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Our Reference: PDS30112022:895BARR:PALMB

Mr Simon and Lisa Causley
895 Barrenjoey Road
Palm Beach, 2107

7th December 2022

Estuarine and Flood Risk Management Report for 865 Barrenjoey Road, Palm Beach

Dear Simon and Lisa,

1.0 INTRODUCTION

I refer to your Development Application (DA) at 865 Barrenjoey Road, Palm Beach (Lot 7 DP 17191) as discussed with JD Evans Company and yourselves. The proposed development is detailed in Figures 7,8,9and 10. Northern Beaches Council (NBC) has identified the property as subject to inundation. Therefore an Estuarine Risk Management Report (ERMP) of the design, potential inundation as detailed in Development Control Plan 2010 (DCP Appendix 7) is required. The ***site*** is also within the Flood Planning Area and subject to DCP Section B3.11.

The following ERMP was undertaken and submitted for both your and Council consideration as part of the DA process. Note that 865 Barrenjoey Road, Palm Beach will be referred to as the ***site.***

2.0 SITE INSPECTION

A ***site*** inspection was undertaken with Simon Causley (owner of the ***site***) and Mr Stephen Wyllie. The ***site*** is located as shown in Figure 1. There are several features of the topography of the ***site*** and its location in Pittwater that are important to the potential inundation of the ***site***. These are:

1. The ***site*** is located on the northern foreshore of Careel Bay as shown in Figures1and 3.
2. The foreshore on this side of the Bay is a relatively flat and with a wide intertidal zone as shown in Figures 1 and 3.
3. The foreshore is protected with a stepped stone sloping wall as shown in Figure 1.
4. There is reserve approximately 25 metres wide bounded by the seawall and the western boundary of the ***site***.
5. The ***site*** varies in level from 1.4 metres AHD to 3 metres AHD from the western to eastern boundaries as shown in Figure 5.

6. The ***site*** is exposed to wind generated waves from the north western sector as shown in Figure 3.
7. Large long period ocean waves may refract/diffract into the ***site*** however would be of low energy.
8. The foreshore appears stable as there is no evidence of seawall instability or sediment erosion/ accretion processes as shown in Figure 3. This stability, suggests low wave energies: locally fetched waves and attenuated ocean swells.
9. In relation to flooding the ***site*** catchment is approximately 3.8 Ha bounded by Whale Beach Road
10. Overland flows to the ***site*** are minor as flows from the catchment are intercepted by Barrenjoey Road and exit through the pipeline as shown in Figures 1and 4.

3.0 REVIEW OF EXISTING DATA

The ***site*** was surveyed by Total Surveying Solutions Ref 170687 dated 13th March July 2017. (Figure 5).

The Pittwater estuary processes has been extensively studied by a number of investigations commissioned by the then Pittwater Councils and Manly Hydraulics Laboratory. These are:

1. Australian Water Coastal Studies (1990) Extreme Water Levels in Pittwater by D.Harradasa, E.Couriel and S. Wyllie (Ref 1).
2. Manly Hydraulics Laboratory (1992) Mid NSW Coastal Region Tide –Storm Surge Analysis Report MHL 621 by S. Wyllie and D. Gorham (Ref 2).
3. Pittwater Estuary Mapping of Sea Level Rise Impacts LJ2882/R2658v8 May 2015 Cardno (Ref 3).

The ocean conditions experienced on the weekend of the 4 to 5th June 2016 was conducive to developing high energies in Careel Bay and at the ***site.*** Manly Hydraulics Laboratory (MHL) wave rider buoy located offshore of Long Reef, measured wave from the East with a maximum wave height of approximately 10 metres and a wave period of 11 seconds. These waves, particularly the wave direction and period, penetrated into Pittwater and Careel Bay. No official records were made of the wave climate in Careel Bay only observations. Wave studies has shown that ocean wave can penetrate to Stokes Point and Careel Bay (Ref 1).

Associated with this wave climate was a predicted high astronomical tide (2.05 ISLW) and a storm surge. The storm surge was measured by MHL tide gauge located at Patonga Wharf. At the time of the peak predicted tide (2030Hrs 5th June 2016) the storm surge was 0.2 metres producing a combined recorded water level of 2.24m ISLW or 1.31mAHD. Note that 2.24m tide has only occurred several times over the last 100 years (Ref 2).

It was observed by Mr Causley on the 5th June 2016 from evidence of debris, that the sea wall had been overtopped and wave run-up had possible occurred. The debris line was approximately 2 metres from the top of the wall as shown in Figure 3.

4.0 RESULTS OF INVESTIGATION

The study which is relevant to this report is the Cardno 2015 study (Ref 3). The key findings for the ***site*** Estuary Planning Level (EPL) are specifically:

1. The foreshore and offshore intertidal zone is a classified as a Foreshore Type 2: Sea wall with a crest level of 1.4 metres AHD.
2. The 1% ARI still water level is 1.5metres AHD. This water level was experienced in June 1974 with a combination of a 0.9 AHD astronomical tide and 0.6m ocean storm surge. (Ref 2). Note that the June 1974 ocean level (1.5mAHD) is in excess of the 1%ARI (Ref4).
3. The significant wave height (Hs) was hindcasted to be 0.78 metres. Zero Crossing period (Tz) of 2.1seconds. This is a local sea from the north-west sector for a 1%ARI wind.
4. The wind set- up near the ***site*** is 0.06 metres from wind stress across the Bay. In essence pushing water onto the foreshore.
5. The EPL is predicted to be 2.20metres AHD. This level is a combination of 1.5 (Astronomical Tide and surge) +0.3 (freeboard) + 0.06 (wind set up) + 0.34 (wave set- up and run- up).
6. The sea level rise predictions do not increase the area of inundation for the ***site*** as detailed in Figure 4.2E Ref 3. It also understood that sea level predictions for small developments do not apply. However sea rise is being monitored in Australia and the trend based on Fort Denison records of approximately 1.3 mm/year (Ref 4). IPPC revised predictions in 2019 are 0.71metres in year 2100. Note this estimate is from the year 2020.

The predicted combined level may inundate the eastern area of the reserve to a depth of approximately 0.8 metres for approximately 30 minutes. The attenuation of that combined water level to the ***site*** boundary is a complex process. However from my experience with wave flume testing of seawalls considering the relatively small significant wave heights (0.78m) and short period (2.1) that these waves will dissipate high percentage of its energy on the sea wall in the plunging break manner as shown in Figure 6.

Therefore the predicted EPL for the ***site*** of 2.30 metres AHD is considered conservative in applying this depth to the western area of the ***site***. The 25 metres reserve between the sea wall and western boundary of the ***site*** will also substantially reduce the wave energy. It has been estimated that the run-up at the ***site*** western boundary, 25 metres from the breaking wave point, will be reduced to approximately 1.6 metres AHD. The estimated breaking and run- up process is shown in Figure 6.

As discussed in Section the local ***site*** catchment is only 3.8Ha and overland flows will be intercepted by Barrenjoey Road to the drainage pipeline as shown in Figures 2 and 4. Overland flows through the ***site*** in the vicinity of the proposed development only occur during a PMF event which is low risk (Figure 4). In essence the Pittwater ocean inundation is the worst case in relation the potential flooding of the proposed lower floor levels of 2.29m AHD.

5.0 IMPACT OF THE ADDITIONS

The proposed additions are shown in Figures 7.8.9 and 10, include the living room, dining room and kitchen at a floor level of 2.29m AHD and bedrooms and bathroom at floor level of 3.13m AHD. Considering the EPL of 2.3metres AHD, the Additions will have no impact on the inundation processes as the proposed floor levels are above the EPL as shown in Figures 8,9 and 10. It should be noted that the existing Dwelling floor level of 3.13 m AHD is above the EPL of 2.3 m AHD and the predicted 2100 0.72metres for sea level rise (Ref 4).

