

**Resource Consents REPORT
APPLICATIONS TO
DISCHARGE DAIRY
EFFLUENT AND TAKE AND
USE GROUNDWATER
Assessment of
Environmental Effects**

**PREPARED FOR
Woldwide One Limited**

C14114/05

24/08/2017

PREPARED BY
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To: The Chief Executive, Southland Regional Council

APPLICATION FOR A RESOURCE CONSENT

Part A: Application Details

1. Full name(s) and address of applicant

Surname:	First names:
OR Company name: <u>Woldwide One Limited</u>	
Postal address: <u>104 Shaws Trees Road, Heddon Bush, RD 3, Winton 9783</u>	
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Email: <u>abe@woldwide.nz</u>	Contact person <u>Abe de Wolde</u>

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Company: <u>Aqualinc Research Ltd</u>	
Postal address: <u>PO Box 20-462, Bishopdale, Christchurch</u>	

3. Names & addresses of the owner and occupier of the site to which this application relates

Same as Section 1 above.

4. Location of the site to which this application relates

Site address: <u>Hundred Line Road East</u>	Map ref (if known): <u>1225175-4888760</u>
Locality: <u>Heddon Bush</u>	
Legal description: <u>Lot 4 DP 399915, Parts Lot 18 DP 942, Lot 1 DP 10885 and Section 420 Taringatura Survey District</u>	

5. In which District or City Council is this site located? Southland District

6. What type(s) of resource consents are you applying for from the Regional Council?

Coastal Permit					
	Reclaim/drain foreshore or seabed		Place/alter/remove structure	Disturb foreshore/seabed	Deposit substance
	Planting foreshore/seabed		Occupy coastal marine area	Remove natural material (e.g. sand)	Install/alter bore
	Take water		Dam water	Divert water	Use water
	Discharge contaminant to air		Discharge contaminant or water to water	Discharge contaminant to land	Other

Land Use Consent					
	Install/alter bore		High country burning	Earthworks	Vegetation clearance

	Contaminate storage		Activity in coastal hazards zone		Fencing/grazing in waterway		Planting in waterway
	Use/place/alter/remove structure in waterway		Place a structure within 8 m of a waterway		Deposit substance in waterway		Reclaim/drain waterway
	Disturb bed of waterway (including excavation of gravel)						

Water Permit							
<input checked="" type="checkbox"/>	Take groundwater		Take surface water		Dam water		Divert water
						<input checked="" type="checkbox"/>	Use water

Discharge Permit			
<input checked="" type="checkbox"/>	Discharge contaminant to air		Discharge contaminant or water to water
		<input checked="" type="checkbox"/>	Discharge contaminant to land

7. Description of the activity

This consent application is for the following;

- To discharge dairy effluent to land (from 800 cows during the milking season and 640 cows during the winter); and
- To take and use 91 m³/day of groundwater for dairy shed and stockwater supply.

Part B: Assessment of Environment Effects

See attached AEE report.

Part C: Other Information

1. Previous consents held at this site for this activity or any related activities

None
 Yes
 Consent No:

2. Duration sought for this consent:


24/08/2017
Nicole Matheson

Signature of person authorised to sign on behalf of applicant
Date
Full name of person signing

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1 INTRODUCTION

This Assessment of Environmental Effects (AEE) has been prepared in accordance with the Fourth Schedule of the Resource Management Act 1991 (RMA) to support the applications of the RMA by Woldwide One Limited (the applicant) to discharge dairy effluent (from 800 cows) and take and use 91 m³/day of groundwater for dairy shed and stockwater supply.

Section 88(4)(b) of the RMA requires that every application shall include an assessment of any actual or potential effects that the activity may have on the environment, and the ways in which any adverse effects may be mitigated. Section 88(6)(b) also requires that any assessment shall be in such detail as complies with the scale and significance of the actual or potential effects that the use may have on the environment, and shall be prepared in accordance with the Fourth Schedule. This assessment is made in accordance with these requirements.

The legal description of the property is Lot 4 DP 399915, Parts Lot 18 DP 942, Lot 1 DP 10885 and Section 420 Taringatura Survey District.

The location of the property is illustrated in Appendix A.

A copy of resource consents 301663 and 301664 are included in Appendices D and E respectively.

The proposed consents are sought to expire 9th November 2027 (same as existing consents 301663 and 301664).

2 BACKGROUND

Woldwide One Limited (the applicant) own and operate a dairy farm located at Hundred Line Road, Heddon Bush. The operation is consented under resource consents 301663 to discharge dairy effluent and 301664 to take groundwater for a dairy purposes.

Existing consent 301663 is to discharge dairy effluent from a maximum of 540 cows. This application is to increase the effluent discharged at the property from 540 cows to 800 cows. Although, this will be limited to a maximum of 700 cows until a new dairy shed is built at the property, once the new shed is built 800 cows will be able to be milked at the dairy shed. The applicant also wishes to change the boundary of the Woldwide One property as part of a land swap with the neighbouring property Woldwide Two. The new property boundary is shown in Appendix A.

The property has an existing effluent storage pond with a storage volume of 3,397 m³. The dairy effluent storage calculator has been used to determine the volume of effluent storage required (a copy of the results are included in Appendices F and G). The applicant is intending to increase the volume of the effluent storage to a minimum of 3,917 m³ (as calculated in Appendix G). A land use consent application for the proposed storage facility will be submitted to Environment Southland once completed.

The existing water supply for dairy shed use and stockwater supplies for the property is taken from groundwater via bore E45/0071 under existing consent 301664. Consent 301664 allows a maximum of 60 m³/day to be taken from bore E45/0071. The applicant wishes to increase the volume taken to 91 m³/day. Once the new dairy shed is constructed, 800 cows will be able to be milked in the dairy shed. However, as the new shed will have an effluent scraper, the volume of water used for dairy shed wash down will not increase above the volume required for 700 cows i.e. 35 m³/day for dairy shed washdown.

This application seeks to have a new consent for the discharge of dairy effluent granted for 10 years. Best practice effluent management utilising buffer effluent storage and low rate irrigation will be incorporated into the farming system to ensure compliance. Good management practices relevant to dairy farming in Oxidising and Central Plains physiographic zones are implemented on farm.

2.1 Increase in cow numbers

This application is to increase the effluent discharged at the property to 800 cows, from 540 cows consented under resource consent 301663. This is considered to be a discretionary activity under rule 21 of the Proposed Southland Water and Land Plan.

This proposal has been modelled in Overseer by Cain Duncan (Fonterra Farm Source) a copy of the .xml files and Nutrient Budgets/Analysis have been attached to this application. The results of the Overseer modelling are shown in Table 1 for the combined Woldwide One and Woldwide Two properties.

Table 1: Estimated nitrogen and phosphorus loss to water - Woldwide One and Woldwide Two combined

	Nitrogen loss to water (kg/year)	Nitrogen loss to water (kg/ha/year)	Phosphorus loss to water (kg/year)	Phosphorus loss to water (kg/ha/year)
Existing situation	11,162	17	330	0.7
Proposed situation	11,002	16	357	0.7
Change	-160	-1	27	No change

The Overseer modelling shows the nitrogen loss to water decreases as a result of this proposal but the phosphorus loss to water increases slightly. The increase in phosphorus loss has been explained in the Nutrient Budgets/Analysis for Woldwide One prepared by Cain Duncan (Sustainable Dairy Advisor, Fonterra Farm Source) which has been included with the application. The Overseer model assumes 30% of all phosphorus deposited on stocklanes is lost to water, with assumptions also from other structures on farm such as feed pads, silage pits etc. However, the model does not take into account the location of stocklanes on the property or on farm Good Management Practices (as per the attached Farm Environment Management Plan), such as ensuring runoff from stocklanes is unable to enter waterways. Therefore it is considered that in reality the phosphate loss to water is likely to reduce or remain the same as the current situation.

Because the Overseer modelling has indicated that both the nitrogen and phosphorus loss to water is likely to remain the same or decrease as a result of this proposal together with the implantation of good management practices (as per the attached Farm Environment Management Plan), further assessment on the effects of dairying farming on groundwater and surface water has been assessed as not being required.

As a result of the no change or a small decrease in nitrogen and phosphorus lost to water the cumulative effects of this proposal for dairy farming are likely to remain the same or decrease and hence no change or a slight improvement in the water quality of both the groundwater and surface water.

3 PROPOSED CONSENT CONDITIONS

3.1 Discharge Dairy Effluent

In order to mitigate any potential environmental effects the following conditions are proposed:

1. This consent will expire 9th November 2027 and shall commence on the surrender or expiry of resource consent 301663.

(Note: Pursuant to Sections 123 and 124 of the Resource Management Act 1991, a new consent will be required at the expiration of this consent. The application will be considered in accordance with the plans in effect at that time, and the adverse effects of the proposed activity.)

2. This consent authorises the discharge of dairy shed effluent and wintering shed slurry onto land, via a land discharge system, as described in the application, on land known as Lot 4 DP 399915, Parts Lot 18 DP 942, Lot 1 DP 10885, and Section 420 Taringatura Survey District.

(Note: The effluent/slurry discharge area shown in Appendix 1 can be altered and/or extended, subject to the approval of the Director of Environmental Management, if the consent holder submits a new plan showing the new effluent discharge area, and providing the written approval(s) of any person whose property boundary will be closer to that area. In the event that written approval cannot be obtained, the effluent discharge area can only be amended by way of limited notification.)

3.
 - a. No dairy shed effluent/slurry shall be discharged to any surface watercourse by overland flow, run-off, or via a pipe, nor shall there be any surface run-off/overland flow, ponding or contamination of water resulting from the exercise of this consent. See Best Practice Notes 1, 2 & 3.
 - b. The land discharge system shall be operated and maintained to ensure that there is no odour or spray drift to the extent that it causes an adverse effect beyond the property boundary.
 - c. The consent holder shall install and maintain an alarm and automatic switch-off system as a contingency measure in the event of a system failure such as a sudden pressure drop, irrigator stoppage or breakdown of the travelling irrigator. See Best Practice Note 4.
4. Subject to condition 3(a), the land discharge system is limited to the following:
 - a. a maximum depth of application of 10 mm for each individual application. Where the slurry is applied by the slurry tanker, the depth of application shall be averaged across the width of the applicators on the tanker.

Note: The application depth needs to be less than the soil-water deficit (i.e. the depths above are maximum depths and as soil moisture levels approach field capacity, smaller depths will be necessary to avoid losses of contaminants from the root zone. When soil moisture levels reach field capacity, irrigation will need to cease completely to prevent these losses.)

- b. the maximum loading rate of nitrogen onto any land area shall not exceed 150 kg of nitrogen per hectare per year from the effluent/slurry; See Best Practice Note 5.
5. Effluent/slurry may be applied to the land as described in the application and generally as shown in Appendix 1, but the following specific buffers shall be observed:
- a. there shall be no application of effluent and/or slurry within:
 - i. 20 metres of any surface watercourse;
 - ii. 100 metres of any potable water abstraction point;
 - iii. 100 metres of any residential dwelling other than residential dwellings on the property;
 - b. dairy shed effluent shall not be applied to land by travelling irrigator within 20 metres of a property boundary.
- (Note: this does not prevent discharge within 20 metres of the property boundary of effluent and/or slurry applied by tanker.)

Where there is conflict between Appendix 1 and these specified buffers, the latter shall apply.

6.
 - a. The amount of dairy shed effluent discharged of onto land shall not exceed that from 800 cows.
 - b. The amount of herd home slurry discharged of onto land shall not exceed that from 640 cows.
7. Prior to the 1st August 2018, the consent holder shall have at least 3,397 m³ of effluent/slurry storage for the purpose of:
 - a. avoiding irrigation of effluent/slurry when soils are at or above field capacity; see Best Practice Note 8.
 - b. providing a contingency measure when the irrigation system is inoperative; and/or
 - c. for primary treatment when it is necessary for the proper operation of the effluent discharge system.
8. By the 1st August 2018, the consent holder shall have at least 3,917 m³ of effluent/slurry storage for the purpose of:
 - a. avoiding irrigation of effluent/slurry when soils are at or above field capacity; see Best Practice Note 8.
 - b. providing a contingency measure when the irrigation system is inoperative; and/or
 - c. for primary treatment when it is necessary for the proper operation of the effluent discharge system.
9. The consent holder shall notify the Council, by 1 September 2017, of the person who is in charge of the operation of the effluent/slurry discharge system. If the person in charge of the effluent system changes during the term of this consent, the consent holder shall notify the Council of the new operator no later than five working days after that person takes responsibility. See Best Practice Notes 6 & 7.

(Note: The person identified by condition 8(a) will be the primary contact for Council staff for monitoring purposes and/or in the event of an incident. Nothing in this condition removes or limits the consent holder's liability to ensure compliance with the consent and its conditions.)

10. The Southland Regional Council may serve notice of its intention to review the conditions of this consent, in accordance with the conditions of this resource consent and Sections 128 and 129 of the Resource Management Act 1991, during the period 1 February to 30 September each year, or within two calendar months of the completion of any enforcement action (prosecution or infringement notice), for the purposes of:
 - a. dealing with any adverse or cumulative effects, including the adverse effects of high stocking rates, on the environment which may arise from the exercise of this consent;
 - b. considering any changes to information on the effects of land discharge of dairy shed effluent/slurry;
 - c. complying with the requirements of a regional plan;
 - d. amending monitoring requirements; or
 - e. imposing a notification requirement for potential effects on registered drinking water supplies.

11. The consent holder shall pay an annual administration and monitoring charge to the Southland Regional Council, collected in accordance with Section 36 of the Resource Management Act. This charge may include the costs of inspecting the site three times each year (or otherwise as set by the Council's Annual Plan), and of monitoring the effects of the discharge on groundwater by taking representative samples of the bore water, from Bore E45/0622 once every six months and analysing for:
 - electrical conductivity;
 - nitrate nitrogen concentration;
 - Total Nitrogen concentration;
 - Dissolved oxygen concentration – field measurement;
 - E. coli concentration;
 - bromine concentration;
 - chloride concentration.

Except that the first sample shall also be analysed for Dissolved Iron concentration.

(Note: The Administration Charges are payable for the costs of the Council's administration, monitoring and supervision of this resource consent. For new conversions, the first monitoring inspection by the Council, in accordance with the Council's Annual Plan, of the exercise of the resource consent shall be carried out following installation of the effluent discharge system.)

12. If an event (such as effluent/slurry overflow to water, significant over-application on a free-draining area or pond collapse) occurs that may have significant adverse effect on water quality at the abstraction point of a registered drinking-water supply, the consent holder shall notify, as soon as reasonably practicable, the following:
 - Environment Southland's Compliance Manager (ph 03 211 5115 or 03 211 5225 after hours);
 - Southland District Council (ph 0800 732 732).

(Note: The consent holder is advised to contact Environment Southland's Compliance Manager in the event of any unexpected event that may result in non-compliance with the conditions of this resource consent or the rules of a regional plan.)

Best Practice and Explanatory Notes

1. Dairy shed effluent should not be discharged onto any land area that has been grazed within the previous 5-10 days. Where there has been significant damage to soil during grazing, it is recommended that effluent not be applied until that damage has been repaired.
2. To avoid contaminating water directly or indirectly, the consent holder should not apply effluent to land when the soils are at or above field capacity. Moisture content is to be determined by either actual monitoring on site or by reference to the appropriate Council monitoring site. The Council's soil moisture monitoring sites can be viewed at <http://www.es.govt.nz> and following the "Farming", "Dairy Advisor" and "Soil Moisture Map" links.
3. For the purposes of this condition, ponding is the accumulation of effluent on the soil surface resulting from the application of effluent to saturated soils, or the application of effluent inducing saturated soil conditions. It does not refer to the temporary accumulation of effluent on the soil surface resulting from the application of effluent at a rate that exceeds the soil infiltration rate.
4. Where the effluent reticulation system is installed in such a way that effluent can be siphoned when pumping ceases, the consent holder should install and maintain an anti-siphon device in the effluent pipe line.
5. A loading of 150 kg N/ha/year is approximately equivalent to a loading of dairy shed effluent to land of 4 ha/100 cows. However, there are significant benefits to having a larger effluent discharge area in terms of managing potassium. Further, scientific research has highlighted decreased nitrogen use efficiency and increased nitrogen leaching losses at annual nitrogen loading rates (from combined fertiliser and effluent N) greater than 150 kg N/ha/yr. Extreme caution should therefore be taken when applying nitrogen fertiliser to the effluent discharge area. It is recommended that a nutrient budget is used to check that nitrogen and potassium application rates to the effluent discharge area are not excessive.
6. The consent holder should prepare and comply with a Farm Environmental Management Plan. The plan should:
 - specify and implement a nutrient budgeting system for the property;
 - provide for the management of effluent discharge to avoid applications when soils are at or above field capacity;
 - identify, as far as is practicable, the drains in the effluent discharge area, so that appropriate management procedures can be taken to avoid contamination of the drains by effluent;
 - if relevant, provide for the operation and management of any feedlot and/or wintering pad;
 - include the provision for monitoring application rates to ensure the consent requirements are being met;
 - include the monitoring requirements specified in this consent; and
 - address ancillary matters such as protecting well-head(s) from contamination; preventing leachate from any silage pits entering water, including groundwater; preventing soil damage; controlling run-off from lanes; and preventing stock access to and maintaining the riparian margins of any watercourses on the property.

A template may be viewed at:

<http://www.es.govt.nz/media/4831/dairy-farm-plan-consent-template.pdf>

7. The consent holder should display, in a prominent place in the dairy shed, a copy of the resource consent and relevant limits about the operation of the effluent discharge system that must be complied with. The material to be displayed will be provided by the Council on laminated sheets suitable for display purposes.
8. Storage ponds should be operated at low levels when conditions for effluent discharge are suitable in order to maintain storage for wet weather periods. In particular, storage ponds should

be emptied in late summer/early autumn to ensure sufficient storage capacity for the following late winter/early spring period.

9. Storage ponds should not, for practical purposes, leak. This resource consent does not authorise the discharge of contaminants due to leaks or failure of the storage ponds. If an existing storage pond is modified (such as by increasing the embankment height to increase storage), the modification will require resource consent.

3.2 Take and Use Groundwater

In order to mitigate any potential environmental effects the following conditions are proposed:

1. This consent will expire 9th November 2027 and shall commence on the surrender or expiry of resource consent 301664.

(Note: Pursuant to Sections 123 and 124 of the Resource Management Act 1991, a new consent will be required at the expiration of this consent. The application will be considered in accordance with the plans in effect at that time, and the adverse effects of the proposed activity).

