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Our Reference: NSW202732_L01.02
Your Reference:

23 March 2022

MM Hyndes Bailey & CO
PO Box 26
MUSWELLBROOK NSW 2333

Attention: Michael Cole

Dear Michael

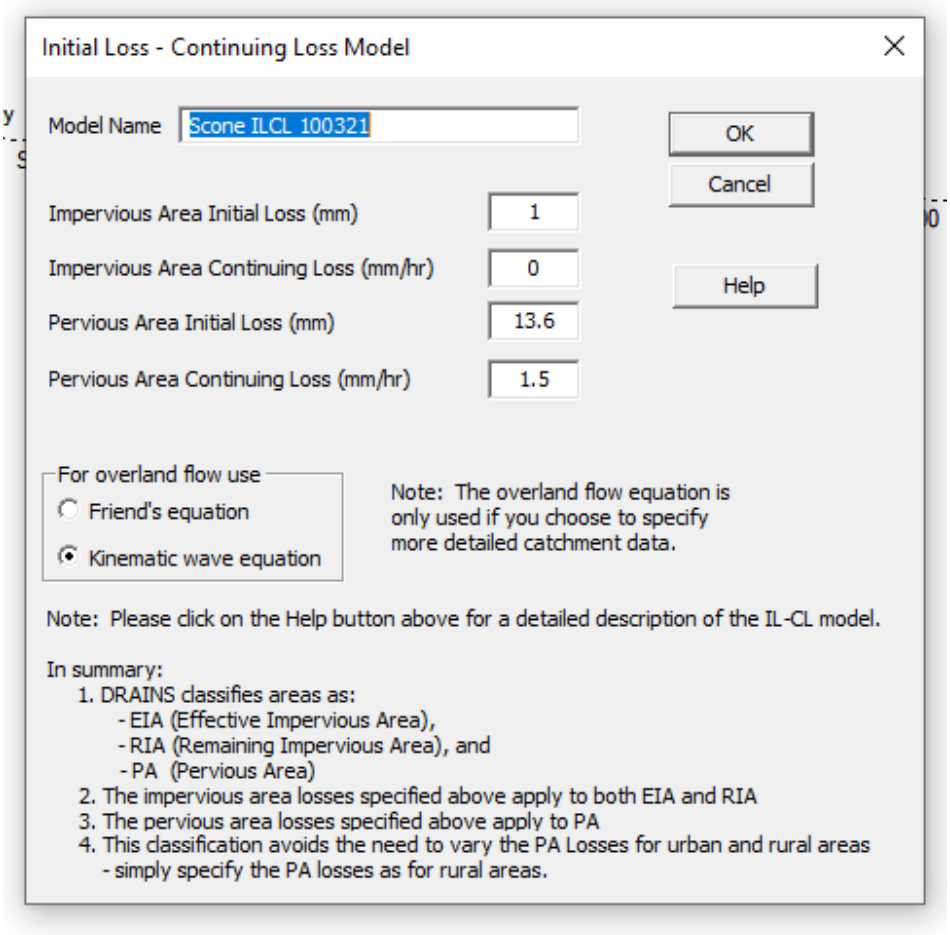
Re: Scone Subdivision Stormwater Management Plan
Response to Northrop Peer Review

ACOR Stormwater Management Plan (SWMP) for Development Approval was prepared for proposed subdivision at Gundy Road Scone. Revision 1 of the report was issued on 19 August 2021. A peer review of the Stormwater Management Plan was undertaken by Northrop. Refer to Northrop letter titled *"Review of Stormwater Management Plan at 150 Gundy Road, Scone"*, and dated 19 January 2022 with a reference number NL213311.

The comments below in BLUE are ACOR responses to Northrop's recommendations from the peer review.

