

Engineering Justification Paper

IP Services - Reconfiguration Appendix B – Asset Health Engineering Justification Framework

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2 Introduction

At the point of sale in 2005, SGN inherited a population of Intermediate Pressure services that included an IP/LP service regulator that terminated at the building wall of domestic property.

These assets were generally installed in the 1970's and included sacrificial anodes to protect the IP steel service pipe from corrosion, thereby extending the life of the asset. These anodes were installed with no means of monitoring their effectiveness and it is considered that they are now reaching the end of their useful life.

In addition, since the 1970's there have been regulatory changes which now require that any new IP must not be installed within 3 metres of the building.

SGN have witnessed an increasing number of incidents where Public Reported Escapes (PREs) have been received and traced to the IP services or service regulators leaking, and this has then required remedial action to ensure it complies with the current regulations.

General Background

The Intermediate Pressure (IP) services were installed prior to network sale and are not compliant with current industry procedures. Specifically, IGEM/TD/4 (version 4) states that an IP service must not be installed within the proximity of 3 meters of a building. Should the regulator fail on these services that were installed circa 1970, this apparatus is obsolete and no longer available which means loss of supply for a customer as well as the associated risk of an incident.

SGN are proposing a structured programme to proactively manage the risk of IP services terminating at the property line that will remove the risk of an incident but also reduce the length of time consumers may be without gas if they are cut-off following a PRE, and the cost of replacing these assets.

There are many benefits to facilitating a service renewal program which promotes a safe and reliable network reducing risk, poor pressures and minimising the risk of interruption to customer supplies.

Site Specific Background

Security , Logierait

The use of Intermediate Pressure to supply domestic properties typically occurs in rural locations where there is no existing Low / Medium Pressure infrastructure.

The Security area of Logierait is an example location that contains several Intermediate Pressure supplies, some of which are installed within 3m of buildings.

SGN are proposing a more structured programme to proactively manage the risk of IP services terminating at the property line that will remove the risk of an incident but also reduce the length of time consumers may be without gas if they are cut-off following a PRE and the cost of replacing these assets.

In this example it is proposed to abandon the existing supplies and install a new Residential Regulator Installation, with Low Pressure outlet mains and services to existing gas users.

3 Equipment Summary

The existing sacrificial anodes on IP services utilise 'blind' anodes i.e. no means of monitoring effectiveness, and date from the 1970's to present. It is considered that these are now reaching the end of their operational life.

As part of our RIIO GD2 Investment plan, SGN have identified 194 sites where IP services are present. Where multiple IP services are in close proximity to one another, it is proposed to install small PRI's, associated Low Pressure PE mains and replace the services at Low Pressure. For single properties, it is proposed to replace the IP service governor to a location greater than 3m from the building line.

SGN propose to introduce a structured programme to re-engineer these services to current standards before customers supplies are interrupted. Typically, IP services would be located in rural locations and we estimate 515 in the Scotland network. In the Southern network we estimate there is a smaller volume estimated at 11, we propose to replace these services as a priority within our Southern bulk services programme and not included in this justification paper.

4 Problem Statement

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

The existing cathodic protection utilised on intermediate pressure services uses sacrificial anodes that are at (or coming to) the end of their useful life. With the reduced effectiveness of the cathodic protection the asset itself begins to degrade increasing the risk of pipe failure. The recorded repair data for this asset group shows that over the previous 3 years there have been 56 PRE's on such services, which it must be emphasised, currently operate at 7bar all the way up to the property line. There is now evidence of failures within this asset group, and that remedial action is required.

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

- Pipeline Safety Regulations 1996
- Health and Safety at Work Act

What is the outcome that we want to achieve?

Undertaking this work will ensure we maintain security of supply to customers within SGN and help reduce the number of future PRE's and associated risk, particularly with assets operating at 7bar so close to properties.

How will we understand if the spend has been successful?

The success criteria include:

- Maintain security of supply across the relevant Network.
- All work delivered on time, within year and to the approved level of costs.
- Accurate capture of asset data, workload and accurate coding.

Narrative Real-Life Example of Problem

The use of Intermediate Pressure to supply domestic properties typically occurs in rural locations where there is no existing Low / Medium Pressure infrastructure.

Analysis of gas escapes caused by corrosion associated with Intermediate Pressure Services indicates that there are approximately 15 instances of corrosion per annum.