Debris will transported across the reserve and into the western ***site*** area. The proposed swimming pool may act as a sink for this debris. It is important that loose items be stored above the EPL and preparations for this action can be planned based on the times of predicted high spring tides associated with extreme storms: strong winds and low barometric pressure.

6.0 RECOMENDATIONS

The proposed additions as detailed in Figures 7,8,9 and 10 will satisfy NBC DCP appendix 7 considering that the estimated EPL is 2.3metres AHD. During a major event as discussed in Section 5 preparations to raise loose item above the EPL should actioned. During a major event it is also recommended that occupants of the ***site*** are briefed about the potential inundation and they remain in the Dwelling or at higher levels above the EPL. That is to restrict access to the western end of the ***site*** during a major storm event when combined with a spring tide.

Yours Faithfully

Stephen Wyllie Bsc(Eng) FMA Member

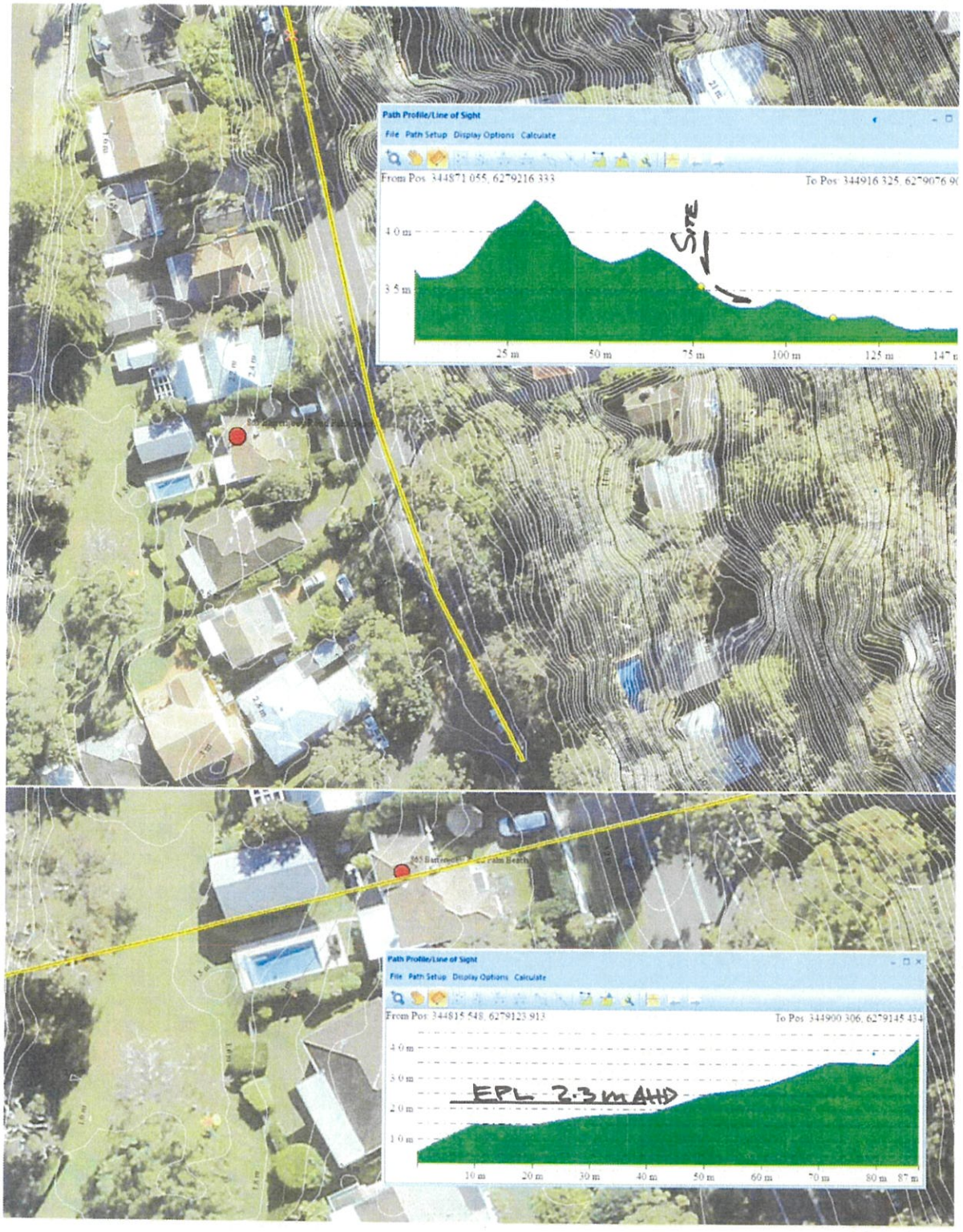
Director 7/12/2022

7.0 REFERENCES

1. Australian Water Coastal Studies (1990) Extreme Water Levels in Pittwater by D.Harradasa, E.Couriel and S. Wyllie.
2. Manly Hydraulics Laboratory (1992) Mid NSW Coastal Region Tide –Storm Surge Analysis Report MHL 621 by S. Wyllie and D. Gorham.
3. Pittwater Estuary Mapping of Sea Level Rise Impacts LJ2882/R2658v8 May 2015 Cardno.
4. Updated Mean Sea-Level Analysis: Australia, Journal of Coastal Research Watson. P.J March 2020
5. IPCC (Internationl Panel on Climate Change), 2020.

