

## Submission to Queensland Floods Commission of Enquiry

The 2004 Crime and Misconduct Commissions investigation into Brisbane River Flood Levels is an example of how a risk is identified by engineering modelling and then official complaints received and investigated and in the follow up works and policies that could have mitigated or reduced the risks did not occur.

Given perfect 20 – 20 hindsight the CMC and the Brisbane City Council got it wrong and Sinclair Knight Mertz got it right.

This submission is not focused on Brisbane but flood management of the Bohle River, the Ross River and operation of the Ross Dam in Townsville City and modern surveying techniques as they relate to survey control and measurement of Australian Height Datum. It is my hope that these issues fall within the Terms of Reference of the Commission of Enquiry.

### BOHLE RIVER

In 1993 the Thuringowa City Council commissioned a Bohle River Flood Mitigation Study. This study modelled the Bohle River and established AR&R Q50 development lines using the 1987 AR&R Rainfall Data. The report recommended channel clearing at an estimated cost of \$88,000. This work was not carried out.

In 2000 the Thuringowa City Council accepted the Bohle River Floodplain Management Study and in this instance I was elected to be a residents representative on the steering committee. I witnessed the Mike 11 and Mike 21 modelling as presented by the consultant's representative and was verbally informed of the impacts of a Probable Maximum Flood (PMF).

The draft report when released showed river long sections of several flooding scenarios including that of a PMF. At no time were the impacts on residents and property of a PMF event ever articulated in writing. A PMF flood in the Bohle River has flood water levels between 1 metre and 5 metres higher than the established Q50 flood levels.

The Bohle River Floodplain Management Study costed various mitigation options ranging from channel clearing at \$121,275 to channel widening and levees at cost of approximately \$8 million. The latter mitigation options would have lowered the ARI Q50 flood levels in some locations by approximately one metre. One would presume that an extreme event such a PMF would have been mitigated by a similar amount, in short the difference between the events being survivable or not by some of the approximately 20,000 residents who would be affected.

None of the mitigation options proposed in the Bohle River Floodplain Management Study were carried out and the Thuringowa City Council continued with its "passive mitigation policies".

In the years since the adoption of the report there was a consistent refusal by both the now defunct Thuringowa City and Townsville City Councils to perform mitigation works west of the ARI Q50 flood line. River maintenance has not occurred and population growth pressures have considerably increased drainage demands upon the Bohle River. Near Q50 flood events now occur in Q1 to Q5 storm events. Flood events similar to PMF flood impacts are now a distinct probability as result from near 20 years of neglect and political indifference of the identified problems.



**SHETLAND PLACE TO EAST**



**SHETLAND PLACE TO WEST**

The drain running under Shetland Place in Kelso demonstrates the ridiculous aspects of the Townsville City Council's flood mitigation policies for the Bohle River. This road is the dividing line of properties with those being below the Q50 flood line to being to the west and those above the Q50 flood line to the being to the east.

The drain to the east is well constructed with a concrete centre section. To the west from Shetland Place it is an overgrown narrow ditch. The Q50 flood line is a political and economic boundary.



#### **MAIN CHANNEL OF BOHLE RIVER AT BOWHUNTERS ROAD CONDON**

This river is expected to drain a 355 square kilometre catchment with urban development adjacent to the river proper.

The Bohle River is public safety time bomb and the possibility for a Lockyer Valley type flash flood disaster is no longer a matter of if, but when. It is not farmland involved but an urban community with over 20,000 residents. Timely evacuation of residents is not an option and the problems are well documented.

## ROSS RIVER

The Ross River has a catchment of 750 square kilometres. Since European settlement of Townsville the Ross River has acted as a transportation corridor and a source of fresh water.

Three weirs were constructed in the river, Gleasons Weir in 1908, Black Weir in 1918 and Aplins weir 1943. These weirs acted purely as water supply and had no flood mitigation role.

In March 1946 a storm event modelled at approximately an AR&R Q20 event fell in the Ross River catchment. At Upper Kelso approximately 1935 cubic metres a second ran down Ross River of which approximately 1000 cubic metres a second overtopped into the Bohle River.

