

**BEFORE COMMISSIONERS ON BEHALF OF
ENVIRONMENT SOUTHLAND**

REF APP-20181750

UNDER the Resource Management Act 1991
IN THE MATTER of an application for resource consent
BY M & C Adams as trustees of the MJ
Adams Trust to:

- use land for farming;
- discharge agricultural effluent to land;
- take and use groundwater for dairy shed operations and stock drinking water.

STATEMENT OF EVIDENCE OF TANYA COPELAND

29 April 2019

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QUALIFICATIONS AND EXPERTISE

1. My full name is Tanya Louise Stephanie Copeland and I am a Senior Planner at Landpro Limited, a firm of consulting planners, surveyors and engineers. I hold the qualification of BSc (Geography and Environmental Studies) from Victoria University, Wellington. I have been in a planning/planning related role for 12 years.
2. In this time, I have worked for both district and regional local government as well as private consultants. I have been employed by Landpro since January 2018 and have undertaken a wide variety of resource management related work for various clients, including preparing resource consent applications, providing policy and regulatory advice, and consent management services. A significant proportion of my work relates to resource consents relating to dairy farms in Southland. I have prepared a number of similar consent applications for other clients to Environment Southland.
3. I have completed the Intermediate and Advanced Sustainable Nutrient Management Courses through Massey University.
4. Until June 2018, I owned two large scale dairy farming business in Southland, and I have expertise with practical farming, farm systems and the wider dairy industry. I have been involved in various industry groups such as Southland high profit discussion group, South Island Dairy Event (SIDE) conference organising committee, technical working group for the development of the FEP Certification Scheme with NZIPIM, Southland dairy leaders advisory group, Southland community of interest group for partnership farm project and I am part of the Waiau Rivercare group.
5. I am familiar with the project and resource consent application subject to this hearing and while I have not yet personally visited the site, I am very familiar with the location. and I will visit the site prior to the hearing. The application and Assessment of Environmental Effects was prepared by Hilary Lennox of Landpro prior to her resignation from Landpro.
6. This evidence has been prepared in relation to the application by M & C Adams to use land for farming that did not exist as of June 2016, to discharge farm dairy effluent to land and to take and use groundwater at 1570 Otautau Nightcaps Road, Otautau.

CODE OF CONDUCT FOR EXPERT WITNESSES

7. I have read the Code of Conduct for Expert Witnesses within the Environment Court Consolidated Practice Note 2014 and I agree to comply with that Code. This evidence is within my area of expertise, except where I state I am relying on what I have been told by another person. To the best of my knowledge I have not omitted to consider any material facts known to me that might alter or detract from the opinions I express.

SCOPE OF EVIDENCE

8. As the planning consultant for M & C Adams, I will be presenting on a range of matters as outlined below;
- Background and summary of the Application;
 - Comment on the Planning Report and Recommendations;
 - Statutory Planning Analysis;
 - Summary of Submissions; and
 - Discussion of Proposed Conditions
9. Firstly, I will provide background information to the application, including an overview of the proposal before the panel and the nature and status of the application.
10. I will also provide comment in relation to the Section 42a Report and Recommendations, including addressing those matters raised by the Consents Officer. This includes an assessment of the objectives and policies of the relevant planning documents, and an assessment of RMA matters where they differ from either the assessment in the application or from the Consents Officers assessment.
11. My evidence will then focus on the submissions that have been lodged, and the matters raised by the submitters.
12. Finally, in the absence of draft conditions of consent being provided in the Section 42a Report, I have prepared a set of conditions which I consider will provide certainty as to the outcome of the proposed activities, and ensure that any adverse effects of the proposed activity on the

environment are no more than minor. For the most part, I have adopted the conditions of consent which have been utilised by Environment Southland for other similar applications, except where I believe that an alternative condition would be more appropriate.

BACKGROUND

13. Hilary Lennox of Landpro Limited, was responsible for the preparation of the Assessment of Environmental Effects (AEE) that forms part of the application for resource consent (the application) submitted to Council on 4 October 2018. Prior to the current application a number of different versions of the application were prepared and submitted to Environment Southland but were amended following various discussion with Environment Southland on the preferred approach. Ms Lennox recently resigned from Landpro.
14. I have taken over administration of the application, and am familiar with the proposal, and the site.
15. Below, I have provided a brief overview of the proposal as submitted on 4 October 2018, noting that the full description of the proposal is detailed in the AEE. The salient components of the proposal as originally lodged are as follows:
 - The application site is located at 1570 Otautau Nightcaps Road, RD 1, Otautau. The site comprises of an 487.8 hectare dairy platform owned by the Applicant. Approximately 159.9ha of this land area will be included into the dairy platform under the proposal. The property is located within the Upper Aparima Catchment.
 - The property is generally flat to undulating in slope and is underlain by artificial drainage through much of the property (a plan of the known tile drains is attached as Appendix A). The property has been run as a dairy farm (including winter grazing) by the applicant for the past 5 years.
 - The applicant has purchased a 100ha (approx.) block of land to the north of Knobby Road for dairying (Northern Block). Prior to this, the property was run as a commercial intensive winter grazing block under the ownership and control of a third party. Up to 940 cows owned by the applicant were winter grazed under contract at this neighbouring support block, along with cows from other dairy farms from throughout Southland. The applicant had no involvement with management of the winter grazing operations on the Northern Block.

- There is a further 22ha (approx.) which was also part of the Northern Block purchase, which will not be operated as part of the dairy platform, as it is not adjoining the Northern Block, due to it being separated by State Highway 96 (Certificate of Title is attached as Appendix B). This block is used for the purpose of generating supplementary feed as it is not feasible to run this as part of the dairy platform. This land forms part of the overall 'landholding' as defined in the Southland Proposed Water and Land Plan (SPWLP) but is proposed to sit outside of the area for which consent is sought.
- The applicant has also purchased a 60ha (approx.) block of land to the northeast of Wreys Bush Nightcaps Highway in 2017 (Eastern Block). Prior to this, the property was run as a sheep breeding and finishing block.
- Soils on the property are comprised of Ohai, Aparima and Makarewa soils which are known to have various vulnerabilities as indicated in the assessment of effects submitted in support of the application, including a moderate vulnerability to structural compaction and high vulnerability to waterlogging.
- Physiographic zones on the property are comprised of Gleyed, Lignite Marine Terraces and Bedrock/Hill Country. Contaminant loss to surface water is the main water quality risk associated with all three of these zones, via both artificial drainage in flatter areas and overland flow in areas where there are slopes.
- The property is traversed by one primary water body, known as Waicolo Stream, with several smaller tributaries that run through the property. The Wairio Stream is located 300m to the west of the farm at its closest point on the opposite side of Otautau Nightcaps Road. The Opio Stream runs along the eastern boundary of the Eastern Block. The Waicolo, Opio and Wairio streams are all tributaries of the Otautau Stream, which flows into the Aparima River approximately 21 kilometres downstream of the property. The Aparima River drains into the Jacobs River Estuary, approximately 50km downstream of the property.

SUMMARY OF APPLICATIONS

16. An application has been prepared seeking resource consents to use land for a farming activity, discharge effluent to land and abstract and use groundwater for dairy purposes. The application specifically sought;

- Land Use Consent – To use land for a farming activity. The proposal seeks to increase the land area of the dairy platform above what was authorised as at 3 June 2016 to include a 100ha Northern Block and 60ha Eastern Block.
- Discharge Permit - To discharge dairy shed effluent from 1,150 cows onto 245ha of land via travelling irrigator, low rate pods and slurry tanker.
- Water Permit – To abstract up to 126.5 cubic metres/day of groundwater for stock and dairy shed purposes;

Land Use Consent

17. A land use consent is sought for the proposed farming activity which I have determined to include all activities located on the subject landholding which is directly associated and inherently linked with the applicant's dairy farming operation over 365 days of the year.

18. The applicant's landholding was defined as the 487.8ha dairy platform in the original application. During the preparation of this evidence, it was discovered that approx. 22ha of additional land was purchased by the applicant at the same time as the purchase of the Northern and Eastern blocks. This land was not included in the original application as it was not to be used as dairy platform. During the course of processing of the application at Environment Southland new interpretations of the term "landholding" and "farming activity" have been released. My understanding of these interpretations means that this land now needs to be included in the landholding, despite the fact it is not to be used as dairy platform. However, the activities on the land do not form part of the farming activity for which consent is sought as small-scale supplement production is not considered to be an integral part of the applicant's farming operation. Accordingly, this amendment to the extent of the landholding does not represent a change in the scope of the application because the scale and nature of the farming activity for which consent is sought has not been amended. I have included

reference to this additional 22 ha for the purpose of transparency given the change in processing approach by Environment Southland since lodgement of the application.

19. No changes to the Overseer modelling are required with the inclusion of this block in the landholding as the activities are included in the "imported supplement" section of the Overseer models. I further discuss and assess this block of land and the activities it contains in Paragraph 26.
20. The proposal is to increase the dairy platform by 160 ha and increase the number of cows milked to 1,150, an increase of 150 cows from the currently consented 1000 cows. The proposal results in a reduction in the stocking rate from 3.0 cows/ha to 2.4 cows/hectare.
21. The proposal includes the winter grazing of up to 1,200 cows on the landholding which includes the 1,150 cow peak milking herd plus additional cows to account for deaths and empty cows. The intensive winter grazing activity will rotate around the landholding on a yearly basis.
22. A draft Farm Environmental Management Plan (FEMP) was lodged with the application which contains details of Good Management Practices (GMPs) proposed by the applicant to ensure that the farm is operated with industry accepted good practice. A revised version of the FEMP is attached as Appendix C.

Additional assessments and proposed mitigations

23. The original application did not provide an assessment of the off-site grazing of young stock at a third-party grazer from weaning until they return to the platform in May as in-calf heifers (R2's). This activity is an integral part of the applicant's farming activity and Mrs Hunter's evidence provides further nutrient loss assessment of this activity to that which was contained in the original application. The applicant does not seek land use consent for this part of the farming activity due to its siting outside of the landholding.
24. The applicant provided Environment Southland with a quantitative assessment of the effectiveness of phosphorus loss mitigations which sit outside of Overseer as part of a further information request. Mrs Hunter has incorporated this assessment into the proposed scenario Overseer models in her evidence to give a complete reflection of the predicted nutrient losses.

25. Additional mitigations are proposed for the Eastern Block as detailed in Mrs Hunter’s evidence. The applicant has included these additional mitigations in the FEMP and in the proposed consent conditions to ensure certainty of their implementation.
26. The inclusion of the 22ha block within the landholding was not assessed under the original application. Although the proposal does not seek land use consent for the activities on this block, a level of assessment of the activities is necessary for completeness. The supplement produced on this block has been included in both the baseline and proposed Overseer nutrient budgets as a portion of the 200T of imported supplement (baleage fed on fodderbeet). The inclusion of this block in the landholding under the proposal will not result in a change to the nature of the supplement produced from this block and therefore will not result in any additional or changes in effects on the environment.

Overseer Modelling

27. Overseer 6.3.0 was used to model the proposed farming activity across the applicant’s landholding in the original application. Overseer 6.3.1 has since been released and the models were re-run in this version of Overseer.
28. Overseer 6.3.1 has been used to model the current farm system to create baseline models for the existing land use on the existing dairy platform, Northern Block and Eastern Block. The baseline model for the dairy platform modelled actual cow numbers milked on farm averaged over the preceding 4 seasons. The baseline model for the Northern Block modelled an average winter crop area and number of cows intensively winter grazed for 77 days over the preceding 4 seasons. The baseline model for the Eastern Block modelled the farm system prior to the applicant’s purchase of this block in 2017. Inputs into the model were estimated based on the block being operated as a highly productive sheep breeding and finishing operation.
29. The summary outputs from the baseline models are:

Land Use	Nitrogen Losses (total kg)	Nitrogen Losses (kg/ha/year)	Phosphorus Losses (total kg)	Phosphorus Losses (kg/ha/year)
Current milking platform	15,091	46	349	1.1
Current Northern Block	8,198	82	175	1.8
Current Eastern Block	1,395	23	36	0.6
Current combined	24,684	51	560	1.1

30. The summary outputs from the proposed model including the consideration of the off-site young stock grazing, additional P loss mitigations and further mitigations on the Eastern block are:

Land Use	Nitrogen Losses (total kg)	Nitrogen Losses (kg/ha/year)	Phosphorus Losses (total kg)	Phosphorus Losses (kg/ha/year)
Proposed dairy platform	22,870	47	528	1.1

31. Overall, modelling of the proposal indicates that nitrogen losses from the landholding are estimated by Overseer to reduce by 1,814 kg N/year and 4 kg N/ha/year compared to the baseline combined model. Phosphorus losses are estimated by Overseer to reduce by 32 kg P/year and <1.0 kg P/ha/year compared to the baseline combined model.

Discharge Permit

32. A new discharge permit is sought for the proposal to allow for the discharge of farm dairy effluent from 1,150 cows to a 245ha effluent discharge area. Effluent infrastructure at the property consists of a weeping wall with sludge beds for effluent treatment and a clay lined effluent pond for deferred storage.
33. The volume of deferred storage provided on farm meets the requirements of the Massey University Dairy Effluent Storage Calculator (DESC), as outlined in the application for resource consent.
34. Effluent will be discharged to land via low rate pods and a Briggs Travelling Irrigator, discharging effluent at maximum depth of 15mm and rate of 10mm/hour. A slurry tanker may be used as a contingency measure. The soils within the FDE disposal area appear to be classified by Map 1 of Appendix N of the Regional Water Plan as being Category A soils (artificial drainage or coarse soil structure) and Category C soils (sloping land).
35. The Consents Officer has raised some questions with respect to the activity status of the discharge of effluent activity under the RWPS. The RWPS allows for "farm scale soils mapping undertaken by a suitably qualified person" to allow a discharge activity to be considered a restricted discretionary activity under Rule 50(d). A detailed assessment of the soils classification of the property has been undertaken by Dr. Freeman that concludes that the

application for discharge of effluent will not be to Category C (sloping land) and should be considered a restricted discretionary activity, as set out in the assessment attached as Appendix D.

Water Permit

36. A new water permit is sought for the proposal to allow the abstraction of 126.5 cubic meters per day and 46,172 m³ per year at a rate not exceeding 2 L/sec. The water will be used for stock drinking water and shed wash down water and will be abstracted from bore D45/0318.

COMMENT ON PLANNING REPORT

37. I have read the Section 42A Report prepared by Environment Southland. The Consents Officer has recommended that the application be declined. The Consents Officer considers that the adverse effects on water quality will be more than minor and considers that the proposed activities are contrary to the objectives and policies of the Regional Plans.
38. The Section 42A report provides a description of the existing environment in Section 3.1. The evidence of Dr Freeman provides a more detailed description of surface water quality state and trends of the Waikouro Stream and Otatau Stream at Otatau-Tuatapere Rd water quality monitoring sites. Dr Freeman also provides a detailed description of groundwater quality in the vicinity of the landholding.
39. There is an existing discharge permit AUTH-206291 held by Southland District Council to discharge stormwater to water at three different locations surrounding the Nightcaps township, upstream of the Waikouro monitoring site. There is also an expired discharge permit for the discharge of treated sewage from Nightcaps and a current discharge permit for the discharge of treated mine waste water from the Takitimu mine that both discharge into the Wairio Stream.
40. The Consents Officer states that the Northern Block has been utilised as a runoff block for the applicants. This statement is incorrect as the block has been owned and operated by a third party (Roughan) who has operated a commercial winter grazing activity on this block prior to the applicant's purchase.

41. The soils assessment completed by Dr Freeman and appended in Appendix D to this evidence provides detailed analysis to confirm that the land should be considered as either Category A or B land and the discharge permit application should therefore be considered as a restricted discretionary activity in accordance with Rule 50 (d) RWPS.
42. The Consents Officer identifies key issues relating to the actual and potential effects from the proposed activities, including the potential for contamination of surface water in Section 3.3 of the report. The following issues are discussed below:
 - Effects arising from the change in land use on the Eastern Block;
 - Offsetting of effects;
 - Transfer of effects to an off-site location; and
 - Cumulative effects.

Effects arising from the change in land use on the Eastern Block:

43. The applicant proposes additional mitigation measures for the Eastern Block as detailed in Mrs Hunters evidence. These mitigation measures have been designed to reduce overall nitrogen and phosphorus losses from this block as modelled by Overseer and additional modelling outside of Overseer to a level which is lower than the modelled losses from the existing land use. Dr Freeman has assessed the likely adverse effects on water quality, in the Opio Stream as insignificant as a result of the proposed activities and mitigations on the Eastern Block.
44. The Consents Officer states that the main risk associated with the intensification/change of land use on the Eastern Block is the contamination of surface water via overland flow and artificial drainage. The Eastern Block contains gully systems which appear to be the headwaters of tributaries of both the Waicolo and Opio Streams. These gully systems are classified as Critical Source Areas (CSA's) and good management practices surrounding CSA's forms a vital part of the proposal and is detailed in depth in the FEMP.
45. The good management practices for managing CSA's includes the establishment and maintenance of vegetated riparian buffer zones which are designed to capture and filter nutrients that may be transported over the land surface towards waterways. CSA's are fenced to exclude stock and are excluded from the effective dairy platform which ensures a buffer

zone from potential contaminant losses via direct deposition from grazing animals and fertiliser application under the proposal. The additional P loss mitigation assessment provided by Mrs Hunter in the request for further information response and in her evidence quantified the effectiveness of the GMPs/additional mitigation implemented to mitigate against phosphorus losses from the entire property, as well as specifically from the Eastern block.

46. The location of tile drains on the Eastern Block have been mapped by the applicant and are appended to my evidence in Appendix A. The applicant utilises the knowledge of the location of these drains in order to implement practices such as selective grazing to avoid the grazing of very wet paddocks, or wet areas within a paddock likely to be underlain with tile drains in order to protect soil structure and reduce risks of contaminant losses through artificial drainage channels on this block. This practice is included in the FEMP as a good management practice used across the entire dairy platform.
47. The additional mitigation measures proposed remove intensive winter grazing from the Eastern Block.
48. The Consent Officer expresses concern in relation to capital fertiliser applications being required on the Eastern Block in the short term during the land use change. Mrs Hunter has responded to this concern in Paragraph 34 of her evidence.
49. The proposed consent conditions in Appendix E and the FEMP in Appendix C will ensure the proposed mitigation measures for the Eastern Block are implemented.

Offsetting of effects / spreading effects over the landholding

50. The Consents Officer correctly notes that the proposal represents a decrease in nutrient losses across the landholding as modelled by Overseer. The Consents Officer believes the overall decrease in modelled losses is due to the spreading of nutrient losses over a larger area with increases in losses in some areas, presumably referring to areas within the landholding. The Consents Officer has correctly identified a major mitigation measure for this proposal which is the proposed reduction in stocking rate and overall lowering of the intensity of the farming activity which is brought about by the act of spreading nutrient losses across a larger area.
51. Despite the identifications made by the Consents Officer in the paragraph above, I note the Consent Officer appears to confuse nutrient losses with effects in this section of the report. The landholding contains various components of the overall farming activity, some of which

result in higher nutrient loss than others. The assessment of effects in the application assesses the effects of the proposal on water quality in the receiving bodies as is required and is consistent with the RMA which is an effects based piece of legislation. In the Consents Officers own words it is a "simplification of reality" to use Overseer output figures to estimate the environmental impacts of these losses.

52. The proposal has been designed to eliminate the continuous year on year intensive winter cropping which had been previously occurring on the Northern Block. Continuous cropping on this singular Northern Block is likely to have resulted in significant localised adverse effects on the environment especially in relation to soil structure damage, accumulation of nutrients within the soil profile and effects on water quality within the immediate catchment. The proposal seeks to mitigate, remedy and avoid these localised effects from resulting on the Northern Block, or on any other part of the remainder of the landholding by rotating the intensive winter grazing across the remainder of the dairy platform excluding the Eastern Block. The proposal eliminates continuous and repetitive cropping of specific blocks of land and results in an overall reduction in the intensification of this activity within any one locality.
53. The Consents Officer concludes Issue 2 by stating that the increase in cow numbers will result in greater effects overall. I disagree with this conclusion in light of the expert evidence and analysis undertaken by Mrs Hunter, and by Dr. Freeman. The extensive Overseer and other modelling which has been undertaken to support the application takes full account of the proposed increase in cow numbers, and the conclusions of Dr Mike Freeman that there would be no adverse effects on water quality in the Opio Stream and a very small improvement in the quality of the Otautau Stream and other contributory tributaries.

Transfer of effects to an off-site location

54. I do not agree with the Consents Officer's decision to consider the potential adverse effects that might arise from the displacement of 530 cows that were previously winter grazed on the Northern Block prior to the applicants purchase of this block of land. In my view the assessment of the consequential effects on the environment from the displacement of 530 cows which are neither owned, controlled or under the jurisdiction of the applicant, is beyond the scope and reasonable control of the applicant. The displacement of these cows and the resulting effects on the environment are too remote for consideration of the activity for which consent is sought with no *causal nexus*, as the activities these cows may be involved in do not inevitably follow from the granting of consent for the activities sought by the applicant.

55. The proposal provides for a full quantitative and qualitative assessment of the intensive winter grazing of the full 1,150 proposed herd (1,200 cows calved accounting for deaths and empties). All of the applicant's milking herd are wintered on the dairy platform and have been fully accounted for in the Overseer nutrient budgets provided with the application, and as set out in the evidence of Mrs Hunter. Therefore, there is no new, additional or further intensified wintering of the milking herd occurring elsewhere under the proposal as suggested by the Consents Officer.
56. I raise concern as to the possibility of an error in the recommending report, with the Consents Officer's use of speculation that these 530 cows and/or the sheep which were grazed on the Eastern Block will be grazed in future on land not previously used for dairy farming operations. This statement does not appear to correlate or make sense with *Issue 3: Transfer of effects to an off-site location*. Our proposal has not assessed any such effects because the applicant is under no obligation to either know or dictate the future location of this stock, nor to know the previous land use at these location(s). I consider this matter to be beyond the scope of the applications as sought by the applicant, and inconsistent with the Resource Management Act.
57. The proposal includes the grazing of young stock at a location outside of the applicant's landholding. A total of 234 young stock of each age class are currently contract grazed by a third party grazier. The proposed increase in milking cow numbers results in the rearing of an additional 66 rising 1-year old at the off-site graziers from weaning until returning as in-calf heifers. The original application did not separately assess the effects of the grazing of the young stock. We conclude that the grazing of the young stock for 365 days of the year is a part of the applicants farming activity and should be assessed for completeness. Mrs Hunter has quantified the potential contaminant losses outside of the use of Overseer from the grazing of the additional young stock. The quantification of losses from just the additional young stock was done to accurately reflect the overall predicted increase in contaminant losses from this aspect of the proposal.
58. Overall, I consider that the proposal has fully assessed and quantified the farming activity in its entirety by accounting for losses from the grazing of all stock, both the milking herd and young/dry stock, over the entire 365 days of the year. The proposal cannot therefore be perceived to be exporting effects or creating "headroom" within the nutrient budgets.

