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14 December 2006

Attentus Projects and Properties Pty Limited
PO Box 1748
NORTH SYDNEY NSW 2060

Our ref: 22/13148/01/74496
Your ref:

Attn: William Jenner

Dear Bill

Sapphire Beach Development
Addendum to Coastal Hazard, Water Management and Services Assessment Report

Background

Initial responses from the Department of Planning (DoP) (letter dated 9 November 2006) included comments from various authorities including the Department of Natural Resources (DNR), Coffs Harbour City Council and Marine Parks Authority.

Further correspondence from DoP (letter dated 20 November 2006) was received and a subsequent meeting with the Department of Natural Resources was held on 28 November 2006 in their offices in Coffs Harbour.

The issues raised by the various authorities can be summarised as:

- Coastal Processes – particularly the adequacy of proposed setbacks for the buildings and the detention basin within the 100 year coastal hazard zone from risks presented from coastal hazards: and
- Stormwater Management – particularly the location of the detention basin within the 100 year coastal hazard zone, related water quality issues due to infiltration and possible runoff from the detention basin to the property to the north.

As a result of the DNR meeting on 28 November 2006 we have taken a different approach to the design philosophy for this project. The major change is the removal of the detention basin, which was located within the 100 coastal hazard zone.

The removal of the detention basin will have the following impact on the two (2) issues noted above as follows:

1 Coastal Processes

1.1 Previous Report

GHD's previous report (Coastal Hazards, Water Management and Services Assessment, August 2006) outlined a number of key issues with respect to Coastal Processes. These included the definition of the immediate, 50 year and 100 year hazard lines as previously determined in the Geomarine (1998) report and mapped by Willings and Partners (1999). These lines included long-term recession, climate change and a design storm bite of 10m.

The long term recession of 0.3m^3/m/yr used in the Geomarine (1998) report is considered conservative as the average long term recession for the southern section of Campbells Beach was determined to be 0.2m^3/m/yr. In addition to this, the climate change values used to predict recession associated with sea level rise were based on the International Panel on Climate Change (IPCC) mid range recommendations of 0.54m over 100 years.

The location of these hazard lines formed the basis for the positioning of building setbacks. It should be noted that the proposed dwellings are landward of the 100 year hazard line, therefore the residential building development will be free of coastal hazards for that period. Further to this, the removal of the detention basin means that there are no longer any built works, other than retaining the fill to the front patios of some of the beachfront homes, within the 100 year hazard line.

1.2 Recession Rates and Dune Stabilisation

With the detention basin being removed from the stormwater system design, the buffer area between the dunes and proposed dwellings will be able to be more heavily vegetated.

The stability of the dunes has been raised as a concern and subsequently, a number of options have been considered. These options include, but are not limited to, the planting of appropriate species, rock protection and beach renourishment.

The applicant has provided a comprehensive Plan of Management for the Dune Area and the 7A Environmental Zone as part of their original submission, its called '*Sapphire Plan of Management'* and located in *Volume 1, Appendix 8.* It is worth noting the northern dunal area is already heavily vegetated and the Plan of Management, as well as the Landscape Masterplan, indicates the southern dunal area will be revegetated and stabilised. The dune rehabilitation work and ongoing management plan has been adopted for the whole of the dune area in accordance with the '*Coastal Dune Management Manual'* prepared by NSW Department of Land and Water Conservation 2001.

1.3 Oceanic Inundation

Following DoP's letter dated 20 November 2006 and subsequent discussions with Robert Kasmarik of DNR, it was acknowledged that there is a potential for oceanic inundation during storm events. To alleviate concerns in regards to this matter, the foundations of the first row of residential dwellings will be designed to withstand wave runup.

2 Stormwater

2.1 Previous Report

GHD's previous report indicated that the aforementioned detention storage and infiltration would allow for the reduction of 100 year stormwater runoff to a level suitable for safe conveyance through the existing stormwater system on the adjacent property south of the site. The ground surface formation within the development site would be such that all runoff was conveyed to the detention area and allowed to pond and/or infiltrate thereby allowing for the removal of sediment prior to discharge to the Marine Park.

2.2 Revised Design Philosophy

During the Environmental Assessment (EA) review process, both Coffs Harbour City Council and DNR raised concerns with locating the detention structure within the Coastal Hazard Zone. In addition, DNR was concerned with the infiltration of untreated stormwater that may potentially increase the nutrient input into the groundwater.

