ALPHA
ENGINEERING & DEVELOPMENT

CIVIL, STORMWATER & STRUCTURAL ENGINEERS
24A BURLEIGH STREET, BURWOOD NSW 2134
TEL: 02 9745 5202
EMAIL: INFO@ALPHAENGINEERING.COM.AU

FLOOD IMPACT ASSESSMENT REPORT

Proposed Two Storey BOARDING HOUSE

At

51 Jamison Road, Kingswood

For

Liquid Design

LIQUID
DESIGN

p: +61 414 781 512 | www.liquidesign.com.au
Suite 5.17, 55 Miller Street, Pyrmont, Sydney NSW 2009

Ref: A9057 - REV H
Issue Date: 04 APRIL 2019

CIVIL, STORMWATER & STRUCTURAL ENGINEERS
24A BURLEIGH STREET, BURWOOD NSW 2134
TEL: 02 9745 5202
EMAIL: INFO@ALPHAENGINEERING.COM.AU

DOCUMENT CONTROL

Document Reference	A9057 – 51 Jamison Road, Kingswood – Flood Impact Assessment
Project	A9057 – 51 Jamison Road, Kingswood
Document Type	Flood Impact Assessment Report
Author	Stephen Yin
Reviewed By (Date)	Kundan Pokharel (04/04/2019)

REVISION HISTORY

Date	Version	Name	Comments
28/08/2018	A	Stephen Yin	First draft
13/03/2019	B	Stella Hong	Second draft
04/04/2019	C	Stella Hong	Issued for DA

DOCUMENT APPROVAL

For Alpha Engineering	
Name	Jean Jose Mauad
Position	Senior Civil Engineer
For	Liquid Design
Name	
Position	

TABLE OF CONTENTS

CIVIL, STORMWATER & STRUCTURAL ENGINEERS
24A BURLEIGH STREET, BURWOOD NSW 2134
TEL: 02 9745 5202
EMAIL: INFO@ALPHAENGINEERING.COM.AU

LIST OF FIGURES

GLOSSARY

Annual Exceedance Probability (AEP)
The chance of a flood of a given or a larger size occurring in any one year, usually expressed as a percentage.

Australian Height Datum (AHD)
A common national surface level datum approximately corresponding to mean sea level.

Average Recurrence Interval (ARI)
The long-term average number of years between the occurrence of a flood as big as or larger than the selected event.

Catchment
The land area draining through the main stream, as well as tributary streams, to a particular site. It always relates to an area above a specific location.

Flood
Relatively high stream flow which overtops the natural or artificial banks in any part of a stream, river, estuary, lake or dam, and/or local overland flooding associated with major drainage before entering a watercourse.

Flood Liable Land or Flood Prone Land
Land susceptible to flooding by the PMF.

Flood Planning Levels (FPLs)
Are the combinations of flood levels and freeboards selected for floodplain risk management purposes.

Freeboard
Is a factor of safety typically used in relation to the setting of floor levels.

Habitable Room
In industrial or commercial situation: an area used for offices or to store valuable possessions susceptible to damage in the event of a flood.

Peak Discharge
The maximum discharge occurring during a flood event.

Probable Maximum Flood
PMF is the largest flood that could conceivably occur at a location, usually estimated from probable maximum precipitation.

Probable Maximum Precipitation
PMP is the greatest depth of precipitation for a given duration meteorologically possible over a given size storm area at a particular location at a particular time of the year.

Runoff
The amount of rainfall which actually ends up as stream flow.

CIVIL, STORMWATER & STRUCTURAL ENGINEERS
24A BURLEIGH STREET, BURWOOD NSW 2134
TEL: 02 9745 5202
EMAIL: INFO@ALPHAENGINEERING.COM.AU

1 INTRODUCTION

In accordance with Penrith Council Policy, Alpha Engineering & Development has been engaged to prepare a Flood Impact Assessment Report to accompany the Development Application submitted to Penrith Council for the proposed residential development at 51 Jamison Rd, Kingswood.

2 SITE SPECIFIC INFORMATION

The proposed development is to be built at the intersection of Somerset St & Jamison Rd, Kingswood. The subject site is located in a residential area with the majority of the neighbouring buildings also residential. As per the survey plan prepared by TSS (Total Surveying Solutions), the portion of Jamison Road at the Southern boundary of the subject site falls towards the East and the portion of Somerset Street at the Western boundary of the subject site falls towards the South. The run-off rainwater on Jamison Road is expected to fall towards the East and be collected by the nearest kerb-inlet pit. The run-off rainwater on Somerset Street is expected to fall towards the South and be collected by the nearest kerb-inlet pit. There is a kerb inlet pit located in front of 47 Jamison Road, Kingswood (**Figure 2**) which is downstream and adjacent to the subject site. There is another kerb inlet pit located in front of 36 Stapley Street (**Figure 3**) which is downstream of the Somerset Street. **Figure 1** below shows the subject site and an indication of nature of the surrounding area.

