Vector®

GAS DISTRIBUTION ASSET MANAGEMENT PLAN UPDATE 2019-29

Table of Contents

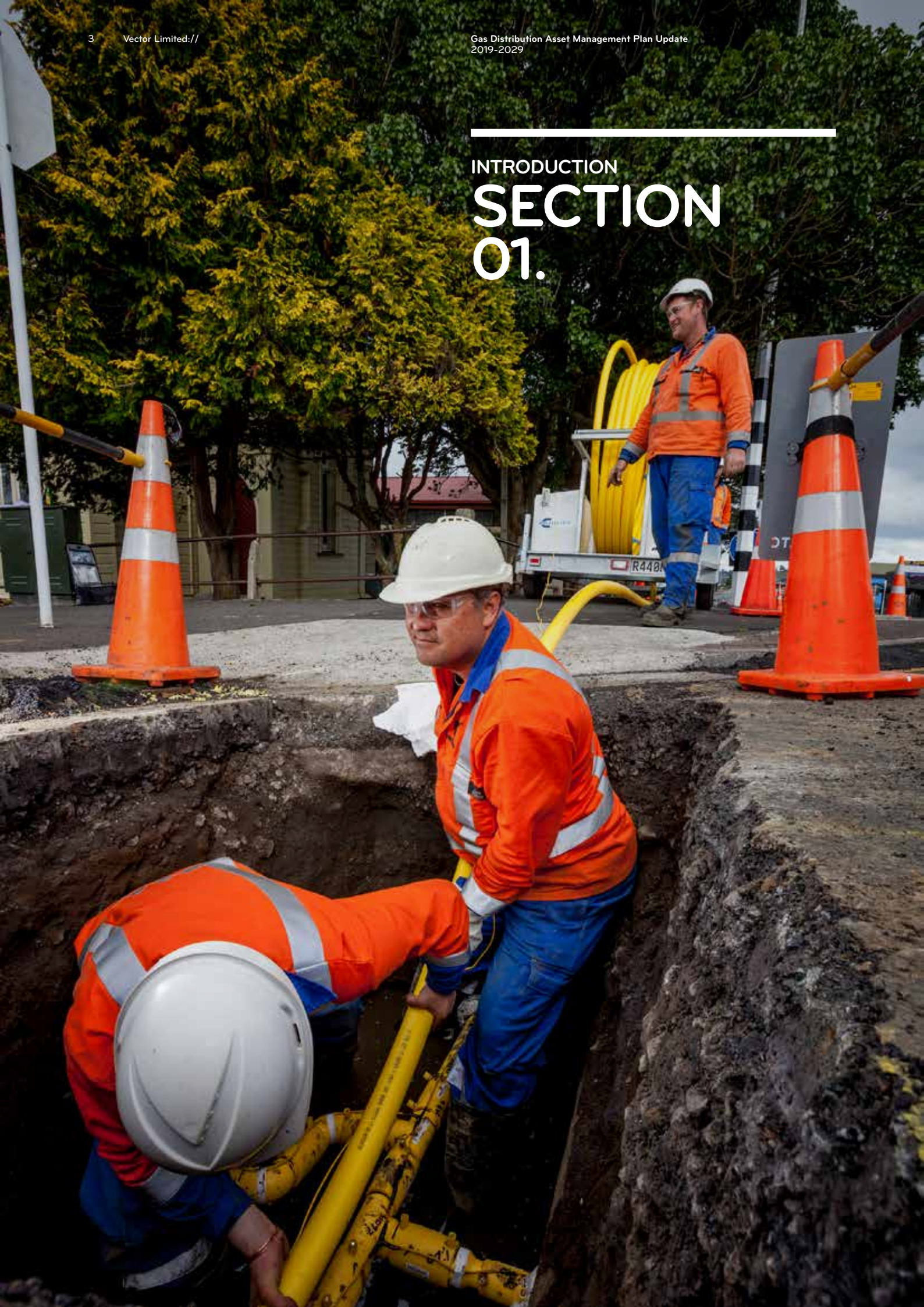
SECTION 1. INTRODUCTION 4
SECTION 2. SUSTAINABILITY 6
SECTION 3. NETWORK PERFORMANCE 8
3.1 Response Time to Emergencies 8
3.2 Number of Unplanned Interruptions 8
3.3 Number of Poor Pressure Events 8
3.4 Public Reported Escapes 9
3.5 Environmental Breaches 9
SECTION 4. NETWORK DEVELOPMENT PLANNING 11
4.1 Gas Connections 11
4.2 East Auckland IP10 – East Tamaki Reinforcement Project 11
4.3 Whangaparaoa MP4 – Wainui Security of Supply Project 11
SECTION 5. LIFECYCLE ASSET MANAGEMENT 13
5.1 Installation of additional Cathodic Protection test points 13
5.2 District regulator station upgrades 13
5.3 Auckland Harbour Bridge pipeline support-bracket replacement 13
5.4 Service regulator removal/replacement 13
5.5 Unspecified asset replacement and renewal 14
5.6 Pipes in buildings replacement 14
SECTION 6. CAPITAL EXPENDITURE FORECAST 16
6.1 Capital Expenditure Forecast 16
6.2 Comparison to Previous AMP 16
6.3 Explanation of Major Capital Expenditure Variances 17
SECTION 7. OPERATIONAL EXPENDITURE FORECAST 19
7.1 Operational Expenditure Forecast 19
7.2 Comparison to Previous AMP 19
7.3 Explanation of Major Operational Expenditure Variances 20
SECTION 8. APPENDICES 21
APPENDIX 1 FORECAST CAPITAL EXPENDITURE (SCHEDULE 11A) 22
APPENDIX 2 FORECAST OPERATIONAL EXPENDITURE (SCHEDULE 11B) 27
APPENDIX 3 REPORT ON ASSET CONDITION (SCHEDULE 12A) 28
APPENDIX 4 REPORT ON FORECAST UTILISATION (SCHEDULE 12B) 29
APPENDIX 5 REPORT ON FORECAST DEMAND (SCHEDULE 12C) 30
APPENDIX 6 MANDATORY EXPLANATORY NOTES ON FORECAST INFORMATION (SCHEDULE 14A) 31
APPENDIX 7 CERTIFICATE FOR YEAR BEGINNING DISCLOSURES 32

List of Figures

Figure 4-1 Gas connections – Actual and Forecast 11
Figure 6-1 CAPEX AMP movement 2018 v 2019 by year 16
Figure 7-1 OPEX AMP movement 2018 v 2019 by year 19

List of Tables

Table 3-1 Response time to emergencies 8
Table 3-2 Number of unplanned interruptions per 1,000 customers 8
Table 3-3 Number of poor pressure events 8
Table 3-4 Number of PRE per 1,000 km of distribution system 9
Table 6-1 Forecast CAPEX 16
Table 6-2 2018 and 2019 variance CAPEX 17
Table 7-1 Forecast OPEX 19
Table 7-2 2018 and 2019 variance OPEX 20



INTRODUCTION

SECTION 01.

SECTION 1. INTRODUCTION

This Asset Management Plan (AMP) Update (the Update) has been prepared to inform Vector's customers and other stakeholders of material changes and updates to our asset management planning since 2018, when the last full Gas Distribution AMP (1 July 2018 – 30 June 2028) was published. In particular the Update contains updated 10-year capital investment and maintenance programmes for the gas distribution network.

The 2018 AMP provides the full context and details of our investments, and asset management strategies for our gas network, taking into account the potential for rapid shifts in utilisation trends as the energy sector is disrupted by new technology, climate change, changing customer preferences and Auckland growth.

As of this Update, those macro trends remain in place with no material deviation in terms of impact on our strategic planning.

This Update therefore provides a refreshed view of how we are responding to those trends twelve months on from the last full AMP.

The objectives of this Update are to:

- Be transparent with our customers and stakeholders about our plans and investments for the network;
- Detail the projects, improvements, and trials already underway for our network
- Foster understanding of how our asset management approach works, by providing details about our assets, Vector's plans for them, and the company's objectives
- Explain how these plans and strategies align with our corporate vision to bring about a new energy future for Auckland

Today's energy environment is more uncertain than at any other point in time since mass consumer electrification. The rate of Auckland's growth, the exponential impact of maturing alternative energy technologies, new breakthrough energy innovations both in technical capability and cost of production, changing consumer preferences and behaviours, and the impact of climate change on weather conditions are all creating more uncertainty for previously settled energy infrastructure asset management strategies.

The strategic drivers of our long-term planning remain unchanged since the last full AMP, there have been a number of recent developments that serve to highlight how these trends are impacting the energy sector:

- Restrictions on New Zealand offshore oil and gas exploration permits and subsequent government and private sector announcements around hydrogen illustrate the potential for environmental policy and technology to drive significant disruption around energy sources
- Public discussion resulting from the Electricity Pricing Review on the role of energy poverty in New Zealand today and what interventions could materialise to influence consumer behaviour around energy source

We must retain our ability to pre-empt and respond to these changing scenarios as they emerge, while balancing this agility with providing a safe, reliable and secure service for distributing natural gas throughout Auckland.