LEGEND
● SITE.
– – SITE CATCHMENT

FIGURE 1

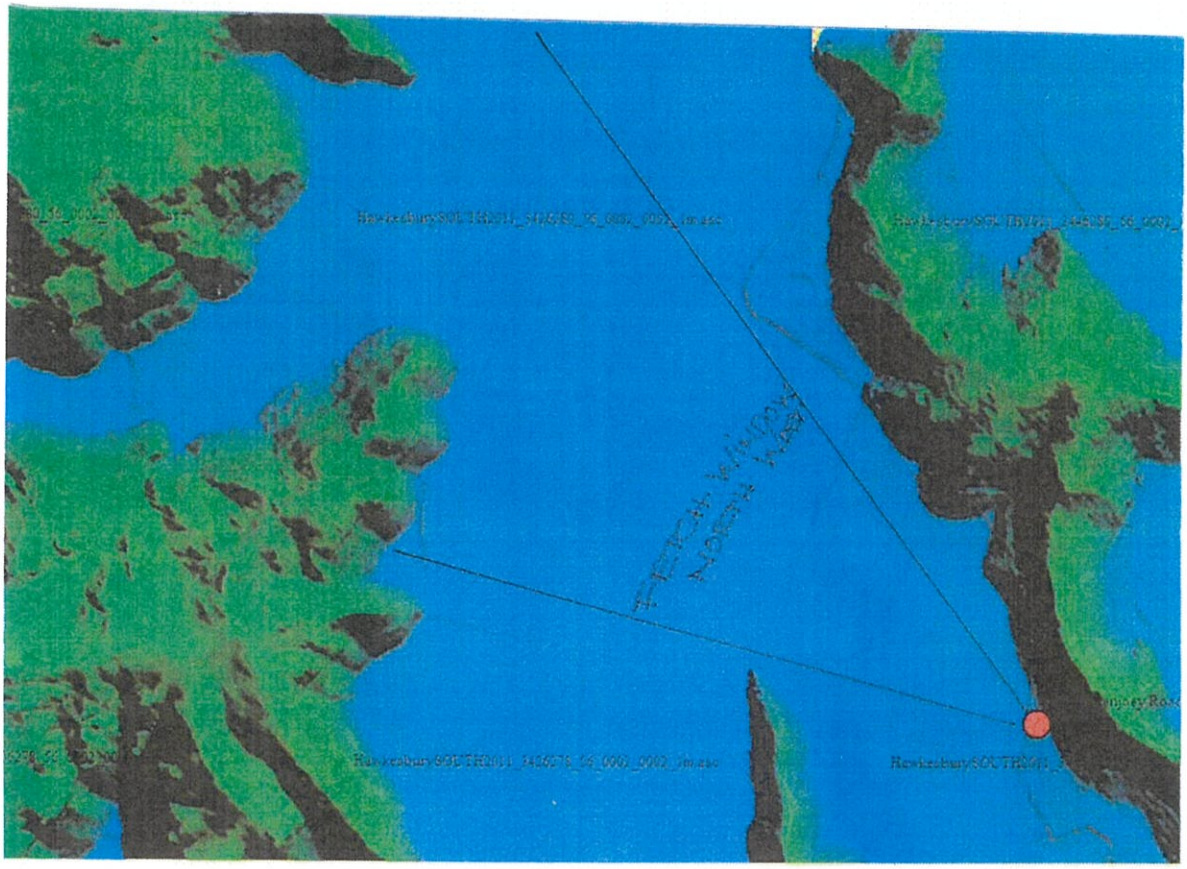


LEGEND

TRANSECT

OVERLAND FLOWS

FIGURE 2



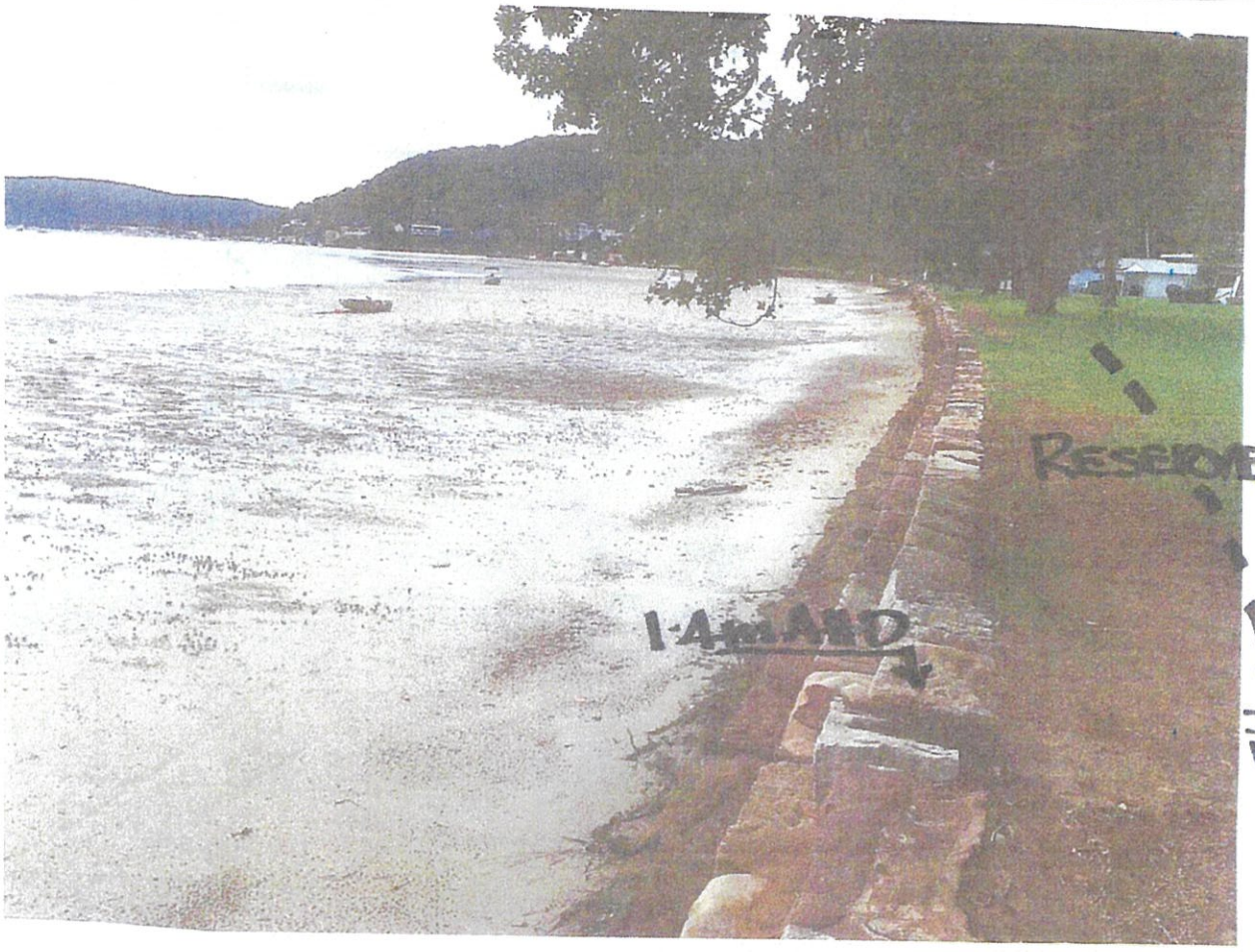
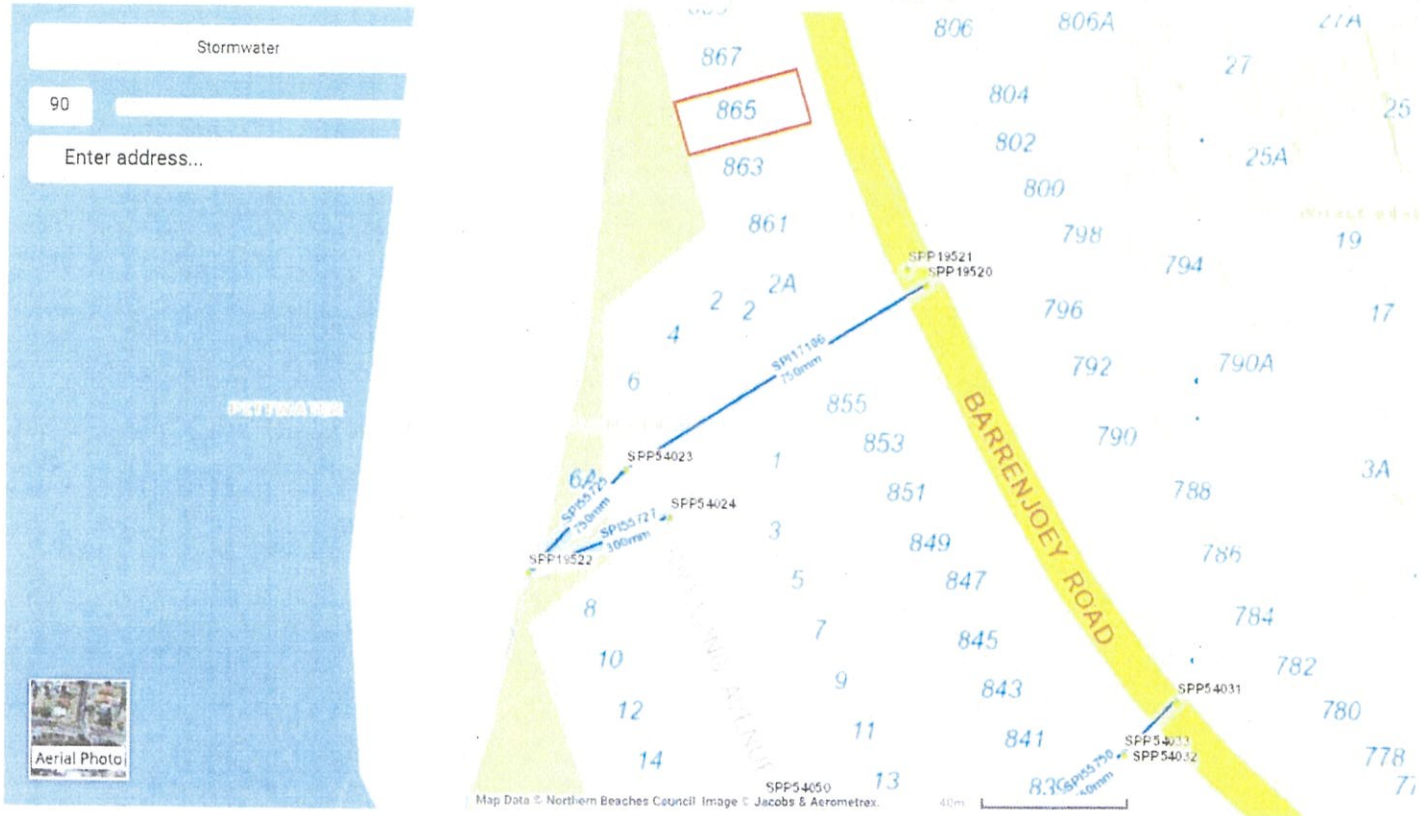


