Hastings District Council

Civic Administration Building
Lyndon Road East, Hastings
Phone: (06) 871 5000
Fax: (06) 871 5100

OPEN

DOCUMENT 2

COMMISSIONER HEARING

Meeting Date: **Tuesday, 22 January 2019**

Time: **9.00am**

Venue: **Council Chamber**
Ground Floor
Civic Administration Building
Lyndon Road East
Hastings

HASTINGS DISTRICT COUNCIL
207 Lyndon Road East
Hastings 4122
Private Bag 9002

Phone 06 871 5000
www.hastingsdc.govt.nz

TE KAUNIHERA O HERETAUNGA

RESOURCE MANAGEMENT ACT 1991
(Resource Application Form)

Office Use Only	
RMA	
PID	

1.0 APPLICANT'S DETAILS

I AM THE ○ PROPERTY OWNER (PROCEED TO 2.0) ○ LESSEE ◉ AUTHORISED AGENT

APPLICANT'S NAME	Hastings District Council
APPLICANT'S POSTAL ADDRESS	Private Bag 9002
APPLICANT'S CONTACT PHONE NUMBER	8715000
APPLICANT'S EMAIL ADDRESS	craigs@hdc.govt.nz
ADDRESS FOR SERVICE	207 Lyndon Rd East

2.0 OWNER'S DETAILS (if owner is not the applicant)

PREFERRED MEANS OF FORMAL CORRESPONDENCE ○ MAIL ○ EMAIL ○ PHONE ○ FAX

OWNER'S NAME	
OWNER'S POSTAL ADDRESS	
OWNER'S CONTACT PHONE NUMBER	
OWNER'S EMAIL ADDRESS	

3.0 BILLING DETAILS

BILLED TO: ◉ APPLICANT ○ OWNER ○ OTHER (PLEASE PROVIDE DETAILS BELOW)

NAME	
POSTAL ADDRESS	

4.0 SUBJECT SITE

SITE ADDRESS	Multiple Addresses and Sites as attached
LEGAL DESCRIPTION	As Above
LAWFULLY ESTABLISHED USES ON SITE	As Above

Please note that current copies of Certificate of Titles are required (no older than 3 months). If a Certificate of Title is not supplied, Council will obtain a copy from Land Information New Zealand – the cost will be added to the cost of processing your consent.

Item 2
Attachment 2

5.0 BRIEF OVERVIEW

BRIEF DESCRIPTION OF THE PROPOSED USE	Notice Of Requirement for Road Corridor and Service Corridor
PROPOSED START DATE	2019
ARE ANY OTHER RESOURCE CONSENTS REQUIRED? *	
ACTIVITY STATUS/TYPE OF RESOURCE CONSENT	Notice Of Requirement
RELEVANT RULE/S OF THE DISTRICT PLAN	N/A

* E.g. Hawke's Bay Regional Council (for discharges or earthworks) or New Zealand Historic Places Trust (for archaeological sites or heritage buildings)

6.0 DECLARATION BY THE APPLICANT

- ⊘ The Information on this form is required to be provided under the Resource Management Act 1991 and is required to process your application. This information (including your personal details) has to be made available to members of the public and the media, including business organisations. In appropriate circumstances it may also be made available to; other units of the Council, Council's approved contractors and government agencies. Under the Privacy Act 1993 you have the right to access the personal information held about you by the Council, and you can also request that the Council correct any personal information it holds about you.
- ⊘ I confirm that I have read and understood the privacy statement above and that the information provided on the application form is true and correct.
- ⊘ I also understand that as the applicant, the Council will send all invoices and refunds for fees to me and I will be responsible for, and will indemnify the Council in respect of, or payment of all fees in connection with this application. I further understand that all correspondence related to the application will be made to me
- O Please tick here if all correspondence related to the application is to go to a surveyor. Please also supply the surveyor's details below:

APPLICANT'S NAME	
APPLICANT'S POSTAL ADDRESS	

SIGNATURE	
PRINTED NAME	

7.0 TERMS OF BUSINESS

Additional charges over and above the deposit paid may accrue during processing of a resource consent application (depending on the quality of application and planning issues involved). These charges will be invoiced in accordance with the Schedule of Resource Management Charges and must be paid by the applicant. Any invoice that remains unpaid after 60 days may attract penalty fees as prescribed in the schedule of charges.

A full copy of the Schedule of Resource Management Charges can be viewed at the Council's office or at website **www.hastingsdc.govt.nz**A

Attachment 2

Schedule 2 - Land Areas to be taken by Designation

PLAN	Property Address	Owner	Legal Description	Land Area (m^2)
A	1239 Howard Street	TW Property Holdings Limited	LOTS 3 DP 3146 BLK IV TE MATA SD (CT 110/280)	2582
B	258 Havelock Road	General Distributors Limited	LOT 1 DP 336086 (CT 158530)	900
C	246 Havelock Road	General Distributors Limited	LOT 41 DP 752 BLK IV TE MATA SD (CT E4/835)	1439
D	238 Havelock Road	George Andrew Brummer, Anthony Patrick Douglas Gee, Eileen Gee, and Steven Yue Lup Gee	LOT 42 DP 752 BLK IV TE MATA SD (CT 37/104)	2632
E	226 Havelock Road	George Andrew Brummer, Anthony Patrick Douglas Gee, Eileen Gee, and Steven Yue Lup Gee	LOTS 43 DP 752 BLK IV TE MATA SD (CT D2/957)	1457
F	226 Havelock Road	George Andrew Brummer, Anthony Patrick Douglas Gee, Eileen Gee, and Steven Yue Lup Gee	LOTS 44 DP 752 BLK IV TE MATA SD (CT D2/957)	1452
G	214 Havelock Road	Barry Paul Keane and Lynne Keane	PT LOT 2 DP 8367 BLK IV TE MATA SD (CT 135/238)	1623
H	208 Havelock Road	Christopher Hugh Burns and Patricia Lorraine Burns	PT LOT 2 DP 8367 BLK IV TE MATA SD (CT H1/584)	1455
I	204 Havelock Road	Ian James Kelly	LOT 47 DP 752 BLK IV TE MATA SD (CT B1/972)	1115
J	180 Havelock Road	Anthony Harold Masters and Heather Margaret Masters	LOT 1 DP 28632 (CT Y2/170)	1803
K	1259 Howard Street	Karen Mary Cooper	LOT 2 DP 492632 (CT 716606)	2583

Howard Street Urban Development Area

Roading and Stormwater Servicing Corridor

Notice of Requirement

August 2018

Table of Contents

PART 1 - NOTICE OF REQUIREMENT FOR A DESIGNATION FOR A ROAD CORRIDOR, WITH ASSOCIATED INFRASRTUCTURE FOR WATER, WASTEWATER, AND STORMWATER; AND STORMWATER CORRIDOR

Notice of Requirement for a Designation under Section 168A of the Resource Management Act 1991

To: Hastings District Council (in its capacity as a Consent Authority)
Private Bag 9002
Hastings

From: Hastings District Council (in its capacity as a Requiring Authority)
Private Bag 9002
Hastings

1. **HASTINGS DISTRICT COUNCIL** gives notice of its requirement for the following designation for a public work to be included in the Hastings District Plan:

   ROAD CORRIDOR AND STORMWATER CORRIDOR

   The public work authorised by the designation is the construction, operation and maintenance of a road and infrastructure servicing corridor to provide road access to internal sites, reticulated water supply, waste water disposal and stormwater disposal to ensure that the new General Residential Zone can be appropriately serviced.

2. **Land to which this requirement applies is as follows:**
   The area to which the requirement applies is located on the south east side of Hastings City and is described as follows:
   - A crescent shaped road corridor running internally through the development.
   - The road is largely 20m wide, apart from the area adjoining Parkvale School which is 22m wide.
   - The road corridor is approximately 840m in length.
   - The road corridor will also include servicing capabilities for water, wastewater and stormwater.
   - A stormwater corridor of 10m wide and approximately 52m long located on 214 Havelock Road being PT LOT 2 DP 8367 BLK IV TE MATA SD.

   The properties subject to this Notice of Requirement are shown on Land Requirement Plan and Table presented in Appendix 1 which forms part of this Notice of Requirement.

3. The nature of the proposed work is:

- Council will construct the stormwater, wastewater and water reticulated network and the internal road to service the proposed residential zone;
- Council will purchase land for the roading and stormwater corridor

This is more fully described in the servicing reports and TIA assessment attached to this report.

4. The effects that the public work may have on the environment, and the ways in which any adverse effects will be mitigated, are set out in the Assessment of Environmental Effects.

5. Whether adequate consideration has been given to alternative sites, routes, or methods of undertaking the work.

This Notice of Requirement to designate a road and three waters servicing corridor is to undertaken along the same alignment to that set out in the structure plan introduced to the Proposed District Plan in Variation 3.

The Stormwater Corridor on the land PT LOT 2 DP 8367 BLK IV TE MATA SD is additional to the existing structure plan.

Details as to the assessment of alternative sites, routes or methods is set out in Section 13 of the supporting Assessment of Environmental Effects.

6. The work and designation are reasonably necessary for achieving the objectives of the Requiring Authority for the following reasons:

Objectives of Requiring Authority

The objectives of the Requiring Authority are;

- to provide sufficient land for the infrastructure servicing of a new residential zone on the southern side of Howard St, Hastings.
- To enable the efficient, effective and timely implementation of the physical infrastructure necessary to service the area.
- To manage the overland flow of stormwater to the road and stormwater detention area via a Council owned and maintained service corridor.

The Work

The proposed work is a new road corridor that is 20m wide for most of the corridor and 22m adjoining Parkvale School. Within the roading corridor, piping and swales will be constructed for reticulated water, wastewater and stormwater services.

A corridor of 10m will be constructed to provide a secondary flow path for stormwater within PT LOT 2 DP 8367 BLK IV TE MATA SD. The corridor typically provides sufficient width to form an overland flow path for stormwater detention purposes.

The work will achieve the above objectives in the following ways:

- By ensuring that there is sufficient land to provide road access to all properties within the new Residential Zone at Howard Street.
- To allow landowners to develop their properties according to individual timeframes, rather than some developments being dependent on other properties to develop first, such that portions of the road / infrastructure corridor are vested to allow completion of the road and servicing.
- To ensure all sites can be adequately serviced for roading, water, wasterwater and stormwater.

The Designation

Designation is reasonably necessary for achieving the objectives because:

- It will allow the roading and servicing infrastructure required to service residential development at Howard Street to be constructed, operated and maintained notwithstanding anything to the contrary in the operative or proposed Hastings District Plan.

- It will allow the land required to be identified in the Hastings District Plan, giving a clear indication of the intended use of the land;

- It will enable the construction of the roading and servicing corridor to be undertaken in a comprehensive and integrated manner;

- It will protect the proposed roading and servicing corridor from earthworks and construction development which may otherwise compromise or preclude the construction of the work.

- It is designed to recognise the servicing needs of individual sites and the environmental effects on adjoining properties.

7. Hastings District Council hereby requests that the requirement for an outline plan be waived under s. 176A(2)(c), on the basis that sufficient information has been provided and will be incorporated into the designation.

8. Hastings District Council provides the following information which relates to this Notice of Requirement:

- Part A – RMA requirements
    1) Part 1 - Notice of Requirement (this document)
    2) Part 2 – Supporting Information

- Part B – Appendices
    1) Schedule 1 – Land Requirement Maps for designation
       Schedule 2 - Land Areas to be taken for Designation
    2) Service Infrastructure Review
    3) Overall TIA Transport Impact Assessment – MWH Limited
    4) Stormwater Capacity Assessment – MWH Limited
    5) Wastewater Servicing Assessment – MWH Limited
    6) Geotechnical Investigation Report – Tonkin & Taylor

Dates 31st August 2018

Signed on behalf of Hasting District Council:

Group Manager: Asset Management, Craig Thew

Address for Service:
Hastings District Council
Private Bag 9002
Hastings
Attention: Craig Scott
Telephone: (06) 871 5000
Email: craigs@hcdc.govt.nz

PART 2 - SUPPORTING INFORMATION

1.0 INTRODUCTION

1.1 The proposed Howard Street Urban Development Area is a 21.2ha area of land located on the south-eastern fringe of Hastings, adjoining the existing General Residential Zoned land. It is located between Havelock Road and Howard St and bordered to the south by the Riverslea Drain. The land is zoned 'Plains' under the Operative Hastings District Plan. The area currently contains a mixture of horticultural, lifestyle residential and small scale land use activities. Parkvale School will also be included within the rezoning, however given this is designated for educational purposes, there is no change of use. The majority of this land has been included within the HPUDS growth areas since 2010 and subsequently included as a growth area within Change 4 to the RPS, however an additional 5 hectares was incorporated as part of variation 3, and has subsequently been included as a HPUDs growth area.

1.2 A key objective of this project is the efficient, effective and timely implementation of the physical infrastructure necessary to service the area. As such it is proposed to establish, operate and maintain a roading corridor that also contains reticulated stormwater, water and wastewater infrastructure . Furthermore it is proposed to establish an additional 10m wide stormwater corridor along the land contained within 214 Havelock Road, PT LOT 2 DP 8367 BLK IV TE MATA SD.

Variation 3 to the Proposed Hastings District Plan 2013

1.3 The identification of this land for residential use was actioned in 2017 with Variation 3 seeking to rezone some 21.2 hectares of land 'Hastings General Residential Land'. The land was also provided for as an 'urban development area'. There was no staging or deferment provided for in the rezoning. Submissions were heard on Variation 3 in 2016 with one appeal resulting from the decisions. This will be discussed in more detail below.

1.4 Variation 3 introduced a Structure Plan, compliance with which is a requirement for development within the Variation area. The Structure Plan shows key features including the internal road, reserves and a stormwater detention area. Under Variation 3, without the designation, land required for those features would have been vested at the time of development or when otherwise acquired by Council. While this is considered to be effective for features within 1 or 2 landholdings (such as the stormwater detention area and reserves), it is much less effective for linear infrastructure.

2.0 BACKGROUND

Overview

2.1 Variation 3 proposed to rezone an area of land on the eastern side of Hastings City to provide for future greenfield residential growth. This area was identified in HPUDS in 2010 as one of a number of areas for greenfield residential growth to 2045, and subsequently in the RPS as being an appropriate residential greenfield growth area within the Heretaunga Plains.

2.2 The area was then included in Hastings District Council's prioritisation of greenfields residential areas adopted by Council in 2011 and was scheduled for development in the 2026 to 2031 period – on that basis, because the Howard Street development area was not anticipated within the 10-year life of the District Plan, it was not included in the recent Proposed Hastings District Plan as part of its 10-year review.

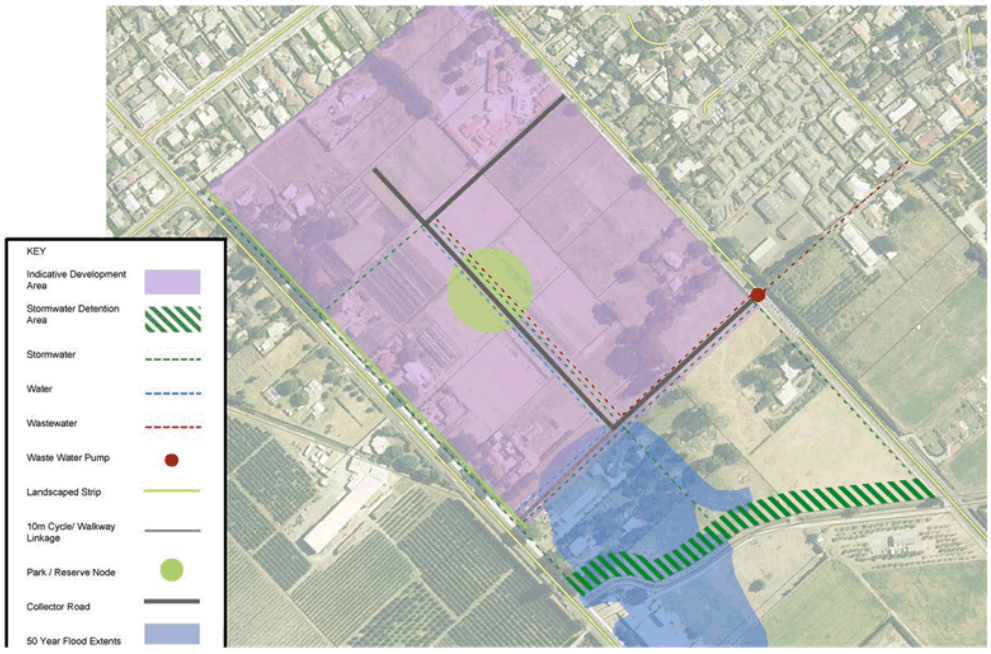
2.3 Issues with unsuitability/unavailability of growth areas scheduled for earlier release (namely, the planned Arataki Extension) resulted in a reconsideration of the timing of the release of the Howard Street area for greenfield residential development. These recent sequencing issues were matters for consideration in the HPUDS Review in 2016.

2.4 At the end of 2015, Council was also approached by a developer with substantial land interest within the Howard Street area, indicating a desire and readiness to progress a substantial residential development as soon as possible. That gave further stimulus for bringing forward the sequencing of the Howard Street development area.

Howard St Residential Rezoning – Variation 3 to the Proposed District Plan

2.5 Consultation and work commenced on preparing a Structure Plan for the Howard Street Residential Rezoning in January 2016. Consultation occurred concurrently with background work to ensure the suitability of the land for residential development. A draft concept plan was produced for preliminary comment in March 2016, which is shown below.

Draft Concept Plan- Howard Street Residential Development Area



2.6 The location of the road as it relates to the centre of the development remained relatively unchallenged throughout the consultation on the concept plan.

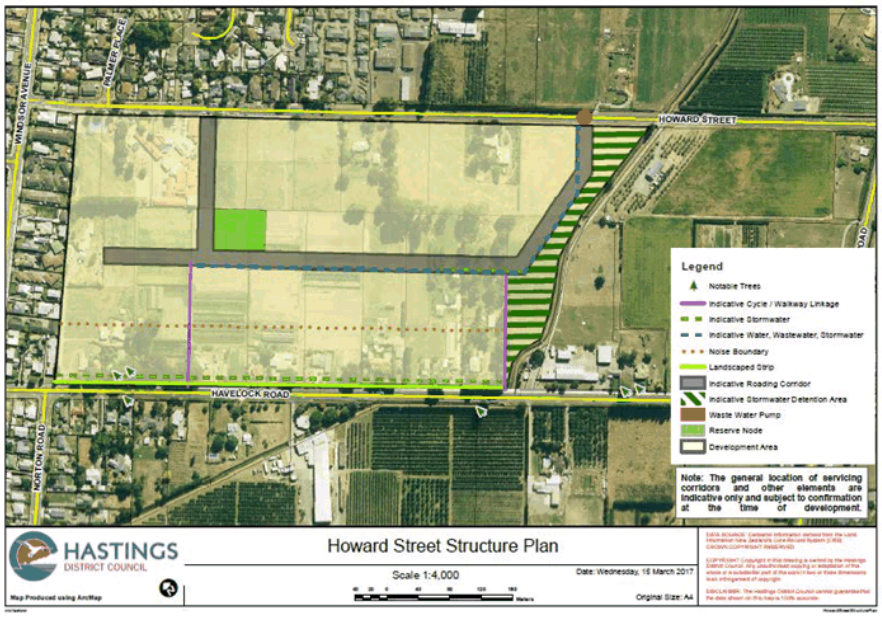
2.7 There were some issues with the location around the southernmost intersection for the internal road. These issues related partly to the close location of the road to existing houses, and partly to the desire for landowners to the south of the road to be included within the Howard St development area.

2.8 Through consultation and consideration of options through a section 32 assessment, it was considered that the additional land to the south of the road, should be included within the urban development area.

2.9 There were 14 submissions and 6 further submissions on Variation 3, the hearings took place on December 2016.

2.10 After decisions on submissions in was recommended the southern intersection of the road should be relocated to be more compatible with landowners wishes.

2.11 As such the following structure plan was recommended by Commissioners, and approved by Council in January 2017 as a result of decisions on submissions.



2.12 It should be noted that as part of the decisions on submissions, the road adjacent Parkvale School was recommended to be 22m width to provide for parking and a pick up drop off area for the school.

2.13 Council made its decisions on submissions in March 2017 and one appeal was subsequently received in April 2017.

2.14 The appeal did not challenge the objective of the Plan Change in rezoning the land from Plains Production to Residential, but rather sought that the location and size of the Stormwater Detention Area be reduced or amended, and any subsequent relocation be made to the road adjoining the detention area upon any amendments.

2.15 The resolution of the appeal is yet to be achieved.

3.0 SITE DESCRIPTION

Wider Plan Variation

3.1 The Variation involved Rezoning approximately 21.2 hectares of land between Howard Street and Havelock Road, on the eastern fringe of Hastings City, from 'Plains Production Zone' to 'Hastings General Residential Zone' (including the Parkvale School site – 1.8 hectares); The proposed zone is identified in Figure 1 – 3 below:

3.2 The site is considered flat with relatively minor fall towards the Riverslea Drain to the southern end of the development. The area is surrounded by existing residential activities to the North and orcharding and Lifestyle activities to the South.

3.3 There are multiple dwellings located within the Howard Street Urban Development Area, but none of these are to be impeded by the proposed designation.

Figure 1 – Proposed planning map new residential zone

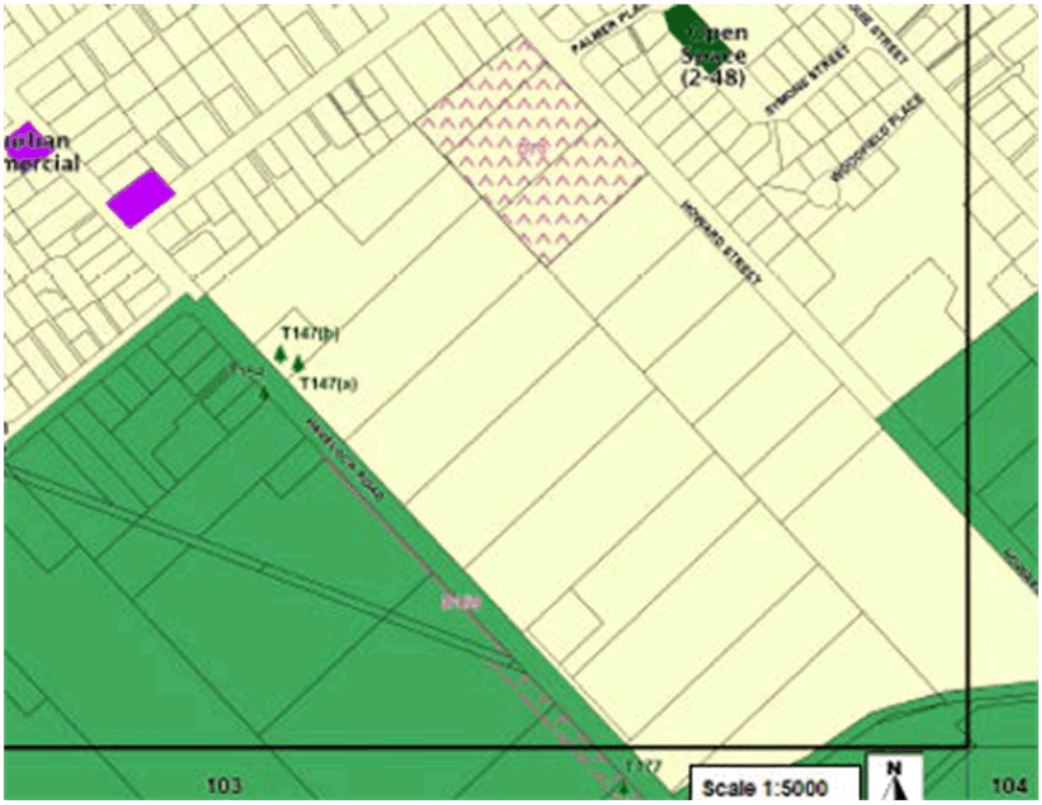


Figure 2: Howard Street Urban Development Area

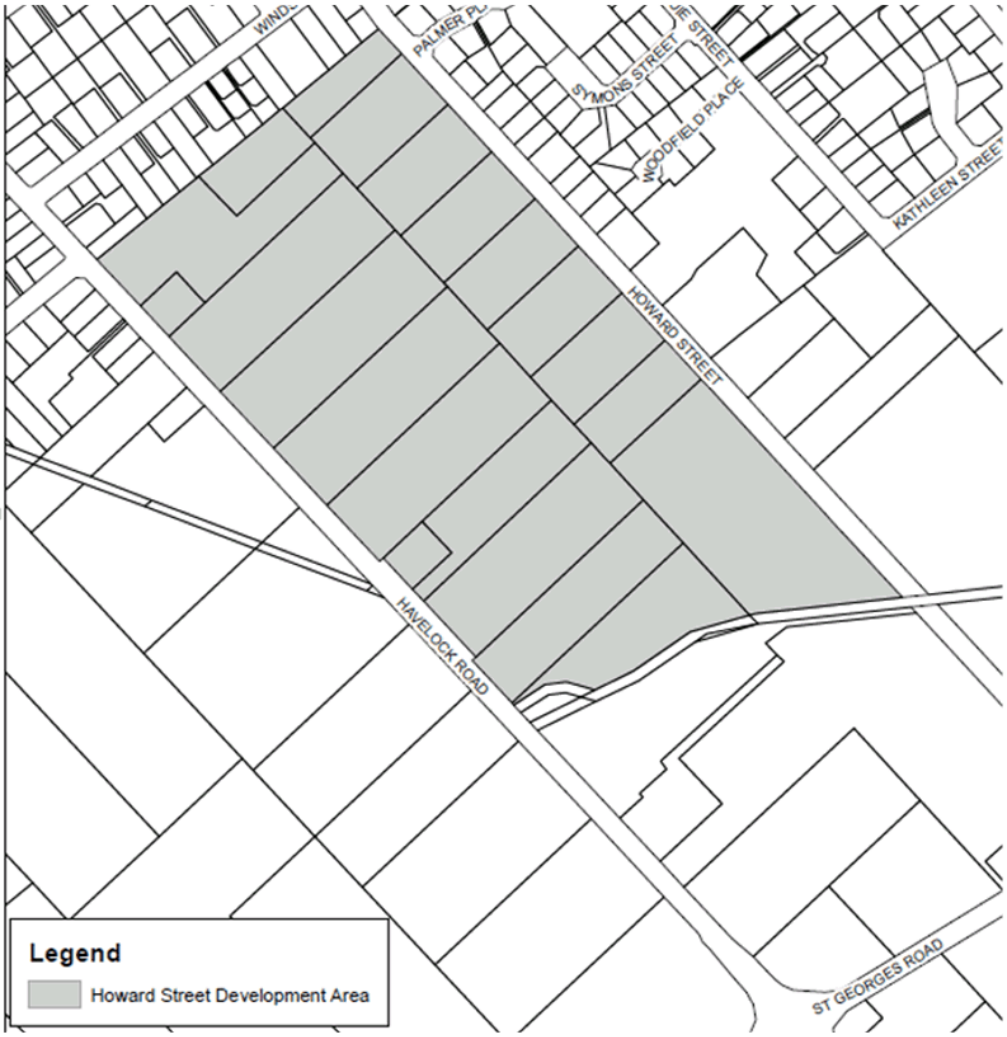
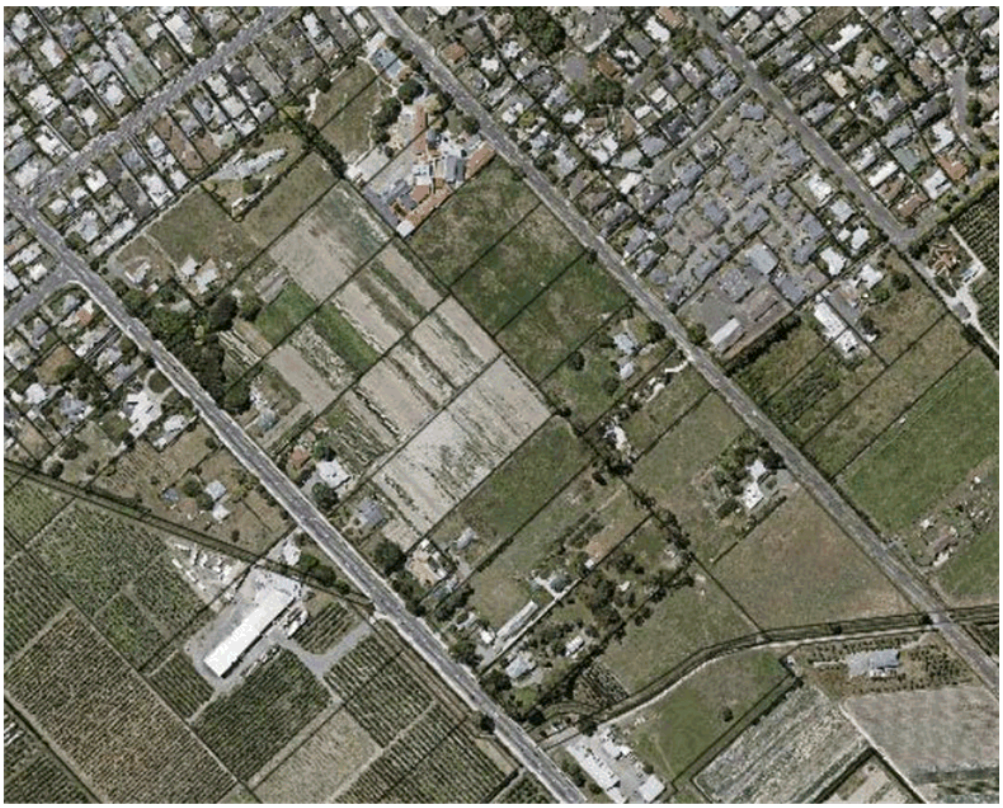


Figure 3: Aerial Photo of Howard Street Urban Development Area



4.0 PROJECT DESCRIPTION

4.1 The intention is for a roading corridor which will provide for reticulated water, wastewater and stormwater; and an additional stormwater corridor to be in Council ownership which will allow for consistent maintenance of the services for the Residential Zone.

4.2 The roading corridor is 20 metres wide in most instances, apart from where the corridor adjoins Parkvale School where it is proposed to be 22m in width to allow for additional car parking for the school. The roading corridor will be accessed from two intersections onto Howard St on the Eastern and Western ends of the development. The corridor will form one continuous crescent shaped road, with an additional segment to provide access to properties behind Parkvale School.

4.3 An additional Stormwater corridor will be located on the northern boundary of 214 Havelock Road being PT LOT 2 DP 8367 BLK IV TE MATA SD. This corridor will provide a secondary flowpath for stormwater from 1239 Howard Street through to the internal road. It is proposed to be 10m in width.

4.4 No additional time is to be requested for the lapse date for the designation, as work is intended to be completed within 5 years of the designation being included in the District Plan.

General Description of the road corridor Urban Development Area

4.5 This Variation is intended to provide a General Residential Zone which will provide for medium and low density development on the south-eastern side of Hastings. The Zone will be able to accommodate a range of low density traditional greenfields sections, of an average of 600m2 with a minimum of 400m2. It will also provide for medium density comprehensive residential development, which would be a Restricted Discretionary Activity and provide for sites of between 250m2 and 350m2 provided service capacity and amenity levels can be maintained.

4.6 The Howard St Urban Development Area is a rectangular area of land of an approximate width of 340m (Havelock Road to Howard St) and a length of 640m (Existing General Residential Zone to Riverslea Drain).

4.7 The roading alignment for the designation will largely follow that of the structure plan which was approved through Variation 3. However there has been an amendment to the road where it runs adjacent to the stormwater detention area (SDA). The road has been altered to allow for a slightly wider SDA. The alteration realigns the road between 5 – 10 metres further away from the drain. This is required due to additional engineering design work being undertaken for the SDA, which found that the width approved by the structure plan could not achieve an appropriate design for stormwater quantity and quality. As part of Variation 3, a traffic impact assessment (TIA) was undertaken by MWH Limited, which recommended a number of measures to ensure safety requirements for the internal road could be achieved.

4.8 The road corridor will be located relatively centrally through the development, approximately 168m from Howard St and 151m from Havelock Road. The road will be designed to cater for the residential development and will be designed to meet Engineering Code of Practice best practice guidelines for residential development.

4.9 The Howard Street Structure Plan, and proposed designation shows two road access points to reach the internal network of the development. The main road throughout the development would likely be classed as a 'local access road' in terms of Council's roading hierarchy.

4.10 Two road access points facilitate access to all land within the development area; provides for safe and efficient traffic circulation throughout the development area; and ensures continued access in and out of the development area in the event of emergency services needing to close the road at any stage.

4.11 The first main access road is proposed near Parkvale School (contained just within the property at 1239 Howard Street along its boundary with the school). The TIA has identified that this may need a right-turn bay on Howard Street as it may experience a greater volume of traffic turning in (from Hastings direction) due to it being the first access way traffic will approach.

4.12 The proposed second main access to the south of the development (contained just within the property at 1259 Howard Street alongside its boundary with 1245 Howard Street) is close to the 50/80 km/hr speed limit boundary. The TIA recommends that speeds of traffic coming from the south will need to be monitored, and that this could mean that threshold treatments into the 50 km/h area might be necessary.

4.13 Selection of the two road access point locations was deliberate, taking into account impacts on the functioning and safety of Howard Street itself, ability to access the entire development area, the location of existing property boundaries, amenity for adjacent land and properties on the opposite side of Howard Street, as well as impacts on Parkvale School.

4.14 The northern road location was selected deliberately near Parkvale School as it is anticipated to facilitate addressing of some of the existing school traffic congestion alongside Parkvale School through the ability to design the road to provide for additional parking and cycle/walkway connections etc. within the resulting road reserve. There is also the ability for consideration of setback of the road from existing classrooms as part of detailed road design.

4.15 The southern intersection will be located 71.9m from the boundary of the Riverslea drain. This intersection will provide for the road which runs at right angles from the road for 50m for safety reasons, before angling to run parallel to the drain.

4.16 The internal road will also provide for cycle and walking links within the road reserve, as well as providing links to Howard St and Havelock Road for both the Northern and Southern sides of the development.

4.17 The road corridor will contain swales designed to convey piped infrastructure for stormwater for up to a 5 year rainfall event and overland flow paths for up to a 50 year rainfall event to a stormwater detention area, which will detain stormwater runoff in significant rainfall events during major events, and is located at the southern end of the Residential Rezoning. It will also contain piped infrastructure for water which will loop around the development, and piped infrastructure to carry wastewater to a pump station, which will be located within the Stormwater Detention Area near Howard St. A likely cross section for the internal road is shown below:

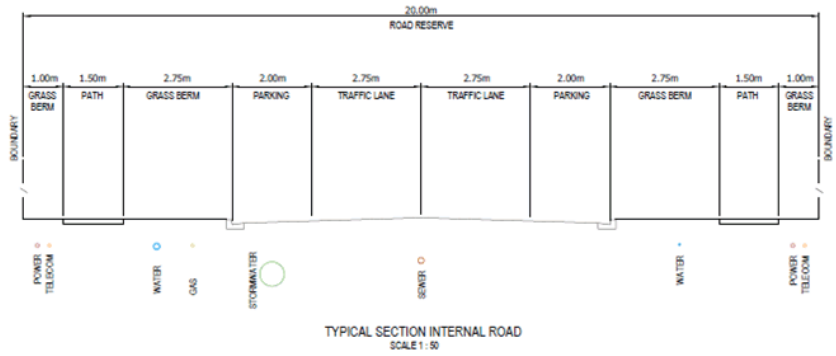


Figure 1: Typical Cross Section for Howard Street Development Internal Road

Stormwater Corridor

4.18 A Stormwater Corridor will be located on the property of 214 Havelock Road being PT LOT 2 DP 8367 BLK IV TE MATA SD. The corridor will be 10m in width and is designed to convey stormwater from the property of 1239 Howard St to the internal road corridor. The reason this stormwater corridor is needed, and was not originally identified within the structure plan, is that the difficulties in achieving fall from 1239 Howard St, to the Howard St road reserve

were not apparent at the time. As such an additional overland flow path is required. The 10m width for the corridor is designed to contain the flow path, as well as ensuring there is sufficient width to provide for a high level amenity for any potential pedestrian link.

4.19 Preliminary details for the stormwater and wastewater, and a traffic impact assessment, were undertaken for Variation 3 by MWH Limited. They have been attached to this report as Appendix 2 – 4.

4.20 It is intended that the roading and 3 water service infrastructure be constructed as soon as possible so as to facilitateresidential development, noting that however delays to works may still be experienced relating to the existing appeal. Confirmation of the Notice of Requirement (following the submission and hearing process) to designate the road and stormwater corridors and then subsequent land purchase would be required before constructions of these services was legally possible.

5.0 OBJECTIVES FOR THE PROJECT

5.1 In considering and responding to a Notice of Requirement, particular regard must be had to:

"Whether the designation is reasonably necessary for achieving the objectives of the … project or work for which the designation is sought." (section 171(3)(c) RMA)

5.2 The Council's objectives for the project are;

5.2.1 To provide sufficient land for the infrastructure servicing of a new residential zone on the southern side of Howard St, Hastings.

5.2.2 To enable the efficient, effective and timely implementation of the physical infrastructure necessary to service the area.

5.2.3 To manage the overland flow of stormwater to the road and stormwater detention area via a Council owned service corridor.

5.3 Variation 3 has established a new residential zone to the south east of Hastings, between Howard St and Havelock Road. The Hastings District Council 2018/2028 Long Term Plan identifies development Howard St as a major capital project to be completed in the next 10 years (programmed from Year 0 – 4). The designation is considered to be necessary to allow for timely and efficient servicing of the Variation area, to allow development to occur.

5.4 A key objective of this project is the efficient, effective and timely implementation of that physical roading and infrastructure necessary to service the area. Studies carried out as part of the preparation of the Proposed Variation identified the infrastructure necessary to appropriately avoid or mitigate the potential adverse effects of the proposed re-zoning. This included an internal road which provided a corridor for stormwater, water and wastewater infrastructure.However the need for an overland flow path within 214 Havelock Road had not been identified as necessary.

5.5 While the infrastructure could be delivered on an ad hoc basis as individual property owners choose to develop their land, it is considered that this would not meet the 'efficient, effective and timely' requirement for delivery of the necessary infrastructure. The designation will allow for the infrastructure to be delivered by the Council in a timely and efficient way.

5.6 The designations will assist in the achievement of the objectives of the project by:

- Protecting the land within the designated area from future development which may preclude the construction of the proposed network;
- Allowing Council and/or its authorised agents to undertake the project or work, and its maintenance and operation, in accordance with the designation, notwithstanding anything to the contrary in the Hastings District Plan;
- Clearly and accurately identifying and describing the use of the land in the Hastings District Plan;
- Enabling the project or work to be undertaken in a comprehensive and integrated manner
- Ensuring that land can be developed in a timely manner which provides equal opportunity for all landowners to develop their land according to individual timefarmes. This can be

achieved through Council purchasing the land, and constructing the key infracstructure to service the development.

- Ensuring that stormwater is managed to minimise any impacts of flooding within the development on the downstream network by designing stormwater services that consider the impacts of development on water quantity and quality up to the design criteria within the ECoP which is largely based on NZS4404: 2010 Land Development and Subdivision Infrastructure. Council's design specifications for stormwater require up to a 1 in 5 year rain event to be contained within a piped network and consideration for control of overland flow in a 1 in 50 year rainfall event.

6.0 STATUTORY ASSESSMENT

Notice of Requirement by Territorial Authority

6.1 A Notice of Requirement enables a requiring authority to establish a new designation for a public work over parcels of land that are directly affected by a proposal. This is a process where a recommendation is sought from the Council which is then accepted by the requiring authority (providing they agree with the recommendation), and in this case will provide a road corridor, which will include additional capacity for water, wastewater and stormwater; and an additional stormwater corridor to complement Variation 3 to the Proposed Hastings District Plan.

6.2 Section 168A (Notice of Requirement by territorial authority), RMA states:

1 Notice of requirement by territorial authority

(1) This section applies if a territorial authority decides to issue a notice of requirement for a designation—

(a) for a public work within its district and for which it has financial responsibility; or

(b) in respect of any land, water, subsoil, or airspace where a restriction is necessary for the safe or efficient functioning or operation of a public work.

(1A) The territorial authority must decide whether to notify the notice of requirement under—

(a) subsection (1AA); or

(b) sections 149ZCB(1) to (4), 149ZCC(1) to (4), 149ZCE, and 149ZCF, which apply with all necessary modifications and as if—

(i) a reference to an application or notice were a reference to the notice of requirement; and

(ii) a reference to an applicant, the Minister, or the EPA were a reference to the territorial authority; and

(iii) a reference to an activity were a reference to the designation.

(1AA) Despite section 149ZCB(1), a territorial authority must publicly notify the notice if—

(a) it has not already decided whether to give public or limited notification of the notice; and

(b) either—

(i) further information is requested from the territorial authority under section 92(1), but the territorial authority—

(A) does not provide the information before the deadline concerned; or

(B) refuses to provide the information; or

(ii) the territorial authority is notified under section 92(2)(b) in relation to the commissioning of a report, but the territorial authority—

(A) does not respond before the deadline concerned; or

(B) refuses to agree to the commissioning of the report.

(1AB) Subsection (1AA) applies despite any rule or national environmental standard that precludes public or limited notification of the notice of requirement.

(1B) Section 168 applies to the notice of requirement with all necessary modifications.

(2) Sections 96, 97, and 99 to 103 apply to the notice of requirement with all necessary modifications and as if—

(a) a reference to a resource consent were a reference to the requirement; and

(b) a reference to an applicant or a consent authority were a reference to the territorial authority; and

(c) a reference to an application for a resource consent were a reference to the notice of requirement; and

(d) a reference to an activity were a reference to the designation.

(2AA) However, section 101(2) does not apply to the notice of requirement, and the date for the commencement of the hearing is as follows:

(a) if the notice of requirement was not notified, the date must be within 25 working days after the date the notice of requirement was given by the territorial authority:

(b) if the notice of requirement was notified and the territorial authority gives a direction under section 41B, the date must be within 40 working days after the closing date for submissions on the notice of requirement:

(c) if the notice of requirement was notified and the territorial authority does not give a direction under section 41B, the date must be within 25 working days after the closing date for submissions on the notice of requirement.

(2A) When considering a requirement and any submissions received, a territorial authority must not have regard to trade competition or the effects of trade competition.

(3) When considering a requirement and any submissions received, a territorial authority must, subject to Part 2, consider the effects on the environment of allowing the requirement, having particular regard to—

(a) any relevant provisions of—

(i) a national policy statement:

(ii) a New Zealand coastal policy statement:

(iii) a regional policy statement or proposed regional policy statement:

(iv) a plan or proposed plan; and

(b) whether adequate consideration has been given to alternative sites, routes, or methods of undertaking the work if—

(i) the requiring authority does not have an interest in the land sufficient for undertaking the work; or

(ii) it is likely that the work will have a significant adverse effect on the environment; and

(c) whether the work and designation are reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought; and

(d) any other matter the territorial authority considers reasonably necessary in order to make a decision on the requirement.

(3A) The effects to be considered under subsection (3) may include any positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from the activity enabled by the requirement, as long as those effects result from measures proposed or agreed to by the requiring authority.

(4) The territorial authority may decide to—

(a) confirm the requirement:

(b) modify the requirement:

(c) impose conditions:

(d) withdraw the requirement.

(5)Sections 173, 174, and 175 apply, with all necessary modifications, in respect of a decision made under subsection (4).

6.3 The Council, as requiring authority, requests public notification of the notice of requirement under s 149ZCB(2)(b) of the RMA.

7.0 PART 2 OF THE RMA 'PURPOSE AND PRINCIPLES'

7.1 The RMA has as its purpose the promotion of the sustainable management of natural and physical resources.

7.2 Part 2 sets out the purposes and principles of the RMA within sections 5 to 8.

7.3 Section 5 of the RMA incorporates the following description of sustainable management.

"… 'sustainable management' means managing the use, development and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well being and for their health and safety while –

a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and

b) Safeguarding the life supporting capacity of air, water, soil and ecosystems; and

c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment."

7.4 As well as this stated purpose, people exercising powers and functions under the RMA must recognise and provide for a range of matters of national importance. These are set out in section 6 of the RMA and are (paraphrased):

a) Preserving the natural character of the coastal environment, wetlands, lakes, rivers and their margins and protecting them from inappropriate subdivision, use and development
b) Protecting outstanding natural features and landscapes from inappropriate subdivision, use and development
c) Protecting areas of significant indigenous vegetation and significant habitats of indigenous fauna
d) Maintaining and enhancing public access to and along the coastal edge, lakes and rivers
e) Recognising the relationship between Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu and other taonga
f) Protecting historic heritage from inappropriate subdivision, use and development
g) Protecting recognised customary activities

7.5 Further matters to which particular regard must be had when exercising functions and powers are set out in section 7 and are:

a. Kaitiakitanga
aa. The ethic of stewardship
b. The efficient use and development of natural and physical resources
ba. The efficiency of the end use of energy
c. The maintenance and enhancement of amenity values (as defined in the RMA)
d. Intrinsic values of ecosystems
f. Maintenance and enhancement of the quality of the environment
g. Any finite characteristics of natural and physical resources
h. The protection of the habitat of trout and salmon

i. The effects of climate change

j. The benefits to be derived from the use and development of renewable energy

7.6 Section 8 of the RMA requires recognition of the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).

7.7 All the above matters are directly relevant to a Notice of Requirement, as the mandatory considerations under section 171 of the RMA are "subject to Part 2".

Application of Part 2 to the Requirement

7.8 As detailed previously, this Notice of Requirement seeks to achieve sustainable management by providing an efficient, effective and timely implementation of the physical roading and infrastructure necessary to service the Howard Street Urban Development Area. This in turn will provide for a strategic and planned approach to the residential development. The road corridor was positioned as a result of internal and external communication, it was considered that its location was appropriate to service all sites for access and 3 waters at the time of the Variation being heard. The Variation and the method of servicing the area seeks to enable people and communities to provide for their social and economic wellbeing. The residential rezoning has the potential to provide for some of the needs of strong housing demand and lack of supply within the District.

7.9 In terms of section 5(2)(a) – (c), the Roading and Stormwater Corridor involves land on the Heretaunga Plains previously used for growing purposes. However the areas affected by the designation are no longer available for such purposes as they have effectively been rezoned as part of Variation 3 and have already been identified as required for urban use.

7.10 With regard to section 6 of the Act 'Matters of National Importance', the Notice of Requirement does not trigger the need to consider any of these matters, as none of the listed matters are triggered. For completeness however it is noted that in discussions were had with tangata whenua, and no potential issues were raised. This is a relevant issue in terms of section 6(e) being: "the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga:"

7.11 The works proposed as part of the designation have been assessed as part of the Variation with a conclusion that the rezoning as a whole will not result in effects more than minor on the Riverslea Drain and associated Karamu Stream Catchments.

7.12 With regard to section 7 and 'Other Matters' to be given particular regard, the relevant provisions to the Variation are listed as follows:

(b) the efficient use and development of natural and physical resources:

(ba) the efficiency of the end use of energy:

(c)the maintenance and enhancement of amenity values:

(f) maintenance and enhancement of the quality of the environment:

(g) any finite characteristics of natural and physical resources:

7.13 The Variation area has largely been identified through the Heretaunga Plains Urban Development Strategy (HPUDS) process and subsequently in the Hawke's Bay Regional Policy

Statement (RPS), as an Appropriate Greenfield Residential Development Area. This indicates suitability for residential development in terms of efficient use and development of the land resource, maintaining and enhancing amenity values and the quality of the environment, and any finite characteristics of resources, and having taken into account the end use of energy and the effects of climate change. The designation will assist in delivering that outcome.

7.14 The maintenance and enhancement of amenity values in terms of s7(c) is relevant both in terms of the amenity values of neighbouring residents to the zone and to the amenity within the zone. The design of the road and service corridors, provide an opportunity for the enhancement of amenity values through design mechanisms such as swales, plantings and shared use spaces.

7.15 In terms of section 7(g) and the finite characteristics of natural and physical resources, the versatile soils resource of the Heretaunga Plains are relevant considerations. Approving this notice of requirement will not result in the loss of any versatile land resource, as urban development of this land has already been approved through Variation 3.

Section 8 'Treaty of Waitangi'

7.16 Section 8 of the RMA 'Treaty of Waitangi', is as follows:

> *In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi)*

7.17 Consultation with the iwi authorities has not raised any potential issues. It is considered this application is consistent with the principles of the Treaty of Waitangi.

8.0 REGIONAL PLANNING DOCUMENTS

Regional Policy Statement and Heretaunga Plains Urban Development Strategy

8.1 The Heretaunga Plains Urban Development Strategy 2010 (HPUDS) provides a strategic framework for urban growth on the Heretaunga Plains for the period 2015-2045. HPUDS takes a long-term view of land-use and infrastructure and is to be implemented through, amongst other documents, the Hawke's Bay Regional Council's Regional Policy Statement (RPS) and District Plans.

8.2 HPUDS was reviewed in 2015 – 16 as part of the 5 yearly review requirement. As part of this review, it was found that although the principles of HPUDS remained consistent, there was some need to increase reserve areas for development due to the high demand for residential development occurring within Hawkes Bay. The findings are discussed below:

> *'The 2015 – 16 HPUDS Review has provided updated projections which result in both population and dwelling growth increases over the 30 year period (based on the medium – high growth projections) compared to the HPUDS 2010 projections. Nevertheless, these increases would still be able to be accommodated within the HPUDS identified greenfield growth areas and the infill growth projections. In fact there is an approximate buffer of 15% of supply over projected demand1 provided over the identified greenfield growth areas in recognition that it is unlikely that each growth area will be able to be developed to its theoretical potential.'*

8.3 *HPUDS is embedded in the Hawke's Bay Regional Policy Statement. The RPS includes* policies that provide guidance and direction to the local authorities in the Hawke's Bay Region when making decisions on urban activities, infrastructure and associated effects, and has a particular focus on the Heretaunga Plains sub-region. Those specific policies include the HPUDS settlement pattern and principles, which local authorities implement via regional plans and district plans.

8.4 HPUDS identifies specific areas to accommodate urban growth to the year 2045. The preferred settlement pattern involves moving to a more compact approach to development over time and aims to:

- Avoid encroaching onto the Heretaunga Plains
- Increase densities and intensification in suitable locations
- Reduce the spread of both Napier and Hastings
- Provide for a range of housing types
- Encourage walking, cycling and public transport as an alternative to the private motor vehicle

8.5 The Hawke's Bay Regional Resource Management Plan 2006 (RRMP) includes the Regional Policy Statement for the Hawke's Bay Region, which contains the following relevant objectives and policies set out in italic font with the evaluation of the proposed Notice of Requirement against them in plain font.

OBJ 1 To achieve the integrated sustainable management of the natural and physical resources of the Hawke's Bay region, while recognising the importance of resource use activity in Hawke's Bay, and its contribution to the development and prosperity of the region.

OBJ 2 To maximise certainty by providing clear environmental direction.

OBJ 3 To avoid the imposition of unnecessary costs of regulation on resource users and other people.

8.6 The Notice of Requirement seeks to give effect to all three of the above objectives by providing greater certainty for land owners that they can access and service their individual sites, which will contribute to the development and prosperity of the region. This will provide economic and community benefits by ensuring that landowners can be confident in the development of their land and will help avoid delays to the overall development of the Howard St area which may lead to additional holding costs.

8.7 Of particular relevance in terms of long term provision for urban growth and strategic infrastructure, the Hawke's Bay Regional Policy Statement dedicates a whole chapter to issues, objectives, policies, methods and anticipated environmental results for urban development and the strategic integration of infrastructure across the Region, and particularly within the Heretaunga Plains, titled 'Managing the Built Environment' (Chapter 3.1B of the RPS).

8.8 This includes planned provision for urban development and integration of land use with significant infrastructure. Of particular relevance, the RPS places priority on:

ISS UD1 *The adverse effects of sporadic and unplanned urban development (particularly in the Heretaunga Plains sub-region), on: a) the natural environment (land and water); b) the efficient provision, operation, maintenance and upgrading of physical infrastructure or services (particularly strategic infrastructure); and c) the economic, cultural and social wellbeing of the Region's people and communities.*

8.9 The designation will particularly assist in meeting part b) of Issue UD1 in that it will assist in the efficient provision, operation and maintenance of physical infrastructure and services. It will achieve this by providing corridors to allow all sites to have roading and stormwater access which will allow residential development of each property when the landowners choose to.

PLANNED PROVISION FOR URBAN DEVELOPMENT (HERETAUNGA PLAINS SUB-REGION) OBJ UD4 *Enable urban development in the Heretaunga Plains sub-region, in an integrated, planned and staged manner which: a) allows for the adequate and timely supply of land and associated infrastructure; and b) avoids inappropriate lifestyle development, ad hoc residential development and other inappropriate urban activities in rural parts of the Heretaunga Plains sub-region.*

PROVISION FOR URBAN ACTIVITIES (HERETAUNGA PLAINS SUB-REGION) POL UD1 *In providing for urban activities in the Heretaunga Plains sub-region, territorial authorities must place priority on: a) the retention of the versatile land of the Heretaunga Plains for existing and foreseeable future primary production, and b) ensuring efficient utilisation of existing*

infrastructure, or c) ensuring efficient utilisation of planned infrastructure already committed to by a local authority, but not yet constructed.

8.9.1 ***INTEGRATION OF LAND USE WITH SIGNIFICANT INFRASTRUCTURE (REGION) OBJ UD5*** *Ensure through long-term planning for land use change throughout the Region, that the rate and location of development is integrated with the provision of strategic and other infrastructure, the provision of services, and associated funding mechanisms.*

8.10 The Notice of Requirement will provide a corridor for the 3 water services to be located, designed and constructed to ensure that they can be integrated to the wider network. The

8.11 Both Water and Wasterwater will connect to the larger infrastructure network through connections on Howard Street. The existing networks have been assessed as part of Variation 3 and will be upgraded to ensure capacity can be achieved as development occurs. Stormwater will be disposed via a detention basin adjacent to the riverslea drain. The stormwater disposal has been designed to HBRC requirements as to retain stormwater during extreme events. Separate assessments for Wastewater and Stormwater were undertaken as part of Variation 3 which addresses how the Howard Street Urban Development Area will be integrated to the wider network.

INTEGRATION OF TRANSPORT INFRASTRUCTURE WITH DEVELOPMENT (REGION) OBJ UD6 *Ensure that the planning and provision of transport infrastructure is integrated with development and settlement patterns and facilitates the movement of goods and people and provision of services throughout the Region, while: a) limiting network congestion; b) reducing dependency on private motor vehicles; c) reducing emission of contaminants to air and energy use; and d) promoting the use of active transport modes.*

8.12 As part of Variation a Traffic Impact Assessment (TIA) was undertaken to show how the Howard Street Development Area would be integrated to the wider roading network. The TIA recommended a number of intersection upgrades as a result of the Howard Street Rezoning. The included:

- installing right hand turning bays for the intersections off Howard Street onto the development;
- ensuring that the intersections are accessed at 90 degree angles;
- providing for car parking and loading bays adjacent to parkvale school;

8.13 The designation corridor will be designed to such a width to ensure that the above mitigation measures can be achieved. Particularly on the part of the corridor adjacent to Parkvale School, which has been widened to 22m to ensure that car parking provisions for the school can be achieved. It is considered that intersection upgrades will be contained within the proposed designation corridor. The corridor has been designed to ensure safe vehicle movements where the road kinks over the land adjacent to the stormwater detention area. Finally, the corridor will link with proposed cycle and walking links to ensure the Howard Street development is well connected to surrounding areas.

SERVICING OF DEVELOPMENTS (REGION) POL UD13 *Within the region, territorial authorities shall ensure development is appropriately and efficiently serviced for the collection, treatment, disposal or re-use of sewage and stormwater, and the provision of potable water by: a)*

Avoiding development which will not be serviced in a timely manner to avoid or mitigate adverse effects on the environment and human health; and b) Requiring these services to be designed, built, managed or upgraded to maximise their ongoing effectiveness.

8.14 The notice of requirement will ensure that servicing is provided in a timely manner that can service all sites within the Howard Street Development Area. It is considered that this will better achieve Pol UD13 than taking a developer led, piecemeal approach to construction of the internal road and services, which will lead to inefficient and ineffective development where one property owner could hold up development on adjoining properties.

Maintenance and Enhancement of Physical Infrastructure

OBJ 32 *The ongoing operation, maintenance and development of physical infrastructure that supports the economic, social and/or cultural wellbeing of the region's people and communities and provides for their health and safety.*

8.15 The notice of requirement will provide for the construction and ongoing maintenance of the roading and infrastructure requirements of the Howard Street Urban Development Area. This will provide economic benefits to the District, as it will ensure residential development can occur in a timely manner which will help support job creation by providing additional housing stock. The roading and service corridors will also ensure that the residential development are well connected and serviced to ensure high levels of design and amenity.

8.16 Chapter 5 of the RRMP also includes the following relevant Objective:

OBJ 38: The sustainable management of the land resource so as to avoid compromising future use and water quality.

8.17 The designation is considered to be consistent with Objective 38 because it allows the necessary infrastructure to be constructed by Council as one project, which will then enable development to occur throughout the Variation area. The alternative of infrastructure being delivered on an ad hoc basis as landowners choose to develop may compromise future efficient use of the residential land resource.

8.18 In terms of water quality, the Designation for the roading and stormwater corridor will provide sufficient area to provide for swale systems. The water will be reticulated to a stormwater detention area, which will provide for both quality and quantity control prior to any water entering the wider Karamu catchment.

8.19 A full assessment of the water, wastewater and stormwater infrastructure was undertaken as part of the Section 32A report for Variation 3 which is provided with this requirement. This provides greater details on the level and design of servicing infrastructure.

8.20 The designation is proposed to be located in the same location as to what was approved through the structure plan for variation. It provide corridors to provide for roading, water, wastewater and stormwater.

POL UD10.3 STRUCTURE PLANS (REGION)

Notwithstanding Policy UD10.1, structure plans for any area in the Region shall:

a) Be prepared as a single plan for the whole of a greenfield growth area;

b) Be prepared in accordance with the matters set out in POL UD12;

c) Show indicative land uses, including:

i. principal roads and connections with the surrounding road network and relevant infrastructure and services;

ii. land required for stormwater treatment, retention and drainage paths;

iii. any land to be set aside for business activities, recreation, social infrastructure , environmental or landscape protection or enhancement, or set aside from development for any other reason; and

iv. pedestrian walkways, cycleways, and potential public passenger transport routes both within and adjoining the area to be developed;

d) Identify significant natural, cultural and historic or heritage features;

e) Identify existing strategic infrastructure; and

f) Identify the National Grid (including an appropriate buffer corridor).

POL UD10.4 STRUCTURE PLANS (REGION)

Notwithstanding Policy UD10.1, in developing structure plans for any area in the Region, supporting documentation should address:

a) The infrastructure required, and when it will be required to service the development area;

b) How development may present opportunities for improvements to existing infrastructure provision;

c) How effective provision is made for a range of transport options and integration between transport modes;

d) How provision is made for the continued use, maintenance and development of strategic infrastructure;

e) How effective management of stormwater and wastewater discharges is to be achieved;

f) How significant natural, cultural and historic or heritage features and values are to be protected and/or enhanced;

g) How any natural hazards will be avoided or mitigated; and

h) Any other aspects relevant to an understanding of the development and its proposed zoning.

8.21 Variation 3 addressed structure planning requirements for the Howard Street Urban Development Area. The designation will help implement the structure plan in an efficient manner which is fair to all property owners.

8.22 Pol UD12 requires structure plans to have regard to a number of different requirements, the relavant provisions to the designation are listed below:

> *POL UD12 MATTERS FOR DECISION-MAKING (REGION)*
>
> *In preparing or assessing any rezoning, structure plans, or other provisions for the urban development of land within the Region, territorial authorities shall have regard to:*
>
> *c) Good, safe connectivity within the area, and to surrounding areas, by a variety of transport modes, including motor vehicles, cycling, pedestrian and public transport, and provision for easy and safe transfer between modes of transport;*
>
> *d) Location within walkable distance to community, social and commercial facilities;*
>
> *f) Provision for the maintenance and enhancement of water in waterbodies, including appropriate stormwater management facilities to avoid downstream flooding and to maintain or enhance water quality;*
>
> *k) Provision for low impact stormwater treatment and disposal;*
>
> *n) Effective and efficient use of existing and new infrastructure networks, including opportunities to leverage improvements to existing infrastructure off the back of proposed development;*
>
> *o) Location and operational constraints of existing and planned strategic infrastructure;*

8.23 POL UD12 c) and d) require strong connectivity to surrounding transport nodes and community facilities for both pedestrians and vehicles. The roading corridor will provide access to proposed pedestrian and cycling links onto both Howard St and Havelock Road. Havelock Road contains public transport links for the District and the development will ensure connectivity to these links. The development will provide roading and pedestrian links to Parkvale School and will be located within a few hundred metres of multiple commercial shops on Havelock Rd/Heretaunga St.

8.24 POL UD12 f) and k) seeks provision for '*low impact stormwater treatment and disposal'* and appropriate management of stormwater to avoid downstream flooding. The stormwater reticulation is proposed to have a form of grass swale system throughout the corridor to encourage use of low impact design. This is as opposed to more traditional methods of piping stormwater into drains and streams and increasing the flood flows and contaminant levels in these water bodies by doing so, while also providing higher levels of amenity. The designation corridor will direct stormwater flow to a detention area, which will detain stormwater during extreme events to ensure flooding of the Karamu River is not increased at peak times.

8.25 With regards to n) and o) it has been a key principle of this Notice of Requirement to establish a more effective and efficient servicing solution for the Howard St Residential Zone to ensure

that infrastructure can be delivered in an equal and timely matters to all properties within the development, rather than approach where only the downstream properties can be serviced first. Such a proposal would require Council to construct the roading and service infrastructure once the designation was approved, rather than individual landowners. The servicing proposed with the Notice of Requirement is much more responsive to those with immediate needs to commence development, with individual developments being able to the global networks once construction is complete.

8.26 Based on the assessment above, it is considered that the Notice of Requirement is consistent with the expectations of the Regional Policy Statement.

9.0 HASTINGS DISTRICT PLAN

9.1 Section 168A(3)(a)(iv) requires that particular regard be had to a plan or proposed plan. Following Variation 3 to the proposed Hastings District Plan, and the limited scope of the appeal on that Variation, it is considered that the Objectives, Policies and standards for the Proposed Plan, as varied by Variation 3, are most relevant provisions to consider.

9.2 The District Plan recognises the need to establish new residential zones in accordance with HPUDs and the RPS. Following careful consideration through the variation 3 process, the Howard Street area was rezoned, giving effect to key objectives in the PDP, such as the following:

> **OBJECTIVE UDO1 To reduce the impact of urban development on the resources of the Heretaunga Plains in accordance with the recommendations of the adopted Heretaunga Plains Urban Development Strategy (HPUDS).**
>
> *POLICY UDP1 To achieve containment of urban activities and provide for residential greenfield growth in the areas identified as appropriate within the Hastings Urban Development Study document through to 2015 and in HPUDS for the period beyond 2015 and through to 2045.*
>
> **OBJECTIVE UDO2 To ensure that new urban development is planned for and undertaken in a manner that is consistent with the matters outlined in the Hawke's Bay Regional Policy Statement.**
>
> *POLICY UDP4 To establish a sequence of the land that has been identified as appropriate for urban development.*
>
> *POLICY UDP5 To prepare comprehensive structure plans, in consultation with tangata whenua with Mana Whenua, landowners, infrastructure providers and the local community, for each identified urban growth area. Structure Plans shall be prepared prior to any plan change application to amend the zoning of these areas to facilitate urban development.*
>
> **OBJECTIVE UDO3 To establish an effective and sustainable supply of residential and business land to meet the current and future demands of the Hastings District Community.**

9.3 The current Notice of Requirement now seeks to deliver the roading and key parts of the 3 waters infrastructure needed to give effect to the new residential area. In this respect, the following PDP objectives and policies are considered relevant:

> **OBJECTIVE RO3 To ensure that suitable levels of infrastructural services are in place and that potential conflicts over zone boundaries are addressed, in advance of any new residential development.**
>
> **OBJECTIVE RO4 To protect people, property and infrastructure of the community from flooding and ponding effects associated with stormwater runoff.**

POLICY RP9 The provision of suitable community or on-site infrastructure including sewage collection, treatment and disposal, water supply, stormwater collection and roading as a prerequisite to residential intensification or greenfield residential development.

9.4 The designation will ensure that all developments within the Howard Street Urban Development area can be serviced appropriately and efficiently for roading, water, wasterwater and stormwater in accordance with the approved structure plan. This will help ensure that Objective RO3 and RO4 can be achieved.

10.0 OTHER RELEVANT DOCUMENTS

National Policy Statement on Urban Development Capacity

10.1 The National Policy Statement on Urban Development Capacity 2016 (NPS-UDC) recognises the national significance of:

- urban environments and the need to enable such environments to develop and change
- providing sufficient development capacity to meet the needs of people and communities and future generations in urban environments.

10.2 The NPS-UDC directs local authorities to provide sufficient development capacity in their resource management plans, supported by infrastructure, to meet demand for housing and business space. Development capacity refers to the amount of development allowed by zoning and regulations in plans that is supported by infrastructure. This development can be 'outwards' (on greenfield sites) and/or 'upwards' (by intensifying existing urban environments). Sufficient development capacity is necessary for urban land and development markets to function efficiently to meet community needs. In well-functioning markets the supply of land, housing and business space matches demand at efficient (more affordable) prices.

10.3 Hastings District Council is considered a medium growth authority under the NPS-UDC.

10.4 The Howard Street Residential Rezoning will help assist Hastings District Council in meeting its responsibilities as a medium growth authority, by providing for approximately 260 additional dwellings within the District.

10.5 The designation specifically will enable Policy around coordinated planning and particularly PD2 (integrated land use and infrastructure planning) to be achieved. Policy PD2 reads as follows:

> *PD2. Local authorities shall work with providers of development infrastructure and other infrastructure to achieve integrated land use and infrastructure planning in order to implement PA1-PA3, PC1 and PC2*

10.6 The designation will ensure Council can construct roading and servicing infrastructure in a co-ordinated and efficient manner to ensure that the entire development can be serviced efficiently.

Long Term Plan & 2018/19 Development Contributions Policy

10.7 The Long Term Plan (LTP) sets the Council's 10 year strategic direction. The following strategic objectives are of particular relevance to this project:

Moving Around

- *Walking and Cycling*

Where We Live

- *Homes for our people*

10.8 The financial strategy within this plan seeks to facilitate growth within the district. More specifically it seeks to respond to demand for new commercial, industrial and residential growth through the provision of funding for serviced land.

10.9 The current 2018/28 LTP includes the expenditure for the development of the infrastructure required for the Howard Street Urban Development Area from years 0 – 4. This expenditure is to be funded by way of the development contributions collected partly within the Howard Street Urban Development Area catchment, and partly through upgrades to the network from all residential development in the District. It is anticipated that Council will update its Development Contributions Policy and schedule of charges to reflect the revised catchment area, and the timing and quantum of the capital expenditure required to service the revised catchment.

Summary

10.10 In summary, the evaluation of the relevant statutory planning documents demonstrates that the proposed designations are consistent with the relevant objectives and policies of these documents. In particular, the proposed infrastructure will enable safe, efficient, and cost-effective servicing of this urban development area.

11.0 ACTUAL AND POTENTIAL EFFECTS ON THE ENVIRONMENT

11.1 Section 168A(3) requires that the effects on the environment of allowing the requirement must be considered.

Overall Positive Effects

11.2 The proposed designations will assist in enabling the Hastings community to provide for their social, cultural and economic well being by providing for roading access, and reticulated water, wastewater and stormwater for land within the proposed Residential Zone in an efficient manner. This will provide for the economic wellbeing of the area by providing for Residential development in the Hastings area.

Stormwater Quality and Quantity Effects

11.3 The establishment of a new residential zone creates the potential for adverse effects on water quality if stormwater discharges are not appropriately managed. Water Quality and Quantity was assessed through Variation 3 and has to meet Regional Plan requirements prior to being discharged to the Karamu Stream. The swale systems and stormwater corridor will contribute to mitigation for stormwater quality and quantity, however the primary mitigation for stormwater is through the stormwater detention area. This is not being designated, but is required by the Structure Plan. All stormwater design will take into account:

- The principle of low impact design;
- The specific characteristics of the potential stormwater receiving environment;
- Climate change;
- The HBRC Stormwater Guidelines;
- The Council's LTP, Engineering Code of Practice and Best Practice Design Guide for Subdivision and Development, and the;
- On-site Stormwater Management Guideline (NZWERF/MfE 2004).

Construction Effects

Noise

11.4 There will be noise generated from construction of the roading and stormwater corridor areas, including construction traffic and earthworks. The noise from construction is likely to have minor potential effects on the residences within the immediate vicinity of the proposed works. The construction activities will be temporary in nature and will be managed to minimise effects of surrounding owners and occupiers through compliance with NZS 6803:1984 "Measurement and Assessment of Noise from Construction, Maintenance and Demolition Work".

Dust

11.5 The earthworks associated with the construction of the proposed road and stormwater corridors have the potential to generate dust, which may affect the surrounding environment. The construction phase will however be temporary in nature. Appropriate dust control measures will be put in place though best practice construction management processes. All excavated surfaces will be carefully managed by applying water where required during excavation to minimise dust. Following completion of the works any exposed soil will be stabilised to mitigate the effects of dust.

Landscape, Visual and Amenity Effects

11.6 The Hastings District Plan identifies both the outstanding natural features and significant landscapes within the District. This area is not identified as forming part of any of these.

11.7 The amenity values are predominantly determined by the visual qualities of the area and the nature of the noise, odour and general activity occur that occurs within it. The current amenity of this area is mixed. It is currently dominated by both its rural character, and the surrounding residential activities, but will increasingly become residential in nature given the zoning brought about by Variation 3.

11.8 The proposed works are to consist of roading, footpaths and swale systems. These areas will incorporate low impact design principles and will generally be constructed to a design and standard anticipated by a residential development.

11.9 Once the construction of the proposed works is complete, the only activity likely within the area will be periodic maintenance. The long term effects on amenity of this area are hence anticipated to be limited in nature. Construction effects were assessed for Variation and still apply to the construction. This are to be mitigated by compliance with the New Zealand Standard for Noise and the use of best practice management protocols.

Cultural Effects

11.10 Consultation was undertaken with Ngati Kahungunu and Te Taiwhenua O Heretaunga as part of Variation 3 and no concerns have been raised to-date. The site contains no sites identified as being of significance to Tangata Whenua. The desktop archaeological assessment undertaken for the proposed residential area did not identify any archaeological sites. The potential for effects on sites of cultural or historic significance is considered to be low. No specific mitigation measures are hence proposed. However, a Section 12 Authority from the Historic Places Trust will be sought if an incidental discovery is made during the constructions works.

Ecology

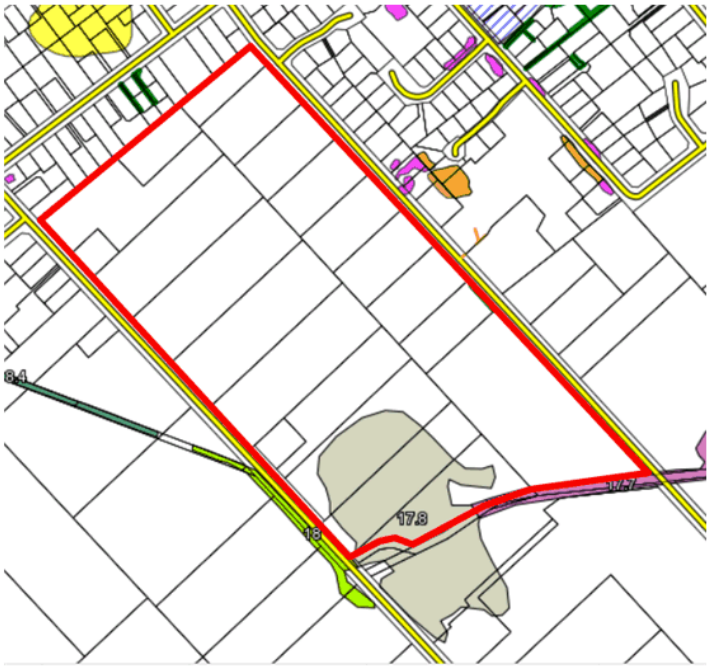
11.11 The site of the proposed designations contains highly modified vegetation which offers little habitat value. The site is not within any of the RAP areas. No noticeable effects are anticipated from the proposed works on the ecological values of the area.

Natural Hazards

11.12 Hastings District Council GIS Database has multiple natural hazards recorded over the District. The following hazards were reviewed in respect of the land contained within the Howard Street development area:

- Flooding, Filling, Ponding, Inundation Areas, Fault locations, Contaminated Sites and Instability Hazards.

11.13 The only other hazard to appear within the Howard Street Residential Rezoning Area is an area of flooding in the southern corner of the rezoning area. A review of the Hawkes Bay emergency Management Hazard Information Portal was also undertaken, however no hazards were recorded with this information. The flooding has a RL level of 17.8. The flooding area is shown in the figure below generated from Council's GIS Database.



11.14 The flooding area is located over a small part of where the road corridor is proposed to be located. However it is considered that the effects of any flooding could be mitigated. The flooding hazard was assessed as part of Variation 3, where it was considered that:

'While the investigation into hazards within the Howard Street Residential Rezoning area has shown there to be an area of flood hazard, it is anticipated that this can be mitigated through engineering measures.'

11.15 The flooding issue was considered to be mitigated as part of the global stormwater detention area for the rezoning, where the stormwater detention area at the southern part of the development would be designed to ensure sufficient capacity to service both the proposed development, as well as mitigate existing flooding effects.

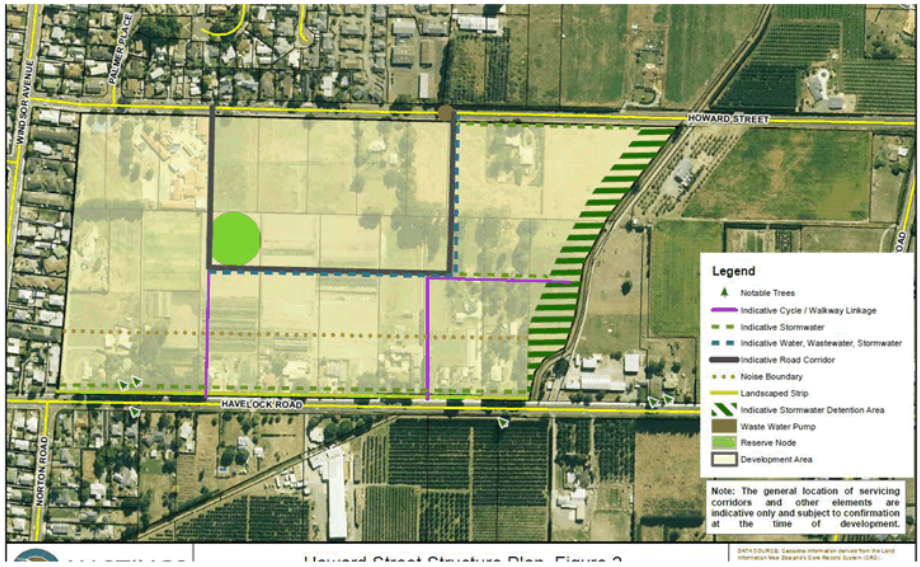
12.0 ALTERNATIVES AND NECESSITY

12.1 When considering an application for a Notice of Requirement a territorial authority must consider whether adequate consideration has been given to alternative sites, routes, or methods of undertaking the work if the requiring authority does not have an interest in the land sufficient for undertaking the work.

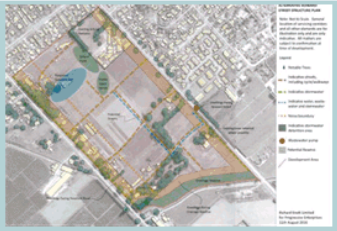
12.2 The territorial authority is also required to give consideration to whether the work and designation are reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought.

Roading Corridor

12.3 Through the process of developing the Howard Street Structure Plan for Variation 3 to the Proposed District Plan a number of different route options were considered. The originally notified orientation for the road corridor was position as such:



12.4 There were a number of submissions to the Variation 3 which requested an alternative roading alignment for the Howard Street Structure Plan. They were robustly considered as part of the Section 42a report, analysis from the Section 42a report is shown below (note the below assessment related to roading alignment only):

	OPTION 1: Hastings District Council Structure Plan (As Notified)	OPTION 2: Amended Council Structure Plan Showing Extension To Road Corridor	OPTION 3 Alternative Structure Plan Submitter: Development Nous (Cooper & Tremain/Ward)	OPTION 4 Alternative Structure Plan Submitter: Progressive Enterprises Ltd
				
EFFECTIVENESS **In achieving:** **the purpose of the Variation; and** **relevant objectives of the District Plan**	Moderately effective The structure plan provides a framework to guide, and where appropriate direct subdivision and development in new urban development areas. The Notified structure plan shows key components which ensure safe and efficient access to the road network, strong connectivity through the development, and cycle and walking links to existing networks. This structure plan is the relies upon Performance Standard HSSP-1 (a) and (b) in Appendix	Effective This option identifies the same key components as Option 1, however it extends the internal road corridor to the east and west fringes of the Howard St Urban Development Area, thus providing direct access to all main sites (larger 3000m^2). This reduces the possibility of sites being landlocked, and still achieve safe and efficient access to the roading network. This is considered effective in achieving the purpose of this proposal, and the existing relevant objectives of the Proposed Plan.	Effective This alternative structure plan follows a similar internal roading route to that of the Council Structure Plan. It's key point of difference is that the south-eastern exit has been relocated further to the south east of Howard St, closer to the Awahou Drain. This option provides road access to all main properties within the development, while still ensuring strong connectivity and maintaining cycle and walking links. At present, this Structure Plan option has not demonstrated how it will achieve safe and efficient access into the 80km/h zone on Howard St, and therefore how objective TPO1 will be achieved.	Ineffective This structure plan proposal has an alternative roading layout from Options 1 – 3. It recommends three interconnecting roads providing links from Howard St through to Havelock Road, and has a grid type layout. Whilst this option would provide connectivity and minimise the possibility of land locking, it would not protect Havelock Road (a primary arterial route) from inappropriate development. Furthermore it is unlikely to achieve safe access in and out of the development area. This option is contrary to Objectives and Policies in Section 26.1 Transport.

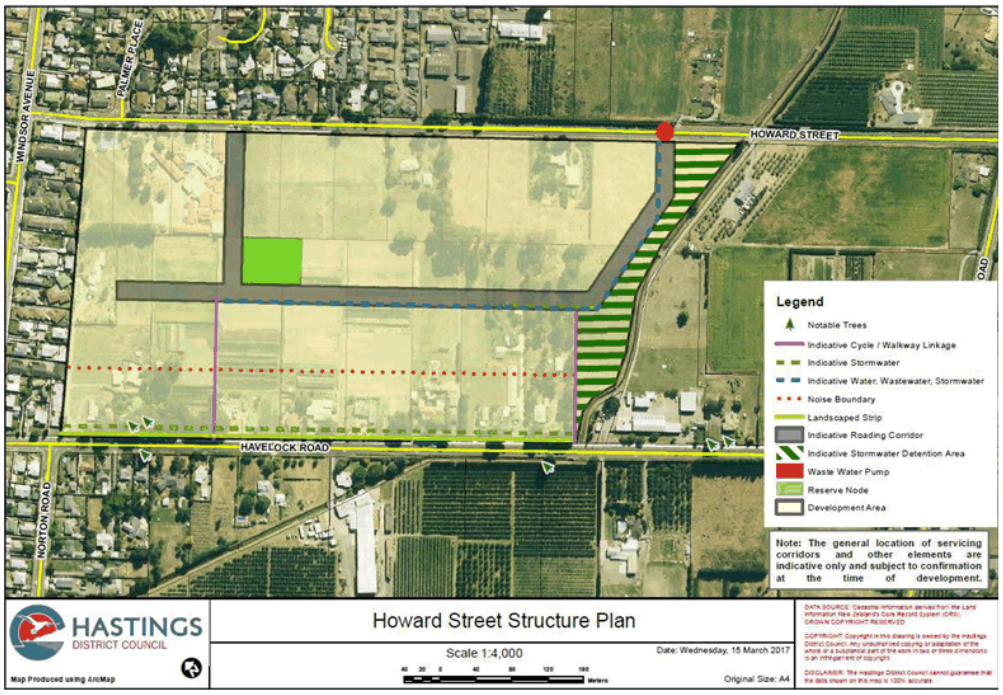
	OPTION 1: Hastings District Council Structure Plan (As Notified)	OPTION 2: Amended Council Structure Plan Showing Extension To Road Corridor	OPTION 3 Alternative Structure Plan Submitter: Development Nous (Cooper & Tremain/Ward)	OPTION 4 Alternative Structure Plan Submitter: Progressive Enterprises Ltd
	80, to ensure that properties in the development area are not landlocked and unable to access the road network, rather than identifying the access on the structure plan diagram - Figure 2. This could be a less effective method of ensuring that all sites have access to the internal road than actually indicating access on the structure plan itself. Due to not showing access to the east and west fringes of the zone on the structure plan it is considered the notified structure plan is moderately effective in achieving the purpose of the rezoning, and the existing relevant objectives of the Proposed Plan.		*OBJECTIVE TPO1* *Ensure that land uses and new subdivision are connected to the transportation network in a manner that provides for the efficient and sustainable movement of people and goods in a safe manner.* Details have however been provided how safe and efficient access to Howard St could be provided. • *Reconfigure angle of intersection to 90°* • *Install right turn bay to service right turning traffic into the development* • *Reduce operating speeds at new intersection to 50km/hr* • *Extend 50km/hr speed zone to the location of the new intersection* • *Implement traffic calming measures over new 50km/hr section of Howard Street to create a self-explaining road.* Provided the above recommendations are implemented, it is considered that the Development Nous alternative	It is considered that the Progressive Enterprises Ltd alternative structure plan would be ineffective in achieving the purpose of this proposal, and the existing relevant objectives of the Proposed Plan.

