Attachment 9.11A

Addendum to Augmentation Business Cases

Response to Victorian Gas Substitution Roadmap

July 2022

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Executive summary

The purpose of this addendum is to provide a summary of the impacts of the Victorian Government's Gas Substitution Roadmap (GSR) on our proposed augmentation program for the next access arrangement (AA) period (July 2023 to June 2028). This Addendum should be read in conjunction with:

- Final Plan Attachment 9.11(1) – HP Augmentation Projects
- Final Plan Attachment 9.11(2) – Augmentation Business Cases

All costs quoted in this addendum are expressed in real unescalated dollars at June 2021 unless otherwise stated.

Our GSR Response augmentation is $55 million. This is $19 million (or 26%) below that included in our Final Plan.

We forecast the GSR impacts to gas loads over the next AA period will see:

- $39 million of proposed augmentations remain as planned;
- $16 million of proposed augmentations deferred, but still required in the period; and
- $10 million of proposed augmentation deferred to subsequent periods or are no longer required.

TableExecSumm 1 provides a summary of the GSR impact on our proposed augmentations in the next AA period.

TableExecSumm 1: Summary of proposed augmentations 2023/24 to 2027/28

Project	Final Plan untreated risk	Final Plan ($m)	Final Plan project description	GSR untreated risk	GSR Response ($m)	GSR Response project description
HP Augmentation Projects						
Cranbourne	High	9.4	Install 6.4km of HP mains and a new field regulator located on Hall Rd.	High	6.1	Partial impact by GSR. No change to Stages 1, 2 and 4, but Stages 3 and 5 may be deferred to subsequent AA periods Install 2.8km of HP mains and a new field regulator located on Hall Rd.
Echuca	Moderate (not ALARP)	0.8	Install 1km of PE main on McKenzie Road, duplicating existing DN200 steel main.	N/A	0	Project deferred to a subsequent period.

Project	Final Plan untreated risk	Final Plan ($m)	Final Plan project description	GSR untreated risk	GSR Response ($m)	GSR Response project description
Thomastown	High	7.7*	Install a new City Gate in Wollert near Andrews Rd, 1km of Steel supply main and 1km of PE main in Rockfield St and in Yann Dr.	High	6.9	Partial impact by GSR. No change to Stage 1 and 2, but Stage 3 may be deferred to a subsequent AA period Install a new City Gate in Wollert near Andrews Rd, 1km of Steel supply main and 0.7km of PE main in Rockfield St
Wallan	Moderate (not ALARP)	1.3	Install 720 m of PE mains in the township.	Moderate (not ALARP)	0.5	Partial impact by GSR. No change to Stage 1, but Stage 2 and 3 may deferred to a subsequent AA period Install 290 m of PE mains in the township.
Traralgon	Moderate (not ALARP)	2.2	Duplicate 4.4 km of main in Firmin St, Latrobe Cres, Davidson St, Gordon St, Burn St, Cross's Rd and Grubbs Ave.	N/A	0	Project deferred to a subsequent period.
Wodonga	Moderate (not ALARP)	0.6	Install 600 m of PE main from Victoria Cross Parade to Balmoral Dr along Beechworth Rd.	Moderate (not ALARP)	0.6	No change – required by winter 2025.
Berwick	High	1.1	Transfer the Clyde North Network load to the Huckerby Dr City Gate.	High	1.1	No change – both stages required by winter 2025.
Eltham	Moderate (not ALARP)	1.0	Install 680 m of PE mains within Plenty, Lower Plenty and Montmorency.	Moderate (not ALARP)	0.8	Partial impact by GSR. No change to Stage 1, but Stage 2 and 3 may be delayed to subsequent AA periods Install 575 m of PE mains
Howlong	Moderate (not ALARP)	2.8	Duplicate 5.3 km of existing mains in the township with PE.	N/A	0	Project deferred to a subsequent period
Pakenham	High	6.4	Install a new City Gate central to future growth area near Dore Rd.	High	6.4	No change – required by winter 2028.

Project	Final Plan untreated risk	Final Plan ($m)	Final Plan project description	GSR untreated risk	GSR Response ($m)	GSR Response project description
Somerville	Moderate (not ALARP)	4.0	Install a new field regulator at Eramosa Road East.	N/A	0	Project deferred to a subsequent period
Augmentation Business Cases						
City Gate Heater Upgrades	Moderate (not ALARP)	2.2		Moderate (not ALARP)	1.2	Partial impact by GSR. Laurimar Park heater has temperatures < -5degC and work underway to complete prior to winter 2024. Wallan heater is also showing low temperatures of –4degC, but work can be potentially deferred to a subsequent period.
City Gate Upgrades	High	4.2		High	1.4	Partial impact by GSR. Hume St is currently over capacity and GSR forecast doesn't change that. Morwell and Lyndhurst can be potentially deferred to a subsequent period.
Sale City Gate Augmentation	Moderate (not ALARP)	1.3		Moderate (not ALARP)	1.3	No change – requested by AEMO to address transmission constraint
Dandenong Crib Point Pipeline Duplication	High	28.2		High	28.2	No change - the project is underway to meet the original deadline of winter 2025. Project is sensitive to disconnection rates and high risk to the Mornington Peninsula network requiring project work to continue.
Total		**73.2**			**54.6**	

*Approximately $3.6 million of the Thomastown augmentation will be incurred in the current AA period, with the project total now being ~$10.5 million.

The purpose of our augmentation program is mitigating growth-driven delivery pressure decreases in parts of the downstream distribution network.

The two key drivers of the need for network augmentation are:

- peak hourly gas demand; and
- new connections.

Given the GSR is expected to have impacts on both the way customers use gas in their homes and businesses, and the number of new customers deciding to use gas as part of their energy mix, it will have impacts on the peak hourly gas demand and new connections across our network.

To understand these impacts we have revisited the timing for each network to reach the pressure constraint based on some key assumptions surrounding the impact of the proposed shift in peak hourly demand and new connection rate.

In summary, our analysis shows moderate changes to our augmentation program over the next AA period. This is because many of the networks requiring augmentation have seen continued, strong growth over the last 5-10 years, which already has them operating at or near minimum allowable pressures. The options analysis covered in Attachments 9.11(1) and 9.11(2) remain valid. The key change observed as a consequence of the GSR is the time period in which augmentation may be required.

In Section 1 of this Addendum, we provide an overview of the revisions to our augmentation program following the GSR.

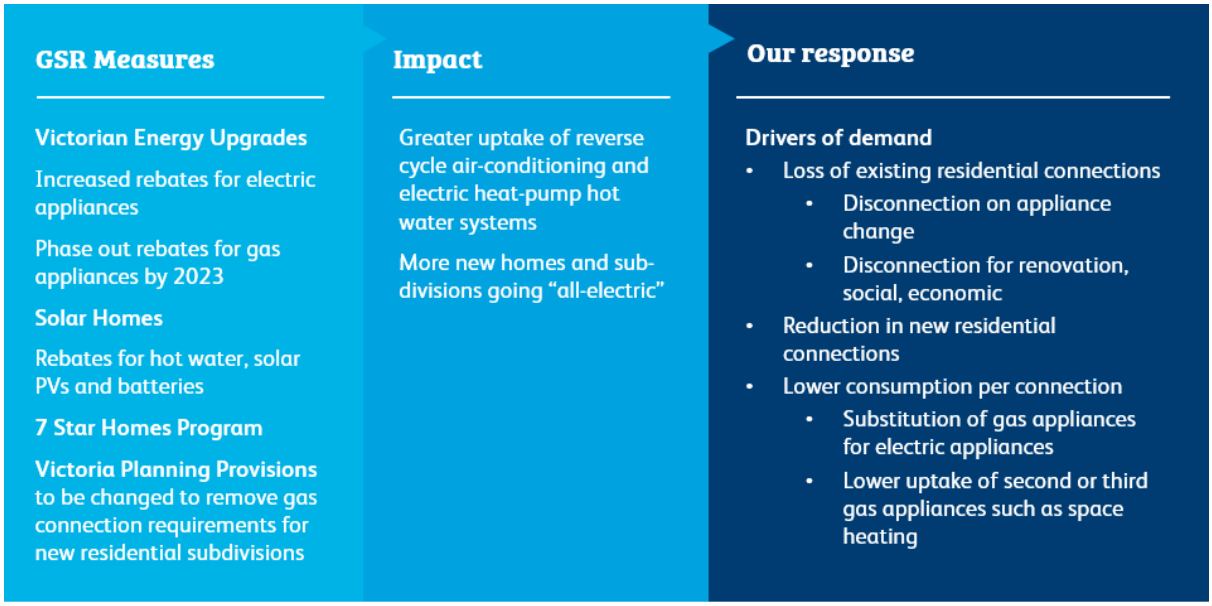
In Section 2, we provide the outcomes of updated connection forecasts and the impact this has on our pressure modelling that has informed our revisions to the Final Plan augmentation capex in our GSR Response. This is set out for each of the 15 Augmentation HP Projects and Business Cases.

1 Overview

1.1 Key aspects of the GSR for our plans

Figure 1.1 below summarises how we have interpreted the GSR measures into the impacts to connection forecasts for our networks over the next AA period.

Figure 1.1: Interpreting the GSR



1.2 Our approach

1.2.1 Background

Our forecasting methodology is outlined in section 2.1 of Attachment 9.11(1): Augmentation Business Case – HP Projects. Each network is configured from the Geospatial Information System (GIS) and exported into capacity modelling software (Synergi). We validate network models against actual field conditions using gate station inputs, large volume customer hourly demand, system pressures, and derived domestic, industrial and commercial loads (using a combination of SCADA data and additional pressure information gathered from 'winter testing').

Computer models are iteratively balanced so that modelled pressures match those from the field. This methodology and process is industry best practice to ensure accuracy of network models and hydraulics forecasts. Each network undergoes periodic winter testing and remodeling, and this occurs prior to the final investment decision during the AA period to ensure investment is still required, or whether it might need to be accelerated or delayed if actual growth is higher or lower than current forecasts.

1.2.2 Remodelling

Given the limited time available to reconsider our plans in light of the GSR, we have adopted a simplified methodology to assess the impacts on our proposed augmentation projects in the next AA period.

This methodology involves the following steps:

1. Update forecast customer numbers for each network, sub network and growth pocket each year based on the assumed impacts to existing customer disconnection rates and new customer connections rates (including appliance mix), as modelled by Core Energy (see Attachments 13.1A Core GSR Response Demand Forecast Report and 13.2A Demand Forecast Model).
2. Refit existing network pressure models to the re-forecast total connection numbers, by matching up corresponding pressures and connection numbers from the original models, to the updated connection numbers.
3. Use updated timing for network to reach pressure constraint to reschedule the proposed augmentation.
4. For a number of networks which have significant high growth pockets, we have validated the result of our simplified approach by also re-modelling the scenarios using the Synergi package.

The methodology does not change the preferred option for the proposed augmentation, just the timing, and, in particular, if it would still be required within the next AA period. This is because the original options analysis on the selected augmentation route/choice is still valid.

Our approach to network augmentation is to adopt the least cost, technically feasible solution to ensure the network does not fall below the minimum acceptable operating pressures. We undertake regular monitoring and network modelling to understand the ongoing requirements of our networks. We adopt a just enough, just in-time approach and will always exhaust all operational and low-cost options before undertaking larger capital investments. Therefore, the areas we have identified as requiring more significant capital investment in the next AA period have already exhausted all feasible, lower cost, operational options to meet minimum acceptable operating pressures.

1.2.3 Assumptions

There are two key impacts of the GSR that we have considered in reviewing our augmentation program. They are:

- 25% reduction in new residential connections compared to our Final Plan; and
- 1.8% average annual load reduction for existing residential customers compared to our Final Plan.

These two key impacts apply differently across the networks in question for augmentation depending on the proportion of established areas (which are susceptible to the additional average disconnection rate for existing customers) and newly developed areas (which are susceptible to the declining new connection volumes).

We have not applied additional existing customer disconnection rates to very newly developed areas (i.e. where all homes are less than five years old) as we consider newly built homes are highly unlikely to be facing the two key decision points that would drive disconnection of their gas appliances within the next AA period; being appliance failure or renovation.

1.3 Our obligations

Augmentation is required to maintain network pressures to adequately supply all customers during peak consumption times. Proactive augmentation of networks approaching capacity

constraints is aligned with good industry practice, as well as ensuring we remain compliant with our obligations to maintain minimum network pressures under Schedule 1 of the Gas Distribution System Code.

The likelihood of a poor pressure event is the same for each of the networks assessed to breach minimum acceptable pressures in the next AA period, and our obligations to maintain minimum delivery pressures for our gas distribution networks are applicable to all our networks, no matter the size.

