

# FLOOD STUDY ASSESSMENT REPORT

For Proposed Subdivision

at

263 Mount Vernon Road, Mount Vernon

Prepared for:

**Fowler Homes**

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L.G.A.	Penrith City Council



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## Introduction

As part of the Development Application for the proposed subdivision at 263 Mount Vernon Road, Mount Vernon; a Flood Impact Assessment Report has been undertaken. The flood impact assessment has determined the impacts (if any) of the proposed development will have on the existing drainage paths and to ensure the proposed residence is safeguarded against potential flooding.

Engineering Studio has been commissioned by Fowler Homes to complete a flood study assessment for the localised upstream catchment and report for the proposed development.

The flood impact assessment has been prepared in conjunction with architectural, landscaping & engineering documentation prepared in the submission of application and in accordance with Penrith City Council's Flood Policy.

## **Objectives**

This report identifies the flood risks and management procedures necessary for the proposed residential development.

The objectives of this report are listed below:

- Guidelines to minimise the impact of flooding on the proposed development and the surrounding residential properties.
- Ensure no changes to flood levels, flows and hazards cause by altering the flood flows
- To determine a 1 in 100 year ARI flood level and set proposed floor levels above the required free board.
- A review of flood hazards for the site & proposes suitable construction methods to accommodate them.

In order to achieve the above, the following has been undertaken:

- Liaison with Local Council officers regarding the proposed development and implementation of suitable development controls to ensure adequate performance of the proposed development during flood events.
- A review of existing topography maps, catchment plans, etc.
- Visual observations of surface features of the existing site and surrounding areas by a walk over conducted by an experienced civil engineer.
- Engineering assessment and reporting of the proposed development and its impact on the existing residences.

Flood risk management will be achieved by imposing the following guidelines:

- Provide minimum floor levels for proposed development, including minimum freeboard requirements.
- Recommendations for structural design of the proposed development to resist additional loadings due to flooding, including the effects of impact loading from floating debris, etc.
- Recommendations in the use of flood proof materials in the building's construction in accordance with Council's policy.

## Existing Site Condition

The site, shown in Figure 1, is a large rural block located on Mount Vernon Road. The overall ground surface varies within the subject property, with the site generally falling from the East to the West at grades between 5-12%.

Water is conveyed from upstream properties along Mount Vernon Road to the natural depressions/ valleys within these upstream properties to the east of the subject property. Several dams are located along the valley, which collect and slow the flow of water downstream. Upstream flow enters the site at two points along the eastern boundary. The flow is conveyed through the natural low points of the site towards the western boundary and into the adjacent properties downstream.

Existing on the site is one residential dwelling situated towards the front of the property. A detached shed is also located within the property.

The property is approximately 262m long and 79m wide; the total site area is 1.98ha. A full copy of the site survey plan has been provided in Appendix A of this report.



Figure 1 - Site Location



### Proposed Development

The proposed development includes the demolition of the existing structures on-site, subdivision of the existing lot into two separate lots, with a single detached dwelling proposed to each new lot.

In order to ensure flood levels and extents are maintained/reduced, grass-lined overland flow channels are proposed to convey water through the site. These channels have been designed to safely convey water within the channel extents.

A detailed copy of the proposed development architectural plans has been provided in Appendix B of this report.

