Regional significance of the Milbrow Estate development

Caland Holdings Ltd

Report prepared by
Perrin Ag Consultants Ltd

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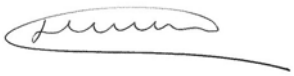
Reviewed by:	Lee Matheson BApplSc (Hons) FIRPNZ (Reg.) ASNM	
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About the Author

Alastair MacCormick [B.Sc. MIRPNZ, ASNM] is a Principal Consultant at Perrin Ag and has been with the firm since 2018. Alastair currently leads the environmental team. Prior to this, Alastair held a senior role at the Bay of Plenty Regional Council, where he worked in the water quality science, regulatory development, and implementation spaces. In this role, Alastair was instrumental in the development of Plan Change 10 in Rotorua. Alastair has proven expertise in supporting landowners to achieve environmental outcomes, including through the development of farm environment plans, and finding collaborative and pragmatic solutions to environmental risks. Alastair is recognised for his industry experience and field of knowledge in the agricultural environment and water quality space, having been called upon to provide technical input for various projects and expert evidence in the Environment Court.

1 Executive Summary

1.1 Lake Rotorua has experienced long-term degradation in water quality due to excessive nutrient inputs, particularly nitrogen and phosphorus, arising largely from land use intensification and historical sewage discharges. Over several decades, substantial scientific, regulatory, and financial efforts have been directed toward restoring lake water quality. These efforts have culminated in the adoption of a sustainable nitrogen load of 435 tonnes per year and the development of an Integrated Framework designed to achieve this target by 2032 (enacted vis a vis Plan Change 10).

1.2 These objectives are reinforced by the Te Arawa Lakes Deed of Settlement, which established lake water quality restoration as a central component of the enduring Crown–Te Arawa relationship and provided the foundation for substantial long-term public investment in lake restoration.

1.3 The Integrated Framework requires a total reduction of approximately 320 tonnes of nitrogen from the catchment relative to early-2000s land use. This reduction is to be achieved through a combination of gorse removal, engineering solutions, regulatory reductions imposed on farming activities, and the Incentives Scheme, which aims to permanently remove 100 tonnes of nitrogen by purchasing nitrogen allocations from landowners. The majority of these nitrogen loss reductions are expected to come from the pastoral farming sector, alongside significant reductions in phosphorus losses.

1.4 The proposed Milbrow Estate development involves the subdivision and redevelopment of 83.3 hectares of land currently operated as part of a dairy farming enterprise. The development would result in the retirement of substantial areas of pastoral land and the permanent surrender of 1,815.7 kg of nitrogen allocation to the Rotorua Incentives Scheme in addition to the land's mandated regulatory reduction. When converted to nitrogen entering Lake Rotorua, this equates to approximately 1.1 tonnes of nitrogen per year being prevented from reaching the lake.

1.5 This contribution represents approximately 1.1% of the total nitrogen reduction sought through the Incentives Scheme, achieved from only around 0.4% of the pastoral land area in the Rotorua catchment. In addition, the development is expected to result in a significant reduction in phosphorus losses relative to the existing dairy land use, particularly through the retirement of gullies and swales that are high-risk areas for phosphorus runoff.

1.6 From a regional perspective, the Milbrow Estate development is significant because it demonstrates a viable pathway for voluntary land use change that supports the achievement of Lake Rotorua's water quality objectives while allowing landowners to maintain land value and equity. This type of development provides an alternative funding mechanism that complements the Incentives Scheme at a time when it is becoming increasingly difficult to secure further nitrogen reductions through nitrogen allocation purchases alone.

1.7 The success of the Lake Rotorua restoration programme depends not only on regulatory controls but also on continued community support and voluntary participation by landowners. Developments such as the Milbrow Estate reduce pressure on the remaining farming community, support progress toward nitrogen and phosphorus targets, and help sustain confidence in the Integrated Framework. In this context, and having regard to the Treaty settlement framework, the Milbrow Estate development makes a meaningful and regionally significant contribution to achieving long-term water quality outcomes for Lake Rotorua.

