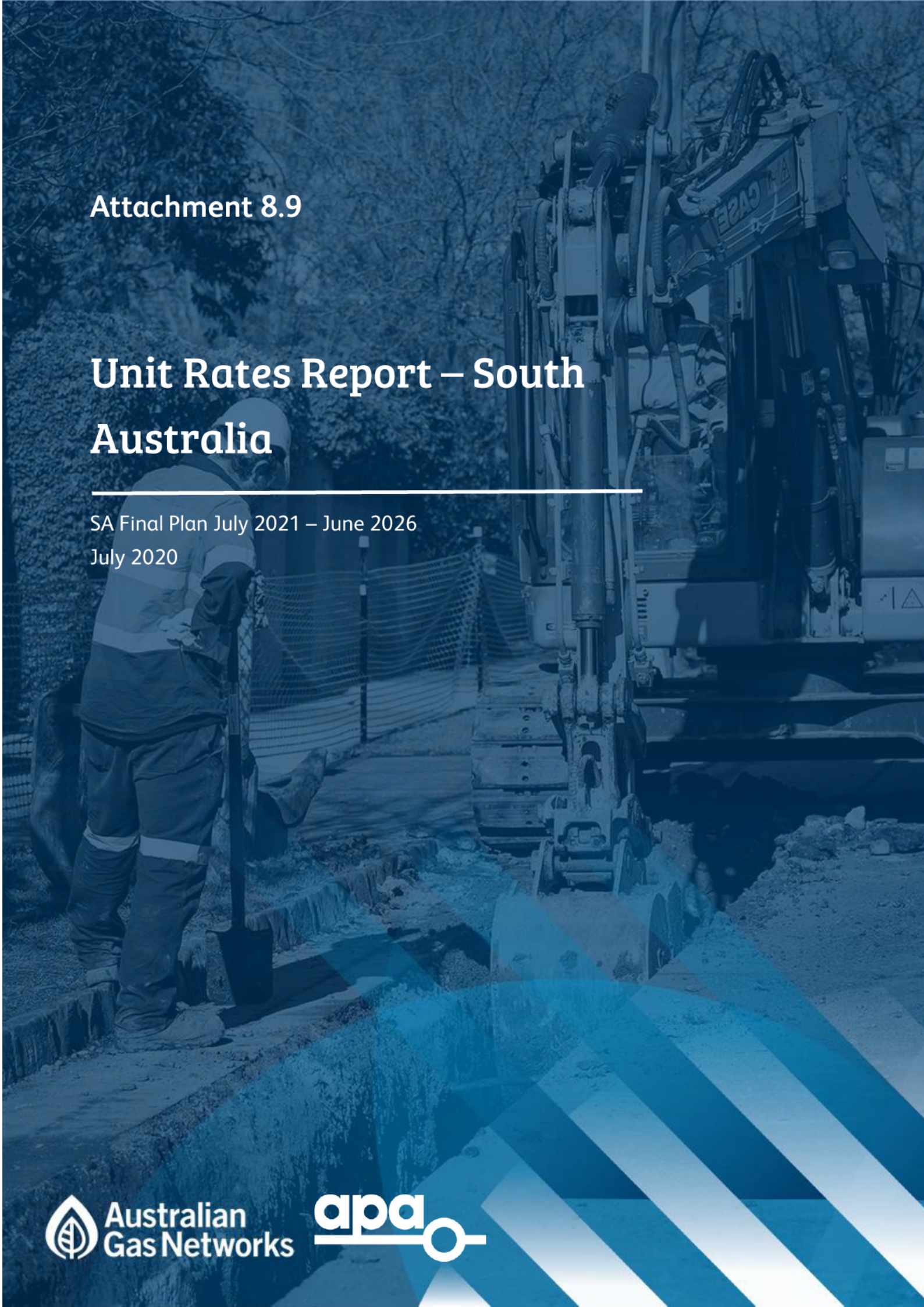

Attachment 8.9

Unit Rates Report – South Australia

SA Final Plan July 2021 – June 2026

July 2020

Australian Gas Networks

apa

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Prepared	
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Revision	Date	Reason / Changes made
0.1	06 December 2019	Issued for Review
0.2	30 April 2020	Unit rates are updated with historical costs. Issued for Review by APA
0.3	14 May 2020	Issued for review by AGN
0.4	1 July 2020	Issued for submission with SA Final Plan

Contents

Executive summary

This Unit Rates Report provides an overview of unit rates we expect to incur during the next access arrangement (AA) period[1] for high volume or repeatable, ongoing works including:

- installation of new mains, services and meters for domestic and I&C customers;
- domestic and I&C meter replacement; and
- mains replacement and associated activities.

The unit rates in this report are a key input into the Distribution Mains and Services Integrity Plan (DMSIP) and the Meter Replacement Plan (refer Attachments 8.3 and 8.4). Costs and unit rates for larger, bespoke capital projects (for example installation of high pressure steel mains or district regulator stations) and other network or non-network activities (for example telemetry and IT) are presented in project-specific business cases.

As shown in the following table, of the 20 unit rates covered in this report, five are forecast to be lower than the current AA benchmark[2], while 12 are expected to be higher. This is a direct result of the revealed costs experienced in the current AA period. Of the three remaining three unit rates, two are new for the next AA period and one is unchanged from the current benchmark.

Summary of forecast unit rate changes from benchmark (those shaded blue are decreasing from benchmark)

Category	Rate for next AA period	Change from current AA benchmark
Growth capex		
New home services	[redacted]	↓ $29 (2%)
Multi-user services	[redacted]	↓ $857 (8%)
New domestic meters	[redacted]	↓$75 (23%)
New I&C meters	[redacted]	↓$1,309 (31%)
New estate mains	[redacted]	↑$17 (40%)
Existing home mains	[redacted]	↑$27 (14%)
I&C mains	[redacted]	↑$356 (146%)
Existing home services	[redacted]	↑$829 (42%)
Existing I&C services	[redacted]	↑$1,063 (22%)
Meter replacement		
Meters < 25m^3 (Domestic)	[redacted]	↑$72 (64%)

[1] July 2021 to June 2026.

[2] The 2016/17 approved rate has been used as the benchmark.

Category	Rate for next AA period	Change from current AA benchmark
Meters > 25m³ (Commercial)	[redacted]	$0 (0%)
Mains replacement		
CI/UPS – Block	[redacted]	↑$38, 17%
CI/UPS – North Adelaide	[redacted]	↑$70, 14%
HDPE 250 - remaining	[redacted]	↓$10, 4%
HDPE 575 - DN50 HP & MP camera inspection and reinforcement	[redacted]	↑$1, 4%
HDPE 575 - DN40 HP	[redacted]	↑$19, 8%
HDPE 575 - DN40 MP	[redacted]	n/a*
Piecemeal mains replacement	[redacted]	↑$237, 65%
Multi-user services	[redacted]	↑$2,672, 22%
Non AMRP service replacement	[redacted]	n/a**

* This is a new unit rate for the next AA period.

** No benchmark was set for the current AA period.

The largest increase in unit rates (+146%) occurs in the cost of installing mains for new I&C customers. The higher-than-expected costs incurred during the current AA period are due to the large number of commercial developments which occurred in the Adelaide CBD during 2017/18, 2018/19 and 2019/20 including the new Calvary Hospital and new facilities for the University of Adelaide and University of SA. These large developments required installation of large diameter steel trunk mains, which cost considerably more to install than standard HDPE mains, resulting in an overall unit rate that was higher than the benchmark.

The SA Department of Planning, Transport and Infrastructure (DPTI) development activity tracker shows the volume of approved and commenced developments is similar in nature and number to those recently completed. We therefore expect the forward-looking unit rate for new I&C mains to remain at the higher levels experienced in the current AA period and have used a weighted average of historical actual rates to forecast the cost of installing new I&C mains over the next AA period.

Similarly, the 40% increase in unit rates for new mains to supply new housing estates is also driven by large building projects. Several major housing estates have commenced development during the current AA period (such as Springwood and Roseworthy). These new developments require larger diameter (125mm to 160mm) trunk mains to bring sufficient gas supply to the estate. These larger mains cost more to install than standard 63mm reticulation main. As a result, the overall unit rate for connecting these new estates is higher than that forecast at the beginning of the current AA period. We expect the current actual rate to continue in the next AA period as more new housing estates seek to connect (such as Concordia).

Other notable forecast unit rate increases are expected for domestic meter replacement (+64%) and existing home services (+42%).

The higher unit rates for domestic meters is due to the larger proportion of new vs refurbished meters being installed, as stocks of refurbished meters are diminished. This unit rate increase is offset in the next AA period to some extent by a decrease in meter replacement volumes. This is discussed in Attachment 8.4 Meter Replacement Plan.

The higher than benchmark unit rate for installing new services to existing homes is driven by a new installation standard which requires additional works to remove potential stress on fittings and mitigate safety risk. As with other works like mains replacement, we have also seen higher costs related to changing requirements by councils, for health and safety, for traffic management and working around other infrastructure assets.

There is a notable unit rate decrease in the next AA period for new meter installation (domestic and I&C). Design changes to the inlet and riser when installing services during the current AA period has allowed us to achieve a lower meter installation unit rate, which we expect to maintain over the next AA period. We have taken the option to extend the current metering contracts by a further 12 months, and will seek to re-tender them during the next AA period.

Additionally, while the unit rate for cast iron/unprotected steel (CI/UPS) mains replacement in North Adelaide has increased by 14% relative to the 2016/17 benchmark rate, it is a 23% decrease relative to the 2019/20 benchmark. This unit rate is based on the block replacement unit rates achieved in the Adelaide CBD. Over the course of the current AA period, the Adelaide CBD block replacement rates have been lower than benchmark reflecting efficient project delivery and favourable tendering outcomes. Due to the similarity in work requirements and environment, we expect the North Adelaide works to reflect those undertaken in the Adelaide CBD and should therefore be deliverable at a comparable rate over the next AA period.

Consistent with NGR 74, the forecast unit rates in this Unit Rates Report have been arrived at on a reasonable basis. They are informed by recent revealed costs of the work that will be undertaken over the next AA period and reflect the best estimate possible in the circumstances.

While we have made every effort to derive accurate forecast unit rates, several factors are expected to place upward pressure on unit rates over the next AA period. For example, more stringent specifications on road reinstatement, non-destructive excavation, meter location compliance, and working around third party assets have all been introduced in the past two years. These specifications are likely to drive costs upwards and, given their recent introduction, are not yet fully reflected in our actual costs. Therefore, the unit rate estimates provided in this report are conservative.

Further detail on individual unit rates and variances from benchmark are provided in the remaining sections of this report.

1. Introduction

1.1. Overview

This report explains the derivation of the unit rate forecasts that underpin the capital expenditure (capex) forecasts for the next access arrangement (AA) period (July 2021 to June 2026).

We use unit rates to develop our capex forecasts for repeatable or high volume works such as mains and meter replacement and new customer connections, which together form over 70% of our ongoing capital works program for the SA natural gas distribution networks. To forecast our capex requirements, we multiply the unit rate for replacing (or refurbishing) each type of asset by the volume of those assets we propose to replace/refurbish.

The capex categories and subcategories derived using this unit rate x volume forecast approach are:

- Growth capex:
  - mains – new estates, existing homes and industrial and commercial (I&C) customers;
  - services – new homes, multi-user sites, existing homes and I&C customers; and
  - meters – new domestic and I&C customers meter connections.
- Meter replacement: periodic meter change (PMC) (domestic and I&C meters); and
- Mains replacement: general block replacement, high density polyethylene (HDPE) replacement, HDPE inspections, piecemeal mains replacement and service replacement (multi-user services and non-annual mains replacement program (non-AMRP) services).

This document explains how we have derived the unit rates for each of the above capex categories.

1.2. Consistency of forecasts with AER's approved approach

When developing the unit rate forecasts, we have adopted the same forecasting approach accepted by the Australian Energy Regulator (AER) in our recent Victorian AA (for the five year period beginning 1 January 2018). To estimate each unit rate, we use one of three methods:

1. **Current actuals** – we use the current actual unit rate being achieved to forecast unit rates where:
   - the expenditure category involves high volumes of work; and
     - the work is subject to regular and ongoing changes in industry practices (e.g. from a safety or technical perspective);
     - the work can be subject to increasing requirements and administrative standards specified by third parties (other infrastructure owners); or
     - the work is affected by other factors that are expected to place upward pressure on unit rates over the next AA period.

   Examples of works where the current actual provides the best forecast are mains block replacement and domestic meter replacement. Current actual unit rates in this Unit Rates Report are based on the actual year-to-date unit rates for the first nine months of the 2019/20 financial year.

2. **Weighted average of historical actuals** – we use a three year weighted average of historical actuals (by volume) to forecast unit rates where:
   - the expenditure category involved lower volumes of work; and
   - the scope and complexity of the work is subject to a high degree of variability, making it difficult to derive meaningful assumptions on the forecast mix of work to be carried out.

   Examples of work where the weighted average historical actuals provides the best forecast are new mains or new meters for industrial and commercial (I&C) customers. This is because the technical requirements of one I&C customer can vary significantly from the next.

   The three year weighted average of historical actuals in the Unit Rates Report is based on the full 2017/18 and 2018/19 financial years, and the first nine months of 2019/20.[3]

3. **Bottom-up estimate** – we use a bottom-up estimate where current or historical actuals are not available. For example, if this is a new type of works where no tender submissions have been made or no historical data recorded. We also use bottom-up estimates to validate unit rates estimated via the current actuals method in certain circumstances (for example, where there has been a material change in works practices in recent years).

   We develop the bottom-up unit rates using informed management estimates and evidence from peers or advice from independent technical expert consultants, contractors or vendors where available.

All three methods outlined in this approach provide a reasonable basis for the forecast unit rates and represent the best forecast or estimate possible in the circumstances. Therefore, all forecast unit rates in this report meet the requirements of Rule 74 of the National Gas Rules (NGR 74).

Note that we also apply these same estimation methods when developing cost estimates and unit rates for larger, more bespoke pieces of work such as installation of transmission pressure steel mains or district regulator stations and other network or non-network activities such as telemetry and IT. The unit rates for discreet capex projects are provided in the individual business cases associated with each project, and are outside the scope of this Unit Rates Report.

1.3. Basis of costs

All costs presented in this report are direct (excluding overheads) unescalated costs expressed in real dollars of December 2019 unless otherwise stated.

[3] If, however, a sufficient time series is not available it may be necessary to use a shorter measurement period.

1.4. Summary of unit rates

Table 1.1. presents the unit rates for our South Australian networks over the next AA period.

Table 1.1: Summary of forecast unit rates for July 2021 to 30 June 2026 ($2019/20)

Category		Unit rate	Forecasting approach
Growth capex			
New mains	New estate	[redacted]	Current actuals
	Existing home	[redacted]	Current actuals
	I&C	[redacted]	Weighted average of historical actuals
New service	New home	[redacted]	Current actuals
	Multi-user	[redacted]	Current actuals
	Existing home	[redacted]	Current actuals
	I&C	[redacted]	Weighted average of historical actuals
New meter	Domestic	[redacted]	Current actuals
	I&C	[redacted]	Weighted average of historical actuals
Meter replacement			
Meters < 25m^3 (Domestic)		[redacted]	Current actuals
Meters > 25m^3 (Commercial)		[redacted]	Weighted average of historical actuals
Mains replacement			
CI/UPS - remaining	CI/UPS – Block	[redacted]	Current actuals
	CI/UPS – North Adelaide	[redacted]	Current actuals
HDPE class 250 - remaining		[redacted]	Current actuals
HDPE class 575	HDPE 575 - DN50 HP & MP camera inspection and reinforcement	[redacted]	Current actuals
	HDPE 575 - DN40 HP	[redacted]	Current actuals
	HDPE 575 - DN40 MP	[redacted]	Bottom-up (using current actuals plus a direct burial premium)
Piecemeal mains replacement		[redacted]	Weighted average of historical actuals
Multi-user sites		[redacted]	Weighted average of historical actuals
Non AMRP service replacement		[redacted]	Current actuals

The remaining sections in this report provide further detail on how these unit rates been derived.

1.5. Relevant contracts

We conduct growth capex, meter replacement and mains replacements works using a range of contractors. Contracts are awarded following a formal tendering process, which helps promote competition and ensure the contractor unit rates are driven by the market. The tendering and contract awarding is also scrutinised via our internal procurement processes. This includes consideration of how the new contractor rates compare with historical and present-day data, and whether market conditions are conducive to achieving a rate that reflects sustainable and efficient forward-looking costs.

Contractor rates can vary depending on the scope of works being conducted and the complexity of asset installations/replacements. We continually review and monitor contractor rates and performance to help ensure our costs are reasonable and our customers receive a quality service.

A summary of the status of relevant contracts that apply to the growth capex, meter replacement and mains replacement and associated works outlined in this Unit Rates Report is provided below.

1.5.1. Growth capex and meter replacement contracts

The previous contract for installing new mains and services commenced in January 2015 and expired 31 December 2019. Tenders for the new mains and services contracts (incorporating new estates, existing homes, multi-user sites and I&C customers) for a five year term were issued to market in August 2019. Tenders were received in November 2019 and the new contracts commenced in January 2020. Copies of the mew mains and services laying contracts are available on request.

For new meter installations and meter replacement, we have recently entered into new contracts for:

- **the acquisition of new domestic meters** – this new national contract was entered into with meter suppliers, [redacted], in June 2016 and had a four-year term expiring 1 June 2020. We have exercised a one-year extension of this contract with existing suppliers given the current economic climate and uncertainty is not conducive to achieving an optimal outcome for a full retender for the acquisition of new domestic meters;
- **domestic meter fitting and replacement in Adelaide Northern Metropolitan Area** – this new contract was entered into with [redacted] in May 2019 and has a three-year term expiring 30 May 2022 with 2 x 1-year extension options; and
- **domestic meter fitting and replacement in Adelaide Southern Metropolitan Area** – this new contract was entered into with [redacted] and Plumbing in April 2019 and has a five-year term expiring 30 April 2024.

I&C meter changes and installation is predominantly carried out by a mixture of APA internal staff and contractors depending on the scale of the job, with I&C meters acquired through a competitive tender process.

1.5.2. Mains replacement contracts

All areas identified for mains replacement are tendered en masse to a panel of pre-qualified contractors. The current panel for mains replacement contracts commenced in 2017 for a five-year term, which is due to end in 2022. Areas identified for replacement are tendered annually, and the pre-qualified contractors on the panel submit their pricing for each annual package. Awards are

made several months prior to the start of the financial year to allow contractors to meet the construction timeframes.

Table 1.2 provides a summary of the status of all relevant contracts.

