IN THE QUEENSLAND FLOODS COMMISSION OF INQUIRY
COMMISSIONS OF INQUIRY ORDER (No.1) 2011

STATEMENT OF KEVIN JOHN FLANAGAN

I, KEVIN JOHN FLANAGAN care of Toowoomba Regional Council at 153 Herries Street, Toowoomba in the State of Queensland, Director of Water Services of Toowoomba Regional Council, can say as follows:

1. I have been Director of Water Services at Toowoomba Regional Council since March 2008. From August 1989 until 1998 I held the deputy Director or its equivalent role in the Engineering Department at Toowoomba City Council. In 1998, I was appointed Director of Engineering at Toowoomba City Council and occupied the position until March 2008. I am a Fellow of The Institution of Engineers Australia and hold a Bachelors Degree in Engineering and a Master of Engineering Science.

2. This statement has been prepared pursuant to the request made by the Queensland Floods Commission by way of letter dated 28 February 2011 ("the Letter").

3. The Letter requested "a report from an engineering viewpoint as to the structural circumstances and layout particular to Toowoomba that resulted in what is often described by the media as "an inland tsunami" that swept through Toowoomba on 10 January 2011". The Letter indicated that the "report could be annexed to a covering statement".

4. Annexed to this Statement is the report entitled "Technical Report on the Toowoomba Flood on 10 January 2011" of Mr Neil Collins, the Principal Hydraulic Engineer, Expert Services, of BMT WBM Pty Ltd.

5. In this Statement, I provide additional background information in relation to the following:
   a. Details of the flood studies undertaken from 1998 and the implementation of those flood studies; and
   b. Details of the Toowoomba Water Supply Dams.

6. Gowrie Creek and its tributaries, East Creek, West Creek and Black Gully form the watercourses that drain stormwater from Toowoomba city.

7. Over the years, Council has progressively carried out flood studies and flood mitigation works. Since 1998, Council has undertaken the following flood mitigation measures:

Gowrie Creek Catchment Management Strategy 1998

8. The 1998 Gowrie Creek Catchment Management Strategy defined goals including minimising flooding and unnatural erosion in the catchment and recommended management

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actions to achieve the goals. The management actions identified by the strategy included structural measures such as detention basins, channel re-profiling and realignment, and non-structural measures such as town planning controls. The strategy proposed construction of detention basins and wetlands along both West and East Creeks and re-profiling sections of Gowrie Creek including the establishment of ponds and riffle structures. The strategy considered the existing conditions and the ultimate development condition in the catchment of East Creek, West Creek, Gowrie Creek and also Black Gully. Accordingly, the outputs of the strategy showed flows that were anticipated both under the existing conditions and under ultimate conditions. It also looked at flows with and without works proposed by the strategy.

Implementation of the Gowrie Creek Flood Study 1998

9. Following extensive investigation and community consultation, the Gowrie Creek Catchment Management Strategy was developed and adopted by Council on 13 October 1998. Refer to Council Decisions and Capital Budgets at Items 357 to 410 inclusive of the documents provided to the Commission for details of implementation of the strategy.

10. Implementation of works contained in the Gowrie Creek Catchment Management Strategy 1998 was included in Council's Capital Works Planning in the 1998/99 financial year. The adopted option of the Strategy, the Maximum Community Benefit Option, provided for $36 million of works, including $6.5 million for land acquisition. Implementation of the Strategy is proposed over 20-25 years. Refer to Item 417 of the documents provided to the Commission.

11. The construction of detention basins was undertaken in a sequential manner commencing from upstream West Creek and working downstream. The work was done upstream first in preference to commencing at the CBD. This decision was made because detention basin construction closer to the CBD would not reduce the volume of upstream water reaching the CBD. The works started from upstream of Spring Street, then the section between Spring Street and Stenner Street, followed by works between Stenner and Alderley Street, then the works at Wilf Gowlett Oval which is between South Street and Long Street and then the channel profiling works in the Herries Street to Russell Street section of West Creek. The last detention basin that is to be constructed in the West Creek corridor is at Clewley Park. The first stage of works to create the Clewley Park detention basin has been completed, however completion of works to create a functional detention basin is dependent on Council regaining control of the land on the eastern side of the creek currently held under private leases. Those leases are due to expire around March 2012 and in Council's forward planning, it has planned to complete that detention basin after those leases expire and the land reverts to Council.

