WAIMAKARIRI DISTRICT COUNCIL

Land Information Memorandum

Application

Harcourts Four Seasons 2017 Ltd 15 Good Street RANGIORA CLIENT REFERENCE: 2344	No. LM2602363 Application date 7 October 2026 Issue date 15 October 2026

Property

Valuation No.	2175401002
Location	46 Brockelbank Drive KAIAPOI
Legal description	Lot 312 DP 452661
Owner	Pamela Ann Taylor, Leslie Eric Clarence Taylor, David Leonard Taylor & Anne Lynette Brown
Area (hectares)	0.0558

Rates

Rating Valuation	
Land	$350,000
Capital Value	$770,000
Improvements	$420,000
Date of Last Revaluation	1 June 2025
Current Rates Year 1st July 2026 to 30th June 2027	
Annual Rates	$5,160.05
Current Instalment	$1,290.00
Current Year – Outstanding Rates	$3,153.80
Arrears for Previous Years	$0.00
Next Instalment Due	20/11/2026

Note: Rates are charged in four equal instalments for the period commencing 1 July and ending 30 June each year.

This Land Information Memorandum (LIM) has been prepared for the purposes of Section 44A of the Local Government Official Information and Meetings Act 1987. It contains all the information described in section 44A(2) that is held by the Waimakariri District Council in relation to the land, as at the date above. It is based on a search of the Council's records only and there may be other information relating to the land which is not held by the Council. The records may not show illegal or unauthorised structures or other work on the land.

The Council has not undertaken an inspection of the land or any building(s) on it for the purpose of preparing this LIM. The applicant is solely responsible for ensuring that the land is suitable for a particular purpose. Please consult the Council if you have any questions.

The inclusion or omission of information in or from this LIM does not limit or affect the Council's functions, powers or duties in relation to the land under any statute, regulation, bylaw, policy, or other enactment.

The Council will, upon request, provide additional information about the land. There will generally be an additional fee payable, based on the amount of time required to locate, collate and provide the requested information.

Planning/Resource Management
WAIMAKARIRI DISTRICT PLAN

The Council has undertaken a review of the Operative District Plan and through this process it has developed a New District Plan ('The Partially Operative District Plan') which provides clear objectives, policies and rules on how people use, subdivide and develop land, what and where they can build and what kind of activities they can undertake. The Plan also controls any adverse effects an activity could have on the neighbourhood and protects the uniqueness of our district by looking after our heritage, cultural values, outstanding landscapes and coastal environment. It also incorporates any changes in legislation, national and regional policy statements, environmental standards and other regulations.

The period for lodging appeals against decisions on the Partially Operative District Plan has closed and the Council released the Appeals Version of the Partially Operative District Plan. Many provisions in Partially Operative District Plan – Appeals Version are now beyond challenge and are operative/treated as operative.

The Operative District Plan (2005) now only applies where a relevant provision in the Partially Operative District Plan remains subject to an appeal.

For more information, please refer to the links below:

https://www.waimakariri.govt.nz/council/district-development/district-plan

Please note that if you lodge a building consent application, the Council will assess your project against the District Plan rules that apply at the time. If your proposed activity doesn't need a building consent, please contact the Council's Duty Planner by email duty.planner@wmk.govt.nz to find out if any new rules apply to your proposal or site.

Link to find out the zoning and rules in the 'Partially Operative District Plan- Appeals Version (2025)': https://waimakariri.isoplan.co.nz/draft/

Link to find out the zoning and rules in the District Plan (Operative 2005): https://waimakariri.isoplan.co.nz/eplan/

31/05/2010	RESOURCE CONSENT 095328 : TO UNDERTAKE 338,202 M3 OF EARTHWORKS FOR SOVEREIGN PALMS SUBDIVISION, copy available.
15/05/2012	RESOURCE CONSENT 115258 : 286 LOT SUBDIVISION OF LOTS 500 & 600 DP 432856 TO BE UNDERTAKEN IN 6 STAGES, copy available. A certificate of conditions and consent notices were issued for Stage 1B (Lots 291-303, 365-390, 396-403, 601, 701 & 802) on 28/08/12, copy attached.
28/08/2012	RESOURCE CONSENT 125290 : VARIATION TO CONDITIONS 1, 4 AND 31 OF RESOURCE CONSENT 115258, copy available.
29/11/2012	RESOURCE CONSENT 125431 : VARIATION TO RESOURCE CONSENT 115258, copy attached.

Land Use on Contiguous Properties

No information located

Building

26/07/2012	BUILDING CONSENT BC121633	ERECT DWELLING WITH ATTACHED GARAGE AND ECOTEK MONICA PLUS FREE STANDING PELLET FIRE. A Code Compliance certificate was issued 7/05/2013, copy attached.

It is recommended that Council records are viewed and compared with the actual structure(s) and activities on site to identify any illegal or unauthorised building works or activities.

Site plan, floor plan and elevations are attached.

Sewer and Water

Sewer	Available - Eastern Districts Sewer – plan attached.
Water	Available - Water – Kaiapoi – plan attached. Water quality information for each public water supply scheme can be found by following the link below and click on “Water Quality Testing Results”: https://www.waimakariri.govt.nz/services/water-services/water-supply *Where Council services are located within a property boundary, they may not be built over and appropriate separation distance by any future development must be maintained. If a buildover is considered unavoidable, Council’s Three Waters team must be contacted to discuss the design prior to any resource or building consent being lodged for the site.*

Copy of As Built drainage plan attached

Land and Building Classifications

Heritage Site Reference: No Information Located.
Refer to copy of map from District Plan for other classifications in the immediate vicinity.

Compliance with The Building (Pools) Amendment Act 2016

There is no swimming pool or spa pool registered on this property. If there is a swimming pool please go on-line and register it at https://www.waimakariri.govt.nz/consents-and-licences/building-consents-and-information/swimming-pools-and-barriers/swimming-pool-registration.
A Council representative will then contact you to arrange an inspection of the pool and any associated barriers (fencing). If there is a spa pool please check first at https://www.waimakariri.govt.nz/consents-and-licences/building-consents-and-information/swimming-pools-and-barriers to determine if it needs to be registered.

Swimming pools must be fenced as required by The Building (Pools) Amendment Act 2016. Owners are advised that an inspection of the swimming pool fencing is mandatory every 3 years to ensure its ongoing compliance with The Building (Pools) Amendment Act 2016.

Vehicle Crossing Requirements

The installation of vehicle crossings is the responsibility of the owner of the property to be accessed; vehicle crossings may not be constructed or Council roading assets (e.g., footpaths, kerb ramps, street trees) impacted without an approved Vehicle Crossing Permit. For further information refer to the Council's Vehicle Crossing Information Pack in the following link: https://www.waimakariri.govt.nz/__data/assets/pdf_file/0012/141330/20250721-QD-RDG-Information-002-Vehicle-Crossing-Information-Pack.PDF

Special Land Features

Wind Zone	High
Earthquake Zone	2
Snow Load Zone	4
Other	No Information located

Licences/Environmental Health

No Information located

Natural Hazards

The Waimakariri District Council supplies the following information in accordance with Section 44B of the Local Government Official Information and Meetings Act 1987. Section 44B: inserted, on 1 July 2025, by section 8 of the Local Government Official Information and Meetings Amendment Act 2023 (2023 No 41).

The Council has completed a hazard assessment for the District. This includes flood hazard, location of fault lines, areas susceptible to liquefaction, coastal flood depth and tsunami inundation. **People are encouraged to view this information before making a property decision.** Maps and information on natural hazards for the district are available at: Waimakariri District Natural Hazards Interactive Viewer (arcgis.com)

This Land Information Memorandum includes natural hazard information deemed by Waimakariri District Council and Environment Canterbury to be the most up-to-date, useful, and relevant, and is provided in accordance with the Local Government (Natural Hazard Information in Land Information Memoranda) Regulations 2025. All due care has been taken to ensure current information required to be provided under the regulations is presented below.

Environment Canterbury may hold superseded or less reliable natural hazards information relating to the land that has not been included in this Land Information Memorandum. Please contact Environment Canterbury if you would like to enquire about this information.

Coastal Hazards - No additional information located.

Earthquakes

Comprehensive district-scale earthquake fault mapping commissioned by Environment Canterbury has not identified a fault deformation hazard on the property. However, it is possible there are some faults in Canterbury that are yet to be identified because they are not visible at the ground surface. More information on fault deformation is available on Environment Canterbury's fault deformation map at https://mapviewer.canterburymaps.govt.nz/?webmap=b5f859bd18ee4912828cb092bef6c449.

Technical report information:

Title: General distribution and characteristics of active faults and folds in the Waimakariri District, North Canterbury
Date: July 2013
Author: D Barrell, J Begg (GNS Science)
Commissioned by: Environment Canterbury
Purpose of report: To map and describe known and suspected faults within Waimakariri District to indicate where fault deformation may occur in future. For use in land use policy and planning, infrastructure planning, emergency management planning and community education.
Study area: Waimakariri District
Accessible at: https://www.ecan.govt.nz/document/download?uri=1811999

District-scale liquefaction susceptibility mapping commissioned by Environment Canterbury shows the property, or part of the property, is within an area where liquefiable sediments may be present and liquefaction damage is possible in future earthquakes. More information on liquefaction is available on Environment Canterbury's liquefaction map at https://storymaps.arcgis.com/stories/aa738ffd2e6d42c4b94eb183e218ed97.

Technical report information:

Title: Review of liquefaction hazard information in eastern Canterbury, including Christchurch City and parts of Selwyn, Waimakariri and Hurunui Districts

Date: December 2012
Author: H Brackley (compiler)
Commissioned by: Environment Canterbury
Purpose of report: To collate liquefaction occurrence during the 2010/11 Canterbury earthquakes, and to determine liquefaction vulnerability. For use in land use planning, subdivision and building consenting.
Study area: Coastal Canterbury from the Waipara River mouth to the Rakaia River mouth, including Banks Peninsula, and inland to Rangiora, Aylesbury, Selwyn and Southbridge.
Accessible at: https://www.ecan.govt.nz/document/download?uri=1702192.

Flooding -
Photographs showing the property during or following past flood events may be available. Flood photographs are available on Environment Canterbury's flood imagery register at https://apps.canterburymaps.govt.nz/FIR.

You can request a new site-specific flood hazard assessment for the property from Environment Canterbury at: https://www.ecan.govt.nz/do-it-online/property-information/flood-hazard-assessments

Landslides
An earthquake hazard assessment for infrastructure commissioned by Environment Canterbury in 2009 included a regional-scale map of earthquake-induced landslide susceptibility and locations of known rock avalanches. This report can be downloaded from the Environment Canterbury website at https://www.ecan.govt.nz/document/download?uri=1182107.

Technical report information:

Title: Earthquake hazard assessment for Waimakariri District
Date: September 2009
Author: M Yetton and I McCahon (Geotech Consulting Ltd)
Commissioned by: Environment Canterbury
Purpose of report: To assess earthquake hazards and their potential impacts on engineering lifelines (infrastructure) in Waimakariri District. For use in infrastructure and emergency management planning.
Study area: Waimakariri District
Accessible at: https://www.ecan.govt.nz/document/download?uri=1182107

Subsidence - No additional information located.

Tsunamis
Refer to the Waimakariri District Council's website on the following link:https://www.waimakariri.govt.nz/services/emergencies-and-recovery/in-case-of-an-emergency

Tsunami modelling commissioned by Environment Canterbury shows the property is not affected by flooding in any modelled tsunami scenarios. The modelling considers a range of tsunami sources and events with an average recurrence interval of up to 2500 years. More information is available on Environment Canterbury's tsunami modelling results webapp at https://experience.arcgis.com/experience/1f01c50c3df84a9b8cd41a0353d24785.

Technical report information:

Title: Multiple scenario tsunami modelling for northern Pegasus Bay and northern Banks Peninsula bays
Date: November 2020

Author: J Roger, C Mueller, X Wang (GNS Science)
Commissioned by: Environment Canterbury
Purpose of report: To model inundation from many different local, regional and distant source tsunamis for average recurrence intervals up to 2500 years. For use in emergency management planning, including creating tsunami evacuation zones.
Study area: Northern Banks Peninsula bays from Godley Head to Le Bons Bay, and northern Pegasus Bay from the Waimakariri River mouth to the Waipara River mouth
Accessible at: https://www.ecan.govt.nz/document/download?uri=3996252

Volcanic and Geothermal Hazards - No additional information located.

Wind - No additional information located.

Other - No additional information located.

There are national datasets that could hold relevant information for the property that are not part of Council information. These include:

Natural Hazard Commission (formerly Earthquake Commission) claims at https://www.naturalhazardsportal.govt.nz/s/claims-map
The New Zealand National Seismic Hazard Model (earthquake shaking) at https://nshm.gns.cri.nz/HazardMaps
Earth Science New Zealand's Landslide Database at https://data.gns.cri.nz/landslides/
Earth Science New Zealand's National Flood Tool at https://niwa.maps.arcgis.com/apps/dashboards/8c1db2b8e37841f29a57a38675388897

Network Utility Operators

Contact Mainpower for power availability.
Contact Chorus for phone availability.

Other Information

Lot 312 Geotechnical Report from Coffey Geotechnics, copy attached.

Liquefaction Hazard Assessment information from Coffey Geotechnics and Review from Eliot Sinclair, copies attached.

This property is within 500m of the down gradient direction of groundwater flow of a closed landfill site. As a consequence there is the potential for groundwater below and up gradient of the property to be affected by landfill leachate, see attached plan and 2025 Report on Groundwater Monitoring at Closed Landfill Sites.

Please see the attached Tsunami inundation extent map.
This property is not within the tsunami evacuation zone. You do not need to evacuate this area if you feel a long or strong earthquake, or in an official tsunami warning. More information is available on the Canterbury CDEM Group website at www.cdemcanterbury.govt.nz/hazards/tsunami.

Environment Canterbury may hold information on natural and physical resources that may be relevant to a property. Information on obtaining a Land Information Report can be found at https://www.ecan.govt.nz/do-it-online/property-information/land-information-requests/what-is-included-in-a-lir/

The Listed Land Use Register (LLUR) is a database that Environment Canterbury uses to manage information about land that is or has been associated with the use, storage or disposal of hazardous substances. Further information on the LLUR can be found at https://www.ecan.govt.nz/your-region/your-environment/hazardous-land-use/listed-land-use-register/

Notes

1. Final inspections on buildings were not mandatory prior to 1 January 1993. Should an evaluation of the building be required an independent qualified person should be consulted.
2. Every care has been taken to ensure that the information supplied by the Council on this form is accurate. The Council relies on information available to it, and will not be held responsible for incomplete or inaccurate information provided, or for any errors or omissions made in good faith.
3. Property boundaries shown on the attached copies of computer generated plans are based on the Digital Cadastral DataBase (DCDB). Topographical information shown (for example, buildings etc.) is captured by photogrammetric methods. The accuracy of the two methods of data capture is different and the relationship of buildings to boundaries cannot be relied on.
4. Any enquiry not accompanied by a fee will be invoiced separately. (All prices are GST inclusive.)
5. If a property is cross-leased any building alterations undertaken may affect the lease documents. If this is the case, appropriate resource consents pursuant to the Resource Management Act 1991, and amended Certificates of Title, should be obtained to reflect the correct situation.
6. It is in your interests to locate the boundary pegs by discovery or redefinition before purchasing the property.
7. Property purchasers should ensure particularly with newly constructed dwellings that the vehicle crossing from the road onto the property is fully formed, in accordance with the Councils' specifications. A check can be made with the Customer Services, if any damage is noted, or if the crossing is not completed.
8. Any subdivision or other further development on this property which requires a new connection or an increased level of usage of Council provided services may be subject to the Council's development contributions policy, ie additional charges may be payable. Council services may include water supply, sewerage, stormwater drainage, reserves, roading and community infrastructure.
9. Use of open fires or older-style burners (older than 15 years within the Clean Air Zones) is not allowed. All older style wood burners that do not meet a 1 gram emission standard and are not on the Environment Canterbury authorised list that are 15 years or older can be replaced with a low emission wood burner provided that a building consent is issued by Waimakariri District Council before 31 October 2017. For information regarding domestic fires and wood burners refer to Environment Canterbury's website www.ecan.govt.nz or telephone 0800 324 636.
10. The applicant is advised that this Land Information Memorandum (LIM) covers information held by the Waimakariri District Council. Any relevant information from Environment Canterbury held on Council files has been included. It is in your interest to also request a Land Information Request (LIR) from Environment Canterbury. Further information can be found at www.ecan.govt.nz/services/online-services/property-information.
11. Territorial Authorities have a wide discretion as to the sort of information that is included in the LIM. Section 44A (3) provides that a Territorial Authority may provide in the LIM such other information concerning the land as the authority considers, as its discretion, to be relevant.
12. This Land Information Memorandum does not contain all information held in a property file. Property files may be requested by telephoning the Council's Contact Team on 0800 965 468 or by visiting a Council Service Centre.



Name:_____ Date: 15 October 2026
Signed on Behalf of Council
CATHY GOLDSWORTHY - PROPERTY INFORMATION – LIMS OFFICER

RC095328/ 100603018947 21611-223-00

WAIMAKARIRI DISTRICT COUNCIL

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of an application lodged by **Sterling Palms Developments** for a resource consent under Section 88 of the aforementioned Act.

APPLICATION

The applicants sought a resource consent to undertake 338,202m3 of earthworks being 185,654 of cut and 152,548 fill within residential and rural zoned properties to the north-east of Kaiapoi. The land is located within a silent file area.

DECISION

The District Plan Manager, on the 31st May 2010, approved:

THAT pursuant to Section 104C of the Resource Management Act 1991, consent be granted to undertake 338,202m^3 of earthworks being 185,654m^3 of cut and 152,548m^3 of fill at 404, 404b, 448, 448B and 448C Williams Street, Kaiapoi, being Pt Lot 4 DP 4102, Pt Lot 5 DP 4102, Lot 6 4102 and Pt RS 1921 as a discretionary restricted activity subject to the following conditions which are imposed under Section 108 of the Act:

1. The activity shall be carried out in accordance with the attached approved application plan.

2. **Standards**

2.1 All stages of design and construction shall be in accordance with the Waimakariri District Council Engineering Code of Practice (and the latest amendments) where applicable.

In addition the following standards shall apply.

N.Z.S. 4431:1989 Code of Practice for Earthfill in Residential Development

N.Z.S. 4402 Methods of testing soils for civil engineering purposes

N.Z.S 4404: 2004 Land Development and Subdivision Engineering.

Standards set by applicant's Geotechnical Engineers to ensure liquefaction compliance with the District Plan requirements.

3. **Access**

3.1 The subdivider shall create an access to the site in the vicinity of the proposed road intersection to the subdivision. The access shall be formed as an access generally in accordance with Waimakariri District Council Standard Drawing 600-217 issue D with a 30 metre sealed strip into the site.

3.2 No access is permitted off Beach Road along the unformed legal road.

4. **Earthworks**

4.1 The earthworks shall be carried out in terms of the designs and plans approved by the Council.

4.2 Where existing levels can be modified, by cut or fill, to conform to the design levels a chartered professional engineer shall determine that all sites have bearing values suitable for residential housing.

4.3 Approval from the Council shall be sought to import any fill for the house and building sites.

4.4 Following removal of surface vegetation, any topsoil shall be stripped and stockpiled for reuse on site. No topsoil shall be removed off site.

4.5 Stockpiles shall be located a minimum of 50 metres away from any neighbouring properties, and 100 metres from any dwelling. The height of the stockpiles shall be limited to 6.0 metres above surrounding ground level. All stockpiles shall be grassed, where practical.

4.6 The filling on the future house and building sites shall be installed and compacted to be in compliance with N.Z. Standards 4431 (Code of Practice for Earth filling in Residential Development), 4402 (Testing), and 4404 (Land Development and Subdivisional Engineering) The filling shall also be completed to the requirements of the applicant's geotechnical engineer. The engineer shall provide a certification that the filing has been installed to the required standards. As built plans of the earthworks shall be prepared for submission to the Council on completion.

4.7 The minimum ground level at the house and building sites shall be at least R.L. 2.90 metres above Mean Seal Level.

4.8 In relation to flood mitigation he Consent holder shall:

Either

Construct the flood mitigation bunds to R.L 5.00 M.S.L. and 4.0 M.S.L at locations set out in the District Plan Map 156;

Or

Construct the flood mitigation bunds in accordance with the District

Plan Map 156 except for the northern boundary where the applicant will enter into a written agreement with Council to realign the northern portion of the bund through Lot 1 DP4521 (Council Reserve) terminating at the boundary of Lot 2 DP 359788.

4.9 A minimum ground level of 3.80m above MSL shall be achieved along the western boundary of Lot 500.

4.10 Reserves to be vested in Council shall be leveled, covered with topsoil, grassed and planted.

4.11 Soil, 150mm deep, shall be spread as soon as possible over the completed filling and reshaped areas. The area should then be grassed, depending on the seasons. The appropriate months for sowing are namely from March to May and August to September so works should be programmed accordingly.

4.12 A maximum of 6.0ha shall be open at any one time.

4.13 All rubbish, organic and any other unsuitable material for filling shall be removed off site to an approved landfill.

4.14 The consent holder shall, where material needs to be imported, provide details as to the source and type of material, laboratory tests to conform mode of compaction, type and frequency of transport and proposed route prior to being used as filling on site.

5. Liquefaction.

5.1 The consent holder shall engage a suitably qualified consultant to undertake a liquefaction report specific to the site and the proposed subdivision. The layout, design and construction of the earthworks shall take into account potential for liquefaction of the ground and effects of associated ground settlement and lateral spreading. The maximum allowable vertical movement is 100mm and for lateral movement 250mm based on a 1 in 150 year earthquake.

5.2 The consent holder shall submit the proposed methodology for engineering approval by the Waimakariri District Council prior to starting works on site, including a producer statement on design from a Chartered Professional Engineer.

5.3 No works relating to liquefaction shall proceed without Councils written approval.

5.4 Upon completion of the works the applicant shall confirm compliance with the liquefaction requirements of the District Plan. The confirmation shall include all test results and reports and a producer statement from a Chartered Professional Engineer that the District Plan standards have been met.

6. Mitigation.

6.1 The consent holder shall take all practicable measures to prevent any

contamination of Macintosh Drain.

7. Stormwater

7.1 The consent holder shall carry out the earthworks generally in accordance with Environment Canterbury:" Erosion and Control Guidelines." No sediment shall be discharged off site. A sediment retention bund shall be installed on the downstream side of the earthworks related to the subdivision.

7.2 The consent holder shall incorporate flood flow paths in the earthworks design and construction so that stormwater during a major event is controlled or managed.

7.3 The consent holder shall control localized runoff during construction.

8. Dust

8.1 The consent holder shall have a water cart available on site at all times. All site works shall cease and the site shall be closed down if dust is creating a nuisance beyond the site boundaries.

8.2 Traffic shall be controlled on site by the management of internal traffic movements, location of storage areas and parking.

8.3 Finished surfaces shall be grassed as soon as possible after completion.

8.5 No dust shall be discharged off site.

8.6 Where possible existing grassed and planted areas should be retained.

8.9 The consent holder shall, prior to earthworks commencing within 200metres of the Moorcroft subdivision, install a dust mitigating fence along the southern boundary where it adjoins the Residential zone of the Moorcroft subdivision.

9. Noise and Vibration

9.1 Construction noise shall not exceed the recommended limits specified in, and shall be measured and assessed in accordance with the provisions of NZ6:6803: P1984 "Measurement and Assessment of Noise from Construction, Maintenance and Demolition Work". Adjustments and exemptions provided in clause 6 of NZ:6803: P1984 shall apply.

10. Construction Management

10.1 The consent holder shall provide a Construction Management Plan indicating how all activities to be carried out on the site are controlled. The plans shall include maps or plans, traffic routes, sediment ponds, overflow channels, storage areas, parking areas, and a timing schedule.

10.2 A Chartered Professional Engineer shall prepare the plans and shall also be responsible for the supervision of the site works.

10.3 The consent holder shall prepare an Environmental Management Plan that covers the carrying out of all works on site. The Contractor may prepare the plan for submission but the Chartered Professional Engineer and ultimately the consent holder shall retain responsibility for the correct execution of the works.

10.4 The Construction and Environmental Management Plans shall be submitted to Council prior to works commencing on site.

11. Certification

11.1 A Chartered Professional Engineer shall on completion of the works, or part of the works, provide certification that the works have been completed in terms of the plans and resource consent conditions and compliance with the liquefaction requirements of the District Plan.

12. Plans and Specifications.

12.1 The consent holder shall submit three copies of plans and specifications of all works to the Council for approval. Approval of complying documents will be given in writing and work shall not commence until this has been received from the Council.

12.2 The consent holder shall forward with the engineering plans and specifications copies of any other consents granted in respect of this development including any consents from Environment Canterbury.

12.3 Any subsequent amendments to the plans and specifications shall be submitted to Council for approval. No amendments shall be carried out until approval has been obtained from the Council in writing.

13. Traffic Management.

13.1 The consent holder shall submit for approval a Traffic Management Plan detailing traffic control works (including sketch layout and control signs). This plan may be submitted at the time of engineering plan approval and shall be submitted prior to work commencing on or the Main North Road. Management shall be to Level 2, as described in the TNZ & LTSA Code of Practice for Temporary Traffic Management.

14. As Built Plans

14.1 As built plans shall be provided showing the extent of the earthworks, cuts and fills and areas not modified.

14.2 The consent holder shall provide details, to the Council, of the compaction tests on the filling, certification and location at weekly intervals.

15. Hours of Operation

15.1 The hours of operation shall be limited to 7am to 7pm Monday to Saturday and 9am to 7pm on Sundays and public holidays

16. Conditions Auditing

16.1 The Council will audit compliance with the conditions of consent by both site inspections and checking of associated documentation to the extent necessary to ensure the work is completed in accordance with the approved plans and specifications and to the Council's standards. The Council will undertake inspections and checking. The consent holder, or their authorised agent, shall notify Council at least one working day prior to commencing various stages of the works to enable audit inspections required by the consent to be carried out.

The minimum level of inspection shall be as follows:

Earthworks

- Following stripping of topsoil
- During progress of the earthworks.
- On completion to final levels.

16.2 Where repeat inspections are required because of faulty workmanship or work not being ready contrary to the receipt of a notification, such inspections will be carried out at the current hourly rate for staff time and vehicle running costs for kilometres travelled. Currently these rates are between $75/hr and $92/hr depending on the Council officer inspecting and between $.45/km and $0.70/km for kilometres travelled.

ADVICE NOTES.

A) The minimum floor levels for all buildings on site shall be R.L.3.20 metres above Mean Sea Level

b) All buildings may be subject to a liquefaction assessment submitted at the time the building consents are applied for.

c) Further testing and construction requirements shall be required for the installation of larger structures.

d) This approval is given prior to issue of the subdivision consent and rework may required due to works being carried out prior to subdivision consent and engineering approval. All rework and associated approvals shall be at the subdividers expense.

e) This proposal will affect recorded archaeological site(s). Work affecting archaeological sites is subject to a consent process under the Historic Places Act 1993. An authority (consent) from the New Zealand Historic Places Trust must be obtained for the work prior to commencement. It is an offence to damage or destroy a site for any purpose without an authority. The Historic Places Act 1993 contains penalties for unauthorised site damage. The applicant is advised to contact the New Zealand Historic Places Trust for further information.

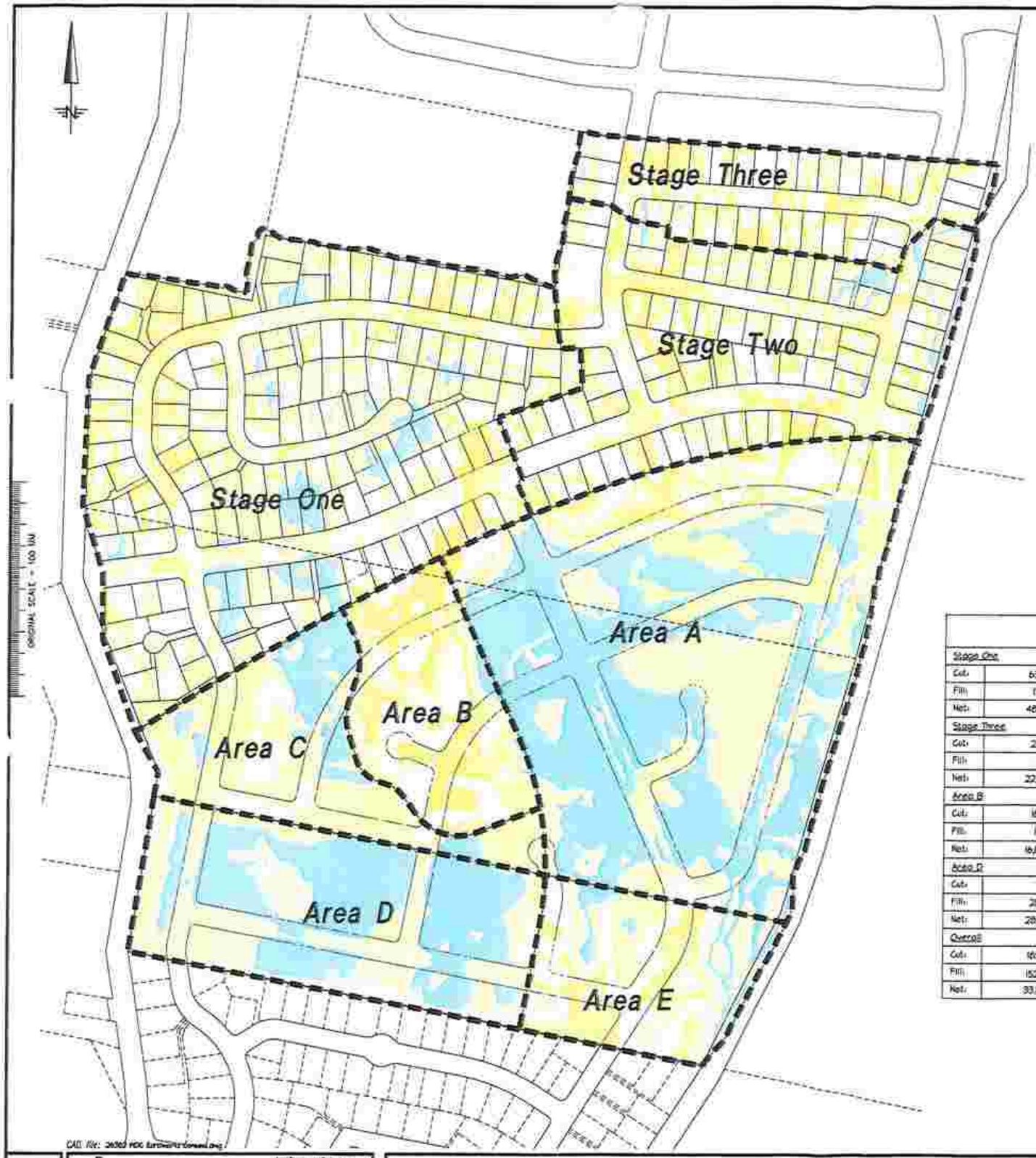
REASONS FOR THE DECISION

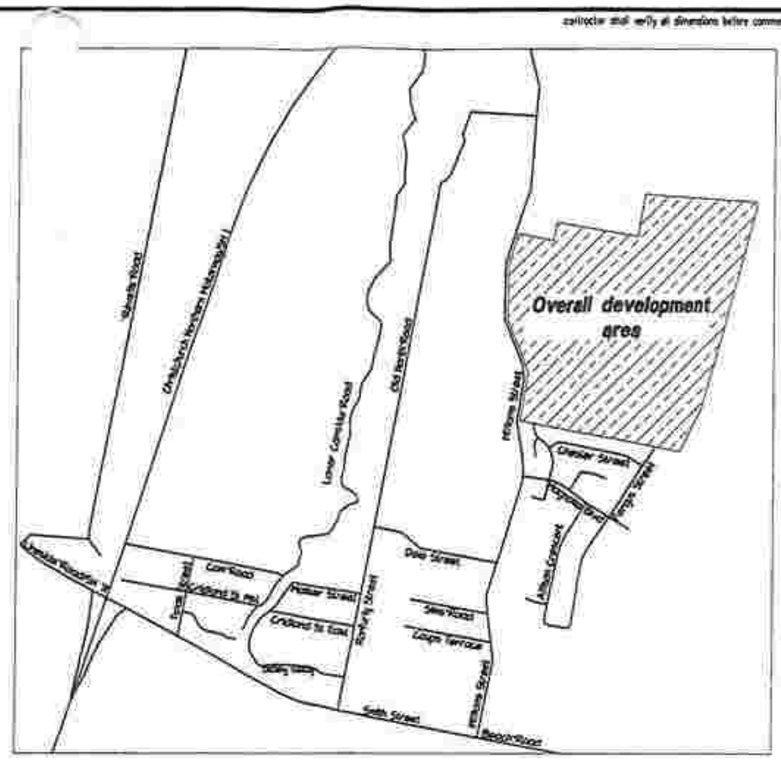
Pursuant to Section 113 of the Act the Council was satisfied that:

- No person is deemed to be adversely affected by the proposal.
- The environmental effects will be sufficiently mitigated through landscaping to be no more than minor.
- The proposal is not contrary to the objectives and policies of the District Plan.

DATED at Rangiora this 3rd day of June 2010

SIGNED by Hamish Dean
PLANNING OFFICER





Locality Plan
Scale 1:10,000

Volumes Table

Stage One		Stage Two	
Cut:	63,984m³	Cut:	51,394m³
Fill:	15,845m³	Fill:	8,595m³
Net:	48,094m³ cut	Net:	42,784m³ cut
Stage Three		Area A	
Cut:	22,987m³	Cut:	18,093m³
Fill:	486m³	Fill:	80,769m³
Net:	22,501m³ cut	Net:	62,675m³ fill
Area B		Area C	
Cut:	18,524m³	Cut:	573m³
Fill:	1,858m³	Fill:	11,007m³
Net:	16,666m³ cut	Net:	10,434m³ fill
Area D		Area E	
Cut:	125m³	Cut:	9,564m³
Fill:	28,137m³	Fill:	4,930m³
Net:	28,012m³ fill	Net:	4,634m³ cut
Overall			
Cut:	165,654m³		
Fill:	152,548m³		
Net:	33,106m³ cut		

Levels Table

Number	Minimum Level	Maximum Level	Colour
1	-5.500	-5.000	
2	-5.000	-4.500	
3	-4.500	-4.000	
4	-4.000	-3.500	
5	-3.500	-3.000	
6	-3.000	-2.500	
7	-2.500	-2.000	
8	-2.000	-1.500	
9	-1.500	-1.000	
10	-1.000	-0.500	
11	-0.500	0.000	
12	0.000	0.500	
13	0.500	1.000	
14	1.000	1.340	

Approved Application
RC095328
Plan 31/5/10
DISTRICT PLAN MANAGER

CAD file: 26382 WDC EarthworksConsent.dwg

Davis Ogilvie

Land Development Professionals
Engineering - Surveying - Planning
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Christchurch, New Zealand
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OFFICES ALSO IN
Auckland - Nelson - Tauranga - Queenstown

PROPOSED RESIDENTIAL SUBDIVISION
KAIAPOI, AREA "A"

EARTHWORKS VOLUMES
WDC EARTHWORKS CONSENT

Issue	Date	Description
P2	08/06/09	Preliminary

Design: BG
Drawn: BG
Check:
Issued:
Date: 22/07/09
Scale: 1:2000 @ A1

Job No. 26382
Sheet 101 P2

Preliminary

RC115258/ 21754-005-00

WAIMAKARIRI DISTRICT COUNCIL

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of an application lodged by **Sovereign Green** for a resource consent under Section 88 of the aforementioned Act.

APPLICATION

The applicants sought a resource consent to subdivide Lot 500 DP 432856 in a 6 stage residential subdivision. The subdivision will be provided with reserves and linkages to existing road infrastructure and services. Stormwater management facilities will be provided by way of an off-site detention and treatment pond. Lot areas will not conform to District Plan requirements in several locations, however, this approach is similar to that utilised in the neighbouring subdivisions and is therefore consistent with the established character and amenity of the area.

DECISION

The District Plan Manager, on the 15th May 2012, approved:

THAT pursuant to Section 104B of the Resource Management Act 1991, consent be granted to subdivide Lot 500 & Lot 600 DP 432856 into 286 residential lots, 6 roads to vest, 5 reserves and 2 utility reserves to vest at 404 and 404B Williams Street, Kaiapoi, as a non-complying Activity subject to the following conditions which are imposed under Section 108 of the Act:

1. Except as required to comply with the following conditions, the activity shall be carried out in accordance with the attached approved application plans.

2. **Standards**

   All stages of design and construction shall be in accordance with the following standards (and their latest amendments) where applicable:

   Council Standards

   - Waimakariri District Council Engineering Code of Practice.

   Other Standards

   - Relevant Transit New Zealand standards
   - Relevant Austroads Guides & standards
   - NZS 4404 - Urban Land Subdivision
   - NZS 4431 - Earthfill for Residential Development

3. **Easements**

3.1 All services, including open drains and access ways, serving more than one lot or traversing lots other than those being served and not situated within a public road or proposed public road, shall be protected by easements. All such easements shall be granted and reserved.

4. **Lots to Vest**

4.1 Proposed Lots 600 - 605 inclusive as shown on Plan 29130 Drawings 301/D and 302/G, shall vest in Council as Road.

4.2 Lots 700 - 704 inclusive as shown on Plan 29130 Drawings 301/D and 302/G shall vest in Council as Recreation Reserve.

4.3 Lots 705 and 706 shown on Plan 29130 Drawings 301/H shall vest in Council as Utilities Reserve.

5. **Development Contributions**

Pursuant to section 198 of the Local Government Act 2002, the consent holder shall pay $5,013,636.60 including GST at 15.0%; this amount is based on the following contributions:

Description	Area	Units/ Lots	Factor (excluding GST) Per Unit/Lot $	Amount (excluding GST) Total $	Amount (inclusive GST) Total $
Reserves	Business & Residential Zone	284	7,564.00	2,148,176.00	2,470,402.40
Water	Kaiapoi	284	1,222.00	347,048.00	399,105.20
Water - ODA	North East Kaiapoi SPA	284	505.00	143,420.00	164,933.00
Sewer	Eastern Districts - Outfall	284	2,497.00	709,148.00	815,520.20
Sewer	Kaiapoi	284	797.00	226,348.00	260,300.20
Sewer - ODA	North Kaiapoi SPA	284	494.00	140,296.00	161,340.40
Drainage	Kaiapoi	284	160.00	45,440.00	52,256.00
Drainage - ODA	North East Kaiapoi SPA	284	819.00	232,596.00	267,485.40
Roading	District	284	930.00	264,120.00	303,738.00
Community Infrastructure	District - Pool	284	230.00	65,320.00	75,118.00
Community Infrastructure	District - Library Extension	284	133.00	37,772.00	43,437.80
Total				**4,359,684.00**	**5,013,636.60**

6. **Financial Contributions**

6.1 The Subdivider shall contribute towards the future cost of installing a new pressure main from the Moorcroft Pump Station to the manhole in the gravity

main in Beach Road. The value has been agreed at $40,040 and payments shall be made on a developed lot basis prior to the issue of the 224c Certificate for each stage. On the assumption that 286 lots are being developed, then a payment of $140.00 + GST per lot shall be made.

7. **Power and Telephone**

7.1 An appropriate network utility operator at the subdividers expense shall provide underground electrical and telephone reticulation to the boundaries of all new dwelling lots including the main body of Lots 243 - 528 inclusive.

7.2 The subdivider shall provide written evidence from the relevant authority that the service reticulation has been installed into Lots 243 - 528 inclusive.

8. **Design of Reticulated Services**

8.1 All water, sewer and stormwater systems within the subdivision shall be separately serviced and piped.

9. **Plans and Specifications**

9.1 The subdivider shall submit three copies of plans and specifications of all works to the Council for approval. Approval of complying documents shall be given in writing and work should not commence until this has been received from the Council.

9.2 The subdivider shall forward with the engineering plans and specifications copies of any other consents granted in respect of this subdivision.

9.3 Any subsequent amendments to the plans and specifications shall be submitted to Council for approval in writing.

10. **Supervision and Setting Out**

10.1 A practising Chartered Professional Engineer or Registered Professional Surveyor, who shall be engaged prior to commencement of any works, shall supervise all engineering works and setting out.

10.2 The supervising Engineer/Surveyor shall supply a certificate to the Council, stating that all works have been designed in accordance with the appropriate standards and sound engineering practice.

10.3 The Engineer/Surveyor shall submit a programme of inspection intended to meet the requirements of this clause at the time of submitting the engineering plans and specifications.

10.4 The supervising Engineer/Surveyor shall supply to Council a certificate stating that all works and services associated with the subdivision have been installed in accordance with the approved plans and specifications and that the "As Built" plans are a true and accurate record of all works and services as constructed. This certificate shall be supplied at the time of requesting the Section 224c Conditions Certificate.

10.5 The supervising Engineer/Surveyor shall forward, to the Council, copies of Site Inspection notes for all site supervision visits. These shall be forwarded within five working days of the date of that site visit.

11. Earthworks

11.1 All lots shall be reshaped to slope to the roadside kerb and channel or swale, or to the head of the right of way serving each lot, or to an approved outfall.

11.2 All earthworks shall be in accordance with NZS 4431, 1989 Earthfill for Residential Development. Where land filling is to be undertaken the areas affected, together with dimensions relative to the created property boundaries, shall be shown on the "As Built" plans to be supplied to the Council.

11.3 Any areas of fill or earthworks not certified in accordance with NZS 4431 shall, together with sufficient dimensions to locate the feature from property boundaries, be registered on the land transfer title plans and shown on the "As Built" plans.

11.4 Where excavated cut material is greater than 200mm in thickness, the subdivider shall undercut and replace with 100mm minimum of compacted topsoil.

11.5 Earthworks reshaping or fill shall not alter natural ground level by more than 300mm where it is carried out within 2 metres of the boundary with any adjacent land in separate ownership.

11.6 Earthworks reshaping or fill shall not alter natural ground level by more than 600mm where it is carried out between 2 metres and 20 metres of the boundary with any adjacent land in separate ownership

11.7 The subdivider shall take measures to control silt-contaminated stormwater at all times during earthworks, roading development and installation of underground services. Details of the proposed control works shall be submitted to the Council as part of the engineering plans and specifications, for Council approval.

11.8 The subdivider shall grass each lot at the completion of earthworks, and shall maintain the areas so that any areas of dead grass are replaced immediately, in order to avoid nuisance effects created by dust.

11.9 During all earthworks the subdivider shall employ dust containment measures, such as watering, to avoid off site nuisance effects created by dust.

11.10 All existing natural stormwater channels shall be retained or replaced with an approved drainage system.

12. Road Opening/Trenching

12.1 All works involving trenching shall meet the requirements of the Council's Standard conditions for Trenching. No excavation shall commence within a public road reserve without the prior receipt of a Trenching Permit from the Waimakariri District Council.

12.2 In the event of any works or trenching being required across the frontage of adjacent properties the subdivider shall inform the affected occupiers of those properties, 48 hours prior to the commencement of any work.

13. Water Supply

13.1 The subdivider shall connect to the Kaiapoi Water Supply by installing a piped reticulation system from the existing mains in Magnate Drive, Fergus Drive and Sutherland Drive on the northern boundary, with provision to link with the existing mains in Yellowlees Drive and Fergus Street on the southern boundary. The ultimate point of supply shall be the 200mm diameter trunk main in Fergus Street at the northern boundary running southwards to connect with the existing 300mm diameter trunk main in the carriage way in Fergus Street in the Moorcroft Subdivision to the south.

13.2 The reticulation shall meet the fire-fighting requirements for a Residential Zone in accordance with SNZ PAS 4509:2003 New Zealand Fire Service Fire Fighting Water Supplies Code of Practice.

13.3 The Consent Holder shall install the water reticulation to meet the following minimum standards for Lots 243-528 inclusive:

(a) The installation of an appropriate number of medium pattern screw down fire hydrants on all new water mains in the roads in accordance with the requirements of the Engineering Code of Practice.

(b) A system of 50-millimetre (63 O.D) PN 12.5 P.E sub mains.

(c) Separate 15mm diameter laterals from the 50mm submain to a toby box.

(d) Toby boxes and valves at the road frontage of each lot.

(e) Individual 15mm laterals from the toby box to a point a minimum of 1mtre inside the boundary of the lots or if access is via a right of way to a minimum of 1metre within the main body of the rear lots.

13.4 As the network utility provider, the Council at the subdivider's expense shall carry out all connections to the existing public water supply.

13.5 Pressure Testing and sterilization shall be completed to the Council's satisfaction for all reticulation.

14. Sewerage

14.1 The subdivider shall install a reticulated sewer system to service Lots 243 - 528 inclusive in accordance with the approved plans and specifications.

14.2 The reticulated sewer system shall connect to the Eastern District Sewer Scheme at the existing sewer pump station in Sovereign Boulevard.

14.3 The subdivider shall install the reticulated sewer system that incorporates the following minimum requirements:

- The design and construction of gravity mains to service Lots 243 - 528 inclusive which shall fall to the pump station.

- The subdivider shall install domestic sewer laterals from the nearest main to a minimum of 1.0 metre inside the main body of Lots 243 - 528 inclusive. All laterals shall be laid perpendicular to the main.

- The sewer system shall be designed to cater for the effects from a 150year earthquake event.

- A 225mm diameter gravity main from the Pump Station to the intersection adjacent to Lot 700.

- 150mm minimum diameter mains in all other streets at the gradients set out in the Code of Practice.

15. **Stormwater**

15.1 The subdivider shall install the stormwater reticulation to collect all stormwater from the subdivision and direct the flow to McIntosh's Drain to the east.

15.2 The subdivider shall treat and retain the flow from the development at pre-development levels within Lot 705 prior to discharge to McIntosh's Drain. The treatment, first flush pond shall be sized on the basis of a 25mm depth over the catchment for a minimum period of 24 hours. The attenuation basin size shall be based on pre-development outflows for a 5 year and 50 year 30 hour duration storm. The size of the outflow drain shall also cope with the 30 minute 5 year event generated by the subdivision.

15.3 The subdivider shall design and provide the stormwater reticulation on the basis of a 20% A.E.P (1 in 5 year) storm using the Hirds 2 plus 10% rainfall values for the subdivision location. The pipework shall be taken to the treatment pond.

15.4 The subdivider shall provide for secondary flow paths with a design capacity to accommodate flows from a 2% A.E.P (1 in 50 year) storms.

15.5 The subdivider shall install all stormwater reticulation including the treatment pond; attenuation pond and outfall drain in accordance with the approved plans and specifications.

16. **Roading and Footpaths**

16.1 The subdivider shall construct all roading and footpaths to service the subdivision in accordance with the approved plans and specifications and generally the requirements set out in the Waimakariri District Council Engineering Code of Practice. (Refer Standard Drawings 600-272 issue d, 600-275 issue c).

16.2 Fergus Street and Sutherland Drive are urban collectors and require concrete footpaths each side. Fergus Street shall be 25 metres wide with two 5.50 metre carriageways and a central grassed median strip. Sutherland Drive shall be 20 metres wide with a 9.0 metre carriageway. All other road shall have carriageways of a minimum of 8.0 metres wide.

16.3 The cul-de-cacs shall be constructed with a minimum turning head dimension of 20.0 metres.

16.4 The proposed linkage between the cul-de sacs on roads on Lot 600 shall be trafficable and 5.0 metres wide.

16.5 Pavement design shall be in terms of N.Z Transport Agency's and Ausroads standards. The minimum metal depth in a roadway shall be 250mm. The subgrade shall be tested prior to the laying of any metal courses to ensure the ground has adequate bearing values.

16.6 The subdivider shall carry out Benkelman Beam tests or other approved in situ formation bearing tests following completion of the base course layer and prior to sealing. The tests shall meet the Councils standards.

16.7 The subdivider shall carry out Clegg Hammer testing of footpath and kerb formation bearing tests following completion of the base course layer and prior to concreting/surfacing. A measured minimum Clegg Impact Value of 35 shall be obtained to assure adequate compaction and pavement strength prior to sealing/pouring concrete.

16.8 Sealing shall comprise a two wet coat seal system (grade 6 chip over grade 4 chip) over the entire carriageway surface, except for the cul-de-sac head, which shall be surfaced with minimum 30 mm AC10 over a single hot bitumen Grade 5 chip seal coat.

16.9 Footpaths shall extend around the circumference of the turning area of cul-de-sac head.

16.10 Pedestrian kerb cut downs shall be provided at all intersections and at other locations such as entrances to reserves.

16.11 The subdivider shall install all road markings and traffic control signs.

17. Traffic Management

17.1 The subdivider shall submit for approval a Traffic Management Plan detailing traffic control works (including sketch layout and control signs). This plan may be submitted at the time of engineering plan approval and shall be submitted prior to work commencing on or in road reserves. Traffic Management shall be to Level 1, as described in the TNZ & LTSA Code of Practice for Temporary Traffic Management.

18. Lighting

18.1 The subdivider shall provide details of street lighting proposals prepared in consultation with the power supply authority, to the Council for approval at the time of submission of the engineering plans and specifications.

18.2 The street lighting shall accord to the requirements set out in the Engineering Code of Practice, Section 11.

18.3 The Subdivider shall provide written evidence that the appropriate electricity utility service provider accepts the lights and associated fittings to their

approval for connection to the network.

18.4 A Chartered Professional Engineer shall design the bases for the light poles considering the location and ground conditions. An installation plan shall be prepared and approved by Council before installation proceeds. The lights shall be installed in accordance with the installation plan and design.

19. Access

19.1 The subdivider shall form and seal the accesses to all rear lots and access strips including reserves in accordance with Waimakariri District Council Standard Drawing 600-211A issue E.

20. Right Of Ways/Access Legs

20.1 The subdivider shall construct the right of way and access legs to Lots 247, 260, 263, 264, 273, 275, 276, 280 – 283 inclusive, 286-289 inclusive, 292, 294, 311, 312, 317, 383, 384, 404, 411, 412, 415, 416, 418, 419, 420-422 inclusive, 428, 429, 431, 458, 465, 470, 471, 481, 482, 490, 491, 500, 504, 505, 508, 509, 513, 517 in accordance with Waimakariri District Council Standard Drawing 600-274 issue D.

20.2 The subdivider shall Clegg Hammer test all rights of way prior to sealing. A measured Clegg Impact Value of at least 35 shall be obtained to assure adequate compaction and pavement strength prior to sealing.

21. Landscaping

21.1 The subdivider shall grass all lawn areas in the reserves and berms. All planted areas shall be mulched and trees, shrubs and fixtures installed in accordance with the Engineering Code of Practice Section 10.

21.2 A landscaping proposal including the installation and maintenance regime shall be submitted to the Council for approval prior to any works on site. The proposal shall include overall plans showing streetscapes and other reserves including grassing and tree locations.

22. Irrigation

22.1 The subdivider shall provide irrigation to each tree in the streets and reserves. Details of the irrigation system including connections and installation method shall be submitted with the plans and specifications for engineering approval.

23. Pedestrian Links

23.1 Concrete cycle/ walkways of minimum width of 2.0 metres shall be provided through Lots 701 - 704 inclusive to provide pedestrian links between roadways.

24. **Floor Levels**

24.1 The Consent Holder shall fill or shape the residential lots to a minimum level of R L 2.90 M.S.L.

24.2 Dwellings shall have a minimum finished floor level of RL. 3.20 M.S.L. This requirement shall be subject to a consent notice pursuant to Section 221 of the Resource Management Act 1991 to be registered on the titles to be issued for Lots 243 to 522 and Lots 524 to 528.

24.2 The Consent holder shall construct a bund a minimum 3 metres width at locations A, B and C shown on District Plan Map 156. Bund Levels shall be to R.L. 3.8, R.L 5.00 M.S.L. and 4.0 M.S.L respectively.

25. **Maintenance**

25.1 The subdivider shall be responsible for the maintenance of all subdivision and associated works (excluding reserves, street trees and landscaping) for a period of twelve months following the date of issue of the Council's 'Condition Completion Certificate'. A bond equal to 5% of the cost of construction works shall be lodged with Council for the same period.

25.2 The subdivider shall be responsible for the maintenance of all subdivision and maintenance works associated with the Reserves, street trees and landscaping for two years and two planting seasons (whichever is the lesser) following the date of issue of the Councils Condition Completion Certificate. A bond equal to 5% of the cost of construction works shall be lodged with the Council for the same period.

25.3 Maintenance shall include:

- Appropriate and regular mowing of grass and watering of all plants and trees together with the replacement of any dead specimens.
- Repair of any damage or defects in any of the works or services associated with the development of the subdivision as consented to.
- Full operation and provision of a maintenance program.

26. **As Built Plans**

26.1 "As Built" plans setting out in detail the location of all services shall be provided to the Council immediately following completion of the works and shall be available at the time of the Condition Completion Certificate inspection. Two sets of plans shall be provided at a scale of 1:500 and 1: 200. In addition to the plans a Chartered Professional Engineer or Registered Professional Surveyor shall provide a separate certificate stating that the As-built plans are a true and accurate record of all services. Furthermore, where plans have been prepared using computer aided draughting techniques a copy of the file shall be made available to the Council in either of the following format - Microstation (.DGN), Autocad (.DWG), or (.DXF).

26.2 The subdivider shall provide daily site sealing records and beam test results

from the sealing contractor as part of the As-Built record. To enable accurate RAMM records to be established for the new road construction.

26.3 Copies of all test results, Producer Statements, certifications, inspections, DVD of CCTVs shall be provided to the Councils satisfaction.

27. **Fencing**

27.1 The owner of Lots 253, 254, 281, 282, 287 – 292 inclusive, 294 - 309 inclusive, 311 - 313 inclusive and 470 - 476 inclusive, shall pay the full costs of erecting and maintaining fencing along the common boundary with the Council Reserve.

27.2 Pursuant to Section 221 of the Resource Management Act 1991, condition 3.28.1 as it applies to 253, 254, 281, 282, 287 – 292 inclusive, 294 - 309 inclusive, 311 - 313 inclusive and 470 - 476 inclusive, shall be subject to a Consent Notice registered on the certificates of title. The Consent Notice shall ensure that the Council is not liable for any fencing costs.

27.3 Lots 247 – 255 inclusive and Lot 523 shall be fenced along their frontage with Williams Street, in accordance with the attached approved 'Front elevation of Williams Street Fence Proposal' prepared by Goom Landscapes, dated 30 September 2009. This condition shall be secured by way of a consent notice, pursuant to Section 221 of the Resource Management Act 1991 to be registered on the title for Lots 247 – 255 and Lot 523.

28. **Moorcroft Bund**

28.1 The owners of Lots 255 - 260, 263, 264, 266-273, 275, 275, 276, 279-281 and 525 shall maintain the bund along the rear of the lots. Any request to breach the bund, shall be forwarded to the District Plan Manager for approval. Any request shall provide a suitable alternate means of support for the existing fence along the bund.

28.2 Condition 28.1 shall be subject to a consent notice pursuant to Section 221 of the Resource Management Act 1991 to be registered on the Certificate of Title to issue for Lots 255-260, 263, 264, 266-273, 275, 275, 276, 279-281 and 525.

29. **Street Names**

The subdivider shall submit three names for each un-named road to the Council for approval, and shall then install the street name signs and poles at the intersections.

30. **Erection of dwellings**

30.1 Dwellings within Lots 243 – 246, 260 – 265, 273, 275 – 278, 284, 285, 291 – 294, 310 – 313, 316, 317, 362 – 365, 406, 407, 416, 419, 425, 431, 432, 439, 456 – 458, 464, 465, 481 – 483, 499, 501, 502 and 514 - 516 shall:

- Be set back a minimum of 2 metres from any road boundary or accessway; and
- Not exceed 35% structure coverage of the net area of the site; and
- Not project beyond the building envelope defined by recession planes constructed 2.5 metres above any site boundary as shown in Appendix 31.1 of the District Plan and attached as Appendix 1 to this consent; and
- Not exceed a maximum height of 8 metres.

30.2 Condition 30.1 shall be subject to a consent notice pursuant to Section 221 of the Resource Management Act 1991 to be registered on the Certificate of Title to issue for Lots 243 – 246, 260 – 265, 273, 275 – 278, 284, 285, 291 – 294, 310 – 313, 316, 317, 362 – 365, 406, 407, 416, 419, 425, 431, 432, 439, 456 – 458, 464, 465, 481 – 483, 499, 501, 502 and 514 – 516.

31. Staging

31.1 The Council is agreeable to the staging of the development as follows;

Stage 1a

- Residential - Lots 304 - 364, 391 - 395, 447 - 449
- Road to vest – Lot 600
- Recreation Reserves to vest – Lots 700, 702 & 703
- Utilities Reserve to vest – Lot 705 and 706
- Balance Rural Allotment – Lot 800

Stage 1b

- Residential - Lots 291 - 303, 365 - 390, 396 - 403
- Road to vest – Lot 601
- Recreation Reserves to vest – Lot 701

Stage 2

- Residential - Lots 258 - 290, 404 - 438, 503 - 512, 524, 525
- Road to vest – Lot 602

Stage 3

- Residential - Lots 439 - 446, 456 - 497, 513 - 522, 526 - 528
- Road to vest – Lot 603

Stage 4

- Residential - Lots 243 - 250, 450 - 455, 498
- Road to vest – Lot 604
- Lot 523 – Existing dwelling

Stage 5

- Residential - Lots 251 - 257, 499 - 502
- Road to vest – Lot 605
- Recreation reserve to vest – Lot 704
-

provided all the conditions that apply to each stage have been met.

32. **Conditions Auditing**

The Council will audit compliance with the conditions of consent by both site inspections and checking of associated documentation to the extent necessary to ensure the work is completed in accordance with the approved plans and specifications and to the Council's standards. The Council will undertake inspections and checking. The subdivider, or their authorised agent, shall notify Council at least one working day prior to commencing various stages of the works. This is to enable audit inspections required by the consent to be performed.

The minimum level of inspection shall be as follows:

Roading, Footpaths

- Following shaping of roading and footpath sub-grade prior to placement of sub-base material.
- Following metalling up, prior to pouring of kerb and any channel
- Following compaction of base course prior to sealing. The carriageway shall be tested with a Benkelman Beam. The results shall be submitted to Council for approval.
- Footpath base course shall be tested with Cleghammer and with the test results showing compliance shall be submitted to Council.

Trenching

- Prior to backfilling of services.
- During compaction of the trench backfilling.

Sewer

- During Installation
- Testing of sewer mains and laterals

Water

- During installation
- Testing of mains and laterals
- Sterilisation of water mains.

Stormwater

- On piping works ,drains ,basins and related works
- On excavation
- During installation
- On completion.

Roading, Access and Right of Ways

- On completion of excavation to sub-grade
- Following compaction of base course prior to final surfacing
- On roads when Benkelman Beam tests are being carried out.
- Under kerb and channel, right of way and footpaths the formation shall be tested with the Clegg Impact Hammer and approved as satisfactory by the Council.

Reserves

- Before setting out of planting and installation of fixtures.
- On completion of levels over the reserve, check levels, topsoil quality and depth.
- On completion of the hard landscaping ,including buildings, structures and fixtures prior to issue of completion certificate.
- On completion of the planting, trees and works and after the first grass mow.
- On completion of the maintenance period.

Street Trees

- Before set out.
- During planting of trees.
- On completion of planting in road reserves.

Irrigation

- During installation
- Testing of mains and fittings.

Whole Works

- Prior to issue of a certificate under Section 224(c) of the Resource Management Act.
- One week prior to end of maintenance period (where applicable).
- On completion of maintenance period (where applicable).

Where repeat inspections are required because of faulty workmanship or work not being ready contrary to the receipt of a notification, such inspections will be carried out at cost for staff time and vehicle running costs for kilometres travelled.

33. **Works Conditions**

32.1 That a certificate under Section 224(c) of the Resource Management Act 1991 will not be issued until conditions 1 to 32 above have been met to the satisfaction of the Waimakariri District Council, at the expense of the subdivider.

ADVICE NOTES

(a) This consent does not constitute approval under the Regional Policy Statement, the Natural Resources Regional plan or the Building Act.

(b) All amounts shown above are GST inclusive.

(c) The requirements and conditions listed are a statement of the Council's minimum standards. Where the subdivider proposes alternative higher standards or more aesthetically acceptable alternatives then these shall be submitted to the Council for approval.

(d) The subdivider is advised that vehicle access to any lot must comply with the requirements of the Waimakariri District Vehicle Crossings Bylaw 1997. Wherein no vehicle may be taken onto any property in the Waimakariri District other than by way of a properly formed vehicle crossing. The owner or occupier of any lot who may require vehicular access across any footpath,

berm and water channel adjoining that lot is required to apply in writing to the Council to construct a vehicle crossing at the owner's or occupier's cost. No owner or occupier of any lot can build, or allow to be built, any dwelling, other significant building or any part of such a building on any property unless the building site on that property is provided with adequate site access in terms of the above mentioned by law.

(e) The approval of the Engineering Plans shall be issued after receipt of a satisfactory Consent from Environment Canterbury.

(f) Electrical and telephone reticulation requires that the network structures be available. In some cases, this could mean that ducting only is provided to the lot from the service box.

(g) The future owner of any lot having a boundary with any Council reserve will be responsible for the full costs of erecting and maintaining fencing along the common boundary with the reserve. The Council will not accept responsibility for any costs associated with fencing along common boundaries with Council reserves.

(h) 30 hours is the critical event time in McIntosh's Drain.

(i) The Council may request that the street tree irrigation system be removed on completion of the maintenance period. The Subdivider is made aware that any irrigation works are not eligible for reserve contribution offsets.

(j) The subdivider should include in sale and purchase agreements a mechanism to ensure that the owners and or builders working within the development are made accountable for damage caused by their construction traffic.

(k) A peer review of the geotechnical test results and analysis leads the peer reviewer to believe that the ground under the individual lots will meet the definition of Good Ground and that the land is suitable for the construction of foundations complying with the provisions of NZS 3604:2011 "Timber Frame Buildings" except where stated in the individual lot reports. Where the Good Ground requirements are not met the foundation will need to be subject to specific design at building consent stage. The peer reviewer anticipates that the specific design requirements are likely to consist mainly of increased footing widths and or additional reinforcement.

(l) "As-Builts" will be checked prior to the issue of the 224c Conditions Certificate. This will be returned as inaccurate on the first error found. Rechecking will incur an additional fee. No 224(c) Conditions Certificate will be issued until the "As- Builts" are conformed as correct.

Landuse

THAT pursuant to Section 104B of the Resource Management Act 1991 consent be granted to erect a dwelling on Lots 243 – 246, 260 – 265, 273, 275 – 278, 284, 285, 291 – 294, 310 – 313, 316, 317, 362 – 365, 406, 407, 416, 419, 425, 431, 432, 439, 456 – 458, 464, 465, 481 – 483, 499, 501, 502 and 514 - 516 having a lot area of less than 600m^2 and/or do not provide the minimum internal 18m x 18m dimension (Lots 260, 263, 264, 277 and 278) being a subdivision of Lot 500 DP 432856 at 404 Williams Street, Kaiapoi as a Non-

complying activity subject to the following conditions which are imposed under Section 108 of the Act:

1. Dwellings within Lots 243 – 246, 260 – 265, 273, 275 – 278, 284, 285, 291 – 294, 310 – 313, 316, 317, 362 – 365, 406, 407, 416, 419, 425, 431, 432, 439, 456 – 458, 464, 465, 481 – 483, 499, 501, 502 and 514 - 516 shall:

   - Be set back a minimum of 2 metres from any road boundary or accessway; and
   - Not exceed 35% structure coverage of the net area of the site; and
   - Not project beyond the building envelope defined by recession planes constructed 2.5 metres above any site boundary as shown in Appendix 31.1 of the District Plan and attached as Appendix 1 to this consent; and
   - Not exceed a maximum height of 8 metres.

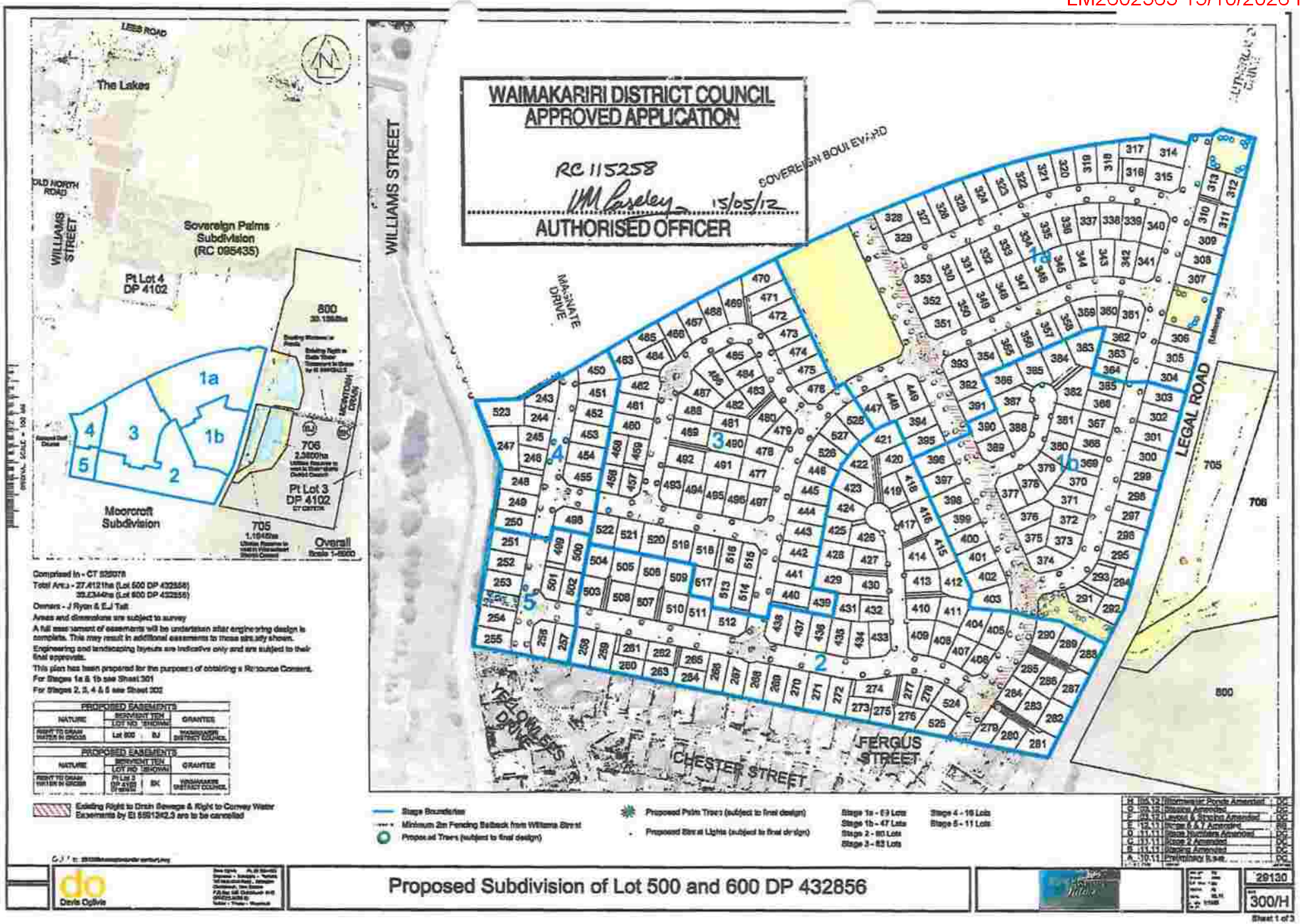
REASONS FOR THE DECISION

Pursuant to Section 113 of the Act the Council was satisfied that:

- No person is deemed to be adversely affected by the proposal. .
- The environmental effects will be no more than minor.
  - Residential amenity and character will be maintained.
  - Reticulated stormwater, sewer and water will be provided.
  - Appropriate access can be provided.
  - A thorough geotechnical assessment has assessed the land as suitable for residential development.
- The proposal is in accordance with the Objectives and Policies of the District Plan.