Table 1.2: Summary of the status of all relevant contracts

Contact	Description	Contract Term	Contract Commencement	Contract Expiry
Gas meter fitting and replacement services – Adelaide North	Contract to install meters, changeover meters and attend first response activities	3 + 1 + 1 years	1 June 2019	30 May 2022
Gas meter fitting and replacement services – Adelaide South	Contract to install meters, changeover meters and attend first response activities	5 years	1 May 2019	30 Apr 2024
Acquisition of meters, (domestic, I&C, rotary, turbine)	National contract to purchase new and refurbished meters	4 years	1June 2016	1 June 2020
New mains and services –	Contract to lay mains and services, split by Northern and Southern Regions	5 years	1 January 2020	30 December 2024
National mains replacement panel of prequalified contractors	Mains Replacement Panel of prequalified contractors - Tendered annually based on an approved program of work.	3 + 1 + 1 years	15 January 2017	30 December 2021

2. Growth capex

2.1. Summary

Installing new domestic mains, service and meters[4] to connect new domestic customers to our network is high volume work, with around 7,500 new domestic customers connected each year. It is also subject to ongoing upward cost pressures (see section 2.1.1). We therefore adopt the current actuals approach (as described at section 1.2) to forecast unit rates for these works.

Installing I&C mains, services and meters to accommodate growth in I&C customers is lower volume work, with around 200 new I&C customers connected each year. It is also subject to variability and is driven by each I&C customer's individual requirements. This makes it difficult to derive meaningful assumptions on the work mix. We therefore use the weighted average of historical unit rates (see section 1.2) to forecast the unit rates for these works over the next AA period.

[4] New estate, existing home, multiusers and domestic meters. Excluding I&C meters.

There are nine forecast unit rates under the growth capex program. Four of the nine unit rates are forecast to be lower in the next AA period than the current AA benchmark, while five are expected to be higher (see Table 2.1).

Table 2.1: Summary of growth capex unit rate changes from benchmark

Category	Unit rate for next AA period	Change from current AA benchmark	Forecasting Approach
New home services	[redacted]	↓ [redacted] (2%)	Current actuals
Multi-user services	[redacted]	↓ [redacted] (8%)	Current actuals
New domestic meters	[redacted]	↓ [redacted] (23%)	Current actuals
New I&C meters	[redacted]	↓ [redacted] (31%)	Weighted average of historical actuals
New estate mains	[redacted]	↑ [redacted] (40%)	Current actuals
Existing home mains	[redacted]	↑ [redacted] (14%)	Current actuals
I&C mains	[redacted]	↑ [redacted] (146%)	Weighted average of historical actuals
Existing home services	[redacted]	↑ [redacted] (42%)	Current actuals
I&C services	[redacted]	↑ [redacted] (22%)	Weighted average of historical actuals

An explanation of the variances from benchmark for the unit rates in Table 2.1 is provided in sections 2.2 to 2.4.

2.1.1. Factors impacting growth capex unit rates

Consistent with NGR 74, the forecast unit rates for the growth capex activities have been arrived at on a reasonable basis. They are informed by recent revealed costs of the work that will be undertaken over the next AA period and reflect the best estimate possible in the circumstances.

While we have made every effort to derive accurate forecast unit rates, several factors are expected to place upward pressure on unit rates for growth capex activities over the next AA period. These are:

- Costs of carrying out work will increase over time as additional administrative and safety standards (including specialist traffic control, access and permit requirements, third party approval processes, etc.) give rise to higher contractor costs. For example, in recent years, local authorities have designated tree protection zones, which require the use of non-destructive excavation (for example, hydro or manual excavation as opposed to mechanical).
- We are anticipating proportionately more work in higher density suburbs and the Adelaide CBD compared to what we have been delivering over the current AA period. This trend is being driven by the State Government 30 year Plan for Greater Adelaide – 2017 Update[5], which targets 85% of new housing in metropolitan Adelaide to be built in established urban areas by 2045. Working in the CBD and densely populated/developed suburbs is more complex and

[5] https://livingadelaide.sa.gov.au/__data/assets/pdf_file/0003/319809/The_30-Year_Plan_for_Greater_Adelaide.pdf

typically more expensive than other areas. This is because we incur additional costs to manage traffic congestion and other working restrictions. We are often required to reinstate roads and other sealed areas each day/night, as well as upgrade or relocate complex meter assemblies or meter rooms. We also engage and coordinate with businesses and residents to help reduce disruption to our customers. All of these additional activities result in greater overall costs compared with undertaking works in less densely populated areas.

- Road reinstatement specifications and traffic management specifications are becoming more stringent. For example, we are now required to conduct full lane with profiling for roads under five years old. Specifications can also vary by local authority. This contributes to higher costs, although the impact of this cost pressure on current unit rates has been masked to some extent by volatility in the mix of work completed.

Given the expected ongoing upward pressure on growth capex unit rates, the unit rates forecast for installing new domestic mains, services and meters in this Unit Rates Report are conservative.

2.2. New mains

The costs we incur when laying mains differs depending on whether the mains are used to supply:

- new greenfield residential areas (new estates);
- existing brownfield residential areas (existing home); or
- industrial and commercial customers (I&C).

Typically, the cost of laying mains in greenfield sites is considerably lower than installing mains in brownfield (established) sites. This is because with a greenfield sites excavation and reinstatement costs tend to be lower (as we are often excavating unsealed ground), plus there is usually less need for traffic management and mitigating customer disruption. Greenfield developments can also offer the opportunity to use common trenches or install mains at the same time as other utility infrastructure.

The cost of I&C customer mains is typically greater than laying domestic mains, as these developments often require higher pressure, larger diameter pipes.

2.2.1. New estate mains

Forecasting approach: Current actuals

2.2.1.1. Nature of works and costs

This work involves installation of reticulation mains (usually installed within common trenches) within new residential greenfield estate developments. It does not include installation of high pressure steel trunk mains, larger diameter trunk polyethylene mains or pressure regulating equipment installed within the estates to step down from higher pressures to the supply pressures.[6]

The volume of new estate mains installation activity is driven by house and land development market conditions. An average of approximately 33 kilometres per annum of new estate mains is installed each year. Because the work is quite consistent, the unit rate is relatively stable.

[6] The cost of trunk mains and district regulator stations are costed individually as part of project-specific business cases and therefore do no form part of this Unit Rates Report.

2.2.1.2. Historical and forecast unit rates

Table 2.2 sets out the actual unit rates incurred in laying mains in new housing estate over the current AA period and the forecast for the next AA period.

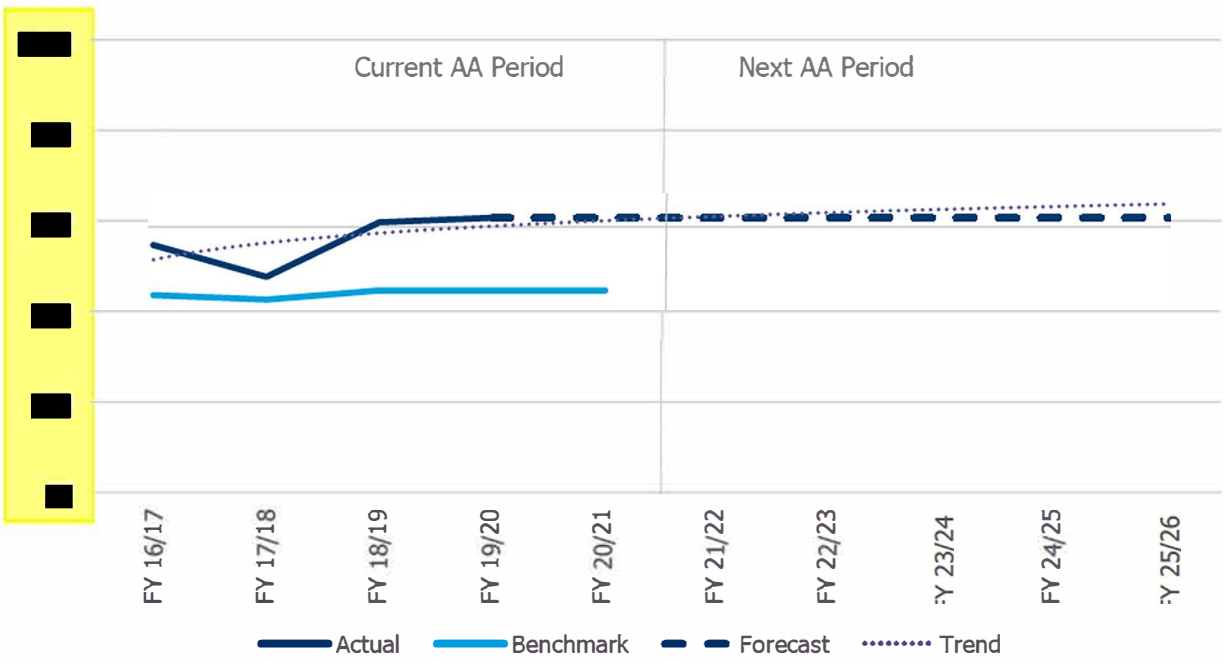
Table 2.2: New estate mains forecast unit rates ($2019/20)

New estate mains	2016/17	2017/18	2018/19	2019/20 YTD Mar20	3 year weighted average	Forecast for next AA period
Contractor rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Materials/Other rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual $/unit	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual volumes (metres)	28,333	43,773	36,958	30,688		
AER volumes (metres)	34,567	32,487	33,824	36,032		
AER $/unit	[redacted]	[redacted]	[redacted]	[redacted]		

Comparison of historical rates with AER approved rates

Figure 2.1 shows that the actual unit rates incurred in 2016/17, 2017/18 and 2018/19 are above the benchmark unit rates approved by the AER in the current AA period.

Figure 2.1: New estate mains unit rates ($2019/20)



The higher rates observed were largely due to the construction of a number of large greenfield developments. The increase in large scale new developments has required additional large diameter polyethylene mains (125mm and 160mm), which have higher average unit rates to install than standard 63mm mains required in smaller scale developments.

Rates are continuing to trend up as major new greenfield developments continue/commence in Springwood, Gawler East, Roseworthy and Seaford/Aldinga Heights. These large scale developments will require additional large diameter polyethylene mains, which drive an increased average unit rate for new estate mains.

2.2.1.3. Are current costs efficient?

The current costs incurred reflect competitively tendered contractor and material costs. These rates are efficient as they have been determined through competitive market processes in line with our procurement processes. As we operate networks across Australia, we will compare to rates experienced in other jurisdictions where the work is sufficiently similar.

2.2.1.4. Forecast unit rates

The forecast unit rate for new estate mains during the next AA period is [redacted]/metre.

The forecast in this case is based on the current year-to-date actual unit rate for 2019/20 for both contractor and materials/other costs. The current actuals approach is appropriate for new estate mains because the volume and type of work we expect to carry out in the next AA period is high and similar in nature to what has recently been delivered.

The unit rate for new estate mains is subject to upward pressure in costs associated with increased health, safety, technical and council requirements (as outlined in section 2.1.1). Current actuals therefore provide an appropriate and conservative basis for forecasting the costs we expect to incur to over the next AA period.

2.2.2. Existing home new mains

Forecasting approach: Current actuals

2.2.2.1. Nature of works and costs

This work involves laying mains in brownfield areas. Typically, this will comprise of small network extensions using 63mm polyethylene mains. The volume of work averages around 10 kilometres per annum. It is subject to a degree of inter-year variability because the scope and complexity of work can differ depending on the location (e.g. within roadway or verge), diameter of the mains and other site specific factors.

2.2.2.2. Historical and forecast unit rates

Table 2.3 sets out actual unit rates incurred in laying mains for existing homes over the current AA period and the forecast for the next AA period.

Table 2.3: Existing home new mains forecast unit rates ($2019/20)

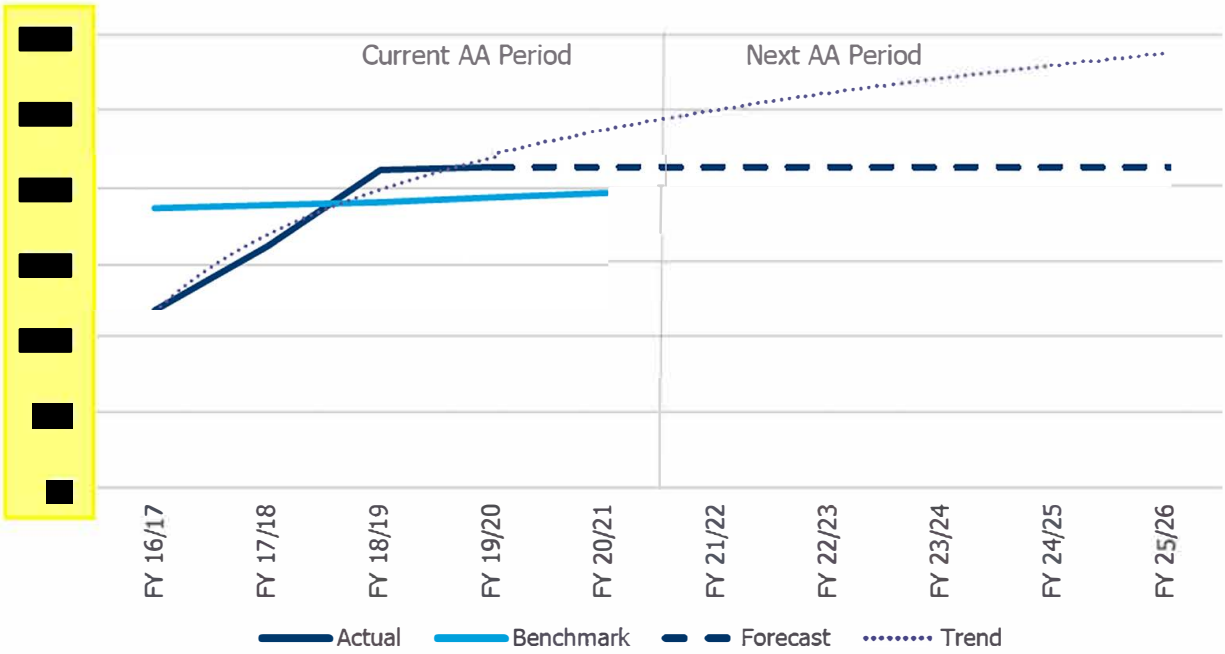
Existing home new mains	2016/17	2017/18	2018/19	2019/20 YTD Mar20	Weighted average	Forecast for next AA period
Contractor rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Materials/Other rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual $/unit	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual volumes (metres)	10,573	10,846	11,384	6,941		

AER volumes (metres)	7,370	7,342	7,342	7,410
AER $/unit	[redacted]	[redacted]	[redacted]	[redacted]

2.2.2.3. Comparison of historical rates with AER approved rates

Figure 2.2 shows the actual unit rates incurred for laying mains to existing homes in the current AA period have exhibited a high degree of variability (i.e. because the scope of work can differ in each year) and on average have been approximately 4% above the approved benchmark.

Figure 2.2: Existing homes new mains unit rates ($2019/20)



The higher contractor rates observed in 2017/18 and 2018/19 were largely due to an increase in the volume of new developments in established urban areas close to the CBD, which are more expensive due to the project delivery complexities (such as traffic management, reinstatement and mitigation of interruptions to existing customers) of this type of development.

The lower unit rates that occurred in 2016/17 are attributed to a greater than usual proportion of work carried out in suburban areas further from the Adelaide CBD. Working in these less densely developed areas requires lower traffic management costs and lower reinstatement costs.

Labour costs for delivering these works are rising each year in line with CPI, but the contractor component of the unit rate is also affected by the mix of work completed, as are materials costs.

2.2.2.4. Are current costs efficient?

The current costs incurred reflect competitively tendered contractor and material costs. These rates are efficient as they have been determined through competitive market processes in line with our procurement processes. As we operate networks across Australia, we will compare to rates experienced in other jurisdictions where the work is sufficiently similar.

2.2.2.5. Forecast unit rates

The forecast unit rate for existing home mains during the next AA period is [redacted]/metre.

The forecast is based on the current year-to-date actual unit rate for 2019/20 for both contractor and materials/other costs. The current actuals approach is appropriate because the volume and

type of work we expect to be carry out in the next AA period is high and similar in nature to what has recently been delivered.

In addition, the unit rate for laying existing home mains is subject to upward pressure in costs associated with increased health, safety, technical and council requirements, traffic management and reinstatement requirements. Current actuals therefore provide an appropriate and conservative basis for forecasting the costs we expect to incur over the next AA period.

2.2.3. New I&C mains

Forecasting approach: Weighted average of historical actuals

2.2.3.1. Nature of works and costs

This work involves the laying of new mains to the boundaries of I&C premises consuming less than 10 TJ of gas per annum. It typically comprises up to 110mm polyethylene and up to 80mm steel mains. The work is lower volume and subject to a high degree of inter-year variability because the scope and complexity of work can vary from small diameter extensions in low density urban areas to high volume large distribution network extensions within the Adelaide CBD.

2.2.3.2. Historical and forecast unit rates

Table 2.4 sets out actual unit rates incurred in laying new mains for I&C customers over the current AA period and the forecast for the next AA period.

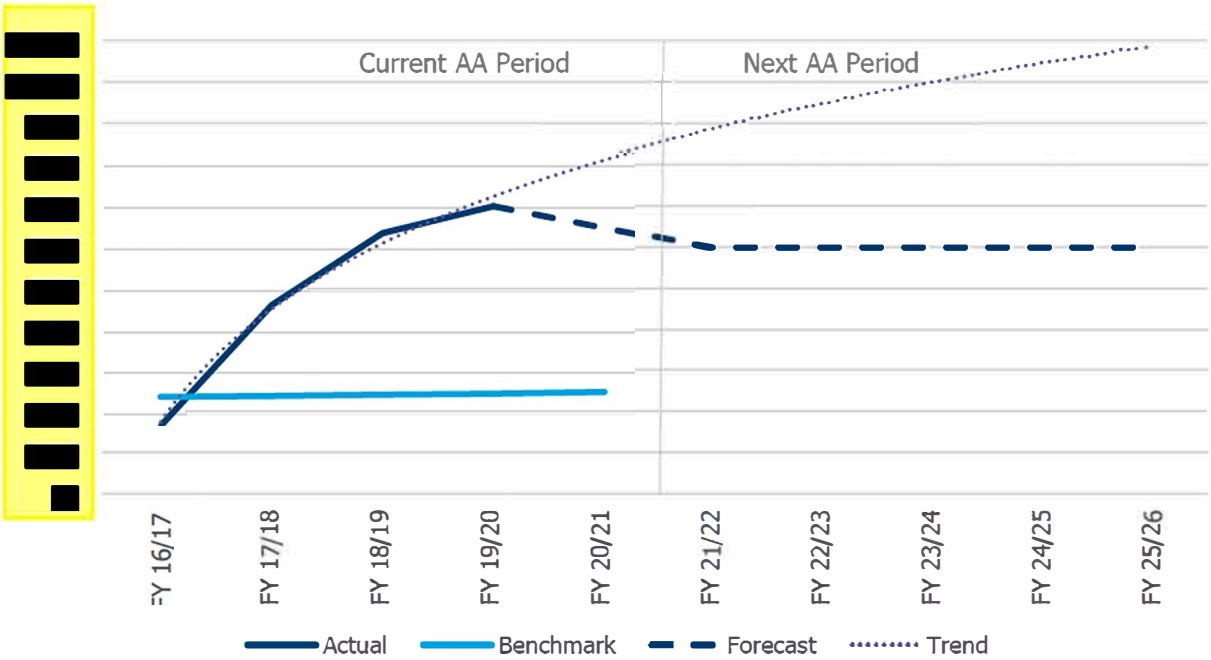
Table 2.4: I&C new mains forecast unit rates ($2019/20)

New I&C mains	2016/17	2017/18	2018/19	2019/20 YTD Mar20	3 year weighted average	Forecast for next AA period
Contractor rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Materials/Other rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual $/unit	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual volumes (metres)	3,292	1,630	2,475	1,193		
AER volumes (metres)	3,185	2,816	3,345	3,407		
AER $/unit	[redacted]	[redacted]	[redacted]	[redacted]		

2.2.3.3. Comparison of historical rates with AER approved rates

Figure 2.3 shows the actual unit rates for I&C new mains have been higher on average than the approved benchmark but have exhibited a significant degree of inter-year variability.