CIVIL, STORMWATER & STRUCTURAL ENGINEERS
24A BURLEIGH STREET, BURWOOD NSW 2134
TEL: 02 9745 5202
EMAIL: INFO@ALPHAENGINEERING.COM.AU

Figure 1 Site Location: 51 Jamison Road, Kingswood

Figure 2 Existing kerb inlet pit at 47 Jamison Road, Kingswood (Downstream)

Figure 3 Existing kerb inlet pit at 36 Stapley Street, Kingswood (Downstream)

3 SITE SPECIFIC FLOOD INFORMATION

The flood information for the subject site presented in **Figure 4** below has been provided by Penrith Council's Stormwater Engineer – Ratnam Thilliyar. From Figure 4, the 1% AEP local overland flow flood level is estimated to be RL 50.4 AHD at the Northern boundary of the subject site to RL 50.1 AHD at the Southern boundary of the subject site.

Flood Information
Lot 3 DP 502054 - No. 51 Jamison Road Kingswood

Date of issue: 23 July 2018

The 1% AEP local overland flow flood level vary in the vicinity of the above property is estimated to be RL50.4m AHD at the Northern boundary to RL50.1m AHD at the Southern boundary.

Property less than 0.5m above the 1% AEP flood level is subject to Penrith Development Control Plan 2014 Section C3.5 Flood Planning. The Penrith Development Control Plan 2014 is available from Council's website www.penrithcity.nsw.gov.au.

Definitions
AEP – *Annual Exceedance Probability* – the chance of a flood of this size occurring in any one year.
AHD – *Australian Height Datum* – A standard level datum used throughout Australia, approximately equivalent to mean sea level.

Figure 4 Flood information through the site provided by Penrith Council

ALPHA
ENGINEERING & DEVELOPMENT

CIVIL, STORMWATER & STRUCTURAL ENGINEERS
24A BURLEIGH STREET, BURWOOD NSW 2134
TEL: 02 9745 5202
EMAIL: INFO@ALPHAENGINEERING.COM.AU

4 PROPOSED DEVELOPMENT – 51 Jamison Rd, Kingswood

The proposed project is a boarding house residential development. **Figure 5** below shows the ground floor Architectural plan that has been designed to ensure a minimum freeboard of 500mm has been implemented which will ensure that the habitable areas of the dwelling are safe from the impact of flood waters during a major storm event.

The Southern section of the dwelling includes landscape areas and basement ramp. The finished floor level of the driveway crest has been designed as 50.40m AHD. From the flood information **(Figure 4)**, the flood level of this area is approximately 50.10m AHD. There is a height difference (freeboard) of 300mm between the proposed driveway level and the flood level.

The Northern section of the dwelling includes landscape areas, planter boxes, communal room and communal outdoor and open communal spaces. The finished floor level of the communal outdoor is 50.90m AHD. The approximate flood level of this area is 50.40m AHD. There is a 500mm height difference (freeboard) in level and therefore satisfies the freeboard requirement by council.

A summary of the comparison between the proposed floor levels and the approximate flood levels is shown in **Table 1** below.

Section of Dwelling	Flood Level (m AHD)	Finished Floor Level (m AHD)	Freeboard (mm)
Driveway Crest	50.10	50.40	300.00
Communal Room	50.40	50.90	500.00

Table 1: Comparison between the flood level and the proposed finished floor levels of the dwelling.

