

Capital Expenditure Overview



Mains Replacement

This page has been intentionally left blank.

Approval and Amendment Record

Version	Amendment overview
1	

Contents

1.	Purpose of this document	5
2.	Structure of this document	6
3.	Overview of expenditure profile	7
4.	Nature of expenditure	9
4.1.	Current Mains Replacement capex programs	9
4.2.	Forecast Mains Replacement capex programs	9
4.3.	Origin and status of LP to HP mains replacement program	10
4.4.	Relevant regulatory obligations or requirements	11
4.5.	Key drivers of Mains Replacement capex	13
5.	Current access arrangement period capex	14
5.1.	Variance between actual and allowed Mains Replacement capex	14
5.1.1.	AER's Mains Replacement capex allowance	14
5.1.2.	Our actual and estimated Mains Replacement capex	15
5.2.	Mains Replacement Volumes	15
5.2.1.	LP to HP Mains Replacement capex volumes	15
5.2.2.	Other Mains Replacement capex volumes	16
5.3.	Mains Replacement Unit rates	18
5.3.1.	LP to HP Mains Replacement	18
5.3.2.	Other Mains Replacement	21
5.4.	Efficiency of Mains Replacement program	22
5.4.1.	LP to HP Mains Replacement capex	23
5.4.2.	Other Mains Replacement capex programs	24
6.	Expenditure forecasting method	26
7.	Forthcoming access arrangement period expenditure	28
7.1.	Overview of Mains Replacement capex forecasts	28
7.2.	LP to HP Mains Replacement capex forecasts	29
7.2.1.	Forecast volumes	29
7.2.2.	Forecast unit rates	30
7.3.	Replacement of MP Cast Iron Mains	30
7.4.	Replacement of Early Generation High-Density Polyethylene Pipes	31
7.5.	Reactive mains replacement	31
7.6.	Unplanned service renewals	32
7.7.	Forecast Mains Replacement Capex is efficient	33
7.8.	Benefits of expenditure to customers	33
8.	Meeting Rules' requirements	34
8.1.	The new capex criteria	34
8.2.	How the forecast meets the new capex criteria	35
9.	Supporting documentation	36

1. Purpose of this document

This document explains and justifies our Mains Replacement capital expenditure (capex) for our Pipeline Services for our next access arrangement period (1 January 2018 to 31 December 2022). This document references other supporting document for further detail. Unless otherwise stated, capex is presented in real 2017 dollars and is expressed in total costs for our Pipeline Services, which includes both our Reference Services and our Non-Reference Services. Total values shown in tables and referred to in the text of this document may not reconcile due to rounding.

The actual 2013 to 2015 capex detailed in this document does not include overheads, as this was reported separately to the AER in our Annual Regulatory Information Notices for these years, rather than being incorporated into each capex sub-category.

We note that our forecast annual revenue requirements for our Haulage Reference Services do not include returns on and of capex attributable to Non-Reference Services (including from major asset relocations) because they are based on our net capex only. This is because our capital contributions (and therefore the revenue that we receive from our major relocations) are netted off from our gross (pipeline services) capex forecast in developing our regulatory asset base for our Haulage Reference Services.

For clarity, Attachment 1 details how we have allocated the components of our asset costs between our different capex categories. We note that our Mains Replacement capex forecast relates to multiple AER asset categories.

We have provided our Mains Replacement Strategy documents to the AER with this Overview Document. The forecasts in these documents do not include labour escalators or overheads, whereas the forecasts in this Overview Document are total costs (unless otherwise stated). The following table reconciles the forecasts in the Mains Replacement Strategy documents with those in this Overview Document and our Access Arrangement Information.

Table 1: Breakdown of 2018-22 capex forecasts by direct costs, overheads and escalations (\$M, Real 2017)

Program	Strategy	2018	2019	2020	2021	2022	Total
LP mains replacement	MG-SP-0009	45.0	42.3	42.0	42.7	36.9	209.0
MP mains replacement	MG-SP-0009	7.2	4.6	6.3	-	-	18.1
HDPE Polyethylene	MG-SP-0009	-	-	-	8.7	7.2	15.9
Reactive Mains Replacement	MG-SP-0009	0.2	0.2	0.2	0.2	0.2	1.0
Reactive Service Replacement	MG-SP-0010	1.1	1.1	1.1	1.1	1.1	5.7
Total Direct (excluding escalations)		53.6	48.3	49.6	52.7	45.5	249.7
Overheads		3.2	2.9	3.0	3.2	2.7	15.0
Total including overheads (excluding escalations)		56.9	51.2	52.6	55.9	48.2	264.7
Escalations		0.3	0.3	0.4	0.6	0.6	2.2
Total including overheads and escalations		57.2	51.4	53.0	56.5	48.8	266.9

2. Structure of this document

This document is structured as follows:

- Section 3 details our Mains Replacement capex profile for the previous, current and forthcoming access arrangement periods;
- Section 4 explains the nature of our Mains Replacement capex;
- Section 5 explains and justifies our actual Mains Replacement capex against the Australian Energy Regulator's (AER) allowances in its:
 - March 2013 Final Decision for the current access arrangement period; and
 - September 2015 Decision on our mains replacement cost pass through application.

This section also details the outcomes that our Mains Replacement capex has delivered.

- Section 6 overviews our forecasting methodology for Mains Replacement capex for the forthcoming access arrangement period;
- Section 7 sets out our Mains Replacement capex forecast for the forthcoming access arrangement period;
- Section 8 explains why our Mains Replacement capex forecast satisfies the conforming capex criteria in Rule 79 of the NGR and, therefore, should be accepted by the AER for the forthcoming access arrangement period; and
- Section 9 lists supporting documents that provide additional information that further substantiate our Mains Replacement capex forecast.

3. Overview of expenditure profile

This section overviews the profile of our Mains Replacement capex for the previous, current and forthcoming access arrangement periods.

Our Mains Replacement capex for the previous and current access arrangement periods is presented in Table 2 and Table 3 below. Our forecast Mains Replacement capex is shown in Table 4.

Table 2: Previous access arrangement period Mains Replacement capex (\$M, Real 2017)*

	2008	2009	2010	2011	2012	TOTAL
AER Final Decision	23.1	22.7	23.3	23.9	24.8	117.8
Actual	8.6	5.4	5.2	4.6	8.7	32.4
Variance (Actual minus Final Decision)	(14.5)	(17.3)	(18.2)	(19.3)	(16.1)	(85.4)

* Excludes Internal Direct Overheads – included as separate line item in AER's Final Decision

Table 3: Current access arrangement period Mains Replacement capex (\$M, Real 2017)

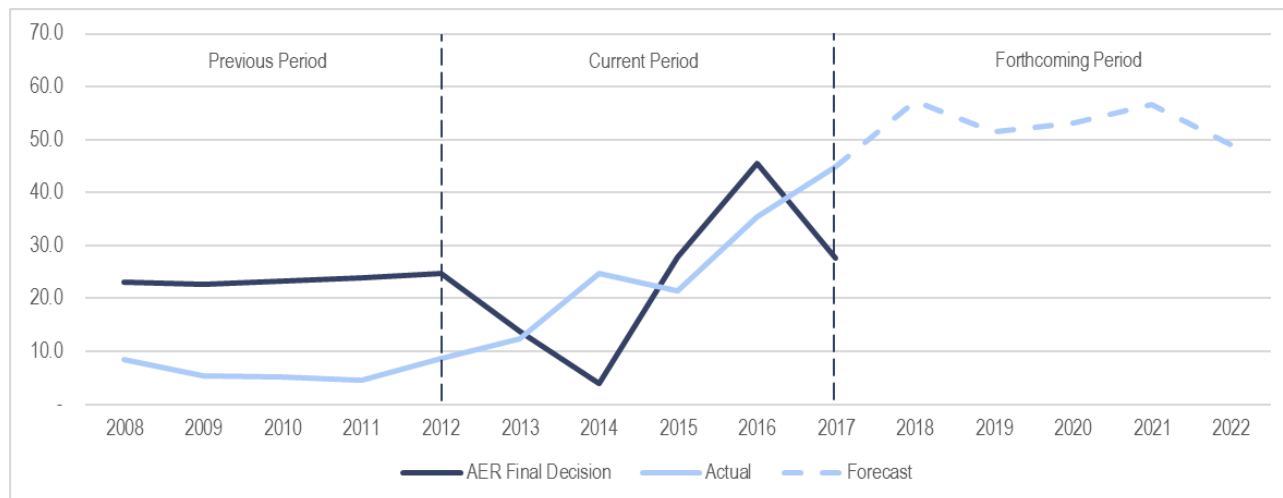
	2013	2014	2015	2016	2017	TOTAL
AER Final Decision (including cost pass-throughs approved in September 2015)	13.8	3.9	27.7	45.6	27.6	118.7
Actual / Estimated	12.4	24.8	21.5	35.5	45.0	139.2
Variance (Actual minus Final Decision)	(1.4)	20.9	(6.2)	(10.1)	17.3	20.5

Table 4: Forthcoming access arrangement period Mains Replacement capex (\$M, Real 2017)

	2018	2019	2020	2021	2022	TOTAL
Forecast	57.2	51.4	53.0	56.5	48.8	266.9

Figure 1 illustrates our actual, estimated and forecast Mains Replacement capex over the previous, current and forthcoming access arrangement periods.

Figure 1: Actual and forecast Mains Replacement capex



4. Nature of expenditure

Mains Replacement capex involves replacing gas distribution mains operating at pressures from 1.5 kPa to 1,050 kPa.

We have structured our Mains Replacement capex into four programs in the current access arrangement period and propose five programs in the forthcoming access arrangement period, as explained below.

4.1. Current Mains Replacement capex programs

In the current access arrangement period, we are undertaking the four Mains Replacement capex programs detailed in Table 5.

