

Network Performance Report 2016

Eastern HP Networks (H01/H02/H24/H48)



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Originated By

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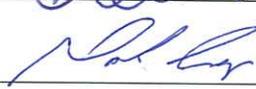
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1. Executive Summary

Eastern high pressure (HP) networks will require reinforcement to maintain minimum system pressure above 140 kPa as required by the Gas Distribution System Code for the next 6 year period:

2017

- Install a new fringe for Olinda South HP in Dulcie Domum Rd, Olinda;
- Relocate Joy Ave fringe in Olinda North HP to Wiseman Rd, Silvan in Olinda South HP; and
- Upgrade High St Rd regulator P4-067 capacity.

2018

- Lay approximately 700 m of 63 mm P10 main in Selkirk Ave for Knox HP;
- Lay approximately 150 m of 63 mm P10 main in Bedford Rd, Ringwood for Ringwood HP;
- Lay approximately 20 m of 125 mm P10 main in Colman Rd, Warrandyte South for Ringwood HP;
- Lay approximately 150 m of 63 mm P10 main in Warrandyte – Ringwood Rd, Warrandyte South for Ringwood HP; and
- Lay approximately 100 m of 63 mm P10 main in Braden Brae Dr, Warranwood for Ringwood HP.

2019

- Install a new fringe for Knox HP in Inverness Ave, The Basin; and
- Install a new fringe for Knox HP in Narani Ct, Ferntree Gully.
- Upgrade Lincoln Rd regulator P4-120 capacity;
- Upgrade Blaxland Dr regulator P4-250 capacity;
- Upgrade Glenfern Rd regulator P4-182 pipework; and
- Upgrade Azalea Ct regulator P4-256 pipework.

2021

- Construct approximately 1,500 m of 125 mm P10 HP main in Sherbrooke Rd, Sassafra for Olinda South HP; and
- Construct approximately 1,700 m of 125 mm P10 HP main in Old Coach Rd, Kalorama for Olinda North HP.

2022

- Install a new fringe for Olinda Nth HP in Donna Buang Rd, Warburton.

Winter testing in 2017 will be conducted to verify any changes and timing for the proposed works.

2. Introduction

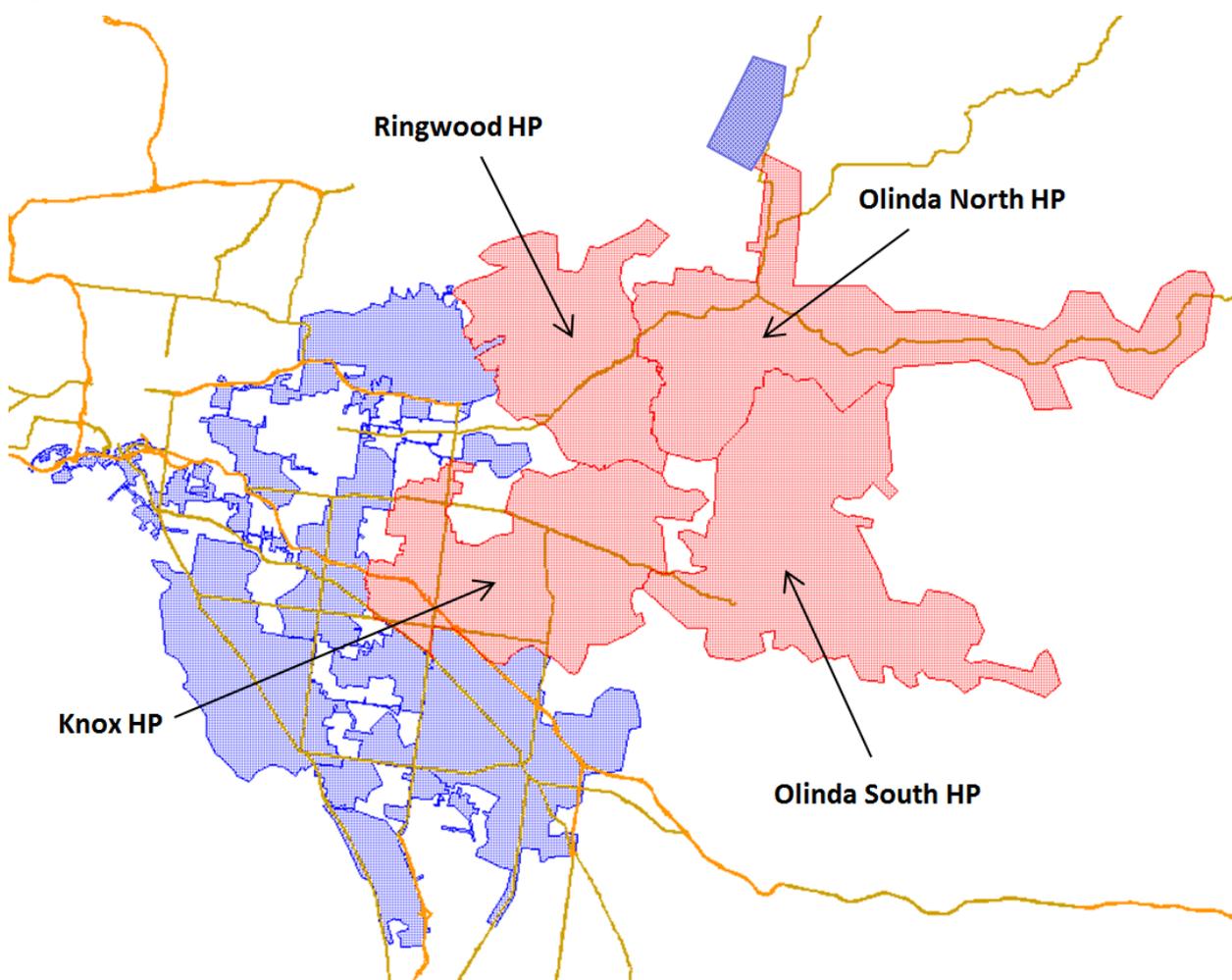
Eastern high pressure (HP) network extends across approximately 35% of Multinet Gas distribution area and supplies approximate 30% of Multinet Gas consumers. It consists of four sub-networks, namely Ringwood HP, Knox HP, Olinda North HP and Olinda South HP. This network is a SCADA controlled network. It is supplied by 20 field regulators feeding from APA Transmission, Multinet Gas (MG) transmission pressure (TP) and 840 kPa system.