This Update was certified and approved by our Board of Directors on 30 May 2019.

SUSTAINABILITY

SECTION 02.

SECTION 2. SUSTAINABILITY

Vector is cognisant of the increasing risks and opportunities posed by a changing environmental and social context. Examples of some of the challenges which are relevant to Vector include the rapid urbanisation of Auckland, increasing storm events linked to climate change, the release of the Climate Change Response (Net Zero) Amendment Bill with ambitious commitments to reduce carbon emissions, and increasing inequality and poverty among our communities.

From a business perspective, these issues create new opportunities to apply innovation and technology to deliver services to customers but also create risks that need to be assessed and managed. This is particularly relevant for the long-term investment in network infrastructure to ensure resilience and accommodate a future which will by necessity be based on a low carbon economy. Our role in this low carbon transition will include reducing our emissions associated with operating and maintaining the network while working with gas suppliers and customers to explore lower emission alternatives to gas.

Vector's approach will be to focus on the issues of materiality to both the business and its stakeholders, improving its understanding of these issues and embedding the appropriate response through the business. Given the scale of the issues the business will look to collaborate and where appropriate partner with other organisations in its response.

NETWORK PERFORMANCE

SECTION 03.

SECTION 3. NETWORK PERFORMANCE

This section reviews the key asset management service levels previously described in the 2018 AMP.

3.1 RESPONSE TIME TO EMERGENCIES

For the period ending 30 June 2018, Vector's Response Time to Emergencies (RTE) within one hour and three hours response was 98.1% and 100%, respectively. Vector's target proportion of RTE within one and three hours is 80% and 100%, respectively; Vector's RTE targets were therefore met or exceeded. Although the count of emergencies for the RY18 period showed a slight increase on the count for the RY17 period, Vector's RTE within one hour improved for the RY18 period compared to the RY17 period. This demonstrates that Vector's current reactive maintenance programme is effective at ensuring that response times to faults and emergencies are appropriate.

Table 3-1 shows the comparison of RTE for the previous five years against Vector's target.

DESCRIPTION	RY14	RY15	RY16	RY17	RY18	TARGET
Proportion of RTE within one hour	94.0%	96.1%	95.6%	93.8%	98.1%	80%
Proportion of RTE within three hours	100%	100%	100%	100%	100%	100%

Table 3-1 Response time to emergencies

3.2 NUMBER OF UNPLANNED INTERRUPTIONS

For the year ending 30 June 2018, Vector's number of unplanned interruptions performance was 2.2 interruptions per 1,000 customers, below Vector's target of (less than) 2.8. Table 3-2 shows the comparison of the number of unplanned interruptions for the previous five years against Vector's target.

DESCRIPTION	RY14	RY15	RY16	RY17	RY18	TARGET
Number of unplanned interruptions[1]	3.1	3.4	2.7	2.4	2.2	2.8

Table 3-2 Number of unplanned interruptions per 1,000 customers

For the year ending 30 June 2018, 84% of total unplanned interruptions were caused by third party damage, with the majority of the balance being caused by equipment failure; the split between third party damage and equipment-failure related interruptions was similar to that for the preceding year. Over recent years, the total count of unplanned interruptions and the count of interruptions caused by third party damage have trended downwards. This trend demonstrates that Vector's current maintenance programmes (i.e. for reactive maintenance, preventive maintenance, corrective maintenance, third-party services and network protection) and asset renewal programmes (e.g. service regulator removal, riser valve audits etc.) are appropriate strategies to achieve ongoing network performance improvements.

3.3 NUMBER OF POOR PRESSURE EVENTS

For the year ending 30 June 2018, Vector had one poor pressure event. This is below Vector's target of (less than) four events per annum. Table 3-3 shows the comparison of poor pressure events due to network causes for the previous five years against Vector's target.

DESCRIPTION	RY14	RY15	RY16	RY17	RY18	TARGET
Number of poor pressure events	4	4	4	5	1	4

Table 3-3 Number of poor pressure events

Analysis of the single poor pressure event for RY18 shows that the event was caused by corrosion of the aluminium riser causing the service carrier-pipe to become constricted; neither the RY18 event nor the poor pressure events that occurred during the previous RY periods were related to poor pressure on the mains network. The absence of poor pressure events on the mains network can be attributed to the level of permanent telemetry monitoring currently installed on the network,

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[1] The 2019 values differ to the 2018 AMP due to an adjustment made to correct a reporting error across all years.

and the annual pressure monitoring and network analysis programmes that Vector undertakes to identify constraints on the network.

3.4 PUBLIC REPORTED ESCAPES

For the year ending 30 June 2018, Vector's Public Reported Escapes (PRE) performance was 24 PRE per 1,000 km of distribution system, below Vector's target of (less than) 38. Table 3-4 below shows the comparison of PRE for the previous five years against Vector's target.

DESCRIPTION	RY14	RY15	RY16	RY17	RY18	TARGET
Number of PRE per 1,000 km	41	43	32	30	24	38

Table 3-4 Number of PRE per 1,000 km of distribution system

For the year ending 30 June 2018 approximately 45% of all PRE were related to service riser faults (i.e. riser valve, pipe or crimp joint); a further 20% of PRE were related to service pipe faults (i.e. service pipe or fitting) and the balance were related to mains pipes and fittings, District Regulator Station (DRS) and service regulators etc. This makeup is similar to that for the preceding RY period. Over recent years the PRE rate has trended downwards; this trend demonstrates that Vector's current maintenance programmes (in particular preventive maintenance and corrective maintenance), and asset renewal programmes (e.g. pre-1985 Polyethylene (PE) pipeline replacement, riser valve audits etc.) are appropriate strategies to achieve ongoing network performance improvements. Further analysis of service riser related faults is planned to identify opportunities to further reduce this type of PRE.

During RY16, Vector began using SELMA (Street Evaluating Laser Methane Assessment) leak detection equipment (this equipment employs laser technology to identify methane releases) for all leakage survey work, and modified leakage survey preventive maintenance cycles to ensure all parts of the network are surveyed on a two-yearly or shorter cycle. This change has resulted in a marked increase in the number of leaks detected by leakage survey, and a corresponding decrease in the number of PRE. This approach allows Vector to take a proactive approach in managing gas leaks to achieve a better public safety outcome and the success is demonstrated in the PRE trend described above.

3.5 ENVIRONMENTAL BREACHES

There was one environmental breach for the period ending 30 June 2018. An environmental infringement notice was received from Auckland Council when a contractor working on an excavation, inadvertently pumped sediment laden water from a trench into the stormwater drain. A detailed investigation was completed, which resulted in the contractor's environmental management procedures being updated and employee awareness training undertaken.

Our target performance remains at zero environmental breaches.

NETWORK DEVELOPMENT PLANNING

SECTION 04.

SECTION 4. NETWORK DEVELOPMENT PLANNING

This section discusses aspects that have led to key changes to Vector's network planning practices previously described in the 2018 AMP.

4.1 GAS CONNECTIONS

Following a review of new customer connections, Vector is forecasting a decrease in the number of new connections compared to the 2018 AMP. The key reason for this reduction is lower residential connections in the established networks. However, this reduction is partially offset against strong subdivision growth in the suburbs of Waitoki, Whangaparaoa and Tuakau. Figure 4-1 shows the historical and 10-year forecast for the number of new customer connections.

NUMBER OF GAS CONNECTIONS

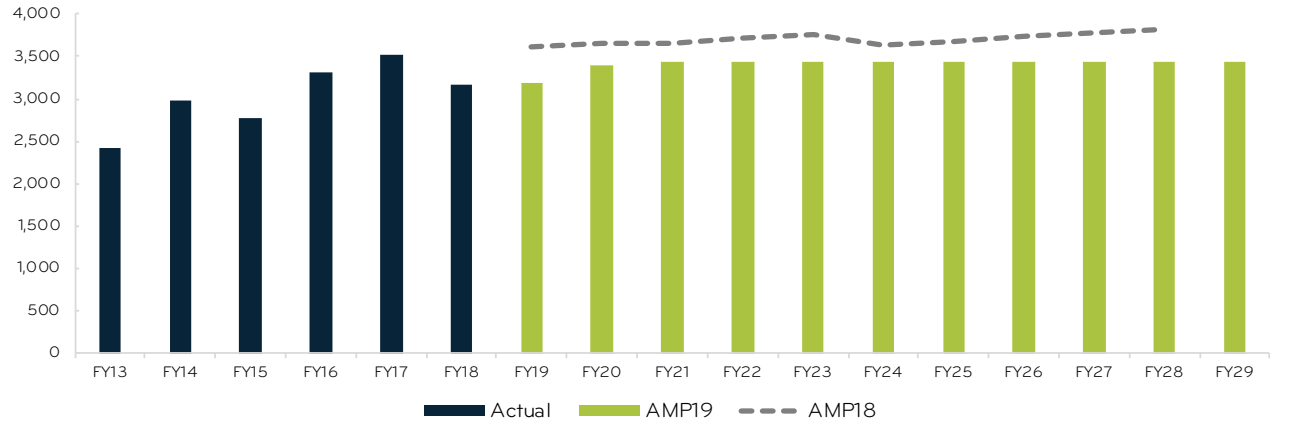

Figure 4-1 Gas connections – Actual and Forecast

4.2 EAST AUCKLAND IP10 – EAST TAMAKI REINFORCEMENT PROJECT

Vector's network modelling has indicated that the East Auckland IP10 network in the East Tamaki area is heavily-utilised, and possibly at risk of breaching Vector's minimum operating pressure criteria within the 10-year planning period. As a result, system reinforcement is required to support future growth opportunities and enhance network security. The following projects are planned from FY20 (or under investigation):