FIGURE 3


Stormwater
90
Enter address...
Aerial Photo
BARRENJOEY ROAD
SPP19521
SPP19520
SPP54023
SPP54024
SPP19522
SPP54031
SPP54032
SPP54050
Map Data © Northern Beaches Council Image © Jacobs & Aerometrex.

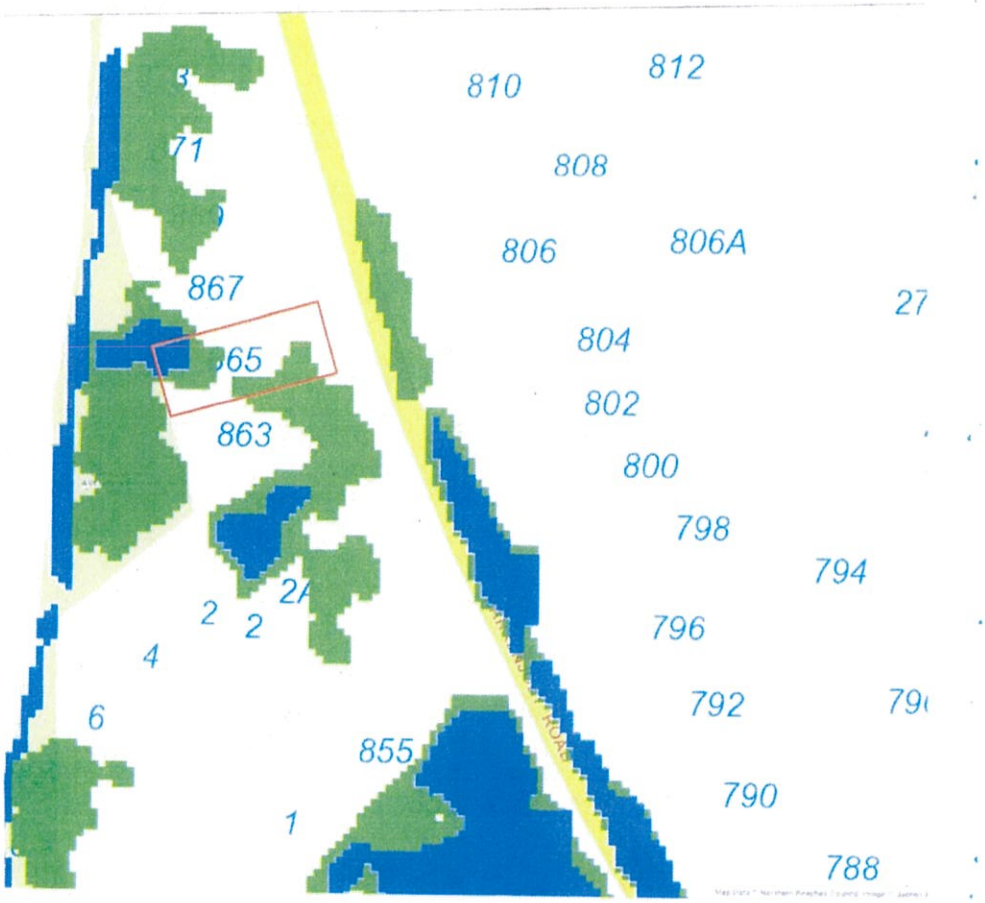

BARRENJOEY ROAD

FIGURE 4

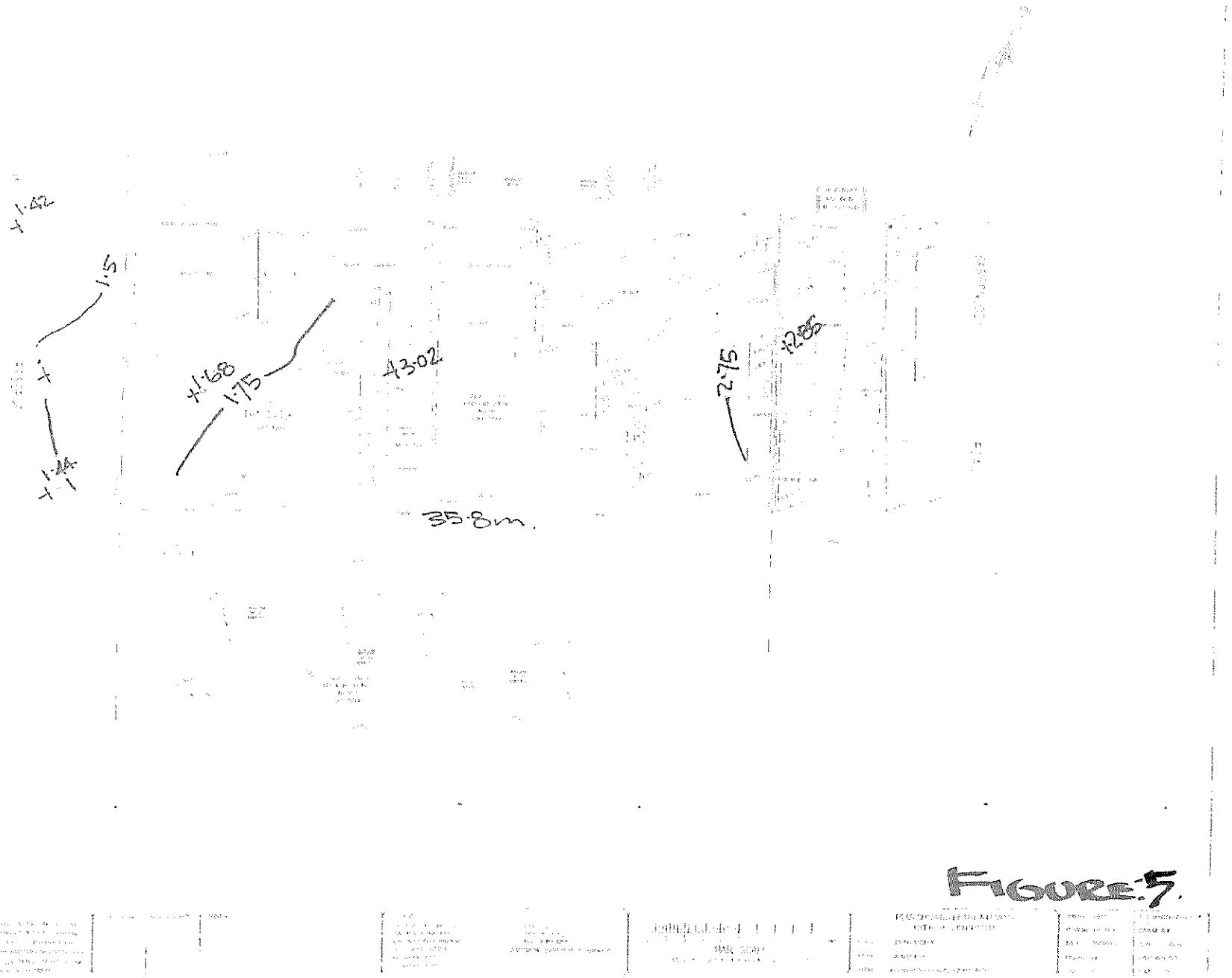


FIGURE 7.

