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 Form 9). 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 Covnsent 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)
○ **Other (please specify)** _____

○ **Discharge**
○ **Change of Consent Notice (s.221(3))**
○ **Extension of time (s.125)**

**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? Refer to AEE

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: Beryl Oldham as director of East Property Investments ltd

Email: [redacted]

Phone number: Work [redacted] Home

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

2 Heathcote Rd
Castor Bay
Auckland 0620
Postcode

Have you been the subject of abatement notices, enforcement orders, infringement notices and/or convictions under the Resource Management Act 1991? ◯ **Yes** ☒ **No**

If yes, please provide details.

6. Address for correspondence

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

Name/s: Hodgson Planning Consultatns

Email: [redacted]

Phone number: Work [redacted] Home

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

11Martyn Street, Wailuku
111
Postcode

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:

Property address/
location:

[redacted]
Gosse
Postcode

8. Application site details

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

Name/s:

Site address/ location: 111 and 115 Yorke Road, Haruru

Postcode

Legal description: Lot 2 and 3 DP 46802 **Val Number:**

Certificate of title: NA1815/37 and NA1815/38

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** (X) **No**

Is there a dog on the property? ◯ **Yes** (X) **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.

Notice will need to be given to tenants

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.

Subdivision consent to create 20 residential lots, a balance lot, four common access lots and two lots to vest as esplanade

Land use consent to undertake earthworks associated with the construction of private ways and infrastructure as part of

Land use consent for residential density of no greater than 300m² where more than one other rule is not complied with.

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

10. Would you like to request public notification?

◯ **Yes** (✔) **No**

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

(more than one circle can be ticked):

◯ **Building Consent** Enter BC ref # here (if known)

(✔) **Regional Council Consent (ref # if known)** Ref # here (if known)

◯ **National Environmental Standard Consent** Consent here (if known)

◯ **Other (please specify)** Specify 'other' here

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

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

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

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

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

13. Assessment of environmental effects:

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

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

14. Draft conditions:

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

If yes, please be advised that the timeframe will be suspended for 5 working days as per s107G of the RMA to enable consideration for the draft conditions.

15. 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)	East Property Investments Ltd
Email:	[redacted]
Phone number:	Work [redacted] Home
Postal address: (or alternative method of service under section 352 of the act)	2 Heathcote Rd Castor Bay Auckland 0620 Postcode

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.

15. *Billing details* continued...

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) Beryl Oldham

Signature: [redacted] Date 04 Nov 2025

(signature of bill payer) **MANDATORY**

16. 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.

17. Declaration

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

Name (please write in full) Beryl Oldham

Signature [redacted] Date 04 Nov 2025

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

See overleaf for a checklist of your information...

Checklist

Please tick if information is provided

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

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Guaranteed Search Copy issued under Section 60 of the Land Transfer Act 2017

R.W. Muir
Registrar-General of Land

Identifier **NA718/108**

Part-Cancelled

Land Registration District **North Auckland**

Date Issued 12 September 1939

Prior References
NA750/240

Estate Fee Simple

Area 4.1075 hectares more or less

Legal Description Deposited Plan 28923

Registered Owners

Charles Edward Yorke

Interests

633533 Transfer of Lot 1 DP 46802 CT NA1815/36 issued - 9.2.1960 at 10:40 am

633534 Transfer of Lot 2 DP 46802 CT NA1815/37 issued - 9.2.1960 at 10:41 am

633535 Transfer of Lot 3 DP 46802 CT NA1815/38 issued - 8.3.1960 at 2:00 pm

A53291 Pursuant to Section 44 (3) Counties Amendment Act 1961 Lot 4 DP 46802 is vested in the Chairman Councillors and Inhabitants of the County of Bay of Islands as an Esplanade Reserve subject to the Reserves and Domains Act 1953 - 12.1.1965

Lot 4 DP 46802 only (reserve) remains herein (the residue).

at Auckland as Number 28923 and being portion of Old Land Claim Number

EQUIVALENT METRIC
AREA IS 4.1075 ha.
4·1075ha

Pursuant to Section
1915 Lot 4
vested in Her Majesty
and Domains Act 19

Pt. O.L.C. 245

1657·5

Pt. O.L.C. 245
To T.L.
46802 M.
10 : 0 : 24

Waitangi River

193·5
350·3
204·75

2
D.P. 17629

Scale: 6 Chains to an Inch.

Transfer 63
Lot Lease
Part Lot
Plan dis802
Plan dis802
to M
9-2-1960
1815/36

Transfer
Lot
over the
yellow on
Plan dis802
Ronald
at 10·14
1815/37

Transfer 63
right
shown
dis802
dis802
Yorke
Produced

Transfer 63
(residue)
Produced 9-
Lot 8-3-1990
1815/38



(2)

633534TE
09021960

(Approved by the District Land Registrar, Auckland, No. 3360)

New Zealand] (C)

Under the Land Transfer Act, 1952

Memorandum of Transfer

CHARLES EDWARD YORKE of Russell Labourer (hereinfater called "the Transferor")

being registered as proprietor of an estate of freehold in fee simple

subject however to such encumbrances, liens and interests as are notified by memoranda underwritten or endorsed hereon in ALL THAT piece of land situated in the Land District of Auckland containing Two acres Three roods Eight decimal one perches (2 acres 3 roods 8.1 perches)

more or less being Lot Two (2) on a plan deposited in the Land Registry Office at Auckland as No. 46802 and being part of the land comprised and described in Certificate of Title VOLUME 718 FOLIO 108 of the Register Book for the Auckland Land Registration District. TOGETHER WITH the Right of Way created by Transfer 633533 BUT RESERVING NEVERTHELESS unto the Transferor the Right of Way more particularly described in the Schedule hereto.

IN CONSIDERATION of the natural love and affection he doth bear unto his son RONALD CLIFF YORKE of Paihia Forestry Employee DOTH HEREBY TRANSFER unto the said Ronald Cliff Yorke all his estate and interest in the said parcel of land.

IN WITNESS whereof these presents have been executed this 18th day of July One thousand nine hundred and fifty-nine.

SIGNED by the said CHARLES EDWARD YORKE in the presence of: } C E Yorke

Solicitor.
Kawakawa

14 IX 59 1133 -01.13.0
N.Z. Stamp Duty WRK

THE SCHEDULE HEREINBEFORE REFERRED TO

RESERVING NEVERTHELESS unto the Transferor and his assigns full and free right and liberty to and for him and them the registered Proprietor or Proprietors for the time being of ALL THAT parcel of land containing Two acres Three roods Nine decimal two perches (2 acres 3 roods 9.2 perches) more or less being Lot Three (3) on the said Deposited Plan No. 46802 and being the balance of the land in the said Certificate of Title VOLUME 718 FOLIO 108 or any part thereof and his and their tenants servants agents and workmen and visitors from time to time and at all times hereafter at his and their will and pleasure to go pass and repass with or without vehicles horses or other animals carts carriages and motor vehicles of all descriptions through over and along that portion of the said Lot Two (2) hereinbefore transferred coloured yellow on the said Deposited Plan TO THE INTENT that the Right of Way hereby reserved shall be for ever hereinafter appurtenant to the said Lot Three (3) of the said Deposited Plan 46802 hereinbefore described for all purposes connected with the use occupation and enjoyment thereof.

A E Yorke

In consideration of

(the receipt of which sum is hereby acknowledged)

Do hereby Transfer to the said

all estate and interest in the

said piece of land above described

In witness whereof have hereunto subscribed name this

day of one thousand nine hundred and

Signed by the above named

in the presence of

633534

No.

TRANSFER OF
Lot 2 D.P. 46802

C.E. YORKE ..... *Transferor*

R.C. YORKE ..... *Transferee*

Particulars entered in the Register-Book Vol. 718
Folio 108
the 9th day of February 1960
at 10.41 o'clock

Assistant Land Registrar
of the District of Auckland.

AUCKLAND DISTRICT LAND REGISTRAR NEW ZEALAND

68

Correct for the purposes of the Land Transfer Act.

Solicitor for the Transferee

Rep P.O.W. to be varied in accordance with the local body's condition of subdivision.

The easement created by the within transfer is subject to the provisions of Section 9a Sub-section (3) (a) of The Land Subdivision in Counties Act 1946. See Section 10 of the Land Subdivision In Counties Amendment Act, 1953.

H.L.R.

1815/37½ : 2 . 0

(2)

2

(2)

LAND & DEEDS
Nature: Transfer
Firm: Edgcumbe & Beech
- 9 FEB 1960
Time: 10-41
Fee: £ 4 : 2 : —
Contract No. 14687

L.A. WILLIAMS ESQ.
Solicitor
KAWAKAWA.

Solicitors for the Transferee

THE LAW SOCIETY OF THE DISTRICT OF AUCKLAND
A.D. 60709

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Guaranteed Search Copy issued under Section 60 of the Land Transfer Act 2017

R.W. Muir
Registrar-General of Land

Identifier	**NA1815/38**
Land Registration District	**North Auckland**
Date Issued	08 March 1960

Prior References
NA718/108

Estate	Fee Simple
Area	1.1362 hectares more or less
Legal Description	Lot 3 Deposited Plan 46802
Registered Owners	

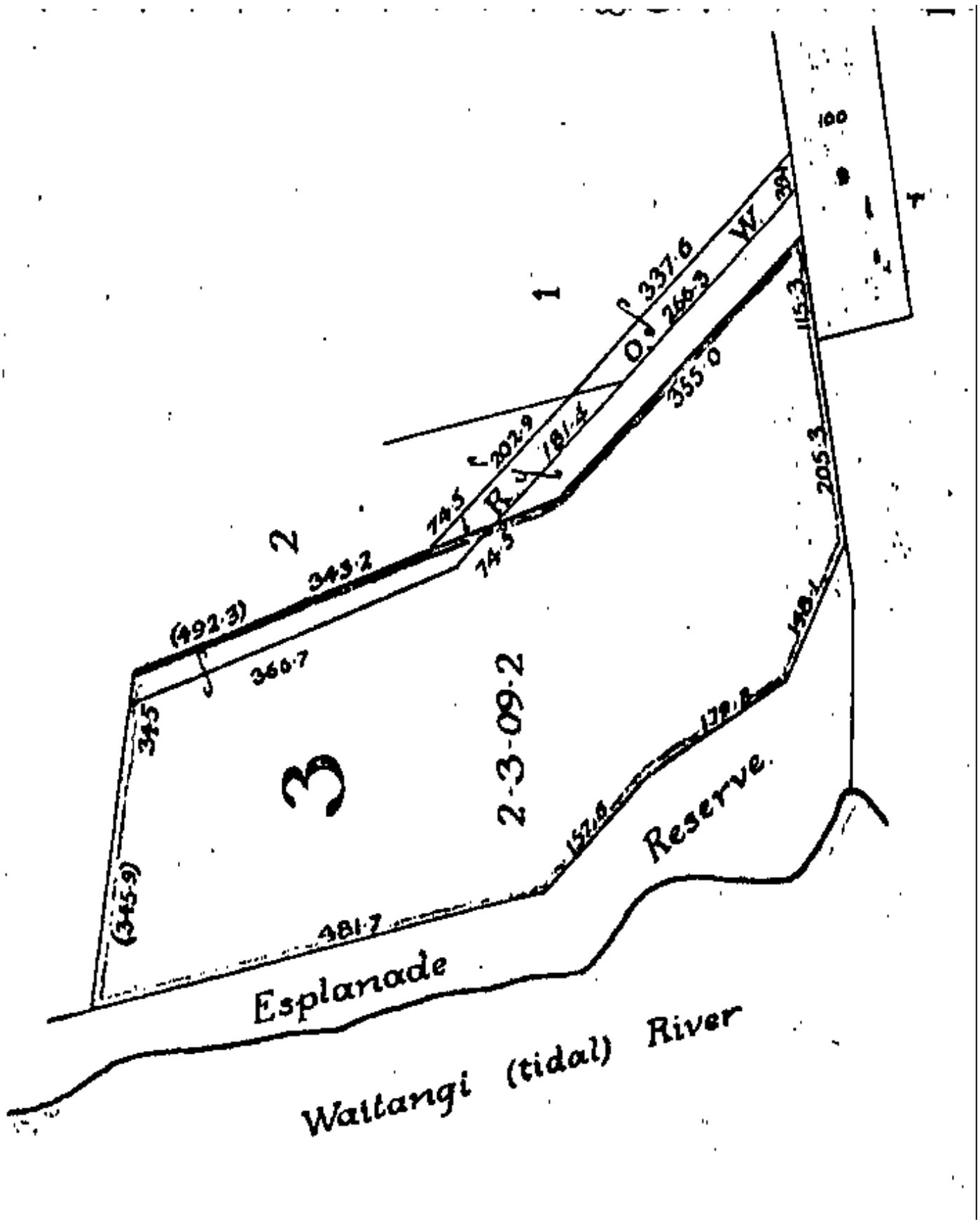
East Property Investments Limited

Interests

Subject to a right of way over part created by Transfer 635079

Appurtenant hereto is a right of way created by Transfer 633534

13394212.2 Mortgage to Conrad Funds Management Limited - 3.9.2025 at 3:05 pm


1
2
3
100
337·6
W.
266·3
O.
355·0
115·3
205·3
202·9
181·4
R.
74·5
74·5
74·5
343·2
(492·3)
360·7
345
(345·9)
481·7
148·1
137·8
157·8
2·3·09·2
Reserve
Esplanade
Waitangi (tidal) River

IN THE MATTER of the Land Transfer Act 1952

AND

IN THE MATTER of the Counties Amendment Act 1961

I, JOHN DARCY O'BRIEN, Assistant Commissioner of Crown Lands for the North Auckland Land District for and on behalf of Her Majesty the Queen certify that the reserves set out in the attached schedule have duly vested in the Bay of Islands County Council pursuant to the provisions of Section 44 of the Counties Amendment Act 1961.

Assistant Commissioner of Crown Lands

TO:

District Land Registrar,
AUCKLAND.

BAY OF ISLANDS COUNTY COUNCIL

Pursuant to the provisions of Section 44 sub-section (3) of the Counties Amendment Act, 1961 application is hereby made for the vesting of reserves, as detailed in the following Schedule, in the Chairman, Councillors and Inhabitants of the County of Bay of Islands.

SCHEDULE

Lot 11, D.P. 31384, being part Old Land Claim 251, situated in Block IV, Kawakawa Survey District. Area, 4.7 perches, more or less. Part certificate of title, Volume 789, folio 171.

(Recreation Reserve)

Lot 7 D.P. 39383, being part Old Land Claim 60, situated in Block XI, Kerikeri Survey District. Area, 1 rood 11 perches more or less. Part certificate of title Volume 649, folio 139.

(Esplanade Reserve)

Lot 3 D.P. 39923, being part Old Land Claim 60, situated in Block XI, Kerikeri Survey District. Area, 1 rood 5 perches, more or less. Part certificate of title Volume 645, folio 224.

(Esplanade Reserve)

Lot 9 D.P. 35860, being part Old Land Claim 3, situated in Block XI Kerikeri Survey District. Area, 2 roods 10,8 perches, more or less. Part certificate of title, Volume 679, folio 153.

(Recreation Reserve)

Lot 33 D.P. 41378, being parts of Old Land Claim 39, situated in Block XI, Kerikeri Survey District: Area, 5 acres 2 roods 3 perches, more or less. Part certificate of title, Volume 617, folio 243.

(Recreation Reserve)

Lot 3 D.P. 42315, being part of Old Land Claim 60, situated in Block XI, Kerikeri Survey District, and part Section 29, Block XI, Kerikeri Survey District: Area, 2 roods 12 perches, more or less. Part certificate of title, Volume 985, folio 296.

(Esplanade Reserve)

Lot 14, D.P. 43366, being part Old Land Claim 60, situated in Block XI, Kerikeri Survey District: Area, 2 roods 5 perches, more or less. Balance certificate of title, Volume 792, folio 258.

(Esplanade Reserve)

Lot 30 D.P. 16475, being part Allotment 1, Okaihau Parish, situated in Block VII, Omapere Survey District: Area, 23.1 perches, more or less. Part certificate of title, Volume 402, folio 37.

(Plantation Reserve)

Lot 16 D.P. 44859, being part Allotment 17, Omapere Parish, situated in Block VII, Omapere Survey District: Area, 18 perches, more or less. Part certificate of title, Volume 876, folio 103.

(Esplanade Reserve)

Lot 10 D.P. 28604, being part Allotment 140, Kawakawa Parish, situated in Block XV, Kawakawa Survey District: Area, 1 rood 10.8 perches, more or less. Part certificate of title, Volume 188, folio 206.

(Hall Reserve)

Lot 35 D.P. 16531, being part Allotment 152, Kawakawa Parish, situated in Block XV Kawakawa Survey District: Area, 2 roods 26 perches more or less. Part certificate of title, Volume 171, folio 163.

(Recreation Reserve)

Lot 8 D.P. 38238, being part Old Land Claim 251, situated in Block VIII, Kawakawa Survey District: Area, 1 rood 14.2 perches, more or less. Part certificate of title, Volume 317, folio 280.

(Recreation Reserve)

County Clerk

A 53291

[illegible] ENTERED IN THE REGISTER-BOOK
VOL. 789 FOLIO 171 : 649/139 : 645/224 : 679/153 : 617/243 : 985/296 : 792/258 : 402/37 : 816/103 :
188/206 : 171/163 : 317/280 : 659/42 : 309/156 : 263/284 : 718/108 : 956/242 : 721/213 : 1024/1
THE 12th DAY OF January 1965
AT 10.46 o'CLOCK.

[illegible]
ASSISTANT DISTRICT REGISTRAR
for AUCKLAND

RECALL FILE LABEL
F5000003001285

22313
120·6·2C

Recorded on O.R.'s 35860, 40459, 32486, 45719, 46802, 17644, 16246, 40239, 38238, 16581, 28604, 44659, 16475, 43336, 41378, 42315, 39388, 39923, 31384.

[illegible]
12.[illegible]
0
[illegible]

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Guaranteed Search Copy issued under Section 60 of the Land Transfer Act 2017

R.W. Muir
Registrar-General of Land

Identifier	**NA1815/37**
Land Registration District	**North Auckland**
Date Issued	09 February 1960

Prior References
NA718/108

Estate	Fee Simple
Area	1.1334 hectares more or less
Legal Description	Lot 2 Deposited Plan 46802
Registered Owners	

Anthony Paul Gosse and Sonnia Lee Gosse

Interests

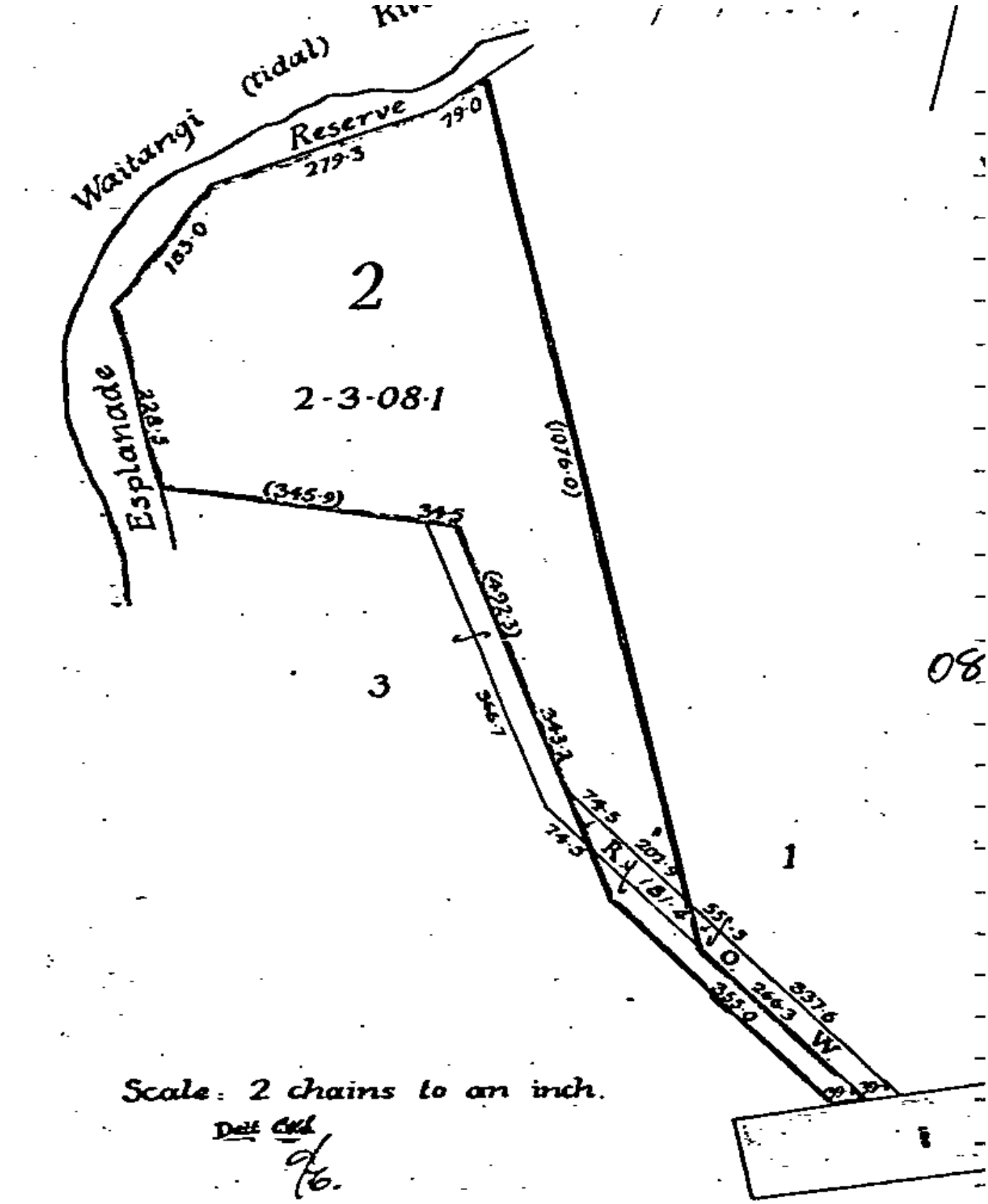
Appurtenant hereto are rights of way created by Transfer 635079

Subject to a right of way over part created by Transfer 633534 - 9.2.1960

Subject to a right to drain water over part marked A on DP 187511 created by Transfer D263350.1 - 21.4.1998 at 10.35 am

Subject to a right to convey electricity, telecommunication, computer media and water and the right to drain sewage over part marked A on DP 429804 created by Easement Instrument 8568723.1 - 26.10.2010 at 8:42 am

11806221.2 Mortgage to Resimac Home Loans Limited - 24.7.2020 at 10:39 am


Waitangi (tidal)
Reserve
279·3
79·0
103·0
2
2-3-08·1
Esplanade
228·3
(345·9)
345
(1076·0)
(492·3)
3
346·7
343·3
74·3
74·3
207·9
187·4
551·3
O.
266·3
W.
355·0
337·6
1
08
Scale: 2 chains to an inch.
Det Grid
6.

635071 TE 01011870

(3)

INLAND REVENUE DEPARTMENT OFFICIAL 29 FE 60 SEAL WHANGAREI N.Z.

(Approved by the District Land Registrar, Auckland, No. 3360)

New Zealand] (C)

Under the Land Transfer Act, 1952

Memorandum of Transfer

WHEREAS CHARLES EDWARD YORKE of Russell Labourer (hereinafter called "the First Owner")

being registered as proprietor

of an estate of freehold in fee simple

subject however to such encumbrances, liens and interests as are notified by memoranda underwritten or endorsed hereon in ALL THAT piece of land situated in the Land District of Auckland containing Two acres Three roods Nine decimal two perches (2 acres 3 roods 9.2 perches)

more or less being Lot Three (3) on a plan deposited in the Land Registry Office at Auckland as No. 46802 and being the residue of the land comprised and described in Certificate of Title VOLUME 718 FOLIO 108 of the Register Book for the Auckland Land Registration District (hereinafter called "the first described land") AND WHEREAS RONALD CLIFF YORKE of Paihia Forestry Employee (hereinafter called "the Second Owner") is registered as proprietor of an estate of freehold in fee simple in ALL THAT parcel of land situate in the Land District of Auckland containing Two acres three roods eight decimal one perches (2 acres 3 roods 8.1 perches) more or less being Lot Two (2) on the said Deposited Plan No. 46802 and being the whole of the land comprised and desdribed in Certificate if Title VOLUME FOLIO of the Register Book aforementioned (hereinafter called "the secondly described land") AND WHEREAS the First Owner has for the consideration hereinafter appearing agreed to give and grant unto the Second Owner the Right of Way appurtenant to the secondly described land in the terms hereafter set forth NOW THIS MEMORANDUM WITNESSETH that in pursuance of the said Agreement and IN CONSIDERATION of the sum of ONE SHILLING (1/-) paid by the Second Owner to the First Owner (the receipt whereof is hereby acknowledged) the First Owner DOTH HEREBY TRANSFER AND GRANT unto the Second Owner his Executors Administrators and Assigns and his and their servants agents workmen and visitors and all persons having business with him or them a free and perpetual right of way ingress egress and regress on horseback or on foot and with or without implements and vehicles of every description loaded or unloaded by night as well as by day in and over that portion of the first described land coloured yellow on the said deposited plan No. 46802 for the purpose of giving access to and from the secondly described land and any part thereof to and from the public road SUCH easement of right of way hereby created being in common with that of any other person or persons from time to time entitled to any easement of right of way over the first described land or any part thereof TO THE INTENT that such easement of right of way hereby created shall be forever appurtenant to the secondly described land.

29 FE 60 5014 011D Stamp Duty Nil

IN WITNESS whereof these presents have been executed this 23rd day of February One thousand nine hundred and Sixty.

SIGNED by the said CHARLES EDWARD YORKE in the presence of: } C E Yorke

Solicitor
Kawerau

SIGNED by the said RONALD CLIFF YORKE in the presence of: } R C Yorke

Solicitor
Kawerau

~~In consideration of~~

(~~the receipt of which sum is hereby acknowledged~~)

~~Do hereby Transfer to the said~~ —

~~all~~ ~~estate and interest in the~~

~~said piece of land above described~~

~~In witness whereof~~ ~~have hereunto subscribed~~ ~~name this~~

~~day of~~ ~~one thousand nine hundred and~~

~~Signed by the above named~~

~~in the presence of~~

635079

No.

2-25

Correct for the purposes of the Land Transfer Act.

TRANSFER OF Right of Way
First: Lot 3 D.P. 46802
Second: Lot 2 D.P. 46802

C.E. YORKE ..... *Transferor*

R.C. YORKE ..... *Transferee*

Solicitor for the Transferee

Particulars entered in the Register-Book Vol. 718
Folio 108,
the 8th day of March 1960
at 2 o'clock

Assistant Land Registrar
of the District of Auckland.

AUCKLAND DISTRICT LAND REGISTRY

The easement created by the within transfer is subject to the provisions of Section 9a Sub-section (3) (a) of The Land Subdivision in Counties Act 1946. See Section 10 of the Land Subdivision in Counties Amendment Act, 1953.
H.L.R.

LAND & DEEDS
Nature: T.
Firm: Edge M.B.
8 MAR 1960
Time: 2 o'cl
Fee: £ —:16:—
Abstract No. 15695

Hand to Law Titles Branch.

3

12/-
4/-
16/-

D.A. WILLIAMS,
Solicitor,
KAWAKAWA.

Solicitors for the Transferee

THE LAW SOCIETY OF THE DISTRICT OF AUCKLAND
A.D. 90252

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Guaranteed Search Copy issued under Section 60 of the Land Transfer Act 2017

R.W. Muir
Registrar-General of Land

Identifier **958495**

Land Registration District **North Auckland**

Date Issued 14 September 2021

Prior References
138545

Estate Fee Simple

Area 2728 square metres more or less

Legal Description Lot 2 Deposited Plan 552961

Registered Owners

Jason Dean Tolley as to a 1/2 share

Angela Maria Margaret Woolston as to a 1/2 share

Interests

Subject to a water drainage right over part marked X and C on DP 552961 created by Transfer C869127.4 - 24.7.1995 at 2.55 pm

6093474.2 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 27.7.2004 at 9:00 am

Subject to stormwater drainage easements over parts marked X and C on DP 552961 created by Easement Instrument 6093474.6 - 27.7.2004 at 9:00 am

The easements created by Easement Instrument 6093474.6 are subject to Section 243 (a) Resource Management Act 1991

Subject to a right of way over part marked P, C, R and U, a right to convey water, electricity and telecommunications and a right to drain sewage over part marked P, R and C and a right to drain water over part marked P, C, NA and TB all on DP 552961 created by Easement Instrument 11918845.7 - 14.9.2021 at 10:24 am

Appurtenant hereto is a right of way, a right to convey water, telecommunications and electricity, a right to drain sewage and water created by Easement Instrument 11918845.7 - 14.9.2021 at 10:24 am

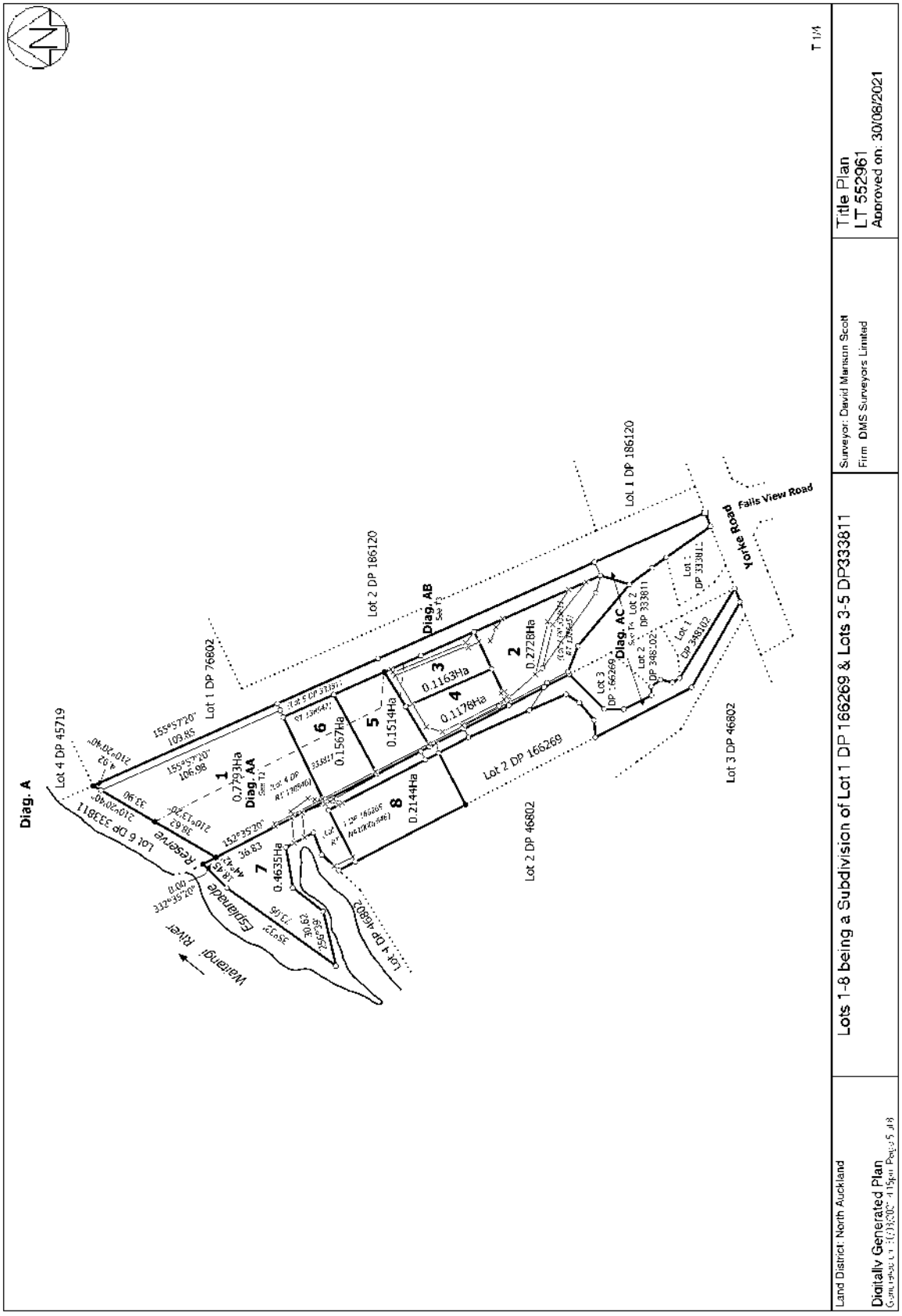
The easements created by Easement Instrument 11918845.7 are subject to Section 243 (a) Resource Management Act 1991

Subject to a right (in gross) to convey water and drain sewage over part marked P, C, R, U and V on DP 552961 in favour of Far North District Council created by Easement Instrument 11918845.8 - 14.9.2021 at 10:24 am

Subject to a right (in gross) to convey electricity over part marked P, C, R, U and V on DP 552961 in favour of Top Energy Limited created by Easement Instrument 11918845.9 - 14.9.2021 at 10:24 am

Subject to a right (in gross) to convey telecommunications over part marked P, C, R, U and V on DP 552961 in favour of Chorus New Zealand Limited created by Easement Instrument 11918845.10 - 14.9.2021 at 10:24 am

Land Covenant in Covenant Instrument 11918845.11 - 14.9.2021 at 10:24 am (limited as to duration)


Lot 1 DP 186120
Lot 2 DP 186120
Lot 1 DP 76802
Lot 4 DP 45719
Lot 6 DP 333811
Lot 2 DP 166269
Lot 2 DP 46802
Lot 3 DP 46802
Lot 4 DP 46802
Diag. A
Diag. AA
Diag. AB
Diag. AC
Reserve
Waitangi River
Explanade
Yorke Road
Falls View Road
1 0.7793Ha
2 0.2728Ha
3 0.1163Ha
4 0.1178Ha
5 0.1514Ha
6 0.1567Ha
7 0.4635Ha
8 0.2144Ha
155°57'20" 109.85
155°57'20" 106.08
152°35'20" 36.63
210°13'20" 38.62
210°20'40" 33.90
210°20'40" 4.92
Lot 3 DP 166269
Lot 2 DP 333811
Lot 2 DP 348102
Lot 1 DP 348102
Lot 1 DP 333811
T 1/4
Land District North Auckland
Digitally Generated Plan
Lots 1-8 being a Subdivision of Lot 1 DP 166269 & Lots 3-5 DP333811
Surveyor: David Manson Scott
Firm DMS Surveyors Limited
Title Plan
LT 552961
Approved on: 30/08/2021

View Instrument Details

Instrument No	8568723.1
Status	Registered
Date & Time Lodged	26 October 2010 08:42
Lodged By	Snedden, Shona Joyce
Instrument Type	Easement Instrument

Affected Computer Registers	Land District
NA100D/646	North Auckland
NA1815/37	North Auckland

Annexure Schedule: Contains 7 Pages.

Grantor Certifications

I certify that I have the authority to act for the Grantor and that the party has the legal capacity to authorise me to lodge this instrument	☑
I certify that I have taken reasonable steps to confirm the identity of the person who gave me authority to lodge this instrument	☑
I certify that any statutory provisions specified by the Registrar for this class of instrument have been complied with or do not apply	☑
I certify that I hold evidence showing the truth of the certifications I have given and will retain that evidence for the prescribed period	☑
I certify that the Mortgagee under Mortgage D642074.2 has consented to this transaction and I hold that consent	☑
I certify that the Mortgagee under Mortgage 6599546.2 has consented to this transaction and I hold that consent	☑

Signature

Signed by Nicole Jayne Prosser as Grantor Representative on 08/10/2010 10:59 AM

Grantee Certifications

I certify that I have the authority to act for the Grantee and that the party has the legal capacity to authorise me to lodge this instrument	☑
I certify that I have taken reasonable steps to confirm the identity of the person who gave me authority to lodge this instrument	☑
I certify that any statutory provisions specified by the Registrar for this class of instrument have been complied with or do not apply	☑
I certify that I hold evidence showing the truth of the certifications I have given and will retain that evidence for the prescribed period	☑

Signature

Signed by Alison Margaret Kellaway as Grantee Representative on 24/09/2010 02:59 PM

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

Form B

Easement instrument to grant easement or *profit à prendre*, or create land covenant

(Sections 90A and 90F Land Transfer Act 1952)

Grantor

YORKE ON YORKE LIMITED

Grantee

TREVOR JAMES WOOLSTON, SUZANNE ELIZABETH WOOLSTON AND MICHAEL G STUART TRUSTEE CO LIMITED

Grant of Easement or *Profit à prendre* or Creation of Covenant

The Grantor being the registered proprietor of the servient tenement(s) set out in Schedule A **grants** to **the Grantee** (and, if so stated, in gross) the easement(s) or *profit(s) à prendre* set out in Schedule A, **or creates** the covenant(s) **set out** in Schedule A, with the rights and powers or provisions set out in the Annexure Schedule(s)

Schedule A *Continue in additional Annexure Schedule, if required*

Purpose (Nature and extent) of easement; *profit* or covenant	Shown (plan reference) 429804	Servient Tenement (Computer Register)	Dominant Tenement (Computer Register) or in gross
Right to Convey Electricity, Telecommunications, Computer Media and Water, Right to Drain Sewage	A	NA1815/37	NA100D/646

Form B - continued

Easements or *profits à prendre* rights and powers (including terms, covenants and conditions)

Delete phrases in [ ] and insert memorandum number as required; continue in additional Annexure Schedule, if required

Unless otherwise provided below, the rights and powers implied in specified classes of easement are those prescribed by the Land Transfer Regulations 2002 and/or Schedule Five of the Property Law Act 2007

The implied rights and powers are hereby [varied] ~~[negatived] [added to] or [substituted]~~ by:

~~[Memorandum number , registered under section 155A of the Land Transfer Act 1952]~~

[the provisions set out in Annexure Schedule]

~~**Covenant provisions**~~

~~*Delete phrases in [ ] and insert Memorandum number as require; continue in additional Annexure Schedule, if required*~~

~~The provisions applying to the specified covenants are those set out in:~~

~~[Memorandum number , registered under section 155A of the Land Transfer Act 1952]~~

~~[Annexure Schedule]~~

Approved by Registrar-General of Land under No. 1995/1004

Annexure Schedule 2

Dated _____ Page of Pages

1. Where there is a conflict between the provisions of the Fourth Schedule to the Land Transfer Regulations 2002 and the Fifth Schedule to the Property Law Act 2007, the provisions of the Fifth Schedule must prevail.

2. Where there is a conflict between the provisions of the Fourth Schedule and/or the Fifth Schedule, and the modifications in this Easement Instrument, the modifications must prevail.

3. All costs incurred in respect of the installation, maintenance, repair or replacement of the right to convey electricity, telecommunications, computer media, water and right to drain sewage shall be the responsibility of the Grantee in all respects and the Grantee agrees to indemnify the Grantor against all liability in full howsoever arising from the exercise of the rights conferred by this Easement Instrument.

If this Annexure Schedule is used as an expansion of an instrument, all signing parties and either their witnesses or their solicitors must put their signatures or initials here.

ANNEXURE SCHEDULE - CONSENT FORM

Land Transfer Act 1952 Section 238(2)

BANK OF NEW ZEALAND	Mortgagee under mortgage No. D642074.2

Consent

Delete words in {} if the inconsistent with the consent
State full details of the matter for which consent is required

[Without prejudice to the rights and powers existing under the interest of the person giving consent,]

the Person giving consent hereby consents to: the registration of an easement instrument creating easements of right to convey electricity, telecommunications, computer media and water, right to drain sewage

Dated this 25th day of September 2010

Attestation

	Signed in my presence by BANK OF NEW ZEALAND by its attorneys
SIGNED for and on behalf of BANK OF NEW ZEALAND by its attorney: Makerita Wright	*Signature of Witness*
	Witness to complete in BLOCK letters (unless legibly printed):
	Witness name [illegible]
	Occupation Bank Officer
	Address Auckland
Signature of Person giving consent	

[1] An Annexure Schedule in this form may be attached to relevant instrument, where consent is required to enable registration under the Land Transfer Act 1952, or other enactments, which no form is prescribed.

bnz

CERTIFICATE OF NON-REVOCATION OF POWER OF ATTORNEY

I, Makerita Wright ,**Quality Assurance Officer of** Auckland, New Zealand, certify:

1. That by deed dated 12 July 2005, Bank of New Zealand, of Level 4, 80 Queen Street, Auckland, New Zealand, appointed me its attorney.

2. A copy of the deed is deposited in the North Auckland registration district of Land Information New Zealand as dealing No. 6508607.1

3. That I have not received notice of any event revoking the power of attorney.

SIGNED at Auckland 20 September 2010

Makerita Wright

H:\Cert of Non-Revocation.doc

ANNEXURE SCHEDULE - CONSENT FORM[1]

Land Transfer Act 1952 section 238(2)

Person giving consent *Surname must be underlined*	Capacity and Interest of Person giving consent *(eg. Mortgagee under Mortgage no.)*
ASB BANK LIMITED	**MORTGAGEE UNDER MORTGAGE NO. 6599546.2**

Consent

Delete words in [ ] if inconsistent with the consent
State full details of the matter for which consent is required

[Without prejudice to the rights and powers existing under the interest of the person giving consent,]

the **Person giving consent hereby consents** to:

Registration of the Easement Instrument to create a right to convey electricity, telecommunications, computer media and water and a right to drain sewage over the area marked "A" on DP 429804

Dated this day of 20

Attestation

10 SEP 2010 Robert William Reive	**Signed in my presence by the Person giving consent** *Signature of Witness* *Witness to complete in BLOCK letters (unless legibly printed)* **Witness name** **Occupation** **Address**
Signature [Common seal] of Person giving consent	

[1] An Annexure Schedule in this form may be attached to the relevant instrument, where consent is required to enable registration under the Land Transfer Act 1952, or other enactments, under which no form is prescribed

ASB BANK LIMITED
CERTIFICATE OF NON-REVOCATION OF POWER OF ATTORNEY

I Robert William Reive of Auckland, New Zealand, hereby certify:

1 THAT by a Deed dated **27 April 2010** and deposited in the Land Information New Zealand office as **No. 8483422.1** ASB Bank Limited appointed the persons holding, or from time to time acting in, the following ASB Bank offices as its attorneys on the terms and subject to the conditions set out in the said Deed:

Senior Manager Lending Services
Manager Loan Documentation
Legal Executive, Lending Services
Manager Administration
Manager Security Alterations and Settlements
Manager Filing and Security Maintenance
Manager Loan Advancing
Head of Lending Services
Head of Credit Solutions and Recoveries
Senior Credit Recoveries Manager
Credit Recoveries Manager
Manager Credit Management

2. THAT I hold the appointment of Manager Security Alterations and Settlements, Lending Services, with ASB Bank Limited

3. THAT at the date of signing I have not received any notice of or information of the revocation of that appointment by the winding up of the said company or otherwise.

Robert William Reive

SIGNED at Auckland this 10 day of September 2010

View Instrument Details

Instrument No	11918845.7
Status	Registered
Date & Time Lodged	14 September 2021 10:24
Lodged By	Lapworth, Lichelle Abigail
Instrument Type	Easement Instrument

Affected Records of Title	Land District
958494	North Auckland
958495	North Auckland
958496	North Auckland
958497	North Auckland
958498	North Auckland
958499	North Auckland
958500	North Auckland
958501	North Auckland
NA100D/647	North Auckland

Annexure Schedule Contains 6 Pages.

Grantor Certifications

I certify that I have the authority to act for the Grantor and that the party has the legal capacity to authorise me to lodge this instrument	☑
I certify that I have taken reasonable steps to confirm the identity of the person who gave me authority to lodge this instrument	☑
I certify that any statutory provisions specified by the Registrar for this class of instrument have been complied with or do not apply	☑
I certify that I hold evidence showing the truth of the certifications I have given and will retain that evidence for the prescribed period	☑
I certify that the Mortgagee under Mortgage D642074.2 has consented to this transaction and I hold that consent	☑
I certify that the Mortgagee under Mortgage 7876584.1 has consented to this transaction and I hold that consent	☑

Signature

Signed by Carolyn Ann Cameron as Grantor Representative on 13/09/2021 11:09 AM

Grantee Certifications

I certify that I have the authority to act for the Grantee and that the party has the legal capacity to authorise me to lodge this instrument	☑
I certify that I have taken reasonable steps to confirm the identity of the person who gave me authority to lodge this instrument	☑
I certify that any statutory provisions specified by the Registrar for this class of instrument have been complied with or do not apply	☑
I certify that I hold evidence showing the truth of the certifications I have given and will retain that evidence for the prescribed period	☑

Signature

Signed by Carolyn Ann Cameron as Grantee Representative on 13/09/2021 11:09 AM

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

This approved format may be used for lodgement as an electronic instrument under the Land Transfer Act 2017

Form 22

Easement instrument to grant easement or *profit à prendre*

(Section 109 Land Transfer Act 2017)

Grantor

Trevor James Woolston, Suzanne Elizabeth Woolston and Michael G Stuart Trustee Co Limited

Grantee

Trevor James Woolston, Suzanne Elizabeth Woolston and Michael G Stuart Trustee Co Limited

Christine Margaret Bray (in respect of NA100D/647)

Grant of Easement or *Profit à prendre*

The Grantor being the registered owner of the burdened land set out in Schedule A **grants to the Grantee** (and, if so stated, in gross) the easement(s) or *profit(s) à prendre* set out in Schedule A, with the rights and powers or provisions set out in the Annexure Schedule(s)

Schedule A *Continue in additional Annexure Schedule, if required*

Purpose of Easement, or *profit*	**Shown (DP 552961)**	**Burdened Land (Record of Title)**	**Benefited Land (Record of Title) or in gross**
Right of Way	M, N	Lot 1 DP 552961 (958494)	Lot 2 DP 552961 (958495) Lot 3 DP 552961 (958496) Lot 4 DP 552961 (958497) Lot 5 DP 552961 (958498) Lot 6 DP 552961 (958499) Lot 8 DP 552961 (958501)
	P, C	Lot 2 DP 552961 (958495)	Lot 4 DP 552961 (958497) Lot 8 DP 552961 (958501)
	R, U	Lot 2 DP 552961 (958495)	Lot 4 DP 552961 (958497)
	D, Q	Lot 4 DP 552961 (958497)	Lot 8 DP 552961 (958501) Lot 2 DP 166269 (NA100D/647)
	B, K, L	Lot 7 DP 552961 (958500)	Lot 8 DP 552961 (958501)

This approved format may be used for lodgement as an electronic instrument under the Land Transfer Act 2017

	O	Lot 1 DP 552961 (958494)	Lot 2 DP 552961 (958495) Lot 3 DP 552961 (958496) Lot 4 DP 552961 (958497) Lot 5 DP 552961 (958498) Lot 6 DP 552961 (958499) Lot 8 DP 552961 (958501)
Right to convey water, electricity, telecommunications	M, N	Lot 1 DP 552961 (958494)	Lot 2 DP 552961 (958495) Lot 3 DP 552961 (958496) Lot 4 DP 552961 (958497) Lot 5 DP 552961 (958498) Lot 6 DP 552961 (958499) Lot 8 DP 552961 (958501)
	P, R, C	Lot 2 DP 552961 (958495)	Lot 1 DP 552961 (958494) Lot 3 DP 552961 (958496) Lot 4 DP 552961 (958497) Lot 5 DP 552961 (958498) Lot 6 DP 552961 (958499) Lot 8 DP 552961 (958501)
	D, E, Q, S	Lot 4 DP 552961 (958497)	Lot 1 DP 552961 (958494) Lot 2 DP 552961 (958495) Lot 3 DP 552961 (958496) Lot 5 DP 552961 (958498) Lot 6 DP 552961 (958499) Lot 8 DP 552961 (958501)
	T	Lot 3 DP 552961 (958496)	Lot 1 DP 552961 (958494) Lot 5 DP 552961 (958498) Lot 6 DP 552961 (958499)
	L	Lot 7 DP 552961 (958500)	Lot 8 DP 552961 (958501)
Right to drain water, sewage	M, N	Lot 1 DP 552961 (958494)	Lot 2 DP 552961 (958495) Lot 3 DP 552961 (958496) Lot 4 DP 552961 (958497) Lot 5 DP 552961 (958498) Lot 6 DP 552961 (958499) Lot 8 DP 552961 (958501)
	L	Lot 7 DP 552961 (958500)	Lot 8 DP 552961 (958501)

This approved format may be used for lodgement as an electronic instrument under the Land Transfer Act 2017

Right to drain sewage	P, R, C	Lot 2 DP 552961 (958495)	Lot 1 DP 552961 (958494) Lot 3 DP 552961 (958496) Lot 4 DP 552961 (958497) Lot 5 DP 552961 (958498) Lot 6 DP 552961 (958499) Lot 8 DP 552961 (958501)
	D, E, Q, S	Lot 4 DP 552961 (958497)	Lot 1 DP 552961 (958494) Lot 2 DP 552961 (958495) Lot 3 DP 552961 (958496) Lot 5 DP 552961 (958498) Lot 6 DP 552961 (958499) Lot 8 DP 552961 (958501)
	T	Lot 3 DP 552961 (958496)	Lot 1 DP 552961 (958494) Lot 5 DP 552961 (958498) Lot 6 DP 552961 (958499)
	L	Lot 7 DP 552961 (958500)	Lot 5 DP 552961 (958498)
Right to drain water	T	Lot 3 DP 552961 (958496)	Lot 1 DP 552961 (958494) Lot 2 DP 552961 (958495)
	J	Lot 7 DP 552961 (958500)	Lot 8 DP 552961 (958501)
	P, C	Lot 2 DP 552961 (958495)	Lot 1 DP 552961 (958494)
	D, E, Q, S	Lot 4 DP 552961 (958497)	Lot 1 DP 552961 (958494) Lot 2 DP 552961 (958495) Lot 3 DP 552961 (958496) Lot 8 DP 552961 (958501)
	L	Lot 7 DP 552961 (958500)	Lot 8 DP 552961 (958501)
	F	Lot 5 DP 552961 (958498)	Lot 1 DP 552961 (958494) Lot 2 DP 552961 (958495) Lot 3 DP 552961 (958496) Lot 4 DP 552961 (958497) Lot 8 DP 552961 (958501)

This approved format may be used for lodgement as an electronic instrument under the Land Transfer Act 2017

	G	Lot 6 DP 552961 (958499)	Lot 1 DP 552961 (958494) Lot 2 DP 552961 (958495) Lot 3 DP 552961 (958496) Lot 4 DP 552961 (958497) Lot 5 DP 552961 (958498) Lot 8 DP 552961 (958501)
	H	Lot 1 DP 552961 (958494)	Lot 2 DP 552961 (958495) Lot 3 DP 552961 (958496) Lot 4 DP 552961 (958497) Lot 5 DP 552961 (958498) Lot 6 DP 552961 (958499) Lot 8 DP 552961 (958501)
	HA	Lot 1 DP 552961 (958494)	Lot 2 DP 552961 (958495) Lot 3 DP 552961 (958496) Lot 4 DP 552961 (958497) Lot 5 DP 552961 (958498) Lot 6 DP 552961 (958499)
	HB	Lot 7 DP 552961 (958500)	Lot 1 DP 552961 (958494) Lot 2 DP 552961 (958495) Lot 3 DP 552961 (958496) Lot 4 DP 552961 (958497) Lot 5 DP 552961 (958498) Lot 6 DP 552961 (958499)
	HC	Lot 7 DP 552961 (958500)	Lot 8 DP 552961 (958501)
	I	Lot 7 DP 552961 (958500)	Lot 1 DP 552961 (958494) Lot 2 DP 552961 (958495) Lot 3 DP 552961 (958496) Lot 4 DP 552961 (958497) Lot 5 DP 552961 (958498) Lot 6 DP 552961 (958499) Lot 8 DP 552961 (958501)
	NA	Lot 2 DP 552961 (958495)	Lot 1 DP 552961 (958494)
	TA	Lot 3 DP 552961 (958496)	Lot 1 DP 552961 (958494) Lot 2 DP 552961 (958495)
	TB	Lot 2 DP 552961 (958495)	Lot 1 DP 552961 (958494)

This approved format may be used for lodgement as an electronic instrument under the Land Transfer Act 2017

Right to convey water	L	Lot 7 DP 552961 (958500)	Lot 5 DP 552961 (958498)

Easements or *profits à prendre* rights and powers (including terms, covenants and conditions)

Delete phrases in [ ] and insert memorandum number as required; continue in additional Annexure Schedule, if required

Unless otherwise provided below, the rights and powers implied in specified classes of easement are those prescribed by the Land Transfer Regulations 2018 and/or Schedule 5 of the Property Law Act 2007

The implied rights and powers are hereby **[varied]** ~~**[negatived]**~~ and **[added to]** ~~**or [substituted]**~~ by:

~~[Memorandum number , registered under section 209 of the Land Transfer Act 2017]~~

[the provisions set out in Annexure Schedule]

This approved format may be used for lodgement as an electronic instrument under the Land Transfer Act 2017

ANNEXURE SCHEDULE

1. **Right of way**

1.1 The provisions set out in Schedule 5 of the Land Transfer Regulations 2018 which apply to a "right of way" shall apply to the Right of Way created by this Instrument provided that:

a) The grantor together with all grantees shall equally share the costs of repair and maintenance of any fixtures and fittings associated with the easement facility; and

b) The grantor together with all grantees shall equally share the costs of repair and maintenance of street lighting and the CCTV system for the easement facility,

except that nothing in this clause is intended to prevail over Regulations 11(5) and 11(6) of Schedule 5 of the Land Transfer Regulations 2018, so that if any such repair or maintenance is attributable (or party attributable) to any act or omission by any one or more party, they shall be responsible for carrying out such repair or maintenance at their cost.

D263350.1 TE

TRANSFER

Land Transfer Act 1952

This page does not form part of the Transfer.

N/L

TRANSFER

Land Transfer Act 1952

If there is not enough space in any of the panels below, cross-reference to and use the approved Annexure Schedule: no other format will be received.

Land Registration District

NORTH AUCKLAND

Certificate of Title No.		All or Part?	Area and legal description — *Insert only when part or Stratum, CT*
1815	37	All	

Transferor *Surnames must be underlined*

RONALD CLIFF YORKE and KATHLEEN ELSIE YORKE

10PMG1 09/04/1998 2022695
~~NZ Stamp Duty~~ ~~Not Liable~~
Self assessed duty $0.00

Transferee *Surnames must be underlined*

ROSS DONALD FAYNE, GAEL JOY FAYNE and MAHMOOD KHAN

Estate or Interest or Easement to be created: *Insert e.g. Fee simple; Leasehold in Lease No. .....; Right of way etc.*

Easement of right to drain water (continued on page 2 annexure schedule)

Consideration

ONE DOLLAR ($1.00)

Operative Clause

For the above consideration (receipt of which is acknowledged) the TRANSFEROR TRANSFERS to the TRANSFEREE all the transferor's estate and interest described above in the land in the above Certificate(s) of Title and if an easement is described above such is granted or created.

Dated this 30th **day of** March **19** 98

Attestation

D.C. Yorke
K.E. Yorke

Signed in my presence by the Transferor
Signature of Witness

Witness to complete in BLOCK letters
(unless typewritten or legibly stamped)

Witness name PETER J. LYNCH
Occupation SOLICITOR
Address WAIPU

Signature, or common seal of Transferor

Certified correct for the purposes of the Land Transfer Act 1952

~~Certified [illegible] CERTIFICATE~~
(DELETE INAPPLICABLE CERTIFICATE)

Solicitor for the Transferee

REF 4135

Annexure Schedule

TRANSFER Dated 2nd March 1998 Page 2 of 2 Pages

Continuation of "Estate or Interest or Easement to be created"

The transferee shall have the right to drain water over the part of the land in Certificate of Title 1815/37 marked "A" on DP 187511 being forever appurtenant to the land of the transferee contained in Certificate of Title 100D/647.

The Transferee shall maintain the drain at their sole expense and will keep the drain clean and unobstructed.

K.E.Y
R.B.J

Continuation of "Attestation"

Signed in my presence by the Transferee

Signature of Transferee

Signature of Witness

Witness Name PETER GILMOUR MACAULEY

Occupation SOLICITOR

Address KAIKOHE

If this Annexure Schedule is used as an expansion of an instrument, all signing parties and either their witnesses or their solicitors must put their signatures or initials here.

K.E.Y R.B.J

Approved by Registrar-General
of Land under No. 1995/1004

TRANSFER

Land Transfer Act 1952

Law Firm Acting

PALMER MACAULEY
SOLICITORS
KAITAIA

PCM
IP

Te $115
$5

Auckland District Law Society
REF: 4*35

This page is for Land Registry Office use only.
(except for "Law Firm Acting")

LINZ COPY

10.35 21.APR98 D 263350.1

PARTICULARS ENTERED IN REGISTER
LAND REGISTRY NORTH AUCKLAND
ASST. LAND REGISTRAR

Monique

From: Monique
Sent: Tuesday, 3 June 2025 1:06 pm
To: ngatikawat@gmail.com
Cc: Te Hono Support
Subject: Consultation request for proposed development at Yorke Road, Haruru

Kia ora koutou,

We are writing to you regarding a proposed residential subdivision project at 111 and 115 Yorke Road in Haruru Falls. We are assisting East Property Investments Ltd, to prepare a resource consent application for this proposed 21-lot residential subdivision.

The site is located in Haruru adjacent to the Waitangi River. Spanning 2.27 hectares across lots at 111 and 115 Yorke Road, the site is positioned within a mixed residential and rural lifestyle environment, and features flood hazard zones and escarpments above the river. The subdivision design incorporates natural hazard considerations, environmental effects, and technical assessments to support the area's growth and create a high-quality residential living environment. As currently drafted the subdivision includes 21 residential lots, one common lot, three jointly owned access lots, and a balance lot which have been designed to harmonise with the physical environment and foster a unique residential village character. Infrastructure plans include upgrades for road access, pedestrian pathways, stormwater management using natural drainage patterns, and wastewater systems with pump stations.

Here is a link to the proposed concept draft drawings and draft engineering plans:

310325 Drawings
22 322 Engineering Assessment FOR ISSUE tk.pdf

We are aware that land and waterways in this region have significant cultural, historical, and spiritual importance to your group. We are keen to learn of the hapu's association with the site or wider area.
Is there a relevant Hapū environmental management plan that we need to take into consideration?

We would greatly value the opportunity to share the proposed subdivision plans with you further and, more importantly, to listen to your perspectives and feedback.
Could you please let us know what time and method would work best for you?

Thank you very much for considering our request and for your time. We look forward to the possibility of engaging constructively with you to ensure that this development respects both cultural values and environmental sustainability.

Ngā mihi,

Monique Kimber
HODGSON PLANNING CONSULTANTS
Planning Consultant

09 235 5400 (09 235 3252)
11 Martyn Street Waiuku

PO Box 97 Pukekohe 2340

Please Note: I work part time. My days in the office are Mondays, Tuesdays and Thursdays.

Monique

From: Monique
Sent: Tuesday, 3 June 2025 1:17 pm
To: wiremu.t@tetiiwaitangi.co.nz
Cc: Te Hono Support
Subject: Consultation request for proposed development at Yorke Road, Haruru

Kia ora Wiremu,

We are writing to you regarding a proposed residential subdivision project at 111 and 115 Yorke Road in Haruru Falls. We are assisting East Property Investments Ltd, to prepare a resource consent application for this proposed 21-lot residential subdivision.

The site is located in Haruru adjacent to the Waitangi River. Spanning 2.27 hectares across lots at 111 and 115 Yorke Road, the site is positioned within a mixed residential and rural lifestyle environment, and features flood hazard zones and escarpments above the river. The subdivision design incorporates natural hazard considerations, environmental effects, and technical assessments to support the area's growth and create a high-quality residential living environment. As currently drafted the subdivision includes 21 residential lots, one common lot, three jointly owned access lots, and a balance lot which have been designed to harmonise with the physical environment and foster a unique residential village character. Infrastructure plans include upgrades for road access, pedestrian pathways, stormwater management using natural drainage patterns, and wastewater systems with pump stations.

Here is a link to the proposed concept draft drawings and draft engineering plans:

310325 Drawings
22 322 Engineering Assessment FOR ISSUE tk.pdf

We are aware that land and waterways in this region have significant cultural, historical, and spiritual importance to your group. We are keen to learn of Ngāti Rāhiri association with the site or wider area.
Is there a relevant Hapū environmental management plan that we need to take into consideration?

We would greatly value the opportunity to share the proposed subdivision plans with you further and, more importantly, to listen to your perspectives and feedback.
Could you please let us know what time and method would work best for you?

Thank you very much for considering our request and for your time. We look forward to the possibility of engaging constructively with you to ensure that this development respects both cultural values and environmental sustainability.

Ngā mihi,

Monique Kimber
HODGSON PLANNING CONSULTANTS
Planning Consultant

09 235 5400 (09 235 3252)
11 Martyn Street Waiuku

PO Box 97 Pukekohe 2340

Please Note: I work part time. My days in the office are Mondays, Tuesdays and Thursdays.

Meeting Notes:

Elizabeth Stacey (NTA) – 10/08/2023

Agreement with Opt 4 scheme design in terms of:

- Footpath alignment/routes
- Carriageway alignment
- Visitor parking configuration

The main reason for NTA support of the scheme and non-vesting of the road is the superior pedestrian amenity provided and the general separation of pedestrians from vehicle movements. Her advice is to focus on that in the application and support it with plenty of design detail.

Other advice/suggestions:

- Continue the existing Yorke Rd footpath along the south side of the entrance road after crossing Falls View Rd. Lot 1 driveway access to the north of the footpath.
- Pedestrian access for 103 & 103a Yorke Rd to be part of the carriageway formation eg 5m vehicles & 1m pedestrians (constructed to vehicle standard) differentiated by material change.
- 5m absolute minimum for the vehicle carriageway down to at least the 1st visitor parking area. Beyond that, see District Plan tables for different segment widths. Happy with 6m for the first section, particularly if tree planting is in close proximity to the road edge to maintain low vehicle speeds.
- 1.5m minimum footpath width on formed surface along lot frontage. More than happy if we want to make it wider.
- Pedestrian priority where vehicles cross ie 1st parking area and greenway crossings.
- Provide turning templates for parking areas in the application.

Monique

From: Gio Alagao <Gio.Alagao@fndc.govt.nz>
Sent: Friday, 11 April 2025 3:52 pm
To: Monique
Subject: RE: PAM-2025-12/0 -111 & 115 Yorke Road, Haruru 0204

Kia ora Monique,

Appreciated our discussion earlier on 111 & 115 Yorke Road proposal.

Please see the notes summary below (AI generated):

Meeting Notes
Date: April 11, 2025
Time: 2:05 AM
Duration: 56m 18s
Location: 111 & 115 Yorke Road, Haruru 0204

Attendees:
- Monique
- Kyron Gosse
- John Papesch
- Tom (Engineer from Hague Workman)
- Chris (Surveyor)
- Gio Alagao (Planner)
- Robin Rawson (Parks and Reserves Planner for Council)
- Sujeet Tikaram (Resource Consent Engineer)
- Losaline Finekifolau (Development Engineer)

Agenda:
1. Overview of the proposal
2. Discussion on stormwater management
3. Interface with the Esplanade Reserve
4. Connection to public reticulation

Key Points Discussed:
1. **Proposal Overview:**
    - Subdivision of two properties on York Rd with a total area of 2.29 hectares.
    - Proposal includes 20 residential lots and one balance lot.
    - Focus on protecting and enhancing natural values of the river environment.
    - Integration with the natural environment through pedestrian walkways and greenways.
    - Central road referred to as a "living road" with clusters of residential lots.
    - Alternative urban design standards to promote social cohesion and a sense of place.
    - Retention and enhancement of existing vegetation.

2. **Stormwater Management:**
    - No on-site attenuation proposed; using existing overland flow paths.
    - Multiple outlets to disperse stormwater and prevent erosion.
    - Discussion on the impact of stormwater discharge on the Esplanade Reserve.
    - Need for easements for stormwater outfalls.
    - Explanation of the site's topography and natural stormwater flow paths.
    - Consideration of erosion protection and stormwater quality.
    - Potential for stormwater discharge onto rock shelves to avoid erosion.

3. **Esplanade Reserve:**
    - Discussion on the width of the Esplanade Reserve, with a preference for a 20-metre width.
    - Consideration of public benefits and potential for public notification.
    - Existing Esplanade Reserve is constrained by topography and accessibility issues.
    - Potential for enhancements to existing tracks and swales within the reserve.
    - Requirement for hapū approval for any easements or reserve waivers.
    - Discussion on the usability and natural character of the existing reserve.
    - Comparison with neighbouring subdivisions and their Esplanade reserves.

4. **Connection to Public Reticulation:**
    - Preference for connecting to public reticulation for wastewater and water supply.
    - Site is partially within the area of benefit for water supply.
    - Need for a capacity assessment to understand the impact on current infrastructure.
    - Discussion on the feasibility of extending water supply lines to meet firefighting requirements.
    - Consideration of on-site water supplies for areas outside the benefit zone.
    - Potential for developer agreements to fund necessary infrastructure upgrades.

5. **Engineering and Infrastructure:**
    - Review of the draught engineering report and its coverage of capacity assessments.
    - Discussion on the alignment of gravity sewer lines and connection to pump stations.
    - Consideration of private infrastructure within the development.
    - Potential need for Northland Regional Council (NRC) consent for earthworks and stormwater discharge.
    - Discussion on the type of fill material for lot 22 and its impact on flood risk.

6. **Planning Issues:**
    - Potential breach of setback rules from rivers and archaeological sites.
    - Need to show compliance with impermeable surface and building setback requirements.
    - Ensuring no lots are within identified archaeological sites.

Action Items:

- Monique to follow up with Robin on specific contacts for hapū engagement.
- John and Tom to review and potentially amend the stormwater management plan.
- Chris to reconsider boundaries in light of the Esplanade Reserve discussion.
- Council engineers to review the draught engineering report and provide feedback.
- Further consultation with hapū regarding the Esplanade Reserve waiver and drainage specifics.
    - Council strongly encourages engagement and consultation with iwi/hapū prior to lodgement of the application for resource consent for your proposed development.
      If you are unsure who to consult, please contact our Te Hono Team for information and advice.
    - Te Hono Support - tehonosupport@fndc.govt.nz
- Reconfirmation of regional consents for earthworks and stormwater discharge.

Next Steps:

- Follow-up emails to be sent to Robin with additional points from the urban designer.
- Continued engagement with Council engineers to finalise servicing plans.
- Addressing planning issues related to setbacks and archaeological sites.

Reference:
Recap: PAM-2025-12/0 -111 & 115 Yorke Road, Haruru 0204 Friday, 11 April

Nga mihi,

Gio Alagao
Intermediate Resource Planner - Resource Consents Team 2
M 64272548053 | **P** 6494015521 | Gio.Alagao@fndc.govt.nz
Te Kaunihera o Te Hiku o te Ika | Far North District Council

fndc.govt.nz



-----Original Appointment-----
From: Planning Support <Planning.Support@fndc.govt.nz>
Sent: Friday, 4 April 2025 3:35 pm
To: Gio Alagao; Sujeet Tikaram; Robin Rawson; Monique <Monique@hpcplanning.co.nz>
Subject: PAM-2025-12/0 -111 & 115 Yorke Road, Haruru 0204
When: Friday, 11 April 2025 2:00 pm-3:00 pm (UTC+12:00) Auckland, Wellington.
Where: Microsoft Teams Meeting

Kia Ora All,

This PAM has been booked for **Friday 11th April at 2:00pm (ONLINE)** please forward this invite to any others that will be attending the meeting.

PAM-2025-12/0, 111 & 115 York Road Haruru 0204
Subdivide and develop the 2.2 hectare site to create an intimate, pedestrian-centric residential village within a natural setting. Twenty one residential lots will be created, a balance lot and a series of jointly owned lots.

Council Attendees:
Gio Alagao – Intermediate Resource Planner
Sujeet Tikaram – Senior Resource Consent Engineer
Robin Rawson – Parks and reserves Planner

Nga mihi,
Planning Support

_____

Microsoft Teams Need help?

Join the meeting now

Meeting ID: 442 942 379 787

Passcode: 3wW3PX3a

Dial in by phone

+64 4 909 4415,,291030563# New Zealand, Wellington

Find a local number

Phone conference ID: 291 030 563#

Join on a video conferencing device

Tenant key: 142522899@t.plcm.vc

Video ID: 136 728 203 2

More info

For organizers: Meeting options | Reset dial-in PIN



Far North District Council Teams Meeting Invitation

Org help | Privacy and security

Monique

From: Robin Rawson <Robin.Rawson@fndc.govt.nz>
Sent: Wednesday, 16 July 2025 6:23 pm
To: Tim; Monique
Subject: 111-115 Yorke Rd

Kia ora

I sometimes make notes from a meeting in my diary, but unfortunately not for the meeting with Tim on the Yorke Road sites.
I emailed reserve heritage notes below to Tim which are desk top / high level.

Comment after looking at this again:
Expectation of reserve top up to 20m or would consider 20m average - most applicable to 111 Yorke Rd which has an undersized esplanade reserve
Surrounding residential area has very poor relationship with water, and although there is public land from the end of Yorke Road down to the water and Old Wharfe Road, access would be difficult to form in one steepish area.
A case for a reduction in esplanade can be made where improved public access either by easement or reserve provides for an overall improvement in public benefit.
I recall Tim and I discussed possible public access from Yorke Road down the track to the water
Looking at the contours now there may be 2 tracks down to the water with one under vegetation at southern end of site?
Unsure of what this looks like on site and would want to know that the benefit was real.

Ngā mihi | Regards
Robin



Robin Rawson
Parks & Reserves Planner - Growth Planning and Placemaking
M 272171426 | **P** 6494015288 | Robin.Rawson@fndc.govt.nz
Te Kaunihera o Te Hiku o te Ika | Far North District Council

Pokapū Kōrero 24-hāora | 24-hour Contact Centre 0800 920 029



From: Robin Rawson <Robin.Rawson@fndc.govt.nz>
Sent: Tuesday, May 13, 2025 9:49 AM
To: tim@cgstudio.co.nz <tim@cgstudio.co.nz>
Subject: Yorke heritage



Robin Rawson
Parks & Reserves Planner - Growth Planning and Placemaking
M 272171426 | **P** 6494015288 | Robin.Rawson@fndc.govt.nz
Te Kaunihera o Te Hiku o te Ika | Far North District Council

Pokapū Kōrero 24-hāora | 24-hour Contact Centre 0800 920 029
fndc.govt.nz



28 August 2023

fluid-industries.co.nz
36a New Windsor Road
Avondale, Auckland 0600

…
…
…
…

By email: …

Invitation for Consultation on Proposed Subdivision at Yorke Road, Haruru

I am working with the owners of two properties the project lead for a proposed urban subdivision development at 111 & 115 Yorke Road, Haruru. We acknowledged the importance of the relationship that Ngāpuhi has with the land in this area, and we are eager to engage in a meaningful dialogue regarding this proposal.

The proposed project involves a 21-lot subdivision, encompassing a total site area of 2.26 hectares. The project is in its early stages, and we understand the importance of involving Ngāpuhi as mana whenua for this area. A copy of the draft plan of subdivision is attached for your information.

We are committed to an inclusive, transparent, and respectful engagement process, and it is our sincere hope that we can work together to ensure any potential impacts on cultural values, wāhi tapu, and the local environment are adequately acknowledged and addressed.

We would greatly appreciate the opportunity to meet with you or a representative from Ngāpuhi at your earliest convenience to discuss the proposal, our approach to the project, and to understand any initial thoughts, concerns, or suggestions you may have.

We are flexible and open to your preferences regarding the format of this meeting, whether it be a kanohi ki te kanohi (face to face) meeting, a virtual hui, or another form of engagement that best suits your needs.

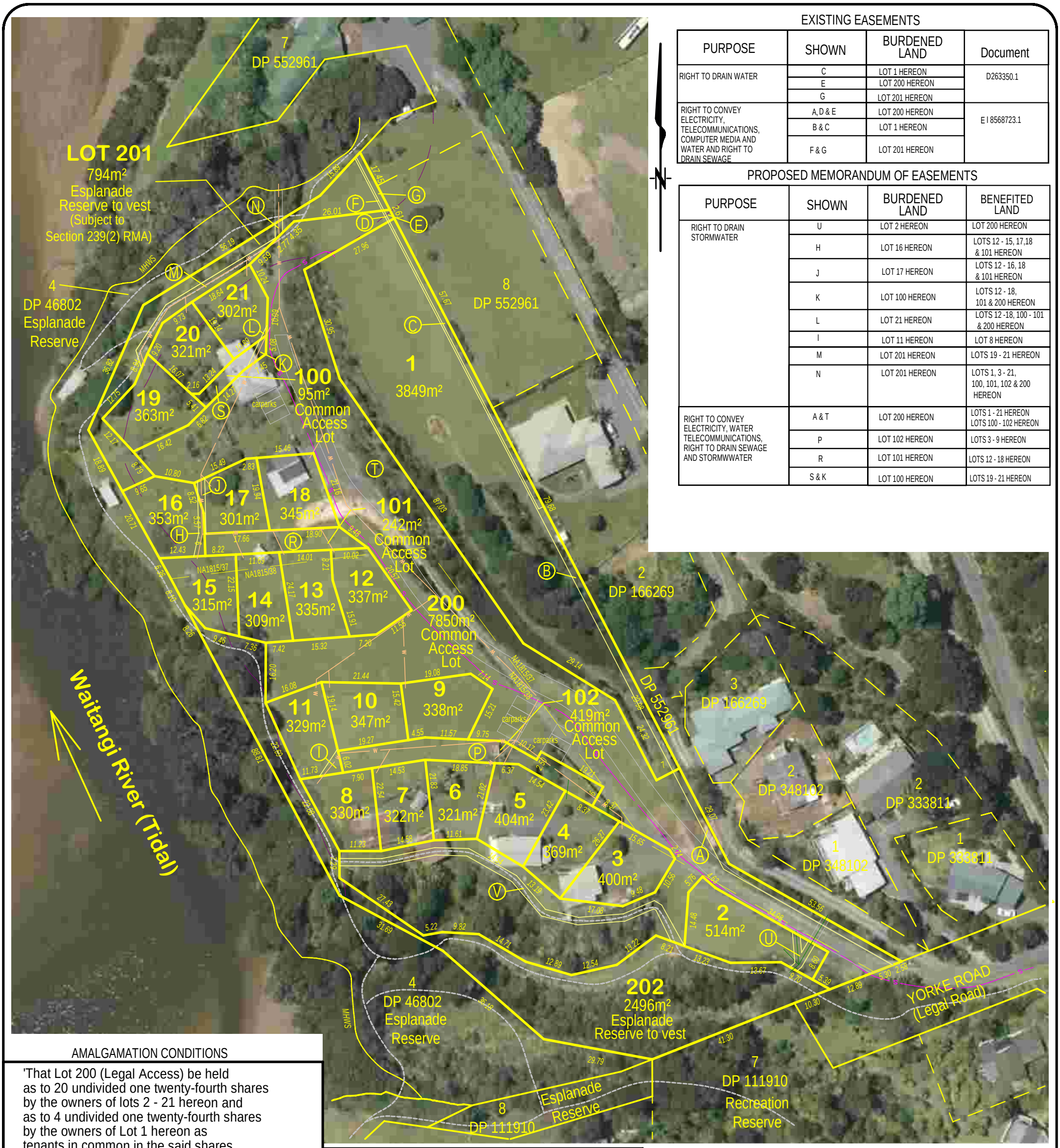
Please let us know a time and date that works best for you, and we will do our best to accommodate. We value your insights and look forward to the opportunity to work collaboratively throughout this process.

Thank you for considering this invitation. We look forward to your response.

Noho ora mai,



Nick Williamson
Planning Consultant
nick@fluid-industries.co.nz
Mobile: 027 555 5454



EXISTING EASEMENTS

PURPOSE	SHOWN	BURDENED LAND	Document
RIGHT TO DRAIN WATER	C	LOT 1 HEREON	D263350.1
	E	LOT 200 HEREON	
	G	LOT 201 HEREON	
RIGHT TO CONVEY ELECTRICITY, TELECOMMUNICATIONS, COMPUTER MEDIA AND WATER AND RIGHT TO DRAIN SEWAGE	A, D & E	LOT 200 HEREON	E I 8568723.1
	B & C	LOT 1 HEREON	
	F & G	LOT 201 HEREON	

PROPOSED MEMORANDUM OF EASEMENTS

PURPOSE	SHOWN	BURDENED LAND	BENEFITED LAND
RIGHT TO DRAIN STORMWATER	U	LOT 2 HEREON	LOT 200 HEREON
	H	LOT 16 HEREON	LOTS 12 - 15, 17,18 & 101 HEREON
	J	LOT 17 HEREON	LOTS 12 - 16, 18 & 101 HEREON
	K	LOT 100 HEREON	LOTS 12 - 18, 101 & 200 HEREON
	L	LOT 21 HEREON	LOTS 12 -18, 100 - 101 & 200 HEREON
	I	LOT 11 HEREON	LOT 8 HEREON
	M	LOT 201 HEREON	LOTS 19 - 21 HEREON
	N	LOT 201 HEREON	LOTS 1, 3 - 21, 100, 101, 102 & 200 HEREON
RIGHT TO CONVEY ELECTRICITY, WATER TELECOMMUNICATIONS, RIGHT TO DRAIN SEWAGE AND STORMWWATER	A & T	LOT 200 HEREON	LOTS 1 - 21 HEREON LOTS 100 - 102 HEREON
	P	LOT 102 HEREON	LOTS 3 - 9 HEREON
	R	LOT 101 HEREON	LOTS 12 - 18 HEREON
	S & K	LOT 100 HEREON	LOTS 19 - 21 HEREON

AMALGAMATION CONDITIONS

'That Lot 200 (Legal Access) be held as to 20 undivided one twenty-fourth shares by the owners of lots 2 - 21 hereon and as to 4 undivided one twenty-fourth shares by the owners of Lot 1 hereon as tenants in common in the said shares and that individual Records of Title be issued in accordance therewith.
See .....

'That Lot 100 (Legal Access) be held as to 3 undivided one third shares by the owners of lots 19 - 21 hereon as tenants in common in the said shares and that individual Records of Title be issued in accordance therewith.
See .....

'That Lot 101 (Legal Access) be held as to 7 undivided one seventh shares by the owners of lots 12 - 18 hereon as tenants in common in the said shares and that individual Records of Title be issued in accordance therewith.
See .....

'That Lot 102 (Legal Access) be held as to 8 undivided one eighth shares by the owners of lots 4 - 11 hereon as tenants in common in the said shares and that individual Records of Title be issued in accordance therewith.
See .....

EASEMENTS TO BE CANCELLED

'Easement Documents T635079 and T633534 are to be cancelled'

PROPOSED EASEMENTS IN GROSS

PURPOSE	SHOWN	BURDENED LAND	GRANTEE
RIGHT OF WAY (PEDESTRIAN)	V	LOT 200 HEREON	FNDC

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF WILLIAMS & KING AND MAY NOT BE REPRODUCED WITH-OUT THE WRITTEN PERMISSION OF WILLIAMS & KING

This plan and accompanying report(s) have been prepared for the purpose of obtaining a Resource Consent only and for no other purpose. Use of this plan and/or information on it for any other purpose is at the user's risk

Local Authority: Far North District Council
Total Area: 2.2696ha
Comprised in: NA1815/37 & NA1815/38
Origin of Levels:
Levels in terms of:
Contour interval is:

0 10 20 30 40 50 60 70 80m

Prepared For: Yorke Road Developments Ltd

WILLIAMS AND KING
Registered Land Surveyors, Planners & Land Development Consultants
Ph: (09) 407 6030
Email: Kerikeri@saps.co.nz
27 Hobson Ave,
PO Box 937, Kerikeri

PROPOSED SUBDIVISION OF LOTS 2 & 3 DP 46802

AREAS AND MEASUREMENTS SUBJECT TO FINAL SURVEY

	Name	Date
Survey		
Design		
Drawn	W & K	Aug 2025
Ver 1		

ORIGINAL SCALE 1:1000 SHEET SIZE A3

FILE 24653

NORTHERN ARCHAEOLOGICAL RESEARCH

ARCHAEOLOGICAL SURVEY AND ASSESSMENT OF THE PROPOSED SUBDIVISION OF THE GOSSE PROPERTY, 111 YORKE ROAD, HARURU FALLS, BAY OF ISLANDS.



Prepared for
AP and SL Gosse

Northern Archaeological Research Ltd P
O Box 32 585, Devonport, Auckland 0744

May 2020

NORTHERN ARCHAEOLOGICAL RESEARCH

ARCHAEOLOGICAL SURVEY AND ASSESSMENT OF THE PROPOSED SUBDIVISION OF THE GOSSE PROPERTY, 111 YORKE ROAD, HARURU FALLS, BAY OF ISLANDS.

By
Leigh Johnson and Elisabeth Callaghan
Northern Archaeological Research Ltd.

CONTENTS

Introduction	1
Location	1
Proposed Development	3
Statutory Obligations	3
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Archaeological and Historical Background	5
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Archaeological Significance	9
Assessment of Effects	9
Conclusion	10
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FIGURES

Figure 1. The location of the Gosse property, 111 Yorke Road, Haruru Falls, Bay of Islands (P05). 1

Figure 2. The plan of the proposed subdivision (Courtesy of DMS Surveyors-May 2020). 2

Figure 3. The recorded archaeological sites in the area of the Gosse property at Haruru (Courtesy of *Archsite*-September 2019). 5

Figure 4. The location of the shell midden exposures and the test pits in relation to the proposed subdivision. 7

TABLE

Table 1. The test pit profile results. 6

PLATES

Plate 1. The area of the shell midden located in the escarpment in Lot 7 on the Gosse property marked by warratahs (View to the west). 8

Plate 2. The small cleft in the escarpment in proposed Lot 8 (View to the west). 8

Cover: The area of proposed Lot 5 with the existing house (View to the north).

Introduction

A and S Gosse propose to subdivide their property at 111 Yorke Rd, Haruru Falls, in the Bay of Islands. Northern Archaeological Research Ltd was commissioned by the owners agent David Scott (DMS Surveyors Ltd-Paihia), to undertake an archaeological survey and assessment of the proposed subdivision. The survey and assessment was undertaken to record archaeological sites or remains affected by the proposal and advise the owners as to their obligations under the Heritage New Zealand Pouhere Taonga Act, 2014. The survey was undertaken by Leigh Johnson and Elisabeth Callaghan on the 5th of September 2019. This report outlines the results.

Location

The Gosse property (Legal Description: Lot 2 DP46802) occurs at 111 Yorke Rd, Haruru Falls, Bay of Islands. The property is located immediately adjacent to the Waitangi River Estuary below the Falls. Approximately half the property is located on a low hill which descends steeply to the river flat on the eastern side. The property is accessed via an existing driveway to a house located at the (raised) north end of the property. An existing garage and two further sheds are located near the house. An excavated area at the terminal end of the main access to the house was the location of a previous shed. Two formed accessways give access to the river flat area of the property, one to the north-east of the existing house and one which diverts north from the south end of the existing main access. An escarpment extends from the intersection of the accessway to the house and river flat, extending north to the accessway just below and north-east of the house.

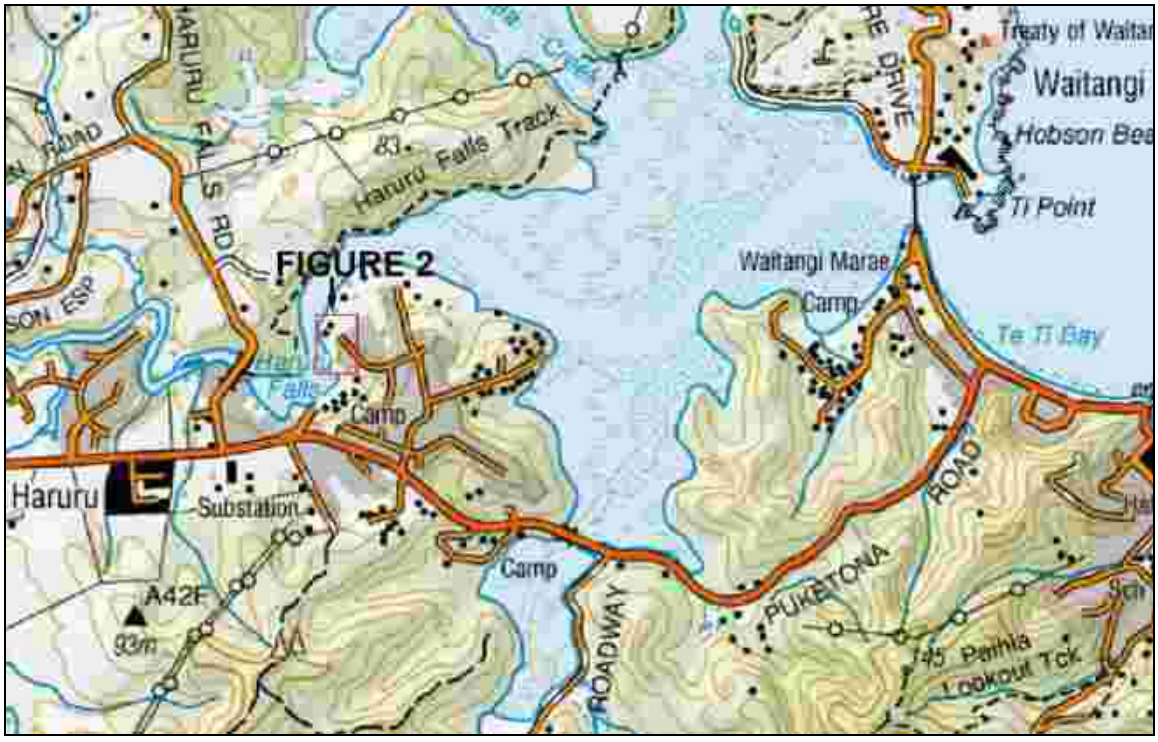


FIGURE 1. THE LOCATION OF THE GOSSE PROPERTY, 111 YORKE ROAD, HARURU FALLS, BAY OF ISLANDS (P05).

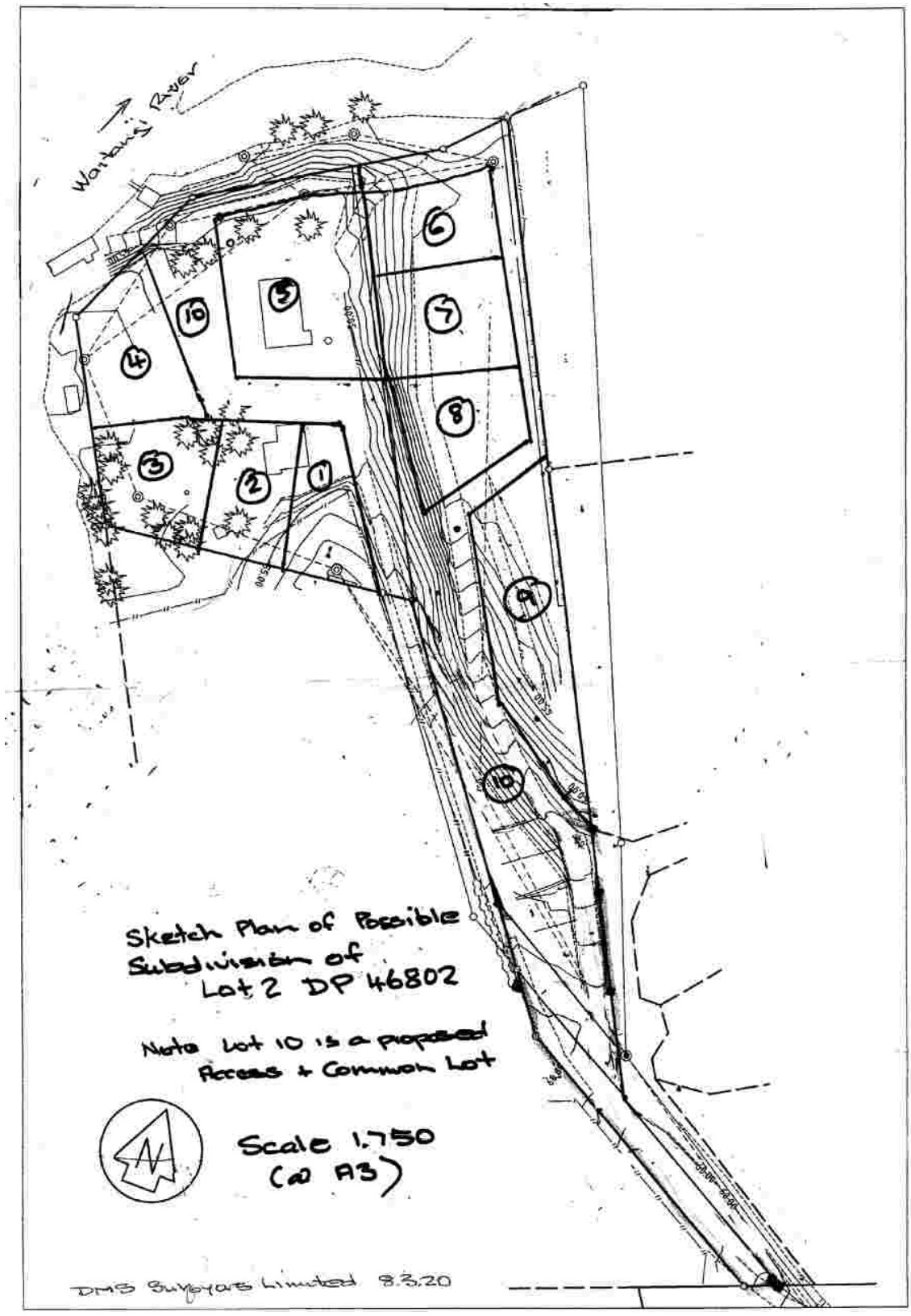


FIGURE 2. THE PLAN OF THE PROPOSED SUBDIVISION (Courtesy of DMS Surveyors-May 2020).

A stormwater drain is located along the base of the escarpment with a steel stormwater drain near the terminal end of the driveway on to the flat. The escarpment is covered in scrubby vegetation while the remainder of the property is in mown grass and remnant orchard trees (peaches), with an area of ornamental rhododendrons, camellias and roses and a vegetable garden near the house. The property ranges from 1m to some 15m above sea level. Soils of the property consist of Whananaki Sand of the Coastal Dune complex and Rangiora clay, clay loam and silty clay loam of the Rolling and Hill Land series (Sutherland *et al*. 1980).

Proposed Development

The Gosse family propose to subdivide their property at 111 Yorke Road, Haruru Falls, Bay of Islands (Legal Description: Lot 2 468023). There is an existing house in proposed Lot 5 and an existing garage in proposed Lot 2. The Gosse property covers an area of almost 1.13ha, which they propose to subdivide into nine residential Lots (Lots 1-9). There is an existing main accessway to the upper area of existing Lot 2, is proposed to be the joint access Lot (proposed Lot 10) which has a secondary branch leading downslope to the lower eastern flat area (also proposed Lot 10). A further formed access leads south from the secondary access (also on the lower eastern flat) is located near the western boundary of proposed Lot 9. The area of Lot 10 to the north of proposed Lots 5 and 6 is pedestrian only access.

No house sites have been identified for the Lots and no information regarding the provision of services has been supplied. Notwithstanding, it is understood that services to proposed Lots 1-4 would be via the existing formed accessway to the existing house in proposed Lot 5 and via proposed Lot 10 to the lower river flat area in proposed Lots 6-9. There is an existing drain located along the base of the escarpment, with a stormwater drain below and to the south of the small cleft in proposed Lot 8.

Statutory Obligations

The following is a brief outline of statutory obligations in New Zealand in respect of archaeological sites prepared by the Heritage New Zealand Pouhere Taonga (HNZ).

There are two main pieces of legislation in New Zealand that control work affecting archaeological sites. These are the *Heritage New Zealand Pouhere Taonga Act,* 2014 (HNZPTA), and the *Resource Management Act,* 1991(RMA).

HERITAGE NEW ZEALAND POUHERE TAONGA ACT 2014
ARCHAEOLOGICAL PROVISIONS

The Heritage New Zealand Pouhere Taonga (HNZPT) administers the Heritage New Zealand Pouhere Taonga Act (HNZPTA). All archaeological sites in New Zealand are protected under the HNZPTA and may only be modified with the written authority of the HNZPT.

The maximum penalty in the HNZPTA for un-authorised damage of an archaeological site is $120,000. The maximum penalty for un-authorised site destruction is $300,000. The HNZA contains a consent (commonly referred to as an "Authority") process for any work of any nature affecting archaeological sites, where an archaeological site is defined as:

Any place in New Zealand, including any building or structure (or part of a building or structure), that -

a. Was associated with human activity that occurred before 1900 or is the site of the wreck of any vessel where the wreck occurred before 1900; and
b. Provides or may provide, through investigation by archaeological methods, evidence relating to the history of New Zealand; and
c. Includes a site for which a declaration is made under section 43(1)

Any person who intends carrying out work that may damage, modify or destroy an archaeological site must first obtain an authority from the HNZPT (Part 3 Section 44). The process applies to archaeological sites on all land in New Zealand irrespective of the type of tenure.

The archaeological authority process applies to all sites that fit the Heritage New Zealand definition, regardless of whether:

- **The site is recorded in the NZ Archaeological Association (NZAA) Site Recording Scheme or registered/declared by the Heritage New Zealand Pouhere Taonga,**
- **The site only becomes known about as a result of ground disturbance and /or**
- **The activity is permitted under a district or regional plan, or resource or building consent has been granted.**

Heritage New Zealand Pouhere Taonga also maintains a Register of Historic Places, Historic Areas, Wahi Tapu and Wahi Tapu Areas. The register can include some archaeological sites (though the main database for archaeological sites is maintained independently by the NZAA). The purpose of the register is to inform members of the public about such places and to assist with their protection under the *Resource Management Act*, 1991.

THE RESOURCE MANAGEMENT ACT 1991
ARCHAEOLOGICAL PROVISIONS

The RMA requires City, District and regional; Councils to manage the use, development, and protection of natural and physical resources in a way that provided for the well-being of today's communities while safeguarding the options for future generations. The protection of historic heritage from inappropriate subdivision, use, and development is identified as a matter of national importance (section 6f).

Historic Heritage is defined as those natural and physical resources that contribute to an understanding and appreciation of New Zealand's history and cultures, derived from archaeological, architectural, cultural, historic, scientific, or technological qualities.
Historic heritage includes:

- **historic sites, structures, places, and area**
- **archaeological sites;**
- **sites of significance to Maori, including wahi tapu;**
- **surroundings associated with the natural and physical resources (RMA section 2).**

These categories are not mutually exclusive and some archaeological sites may include above ground structures or may also be places that are of significance to Maori.

Where resource consent is required for any activity, the assessment of effects is required to address cultural and historic heritage matters (RMA 4th Schedule and the district plan assessment criteria (if appropriate).

Survey Method

Background research into the archaeology and subsequent history of the affected area included the examination of late 19th and early 20th century land plans and survey reports held by Land Information NZ, Auckland. New Zealand Archaeological Association site record forms were checked for previously recorded archaeological sites, and a review of regional archaeological publications relating to the area was undertaken.

The archaeological survey was undertaken on foot to evaluate surface areas and involved the digging of a number of test pits to investigate the potential for subsurface archaeological remains. The survey included examination of all surface areas where archaeological sites could reasonably be anticipated in the areas affected and the relocation of small areas of shell midden identified during a previous visit by NNZPT staff in 2006 and again in 2019. A number of test pits were dug in the area of the proposed subdivision. The likelihood of undetected subsurface archaeological remains was also considered.

Historical and Archaeological Background



FIGURE 3. THE RECORDED ARCHAEOLOGICAL SITES IN THE AREA OF THE GOSSE PROPERTY AT HARURU (Courtesy of *Archsite* September 2019).

The history of Haruru is well known and recorded in such publications as *The Story of Paihia* (Pickmere 2000) and for further information on the general area should be referred to. The specific history of the Gosse property is not well known to the writers; however, the property appears to have been part of the Yorke family landholdings and possibly farmed for much of the late 19th and early 20th century. The property was later owned by the Gosse for many decades and it is understood the property was developed as an orchard (lemons, limes, grapefruit, feijoas and avocados). Most areas of the property were subject to earthworks including the establishment of farm tracks and outbuildings (sheds), foot-tracks, the establishment of an orchard and irrigation pipework for the orchard.

The Gosse family undertook a subdivision of the wider property in 2006. It was during that time that a complaint was made that damage was occurring to archaeological sites on the property. The HNZPT file from the time shows the Gosse property was visited by the (then) NZ Historic Places Trust Northland Area Archaeologist (M.Turner) as a result of the complaint, who outlined the damage and the location of the shell midden exposures P05/992 (Turner 2006:2-3, 8). Turner noted three areas of shell midden and a ‘small cave’. As previously stated, two of these areas (Turner’s Area 1 and Area 3) are located

on the FNDC Esplanade Reserve. Area 2 (the area of three shell midden exposures along the east face of the escarpment) has been marked two warratahs at the base of the escarpment (Note: The waratah placement does not align exactly with the Turner shell midden location diagram). Turner outlined that the midden was likely to be derived from activities or settlement on the headland, presumably directly above the middens. Turner also noted a 'small cave' located in the same hill scarp to the south-west of the shell midden. She noted that no archaeological remains were observed or located in the "cave".

With the exception of the site visit by Turner in 2006 and Edwards in 2019, no other archaeological fieldwork has been undertaken on the property.

Survey Results

As a result of the fieldwork, one previously recorded archaeological site was relocated on the Gosse property at 111 Yorke Rd. The areas of exposed shell midden are located in the areas identified by Turner in 2006, on the escarpment above the flats in the area of Lot 2 Lot 2 DP46802 and a further exposure on the foreshore Esplanade Reserve, to the north and outside of the subdivision proposal. The small cleft (not a cave) noted by Turner in the area of midden 2 is a natural geological feature and is not archaeological in origin.

P05/992. Shell Midden. E1695978 N6095810 Additional Information.

The shell middens 1 and 3 recorded by M Turner in 2006 occur in the Esplanade Reserve on the edge of the Waitangi River, are outside the property in question and are not considered further. The shell midden 2, reported by Turner in 2006, occurs in what is now proposed Lot 7. The three recorded small shell midden scatters occur at the base of a rock face and are now completely obscured by a vegetation cover of thick grass and weeds. No elements of the shell midden scatters at this location, marked when recorded by warratahs, are now visible.

To test for subsurface archaeological remains eight test pits, TP 1-8, were dug in the area of the proposed Lots and a single exposed profile was recorded in proposed Lot 1 (Figure 4).

Test Pit number	Lot	Profile
TP1	Lot 6	10cm dark brown/black topsoil over 10cm of black charcoal stained oil and burnt orange soil, over 50cm dark brown gravelly soil.
TP2	Lot 7	10cm dark brown topsoil over 50cm of grey/brown compact gravelly subsoil?
TP3	Lot 8	10cm dark brown topsoil over 50cm of grey/brown compact gravelly subsoil?
TP4	Lot 10	10cm of mid brown topsoil over 10cm mid brown loam over compact sterile yellow clay.
TP5	Lot 3	10cm of dark brown topsoil over 15cm grey/brown graduating to light grey soil over dark grey weathered basalt.
TP6	Lot 4	10cm of mid brown topsoil over orange consolidated weathered basalt.
TP7	Lot 10	10cm of dark brown topsoil over 10cm of mid-brown volcanic loam over orange weathered basalt.
TP8	Lot 2	10cm of brown topsoil over mottled yellow clay subsoil.
P1	Lot 1	10cm of dark brown topsoil over orange weathered basalt.

TABLE 1. THE TEST PIT PROFILE RESULTS.

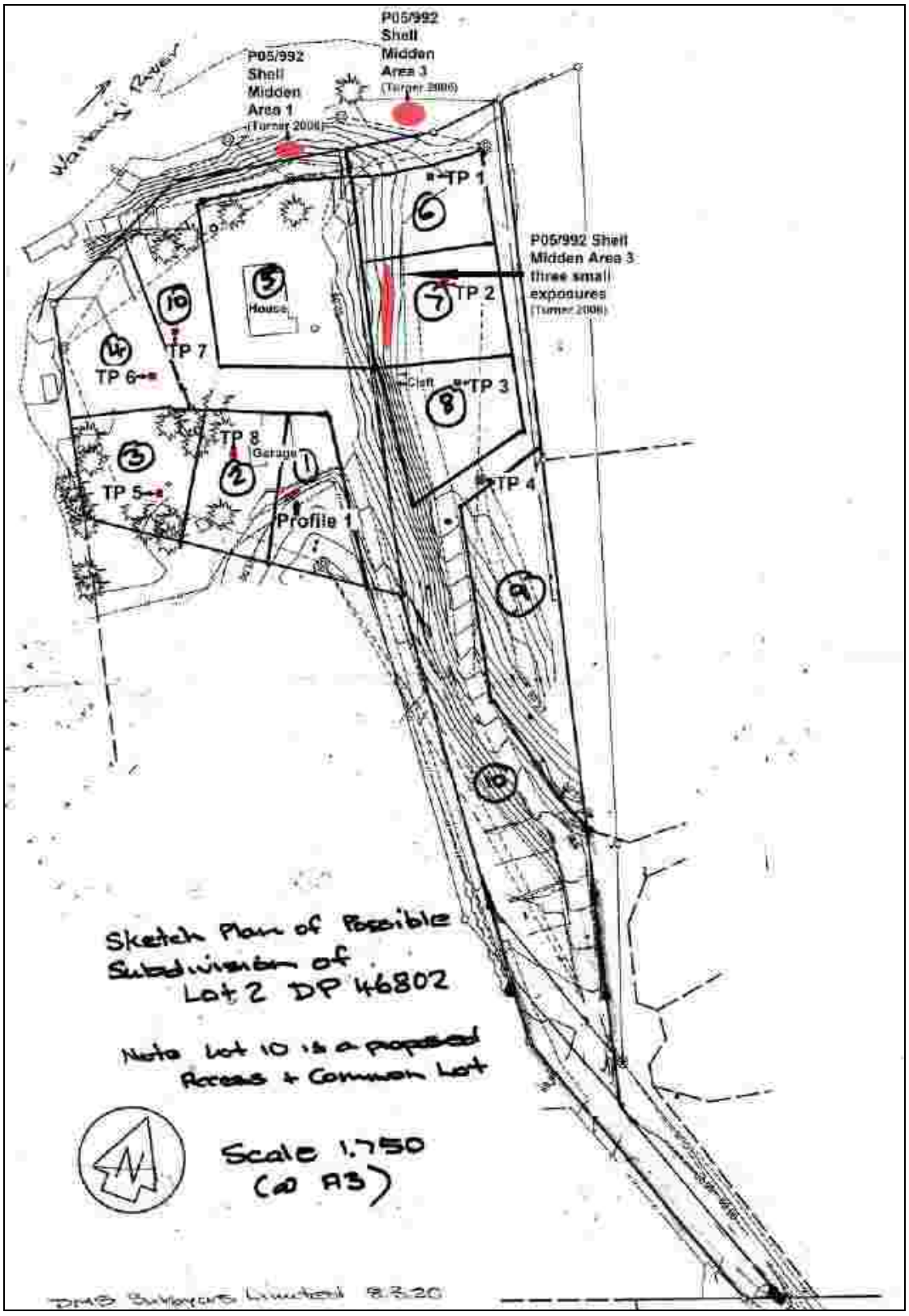


FIGURE 4. THE LOCATION OF THE SHELL MIDDEN EXPOSURES AND THE TEST PITS IN RELATION TO THE PROPOSED SUBDIVISION.



PLATE 1. THE AREA OF THE SHELL MIDDEN LOCATED IN THE ESCARPMENT IN LOT 7 ON THE GOSSE PROPERTY MARKED BY WARRATAHS (View to the west).



PLATE 2. THE SMALL CLEFT IN THE ESCARPMENT IN PROPOSED LOT 8 (View to the west).

Archaeological Significance

Archaeological significance/values relate to the potential of a place to provide evidence of the history of New Zealand. The following matters must be taken into account when assessing archaeological value: Condition of the site; the sites rarity; the sites contextual value; the sites information potential; and any amenity value (HNZPT June 2014).

With no archaeological remains identified in proposed Lots 1-6 and 8-10 the area appears to have no archaeological significance or values.

Assessment of Effects

Apart from the reported shell middens, as outlined by Turner (2006: 3) no archaeological features are visible on the surface of the headland, or the flat below. In order to test for subsurface archaeological remains in the area of the proposed subdivision four test pits were dug on the headland and four were dug on the flat below. An exposed subsoil profile, P1, was also recorded on the headland.

No archaeological remains were found in any of the test pits on the headland itself. Turner in 2006 stated that there had been "little disturbance" on the headland (Turner 2006:3), but omitted to mention that a section of the headland had been bulldozed to form a building platform for a garage, that three sheds had been built on the headland in addition to the house, subsurface sewage lines had been installed and an orchard and pines had also been planted on the headland. From the test pits dug on the headland, it appears that the shell middens are likely to have been associated with short term activities or minor settlement on the headland in the area of proposed Lot 5 with the existing 1930s house. All the shell middens occur immediately below to the north in the esplanade Reserve and to the east in the lower section of the rock face in now proposed Lot 7. From the test pits dug on the headland it appears likely that there is only a low, to no, probability for archaeological remains in the in the area of proposed Lots 1-4 and 10.

Again, no archaeological remains were evident in the test pits dug on the flat below the headland to the east. In relation to Lot 6, this was unusual as one of the shell middens occurred in close proximity to the north boundary of the Lot. However, the test pit here, TP1, revealed only what appeared to be a recent episode of landscaping and burning of vegetation following the bulldozed construction of a vehicle track from the flat up the front north east edge of the flat and small inlet up onto the top of the headland. This northern edge of proposed Lot 6 appeared to have been modified to some extent in the construction of the track and subsequent landscaping. The two shell middens immediately to the north of Lots 5 and 6 initially recorded by Turner in 2006 both occur in the Esplanade Reserve immediately outside the area of the respective lots. The shell midden exposed towards the base of the rock escarpment occurs in proposed Lot 7. The midden is now mostly obscured under low vegetation (see Plate 1) and while some shell fragments may extend into adjacent Lots 6 and 8 to the north and south respectively the exposed midden appears to occur mostly in proposed Lot 7.

No actual building sites are shown for the proposed Lots with the exception of Lot 5 which has an existing house, services and access. On the headland itself, the proposed

lots, Lots 1-4, are small with only limited area around any potential houses built on the lots. No archaeological remains were identified in these areas and the construction of houses, services and access is unlikely to affect archaeological remains. The same applies to the proposed access way, Lot 10.

On the flat, below the headland to the east, there is no obvious potential to build on the lots, Lots 6-9, other than on the flat itself as the eastern section of these lots consist of near vertical rock escarpment. The only viable location for house platforms is on the flat itself. The four test pits dug across the flat (Lots 6-8) again did not reveal any subsurface archaeological remains in these areas and construction of houses in these lots is again unlikely to affect archaeological sites. It is our recommendation, that the shell midden component of P05/992 in Lot 7 (occurring on the escarpment) should be marked out prior to any construction in the Lot, to prevent any accidental damage or unauthorised modification.

As an overview, we think that the potential to affect archaeological features in the subdivision areas are small and those that have been recorded occur either outside the property in question or in an area of Lot 7 that is unlikely to be affected by the construction of a residential dwelling or provision of services or access. The only recommendation we make in relation to this lot is that the midden is marked out to be protected from any further damage or disturbance. The only area for further potential unreported archaeological remains is proposed Lot 5. However, this lot already has an existing house, services and access and there is at this point there is no further proposal to develop the Lot. However, we make the recommendation that if at any point in the future, any further development of the lot is proposed, this will need to be subject to further archaeological survey and assessment of effects.

On the basis of the fieldwork undertaken it appears the proposed subdivision of the property is unlikely to affect archaeological remains. In the unlikely event that archaeological remains are uncovered during earthworks, all work affecting such remains should cease immediately and Northern Archaeological Research Ltd be notified so that appropriate action can be taken.

Any change to the proposal which has not been addressed as part of the current assessment in this report will need to be evaluated by NAR Ltd.

In the unlikely event that any unrecorded subsurface archaeological features are uncovered during development of the access and provision of services in the lot or in development of the lots themselves, any work affecting such remains should cease immediately and Northern Archaeological Research Ltd be notified so that appropriate action can be taken.

Conclusion

Northern Archaeological Research Ltd. were commissioned by David Scott of DMS Surveyors Ltd on behalf of the Gosse Family to survey a proposed subdivision at 111 Yorke Rd, Haruru Falls, Bay of Islands (Legal Description: Lot 2 DP46802). One

previously archaeological site P05/992 was relocated as a result of the fieldwork undertaken, but will remain unaffected by development within the subdivision. Recommendations for the management of this site, for any future development of Lot 5 and 7 in relation to the uncovering of any subsurface unrecorded archaeological sites within the subdivision area in general, have been made in accordance with the archaeological provisions of the Heritage New Zealand Pouhere Taonga Act, 2014, and standard procedures.

References

Edwards, B. 2019. Pers comm: to David Scott. E-mail Re: Possible Subdivision of Lot 1 DP456989-Hautapu Rd[sic] dated 17 April 2019.

Gosse, T. 2019. Pers Comm: To David Scott. E-Mail Re: 111 Yorke Road dated 4th September 2019.

Johnson, L and Callaghan, E. 2019. Archaeological Survey and Assessment of the proposed subdivision of the Woolston property, 108 Yorke Road, Haruru Falls, Bay of Islands. *Unpublished Report.* Auckland: Northern Archaeological Research Ltd.

Pickmere, N. 200. *The Story of Paihia.* Whangarei: Calders Design and Print.

Sutherland, C.F.; Cox, J.E.; Taylor, N.H.; Wright, A.C.S. 1980. Soil Map of Whangaroa-Kaikohe area (Sheets P04/05). North Island. Scale 1:100 000 *NZ Soil Bureau Map 183.*

Turner, M. 2006. Brief Archaeological Assessment of the Gosse Property: Yorke Road, Haruru Falls, Bay of Islands. *Unpublished Report.* Kerikeri: NZHPT

Recommendations

1. That the subdivision of Lot 2 DP 46802 will not affect any archaeological remains. Notwithstanding, archaeological site P05/992 is located on the property. The subdivision has been assessed as appropriate and can proceed without the requirement for an Authority from Heritage NZ subject to the following conditions:

    - That any development of Lot 5 (the existing house) will need to be assessed for potential effects on P05/992.

    - That prior to any development in Lot 7, the area of (part P05/992) occurring on the escarpment is marked out to avoid accidental damage or modification.

2. That any changes to the subdivision plan not included as part of the assessment in the report, are evaluated for any potential effects by NAR Ltd.

3. The survey of the property was conducted specifically to locate and record archaeological remains. The survey and report does not necessarily include the location and/or assessment of wahi-tapu or sites of cultural or spiritual significance to the local Maori community, who may be approached independently for any information or concerns they may have.

APPENDIX

NZ Archaeological Association Site Record
and Additional Information Forms

NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

ARCHSITE archaeological site recording scheme

Site Record Form

NZAA SITE NUMBER: P05/992

SITE TYPE: Midden/Oven

SITE NAME(s):

DATE RECORDED:

SITE COORDINATES (NZTM) Easting: 1695978 **Northing:** 6095810 **Source:** On Screen

IMPERIAL SITE NUMBER: **METRIC SITE NUMBER:** P05/992



Finding aids to the location of the site

At Haruru Falls, down a R.O.W on Yorke Road, Southern side of Waitangi River.

Brief description

Midden exposures.

Recorded features

Midden

Other sites associated with this site

NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

SITE RECORD HISTORY	NZAA SITE NUMBER: P05/992

Site description

Updated: 19/10/2010 - Grid coordinates on 2006 site record form are incorrect. Easting and Northing amended to E1695978 / N6095810, based on aids to location and plan attached to the original record. Note: coordinates are approximate only (N. Molloy, 19/10/2010).

Condition of the site

Statement of condition

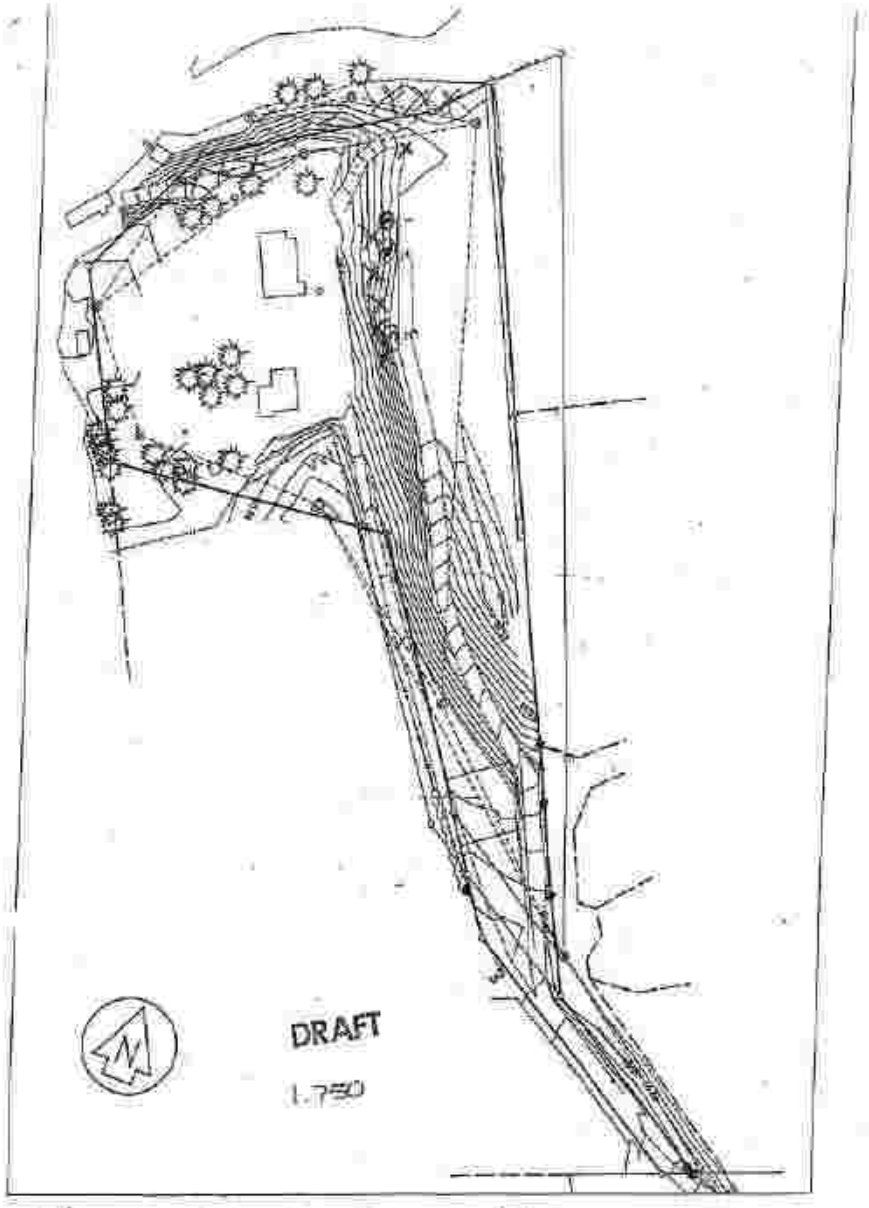
Current land use:

Threats:

NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

SITE RECORD INVENTORY	NZAA SITE NUMBER: P05/992

Supporting documentation held in ArchSite



X approximate location of Moldens.

Fig 2 pp 4502

Figure 2

NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

SITE RECORD FORM (NZMS260)

NZMS 260 map number P05

NZMS 260 map name Kaikohe

NZMS 260 map edition 1 1984

NZAA METRIC SITE NUMBER P05/992

DATE VISITED 4.7.06

SITE TYPE Middens

SITE NAME: MAORI

OTHER

Grid Reference Easting 2571750. Northing 6671710

1. **Aids to relocation of site** *(attach a sketch map)* At Haruru Falls down a R.O.W on Yorke Rd on the southern side of the Waitangi River

2. **State of site and possible future damage** Middens were found on the Gosse property as a result of accidental discovery as a consequence of land development - primarily the creation of an access road and ground levelling. Some of the middens have also been exposed in the grassed bank of a knoll for some time and are slowly eroding. These middens are to be protected behind a retaining wall. Other middens on the rivers edge are also slowly eroding. These middens have received only minor disturbance from earthworks to date. No further impact is anticipated. The midden at the rivers edge extends some distance from edge and much of this is a subsurface deposit.

Description of site *(Supply full details, history, local environment, references, sketches, etc. If extra sheets are attached, include a summary here*

See attached Report and Figures

Patches of midden are visible on both the eastern and northern flanks of a knoll above the Waitangi River. A partially sub-surface midden can be seen in section on the rivers edge below. These middens are described separately below:

1. This midden is located on the north facing side of the knoll. The exposed extent is 9m long and the scatter extends from about 1m below the 10m high bank down to the water's edge with a cut council track interrupting the flow. The midden comprises mainly pipi and cockle with a few oyster and mud snail shells. Shells are predominantly complete (pipi average 6cm wide, cockle 4cm wide). Fire cracked rock and charcoal are scattered throughout a very black greasy matrix. It is likely that this midden is more extensive but the rocky nature of the substrate and the steepness of the bank prevented further probing and inspection.
2. Three exposed patches of midden can be seen on the lower slopes only 1-1.5m above the new access road at the northern bank of the knoll. The first patch (1 on Figure 2) patch of midden is 3 x 1m in extent and comprised mainly of cockle with a few pipi and fire-cracked rock in a black matrix. There is a wide size variation with some fragmentation. The exposed shells are bleached suggesting they have been exposed for some time. Further south some 6.5m away is another midden (2 on Figure 2), a 10-15cm deep lens some 1.1m long and 1.3m above the road. Shell is bleached and very fragmented and in a brown soil mixed with small pebbles. Some 13.2m south is the third midden exposure (3 on Figure 2) and is visible as a discontinuous lens some 2.5m above the road and 3.7m long. Bleached cockle and pipi shell of various sizes and partially fragmented can be seen in a brown/black soil.

Some 3.7m south of Midden 3 and 2.4m above the road surface is a small rectangular cave some 1.4m wide and 70cm high. The depth is difficult to gauge but the size decreases inside quite quickly. No archaeological remains could be observed inside but a thorough inspection was not possible without a ladder.

On the upper slopes above these lower midden exposures, further lenses and scatters of midden can be seen spilling around the rocks. Inspection and probing of the knoll above the slopes showing midden was undertaken as it is most likely that the midden deposits resulted from their discard from here. The top of the knoll is a large wide mostly flat area with a good outlook along and across the river. It appears to be a likely place for other archaeological features such as house floors etc. No archaeological features are visible on the surface however. Apart from a 1930's house and a few sheds, the top of the knoll is relatively undisturbed.

3. Another midden can be seen just above (about 50cm) and in the low banks of the Waitangi River. This has been partially obscured by the placement of boulders along the rivers edge below the bank but small patches are visible. The probed extent of the midden above the bank extends about 10m along the rivers edge and 6.5m back from it. Most of the midden is under 15cm of top soil. Where it is exposed in the bank it is very crushed and in a black soil. Near the river bank the depth of the midden was over 50cm thinning out to 5.10cm at the far edge.

4. **Owner** Tony and Sonia Gosse **Tenant/Manager**

Address

Address
111 Yorke St
Haruru Falls
Bay of Islands

5. **Nature of information** Brief Visit
Photographs *(reference numbers and where they are held)* *Yes* - see attached report
Aerial photographs *(reference numbers and clarity of site)*

6. **Reported by** Marianne Turner
Address 43 Iron bark Rd
Kerikeri

Filekeeper
Date 28/10/06

7. **Key words** Middens, possible sites on knoll above

8. New Zealand Register of Archaeological Sites *(for office use)*
NZHPT Site Field Code

Latitude S

Longitude E

	Type of site		Present condition & future danger of destruction
	Local environment today		Security code
	Land classification		Local body

NZAA SITE RECORD ADDITIONAL INFORMATION FORM **MAP NO:** P05 **MAP NAME**: KAIKOHE **MAP EDITION**: 1st 1984 **GRID REF**: NZTM E 1695978 N 6095810	**SITE NO**: P05/992 **SITE NAME**: **SITE TYPE**: Shell midden

ADDITIONAL INFORMATION:

Site revisited on the 5th September 2019.

The areas of exposed shell midden are located in the areas identified by Turner in 2006, on the escarpment above the flats in the area of Lot 2 DP46802 and a further exposure on the foreshore Esplanade Reserve, to the north and outside of the Gosse property.

The shell middens 1 and 3 recorded by M Turner in 2006 occur in the Esplanade Reserve on the edge of the Waitangi River, are outside the Gosse property.

The shell midden 2, reported by Turner in 2006, occurs at the base of a rock face and are now completely obscured by a vegetation cover of thick grass and weeds. No elements of the shell midden scatters at this location, marked when recorded by warratahs, are now visible.

The small cleft (not a cave) noted by Turner in the area of midden 2 is a natural geological feature and is not archaeological in origin.



PLATE 1. THE AREA OF THE SHELL MIDDEN LOCATED IN THE ESCARPMENT IN LOT 7 ON THE GOSSE PROPERTY MARKED BY WARRATAHS (View to the west).

Reported by: Leigh Johnson
Northern Archaeological Research
PO Box 32-585
Devonport
Auckland

Owner/Manager: T and S Gosse

Refer to Report:
Johnson, L. and Callaghan, E. 2020. Archaeological Survey and assessment of the proposed subdivision of the Gosse property, 111 Yorke Road, Haruru Falls, Bay of Islands. *Unpublished Report.* Auckland: Northern Archaeological Research Ltd.

Geotechnical Assessment Report

111 & 115 Yorke Road, Haruru

For

East Property Investments Limited

Haigh Workman reference 22 322

November 2023



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

Revision History

Revision N°	Issued By	Description	Date
A	Wayne Thorburn	First Issue	22/12/2022
B	Josh Curreen	115 Yorke Rd property included	27/11/2023

Prepared By

Josh Curreen

Senior Geotechnical Engineer
MEngNZ

Reviewed & Approved By

Wayne Thorburn

Senior Geotechnical Engineer
CMEngNZ, CPEng, IntPE (NZ)

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Executive Summary

Haigh Workman Ltd (Haigh Workman) have been engaged by East Property Investments Limited to prepare a geotechnical assessment report for 111 and 115 Yorke Road, Haruru in support of a Subdivision and Land Use Consent application for a proposed 22 Lot subdivision. Lots 1 to 21 are located on an elevated volcanic plateau and Lot 22 is within a low-lying area mapped as a flood zone.

This report contains information required for subdivisional earthworks, as well as outlining geotechnical design issues that need to be considered for subsequent building design and construction on each residential Lot.

Lot 1 and 2 will require ground stabilisation, e.g. in-ground soldier pile walls, to provide stable building platforms. Due to the presence and extent of non-engineered fill material beneath Lots 1 and 2, deeper pile foundations may be required for any future buildings on these lots. Lots 1 and 2 are subject to site specific geotechnical investigation (machine boreholes or test pits), analyses and reporting to provide recommendations pile foundations and ground stabilisation.

The elevated lots (Lots 3 to 21) are generally suitable for standard foundations, provided they designed for Class H – highly expansive soils, in accordance with B1/AS1, and a setback distance from the escarpment is observed, refer Table 6. Based on the soil profiles, we consider the site seismic class to be 'Class C' for lots on the upper plateau and 'Class D' for the low-lying Lot 22 in accordance with NZS1170.

The lower lying area (Lot 22) is located within a mapped flood zone, with a recommended FFL of 3.4 mRL for habitable buildings (from Haigh Workman site suitability report). The existing ground level is in the order of 2.0 mRL, which will require raising the ground above the flood zone and provide minimum 500 mm of freeboard for dwellings. Filling on the site will result in consolidation settlement estimated to be in the order of 250 mm to 350 mm. The rate of settlement has been predicted based on in-situ dissipation testing and existing trial data, and is expected to take place over 30-50 years, therefore will require surcharge loading to speed up the settlement process. The settlement trial design will be subject to detailed design, to include specification for testing and preload requirements e.g., settlement plates to monitor settlement, and surcharge heights. We recommend the preload is undertaken prior to titles being released, as the potential for down-drag to occur on adjacent lots is a significant risk due to the proposed lot sizes. Lot 22 is also susceptible to minor liquefaction induced settlement from a large earthquake (ULS), therefore foundation design should consider a stiffened raft foundation system, and is subject to specific design.

Subject to design issues outlined in Sections 5, 7 and 8, each residential Lot is considered to have a building platform area suitable for domestic residential development subject to specific geotechnical assessment and foundation design. Refer Section 8 for conclusions for each building Lot.

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:

- Ground stabilisation, i.e. soldier walls, are required to provide stable building platforms on Lot 1 and Lot 2.
- Building setback distances from the top of steep slopes and clifftops should be adopted, refer Section 5.2, Table 6.

- The proposed R.O.W should be setback a minimum of 6.0 m from the steep escarpment on the eastern side.
- Foundation soils lie outside the definition of 'good ground' in NZS3604:2011 due to the presence of expansive clay soils. Soils are considered to lie in Site Class H (highly expansive) as defined in B1/AS1. All residential lots will be subject to specific engineering design and site-specific geotechnical investigations.
- Settlement – Construction on Lot 22 will require preloading to remove consolidation settlement, as outlined in Section 5.4. Preload settlement trails are subject to specific design and monitoring by a CPEng (Geotechnical). We recommend the preload is undertaken prior to titles being released, due to the risk for down-drag to occur on adjacent lots.
- Liquefaction – For the elevated lots (1 to 21), the soils encountered are considered too plastic to liquefy. A liquefaction assessment was undertaken for the low-lying area (Lot 22). Based on the results, we consider liquefaction damage across the site, e.g., surface manifestation / sand boils, is not likely. The lack of continuous layers intercepting a free-face, and the overall low seismic hazard of the Northland region, we consider any risk of liquefaction induced lateral spreading as not likely.
- Settlement across Lot 22 due to volumetric strain within the soil column could result in damage to 'standard' foundations. Specific foundation design is recommended for Lot 22 due to the potential for volumetric strain / settlement following a future large seismic event, adopting a stiffened raft foundation system, with an ultimate bearing capacity of 200 kPa.
- Rock fall – Scaling of the loose rocks and vegetation on the escarpment above Lot 22 is recommended for any building within 5.0 m of the rock face.
- All earthworks to be supervised by a CPEng (Geotechnical) familiar with the contents of this report and the ground conditions, including preload filling and monitoring.
- 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.
- For preliminary design purposes, a design CBR of no greater than 3.0 % may be assumed for the upper lots. For the low-lying area, softer zones are expected and may need to be undercut and removed during construction. A design CBR of 2.0% should be adopted for Lot 22, and we also 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) have been engaged by East Property Investments Limited to prepare a geotechnical assessment report for use in support of a Subdivision and Land Use Consent application for a proposed 22 lot residential subdivision. A scheme plan for the proposed subdivision has been provided by the Client (Common Ground Studio Limited).

This report addresses the suitability of the site for subdivision and subsequent residential development. As part of this assessment, the following work has been undertaken:

- Walkover of the site with surface mapping of the geomorphological features.
- Reference to geological maps to assess the likely underlying geology and subsoil conditions.
- Review of available existing geotechnical reports.
- Review of aerial photographs.
- Cone penetration tests (CPTs).
- Hand augered boreholes to assess near surface subsoil conditions.

This report summarises our findings and recommendations and may be used in Civil design and to support a Subdivision Consent application to Far North District Council.

The principal objectives of the investigation are to develop geotechnical models of the site so that geotechnical constraints to the proposed subdivision can be identified and to provide assurance that a stable building platform is available or can be made available within each of the proposed Lots.

2 Site Description and Proposed Development

2.1 General

The subject development area is over two properties, 111 and 115 Yorke Road, legally described as Lot 2 and Lot 3, DP 46802, with a combined parcel area of 2.27 ha. The site is located at the end of Yorke Road, accessed by a shared metalled driveway. The properties border the Waitangi River along the western and northern extents, with residential lots on the surrounding land.

There are currently residential dwellings and detached garages located on both properties which are to be removed as part of the proposed 22 Lot subdivision development. Number 111 Yorke Road is on an elevated terrace approximately 10 m to 13 m above the Waitangi River. This terrace slopes very gently down to the north before descending very steeply down into the Waitangi River. The western part of the site also has a very steep to vertical escarpment down into the river. The eastern part of number 111 Yorke Road is a low-lying alluvial plain approx. 8 – 10 m below the upper terrace. This lower area (proposed Lot 22) has a dominant escarpment feature, comprising a near vertical basalt face up to 6 m high. The feature is approximately in a

north-south direction. Vegetation and tree roots have grown into the fractures on the face of the basalt, with some blocks being dislodged (typically less than 500 mm diameter). A tidal estuarine inlet wraps around the northern boundary of the site, which stormwater from adjacent properties is being piped into. Access to the lower levels is via a formed grassed accessway, supported by timber pole retaining walls built in 2007 (Building Consent 2007-210). The lower lots are low-lying and mapped within the 50-year river flood hazard zone and 100-year coastal flood hazard zone (Northland Regional Council).

The number 115 Yorke Road property is also on an elevated terrace between 14 m and 20 m above the Waitangi River (i.e. higher than number 111 Yorke Road). The ground is near level around the existing dwellings and garages and slopes moderately (up to 12 degrees) down towards the north into a shallow overland flow path which traverses north-west through the lot. From the western boundary, the ground slopes very steeply to near vertical down to the Waitangi River. The southern side also slopes steeply down towards the south where there is a grassed track down to the river.

2.2 Proposed Development

We have been supplied with a subdivision concept plan prepared by Common Ground Studio Ltd title 'Sketch Concept Opt 4', numbered SK-11, dated 7/08/2023. Based on this information and discussions with our client, we understand that the proposed development will involve:

- Removal of all existing dwellings and garages on both lots.
- Subdivision of the properties into 22 residential lots. Lots 1 to 15 are roughly within the bounds of 115 Yorke Road, with the remaining lots on 111 Yorke Road. Lots 1 to 21 have areas varying between 300 and 539 m² and Lot 22 occupies the low-lying alluvial plain with an area of 4,721 m².
- A new Right of Way (R.O.W) from Yorke Road in the south-eastern corner of the lot, running above the basalt escarpment feature, through to Lot 21 at the northern end of the site.

The proposed scheme plan is included in Appendix A.

2.3 Previous Geotechnical Investigations

Vision Consulting* have undertaken geotechnical investigations on the lower lots, comprising CPTs and hand augered boreholes. We have reviewed the data as part of this assessment.

* Vision Consulting Engineers – Subdivision suitability Geotech report, Job No. J13242, dated 28/03/2018.

3 Geology

3.1 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",*

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 underlain by Waipapa Group greywacke of Jurassic to Permian age.

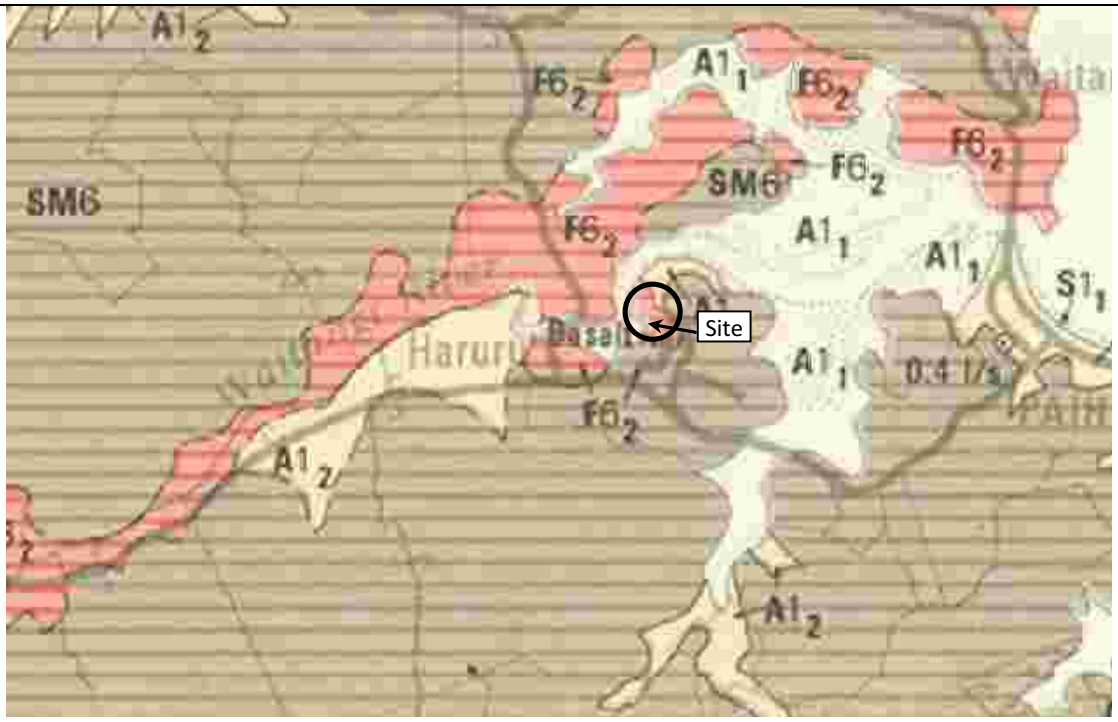
Further reference to the NZMS maps indicates basalt rock, comprising fine to medium grained crystalline basalt, dense and moderately fractured, surfaces form terraces and plateaus generally without rocky outcrops. The lower-level sites are mapped as alluvium, forming riverbed and flood plain deposits up to 10 m above stream level, in places forming a thin (1-3m) veneer over rugged surfaces of lava flows. From the results of our investigation, we agree with the NZMS map.

An exert of the geological map is shown in Figure 1. below, with geological units presented in Table 1.



IGNS 1:250,000

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



NZMS 290 Sheet P4/05

Figure 1: Published geology maps

Table 1: Geological Legend

IGNS Symbol	NZMS Symbol	Group Name	Description
TJw	SM6	Waipapa Group	Massive to thin bedded, lithic volcaniclastic metasandstone and argillite (Jurassic to Permian age).
Pvb	$F6_2$	Kerikeri Volcanic Group	Basalt lava, older flows, and remnants. Late Miocene age.
Q1a	$A1_2$	Tauranga Group	Holocene river deposits. Unconsolidated to poorly consolidated mud, sand, gravel, and peat.

3.2 Geomorphology

The proposed development is situated on a weathered volcanic bluff extending north with Waitangi River along the western side, alluvial plains to the east and a small estuary to the north. The western and eastern slopes comprise a steep soil mantle above a near vertical weathered basalt escarpment. The northern slopes are also steep with basalt exposures observed in the cut face for a track down to the river. On the southern side the slopes are steep (up to 38 degrees) and have a much deeper weathering profile. There is also a track running through to the river, near the base of the slope with basalt outcrops observed near the bottom of the track. Features are outlined in Figure 2 below.

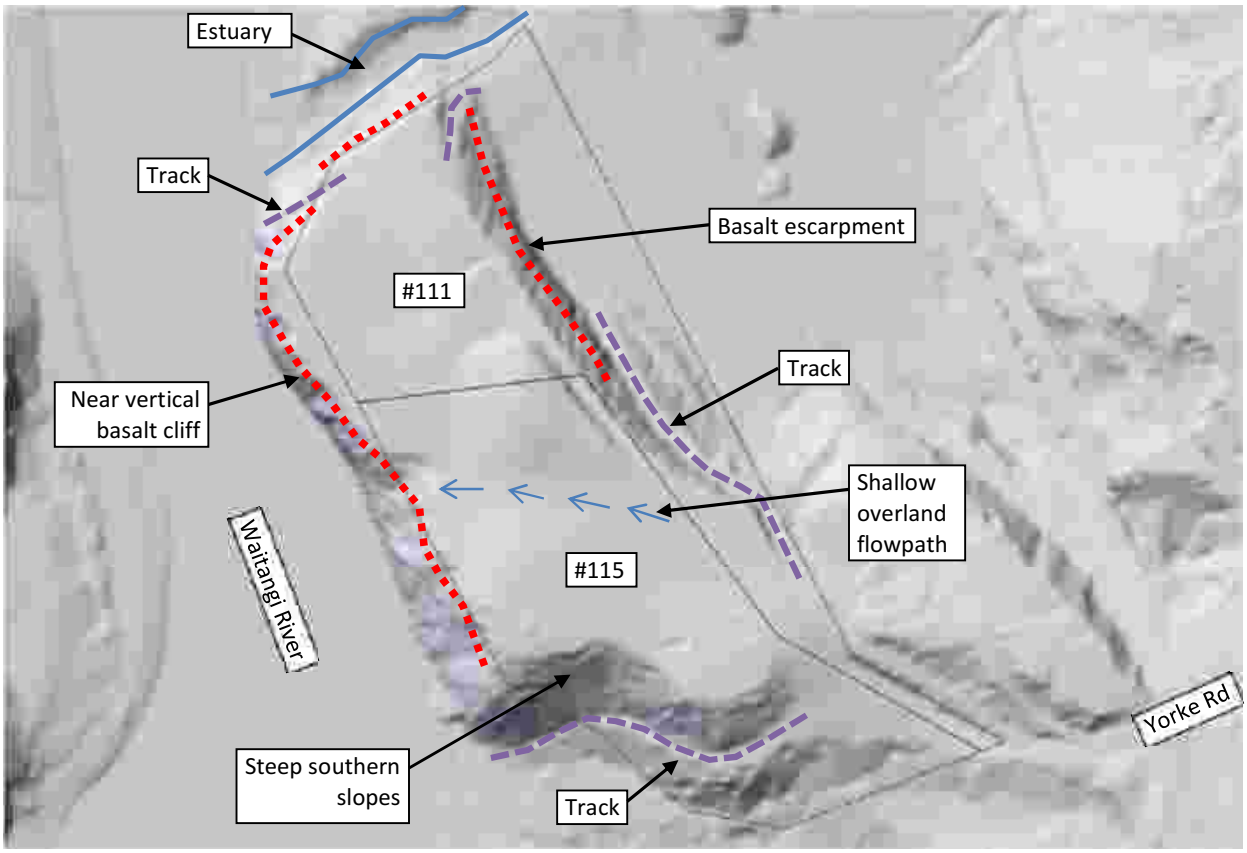


Figure 2: Geomorphology - LiDAR hillshade DEM

4 Geotechnical Investigations

4.1 Site Walkover and Desktop Review

A site walkover was undertaken on 12 August 2022 to identify the geotechnical constraints, with site features shown on the appended drawings. The site walkover identified basalt rock around the property, including the river front escarpment and the lower-level escarpment. The existing accessway into the site is narrow with a steep drop below the accessway and will require ground stabilisation if used as the main access for the development. Displaced rock blocks were observed within the near vertical basalt escarpments above proposed Lot 22. Vision Consulting reported that residual greywacke was observed in a cutting near the existing dwelling, no further testing was undertaken by Vision Consulting to confirm this observation. The focus of the Vision Consulting geotechnical report were the lower area within the flood zone, where two CPTs were undertaken and four hand augered boreholes. Settlement potential was reported as 80 mm within CPT02 and 81 mm in CPT01, however the modelling results show that CPT02 had approximately 80 cm of settlement (800 mm), i.e., we suspect a unit error was made in the reported result.

4.2 Haigh Workman Investigations

Subsoil investigations were undertaken on 28 September and 18 November 2022 within number 111 Yorke Road property. Further testing was undertaken on number 115 Yorke Road in March 2023. Overall the investigation consisted of:

- 20 hand auger boreholes with in-situ vane shear testing.
- 20 Cone penetration tests (CPTs).

The location of the boreholes and CPTs are shown on the appended drawings.

4.2.1 *Hand Auger Investigations*

Hand augers were completed to a maximum depth of 3.0 mbgl. All hand augers (BH01-BH08) completed on the elevated sections (Lots 1 - 21) encountered residual volcanic soils with shallow refusal on inferred weathered basalt in the majority of the holes. Three hand augered boreholes (BH09-BH11) were completed on the lower sections to determine if any fill was present around the CPT locations and were only advanced to 1.0 mbgl. Borehole BH14, drilled in the centre of the overland flow path on 115 Yorke Road encountered a shallow alluvial layer overlying inferred rock. BH19 and BH20, drilled in the vicinity of proposed Lots 1 and 2 encountered non-engineered fill material and were unable to penetrate through to natural ground. A hand shear vane with 19 mm blade was used to measure the Vane Shear Strength of the in-situ material. Readings were taken at the base of the auger hole every 0.5 m of depth. All shear strengths shown on the appended logs are Vane Shear Strengths in accordance with the NZGS; "Test Method for determining the Vane Shear Strength of a Cohesive Soil using a Handheld Shear Vane", 2001. Groundwater was not encountered in any of the augerholes drilled. Hand auger logs are presented in Appendix B.

4.2.2 Cone Penetration Tests

Cone penetration tests (CPTs) were undertaken by Underground Investigation Ltd. Cone penetration testing was undertaken till refusal, anchor pull-out, or excessive tilt. A maximum depth of 28.4 m was achieved at CPT18 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.

Table 2: Summary of Subsoil Conditions

Test I.D.	Termination Depth	Topsoil Depth	Non-certified fill	Tauranga Group alluvium	Kerikeri Volcanic Group	Groundwater observations
	All depths measured in metres below current ground level (mbgl)					
BH01 (Lot 16)	0.7	0.2	NE	NE	>0.7	NE
BH02 (Lot 19)	0.4	0.2	NE	NE	>0.4	NE
BH03 (Lot 21)	0.8	0.25	NE	NE	>0.8	NE
BH04 (Access)	2.1	NE	0.7	NE	>2.1	NE
BH05 (Lot 18)	2.2	0.2	NE	NE	>2.2	NE
BH06 (Lot 17)	0.3	0.1	NE	NE	>0.3	NE
BH07 (Lot 19)	0.6	0.3	NE	NE	>0.6	NE
BH08 (Lot 21)	0.4	0.2	NE	NE	>0.4	NE
BH09 (Lot 22)	1.0	0.3	NE	>1.0	NE	NE
BH10 (Lot 22)	1.0	0.3	NE	>1.0	NE	NE
BH11 (Lot 22)	1.0	0.3	0.6	>1.0	NE	NE
BH12 (Lot 15)	0.9	0.2	NE	NE	>0.9	NE
BH13 (Lot 13)	1.8	0.2	NE	NE	>1.8	NE
BH14 (G/way)	0.7	0.2	NE	0.7	>0.7	NE
BH15 (Lot 11)	3.0	0.2	NE	NE	>3.0	NE
BH16 (Lot 8)	2.0	0.1	NE	NE	>2.0	NE
BH17 (Lot 4)	3.0	0.3	NE	NE	>3.0	NE
BH18 (Lot 5)	0.7	0.2	NE	NE	>0.7	NE
BH19 (Lot 2)	0.5	NE	>0.7	NE	NE	NE
BH20 (Lot 2)	1.0	NE	>1.0	NE	NE	NE
CPT01 (Lot 16)	1.47	NT	NT	NT	>1.47	NE
CPT02 (Lot 19)	0.67	NT	NT	NT	>0.67	NE
CPT03 (Access)	2.26	NT	NT	NT	>2.26	NE
CPT04 (Access)	2.83	NT	NT	NT	>2.83	NE
CPT05 (Lot 21)	1.41	NT	NT	NT	>1.41	NE
CPT06 (G/way)	1.55	NT	NT	NT	>1.55	NE
CPT07 (Lot 18)	2.69	NT	NT	NT	>2.69	NE
CPT08 (Lot 22)	10.6	NT	NT	10.6*	NE	1.9
CPT09 (Lot 22)	10.38	NT	NT	10.38*	NE	1.0
CPT10 (Lot 22)	7.94	NT	NT	7.94*	NE	0.9
CPT11 (Lot 22)	10.3	NT	NT	10.3*	NE	0.9
CPT12 (Lot 22)	9.54	NT	NT	9.54*	NE	0.9
CPT13 (Lot 13)	2.10	NT	NT	NT	>2.10	NE
CPT14 (Lot 15)	1.03	NT	NT	NT	>1.03	NE
CPT15 (Lot 9)	2.00	NT	NT	NT	>2.00	NE
CPT16 (Lot 10)	4.82	NT	NT	NT	>4.82	NE
CPT17 (Lot 8)	4.73	NT	NT	NT	>4.73	NE
CPT18 (Lot 4)	28.35	NT	NT	NT	>28.35	NE
CPT19 (Track)	16.48	NT	NT	NT	>16.48	11.0
CPT20 (Lot 2)	25.91	NT	NT	NT	>25.91	8.1

**Inferred refusal as contact with rock. NE = Not Encountered. NT = Not Tested.*

4.2.3 *Laboratory Testing*

A soil sample was collected from the recovered soils at location BH03 between 0.4 to 0.7 mbgl, within residual Kerikeri Volcanics. The sample was sent to an IANZ accredited laboratory to undertake testing to determine the materials Atterberg limits and linear shrinkage. Results are summarised and discussed later in the report.

