

Our Ref: ED17/190
Your Ref: DOC17/272109

Chair
NSW Coastal Panel
PO Box A290
Sydney South NSW 1232

Attention: Mr Marc Daley

Dear Mr Daley

Re: Development Application – Coastal Protection Works – 46 Arrawarra Beach Rd, Arrawarra

I refer to your letter to Mr Anthony Lean, Chief Executive of the Office of Environment and Heritage (OEH), about the development application (DA) for Coastal Protection Works at 46 Arrawarra Road, Arrawarra. Your letter was referred to me and I have been asked to reply.

I understand the DA has been lodged with the NSW Coastal Panel under *State Environment Planning Policy (Infrastructure) 2007* (ISEPP). I also understand that in determining the development application, the Coastal Panel must give consideration to those matters listed at Clause 129A(3) of the ISEPP, including:

- a) the provisions of any coastal zone management plan applying to the land;
- b) the matters set out in clause 8 of State Environmental Planning Policy No 71 -Coastal Protection; and
- c) any guidelines for assessing and managing the impacts of coastal protection works that are issued by the Director-General for the purpose of this clause and published in the Gazette.

I note that the OEH has previously provided advice to the Panel on an earlier version of this development application dated 22 April 2016, and understand that the proponent has attempted to address some of the issues raised in that advice. However, OEH considers there are still some key outstanding issues that warrant further consideration as follows.

Coastal Hazards

The projected impacts of sea level rise-induced recession have been defined in the Coffs Coast Coastal Processes and Hazards Definition Study Volume 1: Final Report (BMT WBM 2011) (the 'Hazard Study'). The Hazard Study identifies a significant risk to the site from sea level rise-induced long-term recession. Should this occur, the subject land and proposed seawall will become increasingly exposed to full open coast conditions over time. Amongst other things, this is likely to increase the severity of risks from:

- a) coastal inundation;
- b) increased wave exposure; and

- c) scouring of the adjacent intertidal and subtidal substrate which might exacerbate erosion of the riparian zone around the creek mouth and the immediately adjacent beach and dunes.

The above-mentioned issues have not been considered in respect of the proposed seawall development and the potential impact on and from physical coastal processes over the intended life of the works.

Physical Conditions - Design Parameters

The scour profile level across the estuary entrance (saddle level), used to assess design wave penetration through the estuary mouth to the seawall is adopted at 0.2m AHD. This level is based on comparatively limited available data, and may not be conservative enough for the critical purpose of assessing and defining seawall design specifications. Importantly, lowering the saddle level will result in larger waves penetrating to the seawall, in turn influencing the stability and capacity of the proposed structure.

It would be appropriate that the DA either more rigorously justifies the adopted saddle level of 0.2m AHD, or undertakes sensitivity testing to determine the implications for seawall design specifications associated with lowering the level. It is noted the Royal Haskoning DHV assessment (accompanying the DA) has identified this issue and suggests that a saddle level of -0.4m AHD could reasonably apply.

The design conditions include a projected sea level increase of 0.8m by 2100 (relative to current day) for water level definition including design storm surge and flood assessment. However, the design conditions do not appear to consider the possible morphological response of the entrance area under projected future sea level rise and associated shoreline recession scenarios (as detailed in the Hazard Study). For example, the DA states that for assessing design physical conditions under climate change induced sea level rise scenarios, the design entrance scour level (saddle level) is kept static at 0.2m AHD. However, this scour level is highly unlikely to remain at this level as the entrance area becomes more of an 'open coast' environment under increased sea level and shoreline recession projections.

It is important to consider future morphological conditions to ensure the seawall design is adequate for its intended design life (50 years), and that impacts associated with the seawall into the future are adequately addressed. Physical design factors which may be altered by sea level rise and associated coastline recession and changes to the morphological conditions at the entrance to Arrawarra Creek may include:

- a) beach berm height and entrance scour levels lowering, in turn increasing wave height and power at the structure, along with increased coastal inundation risk;
- b) altered scour levels at the seawall toe; and
- c) seawall impacts on coastal processes resulting in increased impacts to adjacent lands.

