Stormwater Discharge – Consent Application and Assessment of Environmental Effects – 227 Hunters Road, Dunsandel

Prepared for: Lifestyle Chickens Ltd

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Quality Control Sheet

TITLE	Stormwater Discharge – Consent Application and Assessment of Environmental Effects – 227 Hunters Road, Dunsandel
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Limitations:

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Appendices:

1. Introduction

Courtenay Environmental Consultants Ltd (CEC) has been engaged by Lifestyle Chickens Ltd to prepare an assessment of environmental effects for the discharge of stormwater onto and into land at 227 Hunters Road, Dunsandel. This is required as the discharge of operational phase and construction phase stormwater is not permitted under Environment Canterbury Rules. The discharge is roof water from a buildings and associated gravelled/sealed hardstand area.

This consent application is prepared in support of other consent applications being prepared by Kinetic Environmental Consulting for the project.

2. Description of the Proposal

Lifestyle Chickens Ltd are contracted to Tegel to construct 8 new breeder sheds at 227 Hunters Road. Breeder sheds are those where chickens lay the eggs which are then sent to a hatchery for hatching before the young chickens are sent to the grower shed. The 8 sheds will be constructed as two stages of four sheds each.

The general layout consists of two pairs of sheds separated by gravelled areas used for roof stormwater management surrounded by a concrete hardstand area for vehicle manoeuvring. There will be area for workers carparks and a driveway to access the site. The location is shown in Figure 1 and the general layout for each set of sheds is shown in Figure 2.

A total of 15 staff will work at the site spread across the two sets of sheds. Note, as the project is contingent on getting the necessary Environment Canterbury (ECan) consents, particularly that of the air discharge consent, the layout shown is of a general nature. Also, Selwyn District Council will not process building consent applications at present until the applicant has already obtained the necessary discharge consents from ECan. Hence, the applicant does not wish to spend any more money than is necessary to develop the concept until the consents have been approved.

2.1 Site Details

Total area of property: 30.689 ha

Total roof area (covered by consent): Building -1.88 ha (subject to final design),

Area of roads: - Nil

Hardstand area: 2.56 ha approx. (subject to final design).

This is a discharge from (part of) a single Lot.

2.1.1 Listed Land Use Register database

The Listed land Use Register (LLUR) shows a site of interest being a former vineyard. A PSI/DSI has been carried out and the results of sampling show that there are no concentrations of contaminants

in the soil above background resulting from the HAIL activity (i.e. the operation of the vineyard) and the site is deemed not to be contaminated. Note, that this only relates to the second stage of construction. The first stage of 4 buildings is not in a site of interest. The Listed Land Use Register report can be found in Appendix B. The Momentum Environmental report can be found in Appendix C.

2.2 Treatment and Capacity of the Stormwater System

2.2.1 Roofs

Roof water will discharge into a gravel filled trench which is excavated the full length of each side of the building or gutters and soak pits will be installed. The gravel fille trench or soak pit will be sized to meet the requirements of the Rule 5.96 that is they are sized to meet the runoff from all events up to 24 hr duration with a 10 % chance of occurring in any one year.

2.2.2 Hardstand Areas

The hardstand area to surrounding the building will be sloped to edge of the seal surrounding the buildings where runoff will be discharged by overland flow into infiltration swales (As shown in Figure 2). The infiltration swales will be sized to contain a runoff volume equal to the impervious area times a rainfall depth of 25 mm. Note that the actual amount of runoff from a 25 mm rainfall event will be less than 25 mm due to ponding on the hardstand area and the amount of rainfall absorbed into the surface. Also, during the rain event water will be infiltrated through the soil as it arrives at the swale. Typically, initial losses on the hardstand surface range from 2.5 mm if the surface is concrete to around ½ the rainfall (of the 25 mm depth) if the surface is compacted gravel. Based on a design infiltration rate of the swale of 50 mm/hr generally the swale will contain and infiltrate up to a 50 mm rainfall event. For all other events the excess water is expected to pond on the catchment until the rain event ceases and the ponded runoff will drain to, and through, the infiltration swale. At 50 mm/hr generally the ponding for all rainfall events up to 50 yr duration does not exceed 12 hours.

2.3 Design Details of the Stormwater System

As noted above the whole project is contingent on getting the necessary consents from ECan. Rather than investing in detailed design at this time the applicant is happy for a consent condition requiring that the designs for the hard stand and roof water management systems be submitted to ECan prior to construction and that the sizes are based on handling the design rainfalls referred to above.

The infiltration swales will have a typical cross section as shown in Figure 4. With the observed soil strata it is anticipated that the infiltration layer will be laid on the in-situ gravels.

Roof runoff will be allowed to drain directly onto the hardstand so the infiltration swales will need to manage the outside roof from the two outside sheds plus the surrounding hardstand. Between the sheds is a gravelled area which are not used or accessible by vehicles. A central infiltration trench will be excavated which will allow the roof runoff and that hardstand runoff to drain into the underlying gravels in the manner of a soak pit. Figure 5 shows a typical configuration.

Note construction of infiltration swales and infiltration trenches is not Restricted Building Work under the Building Code and therefore do not need to be signed off by a Licensed Building Practitioner [LBP](which includes Chartered Professional Engineers). Under the Building Code the sign-off would be from a Registered Drainlayer who would prepare a PS3 (Producer Statement Construction) stating that the installed soak pit and infiltration swale is built according to the plans provided. Therefore, provision of the PS3 to both Selwyn District Council and ECan is all that is required and a sign off from a Chartered Professional Engineer will not be provided.

2.4 Nature of the discharge

Tegel have provided an estimate of the number of vehicle movements on a daily/weekly/monthly basis. The table for the full 8 sheds is presented below (noting that initially just 4 sheds will be constructed).

PRODUCTION FARMS BASED ON 8 SHEDS (42 weeks of production)														
Frequency	Feed Transfer	Shavings Delivery	Egg Collection	Gas delivery	Grass cutting	Waste Collection	Dead bird Collection	Dwelling	Workers	Contractors	Manure Removal	Intercrop	POL Transfers	Depletion
	Truck	Truck	Truck	Truck	Tractor	Truck	Truck	Car	Car	Van	Truck	Car	Truck	Truck
Daily									12					
Weekly	3		4	2		1	2	6		4		2		
Monthly					1									
3 Monthly		8			2					8	36	6	12	32

The vehicle movements indicate that over a 3 month period there would be typically be 14 light vehicle travelling to and from the site and 3 trucks travelling to and from the site per day.

The contaminant risk from such a low number of vehicles cannot be quantified. Generally, information for stormwater runoff starts with data from sites with hundreds of vehicle movements per day. The potential contaminants normally present in runoff from an activity such as this is sediments (windblown, from vehicles), heavy metals, and high molecular weight hydrocarbons (eg. engine, hydraulic oil).

As an example of stormwater runoff data from the Canterbury area, Salina Poudyal Dhakal (April 2019) submitted the thesis “Characterizing stormwater pollutant yields from urban carparks in a low-intensity rainfall climate” in partial fulfilment of the requirements for the Degree of Doctor of Philosophy in Civil Engineering at the University of Canterbury. In the thesis Salina presents monitoring data of stormwater quality from four catchments. The carpark size vehicle numbers and land use are summarised in Table 3.1 below extracted from the thesis.

