Stormwater Assessment for Rezoning

For:	Gainsplay Pty Ltd
By:	Wade Fletcher – CivilTech Consulting Engineers
Project Name:	Proposed Rezoning of Lot 32 DP 1169053 at Tuckeroo Ave, Mullumbimby
Date:	16 January 2026
Our Reference:	1002-32 – Stormwater Assessment – Issue A – 16.01.2026

1. Overview

Barker Ryan Stewart (BRS) is currently preparing a rezoning submission for proposed low and medium density residential development at Lot 32 DP 1169053. CivilTech Consulting Engineers has been engaged by Gainsplay Pty Ltd to undertake a review of the existing stormwater network and a high-level conceptual assessment of the ability to comply with required stormwater management treatment and detention targets.

An inspection of the subject site was undertaken to enable the preparation of this assessment & to demonstrate stormwater compliance with the coastal design checklist. This is required to ensure that the surrounding infrastructure has sufficient capacity to support a development generally in accordance with the rezoning layout & details.

2. Existing Site Layout & Description

The proposed development site subject to the current re-zoning proposal is located at Lot 32 DP 1169053 on Tuckeroo avenue, as shown in Figure 1 below.

Figure 1 – Subject site with existing stormwater network & 1m existing contours

Lot 32 is divided by Tuckeroo Avenue, running north south, creating a 1.66ha eastern portion and a 0.70ha western portion. The eastern portion (Photo 1) is predominantly cleared and regularly slashed grassland with a typical slope of 5%, with steeper vegetated banks in the north and east ranging from 20% up to 35%. The western portion (Photo 2) contains steeper 25-35% vegetated slopes in the north-east and north-west falling to a flatter 5% mostly grassed area in the south with typical 5% slopes.

Australian Wetland Consulting have undertaken a preliminary Ecological Assessment of the subject site and found that High Ecological Value land at the site is very small, fragmented & not considered worthy of rezoning as C2. The eastern section of the lot was characterised by periodically slashed mixed exotic dominated grassland. The far eastern section was Camphor Laurel dominated regrowth weed mixed invasive weeds on the edges. The western section is characterized as Camphor Laurel dominated regrowth forest with dense Green Cestrum and Lantana occurring on the edges and throughout. No Hairy Joint Grass was located at the site & fauna habitat is very limited.

2.1 Existing Stormwater Drainage Regime

As shown in Figure 2 below, there are 3 main catchments on and around the subject site which typically discharge to the existing basin and dam west of the childcare center.

The eastern portion of the site contains a wide shallow swale which collects surface stormwater runoff from the subject site and the upslope external catchments to the north and east. The eastern surface flows are collected in the south-west corner by an existing inlet headwall and piped to the existing basin and dam in the west. The total area of the eastern catchment, including upslope neighboring lots, is 26,200m².

The western catchment typically falls south to the existing basin and dam. It includes small upslope catchments and has a total catchment area of 12,200m². The middle catchment primarily captures existing dwellings fronting Tuckeroo Avenue. This catchment has a total are of 8,400m² and is piped to the existing basin in the west.

The existing pipe network discharges to the western basin via a 900 diameter pipe. Preliminary calculations indicate that this network has sufficient capacity for events greater than 10-year ARI. However, the flow in the existing pipe is likely to be governed by the inlet capacity of the lintels and headwalls and bypass flows would occur in larger events. Large event bypass flows from the eastern and middle catchments will generally flow south along Tuckeroo Avenue and across Left Bank Road or west along the adjacent grassed swale. This section of Left Bank Road is flood prone in major events.