In the past few years, various pocket areas of Ringwood HP, Olinda HP and Knox HP have been experiencing poor supply issues due to load growth. Most of the supply regulators have been running much higher than 450 kPa during peak hours in order to maintain the minimum pressure above 140 kPa. There are no load increases for most of the suburbs within these networks, only some areas in Olinda North and Olinda South will experience growth rates of between 0.4% and 4.3% per annum based on NIEIR's latest forecast which was produced in June 2016.

Growth Area in Eastern Network

Suburb	2017	2018	2019	2020	2021	2022
Seville	2.4%	1.2%	1.1%	1.0%	0.5%	0.4%
Gembrook	3.3%	2.4%	1.8%	1.9%	1.7%	1.8%
Yarra Junction	4.3%	2.2%	1.3%	1.2%	0.6%	0.6%
Millgrove	4.2%	2.2%	1.3%	1.1%	0.6%	0.5%

Figure 2-1 Overview of Eastern HP Networks



3. Analysis

This review is based on the latest available matched model from 2015. Forecast load growth data by postcode provided by NIEIR in June 2016 was used to forecast network capacity and augmentation works for the next regulatory period from 2018 to 2022.

4. Legend

The report includes schematics of the networks to visualise the network before reinforcement and the effects after reinforcement.

The legend depicting the colours for pressure ranges has been used throughout this report. The legend is as follows:

	Below 140 kPa
	Between 140 and 250 kPa
	Between 250 and 350 kPa
	Between 350 and 450 kPa
	Greater than 450 kPa

5. Results and Recommendations

Prior winter 2017

Multinet Gas (MG) engaged Oil Gas Power International to perform regulator capacity analysis. The analysis indicated that a number of regulators need to be upgraded. Refer to Appendix B for forecast regulator flow and their capacities.

The forecast flow for High St regulator P4-067 in 2017 is around 20,000 m³/h which is about 150% of its designed capacity. It's recommended to upgrade this regulator by winter 2017.

In order to improve the performance of SCADA control, two new fringes are recommended to be installed as shown in Figure 5-1:

- Install a new fringe for Olinda South HP in Dulcie Domum Rd, Olinda (Melway 66 J5) (Refer to Figure 5-2);
and
- Relocate Joy Ave fringe in Olinda North HP to Wiseman Rd, Silvan in Olinda South HP (Melway 123 H3) (Refer to Figure 5-3).

