

21 July 2017

Committee Secretary  
Senate Standing Committees on Environment and Communications  
PO Box 6100  
Parliament House  
CANBERRA ACT 2600

Senate Environment and Communications References Committee for inquiry

**Current and future impacts of climate change on housing, buildings and infrastructure**  
**Institute of Public Works Engineering Australasia (IPWEA) and Northern Beaches Council joint-submission**

The Institute of Public Works Engineering Australasia (IPWEA) and Northern Beaches Council are pleased to provide the following submission on the Senate Inquiry into the current and future impacts of climate change on housing, buildings and infrastructure

**Institute of Public Works Engineering Australasia (IPWEA)**

IPWEA is the peak not-for-profit association for public works and engineering professionals across Australia and New Zealand. It provides training, publications and advocacy to support its 4,000-plus members and 20,000 community of engineering professionals who provide essential community infrastructure.

**Northern Beaches Council, Sydney, New South Wales**

On 12 May 2016, the Northern Beaches Council was amalgamated from the former Manly Council, Pittwater Council and Warringah Council. The Council covers an area of 254km<sup>2</sup> and extends from Manly in the south to Palm Beach in the north and Davidson and Duffys Forest in the west. The Northern Beaches Council Local Government Area (LGA) has a population of 263,413 with 31,000 businesses generating \$13.33 billion gross national profit. The area comprises 80km of coastline and 100km<sup>2</sup> of natural areas which is over a third of the LGA and rare for the largest city of a country. The Northern Beaches LGA contains 150 sportsfields, 220 playgrounds, 21 surf clubs, 25 rockpools, 10 libraries, seven childcare centres, two aquatic centres, 20 surf life saving clubs and 50 community centres.

## Introduction

In December 2016, Local Government New South Wales (LGNSW) under the Building Resilience to Climate Change (BRCC) grants program, awarded the Northern Beaches Council in partnership with IPWEA, funding of \$80,000 for the 'Building Resilience into Infrastructure' project which will produce a *Practice Note 12.1: Climate Change Impacts on Assets* - as an addition to a suite of Useful Life of Infrastructure Assets Practice Note. Practice Note 12.1 is being developed in conjunction with the Northern Beaches Council so that it is able to be piloted at the local government level on several case studies to ensure its applicability and useability for local government infrastructure asset managers. Subsequently, the subject of this Senate Inquiry is directly related to this industry Guidance Practice Note for practitioners across Australia and New Zealand.

IPWEA and the Northern Beaches Council have addressed the following key terms of reference to this Senate Inquiry its submission:

- Recent and projected changes in sea level rises, and storm surge intensity;
- Recent and projected changes in temperature and precipitation;
- Recent and projected changes in extreme weather, including heatwaves, bushfires, flood, and cyclones;
- The impact of these changes on the vulnerability of infrastructure in coastal areas
- The impact on financing and insurance arrangements for housing, buildings and infrastructure; and
- The adequacy of current state and Commonwealth policies to assess, plan and implement adaptation plans and improved resilience of infrastructure.

### ***Recent and projected changes in sea level rises, and storm surge intensity***

Recent data released by the United States National Oceanic and Atmospheric Administration (NOAA) has found that global mean sea level rise (GMSLR) is tracking well above the Intergovernmental Panel on Climate Change (IPCC) projections. The Gravity Recovery and Climate Experiment (GRACE; NASA 2017) twin satellites which were launched on 17 March 2002, are providing real time data with sea level rising 23.4 millimetres per year. The real time NASA data found that GMSLR is projected to rise from 2.0 meters to 2.7 meters (NOAAa 2017), which is tracking well above the likely range of global mean sea level rise (GMSLR) RPC8.5 projections (0.45m to 0.82m) as listed under IPCC AR5 (2013). The NOAA 2017 Report has recently projected sea level rise by 2100 to be up to 2 meters in Australia at the highest tide (NOAAb 2017).

### ***Recent and projected changes in temperature and precipitation***

In its annual *Statement on the state of the global climate* (WMO 2017), the World Meteorological Organization (WMO), declared that 2016 was the warmest year on record averaging 1.1°C above the pre-industrial period, and 0.06°C above the previous records set the year before in 2015.

The *Australian Rainfall & Runoff: A Guide to Flood Estimation* (ARR; Geoscience Australia 2016), has acknowledged that there is widespread acceptance that human



induced climate change has the potential to alter the prevalence and severity of rainfall extremes and storm surge. It also recommends that "recognition of the risks associated with climate change is required for better planning for new infrastructure and mitigating the potential damage to existing infrastructure".

ARR uses data from the Climate Futures web tool that was jointly developed by CSIRO and the Bureau of Meteorology (BoM). Projected changes from the Global Climate Models (GCMs) are provided for a range of timescales and across the four Representative Concentration Pathways (RPCs: 2.6, 4.5, 6.0 and 8.5) for greenhouse gas concentrations relative to pre-industrial levels that drive the GCMs.