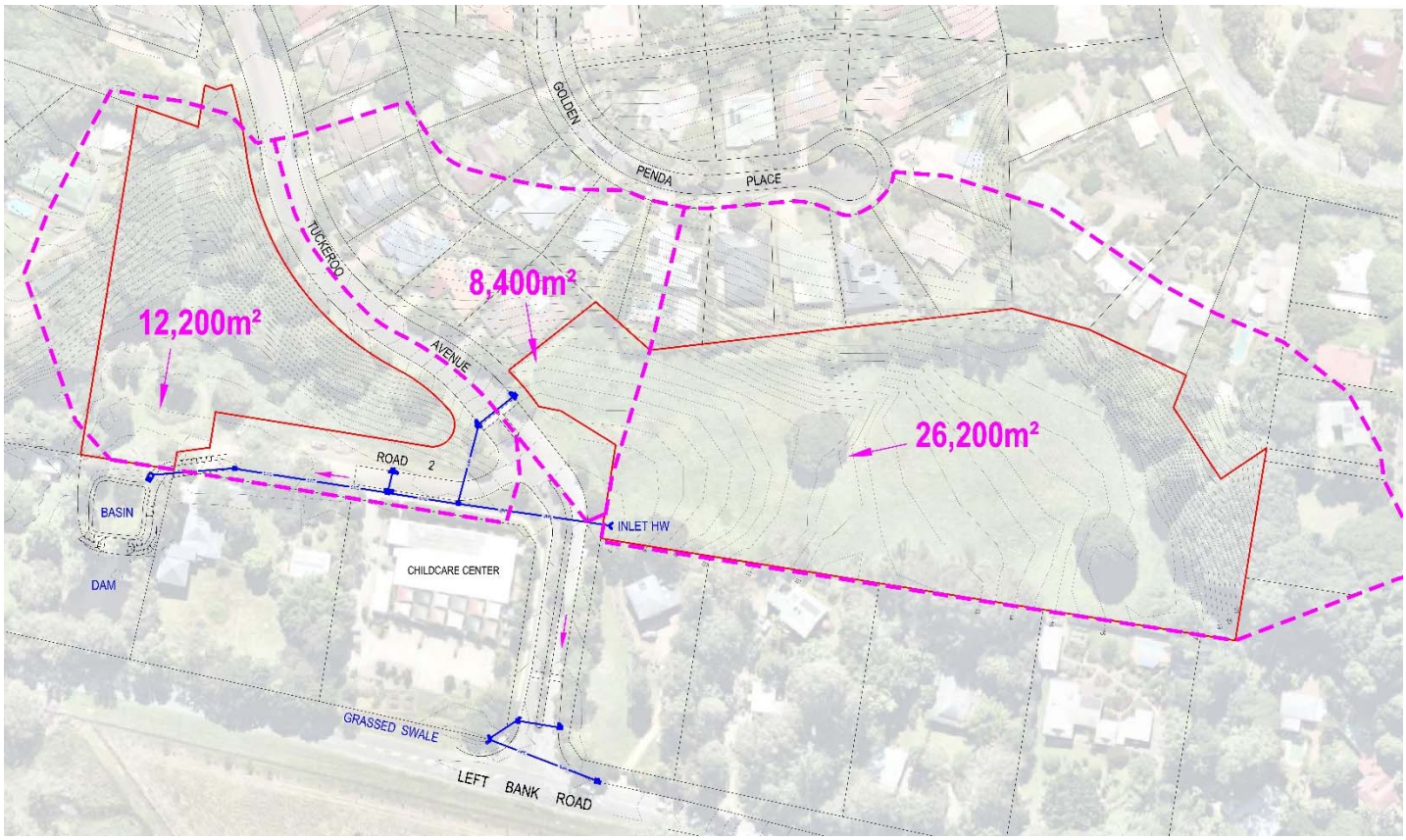

Figure 2 – Stormwater catchment areas

3. Proposed Development Concept

This stormwater assessment has been prepared to support the proposed rezoning submission by BRS. The rezoning is proposing low density Torrens Title lots west of Tuckeroo Avenue and primarily medium density unit development to the east (Refer to Figure 3 below). The lot and unit layout included in the zoning sketch in Figure 3 is conceptual only and will change, following detailed design to be undertaken as part of a future DA submission.

