

# Flood Risk Management Plan

### 17 Fenwick Crescent, Goulburn

Prepared For Infinite Projects Fenwick PTY LTD

Project No. **TEL24381** 

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#### Disclaimer

The advice and information contained within this report relies on the quality of the records and other data provided by the Client and obtained from Council along with the time and budgetary constraints imposed.

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### 1 INTRODUCTION

Telford Consulting Pty Ltd have been commissioned to undertake a Flood Risk Management Plan for the Proposed Childcare Center at 17 Fenwick Crescent, Goulburn.

This report will:

- 1. Determine the existing flood characteristics;
- 2. Define the flood risk for the Proposed Childcare Center in accordance with *Goulburn Mulwaree Council DCP* Flood Risk Management Policy;
- 3. Set development levels for the proposed development in accordance with Council's guidelines; and
- 4. Provide flood risk management procedures for the proposed development;

This report has been prepared generally in accordance with Goulburn Mulwaree Council advice, Council's Flood Risk Management Policies and other reference documents.

### 2 SITE DETAILS

#### 2.1 Location

The proposed development site is located within the municipality of Goulburn Mulwaree Council and is bounded by Fenwick Crescent to the South, by builtup allotments to the North and West, by a vacant area to the East. The property is identified as 17 Fenwick Crescent, Goulburn NSW 2580.

Figure 2-1 below shows the site's location outlined in red.



Figure 2-1- Approximate Site Location

### 2.2 Proposed Development

The proposed development will see the construction of a Proposed Childcare Center development. Vehicle access to the site shall be via Fenwick Crescent.



Refer to the Figure 2-2 below for the proposed site plan.

Figure 2-2 – Proposed Site Plan

### **3** FLOOD ASSESSMENT

According to the flood Information provided by Goulburn Mulwaree Council, the subject site is shown to be minorly affected during the 1% Annual Exceedance Probability (AEP) storm event to the east. The site is categorized as medium flood risk.

The 1% AEP flood depths relative to the subject site are ranging between 0.02m and 0.194m.

Refer to **Figure 3-1** below for the 1% AEP Height Velocity Depth Data as provided by Goulburn Mulwaree Council.



Figure 3-1 - 1% AEP Height Velocity Depth Data

According to the flood Information, the subject site is shown to be totally affected during the PMF storm event.



Figure 3-2 – 1% AEP Flood Extent

The proposed development footprint is outside the 1% AEP flooding extent (medium risk flood water).

Whereas the proposed Childcare Center is completely affected during the PMF Storm Event, specific measures and precautions shall be taken for this regard shown in **Sections 6 & 8**.

### 4 CRITERIA FOR SETTING FLOOR LEVELS

All precautions within the planning and design stages of a proposed development should be taken to ensure the risks of flood impacts are minimised.

While it is generally recommended for childcare centers to be situated at or above the Probable Maximum Flood (PMF) level, achieving this standard is hard in this instance due to the PMF level being a minimum of 3 meters above ground level. Consequently, the proposed development will instead be set at the 1% Annual Exceedance Probability (AEP) level plus 0.8 meters, in accordance with council standards. Additionally, a designated shelter-inplace area will be provided above the PMF level to ensure the safety and evacuation of occupants during extreme flood events. Refer to **Section 8** for more details on the evacuation procedure.

Goulburn Mulwaree Council DCP sets development levels for all developments affected by flooding.

- The minimum habitable floor level shall be set at the 1% AEP level plus 0.8m freeboard.
- The minimum shelter in place level shall be set at the PMF level.

**Table 4-1** below shows the minimum floor level for the proposed development in accordance with Council's DCP.

Building Element	Design Requirement	Design Level		
Childcare Center	1% AEP storm event plus 0.8m freeboard	637.48m AHD		
Shelter in Place	PMF storm event	639.744m AHD		

#### Table 4-1 - Minimum Development Levels

### 5 BUILDING COMPONENTS

All proposed structural components are engineered to resist the various forces imposed by floodwaters, ensuring durability and stability during flood events. These forces include hydrostatic pressure from standing water, hydrodynamic pressure from flowing water, the impact of debris carried by floodwaters, and buoyancy forces that could otherwise dislodge or uplift structural elements.