4.3 Topsoil

Topsoil thickness across the site was typically 200 to 300 mm thick, with minor variations recorded in the auger holes. Topsoil depth may vary across the site. The topsoil typically comprised dark brown, organic rich SILT.

4.4 Non-engineered Fill

Fill material was encountered to 0.7 m depth in BH04 (associated with formation of the existing driveway), BH11 to 0.6 m on the low-lying area, and BH19 to BH20 beneath Lots 1 to 2. Boreholes BH19 and BH20 were unable to drill through the fill, however based on CPT20 the fill depth is inferred to be in the order of 2.0 to 2.5 m.

4.5 Tauranga Group Alluvium (Holocene)

Fine-grained alluvial deposits were encountered on the lower elevation site (Lot 22). The alluvial deposits typically comprised moderately to highly plastic clayey silts and clays. Vane shear strength has been estimated using the CPT soundings, as shown in Figure 3.

The estimated undrained shear strength is variable, with soft soils typically encountered from 2.0 m below existing ground level to refusal depth. A crustal layer exists across the site, with undrained shear strength varying from soft to very stiff.

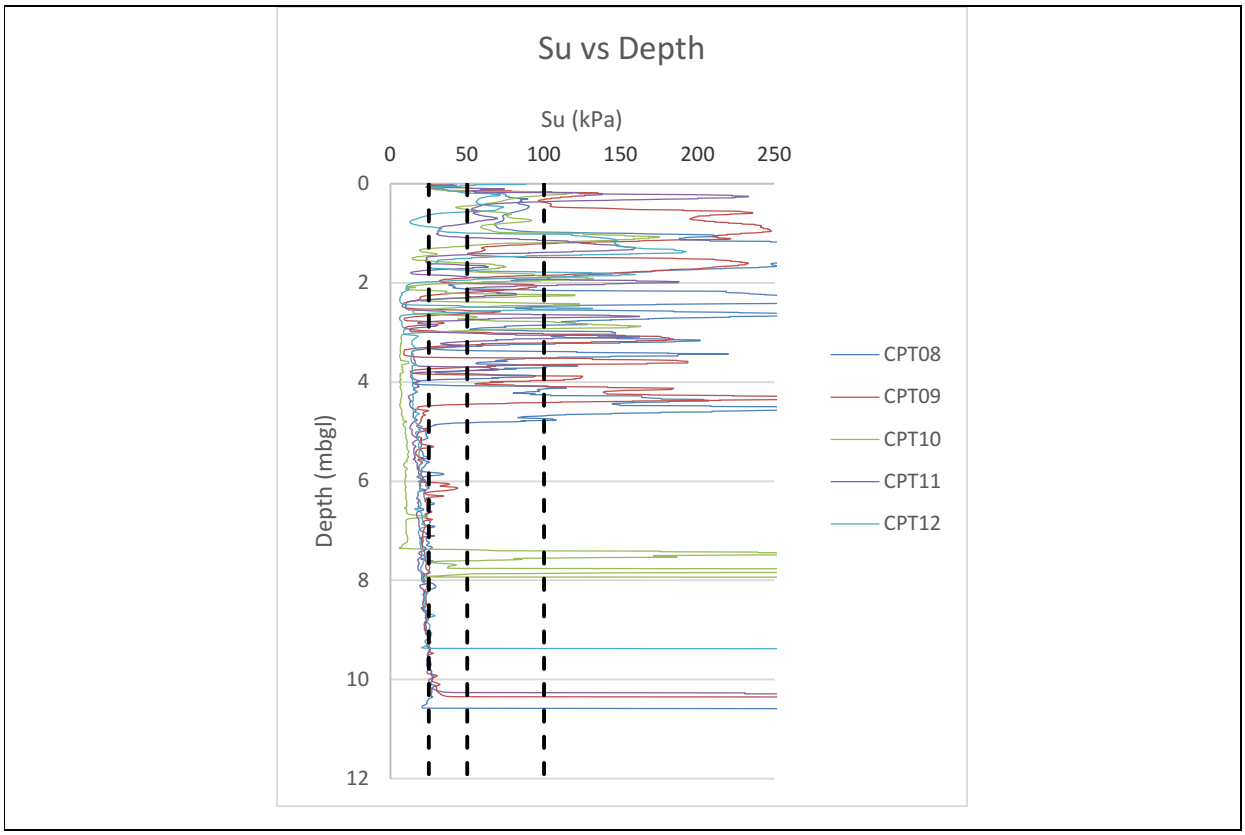


Figure 3: Estimated shear strength vs depth (Tauranga Group soils) – Lot 22

A shallow surface layer of alluvium (up to 0.7 m) was also encountered in the overland flow path area on the upper terrace. The inferred extent of this alluvium is shown on the attached site plan however, extends beneath part of Lot 9, 10, 11, 13, 14 and 15.

4.6 Kerikeri Volcanic Group

Residual Kerikeri Volcanic Group soils were encountered across the upper terrace with shallow refusal on inferred weathered basalt across the majority of the site. From the results of the investigations, the northern part of the site has a shallow soil mantle overlying highly weathered basalt. Towards the south of the site, the weathering profile becomes deeper and by CPT18, a deep soil profile of 28.4 m was encountered.

The residual soils encountered were all found to comprising fine-grained clayey and silty soils described as brown, orangish brown and yellow brown, of low to high plasticity. Vane shear strength recorded within the hand augers were all generally greater than 100 kPa indicative of very stiff soils. CPTs carried out at the southern end of the site revealed a deep profile of stiff soils (50 – 100 kPa) to between 12.2 m and 14 mbgl, with strengths increasing below that depth.

4.7 Groundwater

Groundwater was not encountered in any of the boreholes or CPTs carried out on the upper terraces. CPTs on the low-lying area (Lot 22) encountered groundwater between 0.9 and 1.9 mbgl. CPTs 19 and 20, carried out on the lower southern side of the site, encountered groundwater at greater depths (8.1 to 11 m).

Groundwater standpipes were not installed in the hand auger boreholes or CPTs and no further monitoring has been undertaken. Groundwater levels can and do fluctuate and higher groundwater levels may be encountered during winter conditions and/or following periods of prolonged heavy rainfall.

5 Geotechnical Assessment

5.1 Geotechnical Design Parameters

Geotechnical design parameters recommended in this report are based on in-situ test results, empirical relationships, local experience, and other available public domain data as described in each section, refer Table 3 below for adopted design parameters.

Table 3: Geotechnical Parameters

Geological Unit	Bulk Unit weight, γ (kN/m3)	Cohesion, c' (kPa)	Friction angle, φ' (degrees)	Undrained shear strength, Su (kPa)
Tauranga Group alluvium (Holocene)	15	0	20-24	20 – 50
Residual Kerikeri Volcanic Group **Shallow soil mantle**	18	3	30	100
Residual Kerikeri Volcanic Group **Deeper stiff soil profile***	18	15	30	50 – 100
Slightly weathered Kerikeri Volcanic Group basalt	24	50	40	>25,000
Slightly weathered Waipapa Group greywacke	20	25	35	2,500

**Given the deeper soil profile on the southern part of the site, parameters have been adjusted based on back analyses for the southern slopes.*

5.2 Site Stability

The scheme plan for the proposed subdivision has outlined the proposed Lots, with some of the elevated terrace lots located around the river frontages, and steeper southern slopes. The purpose of the stability assessment is to determine a safe building setback from the crest of the escarpments and steep slopes.

The ground conditions across elevated sections a thin veneer of residual Kerikeri Volcanic Group overlying basalt rock. The basalt rock can be observed from the Waitangi River, with typical vertical jointing at approximately

every 0.5 to 1.0 m. The rock is observed as slightly to un-weathered basalt, with estimated unconfined compressive strength (UCS) more than 50 MPa, based on previous testing of slightly weathered basalt. Behaviour of the rock mass, rather than UCS strength, will determine the behaviour of the near vertical basalt faces. The lower property (Lot 22) has the basalt rock escarpment through the western side, which shows signs of block failures due to vegetation growth. Scaling of the loose rocks and vegetation is recommended for any building within 5.0 m of the rock face.

Slope stability assessment has been undertaken using Slide 2 (ver. 9.029). The rock mass has been modelled using the generalised Hoek-Brown criteria based on a 'very blocky' geological strength index. The residual soils using effective stress parameters based on site observations and in-situ strength testing, refer Table 3.

5.2.1 *Stability Results*

The criteria adopted for assessing the global stability is outlined in Table 4 below. Factors of safety are based on the Auckland Council Code of Practice for Land Development and Subdivision[‡]. The stability model was developed with the primary purpose of assessing the proposed building platform and determine if ground stabilisation is required to achieve a safe building platform. A 10 kPa uniformly distributed load to the ground surface has been applied to represent the dwelling load.

Table 4: Design Factors of Safety (FOS)

Load Case	Design Factor of Safety
Static	≥ 1.5
Elevated groundwater	≥ 1.3
Seismic, 0.13 g (ULS)	≥ 1.0

Results of the stability modelling are summarised below in Table 5, and selected outputs are presented in Appendix C.

Table 5: Stability Analysis Results

Section I.D.	Scenario	Result	Outcome
A-A	Static	3.6	OK
	Elevated groundwater	3.0	OK
	Seismic – 0.13g	2.3	OK
B-B	Static	2.9	OK
	Elevated groundwater	2.5	OK
	Seismic – 0.13g	2.2	OK
C-C	Static	1.6	OK
	Elevated groundwater	1.3	OK, provided a 5.0m setback from slope crest is adopted.
	Seismic – 0.13g	1.3	OK

[‡] The Auckland Council Code of Practice for Land Development and Subdivision, Chapter 2: Earthworks and Geotechnical, May 2023, Version 2.0.

D-D	Static	1.0	Not OK. Accessway to be setback min. 6.0m from top of bank
	Elevated groundwater	1.0	Not OK. Accessway to be setback min. 6.0m from top of bank
	Seismic – 0.13g	<1.0	Not OK. Accessway to be setback min. 6.0m from top of bank
F-F	Static	1.9	OK
	Elevated groundwater	1.6	OK
	Seismic – 0.13g	1.5	OK
G-G	Static	1.8	OK
	Elevated groundwater	1.5	OK
	Seismic – 0.13g	1.4	OK
H-H	Static	1.0	Not OK. Provide a 11.0m setback from slope crest.
	Elevated groundwater	1.0	Not OK. Provide a 11.0m setback from slope crest.
	Seismic – 0.13g	<1.0	Not OK. Provide a 11.0m setback from slope crest.
I-I	Static	1.2	Not OK. Provide a 12.0m setback from slope crest.
	Elevated groundwater	1.0	Not OK. Provide a 12.0m setback from slope crest.
	Seismic – 0.13g	1.0	Marginally OK. Provide a 12.0m setback from slope crest.
J-J	Static	1.1	Not OK. Soldier pile wall required to stabilise platform.
	Static – post-development Soldier pile wall	1.5	Provide soldier pile wall (48 kN shear strength) acting over 2.4m depth
	Elevated groundwater – post-development Soldier pile wall	1.3	Provide soldier pile wall (48 kN shear strength) acting over 2.4m depth
	Seismic – 0.13g – post-development Soldier pile wall	1.1	Provide soldier pile wall (48 kN shear strength) acting over 2.4m depth

The results of the stability analysis indicate that the global slope stability across the elevated terraces is suitable for development based on the scheme plan provided. Development of lots 1 and 2 will require ground stabilisation (e.g. soldier pile walls) to create stable building platforms. Building setbacks from the crest of escarpments and steep slopes are also required as further discussed below.

Slope stability software does not account for streambank erosion. Erosion rates are variable and based on the hard basalt rock at the site, the erosion will be slow and is estimated at 0.1 to 0.3 m per 100 years (B. Hayward, 2017). Clifftop erosion, as published by Auckland Council, for hard rock is estimated to be in the order of 0.02 m/year, which equates to 2.0 m over 100 years within the hard rock, and further regression of the softer residual layer. Based on the erosion rates and clifftop instability, we recommend a regression line is adopted

from the crest of the escarpment, which will provide a safe building setback line, as shown in Figure 4, and summarised in Table 6. It is possible to build inside the setback zones, however further geotechnical investigations and ground stabilisation works would be required to provide safe building platforms. The building restriction line is shown on the attached site plan G02.

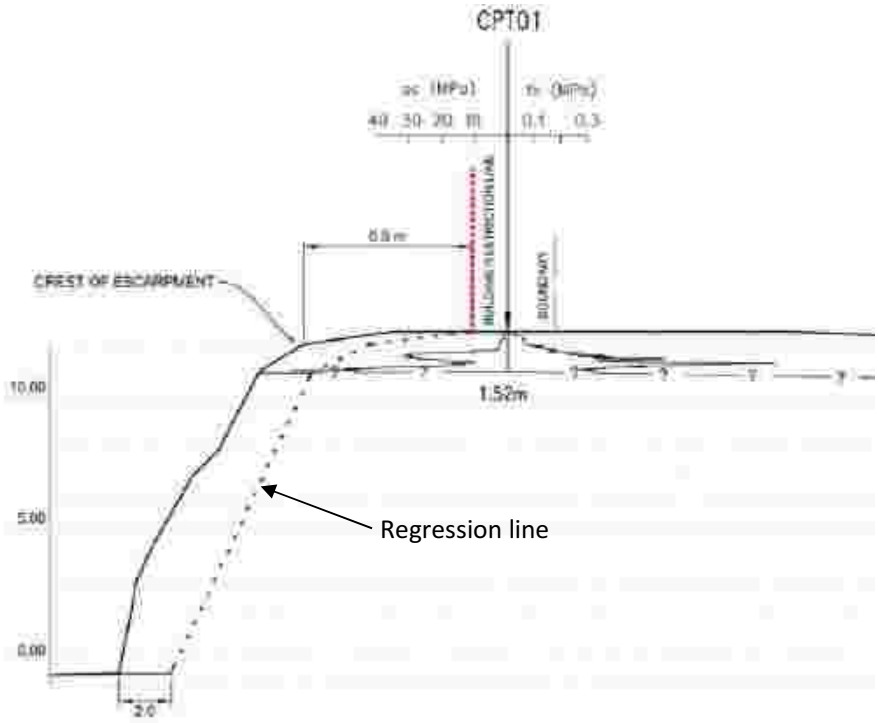


Figure 4: Typical clifftop regression line

Table 6: Minimum setback distance

Geological Section [Lot I.D]	Distance from Property boundary / Escarpment Crest
Section A-A [Lot 16]	0 m / 6.5 m
Section B-B [Lot 19]	4.0 m / 6.5m
Section C-C [Lot 20, Lot 21]	9.0m / 6.5m
Section F-F [Lot 15]	1.6m / 5.0m
Section G-G [Lot 9, west of Lot 8]	3.4m / 6.5m
Section H-H [Lot 6, Lot 7, Lot 8]	4.8m / 11.0m
Section I-I [Lot 3, Lot 4, Lot 5]	6.2m / 12.0m

5.3 Liquefaction Potential

Cyclic behaviour of saturated soils during strong earthquakes is characterised by development of excess pore water pressures and consequent reduction in effective stress. In the extreme case, the effective stress may drop to zero or nearly zero (i.e., the excess pore water pressure reaches the initial effective overburden stress, or the total pore water pressure rises to equal the total overburden stress) and the soil will liquefy. The mechanism of pore water pressure build-up is governed by a generally contractive tendency of soils under cyclic loading, e.g., loose granular soils (sand) are particularly susceptible.

Liquefaction potential has been assessed for all proposed sites. The elevated sites have been assessed as non-liquefiable based on the soil type (fine-grained soils) and absence of groundwater. The lower site (Lot 22) has been assessed using the simplified method presented within Module 3 (MBIE, Earthquake geotechnical engineering practice). The assessment has been carried out using computer software (GeoLogismiki, CLiq v. 2.2.1.7), using the following methodologies:

- Boulanger and Idriss (2014) for liquefaction triggering.
- Zhang et al (2002) for post liquefaction induced ground settlement (settlement induced due to volumetric strain).
- Peak ground acceleration from Module 1 (500-year return period), mean hazard level for Paihia/Russell – 0.13g, Mw = 5.8. Lower bound values for step change behaviour 0.19 g, Mw 6.5.

Results are summarised in Table 7, with detailed results presented in Appendix D. The liquefaction severity number has been to indicate the potential for surface manifestation, with all tests recording less than 10 (little to no expression of liquefaction, i.e., low risk site) using the mean hazard level peak ground acceleration, and CPT08 recording possible liquefaction damage under the lower bound 0.19g case.

Table 7: Summary of results (ULS, 0.13g)

Test I.D.	Liquefiable zone (mbgl)	Estimated total vertical settlement, mm	Liquefaction Severity Number (LSN)	Liquefaction Potential Index
CPT08	4.0-4.5	22	6 (little to no expression)	Low risk
CPT09	4.0-4.5	10	3 (little to no expression)	Low risk
CPT10	7.2-8.0	5	1 (little to no expression)	Low risk
CPT11	3.5-3.6	5	1.5 (little to no expression)	Low risk
CPT12	2.4-2.5	5	1 (little to no expression)	Low risk

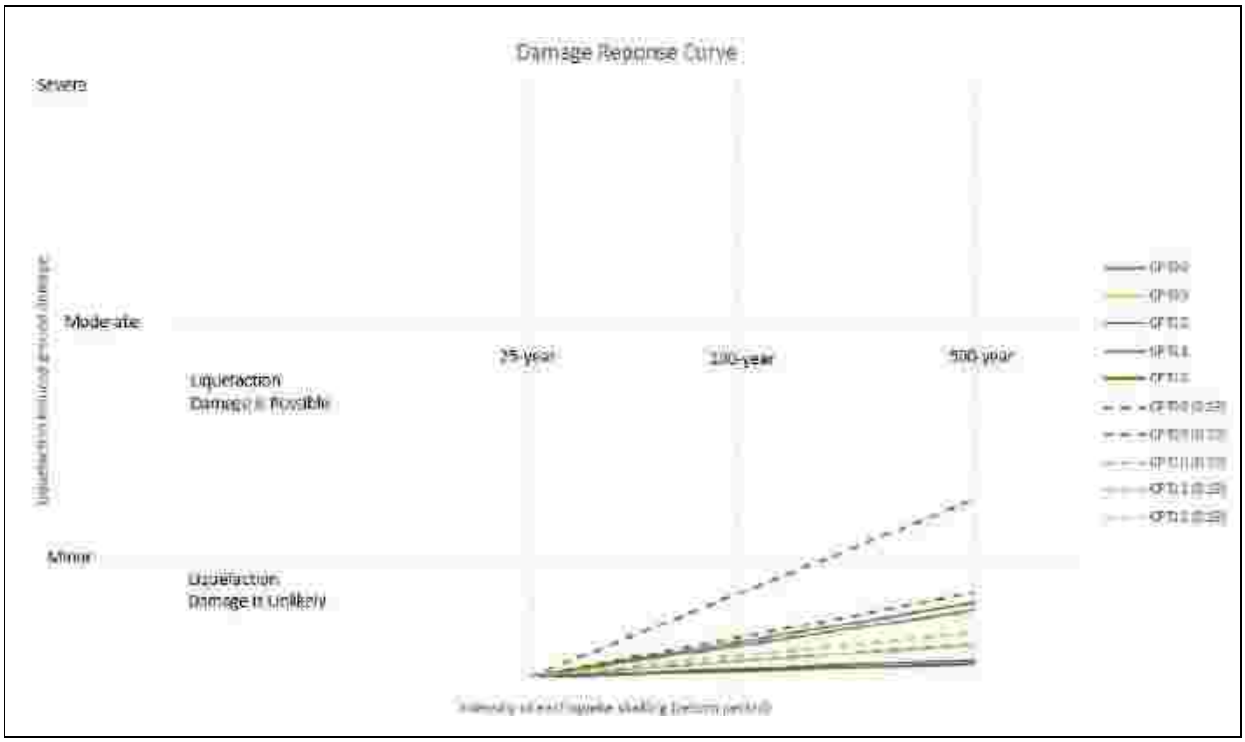


Figure 5: Damage response curve

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. Results indicate that soils susceptible to liquefaction triggering are intermittent lenses only, with no discernible continuous layers that daylight into the free face of the Waitangi River (for both cases analysed). The results indicate a fine-grained surface crustal layer in the upper 1.0 m, with intermixed bands of fine-grained and sandy mixtures in the upper 3.0 m to 5.0 m, further underlain by fine grained clayey soils to refusal. The presence of fine-grained soils across the spread of data indicates liquefaction damager is unlikely, with fine grained soils in between the potentially liquefiable layers lowers the possibility of liquefaction to occur as the less permeable layer restricts the release of excess pore pressure during a seismic event.

Based on the results, we consider liquefaction damage across the site, e.g., surface manifestation / sand boils, is not likely. The lack of continuous layers intercepting a free-face, and the overall low seismic hazard of the Northland region, we consider any risk of liquefaction induced lateral spreading as not likely and no further assessment, e.g., sliding block analysis, has been undertaken.

Based on the results, foundations should be designed with a stiffened raft, e.g., Technical Category 2 (TC2 - MBIE). Although liquefaction damage across the site is considered not likely, settlement across the site due to volumetric strain within the soil column could result in damage to 'standard' foundations.

5.4 Consolidation Settlement

Residential dwellings should be designed to tolerate angular distortion of up to 1:240 (approximately 25 mm over a 6.0 m length) as required by the New Zealand Building Code (B1/VM4).

It is our understanding that minimal earthworks will be required for Lots 1 to 21. Haigh Workman Ltd have not been provided detailed earthworks plans for the residential lots, provided the fill thickness does not exceed 600 mm thick, and the fill is placed to an engineered standard (NZS4431:2022), we do not consider consolidation settlement to cause any undue risk to the building platforms. If fill exceeds 600 mm thick, then a detailed geotechnical investigation and settlement analysis is required to estimate the differential settlement and associated angular distortion across the proposed buildings.

The low-lying area (Lot 22) is located on flood susceptible land. Based on the site suitability report prepared by Haigh Workman (prepared concurrently with this report), the flood hazard level has been given as 2.8 mRL (OTP), with a recommended floor level of 3.4 mRL (OTP) for habitable structures. The existing ground level is between 2.0 mRL along the eastern boundary, to 3.0 mRL on the western boundary of the lots, which will require all building platforms to be raised approximately 1.0 m from existing ground level. A preliminary assessment of the settlement potential has been undertaken using the investigation data, and from existing pre-load data on adjacent sites, with an assumed total applied pressure of 30 kPa to account for the filling across site and future building surcharge. Preliminary settlement results are presented in Table 8.

Table 8: Preliminary settlement estimates (30 kPa surcharge)

Test I.D	CPT settlement estimate (mm)	Settlement estimate based on adjacent trial data (mm)*
CPT 08	120	280
CPT 09	120	280
CPT 10	250	210
CPT 11	150	330
CPT 12	170	320

**Based on coefficient of volume compressibility, mv = 1.6 m^2/MN for soft layer for adjacent settlement trial.*

The rate of settlement has been predicted based on in-situ dissipation testing and existing trial data. Based on the available data, settlement is expected to take place over 30-50 years and will require surcharge loading to speed up the settlement process. The settlement trial design will be subject to detailed design, to include specification for testing and preload requirements e.g., settlement plates to monitor settlement, and surcharge requirement. A pre-load settlement design is outside the scope of this report however, based on adjacent settlement trials carried out, the time to complete the settlement trial is expected to be 12 to 24 months.

The maximum load that can be applied has been selected by determining the ultimate bearing capacity of the normally consolidated soils, using an undrained shear strength (S_u) of 20 kPa, giving an ultimate bearing capacity of approximately 100 kPa, a geotechnical strength reduction factor of 0.5 has been applied to provide a safety factor against bearing failure. Therefore, the maximum applied load is limited to 50 kPa, i.e. 2.5 m (including preload). It is recommended that filling is carried out in a staged manner, with up to 1.5 m placed initially for 6 months, then additional fill placed (to be determined in pre-load design report). This will allow pore pressures to dissipate, and provide settlement data to adjust/refine the models.

Based on the results of the flood hazard assessment and requirement to raise the ground level to be outside the flood hazard, consolidation settlement of the subsoils will occur. Provided the soils are preloaded and settlement can be removed, subject to monitoring and approval a CPEng (Geotechnical), then the sites will be suitable for residential development. We recommend the preload is undertaken prior to titles being released, as the potential for down-drag to occur on adjacent lots is a significant risk due to the proposed lot sizes.

6 Foundation Recommendations

6.1 Lots 1 and 2 (Southern Corner)

Due to the presence of non-engineered fill material beneath Lots 1 and 2, deeper piled foundations will be required for any future buildings. Fill that has been placed without engineering supervision is likely to undergo ongoing settlement under additional loading and is not considered suitable for supporting future building loads.

Hand auger boreholes in this area were unable to penetrate through the fill however, from the CPT trace and surrounding topography the fill depth on the southern edge of these lots is likely to be in the order of 2.0 to 2.5 m. Additional testing for the future dwellings will require machine boreholes or test pits to establish the fill depths and provide recommendations for piled foundations.

Furthermore, ground stabilisation, i.e. soldier walls, are required to provide stable building platforms on Lot 1 and Lot 2.

6.2 Lots 3 to 21 (Upper Elevated Terraces)

The soils tested across the elevated part of the site indicated stiff to very stiff silts and clays. An ultimate bearing capacity of 300 kPa can be adopted for foundation design, with a geotechnical strength reduction factor of 0.5 for limit state design.

Foundation conditions fall outside the definition of 'good ground' as contained in NZS3604:2011 due to the presence of expansive soils, defined as soils with liquid limit more than 50% and linear shrinkage of more than 15%. Based on the laboratory testing results, Figure 6 and Table 9, the soils are categorised as Class H, highly expansive, with soils plotting above the A-line, which indicates poor engineering behaviour (Wesley, 2010).

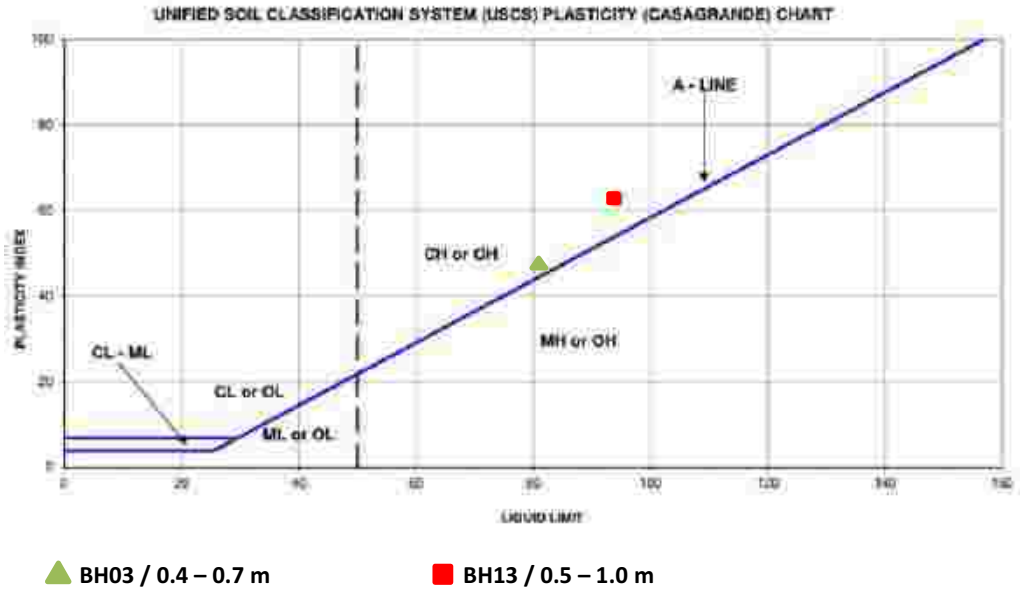


Figure 6: Casagrande Chart

Table 9: Laboratory test results (Atterberg limits)

Borehole Number	Depth (m)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	Linear Shrinkage
BH03	0.4 – 0.7	39.2	81	34	47	20
BH13	0.5 – 1.0	35.7	94	31	63	20

A shallow surface layer of alluvium (up to 0.7 m) was also encountered in the overland flow path area on the upper terrace. The extent of this alluvium is inferred to extend beneath part of Lot 9, 10, 11, 13, 14 and 15. Where buildings or other infrastructure are situated over this alluvial, undercutting and backfilling with engineered fill would be required.

6.3 Lower level (Lot 22)

The lower level lots are located within a mapped flood hazard zone and the land will need to be raised to remove the hazard. Due to the soft soils, consolidation will occur and will be subject to specific design and monitoring prior to the sites being suitable for development. Based on the existing topography, the land will need to be raised to at least the flood hazard level (3.0mRL), and to speed up the settlement a surcharge load should be applied, i.e., additional fill added to reduce the time for consolidation to occur. Based on preload trials on adjacent sites, we anticipate the settlement preload trial to take 12 to 24 months and require a 1.0 m surcharge above the FFL of 3.5 mRL (i.e., total fill height to be 4.5 mRL, approximately 1.5 m to 2.5 m above existing ground level). The pre-load is subject to specific design which is outside the scope of this report.

We recommend foundation specific foundation design for Lot 22 due to the potential for volumetric strain / settlement following a future large seismic event, adopting a stiffened raft foundation system, with an ultimate bearing capacity of 200 kPa.

7 Development Recommendations

7.1 Site Formation Works

Site formation may comprise cuts and fills using material won from the site, clear of any unsuitable material such as non-engineered fill, topsoil, soft or organic soils or vegetation. Unsuitable materials should be stripped from any areas of earthworks and stockpiled well clear of earthwork operations or removed from the site. It is our understanding that proposed sub-divisional earthworks are minimal however for all earthworks associated with development of the subdivision the following recommendations are provided:

All earthworks should be carried out to the requirements of NZS 4404:2010 'Land Development and Subdivision Infrastructure' and NZS 4431:2022, 'Engineered fill construction for lightweight structures. It is recommended that any unsuitable material identified during excavation be removed and replaced with granular hardfill or engineered cohesive fill.

If site won material is proposed for filling across the site, laboratory testing of the material is required prior to filling to ensure the material is appropriate to be used as fill. Following confirmation of the material, and if deemed suitable for re-use as fill, monitoring during placement is required to ensure fill material has been placed and compacted to an engineered standard and can be signed off by as certified fill as part of the geotechnical and earthworks completion report. Laboratory testing of the material to be used as fill will be required to determine the optimum moisture content. The laboratory testing required will be as follows:

- 1x standard compaction curve (to determine the optimum maximum dry density and moisture content).
- 2x Atterberg limit tests (to confirm the liquid and plastic limits of the soil, i.e., plastic limit is optimum).

Compaction control of the cohesive fill consists of maximum allowable air voids and minimum allowable shear strengths and outlined in NZS4431:2022. The fill specification outlined below is recommended for subdivisional earthworks, to be read in collaboration with NZS4431:2022:

- Vane shear strength testing comprising an average of ten tests of 140kPa with no single vane shear test of less than 120kPa.
- Testing shall also include air void testing with a minimum of ten consecutive tests with an average of 10% air voids with no single test greater than 12%, in accordance with NZS4402:1986.

7.2 Erosion and Sediment Control

Prior to commencing earthworks, a sediment control system needs to be constructed to ensure the Territorial and Regional Authority requirements are met. Typical details can be found in the GD05 – "Erosion and Sediment Control for Land Disturbing Activities". Erosion and sediment control should be undertaken as early as possible before soil particles become dislodged and mobilised. The use of contour drains, mulching, and earth bunds to control erosion during the construction phase is recommended, as is maintaining vegetation cover where possible to reduce erosion potential.

7.3 Stormwater Control

Concentrated stormwater flows from all impermeable areas must be collected, carried in sealed pipes, and discharged in a manner that will not affect the stability of the ground. Concentrated stormwater flows must not be allowed to saturate the ground to adversely affect foundation conditions.

Design of devices to collect, transport and discharge concentrated flows should be engineered. Devices associated with subdivision development (paved access etc.) should be designed as part of the Subdivision Consent works however design for future house construction can only be carried out as part of Building Consent activities as the design is pertinent to the house and site coverage proposal.

7.4 Pavement Design

No specific testing was undertaken for pavement design. For preliminary design purposes, a design CBR of no greater than 3.0 % may be assumed for the upper lots. For the low-lying area, softer zones are expected and may need to be undercut and removed during construction. A design CBR of 2.0% should be adopted for Lot 22, and we also recommend a geotextile and geogrid is installed between subgrade and pavement to minimise the ingress of fines into the pavement from dynamic loading.

7.5 Service Connections

All external service connections (power, water supply, stormwater, sewer, telecommunications, and others) should be detailed for seasonal movement such as the use of rubber ring joints for stormwater or wastewater, or looped power and water connections.

Building foundations within a 45-degree zone of influence from the invert level of any service pipe shall adopt the standard engineering details within the Far North District Council plan and NZS4404:2010.

7.6 Retaining Walls

Stability modelling along cross section J-J indicates that ground improvement is required create stable building platforms on Lot 1 and Lot 2. We recommend a soldier pile wall is constructed along the southern side of proposed Lot 1 and Lot 2 (refer to G02 and G12 in Appendix A). These in-ground retaining walls require further machine testing and will be subject to specific design.

Existing timber pole walls were built in 2007 (BC 2007-210) to provide access to the lower lots. No other retaining walls are shown on the plans provided to Haigh Workman Ltd. All retaining walls should be designed by a Chartered Professional Engineer familiar with the contents of this report. Loading from adjacent structures, traffic, slope surcharges above and/or below retaining wall cuts and fills shall be considered during wall design.

7.7 Unexpected Ground Conditions

Areas of unsuitable ground conditions may be encountered across the site. If unsuitable material is encountered the Engineer responsible for providing certification of the earthworks and Geotechnical Completion Report should be contacted immediately to provide advice.

7.8 Safety in Design

The recommendations made in this report have been made with regards to Safety in Design, which should be considered during the design phase. The following points were raised during planning for safety in design:

- Construction monitoring needs to be considered.
- Trench construction for services should be benched to ensure the vertical height does not exceed 1.0 m without shoring / trench shields. Groundwater is expected to be in the upper 1.0 m in the lower elevation lots. Excavations below groundwater should be avoided.
- Temporary battering of excavations.

7.9 Construction Monitoring

A Chartered Professional Engineer familiar with the findings of this report should be engaged to carry out construction monitoring during subdivision development and earthworks to confirm soil conditions are consistent with those adopted within this report.

The recommendations given in this report are based on limited site data from discrete locations. Variations in ground conditions could exist across the site. It is in the interests of all parties that a Chartered Professional Engineer inspect excavations and foundation conditions exposed during construction, so that ground conditions can be compared with those assumed in formulating this report. In any event, we should be notified of any variations in ground conditions from those described or assumed to exist.

A geotechnical completion report should be prepared at the completion of subdivision works, with as-builts provided by the Contractor of all earthworks and drainage works undertaken.

8 Conclusion

Geotechnical investigations indicate that the proposed subdivision is suitable, and the subsoil properties are appropriate for residential development, provided the recommendations in this report are followed and specific design of settlement trials and retaining walls is undertaken. The extent of the geotechnical investigations is outlined within this report.

The development will need to be undertaken in accordance with current best engineering practice and the following guidelines are applicable to all Lots:

- Due to the presence of non-engineered fill material beneath Lots 1 and 2, deeper piled foundations will be required for any future buildings on these lots. Ground stabilisation, i.e. soldier walls, are also required to provide stable building platforms on Lot 1 and Lot 2.
- The natural ground within the elevated residential lots (Lots 3 to 21) is considered generally suitable for residential development of light-framed, flexible clad residential buildings not requiring specific design in terms of NZS3604:2011, subject to the following conditions:
    - Building setback distances from the top of steep slopes and clifftops should be adopted, refer Section 5.2, Table 6.
    - Foundation design should limit the geotechnical ultimate bearing capacity to 300 kPa, with a geotechnical strength reduction factor of 0.5 for limit state design.
    - Foundation soils lie outside the definition of ‘good ground’ in NZS3604:2011 due to the presence of expansive clay soils. Soils are considered to lie in Site Class H (highly expansive) as defined in B1/AS1. All residential lots will be subject to specific engineering design and site-specific geotechnical investigations. Specific design may be undertaken by first principles or by reference to AS2870:2011, Section 4 and related documents (provided the updated return period and characteristic surface movement of B1/AS1 is adopted).

- Slab on grade construction is expected to be relatively straightforward across the subdivision, but problems can occur with slab construction on shrink/swell sensitive soils. In soils which become desiccated in summer, subsequent capillary moisture rise may cause dry soils to wet up and swell, causing slab uplift and building distress. Conversely, construction during winter may result in subgrade soils with high moisture contents drying out through summer, with subsequent soil shrinkage and possible building deformation. The structural engineer should take likely construction timeframes into account and confirm that their design, or construction methodologies, will accommodate the soil shrinkage or swelling that may occur.

- The lower elevation lots (Lot 22) are subject to a flood hazard and will require the land to be raised to remove the hazard.
    - All lots will require preloading to remove consolidation settlement, as outlined in Section 5.4. Preload settlement trails are subject to specific design and monitoring by a CPEng (Geotechnical). We recommend the preload is undertaken prior to titles being released, as the potential for down-drag to occur on adjacent lots is a significant risk due to the proposed lot sizes.
    - Foundation design shall consider the effects of liquefaction, e.g., a stiffened raft foundation with an ultimate bearing capacity of 200 kPa. This recommendation can be altered subject to detailed site-specific geotechnical investigations.
    - Scaling of the loose rocks and vegetation is recommended for any building within 5.0 m of the rock face.
- The proposed R.O.W should be setback a minimum of 6.0 m from the steep escarpment on the eastern side.
- The site is located adjacent to Waitangi River and has had flood hazard mapping undertaken by Northland Regional Council. A flood hazard assessment has been completed by Haigh Workman, which recommends a FFL of 3.4 mRL for habitable buildings.
- No earthworks involving fills or unsupported should take place on any Lot unless endorsed by a suitable design undertaken by a Chartered Professional Engineer with suitable geotechnical experience familiar with the contents of this report and responsible for design of structural elements of the building.
- Any earthworks conducted at the site should be undertaken and tested in accordance with NZS4431:2022. Any unsuitable material identified during excavation shall be removed and replaced with granular hardfill in accordance with NZS4431:2022. Granular hardfill is recommended to be GAP40 or GAP65, compacted to 95% MDD.
- Where building envelopes lie adjacent to or across service lines, all foundations should extend and be founded below the 45-degree zone of influence line extending from pipe inverts. This requirement is to avoid excessive pipe surcharges, and to allow for future maintenance of the system without detrimentally affecting adjacent structures.

- Our assessment is based on interpolation between borehole positions and site observations. Local variations in ground conditions may occur. Unfavourable ground conditions may be encountered during earthworks. It is important that we are contacted in this eventuality or if any variation in subsoil conditions from this described in this report are found. Design assistance is available as required to accommodate any unforeseen ground conditions present.

Provided the recommendations provided in this report are followed, the subject is capable of being developed as proposed. All works should be carried under the guidance of a Chartered Professional Engineer familiar with the contents of this report. A geotechnical completion report is recommended at the completion of the earthworks to confirm the findings in this report and document the work undertaken, e.g., earthworks compaction certification.

This report is not intended to be used for foundation design, other than provide general framework for building platform suitability. Specific geotechnical investigations are recommended to confirm the subsoil conditions, confirm the soil expansivity, and provide site specific geotechnical recommendations for foundation design.

Summary of geotechnical requirements			
Lot No.	**Comments on Nominated Building Platform**	**Shallow Bearing Capacity / Expansive soil class**	**Anticipated scope of additional works following specific investigation and design. [Comments are given as a guide only – specific engineering to be undertaken by a Chartered Professional Engineer – Geotechnical]**
Lot 1 – Lot 2	Ground stabilisation, e.g. soldier pile walls are required to create stable building platforms	Pile foundations required due to fill. Shallow foundations not viable (unless fill is completely removed). Seismic 'Class C'	Site specific geotechnical investigation (machine boreholes or test pits), analyses and reporting to provide recommendations pile foundations and ground stabilisation. Specific design of soldier pile walls to create stable building platform. Design to be undertaken by a CPEng Geotechnical engineer.
Lot 3 – Lot 9	Elevated sections along Steep southern slopes. Building setback distances required, refer Section 5.2, Table 6.	300 kPa/ Class H. Seismic 'Class C'	Site specific geotechnical investigation and reporting to confirm the soil conditions assumed within this report. Building setback distances from steep slopes to be followed, or ground stabilisation to provide a safe building platform.
Lot 10 – Lot 14	Gentle to moderate slopes. Earthworks likely required to create building platforms. Alluvial soils in OLFP require undercutting and replacement with engineered fill	300 kPa/ Class H. Seismic 'Class C'	Site specific geotechnical investigation and reporting to confirm the soil conditions assumed within this report.

Summary of geotechnical requirements			
Lot 15 – Lot 16	Elevated sections along Waitangi River. Building setback distances required, refer Section 5.2, Table 6.	300 kPa/ Class H. Seismic 'Class C'	Site specific geotechnical investigation and reporting to confirm the soil conditions assumed within this report. Building setback distances from Waitangi River escarpment edge to be followed, or ground stabilisation to provide a safe building platform.
Lot 17 – Lot 18	Flat site, minimal earthworks required.	300 kPa/ Class H. Seismic 'Class C'	Site specific geotechnical investigation and reporting to confirm the soil conditions assumed within this report.
Lot 19 – Lot 21	Elevated sections along Waitangi River. Building setback distances required, refer Section 5.2, Table 6.	300 kPa/ Class H. Seismic 'Class C'	Site specific geotechnical investigation and reporting to confirm the soil conditions assumed within this report. Building setback distances from Waitangi River escarpment edge to be followed, or ground stabilisation to provide a safe building platform.
Lot 22	Lower elevation sites, subject to flood hazard, soft soils, and low liquefaction potential.	200 kPa/ Class H. Seismic 'Class D'	Settlement preload design and monitoring by CPEng. Geotechnical completion report required to provide foundation recommendations which can be adopted for building consent application. We recommend the preload is undertaken prior to titles being released, as the potential for down-drag to occur on adjacent lots is a significant risk due to the proposed lot sizes. Foundation design to be in accordance with TC2 – stiffened raft foundation system, e.g., reinforced granular raft below waffle raft concrete slab.
Site Access (R.O.W)	Min. setback 6.0m from escarpment	N/A	Site specific geotechnical investigation and recommendations for pavement design.

9 Limitations

This report has been prepared for the use of East Property Investments Limited 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. If any changes are made, we must be allowed to review the new development proposal to ensure that the recommendations of this report remain valid 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
G01	Site Location Plan
G02	Site Investigation Plan
G03	Geological Section A-A
G04	Geological Section B-B
G05	Geological Section C-C
G06	Geological Section D-D
G07	Geological Section E-E
G08	Geological Section F-F
G09	Geological Section G-G
G10	Geological Section H-H
G11	Geological Section I-I
G12	Geological Section J-J
SK-11	Common Ground Scheme Plan – Sketch Opt 4

NOTES:

1. LOT BOUNDARIES AND AERIAL PHOTO INFORMATION TAKEN FROM LAND INFORMATION NEW ZEALAND (LINZ).



Issue	Date	Revision
A	4/11/2023	FIRST ISSUE

DWG: Site Location Plan

Scale 1:2500 @A3 | Date NOV 2023

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Client: East Property Investments Ltd

Project No. 22 322 | RC no. N/A

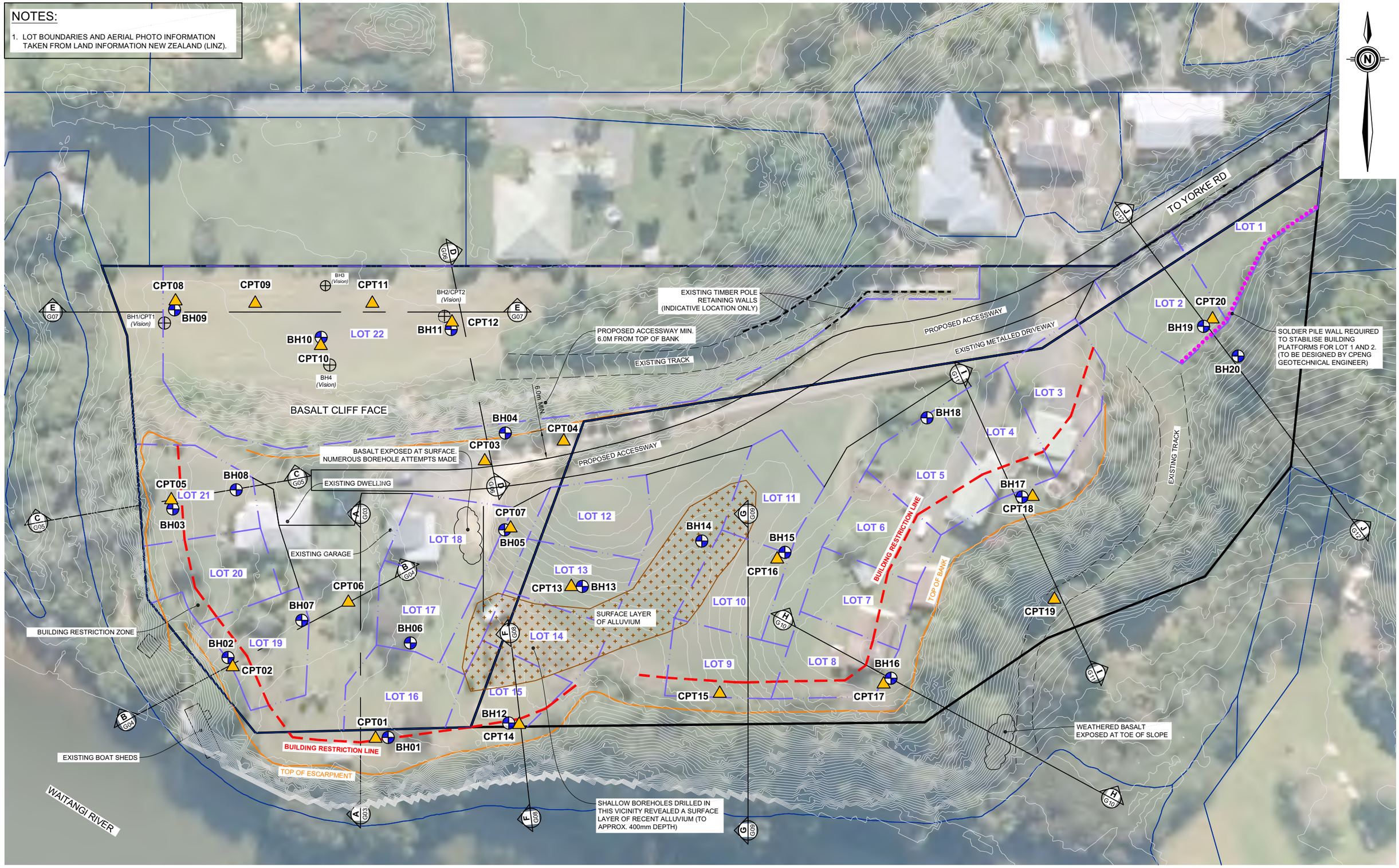
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Sheet No. **1** of **12**

Plotted By Josh Curreen at 26/11/2023 10:37:15 am

NOTES:

1. LOT BOUNDARIES AND AERIAL PHOTO INFORMATION TAKEN FROM LAND INFORMATION NEW ZEALAND (LINZ).



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DWG: Site Investigation Plan

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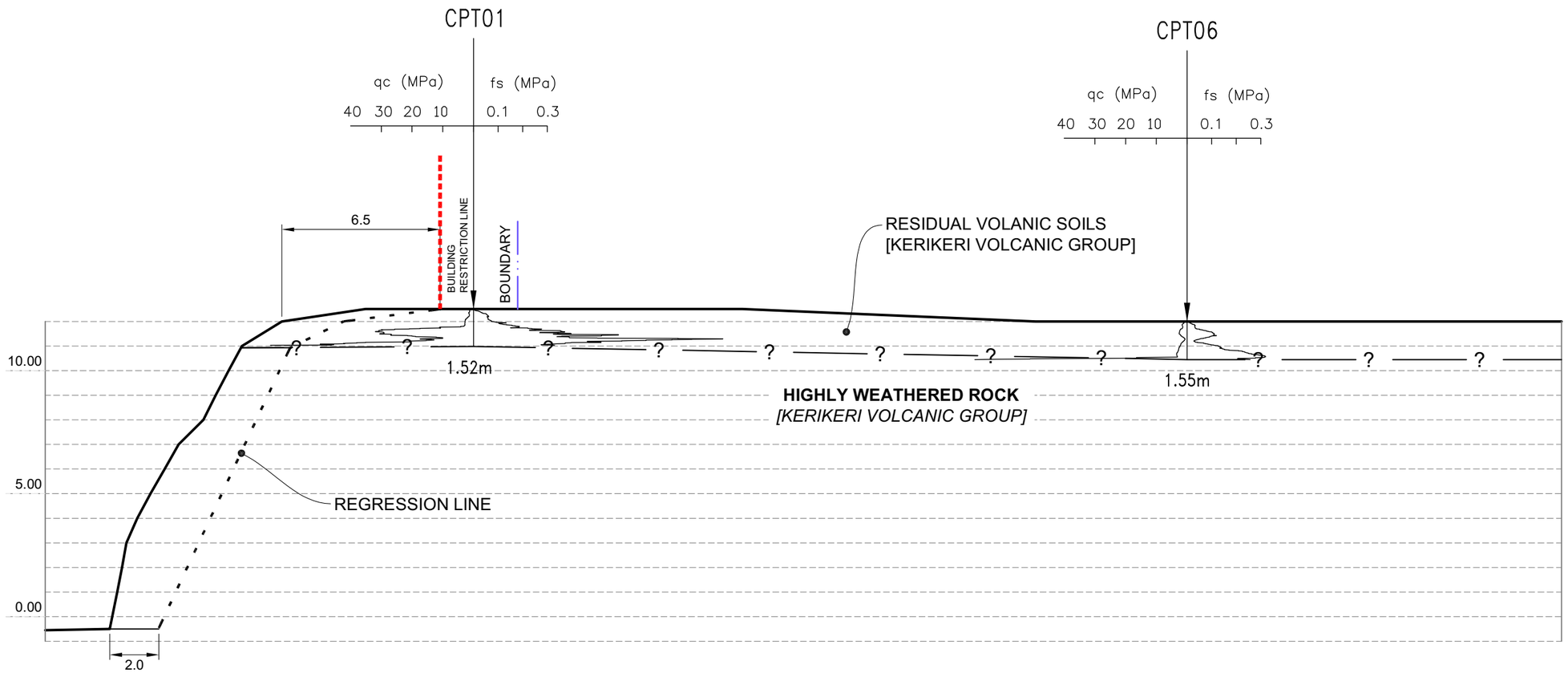
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DWG: Geological Cross Section A-A'

Scale 1:200 @A3 | Date NOV 2023

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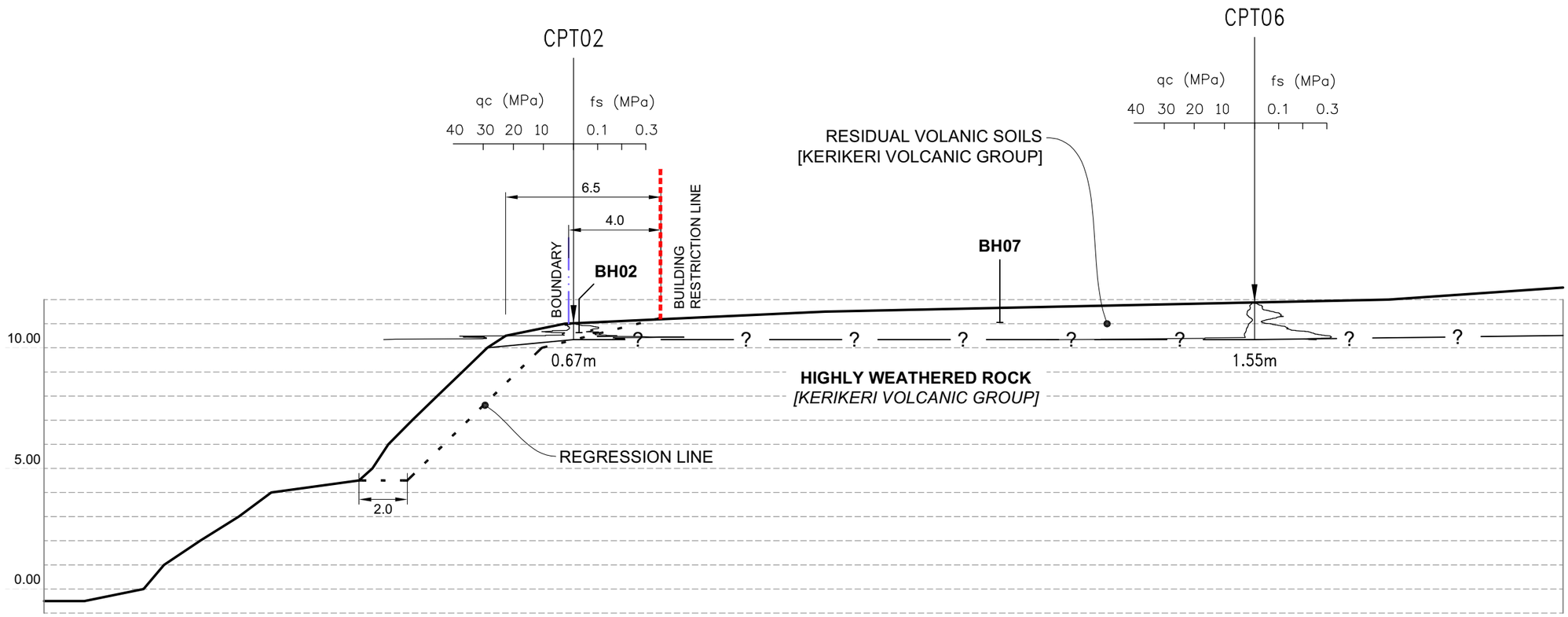
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Issue	Date	Revision
A	4/11/2023	FIRST ISSUE

DWG: Geological Cross Section B-B'

Scale 1:200 @A3 | Date NOV 2023

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Client: East Property Investments Ltd

Project No. 22 322 | RC no. N/A

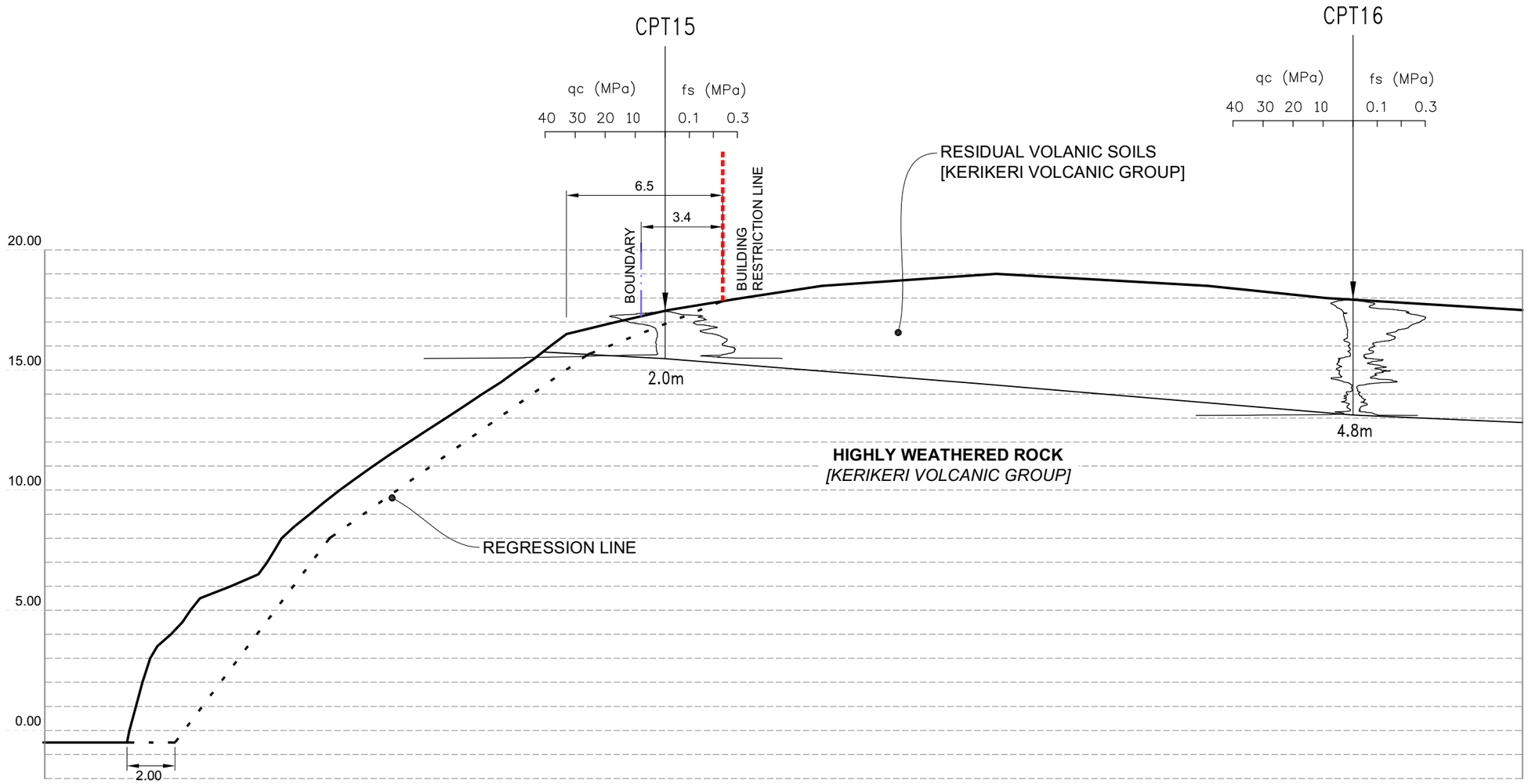
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Sheet No. **4** of **12**

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Issue	Date	Revision
A	4/11/2023	FIRST ISSUE

DWG: Geological Cross Section G-G'

Scale 1:200 @A3 | Date NOV 2023

Drawn JMC | Checked WT | Approved JP

File C:\USERS\JOSHCURREEN\HAIGH WORKMAN LIMITED\SUITEFILES - 22 322 - 111 & 115 YORKE ROAD, HARURU\ENGINEERING\DRAWINGS\22 322 - GEO PLANS-NOV 23.DWG

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Client: East Property Investments Ltd

Project No. 22 322 | RC no. N/A

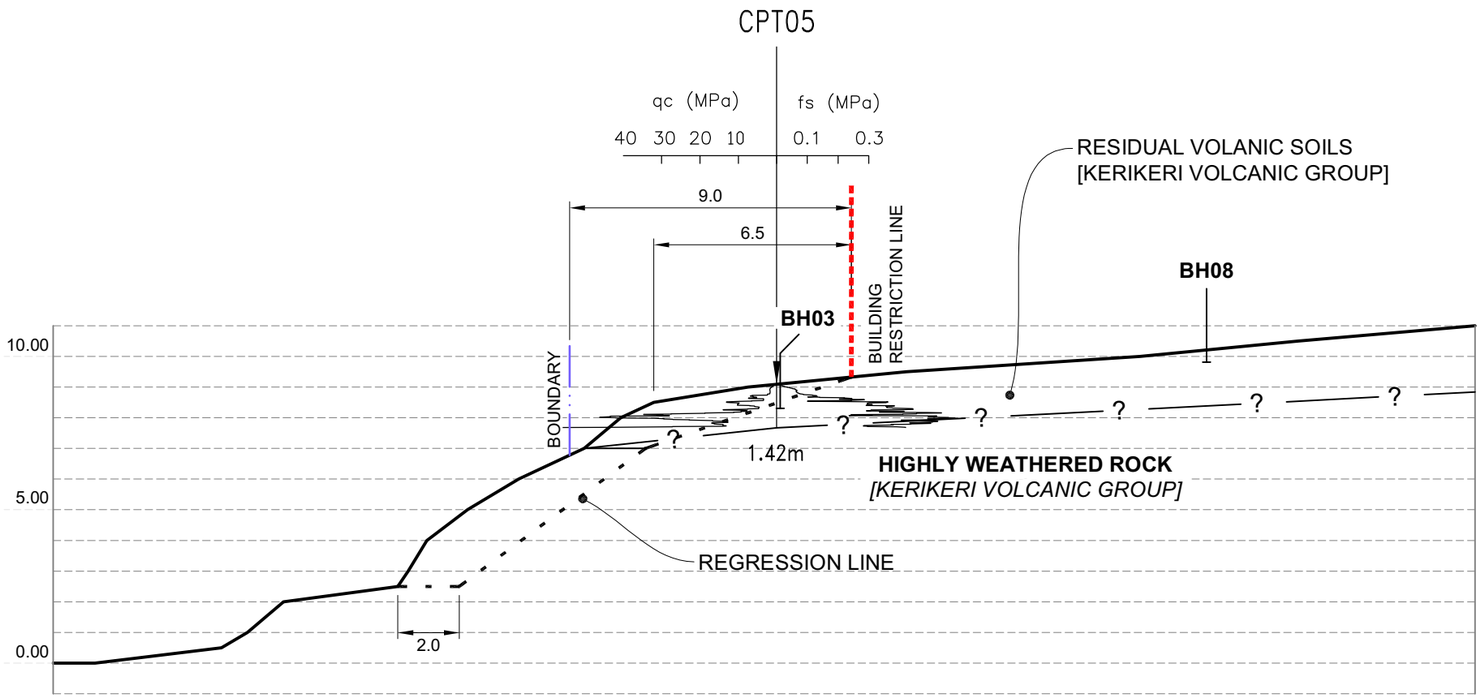
DWG No. **G09**

Sheet No. **9** of **12**

Plotted By Josh Curreen at 26/11/2023 10:39:08 am

NOTES:

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Issue	Date	Revision
A	4/11/2023	FIRST ISSUE

DWG: Geological Cross Section C-C'

Scale 1:200 @A3 | Date NOV 2023

Drawn JMC | Checked WT | Approved JP

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Client: East Property Investments Ltd

Project No. 22 322 | RC no. N/A

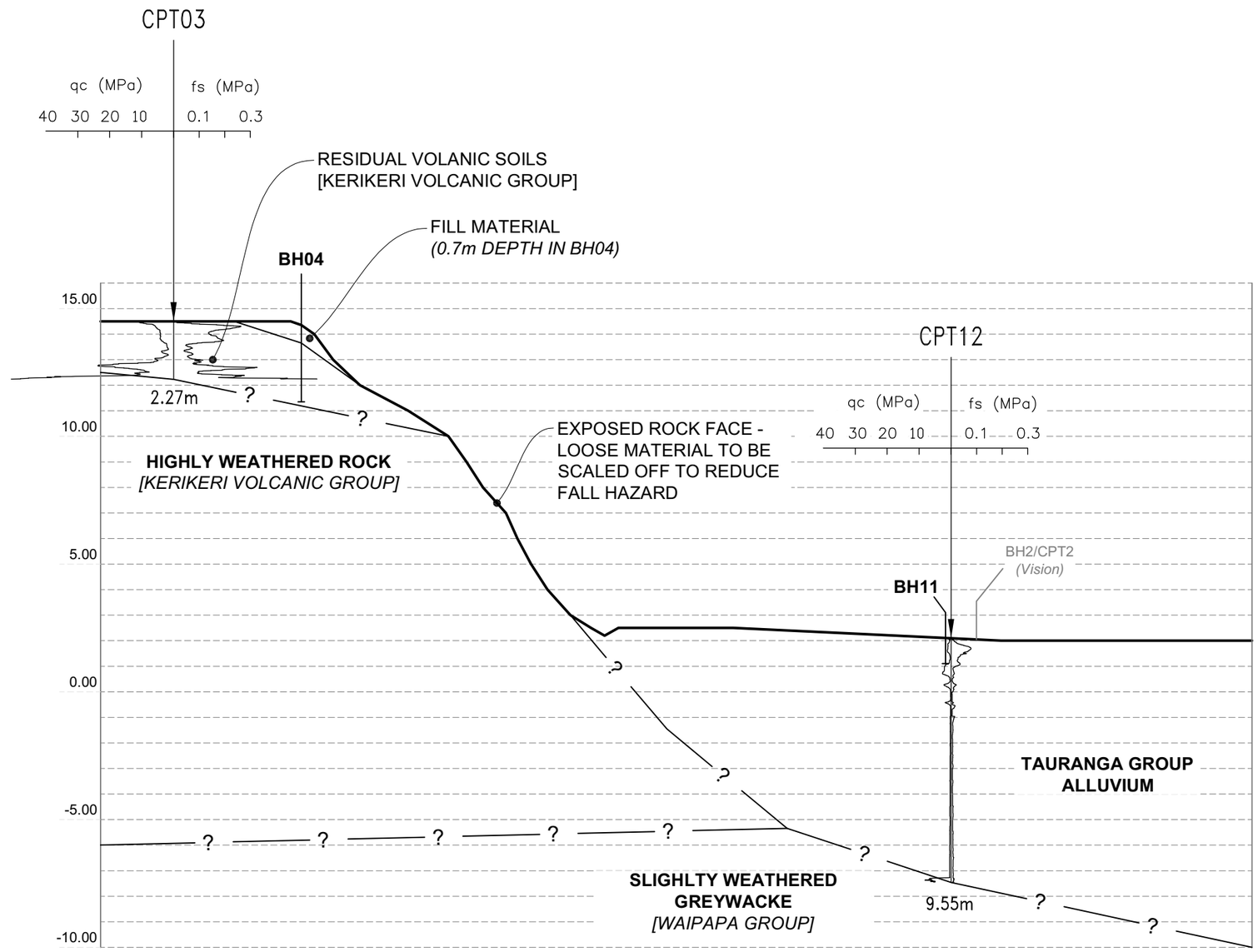
DWG No. **G05**

Sheet No. **5** of **12**

Plotted By Josh Curreen at 26/11/2023 10:38:08 am

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3. DRAWING NOT TO BE USED FOR CONSTRUCTION PURPOSES.



Issue	Date	Revision
A	4/11/2023	FIRST ISSUE

DWG: Geological Cross Section D-D'

Scale 1:200 @A3 | Date NOV 2023

Drawn JMC | Checked WT | Approved JP

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Project No. 22 322 | RC no. N/A

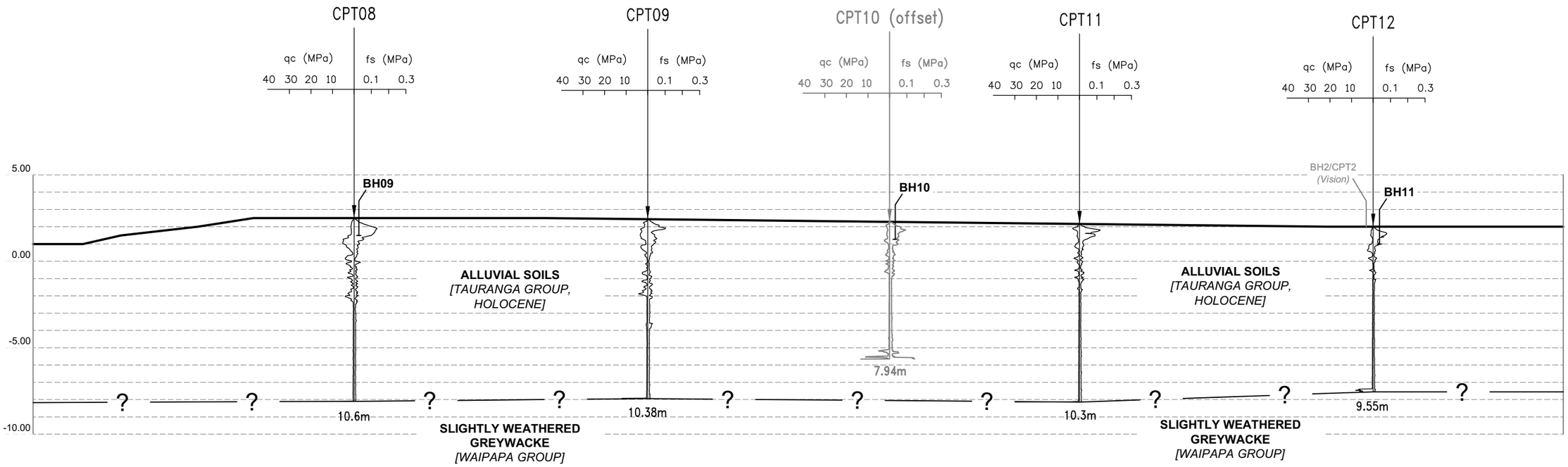
DWG No. **G06**

Sheet No. **6** of **12**

Plotted By Josh Curreen at 26/11/2023 10:38:24 am

NOTES:

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3. DRAWING NOT TO BE USED FOR CONSTRUCTION PURPOSES.



Issue	Date	Revision
A	4/11/2023	FIRST ISSUE

DWG: Geological Cross Section E-E'

Scale 1:250 @A3 | Date NOV 2023

Drawn JMC | Checked WT | Approved JP

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Client: East Property Investments Ltd

Project No. 22 322 | RC no. N/A

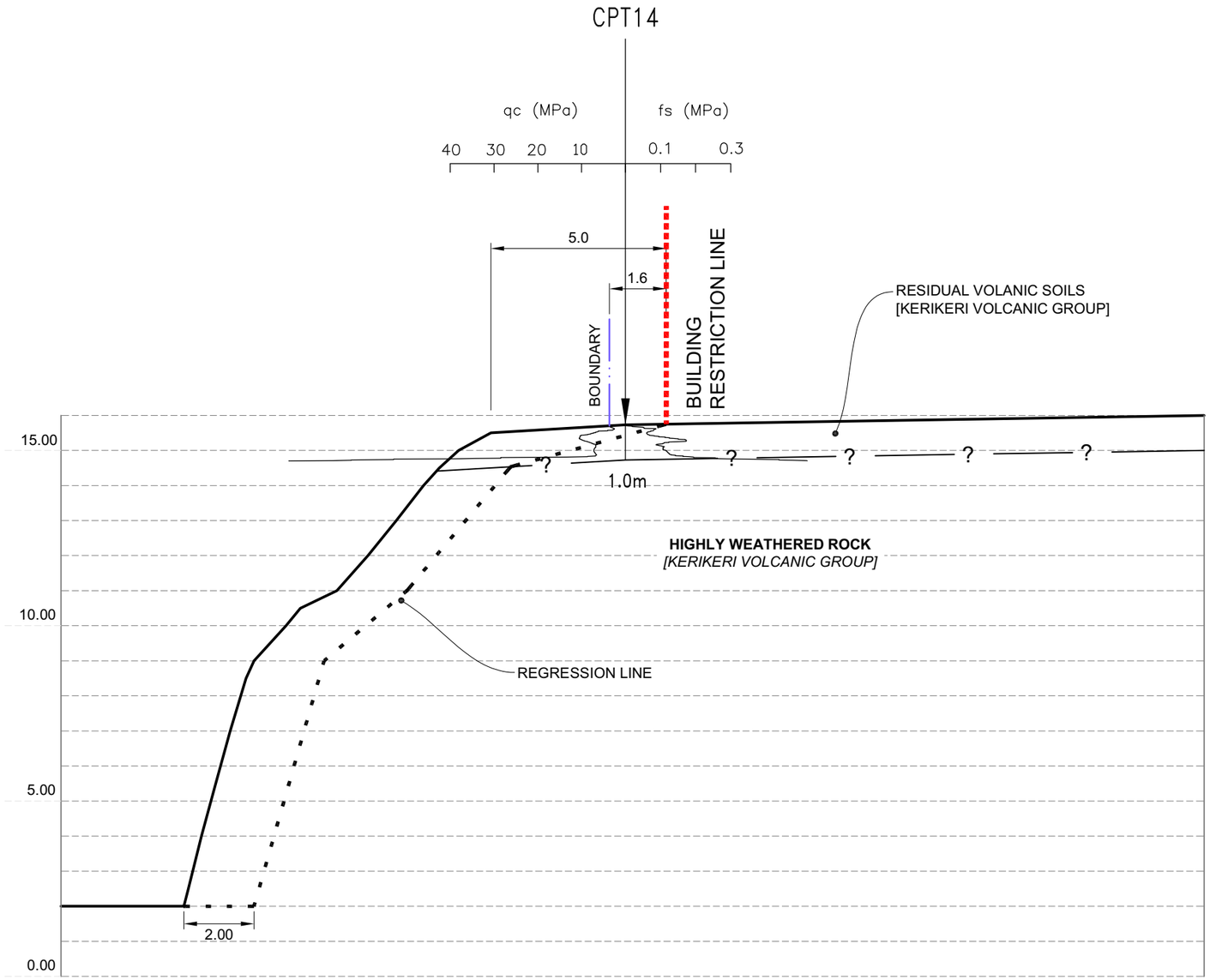
DWG No. **G07**

Sheet No. **7** of **12**

Plotted By Josh Curreen at 26/11/2023 10:38:38 am

NOTES:

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Issue	Date	Revision
A	4/11/2023	FIRST ISSUE

DWG: Geological Cross Section F-F'

Scale 1:150 @A3 | Date NOV 2023 | Drawn JMC | Checked WT | Approved JP

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Client: East Property Investments Ltd

Project No. 22 322 | RC no. N/A

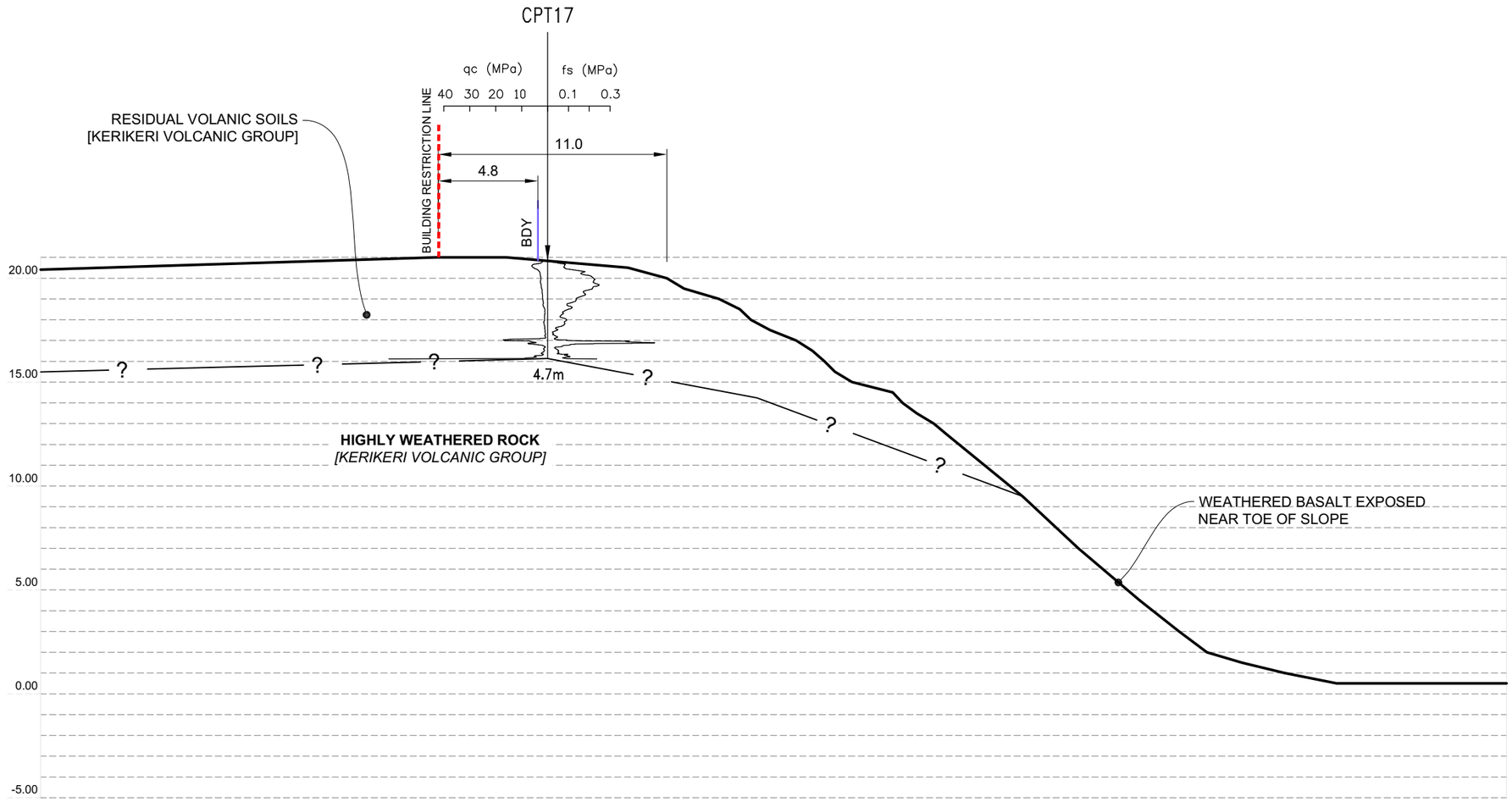
DWG No. **G08**

Sheet No. **8** of **12**

Plotted By Josh Curreen at 26/11/2023 10:38:54 am

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Issue	Date	Revision
A	4/11/2023	FIRST ISSUE

DWG: Geological Cross Section H-H'

Scale 1:250 @A3 | Date NOV 2023

Drawn JMC | Checked WT | Approved JP

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Client: East Property Investments Ltd

Project No. 22 322 | RC no. N/A

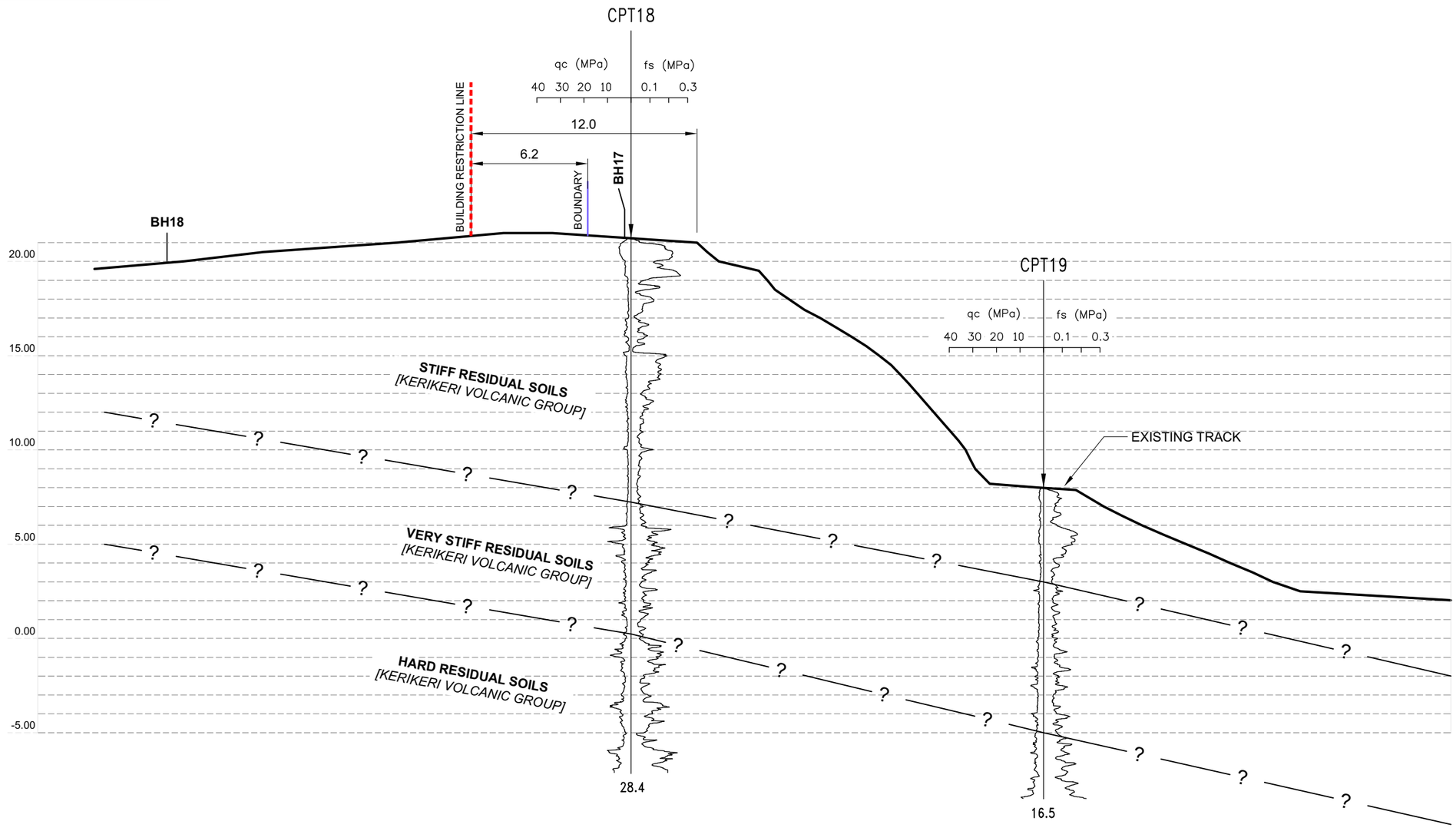
DWG No. **G10**

Sheet No. **10** of **12**

Plotted By Josh Curreen at 26/11/2023 10:39:24 am

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Issue	Date	Revision
A	4/11/2023	FIRST ISSUE

DWG: Geological Cross Section I-I

Scale 1:250 @A3 | Date NOV 2023

Drawn JMC | Checked WT | Approved JP

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Client: East Property Investments Ltd

Project No. 22 322 | RC no. N/A

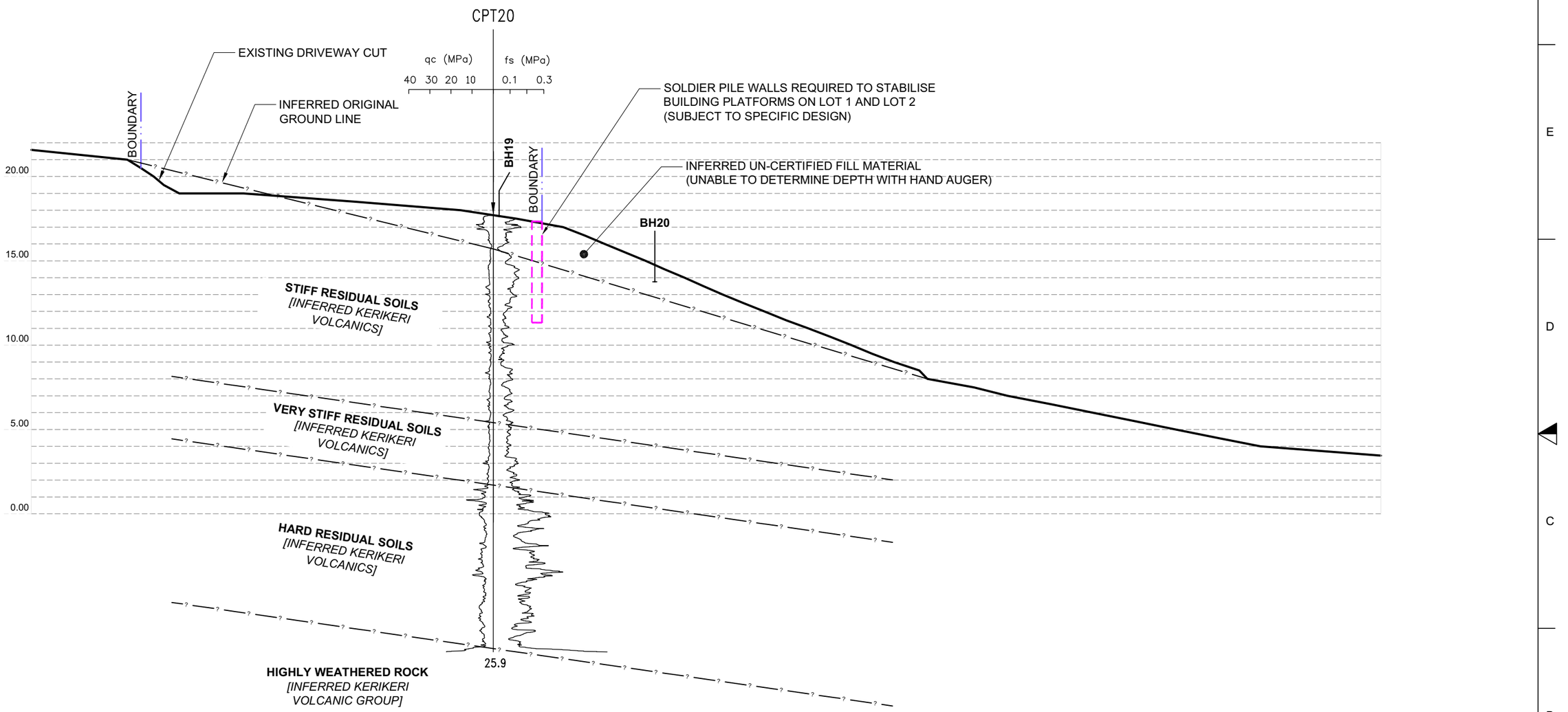
DWG No. **G11**

Sheet No. **11** of **12**

Plotted By Josh Curreen at 26/11/2023 10:39:41 am

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3. DRAWING NOT TO BE USED FOR CONSTRUCTION PURPOSES.



Issue	Date	Revision
A	4/11/2023	FIRST ISSUE

DWG: Geological Cross Section J-J'

Scale 1:250 @A3 | Date NOV 2023

Drawn JMC | Checked WT | Approved JP

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Project: Geotechnical Investigation
111 Yorke Road (Lot 2, DP46802)

Client: East Property Investments Ltd

Project No. 22 322 | RC no. N/A

DWG No. G12

Sheet No. 12 of 12

Plotted By Josh Curreen at 26/11/2023 10:39:56 am

exist boatsheds

Lot 21
447 sq m

Lot 20
405 sq m

Lot 19
380 sq m

Greenway

P

Lot 16
357 sq m

Lot 17
306 sq m

Lot 18
355 sq m

Lot 22
4721 sq m

Lot 15
300 sq m

Lot 14
304 sq m

Lot 13
325 sq m

Lot 12
345 sq m

Greenway

Lot 9
335 sq m

Lot 10
347 sq m

Lot 11
338 sq m

P

Lot 8
330 sq m

Lot 7
322 sq m

Lot 6
321 sq m

Lot 5
404 sq m

Lot 4
369 sq m

Lot 3
402 sq m

exist boatshed

Lot 2
437 sq m

Lot 1
539 sq m

Yorke Rd

KEY

- Property Boundary
- River
- Lot Boundaries
- Open-space Reserve
- Roading (vehicle) Reserve
- Escarpment - Top Edge
- Pedestrian Routes/Paths
- Lot Frontage
- P Visitor Parking

0 10 20 30 40 50 60 70 m

[redacted]
office@cgstudio.co.nz Auckland, New Zealand t: (+64) 9 302 2200

client: Yorke Road Developments Limited

rev	date	details	by
A	7/08/2023	Scheme 4 - escarpment edge setback alt	

scale 1:500 size A3
Do not scale drawings. Verify all dimensions on site.

drawn tk checked By

pr date 7/08/2023

file BASE Yorke 2.vwx

project Yorke Road

name Sketch Concept Opt 4

project # 22015-1

SK-11

Set Page

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Appendix B – Geotechnical Investigation Data

Hand Auger Logs

CPT Soundings

Laboratory Test Results

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Kerikeri, 0230
New Zealand

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Borehole Log - BH01

Hole Location: Refer to Site Plan

JOB No. 22 322

CLIENT:	Yorke Road Developments	**SITE:**	111 Yorke Road, Haruru (Lot 2, DP 46802)		
Date Started:	28/09/2022	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	JMC
Date Completed:	28/09/2022	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	WT

Soil Description
Based on NZGS Logging Guidelines 2005

TOPSOIL; organic SILT, dark brown. Moist, friable, some rootlets.

Clayey SILT; light greyish brown. Hard, moist, low plasticity.
[KERIKERI VOLCANIC GROUP]

Silty CLAY; light greyish brown. Hard, moist, high plasticity.

SILT; some fine to medium weathered gravel, grey brown mottled dark orange. Hard, moist.

End of hole at 0.7m
(Refusal on basalt rock or boulder)

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

Geology: T.S. / KK VOLCANIC

Graphic Log

Water Level: Groundwater Not Encountered

Sensitivity

Vane Shear and Remoulded Vane Shear Strengths (kPa): 242 +

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: 2278
Scala penetrometer testing not undertaken.

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Borehole Log - BH02

Hole Location: Refer to Site Plan

JOB No. 22 322

CLIENT:	Yorke Road Developments	**SITE:**	111 Yorke Road, Haruru (Lot 2, DP 46802)		
Date Started:	28/09/2022	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	JMC
Date Completed:	28/09/2022	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	WT

Soil Description
Based on NZGS Logging Guidelines 2005

TOPSOIL; organic SILT, dark brown. Moist, friable, some rootlets.

SILT; some fine to medium gravel, sub-angular to angular, dark brownish grey mottled grey and orange, Stiff, moist, non-plastic.
[KERIKERI VOLCANIC GROUP]

End of hole at 0.4m
(Refusal on basalt rock or boulder)

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

Geology: T.S. / KK VOLCANIC

Graphic Log

Water Level: Groundwater Not Encountered

Sensitivity

Vane Shear and Remoulded Vane Shear Strengths (kPa)

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: 2278
Scala penetrometer testing not undertaken.

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Borehole Log - BH03

Hole Location: Refer to Site Plan

JOB No. 22 322

CLIENT:	Yorke Road Developments	**SITE:**	111 Yorke Road, Haruru (Lot 2, DP 46802)		
Date Started:	28/09/2022	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	JMC
Date Completed:	28/09/2022	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	WT

Soil Description

Based on NZGS Logging Guidelines 2005

TOPSOIL; organic SILT, trace fine gravel, dark brown speckled orange. Moist, friable, trace rootlets (250mm)

Silty CLAY; brown. Hard, moist, high plasticity.
[KERIKERI VOLCANIC GROUP]
At 0.5m: Trace fine weathered gravel.

End of hole at 0.8m
(Refusal on basalt rock or boulder)

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

Geology: T.S.

Graphic Log

Water Level: Groundwater Not Encountered

Sensitivity

Vane Shear and Remoulded Vane Shear Strengths (kPa): 242 +

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: 2278
Scala penetrometer testing not undertaken.

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Borehole Log - BH04

Hole Location: Refer to Site Plan

JOB No. 22 322

CLIENT:	Yorke Road Developments	**SITE:**	111 Yorke Road, Haruru (Lot 2, DP 46802)		
Date Started:	28/09/2022	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	JMC
Date Completed:	28/09/2022	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	WT

Soil Description
Based on NZGS Logging Guidelines 2005

SILT; brown mixed dark brown, some intermixed topsoil. Hard, dry, friable.
[NON-ENGINEERED FILL]

Silty CLAY; grey brown. Hard, dry, high plasticity.
[KERIKERI VOLCANIC GROUP]
At 0.8m: Becoming brown, trace orange weathered gravel.

At 1.3m: Becoming brown mottled grey and dark orange.

Clayey SILT; brown speckled dark brown and grey. Hard, moist, low plasticity.
At 1.7m: 50mm band of hard silt, light grey speckled dark brown.
At 1.8m: minor fine to medium limonite stained gravel.

End of hole at 3.0m
(Too hard to auger further)

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

Geology: FILL; KERIKERI VOLCANIC GROUP

Graphic Log

Water Level: Groundwater Not Encountered

Sensitivity

Vane Shear and Remoulded Vane Shear Strengths (kPa): 242 +; 242 +; UTP

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: 2278
Scala penetrometer testing not undertaken.

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Borehole Log - BH05

Hole Location: Refer to Site Plan

JOB No. 22 322

CLIENT:	Yorke Road Developments	**SITE:**	111 Yorke Road, Haruru (Lot 2, DP 46802)		
Date Started:	28/09/2022	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	JMC
Date Completed:	28/09/2022	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	WT

Soil Description
Based on NZGS Logging Guidelines 2005

TOPSOIL; organic SILT, dark brown. Wet, friable, trace rootlets.

SILT; trace clay, grey brown. Moist, low plasticity. *[KERIKERI VOLCANICS]*

Silty CLAY; yellow brown. Hard, moist, high plasticity.

At 1.0m: Becoming yellow brown streaked light grey.

At 1.2m: Becoming light grey streaked orange brown, trace fine sand.

Silty CLAY; brown speckled dark orange brown & grey. Wet, high plasticity.

Clayey SILT; trace fine to medium weathered gravel, brown speckled dark orange brown. Very stiff, moist, low plasticity.

End of hole at 2.2m
(Refusal on basalt rock or boulder)



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

Geology: T.S. / KERIKERI VOLCANIC GROUP

Graphic Log

Water Level: Groundwater Not Encountered

Sensitivity

Vane Shear and Remoulded Vane Shear Strengths (kPa): 242 +, 242 +

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: 2278
Scala penetrometer testing not undertaken.

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Borehole Log - BH06

Hole Location: Refer to Site Plan

JOB No. 22 322

CLIENT:	Yorke Road Developments	**SITE:**	111 Yorke Road, Haruru (Lot 2, DP 46802)		
Date Started:	28/09/2022	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	JMC
Date Completed:	28/09/2022	**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)
TOPSOIL; organic SILT, dark brown. Moist, friable, some rootlets.	0.0	KK VOLCANICS		Groundwater Not Encountered			0 5 10 15 20
SILT; some fine to medium angular gravel, brown. Moist, friable. *[KERIKERI VOLCANIC GROUP]*							
End of hole at 0.3m **(Refusal on basalt rock or boulder)**	0.5						
	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.
Hand Held Shear Vane S/N: 2278
Scala penetrometer testing not undertaken.

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Borehole Log - BH07

Hole Location: Refer to Site Plan

JOB No. 22 322

CLIENT:	Yorke Road Developments	**SITE:**	111 Yorke Road, Haruru (Lot 2, DP 46802)		
Date Started:	28/09/2022	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	JMC
Date Completed:	28/09/2022	**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)
TOPSOIL; organic SILT, trace fine gravel, dark brown speckled orange. Wet, friable, trace rootlets.	0.0	T.S.		Groundwater Not Encountered			0 5 10 15 20
SILT; trace clay, brown. Stiff, wet, low plasticity. *[KERIKERI VOLCANIC GROUP]*		KK VOLCANI					
End of hole at 0.6m (Refusal on basalt rock or boulder)	0.5						
	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.
Hand Held Shear Vane S/N: 2278
Scala penetrometer testing not undertaken.

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Borehole Log - BH08

Hole Location: Refer to Site Plan

JOB No. 22 322

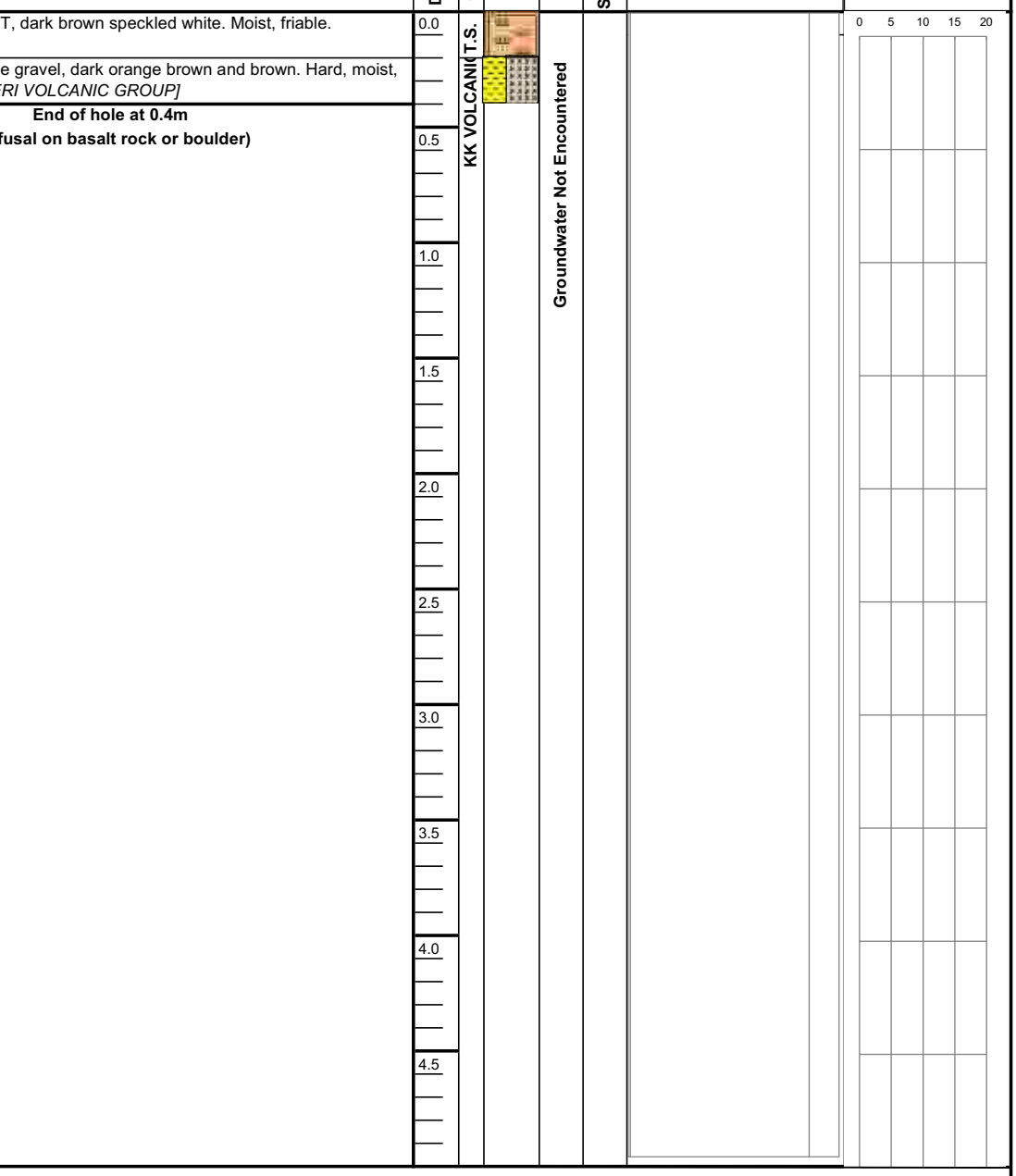
CLIENT:	Yorke Road Developments	**SITE:**	111 Yorke Road, Haruru (Lot 2, DP 46802)		
Date Started:	28/09/2022	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	JMC
Date Completed:	28/09/2022	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	WT

Soil Description
Based on NZGS Logging Guidelines 2005

TOPSOIL; organic SILT, dark brown speckled white. Moist, friable.

Clayey SILT; some fine gravel, dark orange brown and brown. Hard, moist, low plasticity. *[KERIKERI VOLCANIC GROUP]*

End of hole at 0.4m
(Refusal on basalt rock or boulder)



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: 2278
Scala penetrometer testing not undertaken.

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Borehole Log - BH09

Hole Location: Refer to Site Plan

JOB No. 22 322

CLIENT:	Yorke Road Developments	**SITE:**	111 Yorke Road, Haruru (Lot 2, DP 46802)		
Date Started:	18/11/2022	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	JMC
Date Completed:	18/11/2022	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	WT

Soil Description

Based on NZGS Logging Guidelines 2005

TOPSOIL; SILT, minor clay, trace fine gravel and shell fragments, dark brown. Wet, low plasticity.

Silty CLAY; orange brown. Very stiff, moist, high plasticity.
[TAURANGA GROUP ALLUVIUM]

At 0.8m: Becoming orange brown streaked grey and dark orange.

End of hole at 1.0m (Target Depth)



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

Geology: T.S. TAURANGA GROUP

Graphic Log

Water Level: Groundwater Not Encountered

Sensitivity: 4, 5

Vane Shear and Remoulded Vane Shear Strengths (kPa): 158, 36, 147, 29

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: 1698
Scala penetrometer testing not undertaken.

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Borehole Log - BH10

Hole Location: Refer to Site Plan

JOB No. 22 322

CLIENT:	Yorke Road Developments	**SITE:**	111 Yorke Road, Haruru (Lot 2, DP 46802)		
Date Started:	18/11/2022	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	JMC
Date Completed:	18/11/2022	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	WT

Soil Description

Based on NZGS Logging Guidelines 2005

TOPSOIL; clayey SILT, brown. Moist, low plasticity.

At 0.2m: Some fine gravel.

Silty CLAY; light orange brown. Very stiff, moist, high plasticity.
[TAURANGA GROUP ALLUVIUM]

SILT; minor coarse sand, trace clay, light orange brown and grey. Stiff, moist to wet, low plasticity.

End of hole at 1.0m (Target Depth)



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 ALLUVIUM

Graphic Log

Water Level: Groundwater Not Encountered

Sensitivity: 4, 7

Vane Shear and Remoulded Vane Shear Strengths (kPa): 151, 36, 117, 18

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: 1698
Scala penetrometer testing not undertaken.

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Borehole Log - BH11

Hole Location: Refer to Site Plan

JOB No. 22 322

CLIENT:	Yorke Road Developments	**SITE:**	111 Yorke Road, Haruru (Lot 2, DP 46802)		
Date Started:	18/11/2022	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	JMC
Date Completed:	18/11/2022	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	WT

Soil Description

Based on NZGS Logging Guidelines 2005

TOPSOIL; clayey SILT; brown. Wet, low plasticity. Trace rootlets.

SILT; minor fine gravel, trace clay, orange mixed brown. Wet, low plasticity
[NON-ENGINEERED FILL]

Silty CLAY; light grey streaked orange brown. Stiff, high plasticity.
[TAURANGA GROUP ALLUVIUM]

End of hole at 1.0m (Target Depth)



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

Geology: FILL; TAURANGA

Graphic Log

Water Level: Groundwater Not Encountered

Sensitivity: 4; 4

Vane Shear and Remoulded Vane Shear Strengths (kPa): 115; 32; 86; 22

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: 1698
Scala penetrometer testing not undertaken.

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Borehole Log - BH12

Hole Location: Refer to Site Plan

JOB No. 22 322

CLIENT:	Yorke Road Developments	**SITE:**	111 Yorke Road, Haruru (Lot 2, DP 46802)		
Date Started:	30/03/2023	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	JMC
Date Completed:	30/03/2023	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	WT

Soil Description
Based on NZGS Logging Guidelines 2005

SILT; dark brown. Dry. Friable. [Topsoil]

SILT; brown, mottled orangish brown. Hard, dry, no plasticity. [Kerikeri Volcanic Group]

Clayey **SILT**; light brown. Hard, dry, low plasticity.

End of hole at 0.9m
(Refusal on basalt rock or boulder)



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

Geology: TS; KK VOLCANIC GROUP

Graphic Log

Water Level: Groundwater Not Encountered

Sensitivity

Vane Shear and Remoulded Vane Shear Strengths (kPa): UTP; UTP

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.
Scala penetrometer testing not undertaken.
Hand Held Shear Vane S/N: DR2278

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Borehole Log - BH13

Hole Location: Refer to Site Plan

JOB No. 22 322

CLIENT:	Yorke Road Developments	**SITE:**	111 Yorke Road, Haruru (Lot 2, DP 46802)		
Date Started:	30/03/2023	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	JMC
Date Completed:	30/03/2023	**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; dark brown. Moist. Friable. Trace Rootlets. [Topsoil]	0.0	TS		Groundwater Not Encountered	2	242	0 5 10 15 20
Clayey **SILT**; light greyish brown, mottled orangish brown. Very stiff, dry to moist, low plasticity. [Kerikeri Volcanic Group]		KERIKERI VOLCANIC GROUP				216 / 100	
Silty **CLAY**; yellowish brown. Very stiff, moist, high plasticity.	0.5						
1.0m: becomes orangish brown, streaked light grey.	1.0					242	
1.6m: becomes light grey, mottled orangish brown, minor fine to medium weathered, angular gravel.	1.5						
End of hole at 1.8m (Refusal on basalt rock or boulder)	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: DR2278

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Borehole Log - BH14

Hole Location: Refer to Site Plan

JOB No. 22 322

CLIENT:	Yorke Road Developments	**SITE:**	111 Yorke Road, Haruru (Lot 2, DP 46802)		
Date Started:	30/03/2023	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	JMC
Date Completed:	30/03/2023	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	WT

Soil Description

Based on NZGS Logging Guidelines 2005

SILT; dark brown. Moist. Friable. Rootlets. [Topsoil]

Clayey **SILT**; light brown, speckled dark orangish brown. Firm, wet, low plasticity. [Alluvium]

CLAY; grey. Firm, wet to saturated, high plasticity.

End of hole at 0.7m
(Refusal on basalt rock or boulder)



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

Geology: TS; ALLUVIUM

Graphic Log

Water Level: Groundwater Not Encountered

Sensitivity: 8

Vane Shear and Remoulded Vane Shear Strengths (kPa): 55; 7

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.
Scala penetrometer testing not undertaken.
Hand Held Shear Vane S/N: DR2278

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Borehole Log - BH15

Hole Location: Refer to Site Plan

JOB No. 22 322

CLIENT:	Yorke Road Developments	**SITE:**	111 Yorke Road, Haruru (Lot 2, DP 46802)		
Date Started:	30/03/2023	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	JMC
Date Completed:	30/03/2023	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	WT

Soil Description

Based on NZGS Logging Guidelines 2005

SILT; dark brown. Moist. Friable. Rootlets. [Topsoil]

Clayey **SILT**; orangish brown, mottled light brown. Hard, dry, low plasticity. [Kerikeri Volcanic Group]

Silty **CLAY**; yellowish brown, streaked orangish brown. Hard, moist, high plasticity.

0.9m: becomes orangish brown, mottled light grey.

1.5m: becomes orangish brown, brown and grey.

CLAY; grey. Very stiff, wet, high plasticity. Trace weakly cemented clasts.

Silty **CLAY**; light grey, speckled reddish brown. Very stiff, wet, high plasticity.

Clayey **SILT**; whitish grey, mottled grey, trace white, fine weathered gravel. Stiff, wet, low plasticity.

End of hole at 3.0m (Target Depth)



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

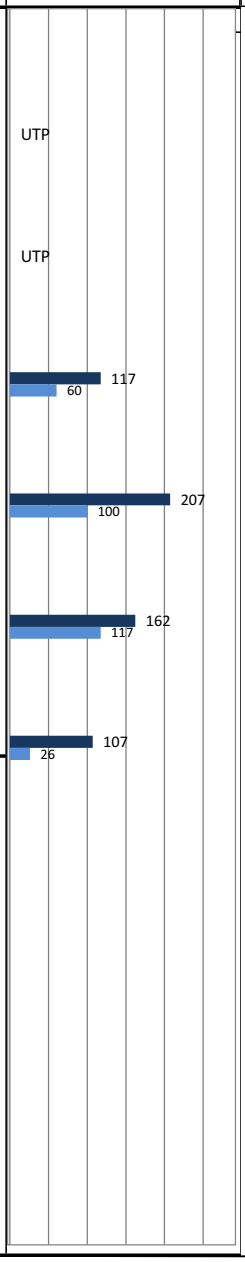
Geology: TS; KERIKERI VOLCANIC GROUP

Graphic Log

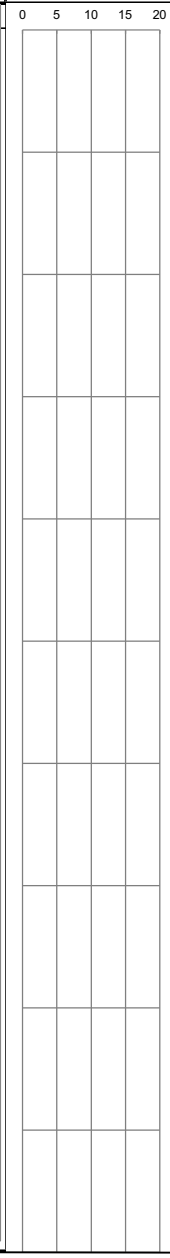
Water Level: Groundwater Not Encountered

Sensitivity: 2, 2, 1, 4

Vane Shear and Remoulded Vane Shear Strengths (kPa)



Scala Penetrometer (blows/100mm)



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: DR2278

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Borehole Log - BH16

Hole Location: Refer to Site Plan

JOB No. 22 322

CLIENT:	Yorke Road Developments	**SITE:**	111 Yorke Road, Haruru (Lot 2, DP 46802)		
Date Started:	30/03/2023	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	JMC
Date Completed:	30/03/2023	**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; dark brown. Dry. Friable. [Topsoil]	0.0	TS		Groundwater Not Encountered			0 5 10 15 20
SILT, minor clay; light yellowish brown. Hard, dry, low plasticity. [Kerikeri Volcanic Group]		KERIKERI VOLCANIC GROUP					
Silty **CLAY**; light brown, mottled minor dark orangish brown. Hard, moist, high plasticity.	0.5				2	UTP; 211; 107	
Clayey **SILT**, minor silt lenses, trace fine to medium gravel; brown, mottled orangish brown and grey. Hard, moist, low plasticity.	1.0					UTP	
1.6m: becomes brownish orange, mottled reddish brown and light yellowish brown. Minor fine to medium gravel. Wet.	1.5				7	124; 17	
End of hole at 2.0m (Target Depth)	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: DR2278

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Borehole Log - BH17

Hole Location: Refer to Site Plan

JOB No. 22 322

CLIENT:	Yorke Road Developments	**SITE:**	111 Yorke Road, Haruru (Lot 2, DP 46802)		
Date Started:	30/03/2023	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	JMC
Date Completed:	30/03/2023	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	WT

Soil Description

Based on NZGS Logging Guidelines 2005

SILT; dark brown. Dry. Friable. [Topsoil]

Silty **CLAY**; brown. Very stiff, moist, high plasticity. [Kerikeri Volcanic Group]

1.4m: trace orangish brown weakly cemented clasts.

SILT, trace fine gravel; grey and brown. Wet, very stiff, no plasticity.

End of hole at 3.0m (Target Depth)



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

Geology: TS; KERIKERI VOLCANIC GROUP

Graphic Log

Water Level: Groundwater Not Encountered

Sensitivity: 2, 2, 2

Vane Shear and Remoulded Vane Shear Strengths (kPa): UTP; 198 / 97; 164 / 90; 190 / 121

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.
Scala penetrometer testing not undertaken.
Hand Held Shear Vane S/N: DR2278

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Borehole Log - BH18

Hole Location: Refer to Site Plan

JOB No. 22 322

CLIENT:	Yorke Road Developments	**SITE:**	111 Yorke Road, Haruru (Lot 2, DP 46802)		
Date Started:	30/03/2023	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	JMC
Date Completed:	30/03/2023	**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; dark brown. Dry. Friable. [Topsoil] (250mm)	0.0	TS		Groundwater Not Encountered		UTP	0 5 10 15 20
Clayey **SILT**, some fine to medium, well weathered gravel; brown, mottled orangish brown. Very stiff, moist, low plasticity. [Kerikeri Volcanic Group]	0.5	KK VOLCANICS					
End of hole at 0.7m **(Refusal on basalt rock or boulder)**	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: DR2278

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Borehole Log - BH19

Hole Location: Refer to Site Plan

JOB No. 22 322

CLIENT:	Yorke Road Developments	**SITE:**	111 Yorke Road, Haruru (Lot 2, DP 46802)		
Date Started:	30/03/2023	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	JMC
Date Completed:	30/03/2023	**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**, some fine to medium gravel; orangish brown, mixed brown. Stiff, dry, low plasticity. [Fill]	0.0	FILL		Groundwater Not Encountered			0 5 10 15 20
Refusal at 0.5mbgl **(Multiple attempts encountered obstructions in fill material)**	0.5 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: DR2278

PO Box 89, 0245
6 Fairway Drive
Kerikeri, 0230
New Zealand

HAIGH WORKMAN Ltd
Civil & Structural Engineers

Phone 09 407 8327
Fax 09 407 8378
www.haighworkman.co.nz
info@haighworkman.co.nz

Borehole Log - BH20

Hole Location: Refer to Site Plan

JOB No. 22 322

CLIENT:	Yorke Road Developments	**SITE:**	111 Yorke Road, Haruru (Lot 2, DP 46802)		
Date Started:	30/03/2023	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	JMC
Date Completed:	30/03/2023	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	WT

Soil Description

Based on NZGS Logging Guidelines 2005

Clayey **SILT**; orangish brown. Hard, dry, low plasticity. [Fill]

0.5m: some blueish grey, angular gravel.

0.7m: trace scoria gravel.

Refusal at 1.0mbgl



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

Geology: FILL

Graphic Log

Water Level: Groundwater Not Encountered

Sensitivity

Vane Shear and Remoulded Vane Shear Strengths (kPa)

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

LEGEND

TOPSOIL | CLAY | SILT | SAND | GRAVEL | FILL

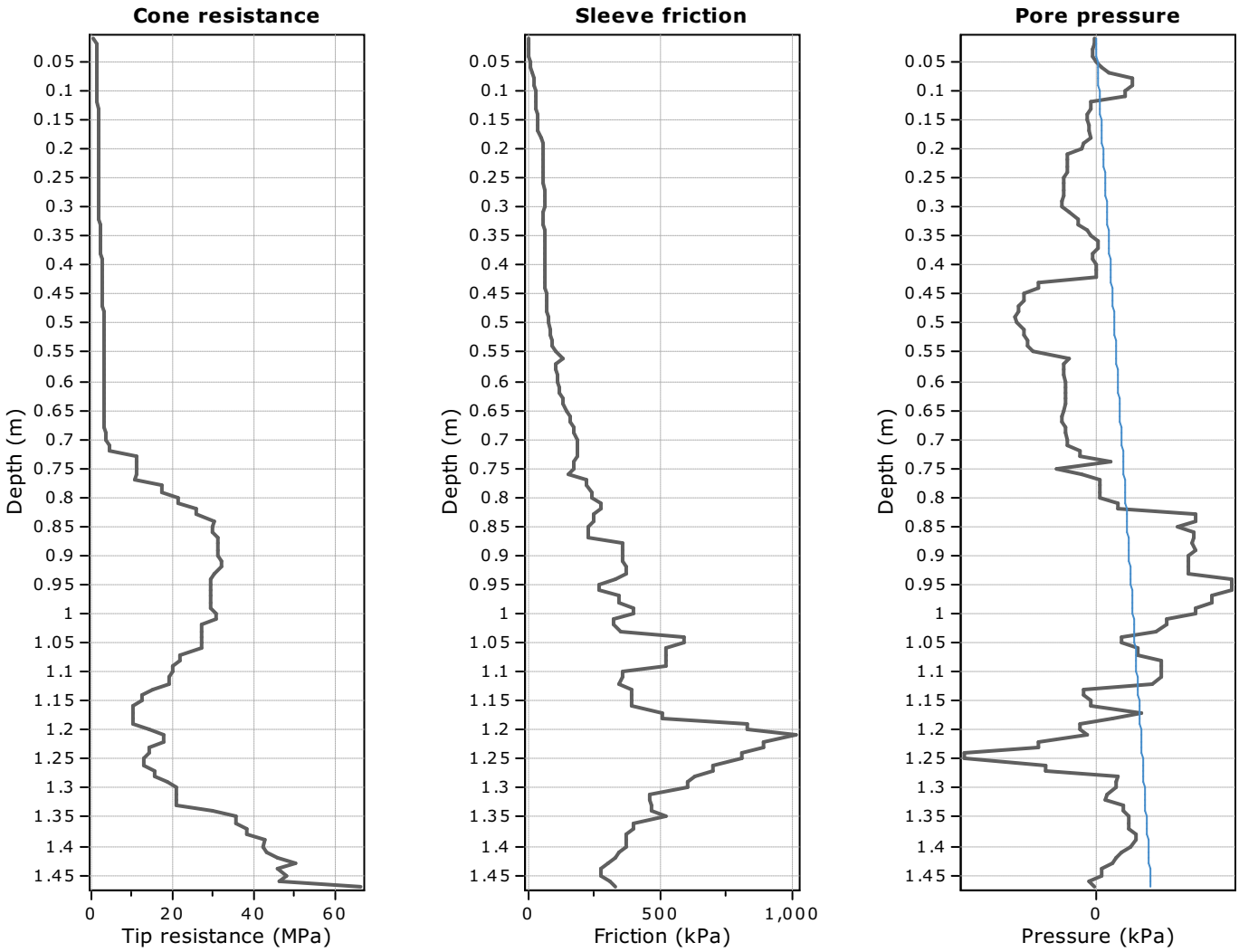
Corrected shear vane reading
Remoulded shear vane reading
Scala Penetrometer

Note: UTP = Unable To Penetrate. T.S. = Topsoil.
Scala penetrometer testing not undertaken.
Hand Held Shear Vane S/N: DR2278

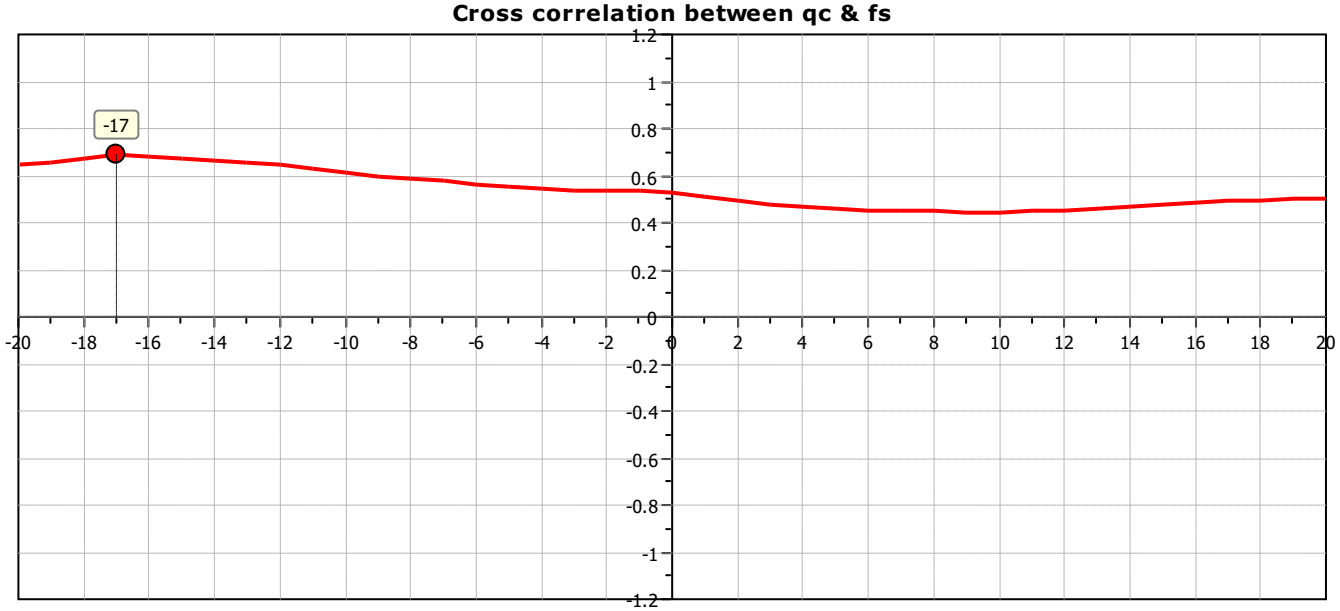
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+64211473249

Project: **Yorke Road Developments Ltd**
Location: **111 Yorke Road, Haruru**

CPT: CPT01
Total depth: 1.47 m, Date: 29/09/2022



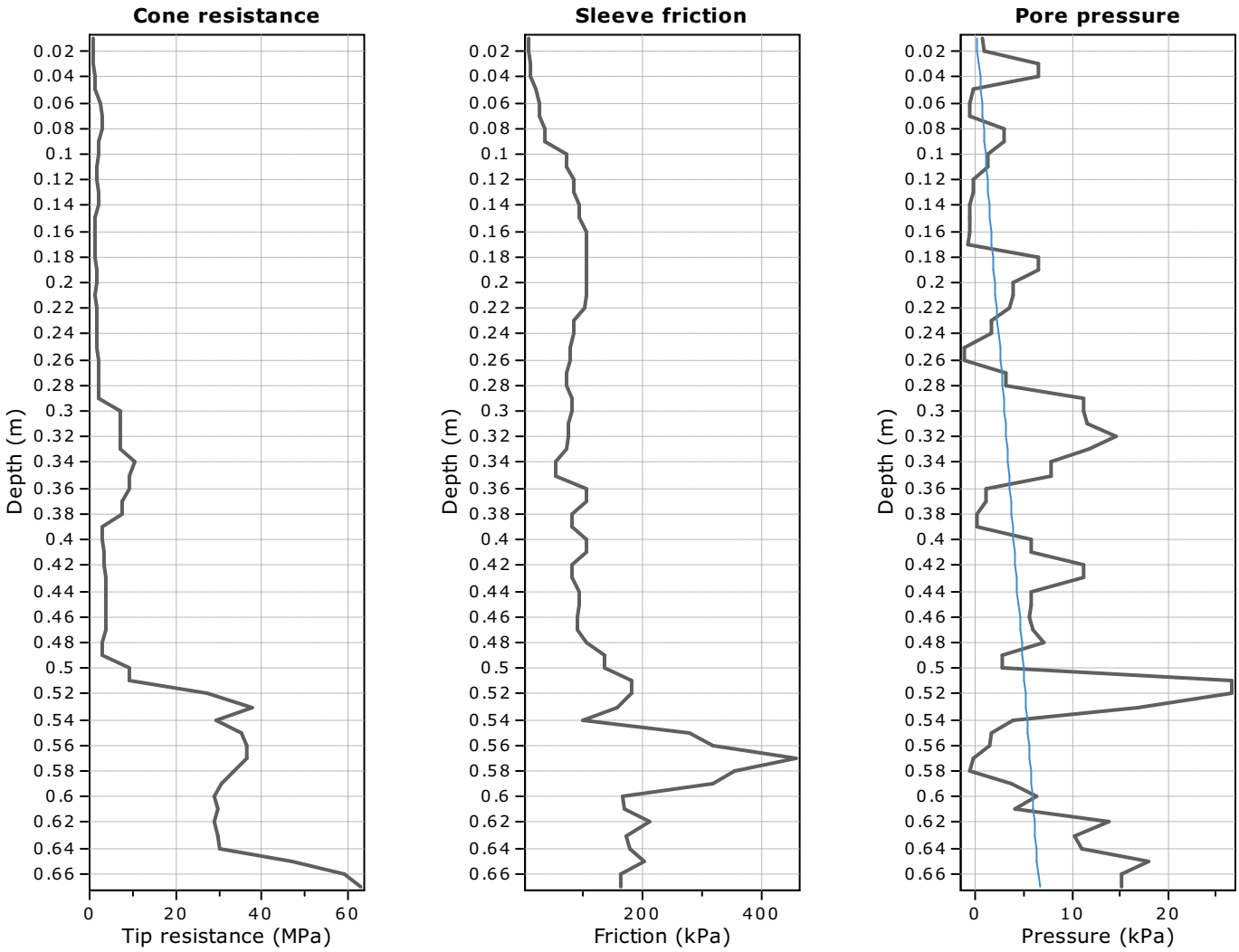
The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



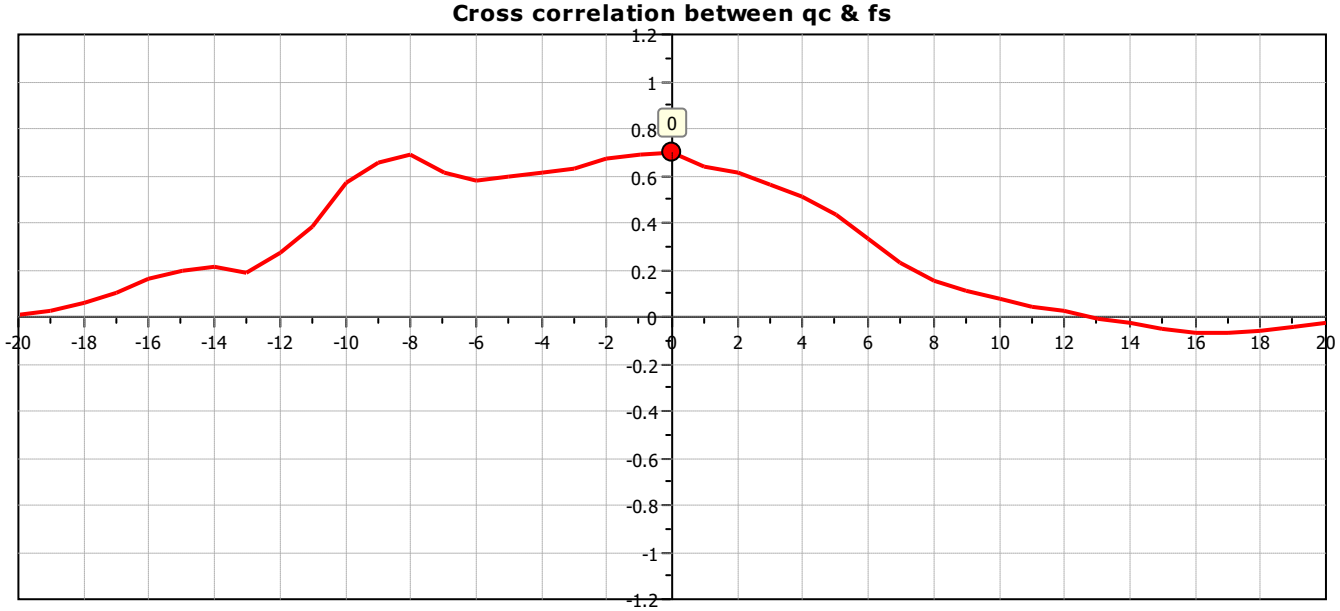
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+64211473249

Project: **Yorke Road Developments Ltd**
Location: **111 Yorke Road, Haruru**

CPT: CPT02
Total depth: 0.67 m, Date: 29/09/2022



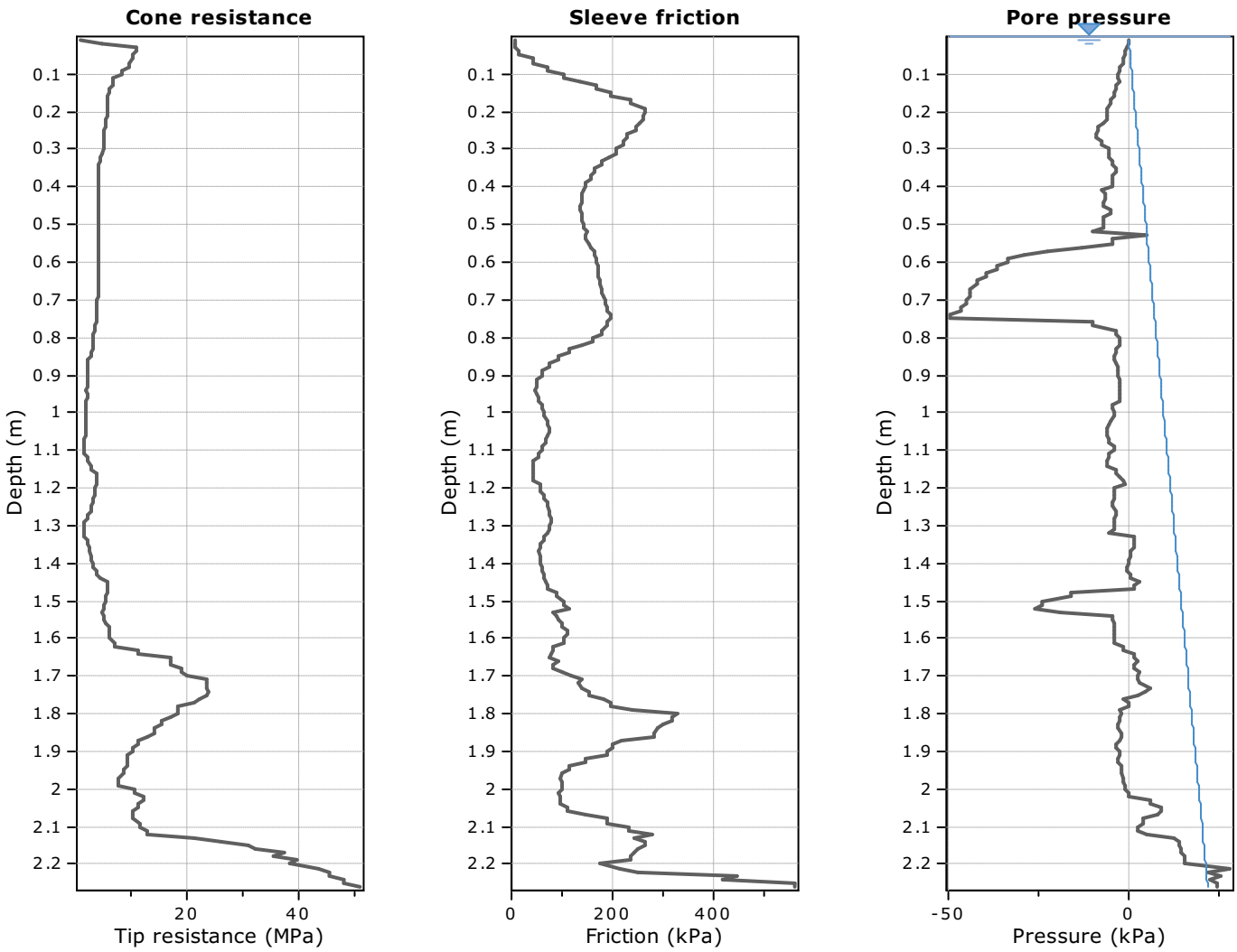
The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



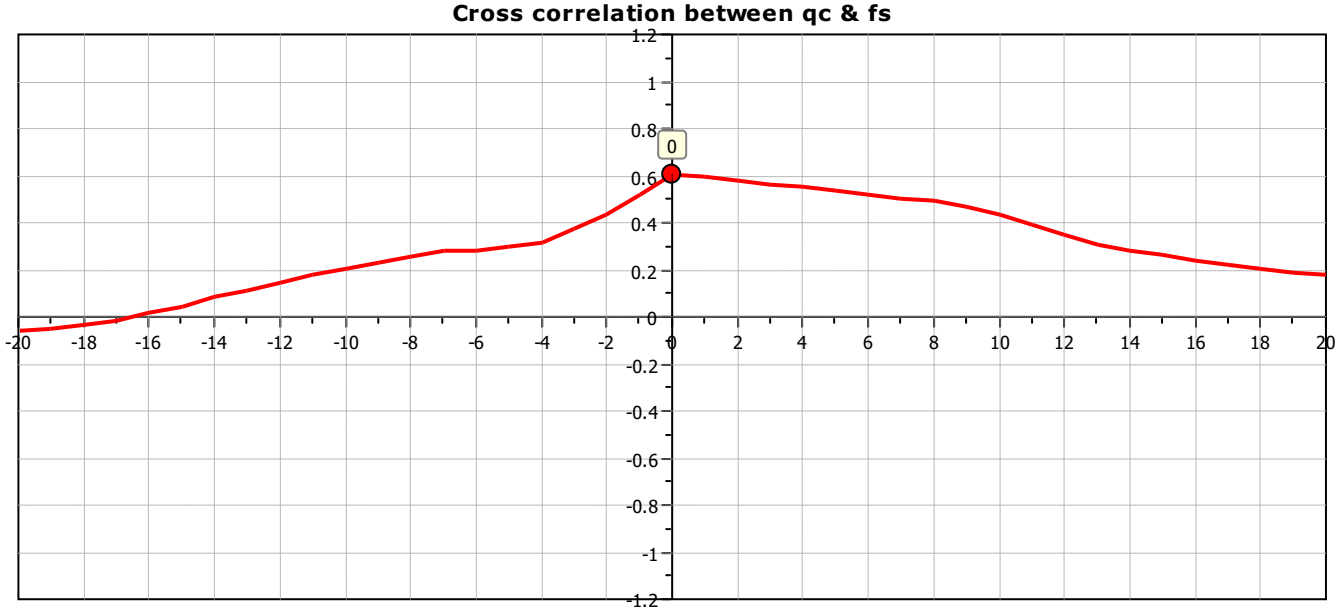
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+64211473249

Project: **Yorke Road Developments Ltd**
Location: **111 Yorke Road, Haruru**

CPT: CPT03
Total depth: 2.26 m, Date: 29/09/2022



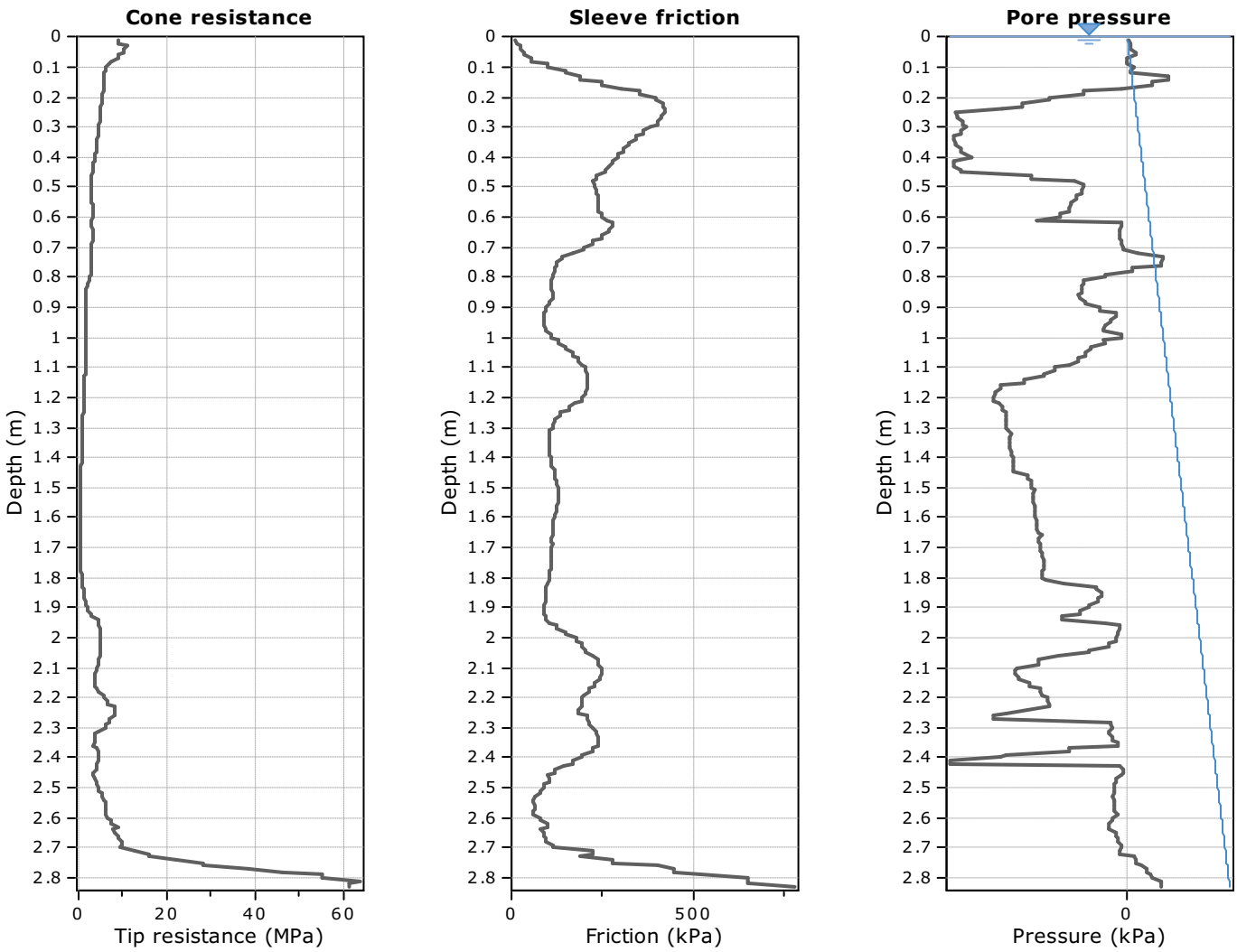
The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



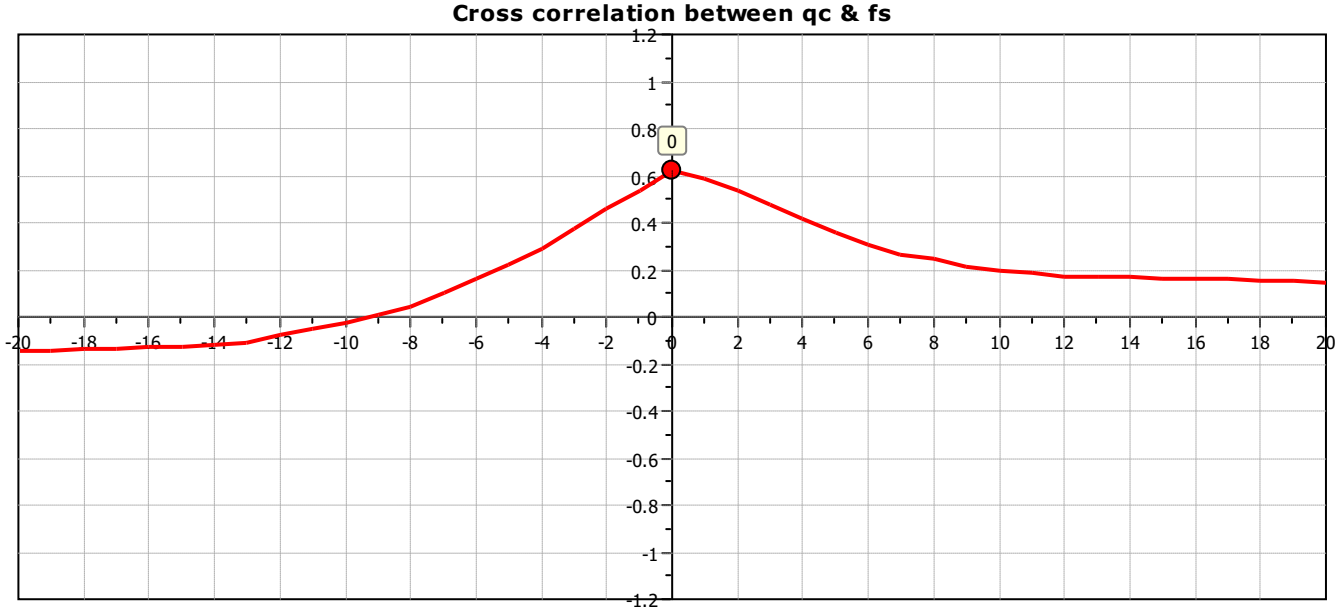
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craig@undergroundinvestigation.co.nz
+64211473249

Project: **Yorke Road Developments Ltd**
Location: **111 Yorke Road, Haruru**

CPT: CPT04
Total depth: 2.83 m, Date: 29/09/2022



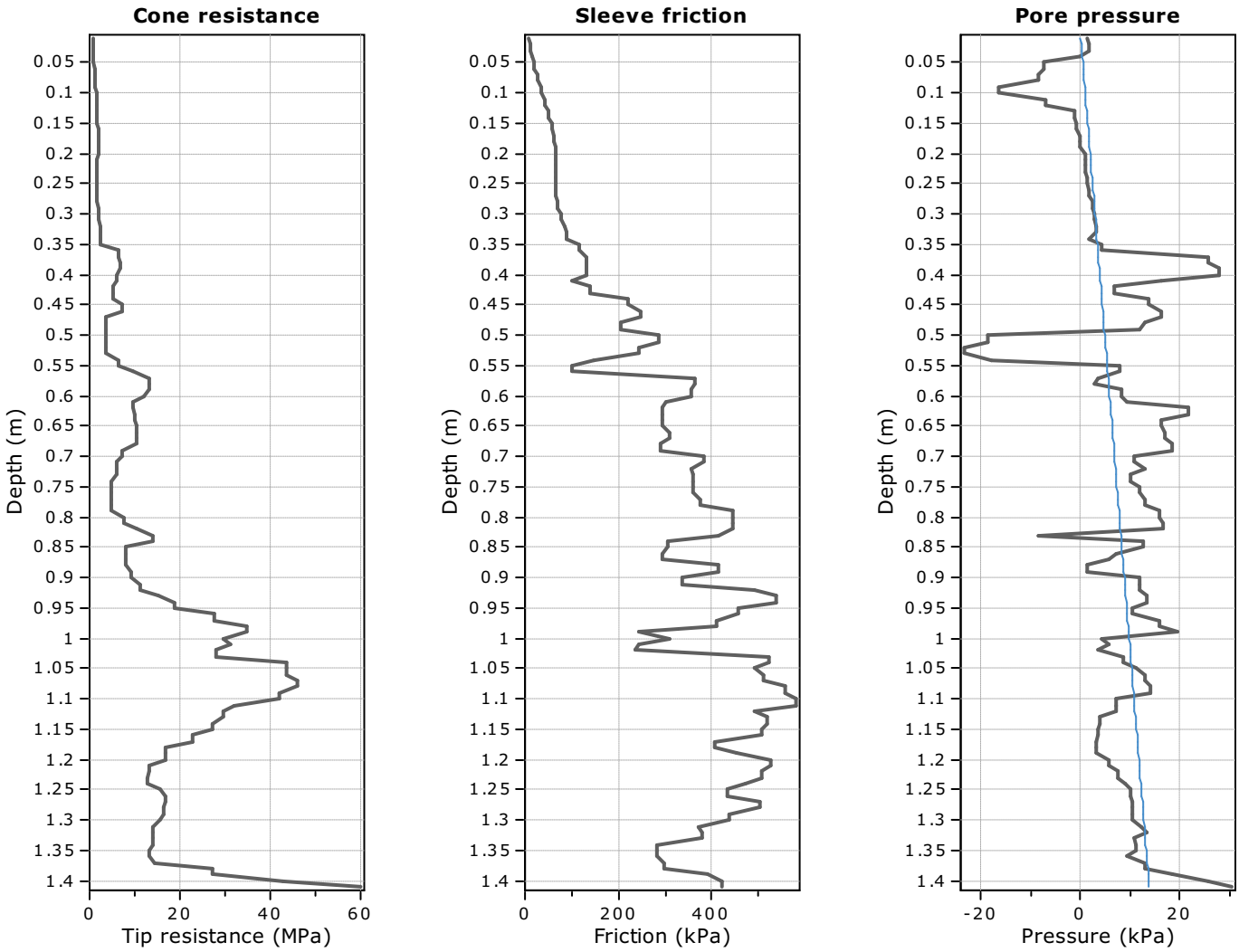
The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