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2 Terms of Reference

2.1 The purpose of this report is to assess the regional significance of the proposed Milbrow Estate development, with particular regard to Lake Rotorua water quality objectives. Specifically, the report addresses:

- the background to Lake Rotorua water quality issues and the associated scientific and regulatory response;
- nitrogen and phosphorus reduction targets applicable to the Rotorua catchment and the Milbrow Estate development; and
- the significance of the Milbrow Estate development in contributing to the achievement of these water quality objectives, including implications for the farming community.

2.2 This report does not seek to assess the regional significance of the Milbrow Estate development beyond matters directly related to water quality and associated land use change within the Rotorua catchment.

3 Background

3.1 Lake Rotorua has experienced declining water quality due to excessive nutrient inputs, particularly nitrogen and phosphorus. Concerns regarding lake water quality were first raised in the early 1960s, and since that time, there have been sustained efforts to identify the nutrient sources and implement management responses.

3.2 The primary sources of excess nutrients to the lake have been identified as land use intensification, particularly pastoral farming, and historical sewage discharges. During the 1980s, nitrogen inputs from sewage were estimated at approximately 150 tonnes per year. The installation of a land treatment system in 1991 resulted in a substantial reduction in these discharges, with current sewage-derived nitrogen inputs estimated at approximately 30 tonnes per year[1].

3.3 In contrast, nutrient inputs from pastoral farming have increased steadily over time. Modelling of historical land uses within the Rotorua catchment indicates that nitrogen discharges to the lake from pastoral land use have increased by approximately 430 percent since 1940. By comparison, nitrogen discharges from non-agricultural land uses have increased by approximately 12 percent over the same period[2].

3.4 A sustainable nitrogen load of 435 tonnes per year entering Lake Rotorua was first proposed in 1989[3], based on lake water quality conditions observed during the 1960s. This estimate has been reviewed through subsequent scientific studies and remains the accepted sustainable nitrogen load for the lake.

3.5 In December 2004, the Te Arawa Lakes Deed of Settlement was signed by representatives of Te Arawa and the Crown. The Deed established an enduring governance and relationship framework that explicitly recognises the protection, restoration, and sustainable management of lake water quality as a central and ongoing objective.

3.6 The settlement provided the foundation for subsequent co-governance arrangements and formal agreements between the Crown and local authorities, including significant long-term funding commitments. Through these arrangements, approximately $144 million was committed toward the protection and restoration of Lake Rotorua and four other priority lakes. This investment reflects the central importance of lake water quality to the Treaty settlement and underpins the development and implementation of the Integrated Framework for nutrient management within the Rotorua catchment

[1] https://www.rotorualakes.co.nz/vdb/document/481#:~:text=History%20of%20Rotorua's%20wastewater,Plant%20and%20Land%20Treatment%20System.

[2] Rutherford, J.C., Palliser, C.C., & Wadhwa, S. (2011). Prediction of nitrogen loads to Lake Rotorua using the ROTAN model. (NIWA Client Report HAM2010-134). Hamilton, New Zealand: NIWA.

[3] Rutherford, J.C.; Pridmore, R.D.; White, E., 1989. Management of phosphorus and nitrogen inputs to Lake Rotorua, New Zealand, Journal of Water Resources Planning & Management 115 (4): 431-439.

3.7 In response to ongoing water quality degradation and increasing public concern, the Regional Council introduced a suite of nitrogen capping rules in December 2005. Commonly referred to as "Rule 11", these rules benchmarked nitrogen discharges from properties based on land use during the 2001–2004 period and effectively prevented further intensification of land use within the catchment.

3.8 With the nitrogen capping rules in place, it became possible to assume a steady-state nitrogen load to the lake based on the 2001-2004 land use. This was calculated to be 755 t N annually. By comparing the steady-state load with the sustainable load, it was determined that reductions of at least 320 tonnes would be required from the average nitrogen discharges during the 2001-2004 period.

3.9 In 2014, the 435-tonne sustainable nitrogen load was embedded in the Regional Policy Statement. Policy WL 3B directs that the sustainable nitrogen load shall not be exceeded, while Policy WL 6B provides that nitrogen discharges in excess of this level shall not be authorised beyond 2032. Achieving these outcomes relies on a combination of regulatory and non-regulatory measures collectively referred to as the Integrated Framework.