Cumulative Effects

59. I concur with the Consents Officers conclusions that phosphorus, sediment, microbial contaminants and nitrogen pose a risk to some degree to cumulative effects on receiving waters, based on the evidence in chief of Dr. Freeman. The proposal has described the implementation of a full range of good management practices and mitigation measures which seek to mitigate the loss of these contaminants via the three primary loss pathways: overland flow, artificial drainage and deep drainage. These good management practices have been included in the FEMP and the applicant proposes conditions that would require the FEMP to be implemented. The mitigation measures included in the proposal are primarily integrated into the nutrient budget and would also form part of consent conditions, should consent be granted. The imposition of consent conditions gives the decision maker certainty that these measures will be implemented for the duration of the consent.
60. A tile drain map for the Northern Block, existing dairy platform and Eastern Block are attached in Appendix A. The tile drains are contaminant pathways and the GMPs in the FEMP seek to reduce contaminant losses by the use of selective grazing over tile drains during periods where soil is saturated to protect soil structure and N and P loss. Effluent application over tile drains will be undertaken using low rate application methods.
61. The Consents Officer states that the surface water bodies within the receiving environment are degraded. Dr Freeman has provided an in-depth assessment of the effects, including cumulative effects of the proposal on the receiving surface water bodies. His assessment specifically addresses the Consents Officers concerns in relation to cumulative effects on the Opio Stream.
62. The Consents Officer identifies that the applicant's landholding will present the largest contribution to contaminant load within the Waicolo Stream catchment based on peak herd size. The nutrient budgeting and other contaminant loss assessments provided with the application predict that the applicant's contribution to cumulative loads will decrease if the proposal is granted. A reduction in the applicant's contributing load will therefore result in a significant reduction to contaminant load on this waterbody. Furthermore, by entering this consenting process, the applicant will be under long-term restrictions on nutrient losses at the baseline level which will inherently lower the risk of the applicant's contributing contaminant load resulting in adverse cumulative effects.

Other Matters

63. The Consents Officer states that the effluent storage structures do not meet permitted activity criteria of Rule 32D of the PSWLP in the absence of confirmation that the structures comply with parts (a) and (b) of Rule 32D (a)(2). I note that Environment Southland provided the applicant advice on numerous occasions that a pond drop test and visual assessment as required by abovementioned parts (a) and (b) were not required for the processing of the application. This stance was confirmed by the absence of any requests under Section 91 of the Resource Management Act during the processing of the application to date.
64. The advice inevitably indicated that Environment Southland understood the effluent storage structures on site retained existing use rights under Section 20A of the Resource Management Act and consent under Rule 32D (b) was not required at present.
65. In my view, the applicants retain existing use rights for the use and maintenance of the effluent storage structures under Section 20A of the Resource Management Act as the character, intensity and scale of the use and maintenance of the effluent storage structures activity will not change under the proposal. The effects of the use and maintenance activity do not change in character, intensity or scale because the proposal does not require an increase in the size of the effluent storage pond to accommodate the effluent from the additional 150 cows, nor are any amendments to the operation or maintenance of the effluent management system proposed. The additional effluent generated by the extra 150 cows is a matter assessed and restricted under the effluent discharge activity and our assessment has concluded that the effluent storage structures are sized appropriately to cater for the projected effluent volumes. Therefore, I do not consider any additional consents are required in association with the storage of effluent.
66. The existing effluent storage pond is approximately five years old and was constructed under a land use consent, designed and approved by a suitably qualified professional. The applicant has confirmed that there is no evidence of the pond leaking nor of any structural issues and therefore the evidential presumption for a structure of this age and design should be of adequacy absent of any evidence of failure.
67. Should the Commissioners find that consent is required under Rule 32D (b) for the ongoing use and maintenance of the effluent storage structures on site on the grounds that existing use rights do not apply, then I do not consider that it would be appropriate to halt the processing of these applications and the applicant is proposing a condition that would require

a pond drop test and visual assessment of the effluent storage structures to be submitted prior to the increase in cow numbers.

68. Mrs Hunter has discussed limitations with the Overseer model at length in her evidence. The only point I wish to add is that the Consents Officer fails to state that the Overseer model also has a margin of error or uncertainty at a value of less than the suggested 30% uncertainty as well. This point is important to note to give balance to the situation.

Regional Planning Framework

69. Appendix D contains a farm-scale soil mapping assessment undertaken by Dr Mike Freeman, acting as a "suitably qualified person". Rule 50 (d)(ii) of the RWPS provides a pathway for a farm-scale soil assessment to an alternative assessment of the soil classifications in Map 1 of Appendix N of the RWPS. Dr Freeman's assessment concludes that the proposed discharge of effluent will be to land which is classified as either Category A or Category B under the Regional Water Plan and should not be classified as Category C – sloping land.
70. The classification of the entire discharge area as Category A or B results in the discharge activity being a **restricted discretionary activity** under Rule 50(d)(ii) of the Regional Water Plan. Therefore, the activities should not be considered as non-complying as asserted by the Consents Officer.
71. For completeness however, I have considered the proposed activities in the context of Section 104D of the Resource Management Act and I consider that even if the application were an activity for a non-complying activity that we would be able to pass through both "gates" of the "gateway" tests. The application is consistent with the policies and objectives of the statutory documents and the effects are no more than minor as described in detail in the evidence presented to the Commissioners.
72. Overall the application should be considered as a **discretionary activity** as the highest activity level when a bundling approach is used. Consent can be granted in accordance with Section 104B of the Resource Management Act and consideration of Section 104D is not considered to be applicable given that the activity is not considered a non-complying activity.

Statutory Considerations

73. The Consents Officer lists the matters of relevance to the application in Section 4.4 of the report. I note that regional or proposed regional policy statements has been omitted from his consideration. Section 104 (1) of the Resource Management Act states that the Consent Authority must have regard to any relevant provisions of a regional or proposed regional policy statement. I have provided an assessment of the application in respect to both the operative and proposed regional policy statement as set out in Paragraph 100 below.

Proposed Southland Water and Land Plan Policies (PSWLP)

74. The Consents Officer has separated the assessment of the PSWLP policies into two parts, with the first section including what he considers to be the “key policies” and the second part assessing the remainder of the relevant policies for the application. My evidence will provide comment on all of the relevant policies of the PSWLP in this section despite the structure of the Consents Officers report or what he perceives to be key policies.

75. The wording of Policy 16 of the PSWLP inserted in the Consents Officers report is incorrect. The correct wording is as follows:

Policy 16 – Farming activities that affect water quality

1. Minimising the adverse environmental effects (including on the quality of water in lakes, rivers, artificial watercourses, modified watercourses, wetlands, tidal estuaries and salt marshes, and groundwater) from farming activities by:

(a) discouraging the establishment of new dairy farming of cows or new intensive winter grazing activities in close proximity to Regionally Significant Wetlands and Sensitive Waterbodies identified in Appendix A; and

(b) ensuring that, in the interim period prior to the development of freshwater objectives under Freshwater Management Unit processes, applications to establish new, or further intensify existing, dairy farming of cows or intensive winter grazing activities will generally not be granted where:

(i) the adverse effects, including cumulatively, on the quality of groundwater, or water in lakes, rivers, artificial watercourses, modified watercourses, wetlands, tidal estuaries and salt marshes cannot be avoided or mitigated; or

(ii) existing water quality is already degraded to the point of being overallocated; or

(iii) water quality does not meet the Appendix E Water Quality Standards or bed sediments do not meet the Appendix C ANZECC sediment guidelines; and

(c) ensuring that, after the development of freshwater objectives under Freshwater Management Unit processes, applications to establish new, or further intensify existing, dairy farming of cows or intensive winter grazing activities:

(i) will generally not be granted where freshwater objectives are not being met; and

(ii) where freshwater objectives are being met, will generally not be granted unless the proposed activity (allowing for any offsetting effects) will maintain the overall quality of groundwater and water in lakes, rivers, artificial watercourses, modified watercourses, wetlands, tidal estuaries and salt marshes.

2. Requiring all farming activities, including existing activities, to:

- (a) implement a Farm Environmental Management Plan, as set out in Appendix N; and*
- (b) actively manage sediment run-off risk from farming and hill country development by identifying critical source areas and implementing practices including setbacks from waterbodies, sediment traps, riparian planting, limits on areas or duration of exposed soils and the prevention of stock entering the beds of surface waterbodies; and*
- (c) manage collected and diffuse run-off and leaching of nutrients, microbial contaminants and sediment through the identification and management of critical source areas within individual properties.*

3. When considering a resource consent application for farming activities, consideration should be given to the following matters:

- (a) whether multiple farming activities (such as cultivation, riparian setbacks, and winter grazing) can be addressed in a single resource consent; and*
- (b) granting a consent duration of at least 5 years.*

76. Having considered the matters raised by the Consents Officer in relation to Policy 16, I have subsequently disregarded these comments on the basis the incorrect policy has been assessed. I have included an additional full assessment of Policy 16 below to supplement the assessment provided in the original application.

77. Policy 16 (1)(a) is not relevant to this application as the landholding is not sited within close proximity to a regionally significant wetland or sensitive waterbody identified in Appendix A of the PSWLP. The nearest regionally significant wetland is the Blue Bottle Peatland which is 7km north west of the landholding and is in an upstream location on the Orauea Stream.

78. I consider Policy 16 (1)(b) to be relevant to the application because the Southland region is currently in the interim period prior to the development of freshwater objectives under Freshwater Management Unit processes. Section (i) of the policy states that applications to establish new or further intensify existing dairy farming of cows or intensive winter grazing should not be granted where adverse effects, including cumulative effects cannot be avoided or mitigated. In relation to this part of the policy, the question could be raised about whether this application should be considered an intensification of an existing dairy farming of cows or intensive winter grazing in light of the fact that the addition of both land area and cows to the applicant's existing dairy farm is reducing the stocking rate and therefore making the dairy farming activity less intensive. The rotation and spreading out of the intensive winter grazing

activity over a larger land area also represents a reduction in intensity of the intensive winter grazing activity. Furthermore, the change in landuse on the Northern Block which was used entirely for intensive winter grazing to dairying would also indicate a reduction in intensity of effects.

79. Despite the interpretation of whether intensification is occurring, part (1)(b)(i) of Policy 16 provides for the mitigation or avoidance of adverse effects, suggesting that either approach is consistent with the policy. The proposal and Dr Freeman's evidence describes in detail how adverse effects on water quality, including cumulative effects are either avoided or mitigated. Our proposal utilises quantitative assessment through Overseer, qualitative assessment outside of Overseer and catchment nutrient load assessment to prove that adverse effects on all water receiving environments are negligible, as set out in detail in the evidence of Mrs Hunter and Dr. Freeman.
80. I do not consider Policy 16(1)(b)(ii) and (iii) as being particularly relevant to this application as water quality is not degraded to the levels implied in the policy, as detailed in the evidence in chief of Dr Mike Freeman. He concluded that some PSWLP water quality standards are unlikely to be fully met. However, as Mr Stephen West concluded recently (s.42A report on Duoreges resource consent application) given the wording of the policy it would not be consistent with the policy intent to decline an application that will reduce contaminant loads to a catchment because of existing non-compliance with a water quality standard.
81. Policy 16 (1)(c) is not yet relevant to this application because the Freshwater Management Unit limit setting process has not yet commenced in the Southland Region.
82. In respect to Policy 16(2) I concur with the assessment of the Consents Officer that the application is consistent with this aspect of the policy because a FEMP has been provided and CSAs are managed appropriately through good management practices, this is despite the reference to the incorrect policy wording.
83. The proposal is not inconsistent with Policy 16(3).
84. I concur with the Consents Officers overall assessment of the proposal in relation to Policy 16. However, the Consents Officer appears to hold concerns regarding the effectiveness of the good management practices and mitigation measures proposed due to a lack of ability to quantify some aspects of the proposed measures.

85. This position is difficult to justify on the basis of previous advice from Environment Southland which indicates that to undertake farming as a permitted activity in accordance with Rule 20 PSWLP it is assumed that good management practice is already being implemented and that the effects of the activity are less than minor due to the permitted activity status. If there are concerns as to the effectiveness of good management practices and mitigation measures being able to be quantified, then arguably no farming activities can be undertaken in accordance with the permitted activity standard set out in the PSWLP.
86. In my opinion, the combination of Overseer modelling, further quantification of the effectiveness of phosphorus loss mitigations and catchment load assessments provides more than adequate quantification of the effectiveness of the proposed good management practices and mitigation measures. Specifically, the Overseer modelling assumes good management practice implementation so therefore, in effect, provides a quantification of the effectiveness of good management practice. The Overseer modelling also incorporates the proposed mitigation measures as inputs into the model and also provides for a level of quantification of their effectiveness with the ability to compare the predicted losses from the proposal with the baseline model.
87. The phosphorus loss assessment completed by Mrs Hunter in the application also quantified the effectiveness of phosphorus loss mitigations which sit outside of Overseer, which again provides for a level of quantification of their effectiveness. Dr Mike Freeman provides further quantification of how the overall proposal could contribute to improving water quality in the catchment.
88. It is also possible to assess the effectiveness of the GMP's through conditions of consent. The applicant has included draft consent conditions, as Appendix E.
89. The Consents Officer does not adequately consider Policy 13(1). The continuation of the activity as proposed will enable the applicant to provide for their economic and social wellbeing and that of the staff and contractors they employ. The presence of the applicants farming operation provides positive effects for the immediate small Southland community of Nightcaps and also the wider regional economy of Southland.
90. I consider the application to be fully consistent with Policy 14 which outlines the preference of discharges to land rather than direct discharges to water.

91. Policies 15A, B and C relate to discharge activities only. The discharge activity will be undertaken in a manner which avoids adverse effects on water quality.

92. The wording of Policy 17 of the PSWLP inserted in the Consents Officers report is incorrect. The correct wording is as follows:

Policy 17 – Agricultural effluent management

1. Avoid significant adverse effects on water quality, and avoid, remedy, or mitigate other adverse effects of the operation of, and discharges from, agricultural effluent management systems.

2. Manage agricultural effluent systems and discharges from them by:

(a) designing, constructing and locating systems appropriately and in accordance with best practice; and

(b) maintaining and operating effluent systems in accordance with best practice guidelines; and

(c) avoiding any surface run-off or overland flow, ponding or contamination of water, including via sub-surface drainage, resulting from the application of agricultural effluent to pasture; and

(d) avoiding the discharge of untreated agricultural effluent to water.

93. The effluent system and discharge activity is consistent with Policy 17. The existing use rights status of the effluent storage structures has been discussed above in Paragraph 67 and the applicant has agreed to the imposition of a consent condition (if required) requiring further assessment of the effluent storage structures to give certainty that adverse effects are not eventuating from effluent leakage if considered necessary by the Commissioners.

94. The applicant acknowledges that the Freshwater Management Unit process is still to occur and that this may require changes in the future to their farming system, albeit this remains the case irrespective of the proposal to increase the herd size and add extra land to the existing dairy platform.

Regional Water Plan (RWPS)

95. The evidence provided by Dr. Freeman confirms the proposal is consistent with Policies 1 and 4. The proposal has been designed in accordance with Policies 7 and 13.

96. I do not concur with the Consents Officers assessment that Policy 13A is relevant to this proposal. The Policy explicitly refers to the establishment of new dairy farms, which this

application is not for. The plan clearly defines the term "new dairy farm" and specifically excludes any increase in the land area or intensity of an existing dairy farm that is undertaken without an additional dairy shed.

97. I also disagree with the Consents Officers conclusion that the proposal will result in the addition of contaminants to the Aparima River parent catchment which would cause a reduction in water quality. Since the preparation of the s.42A report the applicant has incorporated further mitigation measures that are outlined in the FEMP and in Mrs Hunters evidence. The result of this is that the overall load of contaminants to the Aparima River will reduce.
98. As discussed earlier in this report, the effluent discharge activity will be to Category A and B soils. The proposed effluent discharge is entirely in accordance with the relevant policies and seeks to avoid adverse effects on the environment by matching application depth and rate with nutrient uptake and soil moisture conditions.
99. Policy 41 refers to adverse environmental effects associated with the location, design, construction, operation and maintenance of agricultural effluent ponds. The policy does not refer to the use of agricultural effluent ponds as this is not an activity which required consent under the RWPS and accordingly is not relevant to the ongoing use of effluent storage structures on farm. The Consents Officer has confirmed that the pond was suitably designed and constructed with a resource consent and was considered at the time to be wholly consistent with Policy 41. The applicant proposes and agrees to the imposition of consent conditions (if required) requiring a pond drop testing and assessment regime if existing use rights do not apply for the use and maintenance of the effluent storage structures.

National Policy Statement for Freshwater Management 2014 (NPSFM)

100. I concur with the Consents Officers conclusion that the proposal is not inconsistent with the objectives and policies related to water quality, water quantity and tangata whenua roles and interests in the NPSFM.

Section 104 Matters

101. The Consents Officer rightly identifies that positive effects will eventuate from the proposal on the Northern Block. The application described in detail that the existing activities on the Northern Block are unsuitable for the topography of the block and are likely resulting in significant adverse effects on the environment in relation to water quality degradation from

contaminant loss. The proposal results in other positive effects on the environment such as the overall reduction in stocking rate across the landholding, the introduction of more permanent pasture cover on the Northern Block, the reduction in predicted contaminant losses as modelled by Overseer across the landholding and the ongoing restrictions on the applicant's operation under the land use consent. The applicants are currently able to operate their farm with only restrictions related to the discharge of effluent. By voluntarily entering this consenting process, the applicants accept that their operation is likely to be restricted in relation to nutrient losses at a landholding level which ensures positive effects on the environment compared to the current predominantly unregulated scenario in relation to landholding nutrient losses.

Southland Regional Policy Statement 2017 (SRPS)

102. The Consents Officers report does not assess or consider the Southland Regional Policy Statement. Section 104 of the Resource Management Act states that the consent authority must have regard to regional or proposed regional policy statements.

103. The application did not provide a separate assessment of the Southland Regional Policy Statement because under the RMA, regional plans need to give effect to regional policy statements and therefore an assessment against the policies within a regional plan will ultimately give effect to this higher order statutory document. However, for the purposes of this hearing I have provided a detailed assessment of the proposal against the SRPS.

104. The water quality and water quantity policies within the SRPS closely mimic the principles within the respective water quality and water quantity policies in the PSWLP. An assessment against these policies is not repeated. Policies Rural.1 and Rural.5 are particularly relevant for the proposal. The proposal is a cumulation of the applicants wanting to farm in an environmentally sustainable manner whilst still enhancing the productive capacity of their farm and providing for their economic and social well-being. The proposal is therefore consistent Policy Rural.1 that reiterates the notion of supporting the sustainable use and development of rural land resources, both environmentally and economically, if undertaken in an appropriate manner.

105. Policy Rural.5 encourages land management practices that safeguards soil properties, minimises erosion of soil, minimises soil compaction and nutrient and sediment loss, reduces soil disturbance and maintains or enhances water quality. The proposal is a direct

representation of the applicants seeking to safeguard, minimise and enhance these matters by utilising an expanded dairy platform to reduce the intensification of their overall farming activity including the intensive winter grazing activity and reduce significant adverse effects from the existing activities on the Northern Block in particular.

Part 2 of the Resource Management Act (RMA)

106. The application concluded that the proposal was wholly consistent with Part 2 of the RMA.

Further to the assessment previously provided, I wish to reiterate that Part 2 of the RMA states the general purpose to the Act which is to promote the sustainable management of natural and physical resources. Sustainable management is explained to mean managing the use, development, and protection of natural and physical resources in a way which enables people and their communities to provide for their economic, social and cultural wellbeing while sustaining the reasonably foreseeable needs of future generations, or on the life-supporting capacity of the environment and any ecosystems associated with it and avoiding remedying and mitigating adverse effects on the environment. The applicant's proposal is for the continuation of their farming activity which utilises their land in a way which provides for their economic and social wellbeing, and that of the immediate small Southland community and the wider regional economy in which it operates. The applicants land has proved to be suitable for the proposed activity in terms of natural topography, climate, location and pastoral cover and the proposal represents the sustainable management of this land resource. The applicant has designed the proposal to avoid, remedy and mitigate adverse effects on the life-supporting capability of the receiving environment. No parts of the proposal suggest possible inconsistency with Part 2 of the RMA.

107. The applicant acknowledges Tangata Whenua have a long history and relationship with the area and consider that their proposal will not compromise or have an adverse impact on Maori culture, traditions or taonga.

108. The Consents Officer concludes that the application is contrary to Section 7(f) of the RMA. Section 7(f) requires that particular regard shall be given to the maintenance and enhancement of the quality of the environment. This issue is the primary issue of contention between the applicant and the Consents Office.. The evidence of Dr. Freeman and Mrs Hunter has provided in-depth quantification to demonstrate that overall water quality in the catchment will be enhanced as a result of the proposal. The Consents Officer has provided no quantification or

explanation as background to the conclusions he has reached, on which basis I am firmly of the view that the application is consistent with Section 7(f).

Recommendations

109. As discussed above, the application should be assessed as a discretionary activity as the highest consent test when a bundling approach is taken. The applicant has provided further information to show that the discharge area should not be classified as Category C land, and accordingly the activity status of the discharge permit application should be restricted discretionary. Section 104D of the RMA and the "gateway tests" then becomes not applicable to this application, as outlined in Paragraph 70. Even if it is decided that this is incorrect and the applications are bundled up to non-complying activities I consider that the applications pass both gateway tests.
110. Section 104 of the RMA requires the Consent Authority to have regard to all relevant provisions of the operative and proposed plans, among other documents. I note that it is only for the consideration of a non-complying activity under one gateway test (104D(1)(b)) that the application must not be contrary to the objectives and policies of an operative or proposed plan. Consideration of a discretionary activity application does not need to meet this test under the RMA.
111. The Consents Officer concludes in several parts of the recommendation that adverse effects from the proposal will be more than minor and this seems to form a very central part of the final recommendation to decline the application. The applicant has provided an extensive water quality assessment that concludes that there will be no adverse effects on water quality and on a catchment basis there will be enhancement of water quality. However, I acknowledge that further mitigation has been proposed since the initial lodgement of the application.
112. The Consents Officer states that the PSWLP requires that where water quality is already degraded then the proposed activities must result in an improvement to water quality. My assessment of the policies of PSWLP provide for an alternative view. Policy 15 A and B which refer to either the maintenance or improvement of water quality relates to discharges only, not to farming activities. Policy 16 relates to farming activities which affect water quality and this policy does not suggest the decline of consent based on whether water quality is maintained or improved. The policies of the PSWLP do not require the improvement of water quality for

farming activities, however they do require the avoidance, remedying and/or mitigation of adverse effects on water quality which is what the proposal provides for.

