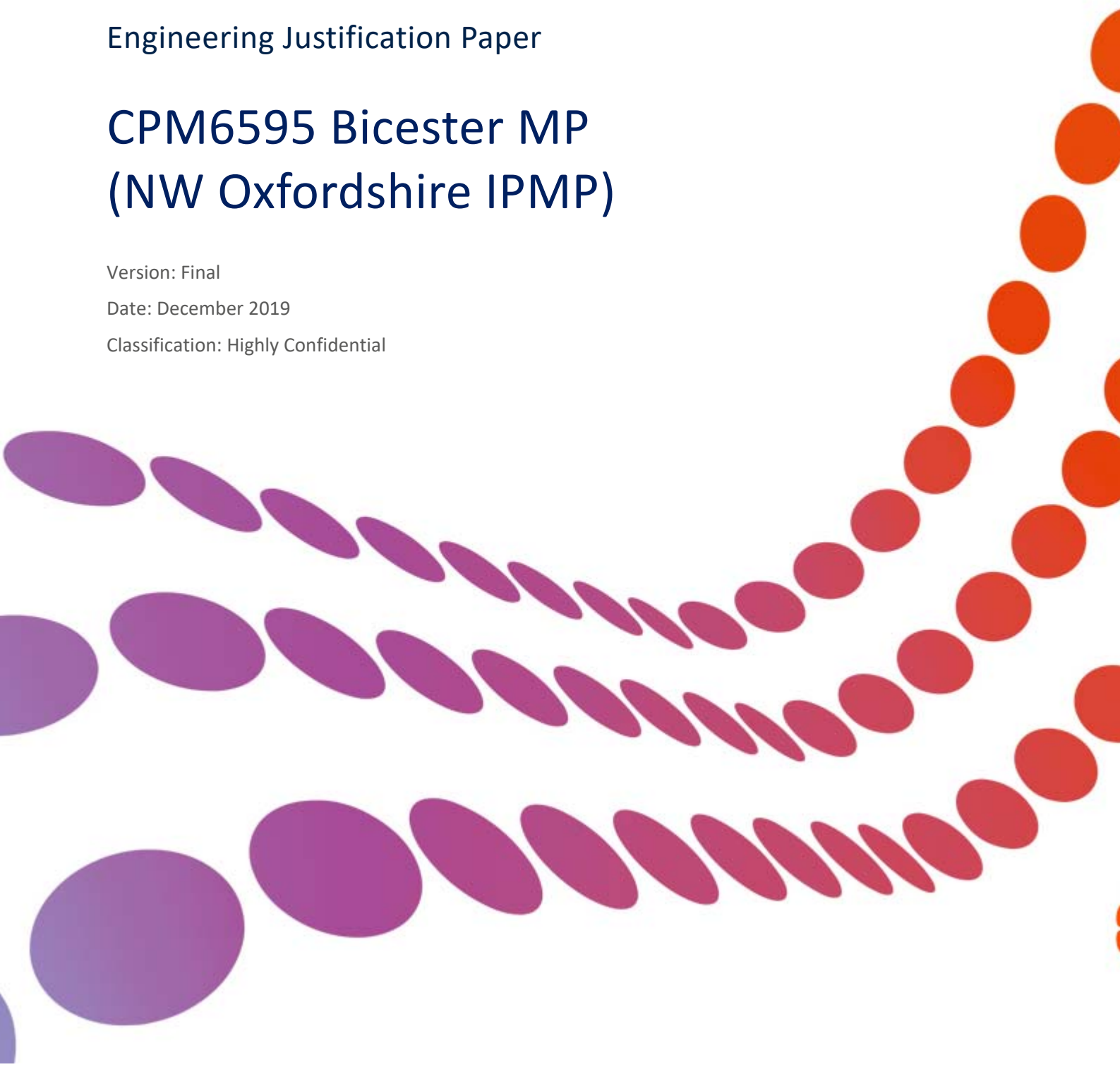
Engineering Justification Paper

CPM6595 Bicester MP (NW Oxfordshire IPMP)