Table 3.1: Land use characteristics and estimated daily traffic from urban carparks

Carpark	[1] Estimated daily traffic	Characteristics of vehicles and land use category	[2]Drainage area (m^2)
University	900 vehicles/day	Residential/institutional: private car, occasionally (truck for loading/unloading)	5036
Hospital	600 vehicles/day	Commercial/institutional: private car-occasionally bus and truck	1752
Industrial	>1000 vehicles/day	Industrial: truck (mainly 16-wheeler), van and private car	3042

[1] total parking lots were surveyed during the site visit. Total vehicle count was estimated based on field observation at the hospital carpark and with a data logger at the university and industrial carparks
[2]carpark areas were estimated using ArcGIS 10.3

As can be seen the site with the lowest estimated vehicle traffic is around 35 times more than expected for this site

Table 4.2 from the thesis (below) shows the concentrations of contaminants in the stormwater.

Table 4.2: Mean, median, range, and mean rank of TSS and total metals (Zn, Cu, Pb) concentrations from different carparks, and mean ranks from Kruskal-Wallis test

Carpark type	TSS (mg/L)	TZn (µg/L)	TCu (µg/L)	TPb (µg/L)
	mean, median (range) **mean rank**			
University	174, 154 (17 - 651) **22**	401, 272 (55 - 2128) **22**	50, 41 (12 - 157) **24**	58, 14 (4 - 532) **21**
Hospital (active)	237, 196 (64 - 476) **28**	332, 236 (108 - 997) **20**	34, 32 (21 - 51) **17**	27, 25 (11 - 50) **24**
Hospital (passive)	63, 62 (6 - 120) **9**	151, 126 (41 - 300) **11**	28, 26 (14 - 58) **13**	16, 11 (2 - 42) **12**
Industrial	781, 657 (185 - 3002) **46**	2716, 2035 (761 - 8277) **46**	178, 153 (56 - 390) **45**	171, 137 (36 - 359) **44**

Based on the comparison of the number of vehicle movements (i.e. around 35 times lower) it is expected that the runoff from the hardstand area will have concentrations of key contaminants which are also around 35 times lower than found above.

Take for instance the industrial contaminant concentrations. Dividing those by 35 and comparing with the Drinking Water Regulations Maximum Acceptable Values (MAV) or Guideline Values (GV) we get the comparisons in Table 1.

Table 1: Contaminant Concentrations Compared with Drinking Water Standards		
Contaminant	**Stormwater Concentration**	**Drinking Water Standard**
Total Zinc	0.077 mg/L	1.5 mg/L (GV)
Total Copper	0.005 mg/L	2 mg/L (MAV)
Total Lead	0.005 mg/L	0.01 mg/L

The roof water discharge will contain any material that has accumulated on the roof including sediments, leaves, and bird droppings. These will be removed in the gravel trench prior to filtration through the underlying soil strata to the groundwater.

All potential contaminants normally expected in the stormwater will be treated by filtration through the infiltration media, and by filtration through the natural unsaturated strata (vadose zone). Furthermore, the depth to groundwater is 15 m or more at this location. As such any discharge will pass through 15 m or more of unsaturated natural strata before reaching groundwater.

There is little risk of a 'spill' occurring. Any spill should it occur be adsorbed onto the soils in the infiltration swales, or absorbed onto the surface materials of the hardstand.

2.5 Inspections, Maintenance and Monitoring of the Stormwater System

Periodic inspection of the infiltration swales will be necessary to ensure grass cover is maintained, to remove any debris or sediments that might have accumulated. Given the low intensity of the activity on the hardstand yearly inspections is all that is considered necessary for this site.

2.6 Construction Phase

The compliance assessment reported below indicates that a discharge consent is required for the construction phase stormwater. As the soils are free draining there will be no runoff from the site during construction and all stormwater will infiltrate into the ground. There are no overland flow paths onto or from the site so no specific management of stormwater is required at the site boundaries. A standard site entrance will be required to minimise the tracking of sediments from the site onto the road. Dust management using water carts may be required depending on the time of year site excavation and placement of materials occurs.

3. Legal and Planning Matters

The Resource Management Act 1991 Section 15 of the RMA states that:

"(1) No person may discharge any—
(a) contaminant or water into water; or
(b) contaminant onto or into land in circumstances which may result in that contaminant (or any other contaminant emanating as a result of natural processes from that contaminant) entering water; or
(c) contaminant from any industrial or trade premises into air; or
(d) contaminant from any industrial or trade premises onto or into land
unless the discharge is expressly allowed by a national environmental standard or other regulations, a rule in a regional plan as well as a rule in a proposed regional plan for the same region (if there is one), or a resource consent."

The proposed discharge cannot comply with the relevant regional rules and there is no national environmental standard that authorises the discharge, therefore a resource consent is required under the relevant regional plan.

3.1 Canterbury Land and Water Regional Plan (LWRP)

The operational phase and construction phase stormwater discharge has been assessed against the conditions of Rule 5.96 and 5.94A in the Canterbury Land and Water Regional Plan as follows.

Rule 5.96 The discharge of stormwater, other than into or from a reticulated stormwater system, onto or into land where contaminants may enter groundwater is a permitted activity, provided the following conditions are met:	
Condition	Assessment
1. The discharge is not from., into or onto contaminated or potentially contaminated land; and	The LLUR indicates a site of interest (a former vineyard). Testing of the soils indicates that there are no concentrations of contaminants resulting from the HAIl activity and therefore the site is not contaminated (see Appendix C). (**COMPLIES**)
2. The discharge:	
(a) Does not cause stomwater from up to and including a 24 hour duration 10% Annual Exceedance Probability rainfall event to enter any other property; and	(**COMPLIES**)
(b) Does not result in the ponding of stormwater on the ground for more than 48 hours, unless the pond is part of the stormwater treatment system; and	The stormwater will drain from the hardstand in less than 48 hours from the cessation of a storm event. (**COMPLIES**)
(c) Is located at least 1 m above the highest groundwater level at the time the discharge system is constructed; and	Highest groundwater estimated to be 15 m below ground level. Deepest stormwater management will be not more than 1.5 m deep. (**COMPLIES**)
(d) Is only from land used for residential, educational or rural activities; and	The site is for intensive farming (**DOES NOT COMPLY**)
(e) does not occur when there is an available reticulated stormwater system, except where incidental to discharge to that system; and	No reticulated system in area. (**COMPLIES**)
(f) is not from a system that collects and discharges stormwater from more than five sites	This is a single site. (**COMPLIES**)

As the activity does not comply with condition 2(d) then a consent is required under Rule 5.97 as a **DISCRETIONARY ACTIVITY**.

Rule 5.94A The discharge of construction-phase stormwater, other than into or from a reticulated stormwater system, to a surface waterbody, or onto or into land in circumstances where a contaminant may enter groundwater or surface water, is a permitted activity, provided the following conditions are met:	
Condition	Assessment
1. The area of disturbed land from which the discharge is generated is less than: (a) 1000m^2 for any construction-phase stormwater generated as a result of work carried out in an area shown as High Soil Erosion Risk on the Planning Maps; or (b) two hectares in any other location; and	The site is not in an area shown as High Soil Erosion Risk but area of excavation for ech set of sheds is more than 2 hectares. (**DOES NOT COMPLY**)
2. The concentration of total suspended solids in the discharge shall not exceed: (a) 50g/m^3 where the discharge is to any spring-fed river, Banks Peninsula river, or to a lake except when the background total suspended solids in the waterbody is greater than 50g/m^3 in which case the Schedule 5 visual clarity standards shall apply; or (b) 100g/m^3 where the discharge is to any other river or to an artificial watercourse except when the background total suspended solids in the waterbody is greater than 100g/m^3 in which case Schedule 5 visual clarity standards shall apply; and	Any construction phase discharge will be to ground and there is no discharge to surfacewater (**COMPLIES**)
3. The discharge does not result in an increase in the flow in the receiving waterbody at the point of discharge of more than 1% of a flood event with an Annual Exceedance Probability of 20% (one in five year event); and	No Discharge to a watercourse. (**COMPLIES**)
4. The discharge is not from, into or onto contaminated or potentially contaminated land; and	Soil sampling shows no contamination from HAIL activity (see Appendix C). (**COMPLIES**)
5. The discharge does not contain any hazardous substance; and	Any discharge will be sediments from the site during earthworks. (**COMPLIES**)
6. The discharge does not occur within a Community Drinking-water Protection Zone as set out in Schedule 1.	The site is not within a CDWPZ (**COMPLIES**)

As the site is more than 2 hectares in size and does not comply with Condition 1b then it is necessary to obtain a discharge consent under Rule 5.94B as a **RESTRICTED DISCRETIONARY ACTIVITY**.

