AusNet

# Gas Network

## Network Planning Report – Bellarine
## Public

Friday, 10 June 2022

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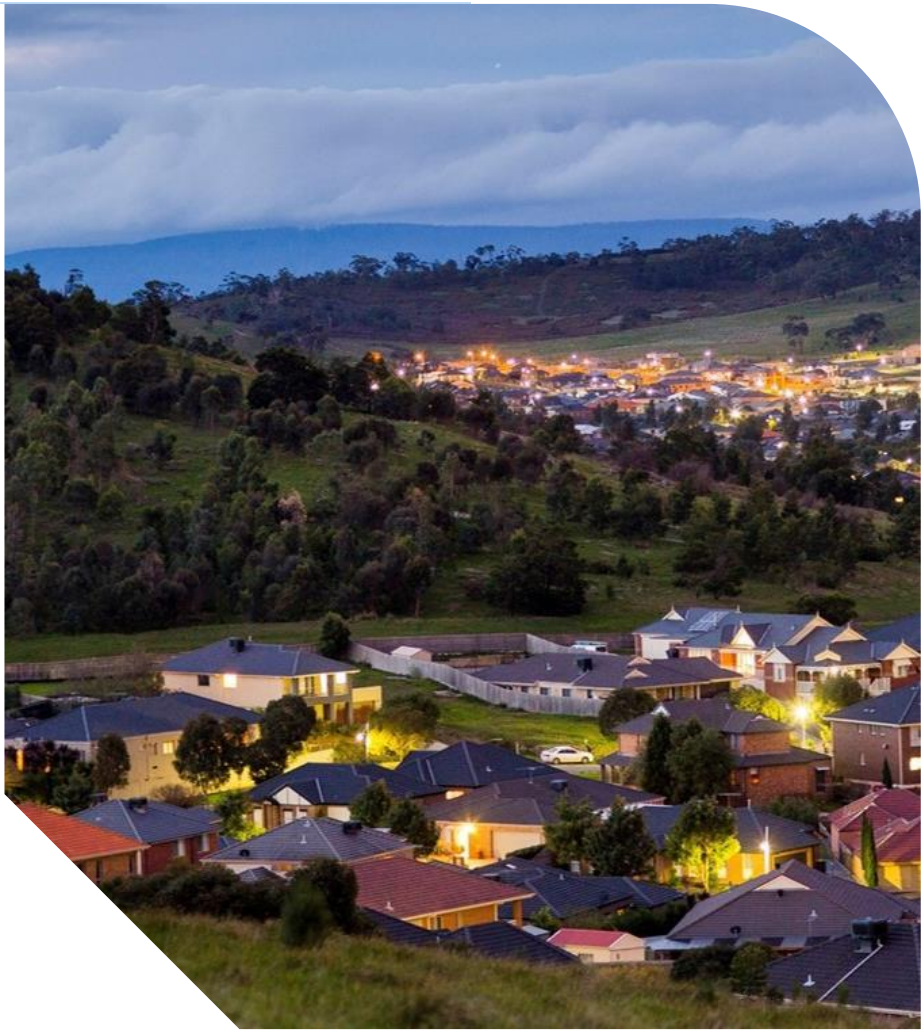

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# Executive Summary

The Geelong Bellarine gas network will be unable to support projected gas consumption growth and would require a network reinforcement by FY2022/23 and FY2026/27 to increase network capacity required in affected areas and to maintain adequate minimum network pressures in the area.

**Stage 1:**

**FY22/23**

- Buckley Grove Field Regulator upgrades and reinforcement

**Stage 2:**

**Recommendation - FY26/27**

- Construct approximately [C.I.C] of 180mm polyethylene along Grubb Road

# 1. Network Overview

The Geelong Bellarine Peninsula consists of various coastal towns that are expanding in development and size. The northern and southern legs of the area are fed by one (1) field regulator located in Leopold and feeds through multiple towns to St. Leonards at the end of Northern corridor and to Queenscliff at the end of Southern corridor of Geelong Bellarine.

The sole supply field regulator in Leopold located at Grand Scenic Drive is supplied by Buckley Grove field regulator via the Portarlington HP2 network operating at 1,000kPa.


**Figure 1: Bellarine gas distribution network overview**

# 2. Network Performance

As a result of continued strong growth in the Geelong Bellarine areas, the towns of St. Leonards and Point Lonsdale at the fringe of the network are experiencing increasing number of low supply pressure events. Due to the strong increase in demand, the outlet pressure at the current sole supply regulator at Grand Scenic Drive have been dropping below its normal operating pressure from 450kPa to approximately 370kPa caused by its diminished inlet pressure supplied by the Portarlington HP2 network. The decline in inlet pressure at Grand Scenic Drive regulator is driven by the limited capacity in existing DN80 inlet pipeline fed from AusNet Services DN250 Licence 57 operating at 2,000kPa supplying at Buckley Grove field regulator impacting its performance and reducing the outlet pressure to approximately below 700kPa from 1,000kPa operating pressure supplying the Portarlington HP2 network.


**Figure 2: Buckley Grove Field regulator overview**

The chart below details the recent lowest occurrence of regulator outlet and inlet pressures events experienced at Buckley Grove field regulator.

