New Customer Contributions - Review Capital and Operating Expenditure

EXPENDITURE ASSESSMENT REPORT - REGIONAL URBAN WATER BUSINESSES

- Final Rev D
- 12 March 2013

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Executive Summary

The ESC engaged SKM to undertake a review of the expenditure (capital, operating) underpinning the calculation of NCCs for nominated Regional Urban Water Businesses (RUWBs) using the NCC spreadsheet model prescribed by the ESC.

The four RUWBs whose NCCs expenditures were reviewed are:

- Gippsland Water
- Wannon Water
- Barwon Water
- Goulburn Valley Water (water component only)

In undertaking the NCC expenditure review the ESC in particular sought an assessment of the assumptions and calculations in relation to the reasonableness of:

- whether the capital expenditure included in the calculation relates to growth and the basis of the cost estimate is reasonable;
- any capital expenditure from Water Plan 2 (WP2) that is included [noting that the ESC Guidance Paper allows costs from the Water Plan 2 period (2008 – 2013) to be recovered from future NCC charges but does not make provision for costs prior to 2007/2008 to be recovered];
- the methodology used to apportion capital expenditure that serves multiple purposes (e.g. compliance, renewals etc as well as growth) to growth and to new customers; and
- the proposed infrastructure and related capital expenditure in serving specific catchments versus a broader area; and
- the incremental operating costs (and their relationship to growth).

The detailed outcomes of the reviews for each of the RUWBs are provided in **Sections 3 to 6**.

A summary of the key issues overall arising out of the review is provided in **Section 2**.

In general:

- For all four RUWBs, the expenditure (both capital and operating) underpinning the calculation of the NCCs proposed for their respective businesses is reasonable both in terms of the manner of apportionment and the quantum and timing of expenditure allocated to growth.

  However, there are some instances of apparent “overs and unders” in the appropriate expenditure to be adopted for inclusion in the NCC calculations. For example,
  - Wannon Water’s estimate of the capex for the Wollastan Road Project infrastructure works appears to be underestimated (even compared with other data it has used) and some five projects were agreed in discussions with SKM should have a lower apportionment to growth (but may not yet have been incorporated into information provided to the ESC); and
  - Gippsland Water should reasonably include some component of the Gippsland Water Factory operating expenditure in the incremental growth opex for its NCC calculations.

- The single most important issue is the adoption, by all the RUWBs reviewed, of a uniform standard NCC charge across all growth areas (or towns) rather than non-uniform or specific individual geographic/catchment/town area standard NCCs that are cost reflective of servicing those growth areas (as is understood to be required by the ESC's Guidance Paper).

There are various reasons put forward by the RUWBs to support and rationalize this position (i.e. adoption of uniform standard NCCs). These include:

- ***Social Equity***: A need to provide social equity (although this is not defined and simply is based on a perceived need to smooth "material" differences in the quantum of standard NCCs across different growth areas/towns and a premise that uniformity is good in its own right);
- ***System interconnectedness***: Systems normally have a high degree of interconnectedness and the water resources and infrastructure should be treated in a holistic sense.
- ***Extent of prior capital investment***: The standard NCC charges for individual growth areas can be heavily influenced by previous capital investment in infrastructure (before Water Plan 2) and which still has "unutilized" capacity to service future growth.
- ***Administrative simplicity*** (from the water business and stakeholder perspective);
- ***Stakeholder acceptability*** or preference (especially from a developer perspective);
- ***Financial Incentives***: Financial incentives may be required in some cases to encourage growth to particular areas.
- ***Transitional Smoothing***: As the proposed future approach to determining NCCs and their application is materially changing from that applying in the Water Plan 2 period, some form of transitional arrangement may be appropriate to avoid significant dislocation in the charges.

Overall, it would seem important for properly informed decision-making - on whether to adopt uniform standard NCCs or not - that the underpinning work be done to establish the quantum of (non-uniform) standard NCCs that would apply to each individual growth area/catchment area/town regardless of whether the alternative true cost reflective geographic based NCCs approach is adopted. This applies in aggregate and for individual services (notably water, recycled water).

A number of businesses (e.g. Barwon Water, Goulburn Valley Water and Wannon Water) have at least estimated the non-uniform standard NCCs that would apply for some growth areas within their operating areas to assess the variability in NCCs if a fully cost reflective approach was adopted. Wannon Water has calculated geographically based standard NCCs for each of its growth areas but is proposing to adopt only two uniform standard NCCs - one a uniform standard NCC for 'growth towns' and a separate uniform standard NCC for 'everywhere else', effectively small towns.

The approach adopted by the RUWBs may at least be an acceptable short to medium term pragmatic transitional approach but further work should be undertaken to test the merits of individual growth area standard NCCs. This would involve further testing the practicality and acceptability of this with stakeholders. It is understood (from feedback provided to the regional urban water businesses) that developers prefer a uniform standard NCC rather than individual growth area standard NCCs. The non-inclusion of capital expenditure prior to WP2 in the NCC calculations when that expenditure is continuing to provide capacity to service new growth seems an anomaly.

1. Background

1.1. The Context

In August 2012, the ESC requested all 16 Victorian urban water businesses (metropolitan and non-metropolitan) to establish their proposed standard new customer contributions (NCCS) - for water, recycled water and sewerage services - for the Water Plan 3 (WP3) period in accordance with a set of pricing principles defined by the ESC. The NCCs proposed should reflect the incremental costs required to service growth.

1.2. The Scope of this Report

This report assesses the appropriateness, prudency and reasonableness of the capital and operating expenditure (and key related assumptions) used by the three regional water businesses reviewed to underpin their calculations and to establish the NCCs proposed for their growth/development areas.

This review has been undertaken to specifically assess:

- Whether the capital expenditure included in the underlying NCC calculations relate to growth and the basis of the cost estimates is reasonable;
- Whether the methodology used is reasonable for apportioning capital expenditure that serves multiple purposes (e.g. compliance, renewals etc as well as growth) to growth and to new customers;
- The relative merits of the proposed infrastructure and related capital expenditure in servicing specific catchments versus a broader area;
- Any capital expenditure from Water Plan 2 (WP2) that is included in NCC calculations (i.e. no double counting); and,
- The reasonableness of the incremental operating costs (and their relationship to growth).

The scope of this review does not include an assessment of the water business financial / economic models themselves (as provided to the ESC) nor of the appropriateness, fairness and reasonableness of the outputs of the models or the proposed NCCs themselves.

1.3. Regional Water Businesses included in this Review

The four regional water businesses whose NCCs have been reviewed are:

- Gippsland Water
- Wannon Water
- Barwon Water
- Goulburn Valley Water (water component only)

1.4. Development of a new framework for new customer contributions

In 2012 the Essential Services Commission (ESC) consulted with the Victorian water industry and key stakeholders on the issues of the charging regime for the recovery of costs from parties making new connections to sewerage, water and recycled water networks. The intention was to have a new framework in place for the next regulatory period (Water Plan 3) that:

- Improved the clarity of charging regimes for new customer connections (NCC);
- Enabled water businesses to set locally appropriate NCC charges, following a consistent set or pricing principles;
- Avoid the disputes arising from application of the existing 'one size fits all' approach; and,
- Be consistent with the relevant statutory documents governing the water corporations.

Following the consultation exercise the ESC issued a Guidance Paper on New Customer Contributions in August 2012. The Guidance Paper includes information for the water businesses in the form of a New Customer Contributions Framework that broadly sets out the ESC's expectations of the key elements of the NCC models to be developed by the water businesses. In this way the water businesses can have some certainty about how the ESC intends to assess the NCC approach and meet requirements under clause 13 and 14(1) of the Water Industry Regulatory Order 2012. Whilst each water business has some flexibility to propose its own approach to NCC the ESC – through the price review and water plan process – approves the negotiating framework, the application of pricing principles by each water business and the "standardised" NCCs submitted in the Water Plan for each water business. SKM understands that all but one of the water businesses has provided the ESC with proposed standard NCCs for the next regulatory period.

The ESC's NCC Framework consists of four main elements:

- Definition of the service covered by the NCC
- A charging model
- A set of pricing principles
- Supporting tools and guidance

1.5. Definition of service covered by NCC

The NCC service covers infrastructure and associated activities to connect an un-serviced property to water or wastewater services networks **or** to increase services to a serviced property.

1.6. Charging Model

The charging model used to determine the NCCs should consider both the incremental costs to the water business associated with making new service connections as well as the incremental benefits that it receives from those customers (increased revenue stream, wider customer base to spread fixed costs).

It is envisaged that the NCCs proposed would vary between individual water businesses and also between both

- individual catchments (or growth areas) serviced by a water business; and for
- individual services (water, alternative water and wastewater) provided by the water business.

While not explicitly stated it is assumed that these individual NCCs or contributions to NCCs should at least be identified with the potential for a water business to adopt “uniform” NCCs where it can be demonstrated that there is little material difference (across catchments and/or services) between the cost of servicing new connections and/or there is a strong stakeholder preference for such an approach. This is consistent with the intent and principles (including cost reflectivity) set out by the ESC.

1.7. Pricing principles

Each NCC proposed must meet the following minimum pricing principles. It must:

i. have regard to the incremental infrastructure and associated costs in one or more of the statutory cost categories;
ii. have regard to the incremental future revenues that will be earned from customers at that connection; and
iii. be greater than the avoidable cost of that connection and less than the standalone cost.

Water businesses may propose additional pricing principles so long as they are consistent with the NCC framework and the minimum pricing principles.

Incremental costs include the capital and operating costs (as well as tax and financing costs) that are incurred by the water businesses to service new customers. Typically the capital provided to service new customers is classified as growth capital.

Ultimately the intent is to have a charging model that applies a demonstrable fair and reasonable charge to new customer connections, in accordance with the Water Act.

1.8. Supporting tools and guidance

The ESC has provided a template negotiating framework that follows the main matters that water businesses are required to action (or notify customers of their requirements) to implement the NCC framework and comply with the statutory provisions of the Water Act.

The ESC has also provided a model NCC estimator that may be used to capture the calculation of standardised NCC charges.

2. Summary of Key Review Issues Arising

The detailed outcomes of the NCC assessment of the individual Regional Urban Water Businesses (Barwon Water, Gippsland Water, Goulburn Valley Water and Wannon Water) are provided in **Sections 3 to 6**.

This section provides an overall commentary of selected key overall issues that have arisen during the review of the Regional Urban Water Businesses NCCs and are of interest to the ESC.

1. Variability in Quantum of Standard NCCs across Water Businesses

There is a differing level in the quantum of standard NCCs proposed across the Regional Water Businesses - in aggregate for all services (water, sewerage, alternative water) or for each of the individual water, sewerage or alternative water services. This applies whether uniform or non-uniform standard NCCS are proposed or adopted.

Some factors that influence this variability in NCCs include:

- Differing levels of historical investment in infrastructure;
- Differing extent of availability of spare or unused capacity in existing infrastructure that can be used to service growth (from pre-investment generally and pre-WP2 investment in particular, as such pre-WP2 investments in growth infrastructure are not included in the NCC model currently);
- Proximity of growth areas to existing infrastructure – the more remote the growth is from existing infrastructure the greater the extent of new infrastructure to service it (e.g. longer pipes and/or a requirement for local water or sewage treatment plants);
- The nature and span of the water business operating area and the extent of interconnectedness of water and sewerage service infrastructure. For example (as occurs to some extent for the Melbourne metropolitan area) for growth in the west water services would be relatively more expensive as the water resources are sourced in the east and need to be transported long distances, while sewerage services would be relatively cheaper in the west because of the proximity to low cost sewage treatment in the west.
- Differing economies of scale – for example where growth rates are high whether in aggregate or for individual growth areas the costs of new infrastructure can be recovered over greater customer numbers and more rapidly;
- Differing extent of natural resources – for example those water businesses with access to relatively more abundant cheaper surface water resources would have an NCC advantage over water businesses which rely more heavily on alternative water sources including recycled water (for potable water substitution) and/or access to water from outside its catchment area (e.g. Barwon Water's and Western Water's access to Melbourne Water's water resources).

2. Uniform vs Non-Uniform Standard NCCs

The approach by the regional water businesses to standard NCCs can be summarised as follows:

- *No Regional Urban Water Business has elected to adopt different standard NCCs for each individual growth area or catchment area (i.e. adopt a non-uniform standard NCCs approach) within its licensed operating area*.

  Growth/catchment area specific standard NCCs would be the desirable approach in the longer term particularly if cost reflectivity is a primary objective. However the practicality and acceptability of this should be further tested with stakeholders. It is understood (from feedback provided to the regional urban water businesses) that developers prefer a uniform standard NCC rather than individual growth area standard NCCs.

- *Most Regional Urban Water Businesses have chosen to adopt a singular or uniform standard NCC that applies for the whole of their respective licensed operating areas.*

  For example, Barwon Water has calculated geographically based standard NCCs for some of its growth areas (but not all) and has elected for pragmatic reasons to adopt a singular or uniform standard NCC.

  This approach is at least an acceptable short to medium term pragmatic approach but further work should be undertaken to test the merits of individual growth area standard NCCs.

- *Summary of Regional Urban Water Business rationale for adopting uniform standard NCCs:*

  The Regional Urban Water Businesses have put forward various reasons to rationalise the adoption of uniform standard NCCs including:

  - ***Social Equity***: A need to provide social equity (although this is not defined and is based on a perceived need to smooth "material" differences in the quantum of standard NCCs across different growth areas/towns and a premise that uniformity is good in its own right);
  - ***System interconnectedness***: Systems normally have a high degree of interconnectedness and should be treated as one and it is not important where the demand is as long as the most economic and financially sound decisions are being made for new growth infrastructure investment. For example, an interconnected water supply system where water can be shuffled around to meet demands both in aggregate and in differing geographic areas by balancing different water sources should be considered in a holistic sense. This assumes the required level of water security has already been provided and new infrastructure is not being provided to enhance the level of water security and that alternative water sources (recycled water, groundwater) are just part of the total water resource pool whether for potable water substitution or not;
  - ***Extent of prior capital investment***: The standard NCC charges for individual growth areas can be heavily influenced by previous capital investment in infrastructure (before Water Plan 2) and which still has "unutilized" capacity to service future growth.

    The non-inclusion of capital expenditure prior to WP2 in the NCC calculations when that expenditure is continuing to provide capacity to service new growth seems an anomaly;

- ***Administrative simplicity*** (from the water business and stakeholder perspective);
- ***Stakeholder acceptability*** or preference (especially from a developer perspective);
- ***Financial Incentives***: Financial incentives may be required in some cases to encourage growth to particular areas. This is considered to be especially so where a water business has made an investment in infrastructure to service growth but that growth is occurring slower than expected and some encouragement is needed to achieve the planned return on such investments. NB: It should be noted that while this has some attraction from a water business perspective, the basis of selecting individual growth areas in the first place is presumably largely governed by the aggregate costs and developer charges to cover all services to an area (of which water business charges while important are less significant quantitatively than those for other essential services to a growth area);
- ***Transitional Smoothing***: As the proposed future approach to determining NCCs and their application is materially changing from that applying for the Water Plan 2 period, then some form of transitional arrangement may be appropriate to avoid significant dislocation in the charges.

It would seem important for properly informed decision-making - on whether to adopt uniform standard NCCs or not - that the underpinning work be done to establish the quantum of (non-uniform) standard NCCs that would apply to each individual growth area/catchment area/town regardless of whether the alternative true cost reflective geographic based NCCs approach is adopted. This applies in aggregate and for individual services (notably water, recycled water).

- *In some cases a water business has elected to adopt a hybrid approach of having multiple uniform standard NCCs (or effectively going part way to adopting non-uniform standard NCCs.*

  For example, Wannon Water has calculated geographically based standard NCCs for each of its growth areas but is proposing to adopt only two uniform standard NCCs - one a uniform standard NCC for 'growth towns' and a separate uniform standard NCC for 'everywhere else', effectively small towns. The application of this approach is somewhat arbitrary – firstly in that the differentiation between large towns and small towns appears to be based on the significance of the revenue provided and/or the rate of new connections, and secondly the uniform standard NCC for the small towns is based on a significant arbitrary discount to the standard NCC determined for them (i.e. effectively some notion of affordability or social equity). A further discount is applied to those new customers in the designated new rainwater harvesting catchment in Warrnambool.

  This approach is reasonable and potentially could be part of a transitional approach to standard NCCs for individual growth areas if desired in the longer term.

3. Variability in Quantum of NCCs over Time

Using the ESC's NCC model, some water businesses have a zero NCC charge at least initially (for the WP3 period). In the longer term this would be expected to increase when the next

augmentation in infrastructure triggered by growth is required. Gippsland Water is an example of this and also Wannon Water, at least for some of its individual growth areas including Port Fairy.

The two key reasons for this appear to be due to:

- The level of pre-investment that has resulted in significant "spare" capacity available to accommodate future growth - that is, new customers are receiving the benefit of the "economies of scale" associated with existing infrastructure; and
- The whole of the general tariff revenue is an offset in the NCC model. This substantially lowers NCC charges, to zero in some cases (driven by a net zero NPC outcome from the ESC's NCC model, or in some cases a negative NPC).

If a "zero" NCC charge is adopted now, the corollary is that future customers triggering the next augmentation will bear a higher NCC. While this approach is reasonable it would potentially result in significant variations in NCCs. A better approach would be to "smooth" the NCCs over time.

4. Apportionment of WP2 Expenditure Carried Forward into NCC Calculations

WP2 expenditure can be apportioned to growth based on at least the following three differing approaches:

- Residual hydraulic capacity ("unused" capacity after meeting servicing levels for existing customers) for water and either hydraulic or pollutional load treatment capacity for sewerage (whichever is the primary driver of the next augmentation) – as Barwon Water has adopted;
- Remaining asset life (as Goulburn Valley Water has adopted together with unused capacity); or
- Residual unrecovered costs from the new infrastructure (i.e. total expenditure less costs recovered from NCCs or other). No business has adopted this approach.

The first of these approaches (or a combination of the first two approaches) is most appropriate. The second is less preferred (if used on its own) especially where an asset will be "idle" for some time and where "asset life" is being consumed but not capacity (e.g. Barwon Water's Melbourne to Geelong pipeline). The last mentioned approach should be explored further.

SKM notes that Wannon Water has not carried forward any WP2 expenditure into its NCC calculations.

5. Differing approaches to Assessment of Incremental Opex

Similarly the differing approaches to determining incremental Opex can have an effect on the quantum of NCCs. Barwon Water, Gippsland Water, Goulburn Valley Water and Wannon Water have all adopted somewhat differing approaches to the determination of incremental Opex for inclusion in the NCC model. These are summarised in the **Table E 1** below.

Table E 1 Basis of Incremental Opex Determinations

Water Business	Incremental Cost / Opex [IC]	
	Approach to Calculation	Comment
Barwon Water [BW]	BW has adopted a mixed approach whereby: IC = Fixed Opex component + Variable Opex component with Fixed Opex component = [Current fixed Opex + Future fixed opex] / total customers. Variable cost component = short run marginal cost for water and an average incremental cost for sewerage services.	The future fixed opex is determined as a %age of the capital cost of new infrastructure for growth. Variable cost component based on : • - Water: Cost of next cheapest water supply; • Sewerage: Total sewerage variable Opex /total no. of customers.
Gippsland Water [GW]	GW has adopted an approach whereby: IC = Total Current Variable Opex / Total Number of Existing Connections. This average cost is then assumed to be the incremental cost /lot for the next planning period.	Fixed costs are ignored as these are assumed to be independent of customers /lots. The variable cost is a proxy for the variable cost for new lots. It includes energy, chemicals and sludge/biosolids handling expenses. The costs of the GWF are not included but should be.
Goulburn Valley Water [GVW]	GVW incremental opex has two components ▪ The cost of delivery of additional water to service growth – at GVW's average production and distribution cost across whole business; & ▪ The consequential operating costs from new capital works projects (using a percentage of the individual project capex and project type).	Future opex is based on a %age of the asset replacement cost (determined from GVW's current operating cost structure for each major asset type (e.g. water treatment plants, chlorinators, storage tanks) and in aggregate for various functions (e.g. water treatment, water pipes, water pump stations).
Wannon Water [WNW]	WNW has adopted a "simplistic" approach whereby: IC = Total Current Opex / Total Number of Megalitres supplied &/or treated. This average cost is then assumed to be the incremental cost /additional ML supplied &/or treated for the next planning period.	Current Opex includes both fixed and variable costs.

More detail is provided in the specific sections on the individual water businesses.

All these approaches are reasonable for the establishment of NCCs under the new regime.

There are some isolated specific apparent anomalies where not all incremental operational expenditure has been included (e.g. exclusion by Gippsland Water of Gippsland Water factory operating costs from the incremental costs used for the NCC determination).

6. Organic Growth Issue

Greater clarity is required between the charges for organic growth ("greenfield" development) and those for "infill" development.

Apart from the need to have greater clarity regarding the definition of these, it is important if there is localised "infill" development (or connections) which trigger augmentation separately from "greenfield" development then identification of a discrete NCC charge is appropriate.

If both "infill" development and "greenfield" development are consuming the same existing system capacity and both combined will trigger the next augmentation then a common or uniform standard NCC seems appropriate.

In any event, greater transparency of the charges for each individual growth area and for each "growth type" (whether "infill" or "greenfield") should be undertaken to best inform the decision on whatever approach regarding uniform standard NCCs (or otherwise) is adopted by a water business.

7. Other matters

Some other general comments are relevant:

- There may be some level of cross –subsidy by the general customer base to the developers/new customers. However the significance of this is not clear and is beyond the scope of this review; but it could be reviewed when the NCC model is reviewed;
- The outcomes of the stakeholder consultation being undertaken by the regional urban water businesses is still progressing and is not yet sufficiently transparent to assist the review or analysis. This has largely been due to the time constraints of undertaking the development and NCC analysis and implementing the revised processes to support the new NCC regime;
- In some instances, for lower value ("less significant") projects, allocation of the whole of its capex has been to the primary driver – e.g. if 60% growth, then 100% capex is allocated to growth; or if 60% renewals, then 100% capex is allocated to renewals (e.g. Barwon Water). The reasonableness (or materiality) of this assumption should be demonstrated.

3. Gippsland Water (GW)

3.1. Overview

In summary, Gippsland Water's (GW's) capital and operating expenditure included in its NCC calculations (i.e. in the ESC's NCC Model) are generally reasonable, with a single exception (being the unreasonable inclusion of full WP2 project costs) and the identification of several opportunities for improvement.

This review has been performed by SKM using information obtained from the documents and follow up conversations with GW as listed in **Section 3.5**.

Whether the capital expenditure included in the calculation relates to growth and the basis of the cost estimate is reasonable

- Growth forecasts underpinning NCC calculations are based on historical data and DPCD and council forecasts. They appear reasonable.
- The sizing and sequencing of growth shared infrastructure appears reasonable. Scenario testing has been demonstrated for major augmentation projects but not for shared growth infrastructure for specific Land Areas. That is the proposed infrastructure servicing strategy has not been robustly demonstrated to be optimal (most cost efficient) means to service particular growth areas.