Table 5: Mains Replacement programs for the current access arrangement period

Capex programs	Description
Low pressure (LP) to high pressure (HP) replacement program	<p>We have the largest remaining cast iron gas distribution network in service in Australia. Compared to modern materials (such as polyethylene) cast iron pipes are susceptible to fracture, which can be catastrophic in nature and result in an uncontrolled release of gas, resulting in a high risk of incidents leading to loss of life or significant property damage. In addition, cast iron pipes account for the majority of leaks and far exceed other pipe materials in relation to leakage incident rates, leading to high fugitive emissions.</p> <p>To address these risks and issues, this program involves replacing the ageing LP network, which is predominantly cast iron, with HP polyethylene mains. Block replacement of LP mains is undertaken by working geographically inwards from HP mains areas, which are typically located in outer suburban areas. This approach is explained further in subsequent sections of this Overview Document.</p>
Large Diameter Cast Iron (LDCI) Mains replacement program	<p>We have ageing large diameter cast iron mains in poor condition. Many of these are critical large diameter (600 mm down to 225 mm) mains that cannot be abandoned or replaced with smaller sized mains, due to the amount of gas they transport either locally or over a long distance. These mains are therefore planned for replacement on a 'like-for-like' basis.</p> <p>Capex in this program includes the planned replacement of these mains, as well as an allowance for unplanned (reactive) replacement in response to critical faults.</p>
Low Pressure Designated Zone (LPDZ) mains replacement program	<p>Our LPDZ program contains ageing, high risk mains that we expect will not be replaced under the LP to HP Mains Replacement program within an appropriate timeframe. A program of work is required to manage this risk by replacing these assets in advance of the timeframe envisaged by the LP to HP Mains Replacement program.</p>
Unplanned service renewals program	<p>The service main comprises the pipe work from the distribution main up to and including the service valve. This program involves the unplanned replacement of service mains operating at pressures up to 515 kPa.</p>

4.2. Forecast Mains Replacement capex programs

In the forthcoming access arrangement period, we have structured our Mains Replacement capex forecast into the five programs detailed in Table 6.

Table 6: Mains Replacement programs for the forthcoming access arrangement period

Capex program	Description
LP to HP Mains Replacement program	This is a continuation of the existing program to replace, for safety reasons, the ageing LP network, which is predominantly cast iron, with HP polyethylene mains. The origin and status of this program is detailed in section 4.3 below.
Replacement of medium pressure (MP) cast iron mains program	This program targets the removal of all remaining cast iron mains operating at MP by the end of the forthcoming access arrangement period. This is also a safety-driven program.
Replacement of early generation high-density polyethylene pipes program	This program targets the replacement of 31 kilometres of early generation high-density polyethylene pipes to address failures and performance issues. This too is a safety-driven program.
Reactive mains replacement program	This program enables the piecemeal renewal of minor sections of mains outside the planned mains replacement program. These minor works are required when reactive maintenance (i.e. repairing a mains leak) is deemed unsafe and inefficient considering the deteriorated condition of the asset which limits the effectiveness to repair the fault.
Unplanned service renewals program	This program allows for the ad hoc renewal of services outside the planned mains and services replacement program. These works result when reactive maintenance (i.e. service repairs) are deemed unsafe and inefficient considering the deteriorated condition of the asset which limits the effectiveness to repair the fault.

4.3. Origin and status of LP to HP mains replacement program

Over 95 per cent of our Mains Replacement capex in the current access arrangement period relates to our LP to HP Mains Replacement program. We forecast that it will comprise over 80 per cent in the forthcoming access arrangement period.

Our LP to HP Mains Replacement program is based on a 30-year initiative, which commenced in 2003 and is scheduled to be completed by 2033. The AER accepted and endorsed the basis for this initiative in, amongst other places, its September 2015 decision on our mains replacement cost pass-through for the current access arrangement period, in which it stated:

Under Multinet's Asset Management Plan it is scheduled to complete its mains replacement work program over a 30 year period, concluding in 2033. This end date is a critical factor in considering what is an efficient and prudent volume of mains replacement under r.79(1) given the long term safety objective of removing all cast iron and unprotected steel mains from Multinet's (sic) network. We noted in our final decision that the mains replacement pass through provides a means by which Multinet can complete the mains replacement program by 2033. Therefore we have had regard to Multinet's ability to meet this timeframe for completing its mains replacement in considering the efficiency and prudence of the proposed volumes.¹

Table 7 below overviews the volumes (in kilometres) associated with the LP to HP Mains Replacement program to meet the 2033 target. For technical and practical reasons, the new pipeline volumes will differ slightly from the decommissioned volumes.

¹ AER, Multinet Gas Mains Replacement Cost Pass-Through AER Decision, September 2015, page 9

Table 7: Actual and forecast HP mains installed under LP to HP Mains Replacement program (kilometres)

	2003 to 2007	2008 to 2012	2013 to 2017	2018 to 2022	2023 to 2033
Length over the period	537	255	527	625	1,331
Cumulative length	537	792	1,319	1,944	3,275

In the 2003 to 2007 access arrangement period, we replaced 537 kilometres of LP pipes with HP pipes, consistent with the 30-year program.

In the 2008 to 2012 period, our LP to HP replacement capex was below the AER's allowance, as shown in Table 2. We explained the reasons for this underspend in our AAI for the current access arrangement period. The AER accepted our expenditure for the period to be conforming capex.

In its 2012 Final Decision, the AER based our LP to HP replacement capex allowance for the current access arrangement period on the 255 kilometres of mains that were replaced over the previous (2008 to 2012) access arrangement period. However, the AER also accepted that the actual volume may be substantially higher than forecast. To manage this risk, the AER implemented a cost pass through arrangement to enable us to recover the additional costs if actual volumes exceeded the AER's forecast. As noted above, we applied to the AER for a cost pass through in May 2015. In September 2015, the AER approved our increased volume and revised its original allowance accordingly.²

We expect to replace a total of 527 kilometres of LP main with HP mains during the current access arrangement period, which is more than double the AER's original forecast. The increased volume ensures that our LP to HP Mains Replacement program remains on track for completion in 2033. We also expect during the current access arrangement period to decommission a total seven kilometres of MP cast iron mains through efficient incorporation into the LP replacement program.

Consistent with our 30-year LP to HP capex replacement program, we are forecasting to replace 625 kilometres of LP main with HP mains over the forthcoming access arrangement period. In addition, we are also targeting the replacement of the remaining 27 kilometres of cast iron mains operating at MP by 2022 along with the replacement of 31 kilometres of early generation high density polyethylene. The rationale for these programs is discussed in sections 6 and 7.

We expect the costs of the LP to HP replacement capex program to increase over the forthcoming access arrangement period. In part, this reflects an increase in volume consistent with the overall timetable for completion. However, the larger effect relates to unit rates. As the LP to HP replacement capex program progresses into the inner suburban areas of our network, population density increases markedly, which leads to higher replacement costs per metre. In addition, other factors such as the reinstatement of sealed surfaces following pipe replacement, increased traffic management requirements in more densely populated areas, and challenges in gaining access to undertake works will also contribute to upward pressure on unit rates.

4.4. Relevant regulatory obligations or requirements

Under Rule 79 of the National Gas Rules (NGR), capex is justifiable if, amongst other things, it is necessary to:

- Maintain and improve the safety of services; or
- Maintain the integrity of services; or
- Comply with a regulatory obligation or requirement; or
- Maintain the service provider's capacity to meet levels of demand for services existing at the time the capex is incurred (as distinct from projected demand that is dependent on an expansion of pipeline capacity).

² AER, Multinet gas mains replacement cost pass through: AER Decision, September 2015.

As discussed further in section 4.5, safety is the primary driver of our Mains Replacement capex. Mains Replacement capex must be undertaken to enable us to deliver services in accordance with the key regulatory obligations outlined in Table 8 below.

Table 8: Key regulatory obligations

Regulatory instrument	Summary of obligations
Gas Safety Act 1998	<p>The <i>Gas Safety Act 1997</i> (the Act) makes provision for the safe conveyance, sale, supply, measurement, control and use of gas and to generally regulate gas safety.</p> <p>Under section 32 of the Act, we must manage and operate our facilities to minimise as far as practicable:</p> <ul style="list-style-type: none"> (a) the hazards and risks to the safety of the public and customers arising from gas; and (b) the hazards and risks of damage to property of the public and customers arising from gas; and (c) the hazards and risks to the safety of the public and customers arising from: <ul style="list-style-type: none"> (i) interruptions to the conveyance or supply of gas; and (ii) the reinstatement of an interrupted gas supply. <p>Division 2 of Part 3 of the Act sets out provisions relating to the preparation of, and compliance with, safety cases for gas facilities. Under these provisions, we must submit a safety case to Energy Safe Victoria (ESV) for each of our facilities. We must comply with a safety case that has been accepted by ESV.</p>
Gas Safety (Safety Case) Regulations 1999	<p>These Regulations detail requirements relating to, amongst other things, the purpose and content of safety cases. The Regulations require Multinet to specify the safety management system being followed to ensure compliance with its obligations under section 32 of the Act (i.e. to ensure the safe and reliable supply of gas).</p> <p>Regulation 17 states that the safety management system for a facility must specify the means used or to be used by the gas company to ensure that the design, construction, installation, operation and maintenance of the facility and any modification of the facility</p> <ul style="list-style-type: none"> (a) are adequate for the safety and safe operation of the facility; and (b) provide adequate means of achieving isolation of the facility or any part of the facility and pressure control in the event of an emergency; and (c) provide adequate means of gaining access for servicing and maintenance of the facility and machinery and other equipment; and (d) provide adequate means of maintaining the structure and operation of the facility; and (e) take into account the results of the formal safety assessment for the facility. <p>As noted above, the Gas Safety case is subject to approval by ESV.</p>
Victorian Gas Distribution System Code	<p>The Code set out the minimum standards for the operation and use of the distribution system.</p> <p>Schedule 3 of the Code lists 23 Australian Standards relevant to distribution systems, or otherwise applicable to the operation of the Distribution System Code. For brevity, the Standards listed in the Code are not listed here, however it is noted that they relate to the design, construction, installation, maintenance, management and operation of gas distribution networks. We comply with all of these Australian Standards.</p>
The Environment Protection Act 1970	<p>The Environment Protection Act 1970 empowers the Environment Protection Authority (EPA) to issue regulations and other compliance instruments relating to protection of the environment. Areas covered by the legislation include: Clean Water; Clean Air; Control of solid wastes and pollution of land; Control of noise; Transport of prescribed waste; and Environmental audits.</p> <p>We have detailed plans to ensure that we comply with the EPA regulations.</p>

Our Mains Replacement capex focuses on ensuring that we undertake our network functions in accordance with these regulatory obligations at an efficient cost, to achieve the lowest sustainable cost of providing services.