Version: Final

Date: December 2019

Classification: Highly Confidential



1 Table of Contents

1 Table of Contents **2**

2 Introduction **3**

2.1 General Background 3
2.2 Site Specific Background 3

3 Equipment Summary **4**

4 Problem Statement **5**

4.1 Narrative Real-Life Example of Problem 5
4.2 Spend Boundaries 7

5 Probability of Failure **7**

5.1 Probability of Failure Data Assurance 7

6 Consequence of Failure **9**

7 Options Considered **10**

7.1 Options Summary 10
7.2 Option 1 Summary – West Bicester 10
7.3 Option 2 Summary – North Bicester 11
7.4 Option 3 Summary - Interruption 12
7.5 Options Technical Summary Table 12
7.6 Options Cost Summary Table 13

8 Business Case Outline and Discussion **13**

8.1 Key Business Case Drivers Description 13
8.2 Business Case Summary 14

9 Preferred Option Scope and Project Plan **14**

9.1 Preferred option 14
9.2 Asset Health Spend Profile 14
9.3 Investment Risk Discussion 14

Appendix A - Categorisation of Potential Load Growth **16**

Appendix B - Development Trajectory Summary **17**

Appendix C - List of Acronyms **18**

2 Introduction

Reinforcement has been identified within the Bicester MP system, specifically relating to an anticipated system capacity failure at the west of Bicester. This project is part of a wider programme of reinforcement associated with the RIIO-GD2 Business Plan Appendix covering Capacity Mangement.

2.1 General Background

The SGN distribution system is built to ensure security of supply for all our customers. Our networks operating at pressures below 7bar are designed to meet a peak six-minute demand level that could be experienced under 1 in 20 conditions, supporting a safe, secure and reliable service to those customers and meeting requirements outlined within our Licence Condition, including, but not limited to, Condition 16 contained therein.

Link: **Gas Transporters Licence – Standard Conditions**

Where capacity constraints are identified that are likely to impact on SGNs ability to ensure security of supply to all customers, Network Planning will look to establish optimum, cost-efficient reinforcement strategies to mitigate that risk. Such constraints may arise as a result of a number of factors, but the most common is increased demand levels, often resulting from new connections.

SGN has initiated an extensive programme of stakeholder engagement, working closely with Local Authorities, both in Scotland and the south of England, to establish a fully informed and independently sourced picture of planned development.

This engagement has provided SGN with confidence that the sites identified will progress to development and, to support this level of growth, SGN has developed a programme of reinforcement across its network.

2.2 Site Specific Background

Development within the Bicester MP Grid is primarily covered by the Cherwell District Council Local Plan. The Local Plan sets out planning policies to guide development, such as housing and employment for the next 10-20 years. A collated list of documents is used to produce the Local Plan, these include Annual Monitoring Reports and Housing Land Audits. SGN have used the local plan and its associated documents to identify developments on each specific grid.

In 2014 Bicester went from being a quiet town to being recognised as the UK's first garden town. The new status means that a wealth of innovation and development is expected, with potentially £100m government funds being spent on the development of the town and increasing the amount of homes by 2031 to more than 10,000. Employment is also set to be developed, creating 18,500 new jobs.

The location of Bicester is one of the reasons that it has been selected. It lies close to the M40 motorway, which links London and Birmingham and is also home to Bicester Village, a luxury shopping outlet with 7 million visitors per year. The train station right outside Bicester Village will also look to link London, Oxford, Milton Keynes and Cambridge.

The wealth of development is expected to have a huge impact on the gas infrastructure and trigger a reinforcement. The driver(s) for this reinforcement project are the following Local Plan sites:

- South East Bicester, 1,475 homes, planning application currently being considered for full site.
- Graven Hill, 2,100 dwellings, outline planning consent for 1,900 dwellings. Unique development will be home to the UK's largest self-build scheme. Full planning consent will be delivered on an individual basis, with the turnaround of 28 days, provided that the house complies to certain guidelines. 10 properties recently showcased on the television programme Grand Designs in April 2019.