DATED at Rangiora this 15th day of May 2012

SIGNED by Garry Blay
PLANNING OFFICER


WAIMAKARIRI DISTRICT COUNCIL
APPROVED APPLICATION
RC 115258
I.M. Caseley 15/05/12
AUTHORISED OFFICER
LEES ROAD
The Lakes
OLD NORTH ROAD
WILLIAMS STREET
Sovereign Palms Subdivision (RC 095435)
Pt Lot 4 DP 4102
600
706
2.3800ha
Pt Lot 3 DP 4102
705
1.1945ha
Moorcroft Subdivision
Overall Scale 1:5000
SOVEREIGN BOULEVARD
MARINATE DRIVE
LEGAL ROAD
YELLOWLEES DRIVE
CHESTER STREET
FERGUS STREET
Comprised In - CT 525078
Total Area - 27.4121ha (Lot 500 DP 432856)
39.5344ha (Lot 600 DP 432856)
Owners - J Ryan & E.J Tait
Areas and dimensions are subject to survey
A full assessment of easements will be undertaken after engineering design is complete. This may result in additional easements to those already shown.
Engineering and landscaping layouts are indicative only and are subject to their final approvals.
This plan has been prepared for the purposes of obtaining a Resource Consent.
For Stages 1a & 1b see Sheet 301
For Stages 2, 3, 4 & 5 see Sheet 302
PROPOSED EASEMENTS
NATURE | SERVIENT TEN LOT NO SHOWN | GRANTEE
RIGHT TO DRAIN WATER IN GROSS | Lot 600 | BJ | WAIMAKARIRI DISTRICT COUNCIL
PROPOSED EASEMENTS
NATURE | SERVIENT TEN LOT NO SHOWN | GRANTEE
RIGHT TO DRAIN WATER IN GROSS | Pt Lot 3 DP 4102 | BK | WAIMAKARIRI DISTRICT COUNCIL
Existing Right to Drain Sewage & Right to Convey Water Easements by EI 5513142.3 are to be cancelled
Stage Boundaries
Minimum 2m Fencing Setback from Williams Street
Proposed Trees (subject to final design)
Proposed Palm Trees (subject to final design)
Proposed Street Lights (subject to final design)
Stage 1a - 69 Lots
Stage 1b - 47 Lots
Stage 2 - 80 Lots
Stage 3 - 82 Lots
Stage 4 - 16 Lots
Stage 5 - 11 Lots
H 15.5.12 Stormwater Ponds Amended DC
G 09.12 Staging Amended DC
F 12.11 Stage 5 & 7 Amended RB
E 11.11 Stage Boundaries Amended DC
C 11.11 Stage 2 Amended DC
B 11.11 Staging Amended DC
A 10.11 Preliminary Issue DC
Davis Ogilvie
Proposed Subdivision of Lot 500 and 600 DP 432856
29130
300/H
Sheet 1 of 3

WAIMAKARIRI DISTRICT COUNCIL
APPROVED APPLICATION
RC 115258
15/05/12
AUTHORISED OFFICER

Areas and dimensions are subject to survey
A full assessment of easements will be undertaken after engineering design is complete. This may result in additional easements to those already shown.
Lots 602, 603, 604 & 605 are Roads to vest in Waimakariri District Council
Lot 704 is Recreation Reserve to vest in Waimakariri District Council
Engineering and landscaping layouts are indicative only and are subject to their final approvals

Existing Right to Convey Water Easement by EI 5981242.3 is to be cancelled
Existing Sewer Easement by EI 5837927.10 to be cancelled
Minimum 2m Fencing Setback from Williams Street

WILLIAMS STREET
YELLOWLEES DRIVE
CHESTER STREET
FERGUS STREET
LEGAL ROAD

MEMORANDUM OF EASEMENTS

NATURE	SERVIENT TEN LOT NO / SHOWN	DOM TEN / GRANTEE
RIGHT OF WAY, RIGHT TO DRAIN SEWAGE & WATER, RIGHT TO CONVEY WATER ELECTRICITY TELECOMMUNICATIONS & COMPUTER MEDIA	Lot 263 DA	Lot 264
	Lot 264 CB	Lot 263
	Lot 275 DC	Lot 276
	Lot 276 CD	Lot 275
	Lot 260 F	Lots 261, 262, 263
	Lot 261 G	Lots 260, 262, 263
	Lot 262 H	Lots 260, 261, 263
	Lot 263 J	Lots 260, 261, 262
	Lot 266 K	Lots 267, 268, 269
	Lot 267 L	Lots 266, 268, 269
	Lot 268 M	Lots 266, 267, 269
	Lot 269 N	Lots 266, 267, 268
	Lot 411 S	Lot 412
	Lot 412 T	Lot 411
	Lot 416 U	Lot 415
	Lot 415 V	Lot 416
	Lot 450 W	Lots 451, 527
	Lot 451 X	Lots 450, 452
	Lot 452 Y	Lots 451, 453
	Lot 456 Z	Lot 455
	Lot 459 CE	Lot 458
	Lot 470 AA	Lot 471
	Lot 471 AB	Lot 470
	Lot 481 AC	Lot 482
	Lot 482 AD	Lot 481
	Lot 480 AE	Lot 483
	Lot 483 AF	Lot 480
	Lot 504 O	Lot 505
	Lot 505 P	Lot 504
	Lot 508 Q	Lot 509
	Lot 509 R	Lot 508
RIGHT TO CONVEY TELECOMMUNICATIONS & COMPUTER MEDIA IN GROSS	Lot 260 DA	CHORUS NEW ZEALAND LIMITED
	Lot 264 CB	
	Lot 275 DC	
	Lot 276 CD	
	Lot 260 F	
	Lot 261 G	
	Lot 262 H	
	Lot 263 J	
	Lot 266 K	
	Lot 267 L	
	Lot 268 M	
	Lot 269 N	
	Lot 411 S	
	Lot 412 T	
	Lot 416 U	
	Lot 415 V	
	Lot 450 W	
	Lot 451 X	
	Lot 452 Y	
	Lot 456 Z	
	Lot 459 CE	
	Lot 470 AA	
	Lot 471 AB	
	Lot 481 AC	
	Lot 482 AD	
	Lot 480 AE	
	Lot 483 AF	
	Lot 504 O	
	Lot 505 P	
	Lot 508 Q	
	Lot 509 R	

PROPOSED EASEMENTS

NATURE	SERVIENT TEN LOT NO / SHOWN	GRANTEE
RIGHT TO DRAIN WATER IN GROSS	Lot 704 SL	WAIMAKARIRI DISTRICT COUNCIL

EXISTING EASEMENTS

NATURE	SERVIENT TEN LOT NO / SHOWN	DOCUMENT
RIGHT OF WAY, RIGHT TO DRAIN SEWAGE & WATER, RIGHT TO CONVEY WATER ELECTRICITY TELECOMMUNICATIONS & COMPUTER MEDIA	Lot 523 E	EI 5828605.12
RIGHT TO CONVEY TELECOMMUNICATIONS & COMPUTER MEDIA IN GROSS	Lot 523 E	EI 5.1258333.9

Areas Marked DA - DW will be subject to a Consent Notice with regards to the protection of the bund associated with the Mooncroft Development

G	05.12	Shadow Amended	DC
F	05.12	Layout & Staging Amended	DC
E	12.11	Stage 6 & 7 Amended	DC
D	11.11	Stage Numbers Amended	DC
C	11.11	Stage 2 Amended	DC
B	11.11	Shadow Amended	DC
A	10.11	Preliminary Issue	DC

Cavis Ogilvie

Stages 2, 3, 4 and 5

29130
302/G
Sheet 3 of 3



Areas and dimensions are subject to survey

A full assessment of easements will be undertaken after engineering design is complete. This may result in additional easements to those already shown.

Lots 600 & 801 are Road to vest in Waimakariri District Council

Lots 700, 701, 702 & 703 are Recreation Reserves to vest in Waimakariri District Council

Engineering and landscaping layouts are indicative only and are subject to their final approvals

MEMORANDUM OF EASEMENTS

NATURE	SERVIENT TEN LOT NO	SHOWN	DOMINANT TEN / GRANTEE
RIGHT OF WAY, RIGHT TO DRAIN SEWAGE & WATER, RIGHT TO CONVEY WATER ELECTRICITY, TELECOMMUNICATIONS & COMPUTER MEDIA	Lot 311	A	Lot 312
	Lot 312	B	Lot 311
	Lot 309	C	Lot 304
	Lot 304	D	Lot 303
RIGHT TO CONVEY TELECOMMUNICATIONS & COMPUTER MEDIA IN DUCTS	Lot 311	A	ENERGIS NEW ZEALAND LIMITED
	Lot 312	B	
	Lot 309	C	
	Lot 304	D	

PROPOSED EASEMENTS

NATURE	SERVIENT TEN LOT NO	SHOWN	GRANTEE
RIGHT TO DRAIN SEWAGE & WATER	Lot 705	EF	WAIMAKARIRI DISTRICT COUNCIL
RIGHT TO DRAIN WATER IN GROSS	Lot 701	EG	WAIMAKARIRI DISTRICT COUNCIL
	Lot 800	EJ	

EXISTING EASEMENTS

NATURE	SERVIENT TEN LOT NO	SHOWN	DOCUMENT
RIGHT TO DRAIN WATER IN GROSS	Lot 800	AD, BA	EI 8891242.3
RIGHT OF WAY	Lot 800	BA, BB	EI 8891242.3
RIGHT OF WAY IN GROSS	Lot 800	BA, BB	EI 8891242.3

Existing Right to Drain Sewage & Right to Convey Water Easements by EI 8891242.3 are to be cancelled

WAIMAKARIRI DISTRICT COUNCIL
APPROVED APPLICATION

RC 115258

I M Papley 15/05/12

AUTHORISED OFFICER

D	05.12	Stormwater Ponds Amended	DC
C	08.12	General Amendment's	DC
B	11.11	Stage Amended	DC
A	10.11	Preliminary Issue	DC

Davis Ogilvie

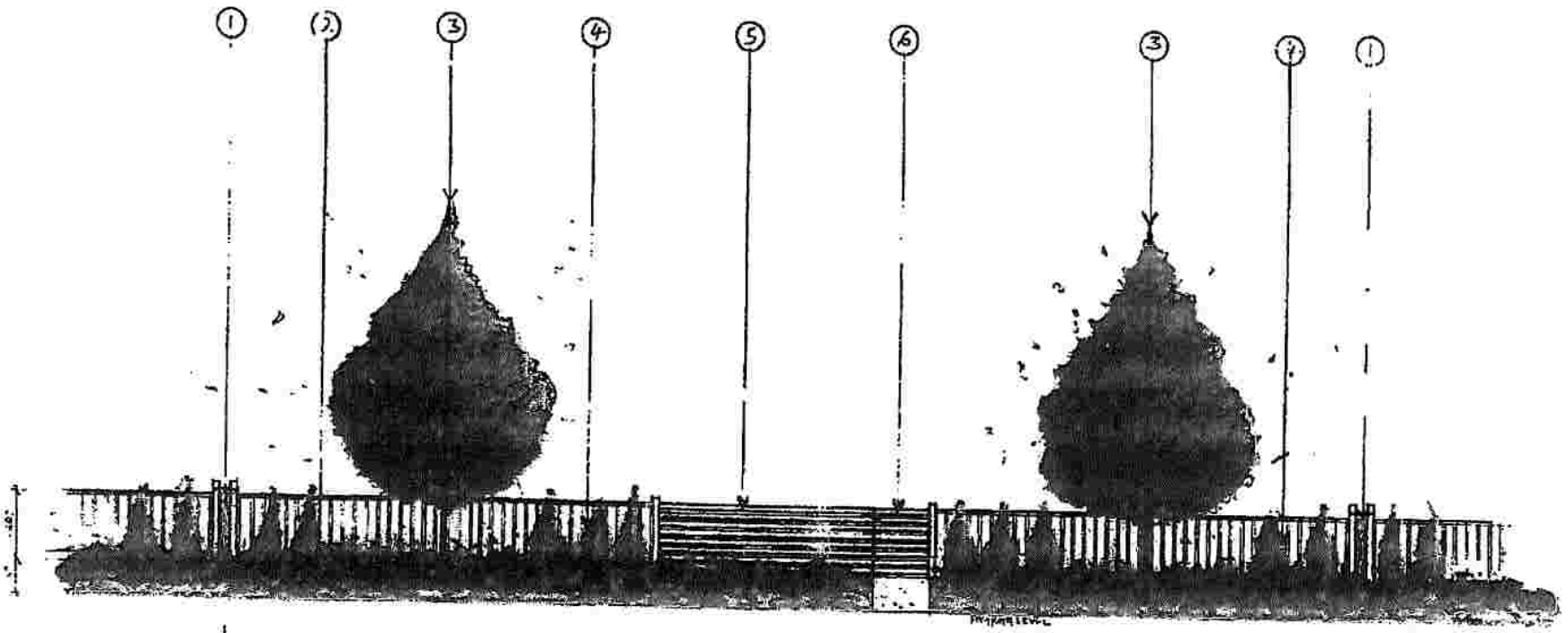
Stages 1a & 1b

29130

301/D

Sheet 2 of 5

FRONT ELEVATION OF WILLIAMS STREET FENCE PROPOSAL



KEY

1. [illegible]
2. PLANTED HEDGE WILL BE EVERGREEN
3. SPECIMEN TREE
4. 1200mm HIGH TIMBER BOARD [illegible] FENCE WITH CAPS
5. [illegible]
6. [illegible] TIMBER GATE WITH [illegible]

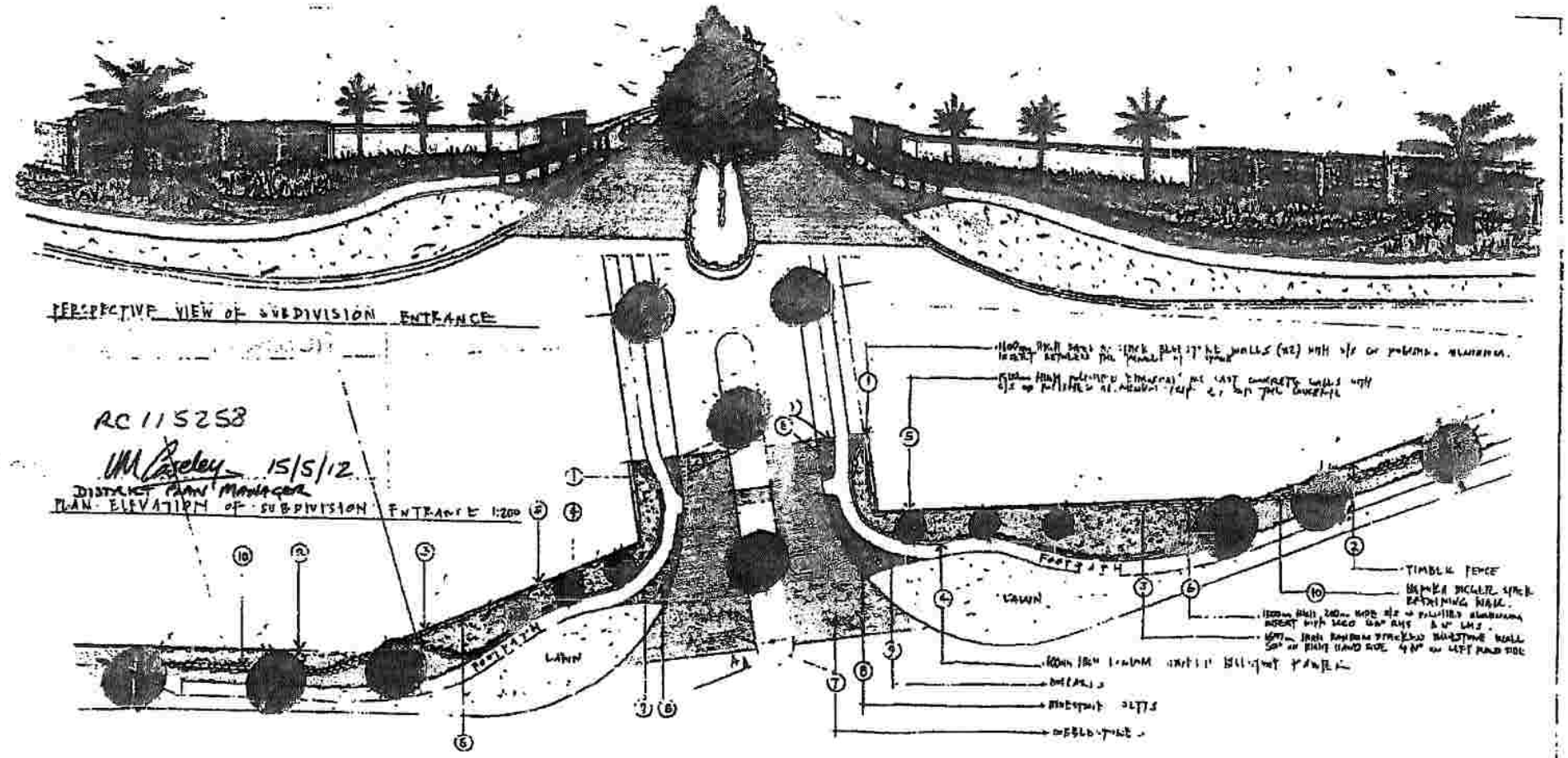
RC 115258
[signature] 15/5/12
DISTRICT PLAN MANAGER

Kaiapoi subdivision - Williams Street, Kaiapoi

DRAWING TITLE : Williams Street Fence Concept
DATE : 30th September 2009
SCALE : 1:50 @ A2
DESIGNER : Hayden Stark
DRAWN BY : Hayden Stark
SHEET NUMBER : 1
REVISIONS :
DISCLAIMER :

Goom Landscapes Limited, 207 Fendalton Road, PO Box 29 422, Christchurch, New Zealand. Telephone - 03 [illegible] Facsimile - 03 351 6110 Email - hayden@goomlandscapes.co.nz www.goomlandscapes.co.nz

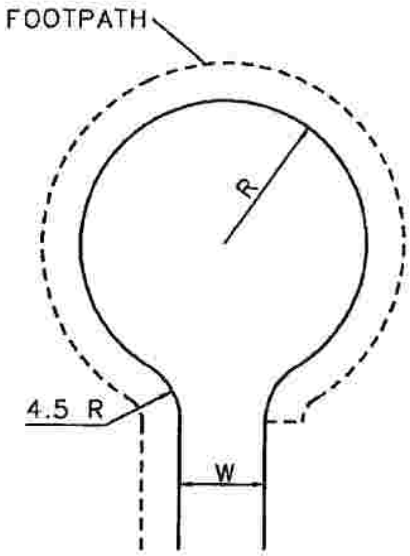
Goom Landscapes



kaiapoi subdivision

Williams Street, Kaiapoi

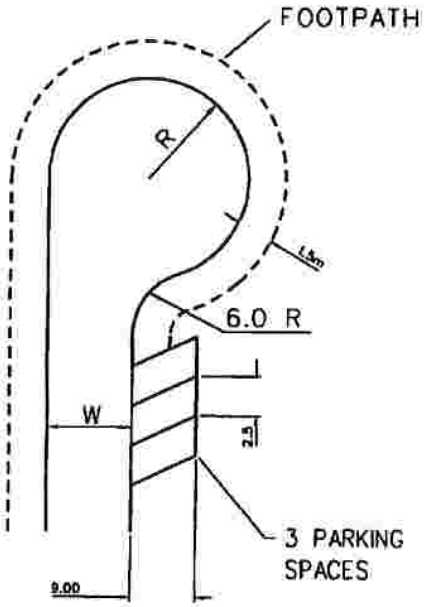
Goom Landscapes



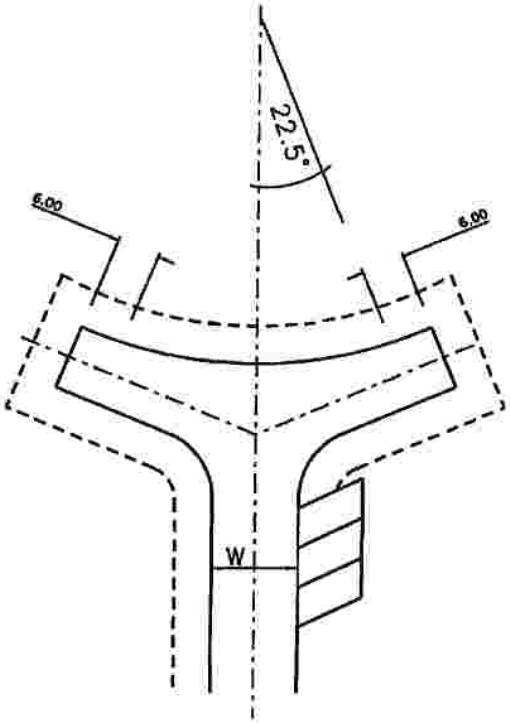
TYPE A (Rural)

R = 12.0 FOR W ≥ 6.0

R = 8.0 FOR W < 6
OR 10.0 WITH PARKING



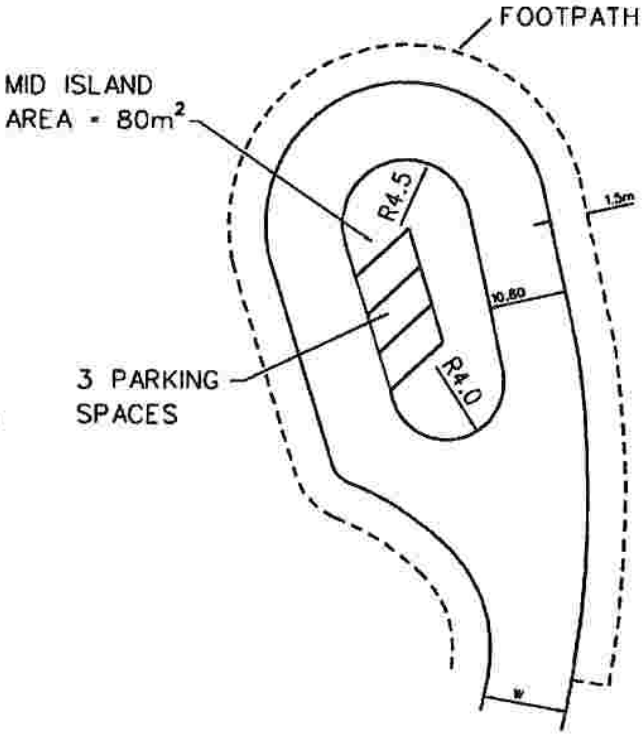
TYPE B (Residential)



TYPE A (Residential)

W < 6.0

MAXIMUM LENGTH OF CUL-DE-SAC 100m
FOR RESIDENTIAL AND BUSINESS ZONES
WITH THIS CONFIGURATION TURNING HEAD



TYPE D (Residential)

W < 7.0

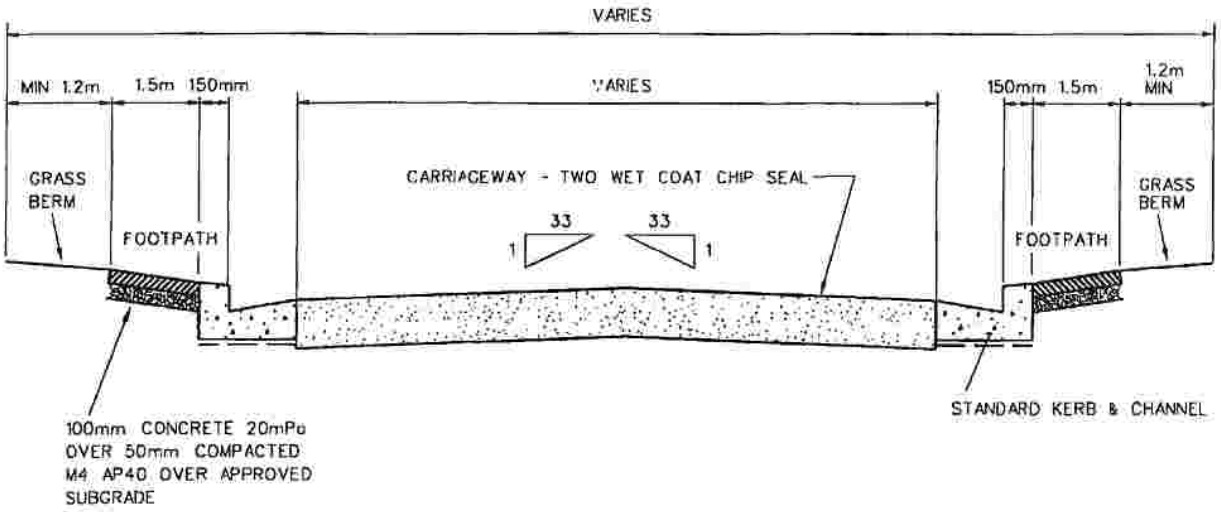
NO 'PRIVATE WAYS' OFF THIS
CONFIGURATION TURNING HEAD

WAIMAKARIRI DISTRICT COUNCIL technical services	NOT TO SCALE	SHEET TITLE: CUL-DE-SAC TURNING AREAS	PROJECT TITLE: STANDARD DRAWINGS	SHEET: 275
				ISSUE: C / PLAN No.: 600

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NOTES

1. Surfacing : Two wet coat hot bitumen and chip or 50mm AP 20 running course.
2. Basecourse : Minimum of 100mm TNZ M/4 AP40.
3. Subcourse : Minimum of 150mm TNZ M/5 AP65.
4. Refer DISTRICT PLAN Section 30 - Utilities & Traffic Management Table 30.1 for road dimensions
5. Footpath to have 1.5m useable width. Location either against kerb or 300 from boundary, meandered paths are acceptable.
6. Only one footpath unless otherwise approved or required.



CROSS SECTION

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WAIMAKARIRI DISTRICT COUNCIL technical services

NOT TO SCALE

SHEET TITLE: TYPICAL ROAD & CUL-DE-SAC CROSS-SECTION

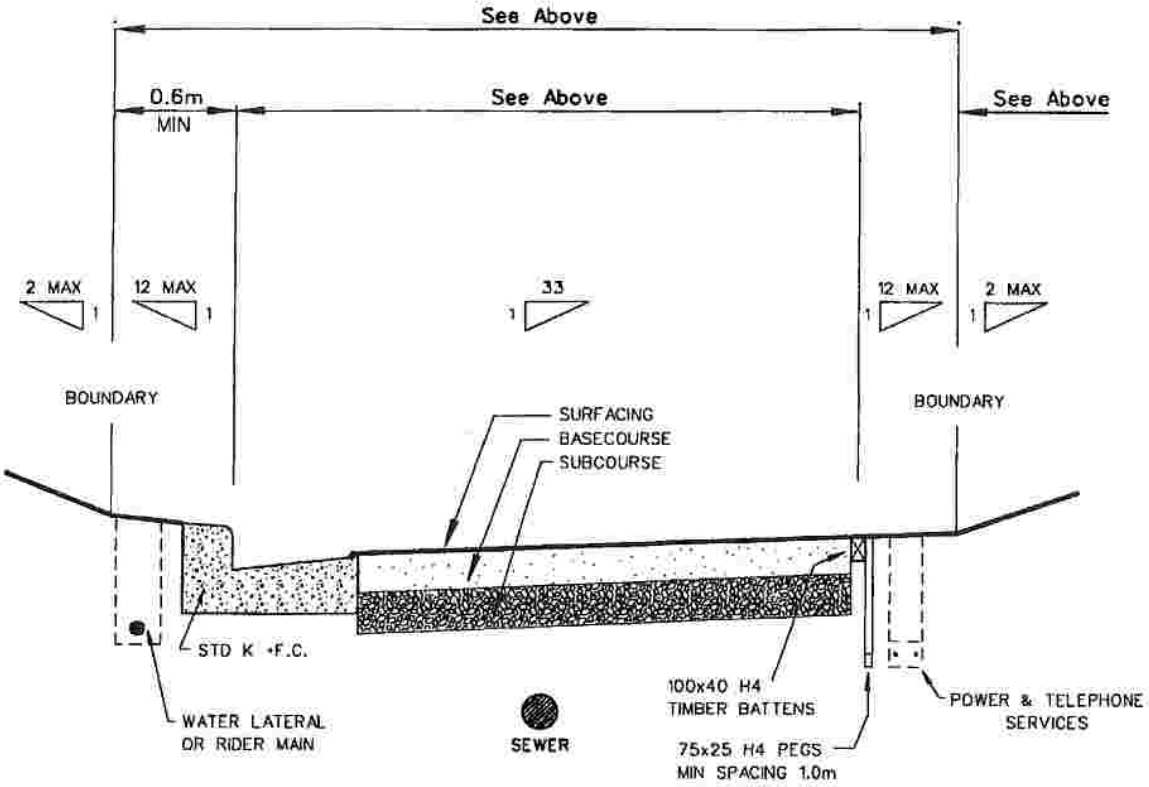
PROJECT TITLE: STANDARD DRAWINGS

SHEET: 272

ISSUE: D

PLAN No.: 600

Zone	Land Use or Activity	Access Formation minimum Width (meters)	Minimum Legal Width (meters)
Residential Zones	0 to 2 dwellinghouses	3	4
	3 to 6 dwellinghouses or any other land use	5	7
Business Zones	Any land use	6m, or separate entry and exit carriageways of 3m each	8m or two separate carriageways of 5m



NOTES

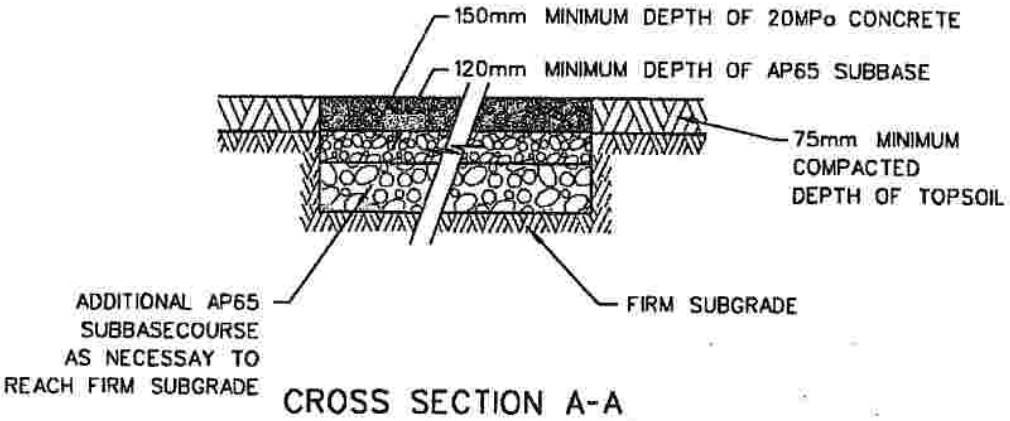
① Surfacing : Single coat hot bitumen and grade 4 chip or bitumen prime coat and 20mm osphaltic concrete.

② Basecourse : Minimum of 100mm TNZ M/4 AP40

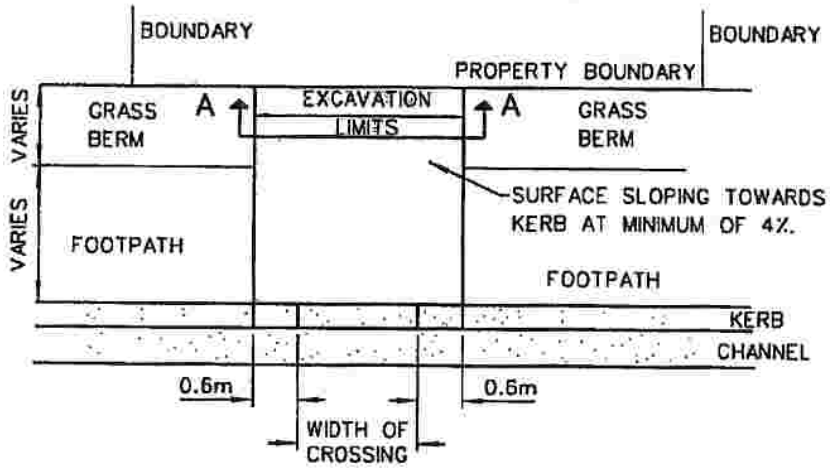
③ Subcourse : Minimum of 150mm TNZ M/5 AP65

	NOT TO SCALE	SHEET TITLE	PROJECT TITLE	SHEET
WAIRARAPA DISTRICT COUNCIL		TYPICAL R.O.W CROSS-SECTION RES. & BUSINESS	STANDARD DRAWINGS	274
				ISSUE D / PLAN No. 600

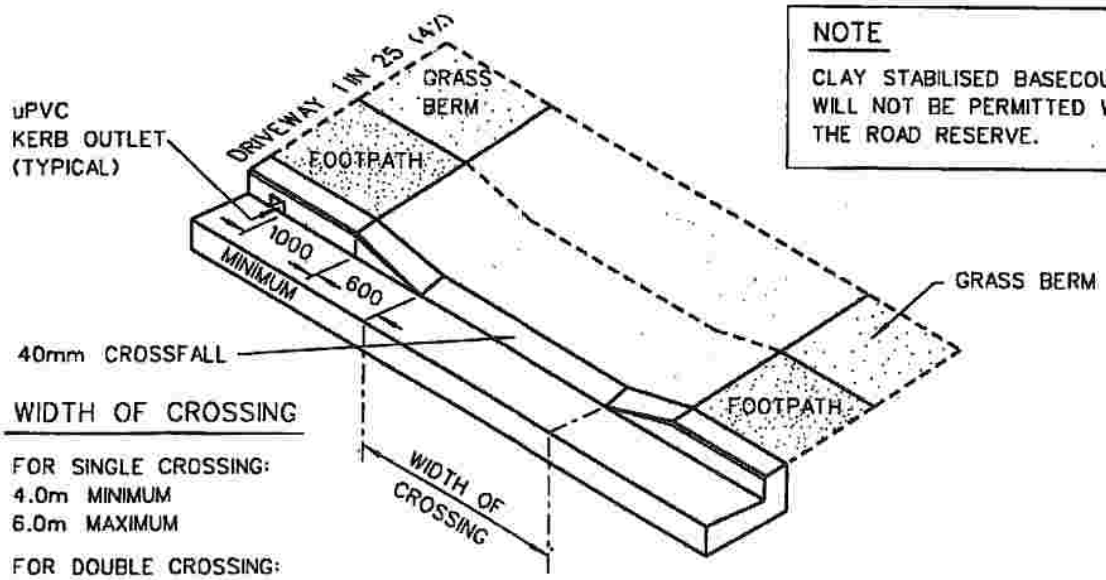
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CROSS SECTION A-A



PLAN



NOTE

CLAY STABILISED BASECOURSE WILL NOT BE PERMITTED WITHIN THE ROAD RESERVE.

WIDTH OF CROSSING

FOR SINGLE CROSSING:
4.0m MINIMUM
6.0m MAXIMUM

FOR DOUBLE CROSSING:
6.0m MINIMUM
8.0m MAXIMUM

ISOMETRIC VIEW

WAIMAKARIRI DISTRICT COUNCIL technical services	NOT TO SCALE	SHEET TITLE: Typical Residential Concrete Vehicle Crossing (Flat Channel)	PROJECT TITLE: Standard Drawings	SHEET: 211A ISSUE: E PLAN No.: 600

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Landonline

Toitu te Land whenua Information New Zealand

TA Approvals

Territorial Authority	Waimakariri District Council TA Certification Division	**TA Reference**	RC115258/120515029276
Survey Number	LT 452661	**Survey Purpose**	LT Subdivision
Surveyor Reference	29130 Stage 1a	**Land District**	Canterbury
Surveyor	Russell Thomas Benge		
Surveyor Firm	Davis Ogilvie & Partners Ltd (Christchurch)		
Dataset Description	Lots 304 - 364, 391 - 395, 447 - 449, 600, 700, 702, 703, 705, 706, 800 and 801 being a Subdivision o Lots 509 DP 448966 and 600 DP 432856		

TA Certificates

I hereby certify that plan DP 452661 was approved by the Waimakariri District Council pursuant to section 223 of the Resource Management Act 1991 on the 23rd day of May 2012. ☑

The approval of the Council under Section 223 of the Resource Management Act 1991 is subject to the granting or reserving of the easement(s) set out in the Memorandum of Easements attached as a supporting document to plan DP 452661 ☑

Signature

Signed by Yvonne Sally Fear, Authorised Officer, on 23/05/2012 02:10 PM

Receipt Information

Transaction Receipt Number	6264020
Signing Certificate (Distinguished Name)	Fear, Yvonne Sally
Signing Certificate (Serial Number)	1292396701
Signature Date	23/05/2012

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

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Landonline

Toitu te Land whenua Information New Zealand

Title Plan - LT 452661

Survey Number	LT 452661
Surveyor Reference	29130 Stage 1a
Surveyor	Russell Thomas Benge
Survey Firm	Davis Ogilvie & Partners Ltd (Christchurch)
Surveyor Declaration	

Survey Details

Dataset Description	Lots 304 - 364, 391 - 395, 447 - 449, 600, 700, 702, 703, 705, 706, 800 and 801 being a Subdivision of Lots 509 DP 448966 and 600 DP 432856		
Status	Initiated		
Land District	Canterbury	**Survey Class**	Class A
Submitted Date		**Survey Approval Date**	
		Deposit Date	

Territorial Authorities

Waimakariri District

Comprised In

CT 571612
CT 575315

Created Parcels

Parcels	Parcel Intent	Area	CT Reference
Lot 800 Deposited Plan 452661	Fee Simple Title	30.1407 Ha	581664
Lot 703 Deposited Plan 452661	Vesting on Deposit for Recreation Reserve (Territorial Authority)	0.1432 Ha	581665
Lot 313 Deposited Plan 452661	Fee Simple Title	0.0501 Ha	581666
Lot 312 Deposited Plan 452661	Fee Simple Title	0.0558 Ha	581667
Lot 310 Deposited Plan 452661	Fee Simple Title	0.0503 Ha	581668
Lot 311 Deposited Plan 452661	Fee Simple Title	0.0553 Ha	581669
Lot 309 Deposited Plan 452661	Fee Simple Title	0.0707 Ha	581670
Lot 308 Deposited Plan 452661	Fee Simple Title	0.0709 Ha	581671
Lot 307 Deposited Plan 452661	Fee Simple Title	0.0711 Ha	581672
Lot 702 Deposited Plan 452661	Vesting on Deposit for Recreation Reserve (Territorial Authority)	0.1429 Ha	581673
Lot 306 Deposited Plan 452661	Fee Simple Title	0.0718 Ha	581674
Lot 305 Deposited Plan 452661	Fee Simple Title	0.0717 Ha	581675
Lot 304 Deposited Plan 452661	Fee Simple Title	0.0714 Ha	581676
Area B Deposited Plan 452661	Easement		
Area A Deposited Plan 452661	Easement		

Landonline

Toitu te Land whenua Information New Zealand

Title Plan - LT 452661

Created Parcels

Parcels	Parcel Intent	Area	CT Reference
Lot 364 Deposited Plan 452661	Fee Simple Title	0.0500 Ha	581677
Lot 363 Deposited Plan 452661	Fee Simple Title	0.0500 Ha	581678
Lot 362 Deposited Plan 452661	Fee Simple Title	0.0500 Ha	581679
Lot 361 Deposited Plan 452661	Fee Simple Title	0.0681 Ha	581680
Lot 360 Deposited Plan 452661	Fee Simple Title	0.0603 Ha	581681
Lot 359 Deposited Plan 452661	Fee Simple Title	0.0604 Ha	581682
Lot 358 Deposited Plan 452661	Fee Simple Title	0.0606 Ha	581683
Lot 357 Deposited Plan 452661	Fee Simple Title	0.0600 Ha	581684
Lot 356 Deposited Plan 452661	Fee Simple Title	0.0600 Ha	581685
Lot 355 Deposited Plan 452661	Fee Simple Title	0.0600 Ha	581686
Lot 354 Deposited Plan 452661	Fee Simple Title	0.0689 Ha	581687
Lot 393 Deposited Plan 452661	Fee Simple Title	0.0618 Ha	581688
Lot 392 Deposited Plan 452661	Fee Simple Title	0.0636 Ha	581689
Lot 391 Deposited Plan 452661	Fee Simple Title	0.0636 Ha	581690
Lot 395 Deposited Plan 452661	Fee Simple Title	0.0683 Ha	581691
Lot 394 Deposited Plan 452661	Fee Simple Title	0.0665 Ha	581692
Lot 449 Deposited Plan 452661	Fee Simple Title	0.0717 Ha	581693
Lot 448 Deposited Plan 452661	Fee Simple Title	0.0665 Ha	581694
Lot 447 Deposited Plan 452661	Fee Simple Title	0.0660 Ha	581695
Lot 700 Deposited Plan 452661	Vesting on Deposit for Recreation Reserve (Territorial Authority)	0.9835 Ha	581696
Lot 353 Deposited Plan 452661	Fee Simple Title	0.0728 Ha	581697
Lot 330 Deposited Plan 452661	Fee Simple Title	0.0665 Ha	581698
Lot 331 Deposited Plan 452661	Fee Simple Title	0.0700 Ha	581699
Lot 332 Deposited Plan 452661	Fee Simple Title	0.0700 Ha	581700
Lot 333 Deposited Plan 452661	Fee Simple Title	0.0674 Ha	581701
Lot 334 Deposited Plan 452661	Fee Simple Title	0.0715 Ha	581702
Lot 335 Deposited Plan 452661	Fee Simple Title	0.0696 Ha	581703
Lot 336 Deposited Plan 452661	Fee Simple Title	0.0705 Ha	581704
Lot 337 Deposited Plan 452661	Fee Simple Title	0.0742 Ha	581705
Lot 338 Deposited Plan 452661	Fee Simple Title	0.0719 Ha	581706
Lot 339 Deposited Plan 452661	Fee Simple Title	0.0701 Ha	581707
Lot 340 Deposited Plan 452661	Fee Simple Title	0.0777 Ha	581708
Lot 341 Deposited Plan 452661	Fee Simple Title	0.0703 Ha	581709
Lot 342 Deposited Plan 452661	Fee Simple Title	0.0718 Ha	581710
Lot 343 Deposited Plan 452661	Fee Simple Title	0.0708 Ha	581711
Lot 344 Deposited Plan 452661	Fee Simple Title	0.0720 Ha	581712
Lot 345 Deposited Plan 452661	Fee Simple Title	0.0692 Ha	581713
Lot 346 Deposited Plan 452661	Fee Simple Title	0.0726 Ha	581714

Landonline

Toitu te Land whenua Information New Zealand

Title Plan - LT 452661

Created Parcels

Parcels	Parcel Intent	Area	CT Reference
Lot 347 Deposited Plan 452661	Fee Simple Title	0.0700 Ha	581715
Lot 348 Deposited Plan 452661	Fee Simple Title	0.0682 Ha	581716
Lot 349 Deposited Plan 452661	Fee Simple Title	0.0673 Ha	581717
Lot 350 Deposited Plan 452661	Fee Simple Title	0.0665 Ha	581718
Lot 351 Deposited Plan 452661	Fee Simple Title	0.0728 Ha	581719
Lot 352 Deposited Plan 452661	Fee Simple Title	0.0746 Ha	581720
Lot 329 Deposited Plan 452661	Fee Simple Title	0.0699 Ha	581721
Lot 328 Deposited Plan 452661	Fee Simple Title	0.0699 Ha	581722
Lot 327 Deposited Plan 452661	Fee Simple Title	0.0825 Ha	581723
Lot 326 Deposited Plan 452661	Fee Simple Title	0.0806 Ha	581724
Lot 325 Deposited Plan 452661	Fee Simple Title	0.0781 Ha	581725
Lot 324 Deposited Plan 452661	Fee Simple Title	0.0789 Ha	581726
Lot 323 Deposited Plan 452661	Fee Simple Title	0.0773 Ha	581727
Lot 322 Deposited Plan 452661	Fee Simple Title	0.0695 Ha	581728
Lot 321 Deposited Plan 452661	Fee Simple Title	0.0712 Ha	581729
Lot 320 Deposited Plan 452661	Fee Simple Title	0.0671 Ha	581730
Lot 319 Deposited Plan 452661	Fee Simple Title	0.0701 Ha	581731
Lot 318 Deposited Plan 452661	Fee Simple Title	0.0750 Ha	581732
Lot 316 Deposited Plan 452661	Fee Simple Title	0.0506 Ha	581733
Lot 314 Deposited Plan 452661	Fee Simple Title	0.0805 Ha	581734
Lot 315 Deposited Plan 452661	Fee Simple Title	0.0805 Ha	581735
Lot 317 Deposited Plan 452661	Fee Simple Title	0.0593 Ha	581736
Area BJ Deposited Plan 452661	Easement		
Lot 705 Deposited Plan 452661	Vesting on Deposit for Local Purpose Reserve	1.1640 Ha	581737
Area BF Deposited Plan 452661	Easement		
Lot 600 Deposited Plan 452661	Vesting on Deposit for Road	2.0379 Ha	
Lot 801 Deposited Plan 452661	Fee Simple Title	19.4185 Ha	581738
Area QQ Deposited Plan 452661	Restrictive Area		
Area E Deposited Plan 452661	Easement		
Area AX Deposited Plan 452661	Easement		
Area AY Deposited Plan 452661	Easement		
Area AW Deposited Plan 452661	Easement		
Area AV Deposited Plan 452661	Easement		
Area AG Deposited Plan 452661	Easement		
Area AZ Deposited Plan 452661	Easement		
Area BA Deposited Plan 452661	Easement		
Area BB Deposited Plan 452661	Easement		
Area AD Deposited Plan 452661	Easement		

Landonline

Toitu te Land whenua Information New Zealand

Title Plan - LT 452661

Created Parcels

Parcels	Parcel Intent	Area	CT Reference
Area FA Deposited Plan 452661	Land Covenant		
Area FB Deposited Plan 452661	Land Covenant		
Area FC Deposited Plan 452661	Land Covenant		
Area FD Deposited Plan 452661	Land Covenant		
Area FE Deposited Plan 452661	Land Covenant		
Area FF Deposited Plan 452661	Land Covenant		
Area FG Deposited Plan 452661	Land Covenant		
Area FH Deposited Plan 452661	Land Covenant		
Area FI Deposited Plan 452661	Land Covenant		
Lot 706 Deposited Plan 452661	Vesting on Deposit for Local Purpose Reserve	2.3797 Ha	584117
Area CF Deposited Plan 452661	Easement		
Area CG Deposited Plan 452661	Easement		
Area CH Deposited Plan 452661	Easement		
Area CJ Deposited Plan 452661	Easement		
Area CK Deposited Plan 452661	Easement		
Area CL Deposited Plan 452661	Easement		
Area CN Deposited Plan 452661	Easement		
Area CM Deposited Plan 452661	Easement		
Total Area		61.0851 Ha	

Schedule / Memorandum

Davis Ogilvie Professionals
Engineers • Surveyors • Planners

Davis Ogilvie & Partners Ltd
186 Hazeldean Road, Addington, Christchurch
P O Box 589, Christchurch, 8140, New Zealand

(03) 366 1653 0800 999 333 (03) 379 2348
admin@do.co.nz www.do.co.nz

Offices in Christchurch, Nelson, Greymouth and Timaru

DP 452661

Memorandum of Easements			
Purpose	**Shown**	**Servient Tenement**	**Dominant Tenement/Grantee**
Right of way, right to drain sewage & water, right to convey water, electricity, telecommunications & computer media.	A, CM	Lot 311	Lot 312
	B, CN	Lot 312	Lot 311
Right to convey telecommunications & computer media in gross.	A	Lot 311	Chorus New Zealand Limited
	B	Lot 312	
Right to convey electricity, telecommunications and computer media.	CM	Lot 311	Lot 310
	CN	Lot 312	

Proposed Easements			
Purpose	**Shown**	**Servient Tenement**	**Grantee**
Right to drain sewage in gross.	BF	Lot 700	Waimakariri District Council
Right to drain water in gross.	BJ	Lot 800	
	AV, CF CG, CH CJ, CK	Lot 801	

Existing Easements			
Purpose	**Shown**	**Servient Tenement**	**Document**
Right to drain water in gross.	AD,BA	Lot 800	EI 8591242.3
Right of way.	BA, BB	Lot 800	EI 8591242.2
Right of way in gross	BA, BB	Lot 800	EI 8591242.3

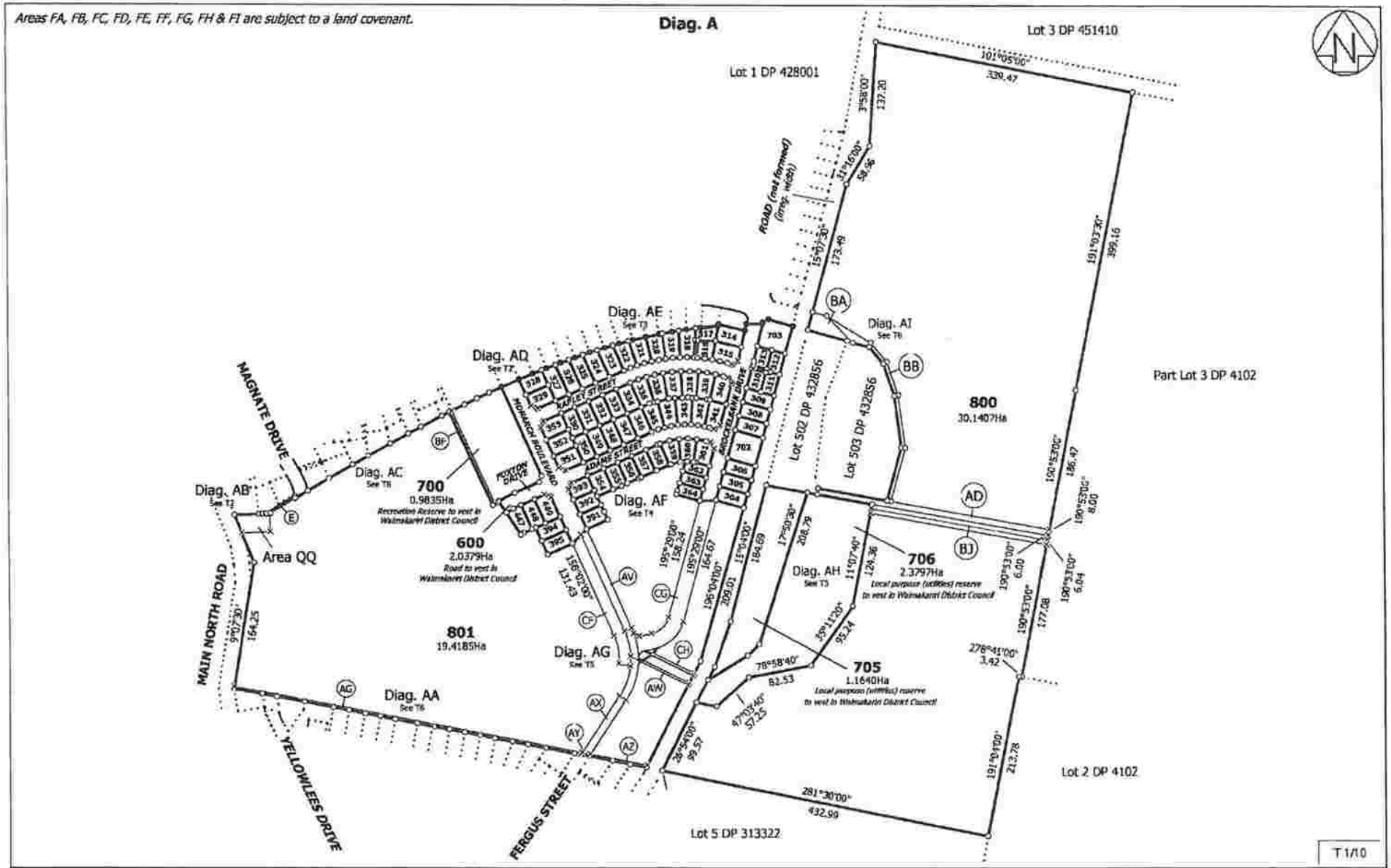
Schedule / Memorandum

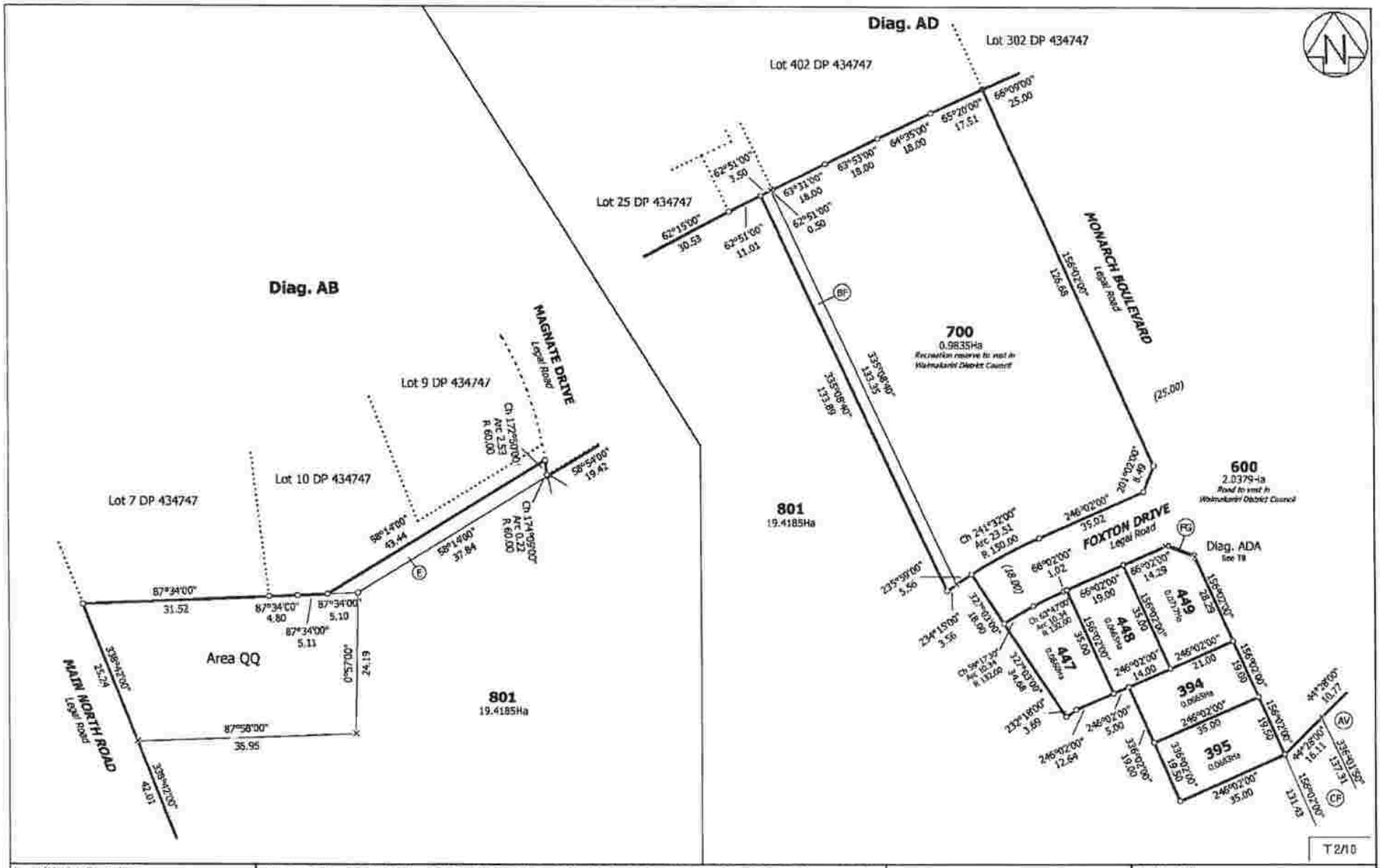
Right to drain sewage in gross and right to convey water in gross.	AV, AW, CJ, CL	Lot 801	EI 8591242.3
Right to convey water in gross.	AX, AY	Lot 801	EI 8591242.3
Right of way, right to drain sewage & water, right to convey water, electricity, telecommunications and computer media.	E	Lot 801	EI 8625933.12
Right to convey telecommunications and computer media in gross	E	Lot 801	EI 8625933.9
Batter easement in gross	AG, AY, AZ	Lot 801	EI 5637927.10

Notes

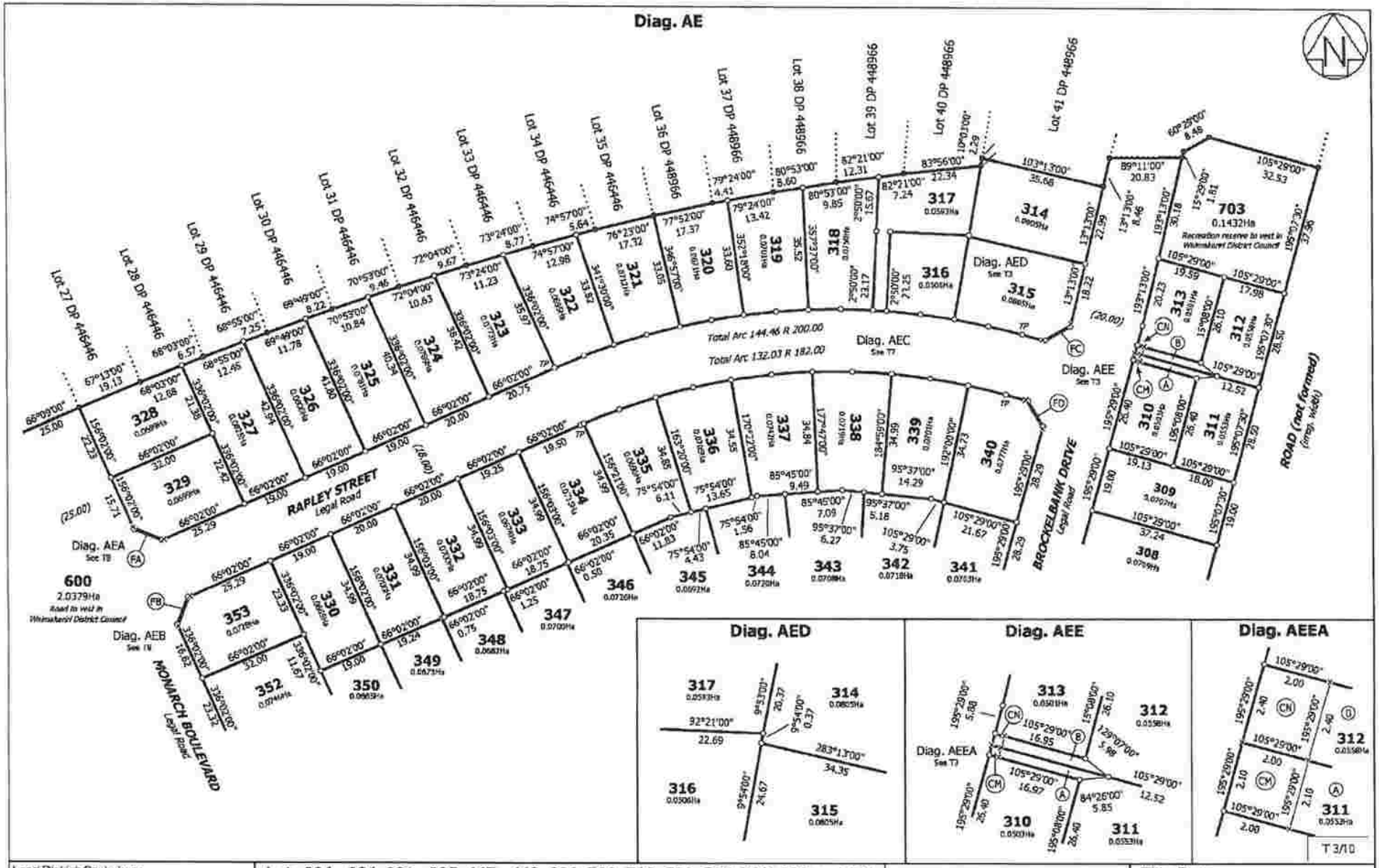
Areas FA, FB, FC, FD, FE, FF, FG, FH and FI are subject to a land covenant.

Existing right to drain sewage & and right to convey water easements by EI 8591242.3 are to be part cancelled.