Figure 5-1 Proposed New Fringe Locations

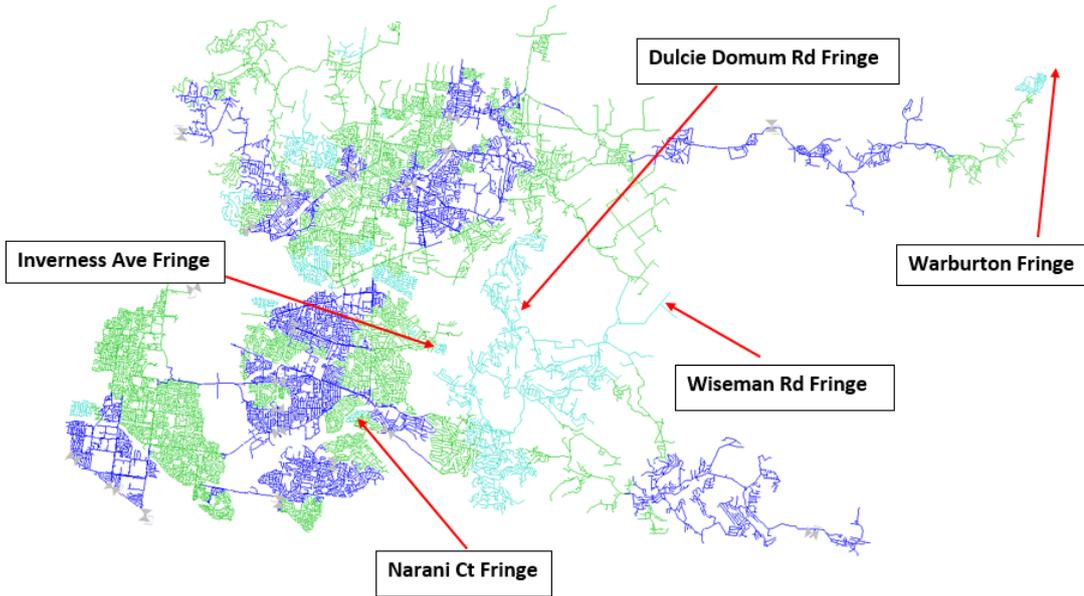


Figure 5-2 Dulcie Domum Rd Fringe Detail

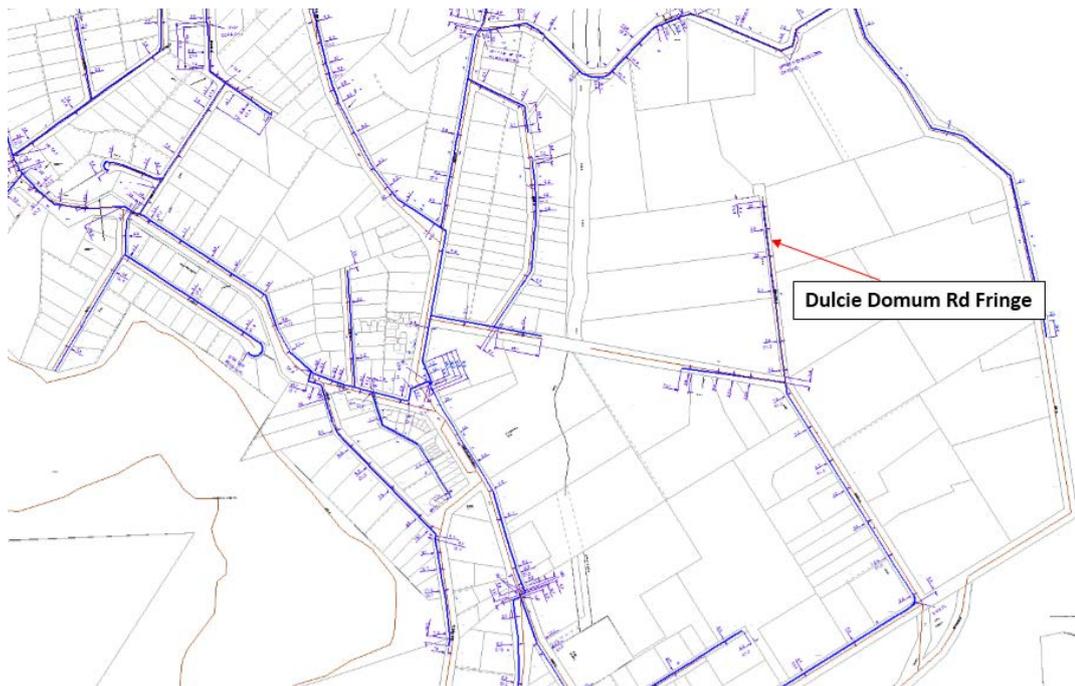


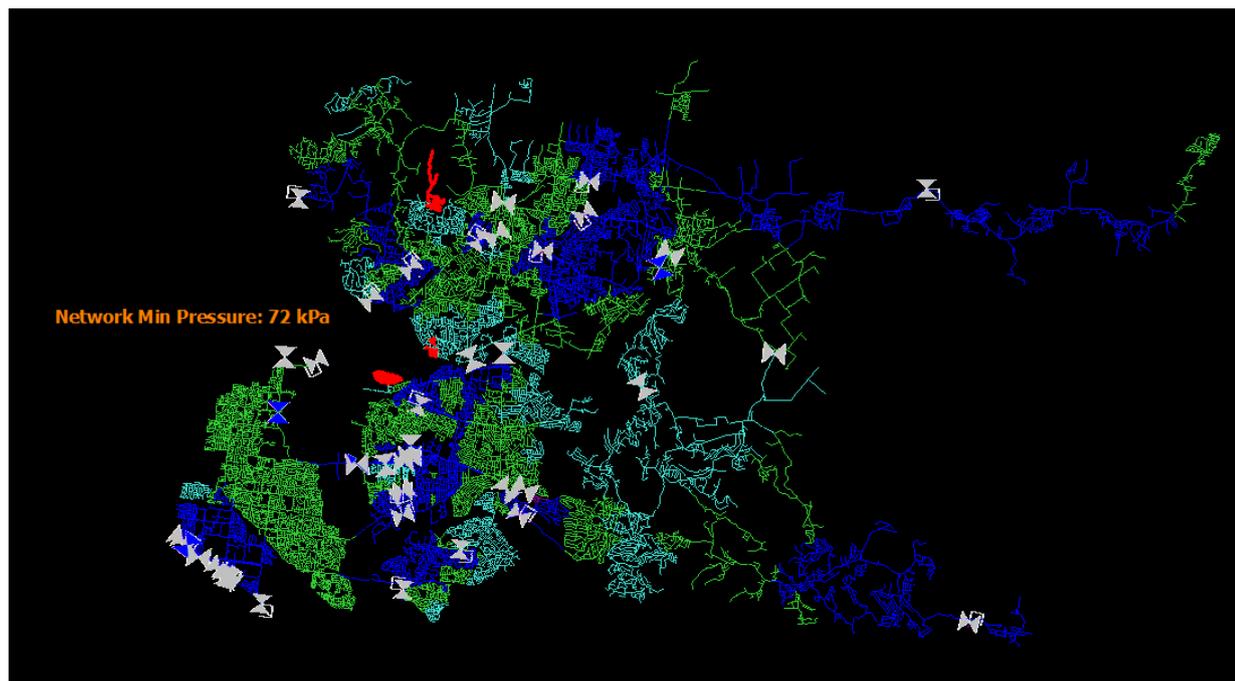
Figure 5-3 Wiseman Rd Fringe Detail



Prior winter 2018

There are three discrete areas that will be experiencing main's pressure under 140 kPa under normal operation conditions as shown in Figure 5-4.

Figure 5-4 Pressure Profile in winter 2018 before augmentation



To ensure minimum pressures do not fall below 140 kPa on a 1 in 2 winter peak day, the following projects are recommended:

- Lay approximately 700 m of 63 mm P10 main from the existing 40 P2 main in Selkirk Ave (Melway 63 J4) and along the Selkirk Ave eastwards and then along Ti-Tree Ave and tie-in to the 40 S2 main at the intersection of Ti-Tree Ave and Cumberland Av as shown in Figure 5-5;
- Lay approximately 150 m of 63 mm P10 main from the existing 40 S4 main in Bedford Rd, Ringwood East (Melway 50C1) and tie-in to the existing 50 P2 main in Canterbury Rd as shown in Figure 5-6;
- Lay approximately 20 m of 125 mm P10 main from the existing 50 P2 main in Colman Rd, Warrandyte South (Melway 35 J7) and tie-in to the existing 100 S7 main in Hall Rd as shown in Figure 5-7;
- Lay approximately 150 m of 63 mm P10 main in Warrandyte – Ringwood Rd, Warrandyte South (Melway 35H7) to interconnect the two 50 P2 mains as shown in Figure 5-7; and
- Lay approximately 100 m of 63 m P10 main to duplicate the 40 P2 main in Braden Brae Dr, Warranwood (Melway 36 C8) as shown in Figure 5-7.

