

Crown Resorts Limited
Attention: Mr Daniel Prince
36 Clarke Street
Southbank Victoria 3006

Our reference: 8A0341
Date: 9 March 2015

**Subject: Potential Marine Ecology Impacts Relating to
Crown Sydney Hotel Resort**

Dear Daniel,

1 BACKGROUND

The Crown Sydney Hotel Resort is a building to be located adjacent to Darling Harbour (with a public walkway between the structure and harbour), within the Barangaroo South development area. Crown Resorts Limited engaged Haskoning Australia (a company of Royal HaskoningDHV) to provide comment on marine ecology impacts associated with the Crown Sydney Hotel Resort development, as set out herein.

The location of the Crown Sydney Hotel Resort in relation to the overall approved Barangaroo site, and latest (Mod 8 Concept Plan Amendment) Barangaroo South development area, is provided in Figure 1. Client provided information on the Crown Sydney Hotel Resort is provided in Section 2.

2 CROWN SYDNEY HOTEL RESORT

2.1 Site Location and Context

Barangaroo is located on the north western edge of the Sydney Central Business District (CBD), bounded by Sydney Harbour to the west and north; the historic precinct of Millers Point (for the northern half), The Rocks and the Sydney Harbour Bridge approach to the east; and a range of new development dominated by large CBD commercial tenants and the King Street Wharf/Cockle Bay precinct to the south.

The 22ha Barangaroo site is generally rectangular in shape and has a 1.4 kilometre harbour foreshore frontage, with an eastern street frontage to Hickson Road. The site has been divided into three distinct redevelopment areas (from north to south) – the Headland Park, Barangaroo Central and Barangaroo South, and has been subject to multiple investigations that detail the physical and natural characteristics of the site.

2.2 Purpose of Report

This report has been prepared on behalf of Crown Resorts Limited to accompany a State Significant Development Application (SSDA) for the Crown Sydney Hotel Resort at Barangaroo. The Hotel Resort is proposed in accordance with the approved Barangaroo Concept Plan (as modified) and is located within Barangaroo South.

2.3 Crown Sydney Hotel Resort Development

The Crown Sydney Hotel Resort development will comprise a single high rise building that will include a hotel, casino and residential apartments. More specifically approval is sought for:

- construction and use of a hotel, VIP gaming facilities and residential apartment building with associated retail and restaurant uses and a basement car park to accommodate parking and servicing allocated to the proposed uses within the development, comprising a total Gross Floor Area of approximately 77,500m² and a maximum building height of approximately 271 metres (RL 275);
- associated building signage; and
- provision of services and utilities required to service the building.

3 INFORMATION PROVIDED

Haskoning Australia was provided with a set of WilkinsonEyre Architects drawings issued on 4 March 2014. Also, 3 sketches by Robert Bird Group were provided on 9 January 2014, showing indicative piling locations for the Crown Sydney Hotel Resort structure.

4 PROPOSED DEVELOPMENT

Part of the proposed Crown Sydney Hotel Resort footprint is currently a concrete deck suspended on piles over water. The existing deck is to remain, and is to be structurally redundant in relation to the Crown Sydney Hotel Resort. The new construction is to include new steel marine piles (with HDPE protective sleeves) driven through holes cut in the existing deck. In all there are proposed to be 12 piles installed through the existing deck.

Therefore, the only long term change that the proposed Crown Sydney Hotel Resort would have (from an ecological perspective) is the insertion of additional piles into the marine environment. These piles would provide additional surface area habitat for marine growth and colonisation by sessile marine fauna. Construction works may also cause short term impacts on water quality and marine ecology. These potential long term and short term impacts are considered herein.



Figure 1: Location of Crown Sydney Hotel Resort in relation to approved Barangaroo site and latest (Mod 8) Barangaroo South development area

5 MARINE ECOLOGY ISSUES

5.1 Preamble

Haskoning Australia (2014) has prepared an assessment of marine ecology impacts associated with the Barangaroo South development as a whole. It can be noted that the Crown Sydney Hotel Resort is a component of the works assessed in Haskoning Australia (2014) and therefore would only contribute a subset of any impacts assessed therein.

Haskoning Australia (2014) concluded that through thoughtful design, detailing and construction methodology, and by employing appropriate industry standard mitigation measures, the proposed Barangaroo South development would be unlikely to have any significant impacts on the marine environment (including water quality impacts and impacts on flora and fauna), with any impacts being short-term in nature and highly localised.

Specific discussion on marine ecology issues associated with the Crown Sydney Hotel Resort development is provided in subsequent sections.

5.2 Potential Short Term Impacts From Construction Activities

Construction activities associated with the over water development of the Crown Sydney Hotel Resort have the potential to impact on water quality in Darling Harbour. Cutting holes in the suspended deck (for piling) has the potential to generate concrete dust and debris that could enter adjacent harbour waters, while the piling itself has the potential to generate localised short term increases in turbidity through suspension of fine bed sediments.

However, by employing industry standard and appropriate techniques, these impacts can be managed and minimised to acceptable levels. To minimise water quality impacts the following should be undertaken:

- capturing concrete dust/debris and the like that would be generated by cutting holes in the suspended decks for piling by using dust-control devices attached to the tools and an appropriate capturing hopper under the holes;
- disposing of waste materials appropriately, with all waste managed in accordance with NSW EPA Waste Classification Guidelines;
- limiting the dispersion of turbid plumes generated into the marine environment through construction activities by utilising appropriately designed and positioned silt curtains adjacent to the Barangaroo foreshore during the works;
- developing and implementing a Water & Stormwater Management Plan (including a Construction Environment Management Plan and Construction Water Quality Monitoring Plan) in which erosion and sediment management are addressed;
- water quality monitoring surrounding the development, to ensure that water quality conditions are maintained beyond the silt curtains and in the broader area (Lend Lease is currently undertaking water quality monitoring and it is expected that the existing monitoring system could be utilised for this purpose);
- having site spillage equipment available at the site to absorb any spills that may enter the water; and
- the silt curtain should remain in place following construction until turbidity levels within the curtain return to background conditions, reflective of levels outside of the silt curtain and at nominated reference locations.