• *Model hydrology should be updated to consider the use of the latest NSW Specific Rainfall Losses and Hierarchy Approach recommended by NSW OEH and the ARR 2019 EIA/ ICIA split.*

A factor of 0.4 has been applied to the pervious area initial loss of 34mm for the developed catchments. Pervious area initial loss in the IL/CL hydraulic model has been changed to be 13.4mm. Refer to image below from the DRAINS model.



• Definition of riparian extents should be prepared and placement of Water Quality devices in accordance with NRAR Controlled Activities on Waterfront Land guidelines should be reviewed.

The riparian extents have been added to the figures in accordance with guidelines for second order stream as detailed below. Refer to Figure 4 and 5.

The stream is Second order and requires 20m riparian buffer either side of formal channel.

Riparian corridor widths

The Officer of Water recommends a VRZ width based on watercourse order as classified under the Strahler System of ordering watercourses and using current 1:25 000 topographic maps (see Figure 2 and Table 1). The width of the VRZ should be measured from the top of the highest bank on both sides of the watercourse.

Figure 2. The Strahler System

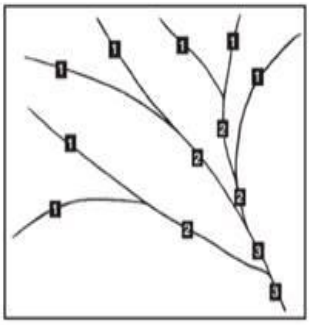


Table 1. Recommended riparian corridor (RC) widths

Watercourse type	VRZ width (each side of watercourse)	Total RC width
1st order	10 metres	20 m + channel width
2nd order	20 metres	40 m + channel width
3rd order	30 metres	60 m + channel width
4th order and greater (includes estuaries, wetlands and any parts of rivers influenced by tidal waters)	40 metres	80 m + channel width

Note: where a watercourse does not exhibit the features of a defined channel with bed and banks, the Office of Water may determine that the watercourse is not waterfront land for the purposes of the WM Act

Riparian corridor matrix

The riparian corridor matrix enables applicants to identify certain works and activities that can occur on waterfront land and in riparian corridors. Applicants should note that the matrix relates to controlled activity approvals under the WM Act only. They are still required to comply with other relevant government legislation, such as threatened species, flood planning levels and fisheries guidelines.

Table 2. Riparian corridor matrix

Stream order	Vegetated Riparian Zone (VRZ)	RC off-setting for non RC uses	Cycleways and paths	Detention basins		Stormwater outlet structures and essential services	Stream realignment	Road crossings		
				Only within 50% outer VRZ	Online			Any	Culvert	Bridge
1st	10m	•	•	•	•	•	•	•		
2nd	20m	•	•	•	•	•		•		
3rd	30m	•	•	•		•			•	•
4th +	40m	•	•	•		•			•	•

• *The design for the creek culvert crossing should be reviewed with respect to blockage and climate change and the difference in sizing with previously completed studies for the area should be discussed.*

This has been addressed in the Flood Impact Assessment prepared by Torrent Consulting.

• *The proposed evacuation access track and/ or culvert crossing should be reviewed with respect to risk to life and evacuation.*

This has been addressed by others.

• *The difference between peak flows observed in the Stormwater Management Plan (ACOR, 2021) and other similar studies in the area should be discussed.*

Comparison of peak flows between ACOR and MM Hyndes Bailey report have been included in the current revision of the report. Refer to section 5.3.11 of ACOR report for details.

This has also been addressed in the Flood Impact Assessment prepared by Torrent Consulting.

Scone Bypass Flood Study (GHD, 2015) was not provided to us and has not been reviewed by ACOR to provide comparisons.

• *A detailed two-dimensional flood assessment and report be prepared in accordance with the UHSC DCP Part 10a to analyse (as a minimum):*

o The existing case flood behaviour including hydraulic categories (i.e. floodway, flood storage and flood fringe).

This has been addressed in the Flood Impact Assessment prepared by Torrent Consulting.

o The developed case flood behaviour, including a review of the sizing of the proposed creek culvert crossing.

