

ASCE-A. Suchanski Consulting Engineers

Civil, structural, geotechnical and environmental engineering

PO Box 57, Punakaiki T: +64 21 203 9975
RD1 Runanga 7873 W: asce.co.nz
West Coast E: eng.asce@icloud.com
New Zealand

6 September 2024

Planning Department
Grey District Council
PO Box 382
Greymouth 7805

Dear Sir/Madam,

Professional Services - Peter Savage- Subdivision report for the proposed subdivision of Lot 1 DP 586583, 3021A State Highway 7, Matai, Ngahere, Grey.

This report has been requested by **Peter Savage** of Ngahere (Matai) (the Client/Owner).

This report has been prepared by ASCE under the below listed scope as in agreement dated **7 August 2024** and based on the Engineering New Zealand (EngNZ) Short Form Agreement for Consultant Engagement, and Client's further instructions :

"Scope and nature of the services:

1. The scope of this part of the project is to carry out a qualitative geotechnical land assessment with respect to natural hazards and prepare a brief report on verification of **six (6)** building sites for a dwelling on each of the proposed new lots as shown on **Proposed Lot 1 DP 586583 prepared by Survus Consultants Ltd, received from Survus via email on 2 August 2024**, with respect to the natural hazards as in section 106 (a) of Resource Management Act. Note: proposed new **Lot 4** will be excluded from the report as it already has a dwelling on it.
 - 1.1. The verification will be based on a qualitative geotechnical assessment including a visual inspection of the area in a close proximity to each building site on each new lot, observation of test pits and field soil assessment, study of aerial photos and hazard maps from the **Grey** District and West Coast Regional Councils, if available.
 - 1.2. The building sites, say 15x15 m, on each new Lot will be as indicated and marked by you before our site visit. No part of each site on new Lots 2 and 3 shall be no closer than 10 m to the top edge of the scarp in the northern part.
 - 1.3. The potential building sites are for the following proposed buildings: a new single/double storey, timber frame, house meeting the requirements of NZBC and at least NZS 3604, Importance Level (IL) 2 as per NZS 1170.
2. The scope of this part of the project is to carry out assessment of suitability of receiving soils for an on-site sewerage with respect to AS/NZS 1547. The outcome will be recommendations for each new Lot, and general description of a suitable system. As a model a 3 bedroom house will be used.
3. The scope of this part of the project is to provide recommendations on availability of suitable disposal of roof collected stormwater for new Lots with respect to NZBC Clause E1 Surface Water. As a model a 3 bedroom house will be used.
4. The scope of this part of the project is to design and prepare a set of technical drawings for **two** RoW access roads branching off the existing drive being part of previous subdivision. The new RoWs will be along the easements named RoW Lot 1, 2 and 3 and RoW Lots 5 and 7 as shown on the above Survus plan. The new ROWs will be with gravel surface mainly. The new ROWs would need to meet the requirements of NZS 4404:2010 unless approved otherwise by **GDC**.
 - 4.1. The design will be based on the above subdivision plan, visual inspection of the relevant areas of land, the test pits and some soil probing.

- 4.2. Please note that the Council may require having longitudinal sections of the roads shown on the drawings. This is excluded at this stage. Should the Council require the longitudinal sections later, your surveyor would have to carry out the actual survey and then we will be able to include them in our drawings.
5. The scope of this part of the project is to carry out site observations at Construction Monitoring (CM) 1 Level with respect of the listed below items. The CM will be based on site visits by the writer at construction stages **for both RoWs** as listed in relevant reports, Schedule of Site Observations (SSO), and review of relevant Producer Statements-Construction (PS3) or Schedule 1A Design Certificate (NZS 4404) and documents/digital photos from the Contractors responsible for the relevant parts of the works, which should be submitted to the Engineer by the Owner/ Contractor at the end of relevant works. At the end of works after the relevant final inspection, if satisfactory, ASCE will issue their relevant PS-Construction Review (PS4) or **Schedule 1C Construction Certificate** (NZS 4404). The Owner/Contractor shall give the Engineer a minimum 4 working days' notice before a required site visit. "

The purpose of this report is to:

- Assess in general whether the whole of the land within the proposed new **Lots 1, 2, 3, 5, 6 and 7** being part of current **Lot 1 DP 586583**, hereinafter called the land, is suitable for that purpose with regard to natural hazards as in section 106 of Resource Management Act (RMA) namely: erosion, falling debris, subsidence, slippage and inundation.
- Assess in detail whether within each of the proposed new **Lots 1, 2, 3, 5, 6 and 7** there is a site for a residential building, which is unlikely subject to the above hazards.

It is proposed to subdivide **Lot 1 DP 586583** into **7 (seven) lots** as shown on the plan titled **Proposed Lot 1 DP 586583 prepared by Survus Consultants Ltd, received from Survus via email on 2 August 2024**, **Note: Lot 4** is excluded from this report as it already has a recently built residential building.

This report covers the land within the new proposed **Lots 1, 2, 3, 5, 6 and 7** and one building site on each of the new Lots. Any use of the information in this report for other sections, lots or properties is explicitly not permitted. **Please refer to Limitations at the end of the report.**

As requested by the Client the writer inspected the land around the proposed building sites on **28 August 2024**. The site visit was carried out together with the Client/Owner, and the Client/Owner also marked the building sites on each respective Lot. Test pits at each proposed building site were dug with a small digger operated by the Client/Owner.

The investigation carried out by the writer included the following:

- a) Obtaining information regarding the natural hazards from the **Grey District Council (GDC)** and, if necessary, from the West Coast Regional Council. No information as available.
- b) Viewing the land from distant locations to assess the topography.
- c) Checking vegetation cover and potential catchment areas.
- d) Assessing the proposed building sites with respect to types of soil, age of vegetation and run off water paths and major waterways.
- e) Some probing of soils and observations of soil types from test pits, open banks and fresh cuts near the potential building site.
- f) Examining Geological map of NZ, sheet 12 Greymouth.
- g) Examining topographical maps on websites at Google Maps and GDC website, and on Freshmap computer mapping programme.
- h) "West Coast Regional Liquefaction Assessment" Prepared for West Coast Regional Council, by Beca Limited, 1 November 2021
- i) Reference to scientific papers:
 - "The probability and consequences of the next Alpine Fault Earthquake" prepared by Mark Yetton of Geotech Consulting Ltd for NZ EQC, dated March 1998.

- “Mapping and fault rupture avoidance zonation for the Alpine Fault in the West Coast region” R. Langridge W. Ries, GNS Science Consultancy Report 2009/18 March 201.
- “National Seismic Hazard Model for New Zealand: 2010 Update”, Stirling et al, Bulletin of the Seismological Society of America, Vol. 102, No. 4, pp. 1514–1542, August 2012.
- “Liquefaction case histories from the West Coast of the South Island, New Zealand” by Kirsti M Carr, March 2004, Department of Civil Engineering University of Canterbury.
- Reference to “Planning for Development of Land on or Close to Active Faults”, a guideline to assist resource management planners in New Zealand, prepared for the Ministry for the Environment.

