The Director, Transport Assessments
Planning and Assessment
Department of Planning, Industry and Environment
Locked Bag 5022
Parramatta, NSW 2124 26 March 2020

From: Dr Maria Byrne
Address: 24 Grove St, Birchgrove NSW 2041
Re: Western Harbour Tunnel and Warringah Freeway Upgrade, Environmental Impact Statement: Project 1045; Application No: SSI 8863
Declaration: I have made no political donations in the past 2 years

Dear Sir/Madam

I write in strong objection to the Western Harbour Tunnel (WHT) and Warringah Freeway Upgrade as a marine scientist concerned about impacts to human and environmental health and as member of a community that will be impacted by this development and with concerns for Sydney's future. This submission is prepared with respect to the Environmental Impact Statement (EIS) and the Secretary's Environmental Assessment Requirements (SEARS). The EIS is a difficult to read inaccessible document 1000's of pages in length much of which is repetitive, has superfluous information, is difficult to navigate and seems designed to challenge the reader and deter critical assessment.

Objections

- The EIS scope of work ignored expansive and detailed scientific knowledge key to informing the public, including the toxicity of sediments in WHT proposed area.
- Independent empirical data on metals, dioxins, furans, PCBs, OCs and PAHs as well as on emerging toxics (PBDEs, HBCDs) in the sediments and the toxicity of chemical mixtures were not considered.
- Migration of sediments and toxic contaminants is of great concern especially with respect to the chemical mixtures and the additional risk of acid soil leachate.
- There are no quantitative data on sediment contaminants. Thus, the EIS fails the SEARS. Use of "x" in Table B.1 (Appendix M) to indicate toxics of concern is inadequate. Data on contaminant concentration and methods used must be made available in accordance with NSW EPA guidelines with accessible maps showing sites of sample collection.
- Appendix M was not prepared in accordance with current Sediment Quality Guidelines and so did not meet the SEARS.
- Major pollution and environment impacts such as fish kills, and human exposure seem inevitable. Shallow silt curtains will not prevent movement of contaminated particulate fines. Full-length curtains anchored to the seafloor are the only viable method of control. No curtains can prevent dispersal of toxic sediment pore water.
- In accordance with the SEARS the Proponent must verify the risk of acid sulphate soil/sediment (ASS) disturbance and the impact of ASS runoff. This was not done.
- To meet the SEARS and consideration of contaminant mixtures, the toxicity of the sediments and pore water has to be quantified to determine if remediation is required.
- In accordance with the SEARS, no decision to excavate sediments can be made until the data on the concentration of the contaminants are provided, the volumes of

contaminated sediment to be excavated documented and the requirement that this be addressed as a remediation project assessed.

- The EIS has not properly assessed the alternatives for transport.
- The EIS does not adequately address the human health concerns: the impacts of noise, offensive odours, air quality and exposure to contaminated sediments in waters of Sydney Harbour and through aerosol spread of transported/stored sediment.

Part 1: Inadequate data and assessment of the risks to human and environmental health due to disturbance of contaminated toxic sediments.

Comments on Appendix M – Contamination

The EIS does not consider the environmental impacts and toxicity of chemical mixtures in the sediments and the high risk of remobilizing the toxic cocktail of persistent bioaccumulative chemicals and heavy metals. Due to the limited scope of EIS work, decades of research (full citations listed below) that have quantified contaminant levels in Sydney Harbour sediments, including White Bay and other areas within the WHT project site were not considered. The MEMA Sydney Harbour Background Report (2014) prepared for NSW Department of Primary Industries was also a missed resource.

This weight of evidence from decades of research shows that Sydney Harbour sediments are among the most toxic globally. The contaminant mixture includes a suite of metals (Birch et al. 2017) and a broad range of non-metallic contaminants including organochlorine pesticides (OCs, Birch and Taylor 2000), polycyclic aromatic hydrocarbons (PAHs, McCready et al. 2000), dioxins and furans (Birch et al. 2007), polybrominated ethers (PBDEs) and the highly toxic biocide antifoulant chemical tributyltin (Mortimer 2004; MEMA, 2014). It is the chemical mixture and the sediment pore water that creates toxicity to marine life (McCready et al. 2006: Birch et al. 2008). These chemicals have severe impacts on human health as carcinogens. These are listed in Tables 4.2, 5.2 as "Potential" contaminants. This is misleading when in fact they have been verified as being present on pages 56 and 57.