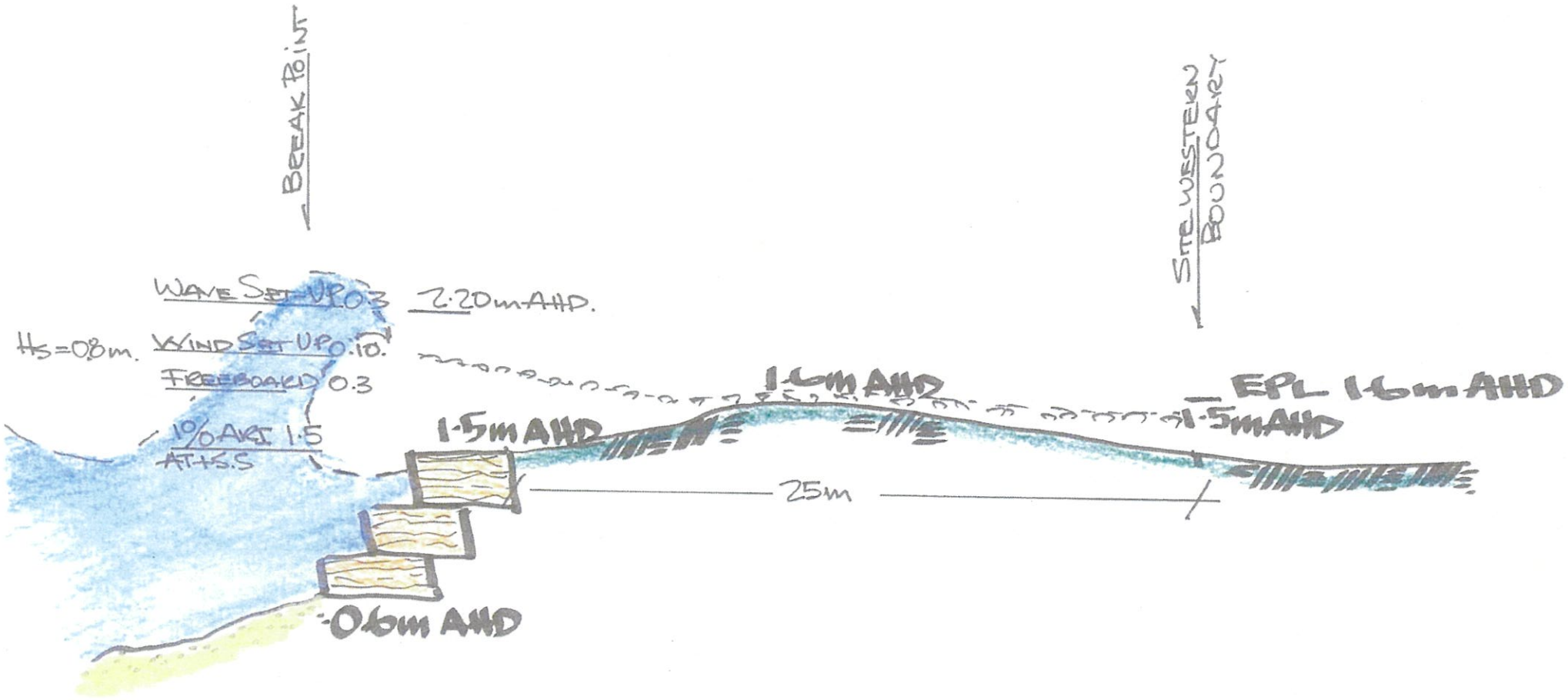
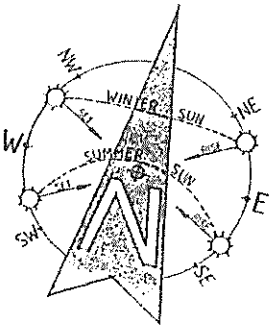
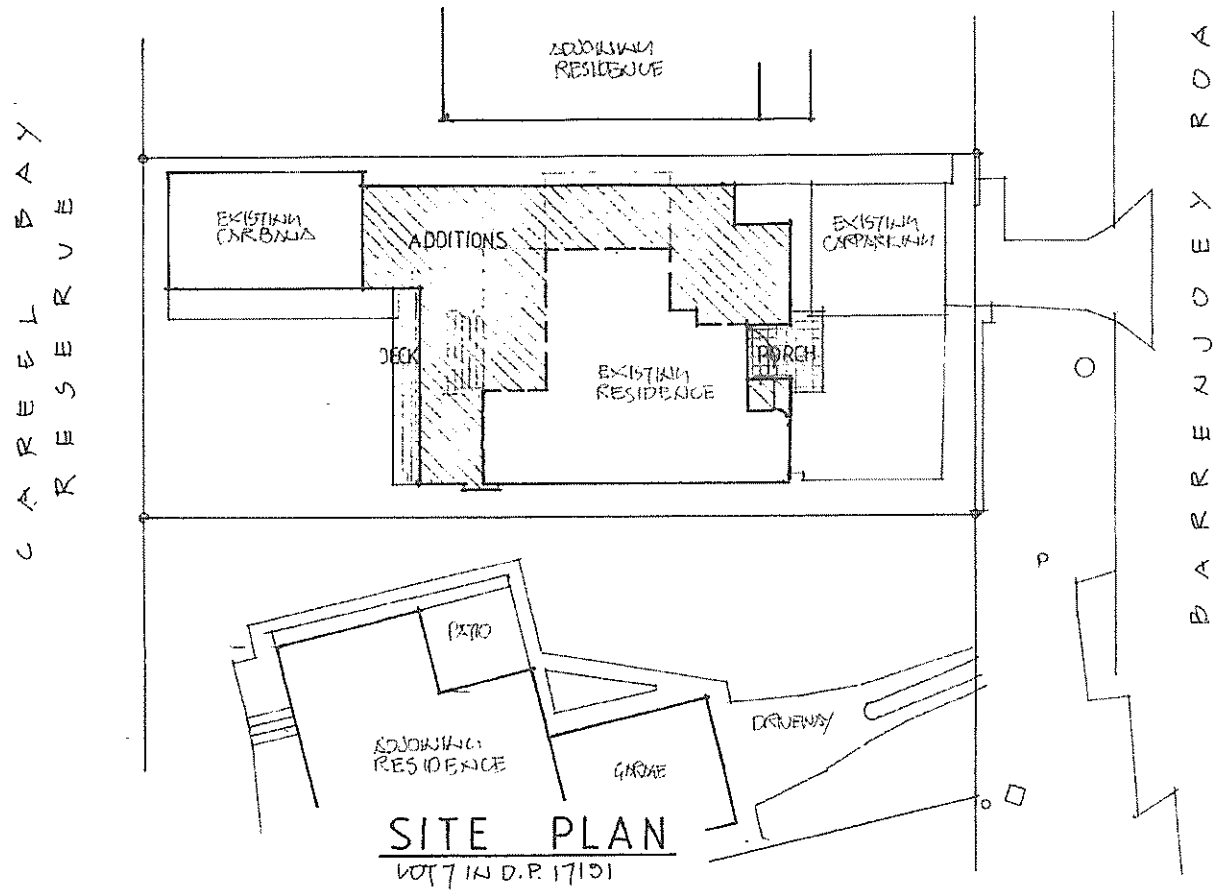