To further enhance the resilience of the development, all building materials and surface finishes situated at or below the flood planning level are carefully selected for their capacity to endure extended periods of water immersion. These materials are designed to resist degradation, such as swelling, warping, or weakening, ensuring the long-term integrity and safety of the structure in flood-prone conditions.

### 6 FLOOD RISK MANAGEMENT

In the event of flooding, staff members and children are required to evacuate to an area of refuge above the adjacent floodwater. Two options are available, depending on the capability of caregivers. Caregivers may retrieve their children before the flood event if feasible, or, if evacuation is not possible, staff and children may shelter in place. The choice of option will also depend on the severity of the flood and safety considerations.:

- Shelter in place
- Early Evacuation

The staff members must always have updated dossier of students and Parent /Guardians information to contact them in case of emergencies.

#### SHELTER IN PLACE

#### Flooding Up to the 1% AEP Event

Occupants are expected to seek refuge above the 1% AEP waters on the Ground Floor (or higher) as these areas have adequate freeboard above the 1% AEP water level according to **Section 4**.

#### Flooding in Excess of the 1% AEP Event

If by any chance the directors of the childcare centre were not able to evacuate early off the site, the directors within the Ground Floor are expected to seek refuge above the PMF at the proposed Shelter in Place. The Shelter in Place is set at RL 639.744m AHD which is above the PMF level.

According to Goulburn Floodplain Risk Management Study and Plan, the duration of the PMF storm event is approximately 4.1 hours. During this time, occupants are expected to remain in the designated shelter-in-place area if evacuation is not possible due to the sudden onset of flooding. Additionally, individuals outside the development should refrain from attempting to reach the site by any means until the flooding has fully subsided and the site is deemed safe.

A flood evacuation plan to lead the directors from the Ground Floor level up to the Shelter in Place level is included within **Appendix C**. This plan is to be always attached in the noticeboard and staff room.

Early evacuation is the preferred management strategy for the children at the centre if possible (Refer to the *Early Evacuation* section below).

#### Child Safety Measures During Shelter-in-Place:

To address child anxiety and ensure safety:

- 1. Prepare a child-specific emergency kit containing:
  - Comfort items (e.g., blankets, stuffed toys).
  - Age-appropriate games or coloring books.
  - Basic first-aid supplies tailored for children.
- 2. Train staff on managing children's emotional well-being during emergencies, including strategies for calming and engaging them.

#### EARLY EVACUATION

Early evacuation is the preferred management strategy for children at the subject site to ensure their safety and well-being. With the Bureau of Meteorology (BOM) providing advance warnings up to 24 hours before a flood event, caregivers and staff are encouraged to avoid coming to the site during this time. Staff and children should evacuate promptly and not return until the site is confirmed safe and deemed secure for reentry.

Note that in expected flooding events, it is anticipated that the childcare centre be closed due to continuous radio/media announcements of an upcoming flood.

#### FLOOD WARNING

The amount of warning available for an impending flood significantly affects the level of risk and potential damage. According to the Goulburn Floodplain Risk Management Study and Plan, flooding in the Mulwaree River typically occurs about 13 hours after heavy rainfall begins. This information provides sufficient warning to plan for early evacuation, ensuring that children do not come to the site during flood events.

Additionally, knowing that the PMF storm event lasts approximately 4.1 hours allows for effective planning. In cases where leaving the site is not possible, shelter-in-place procedures can be implemented for this duration, ensuring safety until conditions improve. The combined warning system and PMF storm duration make it reasonable to manage evacuation effectively, either by leaving early, before arriving at the childcare center, or by allowing caregivers to collect their children when safe and practical to do so.

#### ADDITIONAL RECOMMENDATIONS FOR RISK MITIGATION BEYOND PMF

While the proposed shelter-in-place area above the PMF level provides a safety measure for extreme flooding, further considerations could enhance preparedness including the implementation of additional barriers or flood-proof systems such as watertight doors and reinforced walls for areas below the PMF level.

