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**GEOTECHNICAL OPINION
YAMBA COASTLINE INTERIM EMERGENCY STRATEGY
PILOT HILL YAMBA NSW**

1 INTRODUCTION

This letter has been prepared at the request of Mr Peter Wilson of Clarence Valley Council by email dated 20 April 2021. We have been requested to review the Interim Emergency Management Strategy dated February 2015 and to provide our opinion on the following items;

1. Items 5.2.1 and 5.3.1 require property owners on Pilot Street to be advised when the orange and red alert levels are reached. Council wishes to know whether similar advice should be given to property owners at Convent beach (Ritz and Ocean Streets).
2. Items 5.2.5 and 5.3.5 require actions to be implemented in regard to vehicular traffic along Marine Parade and pedestrians along the zig zag path.

2 CURRENT ALERT LEVELS

As part of this review, we have considered the current Alert levels presented in Table A 1 of the Interim Emergency Management Strategy. Table A1 is reproduced below. Our review has taken into account the latest rainfall data, groundwater levels and stability analyses. The relevant data is presented in our Addendum report dated 22 December 2022 and reference should be made to that report for specific details. In our opinion the current Alert levels are still appropriate for implementation as part of the Emergency Management Strategy.

Table A1 Emergency Rainfall Warnings

Antecedent Rainfall Period (days)	Orange Alert Level (mm)	Red Alert Level (mm)
1	180	200
2	200	280
5	215	325
8	250	370
15	310	425
30	425	560
45	500	675
60	600	800
90	740	955

3 ADVICE FOR PROPERTIES AT CONVENT BEACH

Currently only properties on Pilot Street are advised of the orange and red alert levels. During our site visit on 10 June 2021, we inspected the properties from Queen Street in the north (Craigmore Headland), to the southern end of Convent Beach. The properties were inspected from the ocean side only (i.e. we did not access the individual properties to closely inspect the condition of the structures). Our inspection included a visual appraisal of the surface geotechnical and geological features which were evident.



Plate 1 – Craigmore Headland

Craigmore Apartments

The hillside slope on the eastern side of Craigmore Apartments is irregular in shape and slopes down at about 25°. The toe of the slope is protected by large boulders which are founded on the wave cut rock platform below. The apartment structure is set back from the crest of the hillside slope. The slope has a history of instability when a large slump occurred in 1999.

Just to the south of Craigmore Headland, there are a number of properties at the northern end of Convent Beach. Plates 2, 3 and 4 below show these properties. The properties are generally substantial 3 to 4 level buildings, with the exception of one smaller single level weatherboard structure. Our visual observations are that these properties sit generally within the dune slopes above the wave cut platform. Based on the scale of the larger developments we consider that these properties are most likely founded on the underlying bedrock. The smaller single storey weatherboard residence unlikely to be founded on bedrock but is set back

further than the more substantial adjoining structures. Rock boulders are positioned at the junction between the toe of the dune slopes and the wave cut platform. Strong groundwater seepage was evident at the toe of the dune slopes. While the toe of the dune slopes is irregular in nature and likely to be susceptible to some localised slumping or coast erosion processes, in our opinion, the risk of substantial instability impacting structures is likely to be low and therefore acceptable.

Along the main Convent Beach (refer plates 5 and 6 below), the beach area is backed by steeper dune slopes, with Ocean Street (a sealed roadway) running behind the beach area. The dune slopes along Convent Beach vary from about 25° at the southern end to locally as steep as 37°.

Based on our observations, we do not consider that it is currently necessary to advise property owners at Convent Beach when Orange and Red alert zones are reached. However, the properties in this area will be subjected to ongoing hillside erosion processes which left unattended may lead to localised or more significant instability. Therefore, we recommend that Council advise the property owners of the current studies which have been undertaken, including the potential risks, and that they recommend each property obtain their own independent geotechnical risk assessment to ensure ongoing stability of these properties. This would apply to all properties south of Ritz Street and on the eastern side of Ocean Street.



Plate 2 – Northern end of Convent Beach



Plate 3 – Northern end of Convent Beach



Plate 4 – Northern end of Convent Beach



Plate 5 – Convent Beach looking south



Plate 6 – Crest of Dune Slope along Convent Beach



4 RESTRICTIONS ON VEHICULAR TRAFFIC AND PEDESTRIANS

Currently when a Red Alert is reached Marine Parade is closed to vehicular traffic and the zig zag path is closed to pedestrians. The rainfall and groundwater data collected to date from the main study area below Pilot Street, indicates that when the Red Alert level is reached, groundwater levels are quite close to historical highs. Therefore, any further rainfall and rise in groundwater levels has a high probability of instigating small and larger scale instability within the hillside slopes. Detailed groundwater and stability analysis has not been undertaken for the slopes south of the Pacific Hotel, however based on our surface observations, we consider that such analysis is likely to result in similar conclusions within that portion of Yamba beach. Therefore, we consider that the current recommendation to close Marine Parade to vehicular traffic and to close the zig zag path to pedestrians, while there is a Red Alert Zone in place, it is still a well measured and justified response to the potential risks imposed. This would also include the closure of the Yamba Surf Club for that period.

Further geotechnical studies within the slopes south of the Pacific Hotel could be considered to provide more definitive groundwater and stability data. These studies may enable revised recommendations in regard to the closure of Marine Parade and the zig zag pathway, which would then be based on site specific data.

5 GENERAL COMMENTS

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Should you require any further information regarding the above, please do not hesitate to contact the undersigned.

Yours faithfully
For and on behalf of
JK GEOTECHNICS

Linton Speechley
Principal | Geotechnical Engineer



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