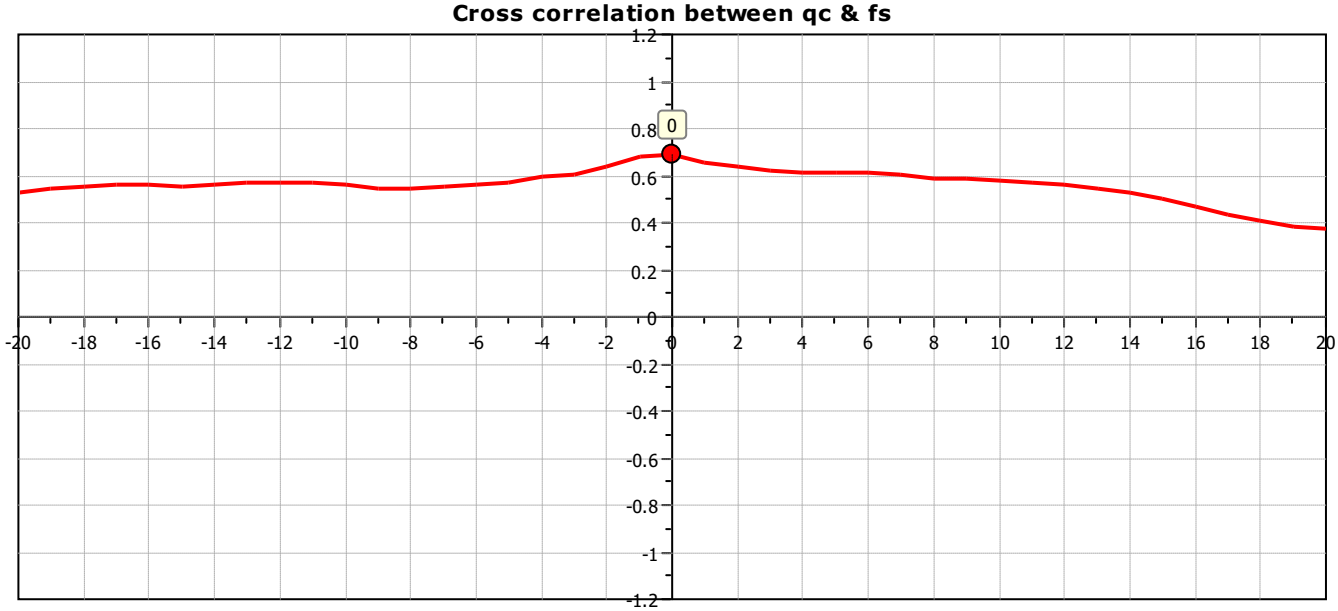
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+64211473249

Project: **Yorke Road Developments Ltd**
Location: **111 Yorke Road, Haruru**

CPT: CPT05
Total depth: 1.41 m, Date: 29/09/2022



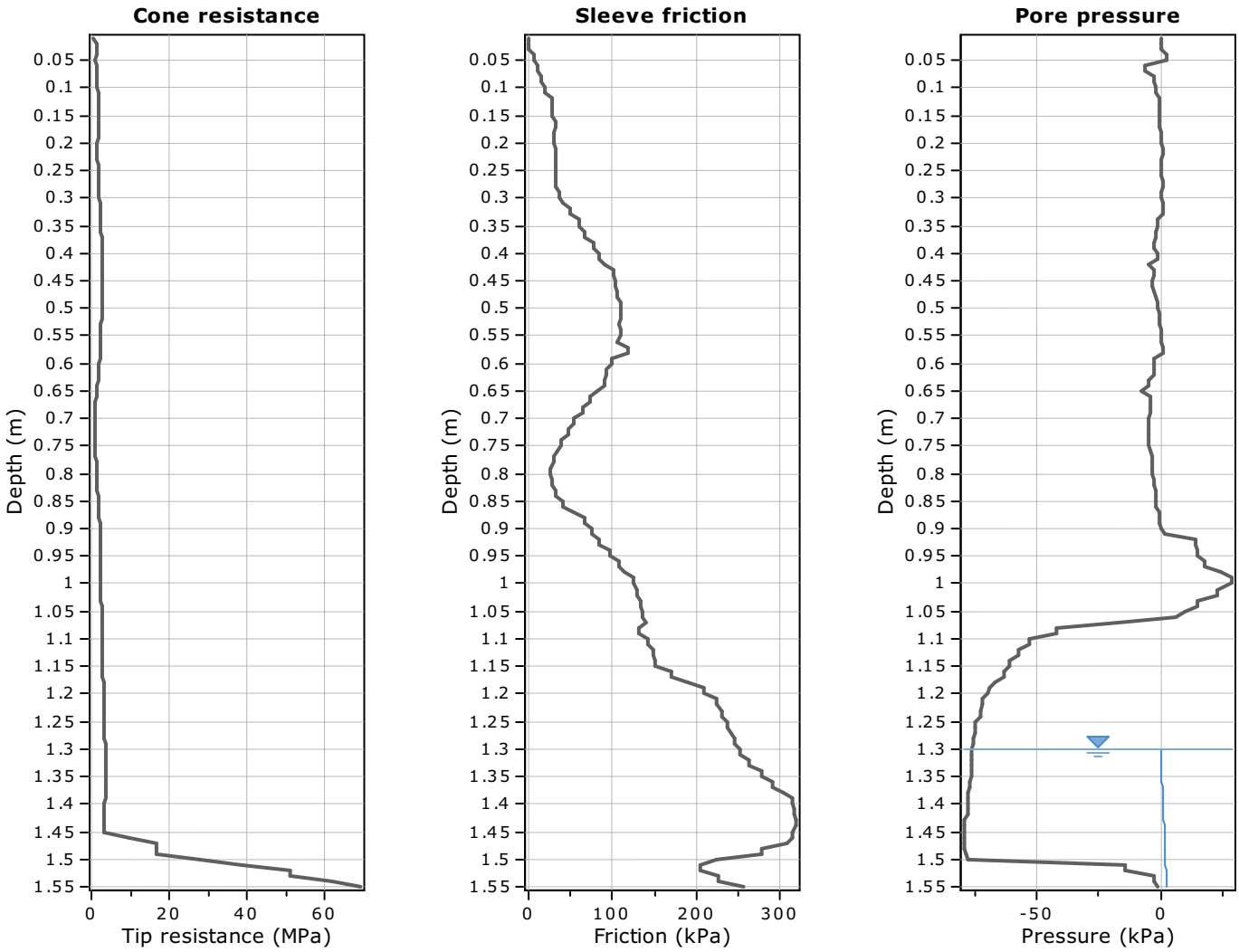
The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



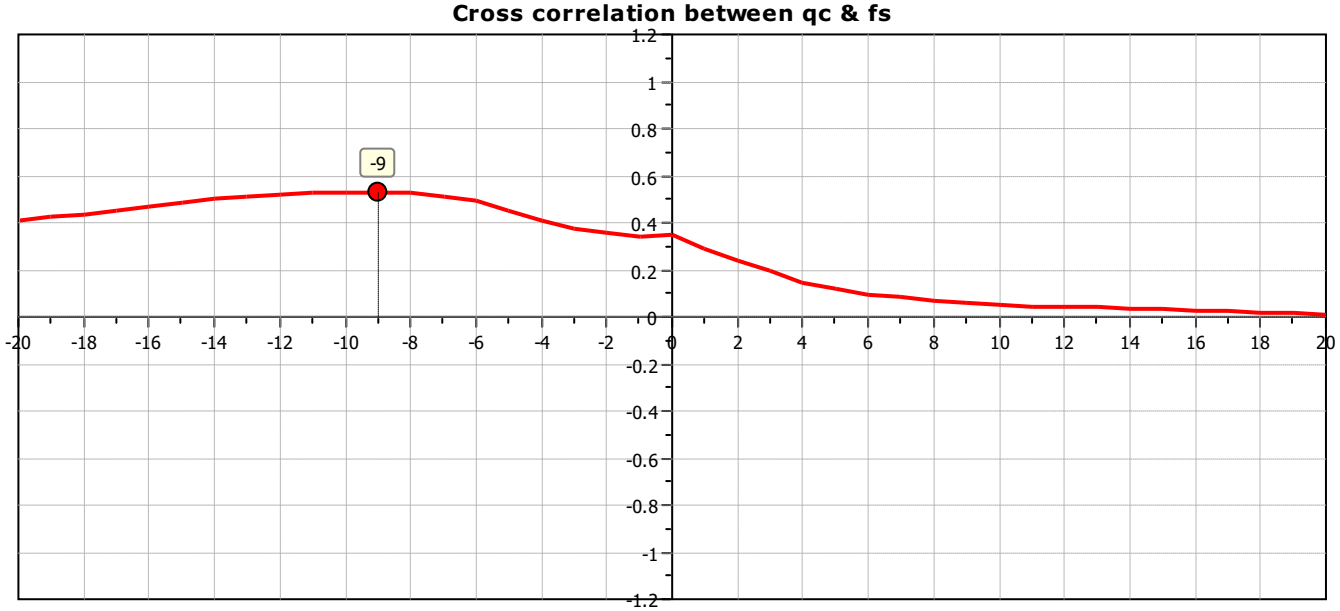
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Project: **Yorke Road Developments Ltd**
Location: **111 Yorke Road, Haruru**

CPT: CPT06
Total depth: 1.55 m, Date: 29/09/2022



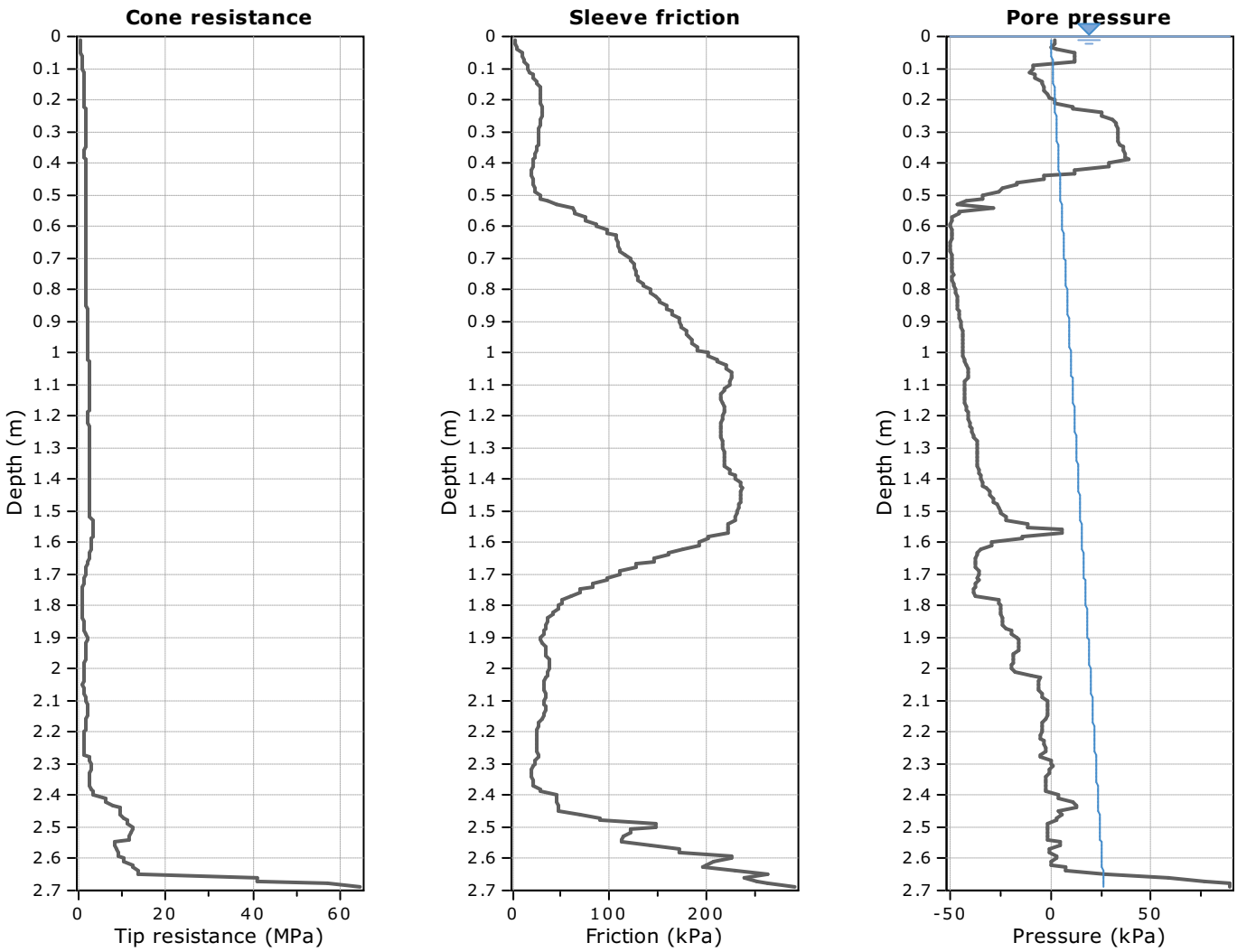
The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



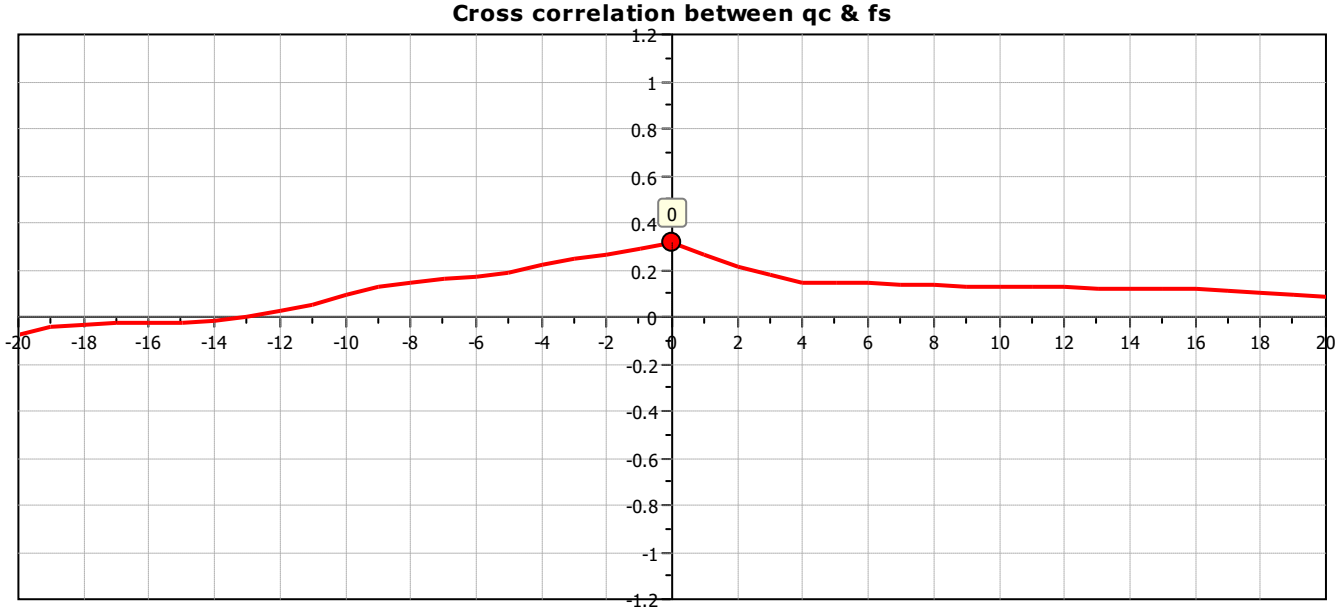
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+64211473249

Project: **Yorke Road Developments Ltd**
Location: **111 Yorke Road, Haruru**

CPT: CPT07
Total depth: 2.69 m, Date: 29/09/2022



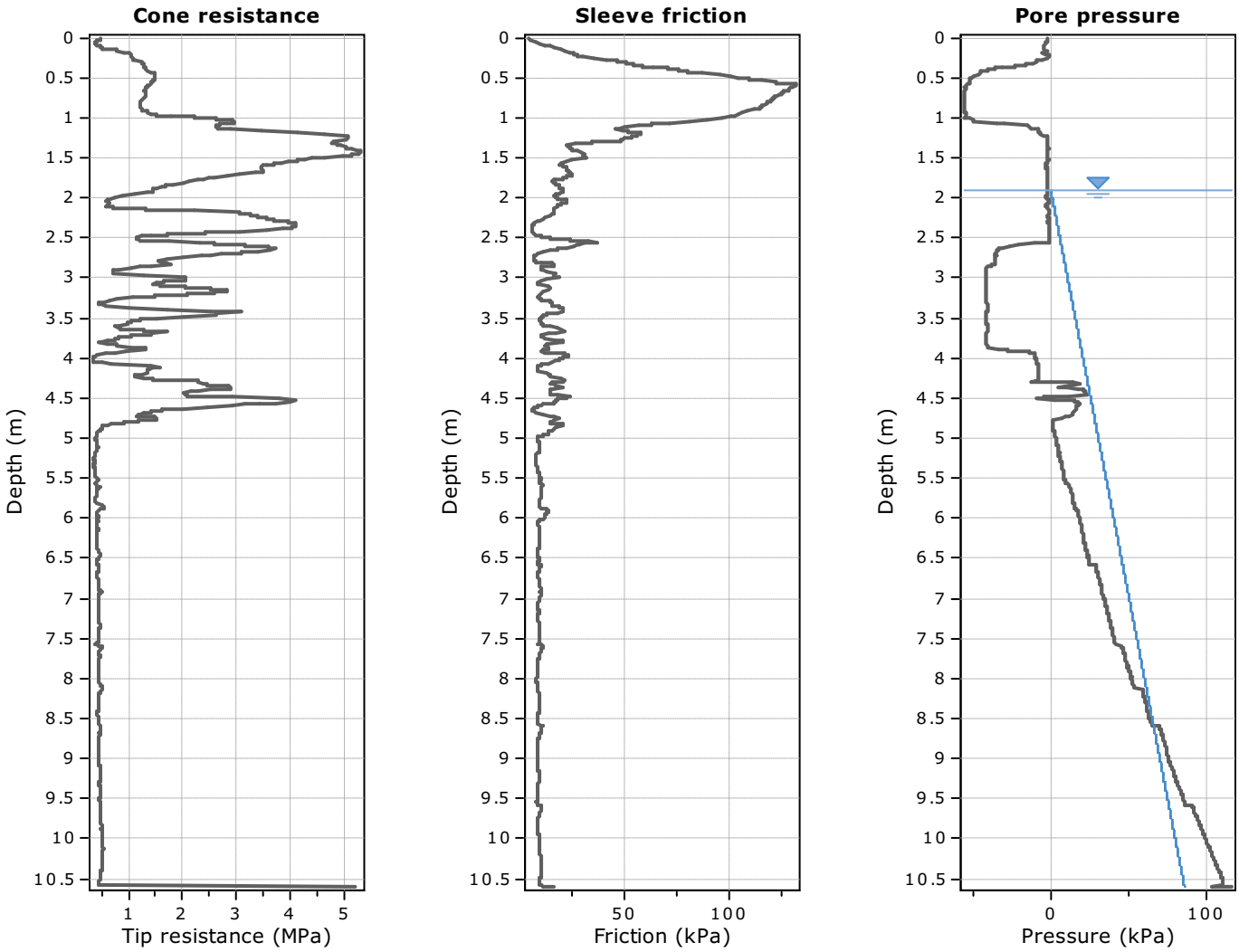
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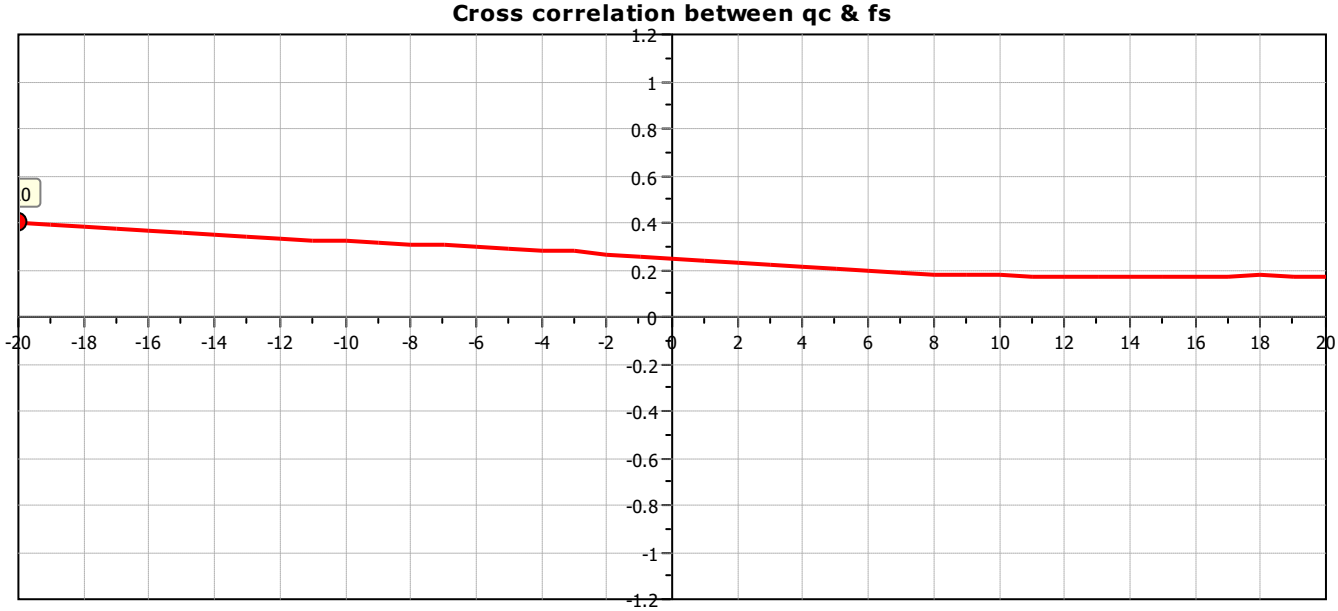
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Project: **Yorke Road Developments**
Location: **111 Yorke Road, Haruru**

CPT: CPT08
Total depth: 10.60 m, Date: 20/11/2022



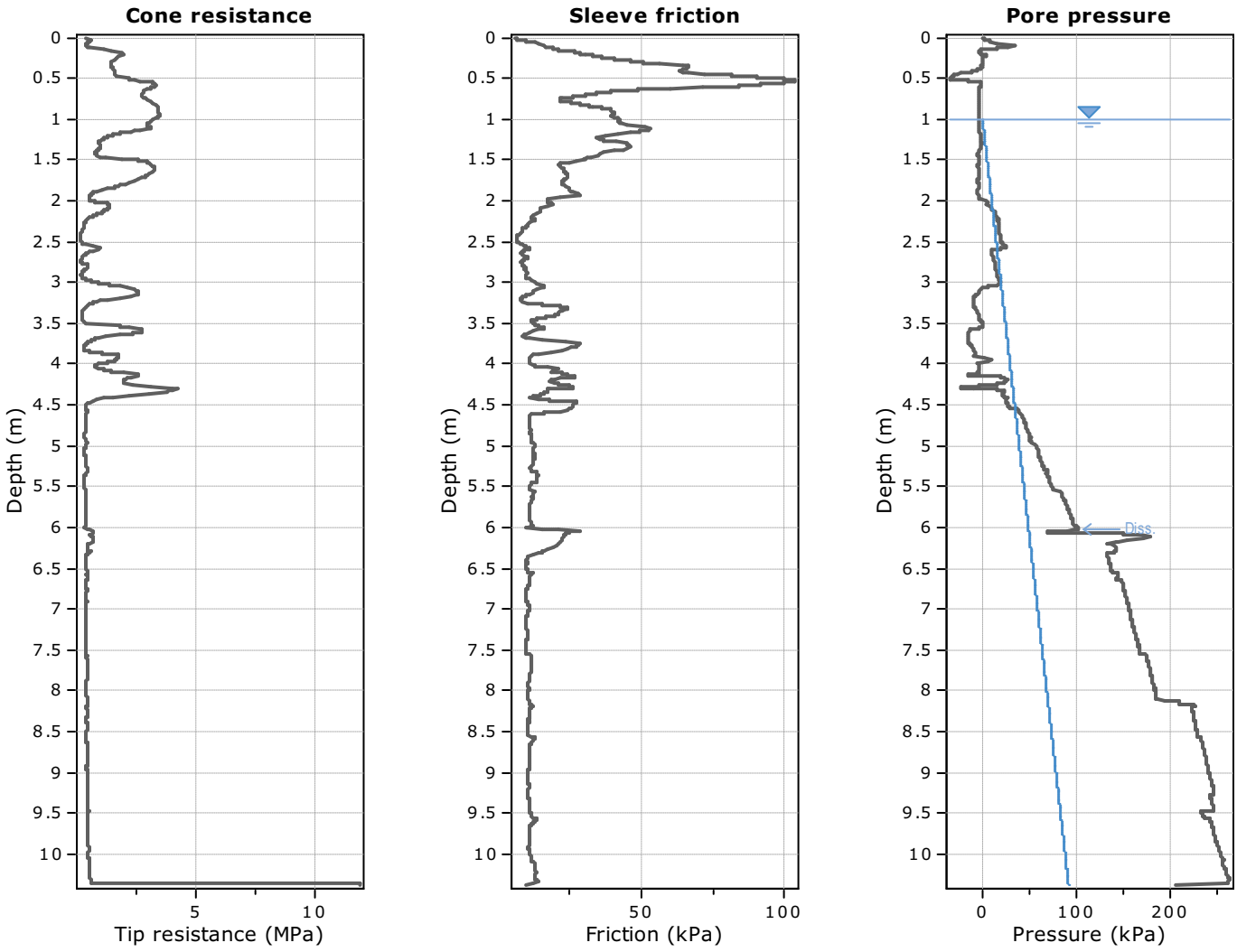
The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



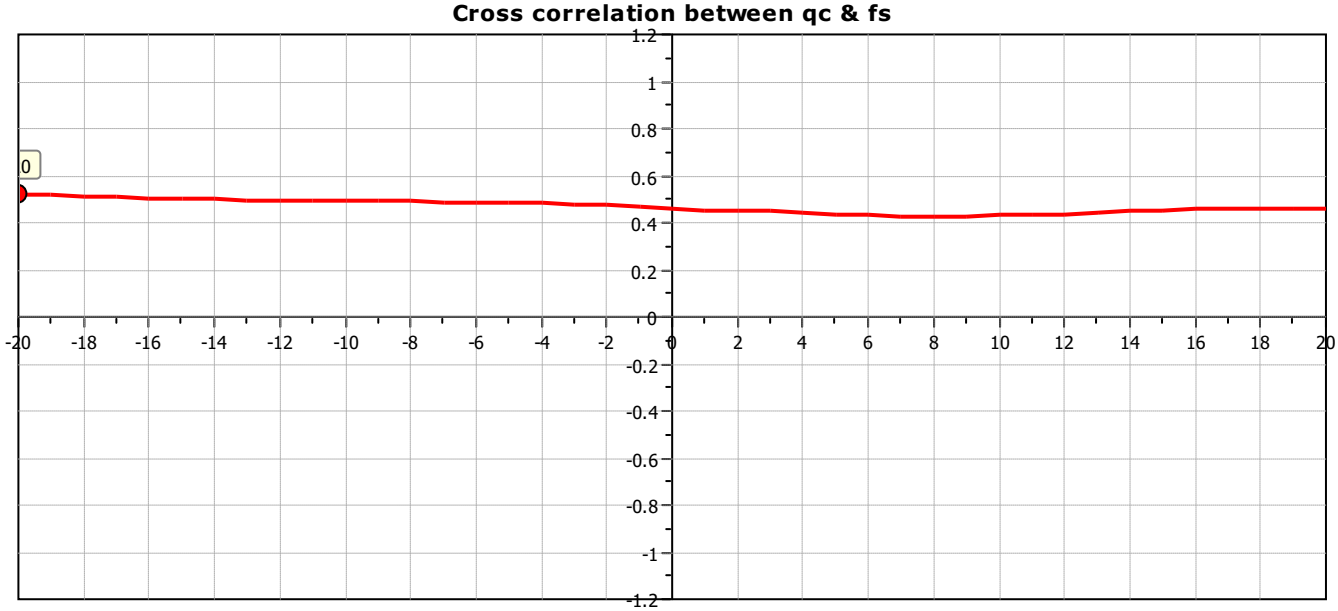
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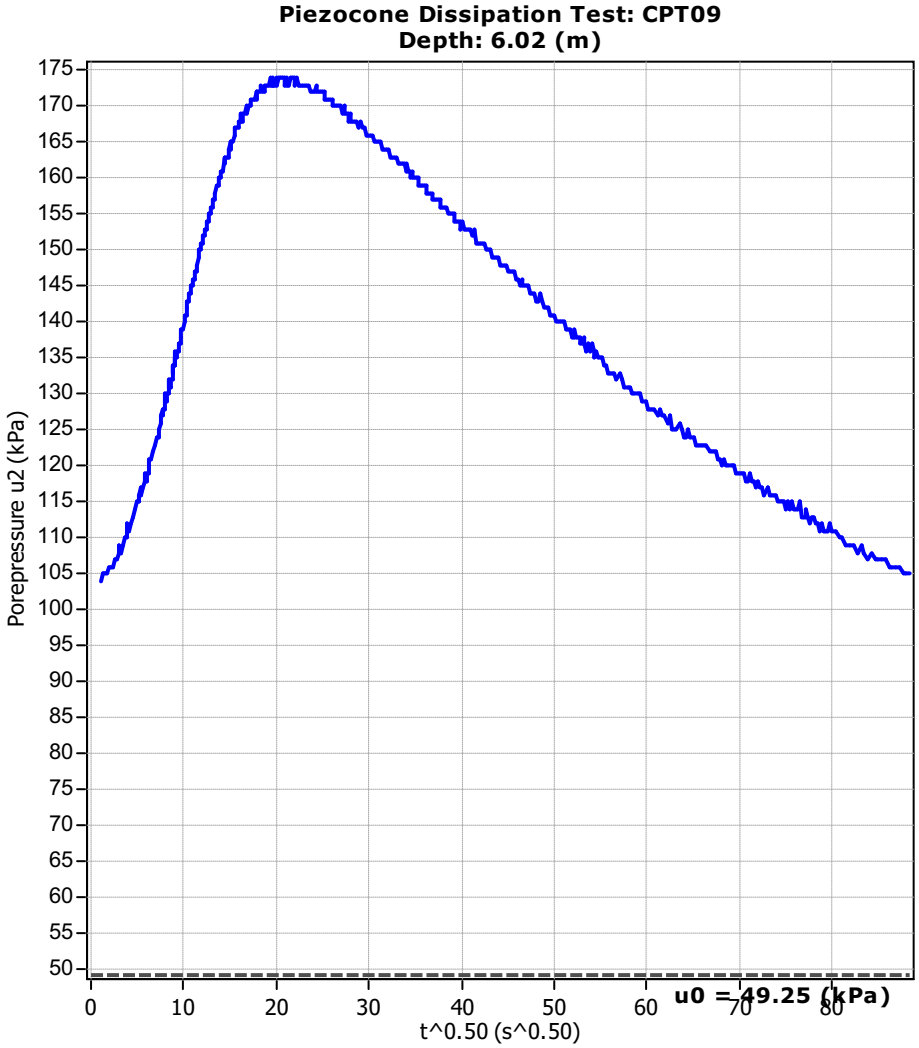
Project: **Yorke Road Developments**
Location: **111 Yorke Road, Haruru**

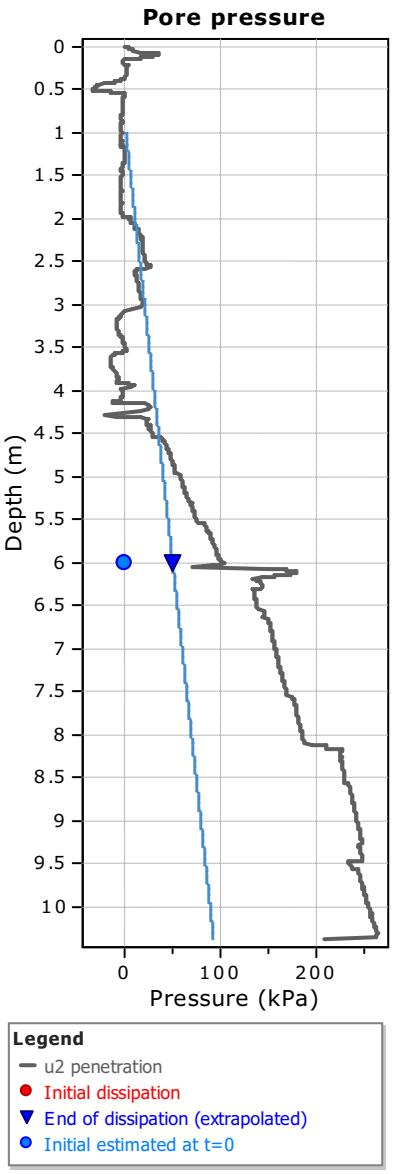
CPT: CPT09
Total depth: 10.38 m, Date: 20/11/2022



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).



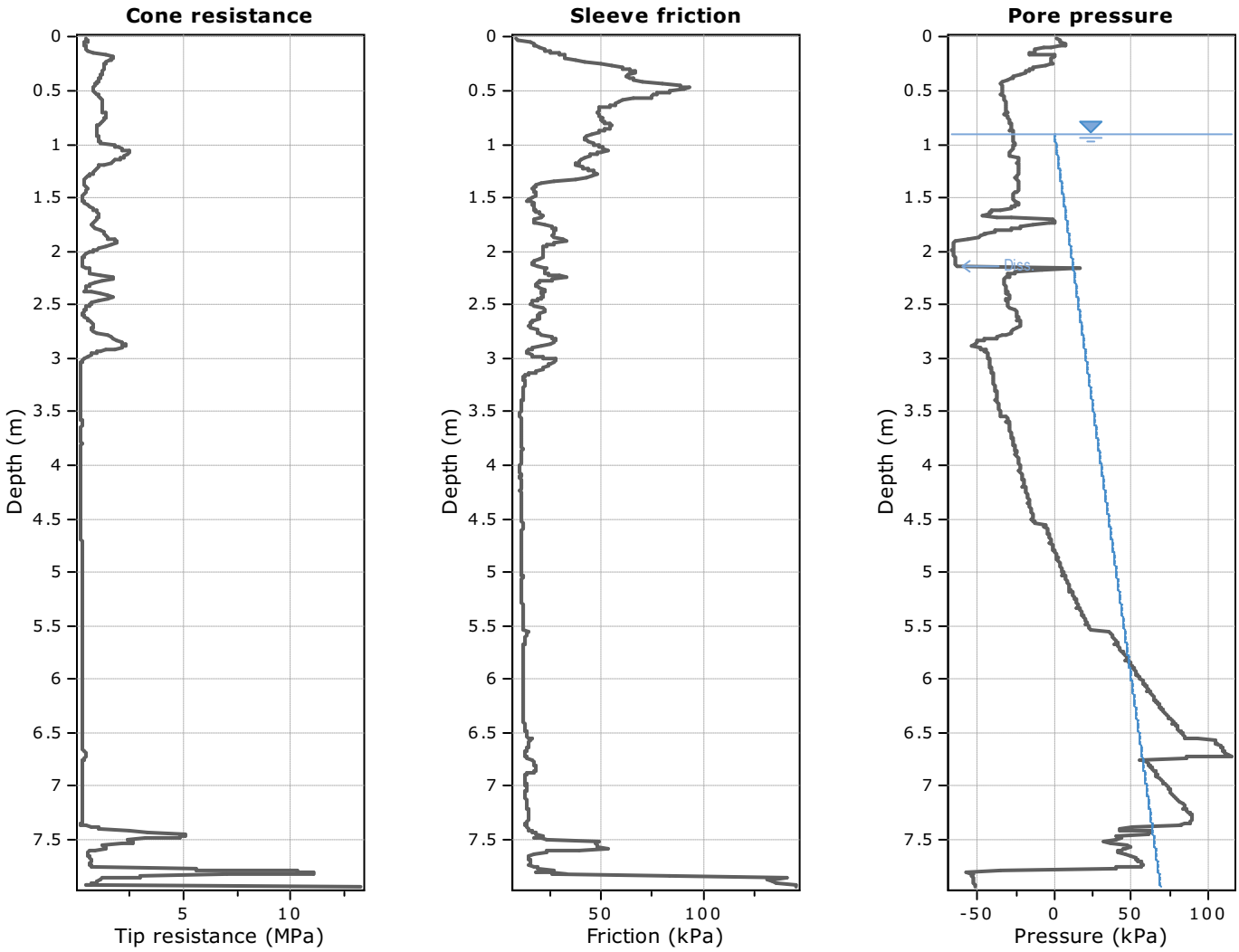

Piezocone Dissipation Test: CPT09
Depth: 6.02 (m)
Porepressure u2 (kPa)
t^0.50 (s^0.50)
u0 = 49.25 (kPa)


Pore pressure
Depth (m)
Pressure (kPa)
Legend
u2 penetration
Initial dissipation
End of dissipation (extrapolated)
Initial estimated at t=0

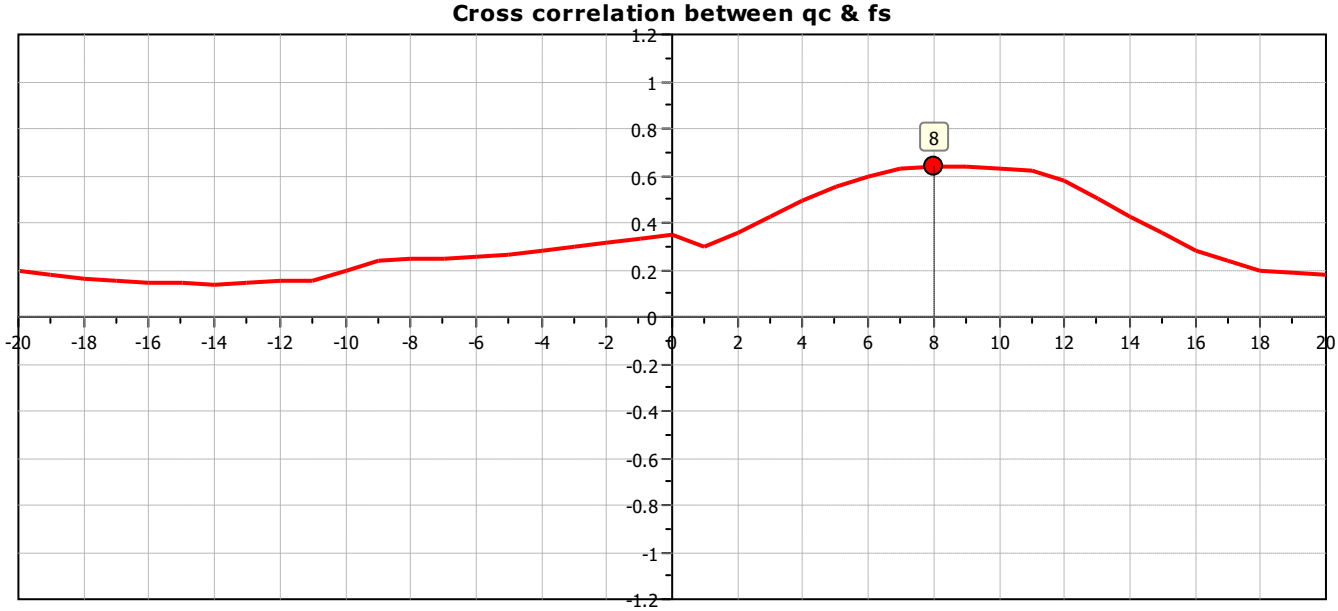
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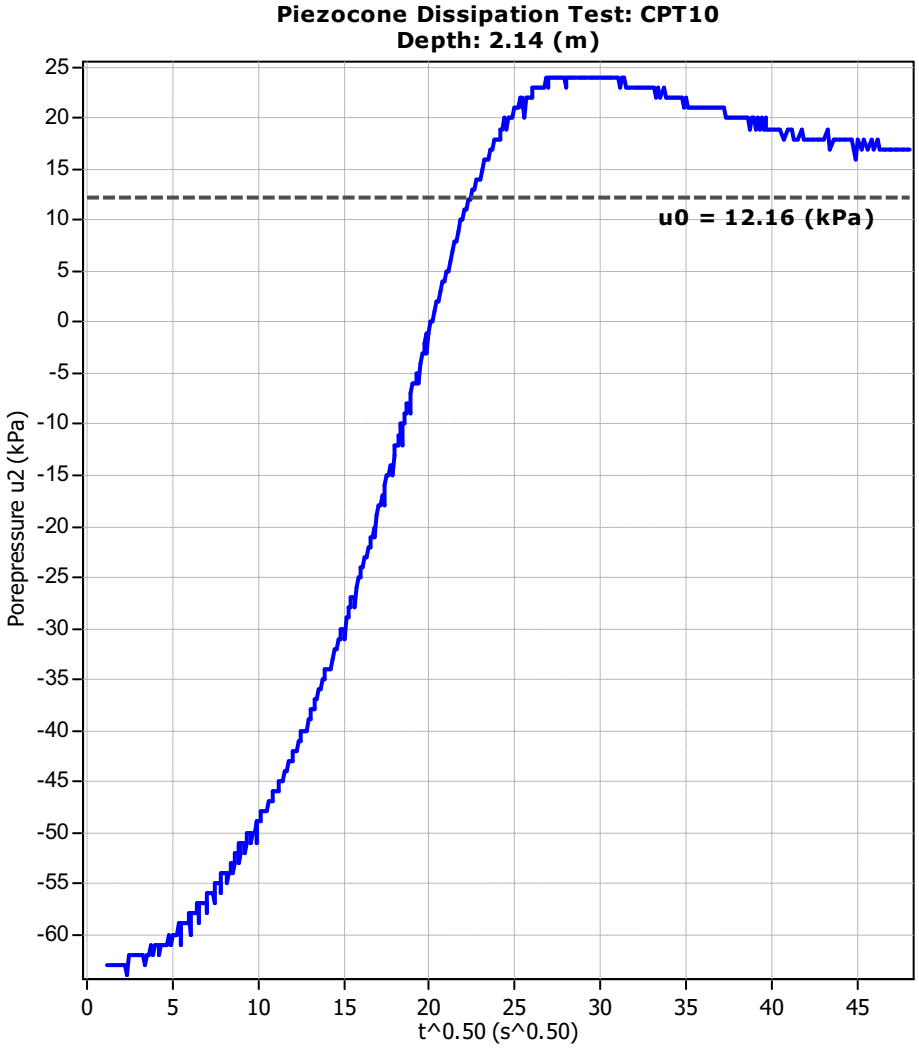
Project: **Yorke Road Developments**
Location: **111 Yorke Road, Haruru**

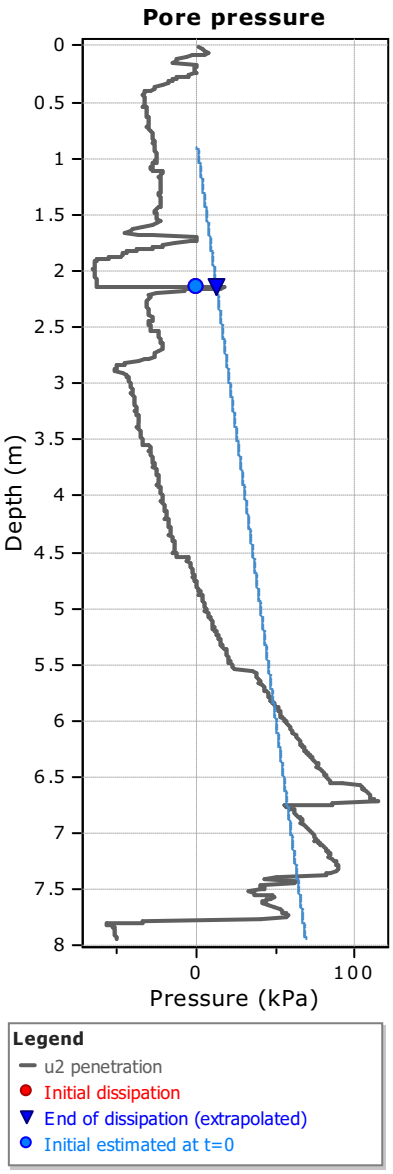
CPT: CPT10
Total depth: 7.94 m, Date: 20/11/2022



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).



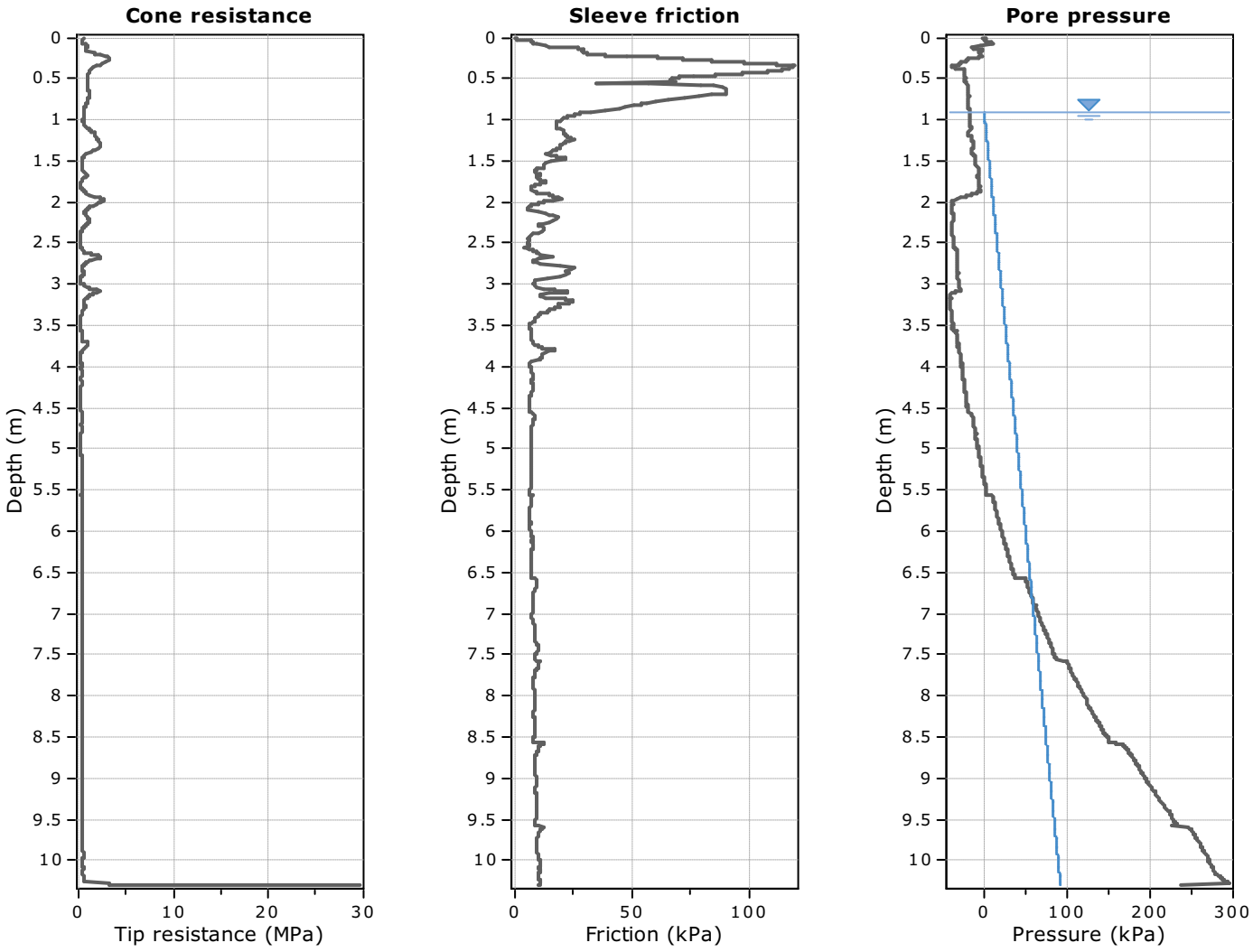

Piezocone Dissipation Test: CPT10
Depth: 2.14 (m)
u0 = 12.16 (kPa)
Porepressure u2 (kPa)
t^0.50 (s^0.50)


Pore pressure
Depth (m)
Pressure (kPa)
Legend
u2 penetration
Initial dissipation
End of dissipation (extrapolated)
Initial estimated at t=0

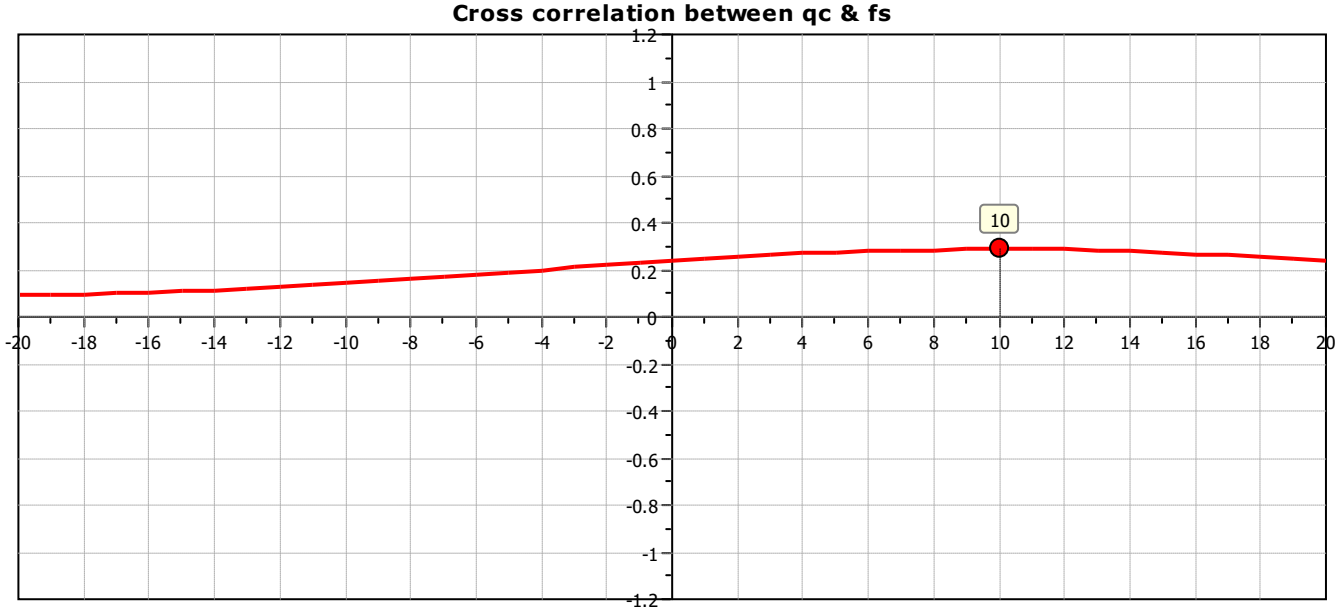
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Project: **Yorke Road Developments**
Location: **111 Yorke Road, Haruru**

CPT: CPT11
Total depth: 10.30 m, Date: 20/11/2022



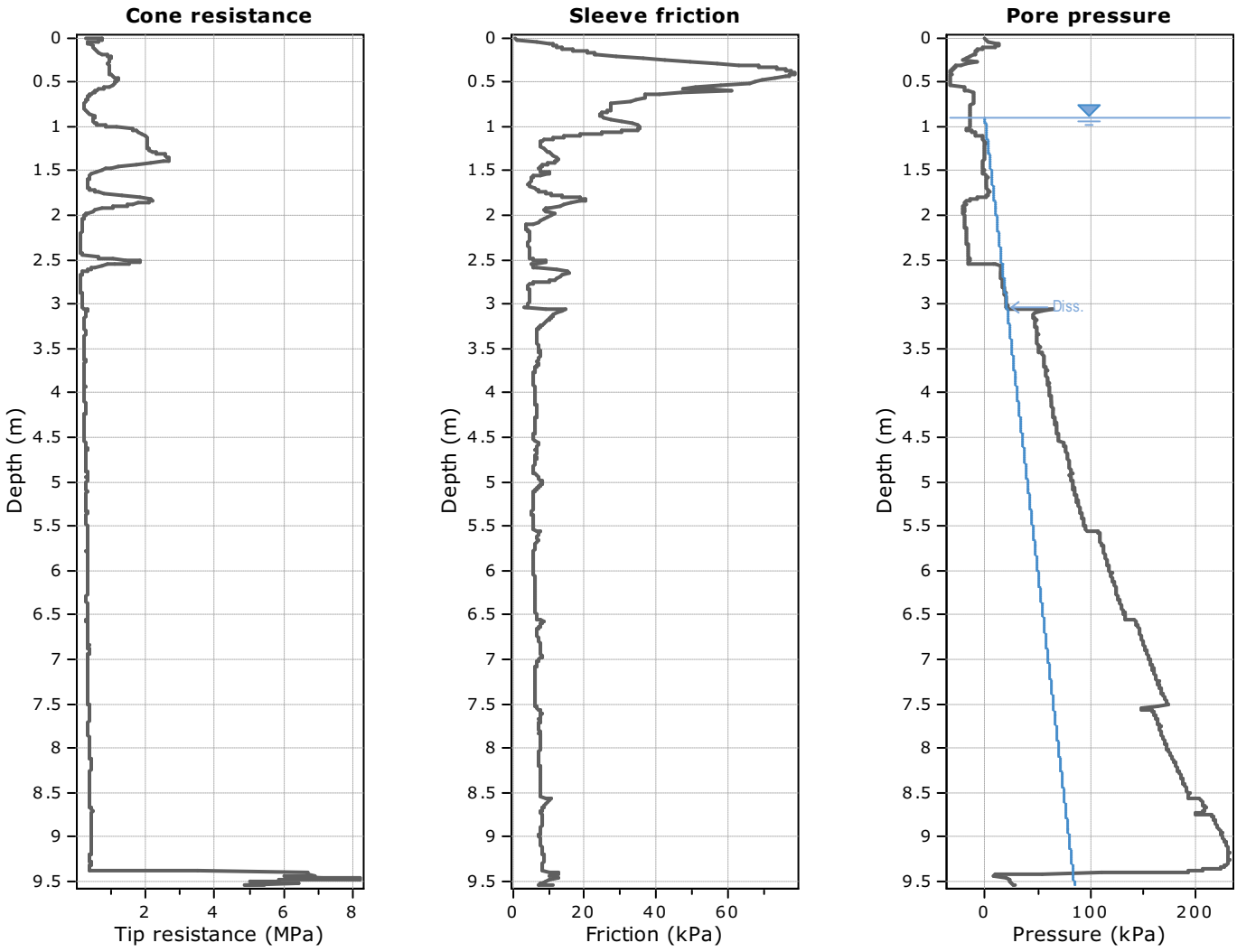
The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



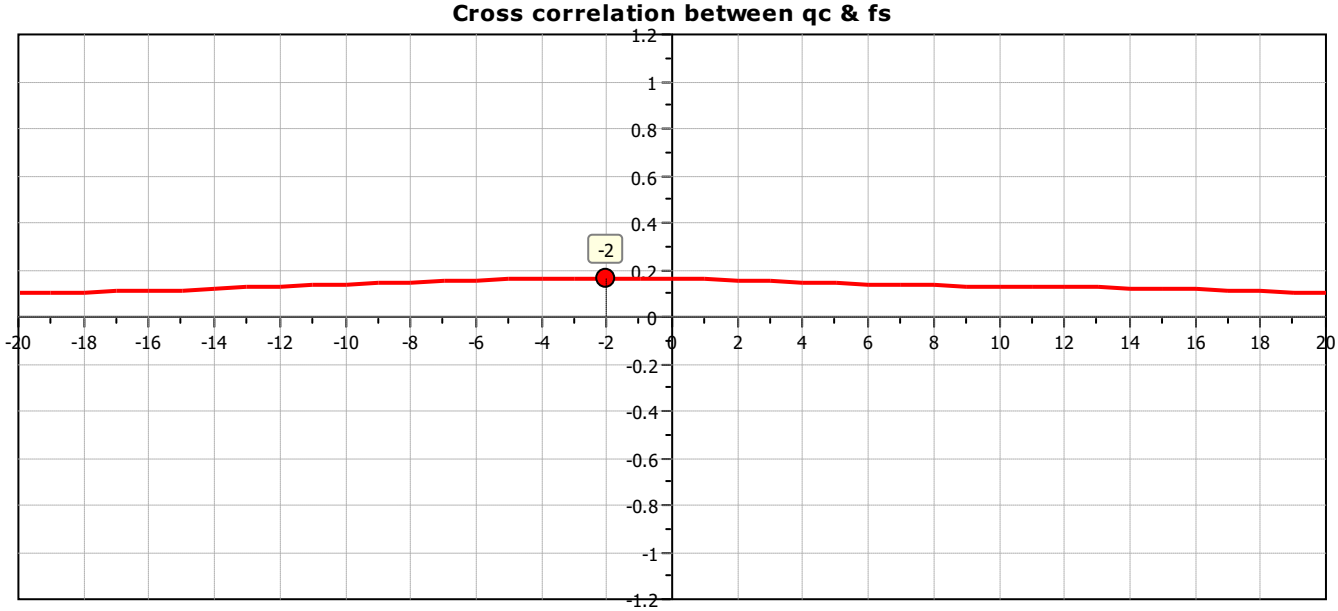
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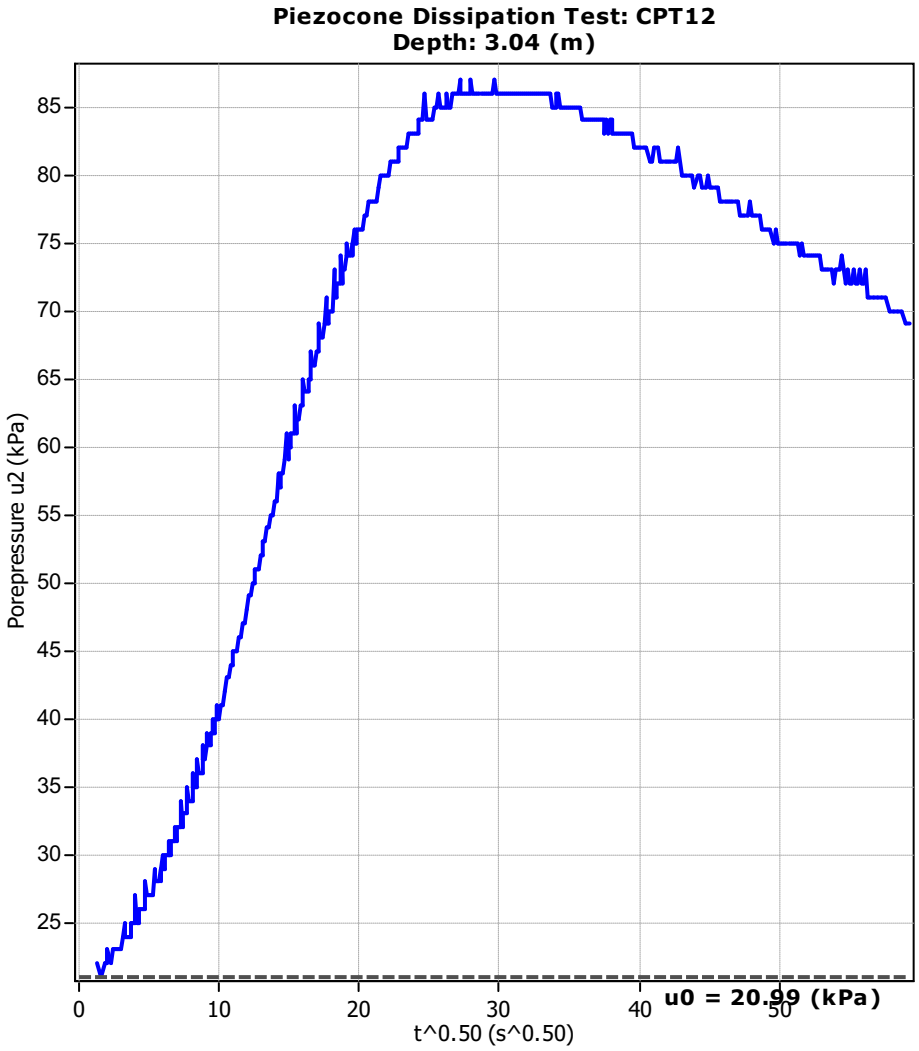
Project: **Yorke Road Developments**
Location: **111 Yorke Road, Haruru**

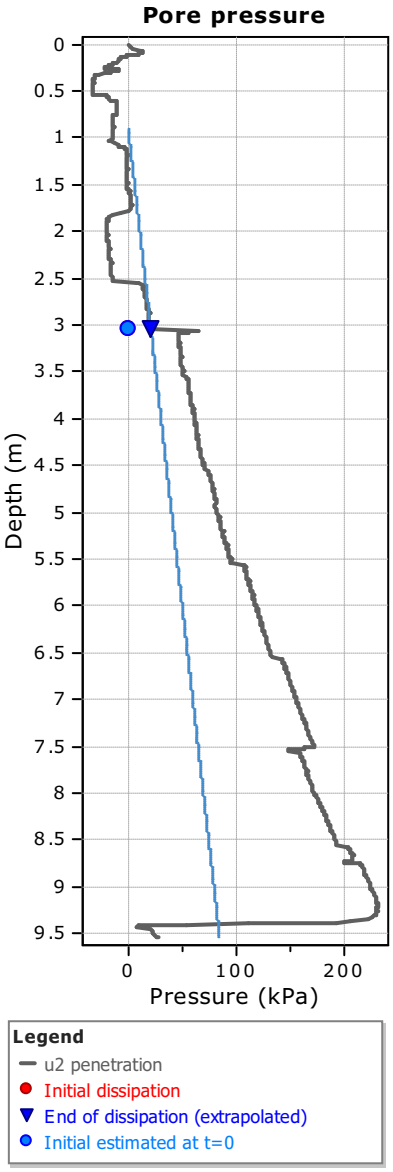
CPT: CPT12
Total depth: 9.54 m, Date: 20/11/2022



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).



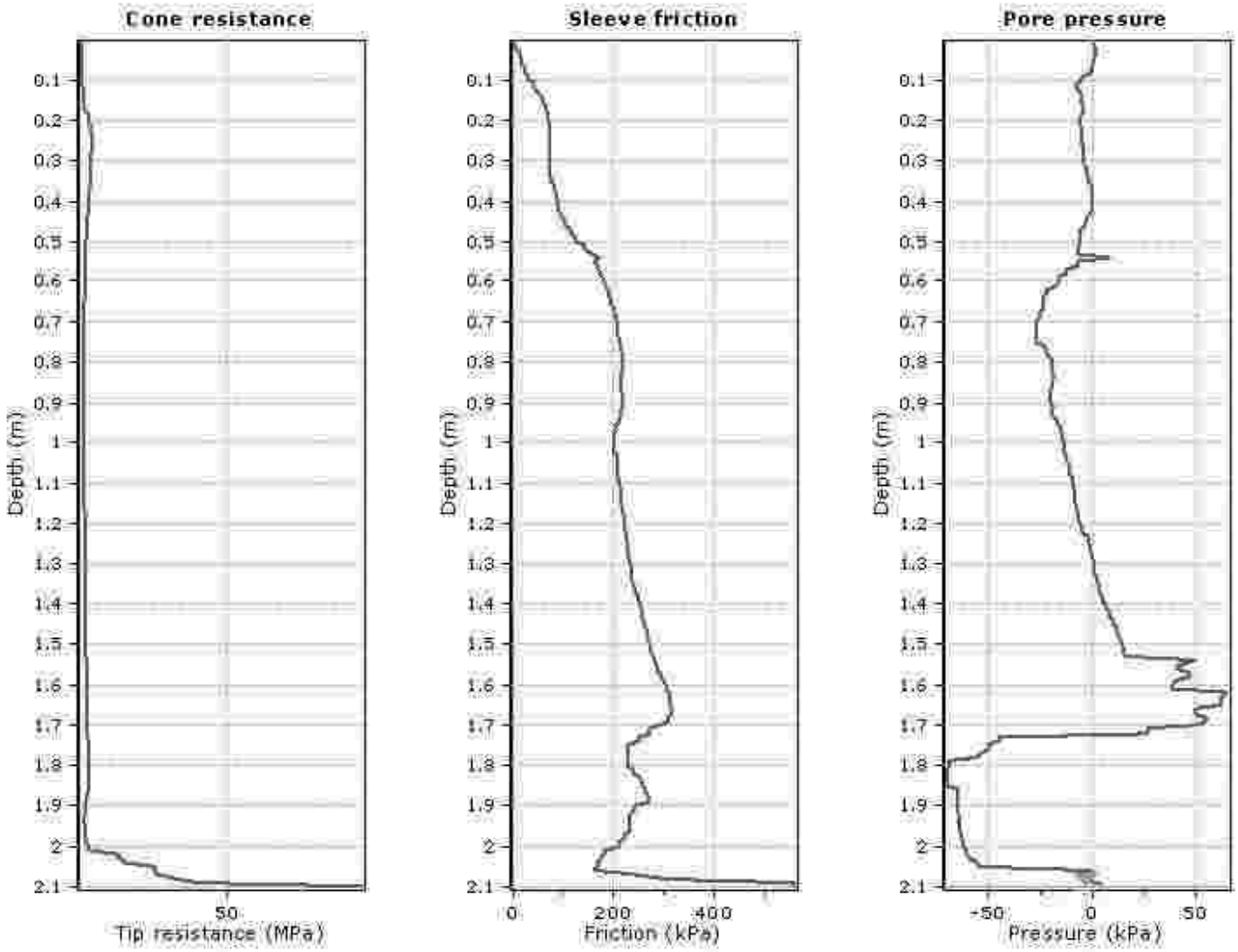

Piezocone Dissipation Test: CPT12
Depth: 3.04 (m)
Porepressure u2 (kPa)
t^0.50 (s^0.50)
u0 = 20.99 (kPa)


Pore pressure
Depth (m)
Pressure (kPa)
Legend
u2 penetration
Initial dissipation
End of dissipation (extrapolated)
Initial estimated at t=0

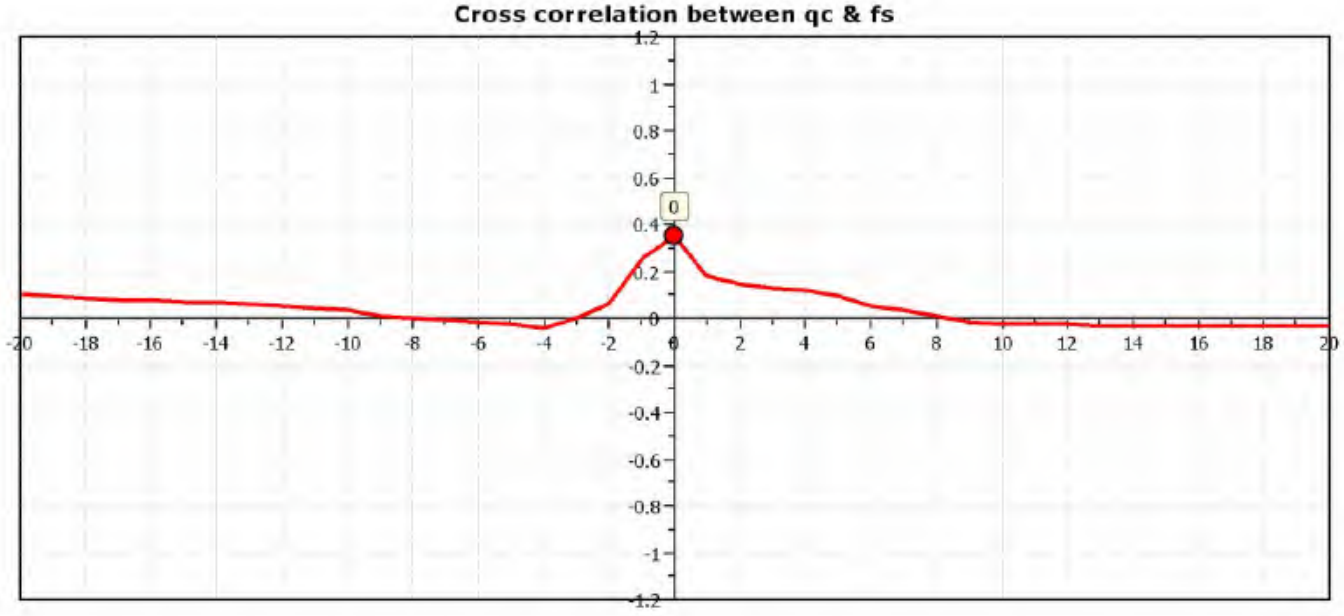
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+64211473249

Project: **East Property Investments Ltd**
Location: **111 & 115 Yorke Road, Haruru**

CPT: CPT13
Total depth: 2.10 m, Date: 31/03/2023



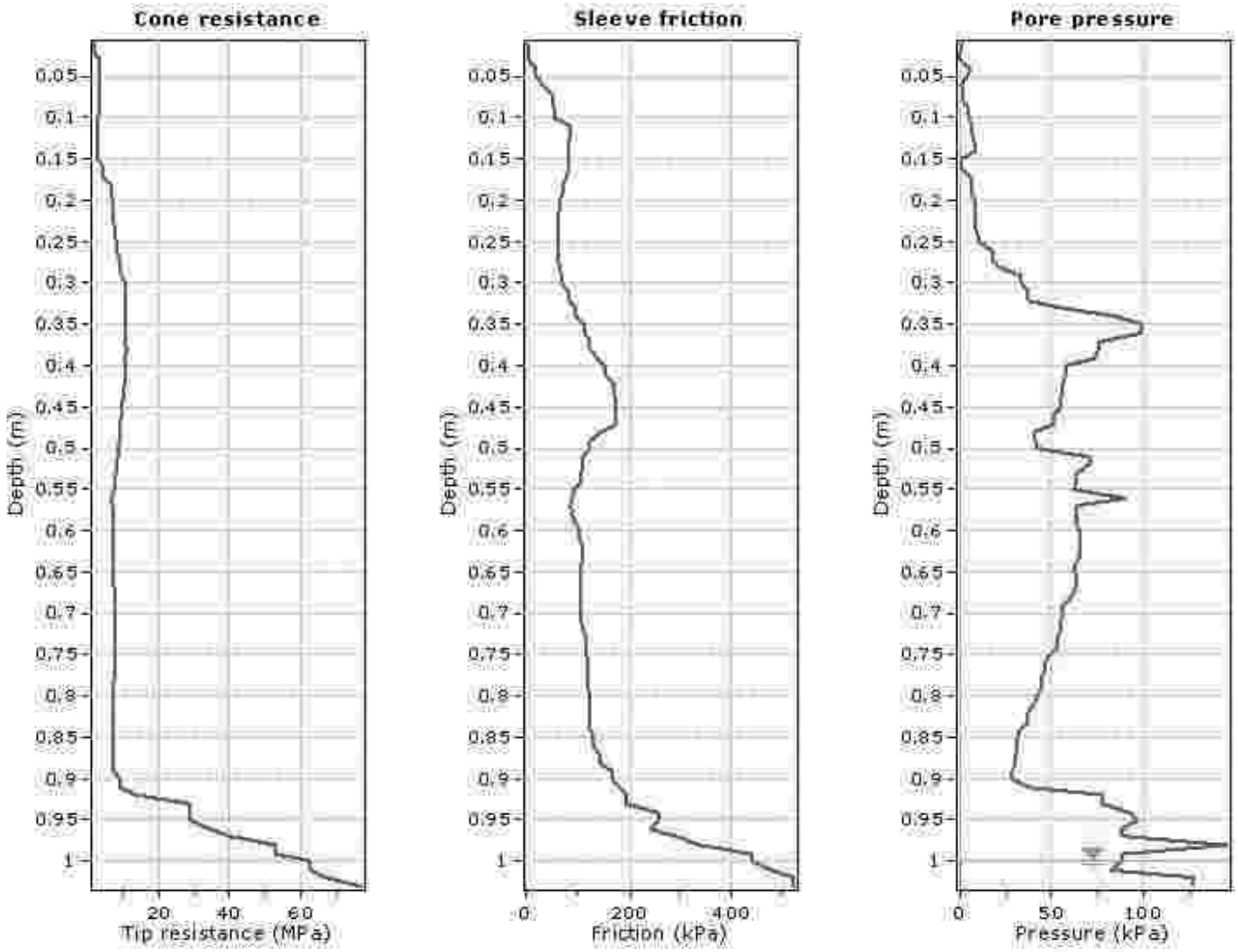
The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



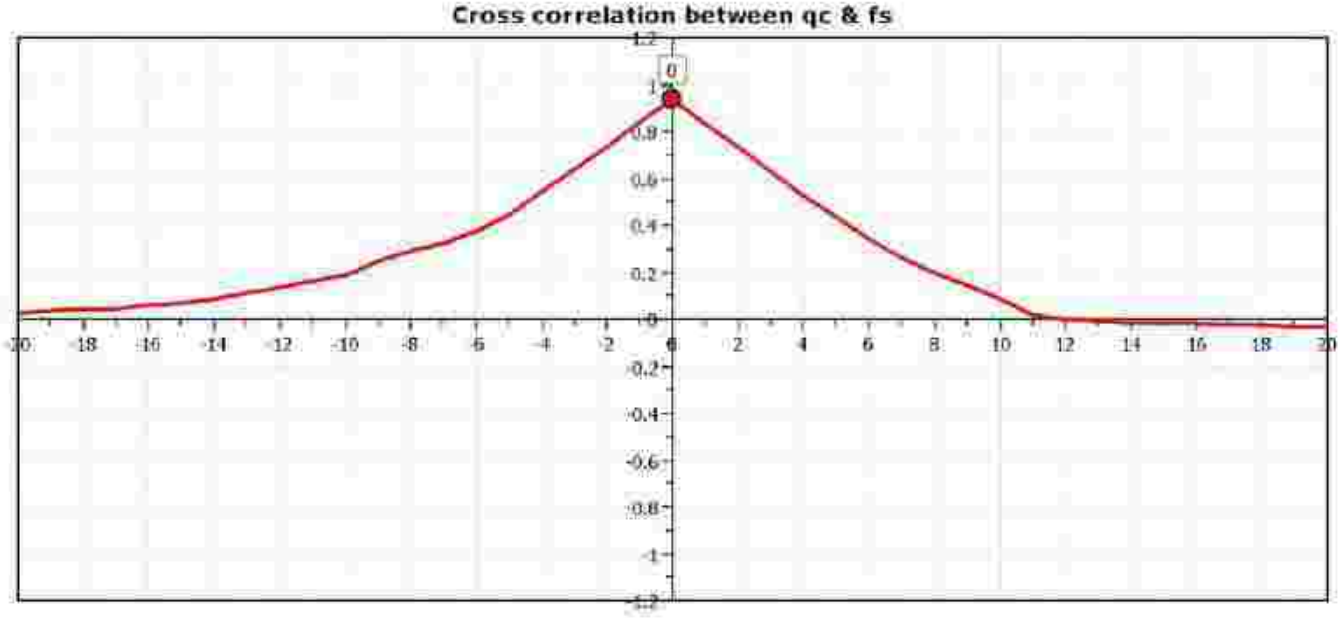
Underground Investigation Ltd
Cone Penetration Testing
craig@undergroundinvestigation.co.nz
+64211473249

Project: **East Property Investments Ltd**
Location: **111 & 115 Yorke Road, Haruru**

CPT: CPT14
Total depth: 1.03 m, Date: 31/03/2023



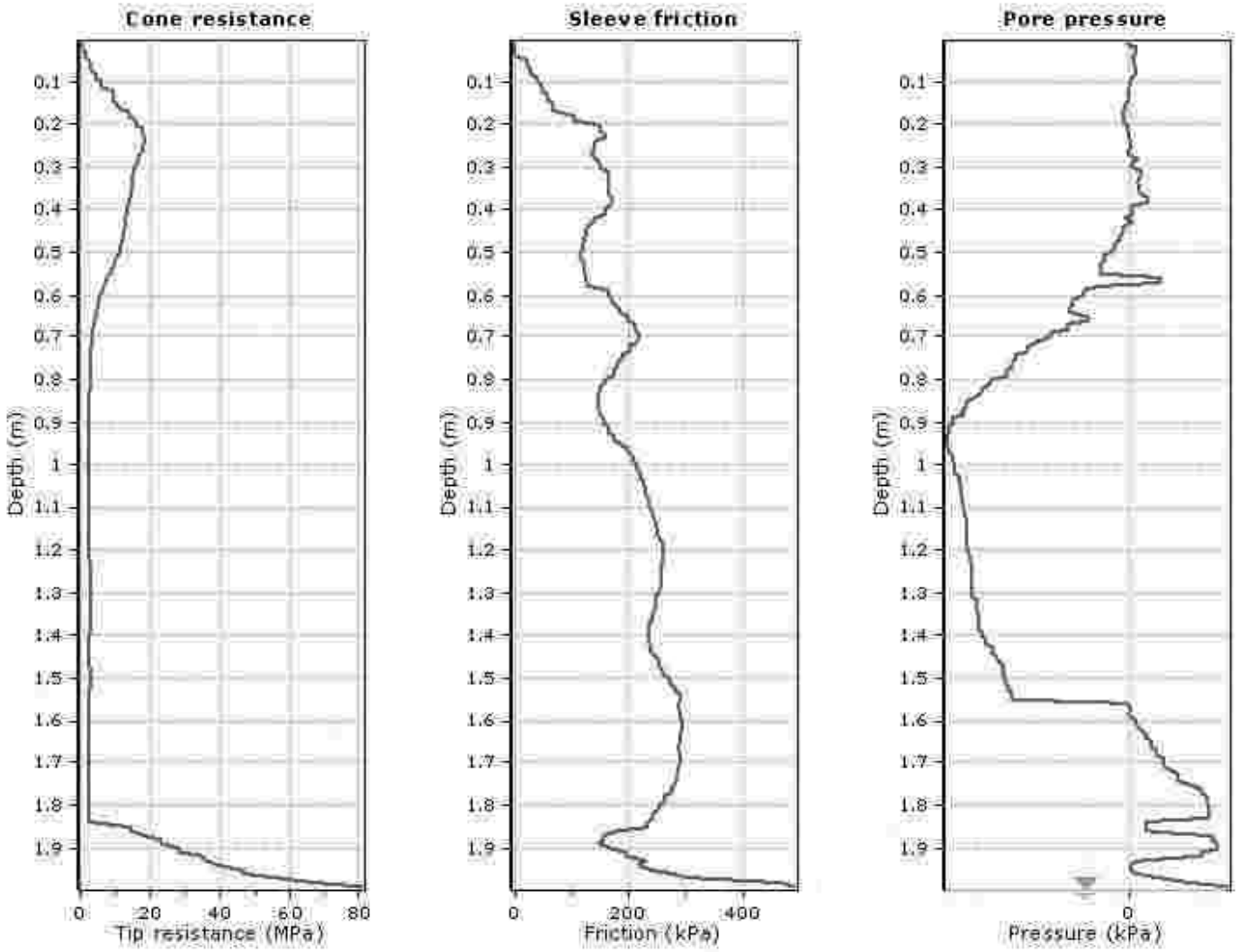
The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



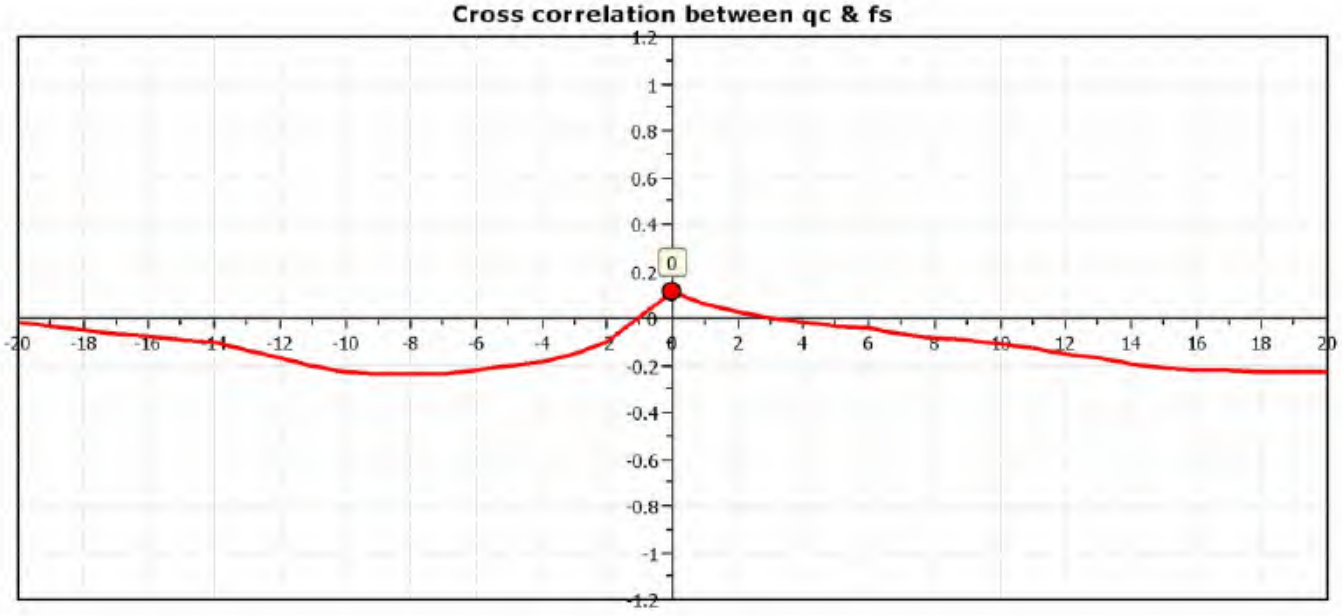
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Cone Penetration Testing
craig@undergroundinvestigation.co.nz
+64211473249

Project: **East Property Investments Ltd**
Location: **111 & 115 Yorke Road, Haruru**

CPT: CPT15
Total depth: 1.99 m, Date: 31/03/2023



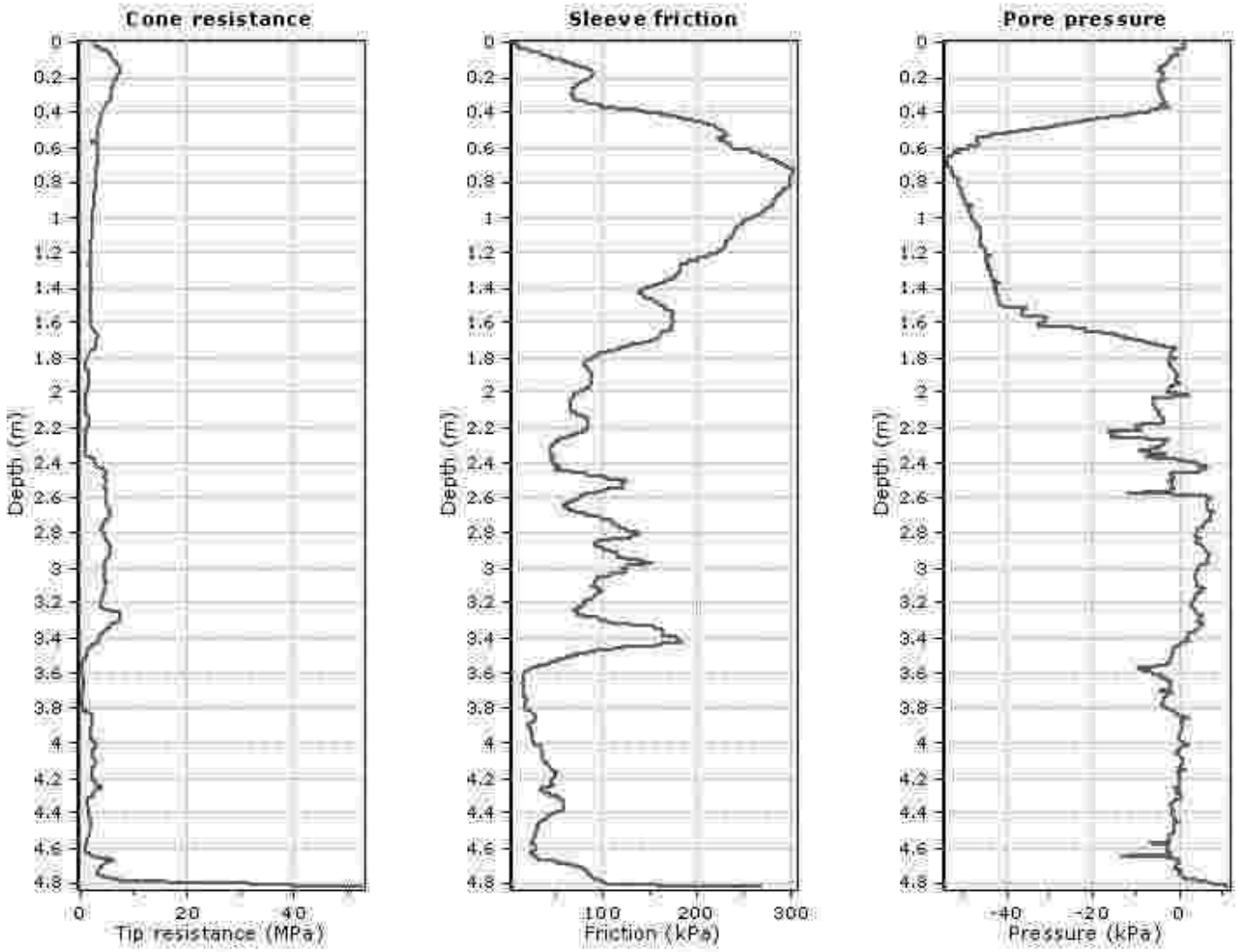
The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



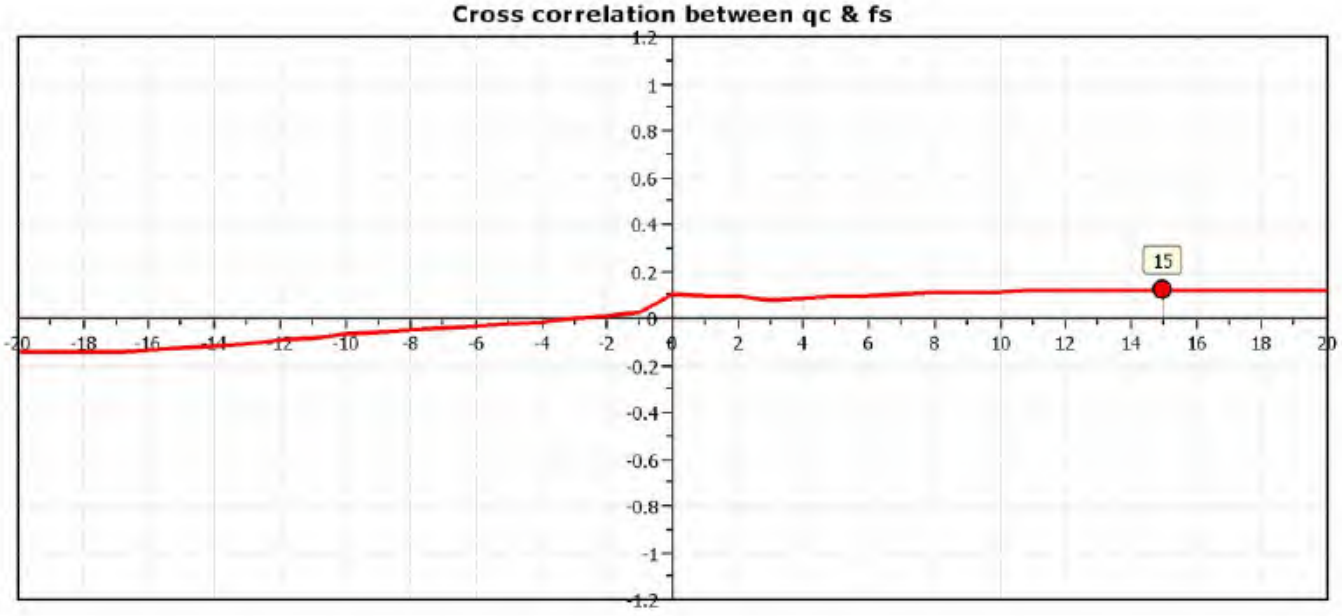
Underground Investigation Ltd
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craig@undergroundinvestigation.co.nz
+64211473249

Project: **East Property Investments Ltd**
Location: **111 & 115 Yorke Road, Haruru**

CPT: CPT16
Total depth: 4.82 m, Date: 31/03/2023



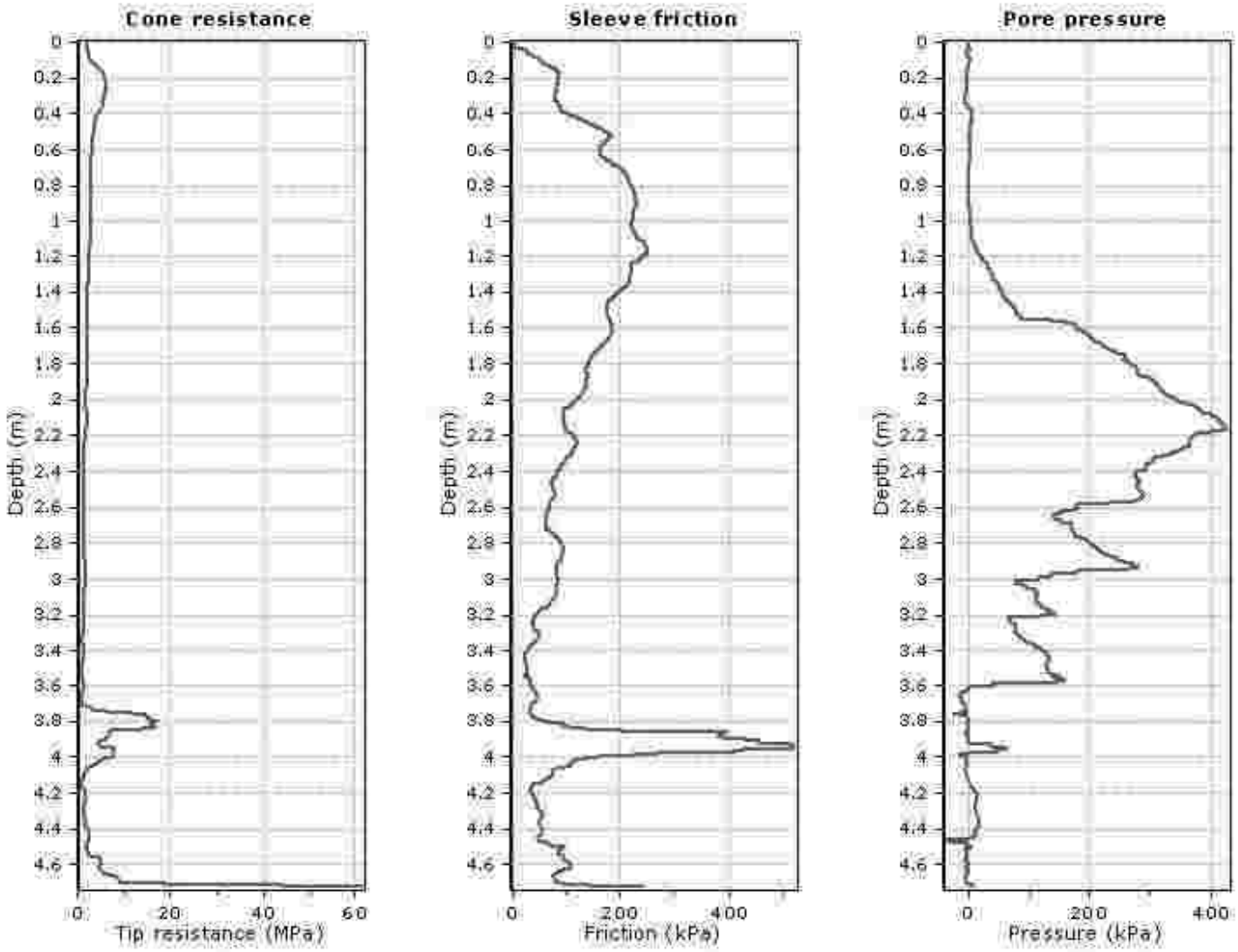
The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



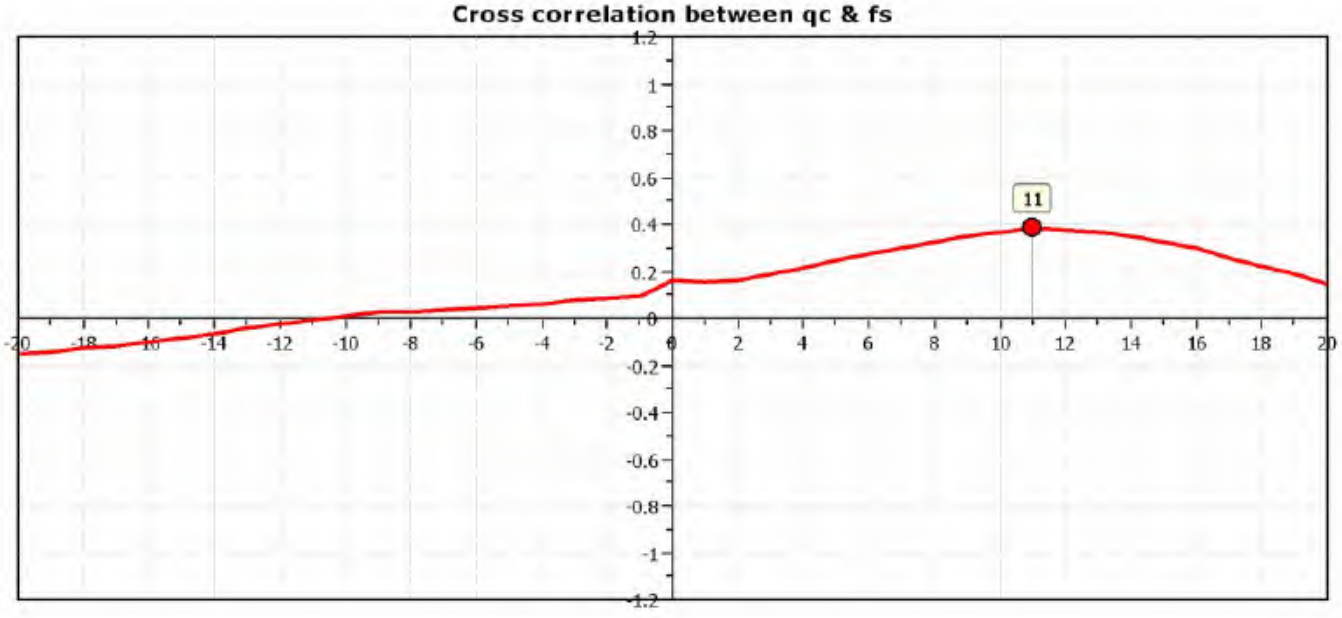
Underground Investigation Ltd
Cone Penetration Testing
craig@undergroundinvestigation.co.nz
+64211473249

Project: **East Property Investments Ltd**
Location: **111 & 115 Yorke Road, Haruru**

CPT: CPT17
Total depth: 4.72 m, Date: 31/03/2023



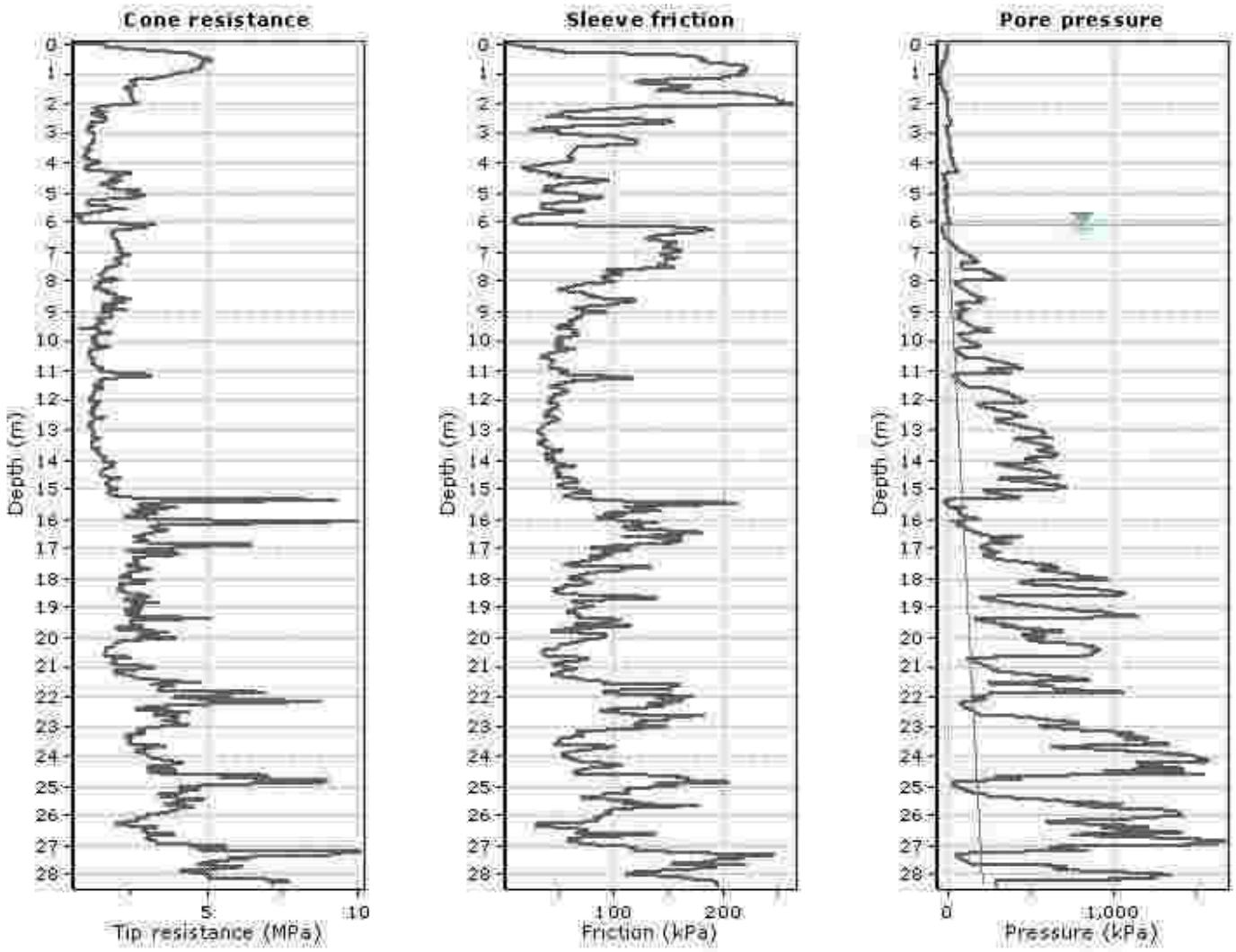
The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



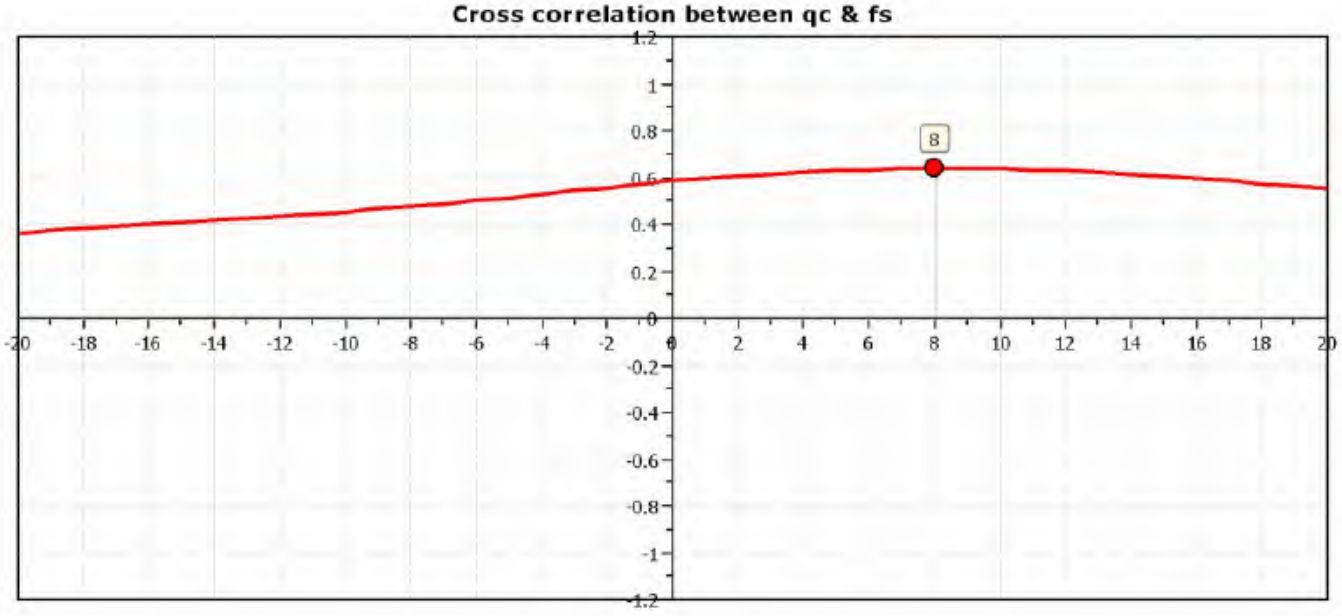
Underground Investigation Ltd
Cone Penetration Testing
craig@undergroundinvestigation.co.nz
+64211473249

Project: **East Property Investments Ltd**
Location: **111 & 115 Yorke Road, Haruru**

CPT: CPT18
Total depth: 28.35 m, Date: 31/03/2023



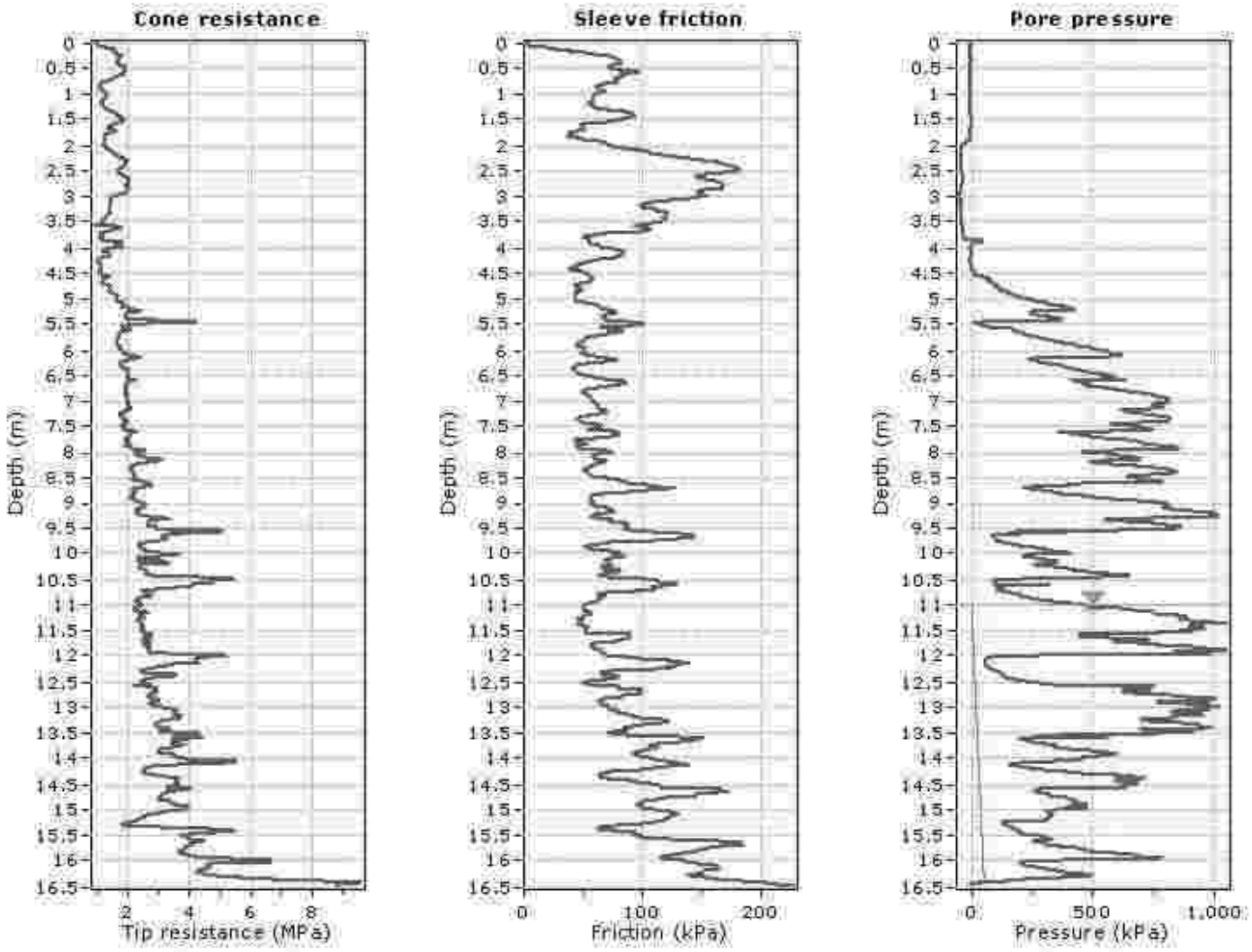
The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



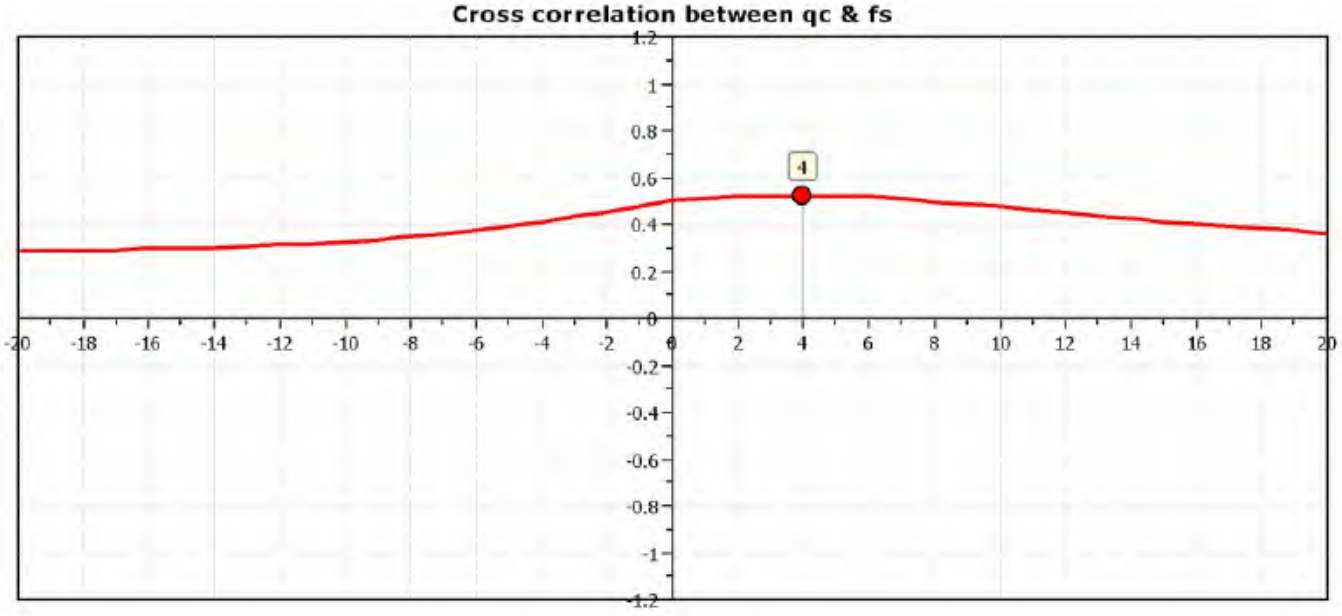
Underground Investigation Ltd
Cone Penetration Testing
craig@undergroundinvestigation.co.nz
+64211473249

Project: **East Property Investments Ltd**
Location: **111 & 115 Yorke Road, Haruru**

CPT: CPT19
Total depth: 16.48 m, Date: 31/03/2023



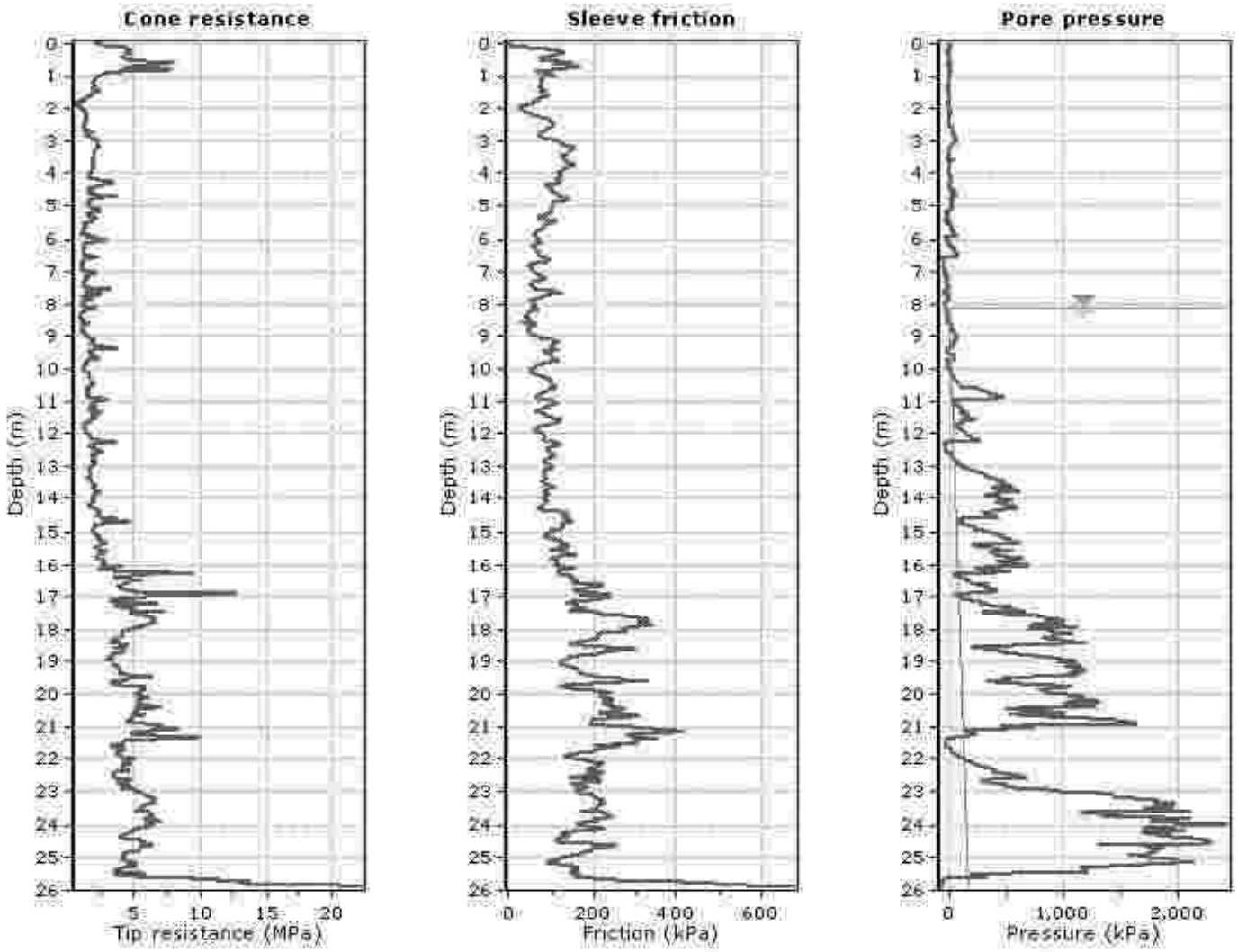
The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



Underground Investigation Ltd
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+64211473249

Project: **East Property Investments Ltd**
Location: **111 & 115 Yorke Road, Haruru**

CPT: CPT20
Total depth: 25.90 m, Date: 31/03/2023



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).

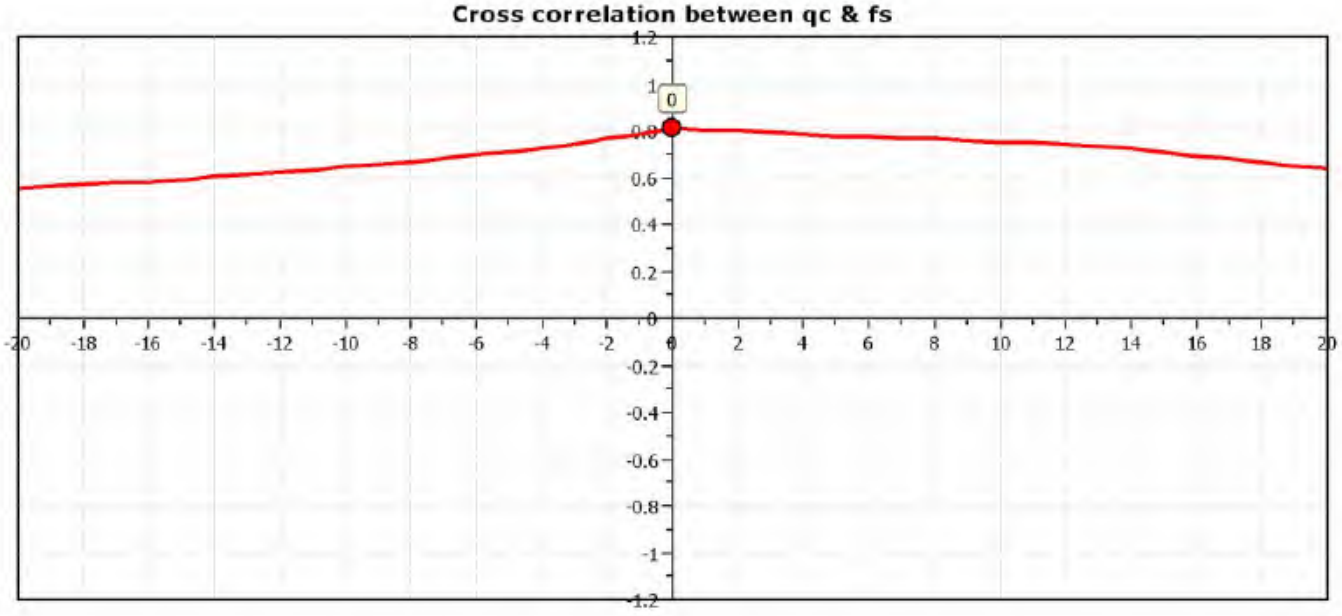


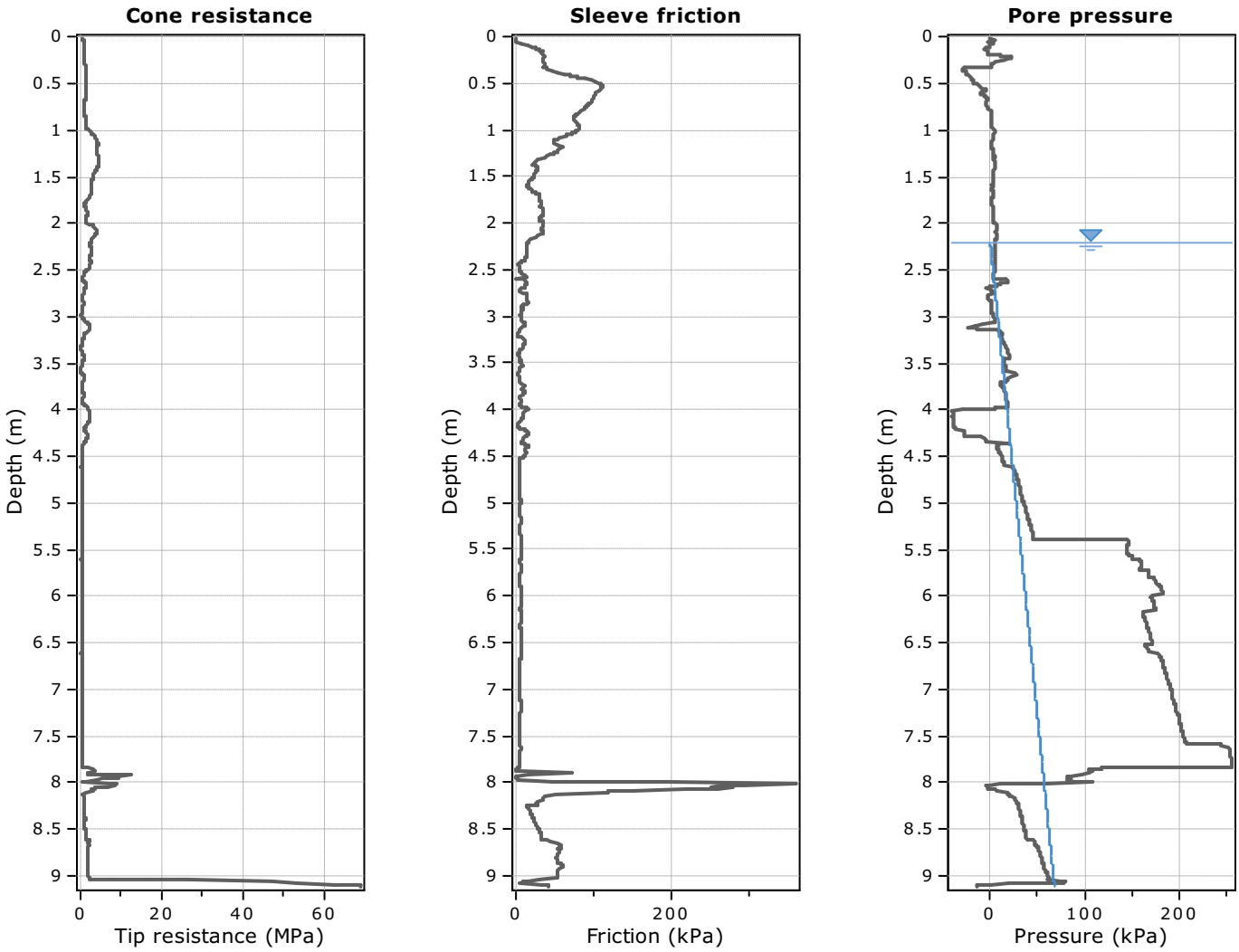


Figure 2. Geotechnical test locations

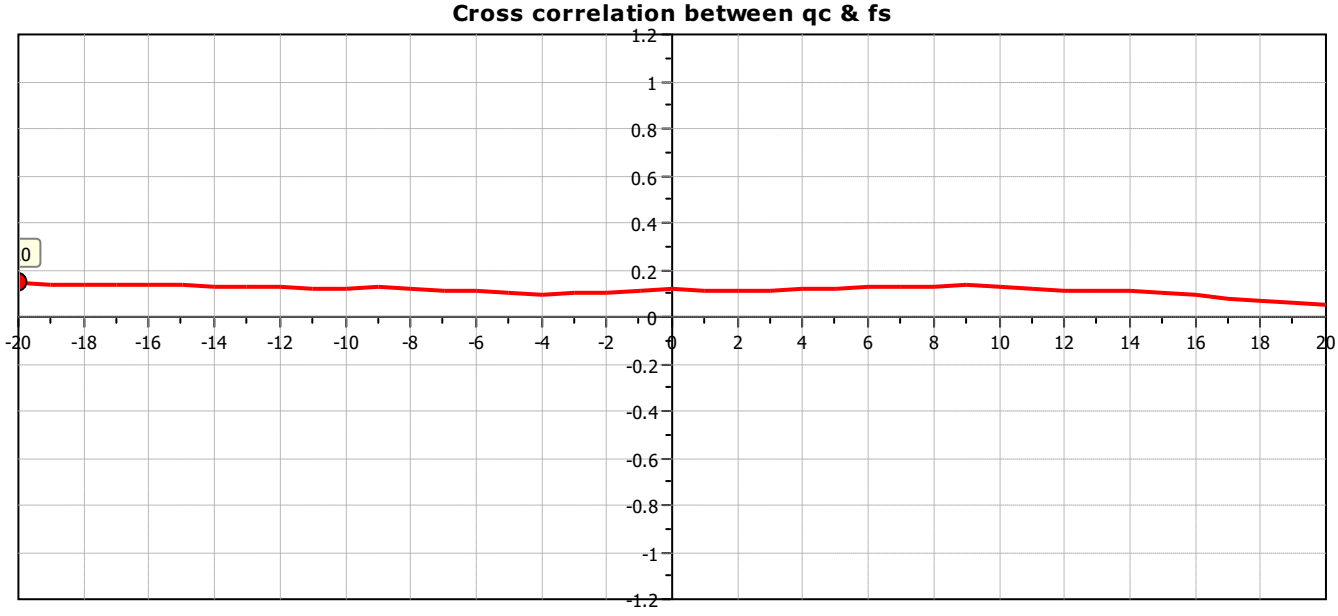
Vision Consulting

Project: **Yorke Road Developments Ltd**
Location: **111 Yorke Road, Haruru**

CPT: CPT01_2018
Total depth: 9.12 m, Date: 6/02/2018

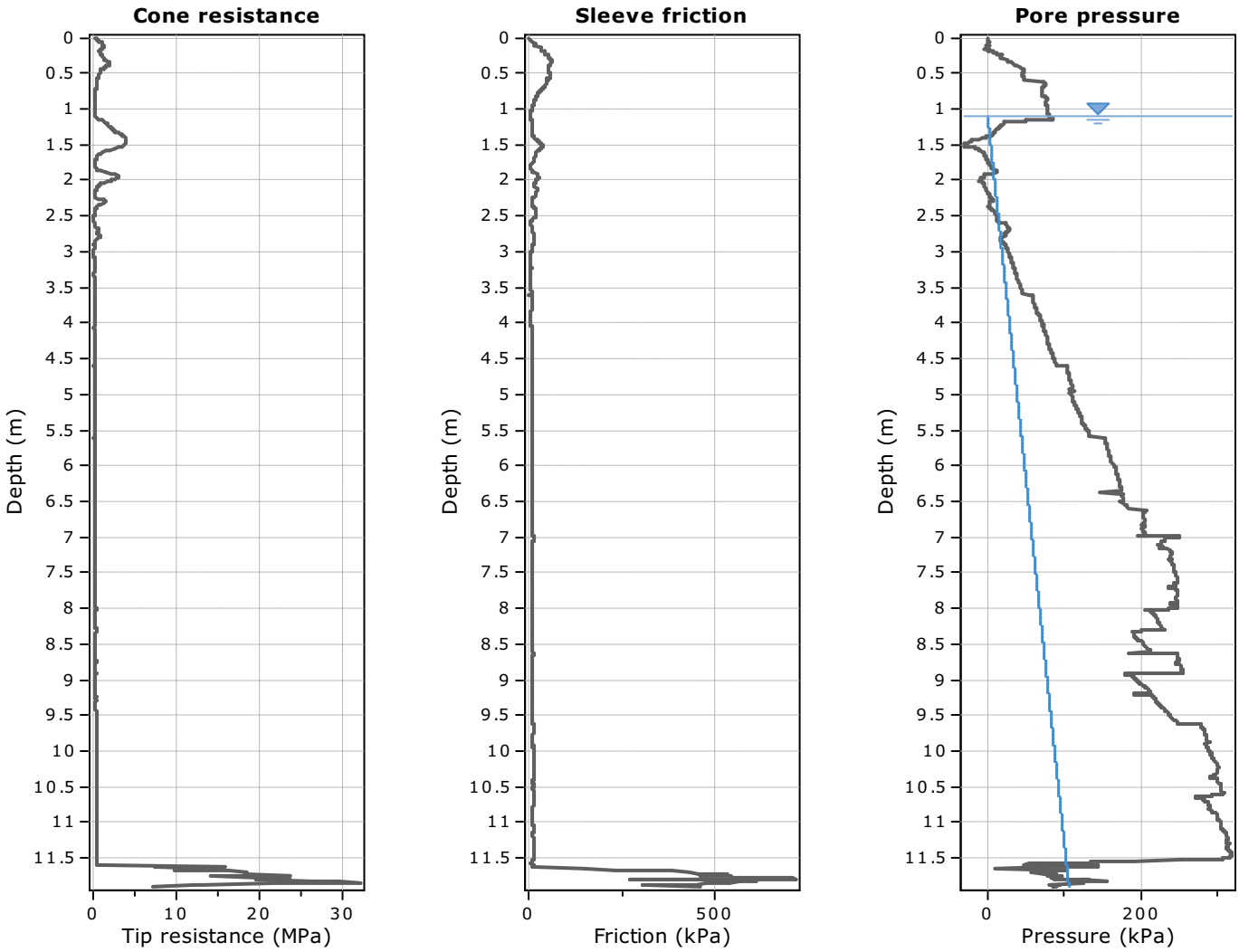


The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).

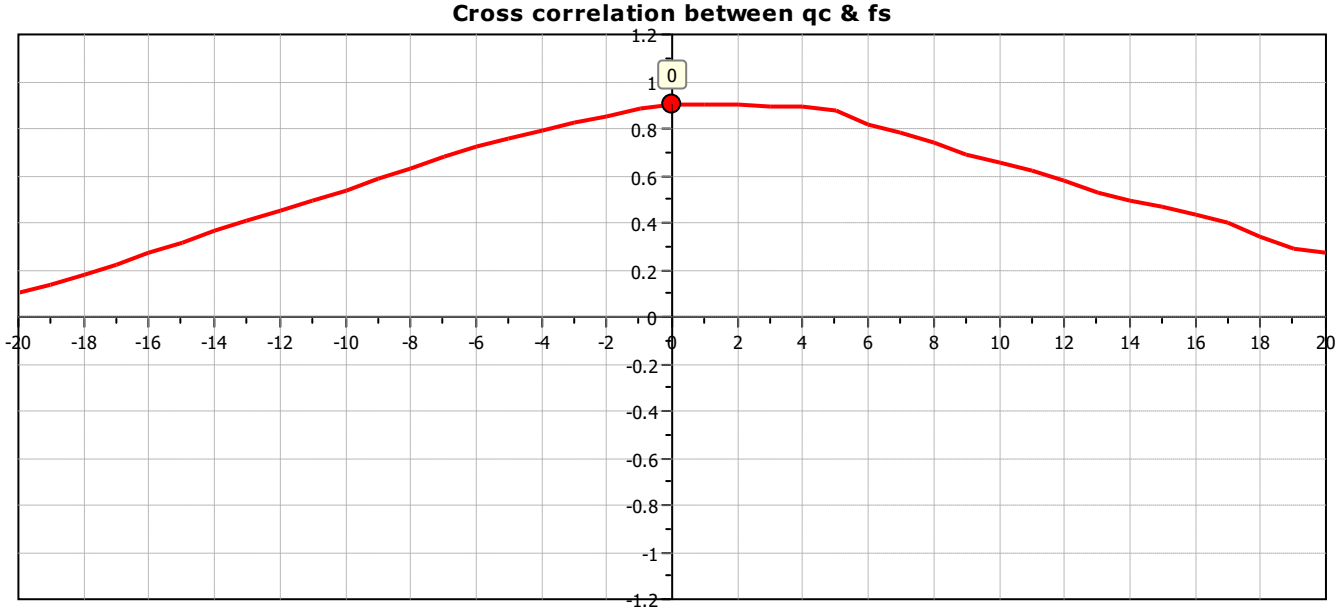


Project: **Yorke Road Developments Ltd**
Location: **111 Yorke Road, Haruru**

CPT: CPT02_2018
Total depth: 11.90 m, Date: 6/02/2018



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).