The number of customers in the network drives the consequence of a poor pressure event, ultimately driving whether there is a medium or a high operational/supply risk as outlined in section 3.1 of the Attachment 9.11(1): Augmentation Business Case – HP Projects. A larger network containing more than 10,000 customers results in a 'major' consequence and therefore high risk, compared to a smaller network which rates as a 'severe' consequence and moderate operational/supply risk. As the obligation to maintain minimum pressure is independent of size, we will look to undertake a HP augmentation where there is a moderate or high supply risk.

In assessing the impacts of the GSR on our proposed augmentation projects in the next AA period, we have reviewed modelled network pressures under revised total connections forecasts. Where the remodelled scenario still sees the breach of minimum acceptable pressures within the next AA period, the risk assessment in the original business case remains unchanged. Where the remodelled scenario does not see the breach of minimum acceptable pressures within the next AA period, then we have considered the risk event does not materialise.

Our augmentation program is sensitive to changes in the assumptions for new residential connections and existing residential customer load reductions, therefore changes in these assumptions may change the forecast augmentation program.

1.4 Revisions to our plan for the next AA period

1.4.1 Program summary

Our GSR Response augmentation is $55 million. This is $19 million (or 26%) below that included in our Final Plan.

Our networks cover several high growth geographic areas across Victoria and Albury, specifically the:

- Northern corridor – Hume Highway route including Eltham, Wollert and Wallan
- Southern corridor – Cranbourne & Clyde
- Regional areas – Echuca, Wodonga and Traralgon

Greenfield development across these areas drives a large proportion of our growth, and due to continued strong growth experienced in these areas over recent years, a number of these networks are approaching capacity constraints. For more information on our original augmentation program proposed refer to Attachment 9.11(1): Augmentation Business Case – HP Projects and Attachment 9.11(2) Augmentation Business Cases.

The GSR will impact the growth in our networks over the next AA period by introducing new incentives for electrification, removing incentives for gas appliances and a 7-star standard for new homes. Together we forecast these measures will see much lower growth in new residential connections, higher rates of existing customer disconnections, and declining

average consumption through the change out of gas space heating and hot water for electric appliances.

Applying the assumptions outlined in 1.2.3 above, we forecast these changes would see:

- $39 million of proposed augmentations remain as planned;
- $16 million of proposed augmentations deferred, but still required in the period; and
- $10 million of proposed augmentation deferred to subsequent periods.

The largest single project in our augmentation program is the Dandenong to Crib Point (DCP) Duplication. This project is $28 million, or 52% of the total $55 million proposed in our GSR Response augmentation capex.

The DCP duplication has the highest risk consequence of the proposed program, with supply for over 140,000 customers across the Mornington Peninsula potentially impacted by a low pressure event. It also has a long lead time of 2.5 to 3 years to complete. The project is already underway to meet the pressure constraints ahead of winter 2025, with engineering started and pipe material purchased.

While this project is sensitive to the levels of load reduction for existing customers exceeding new connection load growth (which is modelled to occur around 2024), the risk of not having the duplication in place by the required timeframe is too great should load destruction happen any slower than modelled in our GSR Response – the DCP duplication therefore remains in our GSR Response.

1.4.2 Risk Assessment

As noted in section 1.3 above, we have remodelled network pressures for revised total connections forecasts in our GSR Response. Where the scenario still sees the breach of minimum acceptable pressures within the next AA period, the risk assessment in the original business case remains unchanged. Where the remodelled scenario does not see the breach of minimum acceptable pressures within the next AA period, we have considered the risk event does not materialise.

2 Gas Substitution Roadmap Impact on Capex

2.1 Cranbourne HP network Augmentation

Project Summary	
Project name	Cranbourne HP network Augmentation
Treated Risk	As per APA risk matrix = **Low**
Amendments to original business case	As a consequence of revised modelling based on growth data predictions driven by the GSR provided by Core, Stages 1, 2 and 4 will be slightly deferred however remain in the upcoming AA period. Stages 3 and 5 of the program will no longer be required in the upcoming AA. The revised scope of work will install 2.8km of HP mains and a new field regulator located on Hall Rd.
Estimated cost	The forecast direct cost (excluding overhead) during the next five-year period (July 2023 to June 2028) is $6.1m. This is a reduction of $3.3m from our Final Plan.

$'000 real 2020/21	23/24	24/25	25/26	26/27	27/28	Total
Revised Program			359		5,742	**6,101**

Basis of cost estimates	All costs in this business case are expressed in real unescalated dollars at June 2021 unless otherwise stated.
Consistency with NGR	This project complies with the following National Gas Rules (NGR): **NGR 79(1)** – the proposed solution is consistent with good industry practice, several practicable options have been considered, and market rates have been tested to achieve the lowest sustainable cost of providing this service. **NGR 79(2)** – proposed capex is justifiable under NGR 79(2)(c)(ii), as it is necessary to maintain the integrity of services. **NGR 74** – the forecast costs are based on the latest market rate testing and project options consider the asset management requirements as per the Asset Management Strategy. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Project Approval	
Prepared by:	Leigh Atkins, Team Lead Asset Planning, APA Group
Reviewed by:	Martijn Vlugt, Manager Asset Planning, APA Group
Approved by:	Mark Beech, Executive General Manager Network Operations
Other Relevant Documents	

This addendum should be read in conjunction with:

- Final Plan Attachment 9.11(1) Augmentation Business Cases – HP Projects'
- Response to IR004

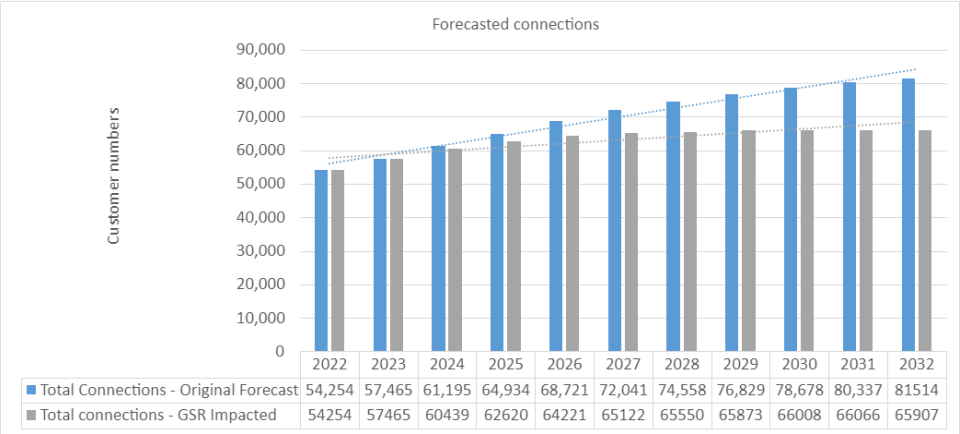
2.1.1 Future growth

Figure 2.1 shows the projected change in growth as a result of the GSR when compared to the original forecast connection growth in the Final Plan.

The GSR impacts have been applied to the Cranbourne network as follows:

- Developed areas – 1.8%average annual load reduction for existing residential customers compared to our Final Plan. Load reductions for existing residential customers were not applied to the growth areas of Botanic Ridge as this is a very newly developed area and newly built homes are unlikely to be facing the two key decision points that would drive disconnection of their gas appliances within the next AA period; being appliance failure or renovation.
- New areas - 25% reduction in new residential connections compared to our Final Plan

Figure 2.1: Cranbourne GSR impact on forecast connections



	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Total Connections - Original Forecast	54,254	57,465	61,195	64,934	68,721	72,041	74,558	76,829	78,678	80,337	81514
Total connections - GSR Impacted	54254	57465	60439	62620	64221	65122	65550	65873	66008	66066	65907

Growth continues over all until 2031, after which disconnects may start to outweigh connections. The time in which the pressure in the Cranbourne HP network will fall below the minimum acceptable pressure shifts from pre-winter 2025 to pre-winter 2026 if the first stage is not augmented. Connections in higher growth areas are likely to continue past this, so there will be a shift in load from the centre of the network to fringes.

2.1.2 Modifications to project

As subsections of the Cranbourne HP network are still forecast to breach the acceptable minimum pressure during the next AA period, the risk event assessed in the original business case remains the same.

In our Final Plan, the recommend approach was a five stage Augmentation program across a four-year period due to multifaceted growth in sub areas of the region. The forecast program has been revised as follows:

- The first stage will be delivered during 2025/26, one year later than the original timing of 2024/25. It involves installing 370 m of DN180 PE HP trunk main to duplicate an existing DN125 main and complete a 180 mm connection along Bells Rd south of Thompsons Rd.
- The second stage will be delivered during 2027/2028, two years later than the original timing of 2025/26. It involves building and commissioning a new field regulator at the intersection of Dandenong to Crib Point TP pipeline and Hall Rd, installing 750 m of DN280 PE HP as the outlet mains to extend east along Hall Rd and tie into the existing DN125 PE HP main just west of Dandenong Hastings Rd.
- The third stage will no longer be required within the next AA period.
- The fourth stage will be delivered during 2027/28, one year later than the original timing of 2026/2027. It involves installing 1,700 m of DN180 PE HP main between the western

and eastern sections of the Botanic Ridge estates to provide a back feed into the eastern area. This main will be laid along Smiths Lane and Browns Rd and tie back into the existing DN180 PE HP main in Hummingbird Dr.

- The fifth stage will no longer be required in the next AA period.

As highlighted in section 1.3, this augmentation is highly sensitive to changes in the assumptions for new residential connections and existing residential customer load reductions, therefore changes in these assumptions may change the forecast augmentation program for Cranbourne.

2.2 Echuca HP network augmentation

Project Summary	
Project name	Echuca HP network Augmentation
Treated Risk	As per APA risk matrix = **Low**
Amendments to original business case	As a consequence of revised modelling based on growth data predictions driven by the GSR provided by Core, this augmentation would no longer be required in the next AA period.
Estimated cost	The forecast direct cost (excluding overhead) during the next five-year period (July 2023 to June 2028) is $0.0m. This is a reduction of $0.8m compared to our Final Plan.

$'000 real 2020/21	23/24	24/25	25/26	26/27	27/28	Total
Revised Program	-	-	-	-	-	**0**

Basis of cost estimates	All costs in this business case are expressed in real unescalated dollars at June 2021 unless otherwise stated.
Consistency with NGR	No longer applicable
Project Approval	
Prepared by:	Leigh Atkins, Team Lead Asset Planning, APA Group
Reviewed by:	Martijn Vlugt, Manager Asset Planning, APA Group
Approved by:	Mark Beech, Executive General Manager Network Operations
Other Relevant Documents	

This addendum should be read in conjunction with:

- Final Plan Attachment 9.11(1) Augmentation Business Cases – HP Projects'
- Response to IR004

2.2.1 Future growth

Figure 2.2 shows the change in growth projected as a result of the GSR when compared to the original forecast connection growth in the Final Plan.

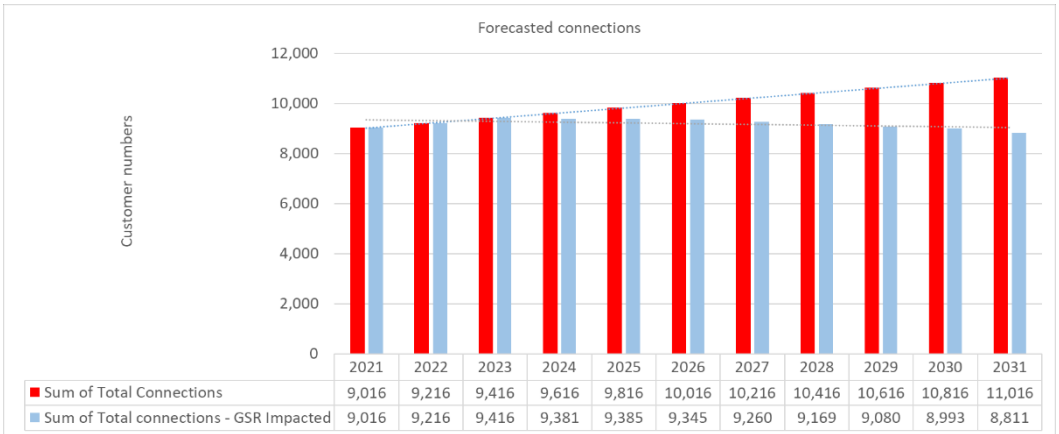
The GSR impacts have been applied to the Echuca network as follows:

- Developed areas – 1.8% average annual load reduction for existing residential customers compared to our Final Plan. This disconnection rate was applied only to low

growth areas of the Echuca network, which in 2023 applies to 6,698 connections out of 9,303 (or 72%).