BREAK POINT
SITE WESTERN BOUNDARY
WAVE SET UP 0.3
2.20m AHD.
Hs=0.8m.
WIND SET UP 0.10.
FREEBOARD 0.3
10% AEP 1.5
AT +5.5
1.6m AHD
EPL 1.6m AHD
1.5m AHD
1.5m AHD
25m
-0.6m AHD

FIGURE 6





SITE PLAN

LOT 7 IN D.P. 17191

NOTES:

1. THE BUILDER IS TO CHECK AND CONFIRM ALL NECESSARY DIMENSIONS AND LEVELS ON SITE PRIOR TO ORDERING MATERIALS AND COMMENCING CONSTRUCTION. DO NOT SCALE OFF THE DRAWING.
2. SHOULD ANY DEVELOPMENT OR CONSTRUCTION OCCUR ON OR NEAR BOUNDARIES, THE BOUNDARIES SHOULD BE CLEARLY MARKED ON SITE BY THE REGISTERED LAND SURVEYORS

J.D. EVANS and COMPANY
DESIGN AND BUILDING CONSULTANTS
NO. 5 ELAINE AVENUE, AVALON BEACH 2107
EMAIL JDECO.AVALON@GMAIL.COM
Mobile: 0418 976 506

PROJECT
PROPOSED ALTERATIONS/ADDITION
No. 865 BARRENJOEY ROAD
PALM BEACH N S W 2108

CLIENT
SIMON & LISA CAUSLEY

DATE 10/11/2022 SCALE 1:200
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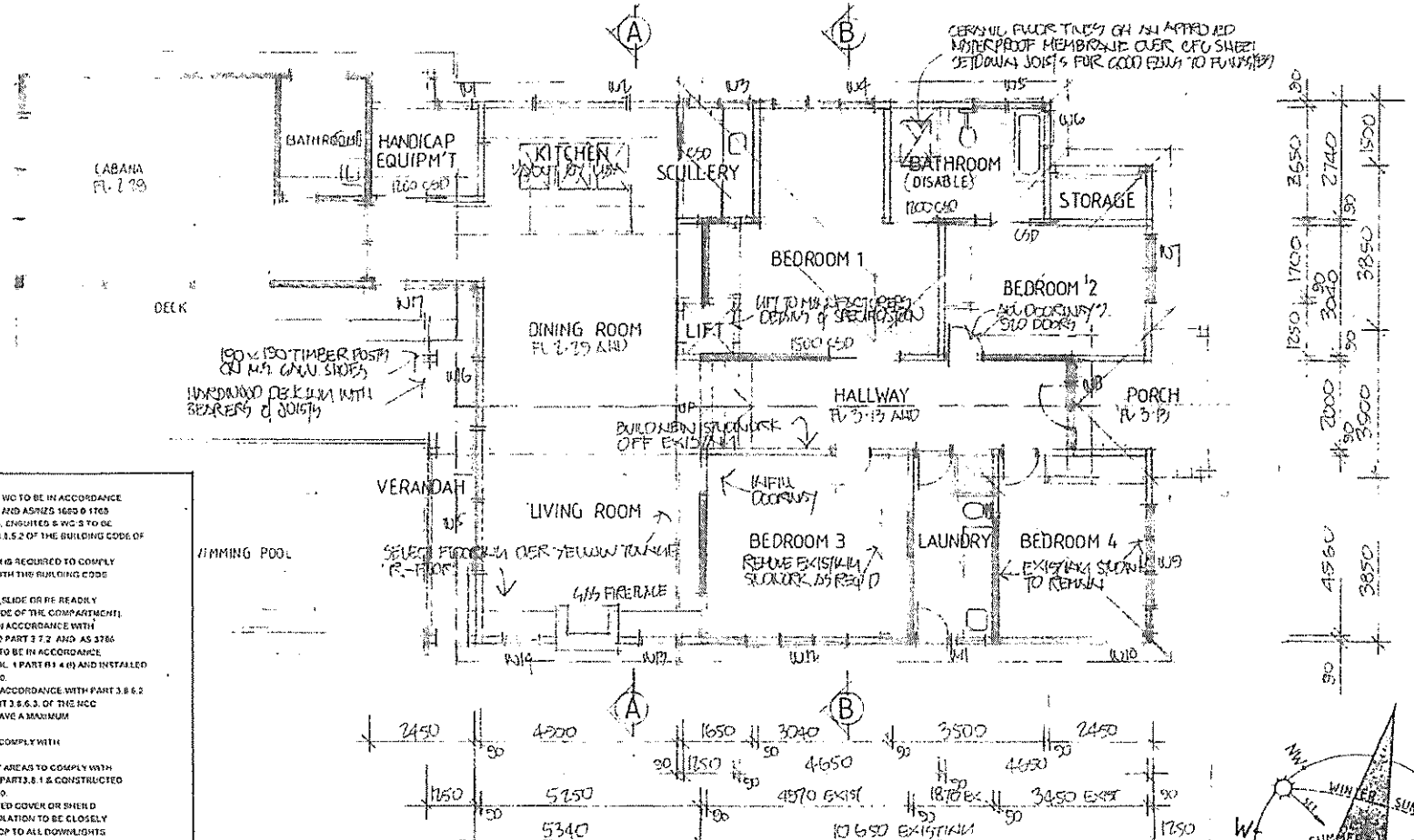
DRAWING No. 1928-1



FLOOR PLAN - 8

NOTE:

1. LIGHTING OF BATHROOM AND WC TO BE IN ACCORDANCE WITH NCC VOL. 2 PART 3.8.4.2 AND AS/NZS 1680 & 1768
2. VENTILATION OF BATHROOMS, ENSUITES & WC'S TO BE IN ACCORDANCE WITH PART 3.8.5.2 OF THE BUILDING CODE OF AUSTRALIA AS/NZS 1668.2.
3. THE DOOR TO THE BATHROOM IS REQUIRED TO COMPLY WITH AND IN ACCORDANCE WITH THE BUILDING CODE OF AUSTRALIA PART 3.8.3.3 (TO EITHER OPEN OUTWARDS, SLIDE OR BE READILY REMOVABLE FROM THE OUTSIDE OF THE COMPARTMENT).
4. FIRE /SMOKE ALARMS TO BE IN ACCORDANCE WITH PART 3.7.2 OF THE NCC VOL. 2 PART 3.7.2 AND AS 3786
5. TERMITE RISK MANAGEMENT TO BE IN ACCORDANCE WITH VOL. 2 PART 3.1.4 OR VOL. 1 PART B1.4 (b) AND INSTALLED IN ACCORDANCE WITH AS 3660.
6. SOUND INSULATION TO BE IN ACCORDANCE WITH PART 3.8.6.2 CLAUSES (a),(b) & (c) AND PART 3.8.6.3. OF THE NCC
7. ALL EXTERNAL GLAZING TO HAVE A MAXIMUM REFLECTIVITY INDEX OF 25%.
8. ALL GLAZED ASSEMBLIES TO COMPLY WITH AS. 2047 AND AS. 1288.
9. WATERPROOFING OF ALL WET AREAS TO COMPLY WITH NCC VOL. 2 PART F1 & VOL. 2 PARTS 3.8.1 & CONSTRUCTED IN ACCORDANCE WITH AS 3740.
10. AN APPROVED NON-VENTILATED COVER OR SHIELD WHICH ALLOWS FOR THE INSULATION TO BE CLOSELY INSTALLED TO THE SIDES & TOP TO ALL DOWNLIGHTS
11. STAIRS, HANDRAILS, BALUSTRADES & RAMPS TO BE CONSTRUCTED IN ACCORDANCE WITH NCC VOL. 2 PARTS 3.9.1 & 3.9.2 IN AS1657
12. PROTECTION OF OPEN ABLE WINDOWS MUST COMPLY WITH NCC VOL. 2 PART 3.9.2.5 (a) & (b) AND NCC VOL. 2 PART 3.9.5 (c) & (d)
13. GLAZING TO ALL BATHROOMS AND ENSUITES TO BE TOUGHENED GLASS.
14. SLIP RESISTANCE TO COMPLY WITH NCC AND AS4586

