

14 November 2018

Environment Southland  
Private Bag 90116  
Invercargill 9348



Attn: Lauren Maciaszek

Dear Lauren,

**RE: Request for Further Information under Section 92(1) of the Resource Management Act 1991 - Application APP-20181750 M & C Adams**

This letter is our response to your request for further information dated 1 November 2018.

**1. Phosphorous losses and GMPs**

The consent application states that the total amount of P lost from the property to water is likely to decrease following the expansion of the dairy farm, despite the accompanying Overseer modelling showing a 19 kg (3%) increase. This is because modelled P losses estimated in Overseer do not take into account specific landscape features, and some P-specific GMPs are not rewarded in Overseer in the proposed scenario, as discussed below. Therefore, based on available technical information, we anticipate an overall reduction in P losses.

Further to the draft FEMP provided with the consent application, the table below lists GMPs that the applicant will be adopting to further manage P losses from the property, the table quantifies how effective these GMPs are likely to be, and the table also notes whether or not the benefits of these GMPs are rewarded in Overseer<sup>1</sup>. The effectiveness of each GMP has been estimated based on a recent AgResearch publication<sup>2</sup> as well as professional judgement. The timeframe for implementation has also been noted.

Good Management Practice	Rewarded in OVERSEER®?	Effectiveness (range)	Implementation Timeframe
Fencing and planting of streams	Yes	52 – 61 %	Done
Appropriate vegetated buffers from water ways	Not assessed	38 – 58 %	Done
Avoid working CSAs and their margins (leave vegetated areas around CSAs)	No	38 – 58%	As per FEMP (from the first exercise of new land use consent)
Providing sufficient effluent storage to enable deferred application	Partially	12 – 17 %	Done
Minimising run-off from tracks, lanes and stream crossings using cut-offs and shaping	No	Up to 30%	As per FEMP (from the first exercise of new land use consent)

<sup>1</sup> Hurunui-Waiiau Nutrient Budgeting Case Studies, report prepared by Rebecca Hyde & James Hoban (December 2014). <http://www.landcare.org.nz/files/file/1445/Hurunui-Waiiau%20Nutrient%20Budgeting%20Case%20Studies.pdf>

<sup>2</sup> McDowell, R., Wilcock, B., and Hamilton, D., 2013. Assessment of Strategies to Mitigate the Impact or Loss of Contaminants from Agricultural Land to Fresh Waters. Report prepared for MfE. Publication RE500/2013/066

Good Management Practice	Rewarded in OVERSEER®?	Effectiveness (range)	Implementation Timeframe
Decommissioning lane adjacent to waterway on Northern Block	No	Up to 100%	Prior to consent being exercised
Using low rate effluent application	Yes	25 -32 %	Done
Cultivate along contours on sloping ground on Northern Block	No	Unknown	As per FEMP (from the first exercise of new land use consent)
No grazing on steeper slopes when soils are near saturation	No	Unknown	As per FEMP (from the first exercise of new land use consent)
Spread fertiliser evenly and precisely	Yes	Unknown	Done
Avoiding applying fertiliser directly to streams	No	Unknown	Done
Targeting optimum Olsen P	Yes	Unknown	Done
Restricted grazing	Unlikely	42 – 70 %	As per FEMP (from the first exercise of new land use consent)
Shifting break fences strategically	No	86 % <sup>3</sup>	As per FEMP (from the first exercise of new land use consent)

The information above shows that the applicant will be adopting GMPs that can mitigate any modelled increases in P losses from the property, even though those modelled increases are not expected to occur, as explained below.

The key driver for the modelled increase in P loss is from "other sources". The P loss sub-model in Overseer was integrated into Overseer a decade ago, and whilst it has been intermittently updated, *"it is recognised that some agricultural systems are currently inadequately modelled, and that some Individual components of systems could be considered for inclusion or updated in Overseer to improve P loss estimates"*<sup>4</sup>. "Other sources" of P account for 43% of total P losses, which are mostly derived from farm lanes. Overseer automatically assumes 30% of P deposited on a lane is lost to water, even if there is no nearby surface water body. Therefore, when a dairy farm is expanded, the "proposed scenario" model assumes that more lanes will need to be constructed, and it assumes that P is lost to water from all of these additional lanes.

