

**PROPOSED TE PŪTAHI LADIES MILE PLAN VARIATION  
SUMMARY OF EVIDENCE OF WARREN DAVID LADBROOK ON BEHALF OF THE GLENPANEL  
DEVELOPMENT LIMITED AND ANNA HUTCHINSON FAMILY TRUST**

1. As directed by paragraph 12.2 of Hearing Minute 1, I set out below a summary of the key points of my evidence. I prepared two statements of evidence in chief dated 20 October 2023.

**Succinct summary of key points of my evidence:**

2. Stormwater catchment boundaries are easily defined through analysis of topographic data, survey data, and an evaluation of on-site conditions.
3. Hydrology calculations take account of climate change through the use of increased future rainfall projections determined by NIWA.
4. Stormwater runoff coefficients are easily determined by an evaluation of land use, surface type, and slope.
5. Based on existing conditions, the pre-developed stormwater flows are well understood, and in consideration of a range of potential rainfall events.
6. Based on projected development, the post-development stormwater flows can be calculated with a high degree of confidence.
7. Post-development stormwater volumes are higher than pre-development, primarily due to the change in land use, surface type, and localised slopes.
8. If discharging stormwater off-site, best practice requires the post-development flows to be lower than pre-development flows, for a range of different rainfall events. This requires attenuation.
9. If discharging stormwater to land, the disposal rate is determined by the infiltration rate of the soils and the surface area that is allocated to stormwater disposal.
10. All stormwater generated by the development areas on the 'flats' should be designed to accommodate the 1% AEP event (100 year return period), with all associated stormwater discharged to land. This does not include stormwater generated by rainfall events that are more extreme than the 1% AEP, and which will likely need to follow defined secondary flow-paths to a controlled discharge location(s).
11. Stormwater attenuation is required for all post-development discharge.
12. Stormwater attenuation can be provided by ponds, channels, pipes, and underground chambers.
13. A single, centralized stormwater solution for the entirety of Ladies Mile is not possible as QLDC is not in a position to purchase the land that is necessary for this option.
14. An integrated stormwater approach for the development area is feasible, whereby similar stormwater disposal solutions are employed in the fewest number of locations. These locations are likely to be those areas which feature the highest infiltrations rates, and which are generally in close proximity to each other.

15. Although there are similarities between the land parcels along Ladies Mile, each one is unique with regard to orientation, configuration, topography, geology, and the timeframe for development. Therefore, some flexibility is needed with respect to the development of stormwater solutions for each development area.
16. Permanent stormwater collection, treatment, and disposal devices must be in place early, and sized for the future developed capacity that each element will serve.
17. Erosion and sediment control measures are extremely important during construction, and must be well maintained throughout the time period where construction is taking place in-catchment.
18. Matters of natural servitude must be considered as part of the sizing for each stormwater element, where this is a primary consideration for stormwater from Slope Hill.
19. A cut-off channel (swale) is proposed along the Slope Hill side of the collector road at the toe of Slope Hill, which serves as the primary collection, disposal, and conveyance mechanism for stormwater from Slope Hill. Land-owner's should endeavour to dispose of Slope Hill stormwater to land for up to 1% AEP rainfall events, where possible, noting that disposal to land must be provided for rainfall events up to 5% AEP. Stormwater above these levels will need to be conveyed downstream in a coordinated manner, to include the provision of secondary flow paths.
20. Secondary flow paths must be provided for all stormwater disposal devices.
21. The specific elements of each stormwater solution can be resolved through the Detailed Design process.

**Latest position on the matters remaining in dispute:**

22. There is agreement between all experts that a viable stormwater solution is possible, utilising disposal to land. However, it is specifically noted that an integrated stormwater approach should not be construed as another name for a *centralised* stormwater solution for Ladies Mile.
23. Land-owners should be enabled to select the optimal stormwater solution for their own land, whether to utilize ponds, channels, or underground chambers. This is a technical matter for assessment, at the appropriate time, and will necessarily require consideration of how the proposed solution will integrate, or allow integration, with solutions provided, or potentially to be provided, on neighboring land.
24. Any guidance document pertaining to stormwater solutions for Ladies Mile should not be completed, nor approved by QLDC, without consultation with affected Land-Owners, and due consideration of Land-Owner input(s). Such a guidance document would be useful, but is not imperative to the delivery of an integrated stormwater solution.
25. There is no reason why road reserves cannot be used for stormwater disposal, providing that any such disposal devices are not located below kerbs or road carriageway, and are designed with consideration of maintenance of said devices.

26. Land owners should be encouraged to collaborate on common stormwater solutions, albeit they must not be hindered from development by QLDC or neighbours with contrary preferences. However, it is noted that there should not be more than one stormwater disposal device for each land parcel, excepting the swale which provides common stormwater service to Slope Hill.

**Dated:** 11 December 2023