MATTERS RAISED BY SUBMITTERS

113. The application by M & C Adams was publicly notified on 15 January 2019 with submissions received from three parties;

- Public Health South on behalf of the Southern District Health Board
- Te Ao Marama Inc; and
- Lawrence T. Cameron

I have provided comments in relation to those points raised by submitters which I consider warrant further discussion.

Public Health South submission

114. The submission received from Public Health South is neutral and neither supports nor opposes the application. The submission seeks that adequate conditions are placed on the consent to protect public health.

115. The submission highlights that this application precedes the catchment limit setting processes which is the main component of the Environment Southland People, Water and Land project which gives effects to the National Policy Statement for Freshwater Management. The applicant recognises the impending limit setting process and understands that this may have implications for their farming operation. However, the timelines published for the limit setting process have been amended a couple of times by Environment Southland and there is no certainty on how close the Southland region is to having nutrient limits imposed, nor what they may look like.

116. Dr. Freeman has addressed the Jacobs River Estuary and assessed the effects of the proposal on water quality in this receiving environment.

117. The evidence of Dr. Freeman has addressed the submitters concerns in relation to disease risk.

118. The applicant has addressed risks to surface water from the effluent discharge from overland flow and artificial drainage through the GMPs and mitigation measures in the FEMP. Consent conditions on the discharge permit also provide assurances that effluent discharge is not undertaken in a manner which results in the inappropriate application of effluent.

119. The applicant has recognised that the intensive winter grazing activity is a high contaminant loss activity. The proposal has been designed to site this activity in a lower risk location on the landholding and reduce the overall intensity of the activity by rotating it across the entire landholding. The result being that the applicant has a lot of scope available every year to site the intensive winter grazing activity in paddocks which are at lower risk of contaminant loss via overland flow, artificial drainage or via deep drainage. Paddocks more suitable to intensive winter grazing includes paddocks with flat topography, paddocks with no CSA's present, paddocks away from water bodies, paddocks containing soils with less vulnerability to waterlogging and paddocks with less known tile drains. These decisions will ensure that intensive winter grazing will not occur on parts of the platform considered to be unsuitable for this activity. The flexibility and options available for the strategic siting of intensive winter grazing provides a powerful mitigation measure to lower risks of contaminant losses from this activity. In addition, the intensive winter grazing activity will be undertaken in accordance with good management practice as detailed in the FEMP.

120. The applicant has provided draft consent conditions for the land use consent for the farming activity which includes a restriction on the nitrogen and phosphorus output from the baseline (current combined) Overseer model.

121. The submitter seeks the imposition of consent conditions to protect public health. Dr Freeman has discussed the use of ozone and the suitability of groundwater monitoring bores on the property. The proposal does not include the use of hard stand areas.

Te Ao Marama Inc Submission

122. Te Ao Marama Inc (TAMI) have opposed the application as they are concerned with the current degraded state of water quality in the region and there is a need to avoid further deterioration to the environment, Ngai Tahu values and cultural wellbeing. TAMI consider that the application lacks an evaluation of whether these risks will be mitigated or avoided. Dr. Freeman has assessed these concerns in his evidence.

Lawrence T. Cameron Submission

123. Mr. Cameron provides a submission in opposition to the application on the basis of objecting to an increase of cows. Mr Cameron seeks that the application be declined.

CONDITIONS OF CONSENT

124. As noted earlier, the Section 42a report does not provide draft conditions of consent for consideration by the Commissioners, presumably on the grounds of the recommendation to decline the application.

125. The applicant has however prepared conditions of consent, which in my view would ensure certainty as to the effects of the proposed activities and the intended outcomes in terms of the environment. Draft consent conditions are therefore included as Appendix E.

126. The starting point for the development of these conditions has been consent conditions which have previously been imposed by Environment Southland for similar activities, so as to provide as far as is practicable a consistent starting point. However, where I am of the view that the 'standard' conditions as adopted by Environment Southland are deficient or not appropriate in this instance, I have suggested alternative wording.

127. To this end, I note that it has been accepted that conditions are not necessarily required to be for the exclusive purpose of ameliorating effects directly related to that activity when offered by the applicant. Therefore, it is not 'invalid at law' to adopt the *Augier* principle to impose offered conditions.

128. Considering the matters detailed above, it is in my opinion clear that the application by M & C Adams can be granted subject to the inclusion of conditions. Section 108 (1) of the RMA clearly states that a resource consent may be granted **on any condition** that the consent authority considers appropriate.

129. Section 108 (2) (e) RMA stipulates that a condition can be imposed requiring the holder to adopt the best practicable option to prevent or minimise any actual or likely adverse effect on the environment of the discharge, providing, subject to Section 108 (8) that (amongst other things) the inclusion of that condition is the most efficient and effective means of preventing

or minimising any actual or likely adverse effect on the environment. In my opinion the inclusion of conditions of consent on both the land use consent for a dairy expansion and conditions of a landuse nature on the effluent discharge consent would be the most efficient and effective means of preventing or minimising any actual or likely adverse effect, therefore providing an avenue for the consent to be granted subject to conditions.

130. It is also in my view appropriate to include conditions that in accordance with Section 108 (3) and (4) provide for the development and implementation of management plans. The draft conditions proposed by the applicant (Appendix E) include requirements for the consent holder to prepare and submit management plans as means of providing information to the Consent Authority, as well as allowing for the matters set out in Section 108 (4) (a)-(g) to be addressed.



TANYA COPELAND

SENIOR PLANNER- LANDPRO LIMITED

29 APRIL 2019

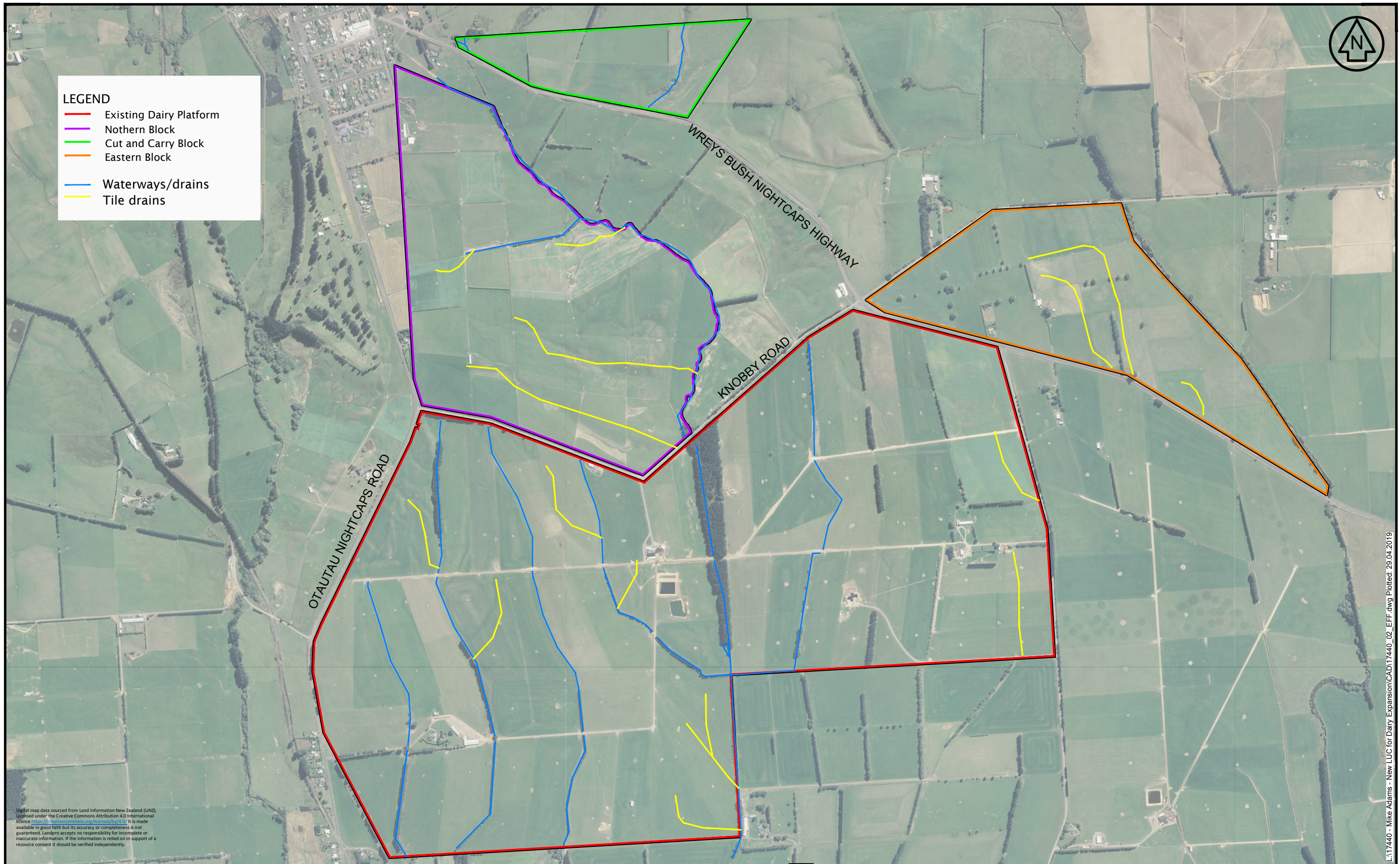
APPENDICIES

Appendix A – Tile Drain Plan



LEGEND

- Existing Dairy Platform
- Nothern Block
- Cut and Carry Block
- Eastern Block
- Waterways/drains
- Tile drains



Digital map data sourced from Land Information New Zealand (LINZ).
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 available in good faith but its accuracy or completeness is not
 guaranteed. Landpro accepts no responsibility for incomplete or
 inaccurate information. If the information is relied on in support of a
 resource consent it should be verified independently.

L:17440 - Mike Adams - New LUC for Dairy Expansion\CAD17440_02_EFF.dwg Plotted: 29.04.2019

Client	ADAMS
NOTES	<ul style="list-style-type: none"> - All dimensions shown are in metres unless otherwise shown - Copyright on this drawing is reserved - Check any electronic data against the hardcopy plan to ensure it is the latest version - If this plan is being used as part of sale and purchase agreement then it is done so on the basis that it is preliminary only, final dimensions and areas may vary on final survey

**M & C ADAMS
TILE DRAINS AND FARM MAP**

Rev.	Date	Revision Details	By	Surveyed	Signed	Date	Job No.	Drawing No.
-	-	-	-	-	-	-	17440	TILE DRAINS
				Drawn	Signed	Date	Scale	
				SLC		29.4.19	1:6250 @ A1 1:12500 @ A3	
				Designed	Signed	Date	Datum & Level	Rev.
							NZTM 2000 & MSL	-



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Appendix B – Certificate of Title(s)

Appendix C – Farm Environmental Management Plan (Draft)

FARM ENVIRONMENTAL MANAGEMENT PLAN

A: Property Overview

Contact Person(s)	Mike and Cindy Adams	Plan Prepared By	Landpro Ltd
Contact Phone	027 225 7097	Date	22 April 2019
Email Address	cindyl@xtra.co.nz	Date of Next Review	30 September 2020
Physical Address	1079 Aparima Road, Wairio		
Consent Numbers and Expiry Dates	TBC		
Farm Area	487.8 ha	Peak Milked Herd Size	1,150
Legal Descriptions	Pt Secs 17, 21, 124 Wairio SD, Secs 131, 132, 338 Wairio SD, Sec 1 SO Plan, Lot 1 DP 13608, CLOSED Road Wairio SD		

This Farm Environmental Management Plan (FEMP) sets out the management practices that will be implemented and adopted to actively manage the operation of the property to ensure that environmental effects are managed appropriately, and resource consent conditions complied with.

The objectives of this plan are to ensure that:

1. there is compliance with all legal requirements related to discharge permits, water permits, and land use consents associated with the operation of the dairy farm;
2. nutrients are used efficiently and nutrient loss to water is minimised;
3. contaminant losses from critical source areas are reduced;
4. cultivation is undertaken in a manner that minimises the movement of contaminants to waterways;
5. intensive winter grazing occurs in a way that minimises the loss of contaminants to waterways; and
6. agricultural effluent and other discharges are managed in a way that minimises the loss of contaminants to water.

This will be achieved through;

- Identifying and documenting contaminant pathways for the property (based on Physiographic Zones);
- Identifying relevant good management practices (GMPs) and mitigation beyond GMPs, and where they are required to be implemented to reduce environmental effects to acceptable levels; and
- Documenting evidence to be provided to show adherence with consent conditions.

As the person responsible for implementing this plan, I confirm that the information provided is correct:

Name:.....

Signed:.....

Date:.....

B: Site Plans

This FEMP contains various site plans identifying key features of the subject property in accordance with Part B(3) of Appendix N of the proposed Southland Water and Land Plan, 2018. The following table can be used as a reference point for locating these features.

Table 1: Schedule of where key features have been mapped

	Plan(s) where features are mapped
Site boundary	All site plans in this FEMP
Physiographic Zones, variants and soil types	Figure 1
Lakes, rivers, streams, ponds, artificial watercourses, modified watercourses and natural wetlands	FEMP Map 1
Other critical source areas (gullies, swales etc)	FEMP Map 1
Land with a slope greater than 20 degrees	None on this property
Existing and proposed riparian vegetation and fences (or other stock exclusion methods) adjacent to waterbodies	FEMP Map 1
Places where stock access or cross water bodies (including bridges, culverts and fords)	FEMP Map 1
Known subsurface drainage system(s) and the location of drain outlets	FEMP Map 1
All land that may be intensively winter grazed over the next 12 months	FEMP Map 1

C: Physiographic Zones and Key Contaminant Pathways

This section of the FEMP documents the Physiographic Zones and variants present across the property and key contaminant pathways associated with these. The Physiographic Plan (Figure 1) shows the location and extent of the Physiographic Zones on the property.

Table 2: Key transport pathways and contaminants for each Physiographic Zone

Physiographic Zone	Key Contaminant Transport Pathways (✓)	
	Overland Flow	Artificial Drainage
Lignite – Marine Terraces	✓	✓
Bedrock/Hill Country	✓	✓
Gleyed	✓	✓

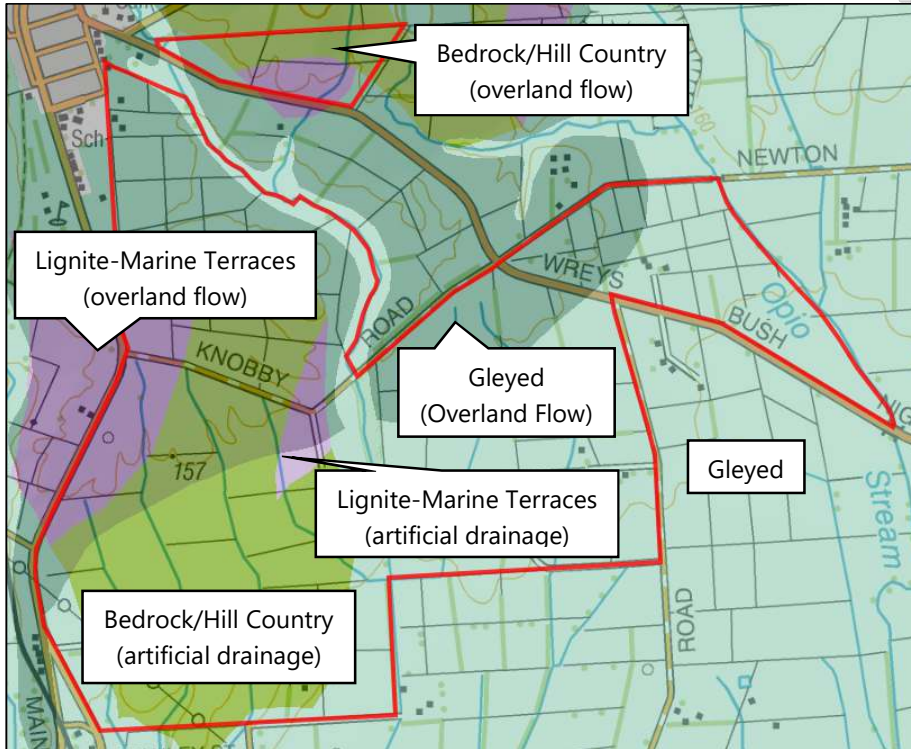


Figure 1: Physiographic Zones and variants present.

Figure 1 shows that:

- The Gleyed physiographic zone is the predominant physiographic zone in the eastern part of the farm;
- The artificial drainage variants of the Bedrock/Hill Country and Lignite – Marine Terraces physiographic zones occur on the northern, central and southern parts of the farm where the topography is gently rolling;
- The overland flow variants of the Bedrock/Hill Country and Lignite – Marine Terraces physiographic zones occur on the northern part of the farm where there is steeper topography; and
- The key contaminant pathway in the northern part of the farm is overland flow, but artificial drainage is a key contaminant pathway across the rest of the farm.

D: Good Management Practices

The table below outlines general good management practices which will be undertaken across the whole farm over the 12-month period from the first exercise of the land use consent for expanded dairying. Critical Source Areas are shown on the attached plans.

Table 3: Good Management Practices for the Farm (Also refer to sections E & F)

DRAFT

Mitigation objective	Good Management Practice / Mitigation beyond GMP	Area where most effective
Protect soil structure (will also help to reduce P and N loss)	1. Reduce stocking rate to 2.4 cows/ha.	Whole farm including identified tile drain locations
	2. Use selective grazing to avoid grazing any saturated paddocks and open the breaks up to avoid pugging and treading damage.	
	3. Any bare soils will be re-sown as soon as possible.	
	4. All cultivation will be undertaken along contours on sloping ground.	
Manage Critical Source Areas	5. All practicable measures will be taken during dry periods to re-grass and stabilise CSAs (shown in FEMP Map 1) and their margins.	Whole farm
	6. Grassed areas (or native vegetation) of at least 3m width will be maintained around CSAs shown in FEMP Map 1. Size of buffer should relate to size, catchment, slope and risk of the CSA.	
	7. All creeks with permanently flowing water will be fenced and a grass or vegetation riparian strip of 3 metres will be in place by 31 October 2020.	
	8. Troughs and gateways will all be moved away from water flow paths.	
	9. (a) All laneways and tracks will use cut-offs and shaping to prevent direct discharges of run-off to water and to maximise the distance that runoff travels before entering water. Specific attention will be paid to prevent direct discharges from culvert crossings.	
	10. New laneways established on the East Block will be a minimum of 10 m from any surface water way	
	11. All practicable measures will be taken during dry periods to re-grass and stabilise CSAs (shown in FEMP Map 1) and their margins.	
Additional P loss reduction GMPs	12. A fertiliser consultant will be used to regularly measure Olsen P at block level, and phosphorus fertiliser programme will ensure that Olsen P is maintained at agronomic optimum at a block level	Whole farm

Manage intensive winter grazing	<p>13. Intensive winter grazing management:</p> <ul style="list-style-type: none"> a) No winter grazing to occur on the East block (fodder crop or grass) b) back-fence stock and use portable water troughs to prevent stock entering previously grazed areas; c) progressively graze stock from the top of a slope to the bottom of a slope; d) use portable feeders when supplementary feed is used; e) ensure critical source areas and swales within the area being grazed are grazed last or grazed on / off to minimise soil disturbance; f) ensure that individual mob sizes being winter grazed do not exceed a maximum of 120 cattle; and g) from 1 October 2020, a vegetated strip will be maintained in, and stock excluded from, the outer edge of the bed of any surface waterbody (excluding ephemeral) and any wetland for a distance of at least 5 metres. h) Grazing of slopes will be carried out as shown on FEMP Map 1 with grazing starting at the top of the slope working down to the bottom of the slope, leaving a 'last bite' buffer zone to be grazed last. 	Whole farm excluding Eastern Block
Additional GMPs to reduce N loss to water	14. Nitrogen fertiliser applications will be timed to meet crop demand using split applications with no nitrogen fertiliser applied between May –July	Whole farm
	15. East Block will have reduced nitrogen applications	East Block

E: Riparian Management

A tributary of the Waikoura Stream runs through the property and the Opio Stream is to the east of the farm. The Wairio Stream is to the west of the farm. There are several smaller, and sometimes ephemeral tributaries that run through the property. The Waikoura Stream, Opio Stream and Wairio Stream are all tributaries of the Otautau Stream, which is a tributary of the Aparima River. The property is wholly contained within the Aparima Surface Water Management Zone.

All waterways across the property have been fenced to prevent stock access. A focus of the next 12 months will be to ensure that a vegetated strip of at least 3m is in place for all permanently flowing waterways. Any drain cleaning works facilitated by the Consent holder will be undertaken in accordance with Environment Southland's *Drainage and Channel Maintenance Fact Sheet*.

Where appropriate and as part of good grazing management, temporary fencing will also be erected to prevent any point source discharges occurring. This includes fencing off swale areas where they may directly discharge to surface water. Such practices will be adopted as set out elsewhere in this plan as part of the management of CSAs, and as set out in the Environment Southland Factsheet on *Critical Source Areas*, and *Dairy NZ Wintering in Southland and South Otago Guide*.

Several small culvert crossings exist on the property, as shown on the attached FEMP Map 1. These will all be inspected over the next 12 months and additional containment and diversion mechanisms will be installed as necessary to ensure there is no direct run-off of effluent from any crossing to water, in accordance with the GMPs outlined in the table above.

F: Farm Dairy Effluent

This section of this plan documents the methods that will be employed in the operation of the Farm Dairy Effluent (FDE) System to ensure that the discharge of effluent occurs in accordance with conditions of consent.

