Woolacotts.
CONSULTING ENGINEERS

Our reference: 20-306

22 December 2021

Penrith City Council
PO Box 60
Penrith NSW 2751
C/O – Richard Crookes Construction

Attn: Stephen Masters

Dear Stephen,

RE: NEW PRIMARY SCHOOL IN MULGOA RISE – OVERLAND FLOW FLOODING IMPACT

In the Response to Submissions (RtS) letter dated the 14 December 2021, Penrith City Council requested a raised pedestrian crossing on Darug Avenue just south of the intersection with Deerubbin Drive.

The purpose of this letter is to supplement the Flood Summary Letter and assessments provided by Woolacotts dated 14 December 2021 and provide clarity regarding predicted impact/s of the raised crossing on overland flow.

Under existing conditions, during a 1% AEP rain event and when the entire subsurface stormwater drainage system (i.e., pit and pipe network) is blocked, the intersection of Darug Avenue and Deerubbin Drive is predicted to experience a flood depth of approximately 300mm to 500mm. The residential property on the south-western corner of the Darug Avenue / Deerubbin Drive intersection is also predicted to experience flooding on the front lawn/turfed area of the property with depth being approximately 100mm to 300mm under existing pre-raised crossing conditions. Refer to Figure 2.

It is important to note the Australian Rainfall and Runoff: A Guide to Flood Estimation 2019 Blockage of Hydraulic Structures assessment criteria, being the applicable assessment methodology in this instance given the consequences of blockage, requires modelling be undertaken assuming the subsurface stormwater drainage system is completely blocked in its entirety and not providing any relief and/or storage of stormwater.

The other two proposed crossings on Forestwood and Deerubbin Drive and not the subject of this summary letter. Given either flood modelling demonstrates it does not adversely affect neighbouring properties or are to be completed by others/not part of the subject proposed development.

With respect to Council's request for the installation of a raised pedestrian crossing, stormwater flood modelling was completed by Woolacotts to assess the impact/s of this installation on overland flow. This assessment is provided as Figure 3. In a 1% AEP flood event the installation of the raised crossing is modelled to increase flood water level/s, from current/existing levels, by approximately 30mm maximum.

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Discussion was also held regarding the installation of protruding blisters at the crossing location, in lieu of the proposed raised crossing. Flood modelling was completed for this scenario with flood depth expected to increase by approximately 10mm to 20mm maximum at these locations – Refer Figure 4.

In regards to the residential property, it is important to note the ground level increases by approximately > 600mm from the Darug Avenue boundary to the dwelling itself – Refer Figure 5. With this it is not expected flood waters reach the built structure in a 1% AEP event under either existing or proposed raised crossing/blister scenarios.

A summary of these stormwater flood modelling assessments is provided below in Figure 1.

Given Penrith City Council's DCP and RtS letter contain conditions to the effect of *'the proposed development must not adversely affect neighbouring properties'*, and to achieve an outcome suitable to both parties, further discussion is required with Council to either:

1) Investigate options to have the crossing installation completed via an alternate mechanism and/or others. Whereby it does not form part of the proposed development and thus the proposed development itself does not adversely affect neighbouring properties and complies.

Or

2) Investigate options to increase the stormwater storage capacity of the road, to offset the reduced storage capacity given the presence of the crossing installation.

We trust this letter has successfully summarised the completed modelling and advice provided to date, and we encourage further discussion to achieve a mutually suitable outcome.

Yours faithfully,
Woolacotts Consulting Engineers

Alexander Phillips
BE MIEAust CPEng
NER Civil – Membership No. 4192513

Attachment A – Figures 1 to 5

Attachment A - Figures

Figure 1 - Stormwater Flood Modelling Assessment Summary:

1% AEP	Existing Conditions (Pre-Raised Crossing &/or Blisters)	Raised Crossing	Blisters
Intersection	300mm to 500mm	+ 30mm (330mm to 530mm Total)	+ 10mm to 20mm (310mm to 510mm Total)
Residential Property (Turf/Lawn Area Only)	100mm to 300mm	+ 30mm (130mm to 330mm Total)	+ 10mm to 20mm (110mm to 310mm Total)

Figure 2 – Flood Modelling of Existing Conditions (Pre-Raised Crossing &/or Blisters) 1% AEP

