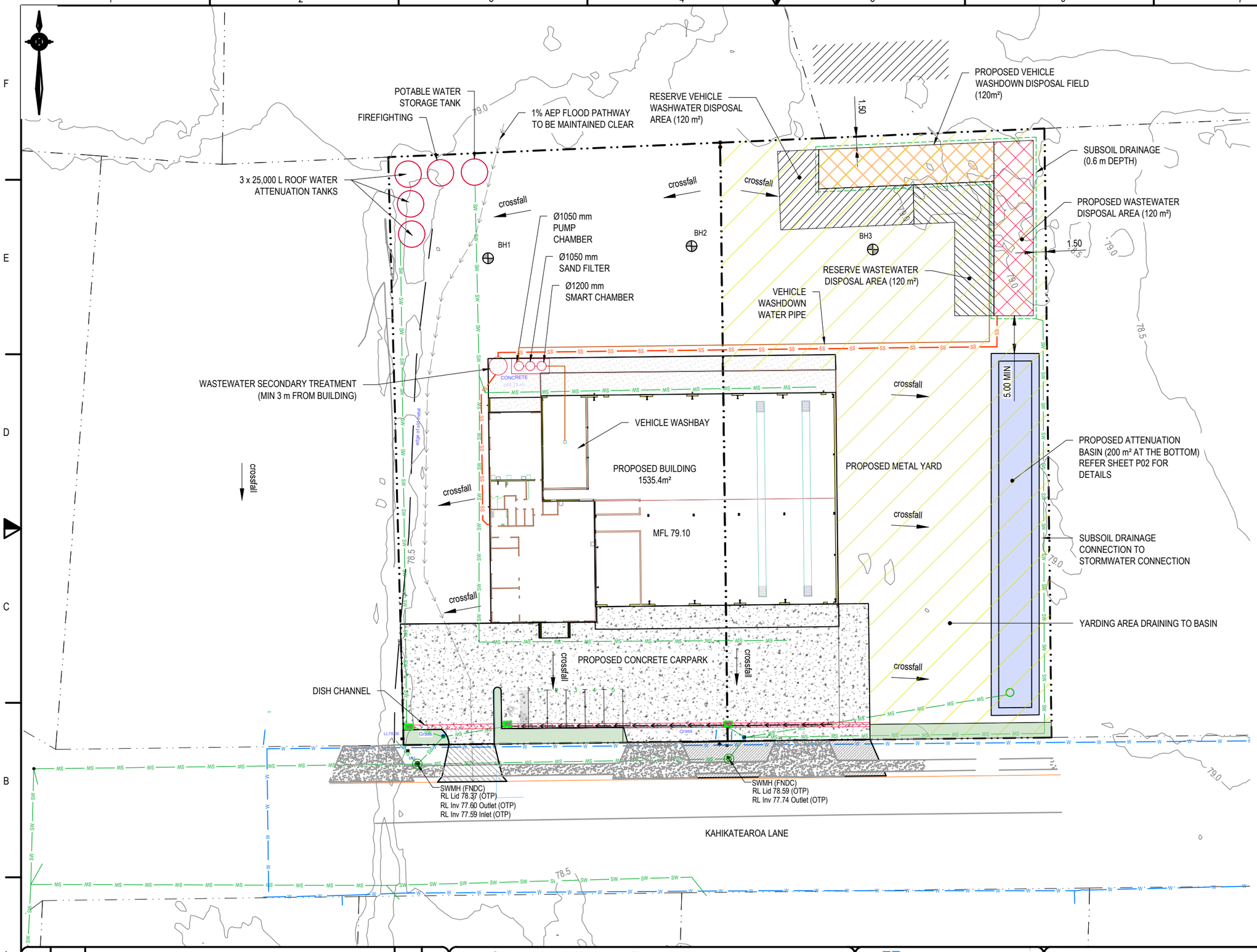
Figure 3 - Basin Attenuation Hydrograph

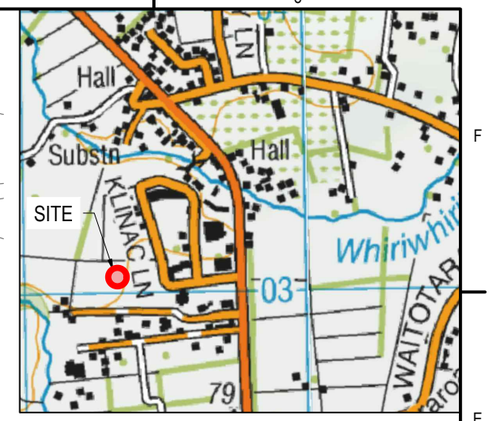
The hydrograph shows inflow reaching a maximum rate at 8.38 hours and release at a 9.2 L/s into the stormwater reticulation system over an extended period of time until the basin is empty.

The combined attenuation of the detention tanks and basin is (16.4 – 3.9) + (23.5 – 9.2) = 26.8 L/s.

Appendix A – Haigh Workman Drawings

Drawing No.	Title	Scale
A102	NEO Architecture Studio - Site Plan	1:200
24 284/DE1	Haigh Workman - Stormwater Attenuation Tank details	Not to scale
24 284/P01	Haigh Workman - Site Drainage Plan	
24 284/P02	Stormwater Attenuation Basin details	Not to scale





Locality Plan (NTS)

GENERAL NOTES:

1. All features are taken from Site plan by Neo Architecture Studio dated Nov 2024, aerial image and site walkover by HWL on 22/11/2024
2. 0.5m Lidar 2018-2020 Contours

SITE INFORMATION:

Legal Description: Lot 2 and 3 DP 567982
Area: 3,412m² and 3,430m²
Zone: Industrial (FNDC)

LEGEND

- Property Boundaries
- Adjacent Boundaries
- FNDC Water Supply
- Stormwater Pipe
- Wastewater Pipe
- BH1 Borehole

MINIMUM SECONDARY TREATMENT PLANT SETBACKS:

- INVERT LEVEL AT INLET - NOT LESS THAN 0.5m BELOW FLOOR LEVEL
- BUILDINGS - 3 m
- BOUNDARIES - 1.5m
- EASILY ACCESSIBLE FOR MAINTANACE.

CHECK ALL DIMENSION ON SITE.

SPECIFIC WASTEWATER DESIGN:

MINIMUM EFFLUENT DISPOSAL SETBACKS:

- BOUNDARIES - 1.5m
- BUILDINGS AND RETAINING WALLS - 3m
- SURFACE WATER - 15m (SECONDARY)
- COAST, RIVERS, LAKES - 30m

CHECK ALL DIMENSION ON SITE.

Rev	Date	Description	By	Checked
A	20/01/2025	FOR CONSENT	JM	JP

DWG Stormwater and Wastewater Plan

A3 Scale 1: 500 (0, 10, 25)

Date 19/02/2025

Drawn JM | Checked TMA | Approved JP

File T:\CLIENTS\SMART STEEL BUILDINGS\JOBS\24 243 LOT 2 & 3 KAHIKATEAROA LANE WAIPAPA\ENGINEERING\DRAWINGS\24 243_20250219_WW+SW PLAN.DWG

HAIGH WORKMAN Ltd
Civil & Structural Engineers
6 Fairway Drive
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Project: Proposed Vehicle Maintenance Facility
18-20 Kahikatearoa Lane, Waipapa (Lot 2 & 3 DP 567982)

Client: SmartSteel Buildings Limited

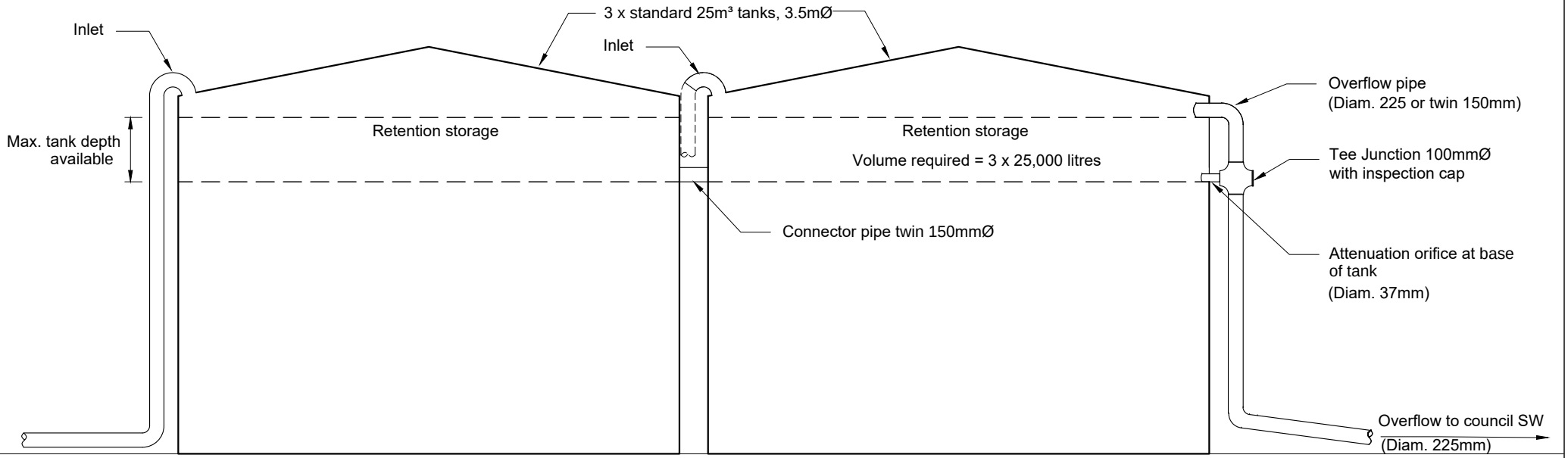
Project No. 24 243

RC no.

Stage

Dwg No. P01

Sheet No.



Total Retention storage = 75,000 litres

NOTE

- Maximun orifice pipe length is 150mm. Allow 75mm clearance from end of pipe to outside tank wall
- Fix orifice pipe to tee junction using reducer fittings

Issue	Date	Revision
A	19/02/25	Revision A

DWG: Schematic Arrangement of Retention Storage

Note

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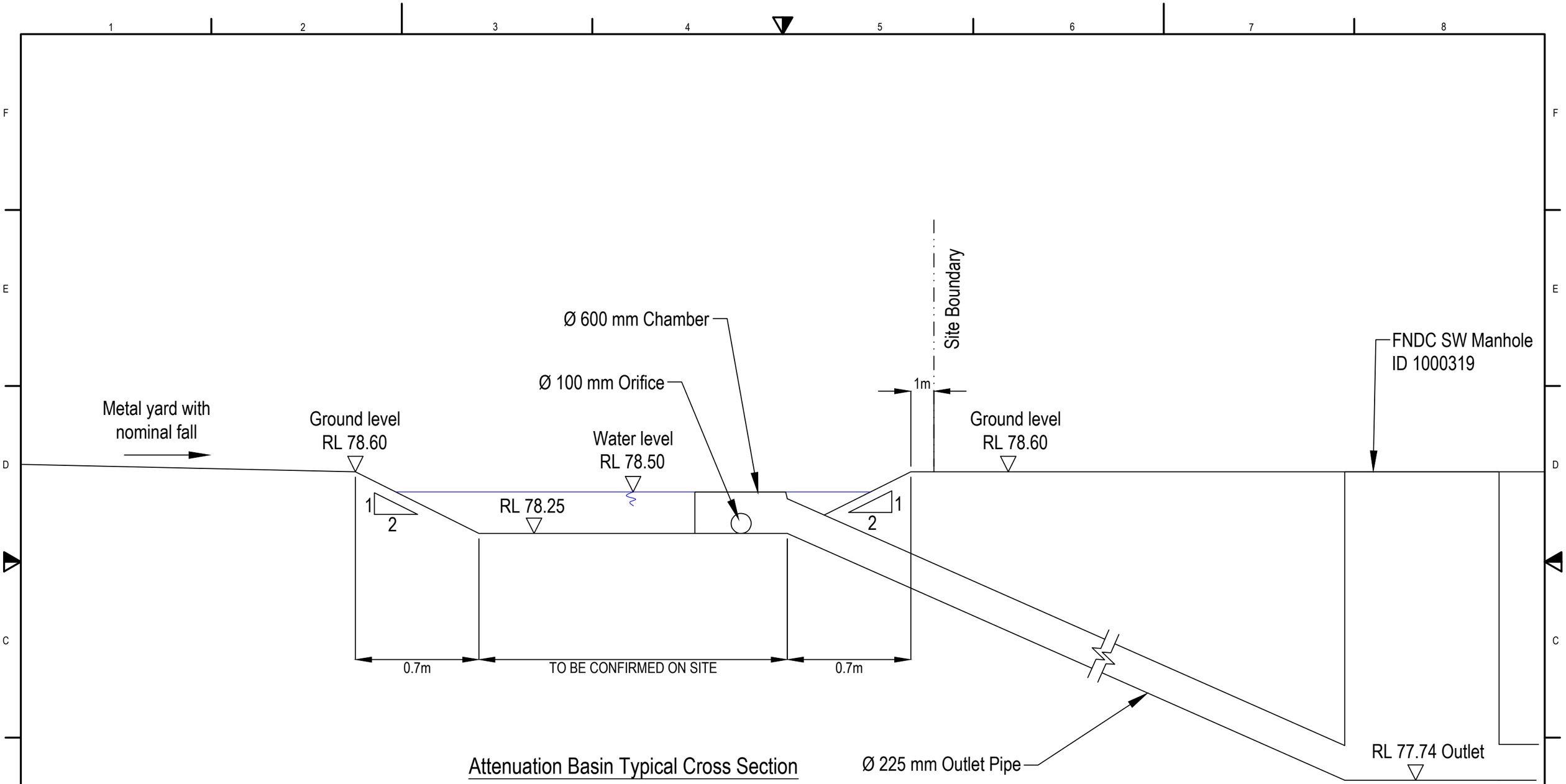
DWG No. 24 243/DE1	Sheet of	Scale	NTS_A4	
Drawn TMA	Check JP	Approved	JP	
Filename		Date	19/02/25	

Project: 18-20 Kahikatearoa Lane, Waipapa

Client: Smart Steel Buildings

Project No. 24 243

RC no.



Attenuation Basin Typical Cross Section
(NTS)

Rev	Date	Description	By	Checked
A	19/02/2025	FOR CONSENT	LP	TMA

DWG Attenuation Basin Details

NOT TO SCALE | Date 19/02/2025

Drawn LP | Checked TMA | Approved JP

File T:\CLIENTS\SMART STEEL BUILDINGS\JOBS\24 243 LOT 2 & 3 KAHIKATEAROA LANE WAIPAPA\ENGINEERING\DRAWINGS\STORMWATER\ATTENUATION DETAILS.DWG

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Project: Proposed Vehicle Maintenance Facility
18-20 Kahikatearoa Lane, Waipapa (Lot 2 & 3 DP 567982)

Client: SmartSteel Buildings Limited

Project No. 24 243 | RC no.

Stage

Dwg No. P02

Sheet No.

Appendix B – Regional Plan permitted activity requirements

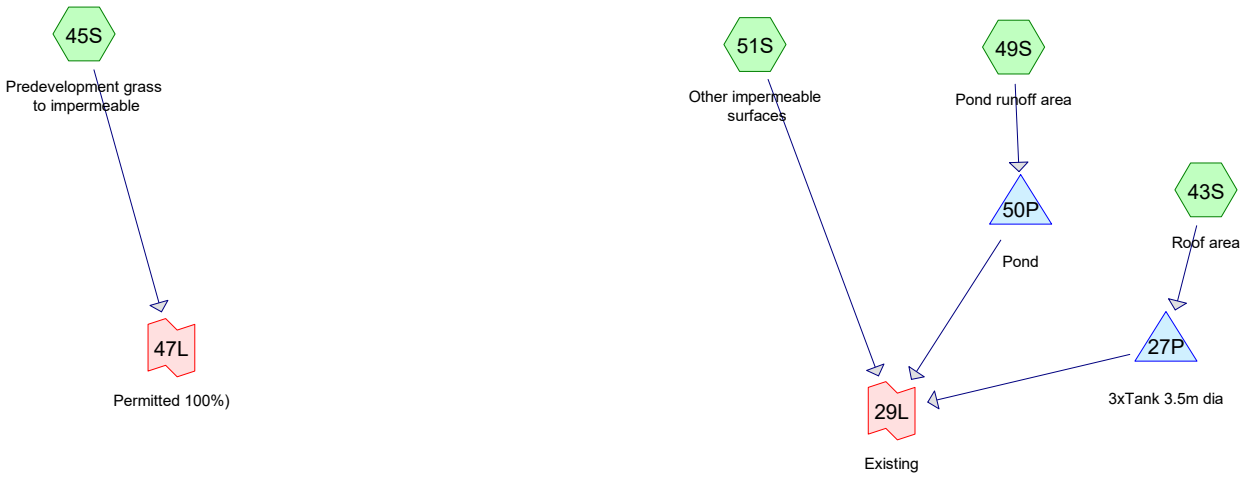
Requirement	Comment
1) the discharge or diversion is not from: a) a public stormwater network, or b) a high-risk industrial or trade premises	The discharge is from a private site that does not fulfil the criteria for "high-risk industrial or trade premises" as defined in the definitions section of the plan and reproduced below. The facility includes a proprietary vehicle washdown with discharge to land via an engineered disposal field. Refer separate design report by Haigh Workman.
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	The NRC flood model allows for 100% impermeable surfaces on land zoned Industrial, so the proposed degree of development is provided for.
3) where the diversion or discharge is from a hazardous substance storage or handling area: …	It is not anticipated that hazardous substances will be stored or handled on-site. The facility includes a proprietary vehicle washdown with discharge to land via an engineered disposal field. Refer separate design report by Haigh Workman.
4) where the diversion or discharge is from an industrial or trade premises: …	The site is a commercial premises rather than industrial or trade premises. The facility includes a proprietary vehicle washdown with discharge to land via an engineered disposal field. Refer separate design report by Haigh Workman.
5) the diversion or discharge is not into potentially contaminated land, or onto potentially contaminated land that is not covered by an impervious area	The discharge is into a consented stormwater system.
6) the diversion and discharge does not cause permanent scouring or erosion of the bed of a water body at the point of discharge	The discharge is attenuated to the capacity of the consented stormwater system.
7) the discharge does not contain more than 15 milligrams per litre of total petroleum hydrocarbons	As no fuel storage is anticipated for the site. The facility includes a proprietary vehicle washdown with discharge to land via an

	engineered disposal field. Refer separate design report by Haigh Workman.
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 b) a conspicuous change in the colour or visual clarity, or c) an emission of objectionable odour, or d) the rendering of fresh water unsuitable for consumption by farm animals, or e) the rendering of fresh water taken from a mapped priority drinking water abstraction point unsuitable for human consumption after existing treatment.	The only contaminants generated from the site are anticipated to be material from the carpark. The quantity and quality of the anticipated contaminants are not expected to result in any of the listed issues. The facility includes a proprietary vehicle washdown with discharge to land via an engineered disposal field. Refer separate design report by Haigh Workman.

"High risk or industrial trade premise" as defined in Proposed Regional Plan:

> "An industrial or trade premise used for any of the following purposes and that stores, uses or generates hazardous substances on-site that are exposed to rain and can be entrained in stormwater, including:
> 1) boat construction and maintenance, and
> 2) port activities including dry docks, and
> 3) commercial cement, concrete or lime manufacturing or storage, and
> 4) chemical manufacture, formulation or bulk storage, recovery, processing or recycling, but excluding bulk storage of chemicals for on-site use by manufacturing processes not specified in 1) to 9) of this definition, and
> 5) fertiliser manufacture or bulk storage, and
> 6) storage of hazardous wastes including waste dumps or dam tailings associated with mining activities, and
> 7) petroleum or petrochemical industries including a petroleum depot, terminal, blending plant or refinery, or facilities for recovery, reprocessing or recycling petroleum-based materials, but excludes service stations, truck stops and refuelling facilities that comply with: Ministry for the Environment. 1998. *Environmental Guidelines for Water Discharges from Petroleum Industry Sites in New Zealand*, and
> 8) scrap yards including automotive dismantling, wrecking or scrap metal yards, and
> 9) wood treatment or preservation (including the commercial use of anti-sap-stain chemicals during milling), or bulk storage of treated timber."

