

**SUBMISSION – 01 – QUEENSLAND FLOODS – 2010-2011**

**COMMISSION OF INQUIRY –QUEENSLAND FLOODS**

**Commission of Inquiry Order (No.1) 2011-02-15**

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**by P. Appapillai**

**By: Premaraj .Appapillai**

**Organisation: Individual Submission as per notification**

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# **1.0 INTRODUCTION**

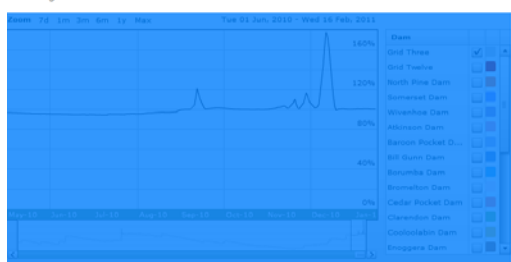
This submission is made in response, to the terms of reference, of the Commission of Inquiry into the Queensland Floods , set up, in accordance with COMMISSIONS OF INQUIRY ORDER (No.1) 2011(Queensland Government 2011).

The object, of the submission, is to recommend the planning, supply & installation of a “SMART DRAIN” which will overcome the inadequacies and the lack of certainty, in the existing equipment/ communications systems, to deal with “flash floods”.

The Queensland Government, invested \$9 ban(QldGovernment 2010), in order to rollout, the South East Queensland Water Grid, which is a set of Water Assets , under the control of a Supervisory Control and Data Acquisition( SCADA) System, referred to as South East Queensland (SEQ) Grid Manager. One of the functions of the SEQ was to capture excessive amounts of water and prevent the inundation the Brisbane Central Business District& associated suburbs, which are situated on a flood plain, with the Brisbane River flowing through it. This is a flood mitigation function.

The SEQ Grid Manger would have been capable of meeting its flood mitigation objectives, under “normal flood conditions”. However, it failed to do so, during the EL Nina Floods of 2010-2011, owing to an exceedingly heavy downpour , referred to as a “flash flood”, impacting on Brisbane and its suburbs(ABC.Reporter 2011).The downpour resulted in a heavy deluge , in the Ipswich – Brisbane area, variously referred to as an “inland tsunami”. Mitigating the “inland tsunami” exceeded the capabilities of the Wivenhoe Dam. Even the gradual release of 25% of the Dam capacity, during early February-2011, would have caused the Brisbane River, to break its banks & inundate the Brisbane CBD & suburbs, causing over \$13bn in damage, as the downpour dumped, well in excess of 1162 GL ( 2 Sydney Harbours), in 3 days.

Historical Dam Storage Data  
This graphs shows the full supply level of Seqwater dams including drinking water supply and flood water storage  
left and right to select dates of interest



(seqwater 2011)

## **2.0 SOLUTION TO FLASH FLOODING OF BRISBANE CBD**

The only solution, to the above crisis, is to create a “rapid bypass tunnel “which can divert the swollen waters of the river via “a smart drain” under the control of the SCADA SEQ Grid Manager. The above deficiency in the SEQ Grid must be rectified, without delay, as the future holds more El Nina down pours. Further, more dams, are not the solution. This position is confirmed by Associate Professor. Willem.Vervoot., in the Age of Jan .11, 2011, when he maintains that ,

*“NOW is not the time to panic as we scramble to find ways to help the people affected by the floods. Calling for the building of new dams is, however, not a satisfactory response to a very wet La Nina year. Rather, Australia must look at more innovative ways to adapt to the naturally occurring floods and future increasing climatic variability.*

*The current deluge has highlighted the risk of flooding in many parts of Australia. Risk is the combination of occurrence (how often something occurs) and damage (how bad it is). The traditional focus in flood management has been to minimise the occurrence by building dams and river control structures.”*

(Vervoot.W 2011)

Fig 1 depicts a “SMART DRAIN”, with the capability of responding to a “flash flood situation, comparable to the 2011 deluge. The “smart drain”, bypasses the waters of the swollen river from Ipswich to Brisbane CBD, under SCADA Control thereby preventing the costly inundation of Brisbane CBD.

