

Statement of Christopher John Beckley

I, Christopher John Beckley, Acting Principal Engineer Structures, Asset Management Branch, Brisbane Infrastructure Division, Brisbane City Council, of 266 George Street, Brisbane, in the State of Queensland, affirm as follows:

- A. Attachment "CJB-1" is a copy of a notice from the Commission of the Queensland Floods Commission of Inquiry (**Commission**) dated 2 September 2011 requiring me to provide certain information to the Commission in the form of a Statement by 9 September 2011 (**Notice**). This Statement is provided in response to the Notice.
- B. For the purposes of responding to the Notice and preparing this Statement I have, in my position as Acting Principal Engineer Structures, Asset Management Branch, Brisbane Infrastructure Division, Brisbane City Council (**Council**), had access to:
- (b) the business records of Council; and
 - (c) Council officers,
- to obtain information to provide a response to the Notice. Unless otherwise stated, the matters set out in this Statement are based on my own knowledge and the information derived from the above sources.
- C. The documents from the above sources and attached to this Statement have been collated by Council officers under my instruction.
- D. I set out below my response to each of the questions set out in the Notice.

Qualifications and Background

1. I am a qualified Chartered Structural Engineer.
2. My qualifications include:
 - (a) a Bachelor of Science, with 2:1 honours degree in Civil Engineering from the Kingston Polytechnic, Kingston Upon Thames, Surrey, in the United Kingdom;
 - (b) a Higher National Diploma, with a Distinction in Civil Engineering, from the Kingston Polytechnic, in the United Kingdom; and
 - (c) an Ordinary National Certificate in Building Construction from the Ewell Technical College, in the United Kingdom.


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3. I hold the following affiliations:
- (a) Chartered Structural Engineer, with the Engineering Council, United Kingdom;
 - (b) Fellow of the Institution of Structural Engineers, United Kingdom;
 - (c) Member of the Institution of Engineers Australia; and
 - (d) Registered Professional Engineer, Queensland, Registration Number 07469.
4. I have been a qualified engineer for twenty-seven (27) years.
5. I currently hold the position of Acting Principal Engineer Structures, Asset Management Branch, Brisbane Infrastructure Division, of Brisbane City Council. I ordinarily hold the position of Senior Structural Engineer, in the City Projects Office of Council, and have held that position since 2006.
6. My previous post qualification work history is as follows:
- (a) 2011-Present: Acting Principal Structural Engineer, Asset Management Branch, Brisbane Infrastructure, Brisbane City Council;
 - (b) 2009-2011: Acting Principal Structural Engineer, City Assets Branch, Brisbane Infrastructure, Brisbane City Council;
 - (c) 2006-2009: Senior Structural Engineer, City Design, Brisbane City Council;
 - (d) 2004 -2006: Contract Technician Engineer, City Design, Brisbane City Council;
 - (e) 2000-2004: Principal of CBC Associates-Consulting Engineers (UK);
 - (f) 1988-2000: Director of John Allen Associates Ltd-Consulting Engineers (UK);
 - (g) 1986-1988: Senior Project Engineer with John Allen Associates- Consulting Engineers (UK);
 - (h) 1985-1986: Company Structural Engineer with Bovis Homes (SE) Ltd (UK);
 - (i) 1982-1985: Assistant Engineer with Evans & Langford-Consulting Engineers (UK); and
 - (j) 1980-1982: Design Engineer with Trevor Crocker & Partners-Consulting Engineers (UK).