2. This consent authorises the abstraction of water from bore E45/0071 at about NZMS 260 E45:350-507.
3. The rate of abstraction shall not exceed 91 cubic metres per day.
4. The consent holder shall install a backflow prevention device or take other appropriate measures to ensure water and/or contaminants cannot return to the water source.
5. The consent holder shall monitor water usage to ensure compliance with condition 3 of this consent, as follows:
 - a. by installing a flow meter prior to commencement of the abstraction:
 - i. able to continuously measure the amount of water taken;
 - ii. capable of accuracy to within 5% of the true flow rate, on each abstraction;
 - iii. that shall record volumes in litres;
 - iv. in accordance with the manufacturer's instructions;
 - v. that is sealed and as tamper proof as practicable;
 - vi. in a location that measures all water taken;
 - vii. that is suited to the qualities of the water it is measuring (such as temperature, algae content and sediment content);
 - b. by recording the volume of abstraction, at or about the same time each week when the consent is being exercised.

A copy of this record is to be provided to the Council's Compliance Manager by 31 May each year (escompliance@es.govt.nz).

6. The consent holder shall pay an administration and monitoring charge to the Southland Regional Council collected in accordance with Section 36 of the Resource Management Act, payable in advance on the first day of July each year.
7. The Council may, in accordance with section 128 and 129 of the Act, serve notice, during the period 1 February to 30 September each year, of its intention to review conditions for the purpose of:
 - a. dealing with any adverse effects on the environment which may arise from the exercise of this consent;
 - b. requiring monitoring of the rate of, or the effects of, the abstraction;
 - c. requiring efficiency of water use; and/or
 - d. complying with the requirements of a regional plan.

4 LEGAL AND PLANNING MATTERS

4.1 Restrictions Relating to Water

Section 14 of the RMA states that no person may take, use, dam or divert any water unless the taking, using, damming or diverting is expressly allowed by a rule in a Regional Plan, in any relevant proposed regional plan, or by a resource consent. Water is allowed to be taken for an individual's reasonable domestic needs and the reasonable needs of an individual's animals for drinking water. The taking or use of that water shall not have, or shall not be likely to be having, an adverse effect on the environment. Water required for fire fighting purposes may also be taken.

The proposed activity is not expressly allowed by a rule in the Southland Regional Water Plan, and therefore a resource consent is required for the proposed activity.

4.2 Restrictions Relating to Discharges

Section 15 of the RMA states that no person may discharge any contaminant or water into water, 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, contaminant from any industrial or trade premises into air, or contaminant from any industrial or trade premises onto or into land water unless the discharge is expressly allowed by a rule in a Regional Plan, in any relevant proposed regional plan, or by a resource consent.

The proposed activity is not expressly allowed by a rule in the Southland Regional Water Plan, and therefore a resource consent is required for the proposed activity.

4.3 Regional Policy Statement

4.3.1 Operative Regional Policy Statement

The Regional Policy Statement provides a framework for managing Southland's natural and physical resources. It promotes sustainable development and management, and addresses resource management objectives and policies for the region. In relation to this application, the following policies are of relevance:

Policy 4.4

The AEE carried out to support this application shows that the allocation of the groundwater resource is reasonable, and that water is used efficiently.

Policy 4.6

The Te Tangi a Tauria Iwi Management Plan for the Murihiku area has been considered in this application. The potential effects of the proposed activity on the cultural values of Tangata Whenua are addressed in Section 4.6 of this application.

Policy 4.7

The AEE provides adequate information that justifies that the allocation of the groundwater resource is appropriate, reasonable and efficient.

Policy 5.2

This AEE assesses the effects of the discharge of dairy effluent and use of land for dairy farming on water quality.

Policy 8.1

The AEE and FEMP provide mitigation to ensure the effects on soil on the applicant's property are less than minor.

4.3.2 Proposed Southland Regional Policy Statement 2012

The Proposed Southland Regional Policy Statement 2012 was publicly notified on 19 May 2012. In relation to this application, the relevant policies have been addressed as follows:

Policy TW.3 – Iwi Management Plans

The Te Tangi a Tauria Iwi Management Plan for the Murihiku area has been considered in this application. The potential effects of the proposed activity on Tangata Whenua are addressed in Section 4.6.

Policy WQUAL.2 – All water bodies

As part of this application Overseer has been modelled to assess the effects of the proposal on water quality as discussed in Section 2.1. The results indicate that the nitrogen loss to water will be reducing as a result of this proposal which will improve the water quality in the surrounding area.

Policy WQUAL.5 – Water in natural state

As part of this application Overseer has been modelled to assess the effects of the proposal on water quality as discussed in Section 2.1. The results indicate that the nitrogen loss to water will be reducing as a result of this proposal which will improve the water quality in the surrounding area.

Policy WQUAL .7 – Preference for discharge to land

Part of this application is to discharge dairy effluent to land as such the application meets Policy WQUAL.7.

Policy WQUAL .8 – Untreated human and animal waste

This application is not for the direct discharge of effluent to water therefore Policy WQUAL.8 does not apply.

Policy WQUAL .9 – Sitting and operation

The applicant has proposed mitigation to ensure the effect on groundwater and surface water from the discharge of effluent to land is less than minor.

Policy WQUAL.10 – Sources of community water supplies

There are no community water supplies in the vicinity of the property.

Policy WQUAN.1 – In-stream values

The AEE carried out to support this application shows that there is a high degree of hydraulic connection between bore E45/0071 and the Bog Burn, however as the hydraulic connections is less than 2 l/s no specific minimum flow restrictions will be imposed on the groundwater take.

Policy WQUAN.2 – Overallocation

The taking of water from bore E45/0071 is within the allocation limit of the Bog Burn and Waimatuku Primary allocation limit.

Policy WQUAN.5 – Abstraction management

This application proposes to increase the take from bore E45/0071 from 60 m³/day to 91 m³/day. The AEE has assessed the effects on neighbouring wells and surface water resources which identified the effects of bore are considered minor.

Policy WQUAN.6 – Efficient use of water

The AEE carried out to support this application shows that the allocation of the groundwater resource is reasonable, and that water is used efficiently.

Policy RURAL.2 – Land use change and land development activities

As part of this application the applicant has proposed mitigation measures to ensure the change of land use to allow dairy farming is minor.

Policy RURAL.5 – Effects of rural land development

As part of this application the applicant has proposed mitigation measures to ensure the development of the property is minor.

Policy AQ.1 – Adverse effects of discharges

As part of this application the applicant has proposed mitigation measures to ensure the discharge of effluent to air on human health, cultural and amenity values and the environment is minor.

4.4 The Regional Water Plan

The proposed activity is assessed against the following policies and rules of relevance of the Regional Water Plan (RWP):

4.4.1 Policies

Policy 3 – No reduction in water quality

The AEE carried out to support this application has assessed the effect of the discharge of dairy effluent and the use of land for dairy farming on surface water and groundwater quality. The assessment identified that the effect of this application on surface water and groundwater quality is unlikely to be measurable.

Policy 4 – Surface water bodies outside Natural State Waters

The applicant has proposed mitigation measures to ensure the discharge of dairy effluent will meet the water quality standards.

Policy 7 – Prefer discharges to land

This application proposes to discharge dairy effluent to land.

Policy 14B – Considering a water permit application for a previously authorised activity

The AEE carried out to support this application to replace existing resource consent 301664 provides detailed information on the proposed groundwater take and its effects on the environment.

Policy 21 – Reasonable use of water

The total volume and rate of groundwater abstraction have been assessed as reasonable in the AEE.

Policy 22 – Water measuring devices

The applicant has flow metering installed on bore E45/0071 (i.e. the water use will be monitored).

Policy 23 – Review of water permits

Proposed condition 7 of the consent to take and use groundwater enables the Southland Regional Council to review consent conditions in accordance with Sections 128 and 129 of the RMA. It is not proposed to change or remove this condition.

Policy 25 - Adverse effects arising from point source and non-point source discharges

The applicant has proposed mitigation measures to ensure the discharge of dairy effluent will be managed to ensure the effects on groundwater and surface water quality will be less than minor.

Policy 28 – To manage groundwater abstraction

The AEE shows that adverse effects of the proposed activity on long-term aquifer storage volumes, existing water users, surface water flows, aquatic ecosystems and habitats, and on groundwater quality will be no more than minor.

Policy 29 – Stream depletion effects

The AEE carried out to support this application shows that there is a high degree of hydraulic connection between bore E45/0071 and the Bog Burn, however as the hydraulic connections is less than 2 l/s no specific minimum flow restrictions will be imposed on the groundwater take.

Policy 30 – Groundwater abstraction

The AEE carried out to support this application provides adequate information about potential adverse environmental effects of this proposal. The information is supported by a conceptual hydrogeological model that corresponds to the level of allocation from the aquifer.

Policy 31 – Interference effects

The well interference assessment carried out in Section 9.2 indicates that adverse effects on neighbouring bores are no more than minor.

Policy 31A – Matching discharges onto or into land to risk

The applicant has proposed mitigation measures to ensure the discharge of dairy effluent to land will be managed to ensure the effects of the activity will be no more than minor.

Policy 31B – Natural State Catchments

The applicant's property is not within conservation areas, reserves and national park therefore this policy does not apply.

Policy 31C - Manage discharges of contaminants onto or into land

The applicant has proposed mitigation measures to ensure the discharge of dairy effluent to land will be managed to ensure the effects of the discharge to land will be no more than minor.

Policy 41 - Adverse effects of agricultural effluent ponds

The applicant's effluent storage pond is clay lined to ensure no leakage to groundwater, is managed to ensure no overflow of effluent and the effluent storage volume has been calculated using the dairy effluent storage calculator.

Policy 42 – Farm dairy effluent

The applicant has proposed mitigation measures to ensure the discharge of dairy effluent to land will be managed to ensure the effects of the activity will be no more than minor.

Policy 42A

Woldwide One has been an operating dairy farm prior to 17 July 2010.

Policy 43

These applications are for a proposed duration of 10 years which adequately matches the level of environmental risk, changes in the dairy industry and the development of technology.

4.4.2 Rules

Rule 17A – Transitional rule relating to the establishment of new dairy farms

Rule 22(c) – Bores and wells

The design and headworks of bore E45/0071 prevents the infiltration of contaminants and the uncontrolled discharge or leakage of water from the surface and between aquifers. Therefore, the use of bore E45/0071 is classified as a permitted activity under Rule 22(c).

Rule 23 – Abstraction and use of groundwater

The applicant proposes to take water from the Waimatuku aquifer, which is a lowland aquifer. Therefore, the proposed activity is classified as a discretionary under Rule 23(d)(ii).

Rule 49 – Agricultural effluent ponds

A land use consent application will be submitted to Environment Southland to increase the size of the current effluent storage pond.

Rule 50 – Discharge of farm dairy effluent to land

The discharge of dairy effluent at the Woldwide One property is a controlled activity under Rule 50(b)(ii) as the effluent is discharged via a slurry tanker and travelling irrigator.

4.5 Proposed Southland Water and Land Plan

The proposed activity is assessed against the following policies and rules of relevance of the Proposed Southland Water and Land Plan (pSWLP). It is noted that the weighting that should be given to the pSWLP is limited due to its current proposed status.

4.5.1 Policies

Policy 1 – Enable papatipu rūnanga to participate

If Environment Southland request a copy of this application will be forwarded to Te Rūnanga o Ngāi Tahu and the local runanga Ngāi Tahu ki Murihiku.

Policy 2 – Take into account iwi management plan

The Te Tangi a Taura, (the Iwi Management Plan for the Murihiku area) is taken into account in section 4.6 of this application.

Policy 5 – the majority of the applicant’s property is within the Central Plains Physiographic Zone, which has the following transport pathways;

- deep drainage of nitrogen; and
- artificial subsurface drainage.

The potential effect of deep drainage of nitrogen is nitrogen entering groundwater and the potential effect of artificial subsurface drainage is on the quality of surface water. The applicant has implemented good management practices on the property to reduce the effects on groundwater and surface water quality (see attached Farm Environment Management Plan). The most significant of the good management practices/mitigation measures to reduce the effects on water quality are as follows;

- Cows are housed inside in winter;
- Wintering barn can be used as a feed pad during wet conditions;
- Streams are fenced;
- Effluent can be stored in the storage pond when soil moisture levels are high or if the soils are dry and cracking and fissures are present; and
- Fertiliser is applied little and often when conditions are appropriate.

Policy 10 – the remaining area of the applicant’s property is within the Oxidising Physiographic Zone, which has the following transport pathways;

- overland flow;
- deep drainage of nitrogen; and
- artificial subsurface drainage.

The potential effect of overland flow is on surface water quality, the potential effect of deep drainage of nitrogen is nitrogen entering groundwater and the potential effect of artificial subsurface drainage is on surface water. The applicant has implemented good management practices on the property to reduce the effects on groundwater and surface water (see the attached Farm Environmental Management Plan). The most significant of the good management practices/mitigation measures to reduce the effects on water quality are as outlined in Policy 5 above.

Policy A4 of the National Policy Statement for Freshwater Management 2014

The AEE shows that the effects of the proposed activity on freshwater quality will be no more than minor.

Policy 13 states the following;

Manage land use activities and discharges (point source and non-point source) to land and water so that water quality and the health of humans, domestic animals and aquatic life, is protected.

As part of this application Overseer modelling has been used to assess the effect on water quality from using land for dairy farming and discharging dairy effluent. With the implemented good management practices at the property (specifically the cows being wintered inside) the effect on water quality is potentially reducing. Also in relation to human health the Worldwide One milking platform is located approximately 2.3 km north of a registered drinking water site located at the Heddon Bush School (bore E45/0718). The groundwater flow in the vicinity of the property is likely to flow in a southeasterly direction towards Winton. Therefore, the discharge of effluent from the Worldwide One property is unlikely to effect the Heddon Bush School take.

Policy 14 – Preference for discharges to land

This application is to discharge dairy effluent to land.

Policy 15 - Maintaining and improving water quality

This application does not propose to discharge dairy effluent directly to surface water or an artificial watercourse. Overseer modelling has indicated that the effects on groundwater and surface water will remain or will be slightly reducing as a result of this proposal (as discussed in Section 2.1). The applicant has implemented good management practices on the property to reduce the effects on groundwater and surface water (see attached Farm Environment Management Plan). The most significant of the good management practices/mitigation measures to reduce the effects on water quality are as follows;

- Cows are housed inside in winter;
- Wintering barn can be used as a feed pad during wet conditions;
- Streams are fenced;
- Effluent can be stored in the storage pond when soil moisture levels are high or if the soils are dry and cracking and fissures are present; and
- Fertiliser is applied little and often when conditions are appropriate.

Policy 16 – Farming activities that affect water quality

This application meets the conditions of Policy 16 given the following;

- The applicant's property is not in close proximity to any of the sensitive waterbodies listed in Appendix Q or to coastal lakes, lagoons, tidal estuaries, salt marshes or coastal wetlands;
- As discussed in Section 2.1 of this application the effects on groundwater and surface water quality are likely to reduce or remain the same as a result of this proposal.
- A farm environment management plan has been prepared for the property;
- The property is flat and all waterways are fenced to reduce sediment run-off to waterways;
- Critical source areas have been mapped; and
- Central Plains and Oxidising Physiographic Zones are managed according to the Environment Southland Good Management Practice Factsheets.

The most significant of the good management practices/mitigation measures to reduce the effects on water quality are as follows;

- Cows are housed inside in winter;
- Wintering barn can be used as a feed pad during wet conditions;
- Streams are fenced;
- Effluent can be stored in the storage pond when soil moisture levels are high or if the soils are dry and cracking and fissures are present; and
- Fertiliser is applied little and often when conditions are appropriate.

Policy 17 – Effluent management

This application has given regard to the relevant provisions of Policy 17 and finds that it is in accordance with them given the following;

- As part of the consent application the applicant has proposed mitigation measures to ensure the effects on water quality from the discharge and storage of effluent is less than minor;
- Once the dairy shed is increased the current effluent pond will also be increased in size, the proposed effluent pond will be constructed to meet the Dairy NZ Farm Dairy Effluent Design Standards and Code of Practice and Practice Note 21.
- The applicant proposes to maintain and operate the effluent systems in accordance with best practice guidelines;
- The applicant will ensure the discharge of dairy effluent does not result in surface run-off/overland flow, ponding or contamination of water;
- This application does not propose to discharge of raw sewage and untreated agricultural effluent to water.

Policy 18 – Stock exclusion from waterbodies

All waterways on the property are fenced to exclude stock access.

Policy B7 of the National Policy Statement for Freshwater Management 2014

The AEE shows that adverse effects of the proposed activity on long-term aquifer storage volumes, existing water users, surface water flows, aquatic ecosystems and habitats, and on groundwater quality will be no more than minor.

Policy 20 – Management of water resources

The AEE shows that adverse effects of the proposed activity on long-term aquifer storage volumes, existing water users, surface water flows, aquatic ecosystems and habitats, and on groundwater quality will be no more than minor.

Policy 21 – Allocation of water

This application proposes to increase the groundwater take from bore E45/0071 from 60 m³/day to 91 m³/day, however the taking of water from bore E45/0071 is within the allocation limit of the Bog Burn and Waimatuku Primary allocation limit.

Policy 22 – Management of the effects of groundwater and surface water use

The well interference assessment carried out in Section 9.2 indicates that adverse effects on neighbouring bores are no more than minor. The AEE carried out to support this application shows that there is a high degree of hydraulic connection between bore E45/0071 and the Bog Burn, however as the hydraulic connections is less than 2 l/s no specific minimum flow restrictions will be imposed on the groundwater take.

Policy 23 – Stream depletion effects

The AEE carried out to support this application shows that there is a high degree of hydraulic connection between bore E45/0071 and the Bog Burn, however as the hydraulic connections is less than 2 l/s no specific minimum flow restrictions will be imposed on the groundwater take.

Policy 39 – Application of the permitted baseline

This application has considered all adverse effects on water quality and has proposed mitigation where required.

Policy 42 – Consideration of water permit applications

This application is not to apply for new water in a fully allocated groundwater zone or surface water catchment, this application is not to replace an expiring resource consent, bore E45/0071 has a water meter, the stream depletion assessment in section 9.6 indicated that the stream depletion or minimum flow conditions were not required.

4.5.2 Rules

Rule 20(i) and (j) – Farming

- i. *From 30 May 2018, the use of land for a farming activity in the Oxidising, Riverine or Peat Wetlands Physiographic Zones, other than dairy farming of cows or intensive winter grazing, that does not comply with the condition of Rule 20(e) or Rule 20(f) is a discretionary activity.*
- j. *From 30 May 2019, the use of land for a farming activity in the Central Plains, Bedrock/Hill Country or Gleyed Physiographic Zones, other than dairy farming of cows or intensive winter grazing, that does not comply with the condition of Rule 20(g) is a discretionary activity.*

The applicant's property is located within both Oxidising and Central Plains Physiographic Zones, therefore the use of land for dairy farming is considered a discretionary activity under conditions (i) and (j) of Rule 20.

Rule 21 – Existing dairy farming of cows

The use of land for dairy farming of cows that existed as at 30 May 2016 is a permitted activity, provided the following conditions are met: (a)

- a. the dairy platform has a discharge consent for agricultural effluent that specifies a maximum number of cows; and (b)
- b. there is no increase in the number of cows, beyond that specified in Rule 21(a); and (c)
- c. a Management Plan is prepared and implemented in accordance with Appendix N, including the mitigations relevant to the farming type being undertaken and relevant physiographic zone, and provided to Environment Southland upon request, or the farming activity and the landholding on which the activity is undertaken is listed on the Environment Southland Register of Independently Audited Self-Management Participants; and (d)
- d. the activity does not occur in the Alpine physiographic zone.