# OPTION B(1) -SMART PIPELINE –CONCEPT PLAN

Slide5

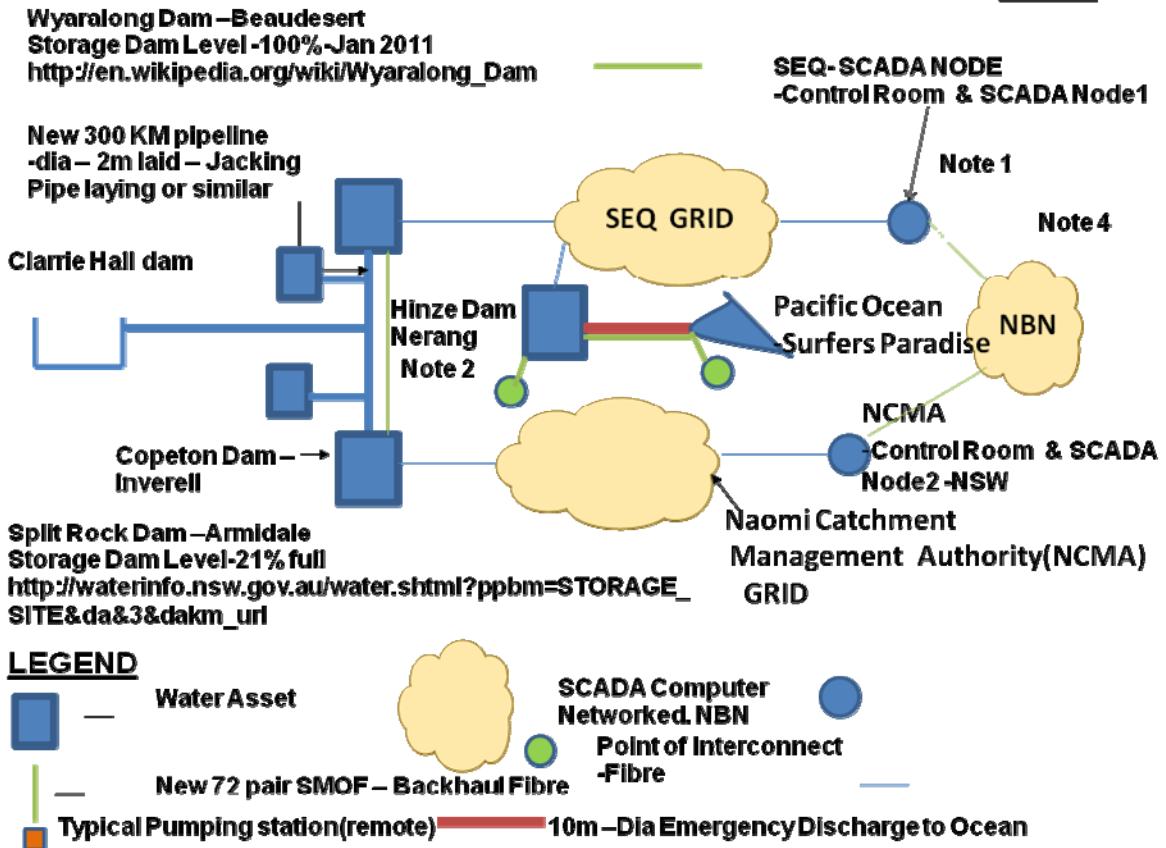


Fig 1

A solution similar or equivalent, to that proposed in Fig1, is essential in the CBD, in view of current plans, to build higher rise apartment blocks, in Brisbane, as reported below.

*“BRISBANE needs to grow up. While regional plans consider population growth in concentrated urban settings, Campbell Newman says it’s time Brisbane had more highrises.”*

(McMahon.Bruce 2011)

Failure to adopt, the smart drain option above, will result in reliance on the status quo , which could work some times, as it did in 1974 & 1999, according to the CEO SEQ Chief Executive and fail at other times, as it did in 2011.

Failure of the Wivenhoe Dam mitigation function occurs, when there is a convergence of a swollen river and a torrential down pour, as it did in 2011. The technology exists , including the NBN which will be on line, to activate an emergency bypass route , as depicted in Fig1.It must be emphasised, “SMART DRAIN “options, can be implemented, with the added benefit of revenue generation(see Para5.3)

### 3.0 ADVANTAGES OF THE NATIONAL BROADBAND NETWORK

Different Parts of Queensland will require SCADA Computer Driven Water Grids, at locations such as Bundaberg, Rockhampton, Townsville, Cairns etc., as depicted in Fig 2.