This has been addressed in the Flood Impact Assessment prepared by Torrent Consulting.

The culvert sizes proposed by Torrent Consulting have been incorporated into the DRAINS model prepared by ACOR. Refer to Section 4.3.7 of the ACOR report for details.

o The flood impact of the proposed development for the full range of storm events up to and including the PMF.

This has been addressed in the Flood Impact Assessment prepared by Torrent Consulting.

o Define the Flood Planning Area (FPA) for the proposed development.

This has been addressed in the Flood Impact Assessment prepared by Torrent Consulting.

o Ensure all proposed lots, roads and infrastructure are positioned in accordance with Council's LEP/ DCP and the NSW Floodplain Policy.

This has been addressed in the Flood Impact Assessment prepared by Torrent Consulting.

o Define tailwater levels for the proposed local stormwater network.

This has been addressed in the Flood Impact Assessment prepared by Torrent Consulting.

o Review the impact of climate change.

The impact of climate change on peak flows has been estimated by ACOR. Refer to Section 4.3.10 of the ACOR report for details.

This has also been addressed in the Flood Impact Assessment prepared by Torrent Consulting.

o Measures to manage the risk to life and property including a review of the sizing of the proposed creek culvert crossing and / or the proposed evacuation access track.

This has also been addressed in the Flood Impact Assessment prepared by Torrent Consulting.

o Review Gundy Road overland flow capacity to confirm whether the proposed lots fronting Gundy Road are flood prone.

The risk to the rear of the lots along Gundy Road being flooded from the runoff from Gundy Road will be reduced with the installation of K&G and regrading of the footpath reserve which we assume will be required as part of the subdivision works. The detail stormwater design required in Gundy Road will be completed during the CC stage.

This has also been addressed in the Flood Impact Assessment prepared by Torrent Consulting.

o Review development compliance with the necessary flooding related LEP/ DCP requirements and the NSW Floodplain Policy.

This has been addressed in the Flood Impact Assessment prepared by Torrent Consulting.

O Review the findings with respect to stormwater detention presented in the Stormwater Management Plan (ACOR, 2021).

The criteria adopted for the DRAINS models are in accordance with Council standards in particular a fraction impervious of 35% for open space (natural bushland). Refer to Section 4.3.4 of the ACOR report for details. A sensitivity test has not been undertaken as recommended by Northrop as the drainage modelling has been completed in line with Council standards.

Catchment modelling shows that the installation of detention for this development is not required. Post development flows have been shown to be generally below the predevelopment flows at the western boundary. Refer to Section 4.3.9 of the ACOR report for details.

• *Review necessary stormwater management measures for the south-western corner to ensure stormwater discharge does not adversely impact both water quality and quantity at the site discharge point and within downstream waterways. NL213311 / 19 January 2022 / Revision A Page 21 of 21*

The increase in flows at the south west boundary does not impact the downstream catchment, hence detention is not required. Refer to Section 4.3.9 of the ACOR report for details.

For water quality, a GPT and a bio-retention basin is proposed to be installed at the south west boundary to treat runoff prior to discharging downstream. Refer to Section 5 of the ACOR report for details and Figure 6 for layout details.

• *The existing Dam, to be maintained post development, should be reviewed from a dam safety perspective to determine whether it is required to be declared for the purposes of the Dam Safety Act 2015*

A dam safety audit will be undertaken as part of the Construction Certificate Works for Stage 1 such that any required upgrade works can be included in the scope of works for the civil contractor and the extent of any proposed works can be discussed in detail with council officers.
The proponent would not object to an appropriate condition being added to the consent to reflect to the above.

In response to the peer review, section of ACOR's Stormwater Drainage Management Report have been updated. Refer to Revision 2 of the report.

If any further information or clarification is required, please do not hesitate to contact me.

Yours faithfully,
ACOR Consultants Pty Ltd

Ulrika Knight
Senior Civil Engineer