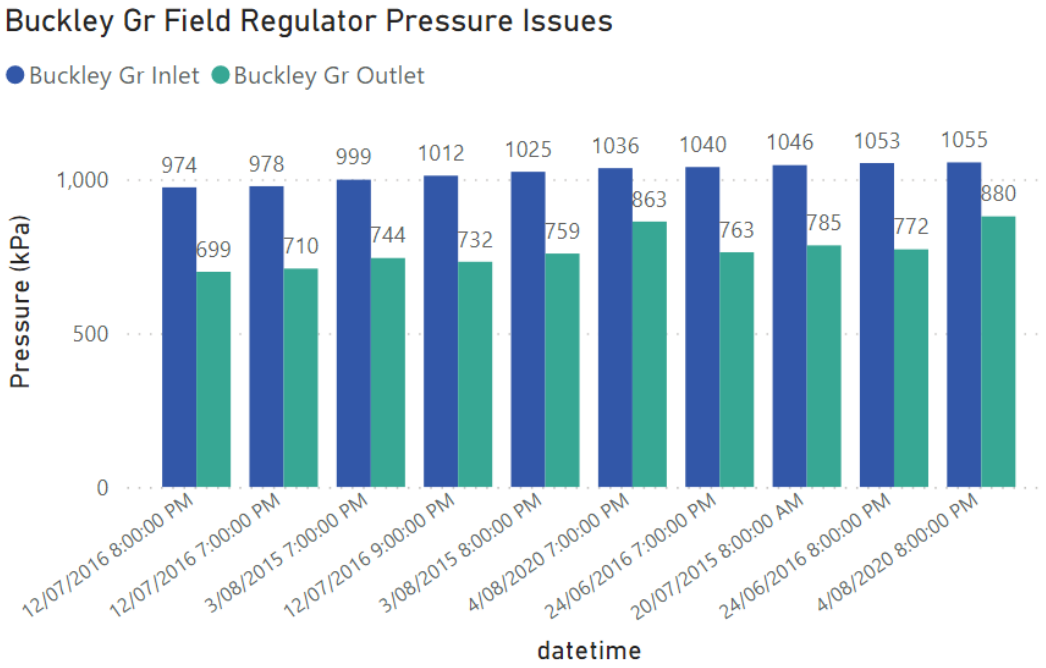



**Figure 3: Buckley Grove field regulator low pressure events**

These low pressure events have cascading effects of impacting the inlet pressure at Grand Scenic Drive regulator and reducing its outlet pressure required to supply the Bellarine's various townships. The below chart shows the corresponding low inlet and outlet pressure events at Grand Scenic Drive field regulator.

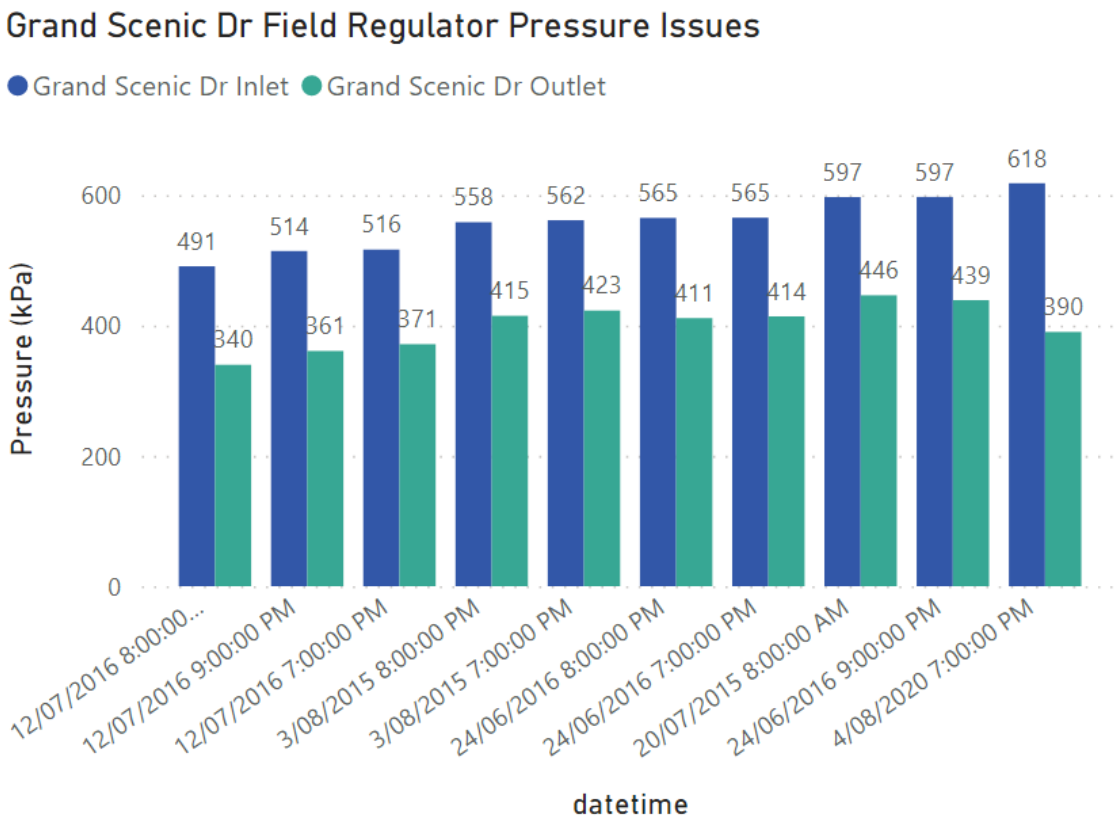



**Figure 4: Portarlington HP2 Network Performance Issues**

The increasing low inlet and outlet pressures at Grand Scenic Dr field regulator events have been resulting in the increasing supply delivery pressures issues in the Geelong Bellarine fringe network. The chart below details the instances of low network pressure experienced in the Geelong Bellarine fringe network in recent years as of August 2020.

