



Ibrahim Stormwater Consultants

ABN: 37 116 185 516



***PROPOSED DEVELOPMENT  
AT 10 EVELYN PLACE  
BELROSE***

***FLOOD IMPACT & RISK ASSESSMENT***

**December 2021**

Prepared by Ibrahim Stormwater Consultants  
Suite 25, 15 Terminus Street  
Castle Hill NSW 2154  
Ph: 02 9980 5515 Fax: 02 9980 6114

## ***FLOOD IMPACT & RISK ASSESSMENT***

<b><u>TABLE OF CONTENTS</u></b>	<b><u>PAGE</u></b>
1 INTRODUCTION .....	3
2 AIM OF ASSESSMENT.....	4
3 SUMMARY OF ASSESSMENT.....	5
4 CONCLUSION.....	6
APPENDIX A .....	8
Part 1 .....	8
Flood Maps .....	8
Site Plan and Drainage.....	12

# 1 INTRODUCTION

A Development Application proposing a, new single detached residential dwelling for the subject site at 10 Evelyn Place BELROSE, is to be lodged with a Council. Subsequently, this report is to provide information with regard to council flood risk policy.

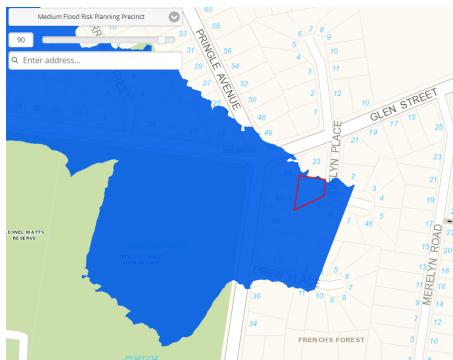
Ibrahim Stormwater Consultants were commissioned to undertake this assessment of the site and proposed development.

The assessment is based on council's flood maps, Frenchs Forest Flood Study 2010 DHI, councils LEP 2011 Clause 6.3 and the following list of documents:

1. Architectural drawings 29915175 dated 8-11-21.
2. Title Searches
3. Survey by Aspect Development and Survey

The site is partially inundated by the 1% AEP flood event along the rear corner of site. The remainder of the site is predominantly under the PMF level excluding the front boundary to Evelyn Place.

Accordingly the site is classified as a Medium Risk Category.



The results of this report are for the purposes of assessing this proposed development only, in its current form and is not to be used for any other purposes or developments on this property or adjoining ones.

## **2      AIM OF ASSESSMENT**

The objectives of this assessment is to address council's Flood Plain Management Policy as follows:

- a) Identify the Flood Risk Precinct
- b) Identify Minimum Floor levels required for habitable areas.
- c) Identify Building Component Requirements
- d) Identify Structural Soundness Requirements
- e) Identify Flood Effects
- f) Identify Evacuation Requirements
- g) Identify Management and Design aspects.
- h) Identify Minimum Car Parking and Driveway Levels and access requirements.

### 3 SUMMARY OF ASSESSMENT

The property is identified as being partly in Medium Flood Risk Precinct as a result of overland flow.

Accordingly the following relevant parameters will need to be followed as per the NSW flood plain management and council planning controls DCP 2011 E11:

Planning Consideration	Residential	
Floor Levels	1,4,7	- Floor levels are to be equal to or higher than the Flood Planning Level (FPL). Floor levels of balconies are to be set at a minimum of the FPL. No net loss of flood storage is to occur. Compensation works may be permitted.
Building Components	1	All structures to have flood compatible building components and/or withstand the hydraulic forces of 1% AEP velocities, up to the FPL.
Structural Soundness	1	A Flood Risk Assessment from a suitably qualified person is required to certify that any structure can withstand the forces of floodwater, debris and buoyancy up to the FPL..
Flood Effects	1	A Flood Risk Assessment from a suitably qualified person is required to certify that the development will not increase flooding or negatively impact on the velocities of the flood waters upstream or downstream in a 100 year flood event
Car Parking & Driveway Access	1,3,4,5	<ul style="list-style-type: none"> <li>- Car park floor levels (including stand alone garages, multistorey and under building open areas) to be set at the 100 year flood level. The installation of movement devices may be required for protection against the movement of vehicles.</li> <li>- Where the garage is connected to the house, the garage floor level must be set at or above the 100 year flood level. The entrance from the garage into the dwelling must be set at the FPL. The height of the garage ceiling is to allow room for potential future raising of the floor level to the FPL.</li> <li>- The basement car park area must have a ramp set with a crest at the FPL to prevent floodwaters entering the car park. All potential water entry points are to be set at or above the FPL.</li> <li>- Carports are to have no more than 200mm depth of floodwater or 0.5m/s velocity of floodwater flowing through in a 100 year flood event. The installation of movement devices may be required for protection against the movement of vehicles.</li> </ul>
Management and Design	2	- The applicant must demonstrate that area is available to store goods (goods that may cause pollution or are potentially hazardous) above the FPL.
Evacuation	1,3	<ul style="list-style-type: none"> <li>- All new dwellings should contain an appropriate area to shelter in place above the PMF. Flood compatible materials should be used in the building materials up to the PMF.</li> <li>- Existing and proposed developments shall be required to produce and maintain a Flood Emergency and Evacuation Plan that demonstrates that any occupants will be able to safely shelter in place in a PMF or have reliable access for pedestrians to evacuate safely above the PMF</li> </ul>

## 4 CONCLUSION

The proposed development based on the above design criteria and with relevant conditioning, will ensure that the current use of the property will not be a hazard to the community in the event of 1 in 100 year storm event.

The proposal to construct a new residence shall adopt the following limitations:

1. A floor level higher than or equal to RL 163.90m relative to the front BM to AHD,
2. A garage level higher than or equal to 163.55m,
3. External ground levels including the future driveways and paths to achieve levels nominated on plans C10419-15175 to achieve compliance with BCA.
4. As the proposed building foundations are below the 1% flood level plus 500mm, flood compatible building components are to be used (Brick, Concrete, Gal. Metals), and structural engineer to certify that structure can withstand the forces of floodwater will be applicable.
5. As the dwelling is replacing an existing dwelling outside the 1% flood extent the impact of flood storage loss is considered negligible.
6. Storage space for poisonous and dangerous goods is available within the dwelling above the FPL.
7. Any new fencing to the boundaries shall be open type fences at their base to allow free flow of waters to the satisfaction of council.
8. Evacuation refuge up to the 1% AEP should be to remain inside the dwelling on the second floor above the PMF level of RL.164.0. Evelyn Place is w above the PMF level of ~164.0m where expected warning time in such an event is considered sufficient for occupants. The evacuation routes are relatively clear with sealed bitumen roads. Site distances are excellent and the building and evacuation route to the North is visible from the flood affected land if directed by SES to do so.

Signage at the Meter box identifying the direction to higher ground is to be provided along with a copy of the Flood Management Plan in Appendix A, that should be laminated and affixed within the laundry or kitchen also.

The proposed development will complement all the design issues raised and provide an extension to any future council flood management proposal.

Name of Engineer: Mark Ibrahim

Qualifications: B.E. Hons, M.I.E. Aust. CPEng,

Address of designer: P.O. Box 400 Cherrybrook NSW 2126.

Business Telephone No. 9980 5515 Fax: 9980 6114

Name of Employer: Ibrahim Stormwater Consultants

This is only a design certificate and is not a Part 4A certificate, as only a consent authority, the council or an accredited certifier can issue such.

Yours faithfully,

A handwritten signature in blue ink, appearing to be 'Mark Ibrahim', with a stylized flourish at the end.

