WorleyParsons
resources & energy

Infrastructure and Environment
Level 11, 141 Walker Street
North Sydney NSW 2060 Australia
Telephone: +61 2 8456 7200
Facsimile: +61 2 8923 6877
www.worleyparsons.com
WorleyParsons Services Pty Ltd
ABN 61 001 279 812

Ref: 5319/02
File: lt5319_02crt081208-Revised Coastline Hazard Assessment.doc

Mr John Oliver
Project – Development Manager
Sandy Shores Developments Pty Ltd
PO Box 5178
WOLLONGONG NSW 2520

10th December 2008

Dear John,

SANDY BEACH NORTH DEVELOPMENT
UPDATED COASTLINE HAZARD ASSESSMENT

I refer to your request that we revisit the coastline hazard assessment that was undertaken in 2004 for the Sandy Beach North Development site at Hearns Lake. The 2004 assessment is documented in our letter dated 24th August 2004, which was accompanied by a figure that showed the position of the provisional 100 year recurrence coastline hazard line superimposed over the layout that existed at that time for the Sandy Beach North Development.

The "coastline hazard line" is the predicted position of the back beach erosion scarp after a 100 year recurrence coastal storm (*including an allowance for subsequent slumping to a stable angle of repose*), for a specified planning horizon. The assessment that was completed for the 2004 Report was based on a 50 year planning horizon and an allowance for sea level rise over that horizon as per recommendations outlined in the IPCC's 2001 publication titled, *'Climate Change 2001'*.

Since then, the IPCC has published a new report (*IPCC 2007*) which documents revised sea level rise projections due to climate change. The Department of Environment & Climate (*DECC*) has also published a document titled, *'Floodplain Risk Management Guideline: Practical Consideration of Climate Change'* (*October 2007*), which focuses on the potential impacts of climate change on flooding and floodplain management.

In recognition of the availability of the revised data presented in these publications, the NSW Department of Planning issued a Supplementary Director General's Requirement (*DGR*) for the EA that is being prepared by the Sandy Beach North Development. The Supplementary DGR is referred to as DGR 7.7 and states that:

> *"A risk management assessment of climate change impacts to the year 2100 is to be undertaken using the latest available information from the International Panel on Climate Change (IPCC), the Department of Environment and Climate Change (DECC) and the CSIRO. This should include sensitivity analyses for low level, mid range and high level ocean impacts as set out in the DECC Floodplain Risk Management Guideline titled 'Practical Consideration of Climate Change"*

This DGR would appear to relate specifically to flooding issues in so far as climate change may impact on predicted peak flood levels for the development site. These issues have been addressed in separate reports which form supporting documentation for the EA.

Notwithstanding, there has been some suggestion that the Supplementary DGR may also require a revised coastline hazard assessment to account for the IPCC's increased predictions of sea level rise. In that regard, it is noted that the assessment that we undertook in 2004 was based on a 50 year planning horizon and that it could be interpreted from DGR 7.7 that the DoP requires an assessment to the year 2100; that is a 90 year planning horizon.

Accordingly, we have undertaken an updated assessment of coastline hazard line along the site frontage to Hearns Lake Beach which provides a projection to the Year 2100. This updated assessment is presented in the following.

1. UPDATED COASTLINE HAZARD LINE ASSESSMENT

The "coastline hazard line" is the predicted position of the back beach erosion scarp after a 100 year ARI coastal storm (*including an allowance for subsequent slumping to a stable angle of repose*), for a specified planning horizon. In 2004, an assessment was undertaken to determine the coastline hazard line along the site frontage to Hearns Lake Beach. The analysis was based on the data and procedures that were available at that time (*i.e., in 2004*).

In that regard, it is understood that the procedures that applied at that time still reflect the current policy position recommended by Coffs Harbour City Council. In particular, it is understood that Council's policy on coastline hazards within the Coffs Harbour LGA is still based on recommendations outlined in a report titled, *'Coffs Harbour City Coastal Assessment Report'* (*PWD, 1995*). It should b noted that this report specifies that coastline hazards should be considered over a planning period of 50 years.