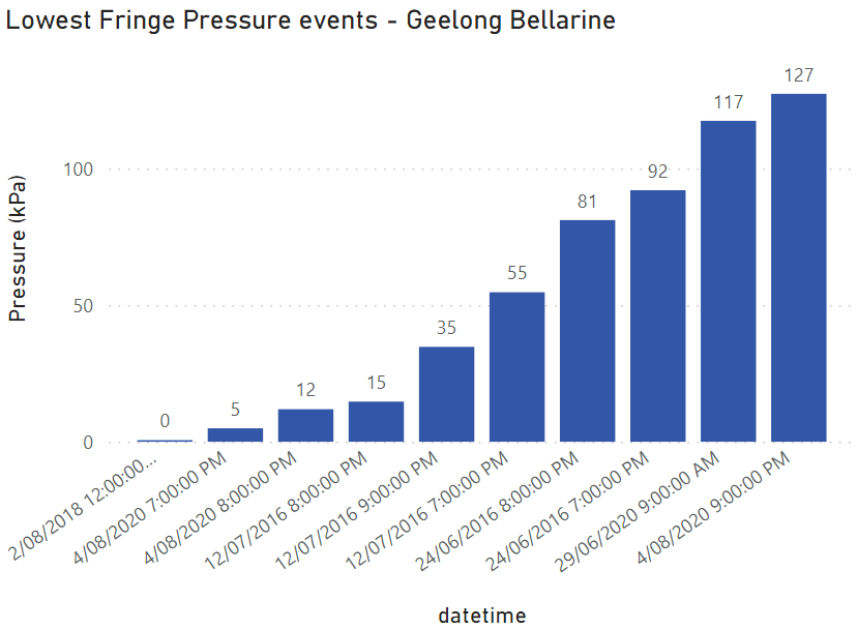



**Figure 5: Southern Bellarine - lowest pressure instances**

The increasing number of low network pressure instances shown above have been resulting in increasing number of customer supply affected since 2015 showing the current reliability issues of the Bellarine areas.

The major contributing factors to the capacity constraints in the Bellarine networks include:

- Restrictions in flow from existing 80mm off-take supplying Buckley Gr field regulator.
- Single lateral supply mains supplying both northern and southern side of the Bellarine Peninsula towns quickly losing capacity.
- Growth in the Bellarine strong growth areas taking away capacity from Bellarine fringes.

# 3. Network Modelling

Network model for the Bellarine High Pressure network is matched with latest analysis of the network using SCADA monitoring, fringe pressures in 2020.