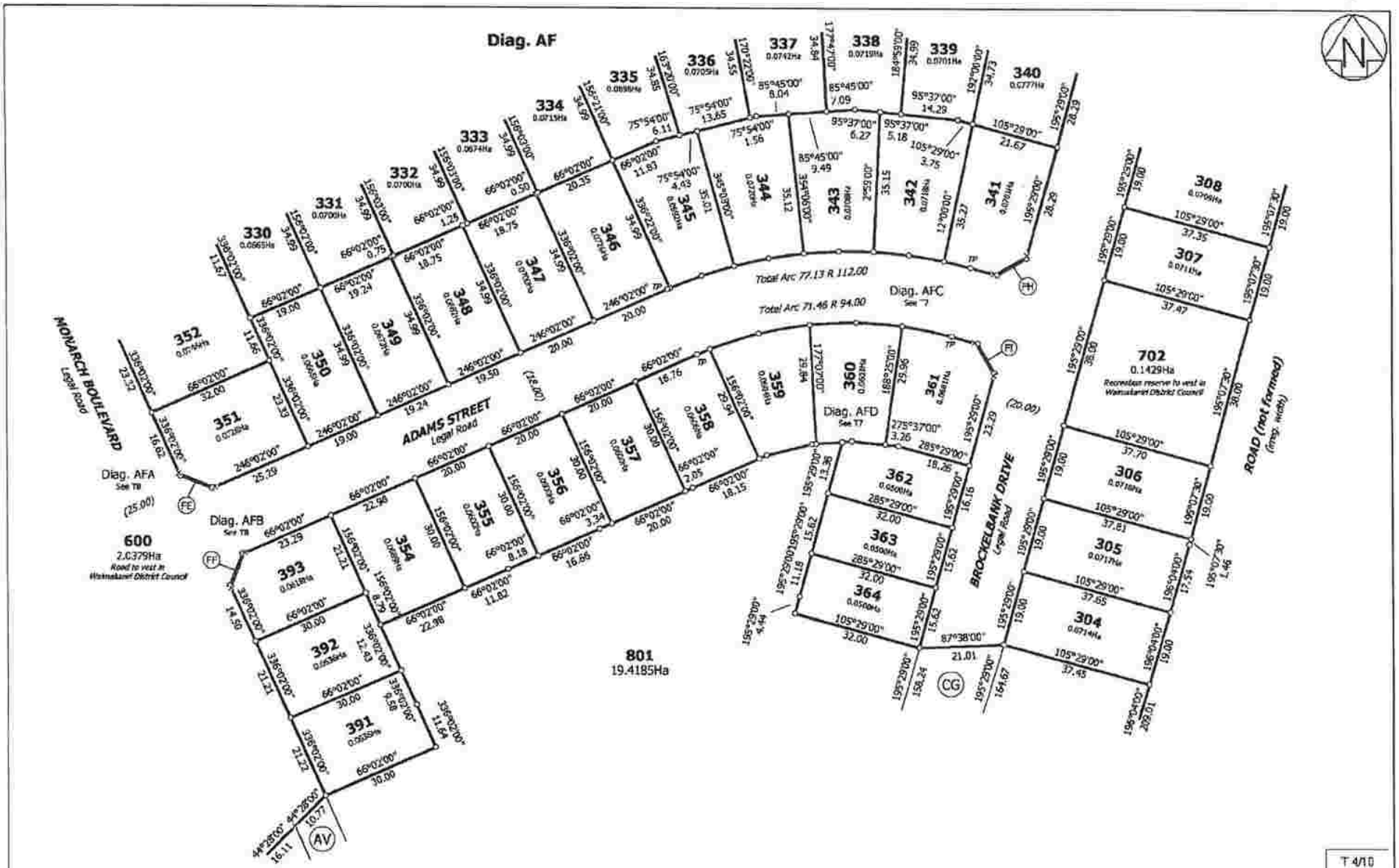

Areas FA, FB, FC, FD, FE, FF, FG, FH & FI are subject to a land covenant.
Diag. A
Lot 3 DP 451410
Lot 1 DP 428001
ROAD (not formed)
Diag. AE
Diag. AD
Diag. AI
Diag. AC
Diag. AB
Diag. AF
Diag. AH
Diag. AG
Diag. AA
MAGNATE DRIVE
MAIN NORTH ROAD
YELLOWLEES DRIVE
FERGUS STREET
Area QQ
700
0.9835Ha
Recreation Reserve to vest in Waimakariri District Council
600
2.0379Ha
Road to vest in Waimakariri District Council
801
19.4185Ha
800
30.1407Ha
706
2.3797Ha
Local purpose (utilities) reserve to vest in Waimakariri District Council
705
1.1640Ha
Local purpose (utilities) reserve to vest in Waimakariri District Council
Lot 502 DP 432856
Lot 503 DP 432856
Part Lot 3 DP 4102
Lot 2 DP 4102
Lot 5 DP 313322
T1/10
Land District: Canterbury
Digitally Generated Plan
Generated on: 16/05/2012 4:09pm Page 7 of 16
Lots 304 - 364, 391 - 395, 447 - 449, 600, 700, 702, 703, 705, 706, 800 and 801
being a Subdivision of Lots 509 DP 448966 and 600 DP 432856
Surveyor: Russell Thomas Benge
Firm: Davis Ogilvie & Partners Ltd (Christch
Title Plan
LT 452661
DRAFT



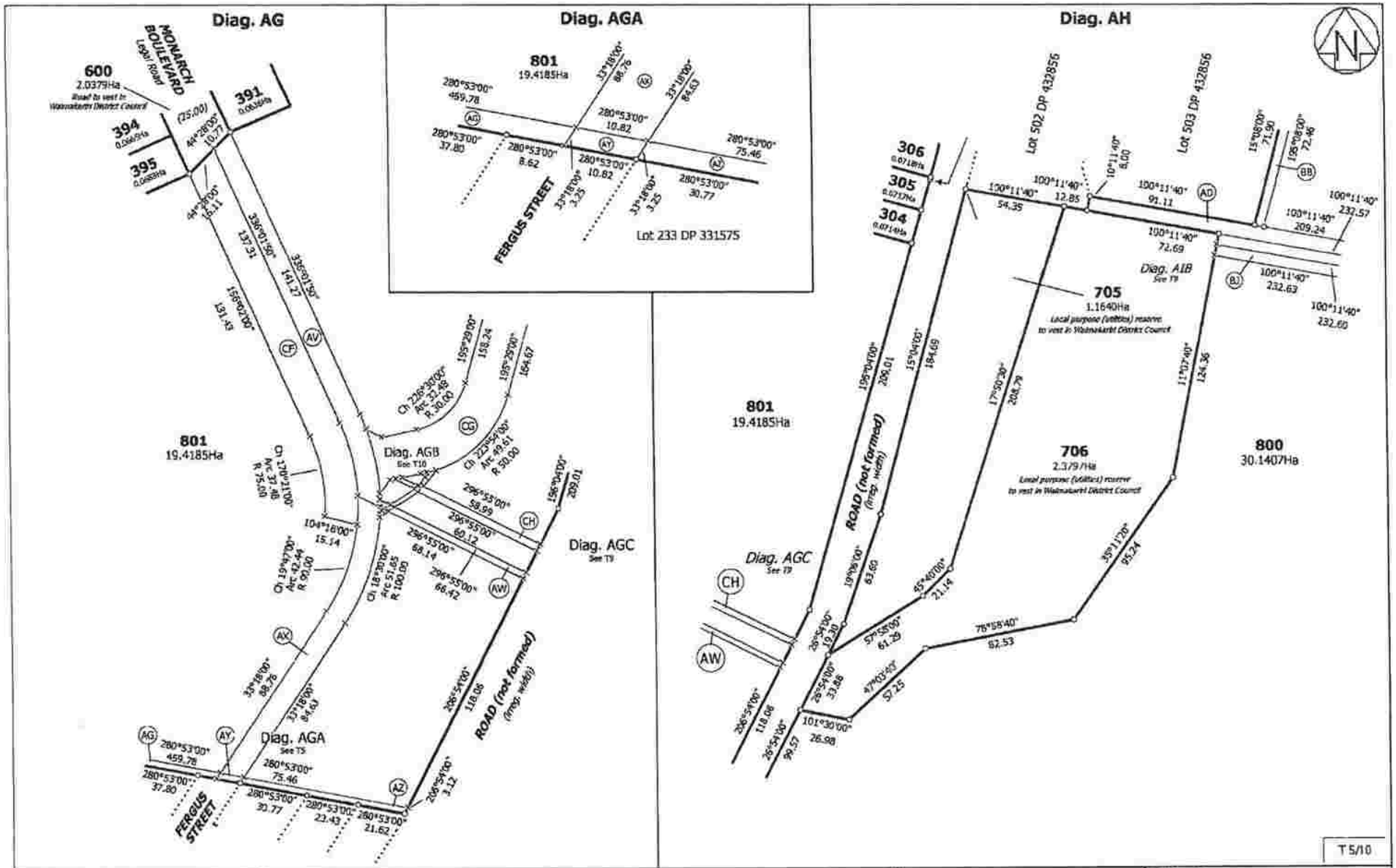
Land District: Canterbury Digitally Generated Plan Generated on: 16/05/2012 4:09pm Page 8 of 16	Lots 304 - 364, 391 - 395, 447 - 449, 600, 700, 702, 703, 705, 706, 800 and 801 being a Subdivision of Lots 509 DP 448966 and 600 DP 432856	Surveyor: Russell Thomas Benge Firm: Davis Ogilvie & Partners Ltd (Christch	Title Plan LT 452661 DRAFT



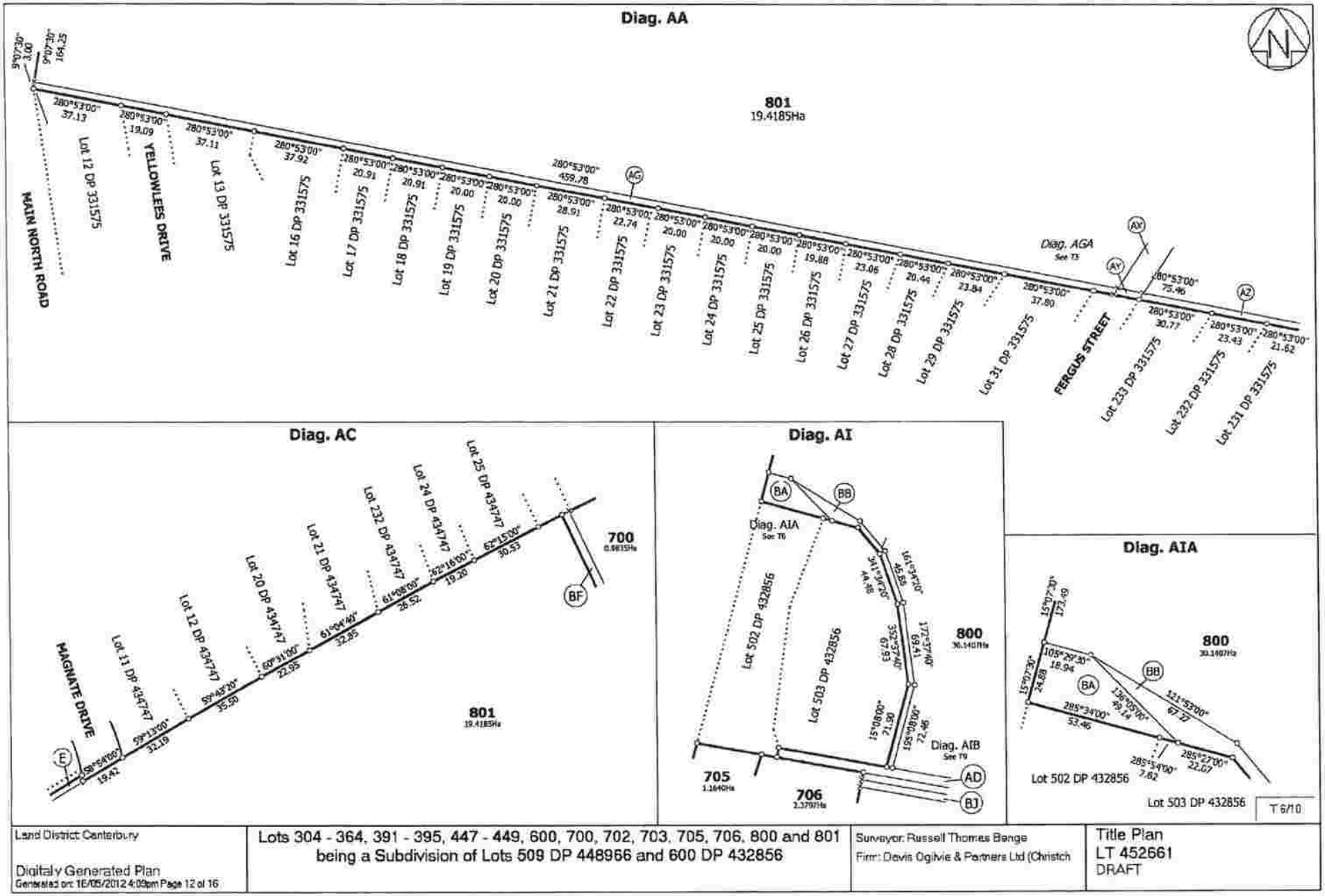
Land District: Canterbury Digitally Generated Plan Generated on: 16/05/2012 4:03pm Page 9 of 16	Lots 304 - 364, 391 - 395, 447 - 449, 600, 700, 702, 703, 705, 706, 800 and 801 being a Subdivision of Lots 509 DP 448966 and 600 DP 432856	Surveyor: Russell Thomas Bange Firm: Davis Ogilvie & Partners Ltd (Christch	Title Plan LT 452661 DRAFT



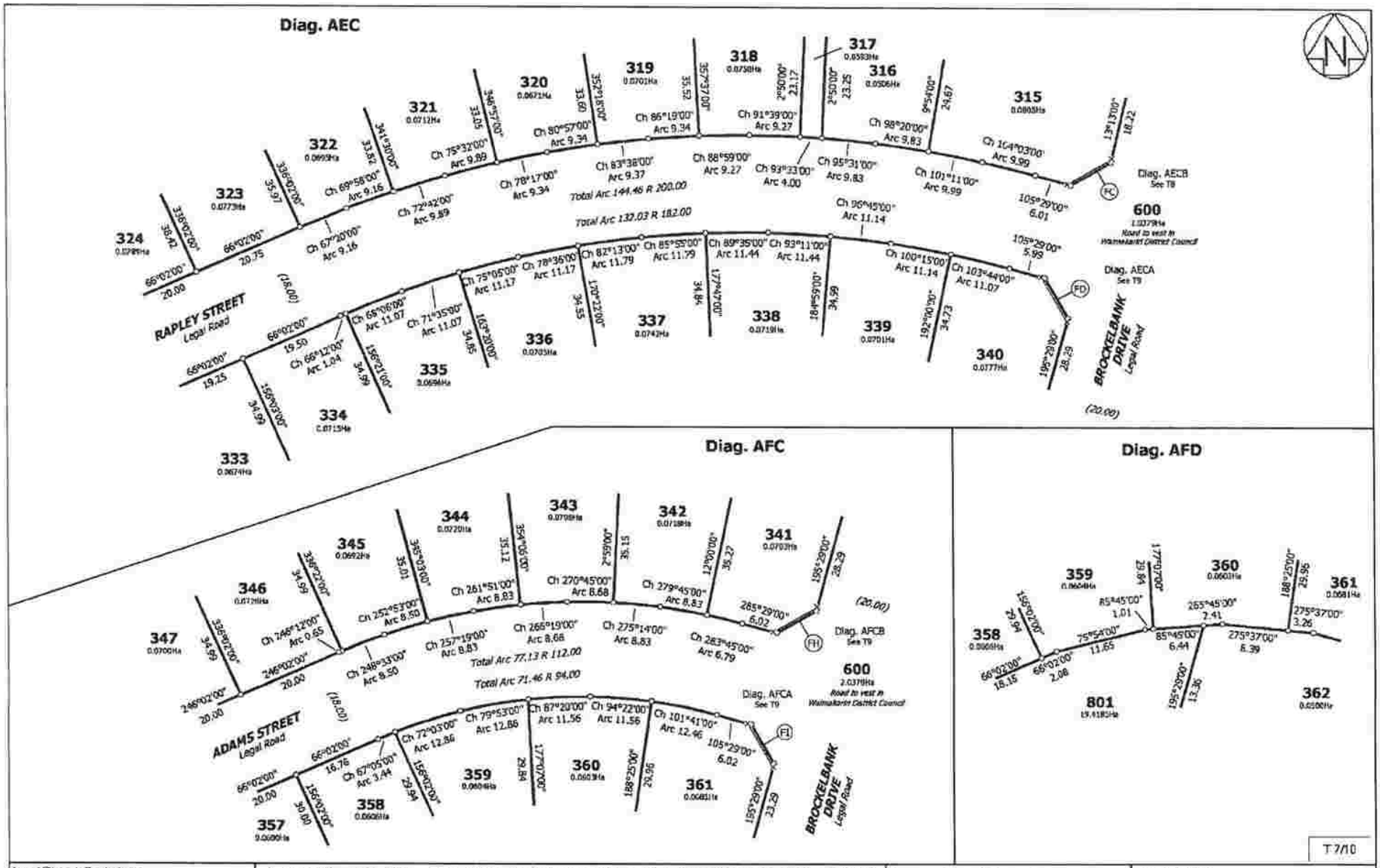
Land District: Canterbury Digitaly Generated Plan Generated on: 16/05/2012 4:03pm Page 10 of 16	Lots 304 - 364, 391 - 395, 447 - 449, 600, 700, 702, 703, 705, 706, 800 and 801 being a Subdivision of Lots 509 DP 448966 and 600 DP 432856	Surveyor: Russell Thomas Benge Firm: Davis Ogilvie & Partners Ltd (Christch	Title Plan LT 452661 DRAFT



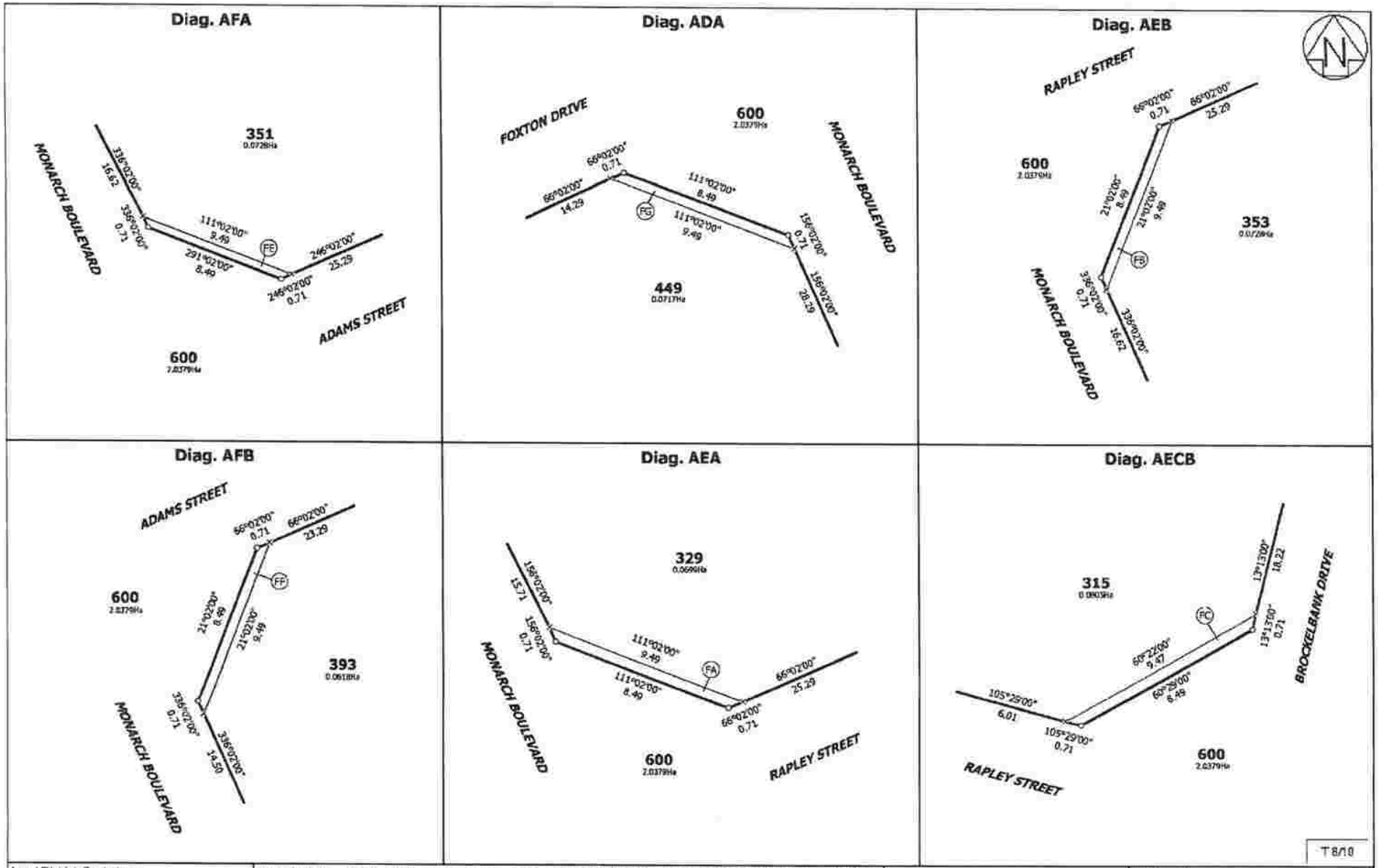
Land District: Canterbury Digitally Generated Plan Generated on: 16/05/2012 4:09pm Page 11 of 16	Lots 304 - 364, 391 - 395, 447 - 449, 600, 700, 702, 703, 705, 706, 800 and 801 being a Subdivision of Lots 509 DP 448966 and 600 DP 432856	Surveyor: Russell Thomas Benge Firm: Davis Ogilvie & Partners Ltd (Christch	Title Plan LT 452661 DRAFT



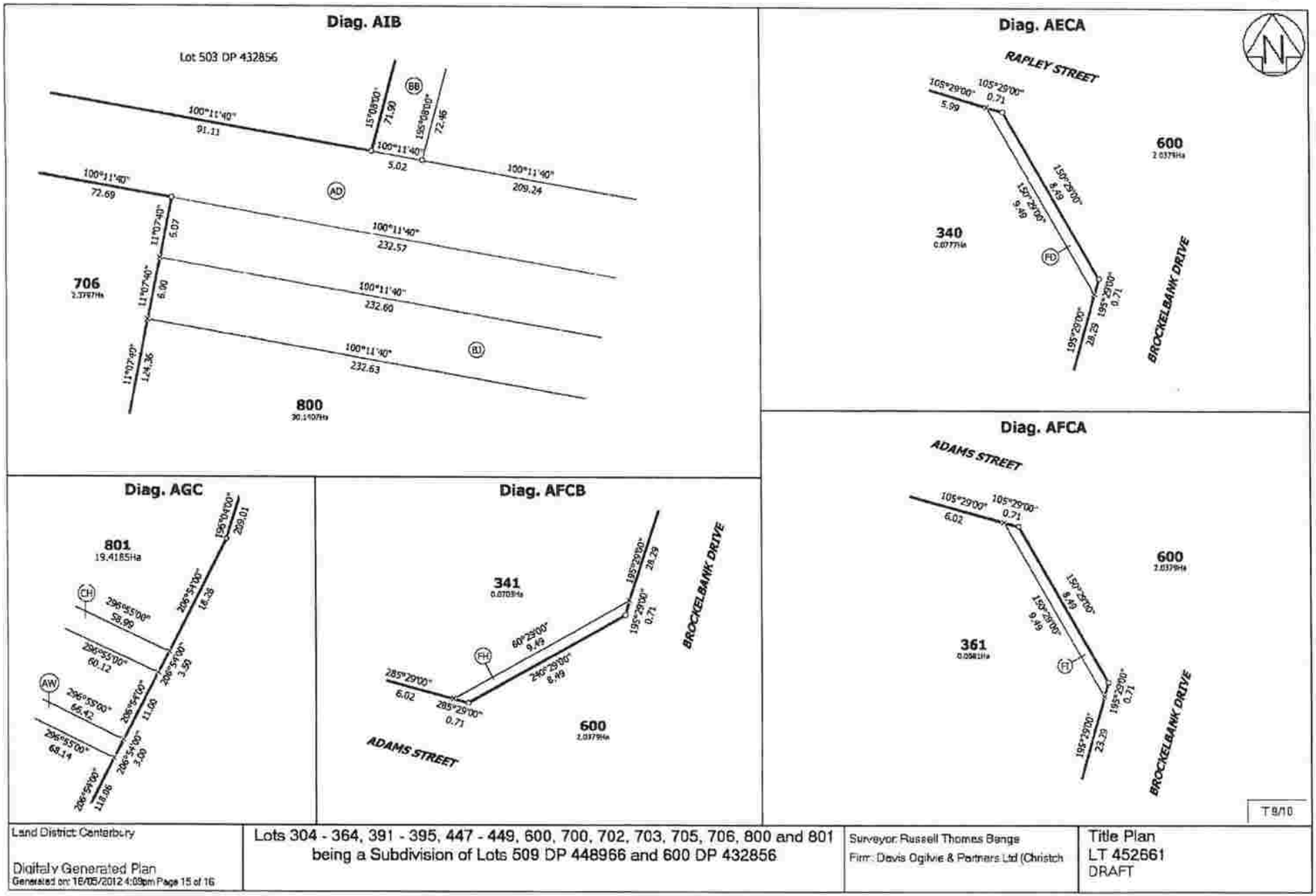
Land District Canterbury Digitaly Generated Plan Generated on: 16/05/2012 4:09pm Page 12 of 16	Lots 304 - 364, 391 - 395, 447 - 449, 600, 700, 702, 703, 705, 706, 800 and 801 being a Subdivision of Lots 509 DP 448966 and 600 DP 432856	Surveyor: Russell Thomas Benge Firm: Davis Ogilvie & Partners Ltd (Christch	Title Plan LT 452661 DRAFT



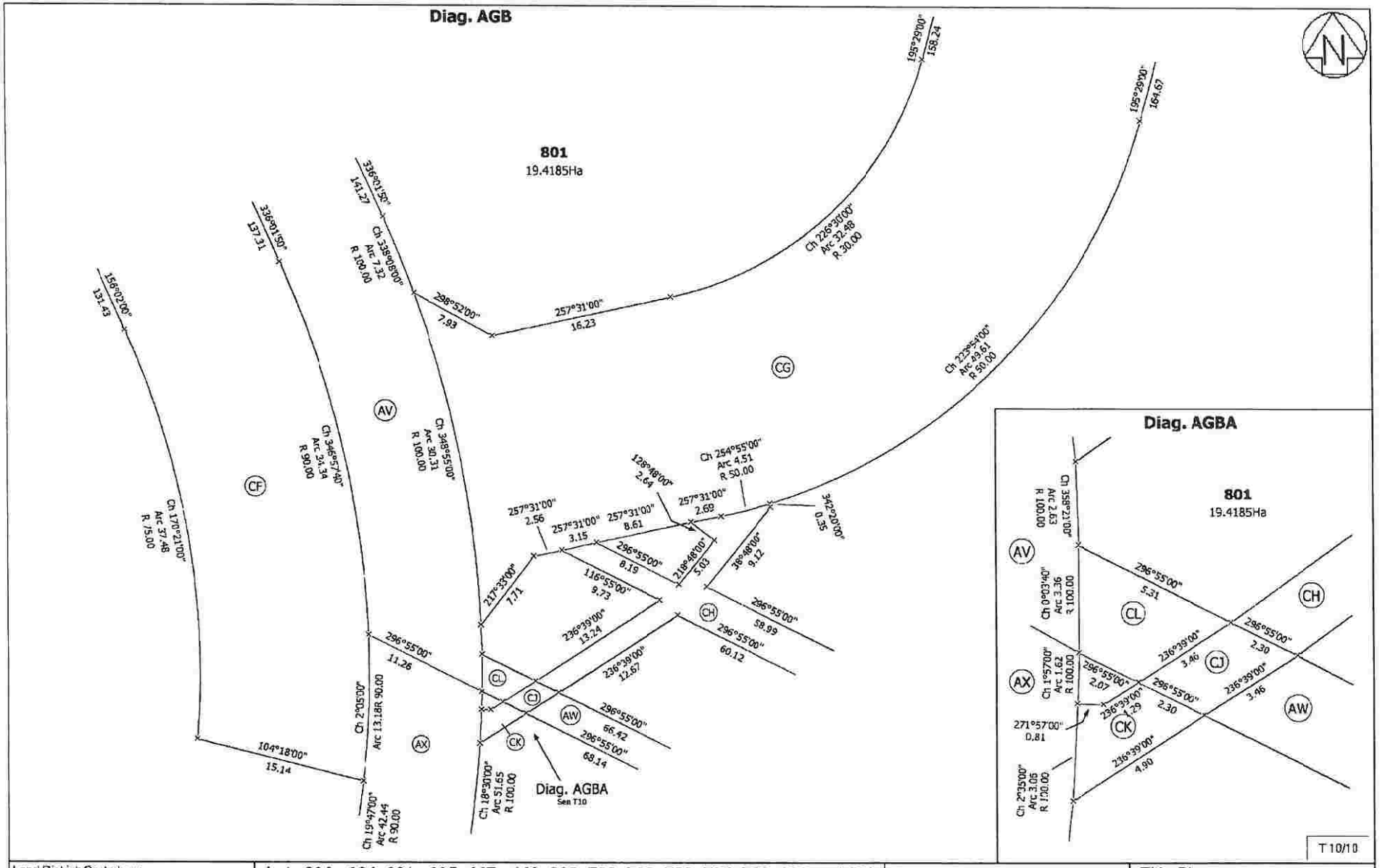
Land District: Canterbury Digitaly Generated Plan Generated on: 16/05/2012 4:09pm Page 13 of 16	Lots 304 - 364, 391 - 395, 447 - 449, 600, 700, 702, 703, 705, 706, 800 and 801 being a Subdivision of Lots 509 DP 448966 and 600 DP 432856	Surveyor: Russell Thomas Benge Firm: Davis Ogilvie & Partners Ltd (Christch	Title Plan LT 452661 DRAFT



Land District: Canterbury Digitaly Generated Plan Generated on: 16/05/2012 4:03pm Page 14 of 16	Lots 304 - 364, 391 - 395, 447 - 449, 600, 700, 702, 703, 705, 706, 800 and 801 being a Subdivision of Lots 509 DP 448966 and 600 DP 432856	Surveyor: Russell Thomas Benge Firm: Davis Ogilvie & Partners Ltd (Christch	Title Plan LT 452661 DRAFT



Land District: Canterbury Digitaly Generated Plan Generated on: 16/05/2012 4:09pm Page 15 of 16	Lots 304 - 364, 391 - 395, 447 - 449, 600, 700, 702, 703, 705, 706, 800 and 801 being a Subdivision of Lots 509 DP 448966 and 600 DP 432856	Surveyor: Russell Thomas Benge Firm: Davis Ogilvie & Partners Ltd (Christch	Title Plan LT 452661 DRAFT



Land District: Canterbury Digitaly Generated Plan Generated on: 16/05/2012 4:09pm Page 16 of 16	Lots 304 - 364, 391 - 395, 447 - 449, 600, 700, 702, 703, 705, 706, 800 and 801 being a Subdivision of Lots 509 DP 448966 and 600 DP 432856	Surveyor: Russell Thomas Benge Firm: Davis Ogilvie & Partners Ltd (Christch	Title Plan LT 452661 DRAFT

LM2602363 15/10/2026 Page 58

RC115258
Sovereign Green – Stage 1A

CERTIFICATE ISSUED PURSUANT TO THE RESOURCE MANAGEMENT ACT 1991

In the matter of the Land Transfer Plan 452661 and pursuant to Section 224(c) of the Resource Management Act 1991, I hereby certify that some of the conditions of the subdivision consent (Lots 304 – 364, 391 – 395, 447 – 449, 600, 700, 702, 703, 705, 706, 800 and 801 being a subdivision of Lot 509 DP 448966 and Lot 600 DP 432856) have been complied with to the satisfaction of the Waimakariri District Council, 3 consent notices have been issued in respect to the conditions not met and a bond agreement has been entered into.

Dated at Rangiora this 7th day of June 2012

N Harrison
Authorised Officer
Waimakariri District Council

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of an application by **Sovereign Green (Stage 1A)** to subdivide land into 69 lots

CONSENT NOTICE PURSUANT TO SECTION 221 OF THE RESOURCE MANAGEMENT ACT 1991

TO: The District Land Registrar
Canterbury Land Registry

TAKE NOTICE that the land described in the Schedule below is subject to a condition in relation to a subdivision consent as follows:

1. Dwellings shall have a minimum finished floor level of RL. 3.20 M.S.L.

The above condition shall be subject to a consent notice pursuant to Section 221 of the Resource Management Act 1991 to be registered on the titles to be issued for Lots 304 – 364, 391 – 395 and 447 – 449.

AND YOU are requested to register this Consent Notice as prescribed by Section 221 of the Resource Management Act 1991.

SCHEDULE
Estate in fee simple and being Lots 304 – 364, 391 – 395 and 447 – 449 Deposit Plan 452661 and being a subdivision of Lot 509 DP 448966 and Lot 600 DP 432856, Certificate of Titles 571612 & CT 575315.

Dated this 7th day of June 2012.

SIGNED for and on behalf of
the **WAIMAKARIRI DISTRICT COUNCIL**
pursuant to Section 252 of the
Local Government Act 1974

AUTHORISED OFFICER

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of an application by **Sovereign Green (Stage 1A)** to subdivide land into 69 lots

CONSENT NOTICE PURSUANT TO SECTION 221 OF THE RESOURCE MANAGEMENT ACT 1991

TO: The District Land Registrar
Canterbury Land Registry

TAKE NOTICE that the land described in the Schedule below is subject to a condition in relation to a subdivision consent as follows:

1. The owner of Lots 306, 307 and 312 & 313 shall pay the full costs of erecting and maintaining fencing along the common boundary with the Council Reserve.

The above condition shall be subject to a consent notice pursuant to Section 221 of the Resource Management Act 1991 to be registered on the titles to be issued for Lots 306, 307, 312 & 313. This consent notice shall ensure that the Council is not liable for any fencing costs.

AND YOU are requested to register this Consent Notice as prescribed by Section 221 of the Resource Management Act 1991.

SCHEDULE
Estate in fee simple and being Lots 306, 307, 312 & 313 Deposit Plan 452661 and being a subdivision of Lot 509 DP 448966 and Lot 600 DP 432856, Certificate of Titles 571612 & CT 575315.

Dated this 7th day of June 2012.

SIGNED for and on behalf of
the **WAIMAKARIRI DISTRICT COUNCIL**
pursuant to Section 252 of the
Local Government Act 1974

AUTHORISED OFFICER

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of an application by **Sovereign Green (Stage 1A)** to subdivide land into 69 lots

CONSENT NOTICE PURSUANT TO SECTION 221 OF THE RESOURCE MANAGEMENT ACT 1991

TO: The District Land Registrar
Canterbury Land Registry

TAKE NOTICE that the land described in the Schedule below is subject to a condition in relation to a subdivision consent as follows:

1. Dwellings within Lots 310 – 313, 316, 317, 362 – 364 shall:

    - Be set back a minimum of 2 metres from any road boundary or accessway; and
    - Not exceed 35% structure coverage of the net area of the site; and
    - Not project beyond the building envelope defined by recession planes constructed 2.5 metres above any site boundary as shown in Appendix 31.1 of the District Plan; and
    - Not exceed a maximum height of 8 metres.

The above condition as it relates to Lots 310 – 313, 316, 317, 362 – 364 shall be subject to a consent notice pursuant to Section 221 of the Resource Management Act 1991 to be registered on the titles to be issued for Lots 310 – 313, 316, 317, 362 – 364.

AND YOU are requested to register this Consent Notice as prescribed by Section 221 of the Resource Management Act 1991.

SCHEDULE
Estate in fee simple and being Lots 310 – 313, 316, 317, 362 – 364 Deposit Plan 452661 and being a subdivision of Lot 509 DP 448966 and Lot 600 DP 432856, Certificate of Titles 571612 & CT 575315.

Dated this 7th day of June 2012.

SIGNED for and on behalf of
the **WAIMAKARIRI DISTRICT COUNCIL**
pursuant to Section 252 of the
Local Government Act 1974

AUTHORISED OFFICER

RC125290/120905058896 21754-005-00

WAIMAKARIRI DISTRICT COUNCIL

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of an application lodged by **Sovereign Green** for a resource consent under Section 88 of the aforementioned Act.

APPLICATION

The applicants sought a resource consent to vary conditions 4 and 31 of subdivision consent RC115258 to allow for a differing staging which will also require splitting of two of the proposed roads into two lots each to fit with the proposed staging. Condition 1 will also require variation as this refers to approved plans which are to be updated to reflect the requested variation.

DECISION

The District Plan Manager, on the 28th August 2012, approved:

THAT pursuant to Section 127 of the Resource Management Act 1991, consent be granted to vary conditions 1, 4 and 31 of the subdivision consent RC115258 to subdivide at 404 and 404B Williams Street, Kaiapoi, being Lots 500 and 600 DP 432856 as follows:

Condition 1 be amended to read:

1. The application shall be carried out in accordance with the attached approved application plans labelled Plan 29130 Drawing 300/J, 301/E and 302/H and held on file RC125290.

Condition 4 be amended to read:

4. **Lots to Vest**

4.1 Proposed Lots 600 - 607 inclusive as shown on Plan 29130 Drawings 300/J, 301/E and 302/H, shall vest in Council as Road.

4.2 Lots 700 - 704 inclusive as shown on Plan 29130 Drawings 300/J, 301/E and 302/H shall vest in Council as Recreation Reserve.

4.3 Lots 705 and 706 shown on Plan 29130 Drawing 301/E shall vest in Council as Utilities Reserve.

Condition 31 be amended to read:

31. Staging

31.1 The Council is agreeable to the staging of the development as follows;

Stage 1a

- Residential - Lots 304 - 364, 391 - 395, 447 - 449
- Road to vest – Lot 600
- Recreation Reserves to vest – Lots 700, 702 & 703
- Utilities Reserve to vest – Lot 705 and 706
- Balance Rural Allotment – Lot 800

Stage 1b

- Residential - Lots 291 - 303, 365 - 390, 396 - 403
- Road to vest – Lot 601
- Recreation Reserves to vest – Lot 701

Stage 2a

- Residential - Lots 271 – 290, 404 – 435, 524, 525
- Road to vest – Lot 602

Stage 2b

- Residential – Lots 266 – 270, 436 – 438, 512
- Road to vest – Lot 603

Stage 2c

- Residential – Lots 258 – 265, 503 - 511
- Road to vest – Lot 604

Stage 3a

- Residential - Lots 439 - 446, 477 – 479, 497, 513 – 515, 526 - 528
- Road to vest – Lot 605

Stage 3b

- Residential – Lots 456 – 475, 480 – 496, 516 - 522
- Road to vest – Lot 606

Stage 4

- Residential - Lots 243 - 257, 450 - 455, 498 - 502
- Road to vest – Lot 607
- Lot 523 – Existing dwelling
- Recreation reserve to vest – Lot 704

provided all the conditions that apply to each stage have been met.

REASONS FOR THE DECISION

Pursuant to Section 113 of the Act the Council considers that:

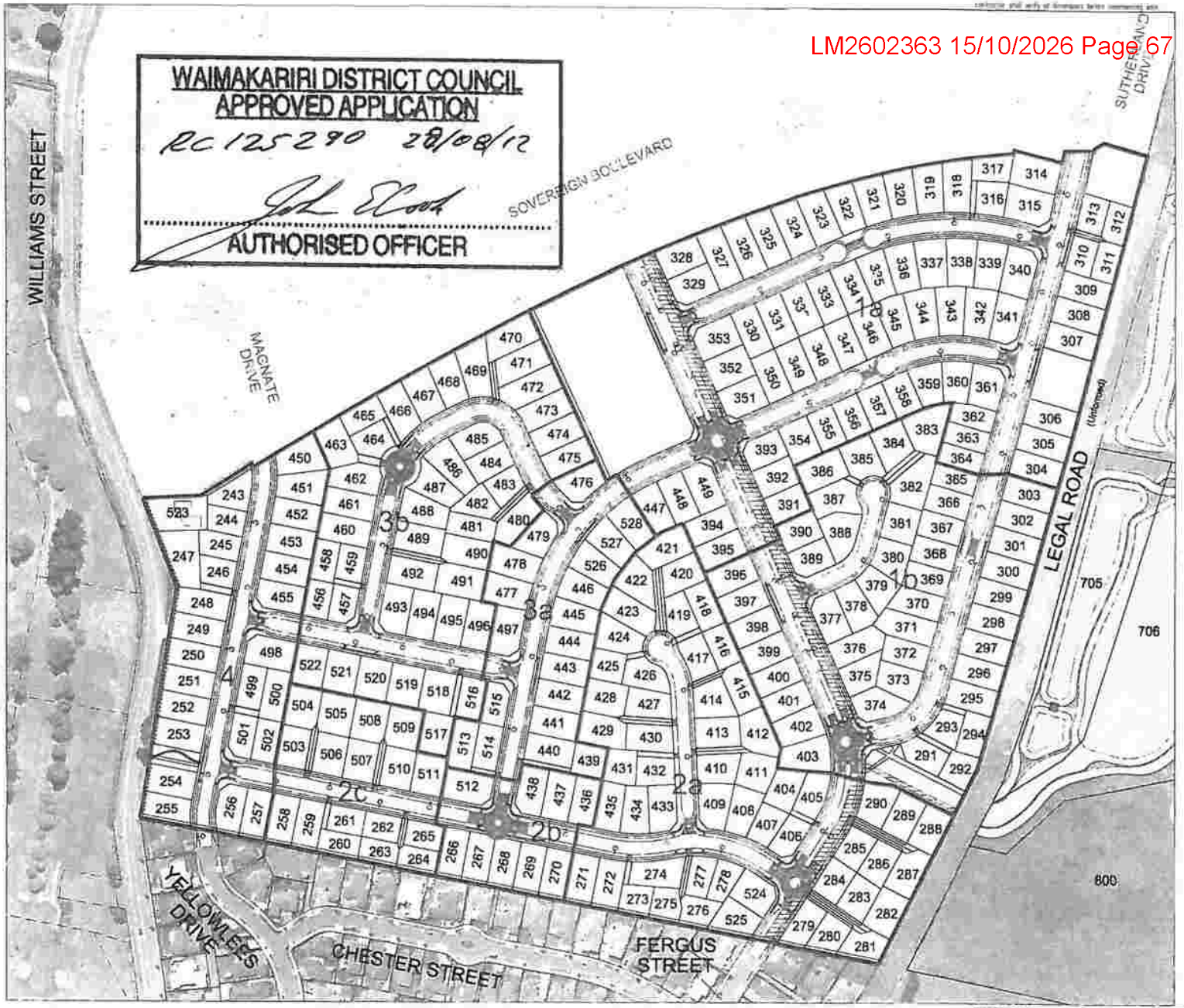
- The environmental effects will be no more than minor.
- The variation sought will meet the policies and objectives of the District Plans.

DATED at Rangiora this 5th day of September 2012

SIGNED by Garry Blay
PLANNING OFFICER

WAIMAKARIRI DISTRICT COUNCIL
APPROVED APPLICATION
RC 125290 28/08/12
AUTHORISED OFFICER





Comprised In - CT 529078
Total Area - 27.4121ha (Lot 500 DP 432856)
33.6844ha (Lot 600 DP 432856)
Owners - J Ryan & E.J Tait
Areas and dimensions are subject to survey
A full assessment of easements will be undertaken after engineering design is complete. This may result in additional easements to those already shown.
Engineering and landscaping layouts are indicative only and are subject to their final approvals.
This plan has been prepared for the purposes of obtaining a Resource Consent.
For Stages 1a & 1b see Sheet 301
For Stages 2a, 2b, 2c, 3a, 3b & 4 see Sheet 302

PROPOSED EASEMENTS			
NATURE	SERVIENT TEN LOT NO	SHOWN	GRANTEE
RIGHT TO DRAIN WATER IN GROSS	Lot 800	BJ	WAIMAKARIRI DISTRICT COUNCIL

PROPOSED EASEMENTS			
NATURE	SERVIENT TEN LOT NO	SHOWN	GRANTEE
RIGHT TO DRAIN WATER IN GROSS	Pt Lot 3 DP 4102 CT OB/974	BK	WAIMAKARIRI DISTRICT COUNCIL

Existing Right to Drain Sewage & Right to Convey Water Easements by EI 8591242.3 are to be cancelled

Stage Boundaries
Minimum 2m Fencing Setback from Williams Street
Proposed Trees (subject to final design)
Proposed Palm Trees (subject to final design)
Proposed Street Lights (subject to final design)

Stage 1a - 69 Lots
Stage 1b - 47 Lots
Stage 2a - 54 Lots
Stage 2b - 9 Lots
Stage 2c - 17 Lots
Stage 3a - 19 Lots
Stage 3b - 44 Lots
Stage 4 - 27 Lots

J	08.12	Staging Amended	DC
H	05.12	Stormwater Ponds Amended	DC
G	03.12	Staging Amended	DC
F	03.12	Layout & Staging Amended	DC
E	12.11	Stage 6 & 7 Amended	RB
D	11.11	Stage Numbers Amended	DC
C	11.11	Stage 2 Amended	DC
B	11.11	Staging Amended	DC
A	10.11	Preliminary Issue	DC

CAD file: 29130Subdivision(Lots 500&600).dwg

Davis Ogilvie

Proposed Subdivision of Lot 500 and 600 DP 432856

SOVEREIGN Palms

29130
300/J
Sheet 1 of

M2602363 15/10/2026 Page 68
M26021692 Page 67



Areas and dimensions are subject to survey

A full land transfer easement will be undertaken after engineering design is complete. This may create additional easements to those already shown.

Lots 600 & 601 are Road to vest in Waimakariri District Council

Lots 700, 701, 702 & 703 are Recreation Reserves to vest in Waimakariri District Council

Engineering and landscaping layouts are indicative only and are subject to their final approvals

MEMORANDUM OF EASEMENTS

NATURE	SERVIENT TEN LOT NO	SERVIENT TEN SHOWN	DOM TEN / GRANTEE
RIGHT OF WAY, RIGHT TO DRAIN SEWAGE & WATER, RIGHT TO CONVEY WATER ELECTRICITY, TELECOMMUNICATIONS & COMPUTER MEDIA	Lot 311	A	Lot 312
	Lot 312	B	Lot 311
	Lot 383	C	Lot 384
	Lot 384	D	Lot 383
RIGHT TO CONVEY TELECOMMUNICATIONS & COMPUTER MEDIA IN GROSS	Lot 311	A	CHORUS NEW ZEALAND LIMITED
	Lot 312	B	
	Lot 383	C	
	Lot 384	D	

PROPOSED EASEMENTS

NATURE	SERVIENT TEN LOT NO	SERVIENT TEN SHOWN	GRANTEE
RIGHT TO DRAIN SEWAGE IN GROSS	Lot 700	BF	WAIMAKARIRI DISTRICT COUNCIL
RIGHT TO DRAIN WATER IN GROSS	Lot 701	BG	WAIMAKARIRI DISTRICT COUNCIL
	Lot 800	BJ	

EXISTING EASEMENTS

NATURE	SERVIENT TEN LOT NO	SERVIENT TEN SHOWN	DOCUMENT
RIGHT TO DRAIN WATER IN GROSS	Lot 800	AD, BA	EI 8591242.3
RIGHT OF WAY	Lot 800	BA, BB	EI 8591242.2
RIGHT OF WAY IN GROSS	Lot 800	BA, BB	EI 8591242.3

Existing Right to Drain Sewage & Right to Convey Water Easements by EI 8591242.3 are to be cancelled

WAIMAKARIRI DISTRICT COUNCIL
APPROVED APPLICATION
RC125290 28/08/12
AUTHORISED OFFICER

E	08.12	Staging Amended	DC
D	05.12	Stormwater Ponds Amended	DC
C	03.12	General Amendments	DC
B	11.11	Stage Amended	DC
A	10.11	Preliminary Issue	DC
issue	date	Nelson	approved

CAD file: 29130schemeplan(under contour).dwg

Davis Ogilvie
Davis Ogilvie Ph: 03 366-1653
Engineers - Surveyors - Planners
166 Hurstdown Road, Addington
Christchurch, New Zealand
P.O. Box 389 Christchurch 8140
OFFICES ALSO IN
Nelson - Timaru - Greymouth

Stages 1a & 1b

SOVEREIGN Palms

design	KS
drawn	mm
QA check	DC
approved	PB
date	10.11
scale @ A1	1:1000

job 29130
dwg 301/E

Areas and dimensions are subject to survey.

A full assessment of easements will be undertaken after engineering design is complete. This may result in additional easements to those already shown.

Lots 602 - 607 are Roads to vest in Waimakariri District Council

Lot 704 is Recreation Reserve to vest in Waimakariri District Council

Engineering and landscaping layouts are indicative only and are subject to their final approvals

Existing Right to Convey Water Easement by EI 8591242.3 is to be cancelled

Existing Batter Easement by EI 5637927.10 to be cancelled

Minimum 2m Fencing Setback from Williams Street

WAIMAKARIRI DISTRICT COUNCIL
APPROVED APPLICATION
RC 125290 28/08/12
AUTHORISED OFFICER



ORIGINAL SCALE = 100 @ A1

MEMORANDUM OF EASEMENTS

NATURE	SERVIENT TEN LOT NO	SHOWN	DOMINANT TEN
RIGHT OF WAY, RIGHT TO DRAIN SEWAGE & WATER, RIGHT TO CONVEY WATER ELECTRICITY, TELECOMMUNICATIONS & COMPUTER MEDIA	Lot 258	CB	Lot 263
	Lot 275	CC	Lot 276
	Lot 276	CD	Lot 275
	Lot 280	F	Lots 281, 282, 283
	Lot 281	G	Lots 280, 282, 283
	Lot 282	H	Lots 280, 281, 283
	Lot 283	J	Lots 280, 281, 282
	Lot 286	K	Lots 287, 288, 289
	Lot 287	L	Lots 286, 288, 289
	Lot 288	M	Lots 286, 287, 289
	Lot 289	N	Lots 286, 287, 288
	Lot 411	S	Lot 412
	Lot 412	T	Lot 411
	Lot 415	U	Lot 416
	Lot 416	V	Lot 415
	Lot 420	W	Lots 421, 422
	Lot 421	X	Lots 420, 422
	Lot 422	Y	Lots 420, 421
	Lot 428	Z	Lot 429
	Lot 429	CE	Lot 428
	Lot 470	AA	Lot 471
	Lot 471	AB	Lot 470
	Lot 481	AC	Lot 482
	Lot 482	BM	Lot 481
	Lot 490	AE	Lot 491
	Lot 491	AF	Lot 490
	Lot 504	O	Lot 505
	Lot 505	P	Lot 504
	Lot 508	Q	Lot 509
	Lot 509	R	Lot 508
RIGHT TO CONVEY TELECOMMUNICATIONS & COMPUTER MEDIA IN GROSS	Lot 263	CA	CHORUS NEW ZEALAND LIMITED
	Lot 264	CB	
	Lot 275	CC	
	Lot 276	CD	
	Lot 280	F	
	Lot 281	G	
	Lot 282	H	
	Lot 283	J	
	Lot 286	K	
	Lot 287	L	
	Lot 288	M	
	Lot 289	N	
	Lot 411	S	
	Lot 412	T	
	Lot 415	U	
	Lot 416	V	
	Lot 420	W	
	Lot 421	X	
	Lot 422	Y	
	Lot 428	Z	
	Lot 429	CE	
	Lot 470	AA	
	Lot 471	AB	
	Lot 481	AC	
	Lot 482	BM	
	Lot 490	AE	
	Lot 491	AF	
	Lot 504	O	
	Lot 505	P	
	Lot 508	Q	
	Lot 509	R	

PROPOSED EASEMENTS

NATURE	SERVIENT TEN LOT NO	SHOWN	GRANTEE
RIGHT TO DRAIN WATER IN GROSS	Lot 704	BL	WAIMAKARIRI DISTRICT COUNCIL

EXISTING EASEMENTS

NATURE	SERVIENT TEN LOT NO	SHOWN	DOCUMENT
RIGHT OF WAY, RIGHT TO DRAIN SEWAGE & WATER, RIGHT TO CONVEY WATER ELECTRICITY, TELECOMMUNICATIONS & COMPUTER MEDIA	Lot 523	E	EI 8625933.12
RIGHT TO CONVEY TELECOMMUNICATIONS & COMPUTER MEDIA IN GROSS	Lot 523	E	EI 8625933.8

Areas Marked DA - DW will be subject to a Consent Notice with regards to the protection of the bund associated with the Moorcroft Development

H	08.12	Staging Amended	DC
G	03.12	Staging Amended	DC
F	03.12	Layout & Staging Amended	DC
E	12.11	Stage 5 & 7 Amended	DC
D	11.11	Stage Numbers Amended	DC
C	11.11	Stage 2 Amended	DC
B	11.11	Staging Amended	DC
A	10.11	Preliminary Issue	DC
Issue	date	Issued	approved

CAD file: 29130subdivision(under survey).dwg

Davis Ogilvie

Stages 2a, 2b, 2c, 3a, 3b and 4

29130

302/H

Sheet 3 of 3

RC125431/121210088051 21754-005-00

WAIMAKARIRI DISTRICT COUNCIL

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of an application lodged by **Sovereign Green** for a resource consent under Section 88 of the aforementioned Act.

APPLICATION

The applicants sought a variation to conditions 4 and 31 of subdivision consent RC115258 to allow for a differing staging. Condition 1 will also require variation as this refers to approved plans which are to be updated to reflect the requested variation.

DECISION

The District Plan Manager, on the 29th November 2012, approved:

THAT pursuant to Section 127 of the Resource Management Act 1991, consent be granted to vary conditions 1, 4 and 31 of the subdivision consent RC115258 to subdivide at 404 and 404B Williams Street, Kaiapoi, being Lots 500 and 600 DP 432856 as follows:

Condition 1 be amended to read:

1. The application shall be carried out in accordance with the attached approved application plans labelled Plan 29130 Drawing 302/J, 301/E and 300/K and held on file RC125431.

Condition 4 be amended to read:

4. **Lots to Vest**

4.1 Proposed Lots 600 - 607 inclusive as shown on Plan 29130 Drawings 301/E and 302/J shall vest in Council as Road.

4.2 Lots 700 - 704 inclusive as shown on Plan 29130 Drawings 301/E and 302/J shall vest in Council as Recreation Reserve.

4.3 Lots 705 and 706 shown on Plan 29130 Drawing 301/E shall vest in Council as Utilities Reserve.

Condition 31 be amended to read:

31. Staging

31.1 The Council is agreeable to the staging of the development as follows;

Stage 1a

- Residential - Lots 304 - 364, 391 - 395, 447 - 449
- Road to vest – Lot 600
- Recreation Reserves to vest – Lots 700, 702 & 703
- Utilities Reserve to vest – Lot 705 and 706
- Balance Rural Allotment – Lot 800

Stage 1b

- Residential - Lots 291 - 303, 365 - 390, 396 - 403
- Road to vest – Lot 601
- Recreation Reserves to vest – Lot 701

Stage 2a

- Residential - Lots 271 – 290, 404 – 435, 524, 525
- Road to vest – Lot 602

Stage 2b

- Residential – Lots 266 – 270, 436 – 438
- Road to vest – Lot 603

Stage 2c

- Residential – Lots 258 – 265
- Road to vest – Lot 604

Stage 3a

- Residential - Lots 439 - 446, 476, 477 – 479, 497, 526 - 528
- Road to vest – Lot 605

Stage 3b

- Residential – Lots 456 – 475, 483 – 485, 493 - 496
- Road to vest – Lot 606

Stage 3c

- Residential – Lots 498 – 522

Stage 3d

- Residential – Lots 480 – 482, 486 - 492

Stage 4

- Residential - Lots 243 - 257, 450 - 455
- Road to vest – Lot 607
- Lot 523 – Existing dwelling
- Recreation reserve to vest – Lot 704

provided all the conditions that apply to each stage have been met.

REASONS FOR THE DECISION

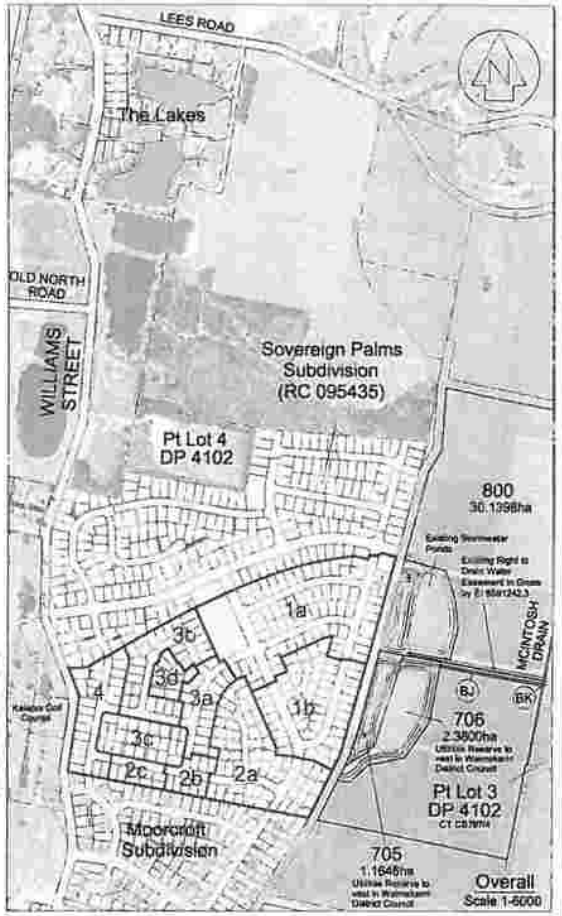
Pursuant to Section 113 of the Act the Council considers that:

- The environmental effects will be no more than minor.
- The variation sought will meet the policies and objectives of the District Plans.

DATED at Rangiora this 10th day of December 2012

SIGNED by Garry Blay
PLANNING OFFICER

WAIMAKARIRI DISTRICT COUNCIL
APPROVED APPLICATION
RC125431
P.M. Wale 29/11/12
AUTHORISED OFFICER



Comprised in - CT 526078
Total Area - 27.4121ha (Lot 500 DP 432856)
33.6844ha (Lot 600 DP 432856)
Owners - J Ryan & E.J Tait
Areas and dimensions are subject to survey
A full assessment of easements will be undertaken after engineering design is complete. This may result in additional easements to those already shown.
Engineering and landscaping layouts are indicative only and are subject to their final approvals.
This plan has been prepared for the purposes of obtaining a Resource Consent.
For Stages 1a & 1b see Sheet 301
For Stages 2a, 2b, 2c, 3a, 3b3c, 3d & 4 see Sheet 302

PROPOSED EASEMENTS			
NATURE	SERVIENT TEN LOT NO	SHOWN	GRANTEE
RIGHT TO DRAIN WATER IN GROSS	Lot 800	BJ	WAIMAKARIRI DISTRICT COUNCIL

PROPOSED EASEMENTS			
NATURE	SERVIENT TEN LOT NO	SHOWN	GRANTEE
RIGHT TO DRAIN WATER IN GROSS	Pt Lot 3 DP 4102 CT CB7B/14	BK	WAIMAKARIRI DISTRICT COUNCIL

Existing Right to Drain Sewage & Right to Convey Water Easements by EI 8591242.3 are to be cancelled



Stage Boundaries
Minimum 2m Fencing Setback from Williams Street
Proposed Trees (subject to final design)
Proposed Palm Trees (subject to final design)
Proposed Street Lights (subject to final design)

Stage 1a - 69 Lots
Stage 1b - 47 Lots
Stage 2a - 54 Lots
Stage 2b - 8 Lots
Stage 2c - 6 Lots
Stage 3a - 16 Lots
Stage 3b - 27 Lots
Stage 3c - 25 Lots
Stage 3d - 10 Lots
Stage 4 - 22 Lots

K	11.12	Staging Amended	DC
J	08.12	Staging Amended	DC
H	05.12	Stormwater Ponds Amended	DC
G	03.12	Staging Amended	DC
F	03.12	Layout & Staging Amended	DC
E	12.11	Stage 6 & 7 Amended	RB
D	11.11	Stage Numbers Amended	DC
C	11.11	Stage 2 Amended	DC
B	11.11	Staging Amended	DC
A	10.11	Preliminary Issue	DC

CAD No: 29130Subdivision(Jones contour).dwg

Davis Ogilvie

Proposed Subdivision of Lot 500 and 600 DP 432856

SOVEREIGN Palms

29130
300/K

Sheet 1 of 3



Areas and dimensions are subject to survey.
A full assessment of [illegible] is complete. This may [illegible] dy shown.

Lots 600 & 601 are Road to vest in Waimakariri District Council

Lots 700, 701, 702 & 703 are Recreation Reserves to vest in Waimakariri District Council

Engineering and landscaping layouts are indicative only and are subject to their final approvals

MEMORANDUM OF EASEMENTS			
NATURE	SERVIENT TEN LOT NO	SHOWN	DOM TEN / GRANTEE
RIGHT OF WAY, RIGHT TO DRAIN SEWAGE & WATER, RIGHT TO CONVEY WATER ELECTRICITY, TELECOMMUNICATIONS & COMPUTER MEDIA	Lot 311	A	Lot 312
	Lot 312	B	Lot 311
	Lot 383	C	Lot 384
	Lot 384	D	Lot 383
RIGHT TO CONVEY TELECOMMUNICATIONS & COMPUTER MEDIA IN GROSS	Lot 311	A	CHORUS NEW ZEALAND LIMITED
	Lot 312	B	
	Lot 383	C	
	Lot 384	D	

PROPOSED EASEMENTS			
NATURE	SERVIENT TEN LOT NO	SHOWN	GRANTEE
RIGHT TO DRAIN SEWAGE IN GROSS	Lot 700	BF	WAIMAKARIRI DISTRICT COUNCIL
RIGHT TO DRAIN WATER IN GROSS	Lot 701	BG	WAIMAKARIRI DISTRICT COUNCIL
	Lot 600	BJ	

EXISTING EASEMENTS			
NATURE	SERVIENT TEN LOT NO	SHOWN	DOCUMENT
RIGHT TO DRAIN WATER IN GROSS	Lot 800	AD, BA	EI 8591242.3
RIGHT OF WAY	Lot 800	BA, BB	EI 8591242.3
RIGHT OF WAY IN GROSS	Lot 800	BA, BB	EI 8591242.3

Existing Right to Drain Sewage & Right to Convey Water Easements by EI 8591242.3 are to be cancelled

WAIMAKARIRI DISTRICT COUNCIL
APPROVED APPLICATION
RC 125431
P.M. Wa[illegible] 29/11/12
AUTHORISED OFFICER

E	08.12	Staging Amended	DC
D	05.12	Stormwater Ponds Amended	DC
C	03.12	General Amendments	DC
B	11.11	Stage Amended	DC
A	10.11	Preliminary Issue	DC

CAD File: 29130subdivision(underground).dwg

Davis Ogilvie

Stages 1a & 1b

SOVEREIGN Palms

29130

301/E

Areas and dimensions are subject to survey

A full assessment of easements will be undertaken after engineering design is complete. This may result in additional easements to those already shown.

Lots 602 - 607 are Roads to vest in Waimakariri District Council

Lot 704 is Recreation Reserve to vest in Waimakariri District Council

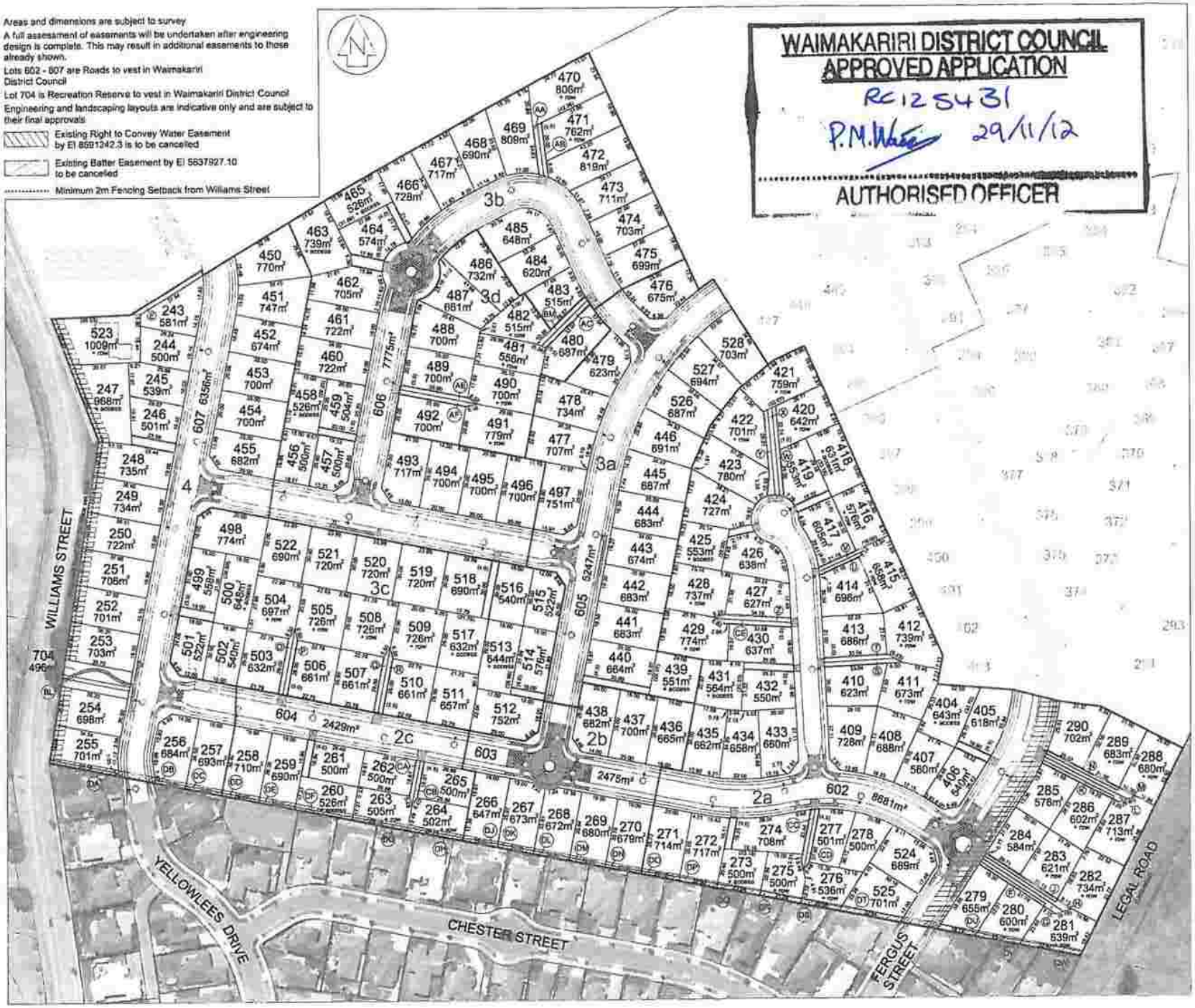
Engineering and landscaping layouts are indicative only and are subject to their final approvals

Existing Right to Convey Water Easement by EI 8691242.3 is to be cancelled

Existing Batter Easement by EI 5637927.10 to be cancelled

Minimum 2m Fencing Setback from Williams Street

WAIMAKARIRI DISTRICT COUNCIL
APPROVED APPLICATION
RC125431
P.M. Wase 29/11/12
AUTHORISED OFFICER



MEMORANDUM OF EASEMENTS

NATURE	SERVIENT TEN LOT NO	SHOWN	DOMINANT TEN LOT NO
RIGHT OF WAY, TO DRAIN SEWAGE & WATER, RIGHT TO CONVEY WATER ELECTRICITY, TELECOMMUNICATIONS & COMPUTER MEDIA	Lot 275	CC	Lot 276
	Lot 276	CD	Lot 275
	Lot 280	F	Lots 281, 282, 283
	Lot 281	G	Lots 280, 282, 283
	Lot 282	H	Lots 280, 281, 283
	Lot 283	J	Lots 280, 281, 282
	Lot 296	K	Lots 297, 298, 299
	Lot 297	L	Lots 296, 298, 299
	Lot 298	M	Lots 296, 297, 299
	Lot 299	N	Lots 296, 297, 298
	Lot 411	S	Lot 412
	Lot 412	T	Lot 411
	Lot 415	U	Lot 416
	Lot 416	V	Lot 415
	Lot 420	W	Lots 421, 422
	Lot 421	X	Lots 420, 422
	Lot 422	Y	Lots 420, 421
	Lot 428	Z	Lot 429
	Lot 429	CE	Lot 428
	Lot 470	AA	Lot 471
	Lot 471	AB	Lot 470
	Lot 481	AC	Lot 482
	Lot 482	BM	Lot 481
	Lot 490	AE	Lot 491
	Lot 491	AF	Lot 490
	Lot 504	O	Lot 505
	Lot 505	P	Lot 504
	Lot 508	Q	Lot 509
	Lot 509	R	Lot 508
RIGHT TO CONVEY TELECOMMUNICATIONS & COMPUTER MEDIA IN GROSS	Lot 263	CA	CHORUS NEW ZEALAND LIMITED
	Lot 264	CB	
	Lot 275	CD	
	Lot 276	CD	
	Lot 280	F	
	Lot 281	G	
	Lot 282	H	
	Lot 283	J	
	Lot 286	K	
	Lot 287	L	
	Lot 288	M	
	Lot 289	N	
	Lot 411	S	
	Lot 412	T	
	Lot 415	U	
	Lot 416	V	
	Lot 420	W	
	Lot 421	X	
	Lot 422	Y	
	Lot 428	Z	
	Lot 429	CE	
	Lot 470	AA	
	Lot 471	AB	
	Lot 481	AC	
	Lot 482	BM	
	Lot 490	AE	
	Lot 491	AF	
	Lot 504	O	
	Lot 505	P	
	Lot 508	Q	
	Lot 509	R	

PROPOSED EASEMENTS

NATURE	SERVIENT TEN LOT NO	SHOWN	GRANTEE
RIGHT TO DRAIN WATER IN GROSS	Lot 704	BL	WAIMAKARIRI DISTRICT COUNCIL

EXISTING EASEMENTS

NATURE	SERVIENT TEN LOT NO	SHOWN	DOCUMENT
RIGHT OF WAY, RIGHT TO DRAIN SEWAGE & WATER, RIGHT TO CONVEY WATER ELECTRICITY, TELECOMMUNICATIONS & COMPUTER MEDIA	Lot 523	E	EI 8625933.12
RIGHT TO CONVEY TELECOMMUNICATIONS & COMPUTER MEDIA IN GROSS	Lot 523	E	EI 8625933.9

Areas Marked DA - DW will be subject to a Consent Notice with regards to the protection of the bund associated with the Moorcroft Development

J	11.12	Staging Amended	DC
H	08.12	Staging Amended	DC
G	03.12	Staging Amended	DC
F	03.12	Layout & Staging Amended	DC
E	12.11	Stage 6 & 7 Amended	DC
D	11.11	Stage Numbers Amended	DC
C	11.11	Stage 2 Amended	DC
B	11.11	Staging Amended	DC
A	10.11	Preliminary Issue	DC

CAD File: 29130sysmaps\plan\plan sheet3.dwg

Davis Ogilvie

Stages 2a, 2b, 2c, 3a, 3b, 3c, 3d and 4

SOVEREIGN Palms

29130

302/J



Legend

- Land Parcel
- Property Boundary

Author: Cathlene Goldsworthy

Date: 15/10/2026

Scale 1:400 Original page size: A4

0 6 12 18 24

Metres

Disclaimer:

Land and property boundary information is sourced from and derived using Land Information New Zealand (LINZ) Land Parcels licensed for re-use by LINZ under the Creative Commons Attribution 4.0 International licence. The Waimakariri District Council does not give and expressly disclaims any warranty as to the accuracy or completeness of this information or its fitness for any purpose. Information on this map may not be used for legal disputes and should be independently verified before taking any action reliant upon it.

Credits:

Waimakariri District Council, Land Information New Zealand, 2025 Urban and Rural Aerial Imagery, 2023 Birch Hill Cemetery UAV Imagery, 2022-23 Cust Cemeteries UAV Imagery, Waimakariri District Council

WAIMAKARIRI DISTRICT COUNCIL

Property Information

WAIMAKARIRI DISTRICT COUNCIL

215 High Street
Private Bag 1005
RANGIORA 7440
New Zealand

Phone: (03) 311 8900
or: (03) 327 6834
Fax: (03) 313 4432
www.waimakariri.govt.nz

Form 7

Code compliance certificate 121633

Section 95, Building Act 2004

The building

Street address of building: 46 Brockelbank Drive, Kaiapoi

Legal description of land where building is located: Lot 312 DP 452661

Valuation number: 2175401002

Building name:

Location of building within site/block number:

Level/unit number:

Current, lawfully established, use:

Year first constructed:

The owner

Name of owner: Taylor Arthur Ronald & Taylor Pamela Ann

Contact person:

Mailing address: 23 Dunns Avenue, The Pines Beach 7630

Street address/registered office:

Phone number: Landline: 3277048 Mobile: 0211196114

Daytime: After hours:

Facsimile number:

Email address:

Website:

First point of contact for communications with the council/building consent authority:
Full Name: Pamela & Arthur Taylor

Mailing Address: C/- Orange Homes 2005 Ltd, 245 Annex Road, Sockburn, Christchurch 8024

Phones:: 3433955

Email: aaron@orangehomes.co.nz

Building work

Building consent number: 121633

Consent description: Dwelling with attached garage and Ecotek Monica Plus freestanding pellet burner clean air 110526

Issued by: Waimakariri District Council

Code compliance

The building consent authority named below is satisfied, on reasonable grounds, that —

(a) the building work complies with the building consent



Signature

Building Administration

On behalf of: Waimakariri District Council

Date: 7/05/13

BEFORE CONSTRUCTION BEGINS, BUILDER MUST CHECK ALL DIMENSIONS ARE CORRECT AND ALL CONSTRUCTION WORK COMPLIES WITH THE NEW ZEALAND BUILDING CODE, LOCAL BODY BYLAWS AND RELEVANT NEW ZEALAND STANDARDS

LM2602363 15/10/2026 Page 79

121633

24 SEP 2012



Sheet Index

Layout ID	Layout Name
1	Cover Sheet & Index
2	Site Plan
3	Foundation Plan
4	Drainage Plan
5	Floor Plan
6	Pergola Design
7	Elevations
8	Cross Section
9	Bracing Plan
10	Dwelling Bracing Calc.
11	Roof Plan
12	Electrical Plan
13	Brick Veneer Details
14	Brick Veneer Details
15	Roofing Details
16	Fixing Details
17	Wet Area Details
18	Wet Area Details
19	Drainage Details
20	Waimea Colour
160DS-C	SolarTube

4 10 12

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ORANGE homes
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Christchurch
Telephone: (03) 343 3955
Facsimile: (03) 343 3177
Email: matt@orangehomes.co.nz
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* THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS & LEVELS ARE CORRECT PRIOR TO COMMENCING ANY WORK
* THESE PLANS ARE NOT TO BE USED FOR CONSTRUCTION WITHOUT LOCAL TERRITORIAL CONSENT

IF IN DOUBT - PLEASE ASK

Working Drawings

PROJECT INFORMATION:

Taylor

Lot 312 Brokelbank Drive, Sover ign Palms

Cover Sheet & Index

JOB No. (V14):	11.84	REVISION	SHEET:
DESIGNED BY:	James	DRAWN BY:	Matt
DATE OF ISSUE:	Friday, 21 September 2012		1 OF 21

BEFORE CONSTRUCTION BEGINS, BUILDER MUST CHECK ALL DIMENSIONS ARE CORRECT AND ALL CONSTRUCTION WORK COMPLIES WITH THE NEW ZEALAND BUILDING CODE, LOCAL BODY BYLAWS AND RELEVANT NEW ZEALAND STANDARDS

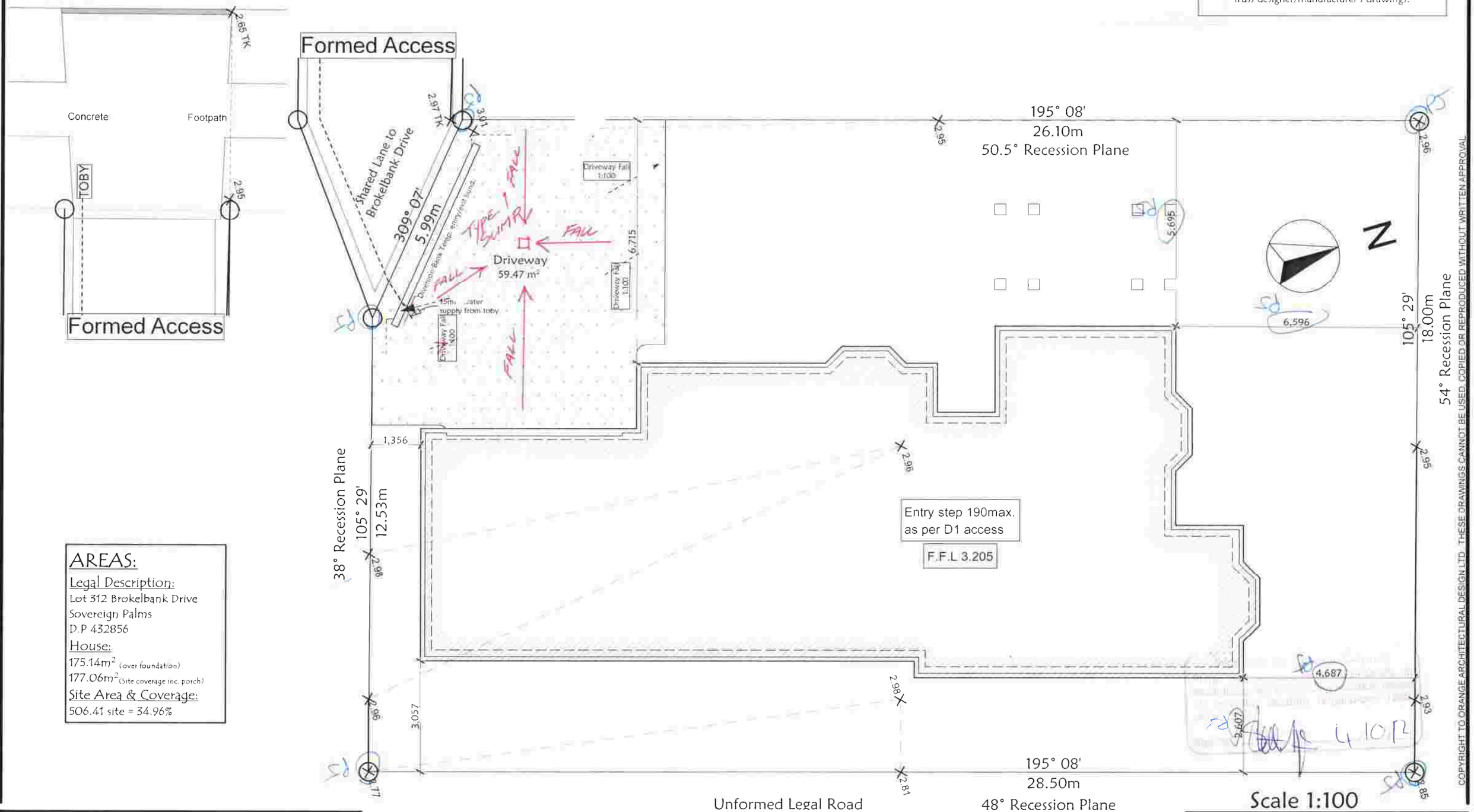
LM2502383 15/10/2026 Page 80

121633

22 SEP 2012

NOTE:
These drawings are to be read in conjunction with the specification documents, engineering details/drawings, manufacturer's specifications and truss designer/manufacturer's drawings.