Given the availability of publicly available scientific data on levels of contamination in the sediment, including in the region of the WHT project, why did the Proponents not consider or at least incorporate/acknowledge the existence of these data in the scope of Appendix M. One can only surmise that they chose not to use this information. Of most concern is that the contamination data assimilated for this EIS is confidential (Sydney Morning Herald, 18 March 2020). Thus, the community is within its rights to have no confidence in this EIS process. We have no ability to independently assess the veracity of the EIS with regard to contamination of the sediments and associated risks to the environment and human health.

That the sediments of the area are contaminated is well known because concerns for human and ecological health prompted the NSW Government to ban commercial fishing in 2006 and place restrictions on eating fish caught in the area of the WHT project due to dioxin levels in fish tissue and fisher families with body burdens of toxicants. Given the industrial history of White Bay, Berrys Bay and vicinity (e.g. Ballast Point Oil Depot, Waverton Gasworks), the weight of evidence points strongly to significant contamination of the sediments that will be disturbed during construction. In context with the strong regulatory policies of the NSW Government, it is surprising that this issue was not in sharper focus in the EIS, especially with respect to dioxins, TBT and metals (mercury, arsenic, lead, etc).

Appendix M lacks veracity as there are no quantitative data on sediment contaminants. Use of ”x” in Table B.1 to indicate toxics of concern is inadequate. Data on concentration of contamination and methods used must be made available with maps showing sites of sample collection. No data were provided in Appendix M to support the findings. There is no information on how the samples were collected, how they were handled, how analysed, how many samples per site and at what depth, etc. To meet the SEARS requirement, replace the “x’s” in Table B. with mean concentration levels, standard error/deviation and sample size. A methods section is needed to explain how this work was done and the quality assurance – quality control measures in place. As a matter of urgency and to provide the transparency required for independent assessment, the proponents should release the data in DGPA (December 2017). Importantly, there are no data on the sediment from Berrys Bay, an omission that is does not comply with the SEARS.

I note that the report refers to ANZECC (2000) Interim Sediment Quality Guidelines. This document is out of date and is not in accordance with SEARS. The proponents should have used current guidelines (Simpson et al. 2013).

In parallel with the sediment contaminant load there is a strong possibility that WHT construction will mobilise acid sulphate soil/sediment (ASS) leachate with the release of sulphuric acid into the environment. These leachates reduce seawater pH and thereby increase the bioavailability of metals and other contaminants in the sediment. The combination of ASS and chemical mixtures in sediment and pore water presents a very high risk to marine life including mortality. This was not considered in the EIS.

The EIS states that shallow silt curtains (2-3 m depth) will be considered as a mechanism to prevent movement of contaminated sediment and that transport of the sediment away from the site is a low risk with respect to modelling of water movement. On the other hand, it is stated that long curtains can’t be used because of tidal water movement and maritime activity. These two statements are in direct conflict with each other. There is no doubt that sediment plumes will be transported eastwards towards Birchgrove/Snails Bay and westwards towards the Dawn Fraser Baths, the Balmain Sailing Club, local beaches and further up the Parramatta River as well as the Greenwich Baths, with high risk of human exposure. Moreover, animals, including bottom feeders, that will be exposed to the sediment such as fishes and prawns migrate broadly in the Harbour and will transport the toxic load in their bodies. Full-length curtains anchored to the seafloor are the most appropriate method to manage this risk. However, no silt curtains can prevent dispersal of sediment pore water – which is a major exposure source of toxicity as also the case for fine particulates which are associated with toxic metals (Birch and Lee 2018).

Given what we know about the sediments and how they and associated contaminants will migrate away from the work site by wind and currents and in the bodies of mobile animals, the Proponent must rigorously address the question on remediation of the sediments with respect to the EPA Guidelines (Contaminated land Management Act 1997) (SEARS). Methods used in thermal treatment remediation of similarly contaminated sediments (with regard to component chemicals) at Homebush prior to being safely disposed of in landfill need to be assessed with validation before proceeding with the project. Remediation was not considered in Table 9.1 in the Risk Management section. This is an urgent matter considering the Proponents have applied for a permit to dump sediments offshore and have not stated how they will monitor the safety of the sediments during excavation. Dynamic testing is needed to

confirm the sediment status. The general lack of attention to remediation is a shortfall of the EIS not in accordance with SEARS.