ARR recognises there is more confidence in GCM simulations of temperature than for rainfall. Further work is being undertaken by the CSIRO to increase the reliability of projecting rainfall extremes at a localised scale and recommends the use of multi-GCM models (Rafter 2016). There has also been recent research undertaken using Tropical Cyclone Yasi as a case study that found a link between increased sea surface temperature to increased rainfall and wind speeds that has follow on effects for East Coast Low systems (Lavender 2016).

The NSW and ACT Regional Climate Modelling (NARClIM) was released in 2014 and provides the most up to date climate projections at a scale of 10 km<sup>2</sup>. Rainfall variability is clearly recognised as having a greater variability in coastal areas than inland areas (OEH 2014). Rainfall projections on the Northern Beaches, across each of the four seasons, range from: -27% to +43% by 2030; and -38% to +42% by 2070.

***Recent and projected changes in extreme weather, including heatwaves, bushfires, flood, and cyclones***

The World Economic Forum's Global Risks Report 2017 (WEF 2017) identifies extreme weather events and failure of climate change mitigation and adaptation as a central feature of the Global Risks Perception Survey. Accelerating action on climate change was ranked as the fifth highest global risk for 2017 where urgent action is needed.

***The impact of these changes on the vulnerability of infrastructure in coastal areas***

The report released by the Climate Council on 17 September 2014, *Counting the Costs: Climate Change and Coastal Flooding*, undertook an evaluation of the risks to Australia from climate change impacts and the cost associated with no action resulting in greater than \$226 billion in Australian coastal infrastructure from asset exposure around Australian coasts from 2100 climate change projections.

Over the last two years, natural disasters were declared on the Northern Beaches in Sydney for the storms and floods in April 2015 and June 2016 (Emergency NSW 2017). The Northern Beaches Council has written to the Prime Minister of Australia recommending the collaboration of all tiers of government to establish a national beach nourishment program in response to sea level rise and coastal storms associated with climate change impacts to maintain social and economic benefits to Australia, particularly in high tourism and population areas ([Attachment A](#), [Attachment B](#)). This



highlights the lack of a national coastal adaptation strategy that prioritises and finances specific actions.

***The impact on financing and insurance arrangements for housing, buildings and infrastructure***

The Australian Prudential Regulation Authority (APRA; Summerhayes 2017) addressed the Insurance Council of Australia's 2017 Annual Forum on climate risk and financial implications resulting from both physical risk as a direct result of damage to assets from severe weather; and transition risk to a low-carbon economy. Financing that facilitates integration across research agencies, government, Non-Governmental Organisations (NGOs) and business would enable leveraging of funds from private sector to achieve greater capacity for building more resilient infrastructure.

***The adequacy of current state and Commonwealth policies to assess, plan and implement adaptation plans and improved resilience of infrastructure.***

The Australian Standard (AS 53347:2013), *Climate change adaptation for settlements and infrastructure – A risk based approach*, provides very generic guidelines on the identification of climate impacts on infrastructure according to the risk management process. A national standard that provides further guidance on climate change adaptation options that builds resilience into asset classes such as community facilities, transport including ports and coastal recreational infrastructure; in addition to critical infrastructure including electricity distribution networks, telecommunications, stormwater, wastewater and roads is required.

The National Climate Change Adaptation Research Facility (NCCARF) undertook a report on 'Quantifying the cost of climate change impacts on local government assets' which found that Australia's 560 Councils managed assets which were valued in 2012 at approximately \$212 billion with many containing life spans over 50 years. Building climate resilience into infrastructure assets is important to prevent greater financial, social and environmental costs to the community in the future. This can be achieved by ensuring that life-cycle assessments incorporate climate change projections into the useful lives of assets and depreciation values so that adaptation options can be considered to provide greater value for money for the community.

The recent Australian Government's Review of Climate Change Policies Discussion Paper only focused on mitigation with adaptation being omitted. The importance of climate change adaptation is set out in Article 7 of the Paris Agreement (UNFCCC 2015), and the reference to the Cancun Adaptation Framework (UNFCCC 2010), which states that "In the Agreements, Parties affirmed that adaptation must be addressed with the same level of priority as mitigation". The status of climate change adaptation policy at the Federal level should subsequently also have been addressed in this discussion paper. The Australian Government (2015) published the 'National Climate Resilience and Adaptation Strategy' in the lead up to the UNFCCC 2015 Paris Climate Conference. The review fails to acknowledge this strategy or discussion around the progress of its implementation such as policy, funding and incentives for addressing climate change adaptation. Additionally, whilst accounting for climate change mitigation seems to be fairly progressed, there is no similar mechanism for climate change adaptation. Climate change policy needs to establish metrics for



climate change adaptation and set quantifiable targets which can be used at the local government level for infrastructure management planning that addresses life-cycle assessment.