Table 4: Effluent System Overview

Total Effluent Disposal Area (ha):	245 ha	Available Storage Volume:	8,511 m ³	Storage Type:	Clay-lined pond
Effluent Method(s):	Application	Briggs Travelling Irrigator and low rate pods. Slurry tanker may be used on rare occasions, such as desludging the pond.		Maximum Rate and Depth of Application:	Briggs Travelling Irrigator and low rate pods: 10 mm/hr rate and 15 mm average depth per application Slurry tanker: 5mm depth per application

Table 5: FDE Good Management Practices (existing and proposed to continue to be undertaken on farm)

Mitigation	Good Management Practice	Monitoring
Reduction in effluent generation	<ul style="list-style-type: none"> Reduce water use in shed by reusing clean water where possible Treat the herd gently in the dairy shed to avoid upset 	N/A
Effluent applied only when soil conditions are appropriate	<ul style="list-style-type: none"> Sufficient storage provided so that when soils are at or above field capacity and/or during adverse weather conditions, effluent can be stored in the effluent storage pond until conditions are suitable for application Monitoring of soil moisture and temperature will be used to determine soil water deficits for sustainable application depths, from data obtained from the ES website. Paddocks will be inspected before effluent application to check that soil water deficit exists. 	Record irrigation dates, times, and areas on the Irrigator run sheet (attached)
Avoidance of direct effluent disposal or runoff to sensitive areas	<ul style="list-style-type: none"> Effluent discharge will observe a range of buffers from sensitive receiving environments as shown on the Appendix 1 Plan attached to the discharge permit No effluent liquids or solids will be applied to the East Block Low rate effluent discharge will avoid ponding and/or runoff Effluent will not be discharged onto any land areas that have been grazed within the previous 5 days Effluent disposal will be to an area of at least 4 ha/100 cows 	Record irrigation dates, times, and areas on the Irrigator run sheet (attached)

Mitigation	Good Management Practice	Monitoring
Avoidance of effluent contamination in tile drains	<ul style="list-style-type: none"> • Low rate effluent discharge to reduce the risk of through-drainage and associated risk of effluent entering water • Tile drain locations are identified and mapped 	N/A
Efficient and effective collection, storage and disposal infrastructure at all times	<ul style="list-style-type: none"> • Monthly/frequent system checks will be undertaken using the Monthly Effluent Check Sheet attached • All parts of the effluent system will be checked and maintained regularly • Leaks will be repaired immediately • Fail safe systems will be kept in place and kept in good working order i.e. automatic alarm and shut off system • Application Rates shall be assessed annually thereafter in accordance with the methodology specified in <i>Dairy NZ Staff Guide to Operating Your Effluent Irrigation System – Low Rate System</i> 	<p>Record all repairs and maintenance</p> <p>Monthly Effluent Check Sheets filled out and signed</p>
Staff appropriately trained in operation and understand the effluent system	<ul style="list-style-type: none"> • All staff involved in the management of the effluent system are fully trained in its use • All staff are familiar with and understand the conditions of consent • All new staff will be taken through the "Staff Training Guide" (attached) • Staff to take immediate action if incident or breakdowns occur including; <ul style="list-style-type: none"> - Rectifying the problem - Cleaning up if possible 	<p>Keep signed training record in the back off this FEMP</p> <p>Ensure both farm manager and employee sign to confirm training</p>
Application that is not offensive to neighbours	<ul style="list-style-type: none"> • Wind conditions will be checked to ensure the effluent can be discharged without resulting in spray drift and odour beyond the property boundary • Observation of buffers to dwellings not located on the property (200 m) and property boundaries (20 m) 	Complaints received by Environment Southland

G: Compliance & Reporting

This section sets out the records which are required to be kept which will enable the Consent Holder to demonstrate compliance, as well as detailing the reporting requirements of the consents. The Consent Holder will also participate in annual compliance monitoring inspection programs that are to be implemented by Environment Southland.

Table 6: Records to be kept by the Consent Holder

Record	Date of most recent version
Nutrient budget	
Fertiliser application records	
Soil sampling results	
Water meter certification	
Water abstraction records	
Effluent system Staff Training Record	
Effluent system monthly maintenance check sheets	
Effluent proof of placement	
Effluent application depth test results	

Annual reporting requirements are set out in the conditions of resource consent and include;

- Prior to the first exercise of the Effluent Discharge Permit, the Consent Holder shall notify Environment Southland of the operator of the effluent system
- The Farm Environmental Management Plan shall be reviewed annually, and any amendments reported to Environment Southland by 31 June each year
- The Consent Holder shall provide water abstraction records to ES by 31 May each year, in accordance with the Water Permit

H: Annual Review & Audit of FEMP

This FEMP shall be reviewed on an at least annual basis. The review shall include (but not be limited to) an assessment of;

- Verification of compliance with conditions of consent
- Details of the implementation of GMPs and identification of any new GMPs that would be appropriate to employ on the farm to manage risks identified
- Review of the data obtained from the monitoring undertaken in accordance with this FEMP and any changes to farming practice required as a consequence
- A report detailing items above shall be submitted to the consent authority each year including an updated version of the FEMP if any amendments made

I: Industry Guidelines

A complete list of the industry guidelines which have been referenced in the development of this FEMP are listed below. The Consent Holder is also referred to the following general sources for guidance in respect to the operation and management of their property.

Environment Southland www.es.govt.nz

Dairy NZ www.dairynz.co.nz

Fonterra www.fonterra.com

Dairy NZ – A staff guide to operating your effluent irrigation system – Low Rate System

Dairy NZ – A farmer’s guide to managing farm dairy effluent – A good practice guide for land application systems

Dairy NZ – Wintering in Southland and South Otago – A land management guide to good environmental practice

Dairy NZ – Land management on Canterbury Dairy Farms – Managing land to reduce sediment and phosphorous loss

Environment Southland Factsheet – Critical Source Areas

Environment Canterbury – Information Sheet for Farmers on OVERSEER®

Sustainable Dairying: Water Accord

Attachment A – Consents



**environment
SOUTHLAND**

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 **M & C Adams for the M J Adams Trust** (the "consent holder") of **1570 Otautau Nightcaps Road, R D 1, Otautau** from **14 January 2014**.

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	1570 Otautau Nightcaps Road, Wairio
- site locality	NZTM2000 1216310, 4895210
- map reference	Land
- receiving environment	Waicolo Stream
- catchment	
Legal description of land at the site:	Part Section 21 Wairio Survey District, Section 131 Wairio Survey District, Section 132 Wairio Survey District, Lot 1 DP 5340 and Part Section 21 Wairio Survey District.
Expiry date:	14 January 2024
Consent amended:	Conditions amended on 2 January 2016.

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.

1. This consent is granted for a period of 10 years.

(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. (a) This consent authorises the discharge of dairy shed effluent onto land, via a land disposal system, as described in the application dated 16 October 2013, further information dated 13 November 2013, and the application to amend conditions dated 23 December 2015, on land known as Part Section 21 Wairio Survey District, and Sections 131 & 132 Wairio Survey District. The scope of the activity is described in the application as being, amongst other things:
 - the discharge to land of dairy shed effluent generated from milking of up to 1,000 cows up to twice per day;
 - the discharge of farm dairy effluent to land via a low rate pod set and travelling irrigation system;
 - the discharge of dairy shed effluent to a discharge area of no more than 245 hectares as per the plan attached as Appendix 1
- (b) This consent excludes effluent from winter milking or from any wintering facility or feed pad.
3. (a) No dairy shed effluent 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 offensive or objectionable odour beyond the property boundary, or any spray drift into or beyond the buffer zones specified in condition 5.
- (c) The consent holder shall install and maintain an alarm and automatic switch-off system as a contingency measure in the event of an effluent system failure such as a sudden pressure drop, irrigator stoppage or breakdown. **See Best Practice Note 4**
4. Subject to condition 3(a), the land disposal system is limited to the following:
 - (i) For the low rate pods or travelling irrigator: a maximum depth of application of 15 mm for each individual application, at an instantaneous rate not exceeding 10 mm/hour;

(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 dairy shed effluent. **See Best Practice Note 5**
5. Effluent 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) 20 metres of any surface watercourse;
 - (b) 100 metres of any potable water abstraction point;

- (c) 20 metres of any property boundary (unless the adjoining landowner's consent is obtained to do otherwise);
- (d) 200 metres of any other residential dwelling other than residential dwellings on the property.

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

6. The amount of farm dairy effluent disposed of onto land shall not exceed that from 1,000 cows.
7. Prior to exercising this consent the consent holder shall provide at least 5,606 m³ of effluent storage for the purpose of:
 - (a) avoiding irrigation of effluent 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. The consent holder shall notify the Council, by 20 October 2014, of the person who is in charge of the operation of the effluent 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 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.)

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;
 - (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; or
 - (f) to give effect to National Environmental Standards and/or a National Policy Statement.

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 1991. This charge may include the costs of inspecting the site twice each year (or otherwise as set by the Council's Annual Plan), and of monitoring the effects of the discharge on surface water, as follows:
 - (a) monitoring of watercourses may be undertaken up to three times each year;

- (b) representative samples will be taken from the watercourse near the effluent disposal field, upstream and downstream of the discharge area, at points approved by the Council's Compliance Manager;
- (c) the samples will be analysed for:
 - pH;
 - electrical conductivity;
 - ammoniacal nitrogen concentration;
 - nitrate nitrogen concentration;
 - dissolved reactive phosphorous concentration;
 - *E. coli* 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 overflow to water, significant over-application on a free-draining area or pond collapse) occurs that may have significant adverse effect on water quality, particularly 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**

Reissued on 2 February 2016 following amendments to the map reference, Conditions 2 and 4 and the Appendix 1 map.



Hilary Lennox
Consents 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 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.
7. 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.
8. 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: M & C Adams
For the M J Adams Trust

- the total milking herd cannot exceed 1,000 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 on the land identified as on the Appendix 1 Plan a maximum depth of application of 15 mm for each individual application, at an instantaneous rate not exceeding 10 mm/hour;
- the contingency plan consists of:
 - 5,606 m³ effluent pond

(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 application is leaving a heavy residue or smothering the grass | Speed up the irrigator |
| • the irrigator is stalling and over-applying | Minimise the amount of hose being pulled by looping the hose ahead of the irrigator |
| • 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.



**environment
SOUTHLAND**

AUTH-302700-03

Cnr North Road and Price Street
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Invercargill

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

Water Permit

Pursuant to Section 104C of the Resource Management Act 1991, a resource consent is hereby granted by the Southland Regional Council (the "Council") to **M & C Adams for the M J Adams Trust** (the "consent holder") of **1570 Otautau Nightcaps Road, R D 1, Otautau** from **14 January 2014**.

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	- site locality - map reference - groundwater zone - catchment	1570 Otautau Nightcaps Road, Wairio NZMS 260 D45:273:573 Upper Aparima Waicolo Stream
Legal description of land at the site:	Section 131 Wairio Survey District	
Expiry date:	14 January 2024	

Schedule of Conditions

1. This consent is granted for a period of 10 years.
(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 D45/0318 at about NZMS 260 D45:273:573.

3. The maximum daily abstraction shall not exceed 110,000 litres, at a rate not exceeding 2 litres/second.
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 flow meters or other water measuring devices:
 - (i) capable of accuracy to within 5% of the true flow rate, on each abstraction;
 - (ii) in a location able to measure all the water taken;
 - (iii) in accordance with the manufacturer's instructions;
 - (iv) that shall record volumes in litres or cubic metres;
 - (v) capable of continuous measurement of water use; and
 - (vi) that are sealed and as tamper proof as practicable
 - (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 Sections 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**



Vin Smith
Director of Policy, Planning and Regulatory Services



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AUTH-302700-02

Cnr North Road and Price Street
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Invercargill

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Southland Freephone No. 0800 76 88 45

Land Use Consent

Pursuant to Section 104B of the Resource Management Act 1991, a resource consent is hereby granted by the Southland Regional Council (the "Council") to **M & C Adams for the M J Adams Trust** (the "consent holder") of **1570 Otautau Nightcaps Road, R D 1, Otautau** from **14 January 2014**.

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 convert land to a dairy farm
Location	1570 Otautau Nightcaps Road, Wairio
- site locality	NZMS 260 D45:263-572
- map reference	Land
- receiving environment	Waicolo Stream
- catchment	
Legal description of land at the site:	Part Section 21 Wairio Survey District, Section 131 Wairio Survey District, Section 132 Wairio Survey District, Lot 1 DP 5340 and Part Section 21 Wairio Survey District.
Expiry date:	Granted in Perpetuity

Schedule of Conditions

- In accordance with Section 123(b) of the Resource Management Act 1991, this consent is granted for an unlimited period.
 - The consent holder's interest in this land use consent may only be transferred, in full or in part, to another person if that person is the owner or occupier of the land and written notice of the transfer is given to the consent authority.

2. This consent authorises the use of land for new dairy farming as generally described in the application dated 16 October 2013 at the property known as Part Section 21 Wairio Survey District, Section 131 Wairio Survey District, Section 132 Wairio Survey District, Lot 1 DP 5340 and Part Section 21 Wairio Survey District.

Farm Environmental Management Plan

3. (a) Prior to the commencement of dairying on the property, a Farm Environmental Management Plan ("FEMP") shall be prepared and submitted to Director of Policy, Planning & Regulatory Services for confirmation that it is in accordance with the conditions of this consent. The purpose of the FEMP shall be as follows:
- (i) to outline how compliance with any relevant Council rules or standards that apply to the activity will be achieved;
 - (ii) to outline how compliance with the conditions of any resource consent that apply to the activities on the property will be achieved;
 - (iii) to outline the consent holder's land management practises to avoid, remedy, or mitigate adverse effects on the environment.
- (b) The FEMP shall detail the following aspects of the operation:
- (i) description of the site, climate and topography;
 - (ii) description of the farming operations and systems, including agricultural good practices to be adopted;
 - (iii) nutrient management;
 - (iv) effluent management;
 - (v) waterways and riparian management;
 - (vi) biodiversity management;
 - (vii) soil management – Winter Management Plan
 - (viii) consent compliance;
 - (ix) monitoring requirements.
- (c) An up-to-date copy of the FEMP shall be maintained by the consent holder at all times and all farming activities shall be undertaken in accordance with this plan. A copy of the plan shall be provided to the Council on request.
- (d) The FEMP shall be reviewed annually to ensure it reflects both on farm and best farm practice. Any significant changes to the Farm Environmental Management Plan shall be submitted to Director of Policy, Planning & Regulatory Services for confirmation that it is in accordance with the conditions of this consent and that the changes will not have a significant adverse effect on the environment.
4. 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 1991. This charge may include the costs of monitoring the effects of land use on surface water, as follows:
- (a) monitoring of background surface water quality may be undertaken on one occasion prior to the commencement of milking on the property;
 - (b) representative samples shall be taken from open drains crossing the property at the locations listed below, or at up to three points otherwise agreed by the Council's Compliance Manager:

- (NZMS 260 E46: 399-201)
- (NZMS 260 E46: 397-206)
- (NZMS 260 E46: 405-198)

(c) the samples will be analysed for:

- pH;
- electrical conductivity;
- ammoniacal nitrogen concentration;
- nitrate nitrogen concentration;
- dissolved reactive phosphorous concentration;
- *E. coli* concentration;
- bromine concentration;
- chloride concentration;
- dissolved oxygen concentration; and
- total suspended solids concentration.

for the **Southland Regional Council**



Vin Smith
Director of Policy, Planning and Regulatory Services

Notes:

1. *In accordance with Section 125(1)(a) of the Resource Management Act, this consent shall lapse after a period of five years unless either the consent is given effect to, or an application is made to extend the lapsing period before the consent lapses.*
2. *Section 126 of the Resource Management Act provides for this resource consent to be cancelled if, having commenced, the exercise of this resource consent ceases for a period of 5 years or more.*
3. *Section 127 of the Resource Management Act allows for the consent holder to apply for changes to the conditions of this resource consent including the constraints or description of activity imposed by the original consent application.*
4. *The purpose of this monitoring specified in Condition 9 is to use as a baseline measurement to assess the effects of the land use change on water quality. Condition 9(b) specifies the monitoring site, although the Compliance Manager can change the location or require sampling at up to two points, which may occur if an alternative needs to be found to the sampling site specified in the condition or if a sampling site upstream of the property is necessary to provide information on background water quality.*

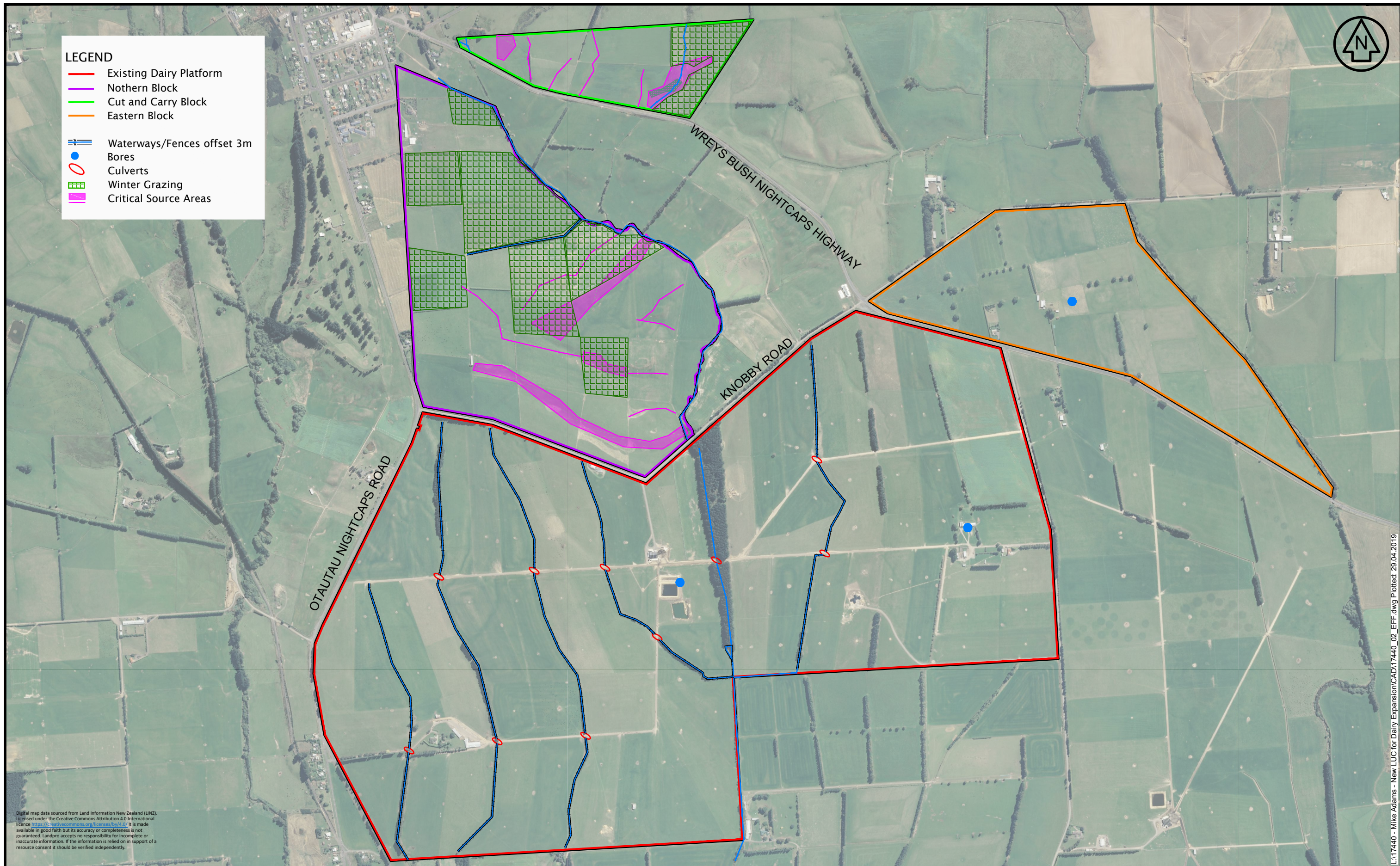
Attachment B – Farm Plans

DRAFT



LEGEND

- Existing Dairy Platform
- Northern Block
- Cut and Carry Block
- Eastern Block
- Waterways/Fences offset 3m
- Bores
- Culverts
- ▤ Winter Grazing
- ▤ Critical Source Areas



Digital map data sourced from Land Information New Zealand (LINZ). Licensed under the Creative Commons Attribution 4.0 International licence <https://creativecommons.org/licenses/by/4.0/>. It is made available in good faith but its accuracy or completeness is not guaranteed. Landpro accepts no responsibility for incomplete or inaccurate information. If the information is relied on in support of a resource consent it should be verified independently.

L:17440 - Mike Adams - New LUC for Dairy Expansion\CAD17440_02_EFF.dwg Plotted: 29.04.2019

Client	ADAMS
NOTES	<ul style="list-style-type: none"> - All dimensions shown are in metres unless otherwise shown - Copyright on this drawing is reserved - Check any electronic data against the hardcopy plan to ensure it is the latest version - If this plan is being used as part of sale and purchase agreement then it is done so on the basis that it is preliminary only, final dimensions and areas may vary on final survey

**M & C ADAMS
"DRAFT"
FEMP**

Rev.	Date	Revision Details	By	Surveyed	Signed	Date	Job No.	Drawing No.
-	-	-	-	-	-	-	17440	FEMP
				Drawn	Signed	Date	Scale	1:6250 @ A1
				SLC		29.4.19	1:12500 @ A3	
				Designed	Signed	Date	Datum & Level	Rev.
							NZTM 2000 & MSL	-



OFFICES IN CROMWELL, GORE, AND NEW PLYMOUTH - www.landpro.co.nz

Attachment C – Nutrient budget for the previous season

DRAFT

Roslin Consultancy Ltd



Overseer Modelling Report

Prepared as part of a consent application for
expanded dairying

Report prepared for:

M & C Adams

1079 Aparima Road

Wairio

Report Prepared In Collaboration By:

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Executive Summary

The property is located in the Western Southland area and operates as a milking platform and is consented to peak milk 1000 cow and all cows are wintered off. It is intended to purchase two neighbouring properties – a dairy support unit and a sheep breeding and finishing unit. It is proposed to expand the dairy platform onto the two purchased blocks, increase the peak cow numbers to 1150 and winter the cows on farm.

Using Overseer (version 6.3) nutrient budgets have been constructed for the current land use (using actual cow numbers of 900 cows rather than consented cow numbers of 1000 cows) and a proposed dairy unit nutrient budget to inform the consent application for expanded dairying.

Predicted results from the Overseer modelling are shown below:

	Current Milking Platform (900 cows)	Current Dairy Support Block	Current Sheep Breeding Block	Total Current Land Use
Total Farm N Loss	15092 kg	8198 kg	1395 kg	24685 kg
N Loss/ha	46	82	23	51
N Concentration in Drainage	Pastoral – 9.2 to 14.1 ppm Crop – 10.7 to 39.7 ppm	Pastoral – 4.9to 5.7 ppm Crop – 29.5 to 33.7 ppm	Pastoral – 3.2 – 3.6 ppm Crop – 27.1 ppm	
Total Farm P Loss	349 kg	175 kg	36 kg	560 kg
Average P loss/ha	1.1 kg/ha/yr	1.8 kg/ha/yr	0.6 kg/ha/yr	1.1 kg/ha/yr
Pasture Grown Kg DM / ha / year	16.1	11.0	14.0	

Table 1: Summarised predicted results from the Overseer analysis of the Adams current nutrient budgets

	Proposed Dairy Unit (1150 cows)
Total Farm N Loss	21893 kg
N Loss/ha	45
N Concentration in Drainage	Pastoral – 7.4 to 10.9 ppm Crop – 9.3 to 26.9 ppm
Total Farm P Loss	579 kg
Average P loss/ha	1.2 kg/ha/yr
Pasture Grown Kg DM / ha / year	15.8

Table 2: Summarised predicted results from the Overseer analysis of the Adams proposed nutrient budget

Using Overseer, nutrient budgets have been constructed for Adams, comparing the nutrient loss of the current farm system against the proposed farm system. Overseer has predicted that the nitrogen loss will decrease and phosphorus loss will increase slightly (by less than 5%).

