Coast Protection Board

270 The Parade,
KENSINGTON SA 5068
Telephone (08) 8204 8840
Facsimile (08) 8204 8838

Postal address
G.P.O. Box 1047
Adelaide
SA 5001

Reference CPB 220/21/06

8 September, 1997

Development Assessment Commission
Department of Housing and Urban Development
G.P.O. Box 1815
ADELAIDE SA 5001

Dear Sir,

DEVELOPMENT APPL. No	: 49211/0004/97
APPLICANTS NAME	: Minister for State Development
DESCRIPTION	: Offshore Boat Ramp and Associated Facilities
LOCATION	: West Beach
ALLOTMENT No	:
SECTION No	:
HUNDRED	: Port Adelaide
COUNCIL NAME	: CITY OF WEST TORRENS THEBARTON

The Coast Protection Board has assessed the development application and provides the following comments.

The proposal to construct boating facilities at West Beach conflicts with beach processes at the site by interrupting the natural longshore movement of sand. As a consequence artificial bypassing of sand will be required in perpetuity. This has been identified in the *Sand Management Report* which forms part of the development application. It is understood that Government has made a commitment to fund this work and has identified that there are opportunities for cost recovery. The substantial cumulative costs and ongoing nature of this work distinguishes this aspect of the proposal as significant and it must be accepted that the State is bearing the risk of the future consequences given that precise quantification is difficult. Indeed, when constructing intrusions in a natural environment an extreme circumstance that should be acknowledged is the possible future removal of the facility in the event of failure to meet designed use in an economically feasible manner.

It is noted that final design details of the proposal are still being determined.

A description of the method and impacts of sand bypassing is not provided in the *Planning Application - Planning Report*. These impacts would include the impact of truck traffic on recreational use of the beach during sand bypass trucking and the disturbance to boating during operational dredging of the harbour.

The ownership and operating responsibilities for the proposed harbour have not been identified in the report. A decision on these responsibllities should be resolved before operating arrangements and designs are finalised, given the likely complex interactions and

relationship that will arise between the Glenelg and West Beach facilities and the West Beach dunes in respect to harbour and sand bypassing operations and the immediate and direct affect on the users of these facilities and open space area.

The Board also recommends that further attention be paid to the following aspects of the proposal:

1. The Traffic and Parking Assessment does not address the need for access to the beach by trucks for sand carting, nor the relatively regular truck traffic on the beach and potential for conflict with beach users.

2. An onshore route for trucks should be considered for inclusion in the proposal. Truck access should provide flexibility for sand carting to be carried out along the beach or landward of the beach and onshore facilities.

3. That any net lock-up of sand within the altered beach shape caused by construction of the facility should be counteracted with a replenishment of the West Beach dunes area with sand from a source external to the beach system.

4. That there are uncertainties surrounding the shape and variations in the salients (ie the beach formed behind the breakwater structures). Material which is unsuited for placement on the open beach should not be used to construct the salients.

5. That the site nominated as a possible source of beach sand also contains a large volume of fill material which is likely to be unsuitable for placement on the beach. The volume of clean sand available from the site needs to be confirmed.

6. That sand sourced from the offshore bar to construct the salients is not considered as being from outside the beach system. The Board does not support the use of this sand in calculating sand volumes for offsetting the sand lock-up volume.

7. That the northern part of the structure is proposed to be built quite close to the beach and entirely within the active part of the beach. Sand transported by wave action in a southerly direction is likely to move around this part of the structure and be deposited within the harbour. This accumulation of sand in the harbour may result in a greater lock-up of sand in the harbour than has been anticipated, and may increase the harbour maintenance dredging required over that estimated (10 000 m^3 per annum average) to maintain harbour and channel depths. This movement of sand into the harbour from the north is in addition to sand moving into the harbour from the beach to the south of the facility.

8. That facilities for occasional mooring of a dredge within the harbour be considered. Occasional mooring of a dredge should be considered in isolation from as well as in conjunction with mooring at the Glenelg harbour, as sand management at Glenelg may be converted to a fixed system which does not routinely require use of a floating dredge.

9. The geotechnical investigation has not identified the likely presence of beach stones at West Beach. The Board notes that stones have been observed in this area and that similar stones have caused difficulties during the construction of the Glenelg harbour project.

10. That the limitations on launching larger yachts at low tides identified in the *Preliminary Design Report* inclusion of the application is noted. Weather conditions may add further limitations to

launching some craft. It is recommended that DoT and the body responsible for harbour operation examine this aspect.

There are a number of discrepancies and inconsistencies between the sand management concept and project design and costing parts of the *Sand Management* report, these include:

- The net volume of sand (ie that which will need to be bypassed annually) is stated as 20 000 m^3 to 60 000 m^3 in the concept report, with gross volumes of 120 000 m^3 to 160 000 m^3. A volume of 40 000 m^3 annual bypassing is adopted for costing purposes. This estimate does not recognise the natural variability of the sand movements, and is also lower than the estimated average sand movements (net) for Glenelg of 50 000 to 80 000 m^3 pa. As a consequence, the estimated costs for sand bypassing do not reflect the annual variability which will occur.

