



## FORM 13

### Submission on a publically notified application concerning resource consent under section 96, Resource Management Act 1991

To: Southland Regional Council

**Name of submitter:** Ministry of Education ('the Ministry')

Address for service: C/- Beca Ltd  
PO Box 13960  
Armagh Street  
Christchurch 8141

Attention: Jess Bould

Phone: (03) 968 4375

Email: Jess.Bould@beca.com

**This is a submission on an application from** *Worldwide One Limited* at Hundred Line Road East, Heddon Bush (legally described as Lot 4 DP 399915, Parts Lot 18 DP 942, Lot 1 DP10885 and Section 420 Taringatura Survey District).

**The application is for resource consent to** use land to increase cow numbers, discharge dairy shed and wintering barn effluent to land via travelling irrigator and to take up to 91,000 litres of groundwater for dairymshed washdown and stockwater supplies.

**The specific parts of the application that the Ministry of Education's submission relates to are:**

The Ministry's submission relates to the water quality aspects of the application and how potential discharge of nutrients may affect the drinking water supply for Heddon Bush School. Of specific concern to the Ministry is the potential effect of nitrates entering the drinking water supply and potential impact on human health. The school is located approximately 2km downgradient from the applicant's site.

**Background:**

The Ministry is the Government's lead advisor on the education system, shaping direction for education agencies and providers and contributing to the Government's goals for education. The Ministry's overall purpose is:

'Lifting aspiration and raising education achievement for every New Zealander.'

Amongst other matters, the Ministry has responsibility for managing all education property owned by the Crown. They also have a role in ensuring education providers have the resources and support they need to deliver services to students. The safety of students and teachers is a high priority and as such, the Ministry monitors and responds to land use applications that may have a potential impact on the operation of a school or the safety or wellbeing of teachers and students.

Under the Resource Management Act (RMA) 1991, decision makers must have regard to the health and safety of people and communities. Furthermore, there is a duty to avoid, remedy or mitigate actual and potential adverse effects on the environment. The Ministry considers there to be a potential adverse effect from the proposed activity, on the safety and wellbeing of students and teachers using drinking water from the supply well at Heddon Bush School, through the uncertainty around effects of nitrates discharging to the groundwater supply as a result of the increased nutrient discharge from the site.

**The Ministry of Education's submission is:**

The Ministry opposes the application to increase the number of cows at the site and the resulting increase in discharge of nutrients to land. Cumulative effects from intensification of farming in the area is likely to impact on groundwater quality. The discharge of nutrients to land near drinking water protection zones is of increasing concern to the Ministry.

The Ministry are responsible for supplying safe drinking-water to students and staff at Heddon Bush School in accordance with the New Zealand Drinking Water Standards 2008. As indicated in the attached memorandum from Beca Senior Hydrologists there are concerns of the actual and potential adverse effects on the quality of the drinking-water supply of the school, particularly given that a water supply bore was installed at the school in May 2017.

Groundwater samples have been collected from the school bore. The results are not available at the time of the submission. However groundwater sampling taken within the vicinity of the applicant's farm show elevated nitrogen concentrations which have exceeded the Drinking Water Standards for New Zealand. There is also concern of the pathogen risk to the drinking supply of the school arising from the applicant's operation.

The applicant has not addressed cumulative effects from other potential sources such as neighbouring farms or any lag time effects from the application of nutrients. There is no reference to additional monitoring that may be required or additional treatment or alternative sources of drinking water for the school in the application.

**The Ministry of Education seeks the following decision from the consent authority:**

The Ministry opposes this application and considers the actual and potential adverse effects on the drinking water supply of Heddon Bush School from the discharge of nutrients has not been adequately assessed in the application.

