Governors Other

Engineering Justification Paper (SGN-GD3-EJP-G&I-002)

Final Version 1.0

11th December 2024

Distribution Asset Management

SGN

Your gas. Our network.

Contents

1 Summary Table

Table 1: Ofgem Project Summary Table

Name of Project	R6 Governors Other		
Scheme Reference	SGN-GD3-EJP-G&I-002		
Primary Investment Driver	Asset Health		
Project Initiation Year	2026		
Project Close Out Year	2031		
Total Installed Cost Estimate (£)	£12.1m		
Cost Estimate Accuracy (%)	±10%		
Project Spend to date (£)	£0		
Current Project Stage Gate	Initiation		
Reporting Table Ref	CV5.04		
Outputs included in RIIO-GD3 Business Plan	Yes		
Spend apportionment	GD2	GD3	GD4
	£0	£12.1m	£0

All expenditure above in 23/24 prices

2 Executive Summary

1 SGN requests a total of £12.1m worth of investment to fund the preferred intervention programme detailed in this paper. This workload is a continuation of a GD2 intervention programme that consists of 325 housing replacement projects and 87 component replacement and refurbishments projects. This makes up 4.4% and 1.2% of our district governor population respectively. The investment will be used on housing, component replacement and refurbishment interventions as part of SGN's governor replacement programme on below 7bar pressure reducing installations (PRIs) in the Southern and Scotland networks. This paper will include a background and justification for the proposed work, the options SGN have considered and risks to delivery.

2 Below are the workloads contained within the scope of this proposal:

- IP inlet housing replacement
- IP inlet housing replacement
- IP inlet component replacement/refurbishment
- MP inlet component replacement/refurbishment

3 The drivers of this work are condition, compliance and obsolescence which are issues identified on these assets through inspections. The benefit of this proposal is that it allows SGN to utilise smaller interventions that will provide better cost efficiency when building a programme of work. SGN will consider smaller interventions before resorting to more major works such as full replacement of the site. Interventions within the scope of this paper allow us to increase the life of the asset and prevent or delay the need for major interventions in the future. This programme was measured against 'do more', 'do less' and 'do nothing' options, however the preferred option gave the most cost-efficient outcome to maintain a level integrity that allows for continued safe operation of our network.

4 Our approach to this investment case has been to review equipment performance, fault data and asset health across all sites that contain below 7 bar pressure reduction systems. Cost benefit analysis has been undertaken for this proposal, the net present value of the preferred option at a 16-year assessment point from the start of the model (2043) is £0.28m in the Scotland Network and £6.47m in the Southern Network with NARMs is our preferred funding mechanism for this programme of work. Risks to delivery include availability of contractors, designers and materials. These are mitigated through early visibility of work to allow delivery partners to plan effectively. Full list of risks can be found in Appendix C.

5 The costs provided are based on an uncertainty of 10% related to an increase in contractor rates and materials above that of inflation. Below is a breakdown of the spend profile on the governor intervention programme for the GD3 price control period across all SGN's networks.

Table 2: GD3 Project Expenditure Profile in 23/24 Prices (for both networks)

Year	26/27	27/28	28/29	29/30	30/31	Total (incl. overheads)
Forecast Cost (£m)	2.48	2.40	2.34	2.38	2.51	12.1
Forecast Volume	82	83	83	82	82	412

6 This is a recurring workload that has been carried out in GD1 and GD2 price control periods. The workloads described in this paper do not relate to any outputs that should have been carried out in GD2. Table 2 shows proposed costs and workloads for GD3 this can be compared to similar workloads proposed in GD2 shown in Table 3. In GD2 a high number of refurbishment and part replacement projects were proposed.

As we have targeted our highest risk assets it was found that full replacement projects were more suitable to remove the risk from these sites (also supported by the NARMs outputs) and as a result we have delivered far fewer smaller interventions then set out in the GD2 proposal. For GD3 we have balanced the volumes to allow for a better mix of interventions to enable SGN to select the most suitable intervention for each individual site.

Table 3: GD2 FD Allowances and Volumes in 23/24 Prices (for both networks)

Year	21/22	22/23	23/24	24/25	25/26	Total
FD Allowance (£m)	2.74	2.74	2.74	2.74	2.74	13.71
FD Volume	682	682	682	682	682	3,410

7 As we look to form our plans and develop our strategy for the next price control GD3, we have engaged with support from our Independent Stakeholder Group (ISG) with a wide range of our customers and stakeholders to better understand what their needs are and what they expect from us. We have responded, challenging ourselves to focus on the projects that prioritise safety and resilience, while delivering most value to our customers. This document should be read in conjunction with our GD3 Business plan, section C2 Customer and Stakeholder priorities. This section provides a greater level of detail of our approach to customer and stakeholder engagement.

3 Introduction

8 We have applied our 4R's approach for Repair, Refurbish, Replace, Rebuild to our Governor assets, in the R6 Governor EJP[1] (SGN-GD3-EJP-G&I-005) we discuss sites that require full site replacement, in this paper we outline smaller interventions that include housing replacements, component replacements and refurbishments that extend the operational life of the asset whilst providing better cost efficiency on behalf of our customers.

9 In this paper we aim to provide an overview of our PRI asset population, detailing the methods we use to maintain, assess, and identify these assets for intervention. The paper will also describe SGN's asset management strategy and present four investment options, evaluating the benefits of each, and outlining why SGN has selected its preferred option. Lastly, this paper will break down the proposed investment, how funds will be allocated across GD3 and highlight any associated risks to delivery.

10 SGN currently have 8,718 district governors and 26,233 service governors across our Southern and Scotland networks in rural, suburban and city centres. These pressure regulating installations (PRIs) reduce pressure within the network to allow us to efficiently transport gas and safely supply 5.9 million customers downstream. SGN recognises these assets will require intervention within the GD3 price control period to ensure they continue to function effectively and safely.

11 Governors can supply vast numbers of customers depending on their location within the network. Due to the network's configuration, the volume of gas transported will fluctuate at different times of the year as demand changes. During winter the network will be supplying gas at a higher demand, interruptions during this period carry the highest likelihood and consequence of losing supply to customers.

12 The network is made up of governors of different makes, models and configurations that have been installed over the years. These installations vary in condition, functionality, maintenance requirements and age, with some having been installed over 50 years ago. These assets are currently maintained at intervals determined by Reliability Centred Maintenance (RCM). This methodology uses previous fault history data to determine future optimal maintenance frequencies. Work orders for maintenance are raised based on the RCM determined frequencies.

13 The SGN/PM/CM/4 Part 2[2] management procedure outlines requirements for condition assessment and defect reporting on below 7 bar assets. These inspections are carried out on all above and below ground assets within the site boundary of the PRI. This includes civil, mechanical, and electrical and instrumentation (E&I) assets. The condition assessment will assess defects on pipework, painting and coating, wrapping, welds, areas of corrosion and structural integrity faults. Details of this can be found in the management procedure, in Appendix B. The table below shows the condition scoring used in the in the assessment, generally assets that score HI4 and HI5 require intervention, but other metrics including obsolescence, compliance, and feedback from maintenance teams are considered when selecting assets for intervention.

[1] R6 Governors EJP, SGN-GD3-EJP-G&I-005.
[2] SGN/PM/CM/4 Part 2 Management Procedure for the Condition Assessment and Defect Reporting of Below 7 bar Assets.

Table 4: CM/4 Health Indices (HI) Ranking Table

Health Indices Ranking Table	
HI1	New or as new
HI2	Good or serviceable condition
HI3	Deterioration: requires assessment or monitoring
HI4	Material deterioration: Intervention requires consideration
HI5	Material deterioration: Intervention required

14 Through the governor intervention programme, we identify and schedule intervention on those assets which exhibit the most risk to the network. This allows us to manage risk on the network and ensure continued safe operation.

15 The interventions on district and service governors during GD1 and GD2 has been identified using a combination of a health and criticality risk-based approach, as well as assessing obsolescence and compliance. Identification of sites for GD3 will be based on the same approach, specifically using data received from condition surveys carried out in accordance with SGN/PM/CM/4 Part 2, NARMS (Network Asset Risk Metric) outputs and feedback from local Maintenance teams. These metrics are used in conjunction to determine the priority of intervention within the programme.

16 Once assets are identified we then select the appropriate method of intervention. We look for the minimum level of intervention to address the issues that have been highlighted. The interventions considered are:

- Refurbishment – This in intervention is selected when a system is generally in good working order, but small interventions are required to extend the assets life, increase safety of the installation, or ensure compliance. This can include shot blast and painting to remove corrosion or housing replacement to bring the installation into compliance with DSEAR.
- Component replacement – This intervention is undertaken when identified issues only relate to part of the installation. Components may not be performing as designed or no longer compliant with current standards. This would only be carried out when a site can be safely isolated utilising onsite compliant valves.
- Full replacement (not within scope of this paper) – This intervention is selected when a governor is at the end of it working life. This is the last option that will be considered and will only be undertaken if smaller interventions cannot address all issues identified or are not cost effective. This will be impacted by factors such as compliance e.g. component replacement will not address unprotected steel entering concrete or potential ignition sources within hazardous area zones.