- North West Bicester Phase 2, 2,405 dwellings, Construction had begun on phase 1 (393 dwellings) planning application currently being considered for phase 2.
- South West Bicester Phase 2, 709 dwellings, full planning consent
- South West Bicester Phase 1, 1,742 dwellings, construction started. As of January 2019, 1,274 dwellings connected to the gas network

Cherwell District Council has stated in their previous Local Plan that part of their strategy is to focus housing growth on Bicester, that cannot be any clearer given the vast amount of developments currently planned and under construction. The latest council information on future housing; *The Housing Land Supply Update 2018*, provided up to date information on phasing and the planning status of all developments.

Due to the size of all sites, they each have an impact on the system, however North West Bicester and South West Bicester sites have the most significant impact to the system and it is expected that they will highly likely trigger the requirement to reinforce.

3 Equipment Summary

Bicester MP is supplied from the north by Marsh Gibbon TRS and from the south by COD Bicester TRS. Due to the short-term growth within Bicester there is a RIIO-GD1 project to elevate the current Maximum Operating Pressure (MOP) from 1.5bar to 2bar.

The Bicester MP network is made up of PE and ST mains, 86% to 14% respectively of the total network.

Security

4 Problem Statement

Why are we doing this work and what happens if we do nothing?
New connections to our networks reduce available capacity and when pressures are predicted to fall below minimum acceptable levels it is necessary to reinforce and increase pressures to facilitate increased capacity in the system.

In the case of Bicester MP system, significant on-going committed development at existing GT sites, combined with potential development identified within the Local Plan and associated documents, will see the network approach capacity in the early part of RIIO-GD2.

Failure to reinforce the network will restrict the delivery of these developments.

What is the outcome that we want to achieve?
Maintain SGN's Licence Conditions to ensure security of supply and support economic prosperity by not becoming a blocker to development.

How will we understand if the spend has been successful?
On completion of the proposed reinforcement, SGN will monitor system performance to ensure expected system pressures are maintained. This will take the form of regular system performance checks and localised pressures surveys to ensure a successful outcome has been achieved.

At a customer level, SGN will have delivered a reinforcement that ensures a safe and secure network, meets stakeholder aspirations and ensures developments progress timeously.

4.1 Narrative Real-Life Example of Problem

The area surrounding the town of Bicester has been identified for major development, with a significant impact on capacity available within the Bicester MP system. The existing network will require significant reinforcement to support these sites.

A recent example of good planning to meet customer expectation, whilst also ensuring security of supply, occurred following the acceptance of a quotation to supply a new development at Milton Heights, Milton, Abingdon, Oxfordshire (P18143337).

Network analysis confirmed a requirement to reinforce SGN's system in advance of connecting the fully developed site load. However, network analysis also confirmed an interim load/connection of 72 new properties in advance of reinforcement, thereby meeting the GT/Developer's schedule of works.

Reinforcement to supply the full development was subsequently planned and completed in advance of connections beyond the interim load, ensuring security of supply to approximately 500 new/existing customers.

The developments driving this reinforcement projected are listed in Table 1 below:

Table 1 - Development Summary

Development Name	Site Usage	Site Status	Confidence
South East Bicester	1,475 Houses	Awaiting decision on Planning application	Probable (>75% confidence)
Graven Hill	2,100 Houses	Outline planning consent	Highly probable (>90% confidence)
North West Bicester Phase 2	2,405 Houses	Awaiting decision on Planning application. Phase 1 has started construction	Probable (>75% confidence)
South West Bicester Phase 2	709 Houses	Full planning consent	Highly probable (>90% confidence)
South West Bicester Phase 1	1,742 Houses	Full planning consent, construction started	Highly probable (>90% confidence)

Please see Appendix A of this document which gives further details of the criteria applied when determining the attributable 'confidence' level of the above sites progressing to development.

Through this determination SGN have deemed the requirement for this reinforcement within RIIO-GD2 as 'High' and have therefore included the funding request in both our Base Growth and High Growth scenarios.

4.2 Spend Boundaries

The spend associated with these reinforcement works (CPM6595) provides capacity within the Bicester MP system to support projected development during RIIO-GD2, while taking cognisance of long-term development beyond 2025/26.

The monies associated with these works ensure security of supply for existing customers and connection of planned development to the network.