Spend Boundaries

The proposed programme covers the Scotland Network only, with the majority of the expenditure incurred being associated within rural areas of Scotland. For areas where a number of Intermediate Pressure services are in close proximity, the spend includes the installation of new small Pressure Reduction Installations along with Low Pressure PE outlet mains/ services ; For individual locations the spend includes the replacement of the IP service and the installation of a new service governor to a location greater than 3m from the building. The installation of the small Pressure Reduction installations and the new service governors will involve capital expenditure, with the remainder of the works being replacement expenditure.

To deliver a safe, secure network and comply with our licence obligations we are proposing to install 18 Residential Regulator Installations (Small PRI's) with 1.87km of associated Low Pressure PE outlet mains and to replace c.103 Intermediate Pressure services per annum. This will equate to a total investment of £3.7m over the five-year period and a total install of 85 small Pressure Reduction Installations (PRI's) with 9.32km of associated Low Pressure PE outlet mains and to replace 515 Intermediate Pressure services.

5 Probability of Failure

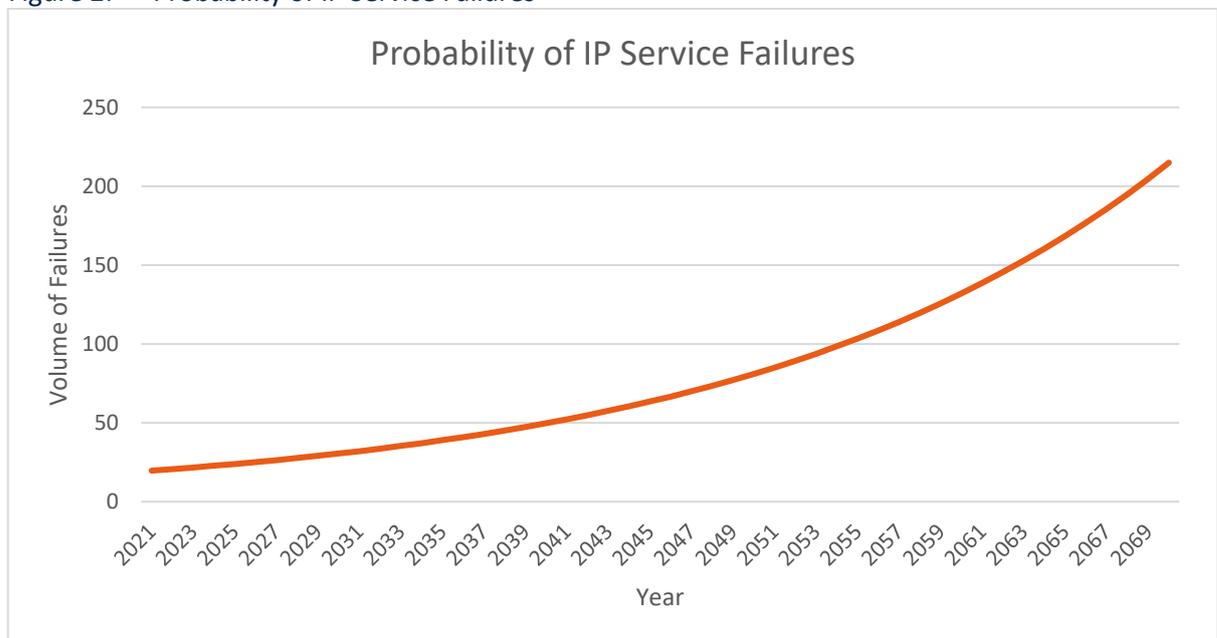
The assets were generally installed in the 1970’s and included sacrificial anodes to protect the IP steel service pipes from corrosion and thereby extend the life of these assets. However, it is considered that the sacrificial anodes will now be approaching the end of their operational life and will no longer be providing adequate cathodic protection to the steel pipes. This introduces a risk of failure to the small diameter steel services pipes operating at Intermediate Pressure and in close proximity to buildings.

Probability of Failure Data Assurance

The failure rates are based on robust failure data specific to IP services that record over the last 3 years an average of 15 IP services per annum requiring remedial action.

Based upon an incremental failure rate increase of 5% per annum, consistent with that of the Safety Reliability Working Group, it is forecast that all IP services will have failed by 2037.

