TO:	Andrew Allsopp-Smith, Andrew Fawcet Vineway Limited	Date:	1 July 2025
COPY TO:	Madeleine Wright	Document No:	10122-006-1
FROM:	Amanda Naude, Dr Grant Allen		

DELMORE FAST TRACK APPLICATION - RESPONSE TO AUCKLAND COUNCIL WASTEWATER QUERIES

Background

Vineway Limited (Vineway) has applied for resource consent under the Fast-track Approvals Act 2024 to develop approximately 109 ha of land at Upper Ōrewa Road and Russell Road ('the site'). As part of the application, Viridis Limited (Viridis) prepared a memorandum assessing the potential effects of treated wastewater discharges on the receiving environment (i.e., an unnamed tributary of the Ōrewa River) (Viridis 2025a).

In accordance with the fast-track process, Auckland Council (AC) was engaged to review and provide technical feedback on the application. Before AC provided its comments to the panel, it provided technical feedback to Vineway (GWE 2025a). This feedback raised several matters relating to on-site discharge of treated wastewater and environmental impacts. Viridis prepared responses to the matters raised in GWE (2025a), and these were provided to AC on 11 June 2025, ahead of it providing its final comments to the panel on 26 June 2025 (GWE 2025b; Annexure 9 of AC's response to the application). Viridis' response memorandum is reissued here to assist the panel's understanding of the proposal and to demonstrate how AC's feedback has been considered.

Response to Queries

Ammonia effects

From Table 2 in the Water Quality Report, it seems feasible likely the discharge will push the stream to State B occasionally for ammonia. Similarly, DRP is also modelled to increase the stream concentration to Attribute B levels. Concentrations of other contaminants in the stream will also increase. While overall the indications are that ammonia in the discharge will not cause serious issues, there is little discussion of what the occasional change to NPSFM State B and the exceedance of the ANZGV means in and what can be expected to be witnessed in terms of impacts on the ecology as a result. For example, will the change to Band B result in there being a reduction in certain species?

Under Scenarios 1 (dry weather) and 2 (average discharge), modelled concentrations of ammoniacal nitrogen and/or dissolved reactive phosphorus (DRP) in the stream are predicted to shift from National Policy Statement for Freshwater Management (NPS-FM) Attribute Band A to Band B[1]. For ammoniacal nitrogen, this transition corresponds to a level that "*starts impacting occasionally on the 5% most sensitive species*" (MfE 2024). For DRP, it signals the potential for eutrophication effects, with the ecological community expected to be '*slightly impacted by minor DRP elevation above natural reference conditions*' (MfE 2024). However, under both scenarios the proposed discharge is not expected to cause

[1] Refer to Viridis (2025). Under Scenario 1, both ammoniacal nitrogen and DRP are modelled to shift from NPS-FM Attribute Band A to Band B. Under Scenario 2, only DRP is predicted to shift from Band A to B, while ammoniacal nitrogen remains within Band A.

ammoniacal nitrogen or DRP concentrations in the stream to exceed the ANZG (2018) default guideline values (DGVs) applied in Viridis (2025a).

Despite the temporary shift in NPS-FM Attribute Bands, the discharge is considered unlikely to result in an ecologically significant shift in overall macroinvertebrate community composition – that is, a meaningful change to the structure or function of the benthic community beyond the natural variability observed in similar lowland agricultural streams. The results of macroinvertebrate sampling undertaken in December 2024 (Table 1, reproduced from Viridis 2025b) indicate that the existing benthic community is largely dominated by pollution-tolerant taxa, such as *Orthocladiinae* (MCI-sb score of 3.2) and *Physa* (MCI-sb score of 0.1).

This assemblage is typical of slow-flowing, unshaded agricultural streams (Landcare Research 2025). Macroinvertebrate community index (MCI) and quantitative MCI (QMCI) scores for each site fell within NPS-FM Attribute Band C or D for ecosystem health, indicating the existing community is largely insensitive to nutrient related stress. While some sensitive EPT taxa were present, they comprised (on average) less than 11% of the population. If 5% of the most sensitive species are expected to experience occasional effects from increases in ammoniacal nitrogen (as per MfE 2024), this would represent fewer than 1% of the total macroinvertebrate community in the unnamed tributary. Similarly, any potential effects from increases in dissolved reactive phosphorus (DRP) are expected to be limited to a small proportion of the most sensitive taxa.