4.5. Key drivers of Mains Replacement capex

The requirement for us to provide a safe and reliable supply of natural gas drives our Mains Replacement capex. Specifically, Mains Replacement capex has a significant positive impact on network performance by reducing the risks to the public and our maintenance personnel associated with gas leaks from the network.

Most of our Mains Replacement capex relates to replacing ageing cast iron and unprotected steel mains with current generation HP polyethylene mains to mitigate the following risks:

- Cast iron pipe fractures that result in the risk of an uncontrolled release of gas; and
- Cast iron and bare steel leaks which when compared to other gas network materials account for the highest proportion of leaks.

The principle driver for the cast iron replacement program is the 'societal risk' posed from failure of cast iron mains and the resultant risk of incidents leading to loss of life or significant property damage. The risk associated with cast iron mains is a quantifiable risk and both UK and US safety regulators accept that cast iron is an obsolete material.

Pipe fracture is the primary mode of failure for cast iron mains. It is catastrophic in nature and results in an uncontrolled release of gas.

If a cast iron fracture remains undetected for a period of time then it can result (and has resulted in both the UK and US) in fatalities. For this reason, replacing cast iron pipes (and in particular those with a history of brittle fracture) is the highest priority of our Mains Replacement capex.

Our Mains Replacement capex also delivers several other benefits, including:

- Optimising network capacity by replacing MP and LP mains with HP mains, enabling us to meet the service needs of existing and future customers at an efficient cost, to achieve the lowest sustainable cost of providing services;
- Securing network reliability by reducing the incidence of leaks and associated unplanned outages on the network; and
- Ensuring the on-going efficiency of the operating and maintenance costs associated with our distribution mains.

The primary drivers of our Mains Replacement capex are, and will remain, mitigating the safety risk of gas leaks and securing reliability of supply. The replacement of the ageing cast iron and unprotected steel mains is a fundamental element of managing the safety risk of our gas distribution network.

5. Current access arrangement period capex

This section explains and justifies our actual Mains Replacement capex against the AER's allowances in its:

- March 2013 Final Decision for the current access arrangement period; and
- September 2015 Decision on our mains replacement cost pass through application.

This section is structured as follows:

- Section 5.1 details the variance between our actual and allowed Mains Replacement capex;
- Section 5.2 discusses the effect of volumes delivered on the capex variance;
- Section 5.3 discusses the effect of unit rates incurred on the capex variance; and
- Section 5.4 discusses the efficiency of our Mains Replacement capex having regard for the criteria for conforming capex in Rule 79 of the NGR.

5.1. Variance between actual and allowed Mains Replacement capex

5.1.1. AER's Mains Replacement capex allowance

Table 9 details the AER's Mains Replacement capex allowance for the current access arrangement period by program, incorporating the increase arising from its September 2015 approval of our cost pass through application.

Table 9: Allowed Mains Replacement capex by category including cost pass through (\$M, Real 2017) ³

Capex program		2013	2014	2015	2016	2017	Total
LP to HP Mains Replacement	Final Decision	12.1	2.5	11.5	22.7	3.0	51.8
	Cost pass through ⁴	-	-	14.3	20.8	21.5	56.7
LDCI Mains Replacement		-	-	0.7	0.7	2.0	3.4
LPDZ Mains Replacement		0.4	-	-	-	-	0.4
Unplanned service renewals		1.3	1.3	1.3	1.3	1.3	6.5
Total		13.8	3.8	27.7	45.6	27.8	118.7

³ AER, Access arrangement final decision, Multinet Gas (DB No. 1) Pty Ltd, Multinet Gas (DB No. 2) Pty Ltd, 2013–17, Part 4 Confidential Appendix C, March 2013, Table C.5, page 12 – note converted from \$M, Real 2017

⁴ Refer Multinet's Attachment G Capex Passthrough Model – note converted from \$M, Real 2017

5.1.2. Our actual and estimated Mains Replacement capex

Table 10 details our actual and estimated Mains Replacement capex for the current Access Arrangement period by program.

Table 10: Actual and Estimated Mains Replacement capex by category (\$M, Real 2017)

Capex program	2013	2014	2015	2016	2017	Total
LP to HP Mains Replacement	11.4	24.0	20.6	34.1	43.6	133.7
LDCI Mains Replacement *	-	-	-	-	-	-
LPDZ Mains Replacement*	-	-	-	-	-	-
Unplanned service renewals	1.0	1.0	1.1	1.4	1.3	5.8
Total	12.4	24.8	21.5	35.5	45.0	139.2

* The AER provided an allowance for three LDCI Mains Replacement projects and one LPDZ project in the current period. While no expenditure is shown under these categories for the current period a number of LDCI mains operating at MP have and will be decommissioned by the end of the current period. These are due to efficiencies in incorporating the decommissioning of these mains along with the completion of the single LPDZ project within the LP replacement program. This is further detailed in Table 11.

Table 11 draws on Table 9 and Table 10 to compare our Mains Replacement capex allowance (including the cost pass through) and our actual capex by program for the current access arrangement period. It shows that we expect to overspend the AER's allowance by \$20.5 million (or 17.3 per cent).

Table 11: Variance between Allowed and Actual Mains Replacement capex by program – 2013 to 2017 (\$M, Real 2017)

Capex program	Allowance (including cost pass through)	Actual	Variance
LP to HP Mains Replacement program	108.2	133.7	25.5
LDCI Mains Replacement	3.3	-	(3.3)
LPDZ Mains Replacement	0.4	-	(0.4)
Unplanned service renewals	6.8	5.8	(1.0)
Total	118.7	139.2	20.5

We now turn to considering the contribution that our volumes and unit rates made to this variance.

5.2. Mains Replacement Volumes

5.2.1. LP to HP Mains Replacement capex volumes

Table 12 details the kilometres of LP to HP Mains Replacement capex for the current Access Arrangement period that:

- Supported the base capex forecast in the AER's March 2013 Final Decision (i.e. 255 kilometres);
- Supported the revised forecast, including our May 2015 cost pass through application and allowance (i.e. 527 kilometres); and
- We now expect to deliver during the period (i.e. 527 kilometres, albeit with a different profile to our cost pass through application and allowance).

Table 12: Kilometres of LP to HP Mains Replacement Capex – 2013 to 2017

	2013	2014	2015	2016	2017	Total
Base forecast excluding pass through allowance ⁵	69.3	3.0	45.5	121.1	16.1	255.0
Revised forecast including pass through allowance ⁶	56.0	110.0	155.0	91.0	114.0	527.0
Actual / estimated	56.0	110.0	85.0	151.0	125.0	527.0

We confirm that we expect to complete our forecast 527 kilometres of LP to HP mains replacement in the current access arrangement period that underpinned our cost pass through application, which the AER approved. We note that we have:

- Tendered and committed to service providers to construct 148 kilometres of HP main in calendar year 2016 – this is currently being delivered; and
- Committed to our service providers to construct 128 kilometres of HP mains in the first half of 2017 and are currently in the process of tendering the remainder of the program.

None of the \$25.5 million variance in LP to HP Mains Replacement capex for the current period detailed in Table 11 is therefore attributable to the total volumes delivered.

5.2.2. Other Mains Replacement capex volumes

Table 13 discusses the other Mains Replacement capex that underpinned the AER's March 2013 Final Decision and what of this we have delivered in the current access arrangement period.

Table 13: Forecast and actual volumes of Other Mains Replacement Capex – 2013 to 2017

Capex program	Details
LDCI mains replacement	<p>The AER's Final Decision included capex allowances for three specific projects:</p> <ul style="list-style-type: none"> • Riversdale Road, Hawthorn 3122 (downgrade) - The completion of LP to HP Mains Replacement capex programs in the adjoining Kew postcode during the current period has partially reduced load on the MP main. However rather than downgrade, the MP main is now schedule to be permanently abandoned in 2020 because of the removal of the MP to LP supply dependency. This efficiency gain is a direct result of the proposed 2018-2020 LP to HP Mains Replacement capex projects in the Hawthorn area. • Auburn Road, Hawthorn – Sections of the large diameter cast iron mains in Auburn Road are to be completed as part of the LP to HP Mains Replacement capex program in the forthcoming access arrangement period. Deferral of the project and its completion as part of LP to HP Mains Replacement capex program provides the most cost-effective means of delivering this project given the complexity to replace the mains like for like in such a congested area. • Summerhill Road, Glen Iris (downgrade) - Detailed analysis of this project resulted in its reassessment due to the complex LP supply dependencies and greater alignment with the scheduled Augmentation project in the area. Consequently, the project was deferred and will now be permanently abandoned at the completion of the proposed 2018-2021 LP to HP Mains Replacement capex projects in the Ashburton area. This is a more effective and efficient approach.⁷ <p>Our LDCI Mains Replacement strategy for the current period sets out plans for several projects that were not included in the AER's expenditure allowance for the current period. An overview of our progress in delivering on these other planned projects is set out below:</p>

⁵ Access arrangement final decision, Multinet Gas (DB No. 1) Pty Ltd, Multinet Gas (DB No. 2) Pty Ltd, 2013–17, Part 4 Confidential Appendix C, March 2013, page 21

⁶ Multinet Gas, Cost Pass-Through Application: Mains Replacement Event, 12 June 2015, page 7

⁷ Access arrangement final decision, Multinet Gas (DB No. 1) Pty Ltd, Multinet Gas (DB No. 2) Pty Ltd, 2013–17, Part 4 Confidential Appendix C, March 2013, page 32

