Surveying & Valuations

ABN: 40 639 608 135

Robert Webb
Registered Surveyor (NSW/VIC)
Registered Valuer No.6143
BCom (Land Economy)
Justice of the Peace

Maree Staight
Assistant Valuer
Property Consultant
Practice Manager

Stephen Boulter
MIEMS
Engineering Surveyor
Surveying Higher Certificate

Steve Boothroyd
Surveyor
Member RICS
B.Sc (Land Surveying Sciences)

Bree Tapscott
Property Consultant

10th February 2009

Ref No: 0833.CC Resp

Heather Warton
Coastal Assessments Team
Department of Planning
GPO Box 39
SYDNEY NSW 2001

Dear Heather,

**Re: Proposed 7 Lot Subdivision**
**"Picnic Point" Ivor Jones Drive, Wonboyn Lake**
**MP 06_0147**

Following presentation of the preliminary response to the Director Generals Environmental Assessment Requirements, and subsequent meeting with The Planning Group, we provide the following comments in relation to Climate Change, specifically the document *"Practical Consideration of Climate Change – Floodplain Risk Management Guidelines."*

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1. **Introduction**
   Investigations have been undertaken into the impacts of rising sea levels due to global warming, accompanied by possible changes to weather patterns that drive sea level extremes such as storm surges that may increase the threat to waterfront communities from Coastal Flooding.

2. **Storm Surge**
   Storm surge events along the NSW South east coast are driven by severe weather such as cold fronts and mid-latitude storms such as East Coast lows and Tasman lows, which produce severe rainfall and flooding as well as high waves and swell from the Tasman Sea.

   It is considered that the location of the subject property, being situated on the Wonboyn River some 1.5 kilometres inland from the open sea, would enjoy a degree of protection from these events, such that it is not considered likely that storm surge will have a significant direct impact on the sites.

   As such, in calculating the likely Flood Planning Level for the subject site, storm surge has not been included as a contributing factor.

Correspondence to:
PO Box 639, (35 Flinders Street), EDEN NSW 2551
Phone: 02 6496 3418 Fax: 02 6496 2259
Mobile: 0409 916 697 Email: property@rwsurveying.com

Also at:
47 First Parade, RAYMOND ISLAND VIC
Phone: 03 5156 0484

A study has been undertaken by CSIRO Marine & Atmospheric Research on behalf of the Gippsland Coastal Board, of several sites across the eastern Victorian coastline, which included Lakes Entrance (considered to be a similar location to the subject.

This report found, that while storm surge played a significant role in the calculation of "storm tides" at the entrance to the inlet, it was not considered these impacts would be seen further up the river, away from the ocean.

This is considered to be the case with the subject property.

**3. Determining the Current Flood Levels**

Since the recording of daily rainfall began at the Green Cape Lighthouse in 1904, the highest monthly rainfall occurred in January 1926, where 456.5mm of rain was recorded for the month.

However, there has been no record of what implications this had for the Wonboyn River, with regards to the flood levels recorded at that time. While this is believed to be a 1:100 year event, there is no evidence to suggest what the height of the Wonboyn River was at that time.

The next highest daily rainfall that was recorded at Green Cape Lighthouse was in April 1989. During this event, it has been recorded that 304mm of rain fell in 24 hours, and it was evidenced by a number of residents that the Wonboyn Lake rose 12 feet (approximately 3.6 metres).

It is not known at what tide this level was taken, however, for the purpose of this assessment, it has been assumed that this level was at low tide, to allow for calculation of the flood planning level.

This level has been accepted in reports prepared for and on behalf of Bega Valley Shire Council, as the highest daily rainfall event, recorded for the Wonboyn River.

Accordingly, we believe that with no flood studies previously being undertaken for the Wonboyn River, that this rainfall event in 1989, should be adopted for consideration in the calculation on the effects of Climate Change.

304mm of rain over a 24hour period is approximately 12.5mm/hour. It is noted that according to the Rainfall Intensity-Duration-Frequency Data system, available from Bureau of Meteorology, this event has an Average Recurrence Interval (ARI) of 50 years (1:50 year event).