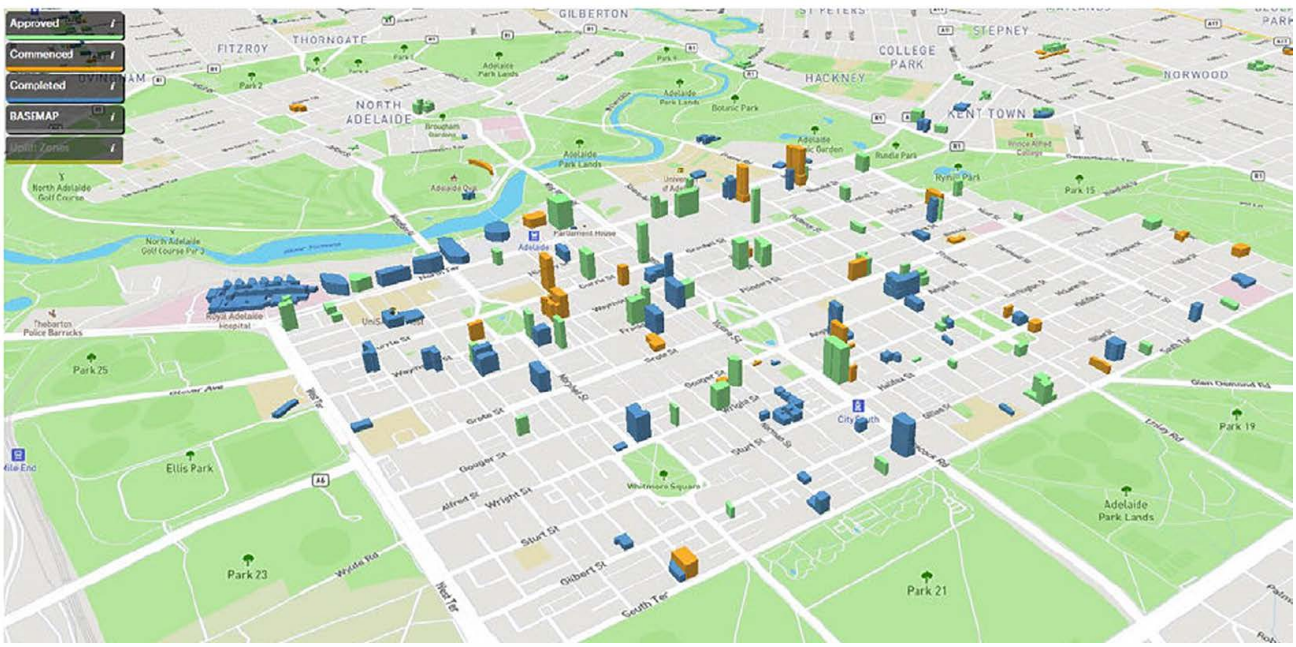
Figure 2.3: I&C new mains unit rates ($2019/20)



The inter-year variability is due to the increase in Adelaide CBD commercial developments established with large diameter steel trunk supply mains, which occurred in 2017/18, 2018/19 and 2019/20. Large developments in the Adelaide CBD continue, such as the recent Calvary Hospital, University of Adelaide and University of SA new facilities.

Figure 2.4 is a screenshot from the development activity tracker web portal managed by the SA Department of Planning, Transport and Infrastructure[7]. It shows the volume of approved developments (green) and commenced developments (orange) is similar to the completed developments (blue) over the last few years.

Figure 2.4: Adelaide CBD development activity March 2020



[7] https://www.saplanningportal.sa.gov.au/interactive_tools/Development_Activity_Tracker

We expect these additional developments in the Adelaide CBD will continue to occur over the next AA period and the forecast unit rate will behave similar to the historical unit rates incurred over the last two years.

2.2.3.4. Are current costs efficient?

The current costs incurred reflect competitively tendered contractor and material costs. These rates are efficient as they have been determined through competitive market processes in line with our procurement processes. As we operate networks across Australia, we will compare to rates experienced in other jurisdictions where the work is sufficiently similar.

2.2.3.5. Forecast unit rates

The forecast unit rate for new I&C mains during the next AA period is [redacted]/metre.

The forecast for contractor and material/other costs has been based on the weighted average of historical actuals. This approach is appropriate for forecasting the cost of laying new I&C mains as this activity involves lower volumes of work that are subject to a high degree of variability and customer/site-specific requirements.

2.3. New services

The unit rates we incur when installing services differ depending on whether the services are used to supply:

- new homes;
- existing home;
- multi-user; or
- I&C.

The costs of installing a gas service differ across these connection types depending on whether services can be installed as part of a greenfield development. As discussed in section 2.2, greenfield developments cost less to supply, as brownfield/established developments require additional road and footpath excavation and reinstatement costs to be incurred.

There is also a high degree of variability between high density multi-user dwellings and I&C jobs. This is because they tend to be site and customer specific, meaning the cost of these jobs can vary depending on the complexity of the work involved.

2.3.1. New home services

Forecasting approach:	Current actuals

2.3.1.1. Nature of works and costs

This work involves the laying of services to new homes, either in greenfield or brownfield conditions. Approximately 7,000 new services are installed each year in new residential dwellings under construction, with the location of new home services varying from urban infill and regeneration projects (which require reinstatement and traffic management services) to dwellings built in new greenfield estates.

The unit rates for this type of work tend to be relatively stable, but can be influenced on a year to year basis by:

- the proportion of work carried out in greenfield versus brownfield developments;
- the volume of road crossings driven by the mix of same side versus opposite side connections; and
- the location of service positions on a customer's property.

2.3.1.2. Historical and forecast unit rates

Table 2.5 sets out actual unit rates incurred laying services to new homes over the current AA period and the forecast for the next AA period.

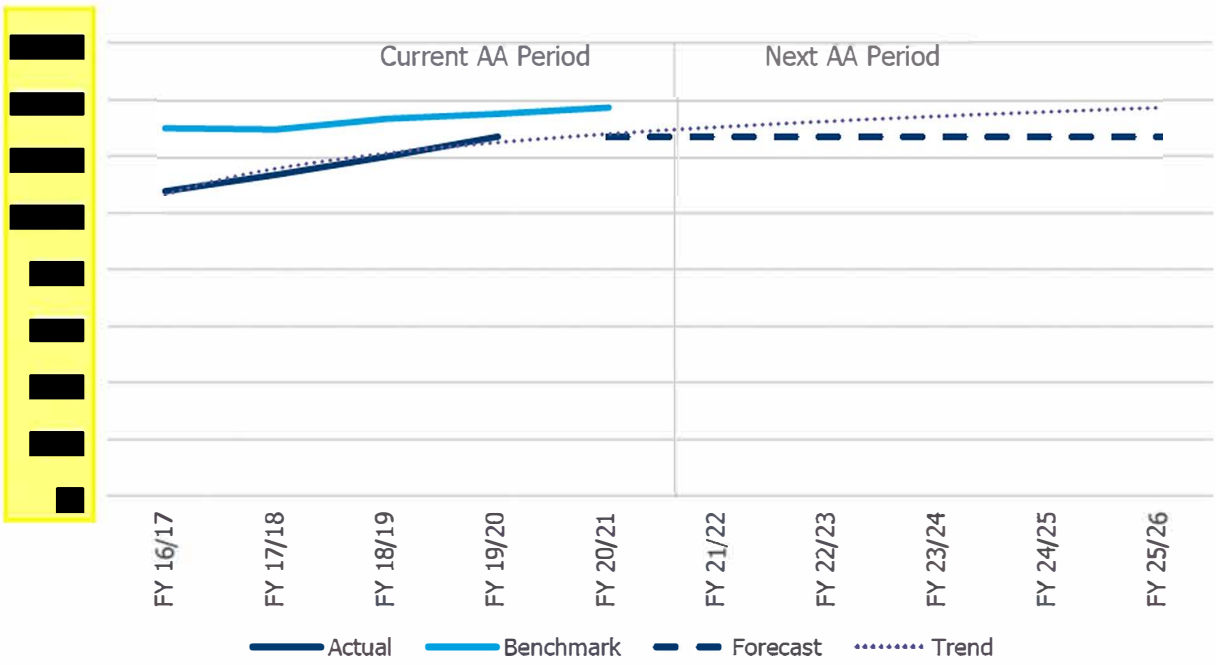
Table 2.5: New home services forecast unit rates ($2019/20)

New home services	2016/17	2017/18	2018/19	2019/20 YTD Mar20	3 year weighted average	Forecast for next AA period
Contractor rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Materials/Other rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual $/unit	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual volumes (services)	6,558	7,071	6,901	5,021		
AER volumes (services)	4,886	4,592	4,781	5,093		
AER $/unit	[redacted]	[redacted]	[redacted]	[redacted]		

2.3.1.3. Comparison of historical rates with AER approved rates

Figure 2.5 shows the actual unit rates for new home services have been lower than the benchmark across the period although have increased linearly each year to 2019/20.

Figure 2.5: New home services unit rates ($2019/20)



The higher unit rates can be largely attributed to the following factors, which will continue to put upward pressure on the unit rate (along with the factors outlined at 2.1.1):

- the introduction of a new internal APA installation standard, which requires meter bars and brackets to be installed to remove potential stress on fittings. Meter bars have been assessed nationally as a preferred method of providing physical stability and protection for free standing meters (we note this design change has reduced the cost of new meter installations); and
- the introduction of new internal APA meter location compliance procedure in July 2019 in order to comply with the updated Australian Standards AS4645 and AS5600. This update to the standards affects the selection of meter location in the customer property, increasing the length and hence the cost of the new service to the meter.

2.3.1.4. Are current costs efficient?

The current costs incurred reflect competitively tendered contractor and material costs. These rates are efficient as they have been determined through competitive market processes in line with our procurement processes. As we operate networks across Australia, we will compare to rates experienced in other jurisdictions where the work is sufficiently similar.

2.3.1.5. Forecast unit rates

The forecast unit rate for new home services in the next AA period is [redacted]/unit.

The forecast unit rate is based on the current year-to-date actual unit rate for 2019/20 for both contractor and material/other costs. This approach is appropriate because the volume and type of work we expect to be carry out in the next AA period is high and similar in nature to what has recently been delivered.

Though the unit rate forecast for the next AA period is 2% lower than that achieved during the current period, there remains upward pressure on costs due to increased health, safety, technical and council requirements. The current actuals therefore provide an appropriate and conservative basis for forecasting the costs we expect to incur over the next AA period.

2.3.2. Existing home services

Forecasting approach:	Current actuals

2.3.2.1. Nature of works and costs

This work involves the laying of services to existing homes (brownfield conditions). The volume of work is relatively stable, however, there is some variation depending on the mix of same side and opposite side connections, the location of gas meters on customer properties (e.g. front boundary, garden, wall box) and the complexity of remaining properties available for connection.

2.3.2.2. Historical and forecast unit rates

Table 2.6 sets out actual unit rates incurred in laying services in existing homes over the current AA period and the forecast for the next AA period.

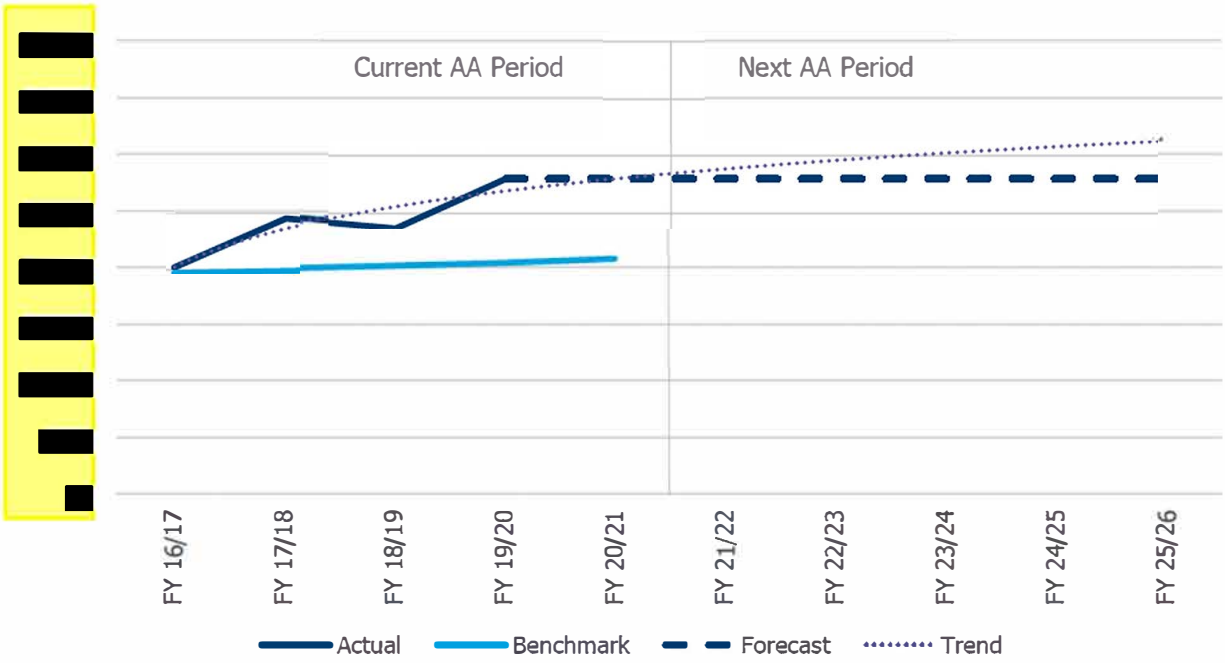
Table 2.6: Existing home new services forecast unit rates ($2019/20)

Existing home new services	2016/17	2017/18	2018/19	2019/20 YTD Mar20	3 year weighted average	Forecast for next AA period
Contractor rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Materials/Other rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual $/unit	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual volumes (service)	1,225	1,310	986	689		
AER volumes (service)	1,435	1,435	1,435	1,435		
AER $/unit	[redacted]	[redacted]	[redacted]	[redacted]		

2.3.2.3. Comparison of historical rates with AER approved rates

Figure 2.6 shows the actual unit rate has been consistently higher than the benchmark unit rate over the current AA period and is expected to remain that way going forward.

Figure 2.6: Existing home services unit rates ($2019/20)



Two factors that have contributed to the higher unit rates are:

- the introduction of a new internal installation standard (as outlined in section 2.3.1.3) resulting in increased contactor and materials costs; and
- as the pool of non-connected established dwellings available for gas connection declines, the available properties remaining has seen more complex connections being undertaken. For example, we are now connecting dwellings on large sites, sloping blocks, major roads and within the hills zone.

2.3.2.4. Are current costs efficient?

The current costs incurred reflect competitively tendered contractor and material costs. These rates are efficient as they have been determined through competitive market processes in line with our procurement processes. As we operate networks across Australia, we will compare to rates experienced in other jurisdictions where the work is sufficiently similar.

2.3.2.5. Forecast unit rates

The forecast unit rate for installing new services at existing homes during the next AA period is [redacted]/unit.

The forecast is based on the year-to-date actual unit rate for 2019/20 for both contractor and materials/other costs. The current actual approach is appropriate because the volume and type of work we expect to carry out in the next AA period is similar in nature to what has recently been delivered.

In addition, the unit rate for existing home services continues to experience an upward trend in costs associated with increased health, safety, technical and council requirements, traffic management and reinstatement requirements. The current actuals therefore provide an appropriate and conservative basis for forecasting the costs we expect to incur over the next AA period.

2.3.3. New multi-user services

Forecasting Approach: **Current actuals**

2.3.3.1. Nature of works and costs

This work encompasses the laying of services to premises that have more than one customer, such as units and apartment buildings. These projects usually arise due to site redevelopment and are therefore rarely greenfield projects. The volume of multi-user services completed each year is relatively stable, however, this work is subject to a degree of inter-year variability because the scope of work can vary from small unit sites containing three or four dwellings to large multiple dwelling developments. The scale of a multi-user site directly affects both contractor and material costs.

2.3.3.2. Historical and forecast unit rates

Table 2.7 sets out actual unit rates incurred in laying multi-user services over the current AA period and the forecast for the next AA period.

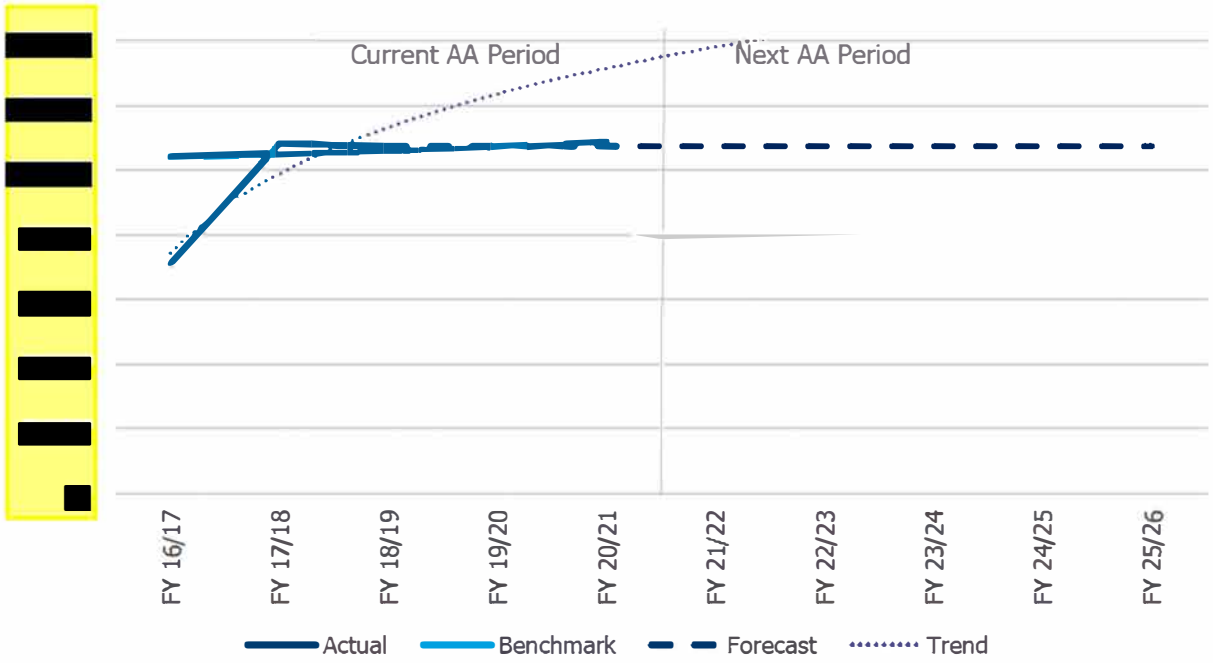
Table 2.7: New multi-user services forecast unit rates ($2019/20)

New multi-user services	2016/17	2017/18	2018/19	2019/20 YTD Mar20	3 year weighted average	Forecast for next AA period
Contractor rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Materials/Other rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual $/unit	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual volumes (services)	221	183	190	146		
AER volumes (services)	83	77	77	91		
AER $/unit	[redacted]	[redacted]	[redacted]	[redacted]		

2.3.3.3. Comparison of historical rates with AER approved rates

Figure 2.7 shows the actual unit rate in 2016/17 was below the benchmark, with actual unit rates in 2017/18 and 2018/19 trending slightly above the benchmark.