The Flooding and Stormwater Assessment (DA, Appendix D) indicates the following:

- a) modelled 1% flood level today = 2.65m AHD;
- b) in 2050 modelled 1% flood level = 3.08m AHD; and
- c) in 2100 modelled 1% flood level = 3.58m AHD.

The 1% flood levels quoted in Section 3.3 of the Statement of Environmental Effects are inconsistent with those in the Flooding and Stormwater Assessment in Appendix D. This warrants further investigation.

Seawall Design

The maximum crest height of the seawall is 3.0m AHD which is approximately equivalent to the design 100 year ARI peak storm tide level, including wave set-up but excluding wave bore impacts. Therefore, significant wave overtopping of the seawall and coastal inundation of the adjacent land would be expected both now and increasingly into the future under sea level rise projections.

It is noted that the seawall is designed to overtop, and to withstand a 100 year ARI event suffering only 5% damage. A significant reliance in the design performance assessment relates to the structure's ability to withstand the forces and inundation associated with major overtopping. It is not clear that these assumptions have been robustly tested.

The predicted design wave overtopping rates of 400 l/s per metre are very high. Wave overtopping may lead to green-water wave bores propagating at high velocity landward of the wall crest.

The seawall Type 1 design (3m AHD crest) includes an abutment rock at the rear of the wall crest, however, omits a scour blanket. Wave overtopping induced scour of the land behind the wall may undermine the wall stability. For both the Type 1 and Type 2 designs, significant accumulation of seawater behind the wall is also envisaged during very large storm events, as no drainage scheme is proposed. Depending on the severity of the overtopping, development immediately behind the wall may be impacted. This may also create a significant public safety risk. The wave overtopping risk warrants more detailed consideration.

The seawall is likely to be under-designed if the saddle level (0.2m AHD) is lowered to a more conservative, risk averse depth for wave propagation assessment and seawall design assessment (refer to design parameters discussed above). This issue warrants further consideration.

The proposed toe depth of -0.5m AHD for the western and southern wall sections would appear optimistic and non-conservative for design purposes. This estuarine area is highly dynamic and will become subject to more intensive wave and scour impacts should the coast recede under projected sea level rise impacts as forecast in the Hazard Study.

The proposed alignment of the seawall appears to 'reclaim' eroded land at the eastern and western margins of the site. This will result in alterations to geomorphic processes in the locality and potential increases in the velocity of waters adjacent to the proposed structure if the cross-sectional area of the creek is constrained beyond its current condition. The possible impacts to estuarine and coastal processes from the proposed realignment of the existing foreshore does not appear to be assessed or described and warrants further clarification.

Finally, the DA does not provide an adequate level of detail on the proposed seawall monitoring or maintenance regime. This appears to inadequately address the requirements of Section 55M of the *Coastal Protection Act 1979* requiring satisfactory arrangements for the maintenance of the works, and repair of any offsite impacts resulting from the works.

Biodiversity

OEH has reviewed the Statutory Ecological Assessment, prepared by Naturecall (December 2015) lodged as part of the development application for the proposed revetment wall. Rather than preparing a stand-alone ecological assessment for the revetment wall, it appears that the ecological assessment prepared for an adjoining subdivision proposal has also been lodged as part of the revetment wall development application. As such, the Statutory Ecological Assessment is largely silent on the anticipated biodiversity impacts of the revetment wall.

Given the proposed location of the revetment wall within that part of the site zoned E2 – Environmental Conservation (E2 zone), the revetment wall would require significant disturbance to the landform and remnant native vegetation within the E2 zone. The E2 zone in this location provides a 20m riparian buffer to Arrawarra Creek, which forms part of the Solitary Islands Marine Park, as

well as wildlife corridor function for moderately to highly mobile fauna species within a highly fragmented landscape.

OEH's preferred response to managing biodiversity on site is to exclude the placement of any infrastructure, including the proposed revetment wall, from the E2 zone, given these works are inconsistent with the objectives of the zone. Under the Coffs Harbour Local Environmental Plan 2013, the objectives of the E2 zone are:

- to protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values; and
- to prevent development that could destroy, damage or otherwise have an adverse effect on those values.

Coffs Harbour City Council's Development Control Plan 2015 (DCP 2015) states that riparian zones are not to be used for private infrastructure purposes. In addition, the Department of Primary Industries – Office of Water 'Guidelines for riparian corridors on waterfront land' seek to minimise disturbance and harm to the riparian corridor and recommend the location of services and infrastructure outside of riparian corridors.