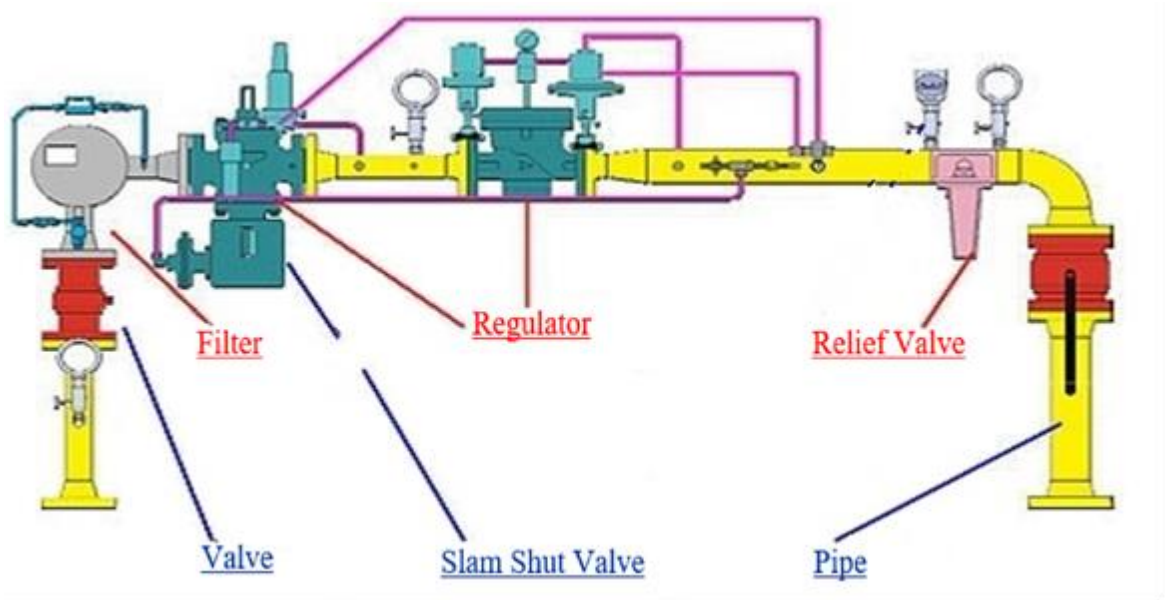
17 Combinations of interventions are often used to avoid full replacement such as housing replacement alongside shot blast and painting. This can reduce the investment needed while providing similar reduction in risk.

4 Equipment Summary

18 Currently SGN has a total of 6,248 district governors and 23,055 service governors in the Southern network and 2,470 district governors and 3,178 service governors in the Scotland network. These supply 5.9 million domestic, commercial, and industrial customers. These assets operate at low (up to 75mbar), medium (75mbar to 2bar) and intermediate (2 – 7 bar) pressure tiers. More detail can be found in Global Equipment Summary Appendix D.

19 For many of the district governors on integrated networks these operate at seasonal settings to meet network usage and demands to ensure supply is maintained.

Figure 1: Typical configuration of Pressure Regulating Installation (PRI) with main components labelled



20 Figure 1 shows a typical configuration will consist of inlet/outlet stream valves to isolate each stream during routine maintenance, or when a fault has occurred. Filters to prevent unwanted debris entering the system and, slamshut valves to act as the primary protective device and isolate the supply and prevent over-pressurisation. The regulator reduces inlet pressure to the desired outlet pressure based on network requirements. Relief valves vent excessive outlet pressure downstream of the regulator to the atmosphere.

21 The installation is connected to the network through inlet and outlet pipework which is usually constructed in either PE or steel and sized adequately to match the capacity of the installation.

Table 5: Shows population of some PRIs separated by make and model:

Governor Make & Model	Southern	Scotland	Total
Donkin 270	986	158	1142
Donkin 280	1386	535	1921
Donkin 680	348	203	551
Donkin 684/685	22	30	52
Donkin IDA Flow	15	7	22
Axial Flow	3216	167	488
ERS Module	148	137	155
Krysalis	46	35	81
Orpheus	193	17	210
Fisher 298	5	0	5

22 Table 5 shows population of common installation types typically found in our network. Many listed, and currently used on SGN's networks are now obsolete, some having not been manufactured since the early 1990's. Replacement of major elements of these devices is unusual as wear and tear occurs principally on elastomer elements, however over time as failures increase and the ability to maintain these obsolete assets reduces.

23 District governors can be installed either above or below ground. There are many factors that will determine which is best suited for individual sites. Above ground installations are generally easier to access and maintain, more visible to the public and avoid flooding issues. Belowground installations are generally preferred by local authorities, can be installed in built up areas where above ground installations are not possible and will provide additional noise suppression when located near residential properties.

24 New installations of district governors will be designed in accordance with IGEM/TD/13 and SGN/SP/E/28 The Design of Pressure Regulating Installations with Inlet Pressures Not Exceeding 100 Bar which is the SGN specification.

25 All district governors should have a duty and standby stream to provide resilience in the network, though there is a population of legacy single-stream governors installed across SGN's networks.

5 Problem/Opportunity Statement

Why are we doing this work and what happens if we do nothing?

26 SGN has an aging asset population that continues to deteriorate over time. Many of these assets are legacy installations that no longer comply with current regulations and industry standards. These assets are critical to the operation of our network, and their failure can lead to a loss of supply to our customers or uncontrolled release of gas downstream.

27 These assets will require pre-emptive intervention prior to failure, to ensure continuity of supply and reduce risk to life and property. Those highest risk installations are identified through a risk-based approach by gathering data on the asset's health and criticality. Installations that are obsolete and those with unreliable operational history will also be targeted with intervention.

28 Interventions on non-compliant assets need to include within its scope works to bring the installation back to into compliance with current standards.

29 Doing nothing has been discounted due to the following compliance drivers:

- DSEAR: Dangerous Substances and Explosive Atmospheres Regulations
- Gas Industry Standard: IGEM/TD/13 – Pressure regulating installations for Natural Gas, Liquefied Petroleum Gas, and liquefied Petroleum Gas/Air.
- Gas Industry Standard: T/SP/E/28 - The design of PRI with inlet pressures not exceeding 100bar.
- Gas Industry Standard: SGN/PM/GOV/1- The replacement (or modification) of network governor installation with inlet pressures less than or equal to 7barg.
- SGN Standard: SGN/PM/NP/38 - Planning and Design of <7Bar Pressure Regulating Installations.
- Regulation Compliance: SGN/PM/PS/3.
- Pressure Systems Safety Regulations 2000.
- Pipeline Safety Regulations 1996.
- Health and Safety at Work Act: Where failure is due to corrosion.

What is the outcome that we want to achieve?

30 The objective is to ensure the continued safe operation of our governor asset population to maintain security of supply to our customers. We want to reduce the risk of failure of this asset group through a planned cost-effective intervention programme. We want to avoid failures which may cause a loss of supply to our customers or in severe cases cause the over-pressurisation of the downstream network and put customers' lives and properties at risk. SGN also wants to ensure pressures are maintained and controlled at the optimum levels throughout the network, to minimise leakage from the system.

31 The opportunities arising from this programme are:

- Safeguarding the integrity of the low-pressure distribution gas networks
- Removal of potentially unsafe aging and obsolete equipment
- Future maintenance activities can be performed in accordance with SGN/PM/MAINT/2 (Part 1 and 2) safely and in compliance with HSWA and PUWER.
- Installation of new governor housings will improve security.
- Compliance with ATEX and DSEAR Regulations
- Improved pressure control
- Provide a safer working environment for SGN staff.

- Reduction in asset failures
- Reduction in risk

How will we understand if the spend has been successful?

32 The spend on this programme will be successful based on the following criteria:

- Meet Ofgem agreed NARM targets within budget.
- Improve SGN governor health indices over the RIIO-GD3 formula period.
- Ensuring compliance with all current regulations, industry standards and policies.
- We prevent failure of PRI assets due to condition.
- We prevent failure of PRI assets that cause loss of supply or over-pressurisation of the network.
- Reduction in Opex costs using preventative intervention which reduces the risk of unplanned events occurring that tend to be more costly than planned proactive work.

5.1 Narrative Real-Life Example of Problem

Tidworth Road, Hampshire

33 This kiosk was replaced in year 4 of GD2. Concerns were raised with the condition of the previous kiosk, specifically the roof where the hinges had been corroding and roof no longer secure.

Figure 2: Housing Replacement at Tidworth Road, Hampshire

Gravel Hill, Croydon

The gatic lids were identified for replacement due to it being a trip hazard as the lids were not flush to the ground. The lids required specialised lifting equipment to access the governor and posed a risk to the installation in the event one of the lids falls onto the asset. Additional risks have been highlighted due to site being located near railway.

Figure 3: Gatic at Tidworth Road, Hampshire

5.2 Project Boundaries

34 It is proposed that in this programme we undertake the refurbishment and replacement of components relating to district governor installations.

35 The work will comprise of the following:

- Governor component(s) replacement
- Governor kiosk or pit lid replacement
- Shot blasting and painting
- Decommissioning and removal of old above ground assets
- Traffic Management (if required)
- Design (if required)

36 The work will not comprise:

- Replacement of the entire PRI installation
- Replacing or reinforcement of mains.
- Upsizing governors or installing new governors to meet growth demands.
- Installing new pressure management low points.

6 Probability of Failure

37 Governors have a variety of failure modes that relate to a loss of containment of gas, under-pressurisation, or over-pressurisation of the downstream network. These failure modes become more likely to occur based on factors such as age of the asset, obsolescence, compliance with standards, material, environment, network configuration etc. These factors are considered when identifying assets for intervention.

