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Proposed Residential Building
33A Lee Street, Maitland

Stormwater and Flooding Report

Koonoona Pty Ltd

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LAND DEVELOPMENT • BUILDINGS • INFRASTRUCTURE

CIVIL, STRUCTURAL & ENVIRONMENTAL ENGINEERING,
WATER & WASTEWATER, BUILDING DESIGN & PROJECT ADVISORY

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List of Acronyms

AEP	Annual Exceedance Probability	FPL	Flood Planning Level
AHD	Australian Height Datum	GCA	GCA Engineering Solutions
ARR2019	Australian Rainfall and Runoff 2019	MCC	Maitland City Council
EY	Exceedances per Year	MOES	Manual of Engineering Standards (MCC)
FPA	Flood Planning Area		

1 Background

This report is to support a Development Application to Maitland City Council (MCC) for a proposed residential building with an associated car parking area at 33A Lee Street, Maitland.

The site is also identified on the Maitland LEP as being affected by the Flood Planning Area. This report provides a suitable response to Clause 7.3 – Flood Planning of MLEP 2011

1.1 Site

The site is Lot 7 on SP 90936, 333 High Street Maitland.

Topography is flat with average grades in the order of 1% generally falling in a south-westerly direction. The site is affected by flooding. Existing infrastructure includes a discharge pit at the north east corner of the site, which connects to an outlet pipe that discharges directly to Lee street at kerb invert.

The property is located within an area identified as flood fringe, of which the FPL is 10.23m AHD.

1.2 Development

The proposed development comprises four new dwellings and associated curtilage including car parking and landscaping with an occupying area of 742m^2.

2 On-Site Detention

2.1 Requirements

Following Clause 7.8.2 on Page 120 of the MOES, stormwater detention for residential development is required at the rate of 7m^3 / 1000m2 site area with a Permissible Site Discharge of 15 l/s per 1000m^2. This is in addition to any BASIX requirements.

In order to reduce the impact of on site detetion on the parking area, detention volume for the roof has been allocated to the proposed Rainwater tanks, required as part of the BASIX commitiments for the development.

2.2 Results

2.2.1 Rainwater Tank

Rainwater tank OSD volume for the roof area = 350m^2 x 7m^3/ 1000m^2 = 2.45m^3

BASIX tank volume is 9m^3

Total tank volume selected = 12 m^3

OSD volume = 2.45/12 = 20% of tank Volume

Assuming 2m High Tank, an Orifice is required at 80% of the tank height – 1.6m.

Max Head = 0.4m

Flow Rate = 350/1000 x 15 = 0.0052 m^3/s

Orifice size = (4 x 0.0052 / Pi x 0.6 x (19.6 x 0.4) $^{0.5}$) $^{0.5}$ = 65mm

: Install a 65mm Reducer into the outlet of the rainwater tank at 400mm from the top of the tank.

2.2.2 Above Ground Basin

Above ground OSD for the car park area = 392m^2 x 7m^3/ 1000m^2 = 2.75 m^3

The proposed above-ground detention basin was sized by iteratively grading the driveway pavement to obtain a minimum volume of 3.15m^3. The details are as follow:

Volume: =3.2m^3 at RL 8.6

Max Head = 8.6 – 8.23 (gutter level at discharge point) = .37m

Flow Rate = 392/1000 x 15 = 0.0059 m^3/s

Orifice size = (4 x 0.0059 / Pi x 0.6 x (19.6 x 0.37) $^{0.5}$) $^{0.5}$ = 68mm

: Install a 65mm Reducer into the outlet pit to the detention basin.

Outlet:	65mm orifice plate or reducer at IL 8.33
Weir:	0.45mm long at RL 8.55

2.2.3 Discussion

The stormwter design comprises a 3.7m^3 above-ground detention basin and rainwater tank with a 2.5m^3 detention capacity that together, satisfy the minimum OSD volume for the proposed development.

The orifice at the control pit for above-ground detention basin discharge is sized to be 65mm diameter at IL 8.33.

The orifice at the rainwater tank for the roof discharge is sized to be 65mm 400mm from the top of the tank,

2.2.4 Conclusion

The proposed design satisfies the on-site detention requirements in accordance with MOES.

3 Flood Risk Management

3.1 Site Affectation

Maitland LEP 2011 Flood Planning Map Sheet FLC_004A identifies the site as being affected by the Flood Planning Area.

3.2 Flood Planning Level

The key concept of a Flood Planning Level (FPL) is critical to the consideration of flood risk management. The FPL is higher than the theoretically determined flood level by a margin known as the "*Freeboard"* that accounts for:

- Errors in modeling
- Errors in ground surface survey
- Wave action
- Localised hydraulic impacts like bow waves

Freeboard is typically applied to floor levels to provide additional certainty of flood protection having regard to the above factors. It provides a factor of safety when determining the impacts of flooding on development. For the purposes of determining the impacts of development on flooding, the raw flood level is most relevant.

In this case the site's flood planning level is at 10.23m AHD. With a freeboard of 500mm, the raw flood level is, therefore, determined to be at 9.73.

3.3 Flood Planning Controls

Clause 7.3 of Maitland LEP 2011 provides the requirements for flood planning, controls for which are detailed in Section B3 of the Maitland DCP 2011.

The site is below the flood planning level and is subject to the council's flood planning controls.

In that regard:

- The proposed development will be implemented in the flood fringe area and hence would not have any significant effect on the pattern of flood flows and/ or flood levels (NSW Government Floodplain Development Manual, 2005).

- The design of the proposed development is such that the risks of structural failure or damage in the event of flooding would be minimal: the habitable spaces are above the FPL.

- The proposed development has been designed to withstand the effects of inundation of floodwaters up to the FPL.: the habitable spaces are above the FPL.

- Proposed measures to allow the timely, orderly and safe evacuation of people from the site, and the measures proposed to safeguard goods, material, plant, and equipment: The site would only be subject to a flood emergency in the case of an extreme event in the Hunter River, which is subject to long warning times and long build-up exceeding a normal working day. The proposed use is not critical flood management infrastructure and safe evacuation on a continually rising route to flood free land is available, self evident and self directed. The habitable spaces are above the FPL and people will be safe in the case of the 1% AEP flood.

- Levels on the site plan are reduced to AHD and are based on a survey provided by a Registered Surveyor.
- The Maitland Flood Risk Management Study and Plan maps confirm the adjacent flood hydraulic category is Flood Fringe.
- Filling is not proposed.
- All habitable finished floors are above the FPL.
- Flood free access is available the 5% AEP flood (the site and environs are not affected by the 5% flood)

4 References

- Australian Rainfall and Runoff, Commonwealth of Australia (Geoscience Australia), Symonston ACT, 2019.
- Hunter River Floodplain Risk Management Study and Plan, WMA Water, Sydney, 2015
- Manual of Engineering Standards, Maitland City Council, Maitland NSW, 2019.
- Maitland LEP 2011
- Maitland DCP 2011
- NSW Government Floodplain Development Manual, Sydney, 2005