Appendix C – HydroCAD Stormwater Runoff Calculations



Subcat Reach Pond Link

Routing Diagram for 24 243_Tank 02 (Type 1A)
Prepared by Haigh Workman Limited, Printed 19/02/2025

Area Listing (all nodes)

Area (sq-meters)	CN	Description (subcatchment-numbers)
525.5	98	Concrete (49S, 51S)
450.2	75	Grass (49S, 51S)
3,483.9	91	Metal (49S, 51S)
303.0	75	Pond (49S)
1,535.4	98	Roofs (43S)
40.0	98	Tanks (51S)
504.0	98	concrete 2 (51S)
6,842.0	75	grass (eng standards (45S)
13,684.0	**83**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-meters)	Soil Group	Subcatchment Numbers
0.0	HSG A	
0.0	HSG B	
0.0	HSG C	
0.0	HSG D	
13,684.0	Other	43S, 45S, 49S, 51S
13,684.0		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-meters)	HSG-B (sq-meters)	HSG-C (sq-meters)	HSG-D (sq-meters)	Other (sq-meters)	Total (sq-meters)	Ground Cover
0.0	0.0	0.0	0.0	525.5	525.5	Concrete
0.0	0.0	0.0	0.0	450.2	450.2	Grass
0.0	0.0	0.0	0.0	3,483.9	3,483.9	Metal
0.0	0.0	0.0	0.0	303.0	303.0	Pond
0.0	0.0	0.0	0.0	1,535.4	1,535.4	Roofs
0.0	0.0	0.0	0.0	40.0	40.0	Tanks
0.0	0.0	0.0	0.0	504.0	504.0	concrete 2
0.0	0.0	0.0	0.0	6,842.0	6,842.0	grass (eng standards
0.0	**0.0**	**0.0**	**0.0**	**13,684.0**	**13,684.0**	**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 43S: Roof area Runoff Area=1,535.4 m² 100.00% Impervious Runoff Depth>156 mm
Tc=10.0 min CN=98 Runoff=16.4 L/s 240.3 m³

Subcatchment 45S: Predevelopment Runoff Area=6,842.0 m² 0.00% Impervious Runoff Depth>92 mm
Tc=10.0 min CN=75 Runoff=42.6 L/s 629.9 m³

Subcatchment 49S: Pond runoff area Runoff Area=2,598.0 m² 1.15% Impervious Runoff Depth>125 mm
Tc=0.0 min CN=87 Runoff=23.5 L/s 324.5 m³

Subcatchment 51S: Other Runoff Area=2,708.6 m² 38.38% Impervious Runoff Depth>142 mm
Tc=10.0 min CN=93 Runoff=27.4 L/s 383.7 m³

Pond 27P: 3xTank 3.5m dia Peak Elev=2.29 m Storage=66.1 m³ Inflow=16.4 L/s 240.3 m³
Outflow=3.9 L/s 220.7 m³

Pond 50P: Pond Peak Elev=0.25 m Storage=55.3 m³ Inflow=23.5 L/s 324.5 m³
Outflow=9.2 L/s 312.1 m³

Link 29L: Existing Inflow=39.3 L/s 916.5 m³
Primary=39.3 L/s 916.5 m³

Link 47L: Permitted 100%) Inflow=42.6 L/s 629.9 m³
Primary=42.6 L/s 629.9 m³

Total Runoff Area = 13,684.0 m² Runoff Volume = 1,578.4 m³ Average Runoff Depth = 115 mm
80.96% Pervious = 11,079.1 m² 19.04% Impervious = 2,604.9 m²

Summary for Subcatchment 43S: Roof area

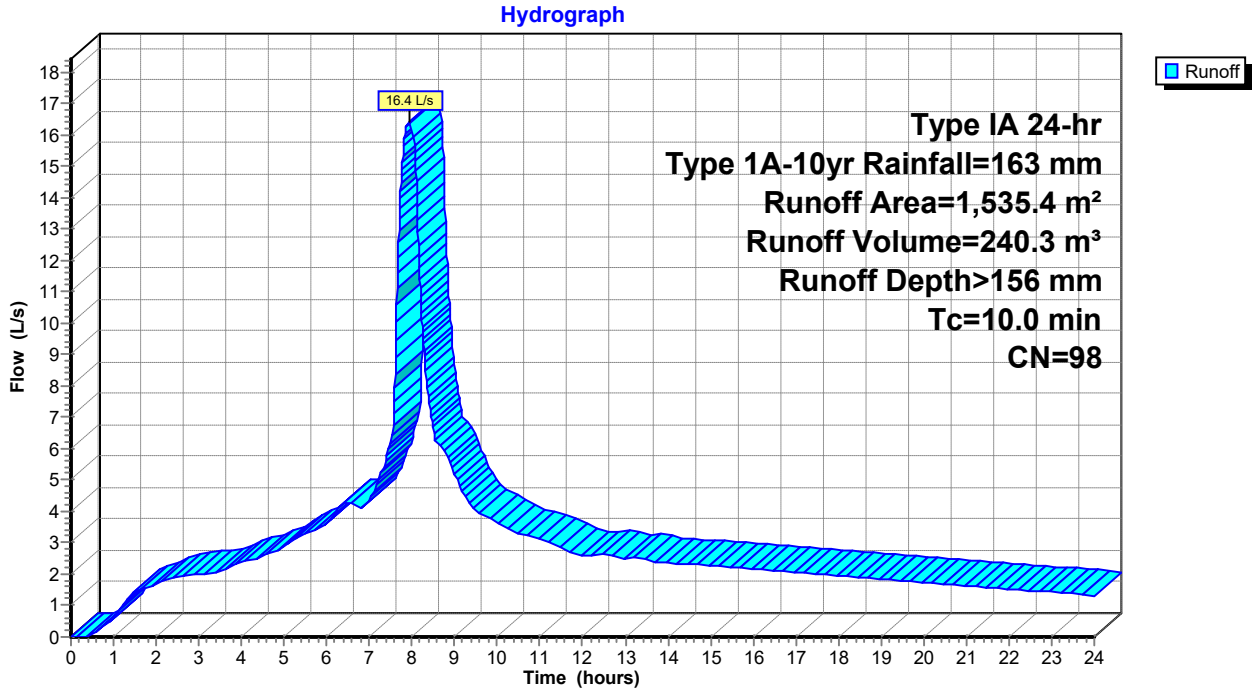
Runoff = 16.4 L/s @ 7.94 hrs, Volume= 240.3 m³, Depth> 156 mm
Routed to Pond 27P : 3xTank 3.5m dia

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr Type 1A-10yr Rainfall=163 mm

	Area (m²)	CN	Description
*	1,535.4	98	Roofs
	1,535.4		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 43S: Roof area



Summary for Subcatchment 45S: Predevelopment grass to impermeable

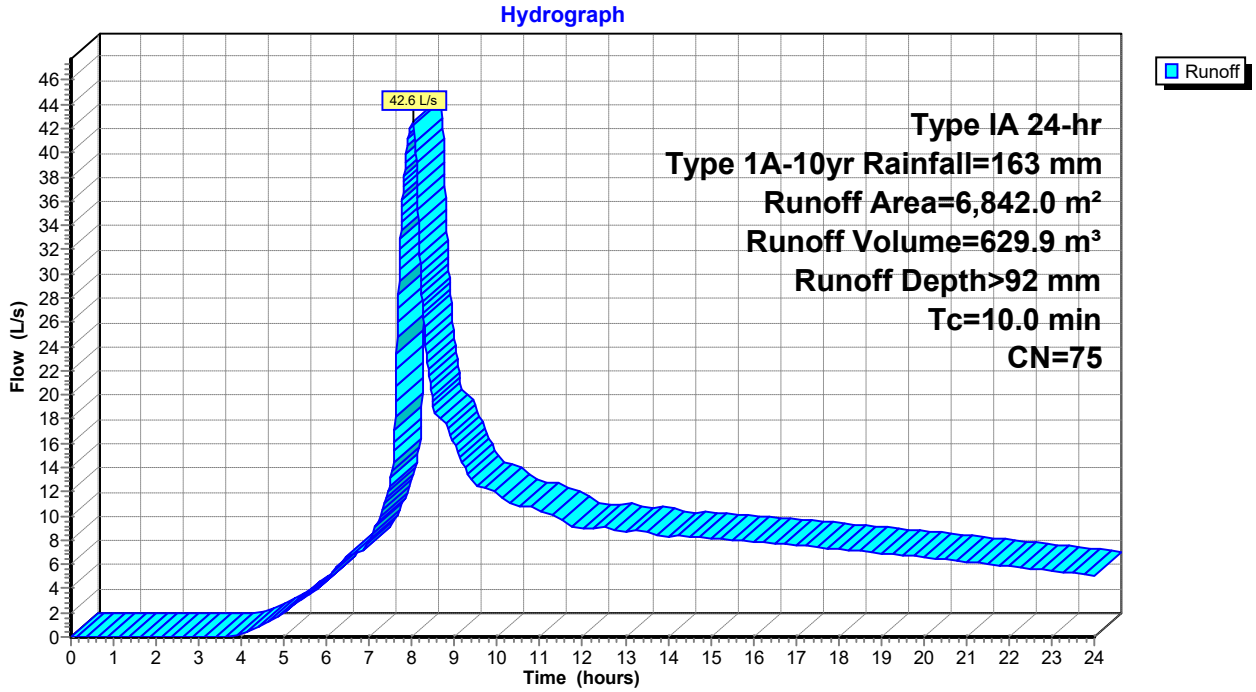
Runoff = 42.6 L/s @ 8.01 hrs, Volume= 629.9 m³, Depth> 92 mm
Routed to Link 47L : Permitted 100%)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr Type 1A-10yr Rainfall=163 mm

	Area (m²)	CN	Description
*	6,842.0	75	grass (eng standards
	6,842.0		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 45S: Predevelopment grass to impermeable



Summary for Subcatchment 49S: Pond runoff area

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

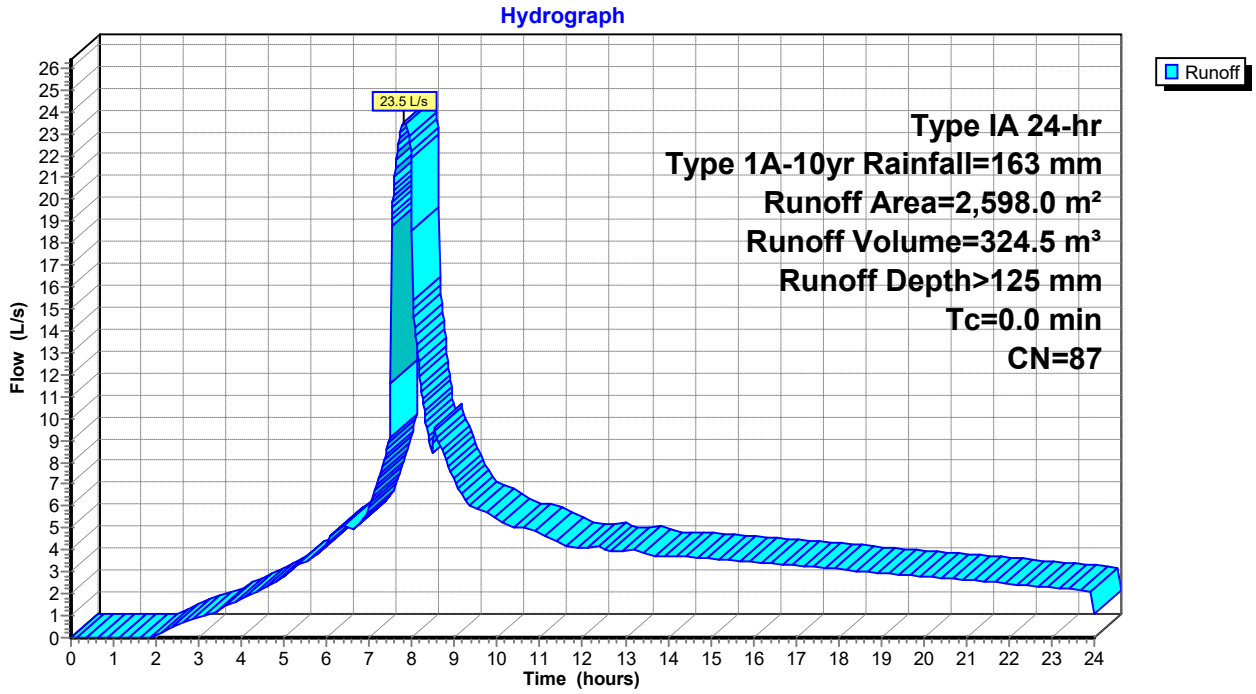
Runoff = 23.5 L/s @ 7.81 hrs, Volume= 324.5 m³, Depth> 125 mm
Routed to Pond 50P : Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr Type 1A-10yr Rainfall=163 mm

	Area (m²)	CN	Description
*	30.0	98	Concrete
*	1,866.0	91	Metal
*	303.0	75	Pond
*	399.0	75	Grass
	2,598.0	87	Weighted Average
	2,568.0		98.85% Pervious Area
	30.0		1.15% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
0.0					**Direct Entry,**

Subcatchment 49S: Pond runoff area



Summary for Subcatchment 51S: Other impermeable surfaces

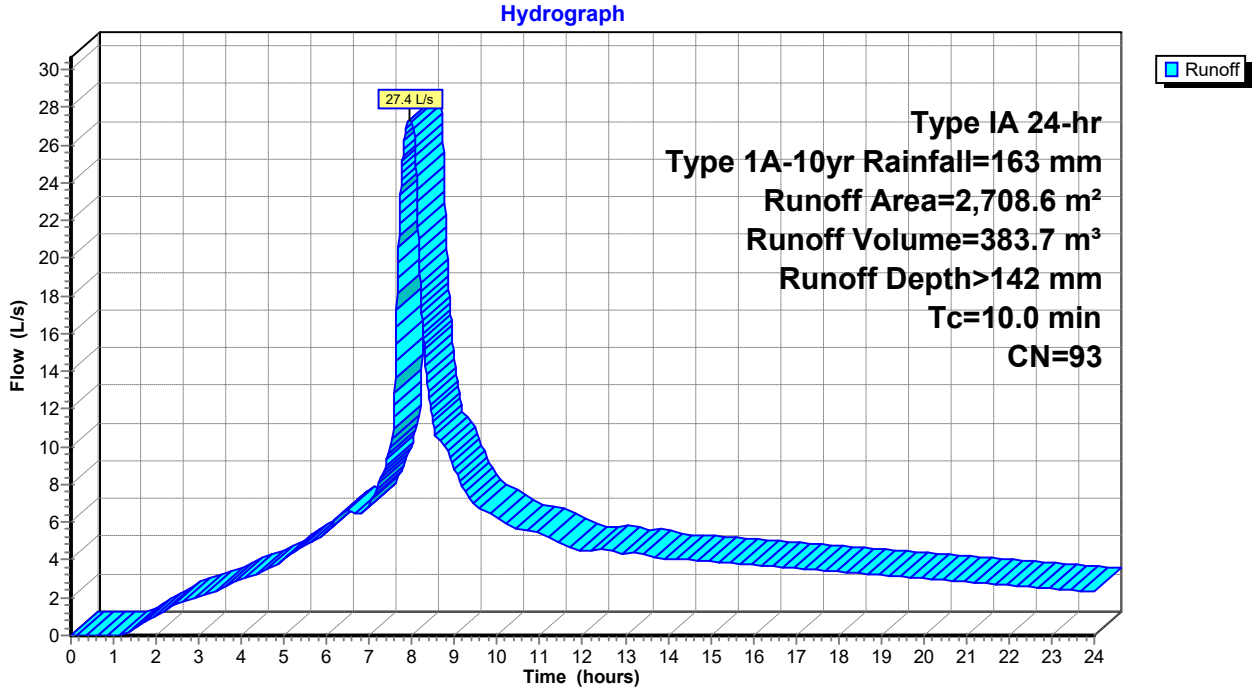
Runoff = 27.4 L/s @ 7.95 hrs, Volume= 383.7 m³, Depth> 142 mm
Routed to Link 29L : Existing

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr Type 1A-10yr Rainfall=163 mm

	Area (m²)	CN	Description
*	495.5	98	Concrete
*	40.0	98	Tanks
*	1,617.9	91	Metal
*	51.2	75	Grass
*	504.0	98	concrete 2
	2,708.6	93	Weighted Average
	1,669.1		61.62% Pervious Area
	1,039.5		38.38% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 51S: Other impermeable surfaces



Summary for Pond 27P: 3xTank 3.5m dia

Inflow Area = 1,535.4 m²,100.00% Impervious, Inflow Depth > 156 mm for Type 1A-10yr event
Inflow = 16.4 L/s @ 7.94 hrs, Volume= 240.3 m³
Outflow = 3.9 L/s @ 9.75 hrs, Volume= 220.7 m³, Atten= 77%, Lag= 108.7 min
Primary = 3.9 L/s @ 9.75 hrs, Volume= 220.7 m³
Routed to Link 29L : Existing

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 2.29 m @ 9.75 hrs Surf.Area= 28.9 m² Storage= 66.1 m³

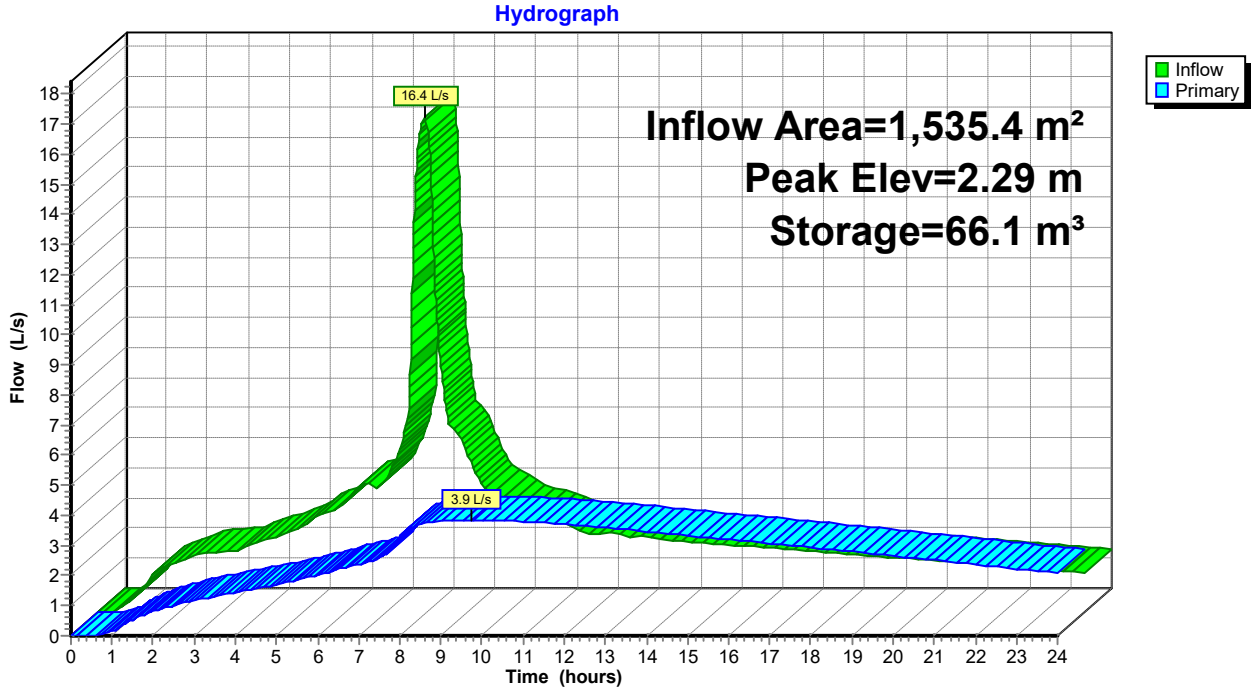
Plug-Flow detention time= 212.9 min calculated for 220.7 m³ (92% of inflow)
Center-of-Mass det. time= 152.9 min (804.7 - 651.8)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00 m	69.3 m³	**3.50 mD x 2.40 mH Vertical Cone/Cylinder** x 3