Notwithstanding, the procedures that were applied in 2004 were based on application of sea level rise projections documented in the IPCC's 2001 publication. These have since been superseded by recommendations outlined in IPCC 2007. IPCC 2001 recommended median sea level rise projections of 0.18 metres and 0.48 metres for 50 and 100 year horizons, respectively. IPCC 2007 has increased these to 0.2 metres and 0.55 metres respectively.

Furthermore, the assessment presented in the August 2004 Report was based upon the policy outlined in PWD's 1995 Report, which specified that the projected long term recession rate for Park Beach should be applied to all other CHCC LGA beaches where no site specific analysis has been undertaken. The long term recession rate for Park Beach is estimated to be 0.5 m/year. Hence, in the absence of better information, this recession rate was applied to Hearns Lake Beach to determine the hazard line documented in the August 2004 Report.

However, the recession rate adopted for Park Beach is considered to be very high due to the impact of the Coffs Harbour breakwalls on longshore transport. Park Beach is situated immediately north of Coffs Harbour, whereas Hearns Lake Beach is about 20 kilometres further north. In addition, the PWD's 1995 Report indicates that the 6 closest beaches to Hearns Lake Beach have an average recession rate of 0.13 m/year. Therefore, the application of a recession rate of 0.5 m/year is considered to be extremely conservative.

In addition, since the preparation of the August 2004 Report, further investigation of available photogrammetry suggests that a long term recession rate of 0.05 m/year would be applicable for the northern end of Hearns Lake Beach (*north of the mouth of Double Crossing Creek*).

Therefore, if a conservative approach was applied based on the adoption of a recession rate of 0.13 m/year over a planning horizon extending to Year 2100, the estimated position of the 100 year recurrence coastline hazard line would be 54.5 metres landward from the existing vegetation line. This is 4.5 metres further landward than the corresponding Year 2050 100 year coastline hazard line that was determined for our August 2004 Report and based on the 0.5 m/year recession rate and 0.2 m sea level rise estimate.

The provisional 100 year ARI coastline hazard line to Year 2100 is shown in **Figure 1** superimposed over the latest layout for the Sandy Beach North Development.

2. CONCLUSIONS

In summary, the following points can be made in regard to the 100 year recurrence coastline hazard line for Hearns Lake Beach:

(i) Any reassessment of the coastline hazard line that may be required as a function of interpretation of DGR 7.7, should be based on a long term recession rate of no greater than 0.13 m/yr (*and possibly even less*). This is in keeping with the latest available data which was published after the August 2004 Report.