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General Observations

7. To assist the Commission in understanding my specific response to the questions asked it seems useful to set out the following four observations.
8. First, this statement deals with that part of the Riverwalk which comprised the floating pontoon section between Howard Smith Wharves and Merthyr Road. This floating pontoon comprised just one section of the Riverwalk which also includes ground and elevated walkways, which run along both sides of the Brisbane River. Those structures (which are not all owned or maintained by Council), are either considered to be normal footpaths directly supported by ground or by bridge or boardwalk structures. Those other sections of the Riverwalk (apart from localised damaged), performed well in the flood event and remain in service. For convenience, when I refer to Riverwalk in this statement, I will be referring just to the floating pontoon section.
9. Second, I include a brief chronological summary of the design and construct process for the Riverwalk based on the documents available to me and my general knowledge acquired while employed by Council. The chronology appears to be as follows:
 - (a) In or around early 2001, Council commenced the tender process for design services in connection with Riverwalk.
 - (b) In about June 2001, Council awarded the tender for design services for Riverwalk to the external consultant engineers, International Marina Consultants Pty Ltd (**International Marina Consultants**).
 - (c) In about December 2001, Council engaged the services of International Marina Consultants for the provision of Marine Engineering advice on the Over Water section of Riverwalk (which I understand to refer to the pontoon section).
 - (d) In or around mid 2002, Council contracted with Smithbridge Australia Pty Ltd (**Smithbridge**) for the construction of Riverwalk.
 - (e) In or around July 2003, Smithbridge commenced construction of Riverwalk
 - (f) In December 2003, Riverwalk was officially opened by Lord Mayor Jim Soorley
10. Third, the Notice refers to standards and policies without limitation. Obviously there are numerous different kinds of engineering and other standards and policies which would have impacted on the design and construction of Riverwalk. The approach taken in this statement is


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to confine the standards and policies considered to those that, in my view, relate to flood design standards.

Response to the Notice

1. The standards and policies used in designing and constructing the New Farm Riverwalk prior to the 2010/2011 flood events, including references to any external entities that assess compliance with these standards and policies.

11. The most helpful documents which set out the standards and policies used in the design and construction of Riverwalk relating to flood design standards, of which I am presently aware, are:

- (a) Brisbane City Council's Updated Internal Design Brief. Attachment "CJB- 2" is a copy of that Brief.
- (b) International Marina Consultants Provision of Design Services for Floating Walkway Engagement Document dated 5 June 2001. Attachment "CJB- 3" is a copy of that document.
- (c) Lawson and Treloar Pty Ltd Engagement Document dated 25 July 2001. Attachment "CJB-4" is a copy of that document.
- (d) International Marina Consultants Provision of Marine Engineering Services for Floating Walkway Engagement Document dated 10 December 2001. Attachment "CJB-5" is a copy of that document.
- (e) International Marina Consultants General Notes and Locality Map "As Built" Drawings CD 0081722 Sheet T3-1 Issue A dated 24 August 2010. The Riverwalk was completed in about December 2003. I note the date on this drawing is August 2010. I have not, in the time available, been able to determine with certainty why that date appears on the AS Built notes. However, I have determined that this document was provided by International Marina Consultants as the As Built notes in response to a request from Council to be provided with such in around mid -2010 for asset management purposes. I have no reason to doubt, in those circumstances, that it is the AS Built notes for the works. Attachment "CJB- 6" is a copy of that drawing.

12. The flood resilience standards applied in the design of Riverwalk are most clearly set out in Attachment CJB-6. It is reasonable to assume that the details contained on this document


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formed the basis of the design because the design engineer would have produced this particular document as a record of his design assumptions for future use by the assets owner in operating, maintaining, renewing and/or retiring the structure.

13. Of particular relevance, in my opinion, is the following parts of Attachment CJB-6:


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"19.0 DESIGN PARAMETERS

DESIGN ISSUE	CRITERIA
....
FLOOD LOADING	STREAM VELOCITY BETWEEN 2.0m/s AND 3.0m/s (DEPENDING ON LOCATION) FOR Q100 EVENT IN ACCORDANCE WITH W.B.M. HYDRAULIC ASSESSMENT OF BRISBANE RIVER RIVERWALK REPORT (VERSION 2, 28/05/01) Q100 FLOOD LEVEL 3.5m AHD INCLUDING SUPERELEVATION EFFECTS.