  Improvement opportunity: Some modifications to the presentation of the sequencing plans would make the justification of sequence timing much clearer.
- The unit costing of infrastructure appears reasonable, although future versions of GW's NCC model should use project cost estimates based on the latest cost curves for SPSs (sewage pump stations).

  Improvement opportunity: It would be desirable to perform statistical analysis on the available cost data to estimate P50 and P90 project costs, against which reasonableness of the 25% contingency allowance could be tested.
- Currently GW has not included brought forward costs within its NCC Model. All project timings are based on their proposed reasonable and efficient 'sequence timing' to service growth.
- The annual value of Gifted Assets appears reasonable.

  Improvement opportunity: Estimates of future gifted assets associated with the specific new infrastructure proposed in the sequencing plans has not been attempted at this point in time.
- Gippsland Water has indicated that no government contributions are relevant for the incremental capital expenditure used in the NCC calculations.

Whether the methodology used is reasonable for apportioning capital expenditure that serves multiple purposes (e.g. compliance, renewals etc as well as growth) to growth and to new customers

- Based on analysis of sample growth areas, apportionment of capital expenditure to growth appears reasonable.

- However, apportionment of major augmentation projects with multiple drivers is currently performed in a subjective/qualitative manner.

  Improvement opportunity: Preparing cost estimates of these projects without the additional costs related to growth (e.g. upsizing) would permit a more objective apportionment of project value to growth.

- *Improvement opportunity:* Consistency of data between sequencing plans (for various growth areas) and the NCC model is generally reasonable, but could be improved to address some minor differences in sequence timing of projects.

The relative merits of the proposed infrastructure and related capital expenditure in servicing specific catchments versus a broader area

- Gippsland Water has made no distinction between infill development and greenfield areas or different growth areas (catchments). There is a single uniform NCC for all growth areas within GW's operating area (for Water, Sewer and Recycled/Alternative Water connections). This decision has been made to provide a NCC charge structure consistent with Water Plan 2.
- Given the 'zero NCC charge' being generated by the NCC Model, the relative merits of uniform NCC charges versus charges for specific catchments/towns cannot be assessed at this point in time.

Any capital expenditure from Water Plan 2 (WP2) that is included (i.e. no double counting)

- *Unreasonable inclusion of costs*: Full project values of WP2 projects have been used in the NCC Model. Project values should be reduced to account for customer contributions charges that have already been received for connections made to these assets in the Water Plan 2 period or alternatively and more appropriately be reduced by the extent of the capacity of these assets that has been utilised up to the beginning of Water Plan 3.

The reasonableness of the incremental operating costs (and their relationship to growth)

- GW's nominated incremental operating costs (and the associated calculation methodology) appear reasonable within the context of the current mechanics of the ESC's NCC model.

  Improvement opportunity: Given the mechanics of the current NCC Model, it would be reasonable that some proportion of the variable operating costs associated with the Gippsland Water Factory also be included in the NCC Model.

- It is noted that GW's current proposed incremental operating expenditure does not materially influence NCC calculations (compared to incremental capital infrastructure costs).

3.2. Setting the Context: GWs NCCs reviewed in this report

There are currently two sets of possible NCCs that for Gippsland Water:

- The NCCs proposed in GW's Final Water Plan 3 Proposal;
- The NCCs generated by the ESC's new Model.

Noting that the scope of this review does not include an assessment of Gippsland Water's NCC model or its proposed NCCs, SKM have sought to understand GW's proposed NCCs to inform this review of the reasonableness of the capital and operating expenditure that underpin its NCC calculations.

SKM notes that the NCCs proposed in GW's Final Water Plan 3 Proposal[6] (Table 7.11) are based on the charge structure used in Water Plan 2, where:

- NCCs are charged based on Lot size (3 categories) and Water, Sewer and Recycled/Alternative Water connections; and
- NCCs within these categories are charged uniformly across all growth areas – i.e. a single uniform NCC for all growth areas within GW's operating area.

Gippsland Water has made no distinction between infill development and greenfield areas. The same NCC has been adopted for both. Discussion with GW[4,12] indicates that this decision has been made to provide a NCC charge structure consistent with Water Plan 2, avoiding complexities in the application of NCC charges to different developers and growth areas.

It is noted that in its Final Water Plan 3 Proposal that GW would provide an updated proposal on NCCs following review of the effect of the ESC's new NCC regime. Through discussions and review of several documents[9, 10, 11] that demonstrate GW's application of the ESC's new NCC regime and associated Model; it is noted that the calculations suggest a positive NPV for the incremental growth infrastructure and hence **a zero NCC charge** to be applied to all new customer connections. It is understood that Gippsland Water is subsequently continuing discussions with the ESC on the application of the new NCC regime and Model.

As discussed with the ESC (14/02/2013), this review will be performed on the specific capital and operational expenditures that have been used as inputs into the new NCC Model for water and sewerage charges[10,11]. Understandably, given the current 'zero NCC charge' output of the Model, discussion of materiality of the various capital and operational expenditure is performed qualitatively.

It is understood that the NCC charges proposed in GW's Final Water Plan 3 Proposal, being based on the state-wide Water Plan 2 regime, have not been developed using utility / growth area specific incremental infrastructure. These NCC charges proposed in GW's Final Water Plan 3 Proposal are unsuitable to be reviewed within the scope and intent of this review.

3.3. Capital Infrastructure Costs underpinning NCC calculations

A review of the reasonableness of Capital Infrastructure Costs underpinning NCC calculations requires testing of the associated growth forecasts and sequencing plans; the apportionment of capital costs (to growth and other drivers) and the influence that gifted assets and government funding have on the NCC calculations.

3.3.1. Review of Growth Forecasts underpinning NCC calculations

Summary: Growth forecasts underpinning NCC calculations are based on historical data and DPCD and council forecasts. They appear reasonable

It is noted that the growth estimate for each town in GW's service area is based on a combination of 7-year historical data of new connections and growth estimates from local council information and 'Victoria in Future' forecasts from the DPCD[1,6,12,13]. A linear growth has been estimated for each town, for Water Plan 3 and beyond (50+ years). The approach taken has been detailed in Section 6.2 of GW's *Final Water Plan 3 Proposal*.

3.3.2. Review of Sequencing Plans underpinning NCC calculations

Summary: The sizing and sequencing of growth shared infrastructure appears reasonable. Scenario testing has been demonstrated for major augmentation projects but not for shared growth infrastructure for specific Land Areas. Some modifications to the presentation of the sequencing plans would make the justification of sequence timing much clearer.

A clear and direct nexus between lots being served (as per GWs ISPs – Infrastructure Sequencing Plans) and the infrastructure servicing them (and the associated expenditure) is not readily apparent.

Sequencing plans[1], approved by Manager – Assets[13], have been developed for each town – including the proposed sequencing of Land Areas and the proposed sequencing (priority and timing) of infrastructure projects. The growth estimates included in GW's *Final Water Plan 3 Proposal* are used in the sequencing plans to determine the Sequence Timing for infrastructure projects (scheduling a project once only all the available capacity from existing capacity is exhausted).

It is understood that no formalised sequencing methodology exists to best demonstrate *cost efficient* provision of additional infrastructure to service growth and optimal timing. The overarching methodology that can be inferred from reviewing the sequencing plans (and was confirmed in discussions with GW[13]) can be summarised as follows:

- Top Priority: Development in Land Areas that can utilise capacity in existing infrastructure. No new shared assets required.
- Middle priority: Development in Land Areas with some new shared infrastructure, but can utilise existing capacity in downstream/upstream infrastructure.
- Lowest Priority: Development in Land Areas that require new shared infrastructure and augmented downstream/upstream infrastructure.

Projects are prioritised on a 'cost per hectare' basis. While the number of new Lots that can be serviced by a growth infrastructure project is identified, the link between infrastructure projects and Land Areas is not immediately clear from the sequencing plans (i.e. how the infrastructure services the anticipated growth). This makes it difficult to identify why the specific timing for infrastructure projects has been selected in the sequencing plans. While analysis of the sequencing plans of some towns does indicate that the sequencing plans are reasonable, some modifications to the formatting/presentation of the sequencing plans would make the justification of timing much clearer.

Projects have been assigned a "Sequence Timing" and an "Expected Timing". The Sequence Timing represents the cost efficient provision of infrastructure to service growth and the optimal timing of individual projects based on the above-mentioned sequencing methodology. It is the "Sequence Timing" of each project that has been used within the NCC model.

The Expected Timing represents the possible brought-forward timing of infrastructure based on discussions with councils and developers[13]. Gippsland Water has included in the sequencing plans a 'degree of confidence' (Low, Medium, High) that each individual project may be required to be brought forward to the Expected Timing. No component of the costs associated with "bring forward" projects is included in calculation of the base/standard NCC. Bring forward costs are reflected in a separate charge and are additional to and separate from the base/standard NCC.

The sequencing plans include sizing calculations (pipelines and pump stations) for each project. However no information or discussion is provided on any scenario testing that may have been performed to justify the selection of the proposed infrastructure. It is understood that options analysis is performed for major augmentation projects, with a sample provided for the Warragul Central Trunk Sewer Main Augmentation project[15].

3.3.3. Unit Costing of Infrastructure

Summary: The unit costing of infrastructure appears reasonable, although future versions of GW's NCC model should use project cost estimates based on the latest cost curves for SPSs (sewage pump stations). It would be desirable to perform statistical analysis on the available cost data to estimate P50 and P90 project costs, against which reasonableness of the 25% contingency allowance in GWs cost build-up could be tested.

Cost Curves

Gippsland Water determines cost estimates of growth infrastructure through cost curves developed using a line of best fit through historical cost data. The project values in the NCC model are based on the following cost curves:

- Cost estimates for pipelines (water and sewer) are based on length and diameter (where 'diameter' is the variable in the cost curve); and,

- The costs equation for SPSs uses Rated Power (kW) as the nominated variable in the cost curve.

GW has moved away from the use of consultants to develop cost estimates and largely relies on its own data. The cost curves have a varying level of correlation (R^2) to the historical project cost data - ranging from 0.81 for sewer gravity mains (open cut) down to 0.115 for sewer gravity mains (deep open cut and tunnels – this dataset contains only 9 projects).

It is noted that the coefficient of correlation for the Sewer Pumping Station (SPS) cost curve is 0.1735, raising a question around the use of Rated Power as the nominated variable in the cost curve and whether testing around other nominated variables (e.g. capacity) has been performed to test the correlation to cost. Discussion[13] shows that GW has also recently explored this and found that Rated Power is an appropriate variable for smaller SPSs but that capacity has a much greater correlation with cost for larger SPSs. Gippsland Water has subsequently developed two new cost curves:

- For SPSs with capacity greater than 100m^3/day – Capacity has been used as the nominated variable in the cost curve. Coefficient of correlation = 0.9048
- For SPSs with capacity less than 100m^3/day – Rated Power has been used as the nominated variable in the cost curve. Coefficient of correlation = 0.3905

Future versions of GW's NCC model should use project cost estimates based on these cost curves.

Land Use Difficulty Factors

Land Use Difficulty Factors (cost multipliers) are applied to water mains and sewer pressure main projects to reflect the increased cost of performing works (whether they be growth or renewals) in established land areas, traffic corridors, and sensitive vegetation locations. These are shown in **Table 1**.

GW has nominated not to apply Land Use Difficulty Factors to sewer gravity mains as experience suggests that gravity sewer mains are typically only installed in greenfield sites. This general approach (and use of the "land use difficulty" factors indicated as cost multipliers) appears reasonable at a qualitative level. However, more evidence is desirable to support and justify them to make them more quantitatively and less subjectively determined factors.

- **Table 1 – GW Land Use Difficulty Factors (Rising Mains and Water Mains)**

Land Use	Factor
Undeveloped	1.0
Mix, Road Reserve and Undeveloped	1.4
Road Reserve	1.6
Road Reserve and Flora and Fauna Issues	1.8

Contingency Allowances

A 25% contingency is added to all capital project cost estimates in the sequencing plans to "complement the errors in these costing models" [1]. Discussion with GW[13] indicates that this contingency allowance also includes project management costs, although no breakdown of costs has been provided to justify adoption of the 25% value. Appreciating that limited historical cost data limits confidence in statistical analysis, it would be desirable to perform statistical analysis on the available cost data to estimate P50 and P90 project costs, against which reasonableness of the 25% contingency allowance could be tested.

3.3.4. Apportionment of Capital Expenditure (Water Plan 3 and Beyond)

Summary:

- Based on analysis of sample growth areas, apportionment of capital expenditure to growth appears reasonable.
- Apportionment of major augmentation projects with multiple drivers is currently performed in a subjective/qualitative manner. Preparing cost estimates of these projects without the additional costs related to growth (e.g. upsizing) would permit a more objective apportionment of project value to growth.
- Consistency of data between sequencing plans and the NCC model is generally reasonable, with some minor differences in sequence timing of projects.

Incremental capital expenditure included in the NCC model is detailed in a separate *Sewer Projects Data* and *Water Projects Data* spreadsheet[2], with line items of each infrastructure type (water mains, sewer gravity mains, rising mains, SPS, valves) for each shared asset project. Two growth areas (Moe/Newborough and Warragul) have been sampled. Both have generally consistent cost and timing data between the sequencing plans, cost spreadsheet and NCC model, with some minor differences in timing (three projects - out by one year each).

Most projects within the sequencing plans have been apportioned 100% to growth (and hence 100% of the project cost estimates are included in the NCC model – shown in *Column E* of the Projects Data spreadsheet), with some exceptions where projects are identified as augmentation rather than growth (e.g. Moe – Fairways SPS outfall) and may have project values of 0-100% apportioned to growth and included in the NCC model. The individual projects within the sequencing plans for the two sample growth areas were tested and the nominated apportionment appears reasonable. These are summarised in **Table 3**.

The apportionment of projects from Water Plan 2 is discussed in **Section 3.3.5**.

At the bottom of the *Sewer Projects Data* and *Water Projects Data* spreadsheet is a list (in red text) of six projects that represent major infrastructure projects outside of the growth-area-specific sequencing plans. These projects and their apportionment to growth are shown in **Table 2**.

- **Table 2 – Apportionment of major WP3-4 augmentation projects included in GW's NCC Models**

Project	Service	Project Value	Growth Apportionment	Value used in NCC Model
Hazel Creek Warragul - Stage 3 sewer main (WP3)	Sewer	$5,000,000	40%	$2,000,000
Warragul WWTP Upgrade (WP4)	Sewer	$17,000,000	100%	$17,000,000
Drouin Waste - WWTP Upgrade Stage 2 (WP4)	Sewer	$15,000,000	100%	$15,000,000
Warragul Waste Water - North East Branch Augmentation (WP4)	Sewer	$2,400,000	40%	$960,000
Drouin Water Lardners Road water main (WP3)	Water	$830,000	100%	$830,000
Warragul - Moe Stage 2 Interconnect water main (WP3)	Water	$8,600,000	100%	$8,600,000

As shown in **Table 2** (and **Table 4**), only two of these major augmentation projects have not had 100% of their value apportioned to Growth. Correspondence from GW[4,12] indicates that the percentage of apportionment to growth has been estimated by GW engineers in a subjective/qualitative manner.

Further information was provided for a sample project (Hazel Creek Warragul sewer main)[13,15]. This project was originally driven by *compliance* drivers (relating to sewer overflows), but that through an options assessment process, GW selected the option to also upsize the sewer to provide additional capacity for future growth in Warragul. Within this context the 40% apportionment to growth appears reasonable.

In the future, for projects with multiple drivers, preparing cost estimates of these projects without the additional costs related to growth (e.g. upsizing) would permit a more objective apportionment of the project value to "growth" to be achieved.

- **Table 3 – Reasonableness of project details in NCC model for sample growth areas**

Land Use	Service	Growth Apportionment	Reasonable?	Timing same in Sequencing Plan & NCC?	Value same in Sequencing Plan & NCC?
Moe/Newborough					
Moe - Waterloo SPS	Sewage	0% (retic)	Yes	N/A	N/A
Moe – Waterloo Main	Water	100%	Yes	Yes	Yes
Moe - Fairways SPS Outfall	Sewage	0%	Yes	N/A	N/A
Moe - Haigh St and Bennett St	Water	100%	Yes	Yes	Yes
Moe - Mountain Glen Drive (PRV)	Water	100%	Yes	No (1yr forward in NCC)	Yes
Warragul					
Warragul - Chesterfield	Water	0%	Unclear	Yes	N/A
Warragul - Copelands Rd SPS	Sewage	100%	Yes	Yes	Yes
Warragul - Copelands Road	Water	100%	Yes	Yes	Yes
Warragul - Twin View Range Sewer	Sewage	100%	Yes	Yes	Yes
Warragul - Twin View Range (Northern Stage)	Water	100%	Yes	Yes	Yes
Warragul - Western Sewer Tarwin St (Stage 1)	Sewage	100%	Yes	Yes	Yes
Warragul - Western Sewer Tarwin St (Stage 2)	Sewage	100%	Yes	Yes	Yes
Warragul - Western Sewer Tarwin St (Stage 3)	Sewage	100%	Yes	Yes	Yes
Warragul - Western Sewer Tarwin St (Stage 4)	Sewage	100%	Yes	Yes	Yes
Warragul - West Water Main: Stg1	Water	100%	Yes	Yes	Yes
Warragul - West Water Main: Stg2	Water	100%	Yes	Yes	Yes
Warragul - West Water Main: Stg3	Water	100%	Yes	Yes	Yes
Warragul - West Water Main: Stg4	Water	100%	Yes	Yes	Yes
Warragul - North Arm Sewer	Sewage	100%	Yes	Yes	Yes
Warragul - Pharoahs Rd Sewer	Sewage	100%	Yes	Yes	Yes
Warragul - Bowen St SPS	Sewage	100%	Yes	Yes	Yes
Warragul - Stoddards (Nth)	Water	100%	Yes	No (1yr late in NCC)	Yes
Warragul - Stoddards (Sth)	Water	100%	Yes	No (1yr late in NCC)	Yes
Warragul - Sutton St (East)	Water	100%	Yes	Yes	Yes
Warragul - Sutton St (West)	Water	100%	Yes	Yes	Yes
Warragul - West Hospital Main	Water	100%	Yes	Yes	Yes

3.3.5. Water Plan 2 Expenditure in the NCC model

Summary:

- Full project values (for projects undertaken in Water Plan 2 period) have been used in the NCC Model – which is not reasonable. Project values should be reduced to account for customer contributions charges that have already been received for connections made to these assets in Water Plan 2.
- Apportionment of major augmentation projects with multiple drivers is currently performed in a subjective/qualitative manner. Preparing cost estimates of these projects without the additional costs related to growth (e.g. upsizing) would permit a more objective apportionment of project value to growth.

Seven infrastructure projects from Water Plan 2 have been included in GW's NCC models – six sewerage projects and one water project. These are shown in **Table 4**.

Table 4 - Apportionment of major Water Plan 2 projects included in GW's NCC Models

Project	Service	Project Value	Growth Apportionment	Value used in NCC Model
West Warragul 500mm sewer main	Sewer	$1,300,000	100%	$1,300,000
Morwell Nth East stage 1 sewer main	Sewer	$1,200,000	100%	$1,200,000
Maffra 300mm sewer main	Sewer	$350,000	100%	$350,000
Hazel Creek Warragul - Stg 1 sewer main	Sewer	$5,000,000	40%	$2,000,000
Hazel Creek Warragul - Stg 2 sewer main	Sewer	$2,000,000	40%	$800,000
Traralgon WW - Pump Station and Rising Main for Eastern Industrial Development	Sewer	$2,900,000	60%	$1,740,000
Warragul Moe Water Supply Interconnect	Water	$5,900,000	100%	$5,900,000

All six of the sewer projects were delivered in Water Plan 2. The $5.9M for the Warragul Moe Water Supply Interconnect represents the project value in WP2, with a further $8.6M expected to be spent over Water Plan 3 (expected 2016/17). Assessment of the values used raised two items for consideration in the reasonableness of these values:

- The project values used
- The growth apportionment applied to each project

Project Values

It is noted from discussions with GW[12] that the project values that have been used (prior to growth apportionment), represent full project values. That is, there has been no reduction in the project value to account for customer contributions that have already been received for connections made

in the Water Plan 2 period associated with these assets. A reasonable project value should take connections established during Water Plan 2 into consideration.

Growth Apportionment

As shown in **Table 4**, three of GW's Water Plan 2 projects have been identified as having multiple drivers and have had only a portion of their value apportioned to Growth (and included in the NCC model). SKM notes from correspondence with GW[4,12] that the percentage of apportionment to growth has been selected by GW engineers.

Similarly for the Water Plan 3-4 assessment, the Hazel Creek Warragul sewer main was selected as the test case, for which GW has provided further information. SKM understands that this project was originally driven by *compliance* drivers (relating to sewer overflows), but that through an options assessment process, GW selected the option to also upsize the sewer to provide additional capacity for future growth in Warragul. Within this context the 40% apportionment to growth appears reasonable.

As with the projects for Water Plan 3 and beyond, where projects have multiple drivers, preparing cost estimates for these projects without the additional costs related to growth (e.g. upsizing) would allow project costs with and without growth to be determined and thus permit a more objective apportionment of project value to growth to be achieved.

3.3.6. Works Brought Forward (or Deferred) Costs

At present GW has not included brought forward costs within the NCC Model. All project timings are based on the proposed "Sequence Timing" of additional infrastructure required to service development in its various growth areas. GWs Sequence Timing notionally represents the most cost efficient means and optimal timing of providing infrastructure to service development in its various growth areas.

GW also undertakes planning and assessment of the potential likely scenarios for development in its growth areas (including potential bring forward works scenarios) to establish a likely "Expected timing". The costs of bring forward works (additional to those for 'Sequence Timing') are separate and not included in the NCC calculations.

3.3.7. Gifted Assets

The annual value of Gifted Assets has been estimated based on 5 year historical data[2], using a $5M/yr value, which is less than the $5.3M/yr 5-year average. This appears reasonable. Estimates of future gifted assets associated with the specific new infrastructure proposed in the sequencing plans has not been attempted at this point in time and may be a future improvement opportunity (depending on possible changes to the mechanics of the NCC Model).

3.3.8. Government Contributions

Gippsland Water has indicated that no government contributions are relevant for the incremental capital expenditure used in the NCC calculations[12].

3.4. Operating Expenditure Costs underpinning NCC calculations

Summary:

- GW's nominated incremental operating costs (and the associated calculation methodology) appear reasonable within the context of the current mechanics of the ESC's NCC model.
- However GW has not attempted to estimate incremental operating costs (on-going or once off) that may be associated with the specific growth capital infrastructure itself. This would tend to underestimate the NCC.
- Similarly given the mechanics of the current NCC Model, it would be reasonable that some component of the variable operating costs associated with the Gippsland Water Factory also be included in the NCC Model.
- It is noted that GW's current proposed incremental operating expenditure does not appear to materially influence NCC calculations (compared to incremental capital infrastructure costs).

GW has proposed an incremental operating cost of $40 per connection in each of the water and sewerage NCC models[10,11].

We note this proposed estimate is based on 4 year historical data of GW's total variable operating costs (specifically its chemical; energy; sludge/biosolids removal, transport and treatment costs - but excluding variable operating costs associated with the Gippsland Water Factory[4,5]), which are averaged out over its approximately 55,000 connections to arrive at a 'per-connection variable operating cost'.