Per Ibrahim Stormwater Consultants  
Mark Ibrahim

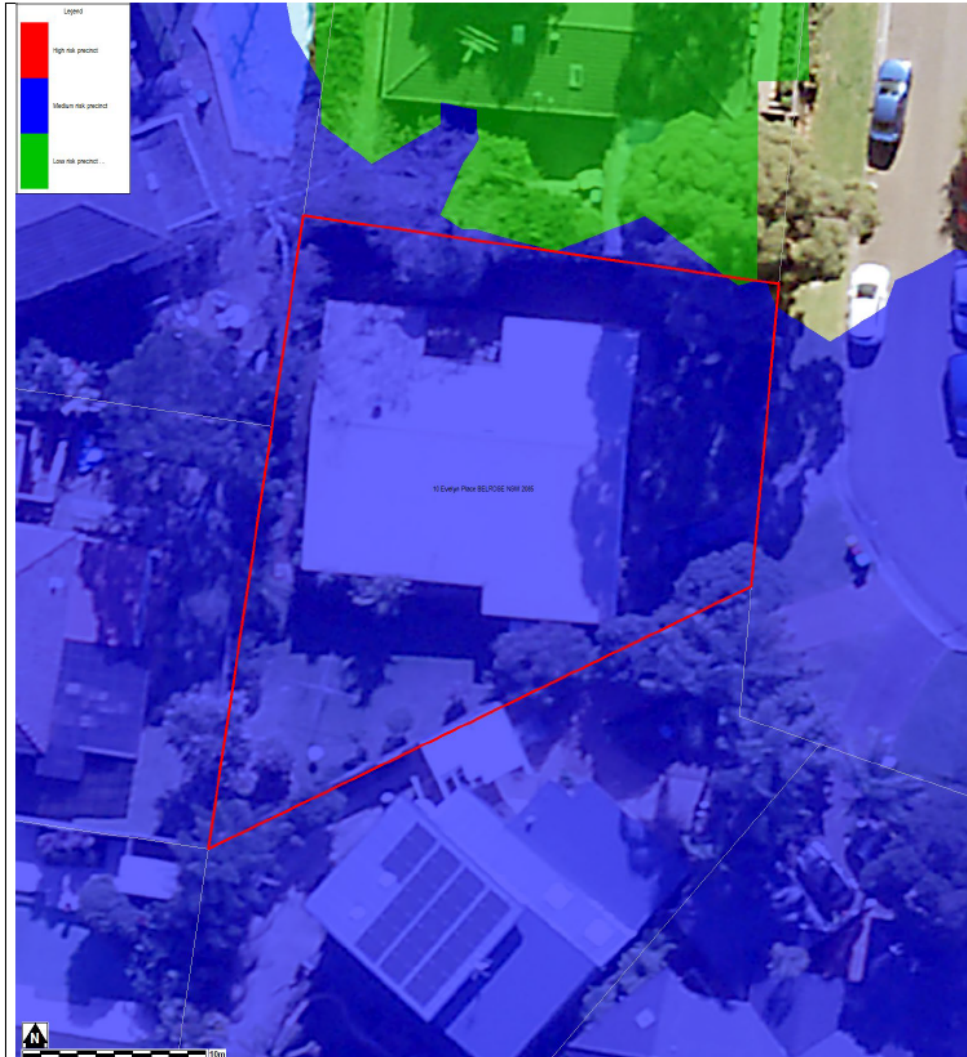
## **APPENDIX A**

### **Part 1**

#### **Flood Maps**



## FLOOD MAP A: FLOOD RISK PRECINCT MAP



### Notes:

- **Low Flood Risk precinct** means all flood prone land not identified within the High or Medium flood risk precincts.
- **Medium Flood Risk precinct** means all flood prone land that is (a) within the 1% AEP Flood Planning Area; and (b) is not within the high flood risk precinct.
- **High Flood Risk precinct** means all flood prone land (a) within the 1% AEP Flood Planning Area; and (b) is either subject to a high hydraulic hazard, within the floodway or subject to significant evacuation difficulties (H5 or H6 Life Hazard Classification)
- The **Flood Planning Area** extent is equivalent to the Medium Flood Risk Precinct extent, and includes the High Flood Risk Precinct within it. The mapped extent represents the 1% annual Exceedance Probability (AEP) flood event + freeboard.
- None of these mapped extents include climate change.

Issue Date: 29/04/2021

Page 3 of 8

Location of site shown indicated by Red outline.