3.2 Relevant Statutory Provisions And Planning Assessment

Section 104(1)(b) of the RMA requires a consent authority to have regard to the relevant provisions of the following documents:

a. A national environmental standard;

b. Other regulations;

c. A national policy statement;

d. A New Zealand coastal policy statement;

e. A regional policy statement or proposed regional policy statement;

f. A plan or proposed plan.

Of relevance to this application are the following documents and provisions:

a. National Environmental Standard for Sources of Human Drinking Water (NESDW);

b. National Policy Statement for Freshwater Management (NPS-FM);

c. Canterbury Regional Policy Statement (RPS);

d. Canterbury Land and Water Regional Plan (LWRP) and any proposed changes to this plan.

National Environmental Standard for Sources of Human Drinking Water

The National Environmental Standard for Sources of Human Drinking Water (NESDW) is a regulation made under the RMA (1991) that sets requirements for protecting sources of human drinking water from being contaminated. It came into effect on 20 June 2008.

Regulations 7, 8 and 12 do not apply to this application as it does not have the potential to affect a registered drinking water supply that provides no fewer than 25 people with drinking water for not less than 60 days each calendar year or any larger community supply. The closest downgradient community water supply well is at Dunsandel around 7.2 km away.

National Policy Statement for Freshwater Management (2020)

The National Policy Statement for Freshwater Management 2020 (NPS-FM 2020) came into effect on 3 September 2020. The proposal is consistent with the NPS-FM 2020 objective and policies (Part 2), which give effect to the fundamental concept of Te Mana o te Wai (Clause 1.3), and the associated hierarchy of obligations.

The fundamental concept of the NPS-FM is Te Mana o te Wai which has a hierarchy of obligations towards protecting the health of freshwater. The objective of the NPS-FM 2020 ('the Objective') is:

[…] to ensure that natural and physical resources are managed in a way that prioritises: that prioritises:

(a) First, the health and well-being of water bodies and freshwater ecosystems.

(b) Second, the health needs of people (such as drinking water).

(c) Third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.

Policies 1 to 15 seek to give effect to the Objective in line with the principles of Te Mana o Te Wai . The following sections consider the relevant policies in relation to the proposal.

Policy 1 of the NPS-FM 2020 requires that: *Freshwater is managed in a way that gives effect to Te Mana o te Wai*. Giving effect to Te Mana o Te Wai means that freshwater resources are managed in a way that gives effect to the priorities in the hierarchy of obligations in Te Mana o te Wai (the Objective). Freshwater management must in the first instance meet the first priority in the hierarchy of obligations. If consistency with the first priority can be ensured, then the next step is to consider a proposal against the second priority and then the third.

- First Priority - The health and well-being of water bodies and freshwater ecosystems

    a. There is no reticulated stormwater system available in this area for the applicant to connect to. Therefore, given the size of the site and the lack of a contaminant load, the best practicable option which will meet the requirements of the first priority requirements, is the proposed treatment of the hardstand runoff using infiltration swales and discharge of the roofwater to ground.

    b. As the stormwater contaminant concentrations will be well below the MAV and GV for drinking water, the treatment of the stormwater as it passes through approximately 15 m of unsaturated natural strata will further reduce the contaminant load to ensure a very high quality discharge limiting the cumulative effects on groundwater associated with any other similar discharges in this area so the health and well-being of water bodies and freshwater ecosystems will be preserved.

- Second Priority – The health needs of people:

    a. The nearest potable supply well in a generally downgradient shown on Canterbury Maps is the Dunsandel public supply well L36/0725 which is over 7 km away. There is no risk to this well from the proposed discharge. It is noted that well BX22/0252 is slightly more than 200 m downgradient of the edge of the area being developed is identified as a domestic supply well. This well is 70 m deep. The water quality discharging into ground below the treatment/discharge systems is expected to be close to potable standard. With further filtering and adsorption/absorption of any contaminants remaining through the natural strata means this well will be unaffected by the discharges.

    b. In terms of the second priority, the site is not located within a community drinking water protection zone. By maintaining adequate separation distances to groundwater, property boundaries and adjacent properties, and nearby existing drinking water supplies, and by treating the stormwater by filtration through the soil and allowing for natural attenuation, the health needs of people will be protected. Many other similar systems have been adopted in Canterbury for stormwater management.

e. Given the above analysis, the application will meet the second priority.

- Third Priority – The ability of people and communities to provide for their social, economic and cultural well-being, now and in the future.

    a. In the absence of a reticulated stormwater system for the area, the provision of an on-site stormwater system for the applicant will help to ensure the ability of them to provide for their social, economic, and cultural wellbeing, now and in the future.

    b. The proposal is likely to give rise to economic benefits as it provides means for the proposed site to operate and therefore provides a source of employment now and into the future.

    c. The proposal is consistent with Mahaanui Iwi Management Plan 2013, which is the principal mana whenua planning document for the local Rūnanga (Te Taumutu) and is consistent with the Te Rūnanga O Ngai Tahu Freshwater Policy Statement 1999. The proposal to discharge stormwater to land and not to water is consistent with objective and policies to restore, maintain and protect the mauri of freshwater sources. Therefore, the cultural well-being of people and communities will be provided for. There are no cultural sites of significance located on the property.

Based on the above discussion, the activity is therefore consistent with the hierarchy of obligations defined in the NPS-FM.

In addition to the hierarchy of obligations, the application has been assessed against the relevant policies of the NPS-FM.

Policy 3 of the NPS-FM 2020 requires that: *Freshwater is managed in an integrated way that considers the effects of the use and development of land on a whole-of-catchment basis, including the effects on receiving environments.*

Currently the LWRP requires land and water to be managed as integrated natural resources and gives effect to the NPS-FM 2020 in this regard. As noted in the AEE, regard has been held to the local groundwater and its users. Given the lack of contaminants along with the treatment that will occur through the natural soil and vadose zone, the actual and potential effects of the discharge both at the site and in the surrounding area especially downgradient of the site, the proposal is consistent with Policy 3 for the duration of the consent.

Policy 5 of the NPS-FM 2020 states: *Freshwater is managed through a National Objectives Framework to ensure that the health and well-being of degraded water bodies and freshwater ecosystems is improved, and the health and well-being of all other water bodies and freshwater ecosystems is maintained and (if communities choose) improved*.

The underlying aquifer at the site is not managed through a National Objectives Framework, however Schedule 8 of the LWRP provides contaminant concentrations limits within groundwater that activities should be able to comply with. The proposal will not result in any additional exceedance of these limits.

Policy 15 of the NPS-FM 2020 states: *Communities are enabled to provide for their social, economic, and cultural wellbeing in a way that is consistent with this National Policy Statement*.

Given the lack of any reticulated stormwater system for this rural area, the proposed stormwater management will provide for the applicants, and the larger community of which they will form part of, social and economic well-being which is therefore consistent with this policy.

Summary

The proposed discharge is consistent with the policies and objectives of the NPS-FW due the quality of the discharge, along with the separation to ground and surface water.

