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The Hon Daniel Mookhey MLC Chair

RE: Parliamentary Inquiry into the impact of the Western Harbour Tunnel and Beaches Link

8 June 2021

Dear Honourable Member Mookhey

On behalf of the members of the Australian Marine Sciences Association, I am pleased to provide this submission to the NSW Legislative Council Parliamentary Inquiry into the impact on the Western Harbour Tunnel and Beaches Link (WHT/BL).

The Australian Marine Sciences Association (AMSA) Inc. represents marine scientists from academia, industry, and government and engages in public policy discussion where we have specialist knowledge. Founded in 1963, AMSA is Australia's peak professional organisation for marine science, representing over 700 professional practitioners across all Australian states and territories. We are a leading organisation promoting the understanding and wise use of our coastal and marine environments. The NSW Branch has over 200 members.

Our comments address term of reference (ToR) (j) the impact on the environment, including marine ecosystems with application to term of reference (i) whether the project is subject to the appropriate levels of transparency and accountability that would be expected of a project delivered by a public sector body.

The Transport for NSW Environmental Impact Statement (EIS, January 2020) and the Submissions Report (SR, September 2020) did not sufficiently consider the impacts to the marine environment and natural resource assets of Sydney Harbour. This is particularly disappointing, considering the considerable improvement of water quality of Sydney Harbour which now supports significant biodiversity as one of the most diverse harbours in the world.

ToR i: Transparency and Accountability
The proponents did not adequately consider the damage that will be caused by redistribution of contaminated sediments and release of contaminants into the water on marine species throughout Sydney Harbour. The Contaminants Factual Report (Golder-Douglas 2017) was commercial-in-confidence, although it contained relevant data on concentrations of contaminants in the sediment (e.g. dioxins, heavy metals, organic chemicals) which are persistent in the environment. This report was not released until after the public submission period was closed. The Submissions Report (SR) showed that additional sediment analyses were undertaken by Royal Haskoning DHV (RHDHV) to incorporate new locations due to the upstream shift of the tunnel alignment (SR, Appendix C2). No results of these new chemical analyses were provided in the Submissions Report. This lack of transparency regarding sediment contaminant information combined with the 1000s of pages of difficult-to-navigate EIS documents clearly show that the WHT/BL project has not been subject to the appropriate levels of transparency expected of a project delivered by a public sector body.

ToR j: Environmental Impact – Sediment Contaminants
The Golder-Douglas (2017) and the RHDHV (2020) reports identify the mixture of contaminants in the sediments including many banned chemicals that are harmful to humans and the marine environment. These legacy contaminants, originating from a history of industrial activities on the foreshores of Sydney Harbour, are persistent and will be with us for at least 100 years. Sediments on the east and west ends of the tunnel corridor

(WHT5, WHT6), where the cofferdams will be constructed, include highly contaminated samples. The sediments of Berrys Bay (WHT7) construction support site contain among the highest levels of toxicants (tributyltin, dioxins, mercury), as detailed in the Sydney Morning Herald article. Construction activities that will be carried out in the harbour including dredging, piling, vessel movements and construction of support sites (WHT7 and Rozelle Rail Yards, WHT1) have high potential to disturb and redistribute contaminated sediment and release toxicants into the water. Due to the dynamic nature of tides and strong currents along the tunnel alignment, it is unlikely that use of shallow silt curtains or the backhoe dredge will contain contaminated sediments (SR, Appendix C1, C2). Measures to contain and track sediment plumes are not convincing, nor is the assumed loss of fine sediment in the EIS (Appendix P, Table 7-2). There are also concerns on the impacts of toxicant mixtures and microplastics released by the dredging and lack of consultation of available literature (see attached recommendations).

The contaminants adhere to the sediment and are therefore taken into organisms on the seafloor when they ingest the sediment. Of great concern is the lack of an acknowledgement that such contaminated organisms are eaten by a wide variety of animals throughout the water column and many of these then disperse throughout the harbour. This includes wading birds feeding on the mud flats. As many of these birds are migratory, they then spread contaminants from sediments far and wide.

The risk of remobilisation and redistribution of contaminated sediments, as a specific impact to Sydney Harbour, was not included in the Environmental Risk Analysis. This analysis also did not identify well-known impacts of water borne toxicants on marine life which includes death and with respect to human health, includes carcinogens. The Revised Environmental Measures (SR Part D) does not include measures to address the risk of environmental poisoning. This is not acceptable and must be addressed before any developments occur.

Crucially, there are no management measures to monitor dissolved toxicants in the waters of Sydney Harbour. For community assurance, this would have to be done in real time with immediate reporting of contaminant levels. In addition to concerns for marine biota, the public have a right to know if they need to curtail on and in water actives (e.g. local sailing and rowing clubs, dive clubs, kayakers, swimmers at local baths).