	OPTION 1: Hastings District Council Structure Plan (As Notified)	OPTION 2: Amended Council Structure Plan Showing Extension To Road Corridor	OPTION 3 Alternative Structure Plan Submitter: Development Nous (Cooper & Tremain/Ward)	OPTION 4 Alternative Structure Plan Submitter: Progressive Enterprises Ltd
			structure plan would be effective in achieving the purpose of this proposal, and the existing relevant objectives of the Proposed Plan.	
COSTS **Effects anticipated from implementation, including:** - **Environment-al** - **Economic (incl. on economic growth & employment)** - **Social** - **Cultural**	Environmental/Social – Minor potential for increase of noise effects from road corridor and intersection location Economic – Less certainty for property owners avoiding being land locked, which means that they are unable to realise the financial gains of property development should this occur.	Environmental/Social - Minor potential for increase of noise effects from road corridor and intersection location Economic – Less flexibility for the location of internal roads as the location of internal road already defined in the structure plan, though still greater flexibility than designated road corridors	Economic – Additional costs associated with achieving road calming measures on Howard St.	Environmental – Increase in noise from through traffic utilising development for rat run purposes. Economic - Reduction in efficiency for traffic on Havelock Road, increase in travel times. Increased construction cost of developing multiple intersections on Howard St and Havelock Rd. Reduced safety on Havelock Road due to increase in vehicles accessing and egressing. Reduced flexibility for developers to maximise efficiency as most roads for development would be predetermined
BENEFITS **Effects anticipated from implementation, including:** - **Environmental**	Economic – Provides maximum amount of flexibility in terms of locations of roads for developments with the Howard St Urban Development Area, as structure plan does not dictate in as much detail	Economic – Reduction in costs for development as additional engineering measures will not be required for Howard St. Ensures all main properties can access roading network and	Environmental – The location of the road (adjoining the Awahou Drain) provides an increased buffer between the proposed residential land uses and the existing rural land uses on the far side of the Drain. This will assist with mitigating rural /	Social/Environmental - Strong Connectivity between properties within the development. Maximises CIPTED requirements by achieving passive surveillance through additional traffic and walking/cycling links

	OPTION 1: Hastings District Council Structure Plan (As Notified)	OPTION 2: Amended Council Structure Plan Showing Extension To Road Corridor	OPTION 3 Alternative Structure Plan Submitter: Development Nous (Cooper & Tremain/Ward)	OPTION 4 Alternative Structure Plan Submitter: Progressive Enterprises Ltd
- **Economic (incl. on economic growth & employment)** - **Social** - **Cultural**	where internal road should be located. Maintains the efficiency and safety of traffic flows on Havelock Road due to no intersections gaining access to it from the Howard Street development area.	reduces likelihood of land locking. Maintains the efficiency and safety of traffic flows on Havelock Road due to no intersections gaining access to it from the Howard Street development area.	residential interface issues (reverse sensitivity). Social – Relocating the main internal road from within the development to the edge of the area will help mitigate noise effects associated with the road traffic. Provides an greater distance for the slowing of vehicle speed along Howard Street prior to arriving at Parkvale School. Economic – Allows a more efficient use of land for residential land use by having road located towards edge of development. Ensures all main properties can access roading network and reduces likelihood of land locking.	Increased safety effects on students at Parkvale School, greater potential for accidents from increased through traffic Economic - Ensures all main properties can access roading network and reduces likelihood of land locking
EFFICIENCY **In achieving:** - **the purpose of the Proposal; and** - **existing relevant objectives of the District Plan.**	Medium Efficiency Low costs, but less benefits resulting from higher risk of landlocking and therefore less certainty and greater risk for property owners with sites without direct access to main internal road shown on the Structure Plan diagram.	Highly efficient Same costs as option 1, but provides certainty to more property owners	Highly Efficient Higher roading costs than Option 2 due to additional road calming measures required on Howard St, but provides greater efficiencies for the roading layout within the Howard St Urban Development Area.	Less efficient Does provide efficiencies in terms of connectivity throughout the development, but poor in ensuring safe and efficient use of the roading network, nor reducing noise and safety effects within the development

	OPTION 1: Hastings District Council Structure Plan (As Notified)	OPTION 2: Amended Council Structure Plan Showing Extension To Road Corridor	OPTION 3 Alternative Structure Plan Submitter: Development Nous (Cooper & Tremain/Ward)	OPTION 4 Alternative Structure Plan Submitter: Progressive Enterprises Ltd
OVERALL APPROPRIATENESS **In achieving:** - **the purpose of the Proposal; and** - **existing relevant objectives of the District Plan.**	Less Appropriate	Appropriate	Appropriate	Not Appropriate
CONCLUSION: **The above evaluation demonstrates that both the amended Council Structure Plan (Option 2) and the Development Nous Structure Plan (Option 3) are both efficient and effective in providing access to all properties within the Howard St Urban Development Area.** **Option 3 is considered the most appropriate way to achieve the purpose of the proposal, as it is considered the greater benefits within the development outweigh the increased costs of upgrading Howard St. In addition Option 3 is supported by submitters.**				

12.5 The commissioner's recommendation mirrored that of the officer's, and the following roading layout was considered the most appropriate option.



12.6 This is the alignment which the proposed roading corridor designation has been designed to. The road is considered necessary to provide for access to all properties in the development. This is particularly important due to the need to restrict access to Havelock Road due to existing traffic constraints. It is also necessary to ensure that all sites can be appropriately serviced for water, wastewater and stormwater.

Stormwater Corridor

12.7 The original structure plan was designed to provide an outlet from 1239 Howard St, to Howard Street itself. The stormwater was then to be conveyed within the road corridor on Howard Street to the stormwater detention area. This option, while still technically feasible, would result in the need to fill the property of 1239 Howard to a height of over 1 metre along some parts of the boundary. This would require building consent, would have high costs and would result in poor amenity outcomes, with there being a need to construct a retaining wall along part of the boundary to achieve fall.

12.8 As such the option of a corridor to the south of 1239 Howard, over 214 Havelock Rd, is considered a more appropriate option than what was originally notified. The corridor has been positioned to ensure minimum disruption to the development of 214 Havelock Road, and to minimise land take. Other options of running the corridor through the centre of 214 Havelock Rd, or along the Southern boundary were not considered viable as they reduced development potential.

13.0 ALTERNATIVES TO DESIGNATION

13.1 Alternatives to designation as a planning method include:

13.2 Option 1: Do not designate and continue with the current situation. This would involve a piecemeal approach where land is developed from the Riverslea Drain side of the structure plan in a lineal fashion to the Parkvale School side. This approach would involve landowners constructing the internal loop road individually as part of their development, but still in accordance with the structure plan. Where landowners adjoin, or a landowner wishes to go ahead of an adjoining site, negotiations would occur.

Option 1:

Advantages	Disadvantages
• Reduces holding costs on council as it does not construct road. • Reduces Development Contributions for developers as cost of road not included. • May provide greater flexibility for landowner consultation without Council involvement. • Removes the Notice of Requirement process which may be appealed.	• Potential for individual land owner to hold development up for upstream sites. • Relies on key landowners for development of the block to commence. • Potential for landowners to request higher purchasing prices if the realise they are key for development occurring. • Difficulties in ensuring a consistent approach to internal road location. • Savings in development contributions offset by the need to construct the road themselves. • Potential for inequity as cost of building road borne by those landowners whose land is affected with no cost borne by those who will benefit from the road but are not required to construct it.

13.3 Option 2: Do not designate but Council enters a willing buyer/willing seller approach to acquire the land and construct the road as a whole. This would involve the purchase of land for the roading corridor and stormwater areas by Council in line with the structure plan. Council would construct the road and services. This would have similar costs as the designation process, but less certainty for Council in acquiring the land.

Option 2:

Advantages	Disadvantages
• Negates the need for the Notice of Requirement process which could be appealed. • Allows for a similar approach to development as designation, ensuring	• Greater difficulties in terms of land purchasing as the designation has not locked the roading corridor and stormwater areas in place.

all properties have similar opportunity to develop, as road and services can all be constructed at once.	• Individual land owner could still hold up negotiations with Council, or request high price for land if they realise they are key to development of the area.

14.0 CONSULTATION

14.1 Ongoing consultation has been undertaken with respect to the development of the proposed Howard Street Urban Development area and the associated infrastructure. Consultation was mainly undertaken during the Variation process to discuss the alignment and positioning of the internal road. Final location of the road was based on discussions with landowners and was considered as part of the written and verbal submissions for Variation 3.

14.2 The additional stormwater corridor was not considered as part of Variation 3, but consultation has been undertaken with the landowners of both 1239 Howard St and 214 Havelock Road. The owners of 1239 Howard are keen for the corridor to progress, the owenrs of 214 Havelock have not confirmed support or opposition to the stormwater corridor.

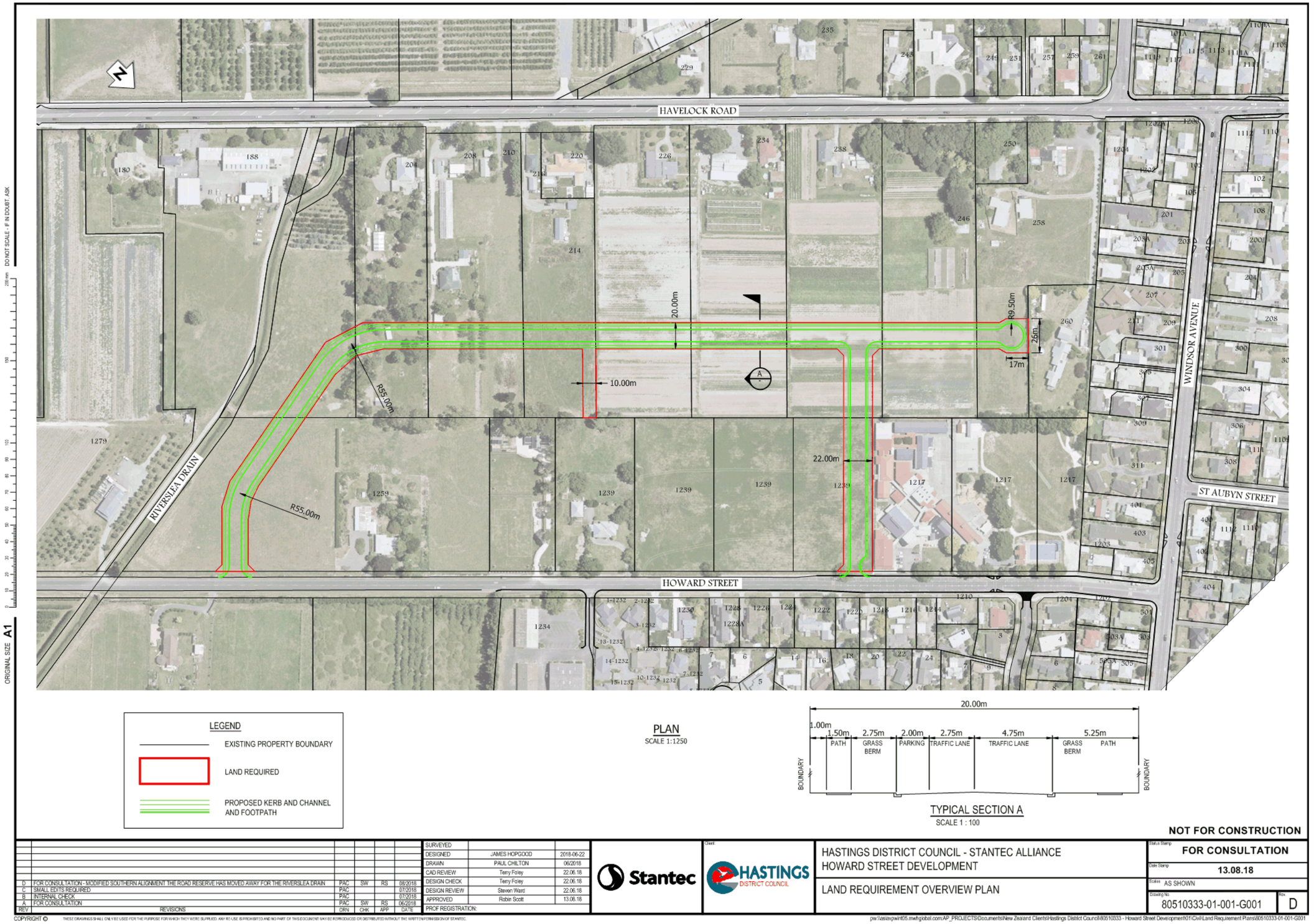
15.0 CONCLUSION

15.1 A Notice of Requirement have been issued for the following designation:

> ***A designation for a Roading Corridor, which includes water, wasterwater and stormwater infrastructure affecting the land identified in Schedule 1, and an additional stormwater corridor on 214 Havelock Road being PT LOT 2 DP 8367 BLK IV TE MATA SD.***

15.2 This designation covers key parts of the physical infrastructure necessary to service the proposed Howard Street Urban Development Area that are located on land that is not currently owned by the Council.

Given the need for the designations; the limited potential for adverse effects; and the consistency of the proposal with the relevant planning documents, it is considered that the proposed designation satisfy Section 168A(3) of the RMA 1991. The Notices of Requirement sought can therefore be confirmed without amendment pursuant to Section 168A(4)(a) of the Act.



LEGEND

- EXISTING PROPERTY BOUNDARY
- LAND REQUIRED
- PROPOSED KERB AND CHANNEL AND FOOTPATH

PLAN
SCALE 1:1250

TYPICAL SECTION A
SCALE 1 : 100

NOT FOR CONSTRUCTION

REV	REVISIONS	DRN	CHK	APP	DATE
D	FOR CONSULTATION - MODIFIED SOUTHERN ALIGNMENT THE ROAD RESERVE HAS MOVED AWAY FOR THE RIVERSLEA DRAIN	PAC	SW	RS	08/2018
C	SMALL EDITS REQUIRED	PAC			07/2018
B	INTERNAL CHECK	PAC			07/2018
A	FOR CONSULTATION	PAC	SW	RS	06/2018

SURVEYED		
DESIGNED	JAMES HOPGOOD	2018-06-22
DRAWN	PAUL CHILTON	06/2018
CAD REVIEW	Terry Foley	22.06.18
DESIGN CHECK	Terry Foley	22.06.18
DESIGN REVIEW	Steven Ward	22.06.18
APPROVED	Robin Scott	13.06.18
PROF REGISTRATION:		

Stantec

Client: HASTINGS DISTRICT COUNCIL

HASTINGS DISTRICT COUNCIL - STANTEC ALLIANCE
HOWARD STREET DEVELOPMENT

LAND REQUIREMENT OVERVIEW PLAN

Status Stamp: FOR CONSULTATION
Date Stamp: 13.08.18
Scales: AS SHOWN
Drawing No: 80510333-01-001-G001
Rev: D

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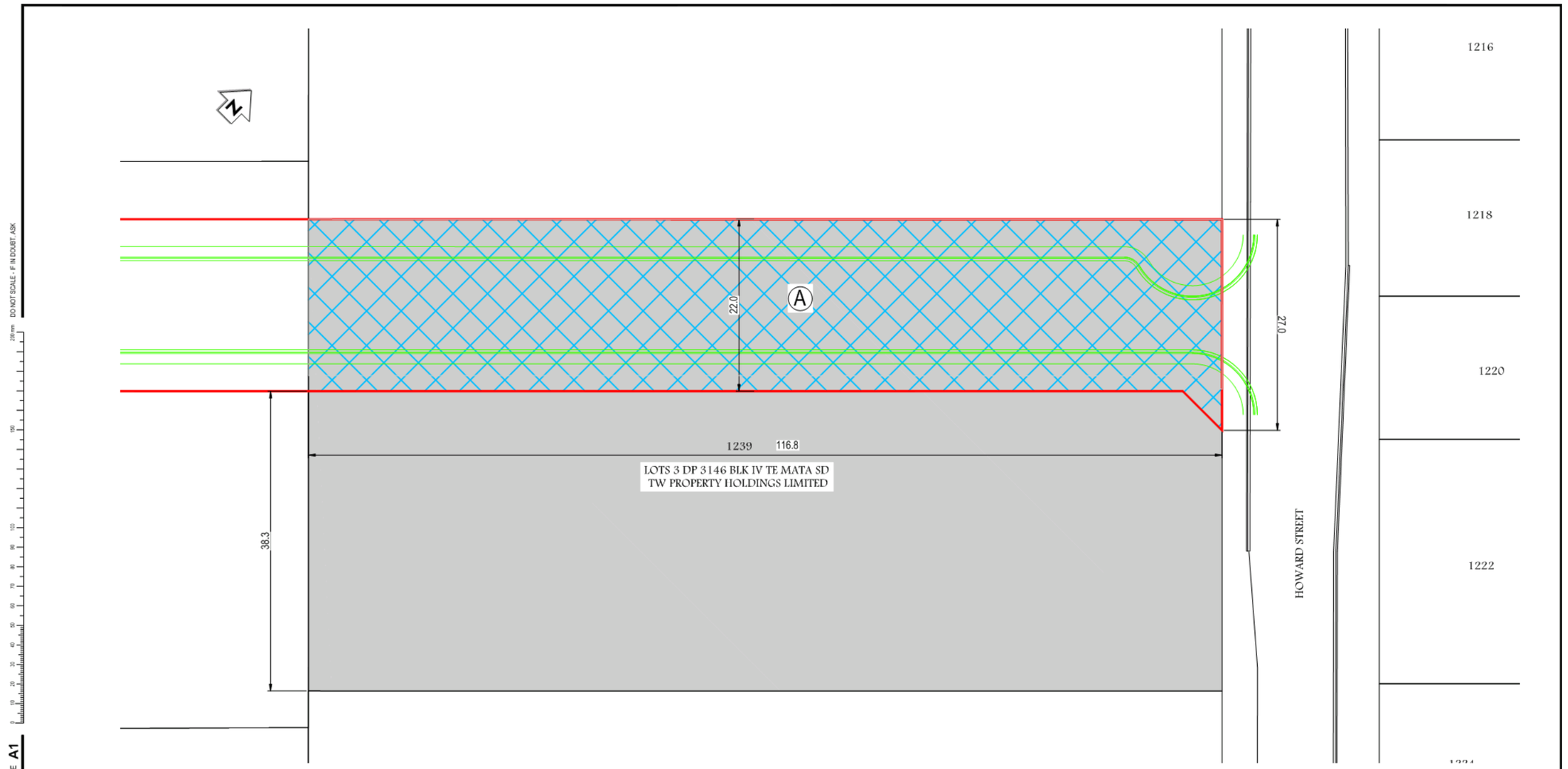

PLAN
SCALE 1:500

LEGEND

- EXISTING PROPERTY BOUNDARY
- LAND REQUIRED
- PROPOSED KERB AND CHANNEL

LAND REQUIREMENT PLAN

LABEL	AREA (m²)	LEGAL DESCRIPTION	OWNER	PARCEL AREA (Ha)	LAND REQUIRED
A	2582	LOTS 3 DP 3146 BLK IV TE MATA SD	TW PROPERTY HOLDINGS LIMITED	0.705	FOR ROAD RESERVE

NOT FOR CONSTRUCTION

REV	REVISIONS	DRN	CHK	APP	DATE
A	FOR CONSULTATION	PAC	SW	RS	06/2018

SURVEYED		
DESIGNED	JAMES HOPGOOD	2018-06-22
DRAWN	PAUL CHILTON	06/2018
CAD REVIEW	Terry Foley	22.06.18
DESIGN CHECK	Terry Foley	22.06.18
DESIGN REVIEW	Steven Ward	22.06.18
APPROVED	Robin Scott	22.06.18
PROF REGISTRATION:		

Stantec

Client: HASTINGS DISTRICT COUNCIL

HOWARD STREET DEVELOPMENT

LAND REQUIREMENT PLAN
1239 HOWARD STREET

Status Stamp: FOR CONSULTATION
Date Stamp: 22.06.18
Scales: AS SHOWN
Drawing No: 80510333-01-001-L001
Rev: A

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Item 2

Attachment 3

PLAN
SCALE 1:500

LEGEND

- EXISTING PROPERTY BOUNDARY
- LAND REQUIRED
- PROPOSED KERB AND CHANNEL

LAND REQUIREMENT PLAN

LABEL	AREA (m²)	LEGAL DESCRIPTION	OWNER	PARCEL AREA (Ha)	LAND REQUIRED
B	900	LOT 1 DP 336086	GENERAL DISTRIBUTORS LIMITED	1.391	FOR ROAD RESERVE

NOT FOR CONSTRUCTION

REV	REVISIONS	PAC DRN	SW CHK	RS APP	06/2018 DATE
A.	FOR CONSULTATION				

SURVEYED		
DESIGNED	JAMES HOPGOOD	2018-06-22
DRAWN	PAUL CHILTON	06/2018
CAD REVIEW	Terry Foley	22.06.18
DESIGN CHECK	Terry Foley	22.06.18
DESIGN REVIEW	Steven Ward	22.06.18
APPROVED	Robin Scott	22.06.18
PROF REGISTRATION:		

Stantec

Client: HASTINGS DISTRICT COUNCIL

HOWARD STREET DEVELOPMENT

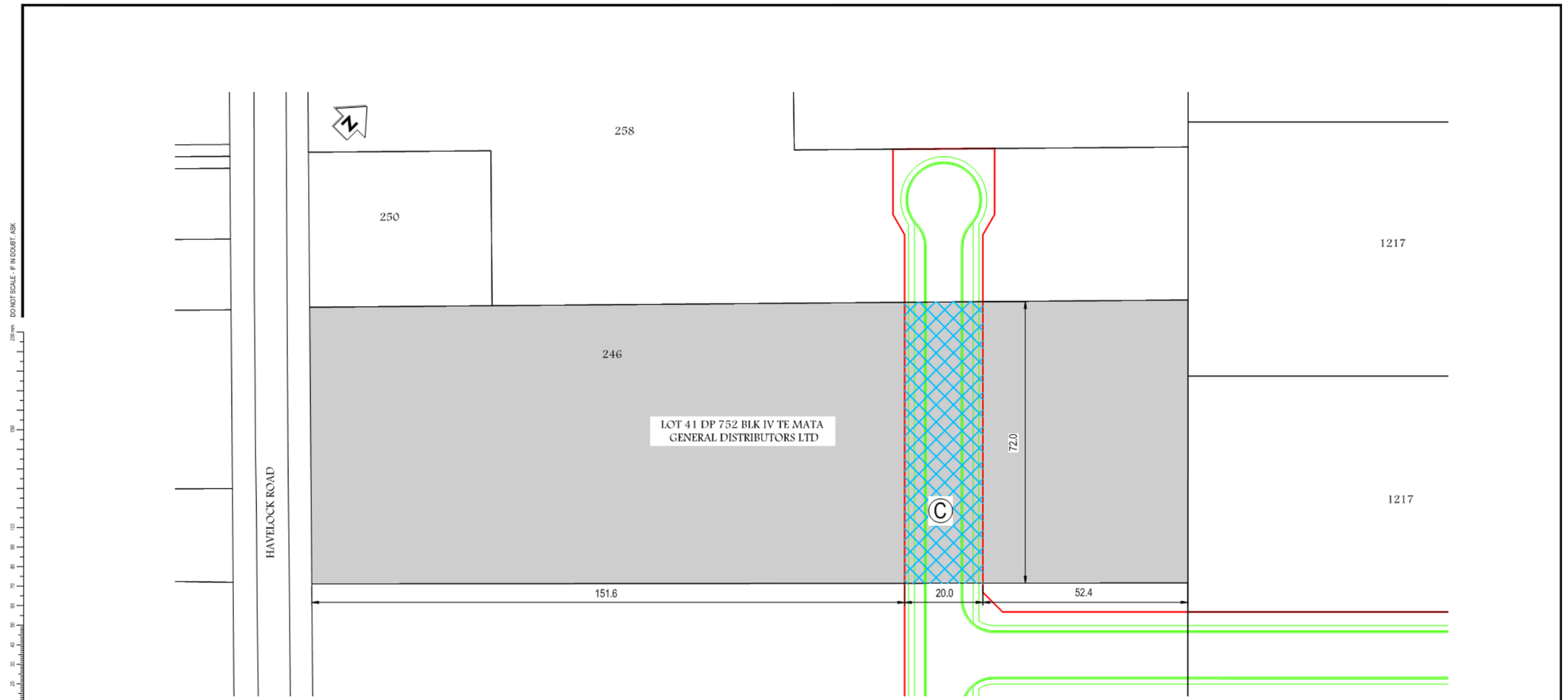
LAND REQUIREMENT PLAN
258 HAVELOCK ROAD

Status Stamp: FOR CONSULTATION
Date Stamp: 22.06.18
Scales: AS SHOWN
Drawing No.: 80510333-01-001-L002
Rev.: A

ORIGINAL SIZE A1

pw://asiapwint05.mwhglobal.com/AP_PROJECTS/Documents/New Zealand Clients/Hastings District Council/80510333 - Howard Street Development/01/Civil/Land Requirement Plans/80510333-01-001-L002

Item 2
Attachment 3



PLAN
SCALE 1:500

LEGEND

- EXISTING PROPERTY BOUNDARY
- LAND REQUIRED
- PROPOSED KERB AND CHANNEL

LAND REQUIREMENT PLAN

LABEL	AREA (m²)	LEGAL DESCRIPTION	OWNER	PARCEL AREA (Ha)	LAND REQUIRED
C	1439	LOT 41 DP 752 BLK IV TE MATA SD	GENERAL DISTRIBUTORS LIMITED	1.606	FOR ROAD RESERVE

DO NOT SCALE - IF IN DOUBT, ASK

ORIGINAL SIZE A1

NOT FOR CONSTRUCTION

REV	REVISIONS	PAC ORN	SW CHK	RS APP	06/2018 DATE
A	FOR CONSULTATION				

SURVEYED		
DESIGNED	JAMES HOPGOOD	2018-06-22
DRAWN	PAUL CHILTON	06/2018
CAD REVIEW	Terry Foley	22.06.18
DESIGN CHECK	Terry Foley	22.06.18
DESIGN REVIEW	Steven Ward	22.06.18
APPROVED	Robin Scott	22.06.18
PROF REGISTRATION:		

Stantec

Client: HASTINGS DISTRICT COUNCIL

HOWARD STREET DEVELOPMENT

LAND REQUIREMENT PLAN
246 HAVELOCK ROAD

Status Stamp: FOR CONSULTATION
Date Stamp: 22.06.18
Scales: AS SHOWN
Drawing No.: 80510333-01-001-L003
Rev.: A

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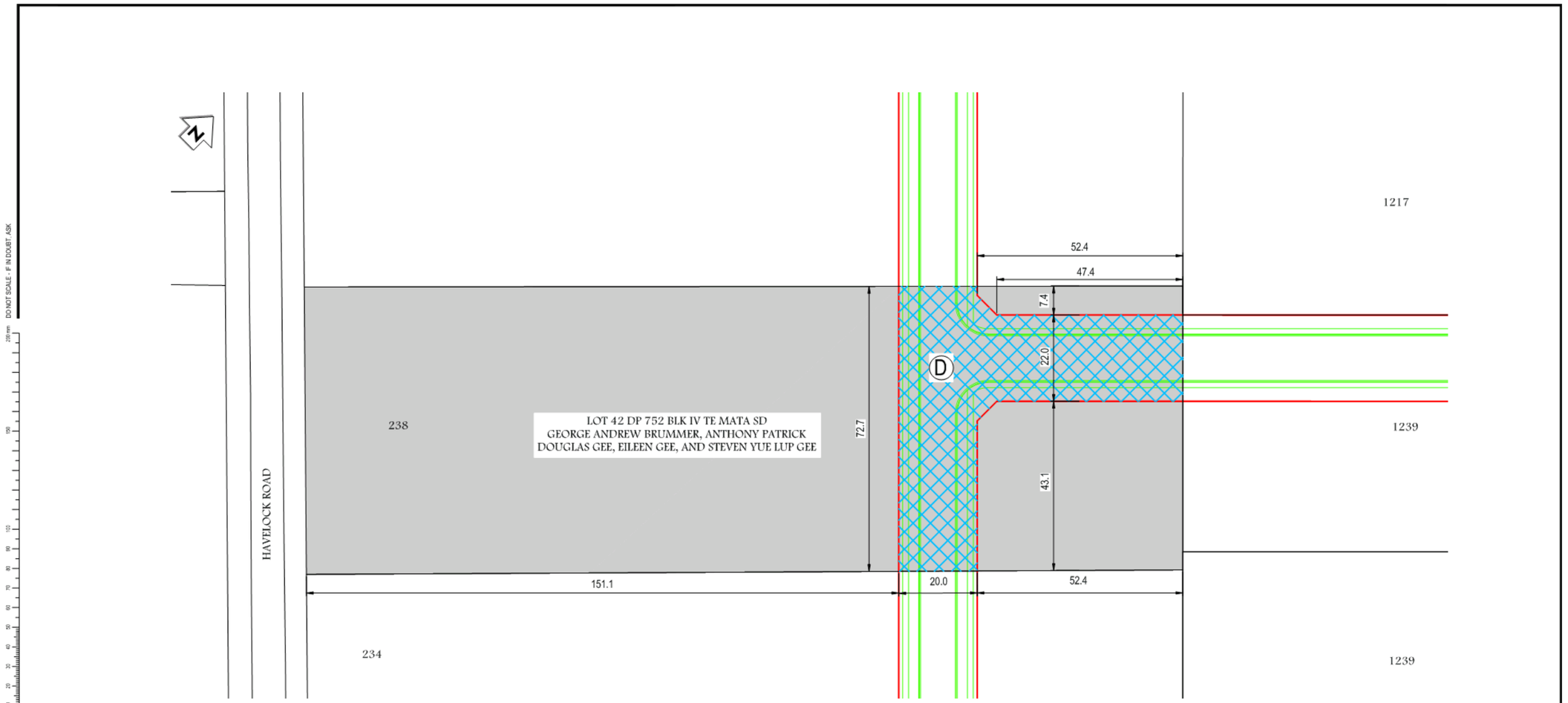
Item 2 Attachment 3



PLAN
SCALE 1:500

LEGEND

- EXISTING PROPERTY BOUNDARY
- LAND REQUIRED
- PROPOSED KERB AND CHANNEL

LAND REQUIREMENT PLAN					
LABEL	AREA (m²)	LEGAL DESCRIPTION	OWNER	PARCEL AREA (Ha)	LAND REQUIRED
D	2632	LOT 42 DP 752 BLK IV TE MATA SD	GEORGE ANDREW BRUMMER, ANTHONY PATRICK DOUGLAS GEE, EILEEN GEE, AND STEVEN YUE LUP GEE	1.630	FOR ROAD RESERVE

NOT FOR CONSTRUCTION

REV	REVISIONS	PAC DRN	SW CHK	RS APP	06/2018 DATE
A	FOR CONSULTATION				

SURVEYED	N/A	
DESIGNED	JAMES HOPGOOD	2018-06-22
DRAWN	PAUL CHILTON	06/2018
CAD REVIEW	Terry Foley	22.06.18
DESIGN CHECK	Terry Foley	22.06.18
DESIGN REVIEW	Steven Ward	22.06.18
APPROVED	Robin Scott	22.06.18
PROF REGISTRATION:		

Stantec

Client: HASTINGS DISTRICT COUNCIL

HOWARD STREET DEVELOPMENT

LAND REQUIREMENT PLAN
238 HAVELOCK ROAD

Status Stamp: FOR CONSULTATION
Date Stamp: 22.06.18
Scales: AS SHOWN
Drawing No.: 80510333-01-001-L004
Rev.: A

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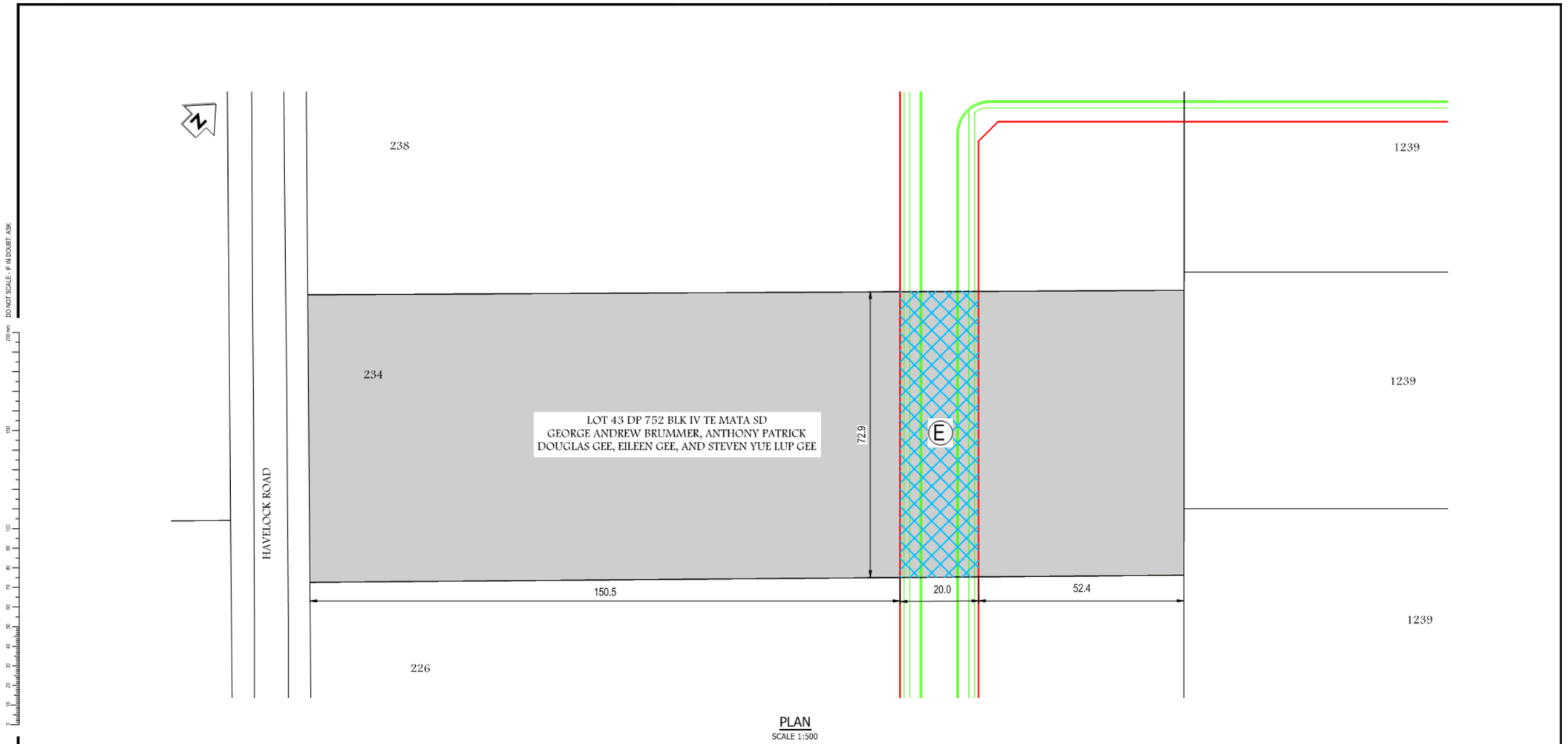
Item 2
Attachment 3



PLAN
SCALE 1:500

LEGEND

- EXISTING PROPERTY BOUNDARY
- LAND REQUIRED
- PROPOSED KERB AND CHANNEL

LAND REQUIREMENT PLAN					
LABEL	AREA (m²)	LEGAL DESCRIPTION	OWNER	PARCEL AREA (Ha)	LAND REQUIRED
E	1457	LOT 43 DP 752 BLK IV TE MATA SD	GEORGE ANDREW BRUMMER, ANTHONY PATRICK DOUGLAS GEE, EILEEN GEE, AND STEVEN YUE LUP GEE	1.629	FOR ROAD RESERVE

NOT FOR CONSTRUCTION

REV	REVISIONS	DRN	CHK	APP	DATE
A	FOR CONSULTATION	PAC	SW	RS	06/2018

SURVEYED		
DESIGNED	JAMES HOPGOOD	2018-06-22
DRAWN	PAUL CHILTON	06/2018
CAD REVIEW	Terry Foley	22.06.18
DESIGN CHECK	Terry Foley	22.06.18
DESIGN REVIEW	Steven Ward	22.06.18
APPROVED	Robin Scott	22.06.18
PROF REGISTRATION:		

Stantec

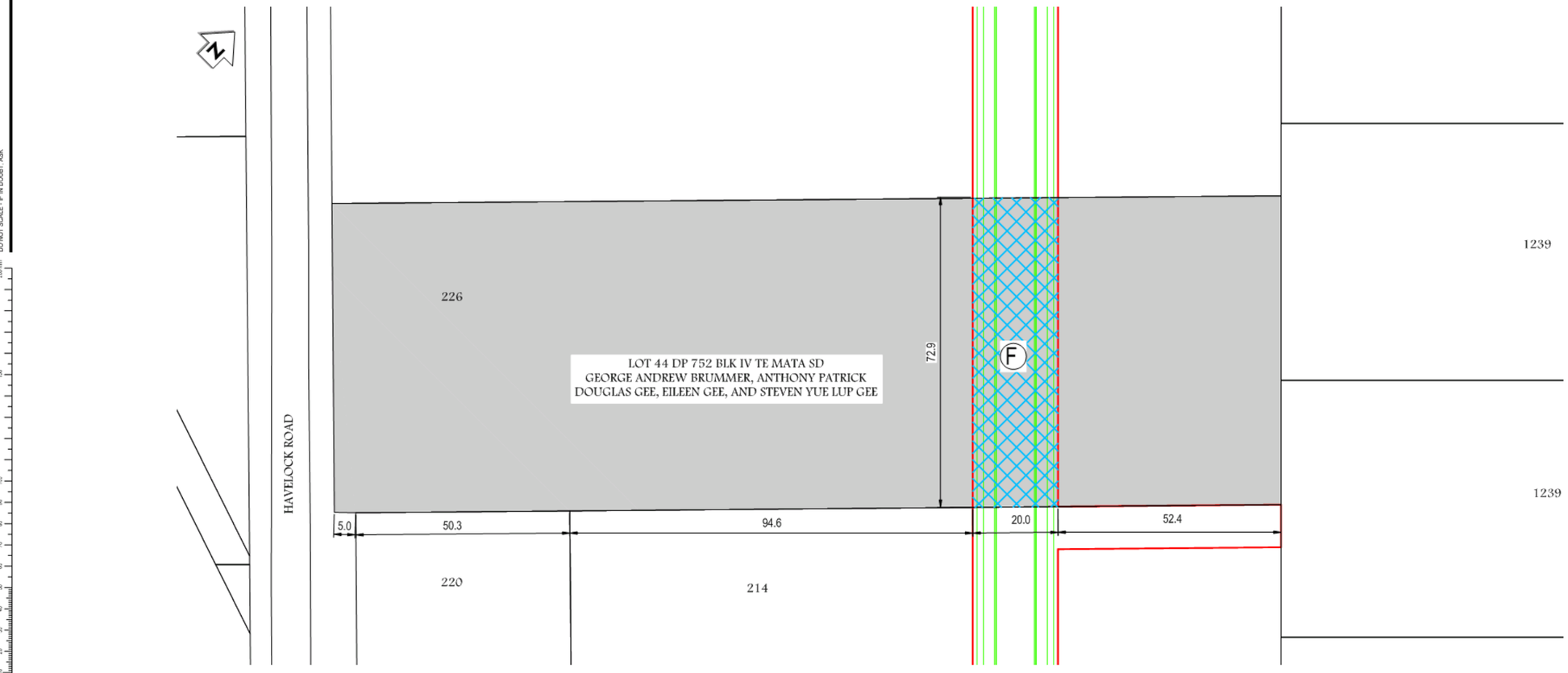
Client: HASTINGS DISTRICT COUNCIL

HOWARD STREET DEVELOPMENT

LAND REQUIREMENT PLAN
226 HAVELOCK ROAD

Status Stamp: FOR CONSULTATION
Date Stamp: 22.06.18
Scale: AS SHOWN
Drawing No.: 80510333-01-001-L005
Rev.: A

pw://asiavpwint05.mwhglobal.com:AP_PROJECTS\Documents\New Zealand Clients\Hastings District Council\80510333 - Howard Street Development\01\Civil\Land Requirement Plans\80510333-01-001-L005



PLAN
SCALE 1:500

LEGEND
EXISTING PROPERTY BOUNDARY
LAND REQUIRED
PROPOSED KERB AND CHANNEL

LAND REQUIREMENT PLAN

LABEL	AREA (m²)	LEGAL DESCRIPTION	OWNER	PARCEL AREA (Ha)	LAND REQUIRED
F	1452	LOT 44 DP 752 BLK IV TE MATA SD	GEORGE ANDREW BRUMMER, ANTONY PATRICK DOUGLAS GEE, EILEEN GEE, AND STEVEN YUE LUP GEE	1.617	FOR ROAD RESERVE

DO NOT SCALE - IF IN DOUBT, ASK
ORIGINAL SIZE A1

NOT FOR CONSTRUCTION

REV	REVISIONS	DRN	CHK	APP	DATE
A	FOR CONSULTATION	PAC	SW	RS	06/2018

SURVEYED		
DESIGNED	JAMES HOPGOOD	2018-06-22
DRAWN	PAUL CHILTON	06/2018
CAD REVIEW	Terry Foley	22.06.18
DESIGN CHECK	Terry Foley	22.06.18
DESIGN REVIEW	Steven Ward	22.06.18
APPROVED	Robin Scott	22.06.18
PROF REGISTRATION:		

Stantec

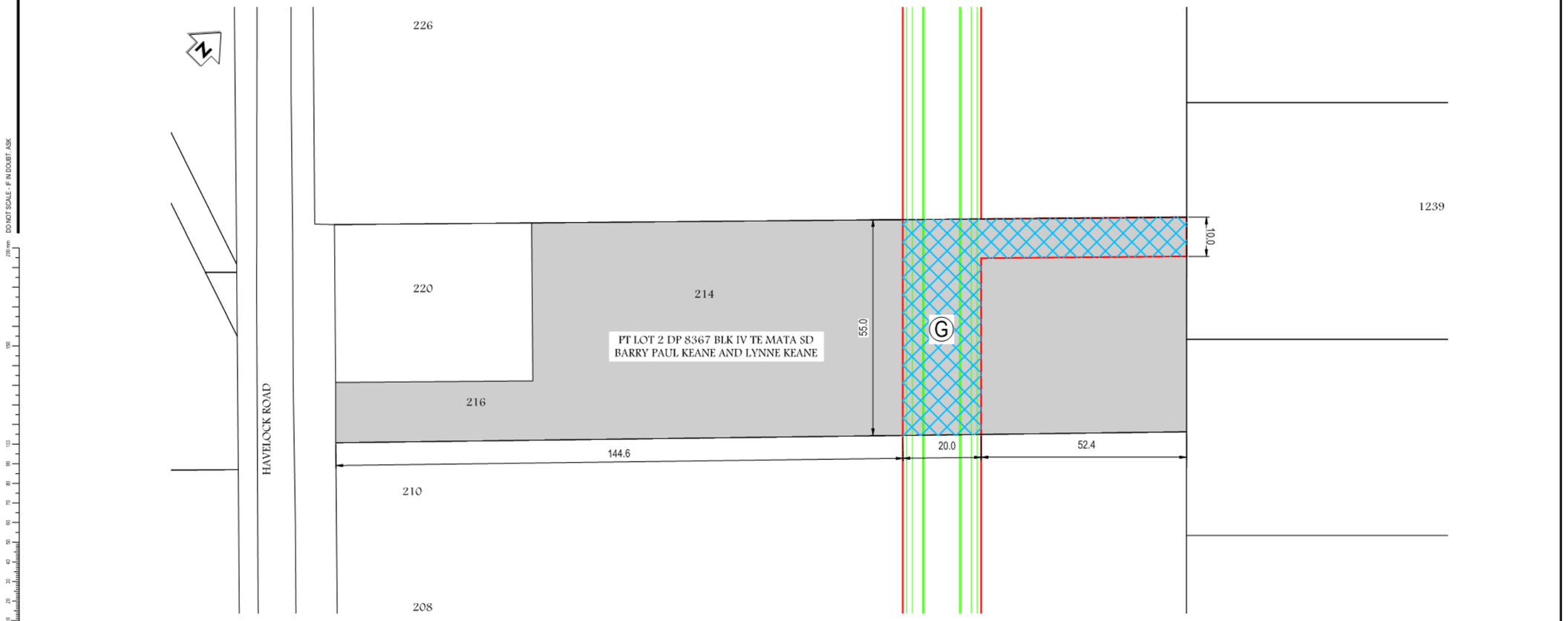
Client: HASTINGS DISTRICT COUNCIL

HOWARD STREET DEVELOPMENT

LAND REQUIREMENT PLAN
226 HAVELOCK ROAD

Status Stamp: FOR CONSULTATION
Date Stamp: 22.06.18
Scales: AS SHOWN
Drawing No.: 80510333-01-001-L006
Rev.: A

pw://asiapwint05.mwhglobal.com/AP_PROJECTS/Documents/New Zealand Clients/Hastings District Council/80510333 - Howard Street Development/01/Civil/Land Requirement Plans/80510333-01-001-L006



PLAN
SCALE 1:500

LEGEND

- EXISTING PROPERTY BOUNDARY
- LAND REQUIRED
- PROPOSED KERB AND CHANNEL

LAND REQUIREMENT PLAN					
LABEL	AREA (m²)	LEGAL DESCRIPTION	OWNER	PARCEL AREA (Ha)	LAND REQUIRED
G	1623	PT LOT 2 DP 8367 BLK IV TE MATA SD	BARRY PAUL KEANE AND LYNNE KEANE	0.995	FOR ROAD RESERVE AND STORMWATER

NOT FOR CONSTRUCTION

REV	REVISIONS	DRN	CHK	APP	DATE
A	FOR CONSULTATION	PAC	SW	RS	06/2018

SURVEYED		
DESIGNED	JAMES HOPGOOD	2018-06-22
DRAWN	PAUL CHILTON	06/2018
CAD REVIEW	Terry Foley	22.06.18
DESIGN CHECK	Terry Foley	22.06.18
DESIGN REVIEW	Steven Ward	22.06.18
APPROVED	Robin Scott	22.06.18
PROF REGISTRATION:		

Stantec

Client: HASTINGS DISTRICT COUNCIL

HOWARD STREET DEVELOPMENT

LAND REQUIREMENT PLAN
214 HAVELOCK ROAD

Status Stamp: FOR CONSULTATION
Date Stamp: 22.06.18
Scales: AS SHOWN
Drawing No.: 80510333-01-001-L007
Rev.: A

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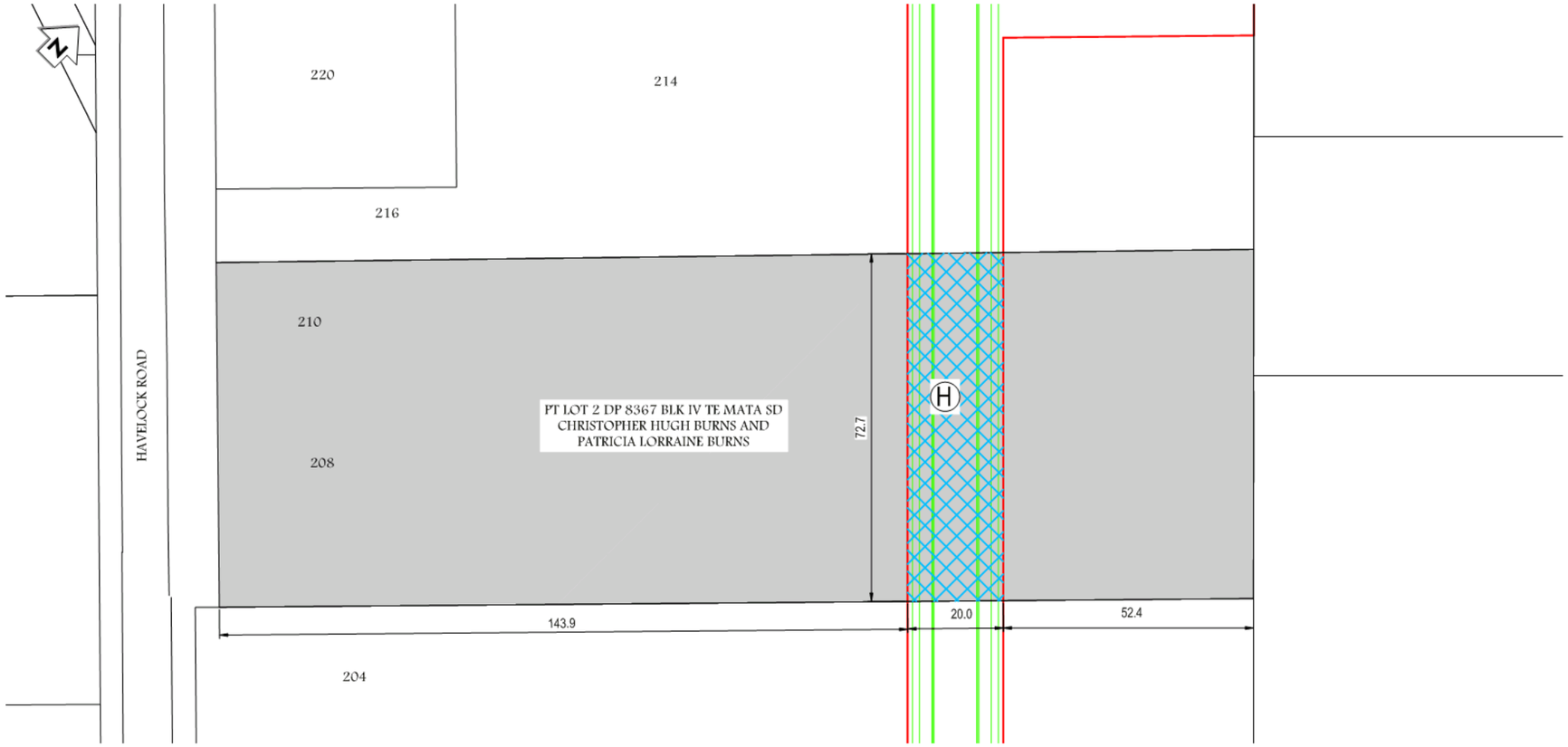

PLAN
SCALE 1:500

DO NOT SCALE - IF IN DOUBT ASK
ORIGINAL SIZE A1

LEGEND

- EXISTING PROPERTY BOUNDARY
- LAND REQUIRED
- PROPOSED KERB AND CHANNEL

LAND REQUIREMENT PLAN					
LABEL	AREA (m²)	LEGAL DESCRIPTION	OWNER	PARCEL AREA (Ha)	LAND REQUIRED
H	1455	PT LOT 2 DP 8367 BLK IV TE MATA SD	CHRISTOPHER HUGH BURNS AND PATRICIA LORRAINE BURNS	1.572	FOR ROAD RESERVE

NOT FOR CONSTRUCTION

REV	REVISIONS	DRN	CHK	APP	DATE
A	FOR CONSULTATION	PAC	SW	RS	06/2018

SURVEYED		
DESIGNED	JAMES HOPGOOD	2018-06-22
DRAWN	PAUL CHILTON	06/2018
CAD REVIEW	Terry Foley	22.06.18
DESIGN CHECK	Terry Foley	22.06.18
DESIGN REVIEW	Steven Ward	22.06.18
APPROVED	Robin Scott	22.06.18
PROF REGISTRATION:		

Stantec

Client: HASTINGS DISTRICT COUNCIL

HOWARD STREET DEVELOPMENT

LAND REQUIREMENT PLAN
208 HAVELOCK ROAD

Status Stamp: FOR CONSULTATION
Date Stamp: 22.06.18
Scales: AS SHOWN
Drawing No.: 80510333-01-001-L008
Rev.: A

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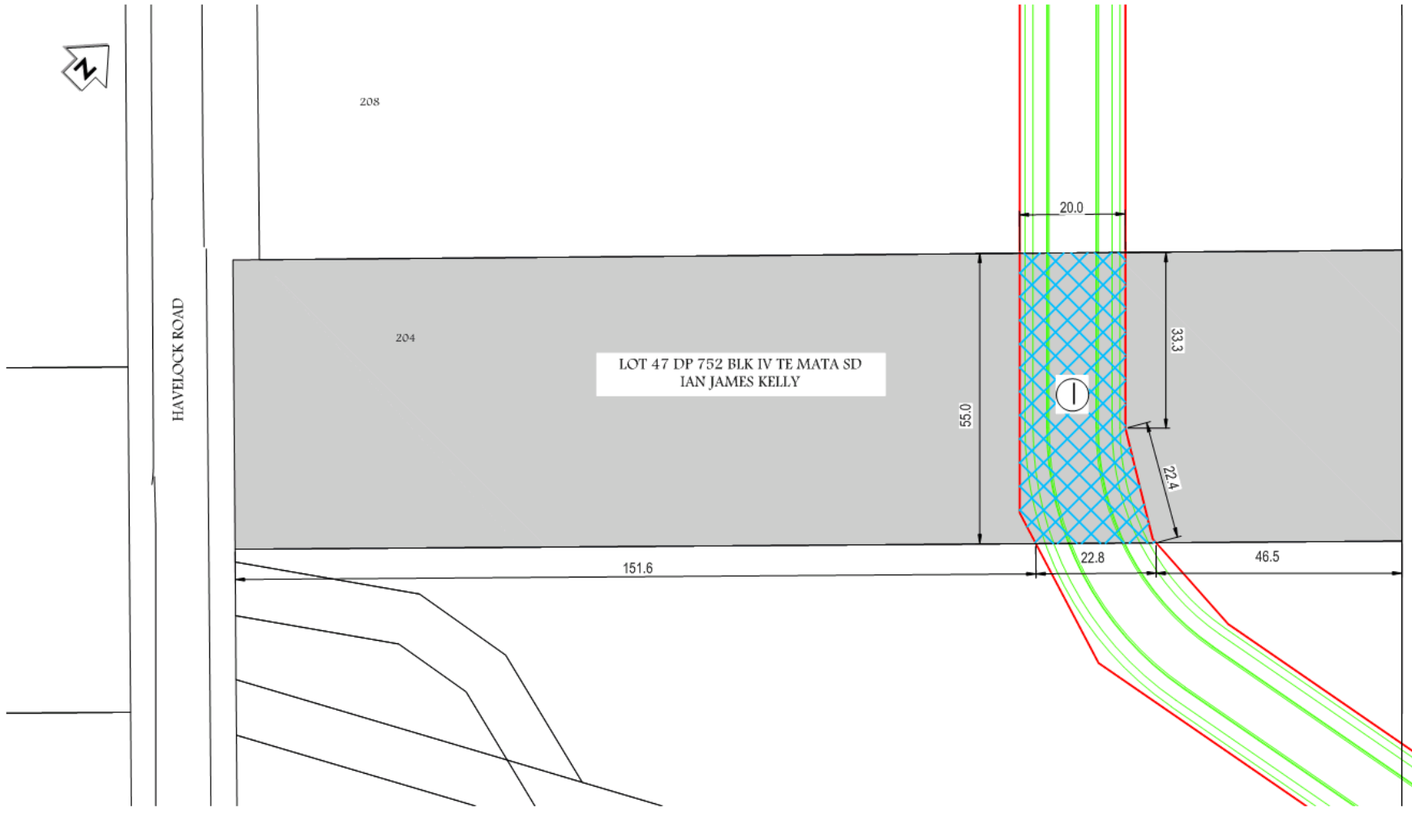

PLAN
SCALE 1:500

LEGEND

- EXISTING PROPERTY BOUNDARY
- LAND REQUIRED
- PROPOSED KERB AND CHANNEL

LAND REQUIREMENT PLAN

LABEL	AREA (m²)	LEGAL DESCRIPTION	OWNER	PARCEL AREA (Ha)	LAND REQUIRED
1	1150	LOT 47 DP 752 BLK IV TE MATA SD	IAN JAMES KELLY	1.214	FOR ROAD RESERVE

NOT FOR CONSTRUCTION

REV	REVISIONS	DRN	CHK	APP	DATE
B	FOR CONSULTATION - MODIFIED SOUTHERN ALIGNMENT THE ROAD RESERVE HAS MOVED AWAY FOR THE RIVERSLEA DRAIN	PAC	SW	RS	08/2018
A	FOR CONSULTATION	PAC	SW	RS	06/2018

SURVEYED		
DESIGNED	JAMES HOPGOOD	2018-06-22
DRAWN	PAUL CHILTON	06/2018
CAD REVIEW	Terry Foley	22.06.18
DESIGN CHECK	Terry Foley	22.06.18
DESIGN REVIEW	Steven Ward	22.06.18
APPROVED	Robin Scott	13.08.18
PROF REGISTRATION:		

Stantec

Client: HASTINGS DISTRICT COUNCIL

HASTINGS DISTRICT COUNCIL - STANTEC ALLIANCE
HOWARD STREET DEVELOPMENT

LAND REQUIREMENT PLAN
204 HAVELOCK ROAD

Status Stamp: FOR CONSULTATION
Date Stamp: 13.08.18
Scales: AS SHOWN
Drawing No.: 80510333-01-001-L009
Rev.: B

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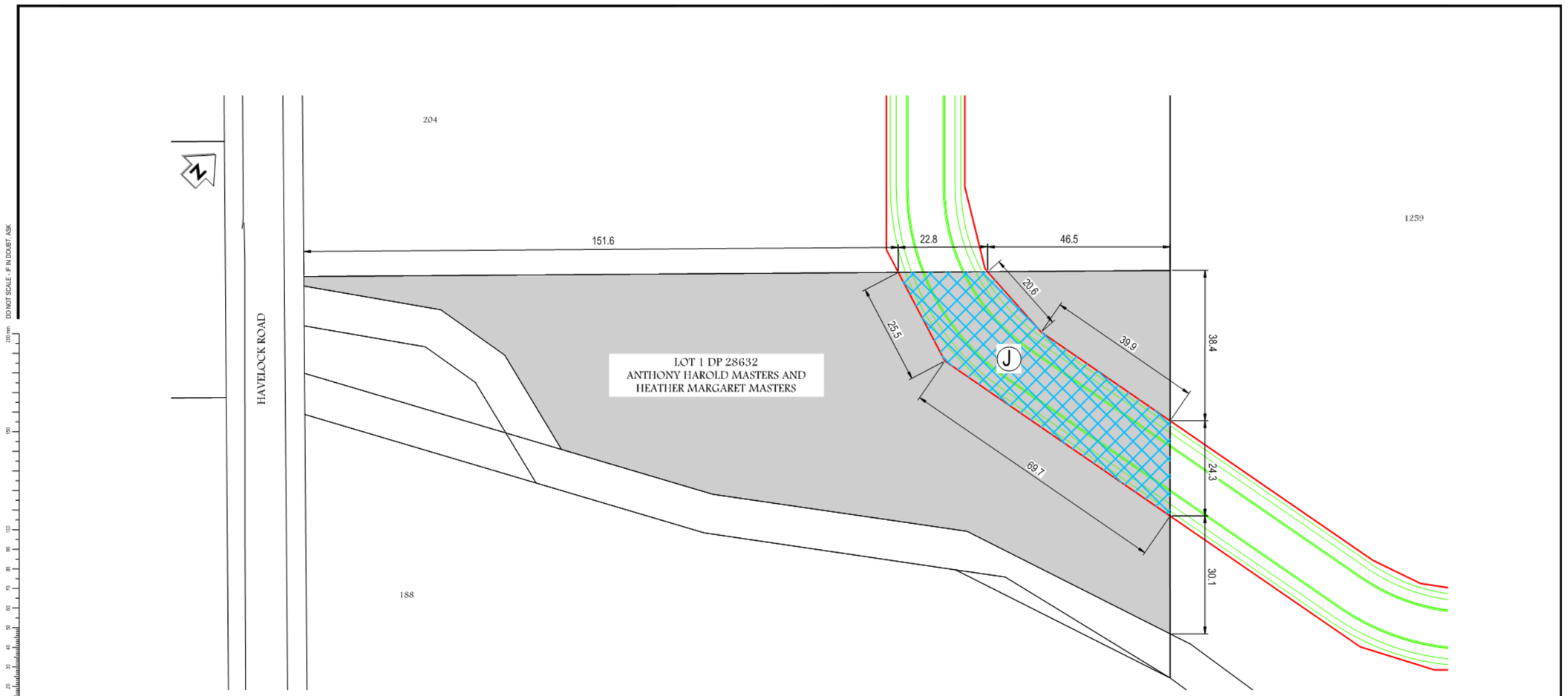


PLAN
SCALE 1:500

LEGEND

- EXISTING PROPERTY BOUNDARY
- LAND REQUIRED
- PROPOSED KERB AND CHANNEL

LAND REQUIREMENT PLAN					
LABEL	AREA (m²)	LEGAL DESCRIPTION	OWNER	PARCEL AREA (Ha)	LAND REQUIRED
J	1594	LOT 1 DP 28632	ANTHONY HAROLD MASTERS AND HEATHER MARGARET MASTERS	1.093	FOR ROAD RESERVE

DO NOT SCALE - IF IN DOUBT, ASK

ORIGINAL SIZE A1

NOT FOR CONSTRUCTION

REV	REVISIONS	DRN	CHK	APP	DATE
B	FOR CONSULTATION - MODIFIED SOUTHERN ALIGNMENT THE ROAD RESERVE HAS MOVED AWAY FOR THE RIVERSLEA DRAIN	PAC	SW	RS	08/2018
A	FOR CONSULTATION	PAC	SW	RS	06/2018

SURVEYED		
DESIGNED	JAMES HOPGOOD	2018-06-22
DRAWN	PAUL CHILTON	06/2018
CAD REVIEW	Terry Foley	22.06.18
DESIGN CHECK	Terry Foley	22.06.18
DESIGN REVIEW	Steven Ward	22.06.18
APPROVED	Robin Scott	13.08.18
PROF REGISTRATION:		

Stantec

Client: HASTINGS DISTRICT COUNCIL

HASTINGS DISTRICT COUNCIL - STANTEC ALLIANCE
HOWARD STREET DEVELOPMENT

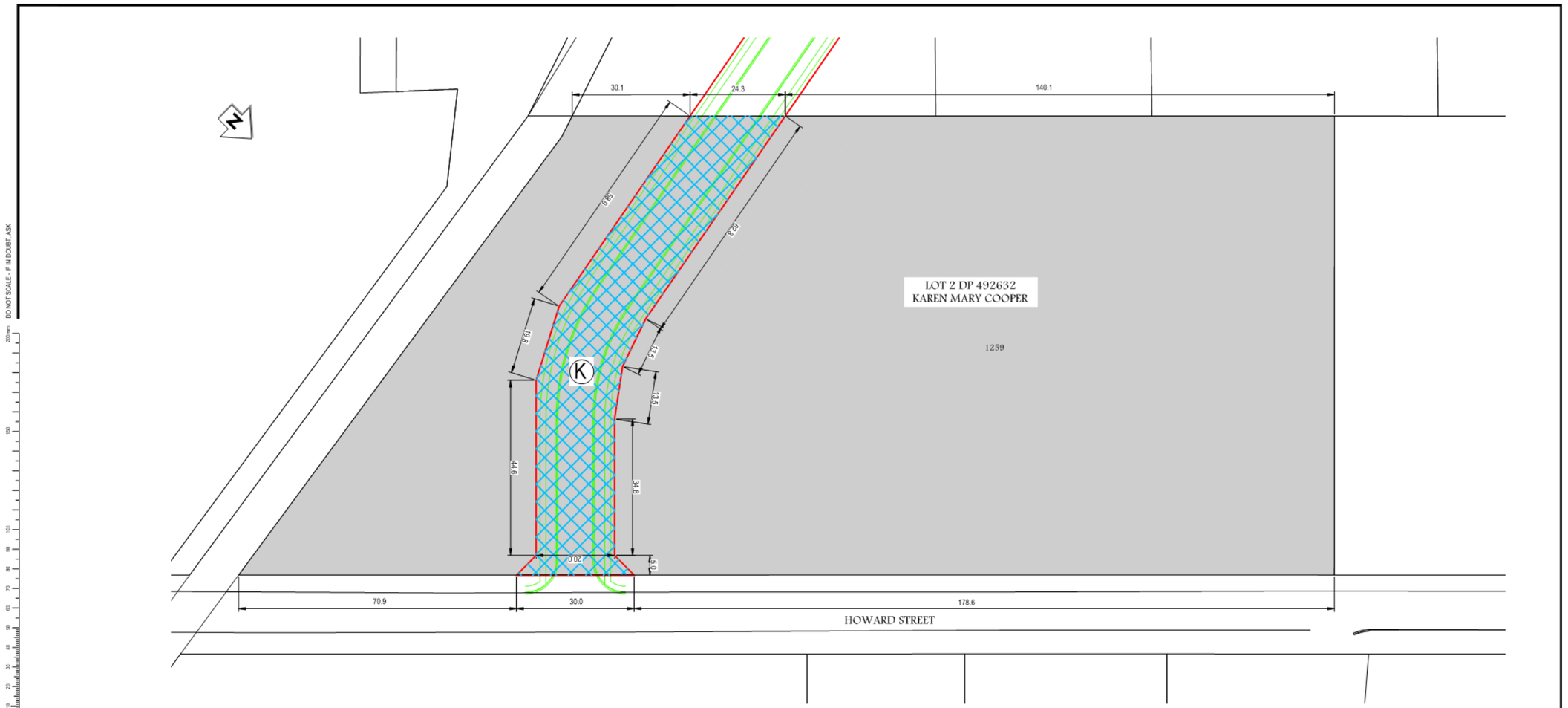
LAND REQUIREMENT PLAN
180 HAVELOCK ROAD

Status Stamp: FOR CONSULTATION
Date Stamp: 13.08.18
Scales: AS SHOWN
Drawing No: 80510333-01-001-L010
Rev: B

pw://asiapwint05.mwhglobal.com/AP_PROJECTS/Documents/New Zealand Clients/Hastings District Council/80510333 - Howard Street Development/01/Civil/Land Requirement Plans/80510333-01-001-L010

Item 2

Attachment 3



PLAN
SCALE 1:500

LEGEND

- EXISTING PROPERTY BOUNDARY
- LAND REQUIRED
- PROPOSED KERB AND CHANNEL

LAND REQUIREMENT PLAN

LABEL	AREA (m²)	LEGAL DESCRIPTION	OWNER	PARCEL AREA (Ha)	LAND REQUIRED
K	2621	LOT 2 DP 492632	KAREN MARY COOPER	2.765	FOR ROAD RESERVE

NOT FOR CONSTRUCTION

REV	REVISIONS	DRN	CHK	APP	DATE
B	FOR CONSULTATION - MODIFIED SOUTHERN ALIGNMENT THE ROAD RESERVE HAS MOVED AWAY FOR THE RIVERSLEA DRAIN	PAC	SW	RS	08/2018
A	FOR CONSULTATION	PAC	SW	RS	06/2018

SURVEYED		
DESIGNED	JAMES HOPGOOD	2018-06-22
DRAWN	PAUL CHILTON	06/2018
CAD REVIEW	Terry Foley	22.06.18
DESIGN CHECK	Terry Foley	22.06.18
DESIGN REVIEW	Steven Ward	22.06.18
APPROVED	Robin Scott	13.06.18
PROF REGISTRATION:		

Stantec

Client: HASTINGS DISTRICT COUNCIL

HASTINGS DISTRICT COUNCIL - STANTEC ALLIANCE
HOWARD STREET DEVELOPMENT

LAND REQUIREMENT PLAN
1259 HOWARD STREET

Status Stamp: FOR CONSULTATION
Date Stamp: 13.08.18
Scales: AS SHOWN
Drawing No: 80510333-01-001-L011
Rev: B

ORIGINAL SIZE A1

DO NOT SCALE - IF IN DOUBT ASK

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Item 2

Attachment 3

PUBLIC NOTICE

PUBLIC NOTICE OF REQUIREMENT FOR DESIGNATION

Section 168A(1A) Resource Management Act 1991

Hastings District Council has received notice of a requirement for a designation from **The Hastings District Council as the Requiring Authority – RMA20180376**.

The requirement is for:
A DESIGNATION FOR A ROAD CORRIDOR WITH ASSOCIATED INFRASTRUCTURE FOR WATER, WASTEWATER, AND STORMWATER; AND A STORMWATER CORRIDOR.

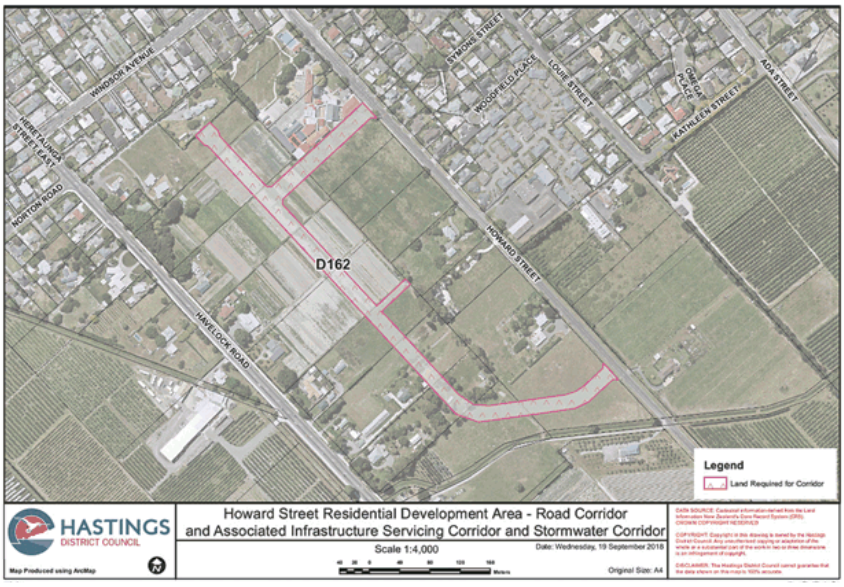
The land to which the requirement applies is:

A residential-zoned block south-east of Hastings city off Howard Street, Parkvale. The requirement is for:

- A crescent-shaped road corridor running through the development, approximately 840m long and 20m wide, apart from the area adjoining Parkvale School, which is 22m wide. It will include servicing capabilities for water, wastewater and stormwater.
- A 10m wide stormwater corridor, approximately 52m long, at the Howard Road end of PT LOT 2 DP 8367 BLK IV TE MATA SD, to provide an overland flow path to the road corridor.

Inspecting the Notice of Requirement:

To see the requirement and associated documents go to the Hastings District Council website: https://www.hastingsdc.govt.nz/consultations or the Hastings District Council Civic Building, 207 Lyndon Road East, Hastings, or Hastings District Council Libraries.



How to Make a Submission:

Anyone can make a submission on 'Form 21', which can be downloaded from the council's website at https://www.hastingsdc.govt.nz/consultations or picked up at Hastings District Council or Hastings District Council Libraries.

Send completed submissions to:

- Email michelleh@hdc.govt.nz
- Post: Hastings District Council, Private Bag 9002, Hastings 4156
- Deliver: Hastings District Council Civic Building, 207 Lyndon Road East, Hastings.

Please contact Michelle Hart, Senior Environmental Planner (Consents) on (06) 871 5000, if you have any questions about the Notice of Requirement.

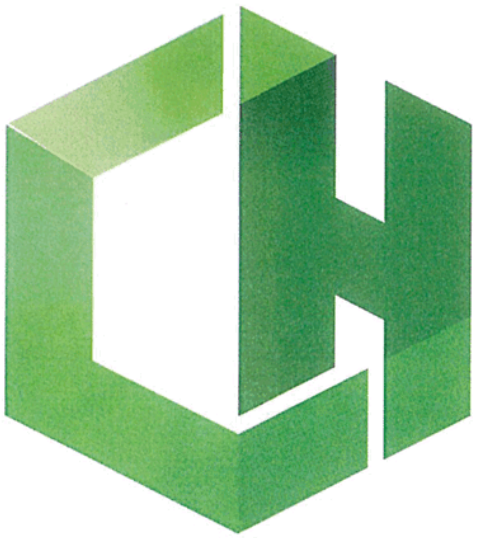
Note: A copy of the submission must also be sent to the requiring authority at the below address for service as soon as reasonably practicable.

Address for Service: Hastings District Council, Private Bag 9002, Hastings:
Attention: Craig Thew, Group Manager, Asset Management.

Submissions close 5pm, Tuesday 23rd October 2018

HASTINGS DISTRICT COUNCIL

1.



NOTICE OF REQUIREMENT
DESIGNATION
FOR ROAD CORRIDOR

HOWARD ST DEVELOPMENT

SUBMISSION

Item 2

Attachment 5

HASTINGS DISTRICT COUNCIL
207 Lyndon Road East
Hastings 4122
Private Bag 9002

Phone 06 871 5000
www.hastingsdc.govt.nz

TE KAUNIHERA O HERETAUNGA

FORM 21

SUBMISSION ON A PUBLICLY NOTIFIED NOTICE OF REQUIREMENT BY THE HASTINGS DISTRICT COUNCIL AS THE REQUIRING AUTHORITY FOR DESIGNATION – ROAD CORRIDOR WITH ASSOCIATED INFRASTRUCTURE FOR WATER, WASTE WATER, AND STORMWATER; AND STORMWATER CORRIDOR – RMA20180376

Date Submission Received: _____

Date Submissions Close: **5pm, Tuesday 23rd October 2018**

To: Environmental Planning
Resource Management
Hastings District Council
Private Bag 9002
Hastings 4156

Attention: Michelle Hart

PERSON(S) MAKING SUBMISSION:

First Name	Middle Name(s)	Last Name
Christopher	Hugh	Burns
Patracia	Lorraine	Burns

I am/am not (circle one) a trade competitor for the purposes of section 308B of the Resource Management Act 1991.

*I am/am (circle one) not directly affected by an effect of the subject matter of the submission that—

(a) adversely affects the environment; and

(b) does not relate to trade competition or the effects of trade competition.

*Delete this paragraph if you are not a trade competitor.

APPLICATION:

This is a submission on a notice of requirement from:	Group Manager: Asset Management Hastings District Council
For a designation:	Designate land for the construction and installation of a road corridor with associated infrastructure for water, wastewater and stormwater; and a stormwater corridor. The land to which the requirement applies is located on the south east side of Hastings City off Howard Street, Parkvale.

HASTINGS DISTRICT COUNCIL
207 Lyndon Road East
Hastings 4122
Private Bag 9002

Phone 06 871 5000
www.hastingsdc.govt.nz

TE KAUNIHERA O HERETAUNGA

1. **The specific parts of the notice of requirement that my submission relates to are:**
(Please continue on separate sheet(s) if necessary)

The location of the structure road

2. **My submission is:** *(include whether you support, oppose or are neutral to specific parts of the notice of requirement or wish to have them amended; and the reasons for your views. (Please continue on separate sheet(s) if necessary)*

To support the councils purposed location of the structure road.
When designing the layout for our subdivision the distance between the structure road to our Howard and Havelock Road boundaries was required when calculating the section sizes
Any movement from the purposed location would alter the boundaries of all 20 sections

3. **I / We seek the following recommendation or decision from the Hastings District Council:**

☑ Confirm the requirement for designation ☐ Modify the requirement

☐ Impose conditions ☐ Withdraw the requirement

(Please give precise details including the general nature of any conditions sought) *(Please continue on separate sheet(s) if necessary)*

4. I wish to be heard in support of my submissions, or ☐

Item 2

Attachment 5

HASTINGS DISTRICT COUNCIL
207 Lyndon Road East
Hastings 4122
Private Bag 9002
Phone 06 871 5000
www.hastingsdc.govt.nz
TE KAUNIHERA O HERETAUNGA

I **do not** wish to be heard in support of my submissions ☐

5. If others make a similar submission I will consider presenting a joint case with them at any hearing, or ☐

I **do not** wish to present a joint case ☐

Signed: C Burns Date: 25/9/18

6. **Submitter Contact Details**

Contact Person: Chris Burns
Postal address for service of submitter: 208 Havelock Rd Hastings

Daytime Phone Number: 06-8706599
Fax Number:
Mobile Phone Number: 021 1675827
Email Address 2Chrstop2@gmail.com

Note:

1. The closing date for serving submissions on the consent authority is 5:00pm on Tuesday 23rd October 2018, the 21st working day after Notification is given under Section 95 of the Resource Management Act 1991 (takes into account Labour Weekend).

   If your submission relates to a notice of requirement for a designation or an alteration to a designation, and you are a trade competitor of the requiring authority, you may make a submission only if you are directly affected by an effect of the activity to which the requirement relates that—

   (a) adversely affects the environment; and

   (b) does not relate to trade competition or the effects of trade competition.

2. You must serve a copy of your submission on the person who gave the notice of requirement as soon as reasonably practicable after you have served your submission on the territorial authority (unless the territorial authority itself gave the notice of requirement).

3. Please note that your submission (or part of your submission) may be struck out if the authority is satisfied that at least 1 of the following applies to the submission (or part of the submission):

   - it is frivolous or vexatious:
   - it discloses no reasonable or relevant case:
   - it would be an abuse of the hearing process to allow the submission (or the part) to be taken further:

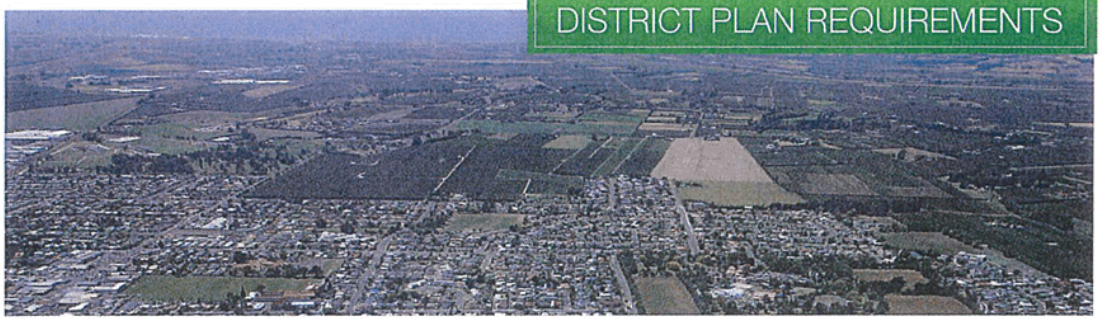
WELCOME TO

DAWN ACRES

Dawn Acres Residential Development has a vision to deliver thoughtful, considerate, well-designed, sustainable, high value, solid and creative living spaces for today's modern lifestyle.

ACHIEVING

DISTRICT PLAN REQUIREMENTS



SUB-DIVISION

Dawn Acres subdivision to create 20 residential lots in the residential zone (List Hastings General Residential Zone)

LAND USE

Land use consent required to construct 20 residential dwellings which will result in complying with all Council residential district plan requirements.

HPUDS

Proposed road location.
Proposed storm water retention.
General submissions.

THE DEVELOPMENT MARKET

A major shortage of land ready for development is a concern for building companies. We have many, many customers ready to go when consent and approval is achieved.
The development market is very strong.

COMPLIANT DESIGN

Our over & above approach to all Council requirements was developed in order for our clients families to have a spacious feel to the properties:

Better re-sale value
More healthy living
More space
Less clutter
To both take advantage of and protect you from the sun

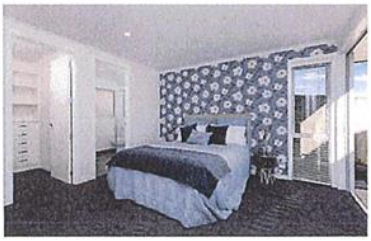
Every house has been carefully designed in order to help the council consent process.

WE HAVE EXCEEDED THE EXPECTED REQUIREMENTS

COUNCIL REQUIREMENT	DEVELOPER	ACHIEVED
Land size – minimum requirement 400m2	400m2 – 828m2	✓
Land size – average 600m2	Our average 640m2	✓
Minimum 1m side boundaries	Dawn Acres are 1.5m on 17 of the sites	✓
Minimum 3m from front boundary	Dawn Acres has 6m driveways so cars stay right off the footpaths	✓
6mø of living – 50% of floor area continuous strip (grass)	All 6mø of living is in the North West or South West	✓
Less than 35% house coverage to land	All plans are at 35% or less	✓
Minimum street & footpath width 12m	Planted, kerbed, grass, path, markings	✓
Planting specific specimen trees 2 x corners of street to have open fence & planting	Evergreen trees are to be used to avoid blocking drains and to create more individual family privacy.	✓
Right of Ways (R.O.W) – minimum 3m	We have allowed for 4m	✓
DAYLIGHT CONTROL H.I.R.T.B'S 30/45 etc North South Boundaries East & West	RECESSION PLANES All homes are compliant because we have increased the yard setbacks	✓
Max height 8m	All homes are single level.	✓

DEVELOPER REQUIREMENTS

We have created a number of covenants over and above what is required to protect the future presentation and value of the development.



COVENANTS

1. Home Business restrictions (ie. No mechanics).

2. Parking restrictions – no mobile homes, no permanent trade vehicle uncovered.

3. Fencing - not required on front boundary – maximum 1.2m open style in order to create a more spacious feel and add to the street appeal. No Colorsteel fencing, to reduce noise pollution. (1.8m)

4. Gardens

Lawns/gardens are to be kept tidy with specific planting requirements to enhance the overall street appearance and attract birdlife.

5. Animal restrictions

6.All homes to have 1000L of storm water storage. Tanks not too be visible from street.

7. House colour and material restrictions.

8. No two storey homes.

OUR HOMES

Our plans have been well thought out for modern open plan living, health & lifestyle.
Our designs factor in wind, sun, privacy and architectural merit.

HOUSE PLANS

A wide variety of layouts/plans are available to suit different family situations and needs.

We have catered for small families, large families, retirees, 1st home buyers and professionals. Homes range from 127sqm to 244sqm.

All homes come with ventilation system as standard. To help provide better PMIO results, reduce internal home maintenance and for future health benefits of our clients.

ROOF DESIGN

Great care has been taken to give a mixed variety of different roof styles. There are hip roofs, gable, raking, small flat roofs, high pitch, low pitch and Dutch gable. This will make the sub-division more interesting.