Key drivers for the reduction in nitrogen loss are:

- Decrease in winter crop area
- Decrease in cows wintered
- Decrease in stocking rate (on a per hectare basis)

Key drivers for the increase in phosphorus loss are:

- An increase in losses from “other sources”

Off Site Effects

The impact of off site effects of extra cow wintering has been raised by Environment Southland in a pre lodgement meeting. While the interpretation of this is unclear, an attempt has been made below to account for the off site effects.

There were previously around 1,470 cows (based on the average crop grown over the last 4 years). Through the cessation of the commercial wintering activity on the support block, there could be around 530 cows that are now being wintered somewhere else.

	Cows Wintered On Land Holding	Cows Wintered Off Land Holding	Total Cows
Current	1470	940 (Adams)	2410
Proposed	1200	1470 (3 rd party)	2670
	Increase of	530 cows wintered	Off land holding

Assuming the extra 530 cows are wintered on a 25 t DM crop of fodderbeet, they would require 17.3 ha of fodderbeet (9 kg DM of fodderbeet for 77 days at 85% utilisation).

Assuming that the fodderbeet crop on average has the following losses (based on the modelling assumptions from the current neighbouring dairy support block of an average N loss of 148 kg N / ha and 1.6 kg P / ha))

- 2560 kg N on 17.3 ha of fodderbeet
- 28 kg P on 17.3 ha of fodderbeet

	Proposed Dairy Unit (1150 cows)	Off Site Effect of 530 extra cows on 17.3 ha fodderbeet	Proposed 1150 cows plus offsite effect
Total Farm N Loss	21893 kg	2560 kg	24453
Total Farm P Loss	579 kg	28	607

Table 3: Assessment of the off site effects of Adams proposal (calculated outside of Overseer)

Note

The above should be interpreted with caution

- The land would have been used for another land use prior to cow wintering off site , the nutrient loss of this prior activity has not been taken account of (and would reduce the offsite effect of the extra cows)
- Different locations (different soils and climate) would provide different loss data
- This assumes that the cows are alive and wintered in Southland (and on crop)

Recommendations from here

Overseer can model a range of good management practices. However, some farm specific good management practices cannot be modelled. It is recommended that the following good management practices are implemented on this property:

- Ensure there are appropriate buffer zones in place for winter grazing to reduce the risk of sediment runoff
- Winter crops should be grazed with the use of back fences and portable water troughs. A grazing plan of the winter crop should be developed to take into account the contour of the paddock and any waterways.
- Fertiliser is applied at the correct rate, and is not applied in close proximity to waterways
- Identify and manage critical source areas to reduce the risk of losses. These include loses from laneways, gateways and high traffic zones.

The nutrient budgets within this report have been developed assuming that soil fertility is at the agronomic optimum and that maintenance fertiliser is applied each year. A soil testing regime should be implemented and fertiliser recommendations should be developed in line with these soil testing results.

The proposed Southland Water and Land Plan is currently in process. It will be important to stay up to date with developments in Environment Southland policy and rules, including the Limit Setting Process which will develop over the next few years

A farm environmental management plan detailing the recommendations within this report should be developed for the property.

Introduction

The property is located in the Western Southland area and operates as a milking platform and is consented to peak milk 1000 cow and all cows are wintered off. It is intended to purchase two neighbouring properties – a dairy support unit and a sheep breeding and finishing unit. It is proposed to expand the dairy platform onto the two purchased blocks, increase the peak cow numbers to 1150 and winter cows on farm.

Using Overseer (version 6.3) nutrient budgets have been constructed for the current land use (using actual cow numbers of 900 cows rather than consented cow numbers of 1000 cows) and a proposed dairy unit nutrient budget to inform the consent application for expanded dairying.

Local Environment and Current Regulations

The proposed Southland Water and Land Plan has been notified by Environment Southland and is currently in the appeals process.

Key elements of the Southland Water and Land Plan are as follows:

- The use of physiographic zones to inform policies and rules in the plan
- Use of good management practices and farm environmental management plans
- A focus on new dairy farming and intensification
- Implementation plan for stock exclusion from waterways
- Buffer zone requirements for cultivation on sloping land
- Importance of discharges from tile drains
- Surface and ground water takes
- Management of biodiversity

This report will emphasise the relevant requirements in the Southland Water and Land Plan from a nutrient budgeting perspective. The broader range of requirements should be captured in the Farm Environment Plan. The Farm Environment Plan is outside the scope of this report, however this report will inform the Farm Environment Plan

Current Land Use

The current milking platform of 327.9 ha (310.0 ha effective) is located in Western Southland (close to Nightcaps). The property is currently consented to peak milk 1000 cows with all cows wintered off. Following the notification of the Water and Land Plan on the 4th of April 2018 and subsequent advice from Environment Southland the current milking platform has been modelled as the actual farming enterprise (peak milking 900 cows). Calves leave the property following weaning and all heifers are grazed off. 6.0 ha of fodderbeet is planted on the milking platform to bring cows home to in the early spring and 9 ha of summer turnips are also grown. 224kg ha of inorganic nitrogen is applied, effluent is applied to 168.4 ha. Bought in feed has been assumed to ensure that a feasible pasture growth rate is achieved in an average season when consented cow numbers are being milked.

The neighbouring dairy support block (of 99.6ha) is owned and operated by another farmer. Information has been provided by the neighbouring farmer to enable modelling of the current land use to be undertaken.

Winter crop has been grown as follows:

Year	Area crop (ha)
2015	30
2016	35
2017	52
2018	76

For the current land use nutrient budget the average winter crop area for the last 4 years has been assumed at 48 ha, with 1470 cows grazing the crop for 77 days (cows fed 9 kg DM in fodderbeet at 85% utilisation)

The neighbouring sheep breeding block (of 60.3ha) was purchased in December 2017. Since its purchase, it has been operated as a silage block. A full season's data is not available and the ongoing management of the block will depend on whether a consent to dairy farm the block is obtained. The block has been modelled in Overseer as per its pre purchase management – a sheep breeding and finishing property. Accurate stock numbers were not available. At the time of inspection the block was assessed as a highly productive unit. Due to lack of data, an estimate of stocking rate and management practice has been made utilising Google Earth imaging, Mike Adam's knowledge, Beef and Lamb farm monitoring data and professional judgement.

Proposed Land Use

Property management objective:

- To operate a sustainable and resilient farm system across a range of payout conditions

It is proposed to operate the total property of 487.8 ha (464.9ha effective) as a property that peak milks 1150 cows and winters 1200 cows. Calves will leave the property following weaning and all heifers are grazed off. 37 ha of fodderbeet will be planted (rotating as part of the regrassing programme), and used for autumn transition, wintering and the early spring period. 12 ha of summer turnips will also be grown. 224kg per ha of inorganic nitrogen will be applied to the non effluent areas and 196 kg per ha of inorganic nitrogen to the effluent areas. Effluent is applied to 168.4 ha. Bought in feed has been assumed to ensure that a feasible pasture growth rate is achieved in an average season when the proposed farm system is operating.

Modelling Method

Nutrient losses have been estimated using Overseer. There are a number of different methods that could be used to model the current land use. The modelling method was discussed with Fertiliser and Lime Research Centre staff at Massey University. Taking their advice the current land use has been modelled as three separate nutrient budgets (milking platform, dairy support and sheep breeding) and the results combined outside of Overseer.

As the proposed is one farm system, the proposal has been modelled as one nutrient budget.

Further information on Overseer can be found in the following reports:

- Technical Description of OVERSEER for Regional Councils, September 2015
- Review of the phosphorus loss submodel in OVERSEER®, September 2016

Overseer Version and Protocols

The nutrient budgets have been developed using Overseer 6.3 and the “Overseer Best Practice Data Input Standards, August 2016”. No deviations have been made from the protocol.

Overseer Assumptions

- Long term annual average model - the model uses annual average input and produces annual average outputs
- Near equilibrium conditions - model assumes that that the farm is at a state where there is minimal change each year
- Actual and reasonable inputs - it is assumed that input data is reasonable and a reflection of the actual farm system. If any parameter changes, it is assumed that all other parameters affected will also be changed.
- Good management practices are followed - Overseer assumes the property is managed in line with accepted industry good management practice.

Overseer Limitations

Key limitations of the Overseer model are:

- Overseer does not predict transformations, attenuation or dilution of nutrients between the root zone or farm boundary and the eventual receiving water body. A catchment model is needed to estimate the effects of the nutrient losses from farms on groundwater, river or lake water quality.
- Overseer does not calculate outcomes from extreme events (floods and droughts), but provides a typical years result based on a long-term average.
- Overseer does not calculate the impacts of a conversion process, rather it predicts the long-term annual average nutrient budgets for changed land use.
- Overseer is not spatially explicit beyond the level of defined blocks
- Not all management practices or activities that have an impact on nutrient losses are captured in the Overseer model
- Overseer does not represent all farm systems in New Zealand

- Components of Overseer have not been calibrated against measured data from every combination of farm systems and environment

Modelling Inputs

To construct the nutrient budgets the following assumptions have been made;

Blocks

The farm has been split into the following pastoral (effluent and non effluent), fodder crop (rotating) and crop blocks.

Block Name	Soil Type	Contour	Current Milking Platform	Current Dairy Support Block	Current Sheep Breeding Block	Proposed Dairy Unit
Ohai MP Eff Flat	Auchr_9b.1	Flat	28.0			28.0
Ohai MP Eff Rolling	Auchr_9b.1	Rolling	18.7			18.7
Makarewa MP Eff Flat	Makar_3b.1	Flat	7.8			7.8
Aparima MP Eff Flat	Apar_6a.1	Flat	112.3			112.3
Aparima MP Eff Rolling	Apar_6a.1	Rolling	1.6			1.6
Ohai Non Eff Flat	Auchr_9b.1	Flat	17.6	10.1	16.4	92.1
Makarewa Non Eff Flat	Makar_3b.1	Flat	8.6	3.2	13.9	25.7
Makarewa Non Eff Rolling	Makar_3b.1	Rolling		5.3		5.3
Aparima Non Eff Flat	Apar_6a.1	Flat	99.9		27.9	127.8
Aparima Non Eff Rolling	Apar_6a.1	Rolling	0.3			0.3
Ohai Non Eff Rolling	Auchr_9b.1	Rolling	15.2	30.1		45.3
Fodderbeet (1 st crop)	Auchr_9b.1			24.0		
Fodderbeet (2 nd crop)	Auchr_9b.1			24.0		
	Effective Farm Area		310.0 ha	96.7 ha	58.2	464.9 ha
	Non productive area		17.9 ha	2.9 ha	2.1	22.9 ha
	Total Farm Area		327.9 ha	99.6 ha	60.3	487.8 ha
Fodderbeet (rotating)			6.0			37.0
Summer turnips (rotating)			9.0			12.0
Swedes (rotating)					6.0	

- Soils areas were obtained from soils mapping provided by LandPro and SMaps (refer appendices)
- Soil settings were obtained from SMap for all soil types
- It is assumed that 60% of the land is mole and tile drained.

Climate Data

- Southland as the location setting
- Climate station tool for the block climate data
 - 995 mm of rainfall
 - 9.6 degrees Celsius has been used as the mean annual temperature
 - Daily rainfall pattern setting 731-1450mm, low
 - 710 mm mean annual PET

Farm System

Description	Current Milking Platform	Current Neighbouring Block	Current Sheep Breeding Block	Proposed Dairy Unit
Milk solids production	432,000 kg ms Mean calving date 23rd August Dry Off 31st ^h May	N/A	NA	552,000 kg ms Mean calving date 23rd August Dry Off 31st May
Cows peak milked and wintered	<u>Breed (Fr J X)</u> July 0 Aug 940 Sept 925 Oct 900 Nov 900 Dec 900 Jan 855 Feb 855 March 810 Apr 765 May 711 June 0 Cows peak milked =900 27 bulls (Angus) Dec and Jan	<u>Breed (Fr J X)</u> May 390 June 1470 July 1470 Aug 390	NA	<u>Breed (Fr J X)</u> July 1200 Aug 1170 Sept 1160 Oct 1150 Nov 1150 Dec 1150 Jan 1090 Feb 1090 March 1030 Apr 970 May 900 June 1200 Cows peak milked = 1150 34 bulls (Angus) Dec and Jan
Dairy replacements on farm	234 calves (all off property by 1 st of January)	200 yearling heifers from Sept to April	NA	300 calves (all off property by 1 st of January)

Description	Current Milking Platform	Current Neighbouring Block	Current Sheep Breeding Block	Proposed Dairy Unit
Sheep			Wintered 521 ewes and 125 replacements 160% lambing 5 rams 3400kg wool	
Milking shed feeding	100% of cows fed during lactation	N/A	NA	100% of cows fed during lactation
Structures	None	None	NA	None
Area crop	<p><u>6.0 ha fodderbeet platform</u> (yield 20 t DM / ha) Conventional cultivation Nov Fert at sowing 47N, 38P, 50K, 18S 100 kg urea in Jan and March Grazed Aug and Sept with cows</p> <p><u>9 ha Summer turnips</u> (yield 8 t DM / ha) Conventional cultivation Oct 350 kg CM 15 at sowing 80 kg urea in Dec Grazed by cows Feb (3 hours) Resown into pasture March</p>	<p><u>24.0 ha fodderbeet (1st crop)</u> (yield 25 t DM / ha) *modelled as 18 t due to Overseer overfeeding error messages Conventional cultivation Nov Fert at sowing 175kg DAP 150 kg Sustain (Dec and Jan) 150 kg Sustain (March)</p> <p>Grazed May to Aug with cows</p> <p><u>24.0 ha fodderbeet (2nd crop)</u> (yield 25 t DM / ha)*modelled as 18 t due to Overseer overfeeding error messages</p> <p>Conventional cultivation Nov Fert at sowing 175kg DAP</p>	<p><u>6.0ha Swedes</u> (yield 12tDM/ha) Conventional cultivation November 200kg/ha DAP at sowing 40kg/ha Potassium Chloride at sowing 100kg/ha Urea in January Grazed Jun – Aug by sheep Resown into permanent pasture in October</p>	<p><u>37.0 ha fodderbeet</u> (yield 20 t DM / ha) Conventional cultivation Nov Fert at sowing 47N, 38P, 50K, 18S 100 kg urea in Jan and March Grazed April (2 hours), May (3 hours) June to Aug with cows</p> <p><u>12 ha Summer turnips</u> (yield 8 t DM / ha) Conventional cultivation Oct 350 kg CM 15 at sowing 80 kg urea in Dec Grazed by cows Feb (3 hours) Resown into pasture March</p>

Description	Current Milking Platform	Current Neighbouring Block	Current Sheep Breeding Block	Proposed Dairy Unit
		150 kg SustainN (Dec and Jan) 150 kg SustainN (March) Grazed May to Aug with cows		
Supplements	<u>Imported</u> <ul style="list-style-type: none"> • 480 t DM PKE (fed in paddocks) • 200 T DM of barley grain (fed in milking shed) • 400 t DM silage (fed across pastoral areas) • 50 t DM baleage (fed on fodderbeet) 	<ul style="list-style-type: none"> • <u>Imported</u> • <u>150t DM Baleage (fed on fodderbeet)</u> 	<u>NA</u>	<u>Imported</u> <ul style="list-style-type: none"> • 400 t DM PKE (fed in paddocks) • 425t DM of barley grain (fed in milking shed) • 200 t DM baleage (fed on fodderbeet)
Soil tests and fertiliser	Soil fertility at the agronomic optimum and that maintenance fertiliser is applied each year.	Soil fertility at the agronomic optimum and that maintenance fertiliser is applied each year.	Soil fertility at the agronomic optimum and that maintenance fertiliser is applied each year.	Soil fertility at the agronomic optimum and that maintenance fertiliser is applied each year.
Nitrogen	224 kg N / ha split Aug to March	84 kg N / ha split Oct to April	31 kg N/ha in September	<u>Non Effluent</u> 224 kg N / ha split Aug to March <u>Effluent</u> 196 kg N / ha split Aug to March
Farm dairy effluent	Holding pond Solids separated 12 to 24mm application	N/A	NA	Holding pond Solids separated 12 to 24mm application

Description	Current Milking Platform	Current Neighbouring Block	Current Sheep Breeding Block	Proposed Dairy Unit
	58 ha required to achieve a loading of less than 150kg N / ha from effluent			71 ha required to achieve a loading of less than 150kg N / ha from effluent

Predicted Overseer Results –

	Current Milking Platform (900 cows)	Current Dairy Support Block	Current Sheep Breeding Block	Total Current Land Use
Total Farm N Loss	15092 kg	8198 kg	1395 kg	24685 kg
N Loss/ha	46	82	23	51
N Concentration in Drainage	Pastoral – 9.2 to 14.1 ppm Crop – 10.7 to 39.7 ppm	Pastoral – 4.9 to 5.7 ppm Crop – 29.5 to 33.7 ppm	Pastoral – 3.2 – 3.6 ppm Crop – 27.1 ppm	
Total Farm P Loss	349 kg	175 kg	36 kg	560 kg
Average P loss/ha	1.1 kg/ha/yr	1.8 kg/ha/yr	0.6 kg/ha/yr	1.1 kg/ha/yr
Pasture Grown Kg DM / ha / year	16.1	11.0	14.0	

Table 4: Summarised predicted results from the Overseer analysis of the Adams current nutrient budgets

It should also be noted that the soils on the neighbouring support block are pallic and gleyed with a rolling contour. This greatly increases the risk of contaminant loss.

When using the crop model in Overseer, the contour is not entered. It is therefore likely that the phosphorus loss 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 (pallic 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 1.6 kg / ha of phosphorus loss estimated by Overseer in the fodder crop block report).

Reference: Reducing surface runoff from grazed winter forage crop paddocks by strategic grazing management [/www.dairynz.co.nz/media/5787285/reducing_surface_runoff.pdf](http://www.dairynz.co.nz/media/5787285/reducing_surface_runoff.pdf)

	Proposed Dairy Unit (1150 cows)
Total Farm N Loss	21893 kg
N Loss/ha	45
N Concentration in Drainage	Pastoral – 7.4 to 10.9 ppm Crop – 9.3 to 36.9 ppm
Total Farm P Loss	579 kg
Average P loss/ha	1.2 kg/ha/yr
Pasture Grown Kg DM / ha / year	15.8

Table5: Summarised predicted results from the Overseer analysis of the Adams proposed nutrient budget

Off Site Effects

The impact of off site effects of extra cow wintering has been raised by Environment Southland in a pre lodgement meeting. While the interpretation of this is unclear, an attempt has been made below to account for the off site effects.

There were previously around 1,470 cows (based on the average crop grown over the last 4 years). Through the cessation of the commercial wintering activity on the support block, there could be around 530 cows that are now being wintered somewhere else.

	Cows Wintered On Land Holding	Cows Wintered Off Land Holding	Total Cows
Current	1470	940 (Adams)	2410
Proposed	1200	1470 (3 rd party)	2670
	Increase of	530 cows wintered	Off land holding

Assuming the extra 530 cows are wintered on a 25 t DM crop of fodderbeet, they would require 17.3 ha of fodderbeet (9 kg DM of fodderbeet for 77 days at 85% utilisation).

Assuming that the fodderbeet crop on average has the following loses (based on the modelling assumptions from the current neighbouring dairy support block)

- Average N loss of 148kg N per ha (2560 kg N on 17.3 ha of fodderbeet)
- Average P loss of 1.6 kg P per ha (28 kg P on 17.3 ha of fodderbeet)

	Proposed Dairy Unit (1150 cows)	Off Site Effect of 530 extra cows on 17.3 ha fodderbeet	Proposed 1150 cows plus offsite effect
Total Farm N Loss	21893 kg	2560 kg	24453
Total Farm P Loss	579 kg	28	607

Table 6: Assessment of the off site effects of Adams proposal (calculated outside of Overseer)

Note

The above should be interpreted with caution

- The land would have been used for another land use prior to cow wintering off site, the nutrient loss of this prior activity has not been taken account of (and would reduce the offsite effect of the extra cows)
- Different locations (different soils and climate) would provide different loss data
- This assumes that the cows are alive and wintered in Southland (and on crop)

Conclusions from the modelling

Using Overseer, nutrient budgets have been constructed for Adams, comparing the nutrient loss of the current farm system against the proposed farm system. Overseer has predicted that the nitrogen loss will decrease and phosphorus loss will increase slightly (by less than 5%)

Key drivers for the reduction in nitrogen loss are:

- Decrease in winter crop area
- Decrease in cows wintered
- Decrease in stocking rate (on a per hectare basis)

Key drivers for the increase in phosphorus loss are:

- An increase in losses from “other sources”

These losses include predicted losses from laneways, calving pads and yards. The increase in losses from other sources includes an increase in animal excretion onto laneways. Overseer estimates amount of excreta and assumes all P ends up in dung and assumes that 30% of the P added to lanes is lost from the farm. Overseer is not spatially explicit; so does not take into account critical source area on farms. These critical source areas accumulate overland flow from adjacent areas and deliver overland flow to surface water bodies. On farms where there is not a direct connection (or a less connection) via critical source areas, or where management mitigates risk, Overseer can not model the impact of these at an individual farm scale.

Recommendations:

Apart from the system changes outlined above, the following recommendations are given to reduce the nutrient losses from this farm system.

Overseer can model a range of good management practices. However, some farm specific good management practices cannot be modelled. It is recommended that the following good management practices are implemented on this property:

- Ensure there are appropriate buffer zones in place for winter grazing to reduce the risk of sediment runoff
- Winter crops should be grazed with the use of back fences and portable water troughs. A grazing plan of the winter crop should be developed to take into account the contour of the paddock and any waterways.
- Fertiliser is applied at the correct rate, and is not applied in close proximity to waterways
- Identify and manage critical source areas to reduce the risk of losses. These include losses from laneways, gateways and high traffic zones.

The nutrient budgets within this report have been developed assuming that soil fertility is at the agronomic optimum and that maintenance fertiliser is applied each year. A soil testing

regime should be implemented and fertiliser recommendations should be developed in line with these soil testing results.

The proposed Southland Water and Land Plan is currently in process and the next stage is likely to be the Limit Setting Process. It will be important to stay up to date with developments in Environment Southland policy and rules.

A farm environmental management plan detailing the recommendations within this report should be developed for the property.