As, this application is to increase cows milked at the property 540 cows to 800 cows this application is considered a discretionary activity.

Rule 22(a) – New or expanded dairy farming of cows

- a. *The use of land for dairy farming of cows that did not exist as at 30 May 2016 or does not comply with Rule 21(a) or 21(b) in the Riverine, Gleyed, Bedrock/Hill Country, Oxidising, Central Plains, or Lignite-Marine Terraces physiographic zones, is a discretionary activity, provided the following condition is met:*
 - i. *a Management Plan is prepared and implemented in accordance with Appendix N including the mitigations relevant to the farming type being undertaken and relevant*

physiographic zone, and provided to Environment Southland upon request, or the farming activity and the landholding on which the activity is undertaken is listed on the Environment Southland Register of Independently Audited Self-Management Participants.

This application is to expand the dairy platform at the Woldwide One property with land that was previously within the Woldwide Two milking platform, therefore no new land will be used for dairy farming. However, the number of cows milked at the property is increasing. A Farm Environmental Management Plan has been prepared for the property and a copy accompanies this application. The use of land for dairy farming is considered a permitted activity under condition (a) of Rule 22.

Rule 23 – Intensive winter grazing

- a. *Until 30 May 2018, the use of land for intensive winter grazing is a permitted activity.*
- b. *From 30 May 2018, the use of land for intensive winter grazing is a permitted activity, provided the following conditions are met:*
 - i. *a Management Plan is prepared and implemented in accordance with Appendix N, including the mitigations relevant to the farming type being undertaken and relevant physiographic zone, and provided to Environment Southland upon request, or the farming activity and the landholding on which the activity is undertaken is listed on the Environment Southland Register of Independently Audited Self-Management Participants;*
 - ii. *no intensive winter grazing is undertaken in the Alpine physiographic zone;*
 - iii. *not more than 20 hectares of intensive winter grazing is undertaken on a landholding within the Old Maitava, or Peat Wetlands physiographic zones;*
 - iv. *not more than 50 hectares of intensive winter grazing is undertaken on a landholding within the Riverine, Gleyed, Bedrock/Hill Country, Oxidising, Central Plains, or Lignite-Marine Terraces physiographic zones;*
 - v. *the area of land used for intensive winter grazing is recorded for each year and provided to Environment Southland on request;*
 - vi. *the location of any sub-surface drains within the area of land used for intensive winter grazing, and their outlet position and relative depth, is mapped and provided to Environment Southland upon request;*
 - vii. *a vegetated strip is maintained, and stock excluded from, the outer edge of the bed of any river, wetland, modified watercourse or artificial watercourse for a distance of:*
 8. *3 metres from the outer edge of the bed on land with a slope of less than 4 degrees; and*
 9. *10 metres from the outer edge of the bed on land with a slope between 4 and 16 degrees; and*
 10. *20 metres from the outer edge of the bed on land with a slope of greater than 16 degrees; and*
 - viii. *the winter grazing does not occur within 100 m of the outer edge of the bed of any lake or the Coastal Marine Area;*
 - ix. *overland flow of run-off water does not cause a conspicuous discolouration or sedimentation of any adjacent waterbody.*

As the property is located within both Oxidising and Central Plains Physiographic Zones, a Farm Environmental Management Plan has been prepared for the property and the area used for intensive winter grazing is less than 50 ha, the activity is considered a permitted activity under condition (b) of Rule 23.

Rule 35 – Discharge of agricultural effluent to land

- b. *The discharge of agricultural effluent or water containing agricultural effluent onto or into land, in circumstances where contaminants may enter water, is a restricted discretionary activity, provided the following conditions are met:*
 - i. *the discharge is the replacement of a lawfully established discharge pursuant to Sections 124-124C of the RMA,*
 - ii. *the existing discharge consent for agricultural effluent specifies a maximum number of animals from which the effluent is collected, and that number is not increasing; and*
 - iii. *any pond, tank or structure used to store agricultural effluent prior to discharge is certified by a Chartered Professional Engineer as:*
 - 1. *being structurally sound;*
 - 2. *meeting the relevant pond drop level outlined below, when tested in accordance with the methodology in Appendix P.*

Maximum Depth of Pond (m) excluding freeboard	Maximum Allowable Pond Level Drop (mm per 24 hours)
<0.5	1.2
0.5 to 1.0	1.4
1.0 to 1.5	1.6
1.5 to 2.0	1.8
>2.0	2.0

- d. *The discharge of agricultural effluent or water containing agricultural effluent to land, in circumstances where contaminants may enter water, which does not comply with Rule 35(b) or Rule 35(c) is a non-complying activity.*

This application proposes to increase the number of cows wintered on the property in the wintering barn, which will increase the volume of effluent collected. It is proposed to increase the size of the current effluent pond the new effluent pond will have a new synthetic lined storage pond which will be signed off by CPEng. Therefore this proposal will be a restricted discretionary activity.

Rule 38 – Animal and vegetative waste

The discharge of solid animal waste (excluding any discharge directly from an animal to land), sludge or vegetative material containing animal excrement or vegetative material, including from a high intensity farming process, feed lot or wintering barn or industrial or trade process, into or onto land, or into or onto land in circumstances where a contaminant may enter water is a permitted activity provided the following conditions are met:

- a. *the material does not contain any hazardous substance or hazardous waste; and*
- b. *the material does not include any waste from a human effluent treatment process;*
- c. *the maximum loading rate of nitrogen onto any land area does not exceed 150 kilograms of nitrogen per hectare per year; and*
- d. *the material is not discharged:*
 - i. *onto the same area of land more frequently than once every two months; or*
 - ii. *onto land where solid animal waste, or vegetative material containing animal excrement or vegetative material from a previous application is still visible on the land surface; or*
 - iii. *onto land when the soil moisture exceeds field capacity; or*
 - iv. *from 1 May to 30 September in any year; or*

- v. *within 20 metres of the landholding boundary, a bore used for water abstraction, the bed of a river, lake, or modified watercourse or the Coastal Marine Area; or*
- vi. *with a depth of material of greater than 10 mm on the land surface*

The discharge of solid effluent and sludge from the wintering barn will be managed to ensure the activity is a permitted activity under rule 38.

Rule 53 - Bores and wells

The design and headworks of bore E45/0071 prevents the infiltration of contaminants and the uncontrolled discharge or leakage of water from the surface and between aquifers. Therefore, the use of bore E45/0071 is classified as a controlled activity under Rule 53.

Rule 54(d) - Abstraction and use of groundwater

Other than that provided by Rule 54(a), groundwater takes from groundwater management zones listed in Appendix L is a discretionary activity provided the following conditions are met:

- i. *the total groundwater allocation is within the primary or secondary allocation limits established in Appendix L.5; and*
- ii. *if the degree of hydraulic connection, calculated in accordance with Appendix L.2 is not Riparian, Direct or High, the relevant surface water minimum flows and allocation limits are met;*
- iii. *any interference effects are 'acceptable' in accordance with Appendix L.3;*
- iv. *if the total groundwater allocation is within the secondary allocation limit, then minimum groundwater level cut-offs and seasonal recovery triggers are established in accordance with criteria outlined in Appendix L.6.*

The applicant takes primary allocation water from the Waimatuku Aquifer which is a lowland aquifer. The AEE carried out to support this application shows that there is a high degree of hydraulic connection between bore E45/0071 and the Bog Burn, however as the hydraulic connections is less than 2 l/s no specific minimum flow restrictions will be imposed on the groundwater take and the well interference effects are acceptable.

4.6 Te Tangi a Tauira Iwi Management Plan

Section 6 of the RMA requires the recognition of the relationship of Maori and their culture and traditions. Section 7 states that particular regard should be given to kaitiakitanga. Section 8 requires the principles of the Treaty of Waitangi to be taken into account in relation to managing the use, development and protection of natural and physical resources.

The Southland Regional Policy Statement requires that Tangata Whenua values have to be incorporated into resource management decision making and practice. The values that Maori place on water have to be recognised and provided for. Further, consultation with the local iwis is encouraged in terms of resource management issues.

To assess potential effects on Tangata Whenua from the proposed abstraction of groundwater, policies from the Te Tangi a Tauira, the Iwi Management Plan for the Murihiku area, have been used. According to policies described in section 3.5 (Southland Plains) of this plan, the proposed activity complies as follows:

4.6.1 Farm Effluent Management

Policy 3.5.1.1

The applicant recognises the role of Ngāi Tahu ki Murihiku in relation to good management practises for managing farm dairy effluent at the property.

Policy 3.5.1.2

The AEE shows that the effect of the discharge of farm dairy effluent at the property is unlikely to have adverse effects on Murihiku that are any more than minor.

Policy 3.5.1.3

The applicant currently hold resource consent 301663 to discharge dairy effluent and this proposal will not go ahead until the granting of the associated resource consent.

Policy 3.5.1.4

The AEE shows that the proposal will sustain and safeguard the life supporting capacity of the soils for future generations.

Policy 3.5.1.5

The soil at the applicant's property is not Waikoikoi clay and peat.

Policy 3.5.1.6

This proposal is not to discharge dairy effluent to water.

Policy 3.5.1.7

Effluent will be discharged at low depth.

Policy 3.5.1.8

The discharge of dairy effluent at the property will be managed to ensure the Good Management Practices are achieved.

Policy 3.5.1.9

A Farm Environment Management Plan has been submitted with this application.

Policy 3.5.1.10

Proposed condition 10 enables the Southland Regional Council to review consent conditions in accordance with Sections 128 and 129 of the RMA.

Policy 3.5.1.11

The applicant will manage the discharge of dairy effluent to ensure there is no surface run off/overland flow or contamination of water.

Policy 3.5.1.13

Farm dairy effluent will not be discharged within 20 m of waterways.

Policy 3.5.1.14

Farm dairy effluent will not be discharges within 100 m of any groundwater bores on the property.

Policy 3.5.1.15

Spray drift of effluent will be managed to ensure it does not leave the property boundaries.

Policy 3.5.1.16

The consent application proposes a conditions to monitor water quality.

Policy 3.5.1.17

The consent application proposes a duration of 10 years.

4.6.2 General Water Policy

Policy 3.5.10.1

The applicant recognises the role of Ngāi Tahu ki Murihiku as kaitiaki of freshwater.

Policy 3.5.10.3

The AEE shows that the groundwater take from bore E45/0071 is unlikely to have adverse effects on freshwater resources throughout Murihiku that are any more than minor.

Policy 3.5.10.4

The AEE shows that the cumulative effects on the groundwater system are minor.

Policy 3.5.10.5

The AEE shows that the groundwater take from bore E45/0071 is unlikely to have adverse effects on freshwater resources throughout Murihiku that are any more than minor.

Policy 3.5.10.8

The AEE carried out to support this application shows that there is a high degree of hydraulic connection between bore E45/0071 and the Bog Burn, however as the hydraulic connections is less than 2 l/s no specific minimum flow restrictions will be imposed on the groundwater take. The customary relationship of Ngāi Tahu ki Murihiku with freshwater resources is therefore unlikely to be compromised.

4.6.3 Rivers

The AEE carried out to support this application shows that there is a high degree of hydraulic connection between bore E45/0071 and the Bog Burn, however as the hydraulic connections is less than 2 l/s no specific minimum flow restrictions will be imposed on the groundwater take. As such, adverse effects on surface water resources are unlikely to be any more than minor.

4.6.4 Water Quality

Policy 3.5.13.1

The applicant recognises the role of Ngāi Tahu ki Murihiku as kaitiaki of water.

Policy 3.5.13.2

The applicant is proposing mitigation measures to ensure the adverse effects of the proposed activity on the water quality are minor.

Policy 3.5.13.3

The AEE carried out to support this application provides an assessment of cumulative effects that the proposed activity may have on water quality.

Policy 3.5.13.4

The AEE carried out to support this application shows that the allocation of the groundwater resource is reasonable, and that water is used efficiently.

Policy 3.5.13.5

This proposal is to discharge dairy effluent to land.

Policy 3.5.13.6

The applicant is proposing mitigation measures to ensure the discharge of dairy effluent is appropriate and will avoid impacts on water.

Policy 3.5.13.9

Buffer areas will ensure effluent will not runoff into waterways.

4.6.5 Water Quantity – Abstractions**Policy 3.5.14.3**

The AEE carried out to support this application provides scientifically sound and culturally relevant information.

Policy 3.5.14.4

This application is for a groundwater take from within the Southland Plains region.

Policy 3.5.14.6

The AEE carried out to support this application shows that the allocation of the groundwater resource is reasonable, and that water is used efficiently.

Policy 3.5.14.7

The applicant has been farming the subject property for many years. Water use is monitored to ensure an efficient use of the resource.

Policy 3.5.14.9

The AEE carried out to support this application shows that the allocation of the groundwater resource is reasonable, and that water is used efficiently.

Policy 3.5.14.10

The AEE indicates that the cumulative effects on the groundwater system and surrounding surface water bodies are no more than minor.

Policy 3.5.14.11

The well interference assessment carried out in the AEE indicates that adverse effects on neighbouring bores are no more than minor.

Policy 3.5.14.14

The AEE carried out to support this application shows that there is a high degree of hydraulic connection between bore E45/0071 and the Bog Burn, however as the hydraulic connections is less than 2 l/s no specific minimum flow restrictions will be imposed on the groundwater take and the well interference effects are acceptable.

Policy 3.5.14.16

The applicant has flow metering installed on bore E45/0071 (i.e. the water use will be monitored).

Policy 3.5.14.17

The consent application proposes a duration of 10 years.

Policy 3.5.14.18

Proposed condition 7 enables the Southland Regional Council to review consent conditions in accordance with Sections 128 and 129 of the RMA.

Policy 3.5.14.20

The AEE carried out to support this application shows that there is a high degree of hydraulic connection between bore E45/0071 and the Bog Burn, however as the hydraulic connections is less than 2 l/s no specific minimum flow restrictions will be imposed on the groundwater take and the well interference effects are acceptable.

The applicant has not undertaken consultation as the effects of the proposed discharge of dairy effluent and abstraction and use of groundwater are considered to be minor.

6.1 Physiographic zones

The Woldwide One property overlies Oxidising and Central Plains physiographic zones. This is shown on the map of physiographic zones shown in Figure 1. Please refer to the attached Appendix N Farm Environment Management Plan for relevant good management practices which are implemented on farm to mitigate contaminant loss in this zone.

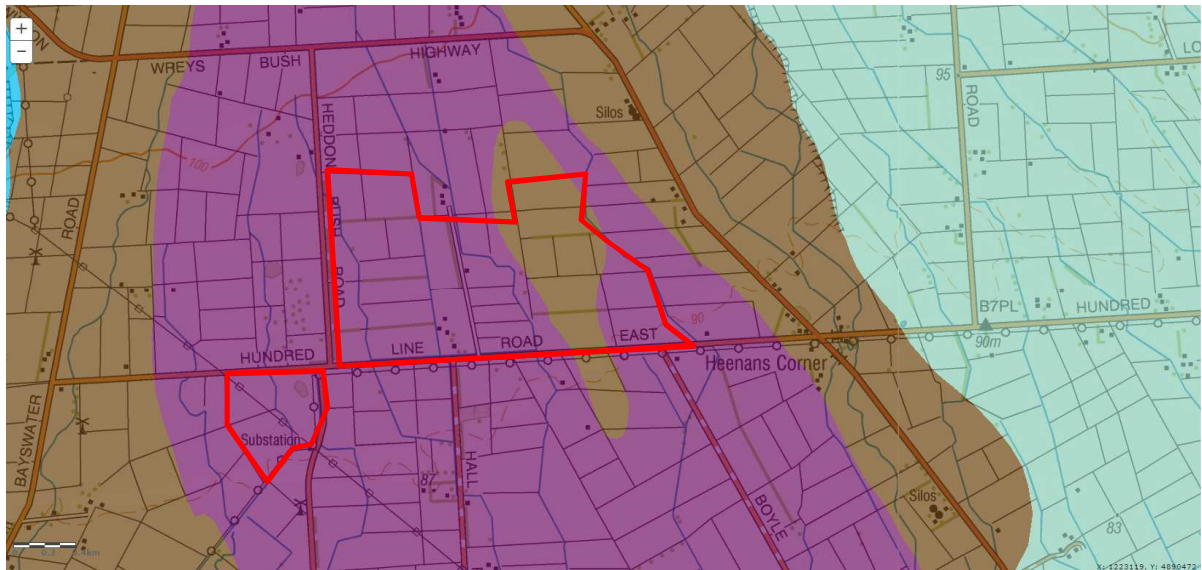













Figure 1: Map of physiographic zones at the Woldwide One property

Physiographic Zones

 Alpine - No Variant	 Lignite - Marine Terraces - Overland Flow
 Bedrock/Hill Country - Artificial Drainage	 Old Maitaura - No Variant
 Bedrock/Hill Country - No Variant	 Oxidising - Artificial Drainage
 Bedrock/Hill Country - Overland Flow	 Oxidising - No Variant
 Central Plains - No Variant	 Oxidising - Overland Flow
 Gleyed - No Variant	 Peat Wetlands - No Variant
 Gleyed - Overland Flow	 Riverine - No Variant
 Lignite - Marine Terraces - Artificial Drainage	 Riverine - Overland Flow
 Lignite - Marine Terraces - No Variant	 Urban Area

6.2 Soil Types

The soil types and areas shown on Topoclimate appear to be incorrect for the milking platform, John Scandrett (Scandrett Rural) has mapped the soil of the property. The property is overlying Braxton and Drummond soil types as shown in Figure 2. The soils for the Horner block have been obtained from the Topoclimate layer in Environment Southlands Beacon mapping service. The Horner block is overlying Braxton and Pukemutu soils as shown in Figure 3.