As noted in the application, lanes were constructed on the Northern Block before the applicant acquired it. One new lane has been constructed leading up to the road, but it has not been located near any watercourses. Furthermore, an existing lane, which runs adjacent to a waterway on the Northern Block, will be decommissioned and this will significantly reduce the risk of P runoff in this area. Regarding the Eastern Block, this land is flatter and there are no waterways running through this block, so there is no risk of direct runoff from any new lanes to water. The modelled P losses to water from the Northern and Eastern Blocks under the "proposed scenario" are, therefore, overestimated.

<sup>3</sup> Environment Southland Critical Source Areas Factsheet. Es.govt.nz. Retrieved: 12 March 2018.

<sup>4</sup> Agresearch. February 2016. Review of the phosphorous loss submodel in OVERSEER®. RE500/2015/050. p28.

In addition, the nutrient budget executive summary attached to the consent application notes:

*When using the crop model in Overseer, the contour is not entered. It is therefore likely that the phosphorus loss (from the "current" environment) is underestimated (as the loss pathway is overland flow, which will be increased with the rolling contour). For example, the "Reducing surface runoff from grazed winter forage crop paddocks by strategic grazing management" trial at Telford (pallid soils of rolling contour) showed a phosphorus loss of 6.9 kg P/ha and sediment loss of 6635 kg/ha on the control sites (significantly higher than the 1.7 kg/ha of phosphorus loss estimated by Overseer in the fodder crop block report).*

This means that the P loss from the current wintering activity on the Northern Block is likely to be significantly underestimated, which means that the overall assessment of effects on the receiving environment under the "proposed scenario" is conservative.

The modelled change in P loss from the property between the "current" and "proposed" should, therefore, be used with caution. This is an example of a situation where the results of the Overseer modelling should not be used in isolation when assessing the effects of P loss on the environment.

When quantifying the effectiveness of GMPs in reducing P losses to water, it is important to note that the contaminant pathways for P and N losses differ. N travels wherever water travels whereas, P tends to "ride" the sediment and so mostly enters water via above ground flow visible to the eye. The predominant loss pathway for P is overland flow, and the higher-risk area of the property is, therefore, the Northern Block. The proposal seeks to significantly reduce the amount of intensive winter grazing operation on the Northern Block, which will ensure more permanent pasture cover, lower stocking rate and better management of CSAs. This will undoubtedly decrease the risk of P loss to water, as discussed and agreed upon during our site visit on 19 July 2018, and at our meeting at ES on 27 September 2018.

The information provided above, in addition to the information provided in the consent application and the outcomes of our previous discussions, provides confirmation that the modelled increase in P losses are not likely to occur, and that P losses from the property are more likely to be reduced as a result of the proposed activity. On this basis, I am satisfied actual P losses from the property will be less than those resulting from current activities.

## **2. Phosphorous losses and Policy 16**

In regard to the modelled 3% increase in P losses from the proposed dairy platform, this has been addressed above. The information provided demonstrates that the modelled P losses are not likely to occur. P losses from the property are expected to decrease following the reduction in the intensity of winter grazing on the Northern Block, and the implementation of GMPs as detailed in the FEMP and application. The potential and actual effects from the proposed use of land for dairy farming on water quality will, therefore, be avoided or mitigated, particularly with regards to P loss, and the modelled 3% increase in P losses poses no threat to this catchment.

In regard to the modelled potential offsite effects, the application notes that based on case law, there is a question as to whether offsite effects should be considered as part of this consent application. Nonetheless, the application has attempted to model potential offsite effects resulting from 530 cows being wintered somewhere else. Overseer modelling has shown that if these cows were wintered on 17.3 ha of fodder beet, on a property that is identical to the Northern Block, then this activity could result in a total of 28 kg/yr of P being lost to water. This result needs to be interpreted with caution for the following reasons:

- If you're going to assume that there will be a 28 kg/yr P **increase**, then you have to assume that the land must have previously been used for a purpose that resulted in zero P loss to water, but this is highly unlikely. It is much more likely that the land would have been used for a farming activity prior to the cows being wintered there, and that this previous activity could have easily resulted in equal, or even more, P being lost to water;
- Different locations (different soils and climate) would provide very different loss data. The 28 kg/yr P has been calculated based on conditions that exist on the Northern Block, but if the offsite location is more suitable for wintering then the amount of P lost to water may be far less than 28 kg/yr.; and
- The assessment assumes that the cows are alive and wintered in Southland (and on crop).

