REDUCTION OF FLOOD POTENTIAL IN BRISBANE

by Lloyd Hamilton
[redacted]
Kenmore Q 4069
1 June 2011

INTRODUCTION

A variety of means of reduction of flood potential in Brisbane are presented here. It is proposed that several means are to be used simultaneously as the risk of floods greater than that of 2011 is very high. Floods of 1893, 1841 and perhaps 1824 were higher than that in 2011 and with global warming even higher floods are likely to occur.

Levee banks are not proposed for the Brisbane River although they may possibly be useful in the Toowoomba region where conditions are different. Levee banks have failed in areas like New Orleans in USA, Northern Japan where they failed to stop the 2011 tsunami, and in China where hundreds of thousands of people have lost their lives when levee banks failed in the past.

My background is that I am a retired associate professor of geology from QUT. Further details of my background can be found at the web site http://lloyd.hamilton.tripod.com. I have been involved with groundwater investigations, with the investigations for the hydro-electric power site at Rouna Falls near Port Moresby, and briefly with Sirinumu Dam construction in PNG. Although I have an engineering degree I have mostly been involved with geological exploration and examination of coal and mineral deposits.

The proposals involve:

A Relief to Wivenhoe Dam
B Relief to Brisbane River below the dam
C Relief to the rainfall situation

A RELIEF TO WIVENHOE DAM

This involves 3 proposals

1. Diversion of water from below Somerset Dam to North Pine River
2. Diversion of water from the Billies Crossing area to North Pine River
3. Diversion of water into a renewed Lake Atkinson

1 Diversion of water from below Somerset Dam to North Pine River

Reedy Ceek is just below Somerset Dam and extends east into Byron Creek. The D'Aguilar Range separates Reedy Creek from North Pine River. It is proposed to join Reedy Creek to North Pine River with a tunnel through the range terminating at a point near where Laceys Creek joins North Pine River. This gives a fall of about 10m over a distance of about 19 km which is just enough slope to run the water down. To get a greater head of water the

tunnel could go about 3km further to a point below Lake Somerset dam. This greater head of water could allow for a shorter tunnel.

The positive aspect of this is that a considerable amount of water is diverted from entering Wivenhoe Dam.

Negative aspects are that the tunnel is long and therefore costly, and that the water will be diverted into Lake Samsonvale and North Pine Dam. The North Pine waterway out through Petrie will need to be able to take a larger flow, and may need some modification.

2 Diversion of water from the Billies Crossing area to North Pine River

Like the above proposal this idea is to divert water easterly through a tunnel into North Pine River. Billies Crossing is on the easterly side of Lake Wivenhoe and about 8 km north of the dam wall. The exit for the tunnel will be near The Basin which is at the south-western corner of Lake Samsonvale. The distance is about 19km and the fall is roughly 30 m.

The positive aspect of this tunnel is that it directly drains Wivenhoe Dam and so has a bigger catchment than the Reedy Creek tunnel. It also has a greater fall.

The negative aspects are the same as for the Reedy Creek tunnel. It must be noted that the work for this proposal has been done from commercial contour maps. With more accurate surveying the tunnels may prove to be somewhat shorter. For Australia 19 km may seem to be a long tunnel but the world's longest is the Delaware Aqueduct in USA which is 137km long and it was built in 1945 for carrying water. The Clem Jones tunnel is 4.8 km long.

3 Diversion of water into a renewed Lake Atkinson

This proposal is for a big extension of the Lake Atkinson Dam which will help alleviate flooding by itself. I do not have details as it was suggested by another geologist friend. His proposal was to enlarge the dam greatly by excavation. Once there is a bigger dam in place then some overflow from Wivenhoe Dam can be channelled into Atkinson Dam. The channel would be about 10km long.

B **RELIEF TO BRISBANE RIVER BELOW THE DAM**

This involves

1 A new dam on the Bremer River
2 Connecting Brisbane River to Logan River
3 Straightening the Brisbane River
4 Deepening the Brisbane River

1 A New Dam on the Bremer River

This will alleviate flooding to some extent. The main problem is finding a suitable place for it as the land is fairly flat. Western River joins the Bremer

River near Lanefield south of Rosewood. This would require a dam about 4 km long and could interfere with the township of Rosewood. Mount Walker Lower is a possibility, and if that is not suitable then the Mount Walker area should be considered.

The advantages of such a dam are obvious. The land is not overpopulated except near Rosewood.

The only serious disadvantage is the flat nature of the country for a large dam.

