



APPENDIX **N**

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Appendix O. Further detail on Option 3 – Water Tariff Reform

The final option is the alternative non-infrastructure measure recommended by the TWST interim report - B2. *Townsville City Council to review and adjust as appropriate, the existing water tariff scheme* (TWST, 2017).

As part of its funding agreement with the Commonwealth Department of Sustainability, Environment, Water, Population and Communities under the CityDeal, Townsville City Council should consider the cost effectiveness and efficiency of a two-part tariff for Townsville in line with the National Water Initiative Pricing Principles.

In 2011, TCC instituted a voluntary two-part tariff (Water Watchers Plan) for residential customers alongside the existing fixed tariff (Standard Plan). According to GHD analysis, in 2016, only 12.5 per cent of residential customers had selected a two-part tariff (GHD, 2018). Non - residential water users are on a compulsory two-part tariff.

The composition of the current residential tariffs is shown in Table O.1.

Table O.1: Residential Water Pricing – Standard and Water Watchers Plans

Plan	Fixed Charge (\$/connection)	Variable Charge (\$/kL)
Standard Plan	\$769.00	\$2.94*
Water Watchers Plan	\$351.00	\$1.41

**Variable charge on Standard Plan is charged after consumption of 772kL of water per household (600L/d/person with 2.51 persons per household)*

The current residential tariff structure means that customers consuming less than 296kL per annum are currently better off switching to the Water Watchers Plan.

The COAG's National Water Initiative Water Pricing Principles, agreed to by the Commonwealth and all State and Territory Governments, specifies two-part tariffs are the preferred structure for cost effective residential water tariffs. The Pricing Principle state that:

In accordance with NCP commitments, the States and Territories agree to bring into effect pricing policies for water storage and delivery in rural and urban systems that facilitate efficient water use and trade in water entitlements, including through the use of:

- i) consumption based pricing;*
- ii) full cost recovery for water services to ensure business viability and avoid monopoly rents, including recovery of environmental externalities, where feasible and practical; and*

Two-part water tariffs provide several benefits:

- The variable or consumption-based component of a two-part tariff provides a price signal for residential users that may result in more efficient use of water, leading to lower demand
- The tariff structure can be established to generate an appropriate return on and return of capital to assist in the maintenance and augmentation of the water supply.

In 2012, PWC undertook an assessment of mandating the Water Watchers Plan for all residential customers (PWC, 2012) and concluded:

- A 2.74% and 5.94% reduction in consumption for current Standard Plan users in the short and long term respectively. Overall, a reduction of approximately 1.44% in the short term to 3.2% in the long term from Level 1 restriction water consumption levels was projected.
- Sensitivity analysis undertaken on an upper-bound test case showed total demand reductions in the order of 5.2% and 8.0% in the short and long term respectively, which equate to reductions of about 10% and 15% for impacted Standard Plan users.
- Demand reductions achieved at a residential level translate to network wide reductions estimated in the order of 3.2% on average.

PWC bill impact of this change was calculated for a household with average consumption of 560kL per annum and shown in the table below.

Table O.2: Bill impact of household with average consumption of 560kL per annum

Avg. Historical consumption	Standard Plan bill	Water Watcher bill	Percentage change in price	Elasticity estimate (long-term)
560 kL	\$1.16 / kL (\$650)	\$1.71 / kL (\$957)	47.2%	-0.14

Source: (PWC, 2012)

GHD adopted the PWC analysis as the basis for the water savings under *Option 4-12A: Water Pricing - Pay for Use Pricing* (GHD, 2018).

A new tariff adjustment recommended by TWST as part of Option 3 should be a consumption-based tariff for the proportion of residential customers that are currently under the Standard Plan. The new tariff should align with National Water Initiative Pricing Principles enabling full cost recovery as well as provide a price signal which leads to a reduction in demand.

O.1 Developing a cost-reflective, consumption-based residential water tariff

The development of a cost-reflective consumption-based water tariff for all residential water users should comprised of the following elements:

- The water tariff structure enables full cost recovery of the existing water supply asset base as well as the revenue requirements of the infrastructure being constructed under the base case
- A variable component of the tariff which references the Short Run Marginal Costs (SRMC) and Long Run Marginal Cost (LRMC) for supplying water to Townsville
 - SRMC is the operating cost, expressed as \$/kL, associated with increasing the water available from existing supply assets and any assets currently being constructed
 - LRMC is the \$/kL of the next likely supply augmentation.

O.1.1 Revenue recovery

The revenue requirements associated with supplying water to the residential customers currently under the Standard Plan has been estimated based on the current water pricing and water use in Townsville. The following tables outline the process in calculating the residential and non-residential revenue requirements.

Table O.3: Standard Plan connections summary

	Unit	Annual amount
Connected residential properties - 2017-18	Number of effective connections	114,940
% of residents on Standard Plan	Percentage of total connections	88%
Access charge	\$ per connection	769
Access charge revenue	\$	77,783,000

O.1.2 Short-run marginal cost

The variable component of a two-part tariff for current Standard Plan residents should include a Short Run Marginal Cost (SRMC). The SRMC is the variable component of the cost associated with the actual delivery of the water required – e.g. the pumping and chemical costs, from existing assets.

