

TECHNICAL MEMORANDUM

INVESTIGATION	Tahimana Groundwater Assessment Summary	PROJECT	Tahimana Subdivision
CLIENT	Tahimana Limited	PROJECT NO	C04732500
CLIENT CONTACT	Gina Grimwood	PREPARED BY	Ryan Nicol
CLIENT WORK ORDER NO/ PURCHASE ORDER		SIGNATURE	
		DATE	4 December 2025

1.0 Introduction and Hydrogeological setting

This memorandum summarises my assessment of effects of the proposed Tahimana subdivision and development project. It includes a description of the hydrogeological setting at the Tahimana Subdivision site, potential effects on groundwater, and how the issues can be mitigated or avoided. It is based on information contained in a report prepared by Pattle Delamore Partners (PDP) (2024¹), subsequent letters and a technical memorandum prepared by PDP (2024², 8 August 2025³ and 11 August 2025⁴, respectively). All four documents concluded that although the development will result in a small increase in catchment throughflow, the development will not have significant adverse effects on groundwater, including hydraulically connected wetlands.

The Tahimana site is located around 4.5 km northwest of Mapua in the Tasman region. It involves development of an area of land currently used for marginal agricultural purposes into a residential and lifestyle subdivision. The topography of the site is generally hilly, irregular terrain with incised gullies with the elevation across the site generally ranging between 44 – 108 metres above sea level (masl) (NZVD2016). The site can be broadly split into two general surface water catchments which are referred to as East and West catchments.

The geology at the site consists predominantly of the Moutere Gravel Formation comprised of yellow-brown claybound gravels, containing deeply weathered clasts. Within the valley and gully floors, the Moutere Gravels have been reworked by fluvial processes to form a veneer which generally consists of saturated, low permeability sandy silts in which wetlands have formed. The Moutere Gravel Formation is underlain by Tertiary sediments and basement granitic rocks.

Wetlands are constricted to gullies and valleys and are relatively narrow (around 10 to 15 m wide) although at lower elevations/further downstream, they become wider (up to 40 m). The wetlands located higher in the catchment are expected to be perched above the wider groundwater system whereas the lower elevation wetland sections are expected to be directly hydraulically connected to the wider groundwater system.

Groundwater levels have been measured at three monitoring locations at the site within two separate wetlands (two standpipes up to 2.1 m deep) and within the underlying Moutere gravels (one bore up to 20 m deep). Groundwater levels have been measured between 0.05 metres above ground level (m agl) and 1 metre below

¹ Pattle Delamore Partners (PDP). 2024. Tahimana Subdivision: Hydrogeology Investigation. Prepared for Tahimana Limited. March 2024.

² Pattle Delamore Partners (PDP). 2024. Tahimana Subdivision S92 Response – Hydrogeology / Groundwater. Prepared for Tahimana Limited. Dated 1 October 2024.

³ Pattle Delamore Partners (PDP). 2025. Tahimana Subdivision – Eastern catchment water balance update. Prepared for Tahimana Limited. Dated 8 August 2025.

⁴ Pattle Delamore Partners (PDP). 2025. Tahimana Subdivision – Additional S92 Response. Prepared for Tahimana Limited. Dated 11 August 2025.

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ground level (m bgl) in the wetlands and between 1.8 and 2.8 m bgl in the deeper bore. Shallow groundwater flows roughly parallel to topography, following the surface water flow paths at the site, which is in a general south to north direction. Shallow groundwater recharge in the vicinity of the site is expected to be predominantly from rainfall recharge.

There are no current or proposed groundwater takes at the site and the closest neighbouring bore used for domestic use is more than 300 m away from the proposed development boundary.

2.0 Potential Groundwater Effects

The project could have an indirect impact on groundwater recharge that may be contributing to the hydrological functioning of wetlands. The main potential effects on wetland recharge are:

- ∴ Interception of groundwater via excavations such as cuts, trenches and other earthworks, diverting groundwater recharge away from wetlands.
- ∴ Reduction of groundwater recharge that sustains wetlands at the site from the creation of impervious surfaces and stormwater management systems.

3.0 Management of Groundwater Effects

There will be no excavations within 10 m of any wetland at the site with the closest excavation proposed to a depth of 1 m bgl at a distance of approximately 13 m from the nearest downgradient wetland. The deepest excavations (up to 4 m) are proposed to occur in areas of the site close to (but below) ridgelines and spurs, which are generally where groundwater levels are expected to be deepest. While groundwater levels are likely to vary spatially as well as seasonally, excavations at the site as part of the development are unlikely to result in diversion or interception of groundwater.

To assess the potential changes in recharge to the wetlands from the establishment of impervious surfaces and stormwater management systems, analytical water balance models were created to compare pre- and post-development states. The modelling indicated that the development would cause a redistribution in the source of recharge to the wetlands (i.e. general reduction in groundwater recharge and corresponding increase in surface water recharge contributions), although there would only be a very small overall increase in throughflow (occurring as a small increase in surface flows) through each catchment. The level of groundwater recharge reduction was considered to be of a magnitude that would be smaller than the natural groundwater level fluctuations.

Although the modelling did not indicate that the development would cause any issues on the overall hydrological functioning of the wetlands, Tahimana Limited have conservatively proposed additional management measures which include diversion of some stormwater discharges from roof areas toward the heads of wetland areas in the gully systems and, in areas where more intensive residential development is proposed, soakage chambers will be utilised to provide localised groundwater recharge/interflow at gully heads upgradient of wetlands. These mitigation measures will be beneficial for retaining recharge for these wetlands. In addition to the assessments, overseas' research into the effect of urbanisation on groundwater recharge indicates that it is possible for urbanisation to increase groundwater recharge in part due to a reduction in evapotranspiration (from creation of impervious areas) compared to the pre-development state (Mining et al., 2018⁵). This supports the conservative nature of the water balance modelling.

⁵ Minning, M, Moeck, C., Radny, D., Schirmer, M. (2018). *Impact of urbanisation on groundwater recharge rates in Dubendorf, Switzerland*. Journal of Hydrology 563 (2018), pg 1135 - 1146).

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Overall, the groundwater assessment indicates that the development is unlikely to result in diversion or interception of groundwater, that a small increase in catchment throughflow may result, and that the development will not have significant adverse effects on groundwater, including hydraulically connected wetlands. Any effect in the modelled change in groundwater recharge for both the east and west catchments of the development is likely to be immeasurable as natural groundwater level fluctuations are expected to be larger.

Limitations

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