ToR j: Environmental Impact – Offshore Dumping of Sediments

The Environmental Risk Analysis addresses the Commonwealth Environmental Protection (Sea Dumping) Act 1981, but details of the quantity of the dredged material that will be dumped offshore was not known at the time that the Submissions Report was released (Appendix C2). Additional sampling and analyses were commissioned to satisfy Commonwealth requirements for sea dumping. This information was not provided, and we have particular concerns for sediment contaminated by dioxins and tributyltin. Storage of sediment unsuitable for disposal on barges at the White Bay support site (WHT3) will need careful management, but the measures to be implemented are not clear.

In summary, it is clear that there have been procedural deficiencies in the WHT/BL process, including an incomplete Environmental Risk Analysis with respect to the marine environment. The risk analysis will need to be revisited with special attention to the design and management of the dredging program and construction support sites, including offshore disposal of sediment.

We provide a list of recommendations in Attachment A and relevant scientific publications in Attachment B.

Kind Regards

Dr Rachel Przeslawski
President | Australian Marine Sciences Association

ATTACHMENT A
Recommendations for AMSA Submission to WHT/BL Parliamentary Inquiry

Undertake a comprehensive literature review for accurate assessment of potential impacts.

As detailed by the NSW Parliamentary Research Service, there has been considerable effort to document the toxic chemicals in the water and sediments of Sydney Harbour (Montoya, 2015). It is important that peer-reviewed scientific literature is considered for the WHT/BL project to ensure a robust evidence-based assessment. This literature also provides an independent source of information for evaluation. The toxicity of Sydney Harbour sediments is well-recorded through decades of research, and the risk posed to marine life is significant. Several key pieces of literature do not appear to have been considered when assessing potential impacts (EIS Appendix M). The Marine Estate Management Authority (MEMA) Sydney Harbour Background Report (2014) provides a comprehensive review of estuary characteristics, ecological assets, relevant stressors and harbour use patterns. It will be important that the WHT project proponents avail of up to date knowledge of Sydney Harbour. We provide a list of relevant literature in Attachment B.

Consider significant exposure pathways, contaminant classes and interactions among stressors.

While the Environmental Impact Statement and Submissions Report considered many potential impacts (e.g. habitat removal, turbidity, sedimentation, mobilisation of contaminants, marine pests, altered hydrodynamics, underwater noise, boat strikes, contaminant spills), many important contaminant exposure pathways were not considered. Among the most important are exposure to the fine particulates that resuspended during dredging, the pore waters that will be released and dissolution of toxicants into the water. Contaminants from the WHT dredging have high potential to be accumulated by benthic organisms which then accumulate through the food chain causing loss of biodiversity. This bioaccumulation prompted restrictions on consumption of fish caught in the WHT region by the NSW Government, in place since 2006. The potential that contaminants released from the sediment have negative combined effects should not be ignored. For example, while the EIS considers that increased turbidity and sedimentation would not substantially impact on seagrass communities, there is potential for these stressors to interact in combination with metal contaminants. The interaction of mixtures of chemicals as found in the sediments can be highly damaging to biota.

The abundances of microplastics in the sediments in the WHT corridor have not been quantified or considered as at risk of resuspension during dredging. Similarly, there has been no quantification of pathogenic bacteria or resting cysts in the sediments that might be released during dredging and pose a human health risk or result in a harmful algal bloom.

Ensure data transparency.

Other than the analysis published for Berrys Bay (SMH, Feb 2021) there are no publically available summaries of the sediment contaminant data including mean, standard error/deviation and sample size. This information is important within location because sites across the WHT corridor differ greatly in industrial history, hydrodynamics and sediment type. QA/QC information should be presented that includes at a minimum the detection limits of relevant analytical equipment, the certified reference materials used and recoveries. This information is needed to allow independent assessment of the nature and extent of contamination.

The time periods chosen to sample the water quality should also be justified since only one wet weather event was captured. It should be clarified whether these were spot measurements or continuously logged to understand tidal changes. Visual monitoring from the harbour surface is proposed to understand the impacts of underwater noise and vibration on marine assemblages; this is inappropriate given the predicted increase in sedimentation and turbidity and low likelihood that visual monitoring below the water will be possible. In addition, there visual monitoring does not consider sub-lethal or cumulative impacts.

Develop and implement effective containment and monitoring measures for dredging activities.

There is a substantial risk of remobilisation of highly toxic chemical mixtures in sediments along the corridor of the WHT, especially at the Waverton end. There is also a very high risk of release of contaminants from sediments of the project support site at Berrys Bay. This was not considered in the Environmental Risk Analysis. Shallow silt curtains will not prevent movement of contaminated particulate fines or prevent dispersal of toxic sediment pore water. Dredging activity is likely to release toxicants from the sediment into the water. Extensive sediment plume mobilisation and toxicant release will be compounded by vessel movements, tidal water movement, wind movement and in the bodies of mobile animals. Monitoring of plumes, movement of fine particles and concentrations of chemicals in the water is required in parallel with all construction activity.