The Productivity Commission (2014) Inquiry into the Natural Disaster Funding Arrangements, recommended that the future risks of natural disasters should be considered in the development of a formula for allocating mitigation funding at the federal level to be distributed to state and territory governments on the basis of where such funding is likely to achieve the greatest net benefits. Determining national guidance on the useful lives of assets that incorporate the impacts resulting from climate change, would assist with determining asset value and depreciation rates to assist calculations of net benefits over the asset life-cycle assessment.

### **Recommendations**

1. To recognise the work being undertaken by IPWEA to develop national industry guidance to assist with building climate resilience into infrastructure across Australia and New Zealand that is able to be applied at the local level through local partnerships such as the with the Northern Beaches Council on the LGNSW BRCC grant funded Building Resilience into Infrastructure Assets project.
2. To fund a national climate change adaptation program that includes priorities for actions to build climate resilience into infrastructure that facilitates integration across research agencies, government, NGOs and the private sector.

### **Conclusion**

The Northern Beaches Council in conjunction with IPWEA appreciates the opportunity to provide a formal submission into the Senate's Inquiry into the current and future impacts of climate change on housing, buildings and infrastructure. If clarification regarding any part of this submission is required, please contact:

#### Northern Beaches Council

Jacqueline Grove – Environment, Resilience & Climate Change Manager:

#### IPWEA Australasia

Robert Fuller – Chief Executive Officer:

IPWEA and the Northern Beaches Council looks forward to a national policy from the Federal Government that demonstrates leadership which addresses climate change impacts on buildings and infrastructure.

**Yours faithfully,**

**Jacqueline Grove**  
**Manager Environment, Resilience & Climate Change, Northern Beaches Council**

**Robert Fuller**  
**Chief Executive Officer**  
**IPWEA Australasia**

**Attachment A** – Report to Ordinary Council Meeting Item No. 1.1 – 13 December 2016 including Attachment 2: Letter to Prime Minister Turnbull – Calling for a National and State Sand Nourishment Program.

**Attachment B** - Minutes of Ordinary Council Meeting 28 March 2017 – 5.1 Administrator's Minute No 2/2017 – Coastal Erosion including the response from the Prime Minister Attachment 3.



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# Attachment A

## 1.0 ADMINISTRATOR'S MINUTES

ITEM 1.1	<b>ADMINISTRATOR'S MINUTE NO 12/2016 - COLLAROY-NARRABEEN BEACH SAND NOURISHMENT OPTIONS</b>
TRIM FILE REF	2016/310689
ATTACHMENTS	<ol style="list-style-type: none"><li>1 <a href="#">↓ Staff Report - Collaroy-Narrabeen Beach Sand Nourishment Options</a></li><li>2 <a href="#">↓ Letter to Prime Minister Turnbull - Calling for a National and State Sand Nourishment Program</a></li><li>3 <a href="#">↓ Letter to Premier Baird - Calling for a National and State Sand Nourishment Program</a></li></ol>

### BACKGROUND

The major east coast low storm event in June 2016 caused significant coastal erosion of approximately 400,000m<sup>3</sup> of sand along Collaroy-Narrabeen Beach. This highlighted the need to adequately protect vulnerable beachfront properties and infrastructure as recognized in the draft *Northern Beaches Coastal Erosion Policy* however, utmost consideration must be given to maintaining ongoing public access, beach amenity and surf quality.

The weight of expert opinion is that once protective works such as seawalls are installed to defend coastal assets, beach nourishment will be needed to maintain beach width and amenity, particularly in the long term as sea level rises. As an example, with 40 years of sea-level rise we can expect the 10 properties between Stuart and Ramsey Street to experience an additional 15-20m of erosion in a similar event to that we experienced in June 2016. For these reasons, I have called for the feasibility of undertaking beach nourishment as a complementary strategy to any long term protective works proposed at Collaroy-Narrabeen Beach.

Historically, sand used for large scale beach nourishment in the metropolitan area has been acquired from terrestrial sources, including Kurnell Peninsula, Stockton Bight and Penrith Lakes, however extracting large quantities from these sites is not cost effective. Recent studies have recommended that offshore sand deposits, accessed by large dredging vessels, represent the most cost effective and environmentally sustainable source of sand for beach nourishment.

Based upon advice and information provided to me I have considered three beach nourishment options for Collaroy-Narrabeen Beach:

Option 1: Beach replenishment to address beach amenity and short term impacts of coastal erosion events, utilising sand from Narrabeen Lagoon Entrance (approximately 45,000m<sup>3</sup> every 5 years) and sand donated from local building sites (approximately 5,000m<sup>3</sup> each year), supplemented by beach scraping. This option represents Council's existing practices, however it does not address the long term effects of sea level rise.

Cost: \$100,000 per year on average (this assumes ongoing funding will be available for the Narrabeen Lagoon Entrance Clearance from the NSW Government)

Option 2: Beach nourishment to address the short term impacts of coastal erosion events (estimated 1 event each 10 years) by adding 400,000m<sup>3</sup> of offshore sand, which will require 6-12 months to be delivered. Without the additional nourishment, it is expected that the beach would naturally recover to pre-storm conditions over a period of 12-24 months. This option would not mitigate the effects of sea level rise in the longer term. To date, this action hasn't been required to address the impacts for sea level rise.