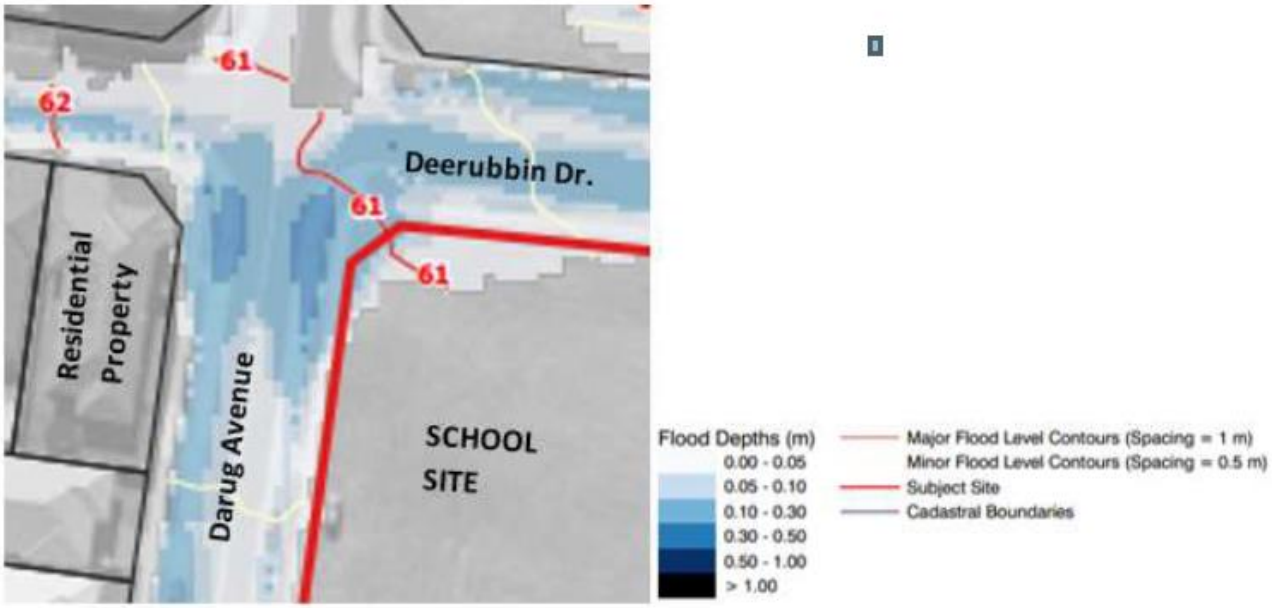

Figure 3 – Raised Crossing Flood Impact Modelling

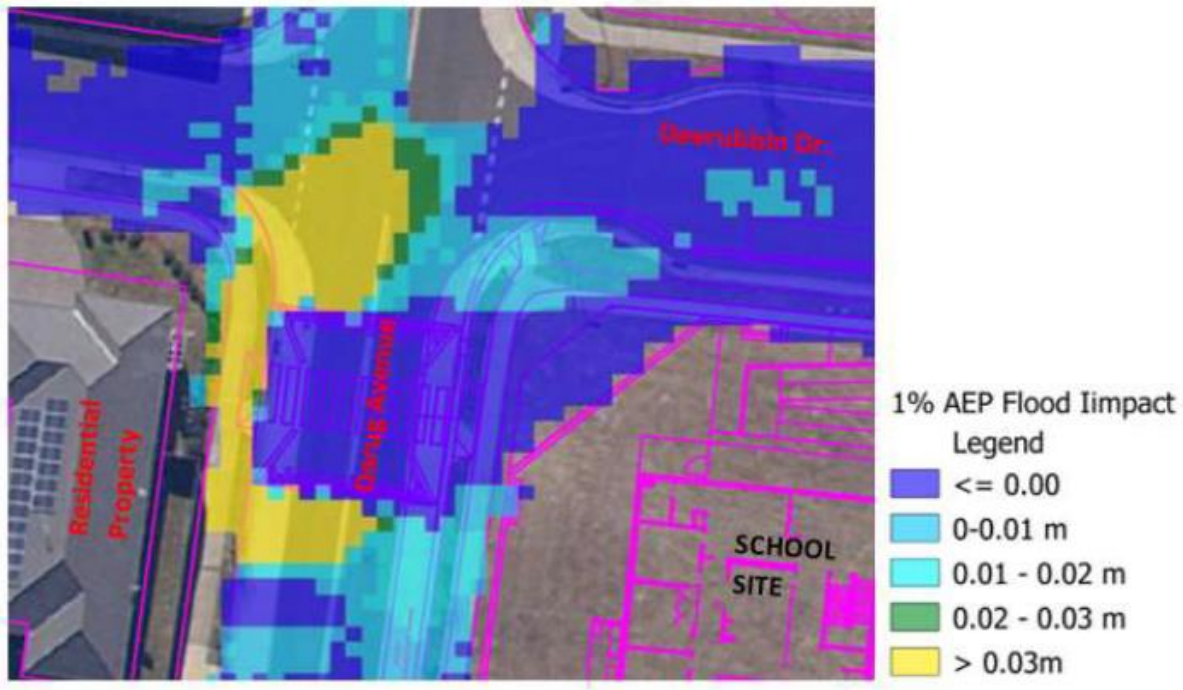