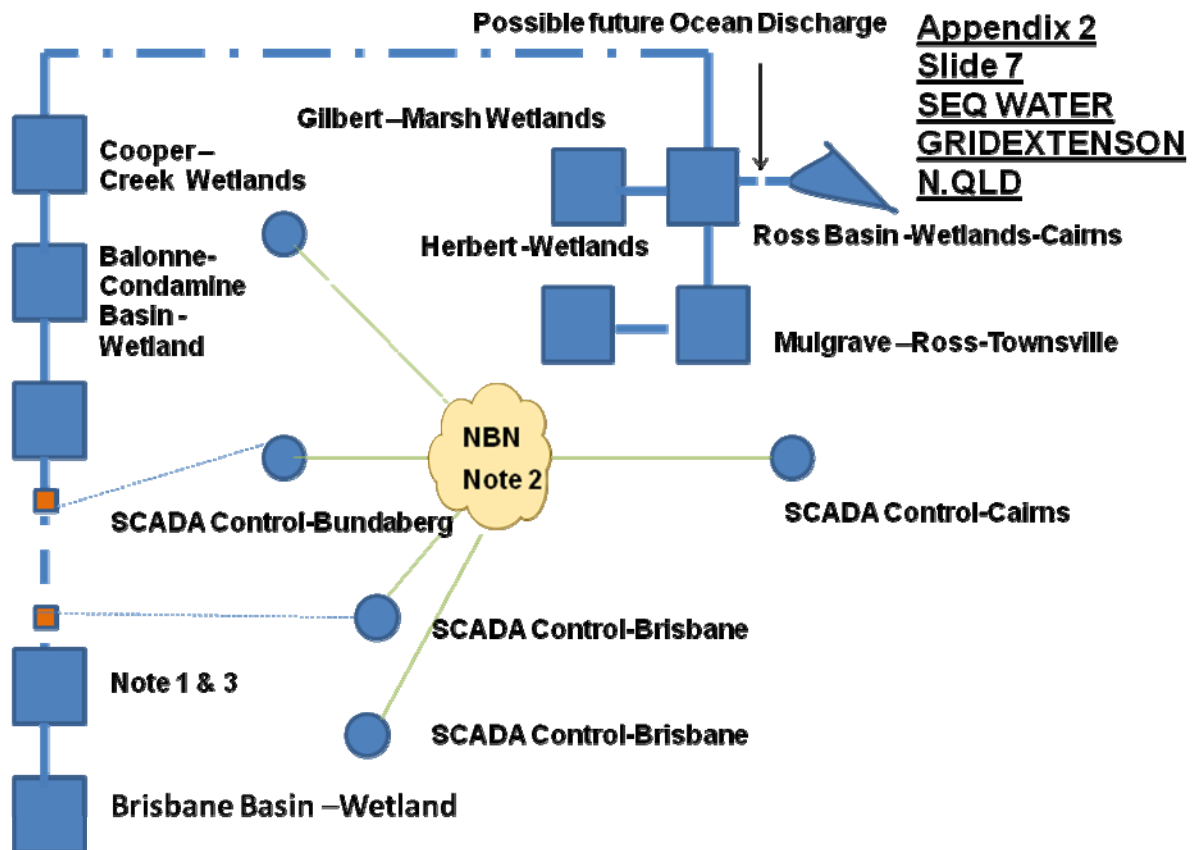


Fig.2

These Water Grids can be interconnected at minimum cost, as NBN Co. is scheduled to be implemented in Queensland, shortly and funding for its rollout, has been allocated by the Federal Government.

The interconnection of the SEQ Grid, on a Queensland basis, with supporting interconnection, via the NBN & Telemetry Upgrades, will cost approx. \$2.5 bn.

The plan is a concept Plan (only) of the cost effective extension of the SEQ Grid Manager via the NBN & Wetlands, is depicted in Fig 1. More accurate network configurations, could be determined, with onsite analysis.