6.1 Probability of Failure Data Assurance

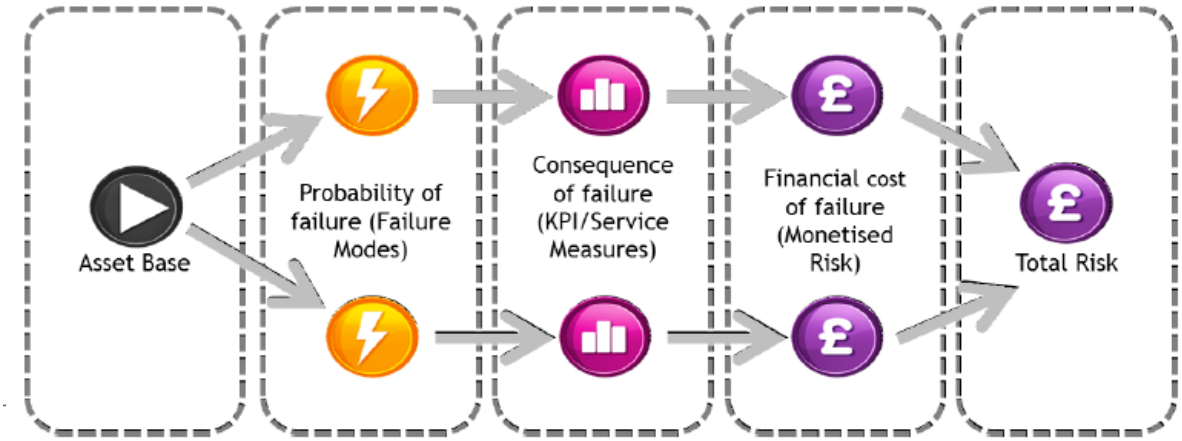
Probability of Failure – NARMs

38 Probability of failure is a key component of the NARM model and has been robustly produced from either industry guidance or from datasets that SGN hold. Sensitivity analysis on key components within the CBA has been undertaken to test if the overall investment is still warranted. However, it must be noted that testing of this type is performed holistically and does not consider specific drivers.

39 The failure rate and deterioration applied to calculate the CBA is consistent with the NARMs methodology. The key principles adopted in the methodology to facilitate the assessment of risk are:

- Asset health equates to the probability that the asset fails to fulfil its intended purpose and thus gives rise to consequence for the network.
- The consequences can be assessed in monetary terms.
- The risk is determined from the product of the number of failures and the consequence of those failures.

Figure 4: Outline of NARM's Model



Failure Rate

40 In the NARM framework 'failure rate' is used to calculate the probability of failure. The failure rate gives the rate of occurrence (frequency) of failures at a given point in time and may also include an age/time variable, known as asset deterioration, which estimates how this rate changes over time. The failure rate can be approximated by fitting various parametric models to observed data to predict failures now and in the future.

41 The NARMs modelled Governor failure rates assumed for each failure mode are provided in Appendix E.

Failure Modes

42 In the NARMs methodology the failures are categorised into different failure modes. Below is list of all failure modes considered in the methodology:

Governors

43 Corrosion - Relating to the failure due to corrosion of a pressure containing component on site leading to an unconstrained release of gas within the site.

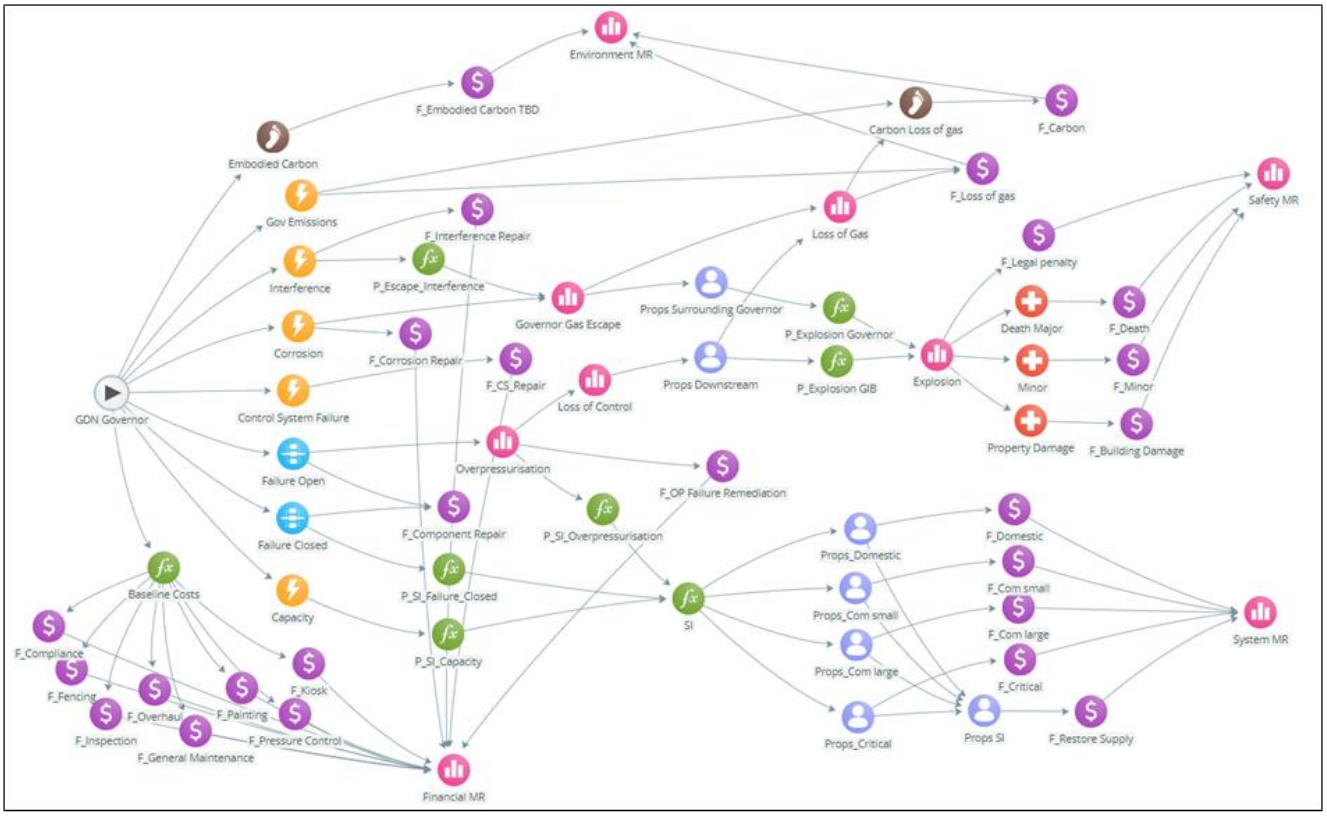
44 Fail Open - Failure of the pressure control system to control the pressure at least to within the Safe Operating Limit of the downstream system. This would typically require the concurrent failure of both regulators and the slamshut (failure to operate) within one pressure control stream.

45 Fail Closed - Relates to the failure of the filter and pressure control system to supply gas at adequate pressure leading to partial or total loss of downstream supplies.

46 Capacity - Where the system has insufficient capacity to meet a forecast 1:20 peak day downstream demand.

47 Interference - Relating to failures due to interference from members of the public or vehicle collisions leading to an unconstrained release of gas within the site.

Figure 5: Tree diagram showing links between failure mode and consequences



48 Our robust methodology provides confidence that our investment is aligned to address the probability of failure highlighted in this paper.

7 Consequence of Failure

49 The failure of a governor installation could in extreme circumstances lead to either a loss of supply to customers, loss of containment or the over-pressurisation of the downstream network.

Table 6: Shows failure modes and associated consequences of failure

Failure Consequence			
Failure Mode	**Loss of Supply to Customers**	**Safety Impact**	**Environmental Impact**
Loss of containment of gas (corrosion)	If gas escape is significant, security of supply could be affected	Safety impact from risk of ignition endangering surrounding people and properties.	Carbon emissions proportionate to the volume of the escape
Pressure Regulating Equipment (fail open)	Over-pressurisation could lead to loss of containment in downstream system, resulting in potential supply disruption	Over-pressurisation of the downstream network could lead to loss of containment of gas near customer homes. Increased risk of gas in buildings and released gas mixture being exposed to ignition sources.	Carbon emissions proportionate to the volume of the escape.
Pressure Regulating Equipment (fail closed)	Gas supply would be lost for a significant quantity of customers if installation failed closed on both streams	No direct impact	No direct impact
Capacity failure	Customers would experience poor pressures or in extreme cases loss of supply if volume of gas passing through installation is not sufficient to meet downstream demand	No direct impact	No direct impact
Loss of containment of gas (interference)	If gas escape is significant, security of supply could be affected	Safety impact from risk of ignition. Immediate danger if third party present on site e.g. vehicle collision. Risk to people and properties near installation.	Carbon emissions proportionate to the volume of the escape

Loss of Supply to Customers

50 A typical DG will usually be one of several supply sources within a low-pressure gas network if that network is integrated but in non-integrated networks a DG could be the single supply to several customers. Failure of these installations will have a more severe consequence for loss of supply.

51 On average DG installations will typically supply in the range of between 500scmh^{-1} to 5,000scm^{-1} under peak flow conditions. This is approximately equivalent to customer numbers of between 500 and 5,000 per installation.

52 Failure of any DG on the MP network would seriously affect the integrity of these networks, resulting in a loss of supply to potentially thousands of customers or over-pressurisation of the downstream LP networks. Failure of a DG on an IP network will have more severe consequences, increasing the number of potential customers that would lose supply or the amount of gas that could be lost through loss of containment failure.

53 Loss of supply to customers would mean losing the ability to heat their homes, have warm running water and use of the cooker to prepare meals. Often a loss of supplies would occur during the winter period when the network is at full capacity and the risk of losing supply is at its highest. For our most vulnerable customers this could be life threatening.

54 Approximate timescales for getting customers back on supply (based upon network configuration, type of emergency, labour and material resources:

- 100 to 500 properties – 5 to 7 days
- 500 to 1000 properties – 7 to 14 days
- 1000 to 2000 properties – 14 to 28 days
- >2000 properties – up to 90 days

55 There are large costs associated with reinstating supplies in emergency conditions, as a trained operative is required to visit each customer individually to purge the service of air before relighting the appliances. This is a complex operation to perform for many customers and depending on the number of supplies to be reinstated and resources available, it could take several weeks or months to complete. Currently for existing sources of regulator equipment, lead times for delivery of new orders can be greater than 6 months.

56 While the customers are without gas SGN are obligated to pay compensation at a cost of £75 per day per property. In addition to this SGN must also ensure customers have adequate alternative heating and cooking facilities while their gas is being reinstated.