Brokelbank Drive



AREAS:

Legal Description:
Lot 312 Brokelbank Drive
Sovereign Palms
D.P 432856

House:
175.14m² (over foundation)
177.06m² (Site coverage inc. porch)

Site Area & Coverage:
506.41 site = 34.96%

Unformed Legal Road

48° Recession Plane

IF IN DOUBT - PLEASE ASK

Working Drawings

Scale 1:100

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solid service solid reputation solid homes
ORANGE homes
245 Annex Road
P.O. Box 11214
Christchurch
Telephone: (03) 343 3955
Facsimile: (03) 343 3177
Email: matt@orangehomes.co.nz
ORANGE ARCHITECTURAL DESIGN LTD

- ALL CONSTRUCTION IS TO COMPLY WITH NEW ZEALAND BUILDING CODE AND ALL RELEVANT DOCUMENTS AND WITH THE LOCAL TERRITORIAL AUTHORITY REGULATIONS
- THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS & LEVELS ARE CORRECT PRIOR TO COMMENCING ANY WORK
- THESE PLANS ARE NOT TO BE USED FOR CONSTRUCTION WITHOUT LOCAL TERRITORIAL CONSENT

PROJECT INFORMATION:

TAYLOR

LOT 312 BROKELBANK DRIVE, SOVEREIGN PALMS

Site Plan

JOB No. (V14): 11.84	REVISION:	SHEET: 2	
DESIGNED BY: James	DRAWN BY: Matt	OF 21	
DATE OF ISSUE: Friday, 21 September 2012			

LM260363 15/10/2026 Page 81

BEFORE CONSTRUCTION BEGINS, BUILDER MUST CHECK ALL DIMENSIONS ARE CORRECT AND ALL CONSTRUCTION WORK COMPLIES WITH THE NEW ZEALAND BUILDING CODE, LOCAL BODY BYLAWS AND RELEVANT NEW ZEALAND STANDARDS

NOTE:
These drawings are to be read in conjunction with the specification documents, engineering details/drawings, manufacturer's specifications and truss designer/manufacturer's drawings.

BRICK VENEER CLADDING:
No length of brick veneer wall or return shall be less than 230mm measured from the external face of the wall.

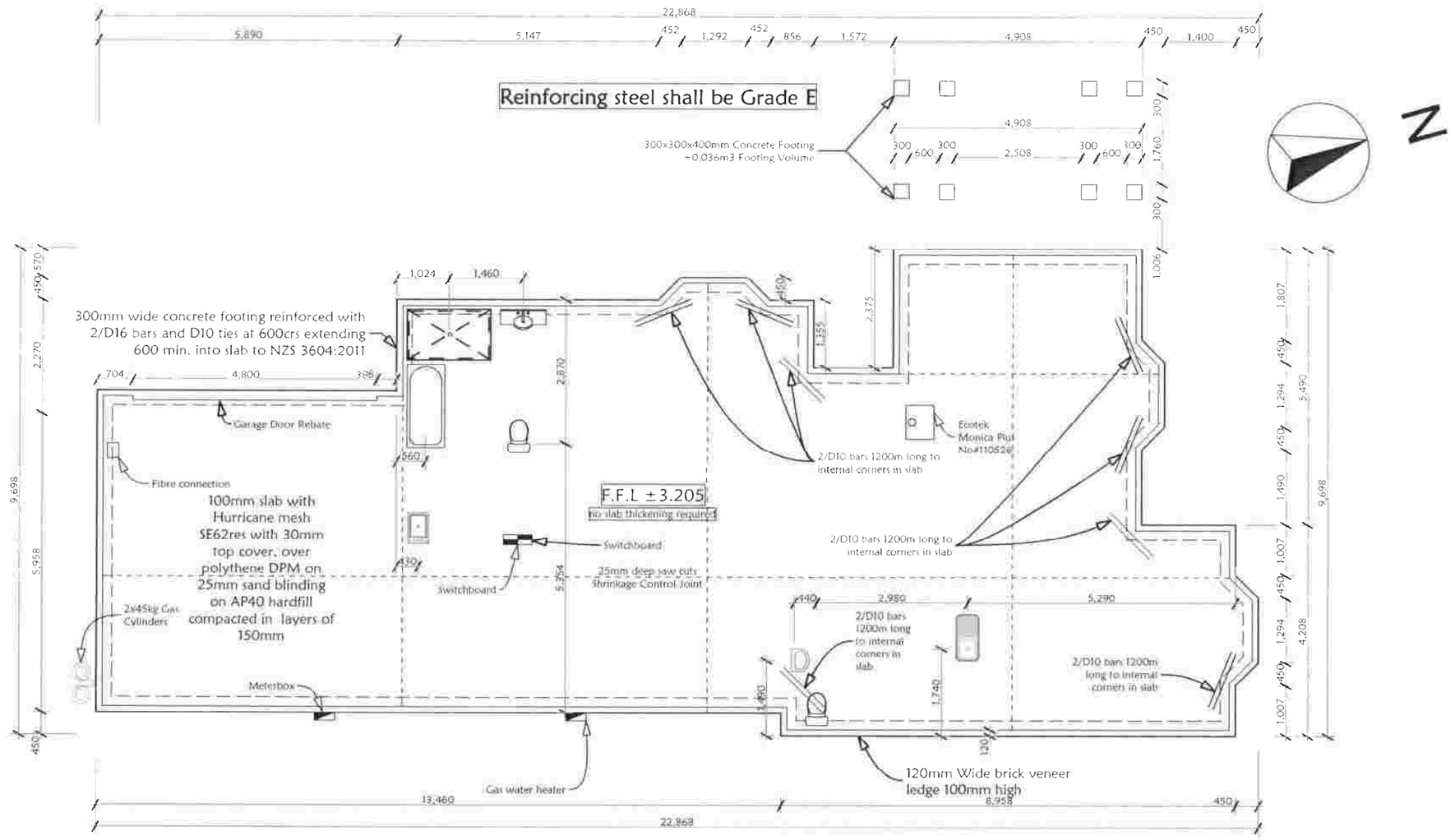
26 SEP 2012

AREAS:

Legal Description:
Lot 312 Brokelbank Drive
Sovereign Palms
D.P 432856

House:
175.14m² (over foundation)
177.06m² (Site coverage inc. porch)

Site Area & Coverage:
506.41 site = 34.96%



4/10/12

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Scale 1:100

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ORANGE homes
245 ANNEX ROAD
P.O. BOX 11214
CHRISTCHURCH
TELEPHONE: (03) 343 3955
FACSIMILE: (03) 343 3177
EMAIL: matt@orangehomes.co.nz
ORANGE ARCHITECTURAL DESIGN LTD

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IF IN DOUBT - PLEASE ASK
Working Drawings

PROJECT INFORMATION:

TAYLOR

LOT 312 BROKELBANK DRIVE, SOVEREIGN PALMS

Foundation Plan

JOB No. (V14): 11.84	REVISION:	SHEET: 3
DESIGNED BY: James	DRAWN BY: Matt	OF 21
DATE OF ISSUE: Friday, 21 September 2012		

121633
LM2602363 15/10/2026 Page 82

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Water supply pipes:
Hot and cold water supply pipes shall be Dux-Secura system polybutylene. Hot water pipes shall be encased in ceiling batts or clad with Armourflex lagging.

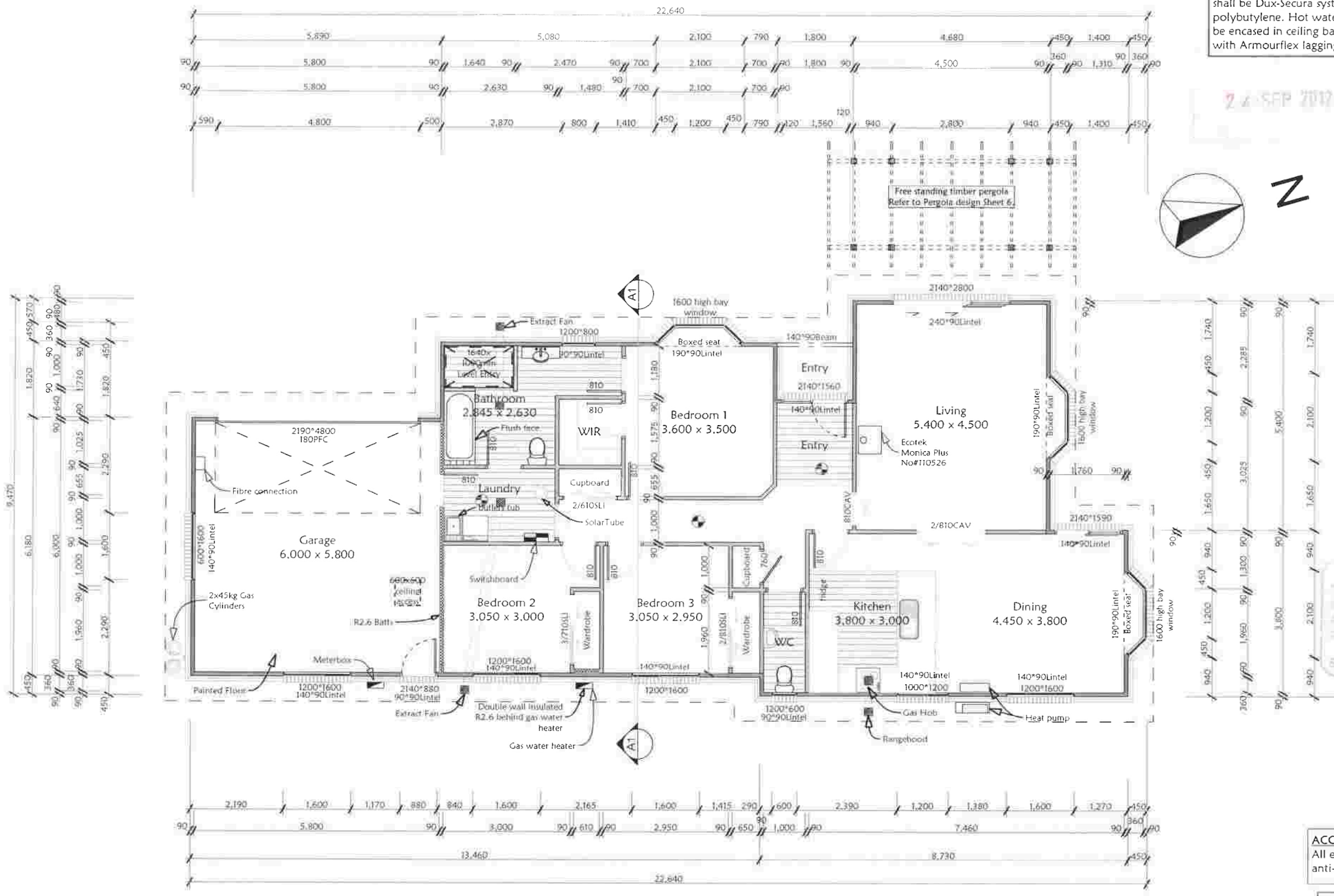
AREAS:

Legal Description:
Lot 312 Brokelbank Drive
Sovereign Palms
D.P 432856

House:
175.14m² (over foundation)
177.06m² (Site coverage inc. porch)

Site Area & Coverage:
506.41 site = 34.96%

7 SEP 2017



NOTE:
-All timber shall be VSG8 or better unless noted otherwise.
-All external & internal walls to be 90x45 untreated Douglas Fir with H1.2 treated bottom plates. Studs at 600crs with dwangs at 800crs.
-All roof framing, trusses and ceiling joists to be untreated Dougls Fir. Coved and attic trusses shall be H1.2 treated. Purlins/Battens H1.2 treated.
-All beam sizes shown are to be confirmed by the precut manufacturer and shall comply with NZS 3604: 2011.

All downlights shall be 'CA' rated.

Scale 1:100

WET AREA FINISHES:
-Floor finish to entry, bathroom, WC, laundry and kitchen is Vinyl.
-Wall and ceiling finishes are acrylic semi-gloss paint over Gib Aqualine linings.
-Bench tops are Formica.
-All to comply with NZBC E3/AS1 clause 3.

ACCESS ROUTES:
All external and internal access routes shall have an anti-slip surface complying with NZBC D1/AS1 table 2.

NOTE:
These drawings are to be read in conjunction with the specification documents, engineering details/drawings, manufacturer's specifications and truss designer/manufacturer's drawings.

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Working Drawings

PROJECT INFORMATION:

Taylor

Lot 312 Brokelbank Drive, Sovereign Palms

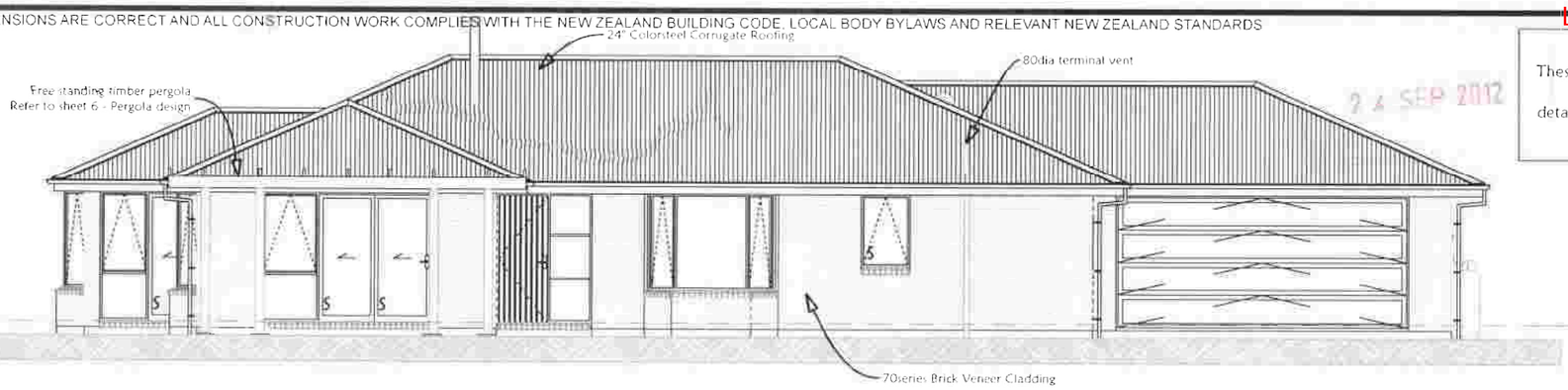
Floor Plan

JOB NO. (V14):	11.84	REVISION	SHEET:
DESIGNED BY: James	DRAWN BY: Matt		5
DATE OF ISSUE: Friday, 21 September 2012			OF 21

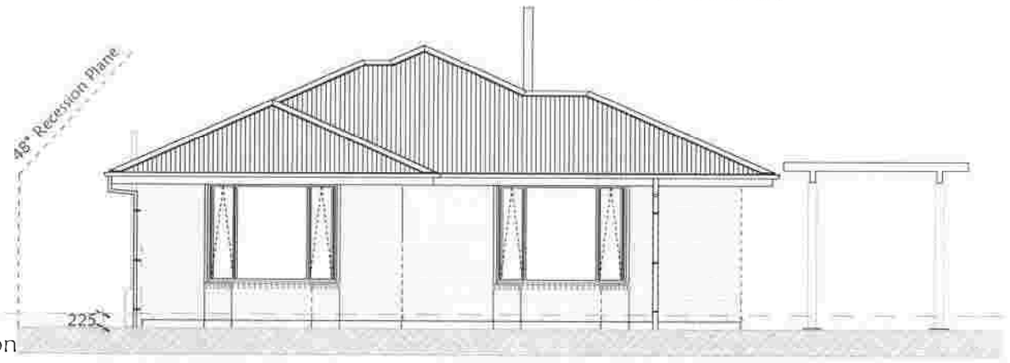
LM26028684 15/10/2026 Page 83

BEFORE CONSTRUCTION BEGINS, BUILDER MUST CHECK ALL DIMENSIONS ARE CORRECT AND ALL CONSTRUCTION WORK COMPLIES WITH THE NEW ZEALAND BUILDING CODE, LOCAL BODY BYLAWS AND RELEVANT NEW ZEALAND STANDARDS

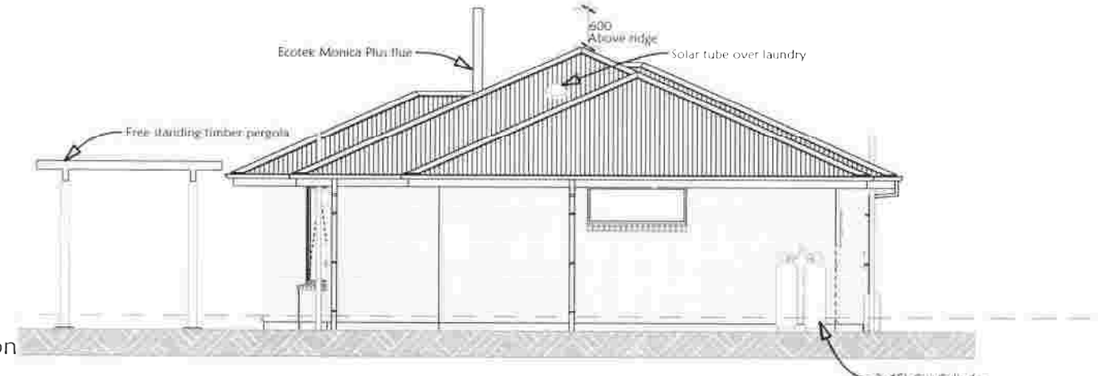
BUILDING ENVELOPE RISK MATRIX		
Alll Elevations		
Risk Factor	Risk Severity	Risk Score
Wind zone (per NZS 3604)	High risk	1
Number of storeys	Low risk	0
Roof/wall intersection design	Low risk	0
Eaves width	High risk	2
Envelope complexity	Low risk	0
Deck design	Low risk	0
Total Risk Score:		3



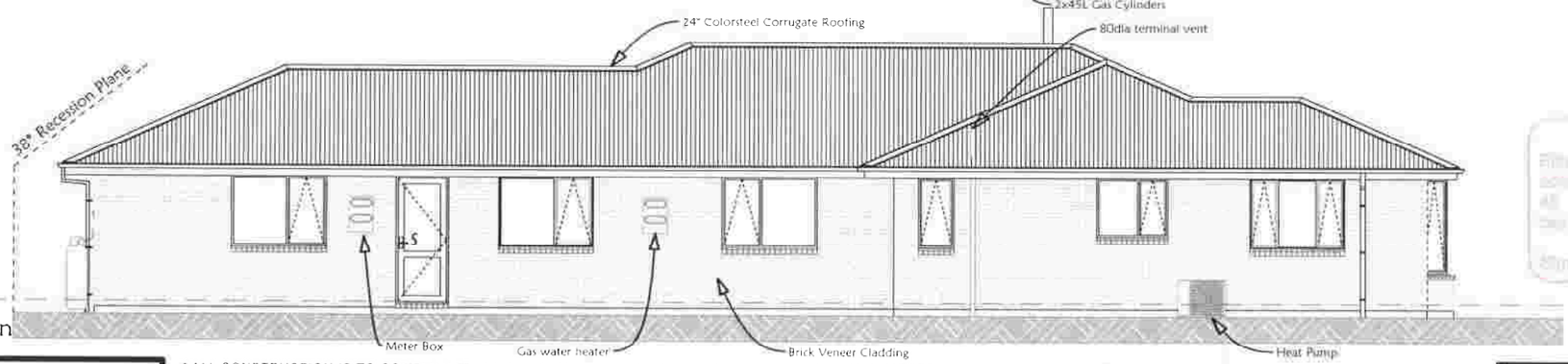
West Elevation



North Elevation



South Elevation



East Elevation

Scale 1:100

NOTE:
These drawings are to be read in conjunction with the specification documents, engineering details/drawings, manufacturer's specifications and truss designer/manufacturer's drawings.

Note:
1. Door and window opening sizes are approximate.
2. All opening sizes are to be measured on site prior to manufacture of doors and windows.
3. WANZ support bar to full length of all doors and windows.
4. 's' denotes safety glass in accordance with NZS 4223
5. 'rs' denotes Restrictor stays
6. All glazing except garage to have an R-value of 0.26 or better

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Working Drawings

PROJECT INFORMATION:

TAYLOR

LOT 312 BROKELBANK DRIVE, SOVEREIGN PALMS

Elevations

JOB No. (V14):	11.84	REVISION	SHEET:
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DATE OF ISSUE: Friday, 21 September 2012			OF 21

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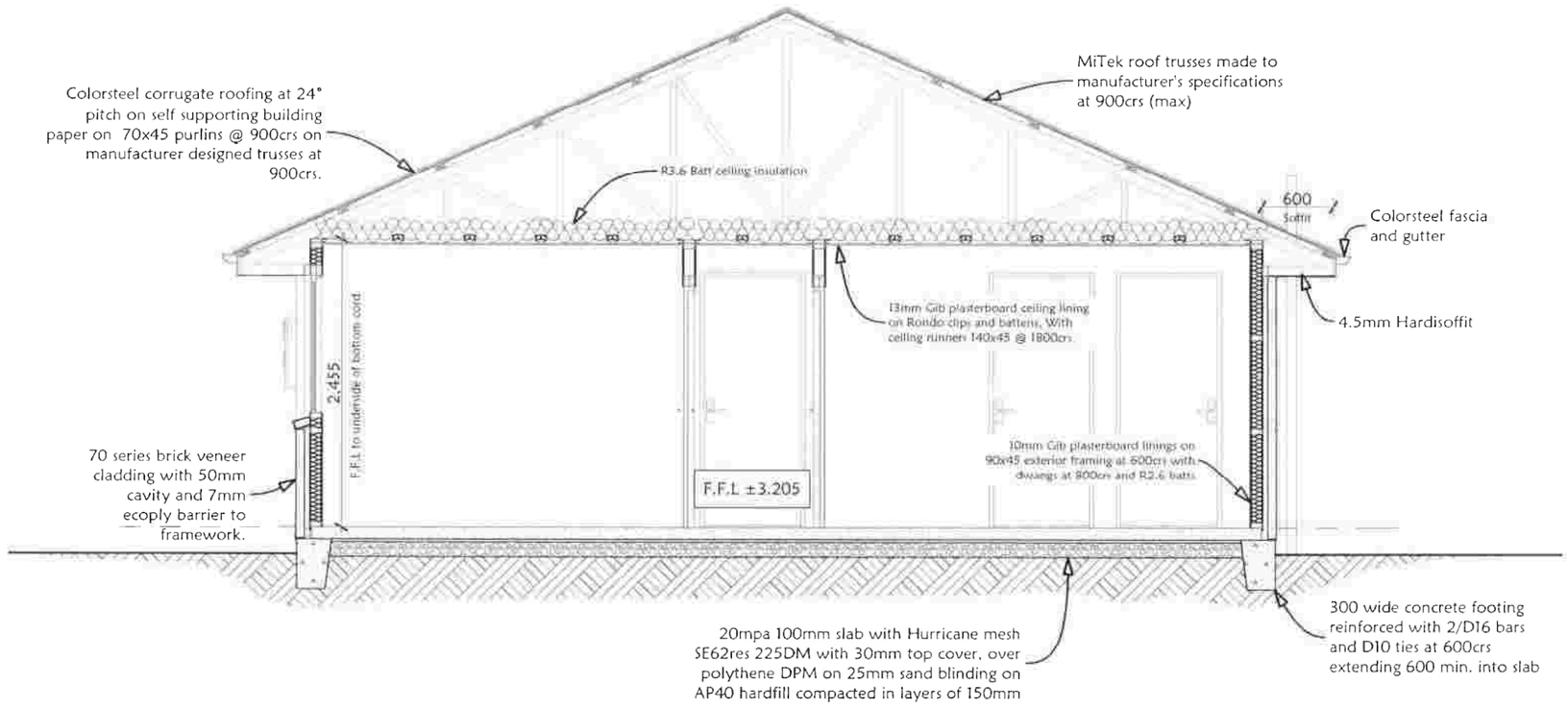
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12163
LM2602363 15/10/2026 Page 84

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24 SEP 2012

NOTE:
-All timber shall be VSG8 or better unless noted otherwise.
-All external & internal walls to be 90x45 untreated Douglas Fir with H1.2 treated bottom plates. Studs at 600crs with dwangs at 800crs.
-All roof framing, trusses and ceiling joists to be untreated Dougls Fir. Coved and attic trusses shall be H1.2 treated. Purlins/Battens H1.2 treated.
-All beam sizes shown are to be confirmed by the precut manufacturer and shall comply with NZS 3604: 2011.



Reinforcing steel shall be Grade E

4.10.12

Section A-A Scale of 1:50

Scale 1:50

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Working Drawings

Cross Section

PROJECT INFORMATION:

TAYLOR

LOT 312 BROKELBANK DRIVE, SOVEREIGN PALMS

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DATE OF ISSUE: Friday, 21 September 2012			OF 21

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2 4 SEP 2012

GIB EzyBrace® 2011 Software

Demand Calculation Sheet — single storey (V06/11)

Job Details

Name	Taylor
Street and Number	
Lot and DP Number	Lot 312
City/Town/District	Sovereign Palms
Designer	Matt Iles
Company Name	Orange Homes 2005 Ltd
Date	19/06/2012

BRANZ Appraised — Appraisal No 294 [2011]

Building Specification — Select Lining Option: 10 or 13 mm GIB® Plasterboard

	Single Floor	Complete Single Floor Column only
Number of storeys	single	
Floor Loading	2kPa	
Foundation Type	slab	
Cladding Weight	heavy	
Roof Weight	light	
Room in Roof Space	no	
Roof Pitch (degrees)	24	
Roof height above eaves (m)	2.4	
Building height to apex (m)	4.8	
Ground to lower floor level (m)	0.2	
Stud Height (m)	2.4	
Building Length (m)	22.9	
Building Width (m)	9.7	
Building Plan Area (m2)	179	

Building Location

Wind Zone	High
Select by Building Consent Authority Map or Preference	Not Available
Wind Region	A
Lee Zone	no
Ground Roughness	Open
Site Exposure	Exposed
Topographic Class	T1

Earthquake Zone: 2
Soil Type: D&E (deep to very soft)
Annual exceedance probability: 1/500 (NZS3604:2011 default)

Bracing Units required for Wind

Demand W (BU)		Walls single
along	slab	493
across	slab	1138

Bracing Units required for Earthquake

Demand along / across E (BU)	Walls single
slab	1075

GIB EzyBrace® 2011 Software

SINGLE OR UPPER STOREY WALLS ALONG (V06/11)

1 Line Total Check	2 Line Label	3 Bracing Element No	4 Available Wall Length L (m)	5 Angle to Bracing line (degrees)	6 Element height H (m)	7 Bracing Type	8 Supplier	9 Bracing Units Achieved W	10 Bracing Units Achieved E
[illegible]	M	1	1.2		2.4	EP1	Ecoply	156	156
		2	2.2		2.4	GS1-N	GIB®	152	132
[illegible]						none			
	N	1	1.8		2.4	EP1	Ecoply	234	234
		2	3.9		2.4	GS1-N	GIB®	269	234
[illegible]						none			
	O	1	1.3		2.4	GS1-N	GIB®	90	78
		2	3		2.4	GS1-N	GIB®	207	180
[illegible]						none			
	P	1	1.2		2.4	EP1	Ecoply	156	156
		2	1.2		2.4	EP1	Ecoply	156	156
		3	1.3		2.4	GS1-N	GIB®	90	78
[illegible]						none			
	Q	1	1.2		2.4	EP1	Ecoply	156	156
		2	1.2		2.4	EP1	Ecoply	156	156
		3	0.9		2.4	EP1	Ecoply	117	117
		4	0.9		2.4	EP1	Ecoply	117	117
						none			
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						none			
						none			
						none			

					Wind	Earthq
Totals Achieved	W	417%	EQ	181%	2055	1950
Concrete Slab					OK	OK
Totals Required (from Demand)					493	1075

GIB EzyBrace® 2011 Software

SINGLE OR UPPER STOREY WALLS ACROSS (V06/11)

1 Line Total Check	2 Line Label	3 Bracing Element No	4 Available Wall Length L (m)	5 Angle to Bracing line (degrees)	6 Element height H (m)	7 Bracing Type	8 Supplier	9 Bracing Units Achieved W	10 Bracing Units Achieved E
[illegible]	A	1	1.2		2.4	EP1	Ecoply	156	156
		2	1.2		2.4	EP1	Ecoply	156	156
		3	0.7		2.4	EP1	Ecoply	91	91
		4	0.9		2.4	EP1	Ecoply	117	117
		5	0.9		2.4	EP1	Ecoply	117	117
						none			
[illegible]	B	1	0.5		2.4	GS1-N	GIB®	28	29
		2	0.5		2.4	GS1-N	GIB®	28	29
		3	1.4		2.4	GS1-N	GIB®	97	84
						none			
[illegible]	C	1	2.7		2.4	GS1-N	GIB®	186	162
		2	0.6		2.4	GS1-N	GIB®	34	35
						none			
[illegible]	D	1	1.2		2.4	EP1	Ecoply	156	156
		2	0.8		2.4	EP1	Ecoply	104	104
		3	1.2		2.4	EP1	Ecoply	156	156
		4	1.2		2.4	EP1	Ecoply	156	156
						none			
						none			
						none			
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						none			
						none			

					Wind	Earthq
Totals Achieved	W	139%	EQ	144%	1581	1548
Concrete Slab					OK	OK
Totals Required (from Demand)					1138	1075

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EMAIL: matt@orangehomes.co.nz
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Working Drawings

Dwelling Bracing Calc.

PROJECT INFORMATION:

TAYLOR

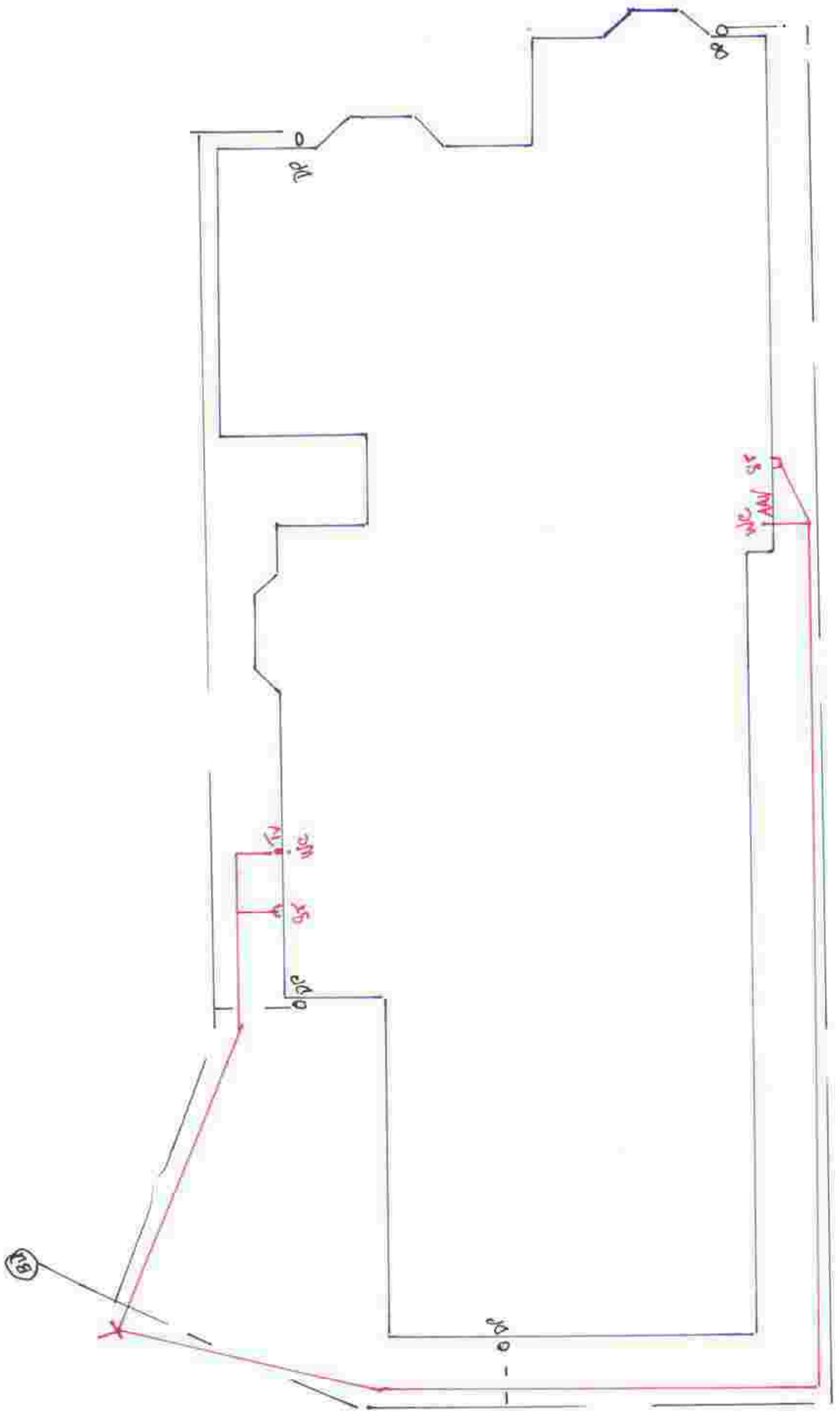
LOT 312 BROKELBANK DRIVE, SOVEREIGN PALMS

JOB No: (V14): 11.84	REVISION:	SHEET: 10
DESIGNED BY: James	DRAWN BY: Matt	
DATE OF ISSUE: Friday, 21 September 2012		OF 21

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WAIMAKARIRI
DISTRICT COUNCIL
215 High Street, RANGIORA
Tel. 03 311 8900
Fax 03 313 4432



LEGEND: SEWER —— STORMWATER — —		**DRAINAGE PLAN**
SCALE: 1-100	DRAWN BY: Les Cresswell	JOB Nº: 121633
NAME: P & A Taylor		VAL Nº: 2175400810
ADDRESS: 46 Brockelbank Drive Kaipoi		INSPECTED: LB
DRAINLAYER: Dynamic Drainage & Excavation J. Rowley 20885		DATE DRAWN: 13. 5. 13

QS-E205-AF 09/01 (is1)



Legend

Node

Water Supply Pipe
- Network Main
- Service Line

Water Supply Service Connection
- On Demand Water Connection

Water Supply Valve
- Isolation Valve

Wastewater Chamber
- Manhole

Wastewater Pipe
- Network Main
- Service Line

Stormwater Chamber
- Manhole
- Sump

Stormwater Pipe
- Network Main

Stormwater Point - Private Ownership

Property Boundaries
- Current Property
- Deposited Land Parcels

Road Names

Author: Cathlene Goldsworthy

Date: 15/10/2026

Scale 1:318 Original page size: A4

0 5 10 15 20
Metres

Disclaimer:

Land and property boundary information is sourced from and derived using Land Information New Zealand (LINZ) Land Parcels licensed for re-use by LINZ under the Creative Commons Attribution 4.0 International licence. The Waimakariri District Council does not give and expressly disclaims any warranty as to the accuracy or completeness of this information or its fitness for any purpose. Information on this map may not be used for legal disputes and should be independently verified before taking any action reliant upon it.

Credits:

Waimakariri District Council approved access only, Waimakariri District Council, Land Information New Zealand, 2025 Urban and Rural Aerial Imagery, 2023 Birch Hill Cemetery UAV Imagery, 2022-23 Cust Cemeteries UAV Imagery, Waimakariri District Council, Waimakariri District Counci, Waimakariri District Council

WAIMAKARIRI DISTRICT COUNCIL

Utilities & Property - 46 Brockelbank

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

Sovereign Green Subdivision, Kaiapoi

Lot 312

Lot-Specific Geotechnical Report

20 March 2012

Development Proposal	Domestic dwelling with garage to NZS3604 incorporating all relevant supplementary recommendations issued by the Department of Building and Housing. Reference should be made to the following DBH advice for design guidance: http://www.dbh.govt.nz/information-sheet-seismicity-changes and http://www.dbh.govt.nz/guidance-on-repairs-after-earthquake. **NB** Certain foundation details included in NZS3604 are precluded from use.
Earthworks / Ground Preparation	The lot has been subject to relatively minor earthworks (cut) to produce a level platform. The lot has been topsoiled.
Fieldwork	5 x dynamic cone penetration tests and 1 x hand auger bore. *Refer to attached investigation plan for positions.*
Ground Conditions	**Published geology** The area of the Sovereign Green Subdivision is predominantly underlain by Holocene sand, silty sand and gravelly sand deposits of an extensive historic dune field that lies along the coastal fringe from Sumner to the Waipara River. The gravel may represent beach gravels or may be fluviatile gravel in former channels. **Lot-specific comments** *Refer to attached ground investigation test results.* The ground profile encountered in the auger borehole is consistent with the published geology. The groundwater level is typically in the order of 1 to 2 metres below ground level. Comments on groundwater observations made during the fieldwork are included in the attached investigation records.
Bearing Capacity	The following comments are based on the assumptions for compliance stated on the attached ground investigation test results (see green shaded area): • The dynamic cone penetration tests confirm the soil penetration resistance at the test locations generally complies with the criteria for *Good Ground* as defined in NZS3604. • The soil below the underside of the foundations may be assumed to have a static ultimate bearing capacity of not less than 300kPa.
Liquefaction Hazard Assessment	A detailed Liquefaction Hazard Assessment has been carried out by Coffey Geotechnics for the Sovereign Green Subdivision (March 2012). The report incorporates evaluation of liquefaction hazard using uprated seismic design criteria as required by the DBH. *continued*

Coffey Geotechnics (NZ) Limited
PO Box 1872 Christchurch 8140 New Zealand
T (+64) (3) 374 9600 F (+64) (3) 374 9601
www.coffey.com/geotechnics

Liquefaction Hazard Assessment (cont'd)	The liquefaction characteristics of the lot satisfy the deformation limits for Green Zone Technical Category 1 (TC1) land in accordance with DBH guidance. Future land performance expectation from liquefaction for TC1 land is defined as: "Future land damage from liquefaction is unlikely, and ground settlements are expected to be within normally accepted tolerances".
Foundation Requirements	Use foundations provided in NZS3604 Timber Framed Buildings, as modified by B1/AS1 that requires ductile reinforcing in slabs (refer to DBH information sheet at http://www.dbh.govt.nz/seismicity-info). **NB** Solutions provided are minimum recommendations. Homeowners can always choose more robust foundation options (e.g. as for TC2 land*) to provide greater structural resilience against earthquake-induced damage, noting the need to discuss this with their insurer. * http://www.dbh.govt.nz/guidance-on-repairs-after-earthquake; Section 5.3.1
Ground Preparation	We recommend the generally accepted good practice to compact (tamp or roll) the ground in foundation excavations to ensure the founding zone is tight and free of soft/loose soil prior to placing concrete.
Ground Inspection	We recommend the generally accepted good practice for a competent, suitability experienced person to verify the ground at the actual foundation locations is consistent with the ground conditions encountered during investigation (i.e. as reported above – see *Ground Conditions*). Coffey can provide this service.

Limitations

This report has been prepared solely for the use of our client Sovereign Palms Ltd, their professional advisers, Waimakariri District Council and future owners of the lot referred to herein, in relation to the specific project described. No liability is accepted in respect of its use for any other purpose or by any other person or entity.

The opinions, recommendations and comments given in this report result from the application of normal methods of site investigation. The interim nature of the comments on Liquefaction Hazard Assessment are such that opinions, recommendations and comments are subject to review as the full suite of factual records becomes available and is subject to interpretation.

As factual evidence has been obtained solely from test methods that by their nature only provide information about a relatively small volume of subsoils, there may be special conditions pertaining to this site that have not been disclosed by the investigation and that have not been taken into account in the report. If variations in the subsoils occur from those described or assumed to exist, then the matter should be referred to us immediately.

Closure

If you have queries or you require further clarification on any aspects of this report, please do not hesitate to contact the undersigned.

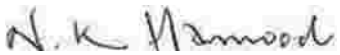
For and on behalf of Coffey Geotechnics (NZ) Limited



R M Hawksworth

BSc(Hons)

Graduate Geotechnical Engineer



N K Harwood

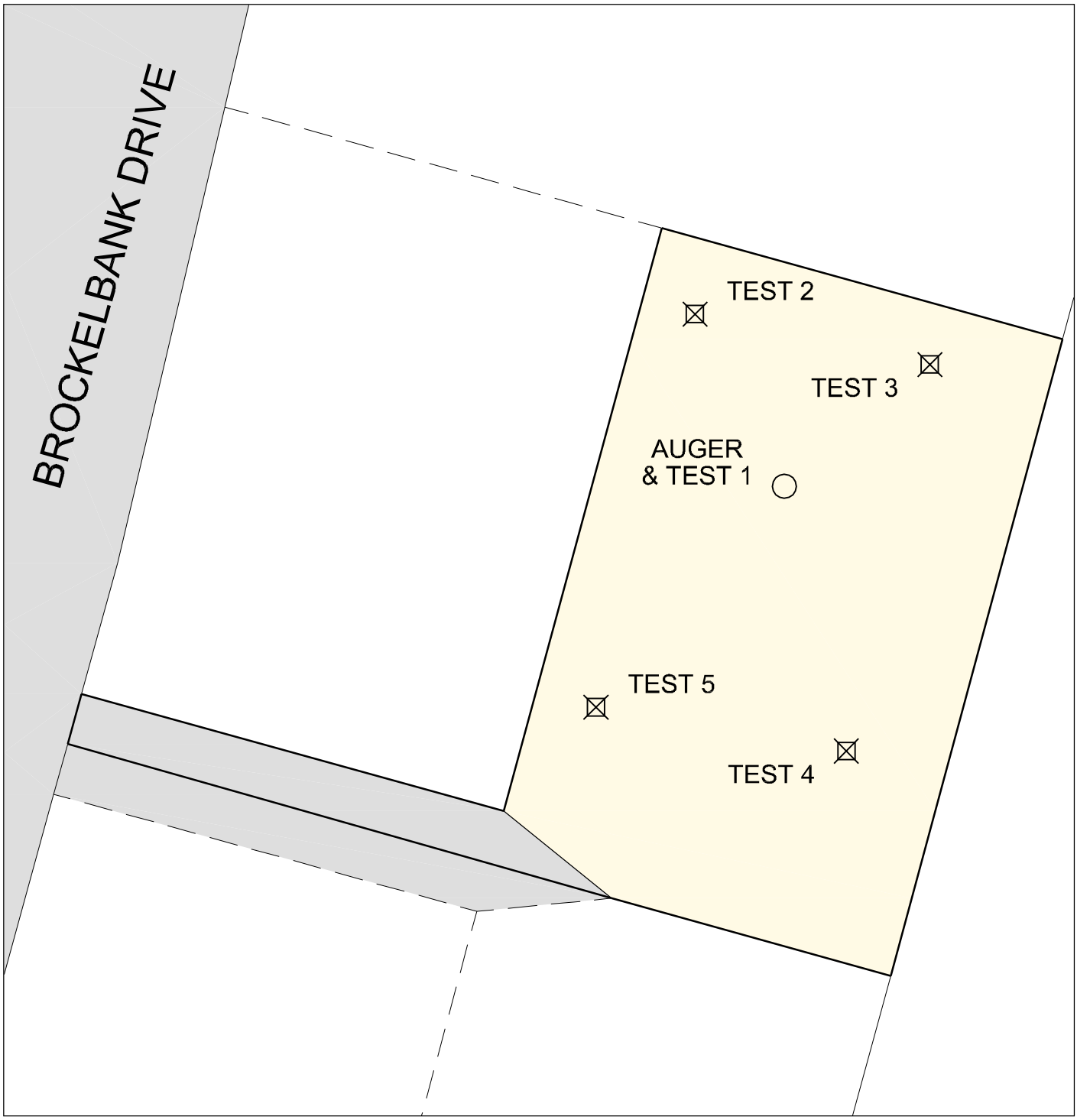
BEng(Hons) MSc MIPENZ CPEng

Principal Geotechnical Engineer

Attachments: *Geotechnical Investigation Location Plan*

Ground Investigation Test Results

Lot 312



Notes:

Positions surveyed by kb Contracting

Test = Dynamic Cone Penetration (DCP) test

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186 Hazeldean Road, Addington
P O Box 589, Christchurch 8140
New Zealand
(03) 366 1653 0800 999 333 (03) 379 2348
admin@do.co.nz www.do.co.nz

drawn	BL (DOP)	coffey geotechnics SPECIALISTS MANAGING THE EARTH	client:	SOVEREIGN PALMS LIMITED
approved	BH		project:	LOT 312 DP 452661 SOVEREIGN GREEN SUBDIVISION
date	April 2012		title:	GEOTECHNICAL INVESTIGATION LOCATION PLAN
scale	1:250		project no: 15352	figure no: 1
original size	A4			

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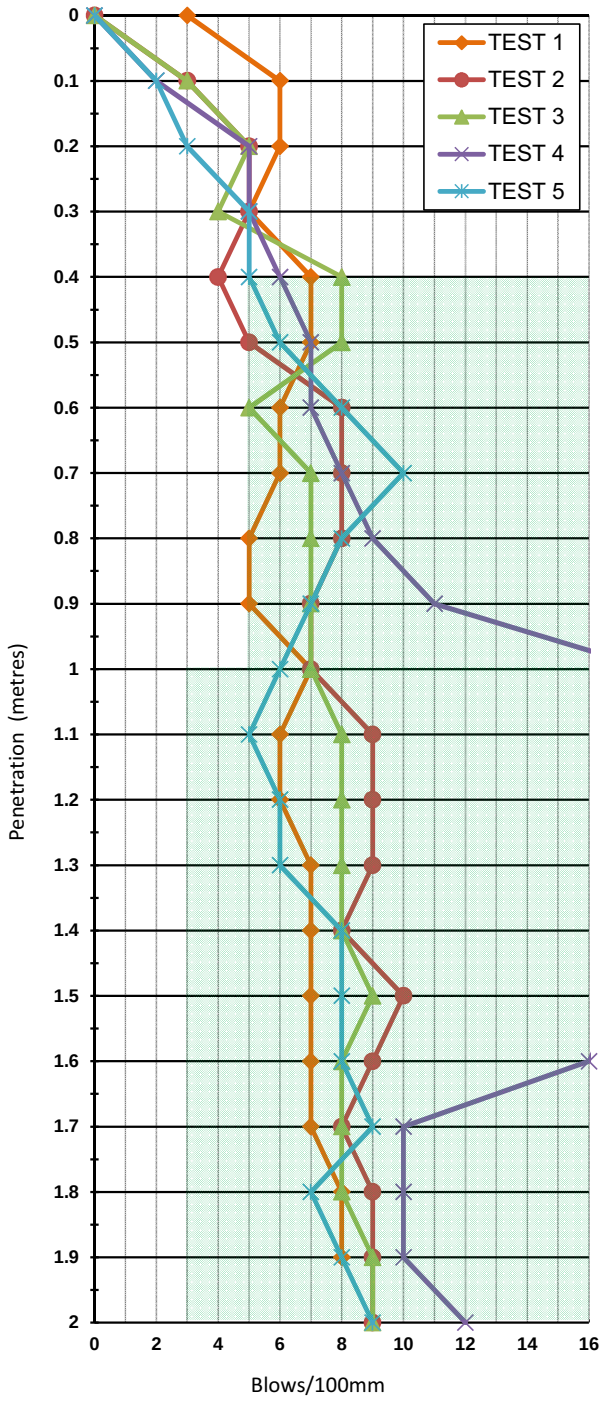
GROUND INVESTIGATION TEST RESULTS

Lot 312

JOB NO.	GENZCHRI15352	**Compliance with NZS3604:2011; Section 3.**
CLIENT	Sovereign Palms Ltd	"Good Ground" indicated by shaded zone, assuming:
PROJECT	Sovereign Green Subdivision, Kaiapoi	(i) Depth to Cleared Ground Level = 0.2m BGL
DATE TESTED	27/01/2012	(ii) Minimum depth to underside of footings = 0.4m BGL
LOCATION	REFER TO SITE PLAN	(iii) Footing width = 0.3m

PENETRATION RESISTANCE TEST RESULTS

Depth tests start at: SURFACE



HAND AUGER BOREHOLE

Inferred groundwater level (mBGL): 1.8

GL	Topsoil
0.20	Fine to medium SAND, brown, moist
0.80	… become grey / brown with orange limonite staining, moist
1.80	…becoming wet

End of Bore @ 2.00 m

coffey geotechnics

Coffey Geotechnics
P.O. Box 1872
Christchurch 8140
www.coffey.com

TESTED BY:	JL / SG
LOGGED BY:	JM
CHECKED BY:	BH

STATEMENT OF SUITABILITY OF EARTH FILL FOR RESIDENTIAL DEVELOPMENT

Davis Ogilvie
Professionals

Subdivision: Sovereign Green, Stage 1a

Owner/Developer: Sovereign Palms Ltd.

Location: Sovereign Boulevard, Kaiapoi.

The earth fills shown on the attached plans No 29130 (301A) dated 5/4/12 have been placed in compliance with the terms of NZS 4431:1989: Earthfill For Residential Development

I am a Chartered Professional Engineer (Member ID 1009228) acting on behalf of Davis Ogilvie and Partners Ltd.

During the work, I and/or staff under my supervision made periodic visits to inspect the site and soil testing was carried out to check the quality of the fill.

The attached Plan No. 29130(301A) shows Lots 304–311, 328–364, 391–395, 447–449

which are affected by filling and the extent of fill covered by this certificate. The maximum fill depth was 1.40metres.

This certification, that the earth fills have been placed in compliance with the terms of NZS 4431:1989, but does not ensure compliance with NZS 3604:2011 (Timber framed building standard) definition of 'good ground' and does not remove the necessity for the normal inspection and design of foundations as would be made in natural ground.

James Hopkins - B.Tech (Env. Eng.), MIPENZ, IntPE(NZ), CPEng

Senior Civil Engineer
(Position)

10th April 2012
(Date)

On Behalf Of Sovereign Palms Ltd.
(Name of Owner/Developer)

Davis Ogilvie & Partners Ltd, 186 Hazeldean Road, Addington, Christchurch 8024, P O Box 589, Christchurch 8140, New Zealand
(t) (03) 366 1653 0800 999 333 (f) (03) 379 2348 (e) admin@do.co.nz (w) www.do.co.nz
Also offices in Greymouth, Nelson and Timaru

Disclaimer: This document shall only be reproduced in full with approval from a Davis Ogilvie engineer.

issue	date	reason	approved
A	5/4/12	Preliminary	DC



CUT/FILL LEGEND		
Lot No	Max site cut	Max site fill
291	-0.41	0.82
290	-0.03	1.33
289	-0.01	0.63
294	0.00	1.36
295	-0.04	0.64
296	0.00	0.82
297	0.00	0.81
298	0.00	1.04
299	0.00	1.32
300	0.00	1.09
301	0.00	0.97
302	0.00	0.93
303	0.00	0.85
304	0.00	0.87
305	-0.41	0.86
306	-0.46	0.78
307	-0.41	0.84
308	-0.41	0.76
309	-0.02	0.11
310	-0.45	0.85
311	-0.45	0.41
312	-0.12	0.03
313	-0.14	0.00
314	-3.33	0.00
315	-3.54	0.00
316	-3.65	0.00
317	-2.69	0.00
318	-0.65	0.16
319	-0.73	0.06
320	-0.36	0.18
321	-1.64	0.18
322	-2.14	0.62
323	-1.23	0.00
324	-2.26	0.00
325	-2.16	0.00
326	-1.35	0.00
327	-1.62	0.00
328	-1.76	0.21
329	-4.56	0.93
330	0.00	1.04
331	0.00	0.14
332	0.00	0.85
333	0.00	0.66
334	-2.22	0.45
335	-2.81	1.08
336	-0.82	0.77
337	-0.56	0.52
338	-0.33	0.96
339	0.00	0.93
340	0.00	0.97
341	0.00	0.65
342	0.00	0.16
343	0.00	0.11
344	0.00	0.77
345	0.00	0.69
346	0.00	1.08
347	0.00	1.00
348	0.00	0.85
349	0.00	0.83
350	0.00	1.05

CUT/FILL LEGEND		
Lot No	Max site cut	Max site fill
351	0.00	0.95
352	0.00	1.05
353	0.00	1.00
354	0.00	1.05
355	0.00	1.11
356	0.00	1.21
357	0.00	1.26
358	0.00	1.24
359	0.00	1.23
360	0.00	1.35
361	0.00	1.24
362	0.00	1.36
363	0.00	1.40
364	0.00	1.35
365	0.00	1.35
366	0.00	1.21
367	0.00	1.11
368	0.00	1.07
369	0.00	1.07
370	0.00	1.05
371	0.00	0.90
372	0.00	0.71
373	0.00	0.50
374	-0.35	0.44
375	0.00	0.58
376	0.00	0.37
377	-0.04	0.45
378	0.00	0.38
379	0.00	1.09
380	-0.05	1.28
381	0.00	1.18
382	0.00	1.35
383	0.00	1.36
384	0.00	1.25
385	0.00	1.20
386	0.00	1.09
387	0.00	0.95
388	0.00	0.78
389	0.00	0.63
390	0.00	0.63
391	0.00	0.86
392	0.00	1.04
393	0.00	1.04
394	0.00	1.21
395	0.00	1.19
396	0.00	1.07
397	0.00	0.95
398	0.00	0.86
399	0.00	0.95
400	0.00	1.01
401	-0.03	0.44
402	-0.36	0.48
403	-0.40	0.34
443	0.00	1.21
448	0.00	1.22
449	0.00	1.10
100	-0.8	1.00
101	-4.25	0.0

Denotes certified fill certificate -

CAD ref: 2010 FILL location.dgn

Davis Ogilvie
Ph: 03 366 1532
Engineers - Surveyors - Planners
165 Hereford Street Addington
Christchurch New Zealand
P.O. Box 589 Christchurch 8140
OFFICES ALSO IN
Nelson - Timaru - Greymouth

FILL LOCATION PLAN - STAGES 1A AND 1B
SOVEREIGN GREEN, KAIAPOI

drawn	QA check
SM	DC
date	sheet
5/4/12	2 of 2

drwg no. 3011 Sk
issue A

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

SOVEREIGN GREEN SUBDIVISION, KAIAPOI

LIQUEFACTION HAZARD ASSESSMENT

Sovereign Palms Limited

FINAL
GENZCHRI15352
March 2012

Coffey Geotechnics (NZ) Limited
PO Box 1872, Christchurch 8140

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

27 March 2012

Sovereign Palms Limited
Unit 2
1 Homersham Place
Burnside
Christchurch

Attention: Kim Sanders

Dear Kim,

RE: Sovereign Green Subdivision, Kaiapoi - Liquefaction Hazard Assessment

This report is a Liquefaction Hazard Assessment carried out by Coffey Geotechnics (NZ) Limited for the proposed Sovereign Green Subdivision, Kaiapoi.

The report has been prepared using the recently up-rated peak ground accelerations as advised by the Department of Building and Housing. SLS1 and ULS IL2 scenarios used in the report are based on provisional revised geotechnical seismic design parameters that were verbally confirmed by DBH to Coffey on Tuesday 31 January 2012. We anticipate that the DBH will officially release these seismic design parameters early in 2012. If these differ from the parameters used in this report, the matter should be referred to us immediately and the content of this report reviewed.

If you have queries or you require further clarification on any aspects of this report, please do not hesitate to contact the undersigned.

For and on behalf of Coffey Geotechnics (NZ) Limited

N K Harwood

BEng(Hons) MSc DIC MIPENZ CPEng
Principal

Distribution:	Sovereign Palms Limited	1 Copy
	Coffey Geotechnics Archives	1 Copy

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10 LIMITATIONS 22

Important Information About Your Coffey Report

Figures

Figure 1: Site location plan

Figure 2: DBH Technical Category Zoning

Figure 3: SLS1 distribution of TC1 (grey) and TC2 (yellow) settlement analysis output

Figure 4: ULS IL2 distribution of TC1 (grey) and TC2 (yellow) settlement analysis output

Figure 5: Proposed provisional DBH zoning plan for Sovereign Green (red boundary marks limits of Sovereign Green Subdivision)

Appendices

Appendix A: Subdivision layout plan including exploratory hole locations

Appendix B: Borehole records

Appendix C: CPTu records

Appendix D: Liquefaction assessment output

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1 INTRODUCTION

Coffey Geotechnics (NZ) Limited was commissioned by Sovereign Palms Limited to provide a liquefaction hazard assessment for the proposed Sovereign Green Subdivision, Kaiapoi.

The assessment has been undertaken generally in accordance with:

1. New Zealand Geotechnical Society's publication *Geotechnical earthquake engineering practice; Module 1 – Guideline for the identification, assessment and mitigation of liquefaction hazards* (2010); and
2. *Guidelines for the investigation and assessment of subdivisions;* Appendix B2; DBH 2011.

2 OBJECTIVES

2.1 Overview

The liquefaction hazard assessment addresses two key requirements relating to earthquake-induced ground deformation:

1. Analysis using up-rated geotechnical seismic design criteria for the Serviceability Limit State (SLS) and Ultimate Limit State (ULS IL2) design earthquake scenarios; and
2. Classification of the land in accordance with the Department of Building and Housing Technical Categories[1].

2.2 Revised design earthquake scenarios

This assessment includes evaluation of the recently revised Serviceability Limit State (SLS1) and Ultimate Limit State (ULS IL2) earthquake scenarios.

The scenarios are based on provisional revised geotechnical seismic design parameters that were verbally confirmed by DBH to us on Tuesday 31 January 2012. We anticipate that the DBH will officially release these seismic design parameters early in 2012.

If these differ from the parameters used in this report, the matter should be referred to us immediately and the content of this report reviewed.

Earthquake Scenario	**Magnitude, M_w**	**~~NZS1170.5 Original PGA values~~** (~~*g*, m/s^s~~)	**~~DBH May 2011 Revision~~** (~~*g*, m/s^s~~)	**DBH Jan 2012 Revision** (*g*, m/s^s)
SLS1	7.5	~~0.07~~	~~0.11~~	0.15
ULS IL2	7.5	~~0.28~~	~~0.34~~	0.49

The provisional PGAs are for geotechnical design only. They relate to NZS1170.5 Class D subsoil sites only.

[1] Revised Guidance on Repairing and Rebuilding Houses Affected by the Canterbury Earthquake Sequence, Department of Building and Housing, November 2011.

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2.3 DBH Technical Catagory

The DBH Technical Categories are based on the expected future liquefaction performance of the land and are used to determine engineering requirements for repairing and rebuilding houses within those technical categories.

The Sovereign Green site is currently zoned as *N/A - Rural & Unmapped*.

The DBH released revised guidance in November 2011, which defines the technical categories and repair / rebuild options. In summary, the Technical categories are:

TC1: Future land damage from liquefaction is unlikely, and ground settlements are expected to be within normally accepted tolerances.

TC2: Minor to moderate land damage from liquefaction is possible in future large earthquakes.

TC3: Moderate to significant land damage from liquefaction is possible in future large earthquakes.

Our report quantifies the expected future liquefaction performance of the Sovereign Green Subdivision in terms of likely vertical settlements and likely severity of lateral spread.

To categorise the site the DBH guidance requires the liquefaction characteristics of the site to be assessed against liquefaction deformation limits. The table below, extracted from 'Appendix B2: Guidelines for the investigation and assessment of subdivisions' of the DBH guidance, outlines the permissible deformation limits:

Table B2.1: Liquefaction deformation limits and house foundation implications

TECHNICAL CATEGORY	LIQUEFACTION DEFORMATION LIMITS				LIKELY IMPLICATIONS FOR HOUSE FOUNDATIONS (SUBJECT TO INDIVIDUAL ASSESSMENT)
	Vertical settlement		Lateral spread		
	SLS	ULS	SLS	ULS	
TC1	15 mm	25 mm	nil	nil	Standard 3604-like foundations with tied slabs*
TC2	50 mm	100 mm	50 mm	100 mm	The Department's enhanced foundation solutions (section 5.2)
TC3	>50 mm	>100 mm	>50 mm	>100 mm	Site-specific measures – piles, ground improvement, etc

* Note that certain foundation details included in NZS 3604 are precluded from use in Canterbury (refer to: www.dbh.govt.nz/information-sheet-seismicity-changes).

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3 SITE DETAILS

Sovereign Green Subdivision is a residential subdivision located approximately 1.5km north of the Kaiapoi town centre (Figure 1). The subdivision is set out in eight stages (1a, 1b, 2, 3, 4, 5, 6, and 7) with approximately 300 lots, some reserve areas and an internal road network (see layout plan in Appendix A).

The site is bounded by Main North Road (also known as Williams Street) to the west and pasture to the east. The Sovereign Palms Subdivision and the Moorcroft subdivision are located at the north and south of the site, respectively.

We have recently completed a ground investigation and liquefaction hazard assessment for the Sovereign Palms[2] site that is currently under construction with houses built in some stages. Essentially, Sovereign Green is the southern extension of Sovereign Palms on the same terrain.

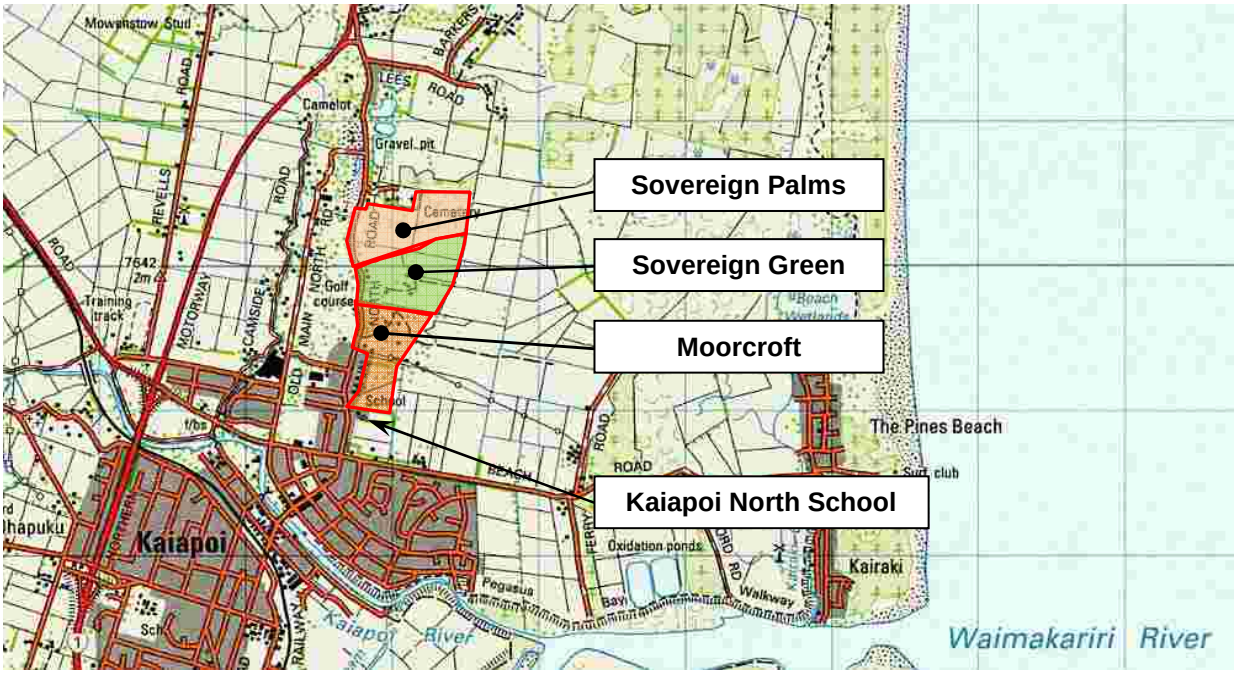


Figure 1 Site location plan (kilometre squares for scale; north at top)

The terrain is a low-lying, gently undulating former dune field in a rural setting. The site is under construction to form the finished surface for the subdivision that requires cut and fill. The original ground surface elevation was typically at or around 2mRL ranging up to 3mRL, and locally in the north-eastern corner up to 6mRL reflecting the undulating nature of the dune field. The finished level of the site is 2.95mRL with local variations up to approximately 3.15mRL.

The earthworks require cut to form the lot platforms with low-points made up with engineered fill using the cut sandy soil. The filling works are being overseen and certified by Davis Ogilvie and Partners Limited (DOP), the engineers for the subdivision.

[2] Coffey (February 2012) *Sovereign Palms Subdivision, Kaiapoi – Liquefaction Hazard Assessment; Revision C*.

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Kaiapoi North School, the site of the nearest seismograph that recorded strong motion data during the recent earthquakes, is located just over 1km to the south of Sovereign Palms. Discussion on the Canterbury earthquake sequence is presented later in the report.

4 SCOPE OF WORKS

The scope of works for the Sovereign Green liquefaction hazard assessment was as follows:

Desk Study

- Review of published geological records
- Review of ECan's wellcard database for relevant bore records in the site and environs
- Review of the liquefaction hazard study for the neighbouring Sovereign Palms Subdivision (Coffey, 2012)
- Review of the liquefaction hazard study for the neighbouring Moorcroft sub-division (URS, 2002)

Fieldwork

The ground model was developed using a selection of investigation records from the adjoining Sovereign Palms subdivision (three boreholes and five CPTs along the shared boundary). A layout plan in included in Appendix A.

Initially 19 CPTu locations were programmed. On review of these records and the revised DBH guidance an additional 18 tests were conducted to help define the boundary between TC1 and TC2 category land areas.

- 37 Piezocone Cone Penetrometer Test probes (CPTu) pushed to refusal at depths of between 2.5m (CPT234) to 14.2m (CPT228), using a track mounted rig, plus 5 CPTu on shared boundary
- 9 boreholes drilled to depths of up to 20.4 metres using dual-tube direct-push techniques, with Standard Penetration Tests (SPTs) at regular intervals in each bore, plus 3 boreholes on shared boundary
- Geotechnical logging of tube samples in accordance with the NZGS's *Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes* (December 2005)

Analysis & Reporting

- Liquefaction hazard analysis (this report)

5 GROUND CONDITIONS

5.1 Geological model

The ground conditions are an extension of those proven to the north (Sovereign Palms) and to the south (Moorcroft) which is in keeping with the mapped geology.

The site is predominantly underlain by Holocene sand, silty sand and gravelly sand deposits of an extensive historic dune field that lies along the coastal fringe from Sumner to the Waipara River. The gravel may represent beach gravels or may be fluviatile gravel in former channels[3]. This unit is part of the Christchurch Formation (*cs*) mapped as *sands of fixed and semi-fixed dunes and inland sand deposits*.

The eastern boundary of the site, i.e., eastern boundary of Stages 1a, 1b and 2, borders a flat paddock area with the site boundary coinciding with what we infer to be the geological boundary with *alluvial silt* of the Springston Formation (*sya*). The boundary is clearly expressed in the terrain as a transition from undulating dune field (the site) to the pasture flats as was observed to the north along the eastern boundary of Sovereign Palms.

A review of the borehole and CPT records shows the soil units encountered across the site are consistent with the published geological records. A summary of the nine boreholes is presented in Appendix B along with the borehole logs. A typical soil profile in the area consists of a veneer of topsoil underlain by a deep deposit of coarse granular soil dominated by fine[4] to medium sand with beds of sandy gravel, interbedded deposits of sand and gravel, and the occasional thin layers of fine-grained deposits. The CPTu logs are included in Appendix C.