Canterbury Regional Policy Statement (CRPS)

The Canterbury Regional Policy Statement sets out the policies and objectives to achieve integrated management of the region's natural and physical resources. The following objectives and policies are considered relevant to the proposed activity:

Chapter 7 – Fresh Water

In relation to water quality:

a. **Objective 7.2.1**: Sustainable management of freshwater.

b. **Objective 7.2.4**: Integrated management of freshwater resources.

c. **Policy 7.3.3** (water quality and land uses – to avoid, remedy or mitigate adverse effects of changes on the quality of freshwater)

d. **Policy 7.3.6** – Fresh water quality - to manage activities which may affect water quality (including land uses), singularly or cumulatively, to maintain water quality at or above the minimum standard set for that water body.

e. **Policy 7.3.7** – To avoid, remedy or mitigate adverse effects of changes in land uses on the quality of fresh water (surface or ground).

The application is considered consistent with the above objectives and policies as there will be less than minor effects on groundwater quality from the proposed stormwater discharge.

In summary, the proposal is consistent with the relevant objectives and policies of the CRPS.

Canterbury Land and Water Regional Plan (LWRP)

The Canterbury Land and Water Regional Plan was notified on 18 January 2014. The current operative Plan is one that incorporates Plan Changes 1-7 and became operative on 1 September 2023 with minor changes noted an incorporated in February 2024

This Plan operates at two levels. There is a region-wide section, which contains the objectives, policies and rules that apply across the region. There are also ten sub-region sections. Each part of

the region is covered by one sub-region section. The sub-region sections contain policies and rules which are specific to the catchments covered by that section.

The policies and rules in the sub-region sections implement the region-wide objectives in the Plan in the most appropriate way for the specific catchment or catchments covered by that section. Where the Plan contains policies and rules on the same subject matter, the more specific sub-region provision will take precedence, except in relation to Policies 4.2 to 4.9. Policy 4.1 will also take precedence unless catchment specific outcomes are specified in the sub-region Section.

The relevant Objectives of the LWRP relevant to the proposed discharge are:

a. **Objective 3.1** *Land and water are managed as integrated natural resources to recognise and enable Ngai Tahu culture, traditions, customary uses and relationships with land and water*;

b. **Objective 3.2** *Water management applies the ethic of ki uta ki tai – from the mountains to the sea – and land and water are managed as integrated natural resources recognising the connectivity between surface water and groundwater, and between fresh water, land and the coast*;

c. **Objective 3.6** *Water is recognised as essential to all life and is respected for its intrinsic values*;

d. **Objective 3.8A** *High quality fresh water is available to meet actual and reasonably foreseeable needs for community drinking water supplies*.

e. **Objective 3.23** *Soils are healthy and productive, and human-induced erosion and contamination are minimised*.

f. **Objective 3.*24*** *All activities operate at good environmental practice or better to optimise efficient resource use and protect the region's fresh water resources from quality and quantity degradation*.

The above objectives are implemented through policies in Section 4 of the LWRP. The policies are to be read and considered together, I have therefore listed the most relevant Strategic, Activity and Resource and Sub-regional Policies (Selwyn – Te Waihora Subregional Section 11 of the LWRP) to the proposal as follows:

a. **Policy 4.1** Lakes, rivers, wetlands and aquifers will meet the fresh water outcomes set in Sections 6 to 15 within the specified timeframes.

b. **Policy 4.2** The management of lakes, rivers, wetlands and aquifers will take account of the fresh water outcomes, water quantity limits and the individual and cumulative effects of land uses, discharges and abstractions will meet the water quality limits set in Sections 6 to 15 or Schedule 8 and the individual and cumulative effects of abstractions will meet the water quantity limits in Sections 6 to 15.

c. **Policy 4.4** Groundwater is managed so that.... (e) overall water quality in aquifers does not decline; and (f) the exercise of customary uses and values is supported.

d. **Policy 4.5** Water is managed through the setting of limits to safeguard the life-supporting capacity of ecosystems, support customary uses, and provide for community drinking-water supplies and stock water, as a first priority and to meet the needs of people and communities for water for irrigation, hydro-electricity generation and other economic activities and to maintain river flows and lake levels needed for recreational activities, as a second priority.

e. **Policy 4.7** Resource consents for new or existing activities will not be granted if the granting would cause a water quality or quantity limit set in Sections 6 to 15 to be breached or further over allocation (water quality and/or water quantity) to occur or in the absence of any water quality standards in Sections 6 to 15, the limits set in Schedule 8 to be breached. Replacement consents, or new consents for existing activities may be granted to: (a) allow the continuation of existing activities at the same or lesser rate or scale, provided the consent contains conditions that contribute to the phasing out of the over allocation (water quality and/or water quantity) within a specified timeframe; or (b) exceed the allocation limit (water quality and/or water quantity) to a minor extent and in the short-term if that exceedance is part of a proposal to phase out the overallocation within a specified timeframe included in Sections 6 to 15 of this Plan.

f. **Policy 4.11** of the LWRP states: The setting and attainment of catchment specific water quality and quantity outcomes and limits is enabled through: a. limiting the duration of any resource consent granted under the region-wide rules in this Plan to a period not exceeding five years past the expected notification date (as set out in the Council's Progressive Implementation Programme) of any plan change that will introduce water quality or water quantity provisions into Sections 6 – 15 of this Plan; but allowing, where appropriate, a longer resource consent duration for discharge permits granted to irrigation schemes or principal water suppliers under the region-wide nutrient management rules in this Plan, provided those permits include conditions that restrict the nitrogen loss from the land and enable a review of the consent under section 128(1) of the RMA.

g. **Policy 4.12** There are no direct discharges to surface water bodies or groundwater of: (a) untreated sewage, wastewater (except as a result of extreme weather related overflows or system failures) or bio-solids; (b) solid or hazardous waste or solid animal waste; (c) animal effluent from an effluent storage facility or a stock holding area; (d) organic waste or leachate from storage of organic material; and (e) untreated industrial or trade waste.

h. **Policy 4.13** Directs to avoid or minimise the volume or amount of the discharge where possible, and to utilise land-based treatment systems prior to discharges reaching surface or groundwater bodies.

i. **Policy 4.14** Direct that the natural capacity of soil to treat or remove the contaminant shall not be compromised...., and distance between discharge and waterbody is sufficient to allow for natural attenuation of pathogenic micro-organisms

j. **Policy 4.14B** Have regard to Ngāi Tahu values, and in particular those expressed within an iwi management plan, when considering applications for discharges which may adversely affect statutory acknowledgement areas, nohoanga sites, surface waterbodies, silent file areas, culturally significant sites, Heritage New Zealand sites, any listed archaeological sites, and cultural landscapes, identified in this Plan, any relevant district plan, or in any iwi management plan.

k. **Policy 4.23** Any water source used for drinking-water supply is protected from any discharge of contaminants that may have any actual or potential adverse effect on the quality of the drinking-water supply including its taste, clarity and smell and group and community drinking water supplies are protected so that they align with the CWMS drinking-water targets and meet the drinking-water standards for New Zealand.

l. **Policy 11.4.1** Manage water abstraction and discharges of contaminants within the entire Selwyn Te Waihora sub-region to avoid, remedy or mitigate adverse cumulative effects on the water quality of Te Waihora/Lake Ellesmere, rivers and shallow groundwater; and the flow of water in springs and tributaries flowing into Te Waihora/Lake Ellesmere and achieve, in combination with non-regulatory actions, the freshwater objectives and outcomes for the sub-region.