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00 m	**35 mm Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.9 L/s @ 9.75 hrs HW=2.29 m (Free Discharge)
1=Orifice/Grate (Orifice Controls 3.9 L/s @ 4.01 m/s)

Pond 27P: 3xTank 3.5m dia



Summary for Pond 50P: Pond

Inflow Area = 2,598.0 m², 1.15% Impervious, Inflow Depth > 125 mm for Type 1A-10yr event
Inflow = 23.5 L/s @ 7.81 hrs, Volume= 324.5 m³
Outflow = 9.2 L/s @ 8.38 hrs, Volume= 312.1 m³, Atten= 61%, Lag= 34.0 min
Primary = 9.2 L/s @ 8.38 hrs, Volume= 312.1 m³
Routed to Link 29L : Existing

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 0.25 m @ 8.38 hrs Surf.Area= 250.0 m² Storage= 55.3 m³

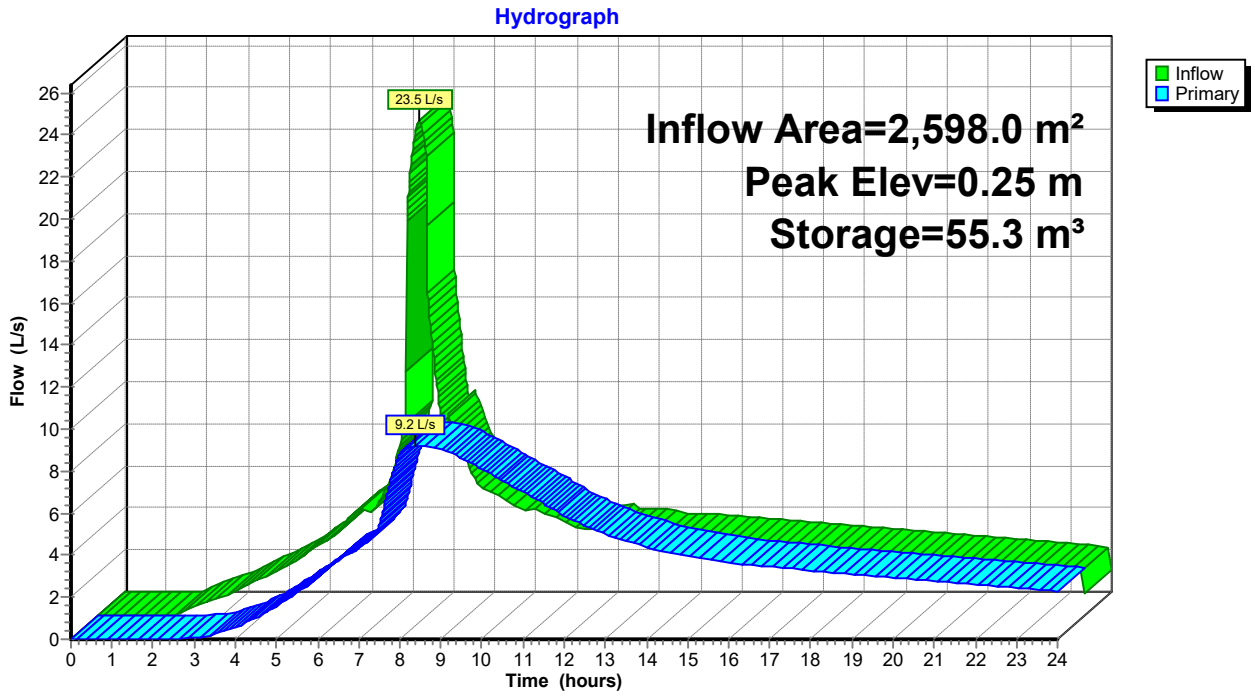
Plug-Flow detention time= 83.6 min calculated for 312.0 m³ (96% of inflow)
Center-of-Mass det. time= 56.7 min (771.7 - 715.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00 m	96.3 m³	**4.42 mW x 45.30 mL x 0.40 mH Prismatoid Z=2.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00 m	**100 mm Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	0.35 m	**0.50 m long + 1.0 m/m SideZ x 0.50 m breadth Broad-Crested Rectangular W** Head (meters) 0.06 0.12 0.18 0.24 0.30 0.37 0.43 0.49 0.55 0.61 0.76 0.91 1.07 Coef. (Metric) 1.43 1.45 1.45 1.47 1.50 1.55 1.59 1.67 1.67 1.64 1.78 1.81 1.83

Primary OutFlow Max=9.2 L/s @ 8.38 hrs HW=0.25 m (Free Discharge)
1=Orifice/Grate (Orifice Controls 9.2 L/s @ 1.18 m/s)
2=Broad-Crested Rectangular Weir (Controls 0.0 L/s)

Pond 50P: Pond

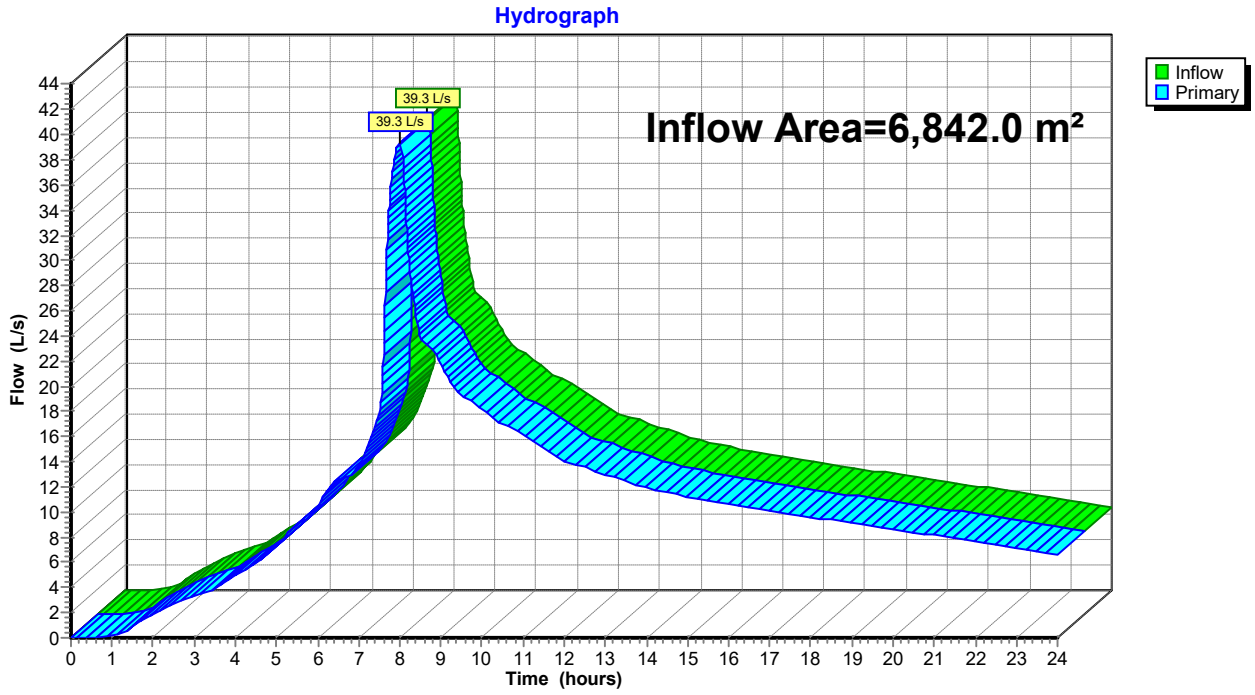


Summary for Link 29L: Existing

Inflow Area = 6,842.0 m², 38.07% Impervious, Inflow Depth > 134 mm for Type 1A-10yr event
Inflow = 39.3 L/s @ 7.99 hrs, Volume= 916.5 m³
Primary = 39.3 L/s @ 7.99 hrs, Volume= 916.5 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 29L: Existing

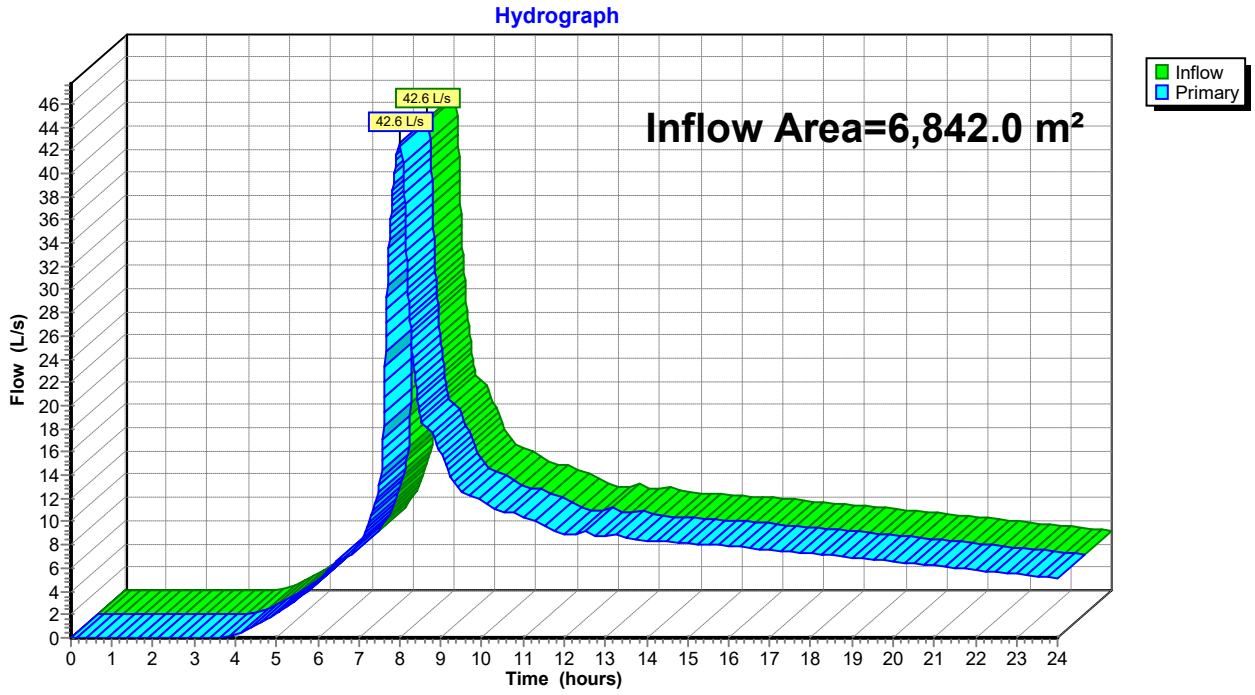


Summary for Link 47L: Permitted 100%)

Inflow Area = 6,842.0 m², 0.00% Impervious, Inflow Depth > 92 mm for Type 1A-10yr event
Inflow = 42.6 L/s @ 8.01 hrs, Volume= 629.9 m³
Primary = 42.6 L/s @ 8.01 hrs, Volume= 629.9 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 47L: Permitted 100%)



APPENDIX 9

HAIGH WORKMAN ON-SITE

WASTEWATER SYSTEM ASSESSMENT

On-site Wastewater System Assessment

18 – 20 Kahikatearoa Lane, Waipapa

(Lots 2 & 3 DP 567982)

SmartSteel Buildings Limited

Haigh Workman reference: 24 243

Rev B

February 2025

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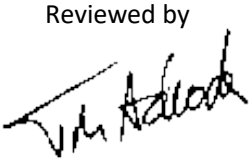
PO Box 89 • 6 Fairway Drive • Kerikeri 0245 • New Zealand

Revision History

Revision №	Issued By	Description	Date
A	Tom Adcock	First Issue	26 February 2025

Prepared by	Reviewed by	Approved by
Joshua McNulty Engineering Technician	 **T**om Adcock Senior Civil Engineer Beng (civil) MEngNZ	 **John Paresch** Senior Civil Engineer BE (Civil Eng), CMEngNZ, CPEng

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TABLES

FIGURES

Executive Summary

It is proposed to construct a new Vehicle Maintenance Facility for Commercial Diesel Limited at 18-20 Kahikatearoa Lane, Waipapa. The proposed development site spans two properties; Lots 2 & 3 DP 567982 which has a combined area of 6,842m^2. Up until recently, the site was utilised as pasture

This report presents a design for the on-site wastewater system to service the proposed development as no reticulated town sewerage system is available.

Wastewater Flows
Wastewater from the proposed new vehicle maintenance facility is calculated to be 15 staff x 40 L/person = 600 litres/day.

Treatment Plant
The treatment plant shall be sized to cater for at least 600 litre/day and meet the quality output of Australian / New Zealand Standard for on-site domestic wastewater treatment units (AS/NZS 1546:3:2008), capable of producing effluent with Biochemical Oxygen Demand and Total Suspended Solids concentrations not exceeding 20g/m^3 and 30g/m^3, respectively.

The treatment plant brand and specifications are to be included with the building consent application.

Disposal Field
The land disposal area is on the northeastern corner of the site, in an area of greenfield. Topsoil stripping has occurred as part of geotechnical preloading for the building platform. Replacement quality topsoil will need to be imported for the proposed effluent disposal area.

Due to the poor natural soakage and high ground water, the land disposal area was investigated by conducting a constant head soakage test for evaluation of soil structure and category. The soil has been evaluated AS/NZS 1547:2012 Category 5 clay.

To mitigate the poorly drained soils and elevated ground water table, it is proposed to construct a Wisconsin Mound, in general accordance with AS/NZS1547 specifications. The mound shall have a minimum 300mm sand bed, a 300mm topsoil cap and 150mm covering elsweher with dense plantings to encourage evapotranspiration.

The ground level along the northern boundary in the vicinity of the disposal field ranges RL78.7 to 79.1m NZVD. By constructing the disposal field as a mound it will achieve the minimum RL 78.8m NZVD specified in the Haigh Workman Flood Hazard report.

A design irrigation rate of 5 mm/day has been adopted which results in a 120m^2 land application area. This is achieved using an 5.2m wide x 23m long mound along the northern boundary. Irrigation shall be via 32 mm pipes with 3 mm drilled squirt holes set in an aggregate bed. A 100% reserve (no build) area is required as per the subdivision consent notice and is situated next to the disposal field.

The disposal field shall achieve minimum 1.5 m setback from the site boundaries as per the typical details enclosed.

Resource Consent
Complies with Regional Plan, no consent required.

Design Summary

Criteria	Comments
Occupancy	15 workers
Wastewater source	Black water from staff lunchroom and toilet facilities
Wastewater generation	600 L/day
Treatment system	Secondary treatment plant
Location of effluent disposal	Northern boundary
Effluent disposal system	Wisconsin Mound with topsoil cover and densely planted
Irrigation design	32 mm distribution pipework with 3 mm squirt holes designed as two fields with indexing valve for consistent dosing
Irrigation pump	Davey D42A/B or equivalent
Soil type	AS/NZS1547 Category 5
Application rate	5 mm/day
Extent of land application area	120 m^2
Slope of land application area	Almost flat

1 Introduction

1.1 Project Brief Scope

Haigh Workman Limited (Haigh Workman) has been commissioned by SmartSteel Buildings Limited (the Client) to undertake an on-site wastewater design for a proposed Vehicle Maintenance Facility at 18-20 Kahikatearoa Lane, Waipapa. This report presents the information gathered during the site investigation, interpretation of data obtained and on-site wastewater recommendations relevant to the site.

The scope of this report encompasses the wastewater design in the context of the proposed development as defined in the drawings provided by SmartSteel Buildings Limited. This appraisal has been designed to assess the subsoil conditions for wastewater design and identify constraints for the proposed development.

This report provides the following:

- A summary of the published geology with reference to the site investigations undertaken.
- Analysis of the data obtained from site investigations and review and published flood hazard data.
- Wastewater design recommendations.

1.2 Consent Condition

The subdivision consent includes a consent notice for Lots 1 to 8 DP 567982 requiring a 100% reserve area:

ii. In conjunction with the construction of any building which includes a wastewater treatment & effluent disposal system the applicant shall submit for Council approval a TP58 Report prepared by a Chartered Professional Engineer or an approved TP58 Report Writer. The report shall be prepared generally in accordance with the recommendations in the Engineers Report prepared by Haigh Workman Civil and Structural Engineers Ltd and submitted with Resource Consent 2160324. It shall identify a suitable method of wastewater treatment for the proposed development along with an identified effluent disposal area plus a 100% reserve disposal area. The report shall confirm that all of the treatment & disposal system can be fully contained within the lot boundary and comply with the Regional Water & Soil Plan Permitted Activity Standards.

1.3 Site Description

Site Address:	18-20 Kahikatearoa Lane, Waipapa.
Legal Description:	Lot 2 & 3 DP 567982
Title:	1019560, 1019561
Zoning:	Industrial
Area:	6842 m^2 (Lot 2 - 3,412 m^2 & Lot 3 - 3,430 m^2)
Owner:	Commercial Diesel Limited

The existing site comprises two parcels of undeveloped land with a combined site area of 6,842 m^2 situated within a newly established industrial subdivision on the edge of the Waipapa industrial estate. Refer to Figure 1 below. Up until recently, the site was utilised as pasture. Topsoil has been stripped from an area

at the southern portion of the site and aggregate placed for preloading the building platform. The proposed wastewater system is to be sited by the northern boundary of the property.

The site is bound by Kahikatearoa Lane to the south, a site undergoing development to the west, pasture to the north and a commercial hire centre to the east. The other lots within the subdivision are anticipated to be populated by light industrial end-users. Topographically the property is generally flat with little change in elevation. The gradient of the land is in the order of less than 1 degree. Mature trees were noted along the northern boundary.

Kahikatearoa Lane is a new road recently vested with Far North District Council (FNDC). The road level has been set specifically low to act as an overland flow path for flood waters. The road contains reticulated stormwater and a water main with fire hydrants, however the water reticulation network is not available for site supply.

Figure 1 - Site Location

1.4 Proposed Development

We understand that Commercial Diesel Limited intends to develop the site with the construction of a new Vehicle Maintenance Facility as per the architectural site plans appended. Access and parking will be from the front of the property with roof water collection tanks, wastewater effluent disposal and vehicle washdown disposal provided at the rear of the site.

1.5 Limitations

This report has been prepared for the use of SmartSteel Buildings Limited with respect to the particular brief outlined to us. This report is to be used by our Client and their Consultants and may be relied upon

by Northland Regional Council (NRC) and FNDC when considering Resource/Building Consent aspects for the proposed development. The information and opinions contained within this report shall not be used in any other context for any other purpose without prior review and agreement with Haigh Workman Limited.

Should the wastewater field be relocated outside of the investigated area, further investigation and/or amendments to the recommendations made in this report may be required.

2 Geology

2.1 Published Geology

The geotechnical site conditions were investigated by Haigh Workman, refer to Report Ref. 24 043 dated 1st March 2024.

Based on the results of the geotechnical investigations and review of published geological maps, it is considered that the surface soils directly underlying the site comprise Tauranga Group alluvial soils, underlain by Kerikeri Volcanic Group.

For wastewater disposal further reference is made to published soils maps which for this site is NZMS 290 Sheet P04/05 Whangaroa – Kaikohe, refer Figure 2 below.