If these mitigation measures are employed, any impacts of the proposed development on water quality within Darling Harbour are expected to be negligible, localised and short-term in nature.

The Crown Sydney Hotel Resort construction has the benefit that the existing land/water interface (revetment under the suspended deck) would not be altered (except for piling into the revetment). This reduces the risk of releasing any land-based sediments, soils and groundwater into the marine environment. Also, most construction work would be undertaken from land, minimising the use of boats and barges and hence minimising the potential for suspension of bed sediments due to anchoring.

It is understood that all stormwater and wastewater onsite would be contained, collected, decontaminated / treated (at an onsite water treatment plant) and discharged to either the sewage network (under trade waste agreement) or stormwater system.

Noise has the potential to impact on marine and terrestrial biota over the duration of the works (such as from engines, generators, and construction equipment). However, mobile marine and terrestrial fauna have the ability to relocate to other areas during construction and no significant impacts are expected. Noise should be managed in accordance with the *Interim Construction Noise Guideline* (DECC, 2009).

5.3 Potential Long Term Impacts

5.3.1 Marine Vegetation

No marine vegetation (including seagrasses, mangroves, and saltmarsh) was recorded in the vicinity of the proposed development during field surveys undertaken in May 2010, nor was any marine vegetation mapped by DPI (2005) in the immediate area. Due to the lack of aquatic vegetation at or in the vicinity of the Crown Sydney Hotel Resort, no impacts on these habitats are expected.

5.3.2 Wetlands

There are no wetland areas in the vicinity of the proposed development, and hence no impacts on such areas are expected.

5.3.3 Introduced Species / Marine Pests

No introduced marine flora (such as *Caulerpa taxifolia*) was recorded in the vicinity of the proposed development during field surveys undertaken in May 2010, nor was introduced marine flora mapped by DPI (2005) in the immediate area. As such, the proposed works would not have the potential to cause spread of species such as *Caulerpa taxifolia*.

5.3.4 Threatened and Protected Species

As discussed by Haskoning Australia (2014), marine species listed under the *Threatened Species Conservation Act 1995* are unlikely to occur in the vicinity of the proposed development.

Only two turtle species listed under the *Environment Protection and Biodiversity Conservation Act 1999* were noted by Haskoning Australia (2014) as having the potential to occur in the vicinity

of the proposed development, but this was considered to be unlikely due to the high level of boating movements in the area and lack of nesting habitat. The proposed development would therefore not be expected to impact upon any Matters of National Environmental Significance listed under the *Environment Protection and Biodiversity Conservation Act 1999*.

No aquatic vegetation nor threatened species protected under the *Fisheries Management Act 1994* are present in the vicinity of the proposed development.

5.3.5 Aquatic Fauna

The placement of piles into the seabed would displace soft sediment benthic habitat and any associated benthic fauna. The high availability of similar benthic habitat in Sydney Harbour suggests that benthic communities such as those recorded at Barangaroo would be widespread, and thus any localised impacts from the Crown Sydney Hotel Resort development on benthic invertebrate communities would be considered to be negligible.

Mobile fauna such as fish may be impacted by the presence of barges and by noise generated during construction works. However, due to the current high levels of boating activity in Darling Harbour these effects are likely to be negligible. Furthermore, these mobile species can remove themselves from the affected area.

Tidal velocities under and near the Crown Sydney Hotel Resort would not be significantly altered by the proposed works, and therefore there is not likely to be any negative hydrodynamic effect on fish species inhabiting Darling Harbour nor enhanced mobilisation of existing bed sediments.

5.3.6 Stormwater

With adoption of principles of Water Sensitive Urban Design, in the longer term upon completion of construction it would be expected that stormwater quality would be improved. It is understood that stormwater is proposed to be collected for reuse within the development (as a source of irrigation etc) and therefore the quantity of stormwater discharge to Darling Harbour is expected to reduce from current levels.

6 CONCLUSIONS

By employing appropriate industry standard mitigation measures, the proposed Crown Sydney Hotel Resort South development would be unlikely to have any significant impacts on the marine environment (including water quality impacts and impacts on flora and fauna).

7 REFERENCES

DECC (2009), *Interim Construction Noise Guideline*, Department of Environment and Climate Change NSW, DECC 2009/265, ISBN 978 1 74232 217 9, July

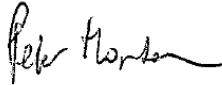
DPI (2005). Mapping the estuarine habitats of NSW – Sydney Harbour.
<http://www.dpi.nsw.gov.au/research/areas/aquatic-ecosystems/estuarine-habitats-maps>

Haskoning Australia (2014), *Barangaroo Stage 1, Barangaroo Concept Plan Amendment (MP06_0162 MOD8), Marine Ecology, Water Quality and Contaminated Sediment Impact Assessment*, prepared for Lend Lease (Millers Point) Pty Ltd, Issue 3 (Final), 14 February

8 SALUTATION

If you have any further queries, please do not hesitate to contact the undersigned on 8854 5110.

Yours faithfully
HASKONING AUSTRALIA



Peter Horton
Principal Engineer

Review / Verification by Date



.....9/3/15
Greg Britton, Director