OUR FLOOR PLAN RANGE FROM SMALL TO LARGE	
3 x	3 bedrooms, 2 bathrooms, 1 x lounge, single car garage
2 x	3 bedrooms, 2 bathrooms, 1 x lounge, double garage
1 x	3 bedrooms, 2 bathrooms, 2 x lounges, double garage
5 x	4 bedrooms, 2 bathrooms, 1 x lounge, double garage
7x	4 bedrooms, 2 bathrooms, 2 x lounges, double garage
2 x	4 bedrooms, 2 bathrooms, 1 x office, 2 x lounges, double garage

CLADDING

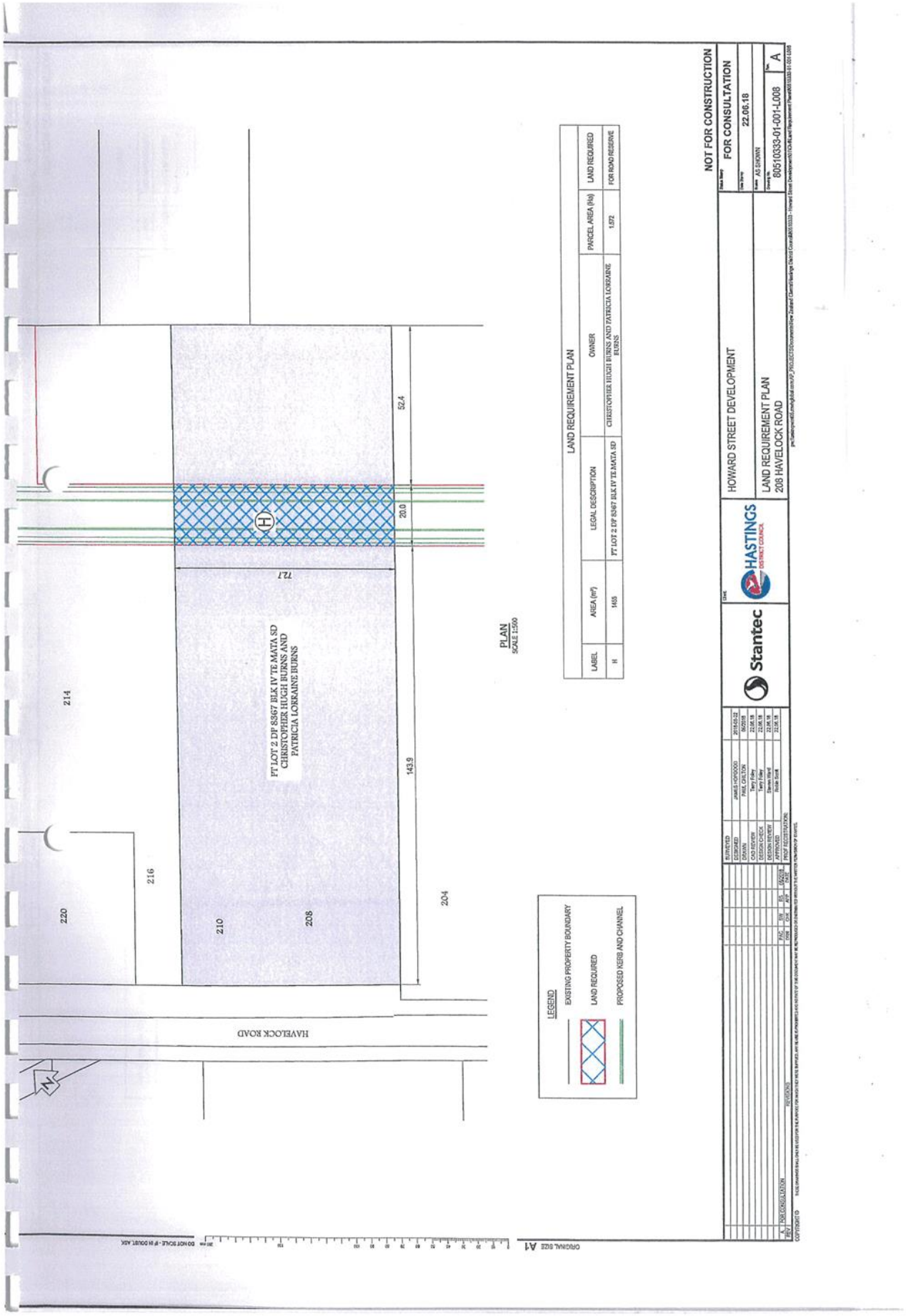
Mixed architectural styles & a variety of cladding is proposed. There are restrictions on the covenants to protect the development from cheap, imported low architectural merit products.

ENVIRONMENTAL MERIT

We actively promote & use sustainable products. We design our homes to make the most use of the environmental conditions, eg. solar aspect, wind, view & privacy.

SITE SIZES	
3 x	407sqm
2 x	565sqm
2 x	595sqm
6 x	600sqm
3 x	685sqm
2 x	728sqm
2 x	877sqm

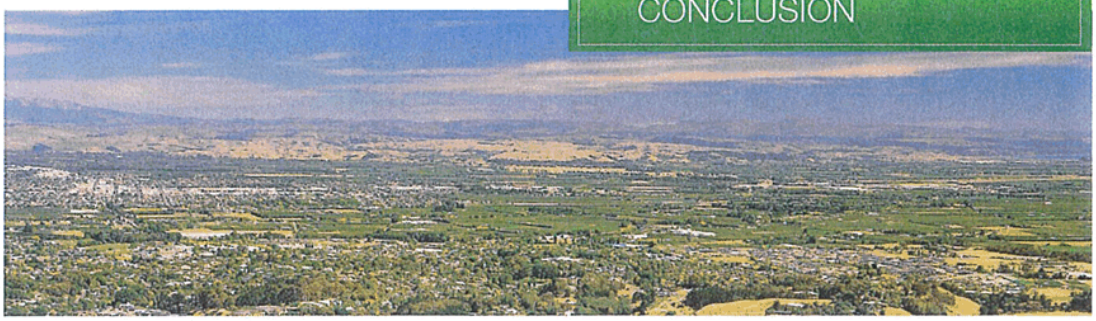
Average size 620 sqm+



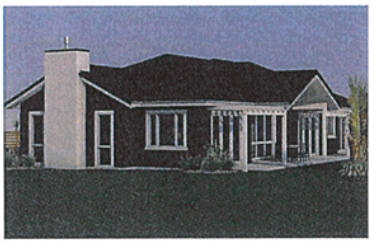
Item 2

Attachment 5

CONCLUSION



CAMBRIDGE HOMES, IN CONJUNCTION WITH SHANLEY & CO SURVEYORS HAVE THE ABILITY TO PRODUCE AND BUILD A WELL-DESIGNED SUB-DIVISION.



All homes have been designed taking into consideration sun, privacy, space and architectural merit.

Mixed architectural styles. No two homes situated next to each other will be the same style. Only 10% are rear sites.
20x individual site sizes & floor plans to suit all types of families.
Our over & above approach to Council regulations will ensure not only a better living environment for our clients but should also ease the consent process for Council.

Our covenants will protect our clients investment, keep the street appeal, reduce maintenance for Council in the future and add value. We believe our product will stand above others in its mixed architectural style, merit, individual family space and lifestyle.

WE LOOK FORWARD TO HEARING YOUR FEEDBACK AND WORKING TOGETHER TO PROVIDE THE DISTRICT WITH AN OUTSTANDING SUB-DIVISION DEVELOPMENT.

2.

HASTINGS DISTRICT COUNCIL

HASTINGS DISTRICT COUNCIL
207 Lyndon Road East
Hastings 4122
Private Bag 9002
Phone 06 871 5000
www.hastingsdc.govt.nz
TE KAUNIHERA O HERETAUNGA

FORM 21

SUBMISSION ON A PUBLICLY NOTIFIED NOTICE OF REQUIREMENT BY THE HASTINGS DISTRICT COUNCIL AS THE REQUIRING AUTHORITY FOR DESIGNATION – ROAD CORRIDOR WITH ASSOCIATED INFRASTRUCTURE FOR WATER, WASTE WATER, AND STORMWATER; AND STORMWATER CORRIDOR – RMA20180376

CUSTOMER SERVICES
10 OCT 2018
RECEIVED

Date Submission Received:

Date Submissions Close: 5pm, Tuesday 23rd October 2018

To: Environmental Planning
Resource Management
Hastings District Council
Private Bag 9002
Hastings 4156

Attention: Michelle Hart

PERSON(S) MAKING SUBMISSION:

First Name	Middle Name(s)	Last Name
BARRY	PAUL	KEANE
LYNNE		KEANE

I am/am not (circle one) a trade competitor for the purposes of section 308B of the Resource Management Act 1991.

*I am/am (circle one) not directly affected by an effect of the subject matter of the submission that—

(a) adversely affects the environment; and

(b) does not relate to trade competition or the effects of trade competition.

*Delete this paragraph if you are not a trade competitor.

APPLICATION:

This is a submission on a notice of requirement from:	Group Manager: Asset Management Hastings District Council
For a designation:	Designate land for the construction and installation of a road corridor with associated infrastructure for water, wastewater and stormwater; and a stormwater corridor. The land to which the requirement applies is located on the south east side of Hastings City off Howard Street, Parkvale.

HASTINGS DISTRICT COUNCIL

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1. **The specific parts of the notice of requirement that my submission relates to are:**
(Please continue on separate sheet(s) if necessary) STORMWATER CORRIDOR 214 HAVELOCK RD
Part 1 Para 6 (The Work) + (The Designation
Part 2 Para 4.3 Para 4.18
Part 2 Para 5.4 Para 5.6 (Final + Point)
Part 2 Para 11.3 Paras 11.13; 11.14; 11.15
Part 2 Paras 12.1, 12.7; 12.8
Part 2 Para 14.2
Part 2 Para 15.1 and Annexes

2. **My submission is:** *(include whether you support, oppose or are neutral to specific parts of the notice of requirement or wish to have them amended; and the reasons for your views. (Please continue on separate sheet(s) if necessary)*
WE OPPOSE THE PROPOSED STORMWATER CORRIDOR ALONG THE HOWARD ST END OF OUR 214 HAVELOCK RD PROPERTY;
a. BECAUSE IN THE 65+ YEARS FAMILY HAVE LIVED AT 214 IT HAS NEVER BEEN FLOODED - NATURAL WATER COLLECTION POINTS ARE ON ADJACENT PROPERTIES.
b. IT WAS NOT PART OF THE ORIGINAL PLAN.
c IT WILL REDUCE THE SUB-DIVISIBILITY OF THAT PART OF OUR LAND FROM 4 TO 3 SECTIONS
d. HDC FUTURE PLANS TO USE THE CORRIDOR ALSO AS A WALK/CYCLE WAY WILL AFFECT PRIVACY & REDUCE VALUE OF ADJACENT LAND.
e THE HOWARD ST OPTION IN PARA 12.7 (THE ORIGINAL PLAN) PROVIDES A SUITABLE ALTERNATIVE)

3. **I/ We seek the following recommendation or decision from the Hastings District Council:**

☐ Confirm the requirement for designation ☐ Modify the requirement

☐ Impose conditions ☑ Withdraw the requirement

(Please give precise details including the general nature of any conditions sought) *(Please continue on separate sheet(s) if necessary)*
WITHDRAW THE REQUIREMENT.
OURS IS THE SMALLEST BLOCK OF LAND
OTHER OPTIONS EXIST (HOWARD ST, KEN GEE'S PROPERTY)

COMMENT: IT SEEMS REMARKABLE TO US THAT HDC HAS LEFT THE LARGEST PROPERTY (TW PROPERTY HOLDINGS LTD) COMPLETELY UNAFFECTED. GIVEN THAT, PARA 2.4 NOTES THAT COUNCIL HAS BEEN APPROACHED "by a developer with substantial land interest ... wanting to progress a substantial residential development ..." WE WONDER IF THERE MAY BE A CONNECTION, GIVEN THAT DEVELOPER IS TW PROPERTY HOLDINGS (TREMAYNES).

4. I/ We ☑ wish to be heard in support of my submissions, or

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I **do not** wish to be heard in support of my submissions ☐

5. If others make a similar submission I will consider presenting a joint case with them at any hearing, or ☐

I **do not** wish to present a joint case ☐

Signed: L. Keane Date: 8/10/18

6. **Submitter Contact Details**

Contact Person: BARRY KEANE
Postal address for service of submitter: 95D MURI RD
PUKERUA BAY
WELLINGTON 5026

Daytime Phone Number: 04-2397181
Fax Number:
Mobile Phone Number: 021703556
Email Address barylyn@xtra.co.nz

Note:

1. The closing date for serving submissions on the consent authority is 5:00pm on Tuesday 23rd October 2018, the 21st working day after Notification is given under Section 95 of the Resource Management Act 1991 (takes into account Labour Weekend).

   If your submission relates to a notice of requirement for a designation or an alteration to a designation, and you are a trade competitor of the requiring authority, you may make a submission only if you are directly affected by an effect of the activity to which the requirement relates that—

   (a) adversely affects the environment; and

   (b) does not relate to trade competition or the effects of trade competition.

2. You must serve a copy of your submission on the person who gave the notice of requirement as soon as reasonably practicable after you have served your submission on the territorial authority (unless the territorial authority itself gave the notice of requirement).

3. Please note that your submission (or part of your submission) may be struck out if the authority is satisfied that at least 1 of the following applies to the submission (or part of the submission):

   - it is frivolous or vexatious:
   - it discloses no reasonable or relevant case:
   - it would be an abuse of the hearing process to allow the submission (or the part) to be taken further:

3.

TRACE GROUP

Craig Scott

Senior Environmental Planner (Policy)

Hastings District Council

Designation of internal road corridor and stormwater corridor for Howard St residential area

Craig Scott

Please accept this letter on behalf of TW Property Holdings Limited, owners of the land:

Street Address:	1239 Howard Street, Hastings
Legal Descriptions:	Lots 3-6 DP 3146
Certificates of Title:	HB110/280
Area:	2.8207ha
Zoning:	Hastings General Residential

This letter relates to the correspondence received dated 9th July 2018 detailing the Hastings District Council's proposed designation of the internal roading corridor and stormwater corridor for the Howard St structure plan area.

The owners of the land above would like to support the position of the proposed road within the structure plan, and also the location and function of the proposed overland flow path within 214 Havelock Road.

It should be noted that the support of the current roading position as shown on the plan below, is contingent on the proposed overland flow path designation in its proposed position remaining, linking the subject land above to the new roading network and in turn to the requisite services that will be under the carriageway.

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FORM 21

SUBMISSION ON A PUBLICLY NOTIFIED NOTICE OF REQUIREMENT BY THE HASTINGS DISTRICT COUNCIL AS THE REQUIRING AUTHORITY FOR DESIGNATION – ROAD CORRIDOR WITH ASSOCIATED INFRASTRUCTURE FOR WATER, WASTE WATER, AND STORMWATER; AND STORMWATER CORRIDOR – RMA20180376

CUSTOMER SERVICES
17 OCT 2018
RECEIVED

Date Submission Received:

Date Submissions Close: **5pm, Tuesday 23rd October 2018**

To: Environmental Planning
Resource Management
Hastings District Council
Private Bag 9002
Hastings 4156

Attention: Michelle Hart

PERSON(S) MAKING SUBMISSION:

First Name	Middle Name(s)	Last Name
Marcus		Mill.

I am/am not (circle one) a trade competitor for the purposes of section 308B of the Resource Management Act 1991.

*I am/am (circle one) not directly affected by an effect of the subject matter of the submission that—

(a) adversely affects the environment; and

(b) does not relate to trade competition or the effects of trade competition.

*Delete this paragraph if you are not a trade competitor.

APPLICATION:

This is a submission on a notice of requirement from:	Group Manager: Asset Management Hastings District Council
For a designation:	Designate land for the construction and installation of a road corridor with associated infrastructure for water, wastewater and stormwater; and a stormwater corridor. The land to which the requirement applies is located on the south east side of Hastings City off Howard Street, Parkvale.

Item 2

Attachment 5

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I **do not** wish to be heard in support of my submissions ☐

5. If others make a similar submission I will consider presenting a joint case with them at any hearing, or ☑

I **do not** wish to present a joint case ☐

Signed: _____ Date: 16/10/18.

6. **Submitter Contact Details**

Contact Person: Marcus Hill
Postal address for service of submitter: PO Box 778
Napier 4140

Daytime Phone Number:
Fax Number:
Mobile Phone Number: 021 671 223
Email Address marcus.hill@tracegroup.co.nz

Note:

1. The closing date for serving submissions on the consent authority is 5:00pm on Tuesday 23rd October 2018, the 21st working day after Notification is given under Section 95 of the Resource Management Act 1991 (takes into account Labour Weekend).

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   - it would be an abuse of the hearing process to allow the submission (or the part) to be taken further:

4.

Submission on Notice of Requirement by Hastings District Council as Requiring Authority for Designation – RMA20180376

To:

Michelle Hart
Senior Environmental Planner (Consents)
Hastings District Council
Private Bag 9002
Hastings 4156
michelleh@hdc.govt.nz

Introduction

1. Woolworths NZ Ltd ("**Woolworths**") (formerly Progressive Enterprises Limited) is the proprietor of land at 246 – 258 Havelock Road, Hastings. This site and the surrounding area have been re-zoned by Hastings District Council ("**the Council**") from Plains Production zone to Hastings General Residential zone, and made subject to a structure plan, pursuant to Variation 3 to the Proposed District Plan ("**PDP**"). One appeal was lodged with the Environment Court in relation to Variation 3, regarding servicing and infrastructure. This appeal remains outstanding.

2. More recently, Council has notified a Notice of Requirement (RMA20180376) to designate a road corridor within the Howard Street structure plan area, with associated infrastructure for water, waste water and stormwater (via a stormwater corridor). The proposed road corridor directly affects Woolworths' land, running centrally through the sites as shown in Figure 1. The associated infrastructure is intended to service Woolworths' land.

3. By way of background, Woolworths is one of New Zealand's leading supermarket operators. Supermarkets serve an essential support function for domestic living, as well as providing an important economic function in the form of increased local employment; lowering the price of goods; and improving the offering to customers. New supermarkets are established in new or growing residential catchments. It is prudent to enable essential support activities, such as supermarkets, alongside development of new homes. This is particularly relevant in the context of the Howard Street structure plan area, which seeks to create a new residential neighbourhood, extending the Hastings' urban footprint.

4. While Variation 3 has not expressly allowed for supermarkets as sought by Woolworths through the Schedule 1 process, Woolworths remains committed to pursuing a resource consent application for a supermarket (and potentially mixed use) development on its land.

5. Infrastructure servicing is a key requirement for any future development of the Howard Street structure plan area, and a current constraint.

Nature of Submission

6. Woolworths **supports** the Notice of Requirement insofar as it seeks to establish necessary roading, access and infrastructure within the Howard Street structure plan area, thus further enabling urban development beyond the previous re-zoning exercise. Woolworths also **supports** Council's intention to purchase the designated land and to complete the construction of the infrastructure within a 5 year period.

7. Woolworths **supports in part** the intended road corridor, road design, and associated stormwater corridor design.

8. However, Woolworths **seeks changes** to the Notice of Requirement to ensure:

   a) the proposed roading does not unnecessarily restrict efficient and appropriate development on its land;

   b) the proposed roading better enables well-connected development in the structure plan area; and

   c) that the designation will deliver appropriate stormwater conveyance and management more generally, to facilitate urban development in the structure plan area.

Reasons for Submission

9. In its current form, the Notice of Requirement:

   a. Will generate adverse effects on the environment that could be avoided, remedied or mitigated by an alternative alignment. In particular, the adverse social and economic effects of the alignment have been overlooked in the Notice of Requirement;

b. Proposes a route that has not been sufficiently tested against alternatives;

c. Does not achieve the Council's objective to enable the efficient, effective and timely implementation of the physical infrastructure necessary to allow development to occur;

d. Will **not** promote the sustainable management of natural and physical resources as required under Part 2 of the Resource Management Act 1991;

e. Will **not** enable people and communities to provide for their social, economic and cultural wellbeing;

f. Will **not** enable the efficient use and development of natural and physical resources;

g. Will **not** achieve an efficient layout for new residential subdivision design with high-quality amenity values owing to the lack of connectivity and isolation of certain parcels of land; and

h. Is **not** the most appropriate means of exercising the Council's functions, particularly having regard to the efficiency and effectiveness of the provisions relative to other means.

10. Without limiting the generality of the above:

Appropriate Location for Road

a. The Notice of Requirement proposes the following within Woolworths' land:

Figure 1: Designation relative to Woolworths' land (shown in blue)

b. Woolworths acknowledges that the proposed road corridor is generally consistent with the structure plan enshrined by Variation 3 to the PDP. However, as its earlier submissions (and hearing evidence) during the Schedule 1 process identified, there is no requirement for the road to run through its land, and certainly not in the location shown.

c. Indeed, the road within Woolworths' land serves only to access the property at 260 Havelock Road – which already has legal and existing access from Havelock Road via a right of way. Woolworths understands that the preference by Council is for all sites within the structure plan area to obtain access internally or via Howard Street rather than directly from Havelock Road. However, this site has existing access to Havelock Road, and the structure plan does not (and cannot) preclude ongoing use of that access from Havelock Road.

d. Conversely, the road as proposed, running centrally through Woolworths' land unnecessarily restricts development opportunities. In particular, the area of land affected by the road corridor is currently used for the provision of playing fields for the adjacent Parkvale School. The area also potentially serves a dual purpose to allow for on-site stormwater attenuation (until suitable stormwater infrastructure is made available by Council in the structure plan area). Therefore, the road not only removes the option of providing a significant local community

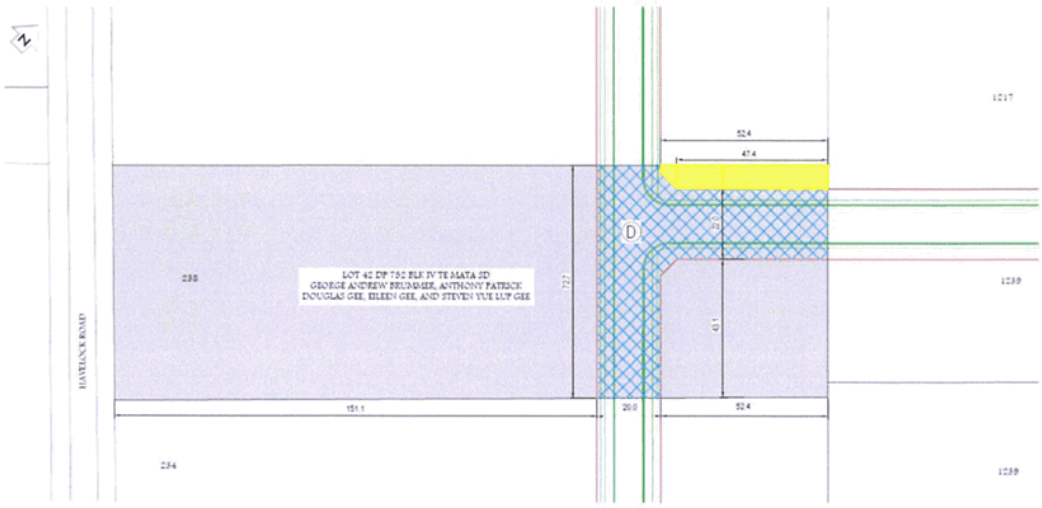
benefit, it also restricts the ability for Woolworths to appropriately service its site in the interim.

e. Woolworths suggests the following alternatives:

- Retain the road layout as shown in the Structure Plan in Variation 3, but remove the road as shown within Woolworths' land from the Notice of Requirement. In other words, do not designate that part of the road corridor now. If concerns are raised about accessing the site at 260 Havelock Road in the future, when a new or intensified development is proposed that renders use of the existing crossing a consentable matter, then the road could potentially be designated at that point; or
- Relocate the road layout in the Notice of Requirement to Woolworths' north-eastern boundary adjacent Parkvale School. A relocation to the rear of Woolworths' land would still allow for access to 260 Havelock Road and potentially provide conveniently located on-street parking for school drop off, while retaining the potential for playing fields on Woolworths' land.

f. In addition to the roading layout within its landholdings, Woolworths is concerned about the proposed location of the road network within the adjacent site owned by the Gee family, as highlighted in Figure 2 below.

Figure 2: Excerpt from Notice of Requirement Plan



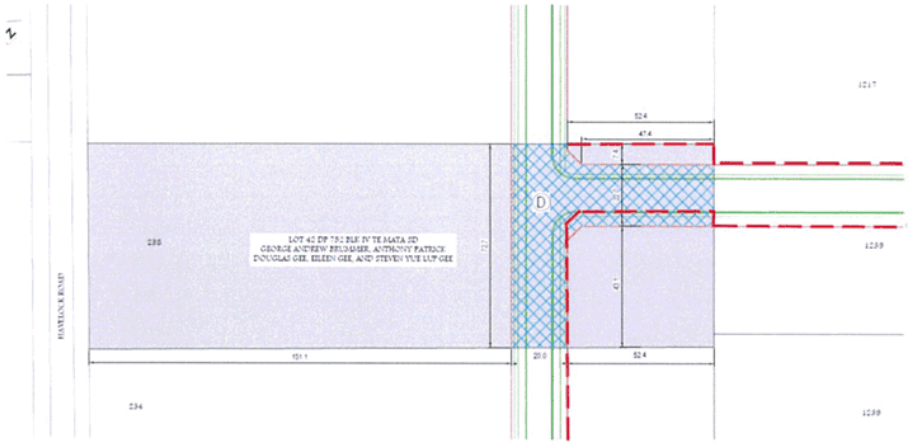
g. The portion highlighted yellow in Figure 2 is a parcel of land that will be orphaned from the rest of the site owned by the Gee family at 238 Havelock Road, should the roading corridor proceed as shown in the Notice of Requirement.

h. This will result in:

- An unusable parcel of land;
- A segregation strip between the road running to Howard Street in the north-east and Woolworths' site boundary which limits a sensible access arrangement to and from Woolworths' land.

i. The alternative would be to designate to Woolworths' boundary. This can be accommodated without impacting on Parkvale School, as shown in Figure 3 below.

Figure 3: Proposed realigned spur to Howard Street (red dashed line)



j. Woolworths acknowledges that this results in a "kink" in the designation boundary but that does not preclude a more subtle curve in the actual road corridor being provided within that legal extent. This is particularly so if the spur into Woolworths' land is deleted from the Notice of Requirement or moved closer to its northern boundary.

k. It also provides the opportunity to include on-street parking within the road reserve adjacent the school's boundary, to facilitate drop off and pick up by parents. A slight curve in the road at this point would assist in reducing speeds around a sensitive use such as a school in a traffic safety context. This approach

can still facilitate an off-set from existing classrooms, as suggested in the application documentation.

Appropriate Stormwater Infrastructure and Network Capacity

l. One of the critical issues that has held up urban development within the structure plan area has been the lack of provision for stormwater run-off and management. Woolworths understands that is the key reason for the singular appeal against Variation 3 to the PDP.

m. In this regard, Woolworths supports the intention by Council in this Notice of Requirement to ensure appropriate land is available to provide critical services to the structure plan area, particularly for the conveyance of stormwater, and agrees the timely provision of servicing by Council is better than a developer-led, piecemeal approach to construction of services (para 8.14). Woolworths particularly supports the "key principle" of the Notice of Requirement that the infrastructure be delivered in an equal and timely manner across the structure plan area, rather than to the downstream properties first, on the basis that it is "much more responsive to those with immediate needs to commence development" (para 8.25).

n. Woolworths acknowledges the Council's intention to "convey piped infrastructure for stormwater for up to a 5 year rainfall event and overland flow paths for up to a 50 year rainfall event to a stormwater detention area, which will detain stormwater runoff in significant rainfall events during major events" (para 4.17).

o. However, the supporting Stormwater Capacity Report provided by the Council (prepared by MWH) acknowledges it is only a high-level assessment, and appears to assess only existing stormwater capacity. It concludes that the structure plan area is undersized in some catchments and that further analysis, including topographical surveys, is necessary to ascertain a more detailed stormwater network design.

p. Woolworths therefore considers that Council needs to undertake further assessment of the intended stormwater network design to ensure that it will appropriately provide for future development within the structure plan area.

Relief Sought

11. Progressive seeks the following relief:

    a. Confirm the requirement for designation with the following proposed amendments:

        i) Either:

            i. Remove the proposed roading corridor from Woolworths' land; or

            ii. Re-locate the proposed roading corridor within Woolworths' land to immediately adjacent the common boundary with Parkvale School;

        ii) Re-locate the proposed roading network within the Gee family property (238 Havelock Road) to avoid severing land by designating to the Woolworths' land boundary; and

        iii) Undertake further assessment of required stormwater capacity and network design to ensure the structure plan area can be appropriately developed in the future, being suitably serviced, especially in relation to stormwater conveyance and discharge.

    b. Any consequential and/or other changes necessary to address the matters identified in this submission.

Other Matters

12. Woolworths is not a trade competitor for the purposes of section 308B of the Resource Management Act 1991.
13. Woolworths wishes to be heard in support of its submission.
14. If others make a similar submission, Woolworths would consider presenting a joint case with them at the hearing.

DATED at Auckland this 18th day of **October 2018**

Woolworths NZ Ltd

pp.

Matthew Grainger
National Development Manager
E: matthew.grainger@countdown.co.nz
P: Private Bag 93306, Otahuhu, AKL 1640

Address for Service:

Kay Panther Knight
Director / Planning Consultant
DDI: 09 636 4535, Mobile: 029 502 4550
Email: kay@formeplanning.co.nz
Forme Planning Ltd, PO Box 24463, Royal Oak, Auckland 1345

5.

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FORM 21

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CUSTOMER SERVICES
23 OCT 2018
RECEIVED

Date Submission Received: _____

Date Submissions Close: **5pm, Tuesday 23rd October 2018**

To: Environmental Planning
Resource Management
Hastings District Council
Private Bag 9002
Hastings 4156

Attention: Michelle Hart

PERSON(S) MAKING SUBMISSION:

First Name	Middle Name(s)	Last Name
KAREN	MARY	COOPER

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For a designation:	Designate land for the construction and installation of a road corridor with associated infrastructure for water, wastewater and stormwater; and a stormwater corridor. The land to which the requirement applies is located on the south east side of Hastings City off Howard Street, Parkvale.

HASTINGS DISTRICT COUNCIL

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TE KAUNIHERA O HERETAUNGA

1. **The specific parts of the notice of requirement that my submission relates to are:**
(Please continue on separate sheet(s) if necessary)

Refer attached

2. **My submission is:** *(include whether you support, oppose or are neutral to specific parts of the notice of requirement or wish to have them amended; and the reasons for your views. (Please continue on separate sheet(s) if necessary)*

Refer attached

3. I/We seek the following recommendation or decision from the Hastings District Council:

- [x] Confirm the requirement for designation
- [x] Modify the requirement
- [x] Impose conditions
- [ ] Withdraw the requirement

(Please give precise details including the general nature of any conditions sought) *(Please continue on separate sheet(s) if necessary)*

Refer attached

4. I wish to be heard in support of my submissions, or [x]

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I **do not** wish to be heard in support of my submissions ☐

5. If others make a similar submission I will consider presenting a joint case with them at any hearing, or ☐

I **do not** wish to present a joint case ☑

Signed: K. M. Coope Date: 23/10/18

6. **Submitter Contact Details**

Contact Person: Karen Mary Coope
Postal address for service of submitter: 1259 Havelock St
HASTINGS 4122

Daytime Phone Number: (06) 8785501
Fax Number:
Mobile Phone Number: 027 406 6526 (Preferred Contact)
Email Address japeka@xtra.co.nz

Note:

1. The closing date for serving submissions on the consent authority is 5:00pm on Tuesday 23rd October 2018, the 21st working day after Notification is given under Section 95 of the Resource Management Act 1991 (takes into account Labour Weekend).

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Item 2

Attachment 5

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- it contains offensive language:
- it is supported only by material that purports to be independent expert evidence, but has been prepared by a person who is not independent or who does not have sufficient specialised knowledge or skill to give expert advice on the matter.

4. A signature is not required if you make your submission by electronic means.

5. If you wish for the application to be heard by independent commissioner(s) rather than the council, this can be requested up until 5 working days after the close of submissions. (Note: requesting independent commissioner(s) is subject to costs)

6. All submissions (including name and contact details) are published and made available to elected members and the public. Personal information will also be used for the administration of this notice of requirement.

Notice of Requirement for Designation of the Road Corridor (Howard St) RMA 20180376

Submission from Karen Cooper1259 Howard St Hastings (23 October 2018)

1. Specific Parts of the Requirement that my Submission Relates to are:

1.1 Specifically, to the portion of the proposed designated road as it affects the property at 1259 Howard St being specified as 'Plan K' in the schedule of land to be taken by designation (Schedule 2) and Schedule 1 being the land requirement overview plan and the land requirement plan for 1259 Howard St as per the Notice of Requirement).

1.2 In general terms to the construction of the proposed road corridor and associated reticulated water, wastewater and stormwater services, including:

- The nature of the work (Part 1 of the Notice of Requirement)
- Development Contributions Policy (Part 2, Section 10 9 Other Relevant Documents of the Notice of Requirement)
- Construction Effects of Noise and Dust Actual and Potential Effects on the Environment (Part 2, Section 11 of the Notice of Requirement)
- Alternatives to the proposed roading corridor (Part 2, Section 12 of the Notice of Requirement)
- The alternatives to designation (Part 2, Section 13 of the Notice of Requirement)

2. My Submission is:

2.1 Background to my Submission

In April 2017, following the release of the Commissioner's recommendations into the Howard St rezoning (Variation 3) in March 2017, I lodged an appeal. This appeal did not challenge the rezoning from plains to residential but related to the sizeable area of land proposed for stormwater detention and the structure road as these affected my property. My appeal sought to remove the stormwater detention area from my property and to relocate the indicative roading corridor to the edge of the Riverslea/Awahou drain. The purpose of this was to increase the area of land available for residential development and to minimise the impact of road noise and nuisance on my residential property.

The parties to the appeal (Karen Cooper, Hastings District Council and the HB Regional Council) agreed to a process of expert caucusing on the issues raised by the appeal. The caucusing process involved investigations by expert engineers into the technical suitability of several stormwater management options for the Howard St area and included a geotechnical report into lateral spread risks.

Through subsequent discussions, I have agreed to settle the appeal by consent. However, a condition of my agreement to settling this appeal is that, subject to any submissions received

through the road designation process, the Hastings District Council must not amend the road designation or construct the road in a location further north-west than shown in Appendix A to the draft Consent Order. To achieve that it will be necessary to ensure that no part of the structure road is located at any point further towards my house section (Lot1) than as shown in the proposed subdivision plan by Shanley and Co (dated 9 October 2018 attached) (ie into the hatched area shown on this plan). The relevant measurements are provided in Para 2.3.1 of this submission.

2.2 Support for the Notice of Requirement

2.2.1 I generally support the proposed location of the roading corridor and including the construction of piping and swales for the reticulated water, wastewater and stormwater services as for Plans A – J inclusive as referred to in Schedule 2 Land Areas to be taken by Designation of the Notice of Requirement and as shown on the Schedule 1 Land Requirement Overview Plan. My reasons for this support are:

- The roading network will provide access to all properties in the Howard St residential zone so that no property is landlocked
- It will ensure that all properties can be serviced by roading, water and wastewater services
- It provides for the overland flow of stormwater to the stormwater detention area

2.2.2 I support the proposal by Hastings District Council to designate the roading corridor as opposed to other alternatives considered in Section 13 of the Notice of Requirement. My reasons are that designation will:

- Enable the construction of the road to be undertaken in a consistent and integrated manner and to the same construction standards across all properties
- Ensure that the road construction is not carried out in an ad hoc and piecemeal manner and that no property owner or developer, for whatever reason, can delay the construction of the road as it crosses their land and hold up any development on adjoining properties
- Allow all property owners in the rezoned area to undertake any residential development on their land in their own timeframe without constraints around essential infrastructure and services
- Allow all landowners to access and service their respective residential developments
- It will support the Regional Policy Statement ISS UD1 in that it will assist in the efficient provision, operation and maintenance of physical infrastructure and services

2.2.3 I support the designation of the additional stormwater corridor on the property at 214 Havelock Road which will convey stormwater from any development on 1239 Howard St to the internal road corridor. This is required to negate the difficulties in achieving sufficient fall to the Howard St road reserve and the high cost of fill (as per Section2 clause 12.7) which impacts negatively on the cost of development.

2.3 Conditions Sought on Notice of Requirement

The structure road as it crosses my land at 1259 Howard St is shown as "Plan K" (as referred to in Schedule 2 Land Areas to be taken by Designation) and in the Schedule 1 Land Requirement Plans. I do not oppose the designation and proposed location of the structure road and including the construction of piping and swales for the reticulated water, wastewater and stormwater services for "Plan K" subject to the following conditions and to the submission below regarding an alternative road width within the alignment.

I also do not oppose the setback from the road curve and the 90 degree access to the Howard St intersection which is required for safety and visibility reasons.

2.3.1 Primary Condition

This part of the structure road (shown as "Plan K" on Schedule1) must not be moved any further north-west and south-west towards my residential property than agreed with Hastings District Council in the appeal consent memorandum and consent order and into the hatched area shown on the proposed subdivision plan by Shanley and Co (dated 9 October 2018 and attached).

The relevant measurements are shown on the attached prosed subdivision plan by Shanley and Co dated 9 October 2018 and are still subject to final survey. These are:

- Distance from the north-west boundary of the structure road to the boundary of Lot 1 at the Howard St boundary equals 61.59 metres
- Distance from the south-west boundary of the structure road to the Lot 1 boundary extension (red arrow) equals 23 metres at the boundary with 188 Havelock Road (Lot 1 DP 28632 on the plan) (this connects with "Plan J" in the Notice of Requirement)
- Distance from the south-west boundary of the structure road to the south-west boundary where Lot 2 on the proposed subdivision plan by Shanley and Co (dated 9 October 2018) intersects with the boundary of Lot 47 DP 752) equals 38.20 metres (15.20 + 23.00 metres)

2.3.2 Other Conditions

- Because of the proximity of my residential dwelling to the stormwater area and structure road, my property will be significantly adversely affected by both noise and dust during construction. Hastings District Council must therefore ensure that any noise and dust generated during construction is minimised. They must take all reasonable steps to protect the privacy and security of my property and must have adequate systems in place to minimise dust and noise and to ensure as little inconvenience as possible to me as the land owner. This includes the use of suitable soil adhering compounds to minimise dust rather than using water which will dry too quickly and will therefore have only limited effect on reducing dust.

- It is highly likely that the residual land (after the Council land take for the stormwater and road requirements) will remain under grazing. Therefore Council must undertake to fence the surveyed boundary between the structure road and my remaining land with a seven wire post and batten stock proof fence prior to the start of any construction (unless the land has been sold for development in the interim).

- I disagree with the statement in Part 2 Site Description Clause 3.3 in so far as it affects my property. I submit that the road is close to my residential dwelling and I will be adversely affected by ongoing road and traffic noise, including acceleration and deceleration of turning

traffic at the intersection of the structure road with Howard St. I am therefore seeking that Council should fund the construction of a noise cancelling or mitigating fence along the eastern boundary of my house section to minimise future vehicle noise from the structure road impacting on my privacy, security and property.

2.4 Areas of Disagreement or Opposition to the Notice of Requirement

2.4.1 I oppose any plan by Hastings District Council to increase development contributions for the Howard St area over and above other development levies for the district as is suggested in paragraph Section 2, Clause 10.9 of the Notice of Requirement. Any increase in development contributions will increase the cost of development and therefore has the potential to deter land purchase by developers and reduce land sale prices for land owners.

2.4.2 The construction of the road should be commenced as soon as practicable. The proposed indicative four year time horizon (Section 2, Clauses 4.4 and 10.9 of the Notice of Requirement) is too long. Property owners need certainty around construction dates and a shortened time frame to facilitate land sale processes and avoid lower sale prices due to finance holding costs.

Alternative Road Width within Proposed Road Alignment

Section 2 Clause 12.4 and the associated table refer to the alternative roading alignments which were considered under the Section 42A report on the Howard St rezoning. None of the options considered a road width of less than 20 metres.

I understand from the Traffic Design Group that it is considered good design practice to have two road access points where residential traffic numbers get to around the 400 – 500 mark. Two exits ensure access to the development in case of an emergency which could close the road. However this is not a legal requirement and there is no requirement for both access points to be primary roads of 20 metres width. One road could be a narrower secondary road of 10 metres in width which could still include water, wastewater and stormwater services. This secondary road could be used if necessary for vehicle access but would be primarily a pedestrian, cycling track. There is thus the potential for that part of the road (as is currently specified in "Plan K") to be reduced to 10 meters in width (6 metres for the road plus some road reserve for services). Access for any residential development on 1259 Howard St would be from Howard St rather than the structure road. The rezoned area would therefore have a primary road by the Parkvale School ("Plan A" in the Notice of Requirement) and a secondary road through 1259 Howard St (to replace "Plan K").

This option would provide additional land for residential development on 1259 Howard St but still allow the water and wastewater services to connect to the infrastructure network on Howard St. As matters stand, adequate consideration has not been given to this alternative, as required under Section 171 of the RMA.

3. I Seek the Following Recommendations or Decisions from the Hastings District Council

3.1 Subject to Section 3.7 below, approve the proposed location of the roading corridor and including the construction of piping and swales for the reticulated water, wastewater and stormwater services as for Plans A – J inclusive

3.2 Subject to Section 3.7 below approve the proposal by Hastings District Council to designate the roading corridor as specified on Plans A-J

3.3 Approve the designation of the additional stormwater corridor on the property at 214 Havelock Road

3.4 Subject to Clause 3.7 below, approve the designation and location of the structure road on my land ("Plan K") but subject to the following conditions as outlined in paragraphs 2.3.1 and 2.3.2 above:

- This road must not be moved any further north-west and south-west towards my residential property than agreed with Hastings District Council in the appeal consent memorandum and consent order and as shown on the proposed subdivision plan by Shanley and Co dated 9 October 2018 (refer to para 2.3.1 above)
- During the construction of the road, Council and their contractors must take all reasonable steps to protect the privacy and security of my property and must have adequate systems in place to minimise dust and noise and to ensure as little inconvenience as possible to me as the land owner
- Council must undertake to fence the surveyed boundary between the structure road and my remaining land with a seven wire post and batten stock proof fence prior to the start of any construction (unless the land has been sold for development in the interim).
- I am also seeking that Council should fund the construction of a noise cancelling or mitigating fence along the eastern boundary of my residential area to minimise future vehicle noise from the structure road impacting on my privacy, security and property.

3.5 Approve commencement of the construction of the road and services as soon as possible in 2019

3.6 Keep development levies at the current advertised rate for 2018/19 of $24,441.81 per section

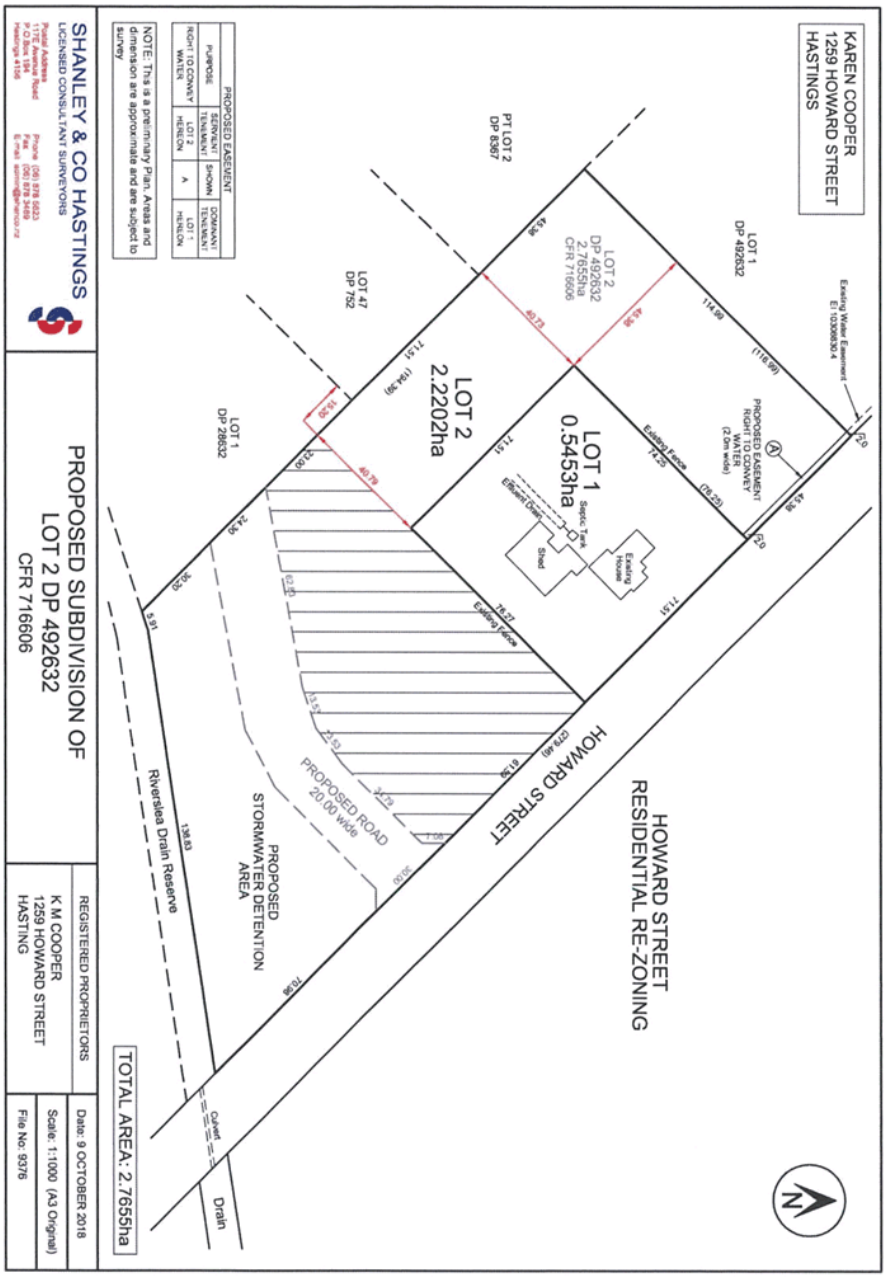
3.7 Give better and adequate consideration to reducing the width of the structure road in "Plan K" to that of a secondary road of 10 m in width (including water, wastewater and stormwater services) to provide additional land for subdivision, and confirm the designation to the extent reasonably necessary and appropriate only following such consideration.

K M Cooper

Karen M Cooper
1259 Howard St, Hastings 4122
23 October 2018

Item 2

Attachment 5



6

6.

MINISTRY OF EDUCATION
TE TĀHUHU O TE MĀTAURANGA

CUSTOMER SERVICES
23 OCT 2018
RECEIVED

18 October 2018

Hastings District Council
207 Lyndon Road East
Hastings 4122

Hastings District Council – Howard Street Road Corridor Notice of Requirement for Designation

The Ministry of Education ('the Ministry') welcomes the opportunity to provide feedback on the Howard Street Road Corridor Notice of Requirement for Designation, Parkvale, Hastings.

Background:

The Ministry is the Government's lead advisor on the New Zealand education system, shaping direction for education agencies and providers and contributing to the Government's goals for education. The Ministry has responsibility for all education property owned by the Crown. This involves managing the existing property portfolio, upgrading and improving the portfolio, purchasing and constructing new property to meet increased demand, identifying and disposing of surplus State school sector property and managing teacher and caretaker housing. The Ministry is therefore a considerable stakeholder in terms of activities that may impact on existing and future educational facilities and assets in the Hastings District.

The Notice of Requirement in relation to the Ministry's interests:

Hastings District Council have notified a Notice of Requirement (NOR) for a designation associated with a road corridor, infrastructure for water, wastewater, and stormwater; and a stormwater corridor. The Ministry is supportive of the NOR. However, the Parkvale School already has traffic and parking problems around the school, particularly on Howard Street. The location of the proposed collector road on the boundary of the school, will impact on the learning environments of the class rooms due to the noise associated with the traffic. With the construction of the road these class rooms will be significantly closer to the road than they are at present and the standard front yard requirement will no longer be available to them. For this reason in prior submissions (April, August and September 2016) on the proposed Howard Street Structure Plan the Ministry requested a buffer area to be incorporated into the design of the road, through the inclusion of vehicle parking and a footpath. While the NOR shows the proposed road is 22 metres wide, no detail has been provided on the potential cross section opposite the classrooms on this boundary.

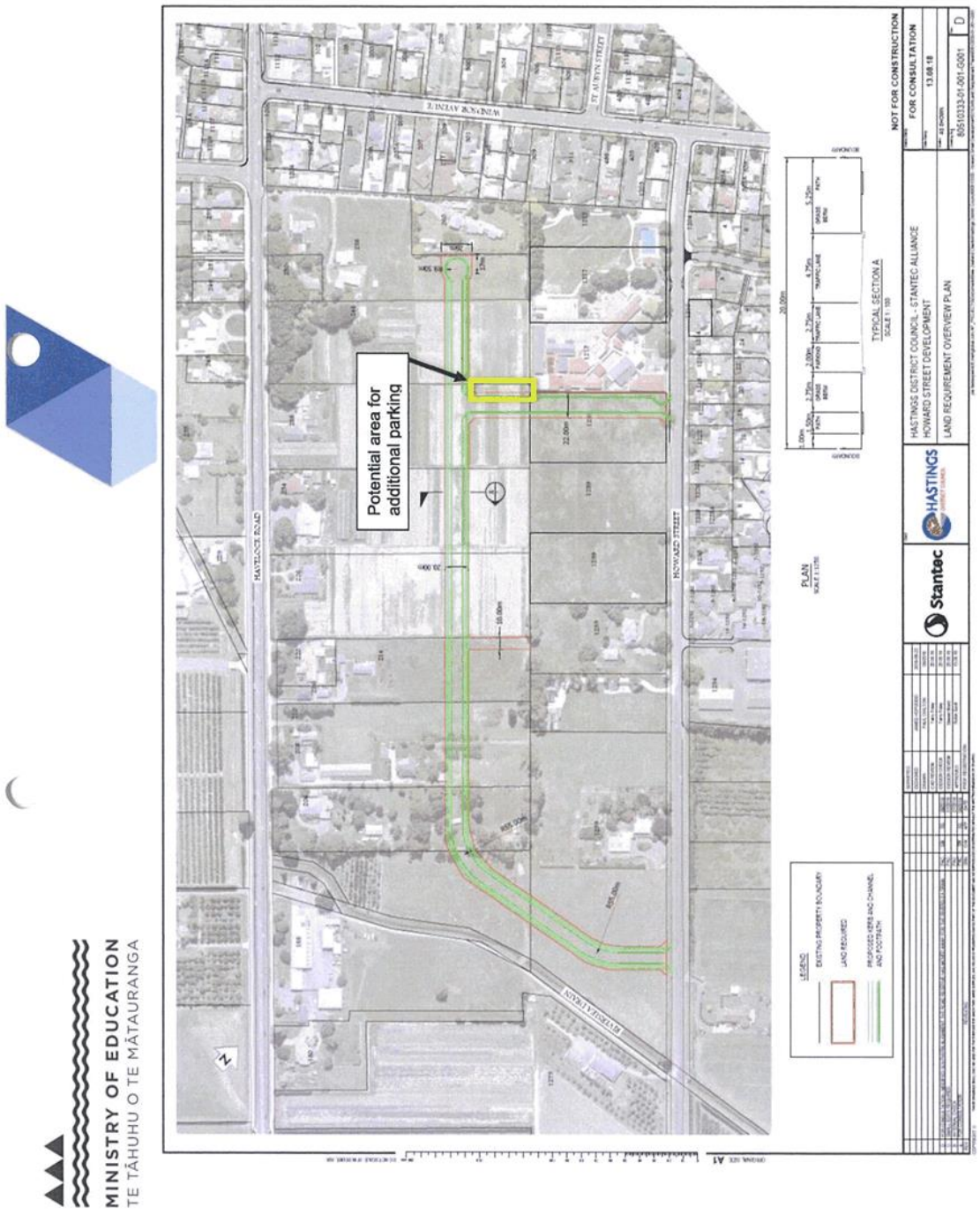
The Ministry also notes that west of the school boundary on the collector road, there may be an available area for additional vehicle parking, leading up to the intersection with the new collector road as shown on the attached sketch. This additional parking area could help to alleviate existing congestion on Howard Street.

Relief Sought:

The Ministry requests that the Council consult with them on the proposed collector road and provide detailed design, including a potential cross section, as part of the NOR and prior to the Outline Plan of Works.

The Ministry welcomes any opportunity to discuss this further with Council. Should you wish to discuss any aspect of this feedback please contact the undersigned as consultant to the Ministry.

Andrew Hill, Planner (Beca Ltd)
P: 07 577 3938 E: andrew.hill@beca.com



Item 2

Attachment 5

HAWKE'S BAY
REGIONAL COUNCIL

18th October 2018

Hastings District Council
Private Bag 9002
Hastings 4156
Attention: Craig Thew/Craig Scott
via email to: craigs@hdc.govt.nz and michelleh@hdc.govt.nz

Dear Craig

Matters for consideration regarding Notice of Requirement for Designation from the Hastings District Council to designate land for a road corridor and a stormwater corridor (RMA20180376)

The Hawke's Bay Regional Council (HBRC) does not wish to make a formal submission regarding this Notice of Requirement but would like to advise Hastings District Council of the following matters to be taken into consideration for the subject site. These matters reflect comments and feedback I have received from various teams within HBRC. You may be aware of some of these matters already given HBRC's prior involvement in the Howard Street rezoning variation.

Section 11.0 Actual and Potential Effects on the Environment
With regards to Section 11.0 Actual and Potential Effects on the Environment, we provide the following comments:

While some changes have been made to the original structure plan associated with Variation 3, HBRC is satisfied that the amended structure plan attached with this Notice of Requirement (NOR) does not present any new flood control or drainage issues that have not previously been discussed in Variation 3 appeal proceedings.

Stormwater
As you are aware, there is an existing comprehensive stormwater discharge consent for the subject site (DP00355Wb). Under the existing conditions for this consent, there are a number of requirements for new developments that need to be met as part of this consent. The NOR in no way alters that consent's conditions nor associated requirements.

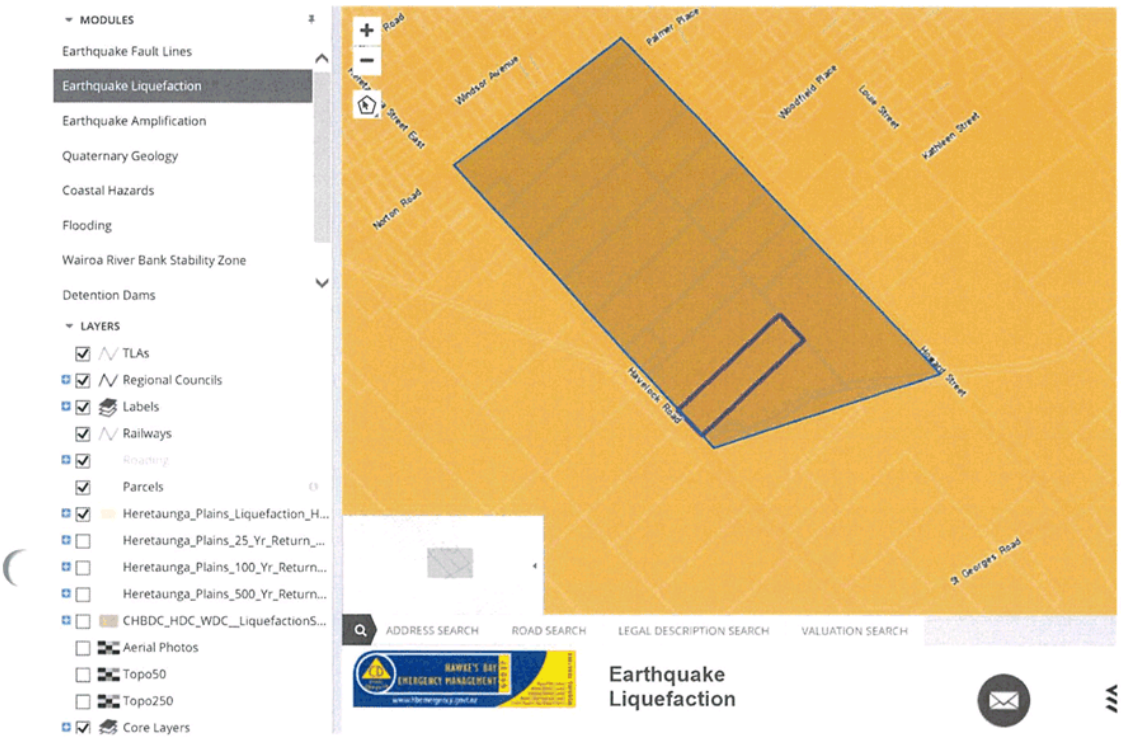
Bores
There are a number of known wells located in the subject site, and possibly some that are not identified across this area of land. As part of your infrastructure works, these wells should be decommissioned. If and when decommissioned, that needs to be done in accordance with Rule 4 of the Regional Resource Management Plan (RRMP).

Contaminated Soils
Previous assessment of the subject site identified that there are some contaminated soils present on 188 Havelock North Road. If contaminated soil is to be stored or stockpiled then please refer to Rule 48 of the RRMP. If the conditions of Rule 48 cannot be met, a consent will be required under Rule 52 of the RRMP.

Drainage Works & Structures
For structures or deposition in or within the Riverslea Drain, if the conditions of RRMP Rule 70 cannot be met, then a resource consent will need to be obtained from HBRC.

Section 11.13 Natural Hazards
The NOR documentation states that a review of the Hawke's Bay Emergency Management Hazard Information Portal was undertaken and no hazards were recorded. In fact, our assessment of natural hazards for the subject site does indeed show both flooding and liquefaction risks, as illustrated in the following screenshot:

Hawke's Bay Regional Council
159 Dalton St, Private Bag 6006, Napier 4142, New Zealand Tel 06 835 9200 Fax 06 835 3601 Freephone 0800 108 838
www.hbrc.govt.nz



In particular, the subject site is:

Situated on alluvial sand/silt/gravel which tends to amplify shaking in an earthquake. The liquefaction risk is identified as medium vulnerability, which means in a 25-year return period earthquake (Mw =6.2, PGA=0.14g) there would be insignificant liquefaction, but in a 100-year return period earthquake (Mw =6.3, PGA=0.25g) or a 500-year return period earthquake (Mw=6.5, PGA=0.42g) there would be moderate liquefaction related land damage in this area.

There are links on the hazard portal to the relevant science reports unpinning these risk maps with further explanations.

We recommend that any buildings and infrastructure to be located and built in this area should give appropriate consideration to all aspects of land conditions, and follow national guidance for development on liquefaction prone land. Such guidance can be found online here:

https://www.building.govt.nz/assets/Uploads/building-code-compliance/b-stability/b1-structure/planning-engineering-liquefaction.pdf

Closing comment

Should you have any queries with regards to the content of this letter please contact me in the first instance.

Yours sincerely

GAVIN IDE
MANAGER POLICY AND PLANNING
STRATEGIC PLANNING GROUP
Phone (06) 833 8077
Email: gavin@hbrc.govt.nz

From: Russell, Grant
To: Michelle Hart
Subject: RMA20180376 (Howard Street NOR - Late submission (Parkvale School, Board of Trustees)
Date: Monday, 12 November 2018 1:27:35 PM

Hi Michelle

For your consideration, with an understanding that there is a separate process for accepting late submissions and it will be the decision of the Commissioner whether he will be prepared to accept a late submission.

Regards Grant

1. **Person Making Submission:**	Parkvale School of Trustees c/- Parkvale School Howard Street Hastings Attention: Grant Russell (Chair)
2. **Trade Competition:**	Parkvale School is not a trade competitor for the purpose of 308B of the RMA.
3. **Specific parts of the NOR that this submission relates to:**	The notice of requirement figure indicating the land to be designated 'taking' the land that traverses land under the ownership of General Distributors Ltd (Woolworth's land) – shown below crossing two parcels of land. 
4. **Submission details:**	We support the NOR, provided Parkvale School is not adversely impacted upon by the vicinity of the NOR on the land owned by General Distributors Ltd. We do not wish to see the NOR relocated immediately adjacent to the common boundary of Parkvale School, and would vigorously oppose any modification of the NOR which resulted in this modification as a suggested outcome.
5. **Seek the following recommendation:**	Modify the requirement.

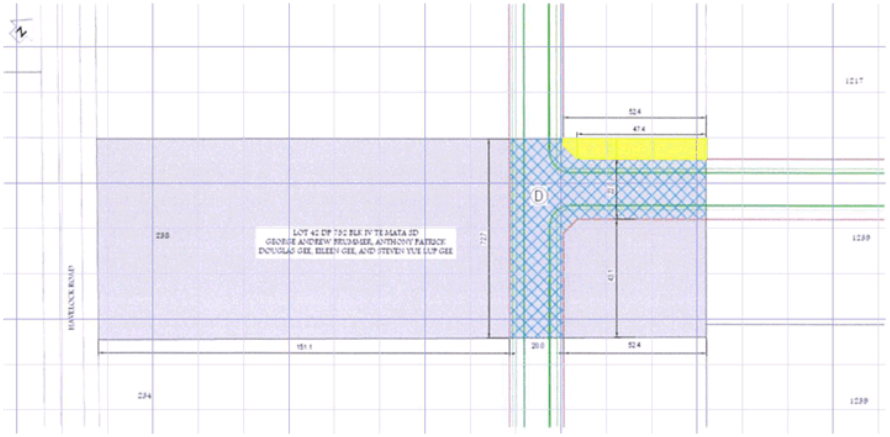
	As noted above.
6. **Submission Support:**	The Parkvale School Board of Trustees recognises the role of the Ministry of Education as the lead Crown Agency in managing property portfolio and would present a joint case with them, if appropriate.
7. **Contact details:**	Parkvale School of Trustees c/- Parkvale School Howard Street Hastings Attention: Grant Russell (Chair) M: 027 223 4129 E: grant@parkvale.school.nz

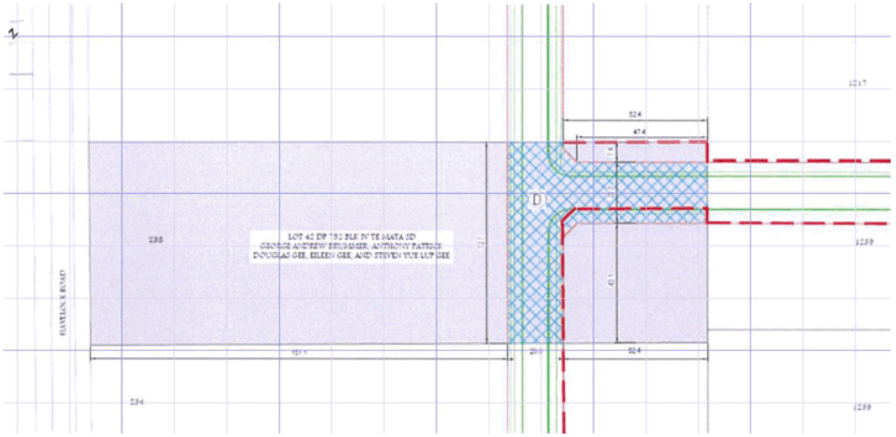
Submission Summary - Howard Street Notice of Requirement - Designation Corridor

Submission Number	Submitter Name/s	Submission Relates to	Submission Summary	Decision Sought
1	Christopher and Lorraine Burns	The location of the proposed structure road	Submission supports the Councils proposed location for the road. When designing the layout for our proposed subdivision the distance between the structure road to our Howard Street and Havelock Road boundaries was required when calculating the section sizes. Any movement from the proposed location of the road will alter the boundaries of all 20 sections.	Confirm the requirement for the designation
2	Barry and Lynne Keane	Stormwater corridor as it applies to 214 Havelock Road	Opposes the stormwater corridor along the Howard Street end of their property at 214 Havelock Road, because: (a) in the 65+ years family have lived at 214, it has never flooded – natural water collection points are on adjacent properties; (b) it was not part of the original plan; (c) it will reduce the subdivision potential of our land from 4 to 3 sections; (d) HDC future plans to use the corridor as a walk/cycle way will affect privacy and reduce value of adjacent land; and (e) the Howard Street option in paragraph 12.7 (the original plan) provides a suitable alternative. This option involves an outlet from 1239 Howard Street, to Howard Street itself. Stormwater would then be conveyed to Howard Street and the detention area.	Withdraw the stormwater corridor as it relates to 214 Havelock Road as other options exist (Howard Street or Ken Gee's property)
3	Marcus Hill on behalf of Trace Group	Designation of the internal road and stormwater corridors	The owners of 214 Havelock Road support the position of the proposed road within the structure plan and the location and function of the proposed overland flowpath. The submission highlights that the support of the current roading position is contingent on the proposed overland flowpath designation and its proposed position remaining, linking the subject land above to the new roading network and in turn to the requisite services that will be under the carriageway.	Confirm the requirement for the designation
4	Woolworths NZ Ltd	Designation of the	Woolworths supports the Notice of Requirement (NOR) insofar as it seeks to establish necessary roading, access and infrastructure within the Howard Street structure plan area, to	Confirm the requirement

	(formerly Progressive Enterprises limited)	internal road and stormwater corridors	enable urban development. However this submission supports in part the intended road corridor, road design and associated design and consequently seeks amendments to the requirement. It is submitted that in its current form the NOR will generate adverse effects on the environment that could be avoided, remedied or mitigated by an alternative alignment; proposes a route that has not been sufficiently tested against alternatives; doesn't promote sustainable management; isn't effective nor effective as its implementation isn't timely; will not achieve an efficient layout for future development with high amenity values due to a lack of connectivity and isolation of certain parcels of land. The designation relative to the Woolworth's land is shown below:	with modifications

			 The road within the Woolworths land is to provide access to 260 Havelock Road, which currently has legal and existing access from Havelock Road via a Right of Way. It is also submitted that the roads position as proposed for this property unnecessarily restricts development opportunities and the use of this area by the adjoining Parkvale School as playing fields. Woolworths therefore suggests the following alternatives:	

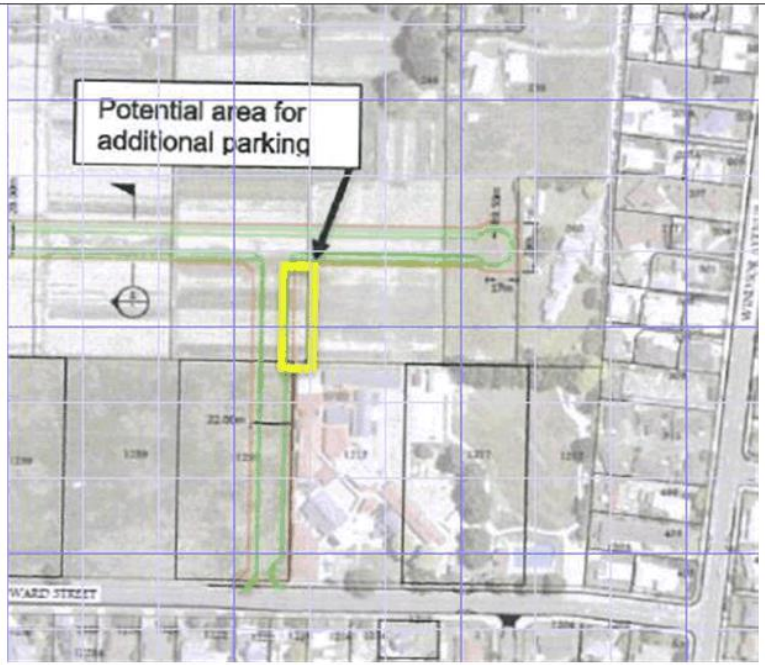
			(a) not designating the portion of the road corridor in Woolworths ownership now, rather leave it and if future concerns are raised about accessing 260 Havelock Road in the future when development details are known then potentially designate; or (b) relocate this portion of the road corridor to the north-eastern boundary adjacent to Parkvale School. A relocation to the rear of Woolworths land will still provide access to 260 Havelock Road and potentially conveniently provide on-street parking for school drop off. In addition to concerns about their own landholdings, Woolworths submission raises the issue of the proposed location of the road within the adjacent site owned by the Gee family, as highlighted in the figure below:  The portion highlighted in yellow above is a segment of land that will be orphaned from the rest of the site owned by the Gee family at 238 Havelock Road, should the roading corridor proceed as shown in the Notice of Requirement. This will result in an unusable parcel of land and a segregation strip which limits a sensible access arrangement to and from Woolworths'	

			land. The alternative would be to designate to the Woolworths' boundary, which could occur without impacting on Parkvale School, as shown below:  Woolworths' acknowledges that this results in a "kink" in the designation boundary but this does not preclude a more subtle curve in the actual road corridor being provided within the legal extent. This is particularly so if the spur into Woolworths' land is deleted from the NOR or moved closer to its northern boundary. It is submitted that this also provides the opportunity to include on-street parking within the road reserve adjacent to the schools boundary, to facilitate drop off and pick up by parents. A slight curve in the road at this point would assist in reducing speeds around a sensitive landuse. To this end, it is sought that the proposed roading network within the Gee family property (238 Havelock Road) be relocated to avoid severing land by designating to the Woolworths' land boundary. This submission supports the intention by Council in this NOR to ensure appropriate land is available to provide critical services to the structure plan area, particularly for the conveyance of stormwater and agrees the timely provision of servicing by Council is better than a developer led, piecemeal approach to the construction of services. The submission	

			acknowledges intent around stormwater management for 5 and 50 year events. However, the submission questions whether the high level stormwater assessment (Stormwater Capacity report prepared by MWH), which appears to consider existing stormwater capacity only is sufficient, as the report concludes the structure plan area is undersized in some catchments and that further analysis, including topographical surveys is necessary to ascertain a more detailed stormwater network design. Woolworths submits that Council needs to undertake this further assessment so that the design will appropriately provide for future development within the structure plan area, thereby more appropriately dealing with stormwater conveyance and discharge.	
5	Karen Cooper	Designation of the internal road and stormwater corridors	This submission generally supports the location of the roading corridor and including the construction of services. This option as opposed to the other alternatives is submitted as the most appropriate, as it will: • Enable the construction of the road to be undertaken in a consistent and integrated manner and to the same construction standards across all properties; • Ensure that the road construction is not carried out in an ad hoc and piecemeal manner and that no property owner or developer, for whatever reason, can delay the construction of the road as it crosses their land and hold up any development on adjoining properties; • Allow all property owners in the rezoned area to undertake any residential development on their land in their own timeframe without constraints around essential infrastructure and services; • Allow all landowners to access and service their respective residential developments; and • It will support the Regional Policy Statement ISS UDI in that it will assist in the efficient provision, operation and maintenance of physical infrastructure and services. The proposed designation of the additional stormwater corridor on the property at 214 Havelock Road which will convey stormwater from any development on 1239 Howard Street to the internal road corridor. This is required to negate the difficulties in achieving sufficient fall to the Howard Street road reserve and the high cost of fill (as per Section2 clause 12.7) which impacts negatively on the cost of development. It is submitted that consideration should be given to an alternative roading alignment, which allows for one road to be less than 20 metres in width (secondary road and currently specified	Confirm the requirement with modifications

			in "Plan K") which could still include water, wastewater and stormwater services. This secondary road could be used if necessary for vehicle access but would be primarily a pedestrian, cycling track. There is thus the potential for that part of the road (as is currently specified in "Plan K") to be reduced to 10 metres in width (6 metres for the road plus some road reserve for services). Access for any residential development on 1259 Howard St would be from Howard Street rather than the structure road. The rezoned area would therefore have a primary road by the Parkvale School ("Plan A" in the Notice of Requirement) and a secondary road through 1259 Howard St (to replace "Plan K"). This would allow additional land to be made available for residential use. The following additional recommendations or decisions are also sought from Council: • Subject to the above amendment, approve the proposed location of the roading corridor and including the construction of piping and swales for the reticulated water, wastewater and stormwater services as for Plans A-J inclusive and designate accordingly and attach the following conditions to any approval: ○ This road must not be moved any further north-west and south-west towards my residential property; ○ During the construction of the road, Council and their contractors must take all reasonable steps to protect the privacy and security of my property and must have adequate systems in place to minimise dust and noise and to ensure as little ○ inconvenience as possible to me as the land owner ○ Council must undertake to fence the surveyed boundary between the structure road and my remaining land with a seven wire post and batten stock proof fence prior to the start of any construction (unless the land has been sold for development in the interim); ○ I am also seeking that Council should fund the construction of a noise cancelling or mitigating fence along the eastern boundary of my residential area to minimise future vehicle noise from the structure road impacting on my privacy, security and property; • Approve the designation of the additional stormwater corridor on the property at 214 Havelock Road;	

			• Approve commencement of the construction of the road and services as soon as possible in 2019; and • Keep development levies at the current advertised rate for 2018/19 of $24,441.81 per Section.	
6	Ministry of Education	Designation of the internal road corridor	The Ministry is supportive of the NOR. However, the Parkvale School already has traffic and parking problems around the school, particularly on Howard Street. It is submitted that the location of the proposed collector road on the boundary of the school, will impact on the learning environments of the class rooms due to the noise associated with the traffic. With the construction of the road these class rooms will be significantly closer to the road than they are at present and the standard front yard requirement will no longer be available to them. For this reason in prior submissions (April, August and September 2016) on the proposed Howard Street Structure Plan the Ministry requested a buffer area to be Incorporated Into the design of the road, through the inclusion of vehicle parking and a footpath. While the NOR shows the proposed road is 22 metres wide, no detail has been provided on the potential cross section opposite the classrooms on this boundary. The Ministry also notes that west of the school boundary on the collector road, there may be an available area for additional vehicle parking, leading up to the intersection with the new collector road as shown below:	Confirm the requirement with modifications

			 This additional parking area could help to alleviate existing congestion on Howard Street.	

EAM
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DETAILED SITE ASSESSMENT WITH NATIONAL ENVIRONMENTAL STANDARD FOR ASSESSING AND MANAGING CONTAMINANTS IN SOIL TO PROTECT HUMAN HEALTH

HAVELOCK ROAD/HOWARD ROAD HASTINGS,

PROJECT NO. EAM560-REP-01

PREPARED FOR
HASTINGS DISTRICT COUNCIL

PREPARED BY
JASON STRONG

JUNE 2016

EAM NZ LTD – ENVIRONMENTAL CONSULTANTS
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Report prepared by:

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Principal Environmental Scientist
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LIMITATIONS:

This report has been prepared on the basis of information provided by third parties. EAM NZ LTD has not independently verified the provided information and has relied upon it being accurate and sufficient for use by EAM NZ LTD in preparing the report. EAM NZ LTD accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the provided information. This report has been prepared by EAM NZ LTD on the specific instructions of Hastings District Council for the limited purposes described in the report. EAM NZ LTD accepts no liability to any other person for their use of or reliance on this report, and any such use or reliance will be solely at their own risk.

EAM
ENVIRONMENTAL CONSULTANTS

EXECUTIVE SUMMARY

EAM NZ Limited (EAM) has been engaged by Hastings District Council to undertake a Detailed Site investigation (DSI) across a large tract of land located between Havelock Road and Howard Street, Hastings.

The Site has been identified for further residential expansion and as such a variation to the proposed district plan is required (Proposed Variation 3a as below).

Proposed Variation 3 sets out to rezone a Greenfield growth area identified in the Hawke's Bay Regional Policy Statement (RPS) and Heretaunga Plains Urban Development Strategy (HPUDS) for urban residential purposes in the Proposed Hastings District Plan (Proposed Plan).

In summary, the proposed variation involves:

i) Rezoning approximately 21.2 hectares of land between Howard Street and Havelock Road, on the eastern fringe of Hastings City, from 'Plains Production Zone' to 'Hastings General Residential Zone' (including the Parkvale School site – 1.8 hectares);

ii) Inserting an accompanying Structure Plan and structure plan provisions for the area into the Proposed Plan;

iii) Consequential amendments to the Proposed Plan.

Historically, the Site has been utilised for a mixture of activities including market gardening (including glasshouses) and orchards which have resulted in the potential for soil contamination at the Site.

On the basis of the findings of this report:

- A review of the Site history was carried out that indicated a requirement for Site sampling due to historic activities including orchards and market gardens, both of which are listed on the NES HAIL;
- Appropriate Site sampling and preliminary laboratory soil analysis was then carried out;
- Fourteen composite samples exceeded the NES soil standard values for arsenic (20 mg/kg) for the land use scenario of residential (10% produce). The majority of these samples were located towards the southern end of the Site on propertied identified as 180 Havelock Road and 1259 Howard Street. This is not surprising as these two properties were shown to have had orchards on them for many decades going back to at least the 1950s;
- Two samples exceeded the NES SCS value of 210 mg/kg for lead;
- The remainder of results indicate that soil arsenic and lead concentrations are similar to Hawke's Bay Background Soils of 9 mg/kg and 27 mg/kg respectively and therefore do not represent a health risk to humans under the NES land use scenario of residential (10% produce);
- A total of 16 Composite samples were analysed for organo-chlorine compounds. The only compounds recorded for all composites analysed were DDT isomers and ranged between <0.06 mg/kg ∑DDT isomers and 4.5 mg/kg ∑DDT isomers. These results are considered to be at trace concentrations and well below the soil contaminant standard value of 45 mg/kg allowed under the NES for the identified land use scenario of Residential (10% produce). As such OCPs in soils under this assessment are considered low risk to human health.

In summary, it is apparent that the majority of the Site is compliant with the NES with regards to human health under the land use scenario of Residential (10% produce). Two areas identified with elevated levels of arsenic and/or lead will require further investigation and likely remedial works if they are to be developed into Residential subdivision.

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 BRIEF

EAM NZ Limited (EAM) has been engaged by Hastings District Council to undertake a Detailed Site Investigation (DSI) across a large tract of land located between Havelock Road and Howard Street, Hastings (Herein referred to as the Site; see Figure 1).

The Site has been identified for further residential expansion and as such a variation to the proposed district plan is required (Proposed Variation 3a as below).

Proposed Variation 3 sets out to rezone a Greenfield growth area identified in the Hawke's Bay Regional Policy Statement (RPS) and Heretaunga Plains Urban Development Strategy (HPUDS) for urban residential purposes in the Proposed Hastings District Plan (Proposed Plan).

In summary, the proposed variation involves:

iv) Rezoning approximately 21.2 hectares of land between Howard Street and Havelock Road, on the eastern fringe of Hastings City, from 'Plains Production Zone' to 'Hastings General Residential Zone' (including the Parkvale School site – 1.8 hectares);

v) Inserting an accompanying Structure Plan and structure plan provisions for the area into the Proposed Plan;

vi) Consequential amendments to the Proposed Plan.

Historically, the Site has been utilised for a mixture of activities including market gardening (including glasshouses) and orchards which have resulted in the potential for soil contamination at the Site.

This DSI has been undertaken to provide an assessment of the Sites contaminative status and to assess the human health risks for the proposed development.

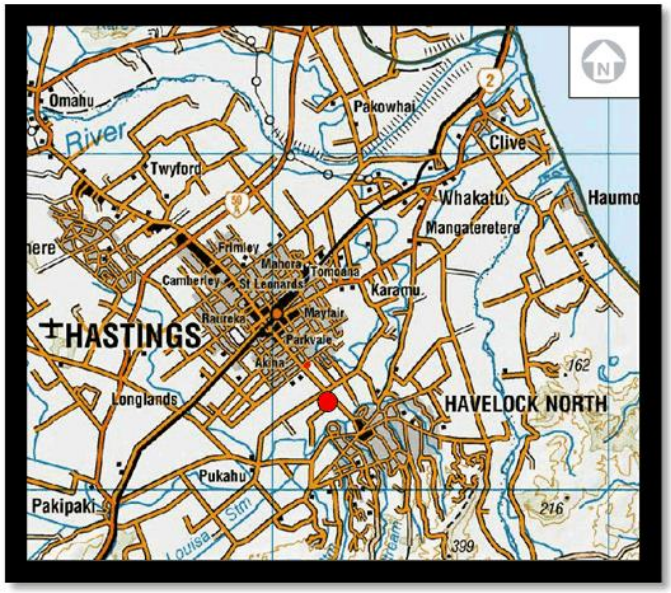
A phased approach has been adopted for the investigation, including an initial Preliminary Site Investigation (PSI) of assembling background information in order to develop a conceptual site model and investigation strategy.

This report details the results of the complete investigation and provides the following information:

- Background information;
- Site history and laboratory results;
- A conceptual Site model;
- Evaluation of determinants and risk assessment;
- Brief outline of recommendations; and
- Conclusions.

This investigation has been carried out in accordance with the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES).

FIGURE 1: SITE LOCATION



2.0 SITE DETAILS

2.1 SITE IDENTIFICATION AND ZONING

The Site is located between Hastings and Havelock North (Figure 1). The Site in total covers an area of approximately 21.2 hectares and is zoned Plains Production Zone as per the Hastings District Plan. Table 1 shows the legal Descriptions, property numbers, property addresses and land areas of the individual land holdings at the Site.

TABLE 1: INDIVIDUAL PROPERTY INFORMATION

Property Address	Property Number	Legal Description	Land Area (ha)
260 Havelock Road	96427	Lot 2 DP 850 BLK IV TE MATA SD	0.4882
258 Havelock Road	55490	Lot 1 DP 336086	1.3910
250 Havelock Road	55492	Lot 1 DP 8949 BLK IV TE MATA SD	0.1848
246 Havelock Road	55491	Lot 41 DP 752 BLK IV TE MATA SD	1.6187
238 Havelock Road	55493	Lot 42 DP 752 BLK IV TE MATA SD	1.6187
226 Havelock Road	55494	Lots 43 44 DP 752 BLK IV TE MATA SD	3.2375
220 Havelock Road	55495	Lot 1 DP 8367 BLK IV TE MATA SD	0.2023
214 Have lock Road	55497	PT Lot 2 DP 8367 BLK IV TE MATA SD	1.0016
208 Have lock Road	55498	PT Lot 2 DP 8367 BLK IV TE MATA SD	1.5631
204 Havelock Road	55499	Lot 47 DP 752 BLK IV TE MATA SD	1.2141
180 Havelock Road	94952	Lot 3 DP 305096 SEC 1 SO 10508 Lot 3 DP 28632 SUBJ TO & INT IN R/W BLK IV TE MATA SD	3.5153
1217 Howard Street	55506	Lots 1 2 35 DP 3146 BLK VI TE MATA SD	1.8698
1239 Howard Street	55505	Lots 3-6 DP 3146 BLK IV TE MATA SD	2.8207
1245 Howard Street	101597	Lot 1DP 492632	0.5848
1259 Howard Street	101598	Lot 2 DP 492632	2.7655

2.2 SITE DESCRIPTION AND CURRENT LAND USE

The Site is flat and consists of mixed land uses including such activities as livestock grazing, a school (Parkvale), market gardening, orchards, residential dwellings, an engineering workshop and a café.