The documents, which, form part of this report are as follows, refer to the Appendix:

- j) Selected photos from various sites within the land. Note: during the site visit several photos were taken and these can be made available on request.
- k) Subdivision Plan as listed above.
- l) GDC provided Hazard Map

1. General observations

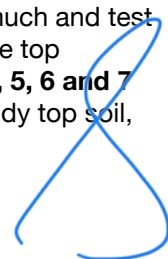
- 1.1. The area of the land (**Lot 1 DP 586583**) is approximate **12 ha** and it has, a part (new **Lot 5**), the south-east boundary common with State Highway 7 (SH7). Access to **Lots 5 and 7**, will be off a new easement running off the main access drive which joins with SH7 at the south-east end. Access to **Lot 6** will be off the existing main access drive. And access to **Lots 1,2 and 3** will be off an existing easement between the existing **Lot 3 DP 5865583** and new **Lot 6**.The existing easement to **Lots 1, 2 and 3** is as well off the main drive.
- 1.2. The land is rather flat within **Lots 1, 5, 6 and 7**. **Lots 2 and 3** are mostly flat but in the north-west part have a moderately steep bank (scarp). All lots have a some 1.5-3 m deep and wide artificial drains running across them which provide main surface drainage. The artificial drains are mostly of ephemeral type and have discharge points at the bank. Other shallow open natural and artificial drains are of ephemeral type as well and discharge into drains along the main drive.
- 1.3. A small area within **Lots 1 and 6** has a shallow surface ponding which will discharge into an extension of some 1.5 - 3 m wide and deep artificial drain running via **Lots 2 and 3** and then over the bank.
- 1.4. The land on **new Lots** is covered mainly with grazing paddocks and with exception of **Lot 7** all other lots have small clumps of native bush with mature trees. The bank running along the north west part of **Lots 1 and 2** is covered with native bush as well.



1.5. There are no prominent near surface geological features within the area near the land apart from the scarp.

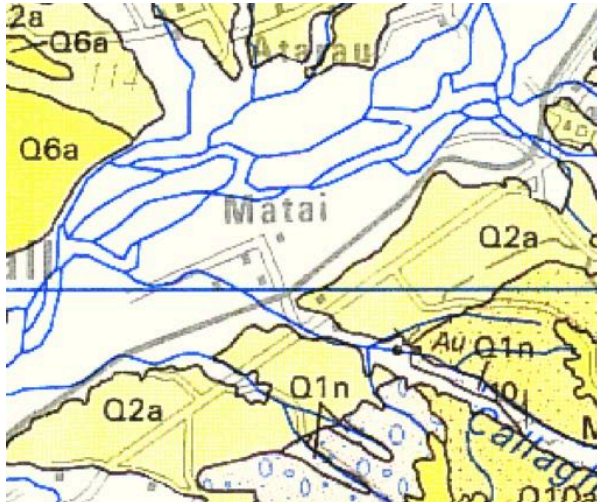
1.6. During the site visit we took coordinates of various indicative geological features on and near the land. The coordinates of sites are in NZTM taken with a hand held GPS unit are shown for each lot and marked on the part cadastral map with red squares. **Note:** hand held GPS units are inherently inaccurate and can be off mark by several meters hence the below coordinates are only approximations of the actual marks/features.

1.7. The soils within the land do not vary much and test pit observations can be described from the top (Ground Level GL) as follows: **Lots 1, 2, 3, 5, 6 and 7** some 100 to 200 mm deep ORGANIC sandy top soil,



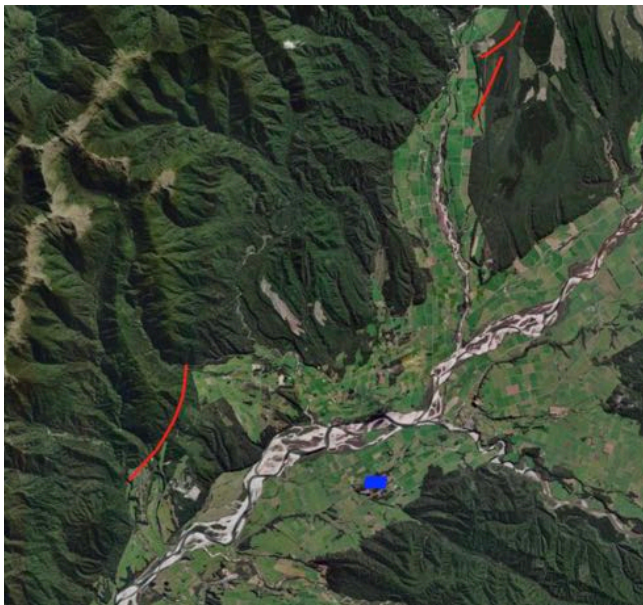
then approximately 600 to 800 mm deep layer of small to medium round GRAVEL in silty SAND matrix mixed with some ORGANIC MATTER, then a deep layer of a very dense small to medium round to sub-round GRAVEL in semi cemented sandy matrix, there re layers of iron precipitate (iron pan) within GRAVEL layers. Gravels are of alluvial origins and show layers of iron precipitate (iron pan).

- 1.8. The regional geology appears to be, based on the Geology of **Greymouth Area Map, sheet 12**, scale 1:250 000 (a part of the map is shown below) as follows:



- Late Mid Holocene (Quaternary) river alluvial gravel and sand and fan deposits (Q5a).
- The site observations generally confirm the above regional geology.

- 1.9. The land is in the high seismic activity region with an approximate design hazard factor Z as 0.4 as extrapolated from part 5 of NZS 1170, and the approximate return of large Alpine Fault earthquakes is 200 to 400 years where the last recorded on-land event took place some 370 years ago.
- 1.10. From the Geological map of NZ, sheet 12 Greymouth and the NZ Active Faults Database on the Institute of Geological and Nuclear Sciences (GNS) website it appears that there are no active faults close to the land.



The north tip of Montgomerie Fault is some 6 km north west from the land and the south west end of Big River Fault is some 12 km north east from the land and both are listed as active on the GNS site. Also the approximate distance to the Alpine Fault, which is classed as active on the GNS site, is more than 60 km from the land. The exact location of the active faults with respect to the boundaries of the land could not be ascertained as the detailed mapping of the faults is outside the scope of this report, however, the land is more than 2 km away from the nearest active fault. The approximate distance to the fault is more than 200 m, which has been adopted by majority of TAs as the safe distance to any fault lines from proposed residential developments. Refer to the aerial photo from GNS showing the active Fault(s) (red lines) and the land (blue rectangle).

