



Technical Memorandum

TO	Bruce Van Duyn	FROM	Cameron Swales and Eoghan O'Neill
	Carter Group Limited	DATE	7 November 2025
RE	Updated Road Reserve Operational Stormwater Management		

1.0 Introduction

This memorandum has been prepared by Pattle Delamore Partners Ltd (PDP) to provide a sizing update of proposed operational stormwater management infrastructure for the road reserve areas associated with the industrial subdivision at 104 Ryans Road. The information presented in this memorandum is based on the detailed assessment and design parameters outlined in Section 3.4 of the previously issued Stormwater Management Technical Assessment for Ryans Road Development (PDP, March 2025) and supersedes the previous version of this technical memorandum, dated 11 September 2025.

2.0 Revised Design Parameters

2.1 Updated SMA Design: Stormwater360 Filterra Bioscape and Soak Pit

Following design review by Christchurch International Airport Limited (CIAL), and feedback received from Christchurch City Council (CCC), the proposed treatment and storage of runoff will be managed by a Stormwater360 Filterra Bioscape and Soak Pit system. This alternative approach will directly replace the Infiltration Basin and Soak Pit system outlined in previous reporting.

The proposed Stormwater360 Filterra Bioscape is an engineered bio-filtration system designed to treat runoff from large stormwater catchments. Given the high infiltration rate provided by the Filterra Bioscape, above ground storage is not required, and once treated, all road reserve run-off will be conveyed to an adjacent soak pit and discharge to ground via a soak pit up to the design 2% AEP design event. In addition to the Stormwater360 Filterra Bioscape, a control manhole with diversion weir will be required to spilt flow into the Filterra and allow excess overflow to convey directly to the soak pit.

Ponding within the Filterra Bioscape is anticipated to only occur during very high intensity rainfall events. These intensities would typically be associated with short duration "cloudburst" type events. During such an event, any ponding would dissipate very rapidly following subsidence of the high intensity rainfall i.e. within minutes. Any ponding that does occur within the bioscape is unlikely to be of a depth greater than 100 mm. The rapid dissipation of ponding is managed by the extremely high infiltration properties of the Filterra media. During typical rainfall intensity and/or medium to longer duration events, ponding within the Filterra is unlikely to occur.

Figure 1 below outlines a typical design of the Filterra Bioscape layout (courtesy of Stormwater360).