The proposed discharge is consistent with the above objectives and policies in the following ways:

a. The stormwater management will result in a high quality of treated stormwater reaching groundwater along with a disposal method that does not exceed the infiltration capacity of the subsoils;

b. There will be no direct discharge of stormwater to surface water or groundwater. In addition with approximately 15 m separation from the base of the land discharge systems to highest groundwater further adsorption, absorption and filtration of the contaminants in the stormwater will occur;

c. The application is not within an area of significance to Ngai Tahu and the discharge is to land which is consistent with policies of the relevant IMP;

d. The proposed discharge will not have any adverse or potential adverse effects on any drinking water supply.

Policy 4.11 requires that the duration of any resource consent granted under the region-wide rules in the LWRP to a period not exceeding five years past the expected notification date (as set out in the Council's Progressive Implementation Programme) of any plan change that will introduce water quality or water quantity provisions into Sections 6 – 15 of this Plan.

A duration of 15 years has been applied for that is consistent with other recent stormwater discharge consents granted in Canterbury region. Based on the assessment above, the proposed discharge is very unlikely to give rise to any adverse effects on water quality and the stormwater system is likely to operate for at least 15 years with the recommended maintenance.

Therefore, although a 15-year duration is not consistent with Policy 4.11 of the Canterbury Land and Water Regional Plan, the duration will not result in adverse effects on water quality and is appropriate for this proposal.

Summary

Overall, it is considered that the proposal is consistent with the objectives and policies and intent of the LWRP.

4. Consultation and Written Approval of Affected Persons

No consultation has been carried out as it has been assessed that no persons or Iwi will be affected by the proposal.

5. Description of the Affected Environment

The site has largely been pastural farming since the first aerial photographs in the 1940's. In the 1990's a vineyard was developed which initially covered the area shown in the Listed Land Use Register. Around 2009 this was reduced in size to a small area to the south of the existing house and was completely removed by 2018.

The land is flat with topsoil and silt overlying gravels in a silt sand matrix.

5.1 Landform

The land is flat with a gentle slope in a southeasterly direction.

5.2 Soils

The soil data on Canterbury Maps Viewer indicates that the soils are most likely to be Lismore shallow silt loams which are moderately well drained over rapid drainage. A review of the soil properties on S-Maps for this location confirm the soils to be predominantly Lismore shallow silt loams (Lismore_1a.1) with potential presence of Lismore shallow silt (Lismore_2a.1) which has the presence of gravels to the ground surface.

Six test pits have been excavated across the site. Test Pits 1 to 5 are consistent with Lismore_1a.1 and Test Pit 6 is consistent with Lismore_2a.1. The test pit logs are available in Appendix D. Preliminary infiltration testing carried out. At 600 mm and 1.5 m below ground level the infiltration rates are several thousand millimetres per hour. As such there is no problem with managing stormwater runoff by discharge into ground. The location of the test pits and indicative infiltration rates are shown on Figure 3. The infiltration was measured at 1.5 m below ground level for Test Pits 1 to 5 and 600 mm below ground level for TP6.

5.3 Groundwater

Canterbury Map Viewer shows 19 wells within the 1 km buffer around the property plus the well on the property. Of these one is not used, one was not drilled, one is an expired bore consent and one well number replaces another well number after the well was deepened. So there is 15 active wells. Figure 6 shows the well locations including corrected locations for some wells as identified. Table 2 shows details of the wells. The shallowest groundwater is slightly less than 16 m below ground level in a relatively shallow monitoring bore which is 35 m deep. The next shallowest bore is 55 m deep while the remainder are 70 to 95 m deep with the groundwater level being deeper in the deeper wells.

Figure 7 shows the regional groundwater flow lines. The property is in an area where the flow direction is south east to the north of the property to south south east to the south of the property.

Table 2: Details of Active Wells within 1 km of Property

WELL NO	WELL STATUS	ROAD/STREET	DEPTH	DIA.	USES	READING COUNT	HIGHEST WATER LEVEL
BX22/0252	Active	Sharlands Road	70.46	150	Domestic and Stockwater	1	-31.73
L36/2211	Active	Hunters Road	86.5	200	Irrigation	0	
L36/1821	Active	Sharlands Road	84	300	Irrigation, Dairy Use	0	
L36/1362	Active	Sharlands Road	82.5	300	Irrigation	0	
L36/2038	Active	Hunters Road	95.23	300	Irrigation	1	-38.58
L36/0878	Active	Sharlands Road	61.5	150	Domestic Supply	0	
L36/1579	Active	Sharlands Road	81	150	Irrigation, Domestic Supply	0	
L36/0887	Active	Sharlands Rd	72	150	Irrigation, Domestic Supply	0	
L36/1099	Active	Sharlands Road	82	300	Irrigation, Dairy Use	0	
L36/0886	Active	Sharlands Rd	55	150	Domestic Supply	0	
L36/1373	Active	Sharlands Road	78	150	Domestic Supply	0	
L36/1443	Active	Sharlands Road	82.5	150	Irrigation	0	
L36/1145	Active	Sharlands Road	75.5	150	Domestic and Stockwater	0	
L36/0319	Active	Sharlands Rd	85	300	Irrigation, Domestic and Stockwater	16	-24.15
L36/0124	Active	Sharlands Road	35	150	Domestic Supply, Water Level Observation	384	-15.67

The site is not located within the Christchurch Groundwater Protection Zone.

There are no NES drinking water sites within 1,000m downgradient of the site.

Groundwater Quality

Well L36/0319 located approximately 850 m north of the property is sampled regularly as part of the ECan groundwater monitoring network. It has been sampled approximately annually since 1998. The last sample was taken in September 2023.

Unfortunately, in relation to stormwater type contaminants e.g. heavy metals and hydrocarbons there is no data. There is data for E. coli which is representative of a range of potential contaminant sources – animal excreta, on-site sewage systems and stormwater. The results have been negative apart from a sample in October 2007. At 85 m deep it would be unusual to expect a positive reading

for E. Coli and the readings being negative before and since suggests some other source for the positive reading than passage of water through the soil profile.

Nitrate-nitrogen has shown a steady upward trend from 3.5 g/m^3 in 1998 to 7.3 g/m^3in 2023 showing the potential that dissolved contaminants that are not easily adsorbed/adsorbed to soil particles could migrate through the strata.

5.3 Surface Water

A stock water race is located on the boundary of the property adjacent to Sharlands Road. This is part of the Selwyn District Council water race network.

5.4 Other Discharge Consents

Within the 1 km radius of the property a total 9 consent numbers were found as shown in Table 3. Five are Permitted Activities for on-site sewage systems, 2 are active discharge of dairy shed effluent and 2 are terminated. So there are only 2 active discharge consents within 1 km radius of the property.

Table 3: Other Consented Activities

Consent No	Consent Type	Consent Status	Feature Type	Location	Expires
CRC062325	Permitted Activity	Issued - Active	Human Effluent	Sharlands Road, R D 13 RAKAIA	
CRC053374	Permitted Activity	Issued - Active	Human Effluent	Sharlands Road, BANKSIDE	
CRC100611	Permitted Activity	Issued - Active	Human Effluent	375 Sharlands Road, BANKSIDE	
CRC970908.3	Discharge Permit	Issued - Active	Dairy Effluent	Sharlands Road, DUNSANDEL	November 13, 2031
CRC053501	Permitted Activity	Issued - Active	Human Effluent	Sharlands Road, DUNSANDEL	
CRC084778	Permitted Activity	Issued - Active	Human Effluent	Sharlands Road, BANKSIDE	
CRC991653.2	Discharge Permit	Issued - Active	Dairy Effluent	Sharlands Road, TE PIRITA	March 16, 2034
CRC991653.1	Discharge Permit	Terminated - Replaced	Dairy Effluent	Sharlands Road, TE PIRITA	March 16, 2034
CRC991653	Discharge Permit	Terminated - Replaced	Dairy Effluent	Sharlands Road, TE PIRITA	March 16, 2034

6. Assessment of Actual and Potential Effects

6.1 Impact on Groundwater Quality

The stormwater runoff from the hardstand will contain contaminants associated with atmospheric deposition – such as sediments and from vehicle movements – such as sediments, heavy metals and

a small risk of hydrocarbons. The runoff will be directed through infiltration swales where the passage through the soil will effectively remove contaminants. In addition the number of vehicle movements is very low on the site compared with sources for stormwater contaminant data associated with vehicle movements (around 35 times lower). With contaminant concentrations (for heavy metals at least) in the stormwater prior to treatment likely to be lower than the limits in the drinking water standards, followed by treatment through the soil and further potential for contaminant removal through 15 m of soil strata it is considered that there is no risk to groundwater or the potability of down gradient water wells from the stormwater discharge from the site.