- Install additional system pressure monitoring points within the East Tamaki area to further validate the network modelling
- Uprate of the existing IP10 pipeline, which is presently operated at 875kPa, which is below its reported maximum allowable operating pressure (MAOP) of 1160kPa (under investigation)

4.3 WHANGAPARAOA MP4 – WAINUI SECURITY OF SUPPLY PROJECT

Vector's MP4 network in the Whangaparaoa peninsula is a single supply to an existing population of approximately 6,000 customers. As a result of strong subdivision growth in the area, the population of reticulated customers is expected to increase to 10,000, during the 10-year planning period. Coupled with the high growth, there is also an increased risk of the single supply pipeline being damaged, resulting in the potential loss of customers. During 2018 there has been three network damages on this pipeline due to third-party construction and excavation activities. Due to the projected customer growth, lack of supply redundancy and the high risk of supply loss, the following projects are planned:

- Construction of a new 150mm steel IP20 pipeline
- Construction of a new IP20/MP4 DRS to establish a second point of supply into the MP4 network (expected by FY23)

LIFECYCLE ASSET MANAGEMENT

SECTION 05.

SECTION 5. LIFECYCLE ASSET MANAGEMENT

This section discusses aspects that have led to key changes to Vector's asset life-cycle management practices previously described in the 2018 AMP.

5.1 INSTALLATION OF ADDITIONAL CATHODIC PROTECTION TEST POINTS

Some of Vector's Cathodic protection (CP) systems (e.g. Takapuna and Panmure) have insufficient test points to allow effective monitoring of the performance of the CP system over all sections of the associated steel network, or to carry out effective fault finding. This is typically due to CP test points being lost or damaged as a result of street works over the period since the test points were originally installed.

In some cases, additional test points are required to meet the minimum spacing requirements stipulated in AS 2832.1 Cathodic protection of metals or to provide additional monitoring points to facilitate CP-system fault finding - e.g. in the event of an electrical short on the system. A 5-year programme of work (FY21 to FY25) has therefore been included in the 10-year CAPEX forecast for the installation of additional test points.

5.2 DISTRICT REGULATOR STATION UPGRADES

Vector's CAPEX work programme includes upgrading DRSs to address integrity and/or compliance issues identified through periodic DRS condition assessments.

The CAPEX forecast for DRS rebuilds that was included in the 2018 AMP was based on an estimated cost for a typical DRS rebuild. Although the cost estimate was based on actual historical costs of the time, recent DRS rebuild projects have highlighted the fact that typical DRS rebuild costs have increased significantly over the period. The increase is primarily due to increased contractor costs and increased compliance costs; in particular Level 2 traffic management costs and associated work hour restrictions, as well as resource consent costs - e.g. where the existing DRS enclosure needs to be replaced or enlarged.

The 10-year CAPEX forecast for DRS upgrades has therefore been increased for a typical major DRS rebuild with this cost estimate based on actual more recent completed project costs.

5.3 AUCKLAND HARBOUR BRIDGE PIPELINE SUPPORT-BRACKET REPLACEMENT

During FY18, Vector initiated a 5-year work programme (FY18 to FY22) to replace all IP20 pipeline support-brackets on the Auckland Harbour Bridge. The pipeline was installed in 1983 and recent maintenance inspections confirmed that the original support brackets were beginning to fail.

Access to the pipeline is difficult for most of its route across the Bridge, and bespoke access solutions are required to allow maintenance and/or replacement work to be carried out on the pipeline. A budget estimate was prepared for the full work programme following the completion of a pilot project in FY17 however the type and cost of the bespoke access solutions that would be required for much of the project were unknown at that time; as a result, the total cost for the entire programme was underestimated.

During the FY18 work programme, access solutions for the more difficult sections of pipeline were developed and approved by the Bridge Authority, thereby allowing the full cost of the remaining stages of the programme to be determined. The CAPEX forecast for the Harbour bridge pipeline-bracket replacement work has therefore been increased for the FY20 to FY21 period. In addition, corrective maintenance costs for the re-painting of the pipeline have also been included in the OPEX forecast for the FY20 to FY21 period.

5.4 SERVICE REGULATOR REMOVAL/REPLACEMENT

Approximately 140 service regulators remain in service on Vector's network. A service regulator is typically comprised of a small capacity pressure regulator along with upstream and downstream isolation valves. Service regulators are installed in situations where it is not possible, or considered impractical, to locate the gas measurement system (GMS) outside of the customer's premises.

Approximately 90% of the remaining service regulators are installed belowground. In some situations, belowground service regulators can be affected by the ingress of water, silt or other debris which can result in gas escapes from corroded fittings and pipework and can allow the downstream systems to be over-pressurised. To mitigate the risks associated with the relatively large number of belowground service regulators, Vector has implemented an ongoing service regulator removal programme that targets the removal or relocation aboveground, of a small number of higher priority service regulators, annually.

Because the remaining population of service regulators includes sites that are becoming increasingly more challenging to upgrade i.e. due to their location, number of connections etc., additional costs will be incurred to upgrade these sites. The CAPEX forecast for the removal/replacement of service regulators has therefore been increased for the duration of the planning period.

5.5 UNSPECIFIED ASSET REPLACEMENT AND RENEWAL

Periodically sections of mains and service pipes will be identified that need to be replaced or relocated, on an as-required basis, due to safety or compliance issues; examples include shallow pipes, pipes located under buildings, or pipes of non-compliant material specification.

In the 2018 AMP CAPEX forecast, Vector included a provision throughout the planning period for the replacement of these assets as they are identified to ensure that H&S and compliance risks are mitigated. However, the cost of this work has steadily increased over the period due to increased contractor costs and increased compliance costs, in particular traffic management. The CAPEX forecast for unspecified asset replacement and renewal has therefore been increased for the duration of the planning period.

5.6 PIPES IN BUILDINGS REPLACEMENT

Vector carries out annual preventive maintenance inspections at approximately 200 sites where a gas service pipe terminates within a building, normally at a GMS location. The purpose of the inspection is to assess the condition and accessibility of the service pipe, and the adequacy of available ventilation and installed gas-tight conduits etc.

The primary risk associated with pipes-in-buildings sites is an asset failure resulting in a gas-in-building event.

A review of pipes-in-buildings site data and associated inspection data was carried out following a recent gas-in-building event; the review highlighted that the current list of sites is not up to date, and that the location information is not always accurate. It also highlighted that the configuration of some sites prevents full and effective maintenance inspections being carried out, and that the demarcation point between network assets and metering assets is not always clearly defined on site.

A 5-year programme of work (FY20 to FY24) has been included in the 10-year CAPEX forecast to mitigate the risks associated with pipes-in-buildings sites. The 5-year work programme will result in upgrades of higher risk sites to either relocate the service pipe and riser and associated metering equipment outdoors where possible, or to reconfigure the site to improve the effectiveness of preventive maintenance inspections. In either case, an agreed demarcation point between distribution network assets and the metering assets is to be determined.

To facilitate the CAPEX work programme, the OPEX forecast includes a provision to undertake an audit of all pipes-in-building sites to develop and prioritise the 5-year work programme according to the assessed risk.

CAPITAL EXPENDITURE FORECAST

SECTION 06.

SECTION 6. CAPITAL EXPENDITURE FORECAST

This section describes the capital expenditure forecasts for the gas distribution network assets for the next 10-year planning period, and provides a comparison with the 10-year forecast prepared and disclosed in the 2018 AMP.