#### SOURCES OF FLOOD INFORMATION

- Observation of Local Rainfall/Floodwater
- The Bureau of Meteorology (Flood Watch, Flood Warning for Eastwood, Severe Weather Warning, Severe Weather Advice)
- The NSW SES
- Local Emergency Management
- Local Television And Radio Stations

Web Addresses:

- 1. Bureau of Meteorology home page : http://www.bom.gov.au/
- 2. Bureau of Meteorology flood warnings: http://www.bom.gov.au/weathernsw/
- 3. Bureau of Meteorology Sydney radar loop
- 4. Bureau of Meteorology NSW Seasonal Rainfall Outlook: http://www.bom.gov.au/climate/ahead/rain.nsw.shtml
- 5. Bureau of Meteorology El Nino Wrap-Up:

http://www.bom.gov.au/climate/enso/

6. Weather zone forecast (supplied by Bureau of Meteorology): http://www.weatherzone.com.au/marine/nsw

### 7 FLOOD RISK MEASURES

To reduce and manage flood risk, a variety of flood risk management measures have been proposed, as outlined in the Goulburn Floodplain Risk Management Study and Plan. These measures aim to safeguard the community and minimize damage during flood events. The strategies are grouped into three categories:

Property Modification Measures

- Minimum Floor Levels: Ensuring buildings meet elevation standards to minimize flood damage, refer to **Section 4**.
- Flood-Proofing Buildings: Using materials and designs resistant to flood damage, refer to **Section 5**.

Response Modification Measures

- Flood Education and Awareness: Providing information to the community about flood risks and preparedness measures, refer to **Section 8**.
- Flood Warnings: Using predictive tools to give advanced notice, such as the 13-hour warning window for the Mulwaree River, to plan evacuations effectively **Section 6**.
- Local Flood Plans: Outlining actions to be taken during and after floods, including emergency shelter-in-place protocols for the PMF storm event duration of 4.1 hours, refer to **Sections 6 & 8**.

By implementing these measures, Goulburn can improve resilience to flooding. Early evacuation remains the preferred strategy to ensure safety, but shelterin-place protocols offer additional security when evacuation is not possible. Advanced warning systems, coupled with community readiness, allow for informed decisions, reducing risks to life and property.

### 8 FLOOD PROCEDURES

#### 8.1 Roles and Responsibilities

To ensure preparedness and safety, specific roles and responsibilities must be carried out by trained personnel and staff members constantly. Staff are required to participate in annual training sessions that focus on evacuation procedures and shelter-in-place protocols, ensuring everyone is wellprepared for emergencies. They must also actively monitor weather forecasts and flood warnings using reliable sources such as the Bureau of Meteorology to stay informed about potential flood risks. These proactive measures are critical for minimizing risks and enabling effective flood management.

#### **Detailed Training Requirements**

To strengthen emergency preparedness:

- 1. Conduct evacuation drills every quarter, including scenarios where parents are delayed in picking up their children.
- 2. Include shelter-in-place simulations to familiarise staff and children with procedures.
- 3. Partner with local emergency services to provide specialised training sessions for staff.
- 4. Maintain a training log to ensure all staff are up-to-date on protocols.

#### 8.2 Flood Actions

- Flood actions when a flood is likely:
  - 1. Trained Personnel/Staff members must monitor weather forecasts and flood predictions.
  - 2. Trained Personnel must follow the site evacuation recommendations.
  - 3. Staff members must ensure that no moveable objects are kept on site to prevent flooding away from site.
  - 4. Staff members must move waste containers and poisons well above predicted flood heights.

- Flood actions during a flood:
  - 1. Trained Personnel must implement the proper evacuation procedures.
  - 2. Staff members must be listening to local radio for updates of the situation and further advice.
  - 3. Trained Personnel/Staff members must make sure that power, water, and other utilities (gas, fuel, etc.) are completely turned off.
  - 4. Trained Personnel/Staff members must inform the emergency services with the flooding situation.
  - 5. Staff members must keep in contact with the children parents/guardians.
  - 6. If safe to do so, collect games/carry out activities for the children to keep them distracted whilst in the refuge area till rescue arrives.
  - 7. Staff members must prohibit children to play in, or near floodwater.
- <u>Flood actions after a flood:</u>
  - 1. No visitors are allowed to access the site in the same day of the flooding event (in case of PMF).
  - 2. Staff members shall not allow children to play in or near flood waters.
  - 3. Staff members must keep listening to their local radio station for information, updates and advice.
  - 4. Staff members must stay in the refuge area (in case of PMF event) until the emergency services allow access to the ground floor.
  - 5. Trained Personnel/Staff members must check for damage to windows, walls and the roof and ensure the structural stability of their property.
  - 6. Staff member/Children shall drink only boiled or bottled water if there is any chance of flood contamination of their drinking water.
  - 7. Trained Personnel/Staff members shall wear suitable clothing, including boots and gloves, when cleaning up.
  - 8. Staff members must not go sightseeing as this may hinder recovery efforts or put themselves and others at risk.
  - 9. Gas appliances and gas bottles that have been exposed to floodwater should be inspected for safety before use.