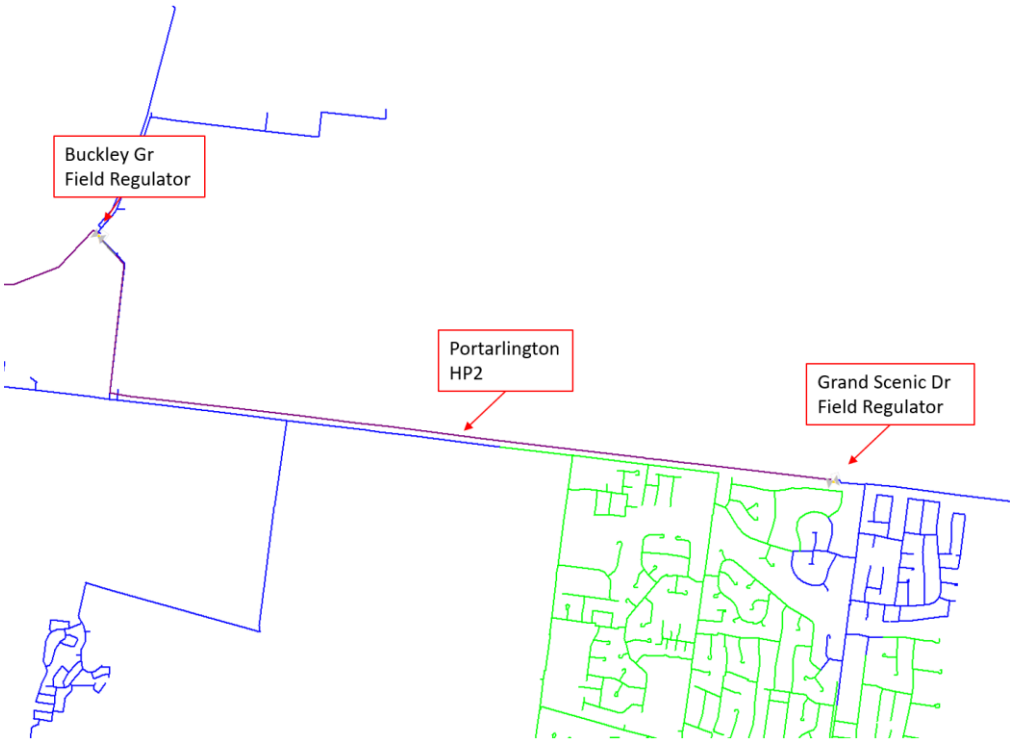



**Figure 6: Portarlington HP2 model - winter 2020**

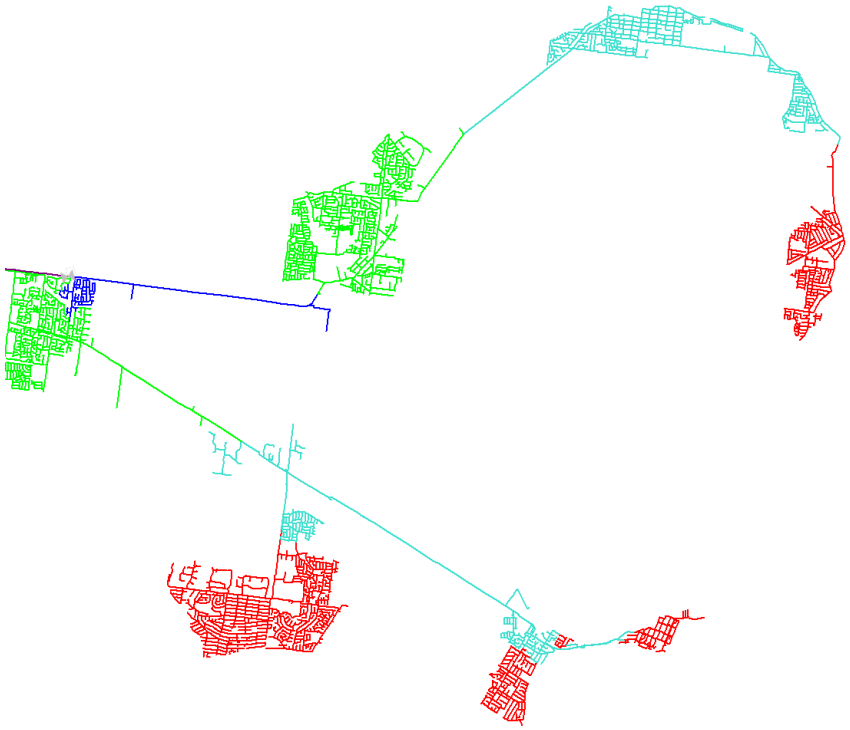


**Figure 7: Bellarine High Pressure network model - winter 2020**

Growth Forecasts rates provided Finance Data Analytics team in AusNet Services' Finance department for the Bellarine are as shown in table below

**Table 1: Bellarine Growth Rate Forecast**

| Postcode | 2022/23 | 2023/24 | 2024/25 | 2025/26 | 2026/27 | 2027/28 |
|---|---|---|---|---|---|---|
| 3226 | 0.93% | 0.92% | 0.91% | 0.91% | 0.91% | 0.91% |
| 3225 | 0.59% | 0.58% | 0.73% | 0.61% | 0.61% | 0.61% |
| 3223 | 1.01% | 1.00% | 1.00% | 0.97% | 0.97% | 0.97% |

Modelling the growth forecast rates above, the forecast minimum network pressures and estimated number of customer impact for the regulatory period can be obtained and detailed below:

**Table 2: Portalrington HP2 forecasted minimum pressure and customer impact**

| PORTARLINGTON HP2 | 2021/22 | 2022/23 |
|---|---|---|
| Minimum inlet pressure (kPa) | 990 | Reinforcement required |
| Minimum outlet pressure (kPa) | 730 | Reinforcement required |
| Customer impact (no.) | 4,400 | - |

# 4. Recommendations

## 4.1. Options considered

Several options were considered to increase the Bellarine network capacity, which include

**Table 3: Options Description Summary**

| OPTION | DESCRIPTION SUMMARY |
|---|---|
| 1 | No Capital Expenditure |
| 2 | Buckley Grove and Grubb Road network reinforcements |
| 3 | Portarlington Road looping and Grubb Road network reinforcements |

## 4.2. Option 1 – Do Nothing / No Capital expenditure

All non-capital expenditure options have been utilised to alleviate pressure issues in the Bellarine network including:

- Increase of all connected supply regulators outlet pressures to maximum allowable pressure of 500kPa during peak demand periods.
- Raising regulators outlet pressure during off-peak period to improve line pack capacity during peak.

These measures have all been unsuccessful to adequately maintain minimum pressures in the Bellarine network and increasingly poor network pressures have been occurring.

### 4.2.1. Cost Estimations

**Raise Grand Scenic Drive Field Regulator outlet pressure to 500kPa**

- The cost of the non-capital expenditure option is to accept safety risk from regulator failures due to the acceleration of deterioration of the regulator components.

**Total capital expenditure = $0**

### 4.2.2. Capacity

Capacity limitations still existing with this option and capital expenditure cannot be deferred.

# 4.3. Option 2 – Buckley Grove and Grubb Road reinforcement

Due to the current flow restrictions caused by the existing 80mm off-takes supplying Buckley Grove field regulator, the Portarlington HP2 network capacity can be increased considerably by increasing the pipeline size of this existing off-take and upgrading existing inlet pipework to Buckley Grove field regulator.

Therefore, by constructing a new 200mm steel off-take from AusNet Services DN250 transmission pipeline and constructing a new field regulator with increased pipework size will remove existing flow constraints and significantly improve inlet pressure required at Grand Scenic Drive field regulator.

Network Reinforcement work comprises of:

**Stage 1:**

- Construct approximately [C.I.C] of 200mm steel pipeline to supply new field regulator at Buckley Grove.
- Construct new field regulator at Buckley Grove from new 200mm offtake and