**The Ministry wishes to be heard in support of their submission.**



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*(Signature of person authorised to sign on behalf of the Ministry of Education)*

**Date:** 22 January 2018

## Memorandum

**To:** Jess Bould  
**From:** Dora Avaniidou, Mike Thorley  
**Copy:** Paul Whyte  
**Subject:** Worldwide One Ltd Application

**Date:** 18 January 2018  
**Our Ref:** 4262476

### Assessment of potential effects on groundwater quality on Heddon Bush School water supply bore

Worldwide One Limited, a dairy farm located at 104 Shaws Trees Road, Heddon Bush (Figure 1), currently holds a consent (301663) to discharge dairy effluent from a maximum of 540 cows. Worldwide One is seeking consent to discharge dairy effluent from 800 cows (an increase of 48%) and increase the groundwater take from a maximum of 60m<sup>3</sup>/day to 91 m<sup>3</sup>/day.

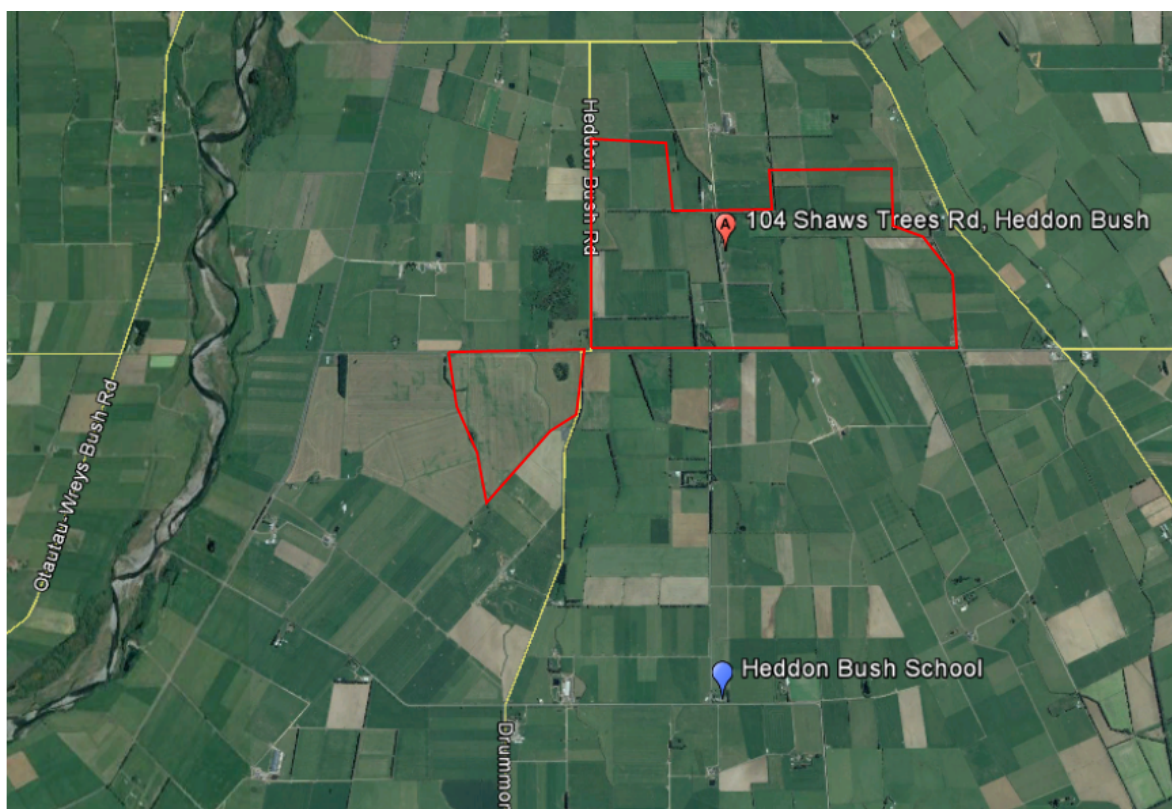


Figure 1: Location Plan (approximate boundaries of proposed area to discharge dairy effluent)

Heddon Bush School is located ~ 2km south of the Worldwide One farm. Groundwater flow in the vicinity of the Worldwide One property is southerly. In May 2017 a water supply bore was constructed in Heddon Bush School property. The bore was drilled to a depth of 14.9m below ground. A simplified geological profile as described in the driller's borelog is presented in Table 1.

