CEMENT CONCRETE & AGGREGATES AUSTRALIA

23 June 2022

Professor Mary O'Kane AC and Mr Michael Fuller APM
NSW Floods Inquiry
GPO Box 5341
SYDNEY NSW 2001

Dear Professor O'Kane and Mr Fuller APM,

NSW INDEPENDENT FLOOD INQUIRY

We welcome the opportunity to comment upon the NSW Independent Flood Inquiry, which was commissioned by the NSW Government in March 2022 into the preparation for, causes of and response and recovery to the catastrophic flood event across New South Wales.

CCAA is the peak industry body for the heavy construction materials industry in Australia including the cement, pre-mixed concrete and extractive industries. Our members operate cement manufacturing and distribution facilities, concrete batching plants, hard rock quarries and sand and gravel extraction operations throughout New South Wales.

Cement, concrete, stone and sand are the critical materials that enable the New South Wales construction industry, employing 370,000 workers and contributing 45% of the New South Wales taxation revenue base. Our members produce and supply these heavy construction materials that contribute to the construction of New South Wales' infrastructure such as roads, railways, bridges, ports, airports, hospitals and schools. The reliable and cost-effective supply to these markets is fundamental to our state's sustainable growth and it is CCAA's aim to promote policies that recognise the importance of these materials to Australia's sustainable future.

Our industry is committed to the protection and improvement of environmental values and minimising environmental impacts when they arise and we strongly believe that we have an obligation to supply construction materials in an environmentally responsible and sustainable manner.

CCAA notes the Inquiry's Terms of Reference and wishes to communicate its perspectives with regards to land use planning and management and the future proofing of resilient design and construction.

Flood Resilience Design and Construction

The extreme rainfall and flooding events that decimated Australia's east coast in early 2022 underline the importance of flood-resilient design and construction solutions that incorporate strong, durable materials like concrete.

Many major towns and cities across New South Wales were, by necessity or design, established on floodplains, close to water resources. Over time, these urban centres have grown rapidly, in many cases outpacing development controls. As a result, they are typically ill-equipped for the escalating impacts of storms and floods and even roads, bridges and houses constructed to then contemporary engineering standards and codes have been seriously impacted by these recent extreme weather events. Governments, Regulators and

homeowners will all need to reconsider the design and engineering of infrastructure given the ongoing prevalence and escalation of extreme weather events.

Across Australia, local councils own and manage an estimated 11,000 aging timber road bridges with an estimated 1800 located in NSW which are notorious for poor maintenance and are particularly susceptible to flood damage. Some of these bridges were constructed in the 1940's and 1950's, have reached the end of their asset life and are predominantly single lane structures in regional towns and cities, serving as the main connector to schools, towns and local employment. It has been estimated that at least 30% of these are in poor to very poor condition and are in desperate need of replacement.[1]

To counter this significant issue. the NSW Government announced its Fixing Country Bridges Program in 2020, a $500 Million grants-based program which enabled Local Governments across the state to secure funding to replace more than 400 timber bridges.[2] Round 1 of the program saw 53 councils secure $282 million in funding.

CCAA notes the program guidelines and eligibility, which while referring to the improvement of reliability, reducing overall maintenance costs and providing resilience to weather events, stops short of outlining the most beneficial construction solution – **concrete**.[3]

What happens to Bridges, Roads and Buildings in a Flood

In addition to the dynamic force of floodwaters, debris can cause significant damage to timber decks and safety barriers, while scouring of the riverbed can undermine foundations.

When it comes to roads, water is the natural enemy of asphalt and bitumen. It finds its way through cracks and into the road base, compromising the integrity of the pavement. In heavy rains, the damage shows up as potholes; in a major flood, entire sections of roadway can be washed away – or worse still, dangerous sinkholes created just below the surface of the pavement.

Most older houses aren't designed and built to withstand the record flood events increasingly experienced across Australia. Apart from the destruction these floods cause to furnishings, floor coverings and household goods, the sheer force of water can cause series damage to building foundations and walls, in some cases causing the house to shift from its footings and/or break up. Structural damage becomes worse the longer water remains inside a building, where it can compromise timber frames, flooring and plasterboard walling.