6.1 CAPITAL EXPENDITURE FORECAST

Table 6-1 below shows the forecast CAPEX during the planning period, broken down into the asset categories defined in the Commerce Commission's Gas Distribution Information Disclosure Amendments Determination 2012. The figures are presented in 2020 dollars. For reference purposes, Vector has also included the corresponding CAPEX forecast disclosed in the 2018 AMP escalated to 2020 prices using an inflation factor of 2.0%

FINANCIAL YEAR ($000)

AMP2019	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	TOTAL
Consumer connection	17,616	19,934	15,853	15,886	15,886	15,886	15,886	15,886	15,886	15,886	164,603
System growth	2,795	1,497	5,109	6,440	1,522	4,087	663	918	1,173	761	24,965
Asset replacement and renewal	3,038	2,903	2,852	2,556	2,444	2,342	2,291	2,291	2,291	2,291	25,301
Asset relocations	3,947	5,308	2,748	3,171	3,171	3,171	3,171	3,171	3,171	3,171	34,197
Quality of supply	1,024	725	2,028	326	0	0	0	76	0	632	4,813
Legislative and regulatory	0	0	0	0	0	0	0	0	0	0	0
Other reliability, safety and environment	160	160	54	353	54	54	54	54	54	54	1,049
Non-network asset	3,838	1,757	2,003	1,990	2,214	2,135	1,624	4,910	2,047	1,588	24,107
Total CAPEX	**32,418**	**32,284**	**30,648**	**30,722**	**25,291**	**27,674**	**23,688**	**27,306**	**24,622**	**24,382**	**279,035**

Table 6-1 Forecast CAPEX

6.2 COMPARISON TO PREVIOUS AMP

The section highlights the significant changes to the 2018 disclosed expenditure forecasts Figure 6-1 below shows the difference between the 2018 and 2019 AMP expenditure forecasts, with Table 6-2 breaking down the variance by expenditure categories.

AMP MOVEMENT 2018 V 2019

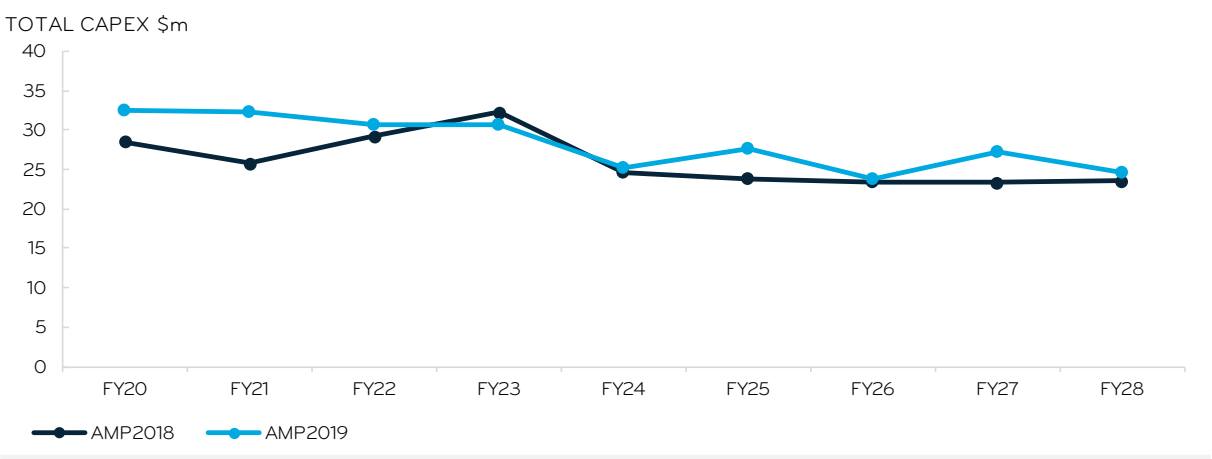

Figure 6-1 CAPEX AMP movement 2018 v 2019 by year

FINANCIAL YEAR ($000)

2018/2019 AMP VARIANCE	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	TOTAL
Consumer connection	(1,207)	2,855	(356)	(2,504)	(30)	(169)	(393)	(564)	(771)	(3,139)
System growth	1,087	149	(503)	(306)	28	3,214	329	584	839	5,422
Asset replacement and renewal	900	765	714	634	522	420	369	369	369	5,061
Asset relocations	370	2,317	(454)	0	0	0	0	0	0	2,233
Quality of supply	397	456	1,884	273	(54)	(54)	(54)	22	(54)	2,817
Legislative and regulatory	0	0	0	0	0	0	0	0	0	0
Other reliability, safety and environment	54	160	54	353	54	54	54	54	54	889
Non-network asset	2,315	(186)	100	(1)	139	364	(6)	3,474	637	6,835
Total CAPEX	**3,916**	**6,516**	**1,440**	**(1,553)**	**658**	**3,829**	**299**	**3,939**	**1,075**	**20,118**

Table 6-2 2018 and 2019 variance CAPEX

6.3 EXPLANATION OF MAJOR CAPITAL EXPENDITURE VARIANCES

This section highlights the significant changes in CAPEX over the 9-year period for which the 2018 AMP and 2019 AMP overlap, reflect the following key changes:

- A $3m reduction in customer connection expenditure largely due to a combination of lower forecast connection volume, a higher proportion of greenfield connection forecast that have a lower cost to connect compared to connections in the established gas network, and recategorisation of projects to system growth (below)
- A $5m increase in system growth attributed to increase in carry over projects, increase in cost assumptions (in particular work associated with DRS), and re-categorisation of expenditure from customer connection category (above)
- A $5m increase in asset replacement and renewal expenditure largely attributed to increase in DRS cost assumption, increase in cost to replace pipes that are non-compliant e.g. shallow network, and additional in-building pipe replacement programme to mitigate asset failure resulting in a gas-in-building event
- A $2m increase in relocation expenditure due to provision for relocation work associated with SH16 Safe Road initiatives
- A $3m increase in quality of supply driven by Wainui pipe extension and building a second DRS and pipeline to avoid the loss of customers in the Wainui / Silverdale areas, that is undergoing significant growth
- Non-network CAPEX increased by $7m driven by transfer of leasing cost from OPEX and CAPEX under IFRS 16 and allocated cost for office fit outs in FY20

OPERATIONAL EXPENDITURE FORECAST

SECTION 07.

SECTION 7. OPERATIONAL EXPENDITURE FORECAST

This section describes the operational expenditure forecasts for the gas distribution network assets for the next 10-year planning period, and provides a comparison with the 10-year forecast prepared and disclosed in the 2018 AMP.

7.1 OPERATIONAL EXPENDITURE FORECAST

Table 7-1 shows the forecast OPEX during the planning period, broken down into the asset categories defined in the Commerce Commission's Gas Distribution Information Disclosure Determination 2012. The figures are presented in 2020 dollars. For reference, Vector has also included the corresponding OPEX forecast disclosed in the 2018 AMP escalated to 2020 prices using an inflation factor of 2.37% (refer to Table 7-2).

FINANCIAL YEAR ($000)

2019 AMP	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	TOTAL
Service interruptions and emergencies	2,236	2,236	2,236	2,236	2,236	2,236	2,236	2,236	2,236	2,236	22,357
Routine and corrective maintenance and inspection	3,117	2,939	2,941	2,652	2,654	2,656	2,658	2,660	2,661	2,663	27,602
Asset replacement and renewal	0	0	0	0	0	0	0	0	0	0	0
System operations and network support	2,412	2,412	2,412	2,412	2,412	2,412	2,412	2,412	2,412	2,412	24,121
Business support	4,919	4,919	4,919	4,919	4,919	4,919	4,919	4,919	4,919	4,919	49,193
Total OPEX	**12,684**	**12,506**	**12,508**	**12,220**	**12,221**	**12,223**	**12,225**	**12,227**	**12,229**	**12,230**	**123,273**

Table 7-1 Forecast OPEX

7.2 COMPARISON TO PREVIOUS AMP

The section highlights the significant changes to the 2018 disclosed expenditure forecasts. Figure 7-1 below shows the difference between the 2018 and 2019 AMP expenditure forecasts, with Table 7-2 breaking down the variance by expenditure categories.