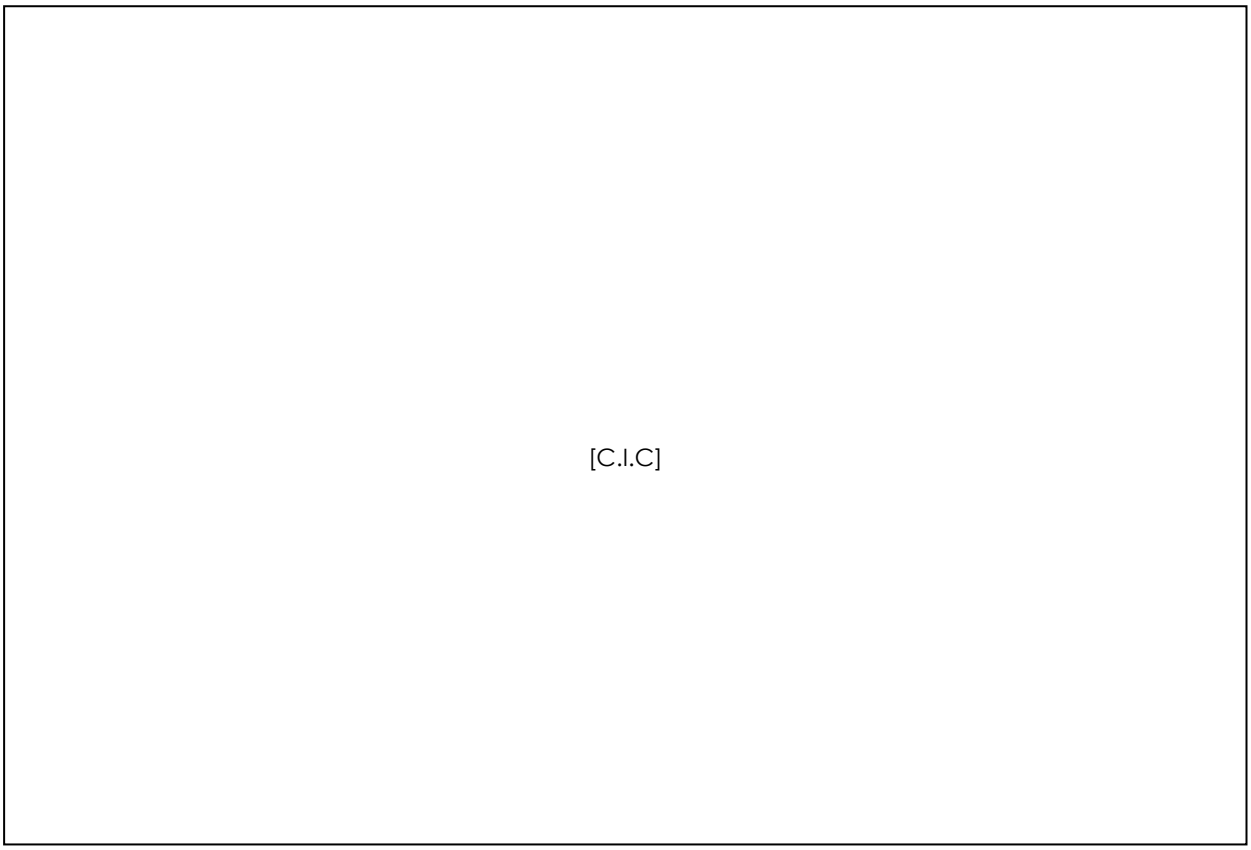



**Figure 8: Buckley Gr Reinforcement - Option 2 Stage 1**

**Stage 2:**

Construct approximately [C.I.C] of 180mm polyethylene along Grubb Road from 150mm Steel at High St and Portarlington Rd intersection and Tie-in to the existing 110mm polyethylene main at Swan Bay Road and Grubb Road intersection.

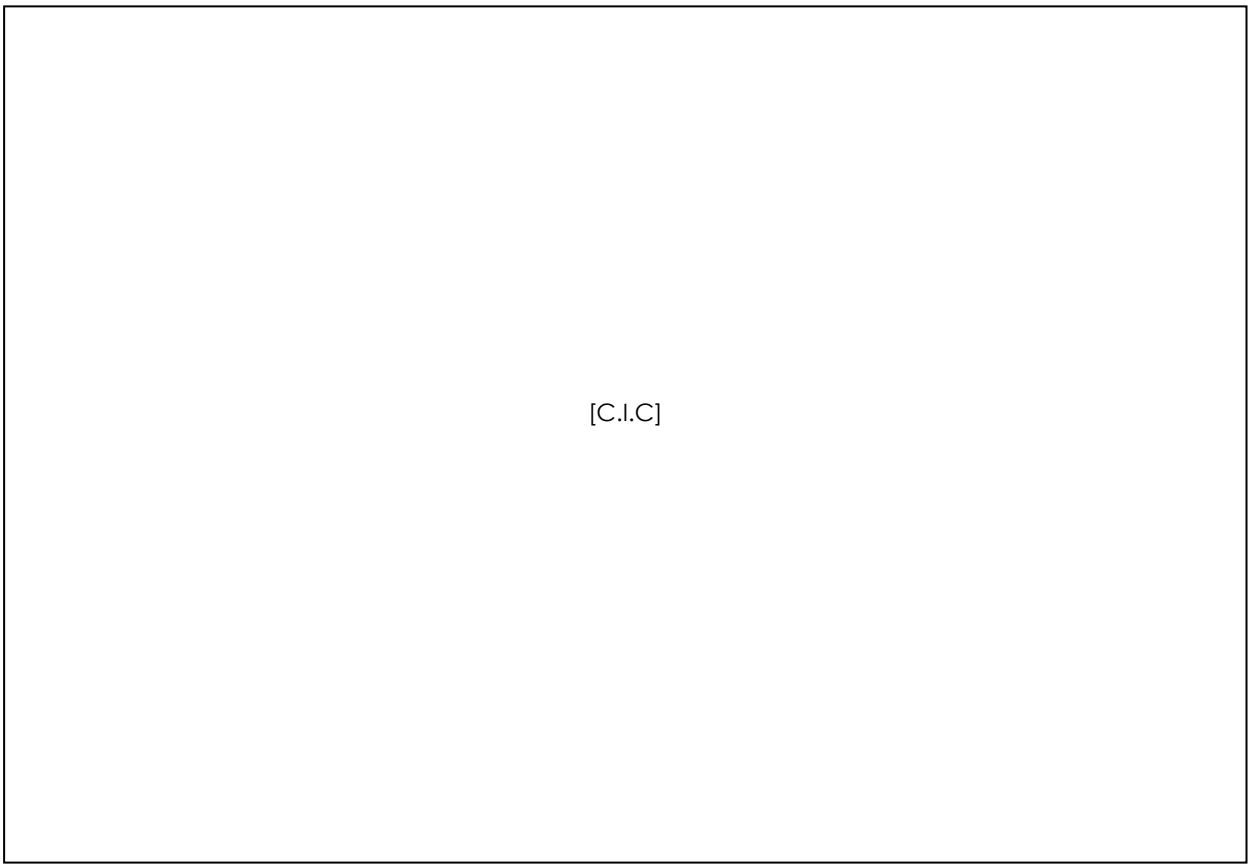



**Figure 9: Geelong Bellarine Reinforcement - Option 2 Stage 2**

### 4.3.1. Cost Estimations

[C.I.C]