Cost: \$12,000,000 per event (average \$1,200,000 per year)



Option 3: Beach nourishment to address the long term impacts of sea level rise and maintain an acceptable beach width along the entire Collaroy-Narrabeen Beach embayment, by initially adding 1,300,000m<sup>3</sup> of offshore sand, followed by an addition 420,000m<sup>3</sup> every 10 years to address further sea level rise.

Cost: \$30,000,000 for the first event, and \$11,000,000 each following decade

I am advised that the figures calculated for the three options are indicative and may be subject to revision following more detailed investigations for a specific beach nourishment proposal.

Council will continue to deliver Option 1, as this maintains the current state of beach amenity under all but the most significant coastal erosion events. Collaroy-Narrabeen embayment is considered by coastal experts to be a closed embayment, meaning that the sand lost during erosion events does naturally return. This beach width has been studied since 1941, and while it can vary on any given day, it shows little if any long term change.

Option 2, is not supported as there will be significant cost for not a great deal of benefit in terms of time for beach recovery.

Most importantly, neither option 1 or 2 address the long term impacts of sea level rise, leaving a significant issue that I feel needs to be addressed.

Option 3, although requiring substantial investment, is the only solution that offers long term benefit to ratepayers and I intend to pursue its delivery.

However this issue is not faced by Northern Beaches Council alone. Shoreline erosion issues are not unique to Sydney or even NSW, and beach nourishment is identified as the best long-term management strategy in many situations world-wide.

The NSW government has identified 15 coastal erosion 'hot spots'. Three of these are within our Council area, but many more beaches across Sydney and NSW will benefit from sand nourishment programs. I am also aware that there are parts of the Australian coast that may need to address current impacts and future sea level rise impacts sooner than we do.

If we have to go it alone, Northern Beaches Council can seek to undertake this project and address the issues of sea level rise that face our three coastal erosion hotspots (Collaroy-Narrabeen, Bilgola and Mona Vale) as well as the rest of our beaches, through sand nourishment. However there are significant financial, logistical and approval barriers to be addressed before this can happen.

I believe this presents an opportunity for all three spheres of government to cooperate, and address the long term impacts of climate change on our shared coastline through accessing offshore sands. I recommend that existing offshore sand deposits suitable for beach nourishment are reserved for public authorities, and that a long-term fund be established for beach nourishment to mitigate the impacts of sea level rise. All spheres of government could contribute so that necessary beach nourishment activities can be delivered in a coordinated manner.

Significant benefit will be provided to the people of NSW and Australia by the Federal and State Government driving a program of sand nourishment to address sea level rise and coastal erosion issues, and I will write to the NSW Premier and Prime Minister to commence this process.

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## **RECOMMENDATION**

That Council:

- A. Write to the Prime Minister of Australia and Premier of New South Wales seeking their support for a national and state sand nourishment program to address the long term
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impacts of climate change on our shared coastline.

- B. Work with the Minister for Primary Industries to ensure that existing offshore sand deposits suitable for beach nourishment are reserved for public authorities, and that appropriate approvals are obtained.
  - C. Inform and work with other coastal councils, community groups and residents on the Northern Beaches who are advocates for beach nourishment to address the impacts of sea level rise.
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**Dick Persson AM**  
**ADMINISTRATOR**



2016/310701

## **Issue**

The major east coast low storm event in June caused significant coastal erosion of approximately 400,000m<sup>3</sup> of sand along Collaroy-Narrabeen Beach, and highlighted the need to adequately protect vulnerable beachfront properties and infrastructure, while retaining public access, beach amenity and surf quality as a priority.

It is widely agreed that once protective works such as seawalls are installed to defend coastal assets, beach nourishment will be needed to maintain beach width and amenity, particularly in the long term as sea level rises.

Historically, sand used for dune restoration and beach nourishment in the metropolitan area has been acquired from terrestrial sources, including Kurnell Peninsula, Stockton Bight and Penrith Lakes, however extracting large quantities from these sites is no longer cost effective. Recent studies have recommended that offshore sand deposits, accessed by large dredging vessels, represent the most cost effective and environmentally sustainable source of sand for future beach nourishment.

### **Option 1: Beach replenishment utilising sand from Narrabeen Lagoon Entrance and sand donated from local building sites, supplemented by beach scraping, to address beach amenity and short term impacts of coastal erosion events.**

This option reflects Council's existing practices, and is considered an appropriate strategy to manage public amenity, and enhance beach recovery following storm events. However it does not address the long term effects of sea level rise.

Narrabeen Lagoon entrance is cleared of sand every 4-5 years for flood mitigation purposes (co-funded by the NSW Government and Council), and 40,000 to 45,000m<sup>3</sup> of sand is returned to Collaroy-Narrabeen Beach at no direct cost to Council for sand replenishment. Around 5,000m<sup>3</sup> of clean excavated sand is donated each year from nearby building sites, with a cost to Council of approximately \$20,000 per year to spread the sand.