AMP MOVEMENT 2018 V 2019

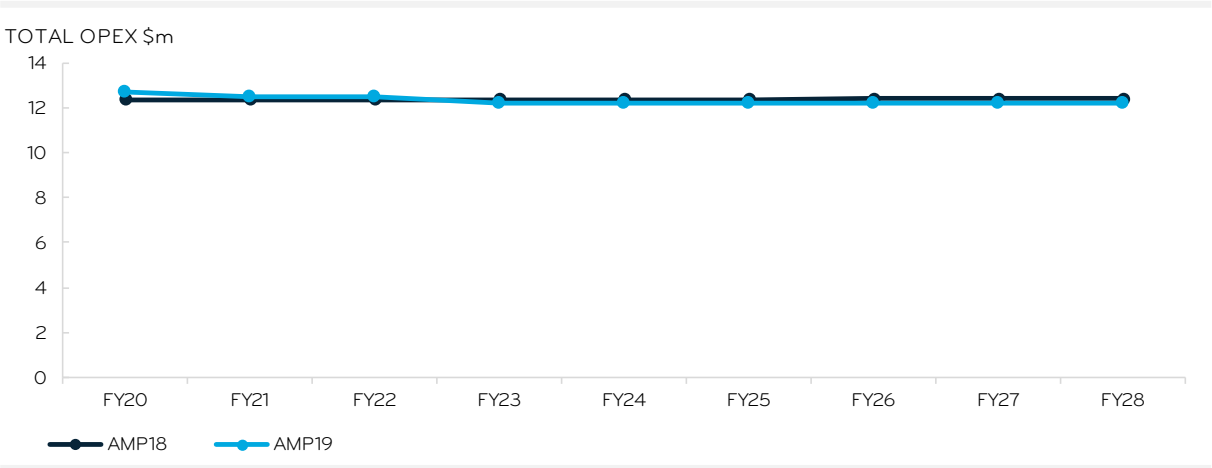

Figure 7-1 OPEX AMP movement 2018 v 2019 by year

FINANCIAL YEAR ($000)

2018/2019 AMP VARIANCE	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	TOTAL
Service interruptions and emergencies	5	5	5	5	5	5	5	5	5	47
Routine and corrective maintenance and inspection	396	217	217	(74)	(74)	(74)	(74)	(74)	(74)	387
Asset replacement and renewal	0	0	0	0	0	0	0	0	0	0
System operations and network support	(166)	(166)	(166)	(166)	(166)	(166)	(166)	(166)	(166)	(1,496)
Business support	82	82	82	82	82	82	82	82	82	736
Total OPEX	**317**	**138**	**138**	**(153)**	**(153)**	**(153)**	**(153)**	**(153)**	**(153)**	**(326)**

Table 7-2 2018 and 2019 variance OPEX

7.3 EXPLANATION OF MAJOR OPERATIONAL EXPENDITURE VARIANCES

This section highlights the significant changes in OPEX over the 9-year period for which the 2018 AMP and 2019 AMP overlap, reflect the following key changes:

- Network OPEX forecast is in line with the 2018 AMP with an increase of $0.4M over the 9-year comparable period. Notable changes in the forecast assumptions include a higher number of Housing NZ disconnections of which Vector is expected to recover the associated expenditure, an expedited Auckland harbour bridge crossing maintenance programme and additional resource allocated for DRS maintenance, offset by a lower valve maintenance expenditure

Total non-network OPEX is $0.8m lower than the previous AMP. There is a reduction of $1.5m in system operations and network support driven by conversion of property OPEX to CAPEX under IFRS 16 and a reduction to shared regulatory costs. This is offset by an increase of $0.7m in business support due to higher corporate costs driven by investment in digital capability and cyber security

APPENDICES

SECTION 08.

Appendix 1 Forecast Capital Expenditure (Schedule 11a)

Company Name	**Vector Limited**
AMP Planning Period	**1 July 2019 – 30 June 2029**

SCHEDULE 11a: REPORT ON FORECAST CAPITAL EXPENDITURE

This schedule requires a breakdown of forecast expenditure on assets for the current disclosure year and a 10 year planning period. The forecasts should be consistent with the supporting information set out in the AMP. The forecast is to be expressed in both constant price and nominal dollar terms. Also required is a forecast of the value of commissioned assets (i.e., the value of RAB additions)
GDBs must provide explanatory comment on the difference between constant price and nominal dollar forecasts of expenditure on assets in Schedule 14a (Mandatory Explanatory Notes).
This information is not part of audited disclosure information.

sch ref			*Current Year CY*	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
		for year ended	**30 Jun 19**	**30 Jun 20**	**30 Jun 21**	**30 Jun 22**	**30 Jun 23**	**30 Jun 24**	**30 Jun 25**	**30 Jun 26**	**30 Jun 27**	**30 Jun 28**	**30 Jun 29**
	11a(i): Expenditure on Assets Forecast		**$000 (nominal dollars)**										
	Consumer connection		17,619	17,574	20,283	16,453	16,817	17,153	17,154	17,497	17,847	18,204	18,568
	System growth		955	2,764	1,510	5,256	6,758	1,631	4,374	724	1,023	1,333	881
	Asset replacement and renewal		1,501	3,032	2,956	2,962	2,707	2,641	2,530	2,525	2,575	2,627	2,679
	Asset relocations		2,569	3,920	5,377	2,840	3,341	3,408	3,408	3,476	3,545	3,616	3,689
	Reliability, safety and environment:												
	Quality of supply		-	1,024	740	2,111	346	-	-	-	86	-	741
	Legislative and regulatory		828	-	-	-	-	-	-	-	-	-	-
	Other reliability, safety and environment		297	159	162	56	375	59	59	60	61	62	63
	Total reliability, safety and environment		1,125	1,183	902	2,167	721	59	59	60	146	62	805
	Expenditure on network assets		23,769	28,473	31,028	29,678	30,344	24,892	27,525	24,282	25,136	25,842	26,622
	Expenditure on non-network assets		3,608	3,791	1,770	2,058	2,086	2,367	2,283	1,770	5,461	2,323	1,837
	Expenditure on assets		27,377	32,264	32,798	31,736	32,430	27,259	29,807	26,052	30,598	28,165	28,459
	plus Cost of financing		124	155	132	151	172	119	149	102	153	119	109
	less Value of capital contributions		6,785	8,803	12,620	6,749	7,304	7,450	7,599	7,751	7,906	8,064	8,226
	plus Value of vested assets		-	-	-	-	-	-	-	-	-	-	-
	Capital expenditure forecast		20,716	23,616	20,310	25,138	25,298	19,928	22,357	18,403	22,845	20,220	20,342
	Assets commissioned		21,684	23,618	20,372	24,910	25,725	19,905	22,955	18,955	23,459	20,784	20,913
			Current Year CY	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
		for year ended	**30 Jun 19**	**30 Jun 20**	**30 Jun 21**	**30 Jun 22**	**30 Jun 23**	**30 Jun 24**	**30 Jun 25**	**30 Jun 26**	**30 Jun 27**	**30 Jun 28**	**30 Jun 29**
			$000 (in constant prices)										
	Consumer connection		17,619	17,229	19,495	15,504	15,536	15,536	15,232	15,232	15,232	15,232	15,232
	System growth		955	2,710	1,451	4,953	6,243	1,477	3,884	630	873	1,115	723
	Asset replacement and renewal		1,501	2,973	2,841	2,791	2,501	2,392	2,247	2,198	2,198	2,198	2,198
	Asset relocations		2,569	3,843	5,168	2,676	3,087	3,087	3,026	3,026	3,026	3,026	3,026
	Reliability, safety and environment:												
	Quality of supply		-	1,004	711	1,989	320	-	-	-	73	-	608
	Legislative and regulatory		828	-	-	-	-	-	-	-	-	-	-
	Other reliability, safety and environment		297	156	156	53	346	53	52	52	52	52	52
	Total reliability, safety and environment		1,125	1,160	867	2,042	666	53	52	52	125	52	660
	Expenditure on network assets		23,769	27,915	29,822	27,966	28,033	22,545	24,441	21,138	21,454	21,623	21,839
	Expenditure on non-network assets		3,608	3,717	1,701	1,939	1,927	2,144	2,027	1,541	4,661	1,944	1,507
	Expenditure on assets		27,377	31,632	31,523	29,905	29,960	24,689	26,468	22,679	26,115	23,567	23,346
	Subcomponents of expenditure on assets (where known)												
	Research and development		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

		Current Year CY	CY+1	CY+2	CY+3	CY+4	CY+5	CY+6	CY+7	CY+8	CY+9	CY+10
for year ended		30 Jun 19	30 Jun 20	30 Jun 21	30 Jun 22	30 Jun 23	30 Jun 24	30 Jun 25	30 Jun 26	30 Jun 27	30 Jun 28	30 Jun 29
Difference between nominal and constant price forecasts		$000										
Consumer connection		-	345	788	949	1,281	1,617	1,922	2,265	2,615	2,972	3,336
System growth		-	54	59	303	515	154	490	94	150	218	158
Asset replacement and renewal		-	59	115	171	206	249	283	327	377	429	481
Asset relocations		-	77	209	164	254	321	382	450	519	590	663
Reliability, safety and environment:												
Quality of supply		-	20	29	122	26	-	-	-	13	-	133
Legislative and regulatory		-	-	-	-	-	-	-	-	-	-	-
Other reliability, safety and environment		-	3	6	3	29	6	7	8	9	10	11
Total reliability, safety and environment		-	23	35	125	55	6	7	8	21	10	145
Expenditure on network assets		-	558	1,206	1,712	2,311	2,347	3,084	3,144	3,682	4,219	4,783
Expenditure on non-network assets		-	74	69	119	159	223	256	229	800	379	330
Expenditure on assets		-	632	1,275	1,831	2,470	2,570	3,339	3,373	4,483	4,598	5,113