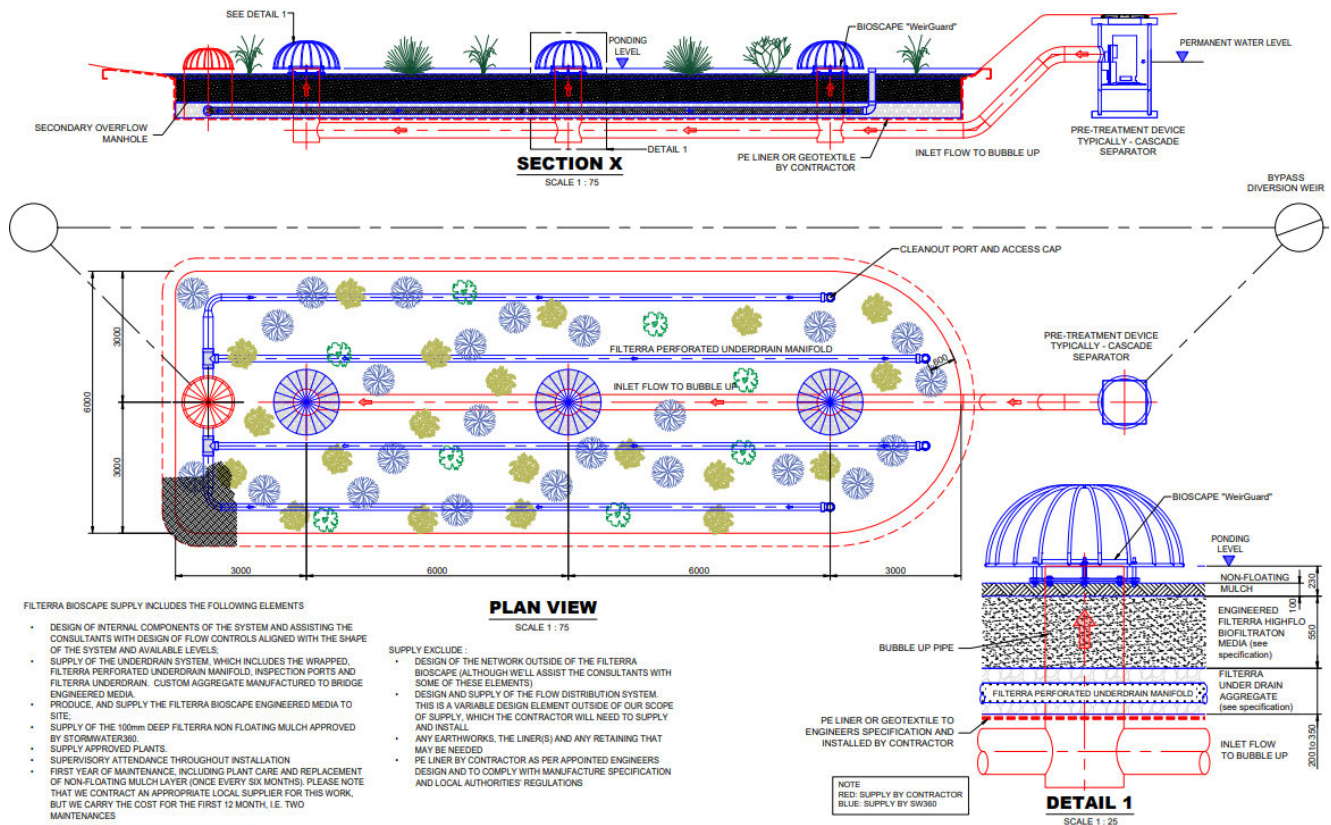


Figure 1: Stormwater360 Filterra Bioscape Typical Layout and Details.

In accordance with the above alternative design approach, PDP has updated the stormwater design of road reserve stormwater management areas (SMA's). The updated design and sizing is as presented in Section 3.

2.2 Additional Rapid Soakage Pit

As discussed in the previous version of this design memorandum (11 September 2025), following feedback sought from Christchurch City Council (CCC), an additional rapid soakage pit has been incorporated into the design to provide contingency in the event the primary soakage pit requires refurbishment, and to ensure minimum system storage is provided in line with the Waterways, Wetlands and Drainage Guide (WWDG). This additional soak pit will be redundant and 'capped off' until needed.

2.3 Updated SMA, Design, Locations and Sizing

As discussed in the 'Stormwater Management Technical Assessment' previously completed by PDP, stormwater is to be collected from the road reserve via a network of kerb and channel, sumps and pipework which discharge to two SMA's Figure 2 below shows the proposed catchment areas for each SMA, with SMA's locations remaining unchanged to achieve minimum 500m separation. Each SMA will include a Stormwater360 Filterra Bioscape, primary overflow soak pit and additional 'capped' off overflow soak pit sized to treat and discharge all road reserve runoff up to the 2% AEP event.