Most of the Site is either grassed or being used for market gardening. In the area where market gardening occurs there are four large glasshouses/greenhouses as well as large implement sheds.

3.0 ENVIRONMENTAL SETTING

3.1 GENERAL SETTING

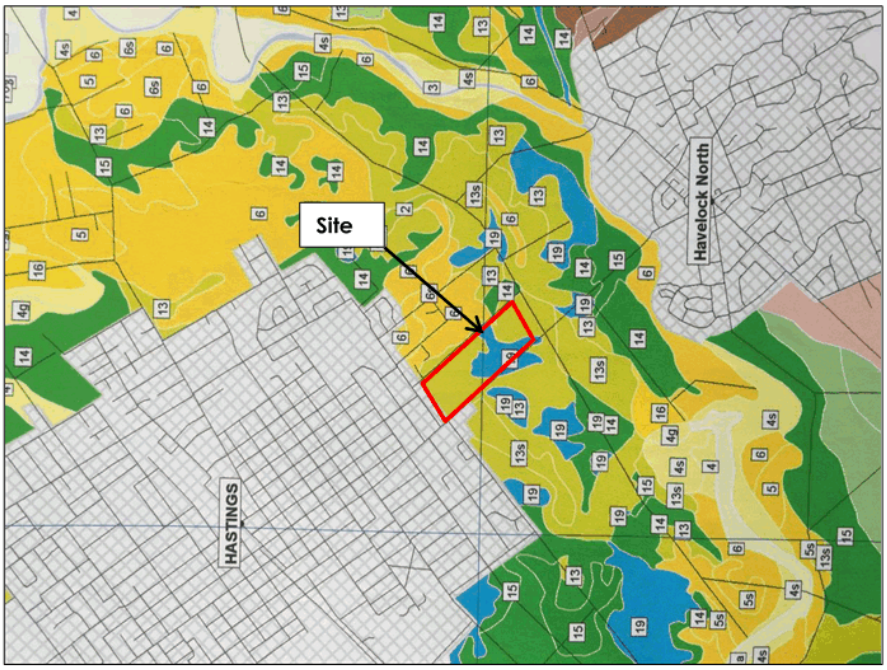
The site and surrounding area is relatively flat. The surounding land use is a mixture of residential, agriculture and horticulture (orchards and market gardens) activities.

The nearest natural waterway is the Awahou Stream approximately 300 metres (at its closest point) to the north east.

Two distinct soil types are described for the site by Griffiths 2011 (Soil Map of The Heretaunga Plains – see Figure 2).

The predominant soil type is Karamu Soils which are described as 30-45 cm silt loam/clay loam on sand with imperfect drainage (WT >60 cm). A secondary soil type is also present towards the middle and south of the site and these are described as Kaiapo soils. These soils are >30 cm clay loam on silt loam and have poor drainage with WT <30cm.

FIGURE 2: EXCERPT OF SOIL MAP OF HERETAUNGA PLAINS (GRIFFITHS 2011)



4.0 DESKTOP REVIEW OF SITE HISTORY

A desktop assessment was undertaken to provide an overview of any potential contaminants of concern that may be present at the site as a result of any documented past and present activities. The following information was sourced in order to establish the history of the site:

- Hastings District Council (HDC) Resource Consents Database and Property Files;
- A search of the Land Use Register held at Hawke's Bay Regional Council (HBRC);
- Historical aerial photographs
- Site Inspection.

4.1 HASTINGS DISTRICT COUNCIL PROPERTY FILES

EAM viewed the property files for the site at HDC offices but very little information with regards to possible sources of contamination could be found.

The only information regarded to be relevant were the records for the construction of the large glasshouses located at 226 and 246 Havelock Road and a previous DSI carried out in September 2015 at 1259 Howard Street. This DSI was carried out by Lorentz Agrology and concluded that soil metals including arsenic and lead, as well as organo-chlorine pesticide compounds were well below the NES Soil Contaminant Standards for the land use scenario of Rural Residential (25% produce). The full DSI is attached to this report as Appendix 1.

4.2 HAWKE'S BAY REGIONAL COUNCIL LAND USE REGISTER

A search was made for information from HBRCs Listed Land Use Register (LLUR). This register is used to hold information about sites that have used, stored or disposed of hazardous substances, based on activities detailed in the Ministry for the Environment's (MfE) Hazardous Activities and Industries List (HAIL) (MfE, 2011a). The search revealed that there has been no recorded or identified HAIL activity within the site by HBRC.

4.3 HISTORICAL AERIAL PHOTOGRAPHS

Historical aerial photographs of the Site from 1945 onwards have been reviewed. The aerial photographs were sourced from HDC and are shown as Figures 2-7.

1945:- This photo shows that the predominant land use at the Site was pastoral grazing. Unfortunately this photograph is only a partial print and does not cover the land located to the south.

1969:- This historic aerial photograph shows that the areas shown previously in 1945 are still utilised predominantly for pastoral grazing however it appears that market gardening is occurring. To the south it is clear that well established orchards are present on the properties identified currently as 180 Havelock Road as well as 1245 Howard Street and 1259 Howard Street.

1994:- Largely unchanged land use from 1969 aerial photograph although market gardening looks to have intensified. .

2004:- This photo shows that the fruit trees have been removed from areas at properties identified today as 180 Havelock Road as well as 1245 Howard Street and 1259 Howard Street.

2010:- This aerial shows the most significant change has been the complete removal of fruit trees over the entire Site.

FIGURE 3: HISTORIC (1945) AERIAL PHOTOGRAPH OF THE SITE

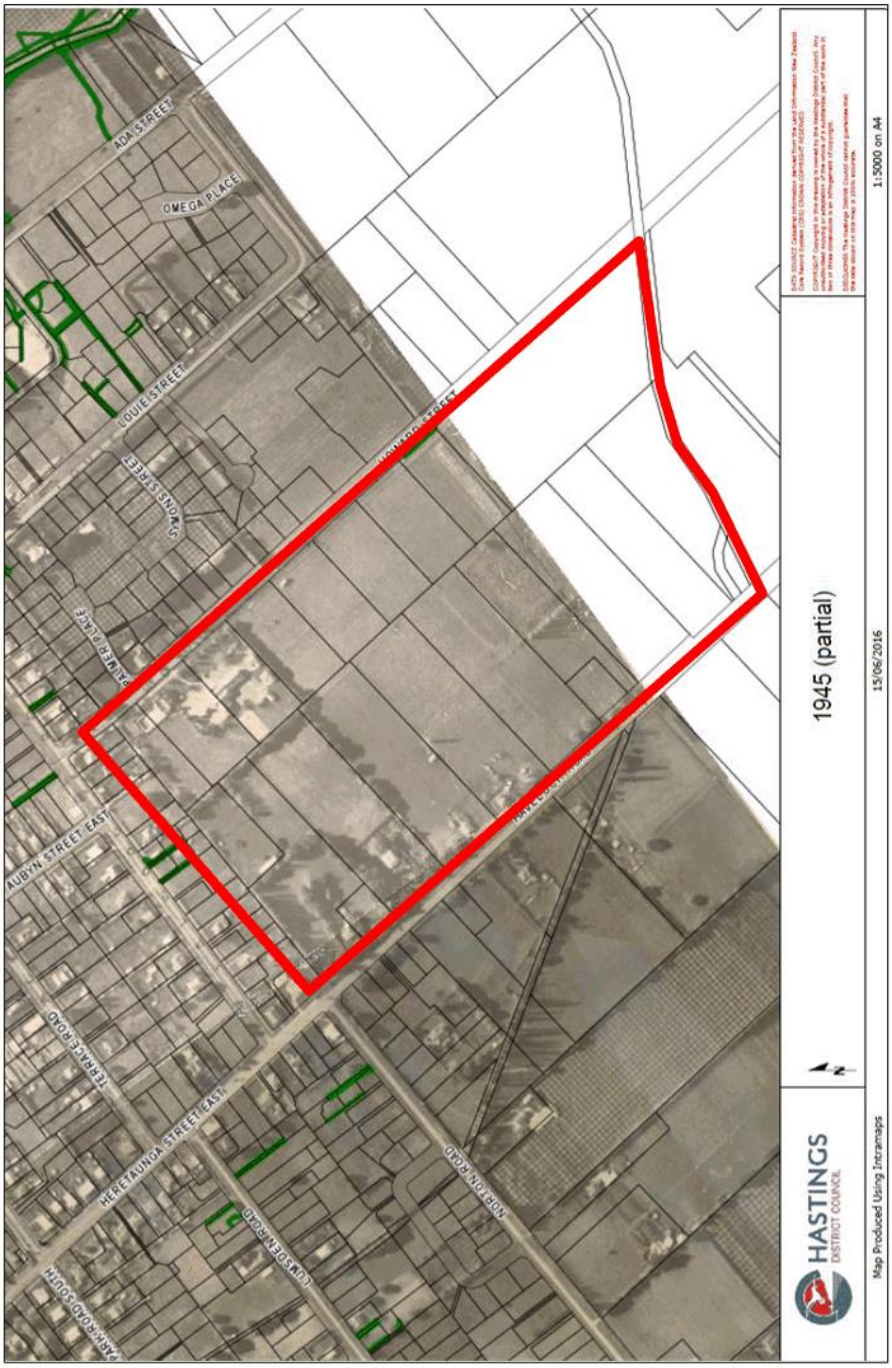


FIGURE 4: HISTORIC (1969) AERIAL PHOTOGRAPH OF THE SITE

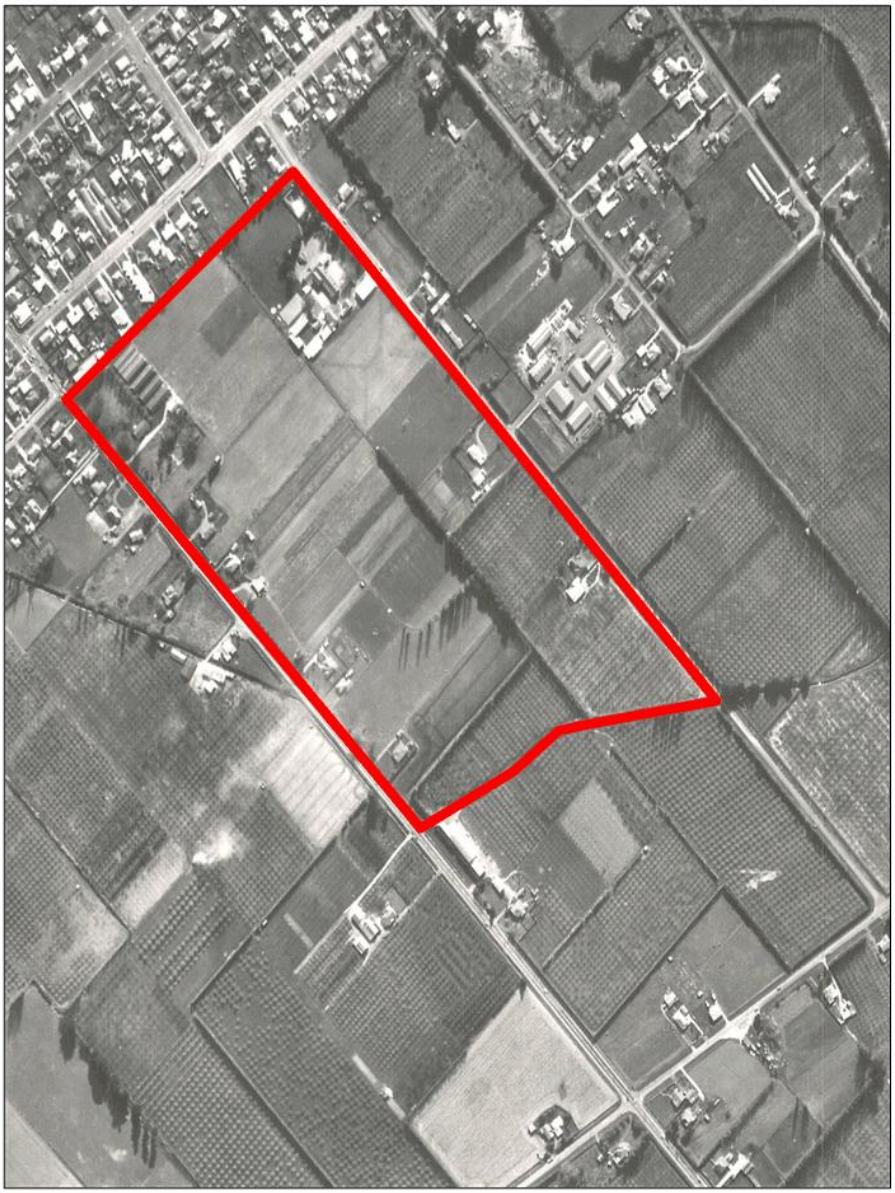
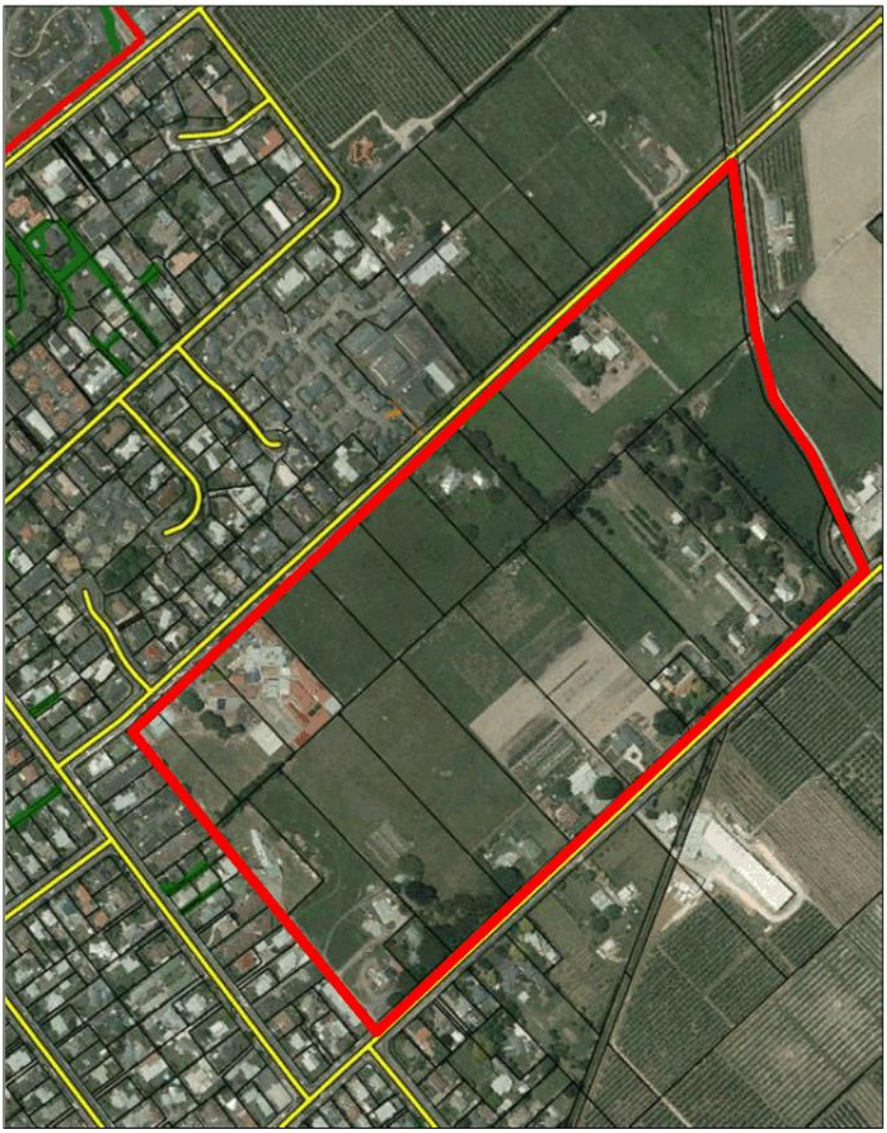


FIGURE 5: HISTORIC (1994) AERIAL PHOTOGRAPH OF THE SITE

FIGURE 6: HISTORIC (2004) AERIAL PHOTOGRAPH OF THE SITE

FIGURE 7: HISTORIC (2010) AERIAL PHOTOGRAPH OF THE SITE



4.4 SITE INSPECTION

Several site inspections across the site were carried out during May 2016, with the objective of identifying any potential sources of land contamination.

During these site visits no obvious contamination indicators (i.e. surface soil staining/odours) or other contamination sources were noted during the inspection of the Site.

Only the four large glasshouses (at 226 and 246 Havelock Road) and areas immediately surrounding them including water sources and sheds were identified as possible hotspots during the site visit (Figures 8 to 11). The location of these possible hotspots is shown in Figure 12.

4.5 SUMMARY OF DESKTOP REVIEW

This desktop review has identified that the Site has been used for a number of activities that are included on the HAIL. In particular market gardening (with glasshouses) and orchards are two activities that have the potential to contaminate soils above concentrations considered to be a health risk to human receptors.

Historic aerial photography indicates that orchards were most prevalent to the south of the Site with properties identified as 180 Havelock Road, 1245 Howard Street and 1259 Howard Street having this activity occurring since at least the 1950s.

As such it is determined that it a Detailed Site Investigation with intensive soil sampling be carried out to ascertain the contaminative status of the Site is warranted.

FIGURE 8: SITE PHOTOGRAPH LOOKING NORTHWEST SHOWING TWO GLASSHOUSES LOCATED AT 246 HAVELOCK ROAD

FIGURE 9: SITE PHOTOGRAPH LOOKING NORTH SHOWING INSIDE ONE OF TWO GLASSHOUSES LOCATED AT 226 HAVELOCK ROAD

FIGURE 10: SITE PHOTOGRAPH LOOKING NORTHWEST SHOWING WATER SUPPLY OUTSIDE ONE OF TWO GLASSHOUSES LOCATED AT 226 HAVELOCK ROAD

FIGURE 11: SITE PHOTOGRAPH LOOKING NORTHWEST SHOWING SHEDS AND STORAGE AREAS OUTSIDE ONE OF TWO GLASSHOUSES LOCATED AT 226 HAVELOCK ROAD

FIGURE 12: AERIAL PHOTOGRAPH SHOWING AREAS OF INTEREST DURING SITE VISITS. THESE AREAS WEWRE CONSIDERED LIKELY HOTSPOTS FOR CHEMICAL RESIDUE CONTAMINATION.

5.0 INVESTIGATION & RISK ASSESSMENT PROCESS

5.1 CONCEPTUAL SITE MODEL

The potential effects of the proposed activity of the Site from contaminated soils are outlined in a preliminary site conceptual model set out below. The following is an analysis of potential contaminants, receptors and pathways (linkages) between the two.

5.1.1 HAZARDOUS SUBSTANCES AND POTENTIAL CONTAMINANTS OF CONCERN

Hazardous substances potentially exist at the site as a result of past activities such as:

- Heavy metals from horticultural sprays in particular arsenic and lead may be present;
- Organic compounds such as organo-chlorines e.g. DDT and dieldrin etc. from horticultural sprays.

5.1.2 POTENTIAL RECEPTORS

Potential receptors include:

- Current and future residents of the Site;
- Excavation and construction workers during redevelopment of the Site.

5.1.3 EXPOSURE PATHWAYS

A human health risk can only occur where there is a complete pathway between contaminant sources and a receptor. Building floors, paved areas and grass will largely or completely prevent contact with soil and therefore direct exposure pathways are or will be incomplete for such areas. Potential complete pathways are:

- Direct contact (dermal) with soil;
- Direct contact and inhalation of dusts and soil during construction and ongoing site maintenance and/or subsurface maintenance works;
- Oral ingestion of soil through uptake by vegetables and by soil attached to vegetables where soil is exposed in garden areas;
- Adjacent sites through dermal absorption and inhalation and oral ingestion of soil.

5.2 INVESTIGATION RATIONALE

The overall rationale for the DSI was to determine whether any of the historical activities on the Site have caused soil contamination that would affect the proposed future use. In this instance it was decided to carry out a combination of targeted and broad-scale sampling. Targeted sampling was carried out in and around areas most likely to contain soil contaminants from historical practices and included in and around glasshouses, workshops and where any water source was associated with these.

5.2.1 SITE SAMPLING

The number of samples collected as part of this assessment was in keeping with the "Contaminated Land Guidelines No. 5" (MfE 2011). These guidelines set out (in Table A1; p63) the *"minimum sampling points required for detection of circular hotspots using a systematic sampling pattern at 95% confidence level"*.

Soil samples were collected using a hand auger and/or spade and were handled using disposable gloves. Samples were collected in clean plastic zip-lock bags and labelled with sample name, number, time and date collected. Once collected, samples were stored in a chilly bin and then despatched to Hill Laboratories Ltd in Hamilton. Sample Sites were identified and marked using a wooden peg and co-ordinates were taken using a handheld GPS. The approximate locations of the sample sites for this assessment are shown in Figures 13 to 24.

NOTE: Sampling was carried out over all of the property located at 1259 Howard Street as some of this has already been assessed in the DSI by Lorentz Agronomy (Attachment 1).

5.2.2 SAMPLE COMPOSITING

To keep costs to a minimum samples collected were composited for arsenic and lead as well as for organo-chlorine compounds analysis. The composites were prepared by the laboratory. Note: When comparing composite results against guideline values, the guideline value must be adjusted by dividing the value by the number of sub-samples in the composite.

5.2.3 FIELD QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

Quality Assurance and Quality Control procedures undertaken during sampling included the following:

- Changing of disposable gloves after each sample;
- Decontaminating and rinsing of tools between each sample;
- Collection of soil samples in new, clean, appropriately labelled glass jars supplied by Hill Laboratories;
- Storing samples in chilled conditions whilst on Site and until delivery to the laboratory for analysis;
- Use of chain of custody procedures and forms; and Use of IANZ accredited laboratories with in-house QA/QC procedures for the analyses requested.

FIGURE 13: SAMPLE SITES AT 258 HAVELOCK STREET (PROPERTY NUMBER 55490)

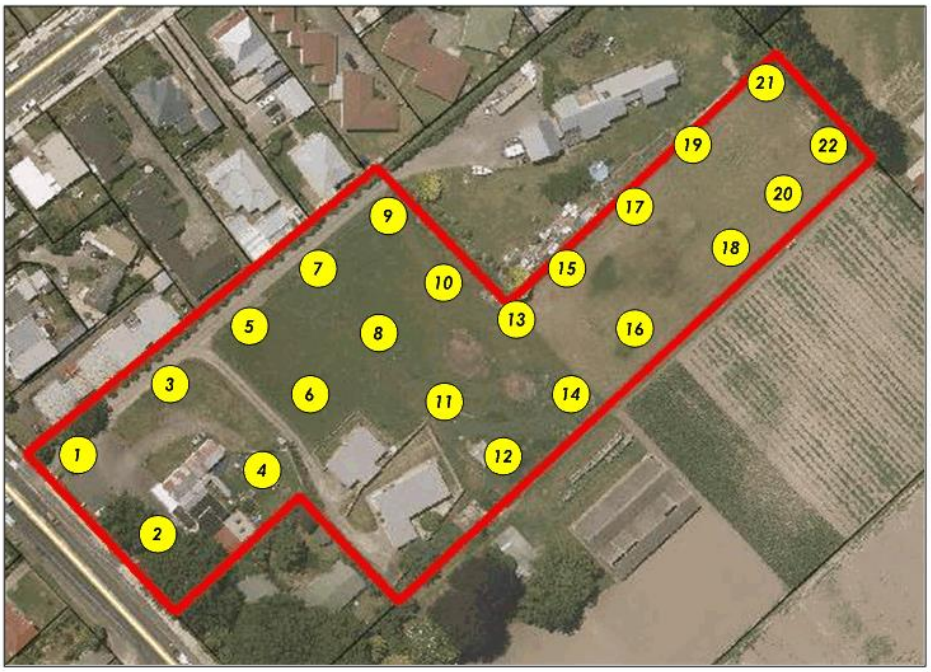


FIGURE 14: SAMPLE SITES AT 246 HAVELOCK STREET (PROPERTY NUMBER 55491)

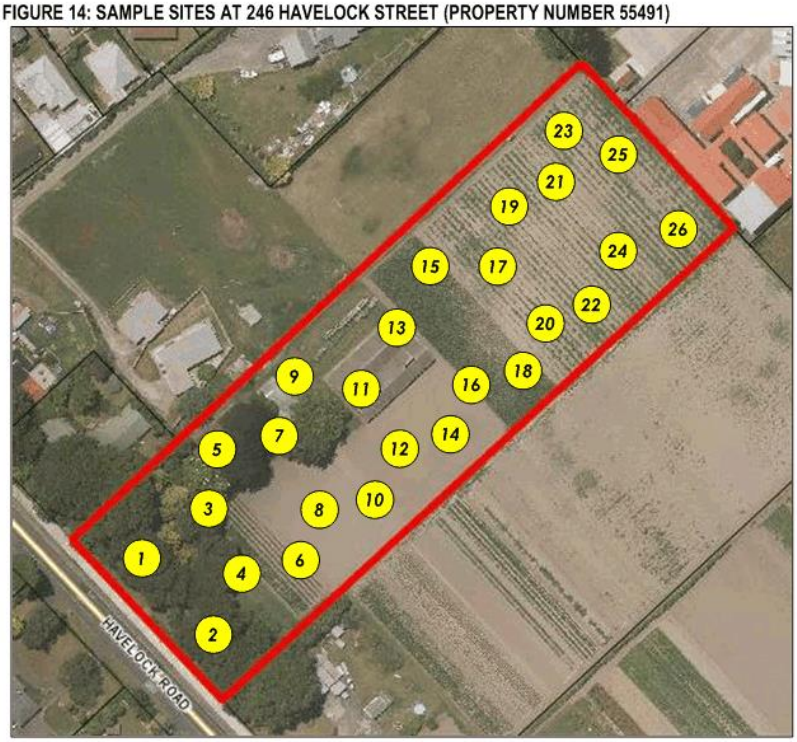


FIGURE 15: SAMPLE SITES AT 238 HAVELOCK STREET (PROPERTY NUMBER 55493)

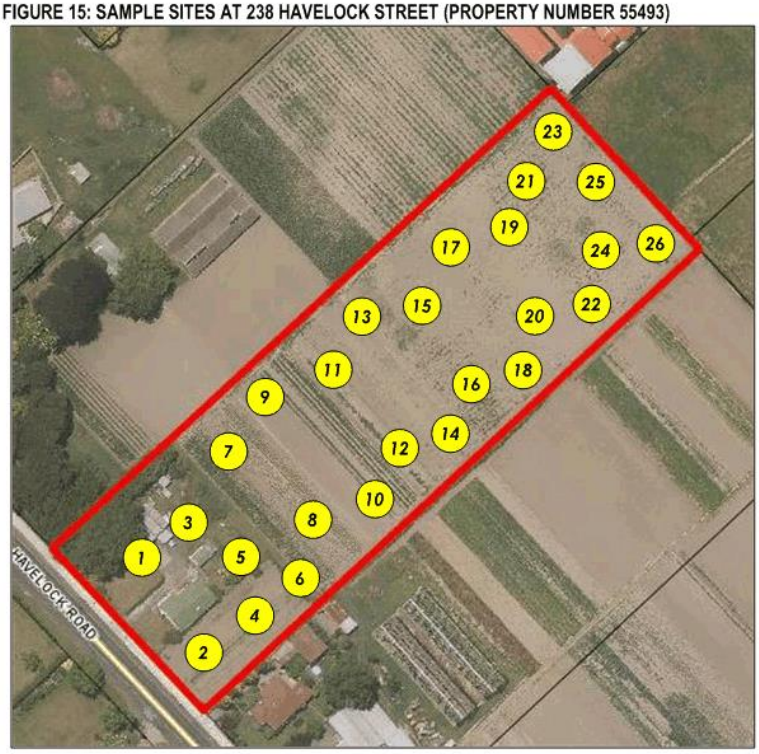


FIGURE 16: SAMPLE SITES AT 226 HAVELOCK STREET (PROPERTY NUMBER 55494)

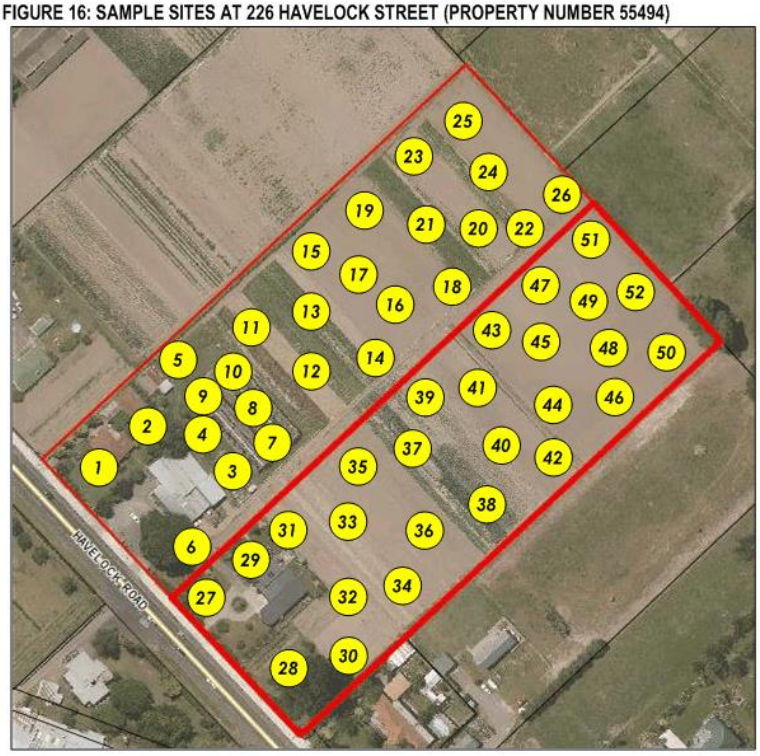


FIGURE 17: SAMPLE SITES AT 214 HAVELOCK STREET (PROPERTY NUMBER 55497)

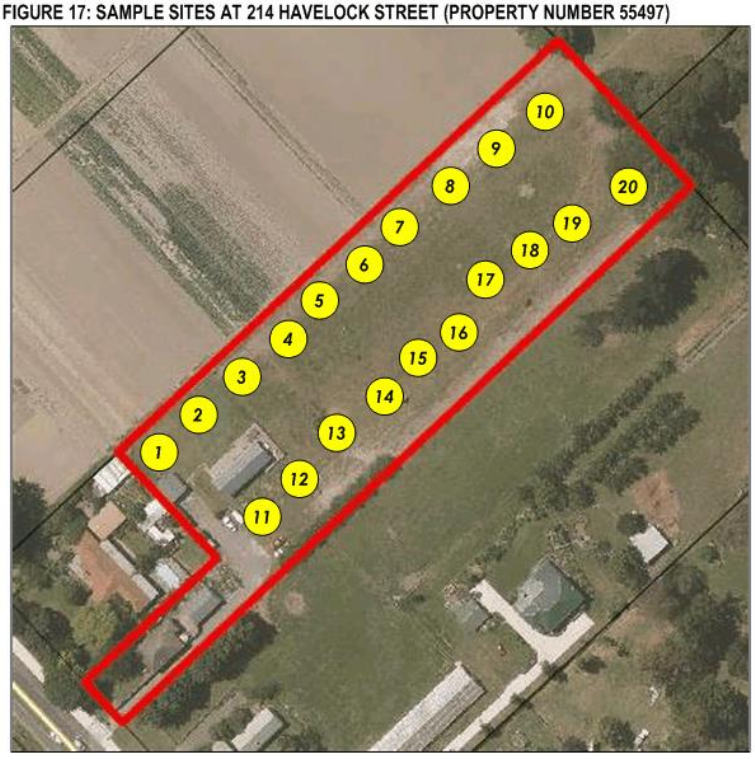


FIGURE 18: SAMPLE SITES AT 208 HAVELOCK STREET (PROPERTY NUMBER 55498)

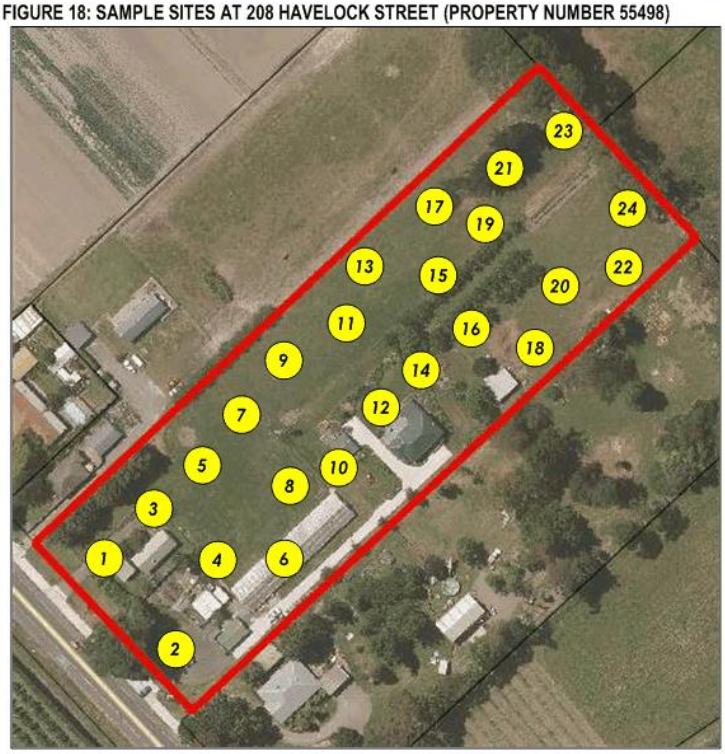


FIGURE 19: SAMPLE SITES AT 204 HAVELOCK STREET (PROPERTY NUMBER 55499)

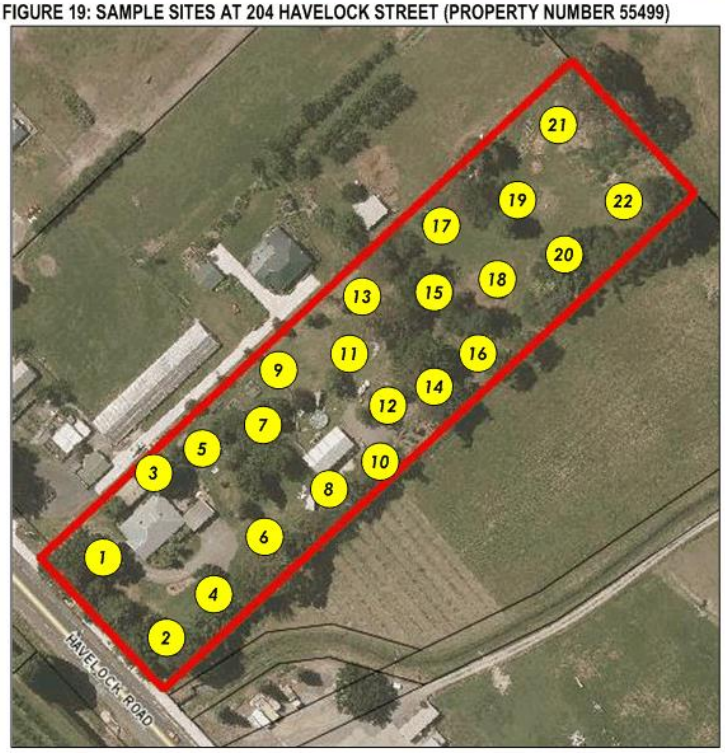


FIGURE 20: SAMPLE SITES AT 180 HAVELOCK STREET (PROPERTY NUMBER 94952)

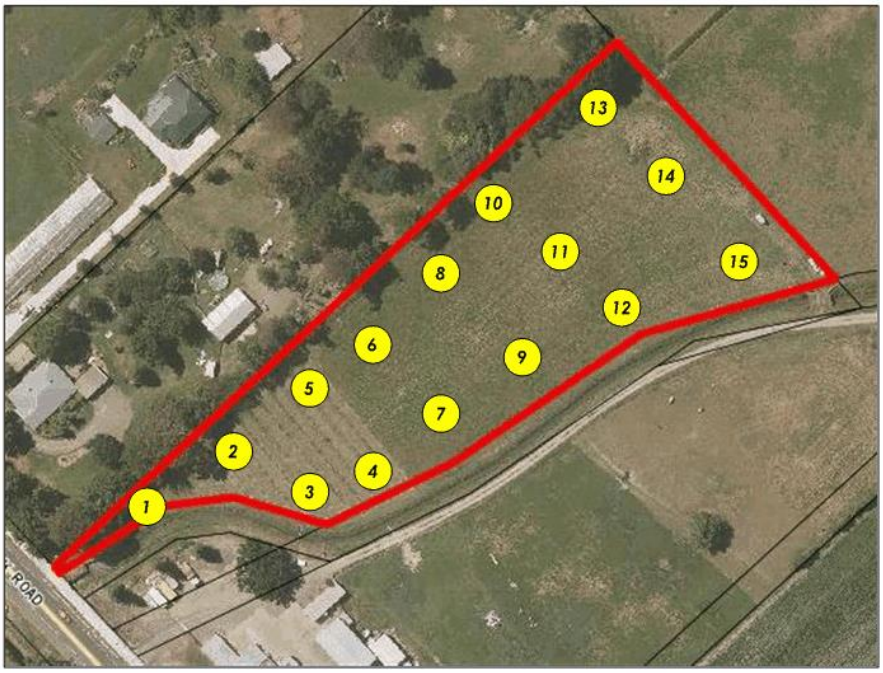


FIGURE 21: SAMPLE SITES AT 1259 HOWARD STREET (PROPERTY NUMBER 101598)

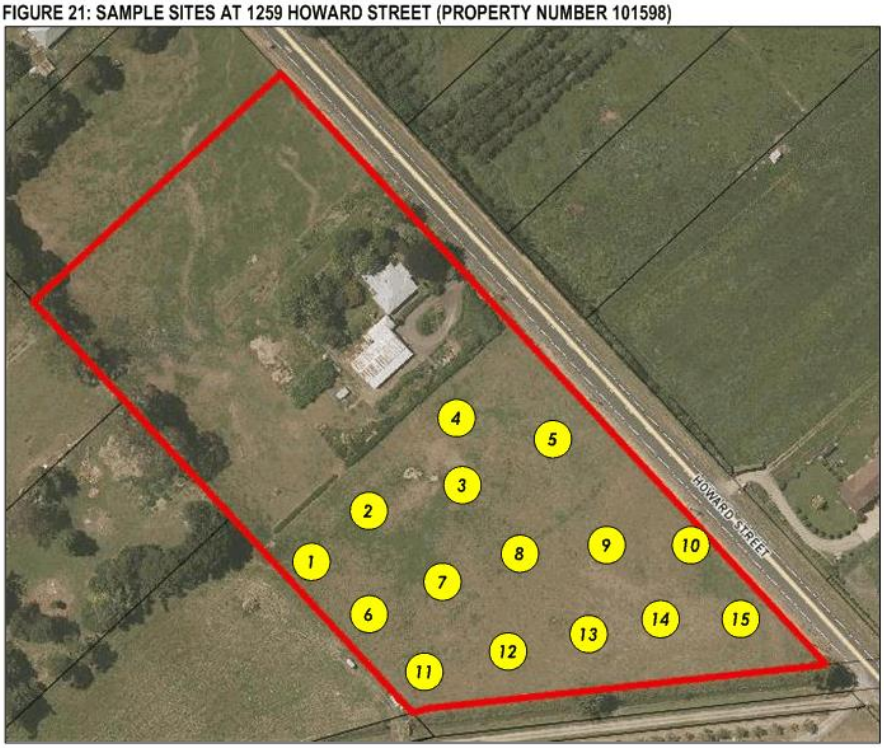


FIGURE 22: SAMPLE SITES AT 1217 HOWARD STREET (PROPERTY NUMBER 55506)

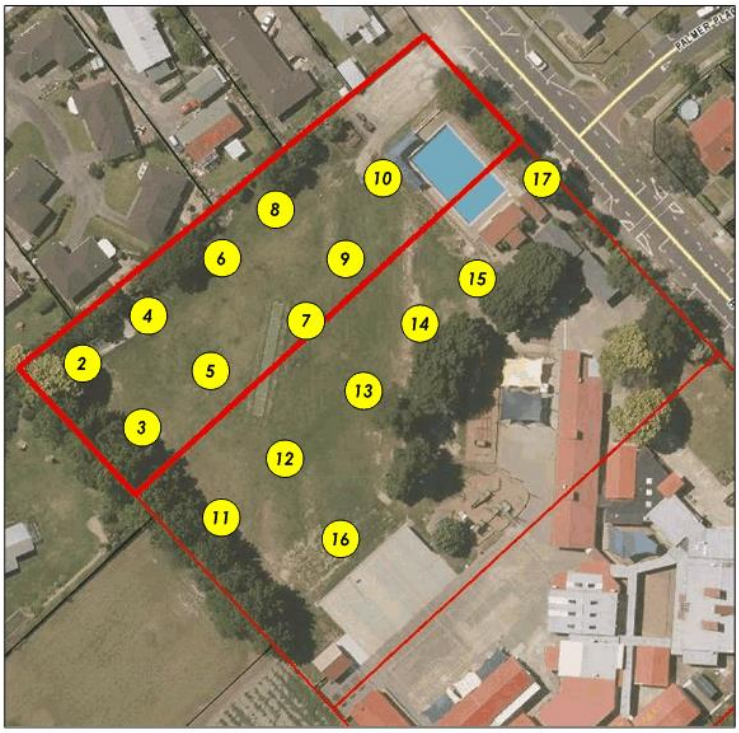


FIGURE 23: SAMPLE SITES AT 1239 HOWARD STREET (PROPERTY NUMBER 55505)

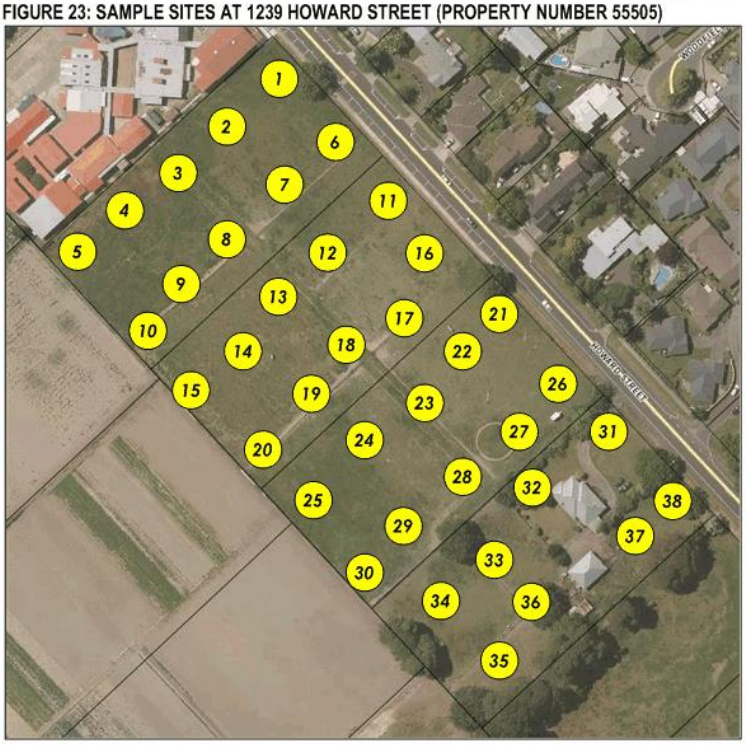
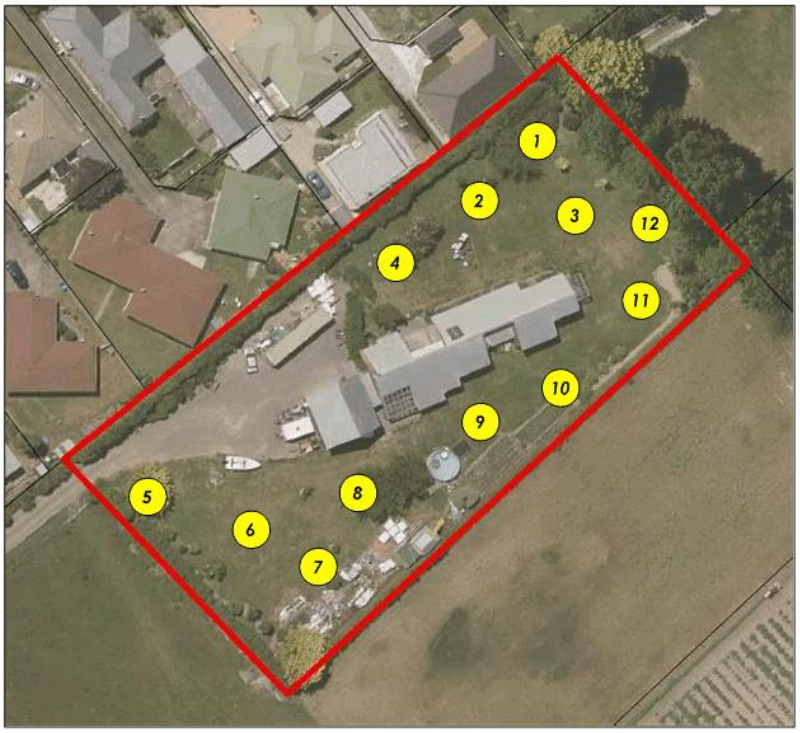


FIGURE 24: SAMPLE SITES AT 1217 HOWARD STREET (PROPERTY NUMBER 55506)



6.0 RESULTS OF ANALYSIS - DISCUSSION

6.1 METALS

A total of 287 soil samples have been collected and analysed for arsenic and lead (Table 2) for this assessment. Of these only sixteen samples recorded contaminants above the Soil Contaminant Standards (SCSs) from the NES Priority contaminants list (MfE, 2012). See Appendix 2 for the full laboratory report. The remainder of results indicate that soil arsenic and lead concentrations are similar to Hawke's Bay Background Soils of 9 mg/kg and 27 mg/kg respectively.

The non-compliant samples included;

- Composite of 55493/3 and 55493/4;
- Composite of 55493/5 and 55493/6;
- individual sample 55498/3;
- Composite of 55499/21 and 55499/22;
- Composite of 94952/1 and 94952/2;
- Composite of 94952/3 and 94952/4;
- Composite of 94952/9 and 94952/10;
- Composite of 94952/13 and 94952/14;
- Composite of 94952/15 and 94952/16;
- Composite of 94952/17 and 94952/18;
- Composite of 94952/19 and 94952/20;
- Composite of 94952/21 and 94952/11;
- Composite of 94952/23 and 94952/24;
- Composite of 94952/27 and 94952/28; and
- Composite of 94952/29 and 94952/30.

NOTE: The Sample identifiers e.g. 55493 represent the actual property numbers sampled (refer Table 1).

Of these, Composite samples 55493/3 and 55493/4 and 55493/5 and 55493/6 were located around sheds and a bore at one particular property (238 Havelock Road).

Composite sample 55499/21 and 55499/22 was located to the rear of 204 Havelock Road and was only marginally above the 20 mg/kg arsenic SCS of 20 mg/kg for the residential (10% produce) land use scenario.

The main area of arsenic and lead contamination above NES SCSs of 20 mg/kg and 210 mg/kg respectively were at the properties identified as 180 Havelock Road and 1259 Howard Street.

Figure 25 illustrates the areas of non compliance with the NES.

TABLE 2: SOIL ARSENIC AND LEAD RESULTS (ALL mg/kg)

Sample	As	Pb
Composite of 55490/1 and 55490/2	9	64
Composite of 55490/3 and 55490/4	9	64
Composite of 55490/5 and 55490/6	10	110
Composite of 55490/7 and 55490/8	9	99
Composite of 55490/9 and 55490/10	8	75
Composite of 55490/11 and 55490/12	9	99
Composite of 55490/13 and 55490/14	10	65
Composite of 55490/15 and 55490/16	6	37
Composite of 55490/17 and 55490/18	6	24
Composite of 55490/19 and 55490/20	6	24
Composite of 55490/21 and 55490/22	6	27
Composite of 55491/1 and 55491/2	12	135
Composite of 55491/3 and 55491/4	8	86
Composite of 55491/5 and 55491/6	8	43
Composite of 55491/7 and 55491/8	6	31
Composite of 55491/9 and 55491/10	7	27
Composite of 55491/11 and 55491/12	6	24
Composite of 55491/13 and 55491/14	6	28
Composite of 55491/15 and 55491/16	6	21
Composite of 55491/17 and 55491/18	6	27
Composite of 55491/19 and 55491/20	7	20
Composite of 55491/21 and 55491/22	6	22
Composite of 55491/23 and 55491/24	7	21
Composite of 55491/25 and 55491/26	6	24
Composite of 55493/1 and 55493/2	16	54
Composite of 55493/3 and 55493/4	**32**	95
Composite of 55493/5 and 55493/6	**54**	132
Individual sample 55493/8	10	28
Composite of 55493/9 and 55493/10	8	26
Composite of 55493/11 and 55493/12	7	23
Composite of 55493/13 and 55493/14	8	27
Composite of 55493/15 and 55493/16	8	26
Composite of 55493/17 and 55493/18	8	26
Composite of 55493/19 and 55493/20	9	28
Composite of 55493/21 and 55493/22	8	28
Composite of 55493/23 and 55493/24	8	27
Composite of 55493/25 and 55493/26	8	26
NES Residential (10% Produce)	**20**	**210**
Hawke's Bay Background soils	**9**	**27**

TABLE 2 (CONTINUED): SOIL ARSENIC AND LEAD RESULTS (ALL mg/kg)

Sample	As	Pb
Composite of 96427/1 and 96427/2	9	44
Composite of 96427/3 and 96427/4	10	45
Composite of 96427/5 and 96427/6	7	32
Composite of 96427/7 and 96427/8	6	21
Composite of 96427/9 and 96427/10	5	21
Composite of 96427/11 and 96427/12	6	24
Composite of 55505/1 and 55505/2	6	25
Composite of 55505/3 and 55505/4	4	17.9
Composite of 55505/5 and 55505/6	5	17.0
Composite of 55505/7 and 55505/8	5	17.6
Composite of 55505/9 and 55505/10	5	18.1
Composite of 55505/11 and 55505/12	5	18.5
Composite of 55505/13 and 55505/14	5	16.5
Composite of 55505/15 and 55505/16	6	19.1
Composite of 55505/17 and 55505/18	5	18.0
Composite of 55505/19 and 55505/20	5	19.2
Composite of 55505/21 and 55505/22	5	17.2
Composite of 55505/23 and 55505/24	4	16.9
Composite of 55505/25 and 55505/26	4	19.7
Composite of 55505/27 and 55505/28	5	16.4
Composite of 55505/29 and 55505/30	5	37
Composite of 55505/31 and 55505/32	5	22
Composite of 55505/33 and 55505/34	7	25
Composite of 55505/35 and 55505/36	7	24
Composite of 55505/37 and 55505/38	8	27
Composite of 55506/1 and 55506/2	7	34
Composite of 55506/3 and 55506/4	9	21
Composite of 55506/5 and 55506/6	10	22
Composite of 55506/7 and 55506/8	5	25
Composite of 55506/9 and 55506/10	5	36
Composite of 55506/11 and 55506/12	9	23
Composite of 55506/13 and 55506/14	8	37
Composite of 55506/15 and 55506/16	6	28
NES Residential (10% Produce)	**20**	**210**
Hawke's Bay Background soils	**9**	**27**

TABLE 2 (CONTINUED): SOIL ARSENIC AND LEAD RESULTS (ALL mg/kg)

Sample	As	Pb
Composite of 55494/1 and 55494/2	10	92
Composite of 55494/3 and 55494/4	14	53
Composite of 55494/5 and 55494/6	13	78
Composite of 55494/7 and 55494/8	9	29
Composite of 55494/9 and 55494/10	6	17
Composite of 55494/11 and 55494/12	8	32
Composite of 55494/13 and 55494/14	8	31
Composite of 55494/15 and 55494/16	6	24
Composite of 55494/17 and 55494/18	6	21
Composite of 55494/19 and 55494/20	6	22
Composite of 55494/21 and 55494/22	6	21
Composite of 55494/23 and 55494/24	6	23
Composite of 55494/25 and 55494/26	6	24
Composite of 55494/27 and 55494/28	6	26
Composite of 55494/29 and 55494/30	6	24
Composite of 55494/31 and 55494/32	7	27
Composite of 55494/33 and 55494/34	6	22
Composite of 55494/35 and 55494/36	6	24
Composite of 55494/37 and 55494/38	6	23
Composite of 55494/39 and 55494/40	7	26
Composite of 55494/41 and 55494/42	7	27
Composite of 55494/43 and 55494/44	7	28
Composite of 55494/45 and 55494/46	6	28
Composite of 55494/47 and 55494/48	6	27
Composite of 55494/49 and 55494/50	6	26
Composite of 55494/51 and 55494/52	5	26
Composite of 55497/1 and 55497/2	5	40
Composite of 55497/3 and 55497/4	6	46
Composite of 55497/5 and 55497/6	10	26
Composite of 55497/7 and 55497/8	7	25
Composite of 55497/9 and 55497/10	7	26
Composite of 55497/11 and 55497/12	5	40
Composite of 55497/13 and 55497/14	5	28
Composite of 55497/15 and 55497/16	5	25
Composite of 55497/17 and 55497/18	5	23
Composite of 55497/19 and 55497/20	5	27
NES Residential (10% Produce)	**20**	**210**
Hawke's Bay Background soils	**9**	**27**

TABLE 2 (CONTINUED): SOIL ARSENIC AND LEAD RESULTS (ALL mg/kg)

Sample	As	Pb
Composite of 55498/1 and 55498/2	16	78
Individual sample 55498/3	39	51
Composite of 55498/4 and 55498/5	17	68
Individual sample 55498/6	9	59
Composite of 55498/7 and 55498/8	6	27
Composite of 55498/9 and 55498/10	7	36
Composite of 55498/11 and 55498/12	5	29
Composite of 55498/13 and 55498/14	6	29
Composite of 55498/15 and 55498/16	5	30
Composite of 55498/17 and 55498/18	6	27
Composite of 55498/19 and 55498/20	6	28
Composite of 55498/21 and 55498/22	5	29
Composite of 55498/23 and 55498/24	10	44
Composite of 55499/1 and 55499/2	8	40
Composite of 55499/3 and 55499/4	7	33
Composite of 55499/5 and 55499/6	7	28
Composite of 55499/7 and 55499/8	7	24
Composite of 55499/9 and 55499/10	8	31
Composite of 55499/11 and 55499/12	8	26
Composite of 55499/13 and 55499/14	6	32
Composite of 55499/15 and 55499/16	6	31
Composite of 55499/17 and 55499/18	6	29
Composite of 55499/19 and 55499/20	7	46
Composite of 555499/21 and 55499/22	27	80
Composite of 94952/1 and 94952/2	35	141
Composite of 94952/3 and 94952/4	33	127
Composite of 94952/5 and 94952/6	13	57
Composite of 94952/7 and 94952/8	16	69
Composite of 94952/9 and 94952/10	33	153
Composite of 94952/11 and 94952/12	44	220
Composite of 94952/13 and 94952/14	62	250
Composite of 94952/15 and 94952/16 (101598/1)	34	148
Composite of 94952/17 (101598/2) and 94952/18 (101598/3)	27	106
Composite of 94952/19 (101598/4) and 94952/20 (101598/5)	40	153
Composite of 94952/21 (101598/6) and 94952/22 (101598/7)	24	94
Composite of 94952/23 (101598/8) and 94952/24 (101598/9)	22	97
Composite of 94952/25 (101598/10) and 94952/26 (101598/11)	18	76
Composite of 94952/27 (101598/12) and 94952/28 (101598/13)	23	90
Composite of 94952/29 (101598/14) and 94952/30 (101598/15)	22	78
NES Residential (10% Produce)	**20**	**210**
Hawke's Bay Background soils	**9**	**27**

6.2 ORGANO-CHLORINE COMPOUNDS

A total of 16 Composite samples were analysed for organo-chlorine compounds. The only compounds recorded for all composites analysed were DDT isomers and ranged between <0.06 mg/kg ∑DDT isomers and 4.5 mg/kg ∑DDT isomers (Table 3).

These results are considered to be at trace concentrations and well below the soil contaminant standard value of 70 mg/kg allowed under the NES for the identified land use scenario of Residential (10% produce). This also holds true when compared against the adjusted value of 17.5 mg/kg ∑DDT isomers for composite samples. As such OCPs in soils under this assessment are considered low risk to human health.

TABLE 3: SUMMARY OF SOIL ORGANIC COMPOUND RESULTS (ALL RESULTS mgkg^{-1} DRY WEIGHT)

Sample Name	∑DDT
Composite of Samples 55490/5, 55490/13 &and 55490/18	0.39
Composite of Samples 55491/8, 55491/15, 55491/22 & 55491/25	0.12
Composite of Samples 55491/11 & 55491/13	1.12
Composite of Samples 55493/12, 55493/17 & 55493/24	0.13
Composite of Samples 55493/3, 55493/17 & 55493/5	4.0
Composite of Samples 96427/1, 96427/5, 96427/7 & 96427/11	0.15
Composite of Samples 55506/1, 55506/7, 55506/8 & 55506/16	<0.06
Composite of Samples 55505/1, 55505/13, 55505/23 & 55505/38	0.08
Composite of Samples 55494/7, 55494/8, 55494/9 & 55494/10	0.13
Composite of Samples 55494/26, 55494/50, 55494/36	0.31
Composite of Samples 55497/2, 55497/6, 55497/19 & 55497/13	0.028
Composite of Samples 55498/7, 55498/11, 55498/14 & 55498/20	<0.06
Composite of Samples 55498/7, & 55498/6	<0.06
Composite of Samples 55499/1, 55499/8, 55499/13 & 55499/22	0.11
Composite of Samples 94952/1, 94952/6, 94952/10 & 94952/15	4.5
Composite of Samples 94952/22, 94952/27, 94952/29 & 94952/30	1.28
NES Rural Residential/lifestyle block 10% produce	70
Adjusted value* (for composited sample)	17.5

*Adjusted to compensate for composites i.e. four samples per composite therefore original standard value divided by four.

6.3 RISK ASSESSMENT

A hazard –pathway –receptor pollution linkage is considered to aid assessment of risk associated with results of the site investigation.

For contaminated soils to pose a risk to a receptor, a complete pathway must exist between the contamination source and the identified receptor(s). If there is an incomplete pathway then there is no risk.

In this instance, the large proportion of the site is considered low risk to human health however two isolated areas have been identified as having elevated arsenic and lead concentrations and therefore in these areas a risk to human health exists.

The possible pathways and receptors associated with this site and its end use are presented in Table 4.

6.3.1 END USERS

In terms of human health, a risk for exposure exists. Elevated concentrations of arsenic and lead have been confirmed within the shallow sub-surface soils. Therefore, ingestion, inhalation and dermal exposure could potentially occur. Remediation is required. This must be addressed in future site remediation/management plans.

6.3.2 SITE WORKERS

Normal precautions for development of the site will apply and should include dust suppression measures. Site workers will need to be made aware of the presence of arsenic and lead contamination within the soil and a programme of site working should be developed in accordance with relevant building guidelines. This must be addressed in future site remediation/management plans.

6.3.3 ADJACENT SITES

Heavy metals are generally immobile and therefore the potential for lateral migration in the soil profile is considered low. There is a possibility that dust may be generated at the site during excavation and construction works, hence a small risk is associated with airborne contaminants. Dust suppression measures such as keeping the soil wet/moist during earthworks are considered appropriate. This must be addressed in future site remediation/management plans.

6.3.4 RISK TO SURFACE WATER & GROUNDWATER

Although not specifically covered under the NES the potential risk to surface water and groundwater resources were considered during this assessment. With regards to surface water there are no significant waterways on or adjacent to the assessment site.

The risk of ground water contamination is considered to be low as these metals (the only elevated contaminant recorded) are largely immobile in soil.

TABLE 4: PATHWAYS AND POTENTIAL RECEPTORS

Contaminants	Receptor	Pathway
Arsenic & lead	End Users	Oral Ingestion of soil or dust, dermal absorption or inhalation where soil is exposed
		Oral ingestion of soil through uptake by vegetables and by soil attached to vegetables where soil is exposed in garden areas
	Site workers	Dermal absorption and Inhalation, oral ingestion of soil.
	Adjacent Sites	Dermal absorption and Inhalation, oral ingestion of soil.

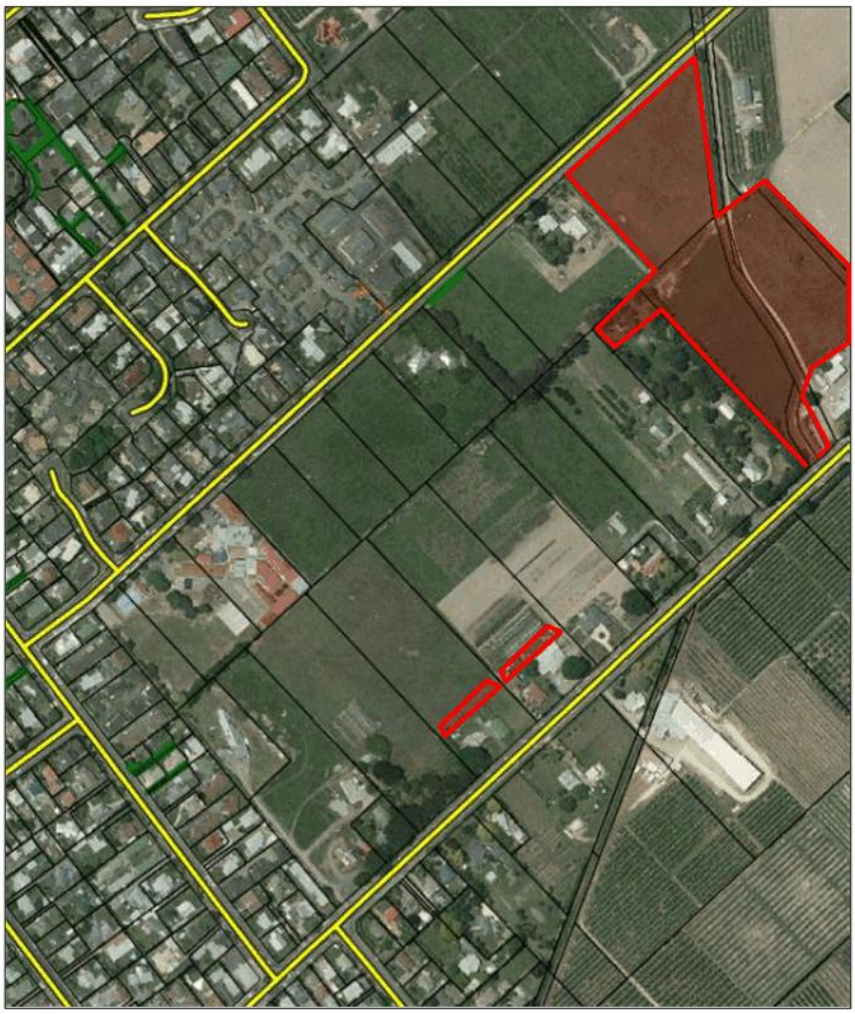
7.0 CONCLUSIONS

On the basis of the findings of this report:

- A review of the Site history was carried out that indicated a requirement for Site sampling due to historic activities including orchards and market gardens, both of which are listed on the NES HAIL;
- Appropriate Site sampling and preliminary laboratory soil analysis was then carried out;
- Fourteen composite samples exceeded the NES soil standard values for arsenic (20 mg/kg) for the land use scenario of residential (10% produce). The majority of these samples were located towards the southern end of the Site on propertied identified as 180 Havelock Road and 1259 Howard Street. This is not surprising as these two properties were shown to have had orchards on them for many decades going back to at least the 1950s;
- Two samples exceeded the NES SCS value of 210 mg/kg for lead;
- The remainder of results indicate that soil arsenic and lead concentrations are similar to Hawke's Bay Background Soils of 9 mg/kg and 27 mg/kg respectively and therefore do not represent a health risk to humans under the NES land use scenario of residential (10% produce);
- A total of 16 Composite samples were analysed for organo-chlorine compounds. The only compounds recorded for all composites analysed were DDT isomers and ranged between <0.06 mg/kg ∑DDT isomers and 4.5 mg/kg ∑DDT isomers. These results are considered to be at trace concentrations and well below the soil contaminant standard value of 45 mg/kg allowed under the NES for the identified land use scenario of Residential (10% produce). As such OCPs in soils under this assessment are considered low risk to human health.

In summary, it is apparent that the majority of the Site is compliant with the NES with regards to human health under the land use scenario of Residential (10% produce). Two areas identified with elevated levels of arsenic and/or lead will require further investigation and likely remedial works if they are to be developed into Residential subdivision.

FIGURE 25: AREAS (IN RED) OF ELEVATED ARSENIC AND/OR LEAD FROM THIS ASSESSMENT)



APPENDIX 1

LORENTZ AGRONOMY DSI REPORT FOR 1259 HOWARD STREET

APPENDIX 2

LABORATORY REPORT OF ANALYSIS

Hill Laboratories
BETTER TESTING BETTER RESULTS
R J Hill Laboratories Limited
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ANALYSIS REPORT

Client:	EAM NZ Limited	Lab No:	1591573 SPv1
Contact:	J Strong	Date Registered:	28-May-2016
	C/- EAM NZ Limited	Date Reported:	10-Jun-2016
	PO Box 1154	Quote No:	72316
	Napier 4140	Order No:	
		Client Reference:	55494, 55497, 55498 & 55499
		Submitted By:	J Strong

Sample Type: Soil

Sample Name:		55498 #3	55498 #6	Composite of 55494 #1 and 55494 #2	Composite of 55494 #3 and 55494 #4	Composite of 55494 #5 and 55494 #6
Lab Number:		1591573.75	1591573.78	1591573.119	1591573.120	1591573.121
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	39	9	10	14	13
Total Recoverable Lead	mg/kg dry wt	51	59	92	53	78

Sample Name:		Composite of 55494 #7 and 55494 #8	Composite of 55494 #9 and 55494 #10	Composite of 55494 #11 and 55494 #12	Composite of 55494 #13 and 55494 #14	Composite of 55494 #15 and 55494 #16
Lab Number:		1591573.122	1591573.123	1591573.124	1591573.125	1591573.126
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	9	6	8	8	6
Total Recoverable Lead	mg/kg dry wt	29	17.0	32	31	24

Sample Name:		Composite of 55494 #17 and 55494 #18	Composite of 55494 #19 and 55494 #20	Composite of 55494 #21 and 55494 #22	Composite of 55494 #23 and 55494 #24	Composite of 55494 #25 and 55494 #26
Lab Number:		1591573.127	1591573.128	1591573.129	1591573.130	1591573.131
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	6	6	6	6	6
Total Recoverable Lead	mg/kg dry wt	21	22	21	23	24

Sample Name:		Composite of 55494 #27 and 55494 #28	Composite of 55494 #29 and 55494 #30	Composite of 55494 #31 and 55494 #32	Composite of 55494 #33 and 55494 #34	Composite of 55494 #35 and 55494 #36
Lab Number:		1591573.132	1591573.133	1591573.134	1591573.135	1591573.136
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	6	6	7	6	6
Total Recoverable Lead	mg/kg dry wt	26	24	27	22	24

Sample Name:		Composite of 55494 #37 and 55494 #38	Composite of 55494 #39 and 55494 #40	Composite of 55494 #41 and 55494 #42	Composite of 55494 #43 and 55494 #44	Composite of 55494 #45 and 55494 #46
Lab Number:		1591573.137	1591573.138	1591573.139	1591573.140	1591573.141
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	6	7	7	7	6
Total Recoverable Lead	mg/kg dry wt	23	26	27	28	28

Sample Name:		Composite of 55494 #47 and 55494 #48	Composite of 55494 #49 and 55494 #50	Composite of 55494 #51 and 55494 #52	Composite of 55494 #7, 55494 #8, 55494 #9 and 55494 #10	Composite of 55494 #17, 55494 #26, 55494 #50 and 55494 #36
Lab Number:		1591573.142	1591573.143	1591573.144	1591573.145	1591573.146

DSI (NES), HAVELOCK ROAD/HOWARD STREET, HASTINGS

Sample Type: Soil						
Sample Name:		Composite of 55494 #47 and 55494 #48	Composite of 55494 #49 and 55494 #50	Composite of 55494 #51 and 55494 #52	Composite of 55494 #7, 55494 #8, 55494 #9 and 55494 #10	Composite of 55494 #17, 55494 #26, 55494 #50 and 55494 #36
Lab Number:		1591573.142	1591573.143	1591573.144	1591573.145	1591573.146
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	6	6	5	-	-
Total Recoverable Lead	mg/kg dry wt	27	26	26	-	-
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	-	-	-	< 0.010	< 0.010
alpha-BHC	mg/kg dry wt	-	-	-	< 0.010	< 0.010
beta-BHC	mg/kg dry wt	-	-	-	< 0.010	< 0.010
delta-BHC	mg/kg dry wt	-	-	-	< 0.010	< 0.010
gamma-BHC (Lindane)	mg/kg dry wt	-	-	-	< 0.010	< 0.010
cis-Chlordane	mg/kg dry wt	-	-	-	< 0.010	< 0.010
trans-Chlordane	mg/kg dry wt	-	-	-	< 0.010	< 0.010
Total Chlordane [(cis+trans)* 100/42]	mg/kg dry wt	-	-	-	< 0.04	< 0.04
2,4'-DDD	mg/kg dry wt	-	-	-	< 0.010	< 0.010
4,4'-DDD	mg/kg dry wt	-	-	-	< 0.010	< 0.010
2,4'-DDE	mg/kg dry wt	-	-	-	< 0.010	< 0.010
4,4'-DDE	mg/kg dry wt	-	-	-	0.043	0.136
2,4'-DDT	mg/kg dry wt	-	-	-	0.010	0.012
4,4'-DDT	mg/kg dry wt	-	-	-	0.076	0.159
Total DDT Isomers	mg/kg dry wt	-	-	-	0.13	0.31
Dieldrin	mg/kg dry wt	-	-	-	< 0.010	< 0.010
Endosulfan I	mg/kg dry wt	-	-	-	< 0.010	< 0.010
Endosulfan II	mg/kg dry wt	-	-	-	< 0.010	< 0.010
Endosulfan sulphate	mg/kg dry wt	-	-	-	< 0.010	0.019
Endrin	mg/kg dry wt	-	-	-	< 0.010	< 0.010
Endrin aldehyde	mg/kg dry wt	-	-	-	< 0.010	< 0.010
Endrin ketone	mg/kg dry wt	-	-	-	< 0.010	< 0.010
Heptachlor	mg/kg dry wt	-	-	-	< 0.010	< 0.010
Heptachlor epoxide	mg/kg dry wt	-	-	-	< 0.010	< 0.010
Hexachlorobenzene	mg/kg dry wt	-	-	-	< 0.010	< 0.010
Methoxychlor	mg/kg dry wt	-	-	-	< 0.010	< 0.010

Sample Name:		Composite of 55497 #1 and 55497 #2	Composite of 55497 #3 and 55497 #4	Composite of 55497 #5 and 55497 #6	Composite of 55497 #7 and 55497 #8	Composite of 55497 #9 and 55497 #10
Lab Number:		1591573.147	1591573.148	1591573.149	1591573.150	1591573.151
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	5	6	10	7	7
Total Recoverable Lead	mg/kg dry wt	40	46	26	25	26

Sample Name:		Composite of 55497 #11 and 55497 #12	Composite of 55497 #13 and 55497 #14	Composite of 55497 #15 and 55497 #16	Composite of 55497 #17 and 55497 #18	Composite of 55497 #19 and 55497 #20
Lab Number:		1591573.152	1591573.153	1591573.154	1591573.155	1591573.156
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	5	5	5	5	5
Total Recoverable Lead	mg/kg dry wt	40	28	25	23	27

Sample Name:		Composite of 55497 #2, 55497 #6, 55497 #19 and 55497 #13	Composite of 55498 #1 and 55498 #2	Composite of 55498 #4 and 55498 #5	Composite of 55498 #7 and 55498 #8	Composite of 55498 #9 and 55498 #10
Lab Number:		1591573.157	1591573.158	1591573.159	1591573.160	1591573.161
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	-	16	17	6	7
Total Recoverable Lead	mg/kg dry wt	-	78	68	27	36
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.010	-	-	-	-

Lab No: 1591573 v 1 Hill Laboratories Page 2 of 5

Sample Type: Soil						
Sample Name:		Composite of 55497 #2, 55497 #6, 55497 #19 and 55497 #13	Composite of 55498 #1 and 55498 #2	Composite of 55498 #4 and 55498 #5	Composite of 55498 #7 and 55498 #8	Composite of 55498 #9 and 55498 #10
Lab Number:		1591573.157	1591573.158	1591573.159	1591573.160	1591573.161
Organochlorine Pesticides Screening in Soil						
alpha-BHC	mg/kg dry wt	< 0.010	-	-	-	-
beta-BHC	mg/kg dry wt	< 0.010	-	-	-	-
delta-BHC	mg/kg dry wt	< 0.010	-	-	-	-
gamma-BHC (Lindane)	mg/kg dry wt	< 0.010	-	-	-	-
cis-Chlordane	mg/kg dry wt	< 0.010	-	-	-	-
trans-Chlordane	mg/kg dry wt	< 0.010	-	-	-	-
Total Chlordane [(cis+trans)* 100/42]	mg/kg dry wt	< 0.04	-	-	-	-
2,4'-DDD	mg/kg dry wt	< 0.010	-	-	-	-
4,4'-DDD	mg/kg dry wt	0.018	-	-	-	-
2,4'-DDE	mg/kg dry wt	< 0.010	-	-	-	-
4,4'-DDE	mg/kg dry wt	0.091	-	-	-	-
2,4'-DDT	mg/kg dry wt	< 0.010	-	-	-	-
4,4'-DDT	mg/kg dry wt	0.049	-	-	-	-
Total DDT Isomers	mg/kg dry wt	0.16	-	-	-	-
Dieldrin	mg/kg dry wt	0.028	-	-	-	-
Endosulfan I	mg/kg dry wt	< 0.010	-	-	-	-
Endosulfan II	mg/kg dry wt	< 0.010	-	-	-	-
Endosulfan sulphate	mg/kg dry wt	< 0.010	-	-	-	-
Endrin	mg/kg dry wt	< 0.010	-	-	-	-
Endrin aldehyde	mg/kg dry wt	< 0.010	-	-	-	-
Endrin ketone	mg/kg dry wt	< 0.010	-	-	-	-
Heptachlor	mg/kg dry wt	< 0.010	-	-	-	-
Heptachlor epoxide	mg/kg dry wt	< 0.010	-	-	-	-
Hexachlorobenzene	mg/kg dry wt	< 0.010	-	-	-	-
Methoxychlor	mg/kg dry wt	< 0.010	-	-	-	-

Sample Name:		Composite of 55498 #11 and 55498 #12	Composite of 55498 #13 and 55498 #14	Composite of 55498 #15 and 55498 #16	Composite of 55498 #17 and 55498 #18	Composite of 55498 #19 and 55498 #20
Lab Number:		1591573.162	1591573.163	1591573.164	1591573.165	1591573.166
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	5	6	5	6	6
Total Recoverable Lead	mg/kg dry wt	29	29	30	27	28

Sample Name:		Composite of 55498 #21 and 55498 #22	Composite of 55498 #23 and 55498 #24	Composite of 55498 #7, 55498 #11, 55498 #14 and 55498 #20	Composite of 55498 #3 and 55498 #6	Composite of 55499 #1 and 55499 #2
Lab Number:		1591573.167	1591573.168	1591573.169	1591573.170	1591573.171
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	5	10	-	-	8
Total Recoverable Lead	mg/kg dry wt	29	44	-	-	40
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	-	-	< 0.010	< 0.010	-
alpha-BHC	mg/kg dry wt	-	-	< 0.010	< 0.010	-
beta-BHC	mg/kg dry wt	-	-	< 0.010	< 0.010	-
delta-BHC	mg/kg dry wt	-	-	< 0.010	< 0.010	-
gamma-BHC (Lindane)	mg/kg dry wt	-	-	< 0.010	< 0.010	-
cis-Chlordane	mg/kg dry wt	-	-	< 0.010	< 0.010	-
trans-Chlordane	mg/kg dry wt	-	-	< 0.010	< 0.010	-
Total Chlordane [(cis+trans)* 100/42]	mg/kg dry wt	-	-	< 0.04	< 0.04	-
2,4'-DDD	mg/kg dry wt	-	-	< 0.010	< 0.010	-
4,4'-DDD	mg/kg dry wt	-	-	< 0.010	< 0.010	-
2,4'-DDE	mg/kg dry wt	-	-	< 0.010	< 0.010	-
4,4'-DDE	mg/kg dry wt	-	-	< 0.010	0.013	-

Lab No: 1591573 v 1 Hill Laboratories Page 3 of 5

Sample Type: Soil						
Sample Name:		Composite of 55498 #21 and 55498 #22	Composite of 55498 #23 and 55498 #24	Composite of 55498 #7, 55498 #11, 55498 #14 and 55498 #20	Composite of 55498 #3 and 55498 #6	Composite of 55499 #1 and 55499 #2
Lab Number:		1591573.167	1591573.168	1591573.169	1591573.170	1591573.171
Organochlorine Pesticides Screening in Soil						
2,4'-DDT	mg/kg dry wt	-	-	< 0.010	< 0.010	-
4,4'-DDT	mg/kg dry wt	-	-	0.010	0.011	-
Total DDT Isomers	mg/kg dry wt	-	-	< 0.06	< 0.06	-
Dieldrin	mg/kg dry wt	-	-	< 0.010	< 0.010	-
Endosulfan I	mg/kg dry wt	-	-	< 0.010	< 0.010	-
Endosulfan II	mg/kg dry wt	-	-	< 0.010	< 0.010	-
Endosulfan sulphate	mg/kg dry wt	-	-	< 0.010	< 0.010	-
Endrin	mg/kg dry wt	-	-	< 0.010	< 0.010	-
Endrin aldehyde	mg/kg dry wt	-	-	< 0.010	< 0.010	-
Endrin ketone	mg/kg dry wt	-	-	< 0.010	< 0.010	-
Heptachlor	mg/kg dry wt	-	-	< 0.010	< 0.010	-
Heptachlor epoxide	mg/kg dry wt	-	-	< 0.010	< 0.010	-
Hexachlorobenzene	mg/kg dry wt	-	-	< 0.010	< 0.010	-
Methoxychlor	mg/kg dry wt	-	-	< 0.010	< 0.010	-

Sample Name:		Composite of 55499 #3 and 55499 #4	Composite of 55499 #5 and 55499 #6	Composite of 55499 #7 and 55499 #8	Composite of 55499 #9 and 55499 #10	Composite of 55499 #11 and 55499 #12
Lab Number:		1591573.172	1591573.173	1591573.174	1591573.175	1591573.176
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	7	7	7	8	8
Total Recoverable Lead	mg/kg dry wt	33	28	24	31	26

Sample Name:		Composite of 55499 #13 and 55499 #14	Composite of 55499 #15 and 55499 #16	Composite of 55499 #17 and 55499 #18	Composite of 55499 #19 and 55499 #20	Composite of 55499 #21 and 55499 #22
Lab Number:		1591573.177	1591573.178	1591573.179	1591573.180	1591573.181
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	6	6	6	7	27
Total Recoverable Lead	mg/kg dry wt	32	31	29	46	80

Sample Name:		Composite of 55499 #1, 55499 #8, 55499 #13 and 55499 #22				
Lab Number:		1591573.182				
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.010	-	-	-	-
alpha-BHC	mg/kg dry wt	< 0.010	-	-	-	-
beta-BHC	mg/kg dry wt	< 0.010	-	-	-	-
delta-BHC	mg/kg dry wt	< 0.010	-	-	-	-
gamma-BHC (Lindane)	mg/kg dry wt	< 0.010	-	-	-	-
cis-Chlordane	mg/kg dry wt	< 0.010	-	-	-	-
trans-Chlordane	mg/kg dry wt	< 0.010	-	-	-	-
Total Chlordane [(cis+trans)* 100/42]	mg/kg dry wt	< 0.04	-	-	-	-
2,4'-DDD	mg/kg dry wt	< 0.010	-	-	-	-
4,4'-DDD	mg/kg dry wt	< 0.010	-	-	-	-
2,4'-DDE	mg/kg dry wt	< 0.010	-	-	-	-
4,4'-DDE	mg/kg dry wt	0.086	-	-	-	-
2,4'-DDT	mg/kg dry wt	< 0.010	-	-	-	-
4,4'-DDT	mg/kg dry wt	0.024	-	-	-	-
Total DDT Isomers	mg/kg dry wt	0.11	-	-	-	-
Dieldrin	mg/kg dry wt	< 0.010	-	-	-	-
Endosulfan I	mg/kg dry wt	< 0.010	-	-	-	-
Endosulfan II	mg/kg dry wt	< 0.010	-	-	-	-
Endosulfan sulphate	mg/kg dry wt	< 0.010	-	-	-	-
Endrin	mg/kg dry wt	< 0.010	-	-	-	-

Lab No: 1591573 v 1 Hill Laboratories Page 4 of 5

Sample Type: Soil						
Sample Name:		Composite of 55499 #1, 55499 #8, 55499 #13 and 55499 #22				
Lab Number:		1591573.182				
Organochlorine Pesticides Screening in Soil						
Endrin aldehyde	mg/kg dry wt	< 0.010	-	-	-	-
Endrin ketone	mg/kg dry wt	< 0.010	-	-	-	-
Heptachlor	mg/kg dry wt	< 0.010	-	-	-	-
Heptachlor epoxide	mg/kg dry wt	< 0.010	-	-	-	-
Hexachlorobenzene	mg/kg dry wt	< 0.010	-	-	-	-
Methoxychlor	mg/kg dry wt	< 0.010	-	-	-	-

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation. May contain a residual moisture content of 2-5%.	-	75, 78, 119-144, 147-156, 158-168, 171-181
Organochlorine Pesticides Screening in Soil	Sonication extraction, SPE cleanup, dual column GC-ECD analysis (modified US EPA 8082).. Tested on dried sample	0.010 - 0.06 mg/kg dry wt	145-146, 157, 169-170, 182
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	75, 78, 119-144, 147-156, 158-168, 171-181
Composite Environmental Solid Samples*	Individual sample fractions mixed together to form a composite fraction.	-	1-118
Total Recoverable Arsenic	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	75, 78, 119-144, 147-156, 158-168, 171-181
Total Recoverable Lead	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	0.4 mg/kg dry wt	75, 78, 119-144, 147-156, 158-168, 171-181

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

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Client Services Manager - Environmental

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ANALYSIS REPORT

Client:	EAM NZ Limited	Lab No:	1588491 SPv1
Contact:	J Strong	Date Registered:	26-May-2016
	C/- EAM NZ Limited	Date Reported:	01-Jun-2016
	PO Box 1154	Quote No:	72316
	Napier 4140	Order No:	
		Client Reference:	
		Submitted By:	J Strong

Sample Type: Soil

Sample Name:		55493/8	Composite of 55490/1 & 55490/2	Composite of 55490/3 & 55490/4	Composite of 55490/5 & 55490/6	Composite of 55490/7 & 55490/8
Lab Number:		1588491.55	1588491.140	1588491.141	1588491.142	1588491.143
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	10	9	9	10	9
Total Recoverable Lead	mg/kg dry wt	28	64	64	110	99

Sample Name:		Composite of 55490/9 & 55490/10	Composite of 55490/11 & 55490/12	Composite of 55490/13 & 55490/14	Composite of 55490/15 & 55490/16	Composite of 55490/17 & 55490/18
Lab Number:		1588491.144	1588491.145	1588491.146	1588491.147	1588491.148
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	8	9	10	6	6
Total Recoverable Lead	mg/kg dry wt	75	99	65	37	24

Sample Name:		Composite of 55490/19 & 55490/20	Composite of 55490/21 & 55490/22	Composite of 55490/5, 55490/13 & 55490/18	Composite of 55491/1 & 55491/2	Composite of 55491/3 & 55491/4
Lab Number:		1588491.149	1588491.150	1588491.151	1588491.152	1588491.153
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	6	6	-	12	8
Total Recoverable Lead	mg/kg dry wt	24	27	-	135	86
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	-	-	< 0.010	-	-
alpha-BHC	mg/kg dry wt	-	-	< 0.010	-	-
beta-BHC	mg/kg dry wt	-	-	< 0.010	-	-
delta-BHC	mg/kg dry wt	-	-	< 0.010	-	-
gamma-BHC (Lindane)	mg/kg dry wt	-	-	< 0.010	-	-
cis-Chlordane	mg/kg dry wt	-	-	< 0.010	-	-
trans-Chlordane	mg/kg dry wt	-	-	< 0.010	-	-
Total Chlordane [(cis+trans)* 100/42]	mg/kg dry wt	-	-	< 0.04	-	-
2,4'-DDD	mg/kg dry wt	-	-	< 0.010	-	-
4,4'-DDD	mg/kg dry wt	-	-	0.014	-	-
2,4'-DDE	mg/kg dry wt	-	-	< 0.010	-	-
4,4'-DDE	mg/kg dry wt	-	-	0.26	-	-
2,4'-DDT	mg/kg dry wt	-	-	< 0.010	-	-
4,4'-DDT	mg/kg dry wt	-	-	0.111	-	-
Total DDT Isomers	mg/kg dry wt	-	-	0.39	-	-
Dieldrin	mg/kg dry wt	-	-	< 0.010	-	-
Endosulfan I	mg/kg dry wt	-	-	< 0.010	-	-
Endosulfan II	mg/kg dry wt	-	-	< 0.010	-	-
Endosulfan sulphate	mg/kg dry wt	-	-	< 0.010	-	-

IANZ ACCREDITED LABORATORY

This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised.
The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked *, which are not accredited.