Figure 2: Probability of IP Service Failures



6 Consequence of Failure

Loss of Supply to Customers

Customer interruptions will increase as services fail, with the average period of interruption being considerably longer than an equivalent low pressure gas escape.

Safety Impact of Failure

The failure of a steel service, operating at Intermediate Pressure and in close proximity to buildings, has the potential to result in a sudden and significant release of gas into a property. Associated with predicted increased levels of degradation comes an increased risk to human life to both the occupants of properties and to operatives working on intermediate pressure escapes.

Failure to address this potential risk could lead to failure to meet SGN's Licence Conditions enforcement and result in enforcement action from the Health & Safety Executive.

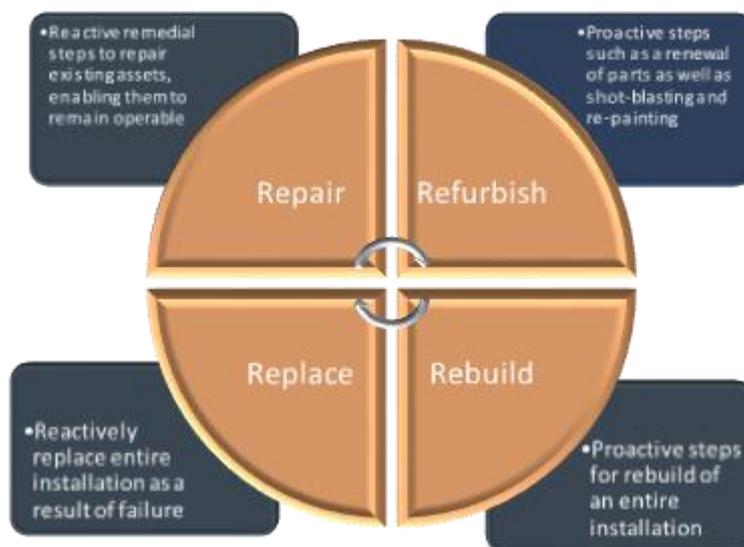
Environmental Impact

Increased escape volumes will have a significant environmental impact, with high volumes of gas being released.

7 Options Considered

We are proposing a business plan that minimises capital investment to levels required to maintain our licence conditions and core safety obligations. Throughout GD1 our approach to asset investment was determined according to the 4R's strategy, designed and used to identify the most appropriate action. This strategy is based on the interventions shown in figure 3. Applying this rationale to our integrity works helps us ensure that we are achieving value for money for our customers.

Figure 3: 4 R Diagram



The following options have been considered within this investment proposal:

Replace on Failure

Replacement on failure of the IP service assets does not form part of this investment proposal. This option has the potential to introduce significant risk both to the public and to our workforce and would result in increased lost gas emissions into the environment in the event of a PRE.

Repair on Failure

Remediation on failure of the IP service assets does not form part of this investment proposal. This option has the potential to introduce significant risk both to the public and to our workforce and result in increased lost gas emissions into the environment in the event of a PRE. Current policy does not permit repair of steel services less than 2" in diameter for any tier of operating pressure and these pipes are operating at 7bar up to the property.

Pre-emptively Replace

Replacement of the service assets forms part of this investment proposal, involving a structured programme to proactively manage the risk of IP services terminating within 3m of buildings. This programme will remove the risk of an incident and also reduce the length of time consumers may be without gas if they are cut-off following a PRE.

Pre-emptively Repair

Remediation of the IP service assets under a planned programme of works does not form part of this investment proposal as this does not address the issue of IP services being installed within the

proximity of 3 meters of a building. Current policy does not permit repair of steel services less than 2” in diameter for any tier of operating pressure and these pipes are operating at 7bar up to the property.

Do Nothing

This option would involve not having a programme of works in place to pre-emptively replace the IP service assets in GD2. This option would not comply with industry standards / SGN Policy and our safety case requirements.

First Option Summary - Replace on Failure

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

IP services supply gas to properties at pressures up to 7bar. The gas pressure is subsequently reduced by means of a service regulator which is installed on the service. To replace on failure would introduce significant risk, both to the public and to our workforce, and increase lost gas emissions into the environment in the event of a PRE. This option does not address the issue of the wider population of IP services terminating within 3m of buildings and carries with it enduring risks and maintenance costs.