#### **4.0 FUNDING OF THE “SMART DRAIN OPTION”**

The “SMART DRAIN “Option, depicted in Fig 1, could be implemented as follows;

- utilising a 12 yr, \$.75bn Common wealth, semi annual bond, with an annual interest rate of 6% p.a. (.i.e. coupon rate of 3% p.a). The repayment is equivalent to \$45M (interest only)p.a For further details see Appendix-1. The bond covers the cost of SCADA Upgrade, Tunnel supply , installation and commissioning and miscellaneous costs. Interconnections to the NSW Water Grid etc and can be included as required.
- Present Value of Total Payments is equivalent to = Present Value of 24 Recurrent Payments + one –off –Redemption Payment= 95.78m p.a (see Appendix -1)
- It is pertinent to note that the Chief Economist Shane Oliver, AMP, has indicated in the reference above, that costs of flood damage, could escalate to “\$30bn”

Further ,the successful implementation of the “SMART DRAIN option, has a precedent , in that it has been successfully , implemented in Kualalampur(National.Geographic 2010).

#### **5.0 COST BENEFITS OF THE “SMART DRAIN” -OPTION**

The “SMART DRAIN”-Fig1, when implemented results in a saving of \$ 2.50 bn, p.a (Appendix -1) for Queensland, which is facing many predicted La Nina events. The Capital Investment of \$.75bn, for the “SMART TUNNEL” and support services, could be paid back, in 3.6 months (Appendix-1. The interconnection of the SEQ Water Grid to NSW (Fig 1), N. Queensland (Fig.2), will result in huge financial benefits, which can be computed as required.

Other benefits of the “SMART DRAIN” -Fig1, are detailed below.



## **5.1 SUPPORTED BY INDEPENDANTS**

The “SMART DRAIN” option is supported by the Independents like Tony Windsor, who has requested a long term solution(Lewis.Steve 2011).When designed and implemented, the “SMART DRAIN ” will effectively immunise Brisbane from future La Nina events, such as the 2011 la Nina event.

## **5.2 SUPPORTED BY N.QUEENSLAND -INDEPENDANTS**

Another feature of the “SMART DRAIN”, is that it satisfies principle demands of the North Queensland Independents such as Bob Katter, in that it can be interconnected to North Queensland Water Grids, cost effectively via the wetlands and the NBN.Piping which is a component cost, can be minimised and is estimated at approximately \$1m per km, by the greater use of wetlands.

*“Construction costs for a significant pipeline are in the order of \$1 million per kilometre.”*

(Scott.Don 2011).

Interconnection of Water Grids (Fig2) via the Wetlands, will have the support of the Greens, in that it, incorporates, green features such as;

- Ecological System Extension –

*“Wetlands are home to an abundant variety of plants, water bugs, reptiles, birds, fish, frogs and mammals.....”*

- Flood mitigation

*“Many constructed wetlands also act as detention basins and have the capacity to store more water in flood events and help mitigate flooding downstream.....”*

(Blacktowncitycouncil 2011)

### **5.3 INBUILT REVENUE GENERATION FACILITIES**

The “SMART DRAIN” ( Fig 1), under normal weather conditions, serves as a twin deck tollway. In the event of a forthcoming La Nina downpour, the tollway can be evacuated and converted into a “SMART DRAIN”, which would serve as a water bypass route, to the ocean / NSW pipeline.

The “SMART DRAIN “(Fig1).bypass would prevent the inundation of Brisbane.

In between La Nina events, the tunnel will generate funds, as a tollway (Fig3) between Ipswich and Surface Paradise or similar tunnel route.



**Fig 3**

The “SMART DRAIN” (Fig1) is equipped with a 72 pair Single Mode Optical Fibre (SMOF), which can be leased to generate revenue, in alliance with a Telco.

Spare fibres can be sold to a Telco, to support a Capital Recovery programme.

### **5.4 SMART -DRAIN & WATER SECURITY**

The Current practice of depleting Wivenhoe Storage Levels, is not satisfactory, as it is based on subjective assessments of acceptable storage levels, in the event of alternating La Nina floods & severe droughts. In the event of heavy downpour, comparable to the 2011 downpour, mitigation failure will impose a financial burden of at least \$2.6 bn p.a.

