Report – **Review of Think Water Act Water**, dated 15 September, 2009

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SUMMARY

This is a proposal for a way forward in addressing water requirements for the ACT. Contained herein are specific recommendations for grey water recycling however these should not be seen in isolation to the bigger picture. The bigger picture is the need to undertake modeling to develop a complete whole-of-urban water quantity/quality analysis for the ACT.

Water Plus – Experience

Water Plus has been involved with the meetings concerning Sustainability Policy and Programs conducted by the Environment and Municipal Services TAMS. These meetings discussed the interaction between storm water, sewer mining and aquifer storage and recharge. We have also completed 5 sewer mining feasibility studies for ACTEW Corporation and another for the Canberra CIT. Water Plus participated in the LDA feasibility planning for the new Hume West Industrial Estate. This experience has led Water Plus to develop a strategy which if implemented, will have a major impact on water security and achieve sustainability outcomes. We have 15 years experience in the industry. Water Plus wishes to work with government and other stakeholders to ensure that the appropriate legislative and cooperative frameworks are put in place to achieve sustainable outcomes.

Whole-of-urban water analysis

Recently I attended a Sustainable Cities forum where Dr Shiroma Maheepala of the CSIRO was one of the guest speakers. The key point that came from Dr Maheepala's presentation was that no Australian city has undertaken modeling a complete whole-of-urban water quantity/quality analysis.

Need for Competition

The Productivity Commission in their research paper "Towards Urban Water Reform: A Discussion Paper" of March 2008 has highlighted the need for competition. ACTEW is the only licensed water authority in the ACT. Urban water monopolies may not be the best structures to provide innovation and efficient delivery of services. The paper recommended more research and analysis is required before changes to market structure could be introduced.

Canberra has Unique Requirements

Canberra being an inland city has different needs to those located on the coast. We also have a different method of government and public service structure. Think Water Act Water (TWAW) goes some way to addressing the issues however I believe that more coordination is needed in order to develop an effective plan and further action is required in order to implement the plan. The recyclability targets set out in the current report will be difficult to achieve unless more concerted action is taken.

No System or Structure for Innovation

LDA (Land Development Agency) proposed rain water capture and recycling for the Hume West industrial estate however ACTEW declined to participate. This is an example that goes against the spirit of TWAW. Government may need to make a decision on how water issues are to be managed into the future. I understand the sensitivities involved given the revenue stream from ACTEW to the government and the need for ACTEW to develop centralised

systems for control and revenue purposes.

Public Concern

Based upon the letters to the editor and editorials in the Canberra Times there may be increasing community concern that ACTEW and perhaps the government do not understand how to address the water issues facing Canberra. On 19/1/2009 the Canberra Times also published "Climate horror scenario for ACT – Canberra will be one of the cities hardest hit by future climate change across Australia, becoming much hotter and drier than previously thought, new research says. Another Wednesday 26 August 2009 "Water Needs management by one federal government body". I propose that this central management should also occur in the ACT. For the purpose of this report we will call the new body the ACT Water Authority (ACTWA)

Water restrictions have become a disempowerment to ACT residents. People see a deterioration in their gardens and a reduction of Canberra's social amenity and cultural heritage. We need to revisit the Garden City concept and re-empower residents.

WHY ACTWA

Whilst I will be putting forward ideas on how to recycle grey water, the deeper issues relating to structural reform need to be addressed first. Any new initiative just becomes part of a patchwork quilt. Low flush toilets and restricted flow shower heads seemed to be good ideas but now the sewer pipe infrastructure is deteriorating because there is insufficient flow to move solid waste to the treatment plant.

There are too many stakeholders in the water management of the ACT and there needs to be more coordination. Institutional arrangements for the management of water need to be put in place which are independent of political considerations. This new institution would need to have or be able to bring together the environmental, regulating, financial and technical capacities required.

In order to develop a whole-of-urban water quantity/quality analysis for Canberra I submit that at least the following organisations need to be involved:

Environment Department
ACTEW
ACTPLA
Plumbing Inspectors
LDA
ICRC
ACT Health
Parks & Gardens
Sustainability Commissioner

Others to consider:

Local Industry
Consultants Environmental, Hydraulic, Mechanical and Landscape
Universities
Sporting Bodies
Plumbing Contractors
Developers

Recycling Domestic Grey Water

Grey water must be used on the garden and should not be stored for more than 24 hours. Treated and Sanitised water that is treated to a high standard (National Guidelines - BOD5 < 10; Suspended Solids < 10 and Coliforms < 10) can be stored and reused for a wider range of purposes.