- New areas - 25% reduction in new residential connections compared to our Final Plan.

Figure 2.2: Echuca GSR impact on forecast connections



	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Sum of Total Connections	9,016	9,216	9,416	9,616	9,816	10,016	10,216	10,416	10,616	10,816	11,016
Sum of Total connections - GSR Impacted	9,016	9,216	9,416	9,381	9,385	9,345	9,260	9,169	9,080	8,993	8,811

In our Final Plan the sum of total connections observed in 2026 results in breaching the acceptable minimum pressure at the extremity of the HP network. This requires augmentation to occur in 2024/25 to prevent this.

In the revised growth forecast this pressure breach in not realised, with total connections declining from 2024, resulting in no augmentation being required.

2.2.2 Modifications to project

As the Echuca HP network is not forecast to breach the acceptable minimum pressure during the next AA period, the risk event assessed in the original business case does not materialise within the period.

As highlighted in section 1.3, this augmentation is highly sensitive to changes in the assumptions for new residential connections and existing residential customer load reductions, therefore changes in these assumptions may change the forecast augmentation program for Echuca.

2.3 Thomastown HP network augmentation

Project Summary	
Project name	Thomastown HP network Augmentation
Treated Risk	As per APA risk matrix = **Low**
Amendments to original business case	As a consequence of revised modelling based on growth data predictions driven by the GSR provided by Core, there will be no change to stage 1, stage 2 will be deferred to 27/28 and stage 3 no longer required within the upcoming AA period. The revised scope of work will install a new City Gate in Wollert near Andrews Rd, 1km of Steel supply main and 0.7km of PE main in Rockfield St.
Estimated cost	The forecast direct cost (excluding overhead) during the next five-year period (July 2023 to June 2028) is $6.9m. This is a reduction of $0.8m compared to our Final Plan.

$'000 real 2020/21	23/24	24/25	25/26	26/27	27/28	Total
Revised Program	5890				962	**6852**

Basis of cost estimates	All costs in this business case are expressed in real unescalated dollars at June 2021 unless otherwise stated.
Consistency with NGR	This project complies with the following National Gas Rules (NGR): **NGR 79(1)** – the proposed solution is consistent with good industry practice, several practicable options have been considered, and market rates have been tested to achieve the lowest sustainable cost of providing this service. **NGR 79(2)** – proposed capex is justifiable under NGR 79(2)(c)(ii), as it is necessary to maintain the integrity of services. **NGR 74** – the forecast costs are based on the latest market rate testing and project options consider the asset management requirements as per the Asset Management Strategy. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Project Approval	
Prepared by:	Leigh Atkins, Team Lead Asset Planning, APA Group
Reviewed by:	Martijn Vlugt, Manager Asset Planning, APA Group
Approved by:	Mark Beech, Executive General Manager Network Operations
Other Relevant Documents	

This addendum should be read in conjunction with:

- Final Plan Attachment 9.11(1) Augmentation Business Cases – HP Projects'
- Response to IR004

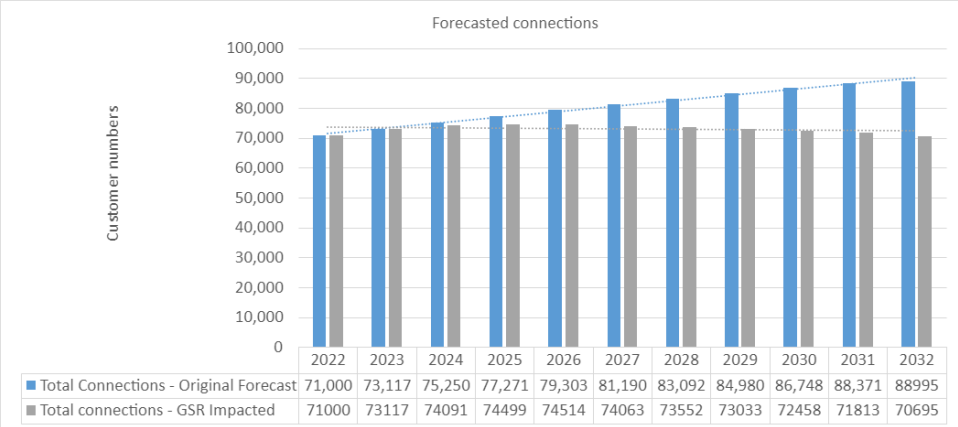
2.3.1 Future growth

Figure 2.3 shows the change in growth projected as a result of the GSR when compared to the original forecast connection growth in the Final Plan.

The GSR impacts have been applied to the Thomastown network as follows:

- Developed areas – 1.8% average annual load reduction for existing residential customers compared to our Final Plan. This was applied to all areas, with the exception of the Wollert PSP which is a newly developed area (see 1.2.3 above).
- New areas - 25% reduction in new residential connections compared to our Final Plan.

Figure 2.3: Thomastown GSR impact on forecast connections



	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Total Connections - Original Forecast	71,000	73,117	75,250	77,271	79,303	81,190	83,092	84,980	86,748	88,371	88995
Total connections - GSR Impacted	71000	73117	74091	74499	74514	74063	73552	73033	72458	71813	70695

In our Final Plan, the sum of total connections observed in 2023 results in breaching the acceptable minimum pressure at the extremity of the HP network. This requires augmentation to occur in 2024/25 to prevent this. Under the GSR adjusted forecast the initial breach is still observed within the same time frame, however subsequent stages of the augmentation program can be deferred compared to our Final Plan, with some remaining within the next AA period and others deferred to a subsequent AA period.

2.3.2 Modifications to project

As the Thomastown HP network is still forecast to breach the acceptable minimum pressure during the next AA period, the risk event assessed in the original business case does not change. However, there is a change to the timing of some project stages, as summarised in Table 2.1 below.

Table 2.1: Thomastown summary of GSR impacts to planned augmentation

Original Targeted year	GSR impacted year	Stage	Description
2022-2024	2022-2024	Stage 1	A new City Gate (inc. land, regulator skid, heater and CTM) located at Andew's Rd and 1000 m x 300 mm Steel HP outlet main along the Transmission pipeline easement and Bodycoats Rd
2025/26	2027/28	Stage 2	650 m of DN180 PE HP trunk main in Rockfield St
2026/27	No longer required in next AA period	Stage 3	360 m of DN125 PE HP main in Yann Dr

As highlighted in section 1.3, this augmentation is highly sensitive to changes in the assumptions for new residential connections and existing residential customer load reductions, therefore changes in these assumptions may change the forecast augmentation program for Thomastown.

2.4 Wallan HP network augmentation

Project Summary	
Project name	Wallan HP network Augmentation
Treated Risk	As per APA risk matrix = **Low**
Amendments to original business case	As a consequence of revised modelling based on growth data predictions driven by the GSR provided by Core, Stage 1 will be deferred by one year. Stages 2 and 3 are no longer required within the current AA period. The revised scope of work will install 290 m of PE mains in the township.
Estimated cost	The forecast direct cost (excluding overhead) during the next five-year period (July 2023 to June 2028) is $0.5m. This is a reduction of $0.8m compared to our Final Plan.

$'000 real 2020/21	23/24	24/25	25/26	26/27	27/28	Total
Revised Program		473				**473**

Basis of cost estimates	All costs in this business case are expressed in real unescalated dollars at June 2021 unless otherwise stated.
Consistency with NGR	This project complies with the following National Gas Rules (NGR): **NGR 79(1)** – the proposed solution is consistent with good industry practice, several practicable options have been considered, and market rates have been tested to achieve the lowest sustainable cost of providing this service. **NGR 79(2)** – proposed capex is justifiable under NGR 79(2)(c)(ii), as it is necessary to maintain the integrity of services. **NGR 74** – the forecast costs are based on the latest market rate testing and project options consider the asset management requirements as per the Asset Management Strategy. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Project Approval	
Prepared by:	Leigh Atkins, Team Lead Asset Planning, APA Group
Reviewed by:	Martijn Vlugt, Manager Asset Planning, APA Group
Approved by:	Mark Beech, Executive General Manager Network Operations
Other Relevant Documents	

This addendum should be read in conjunction with:

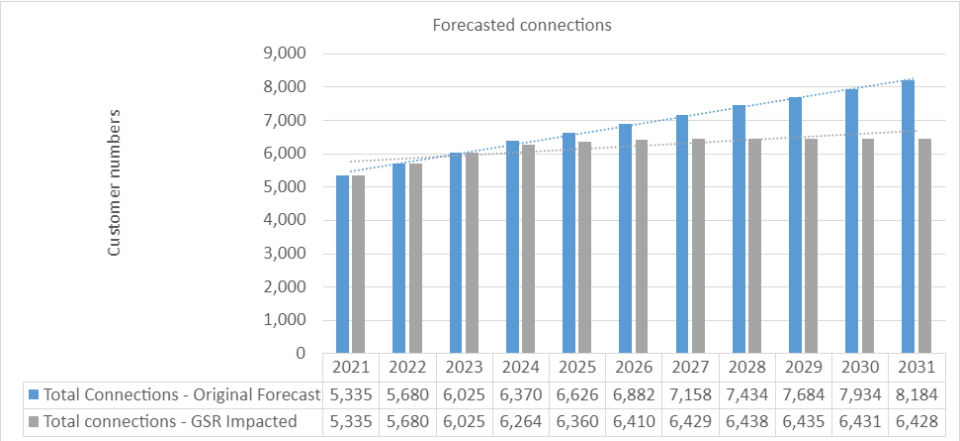
- Final Plan Attachment 9.11(1) Augmentation Business Cases – HP Projects'
- Response to IR004

2.4.1 Future growth

Figure 2.4 shows the change in growth projected as a result of the GSR when compared to the original forecast connection growth in the Final Plan. The GSR impacts have been applied to the Wallan network as follows:

- Developed areas – 1.8% average annual load reduction for existing residential customers compared to our Final Plan.
- New areas - 25% reduction in new residential connections compared to our Final Plan.

Figure 2.4: Wallan GSR impact on forecast connections



	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Connections - Original Forecast	5,335	5,680	6,025	6,370	6,626	6,882	7,158	7,434	7,684	7,934	8,184
Total connections - GSR Impacted	5,335	5,680	6,025	6,264	6,360	6,410	6,429	6,438	6,435	6,431	6,428

In our Final Plan the sum of total connections observed in 2024 results in breaching the acceptable minimum pressure at the extremity of the HP network. This requires augmentation to occur in 2023/24 to prevent this. Under the GSR adjusted forecast the initial breach is deferred by one year.

2.4.2 Modifications to project

As the Wallan HP network is still forecast to breach the acceptable minimum pressure during the next AA period, the risk event assessed in the original business case does not change. However, there is a change to the timing of some project stages, as follows:

- Stage 1 of the program is still required to be completed, but deferred by one year to 2024/2025 compared to the initial forecast of 2023/2024. It involves the installation of 290 m of 180 PE HP trunk main to duplicate an existing 100 mm ST main along William St and to connect an existing 100 mm ST duplication main east of Northern Hwy and 180 mm PE duplication main west of Windham St.
- Stages 2 and 3 are no longer required within the next AA period.

As highlighted in section 1.3, this augmentation is highly sensitive to changes in the assumptions for new residential connections and existing residential customer load reductions, therefore changes in these assumptions may change the forecast augmentation program for Wallan.

2.5 Traralgon HP network augmentation

Project Summary	
Project name	Traralgon HP network Augmentation
Treated Risk	As per APA risk matrix = **Low**
Amendments to original business case	As a consequence of revised modelling based on growth data predictions driven by the GSR provided by Core, this augmentation would no longer be required in the next AA period.
Estimated cost	The forecast direct cost (excluding overhead) during the next five-year period (July 2023 to June 2028) is $0m. This is a reduction of $2.2m compared to our Final Plan.