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**Table 1 – Simplified Geological Soil Profile**

Depth (m bgl)	
0 – 1.2m	Clay
1.2m – 6.0m	Clay Bound Gravel
6.0m – 14.9m	Gravels

The bore is screened from 13.9m bgl to 14.9m bgl. The static groundwater level measured at that time was 4.5m bgl. Groundwater quality samples from the school bore have been collected but were not available at the time of writing.

Groundwater quality testing undertaken in samples from bores within ~2.5km of the farm show elevated nitrogen concentrations (average values range from 3.83 mg/L -15.8mg/L). Long term groundwater quality data are limited. In the vicinity of the Worldwide One property there are three bores with relatively recent groundwater quality data. E45/0330 is approximately 300m south, E45/0010 approximately 1200m west and E45/0435 is approximately 2000m south east of the Woldwide One property (Figure 2). Nitrogen concentration data from those bores are presented in figures 3, 4 and 5 (data obtained from Environment Southland).

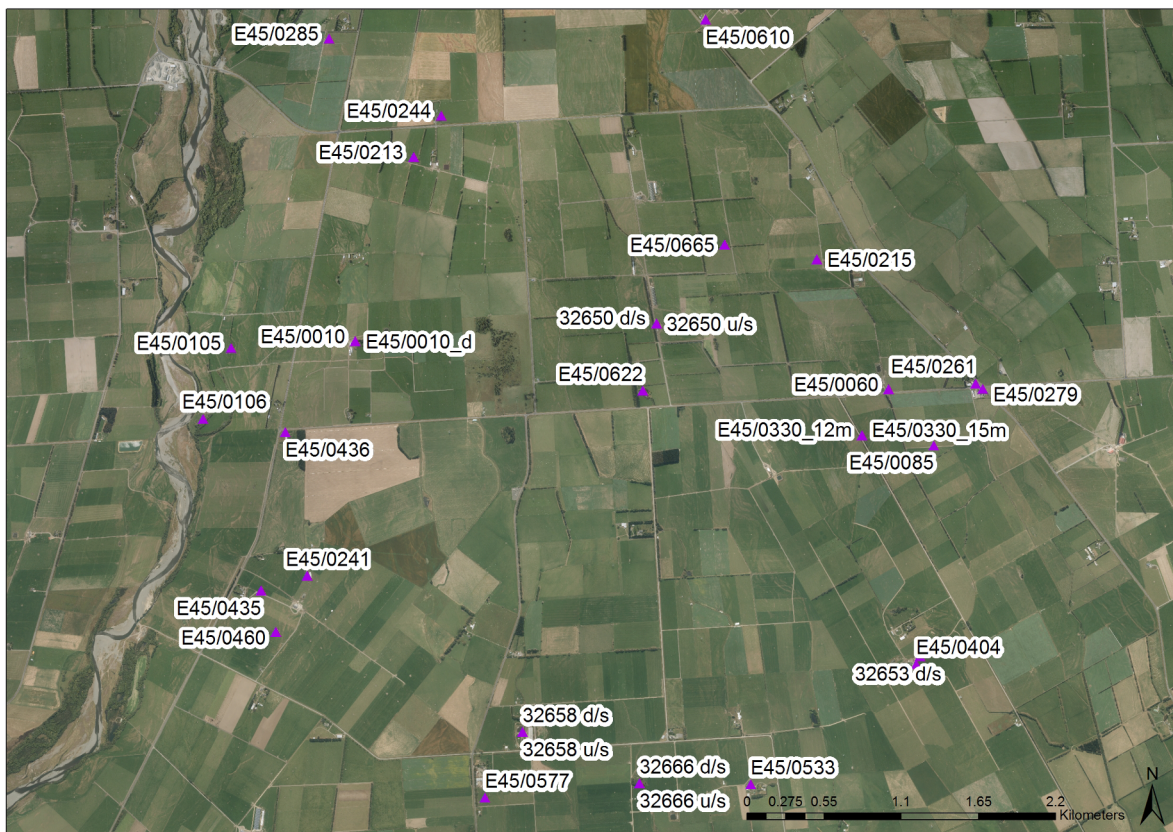


Figure 2: Water quality data map (data obtained from Environment Southland)