Figure 2.7: New MUS Unit Rates ($2019/20)



The actual unit rates incurred during the current AA period are relatively stable, and we expect to achieve a similar rate over the next AA period. The low rate shown in Figure 2.7 for 2016/17 is due to a data capture issue against this relatively new activity code following the transition to a new IT system (Maximo) in that year.

2.3.3.4. Are current costs efficient?

The current costs incurred reflect competitively tendered contractor and material costs. These rates are efficient as they have been determined through competitive market processes in line with our procurement processes. As we operate networks across Australia, we will compare to rates experienced in other jurisdictions where the work is sufficiently similar.

2.3.3.5. Forecast unit rates

The forecast unit rate for installing new multi-user services during the next AA period is [redacted] unit.

The forecast is based on the current year to date actual unit rate for 2019/20 for both contractor and materials/other costs. The current actual rate is appropriate because the volume and type of work we expect to carry out in the next AA period is similar in nature to what has recently been delivered.

There remains upward pressure on costs due to increased health, safety, technical and council requirements. The current actuals therefore provide an appropriate and conservative basis for forecasting the costs we expect to incur over the next AA period.

2.3.4. New I&C services (<10TJ per year)

Forecasting approach: Weighted average of historical actuals

2.3.4.1. Nature of works and costs

This work involves the laying of services for I&C premises that consume less than 10TJ of gas per year. It is lower volume work and subject to a high degree of variation because the scope and

complexity of work is site and customer specific. Projects can vary from small diameter basic commercial connections in suburban streets to complex industrial connections along roads or within the Adelaide CBD.

2.3.4.2. Historical and forecast unit rates

Table 2.8 sets out actual unit rates incurred laying services at I&C premises over the last three years and the forecast for the next AA period.

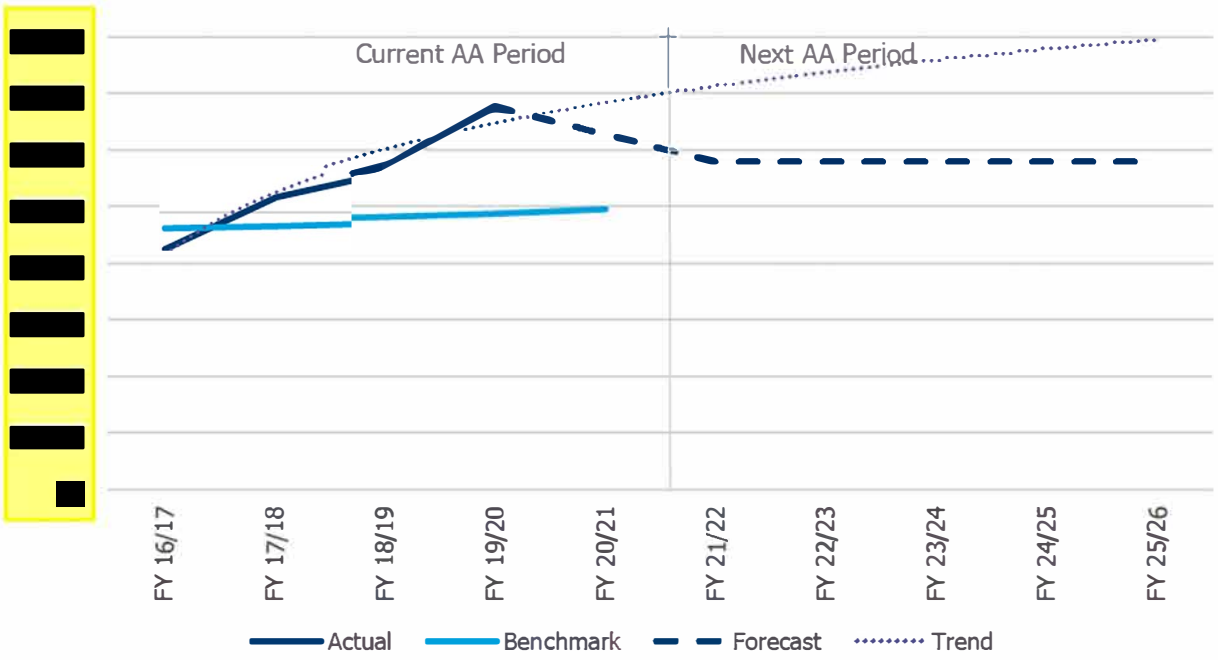
Table 2.8: New I&C services forecast unit rates ($2019/20)

New I&C services	2016/17	2017/18	2018/19	2019/20 YTD Mar20	3 year weighted average	Forecast for next AA period
Contractor rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Materials/Other rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual $/unit	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual volumes (services)	330	337	364	212		
AER volumes (services)	259	229	272	277		
AER $/unit	[redacted]	[redacted]	[redacted]	[redacted]		

2.3.4.3. Comparison of historical rates with AER approved rates

Figure 2.8 shows actual unit rates have been well above the benchmark unit rate approved by the AER, except for in 2016/17 where they were slightly below.

Figure 2.8: New I&C services (<10TJ) unit rates ($2019/20)



The volatility exhibited by the components of the actual unit rates reflects the impact of site and customer specific requirements on costs. The inter-year variability is largely due to the increase in

Adelaide CBD commercial developments established with steel pipe inlets that occurred in 2017/18, 2018/19 and 2019/20. These types of developments are expected to continue over the next AA period.

2.3.4.4. Are current costs efficient?

The current costs incurred reflect competitively tendered contractor and material costs. These rates are efficient as they have been determined through competitive market processes in line with our procurement processes. As we operate networks across Australia, we will compare to rates experienced in other jurisdictions where the work is sufficiently similar.

2.3.4.5. Forecast unit rates

The forecast unit rate for installed new I&C services during the next AA period is [redacted]/unit.

The forecast for contractor and material/other costs is based on the weighted average of historical actuals. This is consistent with the approved approach in the recent Victorian AA.

This approach is appropriate for new I&C services as the work involves lower volumes which are subject to a high degree of variability. The complexity of each project is site/customer specific, making it difficult to derive meaningful assumptions on the work mix over the next AA period.

2.4. New meters

The unit rates we incur when installing a new meter differs depending on the type of meter installed (i.e. whether it is a domestic or an I&C meter). The new meter unit rates include both the cost of the meter and costs associated with the installation of the meter. Note the metering unit rates in this Unit Rates Report apply to the metering units only.

2.4.1. New domestic meters

Forecasting approach: Current actuals

2.4.1.1. Nature of works and costs

Installing domestic gas meters for new connections involves:

- procuring new meters, including quality control;
- planning and scheduling of meter installations;
- organising resources (combination of direct and contractor) to carry out the meter installation; and
- installing the new meter and carrying out a safety check and appliance commissioning.

This work is high volume and associated unit rates are relatively stable.

2.4.1.2. Historical and forecast unit rates

The table below sets out the actual unit rates incurred installing domestic gas meters for new connections over the current AA period and the forecast for the next AA period.

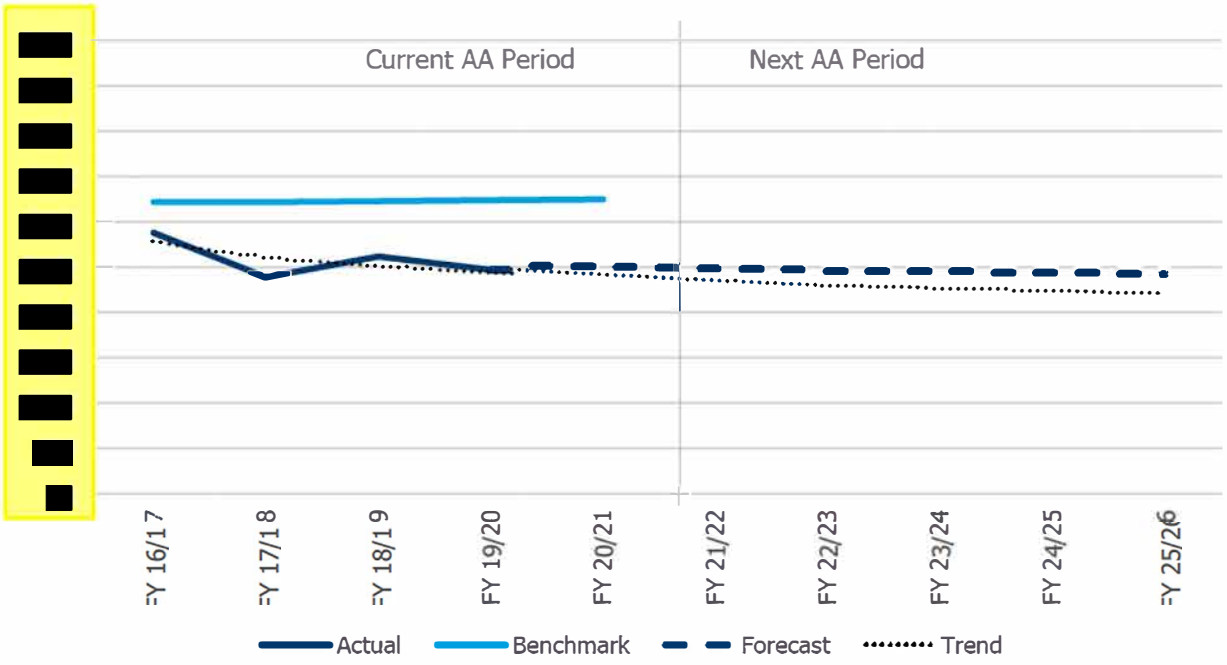
Table 2.9: New domestic meters forecast unit rates ($2019/20)

New domestic meters	2016/17	2017/18	2018/19	2019/20 YTD Mar20	3 year weighted average	Forecast for next AA period
Contractor rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Materials/Other rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual $/unit	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual volumes (meters)	8,025	8,238	7,966	5,941		
AER volumes (meters)	6,819	6,491	6,679	7,075		
AER $/unit	[redacted]	[redacted]	[redacted]	[redacted]		

2.4.1.3. Comparison of historical rates with AER approved rates

Figure 2.9 shows actual unit rates for new domestic meters have been lower than the approved benchmarks and are expected to remain that way over the remainder of the current AA period.

Figure 2.9: New domestic meters forecast unit rates ($2019/20)



The lower rates are driven by lower materials/other costs incurred over the current AA period compared to the benchmark.

The current contract for acquisition of new domestic meters (with suppliers [redacted]) commenced on 1 June 2016 and was due to expire on 1 June 2020. We have exercised a one-year extension of this contract to 1 June 2021.

Given the global economic climate, restrictions and uncertainty due to COVID-19, we considered issuing a full retender in the prevailing economic climate would not be conducive to achieving an optimal outcome. We therefore chose to extend the existing contract to allow the industry and economic to normalise before going to tender.

We have therefore based our forecast on the current actual rates being achieved.

2.4.1.4. Are current costs efficient?

The current costs incurred reflect competitively tendered contractor and material costs. These rates are efficient as they have been determined through competitive market processes in line with our procurement processes. As we operate networks across Australia, we will compare to rates experienced in other jurisdictions where the work is sufficiently similar.

2.4.1.5. Forecast unit rates

In the next AA period, the unit rate for domestic meter connections is forecast to be [redacted]/meter, which is 23% lower than the benchmark for the current AA period.

The forecast is based on the current year to date actual unit rate for 2019/20 for both contractor and materials/other costs. The current actuals approach is appropriate because the volume and type of work that is expected to be carried out in the next AA period is similar in nature to what has recently been delivered.

There remains upward pressure on costs due to increased health, safety, technical and council requirements. The current actuals therefore provide an appropriate and conservative basis for forecasting the costs we expect to incur over the next AA period.

2.4.2. New I&C meters

Forecasting Approach: Weighted average of historical actuals

2.4.2.1. Nature of works and costs

Installing gas meters for new I&C meters (<10TJ p.a.), involves:

- procuring new meters, including quality control;
- fabrication of meter and regulator sets
- planning and scheduling of meter installations;
- organising resources (combination of direct and contractor) to carry out the meter installation; and
- installing the new meter and carrying out any relevant safety checks.

The work is lower volume and subject to a significant degree of volatility because the scope of work can differ from year to year depending on the number and size of I&C meters that need to be connected. The nature and complexity of work poses a challenge, particularly with the limited access and high installation cost around the Adelaide CBD.

2.4.2.2. Historical and forecast unit rates

Table 2.10 sets out the actual unit rates incurred when connecting I&C meters over the current AA period and the forecast for the next AA period.

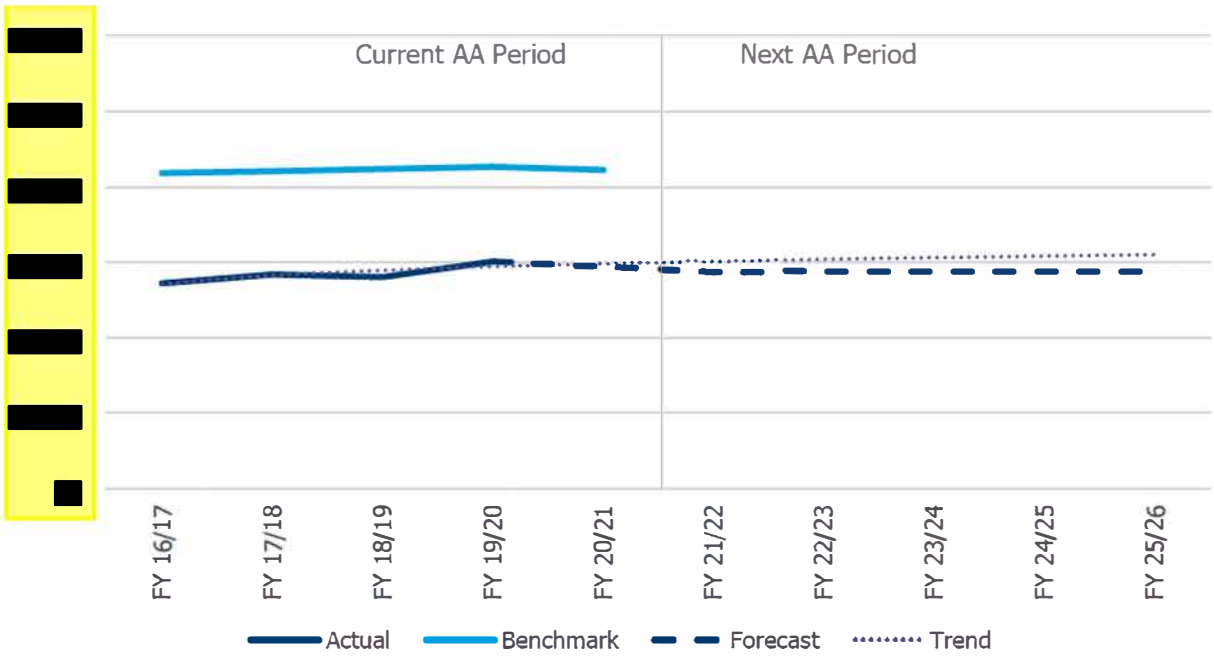
Table 2.10: New I&C meters forecast unit rates ($2019/20)

New I&C meters	2016/17	2017/18	2018/19	2019/20 YTD Mar20	3 year weighted average	Forecast for next AA period
Contractor rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Materials/Other rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual $/unit	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual volumes (meters)	346	456	468	375		
AER volumes (meters)	259	229	272	277		
AER $/unit	[redacted]	[redacted]	[redacted]	[redacted]		

2.4.2.3. Comparison of historical rates with AER approved rates

Figure 2.10 shows actual unit rates have been lower than the approved benchmarks and are expected to remain that way over the remainder of the current AA period.

Figure 2.10: New I&C meter sets forecast unit rates ($2019/20)



As with I&C services, it is difficult to compare unit rates for I&C meters over time and with a benchmark because they can vary substantially from year to year depending on the number and size of I&C meters that need to be installed as well as the location (i.e. meter room, ventilation requirements, sleeved services) the load, the number of meters installed and the type of end user.

2.4.2.4. Are current costs efficient?

Large I&C meter connections are predominantly carried out by a mixture of internal staff and contractors depending on the scale of the job. While the work is not subject to a competitive tender, it can still be viewed as efficient given:

- there are incentives to minimise connections costs under the outsourcing arrangement with our operations and management service provider, APA; and
- materials are procured through a competitive procurement process.

2.4.2.5. Forecast unit rates

The forecast unit rate for I&C meter connections in the next AA period is [redacted]/meter. The forecast for contractor and material/other costs is based on the weighted average of historical actuals.

This approach is appropriate as installing new I&C meters involves lower volumes of work that are subject to a high degree of variability. This makes it difficult to derive meaningful assumptions on the work mix over the next AA period.

3. Meter replacement

3.1. Summary

The unit rates we incur when replacing meters differs depending on the type of meter being replaced (industrial and commercial or domestic application) and the use of new or refurbished meters. There are two forecast unit rates under the meter replacement capex program;

1. Meters < 25m3 (Domestic)
2. Meters > 25m^3 (I&C)

The unit rate for replacing domestic meters is forecast to be higher in the next AA period than the approved benchmark in the current AA period. This is because in recent years there has been a change in the mix of refurbished vs new meters, with fewer refurbished meters available and a higher proportion of new meters being installed.

We have also implemented a change in work practices when our contractors conduct PMCs. The technician is required to conduct more ancillary and associated works when attending each meter (such as sealing or replacing the meter box), with the aim of reducing the frequency of visits and extending the life of the assets where practicable. This change contributes to the higher meter replacement unit rates over the next AA period.[8]

We have used the current actual unit rate as the basis for forecasting the domestic meter unit rate, and based on current information we expect to maintain this unit rate over the next AA period. The unit rate for replacing commercial meters is calculated by using a weighted average of historical actuals. The commercial meter unit rate is forecast to be consistent with that achieved over the current AA period.

Meter replacement unit rate	Rate for next AA period	Change from current AA benchmark	Forecasting Approach
Meters < 25m^3 (Domestic)	[redacted]	[redacted] (64%)	Current actuals
Meters > 25m^3 (I&C)	[redacted]	[redacted] 0%)	Weighted average of historical actuals

[8] Note the higher domestic meter unit rate over the next AA period is offset to some extent by a significant reduction in the volume of domestic meter replacements. Refer to the Meter Replacement Plan for more information on replacement volumes.