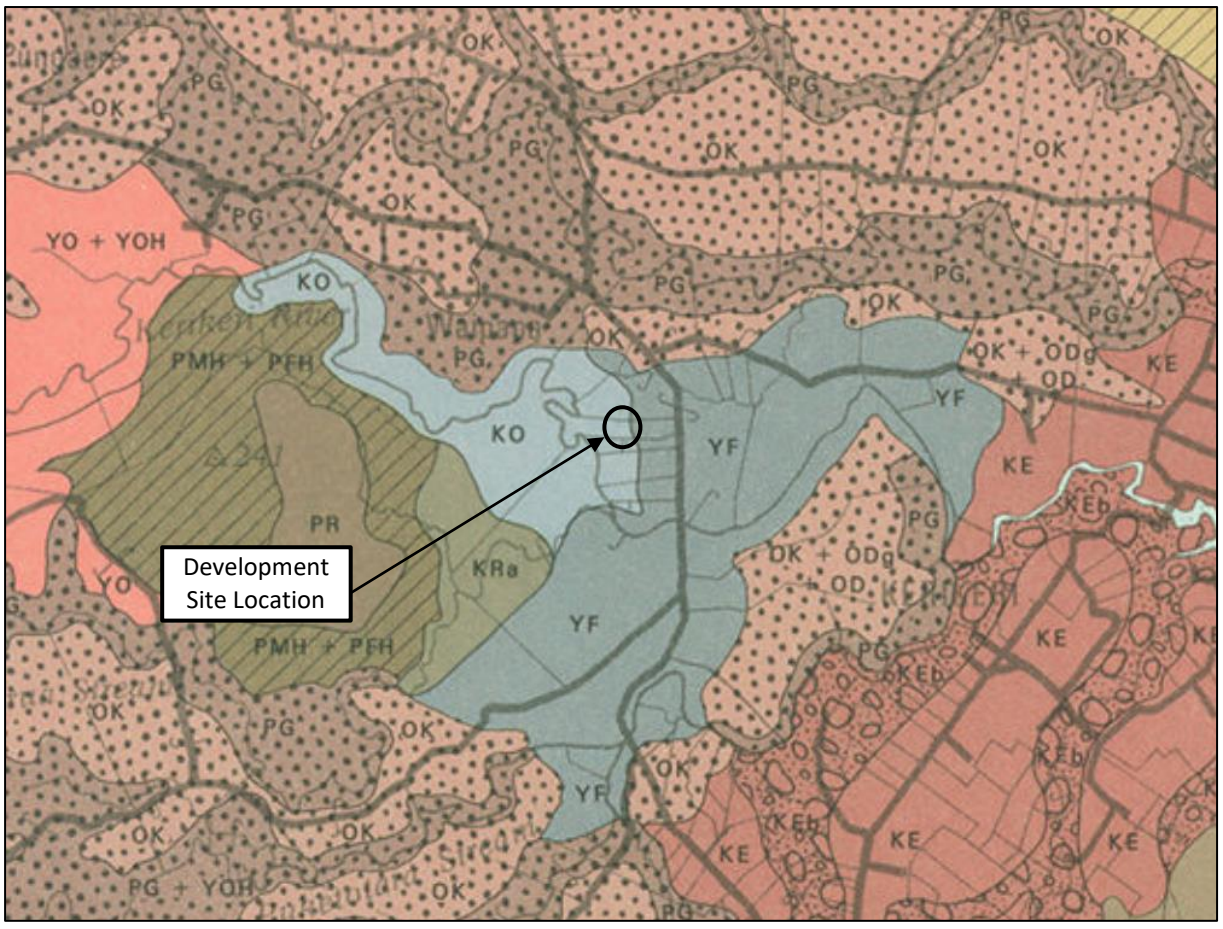


Figure 2 – Extract Soils Map NZMS 290 Sheet P04/05 Whangaroa – Kaikohe (Scale 1: 100,000 scale, 1980)

Based on a review of published soils maps and our site investigations, the surface soils are considered to comprise Kamo clay loam (KO) or Waipapa Clay (YF), both typically described as imperfectly to very poorly drained.

3 Flood Hazard

3.1 Published Flood Data

The site is within the Waipapa floodplain which is known to be susceptible to flooding and exhibits a high groundwater table. Published flood data indicates flood waters from Kerikeri River spilling across the site and neighbouring properties flowing in a general southeasterly direction. Refer to Figure 3 below for flood extents.

The flow is shallow, and it is uncertain how much would actually cross onto the site from the north and west. Kahikatearoa Lane has been engineered to be some 0.5m lower than the site and surrounding ground to act as an overland flowpath in the same manner as Klinac Lane. Refer Figure 3 below. Note that the NRC flood model was published prior to the development of the subdivision and does not reflect the alterations made to ground levels by way of subdivisional earthworks and roading including the formation of Kahikatearoa Lane.

The proposed effluent disposal bunds described later in this report have been positioned to allow overland flow, should this occur, to pass down the western side following the line of an earlier farm drain, and safely out onto Kahikatearoa Lane.

With respect to effluent disposal, NRC Proposed Regional Plan rules require set back from the 5% AEP (20-year extent) floodplain for discharge of secondary treated effluent. Maps are not available for the 5% AEP event. The site and surrounding parcels are not affected by the 10% AEP flooding which is generally constrained to the river channel. Given the sparsity of the 2% AEP flooding and our proposed mounding of the effluent disposal field, adequate setback from flooding in compliance with NRC rules is achieved.

Furthermore, reference to the Flood Hazard Assessment for the site by Haigh Workman dated 24 January 2025, recommends the disposal field achieves a minimum RL 78.8m NZVD. The ground level along the northern boundary in the vicinity of the disposal field ranges RL78.7 to 79.1m NZVD. By constructing the disposal field on a mound, it will achieve RL 78.8m NZVD.

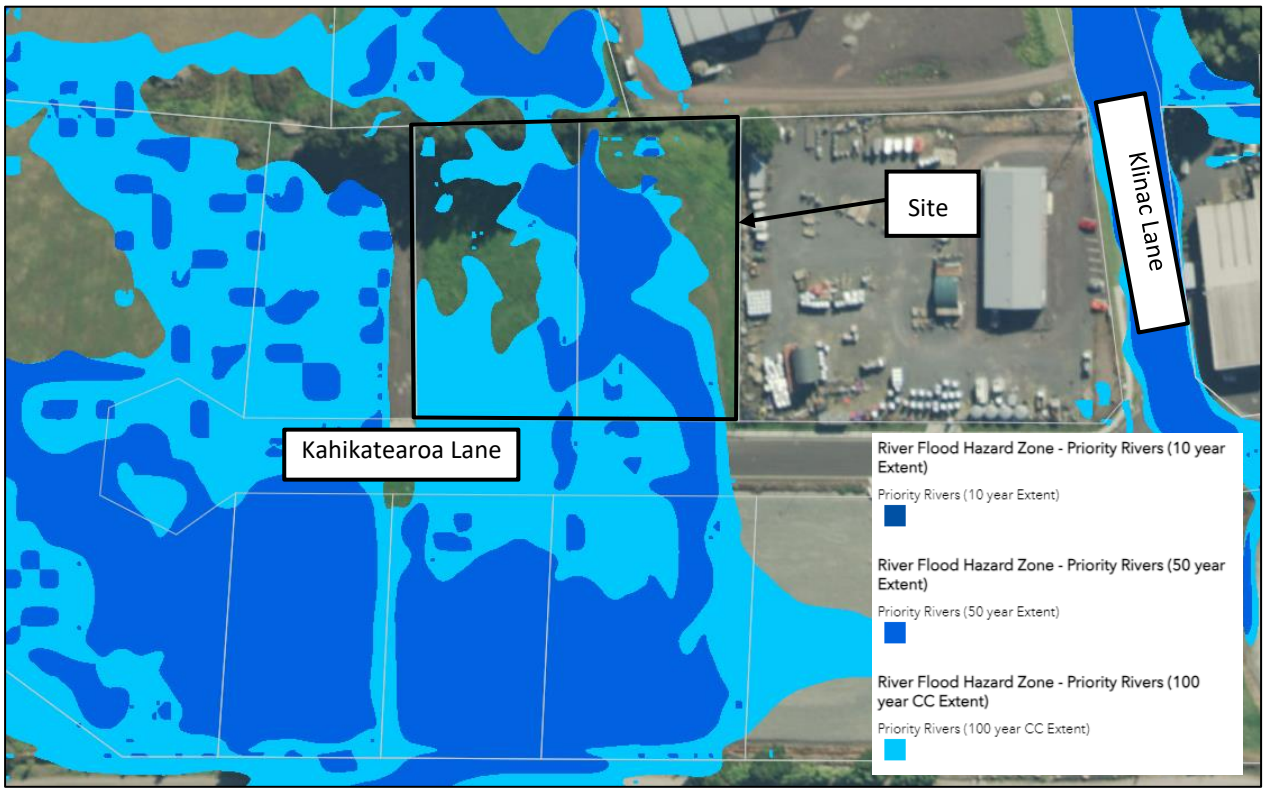


Figure 3 – Priority Rivers Flood Hazard Mapping (Source NRC)

4 Ground Investigations

4.1 Geotechnical Investigations

4.1.1 Subsurface Investigations

The exploratory investigations carried out as part of the Haigh Workman Geotechnical reporting included eleven mechanical and hand driven cone penetration tests (CPTs), plus five 50mm diameter hand augered boreholes. Refer Geotechnical Investigation Plan G01 appended. The CPT testing achieved a maximum depth of 6.98m whilst the hand augurs were extended to a maximum depth of 4.4m. The ground water depth ranged 0.6m to 1.6m.

Fill was encountered within borehole HA02 which was located within the old open trenched farm drain that aligns with the western boundary. The trench has since been re excavated and reinstated with granular hardfill, compacted to an engineered standard as part of the geotechnical pre-loading works.

Alluvial soils were encountered at all locations until sudden refusal was typically encountered being inferred as top of weathered Kerikeri Volcanic Group basalt rock.

Table 1 - Summary of Exploratory Investigations

Test I.D.	Fill (m bgl)	Tauranga Group alluvial soils (m bgl)	Kerikeri Volcanic Group basalt – inferred only (m bgl)	Groundwater level (m bgl)
HA01	NE	2.75	>2.75	0.6
HA02	1.2	>4.4	NE	1.2
HA03	NE	>2.0	NE	0.6
HA04	NE	>2.8	NE	0.55
HA05	NE	>2.5	NE	0.8
CPT01	NT	3.5	>3.51	Collapsed
CPT02	NT	3.27	>3.27	1.1
CPT03	NT	3.19	>3.19	0.8
CPT04	NT	4.07	>4.07	1.2
CPT05	NT	2.64	>2.64	0.8
CPT06	NT	1.80	>1.80	0.85
CPT07	NT	4.62	>4.62	1.5
CPT08	NT	4.62	>4.62	1.3
CPT09	NT	2.91	>2.91	1.6
CPT10	NT	3.22	>3.22	1.2
CPT11	NT	6.91	>6.91	1.5

m bgl meters below ground level
NE Not Encountered
NT Not Tested

4.2 Wastewater Investigations

Further investigations in the area of the proposed wastewater and proposed vehicle washdown disposal field were carried out by Haigh Workman on 22nd November 2024. These comprised three 50mm diameter boreholes to depths ranging 0.7m to 0.9m and one constant head soakage test. The soils were logged and categorised according to AS/NZS 1547.

4.2.1 Boreholes

The bore hole locations are shown on the Site Drainage Plan appended. Surface topsoil had been stripped so there was no observed topsoil at the borehole locations. The surface soils consisted of a moist dark greyish brown silt with rootlets. At 0.4 m bgl the soil became increasingly moist and more loam like with traces of sand. Groundwater was encountered at 0.6 m to 0.8m bgl at which point the holes were terminated. A detailed descriptions of soils and groundwater observations made during intrusive investigation works appended.

4.2.2 Constant Head Soakage Testing

Constant Head Permeability Testing was conducted adjacent to BH2. The results of the investigation yielded an indicative permeability of 0.12m/day which corresponds to a light clay or a clay loam. Previous investigations on neighbouring sites within the subdivision similarly indicate the soil to be a shallow clay loam soil on light clay.

4.2.3 Groundwater

Groundwater was encountered in all boreholes. It should be noted that the water levels are likely to fluctuate seasonally. Little rain fell during the days preceding the investigations, so the groundwater table encountered is considered to be indicative of a normal for the time of season. Based on our observations from surrounding sites the winter groundwater level is expected to be higher of the order 0.4m bgl.

It is proposed to control winter ground water levels to no higher than summer levels (0.6m) by the installation of subsoil drains in the area of the disposal fields.

4.2.4 Soil Soakage Category

The soil soakage testing and previous investigations of neighbouring sites give rise to a poorly drained soil type which we categorise in accordance with AS/NZS 1547:2012 as soil Category 5 *Light clay* with moderate structure with a corresponding drip irrigation at a rate of 3mm/day and for a Wisconsin Mound a design loading rate (DLR) 5mm/day.

Table 2 - 1547:2012 Table N1Recommended mound design loading rates

Soil Category	Soil texture	Structure	Indicative permeability (K_{sat})(m/d)	Design loading rate (DLR) (mm/d)
1	Gravels and sands	Structureless (massive)	> 3.0	32
2	Sandy loams	Weakly structured	> 3.0	24
		Massive	1.4 – 3.0	24
3	Loams	High/ moderate structured	1.5 – 3.0	24
		Weakly structured or massive	0.5 – 1.5	16
4	Clay loams	High/ moderate structured	0.5 – 1.5	16
		Weakly structured	0.12 – 0.5	8
		Massive	0.06 – 0.12	5 (see Note)
5	Light clays	Strongly structured	0.12 – 0.5	8
		Moderately structured	0.06 – 0.12	5 (see Note)
		Weakly structured or massive	< 0.06	
6	Medium to heavy clays	Strongly structured	0.06 – 0.5	
		Moderately structured	< 0.06	
		Weakly structured or massive	< 0.06	

NOTE: To enable use of such soils for on-site wastewater land application, special design requirements and distribution techniques or soil modification procedures will be necessary. For any system designed for these soils, the effluent absorption rate shall be based upon soil permeability testing. Specialist soils advice and special design techniques will be required for clay dominated soils having dispersive (sodic) or shrink/swell behaviour. Such soils shall be treated as Category 6 soils. In most situations, the design will need to rely on more processes than just absorption by the soil.

5 On-Site Wastewater System

5.1 Design Population and Flow

We understand there are to be approximately 15 staff at the new Vehicle Maintenance Facility. Staff loading from a rural factory can vary from 30-50 litres/person/day, depending on various factors such as the source of water supply. The water main within Kahikatearoa Lane is not available for potable water supply at this time. Therefore, roof water supply is required.

Wastewater will be generated by toilets, showers and lunchrooms within the building and will be 'domestic' in nature. Discharge of industrial chemicals and waste into the wastewater system shall be prohibited.

On-site wastewater disposal guidance document TP58 recommends a design loading rate of 40 litres/person/day for day staff for standard facilities. Readings from a nearby factory have yielded average daily loading rates of 34 L/person and peaks of 44 L/person. On this basis we consider a mid-range rate of 40 L/person is suitable. Hence the design flow is 15 staff x 40 L/person = 600 litres/day.

5.2 Site and Soil Evaluation

Whilst a clay loam dominates the upper 0.5m-0.8 m soil profile, the soil soakage testing indicates the site is poorly drained as a result of the light clays beneath and resultant high ground water table. In accordance with AS/NZS 1547:2012 the soils across the proposed disposal field are therefore classed as soil Category 5 *Light clay* with moderate structure. These soils are suitable for drip irrigation at a rate of 3mm/day, or a Wisconsin mound at 5mm/day (1547 Table N1).

5.3 Disposal Field

To address issues with poor drainage, together with the risk of elevated ground water conditions, plus constraints on site space we recommend the disposal field is formed as a raised Winsonsin Mound system. Raising the disposal field with a Wisconsin mound will have the benefit of achieving positive draining of surface water as the natural site gradients may be prone to ponding. The distribution pipes shall be set in the raised mound not less than 0.3 m above the ground surface, thus achieving good setback fromground water.

Topsoil appears to have been removed for the site so a sufficient volume of quality topsoil shall be imported. The effluent disposal field will have an open and sunny aspect, dense plantings will enable evapotranspiration uptake to be maximised. Mounding the disposal field will have the added benefit of encouraging surface water runoff as the site is natural flat. Refer suitable list of suitable evapotranspiration species appended.

The summer groundwater table was measured as 0.6m bgl. To maintain this level throughout winter subsoil drainage is proposed at a minimum depth of 0.6m bgl. This combined with a raised mound provides surety that the required ground water setback will be achieved. The subsoil drains shall outlet to the Council stormwater connection for the site which has an invert level 0.8m bgl.

It is also noted that with development of an area a general lowering of the ground water can occur due to the umbrella effect of impermeable surfaces, combined with the installation of trenched services and drainage pipes.

For Design Loading Rate we follow the recommended irrigation rates found in Australian / New Zealand Standard for on-site domestic wastewater management (AS/NZS 1547:2012). For a Wisconsin mound at this site, we consider an irrigation rate of 5 mm per day is suitable.

The area required for the disposal field is as follows:

$$\text{Area of drip irrigation required} = \frac{\text{Design Loading Rate}}{\text{Design Irrigation Rate}}$$

$$= \frac{600}{5}$$

$$= \mathbf{120\ m^2}$$

This disposal field is to be situated in the northeastern corner with minimum dimensions of 23 m long by 5.2 m wide with a setback of 1.5 m from the site boundary, as per plan appended.

The Wisconsin mound system is to be installed with 3 distribution pipes spaced 0.5 m apart within a 225mm thick scoria aggregate distribution bed underlain by a minimum 300mm sand filter. Due to the narrow width in relation to length, the distribution pipework shall be split in two with an indexing valve to ensure consistent dosing across the full length. The bed will have an estimated storage capacity of 21.2 x 1.2 x 0.225 x 0.38 = 2.2m^3 or 2,200L, which is greater than the daily flow, thus providing >24 hrs storage.

The sand filter shall be medium grain size 0.25 mm > D_{10} > 1.0 mm (D_{10} means 10 % of particles fall below specified limit. A 300 mm deep topsoil cap and 150 mm layer of topsoil shall cover the mound at a slope gradient of not steeper than 1:3.

The subdivision includes a consent notice for Lots 1 to 8 DP 567982 requiring a 100% reserve area which can be accommodated in the same area of the site. Refer Site Drainage Plan appended. The reserve area shall achieve the same minimum mound width of 5.2 m.

The summer groundwater table was measured as 0.6 m below ground level. The distribution pipes will be 0.9 m above this level. Subsoil drainage shall be installed to control the groundwater level, especially in times of increased rainfall intensity or during winter where the level could rise by an estimated 0.2 m.

5.4 Distribution Pipework

Allowing a standard Davey D42A/B pump and 20 mm ID delivery pipe, the expected flow rate is 4.2 L/min. For 200 L dosing volume, the pump run time is 4.8 min.

Allowing 3mm drilled holes in the irrigation pipes, the number of holes required is of the order 10. We recommend 32mm UPVC irrigation pipes with a total of 12 holes, 3 per irrigation pipe at 3.53 m centres. Each 10.6 m length of 32 mm pipe has a volume of 8.5 L. The total volume per dosing zoning is 25.5L which means the pipes will quickly fill each 200 L dose.

5.5 Secondary Treatment System

A treatment plant which is sized to cater for 600 litre/day is proposed here. The treatment plant is to meet the quality output of NZS 1546:3:2008, capable of producing effluent with Biochemical Oxygen Demand (BOD_5) and Total Suspended Solids (TSS) concentrations not exceeding 20g/m^3 and 30g/m^3, respectively.

The treatment plant brand and specifications are to be included with the building consent application.