20.0 LOAD FACTORS

LOAD	ULTIMATE LIMIT STATE		SERVICEABILITY LIMIT STATE	COMMENTS
	REDUCES SAFETY	INCREASES SAFETY		
....
FLOOD LOAD	Q2000		Q20	Q2000 CAN BE TAKEN TO BE Q100x1.4. OTHER FLOOD LEVELS COULD BE CRITICAL.
DEBRIS	Q2000		Q20	AS ABOVE
LOG	Q2000		Q20	AS ABOVE ...

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14. I refer to the references to flood loading and flood load. From the perspective of the ultimate capacity of the structure to withstand a flood load (called the Ultimate Limit State in the document), the design engineer uses the stream velocity for a Q100 event to calculate the forces that he/she anticipates would be applied in a Q2000 event to ensure that the structure will survive a Q100 event (albeit with damage capable of repair). He/she adjusts the Q100 loads to obtain an anticipated Q2000 load applying a load factor to the calculated Q100 load. In this case, the design engineer adopted 1.4 as the load factor.
15. So far as I am aware, while there were at the time statutory requirements relating to authorisation of the carrying out of works like Riverwalk in tidal areas, the standards for flood resilience for such structures were a matter for the design engineer applying professional judgment in the design, and relevant Australian Standards to the extent they applied. I am not aware of any Australian Standard applicable at the relevant time which would have specified flood resilience standards applicable to a structure like Riverwalk. I think it likely, however, that a design engineer designing Riverwalk at the time would have had regard to the standards for bridge design in the Ausroads Traffic Engineering Practice. As I recall, the flood resilience standards specified there for bridges is consistent with those adopted in the load factors table in Attachment CJB-6.
16. So far as I am aware, there was no statutory or other requirement for the flood resilience standards and associated design adopted for Riverwalk to be assessed by any third party and I have seen no evidence so far in the documents I have reviewed indicating that those standards and design were reviewed by any third party.
17. Finally, there was also specific work undertaken by engineering consultants to Council to model, with more precision than was provided by Council's existing model, flood characteristics in the specific part of the River in which Riverwalk was to be located. Attachment "CJB-7" is a copy of that report provided by WBM Oceanics Australia issued 29 March 2001.

2. Any building and design strategies that will be implemented or considered to be implemented as part of the New Farm Riverwalk replacement project.

18. As yet, Council has not commissioned nor obtained any advice or designs for the construction of any replacement for the Riverwalk. It is therefore not possible to speak of strategies which will be implemented in any replacement project. While I understand that Riverwalk is likely to be rebuilt, the process is still at a very early stage. So far as I am aware, the material which relevantly responds to this Request is contained in the following documents:


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- (a) Brisbane City Councils Review of Performance of Floating Riverwalk & Development of Concept for Replacement 18 February 2011. Attachment "CJB-8" is a copy of that document.
- (b) ARUP Looking Back Report provided on 1 June 2011 (**First Arup Report**). Attachment "CJB-9" is a copy of that report.
- (c) ARUP Looking Forward Report provided on 7 June 2011 (**Second Arup Report**). Attachment "CJB-10" is a copy of that report.

19. A convenient summary of the scope and purpose of the Arup Reports is stated in the executive summary of the Second Arup Report which relevantly provides:

"Arup has been commissioned by Brisbane City Council (BCC) to review the New Farm Floating Riverwalk and develop options for its replacement.

This report considers Riverwalk looking forward, incorporating lessons learnt from the looking back review but focussing on the development and evaluation of options for its replacement.

The development of the options has been based on the general requirement to provide a relatively flat link between Howard Smith Whares and Merthyr Road that provides a Riverwalk experience. It has been assumed that vessel access to private moorings should be retained.