Assessment of the values used raised three items for consideration in the reasonableness of these values:

- The materiality of the proposed operational costs;
- The reasonableness of using historical actuals of total variable costs rather than forward estimates of incremental operating costs; and
- Exclusion of Gippsland Water Factory variable opex costs (due to growth) in the NCC model.

The materiality of the proposed operational costs

The ESC's "*Estimator new customer contributions September 2012"* identifies 'Incremental Operating Costs' as including:

- Incremental per-customer expenses
- Incremental volumetric expenses
- Other incremental expenses
- Temporary asset O&M.

GW has proposed that the nominated variable costs (chemicals, energy and sludge/biosolids handling) are the appropriate (and material) costs that can be identified as incremental per customer and volumetric expenses. GW acknowledges that new connections will involve additional effort for meter reading and billing, but that these (personnel) costs are fixed operational costs for which any increase is not material on nature.

Currently GW has not also attempted to estimate incremental operating costs (on-going or once off) that may be associated with the specific growth capital infrastructure included in the NCC model (and noting that no temporary assets are included in the Model). Not including these costs in the NCC model reduces potential NCCs that GW may be able to charge. SKM notes from discussions[8,12,13] that GW expects that these costs are not material relative to other costs in the NCC model, e.g. compared to capital expenditure, on an NPC basis. SKM understands that the current ESC NCC Model supports this view that GW's proposed incremental operating costs are not material within the Model in comparison to the incremental capital costs.

If the mechanics of the ESC's NCC Model are changed in the future it may be reasonable and material for GW to calculate and include these specific incremental operating costs.

The use of historical actuals

SKM notes that GW's nominated incremental operating costs do not relate to the specific growth infrastructure included in the NCC Model. The included variable costs relate to energy, chemical and sludge/biosolids handling expenses across GW's facilities and networks (excluding the Gippsland Water Factory).

This method of estimating incremental per-customer and volumetric expenses appears reasonable within the context of the current calculation methodology of the ESC's NCC model. A utility's service revenue (ex general tariff) is included in the Model and so the incremental per-customer and volumetric expenses proposed by GW effectively negate the variable operational cost portion of the tariff. SKM understands that discussions are currently continuing relating to the mechanics of the Model and note that the scope of this review does not include assessment of the NCC Model.

Within the context of the current NCC model, the use of 4 year historical data as the basis of estimating the incremental per-customer and volumetric expenditure for Water Plan 3 appears reasonable, although there has been no inclusion of real escalation costs associated with electricity and chemicals. As above, in the event that the mechanics of the ESC's NCC Model are changed in the future it may be reasonable and material for GW to calculate these escalation costs.

The exclusion of the Gippsland Water Factory variable costs

We note that GW has elected to exclude any component of the variable operational costs associated with the Gippsland Water Factory in the incremental operational costs value used in the NCC model[4]. Gippsland Water's rationale is that the GWF does not service a large percentage of its growth areas (Warragul / Drouin).

However, Warragul (254 new connections) and Drouin (202 new connection) represent 46% of the total 986 estimated new connections for WP3[1], suggesting that 54% of new connections will be serviced by the GWF.

Gippsland Water has indicated that the GWF was funded by means other than NCC charges. Operational costs are correspondingly built in to the (general customer) service tariffs. Any incremental operating costs in the GWF associated with new connections will presumably be recovered through collection of on-going service tariff revenue from all customers.

Given the mechanics of the current NCC Model (the inclusion of general service tariffs), it is reasonable that incremental operational costs associated with the GWF should be included in the NCC model, independent of the number of growth customers it directly services. It is worth noting (ignoring the current output of a 'zero NCC charge') that the choice to exclude the GWF variable operating costs *reduces* GW's calculated NCC.

3.5. Reference Information

This review has been performed by SKM using the following documents and conversations:

1) *Shared Assets for WP-2, WP-3, WP-4 and Beyond, Asset Planning, November 2012* (MS Word version received 4-Feb-2013; hard copy report version, received 6-Feb-2013)
2) *Sewer and Water Projects Data no brought forward 10 year version* (excel spreadsheet, received 6-Feb-2013)
3) Kevin Enguell email (received 4-Feb-2013)
4) Kevin Enguell email (received 8-Feb-2013)
5) *GW incremental [operational] cost calculation – extract for SKM (Feb 2013)* (excel spreadsheet, received 8-Feb-2013)
6) *GW's Final Water Plan 3 Proposal* (sourced 11-Feb-2013 from http://www.gippswater.com.au/AboutUs/DraftWaterPlan20132018/FinalDraftWaterPlan3.aspx)
7) Kevin Enguell telephone conversation (14-Feb-2013)
8) Kevin Enguell email (received 14-Feb-2013)
9) *Gippsland Water response - Impact of revised NCC regime on Final Water Plan 3 proposal* (pdf document, received 14-Feb-2013)
10) *GW-Capital-Contribution-Model-Draft-v6-20120925 All Sewer Projects - 10 years data WP3 Customers* (excel spreadsheet, received 14-Feb-2013)
11) *GW-Capital-Contribution-Model-Draft-v6-20120925 All Water Projects - 10 years data WP3 Customers* (excel spreadsheet, received 14-Feb-2013
12) Kevin Enguell telephone conversation (15-Feb-2013)
13) Kevin Enguell, Paul Young, Todd Blackney telephone conversation (15-Feb-2013)
14) Kevin Enguell email (received 15-Feb-2013)
15) *Authority to Proceed – Warragul Central Trunk Sewer Main Augmentation* (OM187 – August 2010) (pdf, received 15-Feb-2013)
16) *Graph SPS (Under 100m^3)* (pdf, received 15-Feb-2013)
17) *Graph SPS (Over 100m^3)* (pdf, received 15-Feb-2013)
18) *Table SPS (Under 100m^3)* (pdf, received 15-Feb-2013)
19) *Table SPS (Over 100m^3)* (pdf, received 15-Feb-2013)

4. Wannon Water (WNW)

4.1. Overview

Wannon Water (WNW) is still in the consultation process to confirm its agreed level of NCC. WNW has calculated indicative NCCs based on an adjusted model (principally adjusted to use *average operating costs* rather than incremental operating costs) to calculate an estimated NCC for the purposes of consultation with stakeholders.

In summary, Wannon Water's capital expenditure allocated to growth appears to be reasonable although one of the samples considered does show the potential of skewing costs based on the rates in a single tender that might have resulted in an underestimated capital estimate.

SKM has undertaken this review using information from the documents and follow up conversations with Wannon Water as listed in **Section 4.10**.

Overall

Uniform Standard NCCs: Wannon Water has adopted uniform standard NCCs across its operating area at two levels – an NCC for large towns and a separate NCC for smaller towns. The latter is set subjectively and "arbitrarily" at a lower rate than for large towns on a "social fairness" basis.

As a global issue there is a need to confirm whether or not the application of these global uniform NCCs for the Wannon Water area (all catchments and services) is reasonable and consistent with the ESC's pricing principles; noting that they do not bear any particular relationship to the real incremental cost of servicing individual development areas for large towns and less so for small towns; and to that extent is not cost reflective.

Whether the capital expenditure included in the calculation relates to growth and the basis of the cost estimate is reasonable

- Growth forecasts underpinning growth CAPEX are based on historical data, and council forecasts and developer consultations. They appear however to be proportionately lower than the growth expectations indicated by the council and developed by or for WNW in engineering reports produced in the development of infrastructure concepts to service the developments reviewed.

  Improvement opportunity: It would be beneficial to capture more clearly the basis of adjustments to growth projections compared to growth projections available from the statutory planning authorities, and records of adjustments.
- The sizing and sequencing of growth shared infrastructure appears reasonable. Some optioneering and scenario testing has been demonstrated, including review of the impacts of different staging of development for sampled projects.

Improvement opportunity: Some modifications to the presentation of the sequencing plans would make the justification of sequence timing (and the direct nexus between infrastructure proposed and lots served in various growth areas) much clearer.

- The unit costing of infrastructure appears to of the right order but the process used for determining costs appears to lack sufficient rigor to ensure consistent application and considered adjustment based on historical costs and scenario testing of future commercial rates based on market adjustments. This appears, in some instances, to lead to an underestimation of costs for inclusion in the NCC model – although this may well then be balanced by relatively high contingency allowances through the different stages of project development.

  Improvement opportunity: It would be desirable to collate historic costs in a structured way and perform statistical analysis on the available cost data to estimate P50 and P90 project costs, rather than relying on ad-hoc adjustments by project teams and 'large' contingency allowances (which have not been 'robustly' justified and could result in over-compensation).
- There appears to be alignment between the CAPEX indicated in the NCC models provided for Warrnambool and that indicated in the capital plan.
- At present WNW has not included brought forward costs within the NCC Model. All project timings are based on their proposed efficient sequence timing to service future growth.
- The annual value of Gifted Assets appears reasonable to the limited extent that SKM was able to review this aspect (i.e. the figure does not seem disproportionate to the growth CAPEX).

  Improvement opportunity: Estimates of future gifted assets associated with the specific new infrastructure proposed should be visible for review.
- WNW has indicated that no government contributions are relevant for the incremental capital expenditure used in the NCC calculations.

Whether the methodology used is reasonable for apportioning capital expenditure that serves multiple purposes (e.g. compliance, renewals etc as well as growth) to growth and to new customers

- Based on analysis of sample growth areas, apportionment of capital expenditure to growth appears reasonable.
- Five major regional schemes were included in the growth budget (having previously been allocated against other drivers), allocated 100% to growth. After discussion with SKM and review WNW adjusted the proportion of one of these to be only 20% allocated to growth. [NB: This will not yet be reflected in the NCC model the ESC currently has for WNW.]

  Improvement opportunity: There needs to be improved understanding and clarity around the process to apportion the incremental costs associated with growth to the capital program, to robustly ensure that any costs that would in any case be incurred are not allocated to the growth budget.
- Apportionment of the capital costs of major augmentation projects with multiple drivers is performed in a subjective/qualitative manner. It is not clear that the benefits achieved for the wider customer group in projects developed or (more often) brought forward because of growth drivers are understood, and as a result the cost is not shared with that group of customers.

Improvement opportunity: Preparing cost estimates of these projects without the additional costs related to growth (e.g. upsizing) would permit a more objective apportionment of project value to growth. Where an asset is renewed prematurely the value to existing customers of the renewal of the asset should be recovered in general revenue.

Any capital expenditure from Water Plan 2 (WP2) that is included (i.e. no double counting)

- WNW has not included any costs from WP2 capital expenditure (growth related) into the NCC calculation.

The reasonableness of the incremental operating costs (and their relationship to growth)

- WNW is not proposing to use incremental operating costs in the modelling of NCCs. Rather it intends to use the averaged operating cost per megalitre of service delivered (water / sewerage), adjusted annually to reflect the increase in volume delivered because of growth. The quantum of the average cost per megalitre calculated appears to be reasonable.

4.2. Setting the Context: WNW's NCCs reviewed in this report

Wannon Water's Board has not yet set its NCC charges. The Board received a NCC briefing at its 16 November 2012 meeting and resolved to consult key local developers regarding the application of the ESC NCC pricing principles, including the indicative New Customer Contribution Charges (see below) for the 2013/14 financial year. This consultation process is still on-going, and Wannon Water's Board will subsequently consider submissions and make a decision on the NCC charges to apply from 1 July 2013.

As part of the assessment of applicable NCCs in its area, Wannon Water initially calculated NCCs using the ESC example NCC calculator. WNW generated negative NCC outputs from the ESC's model using its incremental CAPEX, OPEX and revenue numbers (as per **Table 5**). SKM has not been provided the model used to generate these NCC outcomes.

Table 5 Initial WNW NCC outputs from application of ESC Model

Town	NCC Water	NCC Sewer
Warrnambool	-$362	-$6,225
Hamilton	-$2,909	-$4,034
Portland	-$5,641	-$4,824
Port Fairy	-$5,920	-$9,187

SKM understands Wannon Water then subsequently developed an alternate model approach that recovers the ***average cost per new connection*** via the NCC charge.

Wannon Water has created a "Revised" WNW NCC model. All the assumptions and input variables are the same as in the Commission's NCC model, including incremental capital expenditure, incremental revenue and customer growth rates, except for the following amendments to:

- the *incremental operating cost input assumption* such that it equalled the total operating cost of the existing systems divided by the number of megalitres delivered (water) or collected (sewer); and
- the *average total opex* adjustment/reduction such that it equalled the *total operating cost of the existing system* divided by the number of megalitres delivered (water) or collected (sewer) due to increasing megalitres delivered or collected resulting from the addition of new customers (i.e. notional "reflection" of the economies of scale benefit of new customers).

- Wannon Water's "Revised" NCC model produced results for the four main growth areas as shown in **Table 6**.

Notwithstanding the calculation of four quite different area based charges Wannon Water is proposing to apply a common NCC (based on a weighted average) for growth in the main towns.

- **Table 6 WNW NCC outputs from application of Revised ESC Model**

Town	NCC Water	NCC Sewer
Warrnambool	$5,944	$864
Hamilton	$6,802	$8,744
Portland	-$1,254	$2,594
Port Fairy	-$1,445	-$2,734

When considering existing and new customer segments, the WNW Board formed the view that the "Revised" Wannon Water NCC model provides a much more equitable outcome between the two customer segments (being general customers and developers). It believes this can be demonstrated by:

- An NCC set on the Commission's incremental cost model results in a new customer making no contribution to the fixed costs (taking into account new customer revenue and incremental capital costs) of the existing system in which the new customer receives benefit.
- Wannon Water's model is based on the new customer making a NCC contribution that is proportionally equal to existing customers towards the fixed costs (taking into account new customer revenue and incremental capital costs) of the existing system in which the new customer receives benefit.

Wannon Water has identified a very low rate of growth expected outside of the four main towns in the area (Warrnambool, Hamilton, Portland and Port Fairy). It has taken the view that the application of the ESC model to discrete developments in smaller catchments calculates 'excessive' NCCs as it inherently tries to balance the cross subsidy in the overall revenue structure (in that billing revenues are consistent per connection but incremental costs will vary on a catchment by catchment basis).

Wannon Water has therefore proposed a ***nominal value*** for NCCs be set for new connections outside of the main towns. Wannon Water has chosen to subjectively adopt an NCC of $1000 for

water and $1,000 for sewer in the small towns for the purposes of stakeholder consultation. This is substantially lower than the modelled NCC results for small towns. Wannon Water believes this achieves an *equitable 'social pricing'* arrangement for all new customers, rather than differentiate between customers in different towns.

The town of Dunkeld was modelled as a representative small town. The resulting NCC charges (see **Table 7**) were substantially higher (than the nominal value adopted of $1000 per service type). This is because the town operates at a loss (i.e. incremental revenue is low/less than cost).

Table 7 WNW NCC outputs from Revised ESC Model - Dunkeld

Town	NCC Water	NCC Sewer
Dunkeld	$3,804	$14,743

Summary: Adoption of a uniform (or "postage stamp") pricing regime does not appear to truly meet the NCC pricing principles of cost reflectivity, where the new customer should make a contribution relative to the costs and revenues attributed to that connection. The NCC differences between growth areas are material.

Producing an average NCC for the region – and depressing that for low growth areas - means that new connections in one area would in effect subsidise new connections in another area.

4.3. Predicting Growth

Through a process of consultation with the local councils WNW has identified a number of growth areas within its region. SKM has reviewed the growth rates used in Wannon Waters calculations with the available council predictions of growth. These are shown in **Table 8**.

Table 8 Comparison of WNW Growth Predictions

Area	WNW adopted growth figures (WP3 & WP4 only)		Warrnambool City Council Land Use Strategy (2004)	Moyne Shire Council (2006) Note 1
	2012-2016	2017-2021	2004-2019	2011-2021
Warrnambool (including Allansford & Koroit)	1.58%	1.53%	2.2%	-
Hamilton	0.65%	0.65%	-	-
Port Fairy	1.58%	1.53%		1.05%
Portland	0.97%	0.84%		

Note 1: Port Fairy Planning Implementation Strategy Urban Design Framework Context Issues and Directions Report, Parsons Brinkerhoff for Moyne Shire Council, 2006. Figure for population not households.

The prediction for growth in Warrnambool seems to be somewhat conservative. The growth allowed for equates to approximately 235 properties per year, apparently based on a combination of the council projections and recent experience of how quickly the developments have proceeded. The current growth rate reported is approximately 300 properties per year (as stated in the North East Growth Corridor Water Supply report).

The growth prediction for Port Fairy seems generous compared to the council predictions of population growth. However the quantum of the increase in the number of new households per year (approximately 35) does appear to be aligned, although a little slightly conservative, compared to the household growth reported recently and the growth projected to 2031 (averaging approximately 40 properties per year 2001-2005) in the most recent report on the councils website.

Underestimating the number of customers to be connected would tend to inflate the estimated NCC per connection using the ESC template model NCC estimator.

Summary: There needs to be a clearer rationale supporting the process for establishing the expected growth in connections per year, in particular where there is variance from recent trends and / or council predictions.

4.4. Strategy for servicing growth areas

WNW does not produce formal infrastructure servicing plans as stand-alone documents but relies on the project development process to capture the ultimate requirements for each significant development area and formulate and assess options to most efficiently service the envisaged growth appropriately.

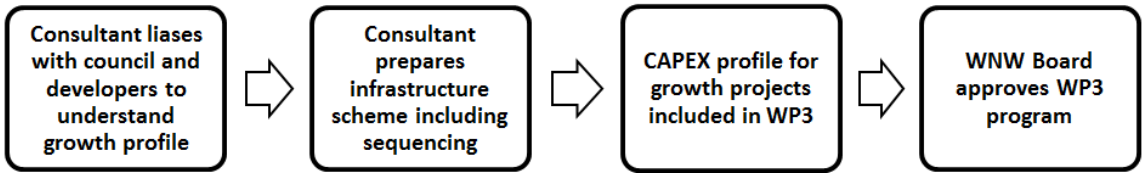
WNW provided typical consultant reports for the New East Growth Corridor (Wangoom Road), Wollaston Road and Hopkins Point developments (all in Warrnambool) for review. These are the largest individual development areas in the Wannon Water region. These reports show a process of assessing growth rates, identifying system deficiencies as a result of the growth, optioneering potential solutions and proposing a solution (based on the ability to meet project objectives at lowest NPV).

4.5. Sequencing of infrastructure development & capital investment

The sequencing of development infrastructure is incorporated in the project development process as discussed in **Section 4.4**. That is, consultant reports for specific developments consider how the development is expected to progress over time and identifies when the necessary infrastructure to service growth will be provided. It is unclear whether this always represents the baseline efficient provision of growth infrastructure or incorporates some element of developer driven “bring forward” works.

SKM understands the infrastructure development process works as shown in **Figure 1.** Particular examples of the application of this process are included in the review of actual growth area projects in the following sections.

Figure 1 Process for establishing sequencing of infrastructure development



It is not clear from this process to what extent the Board has visibility of the detail of growth infrastructure decisions, in particular an understanding about the risk that the assets are being programmed most efficiently (or too early or too late), and the impact that this has on the business.

4.6. Capital Infrastructure Costs underpinning NCC calculations

The NCC models prepared by Wannon Water use the capital costs derived for WP3 for incremental capital expenditure. WNW has provided the NCC models for Warrnambool sewerage and water, and SKM has compared the CAPEX identified in these with those put forward in WNW's WP3 and confirmed that they are consistent with each other.

Wannon Water uses a single source consultancy arrangement (with GHD) to provide engineering investigation and design services. Wannon Water considers that this results in cost estimates developed by the consultant that include an inherent good understanding of the actual costs likely to be incurred in delivering CAPEX in the Wannon Water region.

Risk probability profiled estimates are not routinely prepared. However they have been prepared for two growth schemes (Hopkins Point and Wollaston Road) as part of WNW's WP3 submission. P5 and P95 estimates were prepared with the P50 used for the CAPEX value included in WP3.

There is no formal tracking of projected costs against out-turn costs for prior water plan projects. However a workshop evaluation was undertaken with WNW's consultant service provider during the WP3 preparatory work to improve WNW's capital estimating process and align the estimates for WP3 based on an assessment of WNW's capex expenditure performance during WP2. Key learnings and areas for refinement of the process included:

- The smaller projects in WP2 were constructed close to the estimated cost;
- Some of the larger projects exceeded the estimate by significant amounts. In particular future capex estimates (for WP3) need to better allow for cultural heritage, flora and fauna and geotechnical investigations costs, and project timing needs to allow more time to properly plan and implement projects. Contingency amounts were proposed of 40% when at concept design stage, 30% at functional design stage and 25% at detailed design stage. Project definition as part of business cases also needs to be enhanced to ensure all project elements are properly included in cost estimates.

- Actual tendered amounts depends materially on the level of competition at the time of tendering – which is difficult to predict in advance but costs are expected to be lower due to greater competition for less work in WP3 compared with WP2. WNW has largely drawn on WP2 experiences in developing estimates.

Wannon Water advises that individual estimates are routinely work-shopped with its consultant service provider to align the estimate with recent local experience. An example of the process of reviewing consultant estimates was provided (email with comments on the sewerage options for Wollaston and Hopkins Point Road developments) in which WNW advised a significant (downwards) adjustment in costs using a single recently returned tender. Whilst refining cost estimates based on recent project experience is prudent, there is a significant risk in using single data points (i.e. the lowest recent tender) to adjust estimates globally.

There appears to be alignment between the CAPEX indicated in the NCC models provided for Warrnambool and that indicated in WNW's capital plan as reflected in its WP3 submission.

Two example growth areas are considered in detail in the following sections. Costs are assumed to be in nominal dollars (nom. $)

4.6.1. SAMPLE 1: North East Growth Corridor

A number of growth projects for Warrnambool's North East Growth Corridor (also identified as the Wangoom Road development area) have been identified by WNW.

Projecting growth

There is significant variance between the different figures prepared over a relatively short period of time for the North East Growth Corridor. The Water Plan 3 assessment for water in Warrnambool, Koroit and Allansford (February 2011) indicated only 500 lots over a twenty year period, i.e. an average of 25 lots per year; while the Water Supply report (October 2012) identifies 460 lots to be developed between 2012 and 2021, which is a growth rate of approximately 51 lots per year. The WP3 CAPEX plan indicates an envisaged growth rate of 71-76 connections per year in the period 2013-2021.

SKM understands that Wannon Water identifies in its corporate plan, on an annual basis, the capital works required to service growth in the following year. This includes a recalibration of development expectations with the councils and developers, to determine if the originally planned timing is still relevant. The review is undertaken by the Asset Planning Branch and if the works program needs to be modified, the Wannon Water board will consider the changes and make a decision as part of the adoption of the Corporate Plan.

In the time constraints of this review, SKM has not yet been able to pursue evidence of this process being applied to the North East Growth Corridor development.

Summary: There is a need to better identify and understand how the current growth rates projected for the development have been arrived at, and how they impact on the staging (and extent) of capital works required. Significant variances in growth projections from a number of internal sources are evident and needs further explanation.

It is not clear that WNW develops baseline cost efficient infrastructure plans to service growth (particularly if such plans are amended reactively on an annual basis in response council growth predictions).