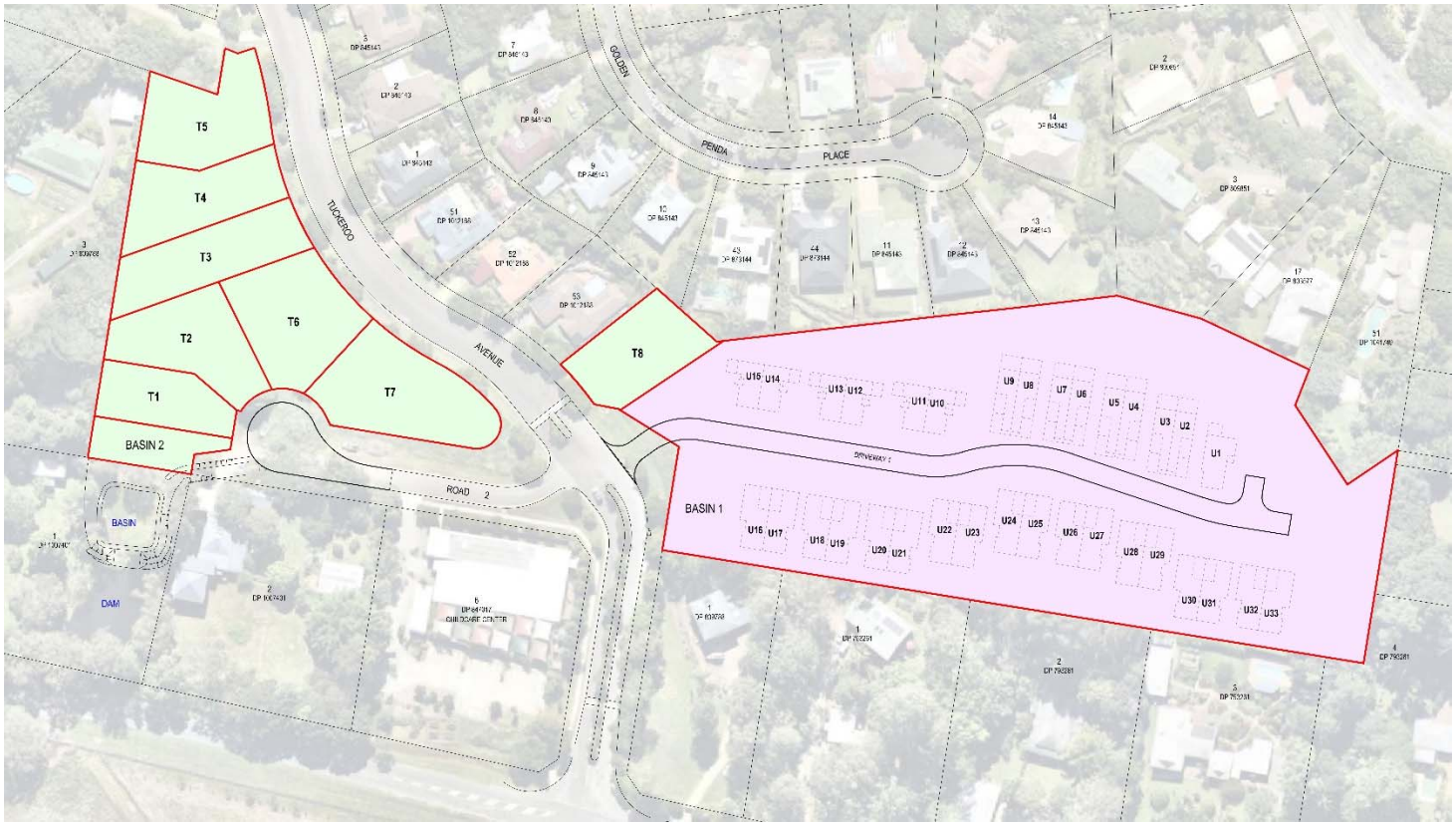

Figure 3 –Zoning Plan with conceptual lot & unit layout (Low density in green, medium density in pink)

4. Stormwater Management Concept

Detailed design of the Stormwater Management for the low and medium density layouts has not been undertaken given their conceptual nature for the purposes of the rezoning application. The ultimate of lots and units will be determined as part of the Development Application process and include detailed design of stormwater treatment & detention.

The proposed stormwater treatment trains will comply with the treatment & detention targets specified in the BSC's Comprehensive Guidelines for Stormwater Management and the Byron Shire Council DCP 2014 Part B3.

3.1 Indicative SWM for Eastern Medium-Density Development

The major eastern catchment shown in Figure 2 falls to the existing inlet headwall located in the south-west corner. Proposed roof water and driveway pipes within the medium density site will be collected and drained to a new **BASIN 1** shown in the south-western corner in Figure 3. Detailed design for the DA will be undertaken to determine if a traditional GPT & bio-retention basin approach will be adopted or if proprietary devices will be specified to meet the required detention and pollutant reduction levels. The ongoing maintenance and management of these devices will be the responsibility of the body corporate managing the unit development.