Even if the wintering of 530 cows at the offsite location posed a higher risk of P loss to water than the previous land use activity occurring on the offsite location, this wintering activity will be controlled by the relevant provisions of the pSWLP. These provisions require a FEMP and other appropriate GMPs to be implemented to reduce the potential adverse effects of wintering activities on water quality. As discussed above, many of these GMPs are not rewarded in Overseer, and therefore the actual losses of P to water from the offsite wintering activity are likely to be far less than modelled. Actual adverse effects on the environment from the offsite wintering activity are, therefore, expected to be less than minor.

Section 104(1)(ab) of RMA states that one of the considerations to be made for an application is *any measure proposed or agreed to by the applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity*. The proposal does not seek to make full use of the potential headroom created through the "displacement" of 530 cows, and so the definite reduction of losses from the subject property can be considered to compensate, and prevail over, unknown and uncertain offsite effects, when ES make a determination on this activity pursuant to s104(1)(ab) of the RMA. What is certain is that the proposal will result in positive environmental effects both locally and in the wider catchment, and the approach suggested (wintering of the applicant's herd onsite) was seen as being positive by ES staff during the meeting on 27 September 2018. It is clear that the onsite benefits from the proposal will be significant, and that the proposal will also guarantee a reduction in N loading to the catchment. The risk of an increase in P losses offsite is very low and, therefore, any resulting adverse effects will be less than minor. Relevant provisions of the pSWLP will ensure that adverse effects from the offsite wintering activity are avoided or mitigated.

Therefore, in consideration of the net positive effect on the environment of the proposed farming system and having regard with Section 104(1)(ab), the proposal is not contrary to Policy 16 of the pSWLP.

It is further noted that the land used consent sought is classed as a discretionary activity, not a non-complying activity, and so whilst ES staff will consider the relevant policies on the pSWLP when making decisions on the application, there is no requirement for the application to be fully consistent with all of these policies.

### **3. Clarification as to inputs for the current scenario for the Northern Block Overseer model, specifically in relation to supplement made on the Northern Block.**

Adding extra supplement provides error messages in Overseer (error message: total feed for beef/dairy grazing is over-estimated). This was also why the fodderbeet crop yield was reduced from 25t DM/ha to 18t DM/ha). A feed budget was completed outside of Overseer to ensure that cow numbers were reasonably estimated in line with crop areas. To remove the Overseer overfeeding error, extra cows would have to be entered (or crop yield

reduced unrealistically further), this would allow the extra making of supplement. Reducing crop yields further, increasing supplement made on farm and increasing feed grown on farm would result in an increase in N loss in the "current" dairy support file. A conservative approach has been taken so that nutrient losses are not overestimated in the "current" scenario, as this is the baseline against which the "proposed" scenario is compared.

#### **4. Effluent from the new underpass**

The new underpass facility will be designed by a suitably-qualified engineer and any necessary permissions will be obtained from NZTA. A final design cannot be provided to ES until it has been agreed upon with NZTA, but ES can be assured that the design will include a sump to collect any run-off. This concrete-lined sump should be able to be constructed in accordance with permitted activity Rule 32B of the pSWLP, but if the 50 m setback from the road is not possible, then the applicant will apply for land use consent from ES prior to construction commencing. The applicant will use either a portable pump and a set low rate pods, and/or a slurry tanker to spread any collected effluent to the existing consented discharge area, at maximum depth of 10 mm per application, in accordance with Rule 35(a) of the pSWLP.

Overseer does not specifically model an underpass facility. In practice it is likely that the underpass facility would be collecting some of the dung that Overseer predicted to be deposited on lane ways and managing this product. The majority of dung will be comprised of phosphorus (rather than nitrogen),

I trust that the information set out above satisfies the request for further information, however if you have any further queries, please do not hesitate to contact me at any time.

Kindest Regards



Hilary Lennox

**Senior Planner, Landpro**