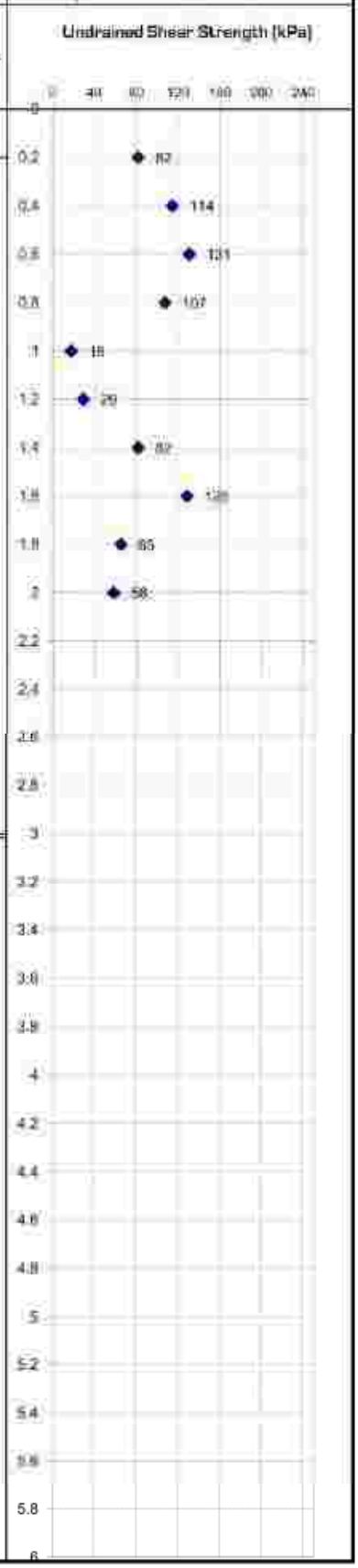


BOREHOLE LOG

BOREHOLE No: BH1

Clients: Sonya and Tony Gosse	Project: GEOTECH INVESTIGATION	VDE Project No.:	13649
Project Location: Lot 2 DP488609 Yorke Rd Nanoro	Borehole Location: Refer to site plan	Hole started:	2/02/2018
		Hole completed:	2/02/2018
Drill method: 50mm Hand Auger		Drilled by:	MK
		Checked by:	LB

Depth (m)	Graphic	Strength	Moisture	Soil Description	GEOLOGY & additional observations
0.0		S	M	Sandy SILT: Minor gravel: Dark brown: cohesionless: topsoil	TOPSOIL
0.1				becoming clayey SILT: minor sand: dark brown	
0.2		St	M	Clayey SILT: 20% fine gravel: 10% sand: Dark brown	ALLUVIUM
0.3				Low plasticity	
0.4					
0.5		VSt	M	Clayey SILT: minor fine sand: Light brown: homogeneous	
0.6				Moderate plasticity	
0.7					
0.8				Lighter brown: increasing fine gravel portion	
0.9		S		Gravelly SILT: mainly clay right texture	
1.0				fine, subangular gravel	
1.1					
1.2			M	Clay GRAVEL: Fine to mod grained, sub angular, greywacke grains	
1.3				Light grey brown	
1.4				Est. 40% Gravel, 40% silt & fine sand, crumbles easily	
1.5					
1.6				Dark grey higher clay portion	
1.7					
1.8					
1.9				becoming wet	
2.0					
2.1					
2.2			W	becoming Sandy Clayey fine GRAVEL: Orange brown	Groundwater
2.3					
2.4					
2.5					
2.6					
2.7					
2.8					
2.9					
3.0				End of Borehole	
3.1				Target Depth Achieved	
3.2				Groundwater encountered @ 2.2m	
3.3					
3.4					
3.5					
3.6					
3.7					
3.8					
3.9					
4.0					
4.1					
4.2					
4.3					
4.4					
4.5					
4.6					
4.7					
4.8					
4.9					
5.0					
5.1					
5.2					
5.3					
5.4					
5.5					
5.6					
5.7					
5.8					
5.9					



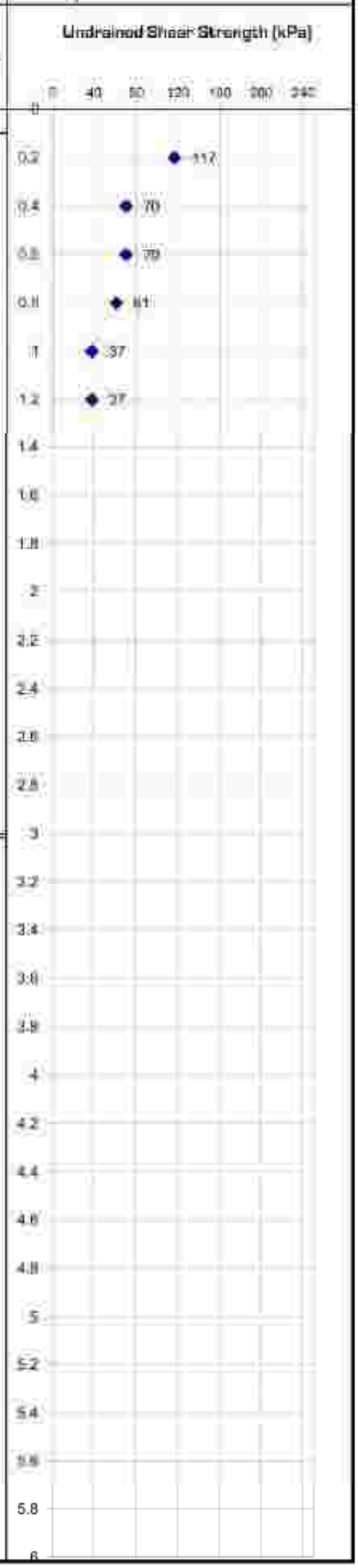
Notes: Shear strength tests are indicative only.
These strength calibrated and adjusted for plasticity

BOREHOLE LOG

BOREHOLE No: BH2

Client: Sonya and Tony Gosse	Project: GEOTECH INVESTIGATION	VDE Project No.:	13649
Project Location: Lot 2 DP468808 Yorke Rd Nambu	Borehole Location: Refer to site plan	Hole started:	2/02/2016
		Hole completed:	2/02/2016
Drill method: 50mm Hand Auger		Drilled by:	MK
		Checked by:	DS

Depth (m)	Graphic	Strength	Moisture	Soil Description	GEOLOGY & additional observations
0.0		S	M	Clayey SILT, Brown, Rootlets	TOPSOIL
0.1		F	M	Gravelly SILT, moderately Brown to light brown	ALLUVIUM
0.2					
0.3				Sandy SILT, mica fine grained, Brown, mottled mid brown	
0.4					
0.5				Increasing clay, light brown, moderate plasticity	
0.6		F	M	Silty CLAY, Minor Dark brown Light brown, mod high plasticity	
0.7					
0.8					
1.0				becoming grey, becoming wet	
1.1			W	Sandy GRAVEL, Grey, fine grained, angular greywacke grains,	
1.2				Meeting sand [illegible]	
1.3					
1.4					
1.5					
1.6				Increasing clay, becoming dark grey	
1.7					
1.8					
1.9					
2.0					
2.1					
2.2					
2.3					
2.4					
2.5					
2.6					
2.7					
2.8					
2.9					
3.0				End of Borehole	
3.1				Target Depth Achieved	
3.2				Groundwater encountered @ 1.1m	
3.3					
3.4					
3.5					
3.6					
3.7					
3.8					
3.9					
4.0					
4.1					
4.2					
4.3					
4.4					
4.5					
4.6					
4.7					
4.8					
4.9					
5.0					
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5.2					
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5.4					
5.5					
5.6					
5.7					
5.8					
5.9					



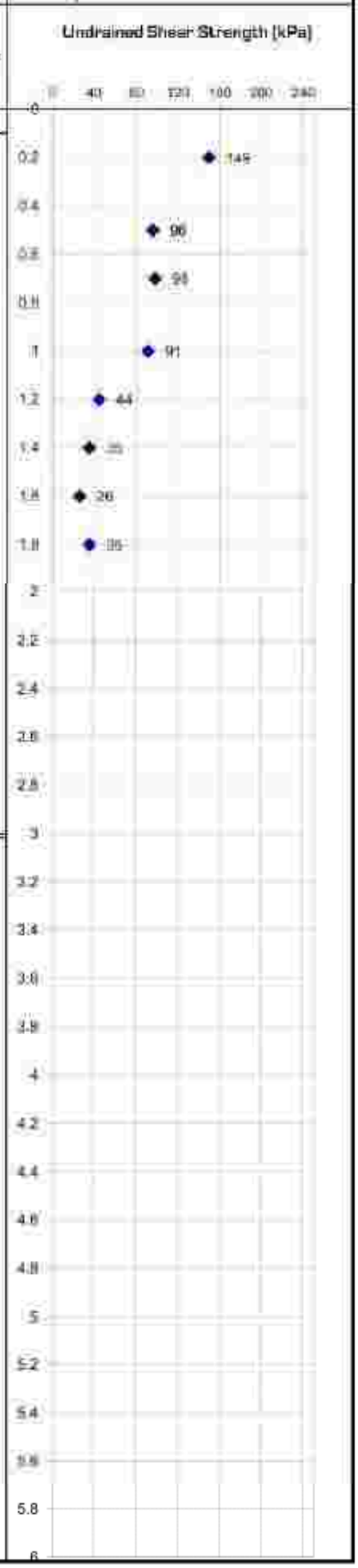
Notes: Shear strength tests are indicative only.
These strength calibrated and adjusted for plasticity

BOREHOLE LOG

BOREHOLE No: BH3

Client: Sonya and Tony Gosse	Project: GEOTECH INVESTIGATION	VDE Project No.:	19049
Project Location: Lot 2 DP488809 Yorke Rd Nanoro	Borehole Location: Refer to site plan	Hole started:	5/02/2019
		Hole completed:	5/02/2019
Drill method: 50mm Hand Auger		Drilled by:	MK
		Checked by:	LB

Depth (m)	Graphic	Strength	Moisture	Soil Description	GEOLOGY & additional observations
0.0		S	M	Clayey SILT: Brown, Rootlets	TOPSOIL
0.1			M	Gravelly SILT: Yellow/ Dark Brown/ Brown	ALLUVIUM
0.2				Angular fine to med greywacke grains	
0.3		St		Clayey SILT: Grey brown, heterogeneous, mod plasticity	
0.4				Minor sand and gravel	
0.5					
0.6				Gravelly SILT: minor clay, fine med angular gw gravel	
0.7				Grey/ dark brown	
0.8				Silty GRAVEL: Grey brown, minor clay	
0.9				Fine-Med greywacke grains	
1.0					
1.1					
1.2				Becoming Wet	
1.3					
1.4		S	W	Sandy CLAY: Medium - Dk Grey 30%, fine gravel 20%	
1.5				Grey/ Brown: Mod-High plasticity	
1.6				Decreasing gravel	
1.7			W	Clayey GRAVEL: minor sand & silt, Grey/ Brn gravel	
1.8					
1.9					
2.0					
2.1					
2.2				Dark Grey	
2.3					
2.4					
2.5					
2.6					
2.7					
2.8					
2.9					
3.0				End of Borehole	
3.1				Target Depth Achieved	
3.2				Groundwater encountered @ 1.4m	
3.3					
3.4					
3.5					
3.6					
3.7					
3.8					
3.9					
4.0					
4.1					
4.2					
4.3					
4.4					
4.5					
4.6					
4.7					
4.8					
4.9					
5.0					
5.1					
5.2					
5.3					
5.4					
5.5					
5.6					
5.7					
5.8					
5.9					



Notes: Shear strength tests are indicative only.
These strength calibrated and adjusted for plasticity

BOREHOLE LOG

BOREHOLE No: BH4

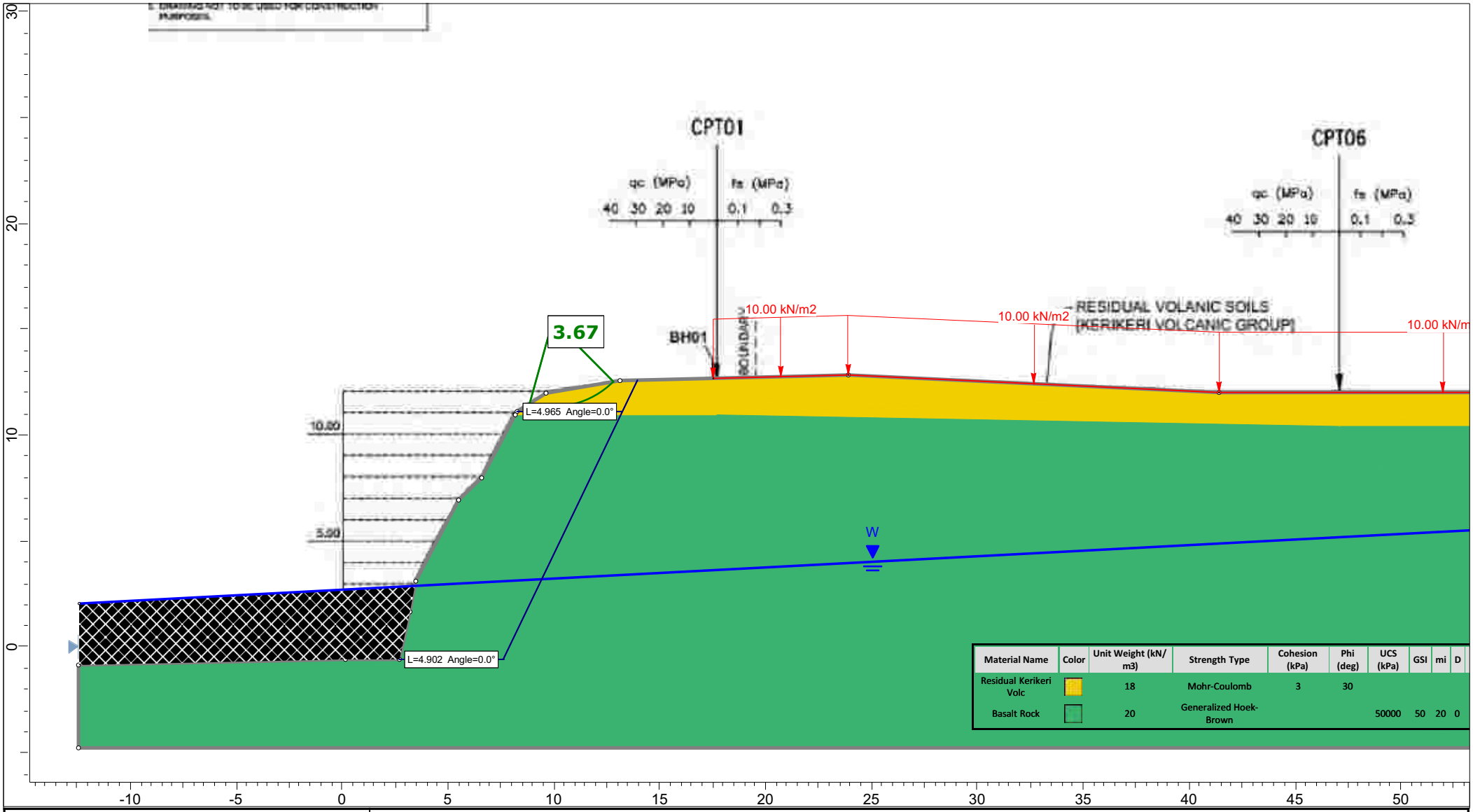
Client: Sonya and Tony Gosse	Project: GEOTECH INVESTIGATION	VDE Project No.:	19049
Project Location: Lot 2 DP488809 Yorke Rd Nanoma	Borehole Location: Refer to site plan	Hole started:	5/02/2019
		Hole completed:	5/02/2019
Drill method: 50mm Hand Auger		Drilled by:	MK
		Checked by:	LB

Depth (m)	Graphic	Strength	Moisture	Soil Description	GEOLOGY & additional observations
0.0		F	M	SILT, Minor Clay, Dark Brown, Rootlets	TOPSOIL
0.1					
0.2		St	M	Sandy SILT, minor clay, Brown, mottled	ALLUVIUM
0.3				Low plasticity	
0.4					
0.5		St	M	Silty CLAY, Light brown, homogeneous, moderate plasticity	
0.6					
0.7					
0.8				Yellow Brown, Increasing grey	
0.9					
1.0		F	M	Sandy SILT, minor clay, Yellow brown	
1.1				Moderate plasticity	
1.2					
1.3					
1.4				Becoming Wet, increasing gravel	
1.5			W	Sandy SILT, minor clay, Grey	
1.6					
1.7			W	Sandy GRAVEL, minor silty SILT, Grey	
1.8					
1.9					
2.0					
2.1					
2.2				Dark Grey	
2.3					
2.4					
2.5					
2.6					
2.7					
2.8					
2.9					
3.0				End of Borehole	
3.1				Target Depth Achieved	
3.2				Groundwater encountered @ 1.4m	
3.3					
3.4					
3.5					
3.6					
3.7					
3.8					
3.9					
4.0					
4.1					
4.2					
4.3					
4.4					
4.5					
4.6					
4.7					
4.8					
4.9					
5.0					
5.1					
5.2					
5.3					
5.4					
5.5					
5.6					
5.7					
5.8					
5.9					



Notes: Shear strength tests are indicative only.
These strength calibrated and adjusted for plasticity

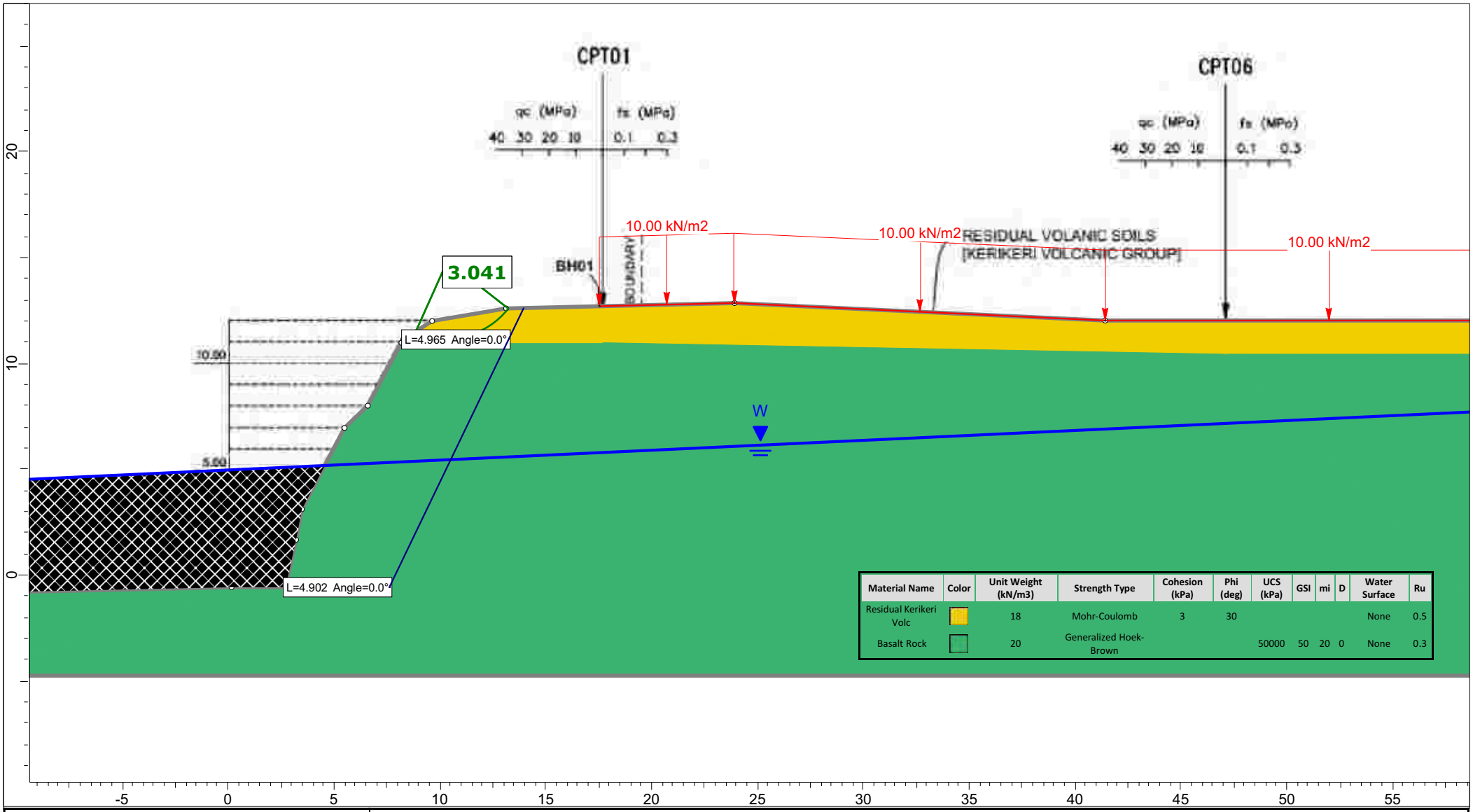
Appendix C – Slope Stability Assessment



rocscience

SLIDEINTERPRET 9.026

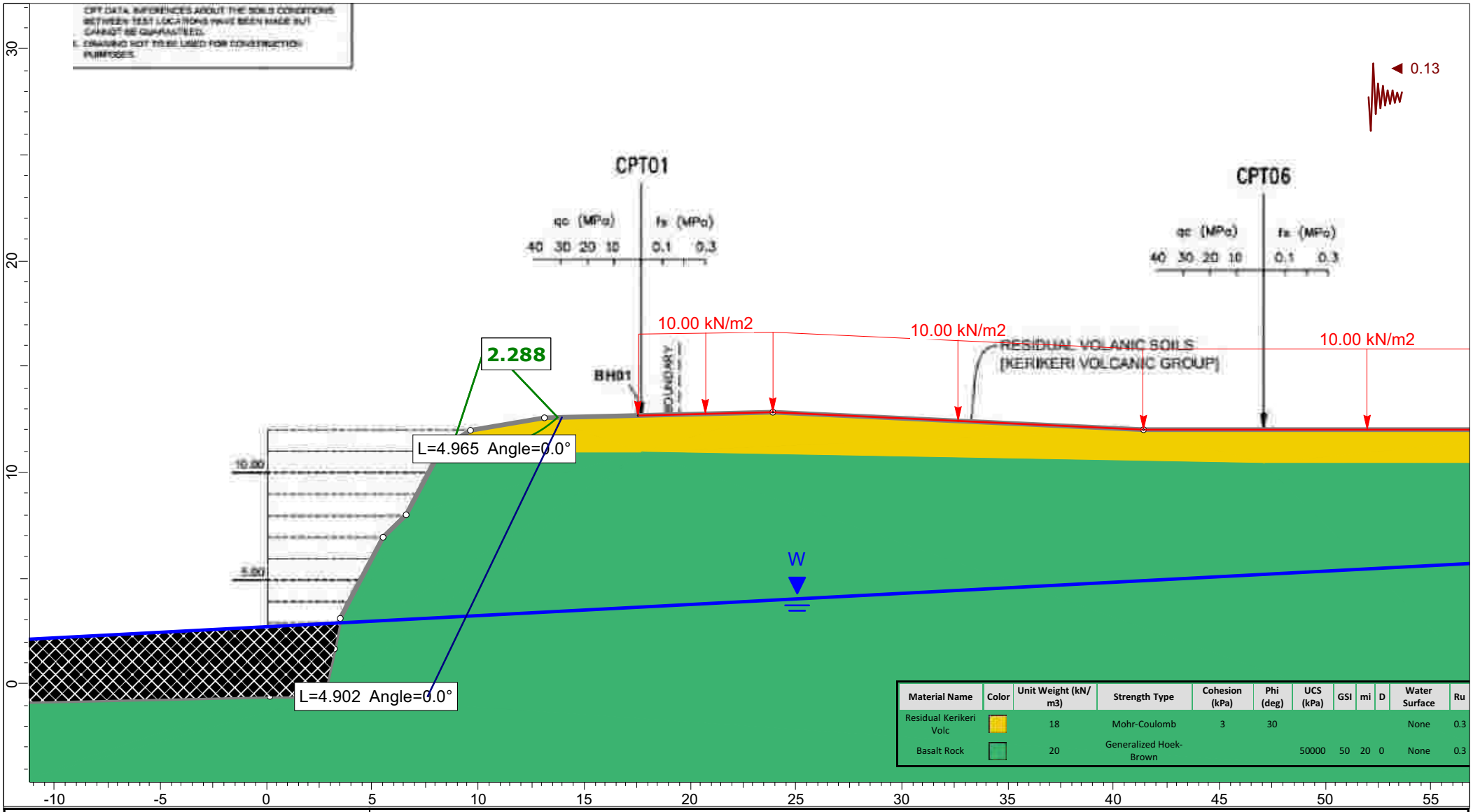
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Group	Group 1	*Scenario*	Master Scenario
Drawn By		*Company*	
Date	14/12/2022, 5:19:38 pm	*File Name*	SEC AA.slmd



rocscience

SLIDEINTERPRET 9.026

Project	Slide2 - An Interactive Slope Stability Program		
Group	Group 1	*Scenario*	Master Scenario
Drawn By		*Company*	
Date	14/12/2022, 5:19:38 pm	*File Name*	SEC AA_elevated gWL.slmd

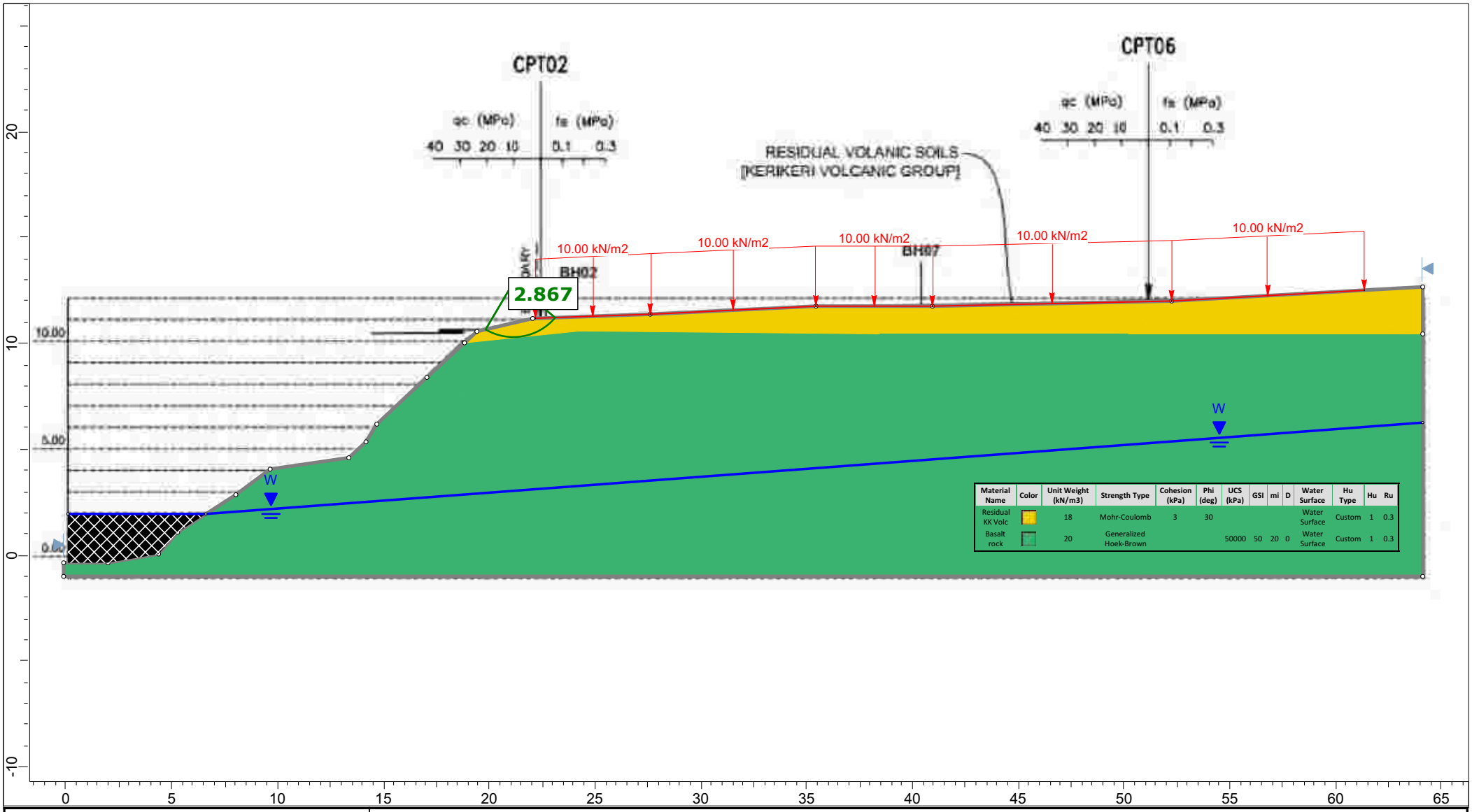


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	UCS (kPa)	GSI	mi	D	Water Surface	Ru
Residual Kerikeri Volc		18	Mohr-Coulomb	3	30					None	0.3
Basalt Rock		20	Generalized Hoek-Brown			50000	50	20	0	None	0.3

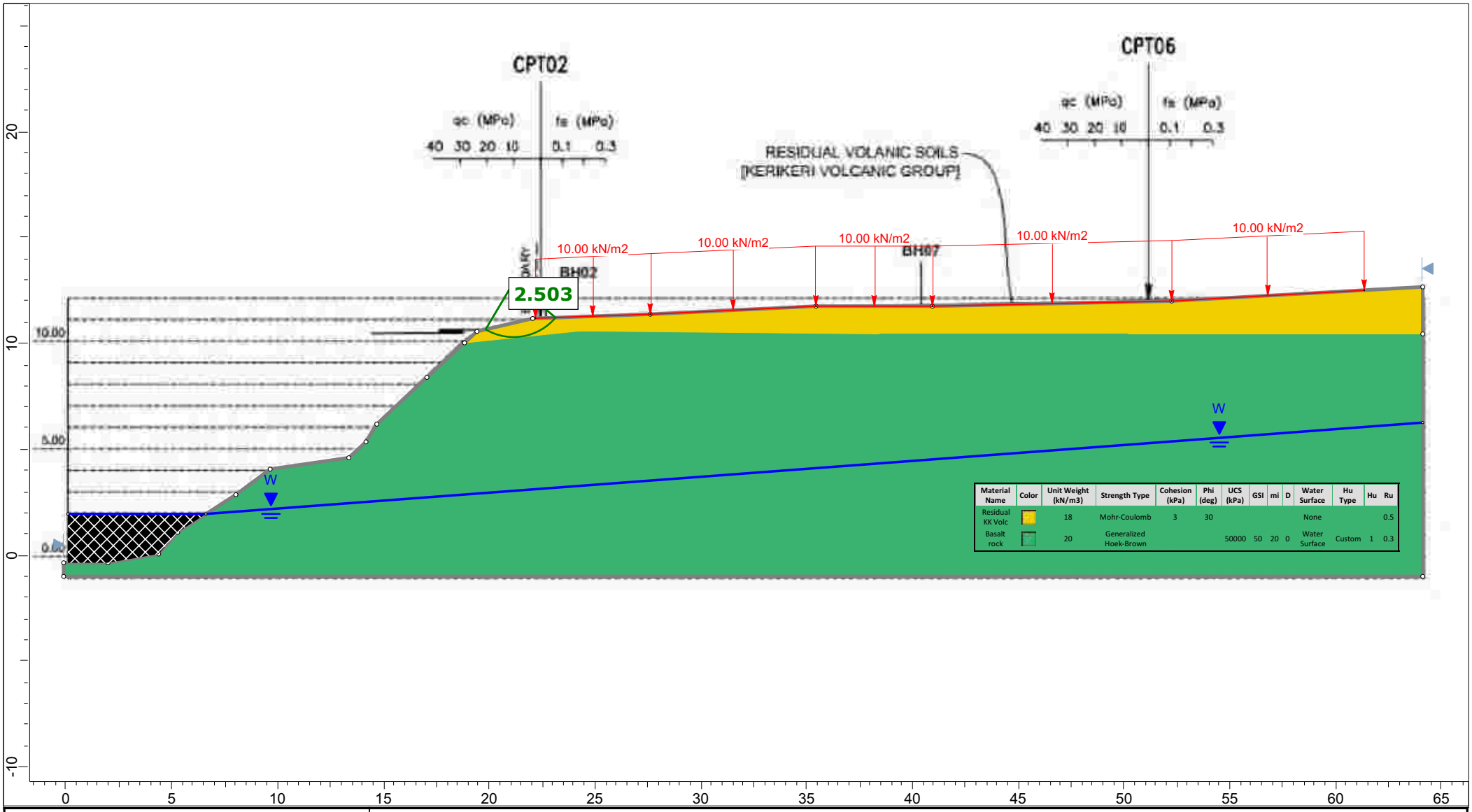
rocscience

SLIDEINTERPRET 9.026

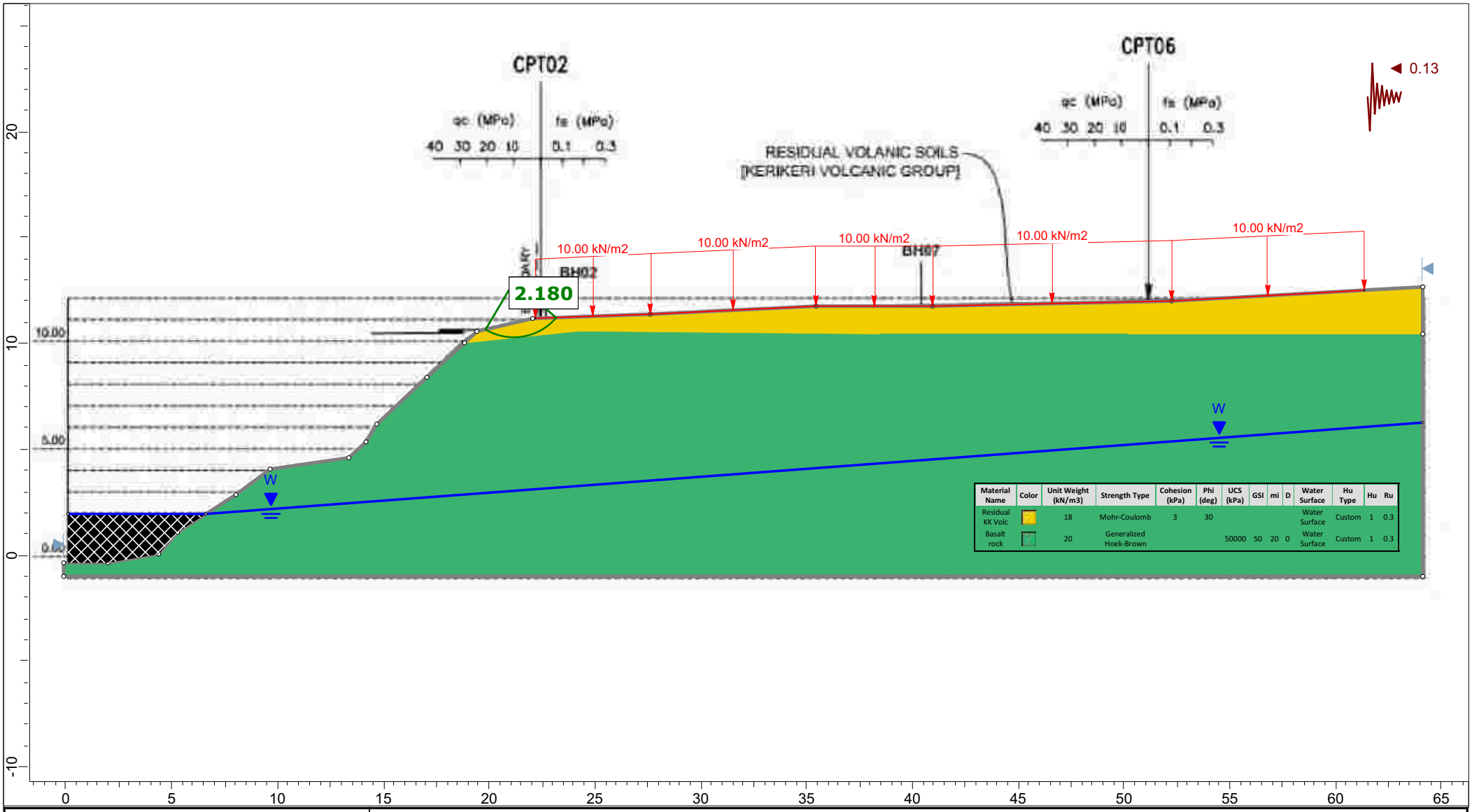
Project	Slide2 - An Interactive Slope Stability Program		
Group	Group 1	Scenario	Master Scenario
Drawn By		Company	
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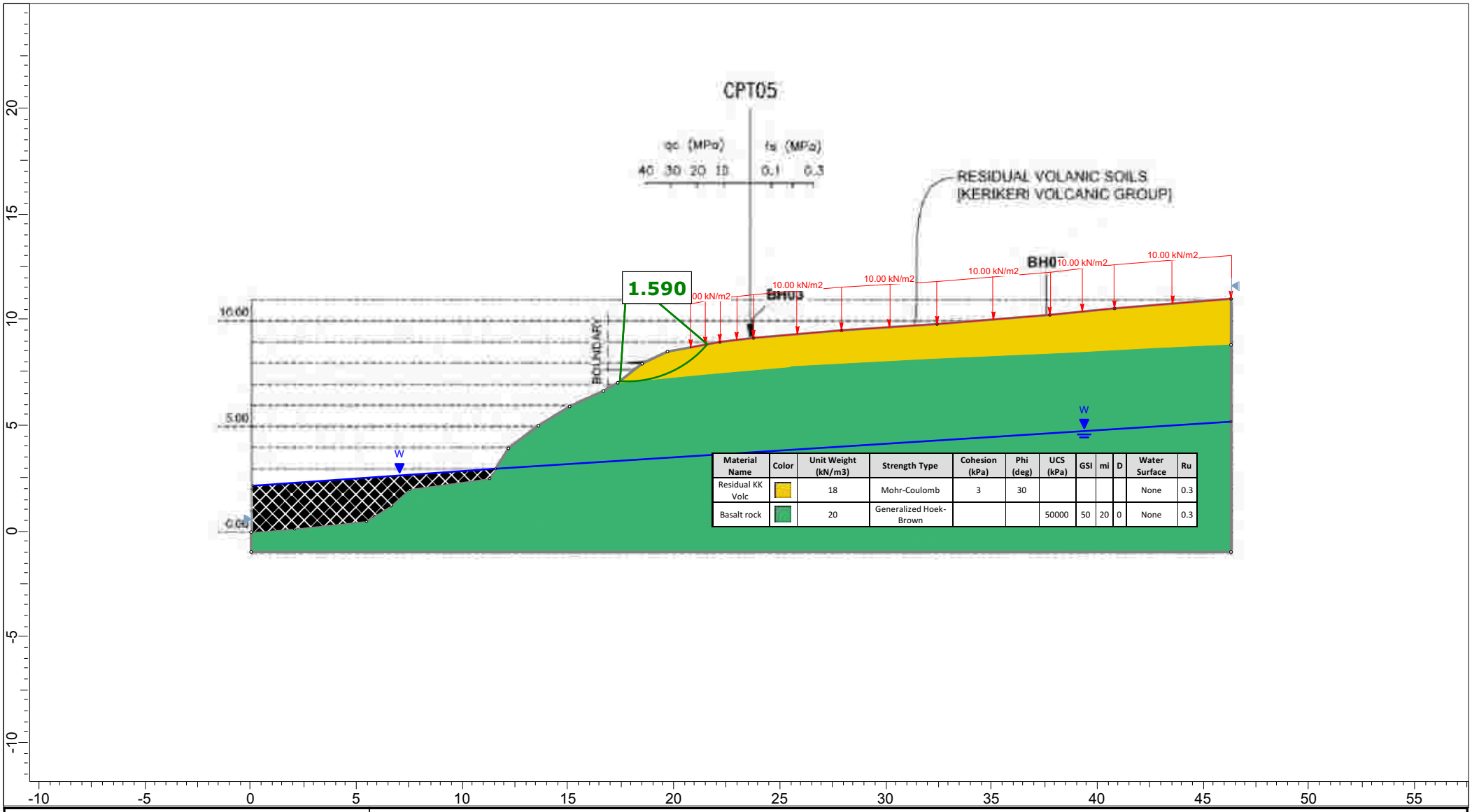
rocscience	Project	Slide2 - An Interactive Slope Stability Program	
	Group	Group 1	Scenario: Master Scenario
	Drawn By		Company
SLIDEINTERPRET 9.026	Date	20/12/2022, 1:10:49 pm	File Name: Sec BB.slmd



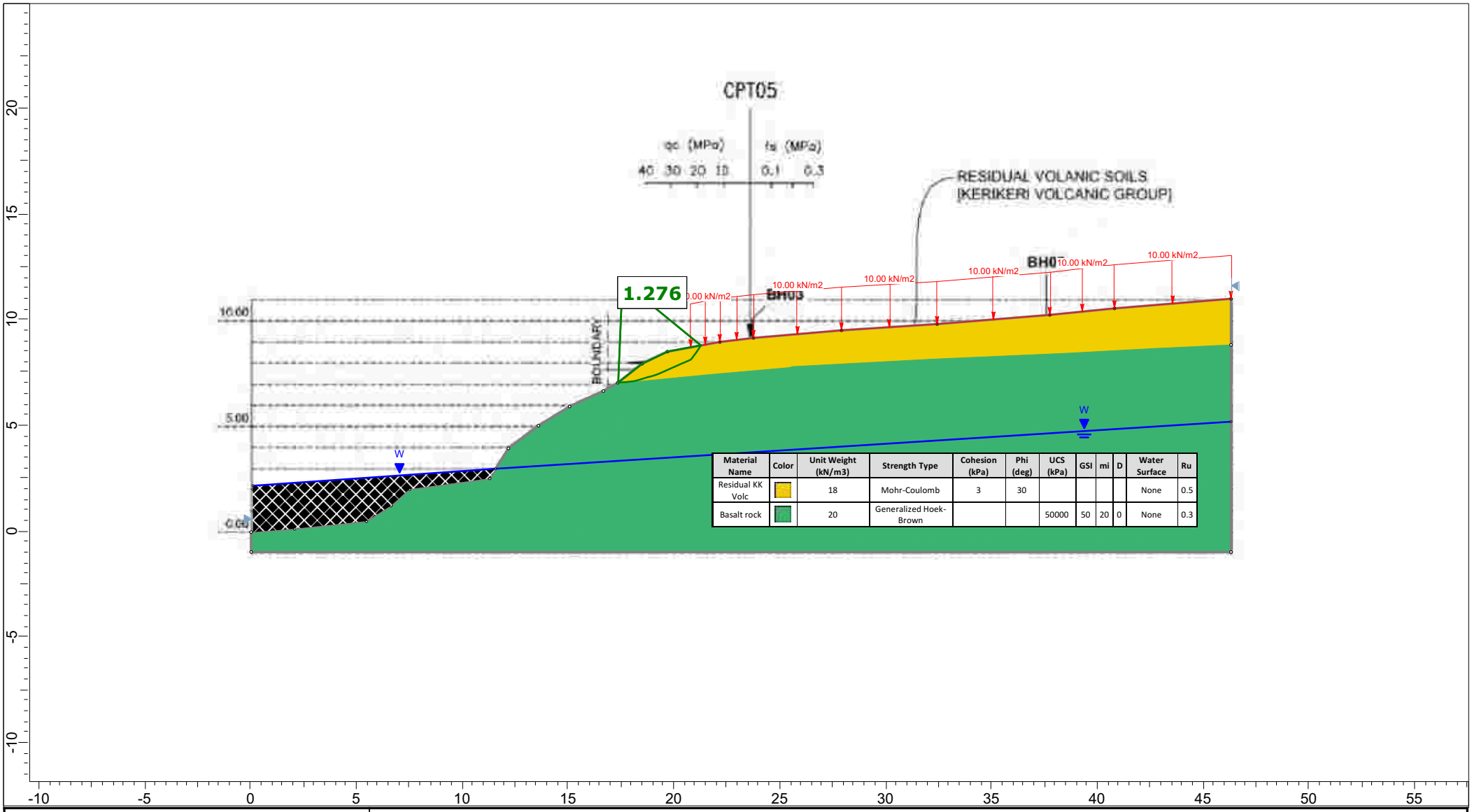
rocscience	Project	Slide2 - An Interactive Slope Stability Program	
	Group	Group 1	Scenario: Master Scenario
	Drawn By		Company
SLIDEINTERPRET 9.026	Date	20/12/2022, 1:10:49 pm	File Name: Sec BB_elvated GWL.slmd



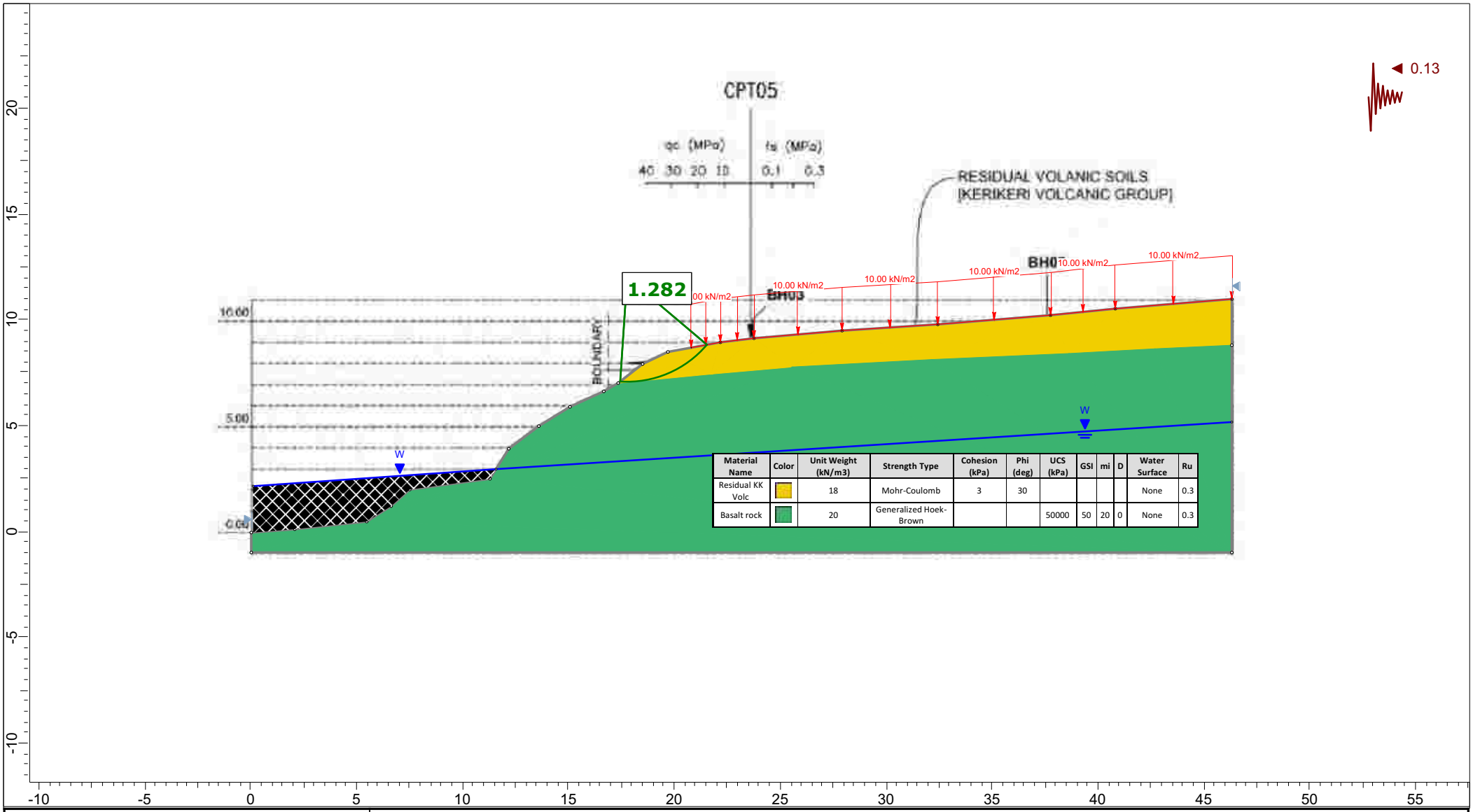
rocscience	Project	Slide2 - An Interactive Slope Stability Program	
	Group	Group 1	Scenario: Master Scenario
	Drawn By		Company
SLIDEINTERPRET 9.026	Date	20/12/2022, 1:10:49 pm	File Name: Sec BB_Seismic.slmd



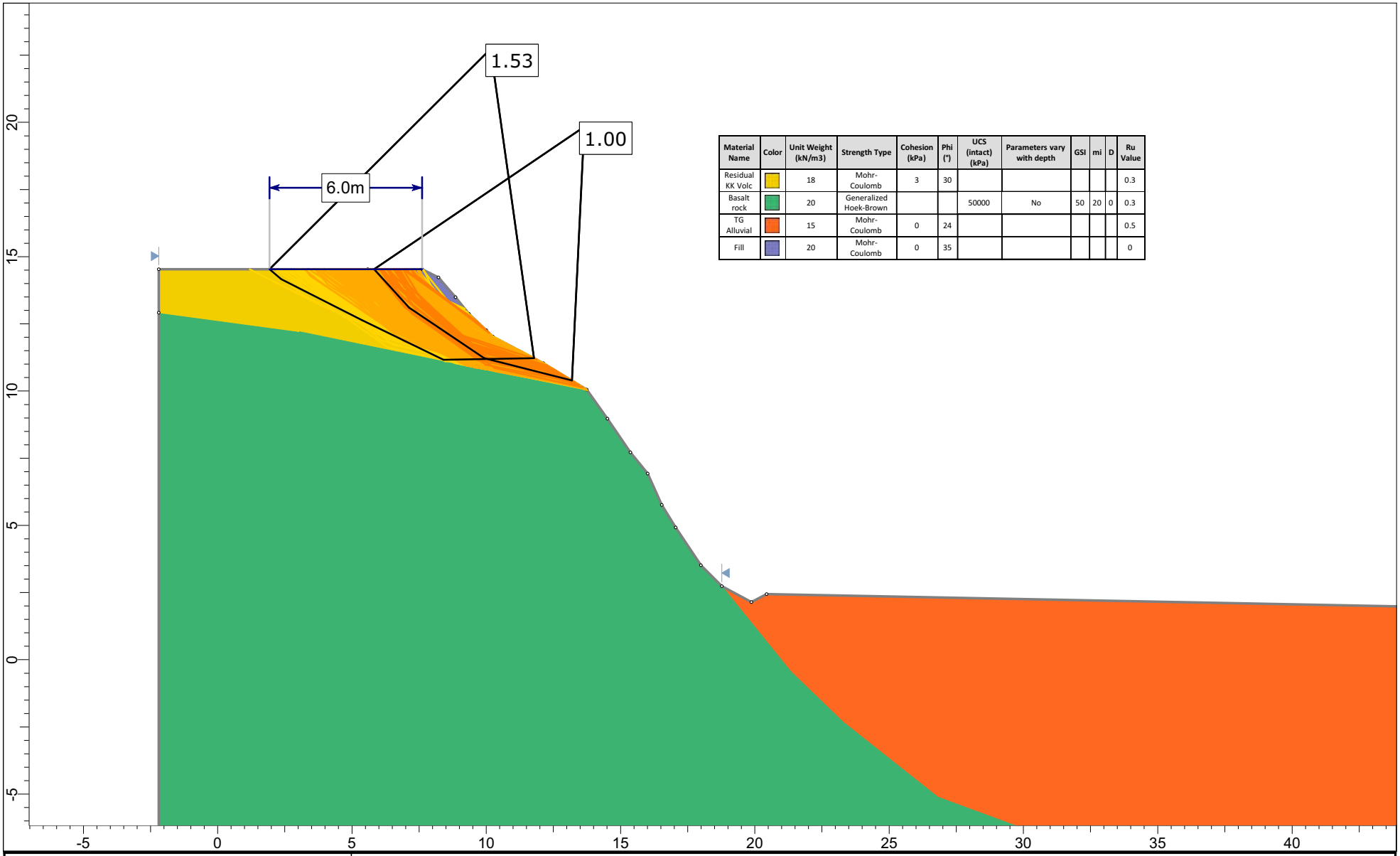
rocscience	Project	Slide2 - An Interactive Slope Stability Program	
	Group	Group 1	Scenario: Master Scenario
	Drawn By		Company
SLIDEINTERPRET 9.026	Date	20/12/2022, 1:10:49 pm	File Name: Sec CC.slmd



rocscience	*Project*	Slide2 - An Interactive Slope Stability Program	
	Group Group 1		*Scenario* Master Scenario
	Drawn By		*Company*
SLIDEINTERPRET 9.026	*Date* 20/12/2022, 1:10:49 pm		*File Name* Sec CC_el GWL.slmd



rocscience	Project	Slide2 - An Interactive Slope Stability Program	
	Group	Group 1	Scenario: Master Scenario
	Drawn By		Company
SLIDEINTERPRET 9.026	Date	20/12/2022, 1:10:49 pm	File Name: Sec CC_seismic.slmd

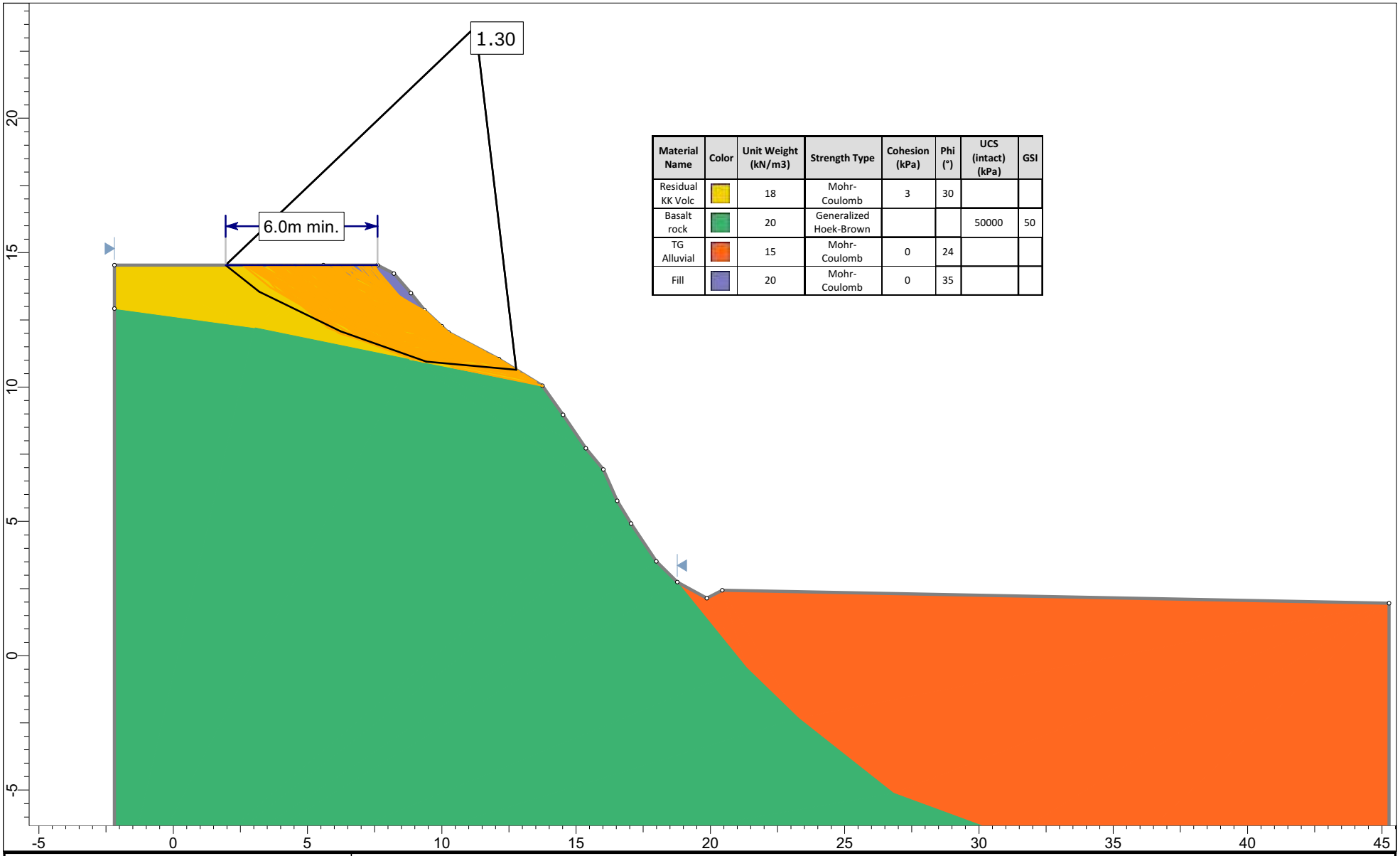


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Ru Value
Residual KK Volc		18	Mohr-Coulomb	3	30						0.3
Basalt rock		20	Generalized Hoek-Brown			50000	No	50	20	0	0.3
TG Alluvial		15	Mohr-Coulomb	0	24						0.5
Fill		20	Mohr-Coulomb	0	35						0

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SLIDEINTERPRET 9.029

Project	22 322 - 111 & 115 Yorke Rd, Haruru		
Group	Cross Section D-D	*Scenario*	Static
Drawn By	JMC	*Company*	
Date	20/12/2022, 1:10:49 pm	*File Name*	Sec DDjc.slmd

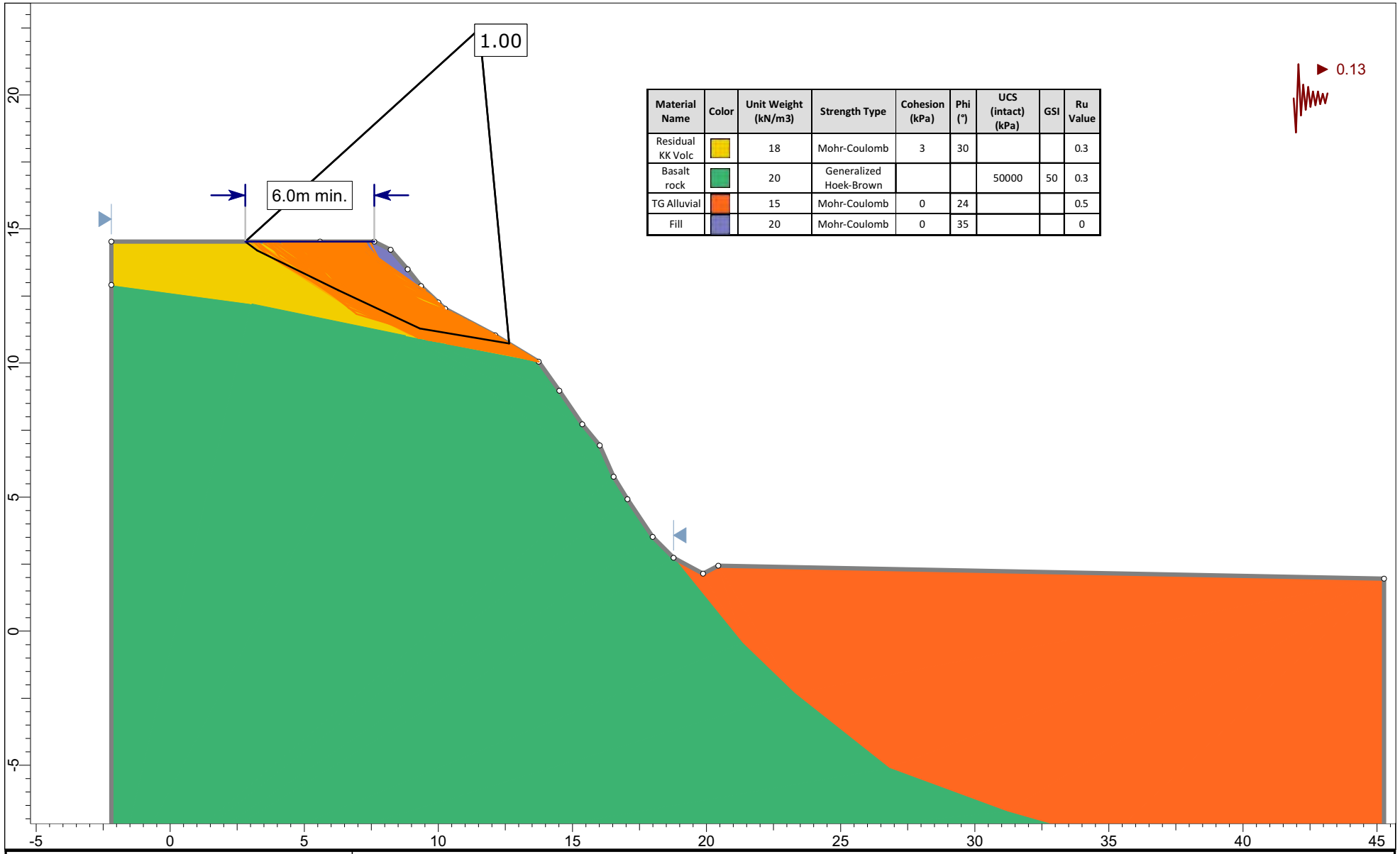


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	GSI
Residual KK Volc		18	Mohr-Coulomb	3	30		
Basalt rock		20	Generalized Hoek-Brown			50000	50
TG Alluvial		15	Mohr-Coulomb	0	24		
Fill		20	Mohr-Coulomb	0	35		

HAIGH WORKMAN Ltd
Civil & Structural Engineers

SLIDEINTERPRET 9.029

Project	22 322 - 111 & 115 Yorke Rd, Haruru		
Group	Cross Section D-D	*Scenario*	Elevated GW
Drawn By	JMC	*Company*	
Date	20/12/2022, 1:10:49 pm	*File Name*	Sec DDjc.slmd



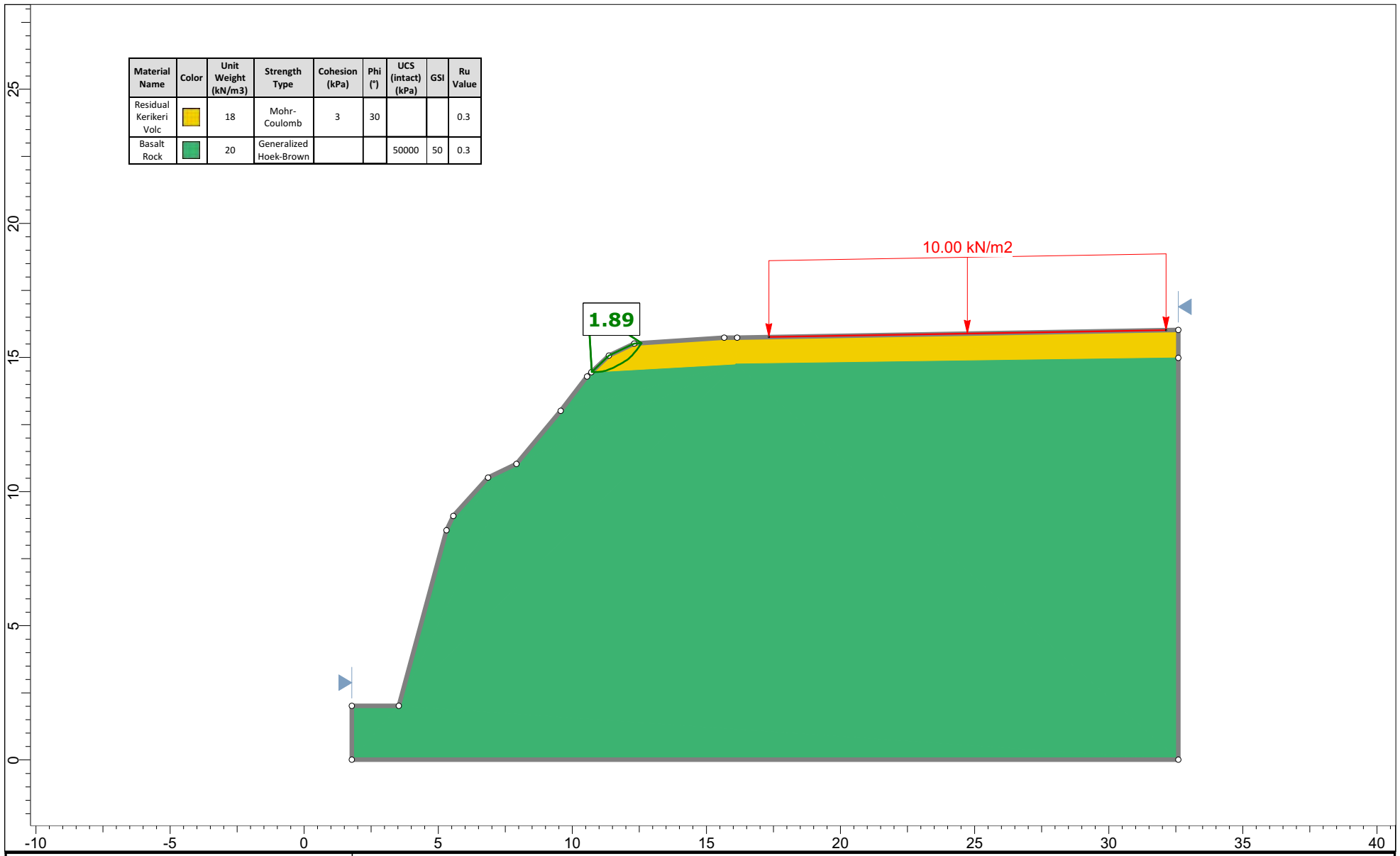
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	GSI	Ru Value
Residual KK Volc		18	Mohr-Coulomb	3	30			0.3
Basalt rock		20	Generalized Hoek-Brown			50000	50	0.3
TG Alluvial		15	Mohr-Coulomb	0	24			0.5
Fill		20	Mohr-Coulomb	0	35			0

HAIGH WORKMAN Ltd
Civil & Structural Engineers

SLIDEINTERPRET 9.029

Project	22 322 - 111 & 115 Yorke Rd, Haruru		
Group	Cross Section D-D	*Scenario*	Seismic
Drawn By	JMC	*Company*	
Date	20/12/2022, 1:10:49 pm	*File Name*	Sec DDjc.slmd

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	GSI	Ru Value
Residual Kerikeri Volc		18	Mohr-Coulomb	3	30			0.3
Basalt Rock		20	Generalized Hoek-Brown			50000	50	0.3

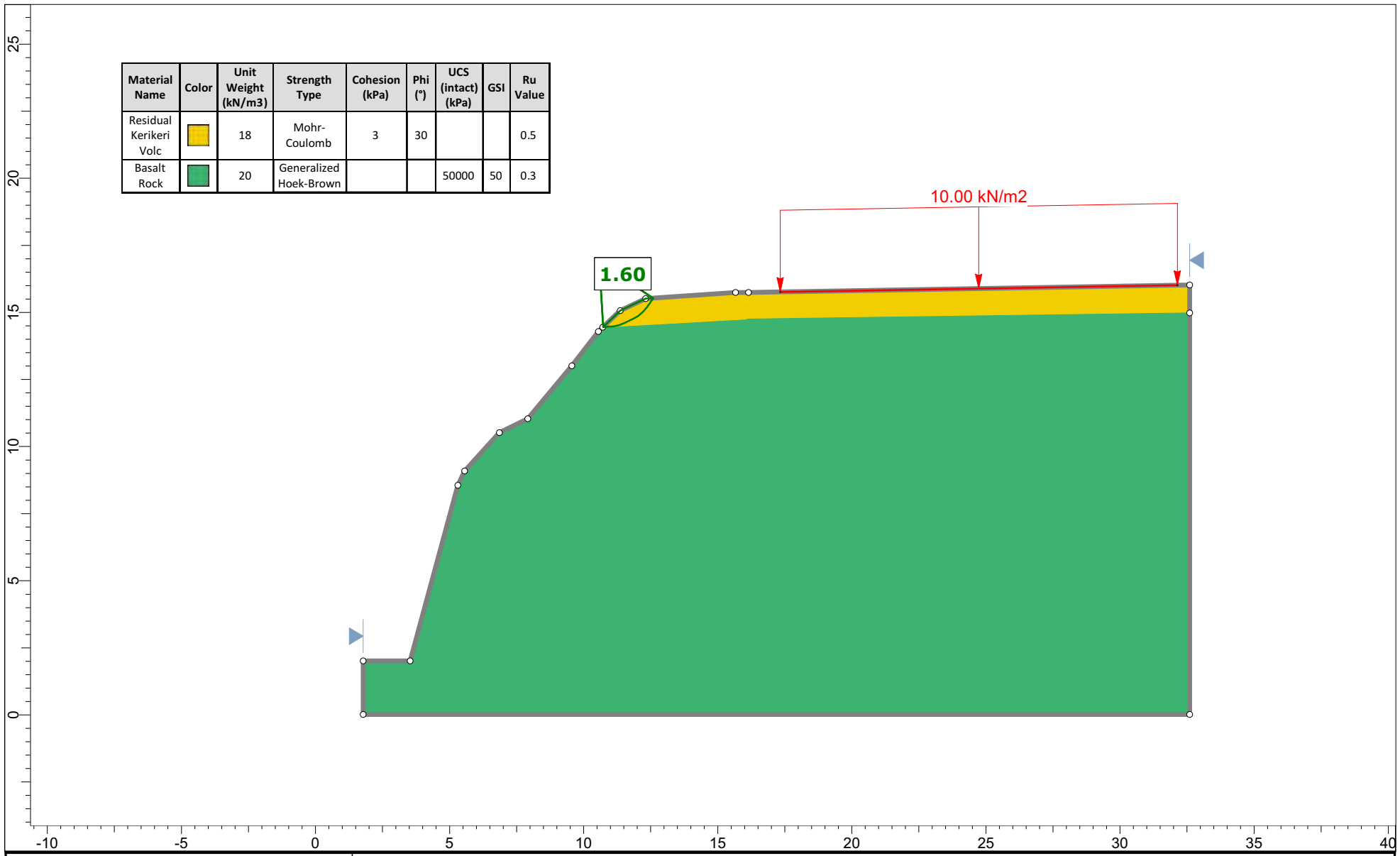


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SLIDEINTERPRET 9.029

Project	22 322 - 111 & 115 Yorke Rd, Haruru		
Group	Cross Section F-F	*Scenario*	Static
Drawn By	JMC	*Company*	
Date	14/12/2022, 5:19:38 pm	*File Name*	Sec FF.slmd

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	GSI	Ru Value
Residual Kerikeri Volc		18	Mohr-Coulomb	3	30			0.5
Basalt Rock		20	Generalized Hoek-Brown			50000	50	0.3

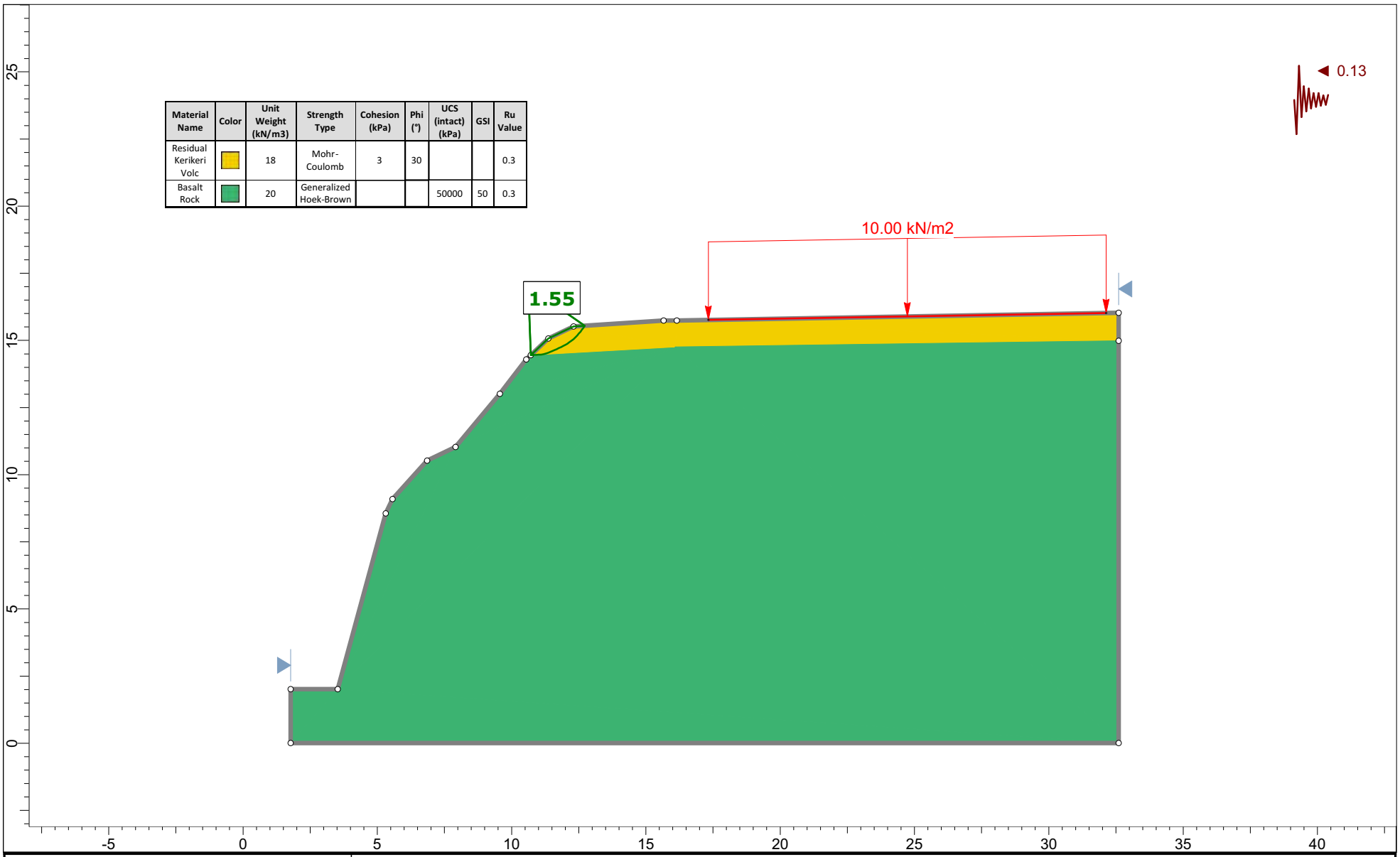


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Civil & Structural Engineers

SLIDEINTERPRET 9.029

Project	22 322 - 111 & 115 Yorke Rd, Haruru		
Group	Cross Section F-F	*Scenario*	Elevated GW
Drawn By	JMC	*Company*	
Date	14/12/2022, 5:19:38 pm	*File Name*	Sec FF.slmd

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	GSI	Ru Value
Residual Kerikeri Volc		18	Mohr-Coulomb	3	30			0.3
Basalt Rock		20	Generalized Hoek-Brown			50000	50	0.3

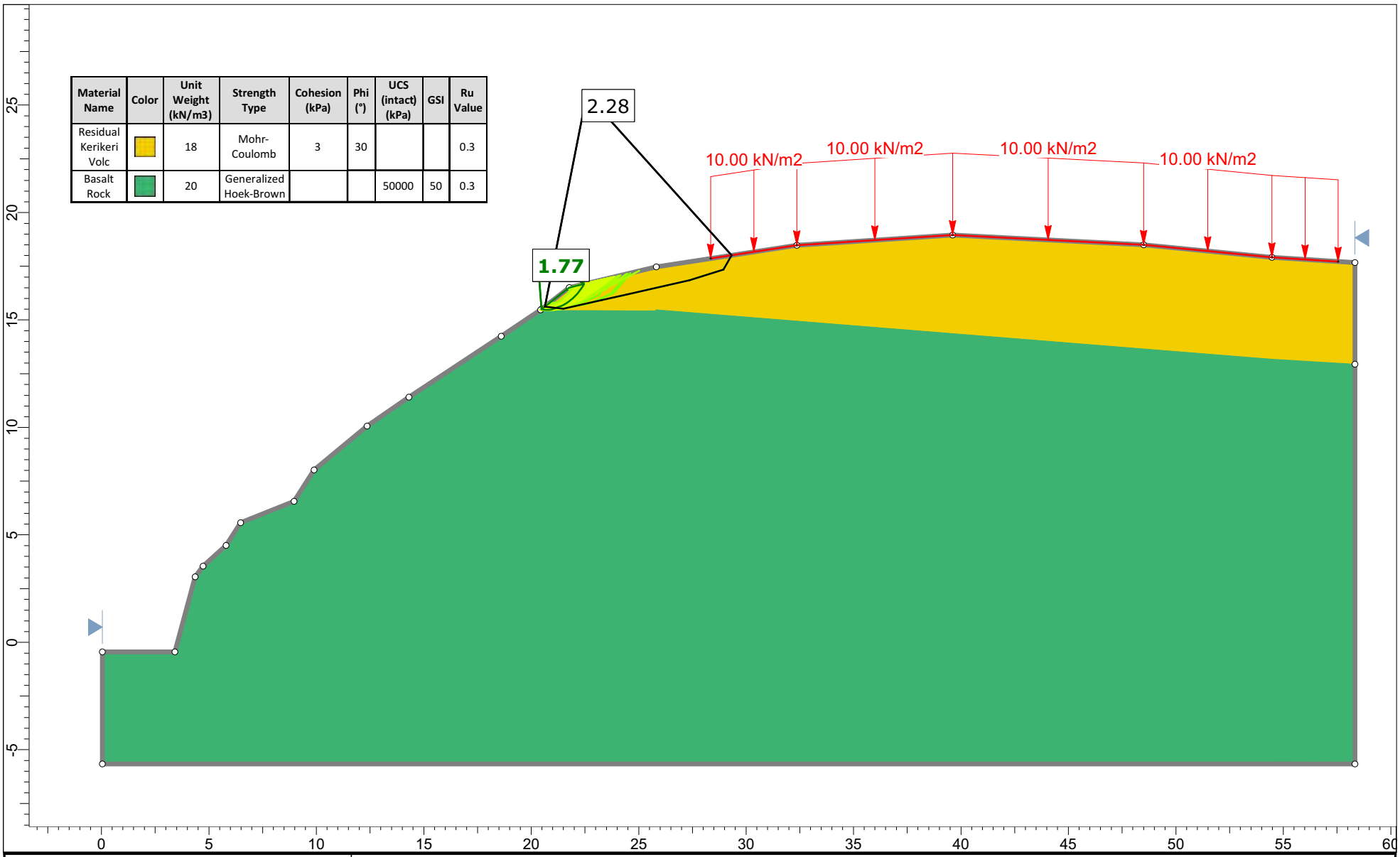


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SLIDEINTERPRET 9.029

Project	22 322 - 111 & 115 Yorke Rd, Haruru		
Group	Cross Section F-F	*Scenario*	Seismic
Drawn By	JMC	*Company*	
Date	14/12/2022, 5:19:38 pm	*File Name*	Sec FF.slmd

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	GSI	Ru Value
Residual Kerikeri Volc		18	Mohr-Coulomb	3	30			0.3
Basalt Rock		20	Generalized Hoek-Brown			50000	50	0.3

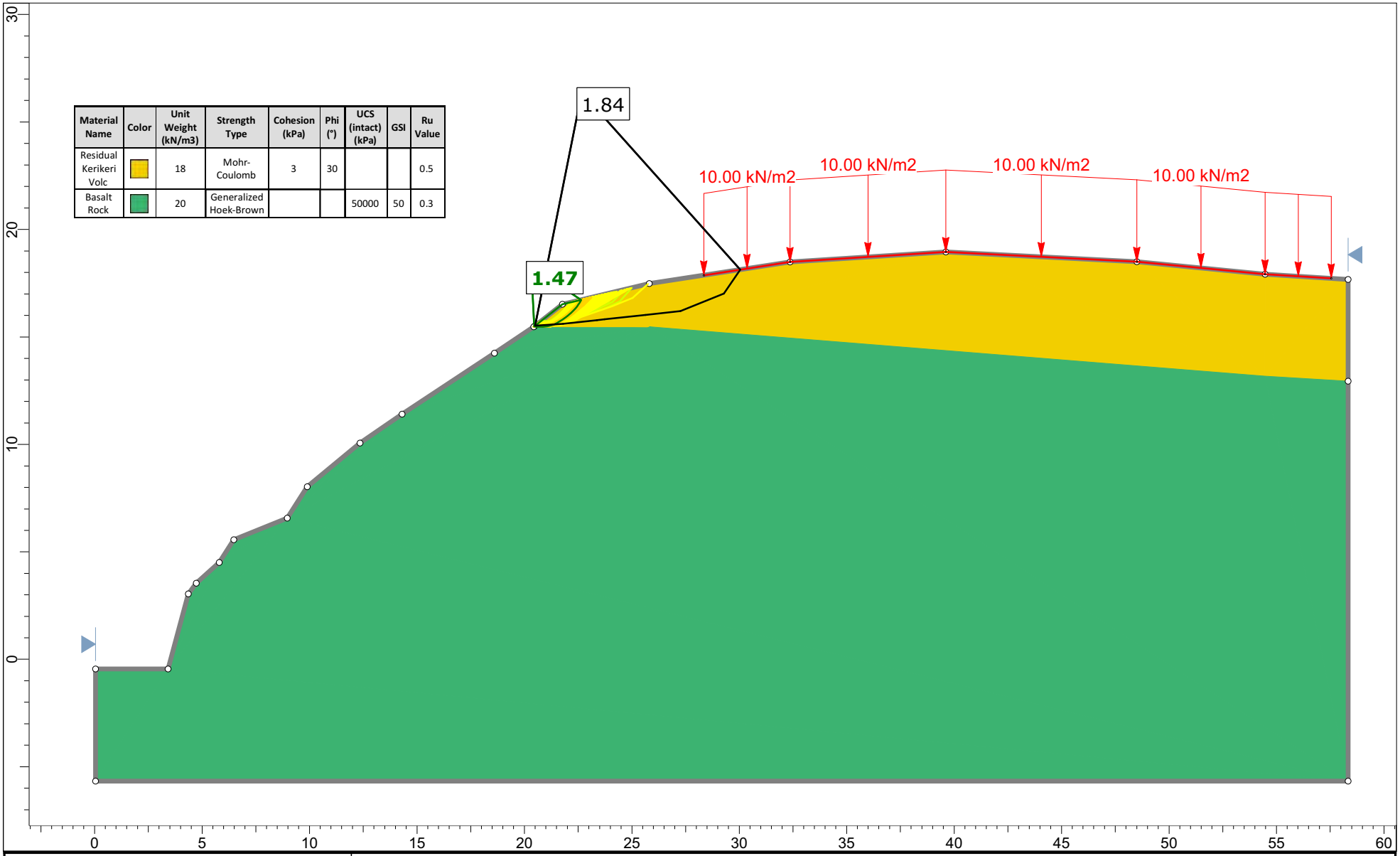


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Civil & Structural Engineers

SLIDEINTERPRET 9.029

Project	22 322 - 111 & 115 Yorke Rd, Haruru		
Group	Cross Section G-G	*Scenario*	Static
Drawn By	JMC	*Company*	
Date	14/12/2022, 5:19:38 pm	*File Name*	Sec GG.slmd

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	GSI	Ru Value
Residual Kerikeri Volc		18	Mohr-Coulomb	3	30			0.5
Basalt Rock		20	Generalized Hoek-Brown			50000	50	0.3

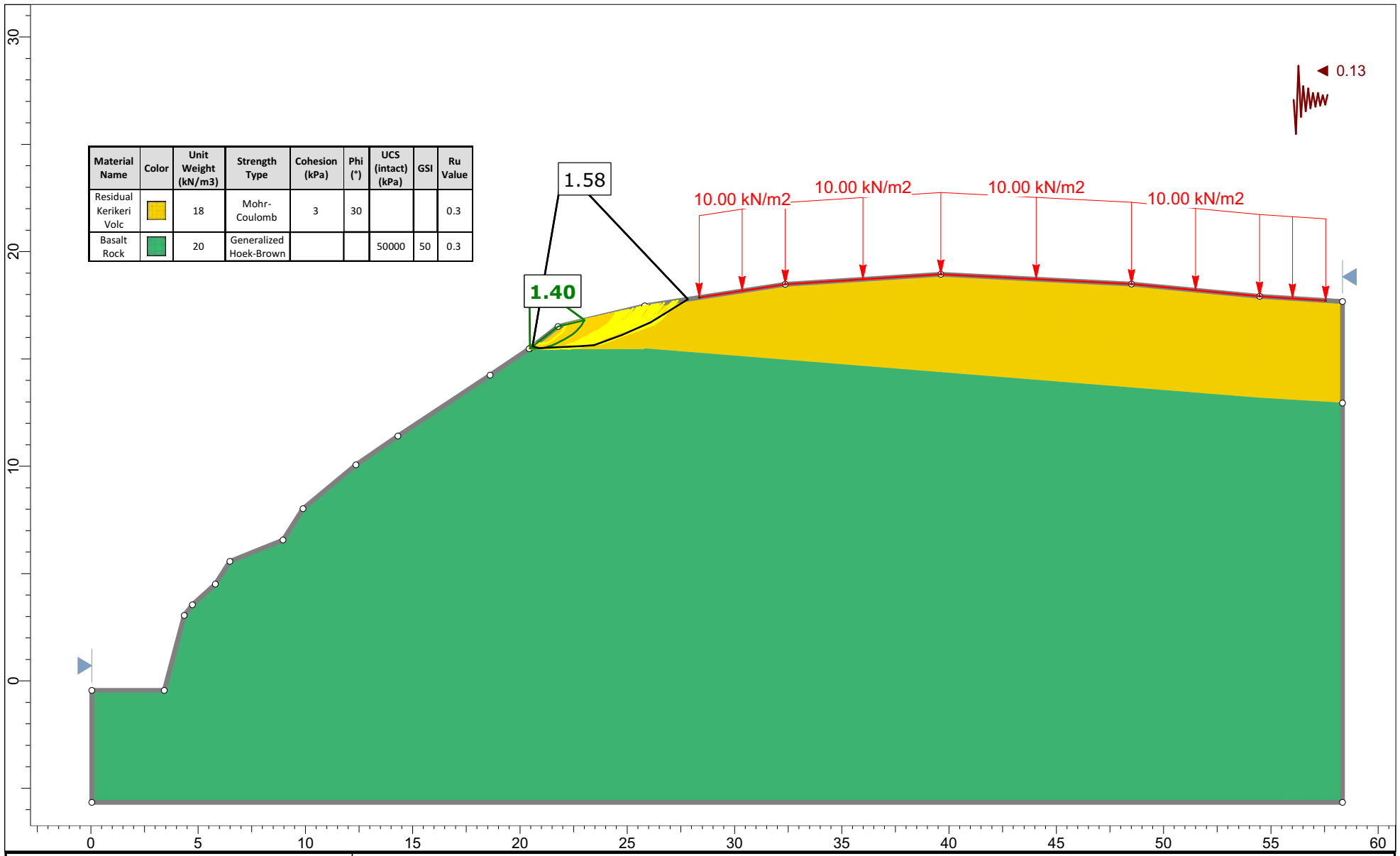


HAIGH WORKMAN Ltd
Civil & Structural Engineers

SLIDEINTERPRET 9.029

Project	22 322 - 111 & 115 Yorke Rd, Haruru		
Group	Cross Section G-G	*Scenario*	Elevated GW
Drawn By	JMC	*Company*	
Date	14/12/2022, 5:19:38 pm	*File Name*	Sec GG.slmd

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	GSI	Ru Value
Residual Kerikeri Volc		18	Mohr-Coulomb	3	30			0.3
Basalt Rock		20	Generalized Hoek-Brown			50000	50	0.3

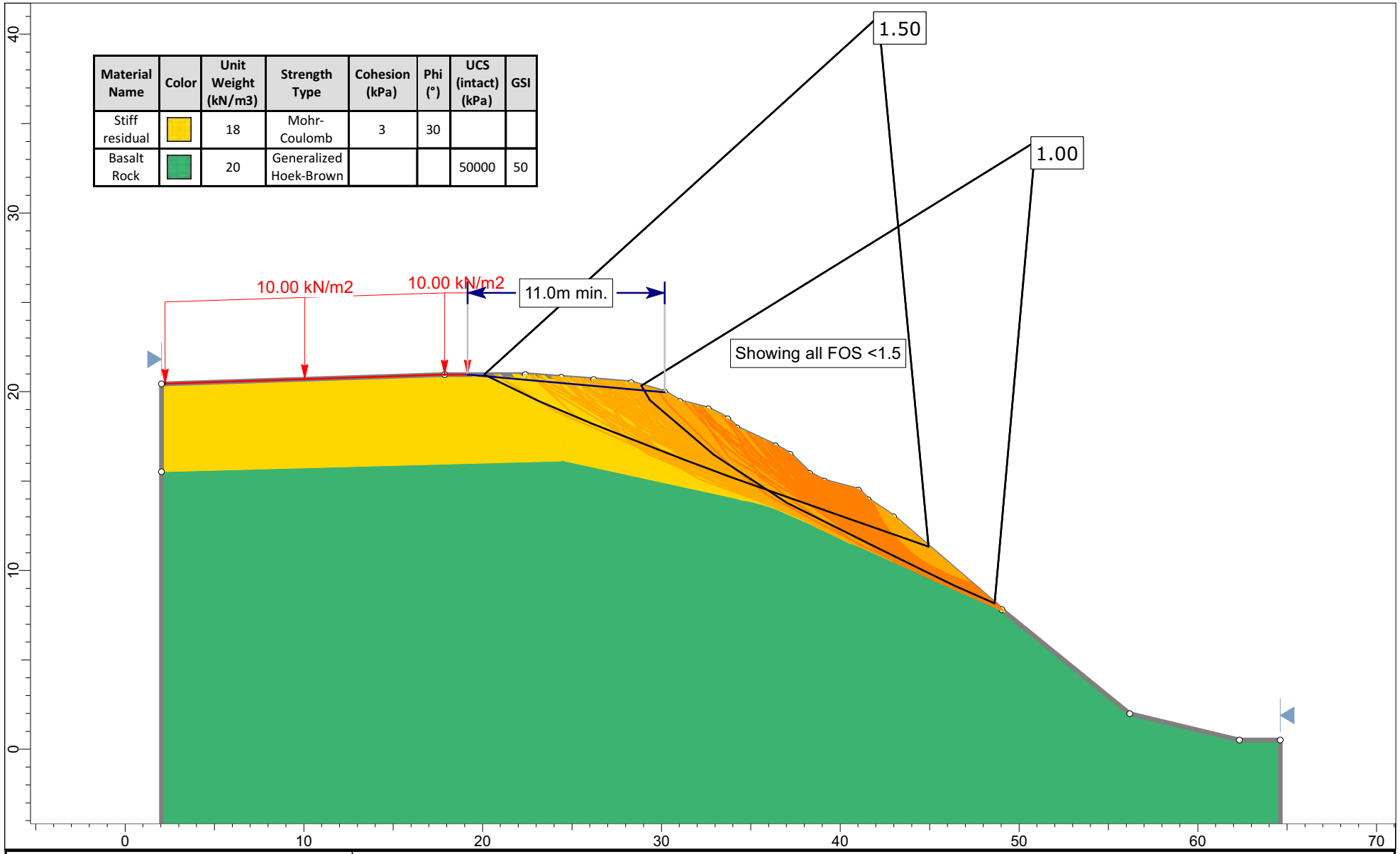


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SLIDEINTERPRET 9.029

Project	22 322 - 111 & 115 Yorke Rd, Haruru		
Group	Cross Section G-G	*Scenario*	Seismic
Drawn By	JMC	*Company*	
Date	14/12/2022, 5:19:38 pm	*File Name*	Sec GG.slmd

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	GSI
Stiff residual		18	Mohr-Coulomb	3	30		
Basalt Rock		20	Generalized Hoek-Brown			50000	50

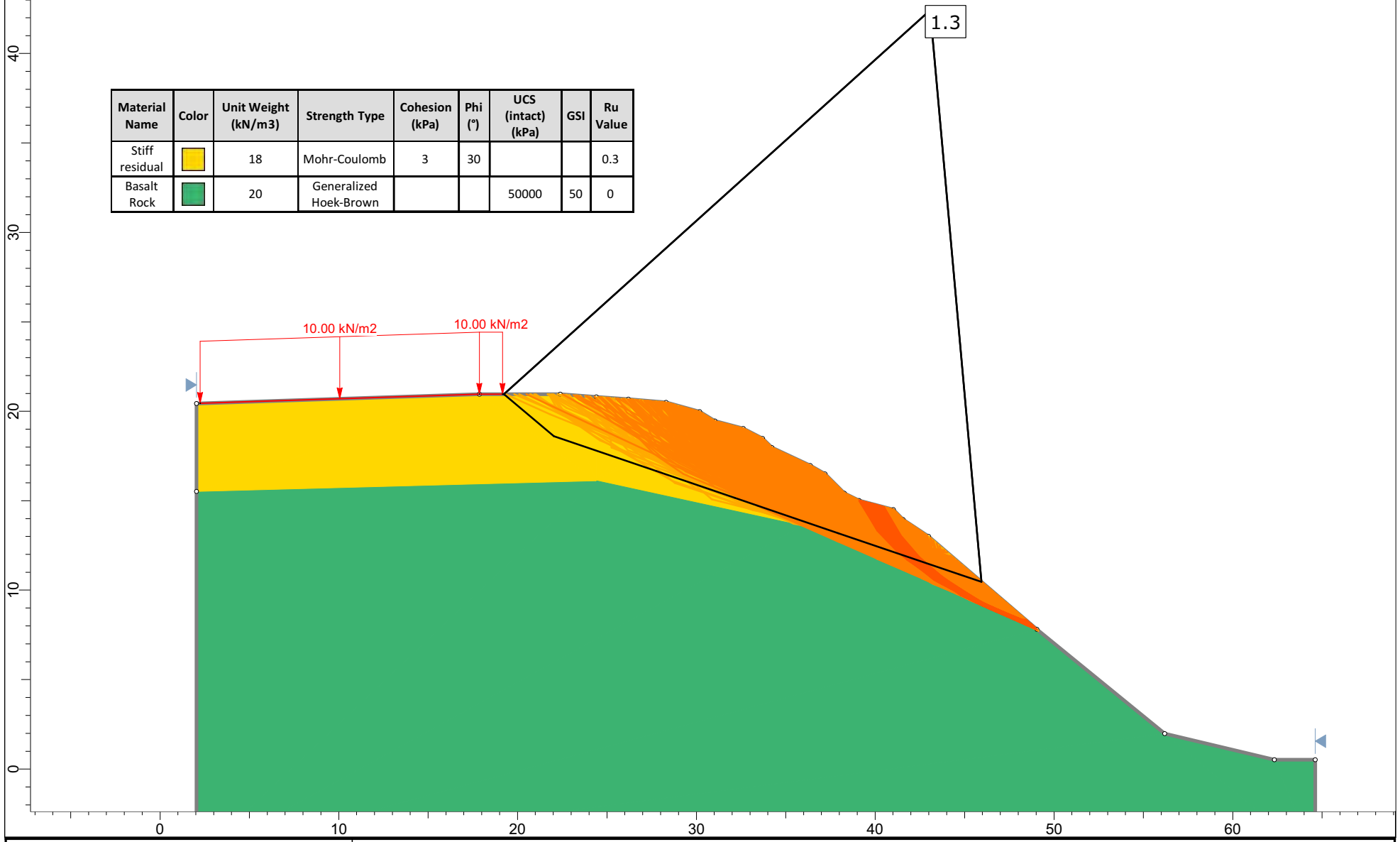


HAIGH WORKMAN Ltd
Civil & Structural Engineers

SLIDEINTERPRET 9.029

Project	22 322 - 111 & 115 Yorke Rd, Haruru		
Group	Cross Section H-H	*Scenario*	Static
Drawn By	JMC	*Company*	
Date	14/12/2022, 5:19:38 pm	*File Name*	Sec HH.slmd

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	GSI	Ru Value
Stiff residual		18	Mohr-Coulomb	3	30			0.3
Basalt Rock		20	Generalized Hoek-Brown			50000	50	0

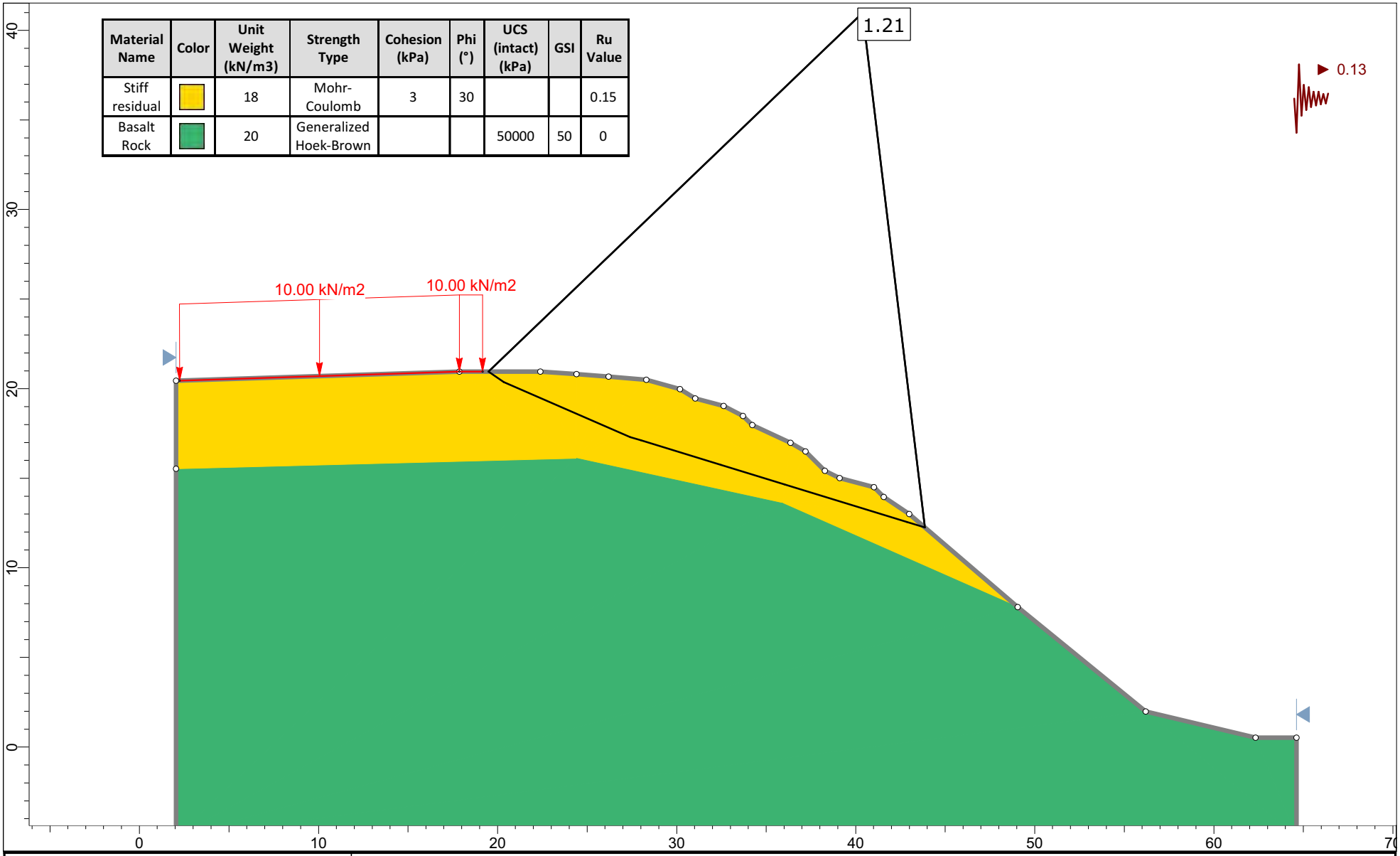


HAIGH WORKMAN Ltd
Civil & Structural Engineers

SLIDEINTERPRET 9.029

Project	22 322 - 111 & 115 Yorke Rd, Haruru		
Group	Cross Section H-H	*Scenario*	Elevated GW
Drawn By	JMC	*Company*	
Date	14/12/2022, 5:19:38 pm	*File Name*	Sec HH.slmd

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	GSI	Ru Value
Stiff residual		18	Mohr-Coulomb	3	30			0.15
Basalt Rock		20	Generalized Hoek-Brown			50000	50	0

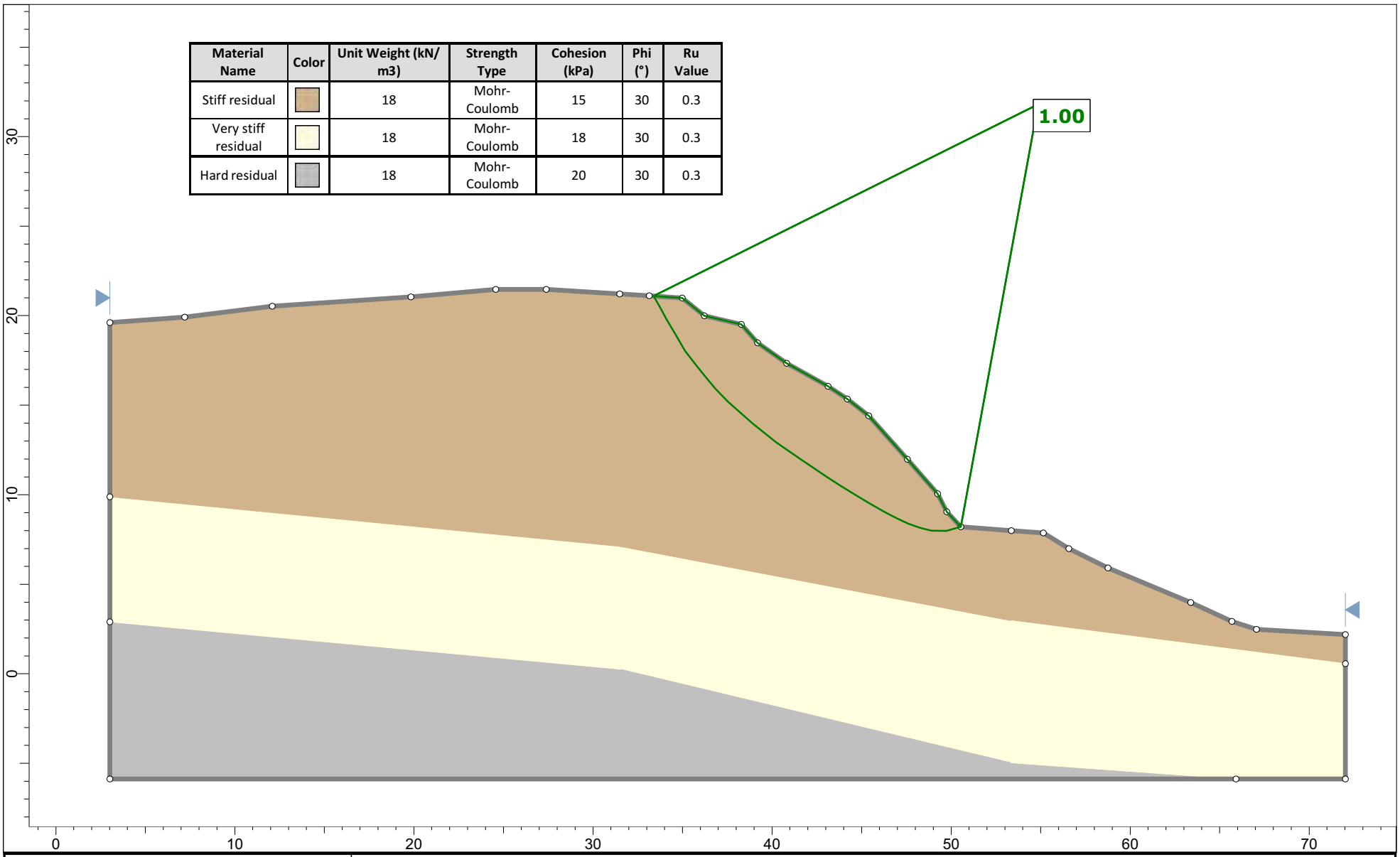


HAIGH WORKMAN Ltd
Civil & Structural Engineers

SLIDEINTERPRET 9.029

Project	22 322 - 111 & 115 Yorke Rd, Haruru		
Group	Cross Section H-H	*Scenario*	Seismic
Drawn By	JMC	*Company*	
Date	14/12/2022, 5:19:38 pm	*File Name*	Sec HH.slmd

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
Stiff residual		18	Mohr-Coulomb	15	30	0.3
Very stiff residual		18	Mohr-Coulomb	18	30	0.3
Hard residual		18	Mohr-Coulomb	20	30	0.3

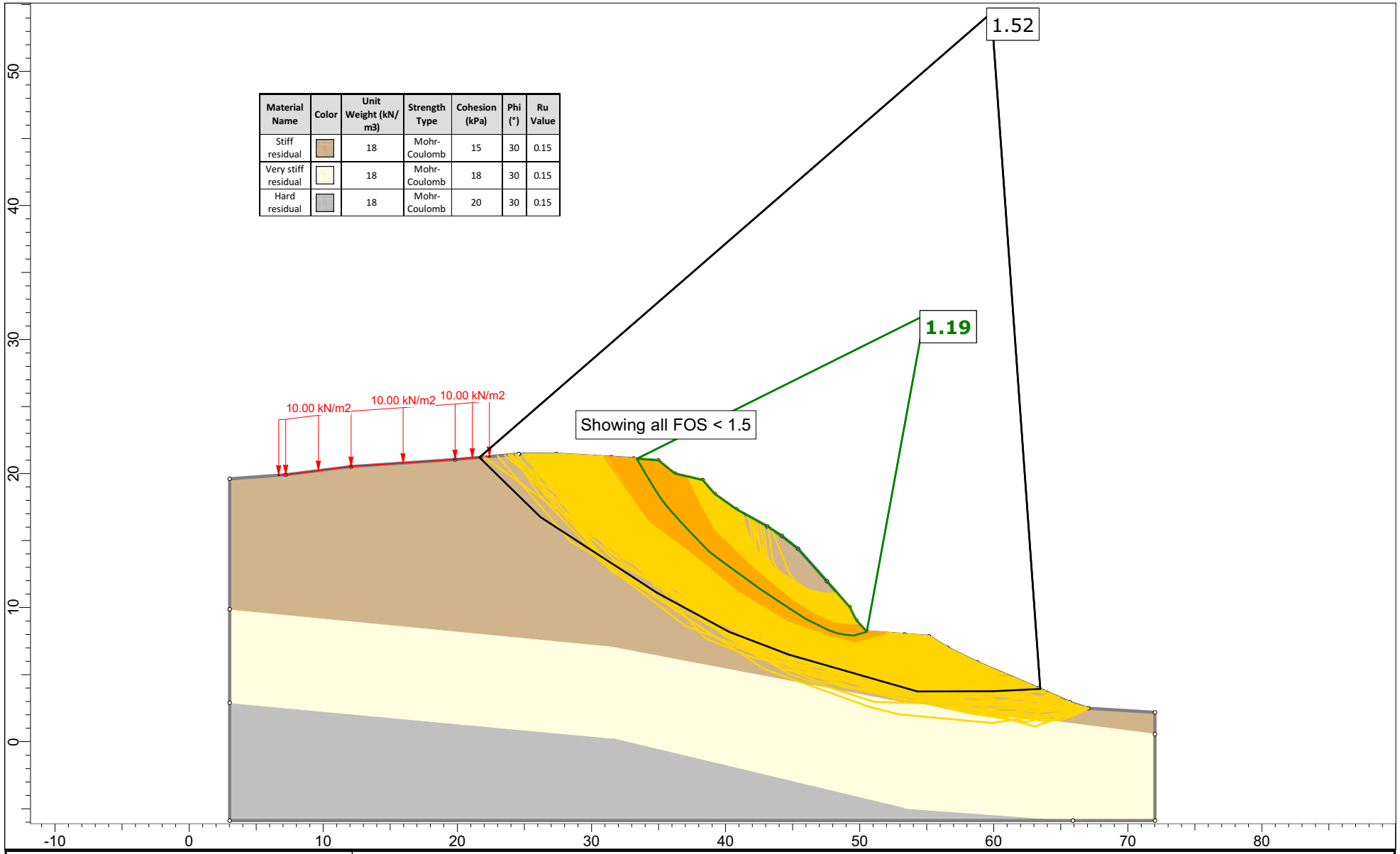


HAIGH WORKMAN Ltd
Civil & Structural Engineers

SLIDEINTERPRET 9.029

Project	22 322 - 111 & 115 Yorke Rd, Haruru		
Group	Cross Section I-I	*Scenario*	Back analyses
Drawn By	JMC	*Company*	
Date	15/06/2023, 10:26:10 am	*File Name*	Sec II_back analysis.slmd

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
Stiff residual		18	Mohr-Coulomb	15	30	0.15
Very stiff residual		18	Mohr-Coulomb	18	30	0.15
Hard residual		18	Mohr-Coulomb	20	30	0.15

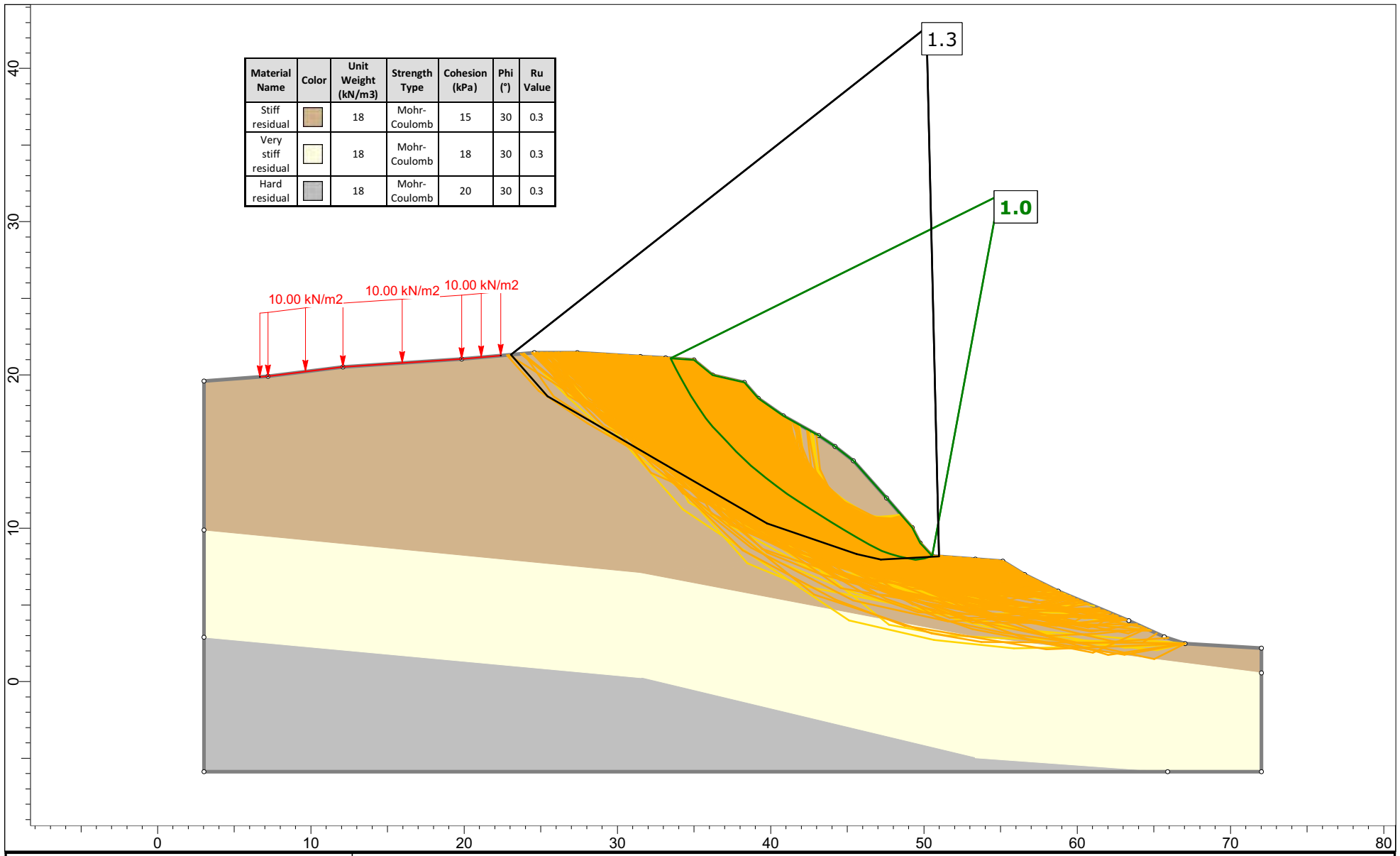


HAIGH WORKMAN Ltd
Civil & Structural Engineers

SLIDEINTERPRET 9.029

Project	22 322 - 111 & 115 Yorke Rd, Haruru		
Group	Cross Section I-I	*Scenario*	Static conditions
Drawn By	JMC	*Company*	
Date	15/06/2023, 10:26:10 am	*File Name*	Sec II.slmd

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
Stiff residual		18	Mohr-Coulomb	15	30	0.3
Very stiff residual		18	Mohr-Coulomb	18	30	0.3
Hard residual		18	Mohr-Coulomb	20	30	0.3

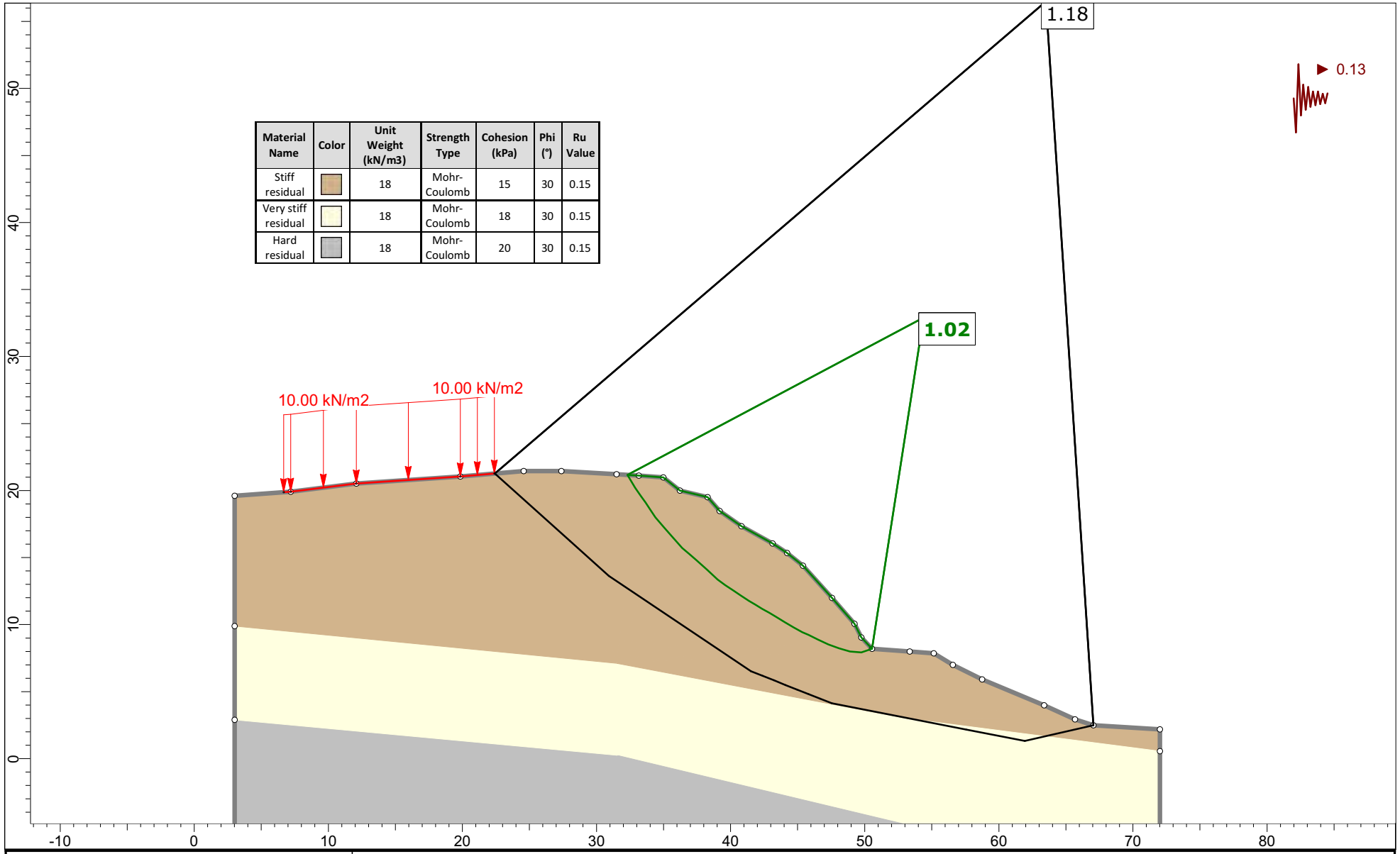


HAIGH WORKMAN Ltd
Civil & Structural Engineers

SLIDEINTERPRET 9.029

Project	22 322 - 111 & 115 Yorke Rd, Haruru		
Group	Cross Section I-I	*Scenario*	Elevated GW
Drawn By	JMC	*Company*	
Date	15/06/2023, 10:26:10 am	*File Name*	Sec II.slmd

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
Stiff residual		18	Mohr-Coulomb	15	30	0.15
Very stiff residual		18	Mohr-Coulomb	18	30	0.15
Hard residual		18	Mohr-Coulomb	20	30	0.15

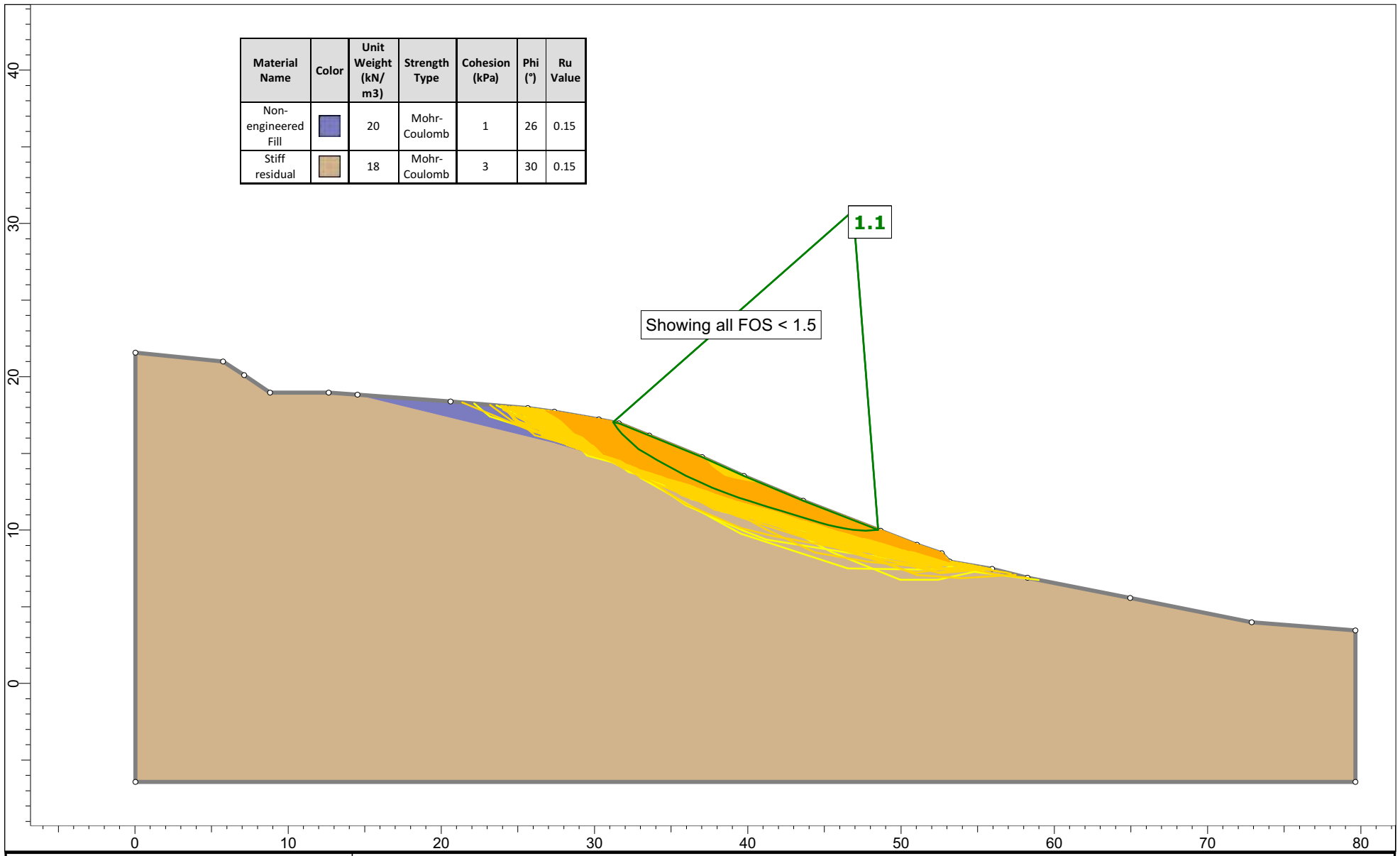


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SLIDEINTERPRET 9.029

Project	22 322 - 111 & 115 Yorke Rd, Haruru		
Group	Cross Section I-I	*Scenario*	Seismic conditions
Drawn By	JMC	*Company*	
Date	15/06/2023, 10:26:10 am	*File Name*	Sec II.slmd

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
Non-engineered Fill		20	Mohr-Coulomb	1	26	0.15
Stiff residual		18	Mohr-Coulomb	3	30	0.15

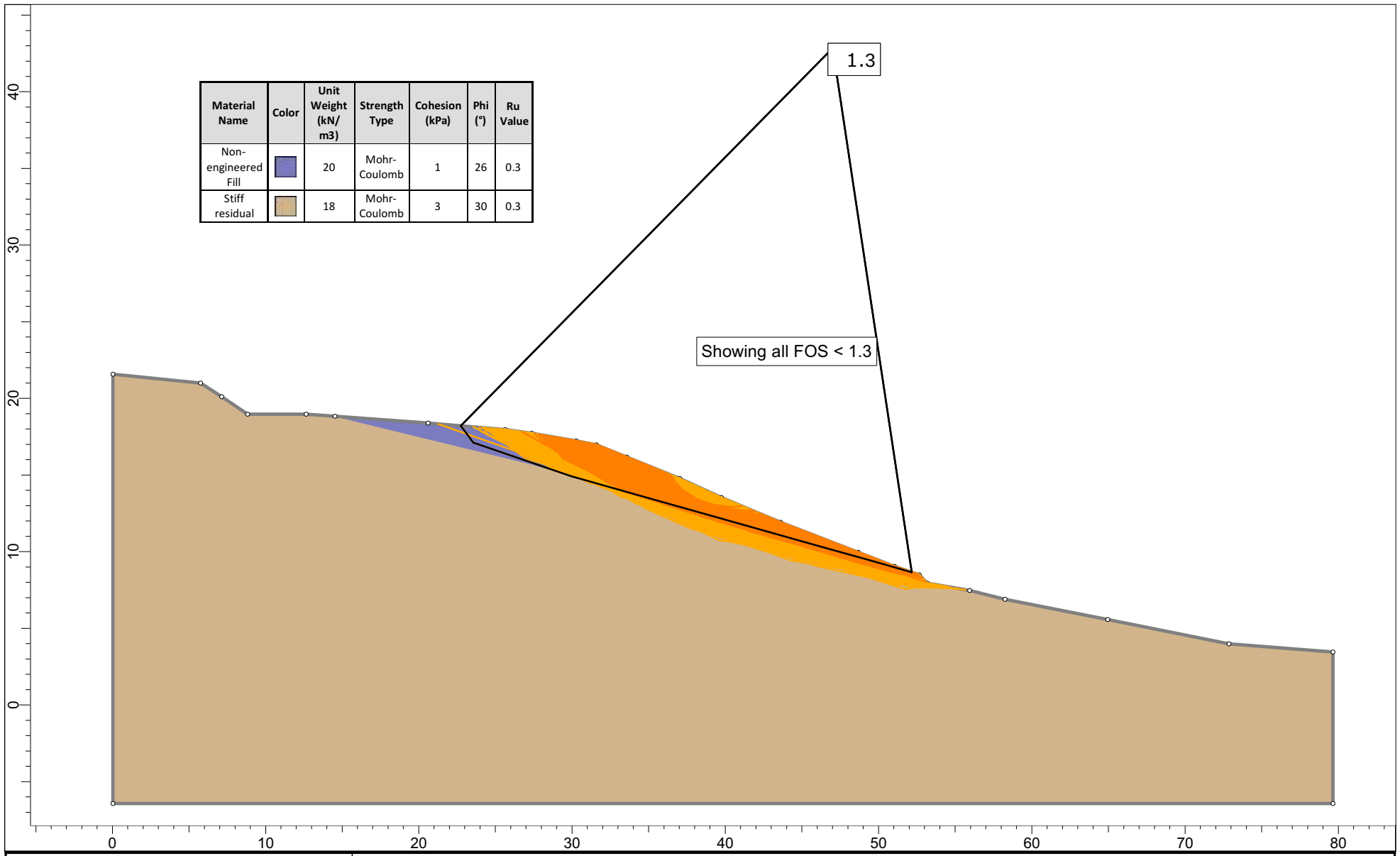


HAIGH WORKMAN Ltd
Civil & Structural Engineers

SLIDEINTERPRET 9.029

Project	22 322 - 111 & 115 Yorke Rd, Haruru		
Group	Cross Section J-J	*Scenario*	Static
Drawn By	JMC	*Company*	
Date	15/06/2023, 10:26:10 am	*File Name*	Sec JJ.slmd

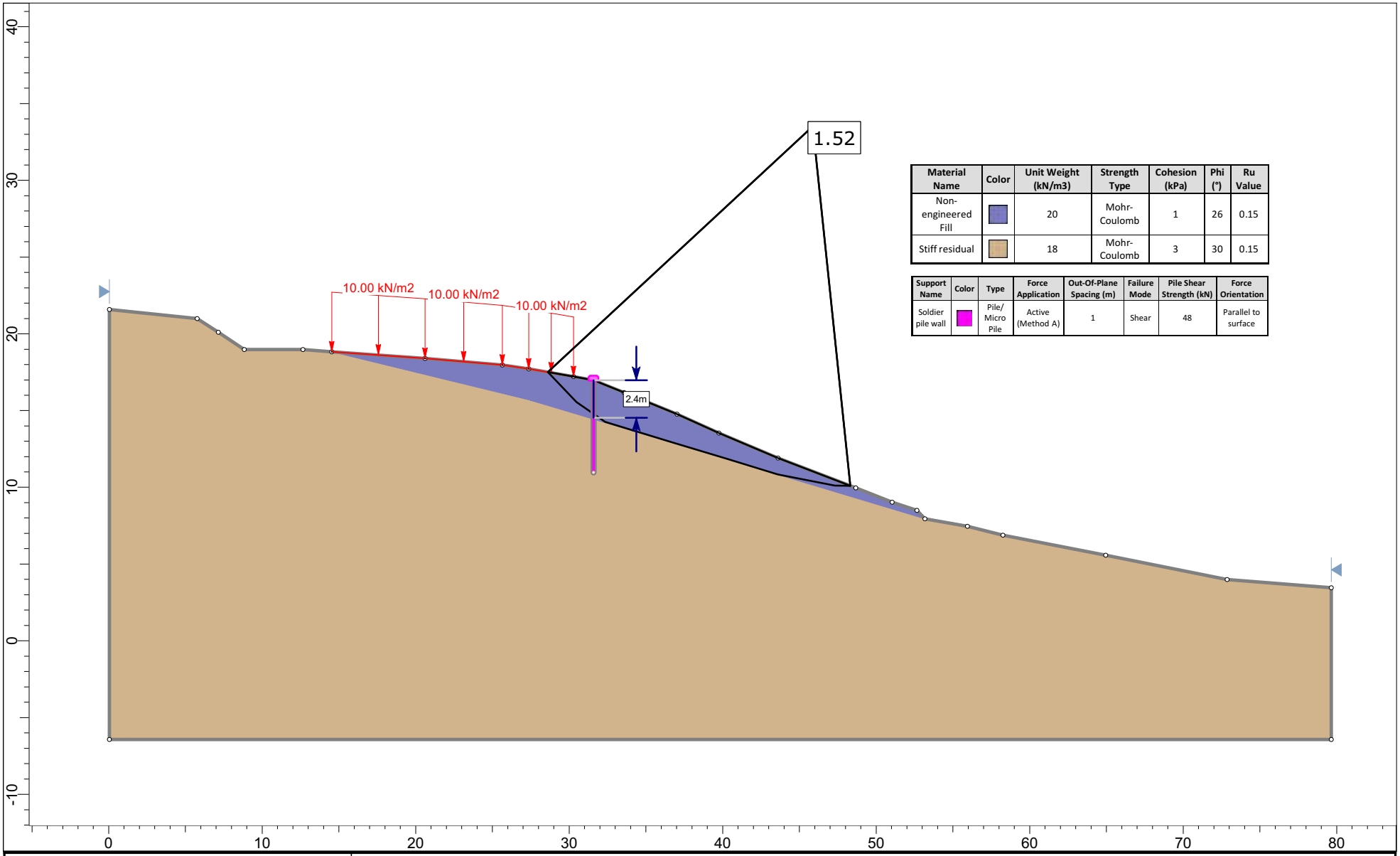
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
Non-engineered Fill		20	Mohr-Coulomb	1	26	0.3
Stiff residual		18	Mohr-Coulomb	3	30	0.3



HAIGH WORKMAN Ltd
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SLIDEINTERPRET 9.029

Project	22 322 - 111 & 115 Yorke Rd, Haruru		
Group	Cross Section J-J	*Scenario*	Elevated GW
Drawn By	JMC	*Company*	
Date	15/06/2023, 10:26:10 am	*File Name*	Sec JJ.slmd



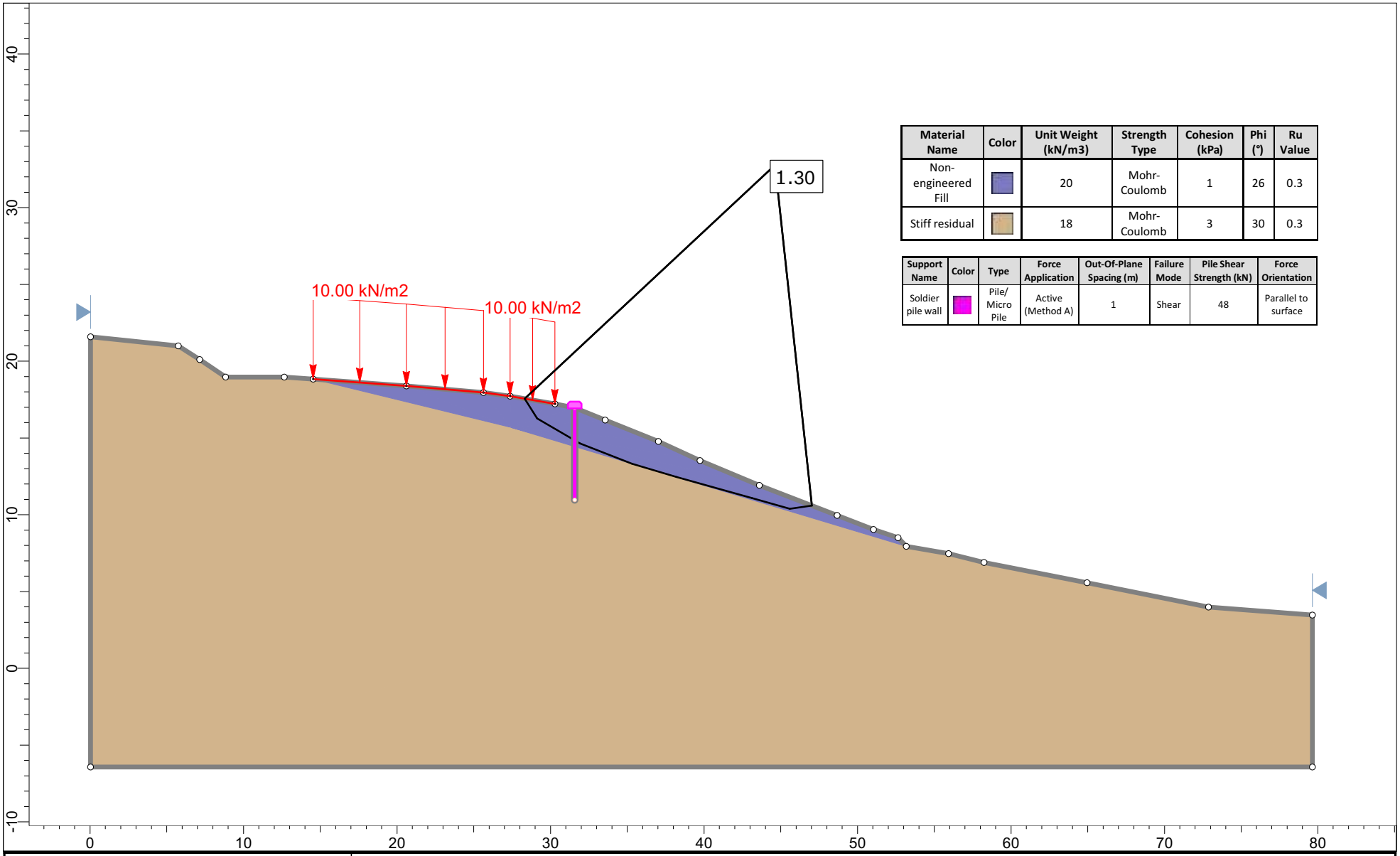
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
Non-engineered Fill		20	Mohr-Coulomb	1	26	0.15
Stiff residual		18	Mohr-Coulomb	3	30	0.15

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
Soldier pile wall		Pile/ Micro Pile	Active (Method A)	1	Shear	48	Parallel to surface

HAIGH WORKMAN Ltd
Civil & Structural Engineers

SLIDEINTERPRET 9.029

Project	22 322 - 111 & 115 Yorke Rd, Haruru		
Group	Cross Section J-J	*Scenario*	Static - Post-development
Drawn By	JMC	*Company*	
Date	15/06/2023, 10:26:10 am	*File Name*	Sec JJ.slmd



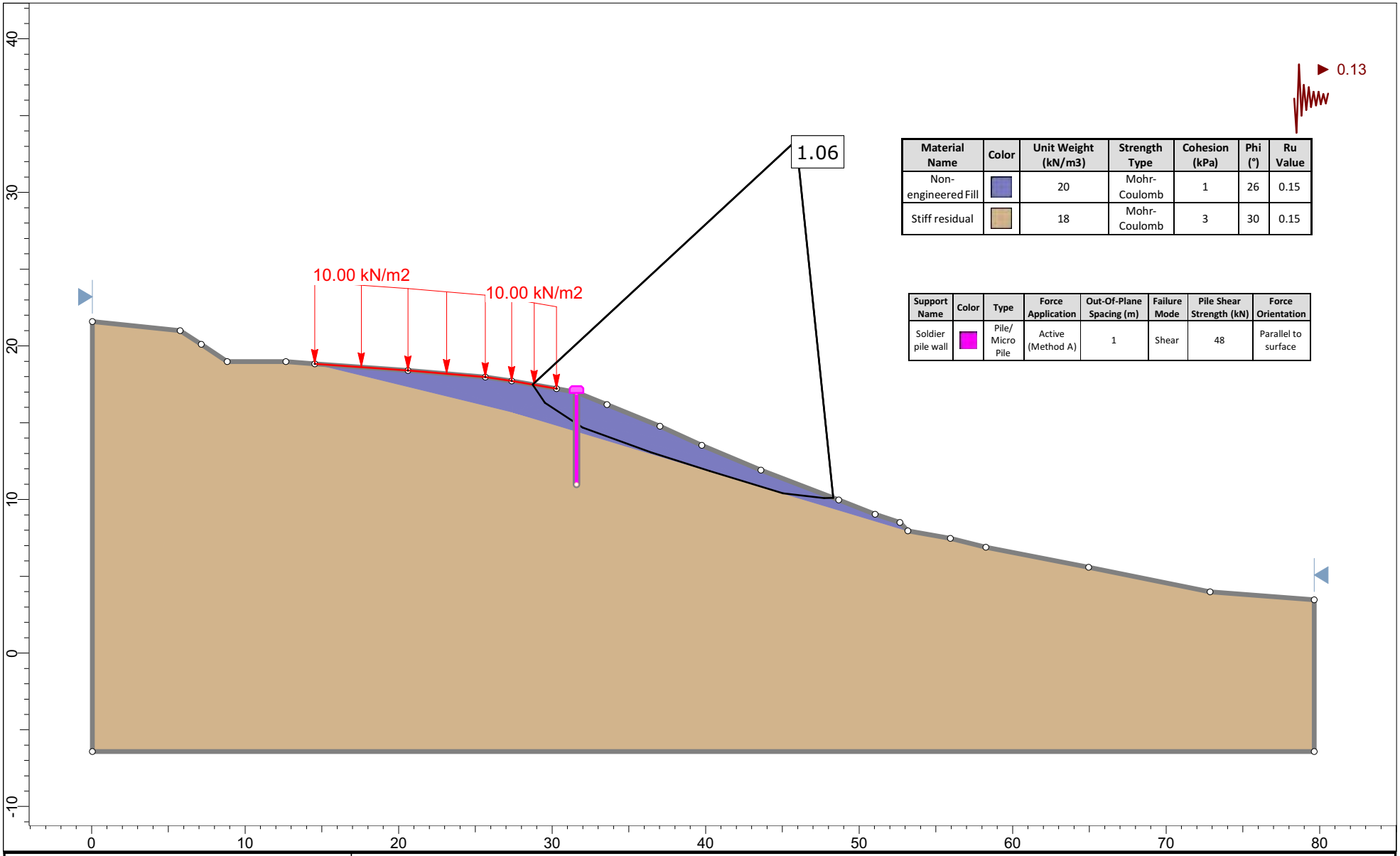
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
Non-engineered Fill		20	Mohr-Coulomb	1	26	0.3
Stiff residual		18	Mohr-Coulomb	3	30	0.3

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
Soldier pile wall		Pile/ Micro Pile	Active (Method A)	1	Shear	48	Parallel to surface

HAIGH WORKMAN Ltd
Civil & Structural Engineers

SLIDEINTERPRET 9.029

Project	22 322 - 111 & 115 Yorke Rd, Haruru		
Group	Cross Section J-J	*Scenario*	Elevated GW - Post-development
Drawn By	JMC	*Company*	
Date	15/06/2023, 10:26:10 am	*File Name*	Sec JJ.slmd



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	Ru Value
Non-engineered Fill		20	Mohr-Coulomb	1	26	0.15
Stiff residual		18	Mohr-Coulomb	3	30	0.15

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
Soldier pile wall		Pile/ Micro Pile	Active (Method A)	1	Shear	48	Parallel to surface

HAIGH WORKMAN Ltd
Civil & Structural Engineers

SLIDEINTERPRET 9.029

Project	22 322 - 111 & 115 Yorke Rd, Haruru		
Group	Cross Section J-J	*Scenario*	Seismic - Post-development
Drawn By	JMC	*Company*	
Date	15/06/2023, 10:26:10 am	*File Name*	Sec JJ.slmd

Appendix D – Liquefaction Assessment

Underground Investigation Ltd
Cone Penetration Testing
craig@undergroundinvestigation.co.nz
+64211473249

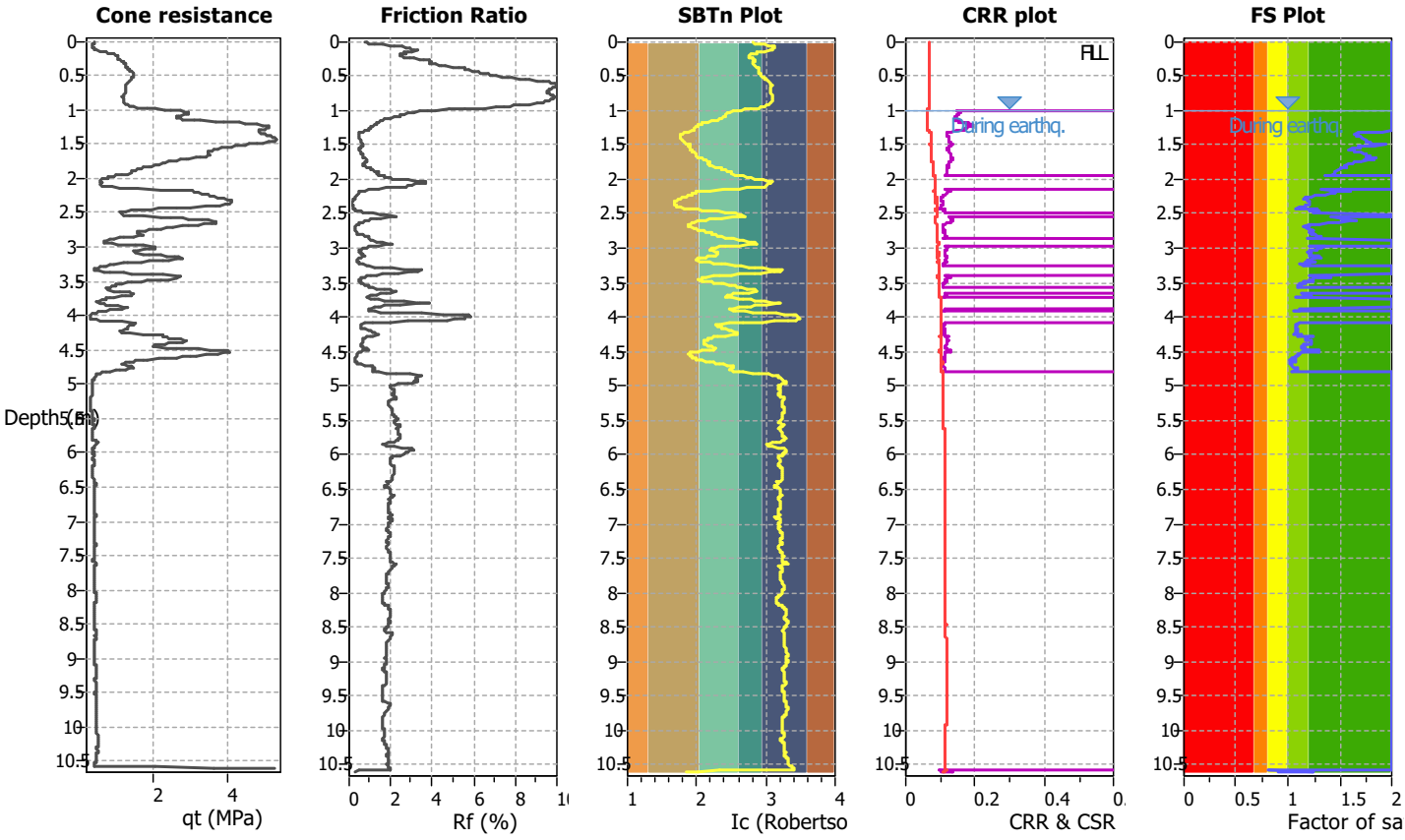
LIQUEFACTION ANALYSIS REPORT

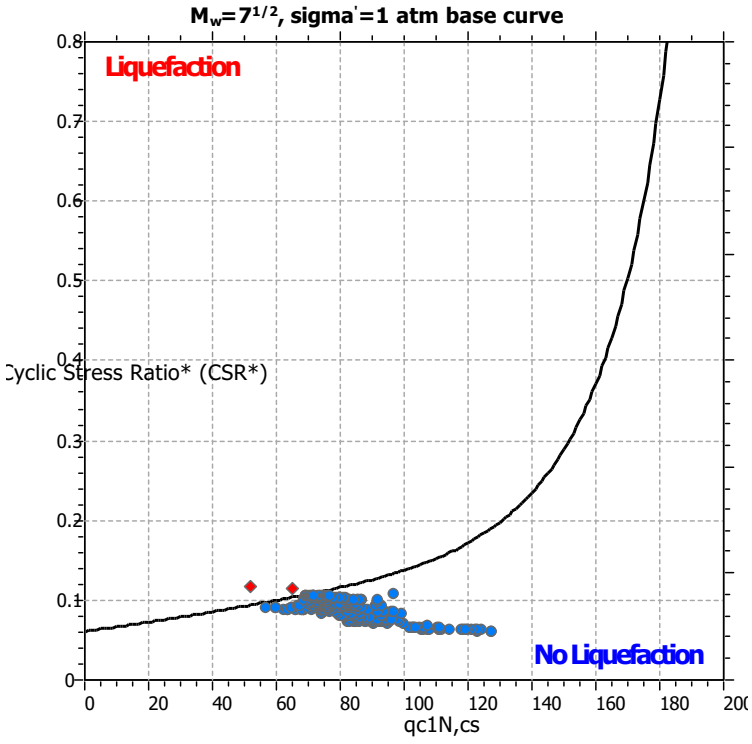
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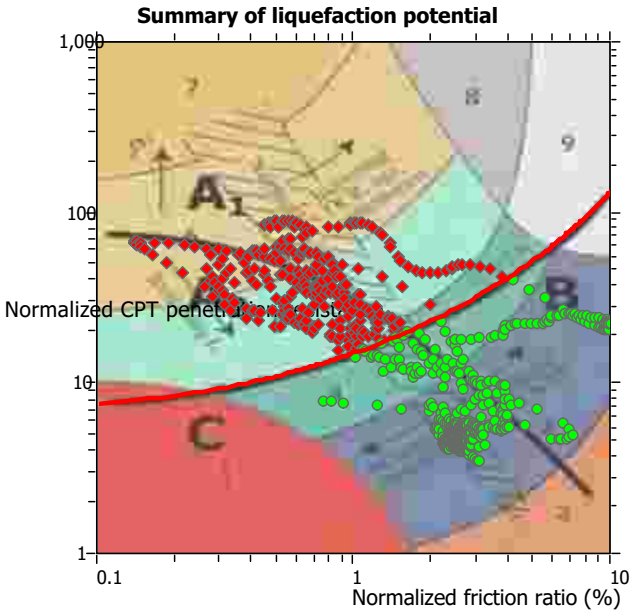
CPT file : CPT08

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	Yes	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	1.00 m	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	19.00 kN/m³	Limit depth:	N/A
Earthquake magnitude M_w:	5.80	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	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

Underground Investigation Ltd
Cone Penetration Testing
craig@undergroundinvestigation.co.nz
+64211473249

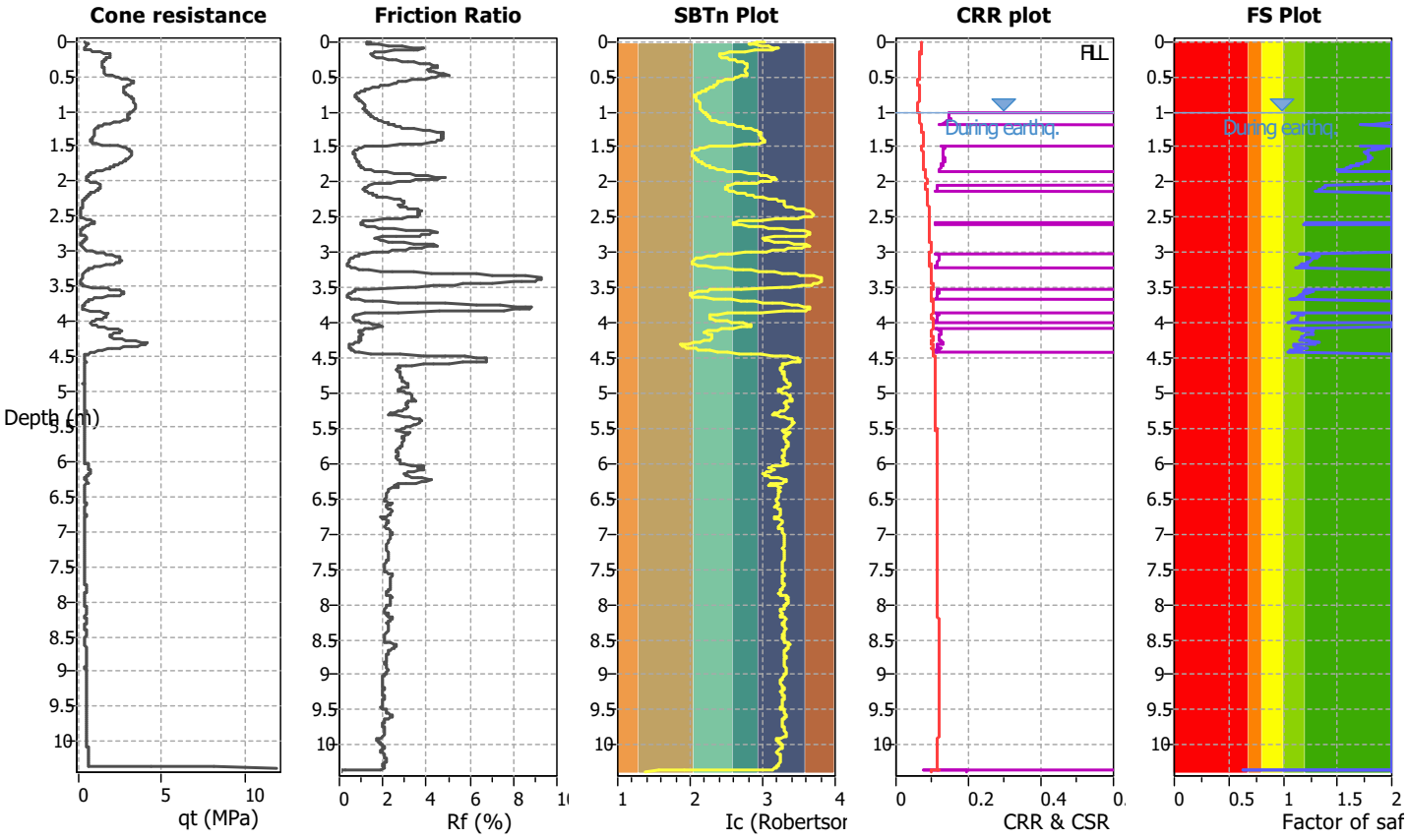
LIQUEFACTION ANALYSIS REPORT

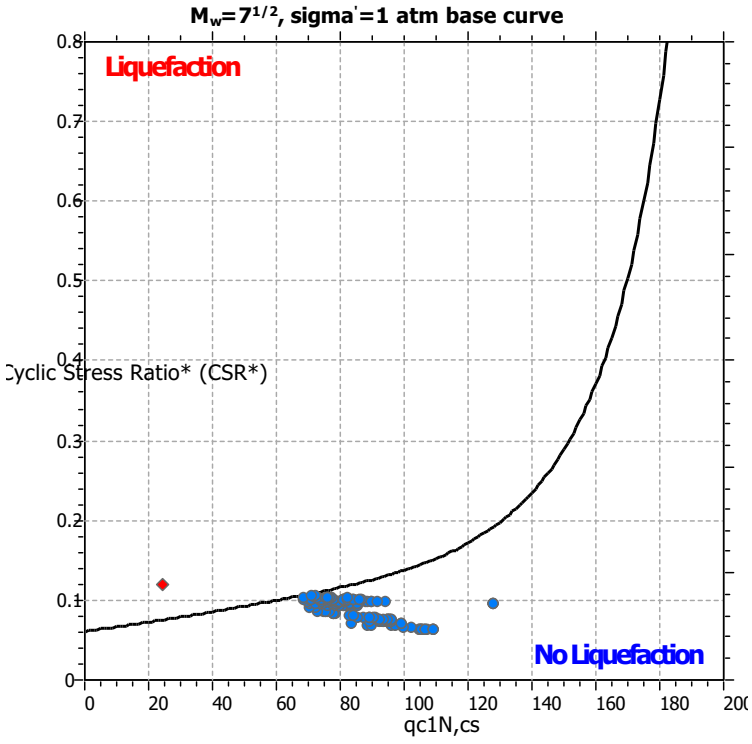
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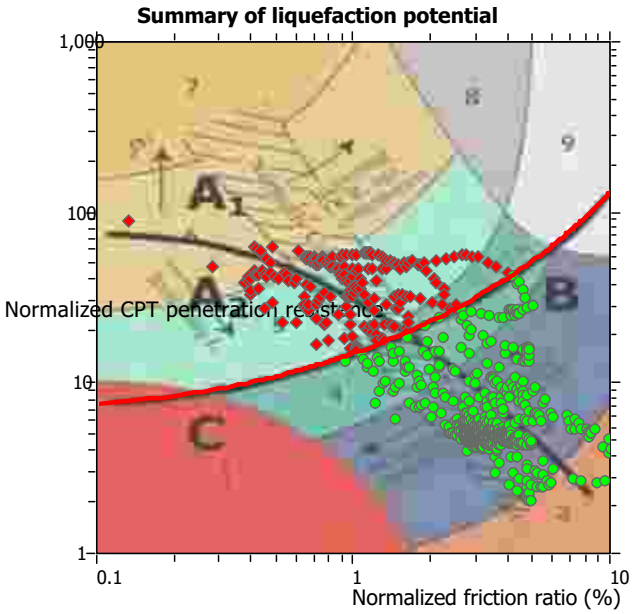
CPT file : CPT09

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	Yes	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	1.00 m	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	19.00 kN/m³	Limit depth:	N/A
Earthquake magnitude M_w:	5.80	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	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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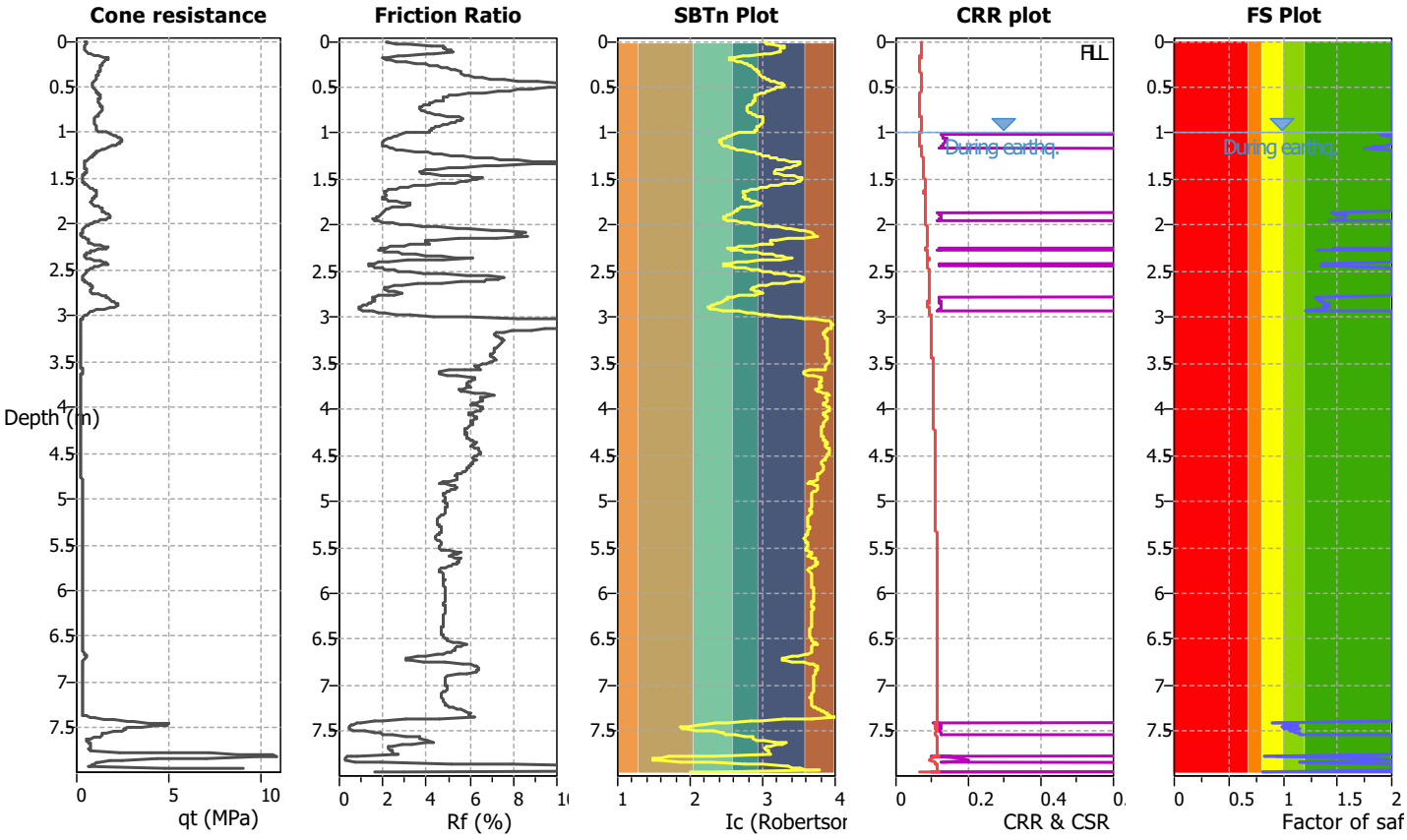
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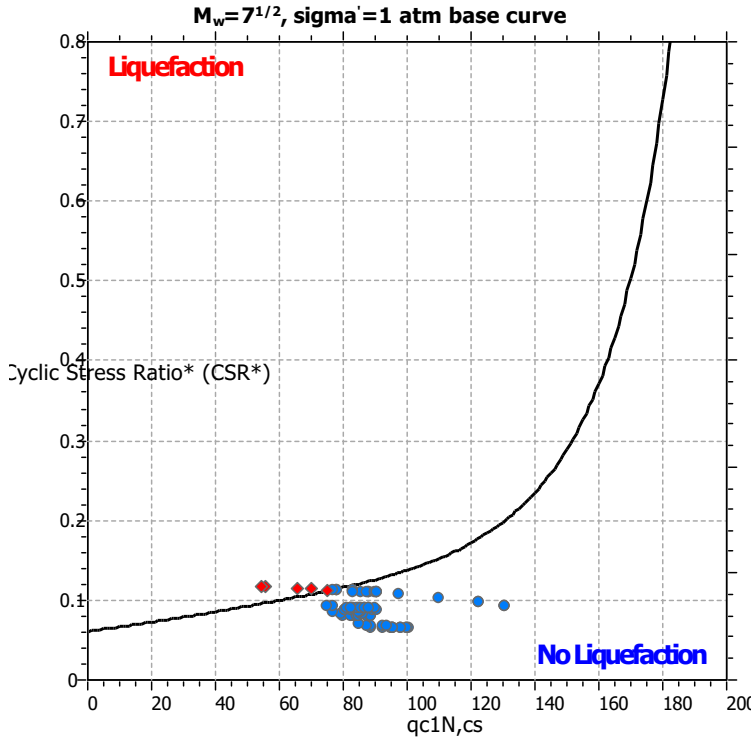
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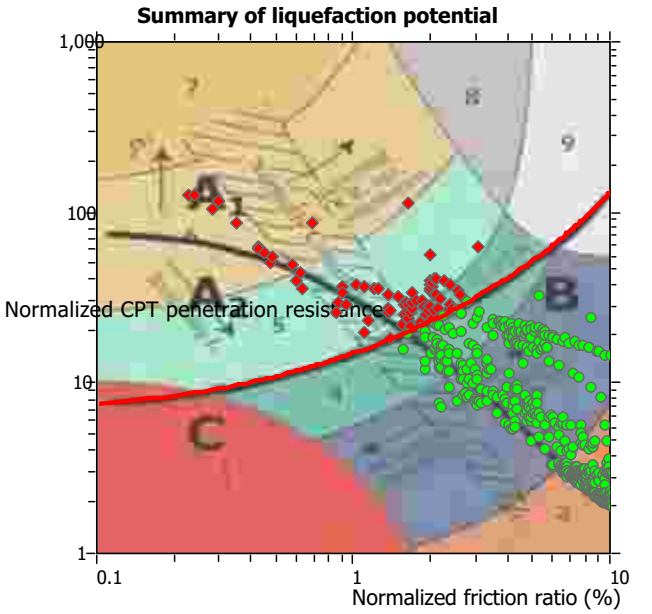
CPT file : CPT10