Comments on Appendix Q – Marine Water Quality

Appendix Q did not avail of up to date research on the marine water quality of Sydney Harbour. The study of Birch and Lee (2018) presents the baseline physico-chemical characteristics of the water in Sydney Harbour including the area of operation of the WHT project. Sydney Harbour is characterised by long periods of dry weather when suspended material would be low, punctuated by infrequent high-rainfall events when resuspension would occur. On average Sydney experiences 265 dry days annually. An important parameter not considered in Appendix Q is particulate metal concentrations. On most days the particulates in the water are in the fine fraction category which are associated with a range of metals (e.g. Co, Cu, Pb, Zn), see Birch and Lee (2018). This Appendix also did not consult detailed scientific literature on sediment contaminants.

There were qualitative assumptions as to the sediment loads that local species may be "adapted" to. With respect to this statement, the appendix did not consider the changes in the water quality of Sydney Harbour over the last 10-15 years in association with the clean-up of Homebush Bay, storm water management and improvement of sewage infrastructure. Over these years the clarity and quality of Sydney Harbour including in the vicinity of the WHT project has markedly improved. The area now supports expansive growth of kelp and sea grass. The sediment plume that will be created by the WHT project will reduce the light penetration that these plants depend on and smother them – resulting in mortality of key habitat forming species. These plumes will occur at times and with the frequency that local species are not adapted to and will very likely have negative impacts (see Fraser et al., 2017). I have a major objection to the conclusion that the marine biota are well adapted to the suspended solids such as in Sydney Harbour because the nature of these solids have changed markedly due to the clean-up of the Harbour and efforts to avoid disturbance of sediments. Recent studies have shown that Sydney Harbour supports a great diversity of species (MEMA 2014; Johnson et al. 2015). We now have iconic species visiting the Harbour including cetaceans and Little Blue Penguins are often seen in Balmain. Many species now occur in greater abundance compared with previous levels. These species would not have been "adapted" to the previous impaired state – or what is alluded to as "background" conditions (p. 24). The WHT project risks reversing the positive gains we have seen in the Harbour.

With respect to dredging, Appendix Q cites an outdated and inaccessible study from Florida (McArthur et al., 2002). I suggest that the Proponents consult more recent Australian research on the impacts and management of dredging and links to better practice and considerations for the receiving environment. The science around dredging and identification of dredging windows to reduce environmental impact has benefitted from the experience of the dredging of Gladstone Harbour and from locations in Western Australia (Review Fraser et al. 2018 and references therein). The dredging effect simulations (p. 23) will need to be revisited based on up to date information and a better understanding of critical ecological processes (Fraser et al. 2018), the hydrodynamics of the area and with respect to contingencies such as East Coast Low events. It is very likely that the mobilised sediments will contaminate other areas of the Harbour. Statements that it is "unlikely that water quality would be significantly impacted by contaminants mobilized" by the WHT project (p. 55) are equivocal.

Due to the poor research and lack of consultation of published scientific evidence, there are no grounds to support the conclusion that it is unlikely that the water quality will be significantly impacted by sediment contaminants (p 1) or the statement that the project has been designed to minimise potential impacts to marine water quality (p. 11). That the contaminants exceed guidelines and can be mobilized is mentioned on pages 30-31 and on page 46 it is stated that "Sediment sampling carried out for the project (for Sydney Harbour, White Bay and Berrys Bay) found that selected contaminants are generally above guideline criteria in samples collected (Douglas Partners 2017)".

There is no mention of pore water impacts on water quality on page 51or on particulate metals. Pore water movement cannot be controlled, or managed, and fine particulates are particularly challenging to manage. The statements on pg. 51 also do not consider toxic mixture and how potential acid sulphate soil (ASS) leachate will change the sediment-contaminate relationship to make the toxics more bioavailable. I note that ASS is mentioned on p. 56 but not with respect to potential interactions with other contaminants.

As noted on p. 24 there are no data on the tolerance of local species to turbidly and sediment loads – including contaminated sediments. No decision to excavate sediments can be made until the toxicity of the sediments/porewater and tolerance of local species is determined and the requirement that the WHT project be addressed as a remediation project assessed.

With respect to environmental offsets (Section 1.7) there are no details and how would this work. Unlike the terrestrial environment there are no borders on the water. The disturbance of the sediment has potential to cause widespread deleterious effects on marine water quality eastwards and westwards from the dredge site due to disturbance and migration of sediments.

The predictive modelling of suspended sediment plumes and sediment deposition with regard to hydrodynamics simulations (p. 17) do not a reflect what is known about water movement and waves in the dredge area (SMH, 18 March 2020) and does not appear to include the dynamics of shallow water areas of the WHT project. In my experience, being on the water regularly, due to wind, waves, tides and activity the waters around Yurulbin Point and across to Berrys Bay are highly dynamic and water movement would certainly cause dispersal of dredge plumes. Importantly, in East Coast Low conditions winds come directly into the WHT project area. This has not been mentioned. The Proponents do not have any contingency management plans for extreme weather events. Targeted research and more rigorous data are needed on the hydrodynamic-sediment plume transport in the exact area of WHT operation.