The basis for the cost estimate/unit cost

Linked to historical work replacing services, SGN have confidence in costing units and projects of this nature. However, due to the nature of replacing in an unplanned emergency, the types and number of projects cannot be fully costed.

The perceived benefits of the option

There are no perceived benefits of this option.

Delivery timescales

Working in an unplanned emergency would result in increased delivery timescales. This option would result in customers being without gas for extended periods.

Key assumptions made

The option would be non-compliant with industry standards/SGN policy and our safety case arrangements and is not considered a viable option.

Any other items that differentiate the option from the others considered

This option would result in an increase of lost gas emissions into the environment in the event of a PRE and our customers being without gas for extended periods.

Second Option Summary - Repair on Failure

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

IP services supply gas to properties at pressures up to 7bar. The gas pressure is subsequently reduced by means of a service regulator which is installed on the service. To repair on failure would introduce significant risk, both to the public and to our workforce, and increase lost gas emissions into the environment in the event of a PRE. This would also conflict with existing policy for all pressure tiers. This option does not address the issue of the wider population of IP services terminating within 3m of buildings and carries with it enduring risks and maintenance costs.

The basis for the cost estimate/unit cost

Not applicable.

The perceived benefits of the option

There are no perceived benefits of this option.

Delivery timescales

Not applicable.

Key assumptions made

The option would be non-compliant with industry standards/SGN policy and our safety case arrangements and is not considered a viable option.

Any other items that differentiate the option from the others considered

It is not possible to repair below 2" steel mains of any tier due to SGN policy. This is not considered a viable option.

Third Option Summary - Pre-emptively Replace

(Install 85 Small PRI's and Replace 515 IP Services – 9.32km x <=180mm PE)

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

IP services supply gas to properties at pressures up to 7bar. The gas pressure is subsequently reduced by means of a service regulator which is installed on the service. Replacement of the service assets forms part of this investment proposal, involving a structured programme to proactively manage the risk of IP services terminating within 3m of buildings. This will remove the risk of an incident and also reduce the length of time consumers may be without gas if they are cut-off following a PRE.

The basis for the cost estimate/unit cost

The project costing has been prepared based on similar completed projects undertaken by SGN. These costs are based on current SGN approved tender documents, which cover labour and materials etc.

We are proposing to invest a total investment of £3.7m over the five-year period to install 85 small Pressure Reduction Installations (PRI's) with 9.32km of associated Low Pressure PE outlet mains and to replace 515 Intermediate Pressure services. Our programme will entail a spend per annum of approx. £0.74m, to install 18 Residential Regulator Installations (Small PRI's) with 1.87km of associated Low Pressure PE outlet mains and to replace c.103 Intermediate Pressure services.

The perceived benefits of the option

At locations where, multiple IP services are in close proximity to one another, it is proposed to install Small PRI's to provide a small low pressure system. For single properties, it is proposed to relocate the IP service governor to a location greater than 3m from the building line. These solutions address any degradation issues due to cathodic protection failure and all building proximity issues.

This option complies with SGN policy, industrial standards and our safety case arrangements.

Delivery timescales

It is proposed to commence the works in 2022, with completion in 2026.

Key assumptions made

The option would ensure compliance with industry standards/SGN policy and our safety case arrangements.

Any other items that differentiate the option from the others considered

The option would ensure compliance with industry standards/SGN policy and our safety case arrangements.

Fourth Option Summary - Pre-emptively Repair

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

IP services supply gas to properties at pressures up to 7bar. The gas pressure is subsequently reduced by means of a service regulator which is installed on the service. To pre-emptively repair would not address the issue of the wider population of IP services terminating within 3m of buildings and carries with it enduring risks and maintenance costs. This option proposes continuation of the existing inspection programme (annual) and repair on discovery of failure.

This option would temporarily address the issue of pipe degradation due to failing cathodic protection but would require to be repeated within a 40-year horizon. In this option, it would not be possible to determine the degree of degradation in the period since a sacrificial anode has failed and consequently could lead to an unplanned PRE.

The basis for the cost estimate/unit cost

Not applicable.

The perceived benefits of the option

There are no perceived benefits of this option.

Delivery timescales

Not applicable.

Key assumptions made

The option would be non-compliant with industry standards/SGN policy and our safety case arrangements and is not considered a viable option.