$'000 real 2020/21	23/24	24/25	25/26	26/27	27/28	Total
Revised Program	-	-	-	-	-	**0**

Basis of cost estimates	All costs in this business case are expressed in real unescalated dollars at June 2021 unless otherwise stated.
Consistency with NGR	No longer applicable
Project Approval	
Prepared by:	Leigh Atkins, Team Lead Asset Planning, APA Group
Reviewed by:	Martijn Vlugt, Manager Asset Planning, APA Group
Approved by:	Mark Beech, Executive General Manager Network Operations
Other Relevant Documents	

This addendum should be read in conjunction with:

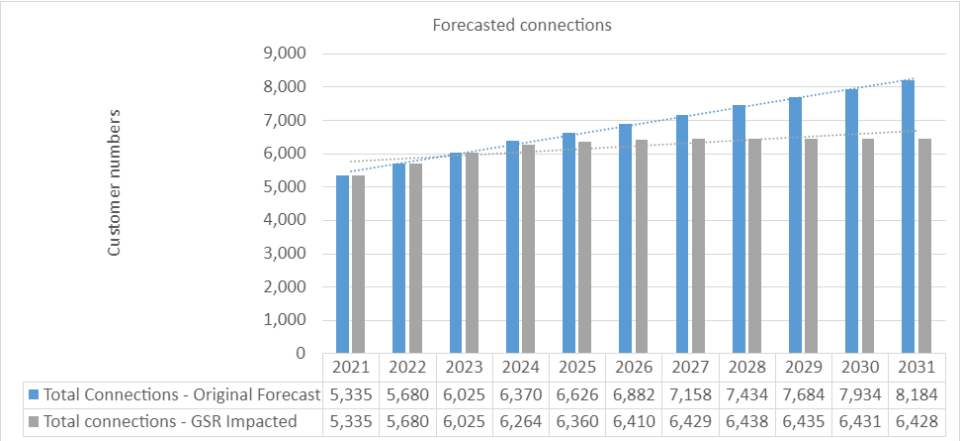
- Final Plan Attachment 9.11(1) Augmentation Business Cases – HP Projects'
- Response to IR004

2.5.1 Future growth

Figure 2.5 shows the change in growth projected as a result of the GSR when compared to the original forecast connection growth in the Final Plan. The GSR impacts have been applied to the Traralgon network as follows:

- Developed areas – 1.8% average annual load reduction for existing residential customers compared to our Final Plan. This has not been applied to growth pockets of the Traralgon network which are considered newly developed areas (see 1.2.3 above).
- New areas - 25% reduction in new residential connections compared to our Final Plan.

Figure 2.5: Traralgon GSR impact on forecast connections



	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Connections - Original Forecast	5,335	5,680	6,025	6,370	6,626	6,882	7,158	7,434	7,684	7,934	8,184
Total connections - GSR Impacted	5,335	5,680	6,025	6,264	6,360	6,410	6,429	6,438	6,435	6,431	6,428

In our Final Plan the sum of total connections observed in 2024 results in breaching the acceptable minimum pressure at the extremity of the HP network. This requires augmentation to occur in 2023/24 to prevent this.

In the revised growth forecast this pressure breach in not realised, with total connections declining from 2024, resulting in no augmentation being required.

2.5.2 Modifications to project

As the Traralgon HP network is not forecast to breach the acceptable minimum pressure during the next AA period, the risk event assessed in the original business case does not materialise within the period.

As highlighted in section 1.3, this augmentation is highly sensitive to changes in the assumptions for new residential connections and existing residential customer load reductions, therefore changes in these assumptions may change the forecast augmentation program for Traralgon.

2.6 Wodonga HP network Augmentation

Project Summary	
Project name	Wodonga HP network Augmentation
Treated Risk	As per APA risk matrix = **Low**
Amendments to original business case	As a consequence of revised modelling based on growth data predictions driven by the GSR provided by Core, this augmentation would be deferred by one year, and is still required in the next AA period. The scope of work is the same as our Final Plan and will install 600 m of PE main from Victoria Cross Parade to Balmoral Dr along Beechworth Rd.
Estimated cost	The forecast direct cost (excluding overhead) during the next five-year period (July 2023 to June 2028) is $0.6m. This is consistent with our Final Plan.

$'000 real 2020/21	23/24	24/25	25/26	26/27	27/28	Total
Revised Program		560				**560**

Basis of cost estimates	All costs in this business case are expressed in real unescalated dollars at June 2021 unless otherwise stated.
Consistency with NGR	This project complies with the following National Gas Rules (NGR): **NGR 79(1)** – the proposed solution is consistent with good industry practice, several practicable options have been considered, and market rates have been tested to achieve the lowest sustainable cost of providing this service. **NGR 79(2)** – proposed capex is justifiable under NGR 79(2)(c)(ii), as it is necessary to maintain the integrity of services. **NGR 74** – the forecast costs are based on the latest market rate testing and project options consider the asset management requirements as per the Asset Management Strategy. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Project Approval	
Prepared by:	Leigh Atkins, Team Lead Asset Planning, APA Group
Reviewed by:	Martijn Vlugt, Manager Asset Planning, APA Group
Approved by:	Mark Beech, Executive General Manager Network Operations
Other Relevant Documents	

This addendum should be read in conjunction with:

- Final Plan Attachment 9.11(1) Augmentation Business Cases – HP Projects'
- Response to IR004

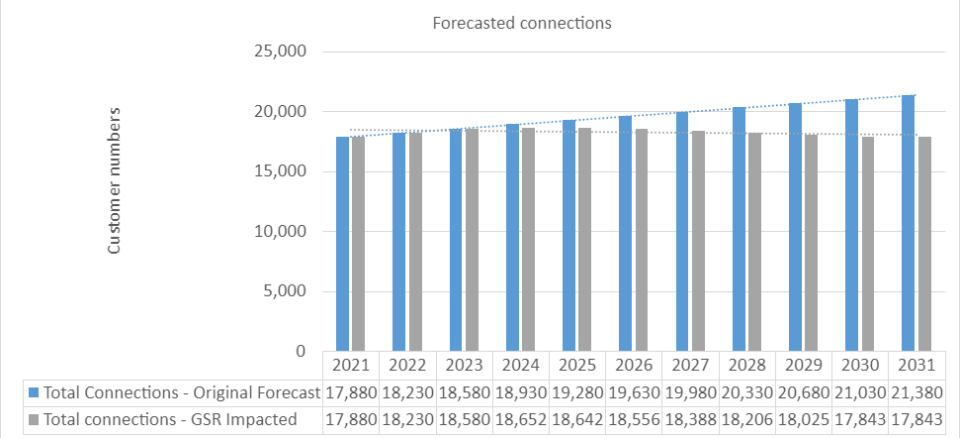
2.6.1 Future growth

Figure 2.6 shows the change in growth projected as a result of the GSR when compared to the original forecast connection growth in the Final Plan. The GSR impacts have been applied to the Wodonga network as follows:

- Developed areas – 1.8% average annual load reduction for existing residential customers compared to our Final Plan. This has not been applied to the Leneve PSP or the growth regions from 2023 onwards (see 1.2.3 above).

- New areas - 25% reduction in new residential connections compared to our Final Plan.

Figure 2.6: Wodonga GSR impact on forecast connections



	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Connections - Original Forecast	17,880	18,230	18,580	18,930	19,280	19,630	19,980	20,330	20,680	21,030	21,380
Total connections - GSR Impacted	17,880	18,230	18,580	18,652	18,642	18,556	18,388	18,206	18,025	17,843	17,843

In our Final Plan the sum of total connections observed in 2024 results in breaching the acceptable minimum pressure at the extremity of the HP network. This requires augmentation to occur in 2023/24 to prevent this.

In the revised growth forecast the sum of total connections do not reach the level which would breach acceptable minimum pressures until a year later (i.e. 2025). This results in the augmentation being deferred one year in 2024/25.

2.6.2 Modifications to project

As the Wodonga HP network is still forecast to breach the acceptable minimum pressure during the next AA period, the risk assessment from the original business case remains unchanged. The scope of work for the augmentation also remains unchanged, however, the timing is deferred by one year.

As highlighted in section 1.3, this augmentation is highly sensitive to changes in the assumptions for new residential connections and existing residential customer load reductions, therefore changes in these assumptions may change the forecast augmentation program for Wodonga.

2.7 Berwick HP network Augmentation

Project Summary	
Project name	Berwick HP network Augmentation
Treated Risk	As per APA risk matrix = **Low**
Amendments to original business case	As a consequence of revised modelling based on growth data predictions driven by the GSR provided by Core, this augmentation would be deferred by one year, and is still required in the next AA period. The scope of work is the same as our Final Plan and will transfer the Clyde North Network load to the Huckerby Dr City Gate.
Estimated cost	The forecast direct cost (excluding overhead) during the next five-year period (July 2023 to June 2028) is $1.1m. This is consistent with our Final Plan.

$'000 real 2020/21	23/24	24/25	25/26	26/27	27/28	Total
Revised Program		1,141				**1,141**

Basis of cost estimates	All costs in this business case are expressed in real unescalated dollars at June 2021 unless otherwise stated.
Consistency with NGR	This project complies with the following National Gas Rules (NGR): **NGR 79(1)** – the proposed solution is consistent with good industry practice, several practicable options have been considered, and market rates have been tested to achieve the lowest sustainable cost of providing this service. **NGR 79(2)** – proposed capex is justifiable under NGR 79(2)(c)(ii), as it is necessary to maintain the integrity of services. **NGR 74** – the forecast costs are based on the latest market rate testing and project options consider the asset management requirements as per the Asset Management Strategy. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Project Approval	
Prepared by:	Leigh Atkins, Team Lead Asset Planning, APA Group
Reviewed by:	Martijn Vlugt, Manager Asset Planning, APA Group
Approved by:	Mark Beech, Executive General Manager Network Operations

Other Relevant Documents

This addendum should be read in conjunction with:

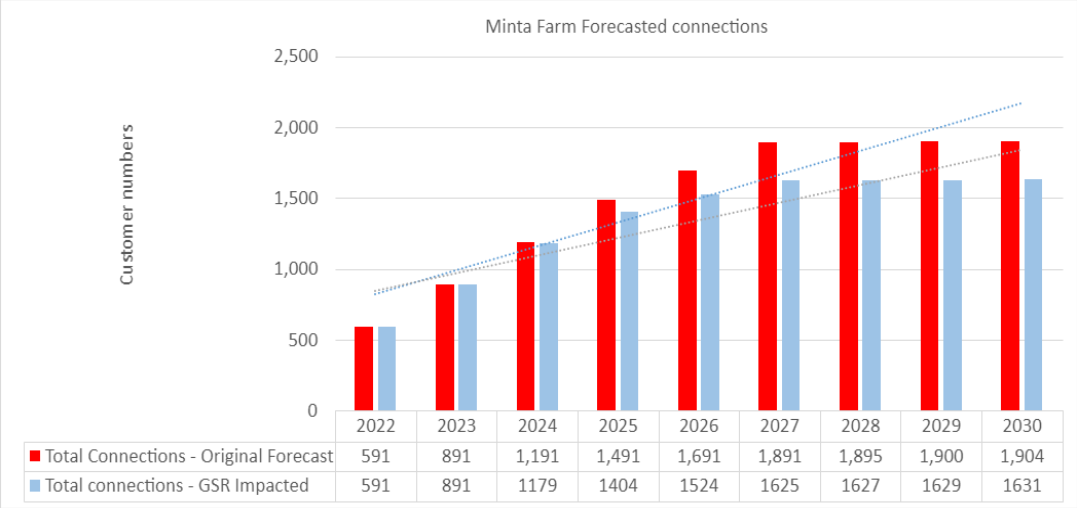
- Final Plan Attachment 9.11(1) Augmentation Business Cases – HP Projects'
- Response to IR004

2.7.1 Future growth

Figure 2.7 and Figure 2.8 shows the change in growth projected as a result of the GSR when compared to the original forecast connection growth in the Final Plan for the two growth areas of Minta Farm and Clyde North which are supplied by the Berwick network. The GSR impacts have been applied to the Berwick network as follows:

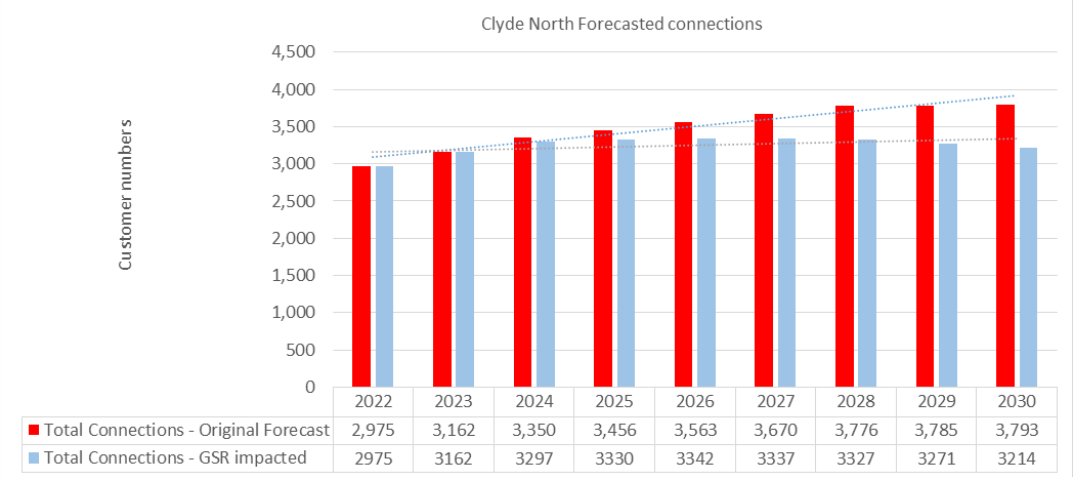
- Developed areas – 1.8% average annual load reduction for existing residential customers compared to our Final Plan. This has not been applied to any connections in the Minta Farm area (see 1.2.3 above).
- New areas - 25% reduction in new residential connections compared to our Final Plan.