- 10. Power, water and other utilities must be inspected by professionals before being turned on, and all affected site infrastructures will need to be cleaned and fixed.
- 11. A hazard assessment and proper work method must be undertaken to cover all flood affected work.
- 12. Staff member shall take as many photos as possible for all damages for insurance purposes.
- 13. Develop a checklist for post-flood cleaning and safety inspections, covering:
  - a. Mold and water contamination checks.
  - b. Structural integrity reviews by licensed professionals.
- 14. Create a "reopening protocol" to ensure all areas are deemed safe before resuming operations.
- Flood Actions During Shelter in Place
  - 1. Trained Personnel/Staff members must notify emergency services (e.g., SES) of the flooding situation, including details such as the number of occupants and immediate risks.
  - 2. Trained Personnel/Staff members must listen to reliable sources for updates on the flood situation and follow any additional advice.
  - 3. Staff members must ensure that children remain in safe, designated areas above predicted flood levels.
  - 4. Staff members must engage children with games or activities to keep them calm and distracted during the shelter-in-place period.
  - 5. Trained Personnel/Staff members must ensure all utilities, including power, water, gas, and fuel, are completely turned off.
  - 6. Trained Personnel must ensure any potentially hazardous materials or objects remain secured and above flood levels.
  - 7. Staff members must regularly update parents or guardians on the status of the situation and ensure they are informed of any changes.

#### 8.3 Enhanced Emergency Communication Plan

To ensure robust communication during emergencies:

- 1. Equip the centre with backup communication tools such as satellite phones or emergency apps that function during power outages.
- 2. Train staff to use these tools effectively, ensuring seamless communication with emergency services and parents.
- 3. Install a public address system within the center to provide clear instructions during emergencies.

### 9 CONCLUSION

This Flood Risk Management Plan provides comprehensive measures to ensure the safety and resilience of the proposed childcare center at 17 Fenwick Crescent, Goulburn. The recommendations provide preparedness for both typical and extreme flood scenarios. Key improvements include:

- Enhanced communication protocols to ensure real-time updates and effective coordination with emergency services and parents.
- Child-specific measures that prioritise emotional and physical well-being during emergencies.
- Detailed training and simulation programs to maintain staff readiness and improve emergency response efficiency.
- Advanced post-flood recovery procedures, including structural and psychological considerations.
- Improved clarity in evacuation plans with accessible maps and instructions.

By addressing these areas, the childcare centre can meet and exceed Goulburn Mulwaree Council's standards for flood risk management. These measures not only safeguard the physical infrastructure but also prioritise the safety and well-being of the children and staff. The integration of these enhancements ensures that the facility remains prepared for a range of flood scenarios, fostering a secure and resilient environment for all occupants.

### **10 REFERENCES**

- 1. Australia Government, Bureau of Meteorology Website http://www.bom.gov.au/
- 2. Goulburn Mulwaree Council Development Control Plan
- 3. New South Wales Government Floodplain Development Manual The management of flood liable land, April 2005

### 11 APPENDICES

### Appendix A SURVEY PLANS



### Appendix B ARCHITECTURAL PLANS



$\land$	DATE:	NOV. '24		
	DRAWN:	HG		
	SCALE:	1:250		
	PR. NO:	FENWICK CCC		
	DWG NO:	DA02		

	REQUIRED	PROPOSED	COMPLIES
RE PLACES	28	29	YES
ACE	784	789	YES
D - 3.5m2 PER S	PACE		YES



			DATE:	NOV. '24
			DRAWN:	HG
			SCALE:	1 : 100
			PR. NO:	FENWICK CCC
issue	date	amendment	DWG NO:	DA03

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				PR. NO:	FENWICK CCC
issue	date	amendment		DWG NO:	DA04

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issue	date	amendment	DWG NO:	DA05