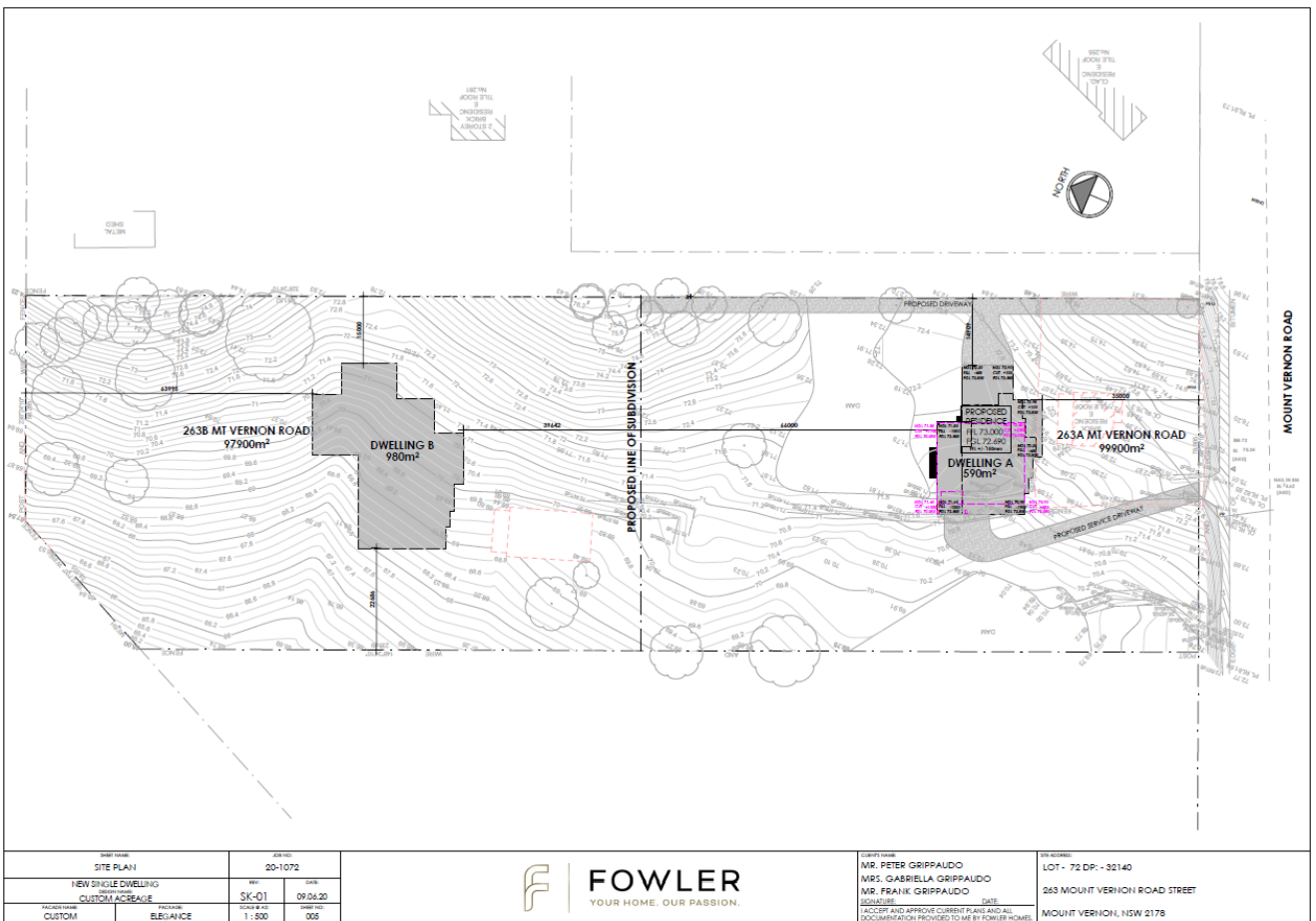


Figure 2 - Proposed Development Site



## Flood Modelling

### **Rational Method**

The rational method has been used to determine the peak 1 in 100 year ARI flowrate traversing over the site.

The following parameters were used:

Parameter	Catchment 1	Catchment 2
Area (ha)	9.70	0.74
Time of Concentration (min)	20	6
Runoff Coefficient	0.92	0.92
Rainfall Intensity (mm/hr)	139	229
Flow Rate (m <sup>3</sup> /s)	3.427	0.431

Catchment extents and detailed calculations can be found on 20408-C01.01. The peak flow resulting from the upstream external catchment was then used in the manning's channel calculations.

### Pre-Development Flood Behaviour

The flow from catchment 1 enters the site and is captured by the existing dam. When the capacity of the existing dam is reached, flow overtops the spillway and is conveyed along the grassed low point of the site towards the adjacent dam on the western boundary.

