Dear Luke,

Re: Pre-Development Application Meeting
18 Myee Avenue, Strathfield - Lot 11, DP15955
Flood Impact Report – Rev 03

Introduction

Tekcivil Pty Ltd has been engaged to provide advice regarding flood impact on No. 18 Myee Avenue, Strathfield as identified by Strathfield Council. The purpose of the following letter is to assess the proposed development in relation to the requirements of the NSW Floodplain Development Manual (2005) and in-line with the advice provided by Council’s Engineering staff over both phone and via email.

The following documentation has been reviewed in the preparation of this letter:

- Pre-Development Application Meeting Minutes (Dated: 21/01/2016) Strathfield Council

Words and expressions within this letter have the same meanings as set out within the NSW Floodplain Development Manual (2005).

Site and Works Information

The proposed development is located within the Strathfield Council area within Lot 11, DP15955. The site naturally grades to the west towards the property boundary along Myee Avenue. The existing property consists of a single residential dwelling with an external fibro garage and carport.

The proposed works consist of the demolition of the existing building and the construction of a new two (2) story residential development. The works also include the construction of a carpark, swimming pool, landscaping, external hardstand areas and new vehicular crossing.

Initial Flooding Information

Strathfield Council provided a Section 149 (2) Planning Certificate (dated 11/11/2015) identifying that the site is within the 1 in 100 Year Average Recurrence Interval (ARI) flood event. As part of the Pre-Development Application Meeting Minutes (dated 21/01/2016) provided by Strathfield Council, the following flood level extracts were provided:

- 1 in 100 Year ARI flood levels at front of property: 22.2m AHD
- 1 in 100 Year ARI flood levels at rear of property: 23.1m AHD

The Pre-Development Application Meeting Minutes also provide a copy of flood mapping for the site. The flood study from which the extracted data was sourced was not publically available at the time of writing. The site mapping provided by Council shows that the 1 in 100 Year ARI flood level across front of the existing building is approximately 22.5m AHD.
Additionally, a Council Drainage Pipe is present at the rear of the site. Additional information was provided via email on 02/10/2016 by Council’s Engineer Said Saqeb including classification of flooding as local overland, flood hazard and max velocity on site.

Please refer attached documentation for relevant extracts from the Section 149 (2) Planning Certificate, Pre-Development Application Meeting Minutes, flood mapping as provided by Council and additional information provided by email dated 01/11/2016 from Council’s engineer Mr. Said Saqeb.

**Design Requirements**

The design requirements for the proposed development area have been outlined by the Floodplain Development Manual (2005), the Council Pre-Development Application Meeting Minutes and through discussions with council engineering staff. The application is required to comply with the following elements:

- Floor Level Freeboard
- Building Components
- Structural Soundness
- Flood Effects
- Carparking and Driveway Access
- Evacuation
- Management and Design

At the time of writing, Strathfield Council was undergoing a review of their Flood Prone Land Policy and did not have the policy or specific development controls available to the public.

**Assessment of Flood Requirements on Design**

Tekcivil has reviewed all the above requirements related to development on flood controlled lots in addition to the flooding information provided by Strathfield Council. The following advice is recommended to comply with the requirements of the NSW Floodplain Development Manual:

**Floor Level Freeboard**

Freeboard is required to provide reasonable certainty that the risk of exposure provided by selection of a particular flood as the basis of a minimum habitable floor level is actually provided given factors such as uncertainties in estimates of flood levels, specific local factors not available for modelling, wind and object induced wave action, changes in climate conditions and future changes to the upstream catchment definition due to development. The Flood Planning Level (FPL) is the 1 in 100 Year ARI flood level plus freeboard.

In-line with the recommendations of Section K5 of the Floodplain Development Manual, a residential property should have a freeboard of 0.5m above the 1 in 100 Year ARI storm for habitable floor levels. Levels are to be provided in line with the following extract from Council Engineer Siad Saqeb’s email dated 11/10/16:

> Habitable floor levels shall be 500mm above the 1 in 100 year flood level. The closest higher 1 in 100 year flood contour shall be used.

As such, a minimum habitable floor level (FPL) of 500mm above the higher closest 1 in 100 Year ARI flood contour should be provided for the site to adequately protect against flood inundation.

**Building Components**

All parts of the proposed development should be constructed of flood compatible materials up to the FPL. Flood compatible materials are building materials and surface finishes capable of withstanding prolonged immersion in water. Building materials should not be used which would be susceptible to damage by prolonged immersion. Electrical and
plumbing components should be flood-proofed to above the FPL. Where possible, all fencing and gates in the vicinity of the flood path should be of an open type that does not impede overland flow.

The following list is a non-exhaustive list of building components that are potentially compatible with prolonged immersion in water:

<table>
<thead>
<tr>
<th>Building Component</th>
<th>Suitable Material</th>
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| Bolts, nails, fittings, hinges | • Brass  
• Nylon  
• Stainless Steel  
• Galvanised Steel  
• Removable pin hinges |
| Windows                     | • Aluminum frames                                      |
| Walls                       | • Concrete walls  
• Cavity brick walls  
• Stainless steel frames  
• Galvanised steel frames  
• Timber frame where not subject to forces from fast moving flood waters  
• Aluminum frames |
| Floor, sub-floor structure | • Reinforced concrete slab  
• Suspended timber floor  
• Masonry walls  
• Marine grade plywood  
• Galvanised steel piers/columns |

*Table 1 – Flood Compatible Material List (Source: Hawkesbury City Council)*

Please note that this list is only indicative of general suitability for use in flood prone areas and should be assessed on a case by case basis.