2. Lots 1, 2, 3, 5, 6 and 7

2.1. Natural hazards evaluation for building sites

- a) Erosion. Apart from the network of open surface drains no source and signs of major erosion have been noticed during the inspection near the proposed house site on the above listed Lots. Hence there is no threat to the house sites from this hazard.
- b) Falling debris. There is no source of this hazard for the house sites.
- c) Subsidence. The soils within the land are rather uniform and from test pit observations can be described from the top down as follows: **Lots 1, 2, 3, 5, 6 and 7** some 100 to 200 mm deep ORGANIC sandy top soil, then approximately 600 to 800 mm deep layer of small to medium round GRAVEL in silty SAND matrix mixed with some ORGANIC MATTER, then a deep layer of a very dense small to medium round to sub-round GRAVEL in semi cemented sandy matrix, there re layers of iron precipitate (iron pan) within GRAVEL layers. Gravels are of alluvial origins and show layers of iron precipitate (iron pan). Some side seepage and surface water retention by layers of iron precipitate were observed in Test Pits on **Lots 1, 2, 3 and 6**, but actual Ground Water Table (GWT) was not found and was assumed to be several meters meters below GL.
- c)i. The report “ West Coast Regional Liquefaction Assessment” Prepared for West Coast Regional Council, by Beca Limited, 1 November 2021, forms the bases for the West Coast Building Authorities to assign whether the area where the particular property is The Liquefaction Damage is possible. The land is within such area hence, the liquefaction consideration for Subsidence Hazard is necessary. However, from our site observations the top layers of soil overlain a deep layer of dense GRAVEL and the GWT was not found but estimated to be several meters below GL. Therefore, we consider the liquefaction hazard as not applicable to the house sites on **Lots 1, 2, 3, 5, 6 and 7**.
- d) Inundation. The existing surface channels appear to sufficiently divert runoff surface water away from the land near the house sites on **all above listed Lots**, except for a small part of **Lots 1 and 6** has a shallow surface ponding which should be drained by the extension to the existing surface drain. Also, we studied several old and recent aerial photographs (no stereoscopic study was done), geological maps and GNS's Active Faults database. The relevant old aerial photos were obtained from <https://retrolens.co.nz>. The more recent ones were obtained from Google and Apple Maps and BDC aerial maps website. For **Lots 1 and 6** where a small shallow ponding occurs, this will have to be drained via a short drain extension to the existing open channels as proposed by the Owner.
- d)i. We could not find any traces of flooding on the land apart from the above mentioned small area of shallow ponding, hence we assume that the building sites as listed below are unlikely subject to this hazard, except for Lots 1 and 6 where small shallow ponding is.
- e) Slippage. In general, there is no source of this hazard near the new house sites. However, for **Lots 1 and 2** there is a need the minimum distance from any parts of a new building to the top edge of the bank. This will be recommended below.

2.2. Building sites for new houses on Lots 1, 2, 3, 5, 6 and 7

- f) The coordinates in NZTM system of the approximate NW side of the building were taken with a hand held GPS unit and are as follows. **Note:** hand held GPS units are inherently inaccurate and can be off mark by several meters hence the below coordinates are only approximations of the actual marks/features:

- **Lot 1 - Eastings: 1477026 Northings: 5308596**
- **Lot 2 - Eastings: 1476934 Northings: 5308644**
- **Lot 3 - Eastings: 1476968 Northings: 5308702**
- **Lot 5 - Eastings: 1477381 Northings: 5308695**

- **Lot 6 - Eastings: 1477145 Northings: 5308630**
- **Lot 7 - Eastings: 1477233 Northings: 5308651**

g) Note, the location of each building site does not include any **GDC** planning limitations.

3. Natural Hazards recommendations for Lots 1, 2, 3, 5, 6 and 7

Considering the geological formation and the topography of the land it can be concluded that it is suitable for the purpose of subdivision. However, the following recommendations must be met to ensure that the identified building sites are unlikely subject to natural hazards listed below in item **4.0** and the construction of a residential building on the respective sites does not contribute to or cause any of the hazards:

3.1. General for Lots 1, 2, 3, 5, 6 and 7:

- a) Any proposed residential buildings on new lots shall comply with NZ Build Code.
- b) The building sites on each new lot shall be near the coordinates in item **2.2**.
- c) Any new buildings being Importance Level (IL) 2 as per NZS 1170 or higher shall have a specific soil assessment for the ultimate bearing capacity carried out by a suitably qualified Chartered Professional Engineer (CPEng). Note: Already carried out by ASCE for **Section 221**.
- d) All existing and formed drains, and new culverts and drain pipes including along access roads shall be kept clear of any vegetation and any obstructions to water flow.
- e) The finished floor level (FFL) shall be at least 400 mm above the original near respective site GL.

3.2. Specific for respective Lots

3.3. Lot 1 and Lot 2

- f) Any part of a new building shall be at least 10 m away from the top edge of the bank.

3.3.1. For Lot 1 and 6

- g) A small shallow ponding area will have to be drained via a short drain extension to the existing open channels as proposed by the Owner. This work, as confirmed by the Owner, has been completed.

4. Natural Hazards conclusion for Lot 1

- 4.4. With regard to natural hazards as in section 106 of RMA as listed below, in general we believe that the whole of the land within the new **Lots 1, 2, 3, 5, 6 and 7** provided that the recommendations in items **3.1 and 3.2** of this report have been implemented, is, under normal conditions, suitable for the purpose of subdivision.
- 4.5. In detail we believe that within the land proposed for the subdivision there is, as identified in this report in relevant items for each respective new Lot, a site for a residential building, which under normal conditions, provided the recommendations in this report have been implemented, will unlikely be subject to erosion, falling debris, subsidence, slippage and inundation (this last hazard is subject to mitigation method described above).

5. On-site sewerage system availability assessment for Lots 1, 2, 3, 5, 6 and 7

- 5.1. From our site observations the top receiving soils present on the land near the building sites have listed below Categories as per AS/NZ Standard 1547 On-site domestic - Wastewater Management.
- 5.2. All Lots: The receiving soils are deep layers dense semi cemented GRAVEL with thin layers of iron precipitate (iron pan). Hence they can be assessed as Category 3 Imperfectly Drained (NZS1547) and would require a specifically designed on-site wastewater treatment and disposal systems for each of new Lots. The design would need to be provided by a suitably qualified Chartered Professional

Engineer (CPEng). In general a suitable system could be gravity fed and comprise a large modern septic tank with an effluent filter at the outlet or similar, and a disposal field typically a sandy/gravel vented filter trench(s) or evapo-transpiration beds. A system like this will provide high quality effluent.

6. Stormwater disposal availability assessment

- 6.1. From the observations of the topography and existing natural and artificial surface drainage the roof collected storm water disposal should not cause major problems for each new Lot provided the collection and disposal of roof collected storm water is as per document E1 of NZ Building Code and as below recommendations.
- 6.1.1. **For all Lots:** the discharge of the collected storm water shall be via suitably sized pies into the deep channels present on each Lot or if more convenient via suitably sized pipes into the road open channels along the main drive or easements.