Capex program	Details																	
	<ul style="list-style-type: none">Thompsons Road, Bulleen - The completion of LP to HP Mains Replacement capex program in the Bulleen and Kew area during the current period has reduced load on these MP mains. This has enabled the next sequenced replacement project to take place. This is project known as the Bulleen Grid Main is schedule for 2017 the completion of which will see 2.2 kilometres of MP LDCI main permanently abandoned.Manningham Road, Millicent Av, Bulleen Road, Bulleen - Approximately 2 kilometres of mains has been abandoned following completion of LP to HP Mains Replacement capex projects in the area during the current period. The Bulleen Road section is now included in the Bulleen Grid Main schedule for completion in 2017. This will see 2.5 kilometres of MP LDCI main permanently abandoned.Wellington Road, Kew - During the current period, the completion of LP to HP Mains Replacement capex in the Kew area will eliminate the need for the MP LDCI. Upon completion in late 2016 the 2.5 kilometres section of MP mains will be abandoned.Aughtie Drive, Acland Street, Carlisle Street, Brighton Road, Nepean Highway, St Kilda - The planned replacement of this 5.5 kilometre of MP LDCI mains is now scheduled early in the forthcoming access arrangement period. The project is integral in providing HP supply to the 2018-2022 LP to HP Mains Replacement capex projects in the St Kilda and Elwood area and post 2022 LP to HP Mains Replacement capex projects in Middle Park, Balaclava, Ripponlea and St Kilda.Graham Street, South Melbourne - The planned replacement of this seven kilometres of MP CI mains is now scheduled early in the forthcoming access arrangement period. The project is a priority given the high number of mains fractures and recent gas entering buildings incidents that have resulted for such fractures. This project is also integral to providing HP supply to the 2018 LP to HP Mains Replacement capex project in Port Melbourne and future LP to HP Mains Replacement capex projects in the area.																	
LPDZ mains replacement	The AER's Final Decision included an allowance for only one project, being the replacement of LP mains at Tashinny Road, Toorak. ⁸ This work has been completed during the current period as part of a LP to HP Mains Replacement capex program.																	
Unplanned service renewals	<p>The AER's Final Decision was based on our actual 2012 number of services renewed⁹. These volumes were not directly stated in the AER's Final Decision documentation. However, in the AER Final decision CAPEX model¹⁰ the 2012 total volume of 365 was stated and formed the basis for the derivation of future volumes.</p> <p>On this basis, we expect our actual and estimated unplanned service renewal volumes for the current period to be in line with the AER's allowance. This expenditure is reactive in nature and therefore future estimates are based on historical volumes.</p> <table><tr><th>2013</th><th>2014</th><th>2015</th><th>2016</th><th>2017E</th><th>Total</th></tr><tr><td>383</td><td>304</td><td>345</td><td>398</td><td>367</td><td>1,797</td></tr></table>						2013	2014	2015	2016	2017E	Total	383	304	345	398	367	1,797
2013	2014	2015	2016	2017E	Total													
383	304	345	398	367	1,797													

⁸ Access arrangement final decision, Multinet Gas (DB No. 1) Pty Ltd, Multinet Gas (DB No. 2) Pty Ltd, 2013–17, Part 4 Confidential Appendix C, March 2013, page 34

⁹ Access arrangement final decision, Multinet Gas (DB No. 1) Pty Ltd, Multinet Gas (DB No. 2) Pty Ltd, 2013–17, Part 4 Confidential Appendix C, March 2013, page 48

¹⁰ Multinet-AER final decision capex models-confidential 'AER final decision - Multinet - Sent to DNSP.xlsx', Sheet 'Unplanned service renewal', Cell G14

5.3. Mains Replacement Unit rates

5.3.1. LP to HP Mains Replacement

5.3.1.1 Forecast unit rates

Table 14 details the evolution of our forecast unit rates for our LP to HP Mains Replacement capex for the current access arrangement period, from what we submitted in our initial Access Arrangement Information through to the AER's Final Decision in March 2013 and finally to its decision on our cost pass through application in September 2015.

Table 14: Forecast Mains Replacement capex volumes by program – 2013 to 2017

	\$ per metre (Real 2012)	\$ per metre (Real 2017)
Multinet Gas Initial Access Arrangement Information	226 ¹¹	249
AER Draft Decision (i.e. for 240 kilometres not covered by the cost pass through)	175 ¹²	193
Multinet Gas Revised Access Arrangement Information	214 ¹³	236
AER Final Decision (i.e. for 255 kilometres not covered by the cost pass through)	185 ¹⁴	204
MG Cost Pass Through Application (i.e. for 272 kilometres covered by the cost pass through)	190 ¹⁵	209
AER cost pass through decision (i.e. for 272 kilometres covered by the cost pass through)	190 ¹⁶	209
AER cost pass through decision (i.e. for total 527 kilometres covered by Final Decision and cost pass through)	187 ¹⁷	206

Table 14 shows that the AER:

- Approved a unit rate of \$204 per metre (Real \$2017) in its Final Decision for the 255 kilometres of LP to HP mains replacement not covered by the cost pass through;
- Approved a unit rate of \$209 per metre (Real \$2017) in its Final Decision for the 272 kilometres of LP to HP mains replacement covered by the cost pass through; and
- Approved, by implication, a combined unit rate of \$206 per metre (Real \$2017) for the 527 kilometres of LP to HP mains replacement covered by the Final Decision and the Cost Pass Through Decision.

The AER explained how it reached its decision on our cost pass through application as follows:

Unit rates are the per km costs of undertaking mains replacement work. In our final decision on Multinet's current access arrangement we determined unit rates for the areas in which Multinet

¹¹ AER, Access arrangement final decision, Multinet Gas (DB No. 1) Pty Ltd, Multinet Gas (DB No. 2) Pty Ltd, 2013–17, Part 4 Confidential Appendix C, March 2013, page 13

¹² AER, Access arrangement final decision, Multinet Gas (DB No. 1) Pty Ltd, Multinet Gas (DB No. 2) Pty Ltd, 2013–17, Part 4 Confidential Appendix C, March 2013, page 13

¹³ Multinet Gas, Gas Access Arrangement Review, January 2013–December 2017, Revised Proposal and Response to Draft Decision, 9 November 2012, page 84

¹⁴ 255 kilometres at \$47.1 million equals 185 per metre

¹⁵ 272 kilometres at \$51.6 million equals 190 per metre

¹⁶ AER, Access arrangement final decision, Multinet Gas (DB No. 1) Pty Ltd, Multinet Gas (DB No. 2) Pty Ltd, 2013–17, Part 4 Confidential Appendix C, March 2013, page 11

¹⁷ 527 kilometres at \$98.7 million equals 187 per metre

proposed, at that time, to undertake mains replacement work during the current access arrangement period. For those areas, Multinet is required to use the already approved unit rates for any additional kms proposed in the current pass through application. However, Multinet's pass through application is not limited to the areas for which we have already approved unit rates. Multinet may propose mains replacement work in other areas, for which we have not yet approved unit rates.

For areas we have not approved unit rates, Multinet must propose new unit rates for our assessment. We must be satisfied Multinet's proposed new rates are prudent and efficient.

Multinet's cost pass through application sets out proposed unit rates for three new areas of mains replacement. To appropriately assess these new unit rates we requested additional details of the methodology used by Multinet to derive the new rates. Multinet submitted details of its methodology on 13 July 2015. We have assessed this additional material.

Multinet based its new proposed unit rates on rates we have previously approved for adjacent areas. In one case Multinet used the same approved rate for a project which overlaps with the area of newly proposed mains replacement works. In another case Multinet used the average of unit rates previously approved for two adjacent areas. And in the third case Multinet used the mean of unit rates previously approved for projects in a number of adjacent areas.

We consider the methodology used by Multinet to derive unit rates for the new areas of mains replacement work is reasonable. On the basis of the information provided to us by Multinet we are satisfied its proposed unit rates for new areas of mains replacement are prudent and efficient.¹⁸

- Table 15 reflects how the AER derived its forecast unit rates for the LP to HP Mains Replacement program for the current access arrangement period in its March 2013 Final Decision and its September 2015 cost pass through decision based on the capex allowances detailed in Table 9 and the volumes in Table 12.

Table 15: AER's Allowances in Final Decision and Cost Pass Through Decision – 2013 to 2017

Capex Program	Final Decision (March 2013)		Cost Pass Through Decision (September 2015)		Final Decision + Cost Pass Through Decision	
	\$, Real 2012	\$, Real 2017	\$, Real 2012	\$, Real 2017	\$, Real 2012	\$, Real 2017
LP to HP Mains Replacement program (\$M)	47.1	51.7	51.6	56.5	98.7	108.2
Kilometres	255.0	255.0	272.0	272.0	527.0	527.0
Unit rate for LP to HP replacement (\$/metre)	185.0	204.0	190.0	209.0	187.0	206.0

5.3.1.2 Actual and estimated unit rates

Table 16 details our actual and estimated LP to HP Mains Replacement capex, volumes and unit rates for each year of the current access arrangement period.

¹⁸ AER, Access arrangement final decision, Multinet Gas (DB No. 1) Pty Ltd, Multinet Gas (DB No. 2) Pty Ltd, 2013–17, Part 4 Confidential Appendix C, March 2013, page 11

Table 16: Actual and Estimated LP to HP Mains Replacement Capex, Volumes and Unit Rates – 2013 to 2017 (\$, Real 2017)

Capex Program		2013	2014	2015	2016	2017 (E)	Total
LP to HP Mains Replacement program	Capex (\$M)	11.4	24.0	20.6	34.1	43.6	133.7
	Volumes (Kilometre)	56.0	110.0	85.0	151.0	125.0	527.0
	Unit rates (\$/metre)	203.6	218.2	242.4	225.8	348.9	253.7

Table 17 details the variance between:

- The AER's Mains Replacement capex allowance and implied unit rate for LP to HP Mains Replacement capex based on 527 kilometres of mains; and
- Our actual and estimated Mains Replacement capex and implied unit rate for our LP to HP Mains Replacement capex based on the same volume.