Figure 4 – Protruding Blisters Flood Impact Modelling

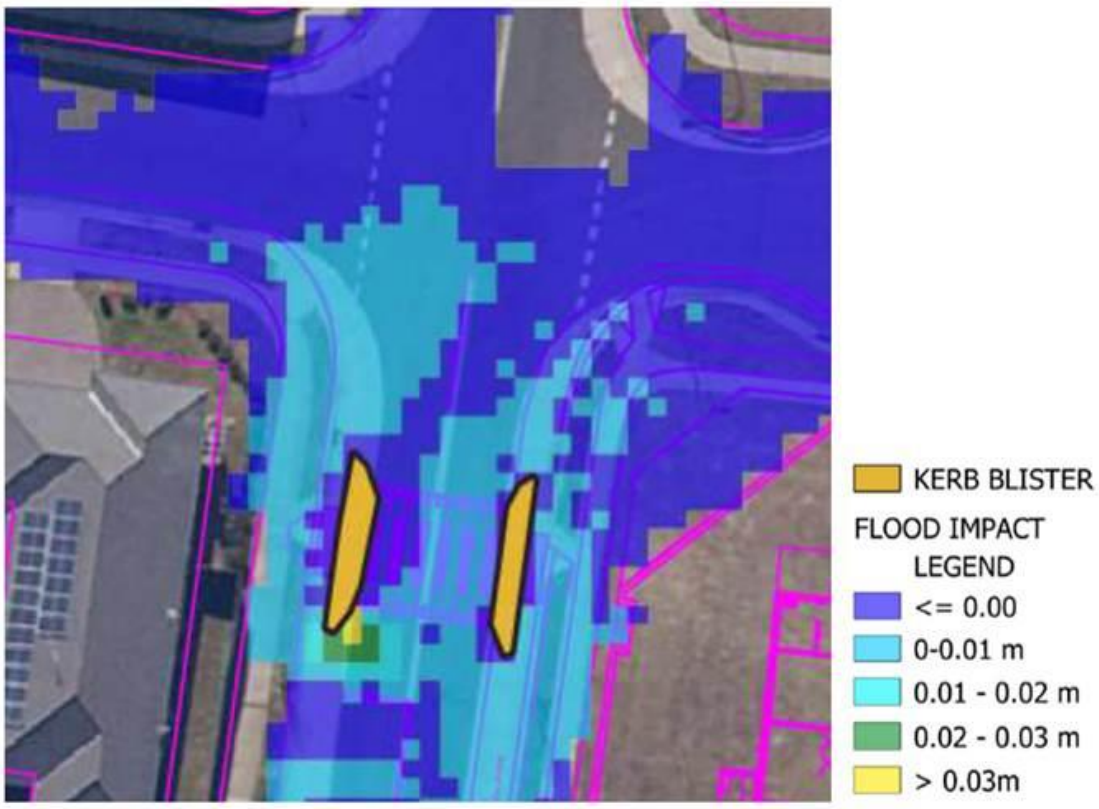

Figure 5 – Residential Property Ground Levels Image