Any other items that differentiate the option from the others considered

Not applicable.

Do Nothing

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

This option would involve not having a programme of works in place to pre-emptively replace the IP service assets in GD2. This option would not comply with industry standards / SGN Policy and our safety case requirements.

The basis for the cost estimate/unit cost

Not applicable.

The perceived benefits of the option

There are no perceived benefits of this option.

Delivery timescales - Not applicable.

Key assumptions made

The key assumptions made for this option includes; IP services will continue to deteriorate; Legacy IP services will continue to terminate within 3m of a building; operational costs could increase; the risk to our workforce and customers would increase; and we do not continue to comply with industry standards/SGN policy and our safety case arrangements.

Any other items that differentiate the option from the others considered

Not applicable.

Options Technical Summary Table

Table 1 – Options Technical Summary

Option	First Year of Spend	Final Year of Spend	Volume of Interventions	Equipment / Investment Design Life	Total Cost
Replace on Failure	2022	2026	515	0	0.51
Pre-emptively Replace	2022	2026	515	45	3.87

7.1 Options Cost Summary Table

Table 2 – Cost Summary

Option	Cost Breakdown	Project Spend (£m)
Replace on Failure	Unit Cost	N/A
	Service Renewal	
	Annual Site visit	
Pre-emptively Replace	Services	3.7
	PRIs	
	Services	

8 Business Case Outline and Discussion

The existing cathodic protection utilised on Intermediate Pressure (IP) services uses sacrificial anodes that are at (or coming to) the end of their useful life. With the reduced effectiveness of the cathodic protection the asset itself begins to degrade increasing the risk of pipe failure. The recorded repair data for this asset group shows that over the previous 3 years there have been 56 PRE's. There is now evidence of failures within this asset group, and that remedial action is required.

Intermediate Pressure (IP) services installed prior to network sale and are also not compliant with current industry procedures. Specifically, IGEM/TD/4 (version 4) states that an IP service must not be installed within the proximity of 3 meters of a building. Should the regulator fail on these services that were installed circa 1970, this apparatus is obsolete and no longer available which means loss of supply for a customer as well as the associated risk of an incident.

It is recommended that SGN install 85 Residential Regulator Installations (Small PRI's) with 9.32km of associated Low Pressure PE outlet mains and to replace 515 Intermediate Pressure services at a cost of £3.7m. As we are fully aware of the volumes involved, we consider this programme to be a price control deliverable (PCD) that can be executed at a pre-determined value.

8.1 Key Business Case Drivers Description

The following options have been considered within this investment proposal:

- Replace on failure- Option 1 [discounted] – This option has been discounted as it does not address the key drivers of increased integrity issues associated with failing cathodic protection, or IP services within 3m of buildings. This option also has enduring maintenance / inspection costs that make it uneconomic over a 50-year horizon.
- Repair on failure – Option 2 [discounted] - This option has been discounted as it does not address the key drivers of increased integrity issues associated with failing cathodic protection, or IP services within 3m of buildings and also conflicts with current policy.
- Pre-emptively replace – Option 3 [preferred] – This option involves the installation of 85 Small PRI's and replacement of 515 IP services with associated 9.32km of <=180mm PE main-laying. This option addresses the issues of failing cathodic protection causing increased degradation of the existing IP services, and addresses the issue of IP services within 3m of buildings. This option has an economic payback period of <30 years.
- Pre-emptively repair – Option 4 [discounted] - This option has been discounted as it does not address the key drivers of increased integrity issues associated with failing cathodic protection, or IP services within 3m of buildings. This option also has enduring maintenance / inspection costs that make it uneconomic over a 50-year horizon. In this option, it would not be possible to determine the degree of degradation in the period since a sacrificial anode has failed and consequently could lead to an unplanned PRE.
- Do nothing – Option 5 [discounted] – This option has been discounted as it does not address the key drivers of increased integrity issues associated with failing cathodic protection, or IP services within 3m of buildings. Operational costs could increase; the risk to our workforce and customers would increase; and we would not comply with industry standards/SGN policy and our safety case arrangements.