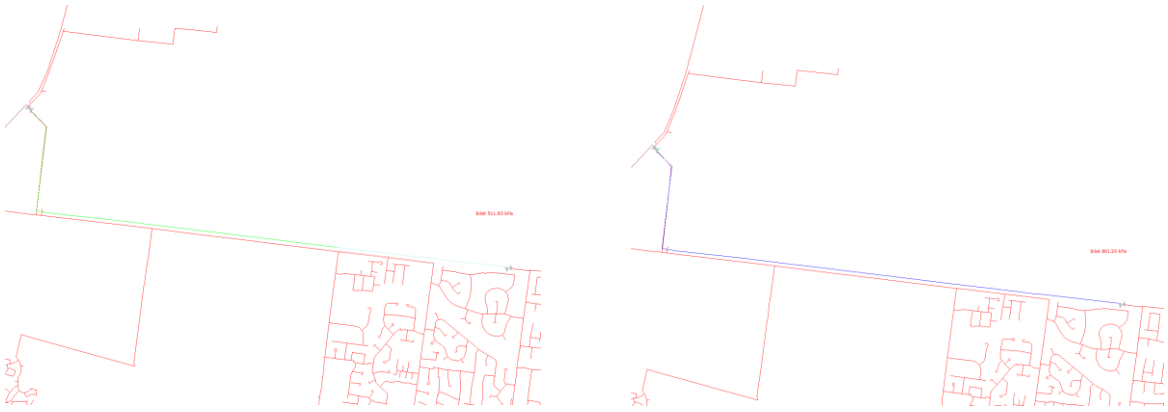
### 4.3.2. Capacity

**Table 4: Option 2 - Portarlington HP2 Identified Network Reinforcement Stage 1**

| 2022/23 Forecast Minimum Pressure | Affected Customers | REINFORCEMENT SUMMARY | Post Reinforcement Minimum Pressure |
|---|---|---|---|
| 510kPa | 1,500 | New TP off-take and Field Regulator at Buckley Grove | 804kPa |

**Table 5: Field Regulator Inlet Forecast Minimum Network Pressures**

| 2022/23 | 2022/23 | 2023/24 | 2024/25 | 2025/26 | 2026/27 |
|---|---|---|---|---|---|
| 510kPa | 801kPa | 798kPa | 795kPa | 792kPa | 786kPa |



**2022/23 Before Augmentation** **2022/23 After Augmentation**

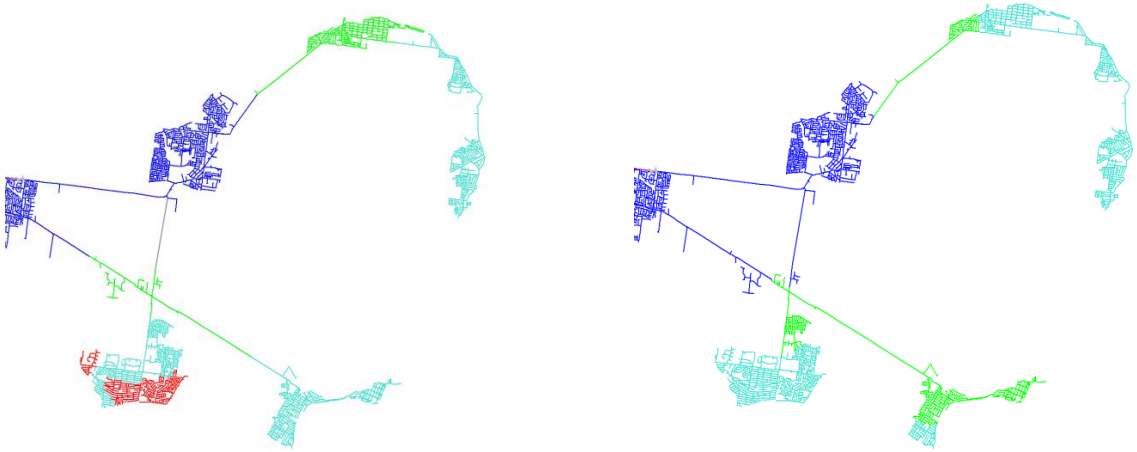
**Figure 10: Portarlington Stage 1 before and after augmentation**

**Table 6: Option 2 - Portarlington HP2 Identified Network Reinforcement Stage 2**

| 2022/23 Forecast Minimum Pressure | Affected Customers | REINFORCEMENT SUMMARY | Post Reinforcement Minimum Pressure |
|---|---|---|---|
| 90kPa | 2,500 | [C.I.C]of 180P10 | 240kPa |

**Table 7: Bellarine Fringe Forecast Minimum Network Pressures**

| 2023/24 | 2024/25 | 2025/26 | 2026/27 | 2027/28 |
|---|---|---|---|---|
| 140kPa | 136kPa | 125kPa | 240kPa | 232kPa |



**FY2026/27 Before Augmentation** **FY2026/27 After Augmentation**

**Figure 11: Portarlington Stage 2 before and after augmentation**

# 4.4. Option 3 – Portarlington Road looping and Grubb Road reinforcements

Due to the current capacity constraints caused by the lateral supply mains for both Northern and Southern parts of the Bellarine network, the Portarlington Road looping and Grubb Road network reinforcements would enable the Bellarine networks to maintain fringe pressures by providing additional capacity by augmenting the network and ensure security of supply by linking back-feed supply to existing lateral supply mains.