- It is noted that the Glenelg harbour sand bypassing design was developed to manage volumes of up to 140 000 m^3 pa gross. A similar design criteria has not been identified for sand management at West Beach.

- The sand volume estimated to be locked up in the salients at West Beach is given as 40 000 to 60 000 m^3 plus approx 20 000 m^3 in the submerged bar, in the concept report. The volume adopted for costing purposes is 55 000 m^3.

- The cost estimates for sand bypassing are based on the bypassing of 40 000 m^3 of sand per annum. The estimates are based on trucking this sand, with the exception of 10 000 m^3 pa which would be dredged from within the harbour. The sand bypassing cost is particularly sensitive to the relative volume of sand dredged against trucked, due to the high cost of dredging and this is not reflected in the estimates or discussion. It is recommended that the unit rate for dredging sand be evaluated in light of the recent dredging contracts at Glenelg, and previous advice given on this by the Board as a consequence of dredging rates determined by consultants on the Review of Management of Adelaide Beaches. The cost of dredge establishment also needs to be considered as this is a relatively large component of cost where small volumes of sand are dredged.

- The location, shape and size of the salients formed behind the smaller northern breakwater, and particularly the boat ramp offshore breakwater is uncertain. The concept report notes that the stability of salients at the case studies considered may be due to lack of sand supply to the sites, therefore implying that the salients may otherwise be larger and/or more variable in shape and location. The concept report also notes that a submerged bar will form behind the breakwater, together with the salient, and that this will require dredging from time to time to maintain harbour depth. The stability and variability of the salients at West Beach is not sufficiently addressed given the variability of gross and net sand movement. The variability of gross and net sand movements is identified in wave studies from 1991 to 1995 and would be greater when considering other years.

  The small variability suggested in the cost assessment does not reflect the uncertainties identified in the concept report. The unknowns raise the possibility that more regular sand bypassing or greater volumes of sand bypassing may be required than has been costed.

- The consultant recommends that mathematical modelling of sand transport and interaction with the breakwaters be undertaken to finalise the sand management program design. The intention with regard to this further modelling is not clear.

- The costing report proposes that the salients be formed during construction from excess material from excavation on the land and with sand dredged from the sand bar and site of the proposed

breakwaters. Given the uncertainty in the location, size and shape of the salients likely to form, as well as the variations in the salients under the trucked sand bypassing operation and seasonal wave climate variability, the use of fill other than clean beach sand would not be advisable. Sand removed from the sand bar for use in creating the salients would not constitute sand from outside the existing beach system.

- The concept report suggests that replenishment of the West Beach area be undertaken with sand sourced from outside the active beach system to compensate for the volume of sand locked up. Sand sourced from the northern beaches or the offshore source used for the principle beach replenishment program is suggested. In either case use of sand from these sources deprives the sources currently allocated to the existing beach replenishment program, impacting on costs of this program.

- The development application does not include an assessment of the effect of a 0.3 metres sea level rise on the proposal. Nor does the application identify the ability of the proposed facility to be adapted to a sea level rise of 1.0 metre.

- The Board notes particularly that the acceptance of the use of offshore breakwaters, in this instance, does not negate it's strongly held opinion that these types of structures are a very costly and unsightly method for providing coast protection. Use here should not been seen as a precedent for this type of coast protection method on the Adelaide coastline.

  A strategy for protecting the coast using offshore breakwaters has been considered by the Board in the 1984 Adelaide Coast Protection Strategy Review and was determined to be the most expensive strategy of those examined. The Board advises that the Government's strategy for coast protection in Adelaide is that beach replenishment should be continued, with the construction of seawalls as a last line of defence in situations where beach replenishment has been tried and shown to be ineffective or unsustainable.

In summary, the Board recommends that:

a) Ownership and operational responsibilities be determined and that those bodies provide input to the design and operational arrangements before approval is granted.

b) Further consideration be given to increasing the flexibility of sand trucking arrangements.

c) The recommendations of the consultant for further modelling of the shoreline be followed through and that the Board be advised of any implications of this further study.

d) The salients be constructed from clean sand.

e) There be no net loss of sand from the active beach system.

f) The proponent manage the facility, including sand management for a period of at least 3 years following completion of the structure to establish suitable management and operation practices and confirm the design adequacy. That the proponent provide funding for any ameliorative works necessary.

g) The uncertainties in estimating the cost of management of the harbour, being principally the sand bypassing costs of the project be recognised and which would have to be borne by the Government.

h) An assessment be made of the capability and cost implications of operating the proposed facility with a 0.3 metres sea level rise and adaptation of the facility for operation with a sea level rise of 1.0 metre.

This submission also does not consider port aspects such as design of the breakwaters or wave conditions for navigation and safe launching, since these are more appropriately assessed by the Department of Transport and the owner and operator of the facility. Similarly water quality aspects such as seaweed accumulation, and turbidity during construction have not been considered in this submission.

If this application is approved then the Board requests that it be notified of the conditions of approval.

Yours faithfully

R Tucker
For Presiding Member
Coast Protection Board

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