3.2. Meter replacement – Meters < 25m³ (Domestic)

Forecasting approach: Current actuals

3.2.1. Nature of works and costs

Replacing domestic gas meters involves:

- procuring any new or refurbished meters required, including quality control;
- planning and scheduling of meters to be changed over;
- organising resources (combination of direct and contractor) to carry out the meter change, which includes testing of outlet service and relighting appliances, and if required, re-attending premises after hours if the customer requires assistance;
- testing meters brought in from the field;
- life extension; and
- refurbishing meters as required.

The replacement of domestic meters over the next AA period is required to ensure meters are calibrated and fit for purpose in accurately measuring gas usage within +/– 2%, as required by Australian Standard AS4944 and the South Australian Gas Metering Code.

3.2.2. Historical and forecast unit rates

Table 3.1 sets out actual unit rates incurred in replacing domestic gas meters over the current AA period and the forecast for the next AA period.

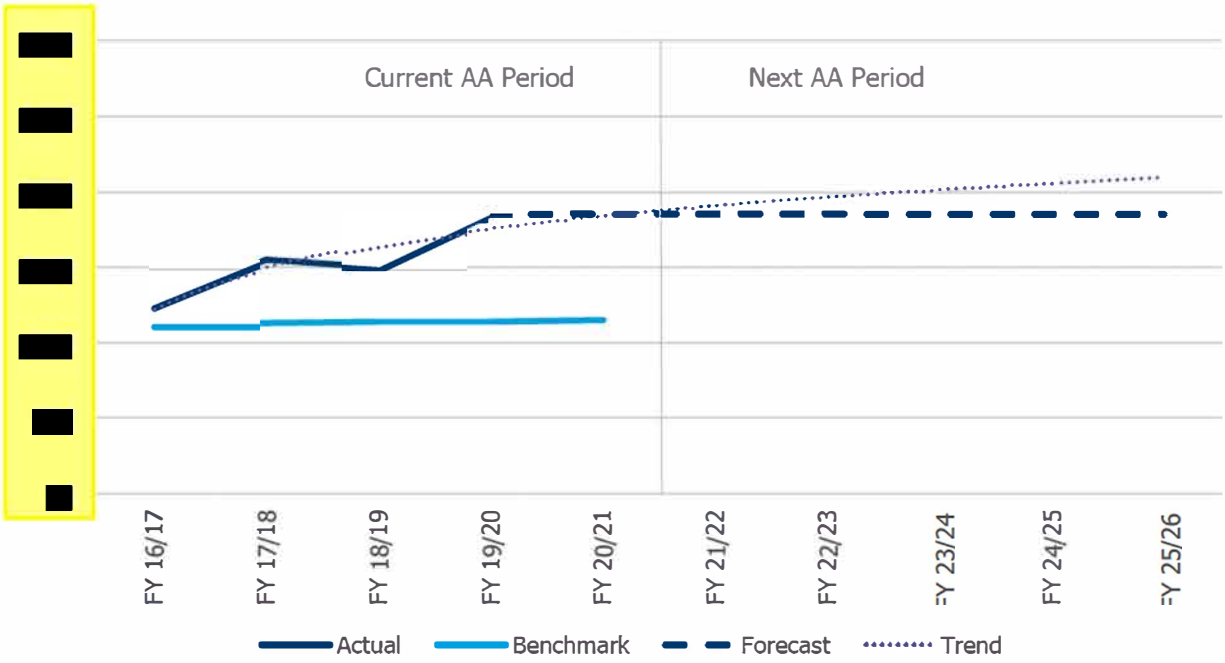
Table 3.1: Meters < 25m³ (Domestic) meter replacement forecast unit rates ($2019/20)

Domestic meter replacement	2016/17	2017/18	2018/19	2019/20 YTD Mar20	3 year weighted average	Forecast for next AA period
Contractor rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Materials/Other rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual $/unit	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual volumes (meters)	40,560	27,189	35,485	11,529		
AER volumes (meters)	37,347	35,064	31,101	24,077		
AER $/unit	[redacted]	[redacted]	[redacted]	[redacted]		

3.2.3. Comparison of historical rates with AER approved rates

Figure 3.1 shows the actual unit rates for domestic meter replacement have been consistently higher than the benchmark.

Figure 3.1: Meters<25m³ (Domestic) meter replacement unit rates ($2019/20)



The primary cause of the higher-than-expected domestic meter replacement unit rate is a change in the mix of refurbished to new meters in recent years. The availability of refurbished meters has decreased[9], which means an increasing proportion of new meters have been installed over the past three years. New meters are more expensive than refurbished meters.

Table 3.2 shows the proportion of new compared to refurbished meters has increased from a weighted average of approximately 22% in the previous AA period (July 2011 to June 2016) to a weighted average of 40% weighted average in the current AA period.

Table 3.2: Percentage of new and refurbished meters <25m³ (Domestic)

Domestic PMC	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
New meters	2,805	1,935	7,398	5,975	6,876	18,539	9,0289	14,189
Refurbished meters	17,439	19,499	21,431	18,086	24,786	22,021	18,161	21,296
Total	**20,244**	**21,434**	**28,829**	**24,061**	**31,662**	**40,560**	**27,189**	**35,485**
% new	16%	11%	26%	25%	22%	46%	33%	40%

We expect this trend of installing a greater proportion of new meters to continue into the next AA period. This results in higher costs for each replacement.

The increase in unit rates between 2018/19 and 2019/20 (as shown in Figure 3.1) is also driven in part by the commencement of the new meter fitting/replacement contracts that commenced in April and May 2019 (as summarised in section 1.5.1). These new contracts have a higher rate as the technician is required to conduct extra ancillary works when carrying out periodic meter changes such as replacing or sealing the meter box and changing regulators.

[9] We have recently changed our practices to conduct more field life extension testing, with a view to increasing the useful life of meters. As a result, fewer meters are being taken out of the field, which means there are fewer meters available for refurbishment.

This extra work reflects the general ageing of these components of the meter set (which have a longer life than the meter itself). It is more cost effective to address these issues during the periodic meter replacement program than under their own program or in a piecemeal/reactive fashion. It is also administratively more costly (compared to the likely benefit) to split out the costs of these additional pieces of work into their own cost line.

3.2.4. Are current costs efficient?

The current costs incurred reflect competitively tendered contractor and material costs. These rates are efficient as they have been determined through competitive market processes in line with our procurement processes. As we operate networks across Australia, we will compare to rates experienced in other jurisdictions where the work is sufficiently similar.

3.2.5. Forecast unit rates

The forecast unit rate for changing domestic gas meters during the next AA period is [redacted]/meter.

As explained above, the availability of refurbished meters has decreased, leading to an increase in the proportion of new meters installed. The rate experienced in the 2019/20 represents the most recent market tested cost of performing the labour component of the work as the new contracts commenced in April/May 2019.

The forecast is based on the current year to date actual unit rate for 2019/20 for both contractor and materials/other costs. The current actuals approach is appropriate because the volume and type of work that is expected to be carried out in the next AA period is similar in nature to what has recently been delivered.

In addition, the unit rate continues to experience an upward trend in costs associated with increased health, safety and technical requirements. The current actuals therefore provide an appropriate and conservative basis for forecasting the costs that are expected to be incurred over the next AA period.

3.3. Meter replacement – Meters > 25m^3 (I&C)

Forecasting approach:	Weighted average of historical actuals

3.3.1. Nature of works and costs

Replacing commercial gas meters involves:

- procuring any new or refurbished meters required, including quality control;
- fabrication of site-specific fittings and pipework;
- planning and scheduling of meters to be changed over;
- organising resources to carry out the meter change in conjunction with customer requirements/restrictions;
- testing meters brought in from the field; and
- refurbishing meters, as required.

The replacement of commercial gas meters does not include the various pipes, values and ancillary components referred to as the 'meter set'. These items typically have a longer useful life than the meter itself and are costed individually by project and are outside the scope of this paper (see for example business case SA108).

This work is lower volume but subject to a significant degree of volatility because the scope of work can differ depending on the mix of sizes of the non-domestic meters that need to be replaced.

3.3.2. Historical and forecast unit rates

Table 3.3 sets out actual unit rates incurred in changing non-domestic gas meters over the current AA period and the forecast for the next AA period.

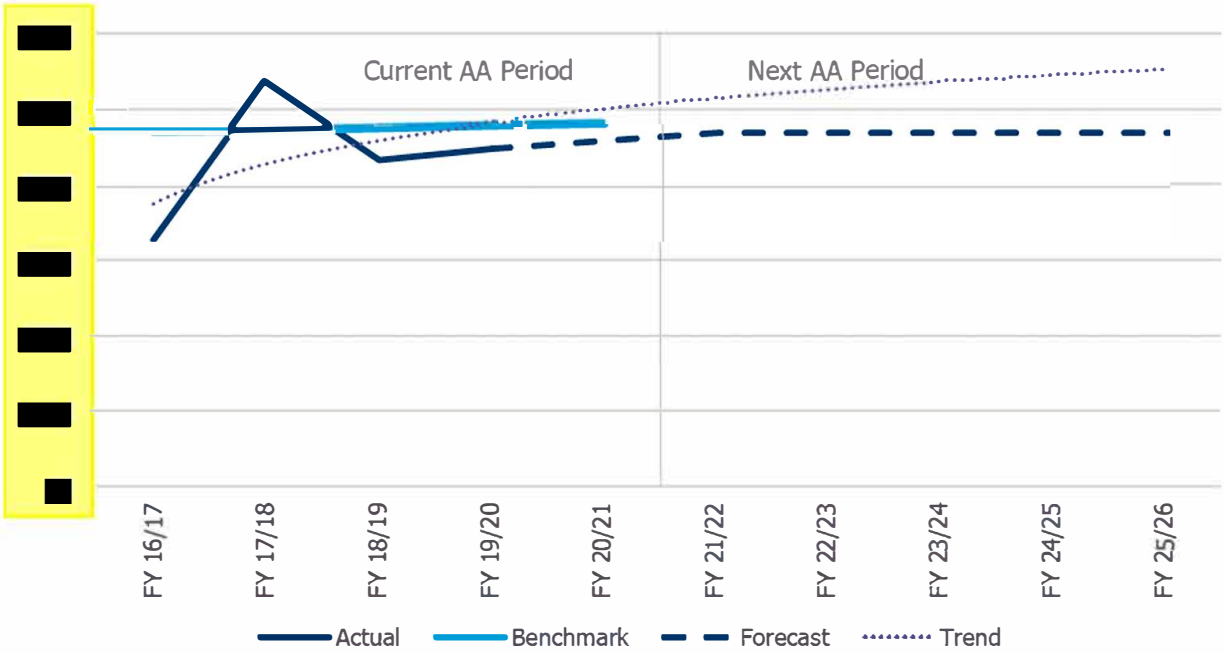
Table 3.3: Meters > 25m3 (I&C) meter replacement forecast unit rates ($2019/20)

Commercial meter replacement	2016/17	2017/18	2018/19	2019/20 YTD Mar20	Weighted average	Forecast for next AA period
Contractor rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Materials/Other rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual $/unit	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual volumes (meters)	814	1,078	1,146	1,460		
AER volumes (meters)	860	955	1,059	1,013		
AER $/unit	[redacted]	[redacted]	[redacted]	[redacted]		

3.3.3. Comparison of historical rates with AER approved rates

Figure 3.2 shows the actual unit rates incurred over the current AA period have been alternating above and below the benchmark unit rate approved by the AER and have been subject to a degree of inter-year variability.

Figure 3.2: Meters >25m³ (I&C) meter replacement unit rates ($2019/20)



The variability in observed unit rates reflects the differences in the number and size of the I&C meters that need to be changed each year (i.e. in some years there may be a greater number of larger models that need to be replaced than in previous years). This will affect the replacement/refurbishment cost, with costs shown to vary by up to 13 times when comparing replacement of a small I&C meter to a large industrial turbine meter, for example.

3.3.4. Are current costs efficient?

Large I&C meter changes are carried out by a mixture of internal staff and contractors depending on the scale of the job. While the work is not subject to a competitive tender, it can still be viewed as efficient given:

- there are incentives to minimise connections costs under the outsourcing arrangement with our operations and management service provider, APA; and
- materials are procured through a competitive procurement process.

3.3.5. Forecast unit rates

The forecast unit rate for changing commercial gas meters during the next AA period is [redacted]/meter.

The forecast for contractor and materials/other costs is based on the weighted average of historical actuals. This approach is appropriate for I&C meter replacements as it involves lower volumes of work which are subject to a high degree of variability. The site and customer-specific

requirements of each job make it difficult to derive meaningful assumptions on the work mix over the next AA period and therefore we have used the weighted average of historical actuals.

4. Mains replacement

4.1. Summary

The unit rate we incur when carrying out mains replacement and related activities varies depending on the category of mains and location. Categories and location of mains are detailed in the Distribution Mains and Services Integrity Plan (DMSIP) (refer Attachment 8.3). There are nine unit rate categories for mains replacement activities.

Mains replace is typically high volume work, and is subject to cost increases (as discussed in section 4.1.1), therefore for most unit rate categories we us the current actuals approach to estimate forward-looking unit rates. Piecemeal mains replacement is lower volume work and MUS replacement is subject to variability, as such we use a weighted average of historical actuals to forecast these unit rates.

Table 4.1 shows how the unit rate categories relate to the mains categories in the DMSIP, the work activity associated with that unit rate and the forecasting approach.

Table 4.1: Mains replacement unit rate and DMSIP categories

Unit rate category	DMSIP categories	Work activity	Forecasting approach
CI/UPS – Block	CI/UPS - block	Replacement by insertion	Current actuals
CI/UPS – North Adelaide	CI/UPS - block	Replacement by insertion	Current actuals (for Adelaide CBD)
HDPE 250 - remaining	HDPE 250 - remaining	Replacement by insertion	Current actuals
HDPE 575 - DN50 HP & MP	HDPE 575 DN50 - HP HDPE 575 DN50 - MP	Inspection by in line camera and reinforcement at squeeze off points	Current actuals
HDPE 575 - DN40 HP	HDPE 575 DN40	Replacement by insertion	Current actuals
HDPE 575 - DN40 MP	HDPE 575 DN40	Replacement by direct burial	Current actuals plus a premium for direct burial as per contractor schedule of rates
Piecemeal mains replacement	Piecemeal mains replacement	Replacement by insertion or direct burial	Weighted average
Multi-user services (MUS)	MUS – Priority 1	Replacement by insertion of services	Weighted average
Non AMRP service replacement	Non AMRP service replacement	Reactive replacement by insertion	Current actuals

Of the nine unit rate categories for mains replacement and related activities in the next AA period, one is lower, six are higher and two are new compared to the benchmark rates approved for the current period (see Table 4.2).

Table 4.2: Summary of mains replacement unit rate changes from benchmark

Mains replacement unit rate	Rate for next AA period	Change from current AA benchmark
CI/UPS – Block	[redacted]	↑[redacted] (17%)
CI/UPS – North Adelaide(1)	[redacted]	↑[redacted] (14%)
HDPE 250 - remaining	[redacted]	↓[redacted] (4%)
HDPE 575 - DN50 HP & MP camera inspection and reinforcement(2)	[redacted]	↑[redacted] (4%)
HDPE 575 - DN40 HP	[redacted]	↑[redacted] (8%)
HDPE 575 - DN40 MP	[redacted]	n/a(3)
Piecemeal mains replacement	[redacted]	↑[redacted] (65%)
Multi-user services	[redacted]e	↑[redacted] (22%)
Non AMRP service replacement	[redacted]	n/a(4)

(1) Similar in complexity to replacement in the Adelaide CBD in the current AA period.

(2) This was a separate business case (SA52) in the current AA period and now forms part of our ongoing management of at risk mains in the next AA period.

(3) This is new in the next AA period as capacity constraints mean these mains cannot be replaced by insertion.

(4) No benchmark was set for the current AA period.

Further detail on the unit rates associated with the mains replacement categories is provided in sections 4.2 to 4.10.

4.1.1. Factors impacting mains replacement unit rates

Consistent with NGR 74, the forecast unit rates for mains replacement and associated activities have been arrived at on a reasonable basis. They are informed by recent revealed costs of the work that will be undertaken over the next AA period and reflect the best estimate possible in the circumstances.

While we have made every effort to derive accurate forecast unit rates, several factors are expected to place upward pressure on the unit rates for mains replacement activities over the next AA period. These are discussed below.

- Costs of carrying out work will increase over time as additional administrative and safety standards (including specialist traffic control, access and permit requirements, third party approval processes, etc.) give rise to higher contractor costs. For example, in recent years, local authorities have designated Tree Protection Zones, which require the use of non-destructive excavation (for example, hydro or manual excavation as opposed to mechanical).
- Road reinstatement specifications and traffic management specifications are becoming more stringent. For example, we are now required to conduct full lane with profiling for roads under five years old. Specifications can also vary by local authority. This contributes to higher costs, although the impact of this cost pressure on current unit rates has been masked to some extent by volatility in the mix of work completed.
- In July 2019, we introduced a new meter location compliance procedure order to comply with the updated Australian Standards AS 4645 and AS 5600. This has impacted the unit rate for

2019/20 by imposing additional requirements to relocate or protect gas meters in compliance with the new procedures. More detail is provided on this change in section 4.1.1.1 below.

- South Australian Power Networks (SAPN) has amended its requirements in terms of excavation around its SAPN assets. Excavations to be undertaken within 3 metres of a stobie pole require a permit, spotter and the stobie pole to be supported by a concrete cube structure. This change commenced in December 2019[10] and was not part of the tender rates submitted for 2020 annual mains replacement package.

  The increased cost of excavations around SAPN assets is noticeable over the last four months. While the current year to date actual unit rate has risen due to this change, the full cost impact is expected to be quantified as we complete future mains replacement works.

4.1.1.1. Meter compliance procedure

Since the introduction of the meter compliance procedure, we will relocate meters if we identify a meter in a non-compliant position during the course of conducting mains replacement. Therefore the relocation is completed while we are working in the area. Incorporating this additional activity as part of the ongoing mains replacement program is more cost effective than addressing these non-compliant meters as part of a bespoke piecemeal program.

Table 4.2 outlines the new criteria for non-compliant meters and how the new procedure requires us to take action to meet the Australian Standards.

Table 4.3: Additional meter location compliance requirements

Criteria for non-compliance	Action prior to July 2019 as per Red Book Procedure 5612 Meter Location	Action post July 2019 as per 400-PR-QM-0011 0.0 National Meter Assembly Location Procedure
Gas meter located adjacent to car park in driveway (private and single occupancy domestic home) – vehicle within 1 metre of a meter set	Leave in place	Relocate meter or protect with bollards
Gas meter located on a wall and is installed less than 1 metre from a driveway	Leave in place	Relocate meter or install adequate protection

[10] SA Power Networks – Guidelines for Excavation near SA Power Networks Assets by APA Group – Version 1 06/12/2019

4.2. CI/UPS - Block

Forecasting Approach: Current actuals

4.2.1. Nature of works and costs

This work involves large detailed constructions, which comprise replacing existing cast iron (CI), unprotected steel (UPS) mains and other associated pipework in the network (including individual customer services, service risers, some polyethylene sections and associated meter set rebuilds).