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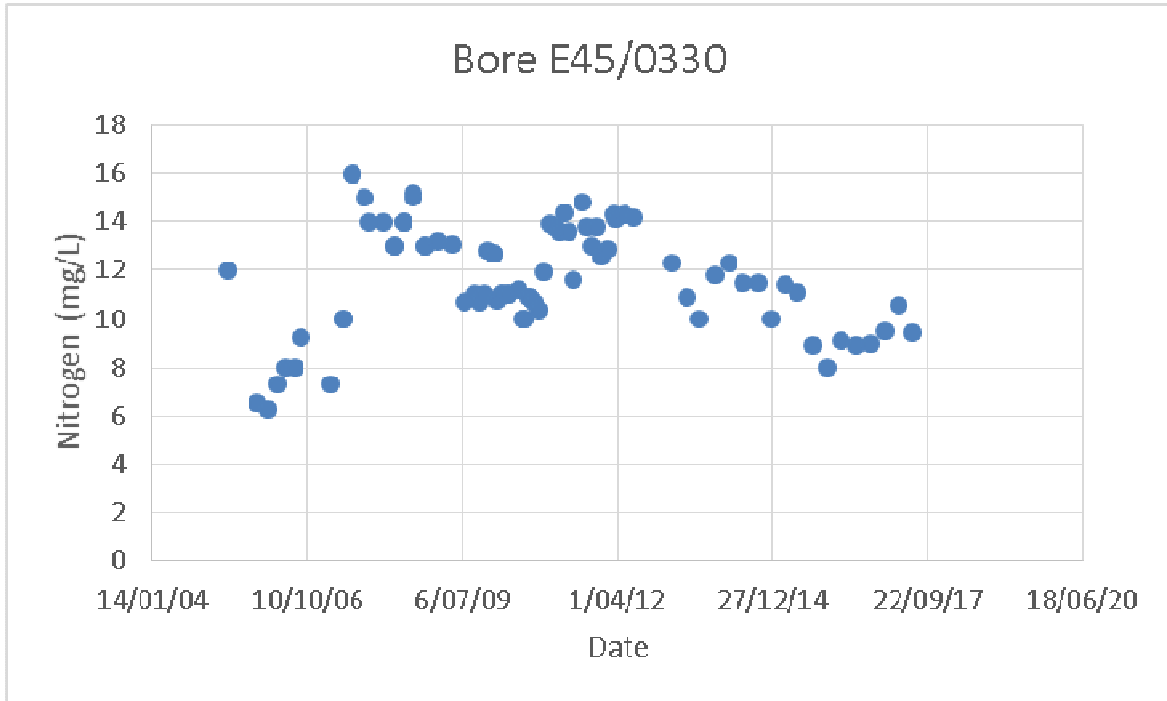


Figure 3: Nitrogen (Nitrate – Nitrite) Concentrations in bore E45/0330 (2004 – 2017)