At Black Weir approximately 11 km downstream an estimated 3212 cubic metres a second flowing over the weir at a height of 4.6 metres above weir wall height. The Ross River burst its banks at the Black Weir.

At Gleeson Weir a further 1.24 km downstream approximately 4556 cubic metres a second went over the weir at an unknown height. The Ross River burst its banks at Gleasons Weir.

I presently do not have river flow and height data for this 1946 event at Aplins Weir. Ross River burst its bank at Aplins Weir.

After the 1946 event levee banks were constructed on the northern side of Ross River at Black Weir, both sides of Ross River at Gleasons Weir and both sides of Ross River at Aplins Weir.

The levee on the Black Weir was partially removed during 2005 with the Riverway construction and the southern levee of Aplins Weir was removed with the construction of the suburb of Annandale.

The upgraded Ross Dam now has a spillway capacity of approximately 3000 cubic metres a second. Giving consideration of the additional discharges directly into Ross River as a result of urban development, catastrophic flooding of Ross River is a distinct probability.

The three weirs in Ross River are not capable of being used as town water supply because of urban runoff pollution; they perform no flood mitigation role, they artificially raise the water table and their very existence poses an unacceptable public safety risk.

The total removal of the three weirs in Ross River would reduce the flood potential of the Ross River by at least the weir wall heights, allow an environmental river flow and lower the water table in several areas. There would still be a recreational water way.

One person's recreational or visible amenity cannot exist at the expense of the greater communities public health and safety.

In January 2009 TOWNSVILLE CITY DISASTER MANAGEMENT STUDY STAGE 1: REPORT SUMMARY was received by Townsville City Council.

This report was put on the Townsville City Council web page at or around October 2010 with a request for public feedback in editable .PDF format.

The report identified and prioritised the following issues.

## 5.4 Flood Risk Treatment

- 5.5 Council has established in its works program a range of structural treatments including upgrading sections of the stormwater infrastructure to cope more effectively with intense rainfall. A flood warning system on the Ross River catchment is established and warning signs have been placed on some road sections that are especially prone to dangerous flooding. The upgrade of the Ross River Dam has also reduced the risk of dambreak flooding.

**Flood strategy 1:** Council to review the detailed flood risk treatment strategies identified by consultants Maunsell Australia in their 2005 report for inclusion in a new City floodplain management strategy. (Ongoing priority)

**Flood strategy 2:** Council establish a rolling program to review and update flood modelling at ten or preferably five-year intervals, in urban areas and rural areas where significant development is planned to take place. Continue research and computerised flood impact modelling to support emergency management planning and operations. (Ongoing priority)

**Flood strategy 3:** Council investigate the need to undertake an updated flood management study to take account of the upgrade of the Ross River Dam and to incorporate the NQ Water operational procedures for managing flows through the dam into the local disaster management plan. (Medium priority)

**Flood strategy 4:** If indicated by the outcomes of *Flood strategy 3* Council investigate the installation of a siren warning system for properties immediately downstream of the dam to be used when flood waters are to be released from the dam. (Medium priority)

**Flood strategy 5:** LDMG ensure that local SES and QPS staffs are made familiar with management arrangements for local flood issues, conduct on-site briefings on the management of the flood threat at identified flash flooding hotspots, especially where road closures are required. (Ongoing priority)

**Flood strategy 6:** Council records flood inundation information from major events in order to build up a database of records that can be used in responding to future flood events in flood prone areas. (Ongoing priority)

**Flood strategy 7:** Recommend to LGAQ that they negotiate with DES and DLGP a review of SPP 1/03 guidelines relating to flood with the particular suggestion that guidance be included on an appropriate resolution for DEM used in flood modelling. (Low priority)

**Please Note:** There is no mention of mitigating or minimising extreme flood events or any mention of the Bohle River in fact it would appear that the old Thuringowa City area had no flooding issues requiring mitigation.

**Flood strategy 1:** These strategies were received 6 years ago and I presume that there has been little or no actions in facilitating the consultant's recommendations?

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Below is my submission to the on line survey.