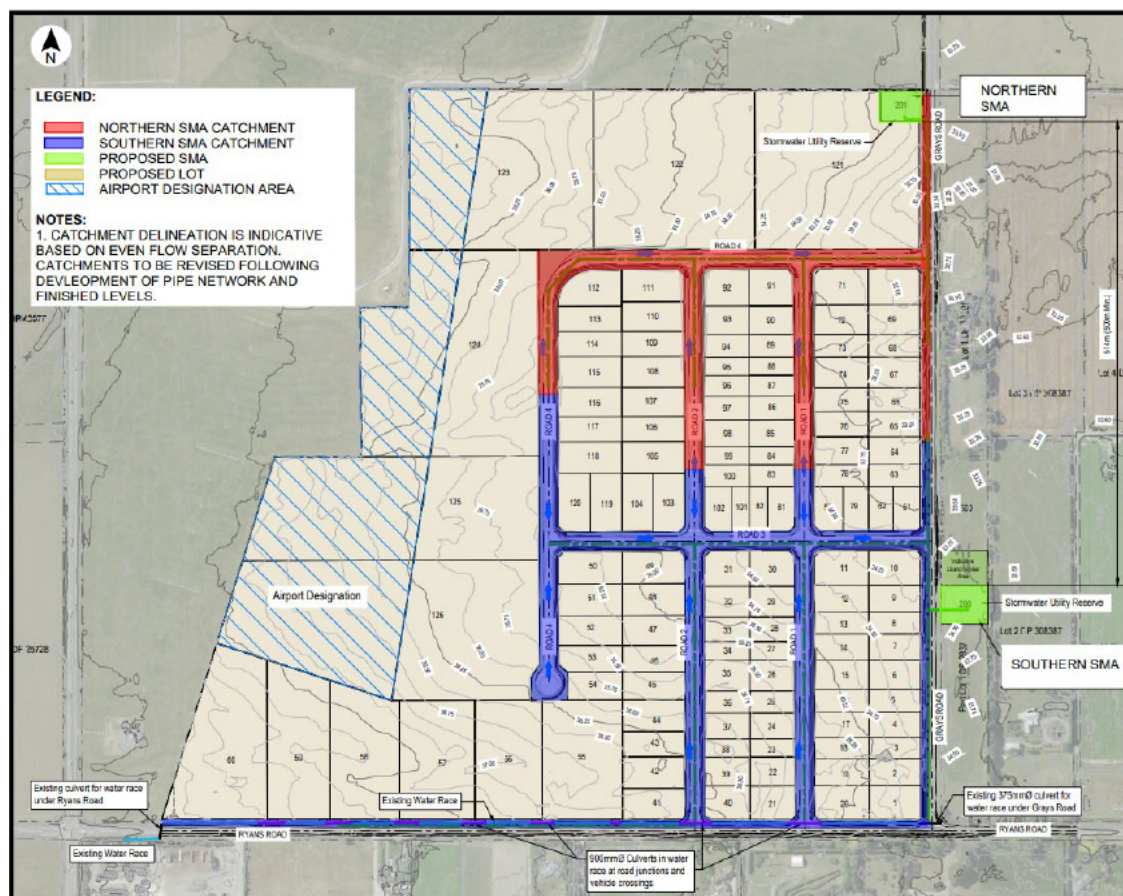


Figure 2: Proposed catchment delineation (background layout plan courtesy of 'Capture Land Development Consultants')

Assuming the catchments as illustrated in Figure 2 above and design parameters outlined in Section 3.4 of the 'Stormwater Management Technical Assessment' previously prepared by PDP, estimated sizing of the proposed Stormwater360 Filterra Bioscapes along with sizes of proposed primary and contingent overflow soak pits have been developed to provide at least the minimum required system storage in accordance with the WWDG. PDP note that the provided bioscape sizing is subject to refinement at detailed design following, however any changes are expected to be minor.

Refer to Table 1 for Stormwater360 Filterra Bioscape and soak pit sizing for both Northern and Southern SMA locations.

Table 1: Estimated Stormwater 360 Filterra Bioscape and soak pit sizing for critical storm

SMA	Stormwater360 Filterra Bioscape	Overflow Soak Pit (Primary)		Overflow Soak Pit (Contingency)	
	Filterra Treatment Area (m²)	Infiltration Area (m²)	Soak pit Operational Depth (m)	Infiltration Area (m²)	Soak pit Operational Depth (m)
Northern	100	360	5	360	5
Southern	160	615	5	615	5

The proposed Stormwater360 Filterra Bioscape sizing has been estimated based on publicly available Filterra media infiltration rate data and previous Stormwater360 case studies. Note that the treatment areas tabulated above represent only the area of Filterra treatment media required in each bioscape. Additional area will be required to facilitate the construction of the bioscape itself and allow for appropriate side slopes from the media surface to surrounding ground level.

Proposed primary soak pits for both northern and southern SMA areas have been sized in accordance with the WWDG and provide storage for the critical 2 % AEP event, noting an additional contingency rapid soakage system will be installed at each SMA site and configured to remain unused until required.

3.0 Summary

The above memorandum outlines changes to the stormwater management design for road reserve areas and to align with Christchurch City Council's recommendation to provide an additional rapid soakage pit as contingency and to assist in addressing design concerns raised by CIAL. The proposed changes continue to meet the permitted activity rule 6.7.3.1 P3 under the Christchurch District Plan.

The relevant stormwater servicing plans (Drawing Nos. RC-SW420 and RC-SW421) by Capture Ltd have been updated to reflect the above changes.

4.0 Limitations

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