The SRMC for the existing water supply network in Townsville is assumed to be \$1.41/kL which is the current variable component of the Water Watchers Plan.

The second element of the SRMC is the variable cost associated with the soon-to-be-completed HPDP- Stage 1. The following table outlines a potential SRMC associated with HPDP – Stage 1. It is noted that not all operational costs are variable costs so the SRMC outlined below should be considered a higher figure.

Table O.4: SRMC for HPDP – Stage 1

	Total
Annual operation & Maintenance – stage 1 pipeline	6,500,000
Capacity of pipeline (kL/year)*	85,410,000
<i>Incremental SRMC (\$/kL)</i>	<i>\$0.08</i>
<i>Existing network SRMC (\$/kL)</i>	<i>\$1.41</i>
Total SRMC	\$1.49

*Based on supply of 234 ML/day for 365 days.

Source: (GHD, 2018)

O.1.3 Long-run marginal cost

The variable component of the two-part tariff should also include the LRMC associated with the next likely augmentation in supply. The next supply augmentation could be a second duplication of the Haughton Pipeline (234ML/day or 85,410ML/annum) to increase the supply from the Burdekin Dam to Ross River Dam. Given the significant water that can be supplied to Townsville following the completion of the HPDP- Stage 1, the likely timeframe for the next augmentation could be up to 30 years.

Table O.5: LRMC calculations

Discount rate (real, pre-tax)	4.50%
Capital cost of next augmentation	219,590,311
Whole-of-life operating costs (discounted)	126,225,661

Assumed years till commission	30
PV of costs	89,511,849
PV of total water capacity (kL)	429,317,406
Marginal cost of next supply augmentation (\$/kL)	0.21

The LRMC associated with the next supply augmentation is \$0.21/kL. This low LRMC represents the substantial nature of the next augmentation with its additional 234ML/day capacity.

O.1.4 Residential water tariff

The analysis conducted above provides an water tariffs inputs and total revenue requirement to develop an indicative water tariff for residential customers who are currently on the Standard Plan. The assumed water use of these customers is shown in the table below.

Table O.6: Average residential water use

	ML/annum	kL/annum
Average residential water use per connection	0.414	414

Consumption based on TCC's stated 600/p/d for residential use and including demand reductions under the Base Case and 2.51 persons per household

Full cost recovery water tariff with a LRMC and SRMC as well as a balancing fixed charge to recover the current amount of revenue is shown in the table below.

Table O.7: Water tariff scenario

LRMC of next augmentation (\$/kL)	SRMC (\$/kL)	Variable charge (LRMC + SRMC) (\$/kL)	Variable cost	Fixed cost (\$/effective connection)	Total Cost (\$)
0.21	1.49	1.69	701	68	769

The fixed bill under the Standard Plan becomes a high variable cost bill with a small fixed annual charge.

O.1.5 Demand reduction due to consumption-based water pricing

The movement from a fixed water price to a two-part tariff pricing structure may result in a demand due to the price elasticity of demand. In 2012, an assessment of the potential impact of a shift to two-part tariff from the Standard Plan¹ The price elasticity of the demand for water used in this assessment is shown in the table below.

The price elasticities in the table refer to the amount of residential water consumption reduced when consumers are faced with a particular volumetric charge. For example, a \$1.20/kL charge reduces water consumption by up to 8%.

Table O.8: Price elasticity of demand for water

Housing Type	\$1.20 per kL
Owner occupied houses	-0.08

¹ PWC, 2012, Two-part tariff – residential pricing, Report for Townsville City Council

Housing Type	\$1.20 per kL
Tenanted houses	-0.02
Units	-0.01

Source: (PWC, 2012)

The price elasticity of demand for water is measured as a negative value between zero (i.e. perfectly inelastic) to negative infinity (i.e. perfectly elastic).

The chosen elasticities with the low and medium elasticities associated with a \$1.20/kL tariff.

Table O.9: Demand reduction scenarios by water tariffs

	Low	Medium	High
Price elasticity scenarios	-0.01	-0.03	-0.05
Water savings (ML per annum)	418	1,255	2,091
% of 2018-2019 total demand	0.7%	2.1%	3.5%
% of per capita demand reduction	0.7%	2.1%	3.5%

Townsville water demand. A conservative estimate of 2.1% reduction has been used for this analysis. This lower figure also reflects the level of water savings that are already being introduced as part of Townsville's Three-Point Water Security Plan.

Further analysis should be undertaken on the potential water savings given the savings forecast under the Plan as well as the potential changes in welfare under the consumption-based tariff..

O.1.6 Implementation costs

The implementation costs for the shifting of the residents on the Standard Plan to the new water tariff are shown in the table below. The estimated costs are:

- Three Full Time Equivalent (FTE) staff for the implementation for a total of \$250,000 per year
- A \$250,000 marketing budget per annum for creative design, marketing, community engagement and material creation (\$20,800 per month).

Table O.10: Option 3 implementation costs

	Year 1	Year 2	Year 3
Implementation costs (\$)	500,000	500,000	500,000