Provide sufficient information about reinstatement of natural habitats

The process intended for reinstatement of natural habitats (rocky reef and sediment) is not provided at the level of detail needed to assess the potential for recovery after the works. Further information about substrate types, sources, reconstruction methods should be included.

ATTACHMENT B
Scientific literature pertinent to Sydney Harbour and dredging

Anim et al. (2020) Occurrence and distribution of pharmaceuticals, personal care products, food additive and pesticides in surface waters from three Australian east coast estuaries, Mar Poll Bull 153 111014

Birch & Taylor (2002) Application of sediment quality guidelines in the assessment and management of contaminated surficial sediments in Port Jackson (Sydney Harbour), Australia. Env Mgt 29:660-670.

Birch et al., (2007) The source and distribution of polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofurans in sediments of Port Jackson, Australia. Mar Poll Bull 54: 295-308.

Birch et al., (2007) The source and distribution of polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofurans in sediments of Port Jackson, Australia Mar Poll Bull 54: 295-308.

Birch et al., (2008) Contaminant chemistry and toxicity of sediments in Sydney Harbour, Australia: spatial extent and chemistry-toxicity relationships. Mar Ecol Prog Ser 363: 71-87;

Birch (2017) Assessment of human-induced change and biological risk posed by contaminants in estuarine/Harbour sediments: Sydney Harbour/estuary (Australia). Mar Poll Bull 116: 234-248.

Birch & Lee (2018) Baseline physico-chemical characteristics of Sydney estuary water under quiescent conditions. Mar Poll Bull 137: 370-381.

Birch et al. (2018) Complex relationships between shallow muddy benthic assemblages, sediment chemistry and toxicity in estuaries in southern New South Wales, Australia. Mar Poll Bull 129/2: 573-591.

Birch et al. (2018). The relationship between metal concentrations in seagrass **(***Zostera capricorni*) tissue and ambient fine sediment in modified and near-pristine estuaries (Sydney estuaries, Australia). Mar Poll Bull 128: 72-81.

Birch et al. (2018) Metal concentrations in seagrass (*Halophila ovalis*) tissue and ambient sediment in a highly modified estuarine environment (Sydney estuary, Australia). Mar Poll Bull 131: 130-141.

Birch G. F. & Lee S. B. (2018) Baseline physio-chemical characteristics of Sydney estuary water under quiescent conditions. Mar. Poll. Bull., 137: 270-381.

Birch et al. (2019) Metal concentrations in Sydney Cockle (*Anadara trapezia*) tissue and ambient sediment in a highly modified estuary (Sydney estuary, Australia). Mar Poll Bull 144: 299-308.

Birch et al. 2020. Sediment metal enrichment and ecological risk assessment of ten ports and estuaries in the World Harbour Project, Mar Poll Bull doi:10/1016/j.maepolbul.2020.111129

Drage et al. (2015) Historical trends of PBDEs and HBCDs in sediment cores from Sydney estuary, Australia. Sci Tot Env 512-513: 177-184

Fraser et al. (2017). Effects of dredging on critical ecological processes for marine invertebrates, seagrasses and macroalgae, and the potential for management using environmental windows. Ecol Indicators 78: 229-242.

Hutchings et al., (2013) Sydney Harbour: its diverse biodiversity. Aust Zool 36: 255-320

Johnston et al. (2015). Sydney Harbour: what we do and do not know about this highly diverse estuary. Mar Freshw Res 66: 1073–1087.

McCready et al., (2000) The distribution of polycyclic aromic hydrocarbons in surficial sediments of Sydney Harbour, Australia. Mar Poll Bull 40: 999-1006;

McCready et al., (2006) Relationship between toxicity and concentrations of chemical contaminants in sediments from Sydney Harbour, Australia, and vicinity. Env Mon Ass 120: 187-220;

MEMA Sydney Harbour Background Report (2014) Sydney Institute of Marine Science prepared for NSW Department of Primary Industries

Montoya (2015) Pollution in Sydney Harbour: sewage, toxic chemicals and microplastics. NSW Parliamentary Research Service Briefing paper 03/2015

Mortimer (2004) Tributyltin (TBT) Analysis Protocol Development and Current Contamination Assessment. A Report from Natural Heritage Trust (Coast and Clean Seas) Project No 25425, Australian Government

Consultant and Government Reports

Golder-Douglas 2017 Contamination Factual Report – Marine Investigations, Submitted to Roads and Maritime Services

Transport for NSW Western Harbour Tunnel and Warringah Freeway Environmental Impact Statement, January 2020

Transport for NSW Western Harbour Tunnel and Warringah Freeway Upgrade Submissions Report, September 2020

Appendix A– Environmental risk analysis.

Appendix C1– Responses to community issues.

Appendix C2– Responses to Environmental Protection Authority issues.

Part D Revised Environmental Management Measures