## ***Townsville Natural Disaster Risk Management Study***

**Name :** *Kevin Parkes*



### **Question 1**

*What do you believe are the biggest natural disaster risks to the Townsville Area? (Please tick one)*

Flooding **X**

Cyclone

Storm Surge

Tsunami

Bushfire

Earthquake

Landslide

### **Question 2**

*Flooding and Storm Tide information for individual properties is available from Council's website. Have you checked the vulnerability of your residence? (Please tick one)*

Yes **X**

No

### **Question 3**

*Do you know where the evacuation centres are located within your local area? (Please tick one)*

Yes **X**

No

### **Question 4**

*Will you need to use an evacuation centre or can you reside with friends or relatives in a safer location until the disaster event has finished? (Please tick one)*

*I will need to use an evacuation centre*

*I can stay with friends or relatives in a safer location until the disaster event is finished* **X**

### **Question 5**

*Do you agree with the strategies that have been suggested in the All Hazards summary report? (Please tick one)*

Yes

No **X**

### **Question 6**

*Do you have any other suggestions to improve these strategies?*

**FLOODING** : *There should be no difference in treating a Dam Break scenario and a Probable Maximum Flood (PMF) Both would have similar catastrophic impacts on the Townsville region.*

*I have concerns regarding Q20 ARI and higher instances that actually fall in the Ross River and Bohle River Catchments.*

*The highest rainfall of rain in the Ross River and Bohle River catchments was in March 1946. The storm was calculated to be an ARI Q20 event and Ross River had flows in the Upper Ross of 1,935 cubic metres a second. Of this 1075 cubic metres a second overtopped into the Bohle River. (Maunsell McIntyre)*

*Black Weir had water 4.6 metres over its wall.*

*This flood event led to the construction of levee banks at Black Weir, Gleesons Weir and Aplins Weir. Riverway Drive acts as a levee bank for the Upper Ross.*

*The southern levee bank at Aplins Weir was removed with the construction of Annandale and the levee at Black Weir was partially removed with the Riverway constructions at Pioneer Park.*

*There have not been any instances of rainfall approaching the 1946 Q20 event in the Ross and Bohle River catchments since that event. The 1998 (night of Noah) event though extreme in Townsville was estimated to be an ARI Q7 event in the catchment areas.*

*The upgraded Ross River Dam has a spillway capacity of about 3,000 cubic metres a second. (Ian Hamilton Townsville Bulletin 2/6/2007)*

*Ross Dam has a filling capability that is way out of proportion to its discharge capabilities at any rainfall event over an ARI Q1 storm event. If we are to have a storm event of any consequence and the spillway of Ross Dam is to operate at or near capacity there is a definite risk of sever river flooding.*

**##Flood strategy3: Council investigate the need to undertake an updated flood management study to take account of the upgrade of the Ross River Dam and to incorporate the NQ Water operational procedures for managing flows through the dam into the local disaster management plan. (Medium priority)**

**## The priority for these activities should be of the very highest order. There is an apparent mindset in the Townsville City Council Counter Disaster Committee and their advisers to satisfy compliance not necessarily reduce risk to the public from natural disasters.**

*The flooding from the Ross Dam is totally in the higher reaches of the Ross River a result of the presence of the 3 weirs. This was made obvious during the March 1946 floods and the remedial actions that were undertaken. None of these weirs are capable of being used for town water supply as they are contaminated by urban run-off. Why are they are they still in existence when they present a public safety risk for abnormal river flooding? They are at present always near capacity and as such have no buffering impacts on downstream flooding and their presence artificially raises river bottom height by their wall height. They are also artificially raising the water table.*

*The concept that these weirs, which perform nothing more than recreation functions and constitute a public risk factor is unacceptable. This should be eliminated by their total removal. Returning Ross River to natural river flows would also have considerable environmental benefits.*

**#### Flood Strategy 3 Council investigate the installation of a siren warning system for properties immediately downstream of the dam to be used when flood waters are to be released from the dam. Yes To be discussed with BOM and EMQ No Action Medium Low Executive Officer Emergency Management Mid-11**

**#### This concept should have the very highest priority as those that live immediately downstream of Ross Dam are also at risk of being flooded by the Bohle River. If there were to be public safety risk from the Ross River there would also be an existing major threat from the Bohle River. Giving locals enough warning so that they could move their motor vehicles and valuables to higher ground could considerable reduce property damage and potential loss of life.**

