J. V. HODGKINSON F.C.A
Chartered Accountant

[redacted]

Correspondence to: [redacted]

18th March 2011

REGISTERED

Commissioner – The Hon. Justice Catherine Holmes
Queensland Floods Commission of Inquiry
PO Box 1738
Brisbane 4000

Commissioner,

Since lodging my submission a matter of considerable consequence has arisen out of the Seqwater "Report on the operation of Somerset Dam and Wivenhoe Dam" dated the 2nd March 2011, relating to the January 2011 Flood Event.

It calls into serious question the credibility of that report or alternatively the output of the IQQM computer model that has the force of Law in the Water Resource (Moreton) Plan 2007. It is on that output that the determination of the 66% required for the Ecology of the Brisbane River is based. Pre-development flows are calculated by that IQQM computer model on a daily time-step basis with no dams or people.

By way of introduction to the problem, in my submission on "Flood proofing Brisbane" I drew your attention to the existence of these "simulated annual volume pre-development flows" at the Wivenhoe Dam. Their availability would permit you to judge volumes when presented in submissions or arising during conduct of the inquiry. Refer page 3 of the introduction.

The problem

The last paragraph on page ii of the Executive summary (attached) reads:

"The volume of the total inflow into Wivenhoe Dam during the Event was 2,650,000ML. This volume is almost double (190%) the comparable volume of inflow from the January 1974 flood event and comparable with the flood of 1893."

The volume of 2,650,000ML is agreed. For comparison that represents **227 %** of the Wivenhoe Dam.

That percentage of 190% when applied to the1974 volume produces 1,394,736 ML or 1.4 million ML for convenience.

Seqwater calculation of the **1974** flood volume as presented in their report was therefore **1.4 million ML.** Again for comparison purposes that represents **116%** of the Wivenhoe Dam Full Supply Level (FSL). A volume of that size is able to be comfortably fully contained by the flood compartments of the Wivenhoe/Somerset.

On the other hand

The pre-development flow calculated by the IQQM computer model for the year of 1974 was **4.3 million ML.** Refer to attachment *A2* (chart) of my submission. Copy also enclosed.

The inflow for the month of January 1974 can be ascertained accurately from Ms Alma Mahmutovic, Principal Hydrologist, Water Planning Sciences, Department of Environment and Resource Management (DERM). Her confirming emails are also at attachment *A2* in my submission.

For the purposes of this letter I am enclosing rainfall data extracted from BOM records that relates to the 1974 year. It also includes the four months commencing December 2003 for comparison with the eleven months excluding the flood month of January 1974.

A review of how rainfall and inflow works is contained in attachment *A7* of my submission. It is also attached. Mr Drury, the operations manager for SEQWater at that time, explained that it required concentrated rain over the whole of the catchments to fill the dams.

The rainfall in the whole of the catchments was well above these requirements which, in turn, have the capacity to generate much more inflow than simple mathematics. It operates somewhat akin to the Richter scale on earthquakes.

Conversely, as the rainfall lowers then the higher the reduction in the rainfall's ability to create flow. In 1974 the months below 100mm average have no opportunity to create flow. The 1974 months of March and November do have the capacity to create flow. The four months December 2003 to March 2004 are included for observation and comparison. They exceed the 1974 months of March and November and therefore a volume of not more than 200,000ML can be deducted from the 1974 pre-development annual total of 4,300,000ML.

The result

After consultation with Ms Alma Mahmutovic, Principal Hydrologist Water Planning Sciences of DERM., the Inquiry will most likely find the position is:

Seqwater calculation of **1.4 million ML** compared to
Water Resource (Moreton) Plan 2007 of **4.1 million ML.**

A minor variation would be of no consequence.
A major variation of this size should bring into question the whole of their report.

The finding that the 1974 flood is as calculated in the above referred to Report does not aid my submission. In fact it makes it easier to flood proof Brisbane to deal with a flood of the volume they describe if Seqwater is found correct.

"comparable with the flood of 1893"

The final few words in the extract identify 1893 as "the flood". There were 4 floods in 1893, comprising two major and two minor floods.

Sincerely

[redacted]

John Vincent Hodgkinson F.C.A.