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						PR. NO:	FENWICK CCC
issue	date	amendme	nt			DWG NO:	DA06
issue	date	amendme	nt			DWG NO:	DA06

### Appendix C COUNCIL FLOOD INFORMATION



Goulburn Mulwaree Council Locked Bag 22 Goulburn NSW 2580 Civic Centre 184 - 194 Bourke Street Goulburn NSW 2580 t (02) 4823 4444 e council@goulburn.nsw.gov.au www.goulburn.nsw.gov.au

Contact: Planning & Development

31 October 2024

Purdon 19 Torrens Street BRADDON ACT 2612

Dear Applicant,

# SUBJECT:FWA/0031/2425Flood Information ReportLOCATION:Lot 20 DP 271268 Parish GoulburnADDRESS:17 Fenwick Crescent GOULBURN NSW 2580

Reference is made to your recent request to determine whether the above allotment is subject to flooding.

Based on information available to Council, the subject property is below Council's Flood Planning Level under the *Goulburn Floodplain Risk Management Study and Plan 2022.* New development or redevelopment at the site is subject to flood related development controls as per the below table.

Flood Category	Is the land affected?	Flood Hazard Category
1%	No	The land is subject to the 1% Annual Exceedance Probability (AEP) which is the probability of an event being equalled or exceeded within a given year. The 1% AEP flood is approximately equal to 1 in 100 year Average Recurrence Interval (ARI) flood event (or simply 100 year flood).
FPCC1	No	FPCC1 identifies the most significantly constrained areas, with high hazard or significant flood flow. Intensification of use in FPCC1 is generally very limited except where uses are compatible with flood function and hazard.
FPCC2	No (Subcategory a,b,c,e) No (Subcategory d)	FPCC2 areas are the next least suitable for intensification of land use or development because of the effects of flooding on the land, and the consequences to any development and its users. FPCC is split into FPCC2 (Subcategory a,b,c,e) of FPCC2 (Subcategory d).
FPCC3	No	FPCC3 areas are suitable for most types of development. This is the area of the floodplain where more traditional flood-related development constraints, based on minimum floor and minimum fill levels, will apply.
FPCC4	Yes	FPCC4 is the area inundated by the PMF (extent of flood prone land), but outside FPCC1-3. Few flood-related development constraints would be applicable in this area for most development types. Constraints may apply to key community facilities and developments where there are significant consequences to the community if failed evacuations occur.

Additional flood mechanisms affecting Goulburn include overland flow.

Is the land subject to overland flow?	Overland Flow Notes:
Yes – the land is identified in a draft overland flow study not yet adopted by Council	Overland flow occurs when excess rainfall runoff is generated from impervious surfaces and flows towards a watercourse refer to Figure 1 (below). This type of flooding is often referred to as "stormwater" flooding due to short warning times. Typically, this type of flooding rises and recedes over a short period of time and the floodwaters are usually relatively shallow and fast moving.
	Land identified as being subject to overland flow, must assess and consider the potential environmental impacts in order to demonstrate the suitability of the site for its intended use.



Figure 1 - illustrative graphic of overland flow and mainstream flooding

Reference should be made to the following, which is not considered to be an exhaustive list:

- Chapter 3.8 Flood Affected Land of the Goulburn Mulwaree Development Control Plan 2009
- DCP Appendix J Flood Policy
- Table 31: Flood Planning Constraint Categories (ADR 7-5) and Goulburn Riverine Flooding Considerations within the Goulburn Floodplain Risk Management Study and Plan 2022, and
- *Flood Risk Management Manual* (ISBN 978-1-923076-17-4) published by the NSW Government in June 2023.

For any further information please contact Council's Planning & Development Business Unit on (02) 4823 4444.

Yours faithfully,

Peter Malloy
Team Leader Development Assessment

Note:

- 1. This information is derived from the Goulburn Floodplain Risk Management Study and Plan 2022.
- 2. The link to the current flood study is available via: https://www.goulburn.nsw.gov.au/Development/Plans-Strategies#section-7
- 3. The individual extent of flooding can only be accurately determined by Australian Height Datum (AHD) survey.

<sup>4.</sup> A full copy of the *Goulburn Floodplain Risk Management Study and Plan 2022* (including the models) is available free of charge on the NSW Flood Data Portal: www.flooddata.ses.nsw.gov.au.