After significant erosion events Council undertakes beach scraping (using earth moving machinery to place sand from the shoreline further up the beach), accelerating the natural rate of accretion. Sand lost during erosion events does accrete naturally, and it is expected that the beach would naturally recover to pre-storm conditions over a period of 12-24 months. A major coastal erosion event such as the 4-6 June 2016 storm would likely benefit from beach scraping activities lasting 20 days or more, with an associated cost of around \$80,000 to \$100,000, reducing the beach recovery period to 6-12 months.

<b>Option 1</b>	<b>Cost to Council</b>
Entrance clearance works	\$330,000 (each 4-5 years)
Spreading donated sand	\$20,000 (per year)
Sand scraping	\$80,000 (as needed)
<b>Cost:</b>	<b>\$100,000 per year on average</b>

### **Option 2: Beach nourishment utilising offshore sand to address the short term impacts of coastal erosion events**

This option is proposed to mitigate the short term impacts of a significant coastal storm, by depositing about 400,000m<sup>3</sup> of offshore sand to repair erosion damage at the worst affected locations within the embayment. Although this volume of additional sand would not be sufficient to mitigate the effects of sea level rise in the longer term, it would theoretically increase the average beach width by up to 5 metres in the short term. Added benefits as a result would include some minor additional buffer for storm erosion demand, and would likely also cater for a 0.1m increase in sea level rise over a 10 year period. Cost estimates have been provided based on 1 significant coastal storm each 10 year period.

This activity would add sand to severely eroded sections of beach within the embayment and approximate the natural process of accretion that occurs following a storm. Additional dredging and earth moving equipment would be required to place and spread sand to reinstate the beach profile and would further increase handling costs for the volume of sand extracted.

Other coastal management issues, notably the probable increase in the movement of sand into Narrabeen Lagoon, potentially requiring more frequent entrance clearance works, may arise as a consequence of this option. The potential impact on surf quality would also require further investigation and consideration.

The time associated with the environmental assessment process and mobilisation activities of large dredging vessels is likely to be 6-9 months. Without this additional nourishment, it is expected that the beach would naturally recover to pre-storm conditions over a period of 12-24 months, and beach recovery can be accelerated to 6-12 months through additional beach scraping (Option 1).

<b>Option 2</b>	<b>Estimated 1 storm per 10 years</b>
Volume of sand required	400,000m <sup>3</sup>
Volume of sand per lineal metre of beach	363 m <sup>3</sup>
Dredging and nourishment costs	\$20 per m <sup>3</sup>
Mobilisation and assessment costs	\$6.40 per m <sup>3</sup>
Sand placement, spreading and regrading	\$3.50 per m <sup>3</sup>
Total Cost per m <sup>3</sup>	\$29.90
Cost per lineal metre of beach	\$10,900
<b>Total cost:</b>	<b>\$12 million per event</b> (\$1.2 million per annum)

Some minor savings on the unit cost of nourishment sand due to greater economies of scale might be achieved if other eroded beaches within the Northern Beaches LGA were also nourished at the same time.

### **Option 3: Beach Nourishment utilising offshore sand sources to address the impacts of sea level rise**

This option is proposed to mitigate the long term impacts of sea level rise, in order to maintain an acceptable beach width along the entire Collaroy-Narrabeen Beach embayment. The calculations are based on a scenario investigated by AECOM for the Sydney Coastal Councils Group entitled 'Beach Sand Nourishment Scoping Study – Maintaining Sydney's Beach Amenity Against Climate Change Sea Level Rise (2010)'.

The case study for Collaroy-Narrabeen Beach requires an initial nourishment campaign of 1,300,000m<sup>3</sup> of dredged sand from the Cape Banks offshore deposit, followed by an addition 420,000m<sup>3</sup> every 10 years to address further sea level rise.

The modelling suggests that adding these volumes of sand would enhance beach amenity by extending the average beach width from the current 50 metres to about 65 metres. Follow-up campaigns would help to maintain the amenity of an enhanced beach width.



	<b>Initial Campaign</b>	<b>Follow-up Campaigns undertaken every 10 years</b>
<b>Sea level rise</b>	Historical 0.2m to 2004, plus 0.1m for every additional 10 years.	0.1m per 10 years (0.01m per year)
<b>Volume of sand required</b>	1,300,000 m <sup>3</sup>	420,000 m <sup>3</sup>
<b>Volume of sand per lineal metre of beach</b>	361 m <sup>3</sup>	117 m <sup>3</sup>
<b>Dredging and nourishment costs</b>	\$19 per m <sup>3</sup>	\$20 per m <sup>3</sup>
<b>Mobilisation and assessment costs</b>	\$3.75 per m <sup>3</sup>	\$6.40 per m <sup>3</sup>
<b>Total Cost per m<sup>3</sup></b>	\$22.75	\$26.40
<b>Cost per lineal metre of beach</b>	\$8,333	\$3,055
<b>Total cost:</b>	<b>\$30 million</b> for the first event	<b>\$11 million per event</b> (\$1.1 million per annum)

Similar to Option 2, the potential impacts of nourishment sand on the Narrabeen Lagoon entrance and surfing breaks would need to be investigated and managed appropriately.