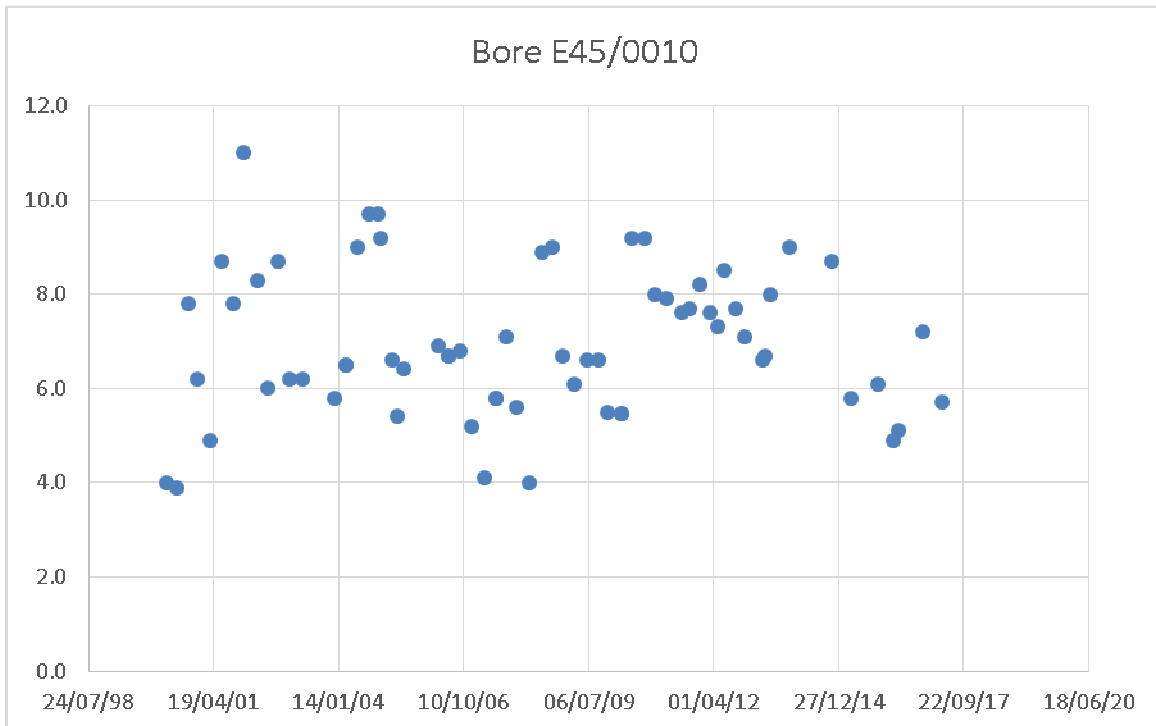


Figure 4: Nitrogen (Nitrate – Nitrite) Concentrations in bore E45/0330 (2000 – 2017)

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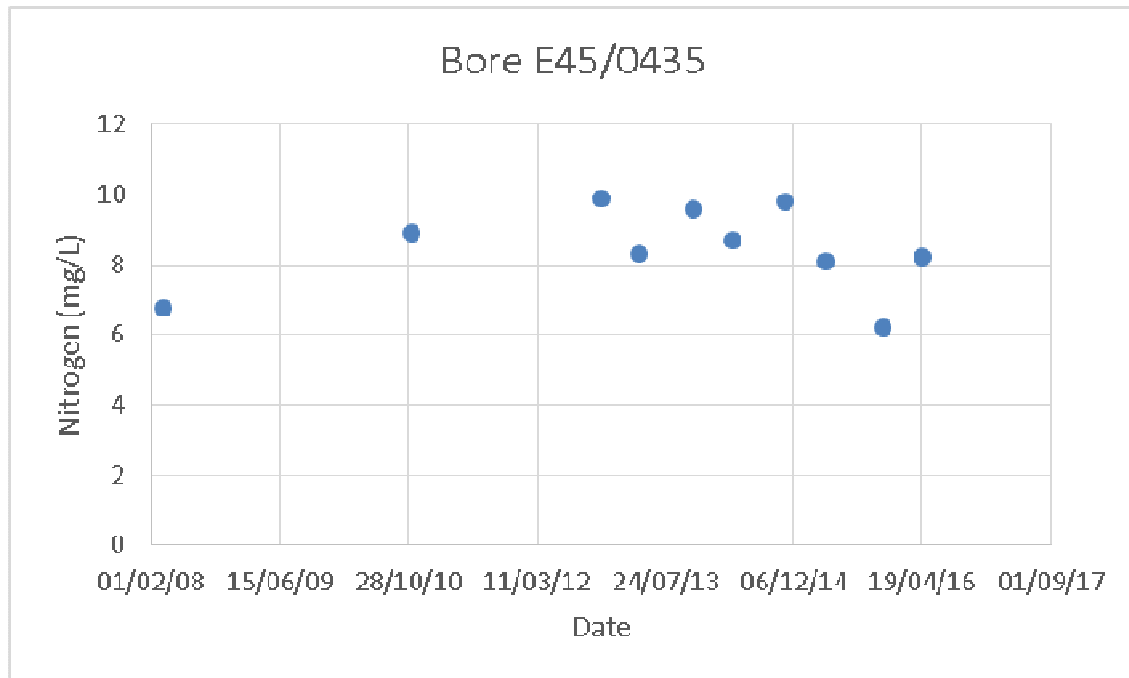


Figure 5: Nitrogen (Nitrate – Nitrite) Concentrations in bore E45/435 (2008 – 2017)

In all three bores the data indicate there is no apparent trend on nitrogen concentrations over the years and the nitrogen concentrations are close and have exceeded the Maximum Accepted Value for Nitrogen (11.3mg/L) in Drinking Water Standards for New Zealand (DWSNZ) in the past.