Table 1. Macroinvertebrate results for the unnamed tributary of the Ōrewa River.

Parameter	**Sampling Site***		
	Up-North	**DS1**	**DS2**
Abundance	3,035	139	763
Taxa richness	18	17	22
EPT taxa richness	3	2	4
% EPT abundance	6.6	12	14
% EPT taxa	17	12	18
MCI-sb	84	92	92
MCI NPS-FM Attribute Band	D	C	C
QMCI-sb	2	3.5	3.1
QMCI NPS-FM Attribute Band	D	D	D

Notes: EPT is the number of taxa that belong to the Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies) taxonomic groups, which are generally more sensitive to changes in water and habitat quality; *as shown in Figure 3 of Viridis (2025b).

The occasional and slight impacts of nutrient increases are expected to take the form of:

- A minor reduction in the abundance or occurrence of sensitive taxa already present at low levels, (due to the existing environmental constraints, such as the stream's lack of shading or soft-bottom habitat).
- A further increase in dominance by tolerant species, reinforcing the current community composition.
- Localised and short-term shifts in community structure during discharge events, with natural recovery expected during intervening periods. This expectation is supported by the short duration and intermittent nature of discharges associated with Attribute Band shifts, as well as the presence of upstream refuge areas and good habitat connectivity.

Given the current ecological state of the tributary and its macroinvertebrate population, these changes are unlikely to represent a meaningful departure from existing conditions. However, given the predicted shift to Attribute Band B, it is appropriate to monitor the stream for potential long-term or cumulative effects. Vineway's proposed ecological monitoring conditions provide an important safeguard by ensuring ecological monitoring can detect unforeseen changes, confirm effects remain within expectations, and trigger management as needed:

Following the commencement of the discharge, the consent holder must conduct ecology surveys on a yearly basis, during summer, at three locations within the unnamed stream present on Site (US, DS-1 and DS-2), which shall include an qualitative assessment of physical habitat characteristics, the collection of macroinvertebrate samples and overnight fish trapping.. Once the development has been fully utilised and at design capacity for a minimum period of 2 years, subject to council approval, the in-stream monitoring frequency may be reduced to once every three years if results indicate the ecological community has been unaffected by the discharge. Ecological monitoring must be undertaken by a suitably qualified and experienced person, who must provide advice to the Consent Holder if results indicate the water quality has deteriorated because of the WWTP discharge.

Potential impacts on fish are also expected to be minimal, given the limited scale and duration of predicted changes in water quality. As mentioned above, the ANZG DGVs for species of nitrogen and phosphorus are met under all scenarios (with the exception of total nitrogen, which is already elevated in the stream). Concentrations of other contaminants, such as total suspended solids (TSS), five-day carbonaceous biochemical oxygen demand ($cBOD_5$) and *Escherichia coli* are not expected to increase under any modelled scenario (Viridis 2025a), further supporting the conclusion that adverse effects on fish are unlikely.

It is also worth noting that the modelling approach employed in Viridis (2025a) is intentionally conservative. It assumes low baseflows (i.e., estimated from Whitehead & Brooker 2020) and does not account for dilution from other stormwater inputs to the stream. Additionally, baseline water quality data was collected during dry summer months (i.e., December and January), which may over-represent dry-season conditions and under-represent typical rainfall-driven stream quality, which is particularly relevant for Scenario 2 (average conditions). This likely results in a cautious estimate of effects, adding further confidence that in-stream impacts will be limited under actual operating conditions.

Effects on the estuary and overall impact of the discharge as a percentage of the catchment

It would be beneficial to understand how the additional ammonia and phosphorous will affect the estuary (if at all). This could be done under the wider umbrella of an analysis of scale of the discharge in relation to other contributions in the catchment. Given the level of development currently taking place upstream of the estuary, and that other wastewater discharges may also be taking place into the catchment, it is important to know what percentage contribution to the estuary (especially nutrients) is from the wastewater discharges.