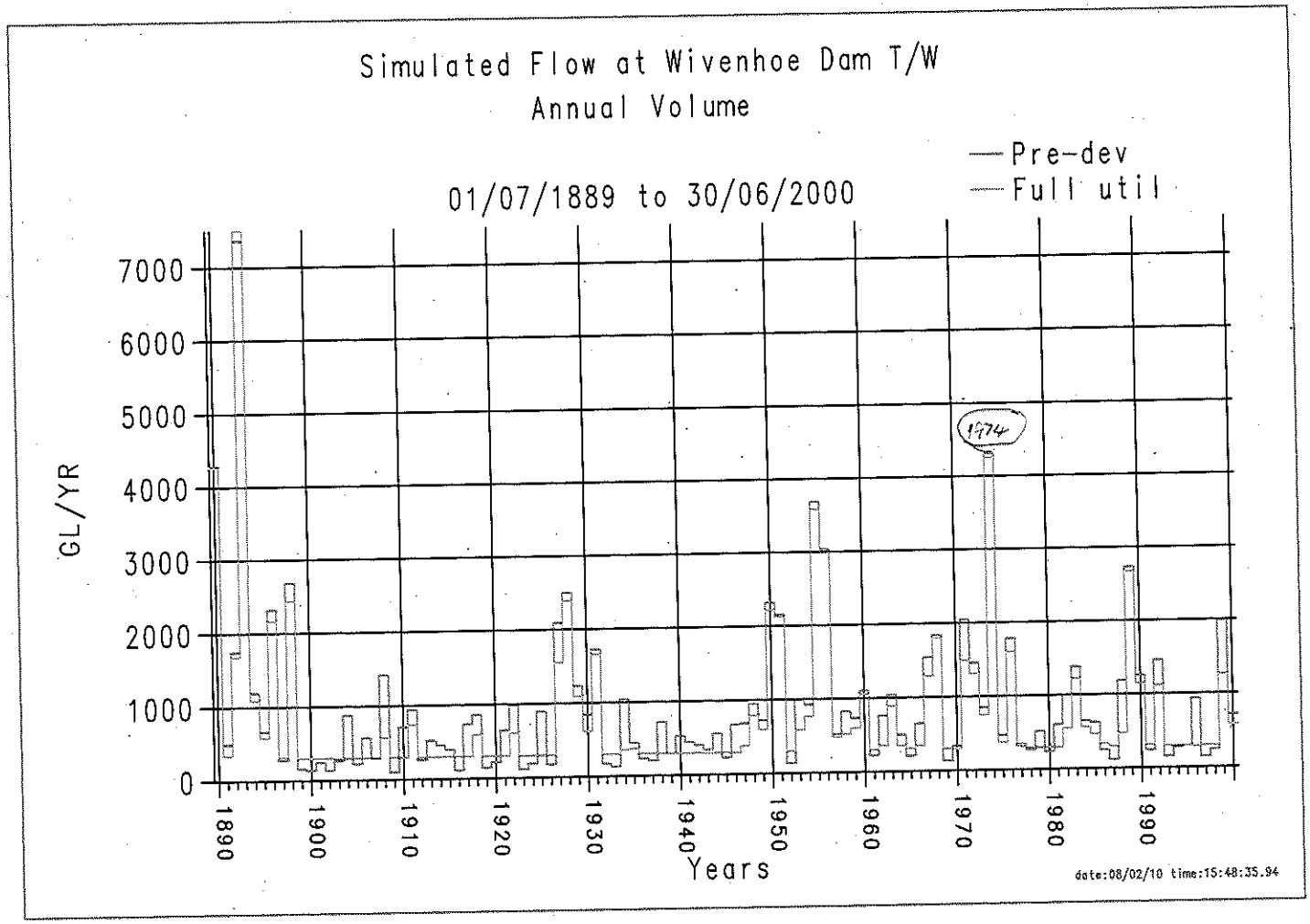

Figure 1: Annual flow volume simulated at Wivenhoe Dam TW for pre-development and full utilisation of existing entitlements scenario