Prepared by

Andrzej Suchanski
B.E. Hons (Civil), CMEngNZ,
CFEng (200225), IntPE

for ASCE

Limitations:

1. This document has been prepared solely for the benefit of **Peter Savage** (the Client/Owner) and the **Grey District Council** (Territorial Authority). The reliance by other parties on the information or opinions contained in this report shall, without ASCE prior review and agreement in writing, be at such parties sole risk.
2. Observations and conclusions in this report are based on a method described herein. The nature and subsoil conditions found were inferred over the whole of the site and it must be appreciated that actual conditions could vary from the assumed model and with the passage of time. Should different conditions be found during construction works, please contact this office immediately.
3. This document has been prepared for the particular purpose/services outlined in ASCE EngNZ based proposal/ contract as signed by the Client and no responsibility is accepted for the use of this document, in whole or in part, in other contexts or for any other purpose. If a purpose/service is not expressly indicated, do not assume it has been provided. If a matter is not addressed, do not assume that any determination/recommendation has been made by ASCE in regards to it.
4. The ownership of this document lies with ASCE (the Consultant) until the relevant payment has been received.

APPENDICES:

- A. Selected photos from various sites within the land.**
- B. Subdivision Plan**
- C. Natural Hazards Map as obtained from GDC**





Typical view of land near Lots 5 and 7



Lot 5 typ land and open surface artificial drain

A blue handwritten signature or mark, consisting of a stylized, looped shape.



Lot 6 typ view



Lot 6 shallow ponding





Lot 1 typ view



Lots 1 and 2 view towards the bank

A blue handwritten mark or signature, possibly initials, located in the bottom right corner of the page.



Lot 1 TP4



Lot 2 TP5

A blue handwritten signature or scribble located in the bottom right corner of the page.



Lot 3 TP6



Lot 5 TP1





Lot 6 TP3



Lot 7 TP2

Notes:

A handwritten signature in blue ink, consisting of a stylized, cursive letter 'S' or similar shape.



- NOTES :**
1. THIS SURVEY HAS NOT INCLUDED SITE MARKING OF THE BOUNDARY POSITIONS UNLESS OTHERWISE INDICATED.
 2. NO UNDERGROUND SERVICE INFORMATION IS SHOWN ON THIS PLAN. THE LOCATION OF ANY SUCH SERVICES SHOULD BE CONFIRMED WITH THE RELEVANT LOCAL AUTHORITY OR UTILITY SERVICE PROVIDER.
 3. SCHEME PLAN ONLY, AREAS & DIMENSIONS ARE APPROXIMATE & SUBJECT TO FINAL SURVEY.

MEMORANDUM OF EASEMENTS			
Nature	Servient Tenement		Dominant Tenement
	Lot No.	Shown	
Right of Way & all services	1	A	2,3
	2	B	1,3
	3	C	1,2
	5	D	7
	7	E	5
	5	F	4,6,7
	6	G	4,5,7
	7	H	4,5,6

SCHEDULE OF EASEMENTS			
Nature	Servient Tenement		Grantee
	Lot No.	Shown	
Convey electricity in gross	1	A	Westpower Ltd
	2	B	
	3	C	
	4	I	



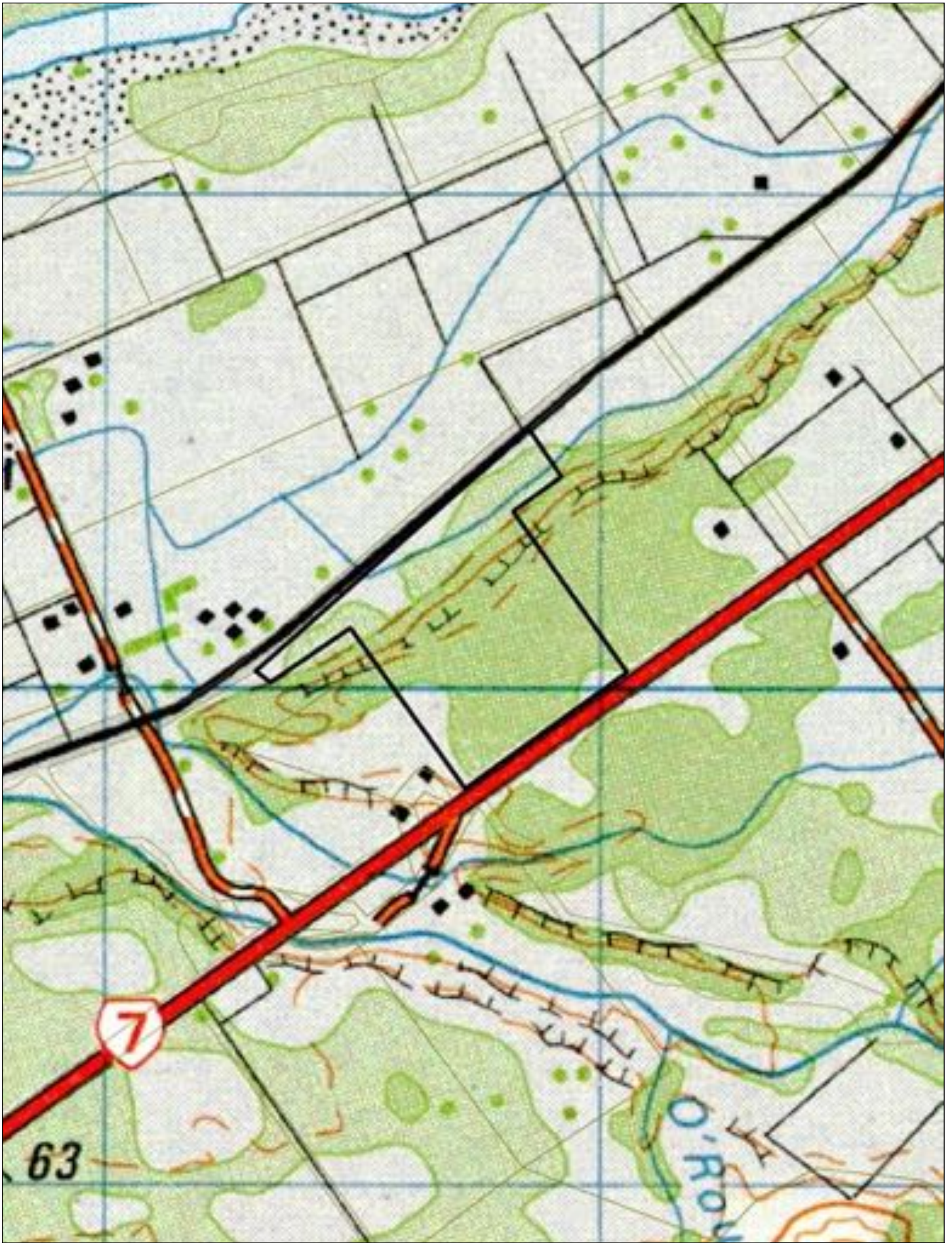
4 Meadow Street, PO Box 5558, Papanui, Christchurch
 P 03 352 5599 AMBERLEY 03 314 9200
 F 03 352 5527 ASHBURTON 03 307 7021
 TOLL FREE 0508 787 887 DARFIELD 03 318 8151

REV	DATE	REVISION DETAILS	DRAFTED SRS	VERIFIED
B	13/08/24	FOR SUBDIVISION CONSENT		
A	19/07/24	FOR SUBDIVISION CONSENT		

APPROVED _____
 DATE _____

PROJECT: PETER SAVAGE - 3201A STATE HIGHWAY 7, NGAHERE
 TITLE: PROPOSED SUBDIVISION OF LOT 1 DP 586583
 RT 1110335 SHEET 1 OF 1

INFORMATION ONLY	
PROJECT NO	16089
SCALE	1 : 2000 (A3)
DRAWING NO	SC-01
SIZE	A3
REV	B



Topo Map

The information displayed is schematic only and serves as a guide. It has been compiled from Grey District Council records and is made available in good faith but its accuracy or completeness is not guaranteed. Cadastral Information has been derived from land Information New Zealand's (LINZ) Core Record System Database (CRS).