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	Yes	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	1.00 m	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	19.00 kN/m³	Limit depth:	N/A
Earthquake magnitude M_w:	5.80	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	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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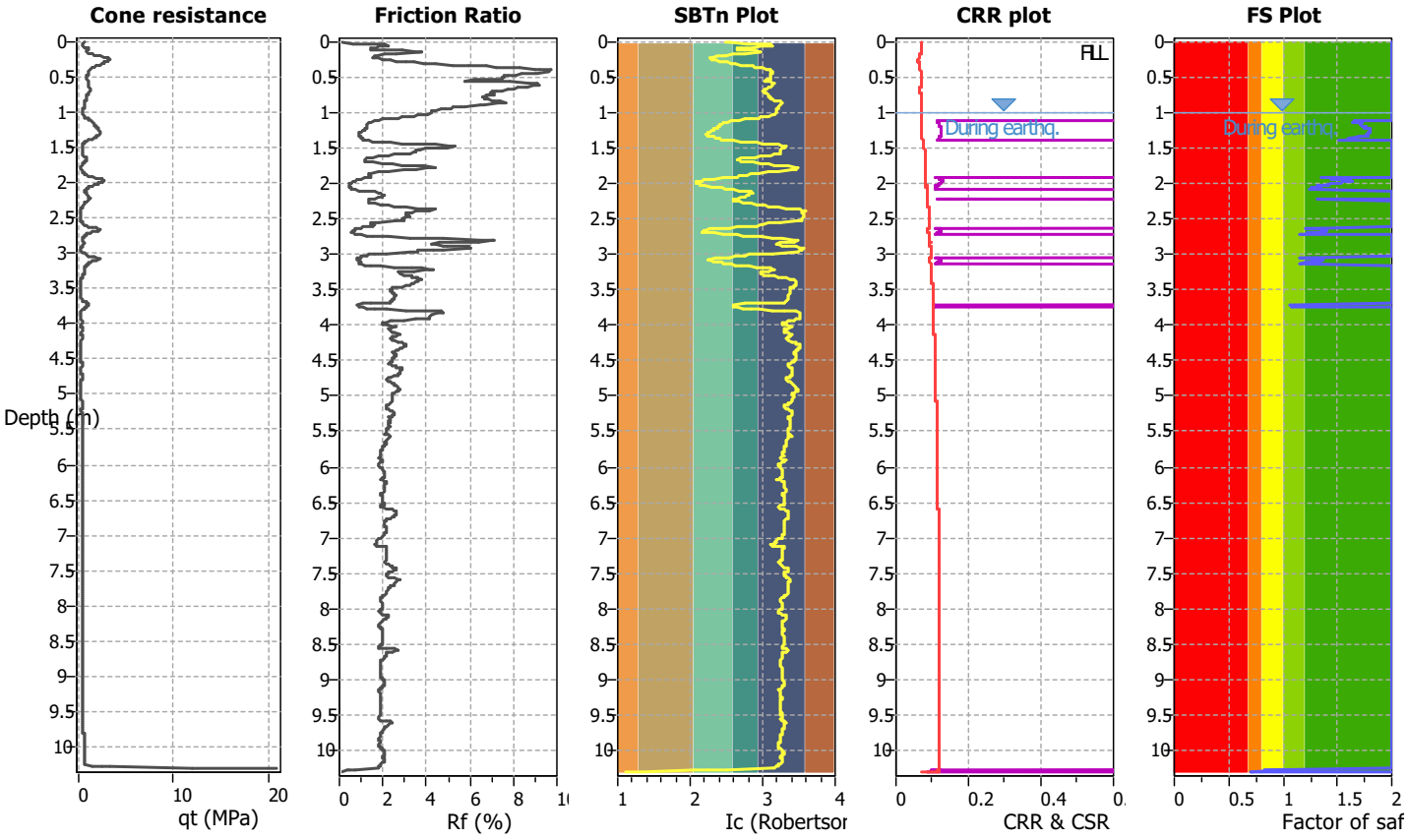
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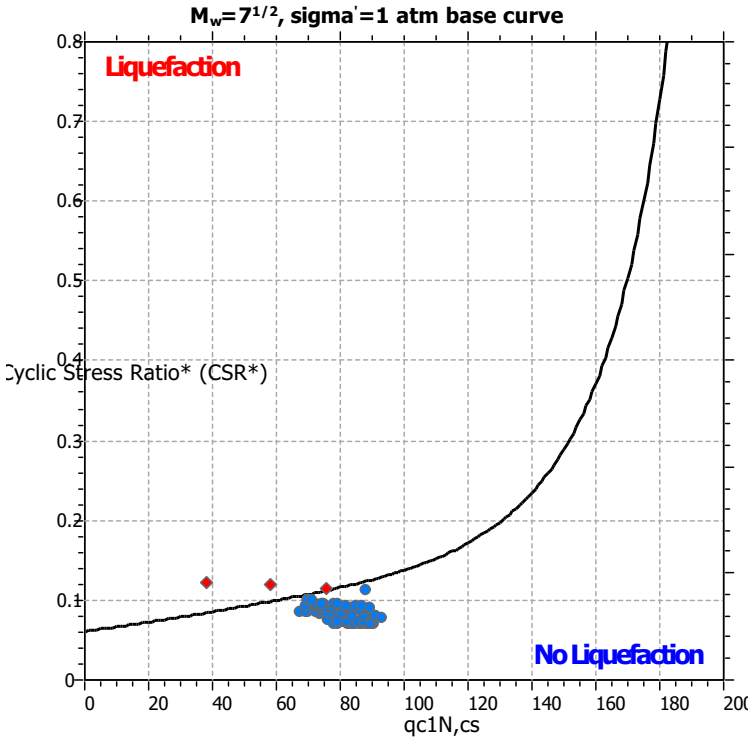
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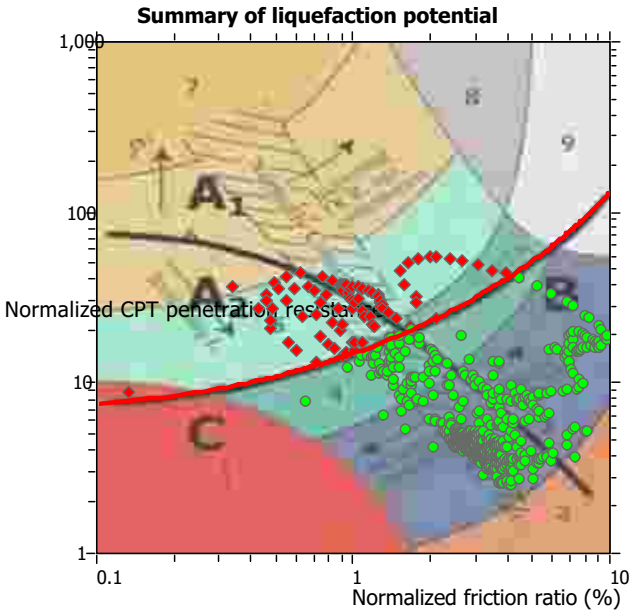
CPT file : CPT11

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	Yes	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	1.00 m	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	19.00 kN/m³	Limit depth:	N/A
Earthquake magnitude M_w:	5.80	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	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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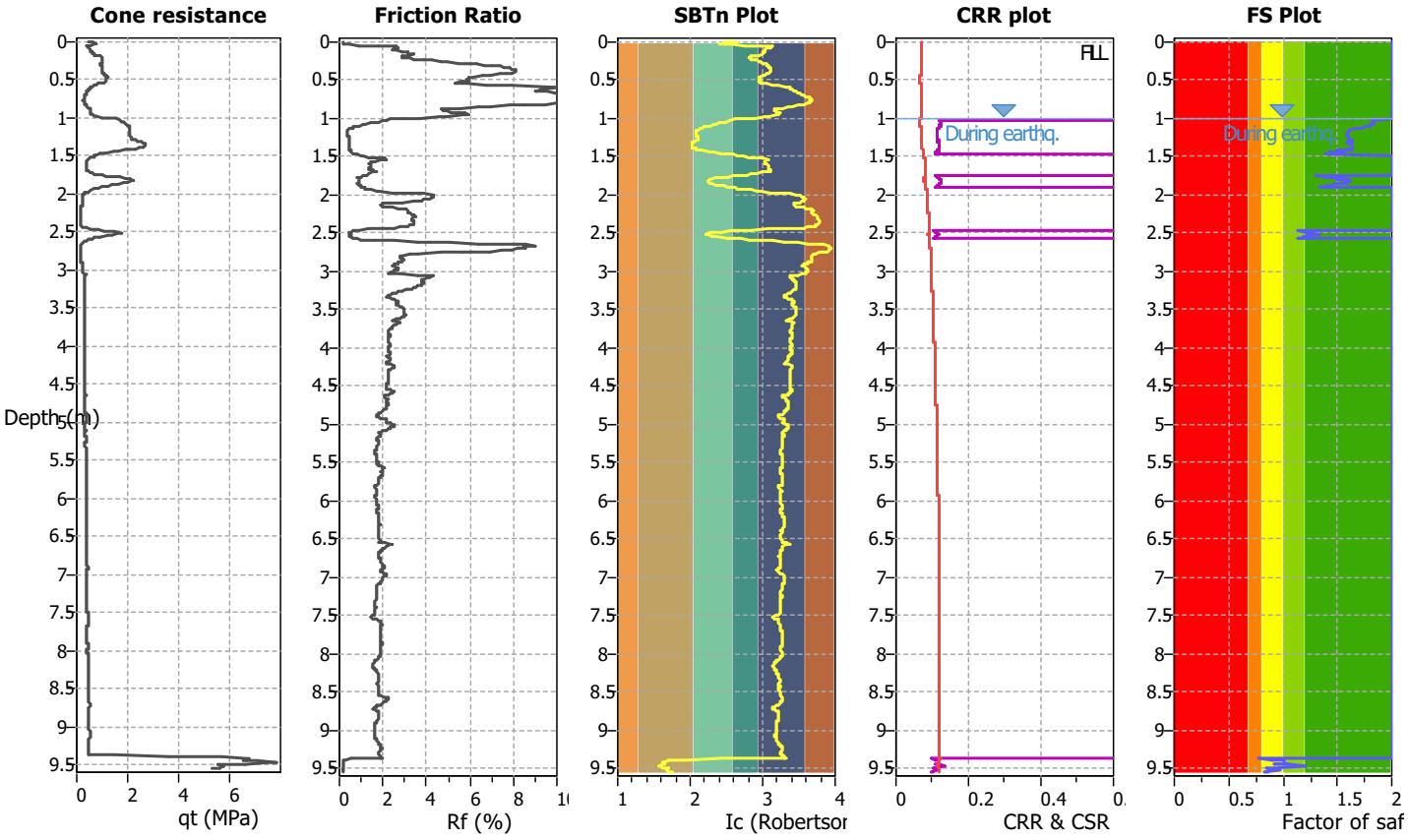
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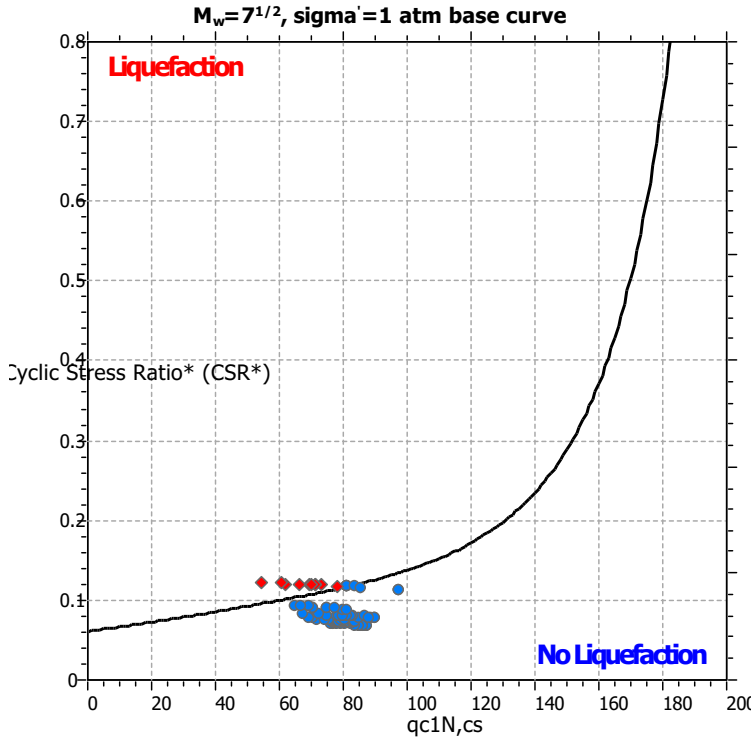
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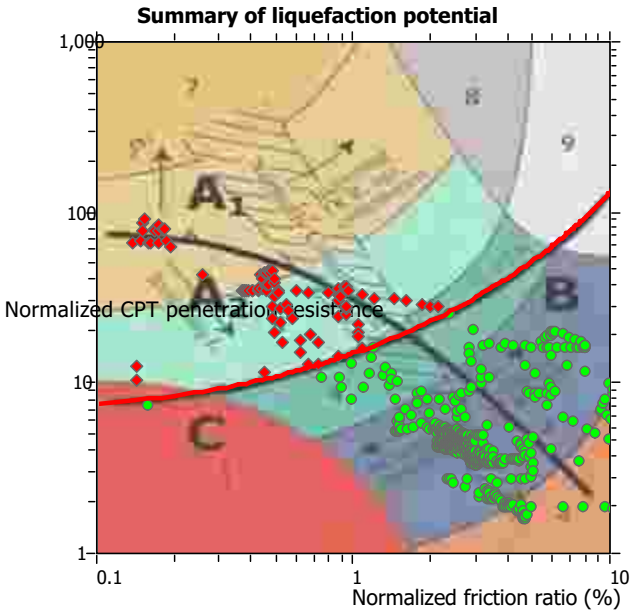
CPT file : CPT12

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	Yes	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	1.00 m	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	19.00 kN/m³	Limit depth:	N/A
Earthquake magnitude M_w:	5.80	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	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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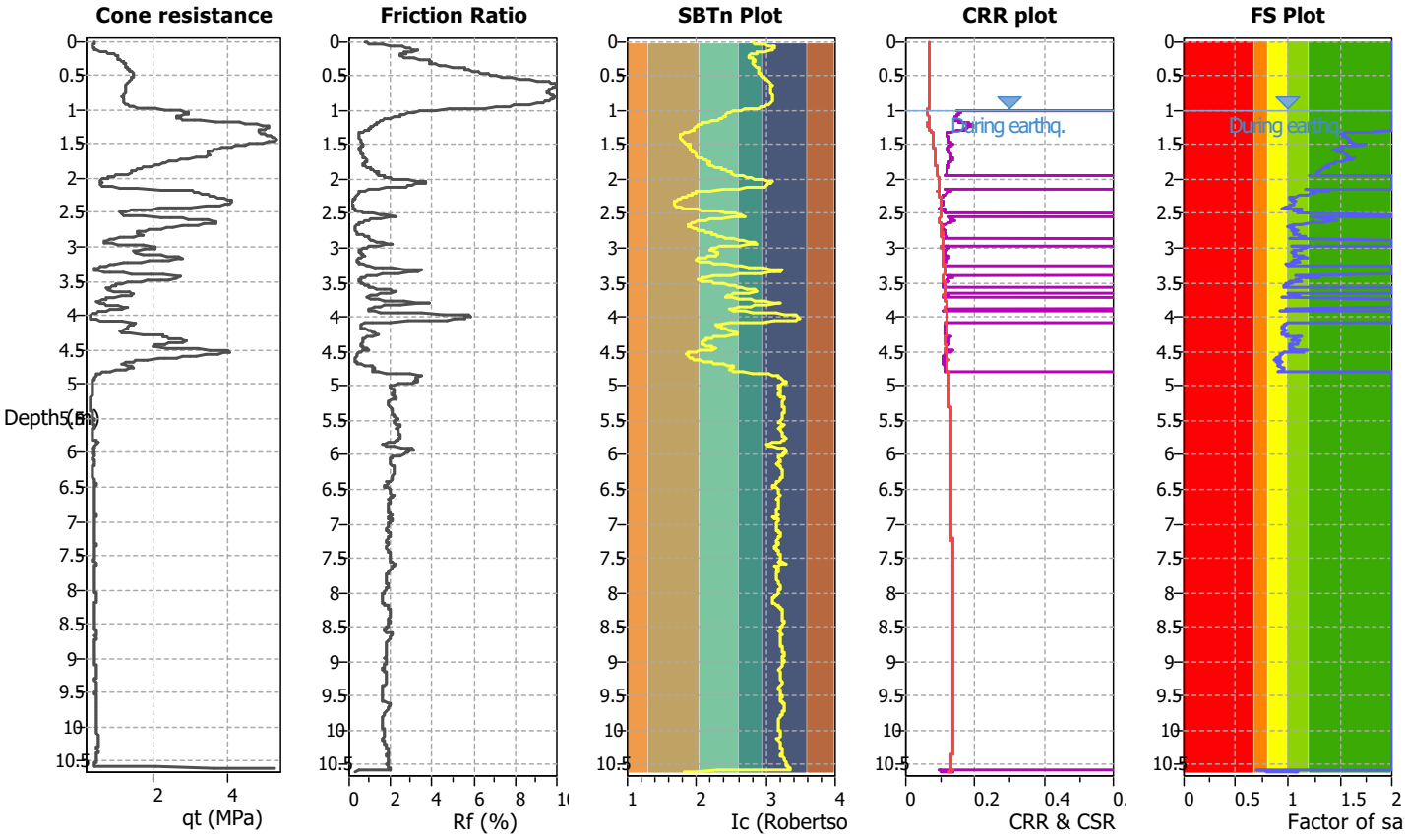
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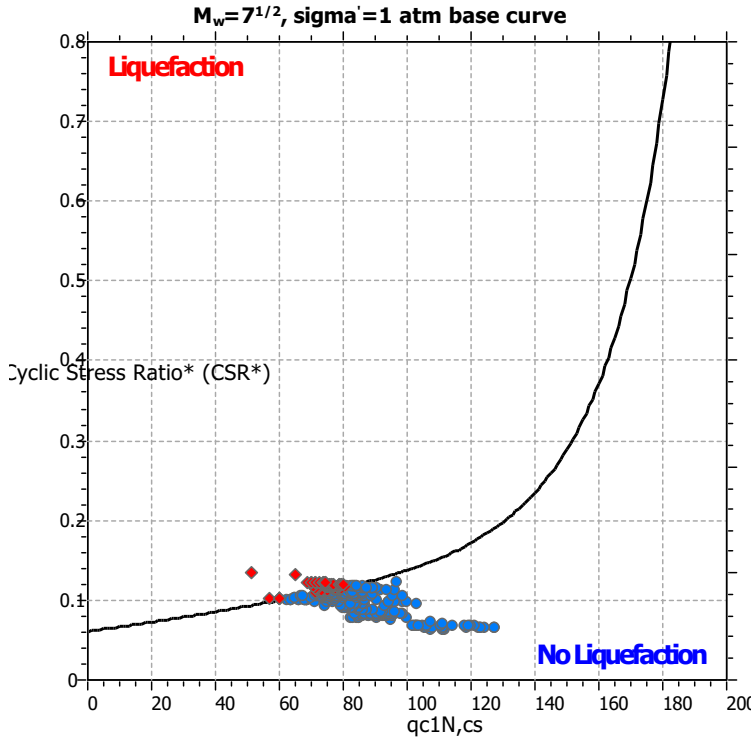
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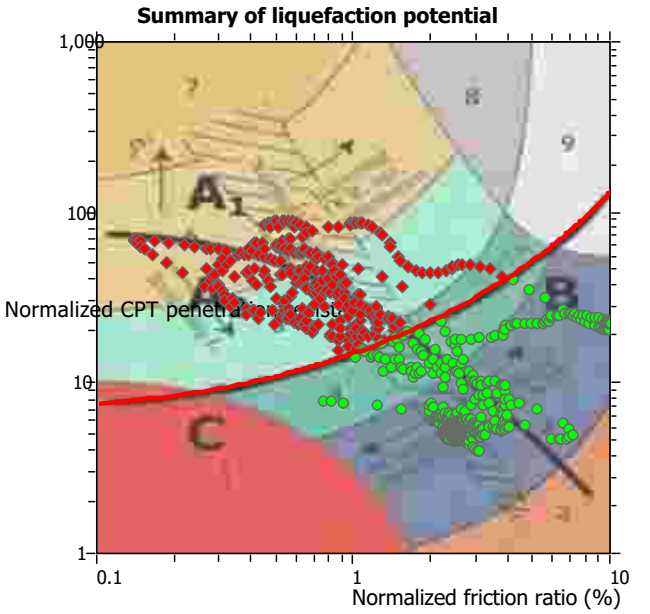
CPT file : CPT08

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	Sands only
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Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	5.80	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	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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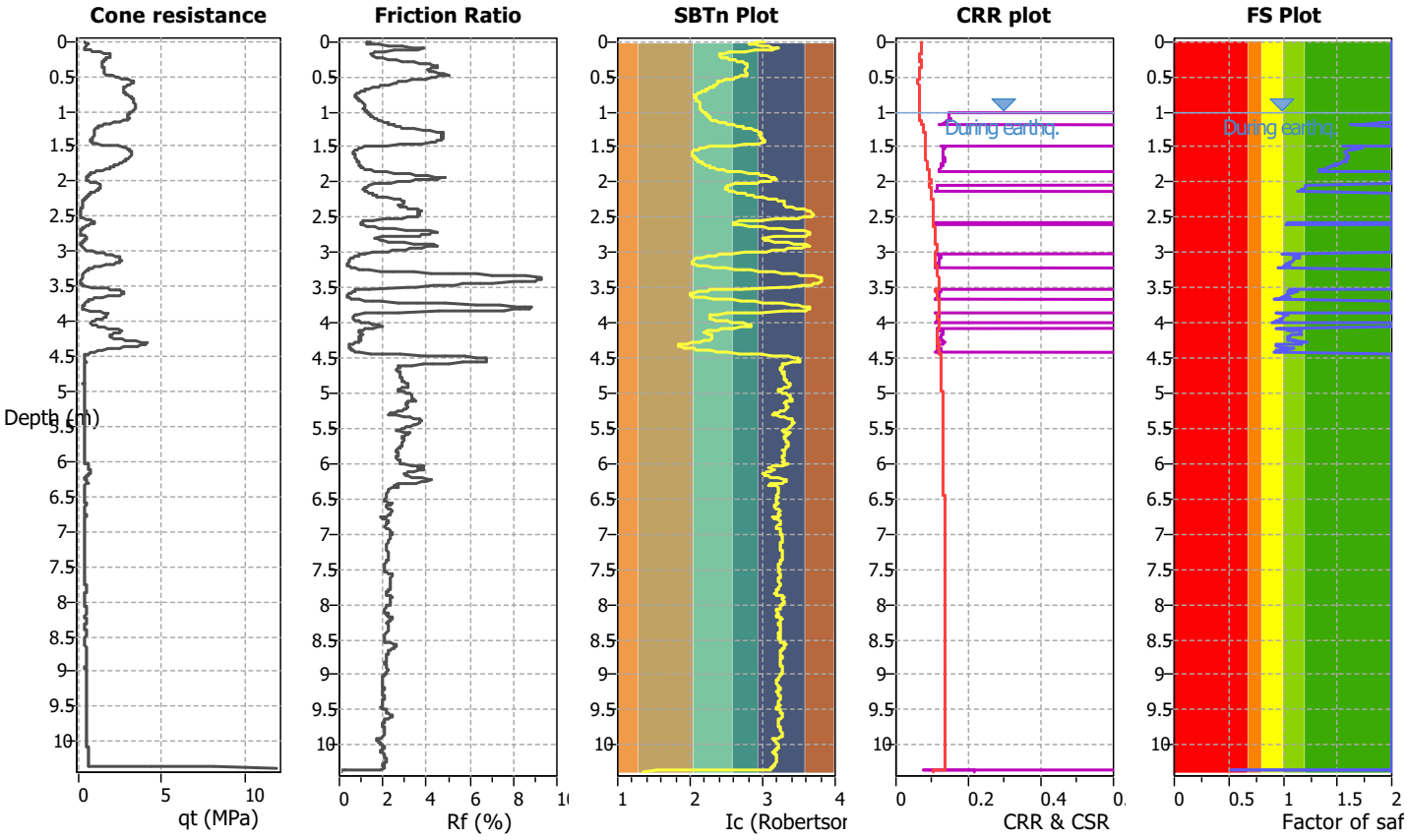
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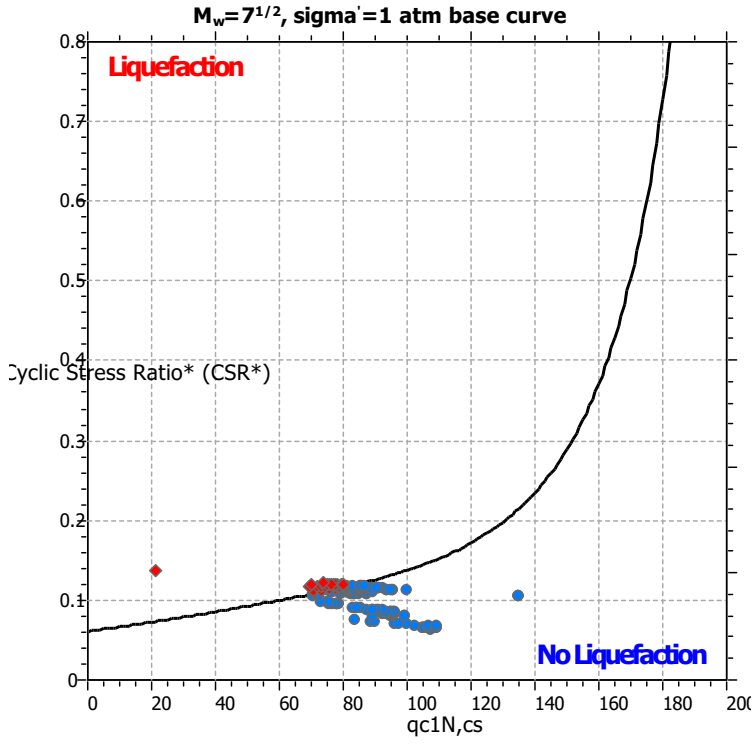
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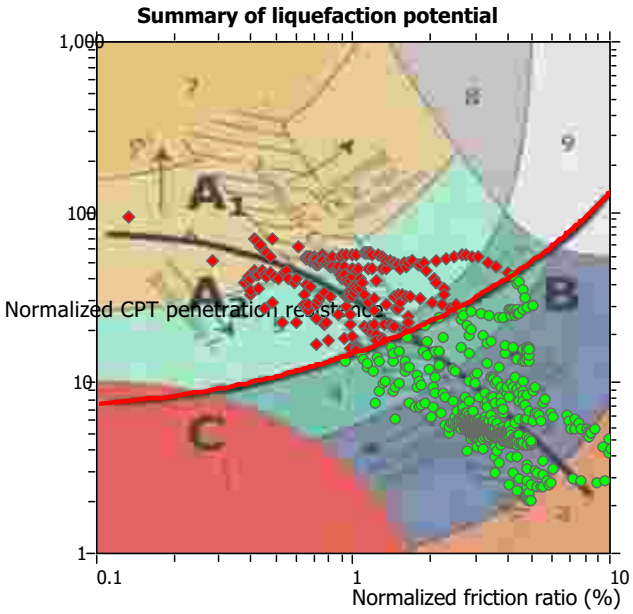
CPT file : CPT09

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	Sands only
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Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	5.80	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	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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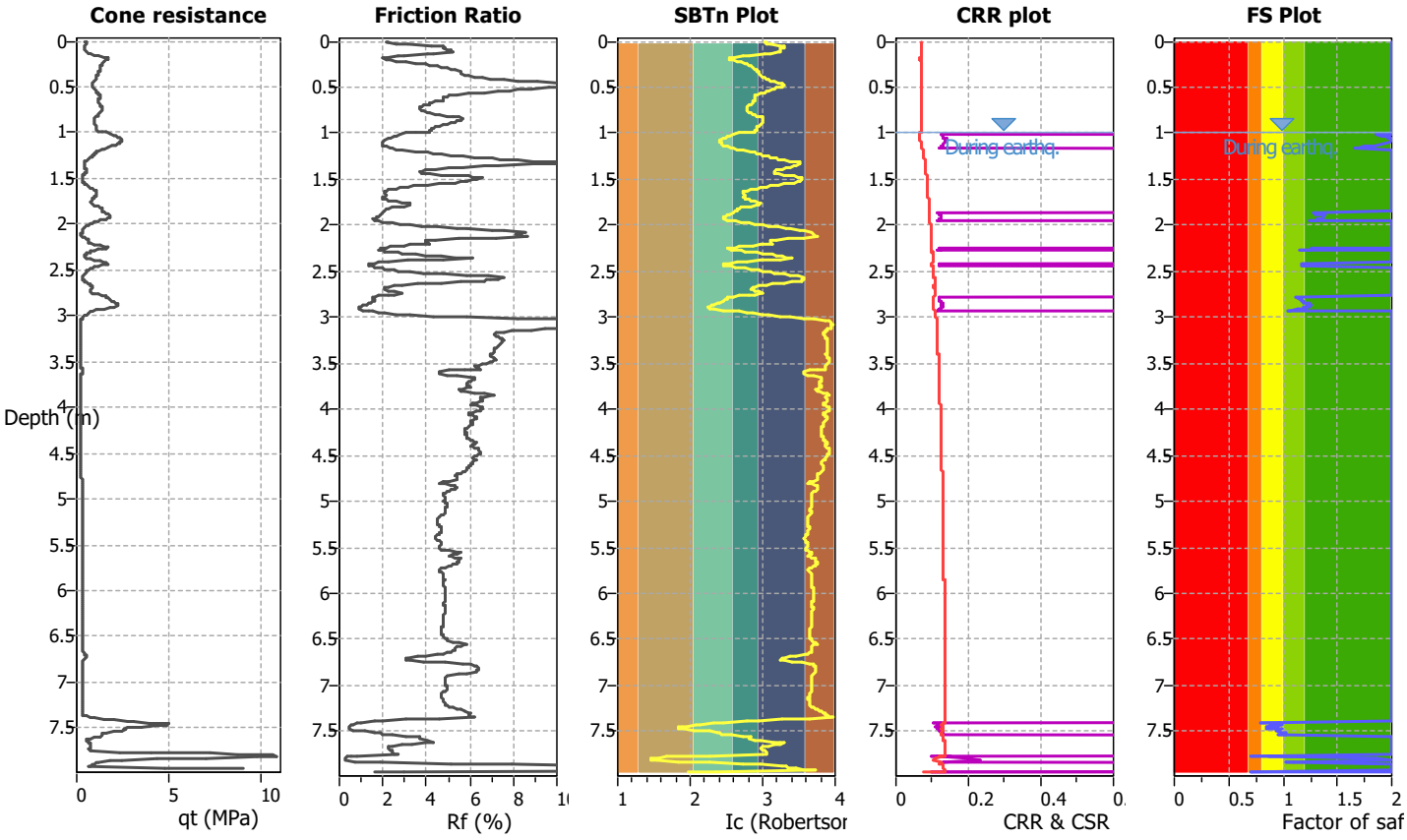
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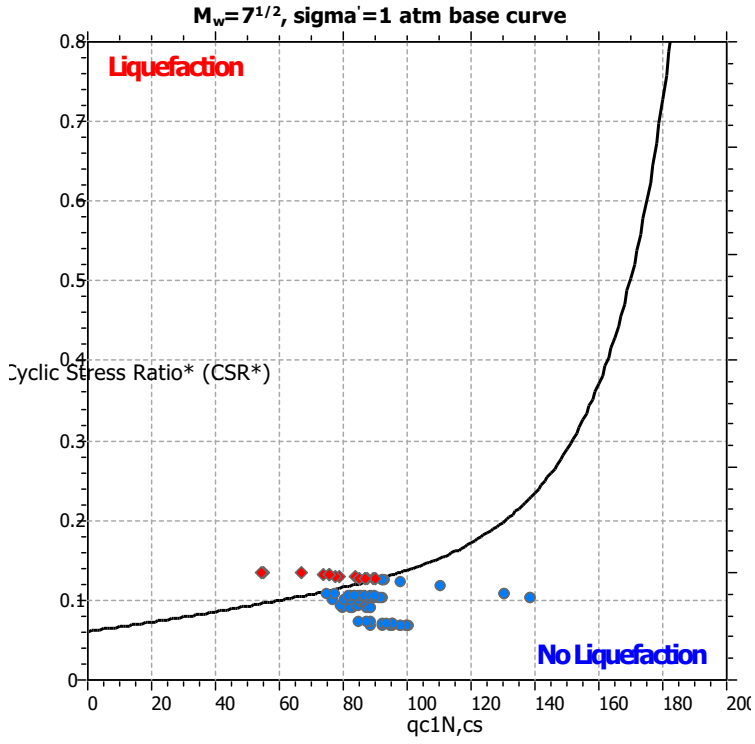
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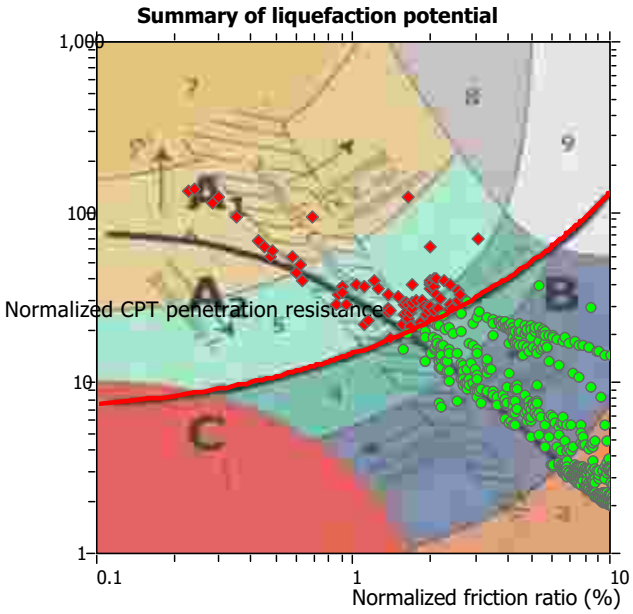
CPT file : CPT10

Input parameters and analysis data

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Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	5.80	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	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
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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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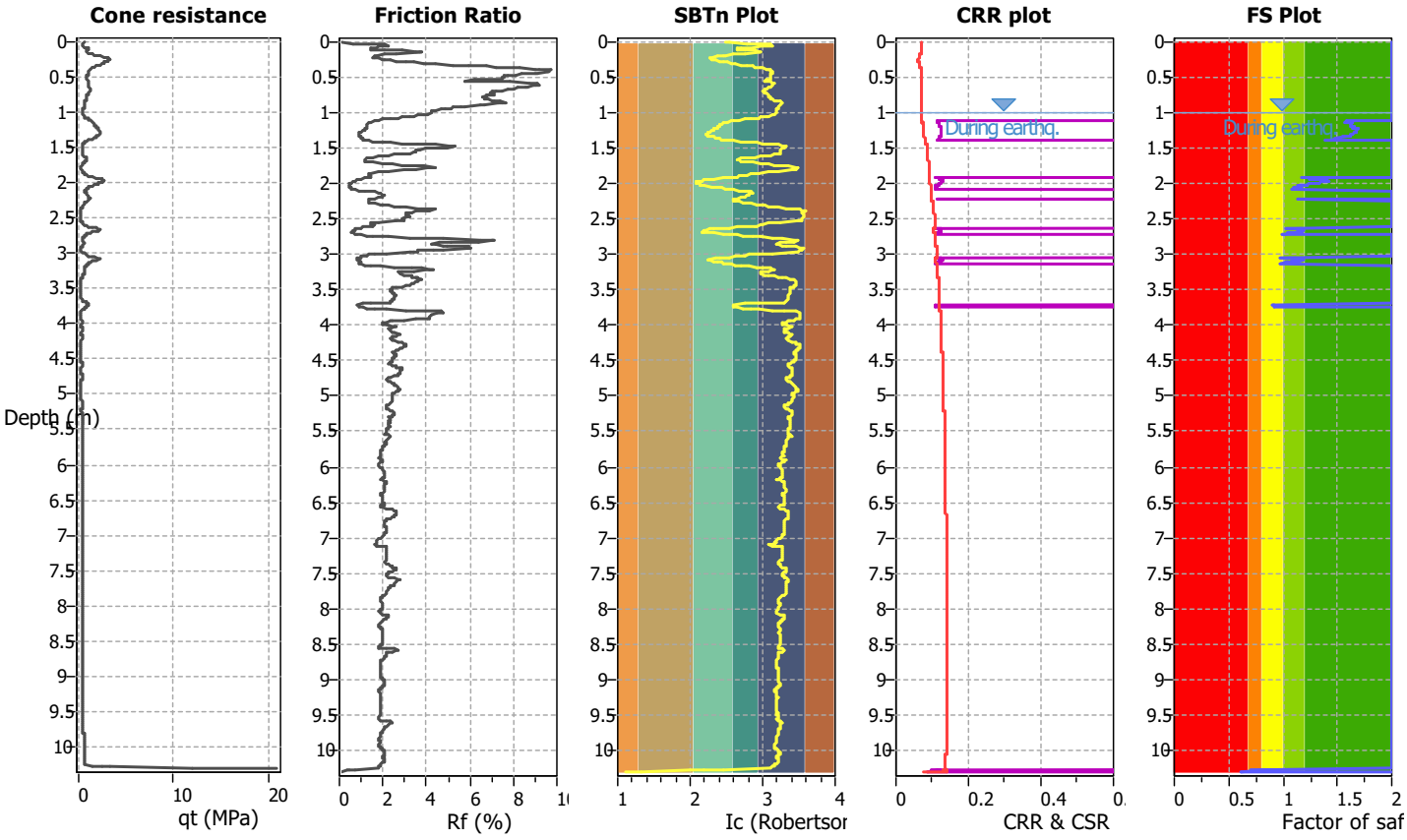
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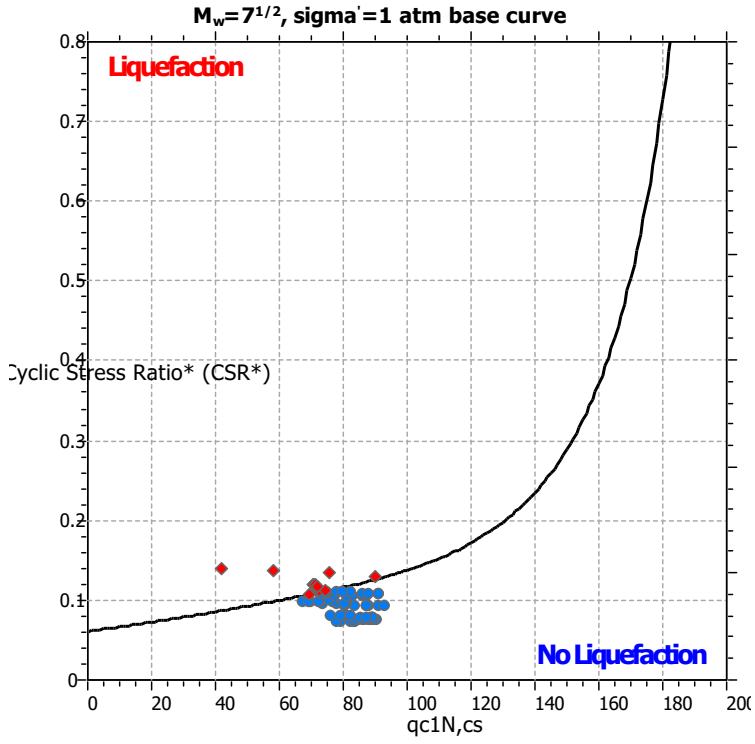
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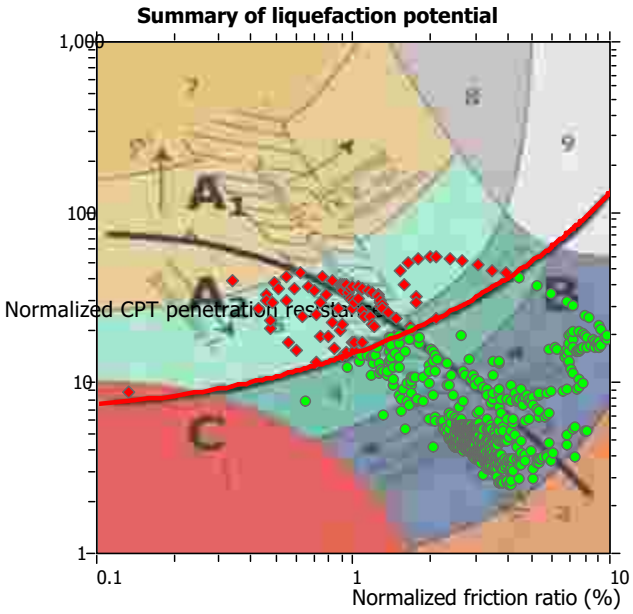
CPT file : CPT11

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	5.80	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	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
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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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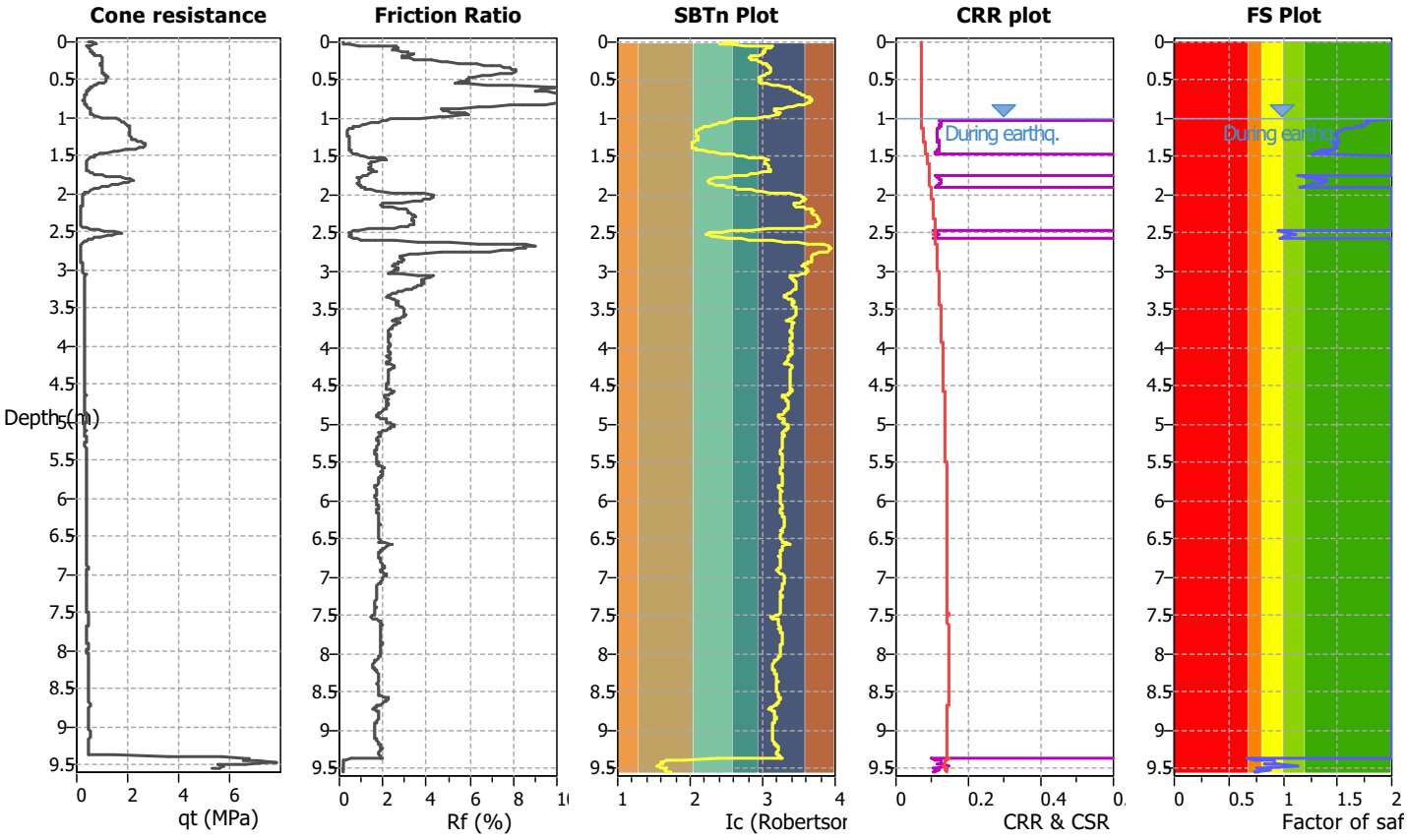
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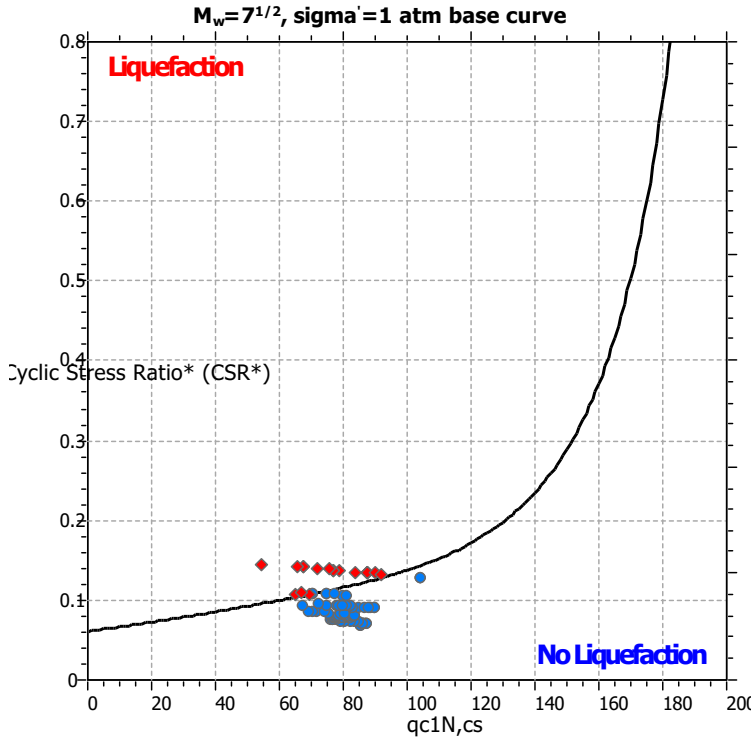
Project title : **Location :**

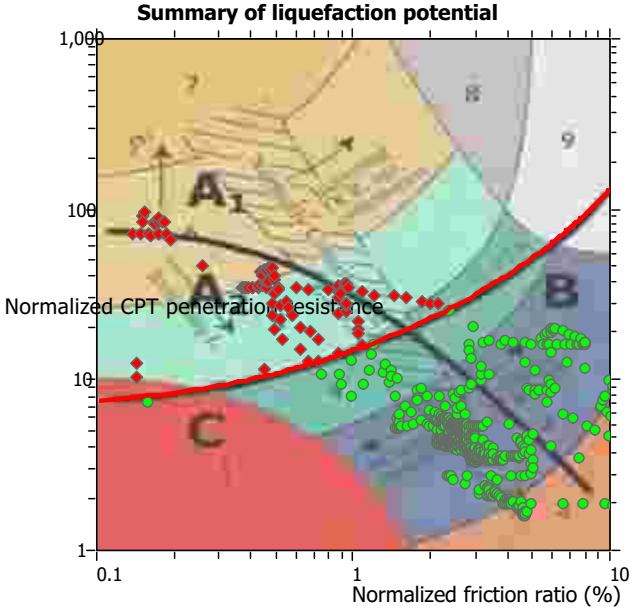
CPT file : CPT12

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	5.80	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		







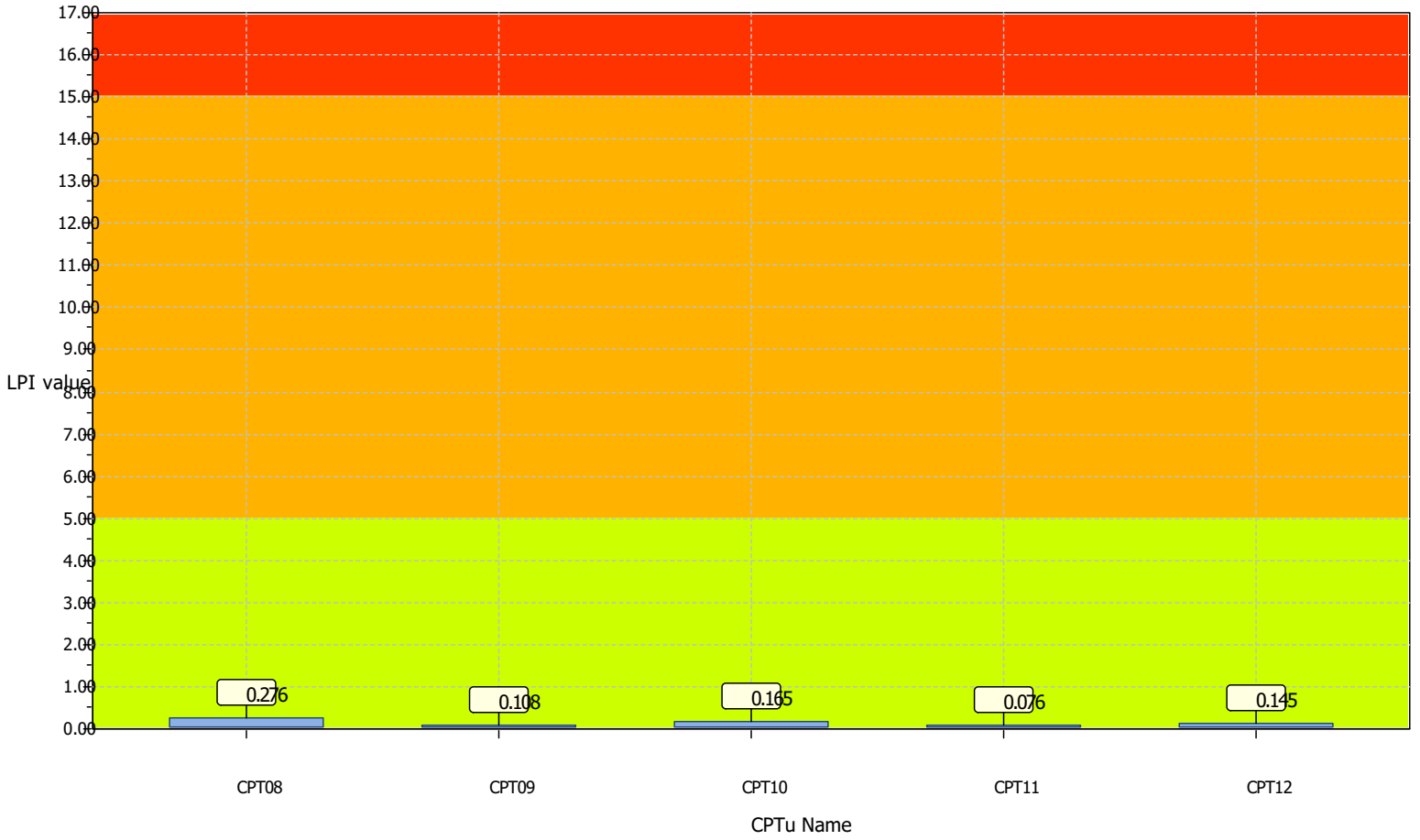
Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and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

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Project title :

Location :

Overall Liquefaction Potential Index report



LPI color scheme

- Very high risk
- High risk
- Low risk

Basic statistics

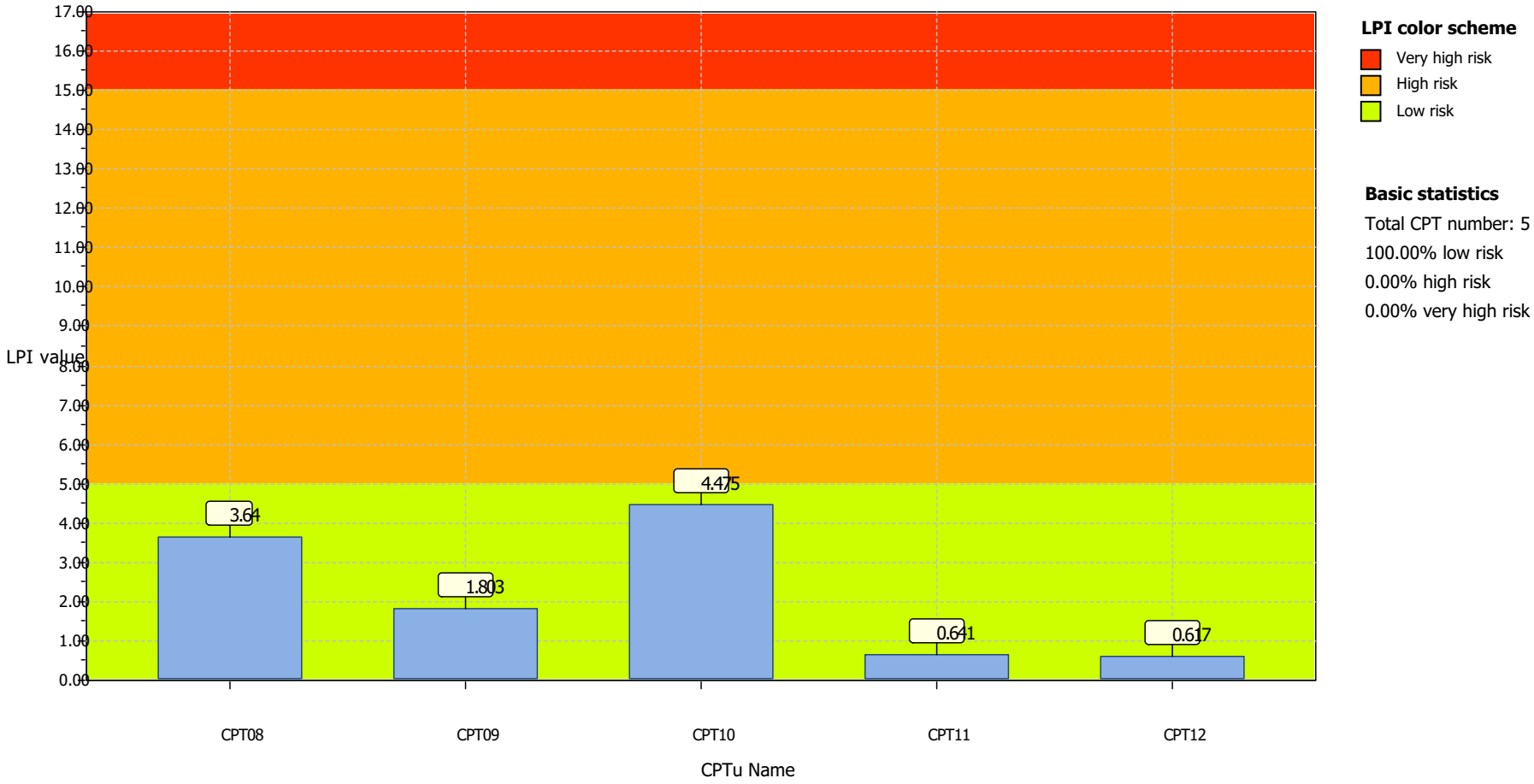
Total CPT number: 5
100.00% low risk
0.00% high risk
0.00% very high risk

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Project title : 111 Yorke Road

Location : Haruru (0.19g)

Overall Liquefaction Potential Index report



Basic statistics

Total CPT number: 5

100.00% low risk

0.00% high risk

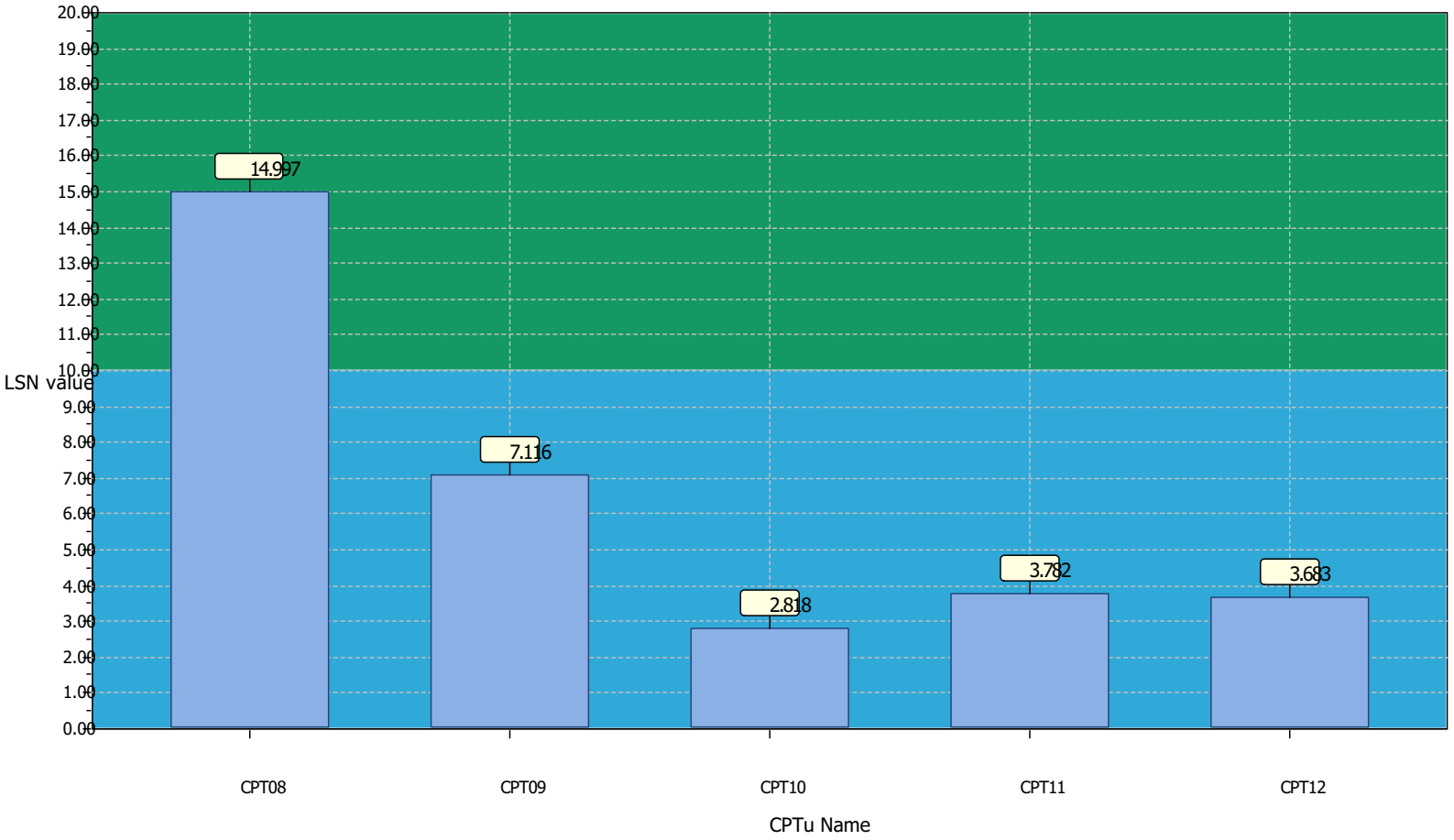
0.00% very high risk

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Project title : 111 Yorke Road

Location : Haruru (0.19g)

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: 5

80.00% little liquefaction

20.00% minnor liquefaction

0.00% moderate liquefaction

0.00% moderate to major liquefaction

0.00% major liquefaction

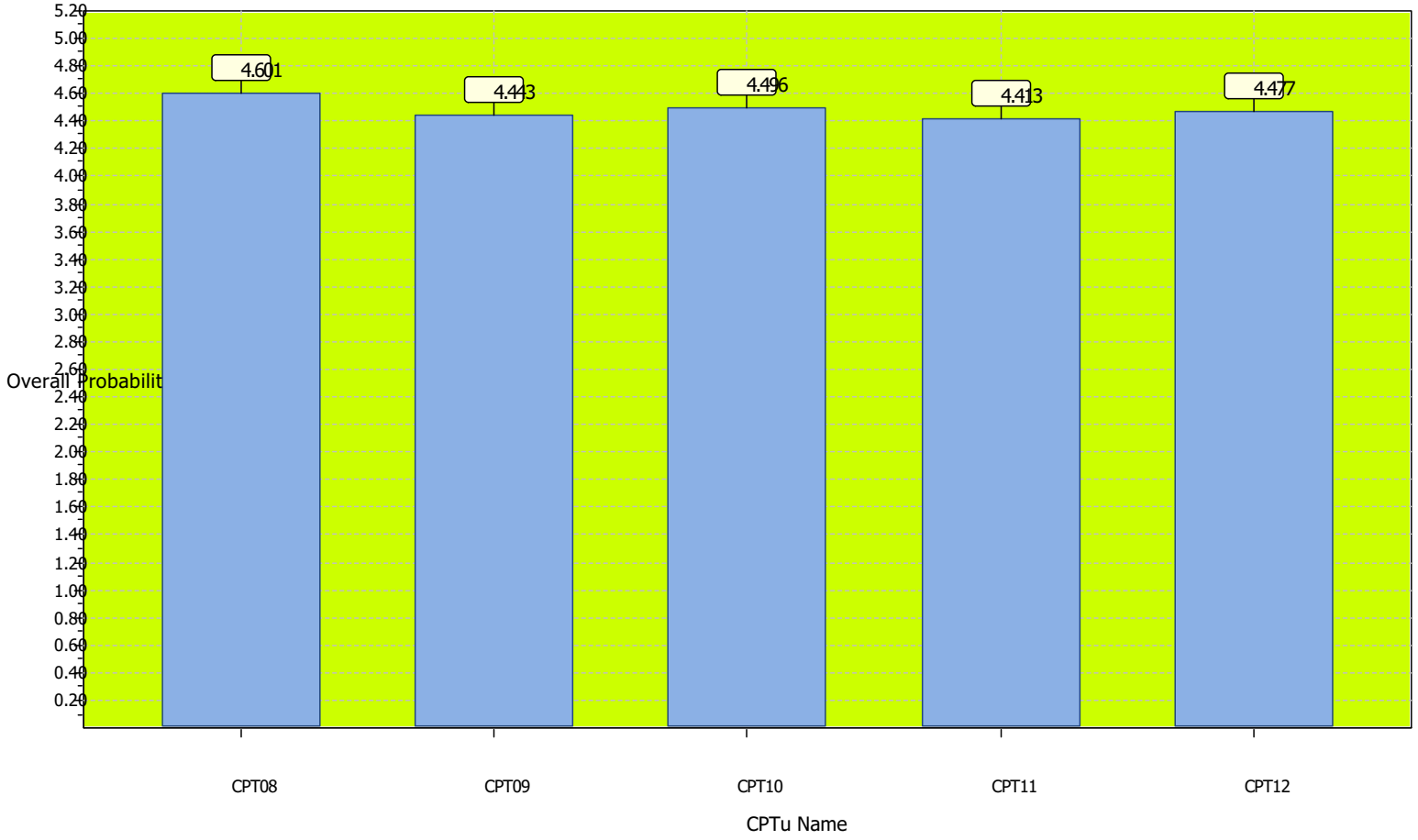
0.00% severe liquefaction

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Project title :

Location :

Overall Probability for Liquefaction report



Probability color scheme

- Very High Probability
- High Probability
- Low Probability

Basic statistics

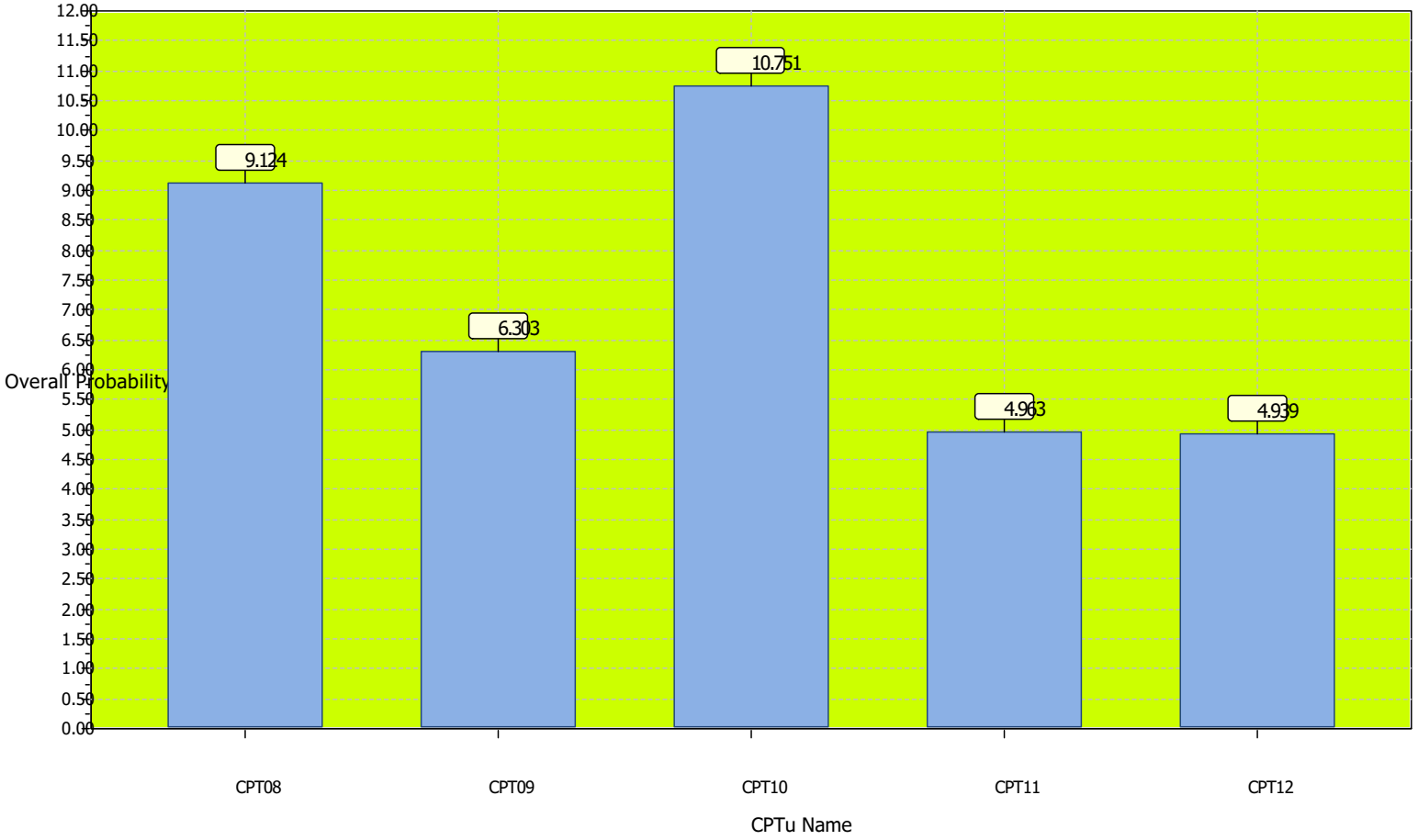
Total CPT number: 5
100.00% low probability
0.00% high probability
0.00% very high probability

Underground Investigation Ltd
Cone Penetration Testing
craig@undergroundinvestigation.co.nz
+64211473249

Project title : 111 Yorke Road

Location : Haruru (0.19g)

Overall Probability for Liquefaction report



Probability color scheme

- Very High Probability
- High Probability
- Low Probability

Basic statistics

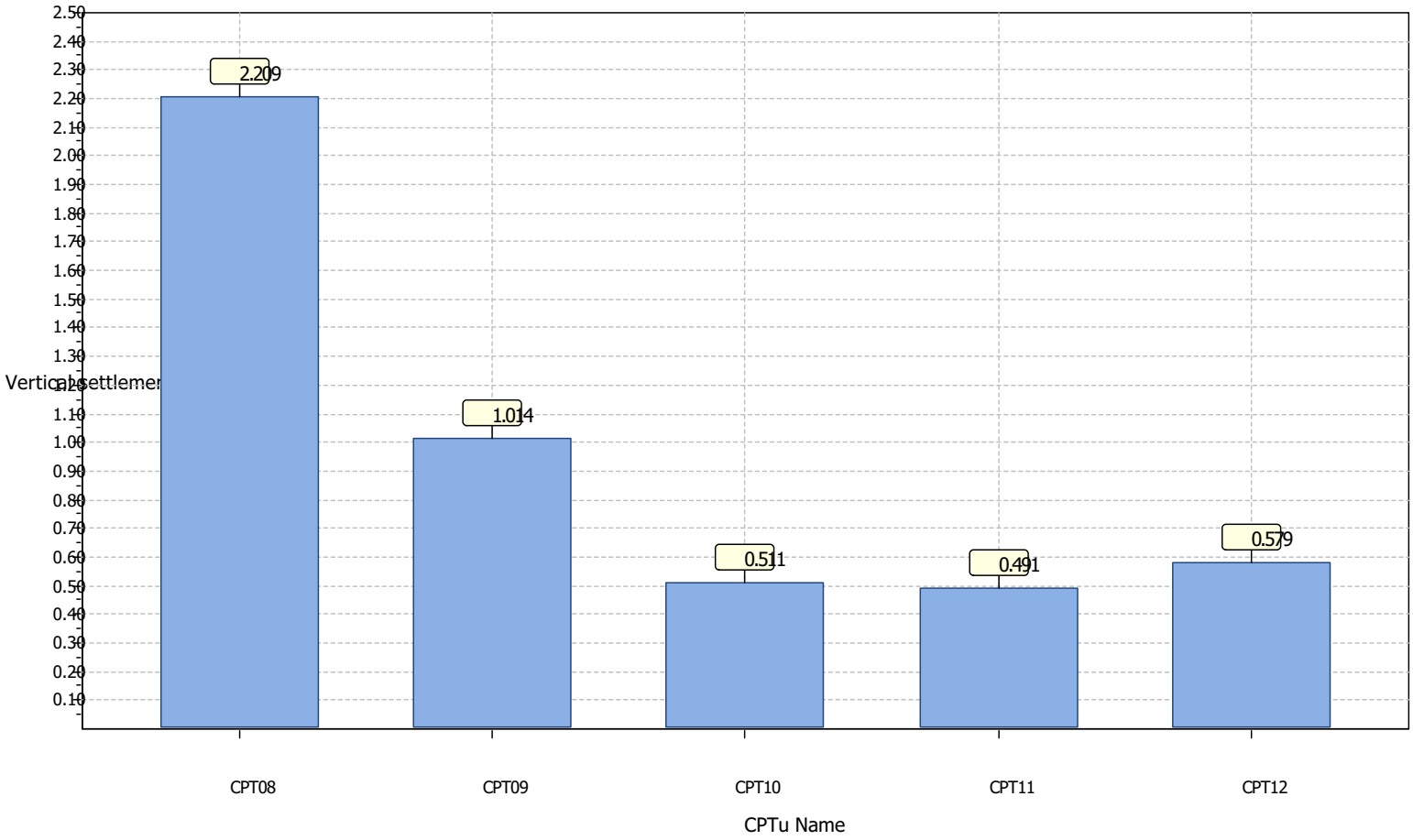
Total CPT number: 5
100.00% low probability
0.00% high probability
0.00% very high probability

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Cone Penetration Testing
craig@undergroundinvestigation.co.nz
+64211473249

Project title :

Location :

Overall vertical settlements report

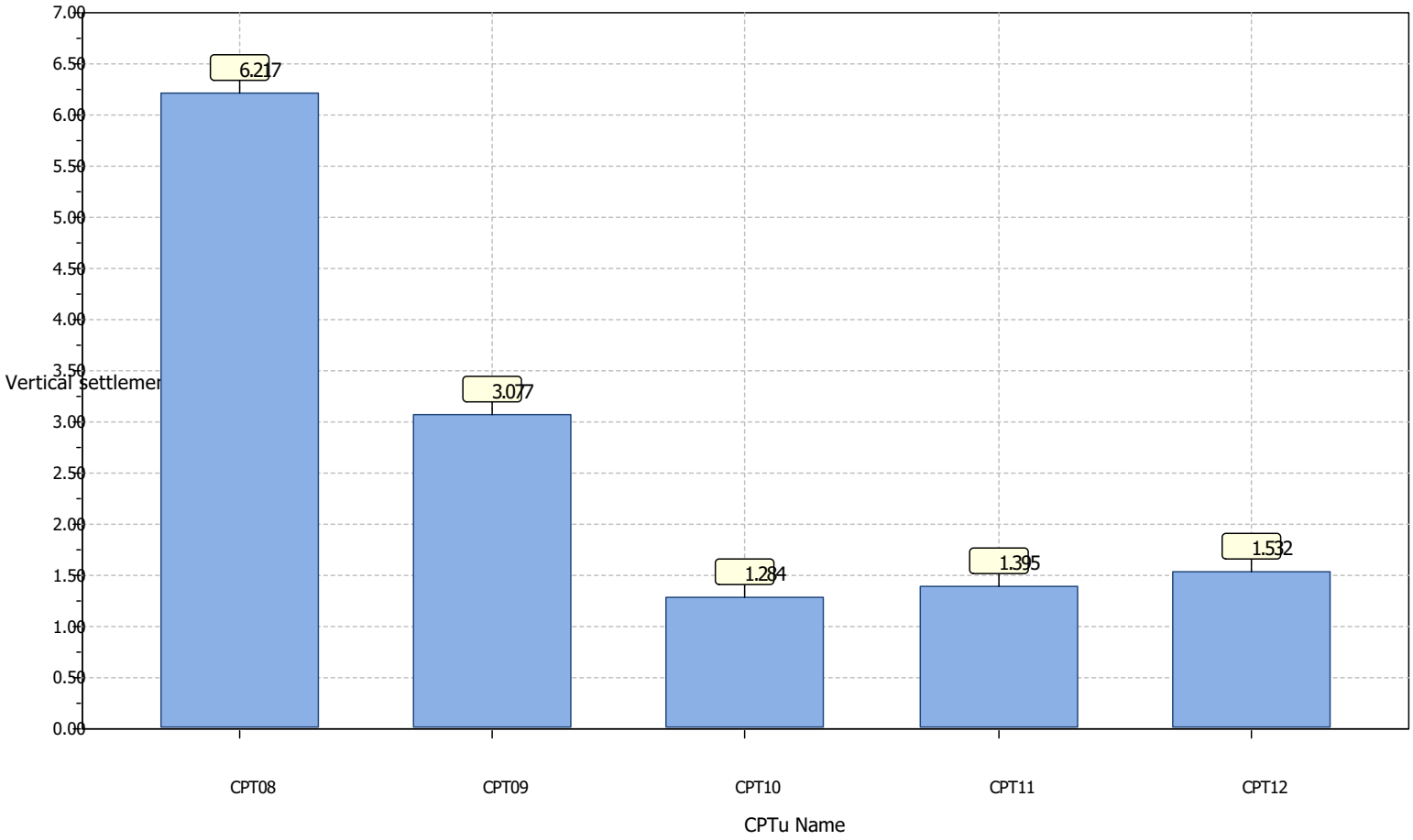


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Cone Penetration Testing
craig@undergroundinvestigation.co.nz
+64211473249

Project title : 111 Yorke Road

Location : Haruru (0.19g)

Overall vertical settlements report



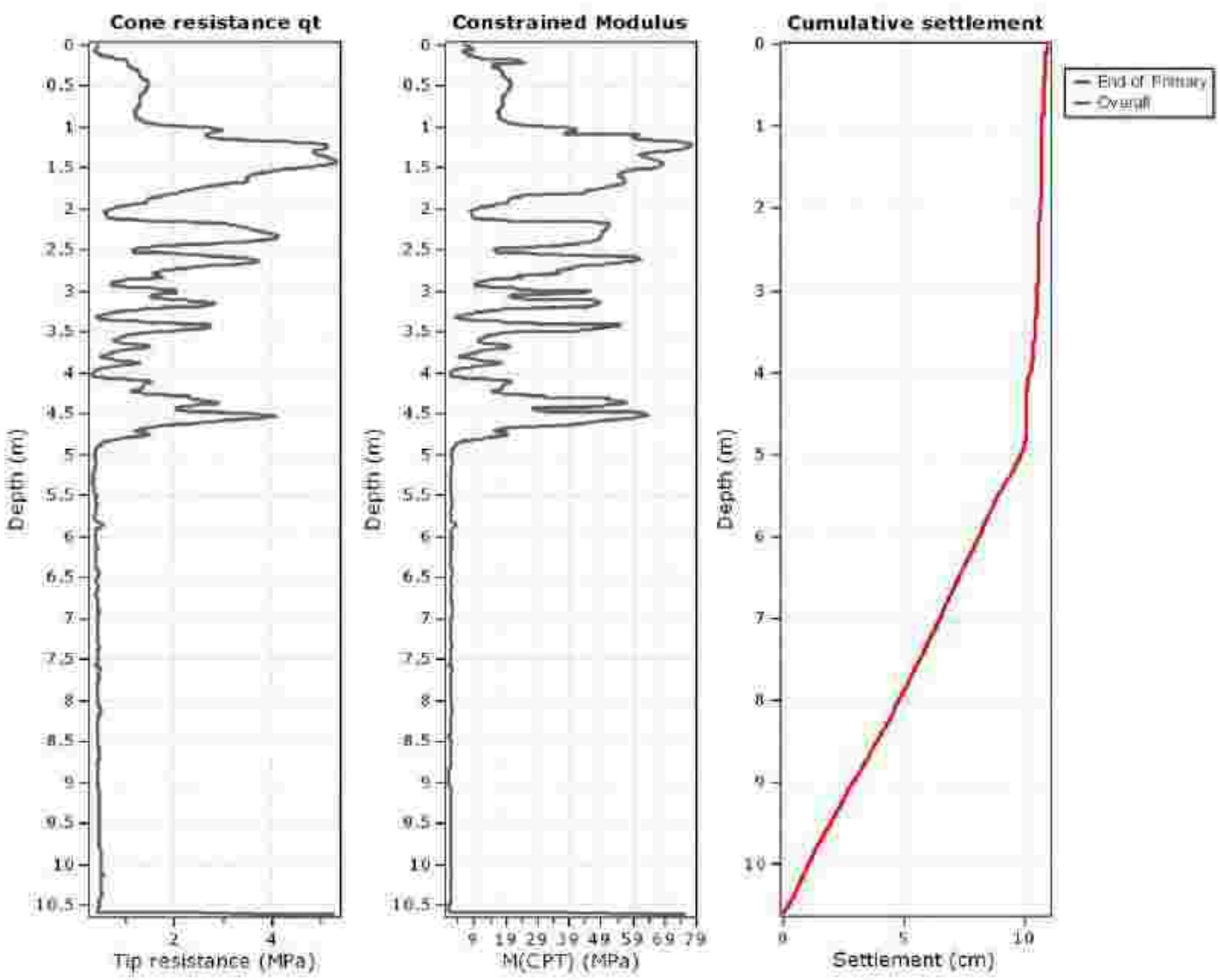
Appendix E – Consolidation Settlement Assessment

Underground Investigation Ltd
Cone Penetration Testing
craig@undergroundinvestigation.co.nz
+64211473249

CPT: CPT08
Total depth: 10.60 m, Date: 20/11/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: 111 Yorke Road, Haruru
Location: Haruru

Settlements calculation according to theory of elasticity*



Calculation properties

Footing type: Rectangular
Footing width: 30.00 (m)
L/B: 1.0
Footing pressure: 30.00 (kPa)
Embedment depth: 0.00 (m)
Footing is rigid: No
Remove excavation load: No
Apply 20% rule: No
Calculate secondary settlements: No
Time period for primary consolidation: N/A
Time period for second. settlements: N/A

* Primary settlements calculation is performed according to the following formula:

$$S = \sum \frac{\Delta \sigma_v}{M_{CPT}} \Delta z$$

* Secondary (creep) settlements calculation is performed according to the following formula:

$$S = C_a \cdot \Delta z \cdot \log(t)$$

:: Tabular results ::

Point No	Start depth (m)	End depth (m)	Thickness (m)	Relative depth (m)	Delta P (kPa)	$M_{(CPT)}$ (MPa)	Iz	Settlement (cm)	Second. settlement (cm)	Overall settlement (cm)
1036	10.36	10.37	0.01	10.37	25.55	1.64	0.85	0.016	0.000	0.016
1037	10.37	10.38	0.01	10.38	25.54	1.56	0.85	0.016	0.000	0.016
1038	10.38	10.39	0.01	10.38	25.53	1.47	0.85	0.017	0.000	0.017
1039	10.39	10.40	0.01	10.39	25.52	1.44	0.85	0.018	0.000	0.018
1040	10.40	10.41	0.01	10.40	25.51	1.41	0.85	0.018	0.000	0.018
1041	10.41	10.42	0.01	10.41	25.50	1.38	0.85	0.019	0.000	0.019
1042	10.42	10.43	0.01	10.43	25.49	1.35	0.85	0.019	0.000	0.019
1043	10.43	10.44	0.01	10.44	25.48	1.33	0.85	0.019	0.000	0.019
1044	10.44	10.45	0.01	10.45	25.47	1.31	0.85	0.019	0.000	0.019
1045	10.45	10.46	0.01	10.46	25.47	1.30	0.85	0.020	0.000	0.020
1046	10.46	10.47	0.01	10.46	25.46	1.30	0.85	0.020	0.000	0.020
1047	10.47	10.48	0.01	10.47	25.45	1.29	0.85	0.020	0.000	0.020
1048	10.48	10.49	0.01	10.48	25.44	1.28	0.85	0.020	0.000	0.020
1049	10.49	10.50	0.01	10.49	25.43	1.27	0.85	0.020	0.000	0.020
1050	10.50	10.51	0.01	10.51	25.42	1.22	0.85	0.021	0.000	0.021
1051	10.51	10.52	0.01	10.52	25.41	1.18	0.85	0.021	0.000	0.021
1052	10.52	10.53	0.01	10.53	25.40	1.10	0.85	0.023	0.000	0.023
1053	10.53	10.54	0.01	10.54	25.39	1.06	0.85	0.024	0.000	0.024
1054	10.54	10.55	0.01	10.54	25.38	1.01	0.85	0.025	0.000	0.025
1055	10.55	10.56	0.01	10.55	25.37	1.01	0.85	0.025	0.000	0.025
1056	10.56	10.57	0.01	10.56	25.36	1.01	0.85	0.025	0.000	0.025
1057	10.57	10.58	0.01	10.57	25.35	1.03	0.85	0.025	0.000	0.025
1058	10.58	10.59	0.01	10.59	25.35	26.39	0.84	0.001	0.000	0.001
1059	10.59	10.60	0.01	10.60	25.34	64.54	0.84	0.000	0.000	0.000

Total primary settlement: 10.98
Total secondary settlement: 0.00

Total calculated settlement: 10.98

Abbreviations

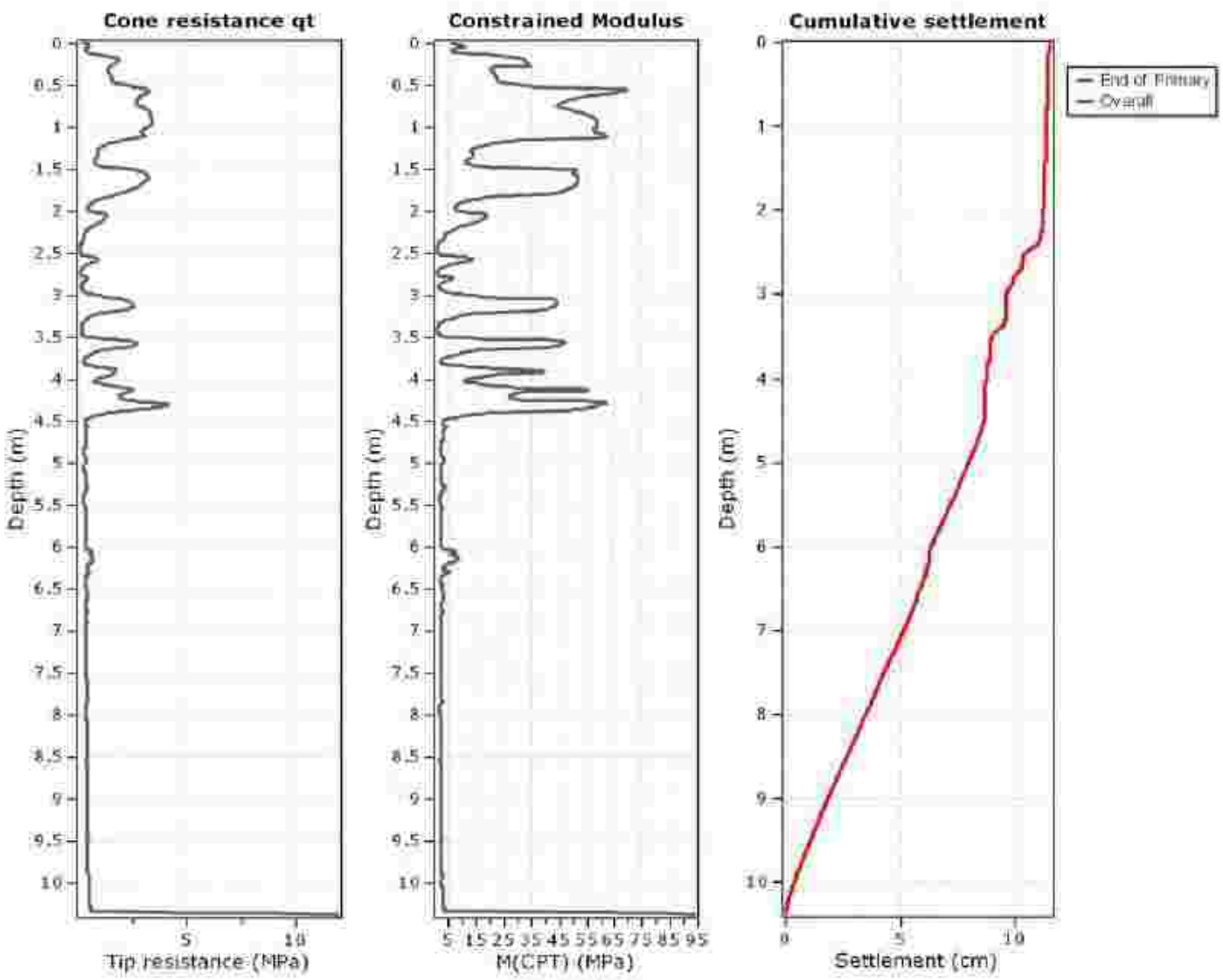
Start depth:	Start depth of soil layer (penetration depth measured from ground free surface)
End depth:	End depth of soil layer (penetration depth measured from ground free surface)
Thickness:	Thickness of soil layer
Relative depth:	Depth of calculation relative to footing
Iz:	Stress influence factor
Delta P:	Footing impossed stress:
Eff. stress:	Effective stress
$M_{(CPT)}$:	Constrained modulus from CPT
Settlement:	Primary settlement
Second. settlement:	Secondary settlemends due to creep

Underground Investigation Ltd
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craig@undergroundinvestigation.co.nz
+64211473249

CPT: CPT09
Total depth: 10.38 m, Date: 20/11/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **111 Yorke Road, Haruru**
Location: **Haruru**

Settlements calculation according to theory of elasticity*



Calculation properties

Footing type: Rectangular
Footing width: 30.00 (m)
L/B: 1.0
Footing pressure: 30.00 (kPa)
Embedment depth: 0.00 (m)
Footing is rigid: No
Remove excavation load: No
Apply 20% rule: No
Calculate secondary settlements: No
Time period for primary consolidation: N/A
Time period for second. settlements: N/A

* Primary settlements calculation is performed according to the following formula:

$$S = \sum \frac{\Delta \sigma_v}{M_{CPT}} \Delta z$$

* Secondary (creep) settlements calculation is performed according to the following formula:

$$S = C_a \cdot \Delta z \cdot \log(t)$$

:: Tabular results ::

Point No	Start depth (m)	End depth (m)	Thickness (m)	Relative depth (m)	Delta P (kPa)	$M_{(CPT)}$ (MPa)	Iz	Settlement (cm)	Second. settlement (cm)	Overall settlement (cm)
1036	10.36	10.37	0.01	10.37	25.55	80.61	0.85	0.000	0.000	0.000
1037	10.37	10.38	0.01	10.38	25.54	93.31	0.85	0.000	0.000	0.000

Total primary settlement: 11.49
Total secondary settlement: 0.00

Total calculated settlement: 11.49

Abbreviations

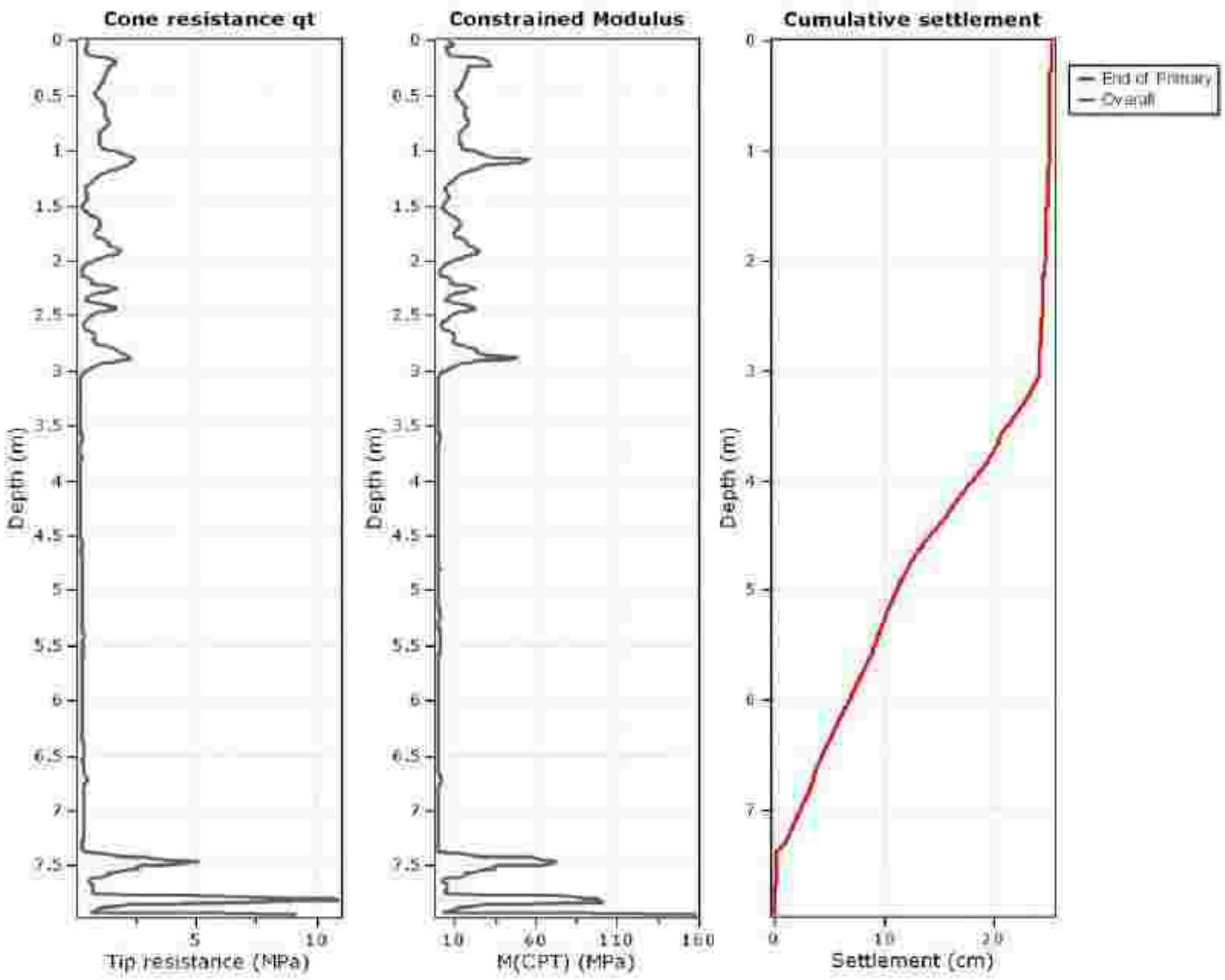
Start depth:	Start depth of soil layer (penetration depth measured from ground free surface)
End depth:	End depth of soil layer (penetration depth measured from ground free surface)
Thickness:	Thickness of soil layer
Relative depth:	Depth of calculation relative to footing
Iz:	Stress influence factor
Delta P:	Footing impossed stress:
Eff. stress:	Effective stress
$M_{(CPT)}$:	Constrained modulus from CPT
Settlement:	Primary settlement
Second. settlement:	Secondary settlemends due to creep

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+64211473249

CPT: CPT10
Total depth: 7.94 m, Date: 20/11/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **111 Yorke Road, Haruru**
Location: **Haruru**

Settlements calculation according to theory of elasticity*



Calculation properties

Footing type: Rectangular
Footing width: 30.00 (m)
L/B: 1.0
Footing pressure: 30.00 (kPa)
Embedment depth: 0.00 (m)
Footing is rigid: No
Remove excavation load: No
Apply 20% rule: No
Calculate secondary settlements: No
Time period for primary consolidation: N/A
Time period for second. settlements: N/A

* Primary settlements calculation is performed according to the following formula:

$$S = \sum \frac{\Delta \sigma_v}{M_{CPT}} \Delta z$$

* Secondary (creep) settlements calculation is performed according to the following formula:

$$S = C_a \cdot \Delta z \cdot \log(t)$$

:: Tabular results ::

Point No	Start depth (m)	End depth (m)	Thickness (m)	Relative depth (m)	Delta P (kPa)	$M_{(CPT)}$ (MPa)	Iz	Settlement (cm)	Second. settlement (cm)	Overall settlement (cm)
766	7.66	7.67	0.01	7.67	27.78	4.18	0.93	0.007	0.000	0.007
767	7.67	7.68	0.01	7.67	27.77	5.17	0.93	0.005	0.000	0.005
768	7.68	7.69	0.01	7.68	27.77	5.74	0.93	0.005	0.000	0.005
769	7.69	7.70	0.01	7.70	27.76	5.99	0.93	0.005	0.000	0.005
770	7.70	7.71	0.01	7.71	27.75	5.53	0.93	0.005	0.000	0.005
771	7.71	7.72	0.01	7.71	27.74	5.04	0.92	0.006	0.000	0.006
772	7.72	7.73	0.01	7.72	27.74	4.86	0.92	0.006	0.000	0.006
773	7.73	7.74	0.01	7.74	27.73	4.80	0.92	0.006	0.000	0.006
774	7.74	7.75	0.01	7.75	27.72	4.83	0.92	0.006	0.000	0.006
775	7.75	7.76	0.01	7.75	27.72	4.86	0.92	0.006	0.000	0.006
776	7.76	7.77	0.01	7.76	27.71	30.64	0.92	0.001	0.000	0.001
777	7.77	7.78	0.01	7.78	27.70	68.62	0.92	0.000	0.000	0.000
778	7.78	7.79	0.01	7.79	27.69	85.26	0.92	0.000	0.000	0.000
779	7.79	7.80	0.01	7.79	27.69	90.66	0.92	0.000	0.000	0.000
780	7.80	7.81	0.01	7.80	27.68	96.16	0.92	0.000	0.000	0.000
781	7.81	7.82	0.01	7.82	27.67	98.49	0.92	0.000	0.000	0.000
782	7.82	7.83	0.01	7.83	27.66	97.19	0.92	0.000	0.000	0.000
783	7.83	7.84	0.01	7.83	27.66	100.81	0.92	0.000	0.000	0.000
784	7.84	7.85	0.01	7.84	27.65	59.07	0.92	0.000	0.000	0.000
785	7.85	7.86	0.01	7.86	27.64	31.55	0.92	0.001	0.000	0.001
786	7.86	7.87	0.01	7.87	27.64	22.57	0.92	0.001	0.000	0.001
787	7.87	7.88	0.01	7.88	27.63	13.58	0.92	0.002	0.000	0.002
788	7.88	7.89	0.01	7.88	27.62	12.35	0.92	0.002	0.000	0.002
789	7.89	7.90	0.01	7.89	27.61	11.59	0.92	0.002	0.000	0.002
790	7.90	7.91	0.01	7.91	27.61	8.30	0.92	0.003	0.000	0.003
791	7.91	7.92	0.01	7.92	27.60	6.50	0.92	0.004	0.000	0.004
792	7.92	7.93	0.01	7.92	27.59	3.68	0.92	0.007	0.000	0.007
793	7.93	7.94	0.01	7.93	27.58	65.70	0.92	0.000	0.000	0.000

Total primary settlement: 25.22
Total secondary settlement: 0.00

Total calculated settlement: 25.22

Abbreviations

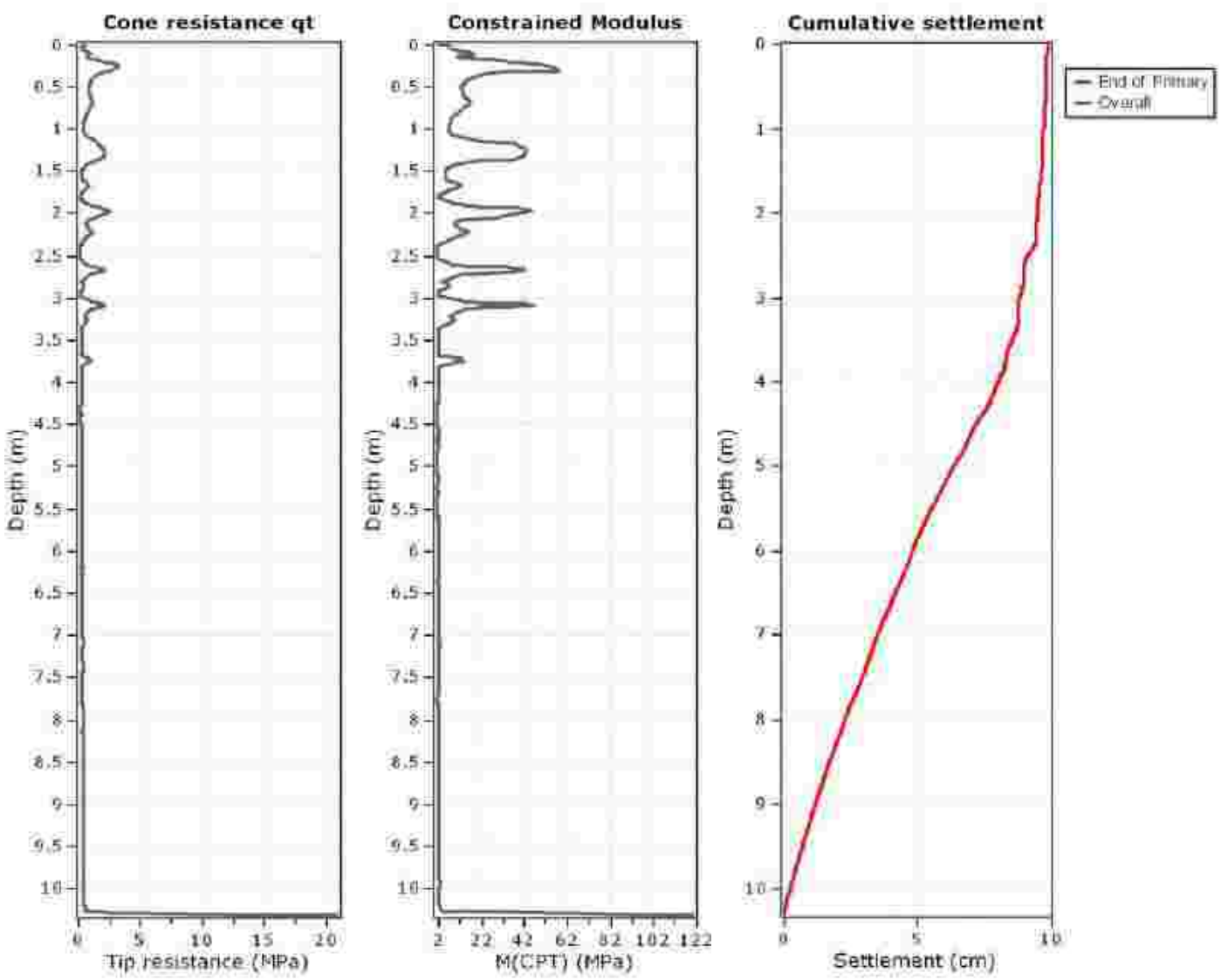
Start depth:	Start depth of soil layer (penetration depth measured from ground free surface)
End depth:	End depth of soil layer (penetration depth measured from ground free surface)
Thickness:	Thickness of soil layer
Relative depth:	Depth of calculation relative to footing
Iz:	Stress influence factor
Delta P:	Footing impossed stress:
Eff. stress:	Effective stress
$M_{(CPT)}$:	Constrained modulus from CPT
Settlement:	Primary settlement
Second. settlement:	Secondary settlemends due to creep

Underground Investigation Ltd
Cone Penetration Testing
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+64211473249

CPT: CPT11
Total depth: 10.30 m, Date: 20/11/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **111 Yorke Road, Haruru**
Location: **Haruru**

Settlements calculation according to theory of elasticity*



Calculation properties

Footing type: Rectangular
Footing width: 30.00 (m)
L/B: 1.0
Footing pressure: 20.00 (kPa)
Embedment depth: 0.00 (m)
Footing is rigid: No
Remove excavation load: No
Apply 20% rule: No
Calculate secondary settlements: No
Time period for primary consolidation: N/A
Time period for second. settlements: N/A

* Primary settlements calculation is performed according to the following formula:

$$S = \sum \frac{\Delta \sigma_v}{M_{CPT}} \Delta z$$

* Secondary (creep) settlements calculation is performed according to the following formula:

$$S = C_a \cdot \Delta z \cdot \log(t)$$

:: Tabular results ::

Point No	Start depth (m)	End depth (m)	Thickness (m)	Relative depth (m)	Delta P (kPa)	$M_{(CPT)}$ (MPa)	Iz	Settlement (cm)	Second. settlement (cm)	Overall settlement (cm)

Total primary settlement: 9.90
Total secondary settlement: 0.00

Total calculated settlement: 9.90

Abbreviations

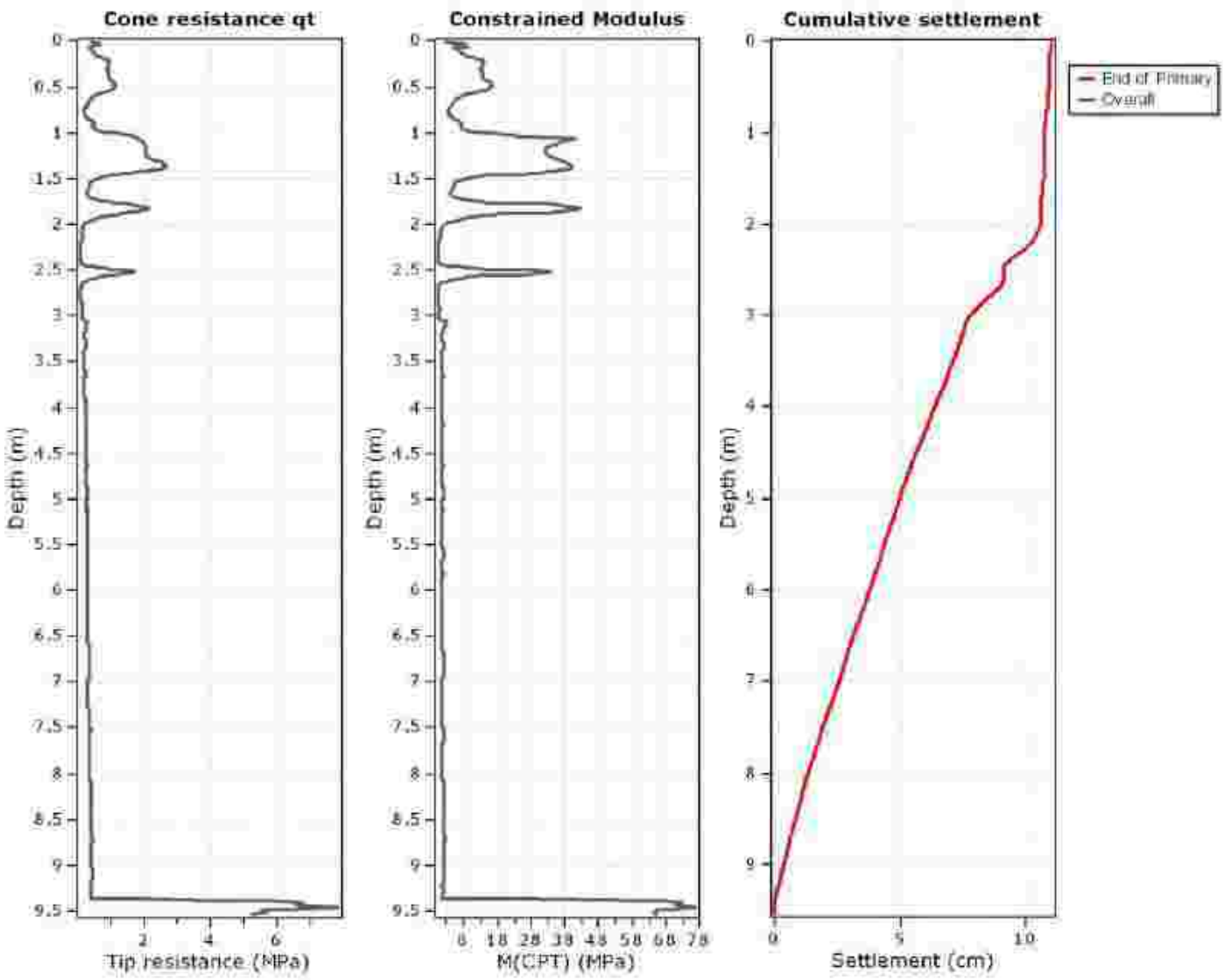
Start depth:	Start depth of soil layer (penetration depth measured from ground free surface)
End depth:	End depth of soil layer (penetration depth measured from ground free surface)
Thickness:	Thickness of soil layer
Relative depth:	Depth of calculation relative to footing
Iz:	Stress influence factor
Delta P:	Footing impossed stress:
Eff. stress:	Effective stress
$M_{(CPT)}$:	Constrained modulus from CPT
Settlement:	Primary settlement
Second. settlement:	Secondary settlemends due to creep

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Cone Penetration Testing
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+64211473249

CPT: CPT12
Total depth: 9.54 m, Date: 20/11/2022
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **111 Yorke Road, Haruru**
Location: **Haruru**

Settlements calculation according to theory of elasticity*



Calculation properties

Footing type: Rectangular
Footing width: 30.00 (m)
L/B: 1.0
Footing pressure: 20.00 (kPa)
Embedment depth: 0.00 (m)
Footing is rigid: No
Remove excavation load: No
Apply 20% rule: No
Calculate secondary settlements: No
Time period for primary consolidation: N/A
Time period for second. settlements: N/A

* Primary settlements calculation is performed according to the following formula:

$$S = \sum \frac{\Delta \sigma_v}{M_{CPT}} \Delta z$$

* Secondary (creep) settlements calculation is performed according to the following formula:

$$S = C_a \cdot \Delta z \cdot \log(t)$$

:: Tabular results ::

Point No	Start depth (m)	End depth (m)	Thickness (m)	Relative depth (m)	Delta P (kPa)	$M_{(CPT)}$ (MPa)	Iz	Settlement (cm)	Second. settlement (cm)	Overall settlement (cm)
946	9.46	9.47	0.01	9.46	17.57	76.79	0.88	0.000	0.000	0.000
947	9.47	9.48	0.01	9.47	17.56	74.46	0.88	0.000	0.000	0.000
948	9.48	9.49	0.01	9.48	17.56	70.29	0.88	0.000	0.000	0.000
949	9.49	9.50	0.01	9.49	17.55	65.50	0.88	0.000	0.000	0.000
950	9.50	9.51	0.01	9.51	17.55	64.70	0.88	0.000	0.000	0.000
951	9.51	9.52	0.01	9.52	17.54	65.15	0.88	0.000	0.000	0.000
952	9.52	9.53	0.01	9.53	17.53	64.34	0.88	0.000	0.000	0.000
953	9.53	9.54	0.01	9.54	17.53	64.94	0.88	0.000	0.000	0.000

Total primary settlement: 11.04
Total secondary settlement: 0.00

Total calculated settlement: 11.04

Abbreviations

Start depth:	Start depth of soil layer (penetration depth measured from ground free surface)
End depth:	End depth of soil layer (penetration depth measured from ground free surface)
Thickness:	Thickness of soil layer
Relative depth:	Depth of calculation relative to footing
Iz:	Stress influence factor
Delta P:	Footing impossed stress:
Eff. stress:	Effective stress
$M_{(CPT)}$:	Constrained modulus from CPT
Settlement:	Primary settlement
Second. settlement:	Secondary settlemends due to creep

Appendix F – CCC Timber Pole walls

Far North District Council

CODE COMPLIANCE CERTIFICATE
UNDER Section 95, Building Act 2004

APPLICABLE TO BUILDING CONSENT NUMBER BC-2007-210/1

OWNER:
Yorke On Yorke Limited

ADDRESS:
C/- West City Professionals Ltd
4A Roland Hill
Glen Eden
Waitakere 0602

CONTACT PERSON:

CONTACT DETAILS:
Phone Daytime:
Phone After Hours:
Mobile:
Fax:
Email:
Website:

LOCATION OF BUILDING:

Address:	111 Yorke Road, Haruru 0204	Level Unit No.
Legal Description:	Lot 3 PP 2070198, Lot 4 PP 2070198, 3350449	Current, lawfully established, use:
Location of Building:		Year first constructed:

PROJECT DESCRIPTION:
Description of Work: Build Timber Retaining Walls Above and Below the Driveway
Intended Life: Not less than 50 years.

☒ This certificate is issued subject to and in reliance on the Chartered Engineers, designers, builders, roofers, waterproofers and plasters, Producer Statements for the weather tightness of the exterior cladding, enclosed decks and roofing of the building.

☒ The Building consent authority named below is satisfied, on reasonable grounds, that:

(a) the building work complies with the building consent, and

(b) the specified systems in the building area capable of performing to the performance standards set out in the building consent and subject to any specified conditions listed.

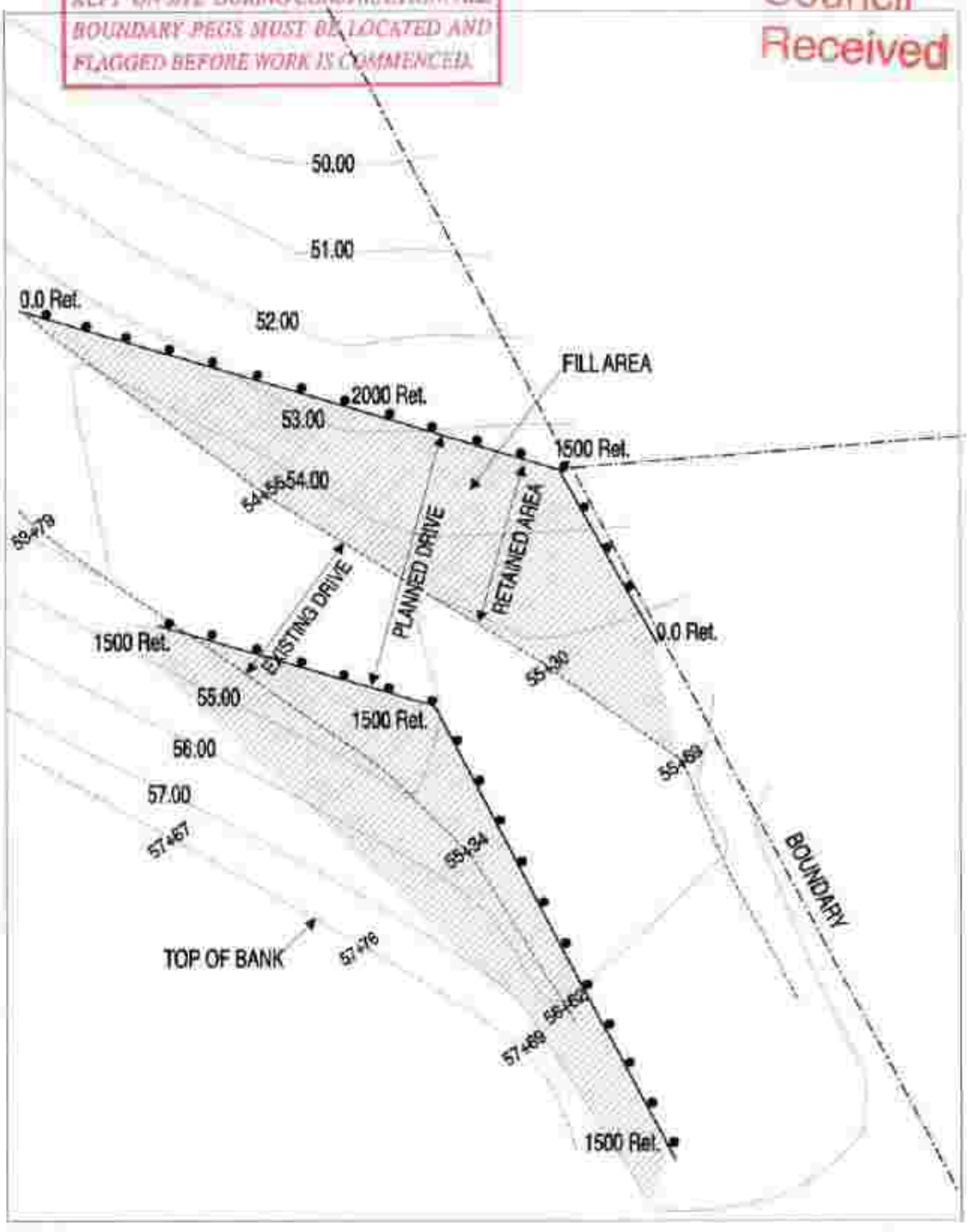
☐ This certificate is issued subject to the conditions specified in the attached ____ pages headed "Conditions of Code Compliance Certificate" (being this certificate).

SIGNED FOR AND ON BEHALF OF THE FAR NORTH DISTRICT COUNCIL

Name: Mark Henwood
Position: BUILDING OFFICER
Date: 11 May 2009

Far North District Council
Received

THESE PLANS AND SPECIFICATIONS MUST BE KEPT ON SITE DURING CONSTRUCTION. ALL BOUNDARY PEGS MUST BE LOCATED AND FLAGGED BEFORE WORK IS COMMENCED.



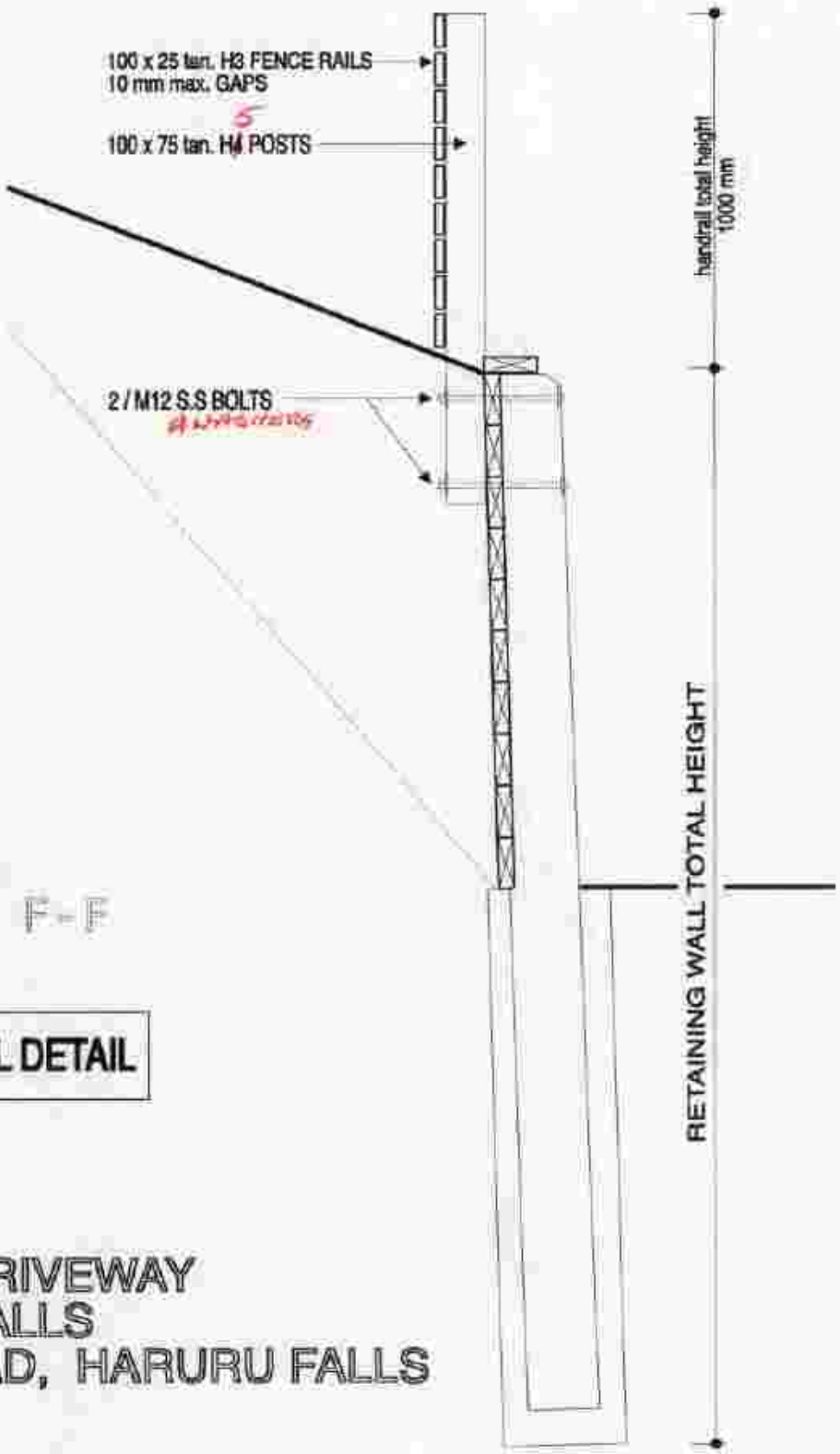
PROPOSED DRIVEWAY RETAINING WALLS 111 YORK ROAD, HARURU FALLS

LOT 2 DP 46802

CLIENT

YORKE ON YORKE LIMITED
99 YORKE ROAD, HARURU FALLS

Far North District
Council
Received



RETAINING WALL
CROSS SECTION F - F

FENCE / HANDRAIL DETAIL

PROPOSED DRIVEWAY RETAINING WALLS
111 YORK ROAD, HARURU FALLS

LOT 1 DP 46802

CLIENT
YORKE ON YORKE LIMITED
99 YORKE ROAD, HARURU FALLS

Far North District
Council
Received



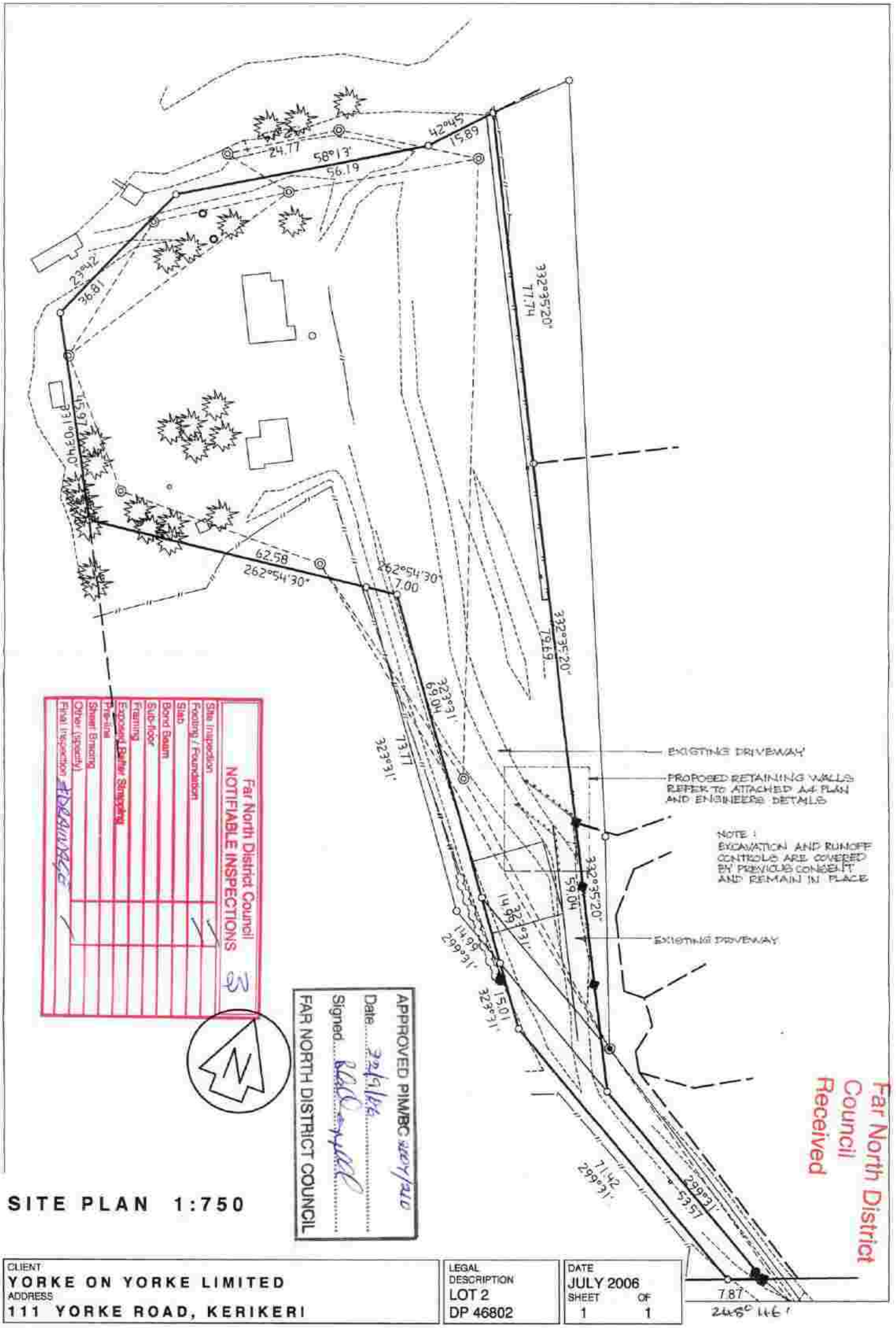
RETAINING WALL
CROSS SECTION - E - E

FENCE / HANDRAIL DETAIL

PROPOSED DRIVEWAY RETAINING WALLS 111 YORK ROAD, HARURU FALLS

LOT 1 DP 46802

CLIENT
YORKE ON YORKE LIMITED
99 YORKE ROAD, HARURU FALLS



SITE PLAN 1:750

CLIENT YORKE ON YORKE LIMITED ADDRESS 111 YORKE ROAD, KERIKERI	LEGAL DESCRIPTION LOT 2 DP 46802	DATE JULY 2006 SHEET 1 OF 1	

PK ENGINEERING
CHARTERED PROFESSIONAL ENGINEERS

Our ref; 08-91

Your ref; BC – 2007-210

Wednesday, 20 March 2009

Far North District Council
Building Officer
Private Bag 752
Memorial Avenue
Kaikohe.

RE; REPORT ON EXISTING RETAINING WALL STRUCTURES FOR TONY GOSSE AT 111 YORKE ROAD, HARURU, NORTHLAND

I have visited this site and done a thorough assessment of the structural integrity of the two retaining wall on the above mentioned property. Refer to included plans and cross sections included with this report.

I have also done a borehole close to the foundations of the lower retaining wall to determine the adequacy of the foundation. The results of the borehole reveal that the foundation material is comprised of interbedded soft/firm and stiff material with depth. Refer to borehole log included.

The upper retaining wall is structurally sound as the soils in this region are very stiff. This wall is easily adequate to sustain the design loads.

The foundations of the lower retaining wall are embedded approximately 2500mm into the ground (As noted on FNDC Inspection Report done by M. Henwood). There is a layer of firm material from a depth of 1.8m to approximately 2.4m in this region of the foundation. All the other material in the region of the foundations appear to be resonably stiff to very stiff.

The retaining wall appears to have performed satisfactory thus far and if the surface water runoff is managed properly it should perform satisfactory in the future.

It is my professional opinion that both these retaining wall meet the original design intent. Should you have any queries relating to this matter please contact me on 09 407 3255.

Regards,

Pradeep Kumar
B.E hons, NZCE, MIPENZ,
IntPE, CPEng,
(Structural, Geotechnical)
Chartered Professional Engineer.

Level 1 National Bank Building 90 Kerikeri Road Kerikeri New Zealand
Telephone: 09 407 3255 Fax: 09 407 3256 Email: pk.engin@xtra.co.nz

P.I.M. No.....
Building Regulation Clause(s) .....

PRODUCER STATEMENT – PS4 – CONSTRUCTION REVIEW

(Guidance notes on the use of this form are printed on the reverse side)

ISSUED BY: **Pradeep Kumar**
(Suitably qualified Design Professional)

TO: **Tony Gosse**
(Owner)

TO BE SUPPLIED TO: THE FAR NORTH DISTRICT COUNCIL
(Territorial Authority)

IN RESPECT OF: **Inspection of Existing Retaining Walls**
(Description of Building Work)

AT: **111 Yorke Road, Haruru**
(Address)

LOT 2 **DP** 46802 **SO** .....

● PK ENGINEERING LTD has been engaged by Tony Gosse
(Design Firm) (Owner/Developer/Contractor)

to provide an assesment of the Structural Integrity of **Existing** Timber Pole Retaining Walls
(Extent of Engagement)

in respect of clause(s) B1 of the Building Regulations 1992 for the building work described by the drawings and specifications prepared by BRIAN JONES ENGINEERING LTD
(Design Firm)

titled S01 – S02 and S1 – S8

NOTE: The excavation for pole foundations was inspected by M. Henwood – Building Officer, FNDC and reliance has been put on his Inspection Report that depths of poles are as per Engineers Design (Brian Jones Engineering Ltd). Copy Included.

Authorised variation(s) No 3 (copies attached) have been issued during the course of the works I have sighted Building Consent No ...2007-210..... and the attached conditions of building consent.

● an independent design professional covered by a current policy of Professional Indemnity Insurance to a minimum value of $200,000, I or personnel under my control have carried out periodic reviews of the work appropriate to the engagement and based upon these reviews and information supplied by the contractor during the course of the works

I BELIEVE ON REASONABLE GROUNDS that ☐ All ☑ Part only as specified in the attached particulars of the building work under the above Building Consent with respect to Clause(s) .....B1..... of the Building Regulations 1992 has been completed to the extent required by that Building Consent.

.....
(Signature Suitably qualified Design Professional) Date: 20/03/2009

B.E. hons, NZCE, MIPENZ, IntPE, CPEng (Structural, Geotechnical)
(Professional Qualifications)

PO BOX 464, KERIKERI
(Address)

Member ACENZ ☐
IPENZ ☑ ☐ NZIA

This form to accompany Form 9 of the Building Regulations 1992 for the issue of a Code Compliance Certificate.

P K ENGINEERING LIMITED

90 KERIKERI RD Phone (09) 4073255 Fax (09) 4073256

BOREHOLE No. AH 1
SHT. of

Location: Tony Gosse
Drilled by: Brian Butcher
R.L. at Ground Level:

Job No. 08-91
Date: 30/10/08

GWL:

Unit	Soil Description	Soil Symbol	Depth(m)	Sample/ Test	Shear Strength (40 80 120 160)	Moisture	Origins, Composition, Defects
	Firm hard dry orange clay	@@@					
	Brown clay moist hard	@@@	0.25		utp		
	Brown moist clay hard	@@@					
	Soft brown clay wet	@@@	0.5		utp		
		@@@	0.6		32/4		
	Soft brown we clay	@@@	0.65		utp		
	Soft brown grey wet clay	@@@	1.0		28/4		
	Brown and grey clay, wet, crumby	###	1.25		utp		
	Brown and grey clay, wet crumby	###	1.5		97/8		
	Brown and grey clay, moist, crumby	###	1.75		utp		
	Brown and grey clay, moist, crumby	###	2.0		30/6		
	Soft, wet, sticky, redish, brown, grey, clay, mouldable	###					
	Hard, rocky, orange, brown, grey, red, clay	###	2.5		64/12		
	Wet, brown, red, crumby, silty, clay	###	2.6		utp		
		###	2.75		80/5		
	Wet, brown, red, crumby, silty	%%	3.0		utp		
			3.5				
			4.0				
			4.5				

FILL CLAY SILT SAND GRAVEL PEAT MUD STONE TOPSOIL SILT STONE SAND STONE TUFF BASALT

FINAL INSPECTION SHEET

For North Shore Council

Date: 13 7 07

Action: 305

BC#: 2007 210

Time: 11:38 AM/PM

Applicant / Builder: TONY GOSSE

Inspection Description: FINAL.

Property Address: 111 YORKE ROAD HAURU

Issue CC: Yes / No

Re-inspection Needed: Yes / No

Valuation:

Travelling Time :

Inspection Time :

Officer: SBM

Signature:

	FINAL Plumbing Inspection	OK	Not	NA	Comments
1	Smoke Alarms with Flush				
2	Hearth size & secured				
3	Fire Place clearances				
4	Fire Place secured				
5	Flue Shield				
6	Flashings / Flue height				
12	Wet back circulators correct size & fill				

	PLUMBING	OK	Not	N/A	Comments
1	Waste pipe correct support & gradient				
2	Waste pipe for washing machine				
3	Hot Water pipe lagged				
4	1 metre minimum of copper outlet of HWC				
5	Hotwater cylinder seismic restraint				
6	Hot water tempering value set at 45/55 degrees				
7	Hot water energy cut out switch to all valve vented systems				
8	Hot water drain OK (falls to outside of building)				
9	Filter, non return, stop, cold water expansion, pressure reducing & pressure relief valves				
10	Benches & holes in joists & bearers				
11	Waste pipes finished at gully trap				
12	Soil pipe sizing / fall / support				
13	Adequate support to water pipes				
14	Back flow prevention where required				

	FINAL Internal Inspection	OK	Not	NA	Comments
1	Smoke alarms with flush				
2	Sink traps secured correctly				
3	Service rooms impervious walls				
4	Service rooms impervious floors				
5	Produce moisture membrane in wet areas				
9	Ceiling insulation (clear of Downlights)				
10	Safety glass where required				
11	Ventilation				
13	Stairs gap / tread / rise/ handrails				
14	Barrier Height 1.0m / Stairs 900mm				
15	Safety from falling eg: 100mm balustrade gaps				
16	Access for disabled - Commercial only				
17	Facilities for disabled - Commercial only				
18	All surfaces Completed				

SCANNED

FINAL EXTERIOR Inspection		OK	Not	N/A	Comments
1	Conditions on Removal/ Building Consent	✓			- RETAINING WALL ALL OK! AS PER PLANS (ENGINEER)
1a	Landscaping				
2	Joists in bearers supported				
3	Ground clearance to underside of floor				
4	Subfloor ventilation				
5	Subfloor bracing				
6	Ufloor Insulation				
7	Finished ground level				
8	Cladding (joints, corners, surfaces, window flashing etc)				WATER BEHIND WALL GOING INTO WATER TABLE OK!
9	Cladding- painted / penetrations sealed				
10	Brick veneer weep holes cleared				
11	Roof & pent flashings				
12	Roof, ridging & flashings fixed correctly				
13	Roof penetrations flashed correctly				
14	Spouting fixed correctly				
15	Down pipe clips at 1.2				
16	Vent pipe clips at 1.2				
17	Vent Discharge/Vermin Caps				
18	Stairs rail / newel / riser handrails				
19	Barriers 1.0m / Stairs 500mm	✓			
20	Safe Non Falling Balustrades				
21	RAMPS - grade / slip resistance				
22	Safety Glass (Glass Visible-commercial)				

DRAINAGE		OK	Not	N/A	Comments
1	As built drainage plan s/water and sewer				
2	Gully dish 25 mm above sealed surface "A"				
3	Gully dish 75mm above unsealed surface "B"				
4	Relief gully installed				
5	Footwaste drain finished				
6	Ventilation to drains e.g. TV & or valves				
7	Stormwater drain finished				
8	Retaining wall drainage connected into stormwater drain				
9	Overflow to water tank				
10	Access for septic tank maintenance				
11	Commissioning statements				
12	Effluent Compliance Barking/Planting				

Producer Statements		OK	Not	N/A	Comments
1	Engineer / Licensed Building Practitioner		X		PS4 REQ AS PER B C CONDITIONS.
2	Membranes / Roof				

FINAL POOL Inspection		OK	Not	N/A	Comments
1	Pool Fencing Compliance. (Sheet completed)				
2	Back flow prevention where required				

ENERGY CERTIFICATES		OK	Not	N/A	Comments
1	Electrical				
2	Gas				

ROAD DAMAGE		OK	Not	N/A	Comments
1	Footpath & kerb damage				
2	Crossing installed				

COMMERCIAL		OK	Not	N/A	Comments
1	Compliance Schedule				
2	Fire Design Compliance				
3	FPIS report				
4	Certificate of Public Use				
5	Fire Service - Evacuation Scheme				
6	Fire Service - Conditions Met				
7	Producer Statements- Fire alarm, Ventilation etc				







207-210





207-210

16055

FAR NORTH DISTRICT COUNCIL

Field Advice Notice - Building 1

Private Bag 752, Memorial Ave, Kaikohe
Free Phone: 0800 920 029
Phone: 09 405 2750
Fax: 09 401 0987
www.fndc.govt.nz

ENTERED

BC# 2007 - 210

Date: 10/10/06

Applicant: Tony Gosse -
Builder:

Site Address: 111 Yorke Rd Haruru

Inspection Completed: (Yes) / No

VAL# 223-13600

Reinspection Required: Yes / (No)

Nº 3403

Travelling Time: 20 min

Inspection Time: 15 mins

Officer: M Henwood

Signature:

209	FOUNDATION Inspection	OK	Not	N/A	Comments..... If further inspection needed please indicate
1	Boundary pegs sited				
1	Correct site & building siting				
2	Ground bearing, fill, expansive clay				
3	Reinforcing: Spacing, size, clearance etc				
4	Excavation: Depth, width				
5	Pile/Pole holes: Depth, diameter				
6	Pile/Pole: Correct grade, diameter				
7	Driven Piles: Engineers Certification				
8	Retaining Wall: Polythene underneath	✓			Sizes + depths as per engineers spec
9	Other				
213	SLAB/UNDER SLAB PLUMBING Inspection	OK	Not	N/A	
1	Slab Thickness: D.P.M., tape, rebates				
2	Slab Reinforcing: Thickenings, tying cover etc				
3	Fill: Compaction, depth, bonding	✓			
4	Pipes: Gradient, protection, sizing, sealed				
5	Other				
217	SUBFLOOR Inspection	OK	Not	N/A	
1	Sub floor brace connections	✓			
2	Bracing: Washers, timber size etc				
3	Bearers/Joist: Size, spacing, joist hangers				
4	Notching/Holes/Blocking for lines of horizontal supports				
5	Ventilation & Insulation				
6	Other				
221	BOND BEAM - SUSPENDED SLAB Inspection	OK	Not	N/A	
1	Block size				
2	Reinforcing: Size, grade, lap's, tied				
3	Washouts: If grout exceed 1.2m in height				
4	Design calculation on site				
5	Retaining Wall: D.P.M. & protection				
6	Adequate propping				
7	Service installation (Fire Collars)				
8	Identify proprietary pre-stress components				
9	Other				
225	FRAMING Inspection	OK	Not	N/A	
1	Flashings				
2	Battening (air cavity)				
3	Wrap				
4	Vermin protection				
5	Framing Timber Treatment				
6	Brick Ties - SS / Galv				
7	Other				
249	MISCELLANEOUS Inspection	OK	Not	N/A	
1	Solid fuel heating, chimney check, setback fixing, flue flashing, mantel shelf, hearth construction				
2	Swimming Pool- Backwash, fencing, registration				
3	Other				

An inspection of the above mentioned premises has been undertaken and the matters as listed above must be completed within ..... days or otherwise stated

Action to be taken:

Issued By:

Designation: Building Officers

This Notice Received By:

Next Inspection: Final


10/08/2006


10/08/2006


10/08/2006

SITE INSPECTION SHEET

Attn: Andrew D'Ath. 1 of 2

Applicant:	Yorke On Yorke Limited	Application No.	BC-2007-210
Site Address:	111 Yorke Road, Haruru 0252	Date:	1 August 2006
Contact Person:	Tony Gosse	Contact Phone:	09-402-8588 027-246-61336

Enter ☑ or ☒ in each box to indicate yes or no

Site Topography:
- ☐ Gentle
- ☐ Moderate
- ☑ Steep

Wind Zone:
- ☐ Medium
- ☑ High
- ☐ Very High
- ☐ Specific Engineering Design
- ☐ Sea Spray Zone

Vehicle Crossing:
- ☒ Required
- ☒ Is there Footpath Damage

Council Service:
- ☐ Is sewerage available
- N.A. ☐ Is water reticulation available
- ☐ Is stormwater reticulation available

Council or Private Easements:
- ☒ Man hole covers
- ☒ Overland flow path
- ☒ Overhead wires
- ☑ Stormwater disposal / kerb outlet

- ☐ **Sec 72** Required (Natural Hazards)
- ☐ **Sec 75** Required (Building across Boundary)

Engineering Required:
- ☑ Signs of slippage
- ☐ Poor soils
- ☐ Fill on site
- ☑ Un-natural profiles
- ☒ Flooding
- ☑ Foundations

Sketch/Topography:



Build Timber Retaining Walls Above and Below the Driveway

Existing Structures on Site:
No. /
Type. /

On-site Effluent Disposal: N.A. - Retaining wall
- ☐ Is the area suitable
- ☐ Is there room for a reserve area
- ☐ If there local knowledge of poor soakage
- ☐ Engineering Design required
- ☐ Ground Water Protection required

Estimated Soil Category:
- ☐ Gravel, coarse sand
- ☐ Coarse to medium sand
- ☐ Medium fine and loamy sand
- ☐ Sandy loam, loam and silt loam
- ☐ Sandy clay-loam, clay-loam, silty clay-loam
- ☑ Sandy clay, non swelling clay, silty clay
- ☐ Swelling clay, grey clay, hardpan

Photos Taken:
- ☑ Site photos
- ☐ Footpath damage (if applicable)

Comments:

Inspector: APD. Date of Inspection: 10-8-6.

BRIAN JONES
ENGINEERING LTD

Far North District
Council
Received

PRODUCER STATEMENT - DESIGN

Date	: 12 July, 2006
To	: The Building Inspector
Client	: York on York Ltd
In respect of	: Proposed Timber Retaining Walls
at	: 111 York Road – Haruru Falls

Brian Jones Engineering Ltd has been engaged by York on York Ltd to provide structural engineering services for:

Timber Retaining Walls

as described in the attached calculations, in respect of the requirements of Clause(s) B1 of the Building Regulations 1992 for the building work as specified.

The design has been prepared in accordance with B1/VM1 of the approved documents issued by the Building Industry Authority and the work is described on the following documentation:

S01 & S02

As an independent design professional, covered by a current policy of Professional Insurance to a minimum value of $200000, I believe, on reasonable grounds, that subject to:

(i) proprietary products meeting the performance specification requirements,
(ii) soil conditions being in accordance with the "Good Ground" requirements of NZS3604:1999. Earthworks design and stability assessment shall be by others.

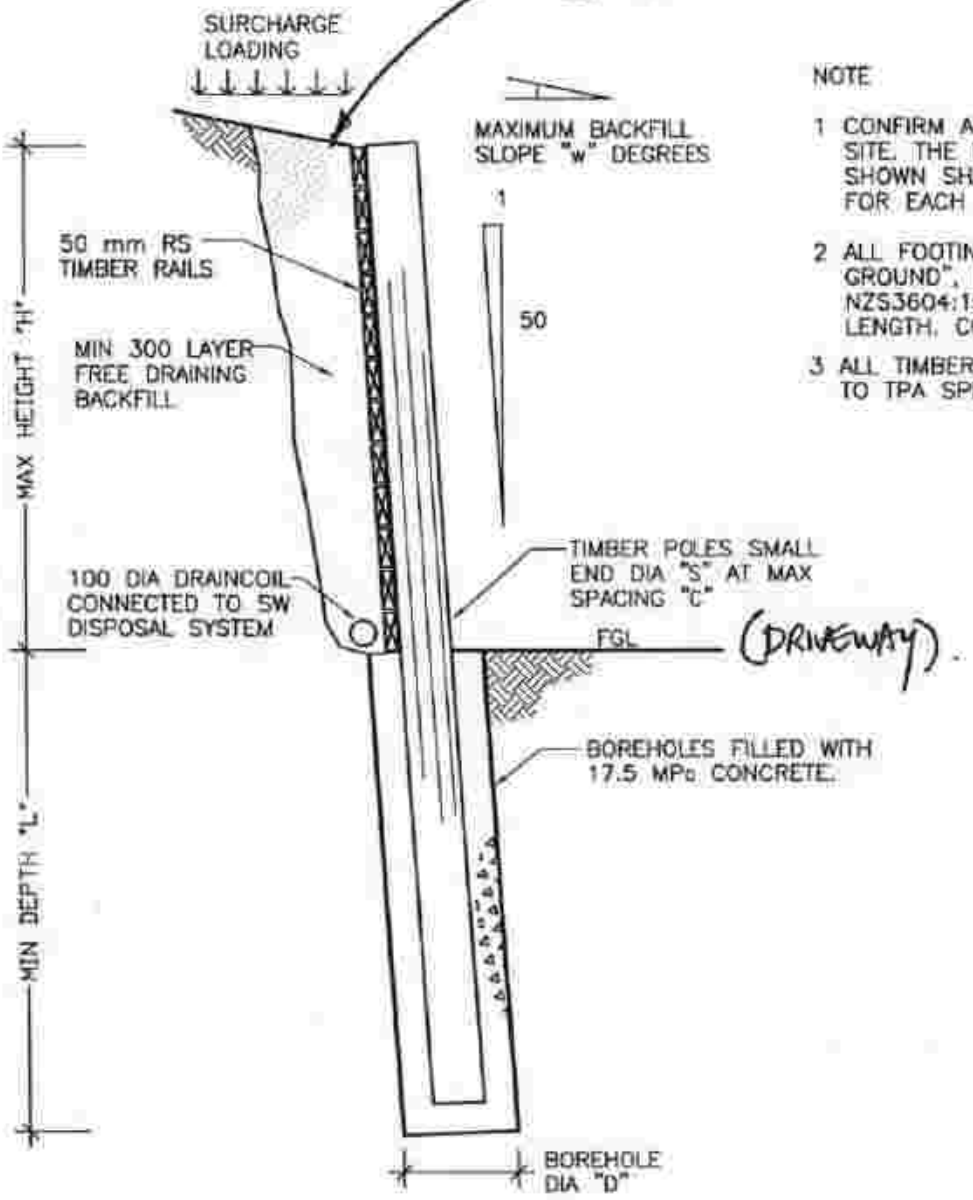
that the documentation outlined above complies with the relevant requirements of the NZ Building Code.