NOTES:

1. THE BUILDER IS TO CHECK AND CONFIRM ALL NECESSARY DIMENSIONS AND LEVELS ON SITE PRIOR TO ORDERING MATERIALS AND COMMENCING CONSTRUCTION. DO NOT SCALE OFF THE DRAWING.
2. SHOULD ANY DEVELOPMENT OR CONSTRUCTION OCCUR ON OR NEAR BOUNDARIES, THE BOUNDARIES SHOULD BE CLEARLY MARKED ON SITE BY THE REGISTERED LAND SURVEYORS

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DATE 10/11/2022 SCALE 1:100
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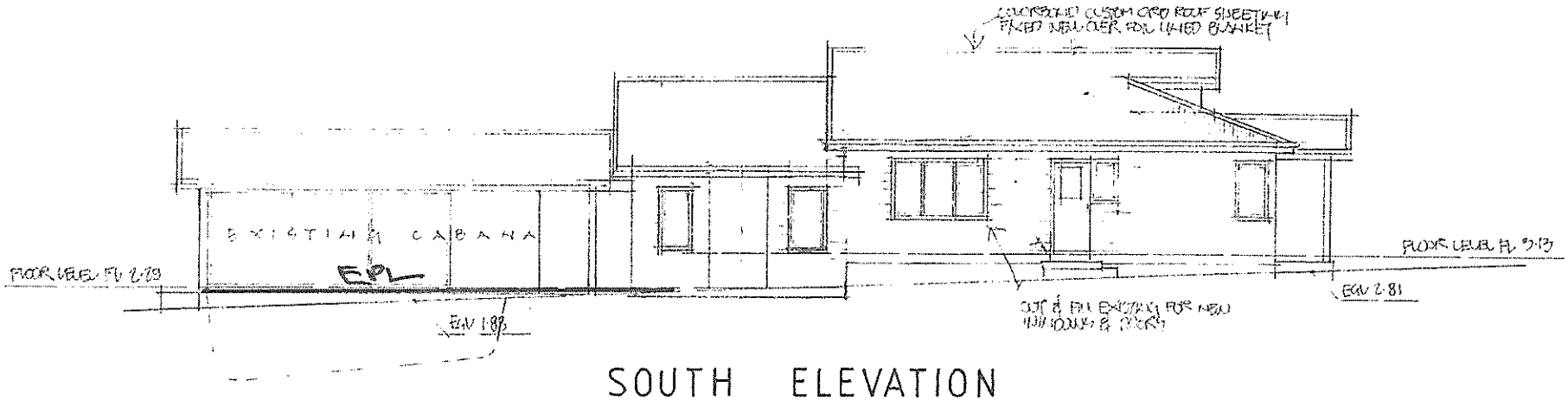
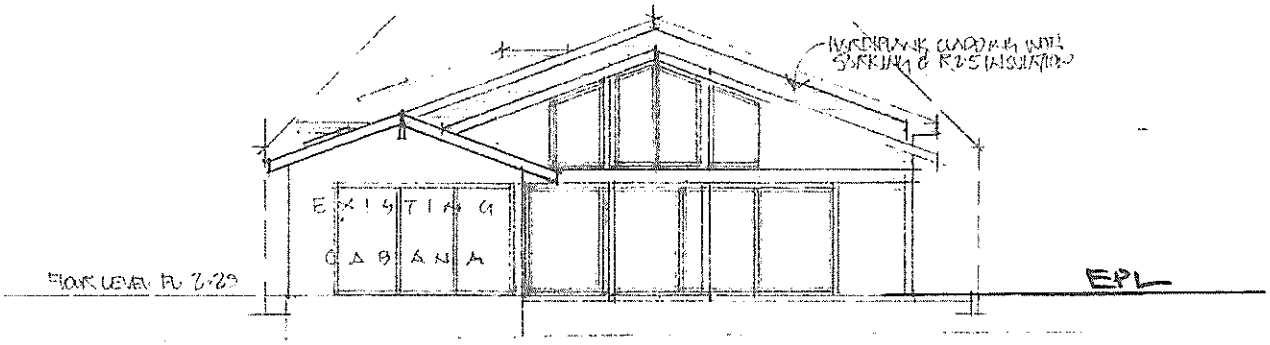
DRAWING No. 1928-2 ISSUE

FIGURE 8



SOUTH ELEVATION



WEST ELEVATION

1. Builder to check and confirm all subsequent dimensions on site prior to construction. Do not scale the drawing.
2. All dimensions shall relate to site boundaries and easements are subject to verification by a site survey.
3. All work to be in accordance with BUILDING CODE of AUSTRALIA & to the satisfaction of local council requirements & other authorities.
4. All timber construction to be in accordance with the "TIMBER FRAMING" code.
5. Any detailing in addition to what is supplied shall be resolved between the owner and the builder to the owner's approval, except for any structural matters on design which is to be resolved by a Structural Engineer.
6. Roof water & rain soil drainage to be disposed of to the approved treatment or as directed by local council inspectors.
7. All electrical power & light outlets to be determined by owner.
8. Make good and repair all existing finishes damaged by new work. Paint existing matching where possible.