CROWN COPYRIGHT RESERVED. © Copyright Grey District Council.



Scale 1:10000

Tuesday, 3 September 2024

Original Sheet Size 210x297mm



Assets Map

The information displayed is schematic only and serves as a guide.
It has been compiled from Grey District Council records and is made available in good faith
but its accuracy or completeness is not guaranteed.
Cadastral Information has been derived from land Information New Zealand's (LINZ)
Core Record System Database (CRS).

CROWN COPYRIGHT RESERVED. © Copyright Grey District Council.



Scale 1:5000

Tuesday, 3 September 2024

Original Sheet Size 210x297mm

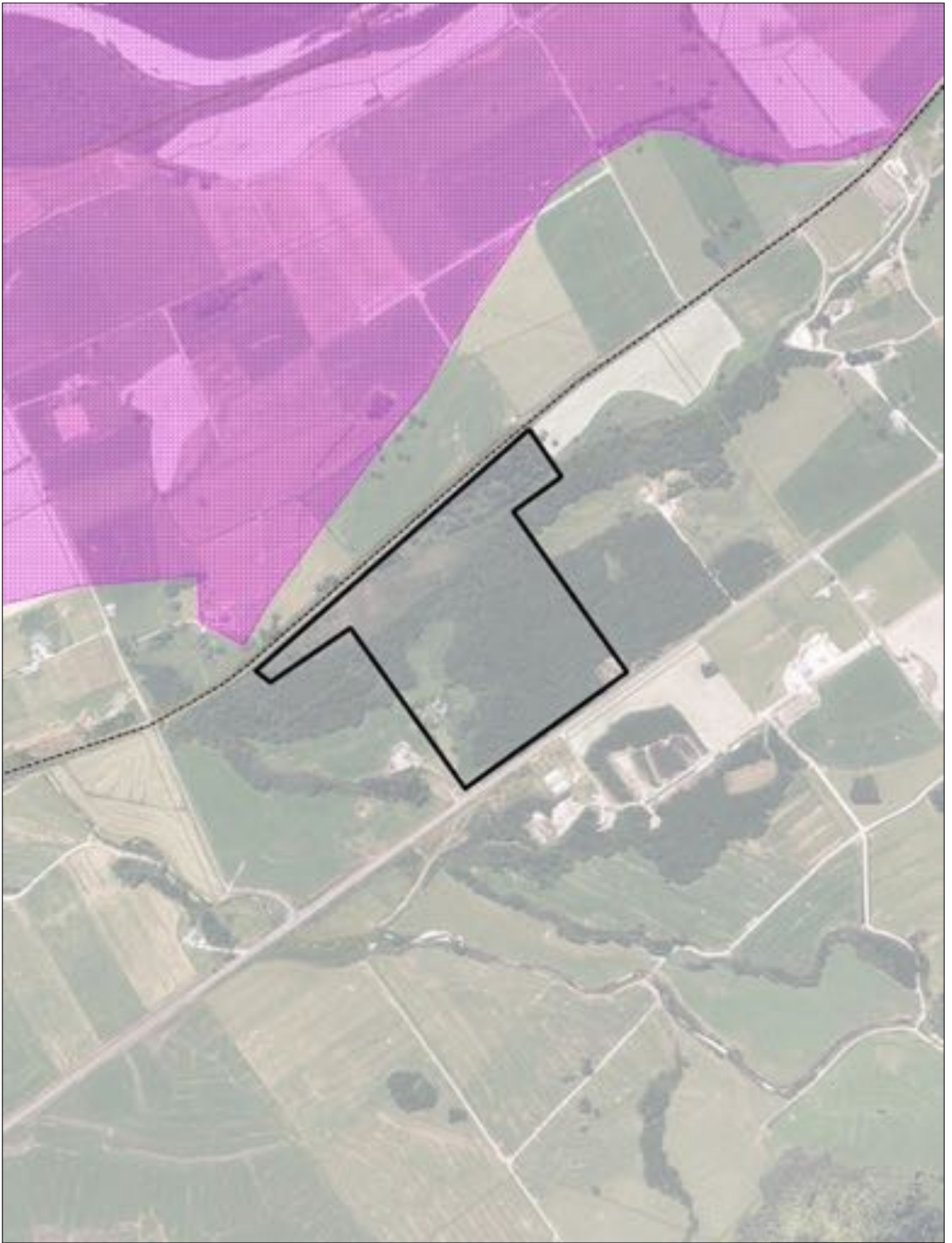
All Maps

Parcels

-  Road Parcel
-  Hydro Parcel
-  Railway Parcel
-  Land Parcel

Infrastructure Assets Plan Legend

- | | |
|--|--|
| <p> Wastewater</p> <ul style="list-style-type: none">  Wastewater Points <ul style="list-style-type: none">  Manhole  Pump Station  Outlet  Floodgate  Pond  Valve  Rodding Eye  Inlet  Maintenance Shaft  Treatment Station  Unknown  Wastewater Lines <ul style="list-style-type: none">  Gravity Main  Pump Rising Main  Service Connection  Wastewater Separation Status <ul style="list-style-type: none">  Not Separated  Separated  Separated & Hooked Up  Hooked up - maybe still discharging  Unknown <p> Water</p> <ul style="list-style-type: none">  Water Points <ul style="list-style-type: none">  Valve  Fire Hydrant  Blank Cap  Pump Station  Meter  Reservoir  Tap  Fountain  Well  Manhole  Treatment Station  Backflow Preventer  Air Release Valve  Filter  Water Lines <ul style="list-style-type: none">  Pipe Main  Rider Main  Rising Main  Service | <p> Stormwater</p> <ul style="list-style-type: none">  Stormwater Points <ul style="list-style-type: none">  Manhole  Outlet  Catchpit  Inlet  Floodgate  Pump Station  Unknown  Rodding Eye  Stormwater Lines <ul style="list-style-type: none">  Gravity Main  Open Drain, Channel  Culvert  Gravity Drain  Service, Connection, Catchpit Lead  Rising Main  Unknown  Private Drain or Culvert <p> Roads</p> <p> Railways</p> |
|--|--|



Flood Map

The information displayed is schematic only and serves as a guide. It has been compiled from Grey District Council records and is made available in good faith but its accuracy or completeness is not guaranteed. Cadastral Information has been derived from land Information New Zealand's (LINZ) Core Record System Database (CRS).