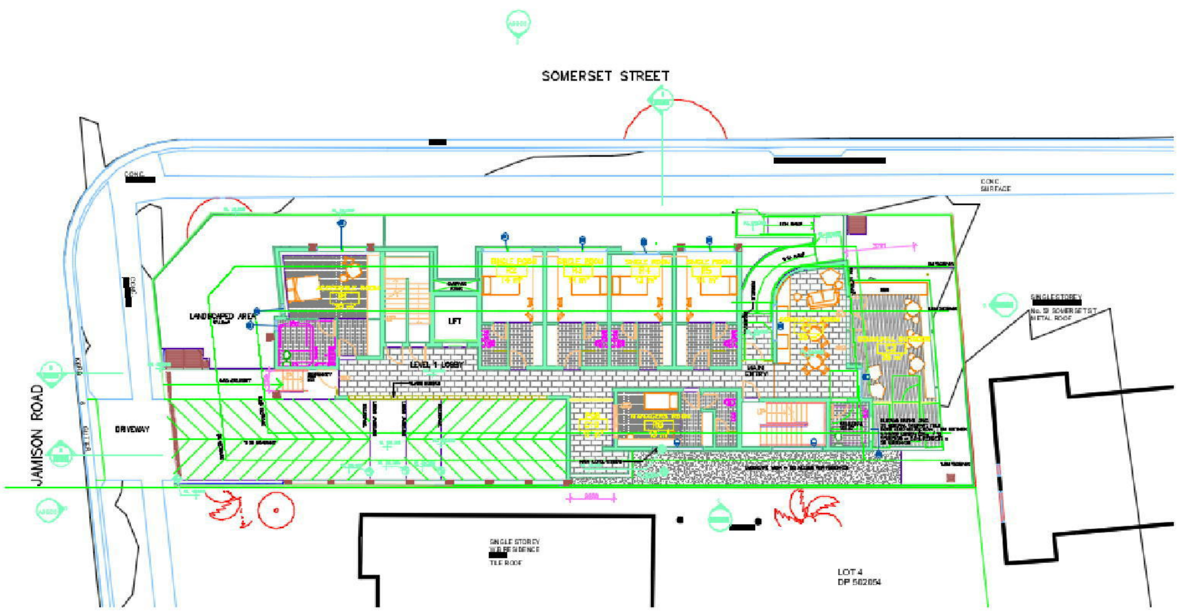

Figure 5 Ground Floor Plan of the Proposed development

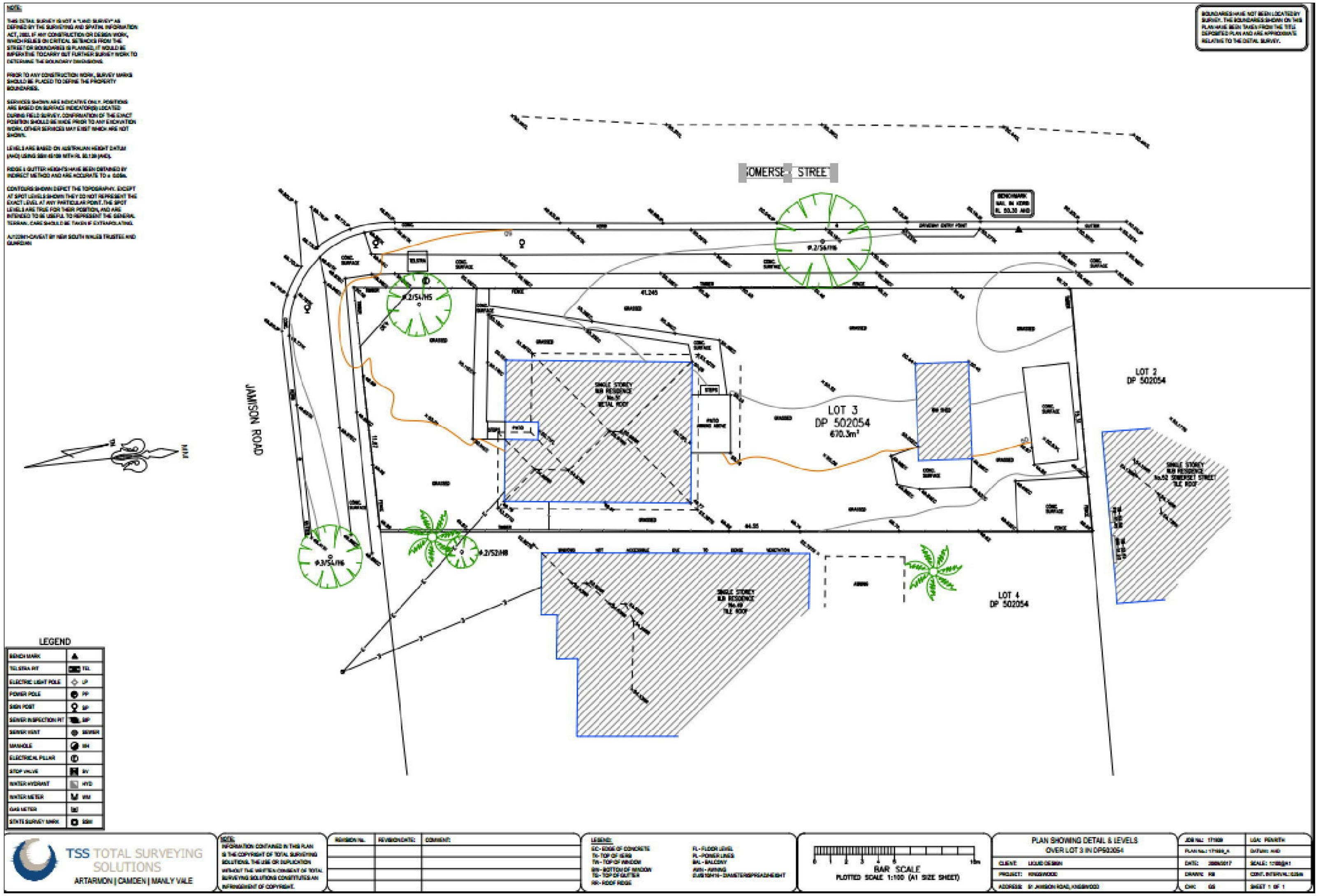

Figure 6 Survey plan – 51 Jamison Road, Kingswood

5 FLOOD IMPACT ASSESSMENT

As mentioned previously, 51 Jamison Road, Kingswood is located in a residential area. The surrounding properties are residential blocks of lands. As per **figure 4**; the overland stormwater run-off flows from the North of the site along Somerset Street towards the East direction at Jamison Road outside the subject site.

The overland flood is outside the property and mainly contained within the roadway as shown by Council's Flood mapping in Figure 4 above. As the site boundary levels will be maintained during the post development scenario, the flood water will not encroach into the property boundaries. The communal open space with suspended deck at northern boundary will be left open above the natural ground level for water to pass through during any flood event rarer than 1%.

Therefore, the development within the subject site will not obstruct any flowpath or cause changes to the flooding behaviour. Adopting minimum flood planning level for habitable floors and minimum crest level above 1% AEP will assure the proposed building is safe against the flooding. There will be no any adverse impact the development on surrounding areas.

6 RECOMMENDATIONS AND CONCLUSION:

This investigation has been undertaken by Alpha Engineering and Development based on the information provided by Penrith Municipal Council and the available survey plan. To ensure compliance with the Council's flood prone land policy, the following is to be adopted:

- The minimum finished floor levels of the proposed communal room shall be 50.90m AHD as the flood level in this area is estimated to be 50.40m AHD.
- The minimum finished floor levels of the proposed car park shall be 50.20m AHD as the flood level in this area is estimated to be 50.10m AHD.
- All proposed structures are to have flood compatible building components below the flood levels. A structural assessment is advised prior to occupation of building by any accredited Structural Engineers.