The modelled network pressures are improved after the augmentation as shown in Figure 5-8.

Figure 5-5 Mains Reinforcement details in Selkirk Ave

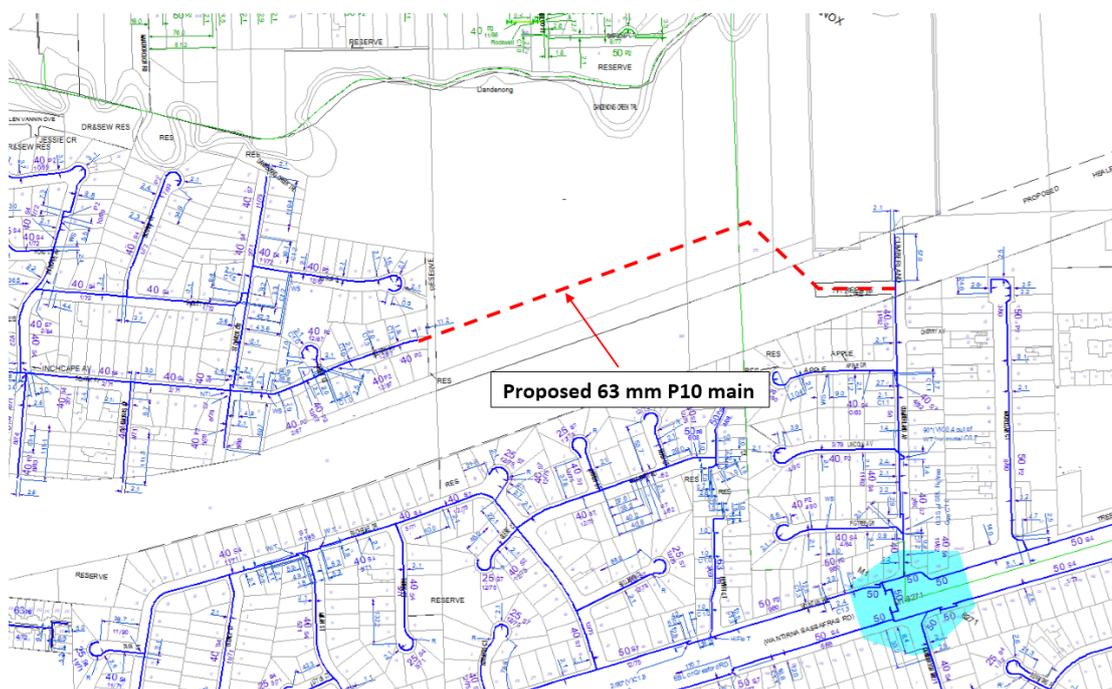


Figure 5-6 Mains Reinforcement details in Belford Rd

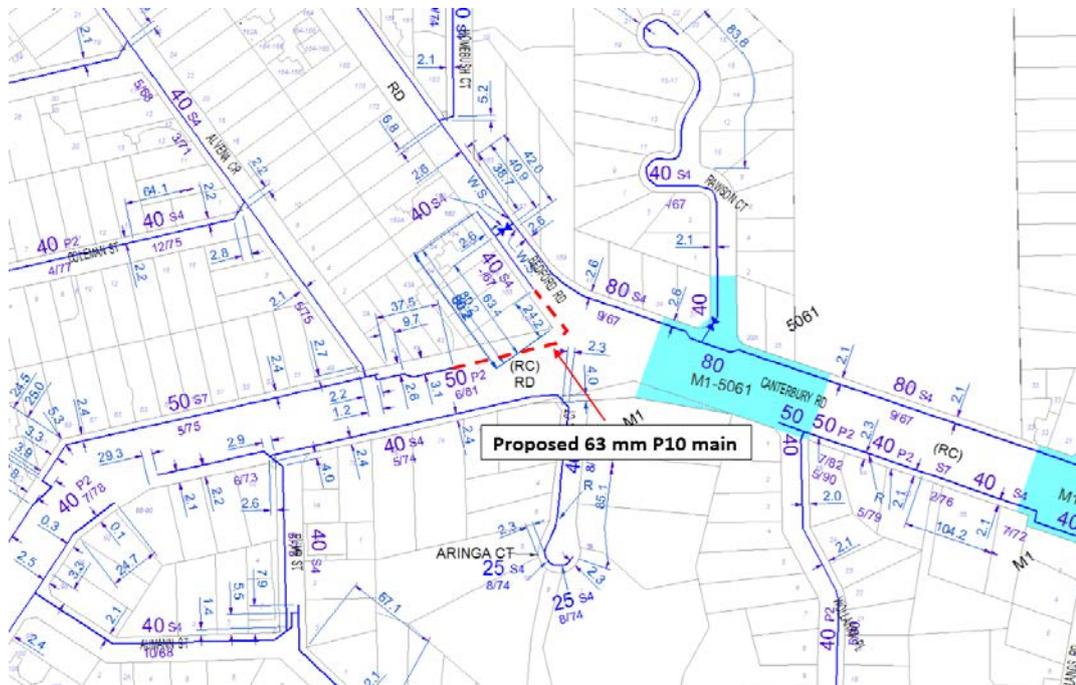


Figure 5-7 Mains Reinforcement details in Ringwood HP

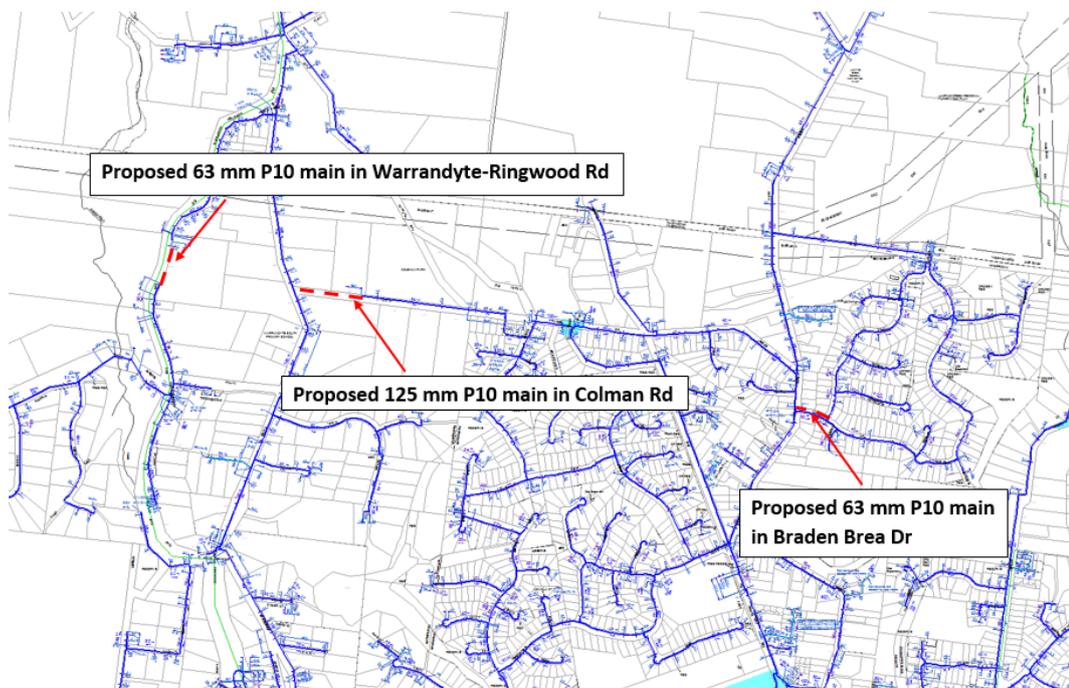
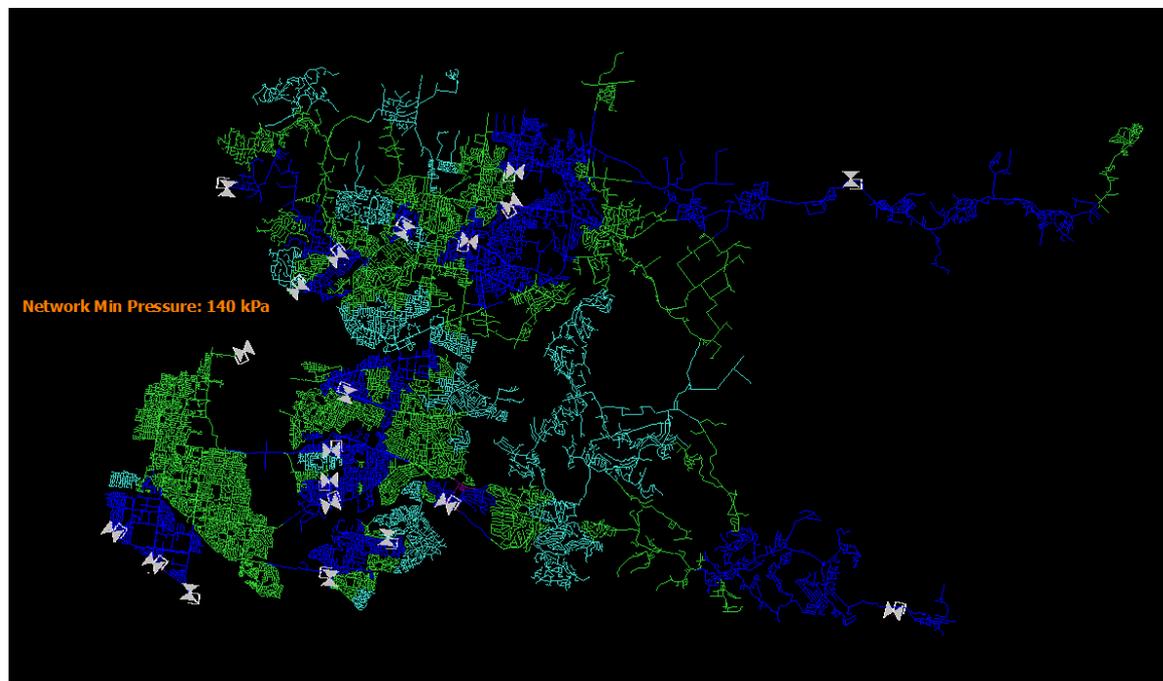


Figure 5-8 Network Pressure Profile in 2018 after augmentation



Prior winter 2019

In order to improve the performance of SCADA control, two new fringes are recommended to be installed:

- Install a new fringe for Knox HP in Inverness Ave, The Basin (Melway 65 K10) (Refer to Figure 5-9); and
- Install a new fringe for Knox HP in Narani Ct, Ferntree Gully (Melway 73 H7) (Refer to Figure 5-10).