3.10 The Integrated Framework was originally developed by a collective of local farmers and then endorsed by the Regional Council in 2013. It seeks to achieve the required 320 tonne reduction through four separate programmes:

- removal of gorse from the catchment, contributing an estimated 30 tonnes of nitrogen reduction per year;
- engineered solutions, contributing an estimated 50 tonnes per year;
- the Rotorua Incentives Scheme, targeting a permanent reduction of 100 tonnes per year through the purchase of nitrogen allocations; and
- regulated reductions under RMA rules, contributing a further 140 tonnes per year (96 tonnes from the dairy sector and 44 tonnes from the drystock sector).

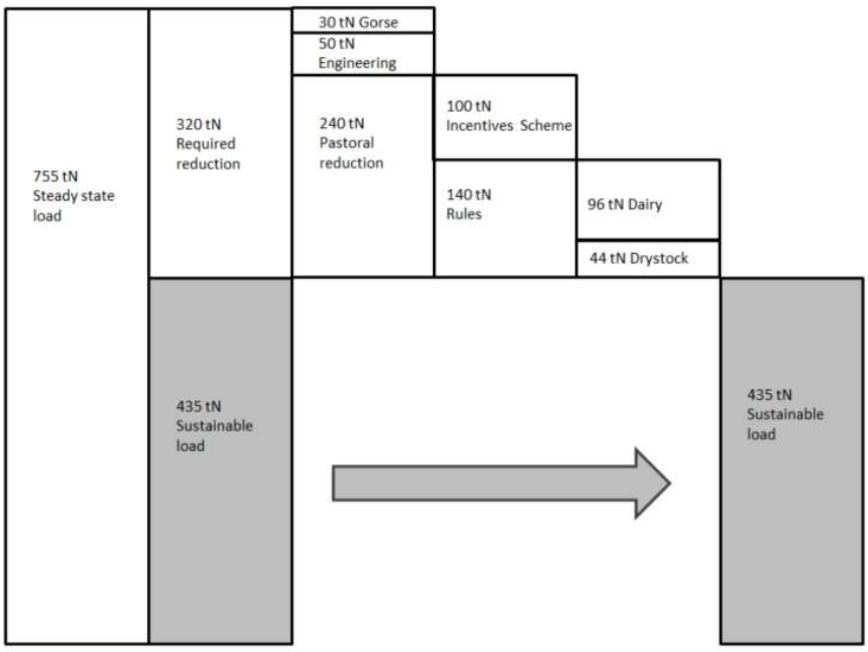

Figure 1: Diagrammatic representation of the Integrated Framework

3.11 To give effect to the regulatory component of the Integrated Framework, a second-generation rules framework was developed through Plan Change 10. This framework allocates nitrogen discharge allowances to all land within the Rotorua catchment using an accounting system based on the Overseer model and stocking rate tables. Rural landowners are required to demonstrate compliance with their nitrogen allocation either through resource consent or permitted activity standards.

3.12 The Incentives Scheme is funded jointly by the Crown and the Regional Council, with each contributing $20 million. The scheme provides for payments of up to $400 per kilogram of nitrogen permanently removed from the lake, subject to eligibility criteria. Nitrogen reductions achieved through the scheme must be in addition to those required under Plan Change 10.

3.13 The nitrogen allocation framework applies to all land within the catchment, including urban areas. Increases in urban nitrogen discharges associated with growth are managed by requiring equivalent reductions from the rural environment, typically secured through the subdivision process.

3.14 Nitrogen discharges from farming activities are quantified using the Overseer model. As the model is periodically updated, nitrogen allocations are adjusted to maintain consistency and equity across the catchment. Changes to the model's predictions result in the sum of nitrogen allocations within the catchment (quantified at the root zone) no longer aligning with the predicted steady-state load entering the lake (755 tonnes). To address this difference, a calibration factor is calculated with each new Overseer version. In practice, this means a kilogram of nitrogen discharged from land is not the same as a kilogram of nitrogen entering the lake. In OverseerFM v6.5.11, a kilogram of nitrogen discharged to land equals 610 g N (61percent) entering the lake.