Alignment of indicated future CAPEX with Assessments

The CAPEX projects shown in **Table 9** have been identified in WNW's WP3 CAPEX plan for the North East Growth Corridor.

- **Table 9 WP3 Capex for WNW's North East Growth Corridor**

Scheme	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Sewerage	**Scheme Costs assumed estimate in nominal $'000K**										
001167: Sewer trunk extension	nil	nil	nil	nil	nil	218.3	nil	nil	nil	nil	nil
Proportion of WRP upgrades and 750mm trunk sewer duplication	548.7	571.7	nil	nil	nil	nil	nil	243.8	4485.6	3120.4	710.0
Water	**Scheme Costs assumed estimate in nominal $'000K**										
000150: Wangoom Rd & Aberline Rd 225mm retic.	395.6	225.4	nil	nil	nil	nil	nil	nil	nil	nil	nil
001095: Tower & Pump station	nil	178.8	182.7	2355.8	nil	nil	nil	nil	nil	nil	nil
001096: Low level tank & pump station	nil	nil	nil	nil	nil	nil	nil	nil	100.0	1612.0	nil

The water infrastructure projects and costs align with the project approach indicated in North East Warrnambool Water Supply Strategy for Water Plan 3. The dates for the staging of the development are not immediately clear in this report so it is not possible to cross check staging requirements against the planned CAPEX spend profile. However the three individual projects appear to broadly align with the three stages of development infrastructure need identified.

Summary: There is a need to confirm that the timing of CAPEX is efficient with respect to the infrastructure needs of the development/growth envisaged.

The CAPEX indicated against each scheme is similar to the CAPEX developed in the water supply strategy options report. The main discrepancy appears to relate to the new 40L/sec pump station being included in the Stage 1 scheme for the WP3 instead of the Stage 2 scheme as per the water supply report (CAPEX $187,200).

- **Table 10 Water Capital Expenditure – various sources [North East Growth Corridor]**

Project	Stage	CAPEX indicated in WP3 (nom. $)	Water Supply Options Report (nom. $)
Wangoom Rd & Aberline Rd 225mm retic.	1	621,000	403,000
Tower & Pump station	2	2,717,248	2,990,000
Low level tank & pump station	3	1,712,000	1,636,000
TOTAL		**5,050,248**	**5,029,000**

WNW has not provided any background data on the sewerage CAPEX needs. The direct expenditure required is relatively modest (and not programmed until WP4).

Reasonableness of detail CAPEX estimates for North East Growth Corridor proposed works

The unit rates for pipelines and the CAPEX for structures all appear to be on the relatively low side, and typically below the lower band of estimates in SKM's cost database. This seems to have been driven (at least for the water mains that are a major component of the cost estimates in **Table 11** above) by the application of the rates from a recent tender that included very competitive rates for piping.

- **Table 11 Comparison on WNW's Unit Costs – Water projects, North East Growth Corridor**

Staging	Item	WNW Unit Rate [or Cost]	SKM Unit Rates Band	
			lower band (pbd 2012)	upper band (pbd 2012)
Stage 1	1400m, 225dia water main	$160/ m	$155/m	$520/m
Stage 2	2940m, 300dia water main	$180 /m (greenfield) $270/m (built-up area)	$263/m	$851/m
Stage 2	400kL elevated tower	$855,000 (excluding land acquisition)	$1,100,000 (RC)	$1,250,000 (RC)
Stage 2 / 3	15 / 20 KW pump stations	$100,000 (both)	$188,000	$251,000

Summary: There is an apparent inconsistency between rates used between different projects for the same or similar work items. CAPEX estimates should be developed on the same basis and be realistic. In the case of the North East Growth Corridor cost estimate it appears that there is a significant risk of underestimation of the new water pipeline cost elements, which are a major component of the envisaged future CAPEX.

Probabilistic modelling of these cost estimates does not appear to have been undertaken as far as SKM Is aware. Wannon Water advised that this was only undertaken for selected WP3 schemes.

4.6.2. SAMPLE 2: Wollaston Road

Projecting growth

The Water System Options Analysis and Concept Design Report (June 2010) summaries the data relevant to the development from the council land use strategy (2004), structure plans (2007) and subsequent consultation (in 2007) between GHD and the council on behalf of Wannon Water. As a result it identifies 1070 lots to be developed between 2009 and 2028, which is a growth rate of 56 lots per year. A higher level of annual growth (62 & 90 lots per year) is indicated in the 'staging of works' proposed in the options report for the periods 2014-2018 and 2019-2023 respectively. The WP3 CAPEX plan indicates an envisaged growth rate of 40-46 connections per year in the period 2013-2028 which appears out of step with the information from the earlier reports and council expectations.

Summary: There is a need to better understand how the current growth rates projected for the Wollastan development have been arrived at, and how they impact on the staging (and extent) of capital works required.

Similar comments apply as for Sample 1 around the process for achieving Board approval for growth schemes and the associated sequencing, and similar adjustments apply over the life of the capital plan to those made under the North East Growth Corridor sample.

Alignment of indicated future CAPEX with Assessments

A number of growth projects for the Wollaston Road have been identified by WNW in its WP3 CAPEX plan to meet the projected growth for the Wollaston Road area. These are indicated in **Table 12.**

The water infrastructure projects and costs align broadly with the capital values shown in the Warrnambool, Koroit and Allansford Water Asset Planning Assessment for Water Plan 3, but the timing appears misaligned – possibly because the project has been delayed since the assessment was undertaken in 2011.

The extent of misalignment of costs is indicated in **Table 13**.

■ **Table 12 WP3 Capex for WNW's Wollastan Road Growth Area**

Scheme	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
Sewerage	**Scheme Costs assumed estimate in nominal $'000K**									
001164 Wollaston Road SPS East	734.9	nil	nil	nil	nil	nil	nil	nil	nil	nil
001165 Wollaston Road SPS West	125.0	843.1	nil	nil	nil	nil	nil	nil	nil	nil
Water	**Scheme Costs assumed estimate in nominal $'000K**									
000161 Wollaston Rd supply main from LL system to Wollaston Rd	854.1	nil	nil	nil	nil	nil	nil	nil	nil	nil
000030 Wollaston Rd Water supply - new tower and pump station	nil	150.0	2160.8	nil	nil	nil	nil	nil	nil	nil
001094 Wollaston Rd Development - low level tank	nil	nil	nil	nil	45.0	1150.7	nil	nil	nil	

■ **Table 13 Variations in Capex estimates – Wollastan Rd Development Area**

Source	WP2	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	TOTAL
CAPEX from **Table 12** (2012)	Not stated	854.1	150.0	2160.8	-	45.0	1150.7	-	**4360.5**
Cost in Water Asset Planning Assessment for Water Plan 3 (February 2011)	1067.0	1975.5	-	-	-	114.8	1320.2	-	**4477.5**
Cost in Hopkins Point & Wollaston Road Water System Options report (June 2010)	3850.9	1071.4	-	-	-	-	1339.6	-	**6261.9**

Dates for the staging of the development only appear to be indicated in the Hopkins Point & Wollaston Road Water System Options Analysis and Concept Design report (June 2010). These dates confirm the lack of alignment, with the WP3 assessments, as shown in **Table 14.**

Table 14 Variations in timing of growth infrastructure delivery

Year	Works proposed (Option 1A Growth Scenario 1)
2009	Construct DN225 main (Jamieson Street to end Ponting Drive), length 2100m) Construct transfer pump station near Ponting Drive and install interim pumps (i.e. 2028 capacity 40L/sec, 40m head, 22kW power) Construct DN225 rising main (length 100m).
2014	Construct DN225 rising main (length 140m) Construct 400kL elevated tank (height 20m) Construct DN225 rising main (length 900m)
2029	Construct 1ML ground level storage Construct high level pump station and install pumps with ultimate capacity (i.e. capacity 81L/sec, 24m head, 26kW power) Upgrade transfer pumps to ultimate capacity (i.e. 32.4L/sec, 16m head, 7kW power) Install booster disinfection station at Liebig Basin

Summary: There is a need for clarity around the development of cost estimates and infrastructure sequencing, and in particular decisions around how these are varied over time in response to changing needs.

The CAPEX indicated for each scheme is similar to the CAPEX developed in the water supply strategy options report, except that the projected WP4 or 5 scheme capex for the low level storage tank and pump stations / disinfection booster facilities is a significantly higher cost estimate in the 2010 options report when compared with more recent reports. This is indicated in **Table 15**.

Table 15 Variation in Cost Estimates – Water, Wollastan Road Growth Area

Project	WP3 CAPEX (assumed nom. 2012 $)	Water Supply Options Report (assumed nom. 2011 $)	Cost in Hopkins Point & Wollaston Road Water System Options report (assumed nom. 2010$)
Wollaston Rd supply main from LL system to Wollaston Rd	$854,088	$1,067,030	$796,950 [$483k+25%+40%]
Wollaston Road Water supply - new tower and pump station	$2,310,813	$1,975,470	$2,024,550 [($240k+$437k+$550k)+25%+40%]
Wollaston Rd Development - low level tank	$1,195,700	$1,435,000	$2,173,000 [($400k+$240k+$80k+$100k)+25%+40%]
TOTAL	**$4,360,601**	**$4,477,500**	**$4,994,500**

As part of its WP3 submission Wannon Water undertook probabilistic cost estimating of the Wollaston Road development using the @RISK software package. Outputs have been shared with SKM for the purposes of this review and are shown in **Table 16**.

Table 16 Wollastan Road development – Risk Cost assessment

Probability that estimate will not be exceeded	Cost Estimate $
5%	1,904,008
20%	2,018,775
50%	2,160,809
80%	2,350,193
95%	2,615,070

The 50%ile value of $2,160,809 is the capital works value used in the WP3 CAPEX program ($2,310,813 including consultancy / design in 2014/15), and appears to be generally consistent with the other estimates prepared.

Reasonableness of detail CAPEX estimates for Wollaston Road proposed works

A comparative check on the unit rates and cost estimates for Wollastan Road infrastructure works is shown in **Table 17.**

Table 17 Wollastan Road Cost Estimate basis check

Item	WNW Unit Rate [or Cost]	SKM Unit Rate band [or cost]	
		Lower band	Upper band
225dia water mains	$230/m	$155/m	$520/m
400kL elevated tower storage	$550,000	$1,100,000 (RC)	$1,250,000 (RC)
1ML low level tank	$400,000	$220,000	$580,000
22 / 26 KW pump stations	$240,000 (both)	$240,000	$320,000

Overall the unit rates shown for pipelines are typical of industry 'rule-of-thumb' estimates of $1/mm diameter, and also compared with those from SKM cost databases based on past experience. However the unit rates and costs are inconsistent with the much lower values apparently used for the Wangoom Road development.

The cost estimate for the elevated tank storage appears to be very low, and is inconsistent with the cost for a 400kL tank storage included within the North East Growth Corridor overall cost estimates (but which was approximately 60% greater the cost estimate for the Wollaston Road tank - $850K vs $550K).

Summary: There is an apparent inconsistency between rates used between different projects for the same or similar work items. CAPEX estimates should be developed on the same basis and be realistic.

4.7. Growth OPEX estimates

OPEX costs have been included in the NCC calculation but as an average cost per megalitre delivered / treated within the Wannon Water NCC model not a true incremental opex cost. WNW has provided the calculations of the overall annualised operating cost for water and sewerage service, and an average OPEX cost (per service) per megalitre. The operating costs per megalitre appear to be reasonable, and have been carried forward into the NCC model.

SKM notes that the growth in consumption appears to have been adjusted (downwards) from the growth (in no. of lots per annum) in the NCC, which more closely relates to CAPEX, to use population growth instead. Population increase is estimated to grow at a lower rate (because of the reduction in household size) and is considered to most closely relate to growth in consumption (and thus OPEX).

4.8. Apportionment of expenditure to growth

Some key points in relation to WNW's approach to the apportionment of expenditure to growth are:

- Sewer augmentation costs are based on the application of a single scheme (Harris Street sewer augmentation) as a 'typical' augmentation cost for all sewer connections. Harris Street was chosen as a typical project because of the availability of data and was applied widely because Wannon Water believe it represented a conservative estimate (in favour of the customers) because it serves a large number of customers and might be expected to have a lower than average unit cost per connection.
- A different approach was taken for water infrastructure. Based on the outputs of water network modelling a CAPEX project is included for three years (Y2/3/4) of WP3 for envisaged water main augmentation (SKM noted that this works out to approximately $688 per connection - $165/~240 connections per annum). A nominal $100 per connection was allowed for extra over augmentation not included in the modelling. This is a "best estimate" from Wannon Water experience.

Summary: Wannon Water has made a number of assumptions about the cost apportionment of network upgrades, and has taken a different approach for water and sewerage assets. The water network augmentation value per connection in particular is not clearly justified by an appropriate cost estimating process.

- Five schemes were transferred from other drivers (renewals / quality) to the growth driver on review of the ESC guidance on what can be included in growth capital. The transfer was 100% of the associated CAPEX. After discussing these projects with SKM, WNW has agreed that one of the projects, the Warrnambool WRP blower replacement and augmentation, should only be 20% allocated to the growth CAPEX. WNW intends to adjust its NCC model to reflect this.
- The reduction of Warrnambool Blower replacement cost attributed to growth from $1.1 mil to $250k (20% of capital costs) within the NCC model results in NCC change from $864 to $613 for the Warrnambool sewerage system. This results in the weighted average NCC for all growth towns changing from $1470 to $1312.
- Wannon Water believes that all other growth projects are correctly allocated 100% to growth.
- Two of the projects included relate to the rainwater harvesting scheme and it is arguable whether any proportion of these should be attributable to growth (as discussed in **Section 9**).
- One of the projects relates to general mains upsizing in Warnambool, to mitigate low pressure during peak demands. It needs to be clarified to what extent the low pressure is an existing problem (and thus required in any case to maintain service delivery standards), and to what extent the project includes bringing forward of works that would otherwise be required (as asset renewal).
- Whilst WNW has explained that the pipes are not near replacement age it is inherent in the replacement scheme that the asset life will be 're-started' and all customers connected will gain a benefit from the new asset with improved performance and increased asset life compared to the old asset. Currently the cost of this is borne solely by new connections.

Summary: There is a need for more clarity in the apportionment of projects to growth, in particular where those projects include inherent benefits for the wider customer base not just growth customers.

4.9. Alternative Water

A summary of some key points in relation to WNW's approach to alternative water in relation to growth works is provided below:

- Wannon Water does not have any conventional recycled water schemes in the current growth CAPEX plan. However it does have a rainwater harvesting scheme, as part of the North East Growth Corridor Project, to capture rainwater and offset potable use.
- Customers in the NE Growth corridor area that includes the rain water harvesting scheme have a 'discounted' NCC.
- The rain water harvesting scheme is not analogous to a third pipe / reuse alternative water scheme. It is the creation of an alternate raw water catchment within the new development. Rainwater is collected and transferred out of the 'catchment' to a water treatment plant and is then available to all customers not just those within the NE Growth corridor.

- Thus the application of a reduced NCC applied in this area reflects the fact that the developers within the NE Growth corridor are contributing some of the infrastructure for the rain water harvesting scheme whilst the wider customer base benefits. The cost of the Wannon Water provided assets are thus distributed across the wider NCC base excluding the NE Growth corridor customers (who are funding the 'reticulation' part of the scheme within the new development.
- A net present value (NPV) assessment of the benefit of the water that the Warrnambool Roof Water Harvesting project creates was prepared and is based on the annual value of the water which is created from the 'urban roof top catchment'.
- Each house roof will generate around 145 kilolitres per year. Over a 25 year period with a discount rate of 5.8% the NPV of the water generated is $2241 which forms the basis of the discount in NCC.
- Developers in the roof water harvesting catchment are required to construct roof water harvesting collection assets and the reduction in NCC offsets these additional costs. The quantum of developer provided assets does not form part of the NPV calculation.
- The Water Supply Assessment for Warrnambool, Allansford and Koroit suggests that, fundamentally, there is adequate system capacity to meet the moderate growth expectations. This assumption needs to be tested but assuming it is correct it seems difficult to justify the rainwater harvesting scheme as a growth project.
- If raw water resource augmentation is required then there is a need to demonstrate that the rainwater harvesting scheme provides best value for customers as a water supply augmentation project.

Summary: Wannon Water does not have any conventional recycled water schemes to service growth. However the North East Growth Corridor scheme includes rainwater harvesting partly funded by the developer which is being used as a new raw water source. The prudence and efficiency of this scheme needs to be tested as it is not clear that a new raw water source is required, or if it is that this is the most cost efficient way to provide it.

There needs to be a clearer justification for the growth driven need for the rain water harvesting project, and that it represents the best value for customers as a raw water source compared to other option that might exist.

4.10. Reference Information

Wannon Water (WNW) provided the following documentation to the review team in support of its plans for servicing growth areas in WP3. The following documents and further discussions with Wannon Water staff during the course of the review have formed the basis of SKM's comments.

- A paper detailing Wannon Water's responses to each of ten key requests for information required for the review (8th February 2013).

- A table detailing the projected growth rates for the four development areas in Warrnambool and for each of the other three towns in the corporations region that are expected to experience appreciable growth in the future (Port Fairy, Portland and Hamilton).
- Tables detailing the 'growth' allocated proportion of its capital works program for a 30 year projection, allocated to either water or sewerage service in each of the growth areas identified above.
- A break-down of the individual projects allocated to growth and their associated CAPEX projected for the next 30 years on a year-by-year basis.
- Warrnambool Land Use Strategy, Warrnambool City Council, September 2004.
- Options Analysis and Concept Design for Proposed Hopkins Point and Wollaston Road Developments, Sewerage System, April 2008.
- Two additional briefing papers on the 15th February 2013 in response to SKM questions raised during the course of the review.

The following documents had previously provided to the ESC / Deloitte for the wider WP3 review and were also used in the NCC review:

- Water Plan 3 Asset Planning Assessment for Warrnambool, Koroit and Allansford Water, February 2011.
- North East Warrnambool Water Supply Strategy for Water Plan 3 dated October 2012.
- Options Analysis and Concept Design for Proposed Hopkins Point and Wollaston Road Developments, Water System, June 2010.

5. Barwon Water (BW)

5.1. Overview

This review has been performed by SKM using information obtained from the documents and follow up conversations with Barwon Water (BW) personnel as listed in **Section 5.11**.

Uniform Standard NCCs: As a global issue there is a need to confirm whether or not the application of a global uniform NCC for the whole Barwon Water area (all catchments and services) is reasonable and consistent with the ESC's pricing principles; noting that it does not bear any particular relationship to the real incremental cost of servicing individual development areas and to that extent is not cost reflective. Barwon Water (BW) aggregates the costs of servicing growth across all its catchments and produces an "average" standard NCC based on total growth in lots across all its catchments. Notionally the net result is an effective or de-facto cross subsidy of customers in one area (of high cost) by those in areas of lower cost. Barwon Water (BW) has a sound rationale for adopting "uniform" standard as indicated in **Section 5.2.**

Combined Water and Water Recycling NCC: A region wide single NCC for water and water recycling services combined is proposed by BW and seems reasonable given the high level of connectedness of the Geelong Water Supply System (including Barwon and Moorabool) – with only Apollo Bay, Aireys Inlet, Colac and Lorne not connected – and the use of all sources of water collectively to service the region's needs. The high extent of interconnectedness is indicated by the fact that approximately 96% of new connections are serviced by the Geelong system, increasing to 98% when Colac is connected. Overall BW's approach results in lowest cost overall for meeting water supply demands for all customers.

Furthermore new customers in the Apollo Bay, Aireys Inlet, Colac and Lorne areas cannot reasonably claim that they are being disadvantaged because they are paying for recycled water when they do not receive any where a uniform standard NCC is adopted as proposed by BW. This is because if the charge for recycled water was separated out then for consistency local geographically based NCCs for water and sewerage should then be applied and the aggregate NCCs for these areas would be substantially greater than the uniform standard NCC across BW's whole area. That is they are better off with the arrangement proposed by BW.

This is discussed in more detail in **Section 5.2**.

Whether the capital expenditure included in the calculation relates to growth and the basis of the cost estimate is reasonable

- BW's growth forecasts underpinning its growth CAPEX are based on historical data, and council and regional planning forecasts and developer consultations. They have been independently reviewed and assessed to be reasonable.
- The sizing and sequencing of growth shared infrastructure appears reasonable. Some optioneering and scenario testing has been demonstrated, including review of the impacts of different staging of development for sampled projects.

- Barwon Water has produced a robust set of ISPs (Infrastructure Sequencing Plans) to service growth in a significant number of its growth areas based on a sound set of principles to ensure the cost efficient provision and optimal timing of servicing growth (for water, alternative water and wastewater) in an orderly manner from its business perspective. These are the subject of current extensive consultation with external stakeholders (especially developers). Progressive completion of remaining ISPs (for all growth areas) and some enhancement of existing ISPs is planned.

  Improvement opportunity: Some modifications to the presentation of the sequencing plans would make the justification of sequence timing and the extent of infrastructure required clearer. SKM understands that Barwon Water is currently undertaking improvements to its ISPs to include more information.

- The unit costing of infrastructure appears to of the right order but risk adjusted estimates are only undertaken in some cases and are not routinely produced to improve the robustness of producing a P50 estimate.

- There appears to be alignment between the CAPEX indicated in the NCC models and that indicated in the capital plan, notwithstanding that BW has confirmed it is currently revising the ISPs and the growth capital program and that there will be changes. The changes are not believed by BW to be material. Final confirmation of the associated capex associated with growth needs to be advised to the NCC when finalised by BW.

- At present BW has not included brought forward costs within its NCC Model. All project timings are based on its proposed cost efficient and optimal sequence timing.

- The annual value of Gifted Assets appears reasonable within the limited extent of this review (i.e. the figure does not seem disproportionate to the growth CAPEX).

  Improvement opportunity: Estimates of future gifted assets associated with the specific new infrastructure proposed should be visible for review.

Whether the methodology used is reasonable for apportioning capital expenditure that serves multiple purposes (e.g. compliance, renewals etc as well as growth) to growth and to new customers

- The methodology for determining whether a project is growth or 'other' investment type is based on the identification as growth as the primary driver. It is clear for the majority of schemes that this is the case, but there are a number of schemes where the distinction is less clear cut and the basis of the apportionment could be made more robustly.

  Improvement opportunity: There is a need to articulate clear and consistent rules for determining the apportionment of CAPEX and OPEX to growth or other investment programs.

Any capital expenditure from Water Plan 2 (WP2) that is included (i.e. no double counting)

- A significant proportion of the growth CAPEX 'projection' for the 10 years is in fact related to a proportion of the capex of projects constructed in WP2 based on 'unutilised' service capacity at the beginning of WP3. A proportion of that in turn relates to regional growth schemes supporting overall growth and some to existing customers (to maintain BW's target level of

security of supply) rather than wholly servicing individual growth areas. This basis of apportionment is reasonable and preferable to the alternative based on remaining asset life.

Improvement opportunity: There is a need to articulate clear and consistent rules for determining the extent of WP2 works carried forward into subsequent NCCs.