.....

Brian Jones Engineering Ltd
B A Jones BE MIPENZ(Civil, Structural) CPEng IntPE
CHARTERED PROFESSIONAL ENGINEER

Note: The design is of specifically designed structural aspects only and excludes any waterproofing or weatherproofing requirements.

BATTER GROUND TO A SAFE SLOPE.
EARTHWORKS DESIGN BY OTHERS.



NOTE

1 CONFIRM ALL DIMENSIONS ON SITE. THE RETAINED HEIGHT SHOWN SHALL NOT BE EXCEEDED FOR EACH WALL TYPE.

2 ALL FOOTINGS SHALL BE IN "GOOD GROUND", IN ACCORDANCE WITH NZS3604:1999, OVER THEIR FULL LENGTH. CONTRACTOR TO CONFIRM.

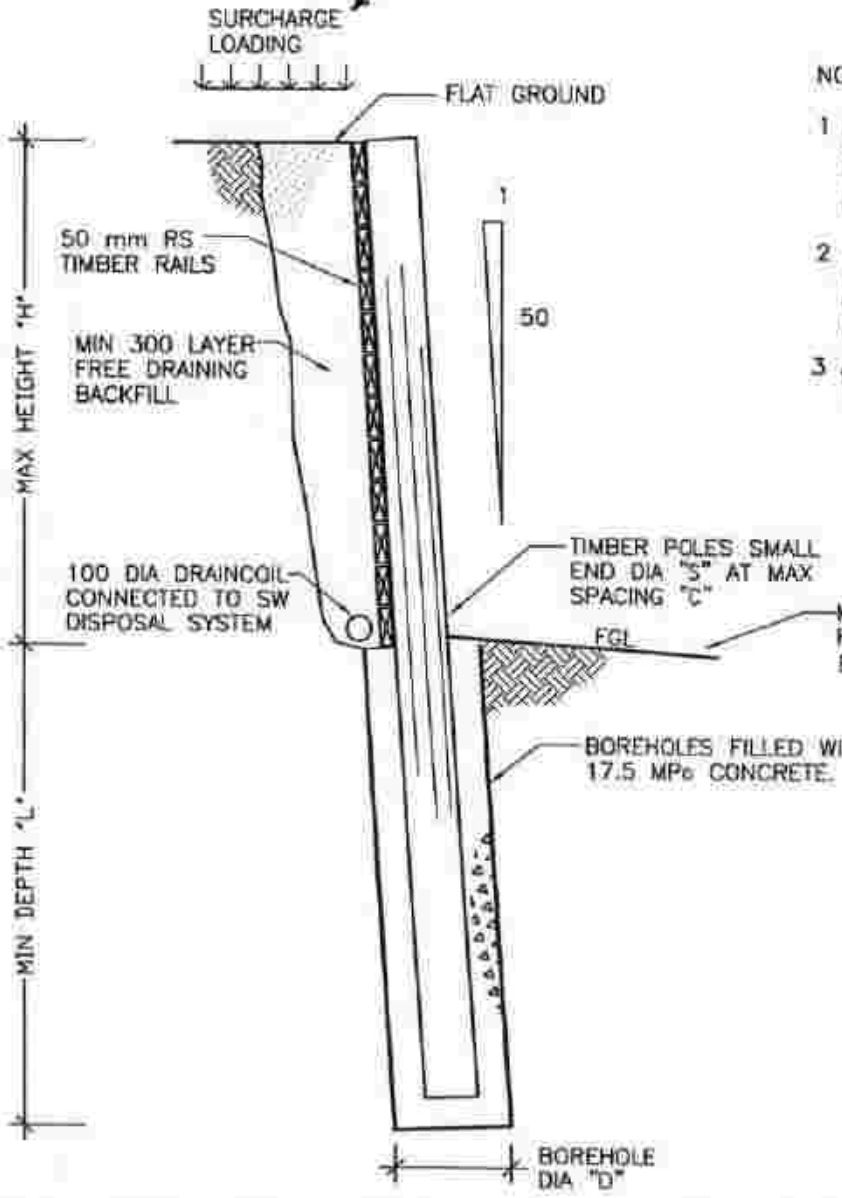
3 ALL TIMBER SHALL BE TREATED TO TPA SPECIFICATION H5.

HEIGHT "H" mm	MAX SLOPE OF BACKFILL "w" DEGREES	POLE DIA "S" mm	POLE SPACING "C" mm	BOREHOLE DEPTH "L" mm	BOREHOLE DIA "D" mm	SURCHARGE ABOVE WALL kPa
1050	20°	150	1000	1000	350	SLOPE
1300	20°	175	1000	1200	350	SLOPE
1500	20°	200	1000	1390	350	SLOPE
2000	20°	250	1000	1890	400	SLOPE

BRIAN JONES
ENGINEERING LTD
STRUCTURAL & CIVIL CONSULTING ENGINEERS
PO BOX 6865 WELLESLEY ST
AUCKLAND
PHONE 09 309 5255

PROPOSED RETAINING WALLS	SHEET	S01
111 YORK ROAD – HARURU FALLS	FILE	110/25
WALL ABOVE DRIVEWAY	DATE	7/06
	BY	BAJ

MAXIMUM VEHICLE WEIGHT = 8 TONNES.



NOTE

1 CONFIRM ALL DIMENSIONS ON SITE. THE RETAINED HEIGHT SHOWN SHALL NOT BE EXCEEDED FOR EACH WALL TYPE.

2 ALL FOOTINGS SHALL BE IN "GOOD GROUND", IN ACCORDANCE WITH NZS3604:1999, OVER THEIR FULL LENGTH. CONTRACTOR TO CONFIRM.

3 ALL TIMBER SHALL BE TREATED TO TPA SPECIFICATION H5.

HEIGHT "H" mm	MAX SLOPE OF BACKFILL	POLE DIA "S" mm	POLE SPACING "C" mm	BOREHOLE DEPTH "L" mm	BOREHOLE DIA "D" mm	SURCHARGE ABOVE WALL kPa
890	FLAT	150	1000	1590	350	5
1100	FLAT	175	1000	1790	350	5
1350	FLAT	200	1000	1950	350	5
1900	FLAT	250	1000	2500.	400	5.
	FLAT					
	FLAT					
	FLAT					
	FLAT					

BRIAN JONES
ENGINEERING LTD
STRUCTURAL & CIVIL CONSULTING ENGINEERS
PO BOX 8865 WELLESLEY ST
AUCKLAND
PHONE 09 309 5255

PROPOSED RETAINING WALLS	SHEET	S02
111 YORK ROAD – HARURU FALLS	FILE	110/25
WALL BELOW DRIVEWAY	DATE	7/06
	BY	BAJ

Engineering Assessment
111 and 115 Yorke Road, Haruru Falls
for
East Property Investments Ltd

Haigh Workman Reference: 22 322
Revision: B

19 November 2023



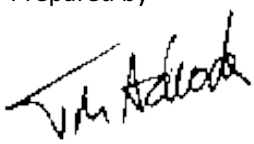
Phone: +64 9 407 8327 • Fax: +64 9 407 8378 • info@haighworkman.co.nz • www.haighworkman.co.nz

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

(a) Revision History

Revision Nº	Issued By	Description	Date
A	Alan Collins	For Issue	September 2023
B	Tom Adcock	Rev. incl. Stormwater, Earthworks & Access	October 2025

Prepared by



Tom Adcock
Senior Civil Engineer
BEng (Civil), MEngNZ

Reviewed / Approved by



John Papesch
Senior Civil Engineer
BE (Civil Engineering),
CPEng, CMEngNZ)

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1 Executive Summary

Haigh Workman Ltd was commissioned by East Property Investments Ltd to undertake an Engineering Assessment to support a consent application for a proposed 22 lot subdivision of 111 and 115 Yorke Road, Haruru Falls.

Access & Parking

A 5.0m wide carriageway is to be extended to the Falls View Rd – Yorke Road intersection. The intersection is essentially a through road from the Falls View Road to Yorke Road East. The visibility from the vehicle crossing meets Council Engineering standards. The pedestrian footpath on Yorke Road is to be extended along the road corridor, 1.8m wide with a 1.2m berm setback to provide pedestrian access to the site. Internal access is to be by a 5m carriageway shared driveway with three mews lanes with 3 and 5m carriageway widths. All lots have sufficient area for two parking spaces. Additionally, there will be two shared visitor parking areas within the common access area providing a total of 12 spaces.

Earthworks

The existing ground contour will be re-shaped to blend the natural contours and reduce a localised high point by approximately 3.5m. Surplus cut will be used to raise the level of lot 1 and to apply a pre-load across the building platform which will be removed off site once monitoring indicates settlement has stabilised.

Total earthworks volume is estimated at 11,511m^3. This includes a pre-load allowance for lot 1. Pursuant to Rule 13.6.3 of the District Plan, it is requested that consent for earthworks be incorporated into the subdivision consent.

Natural Hazard Flooding

Proposed Lot 1 sits within the flood plain of Waitangi River estuary. To ensure adequate freeboard in 1% AEP events, the minimum floor level recommended for a dwelling on Lot 1 is RL 3.3m OTP. (Allow an offset between One Tree Point datum (OTP) and New Zealand Vertical Datum 2016 (NZVD2016) of -0.075m).

The ground level is approximately RL 2.0m and will be raised to at least RL 3.0m at time of subdivision. In addition, the building platform should be preloaded to reduce settlement timeframes, as laid out in the geotechnical report.

Stormwater

The District Plan definition in the case of jointly owned access lots that contain impermeable surfaces within their boundaries, the total area of the impermeable surfaces are to be divided equally and considered as parts of the various sites

Lot 307 (301m^2) will be worst disadvantaged, which after allowing lots 101 and 200 common access shares plus respective roading, has estimated impermeable surfaces of 49.4%.

For the Residential Zone impermeable surface of 50% are permitted.

The internal access roading and all lots will have stormwater connections to a central collector pipe discharging to the north into a natural tidal basin off the main river. Because the receiving environment is a tidal estuary and the site is at the bottom of the catchment, attenuation is not necessary to address flood risk. To manage the risk of scour, the stormwater outfall will require an energy dissipator or diffuser.

Stormwater at the start of the shared access within the unformed Council Road will use the existing cesspit outlets connecting to the Council Drainage system to the south of the site. Drainage for the low point at Ch. 75m will discharge via the existing open drain identified as Easement 'U' on the Scheme Plan.

Stormwater runoff from residential development is not expected to be a source of contamination. All roading and parking areas will sealed or concreted with cesspit collection before entering the system. The addition of 'EnviroPod' cesspit filters are a sustainable low impact design solution for catching litter, debris, sediment and pollutants should this be a concern.

Water Supply

The site is only partially in the "Area of Benefit" for water reticulation. While the existing dwellings on the site are reticulated, it is proposed that the new development has onsite water supply. Two options have been identified. Firstly, each lot has it's own dedicated underground minimum 25,000L tank. Secondly, a minimum 550m^3 shared community tank(s) be constructed within the common access area. Determination and details of the proposed solution are to be finalised at Engineering Plan Approval Stage. Onsite water supply is to be used for firefighting supply.

Wastewater

Wastewater generation is projected to have a peak design flow of 0.92L/s (based on Council reticulated gravity flow rates). It is proposed that wastewater be connected to the community network following a Council capacity check.

The subdivision will be reticulated using a low-pressure collection system. Each lot will have a proprietary Council approved on-site pump chamber such as EOne connecting to a dedicated Council approved boundary kit installed at time of subdivision. Preliminary design by Ecoflow is appended, this shows pipe sizes varying 50 to 90mm.

Council Engineering Standards allow pressure sewer systems but do include a method for estimating pressure sewers flows. The average daily flow for a low-pressure sewer is estimated at 0.1823L/s with a maximum allowing for 5 pumps running simultaneously of 2.9L/s. Although this appears high, it should be noted that the pumps start after 40L has accumulated and run for only one minute. So, whilst the instantaneous peak flow may appear high, it will only be sustained for a very short period of around 1 minute.

2 Introduction

Haigh Workman Ltd was commissioned by East Property Investments Ltd (the Client) to undertake an engineering assessment for the proposed subdivision and development of 111 and 115 Yorke Road, Haruru Falls. This report is to support the Subdivision and Land Use Consent application for a proposed 21 lot residential subdivision plus 4 common access lots and 2 esplanade reserves to vest.

2.1 Objective and Scope

The scope of the report includes the following assessment items:

- Natural hazards (river and coastal flooding)
- Vehicle access and parking
- Earthworks to complete the subdivision
- Stormwater and wastewater
- Water supply and firefighting

A proposed subdivision plan prepared by Williams & King, ref. 24653 was made available at the time of writing.

The site is zoned 'Residential' under the Far North District Council Operative District Plan.

2.2 Limitations

This report has been prepared for our East Property Investments Ltd with respect to the brief outlined to us. This report is to be used by our Client and Consultants and may be relied upon by the Far North District Council (FNDC) when considering the application for the proposed subdivision and 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 by Haigh Workman Ltd.

It has been assumed in the production of this report that the site is to be subdivided with the four smaller lots subsequently developed for residential end use and the balance lot to remain in agriculture. At the time of writing there was no information available for the proposed future development on any of the lots following subdivision. If any of these assumptions are incorrect, then amendments to the recommendations made in this report may be required.

The comments and opinions presented in this report are based on the findings of the desk study and ground conditions encountered during an intrusive site visit performed by Haigh Workman. There may be other conditions prevailing on the site which have not been revealed by this investigation, and which have not been taken into account by this report. 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.

3 Site Description

3.1 Site Location

Site Address:	111 and 115 Yorke Road, Haruru Falls
Legal Description:	Lots 2 and 3 DP 46802
Total Site Area:	1.1334 + 1.1362 = 2.2696 ha

The location of the subdivision site is shown below:



Figure 1- Site Location

The site is located on the banks of the Waitangi River in the Haruru Falls township and is 4km west of the Paihia.



Figure 2: Site Overview

3.2 Site Features

The combined site of the two titles is approximately rectangular in shape with the longer axis running SE to NW. The site sits within a meander on the Waitangi River and occupies a basalt spur ridge with a similar SE to NW trending orientation. The northern, western and eastern flanks of the ridge are mostly very steep with the basalt geology exposed in several locations forming cliff drop offs to the river. Along the eastern flank the basalt is again exposed at a steep escarpment drop off to the river flats below. The southern flank and site boundary is steeply sloping making the southeast corner as the natural access point to the site. It should be noted that the steep western and northern flanks, Lot 4 DP46802 are esplanade reserve.

The land to be developed forms an undulating plateau elevated some 10 to 20m above than the Waitangi Rive, except for proposed lot 1 which in on low lying river flats at the foot of the eastern basalt escarpment.

The main plateaux drains naturally west and northwards to the river with a more pronounced short overland flow path central to the site. Vegetation cover is mostly grass with bush on the steep slopes.

There are two existing residential dwellings with detached garaging and sheds. All existing buildings are to be removed as part of the development. An unsealed driveway provides access onto the site from the southeast off the end of Yorke Road and continues in a north westerly direction along the eastern flank of the exposed basalt escarpment. An access down to the eastern river flats has been formed as a cutting into the eastern flank of the ridge with existing 2m high timber pole retaining at the start.

Also present on the site are two small, dilapidated boatsheds situated within the Lot 4 DP46802 esplanade reserve but held by the title for Lot 2 DP 46802.

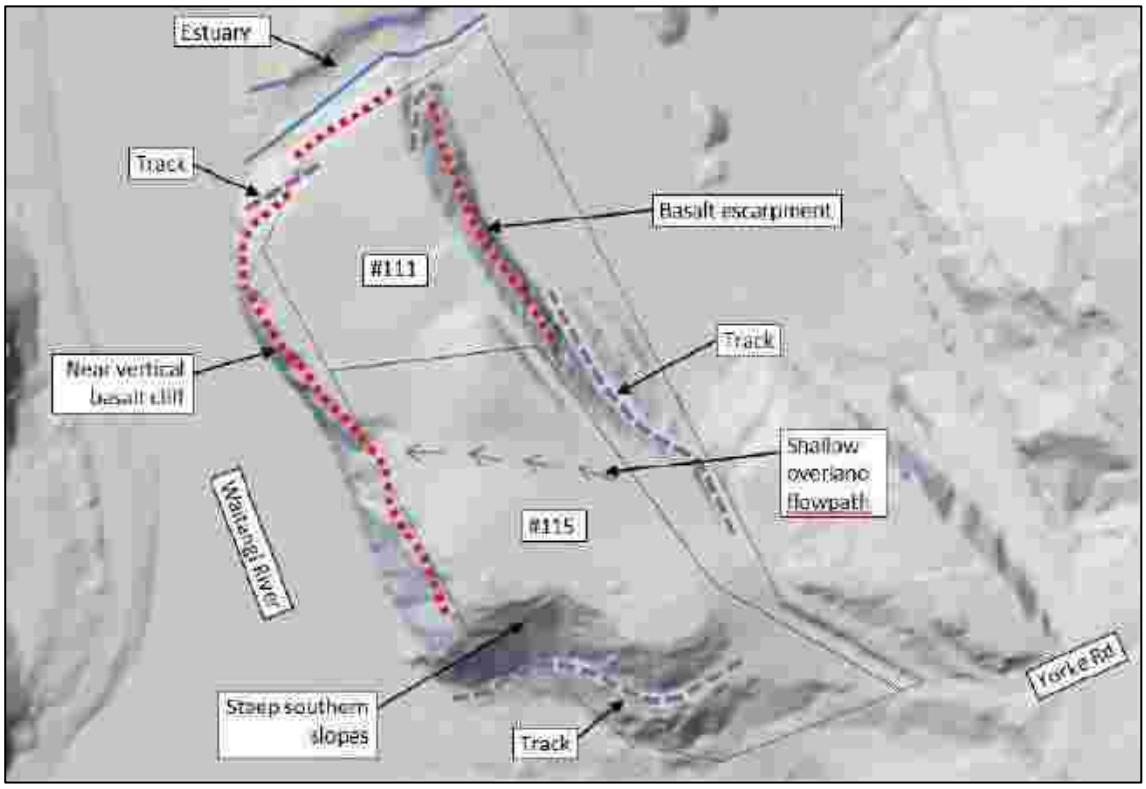


Figure 3: Existing Site Features showing Geomorphology & LiDAR Hill Shade

3.3 District Plan Zoning

According to the Far North District Plan the Site is zoned as 'Residential'. The subdivision is understood to be a restricted discretionary activity under Section 7.6.5.3 of the Operative Far North District Plan due to the private access serving more than 8 lots. The esplanade reserve along the river is zoned 'Conservation'.



Figure 4: Operative District Plan Zoning

3.4 Proposed Subdivision

The proposed subdivision is for 22 residential lots accessed via a 290m long central driveway off Yorke Road with mews lanes leading off to the three residential clusters and a centralised area for visitor parking. All lot will be provided with a connection to the town sewer via a low-pressure pumping line. Lot sizes are generally 300 to 400m^2 with Lot 1 much larger at 3,849m^2. Earthworks shaping is proposed to blend the contours and reduce a localised natural high point by approximately 3.5m.

Housing will be clustered along three mews roads with common access green space between.

Stormwater drainage will be via a central collector pipe discharging to the north into a natural tidal basin off the main river. Directing stormwater in this manner is expected to assist in keeping the basin flushed of sediment build up which is occurring in other areas along the river margins.

All house platforms will be naturally raised well above the coastal flood hazard, except on lot 1 which it is proposed to fill with surplus cut material to achieve a safe floor level.

4 Geotechnical

A detailed geotechnical assessment was carried out by Haigh Workman Ltd, refer report reference 22 322 dated 27 November 2023. A summary of the findings and recommendations is presented in Table 4.1 taken from the geotechnical report. It should be noted that the subdivision plan has been revised since the geotechnical assessment, notably proposed lots 1 and 2 have been combined as lot 2 and lot 22 has been renamed lot 1. Refer also Geotechnical Investigation Site Plan G02 appended, which illustrates the proposed building restriction lines and soldier pile walling.

Table 4.1 Summary of Geotechnical Requirements

Lot No.	Comments on Nominated Building Platform	Shallow Bearing Capacity / Expansive soil class	Anticipated scope of additional works following specific investigation and design. [Comments are given as a guide only – specific engineering to be undertaken by a Chartered Professional Engineer – Geotechnical]
Lot 1 – Lot 2 (Combined as Lot 2)	Ground stabilisation, e.g. soldier pile walls are required to create stable building platforms	Pile foundations required due to fill. Shallow foundations not viable (unless fill is completely removed). Seismic 'Class C'	Site specific geotechnical investigation (machine boreholes or test pits), analyses and reporting to provide recommendations pile foundations and ground stabilisation. Specific design of soldier pile walls to create stable building platform. Design to be undertaken by a CPEng Geotechnical engineer.
Lot 3 – Lot 9 (Renamed Lots 3 – 8 & 11)	Elevated sections along Steep southern slopes. Building setback distances required, refer Section **Error! Reference source not found., Error! Reference source not found.**.	300 kPa/ Class H. Seismic 'Class C'	Site specific geotechnical investigation and reporting to confirm the soil conditions assumed within this report. Building setback distances from steep slopes to be followed, or ground stabilisation to provide a safe building platform.
Lot 10 – Lot 14 (Renamed Lots 9, 10 & 12 -14)	Gentle to moderate slopes. Earthworks likely required to create building platforms. Alluvial soils in OLFP require undercutting and replacement with engineered fill	300 kPa/ Class H. Seismic 'Class C'	Site specific geotechnical investigation and reporting to confirm the soil conditions assumed within this report.
Lot 15 – Lot 16	Elevated sections along Waitangi River. Building setback distances required, refer Section **Error! Reference source not found., Error!**	300 kPa/ Class H. Seismic 'Class C'	Site specific geotechnical investigation and reporting to confirm the soil conditions assumed within this report. Building setback distances from Waitangi River escarpment edge to be followed, or ground stabilisation to provide a safe building platform.

	Reference source not found..		
Lot 17 – Lot 18	Flat site, minimal earthworks required.	300 kPa/ Class H. Seismic 'Class C'	Site specific geotechnical investigation and reporting to confirm the soil conditions assumed within this report.
Lot 19 – Lot 21	Elevated sections along Waitangi River. Building setback distances required, refer Section **Error! Reference source not found.**, **Error! Reference source not found.**.	300 kPa/ Class H. Seismic 'Class C'	Site specific geotechnical investigation and reporting to confirm the soil conditions assumed within this report. Building setback distances from Waitangi River escarpment edge to be followed, or ground stabilisation to provide a safe building platform.
Lot 22 (Renamed Lot 1)	Lower elevation sites, subject to flood hazard, soft soils, and low liquefaction potential.	200 kPa/ Class H. Seismic 'Class D'	Settlement preload design and monitoring by CPEng. Geotechnical completion report required to provide foundation recommendations which can be adopted for building consent application. We recommend the preload is undertaken prior to titles being released, as the potential for down-drag to occur on adjacent lots is a significant risk due to the proposed lot sizes. Foundation design to be in accordance with TC2 – stiffened raft foundation system, e.g., reinforced granular raft below waffle raft concrete slab.
Site Access (R.O.W)	Min. setback 6.0m from escarpment	N/A	Site specific geotechnical investigation and recommendations for pavement design.

5 Access

All lots will be accessed via a central access road formed as a continuation of the western end of Yorke Road as indicated by Figure 5 below.

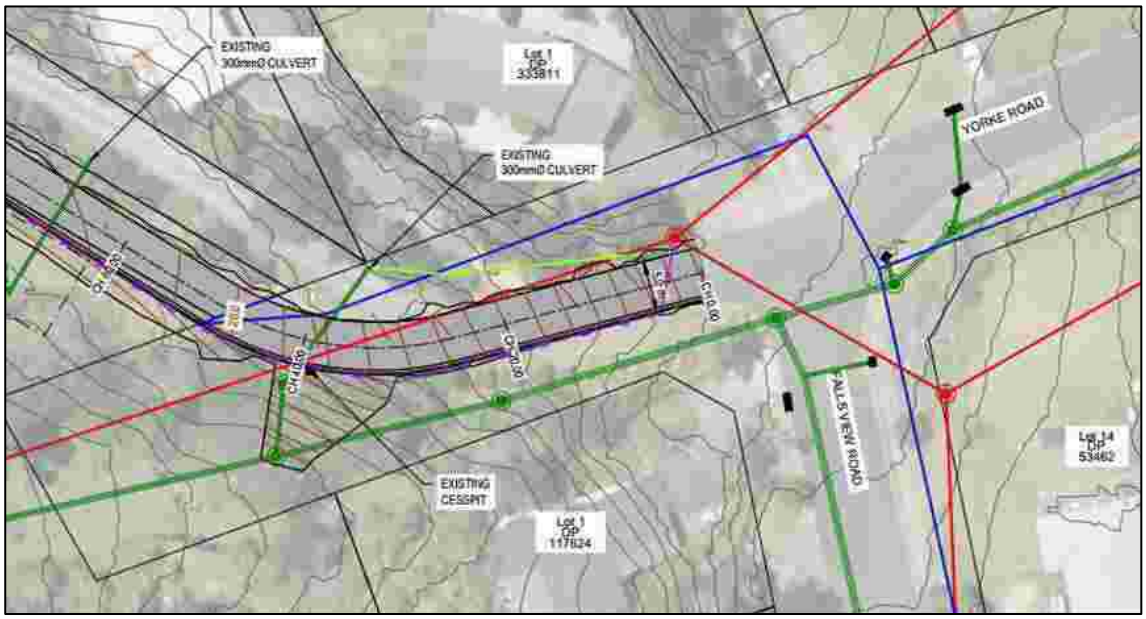


Figure 5: Proposed Site Access

5.1 Internal Access

The existing access to the site is via a common access driveway that follows the unformed public road for a distance of 45m with a crossing onto the formed road at the intersection of Yorke Road with Falls View Road. The Yorke Road / Falls View Road intersection is actually a continuation with no Giveway road markings or signage. Vehicles exiting the common access driveway are to give way to traffic from Falls View Road and Yorke Road East as they do today.

The majority of the lots except lots 1 and 2 will be in three clusters with mews roading.

Operative District Plan Rule 15.1.6C.1.1 (d) Where a subdivision serves 9 or more sites, access shall be by public road. Rule 15.1.6C.1.2 (a) private accessways in the Urban zone serving more than 4 residential units shall be 5m wide.

It is proposed that the main access remains private and have a minimum 5m sealed carriageway width with kerb and channel stormwater drainage.

The first two mews roads will also be 5m wide and the third at the northern end of the site serving three lots will be 3m. The intersection of the third mew with the main access will be design as a turning head in accordance with Council Engineering Standards 2023 Section 3.2.16.2 and NZS 4404:2010 Figure 3.4.

All accesses will be either sealed or concreted with kerb and channel drainage to a piped outfall.

5.2 Unformed Public Road

As described in Section 5.1, the first 45m of driveway formed within the uniformed public road will be to private standard.

5.3 Vehicle Crossings

The crossing for the subdivision access onto Falls View Road / Yorke Road will be sealed to match the internal roading and as a minimum, achieve the dimensions for a double residential crossing given by Council Engineering Standards 2023 Sheet 18.

The local road network has a speed limit of 50kph and the 90-degree bend of Falls View Road with Yorke Road can only be safely driven at a speed no greater than 30kph. Sheet 4 of the Engineering Standards for the lowest speed category of 40kph requires a minimum sight distance of 45m ('Access' category road). Sight distances from the intersection looking south on Falls View Road and east on Yorke Road were estimated in excess of 76 and 120m respectively, thus comfortably achieving Council requirements.

There are three existing vehicle crossings for neighbouring properties gaining access off the unformed public road. The Lots 1 & 2 DP 333811 crossings are concreted and in satisfactory condition, major modification is not anticipated to incorporate them into the subdivision access. The Lot 7 DP 552961 crossing is largely unsealed and will be sealed or concreted in consultation with the landowner as part of the works.

5.4 Parking and Manoeuvring

Appendix 3C of the FNDC District plan requires two car parks for each building envelope. Parking and manoeuvring can be accommodated within the proposed lots. Parking is not proposed on the shared access, instead two visitor parking areas will provide a total of 12 spaces within the Common Access area.

5.5 Driveways

Private driveways for the individual lots are only pertinent to the Building Consent Stage. They are to be formed from the shared access to building platforms and parking areas in compliance with section 15.1.6C. The level to gentle sloping topography means that driveways will fall below the limits for acceptable inclines.

Earthworks for the driveway formation are not expected to have more than 1m high cuts.

5.6 Pedestrian Access

Pedestrian pathways totalling some 900m are proposed within the site providing residents the opportunity to enjoy the Common Access green spaces with links to the river esplanade reserve. Depending on the outcome of discussions with Council Parks and Reserves there may be an opportunity to provide a pedestrian link from Yorke Road onto the esplanade reserve. With this in mind a footpath has been allowed along the southwestern side of the site access within the unformed public road.

A short length of existing footpath on the northern side of Yorke Road terminates at the vehicle crossing to Lot 2 DP 333811 but cannot feasibly be extended due to the steep gradient of the crossing and open stormwater drainage. Furthermore, any pedestrian access within the subdivision should be on the same southwestern side of the roading as the housing.

A new footpath on the southwestern side of the unformed public road will need to have connectivity with the existing network. The existing footpaths on Yorke Road and Fall View Roads are on the eastern (opposite) sides of the carriageway. Hence pram crossings will be required across the end of Falls View Road.

5.7 Assessment Criteria

Assessment Criteria is taken from 15.1.6A.7 from the FNDC District Plan:

Assessment	Comment	Acceptable
a) The extent by which the expected traffic intensity for a proposed activity exceeds the assumed value set by the Traffic Intensity Factor contained in Appendix 3A in Part 4 of the Plan.	The traffic intensity factor for a residential dwelling in Appendix 3A is 7 vpd. The traffic intensity for a residential lot as a permitted activity is 20 vpd (15.1.6A.1). As there is only one dwelling proposed per lot, the permitted limit is not exceeded.	Y
b) The time of day when the extra vehicle movements will occur.	It is expected that vehicle movements will peak between 7-9am and 4-6pm on weekdays. The peak hourly vehicle movements is taken to be a seventh of the expected vehicle movements per day for analysis.	Y
c) The distance between the location of the vehicle movements take place and any adjacent properties.	The shared access carriageway between Ch. 40 to 100m is setback 3m from the boundary with Lot 7 DP 552961 but this is a pan handle ROW. The setback from the nearest residential boundary is 17m.	Y
d) The width and capability of any street to cope safely with the extra vehicle movements.	Yorke Road is classified Primary Collector, has a carriageway width of 7.5m and ADT 1,039. Fall View Road is a Secondary Collector, 8.3m wide and ADT 206. (Source Mobile Road App). Engineering Standards 2023 Table 3.2 gives Secondary Collector ADT 1,001 – 3,000, Primary Collector ADT 3,001 – 5,000 and lane width and movement lane widths of 2 x 3.5m. The additional traffic generated by the additional 20 lots is 20 x 7 = 140 one-way or 70 two-way ADT. In conclusion both connecting roads have capacity to accommodate the additional traffic.	Y
e) The location of any footpaths and the volume of pedestrian traffic on them.	The existing footpath on Yorke Road and Falls View Road will be extended into the site. Pedestrian traffic volumes are not expected to be high. However, if a direct connection was to be formed with the Esplanade Reserve then numbers could be higher.	Y
f) The sight distances associated with vehicle access onto the street.	The sight distance for traffic emerging from the site onto Yorke Road/Falls View Road meets Council Engineering Standards 2023.	Y
g) The existing volume of traffic on the streets affected.	Refer d) above.	Y
h) Any existing congestion or safety problems on the streets affected.	None known. Refer d) above.	Y
i) With respect to effects in local neighbourhoods, the ability to mitigate any adverse effects through the design of access, or the screening of vehicle movements, or limiting the times the vehicle movements occur.	The local roading network can accommodate the additional traffic. Refer d) above.	Y
j) With respect to the effects on through traffic on arterial roads, strategic roads and State Highways, any measures such as right turn bays, flush medians, left turn	Not applicable	Y

	deceleration tapers, etc. proposed to be installed on the road as part of the development to accommodate traffic turning into and out of the site.		
k)	The extent to which the activity may cause or exacerbate natural hazards or may be adversely affected by natural hazards, and therefore increase the risk to life, property and the environment.	The proposed access measures are outside the flood hazard and coastal hazard zones.	Y
l)	Whether providing or having access to bicycle parking, shower/changing facilities or alternative transportation would reduce the number of vehicle movements associated with the proposed activity.	Bicycle parking and shower/changing facilities are measures to be provided at the destination i.e. work, not home so not relevant to residential development. Alternative transportation such as taxis, buses and shared rides may reduce the number of vehicle movements but are not anticipated in the near future for a small community such as Haruru.	N/A
m)	The provision of safe access for pedestrians moving within or exiting the site.	Pedestrian movement within the subdivision will generally be via footpaths with some shared use of the access roads. The proposed roading alignment does not contain any sharp bends or summits that might otherwise reduce forward sight distance and compromise safety. Pedestrians entering and exiting the site will use a dedicated footpath connecting to the existing network.	Y

6 Earthworks

6.1 Proposed Earthworks

Proposed earthworks at time of subdivision mostly comprise re-shaping to blend the contours and reduce a localised natural high point by approximately 3.5m, surplus cut will be used to raise the level of lot 1 and to apply a pre-load across the building platform which will be removed off site once monitoring indicates settlement has stabilised. Earthworks will comprise:

- Recontouring
- Topsoil stripping for access roads
- Imported aggregate for access roads
- Trenches for drainage and utilities
- Pedestrian pathways

Development	Area (m^2)	Cut Volume (m^3)	Fill Volume (m^3)	Aggregate Volume (m^3)
Recontouring, access roads including Yorke Road upgrade	15,071	4,678	3247	1,795
Stormwater drainage trenching	-	2,693	2693	
Wastewater, power & Broadband trenching		930	930	
Pedestrian pathways	1,800	180	180	180
Pre-loading lot 1			900	
Total (FNDC definition)	**16,871**	**4,858**	**4,327**	**1,975**
Total (NRC definition)				

The estimate does not foresee notable volumes of cut-to-waste, although a small volume of unsuitable material is likely to be disposed of off-site at an appropriate facility.

The maximum cut occurs on lot 12 where recontouring lowers the summit by 3.5m.

6.2 Far North District Plan

Under the District Plan definition of earthworks both cut and fill are counted, plus aggregate volumes, but does not trenching, making the total 11,511m^3.

The scale of earthworks exceeds the 200m^3 per year per site maximum and 1.5m cut height for a Permitted activity (District Plan Rule 12.3.6.1.3). The proposed activity is Discretionary under Rule 12.3.6.3 because the earthworks do not comply with Rule 12.3.6.2.2 not exceeding 500m^3 not involving a cut or filled face exceeding 1.5m in height.

When considering a discretionary activity application, the Council will have regard to the assessment criteria set out under Section 12.3.7 and, where appropriate, Chapter 11.

The site does not appear on the FNDC Coastal Hazard maps CH1-CH17. As such, the provisions of Rule 12.4 Natural Hazards do not apply, and earthworks can be consented at Council's discretion.

Filling on lot 1 in the flood prone area is discussed in detail under Section 7 Natural Hazards.

Pursuant to Rule 13.6.8 of the FNDC District Plan, it is requested that consent for earthworks be incorporated into the subdivision consent.

6.3 FNDC Assessment Criteria

The proposed earthworks have been assessed against the Assessment Criteria in Section 12.3.7 of the Far North District Plan as follows:

Table 6.1 FNDC Earthworks Assessment Criteria

Criterion	Assessment	Acceptance
(a) the degree to which the activity may cause or exacerbate erosion and/or other natural hazards on the site or in the vicinity of the site, particularly lakes, rivers, wetlands and the coastline;	The proposed earthworks will not cause or exacerbate erosion with the controls recommended. Filling will prevent coastal flood waters from inundating lot 1 but will not exacerbate flooding elsewhere or on neighbouring properties.	Y
(b) any effects on the life supporting capacity of the soil;	None. Undeveloped areas will remain in grass with landscape plantings	Y
(c) any adverse effects on stormwater flow within the site, and stormwater flow to or from other properties in the vicinity of the site including public roads;	None. Stormwater will continue to discharge directly to the Waitangi River. The proposed stormwater reticulation system for the site including Yorke Road will ensure there are no uncontrolled flows onto neighbouring properties.	Y
(d) any reduction in water quality;	None. Erosion and sediment controls will be implemented during the earthworks operation. Concentrated stormwater flows will be managed to ensure no scour or erosion occurs.	Y
(e) any loss of visual amenity or loss of natural character of the coastal environment;	None. The proposed recontouring and lowering of the highest point will make housing less conspicuous. The visual amenity and natural character of the riverbank will not be affected, and the esplanade reserve will continue to provide a visual buffer.	Y
(f) effects on Outstanding Landscape Features and Outstanding Natural Features (refer to ***Appendices 1A*** and ***1B*** in ***Part 4***, and ***Resource Maps***);	Not applicable.	-
(g) the extent to which the activity may adversely affect areas of significant indigenous vegetation or significant habitats of indigenous fauna;	The riparian belt and the basalt escarpment are areas of site with significant indigenous flora. Earthworks will not extend into these areas, and they will be protected by erosion controls.	Y
(h) the extent to which the activity may adversely affect heritage resources, especially archaeological sites;	Refer Planner's report.	-
(i) the extent to which the activity may adversely affect the cultural and spiritual values of Maori, especially Sites of Cultural Significance to Maori and waahi tapu (as listed in ***Appendix 1F*** in ***Part 4***, and shown on the ***Resource Maps***);	Refer Planner's report.	-
(j) any cumulative adverse effects on the environment arising from the activity;	Refer Planner's report.	-
(k) the effectiveness of any proposals to avoid, remedy or mitigate any adverse effects arising from the activity;	Erosion and sediment controls will be implemented during the earthworks operation as per Auckland GD05 guidelines.	Y

(l) the ability to monitor the activity and to take remedial action if necessary;	Erosion and sediment controls will be monitored during the earthworks operation as per Auckland GD05 guidelines. Follow up action taken as necessary.	Y
(m) the criteria in ***Section 11.20 Development Plans*** in ***Part 2***.	Not applicable.	-
(n) the criteria (p) in Section 17.2.7 National Grid Yard.		

6.4 Northland Regional Plan

The threshold volumes under the Regional Plan are based on the location as provided in Table 15 of the plan, repeated below.

Table 15: Permitted activity earthworks thresholds

Location	Earthworks thresholds
Within 10m of a natural wetland, the bed of a continually or intermittently flowing river or lake	200m² of exposed earth at any time, and 50m³ of moved or placed earth in any 12-month period.
Within 10m of an inanga spawning site	200 m² of exposed earth at any time, and 50m³ of moved or placed earth in any 12-month period.
Catchment of an Outstanding Lake	2,500m² of exposed earth at any time.
Erosion prone Land	2,500m² of exposed earth at any time.
High-risk flood hazard area	50m³ of moved or placed earth in any 12-month period.
Coastal riparian and foredune management area	Excluding for coastal dune restoration, 200m² of exposed earth at any time.
Flood hazard area	100 m³ of moved or placed earth in any 12-month period.
Other areas	5,000m² of exposed earth at any time.

High-risk coastal hazard area is land that subject to effects of coastal erosion and inundation over 50yr.

High-risk flood hazard area is land where there is at least a 10% chance of river flooding occurring annually.

Flood hazard area is land that has a 1% chance in any year of being inundated due to high river flows.

The site boundary is set back 10m or greater from the river, hence there are no volume restrictions except for lot 1 which is mapped within the 10yr. river flood hazard zone. Forming the stormwater outfall at the northern end of the site is not expected to require earthworks in excess of 20m^3 within 10m of the river.

The earthworks volume on lot 1 will exceed the Controlled activity threshold of 50m^3 in a high-risk flood hazard area and 1,000m^3 in a flood hazard area, making the activity Discretionary under Rule C.8.3.4.

6.5 Earthworks Operations

Topsoil will be stripped and stockpiled for re-use within the development. Stockpile locations will be carefully chosen to reduce the risk of runoff entering water ways. Stockpile can be expected to quickly self-seed thereby stabilising the surface.

Earthworks will largely comprise recontouring and be carried out as a cut to fill operation. Fill depths greater than 0.5m across house platforms will be Engineered earth. Shallower fill depths are expected to be re-excavated at time of building and filled using compacted hardfill.

Surplus cut from the re-contouring will be placed on lot 1 and a haulage road will be formed to provide access.

6.6 Erosion and Sediment Control Measures

During construction it will be important for the contractor to control the potential mobilisation of silt to prevent it entering into any watercourses, to the greatest extent practicable. The bulk part of the earthworks is associated with recontouring cut to fill. The operation has the potential to expose a large area of disturbed soil. It will be important to limit exposed areas by replacing topsoil promptly and grass seed to stabilise. Similarly, for roading the prompt placement of the first layer pavement aggregate will ensure the area non-stabilised subgrade is minimised. Controls will predominantly comprise:

- Diversion drains
- Decanting earth bunds
- Silt fences
- Prompt stabilisation of earthworks areas
- Catchpit protection, deployed only at key stages of pavement construction operations
- Dust suppression

Best practice site controls are to be implemented during the works, as generally outlined in NRC publications and Auckland Council Guidance Document GD05 Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region: June 2016 (Incorporating Amendment 1, October 2018).

A preliminary erosion and sediment control plan and calculations for decanting earth bunds are appended.

7 Natural Hazards

7.1 Regulatory Framework

7.1.1 Resource Management Act

Under Section 2 of the Resource Management Act 1991, **natural hazard** means any atmospheric or earth or water related occurrence (including earthquake, tsunami, erosion, volcanic and geothermal activity, landslip, subsidence, sedimentation, wind, drought, fire, or flooding) the action of which adversely affects or may adversely affect human life, property, or other aspects of the environment.

Natural hazards listed in Section 71(3) of the Building Act 2004 include: erosion, falling debris, subsidence, inundation or slippage. We assess the susceptibility of this site to these potential hazards as:

Table 7.1 Natural Hazards Assessment

Erosion (including coastal erosion, bank erosion, and sheet erosion)	No with the stormwater and erosion controls proposed.
Falling debris (including soil, rock, snow, and ice)	No.
Subsidence (vertical settlement)	Yes, on lot 1
Inundation (including flooding, overland flow, storm surge, tidal effects, and ponding)	Yes, on lot 1 inundated from tidal flood waters is mapped for the 10% AEP event.
Slippage	Yes, lot 2 in ground stabilisation wall requires site specific geotechnical investigation and design at building consent stage. Unless proven by site specific geotechnical investigations; observe building restriction lines on lots and 3 – 8, 11, 15, 16, 19 – 21.

Lot 1 is on low-lying flood plain and is subject to river and coastal flood hazards. All other lots are free of flood hazards.

7.1.2 Northland Regional Council

Proposed Regional Plan Policy D.6.5 Flood Hazard Management – Development within Floodplains:

Development in flood hazard areas and continually or intermittently flowing rivers (including high-risk flood hazard areas) must not increase the risk of adverse effects from flood hazards on other property or another person's use of land or property.

Regional Policy Statement for Northland. 7.1.2 Policy – New subdivision and land use within 10yr. and 100yr. flood hazard areas:

New subdivision, built development (including wastewater treatment and disposal systems), and land use change may be appropriate within 10-year and 100-year[18] flood hazard areas provided all of the following are met:

(a) Hazardous substances will not be inundated during a 100-year flood event.

(b) Earthworks (other than earthworks associated with flood control works) do not divert flood flow onto neighbouring properties, and within 10-year flood hazard areas do not deplete flood plain storage capacity;

(c) A minimum freeboard above a 100-year flood event of at least 500mm is provided for residential buildings.

(d) Commercial and industrial buildings are constructed so as to not be subject to material damage in a 100 year flood event.

(e) New subdivision plans are able to identify that building platforms will not be subject to inundation and / or material damage (including erosion) in a 100-year flood event;

(f) Within 10-year flood hazard areas, land use or built development is of a type that will not be subject to material damage in a 100-year flood event; and

(g) Flood hazard risk to vehicular access routes for proposed new lots is assessed.

7.1.3 Policy – New subdivision, use and development within areas potentially affected by coastal hazards (including high risk coastal hazard areas):

Within areas potentially affected by coastal hazards over the next 100 years (including high risk coastal hazard areas), the hazard risk associated with new use and development will be managed so that:

(a) Redevelopment or changes in land use that reduce the risk of adverse effects from coastal hazards are encouraged;

(b) Subdivision plans are able to identify that building platforms are located outside high risk coastal hazard areas and these building platforms will not be subject to inundation and / or material damage (including erosion) over a 100-year timeframe;

(c) Coastal hazard risk to vehicular access routes for proposed new lots is assessed;

(d) Any use or development does not increase the risk of social, environmental or economic harm (from coastal hazards);

(e) Infrastructure should be located away from areas of coastal hazard risk but if located within these areas, it should be designed to maintain its integrity and function during a hazard event;

7.2 Flooding

7.2.1 **Regulative Framework**

The New Zealand Standard NZS4404:2010 'Land Development and Subdivision Engineering' states:

4.3.5.2 Freeboard

The minimum freeboard height additional to the computed top water flood level of the 1% AEP 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

Regional Policy Statement for Northland. Method 7.1.7 - Any new habitable dwelling has a minimum floor level of 3.3m above One Tree Point datum on the east coast.

7.2.2 Flood Mapping

NRC flood mapping shows that the inundation potential at the site due to River Flooding (100yr.+ CC) is identical to Coastal Flooding (100yrs.). This is because the site is tidal, and Sea Level Rise is the controlling factor. Coastal flooding is also subject to dynamic effects such wave run-up and wave surges due to atmospheric pressure changes which can be concentrated in an estuary setting.

Coastal flooding was modelled by Tonkin and Taylor Coastal Flood Hazard Assessment for Northland Region 2019-2020. The nearest location to the site is Point #66 'Waitangi Estuary' which was assessed as not subject to dynamic inundation. The projected CFHZ2 2130 (+1.2m SLR) is 2.8m OTP, which with a 0.5 freeboard addition matches the Regional Policy Statement level.

The Tonkin and Taylor report gives the offset between One Tree Point datum (OTP) and New Zealand Vertical Datum 2016 (NZVD2016) as -0.075m for the nearest location at Opua Wharf.

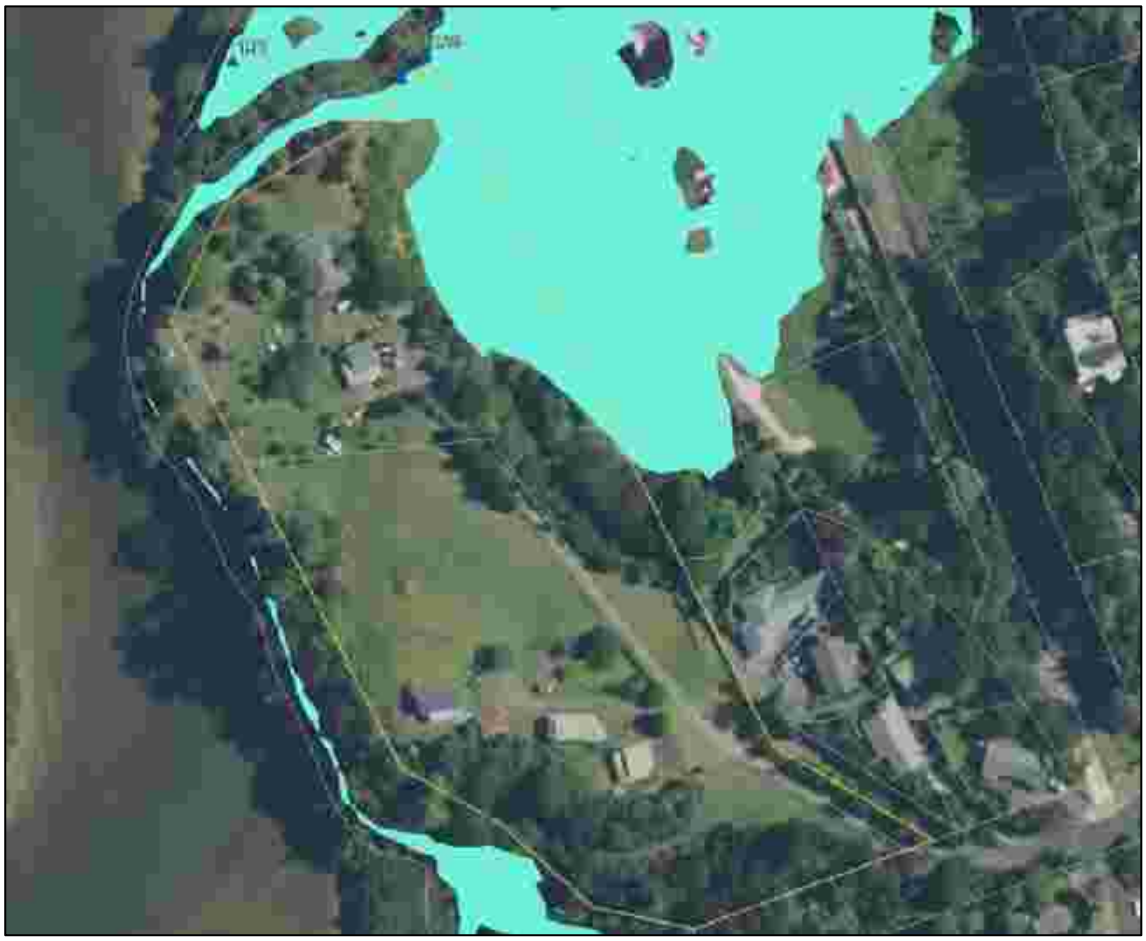


Figure 6: Coastal Flood Inundation (CFHZ2 2130 1% AEP with 1.2m SLR) Surveyed flood levels NZVD

7.2.3 Minimum Floor Level for Lot 1

As per New Zealand Standard NZS4404:2010; habitable dwellings (including attached garages) shall have a minimum freeboard allowance of 0.5m above the computed flood level for the 1% AEP design storm. For this site Coastal Flooding governs in the long term. Hence the minimum floor level for lot 1 shall be CFHZ2 2130 (+1.2m SLR) 2.8m OTP + 0.5m freeboard = 3.3m OTP.

Allow an offset between One Tree Point datum (OTP) and New Zealand Vertical Datum 2016 (NZVD2016) of -0.075m.

The existing ground level across lot 1 varies RL 2 - 3m NZVD. Raising the building platform level will require the placement of engineered fill and the application of a geotechnical pre-load to manage induced settlement.

We recommend a consent notice be placed on the title of lot 1 for an engineer familiar with Coastal Flood hazard processes to confirm the habitable floor level at time of development.

7.2.4 **Flood Risk to Other Properties**

Under rule D.6.5 of the Regional Plan, development in flood hazard areas must not increase the risk of adverse effects from flood hazards on other property or another person's use of land or property. As the flood area for lot 1 is within the estuarine flood plain for the marine management zone, the volume of the basin is negligible in comparison to the volume of the sea. Hence infilling proposed for the foundation of lot 1 will not adversely influence the flood levels experienced by neighbouring properties.

8 Stormwater Management

8.1 Impermeable Surfaces

The estimated impervious surface areas following residential development of the site are presented below.

Roofs	3,780m^2
On-lot parking and vehicle access	630m^2
Access roads	2,155m^2
Total Impervious	**6,565m^2**
Total Site Area	**22,696 – (2,496+794 esplanade to vest) = 19,406m^2**
Impervious Percentage	**33.8%**

The above estimate assumes an average roof area and parking of 180m^2 and 30m^2 respectively.

Under rule 7.6.5.1.6 of the Far North Operative Plan, impermeable surface of 50% for the Residential Zone are a permitted activity.

Lots 3 to 21 range in size 301 to 404m^2, but with common access areas shared as follows:

Lot 200 (7,850m^2) be held as to 20 undivided one twenty-fourth shares by the owners of lots 2 – 21, (i.e. 327m^2 each), and four by the owners of lot 1, (i.e. 1,308m^2).

Lot 100 (95m^2) be held as to 3 undivided one third shares by the owners of lots 19 – 21, (i.e. 32m^2 each).

Lot 101 (242m^2) be held as to 3 undivided one third shares by the owners of lots 12 – 18, (i.e. 81m^2 each).

Lot 102 (419m^2) be held as to 8 undivided one third shares by the owners of lots 4 – 11, (i.e. 53m^2 each).

District Plan definition in the case of jointly owned access lots that contain impermeable surfaces within their boundaries, the total area of the impermeable surfaces are to be divided equally and considered as parts of the various sites.

Lot 307 (301m^2) will be worst disadvantaged. For lot 101 allow 225m^2 impermeable surfaces and for lot 200 allow 1,566m^2. Total lot area becomes 301 + 81 + 327 = 709m^2. Total impermeable surfaces estimated at roof 180 + parking 30 + 225/3 (lot 101) + 1,566/24 (lot 200) = 350m^2. Percentage impermeable =350/709 = 49.4%.

8.2 Regulative Framework

Rule C.6.4.2 of the Northland Regional Plan 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 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.

8.3 Council Engineering Standards 2023

The FNDC Engineering Standards were recently updated and Council is encouraging their use. The pertinent sections relating to stormwater management are:

Chapter 4: Stormwater and Drainage

4.1.3 Performance Standards

e. The primary stormwater system shall be capable of conveying 10% AEP design storm events without surcharge (see Section 4.3.9 Hydrological Design Criteria).

h. Development shall not increase peak discharge rates to receiving environment. An increase may be acceptable for large events where it is demonstrated that there are no adverse effects (including potential, future, or cumulative effects), on the environment or downstream properties as a result of the increase.

i. The stormwater system shall provide the required amount of treatment through the use of low impact design and sustainable solutions (See Sections 4.3.20 Soakage Devices and 4.3.21 Stormwater Treatment and Detention Devices.

4.1.6. Managing Effects of Land Use on Receiving Environments

Hydrological balance can be partly maintained by limiting the maximum rate of discharge and peak flood levels for post-development to that at pre-development levels and enabling infiltration to minimise impacts on base flow and ground water recharge.

Peak flow management can be achieved using detention storage, utilising extended duration, for the duration of a limited peak flow event. Therefore, in the absence of more detailed assessment of stream stability, the discharges from detention devices into a stormwater network shall be constrained to 80% of pre-development peak flow rate. These constraints may be relaxed, subject to detailed assessments and hydrological/hydraulic modelling of the catchment being provided.

4.2.1. Discharge into a Stream or Watercourse

All new and existing discharges to an existing FNDC owned and / or maintained watercourse(s) located within approximately 500m require specific approval from the Stormwater Manager before proceeding with design details and, if approved, FNDC shall apply appropriate conditions to the discharge.

Section 4.2.5. Discharge to Land

Subject to the requirements of the NRC Regional Plans, discharge of stormwater from the development onto land is permitted provided that:

a. Flooding levels shall not be increased due to the development,

b. New outlets to any low-lying areas shall be provided or existing outlets retained,

c. Dispersal of concentrated flow from the development shall be designed to occur at the shortest practicable distance and before a concentrated overland discharge to a neighbouring property occurs and,

d. An acceptable rate of dispersed discharge from stormwater runoff at the boundary is <2L/sec/m (e.g. flow can be managed via dispersal swale or trench).

4.3.8. System Design

Table 4-1: Minimum Design Summary

Current rainfall (i.e. not climate change adjusted) shall be used for the following:

• Determining pre-development stormwater runoff flows and volumes for use in combination with calculated post development flows to determine stormwater treatment (quantity and quality) requirements.

Climate change adjusted rainfall shall be used for the following:
• Determining post-development stormwater runoff flows and volumes for stormwater infrastructure design.

Flood Control (1% AEP event). Detention required, limiting the post-development 1% AEP event flow rates to 80% of the pre-development 1% AEP event flow rates.

Flow attenuation (Attenuation of the 50% and 20% AEP events). Limit the post-development 50% and 20% AEP event flow rates to 80% of the pre-development flows through controlled attenuation and release. Typically, always required in the upper catchment and sometimes not required where development site is located in proximity to the catchment outlet, discharging to a watercourse with sufficient network capacity, and where flow attenuation may worsen flooding hazards due to relative timing of peak flows. This is subject to assessment demonstrating no negative impacts would occur. If the proposed stormwater discharge is into a tidal zone, then no attenuation is required.

Table 4.2 Design Rainfall Event. For primary design flows, piped network no surcharge for 50% AEP, discharge within 0.3m of the lid level for 20% AEP. For secondary systems, overland flowpaths, watercourse 1% AEP.

8.4 Runoff Effects

Runoff effects for both a 1% and 10% AEP 10-minute event were assessed for changes in flow rate using the Rational Method. Rainfall intensities are taken from the NIWA HIRDs database using the RCP 6.0 for the period 2081-2100. Runoff Coefficients were taken from Council Engineering Standards 2023 Table 4.3. for Type C soils. It is assumed that each of the 21 lots following development will have average impermeable surfaces of 25m^2 landscaped garden (conservative), 180m^2 roof area and 30m^2 parking. The piped stormwater system will have a short time of concentration, so we adopt 10 minutes being the lowest practicable. Using the Rational Method, peak flowrates for in a 10 min storm are estimated to increase by 70 L/s and 105 L/s for the 10% and 1% AEP events respectively. Refer summary below.

Table 8.1 Pre-Development Runoff

Component	Area (mm^2)	C	I_{10} (mm/hr)	Q_{10} (L/s)	I_{100} (mm/hr)	Q_{100} (L/s)
Driveway gravel	1,200	0.8	127	33.9	190	50.7
Roofs	530	0.96	127	17.9	190	26.9
Bush	4,150	0.48	127	70.3	190	105.1
Grass medium soakage soil	16,816	0.59	127	350.0	190	523.6
Total	**22,696**			**472.1**		**706.3**

Table 8.2 Post-Development Runoff

Component	Area (mm^2)	C	I_{10} (mm/hr)	Q_{10} (L/s)	I_{100} (mm/hr)	Q_{100} (L/s)
Access roading and visitor parking sealed or concrete	2,155	0.96	127	73.0	190	109.2

On-lot parking concrete	630	0.96	127	21.3	190	31.9
Roofs	3,780	0.96	127	128.0	190	191.5
Bush	4,150	0.48	127	70.3	190	105.1
Landscaped gardening	525	0.59	127	10.9	190	16.3
Grass medium soakage	11,456	0.59	127	238.4	190	356.7
Total	**22,696**			**542.0**		**810.8**
Increase				**69.9**		**104.6**

The site discharges into the Waitangi Estuary that is overlayed by NRC as a Marine Management Area (MM2). There are properties and buildings downstream that are mapped as being susceptible in 10% and 1% AEP events. However, because the basin volume is fixed to the sea, flood levels downstream are governed by tidal levels and not by increased runoff generated by the proposed development.

The internal access roading and all lots will have stormwater connections to a central collector pipe discharging to the north into a natural tidal basin off the main river. Providing stormwater connections in this manner is normal practice for the Residential zone and particularly important for small residential lots where discharge to land within the section is often impractical and can be a source of nuisance to neighbours, and in the case of this site the esplanade reserve.

To manage the risk of scour, the stormwater outfall will require an energy dissipator or diffuser such as that shown in the Engineering Standards Sheet 35 appended. This will form part of detailed design.

Stormwater from the first part of the access within the unformed Council Road will use the existing cesspit outlets connecting to the Council Drainage system to the south of the site.

An existing culvert from neighbouring Lot 7 DP552961 crosses the shared access at Ch. 65m and continues across lot 2 with open drain outfall to the river. Cesspits at the low point at Ch. 75m on the shared access will share the outfall. Stormwater design will include checking the capacity and scour protection requirements for the outfall which is on moderately steep sloping ground.

As per Engineering Standards Table 4.2 the primary stormwater network will be designed to convey the 50% AEP design storm without surcharge.

Achieving hydrological balance is not necessary since the site will be discharging directly into a tidal basin.

The standards allow for peak discharge rates to the receiving environment to be increased for large events where it is demonstrated that there are no adverse effects (including potential, future, or cumulative effects), on the environment or downstream properties as a result of the increase. The outfall will discharge directly into a natural tidal basin at the northern end of the site. Directing stormwater in this manner is expected to assist in keeping the basin flushed of sediment build-up which is a worrying occurrence in other areas along the river margins.

Stormwater runoff from residential development is not expected to be a source of contamination. All roading and parking areas will sealed or concreted with cesspit collection before entering the system. The addition of 'EnviroPod' cesspit filters are a sustainable low impact design solution for catching litter, debris, sediment and pollutants should this be a concern. Roof water is clean and devices to capture leaf debris which is a natural organic material are not warranted.

8.5 FNDC Assessment Criteria

The proposed stormwater management has been assessed against the Assessment Criteria in Section 13.10.4 of the Far North District Plan as follows:

Table 8.3 – FNDC Subdivision Rules 13.10.4 Assessment Criteria

Criterion	Comment	Acceptance
(a) Whether the application complies with any regional rules relating to any water or discharge permits required under the Act, and with any resource consent issued to the District Council in relation to any urban drainage area stormwater management plan or similar plan.	The proposed stormwater management complies with the Proposed Regional Plan permitted activity rules.	Y
(b) Whether the application complies with the provisions of the Council's "Engineering Standards and Guidelines" (2004) - Revised March 2009 (to be used in conjunction with NZS 4404:2004).	The proposed stormwater management complies with Council's "Engineering Standards and Guidelines" (2004) - Revised March 2009	Y
(c) Whether the application complies with the Far North District Council Strategic Plan - Drainage.	N/A	Y
(d) The degree to which Low Impact Design principles have been used to reduce site impermeability and to retain natural permeable areas.	Natural water courses will be retained. All roading and parking areas will sealed or concreted with cesspit collection. 'EnviroPod' cesspit filters are a sustainable low impact design solution for catching litter, debris, sediment and pollutants should this be a concern.	Y
(e) The adequacy of the proposed means of disposing of collected stormwater from the roof of all potential or existing buildings and from all impervious surfaces.	Stormwater from shared accessways, driveways and roofs will be collected and discharged via a central stormwater reticulation system.	Y
(f) The adequacy of any proposed means for screening out litter, the capture of chemical spillages, the containment of contamination from roads and paved areas, and of siltation.	Litter and sediment from the roads will be Captured via stormwater catchpits. 'EnviroPod' cesspit filters are a sustainable low impact design solution for catching litter, debris, sediment and pollutants should this be a concern.	Y
(g) The practicality of retaining open natural waterway systems for stormwater disposal in preference to piped or canal systems and adverse effects on existing waterways.	Natural flowpaths on the site will be retained.	Y
(h) Whether there is sufficient capacity available in the Council's outfall stormwater system to cater for increased run-off from the proposed allotments.	There will be no appreciable increase in runoff into the Council stormwater system on Yorke Road. All lots will be provided with a connection to the subdivision drainage system.	Y
(i) Where an existing outfall is not capable of accepting increased run-off, the adequacy of proposals and solutions for disposing of run-off.	There is adequate capacity in the receiving waters for additional flow from the site.	Y
(j) The necessity to provide on-site retention basins to contain surface run-off where the capacity of the outfall is incapable of accepting flows, and where the outfall has limited capacity, any need to restrict the rate of discharge from the subdivision to the same rate of discharge that existed on the land before the subdivision takes place.	Retention basins are not required.	Y
(k) Any adverse effects of the proposed subdivision on drainage to, or from, adjoining properties and mitigation measures proposed to control any adverse effects.	Stormwater design will incorporate existing runoff from neighbouring property. The site has always drained directly to the river and this will continue, albeit with a single centralised outfall.	Y

(l) In accordance with sustainable management practices, the importance of disposing of stormwater by way of gravity pipelines. However, where topography dictates that this is not possible, the adequacy of proposed pumping stations put forward as a satisfactory alternative.	No stormwater pumping is proposed.	Y
(m) The extent to which it is proposed to fill contrary to the natural fall of the country to obtain gravity outfall; the practicality of obtaining easements through adjoining owners' land to other outfall systems; and whether filling or pumping may constitute a satisfactory alternative.	Natural flow paths will be maintained.	Y
(n) For stormwater pipes and open waterway systems, the provision of appropriate easements in favour of either the registered user or in the case of the Council, easements in gross, to be shown on the survey plan for the subdivision, including private connections passing over other land protected by easements in favour of the user.	Stormwater easements are detailed on the subdivision plan.	Y
(o) Where an easement is defined as a line, being the centre line of a pipe already laid, the effect of any alteration of its size and the need to create a new easement.	Easements have not been defined as a line.	-
(p) For any stormwater outfall pipeline through a reserve, the prior consent of the Council, and the need for an appropriate easement.	A Stormwater easement for the pipeline through the esplanade reserve at the northern end of the sites is detailed on the subdivision plan. The need for prior consent of the Council is noted.	-
(q) The need for and extent of any financial contributions to achieve the above matters.	N/A	-
(r) The need for a local purpose reserve to be set aside and vested in the Council as a site for any public utility required to be provided.	N/A for the proposed stormwater system.	-

9 Water Supply

9.1 Potable Water Supply

The Site is only partially in the "Area of Benefit" for water reticulation. While the existing dwellings on the site are reticulated, it was advised by FNDC in a meeting with Haigh Workman on 9 January 2024, that due to network capacity restrictions, the new development will require onsite water supply.

Onsite water supply is viable for the proposed development. Two options are identified as prospective water supply solutions:

- Each lot has it's own roof water collection tank minimum 25,000L. Due to the small lot areas, tanks will have to be buried beneath the parking areas. The tanks will need to be designed to avoid the effects of floatation due to groundwater level, and to avoid the risk associated with undermining the geotechnical integrity of adjacent lots.
- A community water supply tank/s can be constructed in the common aacess area of the Site. The holding volume will need to be a minimum of 550m^3.

Determination and details of the water supply infrastructure are to be finalised at Engineering Plan Approval stage.

9.2 Fire Fighting

Council Engineering Standards require a water supply that is adequate for firefighting purposes. Where there is currently no reticulated water supply, then each residential lot will be responsible for providing adequate on-site firefighting supply.

For a single-family home without a sprinkler system in a non-reticulated supply area, the New Zealand Fire Service (NZFS) Fire Fighting Water Supplies Code of Practice SNZ PAS 4509:2008 recommends for a firefighting supply a minimum water storage capacity of 45m^3 within 90m of the dwelling, fitted with an adequate means for extracting the water from the tank.

There is adequate manoeuvrability for rigid 8m fire truck within the proposed ROWs.

9.2.1 Alternative to Fire Fighting Supply

The Code (SNZ PAS 4509:2008) specifically allows for alternative methods to be used in meeting the Code requirements, if there is approval from an appropriate person nominated by the NZFS National Commander. Clause 4.4 of the Code states that:

- Fire engineers or similar competent persons may use alternative methods, such as those detailed in Appendix H and Appendix J to determine firefighting water supplies. To comply with this code of practice, such alternatives must be submitted for approval to the person(s) nominated by the National Commander. The person(s) so nominated will approve these cases on confirmation that the method and calculations used are correctly applied.

- Alternative methods will need to show that the calculated firefighting water supply makes allowances for tactical flow rates (that is, the amount needed above a theoretical amount to absorb the released heat for operational effectiveness).

The procedure to be followed in the case of an alternative fire-fighting supply is as follows:

- The competent person should submit a firefighting facilities checklist (FFFC), with a scale site map showing contours and proposed alternatives to Table 2 with rationale for assessment to NZFS.

If the proposed supply is approved by a nominated NZFS person, Council will accept the FFFC and compliance with the Code will be achieved.

NZFS considers that a 'one size fits all' volume is not appropriate in all circumstances. There are alternatives to firefighting couplings, but firefighters are not expected to lift pumps or hoses onto the top of water tanks.

It is our experience that NZFS approve developments where each lot has a 25,000L tank when other tanks are within the vicinity of each dwelling.

Given the small lot sizes and availability of common access space the option is available to provide a centralised firefighting supply which would dramatically reduce the number of tanks required. The standards allow for the firefighting supply to be up to 90m from the building and firefighting mains where this cannot be achieved. With this in mind, a centralised supply could be located next to the visitor parking with a fire main fitted with a fire coupling extending along the central access.

10 Wastewater

10.1 Generation Volume

FNDC Engineering Standards provides a method for estimating reticulated sewers flows, but not low pressure pumped systems.

For reticulated sewers, the assume a flow allowance is 200L/person/day and a household occupancy of 4 (Table 5-1). Peaking factors of 2.5 and 5.0 are to be used for Dry weather peak daily flow and Peak wet weather flow respectively. Calculations of the wastewater flowrates are as follows:

- Average Dry Weather Flow (ADWF): 200 x 21 x 4 /86400 = 0.1944L/s
- Dry Weather Peak Daily Flow: 0.1944 x 2.5 = 0.486L/s
- Peak Wet Weather Flow (PWWF): 0.1944 x 5 = 0.972L/s

The FNDC engineering standards are comparatively conservative, plus a reticulated water supply flow allowance has been used, roof water supply is lower at 140L/p/d. If the Watercare Standard: Auckland Code of Practice for land Development and Subdivision is used to calculate expected wastewater generation volume, the peak design flow is smaller.

It is assumed that each proposed lot will be developed with a four-bedroom home with standard fixtures. Table 5.1.2 recommends a design occupancy of three per house and an allowance of 180L/person/day.

Calculations of the wastewater flowrates using the Watercare standard are as follows:

- Average Dry Weather Flow (ADWF): 180 x 21 x 3 /86400 = 0.1313L/s
- Self-Cleansing Design Flow: 0.1313 x 3.0 = 0.394L/s
- Peak Design Flow (PDWF): 0.1313 x 6.7 = 0.879L/s

10.2 Low Pressure Sewer

The Council Engineering standards allow pressure sewer systems but do include a method for estimating pressure sewers flows.

A preliminary design was carried out by Ecoflow, refer design report appended. The design used a hydraulic flow allowance based on 3 people/lot and 200L/person/day which is less than Council Engineering Standard Section 5.2.2 Design Criteria, but a higher occupancy of 4 persons.

Another feature of the Ecoflow design is their development of a Probability Method for determining peak flow rates in pressure sewerage systems. A key assumption is the predicted maximum daily number of pumps running at once versus the number of pumps connected. Another feature of pumped systems is the smoothing of peaks, due to the buffering provided by storage within the pump chambers. I.e., the pump does not start every time a toilet is flushed.

The maximum dynamic pressure head is 30.7m which is well within the recommended operating maximum for a EOne pump of 56m. Accumulated retention time is 2.43 hrs. once fully developed. The average daily flow was 15,750L or (15,750/86400) 0.1823L/s. Maximum flow was estimated allowing for 5 pumps running simultaneously, each pumping 0.58L/s giving a combined flow of total of 2.9L/s. Although it should be noted that the operating sump in the tank requires a volume of just 40L to start the pump which then runs for only

one minute. So whilst the instantaneous peak flow might appear high, it will likely only be sustained for a very short period of around 1 minute.

10.3 System Capacity

The existing sewer line on Yorke Road is a 150mm gravity main feeding into a pumpstation located at the Haruru Falls campground. The line collects wastewater from approximately 140 existing dwellings. The line continues as a pressurised 200mm diameter. It is improbable that the proposed development warrants a pipe upgrade.

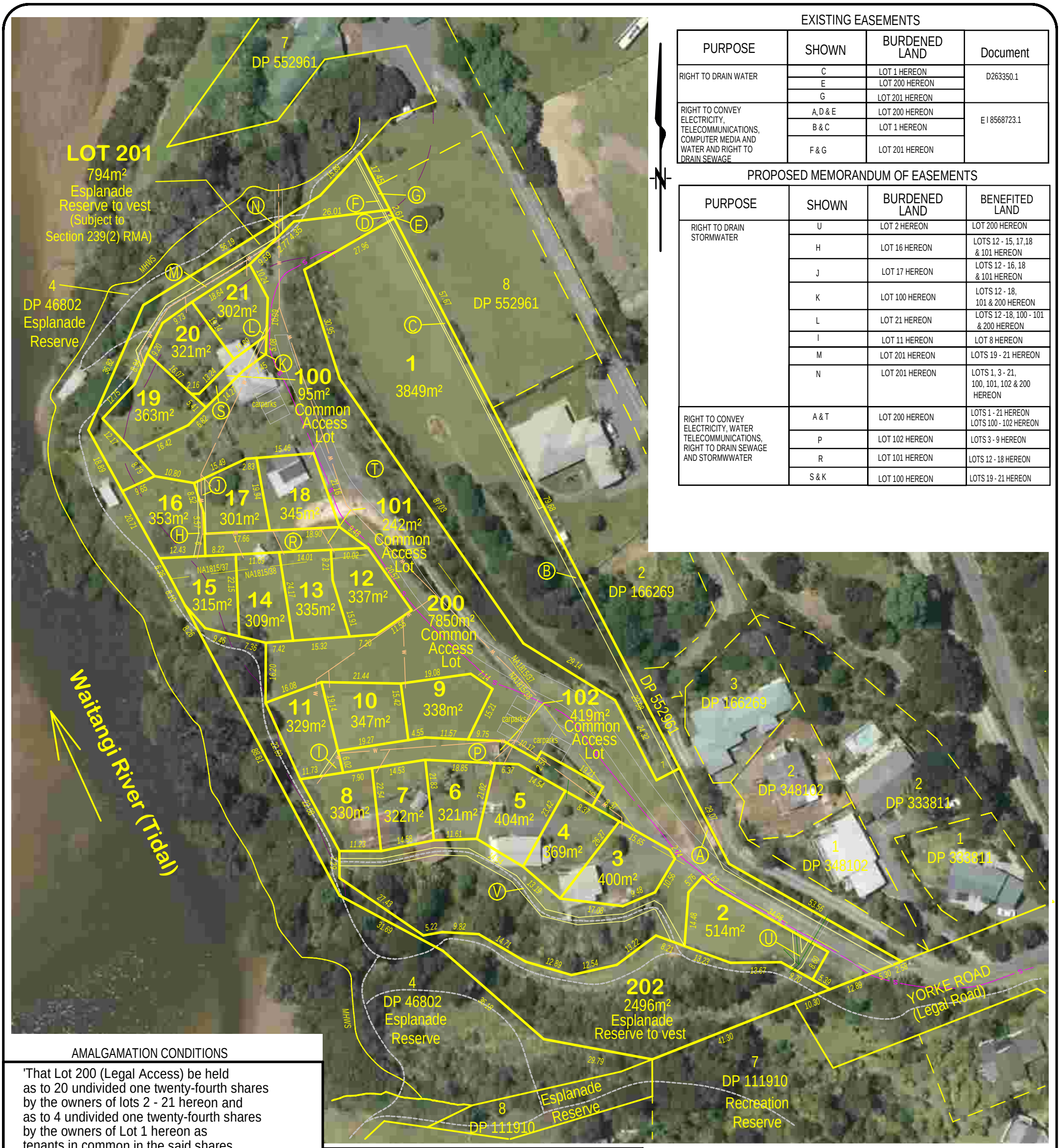
The physical connection will be at the Council manhole at the entrance to the site. The ground level at the indicated location for the manhole is approximately RL 27m and Council records give the as IL 23.68m. If the receiving manhole is this deep then the pressure main shall be graded out to enter the base of the manhole in such a way that it can discharge directly towards the downstream gravity pipe, minimizing disturbance to flows and the likelihood of creating gases. If this is not practicable an internal manhole drop shall be designed such that the flow is again discharged directly towards the downstream gravity pipe.

10.4 Connection to the Network

Each lot will have a proprietary Council approved on-site pump chamber such as EOne connecting to a dedicated Council approved boundary kit installed at time of subdivision.

Appendix A – Drawings

Drawing No.	Title	Scale
24653	Williams and King – Proposed subdivision of Lots 2 & 3 DP 46802 dated August 2025	1: 1,000
22 322/P01	Existing Site Plan	1: 1,000
22 322/P02	Overal Proposed Site Plan	1: 1,000
22 322/P03	Proposed Site Plan Ch. 0 to 180m	1: 500
22 322/P04	Proposed Site Plan Ch. 120 to 295m	1: 500
22 322/P05	Cut/Fill Plan	1: 1,000
22 322/ESCP01	Erosion & Sediment Control Plan	1: 1,000
22 322/DE01	Erosion & Sediment Control Details	N.T.S
22 322/LS01	Longitudinal Section Ch. 0 to 160m	1: 500
22 322/LS02	Longitudinal Section Ch. 140 to 295m	1: 500
22 322/CS01	Cross Sections Ch. 0 to 50m	1: 250
22 322/CS02	Cross Sections Ch. 60 to 110m	1: 250
22 322/CS03	Cross Sections Ch. 120 to 170m	1: 250
22 322/CS04	Cross Sections Ch. 180 to 230m	1: 250
22 322/CS05	Cross Sections Ch. 240 to 290m	1: 250
22 322/CS06	Cross Sections Ch. 295m	1: 250
22 322/CS07	Cross Sections Mew 1 Ch. 0 to 20m	1: 250
22 322/CS08	Cross Sections Mew 1 Ch. 0 to 50m	1: 250
22 322/CS09	Cross Sections Mew 1 Ch. 60 to 72m	1: 250
22 322/CS010	Cross Sections Mew 2 Ch. 0 to 50m	1: 250
22 322/CS11	Cross Sections Mew 3 Ch. 0 to 50m	1: 250
22 322/G02	Geotechnical Investigation Site Plan	1: 750
Sheet 35		



EXISTING EASEMENTS

PURPOSE	SHOWN	BURDENED LAND	Document
RIGHT TO DRAIN WATER	C	LOT 1 HEREON	D263350.1
	E	LOT 200 HEREON	
	G	LOT 201 HEREON	
RIGHT TO CONVEY ELECTRICITY, TELECOMMUNICATIONS, COMPUTER MEDIA AND WATER AND RIGHT TO DRAIN SEWAGE	A, D & E	LOT 200 HEREON	E I 8568723.1
	B & C	LOT 1 HEREON	
	F & G	LOT 201 HEREON	

PROPOSED MEMORANDUM OF EASEMENTS

PURPOSE	SHOWN	BURDENED LAND	BENEFITED LAND
RIGHT TO DRAIN STORMWATER	U	LOT 2 HEREON	LOT 200 HEREON
	H	LOT 16 HEREON	LOTS 12 - 15, 17,18 & 101 HEREON
	J	LOT 17 HEREON	LOTS 12 - 16, 18 & 101 HEREON
	K	LOT 100 HEREON	LOTS 12 - 18, 101 & 200 HEREON
	L	LOT 21 HEREON	LOTS 12 -18, 100 - 101 & 200 HEREON
	I	LOT 11 HEREON	LOT 8 HEREON
	M	LOT 201 HEREON	LOTS 19 - 21 HEREON
	N	LOT 201 HEREON	LOTS 1, 3 - 21, 100, 101, 102 & 200 HEREON
RIGHT TO CONVEY ELECTRICITY, WATER TELECOMMUNICATIONS, RIGHT TO DRAIN SEWAGE AND STORMWWATER	A & T	LOT 200 HEREON	LOTS 1 - 21 HEREON LOTS 100 - 102 HEREON
	P	LOT 102 HEREON	LOTS 3 - 9 HEREON
	R	LOT 101 HEREON	LOTS 12 - 18 HEREON
	S & K	LOT 100 HEREON	LOTS 19 - 21 HEREON

AMALGAMATION CONDITIONS

'That Lot 200 (Legal Access) be held as to 20 undivided one twenty-fourth shares by the owners of lots 2 - 21 hereon and as to 4 undivided one twenty-fourth shares by the owners of Lot 1 hereon as tenants in common in the said shares and that individual Records of Title be issued in accordance therewith.
See .....

'That Lot 100 (Legal Access) be held as to 3 undivided one third shares by the owners of lots 19 - 21 hereon as tenants in common in the said shares and that individual Records of Title be issued in accordance therewith.
See .....

'That Lot 101 (Legal Access) be held as to 7 undivided one seventh shares by the owners of lots 12 - 18 hereon as tenants in common in the said shares and that individual Records of Title be issued in accordance therewith.
See .....

'That Lot 102 (Legal Access) be held as to 8 undivided one eighth shares by the owners of lots 4 - 11 hereon as tenants in common in the said shares and that individual Records of Title be issued in accordance therewith.
See .....

EASEMENTS TO BE CANCELLED

'Easement Documents T635079 and T633534 are to be cancelled'

PROPOSED EASEMENTS IN GROSS

PURPOSE	SHOWN	BURDENED LAND	GRANTEE
RIGHT OF WAY (PEDESTRIAN)	V	LOT 200 HEREON	FNDC

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This plan and accompanying report(s) have been prepared for the purpose of obtaining a Resource Consent only and for no other purpose. Use of this plan and/or information on it for any other purpose is at the user's risk

Local Authority: Far North District Council
Total Area: 2.2696ha
Comprised in: NA1815/37 & NA1815/38
Origin of Levels:
Levels in terms of:
Contour interval is:

0 10 20 30 40 50 60 70 80m

Prepared For: Yorke Road Developments Ltd

WILLIAMS AND KING
Registered Land Surveyors, Planners & Land Development Consultants
Ph: (09) 407 6030
Email: Kerikeri@saps.co.nz
27 Hobson Ave,
PO Box 937, Kerikeri

PROPOSED SUBDIVISION OF LOTS 2 & 3 DP 46802

AREAS AND MEASUREMENTS SUBJECT TO FINAL SURVEY

	Name	Date
Survey		
Design		
Drawn	W & K	Aug 2025
Ver 1		

ORIGINAL SCALE 1:1000 SHEET SIZE A3

FILE 24653

111 & 115 Yorke Road
Haruru
East Property Investments Ltd



Locality Plan

DRAWING REGISTER

Drawing No.	Title 01	Revision No.	Revision Date	Revision No.	Revision Date	Revision No.	Revision Date	Revision No.	Revision Date
P01	EXISTING SITE PLAN	A	01/10/2025						
P02	OVERALL PROPOSED SITE PLAN	A	01/10/2025						
P03	PROPOSED SITE PLAN	A	01/10/2025						
P04	PROPOSED SITE PLAN	A	01/10/2025						
P05	CUT/FILL PLAN	A	01/10/2025						
ESCP01	EROSION AND SEDIMENT CONTROL PLAN	A	01/10/2025						
DE01	EROSION AND SEDIMENT CONTROL DETAILS	A	01/10/2025						
LS01	LONGITUDINAL SECTION	A	01/10/2025						
LS02	LONGITUDINAL SECTION	A	01/10/2025						
CS01	CROSS SECTIONS	A	01/10/2025						
CS02	CROSS SECTIONS	A	01/10/2025						
CS03	CROSS SECTIONS	A	01/10/2025						
CS04	CROSS SECTIONS	A	01/10/2025						
CS05	CROSS SECTIONS	A	01/10/2025						
CS06	CROSS SECTIONS	A	01/10/2025						
CS07	CROSS SECTIONS	A	01/10/2025						
CS08	CROSS SECTIONS	A	01/10/2025						
CS09	CROSS SECTIONS	A	01/10/2025						
CS10	CROSS SECTIONS	A	01/10/2025						
CS11	CROSS SECTIONS	A	01/10/2025						

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Project No. 22 322

FOR CONSENT
01/10/2025



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A	01/10/2025	FOR CONSENT	AS	TMA

DWG EXISTING SITE PLAN

A3 SCALE 1:1000 0 20m 50m

Date 06/05/2025

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RC no.

Stage

Dwg No. P01

Sheet No. 1 of 20



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DWG OVERALL PROPOSED SITE PLAN

A3 SCALE Not to Scale | Date 06/05/2025

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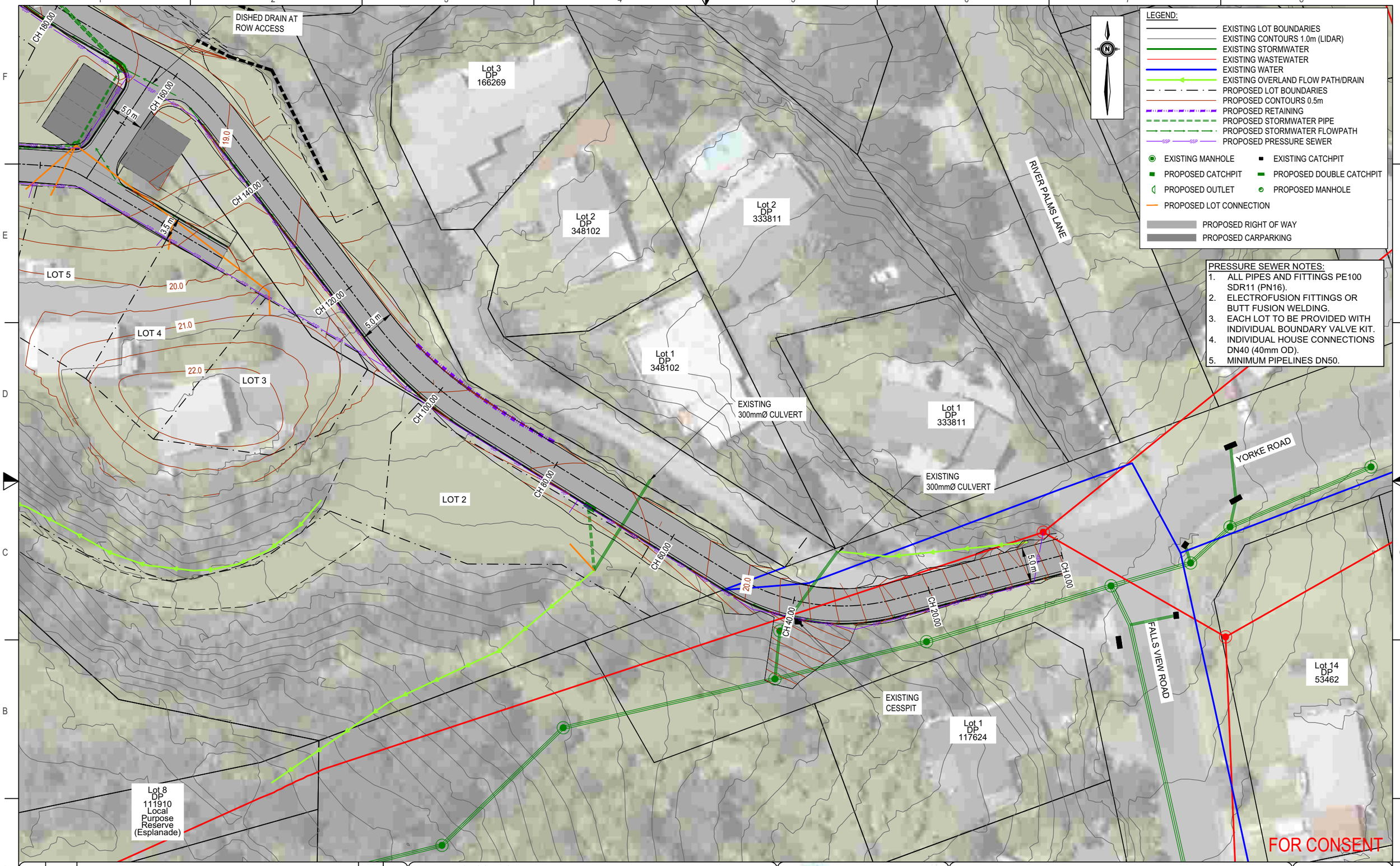
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Stage

Dwg No. P02

Sheet No. 2 of 20



Rev	Date	Description	By	Checked
A	01/10/2025	FOR CONSENT	AS	TMA

DWG PROPOSED SITE PLAN
CH. 00.00 - CH. 180.00

A3 SCALE 1:1000 0 20m 50m

Date 06/05/2025

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Project No. 22 322

RC no.

Stage

Dwg No. P03

Sheet No. 3 of 20

PRESSURE SEWER NOTES:
1. ALL PIPES AND FITTINGS PE100 SDR11 (PN16).
2. ELECTROFUSION FITTINGS OR BUTT FUSION WELDING.
3. EACH LOT TO BE PROVIDED WITH INDIVIDUAL BOUNDARY VALVE KIT.
4. INDIVIDUAL HOUSE CONNECTIONS DN40 (40mm OD).
5. MINIMUM PIPELINES DN50.

LEGEND:
- EXISTING LOT BOUNDARIES
- EXISTING CONTOURS 1.0m (LIDAR)
- EXISTING STORMWATER
- EXISTING WASTEWATER
- EXISTING WATER
- EXISTING OVERLAND FLOW PATH/DRAIN
- PROPOSED LOT BOUNDARIES
- PROPOSED CONTOURS 0.5m
- PROPOSED RETAINING
- PROPOSED STORMWATER PIPE
- PROPOSED STORMWATER FLOWPATH
- PROPOSED PRESSURE SEWER
- EXISTING MANHOLE
- EXISTING CATCHPIT
- PROPOSED CATCHPIT
- PROPOSED DOUBLE CATCHPIT
- PROPOSED OUTLET
- PROPOSED MANHOLE
- PROPOSED LOT CONNECTION
- PROPOSED RIGHT OF WAY
- PROPOSED CARPARKING
- APPROXIMATE LOCATION OF ARCHAEOLOGICAL SITE (SHELL MIDDEN)

NOTE:
ANY UNRECORDED SUBSURFACE ARCHAEOLOGICAL FEATURES ARE UNCOVERED BY THE WORKS ANY WORK AFFECTING SUCH REMAINS SHOULD CEASE IMMEDIATELY AND NORTHERN ARCHAEOLOGICAL RESEARCH LTD OR HERITAGE NEW ZEALAND POUHERE TAONGA BE NOTIFIED SO THAT APPROPRIATE ACTION CAN BE TAKEN.

PROPOSED OUTLET AS PER FNDC ENGINEERING STANDARDS 2023 SHEET 35
Lot 2 DP 166269
LOT 1
CH 295.66
3.5 m
DISHED DRAIN AT ROW ACCESS
DISHED CHANNEL FOR CARPARK ACCESS
11.0
12.0
CH 280.00
3.5 m
14.0
CH 260.00
1:20 TAPER
DISHED DRAIN AT ROW ACCESS
LOT 21
LOT 20
3.0 m
PROPOSED CARPARKING
LOT 18
Lot 2 DP 46802
LOT 19
LOT 17
5.0 m
LOT 16
LOT 15
CH 240.00
15.0
16.0
CH 220.00
17.0
CH 200.00
5.0 m
18.0
CH 180.00
LOT 12
LOT 13
LOT 14
LOT 10
PROPOSED CARPARKING
5.0 m
CH 160.00
19.0
CH 140.00
CH 120.00
3.5 m
20.0
21.0
22.0
LOT 3
LOT 4
LOT 5
LOT 9
Lot 3 DP 46802
LOT 6
LOT 7
LOT 11
DISHED DRAIN AT ROW ACCESS

FOR CONSENT

Rev	Date	Description	By	Checked
A	01/10/2025	FOR CONSENT	AS	TMA

DWG PROPOSED SITE PLAN
CH. 120.00 - 295.66

A3 SCALE 1:1000 (0, 20m, 50m) Date 06/05/2025

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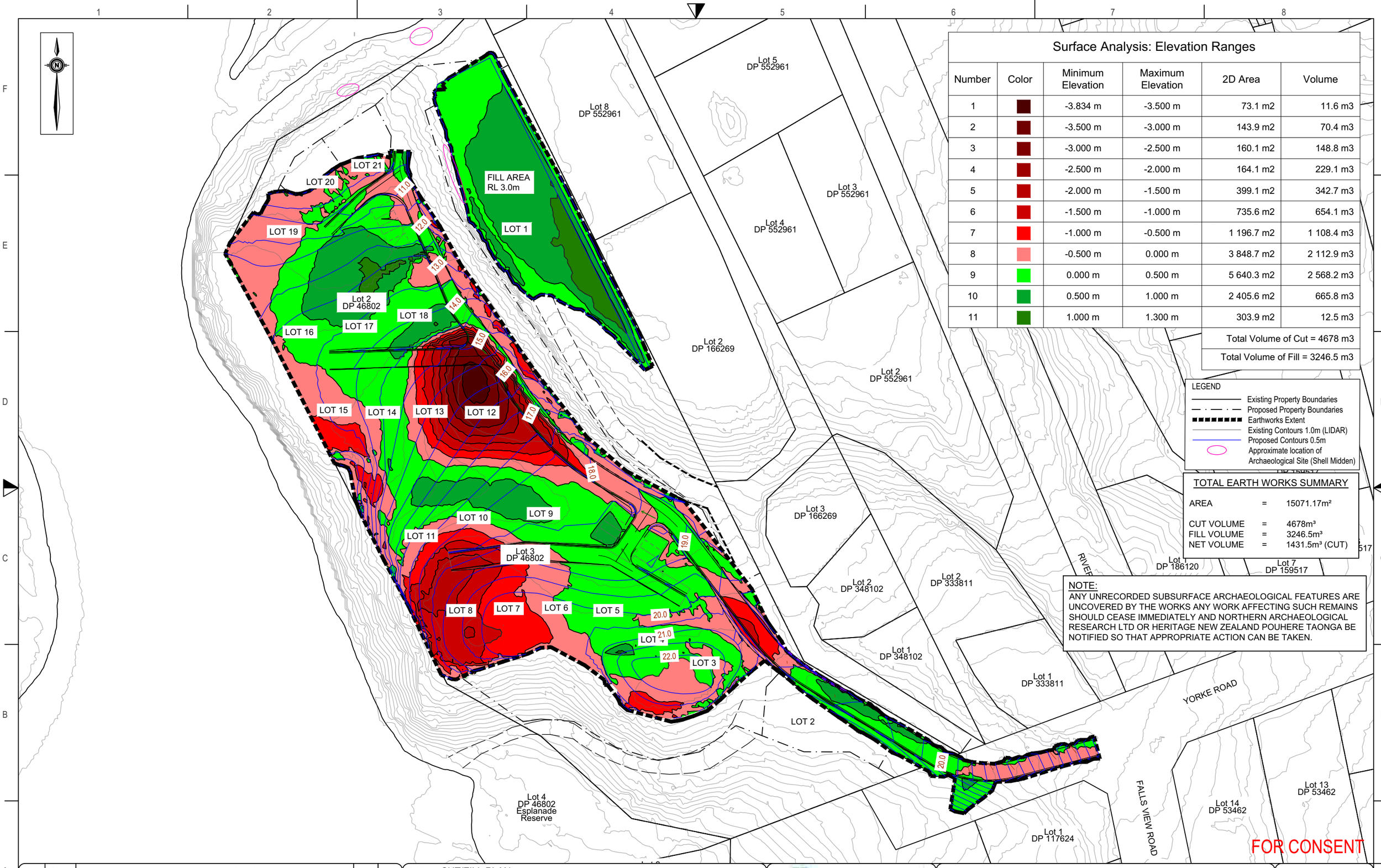
Project No. 22 322

RC no.

Stage

Dwg No. P04

Sheet No. 4 of 20



Surface Analysis: Elevation Ranges

Number	Color	Minimum Elevation	Maximum Elevation	2D Area	Volume
1		-3.834 m	-3.500 m	73.1 m2	11.6 m3
2		-3.500 m	-3.000 m	143.9 m2	70.4 m3
3		-3.000 m	-2.500 m	160.1 m2	148.8 m3
4		-2.500 m	-2.000 m	164.1 m2	229.1 m3
5		-2.000 m	-1.500 m	399.1 m2	342.7 m3
6		-1.500 m	-1.000 m	735.6 m2	654.1 m3
7		-1.000 m	-0.500 m	1 196.7 m2	1 108.4 m3
8		-0.500 m	0.000 m	3 848.7 m2	2 112.9 m3
9		0.000 m	0.500 m	5 640.3 m2	2 568.2 m3
10		0.500 m	1.000 m	2 405.6 m2	665.8 m3
11		1.000 m	1.300 m	303.9 m2	12.5 m3
				Total Volume of Cut = 4678 m3	
				Total Volume of Fill = 3246.5 m3	

LEGEND

- Existing Property Boundaries
- Proposed Property Boundaries
- Earthworks Extent
- Existing Contours 1.0m (LIDAR)
- Proposed Contours 0.5m
- Approximate location of Archaeological Site (Shell Midden)

TOTAL EARTH WORKS SUMMARY

AREA	=	15071.17m²
CUT VOLUME	=	4678m³
FILL VOLUME	=	3246.5m³
NET VOLUME	=	1431.5m³ (CUT)

NOTE:
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DWG CUT/FILL PLAN

A3 SCALE 1:1000 0 20m 50m

Date 06/05/2025

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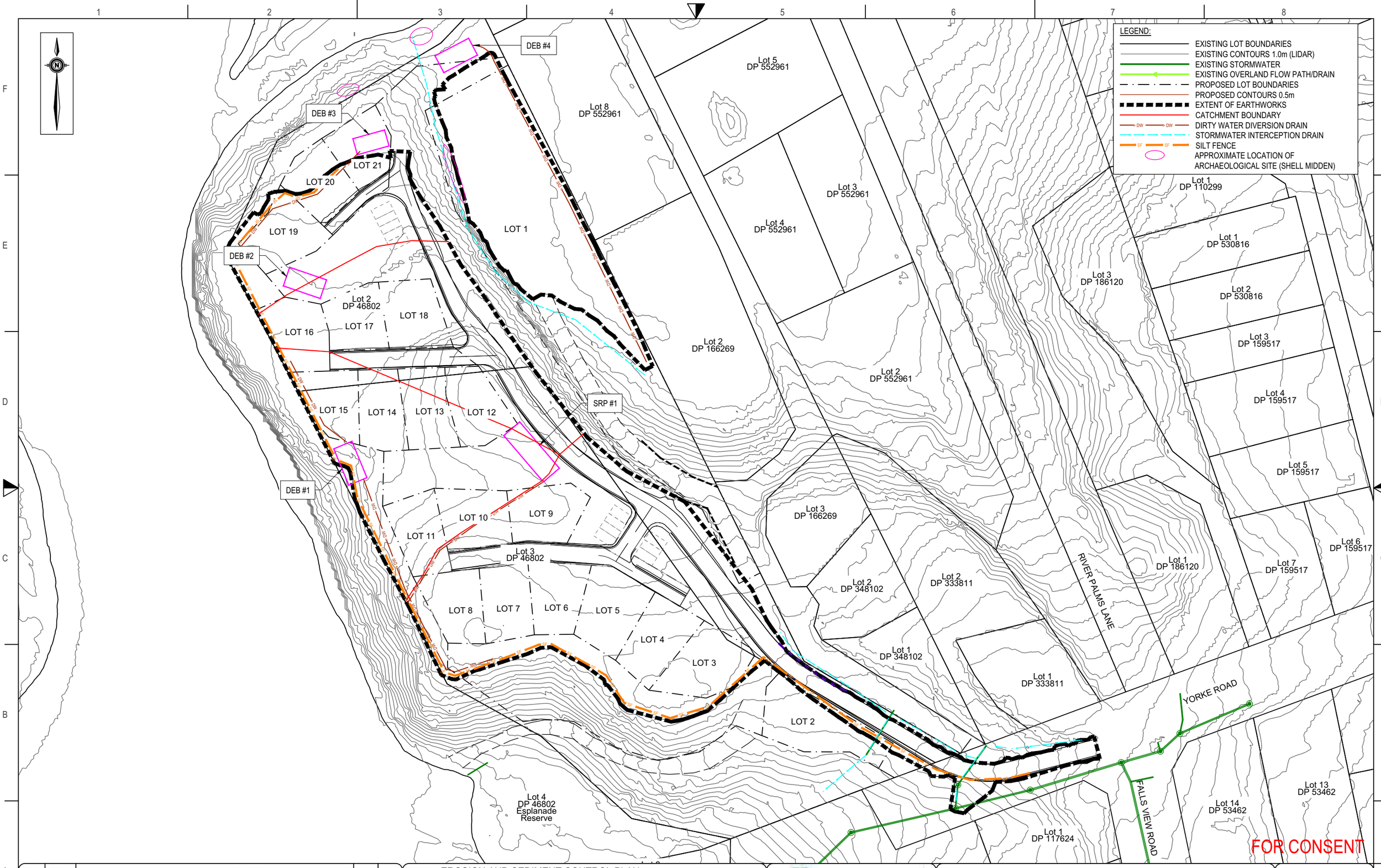
Project No. 22 322

RC no.

Stage

Dwg No. P05

Sheet No. 5 of 20



Rev	Date	Description	By	Checked
A	01/10/2025	FOR CONSENT	AS	TMA

DWG EROSION AND SEDIMENT CONTROL PLAN

A3 SCALE 1:1000 0 20m 50m

Date 21/08/2025

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Stage

Dwg No. ESCP01

Sheet No. 6 of 20

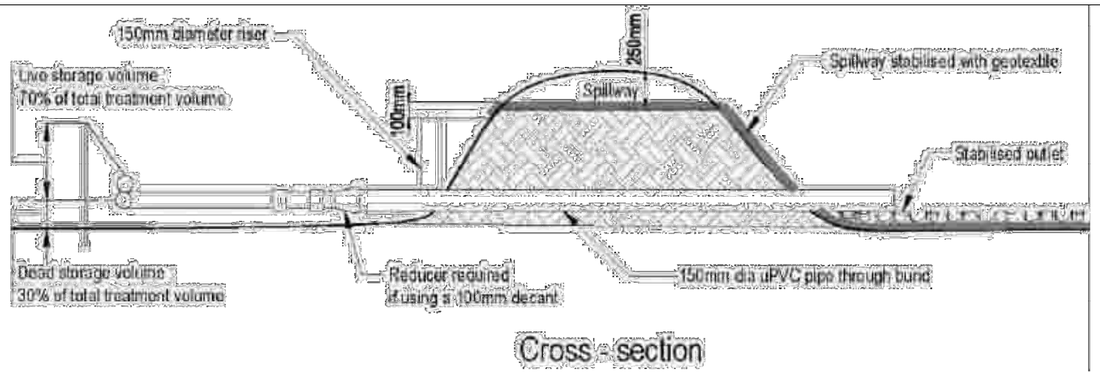


Figure 78: Decanting earth bund

Decanting Earth Bund Summary Table

Parameter	DEB 1	DEB 2	DEB 3	DEB 4
Contributing Catchment (ha)	0.228	0.223	0.1444	0.1838
Minimum Storage Volume (m^3)	45.6	44.6	28.88	36.76
Dead Storage (m^3)	13.68	13.38	8.664	11.028
Live Storage (m^3)	32	31	20	26
Length at Emergency Spillway Level (m)	11.62	11.52	9.73	11.18
Width at Emergency Spillway Level (m)	5.81	5.76	4.87	5.59
Spillway Base Width (250mm deep) (m)	0.53	0.52	0.34	0.43
Primary Spillway Diameter (mm)	150	150	150	150
Number of Decants	1	1	1	1
Number of Holes per Decant	30	30	19	24
Minimum Outlet Diameter (mm)	150	150	150	150
RL Emergency Spillway (m)	1.2	1.2	1.2	1
RL Primary Spillway (m)	1.1	1.1	1.1	0.9
RL Inlet Height (min) (m)	1.35	1.35	1.35	1.15
RL Decant (m)	0.46	0.46	0.49	0.35
Length at Base (m)	6.82	6.72	4.93	7.18
Width at Base (m)	3.41	3.36	2.47	3.59

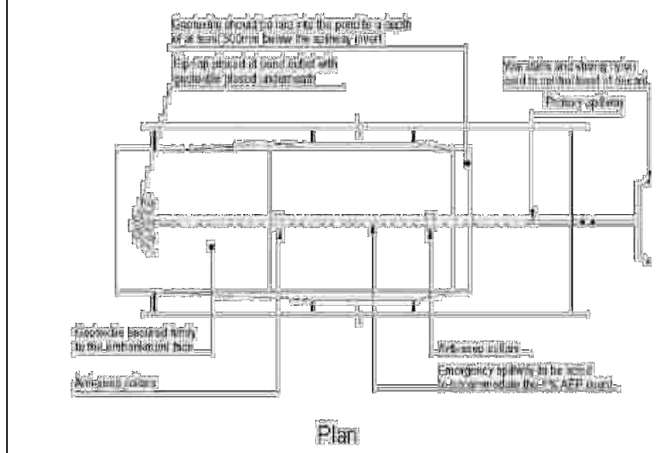
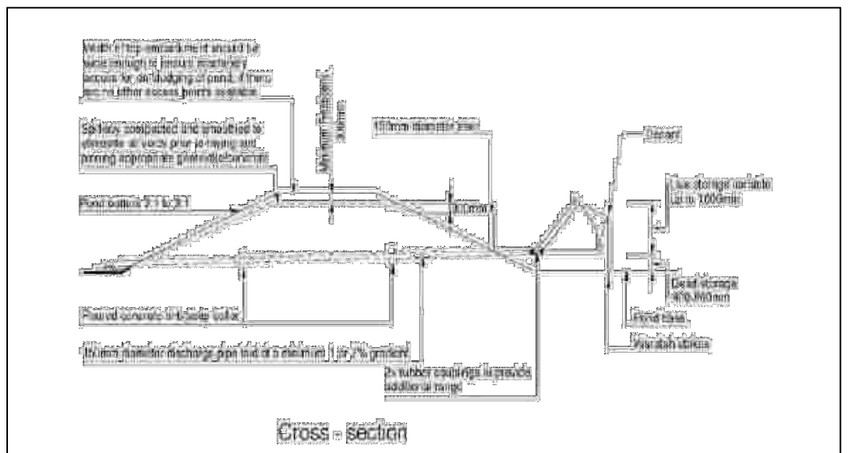


Figure 71: Sediment retention pond for <1.5 ha catchment



Sediment Retention Pond Summary Table

Parameter	Value
Contributing Catchment (ha)	0.386
Minimum Storage Volume (m^3)	77
Dead Storage (m^3)	23
Live Storage (m^3)	54
Length at Emergency Spillway Level (m)	18
Width at Emergency Spillway Level (m)	6.2
Emergency Spillway Base Width (300mm deep) (m)	0.69
Primary Spillway Diameter (mm)	150
Number of Decants	1
Number of Holes per Decant	51
Minimum Outlet Pipe Diameter (mm)	150
RL Emergency Spillway (m)	1.5
RL Primary Spillway (m)	1.2
RL Level Spreader (min) (m)	1.65
RL Base Decant (m)	0.49
Length at Base (m)	12
Width at Base (m)	3.2
Forebay Depth (min.) (m)	1
Forebay Width (full width of pond) (m)	6.2
Forebay Length (min.) (m)	2

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DWG EROSION AND SEDIMENT CONTROL DETAILS

A3 SCALE Not to Scale | Date 21/08/2025

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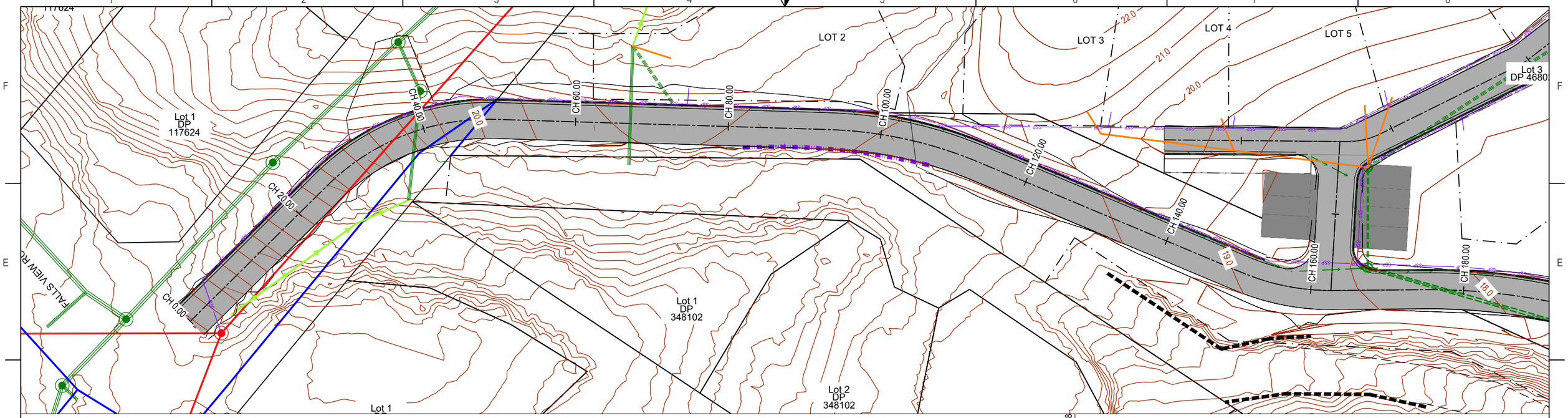
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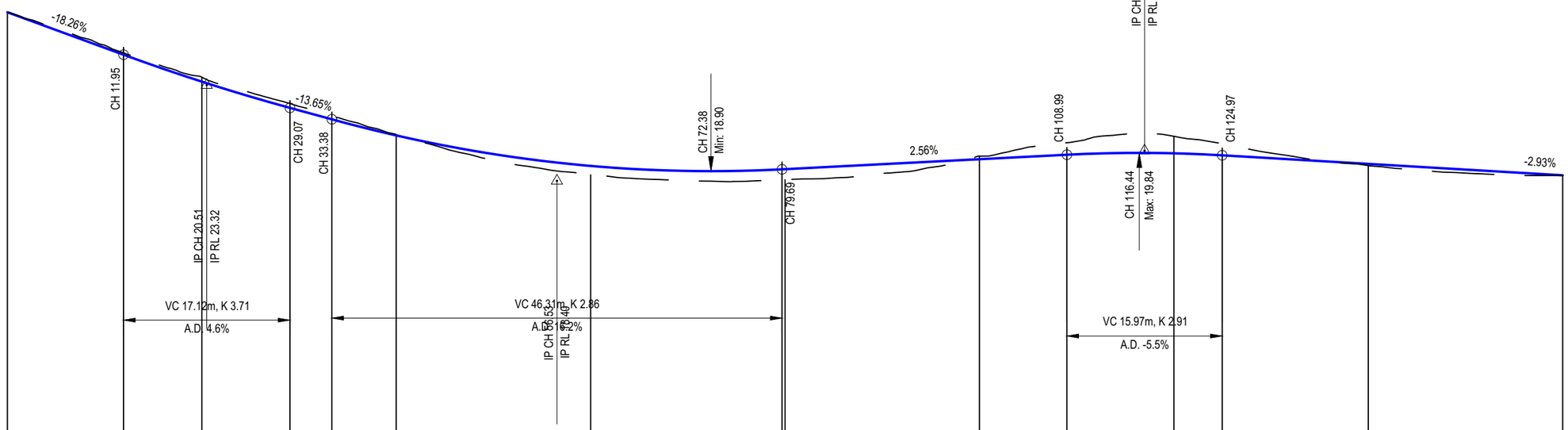
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Stage

Dwg No. DE01

Sheet No. 7 of 20





Datum 5.000

Design Levels	27.061	24.880	23.497	22.148	21.560	20.733	19.166	18.992	18.999	19.511	19.741	19.815	19.712	19.271	18.685
Existing Levels	27.061	24.978	23.725	22.372	21.725	20.789	18.709	18.454	18.462	19.67	20.359	20.690	20.315	19.181	18.668
Cut/Fill Depth	0.000	-0.099	-0.229	-0.223	-0.165	-0.056	0.457	0.538	0.538	-0.159	-0.617	-0.876	-0.603	0.090	0.017
Chainage	0.000	11.947	20.000	29.066	33.377	40.000	60.000	79.690	80.000	100.000	108.994	120.000	124.969	140.000	160.000

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Rev	Date	Description	By	Checked
A	01/10/2025	FOR CONSENT	AS	TMA

DWG LONGITUDINAL SECTION
CH. 00.000 - 160.000

A3 SCALE 1:500 0 10m 25m

Date 06/05/2025

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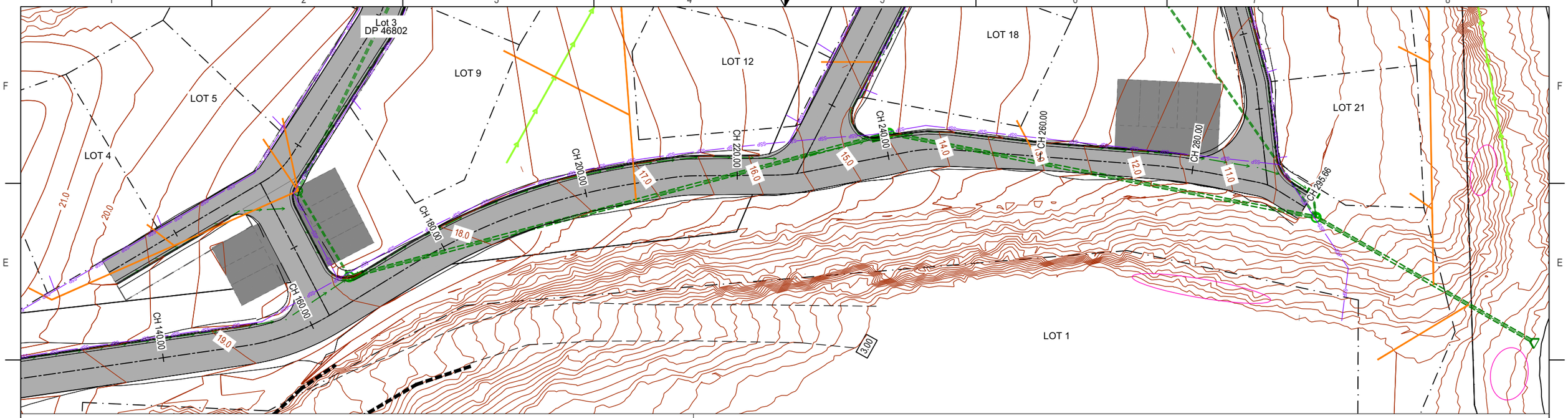
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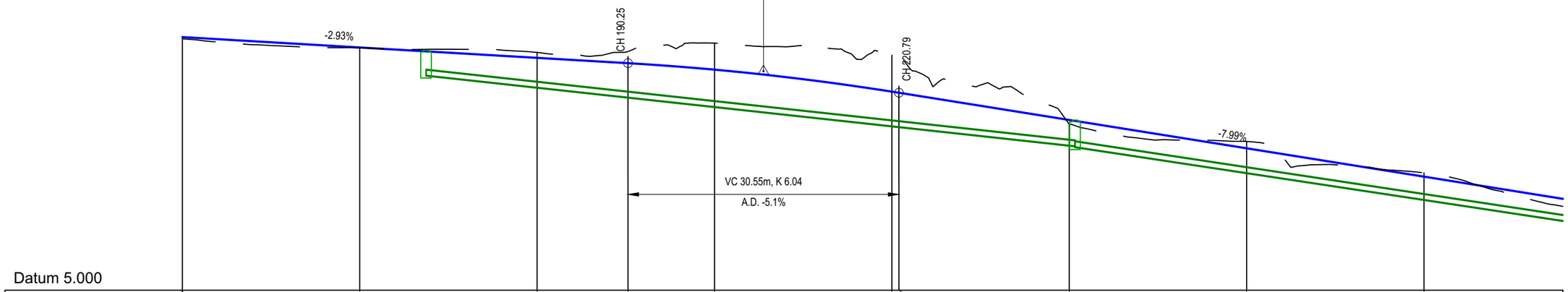
Stage

Dwg No. LS01

Sheet No. 8 of 20



IP CH 205.52
IP RL 17.35



Datum 5.000

Design Levels	19.271	18.685	18.100	17.799	17.435	16.195	16.132	14.597	12.999	11.401	10.150
Existing Levels	19.181	18.668	18.406	18.450	18.93	18.250	18.117	14.373	13.383	11.614	9.727
Cut/Fill Depth	0.090	0.017	-0.307	-0.651	-1.494	-2.055	-1.986	0.224	-0.384	-0.213	0.423
Chainage	140.000	160.000	180.000	190.249	200.000	220.000	220.795	240.000	260.000	280.000	295.660

FOR CONSENT

Rev	Date	Description	By	Checked
A	01/10/2025	FOR CONSENT	AS	TMA

DWG LONGITUDINAL SECTION
CH. 140.000 - 295.660

A3 SCALE 1:500 0 10m 25m

Date 06/05/2025

Drawn AS | Checked TMA | Approved JP

File T:\CLIENTS\EAST PROPERTY INVESTMENTS LTD\JOBS\22 322 - 111 & 115 YORKE ROAD, HARURU\ENGINEERING\DRAWINGS\22_322_EARTHWORKS_STAGE_00.DWG

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Client East Property Investments Ltd

Project No. 22 322

RC no.

Stage

Dwg No. LS02

Sheet No. 9 of 20

Datum: 24.000



Design Surface	25.214	25.169	25.235	25.310	24.924	
Existing Ground	25.291	25.308	25.370	25.036	24.924	
Level Difference	-0.077	-0.138	-0.135	0.274	0.000	
Offset	-2.950	-2.200	0.000	2.500	3.658	

Chainage 10.000

Datum: 21.000



Design Surface	22.174	21.955	22.021	22.096	22.051	
Existing Ground	22.165	22.225	22.226	22.067	22.051	
Level Difference	0.009	-0.270	-0.205	0.029	0.000	
Offset	-2.950	-2.200	0.000	2.500	2.636	

Chainage 30.000

Datum: 19.000



Design Surface	19.231	19.708	19.774	19.849	19.589	
Existing Ground	19.231	19.429	19.471	19.525	19.589	
Level Difference	0.000	0.279	0.304	0.324	0.000	
Offset	-4.513	-2.200	0.000	2.500	3.282	

Chainage 50.000

Datum: 26.000



Design Surface	27.038	26.995	27.061	27.136	26.867	
Existing Ground	27.038	27.070	27.061	26.929	26.867	
Level Difference	0.000	-0.075	0.000	0.207	0.000	
Offset	-2.954	-2.200	0.000	2.500	3.308	

Chainage 00.000

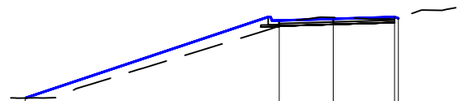
Datum: 23.000



Design Surface	23.734	23.431	23.497	23.572	23.896	
Existing Ground	23.734	23.738	23.725	23.737	23.896	
Level Difference	0.000	-0.307	-0.229	-0.165	0.000	
Offset	-2.970	-2.200	0.000	2.500	3.150	

Chainage 20.000

Datum: 17.000



Design Surface	17.508		20.667	20.733	20.808	20.755
Existing Ground	17.508		20.441	20.789	20.725	20.755
Level Difference	0.000		0.226	-0.056	0.083	0.000
Offset	-12.559		-2.200	0.000	2.500	2.657

Chainage 40.000

FOR CONSENT

Rev	Date	Description	By	Checked
A	01/10/2025	FOR CONSENT	AS	TMA

DWG CROSS SECTIONS
RIGHT OF WAY
CH. 00.000 - 50.000

A3 SCALE 1:250 (0 5m 10m)

Date 18/07/2025

Drawn AS | Checked TMA | Approved JP

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Client East Property Investments Ltd

Project No. 22 322

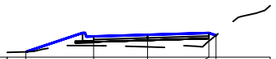
RC no.

Stage

Dwg No. CS01

Sheet No. 10 of 20

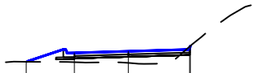
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Design Surface	18.213	18.842	18.908	18.983	18.886	
Existing Ground	18.213	18.465	18.417	18.653	18.886	
Level Difference	0.000	0.377	0.491	0.330	0.000	
Offset	-4.967	-2.200	0.000	2.500	2.790	

Chainage 70.000

Datum: 18.000



Design Surface	18.829	19.189	19.255	19.330	19.475	
Existing Ground	18.829	18.813	18.782	19.450	19.475	
Level Difference	0.000	0.377	0.473	-0.120	0.000	
Offset	-4.164	-2.200	0.000	2.500	2.529	

Chainage 90.000

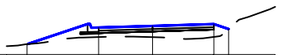
Datum: 19.000



Design Surface	20.726	20.726	19.699	19.765	19.840	20.475
Existing Ground	20.759	20.726	20.639	20.429	20.522	20.475
Level Difference	-0.033	0.000	-0.940	-0.664	-0.682	0.000
Offset	-5.000	-4.415	-2.200	0.000	2.500	3.769

Chainage 110.000

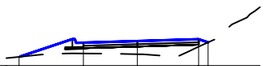
Datum: 18.000



Design Surface	18.421	19.100	19.166	19.241	19.041	
Existing Ground	18.421	18.713	18.709	18.718	19.041	
Level Difference	0.000	0.387	0.457	0.523	0.000	
Offset	-5.118	-2.200	0.000	2.500	3.101	

Chainage 60.000

Datum: 18.000



Design Surface	18.354	18.933	18.999	19.074	18.946	
Existing Ground	18.354	18.493	18.462	18.769	18.946	
Level Difference	0.000	0.441	0.538	0.305	0.000	
Offset	-4.821	-2.200	0.000	2.500	2.885	

Chainage 80.000

Datum: 19.000



Design Surface	19.566	19.445	19.511	19.586	20.209	
Existing Ground	19.565	19.553	19.670	20.157	20.209	
Level Difference	0.001	-0.107	-0.159	-0.571	0.000	
Offset	-2.950	-2.200	0.000	2.500	2.625	

Chainage 100.000

FOR CONSENT

Rev	Date	Description	By	Checked
A	01/10/2025	FOR CONSENT	AS	TMA

DWG CROSS SECTIONS
RIGHT OF WAY
CH. 60.000 - 110.000

A3 SCALE 1:250 0 5m 10m

Date 18/07/2025

Drawn AS | Checked TMA | Approved JP

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Client East Property Investments Ltd

Project No. 22 322

RC no.

Stage

Dwg No. CS02

Sheet No. 11 of 20

Datum: 19.000



Design Surface	20.074	20.068	19.972	19.498	19.564	19.639	19.500	19.477
Existing Ground	20.096	20.096	19.972	19.905	19.824	19.704	19.574	19.449
Level Difference	-0.023	-0.028	0.000	-0.407	-0.260	-0.064	-0.074	0.029
Offset	-5.000	-4.918	-3.310	-2.200	0.000	2.500	4.112	5.000

Chainage 130.000

Datum: 18.000



Design Surface	19.830	19.839	18.823	18.912	18.978	19.053	18.716	18.348
Existing Ground	19.816	18.820	18.823	18.814	18.797	18.796	18.791	18.771
Level Difference	0.015	0.019	0.000	0.099	0.182	0.257	-0.074	-0.423
Offset	-5.000	-4.486	-3.351	-2.200	0.000	2.500	3.668	5.000

Chainage 150.000

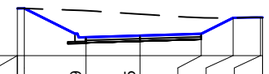
Datum: 17.000



Design Surface	18.674	18.491	18.232	18.327	18.393	18.468	18.000	17.971
Existing Ground	18.597	18.599	18.604	18.600	18.586	18.518	18.000	17.625
Level Difference	0.077	-0.108	-0.372	-0.273	-0.193	-0.051	0.000	0.345
Offset	-5.000	-4.264	-3.226	-2.200	0.000	2.500	4.130	5.000

Chainage 170.000

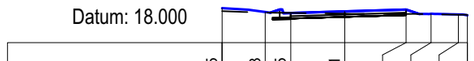
Datum: 19.000



Design Surface	20.921	20.926	19.749	19.815	19.890	20.539	20.558	20.555
Existing Ground	20.937	20.926	20.832	20.690	20.545	20.539	20.552	20.547
Level Difference	-0.016	0.000	-1.083	-0.876	-0.656	0.000	0.006	0.008
Offset	-5.000	-4.716	-2.200	0.000	2.500	3.797	4.916	5.000

Chainage 120.000

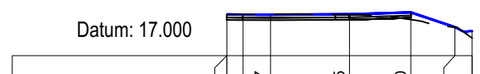
Datum: 18.000



Design Surface	19.405	19.248	19.205	19.271	19.346	19.177	19.149	19.112
Existing Ground	19.282	19.226	19.213	19.181	19.166	19.154	19.139	19.135
Level Difference	0.122	0.022	-0.008	0.090	0.180	0.024	0.010	-0.023
Offset	-5.000	-3.243	-2.200	0.000	2.500	3.519	4.633	5.000

Chainage 140.000

Datum: 17.000



Design Surface	18.680	18.671	18.667	18.685	18.760	18.161	18.000
Existing Ground	18.682	18.683	18.690	18.668	18.468	18.161	17.713
Level Difference	-0.003	-0.012	-0.023	0.017	0.293	0.000	0.287
Offset	-5.000	-4.344	-3.219	0.000	2.500	4.298	5.000

Chainage 160.000

FOR CONSENT

Rev	Date	Description	By	Checked
A	01/10/2025	FOR CONSENT	AS	TMA

DWG CROSS SECTIONS
MEW 1
CH. 120.000 - 170.000

A3 SCALE 1:250 0 5m 10m

Date 18/07/2025

Drawn AS | Checked TMA | Approved JP

File T:\CLIENTS\EAST PROPERTY INVESTMENTS LTD\JOBS\22 322 - 111 & 115 YORKE ROAD, HARURU\ENGINEERING\DRAWINGS\22_322_EARTHWORKS_STAGE_00.DWG

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Client East Property Investments Ltd

Project No. 22 322

RC no.

Stage

Dwg No. CS03

Sheet No. 12 of 20

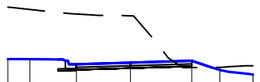
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Design Surface	18.144	18.129	17.741	17.807	17.882	17.982	17.998	
Existing Ground	18.513	18.641	18.681	18.426	17.944	17.913	18.118	
Level Difference	-0.369	-0.511	-0.940	-0.620	-0.062	0.069	-0.119	
Offset	-5.000	-3.464	-2.200	0.000	2.500	3.536	5.000	

Chainage 190.000

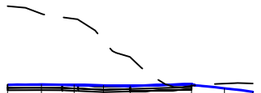
Datum: 16.000



Design Surface	17.043	17.039	16.832	16.898	16.973	16.599	16.414	
Existing Ground	19.160	19.064	18.879	18.805	16.700	16.703	16.769	
Level Difference	-2.117	-2.025	-2.048	-1.908	0.273	-0.104	-0.355	
Offset	-5.000	-4.102	-2.200	0.000	2.500	3.648	5.000	

Chainage 210.000

Datum: 15.000



Design Surface	15.443	15.451	15.435	15.415	15.396	15.471	15.297	15.152
Existing Ground	18.650	18.340	18.131	17.247	16.569	15.399	15.492	15.497
Level Difference	-3.207	-2.889	-2.696	-1.832	-1.172	0.072	-0.195	-0.345
Offset	-5.000	-3.620	-2.284	-1.088	0.000	2.500	3.844	5.000

Chainage 230.000

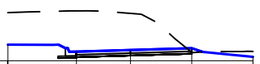
Datum: 17.000



Design Surface	18.253	18.229	18.034	18.100	18.175	18.257	18.000	17.998
Existing Ground	18.292	18.337	18.399	18.406	18.380	18.387	18.249	18.249
Level Difference	-0.039	-0.108	-0.366	-0.307	-0.206	-0.130	-0.249	-0.250
Offset	-5.000	-3.828	-2.200	0.000	2.500	3.829	4.995	5.000

Chainage 180.000

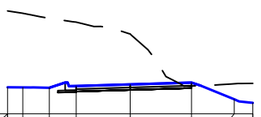
Datum: 17.000



Design Surface	17.655	17.369	17.435	17.510	17.157
Existing Ground	18.960	19.030	18.930	17.343	17.380
Level Difference	-1.305	-1.661	-1.495	0.167	-0.224
Offset	-5.000	-2.200	0.000	2.500	5.000

Chainage 200.000

Datum: 15.000



Design Surface	16.080	16.073	16.058	16.129	16.195	16.270	15.589	15.443
Existing Ground	19.190	19.093	18.892	18.733	18.250	16.130	16.221	16.236
Level Difference	-3.111	-3.020	-2.834	-2.604	-2.055	0.140	-0.632	-0.794
Offset	-5.000	-4.378	-3.295	-2.200	0.000	2.500	4.244	5.000

Chainage 220.000

FOR CONSENT

Rev	Date	Description	By	Checked
A	01/10/2025	FOR CONSENT	AS	TMA

DWG CROSS SECTIONS
MEW 1
CH. 180.000 - 230.000

A3 SCALE 1:250 (0 5m 10m)

Date 18/07/2025

Drawn AS | Checked TMA | Approved JP

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Client East Property Investments Ltd

Project No. 22 322

RC no.

Stage

Dwg No. CS04

Sheet No. 13 of 20

Datum: 13.000



Design Surface	13.823	13.744	13.798	13.862	13.533	13.509
Existing Ground	13.372	13.437	13.472	13.653	13.853	13.902
Level Difference	0.451	0.307	0.326	0.209	-0.320	-0.392
Offset	-5.000	-1.825	0.000	2.125	3.794	5.000

Chainage 250.000

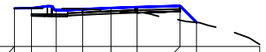
Datum: 11.000



Design Surface	12.389	12.157	12.200	12.253	11.712	11.354	11.195
Existing Ground	12.083	12.099	12.070	12.037	11.970	11.877	11.554
Level Difference	0.306	0.058	0.130	0.215	-0.258	-0.523	-0.359
Offset	-5.000	-1.450	0.000	1.750	3.261	4.343	4.778

Chainage 270.000

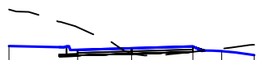
Datum: 9.000



Design Surface	10.554	10.564	10.484	10.512	10.566	10.603	10.655	9.981	
Existing Ground	10.556	10.564	10.541	10.528	10.446	10.384	10.076	9.981	
Level Difference	-0.002	0.000	-0.057	-0.016	0.120	0.218	0.579	0.000	
Offset	-5.000	-4.305	-3.297	-2.218	-1.061	0.000	1.750	2.424	

Chainage 290.000

Datum: 14.000



Design Surface	14.687	14.531	14.597	14.672	14.480	14.320
Existing Ground	16.177	15.452	14.373	14.451	14.579	14.740
Level Difference	-1.490	-0.921	0.224	0.221	-0.099	-0.420
Offset	-5.000	-2.200	0.000	2.500	3.675	5.000

Chainage 240.000

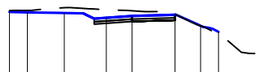
Datum: 12.000



Design Surface	13.227	13.212	13.188	12.956	12.999	13.052	12.779	12.638	12.595
Existing Ground	13.409	13.406	13.413	13.409	13.383	13.086	12.938	12.939	12.927
Level Difference	-0.182	-0.193	-0.225	-0.453	-0.384	-0.034	-0.159	-0.301	-0.332
Offset	-5.000	-4.155	-2.850	-1.450	0.000	1.750	3.760	4.784	5.000

Chainage 260.000

Datum: 9.000



Design Surface	11.568	11.549	11.525	11.328	11.401	11.454	11.000	10.757	
Existing Ground	11.624	11.629	11.740	11.654	11.615	11.473	11.005	10.659	
Level Difference	-0.057	-0.081	-0.215	-0.326	-0.213	-0.019	-0.005	0.099	
Offset	-5.000	-4.270	-2.765	-1.051	0.000	1.750	2.793	3.524	

Chainage 280.000

FOR CONSENT

Rev	Date	Description	By	Checked
A	01/10/2025	FOR CONSENT	AS	TMA

DWG CROSS SECTIONS
MEW 1
CH. 240.000 - 290.000

A3 SCALE 1:250 (0 5m 10m)

Date 18/07/2025

Drawn AS | Checked TMA | Approved JP

File T:\CLIENTS\EAST PROPERTY INVESTMENTS LTD\JOBS\22 322 - 111 & 115 YORKE ROAD, HARURU\ENGINEERING\DRAWINGS\22_322_EARTHWORKS_STAGE_00.DWG

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Client East Property Investments Ltd

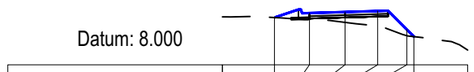
Project No. 22 322

RC no.

Stage

Dwg No. CS05

Sheet No. 14 of 20



Datum: 8.000

Design Surface	9.924	10.107	10.150	10.190	9.431	9.146	
Existing Ground	9.924	9.832	9.727	9.583	9.184	9.146	
Level Difference	0.000	0.274	0.423	0.607	0.247	0.000	
Offset	-2.879	-1.450	0.000	1.332	2.522	2.806	

Chainage 295.662

FOR CONSENT

Rev	Date	Description	By	Checked
A	01/10/2025	FOR CONSENT	AS	TMA

DWG CROSS SECTIONS
RIGHT OF WAY
CH. 295.662

A3 SCALE 1:250 0 5m 10m

Date 18/07/2025

Drawn AS | Checked TMA | Approved JP

File T:\CLIENTS\EAST PROPERTY INVESTMENTS LTD\JOBS\22 322 - 111 & 115 YORKE ROAD, HARURU\ENGINEERING\DRAWINGS\22_322_EARTHWORKS_STAGE_00.DWG

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Client East Property Investments Ltd

Project No. 22 322

RC no.

Stage

Dwg No. CS06

Sheet No. 15 of 20

Datum: 18.000



Design Surface	18.834	18.751	18.676	18.610	18.782
Existing Ground	18.676	18.541	18.392	18.265	18.279
Level Difference	0.158	0.211	0.284	0.345	0.503
Offset	-5.000	-2.500	0.000	2.200	5.000

Chainage 10.000

Datum: 18.000



Design Surface	18.758	18.737	18.686	18.652	18.608	18.571	18.544	18.517	18.489	18.473
Existing Ground	18.668	18.671	18.669	18.639	18.610	18.588	18.572	18.564	18.569	18.573
Level Difference	0.090	0.066	0.017	0.012	-0.001	-0.017	-0.028	-0.047	-0.080	-0.100
Offset	-5.000	-4.339	-2.640	-1.497	0.000	1.375	2.378	3.380	4.382	4.996

Chainage 00.000

Datum: 18.000



Design Surface	18.862	18.860	18.841	18.827	18.814	18.803	18.795	18.783	18.774	18.760	18.746
Existing Ground	18.673	18.699	18.651	18.599	18.542	18.510	18.483	18.458	18.432	18.406	18.391
Level Difference	0.189	0.160	0.190	0.227	0.272	0.293	0.311	0.326	0.341	0.355	0.354
Offset	-5.000	-4.904	-3.903	-2.727	-1.256	0.000	1.050	2.158	3.202	4.250	5.000

Chainage 19.498

FOR CONSENT

Rev	Date	Description	By	Checked
A	01/10/2025	FOR CONSENT	AS	TMA

DWG CROSS SECTIONS
MEW 1
CH. 00.000 - 19.498

A3 SCALE 1:250 (0, 5m, 10m) Date 18/07/2025

Drawn AS | Checked TMA | Approved JP

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Client: East Property Investments Ltd

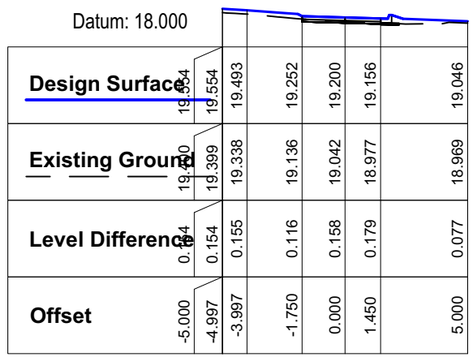
Project No. 22 322

RC no.

Stage

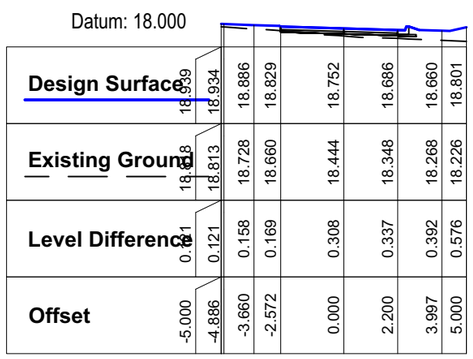
Dwg No. CS07

Sheet No. 16 of 20



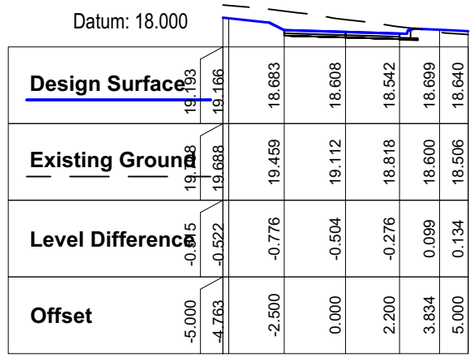
Design Surface	19.554	19.493	19.252	19.200	19.156		19.046
Existing Ground	19.399	19.338	19.136	19.042	18.977		18.969
Level Difference	0.154	0.155	0.116	0.158	0.179		0.077
Offset	-4.997	-3.997	-1.750	0.000	1.450		5.000

Chainage 10.000



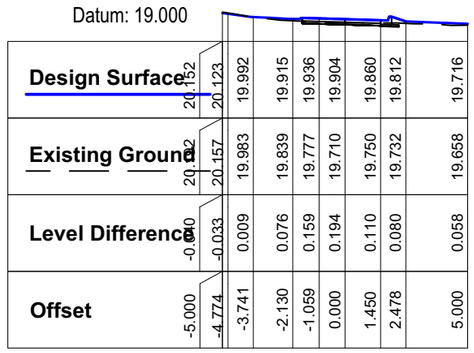
Design Surface	18.934	18.886	18.829	18.752	18.686	18.660	18.801
Existing Ground	18.813	18.728	18.660	18.444	18.348	18.268	18.226
Level Difference	0.121	0.158	0.169	0.308	0.337	0.392	0.576
Offset	-4.886	-3.660	-2.572	0.000	2.200	3.997	5.000

Chainage 30.000



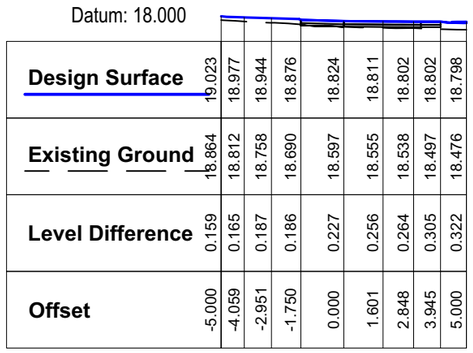
Design Surface	19.166	18.683	18.608	18.542	18.699	18.640	
Existing Ground	19.688	19.459	19.112	18.818	18.600	18.506	
Level Difference	-0.522	-0.776	-0.504	-0.276	0.099	0.134	
Offset	-4.763	-2.500	0.000	2.200	3.834	5.000	

Chainage 50.000



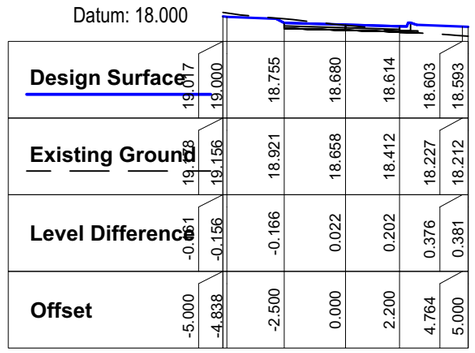
Design Surface	20.123	19.992	19.915	19.936	19.904	19.860	19.812	19.716
Existing Ground	20.157	19.983	19.839	19.777	19.710	19.750	19.732	19.658
Level Difference	-0.033	0.009	0.076	0.159	0.194	0.110	0.080	0.058
Offset	-4.774	-3.741	-2.130	-1.059	0.000	1.450	2.478	5.000

Chainage 00.000



Design Surface	19.023	18.977	18.944	18.876	18.824	18.811	18.802	18.798
Existing Ground	18.864	18.812	18.758	18.690	18.597	18.555	18.538	18.497	18.476
Level Difference	0.159	0.165	0.187	0.186	0.227	0.256	0.264	0.305	0.322
Offset	-5.000	-4.059	-2.951	-1.750	0.000	1.601	2.848	3.945	5.000

Chainage 20.000



Design Surface	19.017	19.000	18.755	18.680	18.614	18.603	18.593	
Existing Ground	19.178	19.156	18.921	18.658	18.412	18.227	18.212	
Level Difference	-0.161	-0.156	-0.166	0.022	0.202	0.376	0.381	
Offset	-4.838	-2.500	0.000	2.200	4.764	5.000		

Chainage 40.000

FOR CONSENT

Rev	Date	Description	By	Checked
A	01/10/2025	FOR CONSENT	AS	TMA

DWG CROSS SECTIONS
MEW 1 (2)
CH. 00.000 - 50.000

A3 SCALE 1:250 (0, 5m, 10m)

Date 18/07/2025

Drawn AS | Checked TMA | Approved JP

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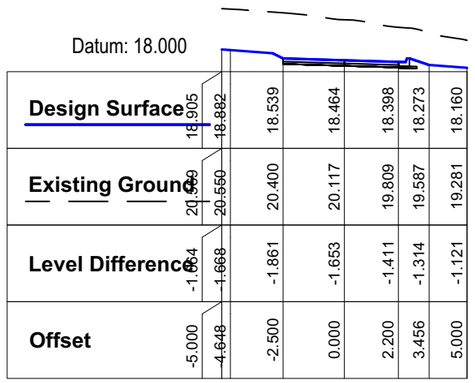
Project No. 22 322

RC no.