Roof runoff too will be filtered through the gravels in the vadose zone so that no impact on groundwater quality would occur as a result of the discharge.

6.2 Impact of Slow Entry of Stormwater into Groundwater (ponding)

Infiltration testing of the subsurface strata has indicated very free draining strata with infiltration rates exceeding 3.8 m/hr. Other than ponding in the infiltration swales no other ponding is expected as a result of this runoff.

6.3 Adverse Effects of Localised Changes in Groundwater Levels

Any change in groundwater level will be minor in the context of 15 or more metres between highest groundwater and ground level so no adverse effects would result from the change in groundwater level.

6.4 Adverse Effects of the Accumulation of Contaminants in Soil

The infiltration swales are specifically designed to capture any contaminants present in the stormwater. However, given the predicted low concentrations it will take many years for concentrations of contaminants to build up to harmful levels. Noting that the infiltration swales are not used for any other purpose. Infiltration swales from sites operating for many years with larger numbers of vehicle movements are still growing grass indicating no loss of performance as a result of any contaminants being present. .

6.5 Adverse Effects on Surface Water

There will not be any impact on surface water as a result of the discharge as the water race is not connected to the underlying groundwater and as the land does not slope towards the water race so no risk of surface runoff.

6.6 Effect on Ngai Tahu Values

The site is in the area covered by Te Taumutu Runanga.

The site is not within, adjacent to, or likely to affect a Statutory Acknowledgement Area, nor is it within a silent file area.

As already discussed in the Planning Section it is considered that the proposal is not contrary to the Objectives and Policies set out in the Iwi Management Plan and it is considered will not impact on the mauri of the groundwater.

An Accidental Discovery Protocol condition can be imposed but is probably unnecessary in this instance as the property is not in an area where artefacts are expected and the area to be excavated for the new buildings and hardstand area has been farmed for many decades.

6.7 Additional Mitigation Measures

No additional mitigation measures are considered necessary for this proposal.

7. Consideration of Alternatives

Given the low contaminant concentrations likely to be present in the stormwater, passive discharge to the surrounding land was considered. However, by using swales if there is a spill of contaminants then it is more easily contained in an area dedicated to managing stormwater.

8. Requested Duration

A duration of a minimum of 15 years is requested.

The start date is November 2024.

APPENDIX A: FIGURES

Figure 1: Property Location

227 Hunters Road

Legend note: if you have a large number of layers on the map, they may not all be visible in the legend.

Disclaimer:

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Information from this map may not be used for the purposes of any legal disputes. The user should independently verify the accuracy of any information before taking any action in reliance upon it.

0 0.2 0.4 0.6 0.8 Kilometres

Scale: 1:20,000 @A4

Map Created by Courtenay Environmental Consultants Ltd on 13/05/2024 at 10:31 PM

Figure 2: Site Layout

1) All dimensions and underground service locations to be checked on site prior to commencement of work.

2) Do not scale from drawings, if in doubt, ask the DESIGNER!!

3) Refer to the specification attached (where applicable).

Highlight pink area: 49269.788 Sqm

NOVASTEEL
DESIGN SMART BUILD STRONG
Novasteel International Limited
5E Armstrong Road, Rosedale 0632
PO Box 301197, Albany
Auckland 0752
New Zealand

project
-

227 hunters rd, Rd 13, Rakaia

drawing
OVERALL SITE PLAN

design	scale	job no.
Roy Z	1 : 2000	--
drawn	revision	drawing no.
Roy Z		A00
date	checked	
03.04.2024	-	

SKETCH DESIGN - SK1

Figure 3: Location of Test Pits

N

READING_COUNT

- 0
- 1 - 50
- Drains
- TP 1
- 227 Hunters Road
- LINZ NZ Primary Parcels

Legend note: if you have a large number of layers on the map, they may not all be visible in the legend.

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0 0.04 0.08 0.12 0.16 Kilometres

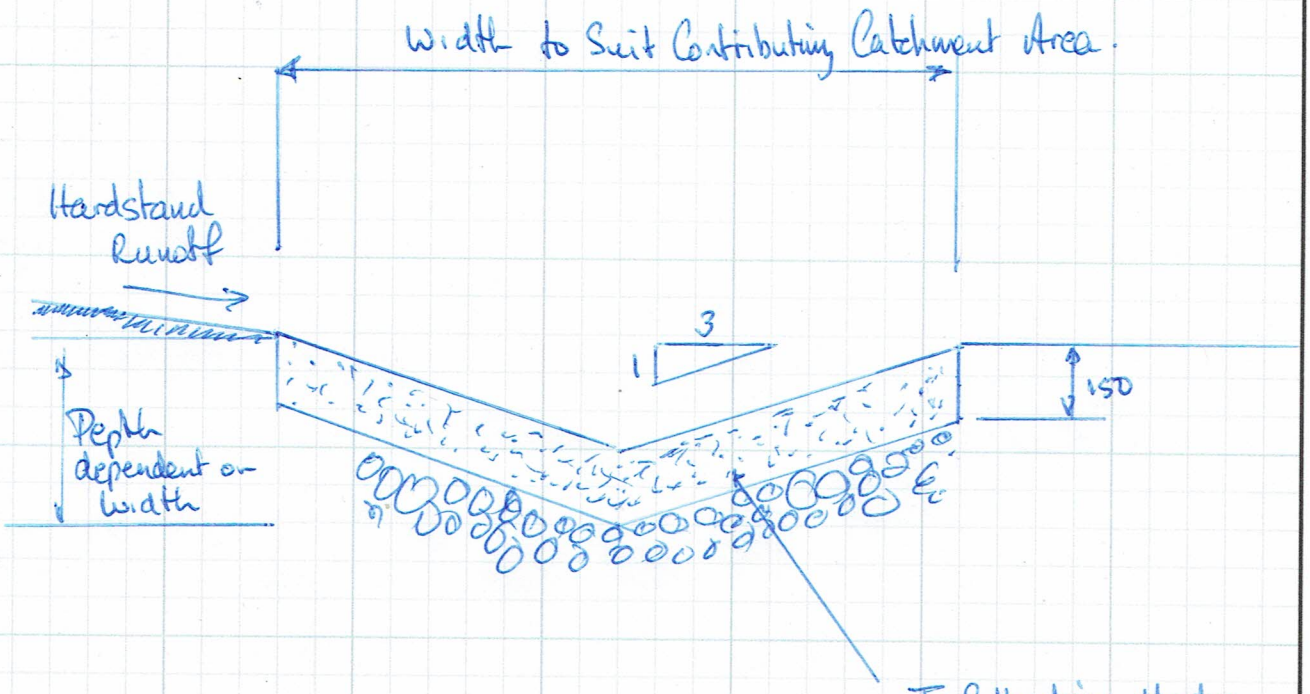
Scale: 1:4,000 @A4

Map Created by Courtenay Environmental Consultants Ltd on 15/05/2024 at 10:56 PM

Courtenay Environmental Consultants Ltd

TITLE			
Lifestyle Chickens - Breeder Sheds			
NAME	AKB	DATE	26/5/24
		PAGE	1

Figure 4 Typical Infiltration Swale Cross Section



Infiltration Media
60% Insitu topsoil
30% Plasterers Sand
10% Compost.
(Design Infiltration Rate 50mm/hr)