Table 17: Actual Mains Replacement Capex, Volumes and Unit Rates – 2013 to 2017 (\$, Real 2017)

Capex Program	Allowance (including cost pass through)	Actual	Variance
LP to HP Mains Replacement program (\$M)	108.2	133.7	25.5
Unit rate for LP to HP replacement based on 527 kilometres (\$/metre)	206.0	253.7	47.7

Table 16 and Table 17 show that we expect:

- Our actual unit rate for our LP to HP Mains Replacement capex for the four years 2013 to 2016 will be \$16 per metre (or 8 per cent) higher than the AER's allowance; and
- There will be a significant increase in our unit rate in 2017 to \$349 per metre, so that the average unit rate over the current period will be \$248 per metre. This is \$41 per metre, or 20 per cent, higher than the AER's allowance.

The 8 per cent increase between our 2013 to 2016 actual, and the AER's benchmark unit rates is due to our tendered market rates being higher than the estimates accepted by the AER, which were based on cost build-ups for each project.

The significant increase in the 2017 rate is due to:

- The scheduled construction of 15 kilometres of grid main of which seven kilometres is based on a tendered rate of \$893/metre for the project known as 'Grid Main North, Prospect Hill Road to Elgar Road' compared to the AER allowance of \$513/metre¹⁹ (\$, Real 2017),
- A tendered rate of \$362/metre for 6.6 kilometres of the 'Balwyn North / Mont Albert (2016 Gaar North 5A Walksheet)' program compared to the AER allowance of \$151/metre¹⁹ (\$, Real 2017), and
- 43 kilometres of the forecast 128 kilometres being based on estimates ranging from \$313/metre to \$362/metre.

Accordingly, the forecast total cost of replacing our LP mains in the current access arrangement period will exceed the AER's allowance due to the increased unit rates.

¹⁹ AER, Access arrangement final decision, Multinet Gas (DB No. 1) Pty Ltd, Multinet Gas (DB No. 2) Pty Ltd, 2013–17, Part 4 Confidential Appendix C, March 2013, pages 35 and 36

5.3.2. Other Mains Replacement

5.3.2.1 Forecast unit rates

The AER determined its allowance for:

- The LDCI and LPDZ Mains Replacement capex programs based on our proposed base unit rates and an overhead rate of 10 per cent²⁰; and
- The Unplanned Service Renewal program based on actual 2011 costs from each service provider (North and South).

5.3.2.2 Actual unit rates

As noted in section 5.1, we have not accounted for any LDCI and LPDZ Mains Replacement capex in the current access arrangement period.

Table 18 compares the AER average allowance per activity type of unplanned service renewal to the 2015 actual rates for the same activity.

Table 18: AER's Unplanned Service Renewal Activity Allowances and Actuals

Unplanned Service Renewal Activity	Average 2013-2017 Rate, Final Decision (March 2013)		2015 Actual Rates		Variance	
	\$, Real 2012	\$, Real 2017	\$, Real 2015	\$, Real 2017	\$, Real 2017	Percentage
Renew Service - Domestic Complex	7,356.0	8,064.0	8,541.0	8,782.0	718.0	9%
Renew Service - Industrial & Commercial	5,358.0	5,874.0	5,152.0	5,297.0	(577.0)	(10%)
Renew Service – Enlargement*	1,543.0	1,691.0	-	-	-	-
Renew Service - Domestic HP	2,092.0	2,294.0	1,700.0	1,748.0	(546.0)	(24%)
Renew Service - Domestic LP	2,585.0	2,833.0	3,115.0	3,203.0	370.0	13%
Renew Service – Relocation*	901.0	988.0	-	-	-	-

*Note: Due to zero/minor volumes a comparison for these rates has not taken place. The 2013-2017 AER forecast was based on an annual volume of 1 for each of these activities. The 2015 actual volumes were only 1 for Renew Service – Enlargement and zero for Renew Service – Relocation.

Table 18 shows that while the variance between unplanned service renewal activities ranges from plus 13 per cent to minus 24 per cent, the Renew Service Domestic LP activity which accounts for over 60 per cent of the annual unplanned service renewal volumes is 13 per cent higher than the average AER allowance when compared to our 2015 actuals. This increase in activity costs above the average benchmark rate determined by the AER reflects the increased cost associated with a higher proportion of more challenging service renewals based on the remaining LP network progressively restricted to higher density areas.

²⁰ AER, Access arrangement final decision, Multinet Gas (DB No. 1) Pty Ltd, Multinet Gas (DB No. 2) Pty Ltd, 2013–17, Part 4 Confidential Appendix C, March 2013, pages 31 and 33

5.4. Efficiency of Mains Replacement program

We consider our capex for the current access arrangement period to be prudent and efficient and to be consistent with the requirements for conforming capex because:

- Our two-party service provider model provides continuous competitive pressure for delivering our capex program. We recently established this model following a competitive tender process. This is discussed in chapter 13 of our AAI;
- We have a robust capital governance framework that has recently been reviewed and endorsed by Jacobs. We have provided their report entitled “Review of Governance Structures and Processes for Capital Expenditure” to the AER with our AAI.

Our view is supported by Oakley Greenwood, whom we engaged to undertake a review of our capex in the current period. In their November 2016 report they stated:

Furthermore, in our opinion, the mains replacement capital expenditure incurred by MG over the current regulatory control period is likely to be consistent with that of a prudent and efficient service provider, and therefore, consistent with Rule 79 of the National Gas Rules. We base this opinion on our view that:

- *MG undertook a competitive tendering process for the provision of services for operational, maintenance and capital work, including mains replacement services.*
 - *The AER accepted that this process was competitive as part of the last GAAR process.*
 - *Our review also comes to the same conclusion.*
- *The process for generating competitive tension throughout the current regulatory period under the current contracting arrangements is reasonable, and likely to incentivise efficient outcomes:*
 - *During the period July 2013 to June 2015, even though work was allocated to the Service Providers based on the geographic area they covered, because of (a) the implicit “threat” of having engaged an independent estimator to review target cost estimates for construction projects, which is recognised as being good practise within the infrastructure and construction industries.*
 - *Except for the requirement for MG to tender one project to each Service Provider, all other projects from July 2015 onwards were tendered to both Service Providers, hence creating competitive tension between the two Service Providers. Note that in our opinion, providing a baseload level of work to each Service Provider (i.e., one project) is also likely to have been efficient, if this base load level of work then allowed the Service Providers to “resource up” and therefore being capable of being a robust bidder against the other service provider.*
- *The underlying contracting structure (P50), which means the contractor shares in any gain or loss relative to budget, incentivises Service Providers to adopt the least cost means of undertaking mains replacement services, given the conditions faced.*
- *The evidence indicates that budgets set through the contractual process for mains replacement projects are not systemically too high (resulting in Service Providers benefiting systemically from over estimating budgets) or too low (resulting in Service Providers being penalised systemically, which may indicate inappropriate risk sharing).*
- *We compared the cost of the two sample mains replacement projects with the cost allowed for by the AER in its decisions on Mains Replacement Event Cost Pass Through applications from MG, AGN and Ausnet Services and found that the derived unit rates for the sample projects were at the low end of the derived unit rates approved by the AER.²¹*

In the following sub-sections, we discuss why we believe our expenditure on the sub-categories of Mains Replacement capex are conforming capex.

²¹ Oakley Greenwood, Prudency and Efficiency of Mains Replacement and Connection Capex prepared for Multinet Gas, November 2016, pages 45-46

5.4.1. LP to HP Mains Replacement capex

As already noted, our current access arrangement contains a pass-through mechanism, which enables us to seek the AER's approval for the recovery of additional Mains Replacement expenditure once a defined threshold (the "Mains Replacement Event") is reached. We triggered this Mains Replacement Event in April 2015 when we completed 207 kilometres of our planned Mains Replacement program. Accordingly, we submitted a Mains Replacement cost pass-through application to the AER in May 2015. Our application sought approval for costs expected to be incurred to install an additional 272 kilometres of HP mains in our current access arrangement compared to the allowance of 255 kilometres provided in the AER's Final Decision.

In support of our cost pass through application, we engaged Advisian to review whether our capex for the 2013 to 2017 period represented conforming capex. We provided Advisian's report to the AER with our application. Their report supported our view that our expenditure is conforming capex. The report concluded:

Advisian have independently examined all information received and confirm the lengths and costs summarised in the Executive Summary of the report to be a true and accurate assessment of the works undertaken from 1 January 2013 to 30 April 2015. Advisian also advise that based on current market knowledge, construction costs associated with these projects are within industry expectations.

Advisian is satisfied that the Capital Expenditure for the current Regulatory period from 1 January 2013 to 31 December 2017 satisfy the new Capex criteria, set out in rule 79 of the NGR which permit expenditure to be included in the opening capital base and subsequently recovered from their customers through tariffs. The expenditure is that of a prudent operator based on performance and generally meeting Levels of Service targets.²²

The AER's approval of our cost pass-through application brought the total approved volume of new mains to be installed under our LP to HP Mains Replacement program to 527 kilometres for the current access arrangement period.

In its decision on our pass-through application, the AER stated²³:

We are satisfied Multinet's proposed additional 272 km of mains replacement is consistent with the capex criteria under cl. 79(1) of the NGR. In reaching this view we have had regard to:

- Multinet's Asset Management Plan and Multinet's submission that its proposed mains replacement align with the Asset Management Plan*
- The views of Energy Safe Victoria on Multinet's proposed volumes, given the underlying safety driver for the mains replacement program*
- Multinet's current level of completed mains replacement in the 2013–17 access arrangement period and its evidence of future works to be undertaken.*

We note that Multinet has a general statutory obligation under s.32 of the Gas Safety Act to 'manage and operate each of its facilities to minimise as far as practicable' the hazards and risks to the safety of the public and customers arising from gas, interruptions to the conveyance or supply of gas and the reinstatement of an interrupted gas supply. The obligation also includes minimising hazards and risks of damage to public property and the property of customers.