## FLOOD MAP B: FLOODING - 1% AEP EXTENT



### Notes:

- Extent represents the 1% annual Exceedance Probability (AEP) flood event.
- Flood events exceeding the 1% AEP can occur on this site.
- Extent does not include climate change.
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Frenchs Creek Flood Study 2010, DHI) and aerial photography (Source: NearMap 2014) are indicative only.

Issue Date: 29/04/2021

Page 4 of 8

## FLOOD MAP C: PROBABLE MAXIMUM FLOOD EXTENT



**Notes:**

- Extent represents the Probable Maximum Flood (PMF) flood event.
- Extent does not include climate change.
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Frenchs Creek Flood Study 2010, DHI) and aerial photography (Source: NearMap 2014) are indicative only.

Issue Date: 29/04/2021

Page 5 of 8



[illegible]

## FLOOD MANAGEMENT PLAN FOR 10 EVELYN PLACE BELROSE

### BACKGROUND

Warringah Council has advised that this property is subject to flooding in a 1% AEP (1 in 100 year ARI) storm event. The Probable Maximum Flood (PMF) is the highest flood level that is ever likely to occur, however it is extremely rare. The relevant levels are:

**1% AEP Flood Level = 163.40 m Australian Height Datum (AHD)**

**Probable Maximum Flood = ~164.0 m AHD**

**Garage Floor Level = 163.835 m AHD**

**Habitable Floor Level = 163.91 m AHD**

**Second Floor Level = 166.985 m AHD**

**Front Boundary Level = ~163.93m AHD**

**Lowest Ground Level = 162.97m AHD at the rear**

The above levels give an indication of how the various floods will impact this property. Habitable living areas are designed to be a minimum of 0.5 m above the 1% AEP Flood Level and staying within the home will provide protection for a wide range of floods.

### PROCEDURE

#### Time Available for Evacuation:

Floods in Frenchs Creek Catchment are considered as “flash floods” and no warning system is available. Storms leading to major flooding are typically 2 to 36 hours long. Once the storm passes floodwaters usually disappear rapidly.

#### Evacuation Route:

During floods many local and major streets and roads will be cut by floodwaters. Traveling through floodwaters on foot, or in a vehicle can be very dangerous as the water may be polluted, obstructions can be hidden under the floodwaters, or you could be swept away. Council recommends staying within the home as much as practical as this is the safest option. If you need to leave the home do so early in the flood event, before the flood level reaches the rear fence. In the event of the PMF go to the second floor and wait for waters to reside. Emergency vehicles that require access can safely enter via Evelyn Place in 1% AEP flood. Develop your own family flood plan and be prepared if flooding should occur while the kids are coming home from school or when you are returning from work. Talk to the Council to determine the safer travel routes that are less likely to be cut by floodwaters.

1. As the flood level approaches the garage floor level (but only if safe to do so) relocate any items that may be damaged by water, or poisons, or wastes to as high a level as possible.
2. As the flood level approaches the habitable floor level:
  - i) gather medicines, special requirements for babies or the elderly, mobile phones, first aid kit, special papers and any valuables into one location,
  - ii) put on strong shoes, raise any items within the home that may be damaged by water (e.g. photo albums) to as high a level as possible, with electrical items on top. Turn off and disconnect any large electrical items such as a TV that cannot be raised.
  - iii) place wet towels across the bottom and lower sides of external doors to slow down the entry of water through the door.
3. In the very rare event that floodwaters may enter the home collect items from 2.i) above and move to an upper level if possible, or if in a single level dwelling provide a chair in the kitchen to enable access to the kitchen bench preferably adjacent to the window. Ensure window is not locked or key readily available. Do not evacuate the home unless instructed to do so by the SES or the Police. Remember floodwaters are much deeper and flow much faster outside.
4. In the case of a medical emergency ring 000 as normal, but explain about the flooding.
5. This flood management plan should be reviewed every 5 years, particularly with the potential sea level rise due to the greenhouse effect.

*A laminated copy of this flood plan which should be permanently attached (glued) on an inside cupboard door in the kitchen and/or laundry and to the inside of the electrical meter box*

Keep listening to your local radio and/or TV station and heed all warnings and advice.