3.15 Phosphorus discharges into Lake Rotorua also have a significant impact on water quality. The total phosphorus load to the lake was estimated by Tempero et al (2015)[4] at 48.7 tonnes. Of this, 23.4 tonnes are considered to originate from anthropogenic sources, with the remainder originating naturally. While not formalised in statutory planning documents, the sustainable phosphorus load is thought to be between 33.7 and 38.7 tonnes, giving a reduction target of 10-15 tonnes. This represents about half the anthropogenic load[5].

3.16 Current phosphorus management measures include the promotion of good farming practice, edge-of-field mitigation, land use change, and in-lake treatment using aluminium sulphate dosing.

3.17 The full extent of public investment into the restoration of Lake Rotorua's water quality isn't known but undeniably extensive. It includes:

- $144 million provided to the Rotorua Te Arawa Lakes Programme
- $60 million spent on sewage upgrades,
- Two RMA plan change processes,
- Many hundreds of scientific studies,

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[4] Tempero, G., Abell. J., Hamilton, D., McBride C. (2015). Anthropogenic Phosphorus Loads to Lake Rotorua. ERI Report 66.

[5] Bay of Plenty Regional Council (2019) *Lake Rotorua Science Review* https://www.rotorualakes.co.nz/vdb/document/1713

- On going alum dosing at a cost of $600,000 to $800,000 annually,
- Funding a science chair at Waikato University,
- Many hours of staff time in both the regional and district councils.

3.18 Private investment has also been extensive. Farmers and concerned members of the community have invested countless hours of their own time and money contributing the development of plans, attending hearings and investing in nutrient mitigation measures.

4 Impacts of the Milbrow Estate on water quality.

4.1 The site proposed for the Milbrow Estate is currently part of a 91.8 ha dairy farm. The 83.3 ha Milbrow Estate proposal occupies the 83.3 ha of owned land with the remaining area of the dairy farm being leased.

4.2 The nitrogen allocations on the owned area are 3,305 kg N/yr (OverseerFM v6.5.11). The proposed development requires 1,489.3 kilograms of nitrogen allocation to offset wastewater and background discharges.

4.3 The balance of the nitrogen allocation, amounting to 1,815.7 kilograms per year, is proposed to be permanently surrendered to the Lake Rotorua Incentives Scheme. When converted to nitrogen entering Lake Rotorua (at 61% of farm losses), this equates to approximately 1,107.8 kilograms of nitrogen per year being prevented from reaching the lake.

4.4 This reduction represents approximately 1.1 percent of the total 100 tonne nitrogen reduction sought through the Incentives Scheme, achieved from approximately 0.4 percent of the pastoral land area within the Rotorua catchment.

4.5 The Incentives Scheme pays up to $400 per kilogram. For comparison the recent sales of a dairy farm and a dairy support farm both achieved circa $1,150/ kg N into the lake. This represents a deficit to the farmer of $750 /ha.

4.6 For the Milbrow Estate, while the proposed surrender of surplus nitrogen to the Incentives Scheme will have associated consideration of $442,00, in doing so there is over $830,000 of opportunity cost to the Milbrow Estate that is foregone.

4.7 Phosphorus losses from the site are also expected to reduce significantly because of the development, although precise quantification is not practicable. Under the existing dairy land use, phosphorus losses arise from maintaining elevated soil phosphorus levels for pasture production, soil disturbance and compaction, and the application of fertiliser and effluent to the soil surface.

4.8 Under a residential land use, there would be a greater proportion of impermeable surfaces, formal stormwater management, reduced soil disturbance, and substantially lower fertiliser application rates. Of particular significance is the retirement of gullies and swales from pastoral use, which are recognised as high-risk areas for phosphorus loss. Overall, the development is expected to result in a meaningful reduction in phosphorus losses relative to the existing dairy farming activity.

5 Regional significance of the Milbrow Estate development

5.1 The broader regional significance of the Milbrow Estate development extends beyond water quality considerations; however, this report focuses on its contribution to Lake Rotorua nutrient reduction objectives and the implications for the farming community.