As per Option 2, cost savings could be achieved if economies of scale were to be realised. This could result from including other beaches in beach nourishment campaigns within the Northern Beaches LGA or partnering with other coastal councils and the state government to develop a much larger project and share costs.

An indication of likely volumes and cost estimates of sand required for possible nourishment sites:

<b>Beach Location</b>	<b>Initial Campaign</b>	<b>Cost for first event</b>	<b>Follow-up Campaigns undertaken every 10 years</b>	<b>Per annum cost</b>
<b>Collaroy-Narrabeen (as above)</b>	1,300,000m <sup>3</sup>	\$30 million	420,000 m <sup>3</sup>	\$1.1 million
<b>Manly/Queenscliff Beach</b>	700,000m <sup>3</sup>	\$16 million	230,000m <sup>3</sup>	\$600,000
<b>All Northern Beaches</b>	6,000,000m <sup>3</sup>	\$137 million	2,000,000m <sup>3</sup>	\$5.3 million
<b>Northern Beaches Hotspots only</b>	1,550,000m <sup>3</sup>	\$35 million	520,000m <sup>3</sup>	\$1.4 million
<b>Northern Beaches and Gosford Hotspots</b>	2,400,000m <sup>3</sup>	\$55 million	800,000m <sup>3</sup>	\$2.1 million

## DISCUSSION

Collaroy-Narrabeen embayment is considered to be a closed embayment, whereby the sand moved offshore during erosion events does accrete naturally and restore beach width. The average beach width of Collaroy-Narrabeen Beach measured seaward to the 0.0m AHD contour (which approximately equates to current mean sea level) is 50 metres. Analysis of historical information including photogrammetric data since 1941 indicate variability in beach width at any given time but little if any long term change in average beach width.

If there is a requirement for mitigating the impacts of constructed protective works, the expectation is that the impact will be relatively small compared to the current situation.

However any identified impacts of development on the beach and associated coastal processes will be dealt with on a case by case basis, in accordance with the draft Northern Beaches Coastal Erosion Policy and relevant NSW Government legislation.

Beach nourishment to address the impacts of constructed protective works combined with sea level rise may not be required for some time into the future, when average beach width is reduced due to long term coastal recession. Arranging finances for the significant costs involved in procuring the necessary equipment to undertake the dredging and placement of sand, organising the cooperation of all three spheres of government, and undertaking the required permit applications and environmental assessments is likely to result in a protracted lead time for any proposed beach nourishment project.

## **CONCLUSION**

Option 1 - provides an effective low cost strategy to replenish Collaroy-Narrabeen Beach so as to maintain current beach amenity, and to aid beach recovery following a major storm event irrespective of whether a more substantive beach nourishment project is approved and undertaken.

Option 2 – provides a strategy to address the short term impacts of coastal erosion events and minor sea level rise through beach nourishment utilising offshore sand sources. The lead time to plan, approve and fund such projects is problematic with the likely result that nourishment will not occur when it is most needed. Similar results at significantly less cost can be achieved through natural accretion combined with beach scraping to accelerate recovery (Option 1).

Option 3 - provides a strategy for dealing with the long term impacts of climate change and sea level rise while continuing to accelerate recovery of the beach following a coastal storm. Such a strategy will be critical as an adaptive option to offset the adverse impacts of sea level rise and increased storms, and maintain beach width and recreational amenity at Collaroy-Narrabeen Beach.



14 December 2016

The Hon Malcolm Turnbull MP  
Prime Minister  
Parliament House  
CANBERRA ACT 2600

Our Ref: 2016/385670

Dear Prime Minister

**RE: Calling for a National and State sand nourishment program**

As you are aware, the major east coast low storm event in June caused significant coastal erosion along New South Wales, including major impacts to Collaroy-Narrabeen Beach.

I am informed that once protective works are installed to adequately protect vulnerable beachfront properties and infrastructure, beach nourishment will be needed to maintain beach width and amenity, particularly in the long term as sea level rises. I have called for the feasibility of undertaking beach nourishment as a complementary strategy to any long term protective works proposed at Collaroy-Narrabeen Beach.

I understand that terrestrial sources of sand are no longer cost effective, offshore sand deposits represent the most cost effective and environmentally sustainable source of sand for beach nourishment.

However this issue is not faced by Northern Beaches Council alone. Shoreline erosion issues are not unique to Sydney or even NSW, and beach nourishment is identified as the best long-term management strategy in many situations world-wide.