Figure 2.7: Berwick (Minta Farm) GSR impact on forecast connections



	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total Connections - Original Forecast	591	891	1,191	1,491	1,691	1,891	1,895	1,900	1,904
Total connections - GSR Impacted	591	891	1179	1404	1524	1625	1627	1629	1631

Figure 2.8: Berwick (Clyde North) GSR impact on forecast connections



	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total Connections - Original Forecast	2,975	3,162	3,350	3,456	3,563	3,670	3,776	3,785	3,793
Total Connections - GSR impacted	2975	3162	3297	3330	3342	3337	3327	3271	3214

In our AGN Final Plan the sum of total connections observed in 2024 results in breaching the acceptable minimum pressure at the extremity of the HP network. This requires augmentation to occur in 2023/24 to prevent this.

In the revised growth forecast the sum of total connections do not reach the level which would breach acceptable minimum pressures until a year later, in 2025. This results in the augmentation now being required in 2024/25.

2.7.2 Modifications to project

As the Berwick HP network is still forecast to breach the acceptable minimum pressure during the next AA period, the risk assessment from the original business case remains unchanged. The scope of work for the augmentation also remains unchanged, however, the timing is deferred by one year.

As highlighted in section 1.3, this augmentation is highly sensitive to changes in the assumptions for new residential connections and existing residential customer load

reductions, therefore changes in these assumptions may change the forecast augmentation program for Berwick.

2.8 Eltham HP network augmentation

Project Summary	
Project name	Eltham HP network Augmentation
Treated Risk	As per APA risk matrix = **Low**
Amendments to original business case	As a consequence of revised modelling based on growth data predictions driven by the GSR provided by Core, Stage 1 will be deferred until 2028. Additionally, Stages 2 and 3 of the program will no longer be required in the next AA period. The revised scope of work will Install 575 m of PE mains.
Estimated cost	The forecast direct cost (excluding overhead) during the next five-year period (July 2023 to June 2028) is $0.8m. This is a $0.2m reduction compared to our Final Plan.

$'000 real 2020/21	23/24	24/25	25/26	26/27	27/28	Total
Revised Program					827	**827**

Basis of cost estimates	All costs in this business case are expressed in real unescalated dollars at June 2021 unless otherwise stated.
Consistency with NGR	This project complies with the following National Gas Rules (NGR): **NGR 79(1)** – the proposed solution is consistent with good industry practice, several practicable options have been considered, and market rates have been tested to achieve the lowest sustainable cost of providing this service. **NGR 79(2)** – proposed capex is justifiable under NGR 79(2)(c)(ii), as it is necessary to maintain the integrity of services. **NGR 74** – the forecast costs are based on the latest market rate testing and project options consider the asset management requirements as per the Asset Management Strategy. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Project Approval	
Prepared by:	Leigh Atkins, Team Lead Asset Planning, APA Group
Reviewed by:	Martijn Vlugt, Manager Asset Planning, APA Group
Approved by:	Mark Beech, Executive General Manager Network Operations
Other Relevant Documents	

This addendum should be read in conjunction with:

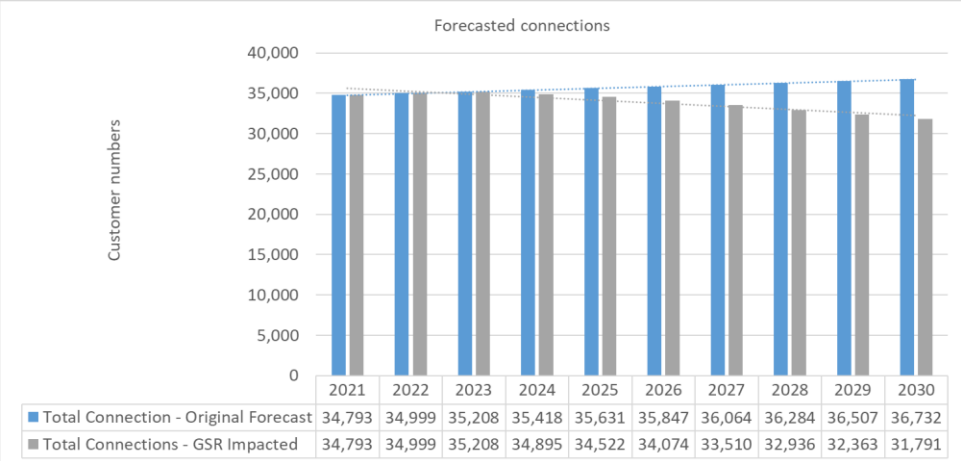
- Final Plan Attachment 9.11(1) Augmentation Business Cases – HP Projects'
- Response to IR004

2.8.1 Future growth

Figure 2.9 shows the change in growth projected as a result of the GSR when compared to the original forecast connection growth in the Final Plan. The GSR impacts have been applied to the Eltham HP network as follows:

- Developed areas – 1.8%average annual load reduction for existing residential customers compared to our Final Plan.
- New areas - 25% reduction in new residential connections compared to our Final Plan.

Figure 2.9: Eltham GSR impact on connections forecast



	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total Connection - Original Forecast	34,793	34,999	35,208	35,418	35,631	35,847	36,064	36,284	36,507	36,732
Total Connections - GSR Impacted	34,793	34,999	35,208	34,895	34,522	34,074	33,510	32,936	32,363	31,791

The time in which the pressure in the Eltham HP network will fall below the minimum acceptable pressure shifts from pre winter 2024 to pre winter 2028 if the first planned stage is not augmented. Growth in the local area of Plenty is a key trigger for augmentation.

2.8.2 Modifications to project

As subsections of the Eltham HP network are still forecast to breach the acceptable minimum pressure during the next AA period, the risk event assessed in the original business case remains unchanged.

In our Final Plan the recommended approach was a three stage Augmentation across a four-year period due to multifaceted growth in sub areas of the region.

Under the revised GSR forecast, the first is stage is delayed by 3-4 years to 2027/28 of the next AA period compared to 2023/24 in our Final Plan. The second and third stages will no longer be required in the next AA period.

As highlighted in section 1.3, this augmentation is highly sensitive to changes in the assumptions for new residential connections and existing residential customer load reductions, therefore changes in these assumptions may change the forecast augmentation program for Eltham.

2.9 Howlong HP network augmentation

Project Summary	
Project name	Howlong HP network Augmentation
Treated Risk	As per APA risk matrix = **Low**
Amendments to original business case	As a consequence of revised modelling based on growth data predictions driven by the GSR provided by Core, this augmentation would no longer be required in the next AA period.
Estimated cost	The forecast direct cost (excluding overhead) during the next five-year period (July 2023 to June 2028) is $0m. This is a reduction of $2.8m compared to our Final Plan.

$'000 real 2020/21	23/24	24/25	25/26	26/27	27/28	Total
Revised Program						**0**

Basis of cost estimates	All costs in this business case are expressed in real unescalated dollars at June 2021 unless otherwise stated.
Consistency with NGR	No longer applicable.
Project Approval	
Prepared by:	Leigh Atkins, Team Lead Asset Planning, APA Group
Reviewed by:	Martijn Vlugt, Manager Asset Planning, APA Group
Approved by:	Mark Beech, Executive General Manager Network Operations

Other Relevant Documents

This addendum should be read in conjunction with:

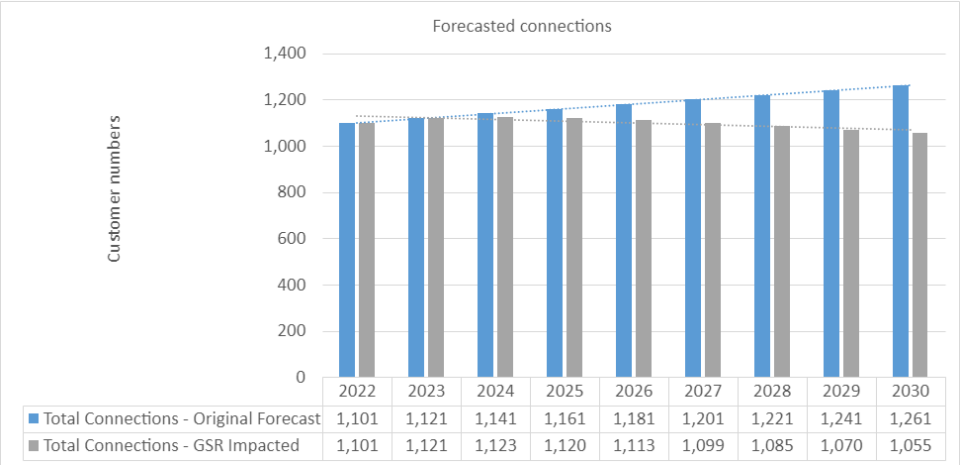
- Final Plan Attachment 9.11(1) Augmentation Business Cases – HP Projects'
- Response to IR004

2.9.1 Future growth

Figure 2.10 shows the change in growth projected as a result of the GSR when compared to the original forecast connection growth in the Final Plan. The GSR impacts have been applied to the Howlong HP network as follows:

- Developed areas – 1.8%average annual load reduction for existing residential customers compared to our Final Plan.
- New areas - 25% reduction in new residential connections compared to our Final Plan.

Figure 2.10: Howlong GSR impact on forecast connections



	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total Connections - Original Forecast	1,101	1,121	1,141	1,161	1,181	1,201	1,221	1,241	1,261
Total Connections - GSR Impacted	1,101	1,121	1,123	1,120	1,113	1,099	1,085	1,070	1,055

This shows disconnections will begin to outweigh new connections in the Howlong network from 2024 onwards.

2.9.2 Modifications to project

As the Howlong HP network is not forecast to breach the acceptable minimum pressure during the next AA period, the risk event assessed in the original business case does not materialise within the period, and the augmentation is no longer required.

As highlighted in section 1.3, this augmentation is highly sensitive to changes in the assumptions for new residential connections and existing residential customer load reductions, therefore changes in these assumptions may change the forecast augmentation program for Howlong.

2.10 Pakenham HP network augmentation

Project Summary	
Project name	Pakenham HP network Augmentation
Treated risk	As per APA risk matrix = **Low**
Amendments to original business case	As a consequence of revised modelling based on growth data predictions driven by the GSR provided by Core, this augmentation is still required in the next AA period. The scope of work will install a new City Gate central to future growth area near Dore Rd. This has not changed from our Final Plan, but has been deferred two years to 2028.
Estimated cost	The forecast direct cost (excluding overhead) during the next five-year period (July 2023 to June 2028) is $6.4m. This is consistent with our Final Plan

$'000 real 2020/21	23/24	24/25	25/26	26/27	27/28	Total
Revised Program				1,189	5,154	**6,443**

Basis of cost estimates	All costs in this business case are expressed in real unescalated dollars at June 2021 unless otherwise stated.
Consistency with NGR	This project complies with the following National Gas Rules (NGR): **NGR 79(1)** – the proposed solution is consistent with good industry practice, several practicable options have been considered, and market rates have been tested to achieve the lowest sustainable cost of providing this service. **NGR 79(2)** – proposed capex is justifiable under NGR 79(2)(c)(ii), as it is necessary to maintain the integrity of services. **NGR 74** – the forecast costs are based on the latest market rate testing and project options consider the asset management requirements as per the Asset Management Strategy. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Project Approval	
Prepared by:	Leigh Atkins, Team Lead Asset Planning, APA Group
Reviewed by:	Martijn Vlugt, Manager Asset Planning, APA Group
Approved by:	Mark Beech, Executive General Manager Network Operations

Other Relevant Documents

This addendum should be read in conjunction with:

- Final Plan Attachment 9.11(1) Augmentation Business Cases – HP Projects'
- Response to IR004

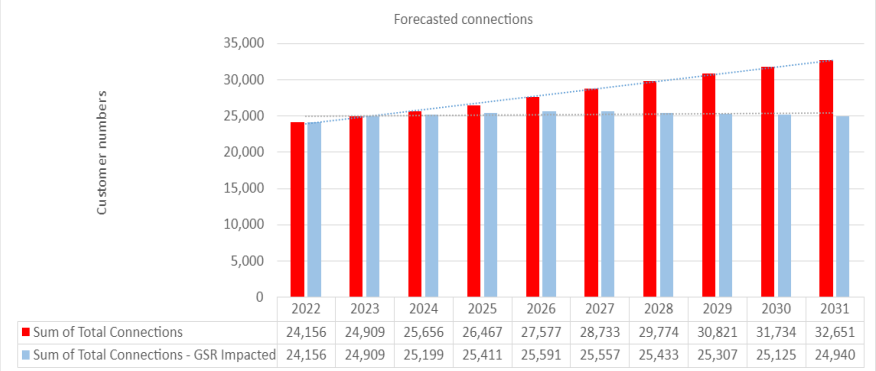
2.10.1 Future growth

Figure 2.11 shows the change in growth projected as a result of the GSR when compared to the original forecast connection growth in the Final Plan. The GSR impacts have been applied to the Pakenham network as follows:

- Developed areas – 1.8%average annual load reduction for existing residential customers compared to our Final Plan. This has not been applied to the Pakenham East PSP (see 1.2.3 above).