Comments on Appendix T – Marine Ecology

As above, Appendix T also did not avail of up to date publicly available literature on sediment contaminants and water quality that impact all aspects of the biology and ecology of marine species in the region of the WHT project and beyond. I ask why this Appendix cited Montoya (2015) from the NSW Parliament instead of peer reviewed scientific literature. My comments on Appendices M and Q are directly relevant to this section of the EIS. The risk assessment in Appendix T did not use the best available data in the modelling. Appendix T did not incorporate the impacts of chemical mixtures, fine particulates with metals in the water column or disturbance of pore water on biota, bioaccumulation of toxicants by local species and lacks toxicity data. Thus, insufficient information was used to assess impacts on marine ecology.

There is expansive superfluous text on species that do not occur in Sydney Harbour such as sea turtles and white sharks. As a result, much of the assessment is off base and not relevant. In recent times there have been extensive studies of the species that reside in the Harbour (Johnson et al. 2015) and these should have been the focus.

What does this sentence mean (p. 100) "accumulation of contaminants in sea grass rather than physiological impacts"? What about trophic transfer of contaminants through the food chain? Many small invertebrates that are fish food eat sea grass. On the same page the statement that most of the dredge accumulated sediment would mostly likely be uncontaminated is in conflict with rigorous scientific analyses.

With regard to impacts of sedimentation and contaminants of sea grass and rocky reefs, I advise the Proponents to consult more recent research (see review Fraser et al., 2017). There are extensive patches sea grass and kelp in the area of the WHT proposal. These are highly sensitive habitats for fishes and invertebrates and are particularly important for biodiversity in general. These key habitats and will undoubtedly be impacted by this project.

Part 2: Inadequate consideration of the alternatives and impacts to the community and health risks.

The EIS has not properly assessed the alternatives for transpor, an omission that is does not comply with the SEARS. Rather than overarching statements that this is by far the best option, the community needs to see the facts. The EIS does not present a business case for this very costly project ($16 bn estimate) at a time when the funds would be better placed in addressing the problems of current transport infrastructure. The roads that will receive the tunnel traffic are inadequate and this will result in moving traffic congestion elsewhere. This project will not solve the problems of traffic congestion in Sydney. The NSW Government has to reassess the role of public transport, in particular trains. The WHT project is based on flawed assumptions with respect to the demand for public transport. Given the economic disaster of the COVID 19 pandemic we can little afford a new $16 bn project.

On March 14-15 The Sydney Morning Herald published an exclusive article entitled "NSW leads the way towards net zero by 2050" in a focus on electricity supply. The WHT and the associated West Connex by design will result in more cars on the road causing a significant increase in emissions and contribute to climate change. If the NSW Government is serious about the net zero goal the need for the WHT and similar projects should be reassessed. We need serious action on climate change in a smarter approach than digging tunnels – with better public transport as the key.

The community is rightly concerned about vibration and potential damage to homes as already seen in similar tunnelling projects in Sydney. The prediction that only properties within a 50 m distance from tunnelling will be impacted is not convincing as in previous projects the homes of residents 300 m away from tunnelling were impacted.

The trucking and transport of the vast volumes of dredge spoil that will be required for this project and the storage of this sediment will have a massive impact on residents. The odour levels will be untenable and there is the risk of aerosol spread of toxic contaminants as well as toxics from unfiltered tunnel exhaust stacks. The noise of the WHT works will also be a major impact. The EIS does not adequately address the human health concerns with respect

to the impacts of noise, air quality and exposure to contaminated sediments in waters of Sydney Harbour.

In closing, I have grave concerns for Sydney Harbour which after 100+ years of being used as a toxic dumping ground has recovered and continues to improve to the point that it now supports a great diversity of marine life. The clarity and quality of the water is the best it has been since industrial times. Sydney Harbour is a resource to treasure now and for future generations. I also have concerns as to the direction the WHT and related projects are taking the people of NSW and the message the such projects deliver. We are at a critical juncture in climate change. For a more sustainable lower emissions future for NSW, alternatives to the WHT and big transport projects must be considered as an utmost priority.

The weight of evidence shows that the WHT project should not proceed and that the EIS was not prepared in accordance with the SEARS. If you have any questions do not hesitate in getting in contact.

References

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