57 Between the time of failure and commissioning of their replacement there will be a period of disruption on the network with a high potential for supply failure, resulting in increased risk and costly reconnection, which can only occur after an alternative gas supply has been arranged. The installations will need to be re-designed, gained the necessary consents and follow a procurement process prior to construction, of which will all be done under duress. This is likely to be at significantly higher cost than if the same installation were programmed in for a planned replacement prior to failure.

Safety Impact of Failure

58 Consequence of failures can be categorised as follows:

- Safety/Environmental - Failures that can cause harm to people or the environment.
- Operational - Failures that result in a business impact greater than the cost of repair.
- Non-Operational - Failures that result only in the cost of repair.

59 The highest concern is that which impacts safety, not just to our customers or members of the public but also SGN staff and operatives. Table 5 shows the greatest risk to safety relate to the loss of containment of gas. Risks of asphyxiation, fire or explosion could lead to loss of life, injury, and damage to property.

60 All installations will have a level of safety and environmental impact on failure, however there are factors that will determine its severity. These include operating pressure, proximity to occupied buildings, material of the installation, housing, network configuration, capacity etc.

61 Failures can be further categorised as 'revealed' & 'unrevealed'. An unrevealed failure is one that, on its own, is not apparent until another failure occurs. Maintenance is scheduled for these installations with tasks to expose unrevealed failures, e.g. failure of a protective device. The risk is that these failures occur between routine maintenance activities and can go undetected for long periods of time.

Environmental Impact

62 The loss of containment of gas will have an adverse effect on the environment. The release of methane gas (CH_4) into the atmosphere is a potent greenhouse gas that has more than eighty times the warming power of carbon dioxide over the first 20 years after it reaches the atmosphere. Even though CO_2 has a longer-lasting effect, methane sets the pace for warming.

63 SGN plans its works to have minimal impact on the environment and the local communities. This is done by early engagement and plenty of foresight into the planned work as well as working with environmental agencies to find minimal impact solutions.

8 Options Considered

64 This section will review five options SGN has considered when proposing workloads for GD3. The preferred option, a 'do more' option, 'do minimum', 'do minimum and defer to GD4' and 'do nothing' In these options we will compare workloads and costs for each, along with the benefits, the expected effect on Opex, assumptions made and overview of delivery of proposed workloads. (This document should be read in conjunction with our GD3 Business plan, Document SGN-GD3-SD-03: Workforce and Supply Chain Resilience Strategy[3].)

65 Our Monetised Risk model has only just been aligned with the new long term risk view and as such is not included within this EJP. For more information on the monetised risk delivered through our interventions please see the CBA benefits and NARM BPDT's.

66 We have spent time to cost up options where we feel there will be value added to the decision-making process. Where options are less likely to be pursued, we have chosen to present higher level costs, without the breakdown, based on some broadly similar assumptions which allows a comparison within the CBA.

8.1 Option 1 – SGN's recommended programme (Preferred Option)

67 The workloads and costs for Option 1 are detailed in Table 7 below. These workloads were established by identifying the installations that were non-compliant, obsolete, in poor condition and had multiple faults. These were measured through SGN/PM/CM/4 Part 2 condition surveys, NARMs outputs, fault data and feedback from maintenance teams.

68 We separated the identified installations to those that require intervention in the next 7 years and those that can be maintained and have their intervention delayed until the GD4 price control period. We have excluded that workload which can be deferred into GD4 and only retained the work we need to carry out in GD3. This was determined by assessing the risk across all metrics mentioned above and evaluating the severity of failure through criteria such as building proximity, single fed systems, pressure tier etc.

Table 7: Option 1 Workloads and Costs

Work Type	Workload		Cost (£m)	
	Southern	Scotland	Southern	Scotland
DG IP Housing Replacement	25	50	1.15	0.63
DG MP Housing Replacement	200	50	5.18	0.63
DG IP Component Replacement/Refurbishment	12	0	0.24	0
DG MP Component Replacement/Refurbishment	50	25	0.88	0.63
Overheads			2.16	0.61
Total			9.61	2.5

[3] SGN GD3 Business plan, SGN-GD3-SD-03, Workforce and Supply Chain Resilience Strategy.

The basis for the cost estimate/unit cost

69 Total cost for Option 1 is £12.1m to carry out 412 interventions. All costs were carried and reviewed by Asset Management and delivery teams. Majority of the costs were estimated based on similar past projects. Costs were also estimated by considering material costs, labour rates and specialist contractor rates. There is a cost variance of 10% due to the cost risk uncertainty that we have not built in. SGN are expecting the possibility that there will be increases in contractor rates above the rate of inflation. This could be due to limited availability of competent workforce and increased contractor overheads. Market costs could also play a role in unforeseen cost increases to materials.

The perceived benefits of the option

70 The benefit of this option is that this level of intervention allows us to continue to maintain the integrity of the assets essential for the safe transportation of gas through our networks. We select the intervention type that will provide the most cost-efficient option to extend the operational life of the asset while ensuring compliance with current regulations and industry standards. This workload allows us to reduce the level of full replacement works needed to reduce that risk. This option reduces the risk from the network and consequently OPEX costs for maintenance of these assets going forward.

Delivery timescales

71 The delivery of this workload will be scheduled evenly across the five years of GD3. As inspections will continually be carried out, priorities will change over that period. Spreading the workloads evenly, we can have flexibility in the programme to ensure that the interventions are planned in for the highest risk assets based on the information available to us at the time. We can also minimise the risk of resource shortages by having a consistent programme of work for specialised contractors.

Key assumptions made

72 The key assumptions made when putting this workload together is:

- The failure rates we expect to see in GD3 will be similar to those experienced in GD2.
- That the data we collect from inspections are true and accurate reflection of the asset health.
- The assets that have their intervention deferred will not need intervention prior to the GD4 price control period.

8.2 Option 2 – Do More

The technical detail of the option i.e. capacity, system rating, availability etc

73 The workloads and costs for Option 2 are detailed in Table 8 below. These workloads were established by identifying the installations that were non-compliant, obsolete, in poor condition and had multiple faults. These were measured through SGN/PM/CM/4 Part 2 condition surveys, NARMs outputs, fault data and feedback from maintenance teams.

74 In Option 1 we have excluded that workload which can be deferred into the GD4 price control period. For Option 2 we kept this workload within the programme. By doing this we not only ensure that the network can transport gas safely, but we can proactively target obsolete equipment with known failure modes and unique risks and remove them from the network. For example, ERS module governors which have known issues with valves shearing and prone to over-pressurise the network when flooded.

75 This option reduces the most risk from the network and consequently OPEX costs for maintenance of these assets going forward. The higher level of interventions will require more resources than we have currently, and steps will need to be taken to ensure the materials required can be sourced to deliver this programme of work.

Table 8: Option 2 Workloads and Costs

Work Type	Workload		Cost (£m)	
	Southern	Scotland	Southern	Scotland
DG IP Housing Replacement	25	50	1.15	0.63
DG MP Housing Replacement	350	50	9.07	0.63
DG IP Component Replacement/Refurbishment	25	0	0.50	0
DG MP Component Replacement/Refurbishment	100	25	1.77	0.63
Overheads			2.16	0.61
			14.65	2.5

The basis for the cost estimate/unit cost

76 Option 2 will cost £17.15m for 625 interventions. All costs were carried and reviewed by Asset Management and delivery teams. Majority of the costs were estimated based on similar past projects. Costs were also estimated by considering material costs, labour rates and specialist contractor rates.

The perceived benefits of the option

77 The benefit of this level of intervention within this option is to not only ensure we maintain the integrity of the assets but also proactively target assets with smaller interventions that will prevent major interventions in the future. For example, having more shotblast and painting interventions scheduled on assets that have a health index of HI3 will prevent full replacement interventions when that asset reaches a score of HI4 or HI5. A larger number of smaller interventions now will prevent major interventions in the future.

78 We select the site and intervention type that will enable the operational life of the asset to be extended by the most cost-efficient option while ensuring compliance with current regulations and industry standards.

Delivery timescales

79 The delivery of this workload will be scheduled evenly across the five years of GD3. As inspections will continually be carried out, priorities will change over that period. Spreading the workloads evenly, we can have flexibility in the programme to ensure that the interventions are planned in for the highest risk assets based on the information available to us at the time. We can also minimise the risk of resource shortages by having a consistent programme of work for specialised contractors.

Key assumptions made

80 The key assumptions made when putting this workload together is:

- The failure rates we expect to see in GD3 will be similar to those experienced in GD2.
- That the data we collect from inspections are true and accurate reflection of the asset health.
- The work is deliverable.

8.3 Option 3 – Do Less (Do Minimum)

The technical detail of the option i.e. capacity, system rating, availability etc.

81 The workloads and costs for Option 3 are detailed in Table 9 below. These workloads were established by taking 50% of the of the preferred option, as this is the percentage of work, we have found to be related to compliance when reviewing our GD2 workloads. Compliance work cannot be deferred so we set this option as 'Do Minimum' option.

82 For the workloads proposed in Option 3, we have taken the preferred option (Option 1) and reduced those workloads by a ratio that reflects the compliance driven work. As our Do Minimum option, we will restrict all work to resolve non-compliance only.

83 This option is not reasonable as failure rates will only increase as the asset ages and to have a programme of work not based on this, we will only increase risk of failure on the network. On some sites being restricted to small interventions and limited number of full replacements we risk not being cost effective. Some instances, a full replacement over many decades can prove to be more cost effective then multiple small interventions in the same period.

84 We are also obligated by regulation and standards that if intervention is carried out on a site, that site must be brought up to current standards. In some cases, only full replacement will enable us to do this.