Overseer reports

Current Farm System (Milking Platform)

(kg/ha/yr)	N	P	K	S	Ca	Mg	Na
Nutrients added							
Fertiliser, lime & other	204	20	2	16	0	0	0
Rain/clover N fixation	63	0	2	4	2	5	19
Irrigation	0	0	0	0	0	0	0
Supplements	79	13	50	10	7	7	3
Nutrients removed							
As products	91	15	22	5	20	2	6
Exported effluent	0	0	0	0	0	0	0
As supplements and crop residues	0	0	0	0	0	0	0
To atmosphere	92	0	0	0	0	0	0
To water	46	1.1	14	30	50	4	18
Change in farm pools							
Plant Material	-3	0	-5	0	0	0	0
Organic pool	108	13	4	-6	1	1	0
Inorganic mineral	0	3	-20	0	-2	-4	-4
Inorganic soil pool	11	1	40	0	-60	9	2

Table 1 Current system nutrient budget

Block name	Total N lost kg N/yr	N lost to water kg N/ha/yr	N in drainage * ppm	N surplus kg N/ha/yr	Added N ** kg N/ha/yr
Fodder Beet Platform	1,065	177	39.7	116	139
Ohai MP Eff Flat ?	1,566	59	14.1	267	262
Ohai MP Eff Rolling ?	1,132	64	14.1	270	262
Makarewa MP Eff Flat ?	252	34	9.7	243	262
Aparima MP Eff Flat ?	4,342	41	11.5	241	262
Ohai MP Non Eff Flat ?	893	53	13.3	248	235
Makarewa MP Non Eff Flat ?	257	31	9.2	225	235
Aparima MP Non Eff Flat ?	3,650	38	10.9	223	235
Summer turnips	425	47	10.7	35	89
Aparima MP Eff Rolling ?	62	42	11.5	242	262
Aparima MP Non Eff Rolling ?	12	38	10.9	223	235
Ohai MP Non Eff Rolling ?	776	54	13.3	248	235
Other sources	660				
Whole farm	15,092	46			
Less N removed in wetland	0				
Farm output	15,092	46			

* N concentration due to leaching in drainage water at the bottom of the root zone. Maximum recommended level for drinking water is 11.3 ppm (note that this is not an environmental water quality standard).

** Fertiliser, organic and effluent inputs.

N/A: N in drainage not calculate for easy and steep pastoral blocks, or for tree and shrubs, riparian, wetland or house blocks.

Table 2 Current system nitrogen report

Block name	Total P lost kg P/yr	P lost to water kg P/ha/yr	P loss categories		
			Soil	Fertiliser	Effluent
Fodder Beet Platform	8	1.3	N/A	N/A	N/A
Ohai MP Eff Flat ?	23	0.9	Medium	Low	Low
Ohai MP Eff Rolling ?	46	2.6	High	High **	Low
Makarewa MP Eff Flat ?	4	0.5	Low	Low	Low
Aparima MP Eff Flat ?	28	0.3	Low	Low	Low
Ohai MP Non Eff Flat ?	14	0.9	Medium	Low	Low
Makarewa MP Non Eff Flat ?	4	0.5	Low	Low	Low
Aparima MP Non Eff Flat ?	25	0.3	Low	Low	Low
Summer turnips	9	1.0	N/A	N/A	N/A
Aparima MP Eff Rolling ?	1	0.5	Low	Low	Low
Aparima MP Non Eff Rolling ?	0	0.5	Low	Low	Low
Ohai MP Non Eff Rolling ?	37	2.6	High	High **	Low
Other sources	151				
Whole farm	349	1.1			

** Fertiliser loss is outside the range for New Zealand data - see comments for each block

Table 3 Current system phosphorus loss report

Current Farm System (Dairy Support Block)

(kg/ha/yr)	N	P	K	S	Ca	Mg	Na
Nutrients added							
Fertiliser, lime & other	155	25	0	9	0	0	0
Rain/clover N fixation	33	0	2	4	2	5	19
Irrigation	0	0	0	0	0	0	0
Supplements	21	4	27	3	7	2	2
Nutrients removed							
As products	10	2	1	1	5	0	0
Exported effluent	0	0	0	0	0	0	0
As supplements and crop residues	0	0	0	0	0	0	0
To atmosphere	58	0	0	0	0	0	0
To water	82	1.8	7	26	84	6	21
Change in farm pools							
Plant Material	-8	0	-26	5	-1	-2	0
Organic pool	40	2	3	-16	1	0	0
Inorganic mineral	0	1	-21	0	-2	-4	-4
Inorganic soil pool	26	23	64	0	-77	6	4

Table 4 Support block nutrient budget

Block name	Total N lost kg N/yr	N lost to water kg N/ha/yr	N in drainage * ppm	N surplus kg N/ha/yr	Added N ** kg N/ha/yr
Fodder Beet Support (1st Crop)	3,720	155	33.7	263	237
Fodder Beet Support (2nd Crop)	3,386	141	29.5	263	237
Ohai Support Flat	232	23	5.7	140	83
Ohai Support Rolling	692	23	5.7	140	83
Makarewa Support Flat	53	17	4.9	131	83
Makarewa Support Rolling	88	17	4.9	131	83
Other sources	27				
Whole farm	8,198	82			
Less N removed in wetland	0				
Farm output	8,198	82			

* N concentration due to leaching in drainage water at the bottom of the root zone. Maximum recommended level for drinking water is 11.3 ppm (note that this is not an environmental water quality standard).

** Fertiliser, organic and effluent inputs.

N/A: N in drainage not calculate for easy and steep pastoral blocks, or for tree and shrubs, riparian, wetland or house blocks.

Table 5 Support block nitrogen loss report

Block name	Total P lost kg P/yr	P lost to water kg P/ha/yr	P loss categories		
			Soil	Fertiliser	Effluent
Fodder Beet Support (1st Crop)	39	1.6	N/A	N/A	N/A
Fodder Beet Support (2nd Crop)	39	1.6	N/A	N/A	N/A
Ohai Support Flat	7	0.7	Low	Low	N/A
Ohai Support Rolling	64	2.1	High	Medium	N/A
Makarewa Support Flat	1	0.4	Low	Low	N/A
Makarewa Support Rolling	6	1.2	Medium	Low	N/A
Other sources	17				
Whole farm	175	1.8			

Table 6 Support block phosphorus loss report

Current farm system (sheep breeding block)

(kg/ha/yr)	N	P	K	S	Ca	Mg	Na
Nutrients added							
Fertiliser, lime & other	35	18	2	29	0	0	0
Rain/clover N fixation	91	0	2	4	2	5	19
Irrigation	0	0	0	0	0	0	0
Nutrients removed							
As products	20	3	1	3	5	0	1
Exported effluent	0	0	0	0	0	0	0
As supplements and crop residues	0	0	0	0	0	0	0
To atmosphere	48	0	0	0	0	0	0
To water	23	0.6	7	34	27	3	16
Change in farm pools							
Plant Material	-12	-1	-14	0	-1	-1	-1
Organic pool	33	8	0	-4	0	0	0
Inorganic mineral	0	1	-23	0	-2	-4	-4
Inorganic soil pool	14	7	33	0	-26	6	7

Table 7 Sheep block nutrient budget

Block name	Total N lost kg N/yr	N lost to water kg N/ha/yr	N in drainage * ppm	N surplus kg N/ha/yr	Added N ** kg N/ha/yr
Makarewa ?	137	11	3.2	108	31
Ohai ?	213	15	3.6	116	31
Aparima ?	306	12	3.5	106	31
Swedes	719	120	27.1	79	81
Other sources	19				
Whole farm	1,395	23			
Less N removed in wetland	0				
Farm output	1,395	23			

* N concentration due to leaching in drainage water at the bottom of the root zone. Maximum recommended level for drinking water is 11.3 ppm (note that this is not an environmental water quality standard).

** Fertiliser, organic and effluent inputs.

N/A: N in drainage not calculate for easy and steep pastoral blocks, or for tree and shrubs, riparian, wetland or house blocks.

Table 8 Sheep block nitrogen loss report

Block name	Total P lost kg P/yr	P lost to water kg P/ha/yr	P loss categories		
			Soil	Fertiliser	Effluent
Makarewa ?	5	0.4	Low	Low	N/A
Ohai ?	9	0.6	Low	Low	N/A
Aparima ?	6	0.2	Low	Low	N/A
Swedes	9	1.4	N/A	N/A	N/A
Other sources	7				
Whole farm	36	0.6			

Table 9 Sheep block phosphorus loss report

Proposed Farm System

(kg/ha/yr)	N	P	K	S	Ca	Mg	Na
Nutrients added							
Fertiliser, lime & other	192	26	14	21	0	0	0
Rain/clover N fixation	74	0	2	4	2	5	19
Irrigation	0	0	0	0	0	0	0
Supplements	41	9	21	6	3	4	2
Nutrients removed							
As products	78	13	19	4	17	2	5
Exported effluent	0	0	0	0	0	0	0
As supplements and crop residues	0	0	0	0	0	0	0
To atmosphere	84	0	0	0	0	0	0
To water	45	1.2	13	33	50	5	18
Change in farm pools							
Plant Material	-6	0	-14	1	-1	-1	0
Organic pool	86	12	3	-8	1	0	0
Inorganic mineral	0	2	-33	0	-2	-4	-4
Inorganic soil pool	19	6	49	0	-60	7	1

Table 10 Proposed system nutrient budget

Block name	Total N lost kg N/yr	N lost to water kg N/ha/yr	N in drainage * ppm	N surplus kg N/ha/yr	Added N ** kg N/ha/yr
Fodder Beet Platform	6,147	166	36.9	300	139
Ohai MP Eff Flat ?	1,153	46	10.8	226	241
Ohai MP Eff Rolling ?	871	52	10.8	229	241
Makarewa MP Eff Flat ?	196	28	7.8	221	241
Aparima MP Eff Flat ?	3,020	30	8.4	205	241
Ohai MP Non Eff Flat ?	3,433	42	10.3	212	234
Makarewa MP Non Eff Flat ?	573	25	7.4	204	234
Aparima MP Non Eff Flat ?	3,229	28	8.0	191	234
Ohai MP Non Eff Rolling ?	1,784	44	10.9	223	234
Summer turnips	496	41	9.3	39	89
Aparima MP Eff Rolling ?	47	34	9.1	220	241
Makarewa MP Non Effluent Rolling ?	117	25	7.4	204	234
Aparima MP Non Eff Rolling ?	9	30	8.5	201	234
Other sources	816				
Whole farm	21,893	45			
Less N removed in wetland	0				
Farm output	21,893	45			

* N concentration due to leaching in drainage water at the bottom of the root zone. Maximum recommended level for drinking water is 11.3 ppm (note that this is not an environmental water quality standard).

** Fertiliser, organic and effluent inputs.

N/A: N in drainage not calculate for easy and steep pastoral blocks, or for tree and shrubs, riparian, wetland or house blocks.

Table 11 Proposed system nitrogen loss report

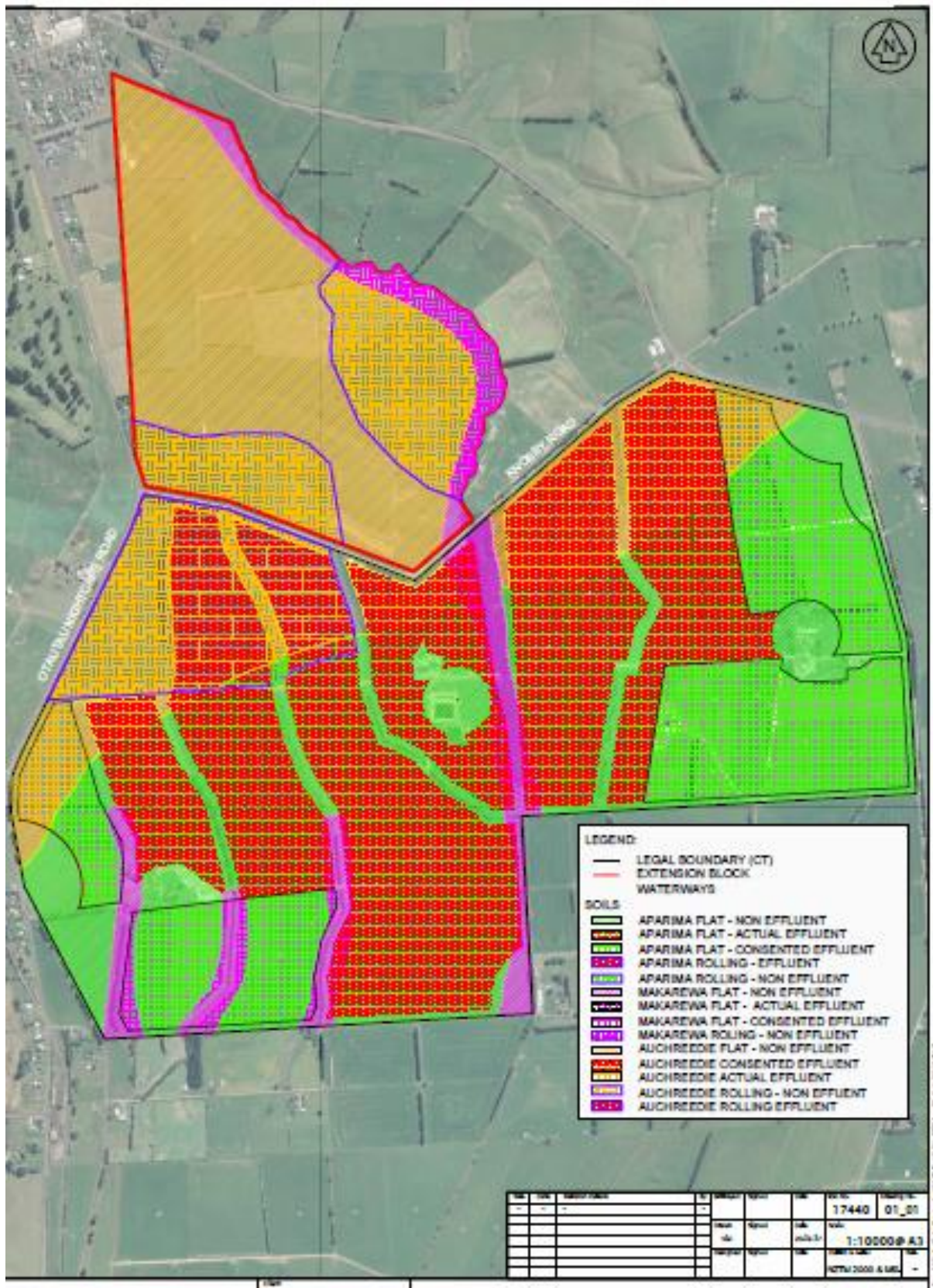
Block name	Total P lost kg P/yr	P lost to water kg P/ha/yr	P loss categories		
			Soil	Fertiliser	Effluent
Fodder Beet Platform	53	1.4	N/A	N/A	N/A
Ohai MP Eff Flat ?	22	0.9	Medium	Low	Low
Ohai MP Eff Rolling ?	44	2.6	High	High **	Low
Makarewa MP Eff Flat ?	4	0.5	Low	Low	Low
Aparima MP Eff Flat ?	27	0.3	Low	Low	Low
Ohai MP Non Eff Flat ?	72	0.9	Medium	Low	Low
Makarewa MP Non Eff Flat ?	12	0.5	Low	Low	Low
Aparima MP Non Eff Flat ?	30	0.3	Low	Low	N/A
Ohai MP Non Eff Rolling ?	105	2.6	High	High **	Low
Summer turnips	13	1.1	N/A	N/A	N/A
Aparima MP Eff Rolling ?	1	0.5	Low	Low	Low
Makarewa MP Non Effluent Rolling ?	6	1.4	Medium	Medium	Low
Aparima MP Non Eff Rolling ?	0	0.5	Low	Low	Low
Other sources	190				
Whole farm	579	1.2			

** Fertiliser loss is outside the range for New Zealand data - see comments for each block

Table 12 Proposed system phosphorus loss report

Appendices

Farm Map – Dairy Platform and Support block



Farm Map – Neighbouring Sheep block



Attachment D – Effluent Management

DRAFT

Dairy Shed Effluent Monthly Check Sheet

On a monthly basis the following checks and measures must be undertaken. The details of the monthly check shall be recorded on this sheet, and at the completion of the inspection the sheet shall be filed for future reference. If there are any matters requiring follow up work i.e. you note that an effluent nozzle needs replacing, please make a note of these, and ensure that the actions are followed up immediately.

Employee Name:

Date of Inspection:


Task	Done? (Y/N)	Any further action required?
Clean out stone trap		
Clean out sump		
Check sludge bed levels and if it needs clearing, shift solids to drying area		
Check all inlet and outlet pipes to storage pond to ensure they are free of debris to prevent blockages.		
Check the pond's leak detection system for the presence of effluent (visual and odour)		
Check effluent nozzles are clear and in good working order		
Check effluent irrigator pipe is in good working order and does not have any leaks		
Check well-head(s) remain capped and in good condition		

Effluent Orientation and Training Record

Season ___/___

Effluent Competencies	Employee name	Employee name	Employee name
General			
Understands the regional council rules and farm policies for effluent management			
Understands health and safety around the effluent system			
Understands record keeping for irrigator runs and maintenance			
At the Dairy			
Use of stormwater diversion system			
Good hosing practice and water management			
Animal handling to minimise effluent volume			
Cleaning the stone trap			
Sump, pump & pond monitoring and management (including float switches)			
In the Paddock			
When to irrigate: assessing soil and weather conditions			
Where to irrigate: runs, paddock rotations, high risk vs low risk soils etc (mark on farm map)			
Where not to irrigate: near waterways, drains, boundaries, slopes etc (mark on farm map)			
How the irrigator works, how to use it, set up, hose layout and performance checks			
Measuring the depth of effluent application			
Irrigator, pump maintenance/cleaning			
Greasing and general maintenance requirements (how and when)			
How to check and replace rubber nozzles and seals (same time as dairy rubber ware)			
Tyre pressure and condition			
Pipe-work, hose and hydrant condition			
Wire-rope, cam and ratchet condition			
Other			

Trainer signature			
Employee signature			
Date			

 Date when staff become competent in each skill. If all training provided in one day, tick and date at the bottom.




Irrigator run sheet

- Check the records to ensure effluent is due to be applied to that particular area
- Allow a minimum interval of 10 days between applications and grazing for animal health
- Ensure irrigator will be applying effluent to short pasture.

<i>Date</i>	<i>Paddock</i>	<i>Run</i>	<i>Name</i>	<i>Comments</i>

dairynz.co.nz
0800 4 DairyNZ (0800 4 324 7969)

You can use your Fonterra Dairy Diary as an alternative to this form, or photocopy a farm map – draw and date the runs on the copy then file it.



Appendix D – Detailed Soils Assessment Report

Regional Water Plan for Southland Rule 50 soil category technical and planning assessment for Adams resource consent applications

Date: 29 April 2019 File Ref: 17440
To: Tanya Copeland, Senior Planner
From: Mike Freeman, Senior Scientist/Planner
Subject: **Southland Regional Water Plan Rule 50 soil category technical and planning assessment**

1. Background

The original AEE for these applications prepared by Hilary Lennox, Senior Planner, Landpro Limited, noted that in her view the land on this property fits into Category A and Category C. However, she stated (page 15) *"It should be noted that whilst there are areas on the existing dairy platform classed as Category C, this land has a slope of less than 7 degrees (see s42A report for APP-302700-01-V1). Consequently, an amendment to Discharge Permit AUTH-302700-01-V1 was granted in 2016 because it was considered suitable to use the travelling irrigator on this land. A low rate system is generally preferred because it minimises risks of run-off and incorporating low rate application of effluent over the soils with mixed contour and good drainage is suitable. This is consistent with Policy 42 of the RWPS."*

Ms Lennox later noted that she considered that the discharge permit under the Regional Water Plan for Southland (RWPS) has an activity status of restricted discretionary activity. I understand that at the time this was not queried by Environment Southland (ES) staff, and no request for additional information was sought in relation to this matter.

Mr Alex Erceg in his Section 42A report has stated that he considered that the discharge permit application should be treated as a non-complying activity because he considers that the RWPS identifies at least part of the land as Category C - the default category. Mr Erceg states (page 9) *"The FDE risk categories for the discharge area are Category A, which identifies artificial drainage as the main contaminant pathway and Category C, where due to the sloping nature of the land,*



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overland flow would be the main contaminant pathway. However, the applicants dispute that the dairy platform has sloping land. The applicants have not provided any further analysis of this as part of this application. I note that Council systems identify that there is no slope greater than 7° on the dairy platform, and therefore I agree with their assessment."

2. The relevant rules and assessment

Notwithstanding Mr Erceg's conclusion that the land does not contain slopes greater than 7 degrees, he has still concluded that the discharge permit application shall be a non-complying activity.

There is a small error in Mr Erceg's S42A report where he refers to Rule 50 (d) of the RWPS as being the relevant rule, however based on the assertion that the activity is non-complying, I have assumed that Mr Erceg in fact appears to be referring to is Rule 50 (f). A copy of that rule is reproduced below:

- (f) The discharge of farm dairy effluent to land within soil/landscape category C as identified on Map 1 of Appendix N or determined by farm-scale soils mapping undertaken by a suitably qualified person using high rate irrigation is a non-complying activity.

Ms Lennox was clearly of the opinion that the fact that there appeared to be agreement that the land did not contain any significant areas with a slope greater than 7° would be enough to provide for the discharge to be considered as a restricted discretionary activity under Rule 50(d), and as such did not provide any greater assessment within the body of the original application for consent.. A copy of that rule is reproduced below.

(d) The discharge of farm dairy effluent to land, that was not being lawfully undertaken as at 17 July 2010 (including an increase in the scale of an activity) in any of the following situations is a restricted discretionary activity:

- (i) low rate irrigation to soil/landscape categories A and B, and D and E as identified on Map 1 of Appendix N or determined by farm-scale soils mapping undertaken by a suitably qualified person; or
- (ii) low or high rate irrigation by slurry tanker to soil/landscape categories A, B, D and E as identified on Map 1 of Appendix N, or determined by farm-scale soils mapping undertaken by a suitably qualified person, does not exceed 5 mm in depth.

provided the following conditions are met:

1. the discharge is not within 20 metres of any surface water body, artificial watercourse or the coastal marine area;
2. the discharge is not within 200 metres of any place of assembly or dwelling not on the same property, or 20 metres of the boundary of any other property; and
3. the discharge is not within 100 metres of any water abstraction point.

The Council will restrict the exercise of its discretion to the following matters:

- (a) application depth and rate, storage requirements, nutrient loading (in particular nitrogen) and contingency plans;
- (b) the separation distance (beyond that required under conditions 1, 2 and 3 above) of the discharge from surface water bodies, artificial watercourses, subsurface drains, the coastal marine area, residential dwellings, places of assembly, urban areas, property boundaries, water abstraction points and registered drinking-water supplies;
- (c) other measures to avoid, remedy or mitigate adverse effects (including cumulative effects directly related to the discharge of farm dairy effluent) on water quality taking into account the nature and sensitivity of the receiving environment.