The reasonableness of the incremental operating costs (and their relationship to growth)

- BW has estimated the fixed proportion of the incremental operating costs associated with new projects (including growth related projects) based on a percentage of the capital cost of growth schemes. They appear to be a reasonable estimate, notwithstanding comments about apportionment above.

  Variable operating costs are based on the costs associated with the volumetric rate of delivery. Two different approaches are used. For water service the OPEX cost is related to the cost per ML from new sources assuming that all the 'new' water goes to new customers. For sewerage service the weighted average cost to provide sewerage services to all customers is used to derive an average OPEX cost per customer.

  Improvement opportunity: There is a need to articulate clear and consistent rules for determining growth OPEX.

5.2. Setting the Context: BW's NCCs reviewed in this report

Summary: Barwon Water has set a single preliminary NCC charge across the entire business, the quantum of which is currently under review as its capital works and the associated ISPs are being reviewed and updated. This is not expected to have a material impact on the level of proposed NCCs. Barwon Water believes that this "uniform NCC" approach is the most equitable solution enabling recovery of costs in an efficient manner whilst being equitable to the development industry.

SKM notes that it does not meet the ESC's broad principle NCCs being cost reflective (with respect to individual growth areas) and alignment of NCC charges with the incremental costs to service the actual development.

Barwon Water has proposed a single standard NCC that differentiates only between the water service and sewerage service provided. It is currently reviewing the growth program and has prepared a draft updated capital program different to that included in its initial WP3 submission, but not significantly so. BW's original WP3 submission and its current numbers for Growth Capex across WP2, WP3 and WP4 are indicated in **Table 18**. The percentage unutilised "growth capex" carried forward into NCC calculations is also indicated.

■ **Table 18 Growth Capex across WP2, WP3 and WP4-(and variation to WP3 Submission)**

Service	Source of Information	Total "Unutilised" Capex in WP2 $K	WP3 $K	WP4 $K	TOTAL $K
WATER	ESC Submission	97,981.3	103,653.0	107,439.4	309,073.6
	Current Figures	101,760.8	103,531.5	105,303.6	310,595.8
RECYCLED WATER	ESC Submission	60,211.7	16,785.8	12,740.9	89,738.3
	Current Figures	63,028.5	20,268.0	13,551.5	96,857.6
SEWER	ESC Submission	73,225.9	58,304.9	77,099.2	208,630.0
	Current Figures	71,417.3	59,843.3	74,776.4	206,037.1
TOTAL	ESC Submission	231,418.9	178,743.6	197,279.4	607,442.0
	Current Figures	236,206.6	183,642.8	193,631.5	613,490.5
	Variance between ESC submission & updated figures	+2.1%	+2.7%	-1.8%	+1.0%

In planning the method for calculating NCC charges for WP3 BW investigated two possible approaches:

1. Apply a business wide cost per connection ("uniform NCC); or
2. Apply a charge to each connection that is specific to a development area. BW assessed three areas - Apollo Bay, Colac and 'everywhere else' (which includes Geelong) - to obtain an indication of the spread across its growth areas were geographic/area based NCC values to be adopted one of three broad development areas (refer Table). BW has not established NCCs for other areas in detail.

An indicative comparison of the outcomes from these two approaches is provided in **Table 19**.

■ **Table 19 Comparison of BW's Uniform and Discrete (Individual Growth Areas) NCC calculations**

Service	Option 1	Option 2		
	All in	Apollo Bay	Colac	All other (incl'g Geelong)
Water (including recycled water where available in Armstrong Creek & Torquay)	$2,600	$53,000	$10,100	$1,800
Sewerage	$1,900	$0	$2,400	$1,850
Total	**$4,500**	**$53,000**	**$12,500**	**$3,650**

BW considers that in most instances the standardised NCC charge applicable to any new connection that is eligible for a standardised charge is still likely to fall towards the bottom end of

the acceptable pricing bounds between the 'avoidable costs' and the 'standalone cost', even with averaging effect of including Colac and Apollo Bay costs.

Barwon Water's Rationale for application of standard (uniform) NCC Charges

Barwon Water's Board has decided to adopt Uniform NCC's across all its growth areas rather than geographic based NCC charges. Its decision is based on the following considerations:

- The perceived high impact on charges in Colac and Apollo Bay and concern that the introduction of such high NCC charges, significantly different to the current developer charging regime, would result in unacceptable reputation and political risk for Barwon Water;
- Only a small proportion (6%) of Barwon Water's forecast new connections are in Colac and Apollo Bay so applying a uniform charge has little impact on wider NCCs while avoiding the perceived negative impact of a geographic charge;
- A single uniform NCC charge is consistent with the general tariff approach of uniform pricing ('postage stamp pricing') for all customers;
- The use of Infrastructure Sequencing Plans (for the establishment of the 'baseline' uniform standard NCC charge) and application of bring forward charges where developers wish to vary from the cost efficient provision of infrastructure to service growth is believed by BW to be a more effective mechanism driving efficient patterns of infrastructure development within growth areas;
- Feedback from the land development industry (via VicWater Essence Communications research and current BW consultation) is that its preference is to minimise the number of geographic based charges for simplicity and stability of charges over time.
- The fact that BW's General Tariff (from which approximately 85% of BW's total revenue from new customers is derived) is not geographic/area based and that its overall pricing structure would be unreasonably "distorted" if the NCCs were to be geographic/area based. BW has stated that overall revenue is (unsurprisingly) less sensitive to NCC revenue noting that a relatively "small" change in the General Tariff would cover the projected NCC revenue;
- A strong desire to set NCCs that are simple, predictable, easy to administer and do not adversely impact on small regional communities at short notice, rather than attempting to track NCCs in alignment with the intent of the pricing principles to the avoidable cost of servicing development in some finite geographic area.

Justification

BW has indicated that using the ESC NCC calculation estimator, the NCC charge partly corrects for the general tariff cross subsidy already built into the existing uniform (or 'postage stamp') price regime that is the general tariff. This correction is borne by just the new customers and is not shared by the existing customers. This is considered by BW to result in inequitable outcomes for new customers in areas that currently receive a cross-subsidy through the 'postage stamp price'.

BW considers that the only reasonable and consistent way to provide fully equitable geographic based charges would be to apply discrete general tariff pricing to the same geographic boundaries as the geographic areas for NCCs. BW is concerned that this would in itself result in widely different pricing for each geographic area that would be a significant change from current practice

and would raise a whole raft of other equity, practicality and political issues. BW has provided information for the Colac growth area to support this as indicated in **Table 20**. This is used as an example only to demonstrate the sensitivity of geographic based NCCs.

- **Table 20 Indicative Comparison of Uniform and Area Based NCC (Colac as example)**

	Geographic based NCC	Uniform NCC
	Colac Growth Area	BW's Entire Service Area
New customer nos. /yr	120	2,500
Based on Uniform General Tariffs [Postage Stamp Pricing]		
NCC / lot	$10,100	$3,340
Geographic Based Discrete General Tariff Pricing	NB: This assumes that a Colac general tariff discrete price is 20% higher than the current 'postage stamp price'.	
NCC / lot	$8,300	N/A

Creation of separate geographic based standardised NCC charges for areas within the same supply system, and attributing the growth related costs to individual assets, is considered by BW to be overly complex. SKM notes that BW has indicated that approximately 48% of the CAPEX included in the NCC calculation is WP2 CAPEX with utilised capacity, attributed (at least in part) to growth.

The most material / significant individual growth assets from a cost perspective are those assets constructed in WP2 that BW considers deliver benefits to growth customers across the whole business and these are shared / required by all of these geographic areas.

These major assets constructed in WP2 and the manner in which the associated WP2 capex has been apportioned to growth is indicated in **Table 21**.

SKM notes that:

- the allocations to growth are relatively subjective (and are therefore somewhat "arbitrary") although BW has reasonable qualitative supporting rationale;
- the costs used by BW appear to align quite well with the real project costs (net of contributions from non-BW sources) as reported in SKM's MGP Re-opening Event report (ESC, March 2012); and
- The costs appear to be based on real $ at January 2013.

BW's rationale for customers in disparate parts of BW's operating areas (and systems), e.g. Apollo Bay, contributing towards the cost of a growth asset that secures increased water security and supply capacity only in the east of BW's region needs to be further tested.

- **Table 21 Apportionment of major WP2 assets capex to growth**

Project	allocation to growth %	"unutilised" hydraulic capacity @ end WP2 %	capex from WP2 included in NCC charges calcn $K	BW justification
Melbourne Geelong Pipeline [MGP]	67	100	39,949.0	Based on a net capex of $60.66M (after contributions). *See Note 3*. Provides drinking water for most growth areas – directly or indirectly
Black Rock Recycled Water Scheme	75	100	22,541.4	Based on net Capex $30.055M (after contributions). *See Note 2*. Frees up drinking water for all growth areas
Main Outfall Sewer Upgrade	53	100	893.9	Sewerage capacity for most growth areas. *See Note 1.*
Northern Water Reclamation Plant	50	30	3,080.6	Based on net capex $20.54M (after contributions).

Notes:

1. All costs in the above table are referenced to January 2013 (real).
2. **For Northern Water Reclamation Plant:**

   This apportionment might be slightly overestimated – a more "accurate" number is approximately $2.60M. However this is not likely to make a material difference to the overall NCC outcomes. BW has based its apportionment on assuming 50% of net capex is compliance and 50% for growth (or $10.27M), with

   70% of the capacity utilised by end WP2 (i.e. allocated to Shell and existing customers) and therefore 30% un-utilised. That is $3.081M included in NCC Model at Yr 0.
3. **For Black Rock RWP**

   Allocate 50% of Black Rock RWP Capex (and Opex) to sewerage and 50% to recycled water (assumption is that if BW built a Black Rock RWP just to reverse the impact of the Northern Water Plant (salt reduction), it would cost 50% of the larger capacity plant. Therefore

   50% allocated to new Recycled Water customers (all new): $15.028M is included in the NCC model.
   PLUS
   50% allocated to Sewerage - $15.028M of which 50% is associated with existing customers and 50% to new customers (growth). Therefore an additional $7.514M is included in the NCC Model at Yr 0.
4. **For MGP**

   MGP's capacity on construction (i.e. now) 'services' 8% of existing customers and has 100% available capacity.
   At 2043 (end of 30 year NCC model period) BW has estimated (based on its water supply strategy that 75% of the MGP capacity will be consumed by growth (new customers) over that period.
   Therefore in the NCC model BW has included 67% (=75% - 8%) of capex at year 0.

In apportioning capex from WP2, BW checked two methods to check reasonableness:

- *Method 1* – Based on recovery of asset costs from NCC contributions up to end WP2:
  Total WP2 Capex less Total WP2 NCC Revenue
  = $389,076,747 – $27,755,000 = **$361,321,747**

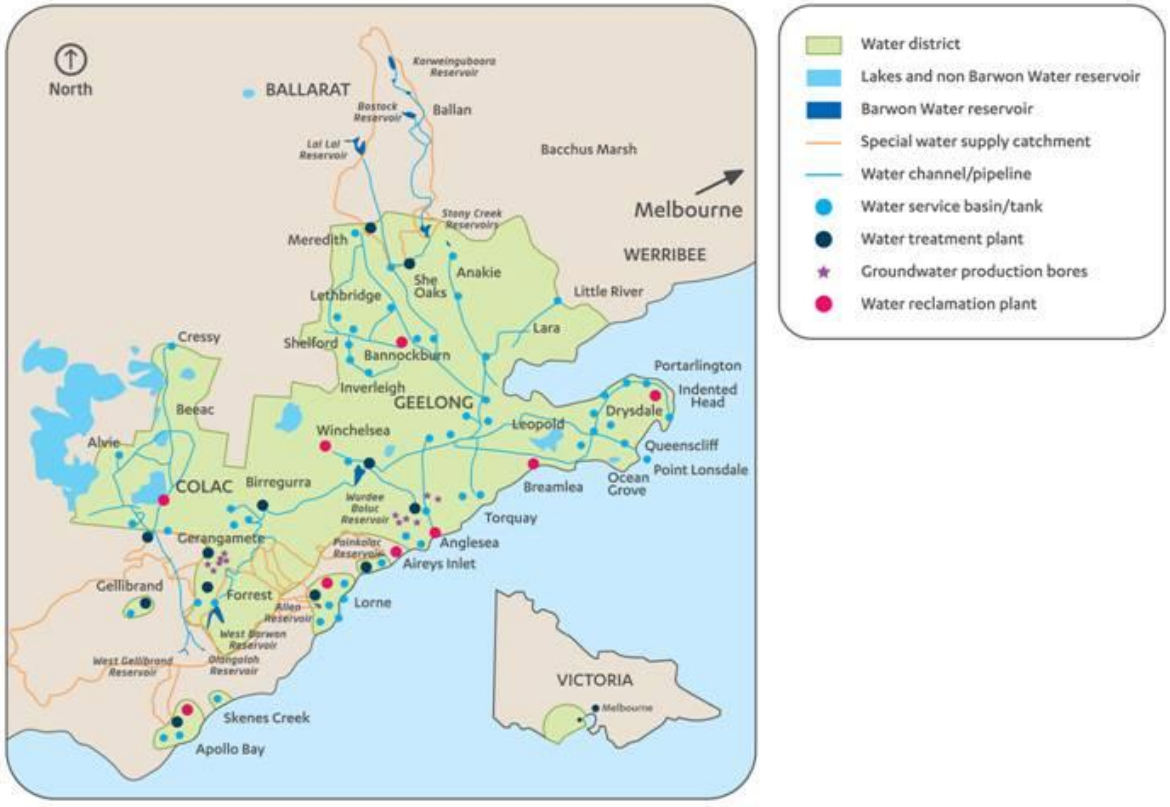
- *Method 2* - Based on "unutilised capacity" at end WP2:
  Total WP2 Capex less Portion of the Total Capex based on asset capacity utilised in WP2 (BW assumptions)
  = $389,076,747 – $157,657,825 = **$231,418,922**

Barwon Water used Method 2 as it considered that this provides the best estimate of the portion of the WP2 capital asset that is utilised by new connections in WP3 and beyond. Method 1 underestimates the asset utilisation in WP2 due to the artificially low NCC revenue received.

Combined Water and Water Recycling NCC

A region wide single NCC for water and water recycling services combined is supported by the high level of connectedness of the Geelong Water Supply System (Barwon and Moorabool). The high extent of interconnectedness is broadly indicated in **Figure 2**.

Figure 2 Barwon Water's Water Supply indicating Level of Interconnectedness



All the Barwon Water operating area - other than the Colac, Aireys Inlet, Lorne and Apollo Bay areas - is for all intents and purposes interconnected for water supply purposes. Barwon Water has a variety of water sources – surface water (e.g. Moorabool, MGP), groundwater and reclaimed water. While each part of its operating area cannot be provided with each type of water and some sources are localised, these sources in aggregate - together with the flexibility of moving water around with the built water supply transfer infrastructure - are used to meet the total needs of its

customers (existing and growth) at the approved target level of security. This is the most cost efficient means of meeting the water supply needs of BW's region as a whole.

BW's water supply strategy was reviewed in terms of what water supply was required for maintaining the target level of security and what was required to meet new customers/growth. The previously constructed Anglesea borefields substantially improved the level of security of BW's system close to its adopted target level. The cost of the Anglesea borefields project (approximately $60M) has been fully allocated to existing customers. A small proportion of the MGP capacity meets the balance of current demands of all existing customers to achieve the target level of security. Thus the balance of the MGP and all WP2/current water recycling projects in aggregate provide for meeting the water demands of future growth and the needs of new customers. Thus the apportionment of the capex for these projects (as indicated in **Table 21**) to growth/new customers is reasonable.

Countervailing relevant points are that arguably BW has excessive capacity to meet the needs of its region with the construction of the MGP and the water recycling plants, the excess capacity could be used to enhance the level of security for all customers as an alternative to meeting future demands, alternative water projects are a cheaper source of water and would be used ahead of the MGP and despite the interconnectedness some facilities could be considered to service local needs only. However on balance BW's approach seems reasonable.

In quantitative terms (using 2011/12 actual numbers), the reasonableness of this is demonstrated by the split in the number of new connections:

- Total: 2487, split as follows
- Geelong System: 2388 (or 96%)
- Lorne System: 16
- Apollo Bay System: 39
- Aireys Inlet System: 7
- Colac System: 37

When Colac is connected to the Geelong System in WP3 the Geelong System numbers would effectively increase to 2,425 (or 98% of new connections).

In summary, a region wide single NCC for water and water recycling services combined is proposed by BW and seems reasonable given the high level of connectedness of the Geelong Water Supply System (including Barwon and Moorabool) – with only Apollo Bay, Aireys Inlet, Colac and Lorne not connected – and the use of all sources of water collectively to service the region's needs. The high extent of interconnectedness is indicated by the fact that approximately 96% of new connections are serviced by the Geelong system, increasing to 98% when Colac is connected. Overall BW's approach results in lowest cost overall for meeting water supply demands for all customers.

Furthermore new customers in the Apollo Bay, Aireys Inlet, Colac and Lorne areas cannot reasonably claim that they are being disadvantaged because they are paying for recycled water

when they do not receive any where a uniform standard NCC is adopted as proposed by BW. This is because if the charge for recycled water was separated out then for consistency local geographically based NCCs for water and sewerage should then be applied and the aggregate NCCs for these areas would be substantially greater than the uniform standard NCC across BW's whole area. That is they are better off with the arrangement proposed by BW.

Stakeholder Consultation

BW expressed a desire to be consistent with the direction of, and guidelines produced by Vicwater and its relevant Working Group (in which BW has participated). These guidelines advocate consistency across all growth areas (within each of the respective regional areas) to provide "certainty, simplicity and fairness". SKM understands Vicwater conducted a consultation exercise with the UDIA and large developers on behalf of the water industry on the subject of NCCs.

Barwon Water also conducted its own consultation with the land development industry on the application of the NCC framework. BW has indicated that uniform standard NCCs were not a major concern for the development industry Barwon Water's initial feedback from the current consultation process appears to be that the key issues for developers is less the quantum of the NCCs (up to a point) or the application of uniform NCCs but rather more importantly:

- The specification of clear sequencing plans (as has been well developed by BW) for each growth area based on well-articulated and robust principles/guidelines and the public availability of these in effectively managing this issue (by ensuring there is information certainty and that the same information is available to all);
- The application of "bring forward charges"; and
- The issue of "free riders" under the application of the sequencing plans.

BW has challenged the developers to come up with a way to effectively address the last two of these issues.

BW has noted that its current NCCs are lower because of the overall methodology adopted and certainly significantly lower than for pre 2005.

Summary

It is noted that it would be reasonable to adopt a uniform NCC if the differences between the NCCs for the various growth areas was small and not material. However if the differences between the NCCs is significant both in $ terms and percentage terms (as here) then it is less apparent why a uniform NCC should be adopted (acknowledging the BW's position and reasoning). The purpose of NCCs, to attribute the actual cost of servicing growth in proportion to the revenues earned, is not achieved for all growth areas/new customers with the single NCC charge. BW nevertheless has strong supporting rationale for adopting uniform NCC charges.

5.3. Capital Infrastructure Costs underpinning NCC calculations

A review of the reasonableness of Capital Infrastructure Costs underpinning NCC calculations requires testing of the associated growth forecasts and sequencing plans; the apportionment of capital costs (to growth and other drivers) and the influence that gifted assets and government funding have on the NCC calculations.

5.3.1. Review of Growth Forecasts underpinning NCC calculations

Summary: The growth estimates prepared by Barwon Water appear to be reasonable, and have been independently checked for consistency with Councils growth predictions.

A number of growth areas have been identified in the four local authority administrative areas that occur within the Barwon Water region, as indicated in **Table 22**.

Table 22 Growth Areas and Lots

Council	Number of growth areas	Lots / year released @2011
Greater Geelong	12	2049
Surf Coast	3	430
Golden Plains	2	210
Colac Otway	4	141

The rates of growth were initially estimated by a consultant (GHD) and reviewed and updated internally by Barwon Water. SKM understands there was a process of extrapolation and modification based on Barwon Water's understanding of historic trends, likely distribution of growth and infill, forward to 2021. The forecasts were assessed by a planning consultant (MacroPlan) who deemed them to be a reasonable projection of business as usual, and consistent with the G21 Geelong Regional Growth Plan. There has only been one year of comparison of BW figures with actual growth and the predicted and actual were reasonably close.

There is some indication in the growth forecasting spreadsheet provided to SKM of review and adjustment to the growth projections based on historic data and an understanding of the interrelations between the different developments and developer strategies.

The process and actual value of growth projections appears to be reasonable.

5.3.2. Review of Sequencing Plans underpinning NCC calculations

Summary: BW has well developed sequencing plans (ISPs) for a significant number of its growth areas and is progressing completion of the outstanding ISPs. The infrastructure servicing and sequencing plans broadly appear to match the CAPEX profile. However there are variations in the level of detail provided and smaller growth areas appear not to have ISPs developed which means that decisions about staging and bring forward charges (where applicable) may be somewhat less transparent.

BW has provided Infrastructure Sequencing Plans (ISPs) for the seven largest growth areas (broadly >100 lots per year) as identified in **Table 23**. These are underpinned by specific infrastructure (pipes, pump stations etc.) in an associated servicing strategy that provides information on the envisaged sequencing of infrastructure provision and / or capacity upgrade to meet the particular phases of the development. These works have been costed and that CAPEX underpins the NCC calculation for that growth area (as included in BW's model).

Smaller areas do not have ISPs at the moment, however BW are we understand reviewing and refining the ISPs to provide additional data in line with the NCC guidelines and in particular to provide additional guidance on likely bringing forward charges.

Each ISP includes a forecast of lots per year developed projected to 2021 that appears to be broadly consistent with the growth modelling figures used by BW, and apportioned this between greenfield and infill again broadly consistent with the figures in the growth projection.

Table 23 Growth Area growth forecasts

Growth area	Data source	Lots/yr (2011-2016)			TOTAL
		Greenfield	Infill	% Infill	
Armstrong Creek	Growth in Forecast	350	0	0	350
	Growth in ISP	350	0	0	350
Bannockburn	Growth in Forecast			17	120
	Growth in ISP	96	24	20	120
Clifton Springs (Jetty Road ISP)	Growth in Forecast			20	100
	Growth in ISP	88	47	35	135
Lara (ISP for West)	Growth in Forecast			26	200
	Growth in ISP	140	60	30	200
Leopold (ISP for South)	Growth in Forecast			18	180
	Growth in ISP	144	36	20	180
Ocean Grove (ISP for North)	Growth in Forecast			32	200
	Growth in ISP	140	60	30	200
Torquay (ISP for North)	Growth in Forecast			35	340
	Growth in ISP	220	120	35	340

The only apparent material discrepancy between the ISP values and the forecast is Clifton Springs, in both the infill % and the rate per year. This needs clarifying; the forecast might capture Jetty Road only whilst the ISP provides figures for the whole, however in that case the infill percentage should be 0%.

Each infrastructure servicing plan:

- takes a broad view of the existing Barwon Water assets and associated constraints in the catchment areas where the development occurs
- the expected staging of development and associated number of lots released in particular time frames and
- how this impacts existing assets and an indication of the assets needed to service each stage of development
- identified developer funded assets that will need to be provided
- identifies temporary assets that will need to be developer funded if some areas are brought forward out of the expected sequence
- The ISPs do not include any capital cost estimates for either BW or developer funded infrastructure.