It is noted that DECC's publication " *"Practical Consideration of Climate Change,"* suggests that the Rainfall Intensity will increase by +5% by 2070.

**4. Mean High Water Mark**

Within the Far South Coast area, it has been approved and accepted, that the Mean High Water Mark (MHWM) for Twofold Bay (Eden) to Cape Howe in the south (NSW/VIC State Border), is at 0.34 AHD (Surveyor Generals advice).

However, given the restrictions on the Wonboyn estuary with the entrance, and reinforced by the tidal information assessed by WBM Oceanics Australia, in their study titled "Wonboyn Lake and Estuary, Estuary Process Study" the MHWM for the Wonboyn Lake appears to be at approximately 0.3m AHD, with the Mean Low Water Mark (MLWM) at approximately 0.1m AHD, in the vicinity of the subject property. This represents a reduction in amplitude of the ocean tide, but remains a consistent level for interpolation.

5. **King Tides**

King tides in NSW historically occur around December and June each year. As such, it is not considered likely that the April flood level occurred during a King Tide.

The most recent King Tide on Wonboyn Lake occurred just recently on 12th January 2009, in which the tide rose to approximately 2.05m, which is the highest King Tide in 18 years (according to newspaper reports at that time), representing an increase in lake water level of around 1.95 metres above the MLWM.

From the above information, it can be concluded that:

- Mean High Water Mark — 0.3m
- King Tide Mark — 2.05m
- Known Highest Flood Rise — 3.5m (total height of flood waters, less MLWM of 0.1)

6. **Practical Consideration of Climate Change**

DECC's guideline recommends the following sea level rise by 2090 be adopted

- Low — 0.18m
- Medium — 0.55m
- High — 0.91m

Adopting the worst case scenario, it could be anticipated that the MHWM of Wonboyn Lake could rise by 0.91m to 1.21m by 2090 - 2100.
In the above rainfall event, this would equate to a flood Level of 4.71m.

This document also identified the following increase in Rainfall Intensity by 2070:

- Scenario 1 — *Low* — *+10%*
- Scenario 2 — *Medium* — *+20%*
- Scenario 3 — *High* — *+30%*

This would indicate that during the identified rainfall event, the following tailwater levels:

| | Tailwater Level | Comments |
|---|---|---|
| | 3.5m | Current rainfall intensity (I) |
| **Scenario 1** | 3.85m (3.5 + 0.35) | I + 10% |
| **Scenario 2** | 4.20m (3.5 + 0.70) | I + 20% |
| **Scenario 3** | 4.55m (3.5 + 1.05) | I + 30% |

In order to provide for the extreme case scenario, it is considered that Scenario 3 should be adopted, in order to ensure maximum safety from an increase in flood levels.

7. **Flood Planning Level**

As such, adopting the highest figures, the Flood Planning Level for the subject site is considered to be:

*4.55m (projected tailwater level) + 1.21m (projected MHWM) =* ***5.76 metres***.

This has been adopted as the Flood Planning Level for assessment of the subject application, currently before Department of Planning.

8. **Conclusion**

In relation to the above development, it is noted that the lowest building envelope is located at a height of approximately 9 metres, with 4 of the 7 building envelopes located at or above a height of 10 metres.

Therefore all proposed building envelopes are located well above the identified FPL for the site (as identified above).

In the event that the flood occurred on a King Tide, the flood level would rise by 1.95 m to 7.71m. By deduction therefore, even in this instance, the proposed building envelopes can be considered to be protected from likely flooding.

It is therefore considered that the proposed subdivision complies with DECC's document - Practical Consideration of Climate Change, with regards to Flood Planning Levels.

*It is not considered necessary to place any additional requirements on future dwellings, in order to protect them from flooding.*

We trust this information provides the required information for the determination of this development by the Minister. We look forward to receiving your determination in the near future.

Yours sincerely

Maree Staight
**RW Surveying & Valuations**