The method of replacement is generally through insertion of the CI/UPS pipes with new PE pipe and upgrading the pressure.

There are two unit rates for the replacement of CI/UPS remaining in the network:

- CI/UPS – Block; and
- CI/UPS – North Adelaide.

This section discusses the unit rate associated with CI/UPS – Block, which is the larger portion of remaining CI/UPS in the network. The unit rate for CI/UPS – North Adelaide is discussed in section 4.3.

4.2.2. Historical and forecast unit rates

Table 4.4 sets out actual unit rates incurred in CI/UPS – Block replacement over the current AA period and the forecast for the next AA period.

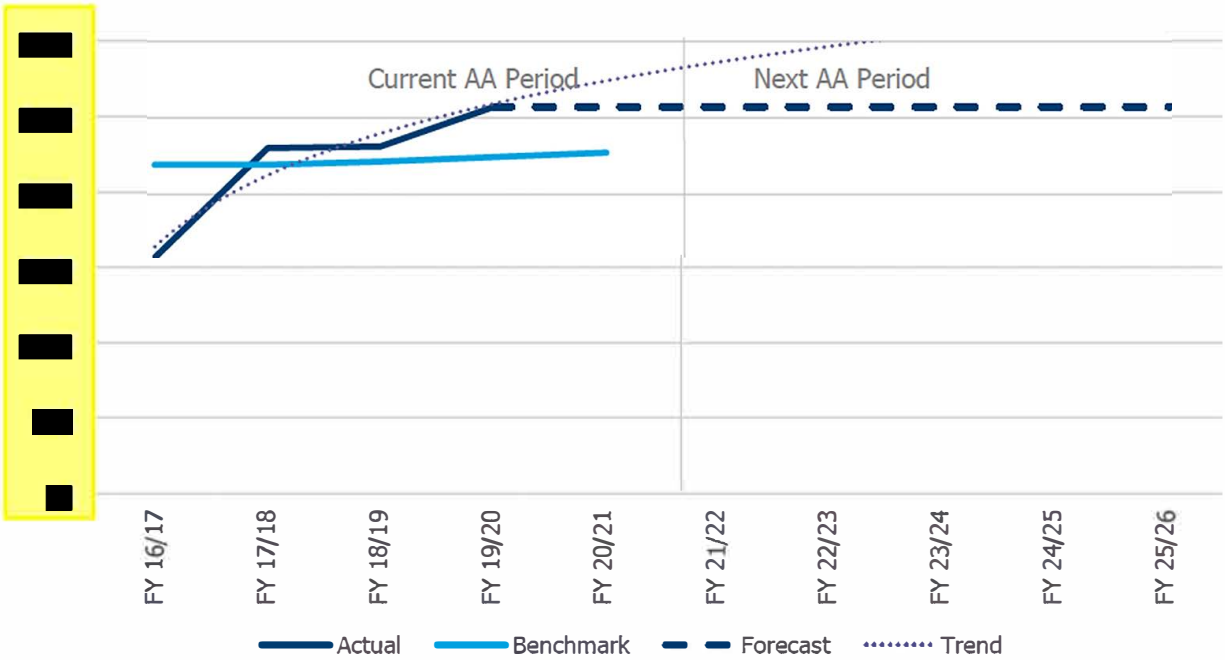
Table 4.4: CI/UPS – Block replacement forecast unit rates ($2019/20)

CI/UPS – Block	2016/17	2017/18	2018/19	2019/20 YTD Mar20	3 year weighted average	Forecast for next AA period
Contractor rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Materials/Other rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual $/unit	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual volumes (metres)	113,522	14,698	8,262	32,241		
AER $/unit	[redacted]	[redacted]	[redacted]	[redacted]		

4.2.3. Comparison of historical rates with AER approved rates

Figure 4.1 highlights that unit rates for CI/UPS - Block were lower than the approved benchmark for the first year of the current AA period and have since trended upwards, exceeding the AER benchmark over the last three years.

Figure 4.1: CI/UPS – Block replacement unit rates ($2019/20)



The lower cost in 2016/17 is related to the carryover of work from the previous AA period under previous contracts. The current mains replacement panel contract commenced in 2017.

Other factors to note in relation to the increase in the CI/UPS – Block unit rate are:

- an additional number of domestic gas meters are now required to be relocated to the nearest safe and compliant location as part of the gas service replacement as outlined in section 4.1.1.1 ;
- amended SAPN requirements in terms of excavation around its assets as outlined in section 4.1.1;
- increasing safety, technical, council, traffic management and reinstatement standards as discussed at 4.1.1 above; and
- shallow gas mains (i.e. not meeting minimum installation standards), have been identified in the Adelaide metropolitan areas, resulting in increased costs associated with un-scoped variations due to the need to relay the new gas main to specification via direct burial method.

4.2.4. Are current costs efficient?

The current costs incurred reflect competitively tendered contractor and material costs. These rates are efficient as they have been determined through competitive market processes in line with our procurement processes. As we operate networks across Australia, we will compare to rates experienced in other jurisdictions where the work is sufficiently similar.

4.2.5. Forecast unit rates

The forecast unit rate for CI/UPS – Block replacement is [redacted]/metre.

The forecast is based on the current year-to-date actual unit rate for 2019/20 for both contractor and materials/other costs. The current actuals approach is appropriate because the volume and type of work that is expected to be carried out in the next AA period is high and of a similar in nature to what has recently been delivered.

The unit rate continues to experience an upward trend in costs associated with increasing safety, technical, council, traffic control, third party asset owner requirements. The current actual rate reflects the increased cost due to all of the above mentioned factors, in particular the new meter location compliance procedure and the SAPN excavation requirements that both arose in 2019/20. The current actuals provide an appropriate and conservative basis for forecasting the costs we expect to incur over the next AA period.

Points worth noting about this forecast are:

- unlike some other networks (e.g. Victorian metropolitan area) that exhibit clear differences in mains replacement difficulty across outer and inner suburbs, mains replacement works in most areas of Adelaide (apart from the CBD and North Adelaide) are generally of similar nature. It has not therefore been necessary to develop suburb-by-suburb pricing for the purposes of forecasting;
- the CBD block historical unit rate is separate to the CI/UPS – Block replacement rate and does not form part of the historical rates or the forecast rate above.

Given the new meter location compliance procedure and the SAPN excavation requirements, we also conducted a bottom-up estimate for CI/UPS – Block. We did this to account for these additional costs and also to test whether the estimate using the current actual approach is reasonable. We used the contractor tendered rates for 2020 as the basis for this bottom-up estimate, and added expected additional costs related to the new requirements (as shown in Table 4.5 below).

This method derived a unit rate consistent with the current actual rate observed in 2019/20. We are therefore confident the current actual unit rate reflects the unit rate we will incur in the next AA period.

Table 4.5 summarises the bottom-up estimate for CI/UPS - Block.

Table 4.5: Bottom-up estimate for CI/UPS - Block forecast unit rates ($2019/20)

CI/UPS – Block **(bottom-up estimate)**		**Inputs**	**Tendered amount**	**Rate $/m**
CY2020 tendered contract rates (refer to Table 4.6)		[redacted]	[redacted]	[redacted]
Unscoped variations		5%		[redacted]
Allowances not in tenders	New meter location compliance procedure	[redacted]		[redacted]
	New SAPN excavation requirements	[redacted]		[redacted]
	Allowances for exemptions	[redacted]		[redacted]
	Project supervision	5%		[redacted]
Subtotal – contractor rate				[redacted]
Subtotal – Materials		[redacted]		[redacted]
Total				[redacted]

The assumptions used to derive the bottom up estimate are:

- contractor unit rate of [redacted]/metre is based on an evaluation of tenders received from the approved contractor panel;
- 5% unscoped variation allows for necessary adjustments to design during progress of works such as supply issues, actual mains alignment and depth or location of existing third party assets and gas mains or services, unforeseeable situations and additional works outside of original scope. It is also consistent with the average actual incurred variations for CI/UPS over the current AA period. It is worth noting that the actual unscoped variations for 2019/20 is 12%. This is related to the new meter location compliance procedure and partly to the new SAPN excavation requirements;
- materials cost of [redacted]/metre allows for pipe, fittings, regulators, mains and service valves, service risers, and other materials required to carry out the works;
- we assume 5% of the total meters will be found non-compliant to the new requirements and will require relocation at a cost of [redacted] each (based on historical average for domestic meter relocation). Total additional cost per meter is calculated at [redacted]/metre;
- we estimate 5% of the inlet services' tees are located within 3 metres of stobie poles and require a support structure, an SAPN permit and a spotter at a cost of [redacted] per support structure and [redacted] per permit including spotter. Total additional cost per meter is calculated at [redacted]/metre;
- contractors are permitted to claim for certain exemptions under their contract terms, examples of these are rock excavation, extra depth in excess of 1.5 metres, dewatering of excavations, specialist services such as removal of hazardous materials, arborist, extra reinstatement over break out due to council/resident requests and direct burial of shallow mains; and
- APA cost of project management, supervision, safety audits, and other associated costs equates to an average of 5% of the full project cost.

A sample of the recently tendered CI/UPS work for 2020 is provided in Table 4.6.

Table 4.6: CI/UPS – Block tendered rates (CY2020)

Tender CI/UPS – Block for 2020 suburbs	Volume (residential gas meters)	Volume (meters)	Tendered contractor amount ($)	Contractor rate $/m
Brooklyn Park	1,169	18,349	[redacted]	[redacted]
Hilton-Mile End (A)	2,036	26,348	[redacted]	[redacted]
Kilburn	1,157	15,901	[redacted]	[redacted]
Medindie	559	12,854	[redacted]	[redacted]
Torrensville (A)	1,464	15,633	[redacted]	[redacted]
Tranmere	1,768	30,145	[redacted]	[redacted]
Vale Park	1,155	19,322	[redacted]	[redacted]
Total	**9,308**	**138,552**	[redacted]	[redacted]

The actual contractor rate component of the unit rate will comprise the tendered rate in addition to unscoped variations and allowances not included in the tender, as demonstrated in Table 4.5 above.

4.3. CI/UPS – North Adelaide

Forecasting approach:	Current Actuals

4.3.1. Nature of works and costs

This work involves large detailed constructions, which comprise replacing existing cast iron (CI), unprotected steel (UPS) mains and other associated pipework in the network (including individual customer services, service risers and associated meter set rebuilds). The method of replacement is generally through insertion of the CI/UPS pipes with new PE pipe and upgrading the pressure.

There are two unit rates for the replacement of CI/UPS remaining in the network:

- CI/UPS – Block; and
- CI/UPS – North Adelaide.

Section 4.2 above discusses the unit rate associated with CI/UPS – Block which is the larger portion of the remaining CI/UPS in the network. The unit rate for CI/UPS – North Adelaide is discussed in this section.

4.3.2. Complexity of mains replacement in North Adelaide

North Adelaide is an area adjacent to the Adelaide CBD. It is part of the Adelaide City Council Area. Many of the footpaths and buildings in this area are heritage listed. The North Adelaide area is heritage zoned except for the two commercial zoned areas around O'Connell Street and Melbourne Street.

O'Connell Street and Melbourne Street form busy and congested commercial and entertainment precincts. They are also the main arterial roads into the Adelaide CBD from the northern suburbs. A number of schools, universities and hospitals are located within North Adelaide, as well as a number of hotels, pubs and entertainment venues.

The replacement works in the next AA period in North Adelaide will involve working within a congested area which is a continuation of the Adelaide CBD. Similar conditions will be encountered in North Adelaide in terms of an increase in congestion of traffic and pedestrians, increased levels of reinstatement (fully paved footpaths, bluestone footpaths), increased working restrictions and increased commercial/business considerations (interruptions, coordination/liaison).

Similar requirements by the Adelaide City Council will be imposed in terms of performing a proportion of these works at night and on the weekends to minimise disruption to businesses, traffic and pedestrians. Night works increase costs due to:

- additional personnel costs where work is carried out outside normal working days/hours;
- additional costs for day crews supporting set up of site for night crews;
- additional costs relating to loader and trucks handling spoilage, due to commercial tips not being available at night; and

- a North Adelaide premium in recognition of the slower pace at which works can be completed due to the number of cut-offs needed, the number of utility assets in the ground and the need for extensive non-destructive and hand excavation to work around these utility assets.

To date, we have required contractors to complete tendered work at nighttime in the Adelaide CBD. Historical allowances for night work premiums have been established as part of the Adelaide CBD historical unit rate. This rate includes spoil handling costs and costs associated with day crews having to respond to matters that cannot be managed after hours such as:

- relight of customer appliances;
- maintaining barricading;
- completing final reinstatements;
- managing customer enquiries;
- liaising with impacted business/customer; and
- liaising with Adelaide City Council or other stakeholders that tend not to be available at night (this typically involves relocation of bus stops, preparation of mark outs, set up for night barricading and traffic control).

A number of factors contribute to the increased complexity of replacement works in North Adelaide compared to the general mains replacement works in the metropolitan suburbs. These factors are:

- increased complexity of mains and services configurations within the O'Connell Street and Melbourne Street commercial areas;
- high vehicle and pedestrian interaction;
- increase in changes of depth and direction of gas mains around other underground assets restricting length able to be replaced per shift;
- increase in hand excavation or vacuum excavation techniques due to congestion and proximity of underground assets in the O'Connell Street and Melbourne Street areas prohibiting mechanical means of excavations;
- programming to meet individual commercial customers 'gas required' times which can vary considerably; and
- impact of working in reduced light or under arc lights producing strong shadows.

No tenders have been conducted for North Adelaide. However, we consider the mains replacement works in the North Adelaide area will be similar in scope to the Adelaide CBD Block replacement, excluding any costs associated with large diameter trunk mains that were completed in the Adelaide CBD. We have therefore used the actual Adelaide CBD Block replacement unit rates as the basis (excluding costs incurred for large diameter trunk mains) for our North Adelaide unit rate estimate.

4.3.3. Historical and forecast unit rates

Table 4.7 sets out actual unit rates incurred in the Adelaide CBD Block replacement over the current AA period and the forecast for the next AA period for the CI/UPS – North Adelaide replacement.

Table 4.7: CI/UPS – CBD Block replacement historical unit rates and CI/UPS – North Adelaide forecast unit rates ($2019/20)

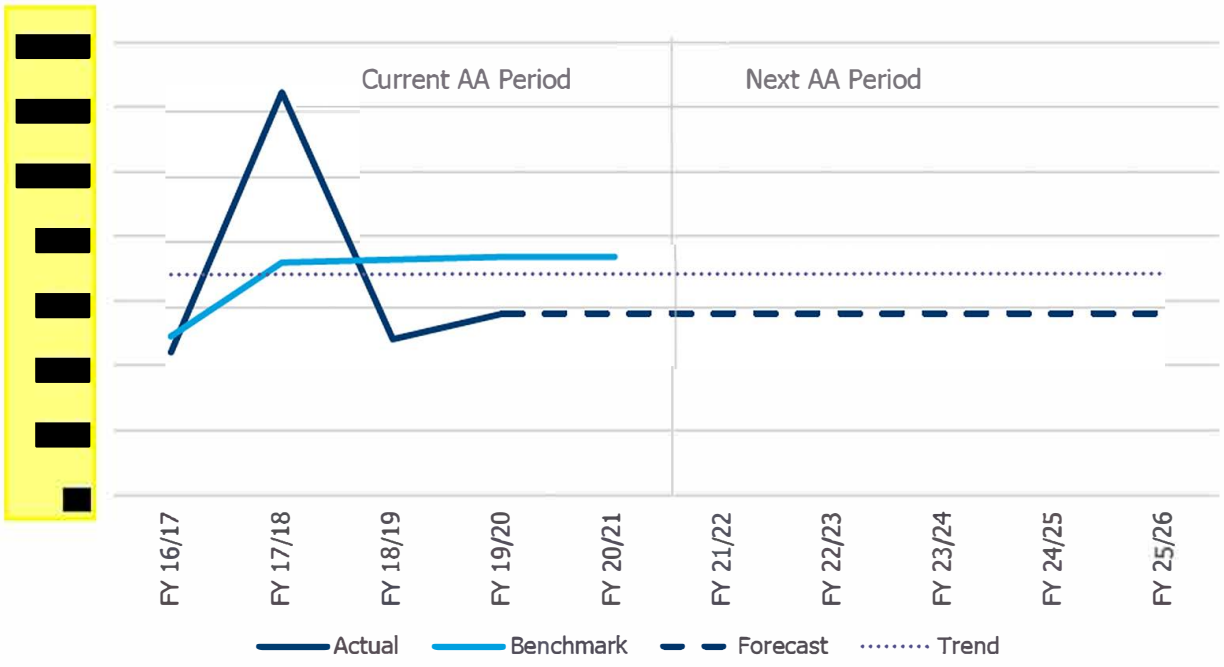
CI/UPS – North Adelaide	2016/17	2017/18	2018/19	2019/20 YTD Mar20	3 year weighted average*	Forecast for next AA period
Contractor rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Materials/Other rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual $/unit	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual volumes (metres)	17,400	2,000	11,800	8,848		
AER $/unit	[redacted]	[redacted]	[redacted]	[redacted]		

*Weighted Average does not include 2017/18.

4.3.4. Comparison of historical rates with AER approved rates

Figure 4.2 shows the unit rates for CBD block replacement were lower than the approved benchmark for 2016/17, spiked in 2017/18 and dropped back below the benchmark unit rates for 2018/19 and 2019/20.

Figure 4.2: CI/UPS – CBD block replacement historical unit rates and CI/UPS – North Adelaide forecast unit rates ($2019/20)



The rate spiked in 2017/18 due to a lower volume and more complex scope of works, which involved laying a large diameter trunk main in Grote Street (the major East to West thoroughfare in the centre of the Adelaide CBD). The unit rate for 2017/18 is deemed irrelevant to the works proposed in North Adelaide, with the 2018/19 and 2019/20 costs reflective of the additional complexity of works compared to metropolitan block that are expected as outlined at 4.3.2 above. These unit rates also fall below the approved benchmark for the current AA period.

4.3.5. Are current costs efficient?

The current costs incurred reflect competitively tendered contractor and material costs. These rates are efficient as they have been determined through competitive market processes in line with our procurement processes. As we operate networks across Australia, we will compare to rates experienced in other jurisdictions where the work is sufficiently similar.

4.3.6. Forecast unit rates

The forecast unit rate for the North Adelaide block replacement in the next AA period is [redacted]/metre.

As no tenders have been conducted for North Adelaide, the forecast is based on the current year-to-date actual Adelaide CBD Block replacement unit rate for 2019/20 for both contractor and materials/other costs. The current actual approach for work of a similar scope and complexity is appropriate and reflects the volume and type of work we expect to carry out in the next AA period (being similar in nature to what has recently been delivered).

Though the forecast unit rate is 14% higher than the current AA benchmark for CBD Block replacement, it is a 23% decrease relative to the 2018/19 benchmark. It should be noted that the North Adelaide unit rate is subject to upward pressure in costs associated with increasing safety, technical, council, traffic control, third party asset owner requirements.