Figure 5-9 Inverness Ave Fringe Detail

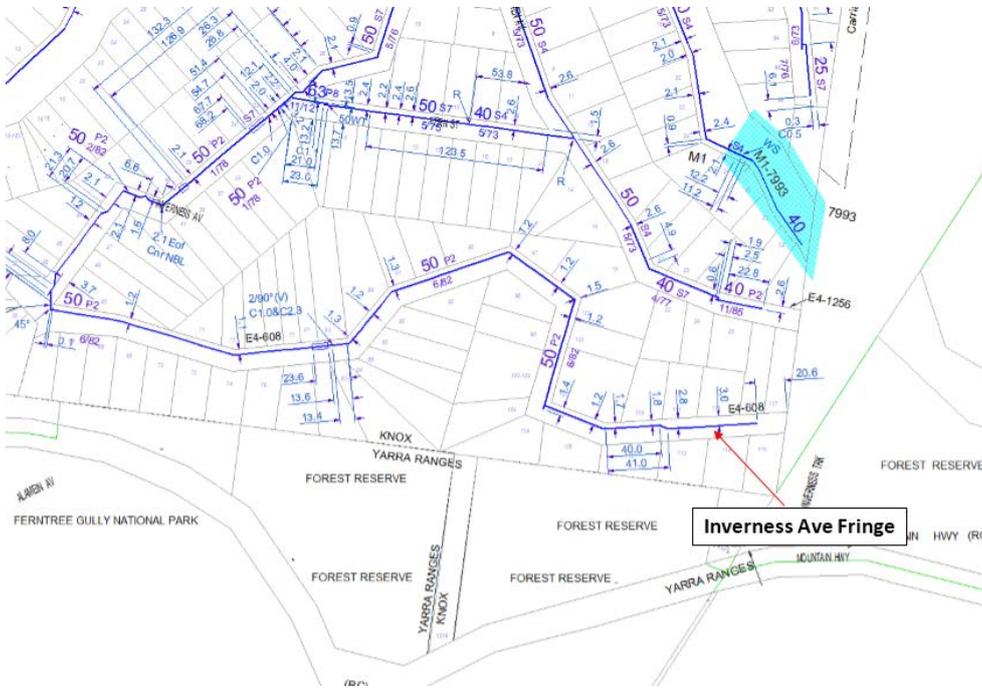
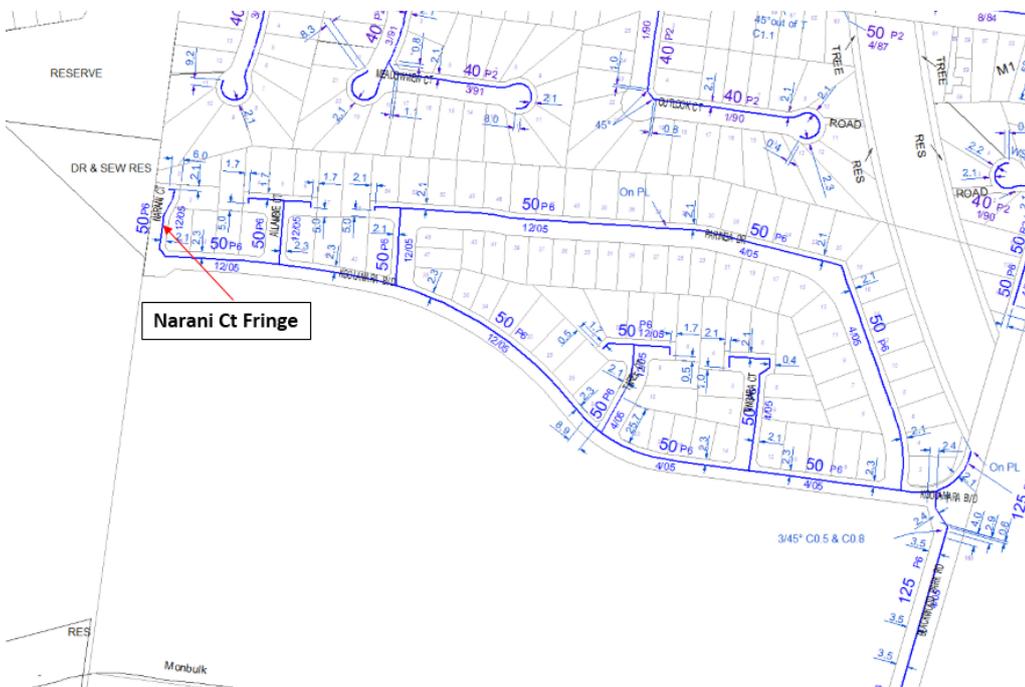


Figure 5-10 Narani Ct Fringe Detail



Prior winter 2020

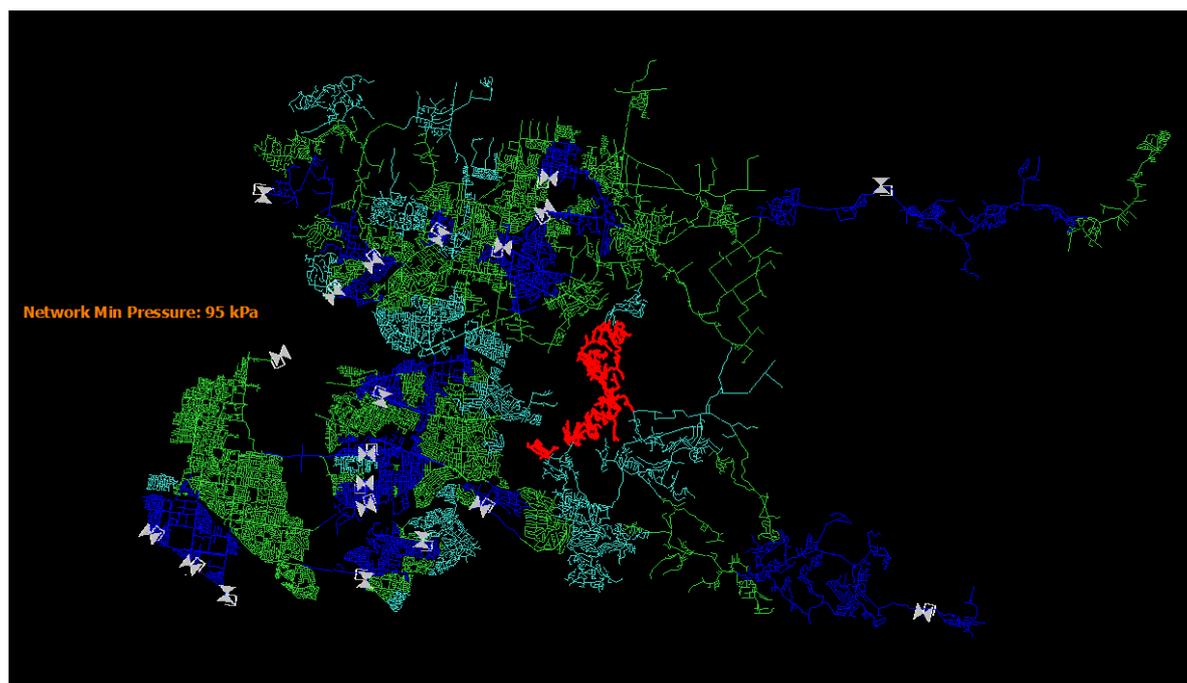
It's recommended to upgrade the following regulators before winter 2020 as Lincoln Rd and Blaxland Dr regulators are exceeding 80% of their designed capacity and Glenfern Rd and Azalea Ct regulators are exceeding their designed velocity limit of 36 m/s:

- Upgrade Lincoln Rd regulator P4-120 capacity;
- Upgrade Blaxland Dr regulator P4-250 capacity;
- Upgrade Glenfern Rd regulator P4-182 pipework; and
- Upgrade Azalea Ct regulator P4-256 pipework.

Prior winter 2021

There are a few pocket areas that will be experiencing main's pressure under 140 kPa under normal operation conditions as shown in Figure 5-11.

Figure 5-11 Pressure Profile in winter 2021 before augmentation



To ensure minimum pressures do not fall below 140 kPa on a 1 in 2 winter peak day, the following projects are recommended:

- Construct approximate 1,500 m of 125 mm P10 HP main in Sherbrooke Rd, Sassafras, 3787 (Melway 75 E2) interconnecting the existing two 100 steel mains as shown in Figure 5-12.
- Construct approximate 1,700 m of 125 mm P10 HP main in Old Mountain Rd, Kalorama (Melway 52 H9), and tie-in to the existing 50P2 main at the intersection of Old Coach and Old Mountain Rd as shown in Figure 5-13.

The modelled network pressures are improved after the augmentation as shown in Figure 5-14.

Figure 5-12 Mains Reinforcement in Sherbrook Rd

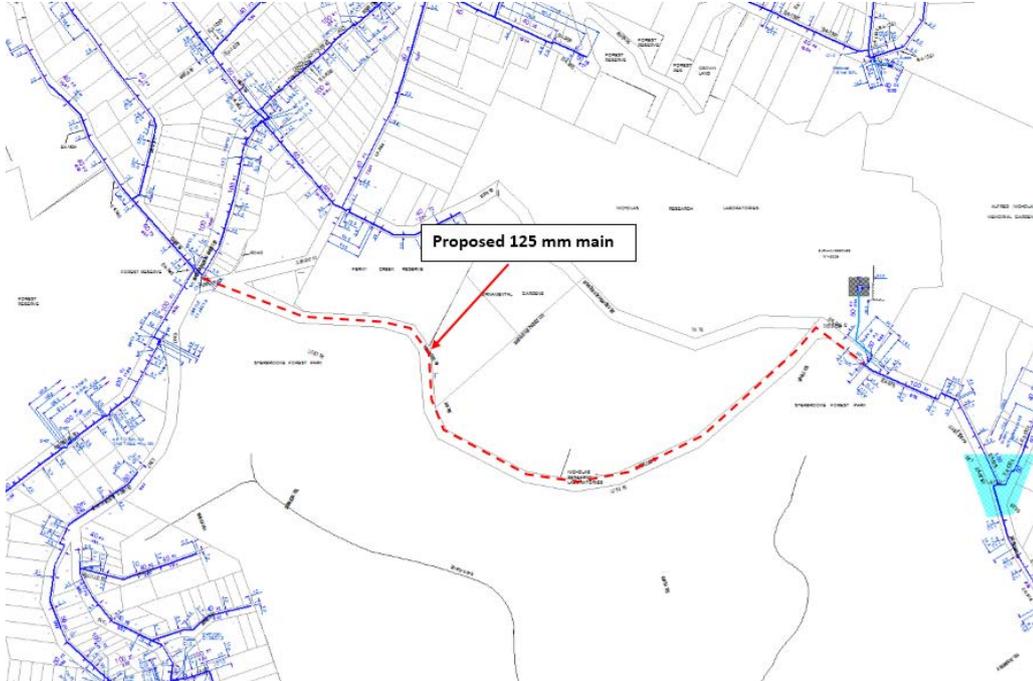


Figure 5-13 Mains Reinforcement details in Old Mountain Rd

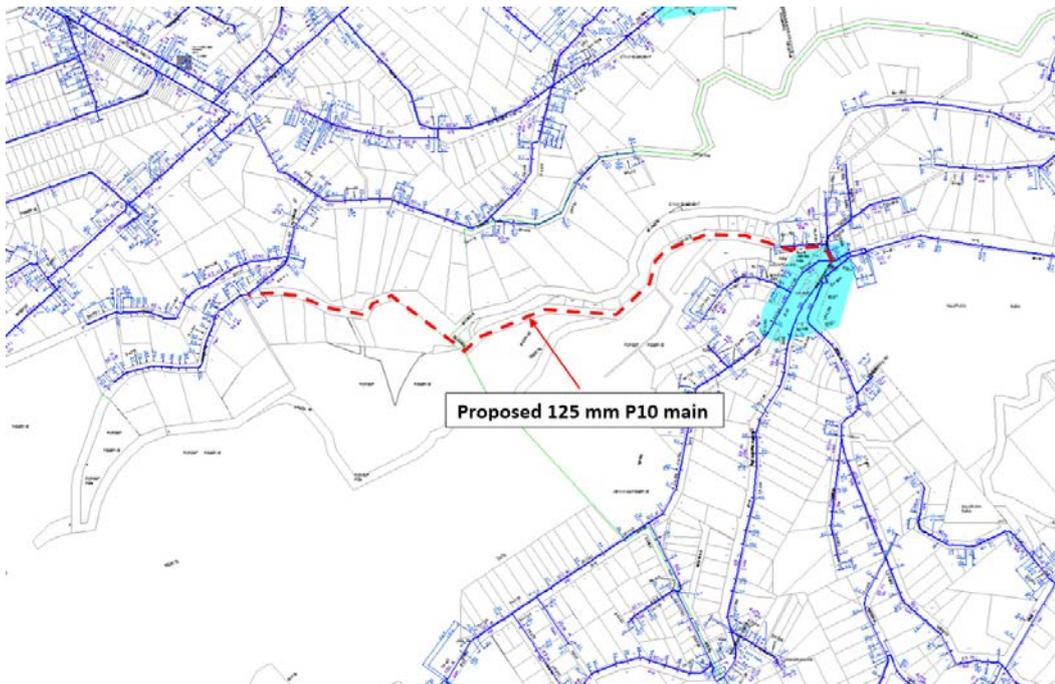
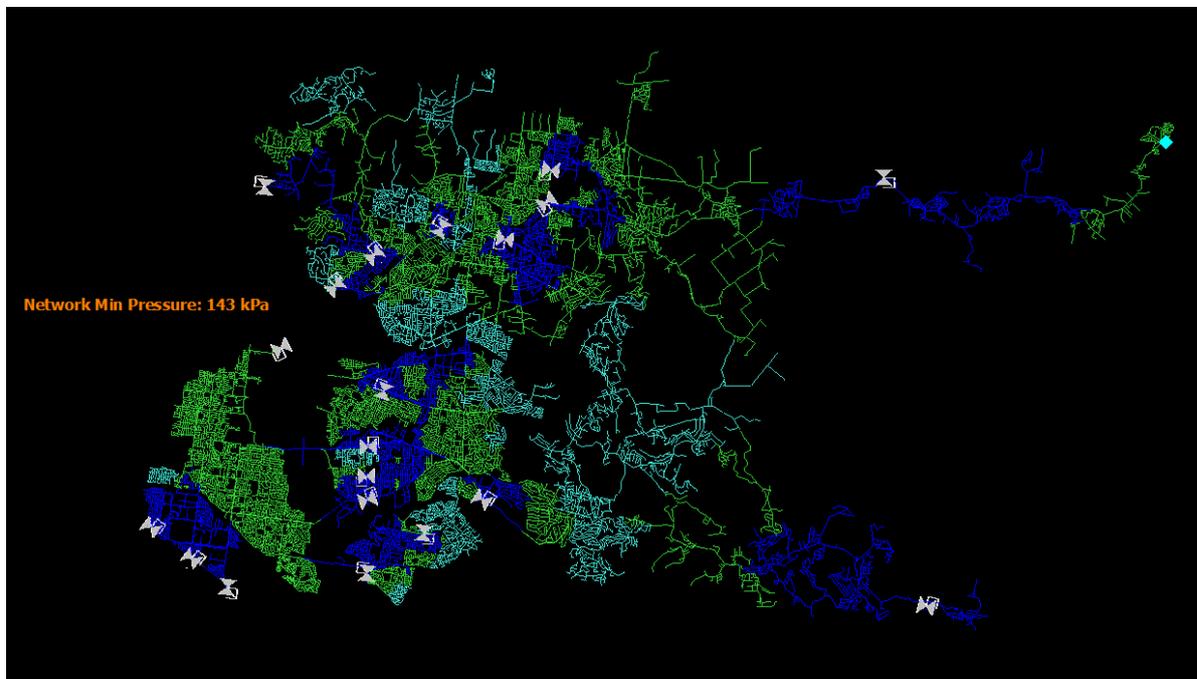


Figure 5-14 Pressure Profile in winter 2021 after augmentation



Prior winter 2022