**Structural Soundness**

All proposed structures and building components should be determined as suitable by a structural engineer in compliance with the requirements of Council and the NSW Floodplain Development Manual (2005). This is to be provided as a separate report.

**Flood Effects**

As per email provided by Council Development Engineer Samuel Lujang on 02/11/2016; there is no requirement to assess flood effects for a single residential property development and hence there is no need to conduct a hydraulic assessment of the works. The email also notes that the proposed development should comply with flood information supplied by council within the Pre-Development Application Meeting minutes.

The proposed development footprint for the property would provide minimum change from the existing condition and as such is unlikely to affect flood conveyance within the area.

**Carparking and Driveway Access**

Crest levels are to be provided in line with the following extract from Council Engineer Siad Saqeb’s email dated 10/11/16:

*The 1 in 100 year flood level at the front boundary of the site is 22.2. AHD. Council accepts a 300mm freeboard over the crest of the access ramp to the basement garage subject to submission of satisfactory long section of the ramp in scale of 1:25. The long section shall start in the gutter and continue to the basement garage. The crest of access ramp at 22.5m AH shall be located inside the development site and not at the property boundary, Council does not accept raising of the footpath levels.*
As per the above extract, it can be reasonably expected that a non-habitable garage area can be provided at a minimum level of 22.5m AHD should a basement car-park not be provided.

Evacuation

A flood evacuation and response plan may be required to address evacuation procedures in flood events greater than the 1 in 100 Year ARI flood event. As the flooding mechanism is local overland flow rather than mainstream flooding, it is likely that peak flood levels will be achieved in a very short time frame. Issues with long term isolation of houses are not an issue for properties in short duration local overland flow catchments. Council may determine that vertical evacuation on-site to a level above the Probable Maximum Flood (PMF) water level would provide a safer alternative than evacuating to an external location. The PMF level has not been provided by Council but should be considered if a flood evacuation and response plan is required. This should be compared to final proposed floor level design.

Management and Design

Hazardous or polluting goods should not be stored on site below the 1 in 100 Year ARI flood level of RL 23.1m AHD.

Summary

The following recommendations are made to satisfy the requirements set out above in line with industry best practices:

- The proposed development should have a minimum habitable floor level (FPL) of 500mm above the higher closest 1 in 100 Year ARI flood contour to adequately protect against flood inundation.
- Building components should be flood compatible up to the FPL.
- Structural soundness of structures and building components to be assessed by structural engineer. To be provided as a separate report.
- No significant effects of flood impact to be expected in line with Council recommendations for single residential properties.
- The proposed garage should be at minimum RL 22.5m AHD (0.3m above 1 in 100 Year ARI flood levels along the boundary of the property)
- Vertical evacuation to above PMF to be considered by Council upon provision of PMF peak flood levels and final design.
- No hazardous or polluting goods should be stored on site below RL 23.1m AHD.

Revision List

<table>
<thead>
<tr>
<th>Revision</th>
<th>Produced</th>
<th>Reviewed</th>
<th>Approved</th>
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<tbody>
<tr>
<td>02</td>
<td>JS</td>
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2. Flooding

Council’s records indicate that the subject site is affected by the 1 in 100 year flood event. The flood levels at the front and rear of the property are 22.2m AHD and 23.1m AHD. A copy of Council’s flood mapping for the site is attached.

You will be required to engage a qualified Civil Engineer with experience in flooding to demonstrate and submit a flood impact report stating compliance with the NSW Flood Prone Lands Manual with discussion of the following points:

- Floor level Freeboard
- Building Components
- Structural Soundness
- Flood Effects
- Car parking & Driveway Access
- Evacuation
- Management & Design

The architectural plans submitted as part of the Pre-DA indicate a finished floor level (FFL) of 22.55m AHD which is 360mm below the highest flood level for the site. This floor level is not acceptable and should be increased in consultation with a Hydraulic Engineer to achieve a freeboard of 500mm above the 1 in 100 year flood event. It should be noted that the proposed basement entry ramp is also required to provide a crest achieving a freeboard of 500mm above the 1 in 100 year flood event.

Figure 1 – Extract from Pre-Development Application Meeting Minutes (Dated: 21/01/2016)
Strathfield Council

Item 7A. Flood related development controls information

(1) Whether or not development on that land or part of the land for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors housing) is subject to flood related development controls.

(2) Whether or not development on that land or part of the land for any other purpose is subject to flood related development controls.

(3) Words and expressions in this clause have the same meanings as in the instrument set out in the Schedule to the Standard Instrument (Local Environmental Plans) Order 2000.

REPLY. The site is within the ‘1 - in - 100 flood event’ (refer to Council’s interim Flood Policy attached).

Figure 2 – Extract from Section 149 (2) Planning Certificate: 18 Myee Avenue Strathfield
NSW 2135 - Ref. JAJ04 (Dated: 11/11/2015) Strathfield Council

Figure 3 - Extract from attachment to Council Engineer Said Saqeb’s email (dated 02/11/2016)
Figure 4 – Flood Contour Map provided by Strathfield Council