One of the main inflows to the Ōrewa Estuary is the southern stem of the Ōrewa River, which has a catchment size of approximately 1,615 ha (as per AC's Geomaps overland flow path layer). A significant proportion of this catchment is currently used for agriculture and is expected to remain so, due to its rural zoning (Figure 1).

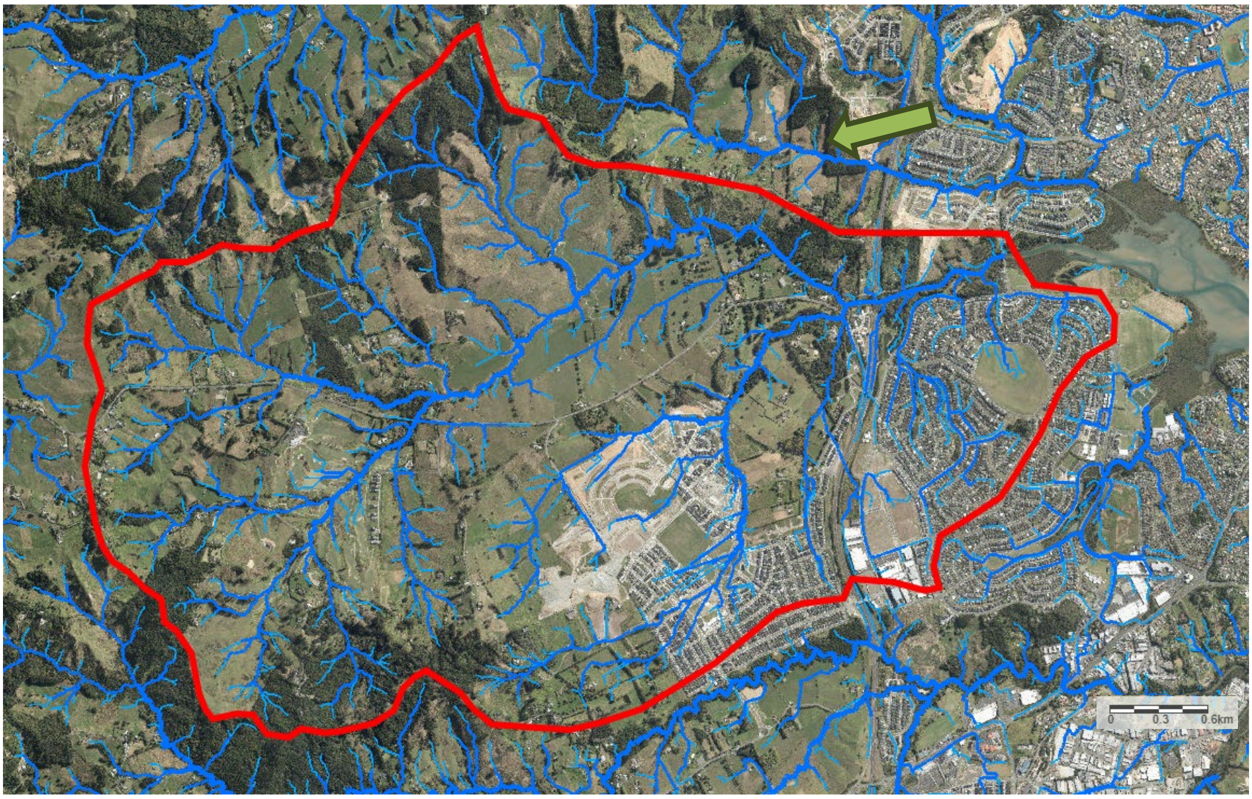

Figure 1. Approximate catchment boundary contributing to the Orewa River shown in red, with overland flow paths in blue. Site location shown by green arrow. Aerial imagery dated 2024–2025, sourced from AC GeoMaps.