DSI (NES), HAVELOCK ROAD/HOWARD STREET, HASTINGS

Sample Type: Soil						
Sample Name:		Composite of 55490/19 & 55490/20	Composite of 55490/21 & 55490/22	Composite of 55490/5, 55490/13 & 55490/18	Composite of 55491/1 & 55491/2	Composite of 55491/3 & 55491/4
Lab Number:		1588491.149	1588491.150	1588491.151	1588491.152	1588491.153
Organochlorine Pesticides Screening in Soil						
Endrin	mg/kg dry wt	-	-	< 0.010	-	-
Endrin aldehyde	mg/kg dry wt	-	-	< 0.010	-	-
Endrin ketone	mg/kg dry wt	-	-	< 0.010	-	-
Heptachlor	mg/kg dry wt	-	-	< 0.010	-	-
Heptachlor epoxide	mg/kg dry wt	-	-	< 0.010	-	-
Hexachlorobenzene	mg/kg dry wt	-	-	< 0.010	-	-
Methoxychlor	mg/kg dry wt	-	-	< 0.010	-	-

Sample Name:		Composite of 55491/5 & 55491/6	Composite of 55491/7 & 55491/8	Composite of 55491/9 & 55491/10	Composite of 55491/11 & 55491/12	Composite of 55491/13 & 55491/14
Lab Number:		1588491.154	1588491.155	1588491.156	1588491.157	1588491.158
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	8	6	7	6	6
Total Recoverable Lead	mg/kg dry wt	43	31	27	24	28

Sample Name:		Composite of 55491/15 & 55491/16	Composite of 55491/17 & 55491/18	Composite of 55491/19 & 55491/20	Composite of 55491/21 & 55491/22	Composite of 55491/23 & 55491/24
Lab Number:		1588491.159	1588491.160	1588491.161	1588491.162	1588491.163
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	6	6	7	6	7
Total Recoverable Lead	mg/kg dry wt	21	27	20	22	21

Sample Name:		Composite of 55491/25 & 55491/26	Composite of 55491/8, 55491/15, 55491/22 & 55491/25	Composite of 55491/11 & 55491/13	Composite of 55493/1 & 55493/2	Composite of 55493/3 & 55493/4
Lab Number:		1588491.164	1588491.165	1588491.166	1588491.167	1588491.168
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	6	-	-	16	32
Total Recoverable Lead	mg/kg dry wt	24	-	-	54	95
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	-	< 0.010	< 0.010	-	-
alpha-BHC	mg/kg dry wt	-	< 0.010	< 0.010	-	-
beta-BHC	mg/kg dry wt	-	< 0.010	< 0.010	-	-
delta-BHC	mg/kg dry wt	-	< 0.010	< 0.010	-	-
gamma-BHC (Lindane)	mg/kg dry wt	-	< 0.010	< 0.010	-	-
cis-Chlordane	mg/kg dry wt	-	< 0.010	< 0.010	-	-
trans-Chlordane	mg/kg dry wt	-	< 0.010	< 0.010	-	-
Total Chlordane [(cis+trans)* 100/42]	mg/kg dry wt	-	< 0.04	< 0.04	-	-
2,4'-DDD	mg/kg dry wt	-	< 0.010	< 0.010	-	-
4,4'-DDD	mg/kg dry wt	-	< 0.010	0.018	-	-
2,4'-DDE	mg/kg dry wt	-	< 0.010	< 0.010	-	-
4,4'-DDE	mg/kg dry wt	-	0.081	0.47	-	-
2,4'-DDT	mg/kg dry wt	-	< 0.010	0.033	-	-
4,4'-DDT	mg/kg dry wt	-	0.040	0.60	-	-
Total DDT Isomers	mg/kg dry wt	-	0.12	1.12	-	-
Dieldrin	mg/kg dry wt	-	< 0.010	< 0.010	-	-
Endosulfan I	mg/kg dry wt	-	< 0.010	< 0.010	-	-
Endosulfan II	mg/kg dry wt	-	< 0.010	< 0.010	-	-
Endosulfan sulphate	mg/kg dry wt	-	< 0.010	< 0.010	-	-
Endrin	mg/kg dry wt	-	< 0.010	< 0.010	-	-
Endrin aldehyde	mg/kg dry wt	-	< 0.010	< 0.010	-	-
Endrin ketone	mg/kg dry wt	-	< 0.010	< 0.010	-	-
Heptachlor	mg/kg dry wt	-	< 0.010	< 0.010	-	-

Lab No: 1588491 v 1 Hill Laboratories Page 2 of 7

Sample Type: Soil						
Sample Name:		Composite of 55491/25 & 55491/26	Composite of 55491/8, 55491/15, 55491/22 & 55491/25	Composite of 55491/11 & 55491/13	Composite of 55493/1 & 55493/2	Composite of 55493/3 & 55493/4
Lab Number:		1588491.164	1588491.165	1588491.166	1588491.167	1588491.168
Organochlorine Pesticides Screening in Soil						
Heptachlor epoxide	mg/kg dry wt	-	< 0.010	< 0.010	-	-
Hexachlorobenzene	mg/kg dry wt	-	< 0.010	< 0.010	-	-
Methoxychlor	mg/kg dry wt	-	< 0.010	< 0.010	-	-
Sample Name:		Composite of 55493/5 & 55493/6	Composite of 55493/9 & 55493/10	Composite of 55493/11 & 55493/12	Composite of 55493/13 & 55493/14	Composite of 55493/15 & 55493/16
Lab Number:		1588491.169	1588491.170	1588491.171	1588491.172	1588491.173
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	54	8	7	8	8
Total Recoverable Lead	mg/kg dry wt	132	26	23	27	26
Sample Name:		Composite of 55493/17 & 55493/18	Composite of 55493/19 & 55493/20	Composite of 55493/21 & 55493/22	Composite of 55493/23 & 55493/24	Composite of 55493/25 & 55493/26
Lab Number:		1588491.174	1588491.175	1588491.176	1588491.177	1588491.178
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	8	9	8	8	8
Total Recoverable Lead	mg/kg dry wt	26	28	28	27	26
Sample Name:		Composite of 55493/12, 55493/17 & 55493/24	Composite of 55493/3 & 55493/5	Composite of 96427/1 & 96427/2	Composite of 96427/3 & 96427/4	Composite of 96427/5 & 96427/6
Lab Number:		1588491.179	1588491.180	1588491.181	1588491.182	1588491.183
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	-	-	9	10	7
Total Recoverable Lead	mg/kg dry wt	-	-	44	45	32
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.010	< 0.010	-	-	-
alpha-BHC	mg/kg dry wt	< 0.010	< 0.010	-	-	-
beta-BHC	mg/kg dry wt	< 0.010	< 0.010	-	-	-
delta-BHC	mg/kg dry wt	< 0.010	< 0.010	-	-	-
gamma-BHC (Lindane)	mg/kg dry wt	< 0.010	< 0.010	-	-	-
cis-Chlordane	mg/kg dry wt	< 0.010	< 0.010	-	-	-
trans-Chlordane	mg/kg dry wt	< 0.010	< 0.010	-	-	-
Total Chlordane [(cis+trans)* 100/42]	mg/kg dry wt	< 0.04	< 0.04	-	-	-
2,4'-DDD	mg/kg dry wt	< 0.010	< 0.010	-	-	-
4,4'-DDD	mg/kg dry wt	< 0.010	0.034	-	-	-
2,4'-DDE	mg/kg dry wt	< 0.010	< 0.010	-	-	-
4,4'-DDE	mg/kg dry wt	0.061	2.2	-	-	-
2,4'-DDT	mg/kg dry wt	< 0.010	0.157	-	-	-
4,4'-DDT	mg/kg dry wt	0.069	1.58	-	-	-
Total DDT Isomers	mg/kg dry wt	0.13	4.0	-	-	-
Dieldrin	mg/kg dry wt	< 0.010	< 0.010	-	-	-
Endosulfan I	mg/kg dry wt	< 0.010	< 0.010	-	-	-
Endosulfan II	mg/kg dry wt	< 0.010	< 0.010	-	-	-
Endosulfan sulphate	mg/kg dry wt	< 0.010	< 0.010	-	-	-
Endrin	mg/kg dry wt	< 0.010	< 0.010	-	-	-
Endrin aldehyde	mg/kg dry wt	< 0.010	< 0.010	-	-	-
Endrin ketone	mg/kg dry wt	< 0.010	< 0.010	-	-	-
Heptachlor	mg/kg dry wt	< 0.010	< 0.010	-	-	-
Heptachlor epoxide	mg/kg dry wt	< 0.010	< 0.010	-	-	-
Hexachlorobenzene	mg/kg dry wt	< 0.010	< 0.010	-	-	-
Methoxychlor	mg/kg dry wt	< 0.010	< 0.010	-	-	-

Lab No: 1588491 v 1 Hill Laboratories Page 3 of 7

Sample Type: Soil							
Sample Name:		Composite of 96427/7 & 96427/8	Composite of 96427/9 & 96427/10	Composite of 96427/11 & 96427/12	Composite of 96427/1, 96427/5, 96427/7 & 96427/11	Composite of 55506/1 & 55506/2
Lab Number:		1588491.184	1588491.185	1588491.186	1588491.187	1588491.188
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	6	5	6	-	7
Total Recoverable Lead	mg/kg dry wt	21	21	24	-	34
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	-	-	-	< 0.010	-
alpha-BHC	mg/kg dry wt	-	-	-	< 0.010	-
beta-BHC	mg/kg dry wt	-	-	-	< 0.010	-
delta-BHC	mg/kg dry wt	-	-	-	< 0.010	-
gamma-BHC (Lindane)	mg/kg dry wt	-	-	-	< 0.010	-
cis-Chlordane	mg/kg dry wt	-	-	-	< 0.010	-
trans-Chlordane	mg/kg dry wt	-	-	-	< 0.010	-
Total Chlordane [(cis+trans)* 100/42]	mg/kg dry wt	-	-	-	< 0.04	-
2,4'-DDD	mg/kg dry wt	-	-	-	< 0.010	-
4,4'-DDD	mg/kg dry wt	-	-	-	< 0.010	-
2,4'-DDE	mg/kg dry wt	-	-	-	< 0.010	-
4,4'-DDE	mg/kg dry wt	-	-	-	0.098	-
2,4'-DDT	mg/kg dry wt	-	-	-	< 0.010	-
4,4'-DDT	mg/kg dry wt	-	-	-	0.052	-
Total DDT Isomers	mg/kg dry wt	-	-	-	0.15	-
Dieldrin	mg/kg dry wt	-	-	-	< 0.010	-
Endosulfan I	mg/kg dry wt	-	-	-	< 0.010	-
Endosulfan II	mg/kg dry wt	-	-	-	< 0.010	-
Endosulfan sulphate	mg/kg dry wt	-	-	-	< 0.010	-
Endrin	mg/kg dry wt	-	-	-	< 0.010	-
Endrin aldehyde	mg/kg dry wt	-	-	-	< 0.010	-
Endrin ketone	mg/kg dry wt	-	-	-	< 0.010	-
Heptachlor	mg/kg dry wt	-	-	-	< 0.010	-
Heptachlor epoxide	mg/kg dry wt	-	-	-	< 0.010	-
Hexachlorobenzene	mg/kg dry wt	-	-	-	< 0.010	-
Methoxychlor	mg/kg dry wt	-	-	-	< 0.010	-

Sample Name:		Composite of 55506/3 & 55506/4	Composite of 55506/5 & 55506/6	Composite of 55506/7 & 55506/8	Composite of 55506/9 & 55506/10	Composite of 55506/11 & 55506/12
Lab Number:		1588491.189	1588491.190	1588491.191	1588491.192	1588491.193
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	9	10	5	5	9
Total Recoverable Lead	mg/kg dry wt	21	22	25	36	23

Sample Name:		Composite of 55506/13 & 55506/14	Composite of 55506/15 & 55506/16	Composite of 55506/1, 55506/7, 55506/8 & 55506/16	Composite of 55505/1 & 55505/2	Composite of 55505/3 & 55505/4
Lab Number:		1588491.194	1588491.195	1588491.196	1588491.197	1588491.198
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	8	6	-	6	4
Total Recoverable Lead	mg/kg dry wt	37	28	-	25	17.9
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	-	-	< 0.010	-	-
alpha-BHC	mg/kg dry wt	-	-	< 0.010	-	-
beta-BHC	mg/kg dry wt	-	-	< 0.010	-	-
delta-BHC	mg/kg dry wt	-	-	< 0.010	-	-
gamma-BHC (Lindane)	mg/kg dry wt	-	-	< 0.010	-	-
cis-Chlordane	mg/kg dry wt	-	-	< 0.010	-	-
trans-Chlordane	mg/kg dry wt	-	-	< 0.010	-	-

Lab No: 1588491 v 1 Hill Laboratories Page 4 of 7

Sample Type: Soil						
Sample Name:		Composite of 55506/13 & 55506/14	Composite of 55506/15 & 55506/16	Composite of 55506/1, 55506/7, 55506/8 & 55506/16	Composite of 55505/1 & 55505/2	Composite of 55505/3 & 55505/4
Lab Number:		1588491.194	1588491.195	1588491.196	1588491.197	1588491.198
Organochlorine Pesticides Screening in Soil						
Total Chlordane [(cis+trans)* 100/42]	mg/kg dry wt	-	-	< 0.04	-	-
2,4'-DDD	mg/kg dry wt	-	-	< 0.010	-	-
4,4'-DDD	mg/kg dry wt	-	-	< 0.010	-	-
2,4'-DDE	mg/kg dry wt	-	-	< 0.010	-	-
4,4'-DDE	mg/kg dry wt	-	-	< 0.010	-	-
2,4'-DDT	mg/kg dry wt	-	-	< 0.010	-	-
4,4'-DDT	mg/kg dry wt	-	-	< 0.010	-	-
Total DDT Isomers	mg/kg dry wt	-	-	< 0.06	-	-
Dieldrin	mg/kg dry wt	-	-	< 0.010	-	-
Endosulfan I	mg/kg dry wt	-	-	< 0.010	-	-
Endosulfan II	mg/kg dry wt	-	-	< 0.010	-	-
Endosulfan sulphate	mg/kg dry wt	-	-	< 0.010	-	-
Endrin	mg/kg dry wt	-	-	< 0.010	-	-
Endrin aldehyde	mg/kg dry wt	-	-	< 0.010	-	-
Endrin ketone	mg/kg dry wt	-	-	< 0.010	-	-
Heptachlor	mg/kg dry wt	-	-	< 0.010	-	-
Heptachlor epoxide	mg/kg dry wt	-	-	< 0.010	-	-
Hexachlorobenzene	mg/kg dry wt	-	-	< 0.010	-	-
Methoxychlor	mg/kg dry wt	-	-	< 0.010	-	-

Sample Name:		Composite of 55505/5 & 55505/6	Composite of 55505/7 & 55505/8	Composite of 55505/9 & 55505/10	Composite of 55505/11 & 55505/12	Composite of 55505/13 & 55505/14
Lab Number:		1588491.199	1588491.200	1588491.201	1588491.202	1588491.203
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	5	5	5	5	5
Total Recoverable Lead	mg/kg dry wt	17.0	17.6	18.1	18.5	16.5

Sample Name:		Composite of 55505/15 & 55505/16	Composite of 55505/17 & 55505/18	Composite of 55505/19 & 55505/20	Composite of 55505/21 & 55505/22	Composite of 55505/23 & 55505/24
Lab Number:		1588491.204	1588491.205	1588491.206	1588491.207	1588491.208
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	6	5	5	5	4
Total Recoverable Lead	mg/kg dry wt	19.1	18.0	19.2	17.2	16.9

Sample Name:		Composite of 55505/25 & 55505/26	Composite of 55505/27 & 55505/28	Composite of 55505/29 & 55505/30	Composite of 55505/31 & 55505/32	Composite of 55505/33 & 55505/34
Lab Number:		1588491.209	1588491.210	1588491.211	1588491.212	1588491.213
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	4	5	5	5	7
Total Recoverable Lead	mg/kg dry wt	19.7	16.4	37	22	25

Sample Name:		Composite of 55505/35 & 55505/36	Composite of 55505/37 & 55505/38	Composite of 55505/1, 55505/13, 55505/23 & 55505/38		
Lab Number:		1588491.214	1588491.215	1588491.216		
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	7	8	-	-	-
Total Recoverable Lead	mg/kg dry wt	24	27	-	-	-
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	-	-	< 0.010	-	-
alpha-BHC	mg/kg dry wt	-	-	< 0.010	-	-
beta-BHC	mg/kg dry wt	-	-	< 0.010	-	-
delta-BHC	mg/kg dry wt	-	-	< 0.010	-	-

Lab No: 1588491 v 1 Hill Laboratories Page 5 of 7

Sample Type: Soil						
Sample Name:		Composite of 55505/35 & 55505/36	Composite of 55505/37 & 55505/38	Composite of 55505/1, 55505/13, 55505/23 & 55505/38		
Lab Number:		1588491.214	1588491.215	1588491.216		
Organochlorine Pesticides Screening in Soil						
gamma-BHC (Lindane)	mg/kg dry wt	-	-	< 0.010	-	-
cis-Chlordane	mg/kg dry wt	-	-	< 0.010	-	-
trans-Chlordane	mg/kg dry wt	-	-	< 0.010	-	-
Total Chlordane [(cis+trans)* 100/42]	mg/kg dry wt	-	-	< 0.04	-	-
2,4'-DDD	mg/kg dry wt	-	-	< 0.010	-	-
4,4'-DDD	mg/kg dry wt	-	-	< 0.010	-	-
2,4'-DDE	mg/kg dry wt	-	-	< 0.010	-	-
4,4'-DDE	mg/kg dry wt	-	-	0.035	-	-
2,4'-DDT	mg/kg dry wt	-	-	< 0.010	-	-
4,4'-DDT	mg/kg dry wt	-	-	0.041	-	-
Total DDT Isomers	mg/kg dry wt	-	-	0.08	-	-
Dieldrin	mg/kg dry wt	-	-	< 0.010	-	-
Endosulfan I	mg/kg dry wt	-	-	< 0.010	-	-
Endosulfan II	mg/kg dry wt	-	-	< 0.010	-	-
Endosulfan sulphate	mg/kg dry wt	-	-	< 0.010	-	-
Endrin	mg/kg dry wt	-	-	< 0.010	-	-
Endrin aldehyde	mg/kg dry wt	-	-	< 0.010	-	-
Endrin ketone	mg/kg dry wt	-	-	< 0.010	-	-
Heptachlor	mg/kg dry wt	-	-	< 0.010	-	-
Heptachlor epoxide	mg/kg dry wt	-	-	< 0.010	-	-
Hexachlorobenzene	mg/kg dry wt	-	-	< 0.010	-	-
Methoxychlor	mg/kg dry wt	-	-	< 0.010	-	-

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation. May contain a residual moisture content of 2-5%.	-	55, 140-150, 152-164, 167-178, 181-186, 188-195, 197-215
Organochlorine Pesticides Screening in Soil	Sonication extraction, SPE cleanup, dual column GC-ECD analysis (modified US EPA 8082).. Tested on dried sample	0.010 - 0.06 mg/kg dry wt	151, 165-166, 179-180, 187, 196, 216
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	55, 140-150, 152-164, 167-178, 181-186, 188-195, 197-215
Composite Environmental Solid Samples*	Individual sample fractions mixed together to form a composite fraction.	-	1-54, 56-139
Total Recoverable Arsenic	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	55, 140-150, 152-164, 167-178, 181-186, 188-195, 197-215

Lab No: 1588491 v 1 Hill Laboratories Page 6 of 7

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Total Recoverable Lead	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	0.4 mg/kg dry wt	55, 140-150, 152-164, 167-178, 181-186, 188-195, 197-215

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

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Ara Heron BSc (Tech)
Client Services Manager - Environmental

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ANALYSIS REPORT

Client:	EAM NZ Limited	Lab No:	1595582 SPv1
Contact:	J Strong	Date Registered:	04-Jun-2016
	C/- EAM NZ Limited	Date Reported:	15-Jun-2016
	PO Box 1154	Quote No:	72316
	Napier 4140	Order No:	
		Client Reference:	Duncan St
		Submitted By:	J Strong

Sample Type: Soil

Sample Name:		Composite of 94952/1 & 94952/2	Composite of 94952/3 & 94952/4	Composite of 94952/5 & 94952/6	Composite of 94952/7 & 94952/8	Composite of 94952/9 & 94952/10
Lab Number:		1595582.31	1595582.32	1595582.33	1595582.34	1595582.35
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	35	33	13	16	33
Total Recoverable Lead	mg/kg dry wt	141	127	57	69	153

Sample Name:		Composite of 94952/11 & 94952/12	Composite of 94952/13 & 94952/14	Composite of 94952/15 & 94952/16	Composite of 94952/17 & 94952/18	Composite of 94952/19 & 94952/20
Lab Number:		1595582.36	1595582.37	1595582.38	1595582.39	1595582.40
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	44	62	34	27	40
Total Recoverable Lead	mg/kg dry wt	220	250	148	106	153

Sample Name:		Composite of 94952/21 & 94952/22	Composite of 94952/23 & 94952/24	Composite of 94952/25 & 94952/26	Composite of 94952/27 & 94952/28	Composite of 94952/29 & 94952/30
Lab Number:		1595582.41	1595582.42	1595582.43	1595582.44	1595582.45
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	24	22	18	23	22
Total Recoverable Lead	mg/kg dry wt	94	97	76	90	78

Sample Name:		Composite of 94952/1, 94952/6, 94952/10 & 94952/15	Composite of 94952/22, 94952/27, 94952/29 & 94952/30			
Lab Number:		1595582.46	1595582.47			
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.010	< 0.010	-	-	-
alpha-BHC	mg/kg dry wt	< 0.010	< 0.010	-	-	-
beta-BHC	mg/kg dry wt	< 0.010	< 0.010	-	-	-
delta-BHC	mg/kg dry wt	< 0.010	< 0.010	-	-	-
gamma-BHC (Lindane)	mg/kg dry wt	< 0.010	< 0.010	-	-	-
cis-Chlordane	mg/kg dry wt	< 0.010	< 0.010	-	-	-
trans-Chlordane	mg/kg dry wt	< 0.010	< 0.010	-	-	-
Total Chlordane [(cis+trans)* 100/42]	mg/kg dry wt	< 0.04	< 0.04	-	-	-
2,4'-DDD	mg/kg dry wt	0.058	0.016	-	-	-
4,4'-DDD	mg/kg dry wt	0.123	0.044	-	-	-
2,4'-DDE	mg/kg dry wt	0.023	< 0.010	-	-	-
4,4'-DDE	mg/kg dry wt	2.7	0.85	-	-	-
2,4'-DDT	mg/kg dry wt	0.086	0.019	-	-	-
4,4'-DDT	mg/kg dry wt	1.53	0.35	-	-	-

IANZ ACCREDITED LABORATORY

This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised.
The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked *, which are not accredited.

Sample Type: Soil							
Sample Name:		Composite of 94952/1, 94952/6, 94952/10 & 94952/15	Composite of 94952/22, 94952/27, 94952/29 & 94952/30				
Lab Number:		1595582.46	1595582.47				
Organochlorine Pesticides Screening in Soil							
Total DDT Isomers	mg/kg dry wt	4.5	1.28	-	-	-	
Dieldrin	mg/kg dry wt	< 0.010	< 0.010	-	-	-	
Endosulfan I	mg/kg dry wt	< 0.010	< 0.010	-	-	-	
Endosulfan II	mg/kg dry wt	< 0.010	< 0.010	-	-	-	
Endosulfan sulphate	mg/kg dry wt	< 0.010	< 0.010	-	-	-	
Endrin	mg/kg dry wt	< 0.010	< 0.010	-	-	-	
Endrin aldehyde	mg/kg dry wt	< 0.010	< 0.010	-	-	-	
Endrin ketone	mg/kg dry wt	< 0.010	< 0.010	-	-	-	
Heptachlor	mg/kg dry wt	< 0.010	< 0.010	-	-	-	
Heptachlor epoxide	mg/kg dry wt	< 0.010	< 0.010	-	-	-	
Hexachlorobenzene	mg/kg dry wt	< 0.010	< 0.010	-	-	-	
Methoxychlor	mg/kg dry wt	< 0.010	< 0.010	-	-	-	

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation. May contain a residual moisture content of 2-5%.	-	31-45
Organochlorine Pesticides Screening in Soil	Sonication extraction, SPE cleanup, dual column GC-ECD analysis (modified US EPA 8082).. Tested on dried sample	0.010 - 0.06 mg/kg dry wt	46-47
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	31-45
Composite Environmental Solid Samples*	Individual sample fractions mixed together to form a composite fraction.	-	1-30
Total Recoverable Arsenic	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	31-45
Total Recoverable Lead	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	0.4 mg/kg dry wt	31-45

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

Carole Rodgers-Carroll BA, NZCS
Client Services Manager - Environmental

Lab No: 1595582 v 1 Hill Laboratories Page 2 of 2

LORENTZ AGROLOGY

Lorentz Agrology trading as Lorentz Solutionz Limited

REAPPRAISAL OF SOIL CONTAMINATION STATUS FOR 1259 HOWARD STREET HASTINGS

Prepared for: DR KAREN COOPER

Prepared by: Peter Lorentz

23 September 2017

REAPPRAISAL OF SOIL CONTAMINATION STATUS FOR 1259 HOWARD STREET HASTINGS

REPORT PREPARATION

Project:

LALSL # 230917

Report for:

DR Karen Cooper

Report by:

Peter Lorentz
Lorentz Agrology
8A Balmoral Street
Taradale 4112

Table of Contents

PREFACE

Lorentz Agrology have been commissioned by Dr Karen Cooper to undertake a reappraisal of the soil contamination status of her property at 1259 Howard Street.

The request was based on the findings detailed in two previous site assessment reports requested by the Hastings District Council (HDC) from EAM New Zealand Limited (EAM) (EAM June 2016 and EAM Amended June 2017).

The HDC's request for a detailed site assessment to National Environmental Standards for 1259 Howard Street was part of a wider assessment for land between Howard Street and Havelock Road designated for change from 'Plains Production Zone' to 'Hastings General Residential Zone'.

There are two reasons provided for the request for reappraisal. Firstly, the initial and subsequent reports provided by EAM NZ Ltd showed some ambiguity regarding sample designation and labelling. Secondly, the arsenic results (which exceeded the NES guidelines) for the property appeared inconsistent with previous work undertaken (Lorentz Agrology September 2015) despite anecdotal evidence the orchard enterprise had similar management for the whole area.

The assessment and work that is the subject of this report has been undertaken by Lorentz Solutionz Limited trading as Lorentz Agrology.

EXECUTIVE SUMMARY

- Lorentz Agrology trading as Lorentz Solutionz Limited were commissioned by Dr Karen Cooper to undertake systematic soil sampling and analysis to determine whether or not her land designated for rezoning exceeds the maximum permissible level for arsenic contained in the Soil Contaminant Standards for Health (SCS_{Health}) for Residential 10% produce.

- The request was based on the following paragraph contained in the two EAM NZ Ltd reports:

  > "Fourteen composite samples exceeded the NES soil standard values for arsenic (20 mg/kg) for the land use scenario of residential (10% produce). The majority of these samples were located towards the southern end of the Site on propertied identified as 180 Havelock Road and 1259 Howard Street. This is not surprising as these two properties were shown to have had orchards on them for many decades going back to at least the 1950s"

- Designation of the land as contaminated (exceeding NES SCS_{Health} Limits) has significant commercial implications and may also influence planning decisions.

- Previous samples submitted (Lorentz Agrology trading as Lorentz Solutionz Limited) for analysis from a parcel of land on the property designated for sale as a lifestyle block showed arsenic values reflective of uncontaminated soil. Anecdotally, the orchard land at 1259 Howard Street has a similar management history. The inconsistency between the results detailed in the EAM reports and those for the Lorentz Agrology report required further investigation.

- Soil sampling and analysis for this investigation was in accordance with The Ministry for the Environment publication, Contaminated Land Management Guidelines No. 5 (Site Investigation and Analysis of Soils – Revised 2011).

- This report shows the arsenic results for the land constituting the same area sampled by EAM NZ Ltd are very likely to be compliant with the Soil contaminant standards for health ($SCSs_{(health)}$). This directly contradicts EAM's submission to the HDC. It has been necessary to qualify this statement by referring to the Adjusted Guideline Value in the body of the report.

- It is noted arsenic analysis was undertaken by two different laboratories (ARL and Hill Labs) both of which are IANZ accredited. In an effort to provide some surety regarding the inter-laboratory precision and accuracy between these two laboratories this report provides recent results for arsenic in soil samples submitted to both laboratories as part of a collaborative inter-laboratory exchange program (Appendix 1).

SAMPLING AND SAMPLES

- The Ministry for the Environment publication, Contaminated Land Management Guidelines No. 5 (Site Investigation and Analysis of Soils – Revised 2011) has been used to develop sampling and analysis protocols.

- Samples were taken using a soil auger with swaged tubular stainless steel of 15 cm.

- The auger was decontaminated between sampling using laboratory distilled water and dried with tissue paper.

- All sample containers were new/clean and supplied by the laboratory.

- Samples were submitted to the laboratory the day after sampling, but were maintained at 4 °C – 8 °C overnight.

- A schematic of the individual sample sites each constituting 12 separate cores to a depth of 15 cm were taken from two diagonal transects.

- To reduce costs individual samples were composited as follows:

Lab Number	Composite of samples:	Sample Name
1544714	Howard Street #1 + #2	Howard Street COMP A
1544721	Field QC #12 only	Field QC 12
1544715	Howard Street #3 + #4 + #5	Howard Street COMP B
1544716	Howard Street #6 + #7 + #8	Howard Street COMP C
1544717	Howard Street #9 + #10 + #11	Howard Street COMP D
1544718	Howard Street #12 + #13 + #14	Howard Street COMP E
1544719	Howard Street #15 + #16 + #17	Howard Street COMP F
1544720	Howard Street # 12 Only	Howard Street #12

- Individual samples (#1 through #17) have been retained by the laboratory for future analysis if needs be.

- A Quality Control sample was taken to constitute a ***field duplicate***. The duplicate was derived by taking 10 replicate cores within a 10 cm radius from sample site #12.
- Samples were clearly recorded and labelled on site with detailed sample handling instructions provided to the laboratory on the submission form.

Sampling Plan

Analysis Plan

Samples were submitted for total acid extractable arsenic only using EPA Method 3035B.

Chain of Custody

Chain of custody in accordance with paragraph 4.2.2 (Contaminated Land Management Guidelines No. 5) was captured on the submission form accompanying the samples which is auditable through the Laboratory's Information Management Systems (LIMS). Copies of these are available on request.

RESULTS

The results of the heavy metal analysis are presented in Table 1 below which is a reproduction from the full report of analysis in APPENDIX 2.

Table 1

SOIL ANALYSIS

Lab Number	Sample Name	Core Length (cm)	EPA-ext Arsenic mg/kg
1544714	Howard Street Comp A	15	9.11
1544721	Feild QC #12	15	5.89
1544715	Howard Street Comp B	15	7.78
1544716	Howard Street Comp C	15	8.22
1544717	Howard Street Comp D	15	7.23
1544718	Howard Street Comp E	15	8.46
1544719	Howard Street Comp F	15	6.13
1544720	Howard Street #12	15	6.12

Evaluation of Laboratory Quality Control

It is apparent from the results for the Field Duplicate Quality Control sample (#12 and Field QC) that the results are well aligned, with differences within the expected sampling variation due to spatial heterogeneity.

ADJUSTED GUIDELINE VALUE

Composite Sampling

For the reconciliation of the results of analysis for compliance with the NES, it is necessary to use the formula for composite sampling contained in paragraph 3.6.4 in the Contaminant Land Management Guidelines No 5. This states that the maximum allowable concentration for composite samples, called the Adjustable Guideline Value, is the NES Guideline Value divided by the number of individual samples used in the composite.

"Adjusted guideline value = Guideline Value ÷ Number of samples in composite"

The very low NES threshold value for arsenic in soil for residential land (20 mg/kg As) means arsenic at background levels (5 to 9 mg/kg As) using this formula for composites of 3 samples or more are very likely to fail compliance (10% produce). In this assessment, this is the case for all composites excluding COMP F. In the case of 1259 Howard Street, all arsenic values for the composite samples are indicative of background levels making it extremely likely that all individual samples are compliant. This can easily be confirmed by analysing all individual samples retained at the laboratory.

CONCLUSIONS

- The reports provided to the Hastings District Council by EAM New Zealand Limited showing the land owned by Dr Karen Cooper at 1259 Howard Street exceeds the NES threshold for soil arsenic concentration of 20 mg/kg DM is very likely to be erroneous.

- This reappraisal was initiated on the basis there were sample label and site identification ambiguities and previous site history suggesting only background arsenic levels prevailed over the entire block. This report confirms the errors in the original report.
- The average arsenic value for the composite samples collected and submitted by EAM NZ Ltd is 26.3 mg/kg As, whereas the average for those collected by Lorentz Agrology from the same sites is 7.8 mg/kg As.
- When the composite samples are adjusted using the formula contained in paragraph 3.6.4 in the Contaminant Land Management Guidelines No. 5, all but one sample still exceeds the adjusted NES for arsenic for residential occupation. However, the author provides evidence that the use of the formula is inappropriate for arsenic because compositing 3 or more samples with background levels (uncontaminated soil) is likely to exceed the adjusted NES value in most cases.
- Confirmation of compliance with NES for all individual samples will require analysis on sample retentions held at ARL.
- Previous soil testing and anecdotal evidence the orchard enterprise treated the entire block "as one" suggests the land parcel is free of any contamination in excess of NES.
- This report provides sufficient and compelling evidence for HDC to make corrections to their records and deem the property at 1259 Howard Street free from contaminants and compliant with NES.

For Lorentz Agrology trading as Lorentz Solutionz Limited

Peter Lorentz
Director

REFERENCES

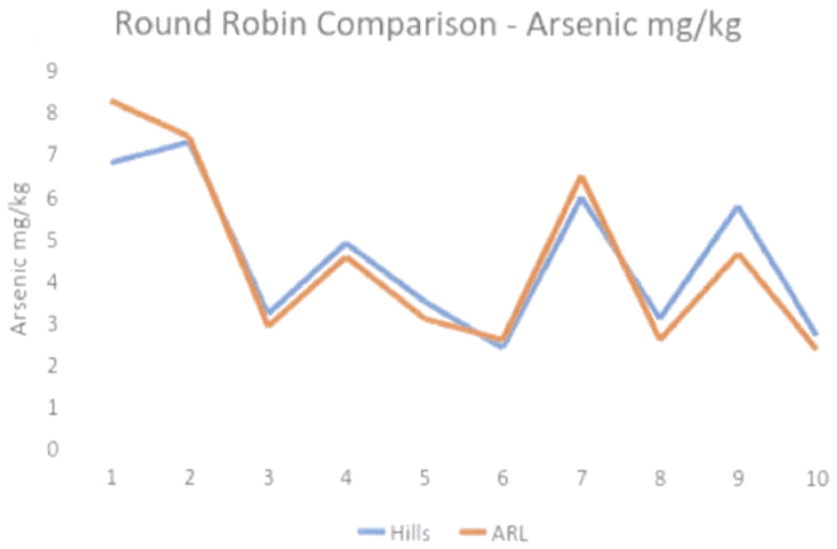
MfE 2011 Contaminated Land Management Guidelines No.1 Reporting on Contaminated Sites in New Zealand. Ministry for the Environment.

MfE 2012 Users' Guide National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health. Ministry for the Environment.

MfE 2011 Contaminated Land Management Guidelines No.5; Site Investigation and Analysis of Soil. Ministry for the Environment.

APPENDIX 1

Inter-Laboratory Comparison Exchange Program 2017. Soil Arsenic EPA Method 3035B



APPENDIX 2

Analytical Research Laboratories

ARL analytical research laboratories

890 Waitangi Road,
Awatoto,
PO Box 989
Napier 4140

Phone: 0800 100 668
Fax: (06) 835 9223
Email: arl@arllab.co.nz
Website: www.arllab.co.nz

Customer:	PETER LORENTZ			**Customer No:**	60874939
	LORENTZ AGROLOGY			**Sampled date:**	16/08/2017
	8A BALMORAL STREET			**Report Issued:**	31/08/2017
	TARADALE			**Samples Received:**	16/08/2017
	NAPIER 4112	**Service Person:**	Customer Centre	**Order Number:**	Howard Street
	06 8448886	**Name:**			
Samples:	8	**Email:**	customer centre@ravensdown.co.nz		
		NZ	6087493-Howard StreetSL		

SOIL ANALYSIS

Lab Number	Sample Name	Core Length (cm)	EPA-ext Arsenic mg/kg
1544714	Howard Street Comp A	15	9.11
1544721	Feild QC #12	15	5.89
1544715	Howard Street Comp B	15	7.78
1544716	Howard Street Comp C	15	8.22
1544717	Howard Street Comp D	15	7.23
1544718	Howard Street Comp E	15	8.46
1544719	Howard Street Comp F	15	6.13
1544720	Howard Street #12	15	6.12

Analysis comment:

Joseph Holloway for ARL

IANZ ACCREDITED LABORATORY

Tests indicated as not accredited are outside the scope of the laboratory's accreditation

- The report applies to samples as submitted by the customer
- Results are expressed on a dry weight basis.
- Summary of methods used and detection limits are available on request

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Tests not Accredited

Tests not Requested

Repeat analysis in progress

RPT - Sample submitted for repeat analysis. **RTF** - Results to follow. **QTU** - Quick test units.

LORENTZ AGROLOGY

Lorentz Agrology trading as Lorentz Solutionz Limited

ADDENDUM TO REPORT LALSL # 030915 3 SEPTEMBER 2015

LOT 2, 1259 HOWARD STREET, HASTINGS, 4122

Prepared for: DR KAREN COOPER

Prepared by: Peter Lorentz

16 October 2018

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ADDENDUM TO REPORT LALSL # 030915 3 SEPTEMBER 2015 FOR THE PROTECTION OF HUMAN HEALTH - SUBDIVISION PROPOSAL

REPORT PREPARATION

Project:

LALSL # 161018

Report for:

DR Karen Cooper

Report by:

Peter Lorentz
Lorentz Agrology
8A Balmoral Street
Taradale 4112

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SUMMARY

- Further information for a Subdivision Consent Application has been requested by the Hastings District Council (HDC) for Karen Cooper's land at 1259 Howard Street, Hastings.
- The HDC acknowledged the further information would be acceptable in the form of an addendum to accompany a previous report (LALSL # 030915).
- Prior to this addendum, Lot 2, 1259 Howard Street, Hastings 4122 remained the only "piece of land" of the larger parcel which had not been subject to NES soil testing for the protection of human health.
- To satisfy the requirements of the NES Dr Karen Cooper requested Lorentz Agrology trading as Lorentz Solutionz Limited to undertake soil sampling and chemical analysis on Lot 2, 1259 Howard Street Hastings 4122.
- For this addendum, all soil sampling and analytical testing protocols iterated in the previous report (LALSL # 030915) were followed.
- **The results of analysis for the sample submitted show that the piece of land (Lot 2, 1259 Howard Street) does not exceed all of the relevant NES contaminant standards for 10% residential use.**

SAMPLING OBJECTIVE

Submitting a single composite comprising 4 individual sub-samples and retaining the individual samples for later analysis in the event of non-compliance was justifiable given anecdotal information, the small area and previous test results. The retention of the four sub-samples would also satisfy the requirement to demonstrate the spatial distribution in the event there was a contamination transgression.

SAMPLING PROCESS

To achieve this objective 8 diagonal sampling transects, 2 each for areas A, B, C and D were chosen to represent the site (Figure # 1). Measurements were taken from the boundary fences to ensure an ability to return to the sampling transects at a later date if required.

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6 soil cores to a depth of 15 cm were taken from each of the diagonal transects and combined into clean and labelled bags to represent each sub-sample area (A, B, C and D).

The sub-samples were submitted to the laboratory with clear instructions to mix them thoroughly before making a composite by taking equal portions of soil by weight from the individual sub-samples into two clean containers and label them "Sample Comp A,B,C,D".

The laboratory was asked to retain sufficient soil of the individual sub samples should they be required for analysis at a later date.

Figure # 1

SOIL ANALYSIS

Samples were submitted to Analytical Research Laboratories at 890 Waitangi Road, Napier for sample preparation and for heavy metal analysis. They were asked to sub-contract the composite sample to Hill Laboratories Ltd, Hamilton for Organochlorine Pesticide residue analysis.

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Heavy Metals

The results of the heavy metal analysis are presented in Table 1 below which is a reproduction from the full report of analysis in APPENDIX 1.

Table 1

Lab Number: **1695692**	Sample: **LOT 2 Howard Street Sample Comp A,B,C,D**
Measureand: ⬇	Result: **(mg/kg (DM)**
Copper	74.8
Lead	30.0
Zinc	97.7
Arsenic	7.51
Chromium	19.2
Nickel	13.7
Cadmium	0.203
Mercury	0.063

- *All heavy metal results are based on the acid extractable method described by US EPA- 200.2 which complies with the laboratory assessment method requirements of the NES guideline.

Organo-Chlorine Pesticide Residues (OCP's)

The results of the OCP's expressed as Total DDT are calculated as the sum of pp DDE, pp DDD, op DDT and pp DDT. The results for Total DDT and for the individual insecticides Aldrin and Dieldrin are presented in Table 2 below. The full report of analysis is contained in APPENDIX 2.

Table 2

Lab Number	Sample Description	Aldrin mg/kg	Dieldrin mg/kg	Total DDT Isomers mg/kg
2056459.1	Lot 2 Howard Street Sample Comp A,B,C,D	<0.001	<0.001	8.5

CONCLUSION

Based on the environmental site investigation, this report concludes:

- **The results of analysis for the sample submitted show that the piece of land (Lot 2, 1259 Howard Street) does not exceed all of the relevant NES contaminant standards for 10% residential use.**

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APPENDIX 1

Analytical Research Laboratories

ARL analytical research laboratories

890 Waitangi Road,
Awatoto,
PO Box 989
Napier 4140

Phone: 0800 100 668
Fax: (06) 835 9223
Email: arl@arllab.co.nz
Website: www.arllab.co.nz

Customer:	PETER LORENTZ			**Customer No:**	60874939
	LORENTZ AGROLOGY			**Sampled date:**	26/09/2018
	8A BALMORAL STREET			**Report Issued:**	01/10/2018
	TARADALE			**Samples Received:**	26/09/2018
	NAPIER 4112	**Service Person:**	Customer Centre	**Order Number:**	Sample comp A,B,C,D
	06 8448886	**Name:**			
Samples:	1	**Email:** NZ	customer centre@ravenscown.co.nz,lorentzagrology@gmail.com 60874939-Sample comp A,B,C,D,SL		

SOIL ANALYSIS

Lab Number	Sample Name	Core Length (cm)	EPA-std Cadmium	EPA-std Mercury
			mg/kg	mg/kg
1695692	Sample comp A,B,C,D	15	0.203	0.063

Lab Number	Sample Name	Core Length (cm)	EPA-std Copper	EPA-std Lead	EPA-std Zinc	EPA-std Arsenic	EPA-std Chromium	EPA-std Nickel
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1695692	Sample comp A,B,C,D	15	74.8	30.0	97.7	7.51	19.2	13.7

Analysis comment:

Joseph Holloway for ARL

IANZ ACCREDITED LABORATORY — Tests indicated as not accredited are outside the scope of the laboratory's accreditation

- The report applies to samples as submitted by the customer.
- Results are expressed on a dry weight basis.
- Summary of methods used and detection limits are available on request.

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RPT - Sample submitted for repeat analysis. **RTF** - Results to follow. **QTU** - Quick test units

Tests not Accredited
Tests not Requested
Repeat analysis in progress
Tests subcontracted

APPENDIX 2

Open with

Hill Laboratories
TRIED, TESTED AND TRUSTED
R J Hill Laboratories Limited
28 Duke Street Frankton 3204
Private Bag 3205
Hamilton 3240 New Zealand
T 0508 HILL LAB (44 555 22)
T +64 7 858 2000
E mail@hill-labs.co.nz
W www.hill-laboratories.com

Certificate of Analysis

Client:	Analytical Research Laboratories	**Lab No:**	2056459 SPv1
Contact:	H Venter	**Date Received:**	28-Sep-2018
	C/- Analytical Research Laboratories	**Date Reported:**	17-Oct-2018
	PO Box 989	**Quote No:**	67552
	Napier 4140	**Order No:**	293548
		Client Reference:	Peter Lorentz
		Submitted By:	H Venter

Sample Type: Soil

	Sample Name:	#1695692
	Lab Number:	2056459.1
Organochlorine Pesticides Trace in Soil		
Aldrin	mg/kg dry wt	< 0.0010
alpha-BHC	mg/kg dry wt	< 0.0010
beta-BHC	mg/kg dry wt	< 0.0010
delta-BHC	mg/kg dry wt	< 0.0010
gamma-BHC (Lindane)	mg/kg dry wt	0.0021
cis-Chlordane	mg/kg dry wt	< 0.0010
trans-Chlordane	mg/kg dry wt	< 0.0010
2,4'-DDD	mg/kg dry wt	0.082
4,4'-DDD	mg/kg dry wt	0.074
2,4'-DDE	mg/kg dry wt	0.0196
4,4'-DDE	mg/kg dry wt	5.3
2,4'-DDT	mg/kg dry wt	0.116
4,4'-DDT	mg/kg dry wt	2.9
Total DDT Isomers	mg/kg dry wt	8.5
Dieldrin	mg/kg dry wt	< 0.0010
Endosulfan I	mg/kg dry wt	< 0.0010
Endosulfan II	mg/kg dry wt	< 0.0010
Endosulfan sulphate	mg/kg dry wt	< 0.0010
Endrin	mg/kg dry wt	< 0.0010
Endrin aldehyde	mg/kg dry wt	< 0.0010
Endrin ketone	mg/kg dry wt	< 0.0010
Heptachlor	mg/kg dry wt	< 0.0010
Heptachlor epoxide	mg/kg dry wt	< 0.0010
Hexachlorobenzene	mg/kg dry wt	< 0.0010
Methoxychlor	mg/kg dry wt	< 0.0010
Total Chlordane [(cis+trans)* 100/42]	mg/kg dry wt	< 0.002

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. Unless otherwise indicated, analyses were performed at Hill Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Soil Prep Dry for Organics,Trace*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%.	-	1
Organochlorine Pesticides Trace in Soil	Sonication extraction, SPE cleanup, GPC cleanup (if required), dual column GC-ECD analysis. Tested on dried sample	0.0010 - 0.006 mg/kg dry wt	1

IANZ ACCREDITED LABORATORY

This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised.
The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked *, which are not accredited.

Item 2

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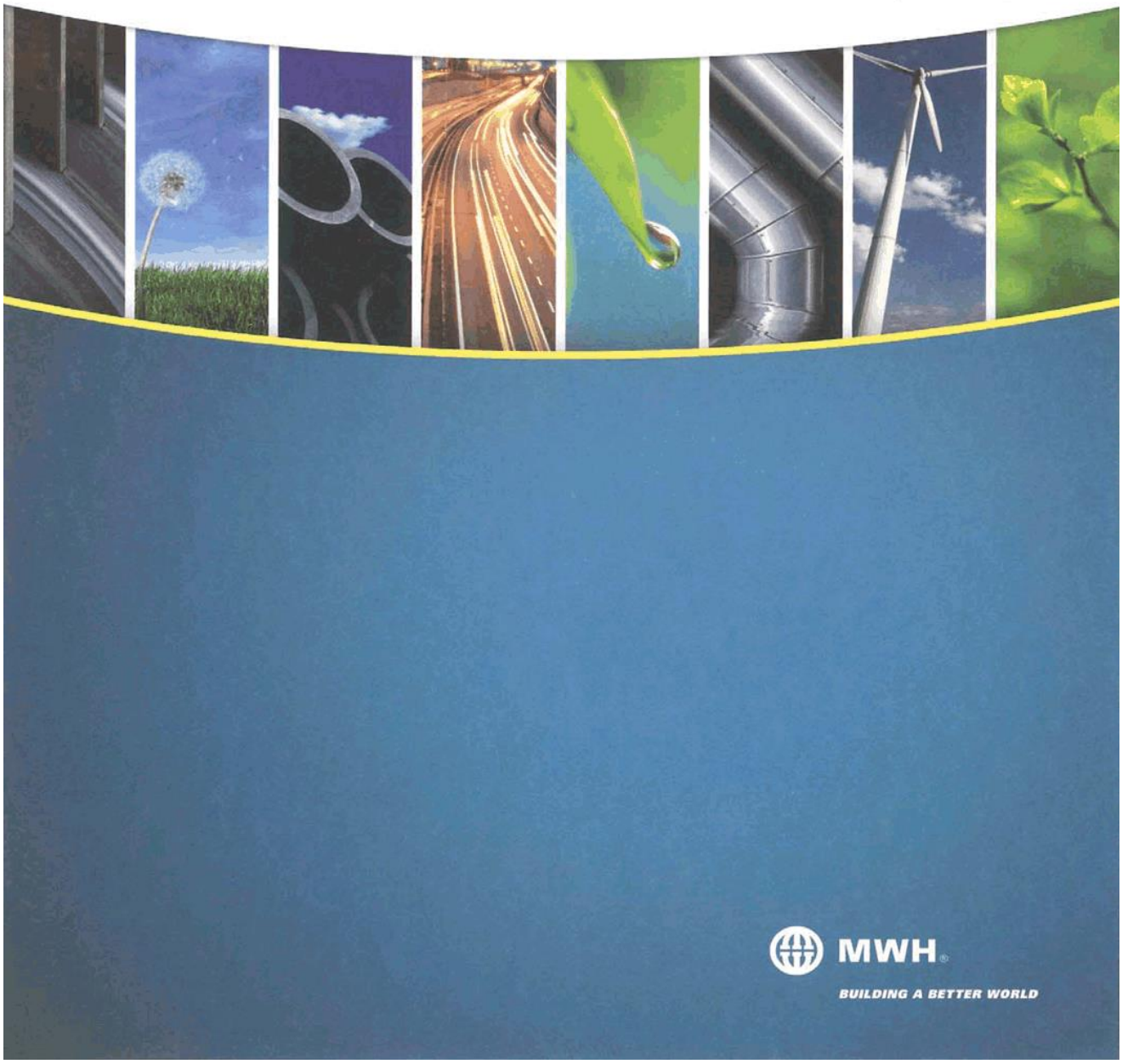
HOWARD STREET STORMWATER CAPACITY

Hastings District Council

March 2016



Howard Street Stormwater Capacity Assessment

This report has been prepared for the benefit of Hastings District Council. No liability is accepted by this company or any employee or sub-consultant of this company with respect to its use by any other person.

This disclaimer shall apply notwithstanding that the report may be made available to other persons for an application for permission or approval or to fulfil a legal requirement.

Rev. No.	Date	Description	Prepared By	Reviewed By	Approved By
01	19/02/2016	Draft	Michael Assenmacher	Wayne Hodson	
02	29/02/2016	Draft	Michael Assenmacher	Jonathan Krause	
03	31/03/2016	Final	Michael Assenmacher	Jonathan Krause	Wayne Hodson

Contents

List of Tables

Appendices

1 Introduction

HDC is seeking to identify the current stormwater system capacity within the Howard Street Catchment to be able to meet existing and future discharge requirements. It is understood that the area south of the school along Howard Street is proposed for development. As a first step HDC has requested MWH NZ Ltd to undertake a high level assessment of the existing piped and open channel stormwater network within Howard Street. It is intended that this will be refined in the future once information from more detailed investigations is available. Ultimately it is expected that a network hydraulic model will be created for the full Hastings area and this will be used to better define capacity constraints and upgrades that would be needed to meet acceptable level of service requirements.

The analysis herein presents a high level investigation that identifies the stormwater flow within the catchments (for a 5 and 50-year ARI flood event) and the capacity of the existing stormwater pipes and open channels around Howard Street. A 5-year event was used to consider primary flow systems while a 50-year event was used to compare against a higher intensity rainfall event.

The objective of the investigation was to determine if the stormwater system within the Howard Street area is sized adequately for a 5-year ARI flood event. Information was gathered by a site visit, desktop study and a review of Councils GIS database. The following summarises the tasks and methodology deployed for the investigation:

1. Identification of pipes discharging stormwater from the catchment areas either side of Howard Street using GIS information.
2. Calculation of stormwater runoff flow for a 5-year and a 50-year ARI event using the Rational Formula.
3. Calculation of pipe capacity using the Manning's Formula for an assumed grade of 1 in 500.
4. Comparison of the pipe capacity against the runoff flow for each sub-catchment.

2 Catchment Analysis

Eight primary catchment zones were identified within Howard Street, with Catchment 1 split into sub-catchments. A plan of these is shown in Appendix A, which also shows the discharge points from each catchment. Currently the Howard Street stormwater catchment areas flow into one of two open channel drains: the Windsor Drain or the Riverslea Drain. In most cases the extent of each catchment was based on LiDAR data which is known to be somewhat inaccurate due to the flat profile of the land. Specific notes on each catchment are described below.

Catchment 1 covers the school area and adjacent paddock on the southern side of Howard Street. The primary flow path of Catchment 1 drains into a manhole and flows across Howard Street into Catchment 2. Should this flow path become blocked or over whelmed, secondary flow paths lead toward Havelock Road or Howard Street.

Catchment 2 is the residential area located on the northern side of Howard Street and discharges to the Windsor Drain; this catchment separates at the boundary of Parkvale Estate to become Catchment 7. It has been assumed that the secondary flow path for Catchment 2 follows the ground profile toward Howard Street.

Catchment 3 is the field area on the southern side of Howard Street between the end of footpath and culvert 51142078. Property number 1239 is also included as a discharge pipe from the dwelling is visible in the swale. The catchment is assumed to cover road centreline to 15m inside the boundary line. LiDAR information indicates that flow that doesn't make its way into the southern swale flows towards Howard Street, but to be conservative we assumed that a portion flows toward Howard Street. A similar condition exists for Catchments 4, 5 and 6 with all primary and secondary flows via overland flow paths to the open channel along Howard Street.

Catchment 7 covers the northern area within the boundary of Parkvale estate. Both primary and secondary flow paths head into the swale on the northern side of Howard Street, however should this become inundated, flow will travel across the road into the southern swale.

Catchment 8 is the orchard area between the boundary of Parkvale estate and the Riverslea Drain. Both primary and secondary flow paths head into the swale on the northern side of Howard Street, however should this become inundated, flow will travel across the road into the southern swale.

Catchment 1 was further broken up into sub-catchments because of different rates of stormwater infiltration and runoff within the Catchment.

3 Stormwater Runoff Calculation

Calculations were carried out to determine the stormwater runoff from each catchment. The Rational Method was used and the runoff flow calculations were carried out based on the following:

- Time of concentration, t_c, for all sub-catchments:
  - 1a=16min
  - 1b=15min
  - 1c=12min
  - 2=17min
  - 3=15min
  - 4=12min
  - 5=12min
  - 6=15min
  - 7a=14min
  - 7b=30min
- Runoff Coefficient, C, values for the various zones were taken from the HDC Engineering Code of Practice 2011 (ECOP) For a Return period of 5-year:
  - $C_{1a} = 0.3$
  - $C_{1b} = 0.8$
  - $C_{1c} = 0.46$
  - $C_2 = 0.5$
  - $C_3 = 0.46$
  - $C_4 = 0.46$
  - $C_5 = 0.46$
  - $C_6 = 0.4$
  - $C_{7a} = 0.5$
  - $C_{7b} = 0.46$
- Rainfall intensity, i, data was taken from NIWA'a High Intensity Rainfall System (HIRDS) values with and without an allowance for climate change were considered.

Table 3-1: summarises the stormwater runoff flows from each catchment for 5-year and 50-year ARI storm events.

Table 3-1: 5 and 50-Year ARI Storm Event Flows

Sub-catchment	5yr ARI Flow (m^3/s)	5yr ARI Flow (m^3/s) with climate change 2090	50yr ARI Flow (m^3/s)	50yr ARI Flow (m^3/s) with change 2090
Catchment 1:				
a	0.03	0.03	0.08	0.10
b	0.12	0.15	0.24	0.29
c	0.02	0.03	0.06	0.07
Catchment 2	0.41	0.46	0.97	1.07
Catchment 3	0.04	0.04	0.10	0.12
Catchment 4	0.01	0.01	0.03	0.03
Catchment 5	0.01	0.01	0.02	0.03
Catchment 6	0.02	0.02	0.06	0.07
Catchment 7	0.22	0.25	0.51	0.59
Catchment 8	0.15	0.16	0.41	0.44

Table 3-2: summarises the total calculated stormwater runoff flows from each catchment for a 5-year ARI storm event.

Table 3-2: 5-Year ARI Storm Event (Without Climate Change) total Catchment Flow

Catchment	Total flow from catchment (m^3/s)
1	0.17
2	0.41
3	0.04
4	0.01
5	0.01
6	0.02
7	0.22
8	0.15

4 Stormwater Flow Assessment

The flow capacity of each stormwater pipe was determined using the Manning's Formula:

$$Q = VA = \left(\frac{1.00}{n}\right) AR^{\frac{2}{3}}\sqrt{S}$$

The calculations were carried out based on the following assumptions:

- A Manning's roughness coefficient of 0.013, assuming all concrete pipes are in good condition.
- A grade of 1 in 500 for all the pipes and swales, unless information on GIS was available.
- Downstream network has adequate capacity and does not cause surcharge at the flow rates considered. This was verified by HBRC report, titled "'*HDC URBAN GROWTH STUDY – RIVERSLEA (HOWARD/ADA ST)*", dated 11 February 2016, which recommends the installation of detention ponds to accommodate future development. This capacity is to be determined in conjunction with HBRC to understand downstream capacity.
- Velocity of flow in the swales was assumed to be 0.5m/s.
- For the purpose of the calculations, it had been assumed that discharges from the swales on the northern and southern sides of Howard Street into the Riverslea Drain are free flowing and not restricted. However, records indicate these pipes are 375mm each, and post calculations it is noted that these outlets are restricted. It has been assumed that these pipes can be replaced with larger pipes if needed. This should be considered further in the next stage of the project.

The capacity of the swale on the northern side of Howard Street was calculated to be 0.52m^3/s and the swale on the southern side has a capacity of 0.22 m^3/s. When compared to the values stated in Table 3.2, it indicates that the swales are both able to handle flows for a 5-year ARI event.

Table 4-1 summarises the calculated maximum capacity of existing stormwater pipes within the study area.

Table 4-1: Maximum Capacity of Existing Stormwater Pipes at Catchment Outlet Before Surcharging

	SUFI No.	Outlet Pipe Diameter (mm)	Pipe Capacity (m^3/s)
Catchment 1	51142088	225	0.02
Catchment 2	50003613	525	0.19
Catchment 3	51142078	300	0.04
Catchment 4	51148337	225	0.02
Catchment 5	51148338	225	0.02
Catchment 6	51148342	375	0.08
Catchment 7	51142076	525	0.19
Catchment 8	51148343	375	0.08

MWH

Table 4-2: Capacity of pipe relative to outlet flow

Catchment	Outlet pipe capacity (from Table 4-1) (m^3/s)	Catchment flow: 5-year ARI event without climate change (from Table 3-2) (m^3/s)	Pipe capacity relative to outlet flow (m^3/s)
1	0.02	0.17	-0.15
2	0.19	0.41	-0.22
3	0.04	0.04	0
4	0.02	0.01	0.01
5	0.02	0.01	0.01
6	0.08	0.02	0.06
7	0.19	0.22	-0.03
8	0.08	0.15	-0.07
Riverslea Drain Discharge (northern swale)	0.08	0.37	-0.29
Riverslea Drain Discharge (southern swale)	0.08	0.08	0

Capacity	Colour Band
< 50%	
50% to 90%	
90% to 120%	
120% <	

5 Summary

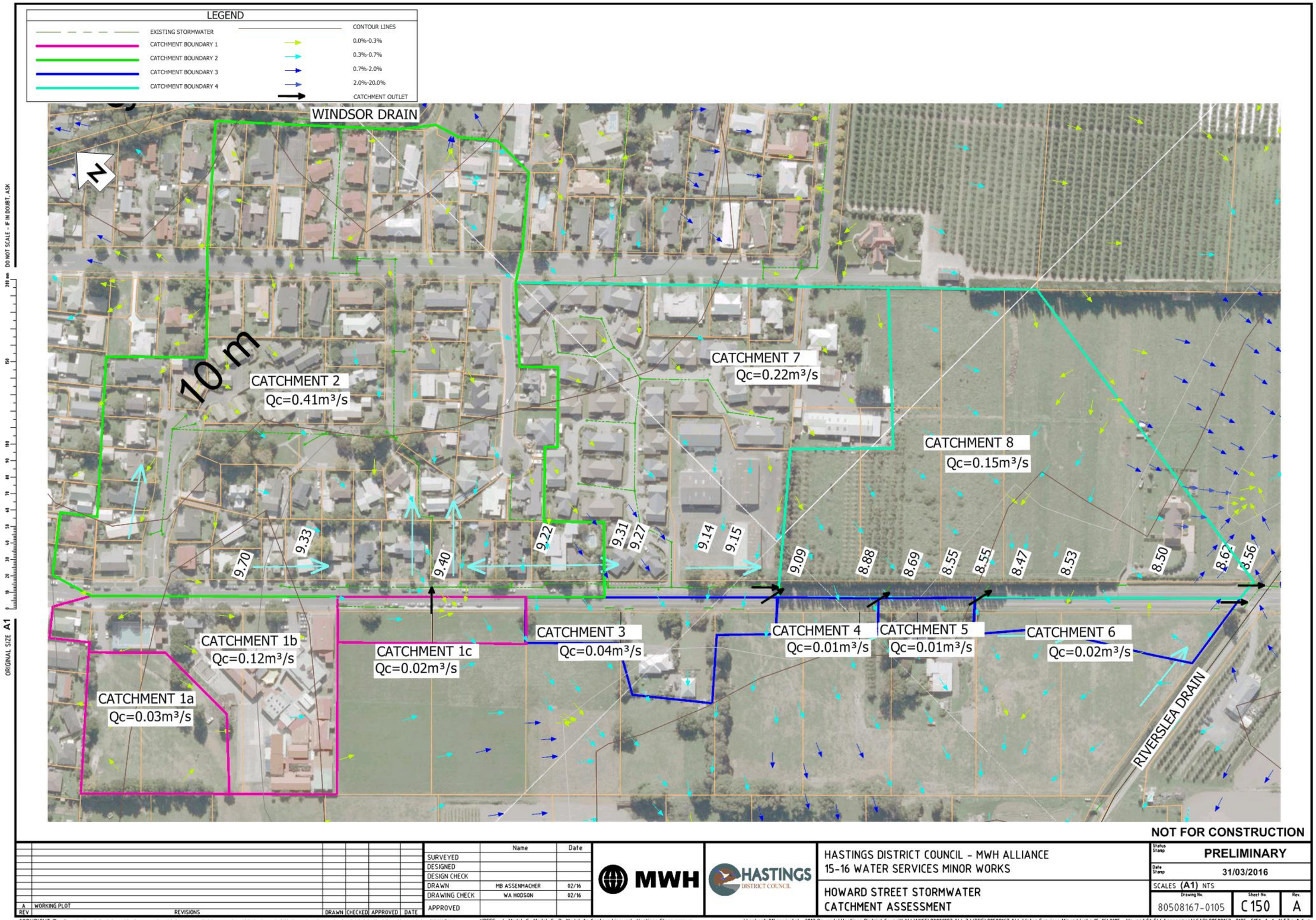
In Summary:

- The network within Catchments 1 and 2 are undersized and likely cannot handle flows from a 5-year ARI. Additional flows from future development should not be discharged into Catchments 1 and 2.
- For a 5-year ARI, there does appear to be capacity in existing infrastructure for existing flows from Catchments 3, 4, 5 and 6. Additional flows from these catchments will require mitigation and/or infrastructure upgrades.
- There does appear to be some storage capacity in the southern and northern swales for a 5-year ARI. However there are restrictions at the discharge into the Riverslea Drain for all storm events considered including the 5 year ARI.
- It appears that the discharge pipe from Catchment 7 does not have capacity for any additional flow without upgrading the outlet pipe, or mitigations upstream.
- It is recommended that Council acknowledge that this is a high level assessment and that this analysis should be reviewed and amended once details of any development in the study area are known. Furthermore, topographical survey will be required in selected locations to confirm flow directions and catchment boundaries.

Some recommended steps forward are for Council to:

- Confirm catchment boundaries through topographical survey.
- Validate the GIS information in Catchment 2 regarding conflicting information in the invert levels of stormwater conveyance system
- Confirm the location of the stormwater discharge from Woodfield Place.
- Data gathering of all swale outlet pipes, to confirm assumptions in this report of a free discharge through these pipes.
- Determine extent of new developments, and appropriate mitigation for future flows considering the effects of climate change.
- Investigate possibilities for diversion between catchments.

Appendix A: Catchment Map



DO NOT SCALE - IF IN DOUBT, ASK

ORIGINAL SIZE A1

NOT FOR CONSTRUCTION

REV	REVISIONS	DRAWN	CHECKED	APPROVED	DATE
A	WORKING PLOT				

	Name	Date
SURVEYED		
DESIGNED		
DESIGN CHECK		
DRAWN	MB ASSENMACHER	02/16
DRAWING CHECK	WA HODSON	02/16
APPROVED		

MWH

HASTINGS DISTRICT COUNCIL

HASTINGS DISTRICT COUNCIL - MWH ALLIANCE
15-16 WATER SERVICES MINOR WORKS

HOWARD STREET STORMWATER
CATCHMENT ASSESSMENT

Status Stamp: PRELIMINARY
Date Stamp: 31/03/2016
SCALES (A1) NTS
Drawing No.: 80508167-0105
Sheet No.: C150
Rev.: A

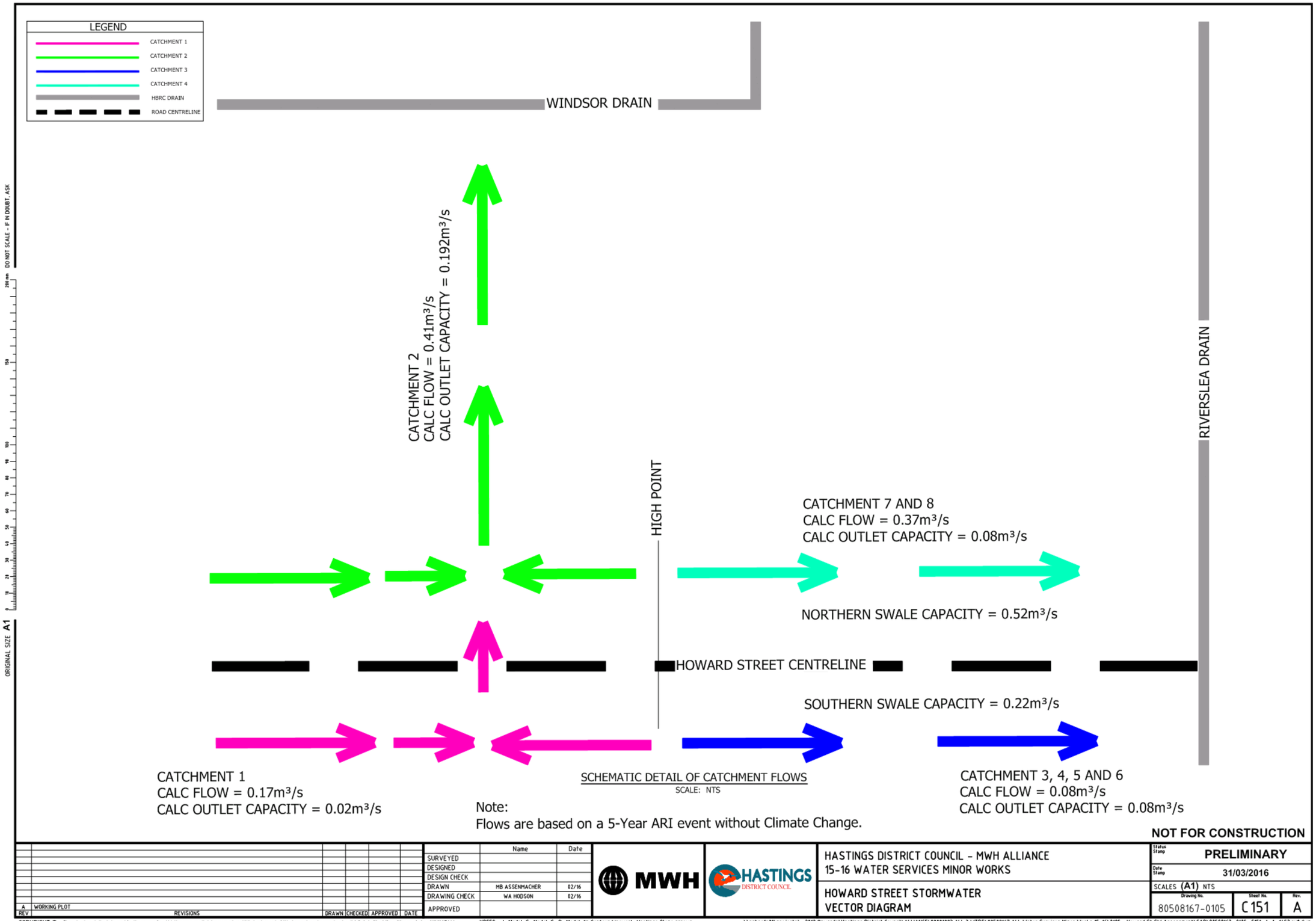
XREFS : I_Model, G_Model, G_D_Model, 1m Contour Linework, Hastings Slope arrows

\\nzhas1s01\projects_2012 Onwards\Hastings District Council\ALLIANCE\80001083 ALL 3 WTRS\80508167 ALL Water Services Minor Works 15-16\0105 - Howard St SW Assessment\CAD\80508167_0105_C151_1_1_1453.sv$.dwg

Item 2

Attachment 10

Appendix B: Vector Diagram



SCHEMATIC DETAIL OF CATCHMENT FLOWS
SCALE: NTS

Note:
Flows are based on a 5-Year ARI event without Climate Change.

DO NOT SCALE - IF IN DOUBT, ASK
ORIGINAL SIZE A1

NOT FOR CONSTRUCTION

REV	REVISIONS	DRAWN	CHECKED	APPROVED	DATE
A	WORKING PLOT				

	Name	Date
SURVEYED		
DESIGNED		
DESIGN CHECK		
DRAWN	MB ASSENMACHER	02/16
DRAWING CHECK	WA HODSON	02/16
APPROVED		

MWH
HASTINGS DISTRICT COUNCIL

HASTINGS DISTRICT COUNCIL - MWH ALLIANCE
15-16 WATER SERVICES MINOR WORKS

HOWARD STREET STORMWATER
VECTOR DIAGRAM

Status Stamp: PRELIMINARY
Date Stamp: 31/03/2016
SCALES (A1) NTS
Drawing No.: 80508167-0105
Sheet No.: C151
Rev.: A

XREFS: I Model, G Model, G D Model, 1m Contour Linework, Hastings Slope arrows

\\nzhas1s01\projects\ 2012 Onwards\Hastings District Council\ALLIANCE\80001083 ALL 3 WTRS\80508167 ALL Water Services Minor Works 15-16\0105 - Howard St SW Assessment\CAD\80508167 0105 C151 1 1 1453.sv$.dwg

Item 2
Attachment 10

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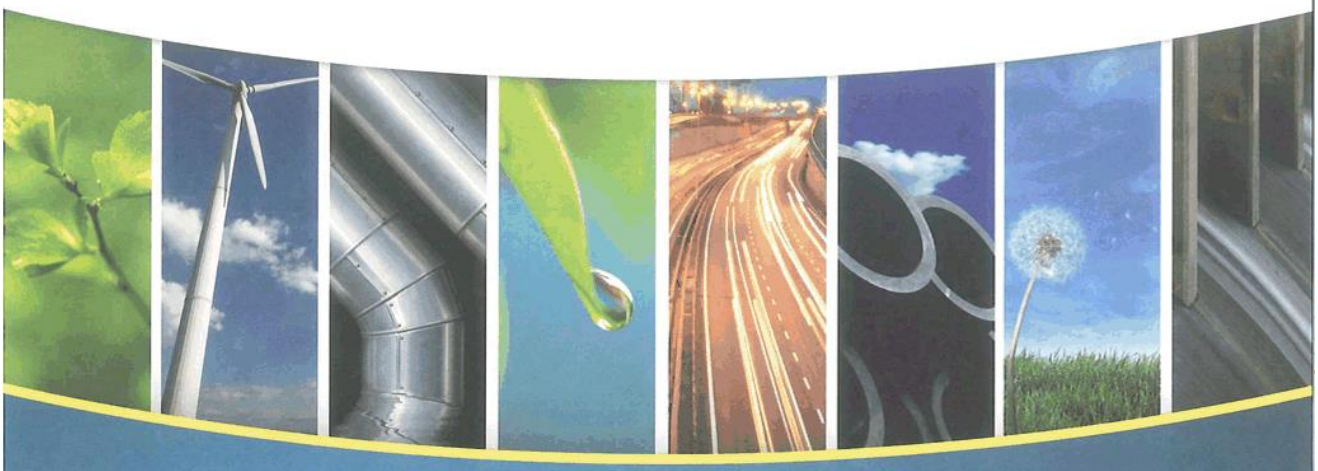

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- Water Supply
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MWH

BUILDING A BETTER WORLD

Tonkin+Taylor

Job No: 31464.4000
11 May 2018

Hastings District Council
207 Lyndon Road East
Hastings

Attention: Rowan Wallis, Craig Scott, Matt Kneebone

Dear Rowan, Craig, Matt

Howard St/Havelock Road Re-Zone Land Acquisition
Lateral Spread Assessment and Slope Stability of
Proposed Stormwater Detention Ponds

1 Introduction and Background

Hastings District Council (HDC) has recently re-zoned the block of land bound by Howard St and Havelock Rd for residential development. To support development, HDC are in the process of producing a structure plan which would identify the location of the roads, stormwater detention areas and other key infrastructure. Tonkin & Taylor Ltd (T+T) undertook geotechnical investigations in for HDC April 2016, prior to the zone change. The results of the investigations were presented in T+T report ref 31464.1000 dated April 2016[1].

The results of the investigations showed the site is underlain by interbedded layers of alluvial sands and silts. Subsequent analyses indicated bands within the subsoil profile are susceptible to liquefaction under a reasonable level of earthquake shaking. Accordingly, as highlighted in the T+T investigation report for the site[1], a risk of lateral spread exists in the following areas should liquefaction trigger under earthquake shaking:

- Adjacent to the stream on the south eastern boundary of the site; and
- Where free faces are created, for instance, stormwater detention ponds.

For flooding purposes, the development area needs to be raised approximately 1 m. This is to involve the placement and compaction of suitable material to an engineering specification. As part of the structure plan, HDC are in the process of assessing suitable locations for a new road and layouts for stormwater management options. These are likely to comprise detention ponds in the vicinity of the existing stream on the southern site boundary.

Four stormwater management options have been developed by Pattle Delamore Partners (PDP) and are currently being assessed. The layouts of these stormwater detention ponds are presented on drawings 18505-01 to 18505-04 in Appendix D.

[1] Tonkin & Taylor Ltd (April 2016), Report for Hastings District Council. *Havelock Road and Howard Road – Geotechnical Investigation Report*. T+T Ref: 31464.1000.v1.

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HDC have engaged T+T to assess the preliminary lateral spread risk, and the stability of the proposed batter slopes of the proposed detention ponds, prior to completing the structure plan. This letter report presents the results of the analyses undertaken and outlines options to mitigate the risk of lateral spread and considerations regarding slope stability.

2 Liquefaction and Lateral Spread Risk

2.1 Liquefaction Risk

Seismic liquefaction occurs when excess pore pressures are generated in loose, saturated, generally cohesionless soil during earthquake shaking, causing the soil to undergo a partial to near-complete loss of shear strength. Such a loss of shear strength can result in settlement, bearing capacity yield or failure and/or horizontal movement of the soil mass.

The occurrence of liquefaction is dependent on several factors, including the intensity and duration of ground shaking, soil density, particle size distribution, and elevation of the groundwater table.

The liquefaction susceptibility of material at the site has been assessed using the results of selected Cone Penetration Tests (CPT) obtained during the investigations in April 2016 and CPT based liquefaction assessment method developed by Boulanger and Idriss (2014)[2]. For the purposes of this report, analyses have been limited to the CPTs adjacent to the stream on the south eastern boundary as indicated on Figure in Appendix A.

Analyses indicate that layers of material between 2 m and 2.5 m as well as 6 m and 7 m below existing ground level are susceptible to liquefaction under earthquake shaking greater than approximately 0.2 g (shaking likely to be generated by an approximately 1 in 50 year event). These liquefiable layers are generally continuous across the site.

3 Lateral Spread Risk

3.1 General

Lateral spreading is a consequence of liquefaction and is generally defined as the horizontal displacement of a surficial block of soil towards an open slope face as a result of liquefaction of the underlying soils. Typically, the presence of a relatively continuous liquefiable layer extending to a free face like a river bank or open channel is required for lateral spreading to occur.

The effects of lateral spreading generally decrease with distance (L) away from the free face (H). Generally the effects of lateral spread can be summarised as follows:

L = 0-5H	'Edge Failure Zone' – Significant ground cracking. Large horizontal and vertical displacement and ground failure can occur.
L = 5-20H	'Block Sliding Zone' –The lateral spreading displacement could be concentrated over one or two large cracks as large blocks of soil slide towards the stream.
L > 20H	'Lateral Stretch Zone' – The lateral spreading displacement occurs over a large number of small cracks, gradually decreasing in width with increasing distance from the stream. These cracks generally have a minor influence on performance of structures or services.

These zones are shown on the 4 No. proposed stormwater management schemes in Appendix D.

[2] Boulanger, R. W., & Idriss, I. M. (2014). CPT and SPT based liquefaction triggering procedures. *Rep. No. UCD/CGM-14, 1.*

Two empirical methods developed from case histories of liquefaction induced lateral spreading have been used to assess the potential lateral spread risk. Details of the methods used and the results of the analyses are presented in the subsequent sections.

3.2 Lateral Displacement Index

The empirical method to quantify lateral spread displacements developed by Zhang, Robertson and Brachman (2004)[3] for level ground with a free face is outlined below:

$$LD = 6\,(L/H)^{-0.8}\,LDI$$

where:

- LD = Lateral displacement (m);
- L = Length to free face (m);
- H = Height of free face (m);
- LDI = Lateral displacement index (m); and
- The range over which the equation is valid is $4<L/H<40$.

