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Townsville Ocean Terminal Project

We refer to the email from Mr. Peter Cardiff of Emanate Legal (dated 01st July 2008) requesting comment in relation to three issues, namely:

1. Long wave effects in the port harbour;
2. Effect of the development on The Strand beaches; and
3. Increased immunity at the Northern Breakwater precinct during severe cyclone events.

We offer the following comments in relation to each of these issues.

1. Long wave effects in the port harbour

As discussed in earlier communications, it is our understanding that the Townsville harbour basin does not experience problems associated with long waves. This understanding is based on advice received during discussions with technical staff of Townsville Port Authority (TPA) in the early stages of our investigations for the EIS.

The lack of any evidence of long waves is very likely due to there being no such phenomenon occurring in the waters of Cleveland Bay. In which case, any future modifications to the basin configuration (by the construction of the Cruise Ship berth) will not cause resonance problems.

When investigating the existence of long waves in the Townsville region we have had discussions with a number of authorities - all of whom state that they are not aware of any long wave issues in Townsville waters. This is consistent with the observations of the Townsville Port Authority. Other organisations with whom we have consulted on this issue include:

Studies

coastal processes

waves

tidal dynamics

water quality

siltation

effluent dispersion

dredging impacts

river entrance

Design

harbours

marinas

beaches

breakwaters

seawalls

reclamations

canal developments

- Marine & Atmospheric Research - CSIRO
- Division of Oceanographic Research - Bureau of Meteorology
- Queensland Transport - Ports Division
- Australian Maritime College
- National Tidal Centre
- Maritime Safety Queensland - Tidal Information Unit
- Australian Maritime Safety Authority

As a consequence of our discussions with these agencies, in conjunction with our own experience of working as coastal engineers in Queensland for some thirty years, we are of the view that long waves are unlikely to trigger any harbour resonance problems due to the proposed Cruise Ship Terminal.

However we cannot state with absolute conviction that this is the case without the commissioning of an extensive monitoring exercise in Cleveland Bay; supplemented by detailed modelling of the pre- and post-development configuration of the harbour.

2. Effect of the development on The Strand beaches

We understand that concern has been expressed regarding the ability of The Strand beaches to act as a buffer against storms should the proposed development proceed. We advise that the capability of these beaches to act as a natural buffer to storm/cyclone wave action will not be compromised by the proposed Townsville Ocean Terminal Project.

Section 5.3 of the *Coastal Engineering Studies* (included as Appendix 13 of the EIS) provides details as to the impact of the development on The Strand beaches. As stated in that document, there will be a slight change to the wave climate on the southern section of this foreshore precinct. The incoming wave energy will have a slightly more northerly approach than it does at present.

As a consequence of this change, the southern foreshore of The Strand will realign itself so that the beach faces directly out into the oncoming waves. This subtle reorientation of the beach means that the foreshore is naturally distributing beach sand within the erosion buffers so as to provide the optimum protection. Since there will be no loss of sand from the beaches, their ability to act as erosion buffers will not be diminished.

3. Increased immunity at the Northern Breakwater

We note the suggestion that the severity of the DSTE could be increased to allow for an increased immunity to proposed dwellings in the vicinity of the Northern Breakwater. Certainly the breakwater could be designed structurally to accommodate a more severe DSTE. Furthermore the protection that it affords to infrastructure located behind it could also be increased. The improved protection could be achieved by raising the crest level of the breakwater (as suggested), by increasing the width of the crest armouring, or by an appropriate combination of these two measures.

A satisfactory strategy for achieving appropriate immunity to the DSTE could be achieved by having a high level crest in front of buildings, in conjunction with a lower wall (with wider crest armour) as the ocean frontage to the open space. This would not compromise the protection afforded either to the buildings or to the open space.

It is also possible that the length of breakwater in front of the buildings could incorporate a terraced berm concept - which could offer a “softer” landscaped aesthetic. Such a structural arrangement would need to be robust, and appropriately designed to accommodate any wave overtopping effects during the DSTE.

What might seem at first to be a significant increase in design criteria, in fact an upgrade from a 100 year ARI DSTE to say a 500 year ARI DSTE does not necessarily result in a significant alteration to the structural elements of the breakwater itself. For example, the following improvements to the two structural options for the Northern Breakwater (refer Figure 6.2 of the *Coastal Engineering Studies*) are estimated to be required so as to provide the same degree of protection for the 500 year ARI event as currently proposed for a 100 year event:

- crest level would need to be raised by approximately 0.75m; and/or
- the width of crest armouring increased by approximately 5m to 8m.

These are approximate modifications only.

As stated in the *Coastal Engineering Studies* and in previous advice to the project proponents, the actual structural requirements of the Northern Breakwater needs to be determined by physical modelling in the subsequent detailed engineering design phase - irrespective of the DSTE selected. The opportunity to investigate a “landscaped wall” as part of the structural solution in front of buildings would be part of that modelling process if the concept was to be considered further.

We trust that the above comments assist Emanate Legal in preparing an appropriate response to the issues raised.

Yours sincerely,



Paul O'Brien
Director - Coastal Engineering Solutions Pty. Ltd.