12. Works proposed in East Creek, West Creek, Gowrie Creek and Black Gully by the Gowrie Creek Catchment Management Strategy 1998 include up to 22 detention basins, 10.5km of channel improvements, 53 pool/riffle structures and 75 ha/18km of revegetation to provide a flood immunity for a 1% AEP (Annual Exceedance Probability) that is, 1 in 100 year flood event. As a result of subsequent investigations and studies the number of detention basins proposed for West Creek has reduced to 6 and for East Creek to 3 to provide flood immunity for a 1 in 100 year flood event in the CBD. To date, implementation of the Strategy has concentrated on works along West Creek in particular, and East Creek with over $22 million expended to date. Works have included six detention basins (five along West Creek and one along East Creek), sedimentation basins and wetlands for water quality and amenity improvement, channel improvements and extensive landscaping.

13. Since the completion of the West Creek channel works between Herries Street and Russell Street in 2006, and prior to the 10 January event, no flooding occurred as a result of stormwater overflowing from West Creek into Dent Street, Margaret Street, Victoria Street and Russell Street. Flood mitigation works upstream comprising detention basins and channel improvements have provided significant improvement to the stormwater capacity of West Creek, including the section between Herries Street and Russell Street. The flood capacity of West Creek is approaching the ultimate catchment development design goal of containing a 1 in 100 year flood event.

14. The modelling work undertaken suggests that the detention basins in the upper reaches of West Creek had effectively reduced the peak flow during the 10 January flooding. If the detention basins installed since 1998 had not been in place, the flow would have been greater than what occurred in West Creek on 10 January 2011.

Gowrie Creek System Flood Risk and Mapping Study 2007

15. This study builds on the modelling developed for the catchment management strategy, and is expected to consolidate the need for the detention basins along with the storage volumes required to assist with flood mitigation in Toowoomba. The purpose of the 2007 Gowrie Creek Flood Risk and Mapping Study was to map on a property by property basis, the extent of flooding including a 100 year Average Recurrence Interval ("ARI"), a 500 year ARI and a Probable Maximum Flood for each catchment. Based on the flood mapping carried out, key infrastructure was assessed in terms of the level of immunity. The infrastructure considered in this study was property inundation, road crossing immunity and critical facilities access. Flood mitigation options were considered in the study such as on-site detention controls for new development, detention basins, channel re-profiling and realignment, road crossing upgrades and planning controls.

Implementation of Flood Risk and Mapping Study 2007

16. The 2007 study reviewed the mitigation options that were proposed under the 1998 Catchment Management Strategy and in particular, it reviewed the detention basins that had been installed at that time. It also looked at the effectiveness of the remaining detention basins that were yet to be built. It looked at how effective they were in reducing the number of properties, particularly in East Creek, that would be affected by a 1 in 100 year flood. The Study recommended, on East Creek in particular, that there be further design work done to determine whether those basins could be established in those areas to the size nominated.

17. The main recommendations of the 2007 Flood Risk and Mapping Study relates to detention basins and potential channel works required on East Creek. The study proposed two major detention basins, one at Ballin Drive and one at Garnett Lehmann Park. The study also looked at the effectiveness of improving the channel capacities downstream of James Street. Funds have been allocated in the current financial year to do concept designs for the abovementioned detention basins to determine if they could be built to the required capacity and meet aesthetic and environmental objectives.

Property Inundation

18. The 2007 Flood Risk and Mapping Study identified the number of Q20, Q50 and Q100 flood affected properties for each catchment. Based on the study, property owners whose properties were affected by up to a 1 in 100 year flood were notified. In the Council's

Property and Rating System, a notation to the effect that the property may be subject to flooding has been placed on the records of those properties that were identified.

Road Crossing Immunity

19. The immunity of each of the creek crossings under the roads within the Gowrie Creek System was identified for Q20, Q50, Q100, Q500 and Probable Maximum Flood. As the James Street culverts across East Creek did not meet Q50 immunity, this structure was considered to be inadequate and was identified as requiring upgrading to meet Q50 immunity. This work has not yet been carried out. The road in question is a national highway not under Council's control.

Critical Facilities Access

20. Based on best management practice, the study adopted Q500 road crossing immunity to access critical facilities such as hospitals. As the James Street crossing on East Creek was identified as needing an upgrade to a Q50, the study suggested that an assessment be carried out to determine the culvert size required to further increase the crossing immunity to Q500 to ensure hospital access. This has not as yet been implemented.

Further Investigative Work Undertaken After Flood Risk and Mapping Study 2007

21. Following the completion of the 2007 Flood Risk and Mapping Study, further investigative work was carried out in 2008 and 2009 including surveying of properties and refinement of the hydraulic model to determine the extent of building inundation under the 1 in 100 year flood event.

Ongoing Program of Flood Mitigation Works

22. Council has in place an ongoing program of flood mitigation works. Further work is planned within the East and West Creek catchments to fully implement the Gowrie Creek Catchment Management Strategy to provide the flood immunity envisaged by the Strategy. Refer to the Page 2 of the Document entitled "Toowoomba Waterways – Flood Mitigation Works (East Creek, West Creek, Black Gully and Gowrie Creek)" at Item 417 of the documents provided to the Commission.