		Current Year CY	CY+1	CY+2	CY+3	CY+4	CY+5
11a(ii): Consumer Connection	for year ended	30 Jun 19	30 Jun 20	30 Jun 21	30 Jun 22	30 Jun 23	30 Jun 24
*Consumer types defined by GDB**		$000 (in constant prices)					
Mains Extensions/Subdivisions		5,920	7,981	10,247	6,256	6,288	6,288
Service Connections - Residential		9,825	7,297	7,297	7,297	7,297	7,297
Service Connections - Commercial		1,874	1,951	1,951	1,951	1,951	1,951
Customer Easements		-	-	-	-	-	-
* include additional rows if needed							
Consumer connection expenditure		17,619	17,229	19,495	15,504	15,536	15,536
less Capital contributions funding consumer connection		4,405	5,070	7,343	3,881	3,888	3,888
Consumer connection less capital contributions		13,214	12,159	12,152	11,623	11,648	11,648

11a(iii): System Growth							
Intermediate pressure							
Main pipe	-	1,780	512	4,508	4,508	-	
Service pipe	-	-	-	-	-		
Stations	441	-	445	445	890	445	
Line valve	78	-	-	-	-	-	
Special crossings	-	-	-	-	-	202	
Intermediate Pressure total	519	1,780	957	4,953	5,398	647	
Medium pressure							
Main pipe	436	930	494	-	384	632	
Service pipe	-	-	-	-	-	-	
Stations	-	-	-	-	461	198	
Line valve	-	-	-	-	-	-	
Special crossings	-	-	-	-	-	-	
Medium Pressure total	436	930	494	-	845	830	

92		**Low Pressure**						
93		Main pipe	-	-	-	-	-	-
94		Service pipe	-	-	-	-	-	-
95		Line valve	-	-	-	-	-	-
96		Special crossings	-	-	-	-	-	-
97		**Low Pressure total**	-	-	-	-	-	-
98		**Other network assets**						
99		Monitoring and control systems	-	-	-	-	-	-
100		Cathodic protection systems	-	-	-	-	-	-
101		Other assets (other than above)	-	-	-	-	-	-
102		**Other network assets total**	-	-	-	-	-	-
103								
104		**System growth expenditure**	955	2,710	1,451	4,953	6,243	1,477
105	*less*	Capital contributions funding system growth						
106		**System growth less capital contributions**	955	2,710	1,451	4,953	6,243	1,477
107								
108								
109			*Current Year CY*	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*
		for year ended	**30 Jun 19**	**30 Jun 20**	**30 Jun 21**	**30 Jun 22**	**30 Jun 23**	**30 Jun 24**
110	**11a(iv): Asset Replacement and Renewal**							
111		**Intermediate pressure**	**$000 (in constant prices)**					
112		Main pipe	18	-	-	-	-	-
113		Service pipe	-	-	-	-	-	-
114		Stations	434	449	449	449	449	449
115		Line valve	-	180	-	-	-	-
116		Special crossings	407	452	502	452	53	53
117		**Intermediate Pressure total**	859	1,081	951	901	502	502
118		**Medium pressure**						
119		Main pipe	499	1,405	1,353	1,353	1,353	1,353
120		Service pipe	92	-	-	-	-	-
121		Station	-	250	250	250	250	250
122		Line valve	-	-	-	-	-	-
123		Special crossings	-	-	-	-	-	-
124		**Medium Pressure total**	591	1,655	1,603	1,603	1,603	1,603
125		**Low Pressure**						
126		Main pipe	-	-	-	-	-	-
127		Service pipe	-	-	-	-	-	-
128		Line valve	-	-	-	-	-	-
129		Special crossings	-	-	-	-	-	-
130		**Low Pressure total**	-	-	-	-	-	-

131	**Other network assets**						
132	Monitoring and control systems	-	63	63	63	63	63
133	Cathodic protection systems	51	74	124	124	233	124
134	Other assets (other than above)	-	100	100	100	100	100
135	**Other network assets total**	51	237	287	287	396	287
136							
137	**Asset replacement and renewal expenditure**	1,501	2,973	2,841	2,791	2,501	2,392
138	*less* Capital contributions funding asset replacement and renewal						
139	**Asset replacement and renewal less capital contributions**	1,501	2,973	2,841	2,791	2,501	2,392
140							

11a(v): Asset Relocations

142	*Project or programme**						
143	[Description of material project or programme]						
144	[Description of material project or programme]						
145	[Description of material project or programme]						
146	[Description of material project or programme]						
147	[Description of material project or programme]						
148	** include additional rows if needed*						
149	All other projects or programmes - asset relocations	2,569	3,843	5,168	2,676	3,087	3,087
150	**Asset relocations expenditure**	2,569	3,843	5,168	2,676	3,087	3,087
151	*less* Capital contributions funding asset relocations	2,380	3,560	4,787	2,479	2,860	2,860
152	**Asset relocations less capital contributions**	189	283	381	197	227	227
153							

11a(vi): Quality of Supply

154		*Current Year CY*	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*
155	for year ended	**30 Jun 19**	**30 Jun 20**	**30 Jun 21**	**30 Jun 22**	**30 Jun 23**	**30 Jun 24**
156							
157	*Project or programme**	**$000 (in constant prices)**					
158	[Description of material project or programme]						
159	[Description of material project or programme]						
160	[Description of material project or programme]						
161	[Description of material project or programme]						
162	[Description of material project or programme]						
163	** include additional rows if needed*						
164	All other projects or programmes - quality of supply	-	1,004	711	1,989	320	
165	**Quality of supply expenditure**	-	1,004	711	1,989	320	-
166	*less* Capital contributions funding quality of supply						
167	**Quality of supply less capital contributions**	-	1,004	711	1,989	320	-
168							

11a(vii): Legislative and Regulatory

	Project or programme						
	[Description of material project or programme]						
	[Description of material project or programme]						
	[Description of material project or programme]						
	[Description of material project or programme]						
	[Description of material project or programme]						
	** include additional rows if needed*						
	All other projects or programmes - legislative and regulatory	828	-	-	-	-	-
	Legislative and regulatory expenditure	828	-	-	-	-	-
less	Capital contributions funding legislative and regulatory						
	Legislative and regulatory less capital contributions	828	-	-	-	-	-

11a(viii): Other Reliability, Safety and Environment

	*Project or programme**						
	[Description of material project or programme]						
	[Description of material project or programme]						
	[Description of material project or programme]						
	[Description of material project or programme]						
	[Description of material project or programme]						
	** include additional rows if needed*						
	All other projects or programmes - other reliability, safety and environment	297	156	156	53	346	53
	Other reliability, safety and environment expenditure	297	156	156	53	346	53
less	Capital contributions funding other reliability, safety and environment						
	Other Reliability, safety and environment less capital contributions	297	156	156	53	346	53

11a(ix): Non-Network Assets

Routine expenditure

	*Project or programme**						
	[Description of material project or programme]						
	[Description of material project or programme]						
	[Description of material project or programme]						
	[Description of material project or programme]						
	[Description of material project or programme]						
	** include additional rows if needed*						
	All other projects or programmes - routine expenditure	2,633	1,119	1,137	1,180	1,104	1,459
	Routine expenditure	2,633	1,119	1,137	1,180	1,104	1,459

Atypical expenditure

	*Project or programme**						
	[Description of material project or programme]						
	[Description of material project or programme]						
	[Description of material project or programme]						
	[Description of material project or programme]						
	[Description of material project or programme]						
	** include additional rows if needed*						
	All other projects or programmes - atypical expenditure	975	2,598	564	759	823	685
	Atypical expenditure	975	2,598	564	759	823	685
	Expenditure on non-network assets	3,608	3,717	1,701	1,939	1,927	2,144

Appendix 2 Forecast Operational Expenditure (Schedule 11b)

Company Name	**Vector Limited**
AMP Planning Period	**1 July 2019 – 30 June 2029**

SCHEDULE 11b: REPORT ON FORECAST OPERATIONAL EXPENDITURE

This schedule requires a breakdown of forecast operational expenditure for the disclosure year and a 10 year planning period. The forecasts should be consistent with the supporting information set out in the AMP. The forecast is to be expressed in both constant price and nominal dollar terms.
GDBs must provide explanatory comment on the difference between constant price and nominal dollar operational expenditure forecasts in Schedule 14a (Mandatory Explanatory Notes).
This information is not part of audited disclosure information.