To provide a high-level indication of the proposal's impact, indicative nutrient loads from the surrounding land uses can be compared to that of the proposed discharge. Based on national averages reported by Monaghan *et al.* (2021a), sheep and beef farming practises typically contribute around 12 kg N/ha/year and 0.8 kg P/ha/year to surface water[2]. However, given that many farms in the catchment have been retired, the mitigation effects of land retirement were also considered. Monaghan *et al.* (2021b) estimates these reductions to be up to 1 kg N/ha/year, and up to 0.65 kg P/ha/year. Excluding the proposed development site and conservatively assuming that half the catchment (approx. 808 ha) consists of retired agricultural land (at the present time), the estimated contributions of retired agricultural land equate to approximately 8,888 kg of total nitrogen and 121 kg of total phosphorus per year to the Ōrewa River.

In contrast, the proposed discharge (under Scenario 2, excluding irrigation attenuation), is modelled to contribute approximately 91.5 kg of nitrogen and 6.4 kg of phosphorus per year – equivalent to just over 1% of the catchment's agricultural load of nitrogen and around 5% of its phosphorus load. These proportions decrease further when the discharge is considered in the context of the larger estuarine catchment and contributions from other land uses. Furthermore, as the discharge is proposed to enter a small headwater tributary, nutrient concentrations are expected to be reduced through natural processes, such as riparian/aquatic vegetation uptake or sedimentation, before reaching the estuary. The Ōrewa Estuary is a permanently open tidal lagoon with a high flushing capacity, which reduces

[2] Presumed to be total nitrogen and total phosphorus loads.

nutrient residence time and the risk of eutrophication. These characteristics further mitigate the potential for estuarine water quality impacts from the proposed discharge.

While further residential development is anticipated in the upstream catchment (e.g., Milldale Stages 4C and 10-13), each proposal must be assessed individually at the time of application. This current application can only account for existing or authorised discharges. Future applications will similarly be required to consider cumulative effects in the context of the existing environment and approved developments at that time.

In summary, the proposed discharge represents a minor, localised nutrient source within the wider catchment and estuarine system. The inclusion of consent conditions requiring ongoing monitoring of water quality and ecological indicators (refer conditions reproduced above) in the receiving tributary provides a framework that ensures that any unexpected effects are identified at an early stage and addressed before impacts propagate downstream. As such, the proposed approach enables effective management of potential effects on the estuary.

Emerging organic contaminants (EOCs), metals

The impact of EOCs and metals was not discussed. If metal impacts are low because of low solids concentration in the discharge, or if RO is effective at removing EOCs, this should be stated somewhere.

As reported in Apex (2025), RO treatment is expected to be very effective in removing both EOCs and metals. Given the high removal efficiency of the reverse osmosis (RO) system, concentrations of these substances in the discharge are anticipated to be very low. As a result, potential impacts on the stream were not considered further in Viridis (2025a).

Borelogs

No borelogs for the land disposal area were provided. The applicant has assumed 3 mm/d loading (irrigation) rate, with 8.5mm/d during drier periods. Soils in the area are extremely poorly draining and may not be able to cope with these loading rates. Page 3 of the Water Quality report also states an assumption that discharge flows will reduce by 50% due to absorption and evapotranspiration at the disposal field and this assumption feeds into the mass balances provided in that report. More confidence is needed that this assumption is reasonably accurate, and an examination of the underlying soils will largely confirm that.

Council can only comment on the information provided to it and in this case the proposed level of treated wastewater quality is extremely high. However, a possible benefit of examining the soils is that the applicant may find that if uptake of water and nutrients via evapotranspiration and in the soils is significant enough, then this may reduce the level of treatment necessary.

It is assumed that around 50% of the irrigated discharge would be absorbed or lost via evapotranspiration, based on the characteristics of densely vegetated environments. Native bush, such as the on-site covenant area where the irrigation field is proposed, has been reported to intercept and evapotranspire a substantial portion of water inputs – up to one-third in some cases (Environment Guide 2025) – with additional losses likely through soil infiltration and absorption.