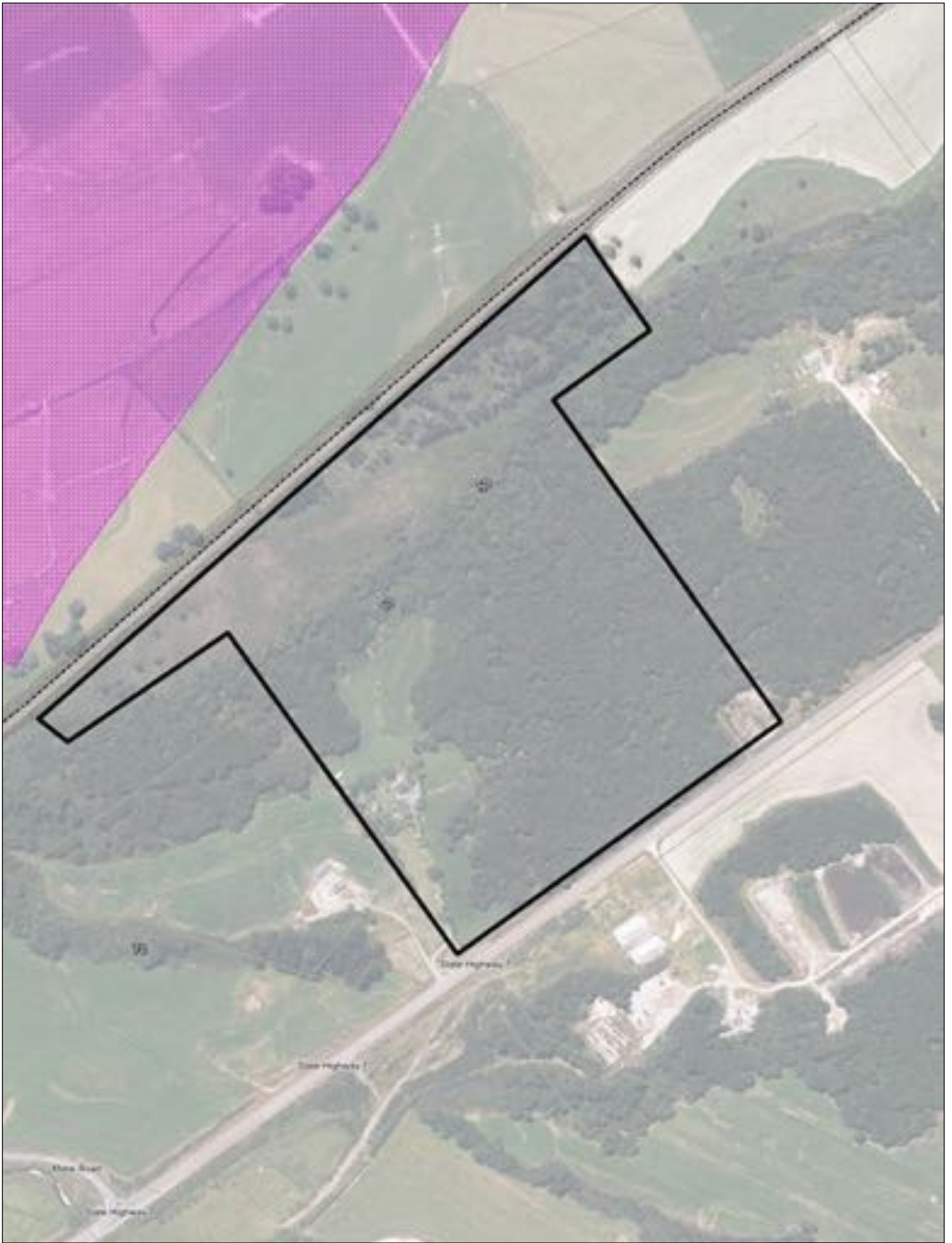
CROWN COPYRIGHT RESERVED. © Copyright Grey District Council.



Scale 1:10000

Tuesday, 3 September 2024

Original Sheet Size 210x297mm



Flood Map 2 Closeup

The information displayed is schematic only and serves as a guide. It has been compiled from Grey District Council records and is made available in good faith but its accuracy or completeness is not guaranteed. Cadastral Information has been derived from land Information New Zealand's (LINZ) Core Record System Database (CRS).

CROWN COPYRIGHT RESERVED. © Copyright Grey District Council.



Scale 1:5000

Tuesday, 3 September 2024

Original Sheet Size 210x297mm

Flood Map Legend

- Known Flood Hazards
-  Sawyers Creek 1978 Flood
 -  September 1988 Flood
 -  November 1984 Flood
 -  WCRC Flood Hazard Maps
 -  Surface Flooding
- Roads 
- Railways 
- Land Parcels 

Contour Legend

- Contours (1:50)
-  100m intervals
 -  20m intervals

Notes on Flooding:

Data obtained predominantly from West Coast Regional Council records and supplemented with GDC records as and when new information comes to light. It is not intended to be used as a detailed description of exact area flooded but simply to highlight the fact there has been flooding there in past.

If you are concerned about any information shown on these plans then please contact GDC or WCRC for further clarification.

Landslide Map Legend

- Landslide Zones
-  High
 -  Medium
 -  Low
 -  Negligible
 -  not classified
-  Known Landslips
- Roads 
- Railways 
- Land Parcels 

Faultline Legend

-  Alpine Fault Avoidance Zone
-  Alpine Fault
-  Other Known Fault Lines
-  Alpine Fault Traces
-  Roads
-  Railways
-  Land Parcels

Notes on Landslides & Faults:

High – Slope movements occurring within the last 50 years

Medium – Slope movements showing no sign of activity in last 50 years

Low – Slope angle in excess of 15 degrees with no history of slope movements

Negligible – Slope angle less than 15 degrees with no history of slope instability

Data sourced from IGNS (Institute of Geological & Nuclear Sciences). Some new information on Landslides has also been included as it comes to light. If you are concerned about information shown then please contact IGNS or a suitably Qualified Geotechnical Engineer for further advice.



Landslide Map

The information displayed is schematic only and serves as a guide.
It has been compiled from Grey District Council records and is made available in good faith
but its accuracy or completeness is not guaranteed.
Cadastral Information has been derived from land Information New Zealand's (LINZ)
Core Record System Database (CRS).

CROWN COPYRIGHT RESERVED. © Copyright Grey District Council.



Scale 1:10000

Tuesday, 3 September 2024

Original Sheet Size 210x297mm



Landslide Map Closeup

The information displayed is schematic only and serves as a guide.
It has been compiled from Grey District Council records and is made available in good faith
but its accuracy or completeness is not guaranteed.
Cadastral Information has been derived from land Information New Zealand's (LINZ)
Core Record System Database (CRS).

CROWN COPYRIGHT RESERVED. © Copyright Grey District Council.



Scale 1:5000

Tuesday, 3 September 2024

Original Sheet Size 210x297mm



Tsunami Map

The information displayed is schematic only and serves as a guide.
It has been compiled from Grey District Council records and is made available in good faith
but its accuracy or completeness is not guaranteed.
Cadastral Information has been derived from land Information New Zealand's (LINZ)
Core Record System Database (CRS).