sch ref

		Current year CY	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
	for year ended	**30 Jun 19**	**30 Jun 20**	**30 Jun 21**	**30 Jun 22**	**30 Jun 23**	**30 Jun 24**	**30 Jun 25**	**30 Jun 26**	**30 Jun 27**	**30 Jun 28**	**30 Jun 29**
	Operational Expenditure Forecast	**$000 (in nominal dollars)**										
	Service interruptions, incidents and emergencies	2,198	2,236	2,293	2,348	2,402	2,457	2,511	2,566	2,622	2,680	2,739
	Routine and corrective maintenance and inspection	2,924	3,117	3,014	3,089	2,850	2,917	2,983	3,050	3,120	3,191	3,263
	Asset replacement and renewal	-	-	-	-	-	-	-	-	-	-	-
	Network opex	5,122	5,353	5,307	5,437	5,252	5,374	5,494	5,616	5,742	5,871	6,002
	System operations and network support	2,496	2,412	2,474	2,533	2,592	2,650	2,708	2,768	2,829	2,891	2,955
	Business support	4,806	4,920	5,046	5,168	5,286	5,406	5,525	5,647	5,771	5,898	6,027
	Non-network opex	7,302	7,332	7,520	7,701	7,878	8,056	8,233	8,415	8,600	8,789	8,982
	Operational expenditure	12,424	12,685	12,827	13,138	13,130	13,430	13,727	14,031	14,342	14,660	14,984

		Current year CY	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
	for year ended	**30 Jun 19**	**30 Jun 20**	**30 Jun 21**	**30 Jun 22**	**30 Jun 23**	**30 Jun 24**	**30 Jun 25**	**30 Jun 26**	**30 Jun 27**	**30 Jun 28**	**30 Jun 29**
		$000 (in constant prices)										
	Service interruptions, incidents and emergencies	2,198	2,184	2,184	2,184	2,184	2,184	2,184	2,184	2,184	2,184	2,184
	Routine and corrective maintenance and inspection	2,924	3,045	2,871	2,873	2,591	2,593	2,595	2,596	2,598	2,600	2,602
	Asset replacement and renewal	-	-	-	-	-	-	-	-	-	-	-
	Network opex	5,122	5,229	5,055	5,057	4,775	4,777	4,779	4,780	4,782	4,784	4,786
	System operations and network support	2,496	2,356	2,356	2,356	2,356	2,356	2,356	2,356	2,356	2,356	2,356
	Business support	4,806	4,806	4,806	4,806	4,806	4,806	4,806	4,806	4,806	4,806	4,806
	Non-network opex	7,302	7,162	7,162	7,162	7,162	7,162	7,162	7,162	7,162	7,162	7,162
	Operational expenditure	12,424	12,391	12,217	12,219	11,937	11,939	11,941	11,942	11,944	11,946	11,948
	Subcomponents of operational expenditure (where known)											
	Research and development	-	-	-	-	-	-	-	-	-	-	-
	Insurance	212	217	223	228	234	239	244	250	255	261	266

		Current year CY	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
	for year ended	**30 Jun 19**	**30 Jun 20**	**30 Jun 21**	**30 Jun 22**	**30 Jun 23**	**30 Jun 24**	**30 Jun 25**	**30 Jun 26**	**30 Jun 27**	**30 Jun 28**	**30 Jun 29**
	Difference between nominal and real forecasts	**$000**										
	Service interruptions, incidents and emergencies	-	52	109	164	218	273	327	382	438	496	555
	Routine and corrective maintenance and inspection	-	72	143	216	259	324	388	454	522	591	661
	Asset replacement and renewal	-	-	-	-	-	-	-	-	-	-	-
	Network opex	-	124	252	380	477	597	715	836	960	1,087	1,216
	System operations and network support	-	56	118	177	236	294	352	412	473	535	599
	Business support	-	114	240	362	480	600	719	841	965	1,092	1,221
	Non-network opex	-	170	358	539	716	894	1,071	1,253	1,438	1,627	1,820
	Operational expenditure	-	294	610	919	1,193	1,491	1,786	2,089	2,398	2,714	3,036

Appendix 3 Report on Asset Condition (Schedule 12a)

Company Name	**Vector Limited**
AMP Planning Period	**1 July 2019 – 30 June 2029**

SCHEDULE 12a: REPORT ON ASSET CONDITION

This schedule requires a breakdown of asset condition by asset class as at the start of the forecast year. The data accuracy assessment relates to the percentage values disclosed in the asset condition columns. Also required is a forecast of the percentage of units to be replaced in the next 5 years. All information should be consistent with the information provided in the AMP and the expenditure on assets forecast in Schedule 11a.

sch ref

					Asset condition at start of planning period (percentage of units by grade)						
7											% of asset forecast to be replaced in next 5 years
8	Operating Pressure	Asset category	Asset class	Units	Grade 1	Grade 2	Grade 3	Grade 4	Grade unknown	Data accuracy (1–4)	
9	Intermediate Pressure	Main pipe	IP PE main pipe	km	-	-	-	-	-	N/A	-
10	Intermediate Pressure	Main pipe	IP steel main pipe	km	-	-	100.00%	-	-	3	-
11	Intermediate Pressure	Main pipe	IP other main pipe	km	-	-	-	-	-	N/A	-
12	Intermediate Pressure	Service pipe	IP PE service pipe	km	-	-	-	-	-	N/A	-
13	Intermediate Pressure	Service pipe	IP steel service pipe	km	-	-	100.00%	-	-	3	-
14	Intermediate Pressure	Service pipe	IP other service pipe	km	-	-	-	-	-	N/A	-
15	Intermediate Pressure	Stations	Intermediate pressure DRS	No.	1.22%	1.22%	96.34%	1.22%	-	4	5.05
16	Intermediate Pressure	Line valve	IP line valves	No.	-	1.86%	78.02%	6.50%	13.62%	3	-
17	Intermediate Pressure	Special crossings	IP crossings	No.	-	5.00%	75.00%	20.00%	-	3	6.02
18	Medium Pressure	Main pipe	MP PE main pipe	km	-	0.49%	1.58%	97.93%	-	3	0.23
19	Medium Pressure	Main pipe	MP steel main pipe	km	-	-	100.00%	-	-	3	-
20	Medium Pressure	Main pipe	MP other main pipe	km	-	100.00%	-	-	-	3	100.00
21	Medium Pressure	Service pipe	MP PE service pipe	km	-	0.26%	99.74%	-	-	3	0.12
22	Medium Pressure	Service pipe	MP steel service pipe	km	-	-	100.00%	-	-	3	-
23	Medium Pressure	Service pipe	MP other service pipe	km	-	-	100.00%	-	-	3	-
24	Medium Pressure	Stations	Medium pressure DRS	No.	-	-	88.24%	11.76%	-	4	-
25	Medium Pressure	Line valve	MP line valves	No.	-	1.42%	77.25%	7.77%	13.56%	3	-
26	Medium Pressure	Special crossings	MP special crossings	No.	-	4.55%	65.15%	30.30%	-	3	3.02
27	Low Pressure	Main pipe	LP PE main pipe	km	-	-	13.61%	86.39%	-	3	-
28	Low Pressure	Main pipe	LP steel main pipe	km	-	-	-	-	-	3	-
29	Low Pressure	Main pipe	LP other main pipe	km	-	-	-	-	-	3	-
30	Low Pressure	Service pipe	LP PE service pipe	km	-	-	7.39%	92.61%	-	3	-
31	Low Pressure	Service pipe	LP steel service pipe	km	-	-	100.00%	-	-	3	-
32	Low Pressure	Service pipe	LP other service pipe	km	-	-	-	-	-	N/A	-
33	Low Pressure	Line valve	LP line valves	No.	-	-	42.86%	-	57.14%	3	-
34	Low Pressure	Special crossings	LP special crossings	No.	-	-	-	-	-	N/A	-
35	All	Monitoring and control systems	Remote terminal units	No.	-	4.23%	45.07%	50.70%	-	4	14.08
36	All	Cathodic protection systems	Cathodic protection	No.						3	7.91

Appendix 4 Report on Forecast Utilisation (Schedule 12b)

Company Name	**Vector Limited**
AMP Planning Period	**1 July 2019 – 30 June 2029**

SCHEDULE 12b: REPORT ON FORECAST UTILISATION

This Schedule requires a breakdown of current and forecast utilisation (for heavily utilised pipelines) consistent with the information provided in the AMP and the demand forecast in schedule S12c.

sch ref

Forecast Utilisation of Heavily Utilised Pipelines

Region	Network	Pressure system	Nominal operating pressure (NOP) (kPa)	Minimum operating pressure (MinOP) (kPa)	Total capacity at MinOP (scmh)	Remaining capacity at MinOP (scmh)	Unit	Utilisation: *Current Year CY* y/e 30 Jun 19	*CY+1* y/e 30 Jun 20	*CY+2* y/e 30 Jun 21	*CY+3* y/e 30 Jun 22	*CY+4* y/e 30 Jun 23	*CY+5* y/e 30 Jun 24	Comment
Auckland	Auckland Central	Central Auckland MP4	400	200	30,517	45	scmh	30,367	30,765	31,168	31,576	31,990	32,409	Remaining capacity at MinOP is available in the Remuera area.
							kPa	235	231	226	220	215	209	
Auckland	Auckland Central	North Shore MP4	400	200	14,128	8	scmh	14,120	14,305	14,492	14,682	14,874	15,069	Remaining capacity at MinOP is available in the Devonport area. Stated pressure assumes planned network reinforcements are actioned by 2020; MinOP is still observed in the Devonport area until full comprehensive reinforcement is made in 2021.
							kPa	211	205	203	305	302	299	
Warkworth	Warkworth	Warkworth IP20	1,000	500	731	77	scmh	654	685	698	710	722	734	Remaining capacity at MinOp is available in the Mahurangi area. Stated pressure assumes planned network reinforcements are actioned in 2019.
							kPa	1,040	1,411	1,402	1,393	1,384	1,374	
							scmh							
							kPa							
							scmh							
							kPa							
							scmh							
							kPa							
							scmh							
							kPa							

** Current year utilisation figures may be estimates. Year 1–5 figures show the utilisation forecast to occur given the expected system configuration for each year, including the effect of any new investment in the pressure system.*

Disclaimer for supply enquiries

The information in this table contains modelled estimates of utilisation and capacity. Any interested party seeking to invest in supply from Vector's distribution networks should contact their retailer and confirm availability of capacity.