5.2 The regional significance of nutrient reduction initiatives in the Rotorua catchment must also be considered in the context of the Te Arawa Lakes Deed of Settlement. That settlement established the protection and restoration of lake water quality as a core and enduring obligation shared between Te Arawa, the Crown, and local authorities, supported by substantial public investment. Achieving sustained improvements in water quality is therefore not only a regulatory objective, but also fundamental to giving effect to the Treaty settlement.

5.3 The Lake Rotorua restoration programme represents one of the most comprehensive and stringent nutrient management regimes applied to an agricultural catchment in New Zealand. The Integrated Framework seeks to reduce nitrogen inputs to the lake by approximately 42 percent, with the majority of these reductions to be delivered by the pastoral farming sector. At the same time, substantial reductions in phosphorus losses are also required, effectively translating to a reduction of approximately half of the anthropogenic phosphorus load.

5.4 Achieving these reductions is not feasible without significant land use change away from intensive pastoral farming. The challenge is to find ways for landowners to exit from farming voluntarily. In most cases, this requires that their equity in the land is at least maintained.

5.5 The proposed development also demonstrates a viable pathway for voluntary land use change that supports the achievement of Lake Rotorua's water quality objectives while allowing landowners to maintain land value and therefore their financial equity.

5.6 While the Incentives Scheme has achieved meaningful progress, with approximately 46.5 tonnes of nitrogen removal secured to date, further reductions are becoming increasingly difficult to secure. This reflects the exhaustion of lower cost opportunities, inflationary pressures reducing the scheme's purchasing power by 24 percent[6], and the disparity between the price offered and the resulting change in land value. For example, to revert a dairy farm in the Rotorua catchment to a low intensity sheep and beef property would be expected to lower the value of the property by around $17,000/ha. The income generated from selling the surplus nitrogen associated with this land use change to the Incentives Scheme would sum to around $6,000/ha, leaving a shortfall of $11,000/ha. It seems reasonable to conclude that landowners are unlikely a take up this opportunity without additional incentive.

5.7 If the required nitrogen reductions are not achieved through the Integrated Framework, further across-the-board reductions in nitrogen allocations would be required. In our view, such an outcome would risk further undermining farm viability, encouraging non-compliance or avoidance behaviour, and eroding community support for the lake restoration programme. The success of the current framework relies heavily on voluntary participation and community buy-in, given the practical challenges associated with monitoring and enforcement.

[6] Calculated from May 2017 to September 2025 using the reserve bank inflation calculator and general CPI.

5.8 By contributing disproportionately to nitrogen and phosphorus reduction targets, in a manner that aligns with the Treaty settlement and supports voluntary land use change, the Milbrow Estate development supports the effectiveness, equity, and durability of the Lake Rotorua nutrient management framework.

6 Summary

6.1 This report has assessed the regional significance of the proposed Milbrow Estate development in relation to Lake Rotorua water quality objectives. The key conclusions are:

- Achieving Lake Rotorua water quality objectives requires substantial and sustained reductions in nitrogen and phosphorus inputs, with the majority of nitrogen reductions expected to be delivered by the pastoral farming sector.
- The Integrated Framework and Rotorua Incentives Scheme rely on voluntary land use change alongside regulatory controls to achieve these reductions. Without the additional financial incentives provided through subdivision, these reductions are unlikely to occur placing the restoration of Lake Rotorua at risk.
- The Milbrow Estate development would permanently remove approximately 1.1 tonnes of nitrogen per year from entering Lake Rotorua, representing a disproportionate contribution relative to the land area involved.
- The development is also expected to result in a meaningful reduction in phosphorus losses through the retirement of high-risk landscape features and reduced pastoral activity.
- By facilitating voluntary land use change while maintaining landowner equity, and by contributing to outcomes anticipated by the Te Arawa Lakes Deed of Settlement, the Milbrow Estate development supports continued community participation in, and confidence in, the Lake Rotorua Restoration Programme.

6.2 Overall, the Milbrow Estate development represents a regionally significant contribution to achieving the objectives of the Regional Policy Statement, the Integrated Framework for Lake Rotorua, and the enduring water quality outcomes anticipated under the Te Arawa Lakes Deed of Settlement.