Water Plus has discovered technology that is ideal for the treatment sanitisation and reuse of grey water. The prototype systems have been on trial for 2 years and continue to operate within the national water quality guidelines for storage and reuse. Reuse options under the ACT Guidelines include irrigation, toilet flushing, washing machine and general cleaning such as homes, windows and car washing.

The Domestic Waste Water Treatment Industry

To date most of the domestic waste water industry incorporates the sales and servicing of septic and aerated water treatment systems. Local Councils in various areas across Australia have registration of black and some grey water treatment systems, administrative procedures, compliance and reporting which produces varied results. The ACT has no register of such systems, some of which may contain chemicals which may be dangerous to trades and service providers including emergency services and fire fighters. Other systems have been sold previously in the ACT which have subsequently been found to be either ineffective or misrepresented by sales and service providers. I suggest that consideration be given to the registration of all domestic and commercial grey water systems as the continued growth of this sector may not prove to be sustainable without adequate supervision and compliance. The ACT has the opportunity to create a compliance and reporting system that can be sold to the rest of Australia and exported to other countries. We do not have the burden of a large number of existing systems and can develop a robust system from the outset using the latest technology. I have outlined the details of this below.

Plumbing Regulations

1. New domestic dwellings are plumbed with the black and grey water pipes separated.

2. The purpose of this separation is to enable the homeowner to reuse the

grey water either as a diversion system to sub-surface irrigation or to treat and sanitise the water for storage and reuse (irrigation, toilet flushing, and laundry etc as per the ACT Greywater Guidelines)

3. Grey Water Treatment Systems are expensive to retrofit to existing dwellings costing approx $15,000 to $20,000 to install

4. Unless the grey water pipes on new homes are joined/connected (bathroom, laundry, ensuite) the homeowner is later faced with a retrofit situation

5. The ideal would be that the grey water points be connected and directed to a collection sump. Cost for a new home $1,000 approx supply and install. This would make the home 'grey water ready' and could supply grey water to any brand of grey water processor or be diverted onto gardens untreated. Water Plus does not recommend untreated diversion due to the risks involved; please see below.

6. Single sale supply and install for new homes should be less than $10,000.00 and multiple sales for a subdivision should be less than $6,000.00 per home. These prices include the sump and pump, grey water processor and storage and reuse tank.

This additional pre-planning to make a new home 'grey water ready' avoids the higher costs of retrofitting systems and the associated environmental costs.

I therefore recommend that consideration be given for new homes to be fitted with grey water pipes directed through a collection sump for the purpose of either diversion of untreated water or treatment and sanitisation and that the building regulations be amended to accommodate this.

Why Recycle:

60% to 80% of residential water to drain is grey water

The reuse of this water is critical for:

• Environmental Flows

Less use of water from our storage dams means that there is more water available from the dams for release into the river systems. This water is better quality than the treated water released from the LMWQCC (Lower Molonglo Water Quality Control Centre)

• Lifestyles

Natural grass and foliage keeps homes cool. People can be re-empowered in having a vibrant garden. Most people prefer a clean environment and a clean motor vehicle.

• Overcoming water restricted living

All water restrictions relate to outdoor use. ACT residents would like further options to help maintain their gardens.

• Maintaining the garden city including nature strips

• Increasing the resale value of homes

• The future growth of Canberra

• Less load on the LMWQCC hence less salts into the Murrumbidgee River

Registration of Service Providers

Water Plus has approached the ICRC in relation to either becoming a licensed water authority, or gaining exemptions under the current regulations or becoming an approved service provider for the purpose of:
1. Harvesting municipal storm/rain water and hard stand storm water run-off for reuse

2. Harvesting municipal, commercial and domestic grey water

The ICRC has advised that under their current legislation/regulations it is difficult to advise Water Plus.

I recommend that consideration be given to opening up the Water Utility Licensing as detailed in the Productivity Commission Discussion Paper of 3/2008. This means a review of the ICRC legislation to accommodate competition in this sector. Please see
http://www.pc.gov.au/research/commissionresearch/urbanwaterreform

Alternatively service providers could be arranged under the supervision of other organisations such as ACTWA with perhaps spot checks undertaken by ACT Health. Please see details below of a recommended structure for compliance and reporting.

Health Considerations

Water Plus believes that diversion of untreated grey water and the impact of rising temperatures may cause unnecessary adverse public health implications and may not be sustainable. I recommend that consideration be given to review these guidelines. The dangers of diverting untreated water onto gardens are clearly set out in the ACT Greywater Reuse Guidelines. The single greatest impact for the advancement of human health has occurred following the introduction of waste water drainage and treatment systems. Waste water reuse in suburban blocks may reintroduce disease and illness unless it is properly supervised and reported. Please see below.