Discussions with DNR (Mohammed Hanif) indicated that a detention basin was not required provided the downstream stormwater pipeline was upgraded to adequately cater for the runoff from the 100 year storm event. Similarly, Council indicated the detention was not necessary for flood mitigation purposes. On this basis, investigations were undertaken into the feasibility of upgrading this pipeline.

Removal of Detention Basin

To determine the impact of removing the detention storage, the estimated increase in peak runoff was calculated using the probabilistic rational method. From this, the peak flow rates for the existing and post development conditions for the 100 year storm event were 2.2 and 2.7m^3/s respectively.

The pipe system south of the subject site consists of a 750mm diameter pipe, which then transitions to a 900mm diameter pipe downstream of Pit 2 (refer Figure 1, attached). To safely convey the above 100 year storm flow, the 750mm and 900mm diameter pipes would be upgraded to 1200mm and 1350mm diameter respectively.

With the upgrade of these pipes to cater for the increased flow, upgrading of the existing headwall is required and this will also include measures to ensure that scouring does not occur at the outlet. The extent of this work would be determined as part of the detail design process.

Extent of Fill - Northern Property Protection and Impact on Dunes

We understand that there is currently an issue with respect to flooding at, or near, the existing pump station. The proposed design will ensure that the stormwater generated from the development site is managed with the site boundary and conveyed to the southern discharge point. The previously discussed upgraded stormwater pipeline has been sized to convey the 100 year flows and hence our development will not exacerbate the flooding at the pump station.

As part of the works required for the protection of properties with respect to coastal processes, fill will be placed under the first two (2) rows of dwellings along the eastern boundary to raise the ground floor to AHD 7.5m. This fill will also result in a ground height variation along the northern boundary.

To ensure the proposed development will not have a negative impact on the northern properties, a stormwater collection system along this boundary will be incorporated. This collection system would be a combination of overland flow paths along with pits and pipes, which would convey the flow through to the proposed gross pollutant trap on the southern boundary. The final configuration of this system would be determined during the detail design phase.

The fill required under the beachfront homes and patios will be compacted and retained. With the removal of the detention basin from the coastal hazard zone, and given any fill is between 14 and 25 metres from the dune, there will be no impact on the dual system as a result of fill.

2.3 Water Quality

With the removal of the detention storage, infiltration of untreated runoff into the groundwater will no longer be a concern. However, in keeping with the Ecologically Sustainable Development (ESD) principles, treatment of stormwater runoff and the removal of nutrients is still a feature of our design.

Bioretention

The nature of the development site and the proposed shaping is such that there are areas throughout the site that lend themselves to being suitable for the incorporation of bioretention. Bioretention is a stormwater treatment measure that filters runoff through a vegetated swale and allows for the percolation of runoff through an underlying prescribed filter media. The filtered stormwater is then collected at the base of the filter media with sub soil pipes and conveyed to either a collection pit or receiving water.

Bioretention is best suited to areas of lower grades and hence has been located within the terraced areas of the lots as well as along the landscaped strips adjacent to the road behind the first row of houses.

Gross Pollutant Trap and Settlement Storage

It is proposed to incorporate a gross pollutant trap (GPT) upstream of the connection into the existing stormwater system prior to it passing through into the adjacent property. The inclusion of this structure will allow for the removal of gross pollutants and course sediment from runoff prior to discharge into the Marine Park. To further assist in the removal of course sediment, a small area of settlement storage has been nominated to be included immediately upstream of the GPT.

Figure 1, attached, indicates the location of the proposed water quality treatment devices as well as the location for the upgraded stormwater pipeline through the existing easement within the adjacent property.

Groundwater Quality

There are no excavations that will intersect the groundwater, this coupled with the removal of the detention basin means that the quality of the groundwater will not be negatively affected and therefore a Groundwater Management Plan is not required.

We understand that the DNR will forward a letter to the DoP confirming that these outcomes are acceptable to them.

Yours sincerely

Ian Joliffe
Principal Water Resources Engineer
4979 9999

Attachment: Figure 1

LEGEND

- Existing Stormwater
- Proposed Stormwater
- Proposed Bioretention Areas
- Proposed Detention Storage

Scale

metres 0 5 10 15 20 25

jackie amos landscape architect

Sapphire
Landscape Masterplan

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Proposed Stormwater Upgrade

scale | for A3 date | month 2005

job no. | 221314801
rev no. | A

Figure 01

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