The current actual rate reflects the increased costs resulting from all the above mentioned factors, in particular, the new meter location compliance procedure and the SAPN excavation requirements, which were both incurred in 2019/20. The current actuals therefore provide an appropriate and conservative basis for forecasting the costs we expect to incur over the next AA period.

4.4. HDPE 250

Forecasting approach:	Current actuals

4.4.1. Nature of works and costs

This work involves large detailed constructions, which comprise replacing existing high density polyethylene (HDPE) class 250 pipe in the network (including individual customer services, service risers and associated meter set rebuilds).

4.4.2. Historical and forecast unit rates

Table 4.8 sets out actual unit rates incurred for replacing HDPE 250 mains over the current AA period and the forecast for the next AA period.

Table 4.8: HDPE 250 replacement forecast unit rates ($2019/20)

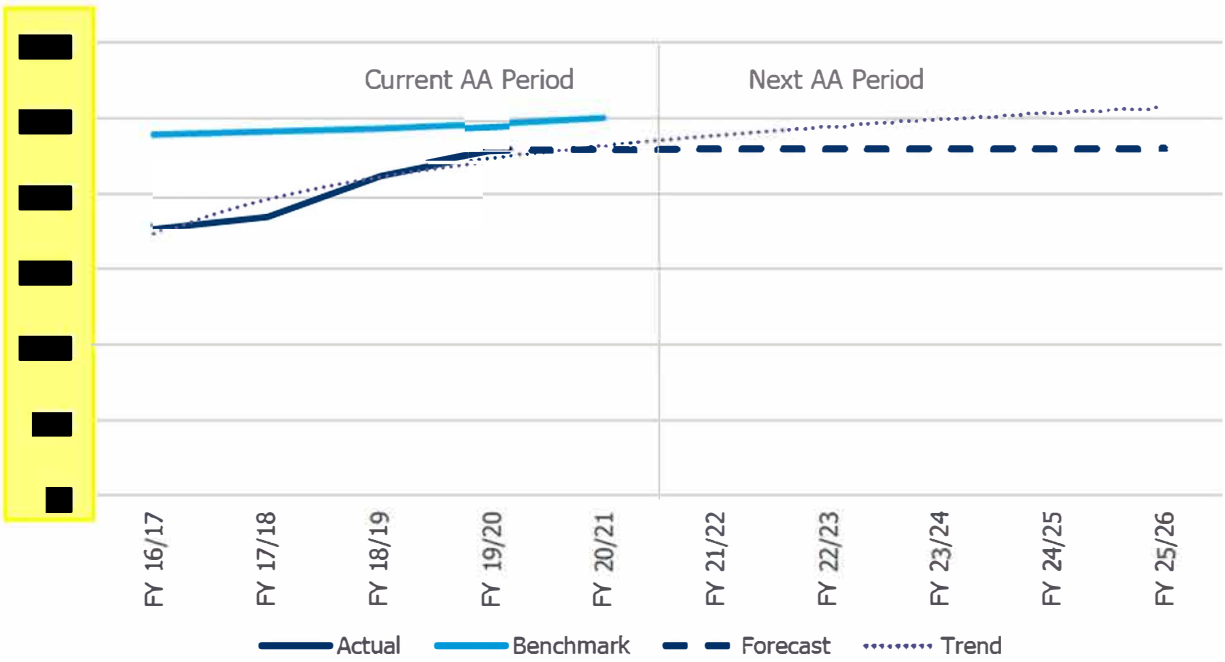
HDPE 250	2016/17	2017/18	2018/19	2019/20 YTD Mar20	3 year weighted average	Forecast for next AA period
Contractor rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Materials/Other rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual $/unit	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

HDPE 250	2016/17	2017/18	2018/19	2019/20 YTD Mar20	3 year weighted average	Forecast for next AA period
Actual volumes (metres)	47,283	129,769	60,603	46,927		
AER $/Unit	[redacted]	[redacted]	[redacted]	[redacted]		

4.4.3. Comparison of historical rates with AER approved rates

Figure 4.3 shows the unit rates for HDPE 250 were lower than the approved benchmark for the current AA period.

Figure 4.3: HDPE 250 replacement unit rates ($2019/20)



We note the rates have been trending upwards over the period and are forecast to continue this trend (as with other mains replacement activities).

4.4.4. Are current costs efficient?

The current costs incurred reflect competitively tendered contractor and material costs. These rates are efficient as they have been determined through competitive market processes in line with our procurement processes. As we operate networks across Australia, we will compare to rates experienced in other jurisdictions where the work is sufficiently similar.

4.4.5. Forecast unit rates

The forecast unit rate for HDPE 250 replacement in the next AA period is [redacted]/metre.

The forecast in based on the current year-to-date actual unit rate for 2019/20 for both contractor and materials/other costs. The current actual approach is appropriate because the volume and type of work we expect to carry out in the next AA period is similar in nature to what has recently been delivered.

Though the forecast unit rate is 4% lower than the current AA benchmark, the HDPE 250 unit rate is subject to upward pressure in costs associated with increasing safety, technical, council, traffic control, third party asset owner requirements. The current actual rate reflects the increased cost resulting from all the above mentioned factors, in particular the new meter location compliance procedure and the SAPN excavation requirements, which were both incurred in 2019/20. The current actuals therefore provide an appropriate and conservative basis for forecasting the costs we expect to incur over the next AA period.

A point worth noting about this forecast is that unlike some other networks (e.g. Victorian metropolitan area), which exhibit clear differences in mains replacement difficulty across outer and inner suburbs, mains replacement works in most areas of Adelaide (apart from the CBD and North Adelaide) are generally of similar nature. It has not therefore been necessary to develop suburb-by-suburb pricing for the purposes of forecasting.

Similar to CI/UPS – Block replacement, given the new meter location compliance procedure and the SAPN excavation requirements, we also conducted a bottom-up estimate for HDPE 250 replacement. We did this to account for these additional costs and also to test whether the estimate using the current actual approach is reasonable. We used the contractor tendered rates for 2020 as the basis for this bottom-up estimate, and added expected additional costs related to the new requirements (as shown in Table 4.9 below).

This method derived a unit rate consistent with the current actual rate observed in 2019/20. We are therefore confident the current actual unit rate reflects the unit rate we will incur in the next AA period.

Table 4.9 summarises the bottom-up estimate for HDPE 250.

Table 4.9: Bottom up approach for HDPE 250 forecast unit rates ($2019/20)

HDPE 250 (bottom-up)		Inputs	Tendered amount	Rate $/m
CY2020 tendered contract rates (Refer to Table 4.10)		[redacted]	[redacted]	[redacted]
Unscoped variations		6%		[redacted]
Allowances not in tenders	New meter compliance	[redacted]		[redacted]
	SAPN permits	[redacted]		[redacted]
	Allowances for exemptions	[redacted]		[redacted]
	Project supervision	5%		[redacted]
Subtotal – contractor rate				[redacted]
Materials		[redacted]		[redacted]
Total				[redacted]

The assumptions used to derive the bottom up estimate are:

- contractor unit rate of [redacted]/metre based on an evaluation of tenders received from the approved contractor panel;
- 6% unscoped variation allows for necessary adjustments to design during progress of works such as supply issues, actual mains alignment and depth or location of existing third party assets and gas mains or services, unforeseeable situations and additional works outside of

original scope. 6% is based on the average actual incurred variations for HDPE 250 over the current AA period. It is worth noting that the actual unscoped variations for 2019/20 is 13%. This is related to the new meter location compliance procedure and partly to the new SAPN excavation requirements;

- materials cost of [redacted]/metre allows for pipe, fittings, regulators, mains and service valves, service risers, and other materials required to carry out the works;
- we estimate 5% of the total meters will be found non-compliant to the new requirements and will require relocation at a cost of [redacted] each (based on historical average for domestic meter relocation). Total additional cost per meter is calculated at [redacted]/metre;
- we estimate 5% of the inlet services' tees are located within 3 metres of stobie pole and require a support structure, SAPN permit and spotter at a cost of [redacted] per support structure and [redacted] per permit including spotter. Total additional cost per meter is calculated at [redacted]/metre;
- contractors are permitted to claim for certain exemptions under their contract terms, examples of these are rock excavation, extra depth in excess of 1.5m, dewatering of excavations, specialist services such as removal of hazardous materials, arborist, extra reinstatement over break out due to council/resident requests and direct burial of shallow mains; and
- APA cost of project management, supervision, safety audits, and other associated costs, equates to an average of 5% of the full project cost.

A sample of recently tendered HDPE 250 work for 2020 is provided in Table 4.10.

Table 4.10: HDPE 250 replacement tendered Rates (CY2020)

Tender HDPE Class250 CY2020	Volume (residential gas meters)	Volume (meters)	Tendered contractor amount ($)	Contractor rate $/m
Black Forest	351	5,675	[redacted]	[redacted]
Ferryden Park	431	5,375	[redacted]	[redacted]
Hendon	61	1,715	[redacted]	[redacted]
Hilton Mile End (B)	397	1,300	[redacted]	[redacted]
Plympton Park	374	3,905	[redacted]	[redacted]
Pt Adelaide	329	6,991	[redacted]	[redacted]
Redwood Park	215	2,744	[redacted]	[redacted]
Rostrevor Magill	420	5,291	[redacted]	[redacted]
West Lakes – Delfin Island	525	11,298	[redacted]	[redacted]
Total	**3,103**	**44,294**	[redacted]	[redacted]

The actual contractor rate component of the unit rate will comprise the tendered rate in addition to unscoped variations and allowances not included in the tender, as demonstrated in Table 4.9.

4.5. HDPE 575 – DN50 HP and MP camera inspection and reinforcement

Forecasting approach: Current actuals

4.5.1. Nature of works and costs

This work involves using camera inspection technology to find, excavate and reinforce 'squeeze off' points where brittle slow crack growth can occur on HDPE class 575 pipe. Camera insertion can occur on pipe with nominal diameter DN50 and above. The works involve camera inspection and reinforcement with steel clamps on the following asset categories:

- HDPE 575 – DN50 high pressure (HP)
- HDPE 575 – DN50 medium pressure (MP)

4.5.2. Historical and forecast unit rates

Table 4.11 sets out actual unit rates incurred for HDPE 575 – DN50 HP and MP inline camera inspection and reinforcement work over the current AA period and the forecast for the next AA period.

These camera inspection activities were new in the current AA period. The benchmark cost was derived using a bottom up approach (see Business Case SA52 and Addendum that was submitted for the current AA period).

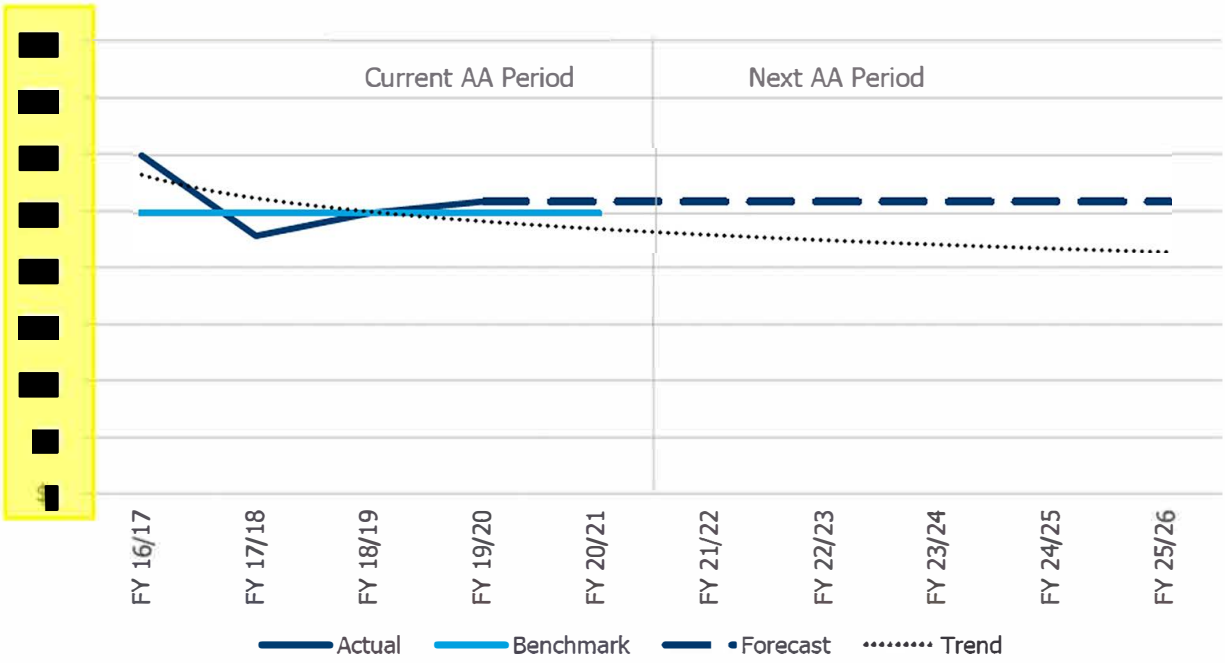
Table 4.11: HDPE 575 – DN50 HP and MP forecast unit rates ($2019/20)

HDPE 575 – DN50 HP and MP (in line inspection by camera)	2016/17	2017/18	2018/19	2019/20 YTD Mar20	3 year weighted average	Forecast for next AA period
Contractor rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Materials/Other rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual $/unit	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual volumes (metres)	40,870	74,500	24,800	48,152		
AER $/unit	[redacted]	[redacted]	[redacted]	[redacted]		

4.5.3. Comparison of historical rates with AER approved rates

Figure 4.4 shows actual unit rates are higher than the approved benchmark in Business Case SA52 in the current AA period.

Figure 4.4: HDPE 575 – DN50 HP and MP camera inspection and reinforcement unit rates ($2019/20)



Inline camera inspection and reinforcement was a new activity proposed for the current AA period that involved establishing new mitigation measures to address the risk of failure at squeeze off points. The estimate was arrived at using a bottom-up approach which was a reasonable basis and represented the best estimate possible in the circumstances reflecting the fact we had little actual experience undertaking this activity of work prior to 2016/17.

The actual rates have proven to be broadly consistent with benchmark. The higher rate in 2016/17 is attributed to the costs involved in delivering this new type of work for the first time (training, instruction and learning). Now our contractors are appropriately skilled and practiced in this type of work, we expect unit rates to remain stable over the next AA period. We consider this camera inspection and reinforcement approach is a cost-effective alternative to mains replacement (refer Attachment 8.3 DMSIP).

4.5.4. Are current costs efficient?

The current costs incurred reflect competitively tendered contractor and material costs. These rates are efficient as they have been determined through competitive market processes in line with our procurement processes. As we operate networks across Australia, we will compare to rates experienced in other jurisdictions where the work is sufficiently similar.

4.5.5. Forecast unit rates

The forecast unit rate for inline camera inspection and reinforcement of HDPE 575 – DN50 HP and MP in the next AA period is [redacted]/metre.

The forecast is based on the current year-to-date actual unit rate for 2019/20 for both contractor and materials/other costs. The current actual approach is appropriate because the volume and type of work we expect to carry out in the next AA period is similar in nature to what has recently been delivered.

4.6. HDPE 575 – DN40 HP

Forecasting approach: Current actuals

4.6.1. Nature of works and costs

This work involves large detailed constructions, which comprise replacing HDPE class 575 pipe with nominal diameter DN40 in the network (including individual customer services, service risers and associated meter set rebuilds) operating at high pressure (250-350 kPa).

4.6.2. Historical and forecast unit rates

We have replace over 300 kilometres of HDPE 575 as part of our mains replacement program in the current AA period, comprising approximately 41% of DN40 and the remaining 59% of DN50. Actual costs incurred in the current AA period are captured by project and not by nominal diameter, with the scope of works for the replacement of either diameter mains being similar and a mix of DN40 and DN50 replaced at the individual tender packages/suburbs level.

This scope of work includes excavation (of the same size for both nominal diameters), renewal of customer inlets, isolation of gas procedure, squeeze offs, customer liaison, traffic control and commissioning and decommissioning activities. The replacement method has predominantly been by insertion (over 95% of cases). The replacement of HDPE 575 – DN40 HP will involve the same scope of works as the HDPE 575 in the current AA period, therefore it is appropriate to forecast the proposed HDPE 575 – DN40 HP unit rate using the HDPE 575 historical unit rates.

Table 4.12 sets out actual unit rates incurred when replacing HDPE 575 over the current AA period and the forecast unit rate for HDPE 575 – DN40 HP in the next AA period.

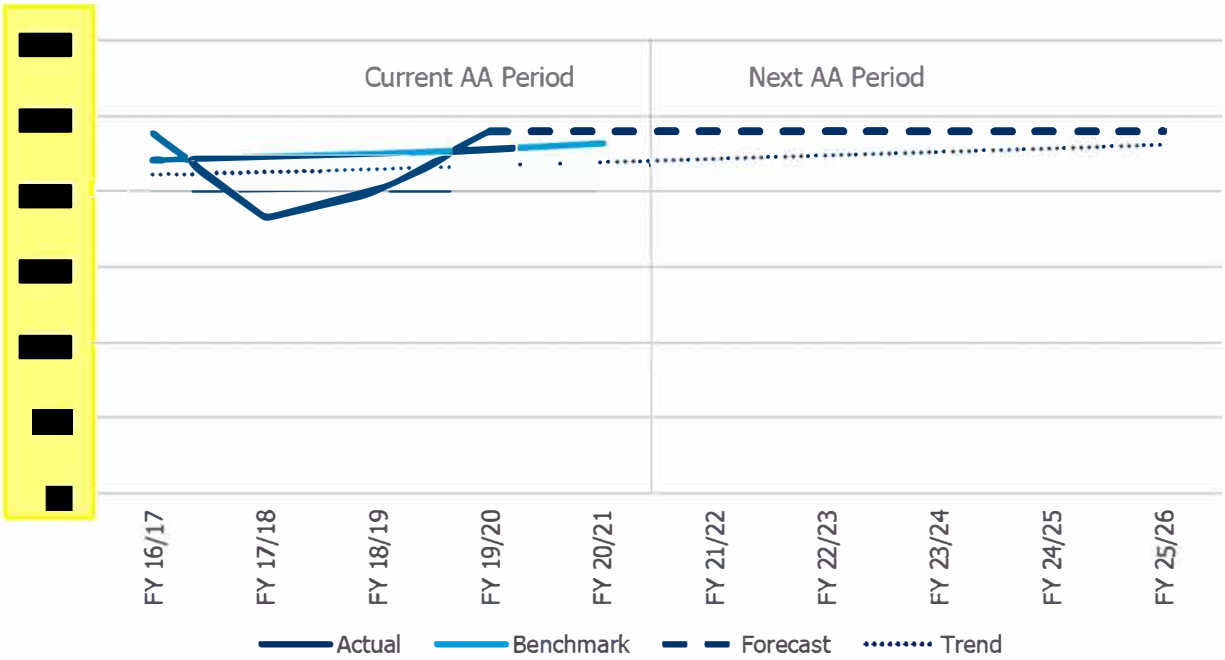
Table 4.12: HDPE 575 – DN40 HP forecast unit rates ($2019/20)

HDPE 575 – DN40 HP	FY 2016/17	FY 2017/18	FY 2018/19	FY 2019/20 YTD Mar20	3 year weighted average	Forecast for next AA Period
Contractor rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Materials/Other rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual $/unit	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual volumes (metres)	5,704	40,668	130,938	45,747		
AER $/unit	[redacted]	[redacted]	[redacted]	[redacted]		

4.6.3. Comparison of historical unit rates with AER approved rates

Figure 4.5 highlights the unit rates for HDPE 575 for 2016/17 were higher than the approved benchmark for the current AA period with a dip below in 2017/18 and increasing again 2018/19 and 2019/20.