The array of boreholes was used to prove the deeper profile terminating at an average depth of 18.27 metres (ranging from 16.8 (BHs 203 & 204) to 20.4 metres depth (BHs 202 & 207)). Core recovery was generally very good to excellent (typically >75%). Two boreholes (BH 205 & 206) experienced core loss of 40 to 50% in a sandy layer. We interpreted this material to be clean, fine sand which, when saturated, is the most likely unit to be lost due to the drilling process and / or when tubes are extracted from the ground.

Standard Penetration Tests (SPTs) were carried out from 1.2m depth to the base of each borehole at 1.2 metre intervals. SPTs typically returned "effective refusal" (i.e. $N_{uncorrected} > 50$) indicating *medium dense* to *very dense* conditions in accordance with NZGS Guidelines.

From the N values and exploratory borehole records one would characterise the site as being underlain by medium dense to very dense coarse granular deposits (predominantly sand with some gravel).

---

[3] Brown, L. J. 1973 : Sheet S76 Kaiapoi (1st edition) "Geological Map of New Zealand, 1:63,360". Department of Scientific and Industrial Research, Wellington.

[4] The soil classification given here is consistent with the approach given in the NZGS's *Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes* (December 2005) where sand (including fine sand) is classified as a "coarse" soil.

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5.2 Groundwater regime

The following sources of groundwater records have been reviewed:

- Environment Canterbury's (ECan) wellcard database for a selection of bores across and close to the site
- Well monitoring records[5]
- Pore pressure monitoring traces included in the CPTu logs
- Driller's field logs and observations
- Moisture condition of the logged soil samples

On review of the available monitoring records dating from November 1996 to August 2009 from three monitoring wells located across the site, we have deduced a conservative groundwater level elevation of 2mRL for the site. Hence, for liquefaction assessment purposes we have adopted a groundwater level of 1.0m depth below Finished Level across the site.

5.3 Liquefaction susceptibility

The soil profile underlying the site is dominated by saturated, non-plastic, fine to medium sand, which is a soil type that is potentially susceptible to liquefaction. Liquefaction hazard assessment is discussed later in the report.

[5] PDP (2009) Groundwater monitoring report; Ref. CJ42109; Waimakariri District Council.

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6 EARTHQUAKE-INDUCED GROUND DEFORMATION

6.1 Introduction

The Canterbury earthquake sequence has caused widespread damage in parts of Waimakariri district with large parts of Kaiapoi zoned red and other parts zoned green-blue in dictating significant damage and significant works required to recover.

At the time of the more significant earthquakes (4 Sept 2010 and 22 February 2011) we were working on the adjoining Sovereign Palms site to the immediate north. The Sovereign Green site was simply adjoining undeveloped rural land so we have no records of post-earthquake inspections specific to the site. However, we did conduct inspections and review on Sovereign Palms to the immediate north, and specifically in Stages 1 & 2 of that site. Stage 1 borders Sovereign Green. Salient comments are included below.

Although Kaiapoi town and some suburbs suffered extensive land and building damage, the Sovereign Green site lies well north of the damage areas and is underlain by a different, more resilient geological profile, which we interpret as being the primary distinguishing attribute between the two areas.

6.2 4 September 2010

Following the September earthquake, Coffey conducted geotechnical visual walkover inspections of the Sovereign Palms site and environs (5 & 8 September 2010). We also conducted a review of pre- and post-earthquake detailed topographic survey records of Stages 1 & 2.

We understand that Sovereign Palms Limited's[6] post-earthquake assessment of the buried services found they suffered no damage. This included a 6.5m deep pump station chamber on the shared boundary of Sovereign Palms and Sovereign Green that was empty and therefore prone to buoyancy but showed no sign of movement, which was confirmed by topographic survey.

Also, following the earthquake the client commissioned a structural review of the entranceway walls to Sovereign Palms to ascertain their condition[7]. The inspection and report was carried out by the wall design engineer and concluded:

> *These are well constructed walls in good condition. They have suffered no perceptible damage in the recent earthquakes, and there is no need to make any insurance claim. The walls are safe to retain in their present condition, and require no remedial work.*

Our inspections and the review of other records found no evidence of earthquake-induced ground deformation or sand boils anywhere on the Sovereign Palms site.

Kaiapoi Lakes, located to the north and north-west of the site is an area of landscaped former gravel pits. Lateral spreading damage was experienced at some of the pits and is attributed to earthquake-induced deformation of waterfront land specifically attributed to the free face presented by the pit slopes that are saturated towards their base.

There are no post-4 September earthquake aerial photos of the site or environs to review for damage.

Given the consistency of the ground conditions between the two neighbouring sites and their close proximity it is not unreasonable to assume that the Sovereign Green land was similarly unscathed on 4 September 2010.

---

[6] Suburban Estates Limited is the parent company of Sovereign Palms Limited.

[7] Harding Consulting Engineers Limited; letter report; File 3918; 28 October 2010.

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6.3 22 February 2011

The 22 February 2011 earthquake had a magnitude (M_w) of 6.3 and a peak horizontal ground acceleration recorded at Kaiapoi North School of 0.23g.

This earthquake caused further land and building damage in the previously severely affected areas of Kaiapoi, but there was no observable damage at Sovereign Palms.

High-resolution post 22 February earthquake aerial photos show no observable evidence of sand ejecta or other surface expressions of liquefaction at Sovereign Green or the neighbouring Moorcroft subdivision on the immediate south.

6.4 CERA Land Status Map

According to Canterbury Earthquake Recovery Authority's (CERA) *Land Status Map*[8] the entire site is designated as Green Zone indicating "repair / rebuild can begin".

6.5 DBH Technical Category

The DBH Technical Categories are based on the expected future liquefaction performance of the land and are used to determine engineering requirements for repairing and rebuilding houses within those technical categories. The Sovereign Green site is currently zoned as *N/A - Rural & Unmapped*.

The zoning strictly applies to the repair or rebuild of homes affected by the recent earthquakes. However, there are important messages within the Zone Information that are relevant to new build at Sovereign Palms e.g. building work should "take into consideration the risk of ongoing aftershocks, so some finishing tasks such as brick and driveway concrete laying should be delayed until that risk decreases".

The Lakes subdivision suffered damage that we infer to be associated with close proximity to banks of the water features and have been designated Technical Category 3. It is not clear why many residential properties at the Lakes have no TC zoning.

Moorcroft has been designated Technical Category 2. The TC zones are based on observations only of land and building deformation and the area's future likely performance inferred with no specific geotechnical analysis.

[8] Accessed in February 2012

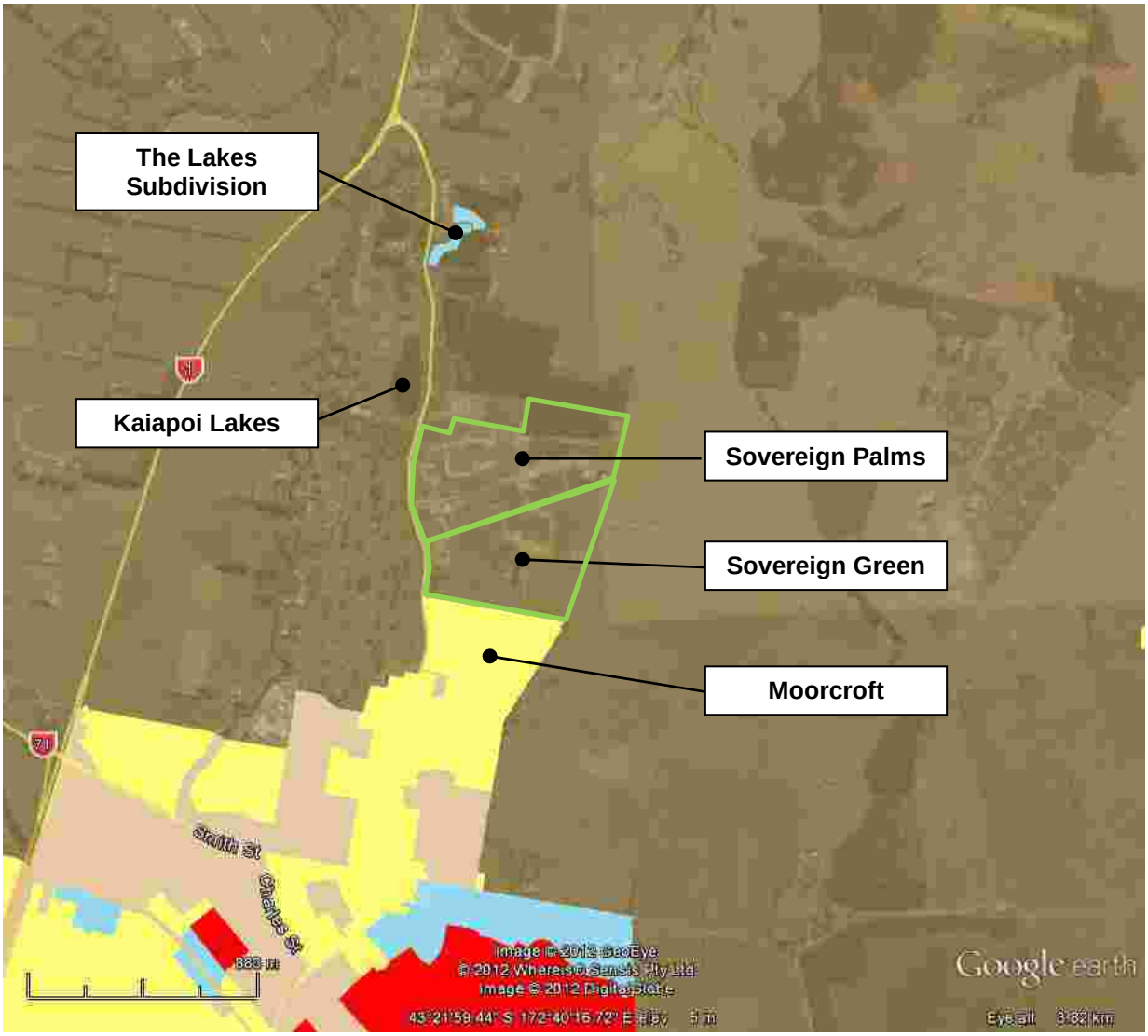


Figure 2 DBH Technical Category Zoning

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7 EARTHQUAKE-INDUCED GROUND DEFORMATION

7.1 Introduction

Assessment of susceptibility to earthquake-induced ground deformation at the site has been carried out generally in accordance with New Zealand Geotechnical Society guidelines[9] and using or with reference to the following:

- Robertson (2009a & b)[10]
- Idriss and Boulanger (2008)[11]
- Liquefaction assessment software for CPT[12]
- Liquefaction assessment software for SPT[13]

Analysis has been carried out using both the SPT and CPT records, which together give soil data for the soil profile to over 18 metres depth.

The liquefaction hazard ground model for the site has been developed from a review of:

- the site's investigation records (boreholes, CPTs) and relevant records from Sovereign Palms to the north
- ECan's wellcard database records
- published geological mapping
- ground water monitoring records of observations from auger holes[14]

The site is predominantly underlain by fine to medium sand deposits with a mantle of topsoil and some gravel layers and the occasional silt/clay seam. For liquefaction assessment purposes we have adopted an upper-bound groundwater level at 1.0 m depth.

If the ground elevation was low at time of field testing compared to the Finished Level, it will be made up with engineered fill during site development. It is conservative to ignore this difference for the liquefaction assessment (i.e. we assume the engineered fill will be more competent than the natural ground profile).

Where the ground level at test positions was notably high compared to Finished Level, we disregarded the data above that level, which applied to CPT219, 220 & 221 with 0.7m, 2.3m & 2.0m cut, respectively.

---

[9] NZGS (July 2010) *Geotechnical Engineering Practice – Module 1 – Guideline for the identification, assessment and mitigation of liquefaction hazards.*

[10] Robertson (2009a) *Performance Based Earthquake Design using the CPT*, Tokyo June 2009 & Robertson (2009b) Interpretation of cone penetration tests – a unified approach; Can. Geotech. J. 46 1337-1335.

[11] Idriss and Boulanger (2008) *Soil Liquefaction During Earthquakes*, Earthquake Engineering Research Institute; Monogragph MNO-12.

[12] *CLiq* Cone Penetration Test based soil liquefaction assessment software; GeoLogismiki.

[13] *LiquefyPro*; CivilTech 2010

[14] Augers undertaken for lot reports in Stage 1a.

7.2 Earthquake characteristics

The characteristics of earthquake events of interest for design are presented below, Table 1.

The Serviceability Limit State (SLS) and Ultimate Limit State (ULS) scenarios are based on the recently revised geotechnical seismic design parameters that were verbally confirmed by DBH to us on Tuesday 31 January 2012. We anticipate that the DBH will officially release these seismic design parameters early in 2012.

If these differ from the parameters used in this report, the matter should be referred to us immediately and the content of this report reviewed.

Table 1 Earthquake scenarios

Earthquake Scenario	**Magnitude, M_w**	**PGA** (g, m/s^s)
SLS1	7.5	0.15
ULS IL2	7.5	0.49

7.3 Analysis output

The assessment of liquefaction and ground deformation is not an exact process. There are a number of assumptions, variables and simplifications inherent in the empirical correlations and calculations on which the methods are based.

The derivation of the procedures has been based on a cautious approach to give estimates of deformation that may be experienced under different earthquake scenarios so that appropriate design for resilience of structures may be made.

The estimates given are each for a single earthquake event and should be seen as displacements “in the order of” *x* millimetres. It is to be expected that ground deformation will be non-uniform across the site. Some areas of the site may not settle significantly, whilst other parts may be subject to displacement to the order of magnitudes indicated.

7.4 Settlement risk assessment

The settlement analysis included an assessment of Liquefaction Potential Index (LPI), probability of liquefaction and estimate of total reconsolidation settlement for the three earthquake scenarios.

The table below presents a summary of the calculated total reconsolidation settlements for the two earthquake scenarios under consideration. Where there are borehole / CPT pairings we relied on the CPT data and then considered the analysis of SPT data where this extended beyond the base of the relevant CPT record.

Appendix D contains a selection of output records from the liquefaction assessment. The table below summarises the output from the settlement analysis and compares the output with the DBH Technical Category deformation limits.

The following key messages are drawn from the settlement analysis output:

- Under the SLS scenario the majority of the site is classified as TC1 with a distribution of TC2 locations (Figure 3)
- Under the ULS scenario there is a definable zone of land within the body of the site that is classified as TC2 with the western margin, north-east quadrant and eastern margin remaining in TC1 (Figure 4).
- It is consistent with the TC2 zoning of Moorcroft Subdivision to the south that a zone of TC2 land extents north into Sovereign Green
- It is a coincidence that the northern limits of the TC2 zone in Sovereign Green extends to its northern boundary with Sovereign Palms where TC1 zoning has been determined (Coffey, February 2012).

Sovereign Green Subdivision
Summary of Liquefaction-Induced Settlement Analysis

Grey cells	= TC1 deformations
Yellow cells	= TC2 deformations

Indicative total (reconsolidation) ground surface settlements under the design earthquake scenarios

CPT analysis				SPT analysis				Sum of CPT and SPT analysis	
CPT	Depth to refusal (mBGL)	Earthquake scenario SLS1 mm	Earthquake scenario ULS IL2 mm	Borehole at *or nearby* CPT position	End of bore (mBGL)	Earthquake scenario SLS1 mm	Earthquake scenario ULS IL2 mm	Earthquake scenario SLS1 mm	Earthquake scenario ULS IL2 mm
201	3.26	0	4	-	-	-	-	-	-
202	3.79	0	8	**BH201**	18.0	0	0	0	8
203	5.26	9	23	-	-	-	-	-	-
204	6.76	22	57	-	-	-	-	-	-
205	7.16	43	75	-	-	-	-	-	-
206	8.46	11	57	-	-	-	-	-	-
207	11.2	0	16	-	-	-	-	-	-
208	11.55	16	62	-	-	-	-	-	-
209	12.4	10	34	-	-	-	-	-	-
210	11.14	40	78	**BH204**	16.8	0	0	40	78
211	11.92	1	16	*BH205*	18.0	0	0	1	16
212	11.68	0	10	*BH205*	18.0	0	0	0	10
213	11.26	13	60	**BH206**	18.0	0	0	13	60
214	11.48	49	78	-	-	-	-	-	-
215	12.77	0	24	**BH207**	20.4	0	0	0	24
216	11.13	1	14	*BH208*	18.0	0	0	1	14
217	11.04	5	14	-	-	-	-	-	-
218	11.84	1	31	**BH209**	18.0	0	0	1	31
219	7.88	25	65	*BH202*	20.4	0	0	25	65
220	6.64	23	55	*BH202*	20.4	0	0	23	55
221	8.74	4	30	-	-	-	-	-	-
222	11.34	15	34	-	-	-	-	-	-
223	11.33	2	21	-	-	-	-	-	-
224	10.44	0	10	-	-	-	-	-	-
225	11.55	30	66	-	-	-	-	-	-
226	11.57	1	30	-	-	-	-	-	-
227	9.96	3	29	-	-	-	-	-	-
228	14.18	28	75	-	-	-	-	-	-
229	7.97	32	74	-	-	-	-	-	-
230	12.03	13	42	*BH203*	16.8	0	0	13	42
231	11.48	19	58	-	-	-	-	-	-
232	8.91	4	30	-	-	-	-	-	-
233	3.12	4	27	-	-	-	-	-	-
234	2.52	16	30	-	-	-	-	-	-
235	6.17	1	17	-	-	-	-	-	-
236	3.9	1	58	-	-	-	-	-	-
237	11.1	0	4	-	-	-	-	-	-
Sov Palms 3	3.32	0	1	**BH8**	10.8	0	0	0	3
Sov Palms 4	6.57	6	22	-	-	-	-	-	-
Sov Palms 111	7.52	0	14	**BH7**	14.4	0	0	0	20
Sov Palms 112	8.7	0	15	-	-	-	-	-	-
Sov Palms 113	8.7	1	12	**BH6**	15.0	0	8	1	20
Sov Palms 113B	4.94	1	16	**BH6**	15.0	0	8	1	24



Figure 3 SLS1 distribution of TC1 (grey) and TC2 (yellow) settlement analysis output



Figure 4 ULS IL2 distribution of TC1 (grey) and TC2 (yellow) settlement analysis output

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7.5 Lateral spread risk assessment

The site is essentially flat and adjoins flat or slightly elevated land on three sides (west, north and south) so essentially the subdivision is not predisposed to lateral spreading in those directions. The adjoining land to the east has a ground elevation of approximately 1 to 1.5 metre below the level of the finished level of the subdivision.

CPTs 215, 216 & 217 located along the eastern margin of the site (beyond which lie the proposed stormwater retention basins) were used to assess the risk and severity of lateral spread using the method of Zhang *et al.* (2002)[15].

The results of the analysis are presented in Appendix D for the most severe earthquake scenario (ULS IL2). The results indicate that the risk of widespread lateral spread is low with the possibility of localised minor ground cracking.

In our opinion the characteristic land performance indicated by the three CPTs is for insignificant earthquake-induced lateral deformation. On this basis we consider the lateral performance of the site to fall within the requirements of Technical Category 1 land with respect to lateral spread deformation limits.

[15] Zhang, P. K. Robertson, and R. W. I. Brachman; *Estimating Liquefaction-Induced Lateral Displacements Using the Standard Penetration Test or Cone Penetration Test;* Journal of Geotechnical & Geoenvironmental Engineering, Vol. 130, No. 8, 861-871.

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7.6 Proposed provisional TC zoning

Combing the findings of the settlement and lateral spread assessment we have drawn up a proposed provisional DBH zoning plan for Sovereign Green (Figures 5a & b). The zoning is provisional to recognise that the seismic design parameters are yet to be confirmed by GNS/DBH.

The approach taken to drawing the TC boundaries was to follow lot boundaries and make sensible decisions about where the line should practically lie. For example, even though the analysis results for the test locations near the Sovereign Palms / Green boundary (CPT3, 4 and 203) indicate TC1 conditions, when drawing the TC boundary it could only sensibly lie along the Sovereign Palms / Green boundary itself.



Figure 5a Proposed provisional DBH zoning plan for Sovereign Green (with coloured-coded CPTs shown)

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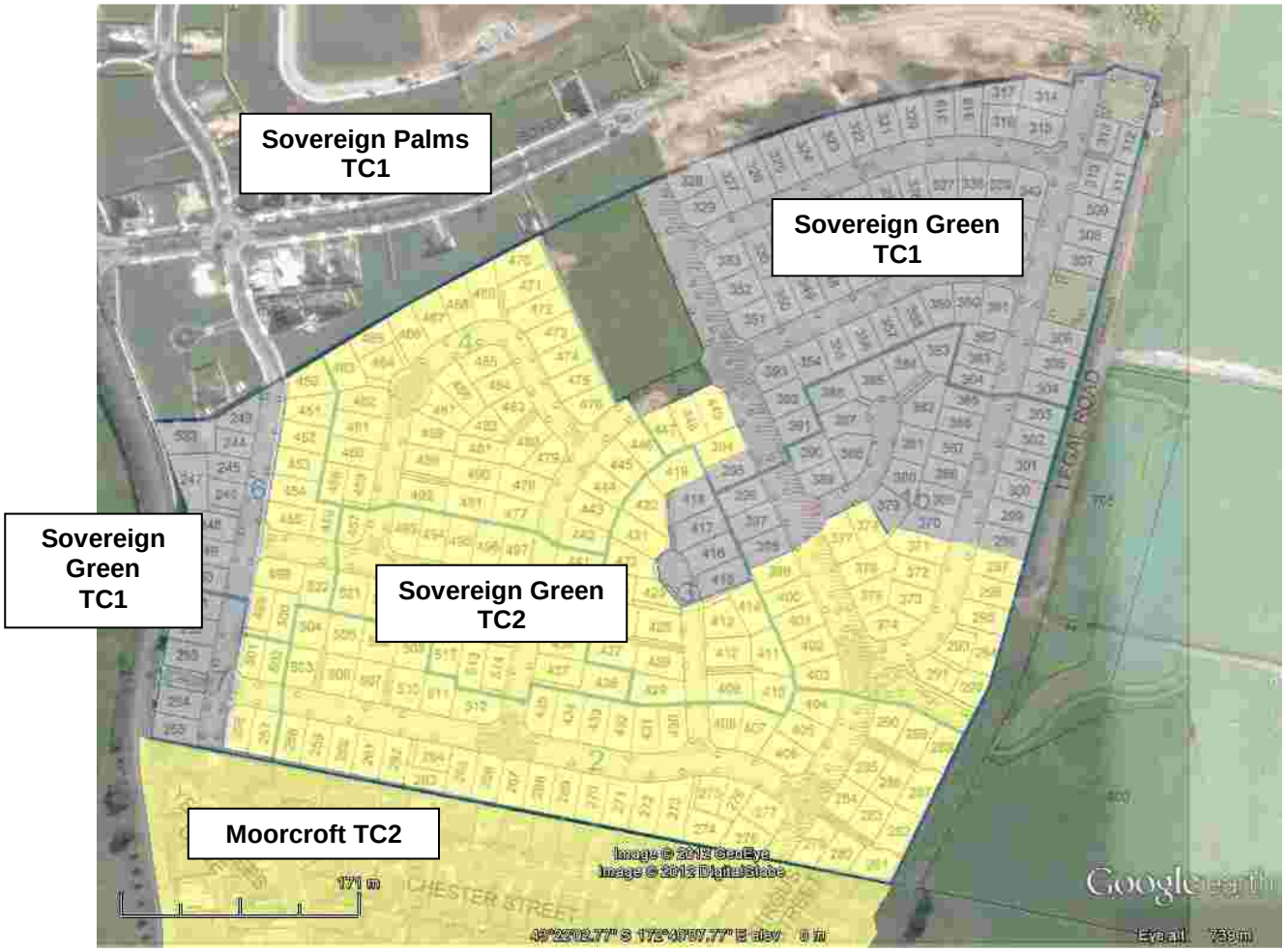


Figure 5b Proposed provisional DBH zoning plan for Sovereign Green

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8 DESIGNING FOR RESILIENCE

It is implicit in the Building Code performance requirements that structures be designed so they satisfy performance requirements for a one-off earthquake event. However, we have seen in the Canterbury earthquake sequence a significant earthquake can be followed by multiple aftershocks, with multiple seismic events causing incremental earthquake-induced land deformation.

Although a building may satisfy the performance requirements under a single Serviceability Limit State event with ensuing land deformations within the tolerable limits, the accumulative effects of aftershocks can cause land and foundation deformation to become excessive. Using a stiffer foundation system than the minimum permissible for Code compliance will provide resilience against potentially excessive cumulative deformation.

Where land is zoned TC1 homeowners can always choose more robust foundation options (e.g. as for TC2 land[16]) to provide greater structural resilience against earthquake-induced damage, noting the need to discuss this with their insurer. For example, although land on the eastern margin is at low risk of lateral spread this is an area where upgrading from a TC1 foundation to a TC2 foundation would be particularly prudent.

Where land is zoned TC2 homeowners can always choose one of the more robust TC2 foundation options to provide greater structural resilience against earthquake-induced damage, noting the need to discuss this with their insurer.

[16] http://www.dbh.govt.nz/guidance-on-repairs-after-earthquake; Section 5.3.1

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9 SUMMARY & CONCLUSIONS

This liquefaction hazard assessment report addresses two key requirements relating to earthquake-induced ground deformation:

1. Revised analysis using up-rated criteria for the Serviceability Limit State (SLS) and Ultimate Limit State (ULS) design earthquake scenarios in accordance with Department of Building and Housing advice.
2. Classification of the land in accordance with the Department of Building and Housing Technical Categories.

SLS and ULS scenarios are based on provisional revised geotechnical seismic design parameters. The report should be subject to review once GNS/DBH have confirmed the design parameters.

A detailed investigation programme with an array of piezocone CPTs and boreholes (with SPTs) was conducted across the site.

Liquefaction susceptibility and the nature of potential earthquake-induced ground deformations has been assessed using current best-practice methods generally in accordance the New Zealand Geotechnical Society's publication *Geotechnical earthquake engineering practice; Module 1 – Guideline for the identification, assessment and mitigation of liquefaction hazards* (2010).

According to Canterbury Earthquake Recovery Authority's (CERA) *Land Status Map*[17] the entire site is designated as Green Zone indicating "repair / rebuild can begin". Essentially, the *Green Zone* classification means the land has no significant issues and construction may proceed but *Technical Category (TC) 2* means the land may be subject to minor to moderate land damage from liquefaction in future significant earthquake.

Under the SLS scenario the majority of the site is classified as TC1 with a distribution of TC2 locations (Figure 3) . Under the ULS scenario there is a definable zone of land within the body of the site that is classified as TC2 with the western margin, north-east quadrant and eastern margin remaining in TC1 (Figure 4). It is consistent with the TC2 zoning of Moorcroft Subdivision to the south that a zone of TC2 land extents north into Sovereign Green.

Combing the findings of the settlement and lateral spread assessment we have drawn up a proposed provisional DBH zoning plan for Sovereign Green (Figures 5a & b). The zoning is provisional to recognise that the seismic design parameters are yet to be confirmed by GNS/DBH.

The risk of lateral spreading is low and we consider the lateral performance of the site to fall within the requirements of Technical Category 1 land.

Homeowners can always choose more robust foundation options beyond the minimum required for Code compliance to provide greater structural resilience against earthquake-induced damage, noting the need to discuss this with their insurer.

[17] Accessed in March 2012

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10 LIMITATIONS

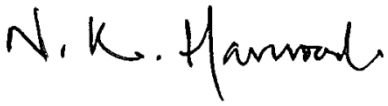
This report has been prepared solely for the use of our client, Sovereign Palms Limited, their professional advisers and the Waimakariri District Council in relation to the specific project described herein. No liability is accepted in respect of its use for any other purpose or by any other person or entity.

The opinions, recommendations and comments given in this report are result from the application of normal methods of site inspection and investigation. As factual evidence has been obtained solely from boreholes that by their nature only provide information about a relatively small volume of subsoils, there may be special conditions pertaining to this site that have not been disclosed by the investigation and that have not been taken into account in the report.

If variations in the subsoils occur from those described or assumed to exist, then the matter should be referred back to us immediately.

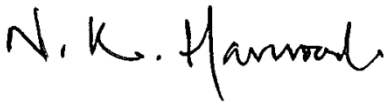
Please also refer to the following pages “Important Information About Your Coffey Report”.

For and on behalf of Coffey Geotechnics (NZ) Limited



pp S Karmacharya

MSc
Project Geotechnical Engineer



N K Harwood

BEng(Hons) MSc DIC MIPENZ CPEng
Principal

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Appendix A

Subdivision layout plan

including exploratory hole locations

(Green = CPTu; Red = Borehole)


CPT112
CPT113
BH6
CPT111
BH7
CPT4
CPT211
CPT215
BH207
CPT219
CPT207
CPT203
BH202
BH205
CPT221
CPT220
CPT3
BH8
CPT232
CPT206
CPT237
CPT222
CPT212
CPT233
CPT208
CPT216
CPT231
CPT223
BH203
CPT224
BH208
CPT201
CPT234
CPT204
CPT230
CPT225
CPT235
CPT209
CPT213
BH206
CPT226
CPT228
CPT217
CPT202
BH201
CPT229
CPT236
CPT227
CPT205
BH204
CPT210
CPT214
CPT218
BH209
Williams St
Ruby Ln
Chester St
164 m
Image © 2012 GeoEye
© 2012 Whereis® Sensis Pty Ltd
Image © 2012 DigitalGlobe
43°22'03.18" S 172°40'07.29" E elev 0 m
Google earth
Eye alt 715 m

2 May 2012

Our Ref: 354813

WAIMAKARIRI DISTRICT COUNCIL
RECEIVED 04 MAY 2012
To: Bruce

Waimakariri District Council
Private Bag 1005
Rangiora 7440

Attention: Bruce Cathro

Dear Sir

Re: Review of liquefaction hazard assessment prepared by S Karmacharya and NK Harwood of Coffey Geotechnics Ltd For Sovereign Green Subdivision Williams Street, Kaiapoi

Eliot Sinclair have been engaged by Waimakariri District Council (WDC) and Sovereign Palms Ltd to review the Liquefaction Hazard Assessment (LHA) report for the Sovereign Green subdivision in North Kaiapoi.

The LHA report, dated March 2012, was prepared by Coffey Geotechnics Ltd (Coffey) to assess the liquefaction hazard at specified levels of seismic activity.

Introduction

Coffey undertook a liquefaction hazard assessment of the entire block of land known as Sovereign Green owned by Sovereign Palms Ltd at Williams Street Kaiapoi. The subdivision is set out in eight stages and comprises some 300 allotments.

A peer review of this report is required by Waimakariri District Council as part of the subdivision consenting process.

Site Inspection

This review did not include a site inspection subsequent to the 23 December 2011 earthquake. The site was thoroughly inspected by Coffey and those inspections have been relied on in preparation of this review. The writer is familiar with the site and had inspected it and the adjacent land in November 2011 after the 4 September 2010 earthquake.

Subdivision Consent Requirements

The limits on ground movement set by the subdivision consent for a 1 in 150 year return period earthquake are:

- Maximum allowable vertical movement 100mm
- Maximum lateral movement 250mm.

Department of Building and Housing Guideline Criteria

The Department of Building and Housing[1] have now issued the Revised Guidance document. This document defines three categories for land used for residential purposes on the basis of the expected reconsolidation settlement and lateral spread movements of the land under the Serviceability Limit State (SLS) and Ultimate Limit State (ULS) earthquakes.

The peak ground accelerations associated with these Limit States are defined in Appendix C to the Guidance document[1] and are more stringent than those set by the subdivision consent conditions. Therefore any land meeting the TC1 and TC2 criteria will meet the subdivision consent criteria and it is not necessary to separately assess the land for the subdivision consent criteria.

Coffey Report Criteria

The Coffey Report dated March 2012 was prepared on the basis of the best available peak ground accelerations (pga) at that time. Work by GNS has since revised the pga's for liquefaction analysis as follows:

	Peak ground accelerations (g, m/s²)	
	Coffey Report March 2012	DBH Guidance Document 27 April 2012
SLS	0.15	0.13
ULS	0.49	0.35

It can be seen that the Coffey pga's are conservative and may slightly over predict settlements and lateral spread especially for the ULS condition.

However examination of the liquefaction analysis data in the Coffey report indicates that this will have almost no effect except at the south west corner of the subdivision where on the basis of the updated pga's, re-calculation may reduce the area of TC2 land slightly.

Canterbury Earthquake Sequence

Coffey have not compared the ground shaking experienced in the September 2010 and February 2011 earthquakes with the above figures.

The nearest seismograph is at Kaiapoi North School where the peak ground acceleration recorded for the 4 September 2010 M_w 7.1 earthquake was 0.41g.

The peak ground acceleration was recorded for the Magnitude M_w 6.3 earthquake on 22 February 2011 was 0.23g.

[1] *Department of Building and Housing publication "Revised Guidance on repairing and re-building houses affected by the Canterbury earthquake sequence, prepared November 2011 and Appendix C dated 27 April 2012*

As the magnitudes were not as great as the design magnitude of M_w 7.5 it can only be stated that the land was subject to close to the design earthquake pga's during these earthquakes and according to the Coffey report was not subject to liquefaction damage.

Analysis Methods

The software used by Coffey in the analysis contains a number of options to select methods of analysis. These are partially stated in the Coffey report and may not fully comply with the latest methods stated in the recently issued DBH document Appendix C. However our experience to date is that any differences will be minor and will not affect the validity of the Coffey Liquefaction Hazard Analysis.

Density of Testing

The Department of Building and Housing have issued a document which sets out the density of testing appropriate for subdivision in the Canterbury Region[2].

The recommended density is 0.25 tests per lot which equates to 75 tests on a subdivision of 300 lots.

The testing undertaken by Coffey included 43 deep tests and falls short of the recommended number. However the document allows the geotechnical engineer some discretion when conditions are relatively uniform and liquefaction potential is not high.

In this subdivision the conditions are relatively uniform and there is a good spread of testing over the site. None of the tests approach the maximum allowable ULS settlement for TC2 land of 100mm, the maximum predicted settlement being 78mm and on this basis we consider that the number of tests, although on the low side adequately characterises the land and the liquefaction potential.

Liquefaction Hazard Assessment

The Liquefaction Hazard Assessment graphs included in Appendix D of the Coffey report demonstrate that for the SLS earthquake the land has only a low probability of liquefaction.

For the ULS earthquake some tests indicate liquefaction potential at the upper end of the high risk range. However it must be noted that the ULS analysis has been done on the basis of a pga of 0.49g whereas Appendix C of the DBH document sets this at 0.35g. If the data was re analysed we would expect the high risk sites to lie about the middle not the top of the high risk range.

As a result of our review of the Liquefaction Hazard Analysis and the zoning of the TC2/TC3 land we are satisfied that the zoning shown on Figure 5a and 5b of the Coffey report is appropriate and will form an adequate basis for determining the extent of additional shallow investigation for foundation design at building consent stage.

Lateral Spread Analysis

Coffey in the report note that the eastern margin of the block would be the most susceptible to lateral spread. They therefore analysed the tests along this boundary and

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[2] *Department of Building and Housing publication "Guidelines for the geotechnical investigation and assessment of subdivisions in the Canterbury Region", prepared 14 November 2011*

found only very low predicted lateral spreads under the ULS earthquake of 0.49g. As noted earlier this pga is conservative. Further as the south east corner of the site is zoned TC2 the foundations provided in this area will be more resilient and better able to withstand any minor lateral spread movements.

Conclusion

An extensive investigation has been undertaken to assess the Sovereign Green subdivision for liquefaction hazard using current best practice techniques. On the basis of this investigation Coffey have zoned the area TC1 and TC2 in accordance with the settlement and lateral spread criteria set out in the DBH document[1].

Individual shallow site investigations will be required for the TC2 land but a range of recommended foundation types are set out in the DBH guidance document for this zone. Investigations and Foundations in the TC1 zone will only need to meet the requirements of the NZS 3604:2011 "Timber framed buildings".

We are satisfied on the basis of our review that the TC1/TC2 zoning is appropriate to the soil condition underlying the site.

Yours sincerely
ELIOT SINCLAIR & PARTNERS LTD

Marton Sinclair
mds:tlc

Limitations

This review has been prepared solely for the WDC and Sovereign Palms Ltd in order to assist them in setting Building Consent conditions for the Sovereign Green subdivision and to satisfy the subdivision consent conditions.

No liability is accepted in respect of its use for any other purpose or by any other person or entity.

The opinions recommendations and comments given in this review result from our assessment of the test results and reporting undertaken by Coffey Geotechnics Ltd in the Liquefaction Hazard Assessment. The limitations as described in Section 10 of the Coffey Geotechnics Ltd Liquefaction Hazard Assessment also apply to this report.

Report on Groundwater Monitoring at Closed Waimakariri District Council Landfills for 2025

Prepared for

Waimakariri District Council

October 2025

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Level 2, 134 Oxford Terrace
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PO Box 389, Christchurch 8140, New Zealand

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Website http://www.pdp.co.nz

Quality Control Sheet

TITLE	Report on Groundwater Monitoring at Closed Waimakariri District Council Landfills for 2024
CLIENT	Waimakariri District Council
ISSUE DATE	29 October 2025
JOB REFERENCE	C05648

Revision History

REV	Date	Status/Purpose	Prepared By	Reviewed by	Approved
1	28/10/2025	Draft	Finn Seeds	Nic Love	Neil Thomas
2	29/10/2025	Final	Finn Seeds	Nic Love	Neil Thomas

DOCUMENT CONTRIBUTORS

Prepared by

SIGNATURE



Finn Seeds

Reviewed by

SIGNATURE



Nic Love

Approved by



Neil Thomas

Limitations:

This report has been prepared by Pattle Delamore Partners Limited (PDP) on the basis of information provided by the Waimakariri District Council and others (not directly contracted by PDP for the work). PDP has not independently verified the provided information and has relied upon it being accurate and sufficient for use by PDP in preparing the report. PDP accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the provided information.

This report has been prepared by PDP on the specific instructions of the Waimakariri District Council for the limited purposes described in the report. PDP accepts no liability if the report is used for a different purpose or if it is used or relied on by any other person. Any such use or reliance will be solely at their own risk.

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Executive Summary

The 2025 Waimakariri District Council closed landfills sampling rounds were conducted in April and September 2025. Samples were taken from bores over four sites: Mandeville North, Rangiora, Oxford and Kaiapoi.

A table summarising exceedances of the Drinking Water Standards for New Zealand from the 2025 monitoring results and trends is provided below (Table 1).

The primary indictors for leachate seepage were manganese, iron, hardness, chloride, and arsenic. pH was excluded as a primary leachate indicator as the pH of Canterbury ground waters are often below the drinking water aesthetic values (AV) range due to natural recharge processes. The 2025 sampling results were compared to the Maximum Acceptable Values (MAV) set by the Water Services (Drinking Water Standards for New Zealand) Regulations 2022 and AVs set by the Aesthetic Values for Drinking water Notice 2022 (Taumata Arowai); and also compared to the historical data to identify the continuation, or development of any trends in groundwater quality.

It was found that the groundwater quality at Mandeville and Oxford was good, with no obvious effects related to leachate seepage. The same is also true for Rangiora with only occasional exceedances of aesthetic AVs for manganese and iron, however results from monitoring bore M35/10956 (which replaced M35/8705) are variable. However, this bore is located cross gradient from the landfill, so there may be other effects impacting the results from this bore.

As with previous years, the results from Kaiapoi are more variable and provide the greatest evidence of the presence of a leachate plume in relatively close proximity to the landfill site. Bore M35/6670 is adjacent to the closed landfill: an exceedance was recorded of the MAV for manganese in September, and for aesthetic AVs for iron in both 2025 monitoring rounds, and hardness in both 2025 monitoring rounds. At bore B24/0829, which is also in close proximity to the closed landfill site, an exceedance was recorded for the MAV for manganese in September and for the aesthetic AV for iron in both April and September. Exceedances of the aesthetic AV for iron were recorded at BW24/0209 in April and September, and no exceedances were recorded at BW24/0208 in the 2025 sampling rounds.

While exceedances of the recreational use and ANZG REC code guidelines have occurred at the Kaiapoi Lakes, they are infrequent and exceedances for the majority of parameters have generally been small. The recreational use water quality guidelines are primarily for the ingestion of water which typically occurs during swimming. Provided that no swimming occurs in the lake, brief contact

with the water arising from fishing and model boating is unlikely to cause adverse effects.

Exceedances of the ANZG values are unsurprising given the urban surroundings and given only monitor exceedances have occurred the waterways appear to be of reasonably good quality in comparison to these guidelines.

Based on the water quality data collected to date it is likely that a leachate plume exists underneath the Kaiapoi Closed Landfill extending in a general south-easterly direction and primarily indicated by elevated iron and manganese concentration, although given that these parameters can also occur naturally, the extent of any leachate effects is uncertain.

Results from the 2025 sampling round showed detections of several previously identified compounds, including the first exceedance of the laboratory detection limit for 1,2,4-Trimethylbenzene across all four landfills. In addition, some monitoring sites recorded first detections of toluene, which has been observed at other locations in earlier rounds. While the presence of these parameters may be an indication of leachate, it is difficult to determine whether this is the source of such contaminants. Given these parameters were reasonably consistent across the different sites and all occurred during the same sampling round, and occurred at sites that are not showing any other indicators of landfill leachate in the monitoring data, it is considered possible that these detections may be false. Continued monitoring is recommended to establish any long-term concentration trends for these compounds.

In light of previous styrene detection at a number of sites that occurred between 2020 and 2023, PDP investigated these detections via a concurrent sampling round during the September 2024 round at Oxford, Mandeville and a cleanfill site owned by WDC. The results indicated that the most likely source of styrene detected on chromatograms during the September 2024 sampling round was from the sampling equipment or sampling procedures being used. It is recommended that any future sampling strictly adopts the procedures outlined in the NEMS guidelines, including decontamination of all sampling equipment between sites, replacement of tubing and checking for stabilisation of field parameters prior to sample collection. Care should also be taken to exclude any contaminant sources from the immediate work area such as generators, which should be placed as far away from the bores as possible and down wind. Future sampling would benefit from the collection of both equipment rinsate blanks (to check for VOC's within the sampling equipment) and field blanks (to check for VOC sources in the wider vicinity during sampling).

Table 1: Summary of 2025 Monitoring Round Exceedances of NZ Drinking Water Standards (excluding pH)[1]

Site	Bore ID	Leachate indicator	Units	April 2025 Value	September 2025 Value	MAV for health **Ecosystem	AV **recreational use	Trend/comment
Mandeville	-	-	-	-	-	-	-	No leachate indicators exceeded Drinking Water Standards for New Zealand
Rangiora	-	-	-	-	-	-	-	No leachate indicators exceeded Drinking Water Standards for New Zealand
Oxford	-	-	-	-	-	-	-	No leachate indicators exceeded Drinking Water Standards for New Zealand
Kaiapoi	M35/0829	Iron	g/m³	12.50	12.90	*	0.3	Stable but fluctuating
Kaiapoi	M35/0829	Manganese	g/m³	NR	0.41	0.4	0.04	Fluctuating
Kaiapoi	M35/6670	Manganese	g/m³	NR	1.60	0.4	0.04	Fluctuating but decreasing
Kaiapoi	M35/6670	Iron	g/m³	5.40	7.60	*	0.3	Stable but fluctuating
Kaiapoi	M35/6670	Hardness		310	282	*	200	Fluctuating but decreasing
Kaiapoi	M35/6670	Vinyl chloride	g/m³	NR	0.0018	0.0003	-	Stable but fluctuating

Table 1: Summary of 2025 Monitoring Round Exceedances of NZ Drinking Water Standards (excluding pH)[1]

Site	Bore ID	Leachate indicator	Units	April 2025 Value	September 2025 Value	MAV for health **Ecosystem	AV **recreational use	Trend/comment
Kaiapoi	M35/6670	Arsenic	g/m^3	NR	0.024	0.01	-	Stable but fluctuating
Kaiapoi	BW24/0209	Manganese	g/m^3	NR	0.145	0.4	0.04	Fluctuating but decreasing
Kaiapoi	BW24/0209	Iron	g/m^3	4.2	10.1	*	0.3	Stable but fluctuating

Notes:

*Blue= Aesthetic GV exceeded; Red= MAV for health exceeded; NR= Not Recorded (no value provided for this parameter); *= No guideline limit set; **= ANZECC Freshwater Quality Standard guidelines for the 95% protection of the aquatic species and the recreational use water quality guidelines.*

1. pH is excluded from this comparison as it is often naturally below the NZDWS GV due to natural groundwater recharge processes.

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DRAFT

1.0 Introduction

This report has been prepared by Pattle Delamore Partners Limited (PDP) for Waimakariri District Council (WDC) in order to provide a review of the groundwater and surface water data following the 2025 monitoring period at the four closed landfills within the Waimakariri District. This monitoring is undertaken at the following former landfill sites, which are the subject of the following consents issued by Environment Canterbury (ECan):

- Mandeville North (Consent No. CRC971350)
- Rangiora (Consent No. CRC971344)
- Oxford (Consent No. CRC971353)
- Kaiapoi (Consent No's. CRC971356, replaced by CRC152074)

As required under the conditions listed for these discharge consents, WDC have commissioned PDP to prepare this report to detail the groundwater and surface water monitoring data, and to provide a summary and interpretation of the information. This report is an update to the previous report dated October 2024 (PDP).

2.0 Compliance with Consent Conditions

As required under the discharge consent conditions, associated with each of the four closed landfills, groundwater monitoring is also carried out at each of the sites and surface water monitoring is also carried out at the Kaiapoi site. The number and location of monitoring bores is unique to each site, although both the frequency of sampling and the required parameter for analysis at each sample location are common between the consents for all four of the closed landfills.

2.1 Environmental Monitoring Requirements and Well Details

2.1.1 Sampling Requirements

Conditions for each of the landfill discharge consents require that samples be collected twice yearly during the first three years (2000-2002), with the samples being collected during February/March and July/August. After three years of the twice-yearly sampling, the ongoing monitoring is to be carried out annually. WDC has chosen to continue collecting samples twice annually (except for 2007 when one sample was collected). The 2025 sampling rounds were carried out in April and September.

The relevant conditions state that:

a) Sampling undertaken during February/March 2000, July/August 2001, February/March 2002 and after November 2002 should be analysed for determinand Suite 1 (Appendix B-1). All metal concentrations should be measured after the sample has been passed through an acid washed 0.45 micron filter.

b) Sampling undertaken during July/August 2000, February/March 2001 and July/August 2002 should be analysed for determinand Suite 2 (Appendix B-1).

The required sampling regimes are summarised on Appendix B-2.

WDC have carried out sampling since it commenced in June 2000. The WDC staff report that all groundwater samples taken from the four sites have been collected after the associated monitoring bore has been purged by pumping for around 15 minutes to allow for a representative groundwater sample to be collected. The surface water samples collected from Kaiapoi Lakes were taken directly from the lake using a bailer.

2.1.2 Mandeville Landfill

Monitoring bore M35/8707 was installed down gradient of the landfill area for the purposes of monitoring the groundwater in accordance with the location suggested in consent CRC971350. The bore was installed by Clemence Drilling Contractors under the direction of WDC staff and was constructed of 100mm diameter casing and screened from 0.7 to 8.4 m below ground level (bgl). No groundwater sample was taken during the September 2001 or March 2006 sampling rounds as the monitoring bore was dry. As a consequence of this a replacement bore was installed in October 2006.

The new bore, M35/11503, was installed by Clemence under WDC staff direction, and is constructed of 100mm diameter stainless steel casing and is screened from 23.5 to 25.5 m below ground level. This bore continued to be referred to as M35/8707 in this report up until the 2015 monitoring rounds.

Subsequently, a replacement shallow bore, BW23/0386, was installed in May 2016 by East Coast Drilling, which is 12 m deep and screened from 3 to 12 m bgl. This bore was installed in order to better sample shallow groundwater down gradient of the landfill most likely to be affected by landfill leachate and also continues to be referred to as M35/8707 in the report.

2.1.3 Rangiora Landfill

Monitoring bores M35/8705 and M35/8706 were installed at the landfill margin for the purposes of monitoring groundwater in accordance with the locations suggested in consent CRC971344. Both bores were installed by Clemence under the direction of WDC Staff and are constructed of 100mm diameter casing and screened from 0.7 to 8.2m bgl. Both bores have been sampled at twice yearly intervals since June 2000 except for bore M35/8705 which could not be sampled in 2005 due to vandalism. The bore was replaced in 2005 by a new bore, M35/10956 which is screened from 3.9 to 7.9m bgl. Sampling began in this new bore in 2006. However, in 2010, this bore was also vandalised and was replaced in April 2010 with sampling resuming in May 2010. The new bore continues to be referred to as M35/8705.

A second new bore, M35/10957, was drilled in late 2005 in accordance with the conditions in consent CRC971344. M35/10957 is located adjacent to Maria Andrews Park, south of the closed landfill and the major stormwater drain that is the outlet for Rangiora's North Drain, which serves the Northern catchment of Rangiora. M35/10957 is constructed of 100mm diameter casing and screened from 5.7 to 11.7m bgl. Monitoring began in March 2006.

2.1.4 Oxford Landfill

Monitoring bore L35/0668 was installed down gradient of the landfill area for the purposes of monitoring the groundwater in accordance with the location suggested in consent CRC971353. The bore was installed by Clemence Drilling under the direction of WDC staff. It is constructed of 100mm diameter PVC casing and is screened from 0.1 to 12.0 m bgl. No groundwater sample was taken during March 2001 or August 2005 sampling rounds as the monitoring bore was dry. This bore was replaced in 2006 by L35/0886, a 100mm diameter bore with a stainless-steel casing, but continues to be referred to as L35/0668 throughout this report. This bore was installed under the direction of WDC staff and is constructed of 100mm diameter stainless steel casing and is screened from 17.1 to 23.1 m bgl.

Subsequently, a replacement shallow bore, BW22/0084, was installed in May 2016 by East Coast Drilling, which is 16m deep and screened from 3 to 16 m bgl. This bore was installed in order to better sample shallow groundwater down gradient of the landfill most likely to be affected by landfill leachate and also continues to be referred to as L35/0668 in the report.

2.1.5 Kaiapoi Landfill

Since monitoring began at the Kaiapoi Closed landfill site in 2000, there have been a number of changes to the bores monitoring at the sites and this has been detailed below.

Table 2: Details of Kaiapoi Landfill Monitoring Bores

Bore Numbers	Descriptions	Bore depth (m bgl)	Current Status
M35/9282[1]	Moore Cowshed	Unknown	Removed – No longer monitored
M35/5599[3]	Ryan 1 Cowshed	15.4	Removed – No longer monitored
M35/0507[2]	Ryan 2 Back Shed – pine trees	24.7	Removed – No longer monitored
M35/0770[3]	Ryan 3 Trough by house	63.7	Removed – No longer monitored
M35/0829 (M35/18473)	Ryan 4 Green Shed	17	Existing – Currently monitored
M35/6670 (M35/18472)	Ryan 5 North	25	Existing – Currently monitored
BW24/0208[4]	34 Magnate Drive	7.05	Existing – Currently monitored
BW24/0209[4]	22a Monarch Boulevard	7	Existing – Currently monitored

Notes:

1. *Bore removed in 2003; 2. Bore removed in 2011; 3. Bores removed in 2012; 4. Bores installed in 2014.*

After the removal of M35/9282 in 2003 which ECan had monitored up to this point, WDC agreed to begin sampling M35/6670 in place of M35/9282.

Development of the Sovereign Palms subdivision has resulted in monitoring bores M35/6670 and M35/0829 no longer being available for sampling. Two new monitoring bores were installed in December 2010 by Clemence under the direction of the WDC. The bores were numbered as M35/18472 (approximately 50m east of M35/6670) and M35/18473 (approximately 100m north-east of M35/0829). Both new bores are referred to as M35/6670 (M35/18472) and M35/0829 (M35/18473) respectively throughout this report due to proximity of the new bores to the ones they replaced. It should also be noted that the new bores were drilled to the same depth as the bores that they have replaced. This also provides a continuous record of data for the areas the bores are located in. Sampling began in the two new bores in 2011.

Ongoing subdivision work at the Sovereign Green development (immediately South of Sovereign Palms development) has resulted in the loss of bores M35/0507, M35/5599 and M35/0770.

M35/0507 was last sampled in September 2011 before being removed. M35/5599 and M35/0770 both had final samples collected from them in March 2012 before being removed. To replace these three bores, two new bores (BW24/0208 and BW24/0209) have been installed in mid-2014 to a depth of 7m. These have been placed on a WDC reserve to ensure their longevity. Sampling of these bores began in September 2014.

Sampling at the Kaiapoi site has historically been undertaken in accordance with resource consent CRC971356. However, with the removal of a number of monitoring bores at the site, consent CRC971356 was terminated and replaced with resource consent CRC152074 on 2 October 2014 to reflect sampling from the two remaining existing bores (M35/0829 (M35/18473) and M35/6670 (M35/18472) and the two new monitoring bores (BW24/0208 and BW24/0209) installed at the site during September 2014. The location of the Kaiapoi monitoring bores as described in CRC152074 have been approved by ECan and are displayed on Figure 4, Appendix A. Figure 4 also shows the locations of the historical bores that have subsequently been removed.

In addition to groundwater sampling, both the original consent CRC971356 and the replacement consent CRC152074 require collection of surface water samples from Eastern Kaiapoi Lake. Surface water samples have been collected in accordance with both CRC971356 since August 2000 and CRC152074 since October 2014. It is worth noting that historically the samples have been collected from the western side of the lake, but more recently samples have been collected from the eastern side due to ease of access. It is considered reasonable to assume that the Eastern Kaiapoi Lake is reasonable well mixed, and alternation of the sample collection location is not expected to have any noticeable effects on the water quality results collected from the lake.

It is worth noting that Condition 1 of both these resource consents stipulates that samples must be collected from four groundwater monitoring bores along with one surface water sample from the Eastern Kaiapoi Lake twice yearly for the first three years and annually, thereafter. However, WDC have continued to sample twice yearly since the commencement of the consents for the Kaiapoi site.

3.0 Water Quality Standards

The results of groundwater sampling described in Section 3 of this report have been compared to the Water Services (Drinking Water Standards for New Zealand) Regulations 2022 and the Aesthetic Values for Drinking Water Notice 2022. These regulations came into force on 14 November 2022 under the Water Services Act 2021, and revoke and replace the Ministry of Health New Zealand Drinking

Water Standards 2005 (Revised 2018) (NZDWS, MoH 2005). Previous reports compared volatile organic compounds (VOC) to the NZDWS 2000 values (Table 14.3). For consistency, this has subsequently been updated to the VOC values listed in the DWSNZ 2022 (Table 3). We note the reports produced between 2018 and 2022 compared results to the NZDWS 2018 revisions, and reports prior to 2018 compared results to the NZDWS values that were revised in 2008. However, there was no change to the maximum acceptable values (MAV) and guideline values (GV) provided in the 2018 revision.

The DWSNZ provide a MAV which represents the maximum acceptable concentration for human health. In addition, the Aesthetic Values for Drinking Water Notice 2022 also provide aesthetic values which specify minimum or maximum values for determinands that may render water unattractive to consumers, such as appearance, taste, or odour. The new standards set updated MAVs for boron (2.4 mg/L) and nickel (0.08 mg/L), and a new aesthetic value for iron (0.3 mg/L).

The surface water samples from Eastern Kaiapoi Lake have previously been compared against the Australia and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC; 2000). However, these guidelines have now been updated in 2018 to the ANZG (2018) default guideline values.

The ANZECC guidelines were updated in August 2018 (referred to throughout this report as the ANZG 2018) to incorporate a more ecoregion context to guideline values for New Zealand's fresh waters. For physio-chemical parameters, sites are now categorised by their River Environment Classification code (REC; Snelder and Biggs, 2002). This code now relates to a specific regional set of water quality guideline values that were determined through multivariate modelling of chosen reference sites. It should be noted that these guideline values represent the 80th percentile values from the reference sites. Therefore, exceedance of these values indicates that the site is impacted by anthropogenic land-use, which in the case of Kaiapoi Lakes, would be unsurprising. As a result, the ANZG guideline values for the 95th percentile values have also been included, which are identical to the previous ANZECC 95th percentile guidelines for the sampled parameters. The ANZECC guideline values for recreational use have also been included, consistent with previous monitoring reports.

The waterways feeding the Kaiapoi Lakes have a River Environment Classification code of 'cool dry low-elevation'.

The results for each sampling location together with the relevant drinking water standard values are detailed in Appendix C-1 to C-14 of Appendix C.

The results shown in these tables are described for each landfill site in the following sections. Sampling for the more extensive set of determinands as described in Suite 1 (Appendix B-1) are discussed. Also included is a full analysis for volatile and semi-volatile organic compounds. Ion balances have not always been

determined in the laboratory, but they have been calculated for all data collected to date as it is required under the consent conditions for each closed landfill site. Note that in some sampling rounds not all the major cations and anions were analysed for, which prevents an accurate assessment of ion balances. The calculated ion balances for all sites are included in Tables C-1 through to C-14 in Appendix C.

4.0 Summary of Groundwater Quality Trends

4.1 Mandeville

Typically, historical sampling rounds at Mandeville have shown contaminant concentrations below the respective MAV or AV, with the exception of pH, which at times continues to be recorded below AV of 7 to 8.5 for the field data. Measurements of pH undertaken in the laboratory have been within the AV range since the September 2019 monitoring round but dropped below the AV range during the September 2024 round. For both the April and September 2025 rounds the laboratory pH was recorded below the AV range.

The hardness reading of 80.4, below the AV, was measured in April 2022 and is the highest reading recorded to date. The hardness results have decreased over subsequent monitoring rounds, although did slightly increase with the latest value recorded in September 2025 at 69.6, which is within the historical range.

Detections of styrene have occurred in September 2020, September 2021 and September 2023, which may be an indicator of landfill leachate. However, no styrene was detected during the 2024 and 2025 sampling rounds.

The results of the September sampling round reported the detection of two other aromatic compounds. Toluene was detected at a concentration of 0.0003 mg/L below the MAV and 1,2,4-Trimethylbenzene, which has no MAV or AV value, was also detected at a concentration of 0.0003 mg/L. This is the first detection of both compounds in the Mandeville Landfill bore. Further discussion around the VOC detections is provided in Section 5.5.

All other parameters were recorded below the respective AV and MAVs. Notably, manganese, nickel and dissolved iron remained below the laboratory limit of detection in the most recent monitoring rounds (Appendix A-6). Ammoniacal nitrogen has not been recorded above the laboratory limit of detection since September 2016.

Overall, most indicators typical of landfill leachate are not present in elevated concentrations, and all other inorganic determinands analysed comply with the DWSNZ MAV for the protection of human health and AV for aesthetic water quality with the exception for a single manganese sample collected in September 2006 which recorded a concentration above the AV.

A complete table of monitoring results at Mandeville is provided in Appendix C-1.

4.2 Rangiora

Contaminant concentrations generally remained below the relevant MAV and AV for each parameter during the 2025 monitoring round.

Bore M35/8705, which has generally recorded lab pH values above the AV in the past, has recorded values within the AV range in all monitoring rounds since September 2016. Field pH was recorded within the AV in bore M35/8705 since September 2018 (Figure 5), more recently readings have fluctuated within and below the AV range (within the historical range). In the 2025 sampling rounds field pH was recorded above the AV range in April and below the AV range in September (within the historical range).

Bore M35/8706 continued to record field pH slightly below the AV range in the April 2025 sampling round with a result of 6.15 and decreased further in September 2025 to 5.91, below the AV range. Laboratory pH readings were within the AV range during the 2025 sampling rounds. The 2025 pH values, for both field and laboratory measurements, are within the historical range in this bore.

Bore M35/10957 show field pH readings below the AV for both the April and September 2025 rounds with a reading of 6.86 and 6.52 respectively. Laboratory measured pH has remained within the AV since April 2020, but dropped just below the AV in September 2025 with a reading of 6.9.

Iron (Figure 6) concentrations in all Rangiora bores (M35/8705, M35/8706 and M35/10957) generally remain below the AV of 0.3 g/m^3 since 2012 and appear to remain stable, with the exception of Bore M35/8705 in 2017 which recorded one exceedance of the AV. Manganese concentrations (shown in Figure 7) in bores M35/8706 and M35/10957 are also below the respective AV of 0.04 g/m^3 with a stable trend. However, exceedance of the AV for manganese occurred in bore M35/8705 during the September 2017, 2019, 2021 and 2022 monitoring rounds. Manganese concentrations in bore M35/8705 have decreased since the 2017 exceedance with the September 2025 result of 0.024 g/m^3 below the AV. The historical manganese exceedances of the AV are well below the MAV and are within the historical range of values recorded in this bore.

Overall, the sampling indicates that the groundwater quality in the Rangiora Closed Landfill monitoring bores generally appears to be stable and is of good quality. Iron and manganese concentrations in M35/8705 remain variable from September 2017 through September 2025 however iron has not exceeded the AV since September 2017. The historical exceedances of the AV for these parameters indicates that the landfill may have impacted groundwater quality on occasions. However, in recent years groundwater quality in M35/8706, and M35/10957 has been good, while parameters in M35/8705 remain variable.

These results together with the bores location across gradient to the closed landfill suggests the results are unlikely a result of leachate, and there may be other effects impacting the results from this bore.

Detections of toluene and 1,2,4-Trimethylbenzene were reported in bore M35/8705 and in bore M35/10957 during the September 2025 monitoring round. Toluene has previously been recorded in M35/10957 on one other occasion in September 2018 and in September 2022 round at M35/8705, but this is the first detection of 1,2,4-Trimethylbenzene in either bore. Detections of styrene have occurred in some bores between 2020 and 2023, which may be an indicator of landfill leachate. However, no styrene was detected during either the 2024 and 2025 sampling rounds. Further discussion around the historical and recent VOC detections is provided in Section 5.5.

A complete table of monitoring results at Rangiora is provided in Appendix C-2 to C-4.

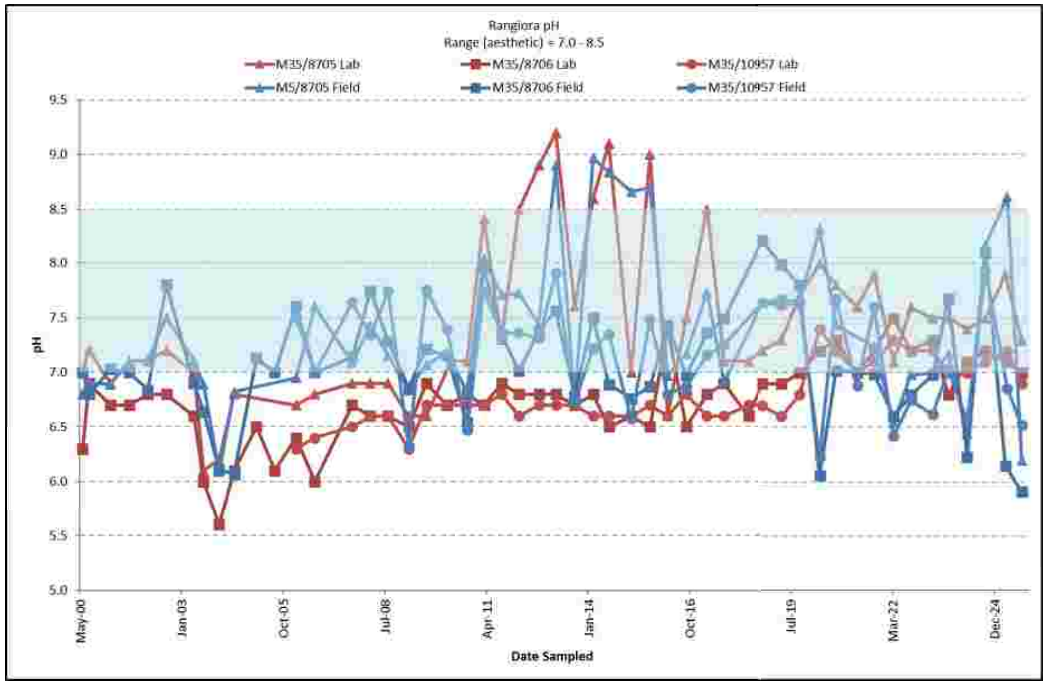


Figure 5: Laboratory and field measured pH values at Rangiora Closed Landfill (2000-2025)

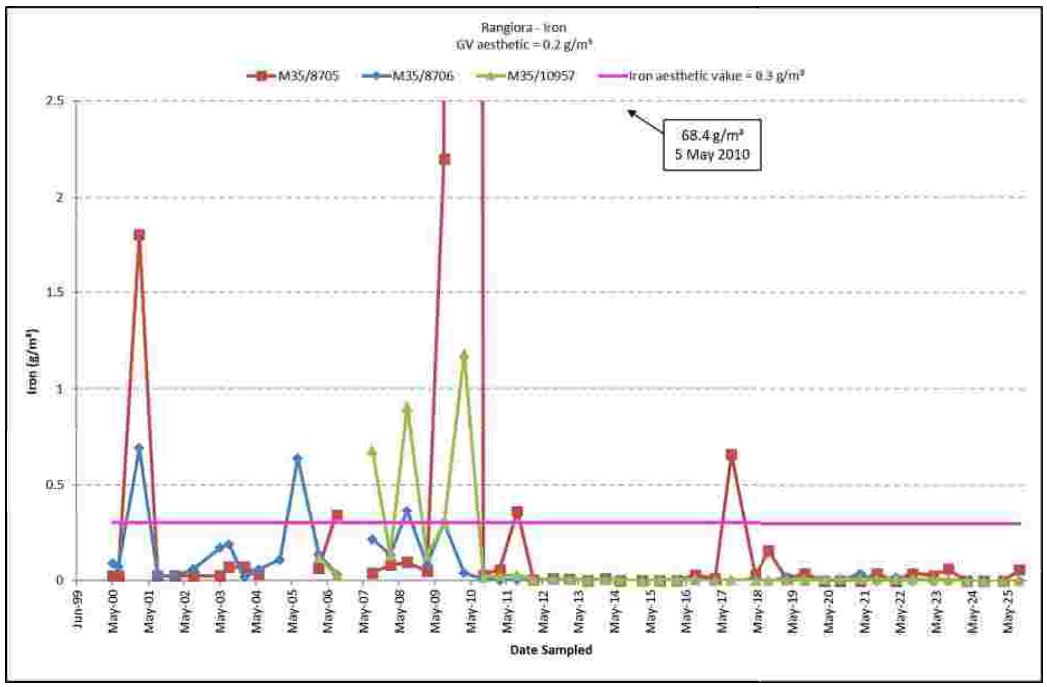


Figure 6: Iron concentrations at Rangiora Closed Landfill (2000-2025)

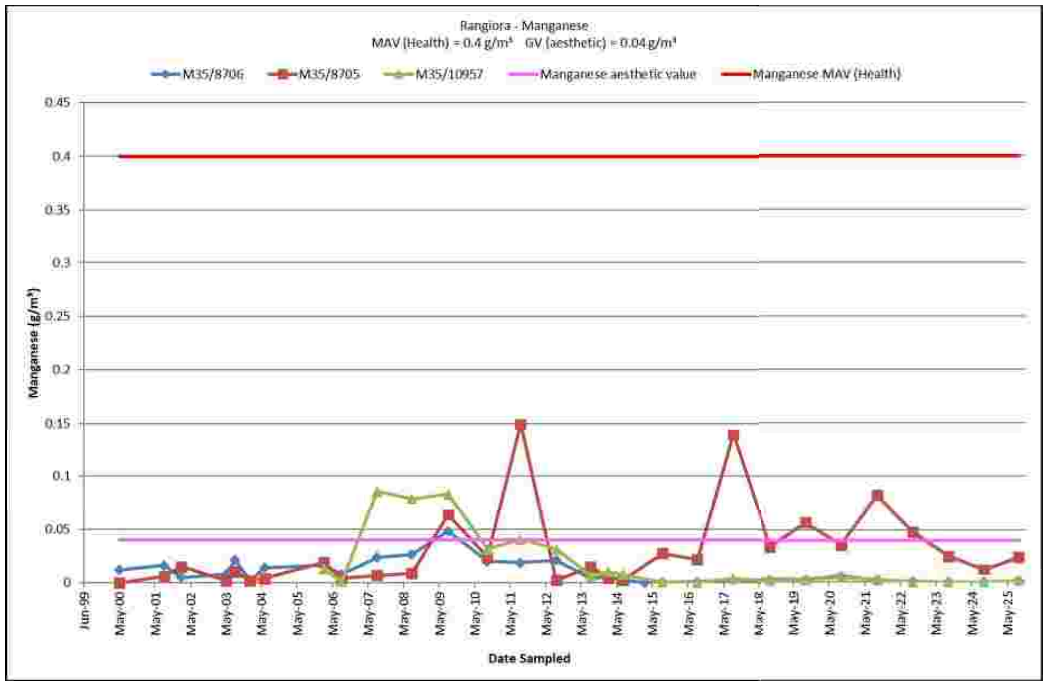


Figure 7: Manganese concentrations at Rangiora Closed Landfill (2000-2025)

4.3 Oxford

The majority of contamination concentrations since the previous sampling rounds remain consistently below their respective MAV and AV. Laboratory pH prior to 2020 was recorded consistently below the AV range, since then it has fluctuated and remained within range during the April 2025 monitoring period but fell below the range in the September 2025 round (Appendix A-7). Field pH was not recorded for the April 2025 round and in September 2025 was recorded at a value of 5.9, which is the lowest value recorded at the Oxford landfill bore. Iron and Manganese concentrations are stable below the AV (Appendix A-8). Ammoniacal Nitrogen levels increased to 0.22 g/m³ (but below AV of 1.5 g/m³) in April 2018 and dropped to below detection limits for eight subsequent sampling rounds (Appendix A-10). In September 2022 ammoniacal nitrogen concentration in bore L35/0668 increased to 0.118 g/m^3 with the 2023 monitoring results fluctuating up to 0.145 g/m^3. In 2025, ammoniacal nitrogen dropped to below the detection limit in both sampling rounds.