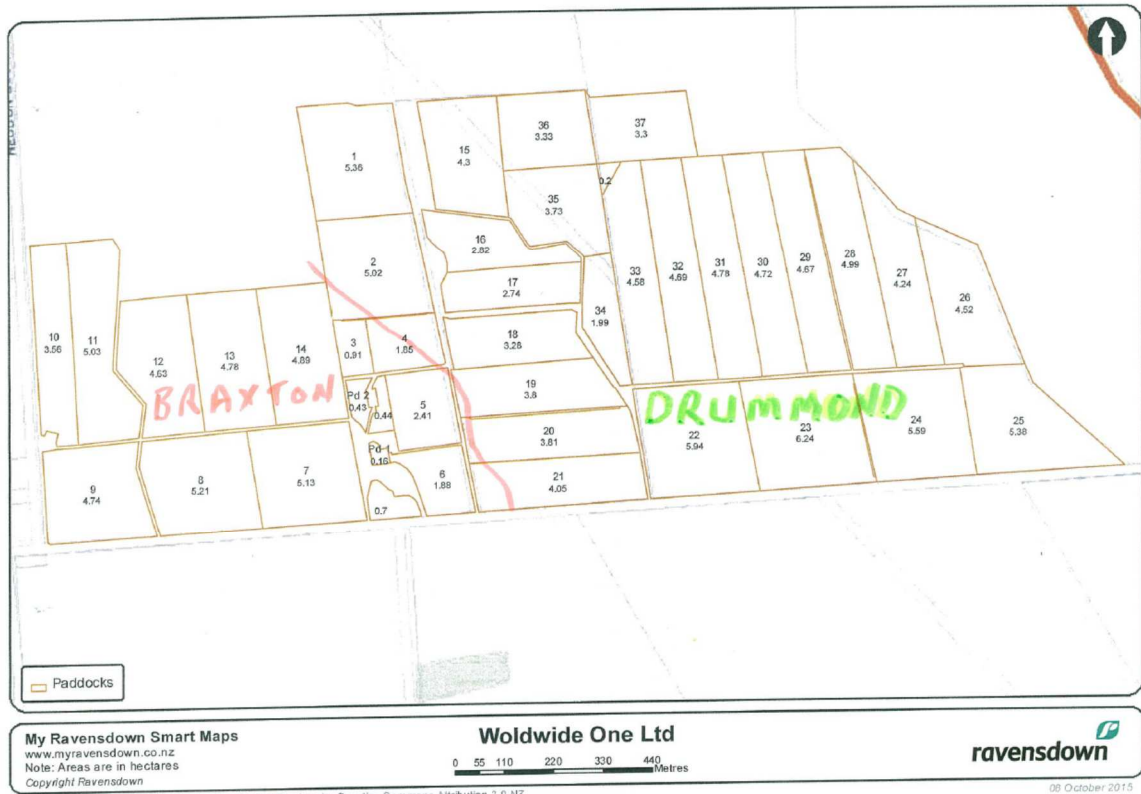


Figure 2: Map of soil types at the Woldwide One property

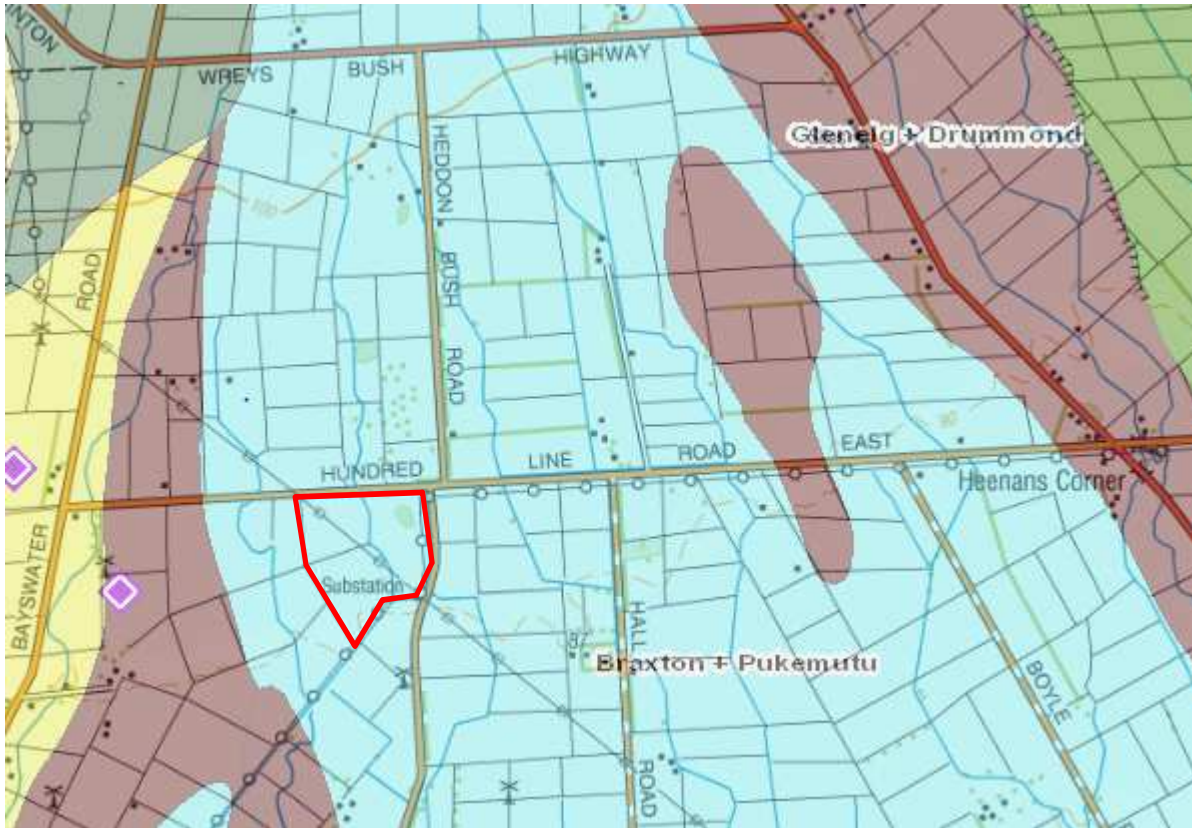


Figure 3: Map of soil types at the Woldwide One property – Horner Block

The vulnerability factors of the soils on the property are shown in Table 2.

Table 2: Vulnerability of soils at the Woldwide One property

Soil type	Compaction	Nutrient Leaching	Erodibility	Organic Matter Loss	Waterlogging
Braxton	Moderate	Slight	Slight	Slight	Severe
Drummond	Minimal	Moderate	Minimal	Slight	Slight

The PAW in the top 30 cm of the soil profile values for the soils at the property have been obtained from the Landcare SMap database and are provided in Table 3.

Table 3: PAW values for the Woldwide One property

Soil Type	Area (ha)	Percentage (%) of property	PAW ₃₀
Braxton	97	33.7	85 mm
Drummond	191	66.3	48 mm

6.3 Groundwater Quality

Condition 10 of existing Resource Consent 301663 required groundwater quality samples to be taken from bore E45/0622 once every six months. The results of the sampling are included in Table 4.

Table 4: Groundwater quality sample results from bore E45/0622

Parameter	30/04/2015	11/11/2015	14/04/2016	01/11/2016
Electrical Conductivity ($\mu\text{S/cm}$)	320	351	313	331
Dissolved Iron (g/m^3)	< 0.02	-	-	-
Chloride (g/m^3)	27.2	35.2	30.7	32.4
Nitrite – N (g/m^3)	< 0.002	< 0.002	<0.002	<0.002
Nitrate – N (g/m^3)	9.1	8.6	7.59	7.75
Nitrate N + Nitrite N (g/m^3)	9.1	8.6	7.59	7.75
E coli (MPN/100mL)	<1	<1	<1	<1

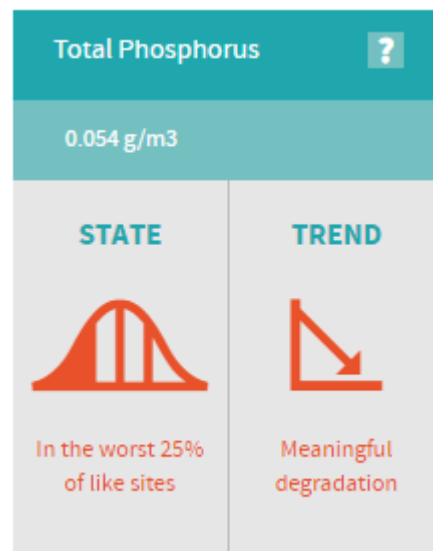
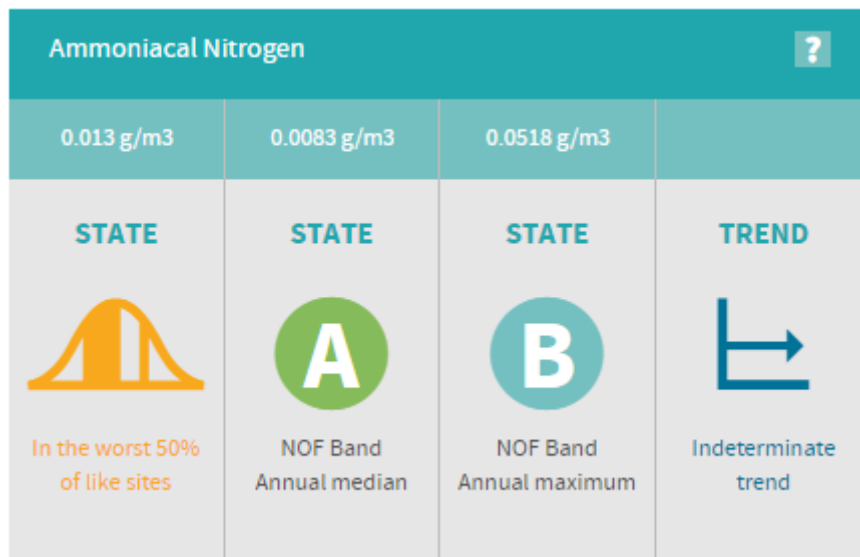
The results indicate the electrical conductivity and chloride are slightly increasing, Nitrate N and Nitrate N + Nitrite N decreasing whilst the remaining parameters have remained constant.

6.4 Surface Water Quality

The applicant's property lies within both the Aparima River and Oreti River catchments. The Aparima River and Oreti River catchments are dominated by intensive land uses including dairy and sheep and beef farming.

The Oreti River is subject to a Water Conservation Order which protects the water quality in the river, however the water quality is only protected from upstream of Rocky Point which is upstream of the applicant's property.

Long term water quality trends can be used as an indication of cumulative effects on water quality. Results from the LAWA site for the Bog Burn downstream of Hundred Line Road reflects the impacts land use is having on water quality. The Bog Burn is the closest monitoring site to the property and is within the Oreti River catchment; the site is located approximately 5 km downstream from the applicant's property. Data below is from the LAWA, monitoring station for the Bog Burn downstream of Hundred Line Road.





Five of the six scientific indicators indicate the Bog Burn water quality is very low, with total nitrogen, total oxidised nitrogen, dissolved reactive phosphorus, total phosphorus and E. Coli all within the worst 25 % of similar sites and ammoniacal nitrogen within the worst 50 % of similar sites. In summary the surface water quality downstream of the property in the Bog burn catchment is low.

7 FARM DAIRY EFFLUENT DISCHARGE

7.1 Duration of consent sought

To expire on 9th November 2027 (same as existing consent 301663).

7.2 Herd size

The milking herd will be not more than 700 cows until a new dairy shed is constructed within the next five years. Following the construction the milking herd will increase to a maximum of 800 cows. With 640 cows wintered in the wintering barn.

7.3 Factory supply number

Supplier number is 32650.

7.4 Volume of effluent – Dairy Shed

Dairy shed effluent for 700 cows at 50 l/cow per day is 35 m³/day. Once the new dairy shed is constructed, 800 cows will be able to milked in the dairy shed. However, as the new shed will have

an effluent scraper, the volume of water used for dairy shed wash down will not increase above the volume required for 700 cows i.e. 35 m³/day for dairy shed washdown.

7.5 Volume of effluent – Wintering Barn

Existing consent 301663 allows for effluent from the wintering barn to be discharged onto land from 400 cows. This application proposes to allow for effluent from the wintering barn to be discharged to land from 640 cows. The current wintering barn will be widened which will enable 640 cows to be wintered at the property in the barn.

The wintering barn has a sealed concrete floor. Dung and urine deposited by the cows is scraped down a scraper lane into a concrete lined sump. From the sump the effluent is pumped into the effluent storage pond.

The effluent from the wintering barn is connected to the dairy shed effluent system. The volume of effluent collected from the wintering barns has been calculated as approximately 2,179 m³/year, the volume has been calculated as follows;

May;

$$400 \text{ cows} \times 6 \text{ Hours/day} \times 50 \text{ l} \frac{\text{effluent}}{24} \text{ Hours} \times 31 \text{ days} = 155 \text{ cubic metres}$$

June and July;

$$640 \text{ cows} \times 50 \text{ l} \frac{\text{effluent}}{\text{day}} \times 61 \text{ days} = 1,972 \text{ cubic metres}$$

August;

$$400 \text{ cows} \times 2 \text{ Hours/day} \times 50 \text{ l} \frac{\text{effluent}}{24} \text{ Hours} \times 31 \text{ days} = 51.7 \text{ cubic metres}$$

Total

$$155 \text{ m}^3 + 1,972 \text{ m}^3 + 52 \text{ m}^3 = 2,179 \text{ cubic metres}$$

Note - the use of the wintering barn as a stand-off pad is very weather dependant and its use will vary each year.

The effluent from the wintering barns will drain by gravity into the adjacent effluent sump and be pumped into the effluent storage pond.

7.6 Period of discharge

Farm dairy effluent will be discharged throughout the year when soil conditions are suitable.

7.7 Milking frequency

Twice per day.

7.8 Winter milking

Winter milking is not currently anticipated on Woldwide One. The cowshed will be operated from 1 August to 31 May each year, with a limited number of cows (which calved late) milked until mid-June.

The property is factory supply, with cows only calving in spring and the applicant does not have a winter milking contract with Fonterra. However, cows are dried off according to their calving date, i.e. if cows calve late in spring they are milked later into June.

The midpoint of calving is 15th August and midpoint drying off is 15th June, with each cow “dry” for two months. When approximately 100 cows are left they are all dried off as it is uneconomic to milk less than 100 cows.

7.9 Other sources of effluent

Underpass – None

Silage Pad – None – not connected to the dairy effluent discharge system

7.10 Area of land

The total land area of the dairy platform is 240 ha plus 48 ha of the Horner Block, which will also be used for effluent application. This application seeks to discharge dairy effluent to a maximum area of 288 ha, excluding standard buffers from dwellings, bores and waterways (as indicated in Appendix B).

7.11 Stocking rate

800 cows on 240 ha (milking platform) gives a stocking rate of 3.3 cows per ha.

7.12 Effluent collection and storage details

7.12.1 Dairy Shed Effluent System

- i. During adequate soil moisture deficit conditions the effluent from the dairy shed will be discharged directly to the land via a travelling irrigator;
- ii. When soil moisture conditions do not allow for direct effluent discharge from the dairy shed the effluent from the dairy shed is pumped to the storage pond adjacent to the wintering barn;
- iii. The effluent is stored in the pond until soil moisture conditions allow for irrigation to occur;
- iv. The effluent is pumped from the pond to the slurry tanker for spreading onto the property; and
- v. A rainwater diversion is used in the off season.

7.12.2 Wintering Barn Effluent System

- i. The effluent flows by gravity to a concrete collection sump and is pumped to the storage pond;

- ii. The effluent is stored in the pond until soil moisture conditions allow for irrigation to occur;
- iii. The effluent is pumped from the pond to the slurry tanker via a vacuum pump; and
- iv. A rainwater diversion is used in the off season.

7.12.3 Storage Capacity

Storage Capacity – Existing storage pond 3,397 m³

The following scenarios have been calculated with the Dairy Effluent Storage Calculator;

- Scenario 1 – before new dairy is constructed
 - 700 cows milked
 - Yard area – 553 m²
 - Milking shed roof area diverted.
 - 400 cows wintered on a covered feedpad that included an uncovered area of 148 m² that is not diverted for 2017.
 - 640 cows wintered on a covered feedpad that included an uncovered area of 180 m² that is not diverted for 2018.
 - The Dairy Effluent Storage Calculator the 90% probability volume of storage required is 3,036 m³ (refer to Appendix F).
- Scenario 2 – after new dairy is constructed
 - 800 cows milked (August to May)
 - 400 cows milked in June (to cover cows that calve late)
 - 50 cows milked in July (to cover cows that calve late)
 - Yard area – approximately 1,150 m²
 - Milking shed roof area diverted.
 - 640 cows wintered on a covered feedpad that included an uncovered area of 180 m² that is not diverted.
 - The Dairy Effluent Storage Calculator the 90% probability volume of storage required is 3,917 m³ (refer to Appendix G).

7.13 Effluent irrigation method

This application is to allow for effluent to be discharged via a travelling irrigator or a slurry tanker, with a backup option of an umbilical system. The discharge system will meet the following conditions:

- A maximum depth of application of 10 mm for each individual application;
- A minimum return period of 28 days between applications;
- A maximum combined depth of application of 25 mm per year to any land area; and
- A minimum land area of 8 hectares/100 cows for the dairy shed effluent.

The slurry tanker will meet:

- A maximum depth of application of 5 mm for each individual application;

The travelling irrigator will meet:

- A maximum depth of application of 10 mm for each individual application; and

The umbilical system will meet:

- A maximum depth of application of 5 mm for each individual application.

7.14 Effluent testing

The nutrient content of the dairy shed effluent has not been tested to date. However the nutrient content of the wintering barn effluent has been tested with the results shown in Table 5.

Table 5: Nutrient content of wintering barn effluent

Potassium	Nitrogen	Phosphorus	Sulphur
2,900 g/m ³	2,900 g/m ³	440 g/m ³	390 g/m ³

7.15 Buffer zones

The applicant intends to comply with all buffer zones as recommended by Environment Southland, that is:

- 20 metres from any surface watercourse;
- 100 metres from any potable water abstraction point;
- 20 metres from any property boundary, (unless the adjoining landowner's consent is obtained to do otherwise);
- 200 metres from any residential dwelling other than residential dwellings on the property;
- Dairy shed effluent shall not be discharged onto any land area that has been grazed within the previous 5 – 10 days; and
- Effluent shall not be discharged over tiles or mole drains when the soil is at field capacity.

7.16 Other discharges

The Woldwide One property is within the discharge area for Fonterra's consent to discharge whey (resource consent 20146925-V3). However, going forward the whey will not be discharged on the property; a copy of the email from Fonterra to Environment Southland confirming the cessation of whey applications at the Woldwide One property is included in Appendix H. Therefore, no further assessment is required as only effluent from Woldwide One's dairy shed and wintering barn will be discharged at the property.

Silage leachate – the silage pit and any associated leachate is not connected to the effluent pond.

Underpass – there is no stock underpass at the Woldwide One property.

7.17 Water zones

Groundwater Zone(s):

The applicant's property is within the Central Plains and Waimatuku Groundwater Zones.

Surface Water Catchment:

Aparima River and Oreti River.

7.18 Groundwater depth

The static water level in bore E45/0061 (adjacent to the dairy shed) was 2.5 m bgl at the time of drilling in 2001. This bore is used for dairy shed use and stockwater supply for the property.

7.19 Slope of effluent discharge area

The property is located in the Oreti Plains and the discharge area is predominately flat.