Overland flow from catchment 2 enters near the rear of the site along the western boundary. The flow is contained within the natural low point and is conveyed towards the adjacent property along the eastern boundary.

### Post-Development Flood Behaviour

The development proposes the removal of the existing dam and the creation of new grass-lined swales to convey overland flow through the site. A new 675mm RCP pipe is also proposed to drain the minor flows of catchment 1 through the site and to the existing dam on the western boundary.

A manning's open flow channel calculation has been conducted to size the overland flow channels. A manning's n value of 0.043 was adopted for both channels. Detailed calculations can be found on 20408-C02.02.

Conditions are recommended to be placed over the proposed development to ensure all possible obstructions such as rainwater tanks and air conditioning units are to be placed either on stands which allow water to flow naturally or to be located out of the 1% AEP flood extents. Items required to be placed on the ground such as garbage bins should be also be located out of these flood extents.

It is considered that the proposed development will help ease the existing flood situation as the proposed channel provides a clear formed path to allow flow through the site free of blockages and obstructions.

## **DEVELOPMENT CONTROLS**

### **Freeboard to Habitable Floor Levels**

In accordance with Penrith City Council requirements the minimum habitable floor level for residences adjacent to an overland flow path is to be set at the 100 year flood level plus a minimum 500mm freeboard. A minimum 300mm freeboard is to be provided to non-habitable areas including garages.

The proposed habitable floor areas on the ground floor have been set at RL 73.0 and RL 72.10 for dwelling A and B respectively, this is 1100mm and 500mm above the maximum water level of the channel. The proposed dwelling is therefore considered to be located clear of any floodwaters and not impacted by the mainstream flow path. The bank of the grass-lined swale draining catchment 1 will also be set a minimum 300mm above the maximum water level of the channel, providing the minimum 300mm freeboard to the basement/ garage of dwelling A.

## **DEVELOPMENT CONTROLS**

### **Building Construction**

The proposed dwelling is to be constructed clear of the overland flow path and therefore there will be no specific requirement for the use of any specific flood compatible materials. The following construction materials are proposed in the current DA submission are therefore considered suitable:

Floor: Slab on ground

Walls: External – brick walls

Internal – timber framed



The structural engineer will need to provide at Construction Certificate stage a structural design certificate stating that the building has been designed to suit relevant Australian Standards and NCC requirements, no additional flood forces are required to be assessed.

### **Building Construction Requirements**

All building services located within or adjacent to the existing driveway are required to be suitable for immersion in flood waters and to allow the free flow of stormwater across the site.

The following controls shall be in place to minimise flood damage:

- All structures to have flood compatible components below the 100 year flood level plus 500mm freeboard
- Electrical wiring and outlets to be located a minimum of 500mm above the 1% AEP flood level where possible. All electrical wiring installed below this level shall be suitable for submergence in water.
- All sewers to be installed with overflow/surcharge protection up the 1% AEP + Freeboard flood level.
- No rainwater tanks are to be placed within the 100 year flood extents.
- Bin storages and other obstructions should be placed adjacent to the proposed dwelling.

## **CONCLUSION**

It is apparent from the site investigation and design review that the site is currently affected by overland flows during the 1:100 ARI storm event. Overland flows from upstream catchments generate a total maximum 100 year flow rate of  $3.427\text{m}^3/\text{s}$  and  $0.431\text{m}^3/\text{s}$ .

Overland flows reaching the subject site are conveyed along the new grass-lined channels to the downstream properties. The channels shall be constructed in accordance with Engineering Studio civil engineering drawings 20408 to alleviating flooding issues within the site.

Based on the Flood Impact Assessment Report undertaken, it has been shown that the proposed development can be constructed on the site with no impact to surrounding properties and within the guidelines imposed by the regulatory authorities.

We trust the above and attached clarify the situation, if you have any further queries please contact the undersigned at your convenience.

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## APPENDIX A

### Existing Site Survey

**APPENDIX B**

**Architectural Plans**