This approach utilises CPT data to estimate liquefaction potential at the site and calculate a lateral displacement index (LDI), where the LDI is:

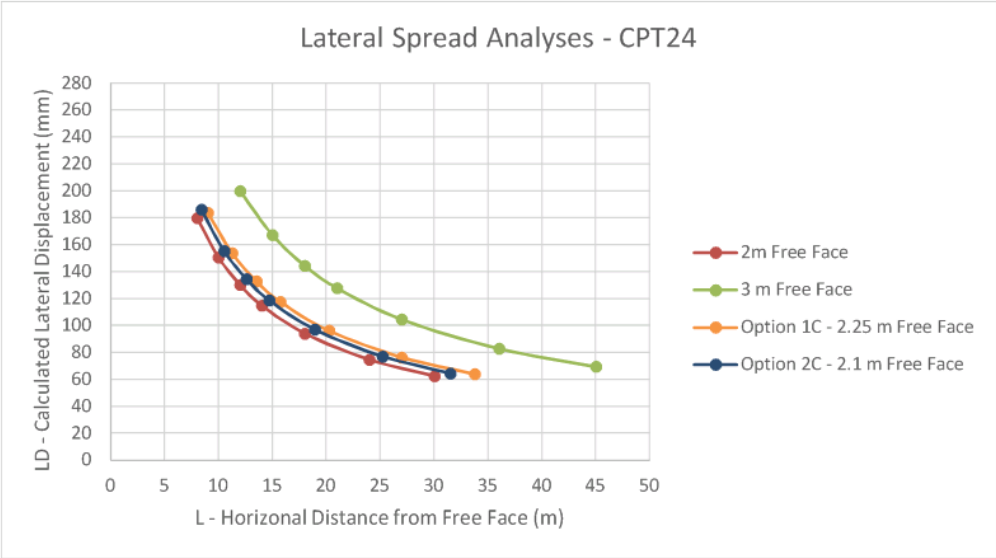
$$LDI = \int_0^{z_{max}} \gamma_{max}\,dz$$

Where γ_{max} is the maximum cyclic shear strains and z_{max} is the maximum depth below all the potential liquefiable layers.

For the purposes of our analyses z_{max} has been limited to twice the height of the free face as soils at greater depths are generally constrained against lateral movements that they make an insignificant contribution to lateral movements at the ground surface Idriss & Boulanger (2014).

The results of the LDI analyses on CPT24 and CPT25 for a range of free face heights are presented in Figure 1.

[3] Zhang, G., Robertson, P. K., & Brachman, R. W. I. (2004). Estimating liquefaction-induced lateral displacements using the standard penetration test or cone penetration test. *Journal of Geotechnical and Geoenvironmental Engineering*, *130*(8), 861-871.



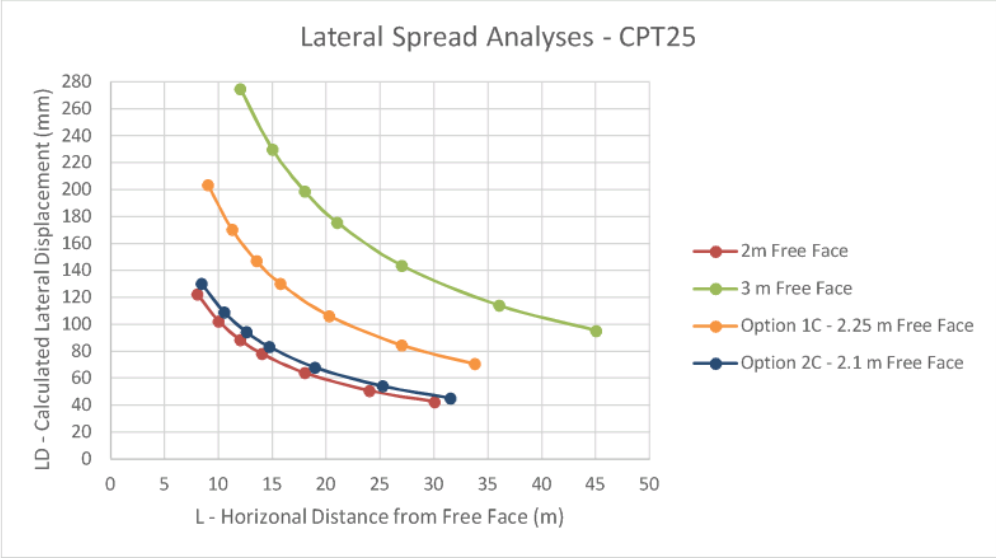


Figure 1: Results of the LDI analyses for CPT24 and CPT25.

Results indicate that as the free face height increases, the magnitude of lateral displacement adjacent to the free face also increases.

3.3 Youd, Hansen and Bartlett (2002)

The empirical method developed by Bartlett, Hansen and Youd (2002)[4] is based on multi linear regression (MLR) analyses on data obtained from case histories of lateral spreading. Lateral displacements using this method are estimated using the equation below:

$$\text{Log Dh} = -16.713 + 1.532M - 1.406 \log R^* - 0.012R + 0.592 \log W + 0.540 \log T15 + 3.413 \log (100 - F15) - 0.795 \log (D50 + 0.1\ \text{mm})$$

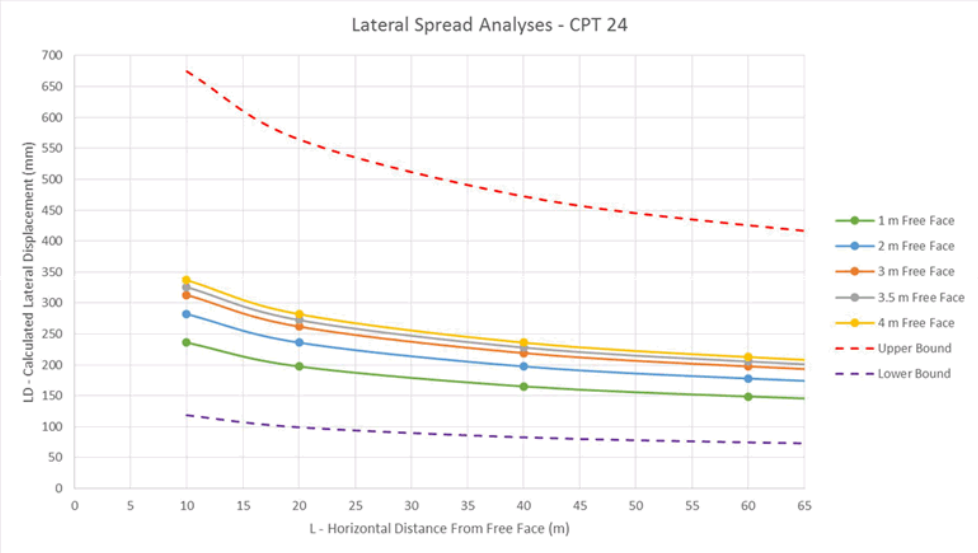
where:

- M = Moment of magnitude of earthquake – 6.9 (ULS)
- R = Nearest horizontal or map distance from site to seismic source (m) – 13
- R* = Correction factor based on the function of magnitude of the earthquake (m) – 16.2
- T15 = Cumulative Thickness of saturated granular layers with N1 (60) less than 15 (m) – 0.5 (from liquefaction analyses)
- F15 = Average fines content passing No. 200 sieve (of material with T15) – 20 (based on experience with similar materials)
- D60 = Average mean grain size for granular materials with T15 – 0.5 (based on experience with similar materials)
- W = Height of free face (H) divided by the distance (L)

For use in engineering assessment, it is recommended the calculated displacements be factored by two (upper bound). The results of the MLR analyses on CPT24 and CPT25 are presented below.

These results are presented as a sensitivity to the LDI analyses. While the maximum displacements between the LDI and the method by Youd et al. are comparable, the spatial distribution of displacements are inconsistent. This is likely due to the inferred parameters (Fines content, grain size etc) incorporated in the Youd et al. method. Further discussion on the use of the lateral spread displacements derived from the empirical procedures is provided in Section 4 below.

[4] Youd, T. L., Hansen, C. M., & Bartlett, S. F. (2002). Revised multilinear regression equations for prediction of lateral spread displacement. *Journal of Geotechnical and Geoenvironmental Engineering*, *128*(12), 1007-1017.



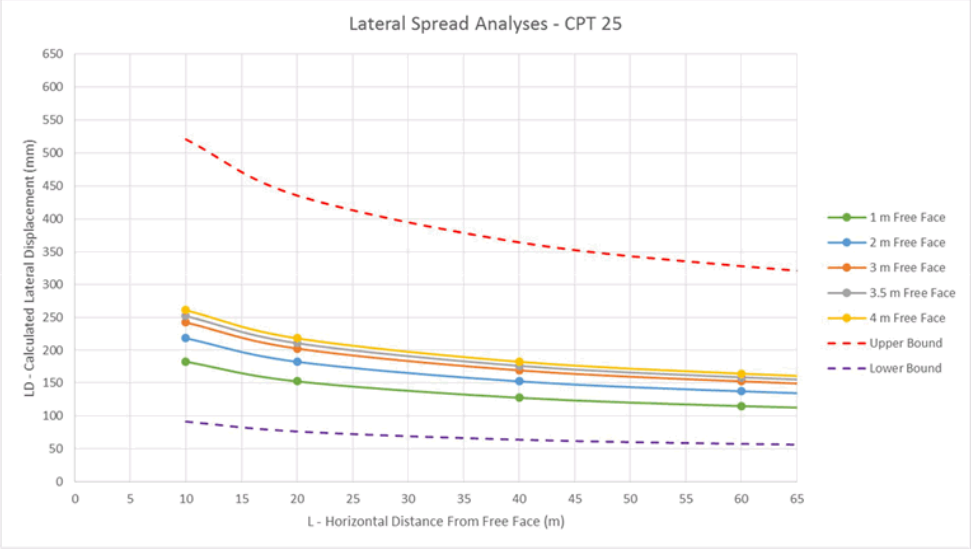


Figure 2: Results of Bartlett and Youd (2002) method analyses for CPT24 and CPT25.

3.4 Discussion of Lateral Spreading and Implications on Development

The results of the analyses presented in Section 3 indicate a significant range of potential lateral spread displacements should liquefaction trigger. This is representative of the complex nature of the phenomena. However, for the purposes of development (residential dwellings) the risk of lateral spreading may generally be mitigated by either:

- Set back zones or building restriction zones, i.e. placing a 'no build' or notice on the title unless specific risk mitigation measures are detailed.

  Set back zones should be developed using the results of the LDI analyses outlined in Section 3. Specifically, the effects on structures and services should be assessed in terms of differential displacements over distance from the free face for a given free face height.

  For typical residential structures, suitably designed rib raft foundations are likely to be able to tolerate the differential displacements if set back approximately 20 m for a 2 m to 3 m free face height (maximum likely differential lateral displacement 50 mm) or 30 m, for a 4 m free face height (maximum likely differential lateral displacement 100 mm). Within the setback zones (steep portion of the curves) large differential lateral displacements could be expected (greater than 150 mm over a shorter length), particularly for the larger free face heights and more robust structural detailing (possibly in conjunction with ground improvement), would be required to ensure foundations perform as stipulated by the NZ Building Code.

  For services and infrastructure asset systems, there is no readily available guidance on tolerances to displacement or the development of suitable set back zones. It is recommended that objectives of the asset owner/operator be discussed and resilience built into strategic points of a system[5]; or

- Undertaking ground improvements within a portion of the recommended setback zones. Ground improvements could comprise either excavation of the potentially liquefiable ground or installing stone columns, rammed aggregate piers or soil cement mixed columns. Further analyses should be undertaken to confirm widths and extents of ground improvements if they are preferred.

Below is a discussion of the lateral spread risk in regards to the stormwater management options currently being assessed.

Options 1C and 1C(A) comprise a single pond with outlets to the existing stream. Options 2C and 2C (A) comprises two ponds either side of the proposed road with outlets into the existing channel to the south.

[5] EQC, MBIE, Ministry for the Environment (2017) – Planning and engineering guidance for potentially liquefaction-prone land.

Table 3-1: Lateral Spread Risk to Road, services within road and dwellings.

Option	Lateral Spread Risk to Road and Services Within Road	Lateral Spread Risk to Dwellings
1C	Analyses indicate that apart from the south western corner, the proposed road is largely outside the 'Edge Failure Zone'. Accordingly, services within the road corridor would need to be detailed to tolerate some deformation (up to 100 mm), however it is unlikely that significant ground improvements will be required.	For both Option 1C and 1C refinements, proposed dwellings are likely to be situated outside the "Edge Failure Zone", in the 'block slide zone' or 'lateral stretch zone'. Accordingly, suitably detailed rib raft foundations on the proposed 1m of fill are likely to be suitable for typical residential dwellings. i.e. no significant ground improvements are likely to be required.
1C - Possible Refinements	Relative to Option 1C, a larger area of the proposed road is located within the 'Edge Failure Zone'. In the edge failure zone, depending on the acceptable level of risk ground improvements are likely to be required to mitigate the risk of lateral spread displacements on services. Alternatively, critical infrastructure can be located in the 'Block Slide Zone' and designed to tolerate some deformation (up to 100 mm).	
2C	Under this scheme, the road is outside the 'Edge failure zone'. Accordingly, critical infrastructure should be designed to tolerate some deformation (up to 100 mm).	A portion of the wedge of land between the proposed road and the existing stream is within the 'Edge Failure Zone'. To facilitate development within this zone more robust structural detailing, possibly in conjunction with ground improvements to facilitate development of typical residential structures. Alternatively, a setback zone could be created and dwellings constructed on suitably detailed rib raft foundations on the proposed 1m of fill i.e. no significant ground improvements are likely to be required. This could however result in lost land yield.
2C (A)	Most of the central, western portion of road would be within the 'Edge Failure Zone'. Ground improvements are likely to be required to mitigate the effects of lateral spread displacements on services.	Proposed dwellings are likely to be situated outside the "Edge Failure Zone", in the 'block slide zone' or 'lateral stretch zone'. Accordingly, suitably detailed rib raft foundations on the proposed 1m of fill are likely to be suitable for typical residential dwellings. i.e. no significant

		ground improvements are likely to be required.

4 Slope Stability

The plans developed by PDP indicate for all options the pond(s) are to have cut slopes between 2.1 m and 2.25 m high (crest at elevation RL 18 m, to maximum base elevation RL 15.75 m).

Slope stability analyses to determine suitable batter slope angles for the proposed pond banks have been undertaken using the limit equilibrium software package Slope/W. The parameters adopted in our analyses are presented in Table 4-1, and were determined using published correlations and CPT probed during the investigations.

Table 4-1: Material properties used in slope stability analyses.

Material	Unit Weight (kN/m^3)	Cohesion (kPa)	Friction Angle (^{0})
Engineered Fill	18	2	32
Upper Alluvial Sands	17	0	35
Upper Alluvial Silts	17	2	30

Analyses have been undertaken on the following scenarios:

- Normal Groundwater — To represent groundwater conditions encountered during the investigations and from our experience in the Hastings area.
- Elevated Groundwater — To represent groundwater conditions following a period of heavy rainfall, we have modelled a near fully saturated slope with the stream level at the toe of the slope to represent a rapid drawdown scenario.
- Seismic Conditions — To assess the effects of seismic loading on the slopes, pre-liquefaction triggering.

A vehicle surcharge of 12 kPa from the proposed road has been assumed.

The results of our analyses are presented in Table 4-2 and Table 4-3.

Table 4-2: Slope stability analyses results for Option 1C.

Option 1C			
Slope Angle	**Scenario**	**Calculated FoS**	**Required FoS**
1V:1H	Normal Groundwater	1.05	1.50
1V:1.5H	Normal Groundwater	1.33	1.50
1V:2H	Normal Groundwater	1.60	1.50
	Elevated Groundwater	1.22	1.20
	Seismic Conditions	0.90	1.00

Table 4-3: Slope stability analyses results for Option 2C.

Option 2C			
Slope Angle	**Scenario**	**Calculated FoS**	**Required FoS**
1V:1H	Normal Groundwater	1.12	1.50
1V:1.5H	Normal Groundwater	1.41	1.50
1V:2H	Normal Groundwater	1.67	1.50
	Elevated Groundwater	1.22	1.20
	Seismic Conditions	0.94	1.00

The results indicate for the normal and elevated groundwater scenarios, to meet generally accepted factors of safety, the proposed pond batter slopes should be cut no steeper than 1V:2H. For steeper batter slopes, consideration will need to be given to stabilisation measures.

Under seismic loading, factors of safety are generally less than 1 due to the high seismicity of the Hawkes Bay Region. A factor of safety less than 1 is generally indicative of displacement. Displacement based analyses however, indicate a minor level of displacement ($\leq$25 mm) is likely for the proposed slopes, prior to liquefaction triggering.

The outputs of our slope stability analyses are presented in Appendix C.

5 Conclusions and Recommendations

On the basis of the available subsurface information and the analyses outlined in the report we summarise our conclusions and recommendations as follows:

- HDC is currently developing a structure plan which involves identifying the location of the roads, stormwater detention areas and other infrastructure;
- The site level is to be raised by approximately 1 m for flooding purposes;
- The underlying ground conditions comprise interbedded alluvial sands and silts;
- Analyses indicate layers within the subsurface profile are susceptible to liquefaction. Lateral spread is a consequence of liquefaction adjacent to "free faces" such as stream banks;
- Four stormwater management options have been developed by Pattle Delamore Partners (PDP), the plans of which are presented in Appendix D. These options involve construction of new ponds with cut slopes between 2.1 m and 2.25 m high;
- The results of lateral spread analyses and associated effects on the proposed road, infrastructure within the road and future dwellings are outlined in Section 3;
- Lateral spread effects are likely to have the least influence on development under Option 1c and 1c(A); and
- The results of slope stability analyses under normal groundwater, elevated groundwater and seismic loading (prior to liquefaction triggering) are presented in Section 4.

6 Applicability

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

The liquefaction susceptibility and lateral spread analyses have been undertaken using empirical procedures developed from various liquefaction databases and case histories. Earthquakes are unique and impose different levels of shaking on different sites. The results of the liquefaction analyses and estimates of consequences presented within this report are based on published analyses methods. It is important to understand that actual performance may vary from that calculated.

During detailed design, a review should be undertaken by a geotechnical engineer competent to judge whether structural/civil design is compatible with the inferred conditions on which this report has been based.

Tonkin & Taylor Ltd
Environmental and Engineering Consultants

Report prepared by:

.....
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Geotechnical Engineer

Authorised for Tonkin & Taylor Ltd by:

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p.p Andy Pomfret
Project Director

Report reviewed by:

.....
Nathan Hickman
Geotechnical Engineer

CPR
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Appendix A: Figures and Investigation Logs

- Site Investigation Location Plan
- CPT23, CPT24 and CPT25 Logs

A3 SCALE 1: 3000

0 30 60 90 120 150 (m)

ORIGINAL IN COLOUR

NOTES:
1. Aerial photo sourced from Linz Data Service <https://data.linz.govt.nz/set/2-nz-aerial-imagery/> , licensed by LINZ for re-use under the Creative Commons Attribution 3.0 New Zealand licence (CC BY 3.0 NZ)
2. Site investigation locations obtained using hand held GPS: accurancy ±5m in plan.

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105 Carlton Gore Road, Newmarket, Auckland
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DRAFTING CHECKED		
APPROVED		
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SCALES (AT A3 SIZE) 1: 3000		
PROJECT No. 3 1464. 1000		

HASTINGS DISTRICT COUNCIL
HOUSING RE–ZONE
HAVELOCK ROAD & HOWARD ST
Site Investigation Plan

FIG. No. Figure 1 REV. 0

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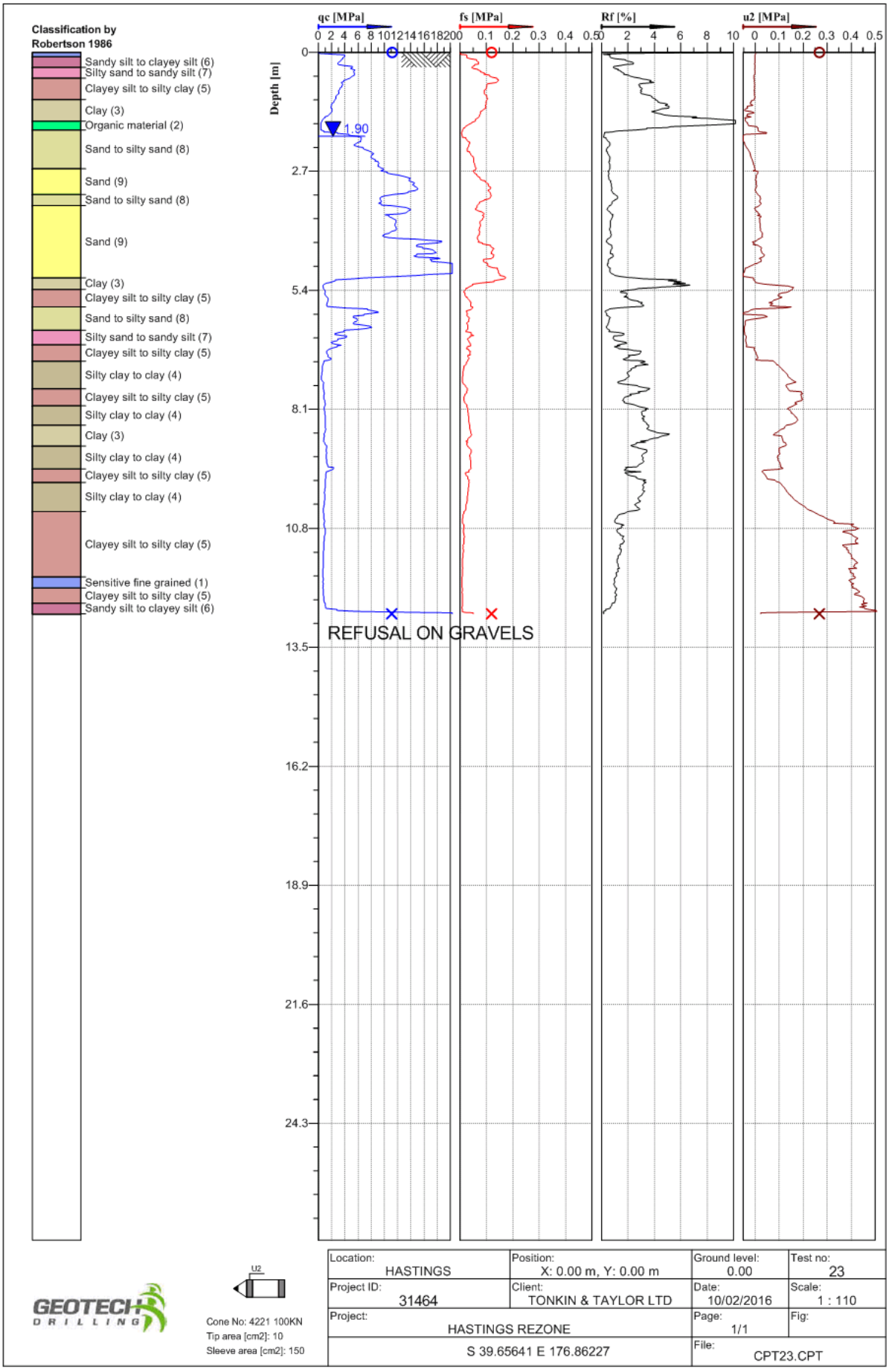

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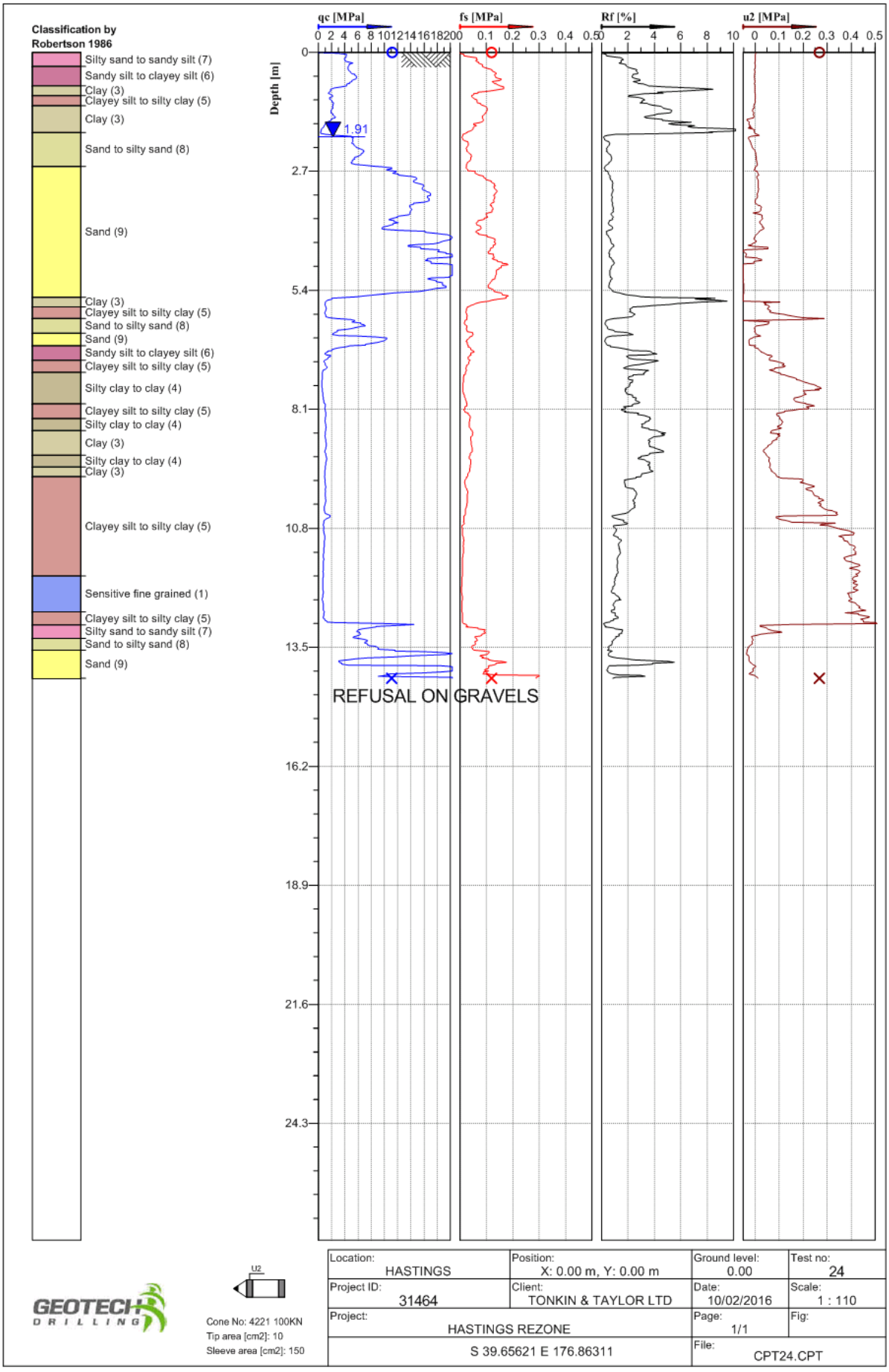

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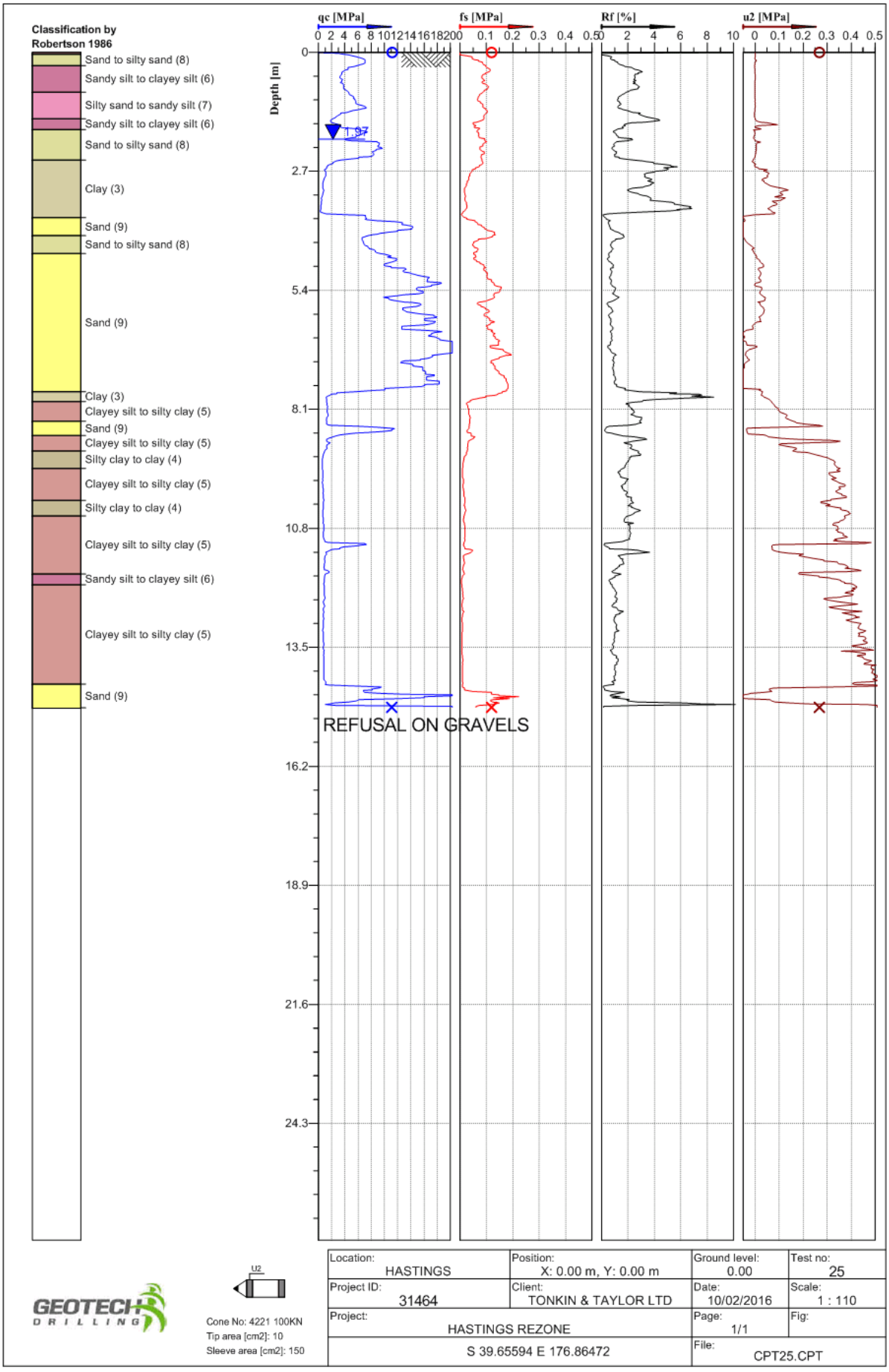

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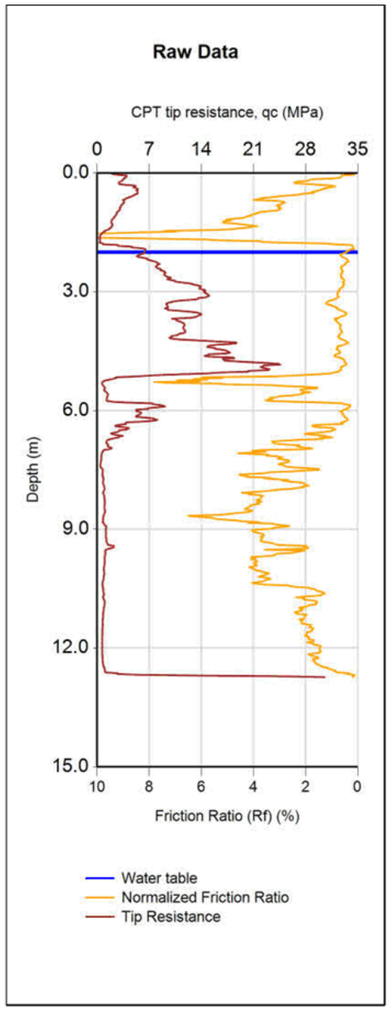
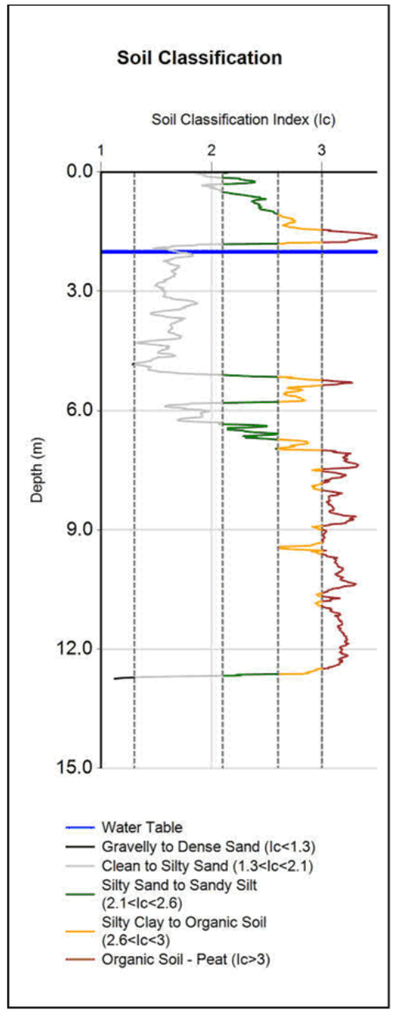
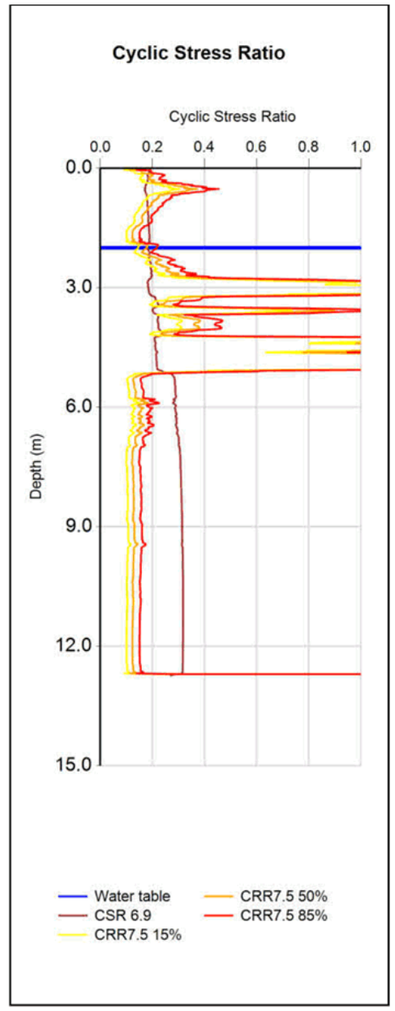
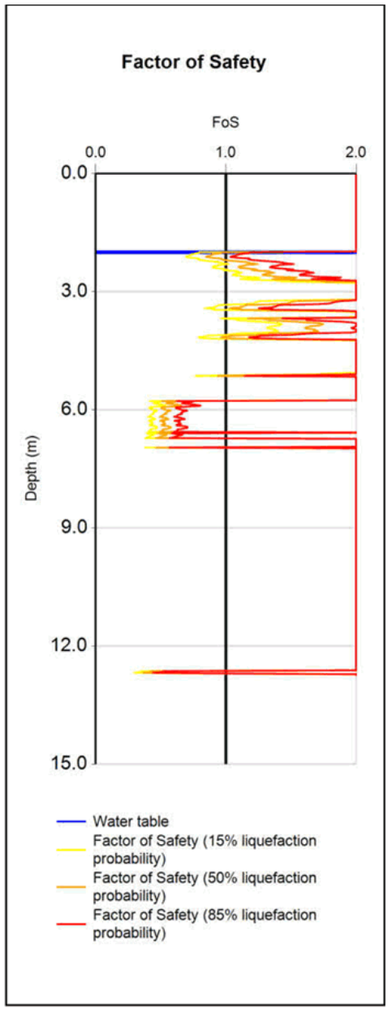
Appendix B: Liquefaction Analyses

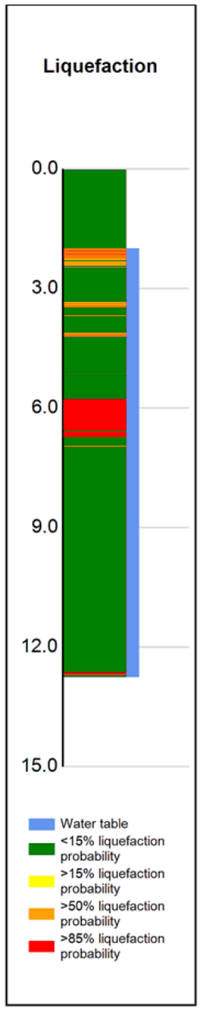
- ULS Analyses and Sensitivity Plots for CPT23, CPT24 and CPT25









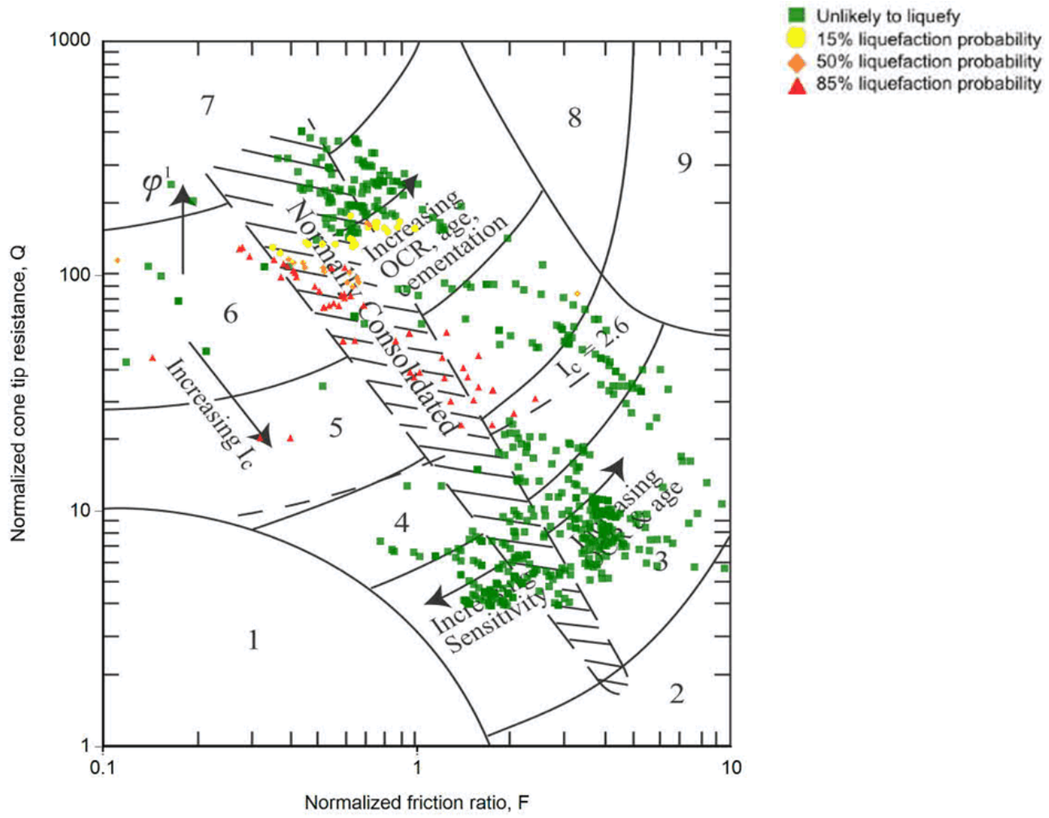


(Assumed pre-drill values)

	CPT Name	Database ID	Investigation Date	Event and PGA	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	Qc (MPa)	Fs (MPa)	γ (kN/m³)
INPUT	CPT23	60522	10/02/2016	User Specified	6.9	0.3308	2.0	BI-2014	ZRB-2002	0.02	2	0.01	18

	Exceedance Probability	S - Calculated Settlement (mm)	CTL - Cumulative Thickness of Liquefaction (m)	LPI - Liquefaction Potential Index	LSN - Liquefaction Severity Number	CT - Crust Thickness (m)	LPI Ishihara
OUTPUT	15%	40	1.8	5	9	2.1	3
	50%	33	1.3	3	7	2.1	2
	85%	29	1	2	5	5.9	0

Tonkin + Taylor Exceptional thinking together V1.3	CLIENT, PROJECT **Hastings District Council** **Housing Rezone**	LOCATION Havelock Road/ Howard Street	DATE	4/03/2016
			ANALYSED	khl
		JOB NUMBER **31464.1000**	CHECKED	
	TITLE **ULS Liqeufaction Assessment CPT 21-23**		PAGE	5 of 9 pages

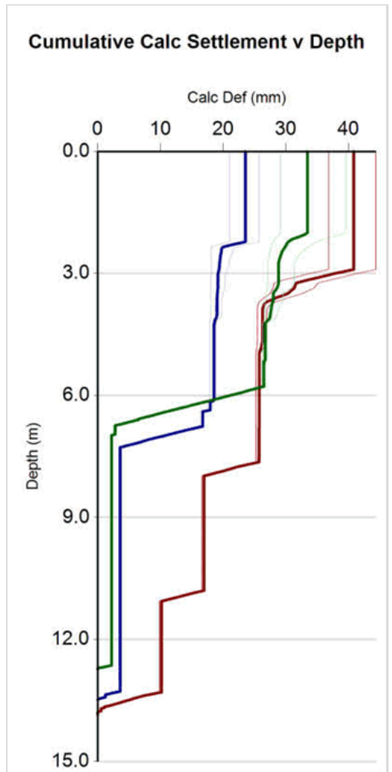


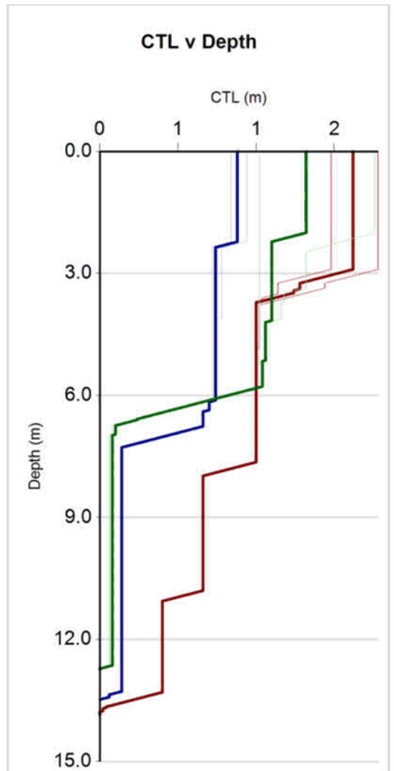
1. Sensitive, fine grained
2. Organic soils - peats
3. Clays - silty clay to clay
4. Silt mixtures - clayey silt to silty clay
5. Sand mixtures - silty sand to sandy silt
6. Sands - clean sand to silty sand
7. Gravelly sand to dense sand
8. Very stiff sand to clayey sand *
9. Very stiff, fine grained *

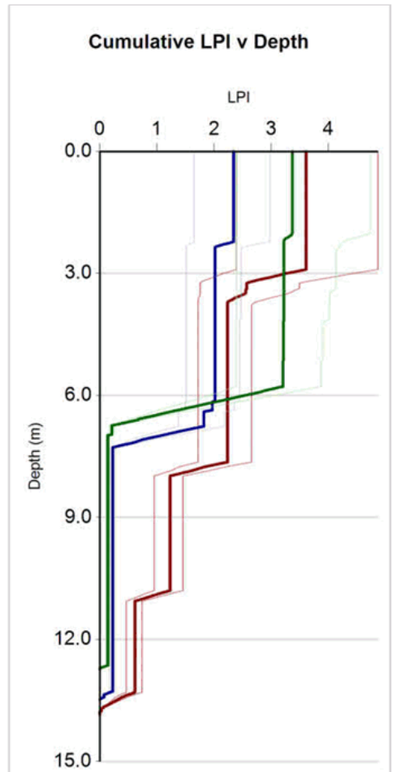
*Heavily overconsolidated or cemented

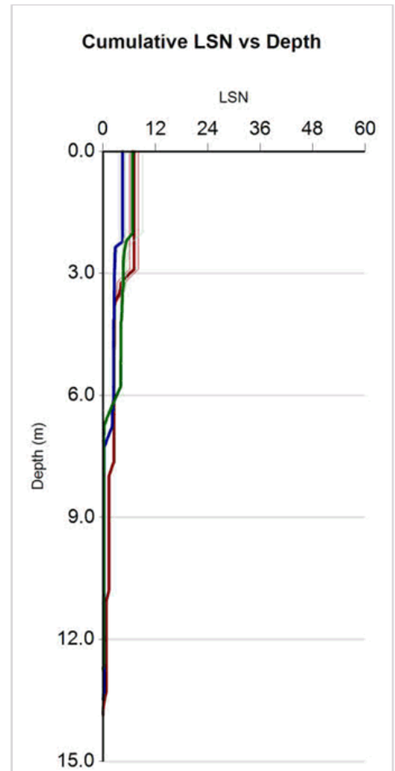
CPT-based soil behavior type classification chart by Robertson (1990)

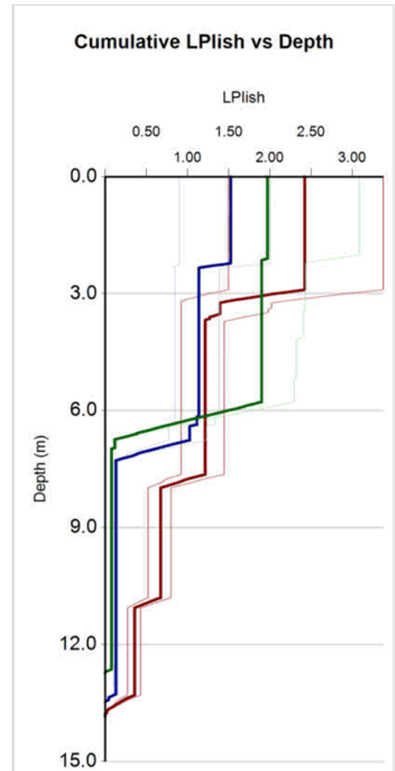
Tonkin + Taylor Exceptional thinking together V1.3	CLIENT, PROJECT **Hastings District Council** **Housing Rezone**	LOCATION Havelock Road/ Howard Street	DATE	4/03/2016
			ANALYSED	khl
	TITLE **ULS Liqeufaction Assessment CPT 21-23**	JOB NUMBER **31464.1000**	CHECKED	
			PAGE	6 of 9 pages





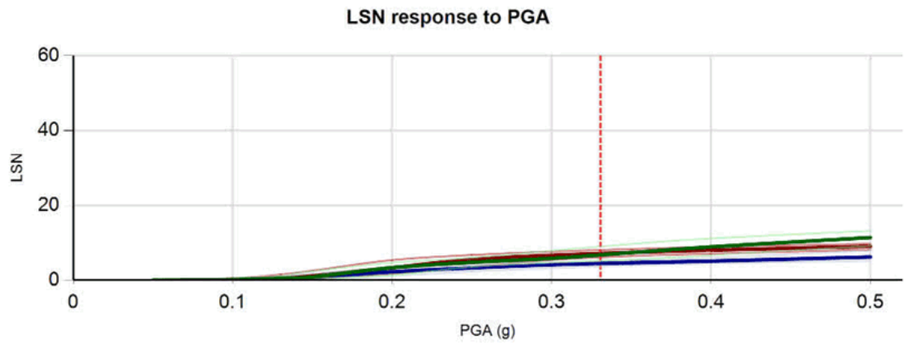


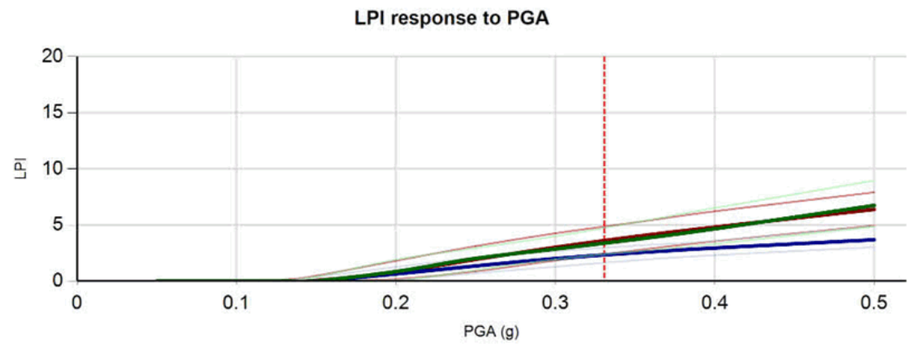


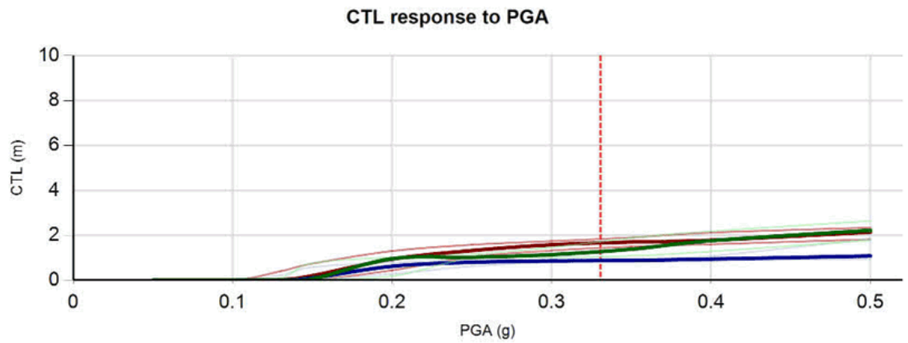


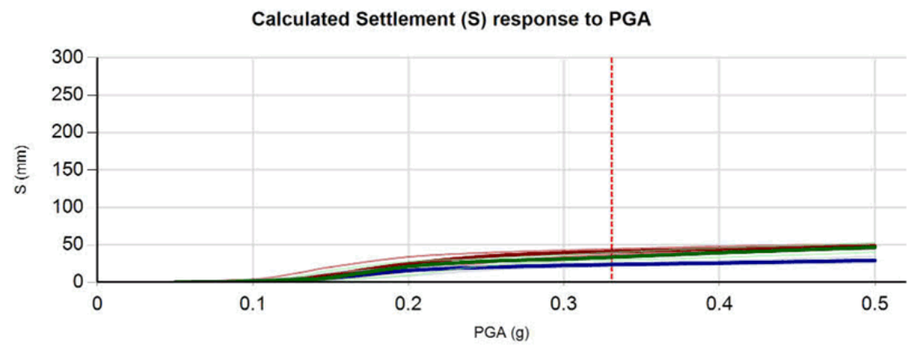
	CPT Name	ID	Investigation Date	Event and PGA	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	(Assumed pre-drill values) Qc (MPa)	Fs (MPa)	ɣ (kN/m³)
	CPT21	60520	11/02/2016	User Specified	6.9	0.3308	Varies	BI-2014	ZRB-2002	0.02	2	0.01	18
	CPT22	60521	10/02/2016	User Specified	6.9	0.3308	Varies	BI-2014	ZRB-2002	0.02	2	0.01	18
	CPT23	60522	10/02/2016	User Specified	6.9	0.3308	Varies	BI-2014	ZRB-2002	0.02	2	0.01	18
	Thicker lines represent the 50% probability of exceedence case and the thinner lines to the left and right of the thicker lines represent the 85% and 15% probability of exceedance cases respectively.												

Tonkin + Taylor Exceptional thinking together V1.3	CLIENT, PROJECT **Hastings District Council** **Housing Rezone**	LOCATION Havelock Road/ Howard Street	DATE	4/03/2016
			ANALYSED	khl
	TITLE **ULS Liqeufaction Assessment CPT 21-23**	JOB NUMBER **31464.1000**	CHECKED	
			PAGE	7 of 9 pages





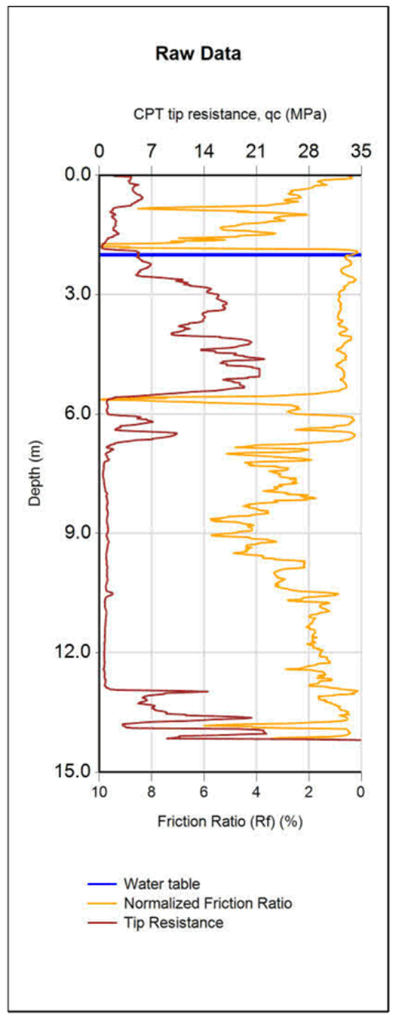


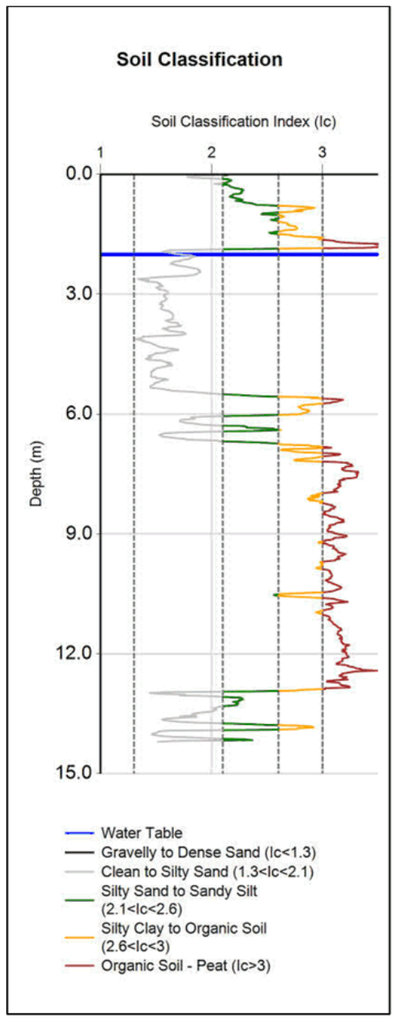


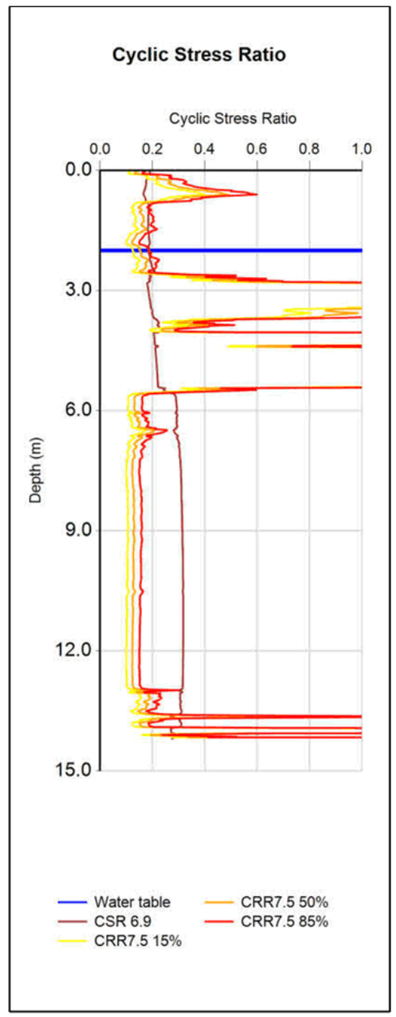
Vertical dotted line/s indicate user specified PGA at the CPT locations. (actual PGA)

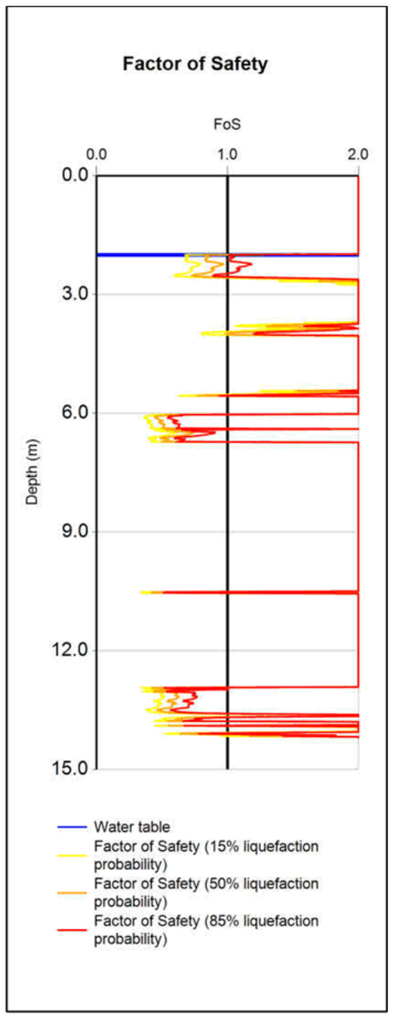
	CPT Name	ID	Investigation Date	Event and PGA	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	(Assumed pre-drill values) Qc (MPa)	Fs (MPa)	Ɛ£ (kN/m³)
	CPT21	60520	11/02/2016	User Specified	6.9	0.3308	Varies	BI-2014	ZRB-2002	0.02	2	0.01	18
	CPT22	60521	10/02/2016	User Specified	6.9	0.3308	Varies	BI-2014	ZRB-2002	0.02	2	0.01	18
	CPT23	60522	10/02/2016	User Specified	6.9	0.3308	Varies	BI-2014	ZRB-2002	0.02	2	0.01	18
	Thicker lines represent the 50% probability of exceedence case and the thinner lines to the bottom and top of the thicker lines represent the 85% and 15% probability of exceedance cases respectively.												

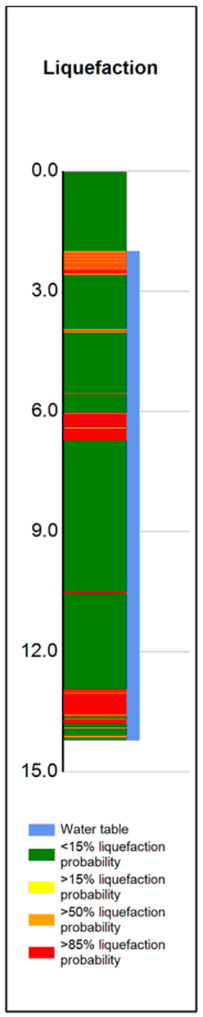
Tonkin + Taylor Exceptional thinking together V1.3	CLIENT, PROJECT **Hastings District Council** **Housing Rezone**	LOCATION Havelock Road/ Howard Street	DATE	4/03/2016
			ANALYSED	khl
		JOB NUMBER	CHECKED	
	TITLE **ULS Liqeufaction Assessment CPT 21-23**	**31464.1000**	PAGE	8 of 9 pages









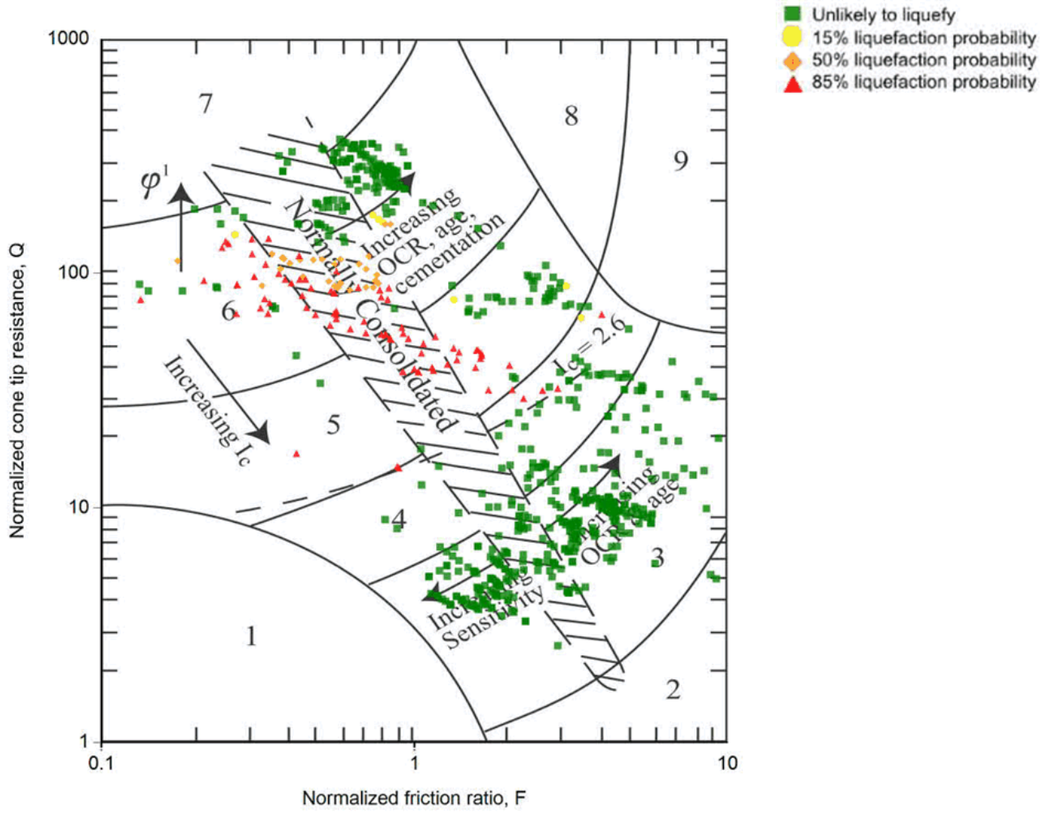


(Assumed pre-drill values)

	CPT Name	Database ID	Investigation Date	Event and PGA	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	Qc (MPa)	Fs (MPa)	γ (kN/m³)
INPUT	CPT24	60523	10/02/2016	User Specified	6.9	0.3308	2.0	BI-2014	ZRB-2002	0.02	2	0.01	18

	Exceedance Probability	S - Calculated Settlement (mm)	CTL - Cumulative Thickness of Liquefaction (m)	LPI - Liquefaction Potential Index	LSN - Liquefaction Severity Number	CT - Crust Thickness (m)	LPI Ishihara
OUTPUT	15%	54	2.4	6	11	2.1	4
	50%	49	2.2	4	9	2.1	3
	85%	41	1.6	3	6	5.6	1

Tonkin + Taylor Exceptional thinking together V1.3	CLIENT, PROJECT **Hastings District Council** **Housing Rezone**	LOCATION Havelock Road/ Howard Street	DATE	4/03/2016
			ANALYSED	khl
		JOB NUMBER **31464.1000**	CHECKED	
	TITLE **ULS Liqeufaction Assessment CPT 24-25**		PAGE	1 of 10 pages

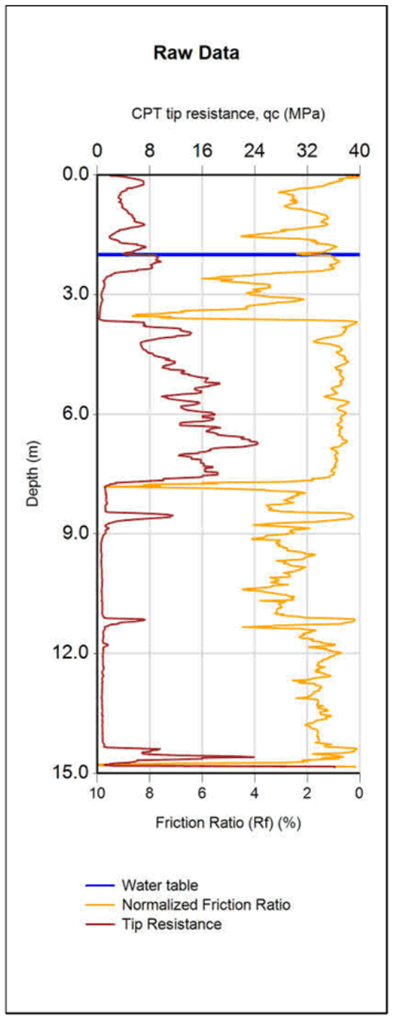


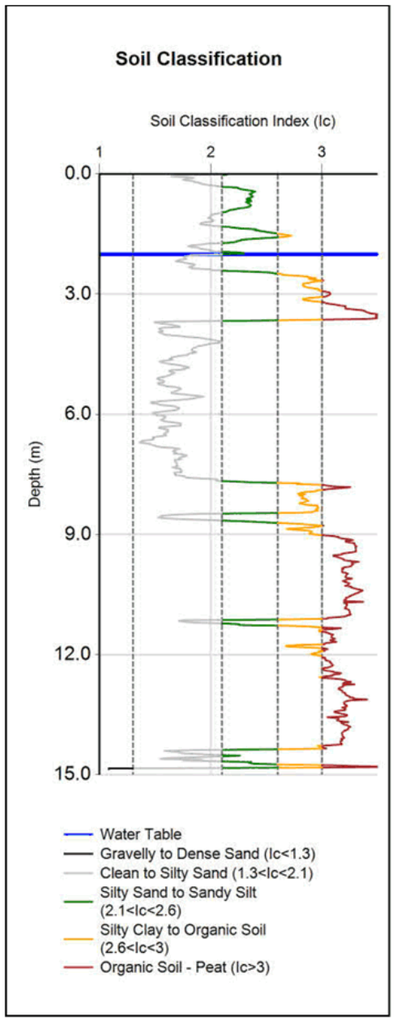
1. Sensitive, fine grained
2. Organic soils - peats
3. Clays - silty clay to clay
4. Silt mixtures - clayey silt to silty clay
5. Sand mixtures - silty sand to sandy silt
6. Sands - clean sand to silty sand
7. Gravelly sand to dense sand
8. Very stiff sand to clayey sand *
9. Very stiff, fine grained *

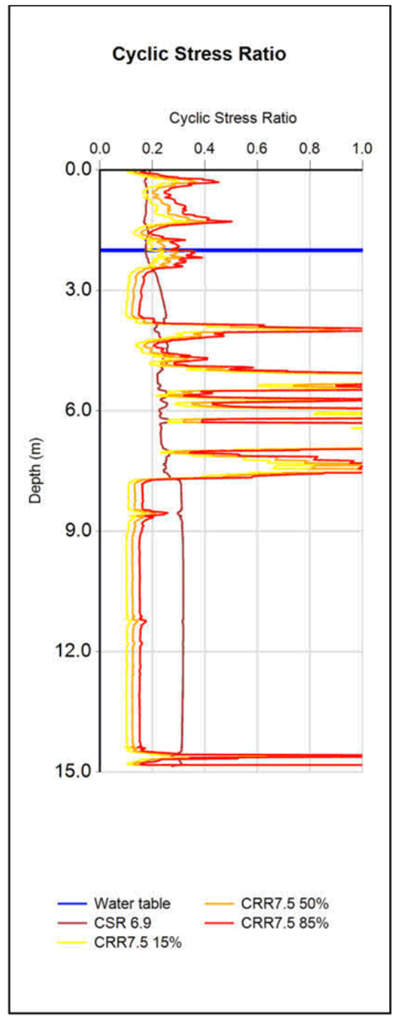
*Heavily overconsolidated or cemented

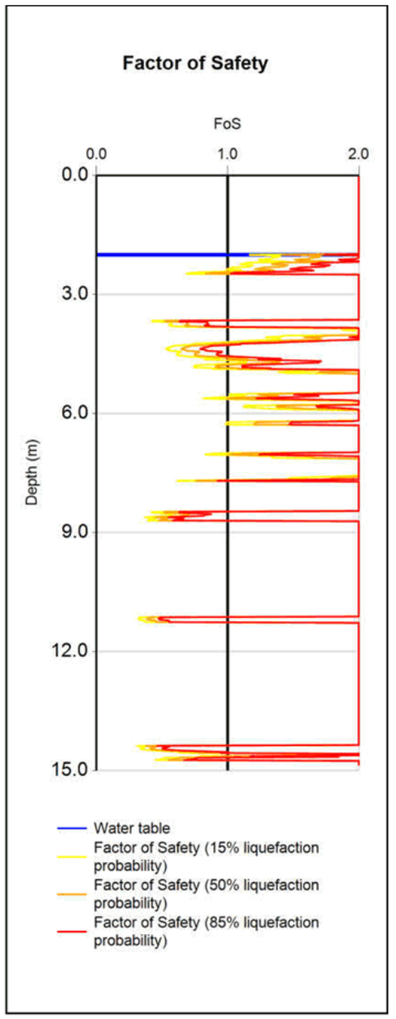
CPT-based soil behavior type classification chart by Robertson (1990)

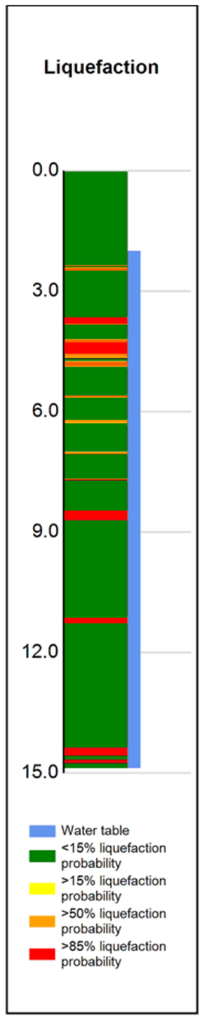
Tonkin + Taylor Exceptional thinking together V1.3	CLIENT, PROJECT **Hastings District Council** **Housing Rezone**		LOCATION Havelock Road/ Howard Street	DATE	4/03/2016
				ANALYSED	khl
	TITLE **ULS Liqeufaction Assessment CPT 24-25**		JOB NUMBER **31464.1000**	CHECKED	
				PAGE	2 of 10 pages









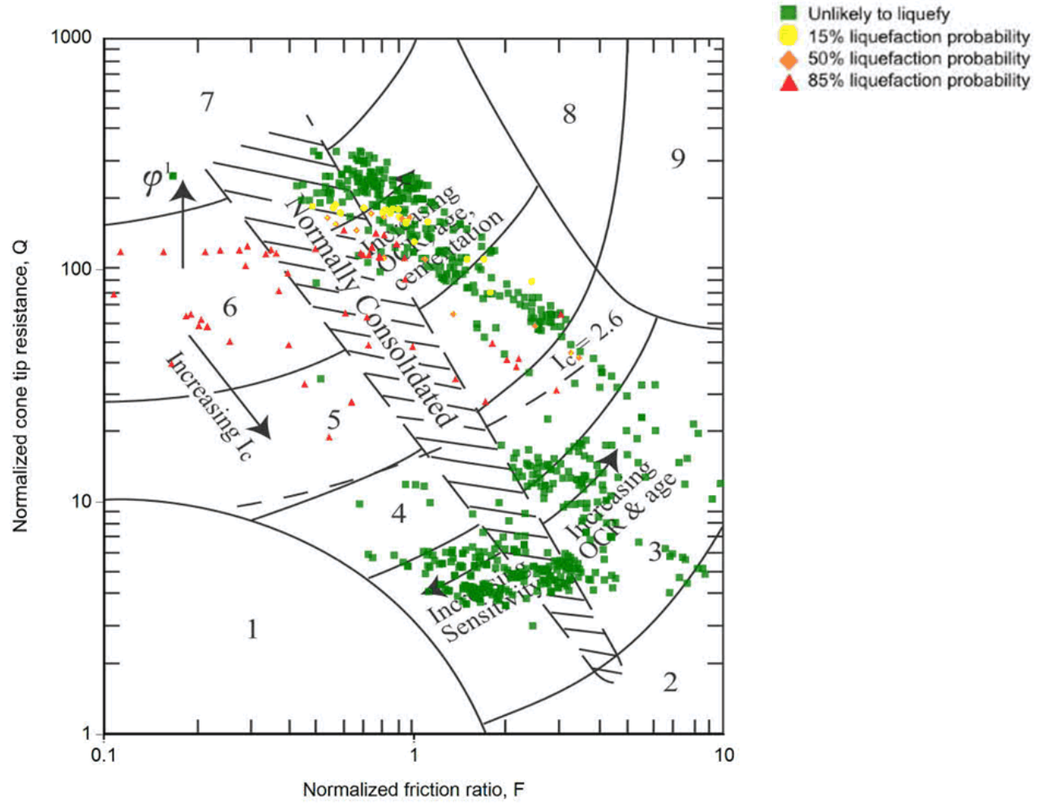


(Assumed pre-drill values)

	CPT Name	Database ID	Investigation Date	Event and PGA	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	Qc (MPa)	Fs (MPa)	γ (kN/m³)
INPUT	CPT25	60524	10/02/2016	User Specified	6.9	0.3308	2.0	BI-2014	ZRB-2002	0.02	2	0.01	18

	Exceedance Probability	S - Calculated Settlement (mm)	CTL - Cumulative Thickness of Liquefaction (m)	LPI - Liquefaction Potential Index	LSN - Liquefaction Severity Number	CT - Crust Thickness (m)	LPI Ishihara
OUTPUT	15%	40	1.8	4	7	2.5	3
	50%	33	1.4	3	6	3.7	2
	85%	26	1.1	1	4	3.7	1

Tonkin + Taylor Exceptional thinking together V1.3	CLIENT, PROJECT **Hastings District Council** **Housing Rezone**	LOCATION Havelock Road/ Howard Street	DATE	4/03/2016
			ANALYSED	khl
		JOB NUMBER **31464.1000**	CHECKED	
	TITLE **ULS Liqeufaction Assessment CPT 24-25**		PAGE	3 of 10 pages

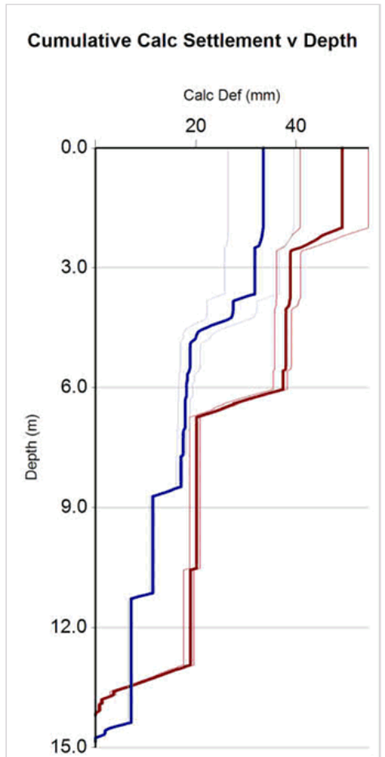


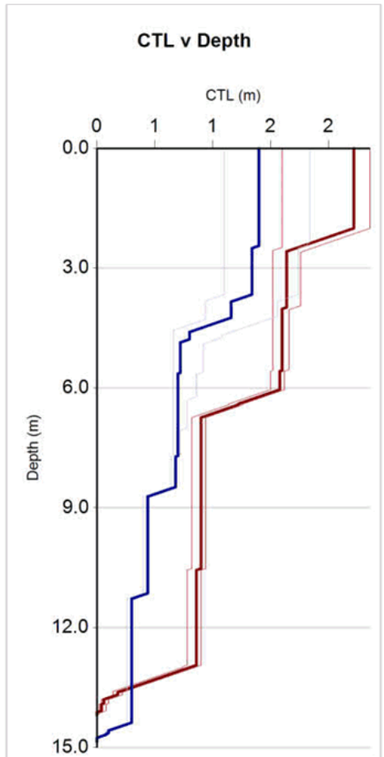
1. Sensitive, fine grained
2. Organic soils - peats
3. Clays - silty clay to clay
4. Silt mixtures - clayey silt to silty clay
5. Sand mixtures - silty sand to sandy silt
6. Sands - clean sand to silty sand
7. Gravelly sand to dense sand
8. Very stiff sand to clayey sand *
9. Very stiff, fine grained *

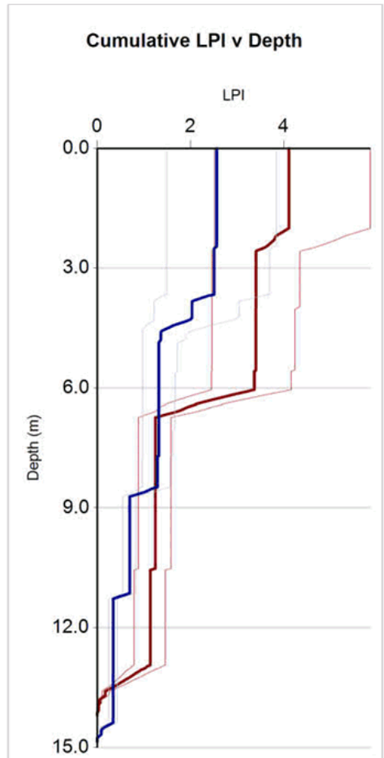
*Heavily overconsolidated or cemented

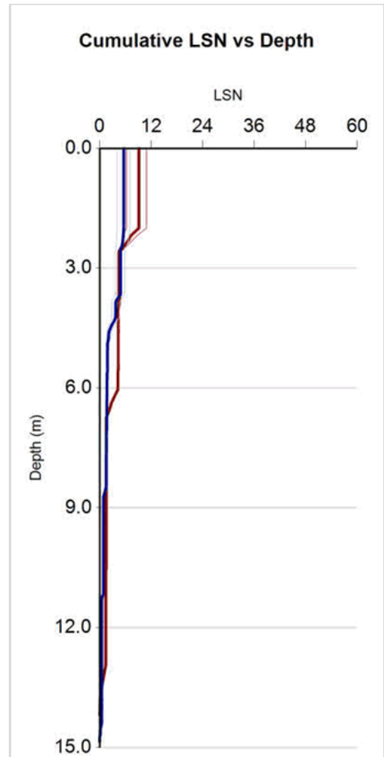
CPT-based soil behavior type classification chart by Robertson (1990)

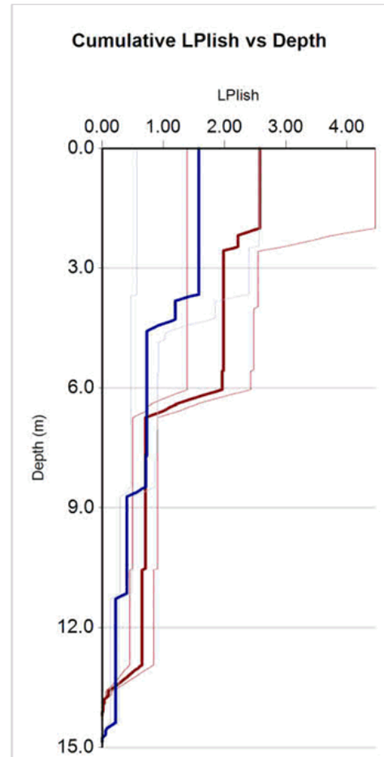
Tonkin + Taylor Exceptional thinking together V1.3	CLIENT, PROJECT **Hastings District Council** **Housing Rezone**		LOCATION Havelock Road/ Howard Street	DATE ANALYSED CHECKED	4/03/2016 khl
	TITLE **ULS Liqeufaction Assessment CPT 24-25**		JOB NUMBER **31464.1000**	PAGE	4 of 10 pages





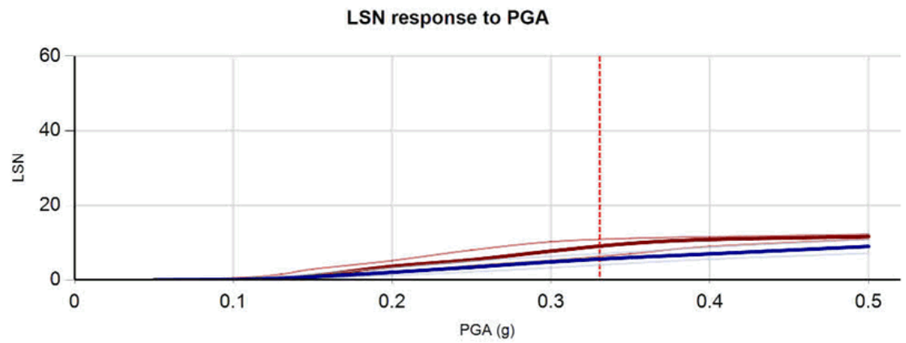


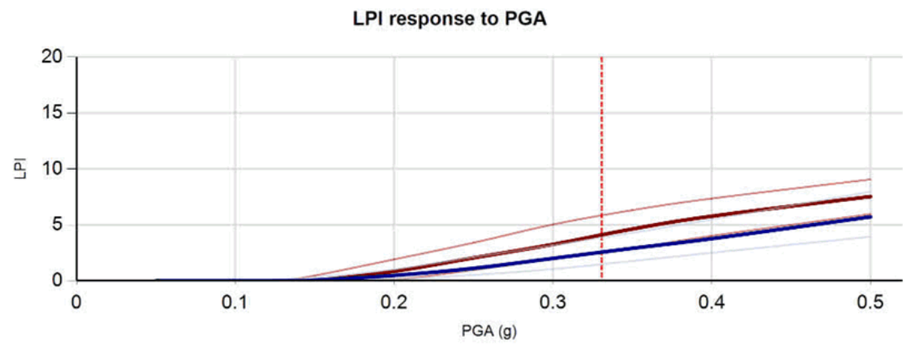


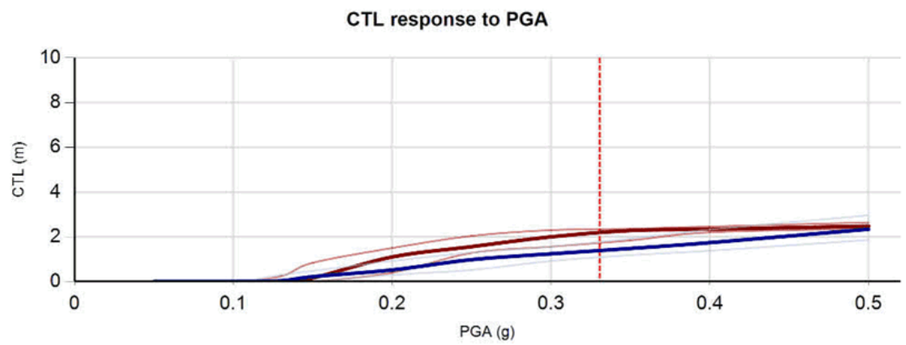


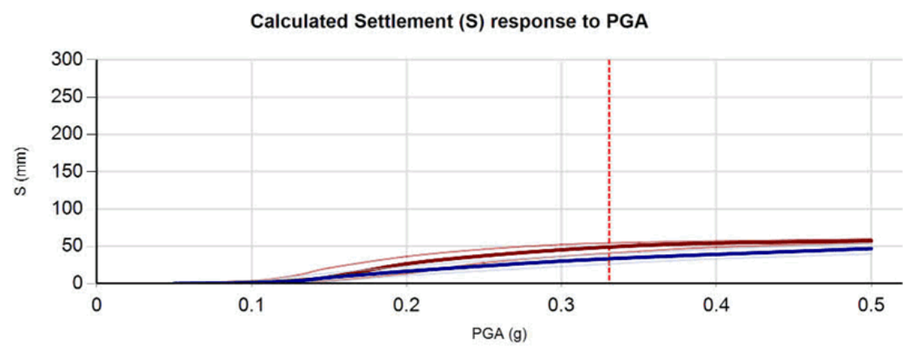
	CPT Name	ID	Investigation Date	Event and PGA	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	(Assumed pre-drill values) Qc (MPa)	Fs (MPa)	ɣ (kN/m³)
	CPT24	60523	10/02/2016	User Specified	6.9	0.3308	Varies	BI-2014	ZRB-2002	0.02	2	0.01	18
	CPT25	60524	10/02/2016	User Specified	6.9	0.3308	Varies	BI-2014	ZRB-2002	0.02	2	0.01	18
	Thicker lines represent the 50% probability of exceedence case and the thinner lines to the left and right of the thicker lines represent the 85% and 15% probability of exceedance cases respectively.												