While that approach may be considered a pragmatic approach, it appears that Mr Erceg does not consider that the information provided by Ms Lennox amounted to "farm-scale soils mapping undertaken by a suitably qualified person" as specified in both rules, despite the ES information also confirming the overall site as not being category C.

The intention of this report is to provide farm-scale mapping to better categorise the land and to confirm the status of the discharge permit application. Based on the assessment detailed below, the application can meet the Rule 50 (d) RWPS, and thus be classified as a restricted discretionary activity and not a non-complying activity.

It is useful to firstly understand the resolution provided in the RWPS. The rule refers directly to Map 1 of Appendix N of the SRWP. A copy of this is attached as Attachment 1. This is the legal reference that must be used to determine categorisation under Rule 50 (d) and Rule 50 (f). Environment Southland do provide a public GIS with a layer that represents this. However, the actual map in the RWPS is the only legal reference point. As can be seen from the map at an A4 scale it is difficult firstly, to line up a specific parcel of land on the map. Secondly, the hatched area ("multiple categories") appears to cross over part of the blue area ("Category C – Sloping Land") that appears to cover this landholding. In my opinion the map and its legend are an unsatisfactory method for categorising specific land parcels for the purpose of determining the activity status of a resource consent application. In addition, neither the rules nor the map actually provide specific definitions of the five primary categories. Some guidance on this can be found in Policy 42 of the RWPS that provides the following table that has been widely used by regional councils.

Table 1: Minimum management criteria for a land applied effluent system to achieve

	Category A	Category B	Category C	Category D	Category E
Soil and landscape feature	Artificial drainage or coarse soil structure	Impeded drainage or low infiltration rate	Sloping land (>7°)	Well drained flat land (<7°)	Other well drained but very stony ^x flat land (<7°)
Application depth (mm)	< SWD*	< SWD	< SWD	< 50% of PAW#	≤ 10 mm & <50% of PAW#
Instantaneous application rate (mm/hr)	N/A**	N/A**	< soil infiltration rate	N/A	N/A
Average application rate (mm/hr)	<soil infiltration rate	<soil infiltration rate	<soil infiltration rate	<soil infiltration rate	<soil infiltration rate
Storage requirement	Apply only when SWD exists	Apply only when SWD exists	Apply only when SWD exists	24 hours drainage post saturation	24 hours drainage post saturation
Maximum N load	150 kg N/ha/yr	150 kg N/ha/yr	150 kg N/ha/yr	150 kg N/ha/yr	150 kg N/ha/yr

* SWD = soil water deficit (The amount of water (mm) required to restore a soil to field capacity from its current moisture status)

PAW = Plant available water (The state of top 300mm of soil after rapid drainage has effectively ceased and the soil water content has become relatively stable)

^x Very stony= soils with > 35% stone content in the top 200 mm of soil

** N/A = Not an essential criteria, however level of risk and management is lowered if using low application rates

I have studied the following information to better understand and map the farm:

Table 2: Summary of farm-scale soil information considered to assess the FDE category

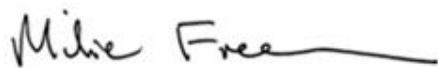
Information source	Characteristics	Conclusion	FDE Category
A LINZ DEM that uses 8 m contours. This has been imported into QGIS and a slope calculation made which has then been categorised. See Attachment 2.	Slope	The vast majority of the land has slopes less than 7°.	Not Category C.

Information source	Characteristics	Conclusion	FDE Category
8 m contours are not the ideal level of resolution, but the information is a useful guide			
Site photographs, aerial photographs (refer original AEE) and Google Street View (Not attached)	Slope	The vast majority of the land clearly has slopes less than 7°. Some small parts of Northern Block and dairy platform with slopes >7°.	Not Category C
S-map fact sheets from S-map website. See Attachment 3 & 4. Note Low confidence rating.	Drainage	Significant majority of the land has artificial and/or imperfectly/impeded drained	Majority Category A or B

3. Conclusions

A suite of farm scale information, including farm scale soil information, has been considered including photographs, aerial images, slope assessments determined from a LINZ DEM, S-map information and the AEE and Section 42A report. On the basis of that information, I conclude that the primary soils/landscape categories for these three areas of the property (Northern Block, Existing Dairy Platform and Eastern Block) are either Category A or Category B.

Therefore, the application to discharge FDE effluent to land complies with the primary definition of RWPS Rule 50 (d) subject to complying with the balance of conditions that relate to separation distances.



Mike Freeman, BSc, PhD

Senior Scientist/Planner

Landpro Limited

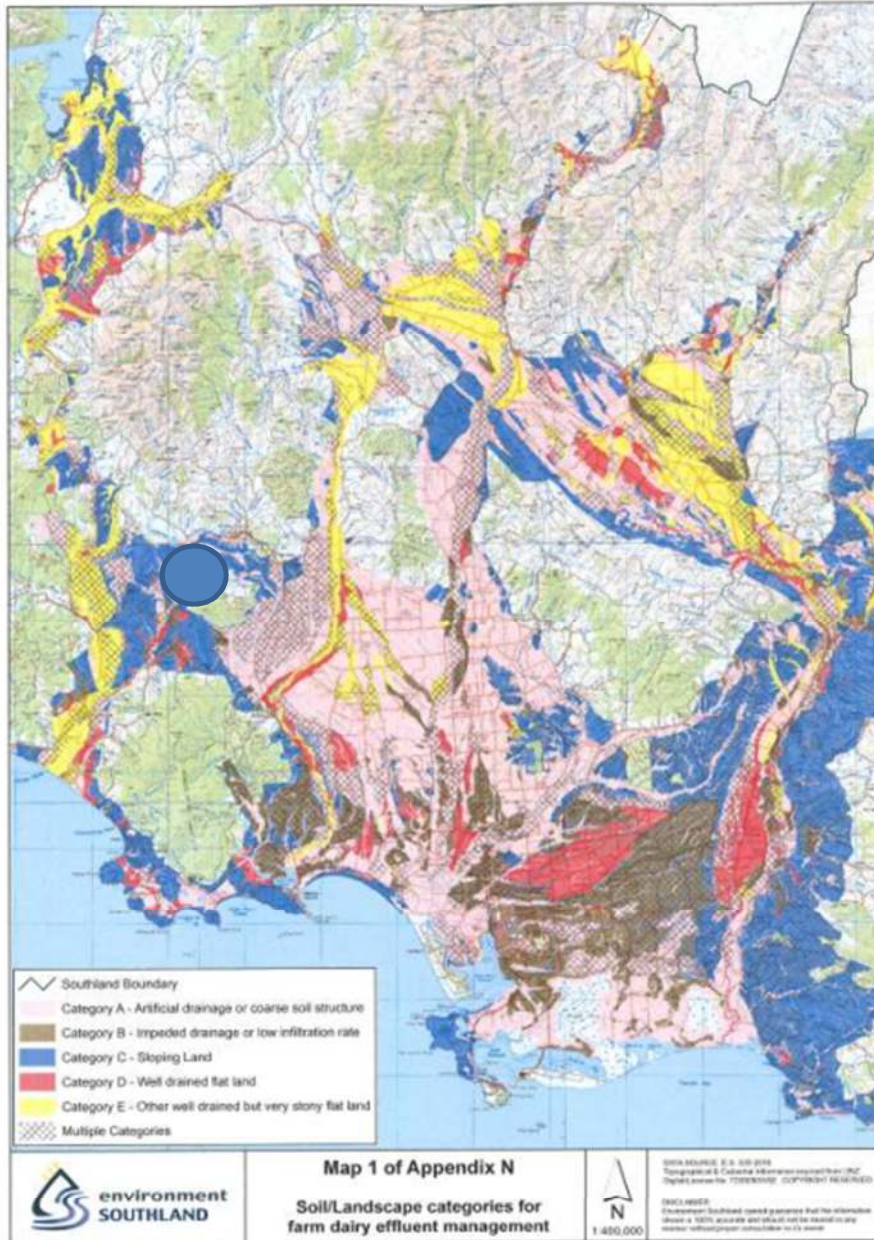
29 April 2019

Attachment 1 Copy of Map 1 of Appendix N of the Regional Water Plan for Southland.

Maps



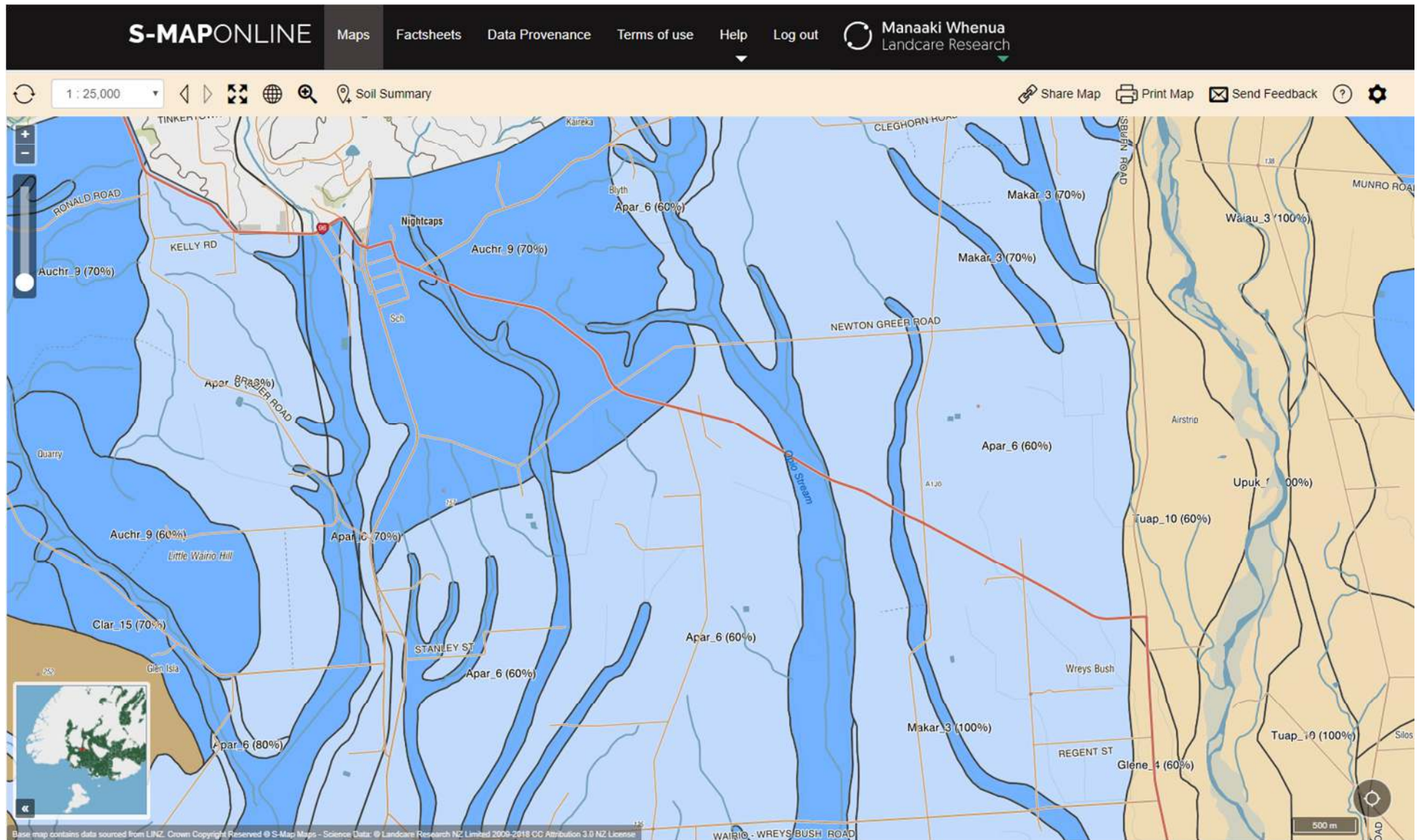
Map 1 – Soil/Landscape Categories for Farm Dairy Effluent Management



Attachment 2 Visual slope map created from LINZ DEM – Yellow green = slope less than 7°, red shades = greater than 7°, land parcel overlaid as transparent blue.



Attachment 3 S-map map for the wider area showing predominant soils for the property (Auchr_9 and Apar_6)



The two soil summaries provide the following Apar_6 = Aparimaf (Sib 6) 60% and Pukemutuf (Sib 6) 40%, the Auchr_9 = Auchreddief (Sib 9) 70% and Aparimaf (Sib 6) 30%.

The key characteristics of these soils are reproduced below.



S-map Soil Report

Environment Southland

Report generated: 19-Apr-2019 from <https://smap.landcareresearch.co.nz>

S-map maps soils at a nominal scale of 1:50,000. At this scale it is common to identify two or more soil siblings that are likely to be present at the selected location. A more detailed resolution is needed to produce map units comprising a single soil sibling. Therefore, it is recommended that users consider the characteristics of each of the identified siblings, the expected proportion of each, and select the S-map sibling that best matches their field observations of the paddock. If no local information is available then it is common practice to select the dominant S-map sibling, i.e. the first listed sibling.

This information sheet describes the typical average properties of the specified soil to a depth of 1 metre, and should not be the primary source of data when making land use decisions on individual farms and paddocks.

Aparimaf

Mottled-acidic Firm Brown Soil

Apar_6a.1 (30% of the mapunit at location (1217076, 4897036), Confidence: Low)

Key physical properties

Depth class (diggability)	Deep (> 1 m)
Texture profile	Silty Loam
Potential rooting depth	45 - 75 (cm)
Rooting barrier	Pan
Topsoil stoniness	Stoneless
Topsoil clay range	25 - 35 %
Drainage class	Imperfectly drained
Aeration in root zone	Limited
Permeability profile	Moderate Over Slow
Depth to slowly permeable horizon	45 - 70 (cm)
Permeability of slowest horizon	Slow (< 4 mm/h)
Profile available water	Moderate to high (120 mm)
	Very high (116 mm)
	High (61 mm)
Dry bulk density, topsoil	1.09 g/cm ³
Dry bulk density, subsoil	1.09 g/cm ³
Depth to hard rock	No hard rock within 1 m
Depth to soft rock	No soft rock within 1 m
Depth to stony layer class	No significant stony layer within 1 m

Key chemical properties

Topsoil P retention Medium (43%)

About this publication

- This information sheet describes the typical average properties of the specified soil to a depth of 1 metre.
- For further information on individual soils, contact Landcare Research New Zealand Ltd: www.landcareresearch.co.nz
- Advice should be sought from soil and land use experts before making decisions on individual farms and paddocks.
- The information has been derived from numerous sources. It may not be complete, correct or up to date.
- This information sheet is licensed by Landcare Research on an "as is" and "as available" basis and without any warranty of any kind, either express or implied.
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Aparimaf

S-map ref: Apar_6a.1

Apar_6a.1 (30% of the mapunit at location (1217076, 4897036), Conf[[d](#)][[p](#)][[c](#)][[e](#)][[m](#)][[w](#)])

Additional factors to consider in choice of management practices

Vulnerability classes relate to soil properties only and do not take into account climate or management

Soil structure integrity

Structural vulnerability	Moderate (0.56)
Pugging vulnerability	not available yet

Water management

Water logging vulnerability	High
Drought vulnerability - if not irrigated	Low
Bypass flow	High
Hydrological soil group	C
Irrigability	Gently undulating land with severe drainage/permeability restrictions and soils with high to very high PAW

Contaminant management

N leaching vulnerability	Medium
P leaching vulnerability	not available yet
Bypass flow	High
Dairy effluent (FDE) risk category	B
Relative Runoff Potential	Medium

Additional information

Soil classification	Mottled-acidic Firm Brown Soils
Family	Aparimaf
Sibling number	6
Profile texture group	Silty
Soil profile material	Stoneless soil
Rock class of stones/rocks	Not Applicable
Rock origin of fine earth	From Tuffaceous Sandstone Rock
Parent material origin	Loess

Characteristics of functional horizons in order from top to base of profile:

Functional Horizon	Thickness	Stones	Clay*	Sand*
Loamy Weak	20 - 30 cm	0 %	25 - 35 %	5 - 25 %
Loamy Weak	10 - 20 cm	0 %	25 - 35 %	5 - 25 %
Loamy Coarse Slightly Firm	15 - 30 cm	0 %	25 - 35 %	5 - 25 %
Loamy Coarse Firm	30 - 45 cm	0 %	25 - 35 %	5 - 25 %

* clay and sand percent values are for the mineral fines (excludes stones). Silt = 100 - (clay + sand)



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Report generated: 19-Apr-2019 from <https://smap.landcareresearch.co.nz>

S-map maps soils at a nominal scale of 1:50,000. At this scale it is common to identify two or more soil siblings that are likely to be present at the selected location. A more detailed resolution is needed to produce map units comprising a single soil sibling. Therefore, it is recommended that users consider the characteristics of each of the identified siblings, the expected proportion of each, and select the S-map sibling that best matches their field observations of the paddock. If no local information is available then it is common practice to select the dominant S-map sibling, i.e. the first listed sibling.

This information sheet describes the typical average properties of the specified soil to a depth of 1 metre, and should not be the primary source of data when making land use decisions on individual farms and paddocks.

Pukemutuf

Argillic-fragic Perch-gley Pallic Soil

Pukem_6a.1 (40% of the mapunit at location (1216985, 4895069), Confidence: Low)

Key physical properties

Depth class (diggability)		Deep (> 1 m)
Texture profile		Silty Loam Over Clay
Potential rooting depth		40 - 80 (cm)
Rooting barrier		Pan
Topsoil stoniness		Stoneless
Topsoil clay range		20 - 35 %
Drainage class		Poorly drained
Aeration in root zone		Very limited
Permeability profile		Moderate Over Slow
Depth to slowly permeable horizon		40 - 80 (cm)
Permeability of slowest horizon		Slow (< 4 mm/h)
Profile available water	(0 - 100cm or root barrier)	Moderate (96 mm)
	(0 - 60cm or root barrier)	High (96 mm)
	(0 - 30cm or root barrier)	High (54 mm)
Dry bulk density, topsoil		1.22 g/cm ³
Dry bulk density, subsoil		1.22 g/cm ³
Depth to hard rock		No hard rock within 1 m
Depth to soft rock		No soft rock within 1 m
Depth to stony layer class		No significant stony layer within 1 m

Key chemical properties

Topsoil P retention Low (22%)

About this publication

- This information sheet describes the typical average properties of the specified soil to a depth of 1 metre.
- For further information on individual soils, contact Landcare Research New Zealand Ltd: www.landcareresearch.co.nz
- Advice should be sought from soil and land use experts before making decisions on individual farms and paddocks.
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Pukemutuf

S-map ref: Pukem_6a.1

Pukem_6a.1 (40% of the mapunit at location (1216985, 4895069), Confidence: Low)

Additional factors to consider in choice of management practices

Vulnerability classes relate to soil properties only and do not take into account climate or management

Soil structure integrity

Structural vulnerability	High (0.69)
Pugging vulnerability	not available yet

Water management

Water logging vulnerability	High
Drought vulnerability - if not irrigated	Moderate
Bypass flow	Medium
Hydrological soil group	D
Irrigability	Flat to very gently undulating land with very severe drainage/permeability restrictions and soils with high PAW

Contaminant management

N leaching vulnerability	Medium
P leaching vulnerability	not available yet
Bypass flow	Medium
Dairy effluent (FDE) risk category	B
Relative Runoff Potential	High

Additional information

Soil classification	Argillic-fragic Perch-gley Pallic Soils
Family	Pukemutuf
Sibling number	6
Profile texture group	Silty
Soil profile material	Stoneless soil
Rock class of stones/rocks	Not Applicable
Rock origin of fine earth	From Tuffaceous Sandstone Rock
Parent material origin	Loess

Characteristics of functional horizons in order from top to base of profile:

Functional Horizon	Thickness	Stones	Clay*	Sand*
Loamy Weak	20 - 25 cm	0 %	20 - 35 %	3 - 15 %
Loamy Weak	10 - 20 cm	0 %	20 - 35 %	3 - 15 %
Loamy Coarse Slightly Firm	10 - 30 cm	0 %	25 - 35 %	3 - 15 %
Clayey Coarse	30 - 60 cm	0 %	35 - 40 %	3 - 15 %

* clay and sand percent values are for the mineral fines (excludes stones). Silt = 100 - (clay + sand)



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S-map maps soils at a nominal scale of 1:50,000. At this scale it is common to identify two or more soil siblings that are likely to be present at the selected location. A more detailed resolution is needed to produce map units comprising a single soil sibling. Therefore, it is recommended that users consider the characteristics of each of the identified siblings, the expected proportion of each, and select the S-map sibling that best matches their field observations of the paddock. If no local information is available then it is common practice to select the dominant S-map sibling, i.e. the first listed sibling.

This information sheet describes the typical average properties of the specified soil to a depth of 1 metre, and should not be the primary source of data when making land use decisions on individual farms and paddocks.