I believe this presents an opportunity for all three spheres of government to cooperate, and address the long term impacts of climate change on our shared coastline through accessing offshore sands. Significant benefit will be provided to the people of NSW and Australia by the Federal and State Government driving a program of sand nourishment to address sea level rise and coastal erosion issues.

I recommend that existing offshore sand deposits suitable for beach nourishment are reserved for public authorities, and that a long-term fund be established for beach nourishment to mitigate the impacts of sea level rise. All spheres of government could contribute so that necessary beach nourishment activities can be delivered in a coordinated manner.

I write to you seeking your support for a national and state sand nourishment program to address the long term impacts of climate change on our shared coastline. I look forward to hearing from you. In the meantime, if you or your Department wish to contact me to discuss the matter further, I can be contacted on .

Yours faithfully

Dick Persson AM  
**Administrator**

Cc The Hon Mike Baird MP

14 December 2016

The Hon Mike Baird MP  
Premier  
Minister for Western Sydney  
Member for Manly  
Shop 2 / 2 Wentworth Street  
MANLY NSW 2095

Our Ref: 2016/385635

Dear Premier

**RE: Calling for a National and State sand nourishment program**

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Dick Persson AM  
**Administrator**

Cc The Hon Malcolm Turnbull MP



# Attachment B



## **5.0 ADMINISTRATOR'S MINUTES**

### **ITEM 5.1 ADMINISTRATOR MINUTE NO 2/2017 - COASTAL EROSION**

**TRIM FILE REF 2017/079499**

**ATTACHMENTS**

- 1 [Letter to Prime Minister](#)
- 2 [Letter to NSW Premier](#)
- 3 [Response Letter from Prime Minister](#)
- 4 [Response Letter from Acting Director, Sustainable Development and Coastal Policy](#)

### **BACKGROUND**

In June 2016 Sydney experienced a massive storm referred to as an East Coast Low, which caused major flooding and coastal erosion. This storm was of such ferocity that it caused the evacuation of dozens of residents from their homes in the middle of the night as the waves washed away the sand dunes underpinning the 10 houses and 14 units over a distance of 160 meters between 1150 and 1126 Pittwater Road, Collaroy.

Fortunately the former Warringah Council had developed a Coastal Zone Management Plan [CZMP] which had been approved by the NSW Government. This Plan provided a policy and regulatory framework for both Council and a number of State Government agencies to deal with the full range of complex issues involved in moving to protect the properties from future major storm events.

The storm, and the plight of the endangered houses, drew a great deal of media attention which led to considerable community debate about the most appropriate response. There was a clear support of measures to increase beach nourishment by bringing additional sand to the beach from off-shore sand deposits. The likelihood of sea-level rise in the future will only exacerbate the current problems.

Given the high cost of sourcing off-shore sand deposits, Council resolved to write to the Prime Minister and the former NSW Premier to seek their support for a national and state sand nourishment program to address the long term impacts of climate change on our shared coastline. Letters were sent on 15 December 2016. Refer to attachment 1 and 2.

Responses from the Prime Minister (attachment 3) and the Acting Director, Sustainable Development and Coastal Policy in the NSW Office of Environment and Heritage (attachment 4) were very disappointing.

The NSW Government has claimed that, under the Local Government reforms, the larger merged councils will be better able to negotiate with governments and their departments. It would appear that this claim is not reflected in the responses of the NSW Premier's Department or the Office of Environment and Heritage.

Not only did Council not receive a response from the Premier, Council did not even receive one from the Minister for the Environment. Rather, correspondence was received from the Office of Environment and Heritage which failed to provide a satisfactory response to Council's call for a national and state sand nourishment program.

With regard to the response from the Federal Government, the Prime Minister did take the time to congratulate Council for its efforts in handling the storm event but basically indicated it was a matter for the State Government.

It appears that Council's 'call to leadership' may have fallen on deaf ears and been sent to the 'too hard basket' by both the Federal and NSW Governments.

---

**RECOMMENDATION**

That Council:

- A. Release the responses to its letter of 15 December 2016 from both State and Federal Governments.
  - B. Write again to the Prime Minister and NSW Premier seeking their intervention in what is clearly a matter of State and National importance.
  - C. Seek the support of the local Federal and State Members of Parliament to advocate on behalf of the Council and the community on this important issue.
- 

**Dick Persson, AM**  
**ADMINISTRATOR**

**NORTHERN BEACHES  
COUNCIL**

northernbeaches.nsw.gov.au

The Hon Malcolm Turnbull MP  
Prime Minister  
Parliament House  
CANBERRA ACT 2600

Our Ref: 2016/386670

Dear Prime Minister

As you are aware, the major east coast low storm event in June caused significant coastal erosion along New South Wales, including major impacts to Collaroy-Narrabeen Beach.

I am informed that once coastal protective works are installed to protect vulnerable beachfront properties and infrastructure, beach nourishment will be needed to maintain beach width and amenity, particularly in the long term as sea level rises. I have called for the feasibility of undertaking beach nourishment as a complementary strategy to any long term protective works proposed at Collaroy-Narrabeen Beach.