Very limited (2010 - 2011) water quality data (surface and groundwater) are available from Environment Southland database in bores within ~700m of the Heddon Bush School (Figure 2). Nitrogen concentrations (<3 mg/L) were measured both at surface water and groundwater samples (Table 2).

**Table 2 – Groundwater and Surface water Nitrogen concentrations within 700m radius of Heddon Bush School**

Sample	Site Name	Date	Nitrogen (mg/L)
Groundwater	E45/0533	18/03/2010	1.51
Groundwater	E45/0577	19/01/2011	0.27
Surface Water	32658 d/s	19/02/2010	0.006
Surface Water	32658 u/s	19/02/2010	0.004
Surface Water	3266 d/s	18/11/2010	2.79
Surface Water	3266 u/s	18/11/2010	2.81

Recent data are not currently available to identify if in the last 6 – 7 years groundwater quality in the vicinity of school has deteriorated.

As stated in Environment Southland Technical Report “Water Quality in Southland: Current State and Trends” assessment of groundwater Nitrate Nitrite Nitrogen concentrations against the drinking water standard illustrate that median concentrations were worse than drinking water standards in 19 of 159 bores measured in the Southland region (Figure 6).

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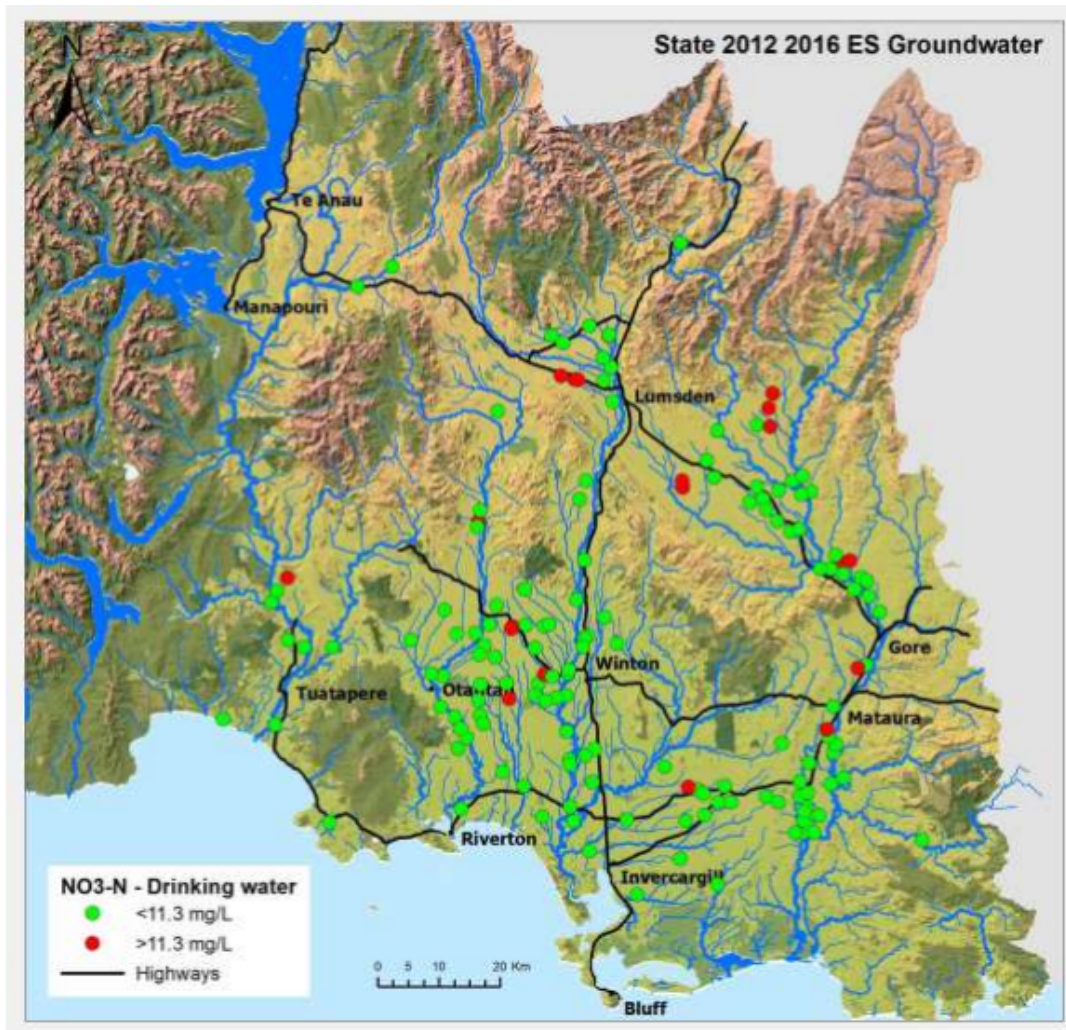