- New areas - 25% reduction in new residential connections compared to our Final Plan.

Figure 2.11: Pakenham GSR impact on forecast connections



	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Sum of Total Connections	24,156	24,909	25,656	26,467	27,577	28,733	29,774	30,821	31,734	32,651
Sum of Total Connections - GSR Impacted	24,156	24,909	25,199	25,411	25,591	25,557	25,433	25,307	25,125	24,940

In our Final Plan the sum of total connections observed in 2024, results in breaching acceptable minimum pressures and requires augmentation to occur prior to winter 2026 to prevent this. The GSR scenario doesn't see total connections at these levels until 2026, deferring this augmentation by two years, to 2028.

2.10.2 Modifications to project

As the Pakenham network is forecast to breach pressure during the next AA period, the risk event assessed in the original business case remains unchanged. The timing for this to occur has been pushed out by two years, deferring the augmentation to 2028.

As highlighted in section 1.3, this augmentation is highly sensitive to changes in the assumptions for new residential connections and existing residential customer load reductions, therefore changes in these assumptions may change the forecast augmentation program for Pakenham.

2.11 Somerville HP network augmentation

Project Summary	
Project name	Somerville HP network Augmentation
Treated Risk	As per APA risk matrix = **Low**
Amendments to original business case	As a consequence of revised modelling based on growth data predictions driven by the GSR provided by Core, this augmentation would no longer be required in the next AA period.
Estimated cost	The forecast direct cost (excluding overhead) during the next five-year period (July 2023 to June 2028) is $0m. This is a reduction of $4.0m compared to our Final Plan.

$'000 real 2020/21	23/24	24/25	25/26	26/27	27/28	Total
Revised Program						**0**

Basis of cost estimates	All costs in this business case are expressed in real unescalated dollars at June 2021 unless otherwise stated.
Consistency with NGR	No longer applicable.
Project Approval	
Prepared by:	Leigh Atkins, Team Lead Asset Planning, APA Group
Reviewed by:	Martijn Vlugt, Manager Asset Planning, APA Group
Approved by:	Mark Beech, Executive General Manager Network Operations
Other Relevant Documents	

This addendum should be read in conjunction with:

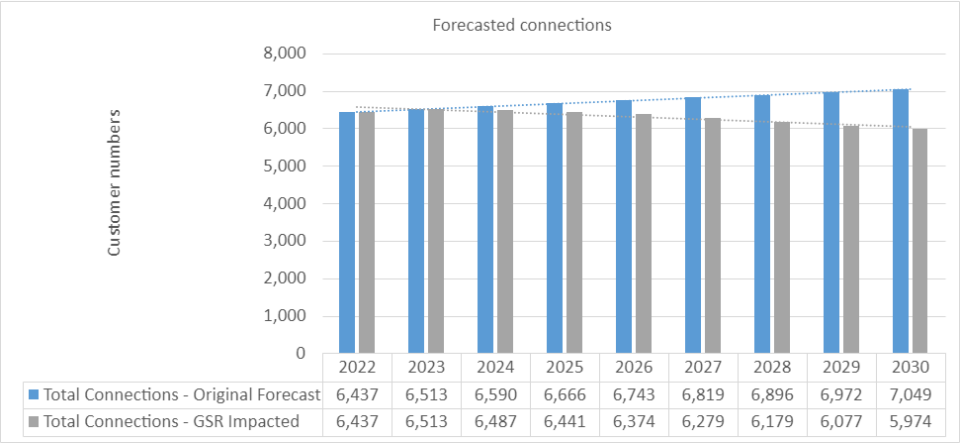
- Final Plan Attachment 9.11(1) Augmentation Business Cases – HP Projects'
- Response to IR004

2.11.1 Future growth

Figure 2.12 shows the change in growth projected as a result of the GSR when compared to the original forecast connection growth in the Final Plan. The GSR impacts have been applied to the Pakenham network as follows:

- Developed areas – 1.8%average annual load reduction for existing residential customers compared to our Final Plan.
- New areas - 25% reduction in new residential connections compared to our Final Plan.

Figure 2.12: Somerville GSR impact on forecast connections



	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total Connections - Original Forecast	6,437	6,513	6,590	6,666	6,743	6,819	6,896	6,972	7,049
Total Connections - GSR Impacted	6,437	6,513	6,487	6,441	6,374	6,279	6,179	6,077	5,974

Under the GSR scenario, disconnections begin to outweigh connections from 2024 onwards resulting in the augmentation to the Somerville HP network no longer being required.

2.11.2 Modifications to project

As the Somerville HP network is not forecast to breach the acceptable minimum pressure during the next AA period, the risk event assessed in the original business case does not materialise within the period.

As highlighted in section 1.3, this augmentation is highly sensitive to changes in the assumptions for new residential connections and existing residential customer load reductions, therefore changes in these assumptions may change the forecast augmentation program for Somerville.

2.12 City Gate Heater Upgrades

Project Summary	
Project name	City Gate Heater Upgrades
Treated Risk	As per APA risk matrix = **Low**
Amendments to original business case	As a consequence of revised modelling based on growth data predictions driven by the GSR provided by Core, the Wallan heater upgrade would no longer be required in the next AA period. However, the Laurimar Park Heater upgrade is still required by 2025.
Estimated cost	The forecast direct cost (excluding overhead) during the next five-year period (July 2023 to June 2028) is $1.2m. This is a reduction of $1.0m compared to our Final Plan.

$'000 real 2020/21	23/24	24/25	25/26	26/27	27/28	Total
Revised Program	844	403				**1,247**

Basis of cost estimates	All costs in this business case are expressed in real unescalated dollars at June 2021 unless otherwise stated.
Consistency with NGR	This project complies with the following National Gas Rules (NGR): **NGR 79(1)** – the proposed solution is consistent with good industry practice, several practicable options have been considered, and market rates have been tested to achieve the lowest sustainable cost of providing this service. **NGR 79(2)** – proposed capex is justifiable under NGR 79(2)(c)(ii), as it is necessary to maintain the integrity of services. **NGR 74** – the forecast costs are based on the latest market rate testing and project options consider the asset management requirements as per the Asset Management Strategy. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Project Approval	
Prepared by:	Leigh Atkins, Team Lead Asset Planning, APA Group
Reviewed by:	Martijn Vlugt, Manager Asset Planning, APA Group
Approved by:	Mark Beech, Executive General Manager Network Operations
Other Relevant Documents	

This addendum should be read in conjunction with:

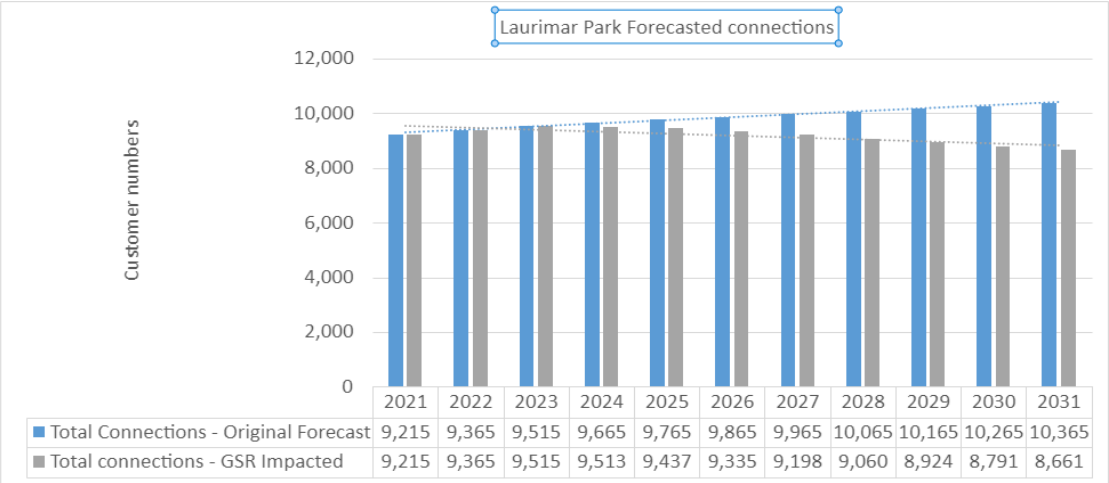
- Final Plan Attachment 9.11(2) Augmentation Business Cases
- Response to IR004

2.12.1 Future growth

Figure 2.13 and Figure 2.14 show the change in growth projected as a result of the GSR when compared to the original forecast connection growth in the Final Plan. The GSR impacts have been applied to the two networks as follows:

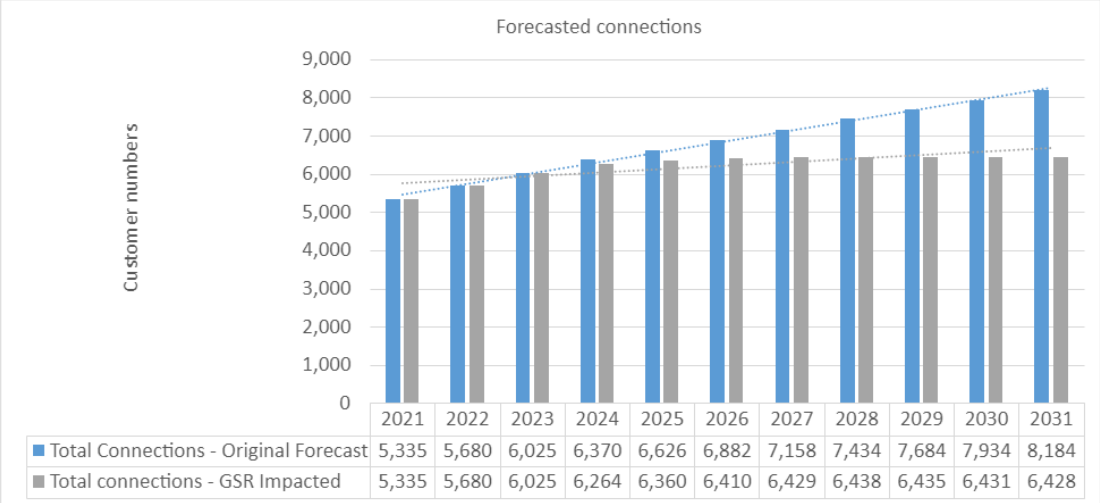
- Developed areas – 1.8%average annual load reduction for existing residential customers compared to our Final Plan.
- New areas - 25% reduction in new residential connections compared to our Final Plan.

Figure 2.13: Laurimar Park GSR impact on forecast connections



	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Connections - Original Forecast	9,215	9,365	9,515	9,665	9,765	9,865	9,965	10,065	10,165	10,265	10,365
Total connections - GSR Impacted	9,215	9,365	9,515	9,513	9,437	9,335	9,198	9,060	8,924	8,791	8,661

Figure 2.14: Wallan GSR impact on forecast connections



	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Connections - Original Forecast	5,335	5,680	6,025	6,370	6,626	6,882	7,158	7,434	7,684	7,934	8,184
Total connections - GSR Impacted	5,335	5,680	6,025	6,264	6,360	6,410	6,429	6,438	6,435	6,431	6,428

The impact of the GSR to the sum of total connections and impact to the peak flow through the gates is as follows:

- Laurimar Park – no impact by the GSR as the heater is already at capacity and had numerous excursions below -5°C in 2021.
- Wallan - the revised growth forecast means that the heater capacity is not reached, with total connections declining from 2024, resulting in no augmentation being required.

2.12.2 Modifications to project

As the Laurimar Park heater is forecast to breach pressure during the next AA period, the risk event assessed in the original business case remains unchanged. The planned augmentation is also unchanged.

As the Wallan heater is not forecast to breach capacity during the next AA period, the risk event assessed in the original business case does not materialise within the period.