Notes and assumptions

1. A 'heavily utilised' pressure system is a pressure system where the modelled flow rate, at system peak during 2018, is greater than or equal to 500 scmh, and its utilisation (pressure drop) is greater than or equal to 40% from the nominal operating pressure (NOP). The utilisation of a pressure system is calculated using the formula: [1 – (system minimum pressure/nominal operating pressure)] *100%.
2. The remaining capacity of a 'heavily utilised' pressure system is obtained by examining the modelled flows at various extremity points in each pressure system, and the level at which the minimum operating pressure (MinOP) is reached. Vector's security standards set the MinOP at 50% of the rated pressure (which equates to approximately 82% of the pipeline capacity) for a pressure system (based on standard operating pressures). The minimum modelled flow rate, analysed at one extremity point, is used to calculate the remaining capacity of the entire pressure system being studied.
3. A forecast model of a pressure system is obtained by applying either its forecast flow rate or an annual growth rate in each forecast year; and scaling its loads evenly to give the system total flow. The resulting minimum system pressure is simulated on this basis.
4. The forecast system flow for the Central Auckland network system is based on an average annual growth rate of 1.31%. The stated growth rate extrapolates trends across historical actuals, which include the flows most recently observed during 2018.
5. Stated annual growth rates are averaged across a 10-year planning period. Owing to seasonality factors influencing the forecasting model the discrete forecast system flows may not mirror the 10-year averaged growth rate incrementally.
6. Schedule 12b provides a snapshot in time of the pressure system capacity, at the date of its preparation, and it should be noted that the figures will change over time. Schedule 12b is provided on the basis that it be used for consumer guidance only.
7. The capacity limits specified in Schedule 12b for each 'heavily utilised' pressure system, highlight only the most constrained part of the pressure system. At that specific location the MinOP is lowest; in reality more capacity may be available at other locations within the pressure or network system.
8. Consumers considering using gas or wanting more capacity should always contact Vector to confirm availability. In these cases, Vector will prepare a dedicated model that will provide an accurate assessment of available gas capacity at the specified location.
9. It has been assumed that the load forecasting documented in the AMP is correct, and that all assumptions and risks associated with this forecasting have been reviewed and approved as part of a separate exercise associated with signing off the AMP.

Appendix 5 Report on Forecast Demand (Schedule 12c)

Company Name	**Vector Limited**
AMP Planning Period	**1 July 2019 – 30 June 2029**

SCHEDULE 12c: REPORT ON FORECAST DEMAND

This schedule requires a forecast of new connections (by consumer type), peak demand and energy volumes for the disclosure year and a 5 year planning period. The forecasts should be consistent with the supporting information set out in the AMP as well as the assumptions used in developing the expenditure forecasts in Schedule 11a and Schedule 11b and the capacity and utilisation forecasts in Schedule 12b.

sch ref

12c(i) Consumer Connections

Number of ICPs connected in year by consumer type

Consumer types defined by GDB	*Current year CY* **30 Jun 19**	*CY+1* **30 Jun 20**	*CY+2* **30 Jun 21**	*CY+3* **30 Jun 22**	*CY+4* **30 Jun 23**	*CY+5* **30 Jun 24**
Residential	2,999	3,202	3,247	3,240	3,240	3,240
Commercial	188	189	189	189	189	189
Total	3,187	3,391	3,436	3,429	3,429	3,429

12c(ii): Gas Delivered

	Current year CY **30 Jun 19**	*CY+1* **30 Jun 20**	*CY+2* **30 Jun 21**	*CY+3* **30 Jun 22**	*CY+4* **30 Jun 23**	*CY+5* **30 Jun 24**
Number of ICPs at year end (at year end)	111,517	113,702	115,932	118,155	120,379	122,602
Maximum daily load (GJ per day)	60,675	63,413	64,203	64,994	65,784	66,575
Maximum monthly load (GJ per month)	1,506,596	1,525,895	1,539,416	1,552,936	1,566,456	1,579,976
Number of directly billed ICPs (at year end)	-	-	-	-	-	-
Total gas conveyed (GJ per annum)	14,482,761	14,818,641	15,022,267	15,216,666	15,413,712	15,607,266
Average daily delivery (GJ per day)	39,679	40,488	41,157	41,689	42,229	42,643
Load factor	80.11%	80.93%	81.32%	81.66%	82.00%	82.32%

Appendix 6 Mandatory Explanatory Notes on Forecast Information (Schedule 14a)

(In this Schedule, clause references are to the Gas Distribution Information Disclosure Determination 2012 – as amended and consolidated 3 April 2018.)

1. This schedule requires GDBs to provide explanatory notes to reports prepared in accordance with clause 2.6.6.
2. This schedule is mandatory—GDBs must provide the explanatory comment specified below, in accordance with clause 2.7.2. This information is not part of the audited disclosure information, and so is not subject to the assurance requirements specified in section 2.8.

Commentary on difference between nominal and constant price capital expenditure forecasts (Schedule 11a)

3. In the box below, comment on the difference between nominal and constant price capital expenditure for the current disclosure year and the 10 year planning period, as disclosed in Schedule 11a.

BOX 1: COMMENTARY ON DIFFERENCE BETWEEN NOMINAL AND CONSTANT PRICE CAPITAL EXPENDITURE FORECASTS

Vector has used a capital expenditure inflator based on the model used by the Commerce Commission in its DPP price reset on 1 September 2017. We have used an inflator which is a mix of Capital Goods Price Index (CGPI) and Labour Cost Index (LCI). The weighting between CGPI (50%) and LCI (50%) is based on the Vector 2017/18 year cost structure, i.e. the capital goods component and labour cost component in our CAPEX.

The CGPI forecast is 2%, which is based on a 10-year average to June 2018. The LCI forecast is 2%, which is based on a 10-year New Zealand average to June 2018.

The constant price capital expenditure forecast is inflated by the above-mentioned index to convert to a nominal price capital expenditure forecast.

Commentary on difference between nominal and constant price operational expenditure forecasts (Schedule 11b)

4. In the box below, comment on the difference between nominal and constant price operational expenditure for the current disclosure year and the 10 year planning period, as disclosed in Schedule 11b.

BOX 2: COMMENTARY ON DIFFERENCE BETWEEN NOMINAL AND CONSTANT PRICE OPERATIONAL EXPENDITURE FORECASTS

Vector has used an operational expenditure inflator based on the model used by the Commerce Commission in its DPP price reset on 1 September 2017. We have used an inflator which is a mix of Producer Price Index (PPI) and Labour Cost Index (LCI). The weighting between PPI (40%) and LCI (60%) as per the Commission's model.

Vector has used the NZIER (New Zealand Institute of Economic Research) December 2018 PPI (Producer Price Index-outputs) forecast up to June 2023. Thereafter, we have assumed a long-term inflation rate of 2.50%.

The LCI forecast is 2%, which is based on a 10 year New Zealand average to June 2018.

The constant price operational expenditure forecast is inflated by the above-mentioned index to convert to a nominal price operational expenditure forecast.

Appendix 7 Certificate for Year Beginning Disclosures

Schedule 17 Certification for Year-beginning Disclosures

Clause 2.9.1

We, Jonathan Mason, and

Deanne Alison Paterson, being directors of Vector Limited certify that, having made all reasonable enquiry, to the best of our knowledge:

a) The following attached information of Vector Limited prepared for the purposes of clauses 2.6.1, 2.6.3, 2.6.6 and 2.7.2 of the Gas Distribution Information Disclosure Determination 2012 in all material respects complies with that determination.

b) The prospective financial or non-financial information included in the attached information has been measured on a basis consistent with regulatory requirements or recognised industry standards.

c) The forecasts in Schedules 11a, 11b, 12a, 12b and 12c are based on objective and reasonable assumptions which both align with Vector Limited's corporate vision and strategy and are documented in retained records.

Director

Director

30 MAY 2019

Date


Vector®