Warburton natural gas project subsidised by state government is expected to be commissioned in 2016. This is an extension of Olinda North HP network. By the year 2022, 750 customers are expected to be connected to the network. There is a need to install a new fringe in Donna Buang Rd, Warburton (Melway 290 G1) to monitor the minimum network pressure (Refer to Figure 5-15).

Figure 5-15 Donna Buang Rd Fringe Details



Forecast minimum network pressure (kPa)

2018	2018R	2019	2020	2021	2021R	2022
74	141	141	141	95	143	143

R denotes reinforcement required

Appendix A Detail of New Fringe Locations

Unit No	SCADA Group	Street Name	Suburb	Melway Ref	Network	Status
D-	Ringwood	Galtymore Cl	Warranwood	36 D8	H01	Future
D-	Olinda South	Wiseman Rd	Silvan	123 H3	H48	Future
D-	Olinda North	Donna Buang Rd	Warburton	290 G1	H24	Future
D-	Knox HP	Inverness Av	The Basin	65 K10	H02	Future
D-	Knox HP	Narani Ct	Ferntree Gully	73 H7	H02	Future

Appendix B Reference Files and Models

All SynerGEE models are saved under folder: \1. Asset Planning & Strategy\1.0 System Planning Synergee \HP_GAAR2016\Eastern\

Matching spreadsheet is saved under folder: \3.0 System Planning_Annual Planning\Winter Testing\Winter Testing Spreadsheet\GAAR

Forecast growth by postcode can be accessed via folder: \1. Asset Planning & Strategy\3.0 System Planning_Annual Planning\Winter Testing\Winter Testing Spreadsheet\GAAR

Appendix C Forecast Regulator's Flow m³/h

Case	Azalea Ct	Glenfern Rd	Blaxland Dr	Lincoln Rd	High St
1 – 450 kPa Outlet	13,520	25,280	10,760	25,690	14,420
2 – 490 kPa Outlet	13,400	25,220	10,600	25,650	14,350
3 – Velocity limit to 36m/s	6,739	10,730	6,739	11,110	11,330
Modelled Flow	8,454	10,088	8,998	22,832	20,763