As highlighted in section 1.3, this augmentation is highly sensitive to changes in the assumptions for new residential connections and existing residential customer load reductions, therefore changes in these assumptions may change the forecast augmentation program.

2.13 City Gate Upgrades

Project Summary	
Project name	City Gate Upgrades
Treated Risk	As per APA risk matrix = **Low**
Amendments to original business case	As a consequence of the revised modelling based on growth data predictions driven by the GSR provided by Core, the augmentation for Morwell and Lyndhurst would no longer be required in the next AA period. However, as Hume St Wodonga is currently over capacity and is less impacted by the GSR, this augmentation is still required.
Estimated cost	The forecast direct cost (excluding overhead) during the next five-year period (July 2023 to June 2028) is $1.4m. This is a $1.8m reduction compared to our Final Plan.

$'000 real 2020/21	23/24	24/25	25/26	26/27	27/28	Total
Revised Program	1,114	279				**1,393**

Basis of cost estimates	All costs in this business case are expressed in real unescalated dollars at June 2021 unless otherwise stated.
Consistency with NGR	This project complies with the following National Gas Rules (NGR): **NGR 79(1)** – the proposed solution is consistent with good industry practice, several practicable options have been considered, and market rates have been tested to achieve the lowest sustainable cost of providing this service. **NGR 79(2)** – proposed capex is justifiable under NGR 79(2)(c)(ii), as it is necessary to maintain the integrity of services. **NGR 74** – the forecast costs are based on the latest market rate testing and project options consider the asset management requirements as per the Asset Management Strategy. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Project Approval	
Prepared by:	Leigh Atkins, Team Lead Asset Planning, APA Group
Reviewed by:	Martijn Vlugt, Manager Asset Planning, APA Group
Approved by:	Mark Beech, Executive General Manager Network Operations

Other Relevant Documents

This addendum should be read in conjunction with:

- Final Plan Attachment 9.11(2) Augmentation Business Cases
- Response to IR004

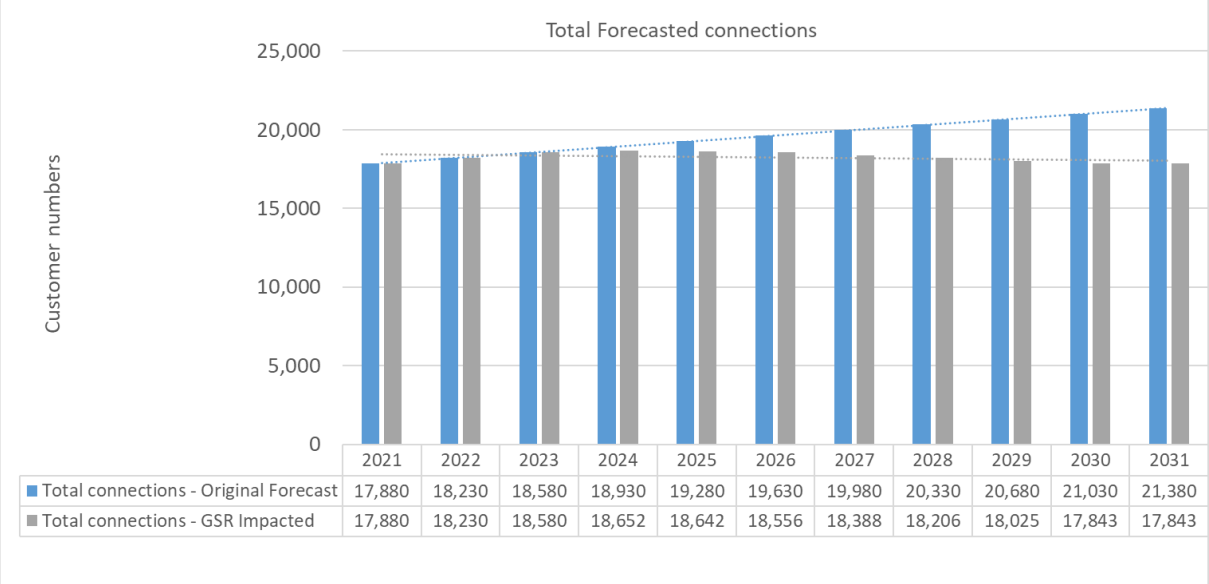
2.13.1 Future growth

Figure 2.15 to Figure 2.20 show the change in growth projected as a result of the GSR when compared to the original forecast connection growth in the Final Plan for Hume St Wodonga, Lyndhurst CG and Morwell CG. The GSR impacts have been applied to the three network as follows:

- Developed areas – 1.8%average annual load reduction for existing residential customers compared to our Final Plan

- New areas - 25% reduction in new residential connections compared to our Final Plan

Figure 2.15: Hume St Wodonga GSR impact on forecast connections



	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total connections - Original Forecast	17,880	18,230	18,580	18,930	19,280	19,630	19,980	20,330	20,680	21,030	21,380
Total connections - GSR Impacted	17,880	18,230	18,580	18,652	18,642	18,556	18,388	18,206	18,025	17,843	17,843

Figure 2.16: Hume St Wodonga, GSR impact on peak flows

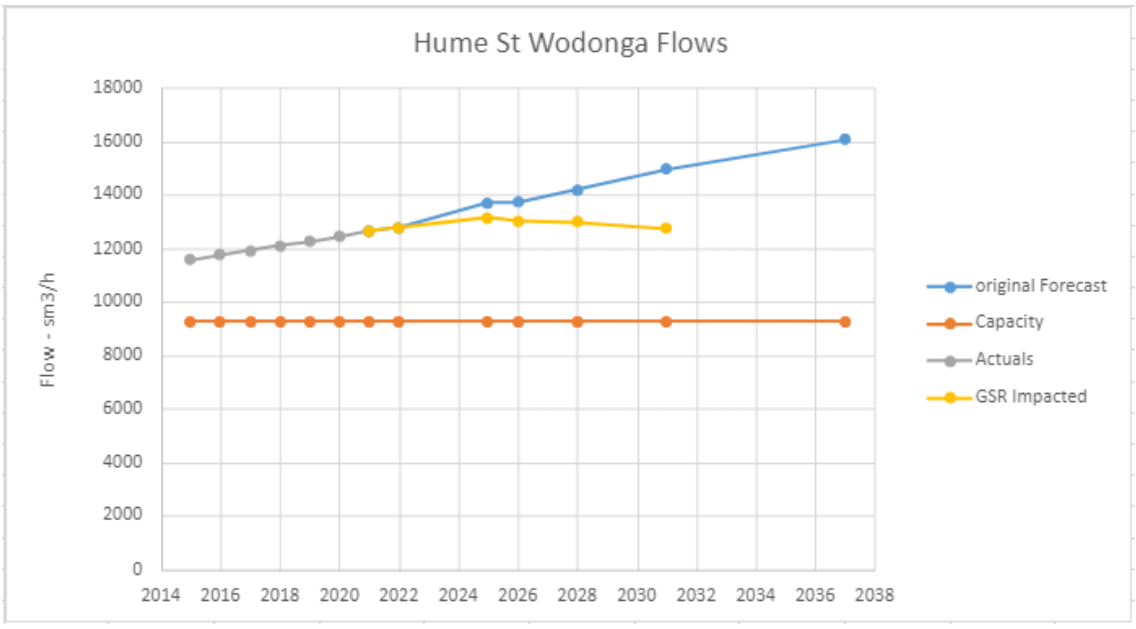
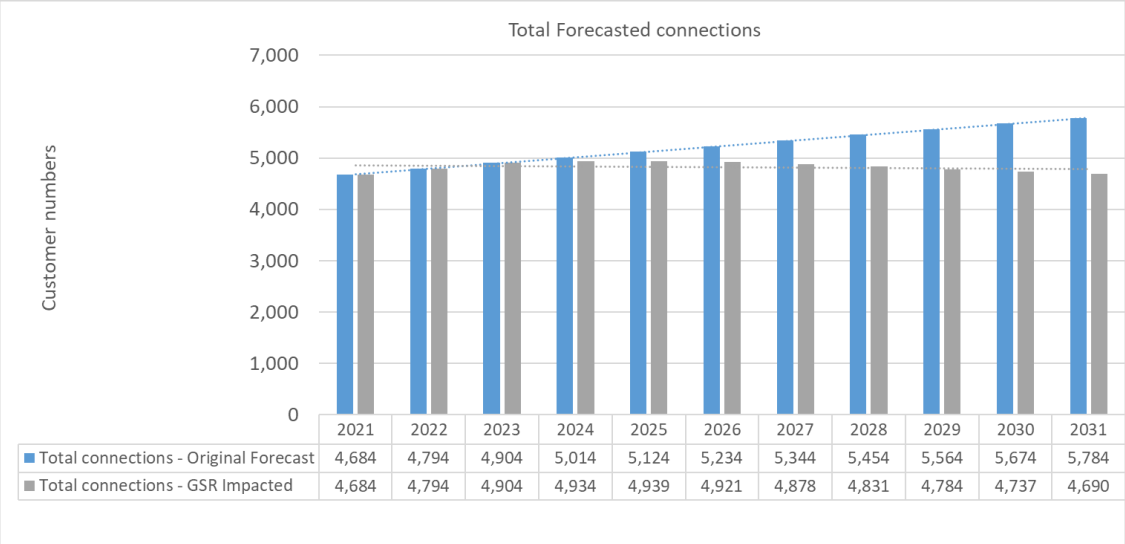


Figure 2.17: Lyndhurst CG, GSR impact on forecast connections



	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total connections - Original Forecast	4,684	4,794	4,904	5,014	5,124	5,234	5,344	5,454	5,564	5,674	5,784
Total connections - GSR Impacted	4,684	4,794	4,904	4,934	4,939	4,921	4,878	4,831	4,784	4,737	4,690