Table 3 – Summary of Key Value Drivers

Option No.	Desc. of Option	Key Value Driver
Baseline	Replace on Failure	None
1	Pre-emptively Replace	Compliance with Pipeline Safety Regulations 1996 and IGEM TD/4 (Version 4)

Table 4 – Summary of CBA Results

NPVs based on Payback Periods (absolute, £m)								
Option No.	Desc. of Option	Preferred Option (Y/N)	Total Forecast Expenditure (£m)	Total NPV	2030	2035	2040	2050
Baseline	Do Nothing / Do minimum	N	-0.51	-8.42	-0.31	-0.72	-1.27	-2.69
1	Option 1 Absolute NPV	Y	-3.87	-3.77	-1.45	-2.24	-2.79	-3.43
1	Option 1 NPV relative to Baseline	Y	-3.87	-3.77	-1.14	-1.52	-1.53	-0.73

8.2 Business Case Summary

The summary table below provides headline business case metrics to enable a high-level comparison of the options.

The project is driven by the necessity to operate and maintain a safe and efficient network which IP services form an integral part.

Table 5 – Business Case Matrix

	Pre-emptively Replace
GD2 Capex (£m)	3.70
Number of Interventions	515.00
Carbon Savings ktCO ₂ e (GD2)	105.63
Carbon Savings ktCO ₂ e /yr	21.13
Carbon Emission Savings (30yr PV, £m)	0.06
Other Environmental Savings (30yr PV, £m)	0.00
Safety Benefits (30yr PV, £m)	0.34
Other Benefits (30yr PV, £m)	0.25
Direct Costs (30yr PV, £m)	-0.44
NPV (30yr PV, £m)	0.21
High Carbon Scenario	
Carbon Emission Savings (30yr PV, £m)	0.10
High Carbon NPV (30yr PV, £m)	0.25

9 Preferred Option Scope and Project Plan

9.1 Preferred option

Pre-emptively Replace – It is proposed to invest £3.7m to install 85 Small PRI's and replace 515 IP Services with the associated installation of 9.32km x <=180mm PE mains within GD2.

9.2 Asset Health Spend Profile

For this programme of works, it is anticipated that the £3.7m will be invested across the period of GD2. An estimated breakdown of spend across the GD2 period for the recommended option is shown in the table below:

Table 6 – Summary of SGN (Total)

Asset Health Spend Profile (£m)						
	2021/22	2022/23	2023/24	2024/25	2025/26	Post GD2
Pre-emptively Replace	0.79	0.78	0.77	0.77	0.76	0.00

9.3 Investment Risk Discussion

The installation of small PRI's and replacement of Intermediate Pressure services are embedded working practices which reduces the unknown risk. To ensure only suitable sites are chosen for installation, site surveys and designs will be completed.

The investment for this project is controlled by a tendered contractor event to ensure a high-level confidence will be seen. This allows a fully forecastable level of investment with fully understood market factors and pressures.

The table below identifies risks outside of our control that have the potential to impact this project, detailed within the cost benefit analysis template are the full mitigation and controls for these events.

Table 7 – Risk Register

Risk Description	Impact	Likelihood
PE pipe supplier ceases trading	REPEX Timing REPEX Expenditure	<=20%
Contracting company ceases trading	REPEX Timing	>20% & <=40%
Unexpected change in HSE approach for IMRRP in GD2	REPEX Expenditure	<=20%
Unexpected change in legislation	Leakage/ Shrinkage Volumes Fatalities / Non- fatalities	<=20%
Brexit impact - road network	REPEX Timing REPEX Expenditure	>20% & <=40%
Brexit impact - pipe materials	REPEX Timing REPEX Expenditure	>20% & <=40%
Highway Authority change to permitry	REPEX Timing REPEX Expenditure	>20% & <=40%
Highway Authority change to lane rental	REPEX Expenditure	>20% & <=40%
Major reinstator contract ceases trading	REPEX Expenditure	<=20%
Shortage of reinstatement materials	REPEX Expenditure	<=20%
City diesel free zones	CAPEX Expenditure REPEX Expenditure	<=20%
Major civil construction programme in Southern Network	REPEX Expenditure REPEX timing	<=20%
Impact of major events	REPEX Timing	<=20%
Change to governing political party	REPEX Expenditure	>20% & <=40%
Skills and labour shortage	REPEX Expenditure	>60% & <=80%
Cost pressures	REPEX Expenditure	>40% & <=60%

Sensitivity Analysis

We have discussed in the earlier sections of this paper and on table 10 the uncertainties that we may experience during GD2. To illustrate the effect of this on our CBA we have conducted a sensitivity analysis on our preferred option, which is illustrated in the table 11 below.