BW has identified 225 'growth' projects in its Capital Works Investment Program (CWIP). This covers annual budget expenditure from Yr5 of WP2 (2012-13) through to for Water Plan 3 and is summarised in **Table 24.**

- **Table 24 Value of Capital Works Investment Program (CWIP) by service for WP3 period**

Service group	No. of projects	Value of Projects [$M]					
		2013	2014	2015	2016	2017	TOTAL
Water Supply	116	30.39	13.42	12.82	43.19	9.75	109.58
Sewerage	77	12.29	8.90	15.39	11.81	9.92	58.30
Recycled Water	32	8.78	1.85	2.01	3.56	0.59	16.79
Total	225	51.46	24.17	30.22	58.56	20.25	184.67

- ***Note:*** SKM understands that different figures for the growth CAPEX spend profile were provided in the December 2012 BW Supplementary submission to the ESC on NCCs in error. BW has provided SKM with a corrected table that now aligns with the CAPEX program (CWIP). BW has advised that this does not materially impact on the calculated NCCs - it was a transcription error in the December submission.

SKM has selected two sample development areas at random to compare the alignment of the CWIP with the ISPs.

5.3.3. SAMPLE: Armstrong Creek – Horseshoe Bend Sewerage Sub-catchment

A summary of the sewer infrastructure needs identified in Horseshoe Bend Infrastructure Servicing Plan is indicated in **Table 25** and the associated capex in **Table 26.**

- **Table 25 Horseshoe Bend Infrastructure Servicing Plan summary**

Stage	When	Infrastructure
Stage 1a	2015-2018	800m of Northern Horseshoe Bend Sewer
Stage 1b	2015-2017	500m of Southern Horseshoe Bend Sewer
Stage 2	2019-2024	Available assets expected to have capacity
Stage 3a	2022-2023	450m of Northern Horseshoe Bend Sewer
Stage 3b	2022-2026	450m of Southern Horseshoe Bend Sewer
Stage 3c	2027-2032	Further extension of Southern Horseshoe Bend Sewer

- **Table 26 Horseshoe Bend Infrastructure - Summary of sewer CAPEX in CWIP program**

Ref	Scheme	Value of Projects [$K]								
		2015/16	2016/ 17	2017 / 18	2018/ 19	2019/ 20	2020/ 21	2021/ 22	2022 / 23	2023/ 24
S1126	Horseshoe Bend Nth	nil [nil prior in CWIP]	166.42	1,479.77	nil	nil	nil	nil	2,654.04	nil
S1127	Horseshoe Bend Nth	nil [nil prior in CWIP]	66.41	597.61	nil	nil	nil	nil	1,914.00	nil

The CAPEX program and the ISP are in broad alignment. The value included in the capital program cannot be checked precisely because of the limited scheme detail provided, but the rate of ~$1200/m of trunk sewer extension appears reasonable.

There is no allowance for the ISP infrastructure identified beyond the WP4 period, but there appears to be limited data developed in the ISP at this point to estimate the CAPEX for this growth area. However this does mean some costs have presumably been omitted from the CAPEX program. As BW has assumed a generic capital expenditure per year beyond year 10 in the 30 year NCC model this has no impact on the NCC calculation.

5.3.4. Sample 2 Ocean Grove

A summary of the sewer infrastructure needs identified in Horseshoe Bend Infrastructure Servicing Plan is indicated in **Table 27** and the associated capex in **Table 28.**

Table 27 Ocean Grove Infrastructure Servicing Plan summary

Stage	When	Infrastructure
Stage 1	2012-2013	Capacity existing
Stage 2a	2014-2016	Developer sewer reticulation only
Stage 2b	2014-2019	Shared water assets required
Stage 3a	2022-2023	Extend shared water assets
Stage 3b	2022-2026	Extend water assets
Stage 4a	2027-2032	New sewer catchment required, new SPS. Extend water assets
Stage 4b	2027-2032	Gravity trunk sewer. Shared water assets

Table 28 Ocean Grove Infrastructure - Summary of CAPEX in CWIP program

Ref	Scheme	% unused in WP2	Value of Projects [$K]										
			2013 /14	2014 /15	2015 /16	2016 /17	2017 /18	2018/ 19	2019 /20	2020 /21	2021 /22	2022 /23	2023 /24
Sewer	**NB: Projects S1028, S1037, S1045 wholly in WP2 totalling $3,528.87K CAPEX unused [50%] not shown)**												
S1029 /S1054 / S1030	OG PS2 PS3 & 4 U/G	6,007.94 [50%]	76.82	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil
S1095	OG Banks Rd PS constr'n	nil	nil	nil	nil	695.2	5,889.0	nil	379.04	379.04	379.04	379.04	379.04
S1096	OG RM1 duplic'n	nil	22.90	155.3	302.39	10.16	nil	nil	nil	nil	nil	nil	nil
S1118	OG North Interceptor	740.30 [100%]	372.3	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil
Water													
W1174	OG Feeder Main	962.27 [95%]	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil
W1241	OG Feeder Main St2	142.50 [95%]	900.00	66.87	nil	nil	nil	nil	nil	nil	nil	nil	nil
W1242	OG Feeder Main St3	nil	nil	507.9	507.9	507.9	507.9	507.9	nil	nil	nil	nil	nil
W1296	OG Feeder Main St4	nil	nil	nil	nil	nil	nil	nil	507.90	507.90	507.90	507.90	507.90
W1101	OG North PS	2,259.59 [80%]	41.90	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil
W1226	OG Nth PS Aug'n	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	30.47	304.74
W1175	OG tank augmentn	nil	nil	nil	nil	nil	nil	nil	nil	609.48	11986. 4	203.16	nil

A significant amount of the sewerage infrastructure for the Ocean Grove area has already been built, as stated in the ISP 'Barwon Water has progressively constructed infrastructure over the past 5 years to upgrade the Ocean Grove sewerage system to ensure it can accept flows from the proposed urban growth areas identified in the Structure Plan'. As shown in **Table 28** a significant amount of WP2 CAPEX has been included in the NCC calculation for as yet unutilised infrastructure. The % unutilised is based on hydraulic utilisation of the pipes, and there needs to be an understanding of how this is calculated and whether it accurately reflects the proportion of CAPEX still to be recovered. The northern boundary sewer mentioned in the ISP for completion in 2013 is included in the above CWIP figures (project S1118). The rising main duplication is not included in the development specific ISP as it sits outside the development. The next major investment is the new 'catchment 3' in the ISP, serviced by a new Banks Road pumping station. The sequencing includes a year with no CAPEX (2018/19) associated with this project, but review of the ISP suggests the WP3 CAPEX is likely sufficient to service Stage 3a with the post 2020 CAPEX being associated with connecting progressive stages (3a, 4a, 4b?) into the pumping station as described in the ISP.

Similarly for water infrastructure a significant proportion of the bulk assets were constructed in WP2. WP3 and WP4 see the progression of the feeder main as additional stages are developed, in line with the ISP timing. The ISP projects infrastructure to service development up to 2034 (Stage 4b) but does not mention the augmentation of the Ocean Grove North pump station and tank indicated in the CWIP for WP4 – presumably again because this sits outside of the development and services a wider group of customers than those in the growth area.

5.4. Growth infrastructure proposed and associated CAPEX

Summary: The sizing and sequencing of growth shared infrastructure appears reasonable. Some optioneering and scenario testing has been demonstrated, including review of the impacts of different staging of development for sampled projects. Some modifications to the presentation of the sequencing plans would make the justification of sequence timing and the extent of infrastructure required clearer. SKM understands that Barwon Water is currently undertaking improvements to its ISPs to include more information.

The unit costing of infrastructure appears to of the right order but risk adjusted estimates are not routinely produced to improve the robustness of producing a P50 estimate.

There appears to be alignment between the CAPEX indicated in the NCC models and that indicated in the capital plan, notwithstanding that BW have confirmed it is currently revising the ISPs and the growth capital program and that there will be some changes. The changes are not believed by BW to be material in terms of capital expenditure and impact on the quantum of the proposed NCCs.

BW has provided its Growth Capital Works Investment Program (CWIP) for this review. This includes three service based spreadsheets for water, sewer and recycled water. Each includes the following information for each of the 225 growth driver projects identified by BW:

- Project identifier, name and location
- WP2 Yr1-4 actual CAPEX

- WP2 Yr 5 budget
- Proportion of WP2 works utilised
- WP3 Yr1-5 budget CAPEX
- WP4 Yr1-5 budget CAPEX
- WP5 Yr 1 budget CAPEX
- Budget CAPEX beyond 2024-2025
- Allocation of project as greenfield or infill split between both (not quantitative)
- Fixed OPEX estimate based on % of CAPEX in asset type (mech./elec. or civil).

SKM's comparison of the growth expenditure included in BW's capital program and the growth expenditure included in its NCC model draft is shown in **Table 29**. It should be noted that there are some material variances, particularly in the sewerage service capex profile and total expenditure.

- **Table 29 Growth Capex Comparison Summary: by Service for WP2 & WP3 – NCC Model & CWIP**

	Value of Projects [$K]						
	2013/14	2014/15	2015/16	2016/17	2017 / 18	WP3 Total	Variance
NCC Model							
Water	30,389.04	13,419.11	12,824.28	43,193.51	9,749.21	109,575.16	
Sewer	12,288.71	8,901.02	15,387.47	11,810.65	9,917.03	58,304.87	
Recycled Water	8,779.33	1,853.33	2,007.12	3,559.01	586.99	16,785.78	
CWIP							
Water	29,743.36	13,666.18	12,824.28	43,193.51	9,749.21	109,176.54	398.63
Sewer	12,338.76	6,71.68	8,908.86	11,810.65	9,917.03	49,688.98	8,615.89
Recycled Water	8,391.57	1,904.50	2,007.12	3,559.01	586.99	16,449.19	336.59
	2018-19	2019-20	2020-21	2021-22	2022-23	WP4 Total	Variance
NCC Model							
Water	22,326.98	12,246.91	14,313.02	34,387.38	24,165.07	107,439.38	
Sewer	6,894.10	23,022.69	34,334.59	13,008.46	6,733.46	83,993.29	
Recycled Water	1,608.91	5,378.58	2,206.20	2,808.98	738.19	12,740.85	
CWIP							
Water	22,326.98	12,246.91	14,313.03	34,387.38	24,165.07	107,439.38	-
Sewer	8,511.42	37,602.01	47,670.53	13,008.46	6,733.46	113,525.87	29,532.58
Recycled Water	1,608.91	5,378.58	2,206.20	2,808.98	738.19	12,740.85	

Given the extent of the information it is not possible nor is it in scope to review the whole capital program. In the previous section SKM sampled alignment of projects with the ISPs for two samples that SKM selected independently. Barwon Water has provided additional information for three growth areas that it has selected, including further detail on the CAPEX estimate build up for a single project of the group of projects associated with that growth area. These are discussed in detail below.

BW has prepared cost estimates for individual projects utilising standard industry unit rates and percentage allowances for known risks relevant to the individual project. For projects >$2M in value these are independently reviewed by "Inside Infrastructure" and were adjusted as required based on the review. BW believes this process achieves a P50 confidence level estimate. A full risk based estimate is only prepared for the top 10 projects included in the WP3 submission, and this was also reviewed with BW's Alliance contractor partner to adjust rates to reflect market conditions where necessary. These 10 projects did not cover all growth related infrastructure.

5.4.1. SAMPLE 3 Inner Geelong

A number of growth projects distributed around the Inner Geelong catchment have been identified by BW. Presumably, from review of the provided large scale plans, the majority of these serve different discrete 'infill' development. No ISP has been provided for the Inner Geelong area. Because of the diffuse nature of relatively small infill lots around the catchment BW believe an ISP is not useful or practical to develop.

Table 30 Inner Geelong Growth Projects

Reference	Title	Value of Projects [$K]		
		Unutilised from WP2	WP3	WP4
Water				
W1318	Highton high level retic Stage 2	0	0	140.0
W1148	South Highton feeder main Stage 3	0	0	0
W1275	Swanston St retic improvement	0	0	200.0
W1122	Golf course FM replacement	0	0	550.0
W1239	Highton feeder main stage 3	0	0	0
W1165	Highton high level PS upgrade	270.45	1,151.67	0
W1166	Highton high level tank no.2	0	0	4,700.0
W1172	Montpellier Basin No 4 disinfection point	0	0	760.0
W1173	Montpellier-Lovely Banks TM Stage 4	0	0	0
Sewer				
S1129	Grovedale diversion sewer	0	0	0
S1097	Outfall to ovoid cross con booster PS	0	0	0
S1098	Ovoid sewer replacement racecourse to Carr St	0	0	0
	TOTALS	**270.45**	**1,151.67**	**6,350.0**

Allocation of CAPEX for Inner Geelong catchment to growth generally

Without an understanding of how the indicated schemes relate to identified growth SKM is not able to review whether or not the projects relate to growth and whether they are wholly growth or an element of renewals etc. Certainly those projects identified as 'replacements' must presumably serve existing customers and include some proportion of asset renewal, with growth just being the proportion of cost associated with an increase in available capacity.

Reasonableness of CAPEX estimates for Inner Geelong generally

Without details of the actual infrastructure associated with each project it is not possible to assess the reasonableness of the estimated CAPEX.

Notwithstanding the above the growth CAPEX is modest for the area. The vast majority of CAPEX 'associated' with Inner Geelong comes from projects external to Geelong which provide water or sewer capacity. Whilst these have been provided by BW as part of the Inner Geelong sample, in reality these projects are not directly associated. As SKM understands it they are part of the rationale that BW has for applying a 'regional' NCC across the business because major capital schemes delivering benefits across the business include (at least a proportion) of growth related benefit in enabling the servicing of new customers. This is discussed further in the apportionment section below.

The regional schemes identified are identified in **Table 31**.

Table 31 Regional Schemes – Projects by Service

Water	Sewer	Recycled water
Anglesea Borefield	Main outfall sewer duplication	Black Rock recycled water plant
Melbourne Geelong Pipeline	Shared sewerage assets	
MGP Bulk Entitlement	Black Rock WRP inlet hydraulic cap up	
Shared water retic assets	Northern Water Reclamation plant	
Pettavel Basin Augmentation	Black Rock RWP – sewerage component	
Pettaval Basin new disinfection works		
Wurdee Boluc WTP lagoon capacity increase		

Reasonableness of detail CAPEX estimates for example Inner Geelong scheme

Barwon Water has provided a cost build up for the estimate for project S1098 Ovoid sewer replacement – Carr Street. This project is estimated to occur beyond 2024. The build-up sheet gives and estimated CAPEX of $8,196,750 (versus a value in the CWIP of $8,326,259). The

project appears to consist 1100m of replacement of an existing 1200mm dia. ovoid sewer with a 1500mm diameter sewer. Very little detail is provided. The unit rate applied for the sewer ($5000/metre) is within the range of rates we would expect for a large diameter reinforced concrete sewer at present day rates, and at the higher bound of that range. An indicative comparison is shown at **Table 32**. The notes on the CAPEX estimate spreadsheet indicate some specific risks have been identified, and that the unit rate is increased to account for this. Percentage factors for investigations, engineering and approvals have been applied and a 30% contingency. No probabilistic modelling of the estimate is presented.

Table 32 Comparison of BW Unit Rates with Typical Industry Unit Rates

Work item	BW Rate	SKM lower band	SKM upper band (typical)
1500dia sewer – assumed RC	5,000	4,090	4,524

Whilst limited detail of the scope of the project is provided for SKM to make an assessment with, this project is clearly a reasonably significant piece of sewer renewal on a busy arterial road near the centre of Geelong. It can be understood that engineering details might be limited at this stage of a project envisaged to occur after WP4. However the use of a relatively typical piping cost as the single construction line in our opinion risks underestimating the CAPEX of this project. For example if, as mentioned in the narrative, a TBM is required then the associated temporary works costs in TBM launch infrastructure will be significant. A 30% contingency has been allowed which is fairly typical of a minimum contingency applied at this level of project estimating. Again the robustness of this contingency may not be adequate at this point of project development.

Allocation of detail CAPEX estimate for example Inner Geelong scheme

BW has indicated that it has developed capital costs for individual schemes and then allocated those costs to an investment class – growth, renewals and compliance. BW has also indicated that it has allocated 100% of the CAPEX of each project to a single investment class based on whichever is the primary driver. This is discussed further in the section on apportionment.

The project provided to show CAPEX build up for Inner Geelong does illustrate the issue of apportionment well. BW has indicated that this project is 100% allocated to growth. The scope replaces an existing sewer (of significant diameter) with a larger sewer. SKM understands that the project will deliver increased capacity (and assumes there is some growth area upstream that is in turn able to be serviced by this asset). However there is also a renewals element to this project in that the existing asset (which will be at some point along its expected asset life) services existing customers and will (once replaced) continue to predominantly service existing customers. It may be that the renewal element is being brought forward to the benefit of some projected growth but this is not clear.

5.4.2. SAMPLE 4 Torquay

A number of growth projects for Torquay have been identified by BW. There is an ISP available for Torquay North (which is the main growth area in the catchment). In broad terms the Torquay High Level system that services the Torquay North area has already seen investment in the current (WP2) and prior water plan to service existing and projected developments. WP2 infrastructure is currently only ~50% utilised.

Alignment of indicated future CAPEX with ISP

For water and recycled water CAPEX the ISP identifies a need to progressively extend the infrastructure to service the developments. It is not clear that CWIP schemes link directly to ISP needs, but it is indicated that the Stage 2a development in 2014-2017 can use spare sewer and water capacity until the need to construct additional 225mm dia. water mains in 2016-17. Subsequent phases (2b/2c/3a/3b/4) through to 2026 see continual extension of the water pipe at 225/300mm dia. This appears to be reflected in the CAPEX profile for water in the CWIP.

Alignment of sewer growth CAPEX with the ISP is less clear. While the ISP identifies the extension of sewers to service certain phases this seems to be covered by an overarching 'Shared sewer assets <300' CAPEX item. BW narrative states that *'there are no sewerage assets listed [in the CWIP] within the Torquay North development, but there are some which are essential to servicing it i.e. the Torquay-Horseshoe Bend sewer*'.

Apportionment of CAPEX estimates for Torquay generally

Again it is not clear for those assets that have CAPEX allocations outside the growth area what proportion of the cost is directly growth attributable. Similarly without details of the actual infrastructure associated with each project it is not possible to assess the reasonableness of the estimated CAPEX.

A significant proportion of the CAPEX 'associated' with Torquay comes from projects external to the catchment that provide global water or sewer capacity. BW has indicated that '*regional growth assets include the Bellarine Transfer Main, whose capacity is drawn from to service Torquay. In addition to this is also the Melbourne Geelong Pipeline. A portion of the capacity of this asset benefits growth in Torquay, although Barwon Water has not yet had to identify this on an area based scale as yet. Doing so would prove extremely complex.*' The regional schemes are identified in **Table 33**.

Table 33 Regional Schemes Servicing Torquay – by Service

Water	Sewer	Recycled water
Bellarine Transfer Main	Misc land purchase (75% of budget to sewer)	Black Rock recycled water plant projects
Melbourne Geelong Pipeline	Black Rock WRP inlet hydraulic cap up	
Misc land purchase (25% of budget to water)	Black Rock RWP – sewerage component	

While a direct connection can clearly be drawn between the Bellarine Transfer Main project and the Torquay development the connection with the other schemes is less specific. As SKM understands it they are part of the rationale that BW has for applying a 'regional' NCC across the business because major capital schemes delivering benefits across the business include (at least a proportion) of growth related benefit in enabling the servicing of new customers. This is discussed further in the apportionment section below.

Reasonableness of detail CAPEX estimates for example Torquay scheme

Barwon Water has provided a cost build up for the estimate for project S1297 and S1298 Torquay High Level Feeder Mains Stage 4 / 5/ 6. This project is estimated to commence in year 1 of WP3 and run through to the end of WP4. The build-up sheet gives and estimated CAPEX of $8,825,050 (versus a value in the CWIP of $8,735,713). The project appears to consist of 225, 300 and 450 mm dia water main pipes. Very little detail is provided. The combined unit rate applied for the supply and install of the 225 and 300 dia. are within the range of rates SKM would expect for plastic pipes at present day rates. The rate for the 450mm pipe is just above the upper band of prices, using SKM collated cost curves. This is shown in **Table 34**.

Table 34 Torquay Scheme Infrastructure – Comparison of BW and Industry Unit Rates

Work item	BW Rate		SKM lower band	SKM upper band
Supply 225	65	325	155	520
Install 225	260			
Supply 300	155	575	263	851
Install 300	420			
Supply 450	455	875	354	840
Install 450	420			

Lumps sums are applied for investigations, engineering and approvals, which appear to be broadly consistent with the percentages used in Example 3. Contingencies have been applied at a level of 30%. No probabilistic modelling of the estimate is presented.

This would appear to be a clear growth project. The assets are all identified as being green field assets.

5.4.3. SAMPLE 5 Armstrong Creek West

There is an ISP available for the Armstrong Creek West Precinct development area.

The ISP indicates that there are six sewerage sub catchments planned. The first four will discharge to the Eastern Branch Sewer. Catchment 5 will discharge to the Horseshoe Bend precinct. Catchment 6 connects to the Western Industrial Precinct and discharges to the Western Branch sewer. Water service will be provided from feeder mains in Boundary Road and Airport Road. Recycled water will be provided from Burvilles Road and Whites Road.

Alignment of indicated future CAPEX with ISP

For water, the ISP identifies that reticulation assets can be extended to connect to the Boundary Road feeder main. This feeder main will be completed in WP2 and will only be 10% utilised at 2013. **Table 35** shows growth Infrastructure details and delivery timing for the Torquay scheme.

- **Table 35 Torquay Scheme – Infrastructure details and timing.**

Stage	Timing	Infrastructure – summary of extent of technical information in ISP
Stage 1a	2014-2018	Sewer: 1km extension to Western Branch Sewer Water: 225mm connection to Boundary Road FM Recycled water: Burvilles Road main connection
Stage 1b	2014-27	Extension of retic assets only required: 225mm water
Stage 2a	2018-19	Extension of sewer and water mains: 375mm sewer, 225mm water Recycled water needs PRV on Whites Road
Stage 2b	2016-17	Extension of retic assets only required
Stage 3a	2018-21	Sewer: connect to Western Branch Sewer Water: PRV and extend 225mm mains Recycled water: extend 225mm and 300mm mains
Stage 3b	2022-28	Sewer: connect to Western Branch Sewer Water: PRV and extend 225mm mains Recycled water: extend 225mm and 300mm mains
Stage 4a	2029-34	Sewer: Extend Western Branch Sewer past Airport Road Water: 450mm main along Airport Road Recycled water: extend 225mm mains
Stage 4b	2037	Requires development of Horseshoe Bend Precinct as this stage will be serviced through that sub-catchment.

The CWIP indicates two schemes that would service the Western precinct, as shown in **Table 36** (along with the Boundary Road Feeder Main that services the early stages of development).