Auchreddief

Argillic Perch-gley Pallic Soil

Auchr_9b.1 (70% of the mapunit at location (1217076, 4897036), Confidence: Low)

Key physical properties

Depth class (diggability)	Deep (> 1 m)
Texture profile	Clay
Potential rooting depth	Unlimited
Rooting barrier	No significant barrier within 1 m
Topsoil stoniness	Stoneless
Topsoil clay range	50 - 65 %
Drainage class	Poorly drained
Aeration in root zone	Very limited
Permeability profile	Moderate Over Slow
Depth to slowly permeable horizon	40 - 80 (cm)
Permeability of slowest horizon	Slow (< 4 mm/h)
Profile available water	(0 - 100cm or root barrier) Moderate (99 mm) (0 - 60cm or root barrier) Moderate (61 mm) (0 - 30cm or root barrier) Moderate (33 mm)
Dry bulk density, topsoil	1.08 g/cm ³
Dry bulk density, subsoil	1.08 g/cm ³
Depth to hard rock	No hard rock within 1 m
Depth to soft rock	No soft rock within 1 m
Depth to stony layer class	No significant stony layer within 1 m

Key chemical properties

Topsoil P retention Low (22%)

About this publication

- This information sheet describes the typical average properties of the specified soil to a depth of 1 metre.
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Auchreddief

Auchr_9b.1 (70% of the mapunit at location (1217076, 4897036), Confidence: Low)

S-map ref: Auchr_9b.1

Additional factors to consider in choice of management practices

Vulnerability classes relate to soil properties only and do not take into account climate or management

Soil structure integrity

Structural vulnerability	Moderate (0.57)
Pugging vulnerability	not available yet

Water management

Water logging vulnerability	High
Drought vulnerability - if not irrigated	Moderate
Bypass flow	Medium
Hydrological soil group	D
Irrigability	Rolling land with severe drainage/permeability restrictions and soils with moderate PAW

Contaminant management

N leaching vulnerability	Medium
P leaching vulnerability	not available yet
Bypass flow	Medium
Dairy effluent (FDE) risk category	C
Relative Runoff Potential	High

Additional information

Soil classification	Argillic Perch-gley Pallic Soils
Family	Auchreddief
Sibling number	9
Profile texture group	Clayey
Soil profile material	Stoneless soil
Rock class of stones/rocks	Not Applicable
Rock origin of fine earth	From Soft Mudstone Rock
Parent material origin	Colluvium

Characteristics of functional horizons in order from top to base of profile:

Functional Horizon	Thickness	Stones	Clay*	Sand*
Clayey Fine SI Firm	15 - 25 cm	0 %	50 - 65 %	4 - 10 %
Clayey Fine SI Firm	15 - 25 cm	0 %	50 - 65 %	4 - 10 %
Clayey Fine SI Firm	20 - 30 cm	0 %	50 - 65 %	4 - 10 %
Clayey Coarse	20 - 50 cm	0 %	50 - 65 %	4 - 10 %

* clay and sand percent values are for the mineral fines (excludes stones). Silt = 100 - (clay + sand)



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Appendix E – Proposed Conditions of Consent

Proposed Resource Consent Conditions

Land use consent

Details of Consent

Purpose for which permit is granted:	Use of land for farming
Location	1570 Otautau Nightcaps Road, R D 1, Otautau
- site locality	NZTM2000 1216310E 4895210N
- map reference	Upper Aparima
- groundwater zone	Aparima
- FMU	Gleyed, Lignite – Marine Terraces, Bedrock/Hill Country
- physiographic zone(s)	Wairio Stream, Waicolo Stream and Opio Stream
- catchment(s)	
Legal description of land at the site:	Pt Sections 17, 21, 124, Sections 131, 132, Lot 1 DP 13608 Wairio SD

Expiry date: XXXX 2029

1. This consent authorises the use of the subject land for farming as described in the application for resource consent dated 4 October 2018 and in accordance with the attached Farm Environmental Management Plan (FEMP) or any replacement FEMP.
2. The consent holder shall:
 - (a) Identify critical source areas¹ on the farm and provide a plan showing those areas, and a description of the measures that will be implemented to mitigate contaminant losses to water from those areas in accordance with recognised dairy industry good management practice by 30 September 2019.
 - (b) Implement the measures identified in (a) to mitigate contaminant losses to water from the critical source areas within the Eastern Block by 30 September 2020 and all other parts of the landholding by 30 September 2021.
3. The Consent Holder shall have and maintain a Farm Environmental Management Plan for the subject site. This management plan shall be the attached FEMP and can be modified in accordance with condition 5 of this consent provided that any such modification will still achieve the objectives specified in the FEMP.
4. This consent shall be exercised in accordance with the Farm Environmental Management Plan at all times. Where there is inconsistency between the FEMP and the conditions of this consent, the conditions of this consent shall prevail.
5. The Farm Environmental Management Plan shall be reviewed and can be modified by the consent holder once every twelve months. The results of the review and any modification to the FEMP shall be supplied to the Consent Authority (escompliance@es.govt.nz) within one month of the review being undertaken to enable the consent authority to assess whether any modification will still ensure

¹ Critical source area is defined as:

- (a) a landscape feature like a gully, swale or a depression that accumulates runoff (sediment and nutrients) from adjacent flats and slopes, and delivers it to surface water bodies (including lakes, rivers, artificial watercourses and modified watercourses) or subsurface drainage systems; and
- (b) areas which arise through land use activities and management approaches (including cultivation and winter grazing) which result in contaminants being discharged from the activity and being delivered to surface water bodies.

that the FEMP will still achieve the objectives specified in the FEMP. The review shall include but not be limited to:

- (a) A site map showing the location of critical source areas; physiographic zones; permanent or intermittent rivers, streams, lake, drains, ponds or wetlands; where known the location and depth of any subsurface drainage systems including outlets, riparian vegetation and fences adjacent to waterways and stock access points across waterways.
- (b) Details of the implementation and maintenance of Good Management Practices, including maintenance of good management practices and adoption of changing industry good management practices. Implementation of these is to avoid, remedy or mitigate any farm specific environmental risks to water quality shown through the water quality monitoring undertaken on the property as required by the conditions of this consent.
- (c) A property specific environmental risk assessment, including a description of the risks to water quality, which shall be prepared by a suitably qualified person and which identifies any farm specified environmental risks along with measures to mitigate the identified risks.
- (d) Review of the data obtained from the monitoring undertaken in accordance with the Farm Environmental Management Plan and any changes made or to be made as a consequence of that monitoring.

Nutrient Management

6. The Consent Holder shall:
 - a. Manage the application of fertiliser in accordance with 'The Code of Practice for Nutrient Management (With Emphasis of Fertiliser Use)' Fertiliser Association, 2013, ISBN 978-0-473-28345-2' or any subsequent updates;
 - b. Not apply fertiliser to land during the period 1 June – 31 July inclusive;
 - c. Not apply fertiliser:
 - i. Within 10 metres of a surface water body (where there is no riparian strip), wetland boundary or significant indigenous biodiversity site;
 - ii. Within 20m of any bore; and/or
 - iii. When soil moisture capacity is exceeded.
7. (a) Contaminant losses from farming activities undertaken on the landholding described in this resource consent (Northern Block, Milking Platform, Eastern Block, and off-site grazing by young stock) shall be maintained at, or below the long-term annual average baseline contaminant loss rates of:

22,870 Kg N/yr, and
528 Kg P/yr.

As estimated by Overseer Nutrient Budgets (Overseer) version 6.3.1 and in accordance with the generally accepted best practice modelling including the applicable Best Practice Data Input Standards.

- (b) The determination of whether the contaminant loss rates have been complied with shall be made using the contaminant loss from the rolling average of the four most recent years (1 July – 30 June) modelled using the latest version of Overseer.
- (c) The baseline contaminant loss rate described in Condition 7(a) above shall be re-modelled annually using the current version of Overseer, in accordance with the generally accepted best practice modelling current including the Best Practice Data Input Standards. The remodelled contaminant losses shall replace previous versions of the baseline contaminant loss rates.
- (d) A report shall be provided to the Consent Authority by 30 September each year summarising the results of Overseer nutrient modelling for the previous year, 1 July – 30 June.
- (e) If any estimated baseline contaminant loss rates is exceeded by up to 10% of any baseline loss rate, the consent holder shall by 30 November of that year prepare a report for the Consent

Authority that details the measures that will be taken to ensure that nutrient losses are reduced to ensure compliance with the baseline contaminant loss rates.

- (f) All Overseer modelling shall be undertaken by a person who is a certified nutrient management advisor under the Nutrient Management Adviser Certification Programme (NMACP), or a person who has demonstrated an equivalent level of expertise.
- (g) An alternative model that has been demonstrated to be equivalent to Overseer may be used provided that the evidence to demonstrate equivalence is provided to the Consent Authority at least six months prior to submitting the relevant annual report.

8. The Consent Holder shall maintain records of the good management practices undertaken on farm for each year between 1 July and 30 June. The records shall include, but not be limited to:

- (a) Fertiliser application, including rates;
- (b) Types of crops and total area of cropping, including winter feed/forage crops;
- (c) Cultivation methods;
- (d) Stock numbers with references to type, age and breed;
- (e) Effluent application areas;
- (f) All other inputs to the OVERSEER nutrient budgeting model; and records of all stock on farm between 1 July and 30 June.

These records shall be provided to the consent authority upon request.

9. (a) The Consent Authority may require the Consent Holder to have the farm independently audited by a person who is a certified nutrient management advisor under the Nutrient Management Adviser Certification Programme (NMACP), or a person who has demonstrated an equivalent level of expertise.
- (b) The audit shall assess the performance of the farming activity occurring on the property against the objectives and good management practices specified in the FEMP. The auditor shall determine the level of confidence they have that each objective is being achieved. This level of confidence shall be categorised into the following:
- 1. High = The objective is probably being achieved;
 - 2. Medium = The objective is possibly being achieved; or
 - 3. Low = It is unlikely that the objective is being achieved.
- (c) The audit shall record the justification for each level of confidence assessment, including noting the evidence, or lack of, used to make the determination. Where an objective has received a Medium or Low level of confidence, the audit shall include the required actions for the farm to meet the objective.
- (d) Where an objective has received a Medium level of confidence (and the farm has received no Lows), the audit shall also determine whether or not the farm is on-track to achieve the objectives.
- (e) The audit report shall be provided to the Consent Authority within three months of the date of the consent authority issuing a requirement to undertake the audit.
- (f) The frequency of audit requirements may be annually except where an audit report concluded that all objectives are probably being achieved, in that situation an audit requirement shall not be made for at least another three years.

Lapse and Review

10. The Consent Authority may, in accordance with Sections 128 and 129 of the Resource Management Act 1991, serve notice on the consent holder of its intention to review the conditions of this consent during the period 1 February to 30 September each year, or within two months of any enforcement action being taken by the Consent Authority in relation to the exercise of this consent, or on receiving monitoring results, for the purposes of:
- (a) determining whether the conditions of this permit are adequate to deal with any adverse effect on the environment, including cumulative effects, which may arise from the exercise of the permit, and which it is appropriate to deal with at a later stage, or which become evident after the date of commencement of the permit; or
 - (b) ensuring the conditions of this consent are consistent with any National Environmental Standards Regulations, relevant plans and/or the Environment Southland Regional Policy Statement.

DRAFT

Discharge Permit

DETAILS OF PERMIT

Purpose for which permit is granted: To discharge agricultural effluent to land from up to 1150 cows via travelling irrigator, low rate gun system (or equivalent low-rate system), and slurry wagon.

Location	- site locality	1570 Otautau Nightcaps Road, R D 1, Otautau
	- map reference	NZTM2000 1216310E 4895210N
	- groundwater zone	Upper Aparima
	- FMU	Aparima
	- physiographic zone	Gleyed, Lignite – Marine Terraces, Bedrock/Hill Country
	- catchment	Wairio Stream, Waicolo Stream and Opio Stream

Legal Description of land at the site: Pt Section 21, Section 131 & 132 Wairio SD

Expiry date: **XX 2029**

SCHEDULE OF CONDITIONS

General conditions

1. This resource consent shall not be exercised until Discharge Permit AUTH-302700-01-V1 is surrendered or has expired.
2. This consent authorises the discharge of dairy shed, exit lane and yard effluent (“agricultural effluent”) onto land, via a land disposal system consisting of a stone trap, concrete sump and clay lined agricultural effluent pond to a travelling irrigator, low rate k-line irrigator (or equivalent low rate system), and slurry wagon, as described in the application (APP-20181750) for resource consent dated 4 October 2018 and further information dated 14 November and 29 November 2018. The activity shall be limited to:
 - (a) The discharge to land of agricultural effluent generated from milking of up to 1,150 cows up to twice per day;
 - (b) The discharge to land of agricultural effluent via travelling irrigator, low rate k-line irrigator (or equivalent low rate system), and slurry wagon; and
 - (c) The discharge of agricultural effluent to an area of 245 hectares as per the plan attached as Appendix 1.
3. The activities as described by condition 2 shall be limited to:
 - (a) The discharge to land of agricultural effluent generated from milking, up to twice per day;
 - i. 1000 cows until Discharge Permit AUTH-302700-01-V1 has been surrendered or has expired;

- ii. 1150 cows once Discharge Permit AUTH-302700-01-V1 has been surrendered or has expired, and as authorised by Land Use Consent AUTH-XXX

Advice Note:

Routine monitoring inspections of this consent may occur up to two times a year. This number does not include any other required inspections.

Agricultural Effluent Application

4. The discharge shall not exceed:
 - (a) For the low rate k-line irrigator (or equivalent low rate system) and travelling irrigator, a depth of application of 15 millimetres for each individual application, and an instantaneous rate of 10 millimetres per hour; and
 - (b) For the slurry wagon, a depth of application of 5 millimetres for each individual application; and
5. The minimum return period for the discharge of agricultural effluent to land shall be 28 days.
6. The discharge shall not occur when the moisture content of the soils is at or above field capacity.
7. Nitrogen loading onto any land area as a result of the exercise of this consent shall not exceed 150 kilograms of nitrogen per hectare per year.

Exclusions

8. This consent does not authorise the discharge of:
 - (a) dairy shed effluent collected during 20 June to 20 July (with the exemption of slipped cows and early calvers);
 - (b) effluent collected by a feed pad, calving pad, wintering pad or underpass; and
 - (c) Silage pad leachate.
9. No discharge shall occur within:
 - (a) 20 metres of any water body including natural wetlands;
 - (b) 100 metres of any water abstraction point;
 - (c) 200 metres of any place of assembly or dwelling not on the subject property; and
 - (d) 20 metres from any property boundaries.

10. The stored or discharged agricultural effluent shall not enter any surface watercourse in any way, including:
 - (a) directly;
 - (b) indirectly;
 - (c) by overland flow;
 - (d) via entrainment by stormwater or run-off; or
 - (e) via a pipe.

11. The stored or discharged agricultural effluent shall not:
 - (a) form ponds or flow on the land surface, or
 - (b) cause contamination of water.

12. The stored or discharged agricultural effluent shall not cause any odour beyond the boundary of the site (see Appendix 1) that is offensive or objectionable in the opinion of the Council's Compliance Officer.

13. Spray drift beyond the boundary of the site shall not occur.

Effluent Storage

14. The discharge shall occur via an agricultural effluent storage facility of between 4,752 cubic metres and 8,511 cubic metres.

15.
 - (a) Within 12 months of the first exercise of this consent, the Consent Holder shall obtain and submit to the Consent Authority, written confirmation from a Suitably Qualified Person in accordance with Appendix P of the proposed Southland Water and Land Plan (Decisions Version 2018) or any subsequent replacement versions that the pond meets the relevant pond drop test criteria of Appendix P.
 - (b) The certification required by condition 15(a) shall be accompanied by photographs of the effluent storage structures (date and time stamped) and be supplied to the Consent Authority within one month of receiving the certification.

16.
 - (a) By the 30th of June 2028, the Consent Holder shall obtain and submit to the Consent Authority, written confirmation from a Suitably Qualified Person in accordance with Appendix P of the proposed Southland Water and Land Plan (Decisions Version 2018) or any subsequent replacement versions that the pond meets the relevant pond drop test criteria of Appendix P.
 - (b) The certification required by condition 17(a) shall be accompanied by photographs of the effluent storage structures (date and time stamped) and be supplied to the Consent Authority within one month of receiving the certification.

System Management

17. The Consent Holder shall install and maintain:
 - (a) an operational alarm that alerts the Person in Charge to any system failure that could cause the over-application, overflow or spilling of agricultural effluent (e.g. sudden pressure drop, irrigator stoppage); and / or
 - (b) an operational automatic switch-off system that prevents any over-application or spilling of agricultural effluent.
18. Where the agricultural effluent reticulation system is installed in such a way that effluent can be siphoned when pumping ceases, the Consent Holder shall install and maintain an anti-siphon device in the agricultural effluent pipeline.
19. In the event of the failure or mismanagement of the agricultural effluent disposal system, or any other event that may result in a discharge of agricultural effluent that may have significant adverse effect on water quality, particularly in the region of the abstraction point of a registered drinking-water supply, the Consent Holder shall notify, as soon as reasonably practicable, the following:
 - (a) the Consent Authority (ph 03 211 5115 or 03 211 5225 after hours); and
 - (b) Southland District Council (03 211 2500)

Monitoring and Reporting

20. If the Pond Drop Tests required by condition 15 and 16 produces a 'pass' result, the Consent Holder shall provide signed confirmation from the Suitably Qualified Person to the Consent Authority within 28 working days of the criteria being met.
21. If the Pond Drop Test or visual inspections required by conditions 16 and 17 identifies that:
 - (a) the incidental discharge is not within the drop test criteria of Appendix P of the proposed Southland Water and Land Plan Decisions Version 2018 (or any subsequent replacement versions); or
 - (b) there is any leakage outside of the normal operating procedures of the leak detection occurs or otherwise; or
 - (a) there are visible cracks, holes or defects that would allow effluent to leak from the facility

the Consent Holder shall notify the consent authority as soon as reasonably practicable.

22. Within five working days of notifying the Consent Authority under condition 29, the Consent Holder shall advise the Consent Authority in writing of the steps that will be taken to ensure that the structure is made suitable for ongoing use, including:

- (a) any additional testing to be undertaken;
 - (b) an outline of the proposed works to be undertaken to remediate the structure;
 - (c) the timeframe for completion, which shall be no longer than 3 months;
 - (d) Where the timeframe is expected to exceed 3 months;
 - i. the Consent Holder shall notify the Consent Authority that they will exceed the timeframe set out in Condition 23(c) and provide an expected date of completion;
 - ii. a suitable qualified person undertake an assessment of the pond and submit a report to the Consent Authority, outlining the defects in the pond and the remedial works to be undertaken, a detailed completion timeframe and the suitability of the pond for use during the remediation works;
 - iii. The Consent Holder shall submit a plan for their temporary operating procedures to the Consent Authority including what is required under Condition 30(f) and how they will manage their effluent;
 - iv. If the pond is deemed not suitable for use under Condition 23(d)(ii), the Consent Holder shall empty the pond and continue not to use it, until the pond has been certified to be within the normal operating parameters of a leak detection system or the pond drop test criteria set out in Appendix B and this certification has been received by the Consent Authority.
 - (e) identification of whether the works will require consent for reconstruction of the structure(s);
 - (f) the additional mitigation measures that will be employed to minimise the adverse effects of the leaking structure prior to remediation being undertaken; and
 - (g) testing, certification, or inspections to be completed following the works to demonstrate that the structure is able to comply with the conditions of this consent.
23. If the Consent Holder changes from a low rate K-line system to an equivalent low rate system, the Consent Holder shall;
- (a) notify the Consent Authority prior to the use of the equivalent low rate system;
 - (b) measure the depth and instantaneous rate of application by the irrigator as installed; and
 - (c) supply these measurements to the Consent Authority within 20 working days of the test required by condition 31(b) being undertaken.

Review of consent

24. The Consent Authority may, in accordance with Sections 128 and 129 of the Resource Management Act 1991, serve notice on the Consent Holder of its intention to review the conditions of this consent during the period 1 February to 30 September each year, or within

two months of any enforcement action being taken by the Consent Authority in relation to the exercise of this consent, for the purposes of:

- (a) Determining whether the conditions of this permit are adequate to deal with any adverse effect on the environment, including cumulative effects, which may arise from the exercise of the permit, and which it is appropriate to deal with at a later stage, or which become evident after the date of commencement of the permit;
- (b) Ensuring the conditions of this consent are consistent with any National Environmental Standards Regulations, relevant plans and/or the Environment Southland Regional Policy Statement;
- (c) Amending the monitoring programme to be undertaken;
- (d) Adding or adjusting compliance limits;
- (e) Ensuring the Aparima Freshwater Management Unit meets the freshwater objectives and freshwater quality limits set in an operative regional plan; and
- (f) Requiring the Consent Holder to adopt the best practicable option to remove or reduce any adverse effect on the environment arising as a result of the exercise of this permit.

WATER PERMIT

DETAILS OF PERMIT

Purpose for which permit is granted: To abstract and use up to 126,500 litres of groundwater per day for dairy shed purposes and stock drinking water

Location	- site locality	1570 Otautau Nightcaps Road, R D 1, Otautau
	- well numbers	D45/0318
	- map reference	NZTM2000 1217413E 489531N
	- groundwater zone	Upper Aparima
	- FMU	Aparima
	- physiographic zone	Gleyed, Lignite – Marine Terraces, Bedrock/Hill Country
	- catchment	Wairio Stream, Waicolo Stream and Opio Stream

Expiry date:

XXX 2029

Schedule of Conditions

1. This consent shall not be exercised until Water Permit AUTH-302700-03 is surrendered or has expired.

2. The abstraction of groundwater authorised by this consent shall only be from the location described in the table below.

Legal description	Pt Section 21 Wairio SD
Map reference of Bore (NZTM 2000)	NZTM2000 1217413E 489531N
Property Address	1570 Otautau Nightcaps Road

3. The rate of abstraction shall not exceed:

- (a) 2 litres per second;
- (b) 126,500 litres per day; and
- (c) 46,172.5 cubic metres per year.

4. Prior to the first exercise of this consent, 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.

- (a) Prior to the first exercise of this consent, the Consent Holder shall install a water meter to record the water take, within an error accuracy range of +/-5% over the meter's nominal flow range. The Consent Holder shall forward a copy of the installation certificate to the Consent Authority within one month of installing the water meter.
- (b) The water meter shall be installed in a straight length of pipe, before any diversion of water occurs. The straight length of pipe shall be part of the pump outlet plumbing, easily accessible, have no fittings and obstructions in it. There shall be a straight length of pipe on either side of the water meter, on the upstream side there shall be a distance that is 10 times the diameter of the pipe and on the downstream side there shall be a distance of 5 times the diameter of the pipe.
- (c) The Consent Holder shall ensure the full operation of the water meter at all times during the exercise of this consent. All malfunctions of the water meter during the exercise of this consent shall be reported to the Consent Authority within five working days of observation and appropriate repairs shall be performed within five working days. Once the malfunction has been remedied, a Water Measuring Device Verification Form completed with photographic evidence must be submitted to the Consent Authority within five working days of the completion of repairs.
- (d) (i) If a mechanical insert water meter is installed it shall be verified for accuracy each and every year from the first exercise of this consent.

(ii) Any electromagnetic or ultrasonic flow meter shall be verified for accuracy every five years from the first exercise of this consent.

(iii) Each verification shall be undertaken by a Consent Authority approved operator and a Water Measuring Device Verification Form shall be completed and supplied to the

Consent Authority with receipts of service. These shall be supplied within five working days of the verification, and at any time upon request.

6. Prior to the exercise of this consent, the Consent Holder shall notify the Consent Authority of the person who is in charge of the operation this consent. If the person in charge changes during the term of this consent, the Consent Holder shall notify the Consent Authority of the new operator no later than five working days after that person takes responsibility.
7. The Consent Holder shall pay an annual administration and monitoring charge to the Consent Authority, collected in accordance with Section 36 of the Resource Management Act 1991. This charge may include the costs of:

- (a) Inspecting the bore.

8. The Consent Authority may, in accordance with Sections 128 and 129 of the Resource Management Act 1991, serve notice on the Consent Holder of its intention to review the conditions of this consent during the period 1 February to 30 September each year, or within two months of any enforcement action being taken by the Consent Authority in relation to the exercise of this consent, or on receiving monitoring results, for the purposes of:

- (a) adjusting the consented rate or volume of water under Condition 3, should monitoring under Condition 7 or future changes in water use indicate that the consented rate or volume is not able to be fully utilised;
- (b) determining whether the conditions of this consent are adequate to deal with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage;
- (c) ensuring the conditions of this consent are consistent with any National Environmental Standards Regulations, relevant plans and/or the Environment Southland Regional Policy Statement; or
- (d) adjusting or altering the method of water take data recording and transmission.