An appropriately designed , “SMART drain with interconnection features via the NBN(Fig 1) capable of withstanding flash floods,twice the size of the 1974 floods(Owens.Jarad 2011b), will provide the desired safety

It is significant that the on January 11, 2011, there was 190 % capacity which was an abundance of water, in storage whilst a few years ago( mid 2007), water levels had dropped to 15% capacity(Owens.Jarad 2011a) which is approx. 7months drinking water capacity.

Recent discharges, could result in the Wivenhoe Water supply, fluctuating between the traditional “rock and a hard place”.

Further discharge to the ocean, is a waste of a precious asset, which should be providing Queensland and it s neighbours with water security.

## **6.0SMART DRAIN OPTION –WATER TRADING**

Diverting surplus water to the Ocean, during a “flash flood “is not the best option, in that it fails to exploit, the opportunity for trading surplus water, with other states like NSW,which are experiencing water restrictions and depleted water supplies. For instance,multi- gigalitre dams , such as, Copeton Dam in NSW , is only 51% full, Split Rock Dam in NSW is only 21% full,Keepit Dam in NSW is only 93% full, Windamere Dam is only 46% full(NSWWATER 2011).

It has been reported that it is proposed to discharge 25% of Wivenhoe Dam (ie290 Gigalitres) from Wivenhoe Dam into Brisbane River(Australian 2011), in order create capacity for flood mitigation functions.This is wasteful. An alternative strategy of piping the 290 Gl over period of time to NSW , fraught with water shortages, could raise \$ 220.4m p.a. @ \$823m per Gigalitre(SunWater 2011).It must be observed, however, that at times of flash flooding or similar, to price of water can drop to \$25-35 per megalitre(ABCRural 2011).

Any water in excess,arising from a 100 yr EL Nina events or similar , could be rapidly discharged into ocean,in accordance with Fig1.

It is pertinent to note, that Split Rock Dam, with a 21% storage capacity, is under pressure to service Tamworth with an \$18M pipeline & would benefit, by water sourced from Queensland, thereby generating revenues.

***“The federal Water Parliamentary Secretary, Mike Kelly, will meet the Barraba community, local politicians and Tamworth Regional Council today to hear why a pipeline should be built from Split rock Dam to the town.”***

**(ABCNews 2010)**

Fig 1, indicates how a 300km( conceptual), with SCADA Control via the NBN, can enable Queensland to share water with other states and generate revenue for Queensland.

At present Queensland, failure to exploit this avenue of revenue generation, is inadmissible, as there are many more predicted EL Nina events.

## **7.0 CONCLUSION**

In conclusion, it must be emphasised that;

- **The existing SCADA System must be upgraded and associated infrastructure installed, with a “smart bypass”, as depicted in Fig1.**
- **One “SMART DRAIN” could provide protection for multiple dams, and control via the NBN.**
- **Flood Insurance costs can be dramatically reduced. This is vital, in view of the lack of insurance & the lack of cost effective insurance as revealed by the State Government.**
- **Failure to do so would render the population, vulnerable to flood devastation, arising from future El Nina events or compelled to squander an invaluable financial asset, namely stored water, through ocean discharge.**
- **Every attempt must be made to pipe water to NSW and engage in Water trading, in the generation of mutual benefits.**

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## **APPENDIX -1**

**1.0 Present Value of Bond Servicing PV(1)= .06X 750m = \$ 45m**

**p.a(2 Coupon Payments)**

**2.0 Present value of Bond Redemption Costs, after 12Yrs**

$$=PV(2)$$

$$= (750) / (1.03)^{24}$$

$$= 750 / 2.03$$

$$= \underline{\$369.46m}$$

**3.0 Present Value of 24 Recurrent Coupon Payments(interest only) of \$369.46m**

**per payment**

$$= PV(1)=\underline{\$779.85m}$$

**4.0 Present Value of 24 Recurrent Coupon Payments + Bond Redemption costs**

**after 12 yrs**

$$= PV(1) + PV(2) = \$779.85m + \$369.46m$$

$$= \underline{\$1149.31m}$$

**5.0 From Item 4 above, the p.a expenditure =( PV(1) + PV(2)) /12 = 1149.31/12**

$$= \underline{\$95.78 m}$$

**6. By comparison, flood damage has been variously estimated at \$ 13 bn-5yrs()  
= \$13 bn /5 = \$2.6 bn p.a**

**The above damage has been estimated, over a one year – period(best scenario).**