What are the Issues?

Water Plus believes that there is inadequate coordination, legislation, regulation and supervision which addresses water recycling in general. This is stifling innovation and will not produce the best outcomes required for a water sustainable city.

Lack of regulations results in 'Industry Cowboys' who give poor advice, systems that do not work, systems that incorporate dangerous chemicals (fire and impact risks to public and emergency services), systems that are not recorded , systems that may need to be decommissioned.

I believe that relying on the ACT Grey Water Guidelines may increase the risk of the spread of disease because:

- diversion systems where untreated water is usually dispersed on to gardens

- treatment and sanitisation systems may not be properly designed nor serviced after installation

- lack of enforcement capability by ACT Health or the plumbing inspectors

- lack of decommissioning procedures or plumbing design which will enable cost effective and easy decommissioning of systems

- there is no compulsion to service or maintain systems either by the homeowner or subsequent home owner/s

- ACT water quality guidelines are out of date when compared to the national guidelines

- Global warming may increase the risk of disease from diversion systems.

- there is no registration of existing diversion and treatment systems

Other Considerations:

- Outlawing domestic products that are damaging to the environment in particular salts (eg salts from washing powders)

- Educating people of what not to put down the drain

- Reusing water that is fit for purpose and has ACT Health approval

- Industry working closely with government agencies

- registration and license fees for service providers

- right of entry onto properties by service providers

- how will ongoing systems maintenance be funded - water or other rates, direct payment to service providers?

- will the use of systems be mandated

- should the homeowner be obliged to enter into a service contract with a service provider? Generally it is recognised in other jurisdictions that the homeowner should not be involved in the servicing of any waste water treatment system. Only approved service providers should have access to the system/s.

- review trade waste requirements and water abstraction charges

- place a value on the cost of not having to treat water at Lower Molonglo Treatment Plant (LMWQCC) including the cost of removing salts prior to discharge into the river.

- place a value on the cost of not adequately watering our parks and trees

- BASICS needs to be reviewed to include grey water treatment and sanitisation

- ACT should consider rebates for grey water systems. The Federal Government has announced a $500.00 rebate to existing homeowners, for grey water treatment and sanitisation systems connected to sub-surface irrigation, toilet or washing machine. New homeowners should also be considered for a rebate.

- impact on existing and new sewer pipe infrastructure by treating and reusing grey water - please see below.

- de-registration or financial penalties on service providers for breaches of the guidelines.

Proposed System, Process, Regulation, Revenue, Benefits and Management Structure

The System

1. A domestic grey water treatment & sanitisation system drawing from an underground sump/holding tank with treated water pumped to a re-use tank.

2. The reuse tank has a distribution pump and connection to toilet flushing, washing machine and irrigation/car washing

3. The sump has 2 pumps installed; 1 pump to feed the grey water processor and the other pump with timer used to flush the sewer mains. In this way the sewer can be flushed at a given time on given days at high velocity, by using some of the captured grey water in the under ground sump.

4. An alarm panel to be installed in each home to monitor each processor. Optional mobile phone alert to the service provider.

5. The licensed/approved service provider (LASP) is responsible for the maintenance and repair of the systems.

6. Homeowners are obliged to pay for the servicing of the systems under

regulations/lease conditions yet to be determined.

7. For equity reasons every home in a sub-division or area has access to the treated water for discretionary reuse. Water is to be used on each block only

8. Overflow from the re-use tank should be plumbed to feed a municipal pond, lake or aquifer if applicable.

9. The LASP is responsible for the data collection and serving the information to the relevant supervisory body (eg ACT Health).

10. LASP is responsible to archive data and make the data available to the relevant supervisory body

11. LASP is to scan plans of plumbing and drainage for each block for remote internet access

12. Relevant supervisory body is to carry out spot checks of water quality and systems maintenance

13 All defects are to be reported to relevant supervisory body by LASP

14 Only accredited trades people are to access the plumbing and drainage for each dwelling

15 Only LASP can allocate jobs for plumbing and drainage to accredited trades people

16 Water Plus would register to become a LASP

The Process

1. All existing and future grey water diversion and treatment systems must be registered

2. A registration fee is to be levied for each registration to assist in funding the of the advertising campaign

3. LASP apply to ACTWA or ICRC for licensing approval

4. CIT or other training to be developed for LADSP and trades

5. Advertising to promote greater public awareness of diversion and treatment systems

6. Grey water systems manufacturers to lodge details of each system with registration fee/s. Annual renewal?

7. Legislation and regulations formulated

8. ACTWA and LASPs may wish to involve ANU and Uni of Canberra for R&D

9. Formulate marketing of systems and processes to other jurisdictions.

10. Encourage assembly, administration and service industry for Canberra with associated employment

Regulations

A partnership between industry and government designed to:

1. Produce desired outcomes

2. Minimise public service administration

3. Safeguard Public Health

4. Build a viable business model for the private sector

5. Raise government revenue

Revenue and Savings

1. Fees from manufacturers, LASP's, trades persons, builders and home owners

2. Inspection fees

3. More land sales and ACT expansion

4. Power usage to run the systems. Estimate $70.00 per annum. Modeling will need to be done in order to compare the power usage of individual systems and the power usage required to run the proposed reverse osmosis system at LMWQCC, power and fossil fuels to dispose of the salts together with the power required to pump the purified water back to the Cotter dam.

5. Employment

Savings

Less infrastructure costs for sewer mains and LMWQCC expansion

More water for municipal parks & gardens. Safer than treating black water for the same purpose.

Benefits

1. Provides a solution that is both de-centralised and centralised. Most new homes would not be able to use the amount of water that is generated and overflows from the re-use tanks would flow to municipal storage.

2. Eliminates the need to build reverse osmosis/desalination plants at LMWQCC and the associated problem of salt removal

3. Many salts are distributed to the gardens, ponds parks and ovals. (It is

interesting to note that black water treatment at the Fyshwick Sewer Treatment Plant is distributed to ovals at Duntroon and the ANU. There is no significant build up of salts in these soils after many years of irrigation)

4. Protects public health

5. Re-empowers residents discretionary use of water on their gardens and helps reinstate the garden city concept.

6. Government seen to be achieving

7. Allows for further expansion of the ACT

8. Provides a model to be marketed to other jurisdictions

9. Involves local universities in R&D

10. Creates employment

11. More control over and better environmental flows through less urban use of stored water

Management Structure

1. Minimal public service staff requirements - oversight and regulatory role only

2. Compliance, testing and maintenance to be undertaken by LASPs

3. Recording and information sharing is mainly internet based

4. Constant liaison with all stake holders and coordinated by ACTWA to be determined.

5. Annual reporting

Other Issues:

1. Will ACT Health and plumbing regulations allow for the overflow of the re-use tanks to municipal storage. I understand that ACT Health would not favour a third pipe system similar to Rouse Hill NSW. At Rouse Hill the grey water left the block to a centralised treatment plant and then piped back to the houses. This system was compromised by trades persons who were ignorant of the recycling system incorrectly plumbing treated grey water to potable outlets

2. It is not proposed that the grey water treatment replace rain water tanks. It is envisaged that a separate rain and grey water tank be installed onto each block. The grey water tank need not be as large as a rain water tank because the water is in constant use and re-use.

3. Black water recycling (sewer mining) is too expensive and requires too much compliance. Treated water reuse is limited to irrigation of parks & ovals. It is too difficult to formulate a viable business plan – who will purchase the water, especially if it rains?

4. Rates and costs will be more for homeowners in new suburbs. Will the benefits make the additional costs worthwhile?

5. Will the Fire Brigade have access to the water in the reuse tanks?

Why raise these issues?

Whilst I am skeptical about any progress on this matter in the near term I strongly urge all involved to recognize the urgency in securing a workable sustainable structure for the water security of the ACT.

To date, grey water systems have been too expensive to purchase and maintain, problematic and sometimes ineffective. This is about to change as smaller, more effective, reliable and cheaper systems are introduced to the market.

The reputation of the water treatment industry in Australia is not good. Claims are made that are misleading, service providers are not doing their maintenance, councils do not follow up on issues, homeowners are not renewing their service contracts and generally the industry is dysfunctional. Is this what we want for the ACT? Water Plus does not wish to be part of an industry with a poor reputation. Damage has already been done to the industry by previous operators and systems, which were introduced to the market place, that were, at best, only prototypes. Because there is no best practice model creates an opportunity for the ACT to develop one. It needs a coordinated effort that is dependant upon government to coordinate in consultation with private industry and other stakeholders.

There has never been a concentration of treatment systems in suburbia to the same extent as what we will see in the future. Now is the time to take control to ensure we can achieve best practice outcomes.

Water Plus has not received any government or private funding to develop an effective processor. With modest means we have a viable product which we know can be developed further. It is early days and Water Plus would like to secure the assembly of systems here in the ACT. Mass production will bring with it economies of scale and wide distribution will bring lower maintenance costs.

I look forward to receiving any questions and feedback

Peter Norton-Baker