Tonkin + Taylor Exceptional thinking together V1.3	CLIENT, PROJECT **Hastings District Council** **Housing Rezone**	LOCATION Havelock Road/ Howard Street	DATE	4/03/2016
			ANALYSED	khl
	TITLE **ULS Liqeufaction Assessment CPT 24-25**	JOB NUMBER **31464.1000**	CHECKED	
			PAGE	5 of 10 pages









Vertical dotted line/s indicate user specified PGA at the CPT locations. (actual PGA)

	CPT Name	ID	Investigation Date	Event and PGA	Magnitude	PGA (g)	GWD (m)	Trigger Method	Settlement Method	Pre-drill Depth (m)	(Assumed pre-drill values) Qc (MPa)	Fs (MPa)	ĖĒ (kN/m³)
	CPT24	60523	10/02/2016	User Specified	6.9	0.3308	Varies	BI-2014	ZRB-2002	0.02	2	0.01	18
	CPT25	60524	10/02/2016	User Specified	6.9	0.3308	Varies	BI-2014	ZRB-2002	0.02	2	0.01	18
	Thicker lines represent the 50% probability of exceedence case and the thinner lines to the bottom and top of the thicker lines represent the 85% and 15% probability of exceedance cases respectively.												

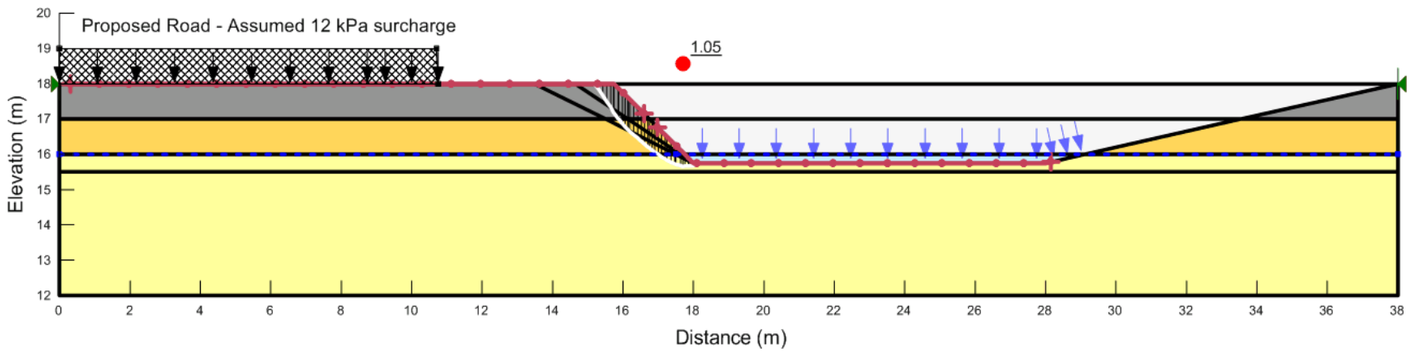
Tonkin + Taylor Exceptional thinking together V1.3	CLIENT, PROJECT **Hastings District Council** **Housing Rezone**	LOCATION Havelock Road/ Howard Street	DATE	4/03/2016
			ANALYSED	khl
		JOB NUMBER **31464.1000**	CHECKED	
	TITLE **ULS Liqeufaction Assessment CPT 24-25**		PAGE	6 of 10 pages

Appendix C: Slope Stability Analyses

- Slope/W Output

Analysis Notes:
1. Name: Option 1C - Static 1H:1V Slope
2. Method: Morgenstern-Price
3. Direction of movement: Left to Right
4. Slip Surface Option: Entry and Exit
5. PWP Conditions Source: Piezometric Line
6. Optimization: Yes
7. Tension Crack Option: (none)
8. F of S Calculation Option: Constant
9. Horz Seismic Load:

Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Phi-B (°)	Piezometric Line
	Engineered Fill	Mohr-Coulomb	18	2	32	0	1
	Upper Alluvial Sands	Mohr-Coulomb	17	0	35	0	1
	Upper Alluvial Silts	Mohr-Coulomb	17	2	30	0	1

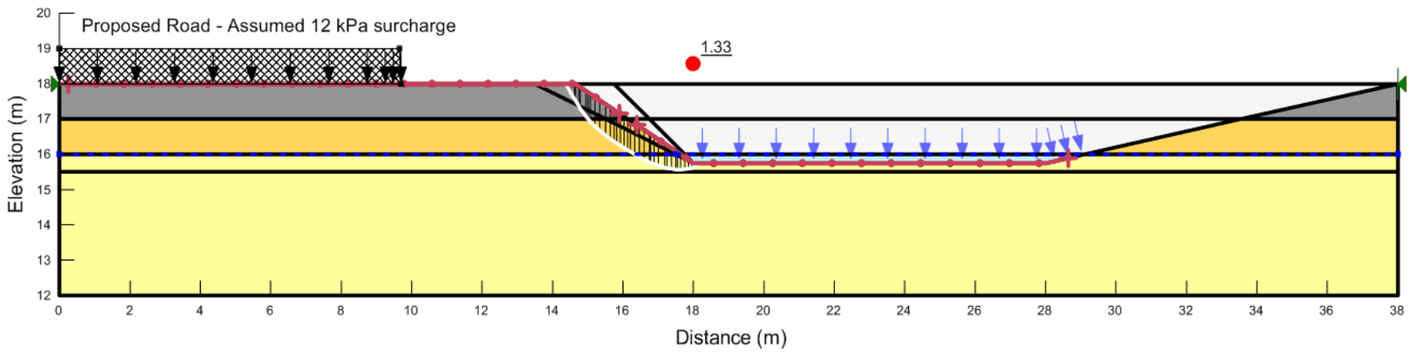


Howard Street	Tonkin+Taylor	Title: Option 1C.gsz		Analysed by: CPR
		Analysis: Option 1C - Static 1H:1V Slope		Checked by: NAH
		Comments:	Scale: 1:150 @ A3	Job number: 31464.4000

Directory: P:\31464\31464.4000\WorkingMaterial\Option Evaluation\

Analysis Notes:
1. Name: Option 1C - Static 1.5H:1V Slope
2. Method: Morgenstern-Price
3. Direction of movement: Left to Right
4. Slip Surface Option: Entry and Exit
5. PWP Conditions Source: Piezometric Line
6. Optimization: Yes
7. Tension Crack Option: (none)
8. F of S Calculation Option: Constant
9. Horz Seismic Load:

Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Phi-B (°)	Piezometric Line
	Engineered Fill	Mohr-Coulomb	18	2	32	0	1
	Upper Alluvial Sands	Mohr-Coulomb	17	0	35	0	1
	Upper Alluvial Silts	Mohr-Coulomb	17	2	30	0	1



Howard Street	Tonkin+Taylor	Title: Option 1C.gsz		Analysed by: CPR
		Analysis: Option 1C - Static 1.5H:1V Slope		Checked by: NAH
		Comments:	Scale: 1:150 @ A3	Job number: 31464.4000

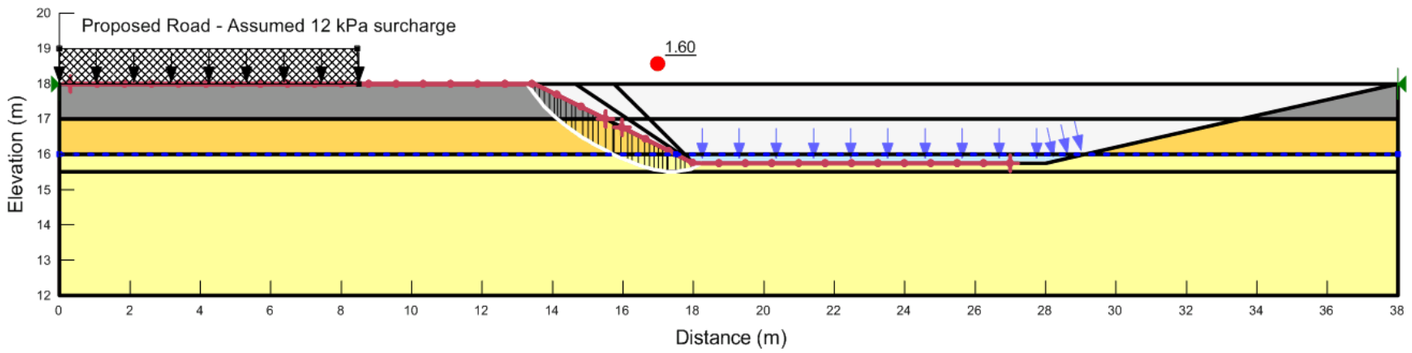
Directory: P:\31464\31464.4000\WorkingMaterial\Option Evaluation\

Item 2

Attachment 11

Analysis Notes:
1. Name: Option 1C - (A) Static 2H:1V Slope
2. Method: Morgenstern-Price
3. Direction of movement: Left to Right
4. Slip Surface Option: Entry and Exit
5. PWP Conditions Source: Piezometric Line
6. Optimization: Yes
7. Tension Crack Option: (none)
8. F of S Calculation Option: Constant
9. Horz Seismic Load:

Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Phi-B (°)	Piezometric Line
	Engineered Fill	Mohr-Coulomb	18	2	32	0	1
	Upper Alluvial Sands	Mohr-Coulomb	17	0	35	0	1
	Upper Alluvial Silts	Mohr-Coulomb	17	2	30	0	1



Howard Street	Tonkin+Taylor	Title: Option 1C.gsz		Analysed by: CPR
		Analysis: Option 1C - (A) Static 2H:1V Slope		Checked by: NAH
		Comments:	Scale: 1:150 @ A3	Job number: 31464.4000

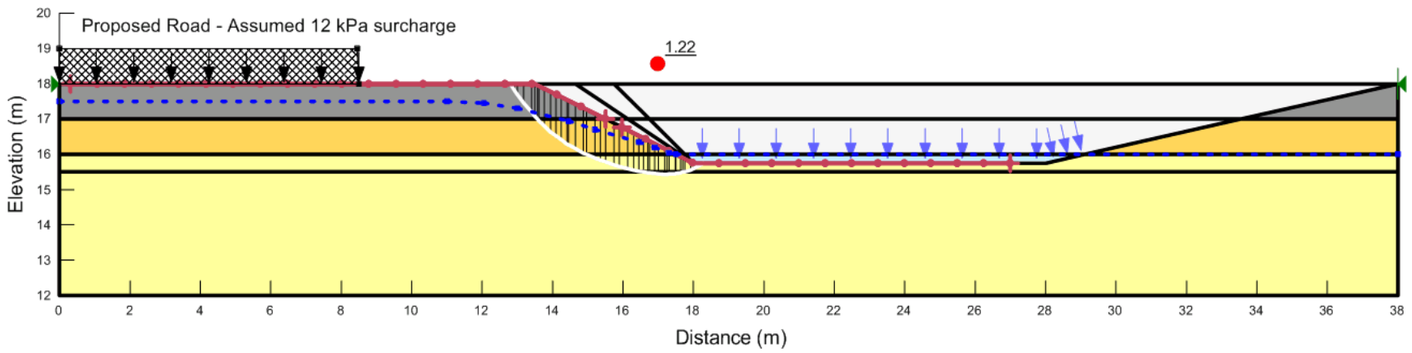
Directory: P:\31464\31464.4000\WorkingMaterial\Option Evaluation\

Item 2

Attachment 11

Analysis Notes:
1. Name: Option 1C - (B) Elevated GWL 2H:1V Slope
2. Method: Morgenstern-Price
3. Direction of movement: Left to Right
4. Slip Surface Option: Entry and Exit
5. PWP Conditions Source: Piezometric Line
6. Optimization: Yes
7. Tension Crack Option: (none)
8. F of S Calculation Option: Constant
9. Horz Seismic Load:

Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Phi-B (°)	Piezometric Line
	Engineered Fill	Mohr-Coulomb	18	2	32	0	1
	Upper Alluvial Sands	Mohr-Coulomb	17	0	35	0	1
	Upper Alluvial Silts	Mohr-Coulomb	17	2	30	0	1



Howard Street	Tonkin+Taylor	Title: Option 1C.gsz		Analysed by: CPR
		Analysis: Option 1C - (B) Elevated GWL 2H:1V Slope		Checked by: NAH
		Comments:	Scale: 1:150 @ A3	Job number: 31464.4000

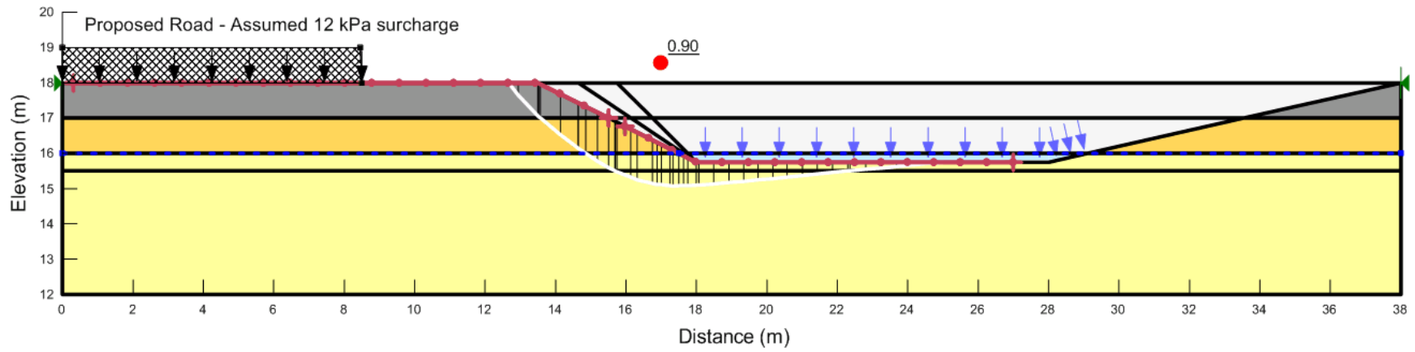
Directory: P:\31464\31464.4000\WorkingMaterial\Option Evaluation\

Item 2

Attachment 11

Analysis Notes:
1. Name: Option 1C - (C) Seismic 2H:1V Slope
2. Method: Morgenstern-Price
3. Direction of movement: Left to Right
4. Slip Surface Option: Entry and Exit
5. PWP Conditions Source: Piezometric Line
6. Optimization: Yes
7. Tension Crack Option: (none)
8. F of S Calculation Option: Constant
9. Horz Seismic Load: 0.33

Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Phi-B (°)	Cohesion R (kPa)	Phi R (°)	Piezometric Line
	Engineered Fill	Mohr-Coulomb	18	2	32	0	0	0	1
	Upper Alluvial Sands	Mohr-Coulomb	17	0	35	0	0	0	1
	Upper Alluvial Silts	Mohr-Coulomb	17	2	30	0	0	0	1



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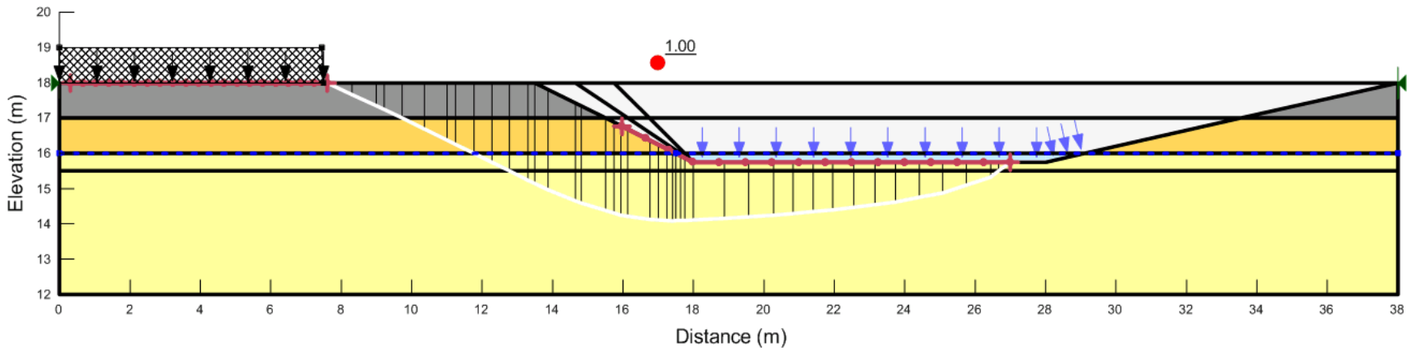
		Analysis: Option 1C - (C) Seismic 2H:1V Slope	Checked by: NAH
		Comments: / Scale: 1:150 @ A3	Job number: 31464.4000

Directory: P:\31464\31464.4000\WorkingMaterial\Option Evaluation\

Analysis Notes:
1. Name: Option 1C - (C) Seismic 2H:1V Slope (6m Set Back)
2. Method: Morgenstern-Price
3. Direction of movement: Left to Right
4. Slip Surface Option: Entry and Exit
5. PWP Conditions Source: Piezometric Line
6. Optimization: Yes
7. Tension Crack Option: (none)
8. F of S Calculation Option: Constant
9. Horz Seismic Load: 0.33

Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Phi-B (°)	Cohesion R (kPa)	Phi R (°)	Piezometric Line
	Engineered Fill	Mohr-Coulomb	18	2	32	0	0	0	1
	Upper Alluvial Sands	Mohr-Coulomb	17	0	35	0	0	0	1
	Upper Alluvial Silts	Mohr-Coulomb	17	2	30	0	0	0	1

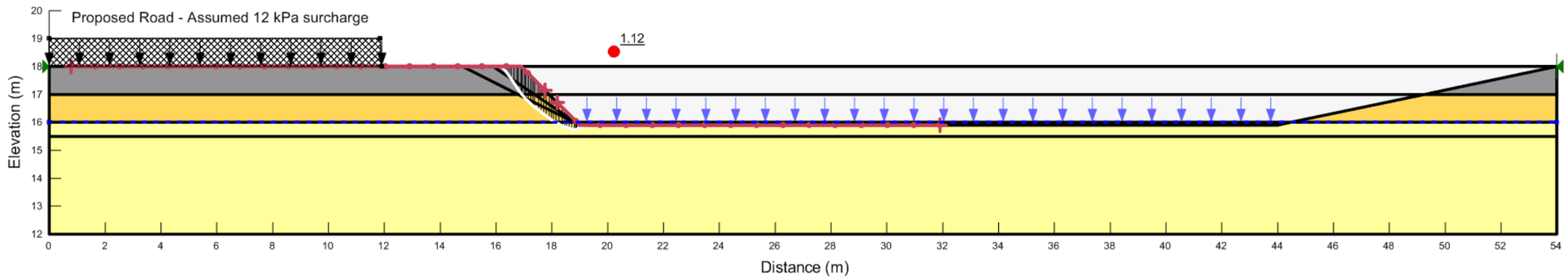


Howard Street	Tonkin+Taylor	Title: Option 1C.gsz	Analysed by: CPR
		Analysis: Option 1C - (C) Seismic 2H:1V Slope (6m Set Back)	Checked by: NAH
		Comments: / Scale: 1:150 @ A3	Job number: 31464.4000

Directory: P:\31464\31464.4000\WorkingMaterial\Option Evaluation\

Analysis Notes:
1. Name: Option 2C - Static 1H:1V Slope
2. Method: Morgenstern-Price
3. Direction of movement: Left to Right
4. Slip Surface Option: Entry and Exit
5. PWP Conditions Source: Piezometric Line
6. Optimization: Yes
7. Tension Crack Option: (none)
8. F of S Calculation Option: Constant
9. Horz Seismic Load:

Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Phi-B (°)	Piezometric Line
	Engineered Fill	Mohr-Coulomb	18	2	32	0	1
	Upper Alluvial Sands	Mohr-Coulomb	17	0	35	0	1
	Upper Alluvial Silts	Mohr-Coulomb	17	2	30	0	1



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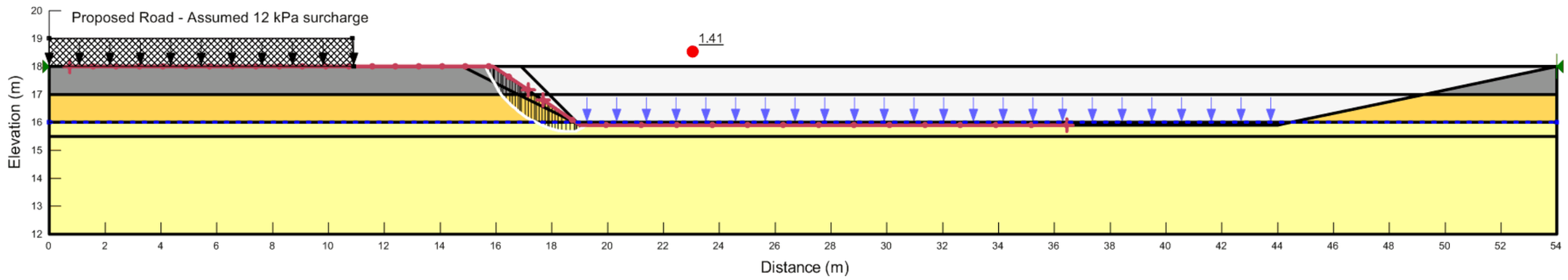
		Comments: Scale: 1:150 @ A3	Job number: 31464.4000

Directory: P:\31464\31464.4000\WorkingMaterial\Option Evaluation\

Analysis Notes:
1. Name: Option 2C - Static 1.5H:1V Slope
2. Method: Morgenstern-Price
3. Direction of movement: Left to Right
4. Slip Surface Option: Entry and Exit
5. PWP Conditions Source: Piezometric Line
6. Optimization: Yes
7. Tension Crack Option: (none)
8. F of S Calculation Option: Constant
9. Horz Seismic Load:

Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Phi-B (°)	Piezometric Line
	Engineered Fill	Mohr-Coulomb	18	2	32	0	1
	Upper Alluvial Sands	Mohr-Coulomb	17	0	35	0	1
	Upper Alluvial Silts	Mohr-Coulomb	17	2	30	0	1

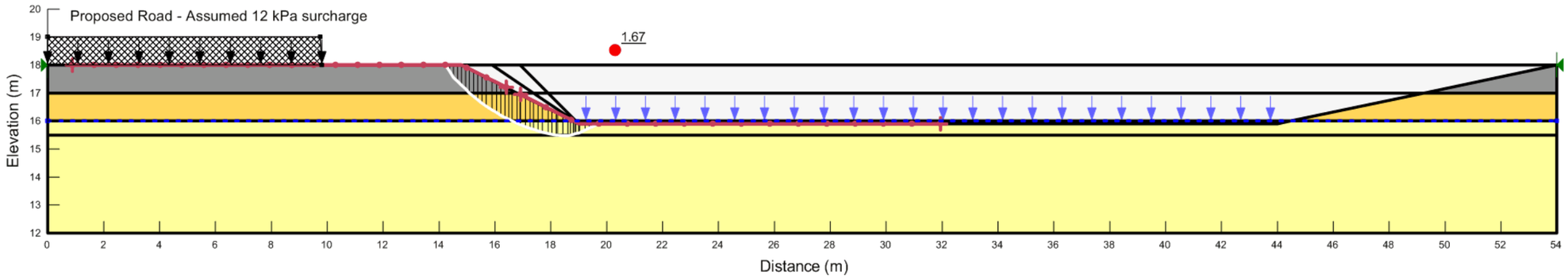


Howard Street	Tonkin+Taylor	Title: Option 2C.gsz		Analysed by: CPR
		Analysis: Option 2C - Static 1.5H:1V Slope		Checked by: NAH
		Comments:	Scale: 1:150 @ A3	Job number: 31464.4000

Directory: P:\31464\31464.4000\WorkingMaterial\Option Evaluation\

Analysis Notes:
1. Name: Option 2C - (A) Static 2H:1V Slope
2. Method: Morgenstern-Price
3. Direction of movement: Left to Right
4. Slip Surface Option: Entry and Exit
5. PWP Conditions Source: Piezometric Line
6. Optimization: Yes
7. Tension Crack Option: (none)
8. F of S Calculation Option: Constant
9. Horz Seismic Load:

Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Phi-B (°)	Piezometric Line
	Engineered Fill	Mohr-Coulomb	18	2	32	0	1
	Upper Alluvial Sands	Mohr-Coulomb	17	0	35	0	1
	Upper Alluvial Silts	Mohr-Coulomb	17	2	30	0	1

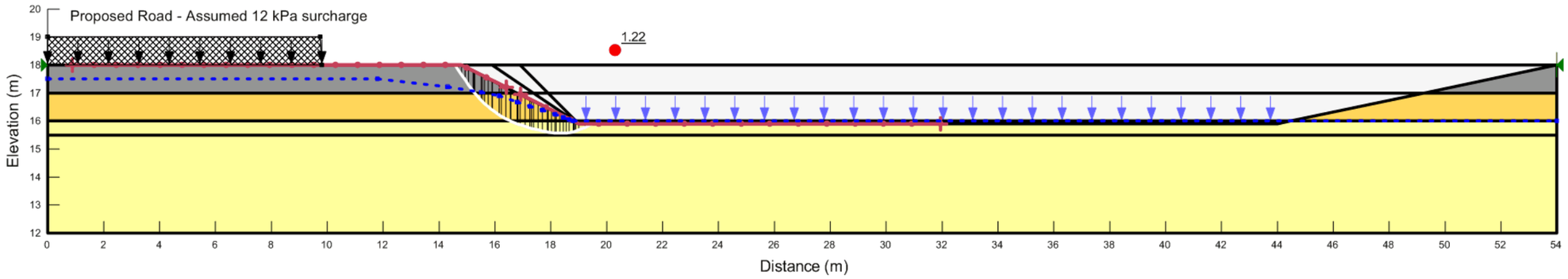


Howard Street	Tonkin+Taylor	Title: Option 2C.gsz	Analysed by: CPR
		Analysis: Option 2C - (A) Static 2H:1V Slope	Checked by: NAH
		Comments: Scale: 1:150 @ A3	Job number: 31464.4000

Directory: P:\31464\31464.4000\WorkingMaterial\Option Evaluation\

Analysis Notes:
1. Name: Option 2C - (B) Elevated GWL 2H:1V Slope
2. Method: Morgenstern-Price
3. Direction of movement: Left to Right
4. Slip Surface Option: Entry and Exit
5. PWP Conditions Source: Piezometric Line
6. Optimization: Yes
7. Tension Crack Option: (none)
8. F of S Calculation Option: Constant
9. Horz Seismic Load:

Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Phi-B (°)	Piezometric Line
	Engineered Fill	Mohr-Coulomb	18	2	32	0	1
	Upper Alluvial Sands	Mohr-Coulomb	17	0	35	0	1
	Upper Alluvial Silts	Mohr-Coulomb	17	2	30	0	1

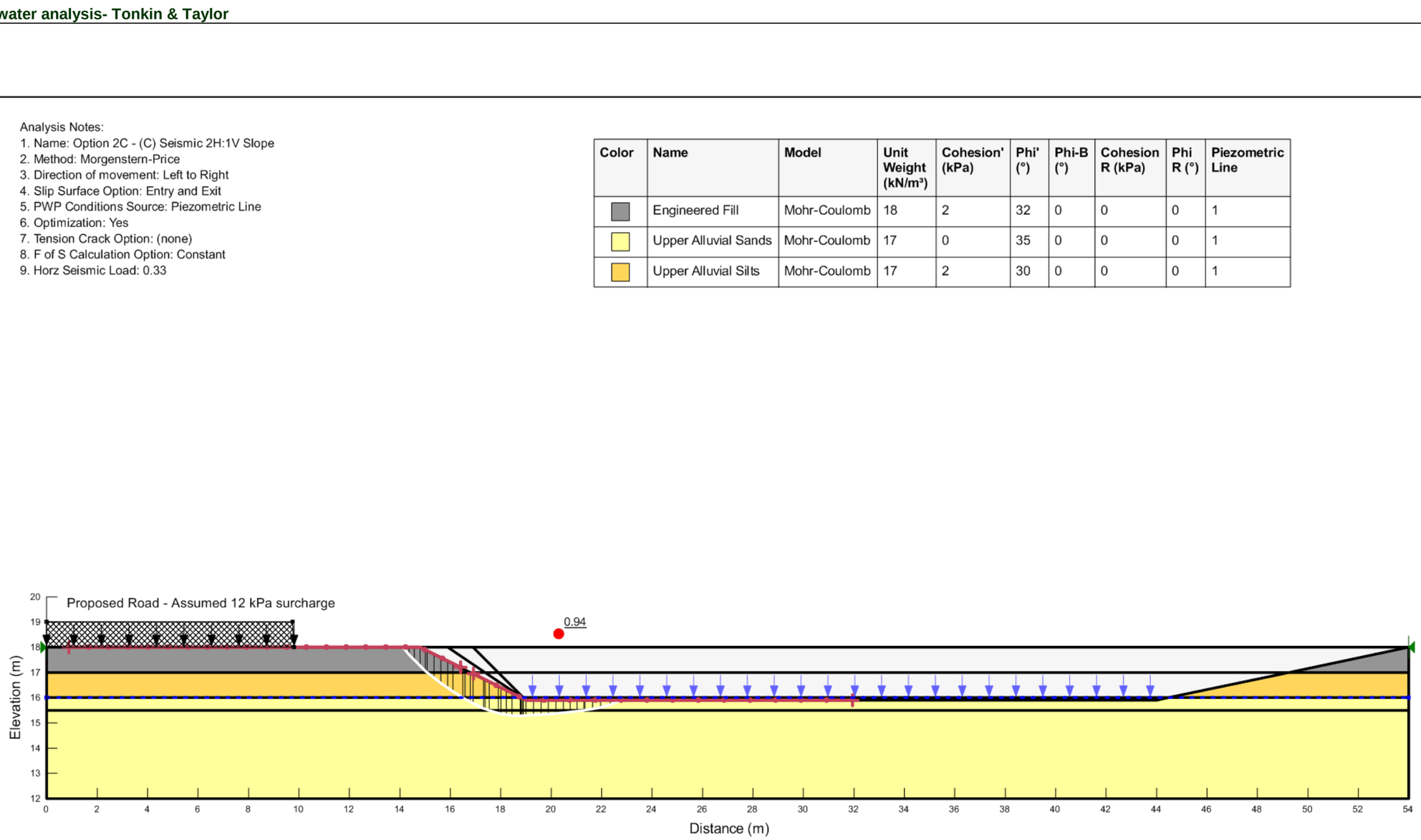


Howard Street	Tonkin+Taylor	Title: Option 2C.gsz	Analysed by: CPR
		Analysis: Option 2C - (B) Elevated GWL 2H:1V Slope	Checked by: NAH
		Comments: / Scale: 1:150 @ A3	Job number: 31464.4000

Directory: P:\31464\31464.4000\WorkingMaterial\Option Evaluation\

Analysis Notes:
1. Name: Option 2C - (C) Seismic 2H:1V Slope
2. Method: Morgenstern-Price
3. Direction of movement: Left to Right
4. Slip Surface Option: Entry and Exit
5. PWP Conditions Source: Piezometric Line
6. Optimization: Yes
7. Tension Crack Option: (none)
8. F of S Calculation Option: Constant
9. Horz Seismic Load: 0.33

Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Phi-B (°)	Cohesion R (kPa)	Phi R (°)	Piezometric Line
	Engineered Fill	Mohr-Coulomb	18	2	32	0	0	0	1
	Upper Alluvial Sands	Mohr-Coulomb	17	0	35	0	0	0	1
	Upper Alluvial Silts	Mohr-Coulomb	17	2	30	0	0	0	1

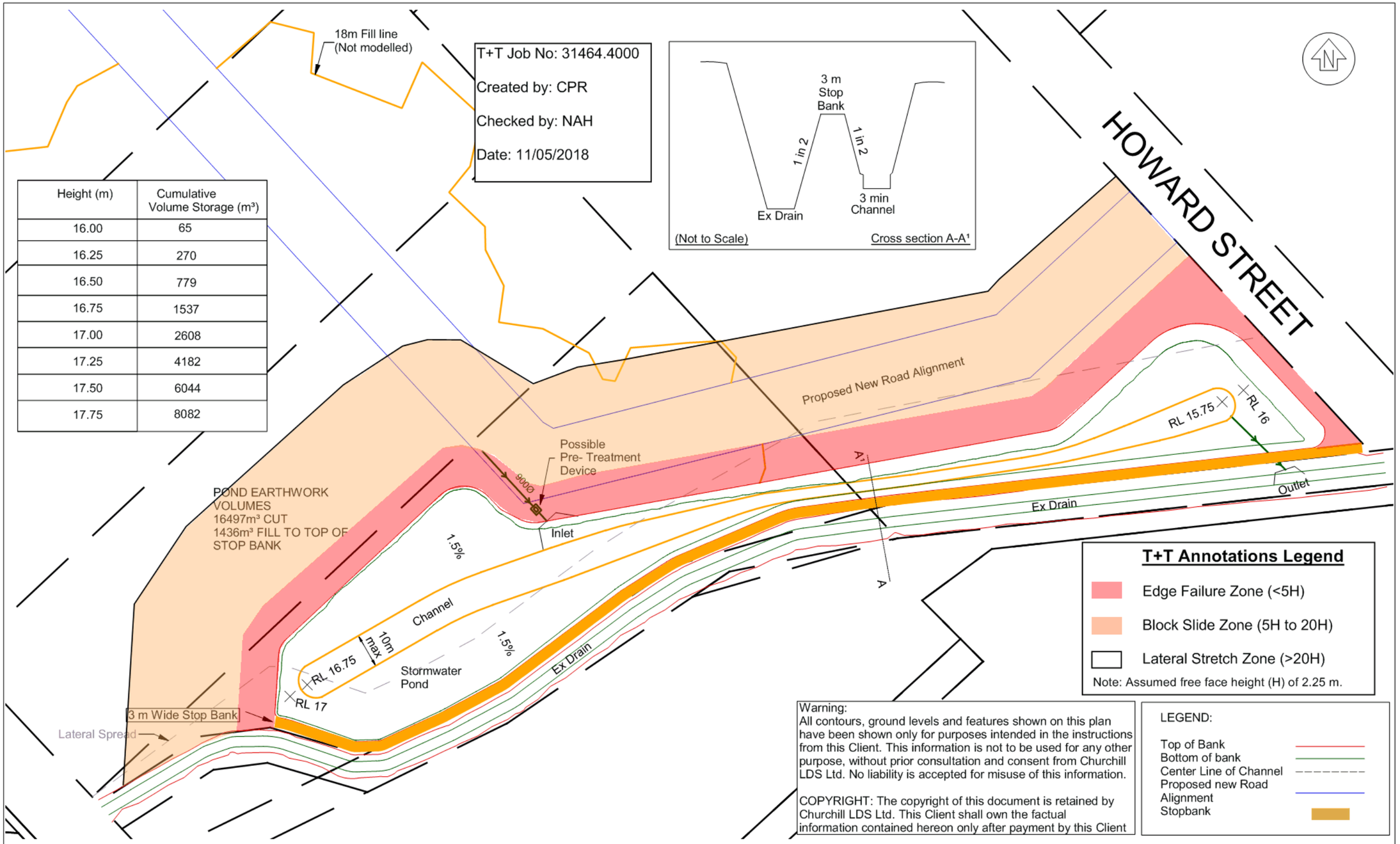


Howard Street	Tonkin+Taylor	Title: Option 2C.gsz	Analysed by: CPR
		Analysis: Option 2C - (C) Seismic 2H:1V Slope	Checked by: NAH
		Comments: / Scale: 1:150 @ A3	Job number: 31464.4000

Directory: P:\31464\31464.4000\WorkingMaterial\Option Evaluation\

Appendix D: Lateral Spread Zone Sketches

- T+T annotated sketches with lateral spread zones marked on provided Option plans



Height (m)	Cumulative Volume Storage (m³)
16.00	65
16.25	270
16.50	779
16.75	1537
17.00	2608
17.25	4182
17.50	6044
17.75	8082

Warning:
All contours, ground levels and features shown on this plan have been shown only for purposes intended in the instructions from this Client. This information is not to be used for any other purpose, without prior consultation and consent from Churchill LDS Ltd. No liability is accepted for misuse of this information.

Churchill LDS
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Christchurch 8149
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Email: admin@clds.co.nz

Option 1C Plan

PROJECT: Howard Street, Hastings

AMENDMENT SCHEDULE

CLIENT: Pattle Delamore Partners Ltd.

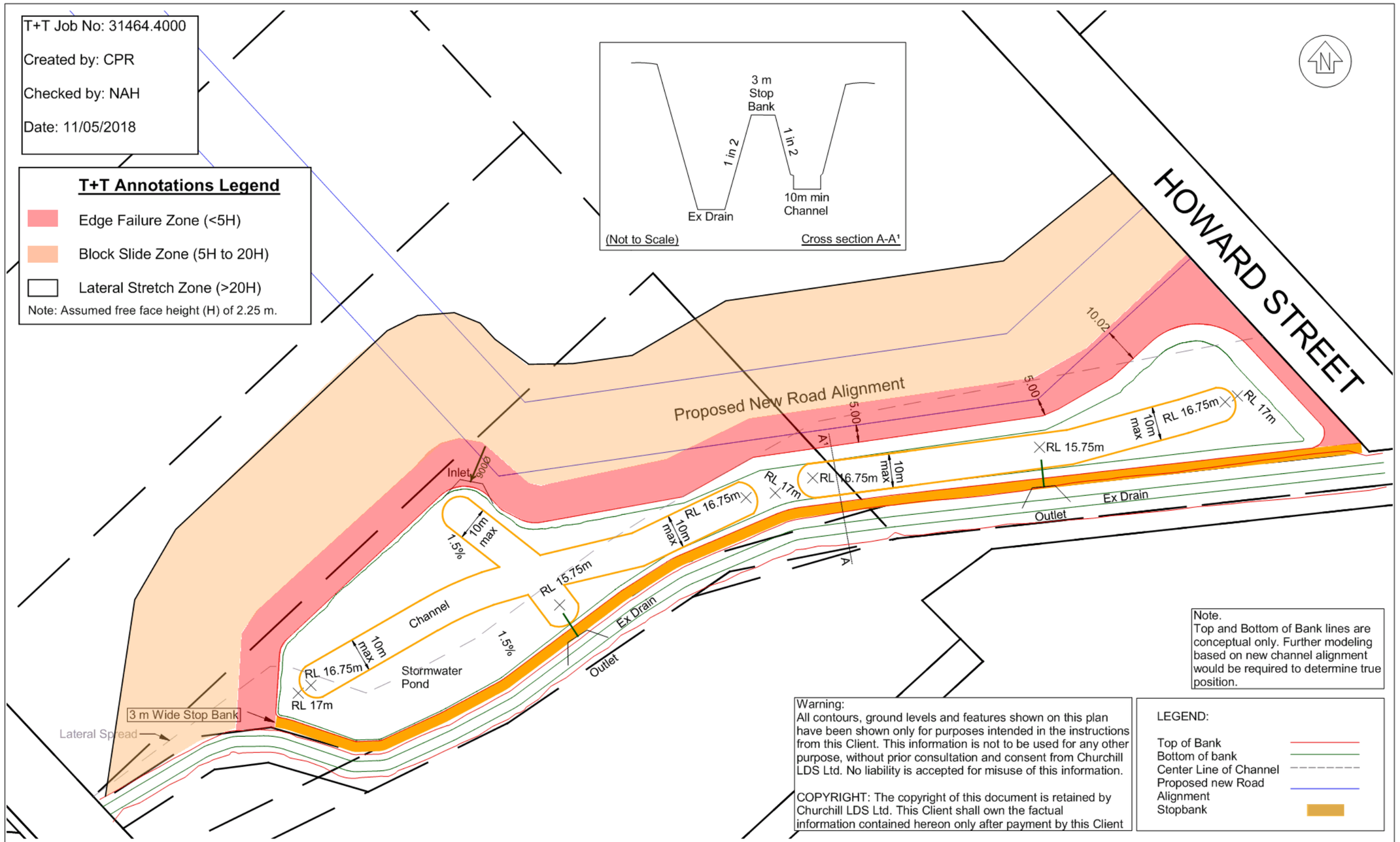
12d: S:\18505 - PDP - Howard Street\12d\18505 Design

DATE DRAWN: 15/03/18 SCALE: 1:1000 (A3)

SURVEYOR: DRAWN: RV

DESIGNED: ADC CHECKED: ADC

18505-01



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Option 1C
Possible Refinements

PROJECT: Howard Street, Hastings

AMENDMENT SCHEDULE

CLIENT: Pattle Delamore Partners Ltd.

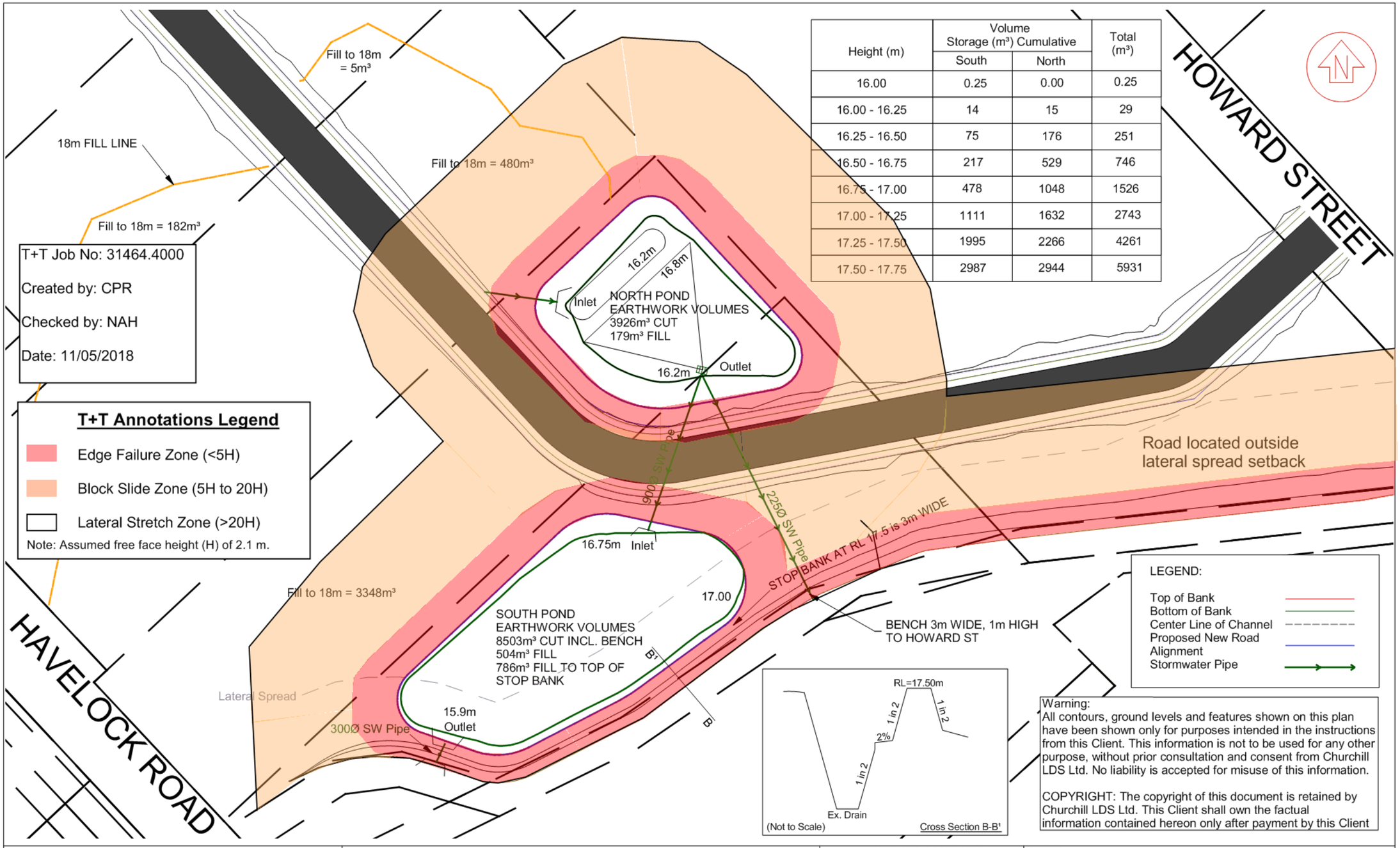
12d: S:\18505 - PDP - Howard Street\12d\18505 Design

DATE DRAWN: 15/03/18 SCALE: 1:1000 (A3)

SURVEYOR: DRAWN: KMO

DESIGNED: ADC CHECKED: ADC

18505-03



Height (m)	Volume Storage (m³) Cumulative		Total (m³)
	South	North	
16.00	0.25	0.00	0.25
16.00 - 16.25	14	15	29
16.25 - 16.50	75	176	251
16.50 - 16.75	217	529	746
16.75 - 17.00	478	1048	1526
17.00 - 17.25	1111	1632	2743
17.25 - 17.50	1995	2266	4261
17.50 - 17.75	2987	2944	5931

Warning:
All contours, ground levels and features shown on this plan have been shown only for purposes intended in the instructions from this Client. This information is not to be used for any other purpose, without prior consultation and consent from Churchill LDS Ltd. No liability is accepted for misuse of this information.

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Option 2C Plan

PROJECT: Howard Street, Hastings

AMENDMENT SCHEDULE

CLIENT: Pattle Delamore Partners Ltd.

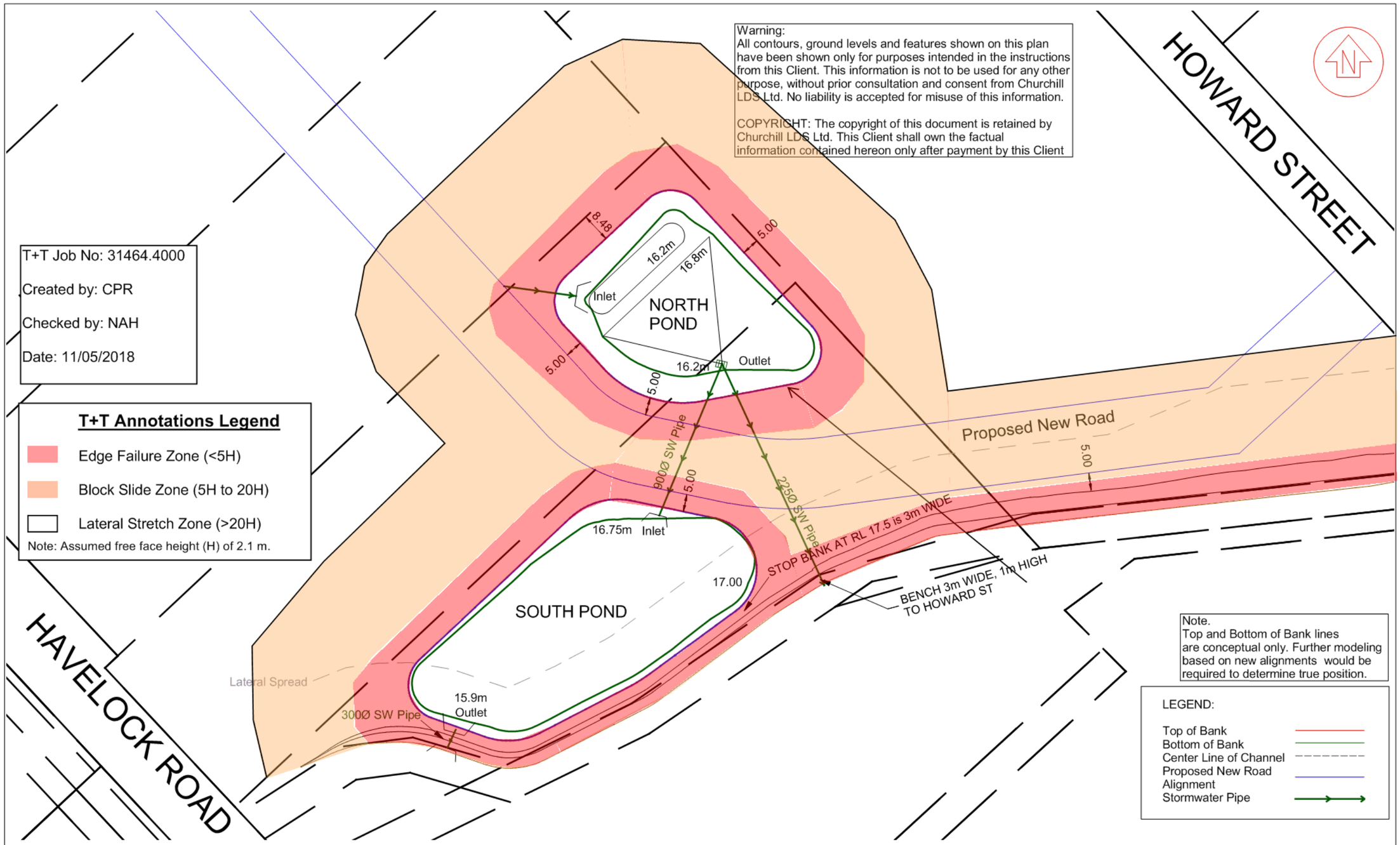
12d: S:\18505 - PDP - Howard Street\12d\18505 Design

DATE DRAWN: 15/03/18 SCALE: 1:1000 (A3)

SURVEYOR: DRAWN: RV

DESIGNED: ADC CHECKED: ADC

18505-02



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Option 2C (A)
Possible Refinements

PROJECT: Howard Street, Hastings

AMENDMENT SCHEDULE

CLIENT: Pattle Delamore Partners Ltd.

12d: S:\18505 - PDP - Howard Street\12d\18505 Design

DATE DRAWN: 14/03/18 SCALE: 1:1000 (A3)

SURVEYOR: DRAWN: KMO

DESIGNED: ADC CHECKED: ADC

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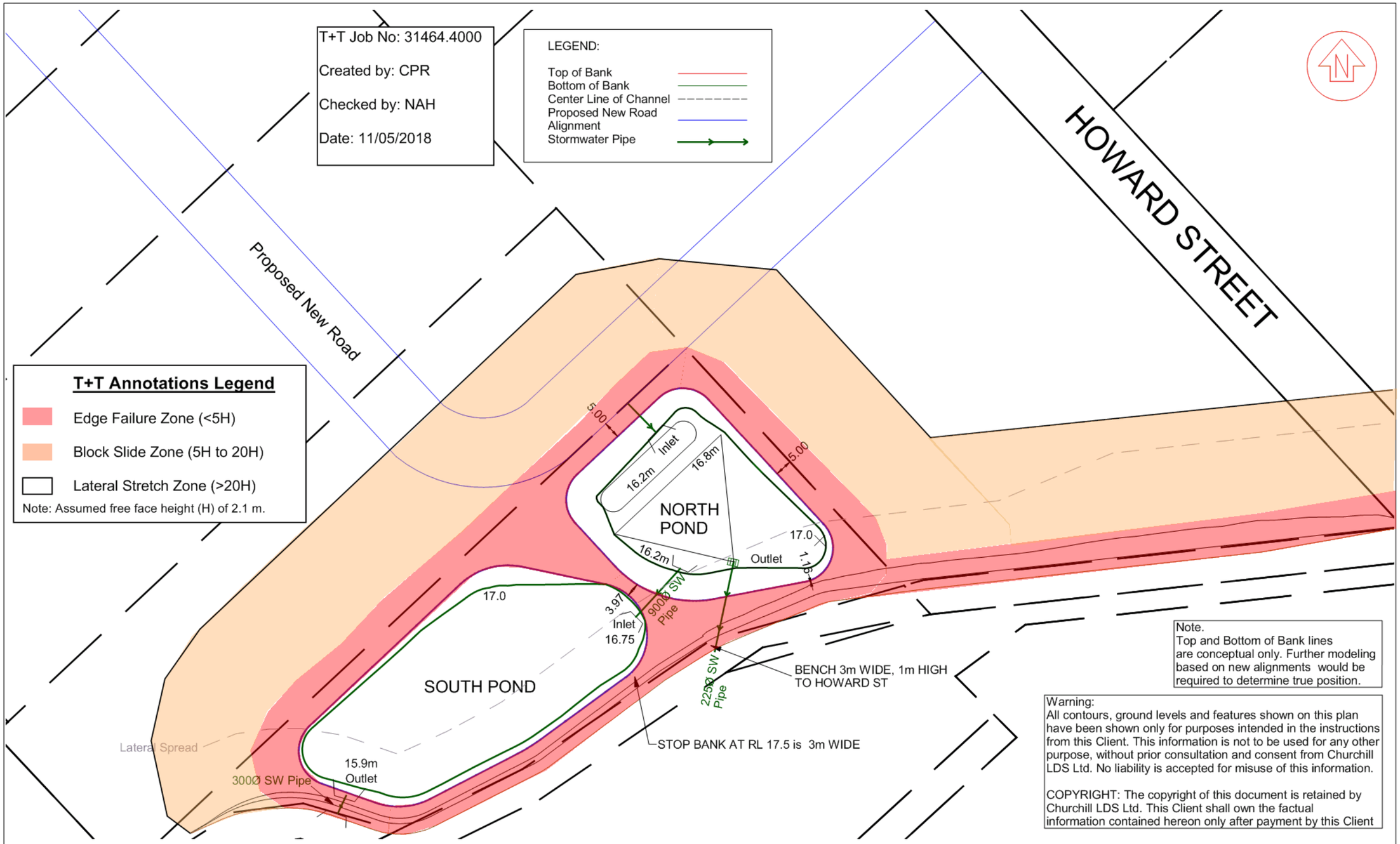

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Option 2C (B)
Possible Refinements

PROJECT: Howard Street, Hastings

AMENDMENT SCHEDULE

CLIENT: Pattle Delamore Partners Ltd.

12d: S:\18505 - PDP - Howard Street\12d\18505 Design

DATE DRAWN: 15/03/18 SCALE: 1:1000 (A3)

SURVEYOR: DRAWN: KMO

DESIGNED: ADC CHECKED: ADC

18505-05

Submission Number	Submitter Name/s	Submission Relates to	Submission Summary	Decision Sought	Stantec Stormwater Comments
1	Christopher and Lorraine Burns	The location of the proposed structure road	NOT STORMWATER RELATED	Confirm the requirement for the designation	N/A
2	Barry and Lynne Keane	Stormwater corridor as it applies to 214 Havelock Road	Opposes the stormwater corridor along the Howard Street end of their property at 214 Havelock Road	Withdraw the stormwater corridor as it relates to 214 Havelock Road as other options exist (Howard Street or Ken Gee's property)	The overall fall of the Howard Street development land is to the south near Havelock Road. The proposed stormwater corridor was to allow stormwater flow from the rear of the TW Property Holdings and Fyfe (with a connection through TW Holding's land) sites to drain without significant earthworks and retaining walls (in the order of 1m near the Fyfe TW Holding boundary) to raise the land and drain back to Howard Street. This has resulted in a linkage stormwater flow path being required through either the Keane or Burns properties. The ideal location is unknown due to no proposed scheme plan in place or design levels confimred. But, the flow path could be made to work from the location proposed moving south through to a location on Burn's property at the boundary between Cooper and Fyfe. Another option would be for stormwater to be conveyed along the back of TW Holding's, through Fyfe and Coopers to the new internal road. While these other options may be achievable, HDC has chosen the path over the Keane property as it represents the corridor which provides the most natural and least restrictive flow path from the Council's perspective. The location was chosen as it is located towards the lowest point of the TW Holdings site, and takes the shortest possible route to the proposed internal road corridor, ensuring that as small as possible additional land will used up for the corridor. It has also been proposed for the Keane land rather than the Gee property, as the Gee land is further upslope, meaning less efficient and effective servicing of the TW Holdings site, and may require additional engineeering works (of the TW Holdings site) to achieve a suitable stormwater outlet to the stormwater corridor. The other options also have increased difficulties, the Burns property option would bequire a bend in the overland flow path which is difficult to achieve, as well as requiring additional land, and muliple land owners. The Cooper/Fyfe option would require additional land and multiple landowners also, neither option utilises the flowpath that will be created by the peroposed internal road corridor.
3	Marcus Hill on behalf of Trace Group	Designation of the internal road and stormwater corridors	The owners of 1239 Howard Street support the position of the proposed road within the within the structure plan, and also the location and function of the proposed overland flow path within 214 Havelock Road.	Confirm the structure plan and the location and function of the proposed overland flow path	Noted
4	Woolworths NZ Ltd	Designation of the internal road and stormwater corridors	This submission supports the intention by Council in this NOR to ensure appropriate land is available to provide critical services to the structure plan area, particularly for the conveyance of stormwater and agrees the timely provision of servicing by Council is better than a developer led, piecemeal approach to the construction of services. The submission acknowledges intent around stormwater management for 5 and 50 year events. However, the submission questions whether the high level stormwater assessment (Stormwater Capacity report prepared by MWH), which appears to consider existing stormwater capacity only is sufficient, as the report concludes the structure plan area is undersized in some catchments and that further analysis, including topographical surveys is necessary to ascertain a more detailed stormwater network design. Woolworths submits that Council needs to undertake this further assessment so that the design will appropriately provide for future development within the structure plan area, thereby more appropriately dealing with stormwater conveyance and discharge.	Confirm the requirement with modifications	The critical downstream flood levels have not been confirmed by HBRC. The 20% and 2% AEP events will be used to set the road levels. However, if the proposed internal road is generally laid at existing ground levels the Woolworths site does have an issue with conveyance back to the proposed internal road network. The property would either need to be significantly raised (in the order of 0.7m at the Norton Road corner) to drain back to the internal road or alternatively overland flows split and allow the property to drain back to the intersection of Norton Road and Havelock Road. Allowing flows back to the intersection of Norton Road and Havelock Road will require some mitigation of peak flows from the development site. The relocation of the road to a site adjacent to Parkvale School will not make the site unserviceable for stormwater, but it may reduce the area of the site that can be serviced by gravity to the internal road. HDC's preferred solution is to direct the majority of runoff from the development area to the Stormwater Detention Area which is designed to ensure stormwater neutrality and quality treatment , and will not put additional strain on the existing network. Any stormwater being diverted to the Havelock Road stormwater network may require mitigation, or alternatively a pumped option discharging to the internal road.
5	Karen Cooper	Designation of the internal road and stormwater corridors	It is submitted that consideration should be given to an alternative roading alignment, which allows for one road to be less than 20 metres in width (secondary road and currently specified in "Plan K") which could still include water, wastewater and stormwater services. This secondary road could be used if necessary for vehicle access but would be primarily a pedestrian, cycling track. There is thus the potential for that part of the road (as is currently specified in "Plan K") to be reduced to 10 metres in width (6 metres for the road plus some road reserve for services). Access for any residential development on 1259 Howard St would be from Howard Street rather than the structure road. The rezoned area would therefore have a primary road by the Parkvale School ("Plan A" in the Notice of Requirement) and a secondary road through 1259 Howard St (to replace "Plan K"). This would allow additional land to be made available for residential use.	Confirm the requirement with modifications	A reduced road width for conveyance of the 2%AEP (1:50 year) flood event could be possible, the vertical grade from Howard Street down to the proposed detention basin would need to be modelled to confirm the increased depth of flow as this may be more than the 100mm at centreline as required in the HDC Code of Practice (if designated a Local Road, or 200mm if Lane). The designation level for the road through this section would also need to be confirmed.
6	Ministry of Education	Designation of the internal road corridor	NOT STORMWATER RELATED	Confirm the requirement with modifications	N/A

HOWARD STREET DEVELOPMENT WASTEWATER SERVICING ASSESSMENT REPORT

Prepared for Hastings District Council

May 2016

QUALITY STATEMENT

PROJECT MANAGER	PROJECT TECHNICAL LEAD
Desmond Parkinson	Wayne Hodson

PREPARED BY		
Amy Patterson Horner		16 / 05 / 2016
CHECKED BY		
Wayne Hodson		16 / 05 / 2016
REVIEWED BY		
Wayne Hodson		16 / 05 / 2016
APPROVED FOR ISSUE BY		
Desmond Parkinson		16 / 05 / 2016

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REVISION SCHEDULE

Rev No	Date	Description	Signature or Typed Name (documentation on file).			
			Prepared by	Checked by	Reviewed by	Approved by
1	3/5/16	Draft for Comment	A Patterson Horner	W Hodson	W Hodson	D Parkinson
2	16/5/16	Draft	A Patterson Horner	W Hodson	W Hodson	D Parkinson

Hastings District Council

Howard Street Development Wastewater Servicing Assessment

CONTENTS

LIST OF TABLES

Status: Draft
Project No.: 80508167 0112
May 2016
Our ref: Howard WW Servicing Report V3.docx

LIST OF FIGURES

APPENDICES

1 Introduction

The Howard Street area is currently designated as Plains zone in the HDC District Plan. The Heretaunga Plains Urban Development Study (HPUDS) has identified Howard Street for residential development however it currently sits outside the 10 year period of the Long Term Plan (LTP).

A review of HDCs strategic timeframes for residential development, coupled with increased developer demand, has brought forward the need to evaluate infrastructure requirements for servicing this development area.

The purpose of this report is to discuss HDCs preferred wastewater servicing options for the area and provide a recommendation for servicing the proposed development in the most effective and efficient manner.

2 Background

A retirement village is proposed on the northern side of the study area and the developer is keen to proceed with development in the near future. Wastewater capacity is significantly constrained in this area and there is no spare capacity to enable the retirement village to proceed without substantial investment in new infrastructure. This development is a catalyst for assessing the full Howard Street servicing needs so that the future anticipated demand can be planned and coordinated with Councils existing and future programme of work.

An assessment of alternative servicing options was carried out by MWH using HDCs wastewater network model. The modelling assessment identified a public pump station and rising main discharging to the Park Road rising main as the preferred option.

Refer to *'Howard Street Development Assessment'* report for further details.

3 Pump Station and Rising Main Servicing Solution

A pump station and rising main has been identified as the only feasible and cost effective solution for servicing the Howard Street development due to the location of existing wastewater infrastructure, topography of the land and other key features including streams. In addition to this it was identified from the assessment that flows from the new development must ultimately discharge into the Park Road trunk rising main as the only alternative catchment (Hood Street) would require significant downstream upgrades to existing pump stations, rising mains and gravity sewer network.

The advantages of servicing the area with a single HDC owned and operated pump station and rising main are:

- A single pump station and rising main will be constructed to service the full potential development area (potentially extending to the Riverslea drain).
- Park Road Rising main and associated pump stations currently require renewal and upgrade to maintain performance and meet level of service requirements. Investigations for this are currently underway including a requirement to accommodate the proposed Howard Street system discharge into the Park Road Rising main project ensuring there are no downstream constraints, i.e. no downstream network upgrades will be required that are not already programmed.
- HDC will own, operate and maintain the proposed pump station and rising main. HDC operations are currently well equipped to manage wastewater assets to ensure asset life is maximised and assets are operated efficiently by effectively managing flows.
- Operation can be managed in conjunction with the wider sewer network which will enable effective management of flows.
- The pump station will be maintained under HDCs existing water services maintenance contract, this will ensure consistency of maintenance across the HDC network and cost efficiency.
- HDC will be able to dictate the quality and specification of infrastructure installed and reinstatement within the public road reserve.
- The pump station can be designed to cater for the full area of potential development in Howard Street.
- The pump station may also be utilised to relieve existing level of service issues within the wider catchment i.e. the Louie Street catchment, and improve network operability and reduce the risk of overflows.
- It is not feasible or practical to allow individual developers to develop standalone solutions and from a planning perspective, Council is required to ensure a servicing solution is in place for the entire development area. A Council solution is therefore considered to be the most appropriate approach.

4 Concept Options

Concept options have been considered to service the Howard Street development with a single pump station and rising main. The options have been promulgated from the modelling report '*Howard Street Development Assessment'*.

4.1 Rising Main Routes

Three rising main routes from the proposed Howard Street development to the Park Road rising main have been identified as shown in the figure below.

Figure 4-1: Proposed Rising Main and Pumpstation Options

4.1.1 Howard Street

The Howard Street alignment includes the proposed rising main located within the berm along the rural section of Howard Street moving into the footpath/parking lane through to Windsor Ave. A short section of rising main will be required within the traffic lane on Windsor Ave between Howard Street and St Aubyn Street before turning into St Aubyn Street within the parking lane and discharging at the Park Road intersection.

A more direct route along Howard Street and then through private property to Park Road was considered. This option however has been dismissed due to the following issues and constraints:

- Existing structures and features within private property,
- Land owner negotiations required with multiple landowners,
- Land purchase and/or easements required,
- Difficulty associated within any access for ongoing operational purposes in the future.

4.1.2 Heretaunga Street

The Heretaunga Street alignment starts on Havelock Road near the Riverslea drain and is located in the live traffic lane through to the Park Road intersection. An alternative for this option is utilising the planned stromwater swale corridor along the Havelock Road frontage. This would enable the location of the rising main from the Riverslea drain to the existing urban edge of Hastings to be located within the greenfield buffer strip.

4.1.3 Greenfield Route

This alignment utilises a greenfield corridor within the zoned development area and the Parkvale School field. A route through either 309 or 311 Windsor Ave is required prior to entering Windosr Ave. A short section of rising main will be required within the traffic lane on Windsor Ave near the St Aubyn Street intersection before turning into St Aubyn Street within the parking lane and discharging at the Park Road intersection.

The route through private property will require further investigation including a site assessment.

This route will require Council to negotiate with existing land owners and purchase land or obtain easements.

4.2 Design Considerations

The following items would require confirmation during detail design of any of the rising main alignments.

1) The Park Road rising main is approximately 1.6km in length with six existing pump stations contributing to the rising main via manifolds. The addition of a seventh pump station will further increase the complexity of the network and operational difficulties associated with operating the pump stations together in an efficient manner. This addition is likely to require an upgrade of the telemetry and control systems to allow advanced real time monitoring and control of each pump station.

2) Discharge point and arrangement into the Park Road rising main. Options include:

   a) Discharge to gravity network directly upstream (approximately 20m) of the existing Park Road North pump station. The capacity of the existing pump station would be reviewed as part of the Park Road rising main investigation and would incorporate the Howard Street development flows.

   b) Discharge directly into the Park Road rising main with a manifold, similar to the other pump stations currently connected to the rising main.

3) Construction method. Two options are available open cut construction or trenchless construction via horizontal directional drilling (HDD). Trenchless construction is preferable as it minimises disruption to the community and road users, minimises the extent of surface reinstatement required and is expected to be the most cost effective construction method. There is however a risk associated with HDD that dips may occur within the rising main. A long-section profile and the potential impacts of dips within the line on operation i.e. air pockets will need to be considered during the detail design phase.

4.3 Pump Station

Preliminary modelling has indicated that a pump station capable of discharging approximately 10l/s in a duty assist arrangement is required for the potential development area. An 1800mm diameter precast manhole would be suitable to operate as a wetwell with submersible pumps. Preliminary assessments indicate 6hrs of average dry weather flow (ADWF) storage should be available within the pump station wetwell chamber and gravity sewer network that will be required within the development area. Offline storage has not currently been allowed for.

Key assumptions associated with the assessment of the proposed pump station include:

- Power is or will be available at the site.
- An emergency standby generator will not be permanently required on site. In an emergency or prolonged power failure situation HDC would utilise one of their portable generators which are currently used for existing pump stations of this scale within the network.
- There is adequate public land within the road reserve to accommodate the required pump station on Howard Street therefore no land purchase would be required. The pump station would need to be constructed within the road or berm area. The berm is preferable however would also need to accommodate the existing roadside drainage channel and existing overhead power (eastern site only).

Four potential pump station locations have been identified. See Figure 4.1 above.

4.3.1 Howard East Pump Station

This pump station would be located on the far eastern edge of the potential development area, adjacent to the Riverslea drain effectively the lowest corner. This location would minimise the depth of contributing gravity sewer and the pump station wetwell itself (approximately 3.5m maximum) however there is likely to be ground water and stability issues that would require mitigation being located so near an existing waterway, the Riverslea drain.

This location would require approximately 1.2km of associated sewer rising main.

4.3.2 Howard West Pump Station

This pump station would be located approximately midway along the potential development area between 1239 and 1245 Howard Street. This location would likely require a deeper pump station, 4-4.5m however would reduce the total length of rising main required. This location does not have any risks associated with proximity to the Riverslea drain, and should still be relatively favourable for the gravity system to discharge. The gravity sewers constructed for part of the development would need to be deeper. This site is located on the urban/rural edge of the opposite side of the road and is well located to also service the existing Howard Street catchment if HDC choose to divert some of the Louie Street catchment.

This location would require approximately 0.9km of associated sewer rising main.

4.3.3 Heretaunga Pump Station

This pump station would be located adjacent to the Riverslea drain on the southern side (Heretaunga Street/Havelock Road) of the proposed development. For a pump station to be located on the south side of the development it is likely land purchase would be required unless the pump station was located beneath the concrete Havelock North cycleway which is not favourable. In addition to the likely requirement of land purchase this areas is low lying and in close proximity to the Riverslea drain which are likely to create both construction and operational/inflow and infiltration issues.

This location would require approximately 1km of associated sewer rising main.

4.3.4 Greenfield Pumpstation

This pump station would be located within the proposed development area. Exact location would be dependent upon a firm structure plan and actual development layout in the future. This would ideally link with internal roading within the development area for ease of access for operational activities.

This location would require approximately 0.9km of associated sewer rising main within both public and private property.

5 Advantages and Disadvantages

5.1 Rising Main Route

The table below compares the advantages and disadvantages of the four feasible rising main routes to the Park Road rising mains from the Howard Street development.

5.1.1 Howard Street

Table 5-1: Howard Street Rising Main Route Summary Table

Advantages	Disadvantages
Approximately a third of the rising main length is located within the rural berm	A short section of rising main within Windsor Ave will have to be located within the traffic lane to avoid other services.
A desktop review of ground conditions indicate this route is favourable for trenchless construction. Trenchless construction is preferable as it is expected to reduce the contract period, level of disruption to the community, traffic management required and reinstatement required. Overall the advantages associated with trenchless construction is expected to reduce the total project cost.	Construction works will impact Parkvale school however this can be minimised through good construction management and communication with affected parties to minimise the extent and duration of disruption.
This route enables HDC the opportunity to divert part or all of the Louie Street catchment if desired.	Long rising main required, approximately 1.2km, however could be reduced to 0.9km if the pump station located more centrally along the potential development extent, with deeper sewers within the development (if development extends further to the south).
Manual traffic control required is likely to be limited to the short Windsor Ave section.	Two changes of direction required.
The development will discharge into the Park Road rising main at the most feasible downstream location potentially reducing the extent of upgrade required to the existing Park Road rising main network.	This alignment does effect the Windsor Ave / St Aubyn Street intersection which was reconstructed in recent years.
Limited service crossings required. Those that are required do not include any major infrastructure.	
The existing gravity sewer on St Aubyn Street is due for renewal due to structural failure. These renewal works could be coordinated with the rising main construction.	

5.1.2 Heretaunga Street

Table 5-2: Heretaunga Street Rising Main Route Summary Table

Advantages	Disadvantages
Shorter length of rising main required, approximately 1km	High traffic volumes along Heretaunga Street and the Havelock Road that would require management.
The pump station and rising main would be located in the lowest lying area of the proposed development. This may minimise the depth of the gravity sewer network required within the development area.	The development will discharge into the Park Road rising main to the upper section of the Park Road rising main, this could potentially increase the extent of upgrade required to the existing Park Road rising main network.
	Service crossings of high pressure gas, fibre optic and high voltage power would be required.
	A significant number of services are located along this route. The only available corridor for the full length of rising main required would be within the live traffic lane, with safety issues for construction and also on-going operation and maintenance.
	Approximately half the total length of the proposed rising main route has recently been resurfaced as part of the Havelock Road cycleway project. This would require reinstatement of new pavement/surfacing, disruption to the community again and loss of face politically for HDC.
	This route does not give HDC the ability to reroute any other catchments with existing level of service issues.

5.1.3 Heretaunga Street Alternative Route

Table 5-3: Heretaunga Street Rising Main Alternative Route Summary Table

Advantages	Disadvantages
Shorter length of rising main required, approximately 1km	High traffic volumes along Heretaunga Street and the Havelock Road that would require management.
The pump station and rising main would be located in the lowest lying area of the proposed development. This may minimise the depth of the gravity sewer network required within the development area.	The development will discharge into the Park Road rising main to the upper section of the Park Road rising main, this could potentially increase the extent of upgrade required to the existing Park Road rising main network.
Approximately 570m of the rising main would be located within the stormwater swale corridor which would enable efficient dual use of the land.	Service crossings of high pressure gas, fibre optic and high voltage power would be required.
	A significant number of services are located along this route. The only available corridor for the full length of rising main required would be within the live traffic lane, with issues for construction and also on-going operation and maintenance.
	This route does not give HDC the ability to reroute any other catchments with existing level of service issues.
	Progressive Enterprises owns the land and would like to develop a supermarket within the proposed stormwater and rising main corridor, approximately 170m.

5.1.4 Greenfield Site

Table 5-4: Greenfield Rising Main Route Summary Table

Advantages	Disadvantages
Approximately 0.9km the rising main is required.	Two changes of direction required.
A desktop review of ground conditions indicate this route is favourable for trenchless construction. Trenchless construction is preferable as it is expected to reduce the contract period, level of disruption to the community, traffic management required and reinstatement required. Overall the advantages associated with trenchless construction is expected to reduce the total project cost.	The rising main will pass through private property which will required easement or land purchase. An 80m section of private property has existing dwellings which restricts width of the construction corridor and access for maintenance. Future development may be restricted over or near the rising main and access is required for operation and maintenance activities.
Approximately 400m of the rising main will be located in greenfields.	A short section of rising main within Windsor Ave will have to be located within the traffic lane to avoid other services.
Manual traffic control required is likely to be limited to the short Windsor Ave section.	This alignment does effect the Windsor Ave and the Windsor Ave / St Aubyn Street intersection which was reconstructed in recent years.
The development will discharge into the Park Road rising main at the most feasible downstream location potentially reducing the extent of upgrade required to the existing Park Road rising main network.	
Limited service crossings required. Those that are required do not include any major infrastructure.	
The existing gravity sewer on St Aubyn Street is due for renewal due to structural failure. This renewal works could be coordinated with the rising main construction.	

5.2 Pump Station Location

Table 5-5: Pump Station Location

Pump station Location	Advantage	Disadvantage
Western Howard St Pump Station	• 0.9 km of rising main required • Favourable location for servicing part of the Louie catchment if required. • Favourable location for servicing the proposed development area. • Construction within the road reserve/berm • Preliminary assessments indicate there will be appropriate storage within the wetwell and anticipated gravity network.	• Existing road side drain likely to make construction within the berm difficult. Diversion or civil works associated with the drain are likely to be required • Deeper pump station required, approximately 4.5 - 5m, and deeper gravity sewers within the development particularly the area that could be potentially developed in the future.
Eastern Howard St Pump Station	• Likely to be most favourable for gravity network required within proposed and potential development area • Depth of pump station required, approximately 3.5 - 4m. • Construction within the road reserve/berm	• Adjacent to stream • 1.2km of rising main required • Existing road side drain • Low slung overhead power lines likely to require undergrounding or construction of pump station in the road or land purchase required • Offline storage more likely to be required
Heretaunga St Pump Station	• Depth of pump station required, approximately 3.5 - 4m.	• Low lying land locked area adjacent to stream. • Likely to require land purchase • 1km of rising main along major arterial road • Difficult to access for maintenance activities due to existing cycleway facilities • Offline storage more likely to be required
Greenfields Pump Station	• 0.9 km of rising main required • Favourable location for servicing the proposed development area. • Preliminary assessments indicate there will be appropriate storage within the wetwell and anticipated gravity network. • Construction within greenfields area.	• Will require land purchase and/or easement. • Deeper pump station required, approximately 4.5 - 5m, and deeper gravity sewers within the development particularly the area that could be potentially developed in the future. • The internal arrangement within the proposed development area would need to accommodate the pump station particularly for operational access.

6 Cost Estimates

Preliminary cost estimates have been developed for each of the pump station and rising main servicing solutions discussed within this report.

The cost estimates include a 25% contingency sum and compare trenchless and open cut construction methods.

Table 6-1: Cost Estimate Summary

Option	Pump station	Rising Main	Total
Howard Street, Eastern Pump station, Open Cut	$ 250,000.00	$ 380,840.00	$ 630,840.00
Howard Street, Eastern Pump station, Trenchless	$ 250,000.00	$ 272,890.00	$ 522,890.00
Howard Street, Western Pump station, Open Cut	$ 275,000.00	$ 350,740.00	$ 625,740.00
Howard Street, Western Pump station, Trenchless	$ 275,000.00	$ 257,840.00	$ 532,840.00
Heretaunga Street, Open Cut	$ 280,000.00	$ 414,200.00	$ 694,200.00
Heretaunga Street, Trenchless	$ 280,000.00	$ 339,200.00	$ 619,200.00
Greenfields Pump station, Open Trench	$ 300,000.00	$ 313,600.00	$ 613,600.00
Greenfields Pump station, Trenchless	$ 300,000.00	$ 215,700.00	$ 515,700.00

Note cost estimates accuracy is +30/-10%.

See Appendix A for a further detail of cost estimates.

A rough order estimate is summarised below for additional items that may be required.

Table 6-2: Rough Order Cost Estimate Summary

Item	ROC ($)
Emergency standby generator (permanently located on site)	$40,000
Power Supply (assuming a transformer upgrade is required).	$50,000
Land Purchase (for Pumpstation site)	$40,000
Easements (required if rising main situated in private property)	$40,000
Offline Storage (20m3)	$40,000
Professional Service Fees	$200,000
Contingency and Management Contingency	$150,000

Note the above cost estimates do not include:

- Associated gravity sewers that will be required to service any development. It is anticipated these gravity sewers will be designed to meet HDC Code of Practice and are compatible with the preferred pump station option. The preferred pump station location is deemed the most efficient and cost effective for the current development area. There is however likely to be additional costs associated with any gravity sewers required in the area marked for potential development in the future, due to depth required to connect to the preferred pump station location. These costs however have not been considered as they may not eventuate and if they do will be borne by a private developer well into the future.

7 Recommendation

Two reasonable servicing options have been identified, the greenfield or the Howard Street west pumpstations and associated rising mains.

For planning and funding purposes it is recommended HDC budget **$1,200,000**. This sum allows for open cut excavation of the rising main until site investigations and a geotechnical assessment with drillers is carried out and drilling is confirmed as a feasible low risk option. It is also includes all other ancillary items as listed in Table 6-2.

It is recommended HDC advance structure planning including any required designations considering these two wastewater servicing options. It is recommended the structure plan allow for a suitable public location for the greenfields pumpstation option i.e. road reserve. Any structure planning would have minimal impact on the Howard Street west option.

It is recommended HDC liaise with developers to confirm the proposed pump station location(s) and depth is compatible with the gravity sewer network required within the development.