Table 9: Option 3 Workloads and Costs

Work Type	Workload		Cost (£m)	
	Southern	Scotland	Southern	Scotland
DG IP Housing Replacement	13	25	0.60	0.32
DG MP Housing Replacement	100	25	2.59	0.32
DG IP Component Replacement/Refurbishment	6	0	0.12	0
DG MP Component Replacement/Refurbishment	25	12	0.44	0.30
Overheads			2.16	0.61
Total			5.91	1.55

The basis for the cost estimate/unit cost

85 Option 3 will cost £7.46m for 206 interventions. All costs were carried and reviewed by Asset Management and delivery teams. Majority of the costs were estimated based on similar past projects. Costs were also estimated by considering material costs, labour rates and specialist contractor rates.

The perceived benefits of the option

86 The benefit of this option is a significantly reduced level of investment in the governor replacement programme in comparison to previous years. With this level of intervention, it is unlikely that we can renew assets at a greater rate that they fail. Reducing investment to this level will increase the risk of failure that could impact safety, the environment and security of supply.

87 We select the site and intervention type that will enable the operational life of the asset to be extended by the most cost-efficient option while ensuring compliance with current regulations and industry standards.

Delivery timescales

88 The delivery of this workload will be scheduled evenly across the five years of GD3. As inspections will continually be carried out, priorities will change over that period. Spreading the workloads evenly, we can have flexibility in the programme to ensure that the interventions are planned in for the highest risk assets based on the information available to us at the time. We can also minimise the risk of resource shortages by having a consistent programme of work for specialised contractors.

Key assumptions made

89 The key assumptions made when putting this workload together is:

- The failure rates we expect to see in GD3 will be less than those experienced in GD2
- That the data we collect from inspections are true and accurate reflection of the asset health
- Compliance driven work will be the same ratio in GD3 as we have seen in GD2

8.4 Option 4 – Do Minimum & Defer Remainder of Preferred Option to GD4

The technical detail of the option i.e. capacity, system rating, availability etc.

90 The workloads and costs for Option 4 are detailed in Table 10 below. These workloads were established by taking 50% of the of the preferred option, as this is the percentage of work, we have found to be related to compliance when reviewing our GD2 workloads. Compliance work cannot be deferred so we set this option as 'Do Minimum' option to be completed in GD3. Workloads that are not compliance driven but within Option 1 will be deferred to GD4.

91 Similarly to Option 1 we separated the identified installations to those that require intervention in the next 7 years and those that can be maintained and have their intervention delayed until the GD4 price control period. In Option 3 however we increased the workload we have deferred on the basis that we will find less failures than we have found in GD1 and GD2 and will carry out work that is compliance driven.

92 This option is not reasonable as failure rates will only increase as the asset ages and to have a programme of work not based on this, we will only increase risk of failure on the network. On some sites being restricted to small interventions and limited number of full replacements we risk not being cost effective. Some instances, a full replacement over many decades can prove to be more cost effective then multiple small interventions in the same period.

93 We are also obligated by regulation and standards that if intervention is carried out on a site, that site must be brought up to current standards. In some cases, only full replacement will enable us to do this.

Table 10: Option 4 Workloads and Costs

Work Type	Workload		Cost (£m)	
	Southern	Scotland	Southern	Scotland
DG IP Housing Replacement	13	25	0.60	0.32
DG MP Housing Replacement	100	25	2.59	0.32
DG IP Component Replacement/Refurbishment	6	0	0.12	0
DG MP Component Replacement/Refurbishment	25	12	0.44	0.30
Overheads			2.16	0.61
Total			5.91	1.55

The basis for the cost estimate/unit cost

94 Option 4 will cost £7.46m for 206 interventions. All costs were carried and reviewed by Asset Management and delivery teams. Majority of the costs were estimated based on similar past projects. Costs were also estimated by considering material costs, labour rates and specialist contractor rates.

The perceived benefits of the option

95 The benefit of this option is a significantly reduced level of investment in the governor replacement programme in comparison to previous years. With this level of intervention, it is unlikely that we can renew assets at a greater rate that they fail. Reducing investment to this level will increase the risk of failure that could impact safety, the environment and security of supply.

96 We select the site and intervention type that will enable the operational life of the asset to be extended by the most cost-efficient option while ensuring compliance with current regulations and industry standards.

Delivery timescales

97 The delivery of this workload will be scheduled evenly across the five years of GD3. As inspections will continually be carried out, priorities will change over that period. Spreading the workloads evenly, we can have flexibility in the programme to ensure that the interventions are planned in for the highest risk assets based on the information available to us at the time. We can also minimise the risk of resource shortages by having a consistent programme of work for specialised contractors.

Key assumptions made

98 The key assumptions made when putting this workload together is:

- The failure rates we expect to see in GD3 will be less than those experienced in GD2
- That the data we collect from inspections are true and accurate reflection of the asset health
- Compliance driven work will be the same ratio in GD3 as we have seen in GD2
- All deferred workloads can be delivered in GD4

8.5 Option 5 – Do Nothing

The technical detail of the option i.e. capacity, system rating, availability etc.

99 Our do-nothing option is to continue to repair/maintain this asset. Our approach has been developed in line with our 4Rs strategy which is covered in more detail within the Network Asset Management strategy document within section A.3.

100 This option does leave an aging population of gas equipment with a greater risk of failure for a period of 5 years without investment. Whilst there will be a degree of maintenance that can be done to keep the PRIs functioning there will inevitably be failures that will occur that can only be resolved with capital investment.

101 Most instances of through wall corrosion, vandalism and equipment failure can only be rectified through intervention. We are currently finding these instances of failure which prevent maintenance activities from being carried out and our ability to demonstrate compliance with regulations. These failures left unresolved will develop into major incidents. This option does not include any work relating to compliance.

102 Based on this deferring work to GD4 is not an option.

8.6 Options Technical Summary Table

103 We have presented a number of broad options to understand where the optimum value point is of our investment and tested this, where possible, using the NARM methodology amending features such as failure rates and consequences where appropriate. For more information on this assessment please see the CBA.

Table 11: Options Technical Summary Table

Option Number	Description of Option	Benefits of Option
1	Preferred Option	Outlines workloads that will enable SGN to continue to maintain the integrity of the assets essential for the safe transportation of gas through our networks. The investment allows us to select the right intervention for all the identified assets without comprising on risk.
2	Do More	This option proactively targets assets with minor interventions to prevent major interventions in future and remove installation types that are obsolete, have high number of or unique faults, require a higher level of maintenance and are currently non-complaint with current standards. This option though reduces the most amount of risk from the network, may not be deliverable with the current resources available to us.
3	Do Minimum	A level of investment that is based on only carrying out compliance driven work with an assumption of lower levels of failure then we are currently seeing. This option allows for a lower investment but at the price of increasing risk of failure of these assets. Preventative intervention will not be done and there is limited flexibility within the programme to accommodate new risks identified throughout the GD3 price control period.

4	Do Minimum & Defer to GD4	A level of investment that is based on only carrying out compliance driven work with an assumption of lower levels of failure then we are currently seeing. This option allows for a lower investment but at the price of increasing risk of failure of these assets. Preventative intervention will be deferred to GD4, while leaving limited flexibility within the programme to accommodate new risks identified throughout the GD3 price control period.
5	Do Nothing	None. Significant risks are associated with this option. There are no benefits, and it leaves the network vulnerable to failure.

8.7 Options Cost Summary Table

Table 12: Options Cost Summary Table

Option Number	Description of Option	First Year Spend	Final Year Spend	Volume of interventions	Design Life	Total installed cost (incl. overheads)
1	Preferred Option	£1.87m	£1.87m	412	40 years	£12.1m
2	Do More	£2.88m	£2.88m	625	40 years	£17.15m
3	Do Minimum	£0.94m	£0.94m	206	40 years	£7.46m
4	Do Minimum & Defer to GD4	£0.94m	£0.94m	206	40 years	£7.46m
5	Do Nothing	0	0	0	0	0

9 Business Case Outline and Discussion

9.1 Key Business Case Drivers Description

104 The driver for the governor intervention programme is to maintain the integrity of regulator installation assets to enable us to run a safe, reliable, and compliant network. To do so, we must manage our portfolio of assets by evaluating data gathered through inspections and identify those assets that require intervention prior to failure.

105 We gather data from various metrics and assess the likelihood and consequence of failure. We prioritise these workloads based on risk and plan propose interventions on a case-by-case basis to reduce the risk of failure using the most effective solutions.

106 The drivers for intervention are mainly compliance, condition, obsolescence, and fault history. Compliance is assessed against regulations and standards which includes IGEM/TD/13, SGN/SP/E/28, or as appropriate, IGEM/GM/8 and DSEAR. We assess compliance against these standards and our own policies. Any intervention done on site should include bringing the installation up to current standards within its scope.

107 Obsolescence causes concerns for ongoing maintenance activities and issues when a failure occurs, and we lose supply to customers due to not retaining any spare parts. These concerns are raised through our maintenance interface meetings to identify assets where manufacturers no longer supply soft parts or support certain products.

108 Condition is primarily assessed through SGN/PM/CM/4 Part 2 condition surveys. This is a detailed survey assessing the site components individually and producing a health score. This data is used to target those assets in the worst condition. Fault data is produced through Maximo reporting to enable us to see fault history on assets. If a high number of faults are found on installations, they are usually flagged to Asset Management through Maintenance interface meetings.

109 NARMs is one of these metrics used where asset health equates to the probability that the asset fails and gives rise to consequence for the network. The consequences can be assessed in monetary terms. The risk is determined from the product of the number of failures and the consequence of those failures. NARMs considers failure rates, asset deterioration and consequence of failure. In the NARMs methodology the failures are categorised into different failure modes for governors including corrosion, capacity, interference and fail open/closed scenarios.

110 Once assets are identified for intervention other factors will be assessed when assessing risk of failure and priority of work. These include environment, network configuration, operating pressure, proximity to occupied buildings, material of the installation, housing, network configuration, capacity, access etc. These factors assist with selecting the right intervention and how to prioritise this in the programme of works. The interventions considered consist of refurbishment, component replacement and full replacement as mentioned in the Introduction.