The replacement of the **Windsor Bridge** crossing in North West Sydney with a new concrete structure is an example of flood resilient infrastructure that is needed to counter extreme weather. While the cost of replacing the height of the new bridge and approach roads was prohibitive, the new concrete structure has proved its resilience and durability, having been closed by floods three times since its opening in 2020 but was quickly put back into operation without the need for any repairs.

[1] Call for action on dilapidated bridges - Government News
[2] Funding to replace timber bridges across regional NSW
[3] Fixing country bridges program guidelines (nsw.gov.au)

Flood Mitigation Strategy

No one strategy or material solution can completely remove the risks associated with flooding. The goal is to mitigate those risks by applying a range of strategies and solutions, within the bounds of what's affordable and practical.

It starts with good planning and an understanding of the current and future risk factors and applying this knowledge to land use and development decisions. How we design and engineer our buildings and infrastructure also plays a key role. Elevating a building, road or bridge is one obvious solution (albeit more expensive), 'dry' floodproofing (sealing the part of the structure that's at risk of flooding) and 'wet' floodproofing (modifying the structure by replacing existing materials with more water-resistant ones and raising services and utilities to higher levels) are another option.

Physical Flood barriers – such as concrete levees, flood gates and seawalls – constructed around vulnerable buildings and infrastructure are a very important way to mitigate flood risk.

The structural integrity, strength and durability of concrete lends itself to these more permanent mitigation solutions.

Flood resilient concrete infrastructure

Roads are an essential lifeline before and after a natural disaster, yet they are typically among the first casualties in a flood or major rain event.

Concrete allows you to build strong roads with a service life of 40 years or more, withstanding extreme environmental and operating conditions as well as heavy traffic loads. The durability of concrete means that over its life, a concrete road typically requires less maintenance, causing less disruption to road users. In particular, concrete roads are less susceptible to potholes.

As an example, a former section of the Pacific Highway at Clybucca Flat on the NSW North Coast was rebuilt in 1975 using continuously reinforced concrete pavement, chosen for its stability, durability and relatively maintenance-free performance. Today, this section of road is part of the Macleay Valley Highway, and although seeing much less traffic, it has exceeded its original design-life by 30-50 per cent, even under flood conditions. We note that this area has flooded on 18 occasions since 1949.[4]

Independent lifecycle cost analysis modelling has shown that concrete pavements are the lowest cost to construct and maintain.[5] Concrete's durability, sustainability and resilience also allows you to build bridges that will last for 100 years and beyond and stand up to the extremes of weather and climate, including flooding. Importantly, concrete offers a virtually maintenance-free design life and is the perfect solution for Local Government to replace aging, timber bridges.

[4] Appendix A. Historic Rainfall and Flood Data - Lower Macleay Flood Study (nsw.gov.au)
[5] CCAA_Concrete_Roads_Life_Cycle_Cost_Analysis_Market_Briefing_Sheet.pdf

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Key Benefits of Concrete

In summary, CCAA urges the NSW Government to consider the following benefits of Concrete with regards to the future proofing of the design and construction of infrastructure across the state, particularly in areas established on floodplains or adjacent to water resources:

- Stands up to extreme weather;
- Doesn't erode in flood conditions;
- Much lower repair and maintenance costs;
- Lower life cycle costs;
- Long design life;
- Superior performance under heavy traffic;
- Lighter coloured roads for cooler temperatures and energy savings;
- Locally manufactured from raw materials; and
- Recyclable at the end of its life cycle

While no one construction material can completely remove the risk associated from extreme weather and flooding, we believe that its critical for concrete to be a significant part of the solution for the future design and construction of infrastructure that will stand up to extreme weather conditions.

Thank you again for the opportunity to comment upon the NSW Floods Inquiry and to offer our thoughts on this significant issue for the NSW community. We would appreciate the opportunity to discuss this matter with you in further detail and would appreciate the opportunity to appear before the parliamentary committee. Accordingly, I can be contacted on or email .

Yours sincerely,

JASON KUCHEL
State Director, New South Wales & South Australia