*I have very serious concerns that disaster management in the Townsville City Council is totally focussed on compliance to government legislation and statutory regulations and is not focussed at actually reducing risks as identified to the community at large.*

*With a little bit of extra effort compliance and public safety could both be satisfied and enhanced.*

[REDACTED]

Kevin Parkes

[REDACTED]

## REPLY FROM TOWNSVILLE CITY COUNCIL

**TOWNSVILLE CITY COUNCIL**  
TECHNICAL SERVICES



Date &gt;&gt; 10 January 2011

PO BOX 1268, TOWNSVILLE  
QUEENSLAND 4810Mr Kevin Parkes  
[REDACTED][REDACTED]  
enquiries@townsville.qld.gov.au  
www.townsville.qld.gov.au

Dear Sir

**SUBJECT >> Townsville City Natural Disaster Risk Management Study  
Public Consultation and Response to Strategies**

I make reference to your email response to the public consultation regarding the above.

Firstly, I would like to thank you for your response to the consultation process and appreciate your concern with regards to the potential flooding issues within the Ross and Bohle Rivers.

Your response was referred to Council's Stormwater Drainage Engineer and the Study Advisory Group over viewing the NDRM study.

With regards to the history of flooding of the Ross River the following comments are made by Council's Stormwater Engineer:

*"Since the construction of the Ross River Dam, the flood risk to Townsville from a Ross River catchment wide flood event has been significantly reduced. The largest flow from the Dam since construction has been in the order of 400m<sup>3</sup>/s (1990 and 2009). The flow determined at Gleasons Weir during the 1946 flood was 4556m<sup>3</sup>/s, which is significantly larger and accordingly it is understandable that vast areas of the present urban area of Townsville would be inundated. A Flood Frequency Analysis suggests that the 1946 flood flow was in the order of between a 70 and 100 Year ARI event based on records prior to the construction of the dam. The construction of the dam significantly attenuates the flood flows from the upstream catchment such that flows of the magnitude similar to the 1946 event should pass through the dam only on very rare occasions (over 1 in 500,000 Year ARI). The 100 Year ARI flow from the dam is now in the order of 630m<sup>3</sup>/s, which should not break the banks of the Ross River until downstream of Abbott Street."*

**TOWNSVILLE CITY COUNCIL**  
TECHNICAL SERVICES

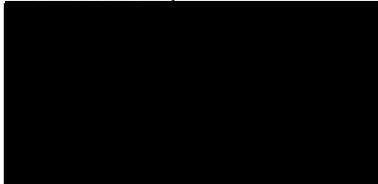


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It is considered extremely unlikely that flow levels in the Ross River will ever reach the levels experienced in 1946. It is with this fact in mind that the priorities for the flooding strategies, included in the study report, were drafted.

It was considered by the Study Advisory Group that the level of priority assigned to the flood strategies is appropriate and the recommended strategies will be implemented in due course.

Yours faithfully



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Given recent Queensland history the reply by the Townsville City Council must be regarded with scepticism at best and with alarm at worst. The quoting 1 in 500,000 year events has been consistent with correspondence

regarding any queries about the Ross Dam by the now defunct North Queensland Water and the Townsville City Council. The quoting of 630 cubic metres a second from the Ross Dam spillway is inconsistent to prior statements by senior representatives of North Queensland Water.

It is not possible to have any confidence in operational and safety statements by Townsville City Council regarding Ross Dam.

## **SURVEY CONTROL and GPS**

For the last 20 years the preferred method of performing survey control measurement is with survey quality Global Positioning Systems. Measurement of 3 dimensional spatial locations is very precise and the ability to perform control and topographic surveys with higher levels of accuracy in a timely and cost effective manner has made GPS the preferred surveying method for outdoor open environments.

In the year 2000 the Australia adopted the GDA 1994 Geocentric Map Datum as the map datum for Australia. This map datum was a result of more than a decade of GPS logging by Auslig and Geo Science Australia at their GPS reference stations. Auslig performed a nation wide 400km grid survey control network on the new map datum. State governments performed a 100km survey control network and it was during this process it was discovered that the earlier First Order Survey Control Network had considerable errors as a result of the inadequacies of earlier surveying methods compared to the modern GPS surveying techniques. Errors of more than 3 metres in some locations were detected. Rather than re-survey the earlier survey control network it was decided to mathematically correct the errors and publish the coordinates as a valid survey control network. There is every possibility that early historic survey control in Queensland is unreliable.