Between Rosewood and Ipswich and west of Amberley airport is a large swampy area. Jeebropilly and Ebenezer open cut coal mines are in this area. My friend suggested large scale excavation in this area. The coal, which is widespread in the area, in the area may be sub-economic but its excavation would help to pay for the excavation works, especially at the current price of coal. Coal extends out to Rosewood. The only problem with this might be increased bird life which could be a nuisance to the airport assuming that there are no proposals for it to be re-sited elsewhere.

2 Connecting Brisbane River to Logan River

Two possible routes for canals between the Brisbane River and the Logan River are being considered. More work is needed on this with better survey information than I have available at the moment.

The first to consider starts at Goodna on the Brisbane River and essentially goes south following a tributary for about 12 km then cuts across Oxley Creek and joins a tributary of the Logan River. Another possibility is to construct it just west around Round Mountain but it seems that the ground there is too hilly and would make for too much excavation.

The second route is from the bend in the Brisbane River at Fig Tree Pocket. This joins up with Oxley Creek for about 7 km then crosses over bare ground for about 4 km to join a tributary of the Logan River from Algester to Woodridge, then it goes into the Logan River.

The advantage of either of these connections is that it takes a load off the Brisbane River. The biggest disadvantage is that the extra load on the Logan River has to be addressed. Some work may be needed on the water-way between Logan and Beenleigh. Another disadvantage is that in the longest alternative there is about 10 km of new ground to be cut and the river tributaries and creeks will need to be deepened. Furthermore, it is yet to be demonstrated that there is enough slope for the canals to operate efficiently. The Fig Tree Pocket will give only partial relief to localities up stream such as Jindalee.

5 Straightening the Brisbane River

This may not be popular with people at certain locations along the river. Straightening the river will allow it to flow faster. When the water gets away

more quickly there is less flooding. Of course, much depends on the tides as well. To maintain the beauty of the river the canals for shortening the river could be gated so that the shortening could be controlled time-wise.

Canals for shortening would be at:
The Oxley Creek junction with the Brisbane River, near Lake Manchester, to the north-west,
Across Kholo Road,
Across the end of Somerville Road, Karalee,
Across Priors Pocket,
Graceville to Fig Tree Pocket,
Across Long Pocket,
Vulture Street to Dutton Park,
Kangaroo Point.

It must be noted that the Brisbane River is an entrenched river and was a canyon before the last Ice Age. Unlike normal meandering rivers it has cut deeply through some tough rock. Putting canals across some parts of the river could be an expensive business from the engineering point of view.

At Kangaroo point, for example, the banks are high so it would probably be better to put a tunnel across it than a canal. This would alleviate the need to put a bridge over the canal.

A full study needs to be made to access the relative value of straightening the river in alleviating floods. The big question is how much relief it will give.

3 Deepening the Brisbane River

The river would run faster if it were deeper. This would help reduce flooding to some extent depending on the tides. When the river was a canyon 12,000 years ago it was about 30m deep. It has since been filling up with sand, silt and mud. Until recently the river was dredged for its sand resources. This has been stopped as it was thought it was muddying the river. It used to be a beautiful clear river in Aboriginal times. There is some doubt now that dredging is the main cause of the opacity of the river. It seems that other factors are probably more important.

Dredging will help the flow of the river if the dredging is done in the right places. As with straightening the river we do not know if dredging in the right places will have a major or minor effect. This awaits further study.

The flood potential would also be reduced if the river was widened. This would apply particularly at certain localities where constrictions occur. Any building that constricts the flow should be removed. It exacerbates flooding and is at risk itself.

C **RELIEF TO RAINFALL**

This involves cloud seeding to precipitate the rain in Moreton Bay rather than over the Wivenhoe catchment area. This would only need doing in potential flood seasons with La Nina operating.

Cloud seeding has been used successfully in Tasmania since the 1960s where catchment in the dam increased by 30%. “Warm cloud” seeding experiments have also been conducted in Queensland by the Australian Bureau of Meteorology.

Cloud seeding is normally done to bring rainfall to certain areas. The concept here is to use it for keeping rain away from a given area. The usual problem about whether or not the cloud has the potential to rain does not apply here as the cloud is expected to rain anyway. Seeding in this case is to control the time and hence the place of rainfall. Although this is a new concept it is hard to see why heavy rain clouds should not be easier to precipitate than milder clouds in more barren areas.

The only problem with this concept is that it needs proving and can only be really tested in a rainy season.

CONCLUSION

Several measures for alleviating floods are given here. They are not incompatible with each other and all should be given careful consideration. Hopefully more than one will be followed up. In discussing there options with friends I find that different people have different preferences.

Further study is obviously needed and some ideas may be modified. I would like to see at least one measure for diverting water from Wivenhoe Dam, at least one measure for controlling the Brisbane River flow, and some serious research into cloud seeding to prevent unwanted rainfall over the Brisbane region.