If construction of the revetment wall has direct or indirect impacts on biodiversity, then these impacts should be offset in perpetuity, in accordance with OEH's 13 principles for offsetting. The offset should include rehabilitation of the E2 zoned land and adjoining land to the west to create a 40m wide vegetated corridor along Arrawarra Creek as per the Office of Water guidelines. This vegetated corridor would also provide an adequate vegetated separation between the existing caravan park and the Solitary Islands Marine Park.

Aboriginal Cultural Heritage

OEH has reviewed the Aboriginal Cultural Heritage Assessment prepared by Everick Heritage Consultants (October 2014) lodged as part of the development application for the proposed revetment wall. Rather than preparing a stand-alone Aboriginal cultural heritage assessment for the revetment wall, it appears that the assessment prepared for the adjoining subdivision proposal has also been lodged as part of the revetment wall development application.

As such, the Aboriginal Cultural Heritage Assessment is largely silent on the anticipated impact of the revetment wall on Aboriginal cultural heritage. Our review identified several inconsistencies and omissions within the Aboriginal cultural heritage assessment and these should be addressed before the development application is determined.

Recommendations

The OEH recommends that prior to determining the development application the NSW Coastal Panel should require the proponent to:

1. Consider coastal inundation, increased wave exposure and scouring of the adjacent intertidal and subtidal substrate in respect of the proposed seawall development and the potential impact on and from physical coastal processes over the intended life of the works.
2. Provide further justification for the adopted saddle level of 0.2m AHD, or undertake sensitivity testing to determine the implications for seawall design specifications associated with lowering the level.
3. Consider future morphological conditions to ensure the seawall design is adequate for its intended design life (50 years) and that impacts associated with the seawall into the future are adequately addressed.

4. Justify the inconsistency of the 1% flood levels quoted in Section 3.3 of the Statement of Environmental Effects with those in the Flooding and Stormwater Assessment in Appendix D.
5. Provide further justification for the revetment wall's ability to withstand the forces and inundation associated with major overtopping and the ability of the structure to protect development immediately behind the wall.
6. Provide further justification for the proposed toe depth of -0.5m AHD for the western and southern revetment wall sections.
7. Provide a description and assessment of the possible impacts to estuarine and coastal processes from the proposed realignment of the existing foreshore.
8. Provide further detail on the proposed revetment wall monitoring and maintenance regime.
9. Demonstrate how the proposal is consistent with Section E1.3 of the Coffs Harbour City Council Development Control Plan 2015.
10. Consider locating the proposed revetment wall outside the E2 Environmental Conservation zone.
11. Provide a biodiversity offset strategy to compensate for the biodiversity impacts of the proposal that accords with the OEH's 13 principles for offsetting at <http://www.environment.nsw.gov.au/biodivoffsets/oehoffsetprincip.htm>. The BioBanking Assessment Methodology and Credit Calculator should be used to determine the type and quantum of offsets required and these offsets should be secured in perpetuity. The offsets should include rehabilitation of the E2 zoned land and adjoining land to the west to create a 40m wide vegetated corridor along Arrawarra Creek.
12. Revise and update the Aboriginal cultural heritage assessment to:
 - a) list known Aboriginal cultural heritage sites in the area and any relationship between those sites and the project area;
 - b) assess the potential for currently unidentified Aboriginal objects to be present subsurface within the project area;
 - c) assess the cultural significance of the project area; and
 - d) correlate the geo-technical investigations and the Aboriginal cultural heritage assessment.

If you have any further questions about flooding and coastal processes please contact Mr Toong Chin, Senior Team Leader, Water Floodplains & Coast, Regional Operations, OEH on 8289 6312 or at toong.chin@environment.nsw.gov.au. Further questions on biodiversity or Aboriginal cultural heritage, should be directed to Mr Dimitri Young, Senior Team Leader Planning, Regional Operations, OEH, on 6659 8272 or at dimitri.young@environment.nsw.gov.au.

Yours sincerely



GABRIELLE PIETRINI
Director, North East
Regional Operations

7 June 2017