Costs contained within this paper have been prepared using average contracted rates at depot level and validated against known costs for similar, completed projects.

Not included within this spend are the costs for subsequent phases of reinforcement required to support demand out-with the RIIO-GD2 period and/or any costs associated with reinforcement of the upstream transmission system.

5 Probability of Failure

As development identified progresses, the Bicester MP Network is predicted to fail at 65-70% peak demand by winter 2025/26, putting at risk supplies to 10,863 existing customers.

5.1 Probability of Failure Data Assurance

Model Validation

To ensure the accuracy of the Network Analysis models, validation is carried out in line with the published requirement under Section 17 of SGN's Safety Case and is a fundament of SGN's Licence to Operate.

Validation ensures that the current models are an accurate representation of the actual gas transportation system and can be used to predict network behaviour under a variety of conditions, including the 1 in 20 design condition.

In addition to the validation programme, a robust model maintenance process and annual system performance checks ensure that models continue to be accurate and fit for purpose. The latest system performance review confirmed the model accuracy against actual pressures recorded on 31/01/2019.

Figure 3 - Anglo Estate DG Logger 31/01/2019. Located close to the MP tail north-west of Bicester.

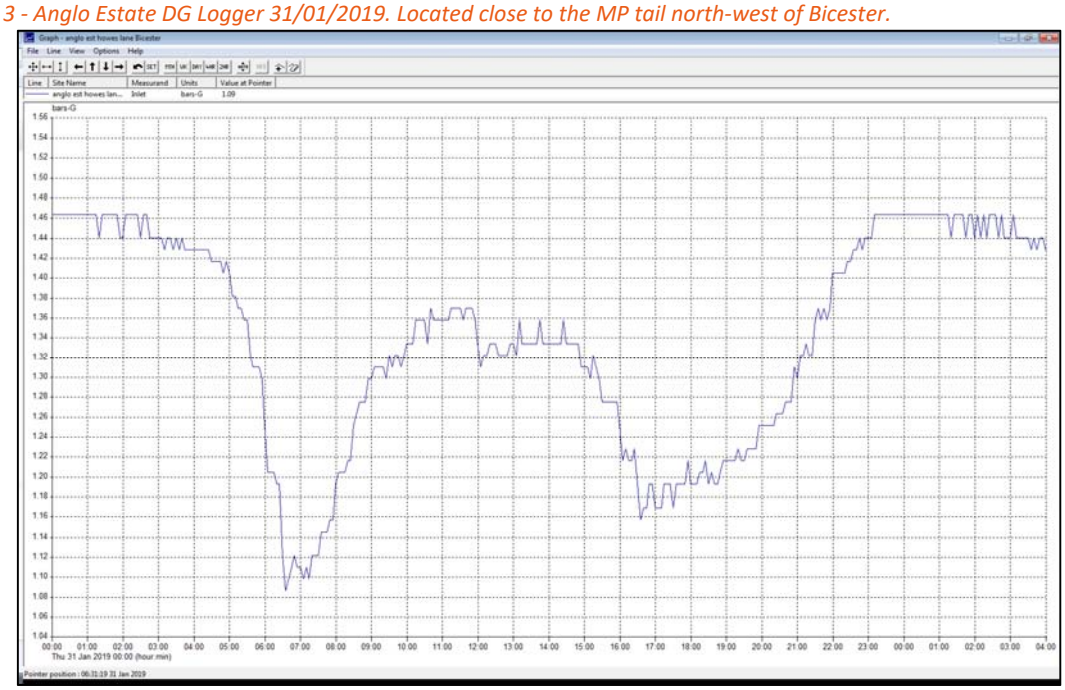


Table 2 - System Performance Review – 31st January 2019 (78% peak demand)

System	Site	System Pressure 78%		System Pressure (1 in 20)	
		Recorded Actual	Modelled Predicted	Min Acceptable	Modelled Predicted
Bicester MP	Anglo Estate DG	1.09bar	1.16bar	0.35bar	1.05bar

Security

Network Growth

The Local Plans and associated documents have been reviewed and an assessment made as to the probability of sites contained therein progressing to construction (see Table 1).