111 Option 1 *'preferred option'* outlines workloads that will enable SGN to continue to maintain the integrity of the assets essential for the safe transportation of gas through our networks. The investment allows us to select the right intervention for many of the identified assets without comprising on risk. We select the most cost-effective intervention type that will see the most benefit over the life cycle of the asset and enable the operational life of the asset to be extended while ensuring compliance with current regulations and industry standards.

112 In Option 2 *'do more'* we proactively target installations that are obsolete, have high number of or unique faults, require a higher level of maintenance and are currently non-complaint with current standards. The level of intervention within this option allows SGN to proactively target assets with smaller interventions that will prevent major interventions in the future. This option though reduces the most amount of risk

from the network will require a larger number of resources to deliver in comparison with the other options.

113 Option 3 & Option 4 is an investment level that is based on lower levels of failure we are currently seeing. This option is not reasonable as failure rates will only increase as the asset ages and to have a programme of work not based on this, we will only increase risk of failure on the network.

114 Option 5 *'do nothing'* is not an option available to us. We must demonstrate that we are actively maintaining the network and without investment, failures will occur that will cause loss of supply or incidents that will compromise safety.

9.2 CBA Outputs

115 Outputs from the CBAs for the options considered in this EJP are shown in table 13 to 16 below.

Table 13: CBA Output Summary (Scotland Network)

Option Name	Included in this CBA? (Y/N)	Preferred Option (Y/N)	NPV (2043 PV, £m)	Company view
Preferred Option	Y	Y	0.28	This option will enable SGN to continue to maintain the integrity of the assets essential for the safe transportation of gas through our networks.
Do More	N	N	N/A	There are no additional interventions identified for GD3 in Scotland Network. Therefore, this option has not been modelled in this CBA.
Do Minimum	Y	N	N/A	This option is a lower level of investment that is the minimum to comply with relevant legislation. Fewer proactive interventions will result in an increasing risk of failure and higher intervention volumes and costs in the longer term.
Do minimum & defer remainder to GD4	Y	N	0.07	This option is a lower level of investment that is the minimum to comply with relevant legislation in GD3. Fewer proactive interventions will result in an increasing risk of failure and higher intervention volumes and costs in the longer term. This option only defers the remainder of our preferred option in GD3 to GD4, however, the GD4 intervention volumes, in reality, would need to be much higher due to low GD3 intervention volumes.
Do Nothing	N	N	N/A	This option is not sufficient to comply with relevant legislation, it has therefore not been modelled in this CBA. There are no benefits and significant risks are associated with this option, it leaves the network vulnerable to failure.

Table 14: CBA Output – Sensitivity Analysis (Scotland Network)

NPV (2043 PV, £m)	Low CO2 Cost	Central CO2 Cost	High CO2 Cost
Capex - Low	0.06	0.37	0.68
Capex - Central	-0.03	0.28	0.59
Capex - High	-0.12	0.19	0.50

Table 15: CBA Output Summary (Southern Network)

Option Name	Included in this CBA? (Y/N)	Preferred Option (Y/N)	NPV (2043 PV, £m)	Company view
Preferred Option	Y	Y	6.47	This option will enable SGN to continue to maintain the integrity of the assets essential for the safe transportation of gas through our networks.
Do More	Y	N	1.78	This option will remove the most risk from the network of all options considered, however, it may not be deliverable with the current resources available to us.
Do Minimum	Y	N	N/A	This option is a lower level of investment that is the minimum to comply with relevant legislation. Fewer proactive interventions will result in an increasing risk of failure and higher intervention volumes and costs in the longer term.
Do Minimum & Defer to GD4	Y	N	3.4	This option is a lower level of investment that is the minimum to comply with relevant legislation in GD3. Fewer proactive interventions will result in an increasing risk of failure and higher intervention volumes and costs in the longer term. This option only defers the remainder of our preferred option in GD3 to GD4, however, the GD4 intervention volumes, in reality, would need to be much higher due to low GD3 intervention volumes.
Do Nothing	N	N	N/A	This option is not sufficient to comply with relevant legislation, it has therefore not been modelled in this CBA. There are no benefits and significant risks are associated with this option, it leaves the network vulnerable to failure.

Table 16: CBA Output – Sensitivity Analysis (Southern Network)

NPV (2043 PV, £m)	Low CO2 Cost	Central CO2 Cost	High CO2 Cost
Capex - Low	4.54	6.82	9.11
Capex - Central	4.19	6.47	8.76
Capex - High	3.84	6.13	8.41

9.3 Business Case Summary

Table 17: Business Case Summary

Option No.	Description	Benefits	Cost (£m)	Workloads
1	SGNs recommended programme	Outlines workloads that will enable SGN to continue to maintain the integrity of the assets essential for the safe transportation of gas through our networks. The investment allows us to select the right intervention for all the identified assets without comprising on risk.	£12.1m	412
2	Do more	This option proactively targets assets with minor interventions to prevent major interventions in future and remove installation types that are obsolete, have high number of or unique faults, require a higher level of maintenance and are currently non-complaint with current standards. This option though reduces the most amount of risk from the network, may not be deliverable with the current resources available to us.	£17.15m	625
3	Do Less (Do Minimum)	A level of investment that is based on only carrying out compliance driven work with an assumption of lower levels of failure then we are currently seeing. This option allows for a lower investment but at the price of increasing risk of failure of these assets. Preventative intervention will not be done and there is limited flexibility within the programme to accommodate new risks identified throughout the GD3 price control period.	£7.46m	206

4	Do Minimum & Defer to GD4	A level of investment that is based on only carrying out compliance driven work with an assumption of lower levels of failure then we are currently seeing. This option allows for a lower investment but at the price of increasing risk of failure of these assets. Preventative intervention will be deferred to GD4, while leaving limited flexibility within the programme to accommodate new risks identified throughout the GD3 price control period.	£7.46m	206
5	Do Nothing	None. Significant risks are associated with this option. There are no benefits, and it leaves the network vulnerable to failure.	0	0

10 Preferred Option Scope and Project Plan

10.1 Preferred Option

116 Option 1 is the preferred option as this outlines workloads that will enable SGN to continue to maintain the integrity of the assets essential for the safe transportation of gas through our networks. Total cost for Option 1 is £12.1m to carry out 412 component and housing replacements and refurbishment interventions.

117 The preferred option facilitates the ability to:

- To operate a safe, secure, and efficient network for the benefit of our customers.
- Installation of new governor housing will improve security.
- Improved pressure control.
- Safeguard the integrity of the distribution gas networks.
- The removal of poor condition and obsolete equipment.
- Improve SGN governor health indices over the RIIO-GD3 formula period.
- To comply with our licence, safety, legislative obligations, and industry standards.
- To provide a safer working environment for SGN staff.

10.2 Asset Health Spend Profile

Table 18: Asset Health Spend Profile Table

Year	26/27	27/28	28/29	29/30	30/31	Total (incl. overheads)
Spend (£m)	2.42	2.42	2.42	2.42	2.42	12.1

10.3 Investment Risk Discussion

118 The highest risks to be considered in this EJP are listed below.

Late Delivery of Materials

119 Delays in the delivery of materials and components, such as bends, tees, valves, fittings, and skids, due to supply chain disruptions or specification issues, could hinder the fabrication and construction phases. This would result in idle contractors waiting for materials, leading to project delays and increased costs. To mitigate this risk, SGN is accounting for longer lead times and ensuring continuous, clear communication with suppliers to avoid disruption.

Approved Designs

120 Limited availability of PS/6 approvers and appraisers for design work could delay the approval of safe and appropriate project designs, impacting overall project timelines. SGN is addressing this by developing standardized designs for medium-risk, high-volume projects and expanding its pool of design professionals to ensure timely completion of design tasks.

Available Contractors

121 The lack of available skilled contractors or subcontractors could delay the contract award process and push back the start of construction phases, potentially deferring the project to later in GD3 or even into the next price control period. To mitigate this, SGN is giving contractors early visibility of upcoming work to allow for appropriate resource planning and is leveraging its workforce and supply chain resilience strategy to ensure project continuity.

10.4 Project Plan

122 We have indicated below our process for managing projects through appropriate project management stage gates. However, we haven't currently detailed this for our submission as it is still being produced. We have; however, Table 19 shows an example of indicative stage gates for projects that will be delivered in year 5 of GD3.

Table 19: Example Project Plan for Governor Intervention Project to be delivered in Year 5

Stage Gate	Date	Description
Identification	Apr 28 – Oct 30	Identification of governor workload through risk analysis.
Costing	Nov 28 – Oct 30	Designing proposal of individual projects and carrying out analysis for capacity requirements and costing exercise.
Issuing	Apr 29 – Oct 30	Preparing project packs to be issued to the relevant delivery team and raising of funds.
Planning	Apr 29 – Oct 30	Engaging with local authorities and/or landowners to arrange for access times to plan in the project(s). Commissioning designs and carrying out data gathering i.e. scrapings, pipe measurements etc. if required
Procurement	Apr 29 – Oct 30	Purchasing of materials and appointing a contractor to carry out the works.
Delivery	Apr 30 – Mar 31	Installation, capture, and completion of proposed project.

10.5 Key Business Risks and Opportunities

Risks to project delivery have been identified and shown in Appendix C.

10.6 Outputs included in RIIO-GD2 Plans

123 This is a recurring workload that has been carried out in GD1 and GD2 price control periods. The workloads described in this paper does not relate to any outputs that should have been carried out in GD2.