CROWN COPYRIGHT RESERVED. © Copyright Grey District Council.



Scale 1:10000

Tuesday, 3 September 2024

Original Sheet Size 210x297mm

ZONES AND EVACUATION

The Red Zone is simply the topographic map coast-line and is to be usually evacuated in response to the 0.2–1m wave height threat level, called 'threat to beach, harbours, estuaries and small boats'.

The Orange Zone matches the 3–5m wave height threat level, called a 'moderate land threat', arriving on or below high tide. In other words, if a moderate land threat level (or a minor land threat level) is determined, only the Red and Orange Zones need be evacuated – even if the wave arrived at high tide.

The Yellow Zone matches the 'maximum credible tsunami wave height from all sources' taking into account the worst cases from both modelling and known geological deposits. In an official warning larger than the moderate land threat level, or in the case of a natural or informal warning where the potential wave height is unknown, all zones including the Yellow Zone should be evacuated.

Summary

Tsunami Evacuation Zones (regional zones) for the West Coast based on a region-wide DEM derived from Geographx New Zealand DEM (version 2.1). Modelling done using a GIS method implementing attenuation relationships for land, harbours and rivers. The 8 m resolution DEM based on LINZ Topo50 topographic 20 m contours, spot heights and SRTM satellite data was modified by setting sea areas and negative DEM elevations to zero. The accuracy of the zones is closely related to the accuracy of the DEM and topographic features (coastline, harbours and rivers) used for modelling. Because of the mismatch between the DEM and river location, the DEM was not used when modelling river inundation but the approximate fall of the river was estimated from the distance along the river from the coastline to the 20 m contour. The output river inundated areas were clipped with 20 m elevation contour which in most cases overestimates the inundated areas around rivers. Red Tsunami Evacuation Zone created by the West Coast Regional Council based on Coastline from LINZ Topo50 and modified to include beach area and into waterways. Modifications are based on coastal oblique photography, 2010/11 aerial photography and spot heights.

Use limitations

The original data has been prepared by the Institute of Geological and Nuclear Sciences Limited (GNS Science) exclusively for and under contract to West Coast Regional Council as part of GNS Letter Report 2014/200LR - Tsunami evacuation zone boundary mapping: West Coast Region.

Unless otherwise agreed in writing by GNS Science, GNS Science accepts no responsibility for any use of, or reliance on any contents of this Report by any person other than West Coast Regional Council and shall not be liable to any person other than West Coast Regional Council, on any ground, for any loss, damage or expense arising from such use or reliance. Modified data has been prepared by the West Coast Regional Council and provided to Grey District Council, Buller District Council, Westland District Council, St Johns, NZ Fire Service, and other organisations as needed for the planning and execution of emergency response and recovery.

These layers are intended for internal use by Civil Defence Emergency Management, Councils and Emergency Services as a tool to aid in planning and decision making. The data has accuracy limitations, is based on a very long return time event (2500 year), and is subject to change with better modelling base data and changes to land, land cover and bathymetry. For these reasons the data provided cannot be relied for any reason and are purely indicative.

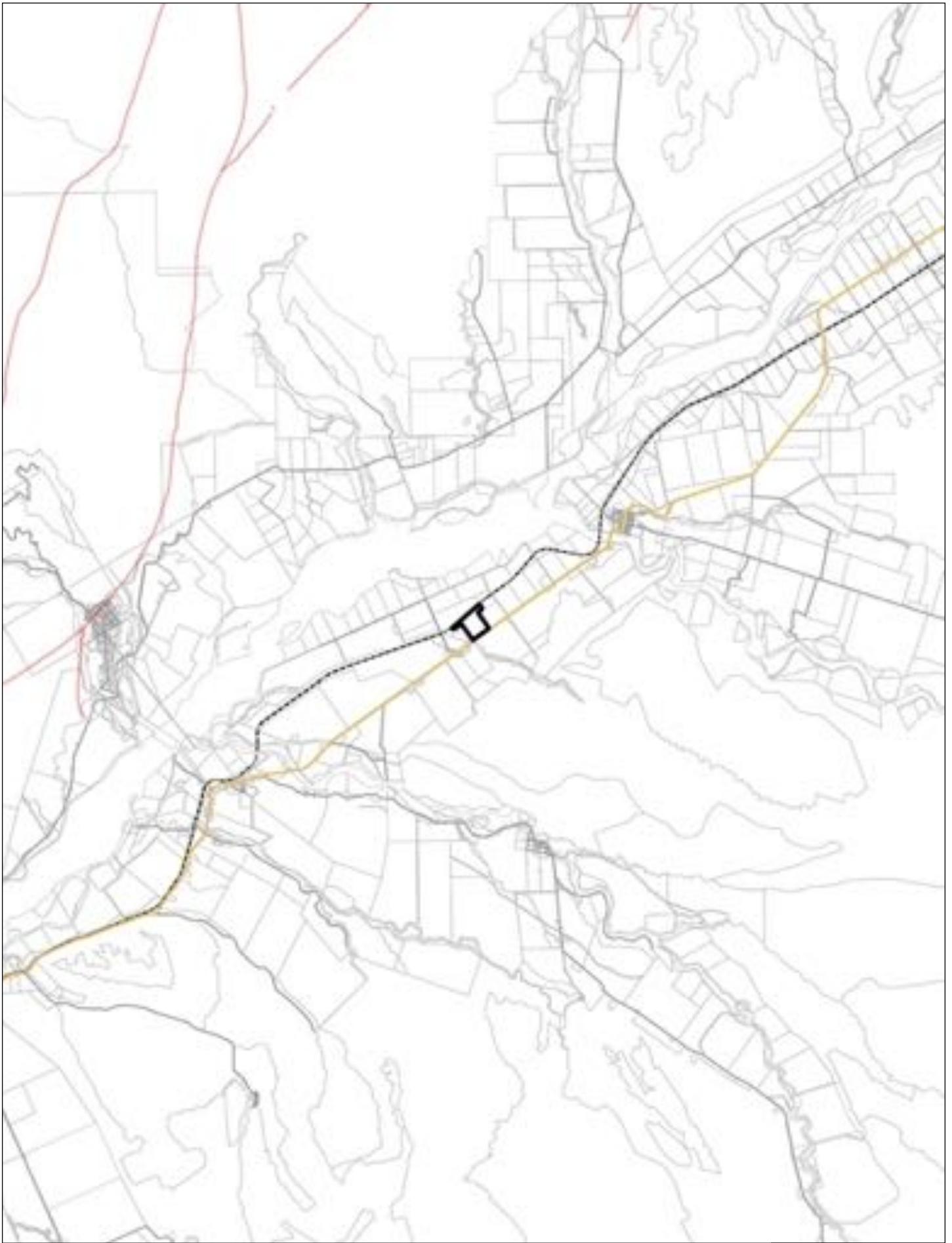
Per the advice from the West Coast Regional Council, the information provided herein is based on very high level research with the conclusions arrived at purely indicative at best. It is suggested that advice be taken from the West Coast Regional Council before any commercial and other decisions in relation to properties affected are taken.