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Australia's beaches are treasured by all Australians. They are used by locals and visitors alike, including overseas tourists. They bring huge economic and social benefits. The costs on maintaining our beaches in the medium to long term are way beyond the financial capability of the local councils that manage them. I write to you seeking your support for a national and state sand nourishment program to address the long term impacts of climate change on our shared coastline. I look forward to hearing from you. In the meantime, if you or your Department wish to contact me to discuss the matter further, I can be contacted on

Yours faithfully

15/12/16

Dick Porson AM  
Administrator

cc: the Hon Mike Baird MP

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Two Centres, 100 Fiddlers Road  
One North Sydney, NSW  
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**NORTHERN BEACHES**  
COUNCIL

[northernbeaches.nsw.gov.au](http://northernbeaches.nsw.gov.au)

The Hon Mike Baird MP  
Premier  
Minister for Western Sydney  
Member for Manly  
Shop 2 / 2 Wentworth Street  
MANLY NSW 2095

Our Ref: 2016/385035

Dear Premier

As you are aware, the major east coast low storm event in June caused significant coastal erosion along New South Wales, including major impacts to Collaroy-Narrabeen Beach.

I am informed that once coastal protective works are installed to protect vulnerable beachfront properties and infrastructure, beach nourishment will be needed to maintain beach width and amenity, particularly in the long term as sea level rises. I have called for the feasibility of undertaking beach nourishment as a complementary strategy to any long term protective works proposed at Collaroy-Narrabeen Beach.

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Yours faithfully

15/12/16  
Dick Persson AM  
Administrator

Cc: The Hon Malcolm Turnbull MP

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Manly NSW 2095  
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Civic Centre, 725 Pittwater Road  
Dee Why NSW 2099  
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Village Park, 1 Park Street  
Mona Vale NSW 2103  
ABN 57 284 295 198  
t. 02 9976 1111 e. 02 9970 1200



PRIME MINISTER

Reference: MC16-103500

28 FEB 2017

Mr Dick Persson AM  
Administrator  
Northern Beaches Council  
1 Belgrave Street  
Manly NSW 2095

Dear Mr Persson

Thank you for your letter dated 15 December 2016 regarding coastal erosion in NSW.

I commend the Northern Beaches Council for taking action on coastal erosion following the major storm in June last year. I note the Council has adopted a *Northern Beaches Coastal Erosion Policy* and a coastal zone management plan for Collaroy-Narrabeen Beach.

While managing coastal erosion is primarily a state and local government responsibility, the Government is committed to helping Australian communities make good decisions about building resilience against coastal erosion risks. We have invested \$9 million in the National Climate Change Adaptation Research Facility to help local governments manage the impact of climate change. I encourage you to access the facility's online *CoastAdapt* tool, which may assist you in developing a strategy for sand nourishment at Collaroy-Narrabeen Beach.

The Government has also funded a number of coastal rehabilitation projects in NSW. Projects include coastal dune recovery at Newport Beach, rehabilitation of riparian and coastal habitats surrounding Tuggerah Lakes, and storm recovery at Putty and Avoca beaches.

I encourage you to continue engaging with the NSW Government and to monitor funding opportunities on the Department of the Environment and Energy website.

Yours sincerely

MALCOLM TURNBULL

Parliament House, CANBERRA ACT 2600  
Telephone (02) 6277 7700  
www.pmt.gov.au



**Office of  
Environment  
& Heritage**

MD17/221  
2016/385635

Mr Dick Persson AM  
Administrator  
Northern Beaches Council  
1 Belgrave Street  
MANLY NSW 2099

Dear Mr Persson

**Beach nourishment proposal**

I refer to your letter to the former Premier, Mike Baird, about beach nourishment. Your letter was referred to the Office of Environment and Heritage and I have been asked to reply.

Maintaining the presence of beaches is an important objective of the NSW Government's coastal management framework and beach nourishment can be an effective part of a coastal management program. The government recognises the challenges that local councils face in responding to erosion and other coastal management issues. The feasibility of beach nourishment in a particular location will depend on a number of factors including the cost and availability of suitable sand, environmental impacts of the activity and regulatory steps that may be required.

Under the new coastal management framework, which is anticipated to commence in the first half of 2017, local councils are encouraged to work closely with neighbouring councils and other public authorities to identify the actions required to address coastal management issues in an integrated and strategic manner. Identifying the costs of proposed coastal management actions, proposed cost-sharing arrangements and other viable funding mechanisms is also essential.

To support local councils to implement equitable and cost effective actions that reduce exposure to coastal hazards, including the impacts of climate change, the government has announced a funding commitment of \$83.6 million.

If you have any further questions about this issue, please contact me on

Yours sincerely

13/2/17

**Matthew Clark**  
**Acting Director Sustainable Development and Coastal Policy**

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# NORTHERN BEACHES COUNCIL