A low-level detection of carbon disulphide (0.0006 mg/L) occurred during the September 2024 sampling round which was the first detection of this parameter at any of the closed landfills, however, this was not detected in the 2025 sampling. Additionally, detections of toluene (0.0003 mg/L) and 1,2,4-Trimethylbenzene (0.0003 mg/L) were recorded in the September 2025 sampling round which was the first detection of both parameters at the Oxford closed landfill. Monitoring will continue to determine if these low level detections persist, noting the detection is only just above the trace level limit of detection. Detections of styrene have occurred between 2020 and 2023, which may be an indicator of landfill leachate. However, no styrene was detected during the 2024 and 2025 sampling round. Further discussion around the historical and recent VOC detections is provided in Section 5.5.

Since the installation of a replacement bore in October 2005 there has been a noticeable drop in iron concentrations with only two exceedances of AV occurring in 2008 (Appendix A-8) and none since.

Overall, pH has decreased this round, and the sampling indicates that the groundwater quality down gradient of the Oxford Closed Landfill is generally good. Continuing to test groundwater in future years will determine whether intermittent and low level VOC concentrations persist.

A complete table of monitoring results at Oxford is provided in Appendix C-5.

4.4 Kaiapoi

Overall, the monitoring results in the bores downgradient of the landfill suggest that the landfill is continuing to have an impact on groundwater quality.

A total of four monitoring bores have been monitored during the 2025 monitoring period, including two of the existing (M35/0829 and M35/6670) bores and two replacement bores (BW24/0208 and BW24/0209) installed in 2014. Kaiapoi Lakes has also continued to be sampled during the 2025 monitoring period. Table 3 below provides approximate separation distances from each of the monitoring bores to the landfill.

Table 3: Approximate Separation Distances of Kaiapoi Monitoring Bores from Closed Landfill

Bore number	Distance from landfill (m)	Status
M35/6670 (M35/18472)	15	Existing
M35/0829 (M35/18473)	209	Existing
M35/5599	490	Removed
BW24/0208	573	New
M35/0770	576	Removed
BW24/0209	603	New
M35/0507	625	Removed

Arsenic levels in bore M35/6670 have been as high as 0.07 g/m³ during 2009 but subsequently dropped to below the MAV between 2011 and 2015, before rising above the MAV again from September 2016 through September 2018. Concentrations returned to below MAV in September 2019, 2021 and 2022, however during September 2020, 2023, 2024 and 2025 arsenic concentrations were recorded above the MAV of 0.01 g/m³. Arsenic concentrations are consistently highest in bore M35/6670 (closest to the landfill) compared with bores M35/0829, BW24/0208 and BW24/0209 which have remained below the MAV during all monitoring rounds (Figure 8).

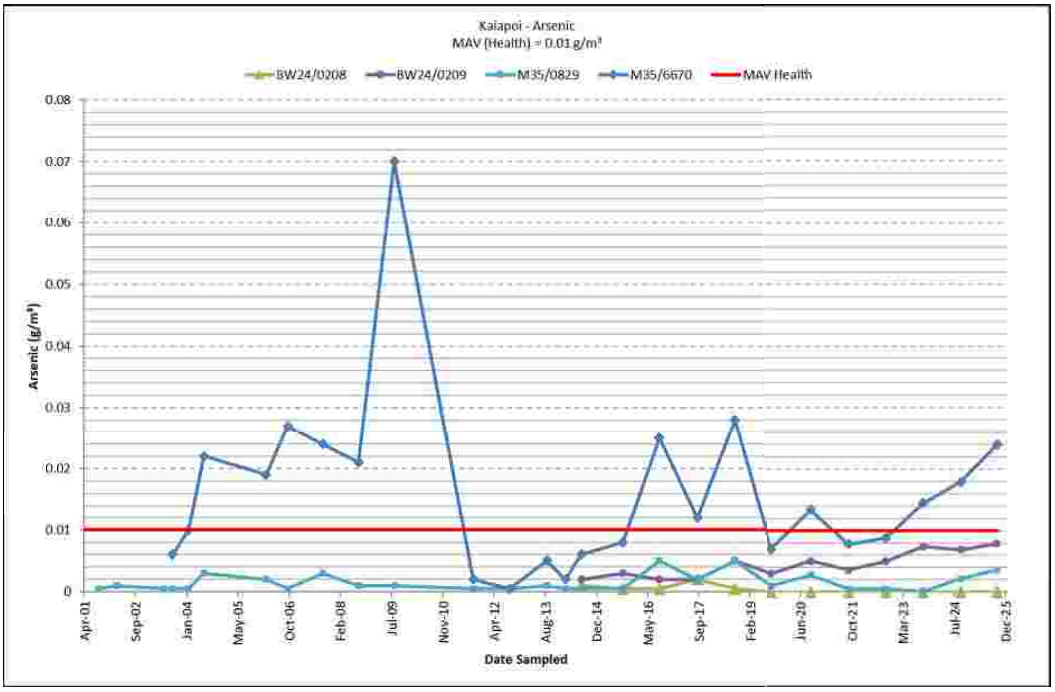


Figure 8: Arsenic concentrations for monitoring wells at the Kaiapoi Closed Landfill (2000-2025)

Manganese concentrations have remained elevated at all four bores at the Kaiapoi Closed Landfill during September 2025 sampling round. While Bore M35/6670 has exceeded MAV for all the monitoring rounds, and the general trend has been decreasing with fluctuations such as the result of 1.89 g/m^3 recorded in 2022 (Figure 9a). Manganese concentrations recorded from Bore M35/0829 continue to fluctuate, exceeding the MAV in ten of the twenty-five years it has been monitored. The September 2025 concentration of 0.41 mg/L is the third consecutive year of declining manganese concentrations, however, he overall trend at M35/0829 is increasing, which contrasts with the upgradient Bore (M35/6670) in manganese trends. (See Appendices A and Figure 9b). Manganese concentrations from Bore BW24/0209 in September 2025 (0.145 mg/L) has exceeded the AV (0.04 mg/L) for the fourth time since 2018, and the September 2025 value for Bore BW24/0208 is just under AV, at 0.03 mg/L.

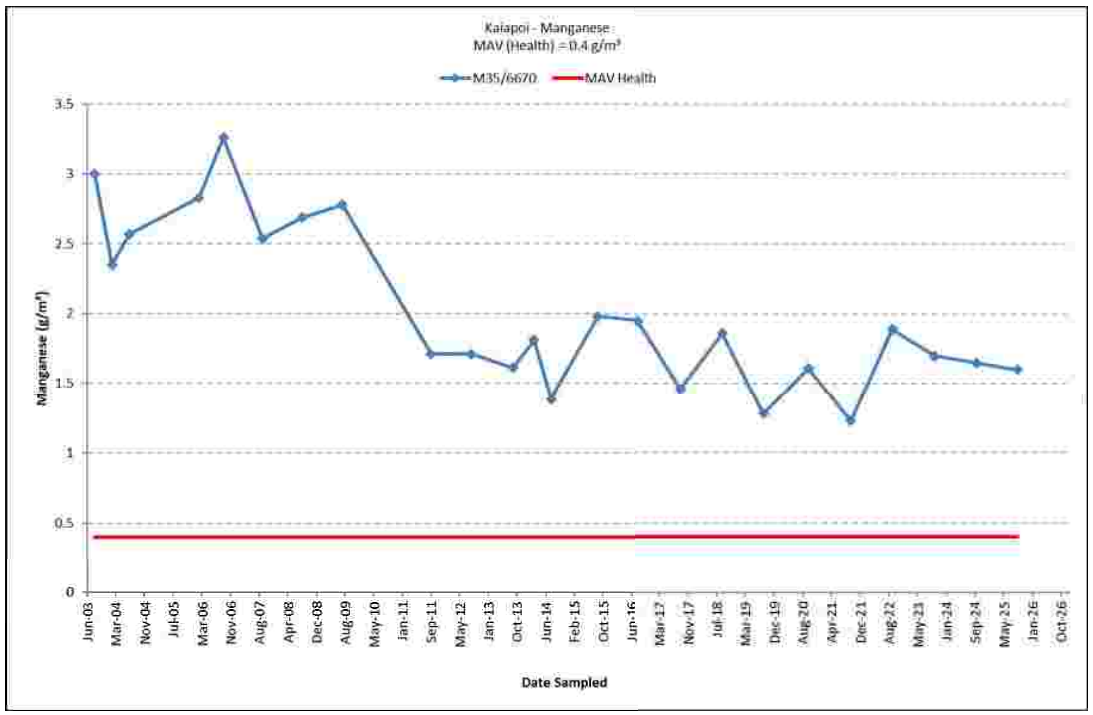


Figure 9a: Manganese concentrations for monitoring well M35/6670 at the Kaiapoi Closed Landfill (2000-2025)

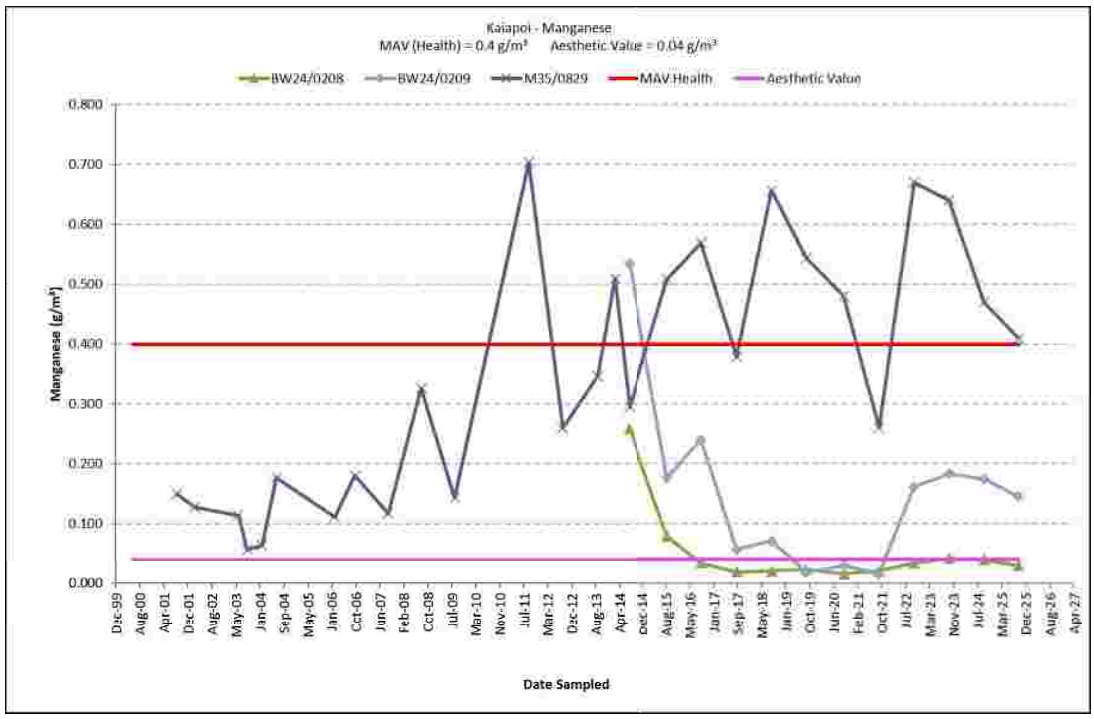


Figure 9b: Manganese concentrations for monitoring wells at the Kaiapoi Closed Landfill (2000-2025)

The two new bores have previously shown elevated concentrations of iron. Iron concentrations remain elevated above AV at three bores in the down gradient direction of flow from the closed landfill, M35/6670, M35/0829 and BW24/0209. The iron concentrations recorded at these three bores remain fluctuating above AV.

Iron concentrations recorded from Kaiapoi Lakes and BW24/0208 located upgradient and western edge, (respectively) from the groundwater direction of flow, have recorded acceptable concentrations since 2018.

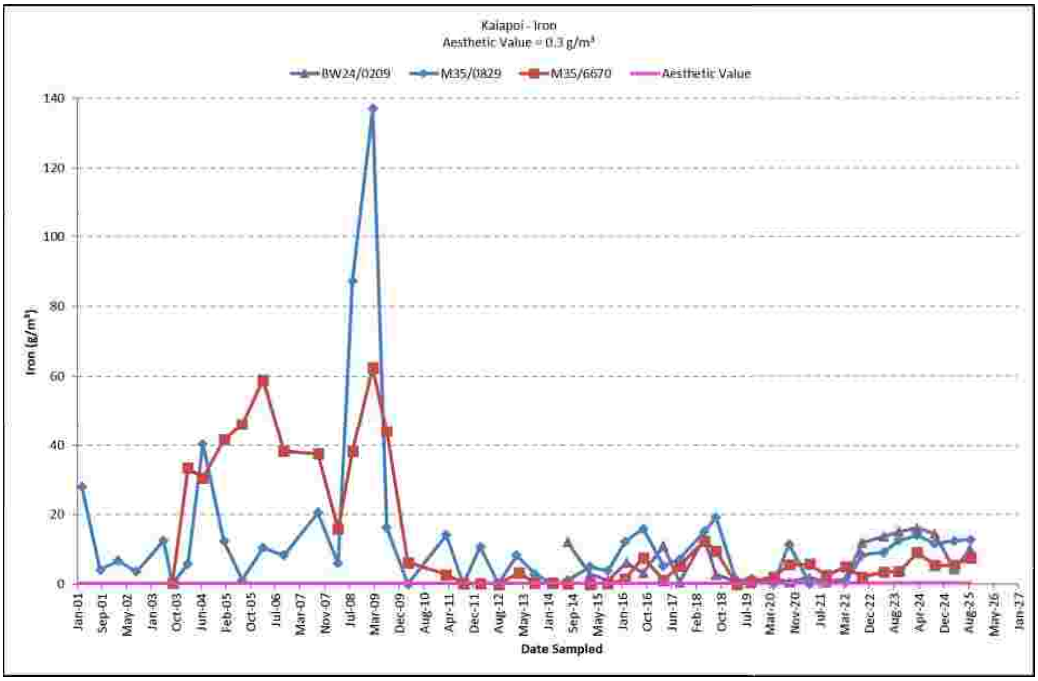


Figure 10a: Iron concentrations for monitoring bores BW24/0209, M35/0829 and M35/6670 at the Kaiapoi Closed Landfill (2000-2025)

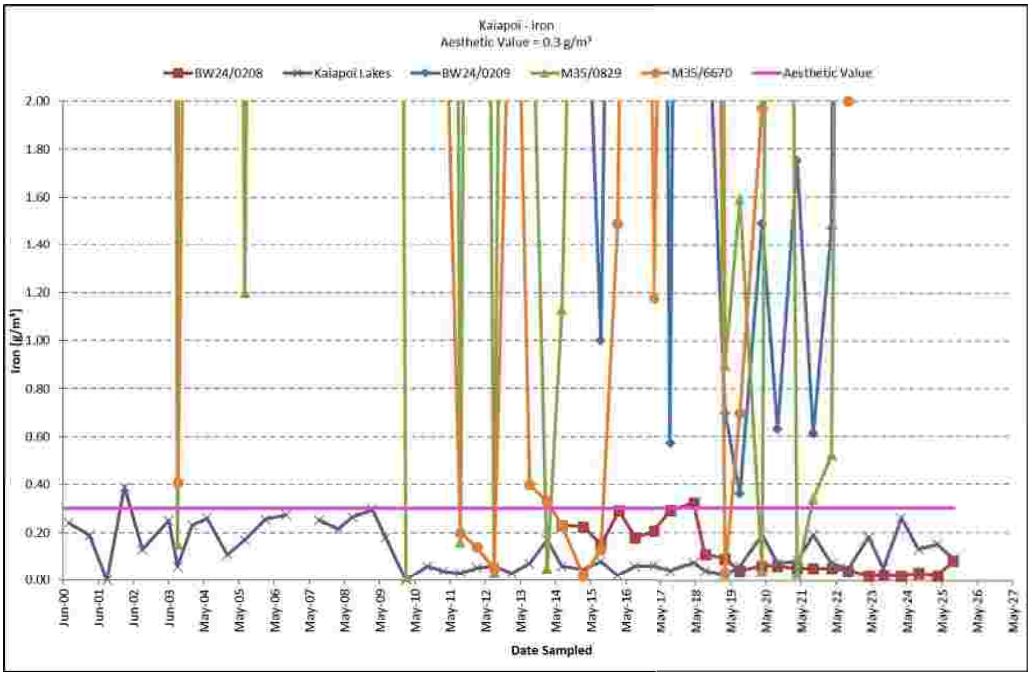


Figure 10b: Iron concentrations for all monitoring bores at the Kaiapoi Closed Landfill (2000-2025)

While such concentrations of iron and manganese may be indicative of landfill leachate, it is not unusual for elevated concentrations to occur naturally in the local groundwater particularly if reducing conditions are present. It should also be noted that early monitoring results of a new bore can be impacted by the extent to which the bore is developed. The oxidising/reducing conditions can subsequently change with time and affect contaminant concentrations. Manganese concentrations are highest in bores M35/0829 (in relatively close proximity to the closed landfill) and M35/6670 (closest to the closed landfill).

Despite being recorded below the pH AV range for both the April and September rounds, field pH levels (Figure 11) are stable and have moved within the historically observed ranges at all four of the monitoring bores. Field pH recorded at the Kaiapoi Lakes was within the AV range in April but in September it was over the AV range, although this is within the range of historical fluctuations at this site. Laboratory measured pH has generally seen an increase into the AV range since 2020. For the April 2025 sampling round all monitoring locations with the exception of bore BW24/0208 remained there, whilst in the September 2025 sampling round only the Lab pH at bore M35/6670 remained within AV range.

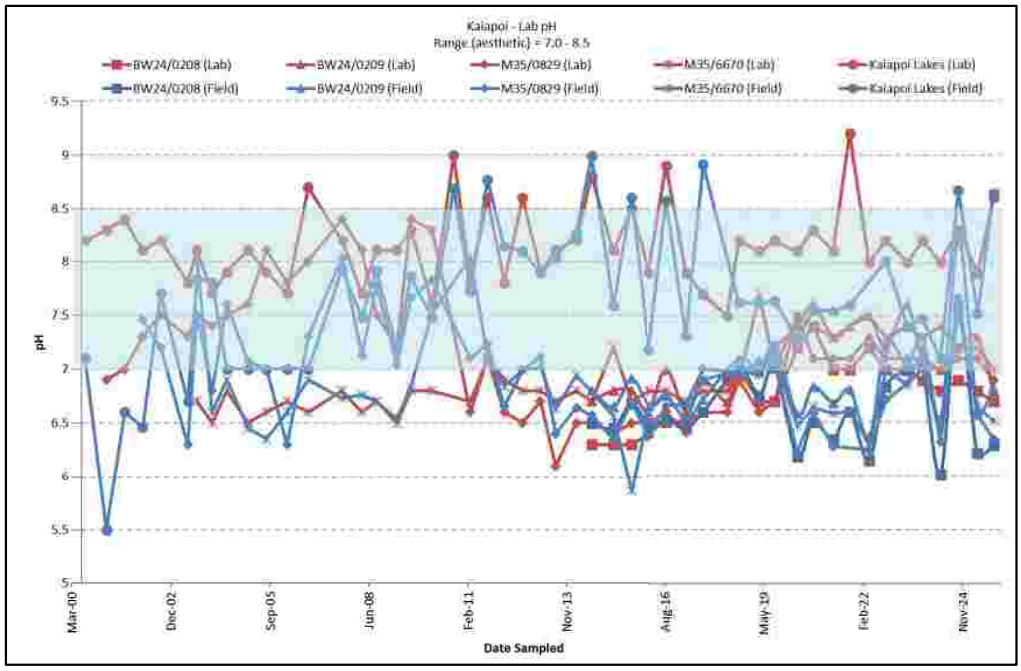


Figure 11: pH levels at Kaiapoi Closed Landfill (2000-2025)

VOC (vinyl chloride, 1,1-dichloroethane and cis-1,2-dichloroethane) have historically been detected in Bore M35/6670 (Figure 12). Records of vinyl chloride levels in M35/6670 concentrations continue to exceed the MAV with the September 2025 results, see Figure 12. Detectable concentrations of cis-1,2-dichloroethene occurred in September 2025 also, with 1,1-dichloroethene not being detected during this sampling round.

The detection of pyrene (0.1 µg/L) occurred in bore M35/6670 during the September 2018 monitoring round and remains the only event (Figure 12).

Styrene was detected in BW24/0209 at low concentrations (0.62 µg/L) in September 2014, well below the MAV (0.03 mg/L, i.e., 30 µg/L) and the AV (0.004 mg/L, i.e., 4 µg/L). Styrene was not detected again until the September 2020 round of sampling, where it was present in all Kaiapoi closed landfill bores. No styrene was detected in Kaiapoi in the 2021 rounds. In the 2022 sampling round styrene was again detected in all Kaiapoi monitoring wells except BW24/0208 and was also detected in the Kaiapoi lakes. Concentrations have ranged from 0.0005 to 0.0007 µg/L, which is well below the MAV and AV. Since 2023 Styrene has been below detection limits across all monitoring sites. In the 2025 sampling round styrene has been detected at Kaiapoi Lakes and BW24/0209. Styrene has also been detected at the other closed land fill sites between 2020 and 2023 and a separate discussion on the styrene detections is provided in Section 5.5.

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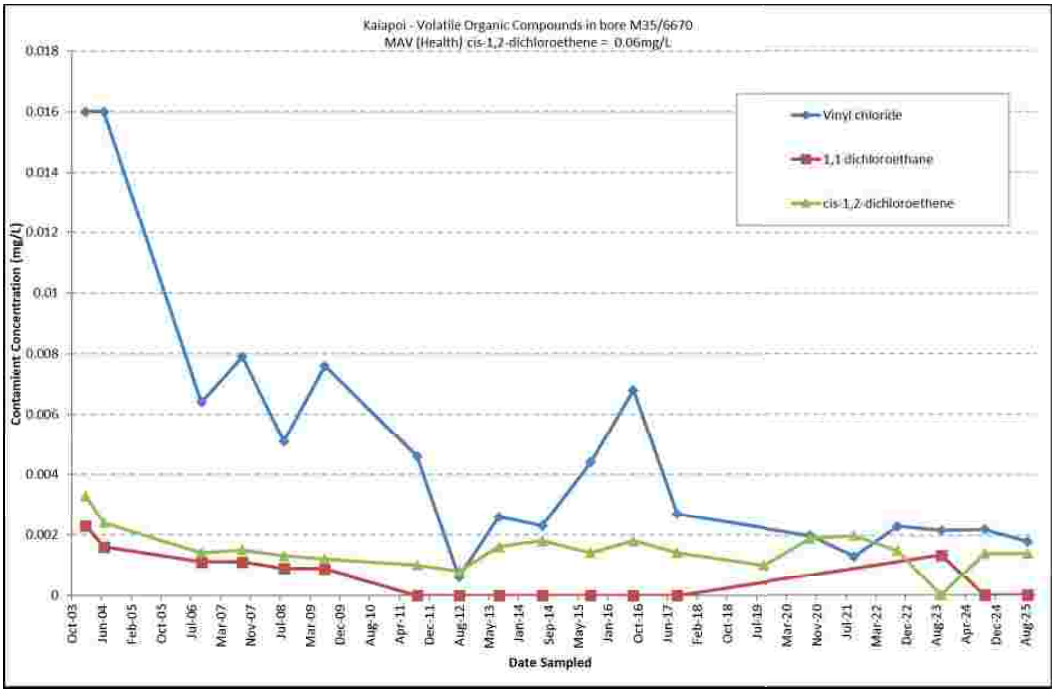


Figure 12: Volatile Organic Compound concentrations for monitoring well M35/6670 at the Kaiapoi Closed Landfill (2000-2025)

Toluene and Isopropylbenzene were found above the laboratory detection limit for the first time at BW24/0208, M35/6670 and M35/0829 in the 2022 sampling round. Neither compound was detected in the 2023 and 2024 sampling rounds, but Toluene was again detected at BW24/0208, M35/0829 along with first detections of 1,2,4-Trimethylbenzene. All results are below the respective MAV during the 2025 sampling round, however continued monitoring will be required. Toluene and 1,2,4-Trimethylbenzene were also detected at the other closed landfills in 2025, and further discussion around these detections is provided in Section 5.5.

The first nitrate-nitrogen concentration (11.5 g/m^3) recorded in bore BW24/0208 slightly exceeded the MAV (11.3 g/m^3) for unknown reasons. WDC have indicated that the property was previously farmland so this could have been a reflection of previous land use. Subsequently, the concentration in bore BW24/0208 has steadily fallen with the latest 2025 sampling round recording 1.41 g/m^3, although slightly above the 2023 concentration of 0.87 g/m^3. Concentrations appear to be fluctuating but remain well below the MAV (Figure 13). It is possible a change in land use has seen historic elevated nitrate-nitrogen concentrations in BW24/0208 decrease. Historical monitoring bore M35/5599, which was sampled between June 2000 and March 2012 (before being lost to subdivision works), also displayed consistently elevated concentrations of nitrate-nitrogen (in the range of 5.76 to 10.6 mg/L) over the entire monitoring period. To the contrary, monitoring bores M35/0829 and M35/6670 which are located closer to the landfill appear to show reducing conditions for iron and manganese. While concentrations of ammoniacal-

nitrogen in these bores have generally been low, higher concentrations above the ammoniacal-nitrogen AV have been recorded in these two bores in the past (Figure 14).

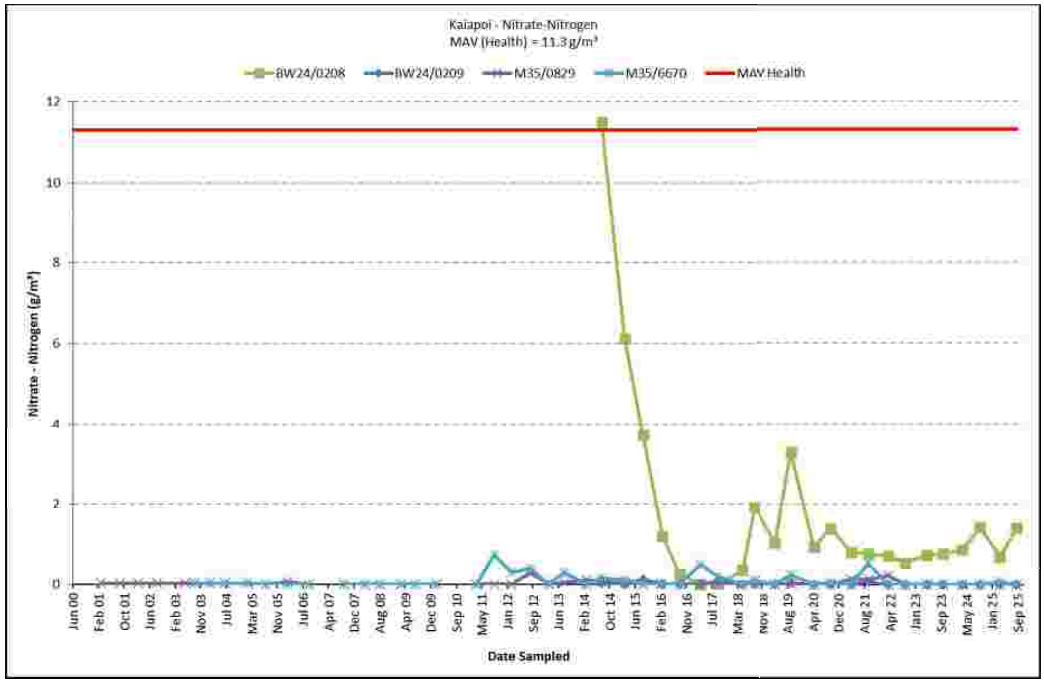


Figure 13: Nitrate-Nitrogen concentrations for monitoring wells at the Kaiapoi Closed Landfill (2000-2025)

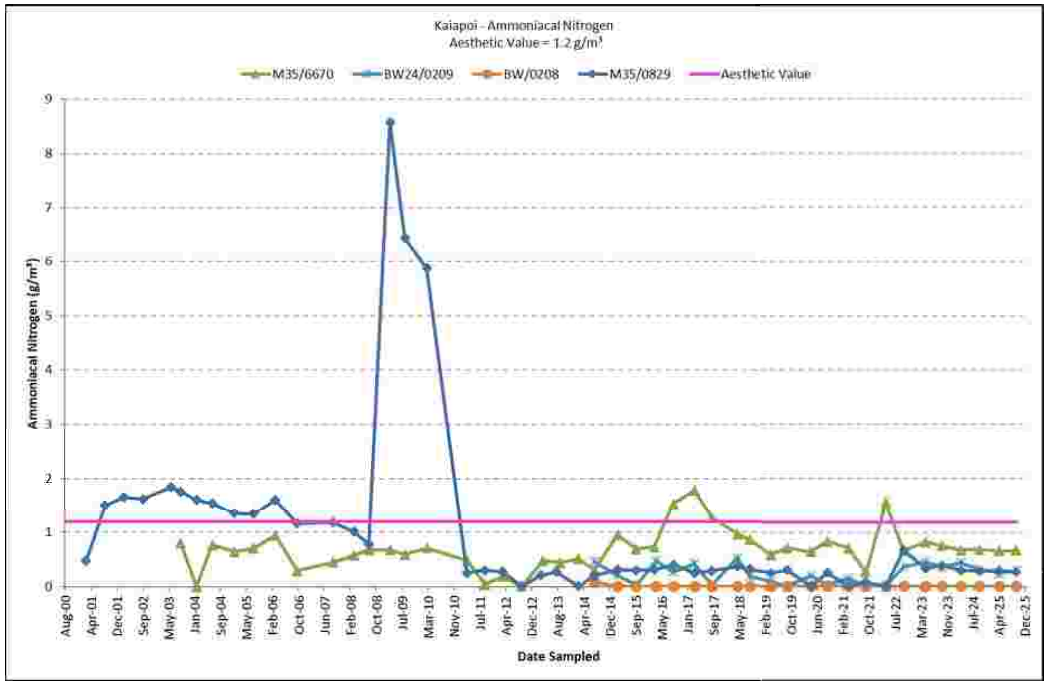


Figure 14: Ammoniacal Nitrogen concentrations for monitoring wells at the Kaiapoi Closed Landfill (2000-2025)

Since the commencement of sampling in bore M35/6670, the hardness concentrations have been consistently above the AV with a general downwards trend, (Figure 15). Elevated hardness levels are common within close proximity to a landfill. The historical downward trend is likely a result of the closure of the landfill. The large increase in hardness during the May 2018 monitoring round and subsequent reduction to near historical levels since indicates that the increase in hardness is short lived and possibly an outlier as subsequent sampling rounds have continued to decrease.

Hardness concentrations in bores BW24/0208 and BW24/0209 and M35/0829 remain below the AV, however results from the April 2021 sampling round has seen an increasing trend from the two bores downgradient from the closed landfill (M35/0829 and BW24/0209), although this appears to have stabilised since the 2023 sampling round.

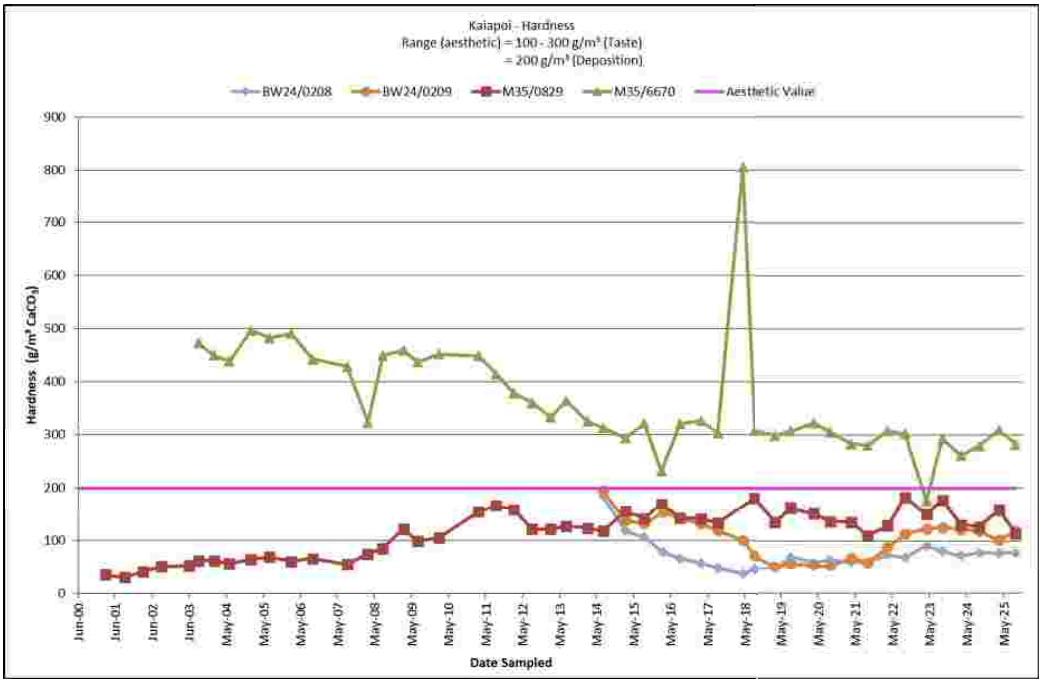


Figure 15: Hardness concentrations for monitoring wells at the Kaiapoi Closed Landfill (2000-2025)

Chloride concentrations are presented graphically in Figure 16, and all remain below the AV in all four monitoring bores. The data available for M35/6670 and BW24/0208 shows a generally decreasing trend. Chloride concentrations in BW24/0209 had been decreasing until the September 2022 sampling round which saw an increase in concentration to 40 g/m^3. Results for BW24/0209 have since remained stable around 26 g/m^3 in 2025.

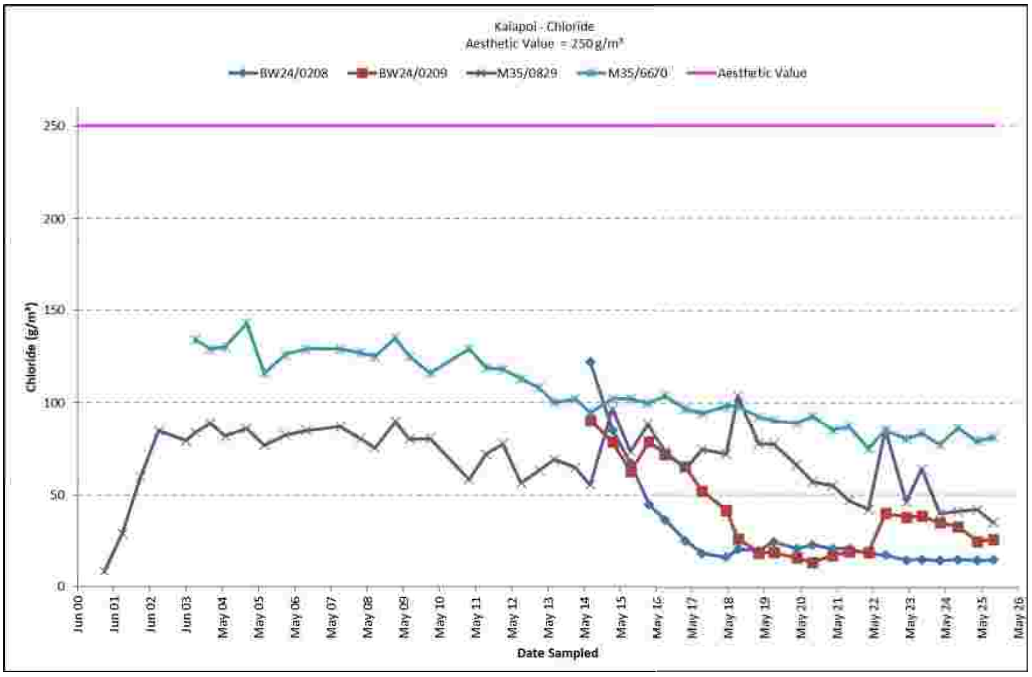


Figure 16: Chloride concentrations for monitoring wells at the Kaiapoi Closed Landfill (2000-2025)

4.4.1 Kaiapoi Lakes

The results shown in Appendix C-14 for Kaiapoi Lakes have been compared to the ANZECC Freshwater Quality Standard guidelines for the 95% protection of the aquatic species and the recreational use of water quality guidelines. The surface water samples from Eastern Kaiapoi Lake have previously been compared against the Australia and New Zealand Guidelines for Fresh and Marine Water Quality (ANZEDD; 2000). However, these guidelines have now been updated in 2018 to the ANZG (2018) default guideline values.

It should be noted that these guideline values represent the 80th percentile values from the reference sites. Therefore, exceedance of these values indicates that the site is impacted by anthropogenic land-use, which in the case of Kaiapoi Lakes, would be unsurprising. As a result, the ANZG guideline values for 95th percentile values have also been included, which are identical to the previous ANZECC 95th percentile guidelines for the sampled parameters. The ANZECC guideline values for recreational use have also been included, consistent with previous monitoring reports.

The Kaiapoi Lakes were originally man-made gravel pit and therefore the ecosystem is disturbed to some extent. The eastern most lake which is closest to the landfill and is sampled as part of the monitoring regime, is a birdlife reserve, the presence of trout and birds within the lake environment requires that the trigger values associated with the protection of 95% of the species is most appropriate. WDC

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have advised that the lakes are not commonly used for swimming, but they are used by the general public for fishing (on a catch and release basis) and for model boating and as such recreational trigger values are also included for reference (recreational water quality guidelines Table 5.2.3 Chapter 5 of the ANZECC guidelines (2005)). On the basis that swimming is not expected to commonly occur, Chapter 5 of the ANZECC guidelines would classify the Kaiapoi Lakes as a secondary contact recreational use water body, due to its use for boating and fishing.

The analytical results show that none of the parameters analysed for were present in concentrations greater than the ANZG (2018) guidelines for the 95% protection of aquatic species during the most recent rounds of sampling. Overall, the monitoring results have complied with the recreational use water quality guidelines. However, some exceedances for the recreational use water quality guidelines have occurred throughout the monitoring period. One of the parameters which has exceeded the recreational use and ANZG REC code guideline values periodically is ammoniacal nitrogen, with recorded concentrations of up to 0.5 g/m^3. The 2025 monitoring in April recorded an ammoniacal nitrogen result of 0.32g/m^3 above the recreational guideline of 0.01 g/m^3 whilst in September 2025 ammoniacal nitrogen was non-detect. ,

A suspended solids measurement of 5 mg/L during the September 2025 monitoring exceeded the ANZG REC code value however this is consistent with previous measurements and is likely to be a result of the receiving water quality rather than a result of the closed landfill. Conductivity readings have consistently been above the ANZG REC code value, although given the proximity to the coast and likely presence of urban runoff in the receiving waterways, conductivity values in the range of around 40 to 60 mS/m are unsurprising. pH has generally been recorded within the recreational use guideline range however for the September 2017, 2021, 2024 and 2025 monitoring rounds Laboratory pH was recorded above the AV range.

A low but detectable concentration of styrene occurred in the September 2025 monitoring round. Styrene has previously been detected at this site in 2020 and 2022.

While exceedances of the recreational use and ANZG REC code guidelines have occurred, they are infrequent and exceedances for the majority of parameters have generally been small. The recreational use water quality guidelines are primarily for the ingestion of water which typically occurs during swimming. Provided that no swimming occurs in the lake, brief contact with the water arising from fishing and model boating is unlikely to cause adverse effects. It is therefore important that no swimming in the lake occurs, and monitoring continues to be undertaken to determine any trends in the parameters that have shown to be elevated in previous monitoring rounds. As previously discussed, exceedances of the ANZG values are unsurprising given the urban surroundings. Given only minor exceedances have occurred, the waterways appear to be of reasonably good quality in comparison to these guidelines.

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5.0 Discussion of Results with Respect to Indicators of Leachate Migration

Leachate is formed from the decomposition of wastes in a landfill together with the infiltration of rainwater through waste and/or the inundation of waste by groundwater. The monitoring programmes reviewed in this report were designed to identify the possible presence of leachate in the groundwater and surface water around the closed landfill sites and if found to be present, to assess the extent to which leachate may be migrating away from the sites.

Appendix D-1 shows leachate composition from the landfill guideline (Centre for Advanced Engineering, 2000). Of the inorganic species such as iron, manganese, ammonia and chloride are common but are often not exclusive indicators of the presence of leachate although they can often affect the water quality from an aesthetic perspective.

The following sections review the four individual sites in terms of any ongoing trends discernible within the groundwater and surface water monitoring data and where possible, make comments on the likely influence the closed landfill may be having on these trends.

Values of pH below the NZDWS AV are common in Canterbury groundwater due to the recharge of the aquifer system by rainfall infiltration.

Ion balances have typically been within the acceptable five percent range on most occasions. Where this has not been the case, it is usually due to not all major ions being analysed for.

5.1 Mandeville Closed Landfill

Most concentrations of parameters analysed in bore M35/8707 downgradient of Mandeville closed landfill (Appendix C-1) have not changed significantly over the monitoring period. All contaminant concentrations other than pH have stabilised at levels below any relevant MAV or AVs. Detections of boron are still occurring, but all remain low. Detections of styrene have occurred in September 2020, September 2021 and September 2023, which may be an indicator of landfill leachate. However, no styrene was detected during the 2024 and 2025 sampling rounds. Trace concentrations of toluene and 1,2,4-Trimethylbenzene were detected for the first time in the 2025 sampling round and continued monitoring will help determine whether concentrations persist. Further discussion around the historical and recent VOC detections is provided in Section 5.5.

There are currently no indicators of any adverse health effects arising from this landfill. However, it should be noted that the bore monitored between March 2007 and March 2016 did not sample the shallow groundwater zone that is most likely to be affected by landfill leachate. WDC installed a new shallow bore in May 2016 which has been monitored since September 2016, except for the September 2019

round during which the deeper was sampled owing to insufficient water in the shallow bore. Since the shallow bore's installation, results are consistent with the deeper monitoring bore indicating that the shallow groundwater is of similar quality to the deeper groundwater. It is worth noting that if the shallow bore cannot be sampled in the future (i.e., if there is insufficient water for sample collection), the deeper bore will be sampled instead.

5.2 Rangiora Closed Landfill

The concentrations of typical landfill leachate indicators analysed for this site are currently not present in elevated concentrations, with the exception of low but detectable concentrations of styrene in the September 2020, 2021 and 2023 sampling rounds as well as 1,2,4-Trimethylbenzene and toluene during the September 2025 sampling round. Iron concentrations within bores M35/8706 and M35/10957 continue to remain below the AV. Historically bores M35/8706 and M35/10957 recorded variable iron concentrations which frequently exceeded the AV, while bore M35/8705 (not directly downgradient of the landfill) generally recorded lower concentrations and only occasionally exceeded the AV, of which at least one sample is considered anomalous.

However, during the September 2017 round the iron AV was exceeded in bore M35/8705. The following monitoring rounds showed iron concentrations below the AV and given the across gradient location of the bore relative to the landfill, it is difficult to conclude that this is an impact of leachate migration.

Manganese concentrations in bores M35/8706 and M35/10957 remain below the AV. while an exceedance of the AV occurred in bore M35/8705 during September 2017. Historically, all bores showed elevated manganese concentrations between September 2007 and September 2011, including some slight exceedances of the AV. The most recent samples taken from M35/8705 in 2017 through 2025 show the concentrations in this bore fluctuating above and below the AV.

All bores have historically recorded detections of boron and nickel, but all detections are very low and not much higher than the detection limit.

Discrepancy between lab and field pH readings continue. High pH levels have occurred in bore M35/8705 since March 2011 sampling rounds, including frequent levels above the AV range, these have reduced in the latest sampling rounds and are generally within the AV range. While the elevated pH levels are unexpected, bore M35/8705 is not located downgradient of the landfill which suggests the increase in pH maybe unrelated to activities at the landfill and is possibly due to other effects impacting the results from this bore. The bore in the direction of flow returns the most consistent pH readings.

No exceedances have been recorded with VOCs (styrene, toluene and o-xylene) however the detection of VOCs in bore M35/8705 continues with the addition of 1,2,4-Trimethylbenzene in the 2025 monitoring round and following the first

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detection of toluene in 2022 another detection was reported in the 2025 monitoring round. Both 1,2,4-Trimethylbenzene and toluene were also detected at trace concentrations in bore M35/10957 too. Low detections of styrene have been recorded at M35/10957 in 2018, 2020 and 2023, in M35/8706 in 2020, 2021 and 2023 and in M35/8705 in September 2020, 2021, 2022 and 2023. However, no styrene detections occurred during the 2024 or 2025 sampling rounds. Further discussion on the VOC results is provided in Section 5.5.

From the information discussed above, it is possible that a small localised aesthetic impact (iron and manganese) is occurring downgradient of the landfill. The low detected concentrations of VOCs may also indicate the presence of leachate. However, future sampling is needed to confirm if this is an ongoing occurrence and overall, the data suggests that there are likely to be minimal adverse health effects arising from this landfill. Further discussion around the historical and recent VOC detections is provided in Section 5.5.

5.3 Oxford Closed Landfill

The results of the groundwater sampling in L35/0668 to date typically show low concentrations of the parameters analysed.

Iron concentrations have remained stable and low, frequently not recorded above the laboratory limit of detection since September 2006 (excluding March and August 2008 where iron concentration slightly exceeded the AV). Isolated elevated iron concentrations may be due to the inclusion of suspended sediments in the sample.

Manganese concentrations have exceeded the MAV once in June 2003, but since then concentrations have remained at or below the AV.

Low but detectable concentrations of styrene occurred in September 2020, 2021, 2022 and September 2023 which may be and indicator of landfill leachate, although no such detections of styrene have occurred in the past or during the 2024 and 2025 sampling rounds. These recent detections also occurred at the Mandeville and Rangiora closed landfills at similar levels, and further discussion around these detections is provided in Section 5.5.

Isopropylbenzene was found above the laboratory detection limit in 2022 for the first time at Bore L35/0668, albeit in low concentrations, and has not been detected in subsequent monitoring rounds. A low-level detection of carbon disulphide (0.0006 mg/L) occurred during the September 2024 sampling round which was the first detection of this parameter. In the September 2025 sampling round toluene (0.0003 mg/L) and 1,2,4-Trimethylbenzene (0.0003 mg/L) were found for the first time in low-level concentrations above the laboratory detection limit. Monitoring will continue to determine if this low level detection persists.

There are currently no obvious indicators of adverse health effects arising from the Oxford closed landfill, with the exception of low concentrations of styrene and the recording of Isopropylbenzene in 2022, carbon disulphide in 2024 and in 2025 toluene and 1,2,4-Trimethylbenzene which require further monitoring. Although it should be noted that historical monitoring did not sample the shallow groundwater zone that is most likely to be affected by landfill leachate. A shallow downgradient monitoring bore was installed in May 2016 and this bore has been monitored during the 2018 monitoring rounds which displayed similar results to the historical measurements from the deeper bore. However, from the 2019 monitoring rounds onwards, the deeper bore was sampled due to insufficient water in the shallow bore.

Based on the most recent data it appears as though the water quality in the shallower bore is not significantly different to the deeper bore. Despite this, further monitoring is required to accurately determine if the results are consistent with the historical deep bore. It is worth noting that if the shallow bore cannot be sampled in the future (i.e., if there is insufficient water for sample collection), the deeper bore will be sampled instead.

5.4 Kaiapoi Closed Landfill

The results of the groundwater monitoring at the Kaiapoi closed landfill site from M35/6670 and M35/0829 have displayed elevated iron and/or manganese and arsenic concentrations which have exceeded the MAVs and/or AVs since monitoring began in these bores. Landfill leachate is almost certainly present in bore M35/6670 although it is difficult to determine whether landfill leachate is present in all bores at the site solely based on elevated concentrations of iron, manganese and arsenic as these elements may occur naturally due to interactions between groundwater and the geology of the aquifer. In addition, there is no upgradient bore at Kaiapoi to compare the downgradient results to.

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Bore M35/6670 (M35/18472) which is located in close proximity to the landfill has shown significant exceedances of the DWSNZ values for water quality for a range of parameters. It therefore follows that the highest concentrations indicative of leachate would be present in this bore. A gradually decreasing trend of key leachate indicators continue to be seen in manganese, iron, hardness and chloride. Arsenic concentrations have generally decreased across the monitoring period but more recently they have gradually increased over the past four monitoring rounds. Manganese fluctuates above the MAV in bore M35/0829 and fluctuates above the AV in bores BW24/0209 and BW24/0208, with an increase detected at all sites in 2022, 2023 and continue to plateau (or drop in the case of bore M35/0829) in 2025. Iron contaminant values continue to exceed the AV in bores BW24/0209, M35/0829 and M35/6670. Overall trends for arsenic are fluctuating above and below the MAV, with recent 2025 results under MAV in bores BW24/0208, BW24/0209 and M35/0829.

A spike in hardness concentration during the May 2018 monitoring round was observed in bore M35/6670, unsurprisingly due to its proximity to the landfill. Bore M35/0829 has the next highest concentrations of hardness. Hardness results in bore M35/6670 are trending downward, comparatively, bore M35/0829 results are trending upward.

Exceedance of AV for ammoniacal nitrogen appear in spikes in 2017 and 2022 monitoring rounds at bore M35/6670. Similarly elevated concentrations have been observed in the further downgradient bore M35/0829 as early as 2009 and have not been present during recent sampling rounds. This spike coincides with a spike in iron concentrations at the same bore (M35/0829) in 2009. Iron concentrations remain elevated above AV at three bores in the down gradient direction of flow from the closed landfill. Overall, the information suggests that leachate impacts the groundwater in the vicinity of bore M35/6670 and M35/0829.

Vinyl chloride was recorded in bore M35/6670 above the MAV in the most recent monitoring round (September 2025) but was not detected in bore M35/0829. Cis-1,2-dichloroethene was found above the laboratory limit of detection at M35/6670 only. VOC detections have commonly occurred in bore M35/6670 and continue to occur during the most recent sampling round. As per the Mandeville, Rangiora and Oxford closed landfills, styrene was detected during the September 2020 and 2022 sampling round in all Kaiapoi monitoring wells except BW24/0208 (outside the direction of flow) it was also detected in the Kaiapoi lakes at low, but detectable concentrations. In the September 2025 sampling round, styrene was once again detected at low concentration in two monitoring locations, Kaiapoi Lake and bore BW24/0209. However, styrene was not detected during the September 2021, 2023 and 2024 sampling rounds in any of the Kaiapoi monitoring bores. Further discussion around the styrene detections is provided in Section 5.5.

For the September 2025 sampling round, as per results at the other closed landfills, toluene and 1,2,4-Trimethylbenzene were also detected, albeit in low concentrations. In the vicinity of the Kaiapoi closed landfill, toluene was detected in monitoring bores M35/0829 (0.0003 mg/L) and BW24/0208 (0.0004 mg/L), 1,2,4-Trimethylbenzene was detected in the same monitoring bores at a concentration of 0.0003 mg/L. Further discussion around these detections is provided in Section 5.5.

The two new bores (BW24/0208 and BW24/0209) have shown possible indicators of leachate effects (elevated iron and manganese); while data is still limited for these bores, future monitoring is recommended. As discussed above, it is difficult to determine whether landfill leachate is present in these bores solely based on elevated concentrations of iron, manganese and arsenic as these elements may occur naturally due to interactions between groundwater and the geology of the aquifer.

5.5 VOC Detections

As previously discussed, low but detectable concentrations of styrene occurred in all monitoring bores at all four closed landfills during the September 2020 sampling round, and in all bores at the Mandeville, Rangiora (excluding one bore) and Oxford closed landfills during the September 2021 sampling round. In 2022 three out of the five monitored bores at Kaiapoi detected Styrene, along with Oxford and one bore out of the three at Rangiora. In 2023, styrene was detected at Mandeville, Oxford and all three Rangiora bores, but not in any of the Kaiapoi bores. Styrene was not detected above the laboratory limit of detection at any sites during the September 2024 sampling round. Styrene was detected again at Kaiapoi closed landfill in September 2025. Given that styrene has not been a cause for concern in the past and has recently been detected in all monitoring bores, including bore M35/8705 at the Rangiora closed landfill, which is not located downgradient of the landfill, this would indicate that sample contamination could be a contributing factor. In addition, the Mandeville, Rangiora and Oxford closed landfills do not show any obvious leachate effects from any of the remaining parameters monitored.

Styrene is a component of many plastic and rubber products so could originate from sample bottles, sampling gloves or components of pumps, tubing or equipment at the testing laboratory.

During the 2023 sampling rounds, WDC collected duplicate samples from bore M35/10957 at Rangiora as well as bore BW24/0209 at Kaiapoi. Field, trip and rinsate blanks were also collected for each landfill. The results from all these duplicate and blank samples showed that styrene was not detected in any of the samples. As styrene was not detected in the primary Kaiapoi samples either, this suggests that previous detections in the Kaiapoi bores were possibly not a true representation of groundwater quality. Furthermore, the results from Rangiora would indicate that the styrene detections in the primary bore samples may not be

representative of the groundwater conditions at the site because styrene was not detected in the duplicate samples.

In September 2024 PDP collected duplicate samples for VOCs in addition to the samples collected by WDC and their consultant at the Oxford and Mandeville closed landfills, as well as another cleanfill site owned by WDC. The analysis of these results and findings of the investigation indicated that the chromatograms for a number of the WDC samples showed the presence of styrene at low levels (and carbon disulphide), whereas the chromatograms were checked by the laboratory for the samples collected by PDP which did not show any presence of these parameters.

It is not uncommon for occasional low level VOC detections to occur near the trace limit of detection. However, the temporal persistence of the styrene detections over a continuous period 5 years indicates that there is likely to be a common source for styrene. In light of the September 2024 sampling results, the most likely source of styrene detected during the September 2024 sampling round was from the sampling equipment or sampling procedures. Such sources could include:

- Materials within the sampling equipment; and/or
- Contamination of sampling equipment from a previous sampling event, noting the equipment was not decontaminated between sites.

Results from the 2025 sampling round showed detections of several previously identified compounds, including the first exceedance of the laboratory detection limit for 1,2,4-Trimethylbenzene across all four landfills. In addition, some monitoring sites recorded first detections of toluene, which has been observed at other locations in earlier rounds. While the presence of these parameters may be an indication of leachate, it is difficult to determine whether this is the source of such contaminants. Given these parameters were reasonably consistent across the different sites and all occurred during the same sampling round, and occurred at sites that are not showing any other indicators of landfill leachate in the monitoring data, it is considered possible that these detections may be false. Continued monitoring is recommended to establish any long-term concentration trends for these compounds.

It is recommended that any future sampling strictly adopts the procedures outlined in the NEMS guidelines, including decontamination of all sampling equipment between sites, replacement of tubing and checking for stabilisation of field parameters prior to sample collection. Care should also be taken to exclude any contaminant sources from the immediate work area such as generators, which should be placed as far away from the bores as possible and down wind. Future sampling would benefit from the collection of both equipment rinsate blanks (to check for VOC's within the sampling equipment) and field blanks (to check for VOC sources in the wider vicinity during sampling).

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6.0 Conclusions

The following conclusions are drawn from the 2025 review of the WDC closed landfills:

- Mandeville: there are currently no indicators of leachate seeping from the closed Mandeville landfill to groundwater. This is based on the assumption that the previous low but detectable concentrations of styrene and recent toluene and 1,2,4-Trimethylbenzene detections are not an indicator of landfill leachate.
- Rangiora: from 2013 to 2025 there have been no exceedances of key indicators of leachate in bores M35/8706 and M35/10957. There is some evidence in the groundwater chemistry to suggest leachate is present in M35/8705. However, it is possible that this bore is producing unexpected pH, iron, and manganese concentrations owing to its cross gradient location from the landfill, so there may be other effects impacting the results from this bore. Overall, it is unlikely that leachate is seeping at elevated concentrations from the closed Rangiora Landfill, to groundwater. This is based on the assumption that the previous low but detectable concentrations of styrene are not an indicator of landfill leachate.
- Oxford: there are currently no indictors of leachate seeping from the closed Oxford landfill to groundwater. This is based on the assumption that the previous low but detectable concentrations of styrene and recent toluene and 1,2,4-Trimethylbenzene detections are not an indicator of landfill leachate.
- Kaiapoi: it is likely that a leachate plume exists underneath the Kaiapoi closed landfill extending in a general south-easterly direction and primarily indicated by elevated iron, manganese and arsenic concentrations, although given that these parameters can also occur naturally, the extent of any leachate effects is uncertain.
- Results from the 2025 sampling round showed detections of several previously identified compounds, including the first exceedance of the laboratory detection limit for 1,2,4-Trimethylbenzene across all four landfills. In addition, some monitoring sites recorded first detections of toluene, which has been observed at other locations in earlier rounds. While the presence of these parameters may be an indication of leachate, it is difficult to determine whether this is the source of such contaminants. Given these parameters were reasonably consistent across the different sites and all occurred during the same sampling round, and occurred at sites that are not showing any other indicators of landfill leachate in the monitoring data, it is considered possible that these detections may be false. Continued monitoring is recommended to establish any long-term concentration trends for these compounds.

- In light of previous styrene detection at a number of sites, PDP investigated these detections via a concurrent sampling round during the September 2024 round. The results indicated that the most likely source of styrene detected during the September 2024 sampling round was from the sampling equipment or sampling procedures being used. It is recommended that any future sampling strictly adopts the procedures outlined in the NEMS guidelines, including decontamination of all sampling equipment between sites, replacement of tubing and checking for stabilisation of field parameters prior to sample collection. Care should also be taken to exclude any contaminant sources from the immediate work area such as generators, which should be placed as far away from the bores as possible and down wind. Future sampling would benefit from the collection of both equipment rinsate blanks (to check for VOC's within the sampling equipment) and field blanks (to check for VOC sources in the wider vicinity during sampling).
- pH values below the AV are commonly observed, but unrelated to leachate seepage, likely a result of rainfall infiltration.
- Groundwater and surface water sampling locations are consistent with the conditions described in the appropriate resource consents.
- Parameters sampled for are consistent with what is required by the respective consents for all four sites.
- WDC have previously noted that, owing to the sampling programme having been interrupted by bores going dry, bores being vandalised and the continued development of subdivisions adjacent to the Kaiapoi closed landfill, the twice-yearly sampling (Suite 1 and Suite 2) regime would continue for the next few years. WDC plan to continue sampling twice yearly for an indefinite period at all four sites. Sampling may eventually be reduced to the consented requirement of once a year depending on the test results and future subdivision plans.

7.0 References

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Centre for Advanced Engineering, University of Canterbury, 2000. *Landfill Guideline Leachate Composition*.

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Taumata Arowai. (2022). *Aesthetic Values for Drinking Water Notice 2022.*

Waimakariri District Council (WDC), 2023. *Report on Groundwater Monitoring at Closed Waimakariri District Council Landfills for 2023.*

Appendix A: Figures

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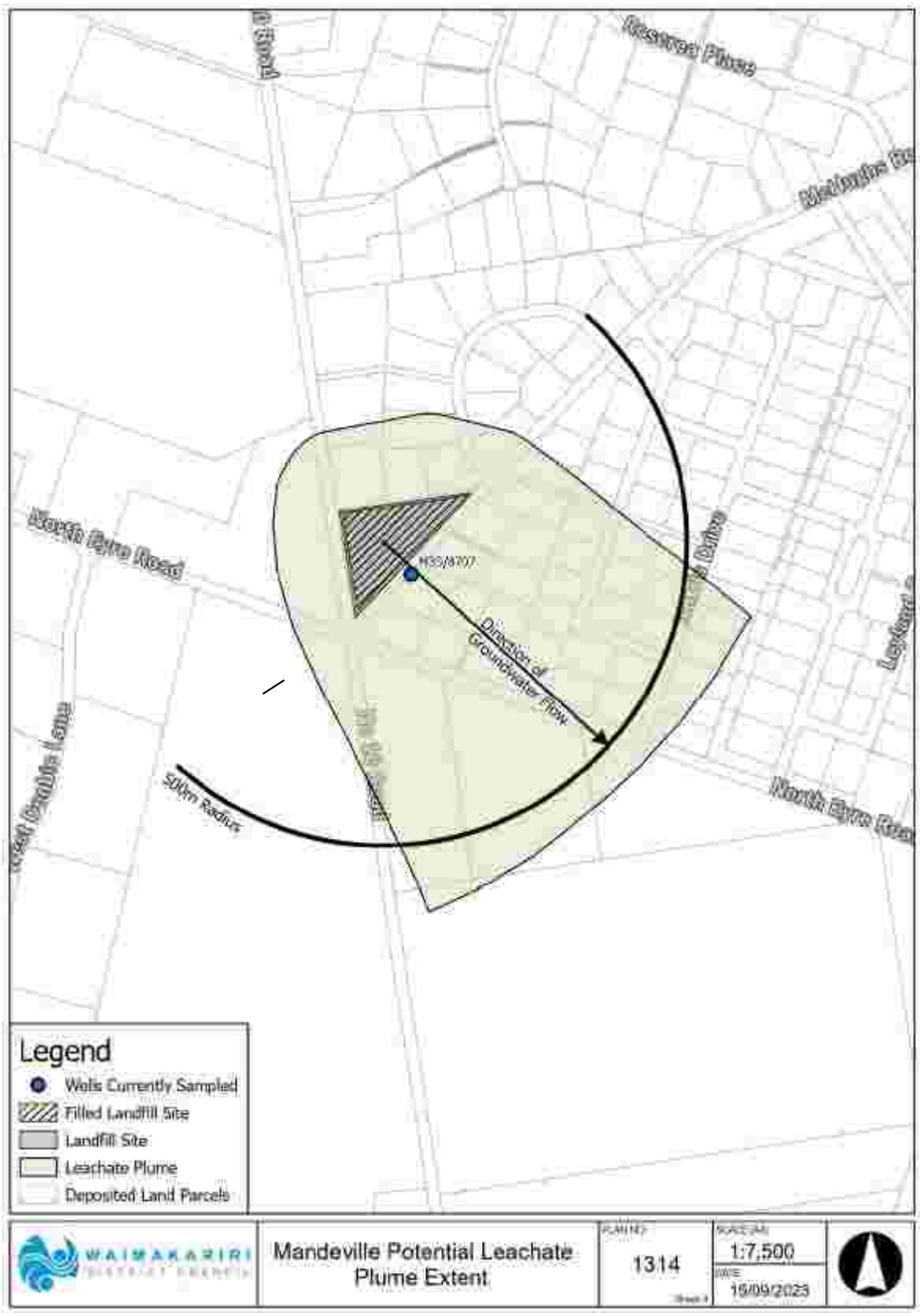


Figure 1: Location of Monitoring Well at Mandeville North Landfill

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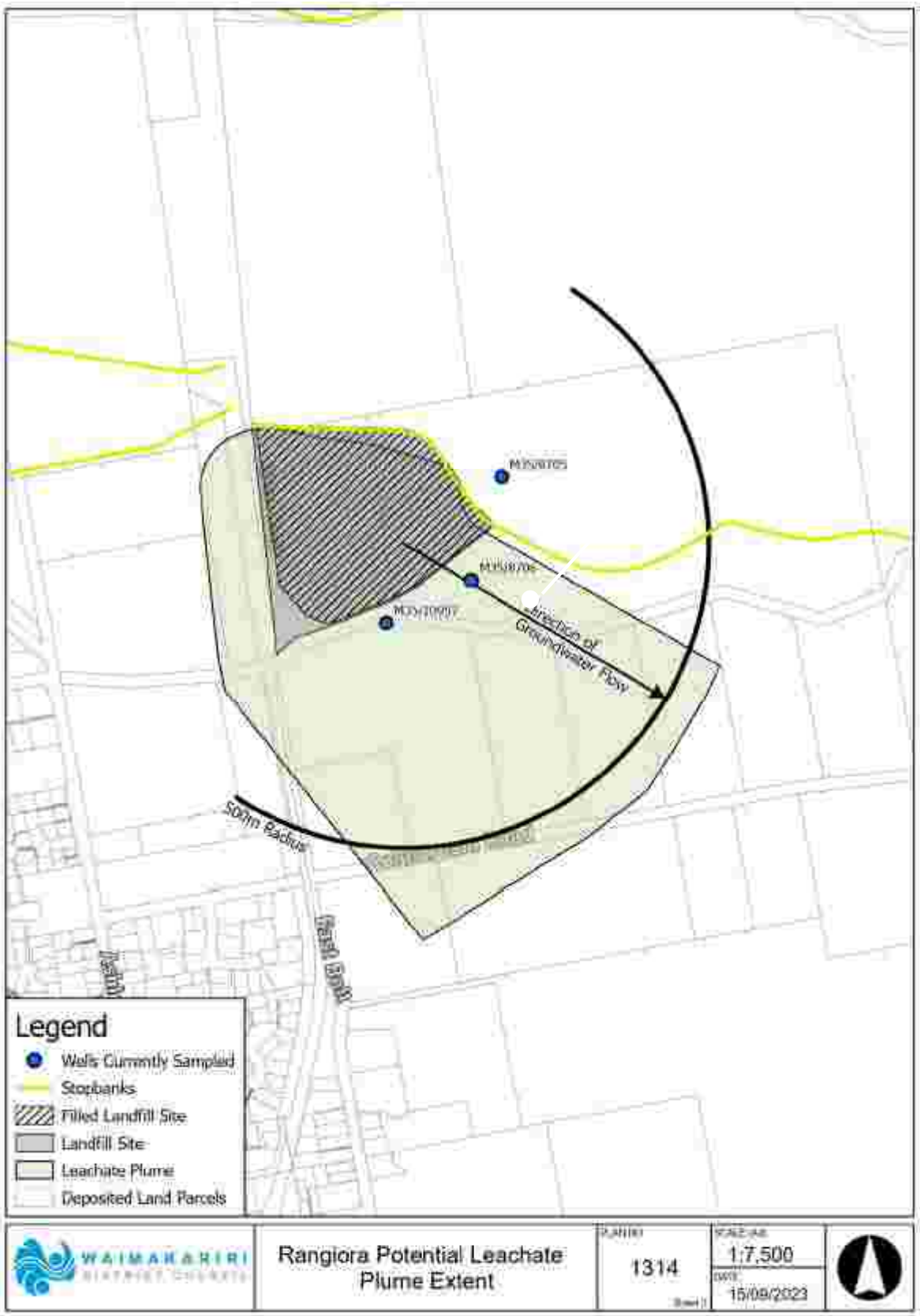


Figure 2: Location of Monitoring Wells at Rangiora Landfill

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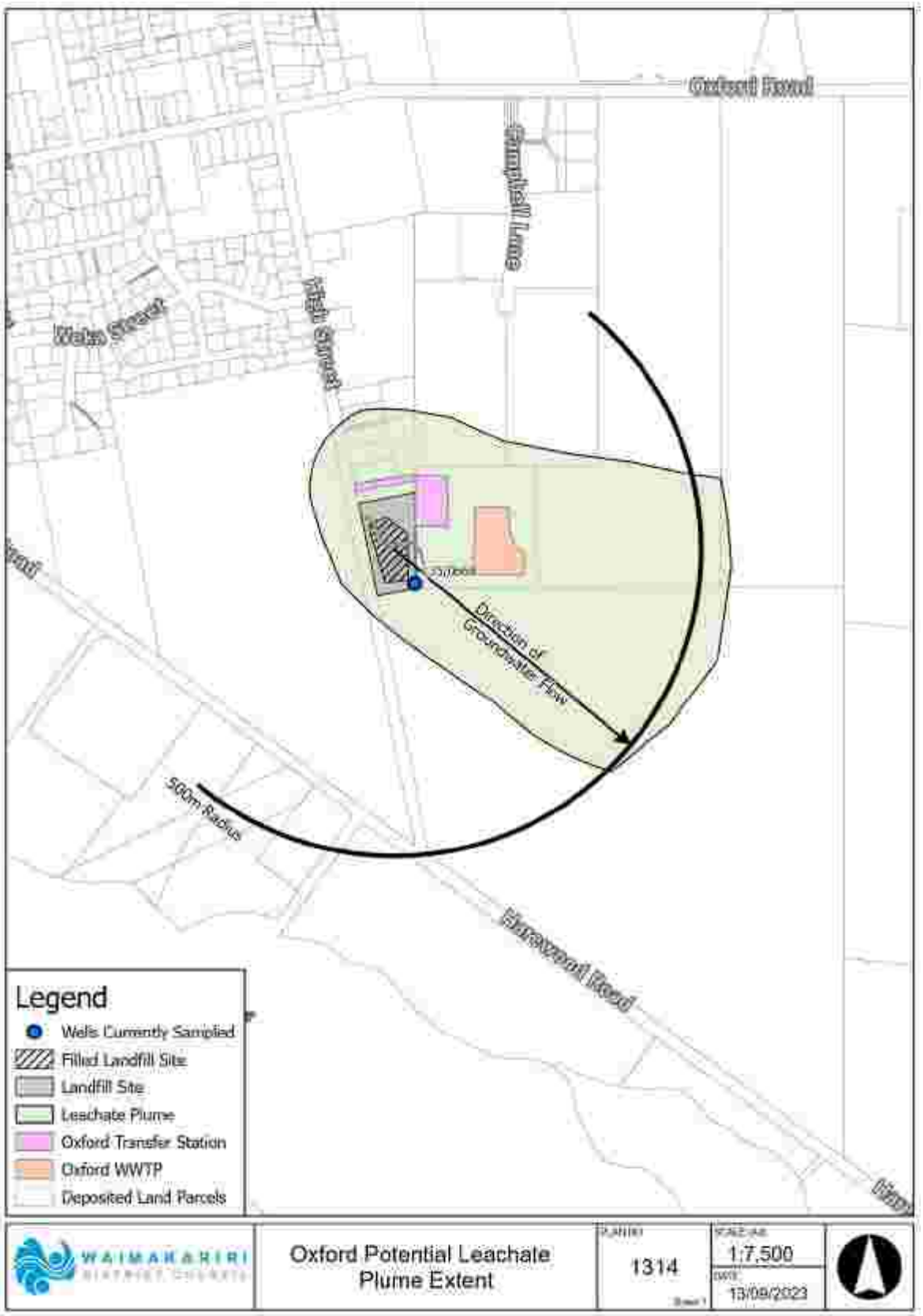


Figure 3: Location of Monitoring Well at Oxford Landfill

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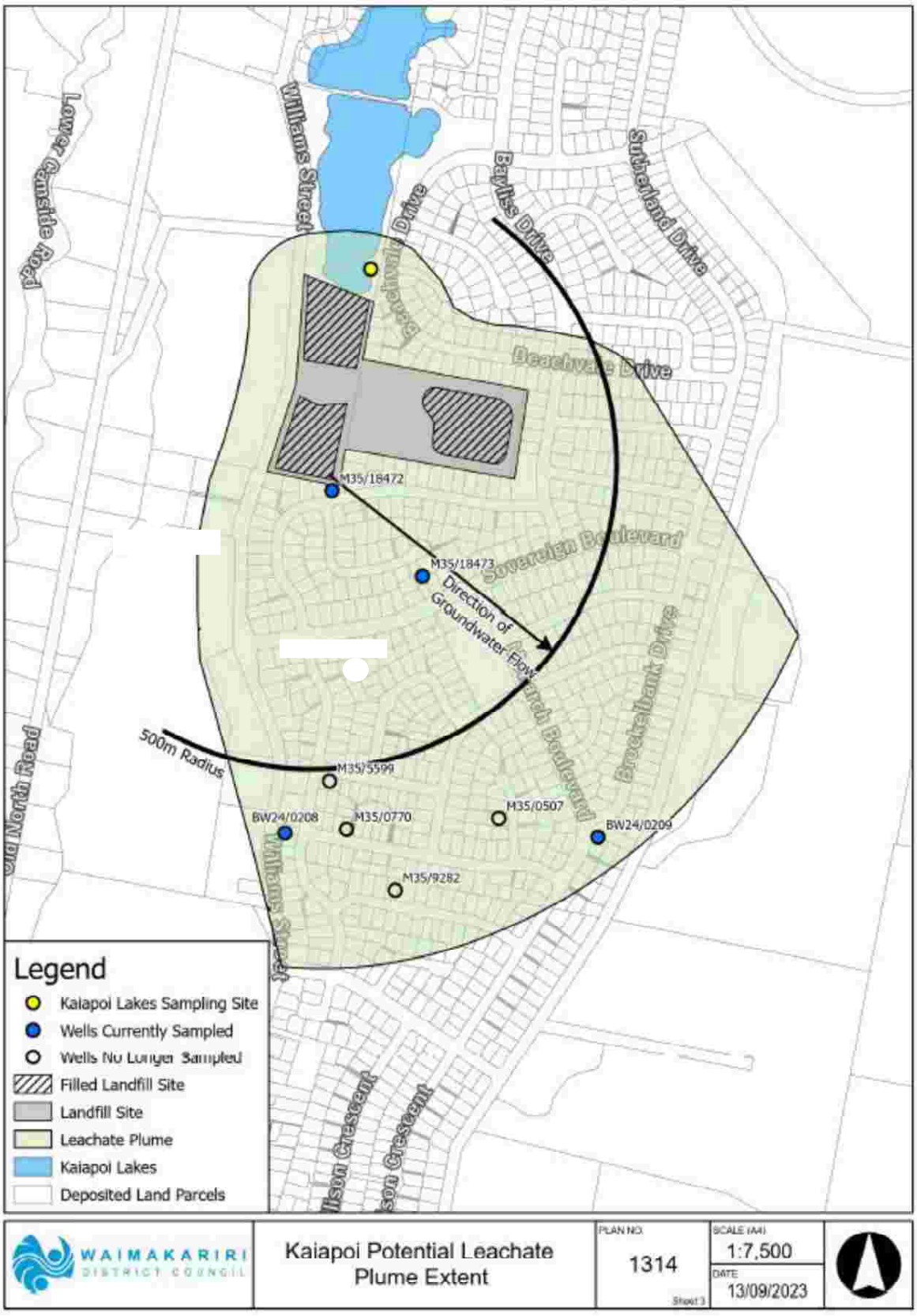


Figure 4: Approximate location of Monitoring Wells at Kaiapoi Landfill

Appendix B: Tables – Monitoring Requirements

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Table B-1: Required determinands for groundwater and surface water monitoring at the closed landfill sites

Suite 1	Suite 2
Field pH	Field pH
Field Temperature	Field Conductivity
Field Conductivity	pH
pH	Alkalinity
Alkalinity	Conductivity
Conductivity	Chloride
Chloride	Nitrate nitrogen
Nitrate nitrogen	Chemical Oxygen Demand (as 0)
Sulphate	Ammoniacal Nitrogen
Chemical Oxygen Demand (as 0)	Calcium
Sodium	Magnesium
Ammoniacal Nitrogen	Iron
Potassium	Total dissolved solids (grav)
Arsenic	
Boron	
Calcium	
Magnesium	
Nickel	
Manganese	
Iron	
Total dissolved solids (grav)	
Suspended Solids (103-5oC	
Volatile Organics	
Semi- Volatile Organics	
Full ion balance	

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Table B-2: Sampling Regimes

Suite 1	Suite 2
February/March 2000	July/August 2000
July/August 2001	February/March 2001
February/March 2002	July/August 2002
Beyond November 2002	

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Table B-3: Monitoring Bore Details for the Four Closed Landfill Sites.