- **Table 36 Torquay – Western Precinct schemes capex**

Ref	Scheme	WP2	WP3	2018 /19	2019 /20	2020 /21	2021 /22	2022 /23	2023 /24	Later than 12yrs budget
W1012	Boundary Rd FM	6,572.34 [10% utilised]	79.50 [Yr1]	nil	nil	nil	nil	nil	nil	nil
W1110	Western precinct water mains	nil	nil	nil	nil	nil	nil	223.48	507.90	711.06
W1111	Airport Rd FM	nil	nil	nil	nil	304.74	2,092.55	1,483.07	203.16	

The ISP indicates continual water main extension to keep track with development throughout WP3 and WP4 periods but it's not clear where these are captured in the CWIP. These are, SKM understands, captured in other projects that service more than one catchment within the wider Armstrong Creek growth area.

Project W1111 appears to align broadly with the need to service Stage 4a, although as that is not expected to commence development until 2029 on the face of it the construction late in WP4/ early WP5 seems premature.

In the additional information provided by Barwon Water as part of the sampling of this project the water infrastructure spend profile was shown for the Western Precinct, but no cross reference to CWIP project(s) was provided – SKM understands that this is a generalised capital profile and the capital is contained within different water main projects servicing the Armstrong Creek area generally. This does appear to align to some degree with the ISP infrastructure staging of trunk infrastructure completed in WP2 / early WP3, moderate CAPEX in extending mains and providing PRVs in the remainder of WP3 and into WP4 and more significant investment at the end of WP4 into WP5 as the larger new main in Airport Road is required:

- **Table 37 Western Precinct –growth water assets capex**

Values [$K]													
2012 /13	2013 /14	2014 /15	2015 /16	2016 /17	2017 /18	2018 /19	2019 /20	2020 /21	2021 /22	2022 /23	2023 /24	Later Periods	Total
0	500	100	100	200	200	50	50	500	2500	100	200	1000	5,900

For sewerage assets it is not easily apparent from the CWIP which particular projects serve the Western Precinct, more so than water assets. As for water assets BW has provided a separate spend profile that they have presented as being for the Western Precinct growth area as shown in **Table 38.**

- **Table 38 Western Precinct –growth sewerage assets capex**

Year	2013 /14	2014 /15	2018 /19		2019 /20		2020 /21	2021 /22	2028-32
Dia. (mm)	600	300	600	375	450	300	375	300	300
CAPEX [$K]	1200	600	400	500	850	350	625	325	1200

As far as it is possible to assess from the information provided, the sewerage infrastructure appears to align generally with infrastructure indicated in the ISP, however there is no clear connection between the figures tabulated above and the figures in the CWIP and passed on via the NCC model.

For recycled water assets the CWIP includes one project that clearly relates (and apparently exclusively) to the Western Precinct. The expenditure for these recycled water growth assets for the Western Precinct is shown in **Table 39**

- **Table 39 Western Precinct –growth recycled water assets capex**

		Values [$K]									
Ref	Scheme	WP2	WP3	2018 /19	2019 /20	2020 /21	2021 /22	2022 /23	2023 /24	Beyond 12yrs budget	TOTAL
R1027	Western Precinct RW mains	nil	nil	168.44	842.19	nil	nil	nil	nil	2,631.01	3,641.64

It is likely that other projects (e.g. R1039 Burvilles Road RW Main) include at least some proportion that services the Western Precinct.

Project R1027 has also been selected by BW as a sample project for review, and has provided the CAPEX profile as well as a detailed cost estimate breakdown as shown in **Table 40**.

- **Table 40 Project R1027 growth capex**

Values [$K]						
2018/19	2019/20	2020/21	2021/22	2022/23	After	Total
220.0	1,100.0	nil	1,540.0	1,540.0	nil	**$4,400.0**

This is a significant deviation from what is shown (both in terms of spend profile and capital value) compared to the CWIP values provided. BW has indicated that this is because of adjustments made to the ISP since the WP3 submission.

Reasonableness of detail CAPEX estimates for example Armstrong Creek Western Precinct scheme

Barwon Water has provided a cost build up for the estimate for project R1027 Armstrong Creek Western Precinct Raw Water Mains. This project is estimated to commence in year 1 of WP4 and run through to the end of WP4. The build-up sheet gives and estimated CAPEX of $4,399,629 (versus a value in the CWIP of $3,641,644). The project consists ~6300m of 225mm recycled water main, along with 390m of 450mm recycled water main. A number of line items are used to capture capital works for different phases, and using different construction techniques. However it is difficult to check the build-up because the pipe size is not indicated at each ‘construction’ line.

It is possible to undertake a consistency check of the overall estimated CAPEX, using the data provided for Torquay as indicated in **Table 41**.

Table 41 Comparison of Capex build-up for project R1027 compared with Torquay Scheme

Details	Unit Rates	Values [$K]
Supply & install 6298m of 225mm dia.	$325 /m (as per Torquay) x 6298m	2,046.85
Supply & install 391m of 450mm dia.	$875 /m (as per Torquay) x 391m	342.13
Cost based on unit rates as per Torquay values		2,388.98 direct cost
Compared with		
Direct cost in BW cost estimate build up		2,033.65 direct cost

The estimate for the project appears to be consistent with the principles applied for the Torquay project (albeit Torquay was water not recycled water.

5.5. Water Plan 2 Expenditure in the NCC model

A significant proportion of the growth CAPEX 'projection' for the 10 years is in fact WP2 'unutilised' service capacity. A proportion of that in turn relates to regional growth schemes supporting overall growth and security of supply rather than servicing individual growth areas.

There is significant clarity on the extent of growth capex in WP2 carried forward from the significant expenditure growth related projects, as discussed in **Section 5.2**. The approach based on the percentage of unused hydraulic capacity is reasonable for water. Sewerage should be based on both hydraulic and load (BOD) capacity unutilised.

There needs to be greater visibility of the process for determining the extent of CAPEX carried forward for recovery in future NCC charges for lesser value growth "shared assets" infrastructure to ensure that this reflects a fair and reasonable recovery from the future connections.

The use of unutilised hydraulic capacity of a growth asset at the end of WP2 to carry forward into the next period is reasonable and potentially better than using residual asset life or the extent of cost recovery from NCCs up to end of the WP2 period. .

5.6. Works Brought Forward (or Deferred) Costs

At present BW ha not included brought forward costs within the NCC Model. All project timings are based on their proposed optimal (cost efficient) sequence timing.

5.7. Gifted Assets

BW has used gifted asset assumptions as follows:

- Water = $2,701 / lot receiving potable water
- Sewer = $5,170 / lot receiving sewerage
- Recycled water = $2,701 / lot receiving recycled water service.

These unit rates have been estimated based on historical gifted asset value / lot for water and sewerage. No adjustment has been made to this due to change in definition of 'reticulation assets' as the change will have no impact on the majority of gifted assets. The unit cost for potable water gifted assets is assumed to be the same as recycled water gifted assets.

5.8. Government Contributions

Barwon Water has indicated a small number of government contributions are relevant for the incremental capital expenditure used in the NCC calculations, and included these in the NCC model. The most significant of these is carried forward from WP2 relating to recycled water projects.

5.9. Operating Expenditure Costs underpinning NCC calculations

Summary: BW has calculated fixed OPEX costs as a proportion of growth CAPEX. Variable OPEX have been based on

1) the average cost to provide sewerage services to all customers; and

2) the actual cost to provide water service from new water sources.

The alternate method for water service tends to inflate the OPEX cost in particular because of the MGP that has a very high unit rate per ML supplied.

Barwon Water has based the fixed operating costs of assets required for providing services to new customers on percentages applied to the associated CAPEX estimates.

Barwon Water has used historical data that indicates for growth infrastructure constructed, typically,78% is Civil and 22% is Mechanical and Electrical. The Operation and maintenance costs for each asset class and service type are different. For each a fixed OPEX has been calculated as a percentage of capital, at the program level. BW has used this empirical approach for all projects as they did not believe it was practical within the time available to prepare individual operation and maintenance cost estimates for each of the 225 growth related projects. Therefore, if the attribution of capital expenditure to growth is apportioned correctly, the fixed operation and maintenance costs of the growth related expenditure will be apportioned correctly.

The process and quantum appears to be a reasonable estimate. It would be useful to see some testing of this approach on specific projects to demonstrate that the quantum of the OPEX cost derived is broadly appropriate.

Some details of the basis for assessing the fixed component of Opex (based on a %age of capex) is shown in **Table 42**.

■ **Table 42 Fixed component of Opex assessment**

Opex estimate based on %age of capex		
Asset Type	**Service Type**	
	Water / recycled water	**Sewer**
Civil	0.12	0.15
Mechanical	1.2	1.65

Variable operating costs are based on the costs associated with the volumetric rate of delivery from existing sources. Two different approaches are used. For water service the OPEX cost is related to the cost per ML from existing sources until the point that their capacity is exceeded and new sources are required. At that point the modelling by BW assumes that all the 'new' water goes to new customers. For sewerage service however the weighted average cost to provide sewerage services to all customers is used to derive an average OPEX cost per customer. These two methods are inconsistent and would tend to results in a proportionately high cost for water service OPEX compared to using the sewerage service average cost of treatment for all customers approach. The quantum of the costs used however appear to be broadly reasonable.

5.10. Apportionment of Expenditure

Summary: Apportionment has been undertaken at a high level without any detailed assessment of the sensitivity of the resultant NCC charges to potential ways of assessing apportionment. There is a need to articulate clear and consistent rules for determining the apportionment of CAPEX and OPEX to growth or other investment programs.

BW has apportioned its new CAPEX on the basis the 'primary' driver, e.g. if the CAPEX for a growth area is driven >50% by growth, then 100% of that CAPEX is allocated to growth. It is not clear if this percentage relates to the proportion of the capital cost of the project (i.e. does the incremental cost of additional capacity exceed the cost associated with other programs) or timing or some other metric for determining the driver.

The corollary of this is that there are some renewals projects etc that include a growth element that is not captured in the growth budget. For example the water main / sewer main rehab program often includes some element of upsizing or improved capacity when new pipes are installed but these are not captured in the growth budget. The issue is whether the balance of the broad brush approach results in a fair and reasonable result for customers.

Of the 225 growth related projects, BW believes less than 25% of them have some component of compliance or renewals to them (25% of capital value or 25% of 225?). The majority of growth projects are, BW has indicated, 100% growth. Those which are not 100% growth, the timing or scale is stated to be growth 'driven' so BW has allocated these to the growth budget. SKM acknowledges that on an individual project basis the majority of the 225 projects appear to be aligned with the main growth areas identified. There are a number of large 'regional' projects,

typically with proportionately high capital values, that are less easily apportioned to growth. BW has however looked in detail at the apportionment of these major regional capital projects (MGP, Black Rock RWP etc as discussed earlier) and believes that this has more material impact than detailed review of the many smaller projects. BW has not undertaken any sensitivity calculations to confirm the significance of the impact of this approach and the related assumptions.

MGP as an example: The capital expenditure for the Melbourne to Geelong pipeline (MGP) has been allocated 67% to growth. It is not called on to provide water for growth until approximately 2026 (based on BW's water supply strategy and the application of the variable OPEX charge in the NCC model). The OPEX cost is an order of magnitude greater than other sources. Given it was constructed prudently to meet the expected urgent need (for existing customers) in Geelong during the drought it is arguable whether it is reasonable to allocate 67% of the CAPEX to growth now, and whether the OPEX should be borne by the growth customers or averaged across the whole customer base (consistent with sewerage variable OPEX). On balance the approach adopted by Barwon Water is reasonable as discussed in **Section 5.2**.

Barwon Water has not included renewal of growth related assets in the assessment. Most of the growth assets are very long life assets, however, as the NCC model utilises OPEX and revenue inputs in perpetuity, exclusion of renewal of assets is likely to have reduced the calculated NCC marginally (BW have not undertaken any calculations to confirm the magnitude of the impact of this exclusion).

There are some key issues here. Firstly what determines that growth has 'driven' a project? It would appear in some instances at least whether a project is entirely growth driven is arguable. For example SKM understands that a number of sewer mains are at or near their capacity limits and close to needing capacity upgrades to ensure standards of service are met. Whilst growth might bring forward this investment, whether the whole project should be allocated to growth or a proportion, less what would have been necessary upgrade anyway at some point in the future given the bounce back in consumption after the drought and climate changes reducing the return period of intense storms) is arguable. Similarly the benefit of advancement of renewals (and associated extended asset life) is not captured – at some point replaced assets would have needed renewal anyway and one would argue some assessment of whether the bringing forward of renewals timing to suit growth is material or not should determine whether the project remains in a the renewals budget or the growth budget.

Thus there are some inconsistencies in the treatment of apportionment:

- NCC: all growth CAPEX spread across new connections
- Water OPEX: growth related variable OPEX spread across new connections
- Sewerage OPEX: average OPEX for all customers used
- Regional projects: Apportioned between growth and other programs on a project specific basis
- Site specific projects: 100% growth if growth driven but not clear what constitutes 'driven'.

5.10.1. Treatment of greenfield versus infill

BW differentiates between growth and infill projects in the capital program, but has decided to make no distinction between these in the NCC and has adopted uniform NCC charges across both, applying the same principle discussed above of the preference to have a simple to understand and administer NCC system. The apportionment of shared assets to growth in greenfield and Infill areas are indicated in **Table 43**. The proportion of clear infill development appears to be very small which would tend to suggest this assumption is reasonable, but no quantitative testing of the impact to NCC charges has been carried out by BW.

- **Table 43 Apportionment of Shared assets for BW greenfield and Infill areas**

Growth (Shared) assets	% apportionment
Servicing only greenfield areas	56%
Servicing both greenfield and infill areas	33%
Servicing only infill areas	11%

Given the small proportion of infill development this approach would appear to likely have a small impact on the NCC but this should be confirmed.

5.10.2. Alternative Water

- **Summary:** Recycled water services included in global NCC as part of the uniform standard NCC seems reasonable (notwithstanding that limited number of customers have access to this service, but do have access to other water resources that this frees up).

BW has aggregated its NCC charges and in particular has not differentiated between potable water and alternative water (whether groundwater, recycled water) services contributions to the NCCs.

BW has adopted this approach (of not differentiating between at least potable water and alternative water NCC contributions) based on its view that BW's overall water supply strategy is targeted at optimising water drawn from all its various sources taking account of both demands (for differing 'fit for purpose' uses) and level of security objectives. Alternative water is part of BW's total water resource "bank".

BW has determined that the cost of providing recycled water to the Armstrong Creek and Torquay growth areas (the areas where it will be made available in the near term) is approximately $15,000/lot.

The reasonableness of this sis discussed in **Section 5.2**.

5.11. Reference Information

Barwon Water (BW) provided the following documentation in support of its plan for servicing growth areas in WP3 to the review team.

- A table responding to ten specific items of information requested by SKM
- Tables detailing projected growth rates for 20 development areas across the corporations region.
- Tables detailing the 'growth' allocated proportion of its capital works program for WP2, WP3 and WP4 (projected).
- Information on the Infrastructure servicing plans (ISP) for some (but not all?) of the individual development areas identified
- Board report incorporating BW proposed method to apply the new NCC framework, calculated standardised NCC charges proposed, summary ISPs (consistent with the detail ISPs – refer above), and development industry stakeholder consultation document.
- A copy of the model used to calculate the proposed NCC (based predominantly it would appear on the ESC provided example estimator)

They had previously provided to the ESC / Deloitte for the wider WP3 review:

- Concept design report for Inverleigh feeder main
- Options report for Apollo Bay water supply upgrades
- Further information provided by Rhys Bennett on 12 February and Peter Morgan on 27 February (following discussion with Barwon Water on 26 February).

6. Goulburn Valley Water (GVW)

6.1. Overview

The ESC required only the ***water*** component of (or contribution to) Goulburn Valley Water's (GVW's) NCC charges to be reviewed. This review has been undertaken using information obtained from the documents and follow up conversations with GVW as listed in **Section 6.5**.

In summary, GVW's capital and operating expenditure included in its NCC calculations (i.e. in the ESC's NCC Model) are generally reasonable. A summary of the review of GVW's NCCs (water component) in response to the particular aspects as required by the ESC are provided immediately following with some additional detail in the later sections.

Whether the capital expenditure included in the calculation relates to growth and the basis of the cost estimate is reasonable

- The growth forecasts underpinning GVW's NCC calculations are based on historical data and updated estimates of growth in various towns. Overall they appear reasonable.
- The sizing and sequencing of growth shared infrastructure appears reasonable.

  However it is noted that some of the Master Plans on which this is based are quite dated.
- The updated unit costing of infrastructure appears reasonable.

Whether the methodology used is reasonable for apportioning capital expenditure that serves multiple purposes (e.g. compliance, renewals etc as well as growth) to growth and to new customers

- Based on analysis of sample town growth areas, apportionment of capital expenditure to growth appears reasonable.
- Apportionment of major augmentation projects with multiple drivers is currently performed variously in both a quantitative and a subjective/qualitative manner and should desirably be more transparent in all cases.

  Potential Improvement opportunity: Preparing cost estimates of these projects without the additional costs related to growth (e.g. upsizing) in all cases would permit a more objective apportionment of project value to growth.
- For a small number of projects, clarification of an apparent inconsistency between identifying projects/assets as fully or partially allocated to growth but also as "replacement of existing assets with no additional operating costs" is required.
- GVW has included capital expenditure covering a replacement schedule for a number of pump and mechanical / electrical assets (with a notional 25 year life) that will require replacement within the 30 year modelling period. The inclusion of this capital expenditure in the NCC modeling seems unreasonable or at least unusual as by definition they are "replacement" assets and not new growth assets. It would seem that such capital expenditure should be in the broader tariff base other than to the extent that some percentage of it is required for or related to "unutilised system capacity" to service future growth.

The relative merits of the proposed infrastructure and related capital expenditure in servicing specific catchments versus a broader area

- GVW is proposing to adopt a uniform standard NCC charge across all the various growth areas/towns in its operating area based on a notion of equity (which is not elaborated upon). It is noted that this approach is not cost reflective for individual geographic growth areas.
- GVW has calculated individual standard NCCs for 5 individual town/growth areas but has elected to smooth these largely because of varying expenditure across pre-WP2, WP2 and WP3 periods and hence significant variations in NCC outcomes (from zero up to approximately $10,000) across these towns and to avoid significant dislocations in transition from the NCCs adopted in Water Plan 2.
- GVW is also understood to have made no distinction between NCCs for any infill development versus greenfield areas.

Any capital expenditure from Water Plan 2 (WP2) that is included (i.e. no double counting)

- GVW has reasonably included WP2 capital expenditure in the determination of its standard NCC charges.
- In broad terms The proportion of the original capital cost that is recoverable from future NCC charges has been determined based on:
  - The current remaining life of the asset.
  - The percentage of the asset that related to growth.
  - The spare capacity currently remaining within the asset.
- The specific manner in which such WP2 capex has been apportioned is reasonable.

The reasonableness of the incremental operating costs (and their relationship to growth)

- GVW has determined its incremental operations and maintenance costs based on two components:
  - The average cost for the production and distribution of water across GVW's entire operating area (applied to additional water to service new connections); and
  - Consequential additional operating costs from new capital works projects (as determined on an individual project basis).
- More particularly, GVW has determined future opex based on a %age of the asset replacement cost based on GVW's current operating cost structure for each major asset type (e.g. water treatment plants, chlorinators, storage tanks, reservoirs and bores) and in aggregate for various functions (e.g. water treatment, water pipes, water pump stations). This is done for materials and labour costs separately and in aggregate.
- Overall, GVW's nominated incremental operating costs (and the associated calculation methodology) appear reasonable within the context of the current mechanics of the ESC's NCC model.

6.2. Setting the Context: GVWs NCCs reviewed in this report

The Goulburn Valley Water service area covers 54 towns which are serviced by 37 separate water supply systems. The growth towns are Alexandra, Broadford, Cobram, Euroa, Kilmore, Kyabram, Mansfield, Mooroopna, Nagambie, Numurkah, Seymour, Shepparton and Tatura. The majority of the development of growth areas within Goulburn Valley Water towns occurs over an extended period (up to 20 years and sometimes longer). A number of water assets constructed in the past 15 years are continuing to provide capacity to service new development.

The NCC charge(s) has been determined based on a methodology that is consistent with the pricing principles from the Guidance Paper.

GVW has proposed that a uniform standard NCC apply for all new connections across all towns in the GVW operating area and its NCC modeling has been undertaken on that basis. The reasons for adopting this are primarily because GVW considers that:

- the calculation of standard NCC charges on an individual town basis is likely to result in major differences in standard NCC charges across its water service area and that this is “inequitable” (especially where there has been substantial capital expenditure prior to Water Plan 2 that is not included in the NCC calculations but which associated assets still provide capacity to service future growth); and
- it is not practical to undertake NCC modelling for each individual development area within towns.

It is noted that:

- there are GVW towns which received growth assets prior to Water Plan 2 and, if non-uniform standard NCCs are adopted, are likely to have a lower standard NCC (or zero) charge than a town that will require future growth assets;
- GVW does not intend to apply a water charge for new connections (in existing serviced towns) that receive wastewater services only; and
- GVW proposes that different NCC charges be adopted where unanticipated development occurs or exceptional circumstances arise that requires substantial growth capital expenditure (although it is not clear whether this is a non-uniform or geographic/town based standard NCC).

6.3. Capital Infrastructure Costs underpinning NCC calculations

A review of the reasonableness of Capital Infrastructure Costs underpinning GVW’s NCC (water component) calculations requires testing of the associated growth forecasts and sequencing plans; the apportionment of capital costs (to growth and other drivers) and the influence that gifted assets and government funding have on the NCC calculations.

Growth forecasts: Growth forecasts underpinning NCC (water) calculations are based on historical data and updated estimates of growth in various towns. A 50 year forecast for new water connections developed for the 2012 Water Supply Demand Strategy (WSDS) has been used for the NCC calculations.

Overall these seem reasonable.

Sequencing Plans: The sizing and sequencing of shared growth infrastructure (for water) appears reasonable.

GVW has used Master Plans for water supply on a regional basis as the foundation for establishing the future infrastructure required to service growth in its various towns. These Master Plans include scenario testing to demonstrate that the proposed infrastructure servicing strategy is reasonable and robust and that the optimal (most cost efficient) means to service particular town growth areas is being adopted. All project timings are based on GVW's proposed reasonable and efficient 'sequence timing' to service growth.

However some of these Master Plans (water component) for differing towns/growth areas:

- are quite dated, having been completed up to 3 to 5 years ago – including for example, Shepparton (January 2010), Mansfield (August, 2008) and Numurkah (January 2008). It does not appear that these have been tested incisively for currency or confirmation that the optimal provision of infrastructure proposed in them to service future growth is still appropriate. Some limited number of local growth area plans (ISPs or Infrastructure Sequencing Plans) to support these has been sighted. In some cases these Master Plans appear to serve as de-facto "ISPs"; and
- include underpinning infrastructure that is more aligned with the connections/lots forecasts in these Master Plans than explicitly with the current 50 year forecast for new water connections in the 2012 WSDS Strategy (i.e. there may be some misalignment on future water demands used for different planning/modelling purposes).