7.20 Existing environment

The discharge of effluent is an existing activity at the property and this application will not lead to any change to the existing environment. The following effects of the effluent discharge have been assessed on the existing environment;

a. In stream life	No Effect
b. Food gathering from watercourses	No Effect
c. Wetlands/ bird nesting habitats	No Effect
d. Recreational activities	No Effect
e. Areas of aesthetic or scientific value	No Effect
f. Waste discharges	No Effect
g. Other water takes	No Effect

8

ASSESSMENT OF ENVIRONMENTAL EFFECTS

8.1 Effects of Discharge on Nitrogen Entering Groundwater

Table 6 shows that the proposal to milk up to 800 cows for factory supply and winter 640 cows in a wintering barn and to spread effluent over an area of at least 200 ha will result in a nitrogen loading rate of 119 kg/ha/year. As the proposed nitrogen loading rate is less than 150 kg per year there is no need for further assessment of the effects of nitrogen entering groundwater.

Table 6: Nitrogen loading rate calculation

	Dairy shed	Wintering barn
Number of cows	800	640
Maximum hours used per day		24
Nitrogen collected	0.024 Kg N/cow/day	0.018 Kg N/cow/hour
Daily nitrogen produced	19.2 Kg N/day	276.5 Kg N/day
Maximum days used per year	300	65 (approximately)
Annual nitrogen produced	5,760 Kg N/year	17,971 Kg N/year
Total nitrogen produced	23,731 kg N/year	
Minimum annual size of discharge area (ha)	200 ha	
Annual maximum nitrogen loading rate	119 kg N/ha	

8.2 Effects of Pathogens Entering Groundwater

As the dairy shed effluent is to be applied to the land, there is the potential for pathogens to pass through the soil profile and enter groundwater. However, studies indicate that if the effluent is spread at a rate not exceeding half the amount of water held within the root zone of the soil, the potential for pathogens passing through the soil and entering groundwater are minimal.

As the majority of the soil at the Woldwide One property is considered to have a high FDE risk category the maximum application depth will not exceed 10 mm, which is also less than half of the lowest average soil's PAW30. Therefore, the effects of pathogens entering groundwater can therefore be considered minor.

8.3 Effect on Local Water Bodies

For the discharge of dairy effluent proposed condition 5(a) proposes buffer distances of 20 m to surface water bodies and 100 m to potable water abstraction points. This complies with the buffer distances listed in both Rule 50 of the operative Regional Water Plan (RWP) and Rule 35 of the proposed Southland Water and Land Plan (pSWLP).

8.4 Effects of Odour and Pathogens in Air

The following steps will be taken to ensure that odour will not be a nuisance to people living and working in the surrounding area of the discharge sites:

- The effluent will be discharged to the land daily when soil conditions allow. Routinely discharging the effluent will reduce the development of potentially odorous compounds.
- All neighbouring dwellings are separated from the discharge areas by distances of at least 500 m.
- The distance from the storage pond to the western boundary of the Woldwide One property is approximately 850 m.

To ensure that pathogens will not cause harm to people using the area surrounding the discharge site the travelling irrigator will operate at relatively low pressures and produce relatively large-sized droplets. The travelling irrigator will also operate at moderately low heights (approximately 2 m)

above the ground to reduce the potential for spray drift. The slurry tanker is equipped with a trailing shoe applicator, which makes a groove in the ground, with the effluent slurry deposited into the groove so the slurry will not be travelling through the air.

8.5 Effects of Odour Due to Storage of Effluent

When effluent is stored, particularly when stored for long periods of time, the potential for odours to become a nuisance to neighbours and those passing the property is increased. This, however, is unlikely to occur on the applicant's property with the effluent storage area situated approximately 1.4 km from the closest neighbouring house (owned by Careykin Limited). Furthermore, effluent will be discharged daily during the milking season when soil conditions allow with no prolonged storage during the summer period, thereby reducing the potential for odours to develop to unacceptable levels. The effluent collected from the wintering barn is collected and stored during the colder part of the year reducing the potential for odour and is discharged to land as soon as soil moisture conditions allow in the spring.

8.6 Effects on Visual Amenity

Dairying is typical of the land use in the Oreti Plains, where Woldwide One is one of five dairy farms the applicant is currently operating in the area. Furthermore, the changes proposed by the applicant pertain only to increasing the number of cows milked at the property, and the number of cows wintered in the wintering barn and swapping some of the area of land used for dairy farming with Woldwide Two. There will be no change to the overall activity on the property and as such, the effects on visual amenity from the proposed activity will not change under this proposal.

8.7 Potential to Affect Soil Quality

The application of excessive contaminants to the soil can have detrimental effects upon the soil structure and its ability to support plant, animal and insect life.

The effluent and washdown water gravitates from the dairy shed and wintering barn. The pipe connecting the sump to the irrigators and storage pond are appropriately sealed to prevent leakage either from the pipe itself or from around the inlet or outlet. This system does not allow for significant volumes of effluent to be in contact with the soil until it is discharged to land. As such, it is not considered this activity will have any adverse effects on soil quality.

The proposed storage facility will consist of a synthetic lined storage pond with a storage capacity of at least 3,917 m³.

All associated yards, tanks, pipes, sumps and channels shall be sealed and maintained at all times with appropriate material such as concrete to prevent leakage of contaminants onto or into land where it may enter water.

Given the above it is considered that the potential for the proposed activity to significantly adversely affect groundwater quality is minor.

8.8 Beneficial Effects

The discharge of dairy shed effluent to land allows for sustainable land management practices to be undertaken. Collected dairy shed effluent provides a valuable resource to be recycled, containing nitrogen, phosphorus, potassium and sulphur – all nutrients required to optimise pasture growth. In addition, the effluent adds organic matter to the soil, thereby increasing earthworm activity.

8.9 Effect on Tangata Whenua Values

The effects on Tangata Whenua are unlikely to be any more than minor because:

- The proposed activity does not interfere with cultural values, the relationship of Maori to land and water, kaitiakitanga and the Treaty of Waitangi as stated under Part 2 of the RMA;
- The proposed activity is consistent with the policies described in the Te Tangi a Tauria Iwi Management Plan;
- The location of the proposed activity is unlikely to have adverse effects on sensitive areas such as lakes, rivers and streams that are any more than minor; and
- The proposed activity is not within, adjacent to, or likely to affect a Statutory Acknowledgement Area or a silent file area.

Therefore, the effects from the proposed activity on Tangata Whenua are considered to be no more than minor.

8.10 FDE risk categories

The majority of the effluent discharge area has a soil risk category of A – artificial drainage or course soil structure, the remaining areas of the discharge area have a soil risk category of E – other well drained but very light flat land. As shown in Table 7 the soil risk category A soil is considered high risk which has the following restrictions;

- an application depth less than the soil water deficit;
- only discharge effluent when a soil water deficit occurs;
- a maximum depth of 10 mm with a high rate tool (i.e. travelling irrigator).

As shown in Table 7 the soil risk category E soil is considered low risk which has the following restrictions;

- an application depth less than half of the soil PAW30;
- discharge effluent 24 hours after drainage saturation;
- a maximum depth of 10 mm with a high rate tool (i.e. travelling irrigator).

The Farm Dairy Effluent Storage Calculator was used to determine the required storage volume (copies are included in Appendices F and G) based on 190 ha of high risk soil and 50 ha of low risk soil. As the FDE storage calculator has been modelled with the majority of the property as high risk soil (artificial drainage) the storage volume is considered to be appropriate to allow for effluent storage to occur when the groundwater level is high and when artificial drainage may be occurring at the property.

Table 7: Guidelines to minimise the risk of effluent ponding and runoff occurring (DairyNZ Pocket guide to determine soil risk for farm dairy effluent application https://www.dairynz.co.nz/media/757892/fde_soil_risk_pocket_guide.pdf)

Dairy Effluent (FDE) Risk Categories	A	B	C	D	E
Soil & landscape feature	Artificial drainage or coarse soil structure	Impeded drainage or low infiltration rate	Sloping land (>7°) or land with hump and hollow drainage	Well drained flat land (<7°)	Other well drained but very light flat land (<7°)
Risk	High	High	High	Low	Low
Application depth (mm)	<SWD ¹	<SWD	<SWD	<50% PAW30 ²	<10mm & ≤50% PAW30
Storage requirement	Only apply when SWD exists	Only apply when SWD exists	Only apply when SWD exists	24hours drainage post saturation	24hours drainage post saturation
Max depth: high rate tool³	10mm	10mm	10mm ⁴	25 mm ⁵ (10mm at field capacity)	10mm
Max depth: low rate tool⁶	25mm	25mm	10mm	25mm	10mm

¹ SWD = Soil Water Deficit

² PAW30 = Plant Available Water in top 30cm of soil

³ A high rate tool is an irrigator that discharges effluent at application rates over 10 millimetres per hour (mm/hr)

⁴ Only applicable when the instantaneous application rate from the irrigator is less than the infiltration rate.

⁵ Suggested maximum application depth when a suitable SWD exists (≥15mm)

⁶ A low rate tool is an irrigator that can discharge at an application rate of less than 10mm/hr.

Note: Application rate refers to the speed (i.e. volume over time), while application depth refers to the depth of effluent and any irrigation water applied to an area over a 24 hour period.

At the Woldwide One property the proposed maximum application depth from the travelling irrigator is 10 mm and application depth the slurry tanker with trailing shoe applicator is approximately 2 mm.

8.11 Physiographic Zones

The applicant's property is overlying both Central Plains and Oxidising Physiographic Zones. The contaminant pathways for nutrients to the receiving environment are discussed below.

8.11.1 Central Plains

The Central Plains zone includes areas of clay-rich soils found in the central parts of the Southland Plains. These soils can crack extensively during summer as they dry out, and swell when wet in winter and early spring, becoming poorly drained.

The contaminant transport within the Central Plains consist of both artificial subsurface drainage and deep drainage of nitrogen.

Artificial subsurface drainage

Artificial subsurface drainage occurs when the soils are wet and/or the groundwater levels are high resulting in contaminants moving through via the drains to streams.

As part of this application the dairy effluent storage calculator was used to ensure the effluent storage volume was adequate for periods when effluent could not be discharged due to saturated soils, high groundwater levels and artificial drainage occurring. Having adequate storage volume means effluent can be stored when the soil is too wet for effluent to be discharged. This along with a wintering barn which acts as a feed pad during the milking season if the paddocks are too wet to graze is the optimum mitigation to reduce the nitrogen loss to drains.

Deep drainage of nitrogen

Deep drainage of nitrogen occurs when the clay minerals in the soil dry and shrink, resulting in the opening of cracks and fissures. The cracks and fissures allow for contaminants to move below the root zone to groundwater and hydraulically connected waterways.

To reduce the occurrence of deep drainage of nitrogen the applicant will endeavour to prevent cracks or fissures occurring as much as possible. This will be achieved by keeping a higher pasture cover and discharging effluent little and often to ensure the soil moisture is kept as high as possible to prevent the soil from drying out and cracking. Before each effluent application a visual assessment will be carried out to check for any cracks in the soil. If cracks do occur the applicant will avoid areas with cracking or move to another part of the property where there are no cracks. If there are substantial cracks and no areas suitable to discharge effluent the applicant will store effluent until the soil moisture level improves and cracking disappears. Given the cracks are likely to occur after prolonged dry periods in the summer the effluent storage facility is likely to provide adequate storage volume for these events.

8.11.2 Oxidising

The contaminant transport within the Oxidising Physiographic Zone consist of artificial subsurface drainage, deep drainage of nitrogen and overland flow. For artificial subsurface drainage, deep drainage of nitrogen see above explanations.

Overland flow

As the Woldwide One property is flat, overland flow at the Woldwide One property is unlikely to occur except potentially during periods of intense rainfall.

The Woldwide One property has a wintering barn which also acts as a feed pad during the milking season if the paddocks are too wet to graze. During periods of intense rainfall the cows will be kept off the pasture to help to reduce the risk of contaminants getting into waterways.

8.12 Values

The values considered to apply to this application are groundwater quantity, groundwater quality and surface water quality. The effects on groundwater and surface water quality have been addressed in Sections 8.1 – 8.3 of this AEE. The effects on groundwater quantity have been addressed in Section 9.3 of this AEE.

8.13 Modelled nutrient loss effect the environment

Groundwater quality samples have been taken from bore E45/0622, the results of the samples are included in Table 3 of this AEE. The average from the four samples available for nitrate-nitrogen is 8.26 g/m³. Overseer modelling calculates the nitrogen loss in drainage for each block, the average nitrogen loss in drainage for the Woldwide One and Two property is 3.8 g/m³. The higher levels of nitrate-nitrogen in bore E45/0622 can be attributed to the cumulative effect of nitrogen loss from all farms in the surrounding area, whereas the lower figure from Overseer is only the nitrogen loss to drainage from the Woldwide One and Two properties.

The results from the Overseer modelling indicate that the nitrogen loss to water will reduce below the current consented situation, with phosphorus loss to water slightly increasing above the current consented situation. However, with the implementation of good management practices at the property (specifically the cows being wintered inside) and ensuring phosphorus from laneways cannot enter waterways; the groundwater and surface water quality is likely to remain the same or reduce below the current consented situation. The potential for nitrogen loss associated with deep drainage is also likely to remain the same or reduce below the current consented situation. Therefore this application meets Policy 15 of the pSWLP as the Overseer modelling results indicate water quality will be maintained or improved.

8.14 Limitations of Overseer

Overseer was developed to assist with fertiliser maintenance requirements and has since been modified to assist regional councils with assessing potential nitrogen and phosphorus lost to water. With Overseer being used by regional councils yearly nutrient budgets are being prepared which causes its own issues given the model is based on average long term climate data, this is especially concerning for irrigation inputs; for example if during drought years the actual irrigation water used is entered Overseer will model excess drainage as the climate data is assuming an average season. The results of Overseer modelling are very dependent on how the data is entered into the model, two people can enter the same data and get different results. Given the limitations the results need to be considered to be within a scale of plus or minus 30 %. Overseer also only models nutrient loss to the bottom of the root zone therefore if the deep drainage was to occur in the Central Plains Physiographic zone below the root zone Overseer will not take account of any nutrient loss to deep drainage. Overseer is also not soil site specific and cannot model all good management practices.

However, Overseer is the most comprehensive farm system tool we have currently available for use to assess nitrogen and phosphorus loss to water which takes into account both farm inputs and outputs.

8.15 Receiving environment

Groundwater and surface water quality information in the vicinity of the Woldwide One property was included in Sections 6.3 and 6.4 of this application. As discussed previously this proposal may potentially improve the water quality in the vicinity of the property. Also, given the following, the effects of dairy farming and discharging dairy effluent are likely to be minor;

- The Woldwide One property has been a dairy farm since 1992 (i.e. not a new conversion);
- the applicant is operating under good management practices according to their farm environment plan;
- intensive farming is common practise in the Oreti Plains;
- the application is not to discharge effluent into surface water,

- The mitigation proposed in the application will ensure water quality will potentially improve in the vicinity of the property;
- The applicant's property is not within close proximity to any of the sensitive waterbodies listed in Appendix Q of the Proposed Southland Water and Land Plan;
- All waterways are fenced off; and
- Cows are wintered inside (i.e. not grazed on the land)

The Worldwide One milking platform is located approximately 2.3 km north of the Heddon Bush School which has a groundwater take from bore E45/0718 which is a registered drinking water site. Bore E45/0718 is 20 m deep. Borelogs in the surrounding area indicate layers of clay and claybound gravels from approximately 15 – 20 m, these clay layers will help to reduce any potential risk of contaminants entering the drinking water supply. The groundwater flow in the vicinity of the property is understood to flow in a southeast direction (i.e. towards Winton). Therefore, the discharge of effluent from the Worldwide One property is unlikely to effect the Heddon Bush School take.

8.16 Monitoring of effects

The potential effects on the environment will be monitored by proposed condition 10 which requires groundwater quality samples to be taken once every six months from bore E45/0622.

Overseer modelling will also be carried out annually to monitor the proposed nitrogen and phosphorus loss to water.

8.17 Travelling irrigator application depth test

A travelling irrigator application depth test was carried out in 2012 as part of the consent application to discharge dairy effluent (resource consent 301663).

8.18 Assessment of the risk of contaminant transportation – farm dairy effluent

The entire design of the effluent discharge system meets best practice by using buffer storage and low depth application. The use of best practice effluent application should avoid adverse effects on the environment. This principle is well documented in various scientific reports prepared for Environment Southland during the process of setting policies and rules around effluent discharge to land. The 2009 Houlbrooke and Monaghan report provides context and background to the principle that low depth effluent application should not cause adverse effects on water quality.

8.18.1 Neighbourhood and wider community:

As the applicant intends to adhere to Environment Southlands buffer zones around boundaries, dwellings, bores etc, there will be no more than minor effects on the neighbourhood and wider community.

The farm is already operating as a dairy farm, with the required infrastructure in place. No issues have been raised (by neighbours or any other person) with the existing owner during their ownership.

8.18.2 Physical effect on the locality including landscape and visual effects:

The discharge of effluent has minimal landscape and visual effects. The discharge of effluent is an existing activity at the property and this application will not lead to any change of the existing landscape and visual effects.

8.18.3 Plants and animals, habitats and ecosystems:

The effluent discharge area covers approximately 288 ha of the property, excluding buffers from dwellings, bores and waterways. The size of the effluent area is important to ensure nitrogen, potassium and phosphate loadings are within expected limits to avoid environmental effects and animal health issues. The total available discharge area is above the Environment Southland and Industry recommended area of 8ha/100 cows (i.e. 64 ha).

Effluent application adds nutrients and organic matter improving soil structure, aeration and drainage. Soil structure is important for plants, habitats and soil ecosystems.

8.18.4 Natural and physical resources having special value:

There are no known QEII covenant's, historical places or sites of special significance to Maori on the property.

8.18.5 Discharge of contaminants into the environment:

Effluent itself may be considered a contaminant, however as discussed above, when applied according to best practice guidelines, it has minimal impact on the environment.

8.18.6 Natural hazards, hazardous substances or installations:

N/A

8.19 Mitigation measures

8.19.1 Maintenance Details:

The effluent irrigation pump performance and need for maintenance will be monitored via a pressure gauge fitted at the pump. The effluent pump and irrigation lines will be drained for the winter period.

8.19.2 Effluent Irrigation Mitigation Methods:

- All buffer zones as recommended by Environment Southland will be adhered to.
- Effluent irrigation will only be undertaken when there is a soil moisture deficit as per the closest Environment Southland website soil moisture monitoring site.
- Effluent will be applied at the appropriate rate and depth as prescribed by consent conditions.
- The travelling irrigator is fitted with a "fail safe" system.

- The tractor towing the slurry tanker has a GPS system which also monitors speed and can provide proof of placement.

8.19.3 Contingency details:

Mechanical Breakdown

If the irrigation pump fails contingency measures will be implemented such as:

- Effluent volumes will be minimised, a contractor will be called if required;
- Effluent being applied using a slurry tanker or umbilical system;
- The pump will be repaired or a backup or loan pump will be installed; and
- The aim is to manage the effluent irrigation system to always ensure there is buffer storage available. This allows a storage contingency for wet weather or pump failure.

Wet Weather

The storage structures will contain enough storage for dairy shed effluent even after allowing for the rainwater and effluent runoff from the yard areas during periods of inclement weather.