Appendix A – Acronyms

Acronym	Meaning	Description
DG	District Governor	A Pressure Reduction Installation - Equipment used to reduce pressure across different pressures and in this case where the supply is to a low-pressure network
DPG	Distribution Pressure Governor	A Pressure Reduction Installation - Equipment used to reduce pressure across different pressures where in this case the supply is to a medium pressure network
ERS	Engineering Research Station	Designer of below ground governor.
GDN	Gas Distribution Network	Gas Distribution Network Geographical Supply Area's
Governor	Pressure reduction installation	Equipment used to reduce pressure across different pressures
GRP	Glass Reinforced Plastic	Current Industry Practice is to enclose PRIs within GRP kiosks. These incorporate, appropriate ventilation, explosion relief, weather protection for equipment and associated instrumentation, noise attenuation and improved security and safety for site personnel.
HI	Industry Health Rating	Health Indices
HSE	Health & Safety Executive	Government agency responsible for the encouragement, regulation and enforcement of workplace health, safety and welfare
HSWA	Health and Safety at Work	The Health and Safety at Work etc. Act 1974
I&C	Industrial & Commercial	Non-Domestic Customers
IP, MP & LP	Pressure Regimes	Industry anacronym for below 7bar pressure tiers, Intermediate Pressure, Medium Pressure and Low Pressure
PRE	Gas Escape	Public Reported Escape
PRI	Pressure Reduction Installation	Equipment used to reduce pressure across different pressures

R6	Reynolds Replacement	British Gas legacy terminology for replacement of non-compliant governors
RIIO	Revenue Incentives Innovation Outputs	Ofgem Price Control
RRI	Residential Regulator Installation	Equipment used to reduce pressure across different pressures for supply between 2 and 30 customers.
RRP	Regulatory Reporting Pack	Ofgem annual workload and finance reporting mechanism
SGN	Scotia Gas Networks	Scotia Gas Networks company name
VS02	Industry Standard for Visual Inspection	Visual inspection of gas network equipment as required by the Pressure System Safety Regulations and the Pipeline Safety Regulations.

Appendix B – References

Pipeline Safety Regulations (PSR) (1996).

Pressure System Safety Regulations (PSSR) (2000).

Health and Safety at Work Act (HASWA) (1974).

Dangerous Substances & Explosive Atmospheres Regulations (DSEAR) (2002).

The Provision and Use of Work Equipment Regulations (PUWER) 1998.

IGEM/TD/13-E3 - Pressure Regulating Installations for Natural Gas, Liquefied Petroleum Gas and Liquefied Petroleum Gas/Air (2023)

SGN/PM/CM/4 Part 1 Management Procedure for Condition Assessment and Defect Reporting of Above 7 Bar Assets

SGN/PM/CM/4 Part 2 Management Procedure for the Condition Assessment and Defect Reporting of Below 7 bar Assets

SGN/PM/GOV/1 - The replacement (or modification) of network governor installation with inlet pressures less than or equal to 7barg (2012)

SGN/PM/NP/38 - Planning and Design of <7Bar Pressure Regulating Installations (2021)

SGN/PM/PS/3 - Ensuring Compliance with The Pressure Systems Safety Regulations 2000 for Gas Pressure Systems (2023)

SGN/SP/E/28 - The design of PRI with inlet pressures not exceeding 100bar (2011)

Appendix C – Key Business Risks and Opportunities

Table 20: Risk Register

Description	Impact	Likelihood %	Mitigation / Controls	Comments
Changes to the Works Information. Additional Plant, labour and material costs as well as extension of time.	Time, Cost	<=20%	NP38 process managed by planning and asset management. Unlikely to change once provided.	Requirement for NP38 to identify scope/design of project i.e. design capacity, location, associated risks etc. however there are some risks that are not known until a site has been excavated or stakeholders engaged.
Unavailability of competent MWC and/or Subcontractors. Delayed start to the contract award awaiting contractor availability. Delays to project impacting on construction phase which could result in project deferral and/or higher costs.	Time, Cost	<=20%	Visibility of work to contractors in advance through SGN's workforce and supply chain resilience strategy. (Increase in operations staff)	Loss of skilled contractors. Impacted by shortages of equipment Issues with resourcing up work due to deferred GD2 delivery in final years.
Late delivery of material and components (bends, tees, valves, fittings, skids etc.) due to supply chain issues, or materials are not to specification. Delay in fabrication and construction phases. Contractor unproductive awaiting material.	Time, Cost	>20% & <=40%	Issues with supplies, controls outside of SGN's hands. Projects will be issued in advance of delivery so that late delivery of materials will have minimal impact of ability to deliver the project. Contingency work will be identified to ensure workforce is not sitting idle.	R6 lead time at ~12 weeks. Heavily affected by global factors.

Availability of PS/6 approvers and appraisers. Delays or changes to design, MWC tender and project delivery.	Time, Cost	<=20%	Visibility of work to contractors in advance through SGN's workforce and supply chain resilience strategy. (Exploration of bringing design in house.)	PS/6 costs up from 15k for DPG to 55k.
Unforeseen Ecological Issues, incl presence of protected species. Potential prolonged activities duration.	Time, Cost	<=20%	Thorough inspections before work commences. NP38 process.	Protected species Japanese knotweed 3 required in GD2 in Scotland
Asbestos (building demolition)	Time, Cost	<=20%	Type 3 asbestos surveys	Type 3 asbestos surveys
NRSWA traffic management issues including lane rental costs in the South.	Time, Cost	>20% & <=40%	Liaison with relevant authorities and network planning. Work to be planned at times that cause minimal disruption.	Unable to gain road space (LA permits) for works affecting highways. LAs are insisting more and more for works on sensitive highways to be carried out during summer holidays. This creates a peak during summer months that is hard to resource. Conversely some LA's put embargos on during the Summer in tourist locations

Appendix D – Global Equipment Summary

Table 21: Global Population

Asset	Global Equipment Count	Manufacturer/Model	Location on Network	Pressure Ratings	Redundancy Architecture	Average Health Score at Start of Price Control
Scotland-0.345-2.0 BAR-Donkin-GOV_1_AM	159	Donkin	Scotland	0.345-2.0 BAR	GOV_1_AM	2.5
Scotland-0.345-2.0 BAR-Donkin-GOV_1_AMS	2	Donkin	Scotland	0.345-2.0 BAR	GOV_1_AMS	2.0
Scotland-0.345-2.0 BAR-Donkin-GOV_1_AS	264	Donkin	Scotland	0.345-2.0 BAR	GOV_1_AS	1.6
Scotland-0.345-2.0 BAR-Donkin-GOV_2_AM	314	Donkin	Scotland	0.345-2.0 BAR	GOV_2_AM	2.2
Scotland-0.345-2.0 BAR-Donkin-GOV_2_AMS	21	Donkin	Scotland	0.345-2.0 BAR	GOV_2_AMS	1.8
Scotland-0.345-2.0 BAR-Donkin-GOV_2_AS	564	Donkin	Scotland	0.345-2.0 BAR	GOV_2_AS	1.9
Scotland-0.345-2.0 BAR-Donkin-GOV_3_AM	7	Donkin	Scotland	0.345-2.0 BAR	GOV_3_AM	3.0
Scotland-0.345-2.0 BAR-Donkin-GOV_3_AS	3	Donkin	Scotland	0.345-2.0 BAR	GOV_3_AS	3.3
Scotland-0.345-2.0 BAR-ERS-GOV_1_AS	3	ERS	Scotland	0.345-2.0 BAR	GOV_1_AS	3.0
Scotland-0.345-2.0 BAR-ERS-GOV_2_AS	128	ERS	Scotland	0.345-2.0 BAR	GOV_2_AS	2.8
Scotland-0.345-2.0 BAR--GOV_1_AM	4		Scotland	0.345-2.0 BAR	GOV_1_AM	2.8
Scotland-0.345-2.0 BAR--GOV_2_AM	60		Scotland	0.345-2.0 BAR	GOV_2_AM	2.1

Scotland-0.345-2.0 BAR--GOV_3_AM	2		Scotland	0.345-2.0 BAR	GOV_3_AM	2.0
Scotland-0.345-2.0 BAR-IGA-GOV_1_AS	105	IGA	Scotland	0.345-2.0 BAR	GOV_1_AS	1.6
Scotland-0.345-2.0 BAR-IGA-GOV_2_AM	10	IGA	Scotland	0.345-2.0 BAR	GOV_2_AM	1.7
Scotland-0.345-2.0 BAR-IGA-GOV_2_AMS	16	IGA	Scotland	0.345-2.0 BAR	GOV_2_AMS	2.2
Scotland-0.345-2.0 BAR-IGA-GOV_2_AS	104	IGA	Scotland	0.345-2.0 BAR	GOV_2_AS	1.9
Scotland-0.345-2.0 BAR-IGA-GOV_3_AMS	1	IGA	Scotland	0.345-2.0 BAR	GOV_3_AMS	3.0
Scotland-0.345-2.0 BAR-Jeavons-GOV_1_AM	1	Jeavons	Scotland	0.345-2.0 BAR	GOV_1_AM	3.0
Scotland-0.345-2.0 BAR-Jeavons-GOV_1_AS	35	Jeavons	Scotland	0.345-2.0 BAR	GOV_1_AS	1.5
Scotland-0.345-2.0 BAR-Jeavons-GOV_2_AM	28	Jeavons	Scotland	0.345-2.0 BAR	GOV_2_AM	2.0
Scotland-0.345-2.0 BAR-Jeavons-GOV_2_AS	85	Jeavons	Scotland	0.345-2.0 BAR	GOV_2_AS	2.0
Scotland-2.7-6.9 BAR-Donkin-GOV_1_AM	122	Donkin	Scotland	2.7-6.9 BAR	GOV_1_AM	2.2
Scotland-2.7-6.9 BAR-Donkin-GOV_1_AMS	1	Donkin	Scotland	2.7-6.9 BAR	GOV_1_AMS	2.0
Scotland-2.7-6.9 BAR-Donkin-GOV_1_AS	17	Donkin	Scotland	2.7-6.9 BAR	GOV_1_AS	1.5
Scotland-2.7-6.9 BAR-Donkin-GOV_2_AM	199	Donkin	Scotland	2.7-6.9 BAR	GOV_2_AM	2.1
Scotland-2.7-6.9 BAR-Donkin-GOV_2_AMS	59	Donkin	Scotland	2.7-6.9 BAR	GOV_2_AMS	1.9