Overall, some modification to the presentation of the sequencing plans would make the justification of sequence timing much clearer.

Expenditure cost estimation: The updated unit costing of infrastructure appears reasonable. Some indication of P5/P50/ P95 cost estimates is undertaken but it is uncertain whether this is done for all projects. Some testing of the standard contingency allowances (e.g. 25%) as part of this would make the process more robust.

Government contributions: There does not appear to be any government contributions relevant for the incremental capital expenditure used in the NCC calculations. Also, as far as can be established, GVW has not currently included brought forward costs within its NCC modelling and calculations.

Gifted Assets: Gifted assets are constructed and funded by developers to service new development. GVW has included an annual amount of $1.7M p.a. in its NCC modeling for gifted assets. The annual value of Gifted Assets adopted is based on the GVW's historic values/levels of gifted assets and appears reasonable. More incisive estimation of the value of future gifted assets associated with the specific new infrastructure proposed in its sequencing plans does not appear to have been attempted yet.

6.3.1. Apportionment of Capital Expenditure (Water Plan 3 and Beyond)

Summary:

- Based on analysis of a sample of GVW growth areas, apportionment of capital expenditure to growth appears reasonable.
- Apportionment of major augmentation projects with multiple drivers is currently performed variously in both a quantitative and a subjective/qualitative manner. Where appropriate, preparing cost estimates of these projects without the additional costs related to growth in all cases (e.g. upsizing) would assist a more objective apportionment of project value to growth.

Goulburn Valley Water completes master plans for servicing growth and addressing service level compliance on a town or development area basis. Future projects identified in master plans are placed on the capital works program. Note that some projects (reticulation size assets) are funded by developers. The scope, cost estimate and timing for projects are reviewed on a yearly basis.

GVW provided documentation outlining its plans for new water infrastructure servicing works (including for growth) for the Mansfield, Mooroopna, Numurkah, and Shepparton/Mooroopna growth areas and some information to support apportionment. GVW also provided a summary spreadsheet of the percentage of new infrastructure capital expenditure attributed to growth for all projects envisaged in a 35 year outlook. This information was used to assess whether the methodology GVW uses for apportioning capital expenditure that serves multiple purposes (e.g. compliance, renewals etc as well as growth) to growth and to new customers is reasonable.

Based on analysis of this sample of GVW town/growth areas, and individual projects for them, apportionment of capital expenditure to growth appears reasonable.

However, there needs to be greater transparency as to how this is apportionment is undertaken or determined. The process of apportionment of major augmentation projects with multiple drivers is not fully transparent in all cases. Some supporting evidence was inferred from the information provided by GVW to justify the apportionment process overall but not in detail in all instances. The apportionment of major augmentation projects with to growth when there are multiple drivers seems to be undertaken both a quantitative and a “subjective”/qualitative manner.

Further for a number of projects there appears to be some inconsistencies in the stated apportionment to growth that at least need some additional explanatory information. For example there is an uncertainty that needs to be resolved where some projects are allocated to growth but have no incremental opex has been assigned to them and which are noted as being “replacement of existing assets with no additional operating costs” (refer the commentary in the section on incremental opex also).

In particular to illustrate these points, it is noted that

- With respect to apportionment, the Numurkah WTP Upgrade Project provides a good example to confirm that GVW’s approach to apportionment of costs of new infrastructure to growth

seems reasonable. For this project, the driver is a mix of increased capacity (from 6.2 ML/day actual or 7.2ML/day nominal design to a new upgraded capacity of 10 ML/day), improved water quality and replacement of assets (e.g. filter beds) which have reached the end of their useful life. The capex for this project has been apportioned 28% to growth and 72% to existing usage. This seems reasonable.

- Another apportionment example reviewed was the Marysville - Disinfection Upgrade (Project 1823). This project involves construction of a new 2.5ML/day WTP (to replace an existing disinfection only treatment system). Peak day demand (pre-bushfire connections) is 1.78ML/day. Spare capacity will be 0.72ML/day. The cost apportionment is 29% (0.72ML/day / 2.5ML/day). This seems reasonable.
- There are 41 Projects in total in GVW's forward look plans and all have been allocated 100% to growth other than the following (with allocation to growth shown):
  - Alexandra Water Network Augmentation Stage 1 (Project 2009): 50%
  - Alexandra Water Network Augmentation Stage 2 (Project 2348): 50%
  - Numurkah WTP Upgrade (Project 1825): 28%
  - Marysville Disinfection Upgrade (Project 1823): 28%
  - Nagambie Clear Water Storage Upgrade (Project 2126): 85%

  It is uncertain why the 5 projects listed above (which are partially allocated to growth) and at least another four of the 41 Projects that are allocated 100% to growth have no incremental opex allocated to them.

A summary of GVW's future capital expenditure for water growth projects (based on its current 20 year outlook capital works program) and the percentage of such expenditure allocated to growth (and included in GVW's NCC models) is provided in **Table 44.**

Table 44 Capex Apportionment - GVW Water Augmentation Projects (Post Water Plan 2)

Project Name	Project Number	Project Value $K	Growth Apportion-ment	NCC Model Value $K
Alexandra - Water Network Augmentation - Stage 1	2009	180.0	50%	90.0
Alexandra - Clear Water Storage Augmentation	2343	445.0	100%	445.0
Alexandra - Water Network Augmentation - Stage 2	2348	1,360.0	50%	680.0
Broadford - Broadford to Kilmore Pipeline	1911	15,680.0	100%	15,680.0
Broadford - WTP Upgrade	2304	7,660.0	100%	7,660.0
Cobram - WTP Augmentation - Stage 2	1384	5,730.0	100%	5,730.0
Euroa - Clear Water Storage Augmentation	2338	1,420.0	100%	1,420.0
Kilmore - Green Street WPS Upgrade	1817	545.0	100%	545.0
Kilmore - Water Network Augmentation	1818	730.0	100%	730.0
Kilmore - North Tank Land Acquisition	2326	430.0	100%	430.0
Kyabram - High Lift Water Pump Station Upgrade	1819	940.0	100%	940.0

Project Name	Project Number	Project Value $K	Growth Apportion-ment	NCC Model Value $K
Kyabram - Albion Street Water Main Augmentation	2124	170.0	100%	170.0
Mansfield - WTP Upgrade	1821	2,740.0	100%	2,740.0
Mansfield - Water Network Augmentation - Stage 1	2003	260.0	100%	260.0
Mansfield - Water Network Augmentation - Stage 2	2349	720.0	100%	720.0
Marysville - Disinfection Upgrade	1823	5,500.0	29%	1595.0
Mooroopna - McLennan Street Pump Station Upgrade	2217	1,695.0	100%	1,695.0
Mooroopna - DN300 Distribution Main to Mooroopna West Growth Corridor	2218	785.0	100%	785.0
Mooroopna - Echuca Road Pump Station Upgrade	2220	870.0	100%	870.0
Mooroopna - McLennan Street Water Main Augmentation	2223	1,635.0	100%	1,635.0
Nagambie - Clear Water Storage Upgrade	2126	2,020.0	85%	1,717.0
Nagambie - WTP Capacity Upgrade	2230	1,380.0	100%	1,380.0
Numurkah - WTP Upgrade	1825	9,100.0	28%	2,548.0
Numurkah - Exhibition Street & Tunnock Road Water Main Augmentations	2245	255.0	100%	255.0
Shepparton - WTP Capacity Upgrade	1226	17,190.0	100%	17,190.0
Shepparton - Old Dookie Road Water Main	1403	905.0	100%	905.0
Shepparton - DN375 Direct Feed Water Main to South Tank	1833	3,900.0	100%	3,900.0
Shepparton - DN450 Trunk Water Main South of Kialla Lakes Drive	1834	1,125.0	100%	1,125.0
Shepparton - DN375 Water Main South (Raftery Rd)	1835	1,620.0	100%	1,620.0
Shepparton - Shepparton South Tank Pump Station Upgrade	2216	1,525.0	100%	1,525.0
Shepparton - Shepparton South Dedicated Pump Station	2219	840.0	100%	840.0
Shepparton - Lemnos Pump Station Upgrade	2221	1,855.0	100%	1,855.0
Shepparton: Poplar Ave Water Main Augmentation	2222	725.0	100%	725.0
Shepparton: Raw Water Pump Station Augmentation	2334	5,640.0	100%	5,640.0
Shepparton - Clear Water Storage Augmentation	2344	3,175.0	100%	3,175.0
Tatura - WTP Capacity Upgrade	1854	6,500.0	100%	6,500.0
Tatura - Additional Raw Water Storage	2335	1,370.0	100%	1,370.0
Yea - East Street Water Main Augmentation	2319	80.0	100%	80.0
Total		**108,700.0**		**97,170.0**

Overall the allocation to growth capital expenditure is approximately 89% which prima facie seems high.

GVW has indicated that its current 20 year capital works program does not cover the entire 30 year modelling period for the NCC calculation. For years 2032/33 to 2041/42 inclusive (and beyond), GVW has assumed an average yearly incremental growth capital expenditure amount of $5.1M per year. This may slightly underestimate the amount of growth capex during this period given that the average annual growth capital expenditure indicated for 2013/14 to 2032/33 is approximately $6.9M. However the impact on the standard NCCs determined is probably small given this relates to expenditure more than 20 years out and will tend to balance any overestimation of growth capex in the earlier years.

In addition to the individual projects identified in **Table 44**, GVW has also included the following capital expenditure in the NCC modeling:

- an annual budget of $600,000 for shared water assets (growth projects for which costs are shared between Goulburn Valley Water and developers). The shared assets "budget" is based on historical expenditure. This seems reasonable.
- A replacement schedule covering a number of pump and mechanical / electrical assets (with a notional 25 year life) that will require replacement within the 30 year modelling period. The inclusion of this capital expenditure in the NCC modeling seems unreasonable or at least unusual as by definition they are "replacement" assets and not new growth assets. It would seem that such capital expenditure should be in the broader tariff base other than to the extent that some percentage of it is required for or related to "unutilised system capacity" to service future growth.

6.3.2. Water Plan 2 Expenditure in the NCC model

Summary:

- GVW has reasonably included Water Plan 2 capital expenditure in its NCC calculations both in terms of the method of apportionment of the costs of WP2 Growth related infrastructure projects and the quantum.

GVW has reasonably included Water Plan 2 capital expenditure in the determination of its standard NCC charges.

In broad terms, the residual proportion of the actual/original capital cost of relevant growth related Water Plan 2 infrastructure projects to be recovered from future NCC charges has been determined based on a combination of:

- The current remaining life of the asset;
- The percentage of the asset that related to growth; and
- The spare capacity currently remaining within the asset.

The specific manner in which such WP2 capex has been apportioned is reasonable. For example:

- *Alexandra WTP*: 23% of WP2 capex apportioned to growth based on the %age of unused WTP (Water Treatment Plant) capacity based on unrestricted peak day demand. The actual allocation formula is based on both the %age of remaining asset life and %age remaining capacity for new customers:

  Actual $ capex allocation = Initial Cost x %age remaining asset life x %age of remaining unused allocation to new customers x %age allocated to growth.

- *Mansfield Raw Water Storage:* This project provides benefit to existing customers and capacity for growth – 65% to existing customers and 35% to future customers. The actual allocation formula used is:

  %age to growth = %age of future customers to total customers potentially serviced (or implied water demands). This is reasonable but somewhat unclear as to how this "benefit" is determined.

It is noted that the asset life of pipes and civils, although understood to be consistent with ESC guidance, seems to be on the low side (at 60 years), whereas the M&E (mechanical and electrical) average asset life of 25 years. This would tend to slightly overallocate capex to NCCs.

A comparison between the original capital cost of growth projects and the residual project value amount to be recovered by future growth and used in the NCC calculation is shown in **Table 45**.

Table 45 Recoverable Value of Water Plan 2 & 3 – Water Growth Projects

Project Name	Project Number	Project Const'n Value $K	Residual Project Value for growth $K
Alexandra - Alexandra to Eildon Pipeline	1707	9,037.0	3,097.50
Alexandra - WTP	1025	3,129.0	480.37
All Areas - Small Town Filtration Plants	2122	5,000.0	1,517.42
Bonnie Doon - WTP Filtration	1843	3,417.0	1,330.22
Broadford - Goulburn River to Broadford & Kilmore Pipeline	1810	13,306.00	4,523.77
Cobram - Water Network Augmentation	1811	944.0	130.48
Girgarre - WTP Filtration	1815	629.0	218.18
Kyabram - Raw Water Storage Construction	1507	1,140.0	299.43
Mansfield - Additional Raw Water Storage	1822	2,522.0	690.74
Numurkah - Clear Water Storage Upgrade	1912	1,425.0	883.34
Numurkah - High Lift Pumps	1322	513.0	54,.17
Numurkah - Raw Water Storage	1826	4,300.0	748.21
Sawmill Settlement - WTP	1021	2,331.0	175.68
Tatura - Additional Treated Water Storage	1850	1,612.0	791.81
Tongala - WTP Filter Replacement	1841	2,136.0	957.86
Total		**51,441.0**	**15,899.15**

6.3.3. Works Brought Forward (or Deferred) Costs

At present GVW has not included brought forward costs within the NCC Model. All project timings are based on the proposed "Sequence Timing" of additional infrastructure required to service development in its various growth areas. GVWs Sequence timing notionally represents the most cost efficient means and optimal timing of providing infrastructure to service development in its various growth areas.

GVW also undertakes planning and assessment of the potential likely scenarios for development in its growth areas as part of its Master Planning processes. The costs of any bring forward works (additional to those for optimal 'Sequence Timing') are separate and not included in the NCC calculations.

6.4. Uniform vs Non-Uniform Standard NCCs (Water)

GVW has undertaken some modelling to establish a standard (non-uniform) NCC charge for a limited number of individual town growth areas for comparative purposes. The purpose of this work was to obtain an indication of the relative differences if such an approach was adopted and to identify the extent of "inequity" that would exist between towns depending on the timing of the construction of growth assets. [Note: A definition of an "inequity" test is not provided but is understood to simply be the mere existence of a material difference in NCC charges between town growth areas (if such an approach was adopted).]

The outcomes of that work (for selected towns) are presented in **Table 46**.

- **Table 46 Water NCC Calculated for Selected GVW Towns**

Town	Calculated NCC (Water) $/connection	Comment
Broadford & Kilmore	3,391	Major growth project constructed in the Water Plan 2 period.
Cobram	0	Major growth project which continues to provide capacity for new connections constructed prior to Water Plan 2.
Kyabram	0	Major growth project which continues to provide capacity for new connections constructed prior to Water Plan 2.
Numurkah	9,471	Major growth projects over the Water plan 2 and 3 periods.
Shepparton & Mooroopna	600	Major growth project in the Water Plan 3 period.

The NCC calculation and analysis for the selected towns has confirmed "inequity" between them would exist (or more accurately a material difference in the standard NCCs calculated on a geographic basis would be evident) if NCC charges are calculated on an individual town basis.

This difference is particularly influenced by the timing of growth related expenditure. It most apparent when comparing towns where growth infrastructure projects were delivered prior to Water Plan 2 and will have little near term future growth infrastructure with those towns which had no growth infrastructure prior to Water Plan 2 but will require significant near term growth infrastructure projects in the Water Plan 2 and 3 periods.

GVW considers that this analysis confirms a need to adopt a uniform standard NCC charge across all its towns and growth areas rather than a non-uniform (geographic/town based) standard NCC. GVW considers that this still remains consistent with the pricing principles in the ESC's Guidance Paper. In summary, GVW is proposing to adopt a uniform standard NCC charge across all the various growth areas/towns in its operating area – i.e. "smooth" the variations in NCCs between towns - based on a notion of equity (which is not elaborated upon). It is noted that this approach is not cost reflective

SKM notes that:

- The approach proposed by GVW is not cost reflective on a geographic basis and to that extent is inconsistent with one of the key ESC guiding principles; and
- If substantial growth capacity has been delivered some time ago and so significantly distorts the determination of a reasonable standard NCC (geographic based) then the issue of cost efficiency and appropriate timing of such growth infrastructure needs to be considered further (as part of this decision-making on uniform vs non-uniform standard NCCs) and whether the broader customer base is unreasonably bearing the burden of this.
- GVW has also made no distinction between NCCs for any infill development versus greenfield areas.

6.5. Operating Expenditure Costs underpinning NCC calculations

Summary:

- GVW's nominated incremental operating costs (and the associated calculation methodology) for its water NCC appears reasonable within the context of the current mechanics of the ESC's NCC model.

The reasonableness of the incremental operating costs (and their relationship to growth) as determined and adopted by GVW appears reasonable.

GVW has determined its incremental operations and maintenance costs based on two components:

- The first component relates to the delivery of additional water to service growth. The average cost for the production and distribution of water across Goulburn Valley Water is $210/ML. This cost has been applied to additional water to service new connections.

- The second component relates to consequential operating costs from new capital works projects. The consequential operating costs have been calculated on an individual project basis.

More particularly, GVW has determined future opex based on a %age of the asset replacement cost as determined using GVW's current operating cost structure for each major asset type (e.g. water treatment plants, chlorinators, storage tanks, reservoirs and bores) and in aggregate for various functions (e.g. water treatment, water pipes, water pump stations). This has been undertaken for materials and labour costs separately and in aggregate.

The percentages to be applied to individual asset type capex to estimate the incremental opex and the information supporting this approach is summarised in **Table 47**.

This approach:

- does not allow for either cost efficiencies or relative cost increases if new technology demands that; and
- does not specifically estimate the operating expenditure for future infrastructure on an individual asset basis.

However, in an overall sense this approach seems reasonable but opportunities to refine it over time should be explored.

Table 47 GVW Percentages to be applied to Growth Capex to derive Incremental Opex

Asset Type	Current Replacement Cost ($)	Annual O&M Cost ($)			Annual O&M Percentage of Replacement Cost		
		Materials	Labour	Total	Materials	Labour	Total
Water Treatment Plants	$ 218,211,333						
Chlorinators	$ 2,611,764						
Storage Basins	$ 90,761,146						
Tanks	$ 45,003,850						
Reservoirs	$ 42,018,109						
Bores	$ 2,298,300						
Total Water Treatment	**$ 400,904,502**	$ 5,903,000	$ 1,523,000	$ 7,426,000	1.5%	0.4%	1.9%
Wastewater Management Facilities	**$ 121,419,903**	$ 5,184,000	$ 1,102,000	$ 6,286,000	4.3%	0.9%	5.2%
Water Pipes	**$ 286,577,219**	$ 743,857	$ 1,416,842	$ 2,160,699	0.3%	0.5%	0.8%
Sewer Pipes	$ 242,610,369						
Manholes	$ 36,267,200						
Total Sewer Network	**$ 278,877,569**	$ 519,325	$ 574,495	$ 1,093,820	0.2%	0.2%	0.4%
Water Pump Stations	**$ 5,838,936**	$ 410,878	$ 79,432	$ 490,309	7.0%	1.4%	8.4%
Sewer Pump Stations	**$ 40,016,693**	$ 1,221,941	$ 517,231	$ 1,739,171	3.1%	1.3%	4.3%
Total Assets / Costs	**$ 1,133,634,822**	**$ 13,983,000**	**$ 5,213,000**	**$ 19,196,000**	**1.2%**	**0.5%**	**1.7%**

The specific application of the information in **Table 47** to demonstrate the calculation of incremental opex is provided in the following examples.

GVW has applied the percentages in the three right hand columns in **Table 47** – at the aggregate level - to future infrastructure based on the initial capex costs and allowing for a two year delay after construction/capex spend before commencing the new opex. For example for:

- *Mansfield Water Network Augmentation Stage 1* (Project 2003) in 2013/14 & 2014/15 of $260K capex: The opex is:

  $2080 p.a. (0.8% x $260K) commencing in 2016/17, and uniform in each year.

  [NB: The spread-sheet provided shows $1840 p.a. which is probably an error – too low.]

- *Mansfield WTP Upgrade* (Project 1821) - WTP Upgrade in 2019/20 & 2020/21 of $2.74M capex. The opex is:

  $52,060 p.a. (1.9% x $2.74M) commencing in 2021/22, and uniform each year.

- *Nagambie WTP Capacity Upgrade* (Project 2230) in 2014/15 & 2015/16 of capex $1.38M. The opex is:

  $115,920 p.a. (8.4% x $1.38M) commencing in 2021/22, plus an additional $300K periodically for new membranes (first replacement after 12 years, then each 6 years).

It is also noted that there appears to be some inconsistencies in the GVW summary spreadsheet provided (which it is noted did not include the underlying apportionment formulae for a more complete sample check). For example the following projects have no actual opex contributed by them as GVW has noted that they are "replacement of existing assets with no additional operating costs", yet they are also noted as being allocated wholly or partly to growth:

- Shepparton South Tank Pump Station Upgrade (Project 2216) – 100% allocated to growth;
- Mooroopna Echuca Road Water Pump Station Upgrade (Project 2220) is allocated 100% to growth and has an opex "apportionment" figure of 4.3% of capex (which is the sewage pump station apportionment rather than 8.4% of capex for water pump station);
- Alexandra Water Network Augmentation Stage 1 (Project 2009): 50% allocated to growth;
- Alexandra Water Network Augmentation Stage 2 (Project 2348): 50% allocated to growth;
- Kilmore Green Street WPS Upgrade (Project 1817): 100% allocated to growth;
- Kyabram High Lift Water Pump Station Upgrade (Project 1819): 100% allocated to growth;
- Mooroopna McLennan Street Pump Station Upgrade (Project 2217): 100% allocated to growth;
- Numurkah WTP Upgrade (Project 1825): 28% allocated to growth;
- Shepparton Lemnos Pump Station Upgrade (Project 2221): 100% allocated to growth.

In addition there are also two additional features contributing to overall new Opex:

- Unspecified shared water assets – bulk annual capex allocation of $600K p.a. at 0.9% capex (approximately) apportionment contributing approximately $5,420 of new opex (although this is not uniformly applied in the early years); and
- Unspecified Landowner Water Reticulation Works – bulk annual provision of $1.7M p.a. at 0.8% of capex contributing approximately $13,600 p.a. of new opex (although this is not uniformly applied in the early years).

Overall GVW's nominated incremental operating costs (and the associated calculation methodology) appear reasonable within the context of the current mechanics of the ESC's NCC model.

6.6. Reference Information

This review has been performed by SKM using the following documents and information provided by GVW:

- GVW NCC Framework Dec 2012_Final Submission to ESC (provided 28 February 2013)
- Supporting data & information – two emails from D Hughes (1 March 2013) including
  - Examples of Master/Servicing Plans
    - Mansfield Water Network Augmentation, Stages 1 & 2
    - Numurkah Water Treatment Plant (Upgrade Options)
    - Shepparton & Mooroopna water network (distribution mains, pump station)
  - Examples of apportionment of capex and opex to Growth, including a spreadsheet showing all projects and allocation to growth
    - Numurkah WTP Upgrade
    - Marysville - Disinfection Upgrade
  - Cost estimate examples
    - including historical costs for similar projects
  - Water Plan 2 Recoverable Cost examples
    - Spreadsheet of worked examples
- Supporting conversation with D Hughes (GVW), 1 March 2013.