The resulting outputs have been applied to the network model, providing confidence that pre-emptive repair of the network (i.e. reinforcement) will be required during RIIO-GD2 to ensure SGN meets its Licence Conditions, maintaining minimum supply pressures under all demand conditions.

6 Consequence of Failure

Loss of Supply to Customers

Failure to reinforce will put at risk the supply to customers supplied via the Bicester MP system. Ultimately this will result in the loss of supply to approximately 10,863 existing customers. Due to failing to meet SGN's Licence Conditions, it will attract adverse publicity and damage the company's reputation.

Affected customers will include multiple schools and Avonbury Business Park.

Financially, after the first 24 hours, affected householders will be compensated for time without gas. Domestic customers will receive £41 for each 24-hour period without gas, small businesses will receive £69 for each 24-hour period without gas.

Table 3 – Projected RIIO-GD2 (2025/26) Pressures without Reinforcement

Location	Min Required Pressure (bar)	Min. Modelled Pressure (bar)
Bicester	0.35	-3.75

Security

Safety Impact of Failure

Reinforcement of Bicester MP system is required to meet the obligations of our Licence Condition.

In this instance, a failure to reinforce will result in a system failure during peak winter conditions. The resulting loss of supply may have serious health and safety implications for vulnerable customers who rely on gas for essential heating and cooking facilities.

Environmental Impact

A system failure on this scale will result in a major recovery exercise. Environmental impacts will include increased travel to site by SGN operatives, leading to an increase in greenhouse gas emissions and disruption to the public.

On site, the use of fossil fuels to power plant and equipment required in the restoration of supplies will further increase greenhouse gas emissions, as will subsequent travel/plant in use for the reinstatement of public highways following the conclusion of these works.

7 Options Considered

7.1 Options Summary

In accordance with the guidelines set out in the Ofgem guidance document 'Engineering Justification Paper Frameworks for RIIO-GD2 and RIIO-GT2' – Appendix B (Section 7), the following options have been considered:

Replace on Failure

Wait until the network fails then replace the system. This option has been discounted due to non-compliance with SGN's Licence Condition.

Repair on Failure

Mains reinforcement after the network has failed. This option has been discounted due to non-compliance with SGN's Licence Condition.

Pre-Emptively Replace

Replace the system prior to network failure. This option has been discounted as it is impracticable to replace Bicester MP system.

Pre-Emptively Repair

Mains reinforcement and/or Interruption based on model data prior to network failure. Three options have been considered for further investigation**:**

- Option 1 – West Bicester
- Option 2 – North Bicester
- Option 3 – Interruption

Do Nothing

The combination of committed development and identified potential growth dictates the requirement to provide additional capacity on this system. Therefore, this is not considered an option.

7.2 Option 1 Summary – West Bicester

The technical detail of option

This option involves the construction of approximately 1.66km x 315mmPE MP.

The basis for cost estimate/unit cost

Costs for this option, amounting to £0.775M, have been prepared using average contracted rates at depot level and validated against known costs for similar, completed projects.

The perceived benefits of the option

The proposed works provide capacity for committed/planned development identified for construction during RIIO-GD2.

Delivery Timescales

The reinforcement is scheduled for 2021/22 and it is expected to be completed in the same financial year.

Key Assumptions Made

It is assumed that known potential demand growth both within RIIO-GD2 period and beyond will require the same level of gas supply as that currently experienced.

Any other items that differentiate the option from the others considered

It may also be possible to phase the reinforcement in line with development and spread the costs over a number of years instead of just one, which is the current plan.

Security

7.3 Option 2 Summary – North Bicester

The technical detail of option

This option involves the construction of approximately 2.8km x 355mmPE MP.

The basis for cost estimate/unit cost

Costs for this option, amounting to £1.906M, have been prepared using average contracted rates at depot level and validated against known costs for similar, completed projects.

The perceived benefits of the option

The proposed works provide capacity for committed/planned development identified for construction during RIIO-GD2.

Delivery Timescales

The reinforcement is scheduled for 2021/22 and it is expected to be completed in the same financial year.