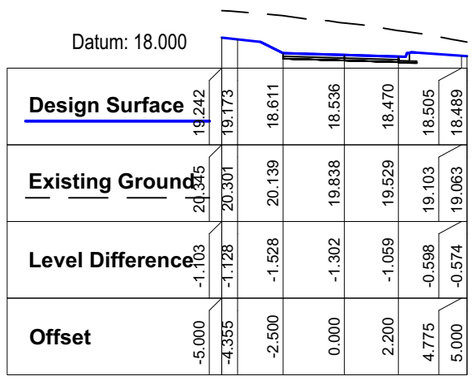
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Dwg No. CS08

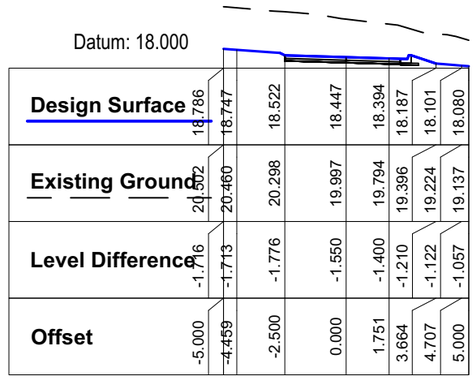
Sheet No. 17 of 20



Chainage 70.000



Chainage 60.000



Chainage 72.422

FOR CONSENT

Rev	Date	Description	By	Checked
A	01/10/2025	FOR CONSENT	AS	TMA

DWG CROSS SECTIONS
MEW 1 (2)
CH. 60.000 - 72.422

A3 SCALE 1:250 0 5m 10m

Date 18/07/2025

Drawn AS | Checked TMA | Approved JP

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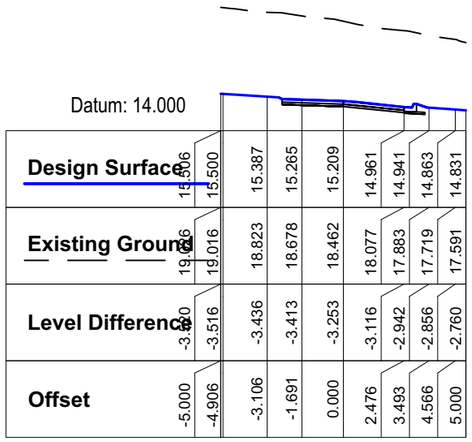
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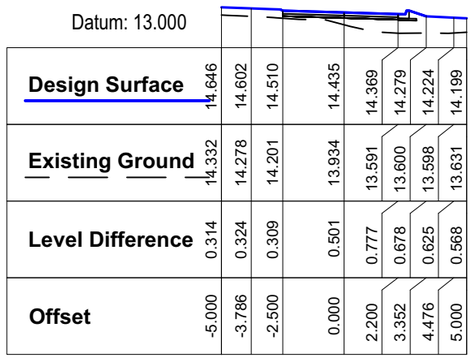
Stage

Dwg No. CS09

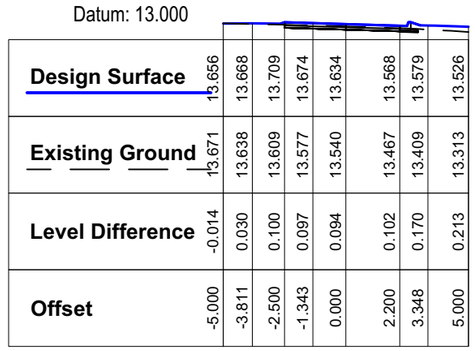
Sheet No. 18 of 20



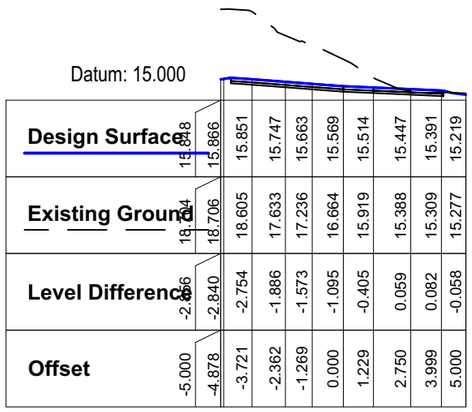
Chainage 10.000



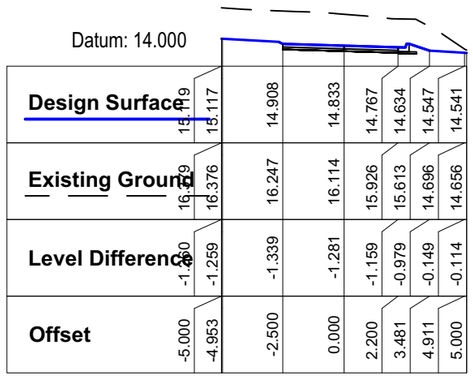
Chainage 30.000



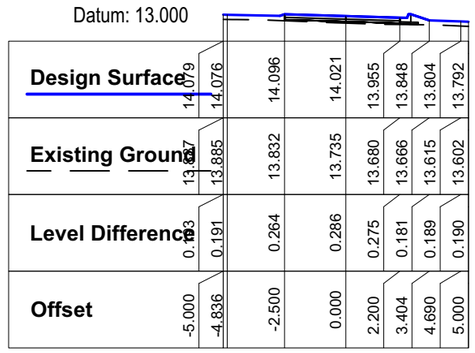
Chainage 49.351



Chainage 00.000



Chainage 20.000



Chainage 40.000

FOR CONSENT

Rev	Date	Description	By	Checked
A	01/10/2025	FOR CONSENT	AS	TMA

DWG CROSS SECTIONS
MEW 2
CH. 00.000 - 49.351

A3 SCALE 1:250 0 5m 10m

Date 18/07/2025

Drawn AS | Checked TMA | Approved JP

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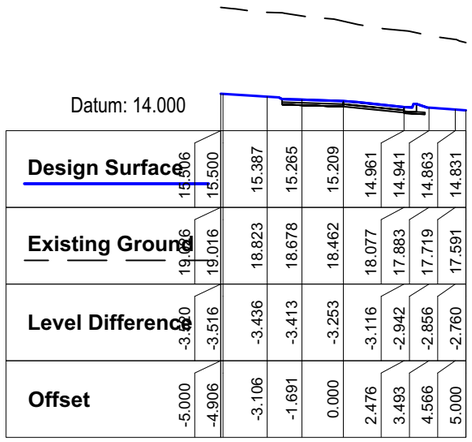
Project No. 22 322

RC no.

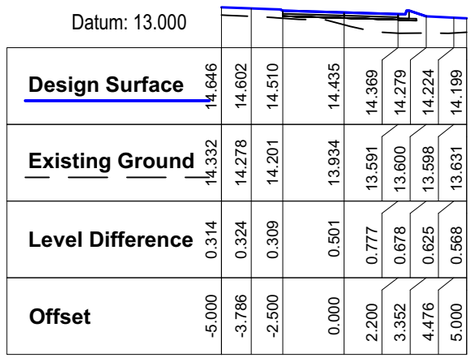
Stage

Dwg No. CS10

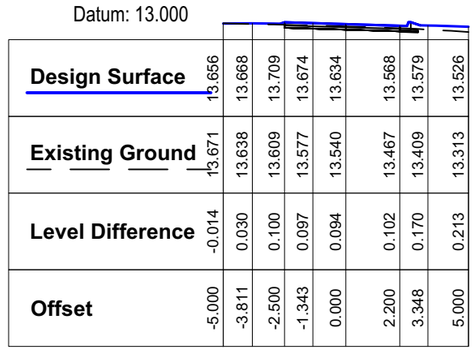
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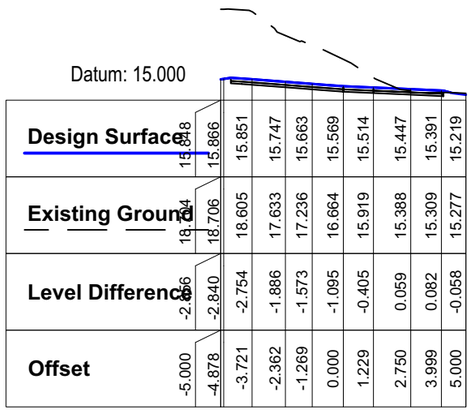
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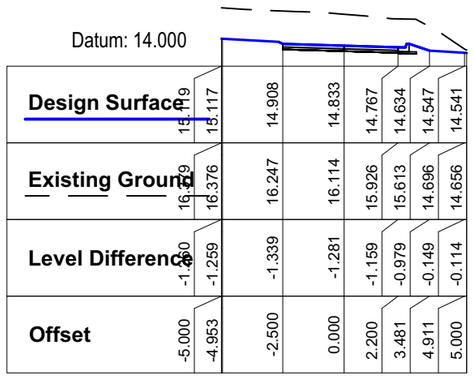
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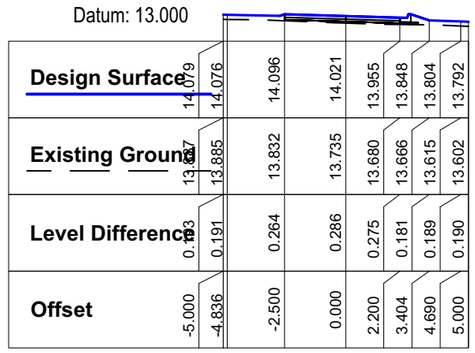
Chainage 49.351



Chainage 00.000



Chainage 20.000



Chainage 40.000

FOR CONSENT

Rev	Date	Description	By	Checked
A	01/10/2025	FOR CONSENT	AS	TMA

DWG CROSS SECTIONS
MEW 3
CH. 00.000 - 49.351

A3 SCALE 1:250 0 5m 10m

Date 18/07/2025

Drawn AS | Checked TMA | Approved JP

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Project No. 22 322

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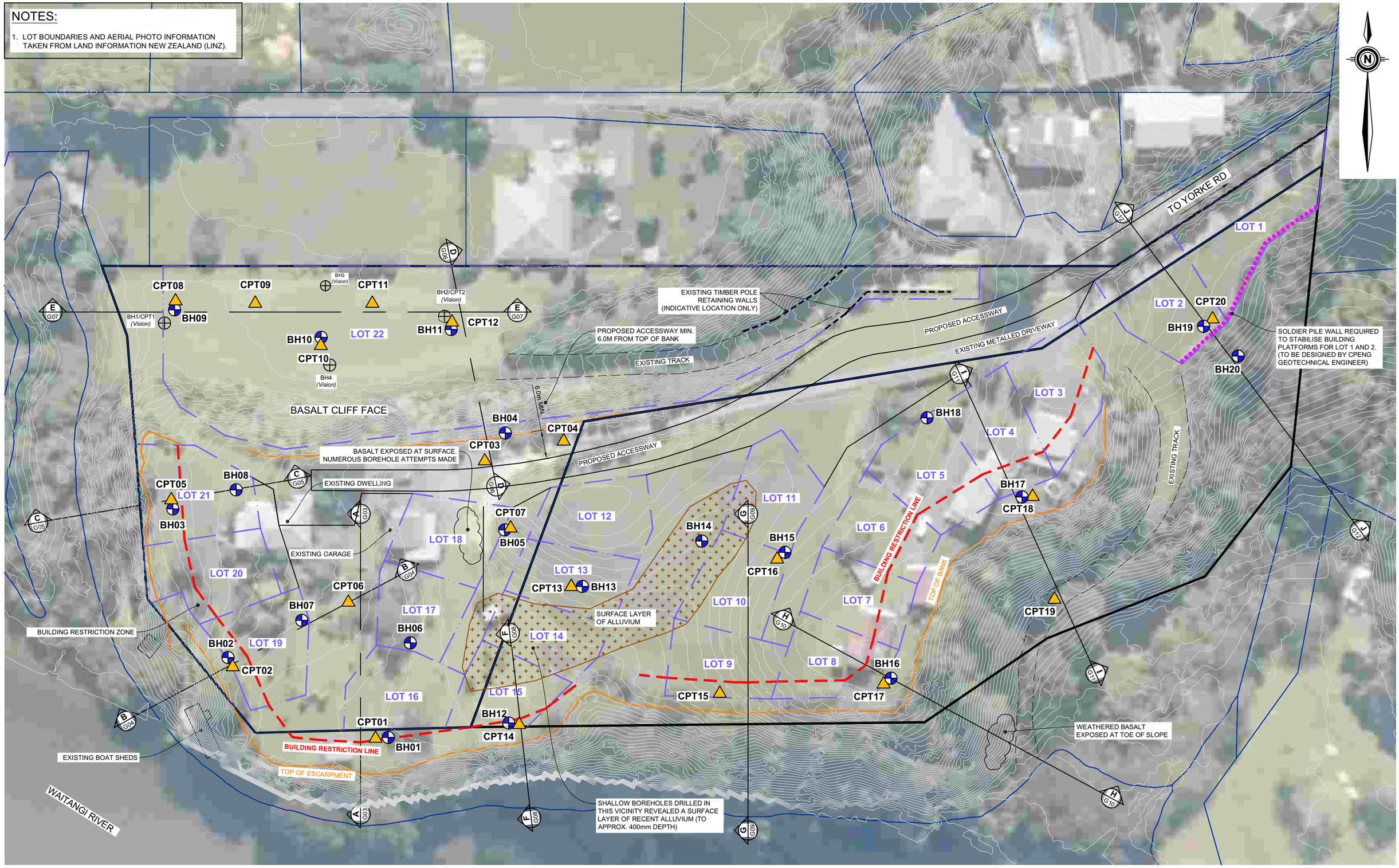
Stage

Dwg No. CS11

Sheet No. 20 of 20

NOTES:

1. LOT BOUNDARIES AND AERIAL PHOTO INFORMATION TAKEN FROM LAND INFORMATION NEW ZEALAND (LINZ).



Issue	Date	Revision
A	4/11/2023	FIRST ISSUE

DWG: Site Investigation Plan

Scale 1:750 @A3 | Date NOV 2023

Drawn JMC | Checked WT | Approved JP

File C:\USERS\JOSHCURREEN\HAIGH WORKMAN LIMITED\SUITEFILES - 22 322 - 111 & 115 YORKE ROAD, HARURU\ENGINEERING\DRAWINGS\22 322 - GEO PLANS-NOV 23.DWG

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Project: Geotechnical Investigation
111 Yorke Road (Lot 2, DP46802)

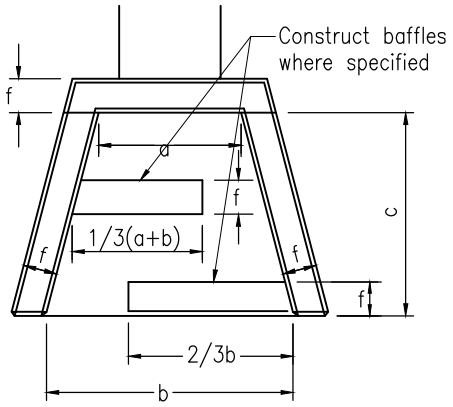
Client: East Property Investments Ltd

Project No. 22 322 | RC no. N/A

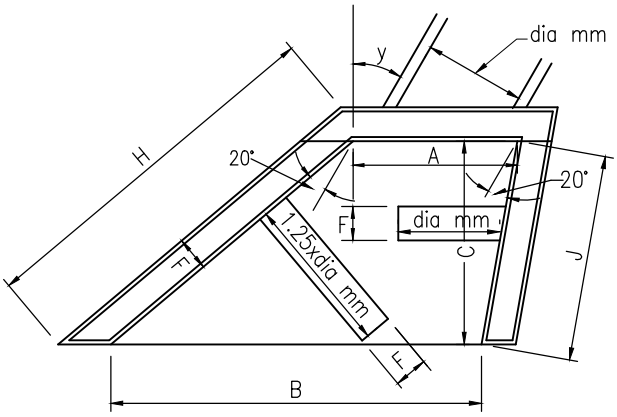
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Sheet No. **2** of **12**

Plotted By Josh Curreen at 26/11/2023 10:28:30 am

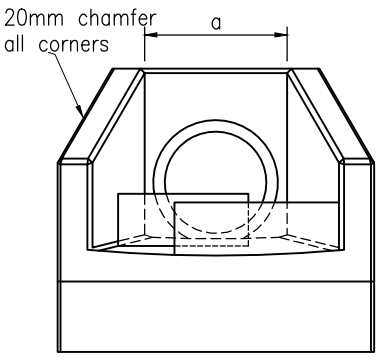


PLAN

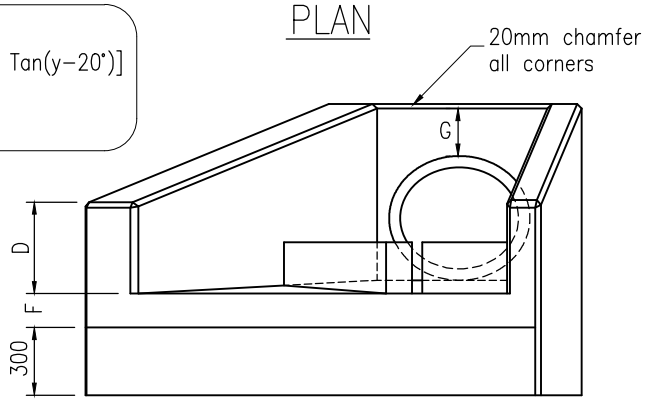


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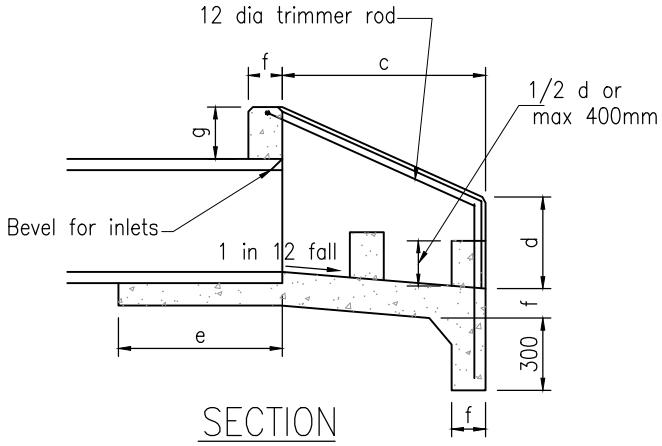
A. Sec y x (a)
B. C Tan (y+20°) + [A−C Tan(y−20°)]
H. C x Sec (y + 20°)
J. C x Sec (y − 20°)



END ELEVATION



END ELEVATION



SECTION

PRINCIPAL DIMENSIONS (mm)							
DIA OF PIPE	a	b	c C	d D	e E	f F	g G
150	300	450	600	200	325	100	150
230	380	600	700	250	425	100	150
300	450	750	750	300	525	100	150
375	550	900	850	350	625	100	150
450	630	1100	900	400	725	150	230
525	700	1200	1000	450	825	150	230
600	800	1400	1100	550	900	150	230
750	1000	1700	1200	600	1050	150	300
900	1170	2000	1450	650	1225	150	300
1050	1380	2300	1700	750	1375	150	300
1200	1520	2600	2100	750	1550	150	450
1350	1680	2800	2400	750	1725	150	450

NOTE:

1. Reinforce floors & walls with:
   150 – 375 665 mesh
   450 – 600 633 mesh or D10 rods at 250 crs.
   675 – 900 D12 rods at 250 crs.
   1050 – 1350 D12 rods at 150 crs.
2. All reinforcement shall be placed centrally in walls and floor, and shall be continuous between walls and floor.
3. Laps in structural grade bars to be 300 min.
4. There shall be at least 2 bars – whether mesh or M.S. over the top of the pipe.
5. Concrete is to be 20MPa at 28 days as per NZS 3104:2021.
6. Baffles are to be constructed as shown when outlet velocities and soil conditions dictate, in extreme cases specific design may be required by the Council.
7. Inlet structures shall have reverse apron fall and no baffles.

INLET AND OUTFALL STRUCTURES

FAR NORTH DISTRICT COUNCIL
ENGINEERING STANDARDS

Date:	FEB 2022
Revision:	0.2
Scale:	AS SHOWN
SHEET No.	35

Appendix B – Low Pressure Sewer

Preliminary low pressure sewer design by Ecoflow

Preliminary Design Report



Project Name: Yorke Street Haruru
Prepared by: *Jon McGettigan*
Date: *1 September 2025*

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Document Control

Ecoflow Project Number	4113
Project Name	Yorke Street Haruru

Revision	1	
Author	Jon McGettigan	1/09/2025
Reviewed	Karl Sentch	1/09/2025

1 Introduction

Ecoflow Ltd have been engaged by Haigh Workman to provide a no cost hydraulic design for the proposed low-pressure sewer (LPS) system to service the residential development Yorke rd Haruru.

The below design allows for each property to have a pressure sewer grinder pump unit, boundary kit and onsite discharge line to the common reticulation network.

You will find included with this report, the preliminary Hydraulic calculations, Retention Times calculations and Layout drawings.

1.1 Background

This 25 lot subdivision is residential and will discharge to an existing FNDC gravity Manhole.

2 Design Scope

The purpose of this report is to give an indication of the pipe sizes required in order to maintain flushing velocities within the network. We have not taken into account any locations within the ground for placement of the services or the placement of flushing pits, air release valves or isolation valves. These would be located as per WASA-07 recommendations at the detailed design stage by others. Please note the following is a "Preliminary" design report carried out in accordance with the Pressure Sewer Code of Practice WASA-07 (Water Services Association of Australia 2007).

Hydraulic Design Disclaimer – E/One Progressive Cavity Grinder Pumps -
This hydraulic design has been specifically developed for use with Environment One Corporation (E/One) progressive cavity grinder pumps. It is not suitable for use with any other pump types or manufacturers.

E/One pumps are uniquely designed for the conveyance of macerated wastewater and feature a near-vertical, consistent Head-Flow (H-Q) relationship. This predictable performance curve enables stable operation across varying flow conditions and incorporates reserve hydraulic capacity beyond the design flow. This reserve is critical for managing atypical and high-stress operational events such as:

- Sudden increases in wastewater volume due to seasonal occupancy changes,
- Recovery from prolonged power outages,
- Other unforeseen variations in system demand.

Use of non-specified pump types may compromise system reliability and void any design assumptions and performance expectations. For reliable and safe operation, this design must only be used with E/One progressive cavity grinder pumps as supplied by Ecoflow.

We would recommend a consent note be placed on all lots to ensure the correct E/One 2010iP Simplex grinder pump system only is used to satisfy this hydraulic design.

3 Design Parameters

The EOne Design Software is utilising the probability method was used in this preliminary design.

The following design parameters were adopted:

- Pump type = E/One Extreme series semi-positive displacement pump.
  We cannot design for or guarantee the suitability of the network for non-progressive cavity pumps other than Environment One pumps.
- Pump requirements = 230V, 50 Hz single phase
- Friction loss formula is Hazen-Williams with a c factor of 140
- Pipe type is Polyethylene, PE100, PN16, SDR 11 (All diameters measured OD)
- Minimum Scouring velocity of 0.6m/s
- Flushing points and air valves included into design of system
- No Stormwater allowance required in design of system

3.1 Sewer Loadings

The hydraulic design has been based on 3 People/lot and 200L/person/day

4 Hydraulic Analysis

The network flows gradually uphill to a high point at the discharge. No future connections have been evaluated.

4.1 Peak Flows

The Probability Method was developed and subsequently used to determine peak flow rates in pressure sewerage systems. This method was developed specifically for the EOne semi-positive displacement pump operating characteristics with their near vertical Head vs Quantity (HQ) performance curve.

Ecoflow determine the peak flow rate in each pipe segment and calculate the following:

- Friction head in each segment
- Static head for each pressure sewer unit
- Resulting total dynamic head for each pressure sewer unit

A key assumption in the recommended design procedure is maximum number of pressure sewer unit cores operating daily and the predicted maximum daily number of pumps running at once vs. the number of pumps connected.

As demonstrated in the hydraulic analysis outputs, the probability method determines a peak wastewater flow rate for the equivalent lots connected. It should be noted that when peak flows are calculated for a pressure sewerage system the duration is only for a short period of say less than a few minutes.

The di-urnal peaks are also smoothed out somewhat, due to the buffering of operational volume in each of the tanks. i.e., the pump doesn't start every time a toilet is flushed. The operating sump in the tank requires a volume of 40 litres to start the pump, the pump then runs for one minute.

4.2 Maximum Desirable Total Dynamic Head

Design is integrally associated with knowledge of the pumps being used. The prime example of this is the maximum total dynamic head (TDH) that is chosen in the design process. Even though the EOne semi-positive displacement grinder pump can lift to over 100m, the total design dynamic head should be restricted to 56m TDH. Constant operation of the pumps over 56m TDH causes the operational life of the stator to diminish, depending on the mix of static and dynamic head experienced.

4.3 Infiltration Allowance

Infiltration factors are not normally used in the calculation of peak flow in a pressure sewerage system provided there is confidence of the water tightness of the house gravity wastewater pipe network.

The simultaneous pump operations method of determining peak flows does not include a component for excessive infiltration/inflow. It has been standard practice and recommendation, that proactive means be employed to eliminate the potential for significant Inflow and Infiltration. This has typically been accomplished by exercising control over the "watertightness" of the private facilities. This would include inspecting the house plumbing at the time of house construction / connection and requiring that any faulty drainage works be rectified.

Because the Low-Pressure Sewer networks are constructed with sealed polyethylene PE pipe, and connections carried out with fusion welds, they are not susceptible for groundwater or surface drainage to creep in. Therefore, a completely pressurised collection system will, for all practical purposes, ignore infiltration flows and deliver only the intended wastewater stream to the treatment plant.

4.4 Retention Time Analysis

Pipe diameters have been sized as small as possible to reduce volume and retention times. This also increases the velocity which helps with self-scouring. We have also standardised on pipe sizes to aid in the construction of the network.

4.5 Pressure Sewer Units

The hydraulic analysis and preliminary design have been performed based on the performance of the Environment One (Eone) grinder pump unit on each lot. This design is not guaranteed or valid for installation of any other technology or product.

4.6 Flushing Velocities

A minimum recommended velocity is 0.6m/s to prevents solids build up.

Following best practise, standard flushing points will be required at the head of all branch mains.

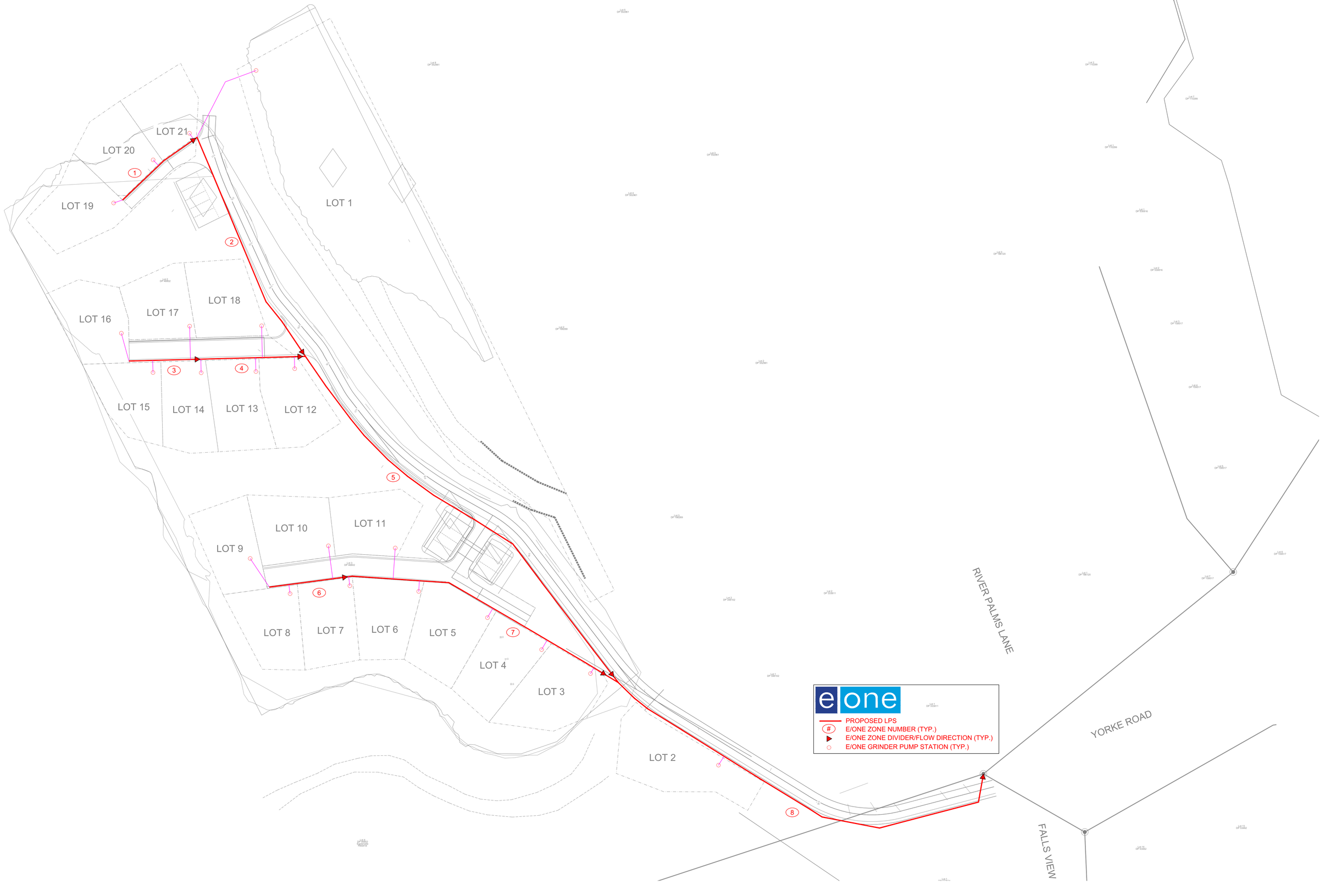
5 Air Management

The network flows gradually uphill to a high point at the discharge, any air entering the network will work its way to the discharge point without the requirement for air release valves. There is also sufficient pump head to push any entrapped air out.

Please feel free to contact us if you have any queries relating to these preliminary designs or require any further information.

Kind Regards,

Jon McGettigan


LOT 21
LOT 20
LOT 19
LOT 1
LOT 18
LOT 17
LOT 16
LOT 15
LOT 14
LOT 13
LOT 12
LOT 11
LOT 10
LOT 9
LOT 8
LOT 7
LOT 6
LOT 5
LOT 4
LOT 3
LOT 2
1
2
3
4
5
6
7
8
RIVER PALMS LANE
YORKE ROAD
FALLS VIEW
PROPOSED LPS
E/ONE ZONE NUMBER (TYP.)
E/ONE ZONE DIVIDER/FLOW DIRECTION (TYP.)
E/ONE GRINDER PUMP STATION (TYP.)

PRELIMINARY PRESSURE SEWER - PIPE SIZING AND BRANCH ANALYSIS

Prepared By:
M. Crowley

Yorke Rd
New Zealand

August 29, 2025

Zone Number	Connects to Zone	Number of Pumps in Zone	Accum Pumps in Zone	Liters/Day per Pump	Max Flow Per Pump (lps)	Max Sim Ops	Max Flow (LPS)	Pipe Size (mm)	Max Velocity (MPS)	Length of Main this Zone	Friction Loss Factor (m/100m)	Friction Loss This Zone	Accum Fric Loss (meters)	Max Main Elevation	Minimum Pump Elevation	Static Head (meters)	Total Dynamic Head (m)
This spreadsheet was calculated using pipe diameters for: SDR11PE100											Friction loss calculations were based on a Constant for inside roughness "C" of: 150						
1.00	2.00	3	3	750	.58	2	1.16	50.00	0.92	25.10	2.36	0.59	7.74	26.50	9.50	17.00	24.74
2.00	5.00	1	4	750	.58	3	1.73	50.00	1.38	64.80	5.00	3.24	7.15	26.50	3.00	23.50	30.65
3.00	4.00	3	3	750	.58	2	1.16	50.00	0.92	18.60	2.36	0.44	5.73	26.50	13.00	13.50	19.23
4.00	5.00	4	7	750	.58	3	1.73	50.00	1.38	27.70	5.00	1.38	5.29	26.50	14.50	12.00	17.29
5.00	8.00	0	11	750	.58	4	2.31	63.00	1.13	119.90	2.61	3.13	3.91	26.50	15.50	11.00	14.91
6.00	7.00	3	3	750	.58	2	1.16	50.00	0.92	20.60	2.36	0.49	5.17	26.50	17.50	9.00	14.17
7.00	8.00	6	9	750	.58	3	1.73	50.00	1.38	78.10	5.00	3.90	4.68	26.50	18.50	8.00	12.68
8.00	8.00	1	21	750	.58	5	2.89	90.00	0.69	113.80	0.69	0.78	0.78	26.50	18.50	8.00	8.78

Note: This analysis is valid only with the use of progressive cavity type grinder pumps as manufactured by Environment One.

PRELIMINARY PRESSURE SEWER - ACCUMULATED RETENTION TIME(HR)

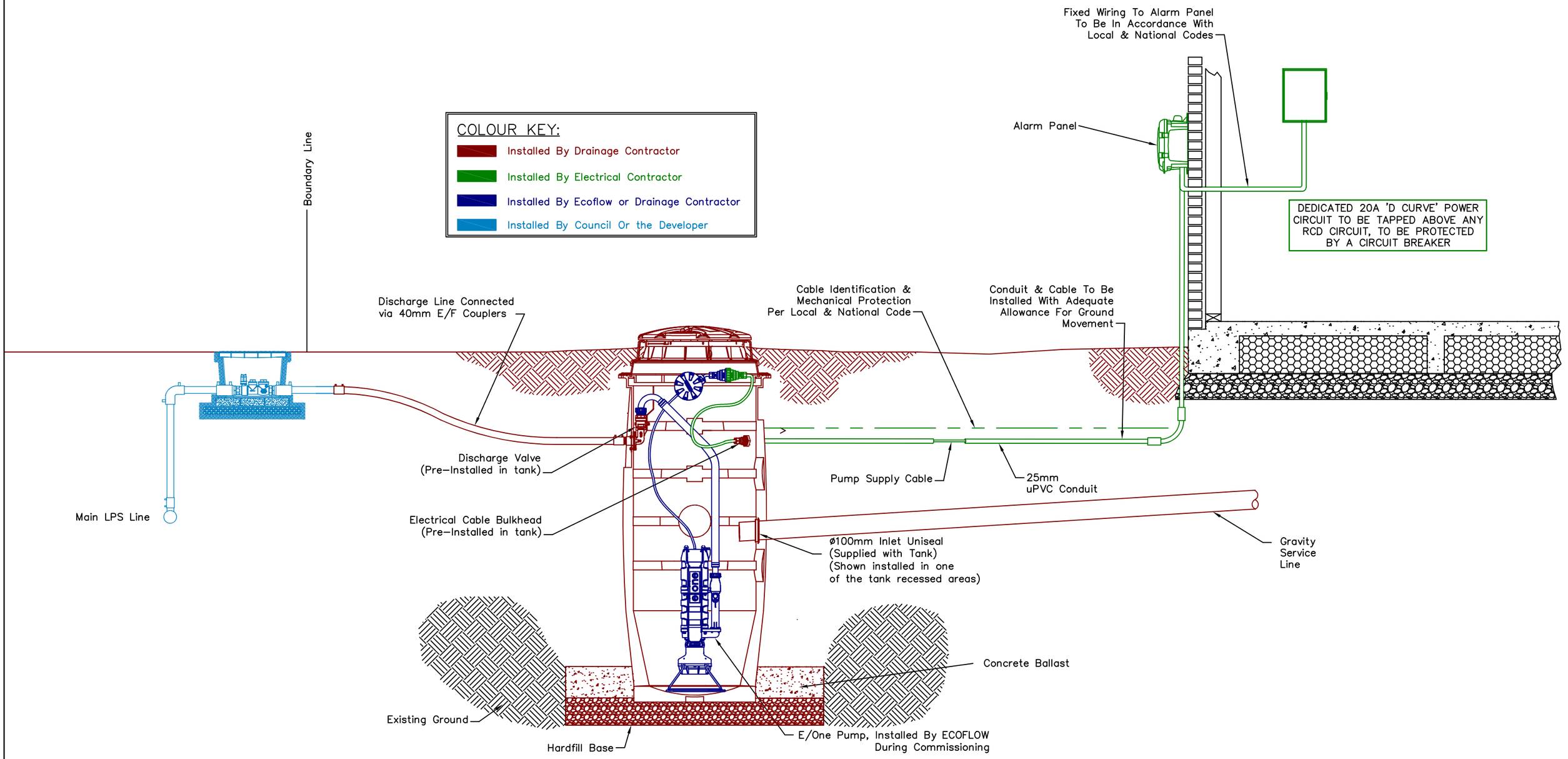
Prepared By:
M. Crowley

Yorke Rd
New Zealand

August 29, 2025

Zone Number	Connects to Zone	Accumulated Total of Pumps this Zone	Pipe Size (mm)	Liters per 100 lineal meters	Length of Zone	Capacity of Zone	Average Daily Flow	Average Fluid Changes per Day	Average Retention Time (Hr)	Accumulated Retention Time (Hr)
This spreadsheet was calculated using pipe diameters for: SDR11PE100								Liters per Day per Dwelling		750
1.00	2.00	3	50.00	125.66	25.10	31.54	2,250	71.33	0.34	2.43
2.00	5.00	4	50.00	125.66	64.80	81.43	3,000	36.84	0.65	2.09
3.00	4.00	3	50.00	125.66	18.60	23.37	2,250	96.26	0.25	1.85
4.00	5.00	7	50.00	125.66	27.70	34.81	5,250	150.82	0.16	1.60
5.00	8.00	11	63.00	204.28	119.90	244.93	8,250	33.68	0.71	1.44
6.00	7.00	3	50.00	125.66	20.60	25.89	2,250	86.92	0.28	1.35
7.00	8.00	9	50.00	125.66	78.10	98.14	6,750	68.78	0.35	1.07
8.00	8.00	21	90.00	418.54	113.80	476.30	15,750	33.07	0.73	0.73

Note: This analysis is valid only with the use of progressive cavity type grinder pumps as manufactured by Environment One



ecoflow
Sewer Made Simple

AUCKLAND - (Head Office)
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Hornby, Christchurch
Ph (03)349-2506

www.ecoflow.co.nz
Email: info@ecoflow.co.nz

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CLIENT		

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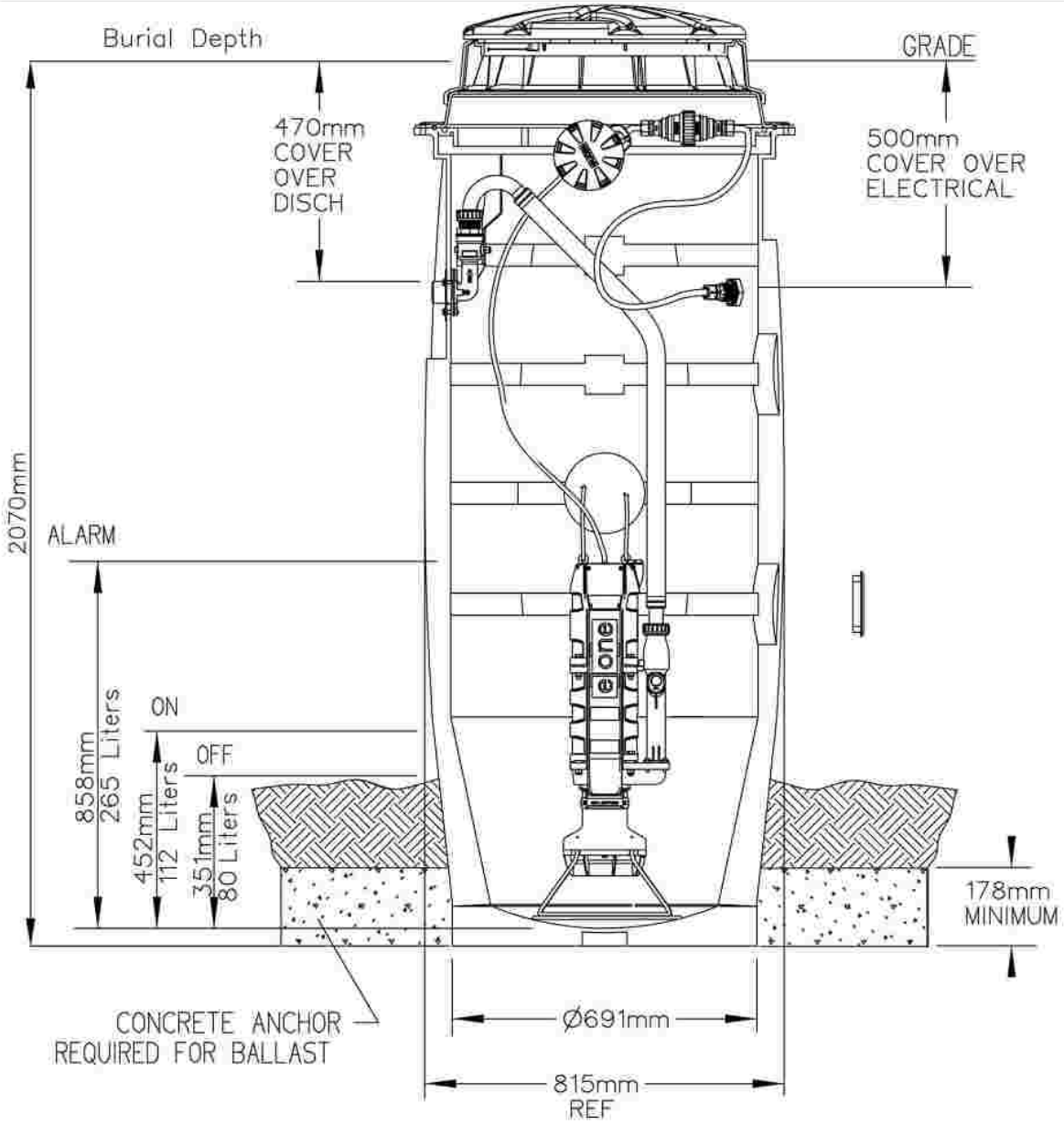
System Layout

Environment One Simplex 2010iP

Job

REVISION	SCALE		Dwg No.
1	NTS	AT	1

eone SEWER SYSTEMS



Pump	
Motor Type	Single Phase, 240V, 50Hz, 0.75kW
Standards	NSF46, AS/NZS 60335.2.41:2004
Pump Type	Helical Rotor, Semi-positive Displacement
Design Head	56m
Pump Flow	0.4 l/s @ 55m TDH 0.75 l/s @ 1m TDH
Speed	1450 rpm
Starting Current	26.4 Amps
Starting Torque	15.6 Nm
Check Valve	Proprietary Swing Check Valve
Anti-siphon Valve	Proprietary integral anti-siphon / Check Valve
Controls	Pressure Switch – On/Off & Alarm

Tank	
Material	High Density Polyethylene
Standards	As/NZS 1546.1:1998
Cover Loading	500kg Point Load in Centre of Lid
Capacity Total	720 Litres

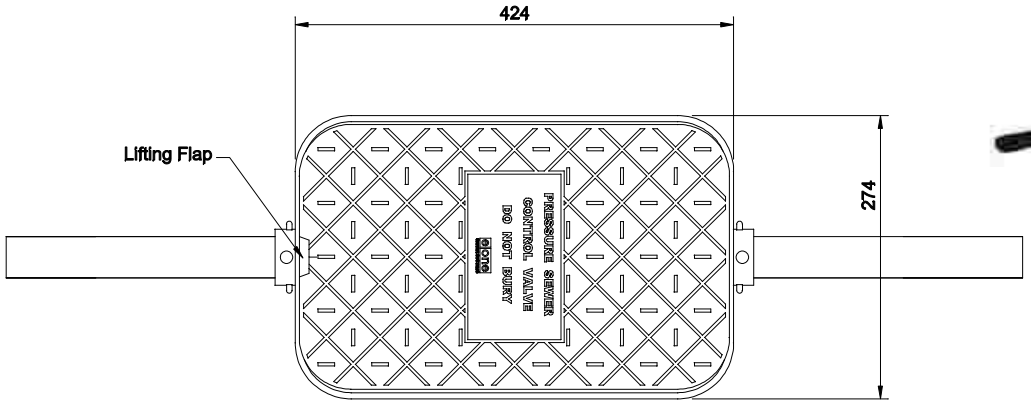
Controller	
Rating	IP56
Audible Alarm	Yes
Visual Alarm	Yes
Protection	Low Voltage, Over Pressure and Dry Run
Information	Hours Run, Max/Min/Avg A, V, Run time

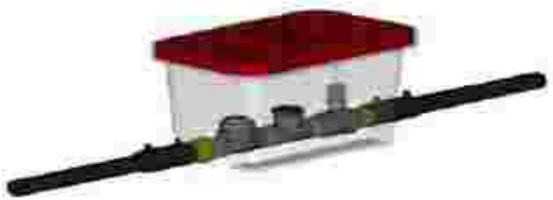
ecoflow

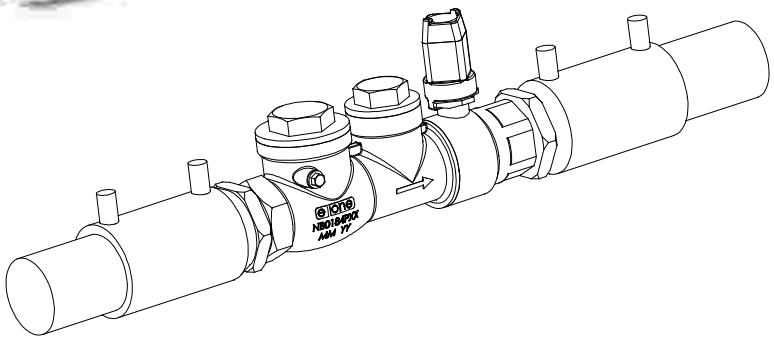
Ecoflow Ltd.
16b Piermark Drive, North Harbour (NZ)
P.O Box 300-249, Albany, Auckland
Ph (09)447-1793 Fax (09) 447-3901

Environment One
Simplex 800x2000iP

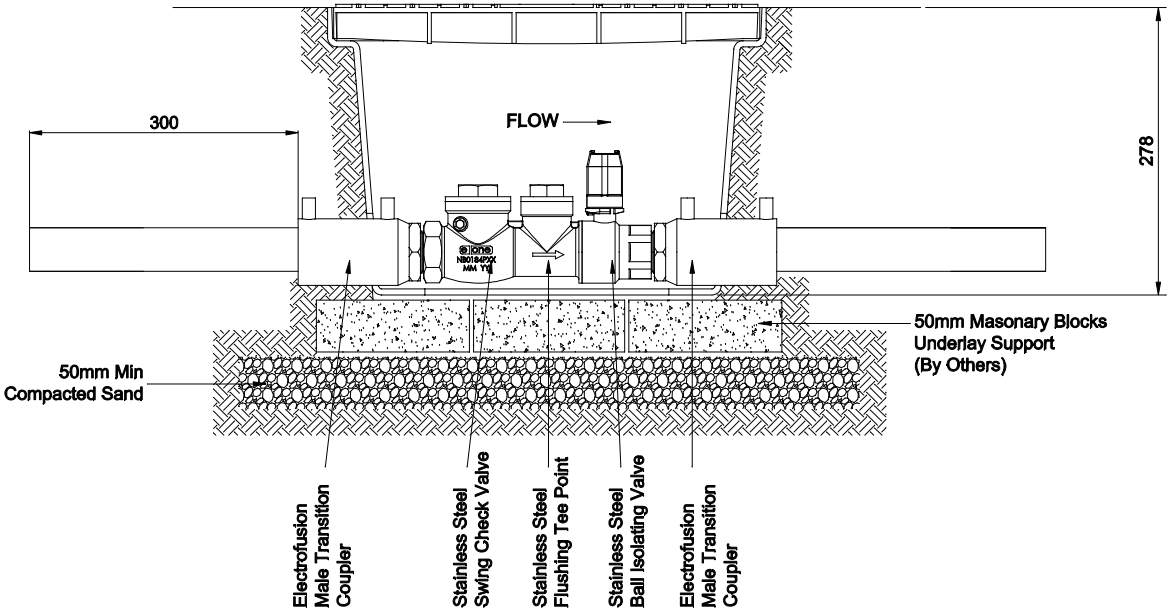
eone SEWER SYSTEMS

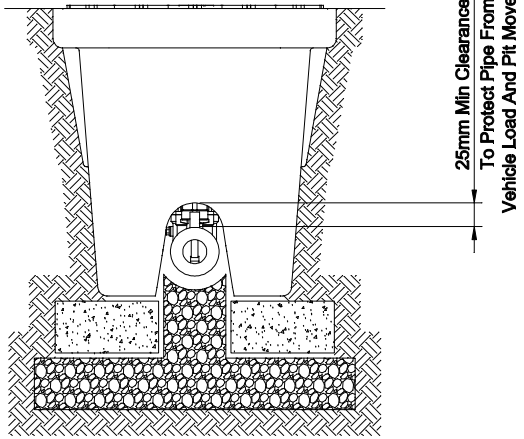






Each boundary kit supplied with
300mm length DN40 PE100 PN16 stubs
each end E/F welded and complete unit pressure
tested to 16 Bar by Ecoflow





ecoflow

Ecoflow Ltd.
16b Piermark Drive, North Harbour (NZ)
P.O Box 300-249, Albany, Auckland
Ph (09)447-1793 Fax (09) 447-3901

	BY	DATE
DRAWN	MC	17/1/13
CHECKED	JM	17/1/13
CLIENT APPROVED		

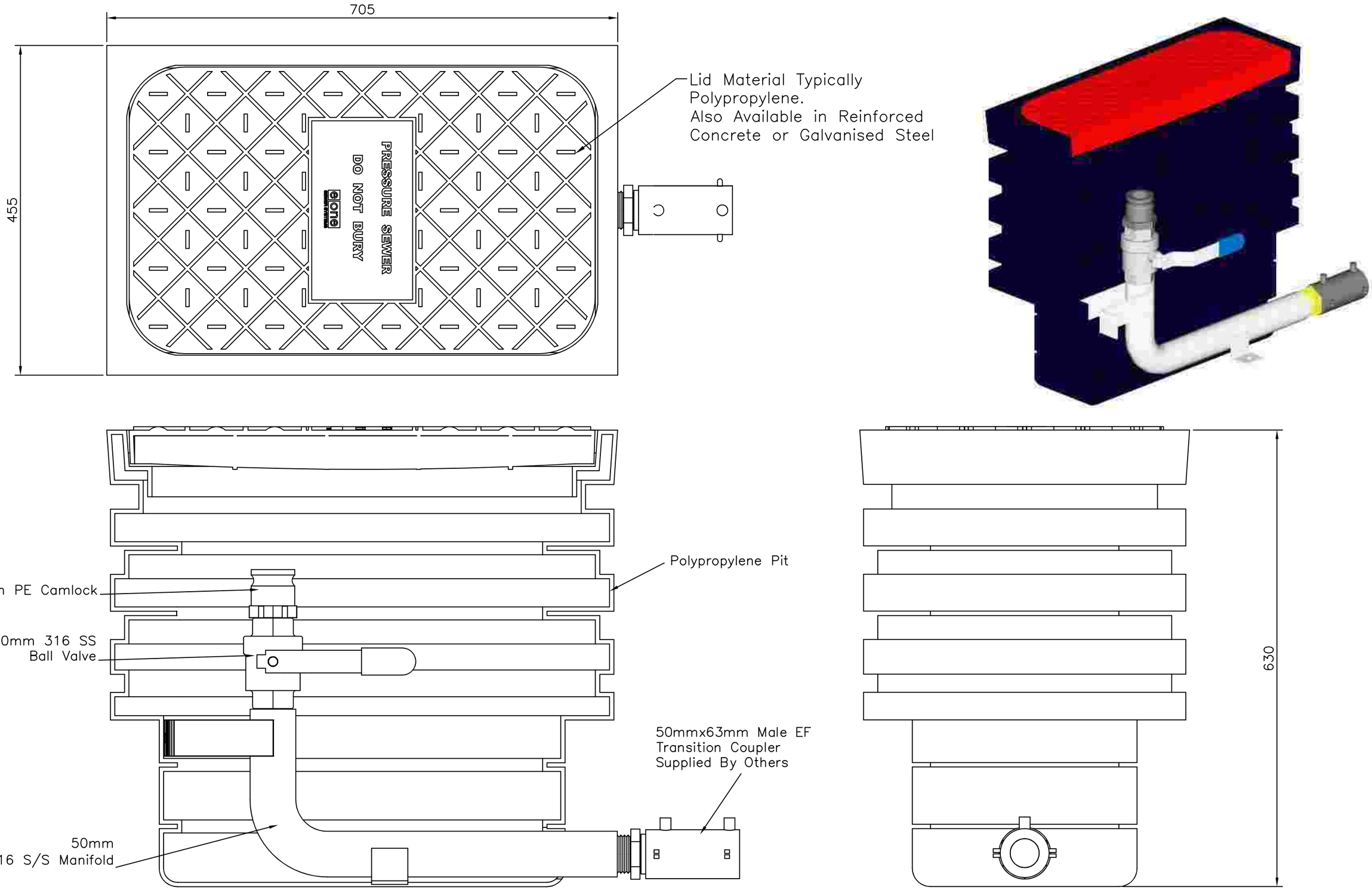
TITLE

Environment One - Boundary Kit With Extended Stubs New Zealand Standard

CLIENT

SCALE 1:20 AT A3

REVISION | Job | Dwg No.



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Ph (03)349-2506

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DRAWN		
CHECKED		
CLIENT APPROVED		
CLIENT		

TITLE

Environment One Flushing Point New Zealand Standard

Job

REVISION	SCALE		Dwg No.
1	NTS	AT	1

e one SEWER SYSTEMS



ecoflow

SEWERS MADE SIMPLE

ENGINEERS | DEVELOPERS | COUNCILS



WHY ECOFLOW?

OUR TRACK RECORD

Over the last 15 years, Ecoflow has installed more than 20,000 E/One pressure sewer systems throughout New Zealand. We have helped engineers and councils design the pressure sewer systems found in many developments across the country.

WORLD-LEADING TECHNOLOGY

Ecoflow exclusively use E/One pumps, internationally recognised as the industry leader for pressure sewer systems.

TRUE SPECIALISTS

Ecoflow is a true specialist - pressure sewer systems are what we know and all we do. We get involved in every aspect of the implementation process, from community consultation, through to commissioning and ongoing support.

WE'RE DOWN-TO-EARTH

Ecoflow is a New Zealand-owned and operated company, with the original founders still working on every aspect of the business. Don't be surprised if you see them out in the field during an installation and talking with building company staff.

TOTAL RESPONSIBILITY

Being a small New Zealand-owned company, we're passionate, pro-active and supportive of every pressure system design and installation we do.

EXCELLENCE IN SERVICE

No matter where our customers are in New Zealand, Ecoflow is there to support them.



SERVICES

DESIGN

For your next project, Ecoflow can offer free hydraulic design, pipe layout and costings to assist with your option study.

AUDIT

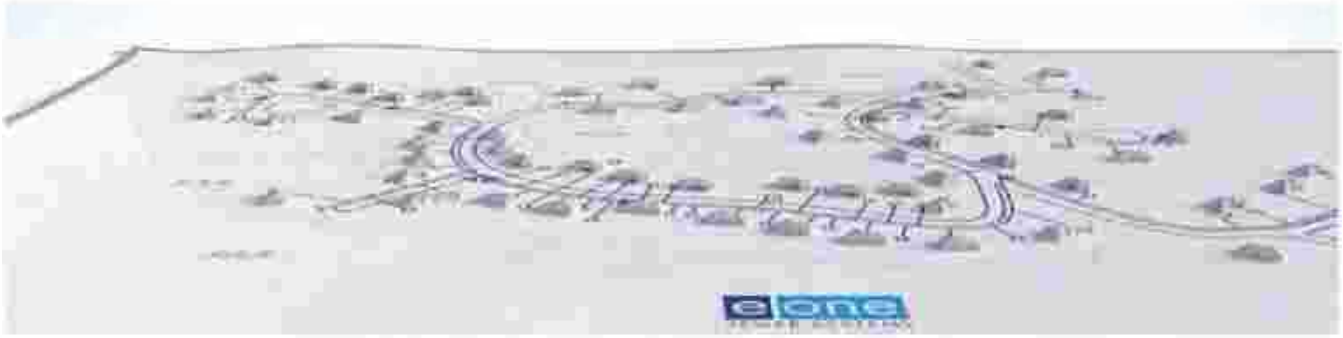
Ecoflow can monitor your existing pressure sewer network to give you a better idea of performance. From the data collected, we can confirm design assumptions, estimate additional capacity, assess how the network is operating in terms of self-scouring and now, with use of smart pump controllers, we can manipulate flows to achieve better efficiencies and weed out sources of infiltration.

MAINTENANCE

Ecoflow exclusively use E/One pumps, which are designed to last in excess of 25 years in a corrosive wastewater environment. With more than 650,000 grinder pumps operating in 40 countries, E/One pumps have an international reputation for being reliable and robust, with minimal maintenance needed. If a pump does need a service, no matter where in New Zealand, Ecoflow is there to provide the necessary support.

PROJECT MANAGEMENT

Ecoflow's in-house project managers can assist with the implementation of your pressure sewer network. Tap into our field experience to ensure your project is delivered without a hitch.





WHY CHOOSE PRESSURE SEWER OVER GRAVITY?

Wastewater treatment and infrastructure is an essential part of any community. However, traditional gravity sewer systems are not the most appropriate or cost-effective solution in difficult ground conditions. Fall requirements for adequate flow by gravity may require deep excavations in hilly or flat terrain and additional expensive pump stations may be needed.

On the other hand, a Pressure Sewer System consists of an E/One grinder pump at each property pumping into a network of small-diameter, heavy-duty polyethylene pipe, which can be installed shallow and follow the contours of the land. Because the network is sealed it eliminates inflow and infiltration. This means peak wet weather design flows can be reduced. The catchment will be less of a burden on downstream existing (often ageing) infrastructure. The network is also more resilient to ground movements and is easily accessible for maintenance.

Ecoflow is New Zealand's leading supplier of Pressure Sewer Systems. With an E/One grinder pump, Pressure Sewer Systems provide a far more reliable, controllable transfer of wastewater from the household to the treatment plant than conventional methods

Pressure Sewer Systems are becoming increasingly popular amongst council asset managers, engineering consultants and developers thanks to the advantages and cost savings they offer over traditional gravity systems.

Plus, upgrading to smart controllers that communicate via a cellular network to an online portal gives councils complete control of their pressure sewer networks. This means councils can monitor and control the network, reduce peak flows, hold back pumping during storm events and offer a higher level of service to the homeowner.

BENEFITS OF AN E/ONE PRESSURE SEWER SYSTEM

Sealed system, no infiltration – lower impact on treatment plant capacity

Minimal maintenance – no manholes or large public pump stations

More resilient to seismic activity such as ground movement and liquefaction

24 HRS STORAGE

24 hours of storage for each home

Difficult ground conditions – a Pressure Sewer System is suitable for flat, wet, rocky and hilly conditions

Lower cost of reticulation – lower material costs and shallower trenching

SEWER SYSTEMS

Dependable, reliable: over 650,000 units, 40 countries

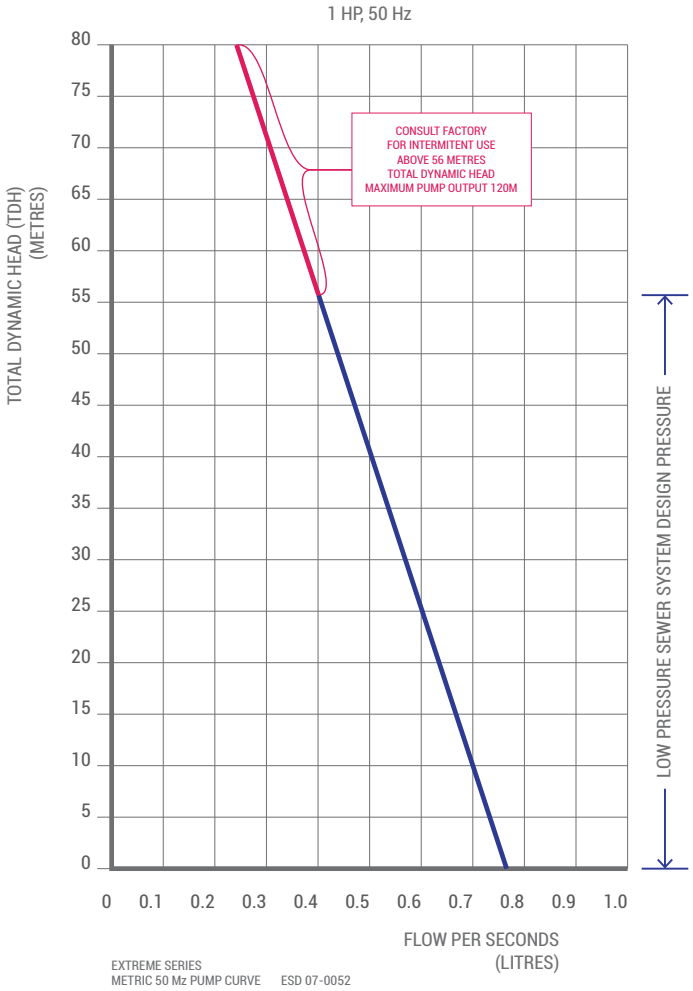
E/One's semi-positive displacement (SPD) grinder pump was developed specifically for pressure sewer systems. Its constant, predictable flowrate over a wide range of pressure provides the network designer with confidence, and the E/One pump's ability to pump at high head provides reserve hydraulic capacity and ultimately reduces design risk. It has benefited from nearly 50 years of fine-tuning and improvement. With over 650,000 units in 40 countries, the larger diameter, low velocity, high torque grinder offers market-leading reliability you can depend on.

How the E/One works

All household wastewater flows to the underground chamber, which is sized to include 24hrs emergency storage. At the heart of the station is the E/One grinder pump.

Pressure sensors in the head of the pump signal the controller to activate the pump at a predetermined level. E/One's low speed, high torque, 133mm cutter wheel has reduced inlet velocity, which slowly introduces the debris into the cutter and is less likely to jam, bind or suffocate.

Wastewater is then pumped via progressive cavity rotor and stator. The precision cast and polished stainless-steel rotor can pump many kilometres to the discharge point or treatment plant, reducing the need for lift stations.



Grinder Pump Performance Curve

PRODUCTS

CHAMBER OPTIONS



E/One Simplex 2010iP – single pump

Designed for residential dwellings.

- Standard storage flows
- Diameter (mm): 815
- Height (mm): 2130
- Weight (kg): 74
- Total Capacity (L): 718



E/One Duplex 2014iP – dual pump

Designed for commercial or industrial areas.

- Greater storage/flows
- Diameter (mm): 1140
- Height (mm): 2030
- Weight (kg): 132
- Total Capacity (L): 1337



Custom T Tank – multiple pump systems

Designed for commercial or industrial areas.

Custom design storage/flows

Ecoflow can design a system solution that meets your storage/ flow rate needs

INTELLIGENT PRESSURE SEWER



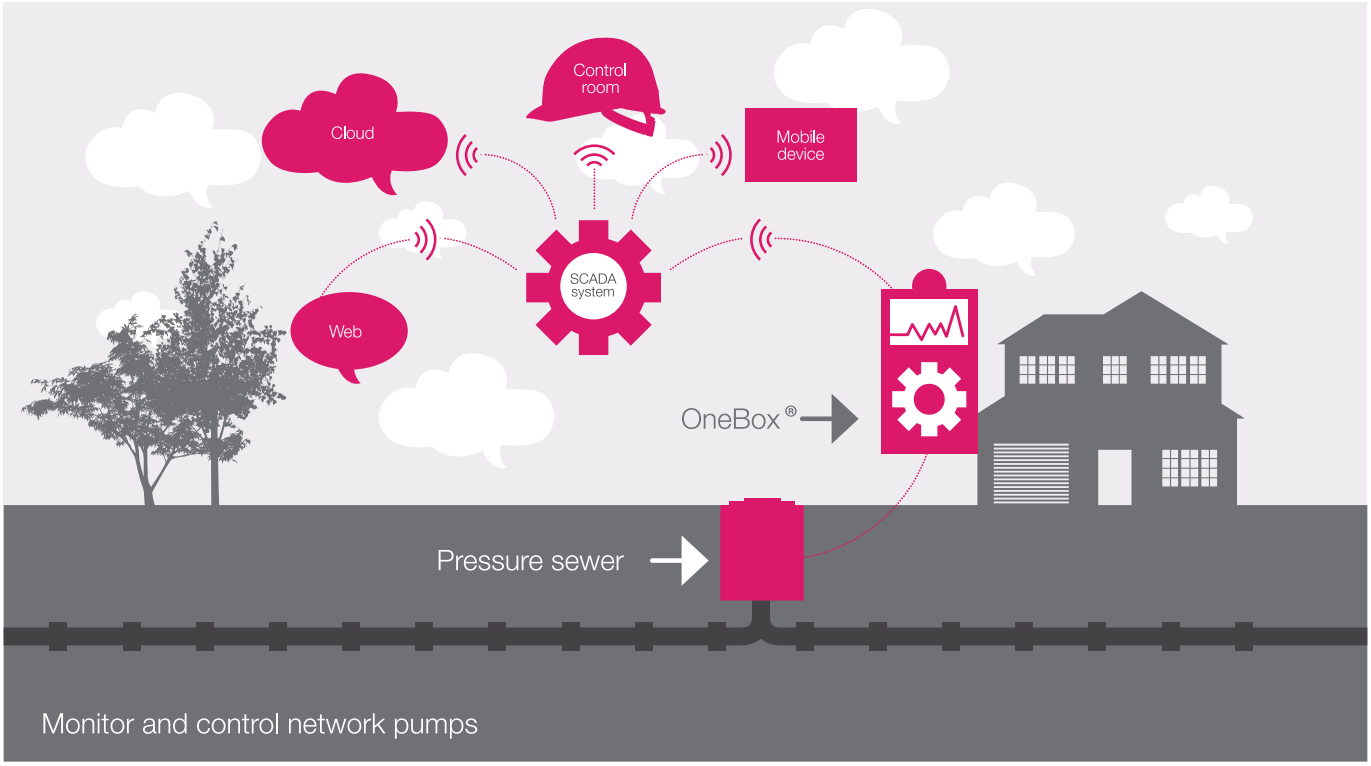
OneBox® iota.

Iota Onebox Controller

Monitor and control your low-pressure sewer system remotely and in real time.

With the Onebox Intelligent Sewer you can monitor the status of the sewer connection to regulate flows and remove peak volumes from the network. You can significantly reduce flows compared to gravity and uncontrolled pressure sewer systems, and also avoid exacerbating overflows downstream during storms.

OneBox Intelligent Sewer provides opportunities for significant savings in capital expenditure and allows growth with the least amount of impact on downstream infrastructure, minimising capacity constraints.



ACCESSORIES

Boundary Kits



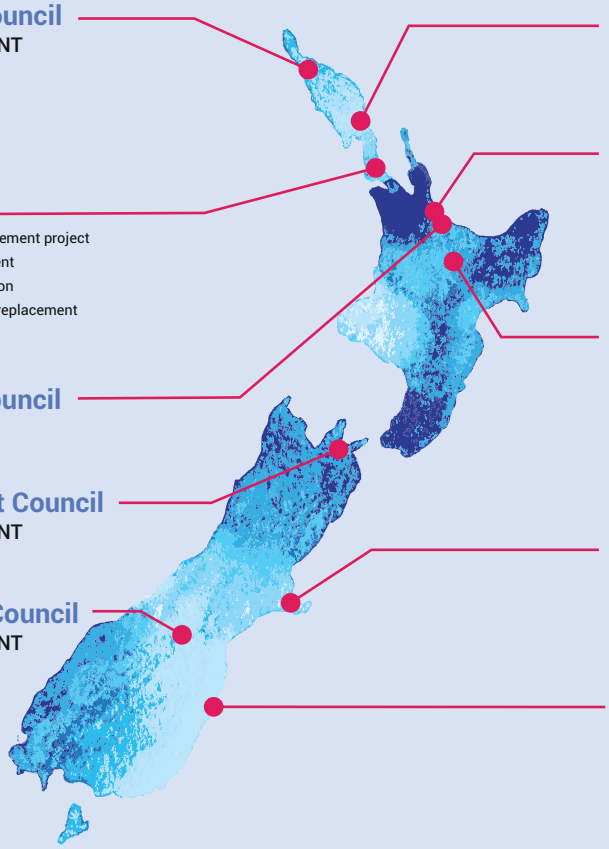
Provide a connection point for each individual house. These are especially useful for greenfield development as they eliminate the requirement for live tapings. Ecoflow's boundary kits come with polyethylene stubs pre-welded and pressure-tested to 16Bar.

Flushing Points



Provide an access point to the network for flushing or sucking if the downstream network is isolated. Ecoflow's Flushing point is pre-assembled, and pressure tested to 16Bar.

15 YEARS OF ECOFLOW
20,000 PRESSURE SEWER SYSTEMS INSTALLED



Far North District Council
SEPTIC TANK REPLACEMENT
2009 - Opua
2012 - Opua stage 2
2013 - Awanui
2017 - Kerikeri

Auckland Council
2008 - Point Wells septic tank replacement project
2009 - Failed step system replacement
2010 - Millwater greenfield subdivision
2010 - Huapai failed gravity system replacement
2012 - Matakana septic tank retrofit

Tauranga District Council
2018 - Mataphi (Smart Sewer)

Marlborough District Council
SEPTIC TANK REPLACEMENT
2009 - Grovetown

Mackenzie District Council
SEPTIC TANK REPLACEMENT
2010 - Fairley

Whangarei District Council
SEPTIC TANK REPLACEMENT
2012 - Ruakaka

Western Bay of Plenty District Council
SEPTIC TANK REPLACEMENT
2011 - Maketu
2017 - Te Puna (Smart Sewer)

Rotorua District Council
SEPTIC TANK REPLACEMENT
2007 - Hinemoa Point
2008 - Brunswick/Rotokawa
2010 - Okere Falls
2010 - Lake Okareka
2011 - Hamurana

Christchurch City Council
2011 - Rebuild, replacement of failing gravity system (post-earthquake)
2016 - Ongoing, greenfield development (Smart Sewer)

Dunedin City Council
SEPTIC TANK REPLACEMENT
2010 - Allanton

ecoflow

SEWERS MADE SIMPLE

CONTACT US FOR A FREE CONSULTATION

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Website: www.ecoflow.co.nz

Appendix C – Erosion & Sediment Control Calculations

22 322 Yorke Road

ESCP

GD045 inputs for Auckland ESCP calculator tool

https://tools.aucklandcouncil.govt.nz/erosion-sediment-control-device-sizing-tool/calculator/decanting-earth-bund

GD05 B1.3.1 Weather - use design rainfall maps appended to TP108 Guidelines for Stormwater Runoff Modelling in the Auckland Region (or its successor).

TP108 5.2 Rainfall

Design 24 hour rainfall depths are selected for the catchment location from the contour maps in Appendix A.

- 2 yr ARI, P24 = 75 mm (from Figure A1)
- 10 yr ARI, P24 = 130 mm (from Figure A3)
- 100 yr ARI, P24 = 200 mm (from Figure A6)

HIRDS V4 for Yorke Road

- 2 yr ARI (P24) = 109mm
- 10 yr ARI (P24) = 169mm
- 100 yr ARI (P24) = 257mm

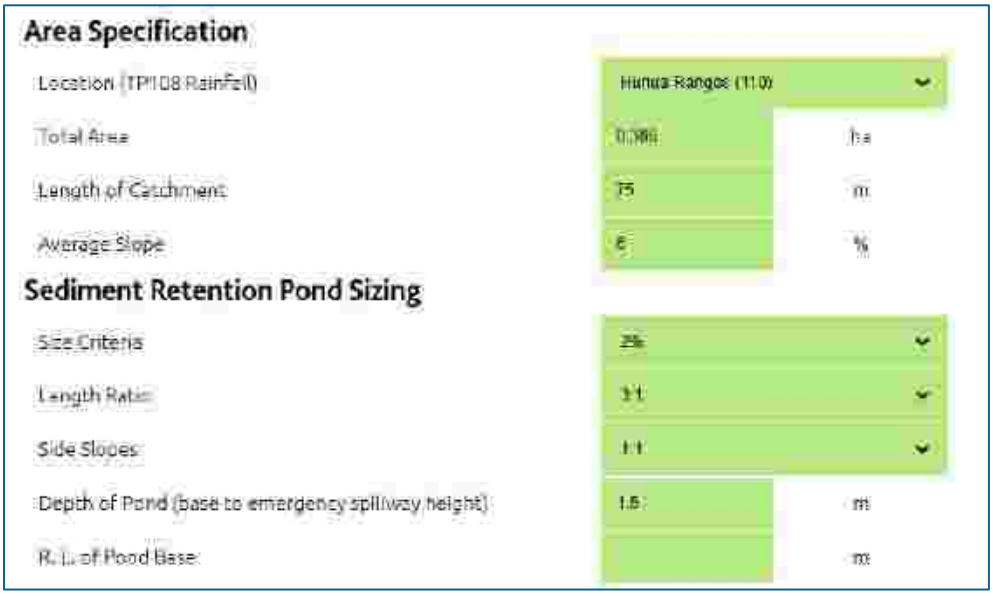
SRP1

Catchment 0.386ha

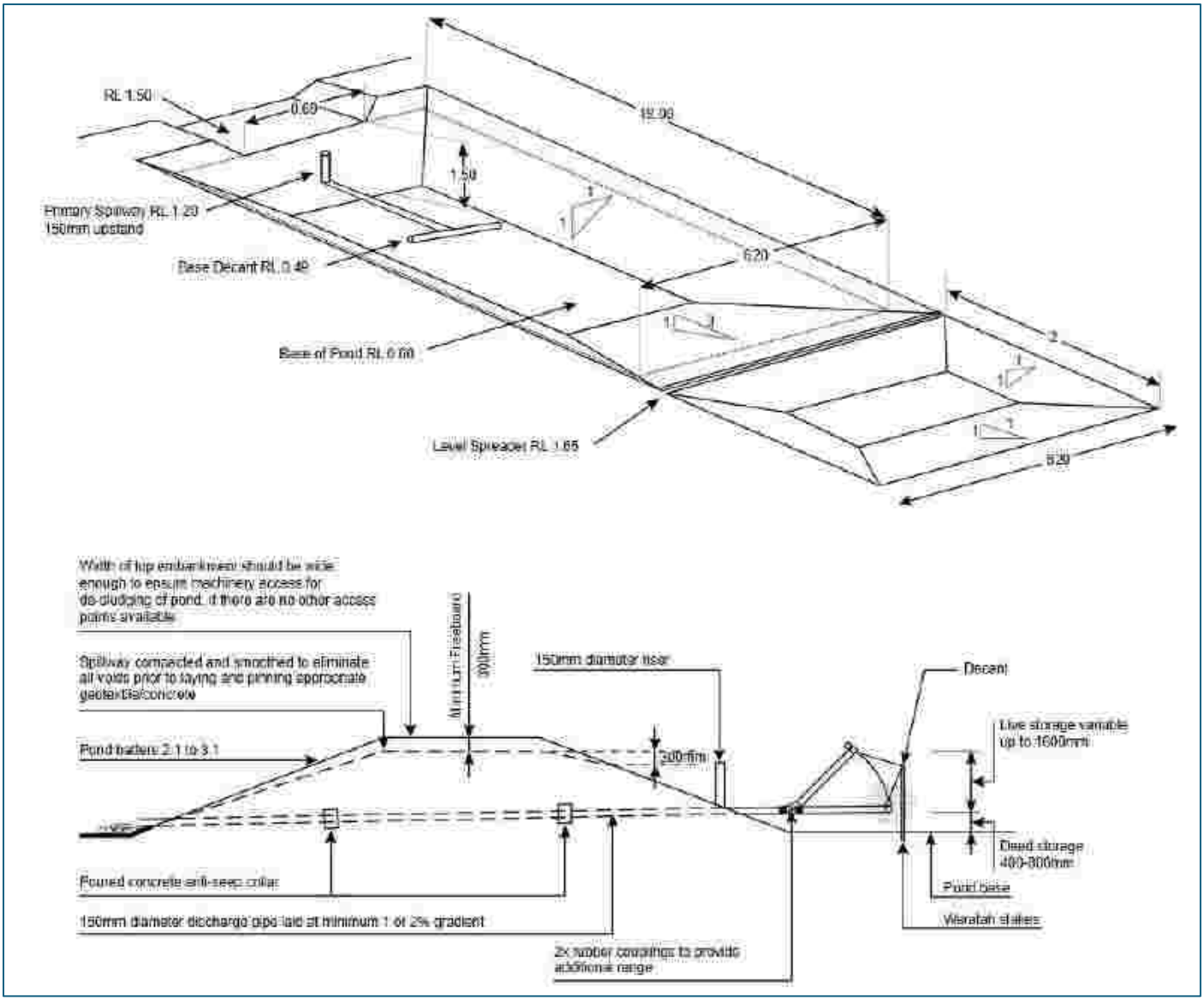
Catchment length 75m

Average slope (22 – 17.5)/75 = 6%

On earthwork sites with slopes < 18% and < 200 m in length, design SRPs with a minimum volume of 2% of the contributing catchment area (200 m3 for each ha of contributing catchment)



Storage Volume Criteria	2	%
Contributing Catchment	0.385	ha
Minimum Storage Volume	77	m^3
Dead Storage	23	m^3
Live storage	54	m^3
Length at Emergency Spillway Level	16.00	m
Width at Emergency Spillway Level	6.20	m
Emergency Spillway base width (300mm deep)	0.69	m
Primary Spillway diameter	150mm	(min)
Number of decants	1	
Number of holes per decant	51	
Minimum outlet pipe diameter	150	mm
RL Emergency Spillway	1.50	m
RL Primary Spillway	1.20	m
RL Level Spreader (min)	1.65	m
RL Base Decant	0.49	m
Length at Base	12.00	m
Width at Base	3.20	m
Forebay		
Depth (min. depth)	1	m
Width (full width of pond)	6.20	m
Length (min. length)	2	m


RL 1.50
0.60
15.00
1.50
Primary Spillway RL 1.20
150mm upstand
Base Decant RL 0.40
6.20
Base of Pond RL 0.00
Level Spreader RL 1.65
6.20
Width of top embankment should be wide enough to enable machinery access for de-sludging of pond, if there are no other access points available
Spillway compacted and smoothed to eliminate all voids prior to laying and pinning appropriate geotextile/concrete
Pond batters 2:1 to 3:1
Minimum Freeboard 300mm
150mm diameter riser
300mm
Decant
Live storage variable up to 1600mm
Dead storage 400-800mm
Pond base
Weratah stakes
Poured concrete anti-seep collar
150mm diameter discharge pipe laid at minimum 1 or 2% gradient
2x rubber couplings to provide additional range

DEB1

Catchment 0.228ha

Catchment length 55m

Average slope (17.5 – 11)/55 = 12%



Area Specification

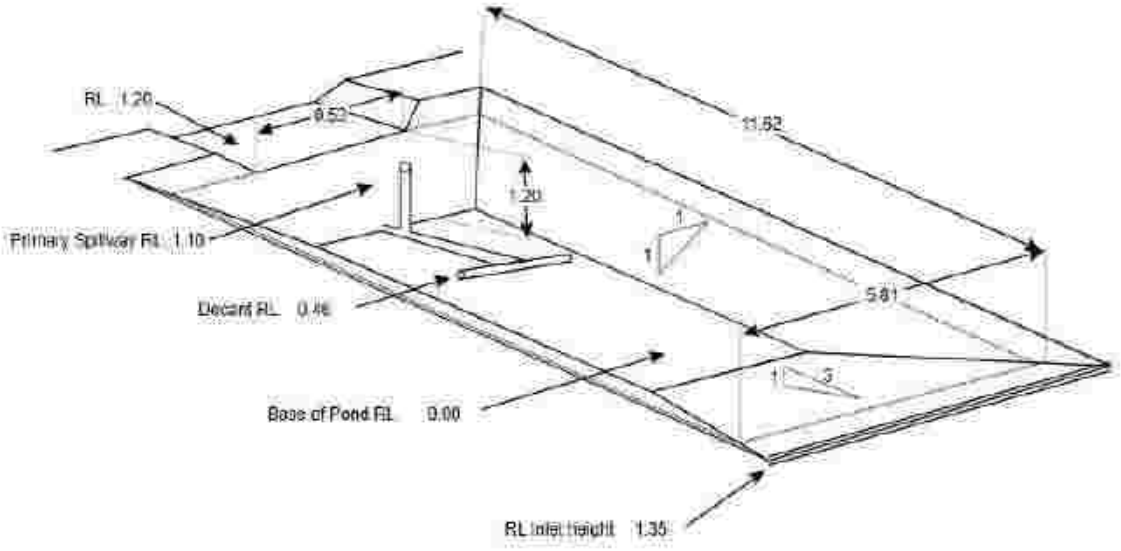
Location (TP108 Rainfall)	Hunua Ranges (110)	
Total Area	0.228	ha
Length of Catchment	55	m
Average Slope	12	%

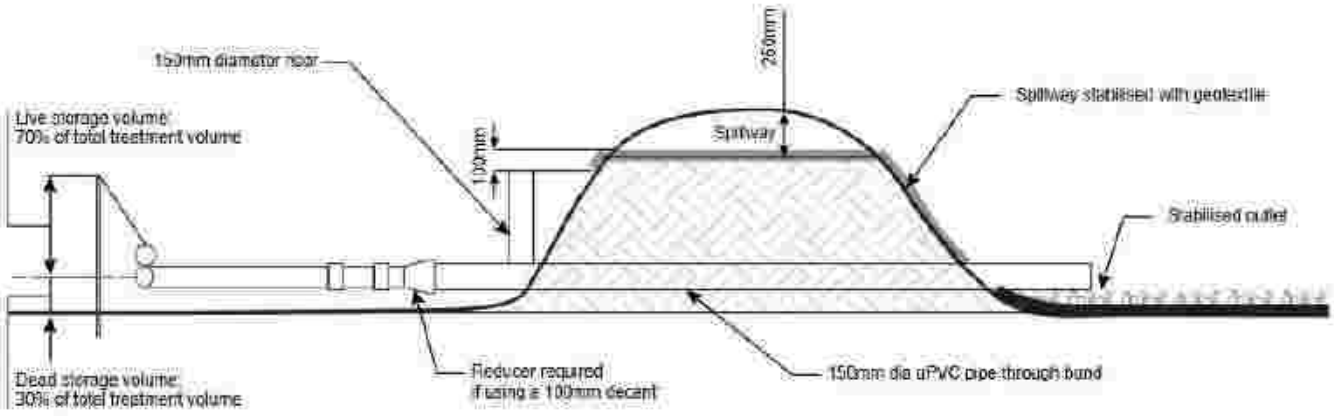
Decanting Earth Bund Sizing

Length Ratio	2:1	
Side Slopes	1:1	
Depth From Emergency Spillway	1.2	m
R.L. of Pond Base		m

Storage Volume Criteria	2	%
Contributing Catchment	0.228	ha
Minimum Storage Volume	45.6	m^3
Dead Storage	13.68	m^3
Live Storage	32	m^3
Length at Emergency Spillway Level	11.62	m
Width at Emergency Spillway Level	5.81	m
Spillway base width (250mm deep)	0.62	m
Primary Spillway diameter	150mm	(min)
Number of decants	1	
Number of holes per decant	30	
Minimum outlet diameter	150	mm
RL Emergency Spillway	1.20	m
RL Primary Spillway	1.10	m
RL Inlet height (min)	1.35	m
RL Decant	0.46	m
Length at Base	5.82	m
Width at Base	3.41	m

Minimum Spillway Width is 1.5m





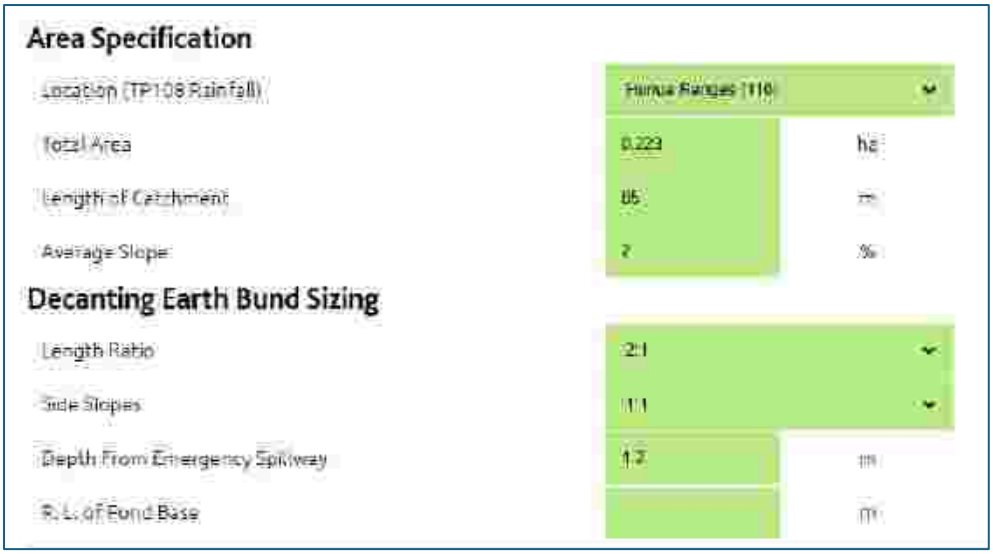
Cross - section

DEB2

Catchment 0.223ha

Catchment length 85m

Average slope (17.5 – 12)/85 = 6.5%



Area Specification

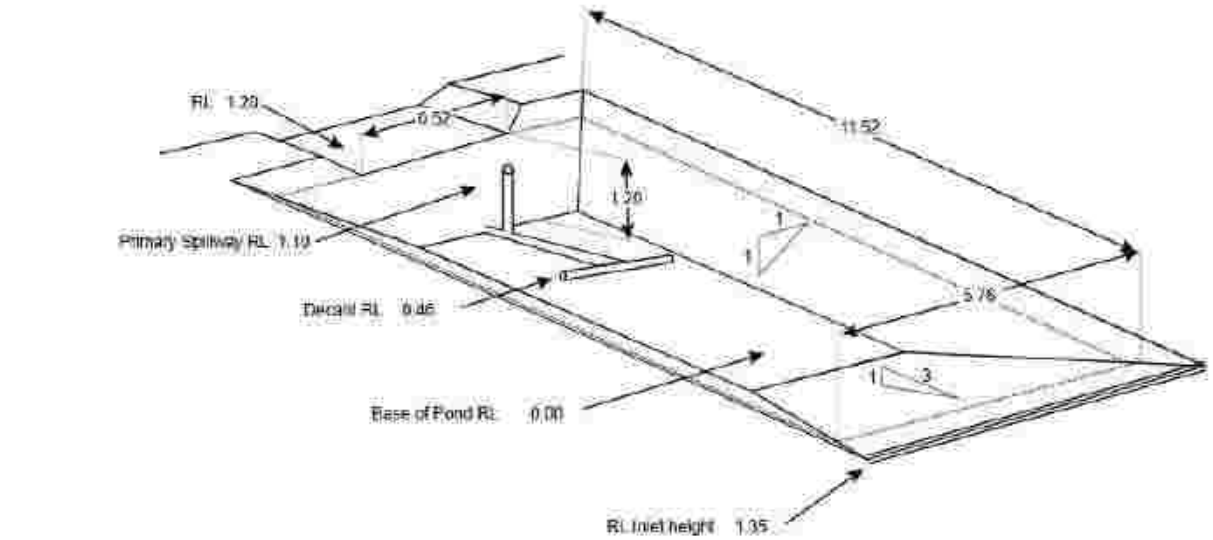
Location (TP108 Rainfall)	Hunua Ranges (110)	
Total Area	0.223	ha
Length of Catchment	85	m
Average Slope	7	%

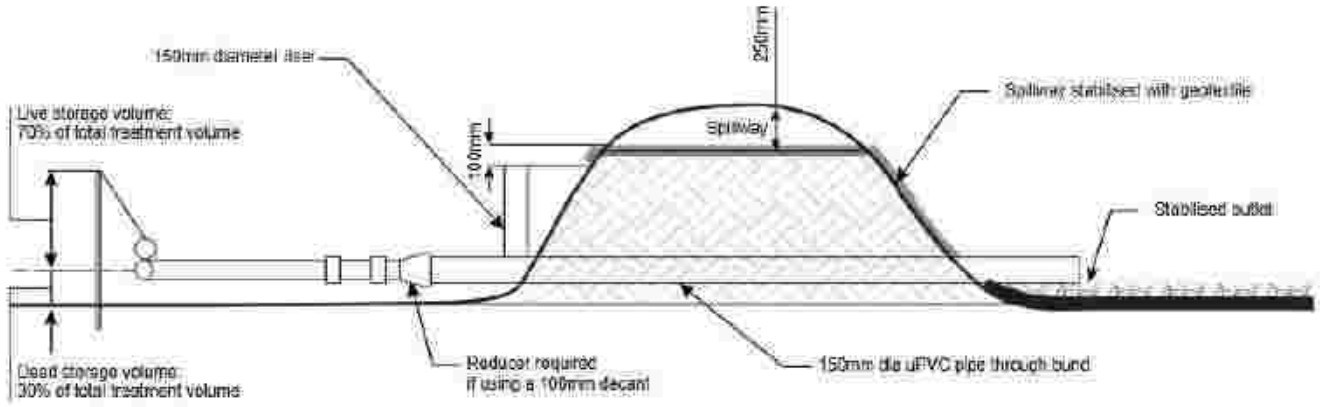
Decanting Earth Bund Sizing

Length Ratio	2:1	
Side Slopes	1:1	
Depth From Emergency Spillway	1.2	m
R. L. of Pond Base		m

Storage Volume Criteria	2	%
Contributing Catchment	0.223	ha
Minimum Storage Volume	44.6	m^3
Dead Storage	13.38	m^3
Live Storage	31	m^3
Length at Emergency Spillway Level	11.52	m
Width at Emergency Spillway Level	5.76	m
Spillway base width (250mm deep)	0.52	m
Primary Spillway diameter	150mm	(min)
Number of decants	1	
Number of holes per decant	30	
Minimum outlet diameter	150	mm
RL Emergency Spillway	1.20	m
RL Primary Spillway	1.10	m
RL Inlet height (min)	1.35	m
RL Decant	0.46	m
Length at Base	6.72	m
Width at Base	3.36	m

Minimum Spillway Width is 1.5m





Cross - section

DEB3

Catchment 0.1444ha

Catchment length 27m

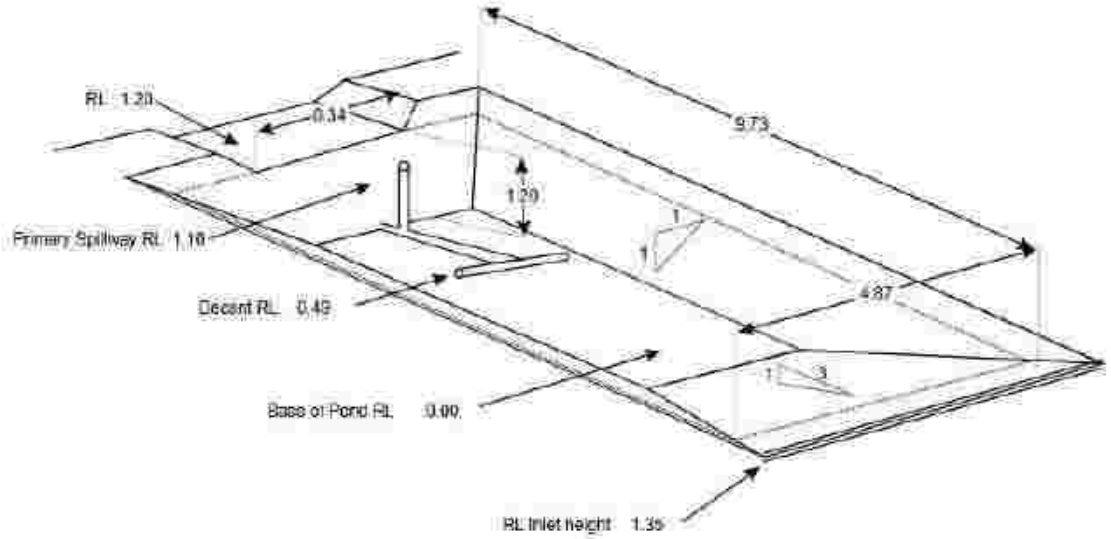
Average slope (11 – 9)/27 = 7.4%

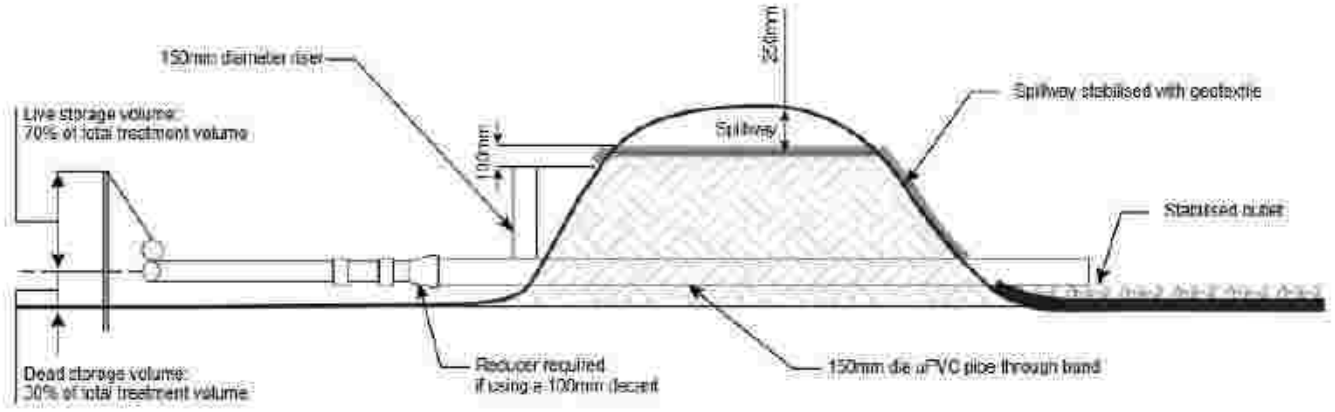


Area Specification		
Location (TP108 Rainfall)	Hunua Ranges (310)	
Total Area	0.1444	ha
Length of Catchment	27	m
Average Slope	7	%
Decanting Earth Bund Sizing		
Length Ratio	2:1	
Side Slopes	1:1	
Depth From Emergency Spillway	1.2	m
R. L. of Pond Base		m

Storage Volume Criteria	2	%
Contributing Catchment	0.1444	ha
Minimum Storage Volume	28.88	m^3
Dead Storage	8.664	m^3
Live Storage	20	m^3
Length at Emergency Spillway Level	9.73	m
Width at Emergency Spillway Level	4.87	m
Spillway base width (250mm deep)	0.34	m
Primary Spillway diameter	150mm	(min)
Number of decants	1	
Number of holes per decant	19	
Minimum outlet diameter	150	mm
RL Emergency Spillway	1.20	m
RL Primary Spillway	1.10	m
RL Inlet height (min)	1.35	m
RL Decant	0.49	m
Length at Base	4.93	m
Width at Base	2.47	m

Minimum Spillway Width is 1.5m





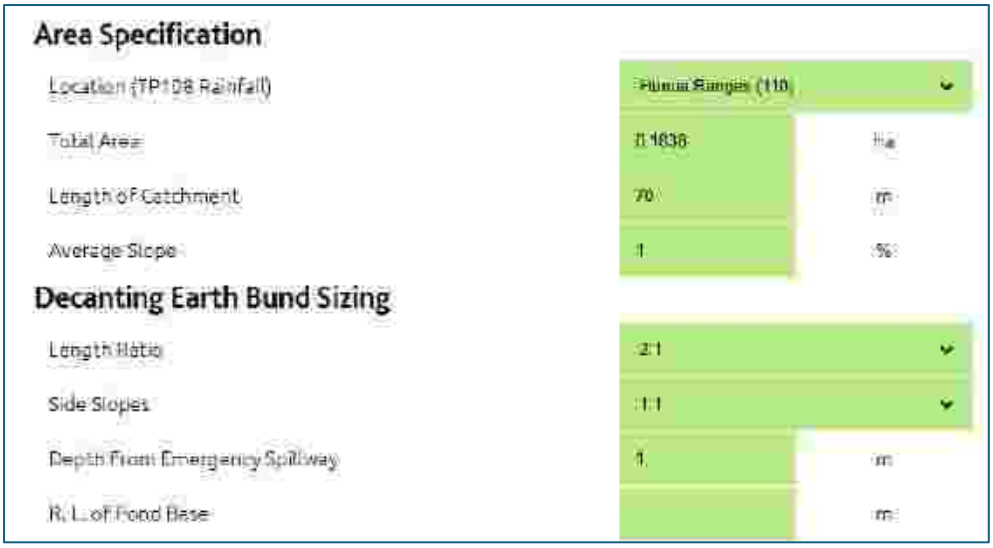
Cross - section

DEB4

Catchment 0.1838ha

Catchment length 70m

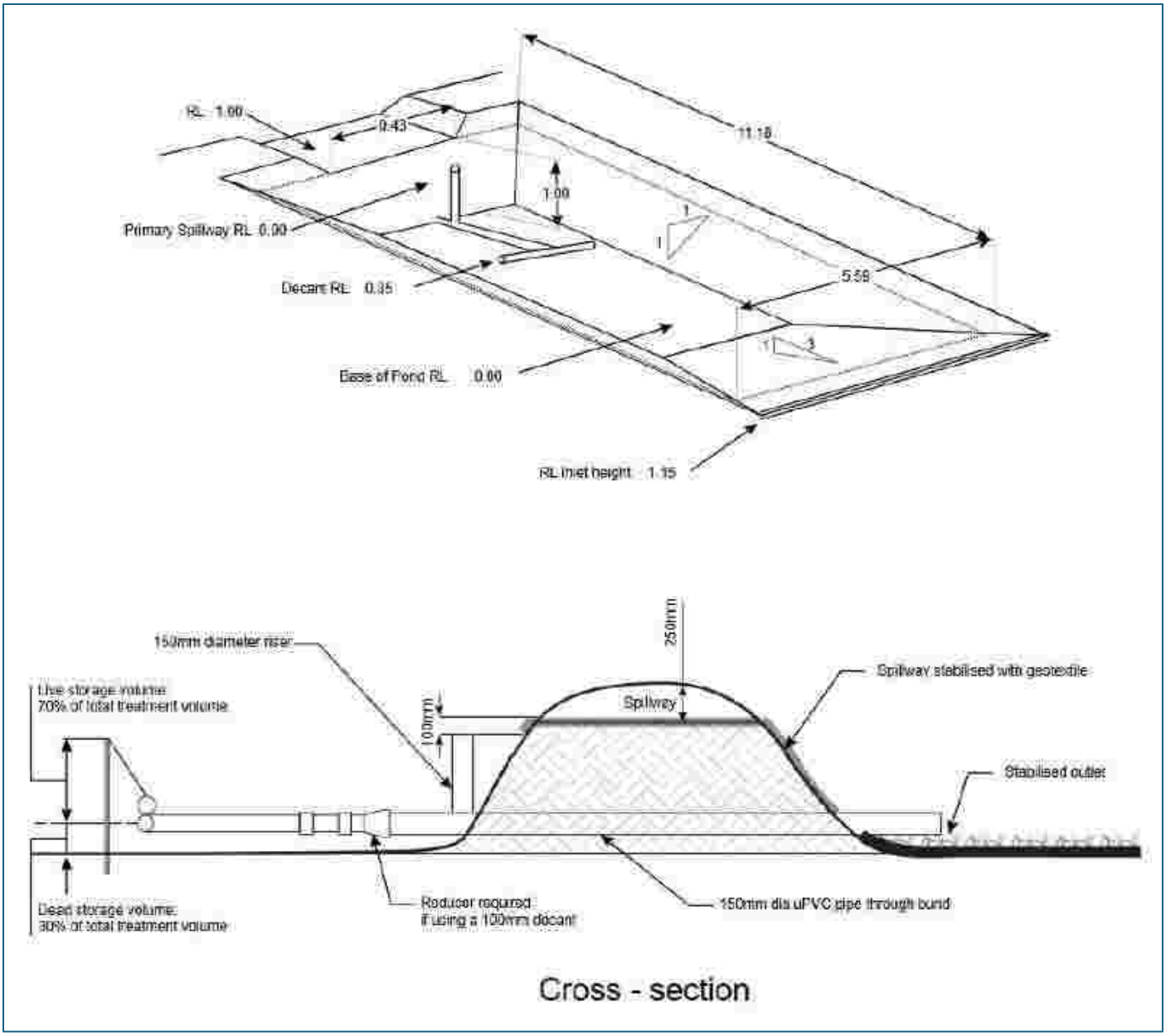
Average slope 1/70 = 1.4%



Area Specification		
Location (TP108 Rainfall)	Hunter Ranges (110)	
Total Area	0.1838	ha
Length of Catchment	70	m
Average Slope	1	%
Decanting Earth Bund Sizing		
Length Ratio	2:1	
Side Slopes	1:1	
Depth From Emergency Spillway	1	m
R. L. of Pond Base		m

Storage Volume Criteria	2	%
Contributing Catchment	0.1838	ha
Minimum Storage Volume	36.76	m^3
Dead Storage	11.027999999999999	m^3
Live Storage	25	m^3
Length at Emergency Spillway Level	11.18	m
Width at Emergency Spillway Level	5.59	m
Spillway base width (250mm deep)	0.43	m
Primary Spillway diameter	150mm	(min)
Number of decants	1	
Number of holes per decant	24	
Minimum outlet diameter	150	mm
RL Emergency Spillway	1.00	m
RL Primary Spillway	0.90	m
RL Inlet height (min)	1.15	m
RL Decant	0.35	m
Length at Base	7.18	m
Width at Base	3.59	m

Minimum Spillway Width is 1.5m



E2.2 'Dirty water' diversion channels and bunds

Diversions must have sufficient capacity to safely carry the flow from a 5% AEP storm, plus a freeboard of 300 mm

Diversion gradients greater than 2% may need to be lined to minimise erosion

On steep sites, construct a 'drop-out pit' within the dirty water diversion (refer Figure 20) to allow heavier sediment particles to drop out before they enter the sediment retention device, reducing the load on the device. Drop-out pits are approximately 500 to 1,000 mm deep and 1,000 mm wide.

Dirty Water Diversion Channel and Contour Drains

Design for largest catchment and adopt this sizing throughout.

Catchment 0.386ha

Catchment length 75m

20 yr ARI (P24) = 195mm

Peak Flow 0.121 m3/s

Trapezoidal Channel

Base Width = 0.5m

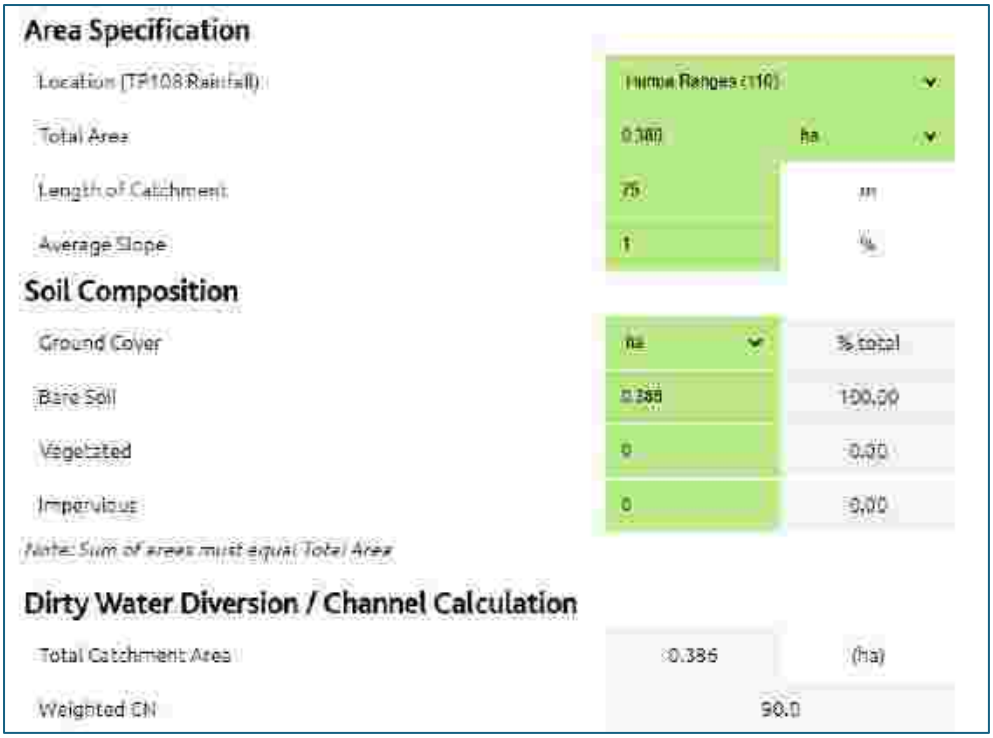
Average slope 0.50/50 = 1.0%

Side Slopes (horizontal to 1 vertical) = 1:1

For flow Depth 0.2m, capacity = 0.15 m3/s > Peak Flow OK

Allow 0.10m freeboard, channel depth 0.30m, capacity 0.34 m3/s

Channel Flow Velocity 1.18 m/s



Area Specification

Location (TP108 Rainfall)	Hume Ranges (110)	
Total Area	0.386	ha
Length of Catchment	75	m
Average Slope	1	%

Soil Composition

Ground Cover	ha	% total
Bare Soil	0.386	100.00
Vegetated	0	0.00
Impervious	0	0.00

Note: Sum of areas must equal Total Area

Dirty Water Diversion / Channel Calculation

Total Catchment Area	0.386	(ha)
Weighted CN	90.0	

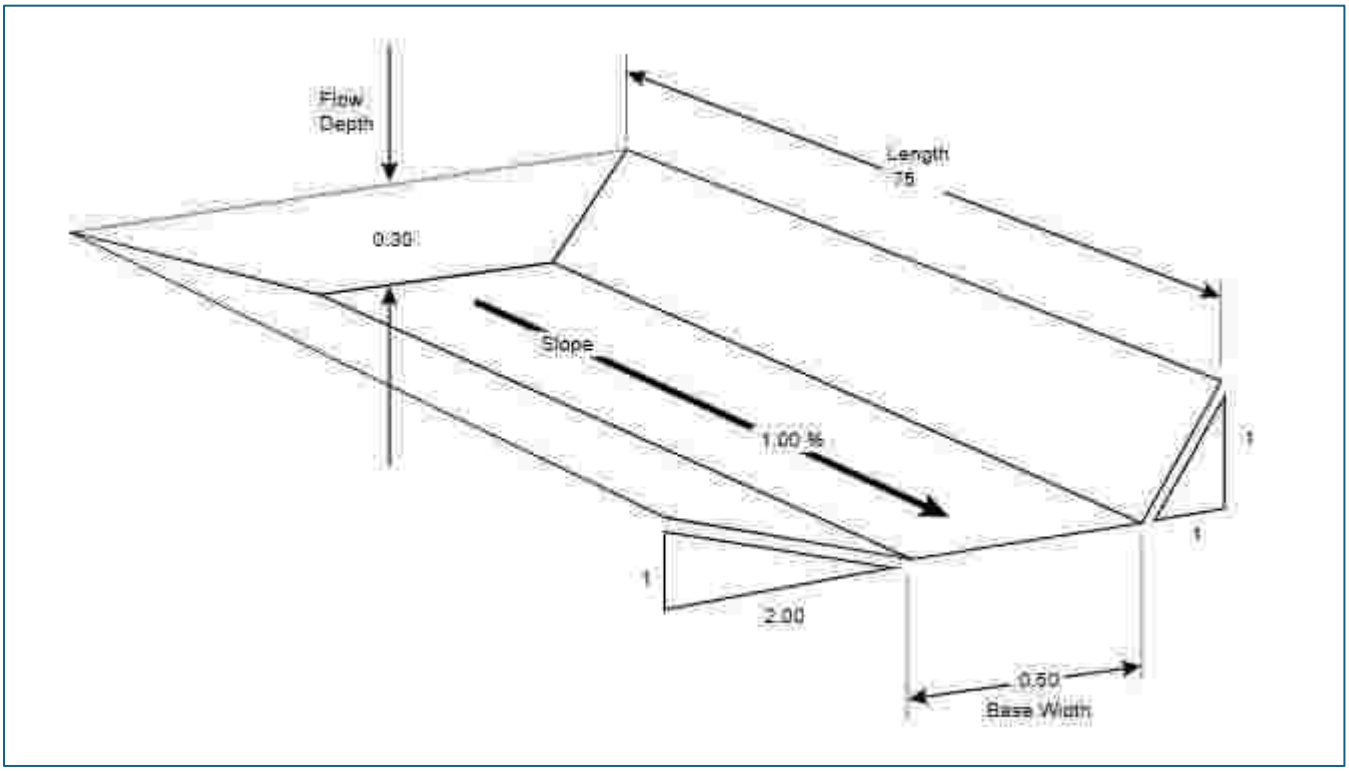
Rainfall event	24 hr rainfall	Peak flow
User defined	195	0.121
ARI 2	110	0.068
ARI 5	160	0.099
ARI 10	200	0.124
ARI 20	230	0.142
ARI 50	280	0.173
ARI 100	310	0.192

Common Criteria

Rainfall Event	User defined	
Peak Flow	0.121	(m^3/s)
Slope	1.00	(%)
Length	75.00	(m)

Trapezoidal Channel

Base Width	0.5	(m)
Flow Depth	0.3	(m)
RH Side Slope (horizontal to 1 vertical)	1:1	
LH Side Slope (horizontal to 1 vertical)	2	
Mannings (n)	Bare Earth (rou	0.03
Channel Flow Velocity	1.18	(m/s)
Channel Capacity	0.34	(m^3/s)



HIRDs V4 rainfall

HIRDS V4 Depth-Duration-Frequency Results													
Sitename: Custom Location													
Coordinate system: WGS84													
Longitude: 174.059													
Latitude: -35.2789													
DDF Mode	Parameter	c	d	e	f	g	h	i					
	Values:	0.002306	0.487624	-0.01354	-0.00363	0.255236	-0.01204	3.3013					
	Example:	Duration (	ARI (yrs)	x	y	Rainfall Depth (mm)							
		24	100	3.178054	4.600149	257.4231							
Rainfall depths (mm) :: Historical Data													
ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11.1	15.7	19.2	27.1	37.8	61	79.3	99.2	118	128	134	138
2	0.5	12.1	17.2	21.1	29.8	41.4	67	87.2	109	130	141	148	152
5	0.2	15.7	22.3	27.4	38.7	54	87.6	114	143	172	186	195	200
10	0.1	18.3	26.1	32.1	45.4	63.3	103	134	169	202	219	230	236
20	0.05	21	29.9	36.8	52.1	72.8	118	155	195	234	254	266	274
30	0.033	22.6	32.2	39.6	56.1	78.5	128	167	210	253	274	287	296
40	0.025	23.7	33.8	41.6	59	82.5	134	176	221	266	289	303	312
50	0.02	24.6	35	43.1	61.2	85.7	140	183	230	277	301	315	325
60	0.017	25.3	36.1	44.4	63	88.2	144	188	237	285	310	325	335
80	0.013	26.4	37.7	46.4	65.9	92.3	151	197	249	299	325	341	351
100	0.01	27.3	38.9	47.9	68.1	95.4	156	204	257	310	337	353	364
250	0.004	30.7	43.9	54.1	77	108	177	232	293	353	384	403	416

CONCEPT AND URBAN DESIGN REPORT

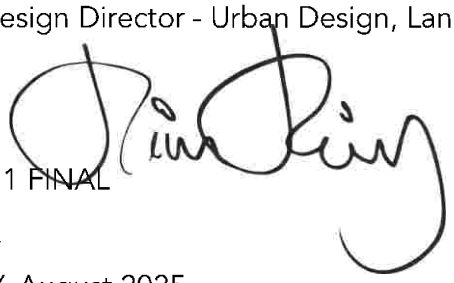


Yorke Road Subdivision, Haruru

for

Yorke Road Developments Limited

commonground STUDIO

APPROVED FOR ISSUE:	
Author	Tim King
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Signature	
Version/Status	2.1 FINAL
Checked	tk
Date	26 August 2025
For and on behalf of Common Ground Studio	

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commonground studio

Tel 09 302 2200 I 72 Beulah Ave, Rothesay Bay , Auckland 0630 I cgstudio.co.nz

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1. EXECUTIVE SUMMARY

This report details and explains the design of a proposed residential subdivision of 111 and 115 Yorke Road, Hururu.

The 2.27ha site is formed mostly of a rocky promontory to the east of the Waitangi River just below the Haruru Falls. It is proposed to be subdivided into 21 residential lots, with 1.11ha of land held in common as open-space and access.

The subdivision design is a direct response to the landscape values of the site. The design concept aims to protect and enhance the natural values of the river environment. The development design is for an intimate, pedestrian-centric residential 'village' within a natural setting.

Traditional subdivision standards, particularly setbacks and Height in Relation to Boundary (HIRB) controls, often work actively against the creation of highly social, people-centred residential environments. Alternative best-practice urban design standards are proposed to counter this, and the report explains how proposed alternatives will satisfy the Objectives and Principles of the District Plan.

Key to the scheme is the inclusion of three road types not usually found in council engineering and environmental standards. Although none of these roads are proposed to be vested, understanding how they function is critical to understand how the lots will function, particularly at small sizes.

To support this 'alternative' approach, the scheme design is assessed using the Residential Subdivision Performance (RSP) Tool which measures subdivision design quality in terms of a Well-Functioning Urban Environment (WFUE – as defined by the NPS-UD). Traditional subdivision usually scores in the range of 15—25 (out of 100). The RSP score for Yorke Road is 98. This is exceptionally high. The major drivers of high urban functionality are the provision of a quality natural public realm and the successful separation of vehicle and pedestrian activity. A much larger site might contain, in part, a public realm of equal quality to that found here. But in this case, that small part is *all* of the site. In addition, the high score is a measure of the extent to which the design has maximised the intrinsic value and amenity of this for the site.

The 20m MHW setback to form an esplanade reserve doesn't result in a usable public open space because the esplanade area is discontinuous – it is split by an 8—19m high basalt escarpment. The development scheme is designed to produce the best open-space outcome for both the public and future subdivision residents by:

- Connecting an end-to-end river-edge pathway through the site from the footpath network in Yorke Road

- Providing river access from Yorke Road and enabling a connection through existing council reserves to Haruru 'central'
- Enlarging the clip-top pathway by extending it into the middle of the site to form open activity areas (Place function)
- Reducing the corridor width where there is no outlook or potential as an open activity area (Link function)
- All residential lots front the reserve (front door access) to create maximum activation and resident use.

The scheme design results in a:

Net increase in usable Esplanade Reserve of 449m^2

Net increase in publicly accessible usable open-space of 2,816m^2

Net increase in Esplanade Reserve area of 1,250—1,616m^2

Net increase in land to vest of 1,250m^2

The surrounding area and relevant lots within the subdivision have been modelled in 3D using massing models and building envelopes to help assess potential visual effects from outside the site. The site is visible to the public from only three positions. Existing tree cover in the esplanade reserve screens most of the development. Three houses will be visible to a greater or lesser extent, depending on whether they are 1- or 2-storey buildings. No building is seen in its entirety – mostly just a small length of the front façade. This is consistent with the general level of building visibility for the existing Yorke neighbourhood.

The Report format beyond this introduction is laid out in a simple 4-part structure:

1. Context – a brief description of both the urban and landscape context of the site
2. Design Concept –response to context and a framework for the design detail
   Scheme Design – movement and open-space network, lot size and access, design assessment, and landscape management, Esplanade Reserve proposal
3. Planning Controls and Standards – identifies standards within the District Plan that militate against the creation of amenity by the design (Part 2, above). Proposes alternatives and a means for managing them.
4. Visual Effects – potential effects of the subdivision for neighbours and as seen from all public viewpoints

Appendices consist of full A3 plansets:

A. Scheme Design Planset
B. Residential Suburban Performance (RSP) Planset

PART 1

2. CONTEXT

2.1. URBAN CONTEXT

Haruru is a small settlement on the Waitangi River centred around the Haruru Falls. It is an old settlement, originating as a river port for inland access to the Bay of Islands. SH 11 runs through it, linking Paihia to the east with Kerikeri, Kaikohe and the rest of Northland to the west. Although having a population of 1100 approx. (400 fewer than Paihia), it has a very low level of self-sufficiency and functions more like a remote suburb of Pahia than a standalone village.



Figure 1: Hururu / Paihia relationship

It has very high levels of tourist accommodation (ranging from a camping ground through to boutique motel and a conference resort), but very low levels of supporting retail and no social services amenity for residents. The proximity of Paihia (4km) diminishes community interaction and identity, drawing activity out of Haruru and towards the larger centre.

Despite this, Paihia is topographically constrained in terms of residential growth for permanents. Already containing a reasonable amount of light industrial activity, this points the way for how Haruru should re-find its identity to service the large inland catchment.

A low permanent population and lack of connectivity are currently the biggest hindrances in this regard. There are topographical constraints to connectivity and growth; therefore the immediate strategy should be to maximise opportunities within the natural extents of the town as it is.

It is a fragmented settlement, consisting of five discrete neighbourhoods connected only by SH 11.



Figure 2: Hururu neighbourhoods

1. The old centre lies mostly on lower ground between the Waitangi River and SH 11. This is the furthest extent of the wide estuarine section of the river and originally provided port access for the territory inland. The old hotel and grand manor house (now a restaurant and music venue) form the psychological centre for the village, with the riverside containing the most extensive and concentrated visitor accommodation in the area.
2. A newer residential neighbourhood has been built well clear of the village 1km to the west, connected only by SH 11.
3. A small industrial area is isolated to the south of SH 11, midway between the two neighbourhoods above.
4. Dispersed and random subdivision has occurred to the east of the centre and to the south of SH 11.
5. Directly across SH 11 from these houses is the physically largest residential neighbourhood in Haruru. It occupies all the land to the east of the centre contained by SH 11 and the Waitangi River and estuary. It has one point of entry from the main

road. Access to the neighbourhood is 500m uphill from the centre. It contains the village's only convenience store and a takeaways. The subject site is within this area, sitting on a promontory that creates a raised western edge for the neighbourhood.

2.2. LANDSCAPE CONTEXT

The Waitangi River valley defines the landscape around Haruru. It is a valley system of 3 parts:

- A broad, 8km wide network of drainage basins, largely in pasture
- A narrower (1km wide, 5km long) middle section, also in pasture
- A 2.5km long by 3km wide estuarine stretch downstream from the Haruru Falls, fed north and south by the Hutia and Kaipatiki Creeks

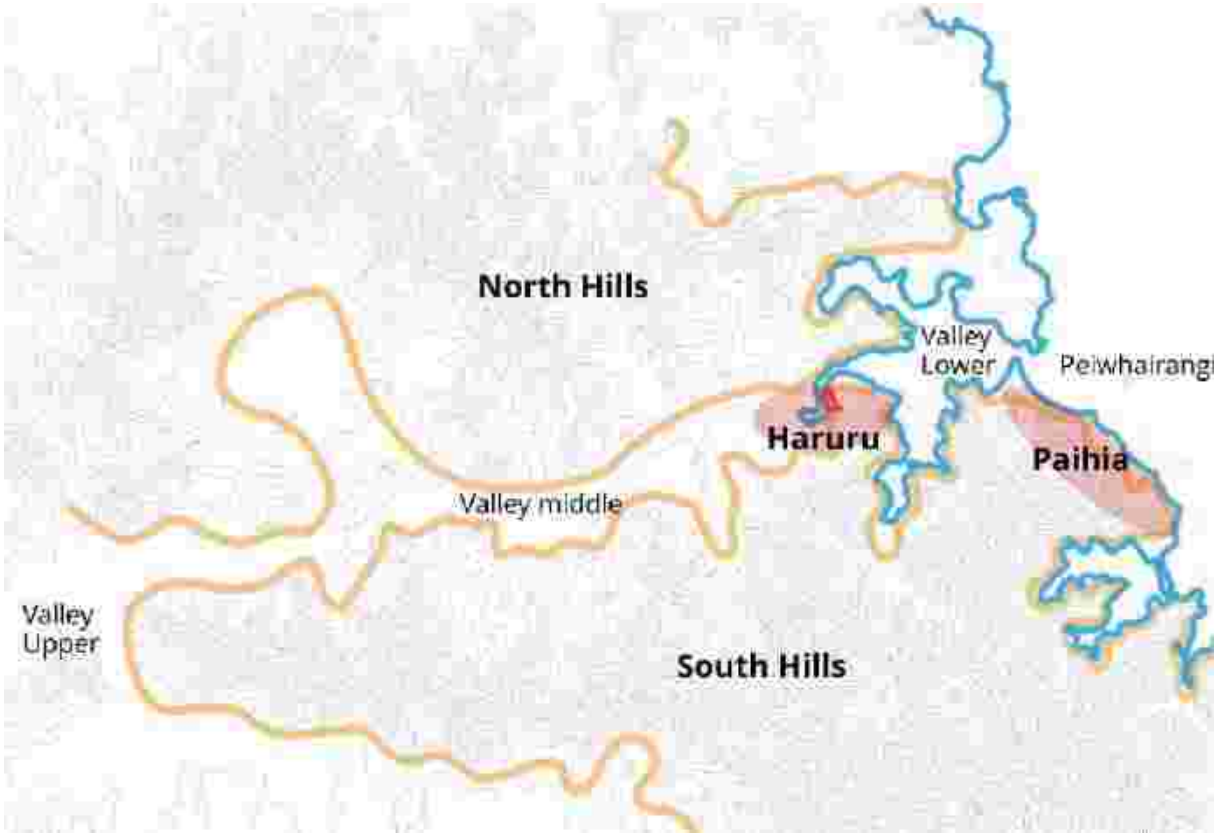


Figure 3: Wider landscape context

The river flows into Peiwhairangi (the Bay of Islands). Peiwhairangi is a drowned valley system. The line of demarcation between the drowned and extant valley is the 5m high Haruru Falls. Haruru Village is spread along the valley floor and onto the edge of the southern hills at this point.



Figure 4: Haruru Falls

The valley sides are formed by hill formations largely covered in a mixture of native vegetation (particularly south hills) and plantation forest (Waitangi Forest – north hills).



Figure 5: View over Haruru to 'north hills'



Figure 6: View over Haruru to 'south hills'

The Waitangi River edge opposite the site is completely covered in native bush. In the vicinity of the site, this is mostly made up of pohutukawa and kanuka, mangroves in the littoral zone together, and a range of minor native species spread throughout.



Figure 7: Waitangi River, opposite bank

2.2.1. The Site

Most of the site consists of a north/south aligned basalt lava 'tongue' that intrudes into the valley from the southern hills. Overlaid with volcanic soil, it creates a barrier for the river, turning the river sharply north shortly beyond the falls. The river turns east again as soon as it clears the northern tip of the property before flowing into Peiwhairangi proper at Waitangi.

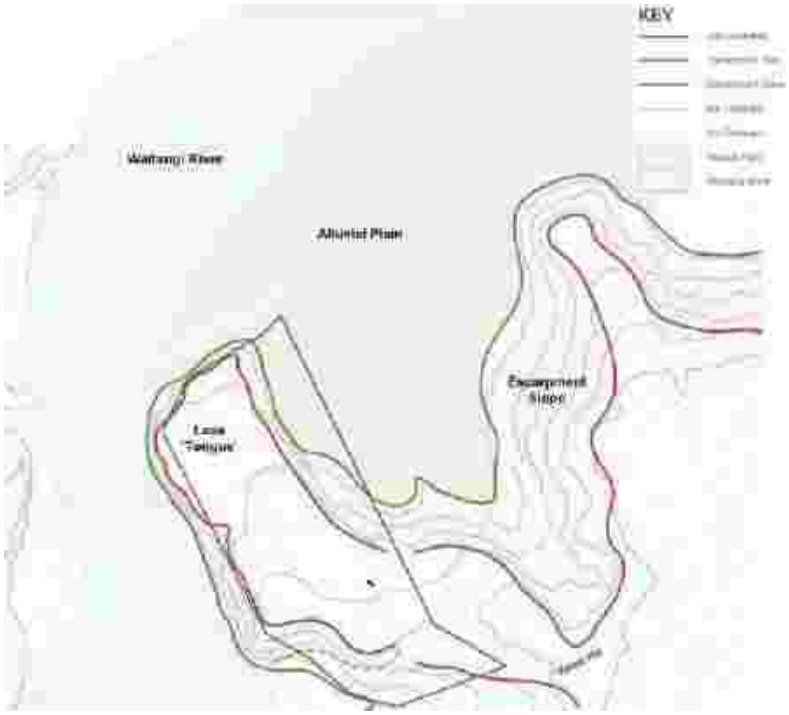


Figure 8: Neighbourhood topography

The smaller eastern side of the property is comprised of deep alluvial soils, drained from the hills and deposited by sea-level rise and in the lee of the river as it turns into the wide estuary basin behind Waitangi.

The dominant topographic feature of the site is the exposed rock escarpment around almost all four sides of the lava 'tongue'. The property is connected to the hills behind only by a very narrow 20m wide strip back to the corner of Yorke and Falls View Roads.

The plateau surface of the tongue falls irregularly from 20m at the entry to the 7m high escarpment edge at the top (northern) end of the site. The terrain is in two parts roughly aligned with the current property boundaries. The two sections are divided by a gently sweeping natural drainage swale leading to a depression on the escarpment edge.



Figure 9: Site – topographic form

PART 2

3. DESIGN RESPONSE

3.1. CONCEPT

3.1.1. Green Response

The subdivision is designed in the first instance as a response to landscape – in particular, the landscape of the river. It proposes a strengthening of the natural escarpment values on all sides, using Greenways to draw these inside the site and provide continuity of native vegetation. Reestablishing natural vegetation cover in this way connects the site with what exists on the opposite bank, healing the river.



Figure 10: Natural vegetation distribution

A full set of A3 scheme plans are attached as Appendix A.

Subdivision and Built Form

The subdivision scheme proposes a built-form layout that expresses the shape and solidness of the basalt underlay. It does this by aligning lot frontage with the escarpment edge, and controlling where houses are positioned with alternative setback rules. The intention is that buildings – the most solid expressions of human settlement – are read as extensions of the natural landform.

Within the site the same escarpment approach is used along the edges of the Greenways, which by association function as escarpment extensions for these lots.

This approach internalises the development blocks (with the exception of Lot 1) so that the perimeter and Greenways crossing the site are an open-space commons, contiguous with and indistinguishable from the esplanade reserve, that completely surround each residential block.

3.1.2. Movement Networks

The subdivision is a 'terminus' settlement, ie the property is at the end of Yorke Road and because of topography and earlier subdivision, doesn't connect back to the rest of the suburb other than by its single entry-point. Although unfortunate in urban design terms, this does allow a different approach internally to vehicle activity and how residents will interact with each other and with the wider environment.



Figure 11: Movement networks

The subdivision design is heavily pedestrian-centric. Visitor ('public') access to each lot is from vehicle-free open-space frontage. Primarily this is around the escarpment edge, connecting all people – residents and visitors alike – with the river environment. The Greenways and a separate footpath entry from Yorke Road feed people onto the edge route, either for access or for recreation.

The open-space network incorporating all the frontage paths also includes river access. This is provided naturally at three points:

1. From a reserve lot in front of Lot 1 to the esplanade reserve at the base of the northern escarpment face
2. Down the escarpment on the north-west corner to an existing boatshed and ramp

3. Down the natural gully at the southern end of the site on the part of the site proposed to be vested as Esplanade Reserve extension (see *0*
4. *Esplanade* Reserve)

Vehicle activity is minimised. The entry road sheds vehicles as quickly as possible via a single mews entry into the interior of each block rather than taking cars around the block perimeter and accessing each site individually.

- For visitors, two dedicated parking areas are provided.
- Residents access their own property across the rear boundary from short mews lanes within each of the three main blocks.
- Only Lots 1—4 have separate entries from first 80m of the access road, separate from the footpath.
- From the site entry to Block 2 the access road is 2-way (5m wide); from Block 2 to Block 1 the carriageway width reduces to 3.5m.



Figure 12: Vehicle network

3.1.3. Community and Amenity Value

Terminus subdivisions nearly always result in 'rear-lot syndrome', where social connection is diminished and amenity is internalised within the lot. The scheme is designed as an antidote to this. The key elements are:

- All frontage access is to open-space reserves

- All vehicle access is across rear lot boundaries

Around half of the site is retained as a commons. More than 2/3's of the commons is a vehicle-free open-space reserve for access and environmental enhancement, contiguous with the esplanade reserve and river. This reserve land is converted from having only passive visual amenity value into a highly activated and social space by virtue of most pedestrian movement occurring along its boundary. Since the value of open-space amenity increases in proportion to the frequency and variety of use, this results in an extremely high increase in public amenity and urban functionality as demonstrated later in this report.



Figure 13: Common lots and esplanade reserve

Mews access for vehicles not only supports high levels of social activity on the front side of the lot, but it greatly increases the development efficiency of the lot itself – particularly as lot sizes get smaller. On-site amenity in these configurations usually increases by 2—300m^2/lot, so that eg a 3—400m^2 rear access mews lot contains the equivalent on-site amenity of a 5—700m^2 traditional front access lot elsewhere. A brief outline of how this works is provided in *6.3.4 Lot Size and Amenity*

4. SCHEME DESIGN

4.1. BLOCK AND LOT PLANS

Three small blocks make up the design, with a further two single lot blocks (4 & 5) at the entry and on the bottom alluvial flat.

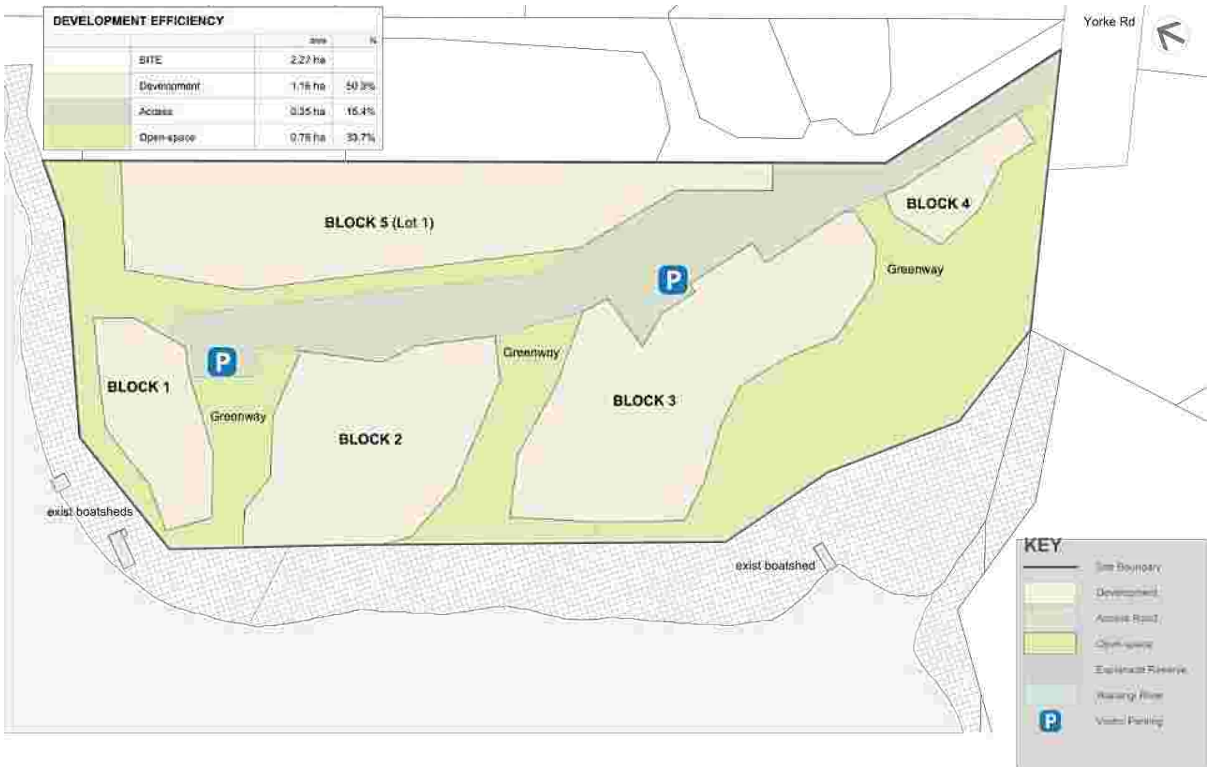


Figure 14: Concept Block Plan

21 Residential lots are proposed (Lot 1 excluded as an oversized outlier where appropriate:

- 347m^2 – average lot size
- 301—506m^2 size range
- 300—399m^2 – 17 lots
- 400—499m^2 – 2 lots
- 500—599m^2 – 1 lot
- 3,849 – 1 lot

Lot 200 (12,722m^2) is held in common as an open-space reserve

JOAL's (Joint Owned Access Lots 101—103) are attached to Blocks 1—3



Figure 15: Lot Plan

4.2. OPEN-SPACE AND MOVEMENT NETWORKS

4.2.1. Road Types

The open-space and movement networks are treated as one in the design, with many road functions being taken into the open-space public realm. This requires the implementation of extra road types not included in the FNDC EES. Although the application is not proposing to vest these 'roads', an understanding of how they are intended to function in the development is important. The new types are:

- Greenway
- Mews
- Living Street



Figure 16: Road Type Plan

4.2.2. Greenway

The Greenway is the front-door address for the lot from which visitors enter the property. It is a road type that fulfils all the functions of a 'normal' road except carry vehicles. Vehicle-free except for emergency and occasional service vehicles, within the wider movement network it performs the role of a pedestrian/cycle arterial. As such it is a major connector, between nodes and destinations or to other open-space areas that constitute the network.

The reserve width is always variable. In this case it provides an active edge to the esplanade reserve from which it is indistinguishable. Together with the Esplanade Reserve with which they are contiguous, the Greenways contain the primary pedestrian routes. They also provide:

- The primary informal open-space recreational environment
- Stormwater management
- Landscape connectivity across the site
- A small orchard as a historic reference to previous landuse

Having no vehicles in the environment outside the front boundary allows the development of a second living court for each property. The traditional 'private' court at the rear of the house is augmented by a 'public' court at the front. A living space in the house eg dining or living room can then spill activity directly into a social space within the yard and from there immediately out into the fully public pedestrian space of the Greenway.

A 2—3m wide self-binding aggregate (SBA – hoggin) footpath is proposed and constructed sufficient to take occasional service/emergency vehicles.

4.2.3. Mews

A mews is a narrow shared-surface lane within a block. Its main purpose is to release the public realm amenity of the (vehicle) street by removing moving vehicles from the passive part of the road reserve. This is a community's primary open-space asset, which the mews unlocks as a pedestrian prioritised 'place' in the sense of Link/Place principles in NZS4404:2010.

Designed well, in larger developments the mews has the potential to completely remove vehicles from every alternate road. In this case, with no through access and because of the small size of the peninsula, *all* lot frontage can be designed to be vehicle-free.

As well as greatly improving the urban design quality of the street, shifting the vehicle entry point to the rear boundary results in considerable efficiency and amenity advantages for the lot itself.

1. A front living court can be provided to address the (now) social space of the street. With two living courts, there will always be a place where people can be in the sun, out of the wind, in private or public, active or passive.
2. Spatial efficiency within the lot is greatly enhanced. The same amenity (house size, living courts, parking etc) of a traditional front accessed 450—500m^2 lot can be reproduced on a mews serviced 250m^2 lot. In addition, the constraints on the spatial arrangement options are greatly reduced for the smaller lot so that negative effects between lots are almost eliminated (*6.3.4 Lot Size and Amenity*).
3. Whereas a normal road provides a 25m min separation between opposing front building faces, a mews will create a similar if not wider separation between opposing rear building faces.
4. Adjacent private living courts to the rear are now separated by 20m minimum garage and access space.

The mews function is not only to do with vehicles. It can also:

- Incorporate utility provision and servicing in a way that avoids disruption in the street/road environment for the wider public
- Concentrate on-site service activity away from the street
- Provide block permeability ie quick access for residents to the other side of the block

There is no fixed configuration for a mews, though the following minimum characteristics can be expected:

- Minimum 6m reserve width
- Building setbacks to provide 8m between opposing garage doors
- Design speed of 5—10kph
- Shared surface, undefined
- High screen fencing set back from the reserve boundary ie for living courts
- Mews entry reduced to 4m wide with transition surface either side of footpath (if present) to reduce vehicle speeds
- Can contain planting where possible and appropriate

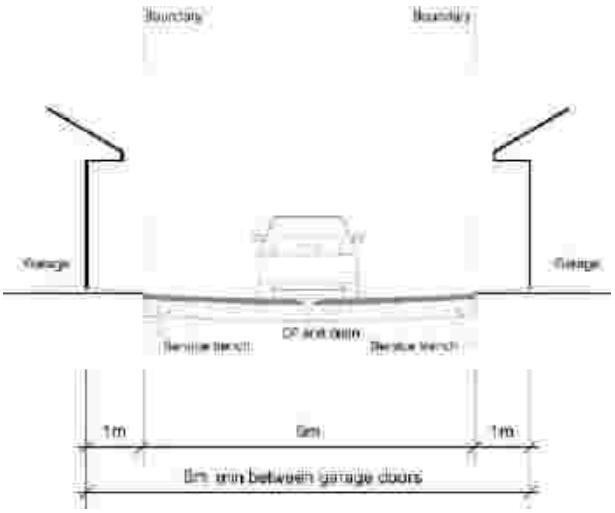


Figure 17: Mews cross-section schematic



Figure 18: A modern mews, Auckland

4.2.4. Living Street

A Living Street is a pedestrian-centric, landscape rich, shared-surface road type. It contains all the elements of a traditional road except for a marked reduction in the number of vehicle movements. With little vehicle traffic, it is configured less formally and regularly than a 'standard' vehicle road. If vehicles are present, required design speeds are 10—15kph.

The entry 'road' conforms to the basic Living Street type as a Greenway connection. It:

- Extends Greenway open-space values further into the development
- Provides vehicle access to mews lanes
- Provides visitor parking for Greenway frontage lots

Although basically still a large driveway set in a broad landscape, it differs from a tradition Living Street in that it isn't edged by lot frontage, nor does it rely at any point of the carriageway as a shared surface. Although shared surface function can be anticipated for the carriageway, link value is elevated and dedicated pedestrian paths are provided along most of its length.

4.3. RESIDENTIAL SUBDIVISION PERFORMANCE (RSP) ASSESSMENT

The RSP is an urban functionality modeller that came out of the FNDC Current State Assessment well-functioning urban environment (WFUE) study of 2022. It is essentially a tool that measures the *quality of a subdivision design* referenced to WFUE values.

The tool has its origins in a simple design aid developed over a decade ago. It worked by attaching a data structure to planar geometry to provide live feedback to a designer, helping shape a subdivision design by responding to urban design best-practice principles. The FNDC project unlocked the potential of this by contributing a much more integrated data structure together with a robust evaluation system. The result today is a tool producing easy to interpret complex analysis that is consistent enough with its big-brother WFUE Tool to be used as a WFUE proxy in most instances.

The proposed subdivision is at the lower end of what can reasonably be expected to return a meaningful evaluation. At a minimum, a design will need to incorporate a valid movement network, even though for small sites analysis of the network itself is a meaningless undertaking.

From the full set of measures, seven criteria have been able to have geometry attached to generate an assessment. They are:

Frontage

This captures factors that influence the relationship of the lot to the 'street'. The street is the primary open-space environment for residents. It is a social space as much as it is part of a movement network. Many factors influence the likelihood of social interaction and the extent to which the activity of each mode can be optimised.

Vehicle Access

How vehicles are managed in relation to the lot has the largest effect on the quality of the street and the expression of 'Place' values. It is an enabling function, not only adding greatly to network capacity but also a pre-requisite for alternative road forms.

Proximity to Open-space

The value of open-space amenity to the community can be measured by researched predictions as to residents' likely use of the public realm.

Open-space Quality

Value accrues to open-space in proportion to the number of people using it. This score compliments as an inverse the previous criteria. It measures the degree to which the reserve edge is separated from houses by a range of barriers that affect visibility and restrict or deter access.

Open-space Network

The mere provision of public open-space doesn't necessarily result in the provision of public amenity. The use of public spaces is proportionate to the extent that they're connected, and their value is further affected by the quality of connection.

Open-space Activity

Pedestrian use of the public realm increases dependent on the number of different activities it contains. This is true even as vehicle presence remains constant. The value of this criterion is also recursively related to the previous three.

Lot Value

This criterion is an overall amenity measure. It captures the extent that, as amenity increases beyond the lot, the potential quality of amenity within the lot will rise even as the lot becomes smaller. Referencing all the criteria above, conditions as perceived by an individual resident include:

- On-site amenity capacity.
- The amenity quality of the street environment.

- The provision, proximity and quality of amenity beyond the subdivision street environment.
- The degree of connectedness to outside amenity.

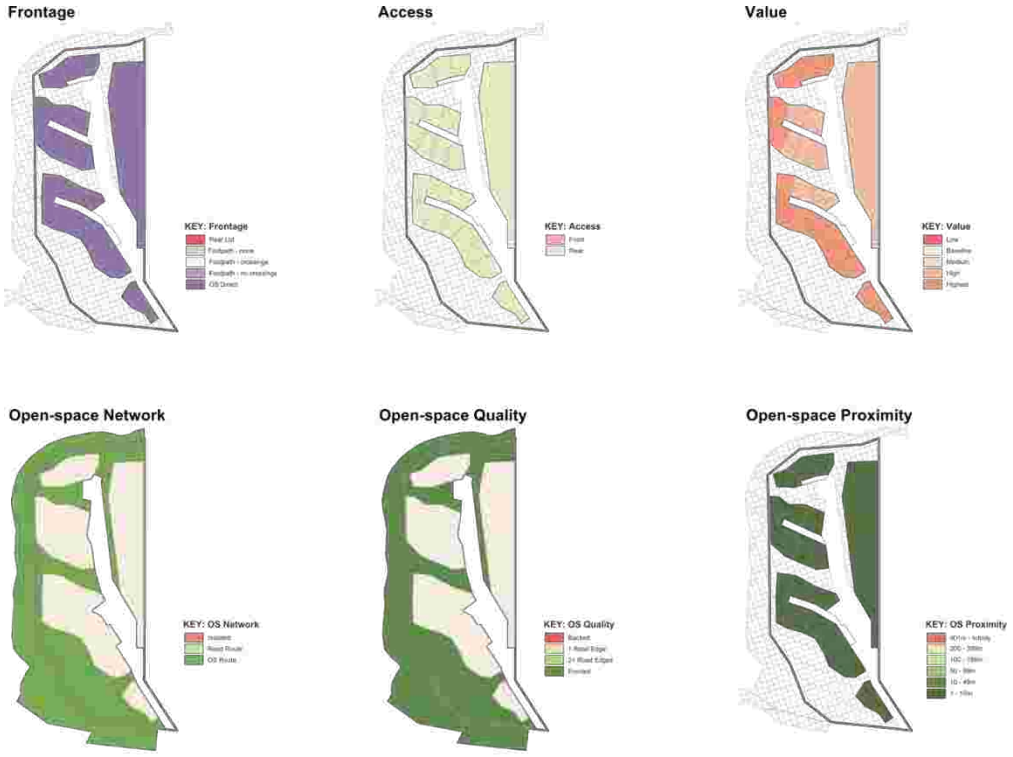


Figure 19: Data visualisations for six of the seven RSP criteria

A full A3 set of data visualisations that includes a score breakdown for each criteria is attached as Appendix B.

SUBDIVISION PERFORMANCE

Measure	*Score*	*Final Score*
Frontage	100	
Lot Access	100	
Lot Value	87	
OS Activities	97	
OS Network	100	
OS Proximity	100	
OS Quality	100	
URBAN FUNCTIONALITY SCORE		**98**

Table 1: Overall RSP Assessment score

These numbers are the assessment of outcomes derived from geometry that extensive research shows to be reliably predictable. An *evaluation of design quality* from the assessment looks first at the distribution of criteria scores, then at the internal distribution of field values for each criterion.