- It is recommended that open style fencing be adopted to ensure no blockages/obstructions to external flows along northern and eastern boundaries.

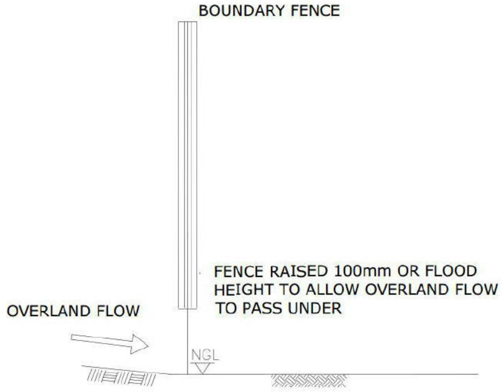

Figure 7 Elevated fence details

Figure 8 below shows a general outline of flood compatible materials to be adopted for construction purposes.

Building Component	Flood Compatible Material	Building Component	Flood Compatible Material
Flooring and Sub Floor Structure	• pier and beam construction or • suspended reinforced concrete slab	**Doors**	• solid panel with waterproof adhesives • flush door with marine ply filled with closed cell foam • painted material construction • aluminium or galvanised steel frame
Floor Covering	• clay tiles • concrete, precast or in situ • concrete tiles • epoxy, formed-in-place • mastic flooring, formed-in-place • rubber sheets or tiles with chemical set adhesive • silicone floors formed-in-place • vinyl sheets or tiles with chemical-set adhesive • ceramic tiles, fixed with mortar or chemical set adhesive • asphalt tiles, fixed with water resistant adhesive • removable rubber-backed carpet	**Wall and Ceiling Linings**	• brick, face or glazed • clay tile glazed in waterproof mortar • concrete • concrete block • steel with waterproof applications • stone, natural solid or veneer, waterproof grout • glass blocks • glass • plastic sheeting or wall with waterproof adhesive
Wall Structure	solid brickwork, blockwork, reinforced, concrete or mass concrete	**Insulation**	• foam or closed cell types
Windows	Aluminium frame with stainless steel or brass rollers	**Nails, Bolts, Hinges and Fittings**	• galvanised • removable pin hinges

Figure 8 General outline for flood compatible materials for construction

7 GENERAL FLOOD RISK MANAGEMENT PLANS

1. At the first signs that there may be a rainfall event, check any form of weather reports (i.e. Bureau of Meteorology, ABC Radio 702) for any possible forecast warnings issued. If any storm warnings have been forecast, this Flood Risk Management Plan must be actioned following the proceeding steps below.