Key Assumptions Made

It is assumed that known potential demand growth both within RIIO-GD2 period and beyond will require the same level of gas supply as that currently experienced.

Any other items that differentiate the option from the others considered

Offers additional resilience by linking two tails together to create a 'looped' system.

7.4 Option 3 Summary - Interruption

In addition to the above, consideration was given to Interruption.

As part of Interruption Reform, also known as the Mod 90 process, SGN has the option to offer a tender for interruptible contracts to customers to offset the need to invest for capacity.

Interruptible consumers receive discounted transportation charges for the flexibility they provide to the system for demand side management at times of high demand.

All eligible interruptible sites were reviewed, none are in a location where they could be considered as an alternative to reinforcement.

7.5 Options Technical Summary Table

Table 4 - Options Technical Summary Table

Option	First Year of Spend	Final Year of Spend	Volume of Interventions	Design Life (Years)	Total Cost (£M)
1. West Bicester	2021/22	2021/22	1.66km x 315mmPE MP	10	0.775
2. North Bicester	2021/22	2021/22	2.8km x m355mPE MP	10	1.906
3. Interruption	n/a	n/a	n/a	n/a	n/a

Costs inclusive of Overheads and Efficiencies

7.6 Options Cost Summary Table

Table 5 - Options Cost Summary Table

Option	Volume of Interventions	Cost Breakdown (£M)	Total Cost (£M)
1. West Bicester	1.66km x 315mmPE MP	0.775	0.775
2. North Bicester	2.8km x 355mmPE MP	1.906	1.906

Costs inclusive of Overheads and Efficiencies

8 Business Case Outline and Discussion

Validation, a robust model maintenance process and system performance checks have confirmed the accuracy of the Bicester MP model for use in network analysis.

A full review of the relevant Local Plans and associated documents, followed by close engagement with stakeholders, has provided confidence in the level of development expected during RIIO-GD2.

The development outputs have been applied to the validated network model which predicts a failure at between 65-70% pk demand by winter 2025/26, putting at risk supplies to 10,863 existing customers.

To mitigate this risk and meet licence conditions it will be necessary to pre-emptively reinforce the network during the RIIO-GD2 period.

There have been no external costs incurred in assessing the options considered as these have been prepared by the in-house Network Planning and Design teams.

8.1 Key Business Case Drivers Description

Pre-Emptively Repair: Option 1

The reinforcement's route is to run parallel with the existing 125mmPE MP, west of Bicester. The purpose of the reinforcement is to mitigate pressure loss over the 125mmPE MP main and to provide capacity for development identified for construction by the Cherwell District Council Local Plan and associated documents, during RIIO-GD2.

COD Bicester TRS and Marsh Gibbons TRS are to increase the operating pressure from 1.5bar to 2bar in RIIO-GD1.

Reinforcement can potentially be phased in line with the developments that drive the reinforcement, providing some flexibility in the scheduling and splitting costs over multiple years instead of just one.

Pre-Emptively Repair: Option 2

Two network tails are connected through the reinforcement, which enables two streams of flow, one from the north (Marsh Gibbons TRS) and one from the south (COD Bicester TRS), come together. Linking the two tails creates a more robust system and provides capacity west of Bicester where due to existing/potential developments identified for construction by the Cherwell District Council Local Plan and associated documents, are set to drop below minimum pressures during RIIO-GD2.

Project costs for this solution can be expected to be significant, the length of the reinforcement is >1km compared to option 1. The reinforcement is to connect to the MP system at the Brashfield Road junction, continuing on this street and travelling through Blake Road. Each of these roads are narrow and not ideal for installing a 315mmPE main. The next street is Banbury Road with roundabouts and give way points. In peak times this road could become very busy, especially with new development north-west of Bicester.

Table 6 - Summary of Key Value Drivers

Option No.	Name of Option	Key Value Driver
1	West Bicester	Economically the best option. Medium-term solution.
2	North Bicester	Most Expensive. Medium-term solution.

8.2 Business Case Summary

This project is driven by SGN's Licence Conditions to ensure security of supply.