Bring us a monsoon

Let it rain

Summer rainfalls in Wivenhoe, Somerset and North Pine Dam catchments

DECEMBER 1991 – MARCH 1992
922.8mm registered at Kilcoy

DECEMBER 1993 – MARCH 1994
414.7mm registered at Esk

DECEMBER 1994 – MARCH 1995
384.2mm registered at Kilcoy

DECEMBER 1995 – MARCH 1996
572.4mm registered at Blackbutt

DECEMBER 1998 – MARCH 1999
838.7mm registered at Esk

DECEMBER 1999 – MARCH 2001
426.2mm registered at Esk

DECEMBER 2003 – MARCH 2004
571.7mm registered at Esk

DECEMBER 2005 – MARCH 2006
392.3mm registered at Kilcoy

Near-tropical storms needed to fill storages

Amanda Gearing

CYCLONES in the Gulf of Carpentaria that have dropped half a metre of rain in tropical Queensland in the past week may have filled dams in the area to overflowing.

But similar amounts of rain would be needed to break the drought gripping southeast Queensland and replenish dwindling water supplies.

The combined storage volume of the region's three main dams is down to 22.17 per cent, well below the previous record low of 44.7 per cent set in November 1995.

SEQWater operations manager for Wivenhoe, Somerset and North Pine dams Rob Drury said a low or a major depression would be needed to cover the whole catchment area of the dams.

Wivenhoe would need 300mm-350mm of rain falling at 120mm a day over three days to fill, he said.

Wivenhoe has the capacity to store 1,165,000 megalitres of water as well as an additional capacity of 1,450,000Ml to mitigate flooding. Brisbane's second largest dam, Somerset Dam, upstream of Wivenhoe, would need 350mm-400mm of intense rain to fill because it has a smaller catchment area, Mr Drury said.

North Pine Dam, which has an even smaller catchment area would need 600mm-650mm of intense rain to fill.

"You do need large, uncommon events to fill large dams. You don't fill them every year," Mr Drury said. "There have been only four main rainfall events in the past 15-16 years. It has been seven years since we had a major rainfall event that has given us a refill of 50 per cent of the dam."

The only two rainfall periods that generated major inflows that filled the dams since 1990 were 922.8mm registered at Kilcoy in the four months to March 1992 and 838.7mm registered at Esk in the four months to March 1999.

"The dam levels were dropping 15-18 per cent a year (before water restrictions began) but last year it was only 10 per cent," Mr Drury said.

A 7

Extracts from BOM official Rainfall stations

Concentrated rain required to create inflow. The four months December 2003 to March 2004 are added so that inflow from minor rainfall can be observed. All months can be discarded as they do not produce inflow with the exception of March and November. The months of March and November 1974 would not have produced more than 200,000ML.

Total inflow for 4 months 240,000ML
20.6% of the capacity of the Wivenhoe

		1974												2003	2004	2004	2004
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Dec	Jan	Feb	Mar
Wivenhoe - Upper Brisbane River catchment																	
Cooyar creek	40060	**376**	4	24	22	50	26	26	30	71	51	130	82	173	250	120	80
Vincent vale	40307	**355**	9	42	6	51	28	31	35	98	78	126	71	168	186	67	107
Glenhaven	40301	**402**	6	94	31	56	30	22	29	57	49	150	103	161	243	115	92
Blackbutt	40020	**586**	34	155	28	63	19	21	55	54	77	99	42	91	291	107	109
Crows Nest	40382	**526**	18	117	27	67	31	23	40	57	75	181	71	143	170	86	94
Esk	40075	**633**	74	114	54	59	32	39	9	55	75	181	71	101	186	149	137
Toogoolwah	40205	**589**	20	122	48	39	36	17	33	71	59	124	73	129	254	130	95
Jim Sue	40188	**669**	44	280	54	53	70	30	42	61	56	125	75	84	199	97	214
		4,136	209	948	270	438	272	209	273	524	520	1,116	588	1,050	1,779	871	928
Average		517	**26**	**119**	**34**	**55**	**34**	**26**	**34**	**66**	**65**	**140**	**74**	**131**	**222**	**109**	**116**
Somerset - Stanley River ctachment																	
Danewood Vale	40635	**512**	85	203	42	85	31	10	32	67	60	124	85	93	260	120	193
Jimna	40102	**524**	52	223	46	85	49	19	43	67	120	143	88	156	236	168	142
Kilcoy	40110	**416**	38	146	64	42	25	9	32	60	90	143	78	129	147	128	155
Somerset dam	40189	**476**	63	157	64	50	46	17	69	67	88	158	59	113	218	104	170
		1,928	238	729	216	262	151	55	176	261	358	568	310	491	861	520	660
Average		482	**60**	**182**	**54**	**66**	**38**	**14**	**44**	**65**	**90**	**142**	**78**	**123**	**215**	**130**	**165**