[...]

Under Multinet's Asset Management Plan it is scheduled to complete its mains replacement work program over a 30 year period, concluding in 2033. This end date is a critical factor in considering what is an efficient and prudent volume of mains replacement under r.79(1) given the long term safety objective of removing all cast iron and unprotected steel mains from Multinet's network. We noted in our final decision that the mains replacement pass through provides a means by which Multinet can complete the mains replacement program by 2033. Therefore we have had regard to Multinet's ability to meet this timeframe for completing its mains replacement in considering the efficiency and prudence of the proposed volumes.

²² Advisian, AER Pipework Projects – Independent Validation Report, 31 May 2015, page 7

²³ AER, Multinet Gas Mains Replacement Cost Pass Through - AER decision, September 2015, pages 9 and 10.

Multinet has acknowledged its mains replacement volumes undertaken in the previous access arrangement period fell short of the Asset Management Plan work program.

[...]

Multinet has submitted that the volumes proposed in its current cost pass through application will bring it back into line with the mains replacement schedule set out in its Asset Management Plan. In considering Multinet's application, we have consulted with Energy Safe Victoria. Energy Safe Victoria is supportive of Multinet's approach.

It follows from the above statements that the AER accepts the efficiency of the increased volume of work we have completed in the current access arrangement period. In relation to the unit rates, the following points were noted in our pass-through application:

- We have established Operational and Management Services Agreements (OMSAs) with two service providers for the construction and maintenance activities on the gas distribution network:
 - Combining construction and maintenance enables service providers to spread overhead across a broader base to reduce costs overall.
 - Having two service providers enables competition by comparison for small scale activities and the agreements have provisions enabling both service providers to compete directly for larger projects.
- Efficiency in costs is incentivised by setting target prices for projects with reference to an Independent Estimator and implementing pain/gain sharing for variations to the target cost.
- The longer-term (five year) relationship under the OMSA contracts enables service providers to invest in labour, equipment and training to ensure sufficient resources are available to complete the required works programs.
- This contracting approach is prudent and efficient as it provides:
 - Sufficient certainty to contractors to make necessary investments in the skilled labour and capital required to undertake mains replacement works efficiently;
 - Certainty over volumes of work over a long period to ensure economies of scale and scope benefits are captured;
 - Sufficient time to adequately plan and prepare for the increasingly difficult areas as the LP to HP Mains Replacement program moves into the inner suburbs;
 - Sufficient time for us to arrange for the necessary funding of the program; and
 - Greater certainty over the capability to deliver the LP to HP Mains Replacement program in the most efficient manner by 2033.

The information presented above, along with the analysis and findings presented by the AER in its decision on our Mains Replacement pass-through application confirms that our LP to HP Mains Replacement capex program in the current access arrangement period is efficient, and meets the criteria for conforming capex set out in Rule 79.

5.4.2. Other Mains Replacement capex programs

As already noted, our Mains Replacement capex includes the following works in addition to the LP to HP Mains Replacement capex program:

- LDCI mains replacement;
- LPDZ mains replacement; and
- Unplanned service renewals.

As discussed above, the outcomes we planned to deliver through our LDCI and LPDZ mains replacement programs have largely been achieved through our LP to HP Mains Replacement program. We have targeted block replacement of LP mains in areas where the highest benefits are delivered through the offloading of high risk MP and other large diameter cast iron mains. In this way, synergies were obtained by extending the LP to HP Mains Replacement program to incorporate the asset replacement requirements identified in the LDCI and LPDZ Mains Replacement programs.

This approach has delivered savings relative to the AER's allowances for LDCI and LPDZ Mains Replacement and therefore our actual expenditure can be regarded as being efficient, and meeting the criteria for conforming capex set out in Rule 79.

As stated in Section 4 our Unplanned Service Renewals allows the *ad hoc* renewal of services outside the planned mains and services replacement program. These works result when reactive maintenance (i.e. service repairs) are deemed unsafe and inefficient considering the deteriorated condition of the asset which limits the effectiveness to repair the fault. We consider these works are prudent given their reactive nature to maintain the safety and integrity of services in accordance with Rules 79(2)(c)(i) and (ii). As such our expenditure for this program can be considered efficient, and meeting the criteria for conforming capex set out in Rule 79.

6. Expenditure forecasting method

This section explains and justifies our method of forecasting Mains Replacement capex for the next access arrangement period.

Our Mains Replacement strategy primarily focuses on minimising, to the extent practicable, public and maintenance personnel safety risks by targeting mains in areas that have a high incidence of mains fracture and leakage. Further, the strategy targets the integrity and performance of mains in areas that have:

- Suffered from loss of supply associated with water in mains incidents; and
- Limited capacity to service additional demand from existing and new customer connections.

Our Mains Replacement program leads to the lowest sustainable costs over the long-term as it:

- Reduces the need to undertake leak repair work – this work does not substitute for the requirement to replace the deteriorating mains;
- Is undertaken, where possible by insertion techniques on a ‘block’ renewal basis, which is considered the most cost efficient technique; and
- Provides increased capacity from renewal to HP to meet increasing peak loads resulting from increasing penetration of high instantaneous demand gas appliances.

The timeframe of our LP to HP Mains Replacement program can be established at a high level by modelling industry accepted asset lives against individual asset installed dates. As already noted, the original timeframe for replacing the LP network was 2033, being a 30-year period commencing in 2003. However, substantial replacement volumes have now been undertaken since the original timeframes were established. It is appropriate for these initial timeframes to be revisited in light of the current information.

Accordingly, our forecasting methodology begins with an initial ‘top down’ assessment of the replacement volume required by the end of the forthcoming access arrangement period, taking into account current asset ages and technical lives. This ‘top down’ analysis is supplemented by an analysis of pipe fracture and leakage rates, which provide an indication of whether the implied rate of replacement is appropriate - given the current and projected performance of the assets - or whether it should be deferred or accelerated. Through this analysis, we identify the volume of pipe replacement works that must be undertaken to ensure that fracture and leakage rates are not allowed to deteriorate from current levels.

From a safety perspective, it is essential that the network does not expose the public or our contractors to unacceptable risks. While the LP to HP Mains Replacement program is the largest single component of our Mains Replacement capex category, the scheduling of work under this program must be optimised by taking into consideration other works, most notably the planned removal of the MP cast iron mains. As already noted, those assets pose a significant safety risk, particularly due to the increased release of gas between MP mains and LP mains. The replacement of the MP cast iron mains is, therefore, a key objective for the forthcoming access arrangement period.

The location of the LP pipe replacement works for the forthcoming access arrangement period targets those areas where synergies can be achieved by coordinating LP pipe replacement with the removal of MP cast iron mains.

The forecasting methodology therefore seeks to optimise our mains replacement work to achieve the lowest sustainable costs over the long-term, considering the following factors, in order of priority:

1. Maintain and improve safety in accordance with Rule 79(2)(c)(i), by focusing on the replacement of MP cast iron mains as this:
 - Mitigates the risk of a catastrophic failure that would threaten the safety of the public, our field personnel and property; and
 - Provides the most effective means of minimising, to the extent practicable, public safety risks.
2. Address local capacity constraints;
3. Minimise local interruptions to supply associated with planned replacement works; and
4. Optimise maintenance costs.

Our Mains Replacement capex forecast also includes an allowance for unplanned service renewals and reactive replacement of mains. Most LP mains and service replacements that we complete are planned replacements of ageing cast iron pipes undertaken as part of the LP to HP Mains Replacement program. However, outside of that program, there is a need to replace a relatively small number of services and mains on an ad-hoc or unplanned basis, to maintain the safety and integrity of services in accordance with Rules 79(2)(c)(i) and (ii). The criteria we apply for replacing services and mains on an unplanned basis are consistent with Australian Standards AS 4645-2005 (Gas Distribution Network Management). Our forecast of unplanned service and mains replacement volumes is based on historical trends.

In terms of unit rates, recent historical data provide a useful guide to likely future costs if the mix of work undertaken in difficult, high cost areas is considered. The replacement program to date illustrates a wide range of unit rates, which reflects the relatively high cost of replacement works in higher density urban areas. Specifically, projects in inner suburban areas with high population densities, a high incidence of multiple and multistorey unit developments, significant traffic management costs, and high site reinstatement costs typically involve higher unit rates than those for standard, outer suburban nature strip areas.

Our forecasts of unit rates for the forthcoming access arrangement period reflect the geographic progression of the LP to HP Mains Replacement program into higher density inner urban areas, which entail higher costs for the reasons outlined above. Unit rate forecasts also reflect the costs we expect to incur under our current competitively tendered contracts with our two service providers. Our competitive contracting approach with our service providers provides confidence that our unit rates are efficient.

Section 7 explains how we have applied this general method to forecast each of our programs in our Mains Replacement capex for the forthcoming access arrangement period.

7. Forthcoming access arrangement period expenditure

This section explains and justifies our Mains Replacement capex forecast for the forthcoming access arrangement period. This section is structured as follows:

- Section 7.1 overviews our Mains Replacement capex for the forthcoming period, broken down by program;
- Section 7.2 details our capex forecast for our LP to HP Mains Replacement program;
- Section 7.3 details our capex forecast for the program to replace MP cast iron mains;
- Section 7.4 details our capex forecast for to replace high-density polyethylene pipes;
- Section 7.5 details our capex forecast for our reactive mains replacement program;
- Section 7.6 details our capex forecast for our unplanned service renewals program;
- Section 0 explains why our Mains Replacement capex forecast is efficient; and
- Section 7.8 details the customer benefits that will result from our Mains Replacement capex in the forthcoming access arrangement period.

7.1. Overview of Mains Replacement capex forecasts

Table 19 details our proposed Mains Replacement capex by category for the forthcoming access arrangement period.