The tight spread of the criteria scores tells us that the total score is a fair proxy for the level of urban functionality. The elements that make up the urban form are in harmony. It is very rare for any subdivision to score over 90. All those that do have several things in common:

- Dependence on a high-quality open-space environment
- Development of a high-functioning open-space network
- Pedestrianisation of the 'street'
- Use of mews access for vehicles

The site is blessed by both the natural quality of its outlook and receiving environment, and its geology and topography that are legibly expressed. To achieve quality, all a design has to do in this case is protect and strengthen those values in a way that also incorporates urban design best-practice solutions. The RSP score is a measure of how well that has been achieved.

4.4. ESPLANADE RESERVE

4.4.1. Esplanade Objectives

To inform the subdivision design, a number of objectives for a future esplanade reserve have been identified:

- Provide a public pedestrian movement corridor for the length of the site along the top of the escarpment and contained within an esplanade reserve.
- Enable connection to this corridor from public property at both ends of the property.
- Provide open activity spaces along the esplanade pathway.
- Have the Esplanade Reserve form an integral part of the wider open-space network within the site.
- Maximise the use off the public reserve by future residents of the subdivision.
- Provide public pedestrian access from Yorke Road to the river's edge.
- Enable pedestrian connection of Yorke Road to Haruru Central foreshore/esplanade, recapitulating the historic Waimate > Waitangi transit route.
- Provide an immediate functional connection between the existing Esplanade Reserve and the general-purpose reserve on Falls View Road to realise and maximise the open-space value of both reserves for the public.

Many of these objectives are shared with the overall open-space objectives of the subdivision which have driven the scheme design from the outset. The esplanade reserve and the block/lot layout have been designed as one so that benefits are maximised for both the open-space environment of the site and for the wider public network. The extent to which reserve value is realised can be seen in the RSP analysis following (see *4.4.6 Reserve Amenity Quality* below).

4.4.2. 20m Esplanade Reserve Setback

Two of the intended purposes of an esplanade reserve created by a MHW 20m setback cannot be satisfied for this site because the accessible parts of the area are not connected to other public reserves. The unfulfilled purposes are:

- Public open-space activity area
- Public open-space route

In addition, the reserve area is discontinuous. Front and back boundaries of a reserve – in this case actually top and bottom boundaries – are separated by an 8—19m high escarpment which takes up most of the reserve area.

The bottom portion of the reserve area is effectively unusable with no flat area at the base of the escarpment alongside the river. There is some usable area at the top of the escarpment ranging from 0—15m wide, though this is unconnected to accessible public land at either end.

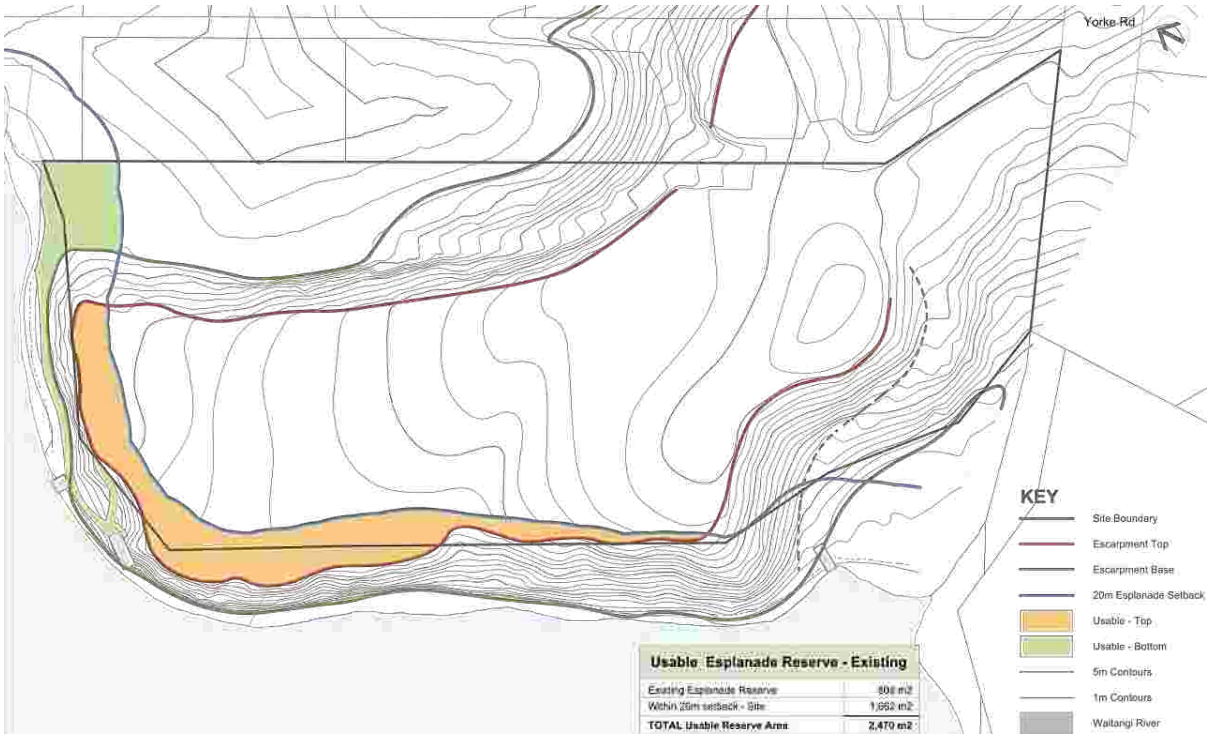


Figure 20: Usable area within 20m MHW setback

Notes on the esplanade setback and usable reserve width:

- The heavy blue 20m setback line on the plans is a simple 20m translation of the 1m FNDC LiDAR contour line. Surveyor advice is that MHW is lower than this, but given the gradient at the base of the escarpment any error can be considered immaterial for current purposes.
- The top edge of the escarpment (heavy red line) used to calculate the usable reserve width is also approximate. Any earthworking along the escarpment boundary to lower the path and retain the front development boundary will have the effect of widening the access corridor.

4.4.3. Scheme Proposal

The proposed Esplanade Reserve scheme is pragmatic – it concentrates on the delivery of greatest usable amenity for the public. As the 20m MHW setback doesn't create a reserve that satisfies the objectives (above), the application proposes adjusting the property boundary along the clifftop so that a fully functional Esplanade Reserve for vesting in council can be created.

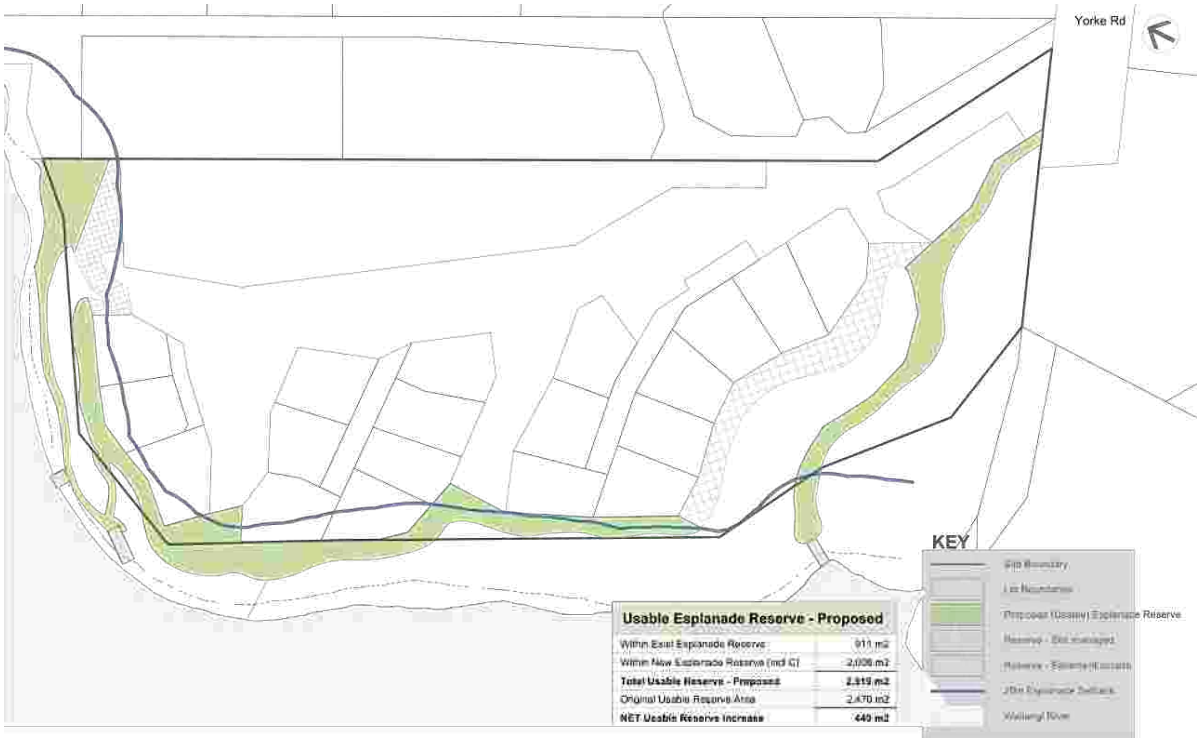


Figure 21: Proposed usable Esplanade Reserve area

While this design results in a 449m^2 net increase of usable reserve area, plotting a reserve boundary from this scheme results in a number of transgressions into the 20m setback zone.

4.4.4. Esplanade Transgressions – Quantitative Assessment

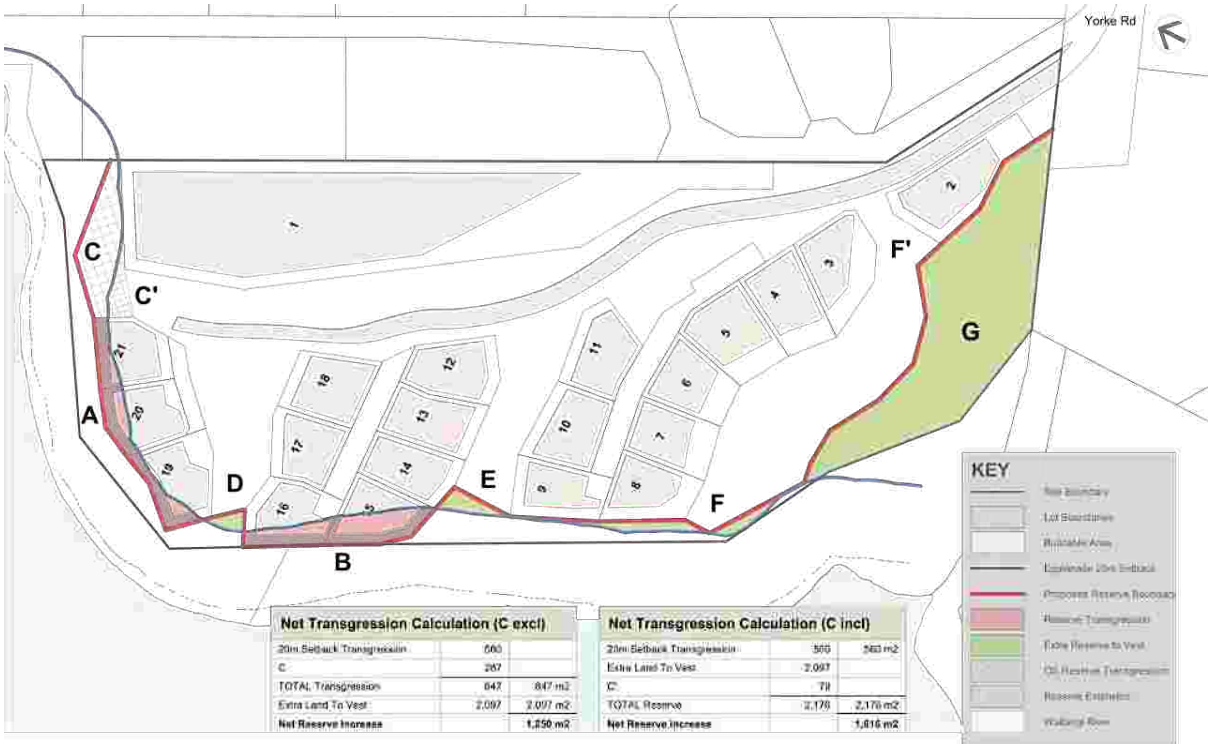


Figure 22: Proposed Esplanade Reserve boundary and 20m setback transgressions

- Coloured areas A and B illustrate development transgressions into the 20m setback. The extents of encroachment effects are identified by the darker intersection of potential buildable areas (beige) and the transgression areas (red).
- Green coloured areas illustrate parts of the site beyond the 20m setback proposed to be included within the vested Esplanade Reserve.
- Hatched areas C and C' are required for full esplanade connectivity but proposed to be managed as part of the site open-space network.
- Un-coloured areas D—F are open-space areas within the development contiguous with the reserve, proposed to be configured as esplanade extensions.
- Area G, proposed to be vested, provides a connection between Yorke Road and the river, as well as providing a common boundary between several existing council reserve parcels.

Area C-C' above is a special case. It connects the upper and lower parts of the site with an existing route down the escarpment. There are two related use-cases for the area, but with different implications for ownership.

1. Provides Esplanade Reserve access between upper and lower paths (loop connectivity and full network function).
2. Provides resilience through service and emergency access to the lower platform (Esplanade Reserve, Lot 1 and neighbouring properties.

Both these functions are about access and are adequately provided for by either a range of easements (vested to Council) or an open-space encroachment into the 20m setback (included in common Lot 200). The issue is really about which is better placed to be responsible for managing the access.

On balance, with both providing the same open-space outcomes, the latter is proposed as the simpler option and the Esplanade Reserve boundary has therefore been set as close as possible to the edge of the existing track that traverses the escarpment.

Area F-F' is similarly a special case. Public access to the clifftop walkway can be provided from the connection to the river within area G, proposed to be vested. But it will need to be constructed and is unlikely to be accessible for people with a movement disability. F-F' provides level access and is already included in the public access easement for the rest of the site.

The special cases notwithstanding, calculating reserve loss/gain in a purely quantitative way results in similar outcomes – **1,517—1,537m²** *more* land in public ownership.

4.4.5. Scheme Design – Qualitative Assessment

To have value, open-space must be part of a wider open-space network. The better connected, at whatever scale, the greater the value.

Although agreed not to be vested, all paths and open-space within the development function as though they were public owned ie all non-residents will access each lot from a 'public' footpath within the open-space network within the site. There is no discernible difference between the actual public paths of the Esplanade Reserve and those footpaths within the development. Until such time as an esplanade track is extended north of the site it is not anticipated the public outside the development will use the Esplanade Reserve path to any great extent. But there will be some use, and there is no impediment to anyone using the open-space network within the site.

All open-space areas can be seen as being mixture of **Link and Place** function. Links, ideally, should be part of connected routes and form loops within the network. Places must be wide enough to become non-directional and contain activity.

Areas 1—4 (below) are where Place function can be achieved within the proposed Esplanade Reserve. Typically these are where there is significant outlook potential over the river or into the backwater slack on the lower level. Block design has been used to extend these spaces with

Greenways and draw esplanade activity and values up into and across the site to the escarpment return on the east side – areas 5—8.



Figure 23: Publicly usable open-space amenity

Link function applies to path segments between 1—4 (above) where open activity space cannot be realised. To achieve Link function these segments should be narrower. 4.5m has been set as the minimum transit corridor, with 3—6m public yard openings on one side and native vegetation dropping away on the other to provide a generally perceived active reserve width of around 10m.

The proposed reserve/site boundary:

- Extends further into the existing property to ensure a minimum 4.5m wide clifftop corridor is maintained.
- Encroaches within the 20m setback where there is no gain to be had in reserve functionality.
- Is aligned logically between block corners.

Compensation for encroachment into the 20m setback is made by:

- Increasing the functionality of the reserve by placing larger open areas within the site adjacent to the reserve as publicly accessible activity spaces. Approximately 50m deep, these are pedestrianised Greenways that, similar to the Esplanade, provide public front door access to all lots ensuring activation of all public open-space areas. They are not proposed to be vested, but via easement are functionally identical to the reserve.

- Vesting an existing 3.5—6m wide access track down the southern escarpment face connecting Yorke Road to the river.
- Vesting all the downhill slope from the track to the boundary of the existing Falls View Road general purpose reserve and Esplanade Reserve parcels to enable further development of the public open-space network.

The calculation shown on ***Error! Reference source not found.*** (above) measures and maps the size and extent of usable public open-space of the proposed scheme. The measurements include pedestrian-only areas, and not the open-space area along the top of the east escarpment which is mixed use (containing moving vehicles as well as pedestrians).

The total area of usable public open-space is 5,286m^2.

The original usable – though not activated – Esplanade Reserve area was 2,470m^2.

Therefore, the scheme proposes a net increase in usable public open-space of 2,816m^2.

4.4.6. Reserve Amenity Value

The previous subsections measured the amount of public open-space in the scheme design. This subsection recapitulates the open-space results from the RSP assessment in section *4.3* to give an indication of *Value*.

People are attracted to open-space areas and use them more often the more connected they are, the busier they are, and the greater the variety of uses they contain. In this way, open-space accrues value for the public to the extent that it is used. The scheme maximises use of the whole open-space network in several ways.

The scheme design integrates the Esplanade Reserve into its internal network and provides usable connections to the road network (south), the existing esplanade area to the north, and potential connections to Haruru Central and adjacent council reserves (see *4.4.7 Extra Benefits* below).

Urban design research tells us that when houses front directly onto a reserve ie it's the front door address, then the household will use the reserve on average 8x per day. 30m from the reserve that drops to 4x per day, until at 200m it is less than 1x per week.

The scheme design maximises use of the Esplanade Reserve by:

- Providing lot frontage along the length of the reserve boundary
- Continuing reserve frontage up all of the Greenways

RSP analysis (see *4.3 RSP Assessment*) measures four criteria relevant to open-space value.

OPEN-SPACE PERFORMANCE		
Measure	*Score*	*Final Score*
OS Activities	97	
OS Network	100	
OS Proximity	100	
OS Quality	100	
URBAN FUNCTIONALITY SCORE		**99**

Figure 24: RSP open-space analysis

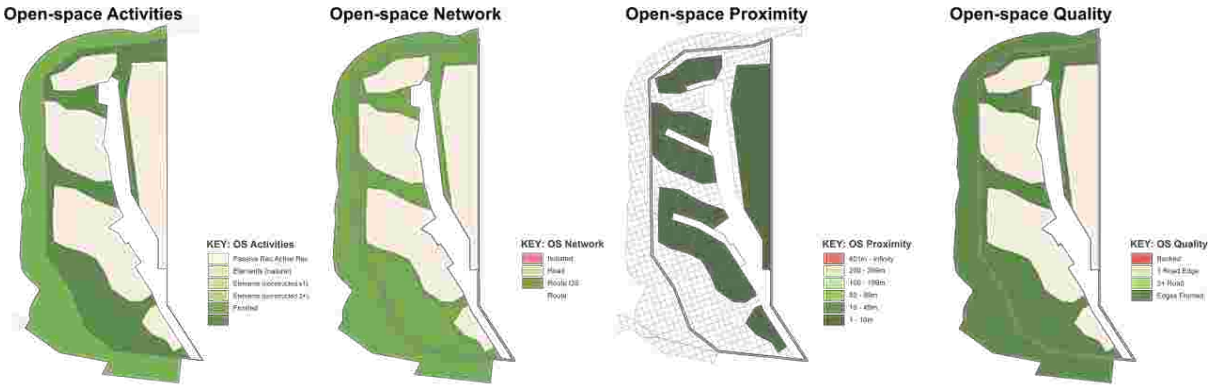


Figure 25: RSP open-space data visualisation

4.4.7. Extra Potential (Enabled) Benefits

Historic Transit Route

The vested southern area ties together a number of existing council reserve parcels and critically, through them, enables a direct connection to be made between the eastern Haruru 'suburb' with the village centre and the Falls. This connection would give expression to the historic general transit route through Haruru from Waimate to Waitangi.



Figure 26: Historic 'horse track'

Connections to Public Places Beyond the Site

From the riverside track it is possible to form a direct connection to the clifftop pathway from within the proposed enlarged Esplanade Reserve.

Public access to the clifftop pathway unlocks the potential to access the esplanade reserve north of the site, and, with future subdivision of any of the properties at the east end of Yorke Road, creating a full public open-space network for Haruru East.

The riverside track also unlocks the potential to connect Haruru east off-road to:

- Haruru central
- Haruru Falls and Waitangi track on the north side of the river

This connection would be at grade around the back of the highwater inlet within the existing Esplanade Reserve or via a more direct short boardwalk experience across the mouth of the inlet.

4.4.8. Vesting Calculation

Together with usability and value, a third method of assessing the public benefit of the proposed reserve boundary is to calculate the amount of land to be vested in Council.

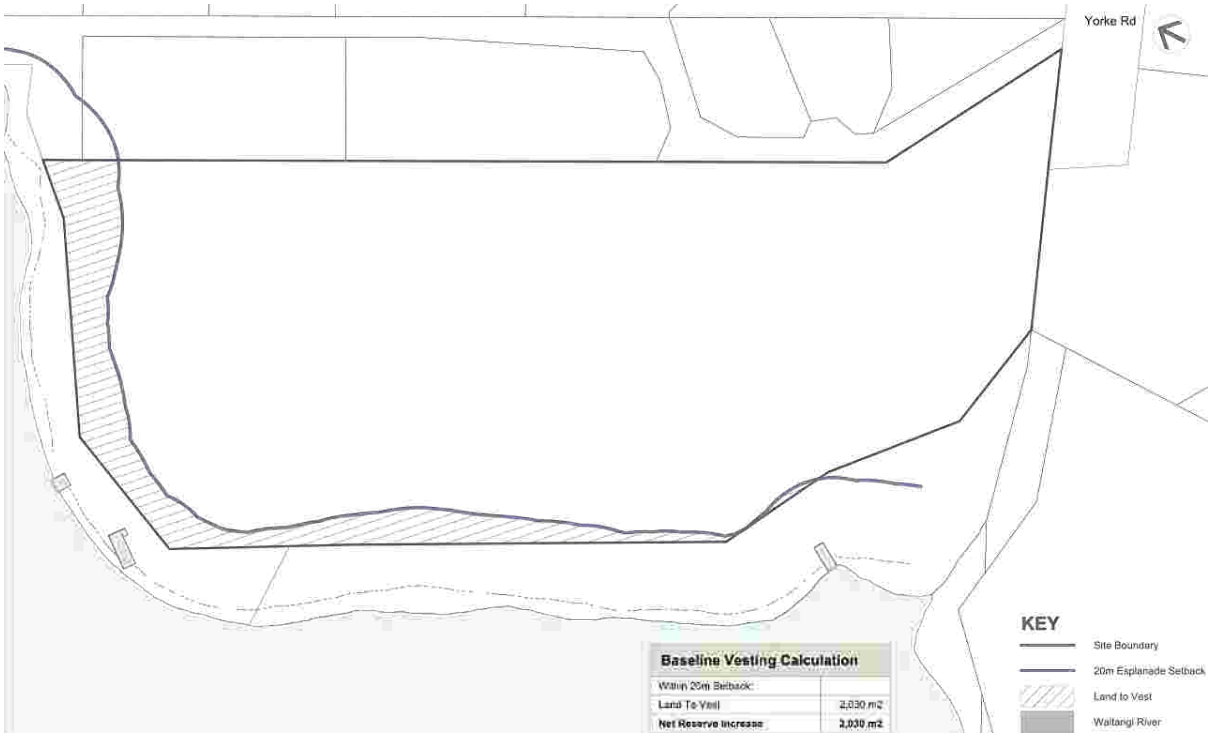


Figure 27: Land within 20m MHW setback to be vested



Figure 28: Proposed land to vest

4.4.9. Summary: Reserve Calculations

Despite the fact that none of the usable land within the 20m MHW setback for an Esplanade Reserve is currently accessibly by the public, the following summary calculates the net public benefit from the proposed scheme using several measures. The first two quantify areas directly usable by the public (active amenity). The second two measures quantify areas of land that also include passive amenity (escarpment slopes, vegetation).

Usable Esplanade Reserve Area

Baseline (within 20m setback)	2,470m^2
Proposed	2,919m^2
Net Reserve Increase	449m^2

Usable Open-space Area

This measure quantifies all of the pedestrian-only open-space amenity available to the public once access is provided by easements over the Greenway areas on the site.

Total usable open-space	5,286m^2
Baseline (within 20m setback)	2,470m^2
Net Open-space Amenity Increase	2,816m^2

20m Setback Transgressions

This measure quantifies the plus/minus calculation of areas either side of the 20m MHW setback.

Encroachment within 20m setback	847m^2
Encroachment within site	2,097m^2
Net Reserve Increase	1,250m^2

Land to be Vested

The final measure quantifies the increase in area vested in Council for public benefit.

Baseline to vest (within 20m setback)	2,030m^2
Proposed to vest	3,280m^2
Net Vested Increase	1,250m^2

5. LANDSCAPE

5.1. EARTHWORKS

Little site disturbance is proposed. The major intervention is to reduce the peak in the middle of the site to heal the excavated junction between the original two lots. This also enables shifting the roadway away from the escarpment edge and placing the pedestrian path within native vegetation.

Apart from this, the shape of the site will be retained, with the block pattern highlighting and making more explicit the shape of natural contour.

5.2. VEGETATION

Much of the site is proposed to be managed as a commons. In general the commons will extend the existing and natural vegetation associations of the river corridor and escarpments across the site.



Figure 29: Proposed native vegetation management and augmentation area within the site and esplanade reserve

Existing vegetation on the site is something of a mixed bag. Several large Pohutukawa, karaka, and totara around the edges provide a framework and the coastal association will be used in new planting to penetrate into the site. Within the site itself most of the native plant cover is on the

upper end of the inland escarpment. Covered with regenerating kanuka, this will be augmented with other species to ensure long-term association succession.

Most of the remaining vegetation within the site is of little value. The most common weed species on the site and esplanade reserve are:

- Chinese Privet
- Cotoneaster
- Agapanthus
- Prunus campanulata
- Gorse

A gradual removal process of these weed species is proposed, with replacement generally by natural coastal association species.

Part 3

6. PLANNING CONTROLS AND STANDARDS

6.1. VILLAGE CHARACTER

'Chapter 2: Context' describes Haruru as a 'detached' settlement, supplying people but not services to a wider community. Neighbourhoods are dispersed; the existing suburban form doesn't express the specifics of place. There are no social/community assets to bind it to place.

In its social life and attachment to place, village character is the opposite of traditional suburbia. Suburbia is configured for extensive urban or metropolitan scales relying on vehicle access. Suburbs, often amenity poor, traditionally internalise amenity within each lot, aiming to satisfy all needs of residents within the property itself. It is a pattern that isolates residents rather than connects.

Villages, on the other hand, evolve in direct response to their immediate physical environment. They are neighbourhoods where much amenity is externalised and shared. Proximity, sociability, accessibility, and intimacy are the urban characteristics at this scale. Recognising and knowing your neighbours fosters a strong sense of community and encourages people to look out for each other. This means people need to be visible and present. Thus the proposed subdivision design is overwhelmingly pedestrian-centric.

Key elements that drive the degree of intimacy required to generate 'village character' are:

- The relationship of the house to the street
- The relationship of the house to its neighbour
- A clear delineation between private and public space within the lot
- Continuous active frontage

To achieve the visual and functional intimacy of a village, best practice urban design insists on the minimum provision for each lot of:

- A private living court – Within the rear yard and a minimum of 35m^2. It will contain paving/decking, lawn, planting and be accessed directly from an active living room within the house.
- A public living court – within the front yard, either paved at ground level or a deck if living is on the upper level, also accessed directly from an active living room within the house. This court is for sun, surveillance and engaging with passers-by.
- A utility court – a dedicated space of around 9m^2 minimum for clothesline, rubbish bins etc.
- An entry – a dedicated space, fully visible and legible from the street
- Garaging/parking – 6—7m wide for 2 car spaces minimum. Need not be an actual garage building.
- Small side yards – for light (not solar gain), ventilation, access, and maintenance only. These are NOT outlook areas, so should be as narrow as practicable to help create continuous frontage for the street.

The complex of controls (setbacks, recession planes, coverage) that create the two-yard approach also 'automatically' manage solar gain for the building, on-site amenity and avoidance of overshadowing by neighbours.

6.2. LOT CONFIGURATION

Lot configuration and function is critical to deliver the potential quality outcomes referred to above. Many existing District Plan performance standards work against the generation of village character, being evolved responses to generally low-amenity subdivision. They tend to isolate buildings and residents through distance and a desire to create enough space on a lot to accommodate all of the things missing from the suburban public realm.

Considering the very high levels of amenity generated by the proposed development design, the existing standards that have been identified as counter-productive are:

- Setbacks – front, side and rear (mews)
- Height in Relation to Boundary (HIRB)
- Minimum lot size

The purpose of setbacks is to control the placement of the building on the lot. This is to secure amenity provision within the lot, to protect the amenity of neighbouring properties, to protect the amenity of the street and to create a particular 'street character'.

HIRB controls manage amenity and character effects beyond the site. As lots decrease in size (<500m^2) it is more difficult to push buildings into the middle of the lot where effects are largely managed through distance. A more nuanced approach to HIRB in relation to building placement is required, especially for smaller lot sizes.

Lot size should be a function of amenity. Where amenity is low, lots should be large. Where amenity is high, lots should be small, both to maximise the value (use) of the amenity for the community and also to minimise the cost.

6.3. PLANNING CONTROLS AND STANDARDS

6.3.1. Front Setback

One of the keys to developing a strong sense of community is to provide space where people mingle across the public/private divide. This is traditionally created through an awareness of the social – or sociable – function of the house. For example, the use of verandahs within talking distance of the street; providing a front-door porch that reaches out to the street, is directly and legibly accessible; entry steps that drop to the footpath, wide enough to sit on and socialise; and so on.

There is a point somewhere around the 6m mark where people choose not to engage with each other, and particularly across the public/private boundary will actively avoid engagement. A ***maximum*** front setback for the front face of the main building form has therefore been set at **6m**.

To provide enough space for an active front living court a ***minimum*** setback for the front face of main building form has been set at **3m**.

Note, in all cases the setback is to the front wall of the main building volume. 'Add-ons' such as a front door porch/roof cover or a verandah can extend into the 3m front yard in order to draw people out of the house towards the boundary and to encourage more activity within the 6m yard. This applies especially to the zone between the 3m and 6m setback lines. A limit to the architectural extrusions into the 3m setback area has been set at 5m^2 to avoid over-dominance of the street by the building in the suburban setting.

6.3.2. Side and Rear Setbacks

Wide section width and deep side-yard setbacks create a streetscape where houses are isolated from each other. When the buildings don't relate to each other to reinforce the continuity of the

street, residents tend to either withdraw to the rear or, for social engagement, go to distant places (usually by car).

Village character is strengthened by near-continuous and homogenous frontage. Minimum/maximum front setbacks and small side yard setbacks have the effect of positioning all houses in an approximate line in relation to the street. At the same time, rear yards also align to reduce potential over-shadowing of neighbouring living courts.

The purpose of the side-yard building setback is only to provide light, ventilation, access, and for maintenance for the house. This can be achieved in quite a small space. Side yards are never outlook areas and they are never required for direct sun access into the building.

A minimum separation between buildings of 2m is required however, unless side walls are to be fire-rated. To ensure this separation and avoid the cost and complexity around fire compliance the ***minimum*** side-yard setback has been set at **1.1m**.

Garages are a special case, particularly in mews lanes. A zero lot line for garages as provided for in the district plan is accepted, both in relation to side and rear boundaries.

For the rear boundary in a mews configuration there is a further control that requires **8m** separation between opposing garage doors for trouble-free manoeuvring. In the case of a minimum 6m wide mews, this rule will push the garage back into the lot by a maximum of 1m.

The side of the access boundary that cars must enter has been identified for all lots on plan **SCH-3 Planning Controls** (see **Appendix A**). For mews lots, separation distances have been calculated and are captured by the rear setback line for each lot.

6.3.3. The Rules in Practice

It is important for the generation of amenity, the visual integrity of the street and the management of overshadowing and overlooking effects to have all of the buildings more or less in alignment. However, the streetscape is also hugely improved when all the front building faces are not in a straight line. This slows down movement along the street and results in an increase in 'place' values. This is the perception of the street as a linked string or 'necklace' of passive spaces that encourage social interaction across the boundary. It therefore results in a decrease in 'link' values – the perception that the street is only a transit corridor.

Two things work together to guarantee that buildings will step in and out of alignment:

- Buildings made up of two primary forms
- Side boundary lines that are not square to the front boundary

The first method is in the form of architectural design guidance.

The front façade of the building itself is articulated by constructing it using more than one primary form. This can be identified in the roof shape. Alternatively, extra elements can be added that have the same effect when viewed from the street, such as bay extensions or porches. Outward reaching parts of one house hide receding parts of its neighbour.

The second and most sure method of encouraging place function is in the design of the lot boundaries relative to the street. Building orientation for medium density and narrower lots is nearly always determined by the side boundary. Moving this away from perpendicular to the front boundary has the effect of turning the building which automatically creates frontage articulation in relation to the road, no matter what the building design. As the viewer moves down the street, building faces open up and the buildings appear to turn to face the viewer on approach.

The following plan illustrates all of the proposed planning controls and proposed design guidance (see Chapter 8) in context, as a 'real world' example. The site is 342m^2 and the building generated from a typology model of a 150m^2 real house design and a 42m^2 garage.

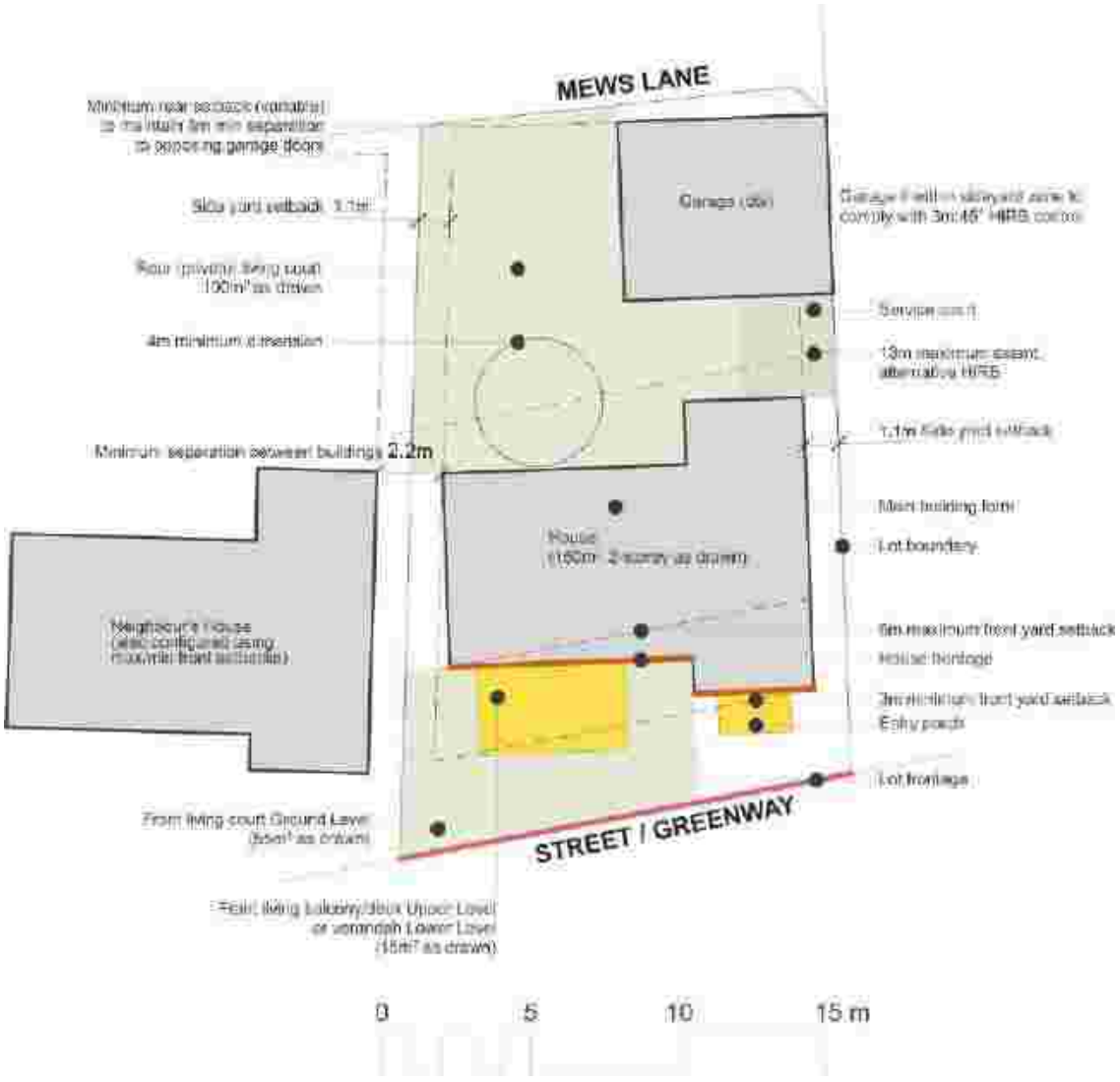


Figure 30: Lot rules and components – sample configuration

6.3.4. Lot Size and Amenity

The extent of the *building footprint* – the perceived intensity or 'built density' of development – is set by building coverage in relation to openness. The design outcome aimed for by the application is for building coverage to be less than 40%. This is more than some properties in Haruru, but less than others and is consistent with most low-density suburban zones in other parts of New Zealand.

As lot size drops below 400m^2 (160m^2 total building coverage), this has the effect of:

- Reducing GFA (building size)
- No garage/carport
- Using 2-storey structures

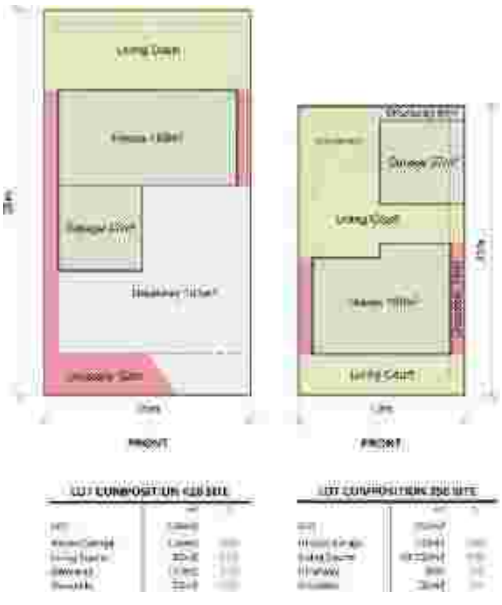
In practice, *usable* amenity bears no relationship to lot size. If building coverage is constrained, the things that makes most difference to the amount of usable amenity achieved are:

- Building setbacks
- The way in which vehicles access the site

Deep setbacks often create spaces that are too shallow to be functionally useful. Deep front setbacks create uninhabited spaces dominated by vehicle values inherited from the street.

When vehicles enter the property from the front, 100m^2 is usually taken up with access and manoeuvring. As no other activities naturally cohabit with moving cars, most front yards in their entirety have no amenity function.

Vehicle access from the rear (mews lanes) completely removes the latter inefficiency. Mews access also releases the front yard for social engagement (the public court), which forces changes to setback controls. The mews/setback combination tends to maximise the efficiency of lot-use. It also pre-empts design decisions so that efficient use is far more likely than for front entry sites.



A theoretical demonstration of this was prepared for the Waiuku Community Board using their own criteria as a brief. The result – a 250m2 mews lot is the functional equivalent of a 420m2 front access lot – roughly tallied with the general 2:1 rule of thumb relationship in practice (250 mews = 500 normal).

WCB theoretical efficiency comparison

Tissue studies of existing suburbia compared to real mews developments (using freestanding houses) confirm the 2:1 advantage of smaller mews lots. The most recent of these from Hikurangi (a development also including Greenway and Living Street types) showed a much more dramatic advantage. A summary of the results comparing 300m^2 mews lots (3—5 bedroom houses) with traditional 6—700m^2 lots concluded the mews lots had:

- **25% LESS** building coverage
- Nearly **2x MORE** green open-space within the block
- **2x MORE** living space within the lot
- **Same** number of bedrooms
- **2—3x MORE** utility space /lot
- **75% LESS** driveway
- **<2x MORE** on-site parking
- **80x LESS** waste space within the lot

This Hikurangi development is also used as an example because it has been designed using the same variations to planning controls and standards proposed here. Not accounting for the social and internal lot benefits of the Hururu design, the Hikurangi example also demonstrates that the smaller lot sizes proposed for Haruru will better manage wider environmental effects than traditional development through less 'builtness', more openness, more naturalness and less hard surfaces.

6.4. HEIGHT / RECESSION PLANES

6.4.1. Building Height

The zone building height limit of 8m is applied to all lots as a base constraint. This enables a 2-storey house with floor to ceiling heights of 2.7m on the living floor and 2.4m for the bedroom floor, a gable roof with a reasonable pitch and pile foundations.

To avoid unintended architectural effects when eg ground slopes irregularly, it is proposed to adopt an exception clause that allows ridgeline infringements to be discretionary. This is a

relatively common exception in other jurisdictions and is managed as a restricted discretionary activity. The extent of discretion is defined as:

> *50% of the roof in elevation (measured vertically from the junction between wall and roof) being able to exceed the height limit by up to 1m when the entire roof slope is 15° or more.*

6.4.2. Height in Relation to Boundary (HIRB)

The purpose of recession planes is to distribute building mass in a way that creates the least impact on neighbouring properties.

Time of the year matters in assessing effects. In summer, having sun in the living courts is a priority. In winter, the living courts are used far less, so direct sun access is less important. However, it is very import in winter to have the sun shine on the building face of active living rooms in order to maximise solar gain and warm the house.

For living courts or house walls, issues arise when one house is positioned between the sun and the target area of the neighbouring house. Positioning houses roughly in line is the best way to remove this issue.

When houses in a street all more or less line up, and when there are active living courts on both sides of the house, then there will always be at least one living area in the sun at any time of the day and year. Overshadowing problems are removed from both building faces and living courts.

For outdoor spaces the recession planes are really only relevant for the part of the day in which they'll be used.



Figure 31: Solar modelling (medium density mews lots, Meadowlands, Christchurch) demonstrating shadow and illumination effects on houses and courtyards at either end of the day.

To encourage containment of the building mass towards the front of the site to limit over-shadowing effects to neighbouring living courts, an alternative zero recession plane applies for the front 13m of the site. This means that even for a house positioned on the maximum 6m line, a 7m deep 2-storey house ie upwards of 2—300m^2 GFA is still able to be positioned close to the boundary within this area. The standard recession plane of 3m and 45° in the District Plan is adopted for the rear part of the section. While a building will still be able to extend into this area, it will need to be restricted to 1-storey close to the boundary and will be at the expense of outdoor living amenity.

The alternative HIRB control encourages buildings to maximise width close to the front and release as much space as possible for amenity at the rear.

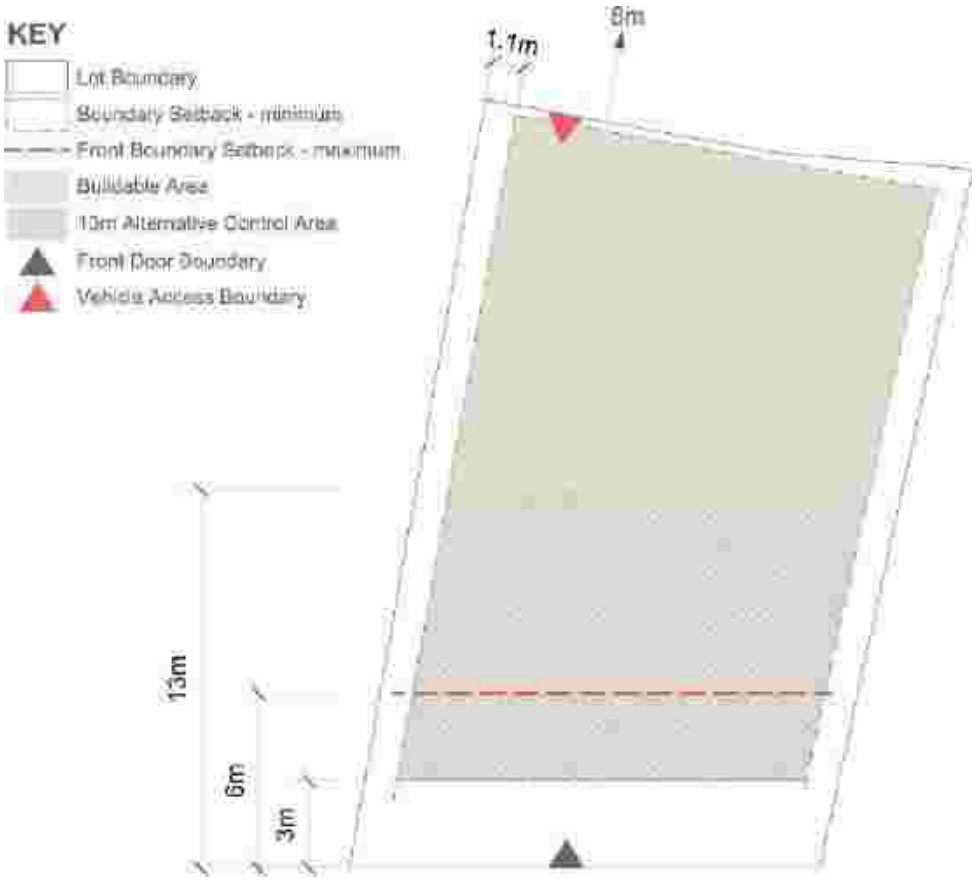


Figure 32: Lot rules summary schematic

6.4.3. Building Envelope and Consent Processing

No matter how good the design, proposing a subdivision with rules and standards different to those in the District Plan can be problematic for Council, particularly for building consent

processing. To assist Council officers and to limit the requirement for them to constantly assess an application for discretion, an alternative assessment path is proposed.

All of the above controls (setbacks/buildable area, HIRB, Alternative HIRB, Height and exceptions) can be captured in a 3D building envelope. This is a NURBs generated form derived from the as-built subdivision contours and includes/expresses all of the above controls. Together with the underlying site model, it will be provided for each site separately as part of the 224c consent package.

At building consent, a 3D version of the house (a simple accurate massing model is sufficient) is positioned on the site model at the correct elevation. A 3D pdf containing only the site model, envelope and building mass, forms part of the consent application. On opening the pdf, any infringement is immediately identifiable by the consent planner, in which case an orthogonally projected elevation that dimensions the infringement needs to accompany the application to confirm that it falls within the discretionary limits.

No other drawings or analyses such as single point cross-sections with traditional 2D measurements need be considered or interpreted for these matters.

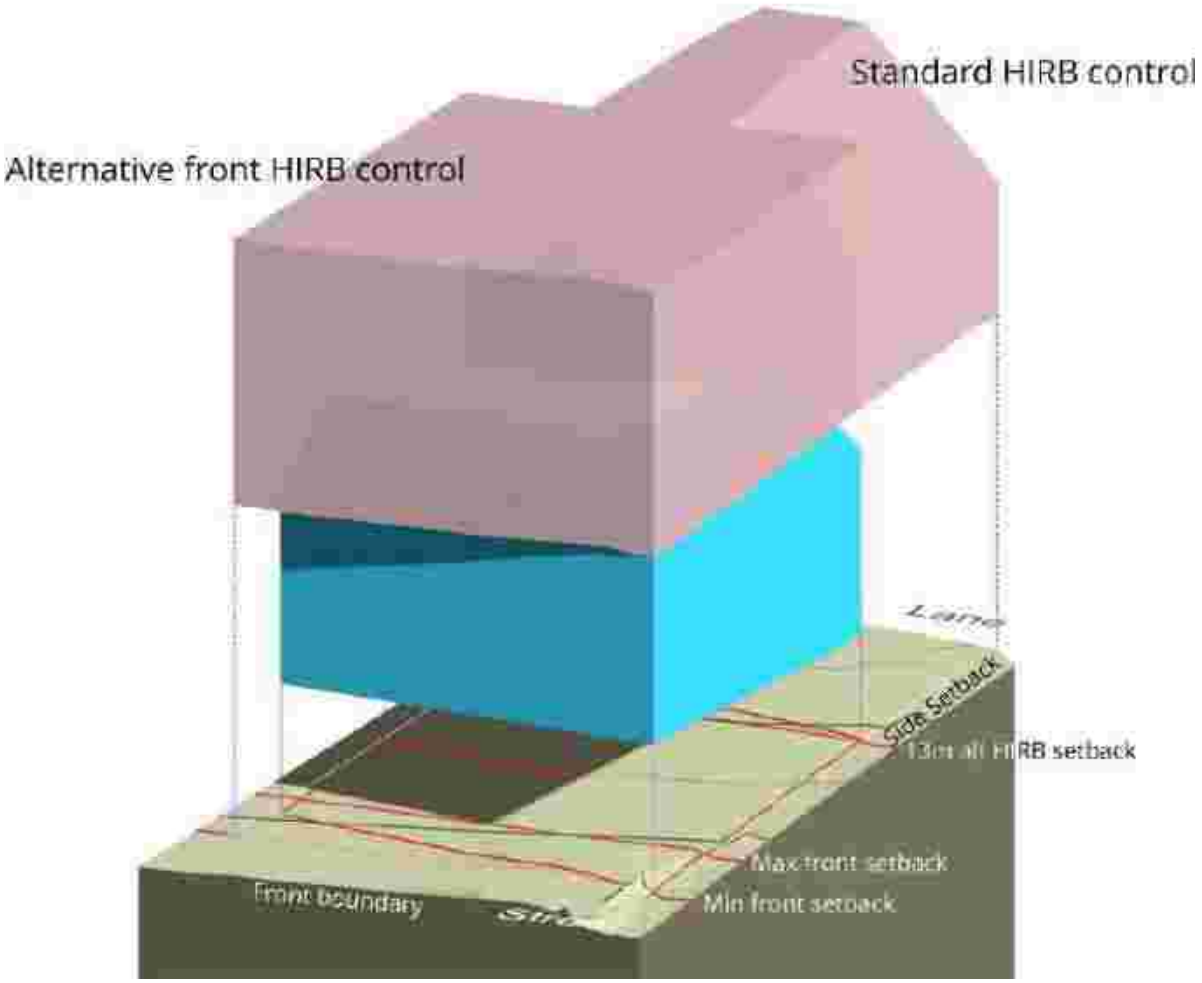


Figure 33: pdf components – site model, NURBs envelopes and building - showing how the envelope expresses all the planning controls and contains the building

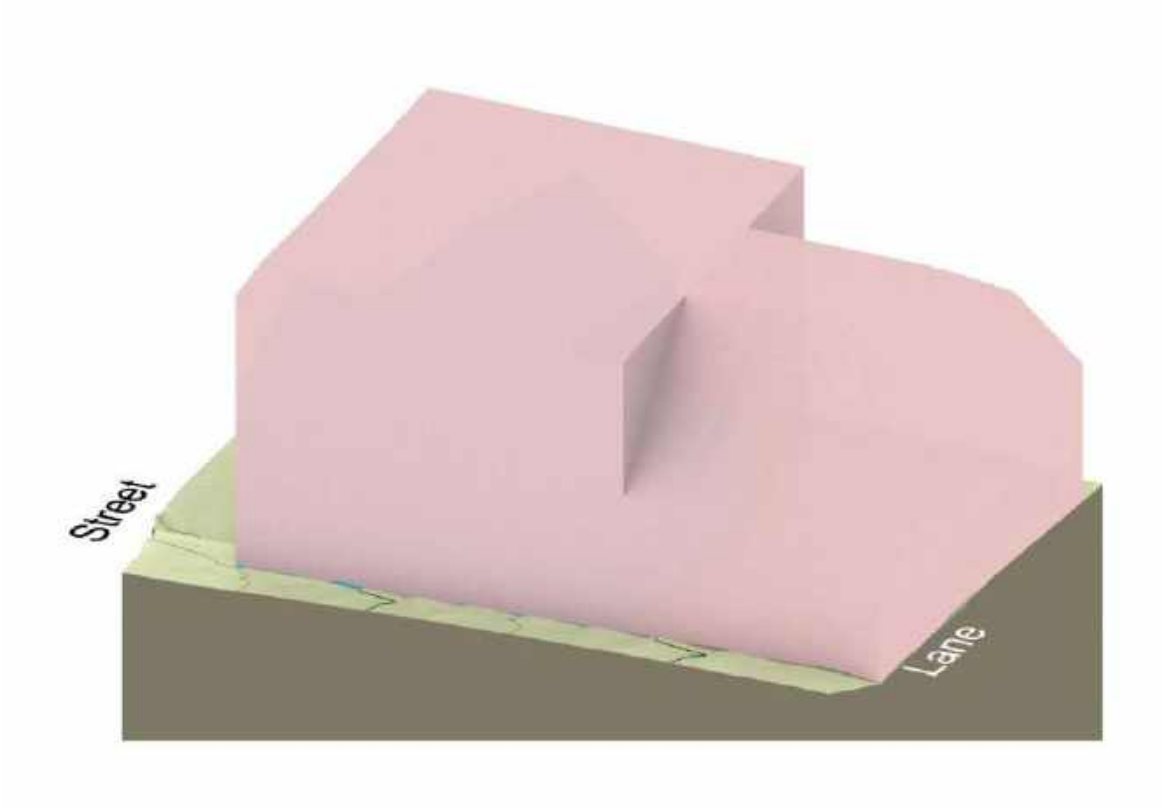


Figure 34: Oblique isometric view showing the two HIRB envelope volumes with a fully compliant building just discernible inside them

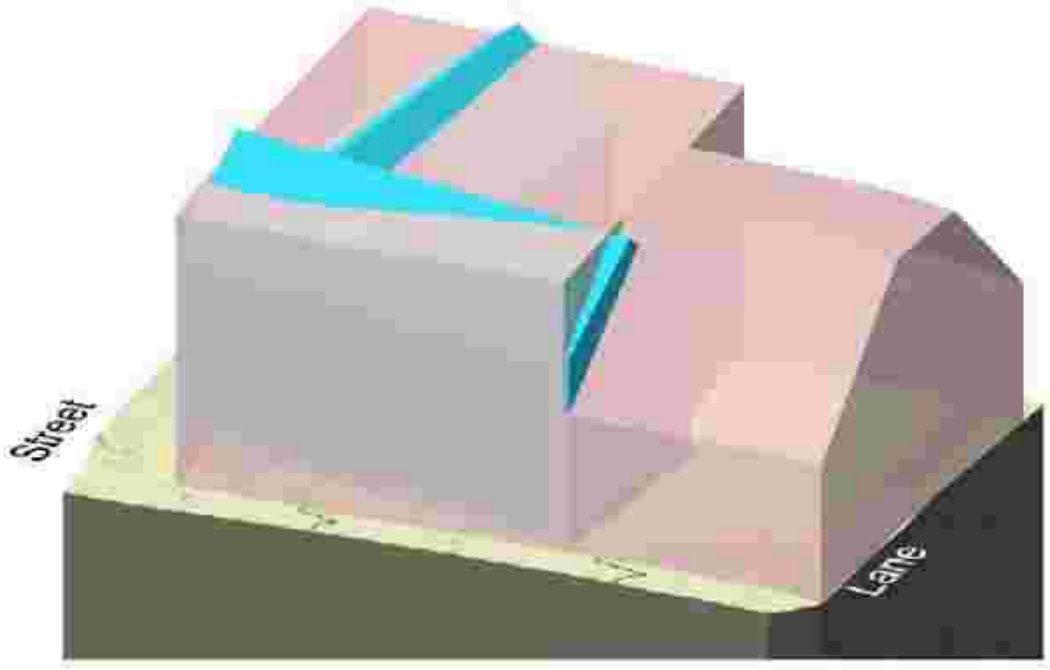


Figure 35: The same view but with the building raised 2m to generate infringements

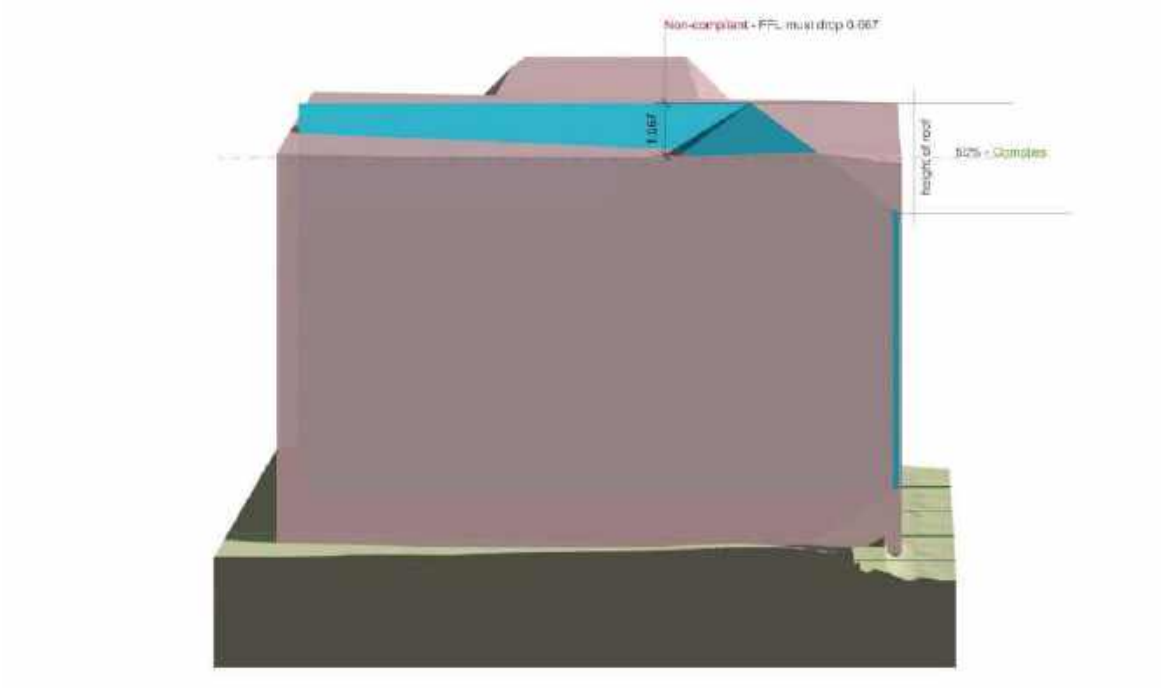


Figure 36: Front elevation. The infringing scheme dimensioned to demonstrate whether it falls within the extents of discretion. To achieve consent the house would need to be lowered by 67mm.

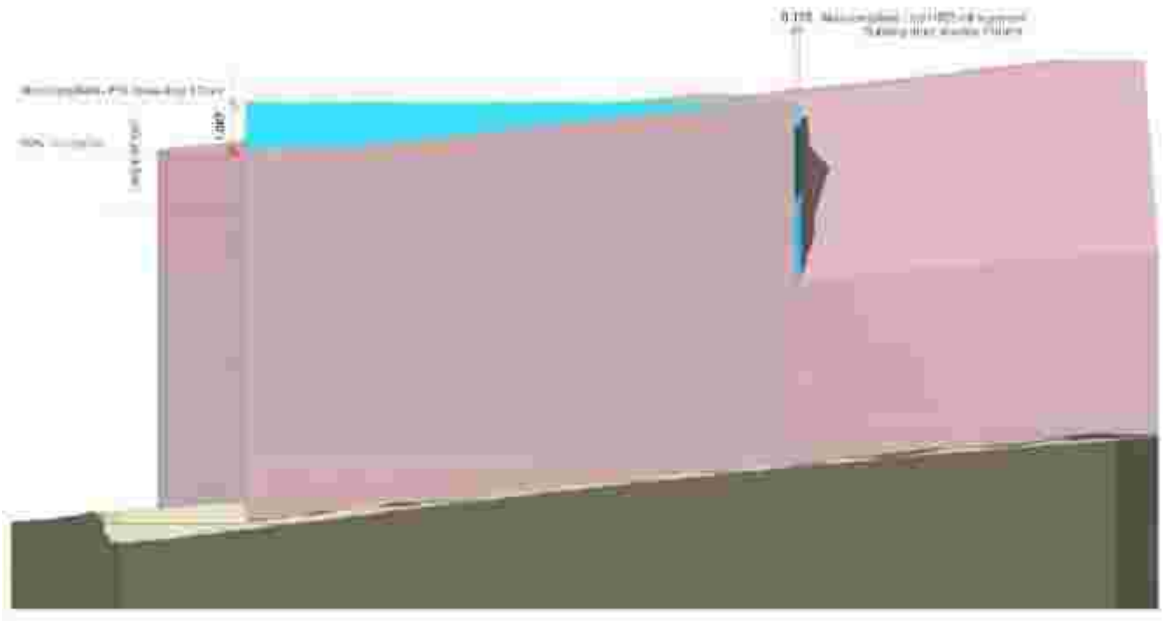


Figure 37: Side elevation. The infringing scheme dimensioned to demonstrate whether it falls within the extents of discretion. To achieve consent the scheme would need to drop the building 67mm (see above) and shorten the length of the building by 118mm where it extends beyond the Alternative HIRB Control volume.

7. DESIGN GUIDANCE

It is not the intent to provide rules proscribing the use of various materials or styles within the development or to introduce constraining rules that add to consent application and processing complexity.

However, there are a number of matters which are unfamiliar or not well-understood by the traditional development and building industries. By and large these are design rather than 'compliance' matters, but they drive the overall amenity and quality of the development. The subdivision design enables potential quality – 'quantified' by the RSP. The building, and internal lot design and configuration can't improve on this potential, but they can diminish it. This is assured when large-lot practice and performance standards are applied to smaller lot sizes.

To avoid any single lot inadvertently affecting the whole in a negative way and to assist individual lots maximise inherent amenity, a level of design guidance and support of a largely urban design nature will be provided to purchasers before individual applications are prepared for consent.

Guidance content will consist of such things as:

Addressing the public realm

- Two-sided houses
- How front yards can be configured
- Frontage articulation

How mews lanes work

Using a 'parts approach' to extend the functionality of buildings

Fencing

PART 4

8. VISUAL EFFECTS

8.1. NEIGHBOUR EFFECTS

At present, with the exception of the escarpment, most of the site is open and in grass, similar to its appearance when farmed. Only four houses look into the site, all adjacent neighbours.



Figure 38: Existing site and neighbouring houses

House 4 on the lower flood-plain level is the exception. It turns its back on the site, with outlook confined to the north and south. The relationship with any future house on Lot 1 is similar to what it has to any of its large-lot neighbours.



Figure 39: Neighbour houses in relation to development

The remaining three houses lie in close proximity to each other (5—6m apart) on higher sloping ground to the east of the site. They will all have some view of the upper part of the development. The proposed scheme introduces a lot of planting inside the site, taken into account in the following descriptions of visual exposure.

Images are taken from the Greenway 3 entry using a DM camera and 26mm lens for human vision equivalence.

HOUSE 1



Figure 40: Houses 1 and 2 from the high point on the site

The outlook and living areas of House 1 face north, away from the site. There is a potential view of Lots 3—5 and Lot 11 from a large window, though this part of the house is generally giving to entry and vehicles.

On the same level as adjacent development on the site, House 1 is approximately 40m away from the closest dwelling (Lot 3) and 70m away from the Lot 11 dwelling. The view will be partially or fully obstructed by roadway and carpark tree planting.

HOUSE 2

House 2 is a 2-storey dwelling with the upper level approximately 3m higher than the adjacent development. It will have a potential view of Lots 3 and 4 from the upper floor, though this is not the living side of the house. The outdoor area between the house and the site boundary is given over to vehicle parking.

Lot 3 and 4 dwellings are 50—60m away. Tree planting at the head of Greenway 3 and across the other side of the entry road will largely limit visual exposure.

HOUSE 3

House 3 is much higher than the site, and the adjacent dwellings (Lots 1 and 2) will sit low on the site, 8m below the deck of House 3. The west-facing deck looks over the site; distant views are southwest over the river towards the motor-camp in central Haruru, or northwest down the development roadway.



Figure 41: House 3 from Greenway 3 entry

Together with Lots 1 and 2, House 3 will have a potential view of dwellings on Lot 3 and 11 as well. The first pair are approximately 30m away, below the view, and the second pair are 60 and 100m away respectively.

There is a lot of mediating tree planting between House 3 and the second pair. Some mediating planting within their own sites can be expected for the first pair at least to the extent that the entry roadway is screened.

8.2. PUBLIC PLACE EFFECTS

8.2.1. Viewpoints

There are only three vantage points from which the site is exposed to public view.

1. From the Waitangi Track, 160m north of the site on the far edge of the Waitangi River
2. From the Waitangi Track, 100m east of the site across the Waitangi River on the edge of the escarpment
3. From the end of Old Warf Road, 180—250m south-east of the site on the edge of the Waitangi River

For anywhere else on the Waitangi Track, the site is obscured from view by extensive vegetation. Cross-sections have been calculated from the terrain model for all houses within the viewshaft of each viewpoint. Proposed houses that are potentially visible are on Lots 15, 16, 19—21. The roofs of remaining Block 3 houses, although just visible now, will be screened by Greenway planting.



Figure 42: Public place viewpoints – arrows indicate photograph direction used to compose panoramas

VIEWPOINT 1

The view from the north gives a fair indication of the general level of visual exposure and the existing urban character as perceived beyond the site. Apart from the larger houses on the river

that tend to be fully exposed, most dwellings are only partially visible and are contained within tree planting that continues through to the ridgeline.

The positions of existing buildings on the site are identified on the panorama. The top of the roofs of the two houses can just be seen along the top edge of existing Pohutukawa and totara growing in the esplanade reserve. A shed (to be removed) is within the reserve on the edge of the escarpment.



Figure 43: Viewpoint 1 vista

VIEWPOINT 2

Much more of the site can be seen from this position, though again, existing buildings are almost completely screened by the existing trees. Some houses are partially visible among trees beyond the site higher on the hill. Three positions are identified where the foreground screening is weaker.

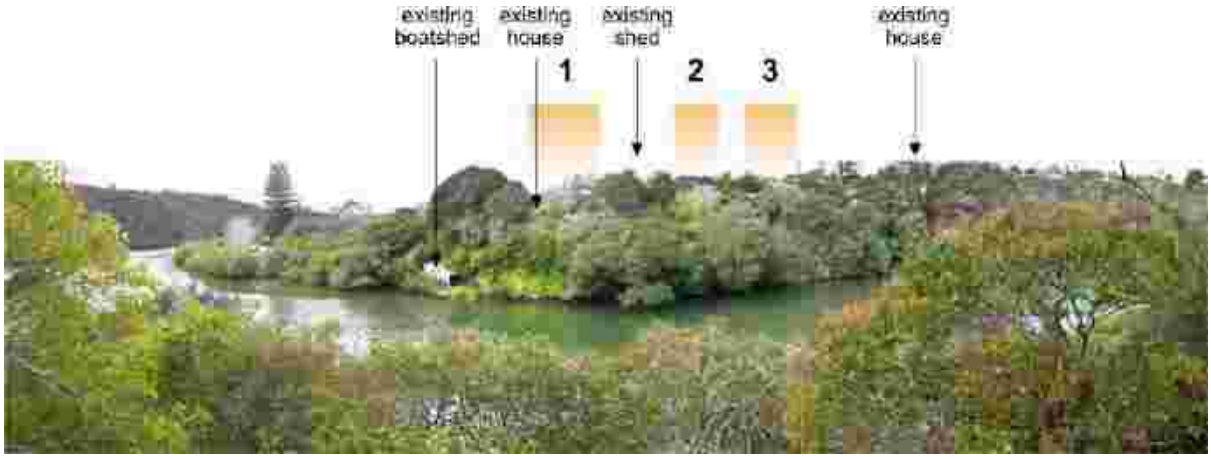


Figure 44: Viewpoint 2 vista – 3 potential openings in existing vegetation identified

VIEWPOINT 3

This vantage point looks into the high tree-clad escarpment at the southern end of the site. The ground falls away to the north beyond the escarpment edge and all houses in this vicinity are well-concealed by the tree-cover. The top of House 3, 8m above proposed Lots 1 and 2 (see Neighbour Effects above) is just visible above the tree-line.

8.2.2. Cross-sections

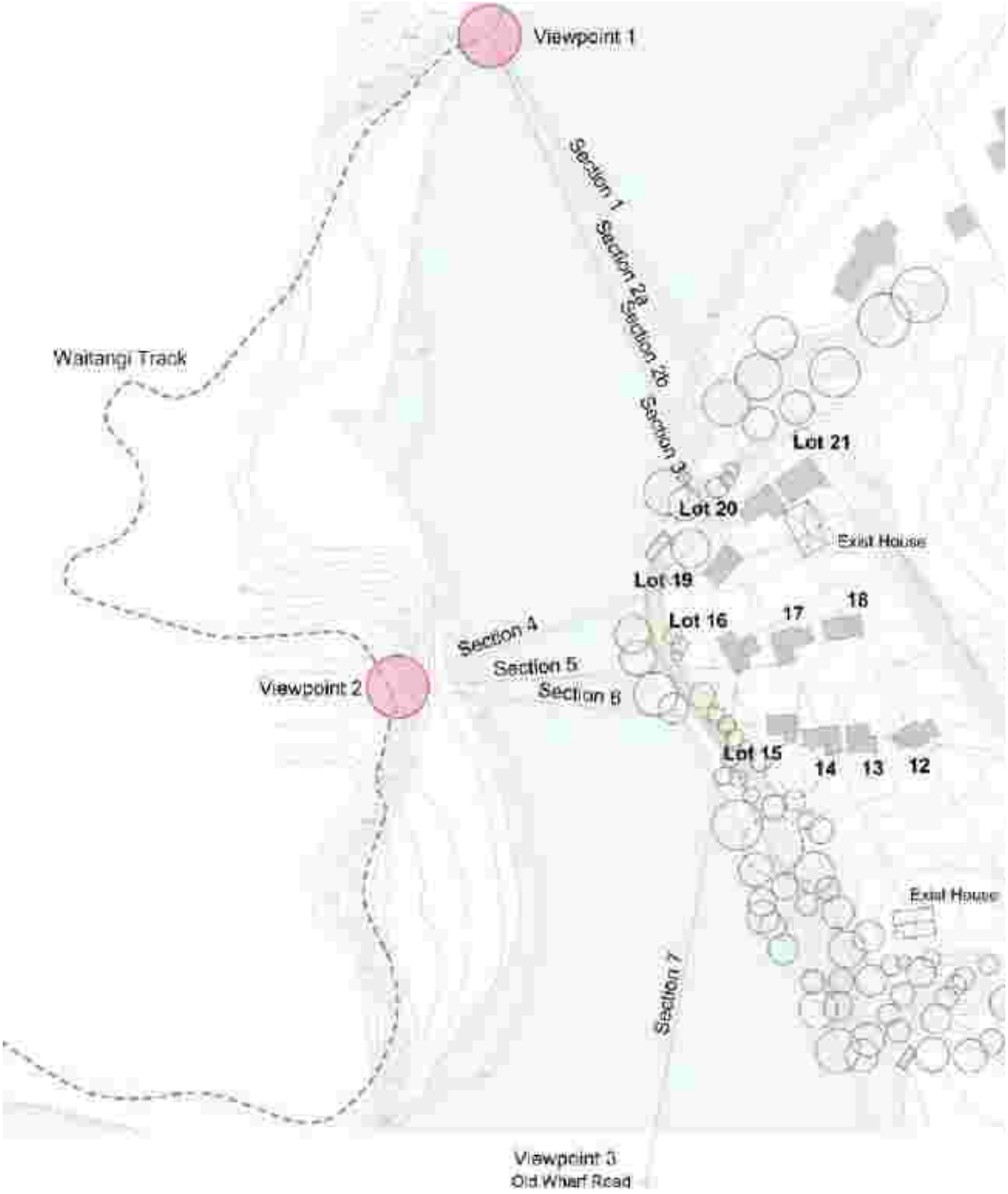


Figure 45: Section lines

Major trees within the Esplanade Reserve are identified. Heights are calculated by photo reference against existing structures on the site and by ground-truthing. Reference photographs are all 20MP using a DM camera and 26mm lens. 150—200m^2 2-storey buildings are modelled to calculate maximum effects.

8.2.3. Viewpoint 1



Figure 46: Viewshaft from Viewpoint 1 – dashed arrows indicate proposed dwellings below vegetation line

SECTION 1

Dwelling 21 will be contained within the existing esplanade vegetation.



Figure 47: Cross-section 1

SECTION 2 (A, B)

Dwelling 20 will be screened similarly to 21. The sightline intersects Block 2 dwellings at the roofline. Any small-medium trees planted in Greenway 1 will penetrate the sightline and will either partially or fully screen houses higher on the site. Without planting, the extent the houses will be visible is still less than for much of the existing neighbourhood.

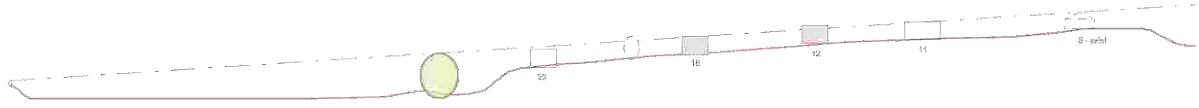


Figure 48: Cross-section 2a

The second cross-section to test the north-facing slope of the site results in much the same effect.

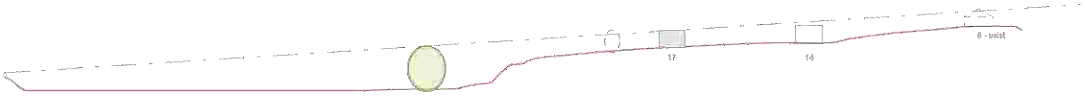


Figure 49: Cross-section 2b

SECTION 3

The top-floor corner of dwelling 19 is visible to the far right of this viewshaft.

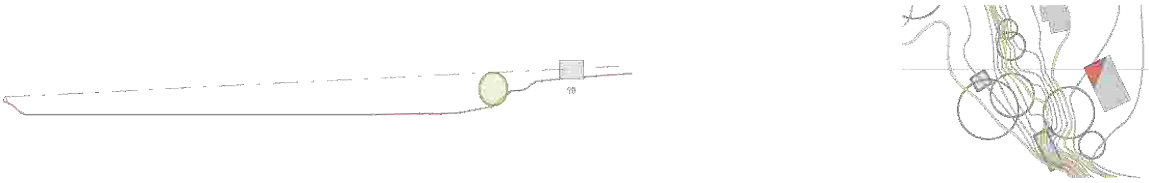


Figure 50: Cross-section 3

8.2.4. Viewpoint 2



Figure 51: Viewshaft (left-hand side) from Viewpoint 2

SECTION 4

The end wall facing the Greenway of dwelling 19 will be visible.



Figure 52: Cross-section 4

SECTION 5

The southern half of the side wall facing the Greenway is visible.



Figure 53: Cross-section 5



Figure 54: Viewshaft (right-hand side) from Viewpoint 2

SECTION 6

Dwelling 15 will be visible above the intersection of the end wall and roofline. Uphill dwellings 12—14 will be screening from Viewpoint 2 by Dwelling 15.

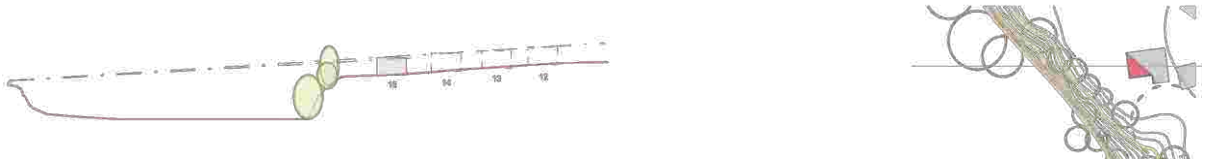


Figure 55: Cross-section 6

8.2.5. Viewpoint 3

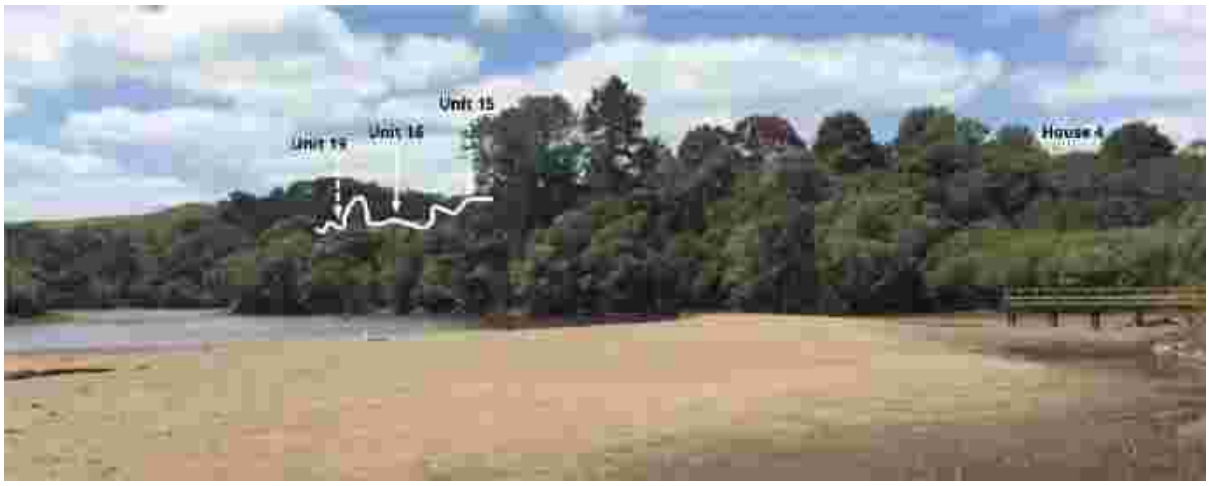


Figure 56: Viewshaft from 40m further east (a wider angle) of Viewpoint 3

SECTION 7

The southwest corner of Dwelling 16 will be visible from just below the wall/roofline junction.



Figure 57: Cross-section 7

9. APPENDIX A: SCHEME DESIGN PLANSET

10. APPENDIX B: RSP PLANSET

Yorke Rd

1
Building Platform
2221.7 sq m
2
287.4 sq m
3
197 sq m
4
232.3 sq m
5
253.5 sq m
6
187.6 sq m
7
178.7 sq m
8
169.5 sq m
9
164.4 sq m
10
233.2 sq m
11
218.9 sq m
12
230.8 sq m
13
230 sq m
14
210.5 sq m
15
187.4 sq m
16
183.5 sq m
17
198.5 sq m
18
241.1 sq m
19
186.7 sq m
20
202.1 sq m
21
181.4 sq m

KEY

- Site Boundary
- Lot Boundaries
- Buildable Area
- Frontage Boundary
- Setbacks
- 6m Front Setback
- Alternative HIRB
- Vehicle Entry
- Waitangi River

0 10 20 30 40 50 60 70 m

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project Yorke Road
name **Planning Controls**
project # 22015-1

SCH 3
Set Page

Yorke Rd

KEY

- Site Boundary
- Lot Boundaries
- Buildable Area
- Geotech BLR
- Esplanade 20m Setback
- 1m Contour & Setback
- Waitangi River

0 10 20 30 40 50 60 70 m

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name **Contraints**

project # 22015-1

SCH 4

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project Yorke Road

name Lot Plan

project # 22015-1

SCH 2b

Set Page

DEVELOPMENT EFFICIENCY

		area	%
	SITE	2.27 ha	
	Development	1.16 ha	50.9%
	Access	0.35 ha	15.4%
	Open-space	0.76 ha	33.7%

Yorke Rd

BLOCK 5 (Lot 1)

BLOCK 4

Greenway

BLOCK 1

Greenway

BLOCK 2

Greenway

BLOCK 3

exist boatsheds

exist boatshed

KEY

- Site Boundary
- Development
- Access Road
- Open-space
- Esplanade Reserve
- Waitangi River
- Visitor Parking

0 10 20 30 40 50 60 70 m

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plot date: 23/07/2025
file: BASE Yorke 4.vwx

project: Yorke Road

name: **Concept Scheme**

project no: 22015-1

SCH 1
Set Page

Yorke Rd

KEY

- Site Boundary
- Lot Boundaries
- Vehicle
- Pedestrian
- Open-space
- Native Enhanced
- Waitangi River

0 10 20 30 40 50 60 70 m

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project Yorke Road

name **Movement Network**

project # 22015-1

SCH 5

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project Yorke Road
name Public OS Network
project # 22015-1
SCH 6b
Set Page



0 10 20 30 40 50 60 70 m

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project Yorke Road

name **Open-space Movement Network**

project # 22015-1

SCH 6a

Set Page

Yorke Rd

ENTRY

BLOCK 5 (Lot 1)

Living Street

BLOCK 4

Greenway 3

BLOCK 3

BLOCK 1

Greenway 1

Greenway 2

BLOCK 2

Mews 1

Mews 2

Mews 3

KEY

- Site Boundary
- Greenways, OS Reserve
- Living Street
- Mews
- Waitangi River

0 10 20 30 40 50 60 70 m

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project Yorke Road

name **Road Types**

project # 22015-1

SCH 7a

Set Page



0 10 20 30 40 50 60 70 m

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project Yorke Road

name Vehicle Network

project # 22015-1

SCH 7b

Set Page

PAVEMENT WIDTHS

Section 1	5m
Section 2	3.5m
Mews Lanes	3 - 6m (variable)
Footpaths	2m min



0 10 20 30 40 50 60 70 m

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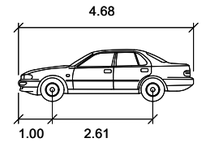
project Yorke Road

name **Access & Pavement Widths**

project # 22015-1

SCH 7c

Set Page



90-CAR

		Meters
Width	:	1.75
Track	:	1.75
Lock to Lock Time	:	6.0 s
Steering Angle	:	22.8 deg

Yorke Rd

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

0 10 20 30 40 50 60 70 m

KEY

- Site Boundary
- Lot Boundaries
- Carriageway (indicative)
- Mews Lanes
- Open-space
- Waitangi River

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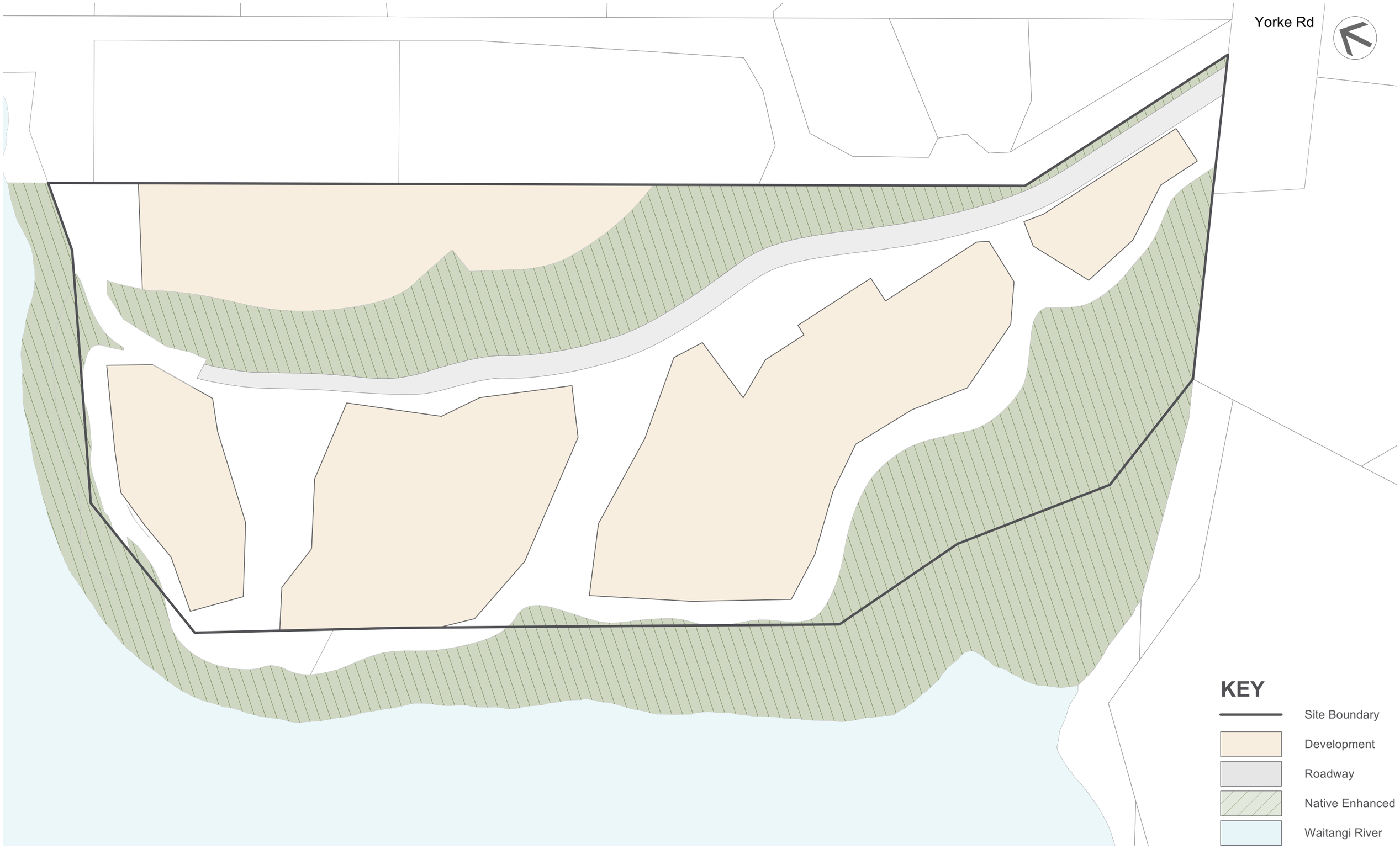
project Yorke Road

name Vehicle Tracking

project # 22015-1

SCH 7d

Set Page



0 10 20 30 40 50 60 70 m

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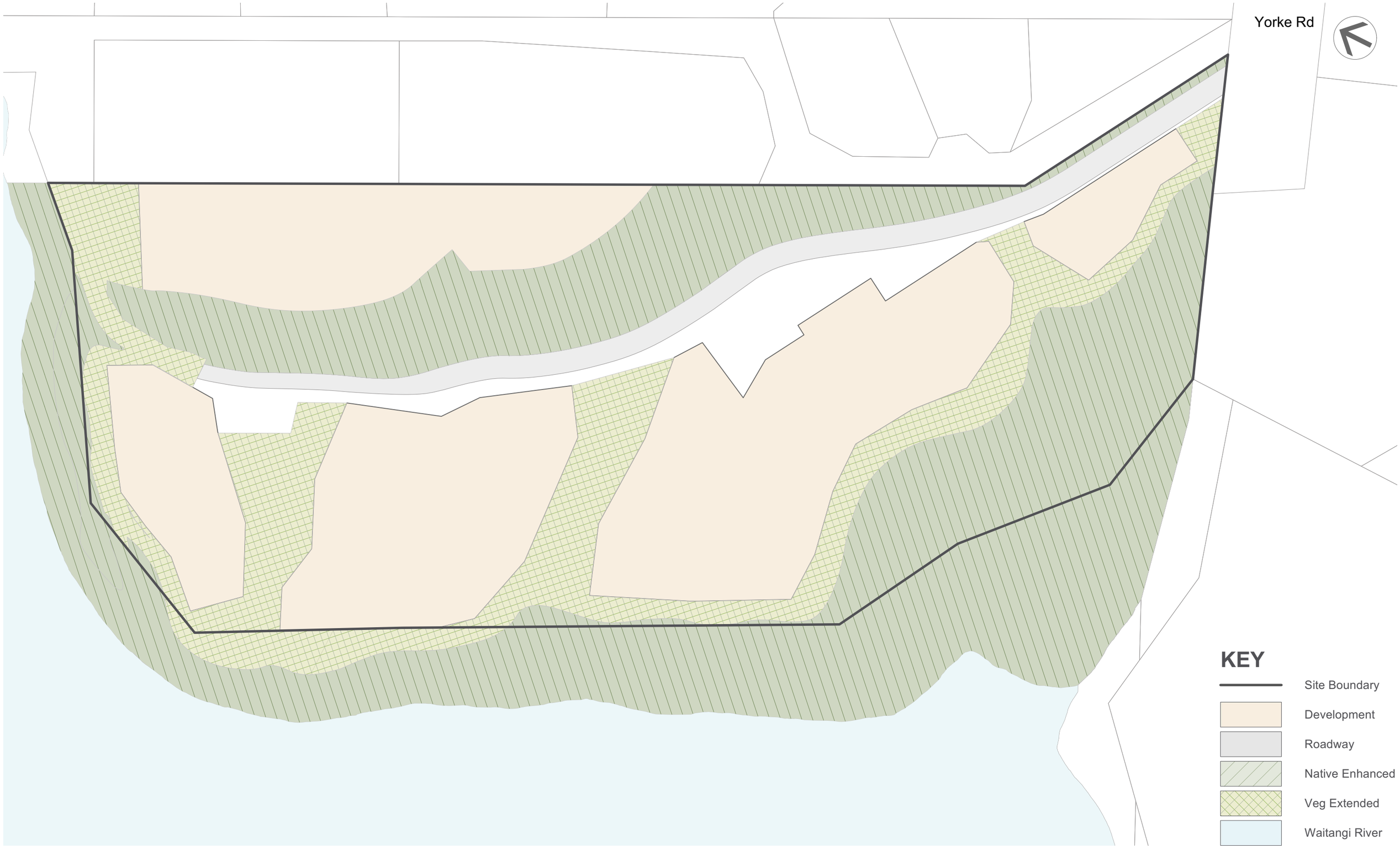
project Yorke Road

name **Natural Vegetation**

project # 22015-1

SCH 8a

Set Page



0 10 20 30 40 50 60 70 m

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project Yorke Road

name **Vegetation Distribution**

project # 22015-1

SCH 8b

Set Page

Yorke Rd

0 10 20 30 40 50 60 70 m

Usable Esplanade Reserve - Existing

Existing Esplanade Reserve	808 m2
Within 20m setback - Site	1,662 m2
TOTAL Usable Reserve Area	**2,470 m2**

KEY

- Site Boundary
- Escarpment Top
- Escarpment Base
- 20m Esplanade Setback
- Usable - Top
- Usable - Bottom
- 5m Contours
- 1m Contours
- Waitangi River

Yorke Rd

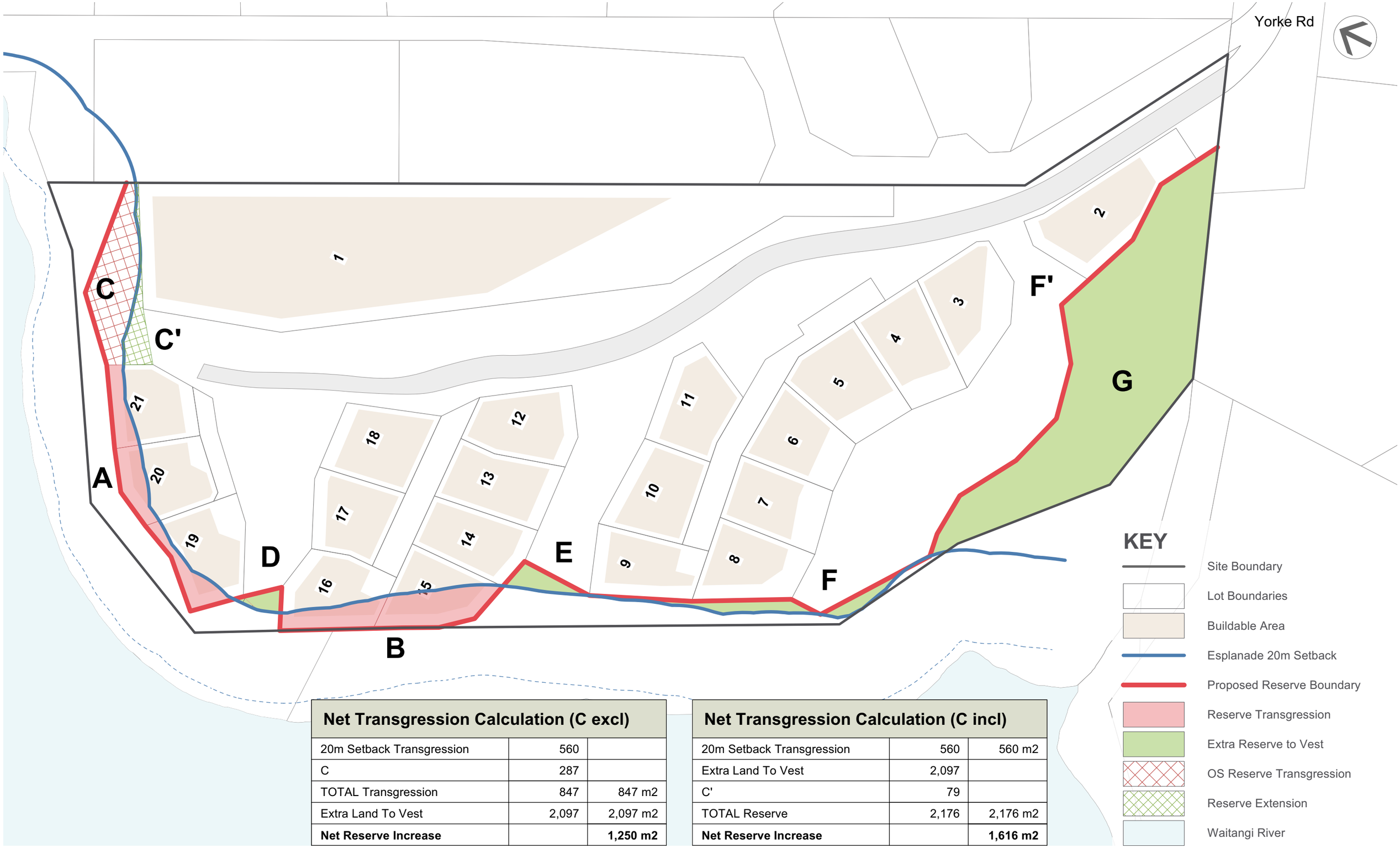
Usable Esplanade Reserve - Proposed

Within Exist Esplanade Reserve	911 m2
Within New Esplanade Reserve (incl C)	2,008 m2
Total Usable Reserve - Proposed	**2,919 m2**
Original Usable Reserve Area	2,470 m2
NET Usable Reserve Increase	**449 m2**

0 10 20 30 40 50 60 70 m

KEY

- Site Boundary
- Lot Boundaries
- Proposed (Usable) Esplanade Reserve
- Reserve - Site managed
- Reserve - Easement access
- 20m Esplanade Setback
- Waitangi River



Net Transgression Calculation (C excl)		
20m Setback Transgression	560	
C	287	
TOTAL Transgression	847	847 m2
Extra Land To Vest	2,097	2,097 m2
Net Reserve Increase		**1,250 m2**

Net Transgression Calculation (C incl)		
20m Setback Transgression	560	560 m2
Extra Land To Vest	2,097	
C'	79	
TOTAL Reserve	2,176	2,176 m2
Net Reserve Increase		**1,616 m2**

Yorke Rd

1
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Connection via easement

Connection within Reserve

Usable Public Open-space Reserves	
Within Exist Esplanade Reserve	911 m2
Within New Esplanade Reserve (incl C)	2,008 m2
Within Site - publically accessible	2,367 m2
Total Usable Reserves - Proposed	**5,286 m2**
Original Usable Reserve Area	2,470 m2
NET Usable Reserve Increase	**2,816 m2**

KEY

- Site Boundary
- Lot Boundaries
- Buildable Area
- Active Frontage
- Proposed Reserve Boundary
- Usable Esplanade Reserve (Public)
- Reserve Extensions (on Site)
- Waitangi River

0 10 20 30 40 50 60 70 m

Yorke Rd

0 10 20 30 40 50 60 70 m

Baseline Vesting Calculation	
Within 20m Setback:	
Land To Vest	2,030 m2
Net Reserve Increase	**2,030 m2**

KEY

- Site Boundary
- 20m Esplanade Setback
- Land to Vest
- Waitangi River

Yorke Rd

Proposed Vesting Calculation

Baseline to vest (20m setback)	2,030 m2
Proposed To Vest	3,280 m2
Net Esplanade Reserve Increase	**1,250 m2**

0 10 20 30 40 50 60 70 m

KEY

- Site Boundary
- Lot Boundaries
- Esplanade 20m Setback
- Proposed Reserve Boundary
- Within 20m Setback - Retained
- Waitangi River


Yorke Rd
Falls View Rd
Haruru Central
0 20 40 60 80 100 120 140 160 180 200 m
KEY
Site Boundary
Lot Boundaries
Development
Road Reserves
Open-space Reserves
Existing Track - Proposed Public Path
Enabled Connections
Approximate Historic Coastal Route
Waitangi River



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client Yorke Road Developments Limited

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project Yorke Road

number 22015-1

Commons

SCH 10

Set Page



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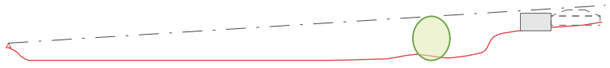
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project Yorke Road

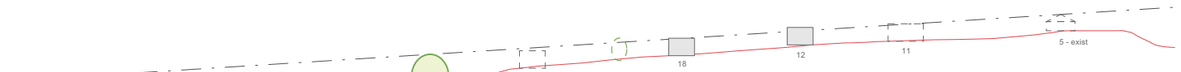
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project no 22015-1 Set Page

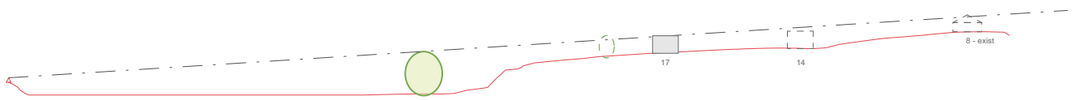
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Section 2a

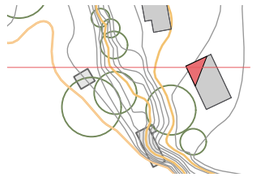


Section 2b



Section 3







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plotted 25/07/2025.
file BASE Yorke 4.vwx

project Yorke Road

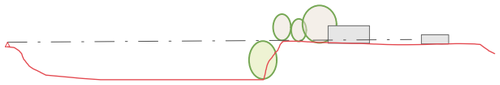
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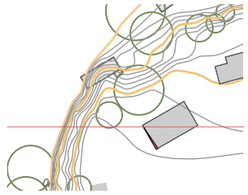
project # 22015-1

SCH 11b

Set Page

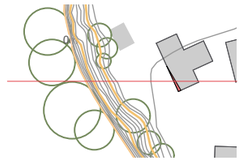
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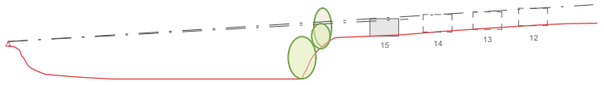


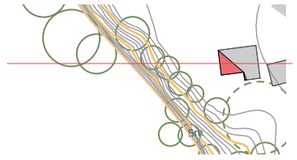
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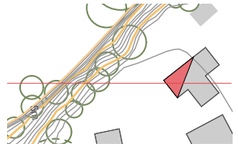
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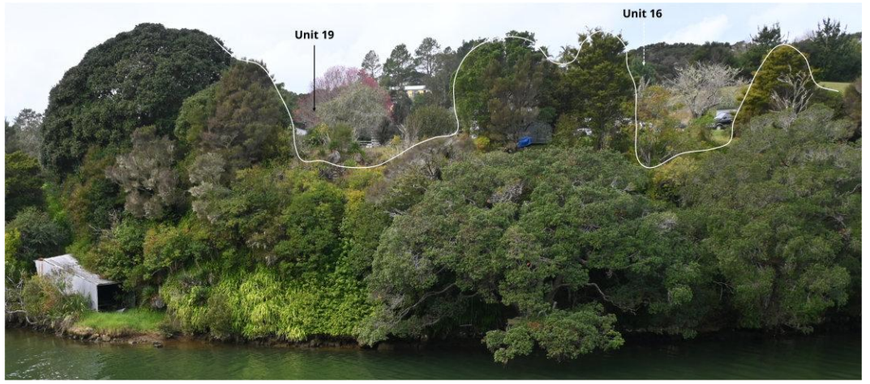




Section 7









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drawn: By checked: By

plot date: 25/07/2025
file: BASE Yorke 4.vwx

project: Yorke Road

number: Visual Impact - x-sects VP 2, 3

project no: 22015-1

SCH 11c

Set Page

This application is a Joint Venture between the land owners of 111 and 115 Yorke rd.
The Gosses own 111 and the Oldham's own 115.

Site History Use

The original land was owned by the Yorke's.
They subdivided into 3 sections for the 3 sons.

The Gosses purchased 111 Yorke Rd, when Ron Yorke died in 2004.
The Oldham's purchased 115 Yorke Rd when Des Yorke died in 2023

Merv Yorke owned the other site, which has long since been subdivided, but it included 103, 103A, 105 and what is now 9 & 11 River Palms Lane.

This is why there is a ROW over the neighbouring land.

There has never been a commercial venture involving farming or horticulture on any of the lots.
A few house cows ,sheep to keep the grass down and fruit trees for personal use.

RetroLens
Please see screenshots taken from Retrolens from 1951 through to 1971 showing the site looks much as it does today, just a couple of homesteads.



Date taken: 29/03/1951
Survey Number: SN209
Copyright: Crown



Date taken: 15/04/1958
Survey Number: SN1072
Copyright: Crown



Date taken: 21/04/1961
Survey Number: SN1347
Copyright: Crown



Date taken: 4/02/1966
Survey Number: SN1782
Copyright: Crown



Date taken: 22/08/1971
Survey Number: SN3406
Copyright: Crown

Chorus New Zealand Limited

17 February 2025

Chorus reference: 11142731

Attention: Kyron Gosse

Quote: New Property Development

22 connections at 111 Yorke Road , Haruru, Far North District, 0204

Your project reference: N/A

Thank you for your enquiry about having Chorus network provided for the above development.

Chorus is pleased to advise that, as at the date of this letter, we are able to provide reticulation for this property development based upon the information that has been provided:

Fibre network	$22,000.00
Pre-built fibre	$0.00

The total contribution we would require from you is **$25,300.00 (including GST)**. This fee is a contribution towards the overall cost that Chorus incurs to link your development to our network. This quote is valid for 90 days from 17 February 2025. This quote is conditional on you accepting a New Property Development Contract with us for the above development.

If you choose to have Chorus provide reticulation for your property development, please log back into your account and finalise your details. If there are any changes to the information you have supplied, please amend them online and a new quote will be generated. This quote is based on information given by you and any errors or omissions are your responsibility. We reserve the right to withdraw this quote and requote should we become aware of additional information that would impact the scope of this letter.

Once you would like to proceed with this quote and have confirmed all your details, we will provide you with the full New Property Development Contract, and upon confirmation you have accepted the terms and paid the required contribution, we will start on the design and then build.

For more information on what's involved in getting your development connected, visit our website www.chorus.co.nz/develop-with-chorus

Kind Regards

Chorus New Property Development Team



Top Energy Limited
Level 2, John Butler Centre
60 Kerikeri Road
PO Box 43
Kerikeri 0245
New Zealand
PH +64 (0)9 401 5440
FAX +64 (0)9 407 0611
www.topenergy.co.nz

20 November 2024

Kyron Gosse
East Property Investments Ltd

Email: kyrongosse@gmail.com

To Whom It May Concern:

RE: PROPOSED SUBDIVISION
East Property Investments Limited – 111 and 115 Yorke Road, Haruru Falls.

Thank you for your recent correspondence with attached proposed subdivision scheme plans.

Top Energy requires new connections to be reticulated to the boundary of each lot.
Design and costs to provide a power supply to proposed Lots 1-21 would be provided after application and an on-site survey have been completed.
Link to application: Top Energy | Top Energy

In order to get a letter from Top Energy upon completion of your subdivision, a copy of the resource consent decision must be provided.

Yours sincerely

Aaron Birt
Planning and Design
T: 09 407 0685
E: aaron.birt@topenergy.co.nz

HODGSON
PLANNING CONSULTANTS

DISTRICT PLAN ASSESSMENT
-FAR NORTH DISTRICT COUNCIL

CHAPTER 7	URBAN ENVIRONMENT	
SECTION 6	RESIDENTIAL ZONE	
7.6.5	ZONE RULES	
7.6.5.1.1	Relocatable Buildings Buildings are permitted activities provided that they comply with all the standards for permitted activities in the Plan, and further provided that where the building is a relocated building all work required to reinstate the exterior including painting and repair of joinery shall be completed within six months of the building being delivered to the site. Reinstatement work is to include connections to all infrastructure services and closing in and ventilation of the foundations.	Not Applicable
7.6.5.1.2	Residential Intensity (a) Each residential unit for a single household shall have available to it a minimum net site area of: Sewered sites: 600m² Unsewered sites: 3,000m² This minimum net site area may be for the exclusive use of the residential unit, or as part of land held elsewhere on the property, provided that a ratio of one residential unit per minimum net site area (as stated above) is not exceeded. Except that this rule shall not limit the use of an existing site for a single residential unit for a single household, provided that all other standards for permitted activities are complied with.	Does not comply The lots will be between 302m² and 514m² Restricted Discretionary Activity
7.6.5.1.4	Building Height The maximum height of any building shall be 8m.	To Comply.
7.6.5.1.5	Sunlight No part of any building shall project beyond a 45 degree recession plane as measured inwards from any point 2m vertically above ground level on any site boundary (refer to	Alternative proposed No HIRB applicable to front 13m and 3m+45degrees for the remainder of the lot. The purpose of the HIRB is to distribute building mass that avoids or mitigates adverse effects on

	definition of Recession Plane in Chapter 3 - Definitions), except that: (a) a building may exceed this standard for a maximum distance of 10m along any one boundary other than a road boundary, provided that the maximum height of any building where it exceeds the standard is 2.7m (refer to Recession Plane Diagram B within the definition of Recession Plane in Chapter 3 – Definitions); and (b) where a site boundary adjoins a legally established entrance strip, private way, access lot, or access way serving a rear site, the measurement shall be taken from the farthest boundary of the entrance strip, private way, access lot, or access way	neighbouring properties. To encourage the containment of building mass towards the front of the site to limit overshadowing effects to neighbouring living courts the alternative zero recession plane for the front part of the site applies. It also enables as much space as possible for amenity at the rear.
7.6.5.16	Stormwater Management The maximum proportion of the gross site area covered by buildings and other impermeable surfaces shall be 50%.	To comply The District Plan definition in the case of jointly owned access lots that contain impermeable surfaces within their boundaries, the total area of the impermeable surfaces are to be divided equally and considered as parts of the various sites. Lot 177 (301m2) will be worst disadvantaged, which after allowing lots 101 and 200 common access shares plus respective roading, has estimated impermeable surfaces of 49.4%.
7.6.5.1.7	Setback from Boundaries The minimum building setback from road boundaries shall be 3m. The minimum set-back from any boundary other than a road boundary, on all sites other than Lot 1 DP 28017, Lot 1 DP 46656, Lot 1 DP 404507, and Lot 1 DP 181291, Lot 2 DP 103531, Lot 1 DP 103531, Lot 2 DP 58333 and Pt Lot 1 DP 58333 (and any sites created as a result of a subdivision of these lots), shall be 1.2m except that no set-back is required for a maximum total length of 10m along any one such boundary; Not less than 50% of that part of the site between the road boundary and a parallel line 2m there from (i.e. a 2m wide planting strip along the road boundary) shall be	Consistent from legal road boundary Alternative setbacks proposed from common lots. The front yard setback of a minimum of 3m and maximum of 6m is to achieve a practical active front living court that encourages engagement. The purpose of the side yard building setback is only to provide light, ventilation, access and for maintenance for the house. The rear boundary is a mews configuration, garages potentially could be located on the boundary provided a 8m separation is achieved between garage doors to allow for manoeuvring.

	landscaped, on all sites other than Lot 1 DP 28017, Lot 1 DP 46656, Lot 1 DP 404507, and Lot 1 DP 181291, Lot 2 DP 103531, Lot 1 DP 103531, Lot 2 DP 58333 and Pt Lot 1 DP 58333(and any sites created as a result of a subdivision of these lots). For the landscaping required on Lot 1 DP 28017 and Lot 1 DP 46656 (and any sites created as a result of a subdivision of these lots) refer to Rule 7.6.5.1.10 (b) below	
7.6.5.1.17	Building Coverage Any new building or alteration/addition to an existing building is a permitted activity if the total Building Coverage of a site does not exceed 45% of the gross site area.	To comply
7.6.5.3	Restricted Discretionary Activity	
	An activity is a restricted discretionary activity in the Residential Zone if: (a) it does not comply with any one of the following Rules 7.6.5.1.2 Residential Intensity; 7.6.5.1.3 Scale of Activities; 7.6.5.1.4 Building Height; 7.6.5.1.5 Sunlight; 7.6.5.1.7 Setback from Boundaries; 7.6.5.1.11 Transportation; 7.6.5.1.15 Noise and/or 7.6.5.1.17 Building Coverage as set out above; but (b) it complies with all of the other rules for permitted and controlled activities under Rules 7.6.5.1 and 7.6.5.2; and (c) it complies with Rules 7.6.5.3.1 Residential Intensity; 7.6.5.3.2 Scale of Activities; 7.6.5.3.3 Building Height; 7.6.5.3.4 Sunlight; 7.6.5.3.5 Building Coverage; 7.6.5.3.6 Transportation; 7.6.5.3.7 Setback from Boundaries and 7.6.5.3.8 Noise below; and (d) it complies with the relevant standards for permitted, controlled or restricted discretionary activities set out in Part 3 of the Plan - District Wide Provisions. The Council may approve or refuse an application for a restricted discretionary activity, and it may impose conditions on any consent.	
7.6.5.3.1	Residential Intensity Each residential unit for a single household shall have available to it a minimum net site area of: Sewered sites: 300m² Unsewered sites: 2,000m² This minimum net site area may be for the exclusive use of the residential unit, or as part of land held elsewhere on the property, provided that a ratio of one residential unit per minimum net site area (as stated above) is not exceeded. Except that this rule shall not limit the use of an existing site for a single residential unit for a single household, provided that all other	The residential lots will comply with the 300m² minimum site area required as a Restricted Discretionary Activity.

	standards for permitted, controlled or restricted discretionary activities are complied with.	
	In assessing an application under this provision, the Council will restrict the exercise of its discretion to: (a) the character and appearance of building(s) and the extent to which they will be compatible with the principal activity on the site and with other buildings in the surrounding area; (b) the siting of the building(s), decks and outdoor areas relative to adjacent properties in order to avoid visual domination and loss of privacy and sunlight to those properties; (c) the size, location and design of open space and the extent to which trees and garden plantings are utilised for mitigating adverse effects; (d) the ability of the immediate environment to cope with the effects of increased vehicular and pedestrian traffic; (e) the location and design of vehicular and pedestrian access, on site vehicle manoeuvring and parking areas and the ability of those to mitigate the adverse effects of additional traffic; (f) location in respect of the roading network – sites on local roads are not generally considered appropriate for activities which generate high levels of pedestrian and vehicular activity; (g) noise generation and the extent to which reduction measures are used; (h) any servicing requirements and/or constraints of the site – whether the site has adequate water supply and provision for disposal of waste products and stormwater; (i) whether the development is designed in a way that avoids, remedies or mitigates any adverse effects of stormwater discharge from the site into reticulated stormwater systems and/or natural water bodies; (j) the ability to provide adequate opportunity for landscaping and buildings and for all outdoor activities associated with the residential unit(s) permitted on the site;	The subdivision is designed to blend with the surrounding area and utilize the site's unique features, especially the Waitangi River. The layout complements the topography and natural elements to create harmony between the built environment and landscape. The Design Report outlines the development's Urban Design Concepts. Building envelopes and setbacks ensure high standards of amenity. An alternative Height in Relation to Boundary control prevents overshadowing of neighbouring properties by concentrating building mass at the front of sites. Nearly two-thirds of the site is designated as open space, with 82% of this being vehicle-free, enhancing access and environmental quality near the river. This mitigates density effects and improves overall amenity. Pedestrian access is prioritized with greenways connecting each lot and minimising vehicular impact. The visual integration with the coastal environment reflects the site's basalt formations, aligning lot frontage with the escarpment edge, and forming perimeter and greenways contiguous with the esplanade reserve.

	(k) the degree to which mitigation measures are proposed for loss of open space and vegetation; (l) any adverse effects on the life supporting capacity of soils; (m) the suitability of sites for building and access; (n) visual effects of site layout on the natural character of the coastal environment; (o) the effect on indigenous vegetation and habitats of indigenous fauna.	
7.6.5.3.4	Sunlight No part of any building shall project beyond a 45 degree recession plane as measured inwards from any point 3m vertically above ground level on any site boundary (refer to definition of Recession Plane in Chapter 3 - Definitions). In assessing an application under this provision the Council will restrict the exercise of its discretion to: (a) the extent to which adjacent properties will be adversely affected in terms of visual domination, overshadowing, loss of privacy and loss of access to sunlight and daylight; (b) the location and proximity of adjacent residential units, and the outdoor space used by those units; (c) the ability to mitigate any adverse effects of loss of sunlight.	Alternative standard proposed. Restricted Discretionary - Refer to discussion above.
7.6.5.3.5	Building Coverage Any new building or alteration/addition to an existing building is a restricted discretionary activity if the total Building Coverage of a site does not exceed 55% or 550m2 , whichever is the lesser, of the gross site area. In assessing an application under this provision the Council will restrict the exercise of its discretion to: (a) the ability to provide adequate landscaping for all activities associated with the site; (b) the extent to which building(s) are consistent with the character and scale of the existing buildings in the surrounding environment; (c) the scale and bulk of the building in relation to the site;	To Comply

	(d) the extent to which private open space can be provided for future uses; (e) the extent to which the cumulative visual effects of all the buildings impact on landscapes, adjacent sites and the surrounding environment; (f) the extent to which the siting, setback and design of building(s) avoid visual dominance on landscapes, adjacent sites and the surrounding environment; (g) the extent to which landscaping and other visual mitigation measures may reduce adverse effects; (h) the extent to which non-compliance affects the privacy, outlook and enjoyment of private open spaces on adjacent sites.	
	Building Height, Scale and Sunlight Assessment Criteria In assessing an application under these provisions the Council will restrict the exercise of its discretion to: <u>Scale of Activities</u> (i) (ii) the siting of the building(s), decks and outdoor areas relative to adjacent properties in order to avoid visual domination and loss of privacy and sunlight to those properties; the location and design of vehicular and pedestrian access, on site vehicle manoeuvring and parking areas and the ability of those to mitigate the adverse effects of additional traffic; (iii) the extent to which hours of operation are appropriate in terms of the surrounding environment; (iv) noise generation and the extent to which reduction measures are used; (v) any servicing requirements and/or constraints of the site – whether the site has adequate water supply and provision for disposal of waste products and stormwater; (vi) where a property is adjacent to a public reserve, the potential impacts on the public use and enjoyment of that reserve. <u>Height</u> (a)the extent to which adjacent properties will be adversely affected in terms of visual domination, overshadowing, loss of privacy and loss of access to sunlight and daylight;	The spatial arrangement of the lots and building areas has been thoughtfully designed to minimize adverse effects on adjacent residential units. The layout ensures privacy and amenity by considering factors such as visual domination, overshadowing, and access to sunlight and daylight. The design incorporates intentional orientation of buildings, ensuring that side boundaries are not strictly perpendicular to the front boundary. This creates frontage articulation in relation to the street, adding visual interest. These measures directly mitigate the impacts on adjacent properties and public spaces. The mews access for vehicles is strategically located to reduce traffic impacts and enhance pedestrian connectivity. Communal open spaces and greenways function as both social hubs and environmental buffers, addressing concerns about the loss of privacy and sunlight. Landscaping and vegetation are key elements to reduce runoff and preserve the natural contour of the site, thus contributing effectively to stormwater management. Servicing requirements, including water supply and waste disposal systems, are integrated into the design to ensure they meet the constraints of the site and provide sustainable solutions while preserving the quality of the surrounding environment. The development maintains a balance between density and open space, integrating into the adjacent environment while meeting the criteria for

	(b) the ability to mitigate any adverse effects by way of increased separation distances between buildings or the provision of landscaping and screening. Sunlight (a) the extent to which adjacent properties will be adversely affected in terms of visual domination, overshadowing, loss of privacy and loss of access to sunlight and daylight; (b) the location and proximity of adjacent residential units, and the outdoor space used by those units; (c) the ability to mitigate any adverse effects of loss of sunlight.	Building Height, Scale, Sunlight Assessment, and Stormwater management.
	Stormwater management Assessment Criteria In assessing an application under this provision the Council will restrict the exercise of its discretion to: (a) the extent to which building site coverage and Impermeable Surfaces contribute to total catchment impermeability and the provisions of any catchment or drainage plan for that catchment; (b) the extent to which Low Impact Design principles have been used to reduce site impermeability (c) any cumulative effects on total catchment impermeability; (d) the extent to which building site coverage and Impermeable Surfaces will alter the natural contour or drainage patterns of the site or disturb the ground and alter its ability to absorb water; (e) the physical qualities of the soil type; (f) the availability of land for the disposal of effluent and stormwater on the site without adverse effects on the water quantity and water quality of water bodies (including groundwater and aquifers) or on adjacent sites; (g) the extent to which paved, Impermeable Surfaces are necessary for the proposed activity; (h) the extent to which landscaping and vegetation may reduce adverse effects of run-off; (i) the means and effectiveness of mitigating stormwater runoff to that expected by permitted activity threshold.	The proposed development will contribute additional impervious surface area, including roofs parking bays and accessways. Overall, these will stay within the 50% Residential Zone threshold. The impervious area on each allotment is mitigated by the proportion of the site is retained overall as open space. The internal access roads and all lots will be connected to a central stormwater collector pipe, which will discharge northward into a natural tidal basin adjacent to the main river. Given that the receiving environment is a tidal estuary and the site is located at the lowest point of the catchment, flood attenuation measures are not required. However, to mitigate the risk of scour, an energy dissipator or diffuser will be incorporated at the stormwater outfall. Directing stormwater in this way is anticipated to help maintain the basin by reducing sediment accumulation, an issue observed in other areas along the river margins. Stormwater runoff from the start of the unformed Council Road will use the existing cesspits connecting the public system. Stormwater runoff resulting from residential development is not anticipated to pose a contamination risk. All roadways and parking areas will be sealed or concreted, with cesspits installed to collect runoff prior to entering the system. Additionally, the inclusion of 'EnviroPod' cesspit filters represents a sustainable, low-impact design solution for capturing litter, debris, sediment, and potential pollutants, should such issues arise.

		Final stormwater system details will be finalized during engineering plan approval.

TABLE 2		
13	SUBDIVISION	
13.7.2	Allotment Sizes, Dimensions and Other Standards	
	Allotment Sizes and Dimensions Residential Zone Controlled Activity Status The minimum lot sizes are 3,000m² (unsewered) and 600m² (sewered). Discretionary Activity Status The minimum lot sizes are 2,000m² (unsewered) and 300m² (sewered).	The lots are greater than 300m². Discretionary Activity
13.7.2.2	Allotment Dimensions Any allotment created in terms of these rules must be able to accommodate a square building envelope of the minimum dimensions specified below; which does not encroach into the permitted activity boundary setbacks for the relevant zones: 14m x 14m	Does not comply Practical building areas are shown for each of the proposed residential lots and will be controlled by consent notices
13.10 ASSESSMENT CRITERIA		
13.10.1	Allotment Sizes and Dimensions a) Whether the allotment is of sufficient area and dimensions to provide for the intended purpose or land use, having regard to the relevant zone standards and any District wide rules for land uses. (b) Whether the proposed allotment sizes and dimensions are sufficient for operational and maintenance requirements. (c) The relationship of the proposed allotments and their compatibility with the pattern of the adjoining subdivision and land use activities, and access arrangements. (d) Whether the cumulative and long-term implications of proposed subdivisions are sustainable in terms of preservation of the rural and coastal environments.	The lot dimensions exceed the minimum requirement of 300m² stipulated for discretionary activities within the Residential Zone (sewered). Each lot has been carefully planned to accommodate a usable building area. The proposed lot sizes and configurations have been specifically designed to accommodate essential on-site amenities, including private open spaces, vehicle parking provisions. The layouts also allow for adequate space to integrate landscaping, stormwater management systems, and other infrastructural requirements. A mews-style access arrangement has been employed to maximize land efficiency while maintaining operational functionality.

		While the proposed lot sizes may be smaller compared to some existing properties, they effectively uphold the residential character consistent with the neighbourhood given the expansive areas of open space. The road network and access strategies have been designed to harmonize with the existing Yorke Road infrastructure, enhancing overall connectivity and ensuring compatibility with the established urban framework.
13.10.2-20	• Natural and Other Hazards • Water Supply • Stormwater Disposal • Sanitary Sewage Disposal • Energy Supply • TOP Energy Transmission Lines • Telecommunications • Easements for any Purpose • Provision of Access • Effect of Earthworks and Utilities • Building Locations • Preservation and Enhancement of Heritage Resources, Vegetation and Landscape and Land Set for Conservation Purposes • Soil • Access to Waterbodies • Land Use Incompatibility • Proximity to Airports • Natural Character of the Coastal Environment • Energy Efficiency and Renewable Energy • National Grid Corridor	The proposal has taken into account natural hazard information from both the Far North District Council and Northland Regional Council, with specific attention to coastal flood hazards and erosion risks. Haigh Workman Ltd conducted a thorough geotechnical investigation to inform the subdivision design and identify any potential hazards. The land, historically used for rural lifestyle and pastoral farming is not known to subject to land contamination. However, if any contamination is discovered during development, appropriate soil testing and remediation measures will be implemented. As detailed in the Haigh Workman infrastructure report the lots will be able to be serviced. Correspondence from Chorus and Top Energy is provided. The lots (other than the balance lot) do not feature any known archaeological sites. The site is zoned for residential purposes.
15 TRANSPORTATION		
15.1.6	RULES	
15.1.6A	Residential Permitted- 20 maximum daily one way traffic movements. Restricted Discretionary 21-40 maximum daily one way traffic movements. Discretionary Activity More than 40 maximum daily one-way traffic movements. Traffic Intensity Factor- 10 per standard residential unit.	The subdivision will generate more than 40 maximum daily one-way traffic movements. Discretionary activity

15.1.3B	Parking 15.1.6B.1.1 On-Site Car Parking Spaces Standard Residential Unit- 2 per unit Size set out in Appendix 3D All parking, loading, access drives and manoeuvring areas shall be formed and provided with an all-weather surface, drained, marked out and maintained to the satisfaction of the Council, and shall be kept free and available for the uses intended. Where a parking area provides four or more car parking spaces is adjacent to a road, a kerb or a barrier shall be provided to prevent direct access except at the designated vehicle access point.	Each allotment will have sufficient space to accommodate 2 car parking spaces per residential unit.
15.1.6C.1	Access Private accessway serving no more than four residential units and less than 60m long: - No steeper than 1:8 adjacent to road boundary for at least 5m. - Not less than 3m wide; and - A minimum overhead clearance of 4m. Where any one of (i) through (iii) above are not complied with. The private accessway shall be 5m wide. Passing Bays Where required, passing bays on private accessways are to be at least 15m long and provide a minimum usable access width of 5.5m. Passing bays are required: (i) in rural and coastal zones at spacings not exceeding 100m; (ii) on all blind corners in all zones at locations where the horizontal and vertical alignment of the private accessway restricts the visibility.	The accesses within the subdivision serving 22 lots will not be up to public road standards but deemed adequate for the development. The sight distance for traffic emerging from the site onto Yorke Road/Falls View Road meets Council Engineering Standards 2023. The main shared accessway will be at least 5m wide. The northern end serving only four lots will be reduced to 3m wide. Provision for passing bays will be available along the shared access. There will be no need for vehicles to reverse out or onto the site. All accesses will be either sealed or concreted with kerb and channel drainage to a piped outfall.

	(c) All accesses serving 2 or more sites shall provide passing bays and vehicle queuing space at the vehicle crossing to the legal road. Access shall not be permitted: (i) onto a State Highway or a Limited Access Road; (ii) onto an arterial or collector road within 90m of its intersection with an arterial road or a collector road; (iii) onto an arterial or collector road within 30m of its intersection with a local road; (iv) onto a local road within 30m of its intersection with an arterial or collector road. Access over footpaths: - no more than two crossings per site, 6m maximum width 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). (b) Where the vehicle crossing serves two or more properties the vehicle crossing is to be widened to provide a double width vehicle crossing. General Access Standards: (a) Provision shall be made such that there is no need for vehicles to reverse off a site except where there are less than 4 parking spaces gaining access from a local road. (b) All bends and corners on the private accessway are to be constructed to allow for the passage of a Heavy Rigid Vehicle. (c) Any access where legal width exceeds formation requirements shall have surplus areas (where legal width is wider than the formation) grassed. (d) Runoff from impermeable surfaces shall, wherever practicable, be directed to grass swales and/or shall be managed in such a way as will reduce the volume and rate of stormwater runoff and contaminant loads.	

15.1.6C.1.8 (b)	Frontage to Existing Roads Where any proposed subdivision has frontage to a road that have not constructed to the standards specified by the Council in its "Engineering Standards and Guidelines" (June 2004-Revised 2009), then the applicant shall complete the required improvements.	Does not Comply The 5m carriageway extension from Falls View Road will not be up to public road standards but considered adequate to service the subdivision. This access layout was discussed with Elizabeth Stacey (NTA). Discretionary Activity pursuant to 17.2.6.4(b).
15.1.6C.4	Assessment Criteria Property access Frontage to Existing Roads	The proposed subdivision will generate approximately 140 vehicle trips per day (7 trips per dwelling), surpassing the zone's Traffic Intensity Factor. Peak traffic movements are anticipated during typical commuter hours (7-9am and 4-6pm), corresponding with current traffic patterns in the area. The scale and nature of traffic is considered to fall within the capacity of the existing road network. Yorke Road currently has a width of 8m and meets the design criteria for a Type-B road, which is suitable to accommodate the additional traffic from the development. The intersection of Yorke Road and Falls View Road has been assessed for sight distances, showing 75m visibility to the south and 122m to the east, which exceed the minimum requirements for the expected operating speeds. No congestion or safety issues have been identified on the affected streets. The development is not anticipated to have noticeable impacts on State Highway 11 or other strategic roads. The existing Yorke Road/State Highway 11 intersection has a right turning bay on the major road and a basic left turn immediately after an overtaking lane, which is deemed sufficient for the expected traffic flows post-development. No additional measures such as flush medians or deceleration tapers are considered necessary. The access point is separated from adjacent properties, reducing potential conflicts. Internal roads generally have a 5m carriageway width, expanding into a 'shared space' with integrated parking and reducing to 3m when only serving a few sites.

		A network of internal pathways will connect to infrastructure and green spaces, promoting active transport modes and reducing reliance on private vehicles. The proposed access are outside the flood hazard and coastal hazard zones.
7	URBAN ENVIRONMENT	
7.3 Objectives	7.3.1 To ensure that urban activities do not cause adverse environmental effects on the natural and physical resources of the District. 7.3.2 To enable the continuing use of buildings and infrastructure in urban areas, particularly where these are under-utilised. 7.3.3 To avoid, remedy or mitigate the adverse effects of activities on the amenity values of existing urban environments. 7.3.4 To enable urban activities to establish in areas where their potential effects will not adversely affect the character and amenity of those areas. 7.3.5 To achieve the development of community services as an integral and complementary component of urban development. 7.3.6 To ensure that sufficient water storage is available to meet the needs of the community all year round.	The proposed subdivision aligns with the objectives and policies of Chapter 7. The design focuses on responding to and enhancing the natural environment, addressing Objective 7.3.1 and Policy 7.4.5. The concept aims to strengthen natural escarpment values, integrate green spaces into the site, and maintain native vegetation. This approach, along with minimal earthworks and following natural contours, helps avoid adverse effects on the area's natural character. Regarding amenity values (Objectives 7.3.3, 7.3.4 and Policies 7.4.1, 7.4.2), the proposal adopts an innovative approach. By retaining a proportion of the site as common open space and separating vehicle and pedestrian access, the design aims to create high-quality amenity despite smaller lot sizes.
7.4 Policies	7.4.1 That amenity values of existing and newly developed areas be maintained or enhanced. 7.4.2 That the permissible level of effects created or received in residential areas reflects those appropriate for residential activities. 7.4.3 That adverse effects on publicly-provided facilities and services be avoided or remedied by new development, through the provision of additional services. 7.4.4 That stormwater systems for urban development be designed to minimise adverse effects on the environment. 7.4.5 That new urban development avoid: (a) adversely affecting the natural character of the coastal environment, lakes, rivers, wetlands or their margins;	The alternative design standards proposed, including setbacks and height controls, are intended to manage effects between lots while fostering a village-like character (Design Report p.24-32). The pedestrian-centric design, featuring extensive open spaces and walkways, contributes to community amenity and services as sought through Objective 7.3.5. The visual effects assessment confirms negligible impact on neighbouring properties and public viewpoints, supporting the maintenance of existing amenity values. The stormwater management approach complies with Policy 7.4.4. This, along with the assessment of potential flood hazards, demonstrates consideration of environmental effects and natural hazards as required by Policy 7.4.5.

	(b) adversely affecting areas of significant indigenous vegetation or significant habitats of indigenous fauna; (c) adversely affecting outstanding natural features, landscapes and heritage resources; (d) adversely affecting the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga; (e) areas where natural hazards could adversely affect the physical resources of urban development or pose risk to people's health and safety; (f) areas containing finite resources which can reasonably be expected to be valuable for future generations, where urban development would adversely affect their availability; (g) adversely affecting the safety and efficiency of the roading network; (h) the loss or permanent removal of highly productive and versatile soils from primary production due to subdivision and development for urban purposes. 7.4.6 That the natural and historic heritage of urban settlements in the District be protected (refer to Chapter 12). 7.4.7 That urban areas with distinctive characteristics be managed to maintain and enhance the level of amenity derived from those characteristics. 7.4.8 That infrastructure for urban areas be designed and operated in a way which: (a) avoids remedies or mitigates adverse effects on the environment; (b) provides adequately for the reasonably foreseeable needs of future generations; and (c) safeguards the life-supporting capacity of air, water, soil and ecosystems. 7.4.9 That the need for community services in urban areas is recognised and provided for.	
7.6.3	Residential Zone Objectives 7.6.3.1 To achieve the development of new residential areas at similar densities to those prevailing at present. 7.6.3.2 To enable development of a wide range of activities within residential areas where the effects are compatible with the effects of residential activity.	The proposed subdivision design will result in a density of development consistent with the residential zone despite the smallest lot being 302m². As discussed in the Urban Design Report the use of the mews provides for land efficiency comparable to a traditional subdivision twice the area. The smaller lots are also offset by large areas of expansive common areas.

	7.6.3.3 To protect the special amenity values of residential sites on the urban fringe, specifically Lot 1 DP 28017, Lot 1 DP 46656, Lot 1 DP 404507, Lot 1 DP 181291, Lot 2 DP 103531, Lot 1 DP 103531, Lot 2 DP 58333, Pt Lot 1 DP 58333 (and any sites created as a result of a subdivision of these lots), and those having frontage to Kerikeri Road between its intersection with SH10 and Cannon Drive.	The urban design report also demonstrates how single residential dwellings can effectively be established on the proposed lots and provide for a suitable outdoor space, planting, parking and manoeuvring. The proposed residential develop in considered sustainable in terms of effects on the environment. The portion of the development that is covered in buildings and other impermeable surfaces is limited and extensive open space is provided privately and publicly to reduce adverse hydrological, ecological and amenity effects. Indigenous vegetation is proposed to be retained and enhanced. It is considered that the sites even with the alternative height in relation to boundary will still have adequate access to sunlight and daylight given the lot layout. The lot layout and the use of greenways and mews ensure a reasonable level of privacy for inhabitants of buildings on a site.
7.6.4	Residential Zone Policies 7.6.4.1 That the Residential Zone be applied to those parts of the District that are currently predominantly residential in form and character. 7.6.4.2 That the Residential Zone be applied to areas which are currently residential but where there is scope for new residential development. 7.6.4.3 That the Residential Zone be applied to areas where expansion would be sustainable in terms of its effects on the environment. 7.6.4.4 That the Residential Zone provide for a range of housing types and forms of accommodation. 7.6.4.5 That non-residential activities only be allowed to establish within residential areas where they will not detract from the existing residential environment. 7.6.4.6 That activities with net effects that exceed those of a typical single residential unit, be required to avoid, remedy or mitigate those effects with respect to the ecological and amenity values and general peaceful enjoyment of adjacent residential activities. 7.6.4.7 That residential activities have sufficient land associated with each household unit to provide for outdoor space, planting, parking and manoeuvring. 7.6.4.8 That the portion of a site or of a development that is covered in buildings and other impermeable surfaces be limited so as to provide open space around buildings to enable planting, and to reduce adverse hydrological, ecological and amenity effects.	

	7.6.4.9 That sites have adequate access to sunlight and daylight. 7.6.4.10 That provision be made to ensure a reasonable level of privacy for inhabitants of buildings on a site. 7.6.4.11 That the built form of development allowed on residential sites on the urban fringe, specifically Lot 1 DP 28017, Lot 1 DP 46656, Lot 1 DP 404507, Lot 1 DP 181291, Lot 2 DP 103531, Lot 1 DP 103531, Lot 2 DP 58333, Pt Lot 1 DP 58333 (and any sites created as a result of a subdivision of these lots), and those with frontage to Kerikeri Road between its intersection with SH10 and Cannon Drive remains small in scale, set back from the road, relatively inconspicuous and in harmony with landscape plantings and shelter belts.	
12	NATURAL AND PHYSICAL RESOURCES	
12.2.6.1.1	Indigenous Vegetation Clearance Permitted Throughout the District Notwithstanding any rule in the Plan to the contrary but subject to Rules 12.5.6.1.1, 12.5.6.1.3 and 12.5.6.2.2 in the Heritage section of this Plan, indigenous vegetation clearance is permitted throughout the District where the clearance is for any of the following purposes: (a) clearance of indigenous vegetation 10 years old or less to establish new exotic plantation forest; (b) to provide clearance for existing overhead power and telephone lines, provided that no more vegetation is cleared or trimmed than is necessary for the safe operation of the utility service; or (c) the removal of trees and other vegetation which, as a result of old age or a natural event such as a storm or erosion, are a risk to the safety of people or property; or (d) the maintenance of existing roads, and private accessways and walkways including for the purposes of visibility and road safety; or (e) the formation and maintenance of walking tracks less than 1.2m wide using manual methods which do not require the removal of any tree over 300mm in girth; or	The lots are not considered “urban environments” given their area is greater than 4000m².

	(f) the maintenance of existing open space within 20m of an existing building; or (g) the removal of dead trees, provided that no more vegetation is cleared or trimmed than is necessary for safe removal; or (h) the sustainable harvest of plant material for rongoa Maori (customary medicine); or (i) the maintenance of existing fence lines, provided that the clearance does not exceed 3.5m in width either side of the fence line; or (j) normal gardening activities which result from the maintenance of lawn and gardens; or (k) the removal is in accordance with an existing use right; or (l) the removal is for a new fence where the purpose of the new fence is to exclude stock and/or pests from the area provided that the clearance does not exceed 3.5m in width either side of the fence line; or (m) creation and maintenance of firebreaks provided that no more vegetation is cleared than is necessary to achieve the practical purpose of the firebreak; or (n) vegetation clearance of land which has been previously cleared and where the vegetation to be cleared is less than 10 years old. (o) it involves the felling, trimming, damaging or removal of a tree or group of trees in an urban environment unless the tree or group of trees is— (A) specifically identified in the plan (refer to Chapter 12.5 and Appendix 1D); or (B) located within an area in the district that— (i) is a reserve (within the meaning of section 2(1) of the Reserves Act 1977); or (ii) is subject to a conservation management plan or conservation management strategy prepared in accordance with the Conservation Act 1987 or the Reserves Act 1977. Where urban environment means an allotment no greater than 4000 m2— (a) that is connected to a reticulated water supply system and a reticulated sewerage system; and (b) on which is a building used for industrial or commercial purposes, or a dwellinghouse.	
	12.2.6.1.4 Indigenous Vegetation Clearance in other zones	The proposed vegetation clearance is intended to be limited to weed clearance and indigenous

	The clearance of indigenous vegetation is a permitted activity if the site meets the definition of an "urban environment" site as specified in Rule 12.2.6.1.1(p) above. On all other sites in other zones, the clearance of indigenous vegetation is a permitted activity, provided that the clearance does not increase the total area of cleared land on the site above 500m2. Note 1: Refer also to Rule 12.1.6.1.2, which applies to vegetation clearance in Outstanding Landscapes and Rule 12.1.6.1.1(d), which applies to Outstanding Landscape Features. Note 2: This means that if a site not meeting the definition in Rule 12.2.6.1.1(p) already has 500m2 of cleared land, any further clearance involving indigenous vegetation will require resource consent under this Rule. Note 3: Refer also to Regulations 93 and 94 of the National Environmental Standards Plantation Forestry which prevail over this rule.	vegetation is proposed to be enhanced. Any occasional clearance of indigenous vegetation for the provision of roads and services would be less 500m^2. The site is not located within an Outstanding Landscape Feature.
Section 3 - Soils and Minerals		
12.3.6.1.3	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 12 month period per site; and (b) it does not involve a cut or filled face exceeding 1.5m in height i.e. the maximum permitted cut and fill height may be 3m. *Note 1: When undertaking any excavation (including cellar construction), or filling, compliance with Council's earthworks bylaw (Bylaw 22) is required.* *Note 2: Where a site is within a Coastal Hazard 1 or Coastal Hazard 2 Area (as shown on the Coastal Hazard Maps), more restrictive excavation and filling rules apply (refer to rules in 12.4).* *Note 3: Some normal rural practices that involve excavation or filling, such as the maintenance of rural tracks, dams, fences and fence lines; land cultivation; clearing of*	Does not Comply Proposed earthworks at time of subdivision mostly comprise re-shaping to blend the contours and reduce a localised natural high point by approximately 3.5m, surplus cut will be used to raise the level of lot 1 and to apply a pre-load across the building platform which will be removed off site once monitoring indicates settlement has stabilised. Earthworks will comprise: - Recontouring - Topsoil stripping for access roads - Imported aggregate for access roads - Trenches for drainage and utilities - Pedestrian pathways The volume of earthworks has been estimated to be: - 4858m^3 cut volume, - 4327m^3 fill volume, and - 1975m^3 aggregate volume

	drains; and obtaining of roading material for use on the same production unit, are excluded from the definitions of excavation and filling (refer to Chapter 3 Definitions).	The scale of earthworks exceeds the 200m³ per year per site maximum and 1.5m cut height for a Permitted activity (District Plan Rule 12.3.6.1.3). The proposed activity is Discretionary under Rule 12.3.6.3 because the earthworks do not comply with Rule 12.3.6.2.2 not exceeding 500m3 not involving a cut or filled face exceeding 1.5m in height Discretionary Activity Pursuant to Rule 12.3.6.3
12.3.6.1.4	Filling in any zone shall meet the following standards: (a) the fill material shall not contain putrescible, pollutant, inflammable or hazardous components; and (b) the fill shall not consist of material other than soil, rock, stone, aggregate, gravel, sand, silt, or demolition material; and (c) the fill material shall not comprise more than 5% vegetation (by volume) of any load.	To Comply
	Section 4 Natural Hazards – Not located within Coastal Hazard Area	The site does not appear on the FNDC Coastal Hazard maps CH1-CH17. As such, the provisions of Rule 12.4 Natural Hazards do not apply, and earthworks can be consented at Council's discretion.
12.3.7	Assessment Criteria	With recommended controls in place, the earthworks will not increase erosion. Filling will protect lot 1 from coastal flooding without impacting other areas. Undeveloped land will stay grassed with landscaping. Stormwater will still flow directly to the Waitangi River. The new system (including Yorke Road) will prevent uncontrolled runoff to neighbouring properties. Erosion and sediment controls, will be used during earthworks. The consequently urban development will be less visible after recontouring, with no effect on riverbank character or the esplanade reserve buffer. Earthworks will not occur within the riparian belt or basalt escarpment, which area areas with significant indigenous vegetation. Known archaeological features will be avoided.
	Section 5 Heritage	
12.5.6.1.3	Registered Archaeological Sites	Three archaeological features "(shell middens) were discovered along the exposed east face of the escarpment, two of the middens being within the

	Activities involving the alteration of land, including building, excavation, filling, planting of trees and disturbance of ground, shall not disturb, modify, damage or destroy a registered archaeological site (as listed in Appendix 1G and shown on the Resource Maps), unless an Authority to Destroy, Damage or Modify an Archaeological Site has been issued by the New Zealand Historic Places Trust. For the purpose of this rule a registered archaeological site is one that is included on the New Zealand Historic Places Register pursuant to the Historic Places Act 1993. Where an application is required because of non-compliance with this rule, the New Zealand Historic Places Trust, Department of Conservation and where appropriate, the tangata whenua for whom the archaeological site has significance, shall be considered an affected party.	esplanade reserve. The location of the shell midden and cave within the site is now located within balance lot 22. A small cave or "cleft "was also discovered. No archaeological remains were observed or located in the "cave". In 2019 various test pits were dug. No archaeological remains were found in any of the test pits. Given the location of these features no works will disturb, modify, damage or destroy these sites.
12.7.6.1.1	Setback from Lakes, Rivers and Coastal Marine Area The setback shall be a minimum of 26m in Residential Zone.	Does not Comply Some building areas will be located within 26m of the Waitangi River but will be separated by the escarpment and esplanade reserve.
12.7.7	Assessment Criteria (a) the extent to which the activity may adversely affect cultural and spiritual values; (b) the extent to which the activity may adversely affect wetlands; (c) the extent to which the activity may exacerbate or be adversely affected by natural hazards; (d) the potential effects of the activity on the natural character and amenity values of lakes, rivers, wetlands and their margins or the coastal environment; (e) the history of the site and the extent to which it has been modified by human intervention; (f) the potential effects on the biodiversity and life supporting capacity of the water body or coastal marine area or riparian margins; (g) the potential and cumulative effects on water quality and quantity, and in particular, whether the activity is within a water catchment that serves a public water supply;	The applicant has reached out to two local hapu to discuss the proposal but no response has been received to initiate a consultation process. We understand that Council all advise the tangata whenua that resource consent has been lodged for the site. If any advise that they are interested and wish to be engaged the applicant is willing to discuss. The subdivision takes into account the protection of registered archaeological sites, as no works will disturb, modify, damage, or destroy these areas. The attached engineering reports considers potential natural hazard effects. Building restriction form the escarpment will avoid or mitigate potential adverse land stability effects. Measures are also proposed to managed the flooding effects on the balance lot (Lot 1). The presence of the escarpment and esplanade reserve provides a degree of separation. The

	(h) the extent to which any proposed measures will mitigate adverse effects on water quality or on vegetation on riparian margins; (i) whether there are better alternatives for effluent disposal; (j) the extent to which the activity has a functional need to establish adjacent to a water body; (k) whether there is a need to restrict public access or the type of public access in situations where adverse safety or operational considerations could result if an esplanade reserve or strip were to vest.	natural character and amenity values will also be maintained through enhancement planning. The site has previously been subject to human intervention The proposal has been designed to protect and enhance biodiversity. No works impact the immediate margins of water bodies or significant vegetation. The subdivision services have been designed to avoid or mitigate adverse effects on water quality or quantity. An effective stormwater management system is proposed. The development will connect to the public wastewater network. The presence of the enhanced esplanade reserve supports continued public access and provides a buffer between development and the river.