8.19.4 Farm Effluent Management Plan

See the attached Appendix N FEMP document.

8.20 Alternative locations or methods

The travelling irrigator and slurry tanker have been chosen as the main irrigation method over other possibilities as there are fewer adverse effects and it is consistent with Environment Southland policies. They are the farms existing equipment and have proven reliability.

Existing resource consent 301664 allows water to be taken from bore E45/0071, with a maximum volume of 60 m³/day. The applicant proposes to take 91 m³/day at a maximum rate of 2 l/s from bore E45/0071. The bore details are as follows;

- E45/0071 – 44.3 m deep, 150 mm diameter at or about map reference 1225144-4888768

The groundwater take is a discretionary activity under Rule 54 of the Proposed Southland Water and Land Plan as the take meets the following conditions;

- The proposed rate is less than 5 l/s;
- The proposed volume is greater than 86 m³/day;
- Bore E45/0071 are not within 50 m of an existing lawfully established groundwater take
- The applicant does not propose to take any surface water to supply the property; and
- The farming type, stocking rate and point of abstractions are all included in this application.

The groundwater take is a restricted discretionary activity under Rule 23 of the Southland Water Plan as the proposed combined rate of take from bore E45/0071 is less than 2 l/s.

As the proposed take is a restricted discretionary activity under Rule 23 of the Southland Water Plan a resource consent is required to take and use groundwater. Therefore the following Assessment of the Environment Effects from taking groundwater from bore E45/0071 has been carried out.

9.1 Scope of Potential Effects

The potential effects relevant to this application are:

- Effects on neighbouring bores (domestic, irrigation, public and other uses);
- Cumulative effects on the aquifer;
- Reasonable and efficient water use;
- Effects due to cross-connection of groundwater;
- Effects on surface water resources through groundwater-surface water connections;
- Effect on groundwater quality;
- Effects on cultural values;
- Effects on recreational values; and
- Effects on Biodiversity.

9.2 Effects on Neighbouring bores

Policy 31 of the RWP states that the interference effect of any new groundwater abstraction should be limited to no more than 20 percent of the available drawdown in any neighbouring bore, provided the neighbouring bore is lawfully established and adequately penetrates the aquifer.

Due to a lack of information regarding the drawdown in bores and water levels in this area, it is not possible to accurately determine 20 percent of available drawdown in neighbouring bores. Because of this, 20 percent of the aquifer thickness has been assumed as an alternative threshold. This approach has been adopted in other groundwater take applications within the Southland region.

The potential effects of pumping bore E45/0071 have been assessed using the Theis (1935) drawdown assessment. This method of assessment provides a conservative estimate of the drawdown effects of the proposed groundwater abstraction and often provides an over-estimate of the effects on neighbouring bores.

The following aquifer parameters have been used in this analysis:

Aquifer parameters

Brydon Hughes advised that a maximum transmissivity value of 200 m²/day is appropriate for the Waimatuku Groundwater Allocation Zone in the vicinity of the Woldwide One property (email dated 14/02/2017). For this assessment a transmissivity of 200 m²/day has been used. This is the same value as what was used in the stream depletion assessment. Brydon Hughes also advised that a Storativity value of 0.001 would be an appropriate storativity value for aquifers in the Oreti Plains (email dated 16/02/2017).

Bore E45/0071

Transmissivity = 200 m²/day

Storativity = 0.001

7 day pumping rate = 1.05 l/s (based on 91 m³/ day)

300 day pumping rate = 1.05 l/s (same as Q7)

The nearest neighbouring bore used for pumping purposes is bore E45/0605 which is located approximately 1.25 km southeast of bore E45/0071. Bore E45/0605 is used for dairy shed supply.

Figure 4 shows that the nearest neighbouring pumping bore (E45/0605) may have a drawdown of approximately 0.035 m from the pumping of bore E45/0071 for 7 days at a distance of approximately 1.25 km. Based on an aquifer thickness of 10 m the drawdown of 0.035 m in bore E45/0605 for 7 days pumping is approximately 0.35 percent of the aquifer thickness which is within the 20 percent available drawdown recommended by Policy 31 of the RWP.

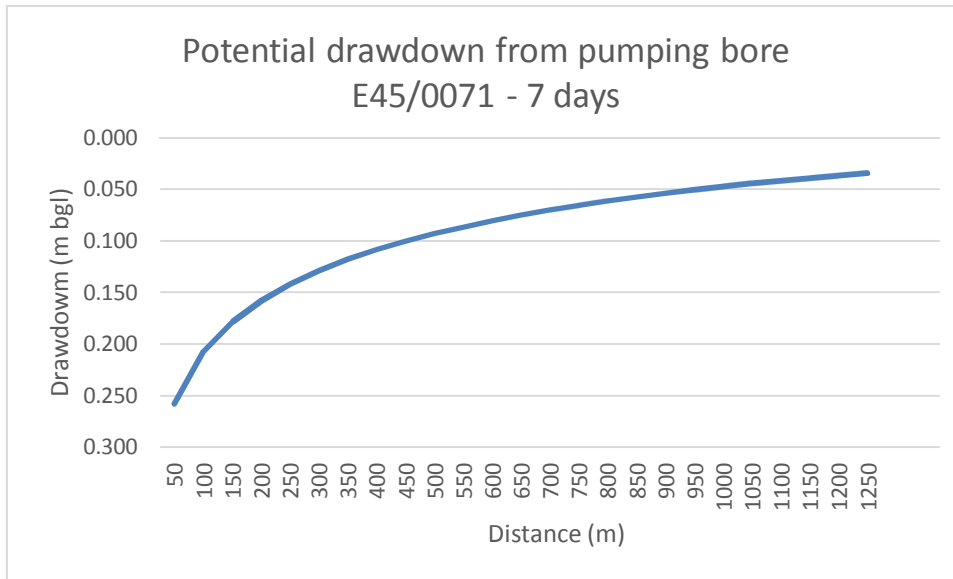


Figure 4: Estimated maximum drawdown effects from pumping bore E45/0071 for 7 days

Figure 5 shows that the nearest neighbouring pumping bore (E45/0605) may have a drawdown of approximately 0.161 m from the pumping of bore E45/0071 for 300 days at a distance of approximately 1.25 km. Based on an aquifer thickness of 10 m the drawdown of 0.161 m in bore E45/0605 for 300 days pumping is approximately 1.61 percent of the aquifer thickness which is within the 20 percent available drawdown recommended by Policy 31 of the RWP. Therefore the effect of the proposed pumping upon neighbouring bores is considered to be minor.

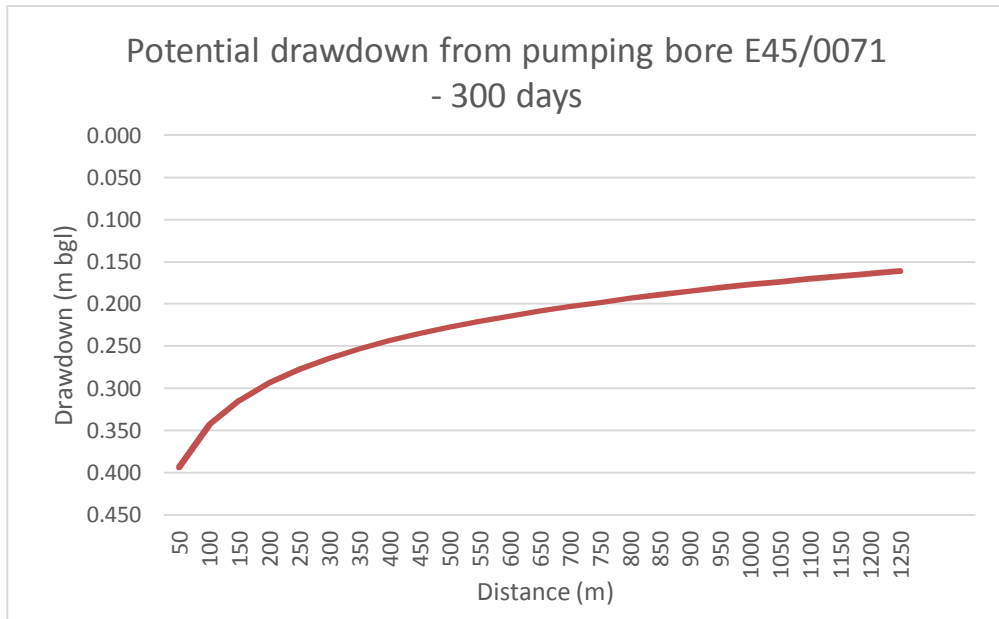


Figure 5: Estimated maximum drawdown effects from pumping bore E45/0071 for 300 days

9.3 Cumulative Effects on the Aquifer

The applicant's property is located in the Waimatuku Groundwater Allocation Zone. This application is to increase the maximum daily volume from 60 m³/day to 91 m³/ day. Under the proposed Southland Water and Land Plan the Waimatuku Groundwater Allocation Zone is only 6.6 % allocated. Therefore the cumulative effects on the groundwater system are considered minor and no further assessment is required.

9.4 Reasonable and Efficient Water Use

The RMA requires that the quantity of water abstracted is both reasonable and used efficiently. Table 2 details the approximate quantity of water required based on a dairy herd of 800 cows during the milking season.

Table 8: Daily water allocation for stock water and dairy shed water use

Water use activity	Number of cows	Water use (ℓ/cow/day)	Daily water use (m ³ /day)	Water use period (days)	Annual water use (m ³ /year)
Stockwater (during milking season)	800	70	56	300	16,800
Stockwater (outside of milking season)	640	45	28.8	65	1,872

Dairy shed water	700*	50	35	300	10,500
Total			91		29,172

* **Note** –Once the new dairy shed is constructed, 800 cows will be able to milked in the dairy shed. However, as the new shed will have an effluent scraper, the volume of water used for dairy shed wash down will not increase above the volume required for 700 cows i.e. 35 m³/day for dairy shed washdown.

From the assessment in Table 8, the maximum daily water take is 91 m³ and the total annual allocation required for stockwater and dairy shed use is 29,172 m³, which is considered both reasonable and efficient. This volume will reduce once the new dairy shed is built as a yard scraper will be used in the dairy shed and overall water use in the dairy shed will be minimal.

9.5 Effects Due to Cross-connection of Groundwater

Taking water from a bore screened at more than one depth may result in contamination of aquifers, with artificial recharge from one aquifer to another (either upwards or downwards, depending on the location). Contamination may also occur if the consent holder has a system with a common mainline supplied from two different bores in two different aquifers, where non-return valves have not been fitted.

As bores E45/0071 is only screened between 41.2 and 44.2 m below ground level, the taking of water from E45/0071 is unlikely to generate an adverse effect from cross-connection on groundwater quality and hence no further assessment is required.

9.6 Effects on Surface Water Resources

Pumping groundwater from the bore E45/0071 could affect surface water bodies (such as rivers and wetlands) if the water bodies are hydraulically connected to the aquifer and the cone of depression resulting from pumping bore intercepts these water bodies.

Policy 29 stated in Section 3.3 of the Regional Water Plan (RWP) outlines the framework for the management of stream depletion effects resulting from groundwater abstraction in the Southland Region. The policy specifies criteria for classifying the degree of hydraulic connection between a bore and nearby surface water ways including a method to proportion the allocation between surface water and groundwater. The policy also identifies those groundwater takes that may be subject to minimum flow control to mitigate impacts during periods of low flow.

Bore E45/0071 is approximately 1,000 m from a tributary of the Bog Burn.

In order to classify the degree of hydraulic connection between bore E45/0045 and the tributary of the Bog Burn a stream depletion analysis has been undertaken using the parameters shown in Table 9 and the Hunt (1999) solution. Brydon Hughes advised that a maximum transmissivity value of 200 m²/day is appropriate for the Waimatuku Groundwater Allocation Zone in the vicinity of the Woldwide One property (email dated 14/02/2017). For this assessment a transmissivity of 200 m²/day has been used. This is the same value as what was used in the well interference assessment. Brydon Hughes also advised that a Storativity value of 0.001 would be an appropriate storativity value for aquifers in the Oreti Plains and that a Lambda value of less than 2 m/day is an appropriate value for the Bog Burn

(email dated 14/02/2017). A Lambda value of 2 m/day has been used as it is the most conservative value. The parameters used in the stream depletion analysis are shown in Table 9.

Table 9: Parameters used in stream depletion analysis

Parameters	Bores E45/0071
Transmissivity (m ² /day)	200
Storativity	0.001
Separation distance from Bog Burn (m)	1,000
Lambda (m/day)	2
Pump rate over 7 days (ℓ/s)	1.05
Pump rate over 300 days (ℓ/s)	1.05

The stream depletion calculations are shown in Appendix I. The stream depletion analysis in Appendix I shows that over 7 days pumping at an average rate of 0.97 ℓ/s the depletion will be 0.5 ℓ/s or a depletion rate of 52 % and that over 300 days pumping at an average rate of 0.97 ℓ/s the depletion will be 0.9 ℓ/s or a depletion rate of 93 %. Therefore according to Policy 29 of the RWP pumping from bore E45/071 would be classified as a high degree of connection with the tributary of the Bog Burn. However as the hydraulic connections is less than 2 l/s no specific minimum flow restrictions will be imposed on the groundwater take from the spring fed stream.

Appendix L2 of the Proposed Southland Land and Water Plan states that a groundwater take with a high degree of hydraulic connection *“where the magnitude exceeds 2 litres per second the calculated stream depletion effect will be managed as an equivalent take from an adjacent surface waterbody with the remainder of the allocation included in the allocation volume for the relevant groundwater zone. Groundwater takes classified as having a high degree of hydraulic connection will be subject to any relevant minimum flow regime.”* As the stream depletion assessment has assessed the groundwater take to have a high hydraulic connection, but the hydraulic connection is less than 2 l/s the take will not be included within the Bog Burn allocation and no specific minimum flow restrictions will be imposed on the groundwater take.

In summary, under the RWP and the Proposed Southland Land and Water Plan the proposed pumping from bore E45/0071 would be classified as having a high degree of connection with the tributary of the Bog Burn, however as the hydraulic connection is less than 2 l/s no specific minimum flow restrictions would be imposed on the proposed groundwater take from the tributary of the Bog Burn.

9.7 Effects of Groundwater Quality

The applicant seeks consent to increase the volume of water taken groundwater to service the dairy shed and provide stockwater supply from 60 m³/day to 91 m³/ day. Given this use, combined with the limited volumes of water to be used, this proposal will not have any measurable effect upon groundwater quality and, hence, an assessment is not required.

Note that the potential effects upon groundwater quality as a result of this application to increase the number of cows effluent has been assessed above as part of the consent to discharge dairy effluent to land.

9.8 Effects on cultural values

The effects on Tangata Whenua are unlikely to be any more than minor because:

- The proposed activity does not interfere with cultural values, the relationship of Maori to land and water, kaitiakitanga and the Treaty of Waitangi, as stated under Part 2 of the RMA;
- The proposed activity is consistent with the policies described in the Te Tangi a Tauira, the Iwi Management Plan for the Murihiku area;
- The location of the proposed activity is unlikely to have any adverse effects on sensitive areas such as lakes, rivers and streams; and
- The proposed activity is not within, adjacent to, or likely to affect a Statutory Acknowledgement Area or a silent file area.

As such, the effects from the proposed activity on Tangata Whenua are considered to be minor.

9.9 Effects on recreational values

Woldwide One has been operating as a dairy farm for a number of years. As the proposed groundwater take increase is only for a short period until the new dairy shed is built at the property the effects on the recreational values within the Waimatuku Aquifer are considered minor, and no further assessment is required.

9.10 Effects on Biodiversity

Woldwide One has been operating as a dairy farm for a number of years. As the proposed groundwater take increase is only for a short period until the new dairy shed is built at the property the effects on the local biodiversity are considered minor, and no further assessment is required.

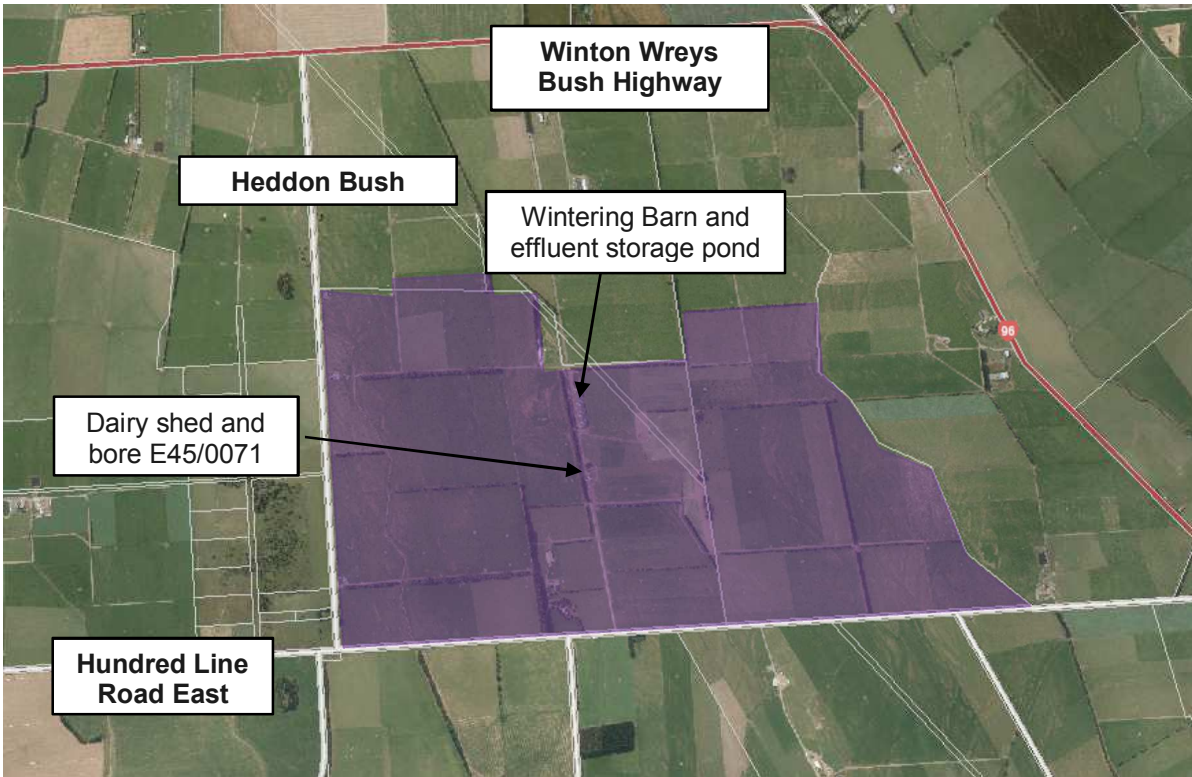
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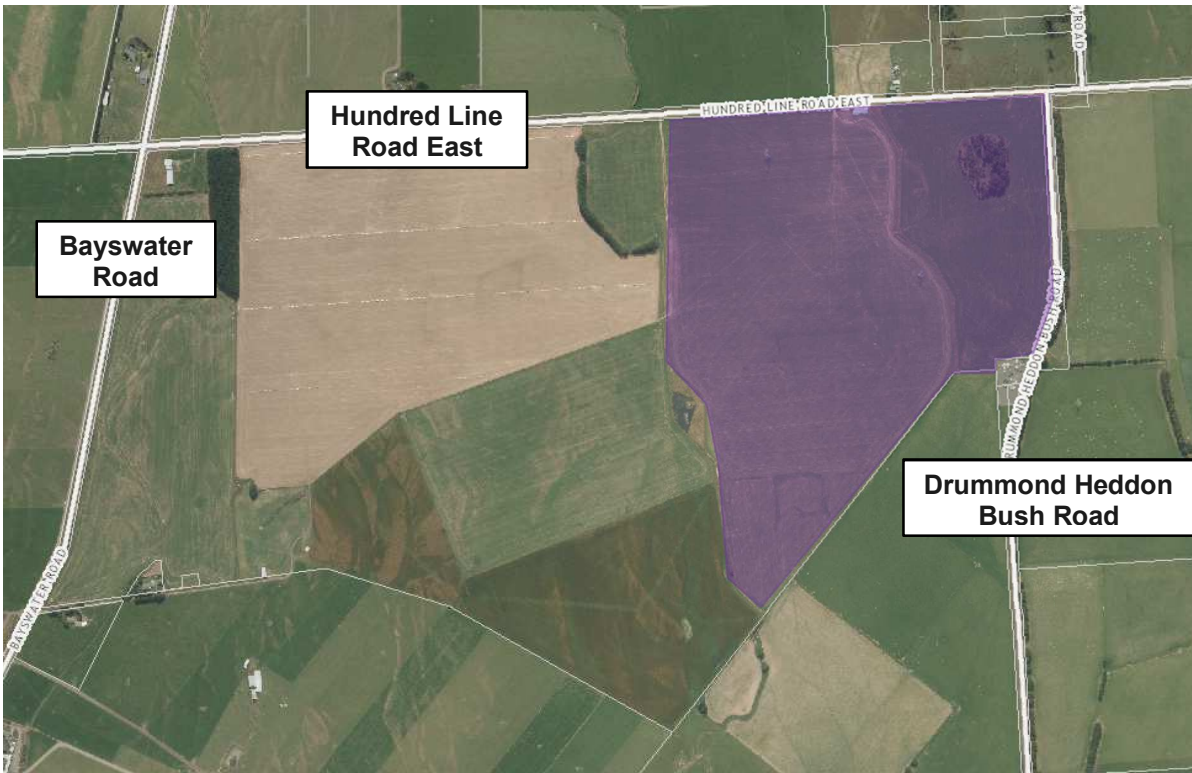
Houlbrooke DJ and Monaghan RM (2009): The influence of soil drainage characteristics on contaminant leakage risk associated with the land application of farm dairy effluent. Prepared for Environment Southland. AgResearch.