The sensitivity analysis has been conducted in the form of a “High” and “Low” position, which we will compare to our “Mid” position that is used for our submission. The “Low” and “High” cases use a swing on each variable to build an illustration. The variables adjusted are as follows:

- 5% Capital Cost
- 5% Repair on failure
- 5% Loss of supply/ Compensation
- 5% Fatal/ Non-Fatal injury
- 5% Leakage (CH4)

A further variable applied is Methane content (Fixed Time Series Data) this uses 3 different rollout approaches best described as a Fast, Slow, and Assumed.

5% is used as a variance as we do not expect, nor have we seen, any large-scale unexpected movements in price or workload associated with maintaining and/or replacing these assets.

Table 8 – Sensitivity

	Low	Mid	High
GD2 Capex (£m)	3.52	3.70	3.89
Number of Interventions	515.00	515.00	515.00
Carbon Savings ktCO2e (GD2)	100.35	105.63	110.91
Carbon Savings ktCO2e /yr	20.07	21.13	22.18
Carbon Emission Savings (35yr PV, £m)	0.05	0.06	0.07
Other Environmental Savings (35yr PV, £m)	0.00	0.00	0.00
Safety Benefits (35yr PV, £m)	0.32	0.34	0.35
Other Benefits (35yr PV, £m)	0.24	0.25	0.26
Direct Costs (35yr PV, £m)	-0.41	-0.44	-0.46
NPV (35yr PV, £m)	0.19	0.21	0.23

*Project payback has not been carried out as part of this analysis due to the effect of the Spackman approach. For a traditional cash-flow project payback period please see scenario 4 of the Capitalisation Sensitivity table.

Capitalisation Sensitivity Analysis

Consumers fund our Totex in two ways – Opex is charged immediately through bills (fast money – no capitalisation) and Capex / Repex is funded by bills over 45 years (slow money – 100% capitalisation). The amount deferred over 45 years represents the capitalisation rate. Traditionally in 'project' CBA's the cashflows are shown as they are incurred (with the investment up front which essentially is a zero capitalisation rate). Therefore, we have developed scenarios that reflect both ways of looking at the investment – from a consumer and a 'project'.

The scenarios are summarised as follows:

- Scenario 1 - we have used the blended average of 65%, used in previous iterations of this analysis.
- Scenario 2 - we have represented the Capex and Opex blend for the two networks, as per guidance.
- Scenario 3 - addresses our concerns on capitalisation rates whereby Repex and Capex spend is deferred (100% capitalisation rate) and Opex is paid for upfront (0% capitalisation rate).
- Scenario 4 - this reflects the payback period in 'project' / cash-flow terms and provides a project payback.

Scenarios 1 and 2 have been discounted as all options considered include Repex elements, therefore only scenarios 3 and 4 are relevant.

We have taken a view of the NPV in each of the scenarios, with the exception of scenario 4, at the 20, 35 and 45 Year points, to demonstrate the effect of Capitalisation Rate on this value.

Table 9 Capitalisation analysis

Scenario	3	4
Capex (%)	100	0
Opex (%)	0	0
Repex (%)	100	0
Output		
NPV (20yr PV, £m)	-1.49	
NPV (35yr PV, £m)	0.21	
NPV (45yr PV, £m)	2.76	
Payback	33.00	26.00

Appendix

Acronyms

Acronym	Description
Pressure Tiers <ul style="list-style-type: none"> o IP o MP o LP 	<ul style="list-style-type: none"> o Intermediate Pressure i.e. 2 – 7bar o Medium Pressure i.e. up to 2bar o Low Pressure i.e. up to 75mb
DG (District Governor)	Pressure regulator primarily used for reducing pressures from IP and MP tiers to LP.
PRI (Pressure Reduction Installation)	Equipment used to reduce pressure across different pressures for supply between 2 and 30 customers.
HDPE (High Density Polyethylene)	Pipe material for use in 7bar rated systems.
PE (Polyethylene)	Pipe material.
RIIO – GD1	8-Year price control period (2013-2021)
RIIO – GD2	Proposed 5-Year price control period (2021-2026)
ST (Steel)	Pipe material.
PCD	Price Control Deliverable
PRE	Public Reported Escapes