Table 19: Forecast Mains Replacement capex by category – 2018 to 2022 (\$M, Real 2017)

Expenditure subcategory	2018	2019	2020	2021	2022	Total
LP to HP mains replacement	48.0	45.1	44.8	45.8	39.6	223.4
Replacement of MP cast iron mains	7.7	4.9	6.7	-	-	19.3
Replacement of high-density polyethylene pipes	-	-	-	9.3	7.8	17.0
Reactive mains replacement	0.2	0.2	0.2	0.2	0.2	1.1
Unplanned service renewals	1.2	1.2	1.2	1.2	1.2	6.1
Total	57.2	51.4	53.0	56.5	48.8	266.9

Our Mains Replacement capex forecast is based on the volume forecasts in Table 20.

Table 20: Forecast Mains Replacement volumes by category – 2018 to 2022

Expenditure subcategory	2018	2019	2020	2021	2022	Total
LP to HP mains replacement (kilometres)	126.4	127.7	127.8	135.4	107.4	624.7
Replacement of MP cast iron mains (kilometres)	10.2	5.5	8.1	-	-	23.8
Replacement of early-generation high-density polyethylene pipes (kilometres)	-	-	-	22.3	17.7	40.0
Reactive mains replacement (units)	-	-	-	-	-	-
Unplanned service renewals (units)	367	367	367	367	367	1,837

The following sections explain and justify these capex and volume forecasts for each program. Our Mains Replacement Strategy document contains further details about how we have prepared our forecasts. We have provided this Strategy to the AER with this Overview Document.

7.2. LP to HP Mains Replacement capex forecasts

Table 21 details our forecast LP to HP Mains Replacement capex, volumes and unit rates for each year of the forthcoming access arrangement period.

Table 21: Forecast LP to HP Mains Replacement Capex, Volumes and Unit Rates – 2018 to 2022 (\$, Real 2017)

	2018	2019	2020	2021	2022	Total
Capex (\$M)	48.0	45.1	44.8	45.8	39.6	223.4
Volumes (Kilometre)	126.4	127.7	127.8	135.4	107.4	624.7
Unit rates (\$/metre)	379.8	353.0	350.6	338.4	369.1	357.5

7.2.1. Forecast volumes

We forecast that we will replace an average of 125 kilometres of LP mains with HP mains in the forthcoming access arrangement period. This is consistent with the average annual volume of work that we need to undertake to complete our LP to HP Mains Replacement program by 2033 (based on there being around 2,000 kilometres of LP mains needing to be replaced as at the end of 2017). As noted in sections 4.3 and 5.4.1, the AER has accepted the 30-year target for us to complete our LP to HP Mains Replacement program by 2033, including most recently in its September 2015 decision on our Mains Replacement cost pass through for the current access arrangement.

We have prioritised our LP to HP Mains Replacement works based:

- Firstly, on cast iron high fracture rate postcodes; and
- Secondly, on high leak rate post codes.

Then we determined which work we will undertake having regard for:

- The availability of existing HP mains;
- Synergies with the removal of MP cast iron mains;
- Our practice of working in from the outer boundary of our LP network; and

- Supply constraints on our network.

This approach has resulted in us identifying 44 discrete packages of work ranging in length from five kilometres to 28 kilometres of mains replacement, covering 27 postcodes.

Of the 625 kilometres of LP replacement, we estimate there will 346²⁴ kilometres of LP cast iron replaced. This will leave 734 kilometres of LP cast iron main to be replaced as at the end 2022.

7.2.2. Forecast unit rates

We used four methods to determine the unit rates that we applied to forecast our LP to HP Mains Replacement capex.

Our preferred method is to undertake a two-party tender using our competitively-sourced service providers, Comdain and ZNX. We can only use this method where the works are sufficiently well-defined to enable us to approach our service providers to provide a firm quotation and we intend proceeding with the successful tender.

However, where this is not possible, we rely on actual historical rates where we have previously undertaken work in the postcode. Otherwise:

- We engage our independent estimator – Advisian
 - We have provided packages of work to Advisian to cost for the forthcoming access arrangement period for the following postcodes: St Kilda, Elwood, Toorak, Southbank and Dandenong. We chose these postcodes because we have no relevant history of unit rates and they are high density areas. We asked Advisian to price Dandenong in order to validate, and provide a sense-check, for our internal density factor modelling.
- Where we don't either have actual unit rates for a postcode or it is premature to undertake a two-party tender we undertake postcode density correlation to establish unit rates in similar postcodes based on actual historical rates and two-party tenders.

Our Mains Replacement Strategy details which of these four methods we have used to cost works in each postcode.

We note that our LP to HP Mains Replacement capex forecast includes an allowance for planned services' replacements associated with the packages of work (in addition to the mains' replacements). The costs of these services' works are included in the unit rates and are estimated using the same methodologies.

7.3. Replacement of MP Cast Iron Mains

Table 22 details our forecast MP Cast Iron Mains Replacement capex, volumes and unit rates for each year of the forthcoming access arrangement period.

Table 22: Forecast Replacement of MP Cast Iron Mains' Capex, Volumes and Unit Rates – 2018 to 2022 (\$, Real 2017)

	2018	2019	2020	2021	2022	Total
Capex (\$M)	7.7	4.9	6.7	-	-	19.3
Volumes (Kilometre)	10.2	5.5	8.1	-	-	23.8
Unit rates (\$/metre)	757.2	897.1	829.1	-	-	813.9

Our MP Cast Iron Mains Replacement program involves the direct replacement of 24 kilometres of MP cast iron main. In this way, we will decommission our remaining 27 kilometres of MP cast iron before the end of 2022. The works involve:

- Like-for-like replacement of 8.1 kilometres of small diameter cast iron at a cost of \$6.7 million;
- Replacing 3.2 kilometres of MP cast iron via block renewal in Clayton South at a cost of \$1.6 million;

²⁴ 346 is based on applying the current proportion of cast iron in the LP network (55.4%) to 625 kilometers.

- Replacing 7.0 kilometres of MP cast iron in Graham Street, Port Melbourne at a cost of \$6.1 million; and
- Replacing 5.5 kilometres of MP cast iron in Aughtie Drive, Albert Park at a cost of \$4.9 million.

Our remaining three kilometres of MP cast iron will be decommissioned as part of synergies with the LP to HP Mains Replacement program.

All our MP Cast Iron Mains Replacement program has been costed by the Independent Estimator, except for the supply regulator works contained within the Graham Street, Port Melbourne and Aughtie Drive, Albert Park projects. These costs have been prepared through an internal estimate based on a combination of a bottom-up build and historical rates.

We note that our MP Cast Iron Mains Replacement capex forecast includes an allowance for planned services' replacements associated with the packages of work (in addition to the mains' replacements). The costs of these services' works are included in the unit rates and are estimated using the same methodologies.

7.4. Replacement of Early Generation High-Density Polyethylene Pipes

Table 23 details our forecast Early Generation High-Density Polyethylene Pipes' capex, volumes and unit rates for each year of the forthcoming access arrangement period.

Table 23: Forecast Early Generation High-Density Polyethylene Pipes' Capex, Volumes and Unit Rates – 2018 to 2022 (\$, Real 2017)

	2018	2019	2020	2021	2022	Total
Capex (\$M)	-	-	-	9.3	7.8	17.0
Volumes (Kilometre)	-	-	-	22.3	17.7	40.0
Unit rates (\$/metre)	-	-	-	414.8	439.0	425.5

Our early generation high-density polyethylene pipes were installed between 1970 and 1980. These early polyethylene pipes have high-leak and brittle fracture rates. These rates are described further in Our Mains Replacement Strategy document.

We are targeting the replacement of the earliest 31 kilometres of early generation high-density polyethylene pipes in the next five years. To achieve this, we propose replacing:

- 22.3 kilometres, including 20.4 kilometres of early generation polyethylene in Glen Waverley in 2019 at a cost of \$9.3 million; and
- 17.7 kilometres, including 11 kilometres of early generation polyethylene in Vermont 2020 at a cost of \$7.8 million.

Both projects have been costed by our Independent Estimator, Advisian.

We note that our Early Generation High-Density Polyethylene Pipes' capex forecast includes an allowance for planned services' replacements associated with the packages of work (in addition to the mains' replacements). The costs of these services' works are included in the unit rates and are estimated using the same methodologies.

7.5. Reactive mains replacement

Table 24 details our forecast Reactive Mains capex for each year of the forthcoming access arrangement period.

Table 24: Forecast Reactive Mains Capex – 2018 to 2022 (\$, Real 2017)

	2018	2019	2020	2021	2022	Total
Capex (\$M)	0.2	0.2	0.2	0.2	0.2	1.1

Reactive mains replacement involves the piecemeal renewal of minor sections of mains outside the planned mains replacement programs described above. These minor works arise when reactive maintenance (i.e. repairing a mains' leak) is deemed unsafe and inefficient considering the deteriorated condition of the asset which limits the effectiveness to repair the fault. The primary drivers for this program are to:

- Align with our objectives to achieve safety and regulatory compliance; and
- Ensure ongoing asset integrity by reactively replacing mains where a repair is assessed as being ineffective.

The program typically covers the replacement of mains sections less than 60 metres in length in geographical areas of the gas distribution network where the planned mains replacement program is not scheduled to take place in the immediate future.

This program excludes mains replacement associated with the planned mains replacement program as well as reactive service replacements that are covered in the Distribution Services Strategy, third party damage and customer initiated works.

We aim to maintain our reactive replacement methodology and rate in line with current practices. Given this program is reactive in nature, the work volume and capex will also naturally vary. However, we have based our forecast on the annual average of about \$0.2 million per annum over the period 2013 to 2015.

7.6. Unplanned service renewals

Table 25 details our forecast unplanned service renewals' capex, volumes and unit rates for each year of the forthcoming access arrangement period.