Theis, C.V., 1935. The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using groundwater storage, Am. Geophys. Union Trans., vol. 16, pp. 519-524.

Woldwide One Milking Platform – Proposed



Horner Block



Woldwide One Milking Platform – Existing



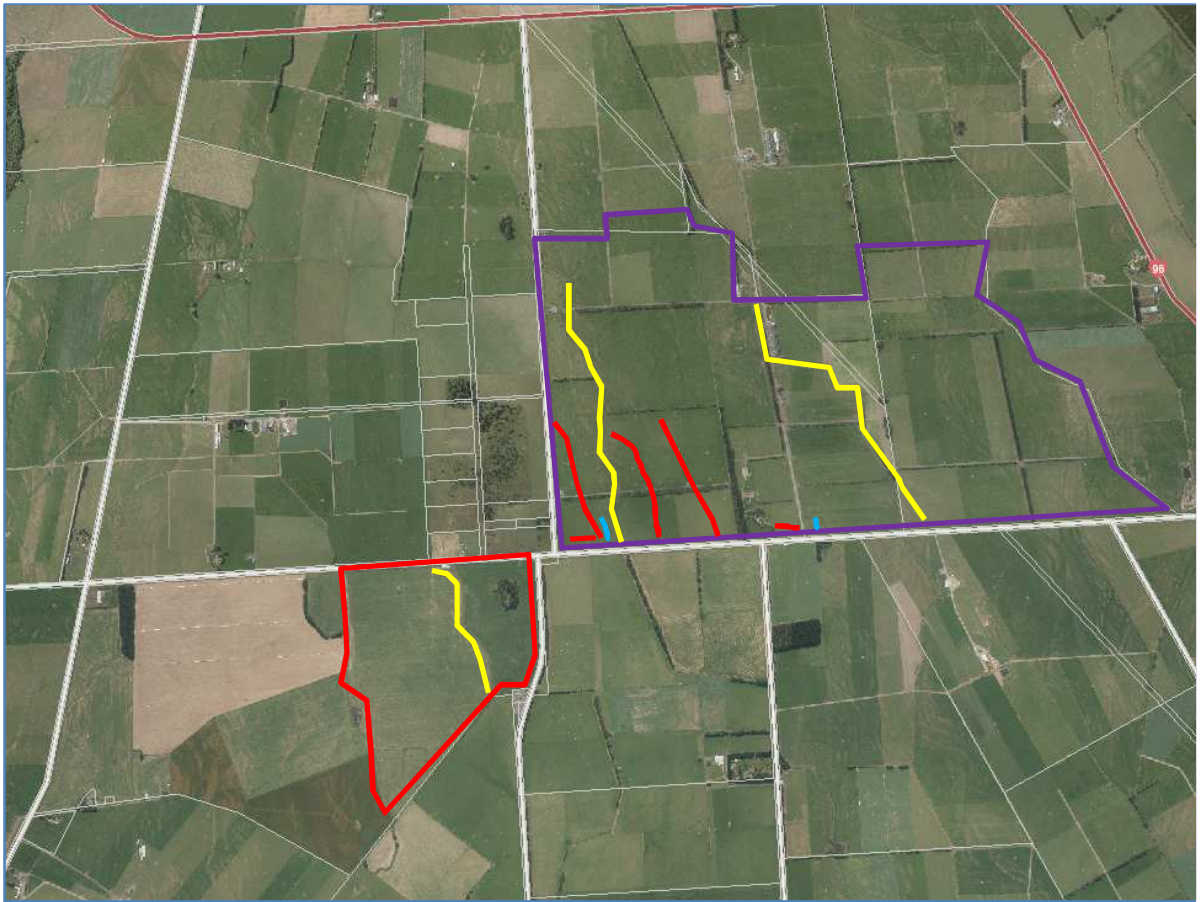
Appendix B: Effluent Discharge Area

Woldwide One Milking Platform – Discharge area



Woldwide One Horner Block – Discharge area





Key

Open Drain

Tile Drain

Critical Source Area





Consent No: 301663

Cnr North Road and Price Street
(Private Bag 90116)
Invercargill

Telephone (03) 211 5115
Fax No. (03) 211 5252
Southland Freephone No. 0800 76 88 45

Discharge Permit

Pursuant to Section 104B of the Resource Management Act 1991, a resource consent is hereby granted by the Southland Regional Council (the "Council") to **Woldwide One Ltd** (the "consent holder") of C/- A and J J de Wolde, 104 Shaws Trees Road, Heddon Bush, R D 3, Winton 9783 from 9 November 2012.

Please read this Consent carefully, and ensure that any staff or contractors carrying out activities under this Consent on your behalf are aware of all the conditions of the Consent.

Details of Permit

Purpose for which permit is granted:	To discharge dairy shed effluent to land
Location	Hundred Line, Heddon Bush
- site locality	E45:350-504
- map reference	Land
- receiving environment	Waimatuku
- catchment	
Legal description of land at the site:	Lot 4 DP 399915, Parts Lot 18 DP 942, Lot 1 DP 10885, and Section 420 Taringatua Survey District
Expiry date:	9 November 2027

Schedule of Conditions

These conditions should be read in conjunction with the best practice recommendations that are appended. These will reduce the risk of non-compliance with the consent conditions.

- This consent is granted for a period of 15 years and shall commence on the surrender or expiry of resource consent 202559.

(Note: Pursuant to Sections 123 and 124 of the Resource Management Act 1991, a new consent will be required at the expiration of this consent. The application will be considered in accordance with the plans in effect at that time, and the adverse effects of the proposed activity.)

Discharge Permit 301663

Environment Southland is the brand name of the Southland Regional Council

2. This consent authorises the discharge of dairy shed effluent and herd home slurry onto land, via a land disposal system, as described in the application, on land known as Lot 4 DP 399915, Parts Lot 18 DP 942, Lot 1 DP 10885, and Section 420 Taringatua Survey District.

(Note: The effluent/slurry disposal area shown in Appendix 1 can be altered and/or extended, subject to the approval of the Director of Environmental Management, if the consent holder submits a new plan showing the new effluent disposal area, and providing the written approval(s) of any person whose property boundary will be closer to that area. In the event that written approval cannot be obtained, the effluent disposal area can only be amended by way of limited notification.)

3. (a) No dairy shed effluent/slurry shall be discharged to any surface watercourse by overland flow, run-off, or via a pipe, nor shall there be any surface run-off/overland flow, ponding or contamination of water resulting from the exercise of this consent. *See Best Practice Notes 1, 2 & 3*
- (b) The land disposal system shall be operated and maintained to ensure that there is no odour or spray drift to the extent that it causes an adverse effect beyond the property boundary.
- (c) The consent holder shall install and maintain an alarm and automatic switch-off system as a contingency measure in the event of a system failure such as a sudden pressure drop, irrigator stoppage or breakdown of the travelling irrigator. *See Best Practice Note 4*
4. (a) Subject to condition 3(a), the land disposal system is limited to the following:
- (i) a maximum depth of application of 10 mm for each individual application. Where the slurry is applied by the trailing shoe system, the depth of application shall be averaged across the width of the applicators on the tanker.
Note: The application depth needs to be less than the soil-water deficit (i.e. the depths above are maximum depths and as soil moisture levels approach field capacity, smaller depths will be necessary to avoid losses of contaminants from the root zone. When soil moisture levels reach field capacity, irrigation will need to cease completely to prevent these losses.)
 - (ii) the maximum loading rate of nitrogen onto any land area shall not exceed 150 kg of nitrogen per hectare per year from the effluent/slurry; *See Best Practice Note 5*
- (b) (i) within six months of commencement of this resource consent the consent holder shall measure the application rate of the irrigator as installed to confirm the operating conditions required to ensure compliance with condition 4(a);
- (ii) within one month of commencing use of the trailing shoe-type tanker, the consent holder shall measure the application rate of the tanker to confirm compliance with condition 4(a);
- (iii) the consent holder shall notify the Council's Compliance Manager in advance of each measurement (escompliance@es.govt.nz);
- (iv) the Council may audit the measurement of the application rate to ensure accuracy. The consent holder shall pay the costs of auditing the measurement in accordance with Section 36 of the Resource Management Act.

The result of each measurement shall be forwarded to the Council's Compliance Manager, (escompliance@es.govt.nz) within 10 working days of the measurement being completed.

5. Effluent/slurry may be applied to the land as described in the application and generally as shown in Appendix 1, but the following specific buffers shall be observed:

- (a) there shall be no application of effluent and/or slurry within:
- (i) 20 metres of any surface watercourse;
 - (ii) 100 metres of any potable water abstraction point;
 - (iii) 100 metres of any residential dwelling other than residential dwellings on the property;
- (b) dairy shed effluent shall not be applied to land by travelling irrigator within 20 metres of a property boundary.

(Note: this does not prevent discharge within 20 metres of the property boundary of effluent and/or slurry applied by trailing shoe-type tanker.)

Where there is conflict between Appendix 1 and these specified buffers, the latter shall apply.

6. (a) The amount of dairy shed effluent disposed of onto land shall not exceed that from 540 cows.
- (b) The amount of herd home slurry disposed of onto land shall not exceed that from 400 cows.
7. The consent holder shall have at least 3,000 m³ of effluent/slurry storage for the purpose of:
- (a) avoiding irrigation of effluent/slurry when soils are at or above field capacity, *see Best Practice Note 8*
 - (b) providing a contingency measure when the irrigation system is inoperative; and/or
 - (c) for primary treatment when it is necessary for the proper operation of the effluent disposal system.
8. (a) The consent holder shall notify the Council, by 31 March 2013, of the person who is in charge of the operation of the effluent/slurry disposal system. If the person in charge of the effluent system changes during the term of this consent, the consent holder shall notify the Council of the new operator no later than five working days after that person takes responsibility. *See Best Practice Notes 6 & 7*
(Note: The person identified by condition 8(a) will be the primary contact for Council staff for monitoring purposes and/or in the event of an incident. Nothing in this condition removes or limits the consent holder's liability to ensure compliance with the consent and its conditions.)
- (b) The consent holder shall notify the Council's Compliance Manager (escompliance@es.govt.nz or ph 03 211 5115) prior to the commencement of the discharge of slurry/effluent from the storage pond each year.
9. The Southland Regional Council may serve notice of its intention to review the conditions of this consent, in accordance with the conditions of this resource consent and Sections 128 and 129 of the Resource Management Act 1991, during the period 1 February to 30 September

each year, or within two calendar months of the completion of any enforcement action (prosecution or infringement notice), for the purposes of:

- (a) dealing with any adverse or cumulative effects, including the adverse effects of high stocking rates, on the environment which may arise from the exercise of this consent;
 - (b) considering any changes to information on the effects of land disposal of dairy shed effluent/slurry;
 - (c) complying with the requirements of a regional plan;
 - (d) amending monitoring requirements; or
 - (e) imposing a notification requirement for potential effects on registered drinking water supplies.
10. The consent holder shall pay an annual administration and monitoring charge to the Southland Regional Council, collected in accordance with Section 36 of the Resource Management Act. This charge may include the costs of inspecting the site three times each year (or otherwise as set by the Council's Annual Plan), and of monitoring the effects of the discharge on groundwater by taking representative samples of the bore water, from Bore E45/0622 once every six months and analysing for:
- electrical conductivity;
 - nitrate nitrogen concentration;
 - Total Nitrogen concentration;
 - Dissolved oxygen concentration – field measurement;
 - *E. coli* concentration;
 - bromine concentration;
 - chloride concentration.

Except that the first sample shall also be analysed for Dissolved Iron concentration.

(Note: The Administration Charges are payable for the costs of the Council's administration, monitoring and supervision of this resource consent. For new conversions, the first monitoring inspection by the Council, in accordance with the Council's Annual Plan, of the exercise of the resource consent shall be carried out following installation of the effluent disposal system.)

11. If an event (such as effluent/slurry overflow to water, significant over-application on a free-draining area or pond collapse) occurs that may have significant adverse effect on water quality at the abstraction point of a registered drinking-water supply, the consent holder shall notify, as soon as reasonably practicable, the following:
- Environment Southland's Compliance Manager (ph 03 211 5115 or 03 211 5225 after hours);
 - Southland District Council (ph 0800 732 732).

(Note: The consent holder is advised to contact Environment Southland's Compliance Manager in the event of any unexpected event that may result in non-compliance with the conditions of this resource consent or the rules of a regional plan.)

for the Southland Regional Council



Ken Swinney
Policy and Planning Manager

Best Practice and Explanatory Notes

1. Dairy shed effluent should not be discharged onto any land area that has been grazed within the previous 5-10 days. Where there has been significant damage to soil during grazing, it is recommended that effluent not be applied until that damage has been repaired.
2. To avoid contaminating water directly or indirectly, the consent holder should not apply effluent to land when the soils are at or above field capacity. Moisture content is to be determined by either actual monitoring on site or by reference to the appropriate Council monitoring site. The Council's soil moisture monitoring sites can be viewed at <http://www.es.govt.nz> and following the "Farming", "Dairy Advisor" and "Soil Moisture Map" links.
3. For the purposes of this condition, ponding is the accumulation of effluent on the soil surface resulting from the application of effluent to saturated soils, or the application of effluent inducing saturated soil conditions. It does not refer to the temporary accumulation of effluent on the soil surface resulting from the application of effluent at a rate that exceeds the soil infiltration rate.
4. Where the effluent reticulation system is installed in such a way that effluent can be siphoned when pumping ceases, the consent holder should install and maintain an anti-siphon device in the effluent pipe line.
5. A loading of 150 kg N/ha/year is approximately equivalent to a loading of dairy shed effluent to land of 4 ha/100 cows. However, there are significant benefits to having a larger effluent disposal area in terms of managing potassium. Further, scientific research has highlighted decreased nitrogen use efficiency and increased nitrogen leaching losses at annual nitrogen loading rates (from combined fertiliser and effluent N) greater than 150 kg N/ha/yr. Extreme caution should therefore be taken when applying nitrogen fertiliser to the effluent disposal area. It is recommended that a nutrient budget is used to check that nitrogen and potassium application rates to the effluent disposal area are not excessive.
6. The consent holder should prepare and comply with a Farm Environmental Management Plan. The plan should:
 - specify and implement a nutrient budgeting system for the property;
 - provide for the management of effluent disposal to avoid applications when soils are at or above field capacity;
 - identify, as far as is practicable, the drains in the effluent disposal area, so that appropriate management procedures can be taken to avoid contamination of the drains by effluent;
 - if relevant, provide for the operation and management of any feedlot and/or wintering pad;
 - include the provision for monitoring application rates to ensure the consent requirements are being met;
 - include the monitoring requirements specified in this consent; and
 - address ancillary matters such as protecting well-head(s) from contamination; preventing leachate from any silage pits entering water, including groundwater; preventing soil damage; controlling run-off from lanes; and preventing stock access to and maintaining the riparian margins of any watercourses on the property.

A template may be viewed at:

<http://www.es.govt.nz/media/4831/dairy-farm-plan-consent-template.pdf>

7. The consent holder should display, in a prominent place in the dairy shed, a copy of the resource consent and relevant limits about the operation of the effluent disposal system that must be complied with. The material to be displayed will be provided by the Council on laminated sheets suitable for display purposes.
8. Storage ponds should be operated at low levels when conditions for effluent disposal are suitable in order to maintain storage for wet weather periods. In particular, storage ponds should be emptied in late summer/early autumn to ensure sufficient storage capacity for the following late winter/early spring period.
9. Storage ponds should not, for practical purposes, leak. This resource consent does not authorise the discharge of contaminants due to leaks or failure of the storage ponds. If an existing storage pond is modified (such as by increasing the embankment height to increase storage), the modification will require resource consent.

Environment Southland*

(03) 211 5115

Toll Free 0800 76 88 45 (Southland only)

or

Emergency After Hours (03) 211 5225

**if you have an effluent or pollution problem,
call us**



environment SOUTHLAND

Held by: Woldwide One Ltd

- the total milking herd cannot exceed 540 cows.
- the amount of herd home slurry disposed of onto land shall not exceed that from 400 cows.
- effluent may only be applied within the area shown on the attached map, as detailed in the application for the Consent.
- effluent cannot be applied within 20 metres of the property boundary.
- if there are waterways within the approved area, effluent cannot be applied within 20 metres of the waterways and ditches.
- a maximum depth of application of 10 mm for each individual application. Where the slurry is applied by the trailing shoe system, the depth of application shall be averaged across the width of the applicators on the tanker.
- the contingency plan consists of:
 - Ability to defer the effluent discharge by storing effluent in a 3,300 m³ storage pond during adverse conditions.