In 1993 Auslig published Ausgeoid 93 gravity model as a means of calculating Australian Height Datum from the WGS84 ellipsoid as recorded by GPS surveys. In 1998 the Ausgeoid 98 gravity model was released and information at the time stated that there was about 100mm confidence with the Ausgeoid 98 model and AHD. There is a 400mm vertical height difference between a AHD point calculated using Ausgeoid 93 and Ausgeoid 98 in the Townsville region.

During 2010 GeoScience Australia stated on their geodetic web site that a N/S vertical error of approximately 1 metre was in the Ausgeoid 98 gravity model against AHD.

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Below is my email to GeoScience Australia and reply.

-----Original Message-----

From: [REDACTED]  
Sent: Thursday, 4 November 2010 12:13 AM  
To: [REDACTED]  
Subject: Townsville Reference Station

Good Afternoon

I am seeking advice regarding the height of the Townsville (TOW2) reference station.

I have noted that the station coordinates are as follows.

S19, 16', 09.42789"  
E147, 03', 20.46545"  
Elipsoid 88.235

Calculated N value using Winter 58.091

Published MGA & AHD

E 505851.334  
N 7869375.326  
AHD 29.474

With a N Value of 58.091 the AHD should be 30.144 m  
Is there an antenna height not being applied here and which AHD should I adopt?  
I would appreciate your advice on this matter.

Regards

Kevin Parkes  
[REDACTED]

Subject: RE: Townsville Reference Station [SEC=UNCLASSIFIED]  
X-RPD-ScanID: Class unknown; VirusThreatLevel unknown, RefID  
str=0001.0A150204.4CD4CB61.0067,ss=1,fgs=0  
X-Brightmail-Tracker: AAAAARaQFaI=  
X-Brightmail-Tracker: AAAAAA==

Kevin

The AHD height for Townsville is an observed height, ie spirit levelled from a know bench mark,

The value of 30.144 would be the value computed using Observed GPS height and AUSGeoid.

The errors is within the accuracy of the AUSGEOID98.  
We have nearly completed AUSgeoid09 and this will improve the result again  
but still will not exactly produce an AHD height from a GPS height.

I hope this helps

Regards

[Redacted]

\*\*\*\*\*

[Redacted]

Geoscience Australia Earth Monitoring Group [Redacted]

[Redacted]

Web: <http://www.ga.gov.au>  
S 35 20' 35"  
E 149 09' 30"

\*\*\*\*\*

At the Cape Ferguson GeoScience Australia GPS reference station a 670mm vertical deviation in the Ausgeoid 98 gravity model and Australian Height Datum exists.

GPS processing software would not detect this error and if a surveyor was to use established survey control measured by GPS it is uncertain to me if errors would compound themselves. The only way of detecting this error would be to survey the height using conventional levelling techniques.

I have discussed this issue with several surveyors and most were ignorant of the problem.

So, to put this submission in perspective we have local governments who ignore public safety concerns made obvious by flood modelling and the flood modelling is based on a surveying data set supplied by our Commonwealth Government that for 18 years has vertical errors of substance in it.

In the interim many billions of dollars of public and private infrastructure was built using this data set in ignorance of the problems.

If the context of this submission has a ring of paranoia about it, it is because there is.

Yours Faithfully

[Redacted Signature]

Kevin Parkes

[Redacted Contact Info]

PS: This is probably outside the Commission of Enquiries terms of reference, but the forced evacuations that occurred in Townsville during cyclone Yasi were focussed only on storm surge. This at the time was the correct action as casualty figures substantiated. There was no mention of a flood threat from the southwest of Townsville. If Yasi had the metre of rain that was predicted there would have been people evacuated from the coastal locals to the Upper Ross, which may have had a much higher risk scenario. At the time I was concerned enough to email the Premiere's office with this concern. The letter from the Townsville City Council of January 10th 2011 aggravated my concerns.