6 Summary of Regulatory Requirements

6.1 Regional Plan

The discharge of sewage effluent on to land is controlled by the permitted activity rules C.6.1.3 of the Regional Plan for Northland. A summary of the requirements is included below:

	Criterion	Comment
1)	The on-site system is designed and constructed in accordance with the Australian/New Zealand Standard. On-site Domestic Wastewater Management (AS/NZS 1547:2012), and	A Wisconsin Mound is proposed with a design irrigation rate of 5mm/day as per NZS 1547:2012 App N
2)	The volume of wastewater discharged does not exceed two cubic metres per day, and	Complies (600 litres/day)
3)	The discharge is not via a spray irrigation system or deep soakage system, and	Complies (mound irrigation proposed)
4)	The slope of the disposal area is not greater than 25 degrees, and	Complies, ground is near flat
5)	For wastewater that has received secondary treatment or tertiary treatment, it is discharged via: a) a trench or bed system in soil categories 3 to 5 that is designed in accordance with Appendix L of Australian/New Zealand Standard On-Site Domestic Wastewater Management (AS/NZS 1547:2012); or b) an irrigation line system that is dose loaded and covered by a minimum of 50 millimetres of topsoil, mulch, or bark, and	Complies, the irrigation system will be dose loaded to a mound
6)	for the discharge of wastewater **onto the surface of slopes greater than 10 degrees:** c) the wastewater, excluding greywater, has received at least secondary treatment, and d) the irrigation lines are firmly attached to the disposal area, and e) where there is an up-slope catchment that generates stormwater runoff, a diversion system is installed and maintained to divert surface water runoff from the up-slope catchment away from the disposal area, and f) a minimum 10 metre buffer area down-slope of the lowest irrigation line is included as part of the disposal area, and g) the disposal area is located within existing established vegetation that has at least 80 percent canopy cover, or h) the irrigation lines are covered by a minimum of 100 millimetres of topsoil, mulch, or bark, and	Not applicable, slopes are not greater than 10 degrees
7)	the disposal area and reserve disposal area are situated outside the relevant exclusion areas and setbacks in Table 9: Exclusion areas and setback distances for on-site domestic wastewater systems, and	Complies – see site plan
8)	for septic tank treatment systems, a filter that retains solids greater than 3.5 millimetres in size is fitted on the outlet, and	N/A

9)	the following reserve disposal areas are available at all times: a) one hundred percent of the existing effluent disposal area where the wastewater has received primary treatment or is only comprised of greywater, or b) thirty percent of the existing effluent disposal area where the wastewater has received secondary treatment or tertiary treatment, and	Complies, the subdivision includes a consent requiring 100 % reserve area
10)	the on-site system is maintained so that it operates effectively at all times and maintenance is undertaken in accordance with the manufacturer's specifications, and	Proposed per maintenance recommendations included
11)	the discharge does not contaminate any groundwater water supply or surface water, and	Will comply given provided design parameters
12)	there is no surface runoff or ponding of wastewater, and	Will comply given provided design parameters
13)	there is no offensive or objectionable odour beyond the property boundary.	Will comply given provided design parameters

Exclusion areas and setback distances are provided in Table 9 of the plan and presented below:

Table 9: Exclusion areas and setback distances for on-site domestic wastewater systems

Feature	Primary treated domestic type wastewater	Secondary and tertiary treated domestic type wastewater	Greywater
Exclusion areas			
Floodplain	5% annual exceedance probability	5% annual exceedance probability	5% annual exceedance probability
Horizontal setback distances			
Identified stormwater flow path (including a formed road with kerb and channel, and water-table drain) that is down-slope of the disposal area	5 metres	5 metres	5 metres
River, lake, stream, pond, dam or natural wetland	20 metres	15 metres	15 metres
Coastal marine area	20 metres	15 metres	15 metres
Existing water supply bore	20 metres	20 metres	20 metres
Property boundary	1.5 metres	1.5 metres	1.5 metres
Vertical setback distances			
Winter groundwater table	1.2 metres	0.6 metres	0.6 metres

6.2 District Plan

The Far North District Plan contains an additional rule relating to wastewater discharges to land:

- District Plan Rule 12.7.6.1.4 specifies that effluent fields shall be located no closer than 30m from any river, lake, wetland or the Coastal Marine Area.

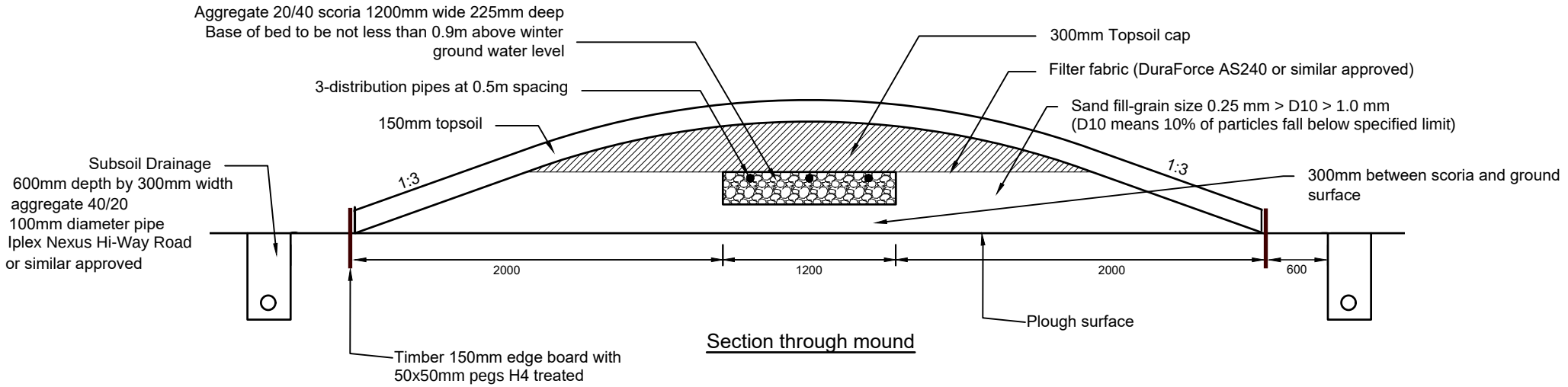
Kerikeri River is the nearest waterway which is 200 m from the site.

Appendix A – Drawings

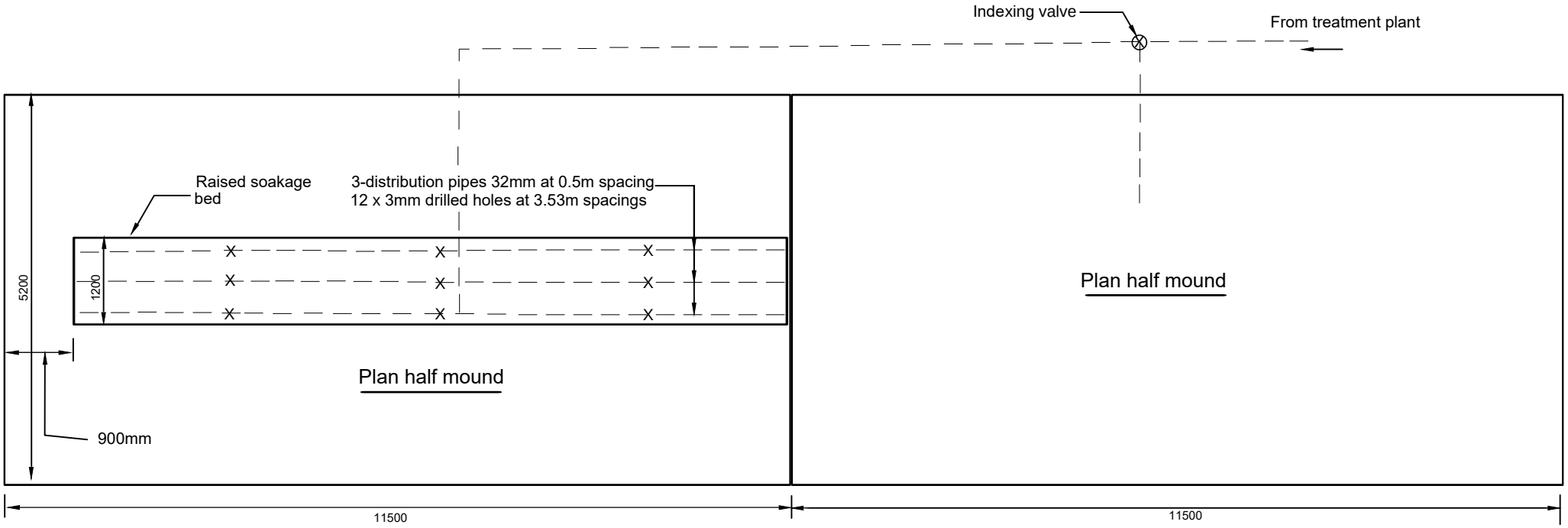
Haigh Workman Geotechnical Investigation Plan 24 043/G01

Haigh Workman Wisconsin Mound Disposal Area Layout 24 243/WW02

Haigh Workman Stormwater and Wastewater Plan 24 243/P01



Section through mound



Plan half mound

Plan half mound

Rev	Date	Description	By	Checked
A	24/02/2025	For Consent	TMA	JP

DWG Wisconsin Mound Disposal Area Layout

DRAWING NOT TO SCALE | Date 25/02/2025

Drawn TMA | Checked JP | Approved JP

File

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Project: Wastewater Treatment System
18-20 Kahikatearoa Lane, Waipapa (Lot 2 & 3 DP 567982)

Client: SmartSteel Buildings Limited

Project No. 24 243

RC no.

Stage

Dwg No. WW02

Sheet No.

NOTES:

1. LOT BOUNDARIES INFORMATION TAKEN FROM QUICKMAP.
2. AERIAL PHOTO INFORMATION TAKEN FROM NRC GIS MAPS

Lot 23
DP 337517
0.4398

A G02

B G02

C G03

North

W E S

PROPOSED SMARTSTEEL BUILDING

CPT01

CPT02

AH01

CPT03

CPT04

AH02

CPT05

CPT06

AH03

CPT07

CPT08

AH04

CPT09

AH05

CPT10

CPT11

Lot 1

Lot 2

Lot 3

Lot 9

78·8

78·8

78·8

78·6

78·4

78·2

0·78·0

KAHIKATEAROA LANE

OUT

IN

Issue	Date	Revision
A	29/02/2024	GEOTECHNICAL REPORT

DWG GEOTECHNICAL INVESTIGATION PLAN

Scale 1:500 | Date 01/03/2024

Drawn WT | Checked JP | Approved JP

File T:\Clients\Smart Steel Buildings\Jobs\24 043 - Klinac Lane, Waipapa\Engineering\Drawings\24 043 - Smartsteel.dwg

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Project PROPOSED COMMERCIAL DEVELOPMENT

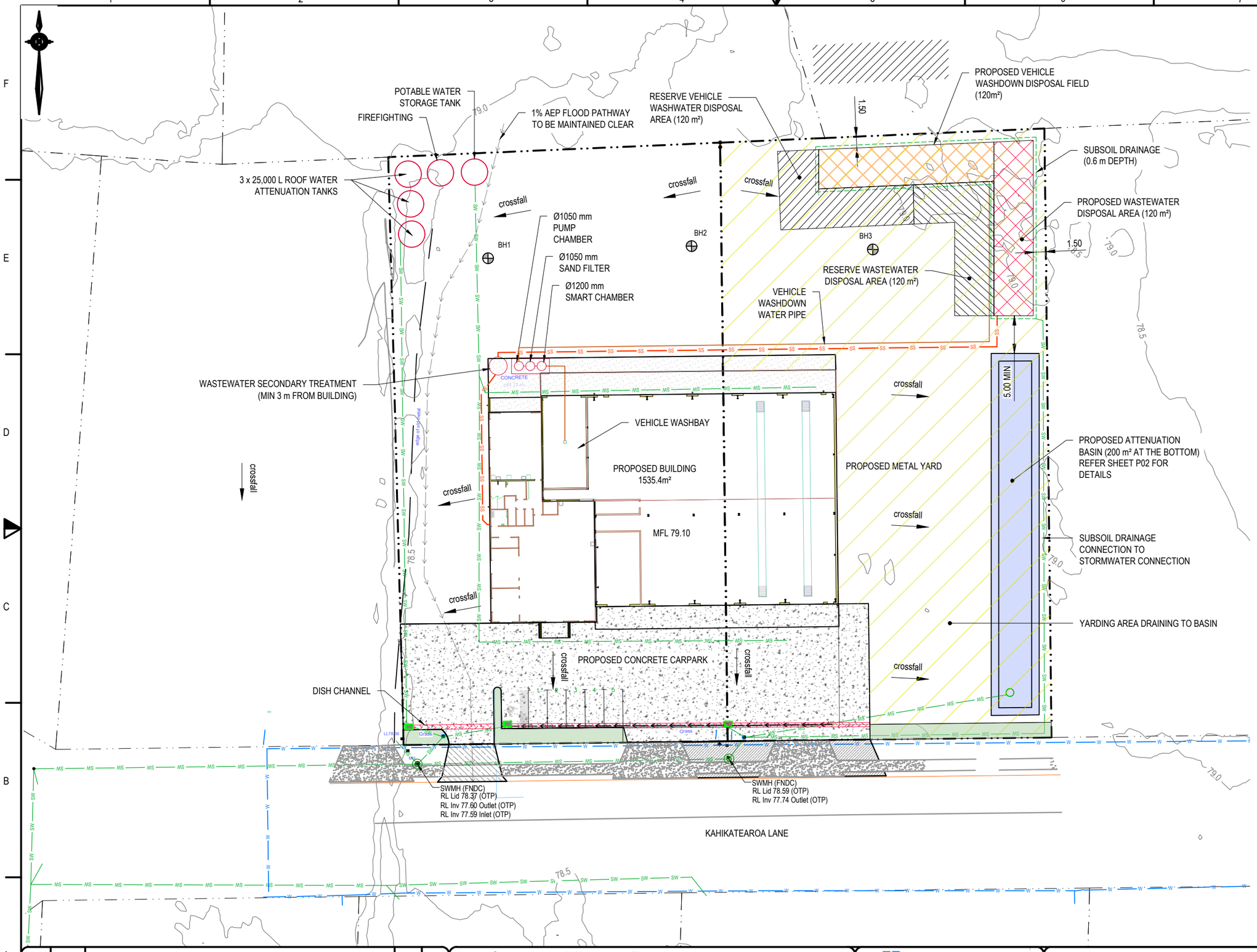
Client SMART STEEL BUILDINGS

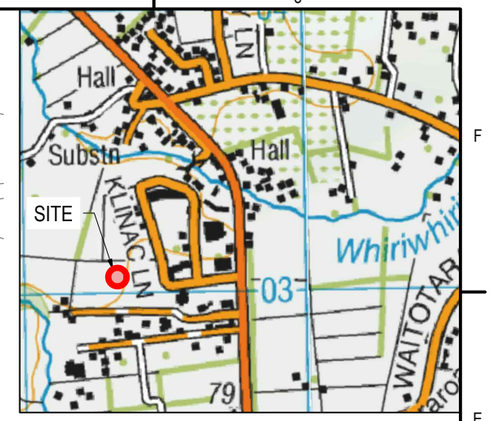
Project No. 24 043 | RC no. ----

DWG No. **G01**

Sheet No. **1** of **3**

Plotted By Warkworth Field Tech at 21/01/2025 1:06:44 pm





Locality Plan (NTS)

GENERAL NOTES:

1. All features are taken from Site plan by Neo Architecture Studio dated Nov 2024, aerial image and site walkover by HWL on 22/11/2024
2. 0.5m Lidar 2018-2020 Contours

SITE INFORMATION:

Legal Description: Lot 2 and 3 DP 567982
Area: 3,412m² and 3,430m²
Zone: Industrial (FNDC)

LEGEND

- Property Boundaries
- Adjacent Boundaries
- FNDC Water Supply
- Stormwater Pipe
- Wastewater Pipe
- BH1 Borehole

MINIMUM SECONDARY TREATMENT PLANT SETBACKS:

- INVERT LEVEL AT INLET - NOT LESS THAN 0.5m BELOW FLOOR LEVEL
- BUILDINGS - 3 m
- BOUNDARIES - 1.5m
- EASILY ACCESSIBLE FOR MAINTANACE.

CHECK ALL DIMENSION ON SITE.

SPECIFIC WASTEWATER DESIGN:

MINIMUM EFFLUENT DISPOSAL SETBACKS:

- BOUNDARIES - 1.5m
- BUILDINGS AND RETAINING WALLS - 3m
- SURFACE WATER - 15m (SECONDARY)
- COAST, RIVERS, LAKES - 30m

CHECK ALL DIMENSION ON SITE.

Rev	Date	Description	By	Checked
A	20/01/2025	FOR CONSENT	JM	JP

DWG Stormwater and Wastewater Plan

A3 Scale 1: 500 (0, 10, 25)

Date 19/02/2025

Drawn JM | Checked TMA | Approved JP

File T:\CLIENTS\SMART STEEL BUILDINGS\JOBS\24 243 LOT 2 & 3 KAHIKATEAROA LANE WAIPAPA\ENGINEERING\DRAWINGS\24 243_20250219_WW+SW PLAN.DWG

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Project: Proposed Vehicle Maintenance Facility
18-20 Kahikatearoa Lane, Waipapa (Lot 2 & 3 DP 567982)

Client: SmartSteel Buildings Limited

Project No. 24 243

RC no.

Stage

Dwg No. P01

Sheet No.

Appendix B – Exploratory Hole Records & Permeability Testing

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Borehole Log - BH01

Hole Location: Refer to Site Plan

JOB No. 22 045

CLIENT:	Hayphil Investments Ltd	**SITE:**	Lots 2 & 3 Klinac Lane, Waipapa (Lot 13 DP 363106)		
Date Started:	22/02/2022	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	CN
Date Completed:	22/02/2022	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	WT

Soil Description

Based on NZGS Logging Guidelines 2005

SILT, minor clay; greyish brown. Stiff, moist, low plasticity.

SILT, some clay; greyish brown. Firm to stiff, moist, medium plasticity.

Fine to medium sandy **SILT**, minor amorphous organics, trace coarse sand to fine gravel; greyish brown to light brown. Firm, wet, low plasticity.

SILT, minor fine sand, trace clay, trace medium to coarse sand; greyish brown. Firm, saturated, low plasticity.

From 1.0m: Becomes grey to brownish grey. Saturated.

SILT, minor fine sand, trace medium to coarse sand, trace clay; light greyish brown. Firm, saturated, low plasticity.

From 1.5m: Becomes trace fine sand.
From 1.6m: Becomes bluish grey.

SILT, minor fine to coarse sand; bluish grey. Soft, saturated, low plasticity.

NOTE: No retrieval from 1.9m

End of hole at 2.6m (No Retrieval)

Depth (m): 0.0, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5

Geology: TAURANGA GROUP

Graphic Log

Water Level: Groundwater Encountered at 0.6 mbgl

Sensitivity: 9, 9, 1 3

Vane Shear and Remoulded Vane Shear Strengths (kPa): 48, 0, 74, 9, 74, 9, 37, 3

Scala Penetrometer (blows/100mm): 0 5 10 15 20

NOTE: 1 blow / 150mm, then bouncing at 2.75m.

LEGEND

TOPSOIL | CLAY | SILT | SAND | GRAVEL | FILL

Corrected shear vane reading
Remoulded shear vane reading
Scala Penetrometer

Note: UTP = Unable to penetrate. T.S. = Topsoil.
Hand Held Shear Vane S/N: 2220
Scala penetrometer testing undertaken from base of borehole to 2.75m.