Courtenay Environmental Consultants Ltd

TITLE			
Lifestyle Chickens - Breeder Sheds			
NAME	AKD	DATE 29/5/24	PAGE 1

Figure 5: Stormwater Management Between Sheds

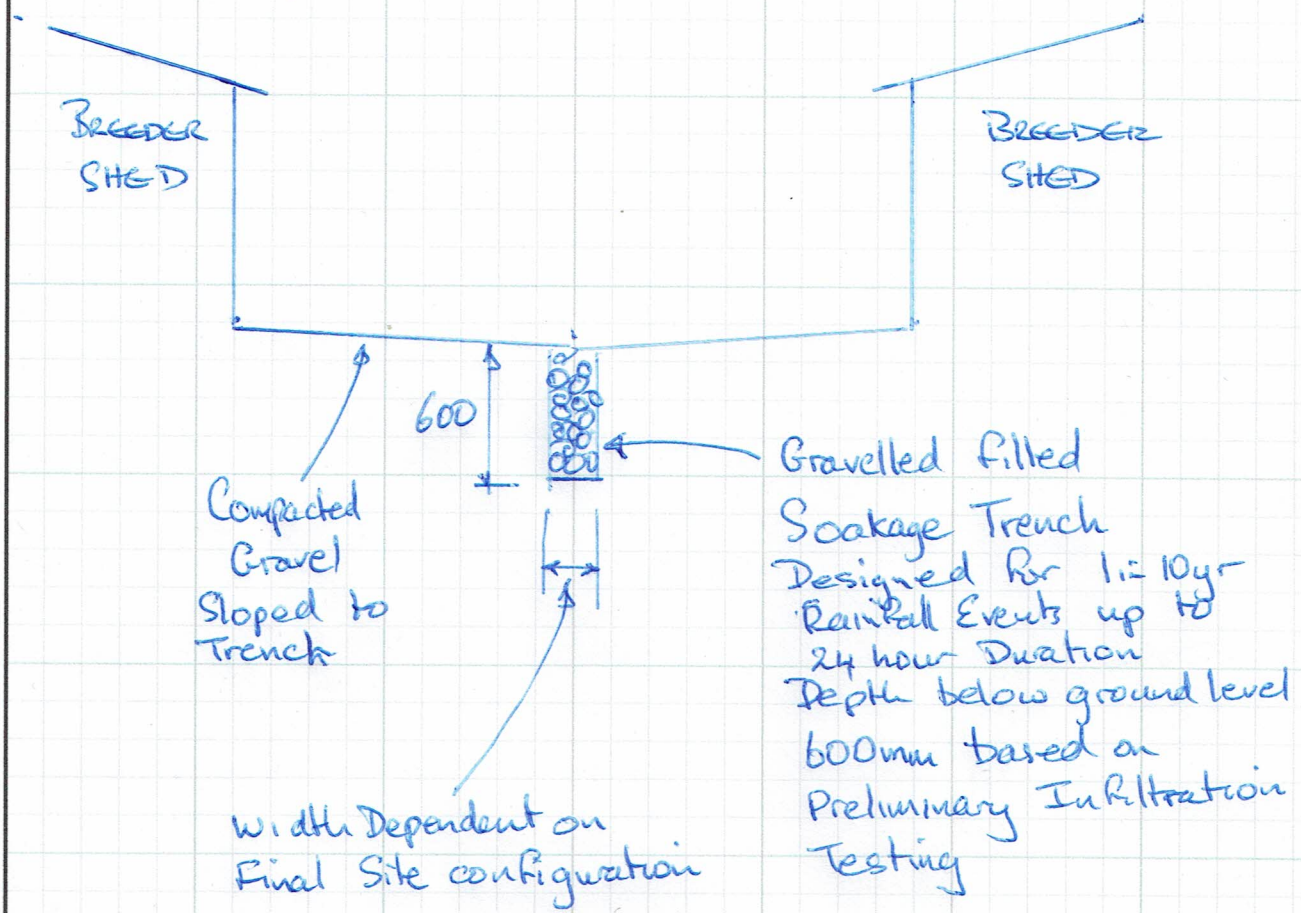


Figure 6: Wells Within 1 km of Property

READING_COUNT

- 0
- 1 - 50
- 50<
- L36/1579 - Actual Location
- L46/0887 - Actual Location
- BX22/0252 - Actual Location
- L36/0886 - Actual Location
- L36/2211 - Actual Location
- 227 Hunters Road
- 227 Hunters Road (1000m buffer)

Legend note: if you have a large number of layers on the map, they may not all be visible in the legend.

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0 0.15 0.3 0.45 0.6 Kilometres

Scale: 1:15,000 @A4

Map Created by Courtenay Environmental Consultants Ltd on 20/05/2024 at 11:02 PM

Figure 7: Regional Groundwater Flow Lines

N

Groundwater Flow Lines

READING_COUNT

- 0
- 1 - 50
- 50<
- L36/1579 - Actual Location
- L46/0887 - Actual Location
- BX22/0252 - Actual Location
- L36/0886 - Actual Location
- L36/2211 - Actual Location
- 227 Hunters Road
- 227 Hunters Road (1000m buffer)

Legend note: if you have a large number of layers on the map, they may not all be visible in the legend.

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0 0.5 1 1.5 2 Kilometres

Scale: 1:50,000 @A4

Map Created by Courtenay Environmental Consultants Ltd on 20/05/2024 at 11:45 PM

APPENDIX B: LISTED LANDUSE REGISTER REPORT

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

P. 03 365 3828
F. 03 365 3194
E. ecinfo@ecan.govt.nz

www.ecan.govt.nz

Dear Sir/Madam

Thank you for submitting your property enquiry from our Listed Land Use Register (LLUR). The LLUR holds information about sites that have been used or are currently used for activities which have the potential to cause contamination.

The LLUR statement shows the land parcel(s) you enquired about and provides information regarding any potential LLUR sites within a specified radius.

Please note that if a property is not currently registered on the LLUR, it does not mean that an activity with the potential to cause contamination has never occurred, or is not currently occurring there. The LLUR database is not complete, and new sites are regularly being added as we receive information and conduct our own investigations into current and historic land uses.

The LLUR only contains information held by Environment Canterbury in relation to contaminated or potentially contaminated land; additional relevant information may be held in other files (for example consent and enforcement files).

Please contact Environment Canterbury if you wish to discuss the contents of this property statement.