Dam levels	Wiv	Som
1st Dec 03	51.6	35.3
31st Mar 04	63.5	61.7
	11.9	26.4
Convert to % of Wiv		8.7
Total **20.6**	11.9	8.7

The primary objectives of the Manual, in order of importance, are:

- Ensure the structural safety of the Dams;
- Provide optimum protection of urbanised areas from inundation;
- Minimise disruption to rural life in the valleys of the Brisbane and Stanley Rivers;
- Retain the storage at Full Supply Level (FSL) at the conclusion of the flood event;
- Minimise impacts to riparian flora and fauna during the drain down phase of the flood event.

While ensuring the Dams are operated during flood events within these objectives, Seqwater is aware that the safety of the public is a primary consideration when making flood releases from the Dams. Every attempt is made to ensure public roads are closed prior to inundation by Dam outflows and that authorities are provided with enough time to prepare for community isolations and to undertake evacuations. These actions are in accordance with draft Communication Protocol prepared by the Department of Environment and Resource Management and followed by Seqwater during the January 2011 Flood Event. When operating the Dams during floods, every attempt is also made to ensure urban damage is minimised, and that Dam outflows with the potential to contribute to urban damage are delayed until it is apparent no other options are available without risking the safety of the Dams.

It is also important to note that under the Manual's current operating rules, both Somerset Dam and Wivenhoe Dam are expected to fail during floods with an AEP larger than 1 in 100,000. This highlights the importance of maintaining the safety of the Dams by ensuring that the flood storage compartments of the Dams are not overfilled.

Finally, Seqwater receives rainfall forecasts for the Dam catchment areas from the Bureau of Meteorology (BoM) to assist in making operational decisions during flood events. These forecasts are derived using the best available meteorological practice, but as shown in this report are not sufficiently accurate to be used as the basis for making decisions on releasing flood water from the dams. Currently, a degree of uncertainty exists in all weather forecasts, particularly quantitative rainfall forecasts, and the longer the forecast lead times the higher the degree of uncertainty in the forecast.

Significance of the January 2011 Flood Event

The January 2011 Flood Event can be categorised as a large to rare event by the Institution of Engineers Australia (Engineers Australia) national guidelines for the estimation of design flood characteristics (AR&R). The flood level classifications adopted by the BoM also define the Event as a major flood. Relevant statistics that demonstrate this are:

- At some individual rainfall stations within the Brisbane River catchment, rainfall estimates beyond the credible limit of extrapolation (AEP of 1 in 2,000) were recorded for durations between 6 hours and 48 hours. Rainfall recorded in the catchment area above Wivenhoe Dam indicates the catchment average rainfall intensity for the 72-hour period to Tuesday 11 January 2011 at 19:00 had an AEP between 1 in 100 and 1 in 200. The catchment average rainfall intensity for the 120-hour period to Tuesday 11 January 2011 at 19:00 also had an AEP between 1 in 100 and 1 in 200.
- On the morning of Tuesday 11 January 2011, water levels in Wivenhoe Dam began rising rapidly in response to very heavy localised rainfall on and close to the Wivenhoe Dam lake area. At the time, the BoM radar indicated this rain was located in an area not containing real time rain gauges. Post flood analysis suggests the rainfall required to reproduce this rise could exceed an AEP of 1 in 2,000 and may be well into the extreme category. Rainfall of this intensity and duration over the Wivenhoe Dam lake area at such a critical stage of a flood event was unprecedented.
- The volume of total inflow into Wivenhoe Dam during the Event was 2,650,000ML. This volume is almost double (190%) the comparable volume of inflow from the January 1974 flood event, and comparable with the flood of 1893.

January 2011
Flood Event

Report on the operation of Somerset Dam and Wivenhoe Dam

2 March 2011

seqwater