



STORMWATER OPTIONS ASSESSMENT

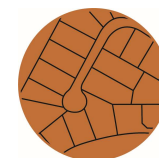
MT WELCOME, PUKERUA BAY

TO	Pukerua Property Group LP	DATE	04 August 2026
PROJECT NAME	Mt Welcome	ENVELOPE REF	1753-02
ATTENTION	William Dorset	FROM	Kyle Dirse
EMAIL ADDRESS	william.dorset@classicdevelopments.co.nz		

This document reproduces Table 13 of the Stormwater Management Plan with Tiaki Wai's comments against each device alternative and Envelope's response.

Table 13 – Stormwater Device Alternatives

STORMWATER DEVICE	CONSIDERATIONS	SUITABILITY	TIAKI WAI COMMENT	ENVELOPE RESPONSE
Extended detention / attenuation basins	Provides peak-flow attenuation and supports hydrological stability of downstream environments. Can be integrated into existing gullies due to geotechnical limitations.	Yes – within existing gullies	Proposed are “wet basins”. Offline versus online detention opportunities, separating detention function from “restored wetlands” online detention opportunities, number of devices and location for devices, risk associated with wet basins on fill above urban areas, access for maintenance and inspection	The proposed basins centralise hydrological control at the natural low points of the catchment.
Dry detention basins			Why was this option not considered to eliminate risk of wet basins, enable reduced size and allow offline solutions	Dry detention was assessed. It was not adopted at the, for the following reasons. The proposed basin locations sit on existing flow paths carrying baseflow, refer to the ecological report. A basin designated “dry” would hold water for much of the year regardless of design intent, creating operational and maintenance issues.



STORMWATER DEVICE	CONSIDERATIONS	SUITABILITY	TIAKI WAI COMMENT	ENVELOPE RESPONSE
				Dry basins away from the gullies would require construction on engineered fill platforms, attracting the same geotechnical and design scrutiny raised on Wetland D, without offsetting benefit. Dry basins have been assessed on an integrated basis, weighing earthworks, stormwater performance, geotechnical risk and ecological outcomes together. The proposed basins represent the best across that combined set of constraints for the site.
On-lot detention tanks			Why was this option not considered to eliminate risk of wet basins, enable reduced size and allow offline solutions	Considered, but centralised vested devices are preferred. Basins are required regardless for road hydraulic neutrality; roof water can attenuate into the same basins, removing on-lot maintenance and compliance risk for future homeowners. Considering this is a greenfield development, it makes sense and is good practice to centralise the detention.
Oversized pipe detention			Why was this option not considered to eliminate risk of wet basins, enable reduced size and allow offline solutions	Considered. However, this option was not progressed because, at the scale of the development, it would require extensive large-diameter pipework, additional flow-control structures and maintenance access, creating a substantial buried asset with increased inspection, sediment and blockage requirements. The steeper roads also makes this option tough to implement. It would also provide attenuation only and would not replace the retention and broader stormwater-management functions provided by the proposed wetland basins.



STORMWATER DEVICE	CONSIDERATIONS	SUITABILITY	TIAKI WAI COMMENT	ENVELOPE RESPONSE
Roadside raingardens	Generally unsuitable for steeper roads due to reduced treatment area and high flow velocities.	No	Proprietary raingarden products (with a smaller footprint as part of the treatment train) can be used to provide treatment. Where practical street scape raingardens can provide easier access for maintenance.	Raingardens have been used at the ends of JOALs where they serve small catchments and can effectively operate as roadside devices. Their wider use has generally been avoided due to the steep road grades, which would limit their hydraulic performance. Some roads along the ridge plateaus could accommodate roadside raingardens; however, the overall strategy is to centralise treatment within larger downstream devices. This provides a more consistent site-wide treatment approach and is expected to simplify long-term inspection and maintenance. The road catchments are also relatively large. Using isolated roadside raingardens would result in fragmented treatment, with treated and untreated flows recombining before reaching the downstream network.
Centralised raingardens	Suitable. Can be sized for 85% MARV treatment and located at existing flow paths. Centralised systems simplify long-term maintenance.	Yes	How have location, vehicle access and number of devices been optimised?	Consolidated at existing flow paths where treated stormwater is required to discharge to these existing flow paths. 4m access designed to and around each device as standard for maintenance and inspection.
Tree pits	Effective for localised treatment of small impervious areas but limited capacity for large catchments.	No	Agree for tree pits (with structural soil) as opposed to raingardens with street trees incorporated into them.	
Wetlands	Large area requirement to achieve hydrological and water-quality performance. Difficult to accommodate within the steep terrain and geotechnical constraints on earthworks areas.	Yes – within existing gullies	There are no constructed stormwater treatment wetlands proposed.	
Bioswales	Generally unsuitable for steep slopes due to high flow velocities and erosion potential.	No	Agree no further comments required	



STORMWATER DEVICE	CONSIDERATIONS	SUITABILITY	TIAKI WAI COMMENT	ENVELOPE RESPONSE
Proprietary treatment	Compact and modular; useful for isolated areas such as JOALs. Simplifies maintenance where vegetated raingardens are impractical.	Yes – as alternative to private raingardens	Minor disagreement: raingardens are easy to visually inspect and maintain, as filtration occurs at the surface.	
Soakage devices	Ground conditions are unsuitable for infiltration and may induce local instability due to low permeability soils and shallow groundwater.	No	Agree no further comments required	
Permeable paving	High maintenance requirement and reduced performance on steep grades. Provides minimal hydrological benefit under current soil conditions.	No	Agree no further comments required (could be used in the carpark in the commercial area by the future owner)	
On-lot rainwater re-use for non-potable	Installation, operation, and maintenance are the responsibility of individual homeowners, making long-term compliance and performance difficult to ensure. Systems increase build cost and complexity, require ongoing maintenance of pumps and filters, and often deliver limited hydrological benefit during wet periods when tanks remain full. Given the site's centralised stormwater management approach, on-lot reuse would add little additional value to overall system performance.	No – not adopted for this site	This is the only available measure for stormwater retention, and as these are new builds, it is a practical solution. Multiple benefits beyond stormwater management (water saving and reduced cultural impact from water sourced from Hutt River catchment)	Retention provided centrally by restored wetlands, modelled by PDP. Delivers required outcomes without on-lot compliance/performance risk. Cultural and water-saving benefits acknowledged but not required to meet stormwater outcomes here. The use of roof run-off tanks has been assessed separately by PDP in <i>Mount Welcome – Roof Run-off Tanks Additional Assessment</i> (PDP, 2026), which examines both their function on site and their effect on downstream hydrology, and supports this view.

•