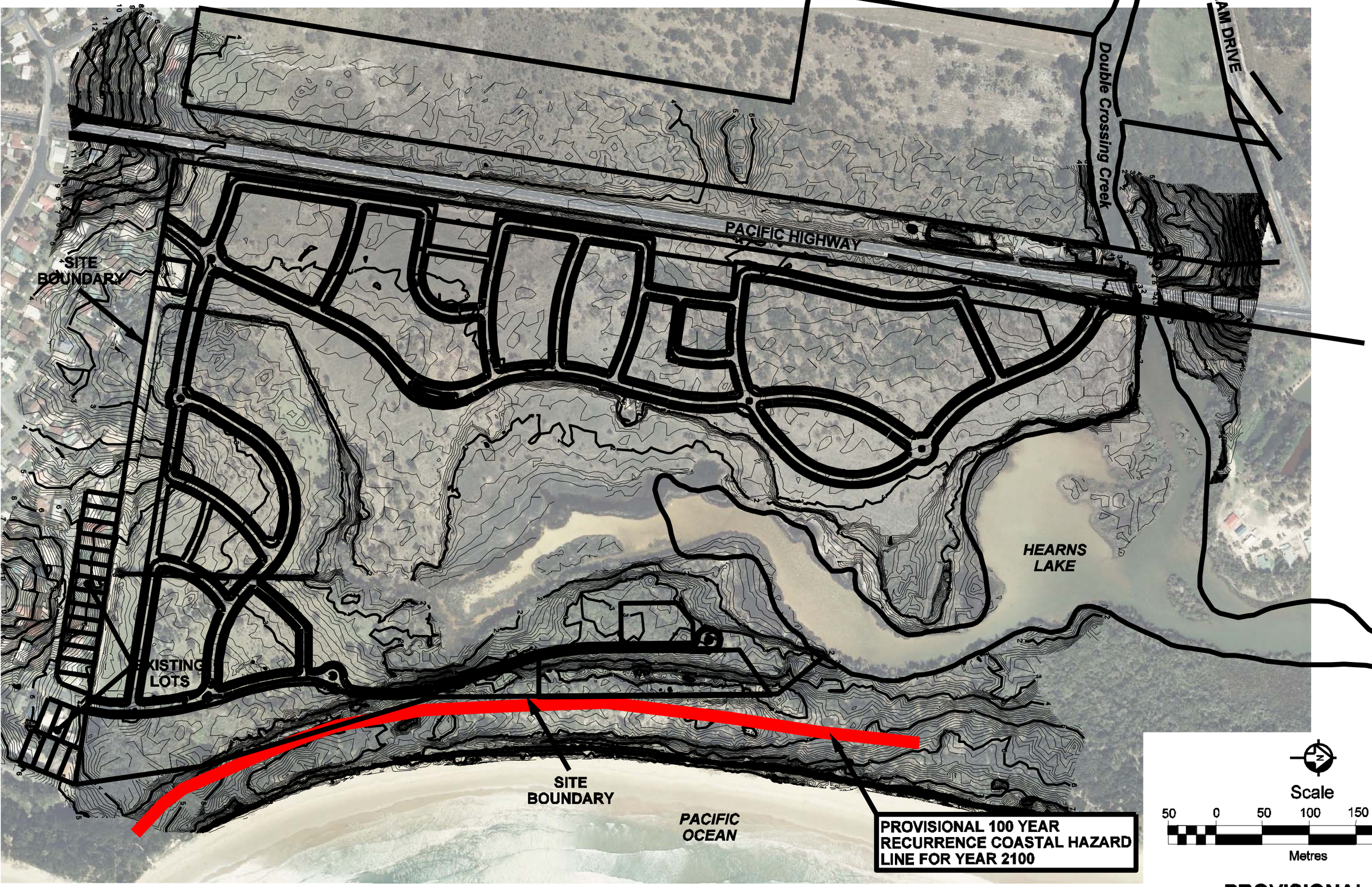
(ii) It is accepted practice to employ the median level estimate for sea level rise in any climate change assessment for development. IPCC 2007 and DECC 2007 indicate that the median level prediction for sea level rise on the North Coast of NSW to the Year 2100 is 0.55 metres.

(iii) Application of a 0.13 m/year long term recession rate and median level IPCC 2007 predictions for sea level rise to determine the 100 year recurrence coastline hazard line for the Year 2100, will result in a 4.5 metre landward extension of the hazard line presented in the figure that accompanied the August 2004 Report. As shown in **Figure 1**, the development footprint that is currently proposed will not encroach within the hazard area defined by this minor landward relocation of the coastline hazard line.

I trust that the revised coastline hazard assessment presented above is suitable for the purposes of the EA. In the meantime, please feel free to contact me should you require clarification of any aspect.

Yours faithfully
WORLEYPARSONS

Chris Thomas
Manager, Water Resources



Scale

50 0 50 100 150 200 250

Metres

PROVISIONAL 100 YEAR RECURRENCE COASTAL HAZARD LINE FOR YEAR 2100

Patterson Britton & Partners Pty Ltd

WorleyParsons
resources & energy

rp5319mjp040824-Sandy Beach Nth
fig-cc100yr_hazard_54.5m.dgn