Table 25: Forecast Unplanned Service Renewals' Capex, Volumes and Unit Rates – 2018 to 2022 (\$, Real 2017)

	2018	2019	2020	2021	2022	Total
Capex (\$M)	1.2	1.2	1.2	1.2	1.2	6.1
Volumes (Units)	367	367	367	367	367	1,837
Unit rates (\$/service)	3,320.7	3,318.7	3,325.8	3,337.1	3,342.2	3,328.9

We assume that the economic life of a service is the same as that of the main to which it is connected. This assumption, together with a lack of information on service material types and locations, suggests that services be replaced:

- In line with the mains replacement program given that the service has not previously been replaced with polyethylene;
- On an assessment basis when the service is not fit-for-purpose due to leakage and the failure of a pressure test irrespective of material type (i.e. unplanned or ad-hoc service renewals); and
- If there has been a leakage report or outage that suggests that a steel service has contributed to the leakage or outage.

We have forecast:

- Our volumes based on our average annual service replacements between 2011 and 2015; and
- Unit rates based on 2015 actual costs taking into account service provider region and particular service activities.

Our forecast annual unplanned service renewals' capex of \$1.2 million is in line with historical levels.

7.7. Forecast Mains Replacement Capex is efficient

The information presented in this Overview Document and in the various supporting documents, including our Mains Replacement Strategy, demonstrates that our forecast Mains Replacement capex is efficient. In particular, our forecast will keep us on track to complete our LP to HP Mains Replacement work program over a 30-year period, concluding in 2033. This end date has previously been accepted by the AER and is consistent with an efficient and prudent volume of mains replacement under Rule 79(1), given the long-term safety objective of removing all cast iron and unprotected steel mains from our network.

Our Mains Replacement capex forecast for the forthcoming access arrangement period is scoped and prioritised to maintain and improve safety (in accordance with Rule 79(2)(c)(i) of the NGR), including by providing for the replacement of MP cast iron mains as this provides the most effective means of minimising, to the extent practicable, both the hazards and risks to the safety of the public, and the risk of property damage arising from the supply of gas. Our programming of replacement works also has regard for the need to address local capacity constraints; to minimise planned interruptions; and to optimise maintenance costs.

Our performance over the current access arrangement period (discussed in section 6) has demonstrated our ability to deliver the planned volume of replacement works over the forthcoming access arrangement period in a manner consistent with a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost, in accordance with Rule 79 of the NGR.

7.8. Benefits of expenditure to customers

Our Mains Replacement Strategy will benefit end users or customers by addressing the ‘societal risk’ posed from failure of cast iron mains and the resultant risk of incidents leading to loss of life or significant property damage by primarily targeting mains that have a high incidence of fractures and mains leakage.

It also provides greater reliability and increased capacity by replacing assets that are prone to water ingress with HP network.

Overall, our Mains Replacement capex provides benefits to customers by enabling us to undertake our network functions in accordance with our regulatory obligations at an efficient cost, to achieve the lowest sustainable cost of providing services.

8. Meeting Rules' requirements

This section explains and justifies our Mains Replacement capex forecast against the new capex criteria set out in Rule 79 of the NGR. It demonstrates that our Mains Replacement capex forecast is conforming capex which should be approved by the AER as part of its final decision for our forthcoming access arrangement period.

8.1. The new capex criteria

Rule 79 defines the new capex criteria as follows:

- (1) Conforming capex is capex that conforms with the following criteria:
 - (a) the capex must be such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services;
 - (b) the capex must be justifiable on a ground stated in subrule (2).
- (2) Capex is justifiable if:
 - (a) the overall economic value of the expenditure is positive; or
 - (b) the present value of the expected incremental revenue to be generated as a result of the expenditure exceeds the present value of the capex; or
 - (c) the capex is necessary:
 - (i) to maintain and improve the safety of services; or
 - (ii) to maintain the integrity of services; or
 - (iii) to comply with a regulatory obligation or requirement; or
 - (iv) to maintain the service provider's capacity to meet levels of demand for services existing at the time the capex is incurred (as distinct from projected demand that is dependent on an expansion of pipeline capacity); or
 - (d) the capex is an aggregate amount divisible into 2 parts, one referable to incremental services and the other referable to a purpose referred to in paragraph (c), and the former is justifiable under paragraph (b) and the latter under paragraph (c).
- (3) In deciding whether the overall economic value of capex is positive, consideration is to be given only to economic value directly accruing to the service provider, gas producers, users and end users.
- (4) In determining the present value of expected incremental revenue:
 - (a) a tariff will be assumed for incremental services based on (or extrapolated from) prevailing reference tariffs or an estimate of the reference tariffs that would have been set for comparable services if those services had been reference services; and
 - (b) incremental revenue will be taken to be the gross revenue to be derived from the incremental services less incremental operating expenditure for the incremental services; and
 - (c) a discount rate is to be used equal to the rate of return implicit in the reference tariff.
- (5) If capex made during an *access arrangement period* conforms, in part, with the criteria laid down in this rule, the capex is, to that extent, to be regarded as conforming capex.
- (6) The AER's discretion under this rule is limited.

8.2. How the forecast meets the new capex criteria

The information presented in this Overview Document and its supporting documents demonstrates that our Mains Replacement capex forecast is consistent with a prudent service provider, acting efficiently and in accordance with good industry practice to achieve the lowest sustainable cost of providing services, as required by Rule 79(1). In particular, the proposed capex is necessary to comply with the following provisions of the NGR:

- Rule 79(2)(c)(i) – The forecast capex is required to maintain and improve safety by reducing the incidence of gas leaks, to the extent practicable, thereby mitigating both the hazards and risks to the safety of both the public and field personnel, along with the risk of property damage associated with gas supply;
- Rule 79(2)(c)(ii) – The forecast capex is required to maintain the integrity of services by:
 - eliminating outages due to water ingress;
 - eliminating supply loss arising from leak repair works; and
 - eliminating poor pressure (or loss of supply) at the customer connection point due to peak loading on LP mains.
- Rule 79(2)(c)(iii) – The forecast capex is required to comply with the Gas Safety Case (as per section 44(2) of the Act), which requires us to minimise as far as practicable the hazards and risks to the safety of the public and customers of gas supply, including the risk of property damage; and
- Rule 79(2)(c)(iv) – The forecast capex is required to maintain our capability to meet levels of demand in those areas where LP mains are unable to satisfy peak demand and/or allow for the connection of new customers.

Given the above, the Mains Replacement capex forecast for the 2018 to 2022 access arrangement period is consistent with the National Gas Objective, in that it promotes efficient investment in natural gas services that is in the long term interests of consumers in terms of price, quality, safety, reliability and security of supply of natural gas services.

9. Supporting documentation

The following documents support our Mains Replacement capex forecast for the forthcoming access arrangement period.

- Mains Replacement Strategy (MG-SP-0009)
- Advisian, Independent Estimates Report – Augmentation and Mains Replacement projects - For Multinet Gas
- Distribution Services Strategy (MG-SP-0010)
- Advisian, AER Pipework Projects – Independent Validation Report, 31 May 2015
- Oakley Greenwood, Prudence and Efficiency of Mains Replacement and Connection Capex prepared for Multinet Gas, November 2016

Glossary

Abbreviations	
Act	<i>Gas Safety Act 1997</i>
AER	Australian Energy Regulator
EPA	Environment Protection Authority
ESC	Essential Services Commission of Victoria
ESV	Energy Safe Victoria
HP	High pressure
LDCI	Large Diameter Cast Iron
LPDZ	Low Pressure Designated Zone
OMSA	Operational and Management Services Agreements
LP	Low pressure
MP	Medium pressure
M	Million
mm	Millimetre
NGR	National Gas Rules



Attachment 1 – Allocation of Asset Costs between Capex Categories

		Capital Allocations							
Expenditure Category		Transmission & Distribution Mains	Services	Cathodic Protection	Meters ²⁵	Supply Regulators / Valve Stations	SCADA	IT Systems	Other
Mains Replacement	Planned and reactive replacement of distribution mains	Yes: 1. LP to HP replacement 2. MP replacement 3. Early Generation High Density Polyethylene pipe replacement 4. Reactive mains replacement.	Yes: 1. Where of a suitable standard reconnecting service after mains replacement 2. Replacement as part of the mains replacement program 3. Unplanned services renewal (i.e. ~\$1m pa) – not related to proactive Mains Replacement programs	No	No	Yes, installation of new supply regulators and valves	No	No	No
	Customer Connections	Residential and C&I Connections	Yes, installation or extension of mains related to a new connection	Yes, installation of new service	No	Yes, purchase of new meters and installation of meters for new connections (excluding as part of the digital meter trial). (Note – purchases of new meters were previously part of Meters Capex.)	No	No	No

²⁵ For the purposes of capital allocation Meters is inclusive of the consumer service regulator.



		Capital Allocations							
Expenditure Category		Transmission & Distribution Mains	Services	Cathodic Protection	Meters ²⁵	Supply Regulators / Valve Stations	SCADA	IT Systems	Other
Meters Replacement	Planned and unplanned replacement of existing metering fleet	No	No	No	Yes, purchase of new meters: 1. to replace a failed meter; 2. to seed the time-expired meter program; and 3. for digital meter trial	No	No	No	No
Augmentation	Project to increase the capacity of the network	Yes, demand related mains augmentation	No	No	No	Yes, demand related regulator augmentation	No	No	No
Information Technology	-	No	No	No	No	No	No	Yes, complete IT program	No
SCADA	-	No	No	No	Yes, for vortex flow meter installations associated with supply regulators	No	Yes, complete SCADA program	No	No
Other capex	Supply Regulators – Replacement	No	Fire valve program	No	No	Yes, 1. integrity related supply regulator upgrades 2. Network valve repayment	No	No	No



		Capital Allocations							
Expenditure Category		Transmission & Distribution Mains	Services	Cathodic Protection	Meters ²⁵	Supply Regulators / Valve Stations	SCADA	IT Systems	Other
	Network Valves	No	No	No	No	Yes, All network valve programs	No	No	No
	Recoverable works	Various, assets created depend on project							
	Corrosion Protection	No	No	Yes, complete CP program	No	No	No	No	No
	Services / Meters	No	No	No	No	No	No	No	No
	Gas Heaters	No	No	No	No	Yes, installation / replacement of heating installations	No	No	No
	Pigging Capex	Yes, Non-piggable pipeline alteration program	No	No	No	No	No	No	No