Tsunami Map 2 Closeup

The information displayed is schematic only and serves as a guide.
It has been compiled from Grey District Council records and is made available in good faith
but its accuracy or completeness is not guaranteed.
Cadastral Information has been derived from land Information New Zealand's (LINZ)
Core Record System Database (CRS).

CROWN COPYRIGHT RESERVED. © Copyright Grey District Council.



Faultline Map

The information displayed is schematic only and serves as a guide. It has been compiled from Grey District Council records and is made available in good faith but its accuracy or completeness is not guaranteed. Cadastral Information has been derived from land Information New Zealand's (LINZ) Core Record System Database (CRS).

CROWN COPYRIGHT RESERVED. © Copyright Grey District Council.



Scale 1:100000

Tuesday, 3 September 2024

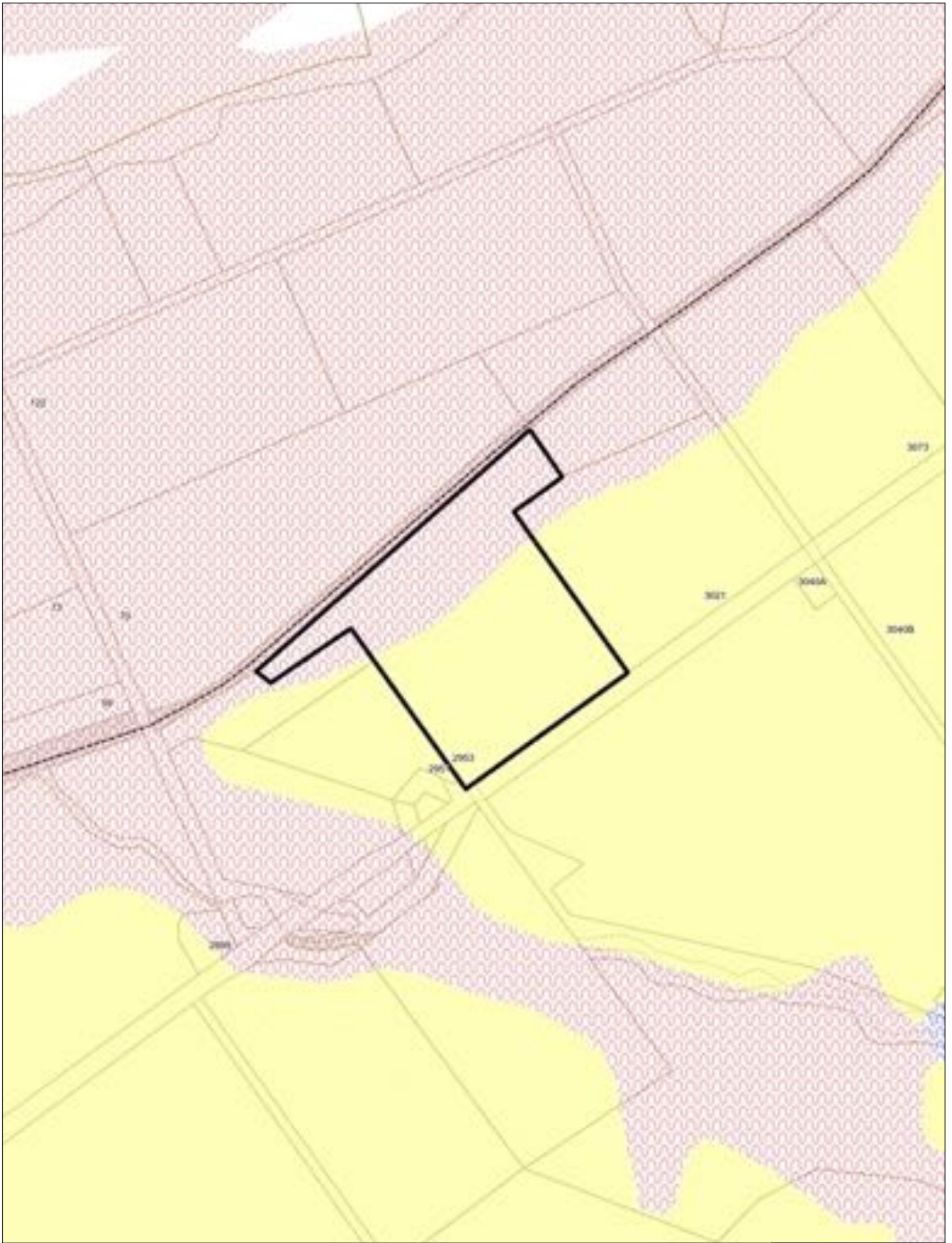
Original Sheet Size 210x297mm



Faultline Map Closeup

The information displayed is schematic only and serves as a guide.
It has been compiled from Grey District Council records and is made available in good faith
but its accuracy or completeness is not guaranteed.
Cadastral Information has been derived from land Information New Zealand's (LINZ)
Core Record System Database (CRS).

CROWN COPYRIGHT RESERVED. © Copyright Grey District Council.



Ground Shaking and Liquefaction Map

The information displayed is schematic only and serves as a guide. It has been compiled from Grey District Council records and is made available in good faith but its accuracy or completeness is not guaranteed. Cadastral Information has been derived from land Information New Zealand's (LINZ) Core Record System Database (CRS).

CROWN COPYRIGHT RESERVED. © Copyright Grey District Council.



Scale 1:10000

Tuesday, 3 September 2024

Original Sheet Size 210x297mm

Legend for Ground Shaking and Liquefaction map

	Zone 1a	Estuarine deposits softer and finer than the rest of Zone 1 Higher liquefaction potential. Higher lateral spreading potential if ground on property or nearby is sloping.
	Zone 1	Deep Soils. Soils more than 20m deep, of moderate density. Recent alluvium or Holocene age. Some Settlement where seismic shaking may compact loose to medium density granular soils. Liquefaction potential. Lateral spreading potential if ground on property or nearby is sloping
	Zone 2	Intermediate ground conditions. Weak or soft rock with soil cover, firm deep soils. Ground shaking - Up to 0.5 unit MM Scale decrease. Peak ground acceleration - Up to 15% decrease.
	Zone 3	Rock. Strong hard rock at shallow depth. Ground shaking - Up to 0.5 to 1.0 unit MM scale decrease. Peak ground acceleration - Up to 30% decrease.
	Liquefaction Sites	

Notes on Ground Shaking Zones:

Zone boundaries have been determined principally from geological maps of the district obtained from IGNS, with some additional limited information. The zone boundaries are approximate only.

Some areas within one zone may behave more like an area in another zone. For any critical structure, a specific site study is needed to determine actual degree of hazard.

Notes on Landslides & Faults:

Data sourced from IGNS (Institute of Geological & Nuclear Sciences). Some new information on Landslides has also been included as it comes to light. If you are concerned about information shown then please contact IGNS or a suitably Qualified Geotechnical Engineer for further advice.