Figure 4.5: HDPE 575 – DN40 HP Unit Rates ($2019/20)



The higher than benchmark rate in 2016/17 was due to a lower volume of this activity, and the more complex smaller mains replacement package that took place in that year.

The actual unit rate for 2017/18, 2018/19 and 2019/20 exhibits an upward trend driven by increasing safety, technical, council, traffic control and third party asset owner requirements. The increase in labour/contractor rates between 2018/19 and 2019/20 is [redacted]/metre.

4.6.4. Are current costs efficient?

The current costs incurred reflect competitively tendered contractor and material costs. These rates are efficient as they have been determined through competitive market processes in line with our procurement processes. As we operate networks across Australia, we will compare to rates experienced in other jurisdictions where the work is sufficiently similar.

4.6.5. Forecast unit rates

The forecast unit rate for replacing HDPE 575 – DN40 HP during the next AA period is $240/metre.

The forecast is based on the current year-to-date actual unit rate for 2019/20 for both contractor and materials/other costs. The current actual approach is appropriate because the volume and type of work we expect to carry out in the next AA period is similar in nature to what has recently been delivered.

The HDPE 575 – DN40 HP replacement unit rate is subject to upward pressure in costs associated with increasing safety, technical, council, traffic control, third party asset owner requirements. The current actual rate reflects the increased cost resulting from all the above mentioned factors, in particular the new meter location compliance procedure and the SAPN excavation requirements,

which were both incurred in 2019/20. The current actuals therefore provide an appropriate and conservative basis for forecasting the costs we expect to incur over the next AA period.

A point worth noting about this forecast is that unlike some other networks (e.g. Victorian metropolitan area), which exhibit clear differences in mains replacement difficulty across outer and inner suburbs, mains replacement works in most areas of Adelaide (apart from the CBD and North Adelaide) are generally of similar nature. It has not therefore been necessary to develop suburb-by-suburb pricing for the purposes of forecasting.

4.7. HDPE 575 – DN40 MP

Forecasting approach:	Bottom-up based on current actuals plus direct burial premium

4.7.1. Nature of works and costs

This work involves large detailed constructions, which comprise replacing existing HDPE class 575 pipe with nominal diameter DN40mm in the network (including individual customer services, service risers and associated meter set rebuilds) operating at medium pressure (35-100 kPa). The HDPE 575 – DN40 MP mains cannot be inspected by camera and hence require replacement (refer Attachment 8.3 DMSIP).

Unlike in high pressure networks, where HDPE 575 – DN40 mains can be replaced by insertion of smaller diameter pipe without materially impacting network capacity, DN40 mains in medium pressure networks cannot. This is because inserting a smaller pipe would lead to a material drop-off in gas flow capacity, which will impact network capacity and can lead to supply issues.

For example, the next largest pipe than can be inserted into a HDPE 575 – DN40 pipe is PE100 – DN32. The internal diameter of this pipe is 26mm. This diameter decrease of 8mm leads to a decrease in flow capacity of approximately 50% and in medium pressure networks (operating at a range of 35-100 kPa) would not be able to cope with the existing demand due to the decrease in capacity nor meet required sizing for 1 in 2 year capacity requirements (see Attachment 8.2 Strategic Asset Management Plan). Therefore size by size replacement using the direct burial method is required.

4.7.2. Historical and forecast unit rates

There are no historical rates that relate directly to this type of work as HDPE 575 – DN40 MP must be replaced by direct burial of new pipe and historical work has been predominantly (over 95%) by insertion.

In line with the risk based approach to the mains replacement program, all HDPE 575 – DN40 replacement completed during the current AA period has been on high pressure networks. Table 4.12 in section 4.6.2 sets out the actual unit rates incurred over the current AA period for HDPE 575 replacement by insertion. Over 95% of the HDPE 575 – DN40 HP replaced in the current AA period has been inserted and the remaining replaced by direct burial due to shallow mains and providing back feeds to allow insertion to occur.

4.7.3. Forecast unit rates

The forecast unit rate for replacing HDPE 575 – DN40 MP in the next AA period is $349/metre.

The forecast has been developed using a bottom-up approach using the current HDPE 575 actuals for 2019/20 by insertion, plus an additional cost per metre for direct burial. The bottom-up approach is appropriate because it has not been possible to rely on either:

- historical rates because this nature of work using complete replacement by direct burial has not commenced yet; or

- the results of a competitive tender because no tenders have yet been conducted for this work.

The direct burial rate premium of [redacted]/metre reflects the incremental cost differential between direct burial and insertion based on the average Schedule of Rates contract prices across the five current active mains replacement contractors in South Australia.

Table 4.13 sets out the bottom-up calculation for HDPE 575 – DN40 MP replacement by direct bury.

Table 4.13: HDPE 575 – DN40 MP Forecast Unit Rates ($2019/20)

	Inputs	Rate $/m
Labour*	[redacted]	[redacted]
Materials/Other**	[redacted]	[redacted]
Increment for direct burial***	[redacted]	[redacted]
Total		[redacted]

* Refer to Table 4.12 for the current labour/contractor actual unit rate for HDPE class 575 replacement by insertion

** Refer to Table 4.12 for the current materials/other actual unit rate for HDPE class 575 replacement by insertion

*** This is based on the average incremental cost differential between direct burial and insertion in the Schedule of Rates contract prices across the panel of mains replacement contractors in South Australia

The bottom up approach using latest actual labour and material/other rates for similar work (HDPE 575 – DN40 HP), plus the average direct burial premium currently applied by our mains replacement contractors when undertaking this work (which currently is incurred 4% of the time) represents a reasonable forecast and the best possible in the circumstances.

4.8. Piecemeal mains replacement

Forecasting approach:	Weighted average of historical actuals

4.8.1. Nature of works and costs

Some mains replacements are performed on a reactive or piecemeal basis as a means of addressing urgent leakage problems or localised cases of water ingress or shallow mains. The HDPE piecemeal mains replacement is also a result of the inline camera inspection program, which can identify deteriorated sections of pipe that need to be replaced rather than reinforced.

We sometimes find conventional repairs are either not possible or not economically feasible due to multiple leaks or defects in a localised area. In these cases, piecemeal mains replacement is undertaken via direct burial (rather than insertions) for sections 100 metres in length or less

This work is lower volume and subject to a high degree of variation. This is because the scope of work can vary from small diameter basic pipe replacement in a suburban area, to complex pipe replacement that could be located on major roads, under major intersections and/or in

highly congested areas. We therefore use the weighted average of historical unit rates to forecast unit rates for the next AA period.

4.8.2. Historical and forecast unit rates

Table 4.14 sets out actual unit rates for piecemeal mains replacement and the forecast been for the next AA period.

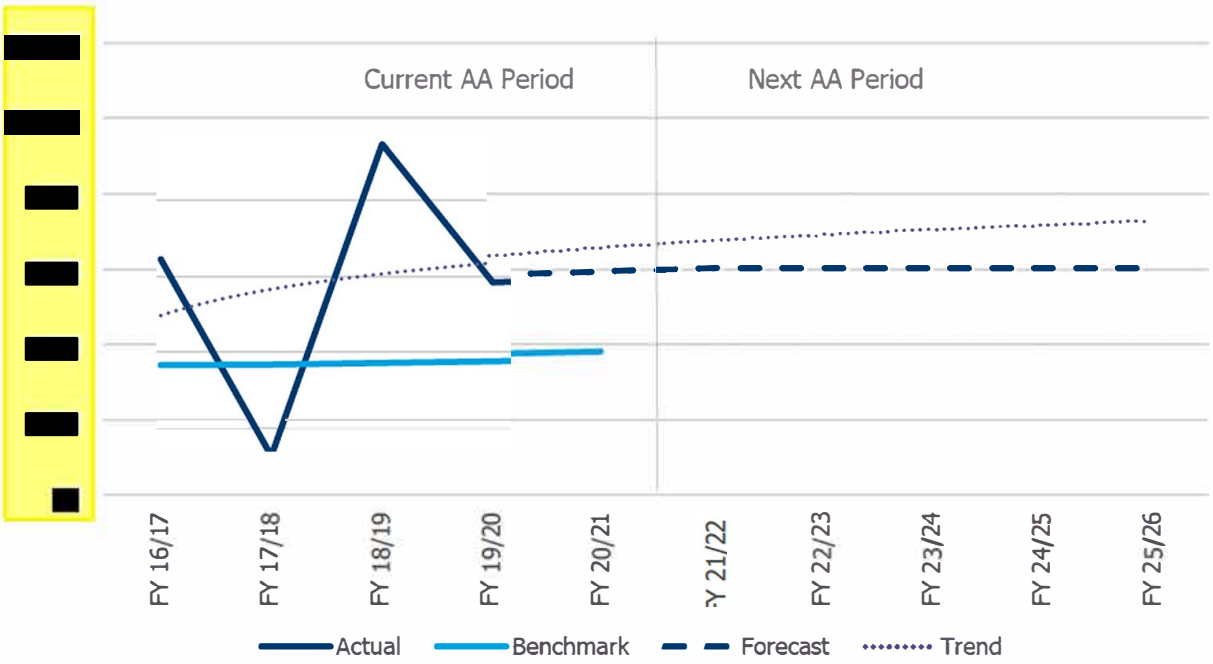
Table 4.14: Piecemeal mains replacement forecast unit rates ($2019/20)

Piecemeal mains replacement	2016/17	2017/18	2018/19	2019/20 YTD Mar20	Weighted average	Forecast for next AA period
Contractor rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Materials/Other rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual $/unit	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual volumes (metres)	796	852	1,197	343		
AER $/unit	[redacted]	[redacted]	[redacted]	[redacted]		

4.8.3. Comparison of historical rates with AER approved rates

Figure 4.6 shows that the actual unit rate for piecemeal mains replacement has been subject to a high degree of variation (as is expected with this lower volume and highly variable activity of work). The unit rates incurred are mostly above the approved benchmark rates for the current AA period.

Figure 4.6: Piecemeal mains replacement forecast unit rates ($2019/20)



4.8.4. Are current costs efficient?

The current costs incurred reflect competitively tendered contractor and material costs. These rates are efficient as they have been determined through competitive market processes in line with our procurement processes. As we operate networks across Australia, we will compare to rates experienced in other jurisdictions where the work is sufficiently similar.

4.8.5. Forecast unit rates

The forecast unit rate for piecemeal mains replacement during the next AA period is [redacted]/metre.

The forecast for contractor and materials/other costs is based on the weighted average of historical actuals. This approach is appropriate as piecemeal mains replacement involves lower volumes of work which are subject to a high degree of variability, meaning it is difficult to derive meaningful assumptions on the work mix over the next AA period.

4.9. Multi-user sites

Forecasting approach:	Weighted average of historical costs

4.9.1. Nature of works and costs

This work is associated with replacing multi-user services (MUS) that are operating at low pressure and were not replaced as part of the mains replacement program prior to 2012.

Prior to 2012, replacement of internal services within multi-user sites was not included in the scope of the mains replacement program. During installation of new/replacement high pressure mains, MUS were fitted with a boundary regulator and the existing MUS for each site remained operating at low pressure. From 2012, replacement of MUS have been packaged with the broader mains replacement program.

A boundary regulator is typically located at the front of a property. It reduces pressure from high to medium or low pressure. A sub-main is connected to the boundary regulator and runs through the multi-user property. Individual inlets branch off the sub-main to reach inlet risers and gas meters for each unit. The majority of the multi-user sub-mains and inlets are ageing unprotected steel and galvanized pipe.

The MUS work involves:

- replacement of the sub-main and inlets by insertion of new polyethylene pipe;
- replacement of inlet risers and meter set assemblies;
- relocation of meters that are in non-compliant locations; and
- removal of the boundary regulator.

4.9.2. Historical and forecast unit rates

A program to replace multi-user services (MUS) commenced during the current AA period. The costs of replacing assets at each multi-user site varies depending on the number of individual delivery points associated with each service. Table 4.15 shows the average actual unit rate achieved during the current AA period to date (July 2016 to March 2020) for each size of

multi-user site. It also shows the percentage of each size of multi-user site that makes up the replacement works program for the next AA period.

We have focused on the historical cost by number of delivery points rather than financial year, as this is the key driver of cost. We have also been completing a survey of all sites so have a good sample of information on which to base the likely scope of works to be delivered in the next AA period (refer Attachment 8.3 DMSIP).

Table 4.15: Multi-user sites forecast unit rates ($2019/20)

Multi-user sites	No. of delivery points 2-4	No. of delivery points 5-10	No. of delivery points 11-20	No. of delivery points 20+	Forecast for next AA period
Average actual $/unit	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Percentage of each service type in the next AA period	38%	52%	7%	3%	
AER $/unit					[redacted]

The weighted average of historical actual costs per site is ~~2218~~% higher than the approved benchmark. The increase is driven by our approach to prioritise high risk multi-user sites during the current period. High risk multi-user sites incur increased costs due to the associated complexity and relocation requirements of non-compliant meters.

4.9.3. Forecast unit rates

The forecast unit rate for replacing services and associated assets at multi-user sites during the next AA period is [redacted]/site.

The forecast for contractor and materials/other costs is based on the weighted average of historical actuals for varying sizes (and number of users) of high risk sites. The weighted average historical cost approach is appropriate because the type of work we expect to carry out in the next AA period is similar in nature to what has recently been delivered. The activity is relatively low volume and subject to a high degree of variability based on the different sizes of sites addressed in any one year.

The proportion of multi-user sites of each size is based on survey data completed on 555 sites to date. This is roughly a sixth of the total number of multi-user sites that were not renewed prior to 2012. We have not yet completed a survey of all multi-user sites, however, we consider the sample of 555 sites provides a reasonable basis for determining forward-looking works and is the best information we have available at the time of making this estimate.

The weighted average historical cost approach therefore produces a reasonable and prudent forecast for MUS in the next AA period.

4.10. Non AMRP service replacement

Forecasting approach:	**Current actuals**

4.10.1. Nature of works and costs

There are cases where services need to be renewed on a standalone basis. This arises when leaks or damage occur on the service and inspection reveals the service is heavily corroded or in such poor condition that repairs are not viable, or that the service is at a non-compliant depth. These works are referred to as non AMRP (annual mains replacement program) service replacements.

4.10.2. Historical and forecast unit rates

Table 4.16 sets out the actual unit rates incurred for non AMRP service replacement over the current AA period and the forecast for the next AA period.

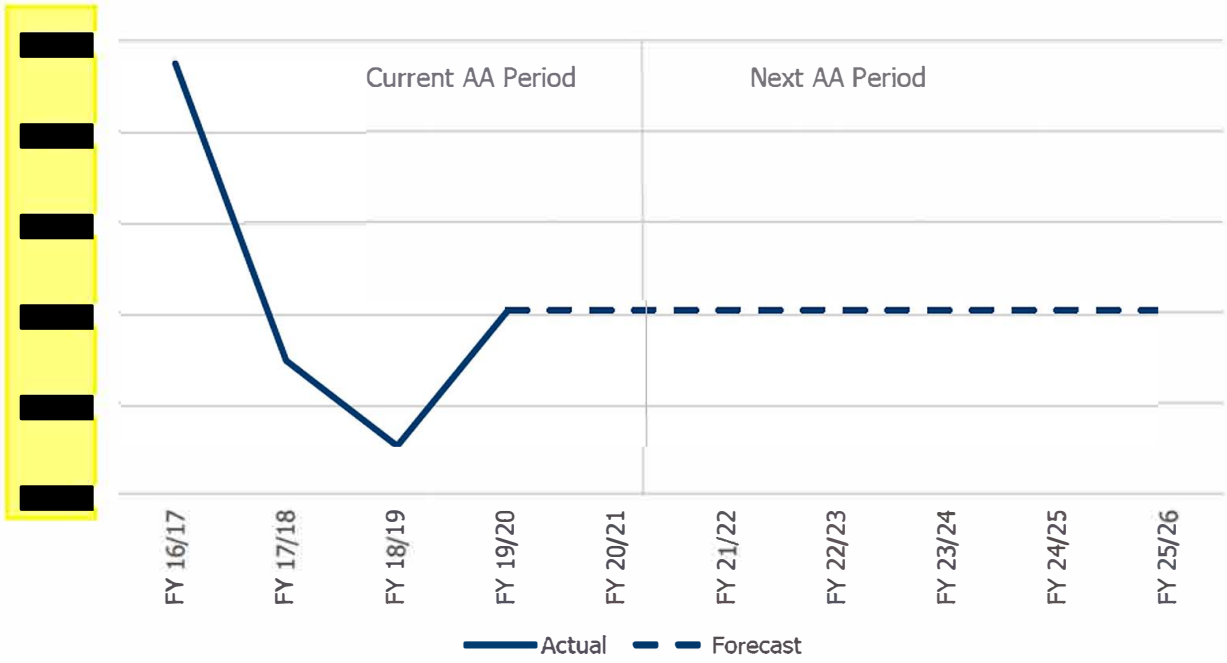
Table 4.16: HDPE 575 – Non AMRP service replacement forecast unit rates ($2019/20)

Non AMRP service replacement	2016/17	2017/18	2018/19	2019/20 YTD Mar20	3 year weighted average	Forecast for next AA period
Contractor rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Materials/Other rates	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual $/unit	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Actual volumes (services)	298	389	783	491		

4.10.3. Comparison of historical rates with AER approved rates

Figure 4.7 shows the actual unit rates incurred over the current AA period have exhibited a significant degree of inter-year variability.

Figure 4.7: Non AMRP service replacement unit rates ($2019/20)



The inter-year variability reflects the fact this work is largely reactive. Work is only undertaken when a failure occurs or when severe corrosion is identified. We look at historical volumes of these replacements to determine a forecast volume of works for the next AA period (refer Attachment 8.3 DMSIP).

There were no approved benchmarks for non AMRP service replacements in the current AA period.

4.10.4. Are current costs efficient?

The current costs incurred reflect competitively tendered contractor and material costs. These rates are efficient as they have been determined through competitive market processes in line with our procurement processes. As we operate networks across Australia, we will compare to rates experienced in other jurisdictions where the work is sufficiently similar.

4.10.5. Forecast unit rates

The forecast unit rates for non AMRP service replacement during the next AA period is [redacted]/unit.

The forecast is based on the current year-to-date actual unit rate for 2019/20 for both contractor and materials/other costs. The current actual approach is appropriate as it reflects a similar volume of work as what we forecast will be required in the next AA period and the work most recently delivered reflects prevailing safety, technical, council, traffic control, third party asset owner requirements when undertaking these works.