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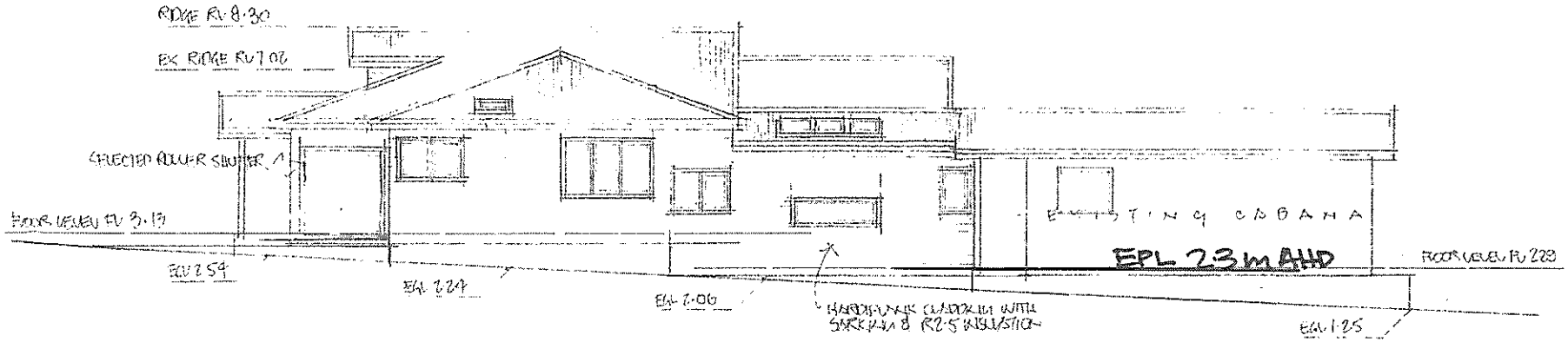
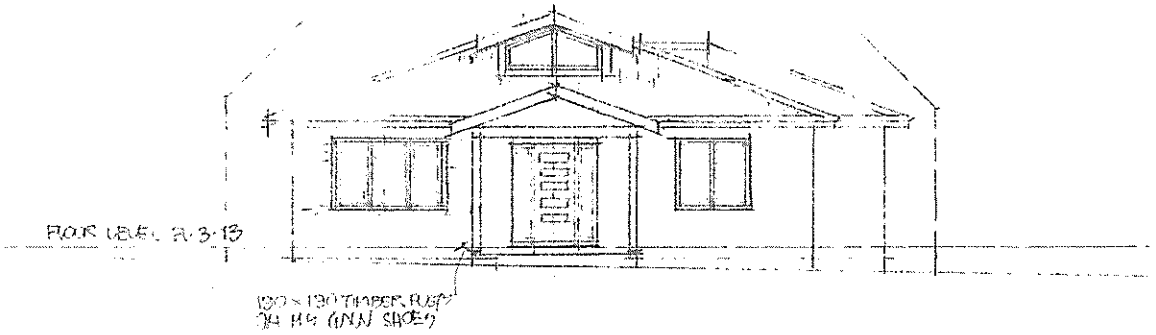
DRAWING No 1928-4 | ISSUE

FIGURE 9



NORTH ELEVATION



EAST ELEVATION

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DRAWING No. 1928-3

FIGURE 10

Control Line
CONSULTING

PO Box 583,
Windsor. NSW 2756
P: 02 4577 0125 F: 02 4577 7688
E: craig@controllineconsulting.com.au

The General Manager
Northern Beaches Council
3 Columbia Court
Baulkham Hills NSW 2153

31st May, 2017

RE: Lot 7 DP 17191 – 865 Barrenjoey Road, Palm Beach NSW 2108

Dear Sir,

Further to a request from the owner of the subject allotment I have undertaken a desktop assessment to establish the relativity of the Northern Beaches Bushfire Prone Land Map to this parcel.

In this instance the subject allotment is only very marginally touched by the outer extent of a category 1 vegetation buffer zone from the bushfire prone land map across the northeast corner boundary line of the allotment (see figure 1).

The regulatory process for requiring an assessment for the bushfire risk, the document *Planning for Bush Fire Protection* 2006 and subsequently AS 3959-2009 *Construction of buildings in bushfire prone areas* is if the development is captured by the LGA bush fire prone land map.

It is my understanding that the development is additions to the western elevation of the dwelling on this site and therefore the development is actually well clear of the implications arising from the bush fire prone land map.

Therefore the correct interpretation of the regulatory process does not in this instance require the preparation of a Bushfire Hazard Assessment Report to satisfy the provisions of section 79BA of the *Environmental Planning and Assessment Act* 1979.

Indeed if a Bushfire Hazard Assessment Report was produced having reference to *Planning for Bush Fire Protection* 2006 and AS 3959-2009 *Construction of buildings in bushfire prone areas* there would be no recommendations arising for bushfire protection.

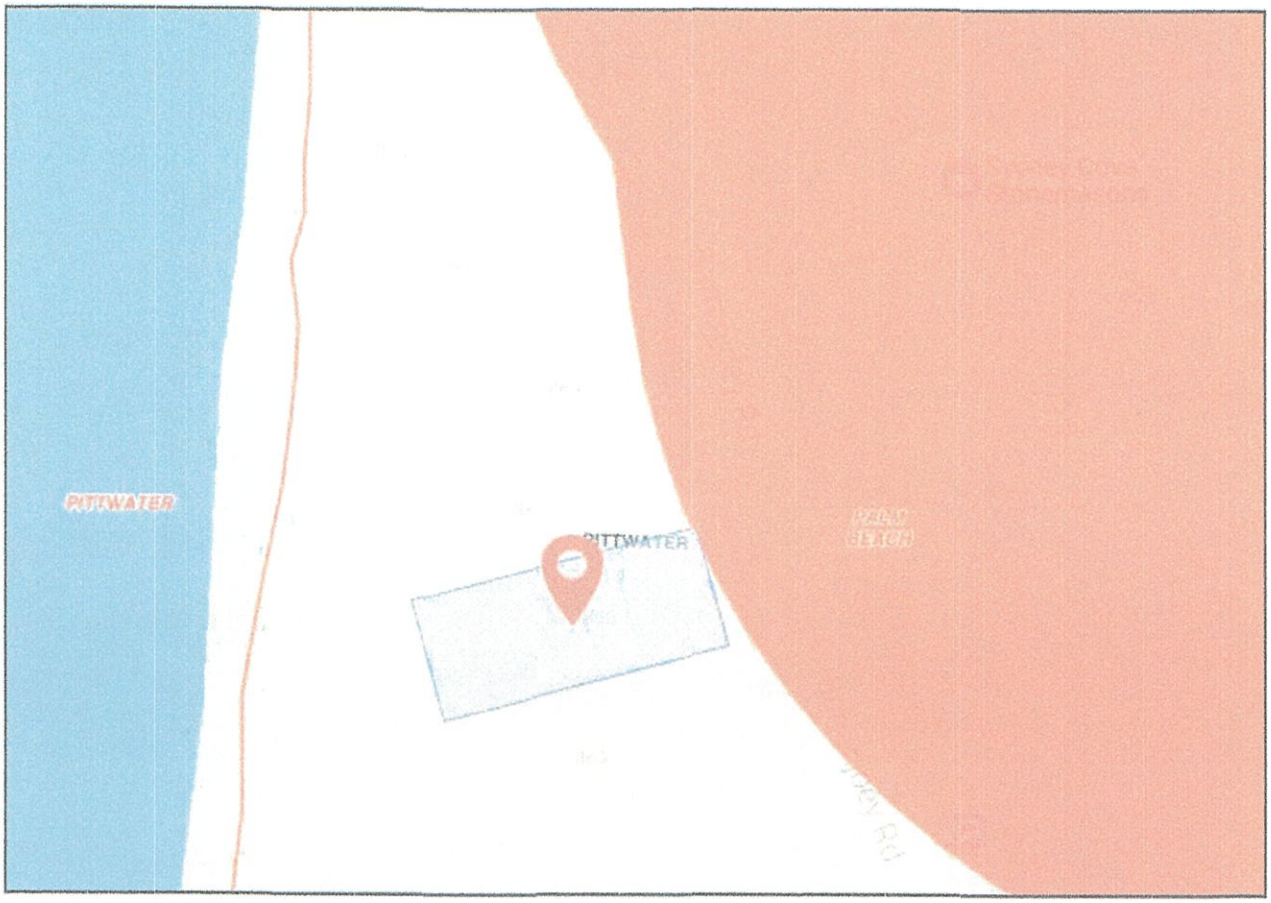

Figure 1; Extract of the Northern Beaches Bush Fire Prone Land Map

Please do not hesitate to contact me with any questions and clarifications.

Yours faithfully

Craig Burley
Grad Dip Design in Bushfire Prone Areas
FPA Australia BPAD – Level 3 Certified Practitioner

BPAD
Bushfire
Planning & Design
Accredited Practitioner
Level 3