(the above is a synopsis. You should ensure you understand the full consent. If you do not have a copy, contact Environment Southland*)

Problem Solving

- the number of cows intended to be milked exceeds the consent limit Contact Environment Southland for a Variation to the Consent

If you have any effluent or pollution problems, please contact Environment Southland at the following numbers: Environment Southland: (03) 211 5115 or 0800 76 88 45 during office hours or 03 211 5225 (emergency response) after hours.





Consent No: 301664

Cnr North Road and Price Street
(Private Bag 90116)
Invercargill

Telephone (03) 211 5115
Fax No. (03) 211 5252
Southland Freephone No. 0800 76 88 45

Water Permit

Pursuant to Section 104B of the Resource Management Act 1991, a resource consent is hereby granted by the Southland Regional Council (the "Council") to **Woldwide One Ltd** (the "consent holder") of C/- A and J J de Wolde, 104 Shaws Trees Road, Heddon Bush, R D 3, Winton 9783 from 9 November 2012.

Please read this Consent carefully, and ensure that any staff or contractors carrying out activities under this Consent on your behalf are aware of all the conditions of the Consent.

Details of Permit

Purpose for which permit is granted:	To take groundwater for a dairy operation
Location	Hundred Line, Heddon Bush
- site locality	E45:350-507
- map reference	Waimatuku
- groundwater zone	Waimatuku Stream
- catchment	
Legal description of land at the site:	Part Lot 18 DP 942
Expiry date:	9 November 2027

Schedule of Conditions

1. This consent is granted for a period of 15 years and shall commence on the surrender or expiry of Resource Consent 202560.

(Note: Pursuant to Sections 123 and 124 of the Resource Management Act 1991, a new consent will be required at the expiration of this consent. The application will be considered in accordance with the plans in effect at that time, and the adverse effects of the proposed activity).

2. This consent authorises the abstraction of water from bore/well E45/0071 at about NZMS 260 E45:350-507.

Water Permit 301664

Environment Southland is the brand name of
the Southland Regional Council

3. The rate of abstraction shall not exceed 60,000 litres per day.
4. The consent holder shall install a backflow prevention device or take other appropriate measures to ensure water and/or contaminants cannot return to the water source.
5. The consent holder shall monitor water usage to ensure compliance with condition 3 of this consent, as follows:
 - (a) by installing a flow meter prior to commencement of the abstraction:
 - (i) able to continuously measure the amount of water taken;
 - (ii) capable of accuracy to within 5% of the true flow rate, on each abstraction;
 - (iii) that shall record volumes in litres;
 - (iv) in accordance with the manufacturer's instructions;
 - (v) that is sealed and as tamper proof as practicable;
 - (vi) in a location that measures all water taken;
 - (vii) that is suited to the qualities of the water it is measuring (such as temperature, algae content and sediment content);
 - (b) by recording the volume of abstraction, at or about the same time each month when the consent is being exercised.

A copy of this record is to be provided to the Council's Compliance Manager by 31 May each year (escompliance@es.govt.nz).

6. The consent holder shall pay an administration and monitoring charge to the Southland Regional Council collected in accordance with Section 36 of the Resource Management Act, payable in advance on the first day of July each year.
7. The Council may, in accordance with section 128 and 129 of the Act, serve notice, during the period 1 February to 30 September each year, of its intention to review conditions for the purpose of:
 - (a) dealing with any adverse effects on the environment which may arise from the exercise of this consent;
 - (b) requiring monitoring of the rate of, or the effects of, the abstraction;
 - (c) requiring efficiency of water use; and/or
 - (d) complying with the requirements of a regional plan.

for the Southland Regional Council



Ken Swinney
Policy and Planning Manager

Dairy Effluent Storage Calculator Summary Report

Regional authority: Environment Southland Regional Council
 Authorised agent: J Scandrett
 Client: Woldwide one
 Program version: 1.47
 Report date: Tuesday, 17 January 2017

General description:

Woldwide One, scenario 1
 {Two Scenarios, 1) 700 milked, 553 sq m yard, original shed, 400 wintered inside 2017, 640 wintered inside 2018
 2) 800 cows, new shed, yard scraped, 640 wintered inside,}

Note there is a covered wintering shed on farm which has a small uncovered catchment of 148 sq m. The details are included under feedpad.

Climate

Rainfall site: Drummond Marson Rd
 Mean annual rainfall: 1061 mm/year

Effluent Block

Area of low risk soil: 50.0 hectares
 Minimum area of high risk soil: 190.0 hectares
 Surplus area of high risk soil: 0.0 hectares

Wash Water

Yard wash:

- Milking season starts: 01 August
 - Milking season ends: 15 June

Month	Number of Cows	Hours in Yard	Wash Volume (cubic metres)
January	670	3.5	34.0
February	660	3.5	33.0
March	640	3.5	32.0
April	580	3.0	27.0
May	500	3.0	25.0
June	25	1.0	1.3
July	0	0.0	0.0
August	300	3.0	15.0
September	600	3.5	30.0
October	700	4.0	35.0
November	680	4.0	34.0
December	670	3.5	34.0

Feedpad wash:

Month	Number of Cows	Hours on Pad	Wash Volume (cubic metres)
January	0	0.0	0.0
February	0	0.0	0.0
March	0	0.0	0.0
April	0	0.0	0.0
May	400	6.0	0.0
June	640	24.0	0.0
July	640	24.0	0.0
August	400	2.0	0.0
September	0	0.0	0.0

October	0	0.0	0.0
November	0	0.0	0.0
December	0	0.0	0.0

Irrigation

Winter-spring depth:	2 mm
Spring-autumn depth:	4 mm
Winter-spring volume:	80 cubic metres
Spring-autumn volume:	160 cubic metres
Irrigate all year?	Yes

Catchments

Yard Area:	553 square metres
Diverted?	No
Shed Roof Area:	175 square metres
Diverted?	Yes
Feedpad Area:	148 square metres
Covered?	No
Diverted?	No
Animal Shelter Area:	0 square metres
Covered?	Yes
Diverted?	No
Other Areas:	0 square metres

Storage

Pond/s present?	Yes
No. of ponds:	1 pond/s
Includes irregular ponds?	No
Pond 1	
- total volume:	3875 cubic metres
- pumpable volume:	3401 cubic metres
- surface area:	965 square metres
- width:	19.5 metres
- length:	49.5 metres
- batter:	0.5:1
- total height:	4.8 metres
- pumped?	Yes
Tank/s present?	No
Emergency storage period:	0 days

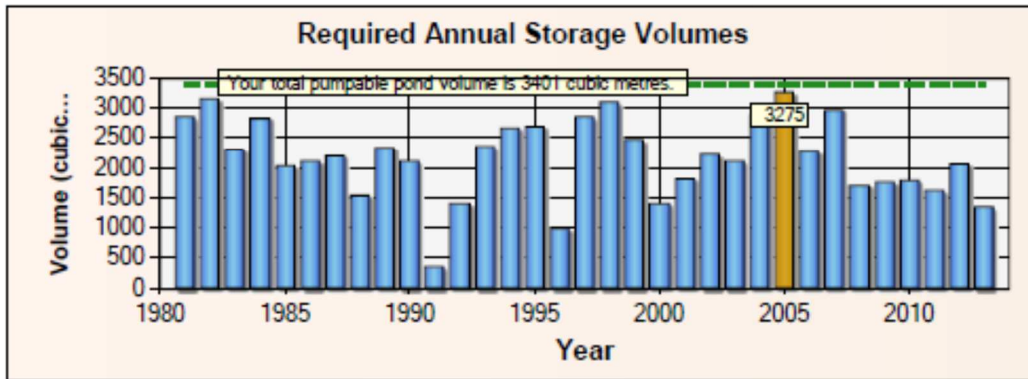
Solids Separation

Solids separator/s present?	No
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Outputs

Maximum required storage pond volume:	3275 cubic metres
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90 % probability storage pond volume: 3036 cubic metres
 During the period from: 01 July 1980
 To: 30 June 2013



Dairy Effluent Storage Calculator Summary Report

Regional authority: Environment Southland Regional Council
 Authorised agent: Nicole Matheson - Aqualinc
 Client: Woldwide one
 Program version: 1.47
 Report date: Thursday, 24 August 2017

General description:
 Woldwide One, scenario 2
 {Two Scenarios,} 1) 700 milked, 400 wintered inside 2017
 and 640 inside 2018
 2) 800 cows, new dairy shed,yard scraped, 640 wintered inside,

Note there is a covered wintering shed on the farm and under feedpad I have included the stock details plus allowed for a small uncovered catchment of 180 sq m at the end of the shed.

Climate

Rainfall site: Drummond Marson Rd
 Mean annual rainfall: 1061 mm/year

Effluent Block

Area of low risk soil: 50.0 hectares
 Minimum area of high risk soil: 190.0 hectares
 Surplus area of high risk soil: 0.0 hectares

Wash Water

Yard wash:

- Milking season starts: 01 August
 - Milking season ends: 15 July

Month	Number of Cows	Hours in Yard	Wash Volume (cubic metres)
January	800	4.0	35.0
February	800	4.0	35.0
March	800	4.0	35.0
April	800	4.0	35.0
May	800	4.0	35.0
June	400	2.0	20.0
July	50	1.0	2.5
August	800	4.0	20.0
September	800	4.0	35.0
October	800	4.0	35.0
November	800	4.0	35.0
December	800	4.0	35.0

Feedpad wash:

Month	Number of Cows	Hours on Pad	Wash Volume (cubic metres)
January	0	0.0	0.0
February	0	0.0	0.0
March	0	0.0	0.0
April	0	0.0	0.0
May	400	6.0	0.0
June	640	24.0	0.0
July	640	24.0	0.0
August	400	2.0	0.0
September	0	0.0	0.0

October	0	0.0	0.0
November	0	0.0	0.0
December	0	0.0	0.0

Irrigation

Winter-spring depth:	2 mm
Spring-autumn depth:	4 mm
Winter-spring volume:	80 cubic metres
Spring-autumn volume:	160 cubic metres
Irrigate all year?	Yes

Catchments

Yard Area:	1150 square metres
Diverted?	Yes
- diversion start:	01 July
- diversion end:	01 August
Shed Roof Area:	175 square metres
Diverted?	Yes
Feedpad Area:	180 square metres
Covered?	No
Diverted?	No
Animal Shelter Area:	0 square metres
Covered?	Yes
Diverted?	No
Other Areas:	0 square metres

Storage

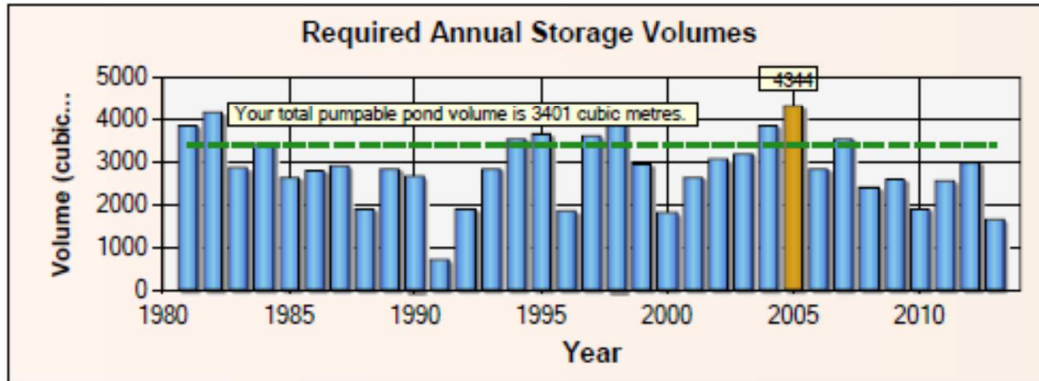
Pond/s present?	Yes
No. of ponds:	1 pond/s
Includes irregular ponds?	No
Pond 1	
- total volume:	3875 cubic metres
- pumpable volume:	3401 cubic metres
- surface area:	965 square metres
- width:	19.5 metres
- length:	49.5 metres
- batter:	0.5:1
- total height:	4.8 metres
- pumped?	Yes
Tank/s present?	No
Emergency storage period:	0 days

Solids Separation

Solids separator/s present?	No
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Outputs

Maximum required storage pond volume: 4344 cubic metres
90 % probability storage pond volume: 3917 cubic metres
During the period from: 01 July 1980
To: 30 June 2013



Appendix H: Ceasing Discharge of Whey By Product

Nicole Matheson

From: Abe de Wolde <abe@woldwide.nz>
Sent: Friday, 30 June 2017 4:31 PM
To: Nicole Matheson; 'Scandrett Rural'
Subject: FW: Ceasing discharge of whey by-product to Woldewide Farms under AUTH-20146925-V3

From: Christian Gunter [mailto:Christian.Gunter@fonterra.com]
Sent: Friday, 30 June, 2017 3:47 p.m.
To: Joanna.Gilroy@es.govt.nz; Alexandra King (Alexandra.King@es.govt.nz) <Alexandra.King@es.govt.nz>
Cc: Erika McNaught (Erika.McNaught@hwr.co.nz) <Erika.McNaught@hwr.co.nz>; Vijai Lal <Vijai.Lal@fonterra.com>; Hannah Furze <Hannah.Furze@fonterra.com>; dewolde@farmside.co.nz
Subject: Ceasing discharge of whey by-product to Woldewide Farms under AUTH-20146925-V3

Hi Joanna

Abe De Wolde has asked for the discharge of whey to his farms listed under AUTH-20146925-V3 to be stopped. This includes:

- | | | |
|-------------------------------------|-----------------------------------|----------------|
| 1) Woldewide Farms (WW1) | 1354 Hundred Line Rd East | A & A De Wolde |
| 2) Woldewide Farms (WW) | 1914 Winton Mossburn Hwy | A & A De Wolde |
| 3) Woldewide Farms (Mayfield Dairy) | 805 Mayfield Rd | A & A De Wolde |
| 4) Woldewide Farms | Cnr Bayswater and Hundred Line Rd | A & A De Wolde |

We understand that he has an application in, but that it is being held up due to his farms receiving whey.

Fonterra Edendale and Herberts Transport have been made aware of Abe's intentions not to receive whey on any of his farms and have been following his instructions.

You are likely to be aware that Alex is currently processing amendments to the abovementioned consent in relation to the addition of whey application properties. We are happy for the removal of the Woldewide Farms to be part of this amendment or for this to be captured by future amendments.

Please advise what further information you need if any from ourselves or Abe.

Kind Regards

Christian Günter

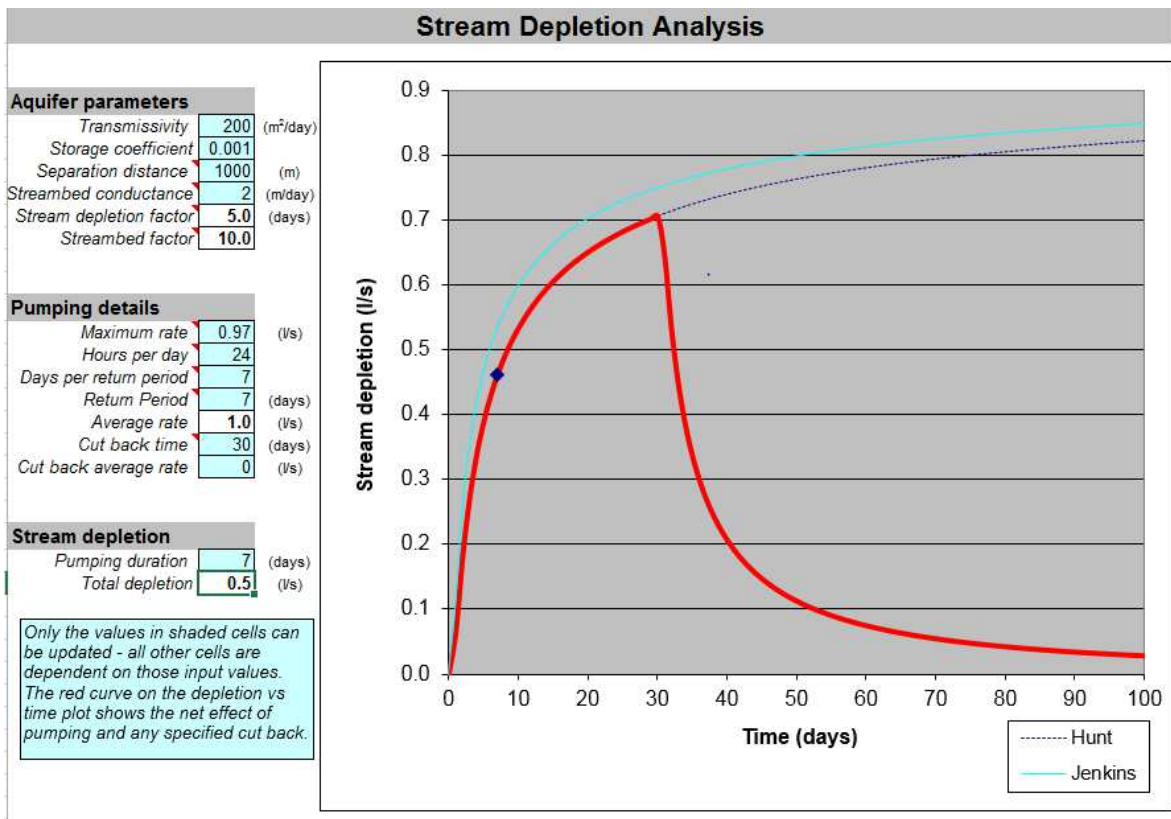
Environmental Advisor

Fonterra Co-operative Group Limited
christian.gunter@fonterra.com
mobile +64 27 563 1383
PO Box 20, Edendale, 9848, 60 North Road, Edendale, Edendale, New Zealand



Appendix I: Stream Depletion Calculations

(i) Potential 7-day effect



(ii) Potential 300 – day effect

Stream Depletion Analysis

Aquifer parameters

Transmissivity	200	(m ² /day)
Storage coefficient	0.001	
Separation distance	1000	(m)
Streambed conductance	2	(m/day)
Stream depletion factor	5.0	(days)
Streambed factor	10.0	

Pumping details

Maximum rate	0.97	(l/s)
Hours per day	24	
Days per return period	300	
Return Period	300	(days)
Average rate	1.0	(l/s)
Cut back time	30	(days)
Cut back average rate	0	(l/s)

Stream depletion

Pumping duration	300	(days)
Total depletion	0.9	(l/s)

Only the values in shaded cells can be updated - all other cells are dependent on those input values.
The red curve on the depletion vs time plot shows the net effect of pumping and any specified cut back.