Appendix A Cost Estimates

Schedule of Price Options

Option	Pumpstation	Rising Main	Total
Howard St, Eastern PS, Open Cut	$ 250,000.00	$ 380,840.00	$ 630,840.00
Howard St, Eastern PS, Trenchless	$ 250,000.00	$ 272,890.00	$ 522,890.00
Howard St, Western PS, Open Cut	$ 275,000.00	$ 350,740.00	$ 625,740.00
Howard St, Western PS, Trenchless	$ 275,000.00	$ 257,840.00	$ 532,840.00
Heretaunga St, Open Cut	$ 280,000.00	$ 414,200.00	$ 694,200.00
Heretaunga St, Trenchless	$ 280,000.00	$ 339,200.00	$ 619,200.00
Greenfields PS, Open Trench	$ 300,000.00	$ 313,600.00	$ 613,600.00
Greenfields PS, Directional Drill	$ 300,000.00	$ 215,700.00	$ 515,700.00

Contract No: N/A
Contract Name: Howard Street Eastern Pumpstation

Item	Description	Unit	Quantity	Rate $	Price $
100	**PRELIMINARY AND GENERAL**				
101	**Establishment and disestablishment**	LS	1	$ 15,000.00	$ 15,000.00
102	**Traffic management plan**	LS	1	$ 1,000.00	$ 1,000.00
103	**On site traffic management**	LS	1	$ 5,000.00	$ 5,000.00
104	**Safety plan**	LS	1	$ 1,000.00	$ 1,000.00
105	**On site safety management**	LS	1	$ 3,500.00	$ 3,500.00
106	**Survey control and setting out**	LS	1	$ 2,500.00	$ 2,500.00
107	**Consultation and liaison with effected parties**	LS	1	$ 1,000.00	$ 1,000.00
108	**Supply As built information**	LS	1	$ 4,000.00	$ 4,000.00
109	**Contingency sum**	PS	1	$ 50,000.00	$ 50,000.00
	SUBTOTAL				$ 83,000.00
Item	**Description**	**Unit**	**Quantity**	**Rate $**	**Price $**
	SUPPLY AND INSTALL PRE-PACKAGED PUMPSTATION AND VALVE ASSEMBLY				
	1800mm diameter Prefabricated Pump Station Chamber including concrete plug, sump top, concrete lid, heavy duty cover and all penetrations for stub pipes and ducts.	LS	1	$ 75,000.00	$ 75,000.00
	Flygt Pump (5-10l/s) and all associated Pipework and Fittings, including discharge pipework, guide rails, floats, pressure transducer and stilling tube.	each	2	$ 15,000.00	$ 30,000.00
	Supply and Install rectangular valve chamber, concrete lid, and heavy duty cover with non return valve, sluice valve and pipework required to connect chamber to pumpstation.	LS	1	$ 30,000.00	$ 30,000.00
	Commissioning and testing, including providing onsite assitance with telemetry supplies for pump start/stop and testing.	LS	1	$ 2,000.00	$ 2,000.00
	SUPPLY AND INSTALL DUCTING	LS	1	$ 10,000.00	$ 10,000.00
	CONSTRUCT HARDSTAND AREA/LANDSCAPING	LS	1	$ 20,000.00	$ 20,000.00
	SUBTOTAL				$ 167,000.00
	TENDER SUM (Excl GST)				**$ 250,000.00**

Contract No: N/A
Contract Name: Howard Street Western Pumpstation

Item	Description	Unit	Quantity	Rate $	Price $
100	**PRELIMINARY AND GENERAL**				
101	**Establishment and disestablishment**	LS	1	$ 15,000.00	$ 15,000.00
102	**Traffic management plan**	LS	1	$ 1,000.00	$ 1,000.00
103	**On site traffic management**	LS	1	$ 5,000.00	$ 5,000.00
104	**Safety plan**	LS	1	$ 1,000.00	$ 1,000.00
105	**On site safety management**	LS	1	$ 3,500.00	$ 3,500.00
106	**Survey control and setting out**	LS	1	$ 2,500.00	$ 2,500.00
107	**Consultation and liaison with effected parties**	LS	1	$ 1,000.00	$ 1,000.00
108	**Supply As built information**	LS	1	$ 4,000.00	$ 4,000.00
109	**Contingency sum**	PS	1	$ 55,000.00	$ 55,000.00
	SUBTOTAL				$ 88,000.00
Item	**Description**	**Unit**	**Quantity**	**Rate $**	**Price $**
	SUPPLY AND INSTALL PRE-PACKAGED PUMPSTATION AND VALVE ASSEMBLY				
	1800mm diameter Prefabricated Pump Station Chamber including concrete plug, sump top, concrete lid, heavy duty cover and all penetrations for stub pipes and ducts.	LS	1	$ 85,000.00	$ 85,000.00
	Flygt Pump (5-10l/s) and all associated Pipework and Fittings, including discharge pipework, guide rails, floats, pressure transducer and stilling tube.	each	2	$ 20,000.00	$ 40,000.00
	Supply and Install rectangular valve chamber, concrete lid, and heavy duty cover with non return valve, sluice valve and pipework required to connect chamber to pumpstation.	LS	1	$ 30,000.00	$ 30,000.00
	Commissioning and testing, including providing onsite assitance with telemetry supplies for pump start/stop and testing.	LS	1	$ 2,000.00	$ 2,000.00
	SUPPLY AND INSTALL DUCTING	LS	1	$ 10,000.00	$ 10,000.00
	CONSTRUCT HARDSTAND AREA/LANDSCAPING	LS	1	$ 20,000.00	$ 20,000.00
	SUBTOTAL				$ 187,000.00
	TENDER SUM (Excl GST)				**$ 275,000.00**

Schedule of Prices

Contract No: N/A

Contract Name: Howard Street Rising Main with Eastern Pumpstation Location

				Open Cut Construction		Trenchless Construction	
Item	Description	Unit	Quantity	Rate $	Price $	Rate $	Price $
100	**PRELIMINARY AND GENERAL**						
101	**Establishment and disestablishment**	LS	1	$ 18,000.00	$ 18,000.00	$ 12,500.00	$ 12,500.00
102	**Traffic management plan**	LS	1	$ 1,000.00	$ 1,000.00	$ 1,000.00	$ 1,000.00
103	**On site traffic management**	LS	1	$ 26,500.00	$ 26,500.00	$ 10,000.00	$ 10,000.00
104	**Safety plan**	LS	1	$ 1,000.00	$ 1,000.00	$ 1,000.00	$ 1,000.00
105	**On site safety management**	LS	1	$ 6,250.00	$ 6,250.00	$ 5,000.00	$ 5,000.00
106	**Survey control and setting out**	LS	1	$ 2,500.00	$ 2,500.00	$ 2,500.00	$ 2,500.00
107	**Consultation and liaison with effected parties**	LS	1	$ 2,500.00	$ 2,500.00	$ 2,500.00	$ 2,500.00
108	**Supply As built information**	LS	1	$ 6,000.00	$ 6,000.00	$ 6,000.00	$ 6,000.00
109	**Contingency sum**	PS	1	$ 75,000.00	$ 75,000.00	$ 50,000.00	$ 50,000.00
	SUBTOTAL				$ 138,750.00		$ 90,500.00
Item	Description	Unit	Quantity	Rate $	Price $	Rate $	Price $
	Sewer Pressure Main Works						
	Supply and lay Sewer Pressure mains						
	Supply and lay 100mm PVC or PE pressure main (in berm)	m	451	$ 100.00	$ 45,100.00	$ 50.00	$ 22,550.00
	Supply and lay 100mm PVC or PE pressure main (in urban footpath and Berm)	m	426	$ 150.00	$ 63,900.00	$ 100.00	$ 42,600.00
	Supply and lay 100mm PVC or PE pressure main in Road	m	317	$ 170.00	$ 53,890.00	$ 120.00	$ 38,040.00
	Supply and Installation of connections						$ -
	Extra over - service clashes	LS	1	$ 15,000.00	$ 15,000	$ 15,000.00	$ 15,000.00
	Connection into existing sewer on Park Rd (Discharge Manhole)	each	1	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00
	Connection into pumping station	each	1	$ 2,000.00	$ 2,000.00	$ 2,000.00	$ 2,000.00
	Miscellaneous Items						
	Supply and installation of air valves (below ground including manh	each	2	$ 8,000.00	$ 16,000.00	$ 8,000.00	$ 16,000.00
	Supply and installation of Scour valves (below ground including m	each	2	$ 9,500.00	$ 19,000.00	$ 9,500.00	$ 19,000.00
	Supply and install flow meter and chamber	each	1	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00
	Support of Power Poles	each	4	$ 1,800.00	$ 7,200.00	$ 1,800.00	$ 7,200.00
	Supply and installation of air vent poles and ducting	each	2	$ 2,500.00	$ 5,000.00	$ 2,500.00	$ 5,000.00
	SUBTOTAL				$ 242,090.00		$ 182,390.00
	TENDER SUM (Excl GST)				**$ 380,840.00**		**$ 272,890.00**

Schedule of Prices

Contract No: N/A

Contract Name: Howard Street Rising Main with Western Pumpstation Location

				Open Cut Construction		Trenchless Construction	
Item	Description	Unit	Quantity	Rate $	Price $	Rate $	Price $
100	**PRELIMINARY AND GENERAL**						
101	**Establishment and disestablishment**	LS	1	$ 18,000.00	$ 18,000.00	$ 12,500.00	$ 12,500.00
102	**Traffic management plan**	LS	1	$ 1,000.00	$ 1,000.00	$ 1,000.00	$ 1,000.00
103	**On site traffic management**	LS	1	$ 26,500.00	$ 26,500.00	$ 10,000.00	$ 10,000.00
104	**Safety plan**	LS	1	$ 1,000.00	$ 1,000.00	$ 1,000.00	$ 1,000.00
105	**On site safety management**	LS	1	$ 6,250.00	$ 6,250.00	$ 5,000.00	$ 5,000.00
106	**Survey control and setting out**	LS	1	$ 2,500.00	$ 2,500.00	$ 2,500.00	$ 2,500.00
107	**Consultation and liaison with effected parties**	LS	1	$ 2,500.00	$ 2,500.00	$ 2,500.00	$ 2,500.00
108	**Supply As built information**	LS	1	$ 6,000.00	$ 6,000.00	$ 6,000.00	$ 6,000.00
109	**Contingency sum**	PS	1	$ 75,000.00	$ 75,000.00	$ 50,000.00	$ 50,000.00
	SUBTOTAL				$ 138,750.00		$ 90,500.00
Item	Description	Unit	Quantity	Rate $	Price $	Rate $	Price $
	Sewer Pressure Main Works						
	Supply and lay Sewer Pressure mains						
	Supply and lay 100mm PVC or PE pressure main (in berm)	m	150	$ 100.00	$ 15,000.00	$ 50.00	$ 7,500.00
	Supply and lay 100mm PVC or PE pressure main (in urban footpath and Berm)	m	426	$ 150.00	$ 63,900.00	$ 100.00	$ 42,600.00
	Supply and lay 100mm PVC or PE pressure main in Road	m	317	$ 170.00	$ 53,890.00	$ 120.00	$ 38,040.00
	Supply and Installation of connections						
	Extra over - service clashes	LS	1	$ 15,000.00	$ 15,000	$ 15,000.00	$ 15,000.00
	Connection into existing sewer on Park Rd (Discharge Manhole)	each	1	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00
	Connection into pumping station	each	1	$ 2,000.00	$ 2,000.00	$ 2,000.00	$ 2,000.00
	Miscellaneous Items						
	Supply and installation of air valves (below ground including manholes)	each	2	$ 8,000.00	$ 16,000.00	$ 8,000.00	$ 16,000.00
	Supply and installation of Scour valves (below ground including manholes)	each	2	$ 9,500.00	$ 19,000.00	$ 9,500.00	$ 19,000.00
	Supply and install flow meter and chamber	each	1	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00
	Support of Power Poles	each	4	$ 1,800.00	$ 7,200.00	$ 1,800.00	$ 7,200.00
	Supply and installation of air vent poles and ducting	each	2	$ 2,500.00	$ 5,000.00	$ 2,500.00	$ 5,000.00
	SUBTOTAL				$ 211,990		$ 167,340.00
	TENDER SUM (Excl GST)				**$ 350,740**		**$ 257,840.00**

Item 2

Attachment 13

Schedule of Prices

Contract No: N/A

Contract Name: Heretaunga Street/Havelock Road Rising Main

				Open Cut Construction		Trenchless Construction	
Item	Description	Unit	Quantity	Rate $	Price $	Rate $	Price $
100	**PRELIMINARY AND GENERAL**						
101	**Establishment and disestablishment**	LS	1	$ 18,000.00	$ 18,000.00	$ 18,000.00	$ 18,000.00
102	**Traffic management plan**	LS	1	$ 1,000.00	$ 1,000.00	$ 1,000.00	$ 1,000.00
103	**On site traffic management**	LS	1	$ 35,000.00	$ 35,000.00	$ 25,000.00	$ 25,000.00
104	**Safety plan**	LS	1	$ 1,000.00	$ 1,000.00	$ 1,000.00	$ 1,000.00
105	**On site safety management**	LS	1	$ 2,500.00	$ 2,500.00	$ 2,500.00	$ 2,500.00
106	**Survey control and setting out**	LS	1	$ 2,500.00	$ 2,500.00	$ 2,500.00	$ 2,500.00
107	**Consultation and liaison with effected parties**	LS	1	$ 1,000.00	$ 1,000.00	$ 1,000.00	$ 1,000.00
108	**Supply as built information**	LS	1	$ 4,000.00	$ 4,000.00	$ 4,000.00	$ 4,000.00
109	**Contingency sum**	PS	1	$ 85,000.00	$ 85,000.00	$ 70,000.00	$ 70,000.00
	SUBTOTAL				$ 150,000.00		$ 125,000.00
Item	Description	Unit	Quantity	Rate $	Price $	Rate $	Price $
	Sewer Pressure Main Works						
	Supply and lay Sewer Pressure mains						
	Supply and lay 100mm PVC or PE pressure main (in berm)	m	0	$ 100.00			
	Supply and lay 100mm PVC or PE pressure main (in urban footpath and Berm)	m	0	$ 150.00			
	Supply and lay 100mm PVC or PE pressure main in Road	m	1000	$ 170.00	$ 170,000.00	$ 120.00	$ 120,000.00
	Supply and Installation of connections						$ -
	Extra over - service clashes	LS	1	$ 30,000.00	$ 30,000	$ 30,000.00	$ 30,000.00
	Connection into existing sewer on Park Rd (Discharge Manhole)	each	1	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00
	Connection into pumping station	each	1	$ 2,000.00	$ 2,000.00	$ 2,000.00	$ 2,000.00
	Miscellaneous Items						
	Supply and installation of air valves (below ground including manholes)	each	2	$ 8,000.00	$ 16,000.00	$ 8,000.00	$ 16,000.00
	Supply and installation of Scour valves (below ground including manholes)	each	2	$ 9,500.00	$ 19,000.00	$ 9,500.00	$ 19,000.00
	Supply and install fow meter and chamber	each	1	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00
	Support of Power Poles	each	4	$ 1,800.00	$ 7,200.00	$ 1,800.00	$ 7,200.00
	Supply and installation of air vent poles and ducting	each	2	$ 2,500.00	$ 5,000.00	$ 2,500.00	$ 5,000.00
	SUBTOTAL				$ 264,200		$ 214,200.00
	TENDER SUM (Excl GST)				**$ 414,200**		**$ 339,200.00**

Schedule of Prices

Contract No: N/A

Contract Name: Heretaunga Street Pump Station

Item	Description	Unit	Quantity	Rate $	Price $
100	**PRELIMINARY AND GENERAL**				
101	**Establishment and disestablishment**	LS	1	$ 15,000.00	$ 15,000.00
102	**Traffic management plan**	LS	1	$ 1,000.00	$ 1,000.00
103	**On site traffic management**	LS	1	$ 5,000.00	$ 5,000.00
104	**Safety plan**	LS	1	$ 1,000.00	$ 1,000.00
105	**On site safety management**	LS	1	$ 3,500.00	$ 3,500.00
106	**Survey control and setting out**	LS	1	$ 2,500.00	$ 2,500.00
107	**Consultation and liaison with effected parties**	LS	1	$ 1,000.00	$ 1,000.00
108	**Supply As built information**	LS	1	$ 4,000.00	$ 4,000.00
109	**Contingency sum**	PS	1	$ 50,000.00	$ 50,000.00
	SUBTOTAL				$ 83,000.00
Item	**Description**	**Unit**	**Quantity**	**Rate $**	**Price $**
	SUPPLY AND INSTALL PRE-PACKAGED PUMPSTATION AND VALVE ASSEMBLY				
	1800mm diameter Prefabricated Pump Station Chamber including concrete plug, sump top, concrete lid, heavy duty cover and all penetrations for stub pipes and ducts.	LS	1	$ 75,000.00	$ 75,000.00
	Flygt Pump (5-10l/s) and all associated Pipework and Fittings, including discharge pipework, guide rails, floats, pressure transducer and stilling tube.	each	2	$ 15,000.00	$ 30,000.00
	Supply and Install rectangular valve chamber, concrete lid, and heavy duty cover with non return valve, sluice valve and pipework required to connect chamber to pumpstation.	LS	1	$ 30,000.00	$ 30,000.00
	Commissioning and testing, including providing onsite assitance with telemetry supplies for pump start/stop and testing.	LS	1	$ 2,000.00	$ 2,000.00
	SUPPLY AND INSTALL DUCTING	LS	1	$ 10,000.00	$ 10,000.00
	CONSTRUCT HARDSTAND AREA/LANDSCAPING	LS	1	$ 20,000.00	$ 20,000.00
	LAND PURCHASE	LS	1	$ 30,000.00	$ 30,000.00
	SUBTOTAL				$ 197,000.00
	TENDER SUM (Excl GST)				**$ 280,000.00**

Schedule of Prices

Contract No: N/A

Contract Name: Greenfield Pumpstation

Item	Description	Unit	Quantity	Rate $	Price $
100	**PRELIMINARY AND GENERAL**				
101	**Establishment and disestablishment**	LS	1	$ 15,000.00	$ 15,000.00
102	**Traffic management plan**	LS	1	$ 1,000.00	$ 1,000.00
103	**On site traffic management**	LS	1	$ 5,000.00	$ 5,000.00
104	**Safety plan**	LS	1	$ 1,000.00	$ 1,000.00
105	**On site safety management**	LS	1	$ 3,500.00	$ 3,500.00
106	**Survey control and setting out**	LS	1	$ 2,500.00	$ 2,500.00
107	**Consultation and liaison with effected parties**	LS	1	$ 1,000.00	$ 1,000.00
108	**Supply As built information**	LS	1	$ 4,000.00	$ 4,000.00
109	**Contingency sum**	PS	1	$ 50,000.00	$ 50,000.00
	SUBTOTAL				$ 83,000.00
Item	**Description**	**Unit**	**Quantity**	**Rate $**	**Price $**
	SUPPLY AND INSTALL PRE-PACKAGED PUMPSTATION AND VALVE ASSEMBLY				
	1800mm diameter Prefabricated Pump Station Chamber including concrete plug, sump top, concrete lid, heavy duty cover and all penetrations for stub pipes and ducts.	LS	1	$ 85,000.00	$ 85,000.00
	Flygt Pump (5-10l/s) and all associated Pipework and Fittings, including discharge pipework, guide rails, floats, pressure transducer and stilling tube.	each	2	$ 20,000.00	$ 40,000.00
	Supply and Install rectangular valve chamber, concrete lid, and heavy duty cover with non return valve, sluice valve and pipework required to connect chamber to pumpstation.	LS	1	$ 30,000.00	$ 30,000.00
	Commissioning and testing, including providing onsite assitance with telemetry supplies for pump start/stop and testing.	LS	1	$ 2,000.00	$ 2,000.00
	SUPPLY AND INSTALL DUCTING	LS	1	$ 10,000.00	$ 10,000.00
	CONSTRUCT HARDSTAND AREA/LANDSCAPING	LS	1	$ 20,000.00	$ 20,000.00
	LAND PURCHASE	LS	1	$ 30,000.00	$ 30,000.00
	SUBTOTAL				$ 217,000.00
	TENDER SUM (Excl GST)				**$ 300,000.00**

Schedule of Prices

Contract No: N/A

Contract Name: Greenfield Rising Main and Pumpstation Location

				Open Cut Construction		Trenchless Construction	
Item	Description	Unit	Quantity	Rate $	Price $	Rate $	Price $
100	**PRELIMINARY AND GENERAL**						
101	**Establishment and disestablishment**	LS	1	$ 18,000.00	$ 18,000.00	$ 12,500.00	$ 12,500.00
102	**Traffic management plan**	LS	1	$ 1,000.00	$ 1,000.00	$ 1,000.00	$ 1,000.00
103	**On site traffic management**	LS	1	$ 12,000.00	$ 12,000.00	$ 6,000.00	$ 6,000.00
104	**Safety plan**	LS	1	$ 1,000.00	$ 1,000.00	$ 1,000.00	$ 1,000.00
105	**On site safety management**	LS	1	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00
106	**Survey control and setting out**	LS	1	$ 2,500.00	$ 2,500.00	$ 2,500.00	$ 2,500.00
107	**Consultation and liaison with effected parties**	LS	1	$ 3,500.00	$ 3,500.00	$ 3,500.00	$ 3,500.00
108	**Supply as built information**	LS	1	$ 6,000.00	$ 6,000.00	$ 6,000.00	$ 6,000.00
109	**Contingency sum**	PS	1	$ 60,000.00	$ 60,000.00	$ 40,000.00	$ 40,000.00
	SUBTOTAL				$ 109,000.00		$ 77,500.00
Item	Description	Unit	Quantity	Rate $	Price $	Rate $	Price $
	Sewer Pressure Main Works						
	Supply and lay Sewer Pressure mains						
	Supply and lay 100mm PVC or PE pressure main (greenfields)	m	400	$ 80.00	$ 32,000.00	$ 40.00	$ 16,000.00
	Supply and lay 100mm PVC or PE pressure main (in private property)	m	80	$ 200.00	$ 16,000.00	$ 120.00	$ 9,600.00
	Supply and lay 100mm PVC or PE pressure main in Road	m	380	$ 170.00	$ 64,600.00	$ 120.00	$ 45,600.00
	Supply and Installation of connections						
	Extra over - service clashes	LS	1	$ 10,000.00	$ 10,000	$ 10,000.00	$ 10,000.00
	Connection into existing sewer on Park Rd (Discharge Manhole)	each	1	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00
	Connection into pumping station	each	1	$ 2,000.00	$ 2,000.00	$ 2,000.00	$ 2,000.00
	Miscellaneous Items						
	Supply and installation of air valves (below ground including manholes)	each	2	$ 8,000.00	$ 16,000.00	$ 8,000.00	$ 16,000.00
	Supply and installation of Scour valves (below ground including manholes)	each	2	$ 9,500.00	$ 19,000.00	$ 9,500.00	$ 19,000.00
	Supply and install flow meter and chamber	each	1	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00
	Support of Power Poles	each	0	$ 1,800.00	$ -	$ 1,800.00	$ -
	Supply and installation of air vent poles and ducting	each	2	$ 2,500.00	$ 5,000.00	$ 2,500.00	$ 5,000.00
	Easement	LS	1	$ 25,000.00	$ 25,000.00	$ 25,000.00	$ 25,000.00
	SUBTOTAL				$ 204,600		$ 138,200.00
	TENDER SUM (Excl GST)				**$ 313,600**		**$ 215,700.00**

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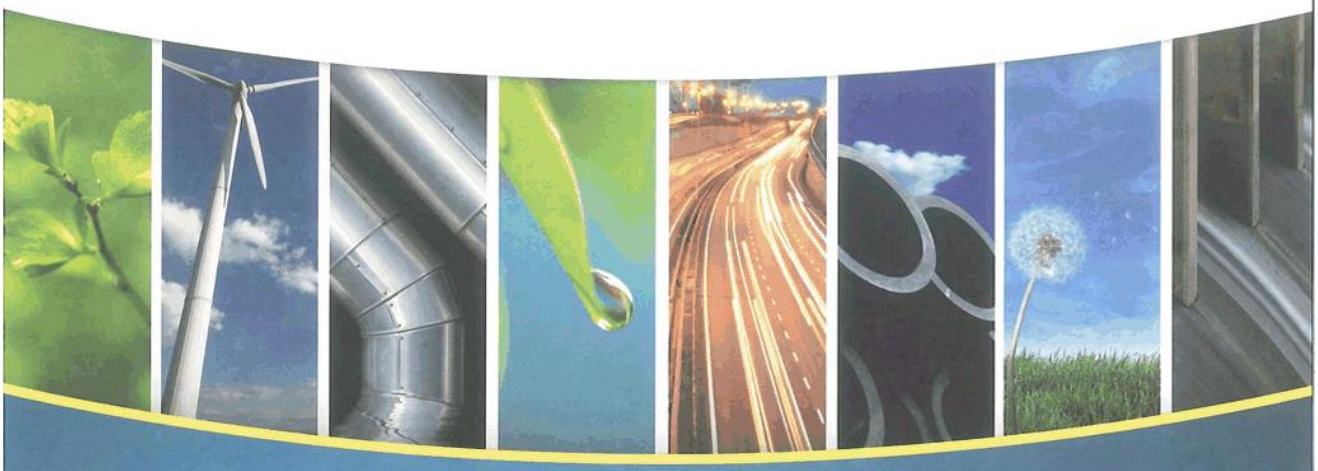

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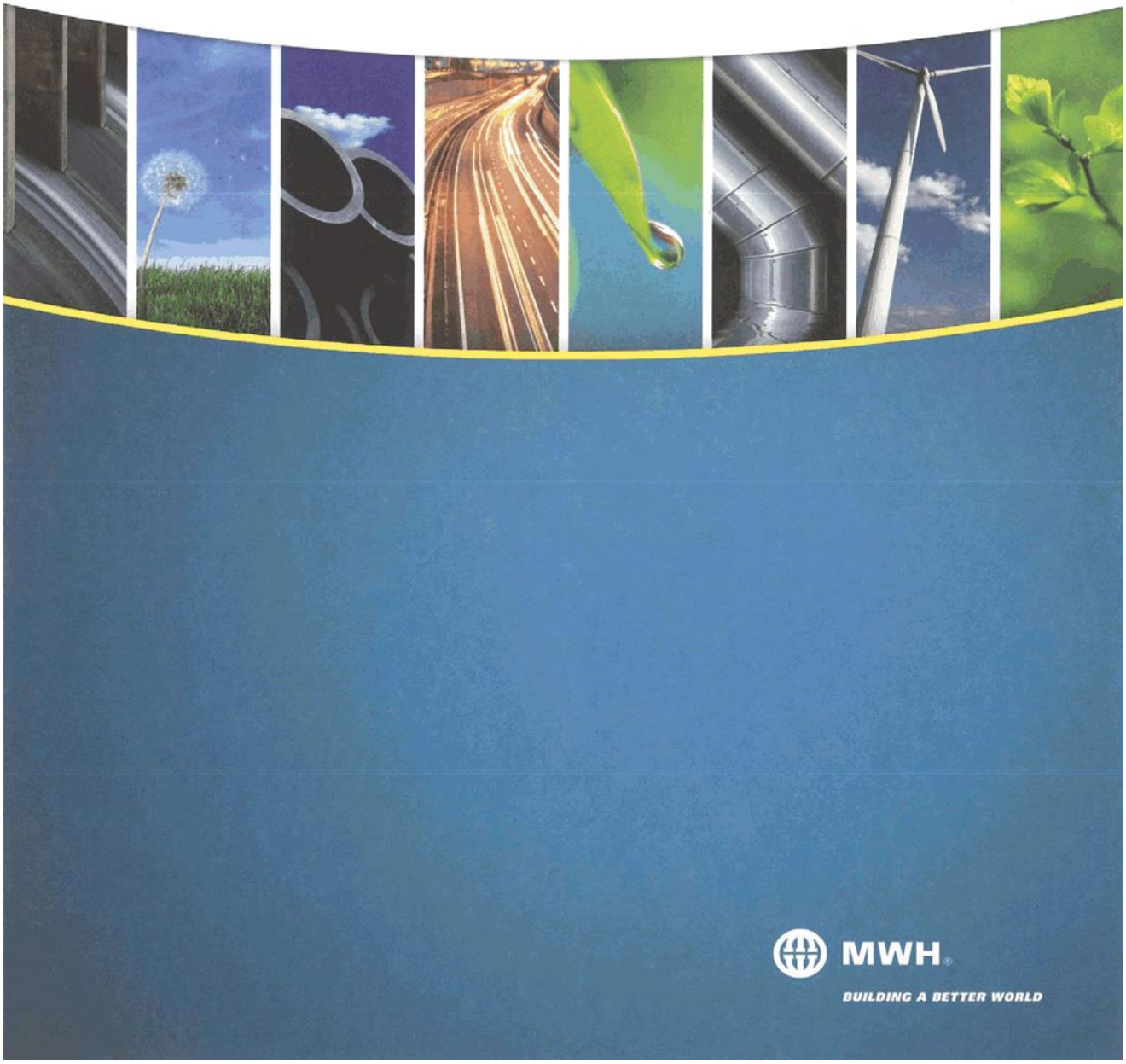
BUILDING A BETTER WORLD

Howard Street Housing Development
Transport Impact Assessment

Hastings District Council

APRIL 2016



QUALITY STATEMENT

PROJECT MANAGER	PROJECT TECHNICAL LEAD
Joanna Davenport	Shane Turner

PREPARED BY			
Shaun Bosher	.....	.....	14/04/2016
CHECKED AND REVIEWED BY			
Shane Turner	.....	.....	14/04/2016
APPROVED FOR ISSUE BY			
Shane Turner	.....	.....	14/04/2016

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REVISION SCHEDULE

Rev No	Date	Description	Signature or Typed Name (documentation on file).		
			Prepared by	Checked and Reviewed by	Approved by
1	April 16	Final	S Bosher	S Turner	S Turner

Hastings District Council

Howard Street Housing Development

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APPENDICES

1 Introduction

Hastings District Council (HDC) has brought forward into their current 2015-25 Long Term Plan (LTP) the possibility of rezoning rural land in between Howard Street and Havelock Road, in the southwest of Hastings. Residential development of this land is expected if the land is rezoned from its current 'Plains Production' designation to 'Hastings General Residential'.

This report has been prepared on behalf of HDC to provide a description of the existing transportation environment, outline any known details of the proposed development for Howard Street and evaluate the impacts of this development on two nearby intersections. It is not a full Traffic Impact Assessment and sits below that level of investigation.

2 Proposed Development Site

The proposed greenfield residential housing development is located south-east of Hastings CBD. It adjoins Havelock Road, which is the main road route between Hastings and Havelock North. No access is proposed from Havelock Road, only Howard Street. Figure 2-1 presents an aerial view of the proposed development site.

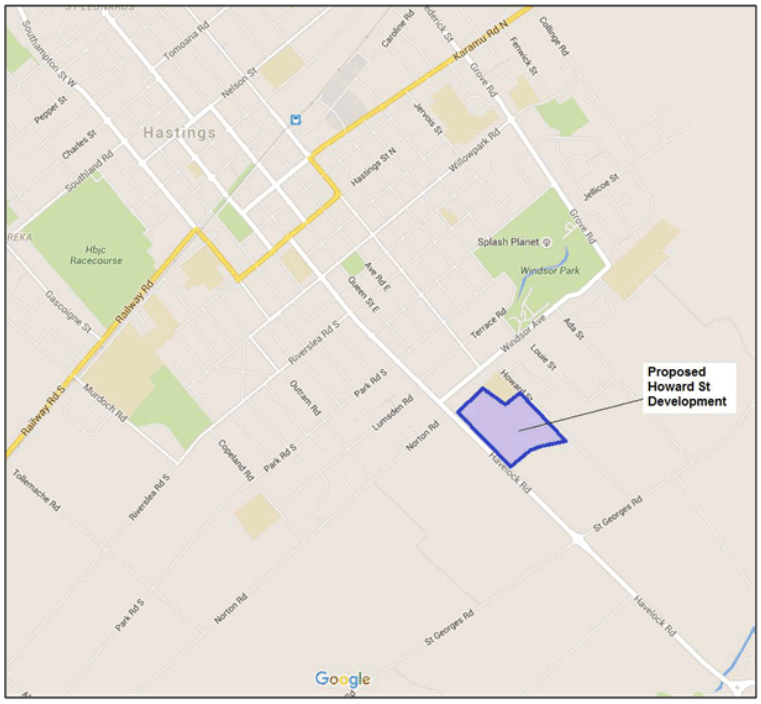


Figure 2-1: Proposed Development Site

3 Existing Transport Environment

3.1 Road Network

Access to the proposed development is via Howard Street only. The majority of traffic generated will be travelling to and from Hastings CBD using Windsor Avenue and St Aubyn Street East. Hence the

focus of this section is on these three roads. The lower flow movements to Havelock North will be via St Georges Road and either Havelock Road or Ada Street. The traffic effects on these roads and intersections are expected to be minor.

3.1.1 Howard Street

Howard Street is classified as a 'District Collector Route' by HDC. The speed limit changes from 80 km/h to 50 km/h 500m south of Windsor Avenue, with the 80km/h speed zone designated as a 'Safer Speed Area' and is signed as such. It is a two lane road with parallel parking on both sides of the road for most of the 50 km/h section.

There is traffic calming road markings near Parkvale School at the northern end, along with appropriate signage as per Figure 3-1. At the give way intersection with Windsor Avenue a small island was constructed in mid-2015, which now permits space for pedestrians to wait and cross Howard St in two motions. A consequence of this island is that the space for vehicles exiting Howard Street has been constricted as shown in Figure 3-2 and is likely to increase queuing in the AM peak. A kea crossing is located outside the school 130m south of Windsor Avenue.

Figure 3-1: Howard Street traffic calming line marking outside Parkvale School (June 2015 – Google)

Figure 3-2: Howard Street / Windsor Ave intersection (June 2015 – Google)

The HDC network traffic count database has one 2008 count for Howard Street. This shows a volume of 1,550 vehicles (1,600 est.), an 85th percentile speed of 58 km/h and that there are 3% HCV. The count site location was located within the first 224m of the road, which is at the northern end of Howard Street.

3.1.2 Windsor Avenue

Windsor Avenue is classified both as a 'District Arterial Route' and a 'District Collector Route' by HDC. It is only the length between Heretaunga Street East and St Aubyn Street East which is classed as a District Arterial Route. The speed limit along its entire length is 50 km/h. It is a two lane road with parallel parking and cycle lanes on both sides of the road as far as Ada Street, where cyclists are encouraged to use Windsor Park for their commute.

There is traffic calming road marking near Karamu High School at the eastern end, where the road becomes Grove Road. This is approximately 750m east of the Howard Street intersection. A kea crossing is located in between the Howard Street and St Aubyn Street East intersections, including kerb extensions.

The right turn is banned at the Heretaunga Street East intersection, so traffic heading towards Hastings CBD can't use Heretaunga Street East and instead uses St Aubyn Street East and other routes to reach the CBD.

The HDC network traffic count database has numerous counts for Windsor Avenue. The most applicable count (for this report) shows a volume of 4,171 vehicles (4,500 est.), an 85th percentile speed of 50 km/h and that there are 2% HCV. The count site location is between the St Aubyn Street East and Haig Street intersections.

3.1.3 St Aubyn Street East

St Aubyn Street East is classified as a 'District Arterial Route' by HDC and has a speed limit of 50 km/h. It is a two lane road with parallel parking and cycle lanes on both sides of the road. The cycle lanes extend all the way into the CBD, where parking towards the CBD is prohibited from just south of the Hastings Street North intersection.

The give way intersection with Windsor Avenue is shown in Figure 3-3. At the limit line, there is enough room for two vehicles to queue for a left and right turn.

Figure 3-3: St Aubyn Street East / Windsor Avenue intersection (June 2015 – Google)

The HDC network traffic count database has numerous counts for St Aubyn Street East. The most applicable count (for this report) shows a volume of 6,692 vehicles (6,000 est.), an 85th percentile speed of 51 km/h and that there are 3% HCV. The count site location is between the Windsor Avenue and Terrace Road intersections.

3.1.4 Existing Traffic Count Summary

records some of the traffic count site data taken from the HDC database available on their website.

Table 3-1: HDC traffic count sites

Road	Location	Count (vpd)	Est AADT	HCV	Year
Howard Street	Near Parkvale School	1,549	1,600	3%	2008
Windsor Avenue	Between St Aubyn Street and Haig Street	4,171	4,500	2%	2013
	Between Heretaunga Street and St Aubyn Street	4,427	4,400	2%	2008
St Aubyn Street East	Between Windsor Avenue and Terrace Road	6,692	6,000	3%	2010
	Between Terrace Road and Park Road North	7,121	6,000	3%	1995

3.1.5 April 2016 Intersection Traffic Count Data

To accompany this report, intersection traffic counts for Windsor/St Aubyn and Windsor/Howard were conducted on 12th April 2016 during AM and PM peak periods. These are the two intersections that are going to be affected by the proposed development if it proceeds. In essence two back to back right turn bays (unmarked) are created by the staggered T-junction arrangement (being a left to right stagger). The kea crossing between the intersections (on Windsor Avenue) further shortens the queue space for turning vehicles.

The purpose of the counts was to provide current traffic movement counts for the SIDRA modelling of how the two intersections perform with and without the proposed development. Additional information about the counts is found in section 7.

3.1.5.1 Windsor Avenue / Howard Street

At the Windsor/Howard intersection, the busiest 15 minute period during the AM peak was 08:15-08:30 with 318 vehicles either driving along Windsor Avenue or turning in/out of Howard Street. This time period would align with the common time for road users to be either commuting for work or dropping their children off at Parkvale School for the day. The busiest one hour period was 07:45-08:45 with 972 vehicles.

The longest queuing on the Howard Street leg was during the 08:15-08:30 period, where nine vehicles queued to turn right and seven vehicles queued to turn left. On Windsor Avenue, the longest queue length was nine right turn vehicles queuing between the 08:30-08:45 period (eight queued during 08:15-08:30 also).

Field observations recorded during the morning survey reveal the following:

- *Pedestrians are using the designated crossings.*
- *Kea crossing holds all legs when in use (>20 vehicles stopped).*
- *Many cars stopping on Windsor Avenue (east origin through movement) to give Howard turning traffic a chance to move.*
- *Due to the splitter island recently installed on Howard Street - one car turning right out of Howard Street held queue for approximately three minutes, no room for left turn while this was happening due to parked cars on Howard*[1].
- *Right turn queue from Windsor into Howard blocks right turn from Windsor into St Aubyn.*

[1] Parking is permitted too close to the intersection; recommend that a couple of parking spaces are removed so that left-turn traffic is not blocked by one right-turn vehicle.

The busiest PM 15 minute period during the PM peak was 17:00-17:15, with 160 vehicles either driving along Windsor Avenue or turning in/out of Howard Street. This period coincides with commuters travelling home from work. The busiest one hour period was 16:30-17:30 with 586 vehicles passing through the intersection. Queuing was not a major issue in the evening, as the kea crossing was not in use.

Field observations recorded during the evening survey reveal the following:

- *No school traffic and kea crossing closed.*
- *No vehicles parked on Howard Street near the give way, so vehicles able to split into left/right turning lanes at give way.*

3.1.5.2 Windsor Avenue / St Aubyn Street East

At the Windsor/St Aubyn intersection, the busiest 15 minute period during the AM peak was 08:15-08:30 with 363 vehicles either driving along Windsor Avenue or turning in/out of St Aubyn Street East. This time period would align with the common time for road users to be either commuting for work or dropping their children off at Parkvale School for the day. The busiest one hour period was 07:45-08:45 with 1,134 vehicles.

The worst queuing observed at this intersection was those vehicles on Windsor Ave who were stopped by the kea crossing situated between the St Aubyn and Howard intersections. The longest queue recorded was thirteen right turn vehicles (for St Aubyn) queuing between the 08:30-08:45 period. This was followed by ten eastbound vehicles queuing on Windsor Avenue, which would block the right turn traffic for St Aubyn (on Windsor).

The longest queue on the St Aubyn St East leg was during the 08:30-08:45 period, with four vehicles queued to turn left onto Windsor Avenue.

Field observations recorded during the morning survey reveal the following:

- *Cyclists using cycleways, but not a large number.*
- *Pedestrian crossing near Heretaunga Street was the most frequently used.*
- *A few jay-walkers but not many.*
- *Truck turning paths into and out of St Aubyn crossing over two lanes.*
- *Cars turning right from St Aubyn to Windsor can experience long waits.*
- *Children crossing St Aubyn at intersection.*

The busiest PM 15 minute period during the PM peak was 17:00-17:15, with 217 vehicles either driving along Windsor Avenue or turning in/out of St Aubyn Street East. This period coincides with commuters travelling home from work. The busiest one hour period was 16:30-17:30 with 824 vehicles passing through the intersection. Queuing was not a major issue in the evening, as the kea crossing was not in use.

Field observations recorded during the evening survey reveal the following:

- *Some creep out by right turn vehicles from St Aubyn (possibly due to car parked outside No. 308 Windsor - No Parking lines could be installed).*
- *Enough width on Windsor for turning bays.*
- *Cyclists crossing Windsor at pedestrian crossing and cycling on footpath toward school.*

In summary the traffic surveyors stated that the kea crossing on Windsor Avenue was the main cause of the queues that developed, particularly so during a 30 minute period. When the crossing was not in use the traffic flowed much better, and queues returned to more normal numbers of two or three vehicles at most. It should also be noted that right turn vehicles on Windsor Avenue did not often obstruct through traffic, as they were able to pass on the left by crossing over into the cycle lane and parking spaces (if no parked vehicles were present).

3.2 Public Transport

The Hawkes Bay Regional Council (HBRC) bus information website shows there are three bus

services which operate within the vicinity of the site, being:

- Route 11 Express (Napier > Hastings > Havelock North > Hastings > Napier);
- Route 17 (Hastings > Parkvale > Akina > Hastings);
- Route 21 (Hastings > Havelock North > Hastings).

Route maps are presented in Appendix A.

Route 11 is an express route with eight stops in each direction. The stop closest to the Howard Street development is 1100 Heretaunga Street (opposite Mac's Fish Supply), with the route travelling along Havelock Road.

Route 17 is a local Hastings circular service that has a bus stop located at 209 Terrace Road. This route only travels in a clockwise direction.

Route 21 is a local Hastings to Havelock North return service. The stop closest to the Howard Street development is 1100 Heretaunga Street (opposite Mac's Fish Supply), with the route travelling along Havelock Road.

Figure 3-4 outlines where the routes drive past the proposed development and the two nearest bus stops to the development.

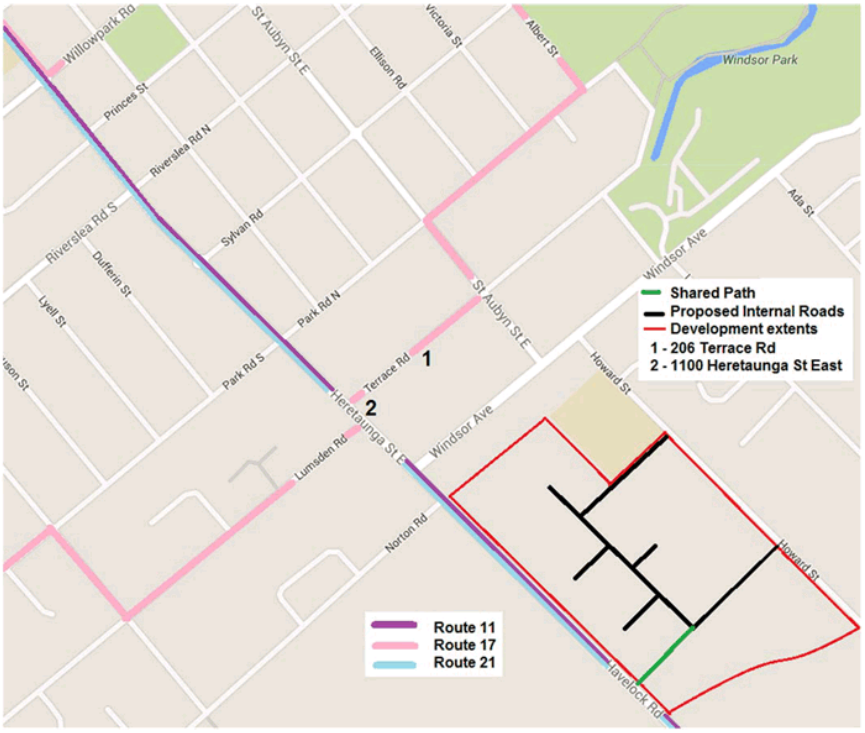


Figure 3-4: Nearby bus services and bus stops

3.3 Pedestrian and Cycle Routes

The local residential streets are well serviced by footpaths and cycle facilities. The residential areas adjoining the site generally provide footpaths for pedestrians on both sides of the road. However an adjacent section of Howard Street has no footpath on the western side, due to the semi-rural nature of the road.

As indicated below there are good existing pedestrian provisions surrounding the development area:

- Howard Street – footpaths on both sides of the road until approximately halfway down the development frontage, where the western footpath ends and continues on the eastern side as far south as the Reformed Church of Hastings;
- Windsor Avenue – footpaths on both sides of the road;
- St Aubyn Street East – footpaths on both sides of the road;
- Heretaunga Street East – footpaths on both sides of the road;
- Havelock Road – a 3.0m wide shared path on both sides of the road, all the way to Havelock North.

As indicated below there are good existing cycling provisions surrounding the development area:

- Howard Street – no cycling facilities are currently provided;
- Windsor Avenue – on-road cycle lanes on both sides of the road;
- St Aubyn Street East – on-road cycle lanes on both sides of the road;
- Heretaunga Street East – on-road cycle lanes on both sides of the road;
- Havelock Road – a 3.0m wide shared path on both sides of the road, all the way to Havelock North.

The western side of the Havelock Road shared path was opened in March 2016, to accompany the previously completed eastern side shared path. Provision of the shared path facilities was one of the items to arise from the 2010 Corridor Management Plan (CMP) for Havelock Road.

There are no current pedestrian or cycle facilities within the proposed development site due to the site presently being mainly rural land.

3.4 Road Safety

Investigation of the NZTA Crash Analysis System (CAS) for the five year period 2011 to 2015 revealed 52 reported crashes on the surrounding road network. The area investigated is shown in Figure 3-5 with the green area showing the approximate extents of the proposed housing development.

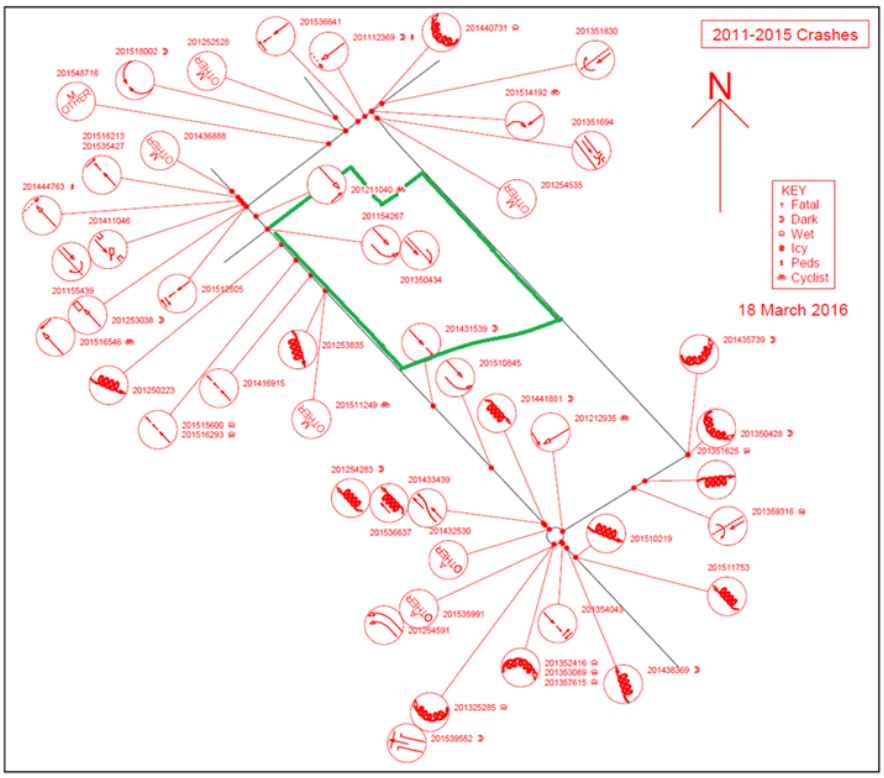


Figure 3-5: 2011-15 Crash Map

Of the overall 52 crashes there were no fatalities, two serious, 15 minor and 35 non-injury crashes. Overall the crash history is at the lower end of the severity scale, with only 4% of crashes resulting in F+S crashes (with 2 deaths and serious injuries). The following sections consider each of the adjoining roads.

3.4.1 Howard Street

The extent of the analysis is from the intersection with St Georges Road to the intersection with Windsor Avenue. There have been four non-injury crashes reported on Howard Street. Two were loss of control crashes at the St Georges Road intersection (traveling too fast) and the other two crashes were manoeuvring crashes 20m south of the Windsor Avenue intersection (most likely associated with parking around the school).

3.4.2 Windsor Avenue

The extent of analysis is from the intersection with Havelock Road to Howard Street. There have been three minor injury crashes and four non-injury crashes. Two of these crashes are at the Howard Street intersection with three other crashes in the immediate vicinity and one crash occurred at the Heretaunga Street East intersection. There are no prevailing crash trends along this road and the crashes are all of a minor nature.

3.4.3 St Aubyn Street East

The analysis extent is from the intersection with Windsor Avenue and just south of the intersection with Terrace Road. There have been two crashes reported, resulting in one serious injury and one

non-injury crash. The serious crash occurred at the intersection with Windsor Avenue, where a vehicle cut the corner and crashed head-on into another vehicle. The driver of the vehicle cutting the corner returned a positive alcohol test.

3.4.4 Heretaunga Street East

The analysis extent is from just north of the intersection with Windsor Avenue to the Norton Road intersection. This is only a short approximately 110m section and is the very tail end of Heretaunga Street East which runs right into Hastings CBD.

There have been eleven crashes reported, resulting in four minor injury and seven non-injury crashes. One crossing (HA type) crash involved a cyclist and another crash involved a pedestrian crossing the road (NA type). There were three manoeuvring crashes just west of the Windsor Avenue intersection, while there were two crashes of each of the following types; rear-end (Type F), turning vs same direction (Type G) and crossing no turns (Type H).

3.4.5 Havelock Road

The analysis extent is from the intersection with Norton Road to just south of the roundabout with St Georges Road. There have been 25 crashes reported, one serious injury, eight minor injury and 16 non-injury crashes. The serious crash occurred 50m south of the roundabout with St Georges Road, where the driver lost control of the vehicle due to an illness (e.g. heart attack).

The most common crash type is loss of control crashes on straight roads (Type C) with seven crashes; of those one was a serious crash and one was a minor crash. Five of these crashes are within 50m of the St Georges Road roundabout, two were caused by illness and two were drunk drivers. At the northern end of Havelock Road there are six other crashes with three of these rear-end queue minor injury crashes (Type FD).

Overall there are 17 crashes within 50m of the roundabout, which is the most common crash location of the area under investigation. Havelock Road has the greatest AADT volume of all the roads, so it is expected that the greatest number crashes would occur along this road.

3.4.6 St Georges Road

The analysis extent is from the roundabout with Havelock Road to the intersection with Howard Street. There have been three non-injury crashes reported, with no commonalities.

4 Planned Transport Improvements

4.1 Background

There are no significant transportation projects identified in the vicinity of the proposed development, either now or in the near future. The HDC forward work plan does, however, include standard renewal work such as sealing, footpaths, kerb & channel, drainage and minor safety improvements. This is work that would normally be expected.

5 Nearby Plan Changes and Urban Growth Areas

There are no nearby plan changes that have been recently granted or are waiting to be heard before Hastings District Plan Hearings Committee. In July 2015 a hearing was held to review the request to rezone land bound by Howard Street, Ada Street, Kathleen Street and the natural watercourse at its southern extents. This application was rejected by the committee as rezoning the land would be in conflict with the Hawke's Bay Regional Policy Statement and would have potential to adversely affect the implementation of the region's growth strategy (as well as seven other reasons).

Appendix 2 of the Proposed District Plan[2] shows no other areas nearby identified as 'Residential

[2] As Amended by Decisions 12 Sept 2015 (by Section) and Decision Reports

Urban Growth Areas', which does not include the Howard Street development as an identified location. However on Appendix 1 of the proposed District Plan, the Howard Street development is shown as well as other locations on the western side of the suburb of Akina as 'Identified Growth Areas' in the Heretaunga Plains Urban Development Strategy (HPUDS). These other locations appear to be west of Copeland Road.

6 Proposed Plan Change – Howard Street

6.1 Background

Hastings District Council has brought forward the timing of the potential rezoning of land around Howard Street into the current 10 year plan (2015-2025). Currently this is zoned as 'Plains' and the potential rezone is to residential land. Should the rezoning occur, then 19ha of Howard Street land is proposed to be converted into 285 dwellings over the next 10-20 years.

The development will be bordered by Parkvale School, Howard Street, Havelock Road and the natural watercourse to the southwest as shown in Figure 6-1. Note that the full size of the development is not shown on the diagram; the purple shading should extend to the stormwater detention zone (green hatching).

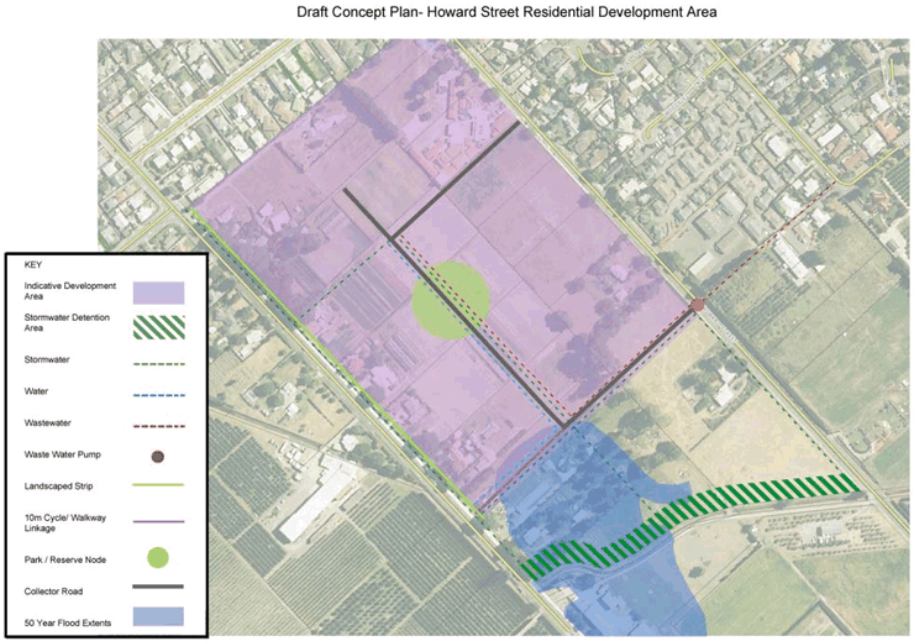


Figure 6-1: Draft concept plan

6.2 Development Road Network

Figure 6-1 shows the draft concept plan for the proposed development and the main internal roads. It should be expected that an additional local access road branches off the southern connection (to Howard Street) to access the extended area towards the stormwater detention area. Any internal roads are expected to have a maximum 50 km/h speed limit, notwithstanding the ability to have lower speed limits (e.g. 40 km/h) applied.

Key attributes of the network are:

1. Two access points onto Howard Street to reach the internal network of the development. The main road throughout the development is likely to be classed as a local access road.
2. No new vehicular access onto Havelock Road along the southern extents of the development. There is however a cycleway connection proposed at the southern corner of the development.

The typical cross-sections proposed for the roads within the development have not been confirmed at this stage, however it is expected they would meet the requirements under HDC's Engineering Code of Practice. The typical urban road layout from the code is shown in Figure 6-2. However, the preference should be to continue using shared paths, rather than on-road cycling facilities, and have these connect up with the shared path on Havelock Road.

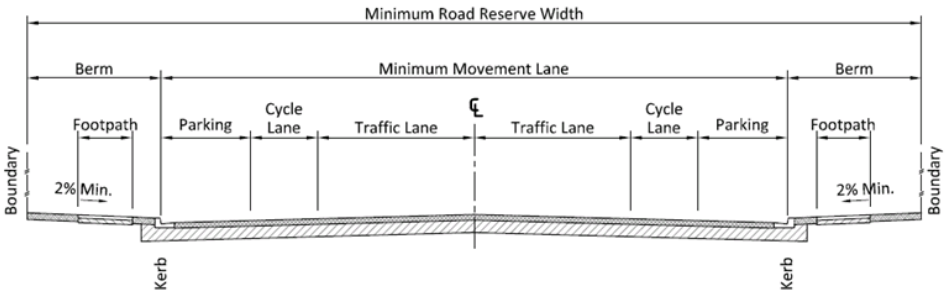


Figure 6-2: Typical Urban Road Cross Section: Drawing No. C1

One of the main aspects of the development's road network is not to have any direct vehicular access onto Havelock Road. Havelock Road currently has an AADT of approximately 19,000 vehicles per day. It is already close to reaching saturation levels, so additional traffic and new intersections are likely to cause congestion, particular in the future. It is important however, to provide new pedestrian and cycling linkages to the shared path on Havelock Road. The concept plan shows only one new shared path connecting to Havelock Road, whereas a second connection closer to Hastings would be hugely beneficial, as it would provide a better provision for pedestrians to then access the bus stop at 1100 Heretaunga Street East. Pedestrians are unlikely to walk south to the one shared path and then walk north up Havelock Road to then continue their journey.

We do not envisage any new bus routes being required, however that does not preclude minor changes to Route 17 in order to drive nearer the new development.

An initial drawing of the first 70 dwellings has been produced as shown in Figure 6-3. This provides an indicative layout that would be adopted throughout the entire development. These 70 dwellings would have their own separate access onto Howard Street (as shown) and would not utilise any of the internal roads as proposed in Figure 6-1. An error in the drawing shows no space available between the school and the dwellings to provide for the northern most local access road. It is understood that Lot 1, as shown, should be located immediately southeast of the school to provide the space needed for the northern local access road, including cycling and pedestrian access. This would slide Lot 2 in a southeast direction.

Figure 6-3: Plan view from NZ0415104-PL-C100-SCHEME-03-C101_r1

As shown on Figure 6-3 there is a third access way onto Howard Street proposed, aside from the two main local road access ways.

The first main access way is near the school, as mentioned, which may need a right-turn bay on Howard Street as it may experience a greater volume of traffic turning in (from Hastings direction) due to it being the first access way traffic will approach. The second main access way, to the south of the development, is close to the 50 km/h / 80 km/h boundary. Speeds of traffic coming from the south will need to be monitored; this could mean that threshold treatments into the 50 km/h area might be necessary. Finally the third access into the gated community, as shown in Figure 6-3, might also need a right-turn bay.

7 Transportation Modelling

No area-wide based modelling was undertaken for this report, instead an assessment of the two intersections off Windsor Avenue (St Aubyn Street East and Howard Street) in Figure 7-1 has been undertaken in SIDRA. Traffic counts were collected by MWH on 12 April 2016 during the AM and PM periods and these figures were used as the base traffic volumes for the SIDRA analysis. The AM counts were recorded between 07:30-09:30 and the PM counts recorded between 16:00-18:00.

Consideration should be given to modelling the downstream effects of the increased development traffic, especially heading north on St Aubyn Street East as it heads towards the Hastings CBD. However that is outside of the scope of this report.

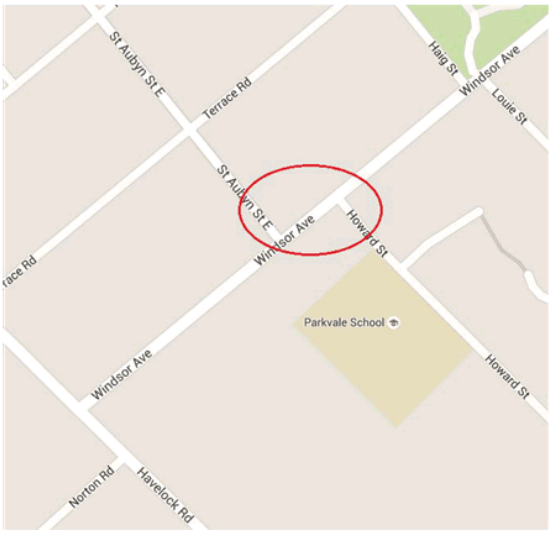


Figure 7-1: Extent of SIDRA analysis

St Aubyn Street East continues northwest until it reaches the Hastings CBD. It is expected that a large proportion of the vehicles generated by the proposed Howard Street development will use the staggered T-intersection to access and return from Hastings CBD.

Models were created for the AM and PM base scenarios using the peak hour counts captured in the April 2016 traffic survey. The second scenario for the AM and PM peaks was to include the traffic generated by the proposed development onto the base data. No traffic growth was applied as the second scenario was not modelled on a future date, when the development might be expected to be fully occupied.

7.1 Trip Generation

To calculate the number of trips generated by the 285 dwelling development, trip generation rates from Table C.1 of the NZTA Research Report 453: Trips and Parking Related to Land Use were used. The two most relevant residential dwelling trip generation rates are inner suburban dwelling (a 7.2.1 dwelling) and outer suburban dwelling (a 7.2.2 dwelling). Their respective trip rates (85th percentile) are outlined in :

Table 7-1: RR 453 Table C.1 dwelling trip generation

Land Use Category	Peak Hour Trips (veh/hr/unit)	Daily Trips (veh/day/unit)
Dwelling (Inner Suburban)	1.2	10.9
Dwelling (Outer Suburban)	0.9	8.2

The outer suburban classification may not readily apply to a city the size of Hastings; it is more aligned for larger centres e.g. Auckland, Wellington and Christchurch.

For the purposes of this report a peak hour trip generation of 1.0 veh/hr/unit and a daily trip rate of 10 veh/day/unit was used.

The Report 453 does not break down the peak hour period to AM or PM generation rates. Looking at the Trips Database Bureau (TDB) database (Jan 2015 version) and filtering the sites in the table that best apply to this situation, an average AM trip generation of 1.07 veh/hr/unit and an average PM trip

generation of 0.99 veh/day/unit are produced. Therefore a trip generation of 1.0 veh/hr/unit for the proposed development appears to be an appropriate value to use. The daily trip rate of the filtered TDB sites equated to 9.5 veh/day/unit, which matches well with the 10 veh/day/unit proposed.

7.2 Trip Distribution of the Proposed Development

For the purposes of this report the split of the AM traffic generated by the proposed development shows 80% is leaving the development and 20% is attracted to it. Of the 80% leaving the development, 75% is heading towards Hastings and the remaining 25% will use Howard Street to head towards Havelock North. Of the 20% attracted to the development, 75% was travelling from Hastings and the remaining 25% from Havelock North. At the two intersections in question, the traffic was distributed by the same percentage splits as recorded by the April 2016 AM traffic counts.

The split of the PM traffic generated by the proposed development shows 30% is leaving the development and 70% is attracted to it. Of the 30% leaving the development, 75% is heading towards Hastings and the remaining 25% will use Howard Street to head towards Havelock North. Of the 70% attracted to the development, 75% was travelling from Hastings and the remaining 25% from Havelock North. Again the traffic was distributed by the same percentage splits as recorded by the April 2016 PM traffic counts.

7.3 Base Scenario AM Peak

The AM peak hour surveyed was recorded as 07:45-08:45 with 972 vehicles passing through/by the Windsor/Howard intersection and 1134 vehicles passing through the Windsor/St Aubyn intersection. A one hour peak SIDRA Network model linking the two intersections was created and an intermediary link with a signalised pedestrian crossing was included to attempt to model the kea crossing which is located between the two intersections (no kea option available). The kea crossing was only active during the AM peak and not the PM peak.

The SIDRA model showed that the two intersections performed well in the AM Peak. The longest queues which developed were on Windsor Avenue with 48m westbound (7 vehicles) and 38m eastbound (5.5 vehicles). On Howard Street the queue was 10m (1.5 vehicles) and on St Aubyn the queue was 17m (2.5 vehicles).

These queue lengths do not correlate with the queues observed in the field by the traffic surveyors in section 3.1.4. However they observed the queuing to be at its worst over a 30 minute period and fairly non-existent either side of that. We believe that the SIDRA model is compensating by distributing the traffic more evenly over the peak hour, which would smooth out the 30 minute period when the surveyors observed greater queuing. A 30 minute peak period was not modelled by this investigation. We would advise that it is modelled to see whether it would better reflect the observations in the field. Further to this, we are not 100% confident in SIDRA's ability to fairly represent the interaction between the intersections and the kea crossing. Ideally, using the Council's network model to analyse the impacts of the development would be a better approach.

7.4 Base Scenario PM Peak

The PM peak hour was recorded as 16:30-17:30 with 586 vehicles passing through/by the Windsor/Howard intersection and 824 vehicles passing through the Windsor/St Aubyn intersection. This is much lower overall than during the AM peak hour (2,106 movements vs 1,410 movements). A one hour peak SIDRA Network model linking the two intersections was again created. On this occasion the kea crossing was not included as it was not in use when the traffic survey started at 16:00.

The SIDRA model showed that the two intersections performed well during the PM peak. The longest queues which developed were on Windsor Avenue with 6m westbound (1 vehicle) and 5m eastbound (1 vehicle). This is fairly consistent with the queue lengths of 1-2 vehicles observed in the field for Windsor Avenue. SIDRA however had near zero queue distances for traffic on St Aubyn Street East and Howard Street, which was inconsistent with the 1-3 vehicles observed queuing on Howard Street and 2-3 vehicles observed queuing on St Aubyn Street East.

In all, the fairly free flowing vehicle movements observed in the field were replicated by SIDRA.

7.5 Proposed Development Scenario AM Peak

The same AM peak hour of 07:45-08:45 was modelled with an additional 214 vehicles included, which are vehicles either generated from or attracted to the proposed development via Hastings. All other generated or attracted traffic (71 vehicles) to/from Havelock North was modelled as using Howard Street south of the intersections under investigation, and therefore not included in the intersection analysis. The same one hour peak SIDRA Network model was used as the AM Base.

The SIDRA model showed the St Aubyn Street East intersection performing well, as only an additional 19 vehicles were added to the link and 19 more vehicles travelling east on Windsor Avenue to oppose them. The longest queue now modelled is 31m (4.5 vehicles) on Windsor Avenue traffic, which affects both right turn for St Aubyn Street East and westbound through traffic. This has nearly doubled from 17m in the base scenario

The Howard Street intersection does not perform as well, with a 71m queue (10 vehicles) developing on Howard Street, due to the 171 additional vehicles generated by the development heading towards Hastings. The average delay has ballooned from 9 seconds in the base model to 29 seconds in this model.

The queues to Windsor Avenue traffic caused by the kea crossing have increased eastbound from 48m to 65m (7 vehicles to 9 vehicles) and westbound from 38m to 46m (5.5 vehicles to 6.5 vehicles). With the additional 214 vehicles using the roads during the AM peak hour, we would expect the scenario in reality to be more congested than SIDRA has suggested. This leads back to comments stated in section 7.3 about the SIDRA results not aligning with the observations in the field.

7.6 Proposed Development Scenario PM Peak

The same PM peak hour of 16:30-17:30 was modelled with an additional 214 vehicles included (using the same trip generation rate of 1.0 veh/hr/unit), which are vehicles either generated from or attracted to the proposed development via Hastings. All other generated or attracted traffic (71 vehicles) to/from Havelock North was modelled as using Howard Street south of the intersections under investigation, and therefore not included in the intersection analysis. The same one hour peak SIDRA Network model was used as the PM base.

The SIDRA model showed that the two intersections performed well during the PM peak. The longest queues which developed were on Windsor Avenue with 12m westbound (2 vehicles) and 6m eastbound (1 vehicle). Again SIDRA had near zero queue distances for traffic on St Aubyn Street East and Howard Street, which is not thought to be realistic given the increase in volumes and the existing queues surveyed in the field for the base PM model.

8 Effects on the Transportation Network

8.1 Transportation Modelling Summary

The base models in SIDRA did not reflect very well what was observed in the field and hence have not been over-analysed by this report. In particular the AM base model did not reflect the queues observed in the field, in particular a 30 minute period mentioned by the traffic surveyors where the kea crossing on Windsor Avenue was the main cause of the queues which generated and then had a flow-on effect to the two intersections. As suggested earlier the HDC network model should produce different results, but it was not possible to be utilised for this report.

The AM model including the development showed the Howard Street link increasing from a 7m average queue length to 71m, due to the 214 vehicles exiting the proposed development and heading towards Hastings. We believe, given the existing queues observed in field, that the negative impact would be greater than the 71m queue calculated and that this would become a congestion problem on the network. Some of the negative effect might be dampened if commuters decided to start work earlier, in an effort to avoid the AM peak traffic induced by Parkvale School.

As the PM peak traffic was much lower in the base model than the AM model (700 less vehicle movements), it performed well in SIDRA. When the additional 214 vehicles generated by the development were included, the model did not deteriorate by much at all. As the traffic surveyors did not comment on any notable queuing issues observed during the PM surveys, we must assume that the intersection should be able to cater for the evening traffic sufficiently. This is particularly as it does not suffer from the same kea crossing problem as experienced in the AM peak period.

8.2 Future Road Safety Impacts

If the proposed development was to proceed, crash numbers would expect to increase along Howard Street as the traffic volume increases. Increases would therefore also be expected at all intersections that surround the development as well. This is particularly at the two intersections along Windsor Avenue (St Aubyn Street East and Howard Street), where increased vehicle volumes through these intersections would mean an increase in the number of conflict interactions between opposing vehicles and hence the likelihood of increased crashes.

The location of the kea crossing on Windsor Avenue would need to be reviewed. It is already causing queuing problems in the base scenario, so these queues would only become worse if the development was to proceed.

Howard Street would need to be upgraded to incorporate cycling facilities which do not currently exist. In addition to this, the car parking near the Windsor Avenue intersection limit line should be reviewed as well. If approximately two car parks were removed it would help increase the capacity of the intersection, as two vehicles (right and left turning) could then wait at the limit line and queue back three or more vehicles deep. As observed in the field, there were long delays experienced during the existing AM situation.

9 Strategic Planning Considerations

A full review of strategic planning documentation has not been undertaken for this report. However the proposed development aligns well against the Heretaunga/Havelock CMP, by not creating an additional access point onto Havelock Road. This road is currently congested and forecasted to get busier, so it is unlikely to cope well with an additional 150-250 vehicles trying to use it during the peak hours.

10 Summary and Recommendations

This report investigated the traffic impacts of the proposed Howard Street greenfield residential development of 285 dwellings that includes three new access ways onto Howard Street. The data provided on the proposed development was of a high level nature and an in-depth review of the internal road network has not occurred. Instead this report focused on the impact of the traffic generated by the proposed development (when fully occupied) on the Windsor/Howard and Windsor/ St Aubyn Street East intersections during the AM and PM peak periods.

The traffic surveys conducted in April 2016 showed there to be an existing queuing problem on Windsor Avenue during the AM peak period, caused in most part by the kea crossing in between the two T-junctions. The knock on effect of Windsor Avenue traffic queuing was the two side road intersections would sometimes become blocked by this traffic. These queues soon disappeared once the kea crossing was not activated. The SIDRA model however, was not able to replicate the same problems and if further traffic impact analysis was required, the HDC network model would be a better tool to assess the impacts to the wider network (not just the two intersections). With an estimated 214 additional vehicles using the two intersections when the development was fully occupied, it is expected that existing queues on Windsor Avenue would only deteriorate. The best method to mitigate this would be to relocate the kea crossing to the east of the Howard Street intersection or to the west of the St Aubyn Street East intersection.

The PM peak period posed much less of a concern, as the afternoon traffic and pedestrian generated

by Parkvale School has dispersed well before 16:00.

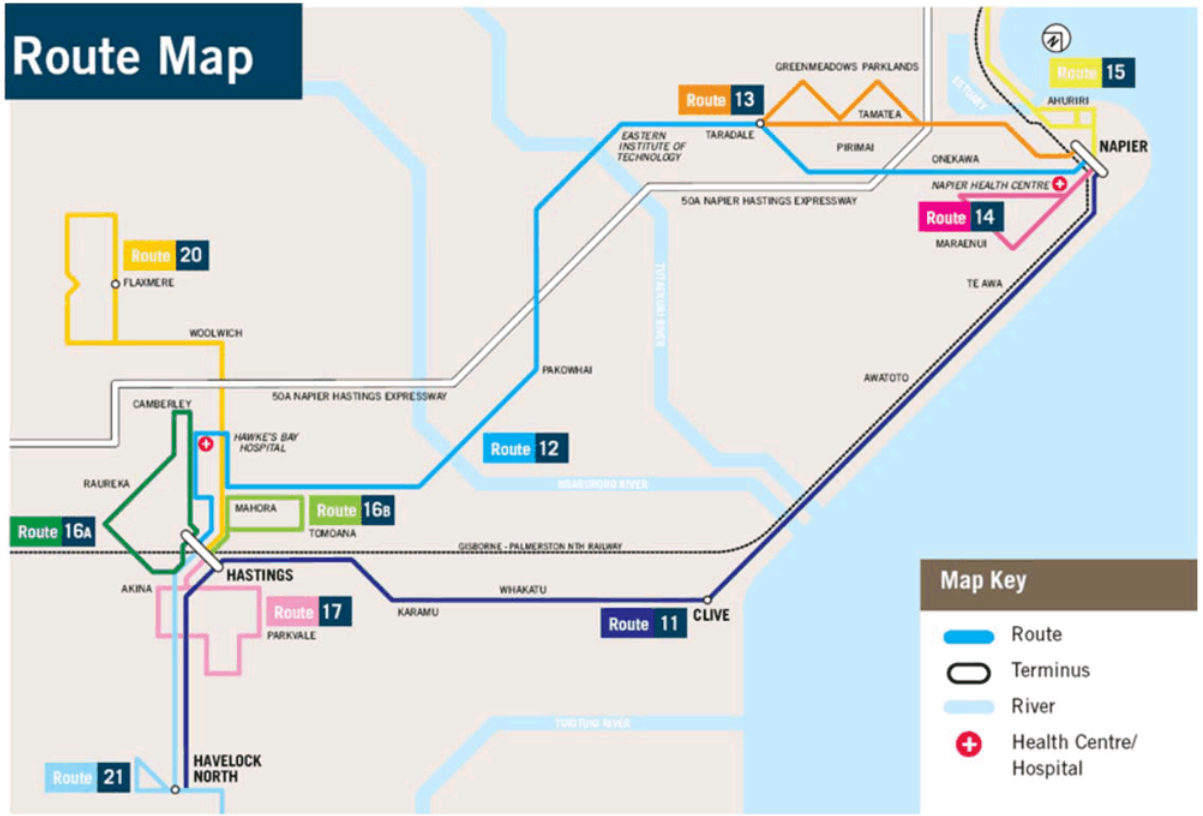
There are three main recommendations raised by this investigation:

1. The need for two shared path facilities (rather than one) that connect from the proposed development to the Havelock Road shared path (at the northern and southern ends of the proposed development).
2. The location of the kea crossing on Windsor Avenue would need to be reviewed. It is already causing queuing problems in the base scenario, so these queues would only become worse if the development was to proceed. Options include moving it east of the Howard Street intersection or west of the St Aubyn Street East intersection. This would need to be discussed with the school as either option would disadvantage some school children.
3. School crossing and parking at northern end of Howard Street. There is a need to eliminate two parking spaces near the Windsor Avenue intersection, to allow more left-turn vehicles to access the limit line and not be delayed by a right-turn vehicle (lower volume movement). Also it is important to monitor the behaviour of pedestrians at the new pedestrian island crossing at this intersection, particularly in the morning when any development traffic is going to have the largest impact combined with school traffic. If there are concerns with traffic speeds near the school, a 40 km/hr zone should be investigated to operate prior to and after school hours.

Appendix A HBRC Public Transport Routes

MWH

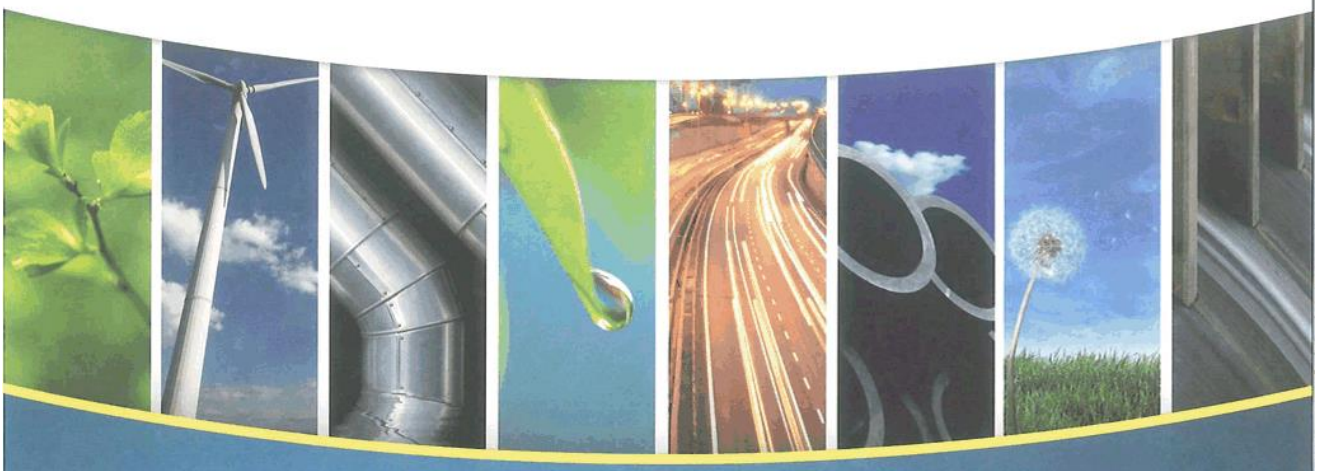
Howard Street Housing Development



Item 2

Attachment 14

HAWKES BAY
1st Floor, 100 Warren Street South, Hastings 4122
PO Box 1190, Hastings 4156
TEL +64 6 873 8900
FAX +64 6 873 8901
www.mwhglobal.co.nz



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- Stormwater
- Surveying
- Transport Planning
- Water Resources
- Water Supply
- Wastewater

MWH

BUILDING A BETTER WORLD

From: Michelle Hart
To: Rowan Wallis
Subject: RE: Roading and Stormwater advice for Howard St NOR
Date: Thursday, 29 November 2018 10:28:03 AM

Hi Rowan,

Thanks for sending this through. I too am puzzled by 3

Cheers
Michelle

HASTINGS DISTRICT COUNCIL

MICHELLE HART
SENIOR ENVIRONMENTAL PLANNER (CONSENTS)

Phone (06) 871 5110 ext 5376
Email michelleh@hdc.govt.nz **Web** hastingsdc.govt.nz
Hastings District Council, Private Bag 9002, Hastings 4156, New Zealand

From: Rowan Wallis
Sent: Thursday, 29 November 2018 9:08 AM
To: Michelle Hart <michelleh@hdc.govt.nz>
Cc: Craig Scott <craigs@hdc.govt.nz>
Subject: FW: Roading and Stormwater advice for Howard St NOR

Hi Michelle

Please find attached the response form Sarath on the road submission points for the Howard designation. I am not sure what he is saying at his point 3 (isn't he a traffic expert?). I will check with him!

Cheers

Rowan

From: Sarath Kuruwita
Sent: Wednesday, 28 November 2018 11:47 AM
To: Craig Scott <craigs@hdc.govt.nz>; Matthew Kneebone <matthewk@hdc.govt.nz>
Cc: Rowan Wallis <rowanw@hdc.govt.nz>
Subject: RE: Roading and Stormwater advice for Howard St NOR

Hi Craig,
Sorry for misreading the email and thanks for reminding me.

1. Woolworths issue – Shifting of the spur on the Woolworths land to be adjacent to Parkvale School will create a very sharp corner (a sharp bend) where the current

intersection is. At an intersection all drivers will generally be careful. Not particularly so in a bend of the road and will tend to keep to safe operating speeds. Creation of sharp bends will restrict the efficiency of the operation of the traffic. There is also reduction of safety due to reduced sight distance available at a bend of the road rather than at an intersection. On normal roads the sight distance requirements are more liberal than on the intersections, which is not the case if the spur is shifted.
So, both from traffic efficiency and safety angles the proposed shift is not advisable unless mitigative measures such as changes in alignment of the road to improve sight lines are in place.

2. Karen Cooper Request – The exit through Karen's land (second Entrance) is of equal priority with the entrance adjacent to the Parkvale School (first entrance) for the interior lots. In reality however small the second entrance is made, equal numbers may use the two entrances to access and depart from the interior of the development. A large no. of lots are being served by this road (The main traffic artery of the development).
Therefore, all road users should enjoy the best safety, amenity and service levels from this road.
Narrowing one entrance reduces the ability to provide sufficient safety, amenity and service levels to road users. This reduced ability discriminates against the users of the second entrance.
As a result of narrowing the second entrance the first entrance will gain in prominence and may require a higher form of intersection control leading to land requirements that are strictly not warranted under the current scheme.

3. This request should be reviewed by traffic experts in terms of traffic safety, provision of road user amenities and the service levels that can be provided, before forming an engineering judgement.

Thanks.

Sarath k

From: Craig Scott
Sent: Tuesday, 27 November 2018 11:17 AM
To: Sarath Kuruwita <sarathk@hdc.govt.nz>; Matthew Kneebone <matthewk@hdc.govt.nz>
Cc: Rowan Wallis <rowanw@hdc.govt.nz>
Subject: RE: Roading and Stormwater advice for Howard St NOR

Hi Sarath

The information we have requested from yourself in regards to the NOR is regarding your option on:

1. The relocation of the road from the Woolworths submission, and whether there will be any traffic safety effects from this? and would this be suitable from a traffic safety viewpoint.
2. Your opinion at to what would be the effects and suitability of narrowing the access on Karen Coopers land to a secondary access? How would this affect the access next to Parkvale School? What would be the effects of this?

Neither of these responses require the HBRC flooding datum. That is for detailed design, which we are not needing to achieve for this response.

I have attached the section 92 which states what she is requiring.

Michelle **urgently** needs this information by Friday the 30th to complete her officer's report. Can you please provide this to us.

Regards

HASTINGS DISTRICT COUNCIL

CRAIG SCOTT
SENIOR ENVIRONMENTAL PLANNER (POLICY) (BEM)

Phone (06) 871 5000
Email craigs@hdc.govt.nz **Web** hastingsdc.govt.nz
Hastings District Council, Private Bag 9002, Hastings 4156, New Zealand

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From: Sarath Kuruwita
Sent: Friday, 23 November 2018 4:51 PM
To: Craig Scott <craigs@hdc.govt.nz>; Matthew Kneebone <matthewk@hdc.govt.nz>
Subject: RE: Roading and Stormwater advice for Howard St NOR

Last I heard from Stantec (last week) they are waiting until HBRC is completing their storm water modelling work to prepare their plans for the roading. Ask James Hopgood of Stantec for further information.

Until then we have a sub-standard roading design.
Have a nice weekend.

Sarath K

From: Craig Scott
Sent: Friday, 23 November 2018 4:14 PM
To: Matthew Kneebone <matthewk@hdc.govt.nz>; Sarath Kuruwita <sarathk@hdc.govt.nz>
Subject: Roading and Stormwater advice for Howard St NOR

Hi guys

I need to chase up where we have got with this. Particularly given that it was due on the 15th of November. The hearing has been delayed until January, however Michelle needs the further info to be able to complete her report which needs to go to the commissioner as soon as possible.

Can you please advise where we are at with the engineering information? We need this completed ASAP.

I am happy to send original email again if needed

Regards

HASTINGS DISTRICT COUNCIL

CRAIG SCOTT
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