Figure 6: Groundwater quality state for Nitrate Nitrite Nitrogen (from ES Technical Report 2017-04)

Nutrients have a “lag time” between when the nutrients are applied and when they reach the groundwater. This means the ultimate effect of extra nutrients being applied to a site is not known immediately. Some effects may be apparent soon after while others may take 10 or 20 years to show.

The application is presenting modelling results using Overseer for the additional discharge and this has shown that it is likely to have greater effects on groundwater quality when compared to the current farm operation. As mentioned above, groundwater flow in the area has a southerly direction and therefore applying more nutrients to the land up-gradient of the Heddon Bush school water supply will potentially affect the water quality of the aquifer that the school bore is drawing water from. Furthermore the cumulative effects of different sources (additional neighbouring farms) and time taken for contaminants to migrate to bores is not assessed in the current application and therefore no mitigation measures are proposed i.e. additional groundwater quality monitoring downgradient of the disposal areas or trigger levels on Nitrogen (Nitrate and Nitrite) measured in groundwater to meet the Maximum Acceptable Values (MAV) and the ratio thereof as given in the Drinking Water Standard for New Zealand 2005 (revised 2008) (DWSNZ).

Under the DWSNZ, larger water suppliers are required to notify the drinking water assessor and monitor determinands that are more than 50% of the MAV. 50% is effectively the point at which larger suppliers would be put on a “watch list” until the concentration drop back below 50% of the

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MAV. Therefore, to have several monitoring bores in the area showing Nitrate and/or Nitrite concentrations exceeding MAV seems to indicate that sooner or later, additional treatment and/or alternative sources for the school supply may be required.

In terms of the pathogen risk, the current level of treatment provided by the school needs to be confirmed (we have not been able to confirm at the time of writing). Under Table 5.1a of the DWSNZ, the catchment risk is likely to be categorised as requiring 5 LOG credits for treatment as the catchment contains "...*frequent high concentrations of cattle, sheep horses or humans...*". This is the highest level of catchment risk and level of treatment required under the DWSNZ. To meet a Log Credit requirement of 5, a water supplier under the DWSNZ would need to provide two treatment barriers, usually akin to UV and filtration treatment. Disinfection for bacteria using chlorination would also be recommended given the source risk and vulnerability of the population at the school i.e. young children.

More information is required to confirm the raw water quality and current level of treatment at Heddon Bush School. Further deterioration in groundwater quality and the catchment risks likely mean that the school's water supply will require additional monitoring and treatment. The contribution to the water quality issues at Heddon Bush School from Worldwide One Ltd in combination with other activities has not been assessed by the applicant. In the absence of specific assessment of contaminant transport and fate from Worldwide One, it appears likely the proposal could potentially contribute to further decline in the water quality in the Heddon Bush School bore.

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