Figure 2.18: Lyndhurst CG, GSR impact on Peak Flows

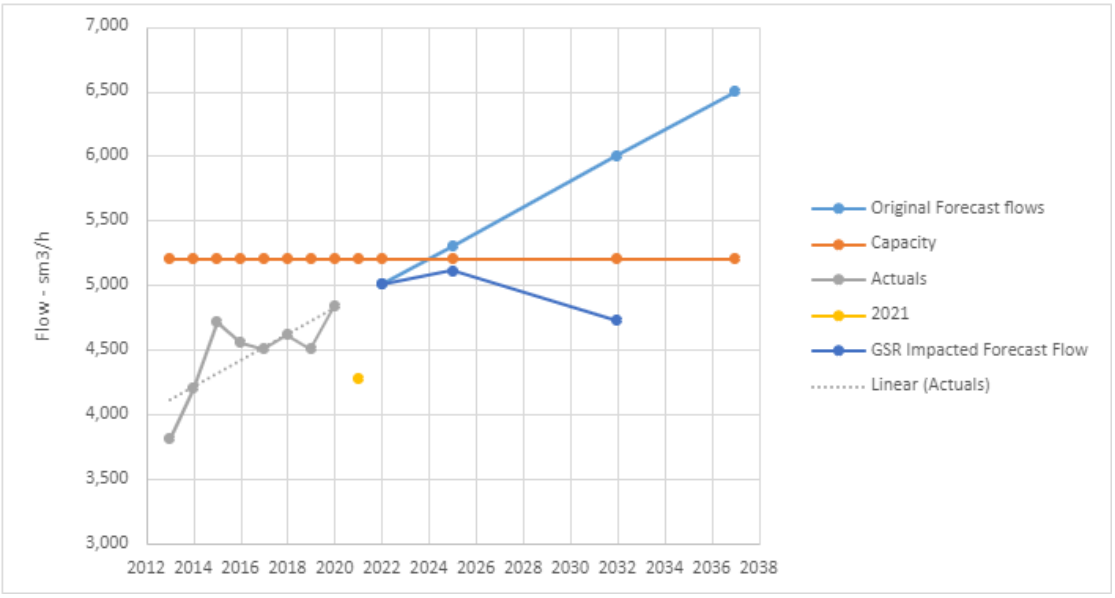
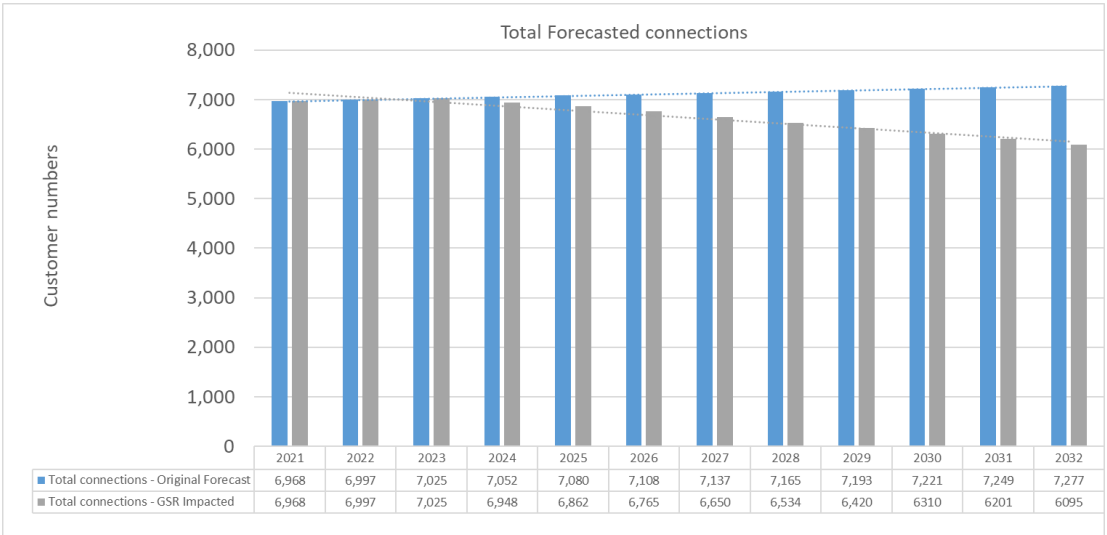
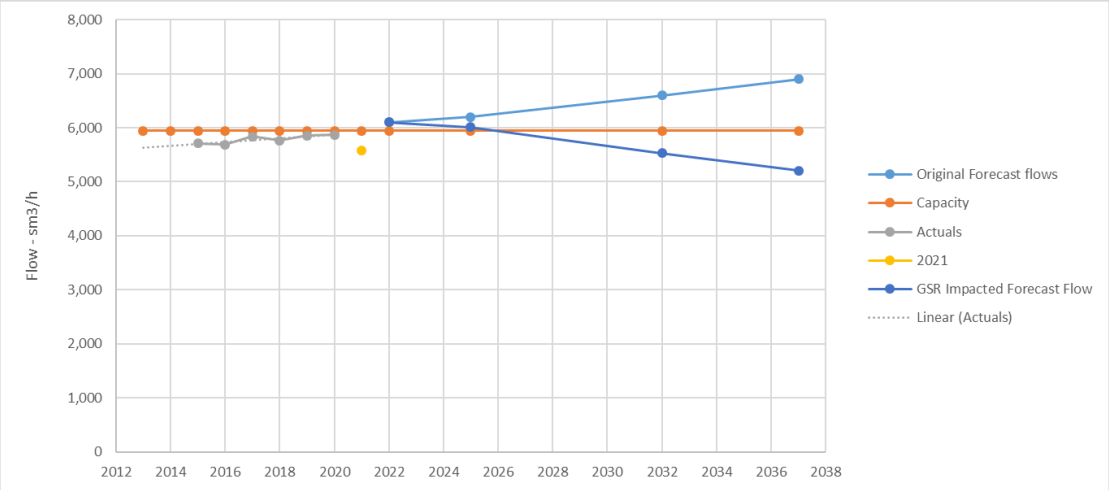


Figure 2.19: Morwell CG, GSR impact on forecast connections



	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Total connections - Original Forecast	6,968	6,997	7,025	7,052	7,080	7,108	7,137	7,165	7,193	7,221	7,249	7,277
Total connections - GSR Impacted	6,968	6,997	7,025	6,948	6,862	6,765	6,650	6,534	6,420	6310	6201	6095

Figure 2.20: Morwell CG, GSR impact on Peak Flows



The GSR impacts to the sum of total connections and impact to the peak flow through the gates as follows:

- Morwell – under the GSR impacted growth forecast, the city gate capacity is still just reached in 2022 and 2023 but with total connections declining from 2024 and the peak flows falling again under the capacity of the site, no augmentation is required.
- Hume St, Wodonga – the city gate is currently over capacity and sees lesser impacts under the GSR, with connections increasing to 2024 before plateauing.
- Lyndhurst – under the GSR impacted growth forecast, the city gate capacity is not reached, with total connections declining from 2024, resulting in no augmentation being required.

2.13.2 Modifications to project

As the Morwell and Lyndurst city gates are not forecast to breach capacity during the next AA period, the risk event assessed in the original business case does not materialise within the period.

As the Hume St Wodonga city gate is forecast to breach pressure during the next AA period, the risk event assessed in the original business case remains unchanged. The planned augmentation is also unchanged.

As highlighted in section 1.3, this augmentation is highly sensitive to changes in the assumptions for new residential connections and existing residential customer load reductions, therefore changes in these assumptions may change the forecast augmentation program.

2.14 Sale City Gate Augmentation

Project Summary	
Project name	Sale City Gate Augmentation
Treated Risk	As per APA risk matrix = **Low**
Amendments to original business case	There are no amendments to this augmentation as it is not driven by growth, and therefore not impacted by the GSR. This augmentation is driven by AEMO's request to reduce the minimum inlet pressure conditions and for AGN to meet its regulatory obligations associated with gas delivery in Victoria.
Estimated cost	The forecast direct cost (excluding overhead) during the next five-year period (July 2023 to June 2028) is $1.3m. This is consistent with our Final Plan.

$'000 real 2020/21	23/24	24/25	25/26	26/27	27/28	Total
Sale City Gate		437	437	437	-	**1,311**

Basis of cost estimates	All costs in this business case are expressed in real unescalated dollars at June 2021 unless otherwise stated.
Consistency with NGR	This project complies with the following National Gas Rules (NGR): **NGR 79(1)** – the proposed solution is consistent with good industry practice, several practicable options have been considered, and market rates have been tested to achieve the lowest sustainable cost of providing this service. **NGR 79(2)** – proposed capex is justifiable under NGR 79(2)(c)(ii), as it is necessary to maintain the integrity of services. **NGR 74** – the forecast costs are based on the latest market rate testing and project options consider the asset management requirements as per the Asset Management Strategy. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.

Project Approval	
Prepared by:	Leigh Atkins, Team Lead Asset Planning, APA Group
Reviewed by:	Martijn Vlugt, Manager Asset Planning, APA Group
Approved by:	Mark Beech, Executive General Manager Network Operations

Other Relevant Documents

This addendum should be read in conjunction with:

- Final Plan Attachment 9.11(2) Augmentation Business Cases

2.15 Dandenong Crib Point Pipeline Duplication

Project Summary	
Project name	Dandenong Crib Point Pipeline Duplication
Treated Risk	As per APA risk matrix = **Low**
Amendments to original business case	As a consequence of revised modelling based on growth data predictions driven by the GSR provided by Core, this augmentation is still required in the next AA period and the scope of work is unchanged. This is due to the long lead time of the project, uncertainty of the GSR impact and the high untreated risk.
Estimated cost	The forecast direct cost (excluding overhead) during the next five-year period (July 2023 to June 2028) is $28.2m. This is consistent with our Final Plan.

$'000 real 2020/21	23/24	24/25	25/26	26/27	27/28	Total
Abbotts duplication	14,110	14,110	-	-	-	28,221

Basis of cost estimates	All costs in this business case are expressed in real unescalated dollars at June 2021 unless otherwise stated.
Consistency with NGR	This project complies with the following National Gas Rules (NGR): **NGR 79(1)** – the proposed solution is consistent with good industry practice, several practicable options have been considered, and market rates have been tested to achieve the lowest sustainable cost of providing this service. **NGR 79(2)** – proposed capex is justifiable under NGR 79(2)(c)(ii), as it is necessary to maintain the integrity of services. **NGR 74** – the forecast costs are based on the latest market rate testing and project options consider the asset management requirements as per the Asset Management Strategy. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Project Approval	
Prepared by:	Leigh Atkins, Team Lead Asset Planning, APA Group
Reviewed by:	Martijn Vlugt, Manager Asset Planning, APA Group
Approved by:	Mark Beech, Executive General Manager Network Operations
Other Relevant Documents	

This addendum should be read in conjunction with:

- Final Plan Attachment 9.11(2) Augmentation Business Cases
- Response to IR004

2.15.1 Future growth

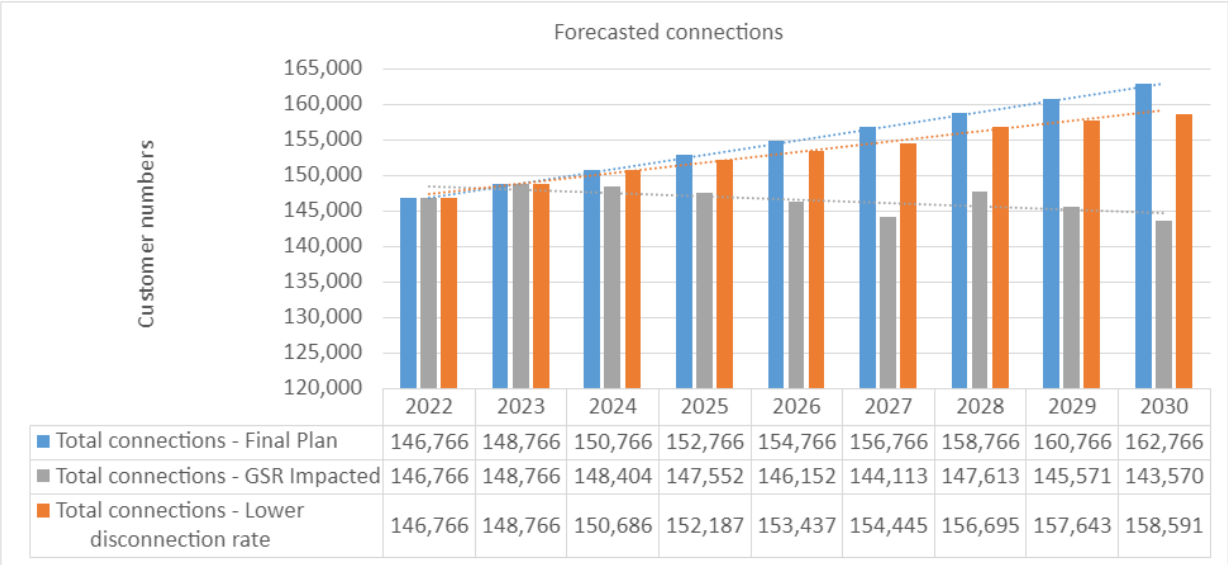
Figure 2.21 shows the change in growth projected as a result of the GSR when compared to the original forecast connection growth in the Final Plan. The GSR impacts have been applied to the Mornington Peninsula network as follows:

- Developed areas – 1.8% average annual load reduction for existing residential customers compared to our Final Plan. This was not applied to a small proportion of newly developed areas. Given the susceptibility of the Mornington Peninsula network to

disconnections, we have also modelled a lower disconnection rate of 0.5% average annual load reduction.

- New areas - 25% reduction in new residential connections compared to our Final Plan.

Figure 2.21: Mornington Peninsula GSR impact on forecast connections



	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total connections - Final Plan	146,766	148,766	150,766	152,766	154,766	156,766	158,766	160,766	162,766
Total connections - GSR Impacted	146,766	148,766	148,404	147,552	146,152	144,113	147,613	145,571	143,570
Total connections - Lower disconnection rate	146,766	148,766	150,686	152,187	153,437	154,445	156,695	157,643	158,591

In our Final Plan the sum of total connections observed in 2024 results in breaching the acceptable minimum pressure at the inlet of Bayview Road's TP/HP regulator in the Mornington region. This requires augmentation to occur prior to winter 2025 to prevent this.

The updated GSR forecast shows that the total number of connections peak in 2023/24, ahead of potentially declining. A lower disconnection rate of 0.5% pa shows total number of connections would continue to rise over the period.

2.15.2 Modifications to project

The DCP duplication has the highest risk consequence of the proposed augmentation program, with supply for over 140,000 customers across the Mornington Peninsula potentially impacted by a low pressure event.

While this project is sensitive to the levels of load reduction for existing customers exceeding new connection load growth (which is modelled to occur around 2024 under the GSR impacted scenario), the risk of not having the duplication in place by the required timeframe is too great should load destruction happen any slower than modelled in our GSR Response. Therefore, the risk assessment in the original business case and the original scope of work both remain unchanged.

There are no other viable alternatives to ensure supply in the Mornington Peninsula HP network, with this stage being the final in a thirteen-year program of duplication. The DCP duplication also has a long lead time of 2.5 to 3 years to complete. The project is already underway to meet the pressure constraints ahead of winter 2025, with engineering started and pipe material purchased. Our GSR Response proposes to continue the DCP as planned, as the risk to the Mornington Peninsula network is too high if the GSR scenario load destruction happens any slower than forecast.