Toowoomba Water Supply Dams

23. Council owns and operates three water supply dams. The Cressbrook Dam and Perseverance Dam are located in the Moreton Catchment to the east of the range and north east of Toowoomba. Cooby Dam is located in the Condamine Catchment to the west of the range and north-west of Toowoomba.

24. Consistent rainfall during December 2010 produced significant rises in dam levels. Heavy rainfall in the first week of January 2011 resulted in Perseverance Dam and Cooby Dam reaching full supply level on Friday 7 January and Sunday 9 January respectively.

25. On the afternoon of Sunday 9 January, a Water Services Dam Event Management Room was set up at James Cook Offices. In accordance with the Dams' Emergency Action Plans, staff were stationed at each dam and around the clock monitoring and reporting began. Staff in the Water Services Dam Events Management Room continuously monitored the Bureau of Meteorology website. Rainfall radar images on 10 January indicated there was a

possibility of moderate to heavy storms moving in a south west direction from the Sunshine Coast area. These warnings did not appear to be any different from what had proceeded in previous days and did not give any indication of the very heavy rainfall event that was soon to impact on the area from the Dams through to Toowoomba and east to the Lockyer Valley.

26. The very heavy rainfall on 10 and 11 January produced further rapid rises with Cressbrook Dam reaching full supply level early afternoon on 10 January and all three dams experiencing the largest recorded flood event since their construction. The "Toowoomba Water Supply Dams event" commenced 13 December 2010 and ended on 11 February 2011. Refer to the Emergency Event Report Cressbrook, Perseverance and Cooby Dams Flood Event December 13, 2010 – February 11, 2011 at Item 169 of the documents provided to the Commission.

27. The Toowoomba Water Supply Dams event is not connected to the 10 January 2011 flash flood event in Toowoomba city. All three dams are remote from and are in different catchments from Toowoomba city and as such the flash flooding in Toowoomba and the Toowoomba Water Supply Dams event are not related.

28. The dams are managed under Council's Emergency Action Plans that are developed by Council and approved by the regulator, the Department of Environment and Resource Management. Refer to Items 167 and 168 of the documents provided to the Commission.

29. There were no major issues with any of the dams during the heavy rainfall in this wet season. However as with all events debriefing sessions have shown up areas for improvement which will be incorporated in the annual review of Emergency Action Plans. Refer to the Emergency Event Report Cressbrook, Perseverance and Cooby Dams Flood Event December 13, 2010 – February 11, 2011 at Item 169 of the documents provided to the Commission.

30. The only issue that arose in relation to the dams was that residents in Oakey expressed concern that they did not receive warnings of potential flooding from Council when Cooby Dam was spilling. Council's Water Service Department officers provided the Local Disaster Coordinator with ongoing status reports on the levels at Cooby Dam. Under the Emergency Action Plan for each dam, the Local Disaster Coordinator is responsible for notifying Emergency Services and other agencies.

31. There seems to have been a misunderstanding in the community that Council has the capability to predict flooding in Oakey. Council cannot predict flood levels at Oakey or anywhere downstream by assessing the volume of water going over the spillway at Cooby Dam. The catchment above Oakey is about 560 square kilometres of which Cooby Dam only contributes about 160 square kilometres (that is, about 28 per cent of the catchment area). Also, flooding at Oakey can be influenced by flood flows in the Gowrie Creek Catchment which is about another 450 square kilometres. Gowrie Creek was in flood during the January event and influenced the flooding in Oakey. The flooding of Oakey was a direct result of prolonged intense rainfall over the whole catchment of which Cooby Dam controlled 28 %.

32. Cooby Dam eases the peak discharge from the catchment above the dam and lessens the flood peak at Oakey from what would have occurred without the dam being in the catchment.

33. The lack of stream gauges in Oakey and in the catchment upstream or a recorded history of previous flood events which together could be used to predict likely flood levels at Oakey meant that the Local Disaster Coordinator could not provide flood warnings to Oakey. This was not the case in other centres around the state where announcements were made regarding rates of rises, when peaks were expected and the expected extent of inundation. Work needs to be done to determine the flood characteristics of the catchment including the establishment of automatic rainfall and stream gauging stations. This work I suggest should be lead by agencies such as the Department of Environment and Resource Management and/or the Bureau of Meteorology. Advice regarding the status of spillway discharges from Cooby Dam would then be provided to such agencies to assist them to analyse the impacts of rainfall on the whole of the catchment upstream of Oakey and for them to give advice to the Local Disaster Co-ordinator who could then notify the people of Oakey of flood predictions.

Dated: 30 th March 2011.

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Kevin John Flanagan