As the Southern corridor of the Bellarine network have seen worse performance in recent years compared to the Northern corridor due to higher population and higher rate of growth, and higher consequence with third-party due to longer stretch of lateral network crossing more towns. The Grubb Road looping would be required prior to the Portarlington Road looping reinforcement.

Network Reinforcement work comprises of:

Stage 1:

- Construct approximately [C.I.C] of 180mm polyethylene along Grubb Road from 150mm Steel at High St and Portarlington Rd intersection and Tie-in to the existing 110mm polyethylene main at Swan Bay Road and Grubb Road intersection.

Stage 2:

- Construct approximately [C.I.C] of 180mm polyethylene along Portarlington Road from 180mm polyethylene at Collins St and Portarlington Rd intersection and Tie-in to the existing 160mm polyethylene main at Tower Road and Portarlington Rd intersection.

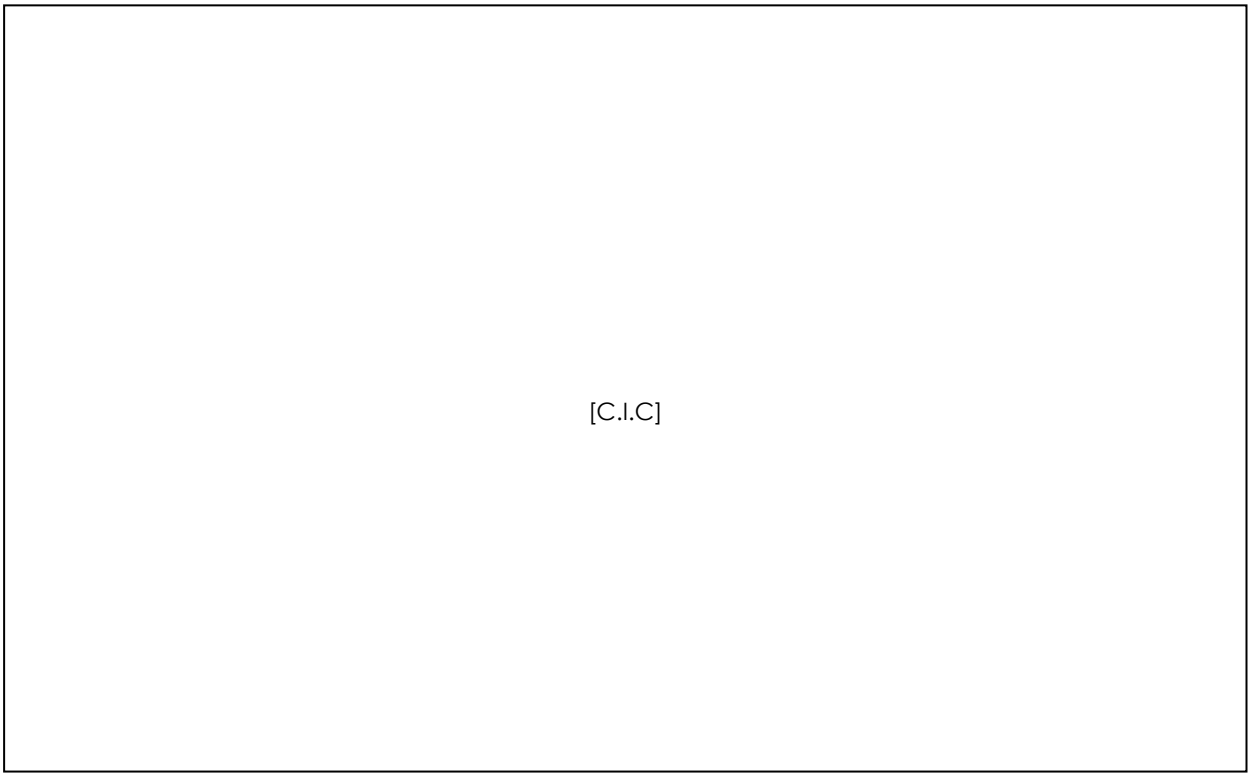



**Figure 12: Geelong Bellarine Reinforcement - Option 2**

### 4.4.1. Cost and benefit analysis

[C.I.C]