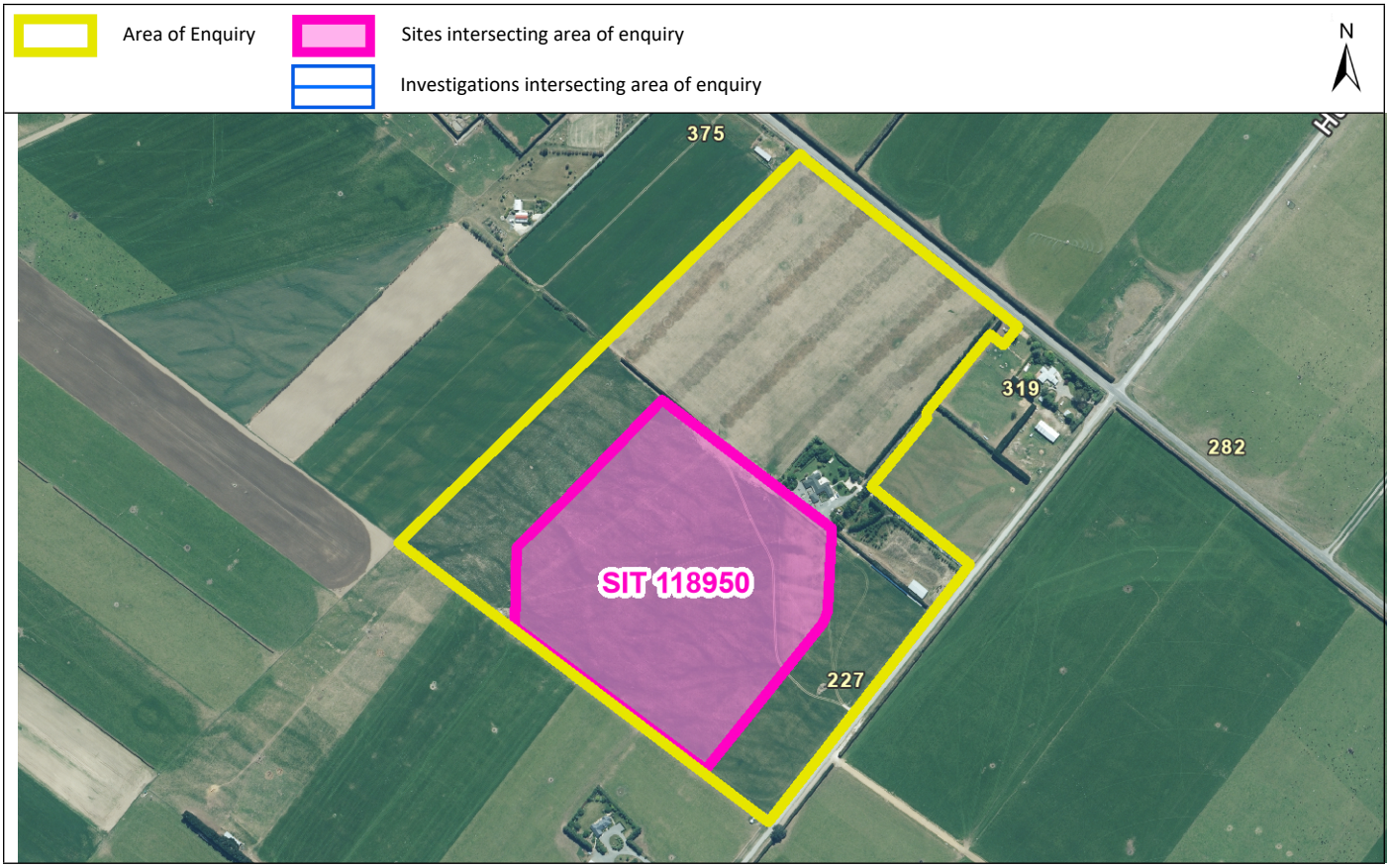
Yours sincerely

Contaminated Sites Team

Property Statement
from the Listed Land Use Register

Visit ecan.govt.nz/HAIL for more information or
contact Customer Services at ecan.govt.nz/contact/ and quote ENQ375803

Date generated: 11 April 2024
Land parcels: Lot 2 DP 82576



The information presented in this map is specific to the property you have selected. Information on nearby properties may not be shown on this map, even if the property is visible.

Sites at a glance

Sites within enquiry area

Site number	Name	Location	HAIL activity(s)	Category
118950	319 Sharlands Rd, 227 Hunters Rd	319 Sharlands Rd, 227 Hunters Rd	A10 - Persistent pesticide bulk storage or use;	Not Investigated

More detail about the sites

Site 118950: 319 Sharlands Rd, 227 Hunters Rd (Intersects enquiry area.)

Category: Not Investigated
Definition: Verified HAIL has not been investigated.

Location: 319 Sharlands Rd, 227 Hunters Rd
Legal description(s): Lot 2 DP 82576

HAIL activity(s):

Period from	Period to	HAIL activity
1998	Present	Persistent pesticide bulk storage or use including sports turfs, market gardens, orchards, glass houses or spray sheds

Notes:

5 Nov 2014	This record was created as part of the Selwyn District Council 2015 HAIL identification project.
5 Nov 2014	Former vineyard
5 Nov 2014	Area defined from 1998 to present aerial photographs. Horticultural activities (persistent pesticides) were noted in aerial photographs reviewed.

Investigations:

There are no investigations associated with this site.

Disclaimer

The enclosed information is derived from Environment Canterbury's Listed Land Use Register and is made available to you under the Local Government Official Information and Meetings Act 1987.

The information contained in this report reflects the current records held by Environment Canterbury regarding the activities undertaken on the site, its possible contamination and based on that information, the categorisation of the site. Environment Canterbury has not verified the accuracy or completeness of this information. It is released only as a copy of Environment Canterbury's records and is not intended to provide a full, complete or totally accurate assessment of the site. It is provided on the basis that Environment Canterbury makes no warranty or representation regarding the reliability, accuracy or completeness of the information provided or the level of contamination (if any) at the relevant site or that the site is suitable or otherwise for any particular purpose. Environment Canterbury accepts no responsibility for any loss, cost, damage or expense any person may incur as a result of the use, reference to or reliance on the information contained in this report.

Any person receiving and using this information is bound by the provisions of the Privacy Act 1993.

APPENDIX C: MOMENTUM ENVIRONMENTAL REPORT

APPENDIX D: TEST PIT LOGS

Test Pit Logs

Test Pit 1		
Depth (m)	*Soil Description*	
0.000 – 0.100	Dry Silty Topsoil	
0.100 – 0.550	Silty GRAVEL (small, rounded), many roots, no mottling, dry	
0.550 – 1.500	Sandy GRAVEL with minor Silt, brown, no mottling	

Test Pit 2		
Depth (m)	*Soil Description*	
0.000 – 0.200	Grey Brown Silty Topsoil, dry	
0.200 – 0.750	Silty Sandy (fine) GRAVEL, many roots, no mottling, dry	
0.750 – 1.500	Sandy (medium to course) GRAVEL with minor moist (recently irrigated)	

Test Pit 3		
Depth (m)	*Soil Description*	
0.000 – 0.100	Dry Silty Topsoil	
0.100 – 0.400	Silty GRAVEL, no mottling, dry	
0.400 – 1.000	Silty Sandy GRAVEL with minor Silt, brown, moist	
1.000 – 1.500	Sandy (coarse) GRAVEL (small), no fines, moist	

Test Pit 4		
Depth (m)	*Soil Description*	
0.000 – 0.100	Dry Silty Topsoil	
0.100 – 0.550	Silty GRAVEL (small, rounded), many roots, no mottling, dry	
0.550 – 1.500	Sandy GRAVEL with minor Silt, brown, no mottling	

Test Pit 5		
Depth (m)	*Soil Description*	
0.000 – 0.250	Dark brown/grey silty topsoil, damp (recently irrigated)	
0.250 – 0.750	Silty sandy GRAVEL (small), many roots, no mottling	
0.750 – 1.300	Sandy GRAVEL (small), brown, no mottling	
1.300 – 1.500	Sandy (coarse) GRAVEL with minor fines	

Test Pit 6		
Depth (m)	*Soil Description*	
0.000 – 0.200	Dark brown/grey silty topsoil with Gravel	
0.200 – 0.500	Sandy GRAVEL with minor fines	
0.500 – 0.600	Loose pea GRAVEL	
0.600 – 1.500	Loose sandy GRAVEL with minor fines, interbedded pea gravel pockets	