Scotland-2.7-6.9 BAR-Donkin-GOV_2_AS	14	Donkin	Scotland	2.7-6.9 BAR	GOV_2_AS	2.1
Scotland-2.7-6.9 BAR-Donkin-GOV_3_AM	3	Donkin	Scotland	2.7-6.9 BAR	GOV_3_AM	2.3
Scotland-2.7-6.9 BAR-ERS-GOV_2_AS	2	ERS	Scotland	2.7-6.9 BAR	GOV_2_AS	2.5
Scotland-2.7-6.9 BAR--GOV_1_AM	5		Scotland	2.7-6.9 BAR	GOV_1_AM	2.2
Scotland-2.7-6.9 BAR--GOV_2_AM	75		Scotland	2.7-6.9 BAR	GOV_2_AM	2.1
Scotland-2.7-6.9 BAR-IGA-GOV_1_AMS	1	IGA	Scotland	2.7-6.9 BAR	GOV_1_AMS	3.0
Scotland-2.7-6.9 BAR-IGA-GOV_1_AS	2	IGA	Scotland	2.7-6.9 BAR	GOV_1_AS	1.0
Scotland-2.7-6.9 BAR-IGA-GOV_2_AMS	48	IGA	Scotland	2.7-6.9 BAR	GOV_2_AMS	2.2
Scotland-2.7-6.9 BAR-IGA-GOV_2_AS	5	IGA	Scotland	2.7-6.9 BAR	GOV_2_AS	2.0
Scotland-2.7-6.9 BAR-Jeavons-GOV_1_AS	4	Jeavons	Scotland	2.7-6.9 BAR	GOV_1_AS	1.3
Southern---	1		Southern			
Southern-0.345-2.0 BAR-Donkin-GOV_1_AM	613	Donkin	Southern	0.345-2.0 BAR	GOV_1_AM	2.8
Southern-0.345-2.0 BAR-Donkin-GOV_1_AMS	4	Donkin	Southern	0.345-2.0 BAR	GOV_1_AMS	3.3
Southern-0.345-2.0 BAR-Donkin-GOV_1_AS	530	Donkin	Southern	0.345-2.0 BAR	GOV_1_AS	2.4
Southern-0.345-2.0 BAR-Donkin-GOV_2_AM	1580	Donkin	Southern	0.345-2.0 BAR	GOV_2_AM	2.0
Southern-0.345-2.0 BAR-Donkin-GOV_2_AMS	23	Donkin	Southern	0.345-2.0 BAR	GOV_2_AMS	2.1

Southern-0.345-2.0 BAR-Donkin-GOV_2_AS	957	Donkin	Southern	0.345-2.0 BAR	GOV_2_AS	2.0
Southern-0.345-2.0 BAR-Donkin-GOV_3_AM	10	Donkin	Southern	0.345-2.0 BAR	GOV_3_AM	1.6
Southern-0.345-2.0 BAR-Donkin-GOV_3_AS	9	Donkin	Southern	0.345-2.0 BAR	GOV_3_AS	2.0
Southern-0.345-2.0 BAR-Donkin-GOV_4_AM	1	Donkin	Southern	0.345-2.0 BAR	GOV_4_AM	4.0
Southern-0.345-2.0 BAR-ERS-GOV_1_AS	128	ERS	Southern	0.345-2.0 BAR	GOV_1_AS	3.3
Southern-0.345-2.0 BAR-ERS-GOV_2_AS	183	ERS	Southern	0.345-2.0 BAR	GOV_2_AS	3.1
Southern-0.345-2.0 BAR-ERS-GOV_3_AS	1	ERS	Southern	0.345-2.0 BAR	GOV_3_AS	3.0
Southern-0.345-2.0 BAR--GOV_1_AM	16		Southern	0.345-2.0 BAR	GOV_1_AM	2.6
Southern-0.345-2.0 BAR--GOV_2_AM	168		Southern	0.345-2.0 BAR	GOV_2_AM	2.1
Southern-0.345-2.0 BAR-IGA-GOV_1_AM	130	IGA	Southern	0.345-2.0 BAR	GOV_1_AM	2.9
Southern-0.345-2.0 BAR-IGA-GOV_1_AMS	53	IGA	Southern	0.345-2.0 BAR	GOV_1_AMS	3.0
Southern-0.345-2.0 BAR-IGA-GOV_1_AS	130	IGA	Southern	0.345-2.0 BAR	GOV_1_AS	2.6
Southern-0.345-2.0 BAR-IGA-GOV_2_AM	351	IGA	Southern	0.345-2.0 BAR	GOV_2_AM	2.1
Southern-0.345-2.0 BAR-IGA-GOV_2_AMS	83	IGA	Southern	0.345-2.0 BAR	GOV_2_AMS	2.9
Southern-0.345-2.0 BAR-IGA-GOV_2_AS	253	IGA	Southern	0.345-2.0 BAR	GOV_2_AS	2.1

Southern-0.345-2.0 BAR-IGA-GOV_3_AMS	2	IGA	Southern	0.345-2.0 BAR	GOV_3_AMS	1.5
Southern-0.345-2.0 BAR-IGA-GOV_3_AS	11	IGA	Southern	0.345-2.0 BAR	GOV_3_AS	1.6
Southern-0.345-2.0 BAR-Jeavons-GOV_1_AM	20	Jeavons	Southern	0.345-2.0 BAR	GOV_1_AM	3.0
Southern-0.345-2.0 BAR-Jeavons-GOV_1_AS	45	Jeavons	Southern	0.345-2.0 BAR	GOV_1_AS	2.1
Southern-0.345-2.0 BAR-Jeavons-GOV_2_AM	418	Jeavons	Southern	0.345-2.0 BAR	GOV_2_AM	2.2
Southern-0.345-2.0 BAR-Jeavons-GOV_2_AS	88	Jeavons	Southern	0.345-2.0 BAR	GOV_2_AS	1.9
Southern-0.345-2.0 BAR-Jeavons-GOV_3_AS	17	Jeavons	Southern	0.345-2.0 BAR	GOV_3_AS	1.9
Southern-2.7-6.9 BAR-Donkin-GOV_1_AM	146	Donkin	Southern	2.7-6.9 BAR	GOV_1_AM	2.9
Southern-2.7-6.9 BAR-Donkin-GOV_1_AS	4	Donkin	Southern	2.7-6.9 BAR	GOV_1_AS	2.3
Southern-2.7-6.9 BAR-Donkin-GOV_2_AM	244	Donkin	Southern	2.7-6.9 BAR	GOV_2_AM	2.2
Southern-2.7-6.9 BAR-Donkin-GOV_2_AMS	1	Donkin	Southern	2.7-6.9 BAR	GOV_2_AMS	3.0
Southern-2.7-6.9 BAR-Donkin-GOV_2_AS	15	Donkin	Southern	2.7-6.9 BAR	GOV_2_AS	2.3
Southern-2.7-6.9 BAR-Donkin-GOV_3_AM	6	Donkin	Southern	2.7-6.9 BAR	GOV_3_AM	2.5
Southern-2.7-6.9 BAR-Donkin-GOV_4_AM	4	Donkin	Southern	2.7-6.9 BAR	GOV_4_AM	2.3

Southern-2.7-6.9 BAR-Donkin-GOV_5_AM	1	Donkin	Southern	2.7-6.9 BAR	GOV_5_AM	1.0
Southern-2.7-6.9 BAR-ERS-GOV_1_AS	1	ERS	Southern	2.7-6.9 BAR	GOV_1_AS	4.0
Southern-2.7-6.9 BAR-ERS-GOV_2_AS	4	ERS	Southern	2.7-6.9 BAR	GOV_2_AS	3.3
Southern-2.7-6.9 BAR--GOV_1_AM	3		Southern	2.7-6.9 BAR	GOV_1_AM	3.0
Southern-2.7-6.9 BAR--GOV_2_AM	5		Southern	2.7-6.9 BAR	GOV_2_AM	2.3
Southern-2.7-6.9 BAR-IGA-GOV_1_AM	2	IGA	Southern	2.7-6.9 BAR	GOV_1_AM	2.5
Southern-2.7-6.9 BAR-IGA-GOV_1_AMS	3	IGA	Southern	2.7-6.9 BAR	GOV_1_AMS	3.0
Southern-2.7-6.9 BAR-IGA-GOV_2_AM	2	IGA	Southern	2.7-6.9 BAR	GOV_2_AM	2.0
Southern-2.7-6.9 BAR-IGA-GOV_2_AMS	5	IGA	Southern	2.7-6.9 BAR	GOV_2_AMS	2.6
Southern-2.7-6.9 BAR-IGA-GOV_2_AS	4	IGA	Southern	2.7-6.9 BAR	GOV_2_AS	1.8
Southern-2.7-6.9 BAR-IGA-GOV_4_AM	1	IGA	Southern	2.7-6.9 BAR	GOV_4_AM	1.0
Southern-2.7-6.9 BAR-Jeavons-GOV_2_AM	4	Jeavons	Southern	2.7-6.9 BAR	GOV_2_AM	2.0

Appendix E – NARMs modelled failures

Table 22: NARMs modelled governor failure rates (no. per asset per year)

Network	Corrosion	Fail Closed	Fail Open	Interference
SC	0.00	0.09	0.10	3.17E-04
SO	0.00	0.08	0.11	3.54E-04

The modelled failure rates are forecast values for financial year 2026/27. These are forecast using the NARM methodology deterioration rates.