Landfill	Well Number	Screened Depth (m bgl)	Diameter
Mandeville North	M35/8707 (BW23/0386)	3 – 12	100 mm
Rangiora	M35/8705 (M35/10956)	3.9 – 7.9	100 mm
	M35/8706	0.7 – 8.2	100 mm
	M35/10957	5.7 – 11.7	100 mm
Oxford	L35/0668 (L35/0886)	17.1 – 23.1	100 mm
Kaiapoi	M35/0507	Unknown (24.7 m deep)	152 mm
	M35/0770	Unknown (63.7 m deep)	51 mm
	M35/0829 (M35/18473)	Unknown (17 m deep)	50 mm
	M35/5599	Unknown (15.4 m deep)	40 mm
	M35/6670 (M35/18472)	Unknown (25 m deep)	50 mm
	M35/9282	Unknown	150 mm
	BW24/0208	5.05 – 7.05	100 mm
	BW24/209	5.0 – 7.0	100 mm

Appendix C: Tables – Monitoring Results

Aug-00	Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Sep-09	Mar-10	Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	Apr-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23	Apr-24	Sep
												new well drilled 2/10/2006								EQ 4/9/10												New shallow well																	
6.2	6.2	Well dry	6.4	5.3	6.1	8.1	5.1	4.1	6.6	7.2	Well dry	4.8			8.5	5.6	5.8	6.1	7.2	3.7	3.4	3.7	8	5.1	7	4	4.5	3.9	8.1	10	8.7	8.6	9.9	3.5		4.65	6.4	5.2	8	8.3	11	7.5	4.2	3.6	5.4	3.86	7.37	8.2
6.9	7.3		6.67	6.7	5.9	6.3	6.24	6.9	7.4	7.4		6.65		6.3	6.7	6.78	6.7	6.54	6.27	6.13	8.18	6.71	6.71	7.46	7.43	6.48	6.83	6.56	6.61	6.76	6.4	6.56	6.63	6.89		7.25	7.01	7.2	6.18	6.41	6.56	6.56	6.41	6.58	6.87	6.69	6.55	7.5
			10	2.2	6.2	4.8	8.6	4.7	6.8	5.7		10.1				4.76	5.5	5.39	6.75	7.77	6.66	5.61	6.30	9.06	9.79	6.82	7.39	5.73	9.61	3.45							65.1	8.2	62.9	57.6	4.65	60.4	6.3	5.58	1.49	0.46	9.08	8.2
		no																			62.1	54.4	60.5	84	98.3	66.4	71				54.4	59.9	57.7	69.1		50.1											
14.4	14.1	sample	14.0	9.5	13.0	11.1	13.2		15.0	13.6		12.9		12.3	15.3	12.6	14	13.5	14.3	13.3	12.2	13.9	13.5	11.9	15.5	14.1	13.5	12.6	14.2	13	13.4	14	13	13.6		12.7	14	12	14.1	15	14	14.4	13.9	17.1	13.6	13.5	12.4	
91.1	131		146.4	159	139	142	164	151	143			175		142.3	127.4	131	156.8	127	127.4	155.6	349.7	335.2	120.6	143	152.4	199.2	224	145	145.3	169	162	135	126.8	214		155	146.1	141.1	139	138.2	174	151.2	172.3	231	158.3	148.1	143	171
6.6	6.5		6.6	6.4	6.2	6.0	5.7	6.1	6.2	6.4		6.4		6.3	6.3	6.3	6.2	6.6	6.4	6.5	6.5	6.6	6.7	6.4	7.1	6.5	6.4	6.4	6.4	6.5	6.4	6.5	6.5	6.3	6.3	6.7	6.8	7.8	7.3	7.1	7	7	7.1	7	7.2	7	7	6.7
40	42		44	42	38	37	42	48	51	39		41		43	48	46	43	42	37	43	36	44	45	42	45	44	50	61	37	45	46	40	40	38	39	38	39	41	42.0	44.0	44.0	41.0	40.0	40.0	44.0	43.2	45.0	46.
	0		0																													48			48	46		50										
15	15		14.4	15.7	11.4	13.0	14.3	14.6	14.6	13.9		20.8		16.0	14.7	13.6	16.6	15.9	15.2	17.4	15.6	16.4	15.6	18.7	16.9	19.8	19.3	19.2	17.8	16.8	16.7	17.5	16.5	21.4	21.5	20.3	18.6	19.1	18	17.6	16.6	20.7	21.9	21	19.7	19.7	18.5	17.
6.7	7.5		6.9	7.6	5.6	6.5	9.2	7.0	6.5	5.48		14.7		7.94	6.76	8.67	8.89	8.38	7.39	8.67	9.33	8.16	6.92	10.3	8.95	10.3	9.09	9.13	8.59	7.29	6.92	7.51	6.67	11.0	11.6	11.4	8.56	8.44	7.3	7.2	6.4	10.8	11.1	11	9.1	9.05	8.5	6.8
4.5	4.2		3.02	3.59	2.3	3.03	4.5	3.6	3.11	2.75		6.16		3.98	3.44	4.59	4.96	4.48	4.22	5.54	5.09	4.13	3.47	5.83	4.79	5.77	4.71	4.83	4.19	3.51	3.44	3.84	3.39	6.54	5.64	5.60	4.23	5.03	4.8	4.1	3.6	6.4	6.8	5.8	4.3	5.32	3.4	3
			9.4		5.8	7.2	9.7	8.7	7.01			19.1		11.5		12.3		13.2		16.9	14.4	12.1	11.3	13.8	13.1	17.6	15.5	16.7	-	12.6		12.8		13.9	16.3	16.9		13.9		12.7		15		17.1		14.3		14.
<5	<5		68	<5	<5	<5	<15	<15	<15	<15		<15		<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	< 15	< 15	<15	<15	20	26	<15	<15	<15	<15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	<
			6.91		6.99	8.63	8.27	8.74	8.25			10.0		9.13		9.25		9.46		10.3	10.8	8.9	8.5	10.5	9.68	10.3	10.3	10.7	-	9.34		9.08				10.70	10.50	10.20		9.08		9.9		10.7		11		10.4		9.3
<0.04	<0.04		<0.04	<0.05	<0.05	<0.05	<0.05	<0.05	0.02	<0.05		<0.05		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	< 0.01	<0.01	0.01	0.02	< 0.01	< 0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	< 0.010	< 0.0
			1.43		0.84	1.1	1.12	1.17	1.25			1.37		1.37		1.21		1.15		1.51	1.47	1.33	1.11	1.43	1.22	1.4	1.36	1.49	-	1.26		1.3		1.69	1.59	1.49		1.42		1.34		1.49		1.58		1.39		1.3
			<0.001		<0.001	<0.001	<0.001	<0.001				<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001	<0.001	<0.001	-	< 0.001		<0.001		<0.001		<0.001		<0.001		< 0.0010		< 0.0010		< 0.0010		< 0.0
			<0.03		<0.03	<0.03	0.204	<0.03	0.097			<0.03		<0.03		<0.03		<0.03		0.017	0.019	<0.03	0.016	0.02	0.015	0.02	0.02	0.03	-	0.01		0.01		0.06	0.057	0.02		0.01		0.019		0.021		0.024		0.0225		0.0
12	13		11.5	12.6	9.5	10.4	14.3	11.2	13.4	12.9		16.9		13.2	13.2	14.2	16.5	14.6	15.1	17.4	16.1	13.6	13.4	16.2	14.9	17.1	17.4	18	15.9	14.9	14.8	15	15.4	18	18.3	17.6	16.1	5.6	16.8	16.6	15	18.6	21	19	18.2	17.2	17.6	16.
3.8	4		3.49	4.53	3.09	3.4	4.21	4.23	4.34	3.97		5.73		4.36	4.28	4.18	4.78	4.39	4.6	5.55	5.07	4.12	3.86	5.21	4.68	5.35	5.07	5.56	4.63	4.36	4.39	4.56	4.71	5.8	5.44	5.63	4.94	5.02	5.3	4.9	4.6	6	6.8	6	6.1	5.38	5.5	5.7
46	49		43	50	36	40	53	45	51	49		66		51	51	53	61	55		66	61	51	49	62	57	65	64	68	59	55	55	56	58	69	68	67	61	35	63.8	61.7	56.4	71.2	80.5	72.2	70.6	65.1	66.6	62.
0.003	0.001		0.003	0.002	0.001	<0.001	<0.001	<0.001				0.0019		0.0025		<0.0005		0.0008		<0.0005		0.0009		0.0005		<0.0005	<0.0005	<0.0005	-	0.0007		0.0034		<0.0005		<0.0005		<0.0005		0		<0.0005		0		<0.0005		<0.0
			0.022		0.010	0.005	0.003	0.005				0.055		0.0018		0.0037		0.0117		0.0059		0.014		0.019		0.0145	0.0007	0.0042	-	0.0052		0.0031		<0.0005	<0.0005	<0.0005		0.0067		0.0018		0.0051		<0.0005		<0.0005		<0.0
0.41	0.17		0.29	0.32	0.2	0.11	0.046	0.066	0.286	0.867		1.08		0.019	0.623	0.03	0.022	0.046	0.013	0.005	0.0025	0.005	0.013	0.02	0.014	0.005	0.005	0.005	0.0025	0.005	0.005	0.005	0.0025	0.005	0.0025	0.003	0.02	0.005	0.1500	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0
39	51		110	75	66	65	121	101	73	69		126		97	95	115	121	106	107	138	110	118	105	107	116	118	117	122	115	112	108	142	81	148	125	145	91	113	124	106	116	145	164	133		129	127	11
			24		27	14	6	14				60		1.5		28		2		7		2.5		21		2.5	3	1.5	-	< 4		<5		<5		<5		<6		< 3		< 3		< 3		< 3		< 3		< 3
1.17	*1.2*		1.33	*1.16*	1.07	1.16	1.47	1.42	1.39	*0.99*		1.92		1.45	*1.22*	1.58	*1.31*	1.52		1.7	1.65	1.5	1.42	1.69	1.61	1.79	1.74	1.95	-	1.46				1.84	1.86	1.83		1.7		1.63		1.89		1.88		1.796		1.8
0.93	*0.98*		1.21	*1.04*	1.06	1.21	1.45	1.32	1.43	*1*		1.83		1.45	*1.03*	1.49	*1.22*	1.53		1.81	1.73	1.44	1.38	1.73	1.58	1.78	1.77	1.86	-	1.54				1.88	1.85	1.82		1.63		1.7		1.93		1.96		1.787		1.7
-11.46	*-9.89*		-4.65	*-6.73*	-0.22	2.12	-0.73	-3.76	1.40	*0.57*		-2.64		-0.06	*-8.42*	-3.12	*-3.65*	0.43		3.27	2.42	2.10	1.2	1.33	0.76	0.42	0.93	2.48	-	2.65				1.30	0.11	0.10		2.42		2.10		1.00		4.06		-0.25		2.7

lues for Drinking Water Notice 2022

v Zealand) Regulations 2022 Maximum Acceptable Value (MAV) for health significance

Aug-00	Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Sep-09	Mar-10	Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	Apr-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23	Apr-24	Sep
		Well dry									sample		new well							EQ 4/9/10																													
-	-		ND	-	ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND				1 detected		1 detected		ND				ND
																																						0,0012		0,0008				0,00057		
		not sampled																																														
-	-		ND	-	ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND				ND				ND		ND		ND
-	-		ND	-	ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND				ND				ND		ND		ND
-	-		ND	-	ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND				ND				ND		ND		ND
-	-		ND	-	ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND				ND				ND		ND		ND
-	-		ND	-	ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND				ND				ND		ND		ND
-	-		ND	-	ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND				ND				ND		ND		ND
-	-		ND	-	ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND				ND				ND		ND		ND
-	-		ND	-	ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND				ND				ND		ND		ND
-	-		ND	-	ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND				ND				ND		ND		ND
					100		34	26																																									
								0,82																																									

eloped in Apr 10.

	Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Sep-09	*May-10*	Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	May-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23	Apr-24
	6.7	2.9	3.0	3.1	4.1	2.2	3.0	3.1			3.0	3.1		3.3	3.2	3.2	3.3	3.3	3.1	2.9	2.6	2.9	2.6	4.7	3	2.5	2.7	3.2	3	3	4.55	3	3.1	2.7		3.2	3.4	2.9	3	2.8		3.6	3.1	3.6	3.2	3.05	4.9
	6.89	7.1	7.11	7.5	7.1	6.89	6.09	6.82			6.95	7.6		7.09	7.43	7.15	6.84	7.07	7.18	6.82	8.04	7.71	7.72	7.44	8.9	6.75	8.97	8.84	8.66	8.7	6.97	7.17	7.73	6.91		7.64	7.62	7.64	8.31	7.44		7.24	6.55	6.98	7	7.17	6.44
			5.9	5.1	4.3	4.8	6	7			4.5	9.7				4.51	3.81	4.63	3.72	6.54	2.30	5.88	4.04	7.95	4.85	6.08	1.02	2.57	2.74	1.64										4	62.3		62	3.21	4.5	6.41	0.23	9.1
																				23.4	54.5	41	73	51.9	58	10.6				42.7	74	10.7	10.9		61.1	35.8	7.96									
	16.5	10.1	16.9	13.1	13.5	11.4	14.8	15.3			18.9	10.6		9.6	19.5	9.3	16.2	10.1	13.8	10.2	16.1	11.9	16	11.5	18.6	13.2	17.2	7.8	16.3	7.9	13.1	9.5	16.3	14.2		9.5	17	8.3	15.5	13.7		14.8	17	10.8	14.3	9.5	13.6
	91.3	97.1	123.9	108	104	164	120	102			414	108		92.2	96.7	83	94.9	87	96.7	60.6	294.6	279.4	69	75.5	90.2	123	8.97	8.84	87.5	70	12.5	62.4	53.5	504.9		67	86.7	61.1	68	76.2		92	88.9	110	88.8	57.7	95
	6.9	7.1	7.1	7.2	7.0	6.1	6.2	6.8			6.7	6.8		6.9	6.9	6.9	6.6	6.6	7.1	7.1	8.4	7.3	8.5	8.9	9.2	7.8	8.8	9.1	7.0	9.0	6.8	7.5	8.5	7.1	7.1	7.2	7.3	7.7	8.0	7.8	7.6	7.9	7.1	7.6	7.5	7.5	7.4
	55	39	46	39	38	46	40	40			50	42		42	44	34	44	35	48	40	28	39	25	19	37	35	33	34	44	21	46	30	32	30	30	31	38	34	38	34	44	31	42	35	39	37.8	44.0
	0																																			38		41									
	11	9	10.8	8.5	8.8	12.4	7.9	8.7			10.5	9.5		9.9	10.5	9.2	9.5	8.3	9.5	7.9	8.7	8.9	5.3	5.7	9.7	7.8	7.2	7	13.0	7.1	11.1	9	8.4	9.3	8.9	9.6	10.5	8	8.5	7.8	10.5	7.3	11	9.6	9.6	9.7	11.9
	2.6	3.5	4.1	3.1	3.9	3.8	2.7	3.3			5.52	4.82		4.33	4.70	4.81	3.43	3.38	3.16	2.81	3.45	3.48	3.24	3.79	3.22	4.05	3.69	4.31	3.10	3.72	3.61	3.88	3.34	4.69	3.73	3.49	4.02	3.63	2.7	3.2	3.2	4	11.1	3.1	3.1	2.61	2.9
	0.35	0.23	0.32	<0.05	0.18	0.34	0.05	0.16			0.16	0.22		0.33	0.15	0.97	0.21	0.39	0.11	0.16	0.06	0.2	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	0.48	0.03	0.23	0.08	<0.01	0.17	0.2	0.15	0.02	0.05	<0.002	0.005	0.26	<0.002	0.52	0.33	0.137	0.278	0.49
		5.8	7.2		5.3	5.2	4.1	5.5			6.42	4.93		5.83		5.37		5.31		4.01	2.63	4.14	2.27	0.11	2.91	2.43	0.9	0.15		4.83		4.31		3.17		4.70		1.50		<0.5		<0.5		5.00		4.34	
	7	<5	<5	<5	<5	7	<15	<15			<15	<15		<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	16	<15	<15	<15	<15	<15	< 15	<15	<15	23	17	<15	24	16	<15	< 6	< 6	< 6	11	< 6	7	< 6	<6	<6
		4.5	4.47		4.22	3.64	4.35	4.07			6.24	4.66		5.09		4.61		4.64		4.79	5.25	4.62	4.01	4.53	5.45	4.51	4.51	4.5		4.38		4.71		4.86		4.95		4.65		4.9		4.5		5		5.19	
	<0.04	<0.04	<0.04	<0.05	<0.05	<0.05	<0.05	<0.05			<0.05	<0.05		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.02	0.25	0.04	0.03	0.06	< 0.01	< 0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	0.044	<0.01	0.01	0.123	0.016	<0.01	<0.01	< 0.01	< 0.01
		0.8	1.22		0.73	0.83	0.91	0.7			1.15	0.74		0.83		0.67		0.67		0.83	1.24	0.79	0.76	0.84	1.13	0.81	0.88	0.87		0.77		0.79		0.85		0.86		0.96		1.19		0.91		0.88		0.895	
		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001			<0.001	<0.001		<0.001		0.002		0.002		<0.001		<0.001		<0.001		<0.001	<0.001	<0.001		< 0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001	
		<0.03	<0.03		<0.03	<0.03	0.182	<0.03			<0.03	<0.03		<0.03		<0.03		<0.03		0.015	0.03	<0.03	0.018	0.01	0.015	0.02	<0.01	0.01		< 0.01		0.02		0.07		0.02		0.01		0.015		0.017		0.017		0.0194	
	13	9.3	11.5	9.1	9.4	9.3	9.71	8.78			11	10.1		11.1	12.2	10.3	11.7	9.9	17.1	9.53	10.8	9.8	5.07	6.24	10.5	8.48	7.9	7.59	15.5	7.31	12.7	9.95	6.82	10.3	10	10.1	11.5	9.75	10.3	8.7	12.3	9.1	13.6	10.4	11.2	10.81	13.9
	2.3	1.3	2.14	2.37	1.97	1.19	1.55	1.76			2.41	1.79		2.02	2.19	1.75	1.88	1.76	3.24	1.72	1.97	1.58	0.36	0.46	1.43	1.33	0.94	1.02	2.33	1.05	2.14	1.65	0.92	1.78	1.67	1.68	1.86	1.66	1.63	1.5	2.1	1.7	2.5	2	2.2	1.89	2.3
	42	29	38	33	32	28	31	29			37	33		36	40	33	37	32	56	31	35	31	14	17	32	27	24	23	48	23	41	32	21	33	32	32	36	31	32	28	39	30	44	34	37	35	92.0
1	0.003	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001			0.0006	0.0006		<0.0005		<0.0005		0.0076		<0.0005		<0.0005		<0.0005		<0.0005	<0.0005	<0.0005		< 0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		0.0005		<0.0005	
		0.006	0.015		0.002	0.01	0.002	0.004			0.0191	0.0043		0.007		0.0087		0.0635		0.0238		0.149		0.0023		0.0149	0.0042	0.0027		0.0274		0.0216		0.1390		0.0340		0.0565		0.0360		0.082		0.048		0.0252	
5	1.8	0.025	0.025	0.025	0.025	0.07	0.07	0.038			0.065	0.345		0.04	0.082	0.095	0.05	2.2	68.4	0.03	0.058	0.36	0.0042	0.01	0.008	<0.01	0.01	<0.01	< 0.005	< 0.01	<0.01	0.03	0.011	0.66	0.028	0.16	0.01	0.04	<0.02	<0.02	<0.02	0.04	<0.02	0.04	0.03	0.063	<0.02
	83	54	49	39	54	93	62	54			54	78		70	63	80	67	53	54	<10	30	47	26	21	51	31	24	37	75	57	58	107	31	68	56	60	51	29	48	41	72	63	78	60	64	66	77
		<5	<1		<1	9	7	<1			<5	35		<3		<8		8		18		42		64		62	66	157		26		48		137		62		333		7		97		80		134	
	1	0.88	1.04	*0.73*	0.86	0.99	0.82	0.87			1.12	0.94		0.96	*0.86*	0.87	*0.83*	0.81		0.83	0.7	0.84	0.55	0.42	0.76	0.74	0.66	0.68		0.55				0.82		0.82		0.81		0.79		0.75		0.92		0.94	
	0.9	0.79	0.98	0.65	0.84	0.74	0.83	0.78			1.05	0.89		0.96	*0.79*	0.88	*0.74*	0.98		0.85	0.96	0.86	0.48	0.57	0.93	0.75	0.69	0.69		0.66				0.93		0.89		0.85		0.8		0.83		0.93		0.947	
	-5.1	-0.52	-3.2	*-5.7*	-1.2	-14.4	0.4	-5.8			-3.2	-3.1		0.5	*-4.4*	0.3	*-5.9*	*9.48*		1.02	*15.6*	1.27	*7.13*	*15*	*9.92*	0.86	2.12	0.19		9.19				6.63		3.71		2.69		0.63		5.06		0.54		0.37	

or Drinking Water Notice 2022

and) Regulations 2022 Maximum Acceptable Value (MAV) for health significance

	Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Sep-09	*May-10*	Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	May-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23	Apr-24
	-	ND	ND	-	ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND																		
																																								0.001		0.0006		0.0005		0.00066	
																																											0.0003				
	-	ND	ND	-	ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
	-	ND	ND	-	ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
	-	ND	ND	-	ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
																																											ND		ND			
																						ND		ND		ND		ND		ND		ND		ND		ND		ND		ND								
	-	ND	ND	-	ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
	-	ND	ND	-	ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
	-	ND	ND	-	ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
	-	ND	ND	-	ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
	-	ND	ND	-	ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
	-	ND	ND	-	ND		ND	**2.2**				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND											

EQ 4/9/10

Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Sep-09	Mar-10	Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	May-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23	Apr-24	Sep
6.0	3.5	3.0	3.3	4.2	2.6	2.8	3.0	3.2	2.1	3.0	3.2		3.2	3.1	3.1	3.15	3.2	3.4	2.9	2.6	2.9	2.9	4.9	3	2.5	2.8	3.1	4.0	2.9	4.0	2.9	3.0	2.8		3.1	3.7	2.9	3.1	3.7		3.9	3.0	3.1	3.1	3.0	4.8	3
7.03	7.0	6.84	7.8	6.9	6.64	6.11	6.07	7.13	7.0	7.6	7.0		7.14	7.74	7.28	6.9	7.21	7.15	6.54	7.96	7.34	7.0	7.4	7.56	6.78	7.5	6.9	6.8	6.9	7.4	6.97	7.36	7.49		8.21	7.99	7.80	6.06	7.02		6.99	6.60	6.80	6.98	7.68	6.23	8.
		5	4.8	4	2.5	5.1	8	4.6	6.6	7	9.7				3.56	5.2	3.89	3.58	6.0	2.71	6.43	3.83	6.91	5.11	6.41	3.86	4.71	4.12	3.11										15.8	61.8		61.8	2.95	7.72	6.68	0.27	6.32	8.
																				26.7	61.6	37.5	64	53.4	61	37.9				15.3	45.6	50.3	60		62	41.4	6.38										
14.9	8.9	15.5	12.7	11.4	11.1	13.8	15.4	15.1	13.3	17.2	10.6		12.6	17	13.7	12.4	13.2	13.7	12.2	14.6	13.4	14.3	11.9	17.4	13.1	14.5	13.2	13.1	11.4	17.2	12.1	12.9	14.5		11.2	13.9	11.1	15.2	14.8		15	15.9	13	14.9	10.8	11.4	8
101	100	115.4	300	102	831	124	190	115		113	108		93.1	99.8	106	99.2	101.6	99.8	72.4	312.6	301.6	81.5	75.9	104.6	93.3	192.9	71	97.1	91	112	72.2	89.5	210		72	93.6	78.9	85.6	80.4		84	94.2	99	88.6	72.8	116.9	1
6.7	6.7	6.8	6.8	6.6	6.0	5.6	6.1	6.5	6.1	6.4	6.0		6.7	6.6	6.6	6.5	6.9	6.7	6.8	6.7	6.9	6.8	6.8	6.8	6.7	6.8	6.5	6.6	6.5	7.4	6.5	6.8	6.9	6.6	6.9	6.9	7.0	7.2	7.3	7	7.2	7.5	7.2	7.3	6.8	7.1	7
49	37	49	39	41	45	44	41	51	32	48	36		38	48	44	45	34		38	40	37	78	38	56	38	48	39	45	30	50	29	37	31	35	27	37	27	41.0	34.0	43.0	34.0	40.0	31.0	39.0	32.8	44	3
0																		38													35				33		34										
10	9	11	8.9	9.7	12.4	9.7	8.8	10.8	9.4	10.0	9.1		9.4	10.5	11.3	10.1	8.4	10	8.5	9.5	9	10.3	9.6	1.6	9.2	10.6	9.3	12.7	8.8	10	9.1	10.6	10.7	10.7	9.1	11.3	9.2	10.6	9.4	10.7	9.5	10.4	9	9.8	9.9	11.3	9
2.5	4.1	3.6	3	3.9	5.6	3.7	3.1	3.4	4.05	3.89	4.9		4.06	4.39	6.79	3.54	3.84	3.37	3.67	2.92	3.78	3.27	4.5	3.11	4.08	3.52	3.56	3.16	3.84	3.7	3.59	3.65	5.06	3.92	3.66	3.93	4.11	3	3.8	3	3.9	4.30	3.00	3.00	3.21	3	3
0.32	0.41	0.35	<0.05	0.29	0.64	0.62	0.24	0.22	0.4	0.31	0.54		0.37	0.45	1.35	0.53	0.43	0.33	0.48	0.3	0.36	0.22	0.59	0.33	0.46	0.36	0.5	0.36	0.40	0.08	0.24	0.21	0.67	0.43	0.35	0.41	0.47	0.59	0.36	0.26	0.46	0.25	0.47	0.137	0.88	0.50	0.
	6.1	6.2		5.1	5.6	5.5	4.7	2.6		4.74	4.76		5.35		6.49		4.91		4.48	4.21	4.9	4.62	4.57	4.38	4.75	4.7	5.38	-	5.72		5		5.23		5.44		5.09		5.1		4.6		4.4		4.96		5
6	<5	67	<5	<5	<5	<15	<15	<15	<15	<15	<15		<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	< 15	< 15	<15	17	18	21	<15	<15	<15	<15	< 6	< 6	23	<6	<6	<6	<6	<6	<6	<6	<
	4.7	4.83		4.89	5.08	4.77	4.19	4.95		6.49	4.66		4.89		5.88		4.3		4.54	5.8	4.75	5.07	5.11	5.95	4.89	5.37	4.6	-	4.76		4.84		5.91		4.86		4.8		5.3		5.3		5.1		5.23		5
0.05	<0.04	<0.04	<0.05	<0.05	0.21	<0.05	<0.05	0.02	0.07	<0.05	<0.05		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.02	< 0.01	< 0.01	0.03	0.02	<0.01	<0.01	0.22	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.015	< 0.01	< 0.01	< 0.01	< 0.01	< 0
	0.86	1.23		0.9	1.2	1.07	0.91	1.06		1.24	0.88		1.00		0.98		0.81		0.92	1.28	0.95	1.01	1.03	1.06	0.92	1.05	1.01	-	0.96		0.92		1.21		0.91		0.88		0.95		0.96		0.95		1.074		0.
	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001			<0.001	<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001	<0.001	<0.001	-	< 0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		< 0.
	<0.03	<0.03		<0.03	<0.03	0.194	<0.03	0.072		<0.03	<0.03		<0.03		<0.03		<0.03		0.013	0.027	<0.03	0.025	0.02	0.024	0.02	0.02	0.02	-	< 0.01		0.01		0.04		0.01		<0.01				0.016		0.017		0.0167		0.
12	9.1	12.2	9	9.6	15.3	12.1	8.37	11.4	11	11.6	9.82		9.85	12.1	12.3	12.6	9.05	11.7	9.94	11.7	9.1	11	10.4	12.7	9.85	12.1	10.6	14.9	9.24	11.6	9.81	12.3	18.3	11.1	9.56	12.3	9.32	12.5	10.5	12	10.6	13	9.6	11.3	12.32	13	9
2.1	1.5	2.37	2.54	2.25	2.61	2.07	1.73	2.75	1.82	2.21	1.83		1.80	2.31	2.26	2.09	1.74	2.61	1.93	2.41	1.67	2.08	1.89	2.43	1.8	1.95	1.73	2.30	1.52	1.85	1.64	2.09	2.12	1.93	1.60	2.12	1.63	2.2	1.82	2.1	1.91	2.3	1.8	2.2	2.11	2.2	1.
39	29	40	33	33	49	39	28	40	35	38	32		32	40	40	40	30	40	33	39	30	36	34	42	32	38	33	47	29	37	31	39	54	36	30	39	30	40.3	33.7	38.6	34.4	42.0	31.4	37.3	39.5	41.6	3
0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001			0.0007	<0.0005		0.0008		0.0008		0.0012		<0.0005		<0.0005		<0.0005		<0.0005	<0.0005	<0.0005	-	< 0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		< 0.
	0.016	0.005		0.008	0.021	0.002	0.014			0.016	0.0078		0.0234		0.0263		0.048		0.02		0.0188		0.021		0.0044	0.0052	0.0032	-	0.0006		0.0008		0.0027		0.0020		0.0022		0.0053		0.0019		0.0005		<0.0005		< 0.
0.69	0.025	0.025	0.06	0.17	0.19	0.017	0.059	0.108	0.638	0.137	0.033		0.214	0.133	0.364	0.083	0.301	0.039	0.01	0.0025	0.005	0.0025	0.005	0.006	<0.01	<0.01	<0.01	< 0.005	< 0.01	<0.01	<0.01	<0.005	<0.01	0.009	<0.01	0.02	<0.01	<0.02	<0.02	0.0400	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	< 0
16	58	56	42	74	79	70	58	54	47	58	52		50	60	79	65	56	81	66	68	56	65	56	74	57	73	74	70	38	49	77	52	90	73	59	55	43	34	54	77	63	75	57	64	65	80	6
	<5	5		<1	18	6	<1			<5	7		6		28		78		<4		<5		<5		<5	<6	<4	-	< 4		<4		<5		<6		<6		< 3		< 3		< 3		< 3		<
0.9	0.88	1.06	0.73	0.91	1.06	0.98	0.87	1	0.87	1.02	0.87		0.86	0.94	1.14	0.88	0.8		0.86	0.99	0.84	1.49	0.89	1.12	0.87	1.01	0.89	-	0.76				0.93		0.78		0.81		0.91		0.93		0.83		0.94		0.
0.8	0.81	1.05	0.66	0.91	1.24	1.01	0.77	1.04	0.72	1.08	0.87		0.88	0.8	1.09	0.8	0.82		0.88	1.07	0.82	0.97	0.92	1.12	0.87	1.03	0.9	-	0.82				1.37		0.84		0.83		0.93		0.94		0.87		0.947		0.
-5.8	-4.3	-0.6	-4.8	-0.2	7.8	1.3	-6.5	1.9	3.9	3	0		0.5	-8.3	-2.2	-4.3	1.28		1.22	3.53	1.14	21.2	1.93	0.1	0.17	0.7	0.38	-	4.01				19.30		3.64		1.55		1.09		0.53		2.35		0.37		1.

er Drinking Water Notice 2022

and) Regulations 2022 Maximum Acceptable Value (MAV) for health significance

EQ 4/9/10

Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Sep-09	Mar-10	Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	May-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23	Apr-24	Sep
	ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND				ND				N
	ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		0.0008		0.001				0.00074				
	ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		N
	ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		N
	ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		N
	ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		N
	ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		N
	ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		N
	ND	ND		ND		ND	ND				ND		ND		detected 1 of 6 analytes		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		N
															6.1																ND		ND		ND														
	ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		N
	ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		N
	ND	ND		ND		ND	7.7				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND														
	ND	ND		ND		ND	ND				14		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND														

	Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	New Bore Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Sep-09	Mar-10	EQ 4/9/10 Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	May-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23	Apr-24	Sep
											5.0	6.3			4.95	4.6	4.9	4.9	5.1	4.9	4.7	5.0	4.6	4.7	5	4	4.8	4.9	5.6	5	6.5	4.9	4.8	4.7		5.1	5.4	4.9	4.9	2.8	5.1	2.9	4.8	5	4.9	5.6	6.2	4.3
											7.5	7.0		7.64	7.34	7.74	6.32	7.75	7.39	6.47	7.74	7.36	7.4	7.3	7.91	6.73	7.22	7.35	6.59	7.48	6.8	6.87	7.16	7.25		7.64	7.67	7.65	6.23	7.68	6.88	7.6	8.42	6.75	6.62	7.03	6.57	7.5
											5.3	9.8				3.97	5.1	4.25	3.16	5.36	4.22807	5.66928	4.38912	6.84495	5.099394	5.776995	4.451824	5.17	4.57	3.6									37.9	73	44.7	70.4	2.51	6.18	4.8	3	10.35	7.1
																					41.8	55.8	43.2	63	51.4	55.5	44.2								50.9	43.7	6.77										
											15.6	10.6		9.7	21.3	13.8	11.8	13.3	13.4	12.6	14.8	14.6	14.6	11.6	15.7	13.5	15	13	14.3	12.9	12.5	13.3	13.3	14.2		12.2	13.6	10.9	14.2	10.5	15.6	12.6	15.1	13.9	15.6	11.7	11	92
											101	104		179.1	296	155.2	101.6	154	296	78.7	332.9	307.1	91.2	98	104.4	106	198.4	80	100	98	113	70.4	81.1	202.2		71.6	90.2	73.1	83.1	57.4	92.8	64.2	90.2	101	91.8	69.4	86.1	14
											6.3	6.4		6.5	6.6	6.6	6.3	6.7	6.7	6.7	6.7	6.8	6.6	6.7	6.7	6.7	6.6	6.6	6.6	6.7	6.6	6.8	6.6	6.6	6.7	6.7	6.6	6.8	7.4	7.2	7	7.1	7.3	7.2	7.2	7	7	7.
											51	37		51	48	56	46	36		37	40	46	49	42	54	40	49	42	46	32	43	29	35	33	36	28	37	28	42	35	42	34	43	33	39	32.5	43	3
																			104												35				34		34										
											10.2	9.4		12.3	17.0	15.6	9.8	8.8	28.9	9.1	9.8	11.1	10.8	10.7	11.4	9.8	11.2	9.7	12.7	9.1	10.8	9.1	10.4	11.3	11.2	9.3	11.4	9.5	10.6	9.9	10.3	9.5	11	9.1	10	9.4	11.3	9.
											6.19	5.68		7.55	4.39	9.11	3.52	4.26	6.00	3.84	3.24	4.22	3.37	4.89	3.05	4.4	3.8	3.73	3.02	3.95	3.58	3.59	3.72	5.33	4.20	3.75	3.94	4.28	3	4	3.1	4	4	3.1	3.1	3.13	2.9	3.
											0.28	0.49		0.42	0.45	1.26	0.46	0.46	0.32	0.5	0.33	0.38	0.23	0.6	0.31	0.52	0.42	0.45	0.32	0.35	0.25	0.23	0.24	0.69	0.42	0.38	0.44	0.52	0.56	0.46	0.24	0.49	0.37	0.48	0.26	0.566	0.51	0.
											4.71	4.98		5.26		6.73		4.91		4.66	4.77	5.04	4.63	4.76	4.2	4.88	4.92	5.56		5.72		4.97		5.59		5.53		5.15		5.3		4.5		4.4		4.8		5.
											<15	<15		<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	< 15	<15	<15	18	21	<15	<15	<15	<15	< 6	< 6	< 6	< 6	< 6	< 6	< 6	<6	<
											6.46	5.12		6.09		7.89		5.24		4.94	6.06	5.03	5.49	5.73	5.74	5.09	5.46	4.78		4.94		4.88		5.33		4.9		5.14		5.5		5.3		5.1		5.32		5.
											0.11	<0.05		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	< 0.01	<0.01	0.02	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	< 0.01	< 0.
											1.15	0.98		1.26		1.37		1.13		1.3	1.23	1.1	1.17	1.34	1.06	0.99	1.2	1.2		1.05		0.91		1.26		0.99		1.02		1.06		1.12		1.09		1.081		0.
											<0.001	<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001	<0.001	<0.001		< 0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.0010		< 0.
											<0.03	<0.03		<0.03		<0.03		<0.03		0.017	0.028	<0.03	0.026	0.02	0.023	0.02	0.02	0.02		< 0.01		0.01		0.04		0.01		0.02		0.02		0.017		0.017		0.00172		0.0
											11.4	10.4		10.5	12.1	15.2	12.3	9.82	22.7	10.6	11.3	9.5	10.6	10.7	12.3	10.5	12.7	10.4	14.9	9.66	11.9	9.71	12	12.1	12.1	9.85	12.7	10.4	12.6	11.5	11.7	10.6	14	9.6	11.7	11.62	13.2	10
											2.15	1.93		3.24	2.31	3.93	2.13	2.58	12.9	2.22	2.56	1.92	2.46	2.46	2.45	1.87	2.1	1.81	2.34	1.58	2.02	1.62	2.02	2.08	1.97	1.66	2.18	1.74	2.2	1.99	2.1	1.93	2.6	1.8	2.3	2.01	2.2	1.4
											37	34		40	40	54	40	33	110	36	39	32	37	37	41	34	40	33	47	31	38	31	38	39	38	31	41	33	41	37	38	34	46	31	39	37	42.1	33
											0.0007	<0.0005		<0.0005		<0.0005		0.0007		<0.0005		<0.0005		<0.0005		<0.0005	<0.0005	<0.0005		< 0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		< 0.0
											0.0131	0.0012		0.0856		0.0788		0.0831		0.0315		0.0403		0.0313		0.0066	0.0102	0.0074		0.0005		<0.0005		0.0040		0.0013		0.0022		0.0044		0.0018		<0.0005		<0.0005		< 0.0
											0.118	0.029		0.678	0.133	0.908	0.131	0.295	1.18	0.02	0.025	0.03	0.006	0.01	0.006	0.005	0.005	0.005	0.00025	0.005	0.005	0.005	0.00025	0.005	0.00025	0.006	0.005	0.005	0.01	0.01	0.01	0.01	0.01	0.01	0.01	<0.02	< 0.
											55	54		70	60	100	80	23	169	69	60	60	72	82	73	59	84	66	77	77	61	88	51	90	76	59	56	48	66	59	74	66	77	57	67	62	70	6
											<3	<3		4		<8		<4		<5		<5		<5		<5	<6	<4		< 4		<4		<5		<6		<6		< 3		< 3		< 3		< 3		<
											1.13	0.91		1.19	0.94	1.4	0.89	0.85		0.85	1.02	1.01	1.01	0.97	1.08	0.92	1.04	0.94		0.78				0.98		0.80		0.83		0.95		0.92		0.87		0.88		0.
											1.06	0.93		1.11	0.8	1.5	0.79	5.05		0.96	1.07	0.88	1	1.02	1.09	0.92	1.08	0.91		0.85				1.04		0.87		0.92		1		0.95		0.88		1.005		0.5
											0.2	1.2		-3.2	-8.3	3.1	-5.5	4.26		6.05	2.52	6.71	0.75	2.54	0.45	0.27	1.47	1.94		4.83				3.15		3.9		5.0		2.56		1.60		0.57		6.75		1.4

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nd) Regulations 2022 Maximum Acceptable Value (MAV) for health significance

	Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	New Bore Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Sep-09	Mar-10	EQ 4/9/10 Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	May-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23	Apr-24	Sep
												ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		2 of		ND				ND		ND				N
																																			0.0027												
																																			0.0006												
																																							0.007						0.0006		
												ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND							N
												ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		N
												ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		N
																																							ND		ND		ND		ND		
												ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	N
												ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		N
												ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		N
												ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		N
												ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		N
												ND		ND		1.4		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND												
												7.9		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND												

										New Well (stainless steel well casing)									EQ 4/9/10																							
Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Sep-09	Mar-10	Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	Apr-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-2
No Sample	5,1	5,4	5,1	6,0	7,3	6,2	5	6,25	No sample	13,6	8,2		7,1	6,9	4,7	6,1	5,8	11,7	5,8	5,4	5,8	5,5	5,5	13	5,5	9,8	5,5	17,1	5,5	11,3	8,1	12,5	4,9		7,7	12,5	5,2	10,5	6,2	12,9	5	6	5,5	5	5,67
	7,0	6,7	6,7	6,1	6,4	6,1	6,9	7,3		7,4	7,1		6,7	7,0	6,9	6,8	6,54	6,72	6,30	8,2	7,0	6,7	7,3	7,47	6,54	7,37	6,7	7,1	7,2	6,7	6,8	6,73	7,42		7,49	7,2	7,22	6,5	6,6	6,7	6,3	6,6	6,4	7,1	6,6
		10	1,6	6,2	4,1	8,0	6,4	4		4,3	10,3				4,39	6,51	4,54	5,7	5,44	4,963126	5,281155	4,694085	6,182164	8,682064	5,7483	6,469265	4,4	8,11	3,48										50,9	59,3	54,6	3,68	4,45	3,77	1,17	4,6
																				46,1	49,5	43,5	55,6	86,2	54	60,5				47,8	52,4	39,8	50,5		43,3	39,1	5,55								
	8,4	12,6	6,3	9,0	10,8	12,5	9,6	12,9		12,6	11,2		12,2	12,5	12,0	12,5	11,1	13,3	11,5	12,0	12,4	11,9	10,8	15	12,5	12,3	12,3	16,1	12,3	12,6	12,2	11,8	13,3		12,7	12,2	10,4	12,4	13,2	13,6	15,1	13,5	14,2	14,3	11,3
	126	156,4	175	142	173	171	146	132		110	115		106,7	103,8	111	108,3	110	103,8	108,2	312,4	286,2	84,5	91	105,9	116	211	97,1	98,1	120	127	103,9	95,6	200,1		91,4	94,9	104,3	105,7	106,8	101,6	163,5	93,5	176	117,9	95,5
	6,3	6,5	6,4	6,2	6,0	5,6	5,9	6,3		6,3	6,5		6,4	6,4	6,4	6,4	6,7	6,5	6,7	6,6	6,7	6,7	6,5	6,9	6,6	6,6	6,5	6,6	6,5	6,6	6,7	6,60	6,50	6,00	6,80	6,70	6,50	7,50	7,20	7,00	6,7	7,60	7,0	7,10	7,0
	59	49	47	43	46	60	94	49		54	46		44	51	58	46	43	39	46	41	48	52	47	53	44	48	71	39	46	45	39	39	45	54	36	38	42	40	42	42	51	44	55	57	51,8
	0	0																													48				44		52								
	15	13,8	11,7	11,8	14,6	12,9	21,4	12,6		11,6	11,7		11,5	11,4	13,2	11,0	10,3	11	10,3	10,6	11,3	11,8	12	11,7	11,2	12,4	12,1	12,8	12,4	12,3	13	12,6	15,5	21,1	11,7	12,6	14	11,6	12,4	12,4	15,9	11,9	15,4	14,9	14,1
	6,2	6,2	5,3	5,5	7,3	5,9	8,3	5,8		5,52	6,65		6,07	5,24	7,26	5,31	5,42	4,98	4,92	5,56	5,31	4,85	5,34	5,1	5,24	6,15	5,2	5,77	5,82	5,49	6,69	5,94	7,29	15,9	5,73	5,66	5,89	5	5,5	5,2	7,4	4,8	5,4	4,2	4,76
	2,63	2,39	0,05	1,94	2,84	1,6	1,76	1,48		1,12	1,54		1,08	1,02	2,56	1,45	1,15	1,03	1,09	1,09	1,02	0,86	1,21	0,94	1,09	1,09	1,31	1,31	1,69	1,13	1,1	1,12	1,89	1,38	1,02	1,26	1,95	1,69	1,56	1,62	2,4	1,16	1,79	1,41	1,54
	4,7	6,5		4,4	6,3	4,3	6,8	2,65		3,86	4,1		3,95		4,37		4,02		3,93	3,67	3,86	3,78	3,66	3,61	3,91	4,19	4,34		4,85		4,36		4,81	5,48	4,23		5,2		3,9		5,1		4,2		3,95
	13	5	<5	<5	<5	<15	<15	<15		<15	84		<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	< 15	< 15	20	<15	25	<15	19	16	20	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
	6,1	5,97		6,56	4,32	6,16	8,23	6,10		7,15	6,28		5,91		6,48		5,44		5,31	6,74	5,59	5,44	6,15	6,3	44,7	6,28	6,14		6,55		6,11		6,7	14,5	5,91		6,71		6,6		8,6		9		7,82
	0,21	0,08	0,21	0,16	0,16	0,025	1,14	0,02		0,025	0,025		0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,07	0,01	0,005	0,005	0,005	0,02	0,005	0,005	0,22	0,005	0,005	0,01	0,005	0,005	0,005	0,005	0,005	0,118	0,041	0,145
	1,9	2,8		2,83	2,1	1,43	4,77	1,78		1,35	1,18		1,5		1,17		1,05		1,16	1,29	1,16	1,12	1,3	1,11	1,13	1,26	1,36		1,79		1,21		2,15	3,37	1,14		1,9		1,33		2,4		2,5		2,04
	<0,001	0,001		0,004	<0,001	<0,001	0,001			<0,001	<0,001		<0,001		<0,001		<0,001		<0,001		<0,001		<0,001		<0,001	<0,001	<0,001		< 0,001		<0,001		<0,001		<0,001		<0,001		<0,001		< 0,001		< 0,001		< 0,00
	<0,03	<0,03		<0,03	<0,03	0,244	0,04	0,141		<0,03	<0,03		<0,03		<0,03		<0,03		0,015	0,021	<0,03	0,018	0,02	0,018	0,01	0,02	0,02		0,02		0,02		0,08	0,034	0,01		0,01		0,017		0,029		0,026		0,022
	14	13,1	13,2	24,1	9,3	15,8	17,6	15,5		11,5	12,1		11,2	11,9	13,6	13,0	11,1	11,4	11,4	13,1	10,6	11,7	11,8	10,8	11	12,6	13	13,0	13,7	11,9	12,6	13,1	14,7	16,9	11,8	12,1	13,5	11,8	12,8	12,7	15,0	13,4	16,0	14,8	13,6
	3,4	3,4	3,73	7,58	3,22	3,76	4,55	4,65		3,07	3,23		2,99	3,14	3,37	3,13	2,7	3,26	3,02	3,38	2,91	2,81	3,21	3,16	2,72	2,94	3,13	2,96	2,89	2,94	3	3,42	3,39	3,51	2,79	3,14	3,33	3,1	3,2	3,2	3,9	3,5	4,3	4,1	3,25
	49	47	48	91	37	55	63	58		41	44		40	43	48	45	39	42	41	47	38	41	43	40	39	44	45	45	47	42	44	47	51	57	40	43	47	42	45	45	54	48	58	54	47
	<0,001	0,003	0,003	0,015	<0,001	<0,001	0,001			0,0043	0,0050		0,0590		0,0050		<0,0005		<0,0005		<0,0005		<0,0005		<0,0005	0,0008	<0,0005		0,0011		<0,0005		<0,0005		<0,0005		<0,0005		0,0006		0,0009		<0,0005		<0,000
	0,094	0,071		0,463	0,015	0,031	0,005			0,0118	0,0041		0,0079		0,0402		0,0077		0,0014		0,0052		0,0041		0,0009	0,0199	0,0053		0,0029		0,0015		0,0044		0,0095		0,0134		0,0014		0,023		0,0087		0,017
	0,24	0,9	3,29	17,4	0,46	0,23	0,3	10,5		0,216	0,022		0,033	0,307	0,589	0,058	0,025	0,0025	0,005	0,0025	0,005	0,0025	0,005	0,0025	0,005	0,02	0,005	0,028	0,005	0,005	0,005	0,0025	0,005	0,132	0,005	0,005	0,005	0,17	0,01	0,01	0,01	0,03	0,01	0,01	0,01
	93	85	35	99	119	86	115	63		66	71		68	59	101	75	66	77	85	73	62	74	67	71	33		166	74	81	66	105	62	104	107	79	62	93	83	76	82	92	86	95	99	86
	9	50		1220	287	11	22			21	<3		<3		112		18		13		23		<5		2,5	3	1,5		< 4		<5		<6		<5		<6		<3		13		20		<3
	1,43	1,28	*0,92*	1,09	1,29	1,35	2,04	1,13		1,2	1,15		1,05	*1,06*	1,43	*1,01*	1,02		1,05	1,13	1,09	1,13	1,08	1,16	1,03	1,13	1,5		1,14				1,35	1,74	1,04		1,26		1,18		1,51		1,47		1,362
	1,3	1,3	*1,09*	2,82	0,99	1,41	1,74	1,84		1,18	1,17		1,1	*0,86*	1,29	*0,91*	1,04		1,08	1,26	1,04	1,08	1,15	1,1	1,04	1,18	1,21		1,26				1,36	1,88	1,10		1,29		1,22		1,5		1,62		1,352
	-4,5	0,6	*8*	44,3	-13,4	2,1	-7,9	24,10		-0,9	1,2		2,3	*-10,1*	*-5,1*	*-5,2*	0,88		1,15	*5,33*	2,31	2,25	3,08	2,44	0,56	2,42	*10,6*		5,05				0,37	3,63	2,58		1,12		1,7		-0,3		4,85		-0,37

s for Drinking Water Notice 2022

aland) Regulations 2022 Maximum Acceptable Value (MAV) for health significance

No sample																																											
Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Sep-09	Mar-10	Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	Apr-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-2
	ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND	ND	ND		ND		ND		ND		ND								
																																							0,0003			ND	
																																					ND		ND			ND	
																																					0,0013		0,0011		0,0008		0,0005
	ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND	ND	ND		ND		ND		ND		ND		ND		ND		ND		ND
	ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND	ND	ND		ND		ND		ND		ND		ND		ND		ND		ND
	ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND	ND	ND		ND		ND		ND		ND		ND		ND		ND		ND
	ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND	ND	ND		ND		ND		ND		ND		ND		<0,001		ND		ND
	ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND	ND	ND		ND		ND		ND		ND		ND		ND		ND		ND
	ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND	ND	ND		ND		ND		ND		ND		ND		ND		ND		ND
	ND	ND		ND		ND	ND				ND		ND		detected 1 of 6 analytes		ND		ND		ND		ND		ND	ND	ND		ND		ND		ND		ND		ND		ND		ND		ND
															8																														
	ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND	ND	ND		ND		ND		ND		ND		ND		ND		ND		ND
	ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND	ND	ND		ND		ND		ND		ND		ND		ND		ND		ND
						17	29																																					
							0.83																																					
							0.69																																					

First sample

EQ 4/9/10

Unit	Jun-00	Aug-00	Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Aug-09	Mar-10	Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	May-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23	Apr-24
mbgl								3,0	5,5	2,8	4,2	3,6	3,1	2,3		3,3	3,8	2,65	3,8	3,5	4,1			3,8	3,2	2,7	3,2	2,5	2,7	2,7	2,8	3	3,3	3	3,2	2,7		2,2	3,2	2,85	3,2	3	3,4	2,6	2,7	2,6	2,85	2,85	3,18
								8,0	6,6	6,9	6,45	6,35	6,6	6,9		6,73	6,76	6,7	6,54	6,84	7,51		8,04	7,11	6,84	6,99	7,02	6,83	6,94	6,75	6,56	5,86	6,61	6,76	6,52	6,91		6,99	6,95	7,13	6,46	6,65	6,59	6,61	6,29	6,99	6,86	7,01	6,45
mg/l								3,1	1,8	3,6	1,5	3,3	1,8	10				1,18	1,35	1,35	0,85		#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	4,02	3,05	1,44								4	18,7	0,87	18,3	0,81	15,7	1,27	0,23	1,51
% Saturation																							17,3	32,2	14,1	39	29,2	22,9	13,1				10,3	12,2	17	10,9		13	10,6	3,34									
Deg C								11,8	16,1	13,9	15,0	12,7	15,0	12,4		11,6	15,4	11,7	14,9	12,4	13,5		14,7	13,6	15,7	12,2	17	14,8	16,3	14	15,3	14,4	14,2	14,1	14,3	14,2		14	15,2	12,5	15,7	15	15	14,9	15,1	16,8	14,3	13,5	11,8
mS/m								325	731	732	733		628	618		664	550	489	628	536	550		589	910	877	317	886	94,6	167,4	700	732	960	797	795	767	504,9		727	724	680	719	705,8	688	642,9	671	815	616	598	866
								6,7	6,5	6,8	6,5	6,6	6,7	6,6		6,8	6,6	6,7	6,5	6,8	6,8		6,7	7,1	6,9	6,8	6,8	6,7	6,8	6,7	7,2	6,7	6,8	6,8	6,7	6,8	6,8	6,9	7,7	7,0	7,5	7,4	7,3	7,4	7,5	7,3	7,4	7,3	7,4
g/m³								516	590	575	577	479	621	577		556	570	547	569	537			415	480	482	433	453	400	420	407	302	406	387	357	328	330	336	326	311	305	340	320	330	300	300	310	300	308	300,0
																					436												436			410				373								
mS/m								122	110	121	122	199	126	120		123	117	118	114	110	104		87,4	108	109	102	103	93,3	96,1	90,4	89,5	97,0	96,3	103	94,6	95,7	97,2	92,6	90,8	88	89,2	87,7	87,2	83,9	82	85,1	82	83,9	81,6
g/m³								134	129	130	143	116	126	129		129	127	125	135	125	116		129	119	118	113	108	100	102	94,6	102	102	99,7	104,0	97	94,5	98,4	98,6	92,5	90,6	89	93	85	87	75	85	80	83,2	77
g/m³								0,025	0,025	0,025	0,025	0,005	0,005	0,005		0,005	0,005	0,005	0,005	0,005	0,005		0,005	0,73	0,30	0,39	0,005	0,29	0,005	0,15	0,10	0,02	0,005	0,005	0,49	0,19	0,005	0,1	0,01	0,24	<0,002	0,053	<0,02	0,53	<0,02	<0,02	<0,02	<0,02	<0,02
g/m³								3,1	2,1	1,6	0,74		0,94	1,05		1,12		1,36		1,7			6,42	6,39	5,28	3,10	1,34	1,01	0,95	1,16		1,47		1,85		0,60	1,00	0,73		0,66		1,5		3,9		4,6		5,94	
g/m³								33	45	34	29	40	57	45		52	32	45	73	40	33		<15	25	28	33	32	27	25	32	28	34	56	35	42	41	25	39	38	30	16	32	28	28	30	29	21	29,5	29
g/m³								65,6	73,4	69,4	20,6		92,8	74,8		60		72,2		71,8			76,8	62,4	68,6	73,5	67,4	66,2	67,7	65,3		67,0		67,8		67,0	66,5	65,3		65		67		63		67		63,8	
g/m³								0,80	<0,05	0,77	0,64	0,70	0,94	0,29		0,45	0,57	0,68	0,67	0,59	0,71		0,46	0,04	0,19	0,005	0,48	0,44	0,51	0,3	0,95	0,69	0,73	1,5	1,78	1,27	0,97	0,86	0,59	0,72	0,65	0,84	0,72	0,27	1,55	0,87	0,83	0,76	0,68
g/m³								11,3	11,2	11,7	14,1		12,6	10,9		11,8		11,5		11,5			12,3	14,7	10,5	10,5	8,95	9,16	9,01	8,72		9,53		10,5		10,6	11,2	9,82		10		10,3		9,3		10,7		9,57	
g/m³								0,006	0,01	0,022			0,019	0,027		0,024		0,021		0,07				0,002		0,0005		0,005	0,002	0,006		0,008		0,025		0,012		0,028		0,007		0,0134		0,0078		0,0088		0,0145	
g/m³								0,44	0,608	0,43	0,529		0,53	0,5		0,44		0,38		0,38			0,529	0,29	0,43	0,48	0,466	0,47	0,46	0,42		0,41		0,42		0,39	0,378	0,37		0,36		0,38		0,33		0,33		0,35	
g/m³								85,9	90,3	73,7	90,7	86,4	78,4	74,1		79,2	81,8	81,4	83,1	74,6	80,4		86	66,5	74,2	74,2	67	65,6	67,2	65	59,8	66,0	64,7	63,1	66,3	62,5	160	60,3	60,5	61,6	65	63	56	58	64	60	65	56,6	52
g/m³								62,7	54,4	61,7	65,5	64,7	71,6	62,5		56	29	59,7	61,2	60,9	61		56,7	60,4	46,8	42,6	40,3	48,8	38,3	36,7	35,0	38,1	17,1	39,6	39,1	35,6	96,7	36,2	36	37,3	39	36	35	33	36	37	3,4	36,9	32
								473	450	438	496	482	491	442		428	324	449	460	437	452		448	415	379	361	333	365	326	314	294	322	232,0	321	327	303	806	308	299	307	323	306	284	281	308	302	176	293	262
g/m³								<0,005	0,004	0,003			0,0042	0,0020		0,0030		0,0053		0,0054				0,0037		0,0031		<0,0005	0,0017	0,0012		0,0015		0,0013		0,0012		0,0016		0,001		0,0014		0,0014		0,0016		0,00118	
g/m³								3,00	2,35	2,57			2,83	3,26		2,54		2,69		2,78				1,71		1,71		1,61	1,81	1,39		1,98		1,95		1,46		1,86		1,28		1,61		1,23		1,89		1,70	
g/m³								0,41	33,4	30,5	41,6	46,1	59	38,3		37,5	15,9	38,3	62,4	44,1	6,26		2,79	6,2	0,139	0,05	3,28	0,4	0,33	0,23	0,018	0,13	1,49	7,58	1,18	5,22	12,5	9,48	0,03	0,7	1,97	5,6	5,8	2,5	5	2	3,4	3,83	9,10
g/m³								643	689	670	609	590	662	669		666	672	674	669	669	670		639	611	630	561	600	515	531	514	496	542	536	556	464	470	524	523	445	443	510	480	500	440	480	470	470	483	480
g/m³								52	62	46			45	129		6,2		46		97				<5		10		6	<6	28		32		11		10		25		25		14		10		115		18,7	
meq/L								12,30	13,35	13,12	13,50	11,12	13,75	13,11		12,77	12,92	12,52	13,13	12,40			12,1	11,4	11,4	10,4	10,5	9,47	9,81	9,41		9,61				9,32	9,54	9,37		8,72		9,1		8,5		8,7		8,62	
meq/L								12,71	13,74	13,26	12,66	11,29	16,38	13,86		12,91	7,04	13,88	11,42	14,60			12,8	11,4	10,8	10,7	10	10,4	9,72	9,36		9,64				9,6	20	9,81		9,31		9,6		8,7		9,4		9,12	
%								1,6%	1,4%	0,5%	-3,2%	0,7%	8,7%	2,8%		0,5%	-29,5%	5,2%	-7,0%	8,1%			2,7%	0,3%	2,54%	1,25%	2,5	4,91	0,44	0,29		0,16				1,47%	35,40%	2,33%		3,26%		2,67		1,16		3,87		2,82	

Water Notice 2022

ions 2022 Maximum Acceptable Value (MAV) for health significance

EQ 4/9/10

Unit	Jun-00	Aug-00	Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Aug-09	Mar-10	Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Aug-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	May-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23	Apr-24
µg/L									ND	ND				ND		ND		ND		ND				ND		ND		ND		ND				ND		ND		ND				1 detected		ND				ND	
µg/L																																														0,0003			
µg/L																																									0,001					0,0007			
µg/L																																														0,0003			
µg/L									ND	ND				ND		ND		ND		ND				ND		ND		ND		ND				ND		ND		ND				ND		ND				ND	
µg/L									3 of 28	3 of 28				3 of 28		3 of 28		3 of 28		3 of 28				2 of 28		2 of 28		2 of 28		2 of 28				2 of 28		2 of 28		ND				2 detected		2 detected				2 detected	
									0,016	0,016				0,0064		0,0079		0,0051		0,0076				0,0046		0,00961		0,0026		0,0023		0,0044		0,0068		0,0027						0,002		0,0013		0,0023		0,00216	
									0,0023	0,0016				0,0011		0,0011		0,00088		0,00087				ND		ND		ND		ND		ND		ND		ND												0,00135	
									0,0033	0,0024				0,0014		0,0015		0,0013		0,0012				0,0		0,00		0,0016		0,0018		0,0014		0,0018		0,0014				0,001		0,0019		0,002		0,0015		ND	
µg/L									ND	ND				ND		ND		ND		ND						ND		ND		ND		ND								ND		ND		ND		ND	
																																					1 of 67										ND	
µg/L									ND	ND				ND		ND		ND		ND						ND		ND		ND		ND		ND		ND		ND				ND		ND		ND	
µg/L									ND	ND				ND		ND		ND		ND				ND		ND		ND		ND		ND		ND		ND		ND				ND		ND		ND	
µg/L									ND	ND				ND		ND		ND		ND				ND		ND		ND		ND		ND		ND		ND		ND				ND		ND		ND	
																		detected 1 of 6 analytes																																	
µg/L									ND	ND				ND		ND		ND		ND				ND		ND		ND		ND		ND		ND		ND		ND				ND		ND		ND	
µg/L																		2,6						ND																									
µg/L									ND	ND				ND		ND		ND		ND				ND		ND		ND		ND		ND		ND		ND		ND				ND		ND		ND	
µg/L									ND	ND				ND		ND		ND		ND				ND		ND		ND		ND		ND		ND		ND		ND				ND		ND		ND	
µg/L																																						0,1		ND									
µg/L									6,1																																										
µg/L																		1,4																																

6847)