While the proposed development is not required to treat and detain uphill flows from existing developments, it will be designed to ensure there is hydraulic capacity for existing pipe and surface flows and flow paths will be provided for major events. The additional treatment and detention provided to existing lots will overcompensate treatment and detention and likely mean that proposed lot T8 will not require treatment & detention. Lot T8 is currently treated and detained in the existing basin located within Lot 1 DP 1007401.

3.2 WSUD Approach for Western Low-Density Development

The western catchment, shown in Figure 2, falls to the existing basin and dam located in Lot 1 DP 1007401 in the south-west corner. It is likely that a new **BASIN 2,** shown in Figure 3, will be constructed to provide treatment & detention for low density lots T1 to T7. Basin 2 would be in a drainage reserve lot with boundaries to be adjusted to suit. Preliminary calculations indicate a filter media area of 180 square meters will be required. Access to the basin and existing SPS will be provided directly from the future cul-de-sac at the end of Road 2.

5. Flooding

Byron Shire Councils Online Mapping tool shows the south-western portion of the site encroaching on the fringe of the North Byron 100 year 2100 Climate Change Flood extent as shown in Figure 4 below. This is primarily located within the existing road reserve and the proposed drainage reserve for the bio-retention basin.

The mapping tool does not show a Fill Exclusion Zone on the subject site, nor does it show any 2100 climate change flooding east of Tuckeroo Avenue. A detailed flood model and assessment will be undertaken as part of the future DA submission. With only a small encroachment into the flood storage fringe, it is expected that 100 year flood free access will be maintained for all lots and that all building envelopes will be located at or above the required Flood Planning Level.

Figure 4 – North Byron 2020 – 100 year 2100 Climate Change Hazard

6. Summary

This preliminary stormwater assessment has been undertaken to support the rezoning submission by Barker Ryan Stewart. A site visit was undertaken to investigate the existing stormwater network, capacity & catchments of the subject site. While the proposed number of low density lots and medium density units is subject to detailed DA & SWC design and stormwater modelling, the Stormwater Assessment of the concept layout found that:

- The existing pipe network in Tuckeroo Avenue and Road 2 has capacity exceeding the 10-year ARI event.
- Existing road reserves and grassed swales have sufficient capacity to act as a 100-year flood flow path, discharging to Left Bank Road.
- Detailed design at the DA stage will enable suitable implementation of stormwater treatment and detention devices to comply with the treatment & detention targets outlined in the BSC's Comprehensive Guidelines for Stormwater Management and the Byron Shire Council DCP 2014 Part B3.
- The implementation of eastern and western detention basins and tanks will ensure that critical stormwater flows within existing networks & flow paths will not be increased.
- Detailed hydraulic design will be undertaken to ensure existing minor upstream pipe outlets and surface flow catchments will be collected and discharged through the proposed developments.
- 100 year Flooding, allowing for 2100 Climate Change impacts, is shown within the south west corner of the site (Figure 4). This is primarily within the Road 2 and future Drainage reserve footprint with Lot T1 shown as low risk. Detailed flood modelling will be undertaken to ensure that flood free access will be maintained for all lots and that all building envelopes will be located at or above the Flood Planning Level.
- There are no Fill Exclusion Zones mapped within the subject site.

Based on preliminary calculations and this assessment, there appear to be no significant issues to prevent compliant hydraulic design & WSUD stormwater management that would be in accordance with Byron Shires applicable guidelines. The detailed design phase, to be undertaken as part of the DA submission, will also ensure that there are no detrimental stormwater impacts on adjacent or downstream properties and that the public infrastructure created will be in accordance with BSC's maintenance guidelines.

If you have any questions, please contact me on 0431 065 645 or by email at wade@civiltech.net.au

Yours sincerely

Wade Fletcher – CivilTech Consulting Engineers
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7. Site Photographs

Image 1 –Eastern section of site (looking east)

Image 2 –Western section of site (looking west)

Image 3 –Eastern catchment inlet headwall

Image 4 – 900 dia outlet into existing western basin on Lot 1 DP 1007401

Image 5 – 2x600 Headwall outlet into Left Bank Road swale

Image 6 – Left Bank Road swale

Our ref: 1002 – Lot 32 Tuckeroo Ave, Mullumbimby
Your ref: #E2026/20407

24 June 2026

The General Manager
Byron Shire Council
PO Box 219 DX 20007
Mullumbimby NSW 2482

Dear Sir,

Re: **Response to Byron Shire Council Stormwater Comments**

Planning Proposal for Rezoning of Lot 32 DP 1169053, Tuckeroo Avenue

A Planning Proposal for the rezoning of Lot 32 DP 1169053, Tuckeroo Avenue, was prepared by Barker Ryan Stewart and lodged on the NSW Planning Portal in early 2026.