The geotechnical team involved in the Delmore application (Riley Consultants) confirmed with GWE that further investigations are not currently required, due to the existing information available for boreholes located near the effluent disposal area (Beaumont J., personal communication, 28 May 2025). Riley Consultants (2025) reported that the soils fall within soil category 5, as defined in AC (2017), which can support irrigation application rates of 2-3 mm/day. Riley Consultants (2025) also reported that the proposed bush disposal area is '*suitable with respect to stability*'. Increased application rates in drier periods are supported by the modelled evapotranspiration deficiency of soils during summer, as per Apex (2025).

To address uncertainty around soil capacity, a condition of consent, developed in consultation with GWE, will require confirmation of the soil category at the project's detailed design stage. Soil moisture monitoring is also proposed (refer Apex 2025) to manage irrigation rates in real time and prevent overloading of the disposal field.

References

Auckland Council 2017. GD06: Erosion and sediment control guide for land disturbing activities in the Auckland Region (Version 1). https://www.aucklandcouncil.govt.nz

Apex 2025. Technical Note – Engagement Requests for Additional Information. A memorandum, prepared by Apex Water Limited for Vineway Limited. 5 May 2025. TN03.

ANZG 2018. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Available at www.waterquality.gov.au/anz-guidelines.

Environment Guide 2025. Horticulture – Description of the impacts to be managed. New Zealand Law Foundation & Environmental Defence Society. Access on 5 June at: https://www.environmentguide.org.nz/activities/horticulture/description-of-the-impacts-to-be-managed/

GWE 2025a. Delmore (88 Upper Orewa Road) Fast Track Application – BUN60446761. A technical memorandum prepared for Auckland Council by GWE Consulting Engineers Limited. 22 March 2025.

GWE 2025b. Delmore Fast Track. 25/06/2025 – Auckland Council Response. Annesure 9: Wastewater. Dylan Walton. A technical memorandum prepared for Auckland Council by GWE Consulting Engineers Limited. 19 June 2025.

Landcare Research 2025. Chironomid midge (Orthoclad). Manaaki Whenua Landcare Research. Accessed on 4 June 2025 at: https://www.landcareresearch.co.nz/tools-and-resources/identification/freshwater-invertebrates-guide/identification-guide-what-freshwater-invertebrate-is-this/no-jointed-legs/true-fly-larvae/midges/chironomid-midge-orthoclad/

MfE 2024. National Policy Statement for Freshwater Management 2020: Amended October 2024. Ministry for the Environment.

Monaghan RM, McDowell RW, and Wilcock RJ 2021a. Nitrogen and phosphorus losses from New Zealand agriculture – National estimates and management strategies. New Zealand Journal of Agricultural Research, 64(4), 510–544. https://doi.org/10.1080/00288233.2021.1936572

Monaghan RM and Smith LC 2021b. Quantifying contaminant losses to water from pastoral land uses in New Zealand: A review of recent research and future challenges. New Zealand Journal of Agricultural Research, 64(3), 365–386. https://doi.org/10.1080/00288233.2021.1876741

NIWA 2025a. Shortfin eel. NIWA Atlas of NZ Freshwater Fishes. National Institute of Water and Atmospheric Research. Access on 6 June 2025 at: https://niwa.co.nz/freshwater/nz-freshwater-fish-database/niwa-atlas-nz-freshwater-fishes/shortfin-eel

Riley Consultants 2025. Geotechnical Report. Proposed Residential Development Russell Road and Upper Ōrewa Road, Wainui. A report prepared by Riley Consultants Limited for Vineway Limited. 14 February 2025.

Viridis 2025a. Delmore Proposed WWTP Discharge: Impact on Water Quality. A memorandum prepared for Vineway Limited by Viridis Limited. 12 February 2025. Document No: 10122-004-3.

Viridis 2025b. Delmore Fast-track Application. Ecological Impact Assessment. A report prepared for Vineway Limited by Viridis Limited. 13 February 2025. Document No: 10122-002-1.

Whitehead AL, Booker DJ 2020. NZ River Maps: An interactive online tool for mapping predicted freshwater variables across New Zealand. NIWA, Christchurch. https://shiny.niwa.co.nz/nzrivermaps/