2. During flood events many local, major streets and roads will be cut off by floodwaters that may make the escape by vehicle extremely difficult. Travelling through floodwaters on foot or in a vehicle can be very dangerous as obstructions can be hidden under the floodwaters, or it is possible to be swept away, even if in a car, or the water may be polluted.

   It is recommended that during any flood event, staying within the building as much as practical is always the safest option. If the rainfall event has occurred, do not evacuate the building unless instructed by the State Emergency Services (SES) or police.

3. Develop your own 'Family Flood Plan' generally in accordance with this Flood Emergency Response Plan. In the case that flooding should occur and children are home alone, arrangements should be ensured the children are aware not to leave the premises and to follow the 'Family Flood Plan'.

4. **If flood levels appear to approach the dwelling of the residence:**

   a. Move important documents, personal items, precious photographs, and vital medical supplies to a safe and easily accessible place with a pre-prepared 'Emergency Flood Kit'.

   b. Gather medicines, special requirements for infants or elderly, mobile phones, first aid kit, special papers, battery operated torch and radio, fresh water, canned food, water proof or easy dry clothing all packed in one location.

   c. Locate any pets and gather special requirements for them

   d. Put on strong shoes, raise any items within the home that may be damaged by water to a high level as possible, with electrical items on top. Turn off any large electrical items at the power point such as a TV that cannot be raised.

NOTE: SUITABLE STORAGE AREAS MAY BE ON TOP OF DESKS/TABLES/BENCH TOPS/ATTICS AND BEDS

5. **In the event that flood waters appear they may enter the dwelling:**

   a. Switch off electricity at the switchboard
   b. Turn off gas at the meter
   c. Turn off water at the meter
   d. Block toilet bowls with a strong plastic bag filled with earth or sand
   e. Cover drains in showers, baths and laundry with a string plastic bag filled with earth or sand.
   f. Once flood waters have been entered the building, all occupants residing within the dwelling must move to the 'First Floor' for refuge from a possible PMF storm event. It is only safe to leave this 'Safe Zone' once the flood water being to reside away from the dwelling.

6. In the event that flood waters have risen up to the building, do not evacuate the building under any circumstances, unless instructed by SES or police personnel. Floodwaters are much deeper, run much faster and are dangerous outside.

7. Continue to monitor the Bureau of Meteorology forecasts and warnings, listen to ABC 702 radio.

8. In the case of medical or life-threatening emergency ring **000** as normal, but explain about the flooding.

9. A laminated copy of this Flood Emergency Response Plan should be permanently attached to an inside cupboard door in the kitchen and/or laundry of the main dwelling and to the inside of the electrical meter box.

10. This Flood Emergency Response Plan should be reviewed every 5 years, particularly with the potential sea level rise due to the greenhouse effect.

Important Phone Numbers

State Emergency Service: Emergency 132 500 General Enquires: 4251 6111

Police, Fire, Ambulance: Emergency 000

Bureau of Meteorology (Website): http://www.bom.gov.au/weather

Land, Weather and Flood Warnings, phone: 1300 659 215

DR/Hospital: ....

Family: ....

Friends: ....

Other: ....

8 FLOOD INFORMATION BACKGROUND

- Stay tuned to ABC 702 on a battery powered radio for official advice and warnings.
- Don't allow any children to play in or near flood waters.
- Avoid entering flood waters in all circumstances unless it is necessary. Check the depth in front of you before every step using a stick/pole or similar.
- Stay away from drains, culverts, and areas where the water is deeper than your knee.
- Don't turn on your gas or electricity until it has been checked by a professional/licensed repairer.
- Avoid using gas or electrical appliances which have been in flood water until checked for safety.
- Do not consume food that has been in flood waters.
- Boil tap water until supplies have been declared safe.
- Watch for trapped animals.
- Beware of fallen power lines.
- Take as many photos as possible of the damages for insurance purposes.
- Notify family and friends of your whereabouts