Table 7 - Business Case Matrix

	West Bicester	North Bicester
CAPEX (£M)	0.775	1.906
Design Life	10 years	10 years
Positive Impact/Pros	Meets license obligations to maintain security of supply. May be possible to phase reinforcement over a number of years, splitting costs.	Meets license obligations to maintain security of supply. Enhanced resilience by creating a second feed to west of Bicester.
Negative Impact /Cons	Likely to cause disruption to public and land owners.	Likely to cause disruption to public and land owners. Most expensive

Costs inclusive of Overheads and Efficiencies

9 Preferred Option Scope and Project Plan

9.1 Preferred option

Pre-Emptively Repair: Option 1 – West Bicester

1.66km x 315mmPE MP

9.2 Asset Health Spend Profile

Table 8 - Summary of Schedule of Spend

Asset Health Spend Profile (£M)						
Pre GD2	2021/22	2022/23	2023/24	2024/25	2025/26	Post GD2
0	0.775	0	0	0	0	0

Costs inclusive of Overheads and Efficiencies

9.3 Investment Risk Discussion

Delay/Cancellations

The project is demand driven by a number of developments. If these developments are delayed or the developer pulls out, then the investment will be a risk, as the reinforcement may be postponed to a later date or no longer be required.

Annual Monitoring Reports and Housing Land Audit's from Cherwell Council that provide the latest trajectory and completions for all current and future sites were reviewed up to this report. This information plus engagement with Cherwell Council provided SGN the confidence that the housing developments would go ahead and trigger the requirement to reinforce.

Costs

SGN have prepared costs using average contracted rates at depot level and have validated them against known costs for similar, completed projects. Nevertheless, whilst all reasonable steps have been taken to ensure accuracy of costs outlined in this paper, it is recognised that external variables may change and subsequently impact on actual costs at time of construction. Examples of such could include unforeseen increases in contractor rates driven by a surplus of market demand for labour or sharp cost increases for materials.

Costs Under/Overspend

Factors such as market driven demand linked to the economy, the UK's potential exit from the European Union, emerging decarbonisation strategies and industry innovation can potentially impact on the scope of works outlined in this paper. SGN has proposed a volume driver funding mechanism to de-risk underspend/overspend for these works. Further details of this proposal can be found in Section 6.2 in the RIIO GD2 Business Plan Appendix for Capacity Management.

Political/Environment Situation (i.e. low/zero carbon)

As stated in the SGN Environmental Action Plan, and in line with current UK Government targets, SGN's long term target is to achieve Net Zero emissions by 2045. This means a decarbonisation of the energy network and supporting the transition to an environmentally sustainable low-carbon energy system. Indeed, SGN recognise that there have been preliminary government targets set facilitating a move toward a renewable or low carbon heat solutions by the end of the RIIO-GD2 period. As such, throughout the RIIO-GD2 period we will continue to closely monitor this emerging heat strategy with a view to refining any potential impact on current growth forecasts.

Appendix A - Categorisation of Potential Load Growth

The following Table sets out the manner in which identified potential load growth has been categorised and applied, leading to customer driven reinforcement, when looking to establish the optimum investment strategy for SGN's networks.

DEFINITION TABLE				
Confidence	**Definition**	**Factors to be considered**	**Base Growth**	**High Growth**
Highly probable (>90% confidence)	Connection expected in RIIO-GD2 for all sites	1. Quotation accepted but not yet on stream 2. Building is in progress. 3. Detailed planning permission granted. 4. Economic conditions indicate that sites for consumers of a particular type are likely to be developed, e.g. a. Domestic sites where there is a high demand for housing and there is a shortage of land available. b. Interest has been shown in having a connection made to a non-domestic site and economic factors suggest development will go ahead.	✓	✓
Probable (>75% confidence	Connection Likely in RIIO-GD2 for majority of sites	1. Outline planning consent has been granted. 2. Recent development has been carried out in the area. 3. The land is a prime site for development, but no connection enquires have yet been received. 4. Adopted Local Plan Site	✓	✓
Good prospects (>50% confidence)	Connection expected for some sites in RIIO-GD2	1. Proposed Local Plan Site 2. No indication of planning permission being granted for the site. 3. The site is outside existing gas supply areas. 4. The site would involve physical problems in delivering a gas supply. 5. The site would require substantial additional infrastructure, e.g. additional roads, schools. 6. Site marked "reserve" in Local Plan. 7. Site is known to be contaminated ground. 8. Site has "protection" orders served over it – e.g. SSSI.		✓
Poor prospects (<50% confidence)	Significant time or investment required to progress	1. Does not meet the above planning criteria. 2. Site has been deemed as 'speculative'. 3. The site would require significant additional infrastructure, e.g. additional roads, schools.		