The rezoning submission included a Stormwater Assessment prepared by CivilTech Consulting Engineers, dated 16 January 2026. The key aspects of the proposed stormwater management strategy are summarised below:

- The proposed rezoning comprises medium-density residential development across the eastern portion of Tuckeroo Avenue and low-density Torrens title residential lots on the western side. The lot and building layouts submitted as part of the rezoning application are conceptual only and will be subject to detailed design during a future Development Application (DA) process.

- Stormwater quality treatment and detention measures will be provided in accordance with Byron Shire Council (BSC) Development Control Plan 2014, Chapter B3, BSC Comprehensive Guidelines for Stormwater Management, the Northern Rivers Local Government Development Design and Construction Manuals (NRLG), and applicable Water Sensitive Urban Design (WSUD) guidelines.

- Stormwater runoff from the western low-density Torrens title lots will be treated via a traditional bio-retention basin located within a drainage reserve in the south-western corner of the site. The drainage reserve will be dedicated to Byron Shire Council for ownership and maintenance. Following treatment and detention, stormwater will discharge to the existing pipe network and subsequently into the existing detention basin within Lot 1 DP 1007401. Major storm bypass flows will follow the existing overland flow path to this detention basin.

- The eastern medium-density development is proposed to utilise a non-traditional WSUD treatment train, which will be owned and maintained by the future body corporate. Following treatment and detention, stormwater will discharge to the existing stormwater network within Tuckeroo Avenue and ultimately into the existing detention basin within Lot 1 DP 1007401. Major storm bypass flows will follow the existing overland flow path south along Tuckeroo Avenue to Left Bank Road.

- Stormwater detention measures will ensure that post-development discharge rates do not exceed existing pre-development flow rates.

Byron Shire Council subsequently undertook an internal review of the submitted studies and provided comments to inform the preparation of final supporting documentation. I met with Mr Renan Solatan of Byron Shire Council on 4 June 2026 to discuss the matters raised in Council's response.

Point 1 – Legal Point of Discharge – Major System Criteria

Figure 2 of the Stormwater Assessment identifies the three principal catchments and their respective discharge points. All three catchments ultimately discharge via the existing stormwater pipe network to the detention basin located within Lot 1 DP 1007401. This basin is situated within a 30-metre-wide easement for stormwater detention created by DP 649971 for the benefit of Byron Shire Council.

The legal point of discharge for the western catchment, which has an area of approximately 12,200 m², is the existing detention basin within Lot 1 DP 1007401.

For the eastern catchments of approximately 8,400 m² and 26,200 m², major storm events may result in bypass flows exceeding the capacity of the existing inlet pits identified in Figure 2 of the Stormwater Assessment. The legal point of discharge for these catchments is Tuckeroo Avenue, with flows continuing south to the flood storage area on Left Bank Road. Preliminary assessment of the 100-year ARI flows indicates that bypass flows remain contained within the Tuckeroo Avenue road reserve.

An inter-allotment drainage system is anticipated along the western boundary of the subject site to collect roof and surface runoff and convey flows to the proposed basin. No additional easements are required for major system flows.

Point 2 – Road Drainage – Minor system criteria

Further investigations have been undertaken to assess the capacity of the existing pipe network shown in Figure 2 of the Stormwater Assessment.

The principal eastern catchment, with an area of approximately 26,200 m², drains to an existing 1200 mm x 1200 mm field inlet pit adjacent to Tuckeroo Avenue. The catchment is conveyed via an existing drainage gully traversing Lot 32 (Photo 1). Existing catchment flows

have been calculated as approximately 700 L/s for the 5-year ARI event and 1,380 L/s for the 100-year ARI event.

Photo 1 – Eastern drainage gully through lot 32 to 1200x1200 field inlet pit

Allowing for a 50% blockage factor and a maximum ponding depth of 200 mm, the inlet capacity of the field inlet pit is approximately 700 L/s. Site inspections identified an actual ponding depth of approximately 500 mm, indicating an inlet capacity that exceeds the 5-year ARI event flow.