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Borehole Log - BH02

Hole Location: Refer Site Plan

JOB No. 22 045

CLIENT:	Hayphil Investments Ltd.	**SITE:**	Lot 2 & Lot 3 (Lot 13 DP 363106), Klinac Lane, Waipapa		
Date Started:	22/02/2022	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	JP
Date Completed:	22/02/2022	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	WT

Soil Description (Based on NZGS Logging Guidelines 2005)	Depth (m)	Geology	Graphic Log	Water Level	Sensitivity	Vane Shear and Remoulded Vane Shear Strengths (kPa)	Scala Penetrometer (blows/100mm)
Clayey **SILT**, trace fine to medium gravel, trace fibrous organics; light brown, brown, orange and grey intermixed. Stiff, dry to moist, low plasticity. [Fill]	0.0	FILL		Groundwater Encountered at 1.2mbgl.			
From 0.4m: Becomes brown and greyish brown, mottled orange. Moist. From 0.5m: From 0.5m: Becomes firm.	0.5				3	60 / 19	
SILT, some clay, trace fine gravel; light grey and light brown intermixed, mottled orange. Firm, moist, low plasticity.	1.0				2	28 / 19	
SILT, some fine gravel, some clay, minor fine to coarse sand; light grey and light brownish grey, streaked bluish grey and light orange. Stiff, moist to wet, low plasticity. [Tauranga Group]		TAURANGA GROUP			4	79 / 19	
SILT, some clay; grey to light grey, mottled light yellowish brown. Stiff, moist to wet, low plasticity.	1.5				3	76 / 22	
From 2.2m: Becomes dark bluish grey, streaked orange and light brown. Firm. From 2.4m: Becomes light grey and dark bluish grey, streaked orange.	2.0				3	32 / 13	
SILT, some fine to medium gravel, minor coarse sand; greenish grey to grey, streaked light grey. Firm to stiff, wet, low plasticity. Gravel: weakly cemented. From 3.2m: Becomes dark green and light grey.	2.5					UTP	
SILT, some clay, minor fine gravel; light grey, streaked dark greenish grey. Stiff, wet, low plasticity. Gravel: weakly cemented. From 3.9m: Becomes very stiff.	3.0				2	35 / 22	
SILT, minor clay, trace fine gravel, trace coarse sand; light green to greenish grey, streaked dark green and light grey. Very stiff, wet, low plasticity.	3.5					UTP	
End of Hole at 4.4m (Unable To Penetrate)	4.0					UTP	
	4.5						

LEGEND

TOPSOIL | CLAY | SILT | SAND | GRAVEL | FILL

Corrected shear vane reading
Remoulded shear vane reading
Scala Penetrometer

Note: UTP = Unable to penetrate.
Hand Held Shear Vane S/N: DR1617. Groundwater encountered at 1.2mbgl completion of drilling.
Scala penetrometer testing not undertaken.

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Borehole Log - BH03

Hole Location: Refer to Site Plan

JOB No. 22 045

CLIENT:	Hayphil Investments Ltd	**SITE:**	Lots 2 & 3 Klinac Lane, Waipapa (Lot 13 DP 363106)		
Date Started:	22/02/2022	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	CN
Date Completed:	22/02/2022	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	WT

Soil Description (Based on NZGS Logging Guidelines 2005)	Depth (m)	Geology	Graphic Log	Water Level	Sensitivity	Vane Shear and Remoulded Vane Shear Strengths (kPa)	Scala Penetrometer (blows/100mm)
SILT, minor clay; greyish brown. Stiff, moist, low to medium plasticity.	0.0	TAURANGA GROUP		Groundwater Encountered at 0.6 mbgl	1 0	54 / 6	0 5 10 15 20
SILT, some clay; brown to greyish brown. Stiff, moist, low to medium plasticity. From 0.3m: Trace medium to coarse sand.							
SILT, minor clay, minor medium to coarse sand; light greyish brown. Firm, moist to wet, low plasticity. From 0.5m: Trace medium sand. From 0.7m: Minor medium to coarse sand.	0.5						
Silty fine to coarse **SAND**; brown to greyish brown. Loose, saturated, no to low plasticity.						201	
Silty fine to medium **SAND**; orange. Medium dense, saturated, no plasticity.	1.0						
SILT, some fine sand; bluish grey. Soft, saturated, low plasticity. **NOTE**: No retrieval from 1.2m to 1.8m	1.5						
SILT, minor fine sand, trace medium sand; bluish grey. Soft, saturated, low plasticity.							
End of hole at 2.0m (Unable To Penetrate)	2.0						
	2.5						
	3.0						
	3.5						
	4.0						
	4.5						

LEGEND

TOPSOIL | CLAY | SILT | SAND | GRAVEL | FILL

Corrected shear vane reading
Remoulded shear vane reading
Scala Penetrometer

Note: UTP = Unable to penetrate. T.S. = Topsoil.
Hand Held Shear Vane S/N: 2220
Scala penetrometer testing not undertaken.

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Borehole Log - BH04

Hole Location: Refer to Site Plan

JOB No. 22 045

CLIENT:	Hayphil Investments Ltd	**SITE:**	Lots 2 & 3 Klinac Lane, Waipapa (Lot 13 DP 363106)		
Date Started:	22/02/2022	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	CN
Date Completed:	22/02/2022	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	WT

Soil Description (Based on NZGS Logging Guidelines 2005)	Depth (m)	Geology	Graphic Log	Water Level	Sensitivity	Vane Shear and Remoulded Vane Shear Strengths (kPa)	Scala Penetrometer (blows/100mm)
SILT, some clay; brown to greyish brown. Very stiff, moist, low to medium plasticity. From 0.3m: Trace fine gravel.	0.0	TAURANGA GROUP		Groundwater Encountered at 0.55 mbgl	1 0	145 / 14	0 5 10 15 20
SILT, minor fine sand, trace coarse sand to fine gravel; light greyish brown, mottled orange. Very stiff, moist to wet, low plasticity. From 0.7m: Minor coarse sand. Firm. From 0.9m: Becomes saturated.	0.5						
Fine Sandy **SILT**, trace medium to coarse sand; grey, mottled light brown. Firm, saturated, low plasticity.	1.0				8	45 / 6	
SILT, minor fine sand; grey to brownish grey, mottled orange. Stiff, saturated, low plasticity.							
Silty fine to medioum SAND; orange. Very stiff, saturated, no plasticity.	1.5				1 6	139 / 9	
SILT, some fine to medium sand, trace coarse sand to fine gravel; orange, mottled greyish brown. Soft to firm, saturated, low plasticity.						26 / 0	
Fine to medium sandy **SILT**; dark bluish grey. Soft, saturated, low plasticity.	2.0						
SILT, trace fine sand; bluish grey. Soft, saturated, no to low plasticity.							
SILT, minor fine sand; bluish grey. Firm, saturated, low plasticity.	2.5				5	45 / 9	
End of hole at 2.8m (Unable To Penetrate)							
	3.0						
	3.5						
	4.0						
	4.5						

LEGEND

TOPSOIL | CLAY | SILT | SAND | GRAVEL | FILL

Corrected shear vane reading
Remoulded shear vane reading
Scala Penetrometer

Note: UTP = Unable to penetrate. T.S. = Topsoil.
Hand Held Shear Vane S/N: 2220
Scala penetrometer testing not undertaken.

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Borehole Log - BH05

Hole Location: Refer Site Plan

JOB No. 22 045

CLIENT:	Hayphil Investments Ltd.	**SITE:**	Lot 2 & Lot 3 (Lot 13 DP 363106), Klinac Lane, Waipapa		
Date Started:	22/02/2022	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	JP
Date Completed:	22/02/2022	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	WT

Soil Description (Based on NZGS Logging Guidelines 2005)	Depth (m)	Geology	Graphic Log	Water Level	Sensitivity	Vane Shear and Remoulded Vane Shear Strengths (kPa)	Scala Penetrometer (blows/100mm)
SILT, trace clay; light brown to brown, mottled orange. Stiff, moist, low plasticity. Rootlets. [Topsoil]	0.0	TOPSOIL		Groundwater Encountered at 0.8m.			0 5 10 15
SILT, some clay, trace fine gravel; brown, mottled orange. Very stiff, moist, low plasticity. [Tauranga Group]	0.5	TAURANGA GROUP			4	136 / 32	
From 0.7m: Becomes brown and light brown, mottled orange. Wet.							
SILT, minor fine to coarse sand, minor clay; light grey and light brown, streaked orange, mottled light brownish orange. Stiff, wet to saturated, no to low plasticity.	1.0				4	92 / 22	
From 1.3m: Becomes light grey to grey, streaked light orange.							
SILT, trace fine gravel; light grey to light bluish grey, mottled light yellowish orange. Firm, saturated, no plasticity.	1.5				3	35 / 13	
SILT, trace coarse sand, trace fine gravel; dark greenish grey and grey, mottled light brownish orange. Firm to stiff, saturated, no plasticity. Gravel: weakly cemented.	2.0				5	51 / 9	
From 2.1m: Becomes light grey, mottled dark greenish grey.							
End of Hole at 2.5m (Unable To Penetrate/Obstruction)	2.5					UTP	
	3.0						
	3.5						
	4.0						
	4.5						

LEGEND

TOPSOIL | CLAY | SILT | SAND | GRAVEL | FILL

Corrected shear vane reading
Remoulded shear vane reading
Scala Penetrometer

Note: UTP = Unable to penetrate.
Hand Held Shear Vane S/N: DR1617. Groundwater encountered at 0.8mbgl at completion of drilling.
Scala penetrometer testing not undertaken.

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Borehole Log - BH1

Hole Location: Refer to Site Plan

JOB No. 24 243

CLIENT:	Smart Steel Buildings	**SITE:**	Kahikatearo Lane, Waipapa		
Date Started:	22/11/2024	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	LP
Date Completed:	22/11/2024	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	TMA

Soil Description (Based on NZGS Logging Guidelines 2005)	Depth (m)	Geology	Graphic Log	Water Level	Sensitivity	Vane Shear and Remoulded Vane Shear Strengths (kPa)	Scala Penetrometer (blows/100mm)
Clayey SILT, dark greyish brown, moist	0.0	TAURANGA GROUP					0 5 10 15 20
Gravely SILT, dark greyish brown/orange brown specs, moist trace fine gravel, moist Sandy SILT, saturated	0.5						
EOH at 0.9m Groundwater encountered at 0.8m	1.0						
	1.5						
	2.0						
	2.5						
	3.0						
	3.5						
	4.0						
	4.5						

LEGEND

TOPSOIL | CLAY | SILT | SAND | GRAVEL | FILL

Corrected shear vane reading
Remoulded shear vane reading
Scala Penetrometer

Note: UTP = Unable To Penetrate. T.S. = Topsoil.
Scala penetrometer testing not undertaken.
Hand Held Shear Vane S/N:

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Borehole Log - BH2

Hole Location: Refer to Site Plan

JOB No. 24 243

CLIENT:	Smart Steel Buildings	**SITE:**	Kahikatearo Lane, Waipapa		
Date Started:	22/11/2024	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	LP
Date Completed:	22/11/2024	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	TMA

Soil Description (Based on NZGS Logging Guidelines 2005)	Depth (m)	Geology	Graphic Log	Water Level	Sensitivity	Vane Shear and Remoulded Vane Shear Strengths (kPa)	Scala Penetrometer (blows/100mm)
SILT, trace clay, greyish brown, moist trace fine gravel/coarse sand	0.0	TAURANGA					0 5 10 15 20
Gravely SILT, dark greyish brown/orange brown specs, moist	0.5						
Silty SAND, fine to medium sand, grey, saturated							
EOH at 0.7m Groundwater encountered at 0.7m	1.0						
	1.5						
	2.0						
	2.5						
	3.0						
	3.5						
	4.0						
	4.5						

LEGEND

TOPSOIL | CLAY | SILT | SAND | GRAVEL | FILL

Corrected shear vane reading
Remoulded shear vane reading
Scala Penetrometer

Note: UTP = Unable To Penetrate. T.S. = Topsoil.
Scala penetrometer testing not undertaken.
Hand Held Shear Vane S/N:

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Existing cut - CUT

Hole Location: Refer to Site Plan

JOB No. 24 243

CLIENT:	Smart Steel Buildings	**SITE:**	Kahikatearo Lane, Waipapa		
Date Started:	22/11/2024	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	LP
Date Completed:	22/11/2024	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	TMA

Soil Description

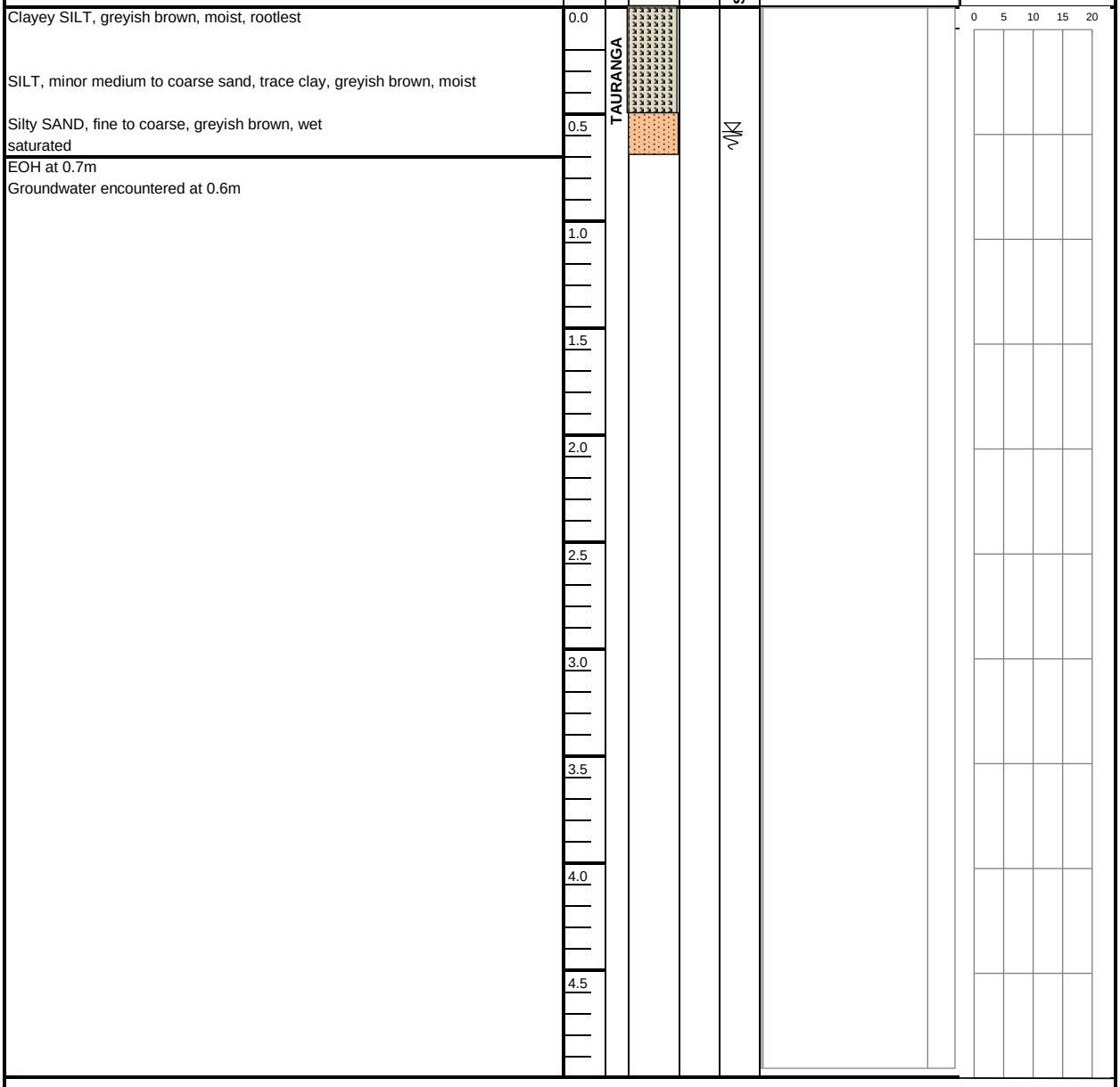
Based on NZGS Logging Guidelines 2005

Clayey SILT, greyish brown, moist, rootlest

SILT, minor medium to coarse sand, trace clay, greyish brown, moist

Silty SAND, fine to coarse, greyish brown, wet saturated

EOH at 0.7m
Groundwater encountered at 0.6m



LEGEND

TOPSOIL | CLAY | SILT | SAND | GRAVEL | FILL

Corrected shear vane reading
Remoulded shear vane reading
Scala Penetrometer

Note: UTP = Unable To Penetrate. T.S. = Topsoil.
Scala penetrometer testing not undertaken.
Hand Held Shear Vane S/N:

Constant Head Permeability Test Results

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Job number:	24 243
Location:	Kahikatearoa Lane, Waipapa (Lot 2 and 3 DP567982)
Client:	Smart Steel Building
Tested by:	LP
Date tested:	22/11/2024

Depth of auger hole (cm)	50
Depth of water in auger hole (cm)	34
Average radius of auger hole (cm)	10
Depth to any impermaeable layer	Unknown
Time elapsed between first filling and start of measurement	1 - 2 mins
Soil moisture at time of excavation	Moist

Permeameter and time readings

Time (s)	Level in tube (cm)	Velocity (cm/s)
0	49.8	
10	49.2	
20	48.8	0.04
30	48.2	0.06
40	47.6	0.06
50	47.2	0.04
60	46.8	0.04
70	46.4	0.04
80	46	0.04
90	45.6	0.04
100	45.2	0.04
110	44.8	0.04
120	44.6	0.02
130	44.2	0.04
140	43.8	0.04
150	43.4	0.04
160	43	0.04

Chosen infiltration velocity (cm/s)	0.04
Flowrate, Q (cm³/min)	37.71
Ksat (cm/min)	0.01
Ksat (m/day)	**0.12**

$$K_{sat} = \frac{4.4Q\left[0.5\sinh^{-1}\left(\frac{H}{2r}\right) - \sqrt{\left[\left(\frac{r}{H}\right)^2 + 0.25\right]} + \frac{r}{H}\right]}{2\pi H^2}$$

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Appendix C – FNDC Wastewater Checklist

Onsite Wastewater Disposal Investigation

This form is to be read in conjunction with AS/NZS 1547:2012 (or any amendments as applicable), and in particular with Part 4: Means of Compliance

Part A – Contact Details

1 - Applicant

Name: *SmartSteel Buildings Ltd*

Property Address: *18-20 Kahikatearoa Lane, Waipapa*

Lot/DP Number: *Lot 2 & 3 DP 597982*

2 – Consultant / Site Evaluator

Site Evaluator Name: *Joshua McNulty*

Company Name: *Haigh Workman Ltd*

Postal Address: *PO Box 89, Kerikeri*

Business Phone: *09 407 8327* Mobile:

Email: *info@haighworkman.co.nz*

SQEP Registered[1]: ❑ Yes ☑ No
If no, details of suitably registered SQEP who will countersign the report are to be supplied below.

Name of SQEP: *John Papesch*

Company Name: *Haigh Workman Ltd*

Postal Address: *PO Box 89, Kerikeri*

[1] It is a requirement that the Evaluator be SQEP registered to carry out on-site effluent investigations/designs. If not, then evaluation/design will need to be counter-signed by a suitably registered SQEP

Business Phone: *09 407 8327* Mobile: *027 411 9944*

Email: *johnp@haighworkman.co.nz*

Part B - Site and Soil Evaluation

1: Desk Study

Requirements (✓ appropriate box) Please complete **all** options. (*If more than one option applies to land under consideration, please clarify with supporting information)*

☐	***FNDC REQUIREMENT***	***APPLIES TO LOT(S)***	***COMMENTS***
1	**Stability Risk**		
✓	Low instability risk		*Flat alluvial ground*
	Medium instability risk		
	High instability risk		
2	**Effluent on slope stability**		
✓	Low disposal potential		*Flat alluvial ground*
	Moderate disposal potential		
	High disposal potential		
3	**Effluent suitability**		
✓	Medium unsuitability		*Cat 5 soils, high ground water table*
	High unsuitability		
4	**Flood susceptibility**		
	Is flood susceptible		
	Is partially flood susceptible		
✓	Is not flood susceptible		
5	**Streams**		
Are there streams on or adjacent to land under investigation?		Yes		
	✓	No		*Kerikeri river flows 200m southwest of property*
6	**GIS land resources layer – aquifers at risk**		
		Yes		

Is land situated over or adjacent to aquifer?		✓	No		
7	**Annual Rainfall (HIRDS)**			*1500 mm*	

Note: It is to be noted that all information obtained off FNDC GIS/Hazard Maps is to be taken as a guide only.