Appendix B - Development Trajectory Summary

Town	Site	Sum of GD1	Sum of GD2	Sum of GD3	Sum of Total
Bicester	South East Bicester	100	950	425	1475
Bicester	Graven Hill	530	1000	570	2100
Bicester	NW Bicester Ph2	205	1100	1100	2405
Bicester	SW Bicester Ph2	180	529	0	709
Bicester	SW Bicester Ph1	1519	223	0	1742
Grand Total		**1015**	**3579**	**2095**	**6689**

The above trajectory is based on council trajectories of the sites.

Appendix C - List of Acronyms

Acronym	Backronym (spelled out acronym)	Definition / explanation
Pressure Tiers o **HP** o **IP** o **MP** o **LP**	o High Pressure o Intermediate Pressure o Medium Pressure o Low Pressure	o High Pressure i.e. above 7bar LTS (NTS) o Intermediate Pressure i.e. 2 – 7bar o Medium Pressure i.e. up to 2bar o Low Pressure i.e. up to 75mb
CSEP	Connected System Exit Point	Third party connection to Gas network from an iGT or UIP
DG	District Governor	Pressure regulator primarily used for reducing pressures from IP and MP tiers to LP.
DPG	Distribution Pressure Governor	Pressure regulator primarily used for reducing pressures from IP tier to MP.
HDPE	High Density Polyethylene	Material standard for plastic pipe – High density allows for use at > 2bar operation due to thicker pipe wall. Reduced internal diameter increases weight of pipe, is not suitable for use < 2bar. Cheaper material and jointing than Steel.
iGT (GT)	Independent Gas Transporter	Third party supplier of gas and infrastructure to closed developments, not generally adopted by SGN.
LTS	Local Transmission System	High Pressure system feeding from National Offtakes to P(T)RS Inlets
MDPE	Medium Density Polyethylene	Material standard for plastic pipe – Medium density allows for greater internal diameter for extra capacity required at lower tiers, but thinner pipe wall thickness is not considered safe for operation at >2bar. Cheap material and jointing due to electro fusion welding.
MOP	Maximum Operation Pressure	Highest design pressure for a mains system, however regulator may be set lower than this but not higher.
NTS	National Transmission System	High Pressure system feeding National Offtakes from Terminals
PMAC	Pressure Management and Control	Third Party monitoring system which communicates live data via BT Comms link, facilitates remote control of pressure settings and profiles on SGN Plant, used at all Plant levels.
P(T)RS	Pressure (Transmission) Regulator Station	Pressure regulator primarily used for reducing pressures from HP (LTS/NTS) tier to IP / MP or LP.
UIP	Universal Infrastructure Provider	Provides and connects infrastructure to gas network but does not supply gas. UIP infrastructure is generally adopted by SGN.
RIIO-GD1	Revenue=Incentives + Innovation + Outputs – Gas Distribution 1	8-Year price control period (2013-2021)
RIIO-GD2	Revenue=Incentives + Innovation + Outputs – Gas Distribution 2	Proposed 5-Year price control period (2021-2026)
SHP	SHP File Format	SHP is a file extension for a Shapefile shape format used in geographical information systems (GIS) software.

ST	STEEL	Steel pipe material is used where PE cannot i.e. protection from heavy traffic or bridge crossings, Regulator outlets where excessive gas cooling may be experienced at pressure reduction. Steel pipe laying can be expensive due to welded joints.
1:20	1:20 Demand Conditions	Designing a network to operate whilst experiencing demand conditions historically only seen every 20 years, during severe weather events.