The concrete lid of the existing kerb inlet pit was removed during inspection and the connecting stormwater pipe was measured and confirmed to be 675 mm in diameter (Photo 2). The pit is approximately 1.35 metres deep and the outlet pipe has an estimated longitudinal grade of 2.0%.

Photo 2 – Tuckeroo Ave – Kerb inlet pit with 675 outlet

At the calculated 5-year ARI flow rate of 700 L/s, the 675 mm pipe would operate at approximately 50% capacity. As identified in the previous report, the downstream outlet pipes comprise twin 900 mm diameter conduits. Their available capacity indicates that the existing underground drainage network has sufficient capacity relative to current design standards.

Based on these observations, the existing drainage network appears to satisfy the objectives of NRLG D5.09, including requirements relating to flow widths, pipe sizing, and minimum and maximum pipe velocities. Any future development will be required to ensure that post-development flows do not exceed existing pre-development flows, thereby maintaining compliance with these objectives.

Stormwater runoff from the western Torrens title lots will not be connected to the existing stormwater infrastructure within Road 2. Instead, a separate drainage system will be constructed along the northern kerb of the future Road 2 to convey runoff to the proposed bio-retention basin for treatment and detention prior to discharge to the existing detention basin. Detailed DRAINS modelling will be undertaken as part of the future DA process to demonstrate that post-development discharge rates do not exceed existing pre-development conditions.

Point 3 – Stormwater Quality

Stormwater runoff from the western low-density Torrens title lots is proposed to be treated via a traditional bio-retention basin (Basin 2) located within a drainage reserve in the south-western corner of the site. The drainage reserve will be dedicated to Byron Shire Council for ownership and maintenance.

The conceptual drainage reserve has an area of approximately 400 m². It is anticipated that the basin will incorporate block retaining walls along the lower boundary, rather than earthen embankments, to provide sufficient treatment area and storage volume.

The total catchment contributing to Basin 2 is approximately 12,200 m², with a development area of approximately 7,500 m². Based on the deemed-to-comply provisions of the Queensland Urban Stormwater Quality Planning Guidelines (2009), the basin would require approximately 120 m² of filter media area and approximately 40 m³ of detention storage. Basin 2 will include a maintenance access track from the Road 2 cul-de-sac, together with a sediment forebay and gross pollutant trap consistent with other local subdivision developments.

The eastern catchment contributing to Basin 1 is approximately 26,200 m², with an anticipated development area of approximately 15,500 m². Under deemed-to-comply provisions, sufficient area exists to accommodate approximately 230 m² of filter media and approximately 80 m³ of detention storage within a traditional bio-retention basin.

As discussed with Mr Solatan, treatment and detention infrastructure associated with Basin 1 will be privately owned and maintained by the future body corporate. To minimise maintenance requirements and maximise opportunities for ancillary uses such as additional bin storage and parking, a proprietary treatment train is likely to be adopted in lieu of a traditional bio-retention basin.

The proprietary treatment system would typically comprise:

- Primary treatment for the removal of gross pollutants and sediment through hydrodynamic separation devices such as an Atlan Vorticeptor or Atlan Ecoceptor;
- Secondary and tertiary treatment for the removal of suspended solids, heavy metals and nutrients through an AtlanBasin or equivalent treatment system; and
- Post-treatment detention using AtlanCube, TankStor or comparable systems prior to discharge into the Tuckeroo Avenue drainage network.

Both treatment and detention systems will be modelled and refined following detailed lot and unit design during the DA process. The final design will comply with Byron Shire Council's WSUD treatment and detention objectives, provide suitable long-term maintenance arrangements, and ensure that development yield and functionality are not adversely affected.

Flooding

Byron Shire Council's comments regarding flooding are consistent with the preliminary assessment undertaken by CivilTech.

Although Council's 100-year ARI, 2100 climate change flood mapping identifies flooding within the south-western corner of the site, the extent of inundation is relatively minor and no Fill Exclusion Zone applies to the subject land.

As part of any future Development Application, a detailed flood study and report will be prepared in conjunction with the detailed design of the proposed lots and drainage basins. This assessment will confirm that the development does not adversely impact neighbouring properties, that suitable flood-free access is maintained, and that all building envelopes are located at or above the required Flood Planning Level.

Should you require any further information or wish to discuss any aspect of this submission, please contact me on 0431 065 645 or via email at wade@civiltech.net.au.

Yours faithfully
CivilTech Consulting Engineers

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