The review of the Floating Riverwalk and its failure is discussed in the Arup document New Farm Riverwalk - Looking Back Report dated June 2011. The review identified lessons relating to alignment, movement, design flood event, piles and levels of fixed structures. As a result of the review changes to design guidelines are proposed including a suggestion to verify the design wave criteria and reconsideration of the defined flood event. It is proposed that an acceptable annual exceedance probability should be selected and used in conjunction with the 100 year design life to determine the structure flood immunity."

20. These reports were not developed to consider in detail building or design standards generally or flood resilience standards and design in particular. However, the second report contains some revised design guidelines which it is reasonable to expect will guide the design of any new project. I refer to Annexure A to the Second Arup Report in that regard which includes, relevantly proposed revised flood loading guidelines.


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21. Informed by the alternative options for rebuilding of Riverwalk contained in the Second Arup Report, Council has sought public comment on which of the options residents might prefer. That consultation process is, as I understand it, still underway.

3. The provisions of the Brisbane City Plan 2000 ('City Plan') and any other materials that relate to the building and design requirements of landings (as defined in City Plan).

22. I am not familiar with development assessment issues generally, nor am I aware of planning scheme policies as they relate to landings in any detail. I have asked officers from Council with expertise in this area to assist me to provide a response to this Request. They have provided the details set out below.

23. Council's planning scheme is City Plan 2000 (**City Plan**) which took effect on 30 October 2000. I am informed that it was the intention of Council to regulate the building of landings under the City Plan. It is my understanding that the term "landings" in this context refers to what would be commonly recognised as private pontoons for boat mooring and river access.

24. Chapter 5 of the City Plan provides a Landing Code which Council is required to implement when assessing a material change of use and/or building work for a landing (**the Landing Code**). Attachment "**CJB-11**" is a copy of the Landing Code.

25. Under the *Integrated Planning Act 1997* (Qld) (**IPA**) in effect at the time City Plan commenced, section 2.1.2 indicated that the scheme applied to the whole of the local government's area (called the planning scheme area).

26. I am advised that in 2000, Council's planning scheme area extended to Mean High Water Spring (**MHWS**), otherwise sometimes referred to as "high water mark". Therefore, the planning scheme excluded that part of a landing extending on or over land that was inundated by tidal water up to MHWS. In practical terms that means that most of the structure comprised in any landing will not be regulated by the Landing Code because pontoons, piles and most of the gangway that make up a landing are necessarily below the MHWS.

27. For several years, I understand that Council required proponents to apply for a development approval to obtain a preliminary approval to carry out building work for a landing. These applications were assessed against the provisions of the Landing Code in City Plan 2000. The preliminary approval did not authorise building work to start (refer to section 3.1.5 IPA).


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4. **Whether Council intends to adopt different building and design requirements for landings compared to the building and design requirements used for landings prior to the 2010/2011 flood events.**

Current Position

28. I am advised that Council does not intend to adopt different building and design requirements for landings compared to the building and design requirements used for landings prior to 2010/2011 flood events. This is because the relevant standards are defined within the *Queensland Coastal Protection and Management Regulations 2003* (Qld) which are currently the responsibility of the Queensland Department of Environment and Resource Management (DERM).
29. On 13 May 2011, Councillor Amanda Cooper wrote to the Honourable Kate Jones, (former) Minister for Environment and Resource Management requesting DERM to review and amend the IDAS Code for Prescribed Tidal Works, and offering for Council to participate and assist in that process.
- Attachment "CJB 12" is a copy of that letter.
30. At the time of writing this statement, no response has been received to that letter.


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I make this statement conscientiously believing the same to be true, and by virtue of the provisions of the Oaths Act 1987 (Qld).

Dated 9 September 2011

Signed and declared by Christopher John
Beckley at BRISBANE
in the State of Queensland
this 9th day of September 2011

Before me:



Signature of person before whom the declaration is
made



Signature of declarant

SARAH JAYNE THOMSON, SOLICITOR
Full name and qualification of person before whom the
declaration is made