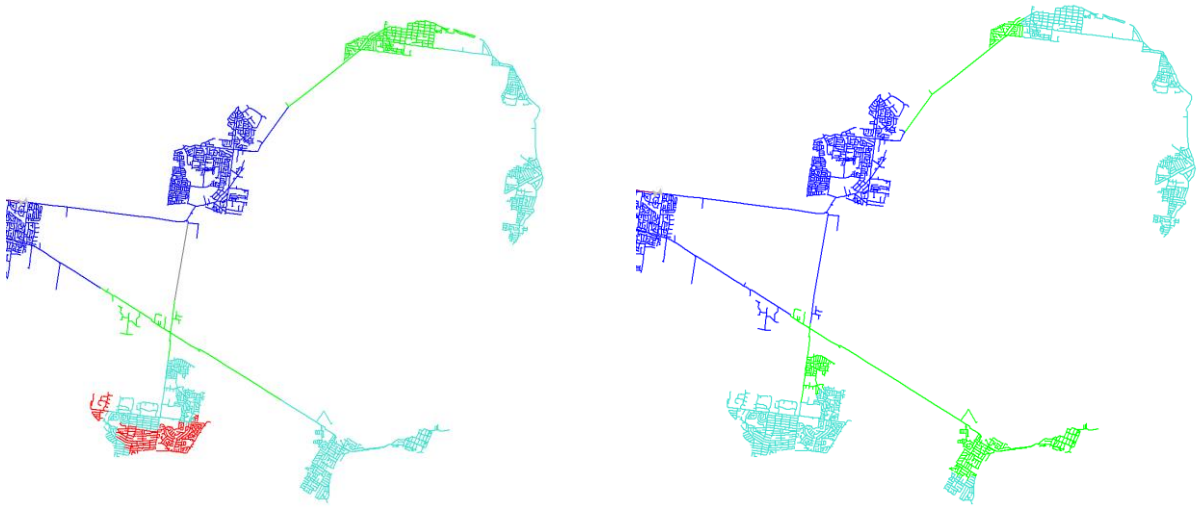
### 4.4.2. Capacity

**Table 8: Option 3 - Bellarine Identified Network Reinforcement Stage 1**

| 2025 Forecast Minimum Pressure | Affected Customers | REINFORCEMENT SUMMARY | Post Reinforcement Minimum Pressure |
|---|---|---|---|
| 125kPa | 500 | [C.I.C] of 180mm P10 | 213kPa |

**Table 9: Bellarine Forecast Minimum Network Pressures**

| 2022/23 | 2022/23 | 2023/24 | 2024/25 | 2025/26 | 2026/27 |
|---|---|---|---|---|---|
| 125kPa | 240kPa | 232kPa | 210kPa | 190kPa | 176kPa |



**2024 Before Facility Installation** **2024 After Facility Installation**

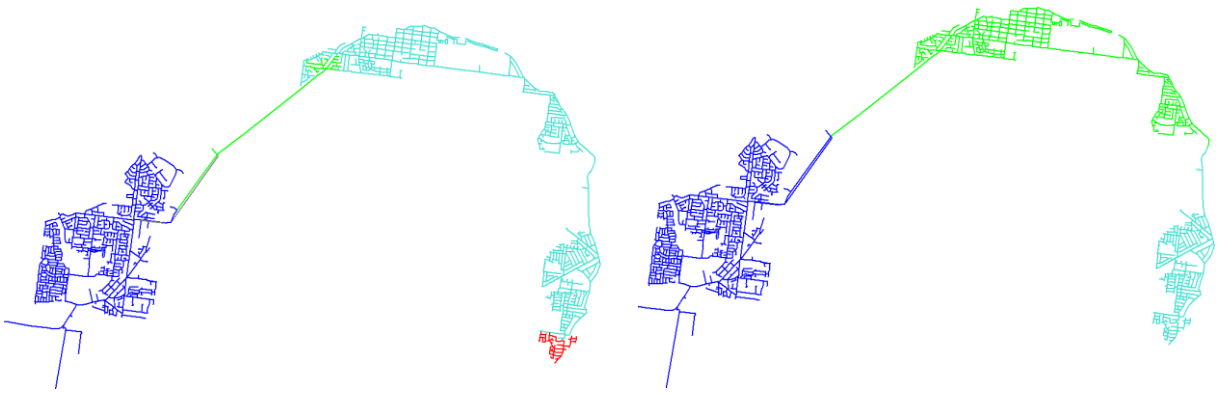
**Figure 13: Bellarine Stage 1 before and after augmentation**

**Table 10: Option 3 - Bellarine Identified Network Reinforcement Stage 2**

| 2025 Forecast Minimum Pressure | Affected Customers | REINFORCEMENT SUMMARY | Post Reinforcement Minimum Pressure |
|---|---|---|---|
| 130kPa | 400 | [C.I.C] of 125mm P10 | 176kPa |

**Table 11: Bellarine Forecast Minimum Network Pressures**

| 2022/23 | 2023/24 | 2024/25 | 2025/26 | 2026/27 | 2027/28 |
|---|---|---|---|---|---|
| 140kPa | 136kPa | 125kPa | 240kPa | 232kPa | 210kPa |



**2026 Before Facility Installation** **2026 After Facility Installation**

**Figure 14: Bellarine Stage 2 before and after augmentation**

# 4.5. Benefit Assessment

The preferred solution is Option 2 which involves the facilities upgrade at Buckley Gr Field Regulator and construction of a [C.I.C]180PE distribution pipeline along Grub Rd required to be in service by FY2022/23 and FY2026/27. This augmentation is considered the most cost-effective solution to increase capacity required for the Bellarine gas network.

**Table 12: Options Assessment Summary**

| OPTION | BENEFITS | COSTS ($2020) |
|---|---|---|
| **Option 1** | Nil. | Continue accepting Bellarine capacity shortfall and further network pressure deterioration and compromised safety and reliability of existing network. |
| **Option 2** | Preferred solution – the most cost-effective option to address current capacity shortfall and long-term capacity solution in the growing Bellarine network | [C.I.C] |
| **Option 3** | Addressing current capacity shortfall. While this proposed option addresses current capacity shortfall, it is less cost effective compared to option 2 and capacity limitation still existing in existing 80mm offtake to Buckley Grove. Therefore, this option 3 is not a recommended solution. | [C.I.C] |

# 5. Capital expenditure summary

**Table 13: Capital Expenditure Summary**

| | 2022-23 | 2023-24 | 2024-25 | 2025-26 | 2026-27 | 2023-28 TOTAL |
|---|---|---|---|---|---|---|
| **CAPEX** | | | [C.I.C] | | | |
| **TOTAL** | | | | | | |

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