EQ 4/9/10

Unit	Jun-00	Aug-00	Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Aug-09	Mar-10	Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	May-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23	Apr-24	Sep
mbg/l			2,5	2,55	2,8	2,4	3,2	2,1	2,9	3,6	3,1	2,2	3,0	1,8		2,25	2,75	2,7	2,8	2,4	3,0			3,7	2,7	2,3	3	2	2,4	2,3	2,9	2,7	2,8	2,7	2,7	2,2		2,4	2,8	2,4	2,8	2,6	2,5		2,3	2,2	2,45	2,31	2,8	2
					7,46	7,2	**6,3**	7,5	**6,8**	7,6	7,07	7,0	**6,3**	7,3		8,03	7,13	7,77	7,04	7,66	7,82		7,1	7,23	**6,85**	**6,99**	7,11	**6,4**	6,64	6,57	6,35	6,69	6,36	6,66	**6,68**	7,01		**6,97**	7,07	7,06	**6,22**	**6,59**	**6,27**		**6,24**	**6,72**	**6,87**	7,19	**6,31**	7,
mg/l			2	3,8	1,5	2,0	2,0	4,3	3,6	2,8	1,3	3,2	2,2	9,4				4,62	0,56	0,47	0,64		#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	3,43	3,79	2,48										12,2	26,1	0,81		1,41	2,11	1,58	0,31	2,64	
% Sat																							15	15,5	19,1	54	23,6	17,2	10,1				16	11,5	26,9	14,2		11,2	10,7	0,95									
Deg C			17,1	9,8	13,9	12,0	12,1	12,4	16,0	16,3	14,4	11,8	14,6	11,5		11,2	16,5	6,7	14,1	12,4	12,6		12,9	13,6	14,5	11,7	16	14	14,7	13,7	14,6	14,4	14,5	13,8	13,9	15,0		12,4	14,3	13,1	14,9	15,7	14,8		14,9	15,5	15,4	13,1	12	
mS/m			103	98	254	561	435	604	372	515	298		272	282		298,4	261	307	434	389	261		774	691	458,5	318	400,2	412,2	220,4	131	332	493	414	424	392,6	179,9		529	434,9	455,7	404,3	405,1	363,7		344	525	372,5	336,6	517	49
			6,9	7,0	7,3	7,5	7,3	7,5	7,4	7,5	7,6	8,1	7,8	8,0		8,4	8,1	7,5	7,2	8,4	8,3		**6,6**	7,1	**6,6**	**6,5**	**6,7**	**6,1**	**6,5**	**6,5**	**6,4**	**6,5**	**6,5**	**6,6**	**6,4**	**6,6**	**6,6**	**6,9**	**6,6**	**6,7**	7,5	7,1	7,1	7,1	7,3	7,1	7,1	7,1	7	7
g/m^3			72	41	39	48	32	35	47	42	55	54	56	57		49	61	48	131	125			94	138	173	95	127	105	104	93	97	103	111	111	68	120	87	152	103	104	106	107	96	88	88	156	144	171,7	142	13
			0																		95		127											136				165		127									
mS/m			14	16	26,7	33,8	33,4	36	35,7	36,5	37,7	38,7	36,5	37,2		36,8	37,5	38,1	50,9	46,8	46,4		44,7	79,8	58,1	42,4	47,4	46,8	43,5	42,8	53,7	52,2	57,5	54,7	48,1	57,6	51,5	66,9	55,1	54,1	51,7	48	46,6	44,2	43,5	60,6	49	58,6	47,4	46
g/m^3			8,7	29,2	60	85	79,5	84	89	82	86	77,1	82,5	85,2		87,1	80,7	75,6	89,8	80,4	80,8		58,5	72,2	77,8	56,6	63,5	69,3	64,9	55,7	96,5	73,7	88,4	73,4	64,0	74,4	72,1	104	77,4	77,4	66	57	55	47	42	85	46	63,8	40	4
g/m^3			0,025	0,025	0,025	0,025	0,025	0,025	0,025	0,025	0,025	0,005	0,06	0,005		0,005	0,005	0,005	0,005	0,005	0,005		0,005	0,005	0,005	0,28	0,02	0,04	0,11	0,07	0,03	0,005	0,02	0,005	0,005	0,02	0,005	0,01	<0,01	0,02	<0,002	<0,002	0,133	0,128	0,23	<0,02	<0,02	<0,02	<0,002	<0
g/m^3				2,1	<0,2		0,2	<0,2	<0,2	0,2	0,21		0,34	<0,02		0,05		1,32		0,25			77,6	39,6	19,4	34,4	27,3	19	23,4	41,6		45,1		40,8		31		17,4		32,2		41		52		4,6		23,7		3
g/m^3			45	55	83	28	12	20	27	59	23	35	46	50		36	<15	77	121	42	17		<15	<15	18	<15	15	16	<15	17	33	20	33	25	38	37	16	43	31	29	10	26	11	17	12	29	18	32,5	29	2
g/m^3				14	28,1		38,6	45,8	36,8	36,8	25,1		47,9	44,3		34,5		39,8		18,7			35,3	40	34,9	32,1	31,5	33	34,3	32,4		35,9		37,6		36,4		46		44,1		42		38		49		49,3		4
g/m^3			0,47	**1,5**	**1,65**	**1,62**	**1,84**	**1,76**	**1,6**	**1,54**	1,35	1,34	**1,6**	1,16		1,18	1,01	0,78	**8,57**	**6,42**	**5,87**		0,25	0,3	0,27	0,005	0,21	0,27	0,005	0,2	0,31	0,30	0,31	0,40	0,25	0,29	0,37	0,32	0,25	0,31	0,01	0,26	0,01	0,08	<0,01	0,67	0,34	0,392	0,3	0,
g/m^3				1,5	3,03		3,73	4,35	3,72	3,89	4,29		4,47	4,15		3,51		4,06		5,16			4,06	5,06	3,64	3,54	3,3	3,69	3,65	3,42		3,87		3,88		4,31	3,95	4,66		4,58		4,2		3,7		4,8		4,58		
g/m^3				0,0005	0,001		0,0005	0,0005	0,0005	0,003			0,002	0,0005		0,003		0,001		0,001				0,0005		0,0005		0,001	0,0005	0,0005		0,0005		0,005		0,002		0,005		0,001		0,0028		0,0005		0,0005		0,000139		0,0
g/m^3				<0,03	<0,03		<0,03	<0,03	0,139	<0,03	0,011		<0,03	<0,03		<0,05		<0,03		<0,03			0,031	0,04	0,035	0,04	0,032	0,31	0,03	0,03		0,02		0,03		0,06		0,04		0,03		0,045		0,04		0,0468		0,0
g/m^3			8,2	6,8	8,4	9,1	10,4	12,1	12,8	11,1	12,2	13,7	11,8	12,2		11,3	14,4	17,4	25,1	19,5	20,1		36,1	39,4	37,7	28,9	28,6	30,4	29,1	28,1	36,8	34,2	41,1	33,9	34,0	31,0		42,2	32,3	37,8	36	33	32	26	31	44	35	42	32	3
g/m^3			3,8	3,3	4,95	6,94	6,51	7,82	7,41	7,01	8,25	8,5	7,59	8,58		6,53	9,47	10,2	14,5	12,1	13,5		15,8	16,6	15,9	12,1	12,2	12,5	12,3	11,6	15,6	13,7	16,3	14,1	13,7	13,5	13,9	18,4	13,5	16,6	15,2	13,4	13,7	11,2	12,6	17,6	15,5	17,6	12,5	12
			36	31	41	51	53	62	62	57	64	69	61	68		55	75	85	122	99	106		155	167	160	122	122	127	123	118	156	142	170	143	141	133		181	136	163	152,6	137,6	136,4	111,1	129,4	182,4	151,3	177,4	131,4	12
g/m^3			0,001	<0,001	0,002	<0,001	<0,001	<0,001	<0,001	0,002			0,0009	0,0015		0,0020		0,0032		0,0007				0,0043		0,0013		<0,0005	<0,0005	<0,0005		0,0005		0,0006		<0,0005		0,0009		<0,0005		0,0007		<0,0005		0,0009		<0,0005		0,0
g/m^3				**0,15**	**0,128**		**0,114**	**0,057**	**0,064**	**0,177**			**0,112**	**0,18**		**0,118**		**0,326**		**0,144**				**0,703**		**0,26**		0,247	**0,51**	**0,295**		**0,508**		**0,569**		**0,379**		**0,656**		**0,543**		**0,48**		**0,260**		**0,870**		**0,840**		**0,**
g/m^3				**28**	**4,1**	**6,74**	**3,61**	**12,5**	0,15	**5,89**	**40,3**	**12,4**	**1,2**	**10,5**	**8,34**		**20,6**	**5,97**	**87,2**	**137**	**16,3**	0,012		**14,2**	0,16	**10,7**	0,03	**8,34**	2,95	0,05	**1,13**	**5,02**	**3,81**	**12,2**	**16**	**5,28**	**7,23**	**15,1**	**19,2**	**0,9**	**1,59**	0,04	**11,5**	0,03	**0,24**	0,52	**8,4**	**9,2**	**12,61**	**14,200**	**11,**
g/m^3			78	110	142	173	175	213	189	218	188	191	196	187		200	199	228	263	229	239		301	481	344	243	271	175	264	264	324	302	359	321	235	308	322	403	270	275	320	300	310	270	280	330	300	340	300	3
g/m^3				130	56		97	18	40	310			92	107		53		453		75				26		13		11	<6	21		36		7		8		10		43		8		6		81		25,7		1
meq/L			1,43	1,54	2,33	3,18	2,77	2,94	3,28	3,00	3,33	3,06	3,25	3,33		3,26	3,27	2,94	4,68	4,32			5,15	5,12	5,43	3,89	4,45	4,1	4,03	3,97		4,70		5,16			6,33		4,94		4,6		4,2		5,8		5,73		4
meq/L			1,73	1,41	2,28	1,15	3,28	3,36	3,16	4,28	2,93	1,43	3,79	3,65		3,43	1,71	6,68	7,36	4,25			5,52	5,23	5,39	3,92	4,35	4,25	4,05	3,93		4,72		4,76			6,79		5,39		5,1		4		6,2		6,3		4
%			9,5%	-4,3%	-1,0%	-46,7%	8,5%	6,6%	-1,5%	17,6%	-6,3%	-36,4%	7,7%	4,6%		2,6%	-31,3%	36,8%	22,3%	-0,6%			3,5%	1,0%	0,5%	0,4%	1,12	1,79	0,25	0,44		0,22				4,02%		3,53%		4,39%		5,15%		-2,44%		3,33%		4,74%		4,2

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ons 2022 Maximum Acceptable Value (MAV) for health significance

EQ 4/9/10

Unit	Jun-00	Aug-00	Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Aug-09	Mar-10	Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	May-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23	Apr-24	Sep
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		1 of 14				ND		ND		1 of 14		1 of 14		ND		ND		ND		ND		1 detected		ND				ND		N
µg/L																																													**0,0003**				
µg/L																																												**0,0011**		**0,0007**			
µg/L																				**5,6**								ND		ND		ND		ND		ND		ND		ND				ND		**0,0003**			
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND								**0,00016**		**0,00012**		ND		ND		ND		ND		ND		ND		ND		ND		N
µg/L																																																	
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND			
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND			
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND			
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND			
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		N
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		N
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		N
µg/L				ND	ND		ND		ND	ND				ND		ND		1 of 6		ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		N
µg/L																		**28**																																
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND				ND		ND		ND		ND		ND		ND		ND												
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		
µg/L																		**1,6**																																
																				1,5				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND			
																				0,79				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND			
																				1,9				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND			
																				18				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND			
																				2,5				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND			

Unit	Jun-00	Aug-00	Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Aug-09	Mar-10	Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	May-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23
mbgl																														2.3	2.9	2.9	2.7	2.6	2.6	2.2		2.7	2.6	2.3	3.6	2.4	2.7	2.4	2.2	2.1	2.35	2.18
																														6.5	6.45	6.68	6.47	6.52	6.44	6.6		7.0	6.76	7.02	6.18	6.5	6.24	6.6	6.14	6.84	6.99	7.03
																														19.7	4.28	3	9.1	9	14.6	24.2		18.1	8.7	2.68	4.7	36	0.63	42.1	0.65	2.38	1.16	2.6
Deg C																														14	16.2	13.8	15.4	13.8	14.7	14.1		14.0	16.7	13.2	16.2	15.1	15.2	15.1	16.1	15.7	15.8	14.3
mS/m																														718	496.5	637	596	342.9	294.4	642		260	270.3	302.5	282.3	291.2	323.8	280.1	293.1	209	310	292.8
																														6.3	6.3	6.2	6.4	6.5	6.5	6.4	6.9	7.0	6.7	6.7	7.2	7.4	7	7	7.2	7	7	6.9
g/m³																														94	70	88	90	75	72	74	75	79	80	91	94	104	102	105	111	120	129	125.1
																																		92						11								
mS/m																														91.2	69.7	63.0	47.1	44.9	37.8	33.6	30.1	33.0	33.2	37.9	34.6	37.1	36.2	36.5	37.4	38.2	38.5	38.2
g/m³																														122	85.3	67.3	44.7	36.5	25.3	18.4	16.3	20.7	19.9	24.6	21	23	21	21	18.3	17.5	14.7	15.02
g/m³																														11.5	6.12	3.71	1.20	0.25	0.005	0.01	0.35	1.92	1.05	3.3	0.94	1.4	0.81	0.77	0.72	0.54	0.74	0.77
g/m³																														113		86.0		60.6		36.3		30.1		32.5		31		30		35		30.2
g/m³																														100	106	112	111	97	109	107	76	65	49	42	26	39	57	36	39	32	26	31.5
g/m³																														72.9		59.2		47.5		37.7		35.3		37.0		40.0		38.0		38.0		38.2
g/m³																														0.09	0.005	0.005	0.01	0.005	0.005	0.01	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
g/m³																														49.1		39.1		30.4		27.2		25.7		26.9		29		26		29		28.7
g/m³																														0.001		0.0005		0.0005		0.002		0.0005		<0.001		<0.001		< 0.0010		< 0.0010		< 0.0010
g/m³																														0.16		0.15		0.15		0.17		0.24		0.32		0.33		0.33		0.41		0.351
g/m³																														32.7	21.2	19.4	14.5	12.4	10.6	9.15	6.89	8.41	9.02	11.9	10.6	11.6	10.7	10.5	12.7	11.8	14.8	13.74
g/m³																														25	15.7	14.1	10.1	8.6	7.43	6.05	4.94	6.31	6.26	9.73	8	8.7	8.1	8.1	10.4	9.7	12.3	11.3
																														185	118	107	78	66	57	48	38	47	48	70	59	65	60	60	75	69	92	81
g/m³																														0.0072		0.0084		0.0082		0.0104		0.0055		0.0029		0.0034		0.0042		0.0036		0.0024
g/m³																														0.259		0.0787		0.0342		0.0188		0.0205		0.0232		0.016		0.021		0.034		0.0417
g/m³																														0.23	0.225	0.15	0.29	0.18	0.206	0.29	0.322	0.11	0.09	0.04	0.06	0.06	0.05	0.05	0.05	0.04	0.02	0.023
g/m³																														609	478	476	377	335	185	292	233	245	162	216	230	230	250	230	270	240	260	246
g/m³																														<6		8		18		16		21		16		8		7		10		<3
meq/L																														8.15		5.41				2.77		2.95		3.46		3.5		3.4		3.8		3.61
meq/L																														8.13		5.70				3.31		3.14		3.69		3.8		3.5		3.8		4.01
%																														0.14		2.60				8.85%		3.09%		3.30%		4.11%		1.45%		2.70%		5.25%

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ations 2022 Maximum Acceptable Value (MAV) for health significance

Unit	Jun-00	Aug-00	Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Aug-09	Mar-10	Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15		Sep-16	Mar-17	Sep-17	May-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23
µg/L																												ND		ND		ND		ND		ND		ND		1 detected		ND		2 detected		ND
µg/L																																													0.0003		
µg/L																																								0.0008							
µg/L																																													0.0003		
µg/L																																															
µg/L																														ND		ND		ND		ND		ND		ND		ND		ND		ND		ND
µg/L																														ND		ND		ND		ND		ND		ND		ND		ND		ND		ND
µg/L																														ND		ND		ND		ND		ND		ND		ND		ND		ND		ND
µg/L																																		ND		ND		ND		ND		ND		ND		ND		ND
µg/L																														ND		ND		ND		ND		ND		ND		ND		ND		ND		ND
µg/L																														ND		ND		ND		ND		ND		ND		ND		ND		ND		ND
µg/L																														ND		ND		ND		ND		ND		ND		ND		ND		ND		ND
µg/L																														ND		ND		ND		ND		ND		ND		ND		ND		ND		ND

Unit	Jun-00	Aug-00	Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Aug-09	Mar-10	Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	May-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23	Apr-24	Sep
mbql																														1.8	2.5	2.2	2.3	2.2	2.3	1.8		2.05	2.4	1.9	2.3	2	2.5	2	1.9	1.8	2	2.83	2.35	2
																														6.8	6.85	6.91	6.66	6.76	6.54	6.72		7.1	6.98	7.24	6.58	6.84	6.69	6.81	6.36	7.25	7.05	7.3	6.55	8.
																														14.2	2.6	3.43	6.8	12.9	13.8	18.1		13.9	7.4	2.46	3.7	22.5	0.85	32.9	0.72	4.61	1.35	2.6	2.02	1.
Deg C																														13.4	16	14.1	14.6	13.9	14.0	14.0		13.9	15.5	12.7	15.4	14.7	15.5	14.2	16.5	14.8	15.7	13.8	12.9	14
mS/m																														637	443	555	496	435.6	453.9	601		248	216.7	209.7	197.1	188	212.2	190.4	237.7	410	283	331.3	518	46
																														6.7	6.8	6.8	6.6	7	6.6	6.8	6.7	7.0	7.0	7.2	7.4	7.6	7.3	7.4	7.5	7.2	7.6	7.1	7.0	7.
g/m³																														83	65	80	85	66	60	65	79	77	62	64	74	76	88	75	84	96	96	106.6	121	11
																																		80						79										
mS/m																														71.1	56.8	54.4	61.8	56.1	55.9	51.6	38.2	32.1	26	26.7	24.3	23.9	27.6	27.2	30	43.1	42.4	45.5	47.3	44
g/m³																														90.8	78.9	63.0	79.1	71.8	65.1	52.1	41.6	26.4	18.7	19.0	16.1	13.6	17.3	19.3	19.1	40.0	38.0	38.5	35.0	33
g/m³																														0.03	0.005	0.12	0.005	0.005	0.005	0.08	0.005	0.01	0.01	0.04	<0.02	0.016	<0.002	0.066	<0.002	<0.02	<0.02	<0.02	<0.02	< 0
g/m³																														121		79.5		90.4		77.4		30.5		24.4		15.3		19.8		47		49		4
g/m³																														34	33	18	39	34	50	40	27	46	35	29	24	32	24	24	29	38	29	34.5	40	3
g/m³																														36.7		28.7		32.3		26.8		25.5		18.6		17.6		17.9		26		29		2
g/m³																														0.46	0.21	0.03	0.47	0.27	0.42	0.03	0.53	0.19	0.09	<0.01	0.20	0.03	0.15	< 0.010	< 0.010	0.37	0.46	0.36	0.45	0.
g/m³																														36.6		35.6		35.1		39.3		21.2		23.1		24		24		26		26.5		2
g/m³																														0.002		0.003		0.002		0.002		0.005		0.003		0.0051		0.0036		0.005		0.00743		0.0
g/m³																														0.06		0.07		0.06		0.09		0.07		0.07		0.077		0.063		0.059		0.0638		0.0
g/m³																														37.4	26.0	24.9	32.1	27.8	27.4	22.2	18.7	14.9	10.5	11.1	10.7	10.4	13.5	11.8	17.3	23	24	26.1	26	2
g/m³																														24.6	17.9	16.9	17.9	17.7	15.4	15.5	13.1	8.56	6.02	7.06	6.6	6.5	8.3	7.3	11	13.8	15.4	14.8	14	13
																														195	139	132	154	142	132	119	101	72	51	57	54	53	68	60	89	114	123	126	123	11
g/m³																														<0.0005		0.0010		0.0007		0.0008		0.0006		<0.0005		0.0008		0.0009		0.0006		<0.0005		0.0
g/m³																														0.535		0.176		0.24		0.0564		0.0706		0.0183		0.03		0.0158		0.161		0.183		0.
g/m³																														12.2	2.98	1.00	6.19	3.26	11.0	0.57	13.1	2.72	0.7	0.36	1.49	0.83	1.75	0.61	1.47	12	13.8	15.1	16.2	14
g/m³																														448	353	342	398	382	274	315	263	240	127	142	176	167	210	177	230	290	310	323	340	3
g/m³																														7		5		< 6		6		11		11		6		5		4		<3		<
meq/L																														6.44		4.75				4.39		2.93		2.34		2.2		2.5		4		4.24		4.
meq/L																														7.11		4.89				4.58		3.26		2.55		2.5		2.6		4.6		5.03		4.
%																														4.93		1.43				2.17		5.35		4.33		6.36		1.96		6.98		8.52		7.6

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ons 2022 Maximum Acceptable Value (MAV) for health significance

Unit	Jun-00	Aug-00	Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Aug-09	Mar-10	Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	May-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23	Apr-24	Sep
µg/L																												1 of 14		ND				ND		ND		ND		1 detected		ND		1 detected		ND		N
µg/L																												0,02		ND		ND		ND		ND				0,0009				0,0005				
µg/L																												ND		ND				ND		ND		ND		ND		ND		ND		ND		N
µg/L																												ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		N
µg/L																												ND		ND				ND		ND		ND		ND		ND		ND		ND		N
																																	ND																
µg/L																												ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		N
µg/L																												ND		ND				ND		ND		ND		ND		ND		ND		ND		N
µg/L																												ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		N
µg/L																												ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		N
µg/L																												ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		N

Subdivision: well capped.

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Unit	Jun-00	Aug-00	Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Aug-09	Mar-10	Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	May-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23	Apr-24
mbgl	1.1	2.4	3.0	2.56	2.8	2.3	2.0	2.2	3.0	2.6	3.0	2.8	2.8	2.9		2.15	2.85	1.45	2.7	2.3	2.9	2.3	2.5	2.8																										
	7.11	7.1	7.99	7.8	7.55	7.5	6.3	7.3	6.5	7.3	6.9	6.85	7.0	6.97		7.64	6.75	7.13	6.86	7.14	7.58	7.41	8.32	7.26																										
mg/l					1.9	1.9	8.9	2.8	9.4	9.8	0.9	2.0	2.0	9.7				1.4	1.77	1.06	0.95	1.43																														
% Sat																							13.7	18.3																										
Deg C	15.4	14.6	14.1	9.6	14.4	12.2	10.6	11.8	16.0	16.2	14.4	13.2	14.5	12.8		10.9	16.6	12.1	14	12.3	12.9	13.5	13.6	13.3																										
mS/m	328	307	336	354	384	376	127	475	93	90	498		446	433		478	405	338	485	476	405	633	595	811																										
	8.3	7.8	7.9	8.2	7.5	7.7	7.0	8.0	7.4	8.4	8.0	7.9	7.5	7.8		8.0	6.6	7.9	7.5	8.4	7.7	7.5	6.8	7.2																										
g/m³	19	20	34	220	45	47	47	84	165	147	150	116	157	149		139	127	161	153	216		164	121	139																										
	0		0				<1														132																										
mS/m	33	32	40	86	45.7	43	46.8	61.4	66.9	73.2	72.3	71.6	71.6	72.7		72	70.7	77	75.1	79.2	73.5	73.1	69.2	80																										
g/m³	87	82	100	152	141	119	118	156	160	146	165	148	153	156		159	159	156	177	156	156	153	192	108																										
g/m³	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	0.54	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01																										
g/m³	<0.2			37.5	<0.2		0.2	12.8	7.1	2.1	<0.20		1.93	0.12		0.03		7.83		4.61		0.32	<0.02	<0.02																										
g/m³	6	<5	11	32	84	8	16	22	31	65	28	<15	27	38		28	42	31	28	39	20	26	45	27																										
g/m³	30			41	48.6		42.2	67.4	55.4	55.1	26		74.7	64.3		66.7		62.5		61.4		66.1	66.1	64																										
g/m³	<0.04	<0.04	<0.04	0.28	0.22	<0.05	<0.05	0.19	0.09	0.07	0.02	<0.05	0.13	<0.05		<0.01	0.06	0.43	0.47	0.28	0.05	0.15	0.55	0.52																										
g/m³	3.7			5.3	5.47		4.34	7.82	5.92	6.23	6.84		6.6	6.8		8.12		7.25		6.11		7.69	9.01	8.25																										
g/m³	0.001			0.002	<0.001		<0.001	0.001	0.002	0.002			0.003	0.002		<0.001		0.002		0.002		<0.001		<0.001																										
g/m³	<0.03			<0.03	<0.03		<0.03	0.03	0.176	0.03	0.053		0.04	0.05		0.04		0.04		0.04		0.049	0.038	0.04																										
g/m³	14	15	20	51	41.0	16.7	18	48.6	46	35.8	34.9	30.5	26.7	28.7		24.3	28.6	42	38.4	53.2	41.2	45	46.6	41.9																										
g/m³	7.1	5.8	9.7	27	21.7	11.2	14.4	35.2	26.7	26.8	28.2	27.9	31.7	27.5		26.7	27.9	28.5	28.2	27.5	27.3	28.9	28.2	27.4																										
	64	61	90	239	192	88	104	266	225	199	203	191	197	185		171	186	222	212	246	215	231	233	218																										
g/m³	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.005	<0.001	0.002	0.001			0.001	0.0018		<0.0005		0.0009		0.0006		0.0007		0.0009																										
g/m³	0.056			0.93	0.194		0.389	0.072	0.34	0.103			0.335	0.213		0.217		0.61		0.276		0.871		1.24																										
g/m³	0.21	0.44	0.92	0.81	0.78	0.51	0.73	<0.05	3.73	0.474	1.06	2.83	2.06	1.08		1	3.61	5.07	4.53	2.28	<0.005	0.03	0.212	0.04																										
g/m³	190	210	220	480	481	219	250	356	442	416	361	352	368	388		363	375	405	399	441	420	457	449	459																										
g/m³	<5			29	6		12	4	20	4			9	81		7		26		6		30		33																										
meq/L	2.76	2.64	3.37	8.67	4.71	4.12	4.1	6.04	7.36	6.57	7.11	6.07	6.92	6.84		6.76	6.56	7.2	7.49	8.05		7.01	7.82	5.33																										
meq/L	2.69	1.24	1.83	6.75	6.12	1.77	4.21	8.45	7.2	6.55	5.42	3.91	7.48	6.96		6.56	3.85	7.55	4.4	7.88		7.7	7.8	7.37																										
%	-1.3%	-36.1%	-29.6%	-12.5%	13.0%	-39.9%	1.3%	16.6%	-1.1%	-0.2%	-13.5%	-21.6%	3.9%	0.9%		-1.5%	-26.0%	2.4%	-26.0%	-1.1%		4.7%	0.1%	16.1%																										

Well has been lost in subdivision works

Water Notice 2022

ions 2022 Maximum Acceptable Value (MAV) for health significance

EQ 4/9/10

Unit	Jun-00	Aug-00	Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Aug-09	Mar-10	Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	May-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23	Apr-24
µg/L	ND			ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND																										
µg/L	ND			ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		detected 1 of 9 analytes																										
µg/L																								2.2																										
µg/L	ND			ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND																										
µg/L	ND			ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND																										
µg/L	ND			ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND																										
µg/L	ND			ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND																										
µg/L	ND			ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND																										
µg/L	ND			ND	ND		ND		ND	ND				ND		ND		detected 1 of 6 analytes		ND		ND		ND																										
µg/L																		6.4																																
µg/L	ND			ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND																										
µg/L	ND			ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND																										
µg/L																		1.6																																
µg/L																		0.69																																
µg/L																		3.9																																
µg/L										13				8.6																																		
µg/L										30																																						
µg/L										39																																						
µg/L										5.5																																						

Well has been lost in subdivision works

9)

Unit	Jun-00	Aug-00	Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Aug-09	Mar-10	EQ 4/9/10 Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	May-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23	Ap
mbgl	Sealed well - static water depth unknown																																															
			7,9	7,9	7,8	7,6	6,6	7,1	7,01	7,2	7,2	7,0	6,9	6,85		7,14	7,07	7,38	6,81	7,4	6,93	7,25	7,21	7,21	7,31																								
mg/l					6.7	4.6	8.3	4	8.1	8.1	1.5	3.2	4.6	6				0.74	2.99	0.91	2.96	4.3																													
% sat																							3.91	3.91	41																									
Deg C			14,2	9,7	10,3	13,4	9,8	11,8	16,0	16,5	14,6	11,8	12,3	12,3		9,3	15	11,6	15,1	11	13,6	13,3	13,4	13,4	13,5																								
mS/m			183,1	200	196	372	140	222	225	199	202		336	365		225,1	187	260	196	220	187	178,8	629	629	540																								
			7.6	7.6	7.8	7.7	7.5	7.4	7.2	7.6	7.3	7.2	7.4	7.5		7.6	7.5	7.6	7.4	7.8	7.6	7.7	7.6	7.6	7.8																								
g/m³			130	130	129	131	127	105	129	127	123	106	128	128		128	119	127	124	125		128	102	126	123																								
			0																		95																											
mS/m			22	20	22.7	81.4	22.2	22.1	19.3	22.5	22.7	22.3	21.9	22		21.9	21.7	22.4	22.5	21.6	18.8	19.7	18.7	21.9	21.4																								
g/m³			6,5	7,4	7,0	5,2	8,7	7,6	7,6	7,5	5,7	6,71	7,15	7,91		7,15	7,27	7,51	7,04	6,96	6,88	6,89	5,35	7,28	7,08																								
g/m³			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	0.02	<0.01		0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01																								
g/m³				0,8	<0,2		0,6	<0,2	0,3	0,8	0,44		0,48	0,05		0,07		0,04		0,49		0,44	0,18	0,51	<0,04																								
g/m³			<5	<5	63	<5	<5	<5	<15	<15	23	<15	<15	<15		<15	<15	<15	<15	<15	<15	<15	<15	<15	<15																								
g/m³				14	15,5		17,2	13,1	16,1	17,8	15,8		18,7	17,1		17,0		19,1		17,5		18,7	20	17,1	16,7																								
g/m³			0,11	0,15	0,18	0,15	0,15	0,13	0,15	0,14	0,14	0,15	0,17	0,11		0,12	0,14	0,15	0,15	0,14	0,13	0,14	0,14	0,15	0,11																								
g/m³				1,0	1,21		1,08	0,92	1,02	1,08	1,21		1,26	1,08		1,13		1,07		1,02		1,15	1,28	1,17	0,94																								
g/m³				<0,001	<0,001		<0,001	<0,001	0,001	<0,001			0,001	<0,001		<0,001		<0,001		<0,001		<0,001		<0,001																								
g/m³				<0,03	<0,03		<0,03	<0,03	0,156	<0,03	0,010		<0,03	0,03		<0,03		<0,03		<0,03		0,018	0,019	<0,03	0,017																								
g/m³			17	17	17,4	17,7	18,9	10,2	18,6	14,6	18,8	17,6	16,8	17,2		16,0	17,8	17,8	18,9	17,3	16,5	18,2	17,9	16,5	16,3																								
g/m³			7,5	6,5	66,1	7,56	6,64	4,59	7,07	7,08	7,66	6,78	7,09	7,44		6,87	7,6	7,06	7,33	6,93	6,56	7,62	7,32	6,6	6,46																								
			73	69	316	75	75	44	76	66	79	72	71	74		68	76	74	77	72	68	77	75	68	67																								
g/m³			<0,001	<0,001	0,003		0,001	<0,001	<0,001	0,001			<0,0005	0,0007		<0,0005		<0,0005		<0,0005		<0,0005		<0,0005																								
g/m³				0,18	0,189		0,192	0,146	0,029	0,194			0,218	0,198		0,207		0,208		0,2		0,211		0,228																								
g/m³			0,81	1,8	0,84	2,14	1,08	0,84	1,56	2,16	0,696	1,37	1,5	3,27		2,85	7,6	2,48	3,41	0,994	<0,005	0,04	0,053	0,03	0,161																								
g/m³			130	130	134	112	130	128	140	125	114	112	117	119		116	130	138	132	117	129	137	129	140	142																								
g/m³				<5	<1		2	<1	14	4			<3	6		5		<8		<4		14		<5																								
meq/L			2,31	2,36	2,31	2,29	2,34	1,84	2,34	2,31	2,19	1,93	2,31	2,32		2,30	2,16	2,29	2,23	2,26		2,30	2,19	2,28	2,22																								
meq/L			1,49	2,09	7,05	1,58	2,31	1,62	2,29	2,20	2,31	1,49	2,33	2,37		2,24	1,79	2,42	1,67	2,28		2,39	2,41	2,15	2,11																								
%			-21,6%	-6,1%	50,6%	-16,3%	-0,6%	-12,2%	-0,9%	-2,4%	2,8%	-12,9%	0,4%	0,9%		-1,3%	-9,4%	2,7%	-14,4%	0,4%		1,9%	4,8%	2,9%	2,5%																								

Well has been lost in subdivision works

Water Notice 2022

tions 2022 Maximum Acceptable Value (MAV) for health significance

Unit	Jun-00	Aug-00	Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Aug-09	Mar-10	EQ 4/9/10 Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	May-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23	Ap
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND																								
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND																								
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND																								
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND																								
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND																								
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND																								
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND																								
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND																								
µg/L										11																																							
µg/L										12																																							
µg/L										38																																							
µg/L										60																																							
µg/L										9,6																																							

Well has been lost in subdivision works

570)

EQ 4/9/10 (above Oct-10) — Subdivision: well capped. (above Sep-12)

Unit	Jun-00	Aug-00	Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Aug-09	Mar-10	Oct-10	Mar-11	Sep-11	Mar-12
mbgl	Sealed well - static water depth unknown																								
	7.05	7.0	7.07	7.3	7.3	7.2	**6.7**	**6.4**	**6.61**	**6.95**	**6.8**	**6.75**	7.6	**6.8**		**6.45**	**6.89**	**6.57**	**6.53**	**6.63**	**6.59**	**6.28**	**6.41**	**6.41**	**6.61**
mg/l					6	3.8	8.6	3	6.9	4.1	1.5	3.1	4.1	9.6				3.16	3.2	3.71	3.28	2.52	2.63	2.63	2.68
% Saturation																									
Deg C	14.6	14.4	15.7	9.7	9.9	12.2	10.0	12.5	16.0	16.4	14.6	13.3	12.5	12.6		12.2	14.7	13.2	14.7	12.6	13.6	13.5	13.3	13.3	13.5
mS/m	574	528	445	386	393	525	130	539	458	455	425		401	400		622	368	397	442	421	368	570	561	561	260.5
	6.6	**6.8**	**6.6**	**6.6**	**6.7**	**6.6**	**6.5**	**6.4**	**6.1**	**6.3**	**6.3**	**6.2**	**6.3**	**6.3**		**6.5**	**6.5**	**6.4**	**6.3**	**6.6**	**6.6**	**6.6**	**6.7**	**6.7**	**6.6**
g/m^3	57	57	53	56	53	59	56	51	57	64	55	51	62	62		61	57	60	57	62		59	46	56	56
	0		0				<1														44				
mS/m	60	61	55	60	61.1	65.1	64.7	68.9	58.7	64.6	58.8	66.1	57.6	65.4		69.4	62.3	69.2	68.4	70.8	64.6	65.5	58.9	68.6	64.1
g/m^3	87	83	76	91	85	112	105	107	101	99	89	100	87.7	103		103	96	104	117	119	97.8	102	105	98.8	92.7
g/m^3	8.3	8.5	8.8	7.89	10.2	5.86	9.41	10.6	8.52	7.61	5.76	7.75	5.95	7.99		8.30	7.81	8.98	8.4	9.39	7.33	8.03	9.51	8.91	7.35
g/m^3	69			72.1	58		75	80	80		48.5		69	82.7		86.9		88.3		100		91.4	96.4	93.1	86.1
g/m^3	10	<5	11	<5	<5	11	<5	8	<15	<15	<15	<15	23	21		<15	<15	<15	<15	<15	<15	<15	<15	<15	<15
g/m^3	44			41	43.2		44.1	65.1	43.9	41.4	25.7		51.6	49.2		47.9		46.7		52.9		53	48	46.9	46.3
g/m^3	<0.04	<0.04	0.06	<0.04	<0.04	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.05	<0.05		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01
g/m^3	5.1			5.10	5.09		4.67	6.00	4.66	5.03	5.11		4.98	5.13		5.65		4.76		4.88		5.54	5.78	5.25	4.35
g/m^3	<0.001			<0.001	<0.001		<0.001	<0.001	0.001	0.001			<0.001	<0.001		<0.001		<0.001		<0.001		<0.001		<0.001	
g/m^3	0.11			0.08	0.09		0.08	0.13	0.235	0.07	0.106		0.08	0.10		0.08		0.08		0.07		0.096	0.103	0.09	0.09
g/m^3	29	31	30	32	30.1	33.7	30.7	46.8	33	27.9	29.4	34.9	25.1	32.3		33.1	32.9	34.5	38.6	38.6	36.9	39.4	37.5	34.2	30.3
g/m^3	25	21	22	24	23.4	24	22.2	33.9	25.1	25.4	23.7	27.9	21.8	26.4		27.4	27.7	27.5	29.1	30.1	27.5	32.1	28.9	27.9	23
	175	164	166	179	172	183	168	**257**	186	174	171	**202**	152	189		196	196	**199**	**216**	**220**	**205**	**231**	**213**	**200**	170
g/m^3	<0.001	<0.001	<0.001	<0.001	0.004	0.001	0.002	<0.001	0.001	0.003			0.0011	0.0009		0.0006		<0.0005		0.0007		0.0009		0.0008	
g/m^3	**0.22**			**0.15**	**0.189**		**0.244**	**0.227**	**0.291**	**0.24**			**0.22**	**0.243**		**0.293**		**0.229**		**0.314**		**0.286**		**0.278**	
g/m^3	0.05	<0.05	<0.05	**0.81**	0.05	<0.05	<0.05	<0.05	0.013	0.024	0.037	0.011	0.01	0.027		0.026	0.021	0.018	0.080	0.036	0.011	0.01	0.012	0.02	<0.005
g/m^3	340	370	350	340	361	346	387	401	399	427	293	326	320	394		395	374	412	408	434	414	439	394	362	399
g/m^3	<5			<5	<1		2	<1	4	<1			<5	<3		<2		9		<4		<5		<5	
meq/L	4.82	3.27	3.01	4.98	4.47	4.12	5.44	5.52	5.45	3.84	4.42	3.65	4.92	5.64		5.71	3.64	5.75	4.23	7.12		6.31	6.59	6.29	5.86
meq/L	5.56	3.28	3.31	5.52	5.44	3.66	5.41	8.12	5.75	5.42	4.67	4.04	5.43	6.06		6.14	3.92	6.15	4.32	6.82		7.05	6.48	3.17	5.52
%	7.1%	0.2%	4.7%	5.1%	9.8%	-5.9%	-0.3%	19.1%	2.7%	17.1%	2.8%	5.1%	4.9%	3.6%		3.6%	3.7%	3.4%	1.1%	-2.2%		5.5%	0.8%	0.9%	2.9%

Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	May-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23	A
Well has been lost in subdivision works																							

Water Notice 2022

ations 2022 Maximum Acceptable Value (MAV) for health significance

EQ 4/9/10 (above Oct-10)

Unit	Jun-00	Aug-00	Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Aug-09	Mar-10	Oct-10	Mar-11	Sep-11	Mar-12
µg/L	ND			ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND	
µg/L	ND			ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND	
µg/L	ND			ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND	
µg/L	ND			ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND	
µg/L	ND			ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND	
µg/L	ND			ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND	
µg/L	ND			ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND	
µg/L	ND			ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND	
µg/L	ND			ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND	
µg/L	ND			ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND	
µg/L										**1.3**															
µg/L										**0.84**															
µg/L														**14**											

Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	May-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23	A
Well has been lost in subdivision works																							

Unit	Jun-00	Aug-00	Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Aug-09	Mar-10	Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	May-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23	Apr
mbgl	Sealed well - static water depth unknown																																															
	7.1	7.1	7.8	7.8	7.8	7.46																																										
					6.3	1.8																																											
Deg C	14.3	14.6	13.1	9.6	10	11.8																																										
mS/m	191	180.6	246	251	247	181																																										
	7.8	8.0	7.6	7.7	7.9	7.8																																									
g/m³	110	110	110	110	110	110																																										
	0		0																																												
mS/m	20	20	29	20	20.4	19.6																																										
g/m³	6.4	6.5	24	6.9	6.8	4.9																																										
g/m³	0.27	<0.05	0.16	0.28	0.20	<0.05																																										
g/m³	2.1			2.1	2.6																																											
g/m³	<5	<5	5	<5	<5	13																																										
g/m³				9.4	11.2																																											
g/m³	<0.04	<0.04	<0.04	<0.04	<0.04	<0.05																																										
g/m³	0.92			0.85	1.12																																											
g/m³	<0.001			<0.001	<0.001																																											
g/m³	<0.03			<0.03	<0.03																																											
g/m³	17	18	25	17	18.5	16.5																																										
g/m³	6	5.4	8.8	5.2	6.06	6.18																																										
	67	67	99	64	71	67																																										
g/m³	<0.001	<0.001	<0.001	<0.001	0.003	<0.001																																										
g/m³	0.023			0.013	0.02																																											
g/m³	0.06	0.19	<0.05	<0.05	0.06	0.08																																										
g/m³	110	110	180	110	133	95																																										
g/m³	<5			<5	1																																										

Well has been lost in subdivision works

Water Notice 2022

tions 2022 Maximum Acceptable Value (MAV) for health significance

Not tested

Unit	Jun-00	Aug-00	Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Aug-09	Mar-10	Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	May-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23	Apr
µg/L	ND			ND	ND																																											
µg/L	ND			ND	ND																																											
µg/L	ND			ND	ND																																											
µg/L	ND			ND	ND																																											
µg/L	ND			ND	ND																																											
µg/L	ND			ND	ND																																											
µg/L	ND			ND	ND																																											
µg/L	ND			ND	ND																																											
µg/L	ND			ND	ND																																											

Well has been lost in subdivision works

Unit	Jun-00	Aug-00	Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Aug-09	Mar-10	EQ 4/9/10 Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	May-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23	Apr-24
mbgl	Not applicable - measured at lake edge																																																
		7.1	5.5	6.6	6.46	7.7	6.7	7.84	7.8	7.0	7.0	7.0	7.0	7.0		7.9	7.5	7.91	7.18	7.86	7.47	8.69	7.72	8.77	8.14	8.09	7.89	8.03	8.27	8.99	7.59	8.6	7.18	8.57	7.31	8.91		7.62	7.62	7.64	7.28	7.56	7.54	7.6		8.01	7.4	7.47	7.1
mg/l					13.0	7.0	7.0	8.1	7.8	9.2	5.1	6.0	8.4	12.1				1.62	5.1	1.02	3.4	10.64	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	13.64	4.64	8.34									50.3	93.3	7.3	6.8		10.08	1.65	0.35	8.63
% sat																							62.5	94.3	54.8	117	87.1	80.6	70.1				49.2	138.9	60.5	18.1		76.8	76.8	11.4										
Deg C		15.4	19.1	12.1	7.6	10.3	9.5	10	17.1	16.3	20.9	14.0	15.3	14.3		8.5	19.3	8.1	17.4	8.6	13	16.2	17.1	11.8	16.4	11.5	21	14.2	18.4	11.7	20.8	10.6	16.9	12.9	16.5	12.1		17.6	17.6	11.3	14	16.2	16.6	14.9		13.3	14	11.7	11.8
mS/m		543	496	39.8	387	478	520	461	464	410	404		421	410		376	341	386	358	379		388.3	483.9	441.4	424	347	480.1	477.9	203.3	335.2	447	484	454	380.2	407.4	305.1		437.5	437.5	372.3	402.4	408.4	435.3	430.8		121	373	330.1	511
		8.2	8.3	8.4	8.1	8.2	7.8	8.1	7.7	7.9	8.1	7.9	7.7	8.7		8.2	7.7	8.1	8.1	8.3	7.8	9.0	7.8	8.6	7.8	8.6	7.9	8.1	8.2	8.8	8.1	8.5	7.9	8.9	7.9	7.7	7.5	8.2	8.1	8.2	8.1	8.3	8.1	9.2	8	8.2	8	8.2	8
g/m³		230	230	230	231	227	227	189	226	229	189	178	220	173		215	221	216	204	203	174	170	173	200	215	159	200	187	203	189	142	180	182	157	148	152	152	146	150	152	176	170	176	166	165	155	166	154.8	169
			0				<1														174													166						186									
mS/m		61	60	60	61.9	58.4	59.2	58.7	55.3	58.7	53.8	56.4	55.9	52.1		53.7	54.7	51.6	51.0	48.5	51.5	46.9	46.7	49	51.6	46.7	50.6	47.3	50	45.7	49.0	49.0	50.6	51.4	48.8	50.3	50.5	48.7	50.4	49.1	51.9	50.4	53.0	49.2	50.3	47.4	48.9	45.7	49.6
g/m³		75	77	81.8	76	38.6	1.1	74	75	77	74	63	72.7	67.4		67.3	67.5		67.5	59.1	59.8	52.7	61	56.8	58.2	53.1	57.5	52.8	56.6	51.7	60.4	55.0	59.6	60.2	56.7	57.7	57.7	56.3	57.8	55.8	57	57	59	58	52	53	53	50.4	53.0
g/m³		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.74	<0.05	0.06	<0.05	0.06	0.19	<0.01		<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.07	<0.01	<0.01	< 0.01	< 0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	0.04	0.02	0.2	<0.002	< 0.002	< 0.002	0.017	0.003	< 0.002	0.007
g/m³				3.8	<0.2		<0.2	3.3	1.9	3.2	1.77		2.33	2.23		23.2		0.47		0.71		2.52	1.42	2.4	1.41	1.40	0.51	1.08	0.17	1.29		0.63		0.34		0.51		0.68		0.45		0.6		1.1		1		<0.5	
g/m³		17	37	23	22	19	<0.05	20	32	77	<15	24	18	148		26	29	27	33	49	24	57	38	47	28	35	35	30	36	85	39	98	< 15	38	47	35	25	35	45	32	31	33	27	77	31	28		26.5	41
g/m³				44.0	65.8		62.0	60.2	57.4	51.3			70.2	57.1		52.1		52.0		47.7		47.3	53.5	46.6	48.2	44.7	44.7	42.3	48.2	43.6		46.7		48.6		49.2		43.2		45.9		52		52		49		48.8	
g/m³		0.05	<0.04	<0.04	<0.04	<0.05	<0.05	<0.05	<0.05	0.06	0.03	0.11	<0.05	<0.05		<0.01	<0.01	0.04	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.11	0.03	0.02	< 0.01	0.04	<0.01	0.03	<0.01	<0.01	0.07	0.04	<0.01	0.04	0.5	<0.1	<0.1	< 0.010	< 0.010	< 0.010	0.014	0.0237	0.31
g/m³				9.0	10.9		9.91	10.5	8.71	8.94	10.0		9.53	8.73		8.83		7.36		7.27		7.88	8.23	7.69	7.33	7.91	7.11	7.29	8.12	7.44		8.34		8.36		9.2		8.43		8.56		9		8.4		9		8.07	
g/m³				0.001	0.002		0.001	0.002	<0.001	0.002			0.002	0.002		0.002		0.001		0.001		0.003		0.002		0.003		0.002	0.003	0.002		0.003		0.002		0.003		0.002		0.002		0.0025		0.0041		0.0031		0.00365	
g/m³				0.14	0.19		0.15	0.14	0.267	0.12	0.145		0.13	0.12		0.01		0.10		0.09		0.092	0.089	0.09	0.087	0.09	0.085	0.08	0.09	0.08		0.09		0.08		0.10		0.1		0.09		0.096		0.094		0.084		0.09	
g/m³	37	35	35	33.8	34.2	35.4	30	33.5	28.9	23.1	31.6	29.1	26.2		29.9	31.1	31.6	33.5	31.8	35.2	31.8	37.8	31.5	32	32.1	26.9	31	32.6	31.8	27.3	32.4	29.5	31.2	30.6	31	30.3	29.5	28	32	35	33	33	33	34	30	34	31.8	33
g/m³	15	17	15	17	14	16.5	18	16.3	16	16.1	15	16.1	15.2		13.7	15.7	13.4	14	13	6.56	13.7	15.3	13.2	13.4	12.7	12.4	12.1	13.6	12.5	12.8	13.1	13.2	13.4	13.1	13.3	12.7	11.9	12.5	14	14.4	13.2	14.2	13.3	14.8	12.9	15.4	13.21	13
%	154	157	149	154	143	158	149	151	138	124	141	139	128		131	142	134	141	133	115	136	157	133	135	133	123	127	137	131	121	135	128	133	130	132	128	122	121	138	146.8	136.8	140.9	137.2	145.9	128.1	148.4	134.1	136.0
g/m³	0.001	0.002	0.001	0.005	0.001	0.003	<0.001	0.002	0.003			0.0015	0.0012		0.0008		0.0009		0.0008		0.0014		0.0014		0.0013		<0.0005	0.0011	0.0011		0.0013		0.0012		0.0009		0.0012		0.001		0		0		0		0	
g/m³				0.018	0.078		0.069	0.011	0.013	0.039			0.0674	0.0332		0.427		0.163		0.0551		0.0152		0.0047		0.0188		0.0288	0.0306	0.0061		0.0397		0.0372		0.0060		0.0079		0.0243		0.043		0.072		0.028		0.00152	
g/m³	0.24	0.19	<0.05	0.29	0.13	0.25	0.06	0.23	0.259	0.108	0.169	0.255	0.273		0.253	0.215	0.264	0.296	0.178	<0.005	0.06	0.038	0.03	0.053	0.06	0.028	0.07	0.17	0.06	0.045	0.08	0.02	0.06	0.061	0.04	0.073	0.04	0.02	0.06	0.19	0.07	0.08	0.19	0.07	0.05	0.18	0.049	0.26
g/m³	330	340	330	335	269	311	315	322	310	270	278	286	282		295	303	292	291	273	129	274	285	285	290	241	336	265	279	277	267	295	268	265	239	248	271	259	247	235	280	270	310	270	300	280	280	284	290
g/m³			<5	4		5	3	4	23			5	80		6		18		18				18		10		6	<6	42		27		7		14		<6		<6		< 3		39		< 3		< 3	
meq/L											5.23		6.52						5.02		4.33	5.2	4.94	5.2	4.14	4.92	4.59	4.93	4.59		4.52				4.69		4.52		4.64		5.0		5.0		4.6		4.5	
meq/L											3.85		6.08						4.93		4.97	5.68	4.86	4.99	4.79	4.59	4.58	5.06	4.71		4.95				5.01		4.55		4.97		5.2		5.2		4.9		5.01	
%											-15.2%		-3.4%						-0.9%		6.9%	4.5%	0.6%	2.12%	7.32%	3.46	0.12	1.26	1.28		4.57				3		0.31		3.47%		1.96%		1.96%		3.16%		5.14%	

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ions 2022 Maximum Acceptable Value (MAV) for health significance

80th Percentile

Unit	Jun-00	Aug-00	Mar-01	Sep-01	Mar-02	Sep-02	Jun-03	Sep-03	Feb-04	Jul-04	Feb-05	Aug-05	Mar-06	Sep-06	Mar-07	Sep-07	Mar-08	Aug-08	Mar-09	Aug-09	Mar-10	EQ 4/9/10 Oct-10	Mar-11	Sep-11	Mar-12	Sep-12	Mar-13	Sep-13	Mar-14	Aug-14	Mar-15	Sep-15	Mar-16	Sep-16	Mar-17	Sep-17	May-18	Sep-18	Apr-19	Sep-19	Apr-20	Sep-20	Apr-21	Sep-21	Apr-22	Sep-22	Apr-23	Sep-23	Apr-24
	not sampled																																																	
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		1 detected		ND		1 detected		ND	
µg/L																																													0.0008				0.0007			
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
µg/L				ND	ND		ND		ND	ND				ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
µg/L														77																																				
µg/L														64																																				
µg/L														210																																				
µg/L														270																																				
µg/L														100																																				
µg/L																				33																														
µg/L																		8.9																																

Appendix D: Tables – Leachate Composition

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Table D-1: Leachate Composition (Landfill Guidelines, Centre for Advanced Engineering, 2000)

Species	Low (g/m^3)	Average (g/m^3)	High(g/m^3)
Ammoniacal Nitrogen	30	750	3000
Arsenic	0.005	0.16	1.6
Calcium	10	630	2500
Chloride	100	2100	5000
Iron	3	398	2100
Magnesium	40	325	1150
Manganese	0.03	12.9	65
Nickel	0.02	0.2	2.05
Nitrate Nitrogen	0.1	3	50
Potassium	10	1100	2500
Sodium	50	1350	4000
Sulphate	10	290	1750
Alkalinity	300	6700	11500
pH	4.5	7	9
BOD	20	6590	40000
COD	500	12500	60000

WAIMAKARIRI DISTRICT COUNCIL

MEMO

FILE NO AND TRIM NO:	039793-05 039793.01 / 230913142844
DATE:	13 September 2023
MEMO TO:	File Note
FROM:	Kitty Waghorn, Solid Waste Asset Manager
SUBJECT:	Update to Plan Showing Potential Extent of the Kaiapoi Closed Landfill Leachate Plume

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This memo clarifies the changes made in updating Plan 1314, which shows the projected extent of the leachate plume from the Kaiapoi Closed Landfill.

Background

The Council-owned property at 476 Williams Street, Kaiapoi was consented as a closed landfill in October 1997. It is a condition of the discharge consent from Environment Canterbury (CRC971356) that *the Waimakariri District Council is to record on the Land Information Memoranda* (LIM) *for each of the properties within 500 metres in the downgradient direction of groundwater flow of the site, the potential for groundwater below and upgradient of the property to be affected by landfill leachate*.

The original Plan 1314 was developed in 1999/2000, as stipulated by the above condition. A significant amount of development has been undertaken on the neighbouring land since 2010, and the plan was reviewed and updated in September 2023.

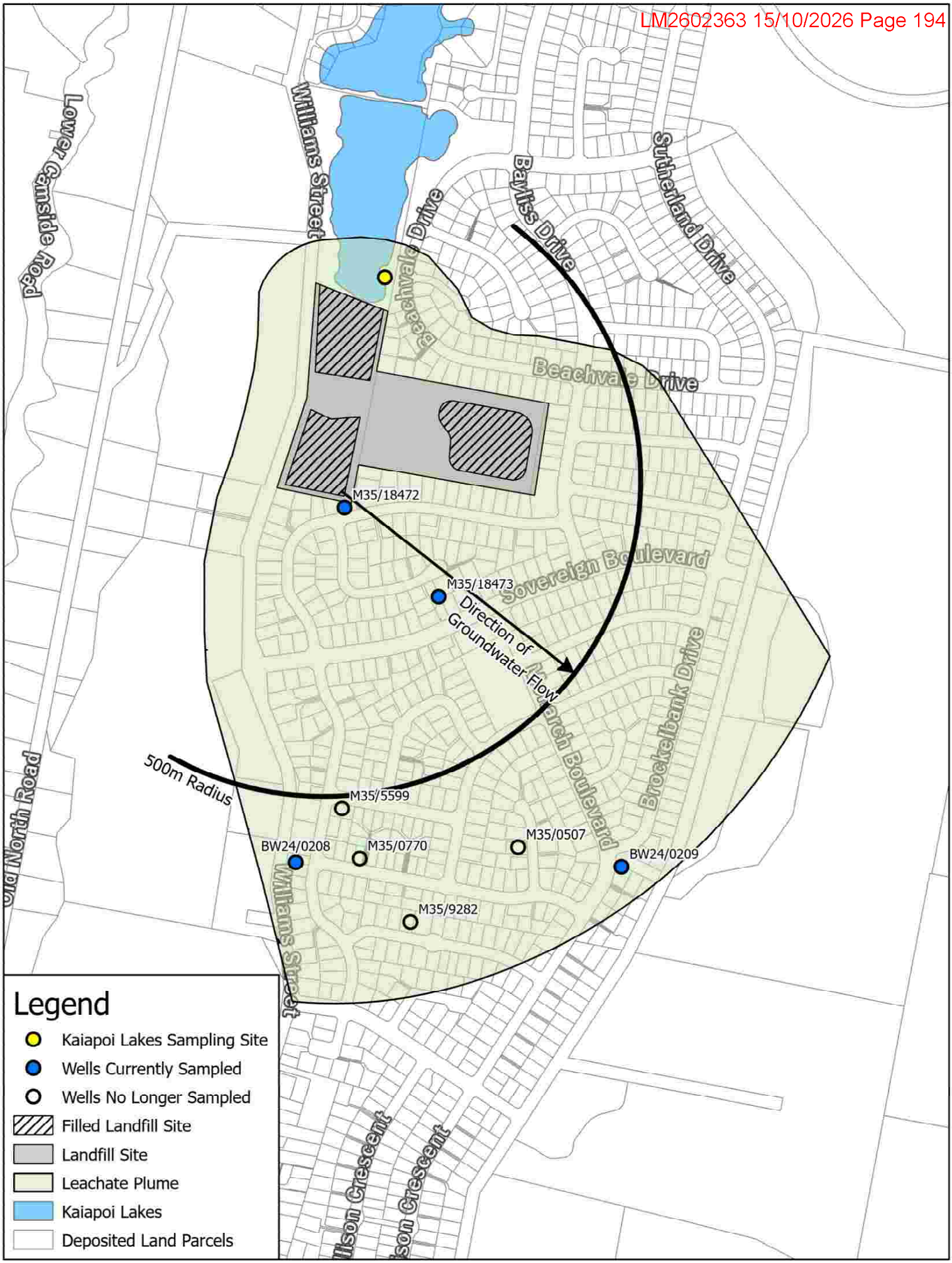
Update

The September 2023 amendments show:

- Where landfill activity was undertaken on the Council-owned property.
- The locations of the original monitoring bores and of the new bores that are now used for groundwater monitoring purposes.
- The current location of the Kaiapoi Lakes water quality monitoring point.
- The new roading network and properties that have been developed since 2010.

No changes have been made to the extrapolated leachate plume extent or to the 500m radius curve.

The updated plan 1314 (issued on 13 September 2023) is appended to this memo.



WAIMAKARIRI DISTRICT COUNCIL	Kaiapoi Potential Leachate Plume Extent	PLAN NO. 1314 Sheet 3	SCALE (A4) 1:7,500 DATE 13/09/2023	



Legend

All Flooding Hazard 200 year

ClassName

- Low
- Medium
- High

Property Boundaries

- Current Property
- Deposited Land Parcels

Road Names

Author: Cathlene Goldsworthy

Date: 15/10/2026

Scale 1:2,545 Original page size: A4

0 40 80 120 160

Metres

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Credits:

Waimakariri District Council, Land Information New Zealand, 2025 Urban and Rural Aerial Imagery, 2023 Birch Hill Cemetery UAV Imagery, 2022-23 Cust Cemeteries UAV Imagery, Waimakariri District Council, Waimakariri District Council

WAIMAKARIRI DISTRICT COUNCIL

Flood Hazards



Legend

All Flooding Hazard 200 year

ClassName

- Low
- Medium

Property Boundaries

- Current Property
- Deposited Land Parcels

Road Names

Author: Cathlene Goldsworthy

Date: 15/10/2026

Scale 1:318 Original page size: A4

0 5 10 15 20

Metres

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WAIMAKARIRI DISTRICT COUNCIL

Flood Hazards - 46 Brockelbank

Notes on Flood Hazard Mapping

The attached plan shows the result of a flood mapping exercise that has been carried out by the Waimakariri District Council.

There are a number of notes that need to be considered when using this information.

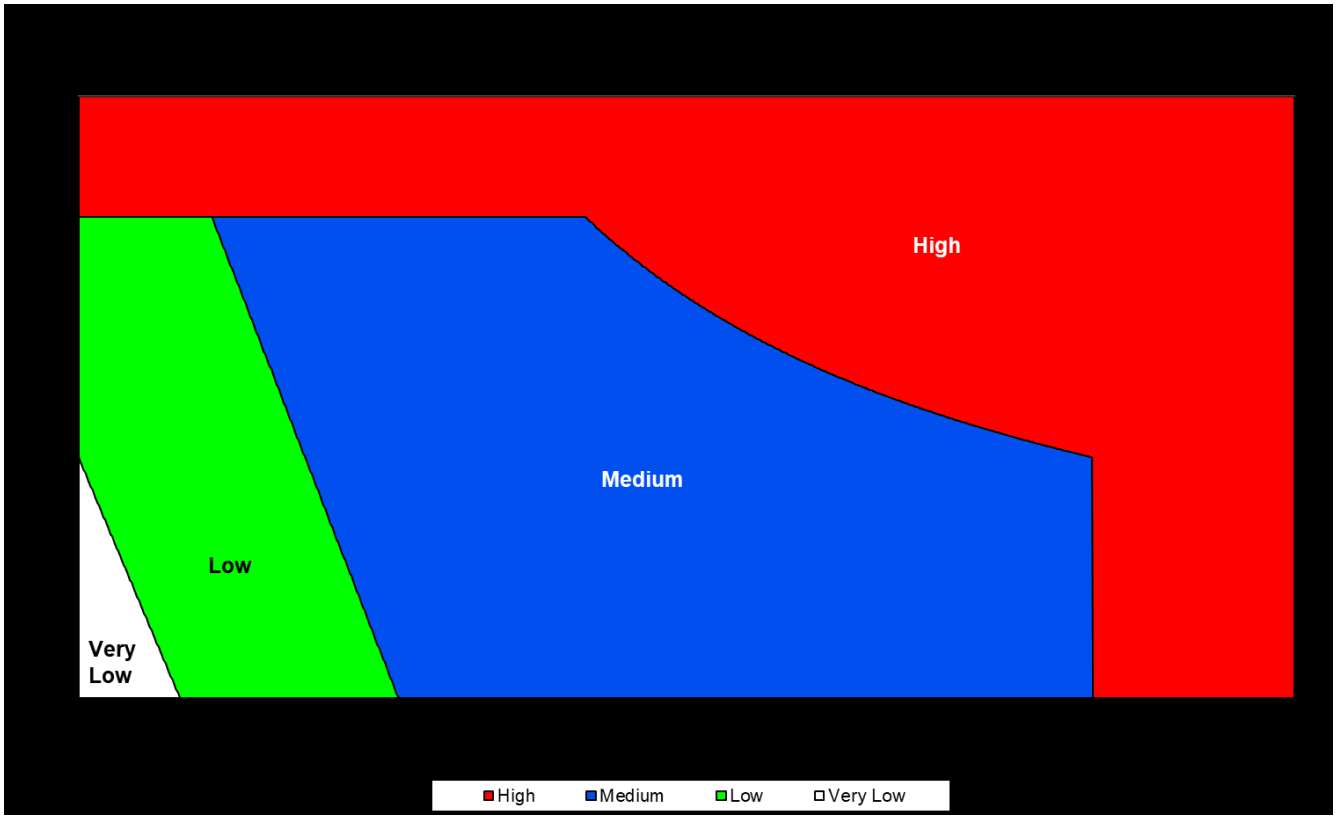
1. Annual Exceedence Probability.

   The rainfall used in this mapping is the 0.5% Annual Exceedence Probability (AEP) rainstorm. This is based on there being a 0.5% probability in any one year that there will be a rainstorm of this severity. This is sometimes referred to as the 1 in 200 year storm.

   Note that if a property has flood hazard shown in the 0.5% AEP it will likely be subject to flooding in more frequent events.

2. Flood Hazard Categories.

   The flood hazard categories are based on both the depth and velocity of the flood water as shown on the following diagram.



3. Flood Modelling

   This flood modelling shows the combined effects of:
   - Localised Flooding, flooding in response to rainfall
   - Ashley Breakout, flooding in response to a breakout event on the Ashely River
   - Coastal Inundation, flooding in response to storm surge, sea level rise and river flows

   Detailed information on the flood models including the technical modelling reports are available on the Council's Natural Hazards Portal on the Council website.

4. Generalised Flooding

   This flood modelling is for generalised, area wide, flooding risk mapping only. It does not take into account all site specific flood risks that may occur on individual properties. There may be areas of ponding or overland flow that occur but are not shown on this flood modelling. This may be due to local topographical characteristics or due to the location and levels of building floors in relation to the surrounding ground. This flood mapping has been carried out to help identify areas that may be at an increased risk of flooding, it is not an accurate prediction of flood levels.

5. Land Changes

   The results from this exercise will be less accurate in areas where major development or significant changes in the shape of the land has occurred since 2005. This is particularly important to note in new subdivision areas where new roads have been constructed or filling has occurred. The eastern area of the district including Rangiora, Kaiapoi and Woodend uses ground information updated in 2014. In some cases more recent subdivision areas have been included where information was available.

6. District Plan

   The attached Flood Map, published in 2020, is based on recent flood modelling work. This flood mapping has been formally adopted by Council and included in the Proposed Waimakariri District Plan.

7. Further Information

   To find further information on flooding and flood hazard please refer to the following links:

   - https://www.waimakariri.govt.nz/environment/natural-hazards
   - https://www.ecan.govt.nz/your-region/your-environment/natural-hazards/floods/
   - https://www.cdemcanterbury.govt.nz/hazards/floods/
   - https://niwa.co.nz/natural-hazards/hazards/floods



Legend

- Land Parcel
- Property Boundary

NZS3604:2011

- High 44 MS

NZS3604:2011

ZONE

- 2

Author: Cathlene Goldsworthy

Date: 15/10/2026

Scale 1:400 Original page size: A4

0 6 12 18 24

Metres

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WAIMAKARIRI DISTRICT COUNCIL

Hazards



Tsunami inundation extent map – Refer to Natural Hazards for further information

This property is eligible for the Council's kerbside collection service. This includes collection of recycling and an optional organics and rubbish wheelie bin service. Information on these services is available at:
https://www.waimakariri.govt.nz/services/recycling-rubbish-and-organics

New property owners may swap the size of bins allocated to their property within 3 months of taking possession, without paying a bin delivery/removal fee, by telephoning the Customer Services Team on 0800 965 468.

rethink rubbish
Working on waste together.

Waimakariri District Council
215 High Street
Private Bag 1005
Rangiora 7440, New Zealand
Phone 0800 965 468

Our Reference: CUS-03-04/190626090676

1 July 2019

Kerbside Bins – Information for New property Owners

The Council's optional kerbside rubbish and organics collection service was introduced on 1 July 2019 to complement the existing wheelie bin recycling collection.

If there are rubbish and/or organics bins at your property, your annual rates will include the rubbish and/or organics service. These rates are set for the financial year and vary according to the size of the bin supplied.

Organics (green lid) and Rubbish (red lid) bins at the property

As a new property owner, you have the opportunity to join the wheelie bin rubbish and organics collection. Also for a limited time, you may change the bin selections made by the previous owner of your property.

If you have rubbish and/or organics wheelie bins at your property and these are not suitable for your use, you are able to change the size of the bin or bins within 3 months of the sale settlement date without paying a delivery/removal fee or the cost of additional capacity. You may also cancel the service.

Contact Customer Services to arrange a swap of bin sizes or to send the bins back. *Please remember that there is no adjustment to your rates until next 1 July, and if your request is received more than 3 months after settlement, a fee for additional capacity will be payable if you are upsizing the bin, and a delivery/removal fee will be payable per set of bins.*

Joining the Organics and Rubbish bin collection

To join the optional services, contact Customer Services to request the bin or bins you require. You will be asked to pay a proportion of the cost of the collection service for the remainder of the rating year, and a bin delivery fee per set of bins. The fees will need to be paid before the bins are ordered. The cost of the collection will be added to your rates from the start of the next rating year.

Ohoka/Swannanoa/Mandeville area have Recycling and Rubbish bin collections only

As part of the new kerbside service a wheelie bin rubbish collection service is available to those properties in this area that currently have a recycling wheelie bin. Please let us know if you would like to have a fortnightly wheelie bin rubbish collection. The rubbish **bag and organics** collection is not available here. You can see if your property is inside the collection area by using our interactive map on waimakariri.govt.nz/rethinkrubbish.



More about the Service

The services offered are outlined on our website, together with costs, collection day calendars and information on what is accepted for collection in each bin.

Sign up for alerts and collection day reminders using our new website tool feature – waimakariri.govt.nz/rethinkrubbish

You can make your choice by talking to Customer Services at any Council Service Centre, sending an email to office@wmk.govt.nz or phone us on 0800 965 468

Landlords

As the ratepayer, you are the only person who can request the Organics and Rubbish bin kerbside collection services as the chosen services will directly affect your rates. Your tenants may wish to talk to you about their preferred choice and may be willing to pay extra for a bin service.

Kerbside Recycling

If you decide not to choose any of the rubbish or organics wheelie bin options, you will still have a recycling wheelie bin allocated to your property. Collection is fortnightly, and this service is funded by the annual Kerbside Collection Rate. *You may also swap the size of this bin for free within 3 months of your property sale settlement. Outside this time a delivery/removal fee will apply.*

If your property is a new build you may need to order your recycling wheelie bin from Customer Services.

Find out more…

Have a look at the information on our website, then if you have any questions, please call us on 0800 965 468.

Yours faithfully

Customer Services