Note: All information obtained from the above sites is to be confirmed by a specific site investigation as localised conditions could vary substantially. However, should the above data checks indicate the potential for a hazard/non-complying activity etc., this must be further investigated to confirm/deny the indicated situation.

2: On-Site Evaluation

a. Determination of Soil Category *(refer table 4.1.1* AS/NZS 1547:2012*)* (✓ appropriate box)

Soil Category	Structure		Applies to lot(s)	Comments
1 Gravels & Sands		Structureless (massive)		
2 Sandy loams		Weakly Structured		
		Massive		
3 Loams		High/Moderate structured		
		Weakly structured or Massive		
4 Clay loams		High/moderate structured		
		Weakly structured		
		Massive		
5 Light clays		Strongly structured		
	✓	Moderately structured		*See site investigation*
		Weakly structured or massive		
6 Medium to heavy clays		Strongly structured		
		Moderately structured		
		Weakly structured or massive		

Note: Refer 4.1 A4 – Soil Assessment AS/NZS 1547:2012 for assessment criteria.

Note: Details of the method used to determine soil type etc. are to be clearly stated, along with positions of boreholes/test pits etc. clearly marked on a site plan. Bore logs are to be provided. Photos should be included.

Note: The site plan should also clearly show the intended area for effluent disposal, along with any site features such as drains, water bores, overland flows etc., along with separation distance achieved.

On-Site Evaluation Continued

b. Site Characteristics for Proposed Disposal Area: (if there is a marked difference between sites, please fill in a separate form for each site and clearly note which site the assessment applies to) (✓ appropriate box)

☐	***DETAILS***	***APPLIES TO SITE(S)***
1	**Flooding potential to proposed field and reserve field (refer note 1 below)**	
	Fields will not flood, or	
	Fields will flood in	
	20% AEP event	
	5% AEP event	
✓	*1% AEP event*	*Site floods in 1% and 2% AEP events based on NRC mapping*
2	**Surface water separation to proposed field and reserve field (refer note 2 below)**	
✓	*Main/reserve disposal field comply with NRC rules*	*Main/reserve disposal fields are outside 20% AEP event in compliance with NRC offset requirements*
	Main/reserve disposal field do not comply with NRC rules	
3	**Surface water separation to proposed field and reserve field (refer note 2 below)**	
	Main/reserve disposal field comply with NRC rules	*As above*
	Main/reserve disposal field do not comply with NRC rules	
4	**Winter ground water separation to proposed field and reserve field (refer note 3 below)**	
✓	*Main and reserve disposal field comply with NRC rules*	*Topsoil mound and subsoil drainage will ensure minimum 600mm separation from ground water as per NRC rules*
	Main and reserve disposal field do NOT comply with NRC rules	
5	**Slope of ground of proposed field and reserve field (refer note 4)**	
Description	*Topsoil mound with 5-degree side slopes*	
6	**Shape of ground of proposed field and reserve field (Refer note 5 below)**	

	Waxing divergent		*Linear divergent*		*Waning divergent*
	Waxing planar	✓	*Liner planar*		*Waning planar*
	Waxing convergent		*Linear convergent*		*Waning convergent*

Comments	*Ground is near flat*

☐	***DETAILS***	***APPLIES TO SITE(S)***
7	**Intended water supply source**	

	Public supply	
✓	*Rainwater*	
	Bore	

8	**Proposed method of disposal and recommended Daily Loading rate (DLR) (refer note 6 below)**
Description	
Wisconsin Mound with DIR 5 mm/day	

Peak loading factored in (refer note 6 below)		Yes	✓ No
Comments			
As per Note 6: soil permeability test utilising the constant head method. Day staff only, holiday and residential peak loading does not apply.			

9	**Site exposure (refer note 7 below)**	***Description***	***Applies to Site(s)***
Site(s) aspect		*Open*	
Pre-dominant wind direction		*South-west*	
Presence of shelter belts		*Trees along northern boundary*	
Presence of topographical features or structures		*none*	

10	**Proximity of water bores (include adjacent to properties) (refer note 9 below)**
N/A	

11	**Visible evidence of slips / instability (refer not 8 below)**
Nil	

12	**Total suitable area available for type of effluent disposal proposed (including reserve area)**
400m^2	

13	**Setback areas proposed (if any) (refer note 10 below)**
Exclusion areas and setback distances comply with Table 9 of the Northland Regional Plan	

Notes

1. *If the FNDC hazard maps/GIS indicate a flooding susceptibility on the site being evaluated, an on -site evaluation is to be carried out to determine the effects from 20%, 5% and 1% AEP storm events. This evaluation is to include all calculations to substantiate conclusions drawn. If necessary, include a detailed contour plan and photos.*
2. *NRC Water & Soil plan defines surface water as 'All water, flowing or not, above the ground. It includes water in continually or intermittently flowing rivers, artificial watercourses, lakes and wetlands, and water impounded by structures such as dams or weirs but does not include water while in pipes, tanks, cisterns, nor water within the Coastal Marine Area'. By this definition, separation (complying with NRC rules) is to be maintained by both the proposed disposal and reserve areas from any overland flowpath and/or swale drains etc. or R/C will be required from NRC. Surface water is to be clearly marked on each site plan, showing the extent of a 1% AEP storm event, and detailing separation distances to main/reserve disposal areas.*
3. *Positions of test borehole/s to be shown and bore logs to be provided. Separation (complying with NRC rules) is to be maintained by both the proposed disposal and reserve areas from winter ground water level or R/C will be required from NRC. If the investigation is done outside of the winter period, allowance is to be made in determining the likely winter level.*
4. *Slopes of ground are to be compared with those recommended maximums for type of system proposed (refer Appendix 4.2B AS/NZS 1547:2012). Designs exceeding those maximums will require specific design to justify the proposal and may also need Resource Consent from NRC.*
5. *Shape of ground is important as it will determine whether there is potential for concentrated overland flows from the upper slopes and also if effluent might be concentrated at base of slope if leeching occurs. Refer Figure 4.1B2 AS/NZS 1547:2012.*
6. *The proposed system (for residential developments) should be sized to accommodate an average 3-bedroom house with 5 people. Sites in holiday areas need to take peak loading into effect in determining daily volumes. The design must state what DLR was used to determine area necessary (including reserve area). If ground conditions are marginal for type of disposal proposed, then a soil permeability test utilising the constant head method is to be carried out across the proposed disposal area. Refer Appendix 4.1F AS/NZS 1547:2012.*
7. *The site aspect is important as a north-facing site that is not sheltered from wind and sun by shelterbelts or other topographical features or structures will perform far better than a south-facing site on the lee of a hill that is shaded from wind and sun etc.*
8. *If any effluent disposal area (including any reserve area) proposed has or is adjacent to areas that show signs of instability, then a full report from a CPEng (Geotech) will be required to justify the viability of the area for effluent disposal.*
9. *If there are any water bores on the subject property or adjacent properties then a site plan will be required showing bore positions in relation to any proposed effluent field(s).*
10. *If setback areas are proposed to mitigate effects, the extent and position/s need to be shown on a site plan.*

Appendix D – Producer Statement - Design

PRODUCER STATEMENT – PS1
DESIGN

Building Code Clause(s):	G13	Job number: 24 243
ISSUED BY: *(Engineering Design Firm)*	Haigh Workman Ltd	
TO: *(Client)*	Commercial Diesel Limited Kerikeri	
TO BE SUPPLIED TO: *(Building Consent Authority)*	Far North District Council	
IN RESPECT OF: *(Description of building work))*	New build	
AT: *(Address)*	18-20 Kahikatearoa Lane, Waipapa, Kerikeri 0230	
LEGAL DESCRIPTION	Lots 2 & 3 DP 567982	

We have been engaged by Commercial Diesel Limited Kerikeri to provide:

Onsite wastewater system

in respect of the requirements of the Clause(s) of the Building Code specified above for part only, as specified in the attached Schedule, of the proposed building work.

The design carried out by Haigh Workman Ltd has been prepared in accordance with:

✓ alternative solutions as per the attached Schedule.

The proposed building work covered by this producer statement is described in the drawings specified in the attached Schedule, together with the specification, and other documents set out in the attached Schedule.

On behalf of Haigh Workman Ltd, and subject to:

- site verification of the following design assumptions:
  - Confirmation of ground conditions, soakage testing
- all proprietary products meeting their performance specification requirements;

I believe on reasonable grounds that:

- the building, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the attached Schedule, will comply with the relevant provisions of the Building Code specified above; and that
- the persons who have undertaken the design have the necessary competence to do so.

I recommend the CM2 level of construction monitoring.

I, John Papesch, am:

- CPEng number 224301
- and hold the following qualifications: B.E.

Haigh Workman Ltd holds a current policy of Professional Indemnity Insurance no less than $200,000.

✓ Haigh Workman Ltd is a member of ACE New Zealand.

SIGNED BY: John Papesch

(Signature):  Date: 27/2/2024

ON BEHALF OF: Haigh Workman Ltd

Note: This statement has been prepared solely for Far North District Council and shall not be relied upon by any other person or entity. Any liability in relation to this statement accrues to Haigh Workman Ltd only. As a condition of reliance on this statement, Far North District Council accepts that the total maximum amount of liability of any kind arising from this statement and all other statements provided to Far North District Council in relation to this building work, whether in tort or otherwise, is limited to the sum of $200,000.

This form is to accompany **Form 2 of the Building (Forms) Regulations 2004** for the application of a Building Consent.

SCHEDULE TO PS1

Please include an itemised list of all referenced documents, drawings, or other supporting materials in relation to this producer statement below:

- Haigh Workman On-site Wastewater System Assessment ref. 24 243 dated February 2025

Limited Scope of Engagement

We have been engaged by Commercial Diesel Limited Kerikeri to provide services in respect of the requirements of the Clause(s) of the Building Code specified above for the following parts of the proposed building work:

Onsite wastewater system

Alternative Solution

The design carried out by Haigh Workman Ltd has been prepared in accordance with:

AS/NZS 1547: 2012

GUIDANCE ON USE OF PRODUCER STATEMENTS

Information on the use of Producer Statements and Construction Monitoring Guidelines can be found on either the **ACE New Zealand** or **Engineering New Zealand** websites.

Producer statements were first introduced with the Building Act 1991. The producer statements were developed by a combined task committee consisting of members of the New Zealand Institute of Architects (NZIA), Institution of Professional Engineers New Zealand (now Engineering New Zealand), Association of Consulting and Engineering New Zealand (ACE NZ) in consultation with the Building Officials Institute of New Zealand (BOINZ). The original suite of producer statements has been revised at the date of this form to ensure standard use within the industry.

The producer statement system is intended to provide Building Consent Authorities (BCAs) with part of the reasonable grounds necessary for the issue of a Building Consent or a Code Compliance Certificate, without necessarily having to duplicate review of design or construction monitoring undertaken by others.

PS1 DESIGN: Intended for use by a suitably qualified independent engineering design professional in circumstances where the BCA accepts a producer statement for establishing reasonable grounds to issue a Building Consent;
PS2 DESIGN REVIEW: Intended for use by a suitably qualified independent engineering design review professional where the BCA accepts an independent design professional's review as the basis for establishing reasonable grounds to issue a Building Consent;
PS3 CONSTRUCTION: Forms commonly used as a certificate of completion of building work are Schedule 6 of NZS 3910:2013 or Schedules E1/E2 of NZIA's SCC 20112
PS4 CONSTRUCTION REVIEW: Intended for use by a suitably qualified independent engineering construction monitoring professional who either undertakes or supervises construction monitoring of the building works where the BCA requests a producer statement prior to issuing a Code Compliance Certificate.
This must be accompanied by a statement of completion of building work (Schedule 6).
The following guidelines are provided by ACE New Zealand and Engineering New Zealand to interpret the Producer Statement.

Competence of Engineering Professional

This statement is made by an engineering firm that has undertaken a contract of services for the services named, and is signed by a person authorised by that firm to verify the processes within the firm and competence of its personnel.
The person signing the Producer Statement on behalf of the engineering firm will have a professional qualification and proven current competence through registration on a national competence-based register such as a Chartered Professional Engineer (CPEng).
Membership of a professional body, such as Engineering New Zealand provides additional assurance of the designer's standing within the profession. If the engineering firm is a member of ACE New Zealand, this provides additional assurance about the standing of the firm.
Persons or firms meeting these criteria satisfy the term "suitably qualified independent engineering professional".

Professional Indemnity Insurance

As part of membership requirements, ACE New Zealand requires all member firms to hold Professional Indemnity Insurance to a minimum level.
The PI Insurance minimum stated on the front of this form reflects standard practice for the relationship between the BCA and the engineering firm.

Professional Services during Construction Phase

There are several levels of service that an engineering firm may provide during the construction phase of a project (CM1-CM5 for engineers3).
The BCA is encouraged to require that the service to be provided by the engineering firm is appropriate for the project concerned.

Requirement to provide Producer Statement PS4

BCAs should ensure that the applicant is aware of any requirement for producer statements for the construction phase of building work at the time the building consent is issued. No design professional should be expected to provide a producer statement unless such a requirement forms part of Haigh Workman Ltd's engagement.

Refer Also:

1 Conditions of Contract for Building & Civil Engineering Construction NZS 3910: 2013
2 NZIA Standard Conditions of Contract SCC 2011
3 Guideline on the Briefing & Engagement for Consulting Engineering Services (ACE New Zealand/Engineering New Zealand 2004)
4 PN01 Guidelines on Producer Statements

www.acenz.org.nz
www.engineeringnz.org

Appendix E – Suitable Plants for Evapo-transpiration Systems

SUITABLE PLANTS FOR EVAPO-TRANSPIRATION SYSTEMS

Native Shrubs and Trees

Coprosma	*Coprosma propinqua*
Hebe	*Hebe*
Manuka	*Leptospermum Scoparium*
Weeping Mapou	*Myrsine Divaricata*
Flax (fast)	*Phormium Tenax*
Pokaka (slow)	*Elaeocarpus Hookerianus*
Cabbage Tree (fast)	*Cordyline Australias*
Rangiora (fast)	*Brachyglottis Repanda*
Lacebark (fast)	*Hoheria Populnea*
Ribbonwood (fast)	*Plagianthus Regius*
Poataniwha	*Melicope Simplex*
Heketara	*Olearia Rani*
Poataniweta	*Carpodetus Serratus*
Kohuhu (fast)	*Pittosporum Tenufolium*

Grasses

Jointed Twig Sedge	*Baumea Articulata*
Longwood Tussock	*Carex Comans*
Pukio	*Carex Secta*
Toetoe (use native species- not invasive Pampas Grass)	*Cortaderia Fulvida*
Umbrella Sedge	*Cyperus Ustulatus*
Oioi	*Leptocarpus Similis*
Hooksedge	*Uncinia Unciniata*

Introduced Species

Canna Lilies, Taro, Aralia, Fuschia, Philodendrons, and Begonias

NORTHLAND REGIONAL COUNCIL

CARING FOR NORTHLAND AND ITS ENVIRONMENT

WHANGAREI: 36 Water Street, Private Bag 9021, Whangarei; Phone 09 438 4639, Fax 09 438 0012.

OPUA: Unit 10, Industrial Marine Park, Opua; Phone 09 402 7516, Fax 09 402 7510.

DARGAVILLE: 61B Victoria Street, Dargaville; Phone 09 439 3300, Fax 09 439 3301.

KAITAIA: 192 Commerce Street, Kaitaia; Phone 09 408 6600, Fax 09 408 6601.

Freephone: 0800 002 004 Environmental Hotline: 0800 504 639 Website: www.nrc.govt.nz

Appendix E – Operation and Maintenance Guidelines

ON-SITE WASTEWATER SYSTEMS

Maintenance Guidelines For Homeowners

PROTECTING YOUR HEALTH, YOUR ENVIRONMENT, YOUR INVESTMENT

PRODUCED BY: SWANS-SIG

The Small Wastewater And Natural Systems Special Interest Group of Water New Zealand

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Contact Details:

SWANS-SIG
Water NZ PO Box 1316
WELLINGTON 6140

Telephone: 64-4-472 8925
Fax: 64-4-472 8926

Web-site: www.waternz.org.nz/swans.html

WHY MAINTENANCE OF YOUR ON-SITE WASTEWATER SYSTEM IS IMPORTANT

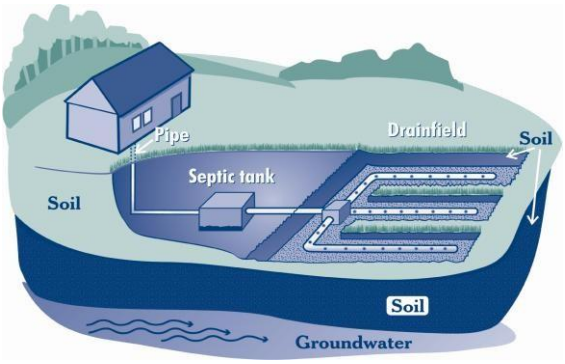
Whether you have a new “high-tech” treatment unit and drip irrigation system or an older “low-tech” septic tank and soakage trench system, regular attention to system inspection and maintenance is important. Effective regular maintenance of the wastewater servicing system on your property is essential for:

(a) protecting family health by ensuring a high level of sanitary performance;
(b) maintaining environmental values both within and beyond your property
(c) protecting the investment in your wastewater system; and
(d) enhancing amenity values in your neighbourhood through contributing to a high level of environmental performance for local on-site wastewater systems.

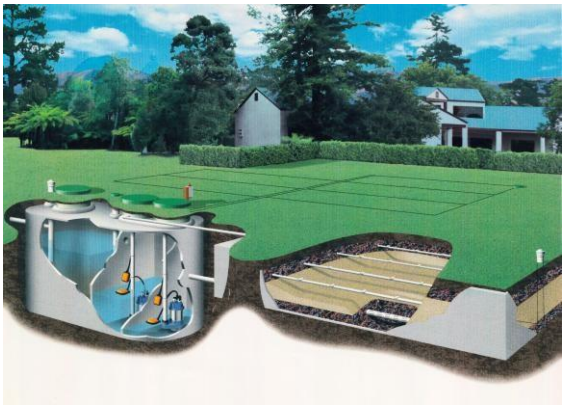
WHAT TYPE OF SYSTEM IS INSTALLED ON YOUR PROPERTY?

You are likely to have one of four types of system on your property:

- an old unknown system about which you have no information;
- an older style septic tank and soakage trench or soak hole system;
- a new modern septic tank and land application system (such as dosed trenches, or shallow planted evapo-transpiration beds, or a mound, or a low pressure dosed irrigation area);
- a new advanced treatment unit (such as an aerobic treatment plant, sand filter, or packed bed reactor) plus drip irrigation land application system.



Older style septic tank and soakage trench system



Modern septic tank, sand filter and drip irrigation field

Before you can attend to the maintenance requirements for your system you will have to establish the system type and capacity. This will require a detailed site inspection and/or a check of building records held by council. You may be able to do some of this yourself, but if a site investigation is needed, it is best to engage a drainage contractor or on-site wastewater servicing professional to investigate as follows:

(a) For an older unknown system	• Carry out a field inspection to locate and identify the treatment unit and soakage field area. • Excavate or probe as appropriate to identify system components, their size and condition. • Prepare a loading certificate based on an assessment of system capacity and its performance potential. • Identify a suitable reserve area for extending the system if need be.
(b) For an older style septic tank and soakage trench or soak hole system	• If necessary, carry out a field inspection to locate the septic tank and soakage field area. • Check the maintenance record for the tank, and/or pumpout and inspect tank condition. • Evaluate the capacity and current performance of the soakage system. • Prepare a loading certificate based on an assessment of system capacity and its performance potential. • Identify a suitable reserve area for extending the system if need be.
(c) For a new modern septic tank and land application system	• Check council building consent records. • Check designer/installer reports and as-built records. • Obtain the designer's loading certificate (see box below). • Check availability of operation and maintenance instructions as provided by the designer. • Confirm the availability of a suitable reserve area for extending the system if need be.
(d) For a new advanced treatment unit and land application system	• Check council building consent records. • Check designer/installer reports and as-built records. • Obtain the designer's loading certificate. • Check availability of operation and maintenance instructions as provided by the designer. • Check if a maintenance contract is in place, and if not investigate options for and commission such a contract. • Ensure the maintenance contract is renewed

Checking scum and sludge levels in a septic tank

Servicing an advanced wastewater treatment unit

Whatever system is installed on your property, it is important that you understand the capabilities of the system. These are best identified and summarised in the preparation of a loading certificate. The loading certificate will enable you to understand the limitations or constraints of your system; however, the most important thing is to know your system type so that the right sort and frequency of maintenance can be carried out. This can simply be done through an inspection by a wastewater servicing specialist who will prepare the loading certificate.

LOADING CERTIFICATE

This should set out the following information:

(a) System type (obtained from the as-built details provided by the designer/installer};

(b) System capacity (number of persons and daily flow volume);

(c) Summary of design criteria;

(d) The location of and use of the 'reserve area';

(e) Use of water efficient fittings, fixtures and appliances;

It is also essential that if you have an advanced treatment and land application system subject to a maintenance contract, this contract is renewed annually.

DO YOU HAVE A SET OF USER GUIDELINES?

Your Regional, City or District Council is likely to have available a set of user guidelines for owner/occupiers of dwellings serviced by on-site wastewater systems. Such guidelines may be based on the provisions of the joint Australia New Zealand Standard AS/NZS 1547:2012 "On-site Domestic

Wastewater Management", and will typically set out 'dos' and 'don'ts' related to household activities which generate wastewater flows (see box below).

USER ADVICE for a PROPERTY OWNER/OCCUPIER (from AS/NZS 1547:2012)

For the on-site system to work well, there are some good habits to encourage and some bad habits to avoid:

(a) To reduce sludge building up in the tank:

(i) Scrape all dishes to remove fats, grease, and so on before washing

(ii) Keep all possible solids out of the system
(iii) Don't use a food waste disposal unit unless the wastewater system has been specifically designed to carry the extra load, and
(iv) Don't put sanitary napkins and other hygiene products into the system;

(b) To keep the bacteria working in the tank and to maintain soil condition in the land application area:

(i) Use biodegradable soaps
(ii) Use a low-phosphorus detergent (less than 1 gram per wash – very good; "no phosphorus" labelled product – best)
(iii) Use a low-sodium detergent in erosive or clayey soil areas (less than 20 grams per wash – OK; less than 10 grams per wash – best)

(iv) Use detergents in the recommended quantities

(v) Don't use powerful bleaches, whiteners, nappy soakers, spot removers and disinfectants
(vi) Don't put chemicals or paint down the drain, and

(vii) Check potential for effects from antibiotic and other medication use.

(c) Conservation of water will reduce the volume of effluent requiring disposal to the land application area, make it last longer and improve its performance. Conservation measures include:

(i) Installation of water conservation fittings

(ii) Taking showers instead of baths
(iii) Washing clothes only when there is a full load, and

(iv) Using the dishwasher only when there is a full load;

(d) Avoid overloading the system by spacing out water use as evenly as possible. For example:

(i) Do not do all the washing on one day, and

(ii) Do not run the washing machine and dishwasher at the same time.

MAINTENANCE INSPECTION REQUIREMENTS

Once you know the details and operating capacity of your on-site wastewater system then you can check out the maintenance inspection and servicing requirements from the table below. Note that your system will include a distribution device to convey the treated effluent to each element of your land application system so as to provide uniform use of the soil in further treating the wastewater flow.

Treatment System Type	Inspection and Maintenance Requirements
Older style septic tank	• Pumpout at 3-year intervals • Alternatively, check scum and sludge levels and pumpout on demand (around half full of scum and sludge)
Modern septic tank with effluent outlet filter	• Check scum and sludge levels (2-yearly) and pumpout on demand (around 6 to 8 years) • Check and hose down effluent outlet filter during pumpout
Aerobic treatment unit (aerated system)	• Periodic effluent quality “sniff and look” inspection (6-months) • Check power consumption (3-months) • Carryout equipment service check at 6-months (as specified in the supplier/installer maintenance contract)
Septic tank/sand filter system	• Periodic effluent quality “sniff and look” inspection (6-months) • Confirm sand is draining satisfactorily and not clogging (12-months) • Replace upper sand layer if draining slowly (as required) • Carryout equipment service check at 6-months (as specified in the supplier/installer maintenance contract)
Packed bed reactor unit	• Periodic effluent quality “sniff and look” inspection (6-months) • Carryout equipment service check at 6-months (as specified in the supplier/installer maintenance contract)

Distribution System	Inspection and Maintenance Requirements
Gravity distribution box	• Check distribution evenly balanced to all outlets (12-months) • Remove any accumulated solids in base of box (12-months)
Flood load gravity dosing system	• Check distribution is evenly balanced to all outlets (12-months) • Remove any accumulated solids in base of dose chamber (12-months)

Siphon dosing system	• Check siphon operation (ensure system not dribbling following 'shut-off') (6-months) • Remove any accumulated solids in base of siphon chamber (6-months)
Pump chamber and manifold distribution to dosing lines	• Check pump start and stop level controllers (clean off grease and solids) (6-months) • Check pump power use (6-months) • Carryout equipment service check at 6-months (as specified in the supplier/installer maintenance contract)
Pump chamber and automatic sequencing valve distribution to dosing lines	• Check pump start and stop level controllers (clean off grease and solids) (6-months) • Check pump power use (6-months) • Check sequencing valve operation (6-months) • Carryout equipment service check at 6-months (as specified in the supplier/installer maintenance contract)

Land Application System Type	Inspection and Maintenance Requirements
Soakage trenches (or beds)	• Inspect soakage field area for signs of wetness, surface seepage and/or excess grass growth (6-months) • Check level of standing effluent in trenches using vent pipes for liquid depth observation (6-months) • Add extra trenches in reserve area if overload (wetness or flooded system) becomes apparent
ETS (evapo-transpiration seepage) beds (or trenches)	• Inspect space between ETS beds/trenches for signs of wetness, surface seepage and/or excess grass growth (12-months) • Trim grass and/or ET plantings to avoid rank overgrowth • Check level of standing effluent in beds/trenches using vent pipes for liquid depth observation (12-months) • Add extra beds/trenches in reserve area if overload (wetness or flooded system) becomes apparent
Mounds (for septic tank effluent)	• Inspect edges (toe) of mound for signs of wetness, surface seepage and/or excess grass growth (6-months) • Install and plant a 1 metre wide by 400mm deep topsoil layer around mound perimeter if toe seepage becomes apparent • Install extra mound in reserve area if toe seepage not managed by supplementary soil and ET plantings.
LPED (low pressure effluent distribution) irrigation field	• Inspect soakage field area for signs of wetness, surface seepage and/or excess grass growth (6-months) • Trim grass and/or ET plantings to avoid rank overgrowth • Check level of standing effluent in LPED trenches using vent pipes (6-months) • Add extra LPED trenches in reserve area if overload (wetness or flooded system) becomes apparent
Drip irrigation field	• Inspect irrigation field area for signs of wetness, surface seepage and/or excess grass growth (6-months) • Trim grass and/or ET plantings to avoid rank overgrowth • Check air release valves are operating effectively (6-months) • Operate irrigation line flush valves (6-months) • Add extra drip lines in reserve area if overload (wetness or flooded system) becomes apparent • Carryout service check at 6-months (as specified in the

	supplier/installer maintenance contract)
NOTE: Where your wastewater system is subject to a resource consent from your Regional Council, you should note and follow the maintenance conditions imposed by the consent.	

DIY MAINTENANCE TASKS

As homeowner (or occupier) there are several inspection and maintenance tasks which you can carry out yourself. However, your must remember at all times that you are dealing with unsanitary waste material which may potentially be infectious, and hence in handling equipment and effluent samples you must take adequate precautions to prevent contamination of yourself and your equipment.

The following simple tasks involve a commonsense approach to on-site wastewater system homeowner/occupier DIY inspection and maintenance requirements (see tables above).

- Check septic tank scum and sludge levels (organise pumpout if required).
- Check drainage lines for evidence of 'backup' (slow draining).
- If backup due to outlet filter blockage, lift and hose down filter into septic tank.
- Check distribution box for even distribution of flow to trenches.
- Inspect land application system (trenches, beds, mounds, LPED and drip irrigation fields) for signs of wetness, seepage, excess grass growth.
- Carry out "sniff and look" assessment of advanced treatment plant effluent quality (if a glass container full of effluent does not appear cloudy, and smells only slightly musty and not offensive, effluent quality is good).
- Check treatment unit and pumping system power consumption (if increases over time, need system check by servicing personnel).
- Check operation of irrigation line flush valves.
- If need be, call in drainage contractor, servicing specialist or maintenance contract service provider to undertake servicing and/or remedial works.

Healthy worm activity in septic tank scum layer

Septic tank pumpout

Backup to gully trap from clogged tank

Lifting and hosing down effluent outlet filter

Distribution box

Automatic sequencing valve

SERVICING AGENT MAINTENANCE TASKS

If you as owner/occupier wish to have no role in maintaining your system, this is fine, but you will need to engage a drainage contractor, servicing specialist or maintenance contract service provider to undertake servicing and/or remedial works.

Even if you do carry out DIY maintenance tasks as outlined above engaging servicing personnel will be essential to carrying out mechanical and electrical servicing as well as specialist servicing tasks such as effluent quality sampling and testing. In addition, servicing specialists are best fitted to undertake tasks such as:

- Checking scum and sludge levels in tanks.
- Lifting and hosing down effluent outlet filters.
- Checking distribution effectiveness from distribution boxes and automatic sequencing valves.
- Checking power consumption and adjusting treatment plant controls and pumping cycles to achieve better efficiency.
- Checking distribution effectiveness and flushing drip irrigation lines.
- Undertaking remedial works and system extensions.

MAINTENANCE CERTIFICATE

Where a specialist servicing check is undertaken, including servicing under a maintenance contract, you should be provided with a maintenance certificate (see box below). This certificate should be filed away and provided as required to your District or Regional Council as proof of maintenance. This requirement may be a consent condition.

A maintenance certificate shall include (from AS/NZS 1547:2012)

(a) Certification by a qualified and experienced person that the on-site system is operating and performing effectively;

(b) A note of any specific operation and maintenance attention which is due;

(c) Identification of any operation and maintenance problems, their likely cause and recommended remedial action;

(d) Any evidence of system capacity being exceeded or likely to be exceeded (for example, by extra residents, or by holiday period occupiers);

(e) Results of effluent quality testing where advanced or disinfection treatment is being used;

(f) Note of actions taken and results achieved following recommendations for remedial work after the previous routine inspection;

(g) A recommendation on when next desludge/pumpout should be undertaken; and

(h) Any other relevant matters.

CONTACT DETAILS FOR ADVICE AND SERVICE

To find a wastewater servicing specialist, contact your local council, septic tank pumpout contractor, treatment plant supplier or plumbing/drainlaying company. Enter contact details/phone numbers in the boxes below of those persons whom you may need to call on at some stage to gain advice on issues related to operation, inspection and maintenance of your on-site wastewater system

System Designer

Council On-site Wastewater Officer

Maintenance Contract Servicing Agent

Local Drainage Contractor

Acknowledgements – Illustrations:

- Marlborough District Council
- US EPA Educational Materials
- Reflection Treatment Systems Ltd
- Ministry for the Environment
- Super-Treat NZ Ltd
- On-Site NewZ
- North Dakota State University
- Inspect*A*Pedia
- Southeast Septic, USA
- Dola Transport, USA

APPENDIX 10

FIRE AND EMERGENCY NEW ZEALAND

APPROVAL

Outlook

RE: Panel Approval.

From Goffin, Jason <Jason.Goffin@fireandemergency.nz>
Date Mon 2025-02-03 9:38 AM
To Dane Allison <dane@neoas.co.nz>

Hi Dane,

This will be sufficient; will the tanks be buried? Or have approved couplings for accessibility?

Regards

Jason Goffin
Advisor Risk Reduction – Kaitohutohu Matua Whakaheke Moorea
Specialist Fire Investigator – Kaititiro Ahi Maatanga
Te Tai Tokerau
Te Hiku Region 1
9 Homestead Road Kerikeri

Mobile: 027 7066467
Email: jason.goffin@fireandemergency.nz
Fire Fact "A House Fire Can Become Fatal within 5 Minutes"

From: Dane Allison <dane@neoas.co.nz>
Sent: Monday, February 3, 2025 8:00 AM
To: Goffin, Jason <Jason.Goffin@fireandemergency.nz>
Cc: Haemish Reid <haemish@smartsteelbuildings.co.nz>
Subject: Re: Panel Approval.

HI Jason,

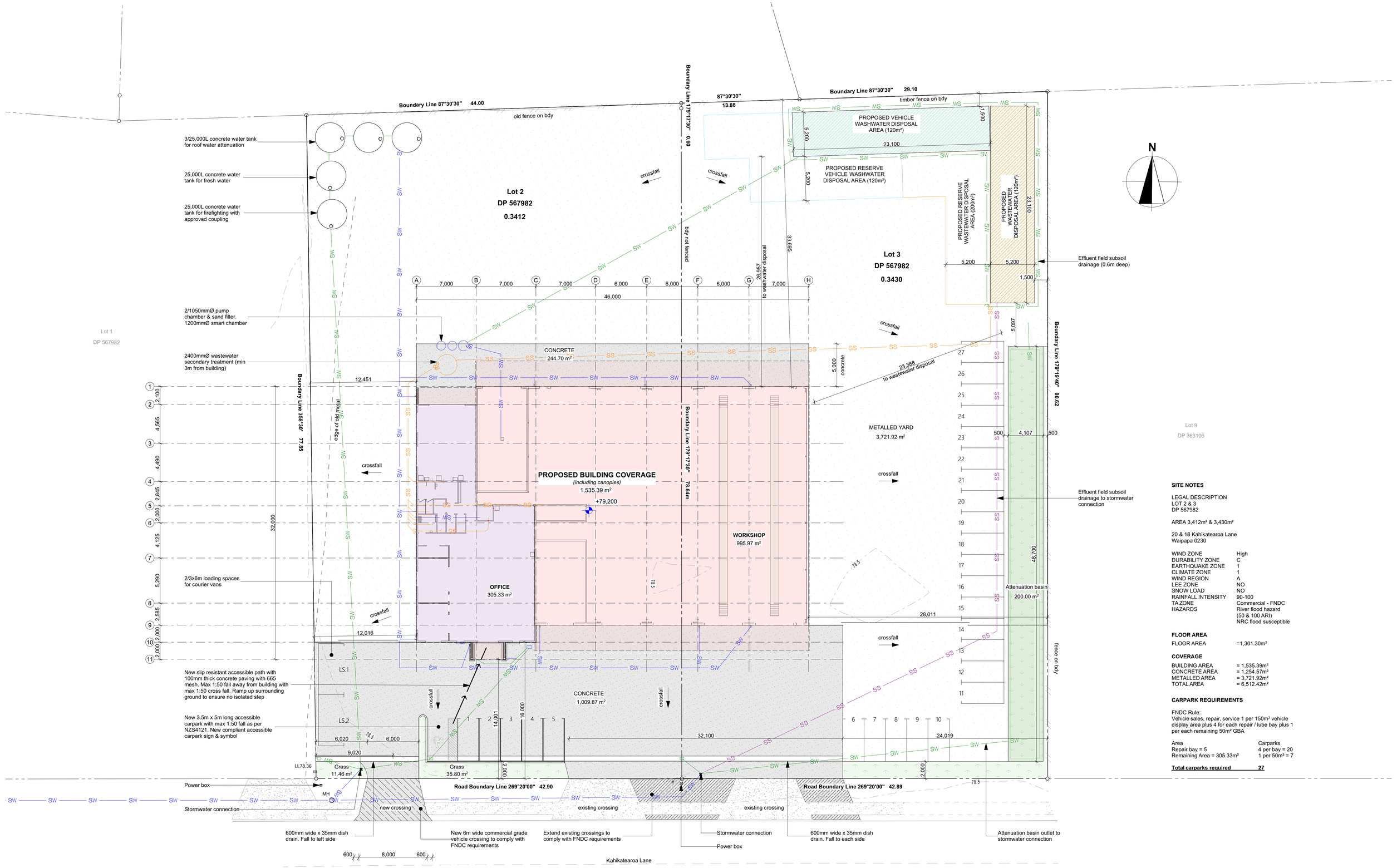
We have finally received the attenuation design for this project to confirm the water tank requirements.

As discussed last year, you mentioned that we should add all the tanks we require for fresh water & attenuation and then you could look at the fire fighting requirements.

Please see attached site plan. Could you please comment on if this is sufficient or if you require more tanks.

Feel free to contact me if you have any questions.

Kind Regards,



SITE NOTES

LEGAL DESCRIPTION
LOT 2 & 3
DP 567982

AREA 3,412m² & 3,430m²

20 & 18 Kahikatearoa Lane
Waipapa 0230

WIND ZONE	High
DURABILITY ZONE	C
EARTHQUAKE ZONE	1
CLIMATE ZONE	1
WIND REGION	A
LEE ZONE	NO
SNOW LOAD	NO
RAINFALL INTENSITY	90-100
TA ZONE	Commercial - FNDC
HAZARDS	River flood hazard (50 & 100 ARI) NRC flood susceptible

FLOOR AREA

FLOOR AREA	=1,301.30m²

COVERAGE

BUILDING AREA	= 1,535.39m²
CONCRETE AREA	= 1,254.57m²
METALLED AREA	= 3,721.92m²
TOTAL AREA	= 6,512.42m²

CARPARK REQUIREMENTS

FNDC Rule:
Vehicle sales, repair, service 1 per 150m² vehicle display area plus 4 for each repair / lube bay plus 1 per each remaining 50m² GBA

Area	Carparks
Repair bay = 5	4 per bay = 20
Remaining Area = 305.33m²	1 per 50m² = 7
Total carparks required	**27**

NEO ARCHITECTURE STUDIO

CONTACT
P 021 182 0261
E admin@neoas.co.nz
W www.neoas.co.nz

CLIENT
SMARTSTEEL BUILDINGS

PROJECT
Commercial Diesel Development
20 & 18 Kahikatearoa Lane
Waipapa 0230

NOTES
CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK - DO NOT SCALE PLANS
ALL BUILDING WORK IS TO BE CARRIED OUT AS PER BEST PRACTICE FOR ALL TRADES
DRAWINGS ARE TO BE READ IN CONJUNCTION WITH NEO ARCHITECTURE STUDIO DRAWINGS, SPECIFICATION & HFC Structure Ltd ENGINEERING
IF IN ANY DOUBT OVER BUILDING WORK CHECK WITH DESIGNER

ALL DRAWINGS TO BE PRINTED IN COLOUR

RevID	Transmittal Set Name	Date
INF - 25	INFORMATION	28/2/2025
INF - 26	INFORMATION	28/2/2025
BC - 01	BUILDING CONSENT	5/3/2025

ISSUE: BUILDING CONSENT
For consent & construction purposes only. Destroy all non stamped building consent or construction plans.

DRAWN: DANE ALLISON
CHECKED: NEO AS LTD
ENGINEER: HFC Structure Ltd

SHEET TITLE: **SITE PLAN**

DATE: **19/3/2025**
SCALE @ A1: **1:200**
JOB NUMBER: **2408**
REVISION: **BC - 01**
SHEET NO: **A102**